Training Examples (2013.01)

Introduction

1. This document contains the collection of the IPC training examples that was approved by the IPC Revision Working Group at its previous sessions.

2. The examples were prepared on the basis of the IPC[7] training examples published on the WIPO *Handbook on Industrial Property Information and Documentation,* taking into account the revision changes introduced in the IPC during the seventh revision period and new features and rules introduced in the process of IPC reform, e.g. What to Classify. Some new examples were added in order to better illustrate the said changes and new rules, or to better reflect up-to-date technologies.

3. These examples, intended for teaching the staff of industrial property offices in the use of the full IPC, are based on identical patent families, or on simplified documents, in some cases even artificial examples. For each example, the training material provides, in general, the following parts:

- categories;
- relevant bibliographic data for the selected family members;
- a short, simplified version of the disclosure (improved abstract) or the text of an artificial example, with a drawing or chemical formula where appropriate;
- representative prior art for examples of Category 3;
- invention information;
- additional information for examples of Category 3;
- explanations on where to classify the invention information and any additional information according to the IPC;
- complete classification using the full IPC.

4. An attempt has been made to categorize the examples into three groups according to the level of difficulty, and in order to illustrate potential aspects of the IPC as follows:

Category I: Introductory Examples

1a Group hierarchy
1b Illustrating differences between classification using main groups and the full IPC

Category II: Examples illustrating certain aspects of the IPC

2a Notes and references

2a1 References limiting the scope
2a2 Informative references

2b Priority rules
- 2b1 Common rule
- 2b2 Standardized sequence
- 2b3 Last place priority rule
- 2b4 First place priority rule

2c Multi-aspect classification in places where explicitly multi-aspect classification rules apply

2d Secondary classification schemes

2e Indexing schemes

2f IPC Definitions

Category III: Complex Examples

3a What to classify

3b Invention Information versus Additional Information

3c Function-oriented places versus application-oriented places

5. It should be noted that the training examples should be studied in conjunction with the following documents or databases:

- the current edition of the IPC (http://www.wipo.int/ipcpub/)
- the Guide to the IPC (http://www.wipo.int/export/sites/www/classifications/ipc/en/guide/guide_ipc.pdf)
- the Catchword Index to the IPC (http://www.wipo.int/ipcpub/#cw&notion=cw)
- the IPC Categorizer (http://www.wipo.int/ipccat)
- TACSY (http://www.wipo.int/tacsy/)

6. The training examples, according to the different categories and technical fields, are listed below:

Technical field		
Chemistry	**Category I**	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C25, C26, C27, C28
	Category II	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28
	Category III	C1, C3, C4, C6, C7, C8, C9, C11, C13, C17, C18, C21, C22, C23, C24, C25, C26, C27, C28
Electricity	**Category I**	E1, E2, E3, E4, E5, E6, E7, E9, E10, E11, E12, E13, E14, E15, E16, E17, E18, E19, E20, E21, E23, E25, E28
	Category II	E1, E2, E3, E4, E5, E6, E7,E8, E9, E12, E13, E14, E15, E18, E19, E20, E22, E24, E25, E26, E27, E28
	Category III	E1, E3, E4, E5, E6, E11, E16, E17, E19, E20, E21, E22, E23, E24, E25, E27, E28
Mechanics	**Category I**	M1, M2, M3, M4, M5, M6, M7, M9, M10, M11, M12, M13, M14 M15, M16, M17, M18, M19, M20, M21, M22, M23, M24, M25, M26, M27, M28, M29, M30, M31
	Category II	M1, M3, M4, M5, M6, M8, M9, M10, M11, M12, M13, M15, M16, M17, M18, M19, M20, M21, M22, M23, M24, M25, M26, M27, M28, M29, M30, M31
	Category III	M2, M4, M5, M6, M7, M8, M9, M12, M17, M18, M19, M20, M22, M23, M30, M31

Category		
Category I	**Chemistry**	C1, C2, C3, C4, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C25, C26, C27, C28
	Electricity	E1, E2, E3, E4, E5, E6, E7, E9, E10, E11, E12, E13, E14, E15, E16, E17, E18, E19, E20, E21, E23, E25, E28
	Mechanics	M1, M2, M3, M4, M5, M6, M7, M9, M10, M11, M12, M13, M14 M15, M16, M17, M18, M19, M20, M21, M22, M23, M24, M25, M26, M27, M28, M29, M30, M31
Category II	**Chemistry**	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28
	Electricity	E1, E2, E3, E4, E5, E6, E7, E8, E9, E12, E13, E14, E15, E18, E19, E20, E22, E24, E25, E26, E27, E28
	Mechanics	M1, M3, M4, M5, M6, M8, M9, M10, M11, M12, M13, M15, M16, M17, M18, M19, M20, M21, M22, M23, M24, M25, M26, M27, M28, M29, M30, M31
Category III	**Chemistry**	C1, C3, C4, C6, C7, C8, C9, C11, C13, C17, C18, C21, C22, C23, C24, C25, C26, C27, C28
	Electricity	E1, E3, E4, E5, E6, E11, E16, E17, E19, E20, E21, E22, E23, E24, E25, E27, E28
	Mechanics	M2, M4, M5, M6, M7, M8, M9, M12, M17, M18, M19, M20, M22, M23, M30, M31

Training Example C1

Categories

1a, 1b, 2a, 2b1, 2b3, 2d, 2f, 3b, 3c

Documents (Classification is based on GB 1 295 393)

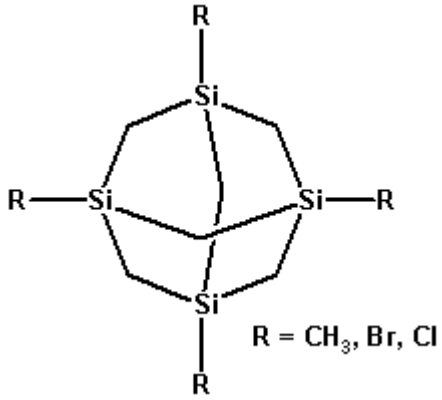
GB 1 295 393
FR 2 091 694
DE 2 123 345
NL 7 106 723

Short Version of the Disclosure

A method of producing tetrasila-adamantanes by the reaction of silmethylene compounds in the presence of aluminium halides. The insect repellent properties of tetrasila-adamantanes are also disclosed.

Representative Prior Art

Tetrasila-adamantanes are known compounds. Two methods for their production are cited in the document, one by pyrolysis of tetramethylsilanes, yielding only methylated tetrasila-adamantanes, and another employing aluminium chloride and high temperatures. Neither method is amenable to commercial-scale synthesis.



Invention Information

I1: Method for producing tetrasila-adamantanes by reaction of silmethylene compounds in presence of at least 10 weight percent of aluminium chloride or bromide. The tetrasila-adamantanes so produced may be substituted by methyl groups.

I2: Method as above where the resulting product is substituted by halogens instead of some or all of the methyl groups of I1.

Additional Information

A1: Compounds of the invention have insect repellant properties. This is not claimed, but shown in the description.

A2: Example 6 of the document demonstrates the application of the compounds to the skin to repel insects. Though this effect is not expressed in the claims, the demonstration of the property may be of interest for search purposes with respect to cosmetic applications.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2	Catchword index	Organic compounds containing SILICON	C07F 7/02
I1, I2	IPCCAT	Abstract Claim 1	C07F C07F 7/00
A1	Catchword index	PEST(S) repellents	A01N
A2	TACSY	Insect + protection + skin	A61K 8/00, A61Q 17/00

Analysis and Selection of Classification Symbols

I1: The invention as a whole relates to a method for producing tetrasila-adamantanes. C07 is the class covering organic compounds. Note (3) after the class title indicates that a last place rule operates in the class. Within C07, C07F covers organic compounds containing elements beyond C, H, N, O, S, Se, Te or halogen. C07F 7/00 deals with compounds containing elements of group IV, which includes silicon compounds. It is clear from the structural formula that all the compounds contain direct C-Si bonds, and the first claimed embodiment is the methylated version which is covered in **C07F 7/08**. It should be observed that note (4) under the class title for C07 states that classification places for the compounds themselves generally also cover their preparation.

I2: Some of the compounds of the invention also contain halogen atoms. The same rationale as for I1 leads us to C07F 7/08, under which C07F 7/12 specifically covers the variants where the compounds are halogenated. Since the synthesis does not involve reaction of either halogenated silanes or elemental silicon, neither of the subgroups under C07F 7/12 are appropriate. This group has subgroups concerned with the preparation of these compounds. However, the preparation method does not relate to either of C07F 7/14 or C07F 7/16, so their preparation is already covered by **C07F 7/12**.

A1: The patent document also discloses the use of the compounds of the invention as insect repellants. Note (2) under the C07 class title indicates that classification should also be made for compounds with pest repellant properties under A01P (this is confirmed by checking the notes in A01N (the catchword index entry for pest repellents)). A01P is a secondary classification subclass indicating, *inter alia*, pest repellant properties for chemical compounds classified under C07. The correct main group here is **A01P 17/00**. Since the pest repellant properties are not claimed as such, but indicated in the description and by means of an example, this classification is useful to assist in searches.

A2: Example 6 shows that compounds of the invention can repel mosquitoes when applied to the skin. Although TACSY suggests A61K (pharmaceutical compounds) the compounds do not break the skin and their effect is only preventative and not therapeutic. Preventative compositions applied to the skin which protect against external influences are, instead, covered in A61Q 17/00. Specifically, insect repellants fall under **A61Q 17/02**. Again, since the application to the skin is only revealed in an example and not claimed, this should be classified as additional information.

Since the primary focus of the invention is the tetrasila-adamantanes, and the halogenated compounds are only a subset of these, **C07F 7/08** should be listed first in the classification.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Organic compounds containing Si (Note (3) under class title)	C07F	Last place priority rule	C07F 7/08 (2006.01)
I2	Organic compounds containing Si (Note (3) under class title)	C07F	Last place priority rule	C07F 7/12 (2006.01)
A1	Note 2 under C07 class title; Note (1) under A01P subclass title.	A01P	Specific to pest repellants	A01P 17/00 (2006.01)
A2	Designated place for compounds with cosmetic use.	A61Q	Specific to insect repellants	A61Q 17/02 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C07F 7/08 (2006.01)
C07F 7/12 (2006.01)
A01P 17/00 (2006.01)
A61Q 17/02 (2006.01)

Training Example C2

Categories

1a, 1b, 2a, 2b3

Documents (Classification is based on GB 1 267 228)

GB 1 267 228 A
FR 2 056 540 A5
DE 2 036 869 A1
JP 49018531 B

Short Version of the Disclosure

A composition for forming oxalate coatings on the surface of steel comprises an aqueous solution of ferrous oxalate, oxalic acid, ferric ion and fluoride ions (e.g. alkali metal or ammonium fluorides, or bi-fluorides, or an iron hydrogen fluoride complex); the composition has a pH in the range 0 – 2.5. This composition is used in a bath to treat a metal surface at a temperature between 130-200 degrees Fahrenheit. The solution may also contain sulfate ions, preferably in the form of iron (III) sulfate.

Invention Information

I1: Steel treating composition comprising ferrous oxalate, oxalic acid, ferric ions and fluoride ions, the composition having a pH between 0 – 2.5. Claims 1-17 show the composition and its use.

I2: A replenishment (rejuvenating) composition for a metal coating bath. Claim 18 shows the composition for rejuvenating a bath.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	COATING, metals	C23C
		METALS, coating of	C23C
I2	As above	As above	As above

Analysis and Selection of Classification Symbols

I1: C23C covers coating metallic material. The process involves reaction of the surface (see e.g. column 3 lines 5-9). This is covered by C23C 22/00, where the last place rule applies (Note 3 after main group). The composition is aqueous, acidic and contains oxalate. Thus **C23C 22/46** is the correct classification.

I2: C23C covers coating metallic material. I2 relates to the replenishment composition for a bath and is effectively a coating composition as described in I1. Although C23C 22/86 covers "Regeneration of coating baths", the composition is to replace old bath compositions, not regenerate them (see e.g. column 4 lines 11-25). Note (2) under C23C 22/00 directs one to classify rejuvenating compositions as the composition per se, i.e. in **C23C 22/46**.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject-matter	C23C	Last place priority rule (Note (2) after C23C 22/00)	C23C 22/46 (2006.01)
I2	Subclass title covers subject-matter	C23C	Last place priority rule (Note (3) after C23C 22/00)	C23C 22/46 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C23C 22/46 (2006.01)

Training Example C3

Categories

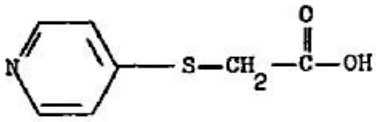
1b, 2b3, 3b

Documents (Classification is based on US 3644377 A)

US 3 644 377 A
FR 2 089 348 A
DE 2 116 159 A

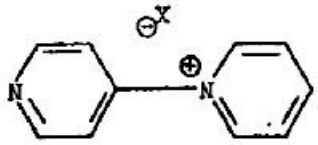
Short Version of the Disclosure

The document discloses the process of the preparation of a compound of formula I, i.e. (4-pyridylthio)acetic acid (see column 2 line 15).



I

The process comprises reacting a compound of formula II, i.e. 4-(pyridyl)pyridinium (see column 2 line 25), with 2-mercaptoacetic acid in water.



II

Representative Prior Art

(4-pyridylthio)acetic acid is an old compound known in the art.
One article teaches the preparation of ethyl (4-pyridylthio)acetate by the reaction of 4-(l-pyridyl)pyridinium chloride hydrochloride with ethyl 2-chloroacetate in the presence of hydrogen sulfide. The hydrolysis of the ethyl (4-pyridylthio)acetate to (4-pyridylthio)acetic acid was then accomplished in a two step reaction (see column 1 lines 36-46).
Another article teaches the preparation of (4-pyridylthio)acetic acid by the mixture of 4-thiopyridone with 2-chloroacetic acid. The disadvantage of the process is the necessity of using 4-thiopyridone, an expensive starting material (see column 1 lines 47-52).

Invention Information

I1. The present invention relates to a process for the preparation of (4-pyridylthio)acetic acid which is a valuable intermediate in the preparation of biologically active cephalosporins. 4-(pyridylthio)acetic acid is claimed to be prepared in high yield (about 70 % to 95 %) without the use of 4-thiopyridone by reacting a compound of the formula II (column 2 line 25) with 2-mercaptoacetic acid in water.

Additional Information

A1. Example 4 discloses the preparation of 7-[alpha(4-pyridylthio)acetamido]cephalosporanic acid (see formula in Example 4) when prepared from 7-aminocephalosporanic acid by acylation of the 7-amino group thereof using compound of formula I .

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	HETEROCYCLIC compounds	C07D
A1	Catchword index	HETEROCYCLIC compounds	C07D

Analysis and Selection of Classification Symbols

Inventions dealing with the preparation of chemical compounds are classified in the groups for the compound prepared (see Note (4) of C07 class notes). Classification is made in the last appropriate subclass of subclasses C07C to C07K (see Note (3) of the C07 class notes). C07D is a last place priority area (subclass note 6) and has special notes to follow which affect classification (see subclass note 7).

Note 4 after the C07 class title indicates that the classification of preparation of compounds is generally to be made in the place for the compounds themselves.

I1. A (process of preparation of a) heterocyclic compound containing six-membered rings, not condensed with other rings, with one nitrogen atom as the only ring hetero atom and three or more double bonds between ring members is classified in C07D 213/00.

C07D 213/70 applies there, as there is a sulfur atom directly attached to the heterocyclic ring.

A1. A (process of preparation of a) heterocyclic compound containing 5-thia-1-azabicyclo [4.2.0]octane, e.g. cephalosporins is classified in C07D 501/00.

The compound containing 5-thia-1-azabicyclo [4.2.0]octane has a nitrogen atom directly attached in position 7, with a double bond between positions 2 and 3, and with the 7-amino radical acylated by carboxylic acids containing a hetero ring. It should be classified in **C07D 501/34**.

Invention information is always listed first ahead of additional information, therefore **C07D 213/70** is the symbol that appears first here.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Rule 5(a) under subclass title	C07D	Last place rule	C07D 213/70 (2006.01)
A1	Rule 5(c) under subclass title	C07D	Last place rule	C07D 501/34 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C07D 213/70 (2006.01)
C07D 501/34 (2006.01)

Training Example C4

Categories

1a, 1b, 2a, 2b3, 3b

Documents (Classification is based on GB 1 277 325)

GB 1 277 325
FR 2 064 875
DE 2 047 983
JP 5001 2414 B

Short Version of the Disclosure

A method of making a selenium compound corresponding to the formula **$CH_3Se(CH_2)_nCH(NHX)COY$** (where n is a number from 1 to 3, X is selected from H or $–COR^1$, R^1 is selected from H, alkyl, aryl, aralkyl or aralkoxy groups, Y is selected from OH or OR^2, and R^2 is alkyl), comprises reacting a halogenated alpha-amino acid derivative of formula **Halogen-$(CH_2)_nCH(NHX)COY$** with an alkali metal methaneselenol.

The halogenated alpha-amino acid derivative may be selected from alpha-amino-gamma-bromobutyric acid and L-alpha-amino-gamma-bromobutyric acid and their esters. The alkali metal methaneselenol may contain radioactive selenium. It may be prepared by converting amorphous red selenosulfate with potassium sulfite at pH 8-10, making the resulting solution strongly basic and adding dimethyl sulfate, recovering dimethyl selenide, reducing the latter with alkali metal in liquid ammonia, and evaporating the ammonia to leave the alkali metal methaneselenol.

The method may be used for the preparation of selenomethionine and related compounds, which may be used for preparing radio-diagnostic agents which contain radioactive selenium and which are optically active.

Representative Prior Art

Methods for the manufacture of selenomethionine were known at the time of filing of this patent. One, involving the reaction of sodium methaneselenol and α-amino-γ-butyrolactotone has very low yields. Other methods use sodium benzylselenol, which presents the disadvantage of having to substitute the benzyl group with a methyl group to obtain the desired product.

Invention Information

I1: A method of making a seleno compound of formula **$CH_3Se(CH_2)_nCH(NHX)COY$** (where n is a number from 1 to 3, X is selected from H or $–COR^1$, R^1 is selected from H, alkyl, aryl, aralkyl or aralkoxy groups, Y is selected from OH or OR^2, and R^2 is alkyl), which method comprises reacting a halogenated alpha-amino acid derivative of formula **Halogen-$(CH_2)_nCH(NHX)COY$** with an alkali metal methaneselenol. (See claim 1).

Further details covered by I1 (but not affecting classification): The halogenated alpha-amino acid derivative may be selected from alpha-amino-gamma-bromobutyric acid and L-alpha-

amino-gamma-bromobutyric acid and their esters. The alkali metal methaneselenol may contain radioactive selenium. It may be prepared by converting amorphous red selenosulfate with potassium sulfite at pH 8-10, making the resulting solution strongly basic and adding dimethyl sulfate, recovering dimethyl selenide, reducing the latter with alkali metal in liquid ammonia, and evaporating the ammonia to leave the alkali metal methaneselenol. (See claims 2-6).

Additional Information

A1: The disclosure that the methods of the invention could be used to prepare radio-diagnostic agents containing radioactive selenium is potentially useful for searching and finding relevant documents in the same field, but cannot be regarded as invention information. See page 1 lines 63-70 of the document.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	Organic compounds containing SELENIUM	C07C 391/00
A1	Catchword Index	RADIOACTIVE [substances] – for use in therapy or testing in vivo	A61K 51/00

Analysis and Selection of Classification Symbols

I1: Since the claimed method of preparation is specific to the selenium compounds mentioned in claim 1, subclass C07B (General methods of organic chemistry) is not appropriate. The compounds are acyclic and contain selenium, therefore C07C is the appropriate subclass. There is no specific place for the preparation of the compounds, and therefore the method of preparation is classified in the place for the compound (see note (4) under the title of class C07). There is only one place for acyclic compounds containing selenium, which is **C07C 391/00**. The last-place priority rule which applies in C07C does not affect the correct classification of this document. Note (3) under the C07 class title imposes a last place rule between the subclasses of C07, but this does not affect the classification of this document since only C07C is appropriate for invention I1. In this case, the Catchword Index indicates the correct subclass as well as the correct group.

A1: The disclosure (at page 1 lines 63-70) that the methods of the invention could be used to prepare radio-diagnostic agents containing radioactive selenium is potentially useful for searching and finding relevant documents in the same field, but cannot be regarded as invention information. A search for RADIODIAGNOSTICS finds no hits in the Catchword Index, but RADIOACTIVE [substances], as above, locates the relevant field of A61K 51/00. A last place priority rule is operational in A61K (subclass note 4). There is no disclosure of the compounds of the invention being carrier, and accordingly a non-obligatory additional classification of **A61K 51/00** is worth adding to the document.

Invention information is always listed first ahead of additional information, therefore **C07C 391/00** is the symbol that appears first here.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Note (3) under class C07	C07C	Last place priority rule	C07C 391/00 (2006.01)
A1	Group title covers subject matter	A61K	Last place priority rule	A61K 51/00 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C07C 391/00 (2006.01)
A61K 51/00 (2006.01)

Training Example C5

Categories

1a, 1b, 2a1, 2b3, 2d

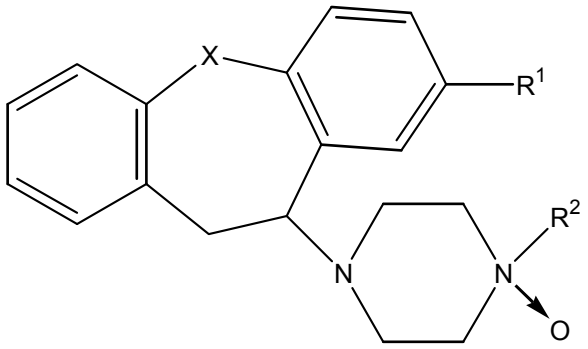
Documents (Classification is based on GB 1 277 854)

GB 1 277 854
FR 2 081 339
DE 2 060 903
JP 4900 4463 B

Short Version of the Disclosure

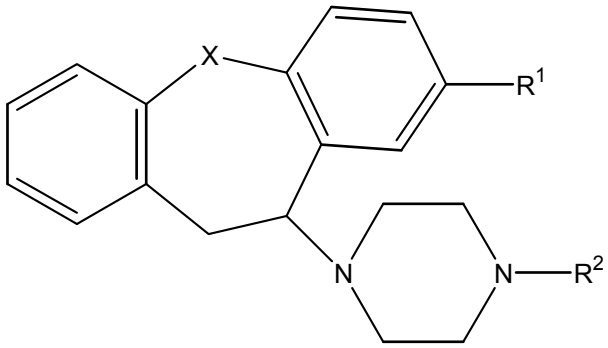
Compounds of the following formula (I), being N-oxides of a dibenzo(b,f)thiepine compound, are claimed per se:

(I)



In these compounds, R^1 is H, halogen, CF_3, alkyl, alkoxy or alkylthio, all of 1-4 carbon atoms, R^2 is C_{1-4} alkyl or C_{2-4} hydroxyalkyl, and X is S or an SO or SO_2 group.

A method of producing the above compounds comprises oxidizing a tertiary amine of formula (II) below with hydrogen peroxide.



(II)

The compounds of formula (I) exhibit a typical shift of the balance between central sedative effect and cataleptic effect, favouring the cataleptic effect. The compounds may be used in the therapy of psychotic diseases of the schizophrenia type.

Invention Information

I1: The compounds of formula (I) above, per se (see claim 1). Six examples are given.

I2: The preparation of the compounds of I1 by oxidizing the compounds of formula (II) above using hydrogen peroxide (see claim 9). Six examples are given.

I3: The use of the compounds of formula (I), which exhibit a typical shift of the balance of central sedative and cataleptic effect, favouring the cataleptic effect, in the therapy of psychotic diseases of the schizophrenia type (see page 1 lines 27-70).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2	Catchword index	HETEROCYCLIC compounds	C07D
I3	Catchword Index	THERAPEUTIC or PHARMACEUTICAL preparations	A61K
I3	TACSY	Treatment of SCHIZOPHRENIA	A61P 25/18

Analysis and Selection of Classification Symbols

I1: There are no hits on IPC-CLASS or in the Catchword Index for dibenzo(b,f)thiepine compounds such as those mentioned in claim 1. However a chemist would recognise that these compounds are heterocyclic compounds, and therefore proper for subclass C07D.

There are two hetero-rings in this compound, and one of these is a piperazine ring covered by group C07D 295/00. This being the case, note (2) following the title of subclass C07D applies, and the piperazine ring is then considered as an acyclic chain containing nitrogen atoms; therefore classification is determined by the other hetero ring. Since that hetero ring has more than 6 members and also contains a sulfur atom, the correct main group is C07D 337/00, and since the ring is a 7-membered ring [b,f]-condensed with two 6-membered rings the correct subgroup is **C07D 337/14**. The last place priority rule which governs the subclass does not affect the classification of this compound; neither does the last place priority rule of Note (3) under the C07 class title (indicating a last place rule between the subclasses of C07), since only C07D is appropriate for invention I1.

I2: Note (4) under the class title of C07 indicates that chemical compounds and their preparation are classified in the groups for the type of compound prepared. Therefore the method of preparation in I2 is classified in the same place as the compound per se of I1, i.e. in **C07D 337/14**.

I3: Regarding the therapeutic activity of the compounds, it is clear from the Catchword Index that pharmaceutical preparations should be classified in A61K. However there is no claim here for a pharmaceutical preparation, nor are there specific examples of such preparations; only a mere indication of therapeutic activity has been given. It is not appropriate to classify this disclosure in A61K. In such a situation, a chemist would recognize that recording the

therapeutic activity of the compound is the only appropriate step. This is done using subclass A61P. As stated in the Table above, the correct term to record drugs for schizophrenia is **A61P 25/18**. The word “sedative” is also mentioned, but page 1 lines 35 and 65-70 show that the compound has low sedative activity and high cataleptic activity, and therefore the term for sedatives (A61P 25/20) appears inappropriate following the “all appropriate places” rule in this subclass (note 3 after the subclass title).

Note (4) under the subclass title of A61P states that classification terms of A61P are not listed first when assigned to patent documents, and therefore **C07D 337/14** must appear first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1, I2	Note (2) under subclass C07D	C07D	Last place priority rule	C07D 337/14 (2006.01)
I3	Only possible subclass for therapeutic activity of compounds	A61P	Note (3) after A61P	A61P 25/18 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C07D 337/14 (2006.01)
A61P 25/18 (2006.01)

Training Example C6

Categories

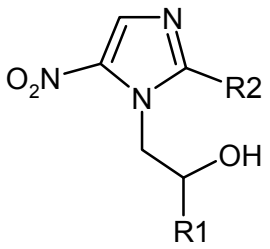
1a, 1b, 2a, 2d, 3b

Documents (Classification is based on GB 1 278 757)

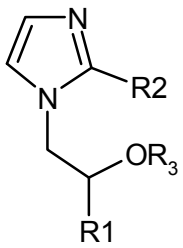
GB 1 278 757
DE 2 107 405 A
FR 2 079 880
JP 49080066 A

Short Version of the Disclosure

The document discloses a method for the preparation of 5-nitroimidazole derivatives of the general formula



wherein R_1 is a straight- or branched-chain alkyl group containing 1 to 6 carbon atoms and R_2 is a straight- or branched-chain alkyl group containing 1 to 4 carbon atoms which comprises the nitration of an imidazole derivative of the general formula



wherein R_1 and R_2 are as defined above, and R_3 is a radical which protects the hydroxyl group during the nitration reaction and is easily removable by hydrolysis. The nitration of the imidazoles, and hydrolysis of the 5-nitroimidazole compound liberating the hydroxyl group is carried out by any known method (see claim 1).

5-nitroimidazole derivatives possess chemotherapeutic properties; they are active as anti-protozoal, amoebicides and trichomonacides.

Representative Prior Art

GB 1079271 - Processes for the preparation of 5-nitroimidazole derivatives involving the reaction of a derivative of nitroimidazole with either a reactive ester reactant or an epoxide.

Invention Information

I1: Process for the preparation of 5-nitroimidazole derivatives which comprises the nitration of an imidazole derivative, and hydrolysis of the resulting 5-nitroimidazole compound (see claims 1 to 8).

I2: Process for the preparation of 5-nitroimidazole derivatives as described in the example (see claim 9).

I3: 5-Nitroimidazole derivatives of the general formula specified in claim 1 when prepared by the process claimed in any one of I1 or I2 (see claim 10).

Additional Information

A1: 5-Nitroimidazole derivatives obtained by the described process possess chemotherapeutic properties (see page 1, lines 9 to 21).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	HETEROCYCLIC COMPOUNDS	C07D
I2	Catchword Index	HETEROCYCLIC COMPOUNDS	C07D
I3	Catchword Index	HETEROCYCLIC COMPOUNDS	C07D
A1	Note 5 after title of C07D	THERAPEUTIC ACTIVITY	A61P

Analysis and Selection of Classification Symbols

I1 - I3: Processes for the preparation of derivatives of 5-nitroimidazole, a heterocyclic compound, are of interest. Attention is drawn to Note (3) after the title of class C07 which states that classification is made in the last appropriate subclass of the range C07C to C07K. According to Note (4) after the title of C07, chemical compounds as well as their preparations are classified in the groups for the type of compound prepared.
The catchword “heterocyclic compounds” leads to subclass C07D. Following the Subclass Index, compounds containing one hetero ring, having nitrogen as a ring hetero atom, having two nitrogen atoms in a five-membered ring, whereas the heterocyclic compounds contain 1,3-diazole rings and are not condensed with other rings, are classified in the main group 233/00.

In regard to the last appropriate place according to Note 6(a) after the subclass title, **C07D233/94** applies here as there are two double bonds between ring members with nitro radicals attached in position 4 or 5 and hydrocarbon radicals, substituted by oxygen, attached to other ring members.

A1: 5-Nitroimidazole derivatives possess chemotherapeutic properties; they are active as anti-protozoal, amoebicides and trichomonacides and are therefore classified in **A61P31/00**, **A61P33/02** and **A61P33/04**. A61P classifications are not obligatory, since the subject is not claimed.

As the C07D symbol represents invention information resulting from the claims, C07D 233/00 is listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Note 6(a) after sublcass title	C07D	Last place priority rule	C07D 233/94 (2006.01)
I2	Note 6(a) after sublcass title	C07D	Last place priority rule	C07D 233/94 (2006.01)
I3	Note 6(a) after sublcass title	C07D	Last place priority rule	C07D 233/94 (2006.01)
A1	Note 5 after subclass title C07D	A61P	Common rule	A61P 31/00 (2006.01) A61P 33/02 (2006.01) A61P 33/04 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
C07D 233/94 (2006.01)
A61P 31/00 (2006.01)
A61P 33/02 (2006.01)
A61P 33/04 (2006.01)

Training Example C7

Categories

1b, 2a, 2a1, 3b

Documents (Classification is based on GB 1 246 070)

DE-OS 2 034 923
FR 2 057 723
GB 1 246 070

Short Version of the Disclosure

In prior art devices for making a culture of micro organisms the inoculum is heavily concentrated in a single area and dilution is not possible. Therefore isolated colonies are not seen because of restricted surface area. Otherwise the inoculated culture medium comes into contact with the sides of the container and permissible movement disrupts growth of micro organisms. The device of the disclosure contains a bar, which is returned into the container with grooves after contacting the bar directly with an area of a patient's body. The grooves guide the bar through brushes, which prevent the bar from touching the interior surface of the container. As the end of the bar passes through the brushes, bristles wipe the inoculum from the end onto bodies of solid culture medium which are located in recessed portions on the surface of the bar. These recessed portions represent multiple separated fields which enable the growth of isolated colonies of micro organisms. To inspect the growth of micro organisms, the bar is removed out of the container together with the guiding member, thus preventing brushes from further brushing the culture medium.

Representative Prior Art

US 3 368 549 – A diagnostic swab for making a culture of micro organisms from animal or human tissue is described. The arrangement consists of a transparent container which includes an elongated support carrying a mass of sterile solidified culture medium at the end. The culture medium is carried on an arrowhead-shaped swab.

Invention Information

I1: For precise and fast specification of micro organisms derived from human body an optimal growth of micro organisms and the cultivation of isolated micro organism colonies is important. To achieve this a device is proposed which consists of a container including a bar. On the surface of the bar are recessed portions containing a solid culture medium. After contacting the end of the bar with a part of a human body, the bar is returned into the container with grooves. On the one hand the grooves guide the bar, so that the bar is prevented from touching the interior surfaces of the container. On the other hand the grooves guide the bar through brushes, whose bristles wipe the inoculum from the end of the bar onto the plurality of the culture medium bodies in the recessed portions. This procedure dilutes the inoculum and provides isolated colonies (see DE document, page 9, first paragraph or GB document, page 2, right column, lines 68-87).

I2: For the inspection of micro organisms the bar together with the guide member is removed and this way the brushes do not further brush the culture medium (see DE document, page 9, last paragraph or GB document, page 2, right column, lines 88-94).

I3: The container for the cultivation of isolated micro organisms is transparent (see claim 9 in DE and GB document).

Additional Information

A1: Devices for making a culture of micro organisms are intended to provide office diagnosis within 24 hours without the necessity for a laboratory. Thus the device allows a specification process for micro organisms, by sampling viable micro organisms.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, I3	Catchword Index	Micro organism and apparatus	C12M
A1	Catchword Index	Micro organism and process	C12Q

Analysis and Selection of Classification Symbols

I1 - I3: A device for making a culture of micro organisms has to be classified. The use of the catchword “micro organism” in combination with “apparatus” as a synonym for device leads to subclass C12M. According to Note (1) after the title of class C12 the last place priority rule has to be used in subclass C12M. The collection of micro organisms from a human body is a prior aim of the device which leads to C12M 1/26. The special design of the bar in combination with the guiding member leads to C12M 1/28. To get isolated colonies of micro organisms the bar has multiple separated fields on its surface, which are called “recessed portions” in the document. C12M 1/32 is therefore the correct IPC place according to the last place priority rule.

To classify not only the bar with the solid culture medium in recessed portions, but also the transparent container including the bar and this way the whole device, a classification in C12M 1/18 is also needed. To take into account the form of the device (a tube) C12M 1/24 is a correct classification subgroup as well.

As C12M1/32 most adequately represents the invention as a whole, this symbol should be listed first.

A1: Using the device covers also a testing process involving micro organisms according to C12Q. In regard to the fact, that viable micro organisms are collected and that the spreading of the sample is very important to get isolated colonies, which represents the surprising effect in contrast to the devices of prior art, C12Q 1/24 is the right classification for this additional information.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1, I2, I3	Subclass/group title	C12M	Last place priority rule	C12M 1/18 (2006.01) C12M 1/24 (2006.01) C12M 1/32 (2006.01)
A1	Subclass/group title	C12Q	Last place priority rule	C12Q 1/24 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
C12M 1/32 (2006.01)
C12M 1/24 (2006.01)
C12M 1/18 (2006.01)
C12Q 1/24 (2006.01)

Training Example C8

Categories

2a, 2a1, 2b1, 3c

Documents (Classification is based on GB 1 251 933 A)

GB 1 251 933 A
FR 2 055 350 A
DE 1 938 318 A

Short Version of the Disclosure

The document discloses a piezoelectric body made of a ferroelectric ceramic material with a perowskite structure, the components of which belong to the triple element system represented by:

$$xPbTiO_3\text{-}yPBZrO_3\text{-}zPb(Mg0.5W0.5)O_3$$

with x = 0.41 - 0.49
y = 0.37 - 0.49
z = 0.05 - 0.18.

The material further contains 1% by weight of MnO_2 and about 0.15 % of Al_2O_3 (see p.2, lines 3 - 19).

Representative Prior Art

Piezoelectric bodies made of ferroelectric ceramic materials with a perowskite structure and which components belong to triple element systems are known. The fundamental triple element system for these materials is $PbTiO_3$-$PbZrO_3$-$Pb(A.B)O_3$, with A being, inter alia, Mn or Mg and B being, inter alia, Sb, Nb, Ta, S or W, e.g.

$$PbTiO_3\text{-}PbZrO_3\text{-}Pb(Mg0.5W0.5)O_3.$$

When 0.2 to 3% by weight of MnO_2 is added the electro-mechanical characteristics are improved (see page 1, line 17 - 69).

Invention Information

I1. The present invention relates to a further improvement of the electro-mechanical characteristics of piezoelectric ceramic materials based on the known $PbTiO_3$-$PbZrO_3$-$Pb(Mg0.5W0.5)O_3$ system, by further incorporating about 0,15 % of Al_2O_3, next to the known addition of MnO_2 (see page 2, lines 2 -19 or claim 1).

I2. As no indication is found that the ceramic product mentioned in I1 as such is know in the prior art, the ceramic composition as such is to be considered as representing invention information as well.

Additional Information

none

Identification of Potential Subclasses

From a term search in the IPC, particularly by the use of the IPC Catchword index, the potentially appropriate IPC places for Invention Information are identified.

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	PIEZO-ELECTRICITY elements in general	H01L 41/00
I2	Catchword index	materials for CERAMIC(S); compositions of CERAMIC(S)	C04B 33/00, C04B 35/00

Analysis and Selection of Classification Symbols

I1. In main group H01L 41/00, the “common rule” for group selection applies. The most detailed classification place provided for the technical subject of I1 is the specific subgroup for ceramic compositions of group H01L 41/16, which group relates to the selection of materials for piezo-electric elements. I.e. classification is made in **H01L 41/187**.

I2. In subclass C04B, main group C04B 35/00 relates to ceramics other than those of the clay-ware type, thus excluding main group C04B 33/00. In C04B 35/00, classification is made according to note (1) following the title of this group, i.e. “*in this group, in the absence of an indication to the contrary, compositions are classified according to the constituent present in the highest proportion by weight”.* In this particular case, there is an indication to the contrary, i.e. the limiting reference in group C04B 35/46, stipulating that ceramic compositions based on titanates which also contain zirconates are not classified in this group, but in group C04B 35/49. As all the compositions covered by the formula of claim 1 contain lead zirconates, lead titanates, as well as another lead compound, classification is made in **C04B 35/493**. Because of the limiting reference, further classification for the higher values of x is not made in the titanates group.

According to paragraph 156 of the Guide, the classification symbol which most adequately represents the invention should be listed first. This is H01L 41/187, as this classification symbol relates to both the material and its application, while C04B 35/493 only relates to ceramic materials as such.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject matter	H01L	Common rule	H01L 41/187 (2006.01)
I2	Subclass title covers subject matter	C04B	Note(1) after C04B 35/00 and reference in C04B 35/46	C04B 35/493 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
H01L 41/187 (2006.01)
C04B 35/493 (2006.01)

Training Example C9

Categories

1b, 2b3, 2d, 3a, 3b

Documents (Classification is based on GB 2 179 947 A)

GB 2 179 947 A
DE 3 623 474 A1
FR 2 584 727 A

Short Version of the Disclosure

The extraction of proteins from milk is described. The starting material in this process is raw milk from which the casein and the fatty substances have been substantially removed. Such milk or lactoserum concentrated by ultrafiltration is used to obtain proteins capable of fixing iron, like lactotransferrins or immunoglobulins. These proteins are obtained in a single adsorption-elution stage on an ion exchanger, under particularly mild conditions. The process comprises therefore adsorbing the proteins on a cationic resin, followed by elution whereby adsorption and elution is carried out at substantially the same pH in the range from 5 to 8,5.

Representative Prior Art

FR 2 505 615 - extraction of proteins capable of fixing iron like lactotransferrins and immunoglobulins from casein free milk or concentrated lactoserum. For the extraction the proteins are adsorbed on a solid support like silicon dioxide in weak basic environment at a pH greater than 7,5 and eluated in an acidic environment at a pH below 4.

Invention Information

I1: A process for the extraction of proteins from milk free of casein and fatty substances is described. The extraction is done on an ion exchanger, in which the adsorption and elution of proteins is carried out at substantially the same pH (see claim 1). The milk used in the process is concentrated by ultrafiltration (see claims 9 to 12). For the extraction a preferably weak cationic resin is used (see claims 5 and 6) and a pH of from 5 to 8,5 is chosen (see claims 7 and 8). The elution is being effected by modifying the ionic strength, e.g. by means of sodium chloride (see page 1, line 57 to 64 and claim 3). The different ionic strengths are chosen so as to enable separation of the desired proteins. After elution the desired proteins are submitted to the action of a complexing agent to increase their capacity for fixing iron (see page 2, line 10 to 14 and claim 4).

I2: Products, lactotransferrins and immunoglobulins obtained by the process of I1 (see claims 15 to 17).

I3: Pharmaceutical compositions comprising at least one product of I2 (see claim 18).

Additional Information

A1: The lactotransferrin obtained by the described process retains its bacteriostatic properties and has therefore a useful therapeutic activity, which is important information even in regard to the claimed pharmaceutical compositions (see page 2, line 18 to 22 and claim 18).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	Proteins/Peptides	C07K
I2	Catchword Index	Proteins/Peptides	C07K
I3	Catchword Index	PHARMACEUTICAL preparations	A61K
A1	Note (5) after title of A61K	Therapeutic activity medicinal preparations	A61P

Analysis and Selection of Classification Symbols

I1: A process for extraction of proteins is of interest. The use of the catchwords “proteins/peptides” leads to subclass C07K. In accordance with Note (4) following the title of class C07 the process for the extraction of proteins from milk is to be classified in main group C07K 1/00. According to Note (3) after C07, the last place priority rule applies in the range C07C-C07K and within each of these subclasses. Because of Note (4), this rule thus is only of importance for the compounds (proteins) as such.

The fact that the extraction of the protein is done by “adsorption on ion exchanger” leads to C07K 1/18. For the extraction of the proteins an ultrafiltration step has to be done as well, so that **C07K 1/36** is according to the last place priority rule the right classification for the claimed process. To keep the information that an ultrafiltration step and an ion exchanger are used in this process, **C07K 1/18** and **C07K 1/34** should be mentioned as well.
Attention is further drawn to note (1), bullet (4) after the title of subclass C07K, indicating that in this subclass the term "peptides" includes "proteins".

I2: The extracted lactotransferrins and immunoglobulins represent important information for the inventive step and are claimed, so these substances have to be classified (see claims 16 and 17). The catchwords “proteins/peptides” lead to subclass C07K. A chemist or biochemist would recognise that lactotransferrins are peptides with more than 20 amino acids and therefore are proper for C07K 14/00. The subdivision of C07K 14/00 is carried out according to the origin of the peptide. The lactotransferrins are extracted from milk and are therefore from animals, which is considered in C07K 14/435. In subgroup **C07K 14/79** transferrins and namely lactoferrins are mentioned as special types of peptides from animals or humans, which is therefore a correct classification place.

Immunoglobulins are a special form of peptides and are covered by C07K 16/00. The origin of the immunoglobulins is as well the criteria for the subdivision of C07K 16/00. Immuno-globulins from milk are covered by **C07K 16/04**.

I3: The “pharmaceutical composition” (see claim 18) is an informative part of the invention because of the bacteriostatic properties of the lactotransferrins (see page 2, lines 20 to 22). In this case the use of the catchphrase “pharmaceutical preparations” leads to subclass A61K. Medicinal preparations containing peptides are covered by A61K 38/00. Lactotransferrins are peptides with more than 20 amino acids, so that A61K 38/04 is first of all the correct one dot group. According to the classification of the peptides per se in C07K, in A61K a specification of the peptides as lactoferrins is possible as well in **A61K 38/40**. The last place priority rule leads in addition to **A61K 39/395** for classifying a medicinal preparation containing immunoglobulins.

A1: In the description of the document (see, page 2, lines 20 to 22) it is mentioned that the isolated lactotransferrins have bacteriostatic properties. Note (5) after the title of A61K refers to subclass A61P where therapeutic activity of medicinal preparations is classified. Substances which show bacteriostatic properties are called “Antibiotics” and are covered by main group A61P 31/00. With **A61P 31/04** a further specification as an antibacterial agent is possible.

The more important aspect is the *process* for the extraction of proteins and thus, classification symbol **C07K 1/36** which most adequately represents the invention should be listed first (Guide paragraph 156).

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass/group title	C07K	Last place priority rule	C07K 1/36 (2006.01) C07K 1/34 (2006.01) C07K 1/18 (2006.01)
I2	Subclass/group title	C07K	Last place priority rule	C07K 14/79 (2006.01) C07K 16/04 (2006.01)
I3	Subclass/group title	A61K	Last place priority rule	A61K 38/40 (2006.01) A61 K 39/395 (2006.01)
A1	Note in A61K	A61P	Common rule	A61P 31/04 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
C07K 1/36 (2006.01)
C07K 1/34 (2006.01)
C07K 1/18 (2006.01)
C07K 14/79 (2006.01)
C07K 16/04 (2006.01)
A61K 38/40 (2006.01)
A61K 39/395 (2006.01)
A61P 31/04 (2006.01)

Training Example C10

Categories

1a, 1b, 2b3

Documents (Classification is based on GB 1 265 465 A)

GB 1 265 465 A
FR 2 051 635 A
DE 2 034 136 A

Short Version of the Disclosure

The document discloses a process for making a phenol-aldehyde condensation product by reacting a monohydric phenol with an aldehyde in the presence of a salt (see claim 1). The preferred salts are zinc acetate or manganese acetate (see page 4, lines 48-49).
The phenol-aldehyde condensation product is also claimed (see claims 7, 8, 10), as well as a dispersion containing said product (see claim 9).
All examples use phenol and formaldehyde as starting components. The dispersion can be an adhesive itself (see example 8(b)).

Invention Information

I1. Process of making a phenol-aldehyde condensation product.
I2. The phenol-aldehyde condensation product .
I3. The dispersion containing the product.

Additional Information

A1. The examples use phenol and formaldehyde as starting components.
A2. The dispersion can be an adhesive.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, A1, I2	Catchword index	phenol aldehyde RESINS(S)	C08G 8/00
I3	Catchword index	COMPOSITIONS based on polycondensation products	C08L
A2	Catchword index	ADHESIVE(S) based on macromolecular organic compounds	C09J 101/00 to C09J 201/00

Analysis and Selection of Classification Symbols

I1, I2, A1: The catchword index refers to subclass C08G for resins in general and to main group C08G 8/00 for phenol-aldehyde resins in particular. Since no separate provisions are

made for the classification of the resins as such and for their processes of preparation, the making of the phenol aldehyde condensation products has to be classified in the classification entry for the condensation product itself, this in accordance with par. 95 of the Guide. Condensation polymers of aldehydes or ketones are provided for in main group C08G 8/00. Within each main group of subclass G08G the last place priority rule is valid (see Note (3) after subclass title). Subgroup C08G 8/04 provides for condensation polymers of aldehydes with phenols. However, since the examples relate to the condensation of formaldehyde and phenol, and applying the last place priority rule, the most appropriate classification symbol is **C08G 8/10**.

I3: Compositions containing polycondensation products such as phenoplasts are classified in subclass C08L as indicted by the Catchword Index (The condensation product of a phenol with an aldehyde is sometimes called a phenoplast resin). In this subclass, compositions based on phenol-aldehyde condensation products are covered by main group C08L 61/00. The condensation products of formaldehyde are to be classified in its subgroup **C08L 61/10.**

A2: For adhesives based on macromolecular organic compounds the Catchword Index guides us to subclass C09J. In this subclass, main group C09J 161/00 specifically relates to condensation polymers of aldehydes or ketones. Phenol-formaldehyde products are covered by its sub group **C09J 161/10**, and thus this group is the correct classification place for A2.

The more important aspect is the *process* of production and thus, classification symbol **C08G 8/10** which most adequately represents the invention should be listed first (Guide paragraph 156).

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1, A1	Note 3 under subclass title	C08G	Last place rule	C08G 8/10 (2006.01)
I2, I3	Subclass title covers subject matter	C08L	Group title covers subject matter	C08L 61/10 (2006.01)
A2	Subclass title covers subject matter	C09D	Group title covers subject matter	C09J 161/10 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C08G 8/10 (2006.01)
C08L 61/10 (2006.01)
C09J 161/10 (2006.01)

Training Example C11

Categories

1a, 1b, 2b3, 3c

Documents (Classification is based on GB 1 267 491 A)

DE 2 100 320 A
FR 2 075 965 A
GB 1 267 491 A

Short Version of the Disclosure

In a method for separation of wax from oil by centrifuging at 30 °C or below, a wax-oil mixture, which would normally be solid at the centrifuging temperature, is agitated to render it mobile without reducing the wax crystals to below 50 microns. The mobile mixture is then centrifuged. The wax-oil mixtures are based on atmospheric or vacuum gas oils or wax distillate fractions boiling in the range 250-550 °C and can contain a diluent such as a gas. The wax-oil mixtures are heated to dissolve the wax and subsequently cooled at a rate of 1-14 °C per hour to the centrifuging temperature before or during agitation. The cooling rate is selected depending on the intended residence time in the centrifuge. A short centrifuge residence time requires a slow cooling, whilst a longer centrifuge residence time needs only relatively quick cooling. The agitation can involve both a beating or whisking action and a stirring action and can be carried out for 1-120 minutes; N_2, CO, CO_2, H_2 or air can be entrained during the agitation in an amount which increases the volume of the mix by 5- 20% so as to increase the mobility of the mixture and improve the separation of wax from the oil. The wax is separated from the oil by a filtration centrifuge or a sedimentation centrifuge with a residence time between 5 seconds and 15 minutes at 150-3500 G. The de-waxing process may be carried out in one, two or more stages.

Representative Prior Art

Traditional oil-wax separation relies on adding a solvent, chilling to cause the wax to precipitate and then filtering out the solid wax. Page 1 of the document discloses attempts to centrifuge these mixtures which require the addition of diluents or solvents, heating of the mixture followed by slow cooling to produce large wax agglomerations, or vigorous agitation to generate very small wax crystals.

Invention Information

I1: A method of separating wax by agitating a wax-oil mixture to generate wax particles of a specified size and then centrifuging at a temperature lower than the pour point. (see Claim 1.)

The invention here lies in the application to separating oil from wax rather than to a general separating apparatus.

Additional Information

The document contains details of the centrifuging step. As can be seen from the examples commercially available centrifuges are used and as such the details are already common in the art of centrifuges, additional classification in centrifuges per se would add nothing to the body of art in that field. Therefore this material is discounted from being additional information.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	REFINING of oils	C10G, C11B, C11C
I1	Catchword Index	mineral WAX(ES)	C10G
I1	Catchword Index	DE-WAXING of hydrocarbon oils	C10G

Analysis and Selection of Classification Symbols

I1: The Catchword Index identifies C10G, C11B and C11C as potential subclasses. Looking at the title for class C11 it is clear that the oils and waxes therein are derived from animals or vegetables. The present application is explicitly aimed at mineral oils and so C11B and C11C can be discounted. In fact, under C11B 11/00, this subject matter is specifically referenced to C10G. This is confirmed by the fact that the Catchword Index for “DE-WAXING of hydrocarbon oils” summarizes the purpose of the invention and points to C10G.

Note (1) under the subclass title states that “refining or recovery of mineral waxes is covered by group C10G 73/00”. Since C10G operates according to a last place priority rule (see Note (3) under the subclass title), the lower main group (C10G 75/00) is also checked. It is not appropriate for the invention information and thus the correct main group is C10G 73/00.

Within main group C10G 73/00, subgroup C10G 73/02 “Recovery of petroleum waxes from hydrocarbon oils; De-waxing of hydrocarbon oils” accurately characterizes the purpose of the invention. C10G 73/02 contains the subgroup C10G 73/28 “by centrifugal force”. When checking the lower groups to ensure that the last place rule doesn’t change the classification from C10G 73/28, the subgroup C10G 73/32 “Methods of cooling during de-waxing” is found. In the present invention, the cooling stage is prior to the de-waxing step and as such C10G 73/32 can therefore be discounted. The classification is thus made in **C10G 73/28**.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass and group title covers subject matter	C10G	Last place priority rule	C10G 73/28 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
C10G 73/28 (2006.01)

Training Example C12

Categories

1a, 1b, 2a1, 2a2, 2b1

Documents (Classification is based on GB 1 280 168 A)

GB 1 280 168 A
FR 2 073 849 A
DE 2 061 795 A

Short Version of the Disclosure

Described and claimed is a method and an apparatus for treating synthetic yarns by means of false twist crimping operations. False twisting is effected in a crimping apparatus by advancing the yarn over a heated element which is followed by a rotary device imparting a twist to the yarn as it leaves the heated element, whereby each end of the heating element has guide rollers rotating at a lower speed than the linear speed of the yarn which is trained in a loop over the heating element and the rotary device imparts to the yarn a twist which runs back at least to the last roller of the heating element over which that part of the yarn is drawn along.

Invention Information

I1: Method of treating a synthetic yarn by advancing it over a heat transfer element and using twisting means to impart false twist to the yarn (claims 1 – 12, 22, 23);

I2: Apparatus (device) therefor (claims 13 – 21, 24, 25).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2	Catchword index	YARNS, finishing or dressing of yarns YARNS, textile yarns YARNS, treatment of yarns FIBERS, crimping or curling fibers FIBERS, treatment of yarns TWISTING in textile manufacture	D02J D02G D06M D02G D06M D01H
I1, I2	TACSY	false twist yarn	D02G, D01G, D01H

Analysis and Selection of Classification Symbols

I1,I2: It is apparent from the description that the purpose of the invention is to crimp the yarn (“false twist crimping operations”, “crimping apparatus”). The appropriate subclass is D02G

titled “Crimping or curling fibres, filaments, yarns, or threads; yarns or threads”. This subclass follows the common rule (Guide paragraphs 141 – 145). The document deals with producing crimped yarns, which is covered by D02G 1/00 (reference in D02G 1/00: “yarns per se D02G 3/00”; reference in D02G 3/00: “processes or apparatus for producing crimped or curled yarns D02G 1/00”). The production method involves imparting false twist (see e.g. claim 2). Thus **D02G 1/02** is the correct classification. Since the *device* for imparting false twist is described as well (see e.g. claims 17 and 18), classification is also made in **D02G 1/04**. Because it is not entirely clear from the document whether the false-twisting device per se (not the whole crimping apparatus) involves spindles (D02G 1/06) or rollers (D02G 1/08) (see page 2, lines 24 – 29, “[false-twisting] device 6 may be a friction twister of the bush type, as shown, or any of the known rotating false twist tubes”), neither D02G 1/06 (spindles) nor D02G 1/08 (rollers) is chosen.

Subclass D02J (Finishing or dressing of yarns; D02J 13/00: heating the yarn) is not appropriate, since the aspect of curling and crimping is referred out in the title of subclass D02J to subclass D02G.
Subclass D01H (Spinning or twisting; D01H 1/11: spinning by false-twisting) is not appropriate, since the aspect of crimping and curling of yarns is referred out in the title of subclass D01H to group D02G 1/00.

Subclass D01G (Preliminary treatment of fibres; D01G 15/66: with arrangements inserting false twist) is not appropriate, since the method of crimping and curling of yarns is not a preliminary treatment.
Subclass D06M (Treatment of yarns) is not appropriate, since the aspect of crimping, curling or twisting of yarns is not mentioned in D06M at all.

The method (I1) and apparatus claims (I2) are different categories of invention, but are classified under the same main group for this document.

The more important aspect is the *method* of production and thus, classification symbol D02G 1/02 which most adequately represents the invention should be listed first (Guide paragraph 156).

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1,I2	Subclass title covers subject matter	D02G	Common rule	D02G 1/02 (2006.01) D02G 1/04 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
D02G 1/02 (2006.01)
D02G 1/04 (2006.01)

Training Example C13

Categories

1a, 1b, 2b1, 2b3, 3a, 3b

Documents (Classification is Based on US 4 013 760 A)

US 4 013 760 A
FR 2 239 739 A1
DE 23 38 739 B1

Short Version of the Disclosure

Graphite or carbon molded articles of high isotropy and high heat conductivity, especially useful for high temperature reactor fuel elements, are prepared by pressing a mixture of a binder and a powdery carbon filler which consists partially or wholly of pyrolytically produced isotropic carbon with subsequent heat treatment of the pressed article. There is used as the filler an isotropic pyrolytic carbon made by depositing a hydrocarbon on a carbon granulate and then grinding to a particle size of less than 100 micrometers.

Representative Prior Art

Nuclear fuel elements produced from mixtures containing carbon or graphite based particles and a binder are well known:
- a compacted mixture of finely divided graphite and pyrolitic carbon coated nuclear fuel particles is impregnated with a carbonisable substance (see US 3406227 - the basic document of the present example - claim 1).
- as filler a carbon black obtained by thermal pyrolysis of gaseous hydrocarbon can be used (see US 4013760, col. 1, lines 48-51)

Invention Information

I1: Process for producing isotropic carbon particles comprising pyrolysing hydrocarbon gas on isotropic carbon granulates to form a carbon deposit on the granulates and grinding to a carbon powder having a particle size below 100 micrometers (see claim 1).

I2: The particles obtained in I1 are used to produce molded synthetic carbon articles by mixing them with a resin as binder and carbonizing the resin (see col. 1, lines 5-10 and col. 4 lines 14-25).

I3: The articles obtained in I2 are suitable for use in high temperature reactor fuel elements (see col. 1, lines 5-10)

[Classification is based on US 4 013 760. In this document only I1 is claimed. So strictly, what is defined above as I2 and I3 could be considered as additional information. From the whole description in the document however, it is clear that the purpose of the invention is to ameliorate the characteristics of the nuclear fuel elements, not so much to produce a new kind of carbon particles. Therefore, it is considered to be more correct to characterize these two pieces of information as invention information rather than as additional information.]

Additional Information

No additional information found.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	CARBON	C01B
I2	IPCCAT	Invention information description (I2)	C04B
I3	Catchword Index	NUCLEAR reactors	G21C

Analysis and Selection of Classification Symbols

I1: Class C01 relates to inorganic chemistry, i.e. to the chemical elements and their compounds as well as their preparation. Subclass C01B deals with non- metallic elements. The IPC definitions of groups of chemical elements can be found in the note after the title of section C. In the whole class C01, as well as in subclass C01B itself, the last place priority rule applies. From the subclass index (as from the search in the Catchword Index) it is clear that carbon is classified within main group C01B 31/00. While in the art of nuclear fuels, graphite is the common material used, the document to be classified refers both to carbon and graphite. Therefore classification is made both in **C01B 31/04** (graphite) and **C01B 31/02** (carbon). As graphite is the more traditional material used in the art, symbol C01B 31/04 is put first.

I2: Articles made of carbon are generally considered to be ceramic products. That is why IPCCAT (as well as the catchword index) points to C04B, and more particularly to C04B 35/00 the main group relating to shaped ceramic products and their composition. In this part of IPC, classification of a composition is made according to the constituent present in the highest proportion by weight (see note (1) after the title of C04B 35/00. In the present example only carbon (or graphite which is a special form of carbon) is present, thus this rule does not apply. The common rule brings us to C04B 35/52, the group for ceramic products or compositions based on carbon, e.g. graphite. Because a carbonisable binder is used, the most appropriate subgroup is **C04B 35/532**.

I3: The subclass index for G21C leads to main group G21C 3/00 for reactor fuel elements and the selection of substances therefor. In this subclass the common rule applies. Selection of substances is classified in G21C3/42 and its subgroups. The subgroup relating to ceramics is **G21C 3/62**.

The same subclass index points to main group G21C 21/00 for processes specially adapted to the manufacture of reactors or parts thereof. In the basic document (see col.4, line 51 - col.5, line 10) a process for manufacturing composite nuclear reactor fuel elements that include fuel containing and fuel free zones is described. The common rule applied in this subclass leads us thus to **G21C 21/02**.

What is claimed in the patent document under consideration, is the production of the isotropic carbon particles. Therefore, the classification symbols of C01B should be listed first as this subclass thus most adequately represents the invention.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject matter	C01B	Last place priority rule	C01B 31/04 (2006.01) C01B 31/02 (2006.01)
I2	Subclass title covers subject matter	C04B	Common rule	C04B 35/532 (2006.01)
I3	Subclass title covers subject matter	G21C	Common rule	G21C 3/62 (2006.01) G21C 21/02 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
C01B 31/04 (2006.01)
C01B 31/02 (2006.01)
C04B 35/532 (2006.01)
G21C 3/62 (2006.01)
G21C 21/02 (2006.01)

Training Example C14

Categories

1a, 1b, 2a, 2b3

Documents (Classification is based on GB 1278886)

GB 1 278 886
FR 2 059 104 A5
DE 1 942925 A1

Short Version of the Disclosure

The process for purification of aqueous H_2SiF_6 solutions is disclosed. Phosphate ions are removed from an aqueous solution of H_2SiF_6 by (a) adding at least sufficient Fe^{3+} ions to give Fe^{3+} in the same molar proportion as the phosphate ions, (b) maintaining the solution at 60 to 100 degrees while adding gaseous ammonia until the pH is 2-4 and (c) removing the precipitated iron phosphate formed. Further ammonia may be added until the pH is 8 to 9 whereby $SiO_2 \cdot H_2O$ is precipitated and can be separated from the ammonium fluoride.

Invention Information

I1: Process for the purification of an aqueous H_2SiF_6 solution consisting of the following steps, (a) adding at least sufficient Fe^{3+} ions to give Fe^{3+} in the same molar proportion as the phosphate ions, (b) maintaining the solution at 60 to 100 degrees while adding gaseous ammonia until the pH is 2-4 and (c) removing the precipitated iron phosphate formed (see claim 1-6,8).

I2: Process for the preparation of a substantially phosphate-free solution of NH_4F, including the further following steps, (d) adding ammonia until the pH is 8 to 9 (e) separating precipitated $SiO_2 \cdot H_2O$ (see claim7).

I3: Aqueous H_2SiF_6 solution substantially free from phosphate, prepared by the above process
(see claim 9).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1,I3	Catchword Index	inorganic compounds of FLUORINE	C01B
		FLUORO silicates	C01B 33/10
		inorganic ACID(S)	C01
I2	As above	ammonium salts	C01C
		inorganic compounds of FLUORINE	C01B

Analysis and Selection of Classification Symbols

I1: No specific place for the process of the preparation of this compound is available, therefore this invention information should be classified in the place for the compound, as defined in paragraph 95 of the Guide.

No specific place is available for classification of the acid as such. It should be classified as a compound containing silicon, fluorine and other elements, the fluorosilicic acid H_2SiF_6 containing hydrogen as another element. As this is a compound of non-metallic elements, subclass C01B is appropriate. Main group C01B 33/00 (silicon; compounds thereof) and C01B 7/00 (halogen; halogen acids) are candidates. Because the last place priority rule applies in the range of subclasses C01B-C01G and within each of these subclasses, as indicated in Note (1) after the title of C01, C01B 33/10 covers compounds containing silicon, fluorine and other elements. Thus C01B 33/10 is the correct classification, which is subdivision of C01B 33/08 covering compounds containing halogen.

Separation of the phosphate occurs in form of iron (III) phosphate, but the phosphate is just a by-product to be removed and not of sufficient importance to merit a classification.

I2: No specific place for the process of the preparation of this compound is available, therefore this invention information should be classified in the place of the compound as defined in paragraph 95 of the Guide.
Because ammonium fluoride is one of the halides of ammonium, subclasses C01B (non-metallic elements; compounds thereof) and C01C (ammonia; cyanogens; compounds thereof) are candidates. The last place priority rule as applied in C01 as shown in Note (1) after C01, indicates that subclass C01C is appropriate. Additionally, as the reference in C01B 9/00, which is a classification symbol for general methods of preparing halides, states " particular individual halides, see the relevant groups in subclasses C01B-C01G according to the element combined with the halogen", subclass C01C is appropriate. Ammonium fluoride is classified within C01C according to the last place priority rule. C01C 1/16 covers all halides of ammonium. Thus **C01C 1/16** is the correct classification.

I3: No specific place is available for classification of the acid as such. It should be classified as a compound containing silicon, fluorine and other elements, the fluorosilicic acid H_2SiF_6 containing hydrogen as another element. This is a compound of non-metallic elements. Therefore, C01B is appropriate. Main group C01B 33/00 (silicon; compounds thereof) and C01B 7/00 (halogen; halogen acids) are candidates. Because of the last place priority rule as applied in C01 as shown in the Note (1) after C01, C01B 33/10 covers compounds containing silicon, fluorine and other elements. Thus **C01B 33/10** is the correct classification, which is a subdivision of C01B33/08 covering compounds containing halogen. Separation of the phosphate occurs in form of iron (III) phosphate, but the phosphate is just a by-product to be removed and not of sufficient importance to merit a classification.

C01B 33/10 should be listed first because the most important feature of this invention is the specified process for preparation of aqueous H_2SiF_6 free from phosphate and **C01B 33/10** most adequately represents this feature.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1,I3	Subclass title covers subject-matter	C01B	Last place priority rule (Note (1) after C01)	C01B 33/10 (2006.01)
I2	Subclass title covers subject-matter	C01C	Last place priority rule (Note (1) after C01)	C01C 1/16 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
C01B 33/10 (2006.01)
C01C 1/16 (2006.01)

Training Example C15

Categories

1a, 2b1

Documents (Classification is Based on GB 1 314 456)

GB 1 314 456
FR 2 092 411
DE 2 102 447

Short Version of the Disclosure

In a paper-making machine comprising a head- box associated with a Fourdrinier wire extending round a breast roll rotatably mounted on a frame, an upper slice lip is pivotably attached to the head box. A fluid pressure operated flexible chamber, mounted between the lip and a beam connected by end links to the frame, adjusts the lip relative to the breast roll. The position of the lip relative to the breast roll is indicated by cooperating index members on the frame and the lip respectively.

Invention Information

I1. Construction of a head box of a Foudrinier machine having the slice-lip pivotally mounted to regulate the pulp flow. Fluid pressure adjusting means adjust the tip of he slice lip relative to the breast roll (see p.1, lines 42-62, claims).

I2. Regulation of pulp flow in a high speed paper-making machine, avoiding distortion or deflection of the head box and slice body achieved by the construction according to I1.

I3. Dimensional reference means for indicating the position of the slice lip relative to the breast roll (see claim 8).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, I3	Catchword Index	Making of PAPER FOUDRINIER - paper-making machines	D21 D21F

Analysis and Selection of Classification Symbols

I1: The catchword index refers to class D21 for subject matter relating to the making of paper. In this class, subclass D21F specifically covers paper-making machines. Also the catchword Foudrinier (paper-making machines) guides the classifier to subclass D21F. In the Catchword index there are entries under the catchword "paper" referring to subclass D21H. This subclass however relates to compositional aspects of papermaking and thus is not relevant to the present example.

In subclass D21F the common rule applies. I1 relates to the so called wet end of the paper making machine. Such subject matter is covered by main group D21F 1/00. Subgroup **D21F 1/02** specifically deals with head boxes for Foudrinier machines.

I2: The sub-combination relating to the regulation of pulp flow is also novel and non- obvious. For the same reason as for I1, main group D21F 1/00 is appropriate. In this main group, the common rule leads us to group **D21F 1/06** relating specifically to the regulation of pulp flow.

I3: For indication means like the dimensional reference means of claim 8, main group D21F 1/00 has no provision. The Subclass Index of D21F guides us for "other details" of paper-making machines to main group D21F 7/00. Indeed, following the common rule, we find in this main group, sub-group **D21F 7/06** entitled "Indicating or regulating the thickness of the layer". This classification symbol is given as a further obligatory classification mark.

Because group **D21F 1/02** accurately and completely identifies the invention, this symbol should appear first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	D21F	Common rule	D21F 1/02 (2006.01)
I2	Subclass title covers the subject matter	D21F	Common rule	D21F1/06 (2006.01)
I3	Subclass title covers the subject matter	D21F	Common rule	D21F7/06 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
D21F 1/02 (2006.01)
D21F 1/06 (2006.01)
D21F 7/06 (2006.01)

Training Example C16

Categories

1a, 1b, 2a1, 2b1

Documents (Classification is based on US 4 357 367A)

US 4 357 367 A
FR 2 478 676 A1
DE 3 010 855 A

Short Version of the Disclosure

Method of blackening steel components, e.g. shadow masks for cathode ray tubes, in which an adhering bismuth layer is formed on steel components by electroless plating in bismuth salt dispersion or solution, and the coating is blackened by heating the coated component in an oxidizing atmosphere, for example in air, at temperatures between 350 deg. C. and 650 deg. C. until the bismuth coating becomes black.

Invention Information

I1: A process for obtaining a blackened bismuth coating on a steel surface, comprising the following steps:

- step 1: forming a bismuth coating on the steel surface by electroless plating in a bismuth salt dispersion or solution (see US4357367, col.2, lines 3-6)

- step 2: blackening the bismuth coated steel component by heating in an oxidizing atmosphere, e.g. air, at temperatures between 350 deg C. and 650 deg C., until the bismuth layer becomes black (see US4357367, col. 2. lines 6 -9 and line 45).

I2: With the process of I1 components are made for cathode ray tubes (color display tubes) (see US4357367, col. 1, lines 6-9).

Additional Information

A1: Using a bismuth salt dispersion for forming a bismuth layer on a steel component by electroless plating (see US4357367, col. 2, lines 4-6).

A2: Shadow masks for cathode ray tubes having a blackened bismuth layer on a ferrous substrate (see US4357367, col. 1, lines 6-9).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index or IPCCAT	COATING metal Invention information description (I1)	C23C
I2	IPCCAT	Invention information description (I2)	H01J
A1	IPCCAT	Invention information description (A1)	C23C
A2	IPCCAT	Invention information description (A2)	H01J

Analysis and Selection of Classification Symbols

I1: Subclass C23C relates to coating of metals. The common rule applies in this subclass. Electroless plating, a chemical coating method involving decomposition of the coating forming compounds, is classified within main group C23C 18/00. More precisely, group C23C 18/16 relates to electroless plating, and its subgroup C23C 18/31 to coating with metals.

The IPC definitions of groups of chemical elements can be found in the note after the title of section C.

According to the reference in group C23C 18/16, group C23C 18/54 takes precedence. This last group however relates to electochemical electroless plating, which is not the case in the present example. Therefore, C23C 18/54 is not relevant here.

For multi-step processes, as a general rule (see paragraphs 98 and 141 to 145 of the Guide to the IPC), classification is made for the combination of steps as a whole, as well as any step which is considered to represent invention information on its own. The claimed overall process of coating with a bismuth layer is identified by the selected group **C23C 18/31** and therefore this group should appear first in the classification.

Step 1: this step is already identified by C23C 18/31.

Step 2: the third part of the title of C23C refers to surface treatment of metallic material by diffusion into the surface. Diffusion of non-metal elements is classified in main group C23C 8/00. (See second part of the title of C23C 8/00). As it is stated that the bismuth layer becomes black, and not the underlying ferrous substrate, C23C 8/12 is more appropriate than C23C 8/14.

The guidance heading before main group C23C 22/00 refers to chemical surface treatment of metallic material by reaction of the surface with a reactive medium. The reference in this heading, “with a reactive gas C23C 8/00”, explains why this group is not appropriate for classification of this aspect.

I2: Cathode ray tubes are electric discharge tubes. Such tubes, details thereof and their manufacture are classified in subclass H01J. In this subclass the common rule applies. The subclass index points to main group H01J 9/00 for processes for the manufacture of discharge tubes or parts thereof. Manufacture of electrodes is covered by group H01J 9/02, its most appropriate subgroup being H01J 9/14 since shadow masks can be considered as non-emitting electrodes.

I2 is not claimed, therefore **H01J 9/14** is put after the classification symbols selected for I1.

A1: For I1 classification is already made in main group C23C 18/00. This group is limited to the use of "either liquid compounds or solutions of the coating forming compounds". When "either solid compounds or suspensions of the coating forming compounds" are used, main group C23C 20/00 is relevant. According to the information on Col. 2, lines 4-6, also dispersions of a bismuth salt can be used indeed. Following the common rule we find C23C 20/04 as the relevant classification entry for A1.

A2: From the description of the present example, it is clear that the invention relates to shadow masks for color display tubes, information not identified by the classification of I2. Details of cathode-ray tubes are to be found in main group H01J 29/00, shadow masks in its subgroup H01J 29/07.

Since Step 2 is part of the claimed multi-step process and thus **C23C 8/12** should appear in second place.

Additional information symbols are added after the invention information symbols. Because **C23C 20/00** relates to the claimed process it is added as the first additional information symbol.

As this additional classification relates to non claimed information **H01J 29/07** is put after the classification for A1.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	C23C	Common rule	C23C 18/31 (2006.01) C23C 8/12 (2006.01)
I2	Subclass title covers the subject matter	H01J	Common rule	H01J 9/14 (2006.01)
A1	Subclass title covers the subject matter	C23C	Common rule	C23C 20/04 (2006.01)
A2	Subclass title covers the subject matter	H01J	Common rule	H01J 29/07 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
C23C 18/31 (2006.01)
C23C 8/12 (2006.01)
H01J 9/14 (2006.01)
C23C 20/04 (2006.01)
H01J 29/07 (2006.01)

Training Example C17

Categories

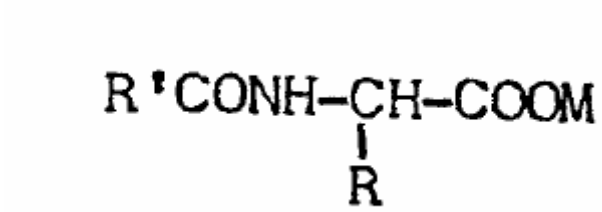
1a, 1b, 2a1, 2b1, 3a, 3b, 3c

Documents (Classification is based on US 4404109 A)

US 4404109 A
WO 80/00921 A1
DE 2953276 T
JP 56500016 T

Short Version of the Disclosure

A process for the preparation of a micro-emulsion by the addition of a surface-active agent of the formula:



wherein R and R' are hydrocarbon groups, M being a cation. This surface-active agent is particularly suitable for the production of micro-emulsions in the presence of aqueous saline solutions. Main application thereof is the tertiary recovery of crude oil from wells.

Representative Prior Art

In known practice, the surface-active agents most commonly used for the tertiary recovery of hydrocarbons are sulfonates, in particular sulfonated cuts of crude oil, alkyl-aryl sulfonates of alkali metals or alkaline earth metals or ammonium salts.

Invention Information

I1: A process for the preparation of a micro-emulsion by the addition of a surface-active agent which is N–acyl–alpha–amino carboxylic acid or its salt (see claims 1-9).

I2: A micro-emulsion comprising an effective surface-active amount of a surface-active agent which is N–acyl–alpha–amino carboxylic acid or its salt (see claims 10-15).

Additional Information

A1: The application of I2 as additives in the process of the tertiary recovery of oil, facilitating forming the micro-emulsion of water and oil.

A large number of potential applications for the surface-active agent used in the patent document under consideration are only broadly stated (see column 3, lines 36-61), only the one relating to the assisted recovery of oil being really described. Therefore, only the application identified as A1 merits a classification for additional information, this is in accordance with paragraph 90 of the Guide.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1 I2	TACSY	Surface-active agents	B01F 17/00
I1 I2	Catchword Index	EMULSIFYING -agents	B01F 17/00
A1	IPC-CAT	Abstract basic document	E21B 43/00

Analysis and Selection of Classification Symbols

I1, I2: The use of compounds as emulsifying agents is classified in the application group B01F 17/00 *"Use of substances as emulsifying, wetting, dispersing, or foam-producing agents"*. The compounds in the invention contain both "amide" and "aminocarboxylic acid" groups, so B01F 17/22 (Amides) and B01F 17/28 (Aminocarboxylic acids) possibly cover the chemical structure of the compounds.

Considering that the common rule is applied in subclass B01F and groups **B01F 17/22** and **B01F 17/28** have a similar degree of specialisation, both groups should be selected for classification.

Paragraph 142 of the Guide, describes the principles of priority in common rule areas to limit unnecessary multiple classification and to select groups that most adequately represent the technical subject to be classified. However, such kind of priority should not be applied between groups of similar complexity or groups having a similar degree of specialisation. In this case classification should thus be made in all appropriate places, i.e. in the two mentioned subgroups of main group B01F 17/00. Because both equally well represent the invention, the alphanumerical order is used.

A1: Main application of this invention is the assisted tertiary recovery of crude oil (see column 1, line13-15). Using IPC-CAT, group E21B 43/00 seems to have to be selected for classification. However, Note (2) after the title of subclass E21B describes that compositions for treating wells are covered by group C09K8/00, *"e.g. compositions for enhanced recovery methods for obtaining hydrocarbons C09K 8/58"*. Considering the use of specific surfactants, it is appropriate to classify in subgroup **C09K 8/584** *"Compositions for enhanced recovery methods for obtaining hydrocarbons, characterized by the use of specific surfactants."*

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1, I2	Subclass title covers subject-matter	B01F	Common rule	B01F 17/22 (2006.01) B01F 17/28 (2006.01)
A1	Note(2) under subclass title of E21B	C09K	Common rule	C09K 8/584 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B01F 17/22 (2006.01)
B01F 17/28 (2006.01)
C09K 8/584 (2006.01)

Training Example C18

Categories

1a, 1b, 2a, 2b1, 2c, 3b, 3c

Documents (Classification is based on GB 2 007 684 A)

GB 2 007 684 A
FR 2 408 638 A1
DE 2 750 903 A1

Short Version of the Disclosure

The document is concerned with coating agents comprising solutions or dispersions of film-forming binders and a finely-divided, rubber-elastic powder dispersed therein. The claims and the description refer to various applications of the coating agents, e.g. for bridging cracks and joints in facades, internal walls and ceilings of old and new buildings, as non-slip and wear-resistant floor coatings on industrial floors and sports grounds, for underfloor protection, as roof coatings or as an anti-drumming agent for a metallic substrate. The rubber-elastic powder may have been produced by grinding vulcanized rubber which contains a filler. A process for the production of a resilient expansible coating, comprising applying the coating agent and drying it to form a rubber-elastic film, is also claimed.

Representative Prior Art

GB 1 509 108 A – a resilient covering for sports ground surfaces, made from a polyurethane-type binder mixed with a powder of a resilient material.
GB 1 387 076 A – a cold-hardening flooring composition including rubber dust coated with resorcinol-formaldehyde latex, and a polymeric binder.
GB 1 242 054 A – a liquid coating composition having specified properties, containing a film-forming material and a rubbery polymer in the form of dispersed particles of a certain size.

Invention Information

I1: Coating agents comprising solutions or dispersions of film-forming binders and a finely-divided, rubber-elastic powder dispersed therein (see claims 9-15, 21 and 23).
I2: A process for the production of a resilient expansible coating, comprising applying the above coating agent and drying it to form a rubber-elastic film (see claims 1-8 and 22).

Additional Information

A1: The claims and the description refer to various applications of the coating agents, e.g. for bridging cracks and joints in facades, internal walls and ceilings of old and new buildings, as non-slip and wear-resistant floor coatings on industrial floors and sports grounds, for underfloor protection or as roof coatings or as an anti-drumming agent for a metallic substrate (see claims 16-20 and examples 3, 5, 6, 8 and 10).

A2: Various polymers are exemplified as constituents for the binders, notably copolymers of styrene, acrylates, butadiene, vinyl acetate and phenolic resins (see examples 1-10).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, A2	Catchword Index	COATING compositions in general	C09D
I1, I2, A2	Catchword Index	Processes for COATING surfaces with liquids, semi-liquids or powders	B05D
I1, I2, A2	Catchword Index	ANTI-SLIP materials	C09K

Analysis and Selection of Classification Symbols

I1:
(a) An allegedly-new additive disclosed in the document – rubber-elastic powder – provides improved film-forming properties for the coating agents and represents the most important feature of the invention. Coating agents or compositions are classified in the function-oriented subclass C09D, where group **C09D 7/12** covers such additives. In addition, function-oriented terms exist to cover the "bridging cracks and joints" and anti-slip uses mentioned above, and therefore **C09D 5/34, C09K 3/10** and **C09K 3/14** can be applied too.

(b) The above coating agents contain film-forming binders and additives, both being macromolecular substances. Note (3) following the title of subclass C09D states that "In this subclass, coating compositions comprising two or more macromolecular constituents are classified according to the constituent upon which the composition is based". Some but not all of the exemplified coating agents (e.g. Example 1(c) or Example 3) clearly have a major amount of the rubber powder (which can be present at 2-150 weight %), and in these cases only it can be seen that the rubber is the constituent upon which the composition is based. In these cases, group **C09D 121/00** (coating compositions based on unspecified rubbers) should be assigned as an obligatory classification.

(c) Classification of the film-forming binder according to its chemical nature would not be appropriate because this nature is not disclosed in the claims. A broad variety of synthetic resins, including addition and condensation polymers, may be used as the binders.

I2:
(a) According to paragraph 96 of the Guide, if there is no place to classify a process for the making or treatment of a product, then the process should be classified in the place for the product. Therefore in this case the process for the production of the coating should be classified in the place for the coating agent itself.

(b) Claim 1 of the document, which is referred to as invention I2, is in effect appendant to claim 9 which is referred to as invention I1. This is because the whole of the wording of claim 9 is incorporated within the wording of claim 1. So the "process" of claim 1 is characterised by the coating agent of claim 9 and not by any process features; indeed the coating process is not in any way novel or unusual. For that reason, classification in B05D is not judged appropriate.

A1: Although many diverse fields of application of the coating agents are disclosed in the claims and the description, they cannot be considered as essential technical characteristics

of the subject of the invention, which is concerned with the nature of the coating agents. Places in the IPC covering these fields of application are based on constructional, structural or process features of the relevant subject matter, and indication of such places will give no useful information relating to the coating agents themselves. In this case, according to paragraph 94 of the Guide, if several applications are specified but are not considered to constitute the essential technical characteristics of the invention, classification is made in the function-oriented place, and application-oriented classification is not needed.

A2: Various polymers are exemplified as constituents for the binders, notably copolymers of styrene, acrylates, butadiene, vinyl acetate and phenolic resins. Note (2) before C09D 101/00 states that "any macromolecular constituent of a composition … which is considered to represent information of interest for search may also be classified in a group chosen from groups C09D 101/00 to C09D 201/00. Such non-obligatory classification should be given as additional information". These polymers can be regarded as representing information of interest for search and can be recorded using terms **C09D 125/08, C09D 131/04, C09D 133/08, C09D 133/12** and **C09D 161/10**.

C09D 7/12 should be indicated as the first classification symbol, since it most adequately represents the invention.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1, I2	Subclass title covers subject matter	C09D	Group title covers subject matter	C09D 7/12 (2006.01) C09D 5/34 (2006.01) C09K 3/10 (2006.01) C09K 3/14 (2006.01)
I1	Subclass title covers subject matter	C09D	Note (3) under subclass C09D	C09D 121/00 (2006.01)
A2	Subclass title covers subject matter	C09D	Note (2) before C09D 101/00	C09D 125/08 (2006.01) C09D 131/04 (2006.01) C09D 133/08 (2006.01) C09D 133/12 (2006.01) C09D 161/10 (2006.01)
A1	Guide paragraph 94	None	None	None

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C09D 7/12 (2006.01)
C09D 5/34 (2006.01)
C09K 3/10 (2006.01)
C09K 3/14 (2006.01)
C09D 121/00 (2006.01)
C09D 125/08 (2006.01)
C09D 131/04 (2006.01)
C09D 133/08 (2006.01)
C09D 133/12 (2006.01)
C09D 161/10 (2006.01)

Training Example C19

Categories

1a, 1b, 2b1, 2e

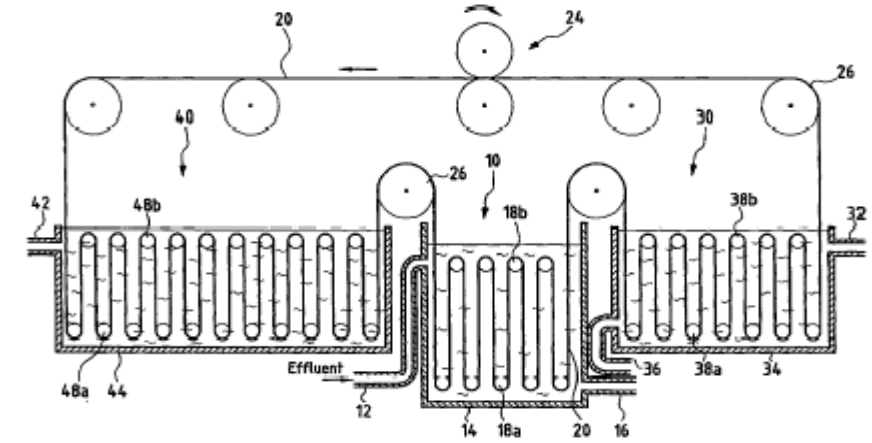
Documents

This is an artificial example.

Brief Description of the Artificial Example

The invention is concerned with a process and an apparatus for separating heavy metals, e.g. chromium, zinc or nickel, contained in liquid effluents, by adsorption of metal ions using a substrate of active carbon fibres, in the form of a fibrous fabric or material. The active carbon fibres are regenerated by desorption of the ions. The origins of the effluent are mentioned as tanneries, textile dyeing plants or surface treatment installations.

The installation comprises a substrate (20), means (12) supplying liquid effluent to be treated to bring said effluent in contact with the substrate so as to adsorb the metal ions thereon, and means (30) for regenerating the substrate by desorption of the metal ions. The substrate (20) is an active carbon fibre “texture” or structure, such as a fabric or cloth circulating along a closed path passing through adsorption (10) and regenerating (30) zones, or housed in an adsorption and desorption reactor.



Invention Information

I1: Process for separating a heavy metal from a liquid effluent (which can be regarded as waste water) by adsorption of metal ions using a substrate of active carbon fibres, which substrate is subsequently regenerated by desorption of the metal ions.

I2: Apparatus for carrying out the above process comprising an active carbon substrate, means for contacting it with an effluent containing metal ions and means for regenerating the substrate by desorption of the metal ions, especially where the substrate is of endless shape.

Additional Information

A1: The metal ions to be separated are heavy metal, especially chromium, zinc and nickel.

A2: The origins of the effluent are mentioned as tanneries, textile dyeing plants, surface treatment installations.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, A1, A2	Catchword Index	Treatment of WASTE water	C02F
I1, I2, A1, A2	Catchword Index	SEPARATING of different materials	B01D
I1, I2, A1, A2	TACSY	“harmful chemicals”	A62D

Analysis and Selection of Classification Symbols

I1: Treatment of water, waste water, sewage or sludge is covered by subclass C02F to which the common rule applies. Treatment of waste water (except for biological and other treatments) is in main group C02F 1/00, and treatment by sorption is covered by groups **C02F 1/28** and **C02F 1/62.**

Subclass B01D (mentioned above) contains a limiting reference under the subclass title, which is a reference from a function-oriented place to an application-oriented place. This reference reads “treatment of water C02F”. It seems that C02F covers the whole of the inventive matter, therefore under paragraph 89 of the Guide there is no need to classify under the general function-oriented subclass B01D. It is also apparent that A62D may have an interest here since it covers making harmful chemical substances less harmful – however the only main group in A62D covering this subject matter (A62D 3/00) requires that a chemical change is made to these substances. This is not the case here since only adsorption is involved, therefore A62D appears irrelevant to this example.

I2: According to paragraph 96 of the Guide to the IPC, if there is no place to classify an apparatus, it is classified in the place for the process performed by that apparatus. Thus, the process covered by invention I2 should be classified in the same place as the process of invention I1.

A1: The metal ions to be separated are covered by the indexing scheme of C02F 101/00 to C02F 103/44, and specifically by terms **C02F 101/20 and C02F 101/22**. Indexing terms are regarded as additional information.

A2: The origins of the effluent (tanneries, textile dyeing plants, surface treatment installations) are covered by indexing terms **C02F 103/24, C02F 103/30 and C02F 103/34.**

As **C02F 1/28** is more function-oriented than **C02F 1/62**, it is the group that most adequately represents the invention and is therefore listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1, I2	Subclass title covers subject matter	C02F	Common rule	C02F 1/28 (2006.01), C02F 1/62 (2006.01)
A1	Subclass title covers subject matter	C02F	Indexing terms	C02F 101/20 (2006.01), C02F 101/22 (2006.01)
A2	Subclass title covers subject matter	C02F	Indexing terms	C02F 103/24 (2006.01), C02F 103/30 (2006.01), C02F 103/34 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C02F 1/28 (2006.01)
C02F 1/62 (2006.01)
C02F 101/20 (2006.01)
C02F 101/22 (2006.01)
C02F 103/24 (2006.01)
C02F 103/30 (2006.01)
C02F 103/34 (2006.01)

Training Example C20

Categories

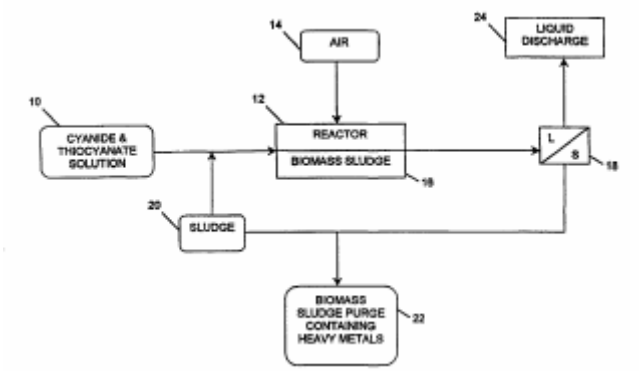
1a, 1b, 2a1, 2b1, 2e

Documents

This is an artificial example.

Brief Description of the Artificial Example

The invention is concerned with a method of treating a solution which contains at least one of thiocyanate and cyanide, which includes the step of contacting the solution in a reactor with at least the active bacteria contained in a microbial culture of the type deposited at the Australian Government Analytical Laboratories under the Accession number NM 98/11331.



Thiocyanate and cyanide ions are common constituents of effluents which arise in metallurgical plants, particularly in gold recovery operations which make use of the cyanidation process.

The method may include introducing air into the solution in the reactor. In one form of the invention the method includes subjecting material, discharged from the reactor, to a liquid/solid separation stage and returning at least a portion of the separated solids to the reactor to maintain an active biological population in the reactor. Preferably the method includes varying the absolute retention time of the solution, in the reactor, from 4 to 24 hours depending on the influent concentration of thiocyanate and cyanide.

In a variation of the invention, the solution is directed to a counter current heavy metals removal stage in a heavy metal adsorption reactor containing the said active bacteria, before being fed to the aerated mixture of biomass sludge and water.

The patentee isolated a microbial culture from a mine in South Africa where a natural destruction of effluent containing thiocyanate and cyanide takes place. The patentee determined the conditions under which a fast rate of activity is obtained, and deposited the microbial culture at the Australian Government Analytical Laboratories under the Accession number NM98/11331.

If the solution contains heavy metals such as copper, gold, arsenic and nickel which are to

be removed, e. g. for commercial or environmental reasons, then a modified process of the invention may be employed, whereby an aqueous thiocyanate and cyanide solution is fed to a counter current metal adsorption reactor. Heavy metals and cyano-metal complexes are removed from the solution by adsorption onto the biomass. The biomass sludge from this reactor is not agitated. This allows the biomass sludge to settle in the reactor, thus automatically giving rise to a liquid/solid separation step. The separated biomass sludge containing heavy metals is purged and thereafter treated in any appropriate way to recover the heavy metals.

The thiocyanate and cyanide are degraded to relatively harmless inorganic compounds of carbonate or carbon dioxide, sulfate and ammonium, and carbonate or carbon dioxide and ammonium respectively.

Invention Information

I1: A method for treating an effluent solution containing thiocyanate and/or cyanide, by contacting the solution with at least the active bacteria contained in a microbial culture of the type deposited in the above laboratory in Australia.

Additional Information

A1: In addition to removal of thiocyanate and/or cyanide, heavy metal removal is mentioned as a variation of the invention, including removal of copper, gold, arsenic and nickel. When this heavy metal removal is for commercial reasons, this equates to production of these metals.

A2: The origins of the effluent are mentioned as metallurgical plants, especially for gold recovery.

A3: The method can be regarded as an activated sludge process.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, A2, A3	Catchword Index	Treatment of WASTE water	C02F
A1	Catchword index	Production or refining of METALS or alloys in general	C22
I1	TACSY	“harmful chemicals”	A62D

Analysis and Selection of Classification Symbols

I1: (a) Treatment of water, waste water, sewage or sludge is covered by function-oriented subclass C02F, which is subject to the common rule. Biological treatment of waste water is in main group C02F 3/00, and treatment characterized by the micro-organisms used is covered by group **C02F 3/34.**

(b) It appears that subclass A62D is relevant. This subclass covers making harmful chemical substances harmless or less harmful by effecting a chemical change in these substances. Since the thiocyanate and cyanide are degraded to relatively harmless inorganic compounds of carbonate or carbon dioxide, sulfate and ammonium, and carbonate or carbon dioxide and ammonium respectively, **A62D 3/00** seems relevant. Subgroup **A62D 3/02 (2007.01)**, which covers processes using biological methods such as enzymes or microorganisms, is the correct classification.

A1: The nature of the contaminant and heavy metal removal are covered by the indexing scheme of C02F 101/00 to 103/44. Thiocyanate is covered by **C02F 101/16**, cyanide is covered by **C02F 101/18**, and heavy metals by **C02F 101/20**. Indexing terms are regarded as additional information. Production of metals, including heavy metals, is mentioned in note (1) under the subclass title of C22B; this states that production of metallic elements themselves is in C22B. The relevant term here for liquid/solid separation is **C22B 3/24**.

A2: The origins of the effluent (metallurgical plants, especially for gold recovery) are covered by indexing term **C02F 103/16.**

A3: The method can also be regarded as an activated sludge process and should therefore be classified in **C02F 3/12.**

C02F 3/34 is the group that most adequately represents the invention and is therefore listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject matter; Note (1) after C02F subclass title.	C02F	Common rule	C02F 3/34 (2006.01)
I1	Subclass title covers subject matter	A62D	Common rule	A62D 3/02 (2007.01)
A1	Subclass title covers subject matter	C02F	Indexing terms	C02F 101/16 (2006.01), C02F 101/18 (2006.01), C02F 101/20(2006.01)
A1	Note (1) under C22B	C22B	Common rule	C22B 3/24 (2006.01)
A2	Subclass title covers subject matter	C02F	Indexing terms	C02F 103/16 (2006.01)
A3	Subclass title covers subject matter	C02F	Common rule	C02F 3/12 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C02F 3/34 (2006.01)
A62D 3/02 (2007.01)
C02F 3/12 (2006.01)
C02F 101/16 (2006.01)
C02F 101/18 (2006.01)
C02F 101/20 (2006.01)
C02F 103/16 (2006.01)
C22B 3/24 (2006.01)

Training Example C21

Categories

1a, 1b, 2a, 2b4, 3a

Documents

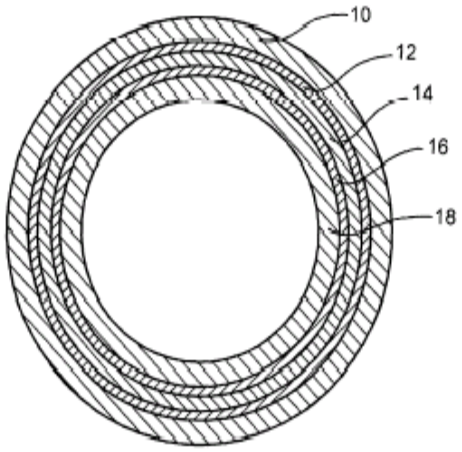
This is an artificial example.

Brief Description of the Artificial Example

A method of post-forming a tube container to a different shape and maintaining the barrier properties of the tube container, comprises providing a multilayer laminate tube having at least one barrier layer and at least one thermoplastic layer either side of the barrier layer, where the barrier layer is elongatable up to about 125% of its length while maintaining at least 90% of its barrier properties. The post-forming itself is conventional.

One embodiment (illustrated) shows a foil laminate wall of a tube container. The foil is comprised of an outer polyethylene layer, an adhesive layer, an aluminium foil layer, an adhesive layer and an inner polyethylene layer. The outer polyethylene layer will have a thickness of 50 microns to 250 microns, the inner aluminium foil layer a thickness of 7 microns to 50 microns, and the inner polyethylene layer a thickness of 50 microns to 250 microns. The adhesive layers are any suitable adhesive such as ethyl acrylate copolymers, maleic anhydride modified copolymers and terpolymers, acrylic acid modified polyolefins, and ethyl methyl acrylate copolymers. The adhesives will have a thickness of 0.25 microns to 10 microns. The ductility of the aluminium or aluminium alloy or other metal will be 1% to 25% and preferably 8% to 15%. This material can be stretched 1% to 25% without any breach of the aluminium foil layer.

Another embodiment shows a typical container wall comprising an organic barrier layer. This organic barrier layer can be any of ethylene, vinyl alcohol copolymers, polyamides, polyesters, PVDC, C1CF3 (Aclar) ZU BAREX, and nano-composites and liquid crystal polymers and blends. There will be an exterior layer of polyolefin, an adhesive layer, the organic film barrier layer, and an inner polyethylene layer. The adhesive will be any suitable adhesive such as any of the above-described adhesives. The outer polyolefin layer will have a thickness of 50 microns to 250 microns, and preferably 75 microns to 200 microns. The organic barrier layer will be of a thickness of 5 microns to 50 microns, and preferably 15 microns to 30 microns. The inner polyolefin layer will have a thickness of 50 microns to 250 microns, and preferably 75 microns to 200 microns. These container walls can be from a laminate or can be formed by extrusion blow moulding. The container wall having this structure can be stretched 1% to 100%. This is greater than when a metal foil is used as the barrier layer.



Representative Prior Art

One prior art document discloses modifying the shape of a tube container by placing it on a heated mandrel and blowing to the shape of a surround mould. Another prior art document shows a modification of this process where the mandrel has recesses and the tube container is sucked on to the recesses either by vacuum or by blowing from the surround mould. The tube wall then takes the shape of the recesses.

Invention Information

I1: A method of post-forming a tube container to a different shape and maintaining the barrier properties of the tube container, characterised by providing a multilayer laminate tube having at least one barrier layer and at least one thermoplastic layer either side of the barrier layer, where the barrier layer is elongatable up to about 125% of its length while maintaining at least 90% of its barrier properties.

Additional Information

A1: The barrier layer may be of aluminium and the thermoplastic layers may be of polyolefin.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, A1	Catchword index	LAMINATES or LAYERED PRODUCTS	B32B

Analysis and Selection of Classification Symbols

I1: It is quite clear that B32B is the appropriate function-oriented subclass for layered products or laminates. For non-planar layered products, the appropriate main group is B32B 1/00. The only appropriate subgroups of B32B 1/00 are B32B 1/02 (receptacles, e.g. tanks) and B32B 1/08 (tubular products). These are adequate to cover the invention information in

view of the “What to Classify” guidelines that require an inventive thing to be classified as a whole. Since there is a first place priority rule in the subclass then **B32B 1/02** is selected. Another term in B32B that appears appropriate is **B32B 43/00** (operations specially adapted to layered products and not otherwise provided for). Because of Note (6) after the subclass title of B32B, main group B32B 37/00 has not to be considered for further classification.

Note (2) under the B32B subclass title states that B32B does not cover processes for the production or treatment of layered products, if the process or apparatus is fully classifiable elsewhere, e.g. in class B29. However Note (7) under the B32B subclass title states that B32B should provide a basis for a complete search with respect to layered products, so all relevant subject matter should be classified there even if it is also classified elsewhere.

A1: The barrier layer made of aluminium next to a synthetic resin layer is covered by **B32B 15/08** and barrier layers of synthetic resin next to another layer of a resin of another kind are covered by **B32B 27/08**. These terms conform with the first place priority rule of the subclass and are worth adding as additional information.

Since the method is characterized by the laminate structure, this term most adequately represents the invention information and is therefore listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Notes (2) and (7) under subclass title of B32B	B32B	First place priority rule	B32B 1/02 (2006.01), B32B 43/00 (2006.01)
A1	Notes (2) and (7) under subclass title of B32B	B32B	First place priority rule	B32B 15/08 (2006.01), B32B 27/08 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B32B 1/02 (2006.01)
B32B 43/00 (2006.01)
B32B 15/08 (2006.01)
B32B 27/08 (2006.01)

Training Example C22

Categories

1a, 1b, 2a, 2b4, 3a, 3b

Documents (Classification is based on US 2003/008087 A1)

US 2003/008087 A1
FR 2757444 B1
DE 69717142 E

Short Version of the Disclosure

The invention is a multilayer structure for fuel pipes and tanks for conveying petroleum-derived liquid fuels, more particularly fuels containing oxygenated compounds such as alcohol. The multilayer structure can also be used for the walls of other hollow articles, e.g., conduits, fuel tanks. The multilayer laminate exhibits good interlayer adhesion, flexibility, dimensional stability and resistance to cracking while providing good barrier properties with respect to petroleum and alcohol containing fuels.

A first layer to be used as the outer layer of the multilayer structure comprises a composition based on polyamide. The second layer to be the internal layer in contact with the petroleum-derived liquid fuels comprises a composition based on polyvinylidene-fluoride. The Structure is characterized in that the polyamide-based composition and/or the polyvinylidene-fluoride-based composition contain a polyacrylate containing recurring units of formula -[CH_2-C(R)(C(O)OR_1)]- (I) and -[CH_2-C(R)(C(O)OR_2)]- (II). In (I) and (II), R and R_1 are identical or different alkyl groups comprising from 1-12 carbon atoms; and R_2 is a radical R_4-F, where R_4 is an alkyl, aryl, arylalkyl or alkylaryl and F represents an amine, epoxy, acid or anhydride, and optionally recurring units of formula -[CH(R_5)-C(R)(C(O)OR_1)]- (III) and/or -[(CH(R_3))n]- (IV). In (III) and (IV), R_5 represents a polyalkyl (meth)acrylate chain; R_3 represents an alkyl radical comprising from 1-6 carbon atoms; and n = 1-4. The multilayer laminate may also possess an intermediate adhesive layer consisting only of polyacrylate, or more advantageously, of a blend of polyacrylate and polyvinylidene-fluoride, and may furthermore comprise a polyamide of the same type as that of which the composition forming the outer layer is composed.

Representative Prior Art

Multilayer structures comprising a polyamide, especially nylon-11 or nylon-12, layer and an ethylene/vinyl alcohol layer (see FR 2,579,290, and EP 0,428,833 and 0,428,834) are not able to meet all the required characteristics for use in internal combustion engines. Multilayer structures are known comprising polyvinylidene fluoride layers bonded to polyamide layers wherein an intermediate polyvinylidene fluoride composition comprising either a glutarimide polymer (EP 0,637,511) or an acrylate copolymer comprising at least anhydride functional groups obtained by the cyclization of two adjacent carboxylic functional groups, is provided to improve adhesion between the layers. However the adhesion and mechanical properties of these multilayer structures deteriorate during aging.

Invention Information

I1: A multilayer structure comprising a laminate having at least one layer formed from a polyamide-based composition and at least one adjacent layer formed from a polyvinylidene-fluoride-based composition characterized in that the polyamide-based composition and/or the polyvinylidene-fluoride-based composition contain at least one polyacrylate compound (see claim 1).

I2: A multilayer structure according to I1 further including an adhesive intermediate layer, the adhesive being formed from a composition comprising at least one polyacrylate compound (see claim 2).

I3: The multilayer structure of I1 characterized in that it forms the walls of a hollow article, such as a tank. (see claim 3).

I4: The multilayer structure of I1 characterized in that it forms the walls of a hollow article, such as a tube or pipe. (see claim 3).

Additional Information

A1: It seems worthwhile to apply additional classifications based upon the synthetic resin compositions being used for the various layers of the multilayer laminate.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, I3, I4, A1	Catchword index	LAMINATES or LAYERED PRODUCTS	B32B

Analysis and Selection of Classification Symbols

I1: The appropriate subclass for layered products or laminates is B32B according to the Catchword index. In groups B32B 1/00 to B32B 33/00, at each level of indentation, classification is made in the first appropriate place in the absence of an indication to the contrary.

In relation to I1, the first appropriate main group under B32B would be B32B 27/00 for layered products essentially comprising synthetic resin. The first appropriate subgroup **B32B 27/08** for layered products having an additional layer comprising a different synthetic resin is selected for obligatory classification.

I2: In relation to I2, the first appropriate main group under B32B would be B32B 7/00 for layered products characterized by the relation between layers. Group **B32B 7/04** provides for layered products characterized by the connection of layers.

I3: For non-planar layered products, the appropriate main group is B32B 1/00. The appropriate subgroup of 1/00 is 1/02 (receptacles, e.g. tanks). Paragraph 131 of the Guide states that different inventive things, for example, alternative variants, should be separately

classified, and since claim 3 recites tanks, obligatory classification into **B32B 1/02** is necessary.

I4: For non-planar layered products, the appropriate main group is B32B 1/00. The appropriate subgroup of B32B 1/00 is B32B 1/08 (tubular products). Paragraph 131 of the Guide states that different inventive things, for example, alternative variants, should be separately classified, and since claim 3 recites tubes, obligatory classification into **B32B 1/08** is necessary.

A1: For layered products comprising copolymers of synthetic resins, B32B 27/30; B32B 27/34 would be appropriate, in order to identify information, due to novel features disclosed in I1, which cannot be classified as invention information under the first place priority rule.

Since B32B 1/00 to B32B 33/00 follow the first place priority rule, and I1, I2, I3 and I4 equally represent the invention as a whole, **B32B 1/02** is selected as the first-listed classification.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1, I2, I3, I4	Subclass title covers subject matter	B32B	First place priority rule	B32B 1/02 (2006.01) B32B 1/08 (2006.01) B32B 7/04 (2006.01) B32B 27/08 (2006.01)
A1	Subclass title covers subject-matter	B32B	First place priority rule	B32B 27/30 (2006.01), B32B 27/34 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B32B 1/02 (2006.01)
B32B 1/08 (2006.01)
B32B 7/04 (2006.01)
B32B 27/08 (2006.01)
B32B 27/30 (2006.01)
B32B 27/34 (2006.01)

Training Example C23

Categories

1a, 1b, 2a1, 2b1, 2e, 3b, 3c

Documents (Classification is Based on US 4350708 A)

DE 3018893 A
FR 2456775 A
US 4350708 A

Short Version of the Disclosure

In simulated ageing of wine or other alcoholic drinks, flavouring extracted from oak is added to the beverage. The extract is obtained through the solid-liquid extraction on shavings and pieces of oak, under an over-pressure of 0.0-0.5 bar. A first extraction is made at a temperature between 25-40 °C with a hydro-alcoholic solution (a solution of ethanol in water), the extract being cooled to 20 °C, before being collected. A subsequent second extraction is made at a temperature between 30-95 °C (but higher than that of the first extraction) with demineralized water running in the opposite direction to that of the solution in the first extraction. This second extract is cooled to 20 °C before being collected. The two extracts, thus prepared, are then combined. In the worked example, the hydro-alcoholic solution is passed through two vessels containing oak shavings. The second extraction is also made by passing the water through both vessels. The extracted flavouring is then added to an alcoholic beverage (wines, spirits or liqueurs) after the completion of fermentation of said alcoholic beverage.

Representative Prior Art

Wine is traditionally aged by storing in oak barrels. Attempts to overcome this include maceration of oak shavings in a hydro-alcoholic solution, distillation under reduced pressure of a hydro-alcoholic solution in which the pieces and oak shavings are immerged, or treatment by electromagnetic radiation (infrared or ultraviolet) or ultrasound.

Invention Information

I1: A method of extracting flavouring from oak shavings by passing a water-alcohol mixture through the shavings and collecting the resultant liquor, then passing water through the shavings and collecting the resultant liquor and combining both liquors. (Claims 1-7.)

I2: An oak flavouring solution. (Claim 8.)

I3: Process for flavouring wine by addition of a flavouring. (Claim 9.)

I4: Process for flavouring spirits or liqueurs by addition of a flavouring. (Claim 9.)

Additional Information

A1: Solvent extraction apparatus. The apparatus has applicability for solvent extraction in general. (Information found in the description only.)

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	SOLVENT extraction	B01D 11/00
I1	Catchword Index	FLAVOURING of foodstuffs in general	A23L 1/22
I2	Catchword Index	FLAVOURING of foodstuffs in general	A23L 1/22
I3	Catchword Index	FLAVOURING of foodstuffs in general	A23L 1/22
I3	Catchword index	preparing WINE	C12G 1/00
I3	Catchword index	ALCOHOL(S) treatment of alcoholic beverages	C12H
I3	Catchword index	ALCOHOL(S) alcoholic beverages, preparing alcoholic beverages	C12G
I4	Catchword Index	FLAVOURING of foodstuffs in general	A23L 1/22
I4	Catchword index	ALCOHOL(S) treatment of alcoholic beverages	C12H
I4	Catchword index	ALCOHOL(S) alcoholic beverages, preparing alcoholic beverages	C12G
A1	Catchword index	SOLVENT extraction	B01D 11/00

Analysis and Selection of Classification Symbols

I1: Class B01 is for chemical apparatus in general. The method of I1 is applied to a specific use and as such B01D is therefore not appropriate for classification of I1. The catchword index points directly to A23L 1/22 “Flavouring agents”. The subclass title indicates that preparation thereof is contained in the subclass. A23 operates under the common rule and since there is no specific group for the preparation of the flavouring, according to paragraph 95 of the Guide, classification is made under the flavouring per se, i.e. A23L 1/22. Looking at the subgroups of A23L 1/22 leads us to **A23L 1/221** for “…flavouring agents…Extracts thereof” which is the correct classification.

I2: The classification of the flavouring per se has been identified during the classification of the process for extracting the flavouring, i.e. **A23L 1/221**.

I3: Preparation of wine does not appear to be classifiable under A23L since “FOODS, FOODSTUFFS, OR NON-ALCOHOLIC DRINKS…” clearly implies that alcoholic beverages are not contained within the subclass. This leaves the options of C12G and C12H. The subclass title for C12G covers “WINE;…PREPARATION THEREOF”. The common rule

applies within this subclass and an examination of the groups shows the main group 1/00 “Preparation of wine” to be the most appropriate. C12H is then consulted. A reference under the Subclass title shows that “simulation ageing by flavouring” is in C12G 3/06. C12H can clearly be discounted for classification. 3/06 deals with mixing non-wine beverages and is not appropriate. Thus the classification is made in **C12G 1/00**.

I4: Similarly as an alcoholic beverage, A23L is quickly discounted. C12G is the appropriate place for preparation of alcoholic beverages. The common rule leads to C12G 3/07 “flavouring with wood or wood extract” – the beverage is produced by merely mixing in the wood extract flavouring ingredient. **C12G 3/07** is therefore appropriate. C12H again shows the reference to C12G 3/06 for ageing. C12G 3/06 contains the sub-group C12G 3/07 already identified which is the correct classification.

A1: The apparatus for carrying out the process is general and as such can be classified with other general apparatus for chemical processes. The Catchword Index points to B01D 11/00 as the appropriate area for solvent extraction. B01D 11/00 “Solvent extraction” has two sub-groups “of solids” and “of solutions which are liquid”. The apparatus is disclosed as being used for solvent extraction of solids, but is in fact suitable for all types of solvent extraction and it is this generic aspect of the apparatus which we are attempting to classify. As such, the main group **B01D 11/00** seems most applicable.

Since there are different inventions it is difficult to decide which should be placed as the first invention symbol. The extraction and use of the extract for flavouring alcoholic beverages appears to encompass the whole inventive concept and is represented by I3 and I4. Wine (I3) is more specialized than other alcoholic beverages (I4) and as such becomes the first classification symbol.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Catchword index	A23L	Common rule	A23L 1/221 (2006.01)
I2	Catchword index	A23L	Common rule	A23L 1/221 (2006.01)
I3	Catchword index and reference under C12H subclass title	C12G	Common rule	C12G 1/00 (2006.01)
I4	Catchword index and reference under C12H subclass title	C12G	Common rule	C12G 3/07 (2006.01)
A1	Catchword index	B01D	Common rule	B01D 11/00 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
C12G 1/00 (2006.01)
A23L 1/221 (2006.01)
C12G 3/07 (2006.01)
B01D 11/00 (2006.01)

Training Example C24

Categories

2a2, 2b1, 2f, 3a, 3c

Documents

This is an artificial example.

Brief Description of the Artificial Example

The example relates to treatment of materials, particularly wet combustible materials, in a fluidised bed reactor. Hot particles are separated from the exhaust gases of the fluidised bed. At least some of the particles are mixed with the incoming material stream, which is thus heated and at least partially dried before introduction into the fluidised bed, where the material is combusted. The example of the treatment is incineration of sewage sludge.

The invention is:
1. A method of treating a material, which contains inorganic chemicals and organic chemicals, which comprises the steps of
a) subjecting said material to combustion in a fluidized bed reactor and recovering flue gases which have entrained hot solid particles;
b) introducing said flue gases from step a) into a dust separator to remove the hot solid particles entrained in the flue gases;
c) introducing said hot solid particles from step b) into a prereactor and mixing therewith said material to preheat and at least partially dry said material whereby a preheated material is obtained;
d) introducing said preheated material from step c) together with said hot solid particles into said fluidized bed reactor, subjecting the preheated and dried material in the presence of said hot particles to combustion therein to obtain flue gases;
e) introducing the flue gases from step d) into said dust separator to separate hot solid particles which are recycled in step c).

2. A method as claimed in claim 1, in which gases are formed in step c), said gases are subjected to a dust separation step to remove solid particles and at least a portion of the gases are introduced into said fluidized bed reactor in step d)

3. A method as claimed in claim 1, in which the material being treated is sewage sludge.

4. Apparatus for performing the treatment according to claims 1 or 3, including a fluidized bed combustion chamber, a dust separator for removing hot solid particles entrained in the flue gases from the fluidized bed combustion chamber, a prereactor for drying the wet material and means for feeding the dried material from the prereactor to the fluidized bed combustion chamber, characterized by means for feeding the hot solid particles to the prereactor and means for mixing the particles therein with the wet material.

Representative Prior Art

The description of the invention describes incineration of sludge in a fluidised bed using mechanical dewatering, chemical additives, contact with hot flue gases or contact with hot bed material for drying the sludge.

Invention Information

I1 A general process for treatment of material, particularly wet combustible material, in a fluidised bed reactor, in which process hot particles are separated from the exhaust gases of the fluidised bed and at least some of the particles are mixed with the incoming material stream, which is thus heated and at least partially dried before introduction into the fluidised bed, where the material is combusted (see claim 1).

I2 Apparatus for performing the process of I1 (see claim 4)

I3 The application of the process according to I1 to incineration of sewage sludge, in which the sludge is dried before combustion (see the preferred embodiment and claim 3).

I4 Apparatus for performing the process of I3 (see the preferred embodiment and claims 3 and 4).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2	Catchword Index	Fluidised bed processes in general	B01J 8/24
I1, I2	TACSY	Treatment of material in a fluidised bed reactor	B01J
I3, I4	Catchword Index	Fluidised bed combustion apparatus	F23C 10/00
I3, I4	Catchword Index	Incineration of refuse	F23G
I3, I4	TACSY	Incineration of sludge in a fluidised bed	F23G 5/30
I3, I4	TACSY	Incineration of sludge in a fluidized bed	C02F 11/00

Analysis and Selection of Classification Symbols

I1 and I2

The title of subclass B01J is "Chemical or physical processes, e.g. catalysis, colloid chemistry; their relevant apparatus". This clearly covers I1 and I2. The reference after the subclass title is not relevant, since I1 and I2 do not relate to any specific application.

B01J 8/00 and B01J 19/00 are the only relevant main groups of B01J. Of these, B01J 8/00 "Chemical or physical processes in general, conducted in the presence of fluids and solid particles; Apparatus for such processes" is the most relevant, since it is more specific.

B01J 8/08 and B01J 8/18 are the only relevant one-dot groups, but the reference in B01J 8/08 clearly points the invention to B01J 8/18. **B01J 8/24** "According to "fluidised-bed" technique" is the only possible two-dot group, and since none of its subgroups covers the invention it is the correct place.

I3 and I4

Three different subclasses are proposed for I3 and I4: C02F, F23C and F23G. C02F covers "Treatment of water, waste water, sewage or sludge". This could be seen as covering incineration, and the group C02F 11/06 covers "treatment of sludge by oxidation", but the purpose of the process is not to treat the waste-water sludge, but to enable extraction of the heat value of it. Therefore classification in C02F is not correct.

F23C covers "Methods or apparatus for combustion using fluent fuel" and F23G covers "Cremation furnaces; Consuming waste by combustion". Both these subclass titles cover I3 and I4. However, the definitions of the two subclasses (see especially the section "Relationship between large subject matter areas" in F23C and the section "Definition statement" in F23G) clearly indicates that classification should be made in F23G and not in F23C, since the invention information relates to a special adaptation for a low-grade fuel that presents special particular combustion problems by having a high water content.

F23G 5/00 and F23G 7/00 are the only relevant main groups in F23G. 5/00 covers "Incineration of waste (of specific waste F23G 7/00); Incinerator constructions; Details, accessories or control therefore" and is mainly subdivided according to functional features of the apparatus used. F23G 7/00 covers "Incinerators or other apparatus specially adapted for consuming specific waste or low grade fuels, e.g. chemicals" and is mainly subdivided according to application. Since the invention relates to both function and application aspects classification should be made in both main groups.

F23G 5/00 contains two relevant one-dot groups, F23G 5/02 "with pretreatment" and F23G 5/30 "having a fluidized bed". Both are highly relevant, but **F23G 5/30** should be the primary choice, since it better reflects the invention as a whole. However, since the pretreatment of the wet sludge is the actual inventive feature, classification should also be made in F23G 5/02, which represents a novel and non-obvious process step. The subgroup F23G 5/027 is not relevant, since the relevant parts of the description do not mention pyrolysis, but only drying. Drying is covered by **F23G 5/04**, which does not have any relevant subgroup.

F23G 7/00 does not contain any subgroup for sewage sludge, so the application aspect can only be classified in the main group itself.

Since I1 and I2 identify the disclosure in its broadest and most general form their classification is the one that should be listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1, I2	Only relevant subclass	B01J	Common rule, most specific main group, only correct subgroup.	B01J 8/24 (2006.01)
I3, I4	F23C and F23G subclass definitions	F23G	Common rule, functional aspect, invention as a whole, only relevant group.	F23G 5/30 (2006.01)
I3, I4	F23C and F23G subclass definitions	F23G	Common rule, inventive process step, only relevant group.	F23G 5/04 (2006.01)
I3, I4	F23C and F23G subclass definitions	F23G	Common rule, application aspect, no relevant subgroup	F23G 7/00 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
B01J 8/24 (2006.01)
F23G 5/04 (2006.01)
F23G 5/30 (2006.01)
F23G 7/00 (2006.01)

Training Example C25

Categories

1a, 1b, 2a , 2a1, 2b1, 2b3, 3b

Documents (Classification is based on US 4 176 090 A)

US 4 176 090 A
DE 2 825 769 A
FR 2 394 324 A

Short Version of the Disclosure

The document discloses pillared interlayered smectite clay products, a method for the preparation and the use of pillared interlayered smectite clay products. The claims and the description refer to various applications, e.g. the interlayered clay products are useful as adsorbents and catalytic supports. The interlayered clay products may be combined with other inorganic oxide adsorbents and catalysts such as silica, alumina, silica-magnesia, silica-alumina hydrogel, and natural or synthetic zeolites, and clays. The interlayered clay products are useful in the preparation of catalysts which contain active/stabilising metals, as well as matrix components such as silica, alumina or silica-alumina hydrogel. These catalysts are used in conventional petroleum conversion processes such as catalytic cracking, hydro-cracking, hydrotreating, isomerisation and reforming catalysts. Furthermore they are useful as molecular sieve adsorbents.

Representative Prior Art

US 3 798 177 and *US 4 060 480* - The preparation of hydroxyl-aluminum modified smectite clays wherein a gibbsite-like layer is formed between the crystalline layers of the clay is disclosed. The gibbsite-like layer is characterised by a 14 A spacing, is continuous and does not substantially increase the internal pore volume of the modified clay material.

Invention Information

I1: An interlayered smectite clay product which includes an inorganic oxide selected from the group consisting of alumina, zirconia and mixtures thereof between the layers thereof, and which possesses an interlayer distance of from about 6 to 16 A, said interlayered clay having greater than about 50 percent of its surface area in pores of less than 30 A in diameter (see claims 1 to 7).

I2: Process for the preparation of an interlayered smectite clay product comprising the reaction of a smectite with a mixture of a polymeric cationic hydroxyl inorganic metal complex and water to obtain a smectite having greater than 50 percent of its surface area in pores of less than 30 A in diameter after dehydration and finally separating the interlayered smectite from the mixture (see claims 8 to 15, 20 and 21).

I3: A hydrocarbon conversion catalyst and a hydrocracking catalyst comprising an interlayered smectite (see claims 16 and 17)

I4: A hydrocarbon conversion catalyst comprising an interlayered clay admixed with a crystalline aluminosilicate zeolith (see claim 19)

I5: An adsorbent composition comprising an interlayered smectite clay (see claim 18).

Additional Information

A1: The properties of the novel minerals based on smectite type minerals may be viewed as being more characteristic of crystalline zeolites than clays (see description, col. 2, line 10 to 12).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	SILICON inorganic compounds of	C01B 33/00
I1	Catchword Index	ZIRCONIUM inorganic compounds of	C01B, C01C, C01G, C01G 25/00
I1	Catchword Index	ALUMINIUM oxides of	C01F 7/00
I2	Catchword Index	SILICON inorganic compounds of	C01B 33/00
I2	Catchword Index	ALUMINIUM oxides of	C01F 7/00
I3	Catchword Index	CATALYSTS	B01J 21/00 to 38/00
I4	Catchword Index	catalysts comprising MOLECULAR [sieves]	B01J 29/00
I5	Subclass Index	CHEMICAL OR PHYSICAL PROCESS, SORBENT	B01J
A1	Catchword Index	ZEOLITES	C01B 39/00
A1	Catchword Index	inorganic MOLECULAR [sieves]	C01B 37/00, C01B 39/00

Analysis and Selection of Classification Symbols

I1: Using the Catchword Index for “oxides of ALUMINIUM” leads to the subclass C01F. Note (1) under the class title indicates that the last place priority rule applies in this class. This should mean that clays (aluminosilicates) are therefore classified under C01F. However, the reference under the title of C01F states “compounds containing silicon C01B 33/00”. So C01F can be discounted for classification. Similarly C01G is discounted for I1 due to the reference under the title “compounds containing silicon C01B 33/00”.

For the interlayered smectite clay product under consideration, the Catchword Index (SILICO N, inorganic compounds of SILICON) points to subclass C01B. In this subclass the last place priority rule applies. Main group C01B 33/00 relates to inorganic silicon compounds and main group C01B 39/00 to inorganic compounds having zeolite type properties. The guidance heading before C01B 37/00 stipulates that main groups C01B 37/00 and C01B 39/00 relate to compounds characterised primarily by their physical or chemical properties, rather than by their chemical constitution. The last place priority rule would guide us to C01B 39/00. However, because the product of the disclosure is merely claimed in terms of composition (see claim 1) rather than in terms of properties (see col. 2, lines 10 to 12), this leads to main group C01B 33/00. In regard to the last appropriate place according to Note (1) under the class title, **C01B 33/40** is chosen as the classification which most adequately represents the invention.

Though the product of interest may contain magnesium or zirconium for altering the properties of the clay product, classification is not made in C01F and C01G, but in C01B since C01F and C01G have references referring out compounds containing silicon, which would include the clay products, to C01B.

I2: The process for the preparation of interlayered clays (I2), inorganic silicon compounds, is also invention information. According to paragraph 95 of the Guide to the IPC chemical compounds as well as the process of preparation are classified in the groups for the type of compound concerned. Using the catchword “SILICON, inorganic compounds of silicon” leads to main group C01B 33/00. In regard to the last appropriate place according to Note (1) under the class title, **C01B 33/40** applies here for the process of preparation of the regarded clays.

I3, I4, and I5: The use of interlayered clays in chemical or physical processes, e.g. as catalyst or adsorbent is classified in B01J. The catchwords “CATALYSTS” and “catalysts comprising MOLECULAR [sieves]” lead to main groups B01J 21/00 to 38/00 and B01J 29/00. Two groups provide for the catalysts of I3 and I4.Catalysts comprising clays or other mineral silicates (I3) are covered by **B01J 21/16** and catalysts comprising crystalline alumosilicate zeolites (I4) are classified **B01J 29/06**. Adsorbent compositions (I5) are mentioned in the subclass index of B01J “CHEMICAL OR PHYSICAL PROCESSES” as “SORBENT”; solid sorbent compositions comprising alumino-silicates are covered by **B01J 20/16**.

A1: The properties of the novel minerals based on smectite type minerals may be viewed as being more characteristic of crystalline zeolites than clays (A1), therefore additional classification is made within main group C01B 39/00. The catchwords “ZEOLITES” or “inorganic MOLECULAR [sieves]” lead us indeed to C01B 39/00. In regard to the last place priority rule according to Note (1) after the class title, and to the definition given for “zeolites” in the note after main group C01B 39/00, subgroup **C01B 39/02** applies here for the novel minerals.

Subject Matter	Anaylsis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Catchword Index	C01B	Last place rule	C01B 33/40 (2006.01)
I2	Catchword Index	C01B	Last place rule	C01B 33/40 (2006.01)
I3	Catchword Index	B01J	Last place rule	B01J 21/16 (2006.01)
I4	Catchword Index	B01J	Last place rule	B01J 29/06 (2006.01)
I5	Subclass Index	B01J	Last place rule	B01J 20/16 (2006.01)
A1	Catchword Index	C01B	Last place rule	C01B 39/02 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
C01B 33/40 (2006.01)
B01J 20/16 (2006.01)
B01J 21/16 (2006.01)
B01J 29/06 (2006.01)
C01B39/02 (2006.01*)*

Training Example C26

Categoryies

1a, 1b, 2a, 2b4, 2c, 2e, 3c

Documents (Classification is based on GB 2 210 071 A)

GB 2 210 071 A
DE 3 832 112 A
FR 2 620 655 A

Short Version of the Disclosure

The technical subject of the invention concerns paper having a specific structure, adapted for use in printing. This paper has a good ink-absorbency and can be used in rapid multi-color printing, and provides good optical images of vivid and uniform image definition with almost no print through. The ink jet recording paper of this invention comprises a plurality of layers. There is a base layer and an ink-receptive layer superposed on one or both sides of the base layer. Important components of the ink-receptive layer are pulp, fillers and retention aids. In addition the ink-receptive layer is coated or impregnated with fine silica. The base layer contains an internal sizing agent and a powdered precipitated calcium carbonate as filler.

This paper is produced by a multi-ply paper-manufacturing process. When ink ejected from a printer has reached the surface of the ink-receptive layer, the ink is rapidly absorbed and penetrated into the layer because of its good affinity for inks solvents and dyes, and high porosity. The ink, having passed through the ink-receptive layer, reaches to the surface of the base layer; however, because it is sized, the further penetration of the ink is hindered by the surface of the base layer.

Representative Prior Art

There are two trends described in the Prior Art:
One trend is described in the Japanese patent applications sho 53-49113 and sho 58-8685. In the first document it is described to coat or impregnate water-soluble polymer into a sheet filled with urea-formalin resin. The second document discloses that a water-soluble polymer is coated on or impregnated into a sheet filled with synthetic silicate and/or glass fiber. With these sheets high speed printing is possible owing to the ink absorbency improved by non-sizing paper filled with fine powder.
The other trend is described in the Japanese documents sho 60-27588 and sho 61-50795. The aim of this trend is to control the spreading of inks on the paper by reducing ink-absorbency to some extent by weak sizing. To achieve this, in the first document a wet strength agent is added to the sheet and then a small amount of coating colour is applied to the sheet, wherein the sizing degree of the obtained sheet is controlled to below 3 seconds. In the second document a recording paper is produced by sizing with a petrochemically produced, emulsified resin-type size.

Further Japanese document sho 55-150370 discloses an ink jet recording process by the use of a recording sheet having a stuff of synthetic pulp and wood pulp, or by the use of a recording sheet having the above stuff on a wood paper. In either case, however, synthetic pulp needs to melt in the paper surface by heat treatment after ink jet recording.

Invention Information

I1: The multi-ply ink jet recording paper consists of an ink-receptive layer superposed on either one or both sides of a comparatively ink-unabsorbable base layer (see claim 1 and description, page 14, second paragraph, first sentence). The ink-receptive layer is coated or impregnated with fine silica and comprises pulp, a filler like ground calcium carbonate and retention aids (see claims 3, 5, 8 and 9). The ink-unabsorbable base layer contains finely powdered precipitated calcium carbonate as filler (see claims 6 and 7).

This paper is produced by a multi-ply paper-manufacturing process (see claim 1). With this process the optical density of the ink jet recording paper is improved, and the print through, and wrinkles by the absorption of inks are prevented (see description, page 14, second paragraph and page 15, first two lines).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	PRINTING	B41
I1	IPC-Class	Colour Printing	B41M
I1	Catchword Index	PAPER	D21H
I1	Catchword Index	LAYERED PRODUCTS	B32B

Analysis and Selection of Classification Symbols

I1: The use of the catchword “printing” results in class B41. A check of the subclasses of class B41 leads to B41M, because colour printing is mentioned in the title of B41M. A sheet or paper for this process is covered by the application group B41M 5/00 (“Sheet materials for use in duplicating or marking methods”). Checking the one dot groups of this main group will guide to B41M 5/50, which covers recording sheets characterised by the coating used to improve ink, dye or pigment receptivity. In addition the use of these papers for ink jet recording is additionally mentioned in this subclass, so that subgroup **B41M 5/50** most adequately represents the invention. For that reason also, this symbol is presented first.

The use of the catchword “paper” leads on the other hand to D21H. This is a function-oriented subclass and covers an aspect of the inventive paper.

The correctness of a further classification in this function-oriented subclass is confirmed in paragraph 90 of the Guide, which indicates that if the essential technical characteristics of the subject relate both to the intrinsic nature or function of a thing and to its particular use, or its special adaptation to or incorporation into a larger system, classification is made in both the function-oriented place and the relevant application-oriented place.

The title of D21H covers “Paper not otherwise provided for”. In regard to the fact that the inventive paper is a recording paper for ink jet printers, this paper is a special paper as provided in D21H 27/00. The following one-dot groups concern different properties or applications of the special papers. The structure of the inventive paper is provided for by subgroup **D21H 27/30**, which relates to multi-ply paper. In view of the Note following group

D21H 27/30, layered paper should also be classified in subclass B32B (“Layered products”). In this subclass group B32B 29/00 covers layered products in which paper is the most important constituent. More specific than the main group 29/00 is the one-dot group **B32B 29/06** which includes the inventive treatment of the surface of the paper with fine silica (see claim 3), so that B32B 29/06 is a correct IPC place.

Note (3) after the subclass title of D21H points out that a paper if it is characterised by more than one feature provided for in this subclass classification is made in all places providing for these features. This way the sizing agent (see claim 1) used in the base layer of the inventive paper has to be classified in **D21H 21/16.**

In addition a coating material for paper as provided in claim 3 is covered by D21H as well. In the a coating material like the inventive fine silica is covered by **D21H 19/40**.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass/group title	B41M	Last place rule	B41M 5/50 (2006.01)
I1	Note following group D21H 27/30	B32B	First place rule	B32B 29/06 (2006.01)
I1	Subclass/group title	D21H	Common rule	D21H 27/30 (2006.01) D21H 21/16 (2006.01) D21H 19/40 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B41M 5/50 (2006.01)
B32B 29/06 (2006.01)
D21H 27/30 (2006.01)
D21H 21/16 (2006.01)
D21H 19/40 (2006.01)

Training Example C27

Categories

1a, 1b, 2b3, 3b

Documents

This is an artificial example.

Brief Description of the Artificial Example

This artificial example concerns a combinatorial chemistry method enabling rapid synthesis and screening of virtually any number of catalysts on a microscale, the resulting catalysts library and the individual catalysts. This particular method is used for discovering catalysts used for making carbon fibrils by a heterogeneously catalysed process. A 128-membered thin film catalysts library is produced on a quartz substrate using an in-vacuum multiple gun sputtering deposition system containing four metals: iron, nickel, molybdenum, and chromium. The sputter guns heat the metals to form metal plasma vapor which is deposited on the substrate using standard apparatus. The resulting catalysts library is then annealed at 200º C for over 24 hours in a vacuum oven under conditions to prevent oxidation. In preparation for screening, the library is then loaded into a chemical vapor deposition reactor containing non-organic gas to create a non-oxidative environment, heated, and exposed to a carbon source, e.g. ethylene, which can lead to the formation of carbon fibrils on the library. The thin film catalysts library is screened for catalyst candidates (those showing the formation of carbon fibrils) using electron microscopy. The following catalysts were shown to produce carbon fibrils: nickel combined with molybdenum; nickel combined with chromium; nickel combined with molybdenum, and chromium; iron combined with nickel and chromium; iron combined with nickel and molybdenum; and iron combined with nickel, molybdenum, and chromium. These catalysts are unlike those in the prior art.

Representative Prior Art

Combinatorial methods have been used as an efficient and rapid way to synthesize and screen numerous different substances on a microscale. Combinatorial methods represent a systematic way to screen for potential drugs, catalysts and materials.
A multitude of combinations of metal alloys and elemental metals may be used to form catalysts. Therefore, the study of potential catalysts in the vast array of metal alloys and elemental metals may be a slow and tedious process. Due to the inefficiency of typical methods, new methods to discover catalysts are constantly being sought".

Invention Information

I1: A method of screening a thin film catalysts library by reacting the library in a chemical vapor deposition reactor containing non-organic gas and a carbon source to form carbon fibrils on the catalysts which is an indication of catalytic activity. Electron microscopy being used to determine the catalysts producing carbon fibrils.

I2: Thin film catalysts library containing the metals: iron, nickel, molybdenum, and chromium.

I3: A combinatorial chemistry method of synthesising a thin film catalysts library comprising the sputtering of iron, nickel, molybdenum, and chromium onto a substrate and then thermally annealing the catalysts onto the substrate.

I4: The catalysts: nickel combined with molybdenum; nickel combined with chromium; nickel combined with molybdenum, and chromium; iron combined with nickel and chromium; iron combined with nickel and molybdenum; and iron combined with nickel, molybdenum, and chromium.

Additional Information

A1: Preparation of carbon

A2: Carbon fibrils

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1-13	Catchword index	Combinatorial chemistry	C40B
I4	Catchword index	Catalysts	B01J 21/00-38/00
A1	Catchword Index	Carbon; inorganic compounds of carbon	C01B 31/00
A2	TACSY	Carbon filaments	D01F 9/12

Analysis and Selection of Classification Symbols

A search of the Catchword Index has shown subclass C40B to be proper for combinatorial chemistry related subject matter. This subclass uses the first place priority rule (paragraphs 147 – 150 of the Guide) for document placement.

I1: Subclass C40B is the proper place for a method of screening a combinatorial library. Based on the first place priority rule, the first main group which provides for the subject matter of the invention is determined. This is main group C40B 30/00 (methods of screening libraries). Under this group, the first one-dot subgroup that provides for subject matter of the invention is C40B 30/08 which is for measuring catalytic activity. As C40B 30/08 has no subgroups indented under it, **C40B 30/08** is the proper classification symbol to be used.

I2. Subclass C40B is the proper place for libraries such as the thin film catalysts library containing the metals: iron, nickel, molybdenum, and chromium. Based on the first place priority rule, the first main group, which provides for the subject matter of the invention, is determined. This is main group C40B 40/00 (libraries per se). The first one-dot subgroup under C40B 40/00 that provides for subject matter of the invention is C40B 40/18 which provides for libraries containing only inorganic compounds such as metals. As C40B 40/18 has no subgroups indented under it, **C40B 40/18** is the proper classification symbol to be used.

I3: Subclass C40B is the proper place for methods of synthesising a catalyst library. Based on the first place priority rule, the first main group, which provides for the subject matter of the invention, is determined. This is main group C40B 50/00 (methods of creating libraries). The first one-dot subgroup under C40B 50/00 that provides for subject matter of the invention (forming of a library on a substrate) is C40B 50/14 for solid phase synthesis. The first appropriate two-dot group is C40B 50/18 for using a particular method of attachment to the solid support (in-vacuum multiple gun sputtering deposition and annealing). As C40B 50/18 has no subgroups indented under it, **C40B 50/18** is the proper classification symbol to be used.

I4: In subclass B01J the range of groups B01J 21/00 to B01J 38/00 is the proper area for catalysts per se. The following catalysts from the library were shown to produce carbon fibrils: nickel combined with molybdenum; nickel combined with chromium; nickel combined with molybdenum, and chromium; iron combined with nickel and chromium; iron combined with nickel and molybdenum; and iron combined with nickel, molybdenum, and chromium. Though B01J is generally a common rule subclass, in the set of groups B01J 21/00 to B01J 31/00 which is where the catalysts of this invention go, classification is made in the last appropriate place. Based on this, main group B01J 23/00 is the proper classification place for the catalysts of this example since they contain metals not provided for in B01J 21/00. Under this main group, the last one-dot subgroup that provides for these catalysts is B01J 23/70. The last two-dot subgroup under B01J 23/70 that provides for these catalysts is B01J 23/76. Under B01J 23/76 the previous procedure is followed for finding the places that provide for these catalysts, and the final classifications are five-dot subgroup **B01J 23/86** (Ni and Cr; Fe, Ni, and Cr), six-dot subgroup **B01J 23/883** (Ni and Mo; Fe, Ni and Mo), and six-dot subgroup **B01J 23/887** (Ni, Mo and Cr; Fe, Ni, Mo and Cr).

Note (2) (b) of the C40B scheme recommends classifying subject matter of interest in other appropriate places of the IPC. Although the subject matter of this example is specifically adapted to combinatorial methods of library preparation and screening it was considered useful to add classification symbols of places for non-combinatorial methods.

A1: C01B 31/00 is the proper place for carbon, with subgroup C01B 31/02 relating to the preparation of carbon.

A2: D01F 9/00 is the proper place for artificial filaments, with subgroup D01F 9/127 specifying manufacture of carbon filaments by thermal decomposition.

The classification symbol listed first is **C40B 30/08** since it is the first place in the C40B scheme that provides for subject matter of the invention and is considered the symbol which most adequately represents the invention as a whole.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject matter	C40B	First place priority rule	C40B 30/08 (2006.01)
I2	Subclass title covers subject matter	C40B	First place priority rule	C40B 40/18 (2006.01)
I3	Subclass title covers subject matter	C40B	First place priority rule	C40B 50/18 (2006.01)
I4	Subclass title covers subject matter	B01J	Last place priority rule	B01J 23/86, B01J 23/883 B01J 23/887 (2006.01)
A1	Subject title covers subject matter	C01B	Last place priority rule	C01B 31/02 (2006.01)
A2	Subclass title covers subject matter	D01F	Common rule	D01F 9/127 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C40B 30/08 (2006.01)
C40B 40/18 (2006.01)
C40B 50/18 (2006.01)
B01J 23/86 (2006.01)
B01J 23/883 (2006.01)
B01J 23/887 (2006.01)
C01B 31/02 (2006.01)
D01F9/127 (2006.01)

Training Example C28

Categories

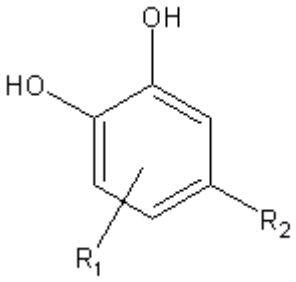
1b, 2b3, 2d, 3a

Documents (Classification is based on EP 0526598 B1)

EP 0526598B1
DE 69123738E
JP 5331148

Short Version of the Disclosure

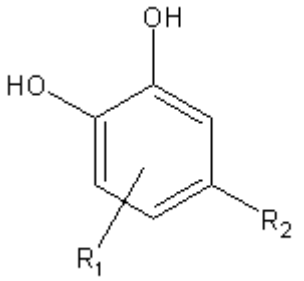
A family of compounds are disclosed, defined by the (Markush) formula **I**, wherein R_1 is selected from either nitro, halo or cyano, and R_2 is a defined heterocycle. The compounds of the invention and their pharmaceutically acceptable salts thereof are useful in the prevention or treatment of tissue damage induced by lipid peroxidation.



I

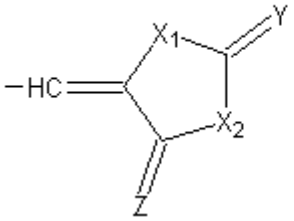
Invention Information

I1: The compounds of the invention according to formula (**I**), wherein R_1 is selected from either nitro, halo or cyano.

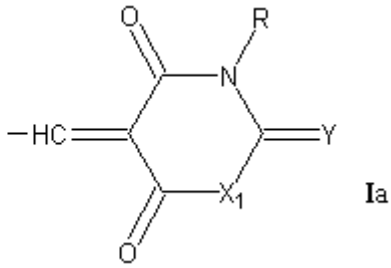


I

There are two general variants of the invention, concerning the nature of R_2. In the first case (variant **I**a), R_2 is selected from the possible heterocycles:

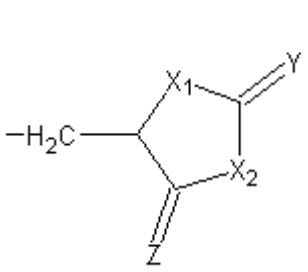


and

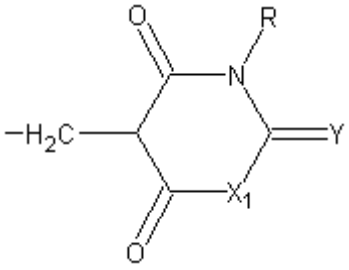


Ia

In the second variant (**I**b), the nature of R_2 is defined as follows:



or



Ib

In cases Ia and Ib, R is selected from H, straight or branched C_{1-8} alkyl, C_{5-7} cycloalkyl, phenyl C_{1-8} alkyl, or a phenyl group, and X_1, X_2, Y and Z can be independently selected from O, S, or NR, where R is defined as above. Also included are the pharmaceutically acceptable salts or esters of the compounds described above.

I2: A method for the manufacture of the compounds of the invention.

I3: Medicaments containing the compounds of the invention or their pharmaceutically acceptable salts or esters. The radical trapping ability of compounds of the invention are demonstrated.

I4: The therapeutic effect of the compounds is described, namely their use in the prevention and treatment of lipid peroxidation.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC places
I1	Catchword index	HETEROCYCLIC compounds	C07D
I2	Catchword index	HETEROCYCLIC compounds	C07D
I3	Catchword index	MEDICINE(S)	A61K
I4	TACSY	THERAPEUTIC	A61P

Analysis and Selection of Classification Symbols

I1: The compounds of the invention are all organic compounds, so primary classification is made in Class C07. Note (3) under Class C07 indicates that a last place priority rule extends between and within subclasses C07C to C07K. The compounds contain, without exception, heterocyclic moieties, and comprise only C, H, N, O, S and halogen. The subclass for such compounds is C07D.

Referring to paragraph 100 of the Guide to the IPC, we see that where a patent document is directed to a plurality of compounds, defined by general formulae, there are rules defining the manner in which classification is to be conducted. The stepwise procedure indicates that where any of the compounds of the invention are fully identified both by name and by the definition of a particular property or worked example of its preparation, classification of such compounds is sufficient to cover the compounds of the invention *per se*. In the present case, test results are listed for 7 named compounds, providing an indication of one of their properties, namely their binding efficiency of radicals. A further 14 examples provide clear

instructions for the manufacture of compounds of the invention, relating to these 7 compounds and 7 others.

Therefore the following compounds should be classified under step 1 of Guide paragraph 100.

1) 4-[(3,4-dihydroxy-5-chlorophenyl)methylidene]-2-thioxoimidazolidin-5-one
2) 5-[(3,4-dihydroxy-5-cyanophenyl)methylidene]-2-thioxothiazolidin-4-one
3) 4-[(3,4-dihydroxy-5-nitrophenyl)methylidene]-2,5-imidazolidindione
4) 5-[(3,4-dihydroxy-5-nitrophenyl)methylidene]-2-thioxothiazolidin-4-one
5) 4-[(3,4-dihydroxy-5-nitrophenyl)methylidene]-2-thioxoimidazolidin-5-one
6) 5-[(3,4-dihydroxy-5-nitrophenyl)methylidene]-2,4,6-(1H,3H,5H)-pyrimidinetrione
7) 4-[(3,4-dihydroxy-5-cyanophenyl)methylidene]-2-thioxoimidazolidin-5-one
8) 5-[(3,4-dihydroxy-5-nitrophenyl)methylidene]-2-thiazolidin-2,4-dione
9) 5-[(3,4-dihydroxy-5-nitrophenyl)methylidene]-2-iminothiazolidin-4-one
10) 5-[(3,4-dihydroxy-5-nitrophenyl)methylidene]-4-thioxothiazolidin-2-one
11) 5-[(3,4-dihydroxy-5-nitrophenyl)methylidene]-3-methyl-2-thioxothiazolidin-4-one
12) 5-[(3,4-dihydroxy-5-nitrophenyl)methylidene]-4-thioxo-2-oxazolidinone
13) 5-[(3,4-dihydroxy-5-cyanophenyl)methylidene]-2-thioxoimidazolidin-5-one
14) 5-[(3,4-dihydroxy-5-nitrophenyl)methyl]-(1H,3H,5H)-pyrimidine-2,4,6-trione

Note also that these 14 compounds equate to the 14 specified compounds in the claims.

Compounds 1, 3, 5, 7 and 13 are 1,3-imidazole derivatives, and are classified under C07D 233/00. At the next hierarchical level, it is noted that all these compounds have three double bonds between ring members and non-ring members (in positions 2, 4 and 5 of the imidazole ring). This is covered specifically in **C07D 233/96**. This has no subgroups, so classification is made here.

Compounds 2, 4, and 8-11, being 1,3-thiazole derivatives, are covered by C07D 277/00. There being no further condensation with other rings, classification us made under C07D 277/02. All the compounds have 3 double bonds between ring and non-ring members, bringing us to C07D 277/20. Further, all the compounds have 2 heteroatoms bound to ring members, which is covered thereunder at C07D 277/32. Compounds 2, 4, 10 and 11 have S and O atoms thus bound. Since the last place rule applies, we select **C07D 277/36**, which covers the bound sulfur atoms. Compound 8 has two bound oxygen atoms, and is therefore placed at **C07D 277/34**. Compound 9 contains a bound imino group, so we turn in this case to C07D 277/38. This is further subdivided, with group **C07D 277/40** specific to unsubstituted imino groups. This group has no subdivisions and none of the later subgroups apply, so we classify this compound here.

Compounds 6 and 14, being pyrimidine derivatives, are classified under C07D 239/00. They are both uncondensed, so classification is made under C07D 239/02. As both compounds are triones, there are at least 3 bonds between ring and non-ring members in both cases, (4 in the case of compound 14) so we turn to C07D 239/24. Each compound also has heteroatoms attached to ring members, which is covered thereunder at C07D 239/28. This group is further divided; there being more than two bound heteroatoms, classification will occur under C07D 239/46. This group is also divided, and we can see a group for 3 oxygen or sulfur atoms attached to the pyrimidine ring at C07D 239/60. Being pyrimidine-2,4,6-triones, both compounds are derivatives of barbituric acid, which has a specific place at **C07D 239/62**. None of the further subdivisions is relevant, so both compounds are classified here.
Compound 12 is a 1,3-oxazole derivative, and is classified in C07D 263/00. It is not condensed (C07D 263/02), and further has three double bonds between ring and non-ring members (C07D 263/30). The ring has 2 heteroatoms directly attached, an oxygen and a

sulfur atom. Looking at the available subgroups, and mindful of the last place rule, classification is made at **C07D 263/46** for the sulfur atom.

I2: Note (4) under class C07 indicates that preparation of compounds is classified in the place for the compound itself. Since the preparation method is not concerned with any new type of chemical reaction, the classification of the compounds *per se* is sufficient to cover the preparation methods disclosed.

I3: The compounds are pharmaceutical agents. The correct place for classification of organic chemical pharmaceutical compounds is in A61K, specifically A61K 31/00. Note (4) under the subclass title indicates a last place rule in this main group. Still applying guide paragraph 100, the 14 "fully identified" compounds cited above therefore need to be classified according to the last place rule in A61K 31/00.

As all of the compounds are heterocycles, they are classified under A61K 31/33. Looking to the next hierarchical place, there are places specifically dealing with oxygen, sulfur and nitrogen as heteroatoms. The nitrogen option is listed last, and as all the heterocycles contain at least one nitrogen heteroatom, they all can be placed under A61K 31/395. All the compounds, except 6 and 14, comprise 5-membered rings, and are therefore covered under A61K 31/41.

Specifically, compounds 1,3,5,7 and 13 are 1,3-diazoles, which are placed under A61K 31/4164. All 5 of the compounds have oxygen atoms directly bound to the heteroring (and 4 of them also have sulfur atoms attached). This is covered in **A61K 31/4166**. None of the other subgroups at this level apply (the aryl moiety being joined by means of a methylidene bridge, none of the compounds are arylalkylimidazoles), so classification is made here. Compounds 2, 4 and 8-11 are thiazoles, which are covered by A61K 31/425. Under this group, **A61K 31/426** caters specifically for 1,3-thiazoles. None of the other subgroups after this one apply, so this is where they are classified.

Compound 12 is an oxazole, covered under A61K 31/42. It is specifically a 1,3-oxazole, which is covered by **A61K 31/421**. Since none of the other subgroups after it apply, this is the correct classification.

Compounds 6 and 14 are pyrimidine derivatives, i.e. 6-membered rings with 2 nitrogen heteroatoms. These are covered under A61K 31/495, and specifically thereunder at A61K 31/505. Having oxo groups directly attached to the heteroring, they are covered under A61K 31/513, whose subgroup **A61K 31/515** specifically covers barbituric acid derivatives (pyrimidine-2,4,6-triones).

I4: The therapeutic effect is given as prevention of lipid peroxidation. Note (5) under both subclasses C07D and A61Kindicates that this should be classified in A61P. This is a secondary classification place, as indicated by note (4) under the subclass title. Note (3) under the subclass title also indicates that multi-aspect classification can occur here. Examining the group titles, and noting the general antioxidant nature of the compounds, classification under A61P 39/00 seems most appropriate. Specifically, group **A61P 39/06** deals with antioxidant behaviour and free-radical scavenging, which clearly covers the therapeutic activity of the compounds in question.

A number of specific ailments are noted in claim 20. It might be considered appropriate to classify further in this subclass to reflect the named ailments. The subclass being small, it is, in particular, easily noticed that A61P 17/18 also mentions antioxidants. This is in the context of dermatological disorders, which might cover the notion of ageing. However, group A61P 39/06 sufficiently covers the therapeutic activity of antioxidant activity and further classification would seem tautological. Classification in other places of A61P should

therefore be undertaken only as additional information, which is in this case a matter of judgement for the classifier.

It should be noted that the classifications under C07D should be given first, since these are for the primary invention, the compounds per se. Within this, the classifications under C07D 277/00 should be listed first, since the largest number of compounds are 1,3-thiazoles. Within this main group, subgroup C07D 277/36 covered the largest number of variants, and is therefore listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Note 3 under class title	C07D	Last place priority rule	C07D 233/96 C07D 277/36 C07D 277/34 C07D 277/40 C07D 239/62 C07D 263/46 (2006.01)
I2	Note 3 under class title	C07D	Last place priority rule	As above (I1)
I3	Note 1 under subclass title	A61K	Last place priority rule	A61K 31/4166 A61K 31/426 A61K 31/421 A61K 31/515 (2006.01)
I4	Note 5 in C07D/A61K		Secondary classification	A61P 39/06 (2006.01)

Complete Classification

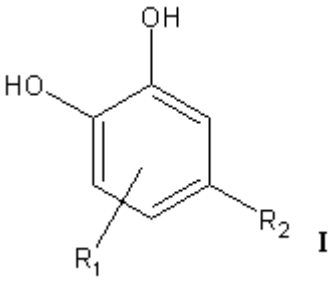
The complete classification for this document based on the above analysis is as follows:

Int. Cl.
C07D 277/36 (2006.01***)***
C07D 277/34 (2006.01***)***
C07D 277/40 (2006.01)
C07D 233/96 (2006.01)
C07D 239/62 (2006.01)
C07D 263/46 (2006.01)
A61K 31/4164 (2006.01)
A61K 31/426 (2006.01)
A61K 31/421 (2006.01)
A61K 31/515 (2006.01)
A61P 39/06 (2006.01)

Appendix

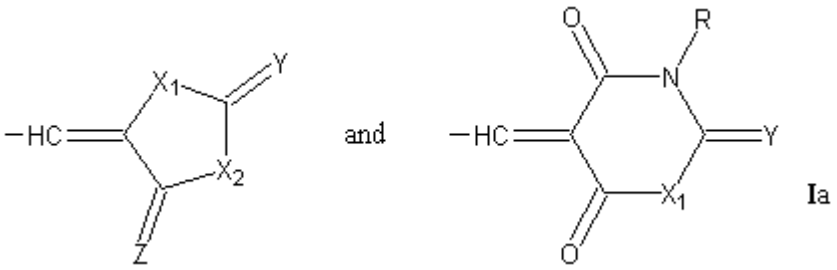
In the interests of more fully explaining the application of paragraph 100 of the Guide, we will consider how to classify the Markush formula of the invention as though there were no "fully identified" compounds disclosed.

The formula is given as follows:



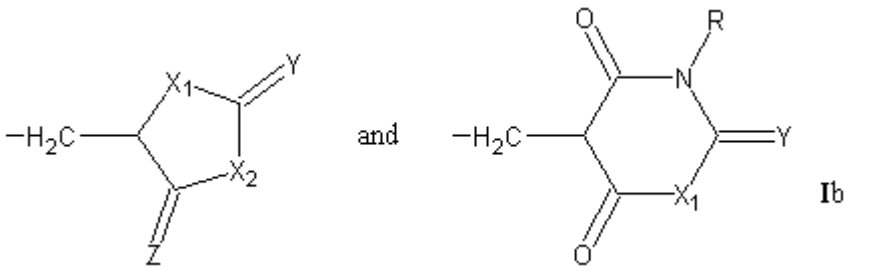
I

wherein R_1 is selected from either nitro, halo or cyano, and R_2 is selected from the following:



Ia

and



Ib

,

where for any of **I**a or **I**b, R is selected from H, straight or branched $C_{1\text{-}8}$ alkyl, $C_{5\text{-}7}$ cycloalkyl, phenyl $C_{1\text{-}8}$ alkyl, or a phenyl group, and X_1, X_2, Y and Z can be independently selected from O, S, or NR, where R is defined as above. For the purposes of the this exercise, we will only consider rigorously the classification of the compounds of this formula *per se*.

Step 2 in the classification procedure of Guide paragraph 100 states that

> "if no "fully identified" compounds are disclosed, the general formula is classified in the most specific group(s) that cover(s) all or most of the potential embodiments. Classification should be limited to a single or a very small number of groups."

We already know that all the compounds are necessarily heterocyclic, and that the compounds are therefore classified in C07D. None of the possible variants involve any ring fusion, and each possible compound contains only one heterocycle.

Let us begin by examining the 6-membered ring variants. In each case, there is always at least one nitrogen atom in the ring, but X_1 can be selected from O, S and NR, meaning that that there a three kinds of potential heterocycle, a pyrimidine (X_1=NR), a 1,3 oxazine (X_1=O) and a 1,3-thiazine (X_1=S). Pyrimidines are covered by C07D 239/00, but we are required to apply the most specific group that covers the maximum variants. C07D 239/02 covers non-condensed pyrimidines. It has a number of subgroups, of which C07D 233/24 covers having 3 or more double bonds between ring and non-ring members. Under this, C07D 233/28 covers that at least one of these bonds is to a heteroatom, and under this **C07D 233/46** covers the fact that there are at least two such bonds. It is not possible to go to a lower subgroup without splitting the variants into at least two groups, so classification is made in this place to minimise the number of classifications given.
Oxazines are covered by C07D 265/00. Here the scheme is simpler, and it is readily obvious that **C07D 265/06** is the lowest group to cover all potential oxazine variants.
Thiazines are accommodated in C07D 279/00. Here, the lowest possible group that covers all the variants is **C07D 279/06**.

Turning now to the five-membered ring variants, there are more possibilities. The two ring heteroatoms can be independently selected from oxygen, sulfur and nitrogen. There are technically 9 variants as follows:

variant	1	2	3	4	5	6	7	8	9
X_1	NR	NR	NR	O	O	O	S	S	S
X_2	NR	O	S	NR	O	S	NR	O	S

The first variant constitutes a 1,3-diazole. This is covered under **C07D 233/00**. Since there are two basic alternatives represented, having either 2 (**I**b) or 3 (**I**a) double bonds between ring and non-ring members, it is not possible to go to lower hierarchical levels without requiring at least two classification symbols. Since step 2 requires a minimum number of classification symbols to cover a maximum of information, we classify these compounds in the main group.
Variant 2 is a 1,3-oxazole, as is variant 4; these are covered by C07D 263/00. Here, we find a subgroup (C07D 263/02) identifying non-condensed oxazoles, under which there is a subgroup (C07D 263/30) covering 2 or 3 double bonds to non-ring members. Under this, group **C07D 263/34** caters for these bonds being to heteroatoms. This group is further subdivided, but none of these subdivisions caters for all the possible oxazole compounds of the formula, so classification is made here.
Variants 3 and 7 are 1,3-thiazoles, which are covered by C07D 277/00. Applying the same rationale as for the oxazoles brings us to **C07D 277/32**, which is the hierarchically lowest group to cover all the potential thiazole compounds.
Variant 5 is a 1,3-dioxole, and is classified under C07D 317/00 at C07D 317/08. Under this, we track through group C07D 317/10 (non-condensed) to group C07D 317/32, covering the heteroatoms which are attached to ring members in all possible dioxoles. This group has only one relevant subgroup (C07D 317/34), but as it does not cover all possible dioxoles of the formula, we remain with the higher group, and classify in **C07D 317/32**.
Variants 6 and 8 are 1,3-oxathioles, covered in C07D 327/00, with all possibilities covered by **C07D 327/04** (specifically for 1,3-oxathioles).
Lastly, variant 9 is a 1,3-dithiole, which is classified in C07D 339/00, and specifically in **C07D 339/06**.

Step 2 requires that that we keep the number of classification symbols to a minimum. However, since the selected groups already independently cover unique sets of possible variants without any overlap, there is no scope for rationalisation.

Note again that we have only rigorously addressed the classification of the compounds per se. A similar procedure could be applied to cover the pharmaceutical aspects of the compounds. However, it would be sufficient in this case to indicate the primary classification of **A61K 31/33**, to indicate to searchers that there are organic chemical pharmaceuticals associated with the compounds of the invention. This group is the lowest hierarchical group under A61K 31/00 that covers all the possible variants, and keeps the number of classifications to a minimum while offering some information of value concerning the disclosure. Classification in **A61P 39/06** should also be made. This classification is not affected by the scope of Guide paragraph 100.

Final classification (applying only Guide step 2).

Int. Cl.
C07D 233/00 (2006.01)
C07D 239/46 (2006.01)
C07D 263/34 (2006.01)
C07D 265/06 (2006.01)
C07D 277/32 (2006.01)
C07D 279/06 (2006.01)
C07D 317/32 (2006.01)
C07D 327/04 (2006.01)
C07D 339/06 (2006.01)
A61K 31/33 (2006.01)
A61P 39/06 (2006.01)

Training Example E1

Categories

1a, 1b, 2b1, 3a, 3b

Documents (Classification is based on GB 1 271 920)

GB-A- 1 271 920
FR-A- 2 070 398
DE-OS- 2 059 629

Short Version of the Disclosure

The document discloses a reflecting cavity (1) for optical pumping of a laser medium, the cavity (1) including a body (4) defining the cavity, a laser medium (2) and an optical pumping medium (3) in said body, and a reflector (5) lining said body, wherein the reflector is in the form an elastic sheet whose edges parallel to the body axis are not joined so that the reflector is held against the body walls by the elasticity of the sheet, without being attached to the body.

Representative Prior Art

Reflecting cavities for optical pumping of a laser medium have been proposed, including a cylindrical reflector of circular cross-section, or of elliptical cross-section, with the active medium and the lamp (for optically pumping the laser medium) lying along respective axes passing through the foci of the cross section – see page 1, left column, lines 18-31 of GB 1 271 920.

Invention Information

Reflecting cavities for optical pumping of a laser medium including a cylindrical reflector are known in the prior art (see above). The addition to the prior art comes from the easiness in construction, as the reflector can be slipped inside the body, as well as from the fact that the reflector edges are not joined but there is a slight spacing between them, so that a temperature increase will not lead to wrinkling of the reflector. This is reflected in the granted claims 1 and 9.

Description is also given for a particular form of the reflecting sheet (5) – see page 2, left column, lines 6-22. However the applicant seems not to claim any novelty of the disclosed reflecting sheet, and indeed the applicant states that "... the reflective layer 6 is of gold and the protective coating 7 of silicon monoxide SiO. It will be appreciated that gold and silicon monoxide are specified here merely by way of example. The reflective layer may provide direct or diffuse reflection, suitable reflective layers being used for each particular application".

Thus, it seems that the elastic reflective sheet of the reflector is known per se.

In summary, the following piece of Invention Information is identified:

I1: optical pumping of a laser medium by a novel reflecting cavity

Additional Information

Having recognized that the disclosed reflector of the optical pumping cavity is not in itself an addition to the state of the art, it is non-obligatory but desirable to classify such reflector as Additional Information, in order to facilitate a searcher looking for an improved optical pumping cavity for lasers, wherein the improvement stems from the reflector (rather than from e.g. the lamp).

Stated differently, it is desirable to complement the Invention Information (~ optical pumping cavity) by identifying the component (~ curved mirror) that in the context of the classified technical subject (thus not in itself) represents the addition to the state of the art.

In summary, the following piece of Additional Information is identified:

A1: optical cylindrical reflector

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	LASER(S)	H01S
A1	Catchword index	Optical MIRROR(S)	G02B 5/08

Analysis and Selection of Classification Symbols

Under H01S, and following the “Common rule” for group selection, it is determined that focusing arrangements for optical pumping by lamps of a laser are covered by **H01S 3/093**, which is then the most appropriate group for piece of information I1.

Likewise, under G02B 5/00 and following the “Common rule” for group selection, it is determined that cylindrical (thus curved) mirrors are covered by group **G02B 5/10**, which is then the most appropriate group for piece of information A1.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	H01S	Common rule	H01S 3/093 (2006.01)
A1	Subclass title covers the subject matter	G02B	Common rule	G02B 5/10 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H01S 3/093 (2006.01)
G02B 5/10 (2006.01)

Training Example E2

Categories

1a, 2a1, 2b1

Documents (Classification is based on GB-A- 1 280 733)

GB-A- 1 280 733
FR-A1- 2 058 320
DE-A1- 1 941 848

Short Version of the Disclosure

The document discloses a novel method for separating the luminance and chrominance components from a PAL colour television signal having quarter line offset by transit time analysis.

Representative Prior Art

Method for separating the luminance and chrominance components from a PAL colour television signal having quarter line offset – see column 1, lines 10-13 of GB 1 280 733.

Invention Information

The addition to the prior art comes from the novel method and related circuit as a whole. This is reflected in the granted claims.

In summary, the following piece of Invention Information is identified:

I1: Method and circuit for separating luminance and chrominance components in a PAL (colour) television signal

Additional Information

None.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	TELEVISION	H04N
I1	Catchword index	TELEVISION contrast or brightness control	H04N 5/57

Analysis and Selection of Classification Symbols

Under H04N and following the “Common rule” for main group selection, it is determined that the arrangement of the invention is covered by group H04N 9/00, which covers “Details of colour television systems”.

Main group H04N 5/00 (dealing with “Details of television systems”) is not appropriate in view of a limiting reference pointing to group H04N 9/00 as far as special adaptations to colour televisions.

Among the one-dot subgroups of H04N 9/00, the group H04N 9/64 (dealing with “Circuits for processing colour signals”) is not appropriate, in view of a precedence rule pointing to H04N 9/77. Therefore, the best fitting one-dot group is H04N 9/77. Its sub-group **H04N 9/78** is found to be the best matching entry for piece of information I1.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	H04N	Common rule	H04N 9/78 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H04N 9/78 (2006.01)

Training Example E3

Categories

1a, 1b, 2a1, 2b1, 2f, 3a, 3b, 3c

0

Documents (Classification is based on US 3,958,646 A)

US 3,958,646 A
FR 2 271 343 A
DE 2 503 414 OS

Short Version of the Disclosure

The invention relates to a penetrometer frame – for the definition of “penetrometer” see the section “Representative prior art” below.

The frame comprises a fixed part provided with slides (11, 13) for guiding a driving hammer (18), wherein said fixed part can be pivoted about a horizontal pivot point (23) offset with respect to the point where the tubes (10) used for the measurements are inserted or removed. A measuring head (22), which is normally positioned on a support (26) when not used, may be interposed between an anvil (21) and the tube (10), when measuring the resistance to driving or extraction by hydraulic forces.

Representative Prior Art

With reference to column 1 of the document, the penetrometer is a means for exploring the ground to drive a probe placed at the lower end of a set of tubes, into the ground. Measurements of the soil strength take place during so called “static operation” of the apparatus, which consists of exerting considerable pressure on the top of the set of tubes, by means of powerful hydraulic means. When it is desired to make borings in hard ground a driving hammer is used (“dynamic operation”).
During “static operation” or extraction, the hammer is immobilized and a measuring head is interposed between an anvil disposed under the hammer and the top of the set of tubes, to undertake the recording during static operation or extraction. During “dynamic operation”, the measuring head needs to be removed.

Also penetrometers are known which have a frame composed of a fixed part and a moving part, in which this frame may be withdrawn in order to expose the central part where the set of tubes is located, in order to provide the space necessary for adding or removing tubes.

Invention Information

The addition to the prior art comes from the advantageous manoeuvrability of the frame: a heavy hammer can be easily manoeuvred, and a measuring head can be easily assembled and dismantled – see column 2, lines 30-64. This is reflected in the granted claims.

In summary, the following piece of Invention Information is identified:

I1 : frame for penetrometer, i.e. a device for exploring (investigating) ground properties

Additional Information

The ground properties are measured by using hydraulic forces, which exert high pressure on the top of the measuring tubes – see column 1, lines 8-13. The ground investigation involves then hydraulic pressure. This subject matter seems to be known per se.

Having recognized that the use of hydraulic pressure means for the investigations is not in itself an addition to the state of the art, it is non-obligatory but desirable to classify such piece of information as Additional Information, in order to facilitate a searcher looking for a penetrometer, wherein investigation is made by hydraulic pressure means.

Stated differently, it is desirable to complement the Invention Information (~ penetrometer) by identifying a component (~ investigating by hydraulic pressure means) that in the context of the classified technical subject (thus not in itself) represents an addition to the state of the art.

In summary, the following piece of Additional Information is identified:
A1 : investigating ground properties by use of hydraulic pressure means

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	Exploring or INVESTIGATING	G01N
I1	Catchword index	GROUND (screws)	E02D 5/56
A1	Catchword index	INVESTIGATING by hydraulic pressure means	G01N

Analysis and Selection of Classification Symbols

Under G01N, which is the place for investigating materials in general, a reference points to subclass E02D 1/00 for “investigation of foundation soil in situ”. This is a reference that affects classification (see also corresponding Definition for G01N): the subject matter under consideration is excluded from G01N as a special adaptation of “investigating materials” when specially adapted to “investigating of soil in situ”.

Under E02D, and following the “Common rule” for group selection, it is determined that the “investigation of foundation soil in situ” is covered by group E02D 1/00.
The available one-dot subgroups cover the aspects of “investigating before construction work” and “investigating after finishing the foundation structure” respectively. Since there is no clear indication in the document that either aspect above is of primary importance, the document has to be classified in the more general group covering all aspects above.

Thus E02D 1/00 seems to be the most appropriate group for piece of information I1.

Group E02D 5/56 (~ screws) is ruled out since the main group E02D 5/00 relates to " [...] structural elements specially adapted to foundation engineering", which is not appropriate for I1.
Under G01N, and following the "Common rule" for group selection, it is determined that "investigating mechanical strength" is covered by group G01N 3/00. Among the subgroups, G01N 3/10 covers precisely the aspect of "by applying steady forces generated by hydraulic pressure".

There is no indication in the document that the applied forces are of repetitive or pulsating type. Actually in column 5, lines 25-26, "measurements of static driving or extraction" are mentioned. This seems to rule out the other group G01N 3/36 for "by applying repeated or pulsating forces generated by hydraulic pressure".

Thus G01N 3/10 seems to be the most appropriate group for piece of information A1.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Limiting reference	E02D	Common rule	E02D 1/00 (2006.01)
A1	Subclass title covers the subject matter	G01N	Common rule	G01N 3/10 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
E02D 1/00 (2006.01)
G01N 3/10 (2006.01)

Training Example E4

Categories

1a, 1b, 2a1, 2b1, 3b

Documents (Classification is based on GB 1273945)

GB 1273945
FR 2079370
DE 2104738

Short Version of the Disclosure

A thermonuclear fusion reactor comprises a pressure vessel. Into this vessel is injected liquid lithium which forms a blanket surrounding a centrally disposed void. Deuterium- tritium pellets are injected into the central void where they are ignited by a pulsed laser beam to cause fusion. The 14-mev neutrons, released by the fusion, breed tritium in the lithium. Heating of the lithium is also effected during fusion and this is transferred, through a heat exchanger to a prime mover. The lithium absorbs neutrons, α- and γ-particles and heat. The liquid lithium is injected into the pressure vessel through jets which cause it to form the central void into which the pellets are directed. Ideally the liquid lithium also contains bubbles which allow the lithium blanket to absorb shock waves created by the fusion reaction. The lithium heated in the reactor supplies heat to a potassium-turbine system through a heat exchanger which also receives the tritium, produced in the reactor, through the niobium exchanger tubes. The tritium is removed from the potassium which supplies heat to a further, steam turbine plant.

Representative Prior Art

Use of deuterium and tritium in thermonuclear reactors. Confinement of the plasma by strong magnetic fields is known. (See page 1, lines 35-92).

Invention Information

In summary, the following pieces of Invention Information are identified:

I1: A fusion reactor fuel with pulsed laser ignition and pellet injection system (claim 1).
I2: A lithium blanket for absorbing heat, energy and breeding tritium (claim 1).
I3: The lithium blanket is specially adapted for inertial plasma confinement (claims 1 & 2).
I4: An electrical generating system comprising cooling the lithium in a heat exchanger which heats potassium which powers a potassium turbine and secondarily a steam turbine (claim 8).

Additional Information

Although not adding a contribution to the prior art the following piece of information could be useful for search purposes:

A1: Use of the nuclear reactor for the propulsion of ships (page 5, lines 36-45).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, I3	Catchword index	FUSION nuclear – reactors	G21B
I1, I2, I3	Catchword index	THERMO-nuclear reactors	G21B
I4	Catchword index	Nuclear POWER plant	G21D
I4	Catchword Index	Heat Exchange – apparatus with indirect contact	F28D
A1	Catchword index	Propulsion of SHIP(S)	B63H

Analysis and Selection of Classification Symbols

I1: In **G21B**, the main groups depend on the temperature of the reactor and as this is thermonuclear the sub-groups of G21B 1/00 are the place to classify. Of the subgroups, only G21B 1/11 “Details” is appropriate, so the subgroups thereof are investigated. The two dot entry **G21B 1/15** explicitly exemplifies pellet injectors as included within the group and thus is appropriate.

I2: Again G21B 1/00 is the starting main group, the common rule leads to “details”, although the blanket does have an incidental affect on confinement of plasma, it has a different primary function. (Note that this application is also classified as I3). Under G21B 1/11 “details” is the two dot entry for blankets **G21B 1/13**, which is the correct place to classify the lithium blanket.

With respect to I1 and I2, reference to the guide dictates that the more specialized feature should be classified. Both features are equally specialized and should both be classified.

I3: Use of the catchword index for “plasma” yields no useful place in the IPC. Thermo-nuclear reactors are classified in **G21B** 1/00. Under this main group, group **G21B 1/03** is appropriate as the disclosed plasma confinement in an inertial one.

I4: Main group G21D 5/00 is the starting place working down the sub-groups, the first appropriate one dot sub-group is “reactor and engine not structurally combined”, the two dot sub-groups thereof are concerned with the engine working medium which in the patent is heated via a heat exchanger (G21D 5/08). The only relevant subgroup of G21D 5/08 is G21D 5/12, but no lower levels of hierarchy are applicable, so **G21D 5/12** is the final classification. The full title of the heat exchange subclass F28D includes the wording “not provided for in another subclass”. The subject matter is provided for elsewhere, i.e. in G21D and thus should not be classified anywhere in F28D.

A1: **B63H** operates under the “common rule”. Consultation of the subclass index directs the classifier to “propulsion power plant”, i.e. B63H 21/00. Applying the common rule within the subdivisions of B63H 21/00 leads to **B63H 21/18**, i.e. “the vessels being powered by nuclear energy”.

I1 and I2 refer to claim 1 and are both equally specialized. Either **G21B 1/15** or **G21B 1/13** could be the first classification symbol.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	G21B	Common rule	G21B 1/15 (2006.01)
I2	Subclass title covers the subject matter	G21B	Common rule	G21B 1/13 (2006.01)
I3	Subclass title covers the subject matter	G21B	Common rule	G21B 1/03 (2006.01)
I4	Subclass title covers the subject matter; F28D is residual with respect to G21D	G21D	Common rule	G21D 5/12 (2006.01)
A1	Subclass title covers the subject matter	B63H	Common rule	B63H 21/18 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.

G21B 1/15 (2006.01)
G21B 1/13 (2006.01)
G21B 1/03 (2006.01)
G21D 5/12 (2006.01)
B63H 21/18 (2006.01)

Training Example E5

Categories

1a, 1b, 2b1, 3a, 3b

Documents (Classification is based on US3648132)

US 3648132
FR 2099077
DE 2119040A1

Short Version of the Disclosure

The document discloses multi-layer ceramic capacitors, often referred to as chip capacitors, with two sets of electrode layers and dielectric ceramic material between the electrode layers. Each set of electrode layers is electrically connected to a terminal.

A ceramic chip capacitor is produced in many dependant operations. Starting with the variable raw materials, the processes of mixing, milling, casting, printing, laminating and firing are each subject to variations of the wanted value of the capacitance.

In the disclosure some electrode layers or parts of electrode layers are not electrically connected to one of the terminals. It is described how to connect or disconnect them or parts of them to the appropriate terminals. So the active area of the electrode layers can be adjusted to achieve the wanted values of the capacitance in spite of a variation of values caused by production processes.

Representative Prior Art

Multi-layer, i.e. stacked, ceramic capacitors are known, which consist of alternate layers of ceramic dielectric which separate alternately polarized electrodes, as well methods to adjust the value of the capacitance - see US Patent, column 1, line 42 to column 2, line 2, and Figures 3 to 6 together with related text.

Invention Information

The addition to the prior art comes from the improved structure and process of manufacture of the ceramic multi-layer capacitors, which enable the capacitance to be adjusted. By way of example, recessed electrodes which are initially not connected may be selectively activated, thereby incrementally increasing the value of the capacitance. This is illustrated in column 2, line 5 to 63 of the US Patent, and is reflected in the granted claims.

Claim 1 of the US-Patent only claims the structural details of the electrode layers, but it is clear from the whole disclosure that these details only make sense in view of the purpose of adjusting the value of the capacitance as described above.

In summary, the following pieces of Invention Information are identified:

I1: multi-layer capacitor

I2: process for adjusting its capacitance value

Additional Information

It can be worth (for search purpose) classifying as Additional Information the connection of the terminals to the electrode layers, to emphasize how the adjustment of the capacitance value is achieved.

A1: connection of terminals to the electrode layers

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	CAPACITORS, stacked or multi-layer	H01G
I2	Catchword index	CAPACITORS, correcting or adjusting the capacitance value thereof	H01G
A1	Catchword index	CAPACITORS, connection of the terminals to the electrodes	H01G

Analysis and Selection of Classification Symbols

Under **H01G**, following the "Common rule" for group selection, it is determined that fixed capacitors are covered by main group H01G 4/00. On the next level of indentation stacked or multi-layer capacitors (piece of information I1) are covered by the one-dot group H01G 4/30. Since there is no lower indentation level under **H01G 4/30**, it is the best matching entry for piece of information I1.

Following the "Common rule" for group selection, the piece of information I2 fits group H01G 4/00 on main group level, group H01G 4/002 on one-dot-level and group H01G 4/255 on the two-dot-level. Again there is no lower indentation level and so group **H01G 4/255** matches best the piece of information I2.

For classifying the Additional Information A1 the "Common rule" leads on the main group level to H01G 4/00, on the one-dot-level to group H01G 4/002 for details, on the two-dot-level to group H01G 4/228 for terminals and finally on the three-dot-level to the most appropriate group **H01G 4/232**.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	H01G	Common rule	H01G 4/30 (2006.01)
I2	Subclass title covers the subject matter	H01G	Common rule	H01G 4/255 (2006.01)
A1	Subclass title covers the subject matter	H01G	Common rule	H01G 4/232 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H01G 4/30 (2006.01)
H01G 4/255 (2006.01)
H01G 4/232 (2006.01)

Training Example E6

Categories

1a, 2a, 2b1, 3a, 3b

Documents (Classification is Based on US 4048526A)

US 4048526A
DE 2724787A1
FR 2389895A1

Short Version of the Disclosure

Motion detector, e.g. for attachment to a car, comprises a sensor with one or more ends fastened to a housing and including a flexible layer of poled piezoelectric polymer, pref. polyvinylidene fluoride, and a flexible electrode on each surface adjacent an end.

A weight is connected to the sensor to act as an inertial mass producing bending when the detector moves, and circuitry connected to the electrodes provides a motion indicating signal and pref. includes a band pass filter tuned to the natural pendulum frequency of sensor and weight when fastened only at one end. There may be two sensors, perpendicular to one another.

Representative Prior Art

Piezoelectric detectors for sensing motion and producing a (electric) signal in response to movement of the detector are known – see column 1, lines 16-40.

For said devices, the use is known of piezoelectric crystals, which suffer from rigidity. Also are known piezoelectric transducers that use polymeric piezoelectric films, which however in operation are not based on the bending of such films.

Invention Information

The addition to the prior art seems to come from the use of a flexible piezoelectric material, and on the operation thereof which is based on the bending of the sensing unit. This is illustrated in column 1, lines 42-48, and is the reflected in the granted claims 1-5.

Therefore the following pieces of Invention Information is identified:

I1 : sensor device for sensing motion, based on bending of a flexible piezoelectric material

Additional Information

It can be worth (for search purposes) classifying as Additional Information the type of piezoelectric material used – see claim 6.

In summary, the following piece of Additional Information is identified:

A1 : the piezoelectric material is polyvinylidene fluoride

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	indicating presence or absence of MOVEMENT	G01P 13/00
I1	Catchword index	PIEZO-ELECTRICITY elements in general	H01L 41/00
A1	Catchword index	PIEZO-ELECTRICITY elements in general (MATERIALS therefor)	H01L 41/00

Analysis and Selection of Classification Symbols

In subclass G01P, main group G01P 13/00 is the only place concerning sensing presence of movement. Under G01P 13/00, none of the sub-groups seems pertinent for aspect of "sensing motion" of piece of information I2. Therefore G01P 13/00 remains the best matching entry for the aspect of "sensing motion" of information I1.

Under H01L, and following the "Common rule" for group selection, it is determined that piezoelectric elements with mechanical input and electrical output are covered by H01L 41/113, which is then an additional matching entry for piece of information I1.
Since H01L 41/00 covers the material without any information about its application, G01P 13/00 is selected as the first classification symbol.

Finally, and still following the "Common rule" for group selection, it is determined that group H01L 41/193 is the best matching entry for piece of information A1.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	G01P	Common rule	G01P 13/00 (2006.01)
I1	Subclass title covers the subject matter	H01L	Common rule	H01L 41/113 (2006.01)
A1	Subclass title covers the subject matter	H01L	Common rule	H01L 41/193 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis should be as follows:

Int. Cl.
G01P 13/00 (2006.01)
H01L 41/113 (2006.01)
H01L 41/193 (2006.01)

Training Example E7

Categories

1a, 1b, 2a1, 2b4

Documents (Classification is Based on US 2003 0 112 221 A1)

US 2003 0 112 221 A1
DE 201 20 335 U1
FR 2 834 579 A3

Short Version of the Disclosure

The document discloses an optical pointing device for controlling a cursor on a display. The device retains an optical sensor system, including a lens, in a cavity of a body, the cavity being covered by a removable light-transmitting panel. With the panel attached to the body the device may be used as an optical touchpad. Placed on a fixed surface and with the panel removed the device may used as an optical mouse. A panel detection element is mounted in the body for detecting the presence of the panel and serves as a switch for switching the pointing device between forward moving mode when used as an optical digitizer and rearward moving mode when used as an optical mouse. The object of the invention according to the document is to provide a pointing device operable both in forward moving mode and in rearward moving mode.

The document discloses a further embodiment: an optical pointing device comprising a removable light transmitting panel wherein the panel defines a bore within which light transmitting button is received. The top surface of the button moves, at the application of pressure, from a fist to a second position thereby changing the focal distance of the top surface from the optical sensing system. Only when pressure is applied and the button is pressed as confirmation of an intentional use of the pointing device, the optical sensing system is able to focus on an object moving in contact with the top surface of the light-transmitting button and detect the object's relative movement. The object of this embodiment is to avoid undesired activation of the optical system.

The optical sensor can be built into a mouse, the surface of a laptop, a keyboard or a remote control of an image projecting device.

Representative Prior Art

The conventional pointing device is operated mechanically and requires conversion of mechanical signals into optical signals which are further converted into electrical to be transferred to an associated computer system. For example, a computer mouse or tracking ball comprises a rolling sphere which is mechanically rotated when the computer mouse or tracking ball is in operation. The rotation of the sphere is converted into optical signals by an encoding system. The optical signal is then processed by an transducer to generate a corresponding electrical signal.

Invention Information

I1: Pointing device adapted to be configured and used as optical mouse or as optical digitizer (claims 1-7). The claims only refer to constructional details but from the description it is clear that the control circuitry of the pointing device is accordingly modified.
I2: Pointing device (mouse or touchpad) including a light-transmitting panel covering an optical sensing system and including a movable light transmitting part retained in a cavity acting as button (claim 8). The top surface of the button moves, at the application of pressure, from a first to a second position changing the focal distance of the top surface from the optical sensing system.

Additional Information

The switching between two modes of operation ("forward" and "rearward" moving modes) based on the output of the "panel detection element" (claim 6) is a technical feature that could be classified a additional information. I2 also implies a modification of the control circuit taking into account the signal from the "panel detection element" to implement the reversion of the cursor direction.

The application further discloses applications shown in figures 7-9 of the invention that could be worth classifying. Figure 7 shows the pointing device positioned the top face of a keyboard and figure 8 shows the pointing device positioned on a face of a notebook computer. Even though the information disclosed about said two applications of the invention may be considered insufficient it could be the object of a prior art search. Therefore, it would be possible to classify what is shown in figures 7 and 8 as additional information. The information given by figure 9, however, is clearly insufficient for classification.

A1: A control circuit implied by I2.
A2: A keyboard integrating the pointing device of claim 1.
A3: A laptop computer integrating the pointing device of claim 1.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, A1	Catchword Index	INPUT for electric digital computers	G06F 3/00
I1, I2, A1	Catchword Index	MOUSE used as input device in computers	G06F 3/033
A2	Catchword Index	KEYBOARDS for electric digital computers	G06F 3/02
A3	Catchword Index	COMPUTER(S)	G06

Analysis and Selection of Classification Symbols

I1: The title of subclass G06F is "ELECTRICAL DIGITAL PROCESSING". This clearly provides for the invention information. The title of G06F does not contain any relevant references to other places. The main group G06F 3/00 covers "Input arrangements for transferring data to be processed into a form capable of being handled by the computer", the one-dot subgroup G06F 3/01 covers "Input arrangements … for interaction between user and

computer “, the two-dot subgroup G06F 3/03 covers “Arrangements for converting the position or the displacement of a member into a coded form “, the three-dot subgroup G06F 3/033 covers “Pointing devices displaced or positioned by the user, e.g. mice, trackballs, pens or joysticks” and the three-dot subgroup G06F 3/041 covers “Digitisers, e.g. for touch screens or touch pads, characterised by the transducing means”. The four-dot subgroup G06F3/042 under G06F 3/041 covers “Digitisers, e.g. for touch screens or touch pads, characterised by opto-electronic means”. Both the subgroups **G06F 3/033** and **G06F 3/042** are equally correct symbols for classifying the invention information, since the invention information states that the pointing device may be used as both a mouse and digitizer. The subgroup **G06F 3/042** should, however, be listed first, since the digitizer is mentioned in claim 1 (“adapted to receive optical signal representing movement of the object on the panel…”) and the mouse is mentioned in claim 2.

I2: Following the same reasoning as above, one would be led to **G06F 3/042** and **G06F 3/033**.

A1: The main group G06F 3/00 covers “Input arrangements for transferring data to be processed into a form capable of being handled by the computer”, the one-dot subgroup G06F 3/01 covers “Input arrangements … for interaction between user and computer “, the two-dot subgroup G06F 3/03 covers “Arrangements for converting the position or the displacement of a member into a coded form “, three-dot subgroup G06F 3/033 covers “Pointing devices displaced or positioned by the user, e.g. mice, trackballs, pens or joysticks” and **G06F 3/038** covers “Control and interface arrangements therefor, e.g. drivers or device-embedded control circuitry” . G06F 3/038 is the correct place of classification.

A2: The main group G06F 3/00 covers “Input arrangements for transferring data to be processed into a form capable of being handled by the computer”, the one-dot subgroup G06F3/01 covers “Input arrangements … for interaction between user and computer“. The two-dot sub-group **G06F 3/02** covers “Input arrangements using manually operated switches, e.g. using keyboards or dials” and since none of the sub-groups under said sub-group is appropriate this would be the right place for classification.

A3: The title of class G06 is “COMPUTING; CALCULATING; COUNTING”, which provides for the information to be classified. The correct subclass is G06F, “ELECTRICAL DATA PROCESSING”. Main group G06F 15/00 covers “Digital computers in general”, and one-dot sub-group G06F 15/02 covers “manually operated with input through keyboard and computation using a built-in programme, e.g. pocket calculators”. This is not appropriate since A3 concerns a general-purpose computer. In the title of G06F 15/00 one is referred to main-groups G06F 1/00-13/00 when dealing with details. Of said main groups only G06F 1/00 covering “Details not covered by groups G06F 3/00-G06F 13/00 G06F 21/00” could be relevant. One-dot sub-group G06F 1/16 covering “Constructional details or arrangements” could be an appropriate place of classification under G06F 1/00. However, classification here would be of no immediate value, since G06F 1/16 is too general. Moreover, A3 may be seen as insufficiently disclosed; hence, classification of A3 is of no use for search and is not given.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1, I2	Subclass title covers the subject matter	G06F	Common rule	G06F 3/042 (2006.01)
I1, I2	Subclass title covers the subject matter	G06F	Common rule	G06F 3/033 (2006.01)
A1	Subclass title covers the	G06F	Common rule	G06F 3/038 (2006.01)

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
	subject matter			
A2	Subclass title covers the subject matter	G06F	Common rule	G06F 3/02 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
G06F3/042 (2006.01)
G06F3/033 (2006.01)
G06F3/038 (2006.01)
G06F3/02 (2006.01)

Training Example E8

Category

2a

Documents (Classification is Based on GB 2 379 304 A)

GB 2 379 304 A
DE 102 23 737 A1
FR 2 825 494 A1

Short Version of the Disclosure

The invention consists of a method and a system for e-commerce. The system includes a coordinator between customers and suppliers. A customer makes a request to the coordinator indicating which items he wishes to obtain and at what terms (e.g. for free, with a discount etc). The coordinator then contacts different suppliers to see who are willing to supply the item at the conditions demanded by the customer. The suppliers can then choose whether or not they are interested and set their conditions for the deal (e.g. the customer has to make the supplier's webpage his homepage, the customer has to provide personal data for advertising etc.). These conditions are passed on to the customer who then decides which offer to choose.

Invention Information

The following piece of Invention Information is identified:

I1: A system for e-commerce containing a coordinator which coordinates offers between customers and suppliers (claim 8).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index (*)	COMMERCE	G06Q

Analysis and Selection of Classification Symbols

G06Q covers "data processing systems or methods, specially adapted for… commercial… purposes", which fits with the scope of the invention. **G06Q 30/00** covers commerce and G06Q 90/00 covers "Systems and methods specially adapted for …commercial …purposes, not involving significant data processing" and both groups are potentially correct for classification.

Note 1 states that groups G06Q 10/00- G06Q 50/00 only covers systems or methods that involve significant data processing operations.

The claims 1-4 disclose no technical features, but it is clear from the description and claims 5, 7 and 8 that it is indeed a computer system that is used to realize the invention and, thus, **G06Q 30/00** is the most suitable subgroup.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Note in G06Q	G06Q	Common rule	G06Q 30/00 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis should be as follows:

Int. Cl.
G06Q 30/00 (2006.01)

Training Example E9
(to be updated soon)

Categories

1a, 2a, 2b1

Documents (Classification is Based on US 5 659 595 A)

US 5 659 595 A
FR 2 718 310 A1
DE 695 23 804 T2
JP 7274246 A

Short Version of the Disclosure

The invention discloses a self-disabling device, which is used in a mobile telephone to prevent fraudulent use of the mobile telephone. The self-disabling device includes a register containing the identification number of a mobile telephone. A buffer memory is provided to temporarily store short information messages transmitted by the network controlling station. One of the received messages includes a list of identification numbers of terminals which are being used fraudulently. A comparator compares the identification number of the terminal with each of the numbers of the list. A circuit then invalidates further transmission and communication by the telephone if a match is found between the numbers. The invention also discloses a method for disabling a mobile telephone according to the device above.

Invention Information

I1: A device and a method for preventing fraudulent use of mobile telephones, where the mobile telephone contains means to compare its identification number with a list of identification numbers of mobile telephones being fraudulently used and disable itself if there is a match.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	CELLULAR systems for mobile switching centres	H04W
I1	Catchword Index	TELEPHONE, TELEPHONY	H04M
I1	Catchword Index	Transmission of TELECOMMUNICATION signals in general	H04B
I1	Catchword Index	PREVENTING fraudulent or unauthorized calling	H04M 1/66

Analysis and Selection of Classification Symbols

I1: Possible subclasses are H04B, H04M or H04W.

H04B has an unclear title; "*Transmission"*. In order to decide if H04B is appropriate more information is needed, and can be found in the notes and in the definition of that subclass.

H04B covers "*transmission of information carrying signals*", which is not suitable since the invention does not concern transmission of signals, but rather a connection between a mobile telephone and a base station.

H04W covers *"communication networks for selectively establishing one or a plurality of wireless communication links between a desired number of users or between users and network equipment, for the purpose of transferring information via these wireless communication links",* which seems to be a suitable subclass.

The most appropriate main group is H04W 12/00, since the invention concerns preventing fraudulent use of mobile telephones. H04W12/00 covers "*Security arrangements, e.g. access security or fraud detection; Authentication, e.g. verifying user identity or authorization; Protecting privacy or anonymity*". H04W12/12 covers "*Fraud detection".*

H04M covers "*Telephonic communication*", which also seems to be a suitable subclass. Further, main group H04M 1/00 covers "*Substation equipment, e.g. for use by subscribers"*, one-dot subgroup H04M 1/66 covers "*with means for preventing unauthorised or fraudulent calling"*, two-dot subgroup H04M 1/663 covers *"Preventing unauthorized calls to a telephone set"* and two-dot subgroup H04M 1/667 covers *"Preventing unauthorized calls from a telephone set"*. Since the invention concerns "disabling transmission of calls by said portable terminal" the most appropriate two-dot subgroup is H04M 1/667. Three-dot subgroup H04M 1/67 under two-dot subgroup H04M 1/667 covers *"Preventing unauthorized calls from a telephone set by electronic means"* and since the invention is directed to electronic means, a self-disabling device, the classification could be made in said subgroup. However, H04M has a limiting reference that excludes wireless communication networks from H04M and directs it to H04W. This means that if the invention relates to subject matter that is covered under subclass H04W, the invention should be classified in that subclass. Since the subscriber equipment in H04M 1/66 is not specially adapted for mobile telecommunications, as in H04W 12/00, H04W 12/00 is the most suitable group. Further, H04M 1/72 covers "*Cordless telephones, i.e. devices for establishing wireless links to base stations without route selecting"*, which also seems like a suitable group. However, since in mobile telecommunications route selection is commonly done, said group is not suitable.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC IPC (2009.01)
I1	Note in subclass	H04W	First place priority	H04W 12/12 (2009.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
H04W 12/12 (2009.01)

Training Example E10

Categories

1a, 1b, 3a, 3b

Documents (Classification is based on GB 1283501 A)

GB 1283501 A
DE 2100871 A
FR 2074309 A

Short Version of the Disclosure

A capacitor comprising:
- two electrodes (4, 6), to be electrically connected in a circuit, separated by a predetermined distance and including terminals (8, 10), said electrodes being deposited (e.g. by screen printing) on a substrate (2),
- a dielectric layer (12) covering the two electrodes and filling the space between them, and
- a floating electrode (14), not to be electrically connected in a circuit, deposited (e.g. by screen printing) on the layer (12).

The dielectric layer (12) comprises ceramic particles in a glass binder.

The capacitance of the capacitor can be adjusted to a desired value by cutting a notch (16), (e.g. by abrasion or laser trimming) through the dielectric layer (12) and the floating electrode (14), thereby reducing the contribution made by the parallel capacitance between the edges of electrodes (4) and (6).

Representative Prior Art

Screen-printed capacitors are known, which are made by screen-printing successive layers of metal compositions and dielectric compositions on a substrate. Typically these capacitors have large capacitance values. Besides, adjustment of the capacitance to a required value is almost impossible when the size of the capacitor becomes too small – see page 1, lines 20-44.

Invention Information

An addition to the prior art seems to come from the overall structure of the capacitor, and the method of making it, which is particularly adapted for low-value capacitances (i.e. less than 100 pF), insofar as the total capacitance is a composite of three individual capacitances, and the final value can be thereby lowered – see page 1, lines 56-59, and page 3, lines 1-11.

A further addition seems to be the method of adjusting the capacitance value – see page 1, lines 60-62.

This is also reflected in the claims.

In summary, the following pieces of Invention Information are identified:

I1: capacitor, and method of making thereof
I2: method for adjusting its capacitance value

Additional Information

The ceramic dielectric composition is not critical (see page 2, lines 1-42). Also the removal of the portion of dielectric and floating electrode by abrasion or laser trimming seems to be conventional (see page 3, lines 12-16).

Having recognized that the ceramic dielectric composition is not in itself an addition to the state of the art, it is non-obligatory but desirable to classify such piece of information as Additional Information, in order to facilitate a searcher looking for a low-capacitance capacitor, wherein the dielectric layer comprises ceramic particles in a glass binder.
In summary, the following piece of Additional Information is identified:

A1: dielectric comprising ceramic particles in a glass binder

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2	Catchword index	CAPACITORS	H01G
A1	Catchword index	DIELECTRIC(S) for capacitors	H01G 4/018

Analysis and Selection of Classification Symbols

I1: Under H01G, and following the "Common Rule" for group selection, it is determined that capacitors with fixed capacitance are covered by main group H01G 4/00. This group also covers the processes for manufacture. Among the one-dot groups, **H01G 4/33** covers "Thin- or thick-film capacitors". As the electrodes and the dielectric of the capacitor are in film form (see claim 1), this group is the most appropriate one for the piece of information I1.

I2: Likewise, and still following the "Common Rule" for group selection under H01G 4/00, it is eventually determined that the two-dot group **H01G 4/255** for "means for correcting the capacitance value" is the most appropriate entry for piece of information I2.

A1: As far as piece of information A1 is concerned, group H01G 4/018 for "Dielectrics" is appropriate. Following the "Common Rule" for group selection, it is eventually determined that the five-dot group **H01G 4/12** for "Ceramic dielectrics" is the most appropriate entry.

The finished capacitor and its method of making seem to be the most relevant aspect of the application. Therefore H01G 4/33 is listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	H01G	Common rule	H01G 4/33 (2006.01)

I2	Subclass title covers the subject matter	H01G	Common rule	H01G 4/255 (2006.01)
A1	Subclass title covers the subject matter	H01G	Common rule	H01G 4/12 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H01G 4/33 (2006.01)
H01G 4/255 (2006.01)
H01G 4/12 (2006.01)

Training Example E11

Categories

1a, 3b

Documents (Classification is based on GB 1 280 388)

GB 1 280 388
FR 2 066 714
DE 2 053 862

Short Version of the Disclosure

A telephone instrument is switchable from a loud speaking arrangement to a low speaking arrangement. In the loud speaking condition, the instrument uses one transducer H as a loudspeaker and the other transducer M as a microphone.
On operation of a switch K by, for example, lifting the instrument or by putting it on a resting surface (e.g. a cradle), the instrument is switched to the low speaking condition and the transducer H functions as a microphone while the transducer M functions as a telephone receiver.
Switch K also selectively connects each transducer to respective incoming and outgoing conductor pairs via two different attenuators that provide suitable frequency corrections according to the operating condition.

Representative Prior Art

A telephone instrument in which the low speaker can also operate as a loudspeaker. The mode selection is done by a switch on the handset.

Invention Information

I1: A telephone instrument having first and second electro-acoustic transducers, respectively for converting sound signals into electrical signals and electrical signals into sound signals, and switching means for interchanging the functions of the two transducers.

I2: A telephone instrument including switching means for interchanging the functions of its two transducers, said switching means operating when the instrument is lifted or respectively put on a cradle or flat surface.

Additional Information

A1 - The handset is so shaped that it comprises two portions forming an obtuse angle between them, one of the two being able to rest on a table-like surface

A2 - The transducer contained in the part supposed to rest on a surface is provided with a strong magnet, characterised by a relatively heavy weight in comparison to the other transducer, and such as to make the instrument stable when resting on said surface

A3 - Selective attenuation (e.g. frequency correction) of the electro-acoustic signals according to the operating mode and switched by switch K.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2	Catchword index	TELEPHONE	H04M
A1-A3	Catchword Index	TELEPHONE	H04M

Analysis and Selection of Classification Symbols

The search in the Catchword Index using as a keyword "telephone" gives H04M as a result. Subclass title of H04M is "Telephonic communication", which seems the appropriate general place for the apparatus in question. Consulting the H04M subclass index, main group H04M 1/00 is the only one concerning equipments, and in particular "Substation equipment, e.g. for use by subscribers".

As a whole, the invention relates to a telephone set selectively functioning in "speakerphone" mode, and characterised by a special constructional arrangement allowing the mode selection. Under main group H04M 1/00, the loud speaking functionality is covered by group H04M 1/60 ("Including speech amplifiers"). Its subgroup **H04M 1/62** ("Constructional arrangements") seems the most appropriate to characterise I1.

I2, A1 and A2 all relate to constructional details of the telephone device. Group H04M 1/02 ("Constructional features of telephone sets"), covering details of constructional features for the housing of a fixed telephone set including a keyboard, is the most appropriate to cover all these different aspects of the invention.

The subgroups of group H04M 1/02 need to be examined in detail to ascertain whether any of them specifically covers a particular sub-aspect.

Subgroup H04M 1/03 ("Constructional features of telephone transmitters or receivers, e.g. telephone handsets (transducers in general H04R 1/00)") is not applicable because it specifically relates to details of the handset enclosure, and in particular to details of the mounting of the transducers (microphone and speaker) in the device, which in this case are not described in substantial detail.

Subgroup H04M 1/04 relates to "Supports for telephone …". Whereas it is true that the document does not specifically show a support *per se*, on the other hand I2 is mostly concerned with the interaction between the supporting arrangement and the handset itself. Therefore, it is appropriate to consider a classification in subgroup H04M 1/04 or in a suitable subgroup thereof because it is reasonable to expect that such an interaction would normally be found therein.

As the document mentions the possible use of a cradle, subgroup H04M 1/06 ("Hooks; Cradles") can be taken into consideration. Under that, subgroup **H04M 1/08** ("associated with switches operated by weight of receiver or hand-set") is the most appropriate for classifying

all aspects linked to the presence and operation of switch K (also referred to as "cradle contact" in the description).

Incidentally, even though the skilled person would expect most of the documents classified under group 1/08 as relating to common "hook switches", the title of this group is not limited to those, but encompasses *any* switch operated by the weight of the handset.

Both A1 and A2 would be covered by group H04M 1/02. However, a more specific sub-group has already been used for I2. The allocation of the symbol H04M 1/02 would not be useful for search purposes, as it would not usefully complement the Invention Information classified already. This is because the title of the group does not convey any new information with respect to group H04M 1/04 in the context of the invention. Therefore this symbol is not allocated for A1 and A2.

Likewise, A3 would be covered by group H04M 1/60. However, a more specific sub-group has however already been used for I1. Once more, the allocation of this symbol would not be useful for search purposes, as it would not usefully complement the Invention Information classified already. Therefore this symbol is not allocated for A3.

In conclusion, between groups H04M 1/62 and H04M 1/08, the first represents the principal subject matter disclosed in the document, therefor it should be listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Title covers invention information	H04M	Common rule	H04M 1/62 (2006.01)
I2	Title covers invention information	H04M	Common rule	H04M 1/08 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H04M 1/62 (2006.01)
H04M 1/08 (2006.01)

Training Example E12

Categories

1a, 1b, 2a, 2b1

Documents (Classification is Based on GB 1273106 A)

GB 1273106 A
FR 2068809 A
DE 1962536 A
SE 359187 B

Short Version of the Disclosure

The document relates to a method of producing an extensible, helically-coiled, twin cored electrical wire, in which the insulation of the two conductors is joined so that in the finished coiled wire one conductor is coiled radically inside the other. This wire has better extensibility than conventional coiled wires.

Representative Prior Art

Not applicable

Invention Information

I1 A method of producing an extensible, helically-coiled, twin cored electrical wire, in which the insulation of the two conductors is joined so that in the finished coiled wire one conductor is coiled radically inside the other (claims 1-3).

I2 A helically-coiled, twin cored electrical wire, in which the insulation of the two conductors is joined so that one conductor is coiled radically inside the other (claims 4, 5).

Additional Information

Not applicable

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	COILING wire to form helices	B21F
I1, I2	Catchword Index	Electric WIRES	H01B

Analysis and Selection of Classification Symbols

I1: B21F covers **"Working or processing of wire"**. This has to be understood in the context of the title of class B21, which is **"Mechanical metal-working without essentially removing material"**. However, Note (1) after class B21 states that it does not cover **"combinations of operations covered by any particular subclass of class B21 with operations covered by other classes … "**. Since I1 involves joining the insulation of the two wires, a process that clearly goes beyond mere mechanical metal-working, it cannot be classified in B21F.

The first part of the title of H01B is **"Cables"**, which has to be understood in the context of the title of class H01, which is **"Basic electric elements"**. This clearly covers I1, and there are no notes or references to the contrary.

H01B 13/00 **"Apparatus or processes specially adapted for manufacturing conductors or cables"** is the only main group which provides for production of cables. H01B 13/008 **"for manufacturing extensible conductors or cables"** is the only subgroup that provides for I1.

I2: The first part of the title of H01B is **"Cables"**, which has to be understood in the context of the title of class H01, which is **"Basic electric elements"**. This clearly covers I1, and there are no notes or references to the contrary.

Since I2 is characterised by its coiled form, rather than its conducting or insulating material, the only relevant main group is H01B 7/00 **"Insulated conductors or cables characterised by their form"**. Several subgroups of this group could possibly be considered, for example H01B 7/02 **"Disposition of insulation"** and H01B 7/04 **"Flexible cables, conductors, or cords, e.g. trailing cables"**. However, since it clearly provides most specifically for the invention information, H01B 7/06 **"Extensible conductors or cables, e.g. self-coiling cords"** is the only one that should be chosen. The reference after the title of H01B 7/06 is of informative character and has no effect on classification of cables per se.

Since I1 is given greater emphasis in the description and claims, its classification should be presented first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Only relevant subclass	H01B	Common rule, only relevant group.	H01B 13/008 (2006.01)
I2	Only relevant subclass	H01B	Common rule, only relevant main group, most specialized subgroup.	H01B 7/06 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H01B 13/008 (2006.01)
H01B 7/06 (2006.01)

Training Example E13

Categories

1a, 1b, 2a, 2b1

Documents (Classification is based on US 3 962 779A)

US 3 962 779 A
FR 2 258 001 A1
DE 25 00 867 A1
JP 50 104579 A

Short Version of the Disclosure

The patent relates to a method of making an oxide isolated integrated circuit structure which reduces the number of masking steps involved. This is accomplished by eliminating a "conventional" underlying insulating layer for the first level of metallization and by using one subsequent masking step to define zones for the introduction of impurities and contact holes for a second metallization layer.

Invention Information

I1: A method for fabricating a semiconductive integrated circuit comprising the steps of preparing a semiconductive element which includes a plurality of semiconductive regions which are separated by dielectric isolation regions, forming a first metallization pattern, depositing an insulating layer over said first metallization pattern, forming openings in the insulating layer for exposing at least one portion of said first metallization pattern and a portion of at least one semiconductive region, introducing impurities into the exposed portions of said semiconductive region for affecting their conductivities, and forming over said surface, including the first metallization pattern and the insulating layer, a second metallization pattern without reforming the openings in said insulating layer, said second metallization pattern making electrical connection to the exposed portions of the semiconductive regions and of the first metallization pattern through the openings in the insulating layer.

The invention information concerns the simplification of the fabrication of the whole device rather than the individual steps of forming insulation regions or metallization patterns.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	manufacture or treatment of SEMICONDUCTOR(S) devices	H01L 21/00
I1	Catchword Index	manufacture of INTEGRATED circuits	H01L 21/82

Analysis and Selection of Classification Symbols

I1: The first part of H01L is **"**Semiconductor device**"**, which has to be understood in the context of the title of class H01, which is "Basic electric elements". This clearly covers I1, and there are no notes or references to the contrary.

H01L 21/00 ***"****Processes or apparatus specially adapted for the manufacture or treatment of semiconductor or solid state devices or parts thereof****"*** is the only main group which provides for manufacture.

Further, one-dot subgroups H01L 21/02, H01L 21/64 and H01L 21/70 relate to manufacture of devices and are potentially relevant. H01L 21/64, however, covers *"Manufacture or treatment of solid state devices other than semiconductor devices …"* and can thus be omitted. Subgroup H01L 21/02 covers *"Manufacture or treatment of semiconductor devices or parts thereof"* and subgroup H01L 21/70 covers "Manufacture or treatment of devices consisting of a plurality of solid state components or integrated circuits formed in or on a common substrate or of specific parts thereof; Manufacture of integrated circuit devices or of specific parts thereof" and since I1 concerns fabrication of semiconductor devices and more particularly fabrication of integrated circuits both subgroups seem correct. According to a Note of the main group, however, subgroup H01L 21/70 takes precedence over subgroups H01L 21/02 through H01L 21/67. Subgroup H01L 21/70 is, therefore, the one-dot subgroup most appropriate in relation to I1. There are two two-dot subgroups under H01L 21/70; H01L 21/71 covering "Manufacture of specific parts of devices defined in H01L 21/70" and H01L 21/77 covering "Manufacture or treatment of devices consisting of a plurality of solid state components or integrated circuits formed in, or on, a common substrate". I1 concerns the fabrication of integrated circuits and not specific parts of devices and, thus, H01L 21/77 is the most appropriate subgroup of the two. The only three-dot subgroup under H01L 21/77 is H01L 21/78 and it covers "Manufacture… of devices consisting of… integrated circuits in, or on, a common substrate with subsequent division of the substrate into plural individual devices". The document does not mention any "subsequent division of the substrate into plural individual devices" and I1 does not comprise said feature. Thus, the correct place of classification is **H01L 21/77**.

Subgroup H01L 21/82 referred to in the Catchword Index is a subgroup of three-dot subgroup H01L 21/78 and, thus, would not be an appropriate place for classification.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Note in H01L	H01L	Common rule	H01L 21/77 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H01L 21/77 (2006.01)

Training Example E14

Categories

1a, 1b, 2b1, 2b3, 3c

Documents (Classification is Based on GB 1 284 257 A)

GB 1 284 257 A
DE 22 01 824 A1
FR 2 088 338 A5

Short Version of the Disclosure

A monolithic semiconductor circuit comprises a lateral PNP transistor and an inversely operated vertical NPN transistor. The lateral transistor is formed by a pair of mutually spaced P-type regions diffused in an N-type semiconductor body. The collector region has diffused therein a region of N-type and constituting the collector of the vertical transistor. The semiconductor body constitutes the base region of the lateral transistor and the emitter region of the vertical transistor.

Representative Prior Art

With regard to bipolar circuits in monolithic technology, an improvement over providing separate isolation pockets for each circuit element consists in grouping several circuit components in one isolation pocket. Semiconductor zones connected to the same potential are preferably jointly integrated. It is also known for NPN and PNP transistors to be jointly integrated in a four-layer structure. In a known circuit of this kind the NPN transistor integrated jointly with the PNP transistor acts as anti-saturation. These known circuits cannot be realized without area-consuming isolation diffusion, nor do they lead to a simplification of or savings in the process steps employed.

Invention Information

Grouping several circuit components in the same isolation pocket is known in the prior art (see above). The addition to the prior art is to group a lateral PNP transistor and a vertical NPN transistor in the same group. The addition to the prior art provides a simpler production process, eliminating isolation diffusion, and a higher packing density.

Another addition to the prior art comes from the use of such integrated circuits as a logic circuit. The addition provides the advantage that the layout requires very little area.

In summary, the following piece of Invention Information is identified:

I1: a monolithic semiconductor integrated circuit utilizing a combination of lateral and inversely operated vertical bipolar transistors- this is the *function* aspect of the invention

I2: the use of I1 as a logic circuit- this is the *application* aspect of the invention

Additional Information

None

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	SEMICONDUCTOR(S) devices	H01L
I1	Catchword Index	INTEGRATED circuits	H01L 27/00
I2	Catchword Index	Electric LOGIC circuits	H03K 19/00

Analysis and Selection of Classification Symbols

I1; The Catchword Index points directly to H01L 27/00, which covers "*Devices consisting of a plurality of semiconductor or other solid-state components formed in or on a common substrate"*. Note (2) third bullet under H01L confirms that this is the correct main group inasmuch as the circuit is a "device" and the transistors are "components" formed in/on a common substrate. Following the Common Rule under H01L it can be confirmed that main group H01L 27/00 is the most appropriate place for the invention information I1. Note (1) after H01L 27/00 specifies a "Last Place Priority Rule" (LPPR) under H01L 27/00. Among the available one-dot subgroups only H01L 27/02 "*including semiconductor components specially adapted for rectifying, oscillating, amplifying or switching and having at least one potential-jump barrier or surface barrier; including integrated passive circuit elements with at least one potential-jump barrier or surface barrier*" is appropriate and so is two-dot subgroup H01L 27/04 "*the substrate being a semiconductor body*". Among the available three-dot subgroups of subgroup H01L 27/04 it is recognized that both H01L 27/06 "*including a plurality of individual components in a non-repetitive configuration*" and H01L 27/08 "*including only semiconductor of a single kind*" are appropriate. Applying LPPR H01L 27/08 is the most appropriate classification symbol of the two. The four-dot subgroup **H01L 27/082** "*including bipolar components only*" provides for the invention information and said four-dot subgroup would the correct place for classifying I1.

Classifying in main group H01L 29/00 "*Semiconductor devices specially adapted for rectifying, amplifying, oscillating or switching and having at least one potential-jump barrier or surface barrier; Capacitors or resistors with at least one potential-jump barrier or surface barrier, e.g. PN-junction depletion layer or carrier concentration layer; Details of semiconductor bodies or of electrodes thereof*" could be considered. However, said main group refers to main group H01L 27/00 when the invention concerns "*devices consisting of a plurality of solid state components formed in or on a common substrate*", which I1 does. Main group H01L 29/00 may, thus, be discarded.

I2: The title of subclass H03K is "*Pulse technique*", which has to be understood in the context of the title of class H03, which is "*Basic electronic circuitry*". Note (1) third bullet of H03K states that the subclass covers logic circuits. This clearly covers I2.

The Catchword Index points directly to main group H03K 19/00 which covers "*Logic circuits*…", and one-dot subgroup H03K 19/02 covers "*using specified components*". Despite the fact that subgroups H03K 19/003-H03K 19/0175 take precedence H03K 19/02 is the most appropriate one-dot subgroup. The title of two-dot subgroup H03K 19/08 is "*using semiconductor devices*", that of three-dot subgroup H03K 19/082 is "*using bipolar transistors*" and that of four-dot subgroup H03K 19/091 is "*Integrated injection logic or merged transistor logic*". Following the Common Rule under H03K 19/02 four-dot subgroup **H03K 19/091** is, clearly, the correct place for classifying I2.

The function-oriented symbol H01L 27/082 most adequately represents the invention and is therefore listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Note after H01L 27/00	H01L	Last place priority rule	H01L 27/082 (2006.01)
I2	Note after H03K	H03K	Common rule	H03K 19/091 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H01L 27/082 (2006.01***)***
H03K 19/091 (2006.01)

Training Example E15

Categories

1a, 2a, 2a1, 2b1

Documents (Classification is based on US 3 958 449 A)

DE 2 422 561 A1
FR 2 270 514 A1
US 3 958 449 A

Short Version of the Disclosure

A process for measuring leaks in liquid-conveying pipelines during inoperative periods by hermetically closing the pipeline at both ends, detecting a drop in pressure, adding a substitute liquid and ascertaining the quantity of substitute liquid required to maintain pressure. The liquids conveyed may be substances having a high vapour pressure, e.g. ethylene, propylene, ammonia, vinyl chloride and acetaldehyde, and the substitute liquid can be the same. An apparatus for carrying out the process is also disclosed.

Invention Information

I1: A process and apparatus for measuring leaks in liquid-conveying pipelines during inoperative periods by closing the pipeline at both ends, detecting a drop in pressure, adding a substitute liquid and ascertaining the quantity of substitute liquid required to maintain pressure (see claims 1 and 2).

Additional Information

None

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	Detecting LEAKS	G01M 3/00
I1	Catchword Index	Preventing or locating LEAKS in pipe-lines	F17D
I1	Catchword Index	PIPE(S)-lines	F17D

Analysis and Selection of Classification Symbols

I1: Catchword Index indicates that detecting leaks is covered by G01M, which has as second part of its title "Testing structures or apparatus not otherwise provided for". The residual

status of G01M means that it must be verified that classification cannot be made elsewhere before classification can be made in the subclass. This will be made below – see the discussion of F17D below. The Note under the subclass title, which itself refers to the Notes following the title of subclass G01, does not affect the situation. G01M is a common rule subclass. "Investigating fluid-tightness of structures" is covered by main group G01M 3/00. Going down the hierarchical order, group G01M 3/02 "by using fluid or vacuum" is appropriate, then G01M 3/26 "measuring rate of loss or gain of fluid" is appropriate and so is G01M 3/28 "for pipes … or tubes", therefore **G01M 3/28** is the correct group. Its subgroup 3/30, which relates to progressive displacement of one fluid by another, is not appropriate.

Pipelines per se are covered by subclass F17D. Group F17D 5/00 "protection or supervision of installations" and its subgroup 5/02 "preventing, monitoring or locating loss" look appropriate for classification of I1 until it is seen that a limiting reference exists under group 5/00, which refers "investigation of the fluid-tightness of structures" to G01M 3/00. Therefore G01M 3/28 is the only correct classification.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject matter in view of limiting reference in F17D 5/00	G01M	Common rule, only appropriate group	G01M 3/28 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
G01M 3/28 (2006.01)

Training Example E16

Categories

1a, 1b, 3a

Documents (Classification is based on GB 1272374 A)

GB 1272374 A
FR2077390 A1
DE 20 04 029 A1

Short Version of the Disclosure

The structural principle of bistable electromagnetic relays is a permanent magnet polarizing the core of the energizing winding(s) with a parallel magnetic shunt.

Representative Prior Art

Bistable electromagnetic relays permanent magnets are known – see page 1, left column, lines 15-38.
Said devices nearly all use ferrite permanent magnets which have the disadvantage of decreasing magnetic induction with increasing temperature.

Invention Information

The following pieces of Invention Information are identified:
I1: The addition over the prior art is the at least one magnetic shunt, which compensates the reduction of the field strength of the permanent magnet with increasing temperature which polarizes the core of the energizing coil. This is illustrated in the right column on page 1 and claim 1.
I2: The shunt is formed in the form of shielding plates (see claim 3).
I3: As material a soft-magnetic material is used (see claim 6).
I4: There is provided an optional auxiliary magnetic circuit as shunt (see claim 2).

Additional Information

Although not adding a contribution to the prior art, the following piece of information could be useful for search purposes:
A1: The relay consists of an enclosed contact space with a magnetisable contact armature and the operating coil is being outside, as it can be seen from page 2, right column.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, I4	Catchword Index	electric contact-making RELAY(S)	H01H
I3	Catchword Index	selection of materials for MAGNETS	H01F
A1	Catchword Index	electric contact-making RELAY(S)	H01H

Analysis and Selection of Classification Symbols

I1: In **H01H** main group H01H 51/00 is related to electromagnetic relays. Of the subgroups only H01H 51/22 is appropriate, so the subgroups thereof are investigated. The two dot entry **H01H 51/24** explicitly refers to relays without intermediate neutral position of rest and is therefore appropriate.

I2: Looking for details of electromagnetic relays leads to **H01H** 50/00 as starting main group. Under this main group, group **H01H 50/10** is the first appropriate subgroup concerning shielding which exactly hits inventive information I2.

I3: Magnetic materials will be found under main group H01F. Starting from here searching for magnetic materials will lead to H01F 1/00. Following the “Common rule” **H01F 1/12** accurately hits the aspect of soft-magnetic devices.

I4: The aspect of a second shunt which is an auxiliary circuit leads again to starting main group H01H 50/00. The first appropriate one dot subgroup is “magnetic circuit arrangements” (H01H 50/16). The two dot groups thereof are concerned with movable or stationary parts. Since the second shunt is not a movable part H01H 50/36 is the relevant two dot group of H01H 50/16. Looking carefully through the subgroups will lead to the only relevant three dot group **H01H 50/42**.

A1: Considering the construction of the armature leads again to main group “electrical relays” (H01H 51/00) as initial point. Working down the subgroups directs the classifier to the appropriate one dot subgroup **H01H 51/28**. Lower levels of hierarchy are not applicable, so H01H 51/28 is the final classification.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	H01H	Common rule	H01H 51/24 (2006.01)
I2	Subclass title covers the subject matter	H01H	Common rule	H01H 50/10 (2006.01)
I3	Subclass title covers the subject matter	H01F	Common rule	H01F 1/12 (2006.01)
I4	Subclass title covers the subject matter	H01H	Common rule	H01H 50/42 (2006.01)
A1	Subclass title covers the subject matter	H01H	Common rule	H01H 51/28 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H01H 51/24 (2006.01)
H01H 50/10 (2006.01)
H01F 1/12 (2006.01)
H01H 50/42 (2006.01)
H01H 51/28 (2006.01)

Training Example E17

Categories

1b, 2b1, 3c

Documents (Classification is Based on US 3683509 A)

DE 2123972 A1
FR 2091713 A5
US 3 683 509 A

Short Version of the Disclosure

A method and apparatus for measuring the relief angle of a helical cutting tool involves placing a sensing probe on the relief surface and moving the tool and probe relative to each other.

An expert in the field of cutting tools would recognize that the tool that is the object of the invention is of the milling (= surface cutting) type, also known as an end-mill. He also would recognize that "angle" means the contour of the curved surface of the milling-cutter.

Representative Prior Art

None

Invention Information

The addition to the prior art comes from the novel method and apparatus for measuring the relief angle (contour) of a helical cutting tool (milling-cutter). This is reflected in the claims.

Measuring relief angles (contours) is the function aspect of the invention.

The special adaptation to the relief angle of a helical cutting tool (milling-cutter) is the application aspect of the invention.

In summary, the following invention information are identified:
I1: A method and apparatus for measuring relief angles (contours) (function aspect)
I2: The special adaptation to helical cutting tools (milling-cutters) (application aspect)

Additional Information

None

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	measuring ANGLE(S)	G01B
I1	Catchword Index	measuring CONTOURS	G01B
I2	Catchword Index	MILLING -cutters	B23C 5/00 B23F 21/12 (21/00) B23G 5/18 (5/00)

Analysis and Selection of Classification Symbols

I1: G01B, having "measuring angles" in its title, is found to be the right place for measuring angles and contours. Following the "Common rule" under G01B and the Subclass Index, it is recognized that main groups G01B 3/00 and G01B 5/00, which both relate to the use of mechanical means, are a priori pertinent. However, none of the instruments listed under G01B 3/00 seems to cover the whole apparatus of the invention. Instead, among the available one-dot subgroups of G01B 5/00, group G01B 5/20 covers "measuring contours or curvatures", while G01B 5/24 covers "measuring angles". In the context of the present invention the variable that is measured is actually a "contour", so G01B 5/20 is correct for I1. None of its two-dot subgroups seems pertinent. Therefore **G01B 5/20** remains the correct classification for I1.

Subclass B23F covers "Making gears or toothed tracks", and it is not pertinent here. Likewise, B23G covers thread-cutting and related work, and it is not pertinent here.

I2: B23C "Milling" is the right place for I2. The Catchword Index points directly to group B23C 5/00, which is indeed the place for milling-cutters per se. Following the "Common rule" under B23C, it is found that group B23C 9/00 covers details or accessories specially adapted to milling cutters. Group B23C 9/00 seems more pertinent than B23C 5/00, as the object of the invention is a not a milling-cutter per se, but the special adaptation to milling-cutters of an angle-measuring apparatus. Therefore **B23C 9/00** is the most pertinent entry for I2.

The application aspect seems to be the most relevant subject of the invention, and therefore the corresponding symbol under B23C is listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	G01B	Common rule, only appropriate group	G01B 5/20 (2006.01)
I2	Subclass title covers the subject matter	B23C	Common rule, only appropriate group	B23C 9/00 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B23C 9/00 (2006.01)
G01B 5/20 (2006.01)

Training Example E18

Categories

1a, 1b, 2a, 2b

Documents (Classification is Based on GB 1 315 230 A)

GB 1 315 230 A
DE 2 159 192 A1
FR 2 116 410 A1

Short Version of the Disclosure

Some insulated gate field effect transistors (IGFETs) are able to store charge and so have a variable transistor threshold voltage; the high or low transistor threshold being used as a memory element. Known charge storing IGFETs tend to exhibit Zener breakdown at low voltages, but this is avoided in the device described by providing a thicker insulating layer overlying the drain and a part of the channel next to the drain than the same insulating layer overlying the remainder of the channel and the source. The dual thickness insulating layer is thought to prevent charge storage in the region of the thicker insulating layer. The dual-thickness insulating layer is covered with a second insulating layer and a conductive layer to be used as a gate electrode.

Invention Information

I1: An IGFET having an insulating layer overlying the drain and a part of the channel next to the drain, the layer being thicker than the same insulating layer overlying the remainder of the channel and the source (see Claim 1 and Figure 2)

I2: An IGFET having an insulating layer overlying the drain and a part of the channel next to the drain and overlying the source and a part of the channel next to the source, the layer being thicker than the same insulating layer overlying the remainder of the channel. (see Claim 9 and Figure 3)

Additional Information

The use of the IGFET as a memory element, e.g. in EPROM devices (see first lines of the FR and GB documents) should be considered for classification as additional information. However, there is no disclosure of how the described memory element is used in a static store and therefore classification of that aspect (for example in G11C 11/40) is not necessary.

Although example materials are given for the semiconductor substrate and the first and the second insulating layers, the materials themselves are well known in the semiconductor field and therefore classification of the insulating materials per se is not desirable.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2	Catchword Index	TRANSISTORS – field-effect	H01L 29/772
I1, I2	Catchword Index	SEMICONDUCTOR devices using field-effect	H01L 29/76

Analysis and Selection of Classification Symbols

I1, I2: The Catchword Index points to subclass H01L, with H01L 29/00 as a relevant main group. The note under main group H01L 29/00 states that H01L 31/00 to H01L 47/00 and H01L 51/05 take precedence. On reading these main group titles, it is apparent that the IGFET described does not fall within their scope. As H01L 29/00 was found using the Catchword Index, hierarchically higher places in H01L should also be considered and doing so verifies that classification in or under H01L 29/00 is indeed appropriate.

H01L 29/66 is a one dot entry for “Types of semiconductor device” and as the described IGFET is an inventive type of semiconductor device, the entries under H01L 29/66 are examined further. Field effect transistors are found in the four-dot group H01L 29/772; below this there is a five-dot group H01L 29/78, for field effect transistors with field effect produced by an insulated gate, and there is an even more specialized six dot entry, H01L 29/792, for those IGFETs with a charge trapping gate insulator. As classification should be made in the deepest indented subgroup that covers the essential characteristics of the technical subject to be classified, **H01L 29/792** is the correct entry.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1, I2	Subclass title covers subject matter	H01L	Common rule, most relevant group	H01L 29/792 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H01L 29/792 (2006.01)

Training Example E19

Categories

1a, 1b, 2b1, 3a, 3b

Documents (Classification is based on US 3 603 416 A)

US 3 603 416 A
FR 2 090 100 A1
DE 2 123 599 A1
SE 368 461 B

Short Version of the Disclosure

Apparatus and method for measuring (at any instant) the weight of a material carried on a moving conveyer belt, comprising flexible supporting means extending across the width of the conveyer belt, frame means for suspending the ends of the supporting means and a load cell connected to the supporting means to measure the tension or tensile force therein. A tachometer means is also provided for measuring the speed of the moving belt, a signal from the tachometer being passed to the load cell wherein the tensile force and the speed of the belt can be integrated over a period of time to produce a signal proportional to the flow rate of the material carried by the belt. The supporting means may have rollers suspended on it. Drawings showing detailed arrangements of the rollers and the support arrangements thereof are present in the document.

Representative Prior Art

Prior art devices include pivotally or resiliently mounted frame members which reflect the load carried on the supported belt by vertical movement of the frame. The movement of the frame is recorded by calibrated weighing apparatus which integrates the amount of movement with the speed of the conveyer belt to give a measurement of the weight of the material carried by the belt.

Invention Information

I1: An apparatus and method for measuring (at any instant) the weight of a material carried on a moving conveyer belt, comprising flexible supporting means extending across the width of the conveyer belt, frame means for suspending the ends of the supporting means and a load cell connected to the supporting means to measure the tension or tensile force therein (see claims 3 and 10).

I2: An apparatus as in I1 where a tachometer means is also provided for measuring the speed of the moving belt, a signal from the tachometer being passed to the load cell wherein the tensile force and the speed of the belt can be integrated over a period of time to produce a signal proportional to the flow rate of the material carried by the belt (see claims 1, 2 and 6).

A1: The supporting means may have rollers suspended on it, and there are drawings showing detailed arrangements of the rollers and the support arrangements thereof in the document (see Figures 1-5).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, A1	Catchword index	WEIGHING	G01G
I1, I2, A1	Catchword Index	CONVEYER(S)	B65G
I1, I2, A1	Catchword Index	Weighers for CONVEYER belts	G01G 11/00

Analysis and Selection of Classification Symbols

I1: Subclasses G01G and B65G are indicated by the Catchword Index, and in particular G01G 11/00, which specifically provides for conveyer-belt weighers and is therefore appears to be the correct technical area. Despite the fact that there are no limiting references clarifying the borderline between G01G and B65G, it is clear that B65G can be discounted because the invention information relates essentially to weighing, not to constructional details of conveyers.

The widest claims of the current document (claims 1, 3 and 10) specify a load cell, which is a conventional electrical weight-sensitive device. Therefore the correct classification for these claims is **G01G 11/04**.

I2: The independent claim 2 mentions a tachometer and a totalizing or integrating device (see also Figure 2), as well as the load cell. **G01G 11/14** is the correct classification for these features**.** Since this term most specifically represents the invention as described, it most adequately represents the invention information, and is therefore listed first.

A1: Dependent claims 4, 5, 8, 9, 11 and 14 mention features of the rollers that are supported by the supporting means, and the drawings are fairly detailed as regards these features. These features merit classification as additional information. Main group B65G 39/00 is appropriate for details of rollers, and the appropriate subgroup is **B65G 39/04,** since many of the figures show multiple rollers mounted on a single cable (axle).

Since I2 represents the most complex combination of the invention it most adequately represents the invention information, corresponding symbol is listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject matter	G01G	Common rule, most relevant group	G01G 11/04 (2006.01)
I2	Subclass title covers subject matter	G01G	Common rule, most relevant group	G01G 11/14 (2006.01)
A1	Subclass title covers subject matter	B65G	Common rule, most relevant group	B65G 39/04 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
G01G 11/14 (2006.01)
G01G 11/04 (2006.01)
B65G 39/04 (2006.01)

Training Example E20

Categories

1a, 1b, 2a, 2a1, 2b1, 3b, 3c

Documents (Classification is based on US 4,236,213 A)

US 4,236,213 A
DE 29 45 168 A1
FR 2 442 542 A1
JP 55 074601 A

Short Version of the Disclosure

Digital microprocessor control system for vehicle motor - uses stored control words to define pulse width modulated output signals
The system uses a stored control word which has a first section specifying the pulse width for the output signal and a second section specifying its frequency. A logic circuit compares the contents of a free-running counter with the first section of the control word, with the second section of the latter determining the effective run of the counter used for the comparison.

The logic circuit provides an initial instruction when the effective run of the counter meets a given condition and a second instruction when the value of the effective run has a given relation to the value of the number of bits of the first section of the control word. These two instructions are received by a bistable output stage, which supplies a two level output signal. Pref. the logic circuit comprises a zero detector, a comparator and a decoder circuit.

Representative Prior Art

Digital systems for controlling a motor vehicle engine, which generate control signals from data regarding existing engine operating conditions, are known. A central processor usually processes the input data and distributes the necessary output data to, and controls the operation of, the various output counters to generate the signals necessary to achieve the desired operating condition. Since engine control parameters must be updated at short intervals of time, servicing the various output devices becomes unmanageable as the number of control functions increases (see column 1, line 12 to 29).

Invention Information

There are nine independent claims in this patent. Claims 2 - 7 are related to an engine control system, while cclaims 1, 8, and 9 identify an apparatus for generating a pulse width modulation output signal and do not mention the control of engines.

Therefore the following pieces of invention information are identified:
I1: Digital system for controlling a motor vehicle engine, which generates control signals from data regarding existing engine operating conditions, using control words with two sections specifying the pulse width and the frequency for the output signal, and using a free-running counter.

I2: Apparatus for generating and modulating electric pulses, using control words with two sections specifying the pulse width and the frequency for the output signal, and using a free-running counter.

Additional Information

While the mentioned use of the digital engine control system in this patent is for combustion engines, the disclosed apparatus for generating electric pulses may be used for controlling in general, namely for engines of other types as well. Particularly, it is noted that the control of electrical motors is usually done with this kind of electrical devices. It can be useful for search purposes to classify this as additional information.

So, the following pieces of additional information are identified:
A1: Digital control system, which generates control signals using control words with two sections specifying the pulse width and the frequency for the output signal, and using a free-running counter.
A2: Digital system useful for controlling electrical vehicles, which generates control signals from using control words with two sections specifying the pulse width and the frequency for the output signal, and using a free-running counter.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, A1	Catchword index	CONTROLLING in general	G05B
I1	Note (5) in G05B	controlling combustion engines	F02D
I2	Catchword index	generating, (…), modulating, (...) electric PULSE(S)	H03K
A2	Catchword index	CONTROLLING of electric motors, (...)	H02P

Analysis and Selection of Classification Symbols

I1: When looking at the first identified subclass G05B in the IPC, one finds in note (1) after its title, the information that this subclass covers the features of control systems or elements for specific variables, which are *"clearly more generally applicable"*. In Note (2)(c), it is specified that systems specially adapted for the control of particular machines are explicitly excluded from G05B, if there is a single other subclass for the particular machines, in which there is specific provision for control of regulation relevant to the special adaptation. Note (2)(c) further refers to Note (5) under which one finds the entry *"F02D - combustion engines"*.

In F02D, the Subclass Index as well as the Guidance Heading *“Electric control of combustion engines”*, leads us to the groups F02D 41/00 *"Electrical control of supply of combustible mixture or its constituents"* and F02D 43/00 *"Conjoint electrical control of two or more functions of combustions engines".* However it is stated in group F02D 41/00 that group F02D 43/00 takes precedence. Since the disclosed engine control system is adapted to control a plurality of engine functions, it is not restricted to the sole controlling of the fuel supply (see column 1, lines 32-38 and 45-50). Therefore, F02D 43/00 matches for

information I1. Because the invention includes analogue and digital means, the subgroups of F02D 43/00 do not match. So **F02D 43/00** remains the best matching entry for I1.

I2: In H03K, entry H03K 3/00 provides for *„Circuits for generating electric pulses"*. Since the inventive information I2 is a complete generator, it is not classified under H03K 3/01, but in **H03K 3/00** itself. The other subgroups of H03K 3/00 do not match either, because the invention, e.g., does not relate to the generation of trains of pulses. Furthermore, H03K 7/00 *"Modulating pulses with a continuously-variable modulating signal"* is selected as an additional classification entry, because the electric pulses are being width-modulated. In particular, the subgroup **H03K 7/08** *"Duration or width modulation"* is relevant.

A1: While not the appropriate place for classifying I1 due to the exclusion criteria discussed above, G05B still is the best match for A2. Namely, **G05B 15/02** *"Systems controlled by a computer - electric"* is a good additional entry.
A2: For the classification of the additional information A1, H02P was identified as potential subclass. As the best matching group H02P 23/00 *"Arrangements or methods for the control of ac-motors characterised by a control method other than vector control"* is found in the IPC. As none of the subgroups of H02P 23/00 match, **H02P 23/00** remains the best entry for classification.

As throughout the document, the controlling system is described and claimed as being adapted to the control of a motor vehicle engine symbol F02D 43/00, relating to "conjoint electrical control" of "combustion engines" (see also subclass title), appears to be the symbol which most adequately represents the invention. Therefore, it should be listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter Exclusion criteria given under G05B in Note 2.c.	F02D	Common rule	F02D 43/00 (2006.01)
I2	Subclass title covers the subject matter	H03K	Common rule	H03K 3/00 (2006.01) H03K 7/08 (2006.01)
A1	Subclass title covers the subject matter	G05B	Common rule	G05B 15/02 (2006.01)
A2	Subclass title covers the subject matter	H02P	Common rule	H02P 23/00 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
F02D 43/00 (2006.01)
H03K 3/00 (2006.01)
H03K 7/08 (2006.01)
G05B 15/02 (2006.01)
H02P 23/00 (2006.01)

Training Example E21

Categories

1a, 1b, 3c

Documents (Classification is Based on US 4 961 036 A)

US 4 961 036 A
DE 40 11 491 C2
FR 2 645 661 A
JP 03-073003 A

Short Version of the Disclosure

The invention is concerned with a system for controlling a working shaft including a counter receiving clock signals, a memory storage, a divider and a shaft driver wherein data on the shaft speed is previously stored in the memory.

Representative Prior Art

In control of actions of a multi spindle automatic lathe or in control of actions of a machine for knitting fishing nets high speed computations by a computer are necessary and conventionally the computations have been loaded to a plurality of micro-processors. In the case of controlling working shafts wherein further complex computations are needed use of complementary ICs that are intended to solely perform high speed computations have been employed.

Invention Information

I1: A system for controlling a working shaft, which comprises:
- a counter fed with clock signals to work as reference timing for actions in downstream;
- a memory sector, having addresses accessible to output from said counter;
- a divider connected to said memory sector and enabled to divide the clock signals with use of output from the memory sector;
- a shaft driver to control the working shaft with a speed relative to output from the divider;
wherein said memory sector is stored with data on speed operative to the shaft to be controlled (see claim 1).

The control system of the invention may be applied to different types of machines and, therefore, should be classified in a function-oriented place in accordance with paragraph 90(a) of the Guide.

Additional Information

Although the description refers to applications (multi spindle automatic lathe, machine for knitting fishing nets), there are no details as to how to adapt the invention to these particular machines and therefore classification of the applications is not desirable.

The description reveals that the motors driving the shafts are pulse motors and the control of pulse motors might be useful to classify. The control of motors is known in it self and thus this information must be considered additional.

A1: controlling a pulse motor driving a working shaft

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	PROGRAMME(S) control systems	G05B 19/00
I1	TACSY	Numerical Control	G05B 19/18
I1, A1	Catchword Index	CONTROLLING of electric motors, generators, or converters	H02P
I1, A1	Catchword Index	controlling electric MOTOR(S)	H02P

Analysis and Selection of Classification Symbols

I1: Using TACSY we are directed to G05B 19/18.

The first part of G05B is *"Control or regulating systems in general"*, which has to be understood in the context of the title of class G05, which is *"Controlling, Regulating"*. This clearly covers I1, and there are no notes or references to the contrary. In this subclass, the common rule applies.

Group G05B 19/00 *"Programme-control systems"* is certainly the correct main group. Although the expression "numerical control" is not included in the claim, the invention deals with a control system corresponding to the definition given by the wording of two-dot subgroup G05B 19/18 *"Numerical control (NC), i.e. automatically operating machines, in particular machine tools, e.g. in a manufacturing environment, so as to execute positioning, movement or co-ordinated operations by means of programme data in numerical form"*. Group G05B 19/18 being a subgroup of one-dot group G05B 19/02 *"electric"*. The numerical control system of the invention is characterized by the control of speed and, therefore, three-dot subgroup **G05B 19/416** *"characterised by control of velocity, acceleration or deceleration"* is the correct place for classification.

Subclass H02P covers arrangements for starting, regulating, electronically commutating, braking, or otherwise controlling motors. Considering the title of H02 *"Generation, conversion, or distribution of electric power"*, H02P has to be understood as covering controlling a high power portion of generating voltage and current needed by the motor. In the case of the invention information the controlling does not relate to starting, regulating or braking a single motor but to control a high number of shafts driven by motors. Therefore, the invention information should not be classified in H02P.

A1: The title of subclass H02P is *"Control or regulation of electric motors, …"***,** which in the context of the title of class H02 *"Generation, conversion, or distribution of electric power"*, clearly covers A1. H02P 8/00 *"Arrangements for controlling dynamo-electric motors rotating step by step "* is the only relevant main group and its subgroup **H02P 8/14** *"Arrangements for controlling speed or speed and torque"* is the right place for classification since the information relates to controlling the speed of the motor.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass/group title	G05B	Common rule	G05B 19/416 (2006.01)
A1	Title of H02P	H02P	Only relevant subgroup	H02P 8/14(2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
G05B 19/416 (2006.01)
H02P 8/14 (2006.01)

Training Example E22

Categories

2b1, 3b, 3c

Documents

This is an artificial example.

Brief Description of the Artificial Example

A portable double-faced electric-type display to visualize the number of players to be substituted on sport matches played with teams, like football.
Two double-digit numbers can be simultaneously displayed: one number (12,13,14,15) for the player to come off the field, and the other number (16,17,18,19) for the player to replace him (see fig.2).

In operation, the device is actuated by push buttons (6,7; 8,9) disposed on the back face, namely on the operator side, of the display (see fig.3).
The type of display is not critical, yet in one embodiment light emitting diodes (LED's) are preferred as individual elements of the display.

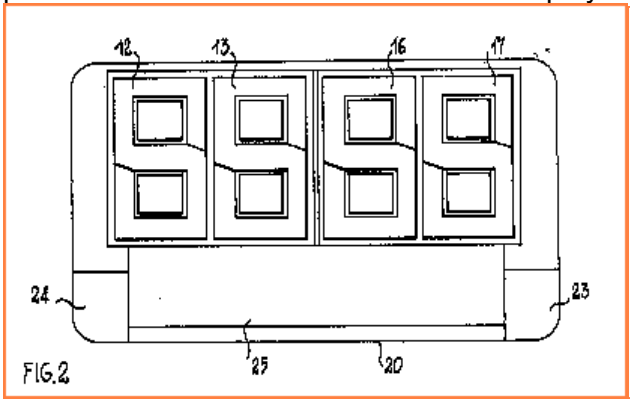


FIG.2

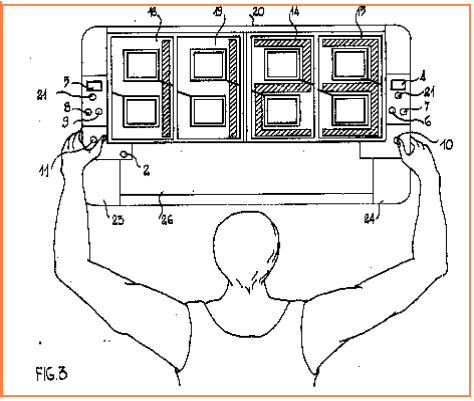


FIG.3

Representative Prior Art

A non-electric manually operated portable display, which is particularly suited for indicating in sport events is known from document EP-A-0031033 (published on 1 July 1981).

Invention Information

An addition to the prior art comes from the overall structure of the portable display, which is double-faced, and easily operated by push buttons. Displaying is in this case the *function* aspect of the invention.

A further addition to the prior art comes from the special adaptation of the display for indicating in sport games: the display is particularly suited for operating during football matches, where a player (with a first number) is substituted and another (with a second

number) comes in to replace him, and this information can be instantaneously displayed to the audience. Indicating in sport games is in this case the *application* aspect of the invention. In summary, the following pieces of Invention Information are identified:

I1 : portable double-faced display (*function* aspect)
I2 : its special adaptation for indicating in sport games (*application* aspect)

Additional Information

Having recognized that the choice of LED's is not critical, and not in itself an addition to the state of the art, it is non-obligatory but desirable to classify such piece of information as Additional Information, in order to facilitate a searcher looking for a portable double-faced LED display.

In summary, the following piece of Additional Information is identified:

A1 LED display

Identification of Potential Subclasses

From a term search in the IPC, particularly by the use of the IPC Catchword index, the potentially appropriate IPC places for Invention Information and Additional Information are identified.

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	DISPLAYING	G09F
I2	Catchword index	scoring-devices for SPORTS	A63B 71/06
A1	Catchword index	LED-type DISPLAY	G09F

Analysis and Selection of Classification Symbols

G09F is found to be the right place for displaying. Under G09F, and following the "Common rule" for group selection, it is determined that displaying of variable information wherein the information is obtained by combination of individual elements is covered by main group G09F 9/00. Illuminated signs are covered by main group G09F 13/00, which however gives priority to G09F 9/00. So G09F 9/00 is the most appropriate main group for piece of information I1. Among the one-dot subgroups of G09F 9/00, group G09F 9/30 covers forming the characters by combining individual elements, and the two-dot subgroups of **G09F 9/30** cover specific types of said individual elements. However, the type of individual elements of the display was recognized to be not critical. Therefore group G09F 9/30 remains the most appropriate one for piece of information I1.

A63B is found to be the right place for sports. The catchword index points to **A63B 71/06** as the place for scoring devices for sports. Indeed its is found that such group covers also indicating devices for sport games. Main group A63B 71/00 is residual with respect to preceding groups, that must therefore be considered. Yet it is easily recognized that group A63B 71/06 remains the most appropriate place for piece of information I2.

As far as piece of information A1 is concerned, following the same arguments as for I1 above, it is eventually determined that the two-dot group **G09F 9/33** for "semiconductor diode display" is the most appropriate entry.

The symbol G09F 9/30 relating to the "Display" aspect is listed first, as this seems to be the most relevant aspect of the document.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	G09F	Common rule	G09F 9/30 (2006.01)
I2	Subclass title covers the subject matter	A63B	Common rule	A63B 71/06 (2006.01)
A1	Subclass title covers the subject matter	G09F	Common rule	G09F 9/33 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
G09F 9/30 (2006.01)
A63B 71/06 (2006.01)
G09F 9/33 (2006.01)

Training Example E23

Categories

1a, 1b, 2a, 2b3, 3a

Documents

This is an artificial example.

Brief Description of the Artificial Example

The document discloses a device which converts value from a multivalued number system (range-N digit) to a binary representation (conventional L-digit binary), which does not mitigate the performance benefits of multivalued logic processors.

This converter comprises multi-level folding circuits containing multiple-peak resonant tunneling transistors (e.g. an FET and a multiple-peak resonant tunneling diode) which exhibit multiple negative differential transconductance being connected by a voltage divider.

The conversion for multiple inputs is accomplished by a series of decomposition stages, and each decomposition stage produces an interim multivalued number and a binary digit, which becomes one of the digits of the binary output word. The decomposition at each stage is accomplished by a set of the converters.

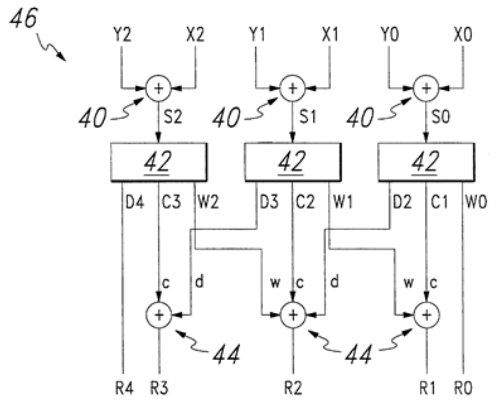


Fig. 1

Representative Prior Art

There are many references relating to Resonant Tunneling Device and it is known that Multivalued Logic circuits have a potential for increased speed and density since multiple binary bits may be simultaneously processed in a single Multivalued Logic circuit.

Invention Information

I1: A converter which converts a multivalued (range-N) digit to a binary (conventional L-digit binary) word

I2: A multivalued logic circuit which comprises series of stages of decomposition which is accomplished by a set of converters which convert a multivalued digit to a binary word

I3: A binary adder in redundant multivalued logic representation (fig. 1)

Additional Information

None

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	TACSY	digits conversion	H03M 5/00, H03M 7/02, H03M 13/03, H03M 1/26
I2	TACSY	multivalued logic circuit / convert a multivalued digit to a binary word	H03K / H03M
I3	Catchword Index	ADDING see COMPUTING Then COMPUTING electrically in digital fashion	G06F
I3	TACSY	Binary adder (in G06F)	G06F 7/00

Analysis and Selection of Classification Symbols

I1: As the table above shows, TACSY indicates some groups whose subclass is H03M which covers “CODE CONVERSION” and must be considered appropriate. In those groups, H03M 13/00 is for error detection and is obviously irrelevant. Additionally, H03M 7/00 is irrelevant because the input information to be converted in I1 is not represented by a given sequence or number of digits. On the other hand, I1 is to convert the form of the representation of individual digits as well, so H03M 5/00 is appropriate. The example given is that of an input signal with 4 amplitude ranges (0-0.5volt, 0.5-1.5v, 1.5-2.5v, >2.5v) to represent the 4 digits of the base 4 code, i.e. respectively 0, 1, 2, 3. This multivalued (4 values) input is converted into binary by two parallel 2-threshold circuit using tunnel diodes which deliver the 2 bit output code CW. The base 4 input could be represented by any kind of signal. This document deals specifically with the conversion of a 4 level amplitude multivalued signal into binary. Therefore, H03M 5/20 (“the pulses having more than three levels”) is selected here.

I2: As the table above shows, TACSY indicates H03K, G06K 9/00 and F15C. F15C (FLUID-CIRCUIT ELEMENTS PREDOMINANTLY USED FOR COMPUTING OR CONTROL PURPOSES) and G06K (RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS) are obviously irrelevant, however from the title of H03K we should investigate this area further.

The title of H03K is “PULSE TECHNIQUE” and its note says “This subclass covers methods, circuits, devices, or apparatus using active elements operating in a discontinuous or switching manner for generating, counting, amplifying, shaping, modulating, demodulating, or

otherwise manipulating signals." Therefore, H03K is appropriate. In the groups of this subclass, I2 is classified in H03K 19/10 because the circuits use resonant tunneling diodes.

On the other hand, the input information described in I2 can be represented by a given sequence or number of digits, and thus H03M 7/00 is appropriate. In addition, output digits are conventional binary codes, that is, weighted codes. So H03M 7/04 is appropriate. Though there is a last place priority rule, other groups under H03M 7/00 are irrelevant. Therefore, I2 is also classified in H03M 7/04.

I3: As the table above shows, TACSY indicates G06F 7/00 for a binary adder. The title of G06F 7/38 is "Methods or arrangements for performing computations using exclusively denominational number representation, e.g. using binary, ternary, decimal representation". Therefore, the group is appropriate. In groups under group G06F 7/38, I3 is classified in G06F 7/50 because I3 is an adder and uses non-contact-making devices.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject matter	H03M	Last place priority rule	H03M 5/20 (2006.01)
I2	Subclass title covers subject matter	H03M	Last place priority rule	H03M 7/04 (2006.01)
I2	Subclass title covers subject matter	H03K	Common rule	H03K 19/10 (2006.01)
I3	Subclass title covers subject matter	G06F	Common rule	G06F 7/50 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H03M 5/20 (2006.01)
H03M 7/04 (2006.01)
H03K 19/10 (2006.01)
G06F 7/50 (2006.01)

Training Example E24

Categories

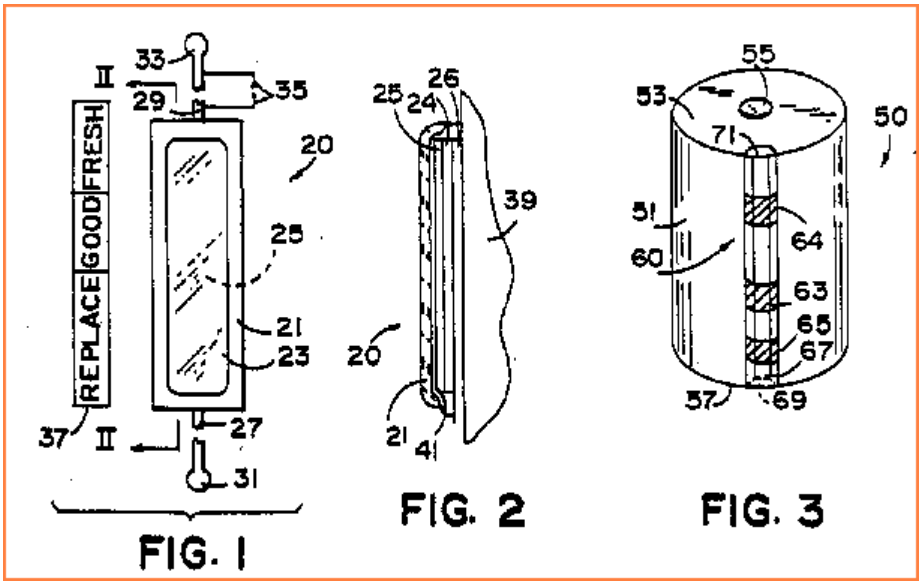
2a, 2b1, 3b

Documents

This is an artificial example.

Brief Description of the Artificial Example

A tester (20, 60) for use in determining the state-of-charge of a battery (50) (Fig.1 and Fig. 3). The tester employs an electrochromic cell (20), comprising an electrochromic layer (25), which changes visual appearance, for example colour or intensity of colour, when electrically connected across the terminals of the battery. The electrochromic cell (Fig. 2) is a conventional one, and its choice and construction are not critical. The tester can be electrically connected to the battery permanently or momentarily via a switch (35) when desired. The tester is preferably comprised in a label for the battery.



Representative Prior Art

Testers and indicators of the state of charge of a battery making use of thermo-optic elements.

Invention Information

An addition to the prior art comes from the novel tester and indicator of the state of charge of the battery, which makes use of an electrochromic cell.

A further addition to the prior art comes from the integral battery with tester, as for example described in Fig. 3.
In summary, the following pieces of Invention Information are identified:

I1 : tester including electrochromic cell for determining and indicating the state-of-charge of a battery
I2 : an integral battery with tester including an electrochromic cell

Additional Information

It is recognized that the electrochromic cell is a conventional one and that its choice and construction are not critical, and not in itself an addition to the state of the art.
Having said that, it is non-obligatory but desirable to classify such piece of information as Additional Information, in order to facilitate a searcher looking for a battery tester using an electrochromic cell.
Stated differently, it is desirable to complement the Invention Information (~ tester of a battery) by identifying the component (~ electrochromic cell) that in the context of the classified technical subject (thus not in itself) represents the addition to the state of the art.
In summary, the following piece of Additional Information is identified:

A1 : use of an electrochromic cell

Identification of Potential Subclasses

From a term search in the IPC, particularly by the use of the IPC Catchword index, the potentially appropriate IPC places for Invention Information and Additional Information are identified.
Obvious alternatives in the present context, like "cell" for "battery", have been used in the queries.

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	TESTING electric properties	G01R 31/00
I2	Catchword index	electric BATTERY(-IES)	H01M
A1	Catchword index	electrochromic	none
I1, I2, A1	IPCCAT – 3 predictions – level: main group	the paragraph under "Short version of the disclosure"	G02F 1/00 G01R 31/00 H01M 10/00

Analysis and Selection of Classification Symbols

G01R is found to be the right place for measuring electric variables – Note (2) after the subclass title confirms that "measuring" includes "investigating". The IPCCAT-tool points directly to G01R 31/00, which indeed is to found to cover arrangements for testing electric properties, as well as arrangements for electrical testing characterised by what is being tested, and not provided for elsewhere. Following the "Common rule" under G01R confirms that main group G01R 31/00 is pertinent for I1.

Among the available one-dot subgroups of G01R 31/00, group G01R 31/36 covers testing condition of electric batteries. As there are no further subgroups, **G01R 31/36** is pertinent for I1.
Among the other main groups of G01R, group G01R 19/00 covers arrangements for indicating the presence or sign of voltages. As the electrochromic element of the invention works both as a tester and as a visual indicator, it seems appropriate to give a further classification under G01R 19/00 as well.

G01R 19/155 covers indicating the presence of voltages, and therefore seems the most appropriate entry under G01R 19/00 – group G01R 19/165 would cover the indication of crossing a predetermined value instead.

H01M is found to be the right place for batteries (electrochemical cells). The IPCCAT-tool points directly to H01M 10/00. The reference after G01R 31/36 points to H01M 10/48 as far as accumulators combined with arrangements for measuring or indicating condition. Following the "Common rule" under H01M confirms that group H01M 10/00 is the most pertinent one for I2, and analysis of the subgroups confirms that **H01M 10/48** is the most pertinent entry for piece of information I2.

The combined and integral battery and tester seems to be the most relevant subject, and therefore the corresponding symbol under H01M is listed first.

It is noted that neither G01R nor H01M 10/48 covers the use of the electrochromic cell. This reinforces the desirability of classifying the piece of information A1 as Additional Information.

G02F is found to be the place for optical modulation devices for the control of colour of light. IPCCAT-tool points directly to G02F 1/00. This group indeed covers the control of colour by devices the optical operation of which is modified by changing the optical properties of the medium of the devices by the influence or control of physical parameters, e.g. electric fields – see Note after group title. Following the "Common rule" under G02F it is confirmed that main group G02F 1/00 is the most pertinent one for A1.

Among the available one-dot subgroups of G02F 1/00, group G02F 1/01 covers control of colour, and two-dot subgroup G02F 1/15 covers the use of electrochromic elements. No further subgroup is pertinent as the construction of the cell was recognized to be not critical. Therefore **G02F 1/15** remains the most pertinent entry for piece of information A1.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	G01R	Common rule	G01R 31/36 (2006.01)
I1	Subclass title covers the subject matter	G01R	Common rule	G01R 19/155 (2006.01)
I2	Subclass title covers the subject matter Reference from G01R 31/36	H01M	Common rule	H01M 10/48 (2006.01)
A1	Subclass title covers the subject matter	G02F	Common rule	G02F 1/15 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
H01M 10/48 (2006.01)
G01R 31/36 (2006.01)
G01R 19/155 (2006.01)
G02F 1/15 (2006.01)

Training Example E25

Categories

1a, 1b, 2b1, 3a, 3b, 3c

Documents (Classification is based on GB 2 184 922 A)

GB 2 184 922 A
DE 3 640 692 A1
FR 2 591 004 A1
JP 62 234 420 A

Short Version of the Disclosure

A digital phase-locked loop system for providing a digital output signal synchronized with a stream of data pulses, comprising:

- variable oscillator means for generating a digital output signal comprises of alternating high and low level pulse windows in which each window is comprised of a plurality of successive segments of equal duration, wherein the oscillator means is alterable to control the number of segments in each window in a sequence of windows to provide one of a plurality of predetermined set output frequencies;
- phase detection means for determining the position of each data pulse relative to the segments of a window in which it occurs; and
- processing means, responsive to the phase detection means, for controlling the oscillator means to (a) alter the set output frequency as a function of the positions of a minimum of three consecutive data pulses with respect to the segments of the windows in which they occur and (b) alter the number of segments in an individual window as a function of the position of a data pulse with respect to the segments of said individual window and as a function of the positions of a minimum of two data pulses with respect to the segments of windows in which they occur.

Representative Prior Art

A digital phase-locked loop system including a variable multiple state component such as a counter or shift register driven by a sample clock. The carry output of the shift register provides an output signal of variable frequency which is used to toggle the recovered clock window signal. The output frequency of the shift register is varied by adding or subtracting states. In order to reduce the frequency of the window signal, one state is added, and in order to increase the frequency of the window signal, one state is subtracted.

A phase detector is implemented with a microprocessor or logic array and determines when the transition pulses arrive with respect to the states of the shift register. The logic array incorporates an algorithm to determine frequency corrections as a function of the determination of the state of occurrence of the transition pulses. If a transition pulse does not arrive in the correct state, the phase detector provides an error signal to alter the number of states, and thus the output frequency, of the shift register.

Invention Information

I1: A digital phase-locked loop system in which phase detection and error amplification is provided by programmed state machines which drive a digital controlled oscillator including a variable state shift register to change the frequency of the shift register output if appropriate. Filter operation is provided by latching state machine output terms and feeding them back at later clock times. The oscillator means is controlled in order to (a) alter the set output frequency as a function of the positions of a minimum of three consecutive data pulses with respect to the segments of the windows in which they occur and (b) alter the number of segments in an individual window as a function of the position of a data pulse with respect to the segments of said individual window and as a function of the positions of a minimum of two data pulses with respect to the segments of windows in which they occur.

Additional Information

A1: Apparatus for reading digital data from a disk storage, where clock information has been embedded in the data information (see "Field of the invention", from second paragraph until end of section).

A2: Clock recovery for data synchronisation in digital data transmission (see "Field of the invention", first paragraph).

Motivation: Even though the invention is directed to a device per se, the main applications that are explicitly mentioned appear to deserve a classification, also according to § 85(c)(d) and § 90(c) of the Guide to the eight edition of the IPC.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	PHASE-LOCKED LOOP (PLL) for frequency or phase control	H03L 7/00
A1	Catchword index	STORAGE of information (by other means)	G11B
A2	Catchword index	TRANSMISSION of digital information	H04L

Analysis and Selection of Classification Symbols

I1: The main invention relates to a (digital) phase-locked loop. For such technical term, the catchword index provides a precise main group, H03L 7/00 ***"Automatic control of frequency or phase; Synchronisation"***.

Under this main group, we find H03L 7/06 ***"using a reference signal applied to a frequency- or phase-locked loop"***, which has the subgroup H03L 7/08 ***"Details of the phase-locked loop"***.

Its subgroup **H03L 7/085** ***"concerning mainly the frequency- or phase-detection arrangement including the filtering or amplification of its output signal"*** seems the most suitable for classifying the aspects of phase error amplification and filter operation (see figure 9, blocks 58, 64, 66) that characterise I1.

On the other hand, the details of I1 concerning the control of the oscillator (see fig. 9, blocks 60, 60a) falls within the scope of group **H03L 7/099** ***"concerning mainly the controlled oscillator of the loop"***. Since the invention is characterised by the combination of aspects covered by both groups, classification in both places is appropriate according to the common rule, which applies in this subclass (see paragraph 145 of The Guide).

A1: An application specifically mentioned in the document (see "Field of the invention") is the use of the invention in the decoding of information encoded on a disk using modified frequency modulation (MFM) format. "***Storage of information based on relative movement between record carrier and transducer, e.g. disks"*** is covered by G11B.

Main group G11B 20/00 covers ***"Signal processing not specific to the method of recording or reproducing; Circuits therefor "***. It has the subgroup G11B 20/10 "Digital recording or reproducing", which has a two-dot subgroup **G11B 20/14** "using self-clocking codes". The latter is the best fitting group.

A2: The reference in group H03L 7/00 says "synchronising in digital communication systems, see the relevant groups in class H04". Under H04, the most appropriate subclass for the case at hand appears to be H04L ***"Transmission of digital information"***, which is also indicated by the Catchword Index. The most relevant main group is H04L 7/00 ***"Arrangements for synchronising receiver with transmitter"***. It has the subgroup H04L 7/02 ***"Speed or phase control by the received code signals, the signals containing no special synchronisation information"***, and its two-dot group H04L 7/033 provides for ***"using the transitions of the received signal to control the phase of the synchronising-signal- generating means, e.g. using a phase-locked loop"***. **H04L 7/033** is the correct group for A2.

None of the two symbols given for invention information can be considered as more relevant than the other. Therefore H03L 7/085 is listed first, since it is the first in alphanumerical order.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Title covers subject matter	H03L	Common rule, combination of two aspects	H03L 7/085 (2006.01) H03L 7/099 (2006.01)
A1	Title covers subject matter	G11B	Common rule	G11B 20/14 (2006.01)
A2	Reference in H03L 7/00	H04L	Common rule	H04L 7/033 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
H03L 7/085 (2006.01)
H03L 7/099 (2006.01)
G11B 20/14 (2006.01)
H04L 7/033 (2006.01)

Training Example E26

Categories

2a, 2a1, 2b4, 2c

Documents

This is an artificial example.

Brief Description of the Artificial Example

A client-server system for corporate travel planning and management operates on a corporate database environment. The system includes a computerized reservation system, a relational database server with a communications link to the reservation system and a travel planning, expense reporting and travel management system on a personal computer. The personal computer provides a graphical user interface which enables communications between the user, the travel planning, expense reporting and travel management system and the relational database server. The relational database server stores traveller and corporate profiles that function as filters between the travel planning, expense reporting and travel management system and the computerized reservation system. The system enables automated travel planning from the traveller's desktop. It further provides pre-travel decision support and automated expense reporting.

The invention is:

(i) A system for travel planning, expense reporting and travel management comprising a computerized reservation system (CRS) and a relational database linked to the CRS configured for allowing a user of a personal computer (PC) to complete a travel reservation and communicate the travel reservation to a travel agency for post-reservation processing.

(ii) A travel planning system which enables a user to complete an entire booking process.

(iii) An expense reporting system which automates expense reports.

Invention Information

I1: A system for travel planning, expense reporting and travel management comprising a computerized reservation system (CRS) and a relational database linked to the CRS configured for allowing a user of a personal computer (PC) to complete a travel reservation and communicate the travel reservation to a travel agency for post-reservation processing.

I2: A travel planning system which enables a user to complete an entire booking process.

I3: An expense reporting system which automates expense reports.

Identification of Potential Subclasses

By using a term search in the IPC Catchword Index the potentially appropriate IPC places for invention information and additional information are identified. Alternatives like “finance”, “reservation”, “administration” have been used in the queries.

Subject Matter	Tool	Query	IPC Places
I1, I2	Catchword Index	Data processing systems or methods, specially adapted for ADMINISTRATION	G06Q 10/00
I1, I2	Catchword Index	Electric computers for RESERVATION of seats	G06F 17/00, G06F 19/00
I1, I3	Catchword Index	Data processing systems or methods, specially adapted for FINANCE	G06Q 40/00

Analysis and Selection of Classification Symbols

I1: G06Q covers “data processing systems or methods, specially adapted for… commercial…
purposes”, which fits with the scope of the invention.

G06Q 10/00 covers “Administration, e.g. office automation or reservations; Management, e.g. resource or project management” and would be a correct place of classification for the information.

G06Q 40/00 covers “Finance, e.g. banking, investment or tax processing; Insurance, e.g. risk analysis or pensions” and is a potential place for classification of the information. The expense reporting of I1 cannot, however, be considered “Finance”. Thus, of main groups G06Q 10/00 and G06Q 40/00, only G06Q 10/00 should be used for classifying the information.

Note (2) of subclass G06Q states that when classifying in groups G06Q 10/00-G06Q 40/00, systems or methods that are specially adapted for a specific business sector must also be classified in group G06Q 50/00, which covers “Systems or methods specially adapted for a specific business sector, e.g. health care, utilities, tourism or legal services”, when the special adaptation is determined to be novel and non-obvious. In this case the system is specially adapted for the travel reservation sector, which is a specific business sector and the information should also be classified in **G06Q 50/00**.

The symbol G06Q 10/00 should be given first since it covers the information as a whole.

There seem to be no relevant places for classifying the information under main group G06F 17/00. Furthermore, G06F 17/00 covers “Digital computing or data processing equipment or methods, specially adapted for specific **functions**” whereas G06F 19/00 covers “Digital computing or data processing equipment or methods, specially adapted for specific **applications**”. In this case the information refers to an application and G06F 19/00 is the more appropriate place of classification. G06F 19/00, however, refers to G06Q when the information relates to “data processing systems or methods specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes”, which it does in this case. Therefore, no classification in G06F 17/00 or G06F 19/00 should be made.

I2: G06Q covers “data processing systems or methods, specially adapted for… commercial…
purposes”, which fits with the scope of the invention.

G06Q 10/00 covers “Administration, e.g. office automation or reservations; Management, e.g. resource or project management” and would be a correct place of classification for the information.

Note (2) of subclass G06Q states that when classifying in groups G06Q 10/00-G06Q 40/00, systems or methods that are specially adapted for a specific business sector must also be classified in group G06Q 50/00. In this case the system is specially adapted for the travel reservation sector and the information should also be classified in G06Q 50/00.

The symbol G06Q 10/00 should be given first since it covers the information as a whole.

There seem to be no relevant places for classifying the information under main group G06F 17/00. Furthermore, G06F 17/00 covers “Digital computing or data processing equipment or methods, specially adapted for specific **functions**” whereas G06F 19/00 covers “Digital computing or data processing equipment or methods, specially adapted for specific **applications**”. In this case that the information refers to an application and G06F 19/00 is the more appropriate place of classification. G06F 19/00, however, refers to G06Q when the information relates to “data processing systems or methods specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes”, which it does in this case. Therefore, no classification in G06F 17/00 or G06F 19/00 should be made.

I3: G06Q covers “data processing systems or methods, specially adapted for… commercial…
purposes”, which fits with the scope of the invention.

G06Q 10/00 covers “Administration, e.g. office automation or reservations; Management, e.g. resource or project management” and would be a correct place of classification for the information, since the in-office expense reporting is automated.

G06Q 40/00 covers “Finance, e.g. banking, investment or tax processing; Insurance, e.g. risk analysis or pensions”, but the information is not related to these subjects. It only describes how a user is allowed to report expenses, which must be considered office automation and not “Finance”. This place is not right for classification of the information.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Note in G06Q	G06Q	First place priority rule	G06Q 10/00 (2006.01 G06Q 50/00 (2006.01)
I2	Note in G06Q	G06Q	First place priority rule	G06Q 10/00 (2006.01) G06Q 50/00 (2006.01)
I3	Note in G06Q	G06Q	First place priority rule	G06Q 10/00 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
G06Q 10/00 (2006.01)
G06Q 50/00 (2006.01)

Training Example E27

Categories

2b1, 3b, 3c

Documents

This is an artificial example.

Brief Description of the Artificial Example

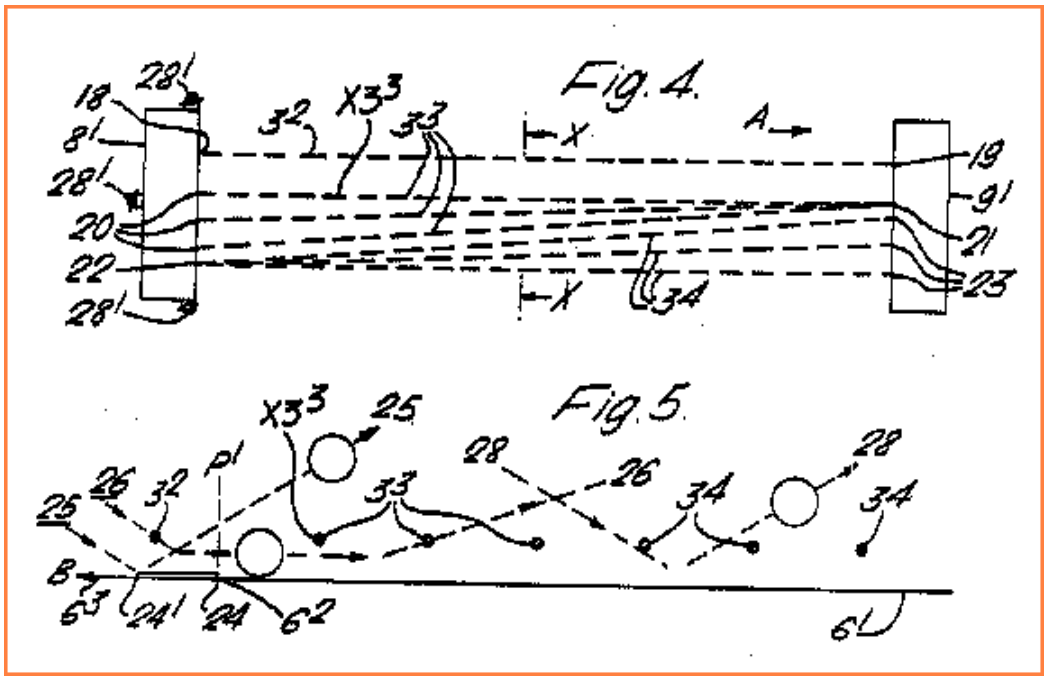
An electrically operated device to optically monitor the area near a critical line on a tennis court, includes (Fig. 4):

- a first box (8') housing a first optical transmitter (18) projecting a first ray (3^2) which registers on a first optical receiver (19) in a second box (9'), said first ray running substantially parallel to the said critical line and running over an area of the court on which a standard tennis ball in play would strike if it were a "good" ball;

- a second optical transmitter (21) housed in said second box (9') projecting a diverging ray (3^3) which registers on three optical receivers (20) housed in said first box (8').

- a third optical transmitter (22) housed in said first box (8') projecting a diverging ray (3^4) which registers on three optical receivers (23) housed in said second box (9').

The rays are infra-red rays. The arrangement is such that ray 3^2 will be a "good ball" ray and, if it is interrupted, will prevent any signal being caused by the interruption further ray, i.e. the "fault" rays 3^3 and 3^4.



Operation of the device will be described by referring to Fig. 5.

- if a ball from a tennis service flying along the path 25 strikes the ground in the area 6^3–6^2, thereby interrupting the ray 3^2, a light confirms that it is a "good" ball;

- if a ball from a tennis service flying along the path 28 strikes the ground in the area 6^2–6^1, thereby interrupting at least one of the rays 3^3 or 3^4, it will actuate, also by sound, a "fault" alarm;

- if a ball from a service flying along the path 26 strikes the ground first in the area 6^3–6^2, thereby interrupting the ray 3^2, and then strikes the ground in the area 6^2–6^1, or strikes first the critical line 24 and subsequently skids into the area 6^2–6^1, thereby interrupting any of the rays 3^3 or 3^4, the prior interruption of the ray 3^2 electrically prevents any supply from actuating any alarm and a light confirms that the ball was "good".

Representative Prior Art

In this artificial example, it is assumed that no similar device exists at all in the prior art – the monitoring of the tennis line being simply done by tennis umpires.

Invention Information

In the electrically operated optically monitoring device of the invention, monitoring is based on the optical detection of moving tennis balls, by interruption of optical beams running along the tennis critical lines.

An addition to the prior art comes from the overall structure and operation of the optically-based detection of moving objects. Optical detection of moving objects is here the *function* aspect of the invention.

A further addition to the prior art comes from the special adaptation of the device for signalling in tennis games. Signalling in tennis games is here the *application* aspect of the invention.

In summary, the following pieces of Invention Information are identified:

I1 : optical detection of moving objects and their position in relation to a critical line, in particular detection of where the objects collide with the ground (*function* aspect)
I2 : its special adaptation for signalling in tennis games (*application* aspect)

Identification of Potential Subclasses

From a term search in the IPC, particularly by the use of the IPC Catchword index, the potentially appropriate IPC places for Invention Information and Additional Information are identified.

Obvious alternatives in the present context, like “sport” for “tennis”, and "detecting" or "signalling" for monitoring, have been used in the queries.

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	DETECTING	G01V, G21J, G01T
I1	Catchword index	SIGNALLING	G08B
I2	Catchword index	scoring-devices for SPORTS	A63B 71/06 A63D 15/20

Analysis and Selection of Classification Symbols

Subclass G21J covers nuclear explosives, and it is not pertinent here.
Likewise, G01T covers measurement of nuclear or X-radiation, and it is not pertinent here.
G01V is found to be the right place for detecting in general. Under G01V, and following the "Common rule" for group selection, it is determined that detecting by optical means is covered by main group G01V 8/00.
Among the available one-dot subgroups, group G01V 8/10 covers the optical detection by using light barriers. Two-dot subgroup 8/12 is not pertinent as I1 involves the use of more than one optical transmitter or optical receiver. Group **G01V 8/20** covers the optical detection by using multiple optical transmitters or optical receivers. None of the three-dot subgroups of G01V 8/20 is pertinent for I1, so group 8/20 remains the most appropriate one for piece of information I1.
Subclass G08B covers signalling or calling systems, as well as alarm systems, and it is potentially (say *a priori*) pertinent for I1. However attention is drawn to the first two indents of Note (2) after the subclass title:

Notes
(2) This subclass does not cover:
- *the mere provision of an audible or visible signalling device on measuring or switching apparatus;*
- *alarm systems for indicating that a specific variable has exceeded, or fallen below, a predetermined value, which are covered by the relevant subclasses of class G01 for the measurement of that variable.*

As the central features of I1 is in the detecting (measuring) aspect, G08B classification is excluded in favour of the relevant subclass of G01, which was just found to be G01V.
A63B is found to be the right place for sports. The catchword index points to **A63B 71/06** as the place for scoring devices for sports. Indeed its is found that such group covers also indicating devices for sport games. Main group A63B 71/00 is residual with respect to preceding groups, that must therefore be considered. Yet it is easily recognized that group A63B 71/06 remains the most appropriate place for piece of information I2.

The catchword index also points to A63D 15/20 as the place for scoring or registering devices for billiards or similar art. Yet it is obviously recognized that the indicating device of I1 would have no practical application for billiard games, and therefore A63D 15/20 is not pertinent for I2.

The symbol A63B 71/06 relating to "Signalling in tennis games" is listed first, as this seems to be the most relevant aspect of the document.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	G01V	Common rule	G01V 8/20 (2006.01)
I2	Subclass title covers the subject matter	A63B	Common rule	A63B 71/06 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows.

Int. Cl.
A63B 71/06 (2006.01)
G01V 8/20 (2006.01)

Training Example E28

Categories

1a, 1b, 2b1, 3a, 3b

Documents (Classification is Based on GB 2 402 581)

GB 2 402 581 A
FR 2 855 003 A1
DE 103 49 800 A1

Short Version of the Disclosure

The document discloses a wireless headset for e.g. a mobile phone, the headset comprising a boom with a buil1 in microphone. The headset has a controller built in a main body for detecting an open or closed state of the boom according to an on/off state of a boom switch. An incoming call indication mode is set depending on whether the boom is closed to the main body or not. If the boom is opened from the main body, the mode is set to a ringing or melody mode. If the boom is closed to the main body, the mode is set to a vibration mode. Upon receiving an incoming call signal the user is informed at a predetermined incoming call indication mode. The vibration mode may also be automatically selected if the call is not answered within a preset time. The advantage of the invention is that the controller sets the vibration mode if the boom is closed to a main body, and thus effectively informs the user of an incoming call signal even if the user is not wearing the wireless headset.

The particular wireless technology used for communication between the headset and the mobile phone is Bluetooth (RTM); a short range two-way packet-switched communication. Some information about Bluetooth (RTM) in general is found in the description.

Representative Prior Art

Conventional wireless headset are known allowing Bluetooth (RTM) communication with mobile telephones via a wireless local area network.

The document describes a conventional wireless headset with reference to US Patent No. 6,230,029 comprising a boom rotated with respect to an ear piece and a microphone positioned at one end of the boom.

There are prior art headsets allowing their speakers to ring or generate melody sound upon receiving an incoming signal.

Mobile phones are commonly known with the feature of different ways of informing a user of an incoming call, e.g. by vibrations or by a melody signal.

Invention Information

I1: A wireless headset for communication with a communication terminal comprising a boom being pivotally mounted to the main body and one end of which has a microphone attached thereon, a boom switch being switched on or off according to an open or closed state of the boom. The user is informed of an incoming call according to a predetermined incoming call

indication mode depending on whether the boom is closed or open. If the boom is opened from the main body, the mode is set to a ringing or melody mode. If the boom is closed to the main body, the mode is set to a vibration mode.

Additional Information

A1: The use of Bluetooth (RTM) as the wireless communication technology connecting a headset and a telephone.

A2: The use of a headset with a mobile telephone.

A3: The positioning of a microphone on a movable boom of a headset for use with a telephone.

Identification of Potential Subclasses

By using a term search, e.g., in the IPC Catchword Index, or the Natural Language Search of the IPC (TACSY), by providing a text to the Computer-Assisted Categorizer (IPCCAT), or by doing a statistical analysis of the classification of documents found in appropriate databases using term search, the potentially appropriate IPC places for invention information are identified.

Subject Matter	Tool	Query	IPC Places
I1	IPCCAT	Abstract	H04M 3/00, H04M 19/00, H02P 3/00
I1	TACSY	Headset for wireless communication with communication terminal	G08C 17/00, H04M 1/72, B03C 1/12
I1	Statistical analysis	Wireless headset	H04M 1/00, H04B 1/00
A1	Catchword Index	DATA switching networks	H04L 12/00
A1	Statistical analysis	Bluetooth (RTM) cellular/ mobile telephone	H04Q 7/00, H04M 1/00, H04L 12/00, H04B 7/00
A1	Statistical analysis	Bluetooth (RTM) headset	H04M 1/00
A2	Catchword Index	Cordless TELEPHONE(S)	H04M 1/725
A2	Catchword Index	CELLULAR systems for mobile switching centres	H04Q 7/22
A3	Catchword Index	MICROPHONES	H04R
A3	Statistical analysis	Microphone headset telephone	H04M 1/00

Analysis and Selection of Classification Symbols

Subgroup B03C 1/12 can be discarded immediately for all information at both main groups and the full IPC since it relates to separating particles from gases or vapour. So can subgroup G08C 17/00 relating to arrangements for transmitting signals since subclass G08C covers transmission system for measured values, control or similar signals, which is not

appropriate for the information to be classified. H02P covers control of electrical motors and is not appropriate for classification in this case.

I1: H04B covers transmission and is not relevant since the disclosed subject matter is not related to the transmission aspects.

H04M covers “TELEPHONIC COMMUNICATION”, which obviously is correct. The information to be classified clearly relates to the substation equipment and not to exchanges or current supply. H04M 3/00 and H04M 19/00, thus, can be discarded and the only relevant main group is H04M 1/00.

Potentially relevant subgroups under H04M 1/00 includes H04M 1/02, “constructional details of telephone sets”, H04M 1/60, “including speech amplifiers” and H04M 1/72, “Substation extension arrangements; Cordless telephones, i.e. establishing wireless links to base stations without route selection”. The invention information does not relate to speech amplifiers in themselves. The headset may be regarded as a substation extension, but not as a cordless telephone within the meaning defined in the title of H04M 1/72. Thus, of the three possible one-dot subgroups, H04M 1/02 and H04M 1/72 is appropriate. There is one two-dot subgroup under H04M 1/02, H04M 1/04, “support for telephone transmitters or receivers”, which would be the correct place for classification. Under H04M 1/04 two-dot subgroup H04M 1/05, “adapted for use on the head” obviously is the correct place. None of the two-dot subgroups under H04M 1/72 is relevant. H04M 1/725 e.g. is not correct since it covers cordless telephones establishing wireless links to base stations without route selection. The headset is not considered a phone and a mobile phone system uses route selection.

Thus, the correct symbols for the information are **H04M 1/05** and **H04M 1/72**. As to the ordering of the symbols, the two relating to the substation details should be given before the two concerning the communication method and H04M 1/05, being the more detailed, should be given before H04M 1/72.

A1: H04L covers “TRANSMISSION OF DIGITAL INFORMATION”, which is correct for Bluetooth (RTM) and main groups H04L 12/00 is relevant covering “Data switching networks”, since the communication path a Bluetooth (RTM) caller and called party is part of such a network. The subgroups **H04L 12/28**, “characterised by path configuration, e.g. local area networks or wide area networks” and **H04L 12/70**, “packet switching systems” are equally correct and the information should be classified in both. The two symbols, being equally correct, should be given in numerical order.

A2:
H04Q covers “SELECTING”, which is a rather vague title, but nevertheless appropriate for a mobile phone network. The main group found by using statistical tools was H04Q 7/00, “Selecting arrangements to which subscribers are connected via radio links or inductive links” and the catchword index points us to the two-dot subgroup H04Q 7/22, “using dedicated mobile switching centres, e.g. cellular systems”, which would be relevant had the invention related to the cellular system. Now, the invention information to be classified relates to the substation equipment and to communication between different pieces of substation equipment using, not a cellular system, but Bluetooth. Then again, one piece of substation equipment communicating is a mobile/cellular telephone and **H04Q 7/32**, “Mobile subscriber equipment”, at the same hierarchical level as discarded H04Q 7/22, would be a correct place for classification.

A3:
H04M 1/60 covers substation equipment including speech amplifiers and its two-dot subgroup H04M 1/62 covering constructional details seems to be a correct place for classifying the information.

H04R and H04R 1/02 covers transducers in general and their casings. **H04M 1/62** is the more appropriate symbol for the information and should be used.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	H04M	Common rule	H04M 1/05 (2006.01)
I1	Subclass title covers the subject matter	H04M	Common rule	H04M 1/72 (2006.01)
A1	Subclass title covers the subject matter	H04L	Common rule	H04L 12/28 (2006.01)
A1	Subclass title covers the subject matter	H04L	Common rule	H04L 12/70 (2013.01)
A2	Subclass title covers the subject matter	H04Q	Common rule	H04Q 7/32 (2006.01)
A3	Subclass title covers the subject matter	H04M	Common Rule	H04M 1/62 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
H04M 1/05 (2006.01)
H04M 1/72 (2006.01)
H04L 12/28 (2006.01)
H04L 12/70 (2013.01)
H04Q 7/32 (2006.01)
H04M 1/62 (2006.01)

Training Example M1

Categories

1a, 1b, 2a1, 2b1, 2b2

Documents (Classification is based on US 3 605 179 A)

US 3 605 179 A
FR 2 073 009 A
DE 2 061 644 A

Short Version of the Disclosure

An eviscerating mechanism for poultry, which includes a shackle for supporting a killed and plucked chicken or other fowl in a head-down position and a spoon-shaped member that is movably disposed on the shackle for being inserted into the abdomen of the fowl and for withdrawing the intestines, lungs and other viscera from the fowl. The fowl is suspended by its hocks from a gripping member that is pivotally mounted on the shackle. The spoon-shaped member is biased toward a retracted or withdrawn position and is provided with a serrated edge that permits its easy insertion into the bird and efficient gripping or pulling the viscera when the spoon is withdrawn. The movement of the spoon-shaped member can be actuated by the shackle being moved past a cam mechanism or the like by a conveyor. The advantage of the invention is that it enables automatic evisceration of birds that hang from a conveyor, thus avoiding manual work and reducing the risk of contamination.

Invention Information

I1: The invention information is an eviscerating mechanism for poultry, which includes a shackle for holding a fowl, a spoon-shaped eviscerating member and a mechanism for operating the spoon-shaped member.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	EVISCERATING devices for poultry	A22C 21/06

Analysis and Selection of Classification Symbols

The title of subclass A22C is "PROCESSING MEAT, POULTRY OR FISH". This clearly provides for the invention information. The title of A22C does not contain any relevant references to other places.

The group indicated by the Catchword Index, A22C 21/06, is indented under A22C 21/00, which has the title "Processing poultry". A22C 21/00 thus clearly provides for the invention

information. Group A22C 21/06 has the title "Eviscerating devices for poultry", which again clearly provides for the invention information.

Within subclass A22C, main groups A22C 15/00 "Apparatus for hanging-up meat or sausages", A22C 17/00 "Other devices for processing meat or bones" and A22C 18/00 "Plants, factories, or the like for processing meat" could possibly be considered as alternative classifications. However, the invention information only relates to evisceration and hanging-up of poultry in the form of whole birds. Meat is most often defined as only the edible parts of animals, for example as ***"the flesh of animals used as food, especially excluding fish and sometimes poultry, and usually in contrast to the bones and other inedible parts"*** (The Oxford English Dictionary). Evisceration is a preparation step that is performed before the bird can be considered to have been transformed into meat. Furthermore group A22C 18/00 contains the reference "for processing poultry only A22C 21/00", which clearly refers the invention information out of that group.

A22C 21/06 is therefore the only appropriate group in the subclass.

Group A22B 5/18 provides for "Accessories for use during or after slaughtering - Cleaning the stomach of slaughtered animals". This group also covers similar matter, and does not contain any reference to A22C 21/06. However, A22C 21/06 provides for the same matter in a more specific way, for poultry rather than for unspecified slaughtered animals in general. It therefore takes precedence over A22B 5/08, according to the principles described in the Guide, paragraph 142 (b).

Subclass A23L, which among other things provides for "preparation or treatment of food or foodstuffs", could also possibly be considered an alternative, for example group A23L 1/015, which provides for "removal of unwanted matter". However, it is not correct, since eviscerating of poultry can not be considered "preparation or treatment of food or foodstuffs".

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Title clearly covers the invention information, no relevant references	A22C	Common rule	A22C 21/06 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
A22C 21/06 (2006.01)

Training Example M2

Categories

1a, 2a, 3b

Documents (Classification is Based on GB 1 279 732)

GB 1 279 732
FR 2 059 142
DE-OS 2 041 926

Short Version of the Disclosure

The treatment of leaf vegetables with a dry matter content usually not exceeding 10% by weight like spinach, kale, broccoli, parsley for the purpose of preserving, involves comminuting the vegetables, reducing their water content, shaping the dewatered product in individual small pieces and deep-freezing them, thereby saving freezing and thawing energy and facilitating use of the deep-frozen product with various cooking applications.
Dewatering is effected by centrifugation providing a product stream and an effluent stream and may be combined with purification, thickening and seasoning measures.
The products obtained by one or more of the treatment steps.

Invention Information

The following pieces of Invention Information are identified:

I1 : Energy saving deep-freezing process as a whole including comminuting, partial dewatering and forming. The products resulting from this overall process.
See claims 1 to 5, 10, 11 and 12.

I2 : The process of partial dewatering per se comprising recombination of effluent and product stream. The products resulting from this process.
See claims 5, 6, 7 and 12.

I3: Partially dewatered deep-frozen products in general of particular form.
See claims 13 to 16.

Additional Information

The following pieces of Additional Information are identified:

A1: Purification of the effluent stream.
See claims 7 and 8.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	FREEZING – of foodstuffs (see PRESERVING) PRESERVING – of fruits and vegetables PRESERVING – of foodstuffs in general	A23B 7/00 A23L 3/00
I2	Catchword index	DEHYDRATING – of foodstuffs (see PRESERVING) PRESERVING – of fruits and vegetables PRESERVING – of foodstuffs in general	A23B 7/00 A23L 3/00
I3	Catchword index	FOODSTUFFS – in general	A23L 1/00
A1	Catchword index	PREPARATION(S) – of foodstuffs in general	A23L 1/00

Analysis and Selection of Classification Symbols

I1, I2: A23L covers 'foodstuffs, their preparation and treatment not covered by subclass A23B to A23J'. As subclass A23B covers 'preserving vegetables' the 'preserved products' subclass A23L is not applicable. According to paragraph 142 (a) of the Guide, at first sight A23B 7/00 could be considered as the place for the complex combination matter of I1 and I2. However, in view of the specific features of the preservation process, i.e. freezing and dewatering, paragraph 145 of the Guide prescribes classification of the sub-combinations of a combination if no specific classification place for the combination is provided. So classification of invention pieces I1 and I2 takes place in **A23B 7/04** and **A23B 7/02**.

I3: Invention information piece I3 relates to dehydrated deep-frozen vegetables independent of a specific dehydration process. Dehydration has not only the aspect of preserving which is paid regard to by classification in A23B 7/02, but also and even more of treatment or preparation for optimising freezing and thawing in the sense of A23L. The lowest fitting subgroup covering the preparation of vegetables is **A23L 1/212**. No further subgroup of it being available for the prepared or treated product, classification of I3 takes place in this group, in accordance with paragraph 92 of the Guide.

A1: The Additional Information of in what stage of the food preparation process the removal of unwanted matter by known methods like anion exchange, charcoal or electrodialysis is being effected, might be of interest too. As the latter removal is independent of a preservation process of vegetables, the common preparation or treatment place for foodstuffs A23L is appropriate. Classification of the Additional Information piece A1 therefore takes place in **A23L 1/015**.

There are no appropriate hierarchically lower groups available covering the Invention or Additional Information.

As A23B7/04 most adequately represents the invention as a whole, this symbol should be listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Title covers invention information	A23B	Common rule	A23B 7/04 (2006.01)
I2	Title covers invention information	A23B	Common rule	A23B 7/02 (2006.01)
I3	Title covers invention information	A23L	Common rule	A23L 1/212 (2006.01)
A1	Title covers invention information	A23L	Common Rule	A23L 1/015 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
A23B 7/04 (2006.01)
A23B 7/02 (2006.01)
A23L 1/212 (2006.01)
A23L 1/015 (2006.01)

Training Example M3

Categories

1a, 2b1

Documents (Classification is based on GB 1 337 870)

GB 1 337 870
FR 2 079 178
DE 2 103 250
NL 7 101 357

Short Version of the Disclosure

A speculum comprising elongate complementary jaws. Interlocking between lugs on one handle section and notches on the other enable the user to open and fix the jaws to a predetermined angle.

Invention Information

I1: The invention rests in the means for fixing the degree of jaw separation of the speculum, which is achieved by the incorporation of lugs in one handle and notches in the other, such that pressure on the jaws to close causes the speculum to lock at the selected degree of jaw separation.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	SPECULA – for medical use	A61B 1/32
I1	TACSY	SPECULUM	A61B 1/32

Analysis and Selection of Classification Symbols

The invention consists of a speculum wherein a predetermined degree of separation of the jaws is fixable. A61B is the subclass covering implements for diagnostic purposes. This subclass has no specific priority rules for classification, so the “Common Rule” applies. Main group A61B 1/00 specifically relates to instruments for performing medical examinations of bodily cavities. Within this main group, **A61B 1/32** covers devices for opening or enlarging the visual field for medical examination of bodily cavities, and is, therefore, the appropriate group for the invention.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass covers diagnosis, note after subclass title indicates coverage of implements therefor	A61B	Common rule	A61B 1/32 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
A61B 1/32 (2006.01)

Training Example M4

Categories

1a, 1b, 2b1, 3a, 3b

Documents (Classification is based on GB 1 344 200)

GB 1 344 200
FR 2 078 330
DE-OS 2 005 981

Short Version of the Disclosure

A book-like appliance with the aim of presenting pictorial and exercise material in conjunction with text comprising two external covers connected by a spine, a block of two-dimensional pages printed with text and/or pictures. The block of pages is attached to the inside of one external cover. Its pages may be fixedly attached to one another along a common edge. Three-dimensional exercise and/or pictorial material are arranged on the inside of the other external cover and are removable there from. When the appliance is closed the two external covers lie substantially parallel to each other and the three-dimensional material does not project into the block of two-dimensional pages.

Invention Information

I1 : Educational device in a book-like appearance comprising a block of pages and three-dimensional exercise and/or pictorial material arranged on the insides of two covers connected by a spine (see claims).

Additional Information

A1: Teaching appliance for electrical engineering (see page 2, column 2, lines 42 to 49).

A2: Cover of a book provided with recesses in which three-dimensional educational and/or pictorial material can be mounted (see claims 3, 4, 6 to 10).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	TEACHING – appliances in general	G09B
A1	Catchword index	TEACHING – appliances in general	G09B
A2	Catchword index	book COVERS	B42D 3/00

Analysis and Selection of Classification Symbols

I1: At first glance, the disclosure seems to refer to a book. Although the invention is claimed as a book it is far more than that. In its concept it is more similar to a folder or package holding together a block of printed pages with some other material. The character of the appliance according to claim 1 shows that the essential feature of a book, namely pages bound to one another as well as directly to the covers is missing. In claim 1 we can only read in this respect that a block of two-dimensional pages printed with text and/or pictures is attached to the inside of one of the external covers. For this reason the subject matter of claim 1 cannot be considered as a book or other bound product and thus cannot be classified in the IPC entry for books, i.e. B42D 1/00 irrespective of the reference in this main group to G09B. On the other hand there is no doubt that the invention per se serves teaching purposes. For teaching in general G09B is found to be the appropriate subclass. Under G09B, and following the common rule for group selection, it is determined that only two main-groups are a priori pertinent: G09B 1/00 for manually operated appliances, and G09B 19/00 for teaching not covered by other groups of the subclass.

Group G09B 1/00 covers *"Manually- or mechanically-operated educational appliances using elements forming or bearing symbols, signs, pictures, or the like which are arranged or adapted to be arranged in one or more particular ways"*. The invention information comprises no features relating to a manual or mechanical operation of the book-like appliance and mere opening of it to get access to its content can not be seen as a manual operation of the appliance. Hence classification in group G09B 1/00 is not appropriate here.

Group G09B 19/00 *"Teaching not covered by other main groups of this subclass"* is residual to the other main groups. Consultation of the scope of the other main groups confirms that this main group is the most appropriate entry for the invention information. Within main group G09B 19/00 none of its subgroups is appropriate so main group **G09B 19/00** has to be selected.

A1: The applicability of the claimed teaching or demonstration device or book to the field of electrical engineering is paid regard to by G09B 19/00, see classification of I1. No subgroup of G09B 19/00 is fitting. There fore G09B 19/00 remains the most appropriate entry for the additional information A1.

A2: The configuration of the external covers is of interest in the field of book covers and justifies classification of this subject matter as additional information. The IPC Catchword Index points directly to group B42D 3/00 which indeed is appropriate. Among the one-dot subgroups, group B42D 3/12 covers the combination of a book cover with other articles. As none of the two-dot entries is pertinent group **B42D 3/12** remains the most appropriate entry for the additional information A2.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	G09B	Common rule	G09B 19/00 (2006.01)
A1	Subclass title covers the subject matter	G09B	Common rule	G09B 19/00 (2006.01)
A2	Subclass title covers the subject matter	B42D	Common rule	B42D 3/12 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
G09B 19/00 (2006.01)
B42D 3/12 (2006.01)

Training Example M5

Categories

1a, 2b1, 2b2, 3c

Documents (Classification is based on GB 1 467 959)

GB 1 467 959
DE 2 428 089
FR 2 265 308
NL 7 503 228
JP 50 130 563

Short Version of the Disclosure

A metal rod wine rack has two end members each comprising two uprights connected by cross rods. Each end member forms a separate rigid welded entity which may be packaged and shipped in a secure and compact fashion. The end members are joined by lateral members comprising grids formed of vertical and horizontal rod members welded at their intersections to form a checkerboard pattern of wine bottle receiving and supporting openings. The horizontal metal rods of the lateral members, or certain of them, have laterally extending and “downbent” portions which hook over the cross rods on the end members so that the device may be set up quickly and conveniently and without any extraneous fastening devices.

Representative Prior Art

Welded rod wine racks are known. If dismantling is required, then the construction relies on the use of separate parts which are screwed together or hinged (see page 1, lines 17-37).

Invention Information

I1: A wine rack which is easily dismantled (claim 1).

Additional Information

A1: A rigid wine rack made of “wire”.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	WINE – cabinets or racks	A47B 69/00 A47B 73/00
I1	Catchword index	Furniture or storage - RACKS	A47B 43/00
I1	Catchword index	Cabinets or racks for STORAGE general	A47B 43/00-87/00

I1	Catchword index	CONTAINERS – for storage or dispensing merchandise	A47F 1/00
A1	As I1	As I1	As I1

Analysis and Selection of Classification Symbols

I1: The closest catchword index entries point to A47B as the subclass to be used for classification. The subclass index refers to “racks … characterized by structural features” and also “racks … characterized by adaptation for particular purpose”. The first of these characterizes the rack per se, i.e. its function. The second of these characterizes the rack’s specialized use for holding wine bottles, i.e. its application. The Common Rule is applicable in the subclass so the main group 47/00 “racks…characterized by features related to dismountability” is relevant to the function, whilst 73/00 “bottle racks” is relevant to the application. Guide paragraphs 88-91 give details of how to decide between the need for function-orientated classification and application-orientated classification. Of particular relevance is clause 90(b) which states that “If the essential technical characteristics of the subject relate both to the intrinsic nature of function of a thing and to its particular use…classification is made in both the function-orientated place and application orientated-place”. Clause 140b further supports this: “if two or more subjects of the invention are disclosed in the patent document, the general rule used in the subclass is separately applied for classifying each subject”. Therefore classification in both main groups is obligatory.

Within main group 47/00 there is a one dot entry for the rack being made of metal, which it is, hence A47B 47/02 is the correct entry. Main group 73/00 has no hierarchically lower groups and is thus the required classification.

A47B 69/00 suggested by the catchword index can be discounted since it is for cocktail cabinets.

A47F covers “Special furniture, fittings, or accessories for shops, bars, restaurants, or the like”. Whilst the rack is appropriate for use in bars or restaurants, there is nothing specialized about the rack which makes it specially adapted for said environments. It is in fact a generalized wine rack suitable for any location. No classification is A47F is necessary.

A1: A47B 55/02 deals with racks made from wire. The rack does have essential features of rigid construction and could be considered to be made of wire (although the actual embodiment specifies tubes and rods (page 2, lines 26-42). However, this is acknowledged as being the state of the art prior to the application. As such it is not invention information (guide paragraph 77 requires invention information to be “an addition to the state of the art”). Consideration could be given to classification here as additional information. A quick inspection of A47B 55/02 shows that similar material has been classified here in the past and as such it might be useful for a searcher if this patent were also classified here.

Guide paragraph 142 determines the priority order of subject matter to be classified. However in the case of dual classification of function and application “in common rule areas of the IPC, priority should not be applied between such groups, but classification should be made in all appropriate places”. However some decision has to be made as to which mark to apply first, so Guide paragraph 142 is useful despite the above sentence. Clause 142(a) would support classifying the application first (whole things have priority over details) whilst clause 142(b) would support classifying the function first (“means for solving particular problems have priority over more general groups”). The standardized sequence could then be used as a method which would leave 73/00 as the first classification.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Catchword index	A47B	Common rule	A47B 47/02 (2006.01) A47B 73/00 (2006.01)
A1	Catchword index	A47B	Common rule	A47B 55/02 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
A47B 73/00 (2006.01)
A47B 47/02 (2006.01)
A47B 55/02 (2006.01)

Training Example M6

Categories

1b, 2a, 3a, 3b

Documents (Classification is based on US 3 958 369A)

US 3958369 A
FR 2257008 A
DE 2460417 A

Short Version of the Disclosure

The document discloses a sealing strip, in particular for corners on doors or windows. The sealing-piece is made of elastic material, such as foam rubber, and has a hollow, tubular shape. The base of the sealing-piece is stuck to the outer side of one wall of the fixture-piece. When placed round a window or door corner, part of the sealing-piece in the corner is cut away, and a corner-piece corresponding in shape to the corner-angle, is attached to the corner to replace the seal at the cut-away section. The document also discloses the method for manufacturing and subsequent placement of the corner piece by moulding.

Representative Prior Art

Sealing strips with hollow tubular shape for doors or windows, e. g.
US2794221 - one-piece, tubular or solid cushion gasket of rubber or the like in linear form, and the method for fixing a selected length of this seal to the corner portion of a door.
US3553301 - moulding a corner member onto the ends of tubular sealing strips. The composite member is positioned in a suitable mould together with an end of the hollow strips. The pieces are heated to foam and fill the cavity of the mould and cure the ends of the sealing strips to a complete corner piece.

Invention Information

The addition to the prior art comes from the ease of mounting of the sealing strip to a corner portion when placed on a door or window by cutting away the sealing-piece in the corner, and replacing it by a corner-piece corresponding in shape to the corner-angle.

The addition to the prior art method of producing a corner piece (see document US3553301) is the fact that only part of the sealing is removed and the gripping portion is left completely uncut to form a base part for the new corner section which is produced by a moulding operation.

In summary, the following piece of Invention Information is identified:

I1: Sealing strip which is easily adapted to different corners by a special corner-piece

I2: Sealing strip which is easily adapted to different corners of doors such as vehicle doors

I3: Method for forming a sealing strip to match a sharp corner by smoothly bending the sealing strip round the corner, cutting away at least part of the sealing portion leaving the gripping portion uncut to form a base part for the corner piece, which is produced by a moulding operation.

Additional Information

The fact that this sealing is applied in a vehicle shows only the application of these sealing strips and forms no inventive contribution over the prior art.
Therefore, the following piece of Additional Information is identified:

A1: application of the above door sealing to a door of a vehicle

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	SEALING - between relatively moving parts	F16J 15/00
I2	Catchword index	SEALING - of windows or doors	E06B 7/16
I2	TACSY	sealing strip for doors	E06B, B60R
I3	Catchword index	MOULDING(S) - plastics or substances in a plastic state in general	B29
A1	Catchword index	SEALING -arrangements for vehicle doors	B60J 10/08

Analysis and Selection of Classification Symbols

I1-I3: The Catchword index reveals subclass F16J and in particular main group F16J 15/00 as the place for sealings in general. The reference in this group refers out “sealing arrangements for vehicle windows or doors” to B60J 10/00. The invention I1 is not limited to this particular application and therefore a classification should be given in **F16J 15/00** or subgroups. Applying the common rule we can not find any better subgroup under F16J 15/00.

The IPC place E06B 7/16 for sealing of windows or doors indicated in the Catchword Index clearly provides for the invention information. It is very easy to select the best matching entry by following the “Common rule” for group selection.

When using the other search means, we start with E06B as the most appropriate subclass for the scope of the invention I2. The subclass title does not contain any relevant references, but Note(3) after the subclass title draws attention to notes (1) and (2) in subclass B60J, which state that door sealing with further reaching applicability and not limited to be used only in vehicle are classified in E06B. Following the “Common rule” for group selection the best matching entry on two dot level is group E06B 7/22 “sealing arrangements on wings by means of elastic edgings”. The best matching subgroup thereof with three dots is **E06B 7/23** “Plastic, sponge rubber, or like strips or tubes”.

The third invention I3 is the installation or assembly process of this sealing, in particular the method comprising the three steps of a) bending the two portions of the sealing strip together to bridge across the corner part b) cutting away at least part of this bridging portion and c)

attaching a corner section which matches with the sharp angle of the corner. The last step could be performed by moulding operation *in situ*. The catchword reveals for these type of mouldings only the rough indication B29. The best possible entry according to note (3a) in class B29 should be found in subclass B29C. Following the common rule we could retrieve group **B29C 65/70** "joining of preformed parts by moulding".

A1: The best matching entry for the additional Information A1, application of the sealing strip to vehicle doors, is identical with the proposed group in the Catchword Index: B60J 10/08. The scope of the other subclass B60R revealed by TACSY are not appropriate for the subject matters.

As the primary goal of the invention is to develop a better sealing strip for corners on doors or windows (in vehicles), the invention as a whole is best characterized by **E06B 7/23**. This classification symbol should thus be mentioned first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	F16J	Common rule	F16J 15/00 (2006.01)
I2	Subclass title covers the subject matter	E06B	Common rule	E06B 7/23 (2006.01)
I3	Subclass title covers the subject matter	B29C	Common rule	B29C 65/70 (2006.01)
A1	Subclass title covers the subject matter	B60J	Common rule	B60J 10/08 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
E06B 7/23 (2006.01)
F16J 15/00 (2006.01)
B29C 65/70 (2006.01)
B60J 10/08 (2006.01)

Training Example M7

Categories

1b, 3a,3c

Documents (Classification is Based on US 3 651 597 A)

US 3 651 597 A
FR 2 056 776 B1
DE 2 039 039 A1

Short Version of the Disclosure

Set of modular building blocks with appropriately positioned male projections and female recesses for interconnecting the various blocks. Several of the block-like pieces have variously shaped protrusions or flanges to build up fancy shapes.

Representative Prior Art

US 4306 373 A - An improved frictionally interconnecting toy block arrangement having hollow body means fabricated of a semi-flexible material. The interconnecting of the toy blocks with each other is achieved by female coupler means and male couplers.
US 4 631 040 A - A toy construction set has a variety of component parts including bases, houses, and auxiliary members. Male and female connecting elements attached to the respective components allow for assembly of the components in a variety of configurations.

Invention Information

Building blocks interconnected by male projections and female recesses are known. The addition to the prior art is the specific type of the distinctively shaped blocks having different shaped protrusions or flanges to create structures which imaginatively resemble a variety of different items or objects. These features are characteristic for toys, where creativity and fantasy of the child has to be stimulated. In summary, the following *i*nvention *i*nformation is identified:
I1: Toy using set of building blocks with different shaped protrusions or flanges to create different objects

Additional Information

none

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	toy building BLOCK(S)	A63H 33/04
I1	Catchword Index	BLOCK(S) as building elements	E04C 1/00
I1	IPC-CAT	The abstract of US 3 651 597 A	A63H33/00 E04H A47G

Analysis and Selection of Classification Symbols

Subclass A63H has the title “Toys, e.g. toys, dolls, hoops, building blocks”, which clearly provides for the invention information. Main group A63H 33/00 is indicated by both the Catchword index and IPC-CAT. Its title is “**Other** toys”, which means that it has to be verified that the invention cannot be classified in other groups in the subclass. This is not the case. A63H 33/00 has a subgroup A63H 33/04 for “Building blocks, strips, or similar building parts”, which is the only appropriate one-dot entry. Its two-dot subgroup A63H 33/06 "to be assembled without the use of additional elements" and its indented three-dot subgroup **A63H 33/08** "provided with complementary holes, grooves, or protuberances, e.g. dovetails" also fit the invention information.

The title of the subclass E04C “Structural elements; Building materials” has to be read in the context of the section and class titles, which are "Fixed constructions" and "Building". This, together with the wording of the proposed main group E04C 1/00, “Building elements of block or other shape for the construction of parts of buildings”, does not cover the invention information. The same applies for the other subclasses E04H and A47G proposed by IPC-CAT.

The functional aspects of the building blocks are not relevant for the invention information. Therefore further classification in a function-oriented place like F16S (Constructional elements in general; Structures built up from such elements, in general) is not needed.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Title clearly covers invention information	A63H	Common rule, only relevant group	A63H 33/08 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
A63H 33/08 (2006.01)

Training Example M8

Categories

2a, 3a, 3c

Documents (Classification is Based on GB 2 156 389 A)

GB 2 156 389 A
FR 2 561 797 A1
DE 3 410 826 A1
SE 457 916 B

Short Version of the Disclosure

A water level control and safety arrangement for domestic appliances such as washing machines and dishwashers has, in addition to the program controlled solenoid water valve (7), a shut-off valve (28) which is held open by a permanent magnet and closed by pressure sensitive element (29).

Representative Prior Art

DE 3 114 668 (cited by applicant): Dual-functioning safety valve which is connected to a pressure-sensing capsule which monitors the water level in the tub, and is in addition connected to a float which rests in a drip tray beneath the machine.

Invention Information

Safety valves for monitoring the water level in a tub of household appliance by using pressure-sensitive means connected to an air trap chamber are known in the prior art (see above) The addition to the prior art comes from the simple construction of a water level control unit using a shut off valve (28) which is closable by a pressure sensitive element connected to the air trap chamber and arranged in series with a program controlled electromagnetic water feed valve (7). Domestic appliances with safety arrangements specially adapted for dishwashing or laundry washing machines.
In summary, the following pieces of invention information are identified:
I1: Water level control unit using shut off valve for controlling water level in a tub of household appliances by pressure sensitive element connected to air trap chamber
I2: Safety arrangement specially adapted for laundry washing machine (claim 8)
I3:Safety arrangement specially adapted for dish washer (claim 9)

Additional Information

Not applicable

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	control of LEVEL(S) of liquid	G05D 9/00
I2	Catchword Index	domestic WASHING in general, except laundry WASHING	A47L
I3	Catchword Index	WASHING of textile articles by laundering	D06F
I1, I2, I3	IPC-CAT	Abstract of GB 2 156 389 A	A47L 15/00 F16K 31/00 D06F 39/00

Analysis and Selection of Classification Symbols

I1: The broad set up of the first claim, dealing with control of the water supply to a container and other possible appliances (see the first paragraph in the description: “laundry washing machine, dishwashing machine or the like”), gives an indication that I1 has to be classified in a general function related place. The title of subclass G05D “Systems for controlling or regulating non-electric variables” provides for this invention information. Note (3) after subclass title of G05D is not applicable, because as will be seen below there are no specific provisions for control or regulation in the subclass for the apparatus. The most appropriate entry in subclass G05D is main group **G05D 9/00 "**Level control, e.g. controlling quantity of material stored in vessel**"**, because none of the subgroups under G05D 9/00 cover the scope of the invention.

IPC-CAT proposes another subclass, F16K. This function-related place for valves in general does not provide for the invention information I1.

I2, I3: The technical characteristics of the invention information are not restricted to the functional aspects of a level control but also related to its particular use and to its incorporation into a larger system, here the safety arrangement specially adapted for a dish washer or a washing machine. These two specific embodiments (I2, I3) must be classified in the relevant application places (see also paragraph 90, section (b) of the Guide). The claimed invention is a “household appliance” which has no general entry in the IPC. The two variants specified in the dependent claims 8 and 9 which form specific embodiments of the broader first claim lead to the two appropriate classification places for dish washers and laundry washing machines.

I2: A47L is one of the application places found in the Catchword Index by the key-words “domestic washing in general”. The subclass title “Domestic washing or cleaning” provides for I2. A47L 15/00 “Washing or rinsing machines for crockery or table ware” is the only relevant main group.. The most appropriate subgroup following the “Common rule for group selection” is **A47L 15/42** “Details”.

I3: D06F ”Laundering, drying, ironing, pressing or folding textile articles” is the application place for I3. Main group D06F 39/00 "Details of washing machines in so far as such details are not special to washing machines of groups D06F 21/00- D06F 25/00 or to any particular type of washing machine defined in groups D06F 9/00- D06F 19/00 or D06F 27/00" with subgroup **D06F 39/08** “Liquid supply or discharge arrangements” is the most appropriate subgroup for this invention information.

G05D 9/00 is given first, since it provides for the invention in its broadest context.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Title covers invention information	G05D	Common rule, only relevant group	G05D 9/00 (2006.01)
I2	Title covers invention information	A47L	Common rule, only relevant group	A47L 15/42 (2006.01)
I3	Title covers invention information	D06F	Common rule, only relevant group	D06F 39/08 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
G05D 9/00 (2006.01)
A47L 15/42 (2006.01)
D06F 39/08 (2006.01)

Training Example M9

Categories

1a, 1b, 2b1, 3b

Documents (Classification is based on GB 1 282 409)

DE 2 126 234
FR 2 093 820
GB 1 282 409
JP 47001331

Short Version of the Disclosure

Method for the preparation of deep-fried potato products comprising blanching of potato pieces prior to deep-frying, wherein potato pieces are heated in water by the passage of electric current through the water.

Representative Prior Art

Blanching is a standard pre-treatment step in industrial deep-frying processes. Conventional blanching is done by the thermal heating of the water in which the potato pieces are immersed possibly combined with mechanical agitation. This can result in higher oil content in the finished fried product.

Invention Information

I1: A method of preparing deep-fried potato products wherein prior to a deep-frying step, a blanching pre-treatment step is used wherein the potato pieces are immersed in water, which is heated by the passage of electric current through the water by means of electrodes arranged in the water (page 1, column 2, lines 74-77; page 2, column 1, lines 7-12; Claims).

I2: The blanching process of I1 *per se* (page 1, column 2 lines 74-77; page 2, column 1, lines 7-12).

Additional Information

A1: Though the blanching is characterised as a step in a larger process for the preparing of deep-fried potato products, the step itself may be of interest as a preservation process. The document indicates the importance of blanching in the prevention of discoloration of the potato pieces (page 1, column 1, lines 18-20). Further, the blanching process decreases the deep-fried product's water content, thereby increasing its shelf-life (page 2, column 1, lines 1-5).

A2: The preservative effect, *per se,* of the blanching process is useful to record for search purposes.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	IPCCAT	Claim 1	A23L
I2	TACSY	Fried + potato	A23L 1/00
A1/A2	IPCCAT	Blanching; preservation of vegetables	A23B

Analysis and Selection of Classification Symbols

I1: The independent claim is directed to a method for the preparation of deep-fried potato products, incorporating the blanching process revealed in the description. A23 is the class for preparation of foodstuffs. It is clear that a deep-frying process for potatoes is not covered in any of A23B to A23J and so falls in A23L. The preparation of foodstuffs is in group A23L 1/00, whereunder group A23L 1/01 refers to frying. However, methods specialised to particular food groups are referred to other subgroups in A23L 1/00. Group A23L 1/212 concerns preparation of fruits and vegetables, under which **A23L 1/217** specifically covers fried potato products. Since this is the classification that most closely covers the disclosed process, this is the first classification given.

I2: The blanching pre-treatment step is the defining characteristic of the method of the invention and should be classified in its own right. A23L contains a place for physical treatment of foodstuffs by electrical means, **A23L 1/025**. Since the common rule applies in A23L, classification of the blanching is done here.

A1: Though the blanching has been disclosed and claimed exclusively in the context of its part in a deep-frying method, it may be of interest to searchers as a preservation method, since claim 2 is characterised by heating to sterilisation temperature. Preservation methods for vegetables are covered by subclass A23B (as noted in A23L 1/025), wherein A23B 7/00 relates specifically to fruits and vegetables. Blanching is specifically covered thereunder at **A23B 7/06**, and classification should be made here.

A2: It may also be of interest to classify the preservative effect of the blanching, which can be done in A23B 7/005. A group (A23B 7/01) refers to preservation by electric treatment. Since the electric current of the process is only claimed to heat the water, and no direct effect on the potato pieces is claimed or described, classification under A23B 7/01 is speculative and unsuitable. Classification of the preservative effect is therefore indicated by **A23B 7/005**, as additional information.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title	A23L	Common Rule	A23L 1/217 (2006.01)
I2	Subclass title	A23L	Common Rule	A23L 1/025 (2006.01)
A1	Preservation methods for vegetables: note in A23L 1/025	A23B	Common Rule	A23B 7/06 (2006.01)
A2	Preservation methods for vegetables: note in A23L 1/025	A23B	Common Rule	A23B 7/005 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
A23L 1/217 (2006.01)
A23L 1/025 (2006.01)
A23B 7/06 (2006.01)
A23B 7/005 (2006.01)

Training Example M10

Categories

1a, 1b, 2b1

Documents (Classification is based on GB 1 283 294 A)

DE 2 112 429 A1
FR 2 084 626 A5
GB 1 283 294 A
JP 51 024 950 B
SE 366 907 B

Short Version of the Disclosure

A runner for supporting a drawer, comprising a channel section member one limb of which terminates in a tongue which is spaced from the base of the channel section by a slot, where the tongue can be bent out of the plane of the limb to allow the runner to be locked into position. The base of the channel member has a cranked arm of substantially L-shape which can be placed in a slot in an upright of a drawer support. The runners are adjustable in order to accommodate drawers in various positions.

Invention Information

I1: A runner for supporting a drawer, comprising a channel section member one limb of which terminates in a tongue which is spaced from the base of the channel section by a slot, where the tongue can be bent out of the plane of the limb to allow the runner to be locked into position.

Additional Information

None

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	RUNNERS for furniture drawers	A47B 88/00

Analysis and Selection of Classification Symbols

I1: The title of subclass A47B, "Tables; Desks; Office furniture; Cabinets; Drawers; General details of furniture" clearly provides for I1, as does its main group A47B 88/00 "Drawers for tables, cabinets or like furniture; Guides for drawers". A47B is a common rule area of the IPC. None of the notes or references apply here, so no other subclasses or main groups are

relevant. Subgroup **A47B 88/04** "Sliding drawers; Slides or guides therefor" covers the invention information. None of its subgroups appears relevant.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject matter	A47B	Common rule, only relevant group	A47B 88/04 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
A47B 88/04 (2006.01)

Training Example M11

Categories

1a, 2b1

Documents (Classification is based on GB 1 344 435)

GB 1 344 435
DE 2 133 769 A1
FR 2 144 642 A

Short Version of the Disclosure

A non refillable fountain pen has a barrel closed at one end by a base attached during an injection molding process. The other end portion of the barrel is plugged by a nib-mounting-assembly. The entire cavity of the barrel between the base and the nib-mounting-assembly provides an ink reservoir.

The nib-mounting-assembly comprises a hollow tube containing an ink feed and a nib both of which are frictionally held in position. Ink distribution channels are formed between feed and nib. A stop formed inside the tube prevents the nib rotating with respect thereto and a further stop prevents rotation of the ink feed with respect to the nib.
The pen is provided with a cap which has a frustro-conical sealing surface to the nib-end of the barrel and an anchor clip molded in the cap.

The advantage of the pen is that it can be cheaply produced and the space available within the barrel enables a large amount of ink to be stored so that the working life of the pen is sufficiently long.

Invention Information

I1: A non refillable fountain pen including an ink reservoir in the interior of a barrel closed at one end and plugged at the other by a nib-mounting-assembly incorporating a hollow tube within are mounted a nib and an ink-feed whereby stops prevent rotation between nib and ink-feed (claims 1 and 2).
I2: A non refillable fountain pen including a cap comprising a sealing surface and an anchor clip (claims 3, 4).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1-I4	Catchword index	PEN(S) - for writing	B43K
I1-I4	TACSY	Fountain pen	B43K 5/00

Analysis and Selection of Classification Symbols

The title of subclass B43K is “IMPLEMENTS FOR WRITING OR DRAWING”. This together with the note that ““writing implement” covers pens” clearly confirms the subclass B43K found by the catchword index. The title of B43K does not contain any relevant references to other places.
In this subclass the common rule is applied for selecting a group.

I1: Pens with reservoir in holders, e. g. fountain-pens, are covered by main group B43K 5/00 where also the subclass index of B43K refers to.
The fountain pen as a whole is a combination of features relating to the ink reservoir and of features relating to the ink feed to the nib. B43K 5/00 has the indents B43K 5/02 which covers pens having specific details of ink reservoirs and B43K 5/18 which covers pens having specific details of arrangements for feeding the ink to their nibs. Therefore both subgroups **B43K 5/02** and **B43K 5/18** provide for the invention information I1.

I2: Caps for pens are specifically named in the subclass index of B43K, which refers to main group B43K23/00. Under this main group the entry “Protecting means, e. g. caps” can be found as sub-group B43K23/10. A further indent, **B43K23/12**, specifically relates to caps for pens.

Both subgroups B43K 5/02 and B43K 5/18 equally represent the inventive information I1. Priority between these subgroups cannot be determined.
The subgroup B43K 23/12 representing I2 is listed last.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Catchword index	B43K	Common rule	B43K 5/02 (2006.01) B43K 5/18 (2006.01)
I2	Catchword index	B43K	Common rule	B43K 23/12 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B43K 5/02 (2006.01)
B43K 5/18 (2006.01)
B43K 23/12 (2006.01)

Training Example M12

Categories

1a, 1b, 2b1, 3b

Documents (Classification is based on GB 1 281 622)

GB 1 281 622
FR 2 058 327
DE-OS 2 039 643

Short Version of the Disclosure

A metal door frame profile comprising a boxlike post of substantially rectangular cross-section usable as a door main or wing frame. The boxlike post may consist of up to three profiles assembled onto one another.
Door assemblies with such main or wing frames including resilient strips inserted into grooves of the frame posts.

Invention Information

The following pieces of Invention Information are identified:

I1: Metal frame to be fixed in a door opening (door main frame or jamb) comprising a post profile of hollow cross-section and in particular composed of several parts (see claims 1 to 4).

I2: Metal frame for a door leaf (door wing frame) comprising a post profile of hollow cross-section and in particular composed of several parts (see claims 1 to 4).

I3: Door assembly consisting of a claimed main and wing frame in particular with inserted resilient sealing strips (see claims 5 to 8 and 12 to 15).

Additional Information

The following piece of Additional Information is identified:

A1: Method of manufacturing boxlike metal post profiles for door frames by cold rolling sheet material (see claim 11 and page 3, lines 85 to 89).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	DOOR(S) – or - frames in general FRAMES – border – for receiving doors or windows	E06B
I2	Catchword Index	DOOR(S) – or - frames in general FRAMES – border – for receiving doors or windows WING(S) – swingable, slidable or otherwise movable members, such as doors or windows for closing openings	E06B
I3	Catchword Index	SEALING – of windows or doors	E06B 7/16
A1	Catchword Index	FORMING – of metal … SHEET(S) – working or processing – metal without essentially removing material	B21D

Analysis and Selection of Classification Symbols

All pieces of the Invention Information point to E06B where the Common Rule applies. With regard to Note (3) after the subclass title of E06B, it can be stated that B60J does not apply for classification, because of notes (1) and (2) after the title of B60J.

I1: Because of the explicitly claimed main frame profiles of hollow cross-section and in particular composed of several parts (see claims 1 to 4), classification of I1 within main group E06B 1/00 has to be made in **E06B 1/16** and **E06B 1/18**.

I2: Also explicitly claimed in claims 1 to 4 are door wing frame profiles of same particular cross-sections or structure as for the main frame profiles. Classification of I2 takes therefore place in main group E06B 3/00 in view of ‘door leaves’ in the first part of the title of this main group. The most appropriate classification place to cover I2 is the six-dots-subgroup **E06B 3/16** ***“Hollow frames”***. Other main groups or subgroups of main group E06B 3/00 are not appropriate for I2.

I3: Of interest concerning invention information with respect to its function, is the assembly of main and wing frame especially in conjunction with sealing arrangements. These special arrangements are not explicitly claimed but claimed within the whole assembly (see claims 7, 8 and claims 12 to 15 as to these arrangements shown in Fig. 1 to 4). Classification of this part of I3 takes place therefore under main group E06B 7/00. Within this main group the three dot subgroup E06B 7/23 can be found which covers sealing arrangements by resilient edgings with ***“Plastic, sponge rubber, or like strips or tubes”*** and which thus is appropriate here. Other main groups or subgroups of main group E06B 7/00 do not apply for the sealing part of I3. As to the assembly of main and wing frame as a whole with or without sealing strips, the second part of the title of main group 3/00 ***“layout of fixed or moving closures”*** is appropriate and the lowest fitting classification is again **E06B 3/16**.

A1: Of interest for Additional Classification is that the frame post profiles could be manufactured by cold rolling sheet material. As ‘cold-rolling sheet material’ (see claim 11) has the meaning of ‘working sheet metal without essentially removing material’ only subclass B21D is appropriate. In subclass B21D main group B21D 47/00 or B21D 51/00 are at disposal. In view of claim 11 - which refers back to claim 1 - main group B21D 51/00 is preferred. The appropriate one-dot group is **B21D 51/16**. No lower subgroup under B21D 51/16 is fitting.

There is no reason to establish a hierarchy in the order of the classification symbols of the inventive information subjects because none of these can be seen as being more relevant than the others. Therefore the classification symbols are listed in alphanumerical order.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Title covers invention information	E06B	Common rule	E06B 1/16 (2006.01) E06B 1/18 (2006.01)
I2	Title covers invention information	E06B	Common rule	E06B 3/16 (2006.01)
I3	Title covers invention information	E06B	Common rule	E06B 3/16 (2006.01) E06B 7/23 (2006.01)
A1	Title covers invention information	B21D	Common Rule	B21D 51/16 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
E06B 1/16 (2006.01***)***
E06B 1/18 (2006.01)
E06B 3/16 (2006.01)
E06B 7/23 (2006.01)
B21D 51/16 (2006.01)

Training Example M13

Categories

1b, 2a1, 2b1

Documents (Classification is based on US 3 601984A)

US 3 601 984 A
FR 2 068 347 A5
DE 2 048 807 A1

Short Version of the Disclosure

System for controlling the fuel supply for a gas turbine after starting. The exhaust gas temperature is measured and compared to a maximum allowable reference signal. The control output from the comparator is used to control the fuel supply of the turbine for limiting the increase rate of the temperature.

Representative Prior Art

In the prior art the adjustment of fuel applied to the turbine during the starting period was controlled as a function of time by means of a rheostat, hydraulic systems or some other mechanical means. These control systems were not able to control or limit directly the rate at which turbine temperature was allowed to increase - see column 1, lines 25-36.

Invention Information

I1: Fuel supply control for limiting turbine temperature variation in response to measured exhaust gas temperature during starting period.

Identification of Potential Subclasses

From a term search in the IPC, particularly by the use of TACSY one potential IPC subclass with a four star rating for I1 is identified.

Subject Matter	Tool	Query	IPC Places
I1	TACSY	Fuel supply control for limiting turbine temperature variation	F02C

Analysis and Selection of Classification Symbols

By considering the scopes of the two different main groups F02C 3/00 and F02C 9/00 and applying the common rule it will be obvious that only F02C 9/00 "Controlling gas turbine

plants; Controlling fuel supply in air breathing jet-propulsion plants" will cover the scope of the invention. This main group has a reference pointing to "controlling turbines F01D" which seems to be relevant from the wording. However, the scope of F01D is limited to “machines or engines”, while F02C covers “plants”. From the definition of “plants” in Note (2) after section F it is obvious that F02C is the correct subclass, since I1 relates to both the “engine” and the fuel system.

Applying once again the common rule, and looking for the best-fitting subgroup of F02C 9/00 for this invention will reveal one dot group F02C 9/26 for control of fuel supply. This group has two references: a precedence note pointing to group F02C 9/48 for controlling of fuel supply conjointly with another control of the plant and a limiting reference to fuel valves in F02C 7/232. The precedence note is not relevant, because the control of fuel supply has no other conjoint features with the other controls of the plant. The second reference is also not significant in this case because the invention is not related to fuel valves. To refine classification further using the common rule leads us to consider the two dot groups below F02C 9/26. The most appropriate entry is F02C 9/28 comprising a precedence note pointing to three other entries on this level. By comparing these entries with I1 it will be clear that none of the precedence notes is appropriate and **F02C 9/28** is the correct classification for I1.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	F02C	Common rule	F02C 9/28 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
F02C 9/28 (2006.01)

Training Example M14

Categories

1a, 1b

Documents (Classification is based on GB 1 278 546)

GB 1 278 546
CH 511 415
ES 382 435
FR 2 056 596

Short Version of the Disclosure

A projectile comprises a shell body containing an explosive charge, an armour-piercing member at its forward end and a base fuze (= ”fuse”) for detonating the charge.
The aim of the invention is to provide a high-explosive armour-piercing shell which has considerable penetrating power and is particularly suitable for combating gradated targets.

Invention Information

I1: A high-explosive armour-piercing shell comprising a hollow cylindrical body containing a high explosive charge with a base fuze (= ”fuse”) and an armour-piercing cylindrical projectile. The diameter of the projectile is less than that of the explosive charge.
The projectile is located in a ballistic cap secured to the front end of the body (see claims).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	ammunition SHELL(S)	F42B

Analysis and Selection of Classification Symbols

I1: The catchword index refers to subclass F42B with the title *“Explosive charges,… ammunition”* which is clearly to be considered.

The title of F42B does not contain any relevant references to other places.
In this subclass the common rule is applied for selecting a group.

The invention resides in the combination of a high explosive charge with an armour-piercing cylindrical projectile: Paragraph 145 of the Guide outlines the rules relating to the classification of combinations in common rule areas of the IPC.

In the subclass index of F42B we find the entries *"Ammunition characterized by warhead, intended effect or material"* and *"Types of ammunition – warhead types",* which both point to main group F42B 12/00 which is relevant here.

The references within main group F42B 12/00 to groups F42B 6/00, F42B 10/00, F42B 14/00, F42B 8/00 and F42B 15/00 are not relevant because aspects of launching the shell, its aerodynamic properties, its performance in the barrel or its use for training are clearly not disclosed in the document.

Main group F42B 12/00 has two one dot subgroups: F42B 12/02 refers to projectiles characterized by the warhead or the intended effect, the other one dot group refers to the material of the projectile and can be disregarded here. Therefore subgroup F42B 12/02 has to be selected for further identifying a detailed classification place.
Within this one dot group two relevant two dot subgroups should be considered, F42B 12/04 for warheads *"of armour-piercing type"*, F42B 12/20 for those *"of high-explosive type"* since the invention comprises a combination of a piercing projectile with a high explosive charge incorporated in a shell.

Group F42B 12/04 has the indent **F42B 12/06** covering warheads *"with hard or heavy core; Kinetic energy penetrators"* which is relevant here. There are two references within subgroup F42B 12/06, one pointing to F42B 12/16 *"in combination with an additional projectile or charge, acting successively on the target"*. This subgroup is not relevant here because the disclosed projectile has only one charge. The other subgroup F42B 12/74 *"characterized by the material of the core or solid body"* can also be disregarded since the document does not refer to any specifications of the material.

Within subgroup F42B 12/20 none of its indents is relevant here. Also its reference to F42B 12/44 *"of incendiary type"* can clearly be excluded because the disclosed shell is high explosive. Therefore **F42B 12/20** has to be selected.

Since the disclosed shell comprises a combination of a high explosive charge with a piercing projectile there is no reason to select either of F42B 12/06 or F42B 12/20 as being more relevant than the others, so F42B 12/06 is selected as the first one since it is first in the alphanumerical order.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the Subject matter	F42B	Common rule	F42B 12/06 (2006.01) F42B 12/20 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
F42B 12/06 (2006.01)
F42B 12/20 (2006.01)

Training Example M15

Categories

1a, 1b, 2a, 2a1, 2b1

Documents (Classification is based on US 3631996)

DE 2 060 061 A1
FR 2 094 177 A7
US 3 631 996 A
NL 7 100 448 A
JP 50 010 701 B

Short Version of the Disclosure

A forge manipulator having a wheeled carriage with jaws mounted thereon in such a way as to be capable of longitudinal movement in relation to the carriage. The combined motion of the jaws and the carriage causes a pre-selected fresh portion of the workpiece to be presented to the press.

Invention Information

I1: A forge manipulator having a wheeled carriage with jaws mounted thereon in such a way as to be capable of longitudinal movement in relation to the carriage. The combined motion of the jaws and the carriage causes a pre-selected fresh portion of the workpiece to be presented to the press.

Additional Information

None.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	Manipulator	B25J
I1	Catchword Index	Manipulators associated with forging machines	B21J

Analysis and Selection of Classification Symbols

I1: Manipulators in general are classified in subclass B25J. Please note the definition of “manipulator” under the B25J subclass title. There is a limiting reference after the B25J subclass title, referring manipulators associated with forging machines to B21J 13/10. It is

clear from a review of subclass B21J that **B21J 13/10** is the only correct group for classifying this example.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Reference in title of subclass B25J	B21J	Common rule	B21J 13/10 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B21J 13/10 (2006.01)

Training Example M16

Categories

1a, 1b, 2a, 2a1, 2b1

Documents (Classification is based on GB 1344153)

GB 1 344 153
FR 2 107 134
DE 2 141 167

Short Version of the Disclosure

A moulding frame to enable soles or heels to be moulded onto shoe uppers, in which the frame conforms to the sole and/or heel and serves to hold an upper applied to a last spaced from a sole mould member, which mould frame is integral and has a resilient portion acting as a hinge opposite the parting line, the resilient material being non-metallic, e.g. elastomeric.

Invention Information

I1: A moulding frame to enable soles or heels to be moulded onto shoe uppers, in which the frame conforms to the sole and/or heel and serves to hold an upper applied to a last spaced from a sole mould member (see claims).

Additional Information

A1: Footwear having no flash on the heel, made by moulding soles or heels onto shoe uppers using the above moulding frame.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, A1	TACSY	Shoes	A01D, A47F, B66B, A43B, A43D
I1	Catchword index	Machines or tools for making or repairing SHOES	A43D
I1	Catchword Index	MOULDING soles or heels on to shoe uppers	B29D

Analysis and Selection of Classification Symbols

I1: Five subclasses are found with the *TACSY* search above. Subclasses A01D “Harvesting; Moving”, A47F “Special Furniture; …” and B66B “Elevators; …” are obviously not appropriate classification places. Subclass A43D is mentioned below. Subclass A43B is not appropriate as invention information since no shoes or footwear are claimed.

Subclass A43D provides for shoe making in general. There are no notes or limiting references in A43D or in class A43 that preclude the claimed invention information from the scope of subclass A43D. The guidance heading above A43D 25/00 indicates that the main groups that follow it cover the making or fastening of soles or heels. Main group **A43D 86/00** covers assembling soles or heels on to uppers, and can be regarded as covering moulding them on to uppers, therefore it seems to provide for the invention information.

Subclass B29D provides for producing particular articles from plastics by moulding techniques. Main group 35/00 is appropriate, as it covers footwear. One-dot subgroup **B29D 35/06** is the most appropriate classification in the IPC since it covers the claimed invention information.

Notes (1) and (2) under group B29D 35/00 state that (i) classification is made there if the moulding technique is of interest (which is satisfied here) and (ii) the assembling of individual parts by mechanical joining is classified in A43D. Moulding can be regarded as satisfying criteria (ii) and therefore classification in A43D is judged appropriate.

Since B29D 35/00 refers to working of plastics or of substances in a plastic state and A43D 86/00 does not, it follows that the B29D term more fully represents the invention and should therefore be listed first.

A1: Footwear characterized by the assembling of the individual parts, and especially footwear with soles moulded on to uppers without adhesive, is covered by **A43B 9/18**, and classification there appears useful for search purposes.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Notes in B29 and under B29D 31/50	B29D	Common rule	B29D 35/06 (2010.01)
I1	Subclass title covers subject-matter	A43D	Common rule	A43D 86/00 (2006.01)
A1	Subclass title covers subject matter	A43B	Common rule	A43B 9/18 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B29D 35/06 (2010.01***)***
A43D 86/00 (2006.01)
A43B 9/18 (2006.01)

Training Example M17

Categories

1a, 1b, 2a, 2a1, 2b1, 3b

Documents (Classification is based on US 3647069)

US 3 647 069
FR 2 088 472
DE 2 123 118

Short Version of the Disclosure

A flotation process and apparatus are disclosed for simultaneously separating insoluble contaminants and oxygen from a liquid (e.g. water). The apparatus uses an enclosed tank with a means for maintaining the level of liquid in the tank to leave a freeboard space between it and the top of the tank, a gas inlet and a gas dispersing means communicating both with the freeboard space and with the liquid underneath it. The specific use is recovery of oil from underwater deposits, where the water from oil/water mixtures has to be purified before returning it to the well.

Representative Prior Art

Various types of separating systems were previously used to float the petroleum and/or solid particles from the water, such as open tanks into which contaminated liquid is introduced. Pressurized gas or air is dispersed as small bubbles in the liquid carrying petroleum and/or solid particles to the surface whence they are removed.

Invention Information

I1: A flotation process and apparatus for simultaneously separating insoluble contaminants and oxygen from a liquid. The apparatus uses an enclosed tank with a means for maintaining the level of liquid in the tank to leave a freeboard space between it and the top of the tank, a gas inlet and a gas dispersing means communicating both with the freeboard space and with the liquid underneath it (see claims).

Additional Information

A1: The specified use is in recovery of oil from underwater deposits, where the water from oil/water mixtures has to be purified before returning it to the well (see column 1 lines 10-23).

A2: The process can also be used for aerating an oxygen-deficient liquid (see column 3 lines 15-21).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	SEPARATING or sorting different materials	B01D, B03, B04, B07
I1	Reference in B01D 17/00	Separating oily substances from water	C02F
I1	Catchword Index	Separating ores by FLOTATION	B03D 1/00
A1	Catchword Index	Obtaining OIL from deep wells	E21B 43/00
A2	Catchword Index	AERATING water, waste water or sewage	C02F

Analysis and Selection of Classification Symbols

I1: The Table above is not entirely clear as to which subclasses to consider, but B01D and B03D are the only ones mentioned by name and look to be most relevant. A look at the Section B contents page shows that other subclasses in classes B03, B04 and B07 are irrelevant. So only B01D and B03D are considered as shown below.

In B01D (which covers separation), relevant main groups are B01D 17/00, B01D 19/00 and B01D 43/00. Group B01D 17/00 contains a reference to subclass C02F in respect of separating oily or other floating substances from water, a reference which is relevant here. C02F is considered below. Group **B01D 17/02**, relating to the separation of non-miscible liquids. Its subgroup **B01D 17/035** is relevant here and should be assigned to the document. B01D 19/00 can be discounted. Removal of oxygen is indeed degassing but this is done by introducing another gas into the liquid. Replacing one gas with another is not degassing in the sense of group B01D 19/00. B01D 43/00 can be discounted too since it contains a limiting reference to B03D 1/00 in respect to flotation processes.

In B03D, the relevant main group is B03D 1/00, entitled *"Flotation"*, the relevant subgroups in the IPC being **B03D 1/04** (see claims 3 and 6) and **B03D 1/16.**

In C02F (which covers water treatment), the relevant main group is C02F 1/00 and the relevant subgroups are **C02F 1/20** (degassing)**, C02F 1/24** (flotation) and **C02F 1/40** (devices for separating oily substances). While B01D 19/00 is regarded as irrelevant in respect of degassing, the title of C02F 1/20 (*"liberation of dissolved gases"*) covers the replacement of one dissolved gas with another and should be assigned.

B03D 1/16 is regarded as the classification that most adequately covers the invention information and is therefore listed first.

A1: E21B 43/00 covers the recovery of oil and its subgroup **E21B 43/16** (enhanced recovery) is the most relevant group for this additional information.

A2: Aerating water is covered by C02F and more specifically by **C02F 1/74.**

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject matter	B03D	Common rule	B03D 1/16, B03D 1/04, (2006.01)
I1	Subclass title covers subject-matter	B01D	Common rule	B01D 17/035 (2006.01)
I1	Limiting reference in B01D 17/00	C02F	Common rule	C02F 1/20, C02F 1/24, C02F 1/40 (2006.01)
A1	Subclass title covers subject matter	E21B	Common rule	E21B 43/16 (2006.01)
A2	Limiting reference in B01D 17/00	C02F	Common rule	C02F 1/74 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B03D 1/16 (2006.01)
B03D 1/04 (2006.01)
B01D 17/035 (2006.01)
C02F 1/20 (2006.01)
C02F 1/24 (2006.01)
C02F 1/40 (2006.01)
E21B 43/16 (2006.01)
C02F 1/74 (2006.01)

Training Example M18

Categories

1a, 1b, 2a1, 2b1, 3b

Documents (Classification is based on GB2161577A)

GB 2161577 A
FR 2567603 A
DE 3524842 A
JP 61026448 A

Short Version of the Disclosure

A vibration damper for a rotary stepping motor consists of an inertial mass connectable to the shaft of the motor through a viscous coupling comprising a standard roller bearing filled with a high viscosity material such as a silicone compound.

Representative Prior Art

Damping devices using an inertial mass connected by a viscous-elastic member to the armature of the motor to smooth the output vibrations of stepping motors are known in the prior art (see page 1, line 27-29 in the description).

Invention Information

The addition to the prior art comes from the simple design of the damping device which can be made at low cost using standard components. The essential features of the vibration damper are not specific for the suppression of vibrations in electric stepping motors. Consequently the damping system per se can be regarded as 'Invention Information'.

I1: Vibration damping system for rotary movement with an inertia mass supported by a bearing comprising standard rolling elements and filled with a high viscosity material

The second addition to the prior art relating to a rotary stepping motor and a damping device is the fact that inertial mass is not connected by viscous means to the armature of the motor, but to the output shaft of the motor.
Therefore, a second piece of 'Invention Information' is identified:

I2: Rotary stepping motor with damping device comprising inertial mass connected by viscous means to the motor output shaft

Identification of Potential Subclasses

From a term search in the IPC, particularly by the use of the IPC Catchword Index and the WIPO-tool TACSY, the potentially appropriate IPC places for the two subjects of 'Invention Information' are identified:

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	VIBRATIONS (4) reducing effects of-damping	F16F
I1	TACSY	rotary vibration damping	B63H1/15, F16F9/12, F16F7/02, F16D3/14, F16F15/126
I2	Catchword Index	STEPPING motors (electric)	H02K37/00
I2	TACSY	motor damper inertia mass	B62D7/22, H02K7/02, F03G3/00, F16F7/10, F02N5/04

Analysis and Selection of Classification Symbols

I1: The Catchword Index provides us with subclass F16F. Following the “Common rule” the most appropriate main group for “suppressing of vibrations in rotary systems” is F16F 15/00. If the user selects main group F16F 7/00 “*Vibration dampers; Shock-absorbers*” he will be guided by the reference “*specific for rotary systems F16F 15/10*” after the main group title. The ‘common rule’ further applied in main group F16F 15/00 will guide the user to F16F 15/10 for “suppression of vibrations in rotary systems” contrary to the non-rotating systems in F16F 15/02. Taking into account the special features of this damping system: “a viscous fluid filling in the bearing which supports the rotating inertia mass” the most appropriate group will be **F16F 15/167**.

When using the WIPO tool TACSY with the term “rotary vibration damping” the system gives five entries on the same five-star level. Three classes are in the subclass F16F, one in B63H and one in subclass F16D. B63H 1/15 is an application place for “Marine propulsion and steering” and F16D 13/00 a functional entry for friction clutches. Both entries are not relevant for this subject matter. By applying the ‘common rule’ for the different entries delivered for F16F, the user will determine the scope of group F16F 15/167 as the best entry for “suppression of vibrations in rotary systems using a viscous fluid and having an inertia member”.

I2: For the second 'Invention information' “stepping motors with damping” we could find the main group H02K37/00 by using the catchword index. The WIPO tool TACSY generates some more entries, but only H02K7/02 and F16F7/10 are appropriate for this subject matter. Both main groups H02K7/00 and H02K37/00 provide for the technical subject of the invention I2. There is no priority given between these two groups and therefore a proper class has to be selected from both groups (see Guide paragraph 144). By applying the 'common rule' for the indented subgroups of H02K7/00 we could find subgroup **H02K7/02** that provides specifically for inertia increasing masses appropriate for the classification of the inventive subject matter. In main group H02K37/00 the 'common rule' reveals group **H02K37/22** which specifies damping units that are in combination with stepping motors, which is clearly the most appropriate entry for this invention information.

The functionally oriented classification F16F15/167 represents the invention information more adequately than the two groups of H02K. Therefore the F16F classification should be in the first place.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	F16F	Common rule	F16F 15/167 (2006.01)
I2	Subclass title covers the subject matter	H02K	Common rule	H02K 7/02 (2006.01)
I2	Subclass title covers the subject matter	H02K	Common rule	H02K 37/22 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
F16F 15/167 (2006.01)
H02K 7/02 (2006.01)
H02K 37/22 (2006.01)

Training Example M19

Categories

1a, 2b1, 3a, 3c

Documents (Classification is Based on GB 2050560 A)

GB 2050560 A
FR 2458658 A1
DE 2923327 B1

Short Version of the Disclosure

The document relates to a device for balancing of a gate or door, which comprises a helical tension spring with a safety member that extends inside the spring between its two attachment points. The safety member consists of two parts that are slidably connected to expand during normal operation and has a corrugated region that can yield and absorb energy in order to provide protection against uncontrolled movement of the spring parts if the spring breaks.

Representative Prior Art

US 4057235 A (see especially figures 3 and 5) discloses a helical tension spring for balancing of a garage door, which comprises a safety member that extends inside the spring between its two attachment points. The safety member consists of two loop-formed parts that are slidably connected to expand during normal operation and that can yield and absorb energy in order to provide protection against uncontrolled movement of the spring parts if the spring breaks

Invention Information

I1: A helical spring having an extendable safety member that extends between its ends, which has a corrugated region that can yield and absorb energy, and that limits the movement of the spring in the event of a failure (see figures and description).

I2: The application of I1 as a detail in a balancing device for a gate or door. The document cannot be considered to disclose a balancing device per se, since it does not give any actual information about how any balancing of gates or doors is achieved (See the Guide, paragraph 90(a)). On the contrary, it states on page 1, second paragraph, that the spring serves in a known way to balance the door.

I3: As a potentially novel and non-obvious subcombination, a shock absorbing safety member with a corrugated yieldable deformed region (see figures and description)

Additional Information

None

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	SPRING(S)	F16F
I2	TACSY	Balancing spring for closing or opening of doors	E06B 9/00, F16F 15/00, E05F 1/00
I2	Catchword Index	DOOR(S) - fittings or operating mechanisms	E05 A47H
I3	Catchword Index	SHOCK absorbers	F16F

Analysis and Selection of Classification Symbols

I1: The title of F16F is ***"****Springs; Shock absorbers; Means for damping vibration****"***. This clearly provides for the invention. The notes after the subclass title confirm that it is the correct place for classification of general aspects of springs.

The safety member has two different functions in the event of a failure; to absorb the released energy of the spring and to limit the movement of broken spring parts. No main group in F16F covers both these functions. Since there is no general precedence rule in F16F it is necessary to classify both functions separately.

Main group F16F 13/00 provides for ***"****Units comprising springs of the non-fluid type as well as vibration-dampers, shock-absorbers, or fluid springs****"***. Even though they never operate at the same time, the spring and the safety member can be considered a unit comprising a spring and a shock-absorber. None of its subgroups are relevant, so classification must be made in **F16F 13/00**.

The only possible main group for the aspect of limiting of movement is main group 1/00 ***"****Springs****"***. 1/02 ***"****made of steel or other material having low internal friction (F16F 1/36 takes precedence); Wound, torsion, leaf, cup, ring or the like springs, the material of the spring not being relevant****"*** is the only relevant one-dot group. Its subgroup 1/04 ***"****Wound springs****"*** also provides for I1. The safety member is an attachment to a spring, and should therefore be classified in **F16F 1/12** "*Attachments or mountings*".

I2: E06B has the title "Fixed or movable closures for openings in buildings, vehicles, fences, or like enclosures, in general, e.g. doors, windows, blinds, gates". This would seem to cover I2, but Note (1) states that E06B does not cover ***"****combinations of wings or frames with operating, mounting, latching or locking means of the type found in class E05****"***. This means that it has to be checked whether any of the different subclasses of E05 provides for a balancing spring for a door.

The only relevant subclass of E05 is E05F ***"****Devices for moving wings into open or closed position; Checks for wings; Wing fittings not otherwise provided for, concerned with the functioning of the wing****"***. This is confirmed by its note, which states that ***"****'closer' or 'opener' includes devices for assisting wing-movement or for wing-counterbalancing****"***.

E05F does not have a detail group for springs of door balancing devices. Therefore, according to paragraph 99(b) of the Guide, the spring has to be classified in the group for door balancing devices as a whole.

Bearing the note in mind, the only relevant main group in E05F is 1/00 ***"****Closers or openers for wings, not otherwise provided for in this subclass****"***. A check of the other main groups verifies that that I2 is indeed not provided for in any of the other groups. The one-dot subgroup **E05F 1/08** ***"****spring-actuated****"*** provides for I2. E05F 1/08 has two subgroups, E05F 1/10 ***"****for swinging wings****"*** and E05F 1/16 ***"****for sliding wings****"***. However, none of these are appropriate. The mechanism described in the document is not described as being applied to purely swinging or purely sliding wings. Furthermore, the operation of the door is not relevant to the disclosed spring safety device.

F16F 15/00 has the title ***"*** *Suppression of vibrations in systems; … Means or arrangements for avoiding or reducing out-of-balance forces, e.g. due to motion* ***…"*** and is an obvious false drop from TACSY. The Catchword Index also gives an entry for A47H, which relates to door furnishings and is irrelevant.

I3: The title of F16F is ***"****Springs; Shock absorbers; Means for damping vibration****"***. This clearly provides for the invention. The notes after the subclass title confirm that it is the correct place for classification of general aspects of shock absorbers.

The title of main group F16F 7/00 is ***"****Vibration-dampers; Shock-absorbers****"***. **F16F 7/12** ***"****using plastic deformation of members****"*** is the only relevant subgroup, and it has no further subdivisions.

The group titles in F16F do not accurately reflect the nature of the claimed device. Therefore, its use for balancing of a gate or door is considered to represent the invention most adequately. Thus, E05F 1/08 is listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Only relevant subclass	F16F	Common rule	F16F 13/00 (2006.01)
I1	Only relevant subclass	F16F	Common rule	F16F 1/12 (2006.01)
I2	Only relevant subclass in view of notes	E05F	Common rule	E05F 1/08 (2006.01)
I3	Only relevant subclass	F16F	Common rule	F16F 7/12 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
E05F 1/08 (2006.01)
F16F 13/00 (2006.01)
F16F 1/12 (2006.01)
F16F 7/12 (2006.01)

Training Example M20

Categories

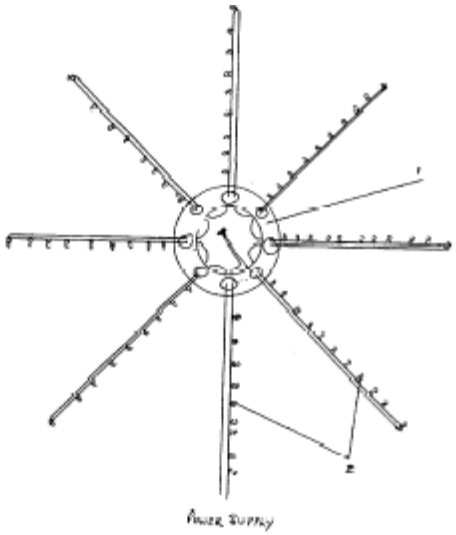
1a, 1b, 2a, 2b1, 2e, 3a

Documents

This is an artificial example.

Brief Description of the Artificial Example

Christmas tree lights have a plate (1) intended to be placed over the topmost fork of the tree. At least one string of electrical lights (2) may be interwoven through holes in the plate to provide a plurality of looped arms radiating out of the plate to facilitate easy decoration of the Christmas tree.



Representative Prior Art

The prior art contains collars, rings etc. that could be regarded as a plate. These are adapted to be placed at or near the top of a Christmas tree and carry strings of Christmas tree lights.

Invention Information

The disclosure is thin and appears to lack novelty. It seems that the disclosure contains the following information:

I1: A lighting system which is intended to be used at a permanent location, using a string or strip of light sources and having a plate intended to be placed towards the top of another article e.g. a Christmas tree.

A1: Lights for Christmas trees.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	Details of LIGHTING devices	F21V
I1	Catchword index	Non-portable LIGHTING devices	F21S
I1	Catchword index	CHRISTMAS trees	A47G 33/00
A1	Notes under F21S and F21V subclass titles	Lights for Christmas trees	F21W

Analysis and Selection of Classification Symbols

I1: As mentioned earlier, the disclosure is thin and appears to lack novelty. The “What to Classify” guidelines specify that if it is determined that no invention information is present in a patent document, at least one classification must be assigned to the document, based on the portion(s) of the total disclosure that appear most useful (see also paragraph 133 of the Guide). Normally, when the subject matter of the disclosure is well represented in the prior art, a single classification is adequate.

The Table above indicates that subclasses F21S and F21V are the most appropriate places for this type of lighting device. Note (1) after the title of subclass F21S indicates that “devices or systems … for use at a permanent location” are classified in that subclass, which is appropriate here. In this subclass, main group F21S 4/00 (electric lighting devices using a string or strip of light sources) is the only appropriate group. Regarding subclass F21V, it is clear that main group F21V 21/00 (supporting, suspending or attaching arrangements for lighting devices) is also appropriate, and its subgroup F21V 21/08 (devices for easy attachment to a desired place) is a good place to classify the disclosure. Since a single classification would be adequate in such a case of a non-novel disclosure, a choice has to be made between these places, and it can be determined that **F21V 21/08** is the better of these classifications.

The A47G classification mentioned in the Table above is inappropriate because there is no claimed novelty in the Christmas trees themselves.

A1: Note (3) under subclass F21S and the Note under subclass F21V point to the desirability of considering the indexing subclasses F21W and F21Y. It can be seen that there is a specific place covering Christmas tree lights, which is **F21W 121/04**. Practice in applying indexing codes is outlined in paragraphs 108-114 of the Guide. Indexing codes are regarded as additional information. Invention information is always listed first before additional information.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject-matter	F21V	Common rule	F21V 21/08 (2006.01)
A1	Notes under the F21S and F21V subclass titles	F21W	Indexing scheme, Common rule	F21W 121/04 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
F21V 21/08 (2006.01)
F21W 121/04 (2006.01)

Training Example M21

Categories

1a, 1b, 2a, 2b1, 2e

Documents (Classification is based on GB 2 385 118 A)

GB 2 385 118 A
FR 2 837 905 A3
DE 2020 2731 U

Short Version of the Disclosure

Decorative lights for an artificial Christmas tree, comprising a “tree trunk” with electrical circuits to provide power, and “palm-shaped” branches with needle-shaped leaves and a string of decorative lamps which plug into the electrical circuits in the trunk, to form horizontal arrays of branches in steps from the top to the bottom of the tree. The claims relate both to the structure of the “tree” and to the arrangement of the decorative lamps on the tree.

Invention Information

I1: An artificial Christmas tree, comprising a “tree trunk” with electrical circuits to provide power and “palm-shaped” branches with needle-shaped leaves, wherein a string of decorative lamps can plug into the electrical circuits in the trunk to form horizontal arrays of branches in steps from the top to the bottom of the tree.

I2: The arrangement of decorative lamps on the above tree.

A1: lights for Christmas trees.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	CHRISTMAS trees	A47G 33/04
I1	Catchword index	Details of LIGHTING devices	F21V
I1	Catchword index	Non-portable LIGHTING devices	F21S
I2	Catchword Index	Combination of LIGHTING devices with other articles	F21V 33/00
A1	Notes under F21S and F21V subclass titles	Lights for Christmas trees	F21W

Analysis and Selection of Classification Symbols

I1: Since the claims relate both to the structure of the tree and to the arrangement of the decorative lamps, then it seems that all the above-mentioned subclasses are appropriate.

Note (1) after the title of subclass F21S indicates that "devices or systems … for use at a permanent location" are classified in that subclass, which is appropriate here. In this subclass, main group **F21S 4/00** (electric lighting devices using a string or strip of light sources) is the only appropriate group. As regards A47G, subgroup **A47G 33/06** (artificial Christmas trees) is appropriate. In view of the wording of the claims this is the most appropriate classification to describe the invention and should be listed first.

I2: Regarding the arrangement of decorative lamps on the tree, combinations of lighting devices with other articles are covered by subclass F21V. It is clear that main group **F21V 33/00** (structural combinations of lighting devices with other articles not otherwise provided for) is appropriate to classify the disclosure.

A1: In the full IPC, Note (3) under subclass F21S and the Note under subclass F21V point to the desirability of considering the indexing subclasses F21W and F21Y. It can be seen that there is a specific place covering Christmas tree lights, which is **F21W 121/04**. Practice in applying indexing codes is outlined in paragraphs 108-114 of the Guide. Indexing codes are regarded as additional information.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Note (1) under the subclass title	F21S	Common rule	F21S 4/00 (2006.01)
I2	Subclass title covers subject-matter	F21V	Common rule	F21V 33/00 (2006.01)
I1	Subclass title covers subject-matter	A47G	Common rule	A47G 33/06 (2006.01)
A1	Notes under the F21S and F21V subclass titles	F21W	Common rule	F21W 121/04 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
A47G 33/06 (2006.01)
F21S 4/00 (2006.01)
F21V 33/00 (2006.01)
F21W 121/04 (2006.01)

Training Example M22

Categories

1a, 1b, 2a1, 2b1, 3b

Documents (Classification is based on GB 1 247 977 A)

GB 1 247 977 A
DE 2 053 977 A1
FR 2 065 336 A5
JP 51-008 084 A
NL 7 014 348 A

Short Version of the Disclosure

An apparatus for the gaseous treatment of solid materials, particularly a sintering apparatus of the kind wherein a plurality of pallets, each having a base in the form of a grate that supports the material, are moved in end-to-end abutting relationship through a treatment zone where a gaseous medium is passed through the grate portion and the material thereon.

The aim of the invention is to seal the sides of the pallets with respect to the supply of gaseous medium to ensure that the gas flows through the material on the pallets and not around the sides thereof.

Invention Information

I1:The combination of a treatment zone with means for supplying a gaseous medium, several traveling pallets each of which includes a base portion in the form of a grate that supports material to be treated within the zone while the pallets sequentially travel through the zone, and gas tight wear strips that are attached to the sides of each traveling pallet and the frame portion of a treatment zone for the purpose of sealing the gaps between each pallet and the frame to prevent gas penetration while the gaseous medium is being released in the zone and passes through the grates of the pallets and the material.

Additional Information

A1: An apparatus for the gaseous treatment of solid materials, particularly a sintering apparatus where a plurality of pallets are adapted to be moved continuously through on rails around an endless path, having upper and lower runs, in end-to-end abutting relationship (see page 1 lines 66 to 75 and fig. 1).

A2: An apparatus for the gaseous treatment of solid materials where combustion air supplied from wind boxes flows through moving grates and through the material carried by these (see page 1 lines 9 to 12 and lines 80 to 83). This process seems to concern drying of material.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, A1	Catchword Index	SINTERING apparatus	F27B 21/00
I1, A1	TACSY	SINTER	C22B 1/16, 1/18, 1/26, B02C 4/26, B22F 3/17
A1	Catchword Index	ENDLESS chain lifts	B66B 9/10
A2	TACSY	DRYING	F26B

Analysis and Selection of Classification Symbols

Selection of subclasses

In the Catchword Index entries relating to “gas treatment” are not distinctly listed. By selecting “sintering” as a catchword the index gives the main group F27B 21/00: ***“Open or uncovered sintering apparatus; Other heat-treatment apparatus of like construction”*** which clearly has to be considered. The titles of F27B and F27B 21/00 also include apparatus like sintering apparatus. Since the invention relates to the machine for sintering, or the like and since the material being treated or the process are not specified, F27B is the most appropriate subclass.

Main group C22B 1/00 ***“Preliminary treatment of ores or scrap”*** includes the subgroup C22B 1/20 ***“in sintering machines with movable grates”***. Although this subgroup seems to cover the subject matter it is not appropriate, since main group C22B 1/00 is restricted to the treatment of ores or scrap and includes a limiting reference to F27B.

A look at the title of subclass B02C shows that subgroup B02C 4/26 is clearly irrelevant.

B22F relates to metallic powder, making metallic powder and the manufacturing of articles from metallic powder. The disclosure does not mention metallic powder or any other material at all therefore subgroup B22F 3/17 cannot be relevant here.

B66B covers ***“Elevators; Escalators or moving walkways”*** and no devices related to the movement of materials through an apparatus for the gaseous treatment of solid materials. Therefore subclass B66B can be disregarded.

It may be also of interest to classify the drying effect of the apparatus disclosed in the patent document. Subclass F26B covers clearly the aspects of drying and should be considered.

Selection of groups

I1: In subclass F27B the common rule is applied for selection of a group.
The title of F27B does not contain any relevant references to other places. According to the subclass index of F27B only group F27B 21/00 is dealing with sintering or the like apparatus, so this main group is more appropriate for I1 then the other main groups within F27B, such as F27B 9/00 ***“Furnaces through which the charge is moved mechanically …”.***

The invention comprises features relating to the pallet with the grate and the means for the supply of treatment gas, particularly because the sealing stripes are carried by both. Therefore both **F27B 21/02** ***“Sintering grates and tables”*** and **F27B 21/08** ***“Details, accessories, or equipment peculiar to sintering or like apparatus”*** should be assigned

to the document. These groups are clearly more suitable than the subgroups for features relating to means for the supply of treatment gas.

A1: Main group F27B 21/00 comprises the one dot subgroup **F27B 21/06** ***"Endless-strand sintering machines"*** which is the most suitable group within F27B for A1.

A2: In subclass F26B the common rule is applied for selecting a group. Looking at the subclass index of F26B the main group F26B 15/00 ***"Machines or apparatus for drying objects with progressive movement; Machines or apparatus with progressive movement for drying batches of material in compact form"*** can be found. Within main group F26B 15/00 subgroup **F26B15/16** ***"the objects or batches of materials being carried by wheeled trucks"*** can be found. This group is the most suitable for classification of A2.

There is no reason to select either of F27B 21/02 or F27B 21/08 as being more relevant than the others, so F27B 21/02 is selected as the first one since it is first in the alphanumerical order. The classification symbols for the additional information follow – in alphanumerical order

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Catchword index	F27B	Common rule	F27B 21/02 (2006.01) F27B 21/08 (2006.01)
A1	Subclass title covers the Subject matter	F27B	Common rule	F27B 21/06 (2006.01)
A2	Subclass title covers the Subject matter	F26B	Common rule	F26B 15/16 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
F27B 21/02 (2006.01)
F27B 21/08 (2006.01)
F26B 15/16 (2006.01)
F27B 21/06 (2006.01)

Training Example M23

Categories

1a, 1b, 2a, 2b1, 3b, 3c

Documents (Classification is based on GB 1 253 175 A)

GB 1 253 175 A
FR 2 057 879 A5
DE 2 037 970 A1

Short Version of the Disclosure

The document relates to circuits providing two levels of brightness for the signalling lamps of motor vehicles, such as direction indicators or brake lights, enabling a reduction of the brightness during night. The purpose of the invention is to avoid the disadvantages of previously known systems in which a voltage-reducing resistance in series with the lamps is used at night. In such systems the lamp filament heats up slowly, due to the low voltage across it, which causes a delay before the lamp lights up.

The solution includes means to retard the connection of the resistance when the lower level of brightness is required until the voltage across the lamp has reached a predetermined value, sufficient to light the lamp but below its upper level of brightness. The signalling lamp is connected in series with a resistor that is shunted by contacts controlled by a relay. The relay circuit includes a switch which is closed when lower brightness is required. In daylight the switch is open so that full battery voltage is applied to the lamp. When the switch is closed the relay is connected in parallel with the lamp through a diode. The relay requires 8 volts to operate and open the contact. Thus 8 volts must appear across the lamp before the resistor is connected in series. This voltage builds up during the time interval in which the lamp filament warms up and thus ensures that the resistor is not connected too soon.

Invention Information

I1: An improvement in a circuit for signalling lamps for vehicles, e.g. direction indicators or brake lights, that have two operating voltages.

I2: The application of I1 to direction indicators

I3: The application of I1 to brake lights

Additional Information

A1: A circuit for controlling the activation of lamps that have two operating voltages, including means to delay the connection of a resistance in series with the lamp when the low voltage is required.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, A1	Catchword Index	circuit arrangements for starting or operating electric LAMP(S)	H05B
I1, A1	Catchword Index	CIRCUITS for operating electric heaters or lighting	H05B
I1, A1	Catchword Index	vehicle SIGNALLING	B60Q
I2	Catchword Index	DIRECTION indicators for vehicles	B60Q 1/34
I3	TACSY	Brake lights	B60Q 1/44, G03B 17/18

Analysis and Selection of Classification Symbols

I1 – I3: Selection of subclass

H05B has the title "Electric heating; Electric lighting not otherwise provided for", meaning that it is a residual place for electric lighting. Since the invention relates to electric lighting this is the relevant subclass, unless another place exists. The title of H05B also has a reference, saying "apparatus for special application, see the relevant places, e.g. A47J, B21J, B21K, C21, C22, C23, F21, F24, F27". This means that two questions have to be answered; "Is the invention specially adapted for vehicle lighting?" and "Is there a specific place elsewhere for it?".

It could be argued that the invention is of general utility, but there is nothing in the document to suggest this and the problem that the invention solves is closely related to vehicle signalling systems. It is not easy to think of another application for the invention.

B60Q has the title "Arrangement of signalling or lighting devices, the mounting or supporting thereof or circuits therefore, for vehicles in general". Since the invention relates to a circuit for signalling devices this title provides for, classification should be made in B60Q and not in H05B. This is further confirmed by Note (1) after B60Q, which says "This subclass covers also arrangement or adaptation of lighting switches or signal-initiating means for vehicles."

G03B relates to cameras and similar apparatus and is obviously irrelevant.

I1 – I3: Selection of groups

Main group B60Q 1/00 with title "Arrangement of optical signalling or lighting devices, the mounting or supporting thereof or circuits therefor" , is the only main group that provides for the invention". Sub-group **B60Q 1/26** having as title "the devices being primarily intended to indicate the vehicle, or parts thereof, or to give signals, to other traffic", is the only one-dot group providing for I1. The precedence reference in B60Q 1/26 is irrelevant for the present invention.

Two of the subgroups of B60Q 1/26 provide for the applications I2 and I3; **B60Q 1/34** "for indicating change of drive direction" and **B60Q 1/44** "for indicating braking action".

A1:
The classifications in the application place B60Q do not give any detailed information about the actual function of the circuits. Even though an invention information classification in H05B is ruled out by its notes, it could be considered to give a further additional information classification in the general field H05B, in order to record more detailed information. The only relevant main group is H05B 39/00 entitled "Circuit arrangements or apparatus for operating incandescent light sources and not adapted to a particular application". The one-dot group **H05B 39/02** "Switching-on, e.g. with predetermined rate of increase of lighting current" is of obvious interest, and give additional information that might be of use for search.

Since B60Q 1/26 represents the invention in its broadest context it is presented first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Reference in H05B, Note in B60Q	B60Q	Common rule, only relevant group	B60Q 1/26 (2006.01)
I2	Reference in H05B, Note in B60Q	B60Q	Common rule, only relevant group	B60Q 1/34 (2006.01)
I3	Reference in H05B, Note in B60Q	B60Q	Common rule, only relevant group	B60Q 1/44 (2006.01)
A1	Only relevant subclass	H05B	Common rule, only relevant group	H05B 39/02 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

B60Q 1/26 (2006.01)
B60Q 1/34 (2006.01)
B60Q 1/44 (2006.01)
H05B 39/02 (2006.01)

Training Example M24

Categories

1a, 1b, 2a1, 2b1

Documents (Classification is based on GB 1 310 142 A)

GB 1 310 142 A
FR 2 061 001 A
DE 2 041 925 A

Short Version of the Disclosure

A floating offshore structure comprises a working platform and at least three floating stabilizing legs. The structure floats both when in transit and when in situ. It comprises a buoyant hull having a working platform thereon and at least three elongated buoyant hollow stabilizing columns, each column being provided with means for independent vertical movement relative to the hull. The columns can be adjusted independently to ensure that the centre of gravity of the structure can be kept as low as possible during operation in situ and the hydraulic drag minimized during relocation.

Invention Information

The offshore structure floats both when in transit and when in situ. The structure comprises a buoyant hull having a working platform thereon and at least three elongated buoyant hollow stabilizing columns, each column being provided with means for independent vertical movement relative to the hull. In situ the buoyant columns are lowered into the water in order to raise the hull and its working platform above the water surface. The structure may either be anchored or dynamically position above a fixed point of the underlying sea bead.

In shallow waters the supporting legs may be lowered to contact the bottom, the working platform may then form an artificial island.

In summary, the following pieces of invention information are identified:

I1: A floating structure providing a working platform for offshore operation
I2: An artificial island mounted on piles

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	floating PLATFORM(S)	B63B 35/44
I1	IPC-CAT	floating structures for special purposes	B63B 35/00
I2	Catchword Index	PLATFORM(S) mounted on supports (artificial island)	E02B 17/00
I2	IPC-CAT	artificial islands mounted on piles or like supports	E02B17/00

Analysis and Selection of Classification Symbols

The entry B63B 35/44, “Floating buildings, stores, drilling platforms, or workshops, e.g. carrying water-oil separating devices”, found in the Catchword index clearly provides for the invention information.

Main group B63B 35/00 “Vessels or like floating structures adapted for special purposes” indicated by the IPC-CAT has a subgroup B63B 35/44 for “Floating buildings, stores, drilling platforms, or workshops, e.g. carrying water-oil separating devices”. Following the Common rule for group selection **B63B 35/44**, which is the best matching entry for the invention information, is selected.

The entry E02B 17/00 "Artificial islands mounted on piles or like supports, e.g. platforms on raisable legs; Construction methods therefor", which is also found in the Catchword Index refers out floating platforms to B63B 35/44. On the other hand, the structure claimed and disclosed in the description is elevated from its barge position to an operating level above the surface of the water where it is used as a support for drilling by lowering its legs. Should the legs be lowered to rest on the sea bed this very same structure would become then an artificial island in the sense of group E02D 17/00. Even if this use of the platform is not explicitly foreseen in the document, since the primary purpose of the classification is to facilitate searching, the information disclosed here requires multiple classification.

Following the Common rule for group selection, the one-dot group E02B 17/04 "Equipment specially adapted for raising, lowering, or immobilising the working platform relative to the supporting construction" and its subgroup **E02B 17/08** "for raising or lowering", is selected as the best matching entry for the additional class.

B63B 35/44 is presented first, since it relates to the matter that is actually disclosed in the document.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers subject matter	B63B	Common rule	B63B 35/44 (2006.01)
I2	Subclass title covers subject matter	E02B	Common rule	E02B 17/08 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B63B 35/44 (2006.01)
E02B 17/08 (2006.01)

Training Example M25

Categories

1a, 1b, 2b1

Documents (Classification is based on GB 1 253 985 A)

DE 2 029 525 A1
FR 2 063 896 A5
GB 1 253 958 A
NL 7009297 A

Short Version of the Disclosure

The invention relates to railway axle counting installations of a kind in which at least one of the two axle-detecting units defining a counting section is linked to a circuit.

Some of the counting errors which arise in axle counting installations are in the form of a difference of +1 or -1 between the numbers of axles counted into the section and the number counted out.

These counting errors can have their origin in an error of the counter itself, in the transmission from the axle-detecting pulse generator to the counter, in excessively worn wheel flanges, in disturbing magnetic fields generated by the locomotive, or in other causes. But if it can be ascertained that no single-axle vehicles are permitted on the section of track in question and if it is assumed that such a counting error will not coincide with a breakage of the train that leads to a two-axle wagon coming to a halt, then the counting installation can be arranged to reject automatically a counting signal having an error of only +1 or -1 and the track section can safely be signaled as clear despite the residual count of +1 or -1.

Invention Information

The axle counting installation is associated with a track circuit so that a check is made on whether there are still one or more further axles to be counted out.
Thus, as soon as the track circuit confirms that the insulated track section has become clear, any correction of the counting that may be necessary can be introduced without delay and no assumptions about a minimum train speed are required.

The following pieces of invention information are identified:

I1: Correction of axle counting error
I2: An axle counting installation

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	COUNTING of rail vehicles or of rail vehicle axles	B61L1/16
I2	Catchword Index	safety of RAILWAY traffic	B61L
I1, I2	IPC-CAT	Abstract of GB 1253958 A	B61L1/00 B61L1/20 B61L1/16

Analysis and Selection of Classification Symbols

B61L ***"Guiding railway traffic; Ensuring the safety of railway traffic"*** is obviously an appropriate subclass.

Following the common rule I1 and I2 are to be found under main group B61L 1/00: ***"Devices along the route controlled by interaction with the vehicle or vehicle train"***.

I1: Group **B61L 1/20** ***"Safety arrangements for preventing or indicating malfunction of the device, e.g. by leakage current, by lightning"*** is the most appropriate group.

I2: Group **B61L 1/16** ***"Devices for counting axles; Devices for counting vehicles"*** is the most appropriate group.

The symbol B61L 1/20, which most adequately represents the invention, is listed first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Subclass title covers the subject matter	B61L	Common rule	B61L 1/20 (2006.01)
I2	Subclass title covers the subject matter	B61L	Common rule	B61L 1/16 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B61L 1/20 (2006.01)
B61L 1/16 (2006.01)

Training Example M26

Categories

1a, 1b, 2b1

Documents (Classification is based on GB 1 270 078)

DE 2 056 849
FI 49 94
FR 2 072 989
GB 1 270 078
JP 49 002 732
NL 7 017 550
NO 127 100
SE 382 995

Short Version of the Disclosure

An endless vulcanized belt track for a sproket-driven, snow-traveling track vehicle, such as a snowmobile, consisting in a body of elastomeric material and a plurality of spaced rigid elongated ground-engaging elements extending transversely of the belt track which are secured to the body to form an integral structure, preferably during vulcanization of the belt track.

Invention Information

An endless track for vehicle consisting in an elastomeric belt and a plurality of spaced traction elements, each element being secured on to the belt to form an integral structure with a portion projecting outwardly therefrom to present an exposed surface for ground contact.

In summary, the following piece of Invention Information is identified:

I1: An elastomeric belt track for vehicle

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword index	ENDLESS track vehicle endless TRACK(S) vehicles BELTS (conveyers -) BELTS (driving -)	B62D 55/00 B65G 15/30 F16G 1/00
I1	IPCCAT	Endless track vehicles and their tracks	B62D 55/00

Analysis and Selection of Classification Symbols

The entry B62D55/00 found in the Catchword index: “Endless-track vehicle” and the subgroup B62D55/08: "Endless-track units; Parts thereof" clearly provides for the invention information. Following the common rule for group selection, B62D 55/24: "(tracks) of continuously-flexible type, e.g. rubber belts" is selected, which is the best matching entry for the invention information.

Classification in B62B 55/26: "Ground-engaging parts or elements" is required for the details of the ground-engaging element. The group is selected following the common rule.

The entries F16G 1/00 and B65G 15/30 are not relevant. A "track belt" and a "driving belt" or "conveyer belt" are fundamentally different in spite of having the term "belt" in common, their functions, dimensions, characteristics and structures are distinct.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Title of the group covers the subject matter	B62D	Common rule	B62D 55/24 (2006.01) B62D 55/26 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B62D 55/24 (2006.01)
B62D 55/26 (2006.01)

Training Example M27

Categories

1a, 1b, 2a1, 2b1

Documents (Classification is Based on GB 2 150 897 A)

GB 2 150 897 A
FR 2 553 826 A1
DE 3 338 466 A1

Short Version of the Disclosure

The document relates to a road vehicle which is equipped with a bumper, at least two radiators, for example an engine cooler and an intercooler, and an air duct system for guiding cooling air over the radiators. The air guidance system has separate air ducts and air inlet ports for each radiator, which are arranged in the elastic cover of the bumper. The bumper can have a support structure of open construction, which forms part of the air duct for one of the radiators. The purpose is to provide an integrated bumper and air duct system which is easy to assemble and enables an optimised flow of air to the two radiators.

Invention Information

I1: A road vehicle with separate air ducts for two separate radiators, which pass through the bumper (see figures 1-2 and claim 1).

I2: As a subcombination, a bumper combined with air inlets (see figures 1-2 and claim 1).

I3: As an other subcombination, a particular arrangement and positioning of two radiators in the nose of a car (see figure 2 and claim 2).

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, I3	TACSY	"Air inlet for vehicle radiator"	B60K 11/00, B60K 15/00
I1, I2	Catchword Index	BUMPER(S) (for vehicle)	B60R 19/02

Analysis and Selection of Classification Symbols

I1 and I3: The fifth part of the title of subclass B60K is "Arrangements in connection with cooling, air intake, gas exhaust, or fuel supply, of propulsion units, in vehicles". This clearly provides for I1 and I3, and there are no notes or references to contradict it.

Main group B60K 11/00 with title "Arrangement in connection with cooling of propulsion units", is the only main group that covers I1 and I3. Its second reference "cooling internal combustion engines per se F01P" relates to cooling arrangements of the engine itself, so it is not relevant to the invention. This is confirmed by the corresponding reference after the title of subclass F01P, which title reads: "Cooling of machines or engines in general; Cooling of internal-combustion engines (arrangements in connection with cooling of propulsion units in vehicles B60K 11/00)". Since I1 and I3 relate to features that are only applicable to vehicles, this reference in F01P clearly applies.

B60K 15/00 entitled "Arrangement in connection with fuel supply of combustion engines; Mounting or construction of fuel tanks" is an obvious false drop from TACSY.

Two of the one-dot groups of B60K 11/00 cover I1 and I3: B60K 11/02 (with liquid cooling) and B60K 11/08 (Air inlets for cooling; Shutters or blinds therefor). Of these, **B60K 11/08** more specifically provides for I1, which therefore should be classified there. B60K 11/02, and particularly its subgroup B60K 11/04 with title "Arrangement or mounting of radiators, radiator shutters, or radiator blinds" , provides for I3. Therefore classification should also be made in **B60K 11/04**.

I2: The title of B60R is "Vehicles, vehicle fittings, or vehicle parts, not otherwise provided for". This title gives no indication of the scope of the subclass. However, it has to be assumed that everything that is provided for in the main groups belongs to the scope of the subclass.

B60R 19/00 has the title "Wheel guards; Radiator guards; Obstruction removers; Fittings damping bouncing force in collisions". The fourth part covers bumpers, which are provided for in the one-dot group B60R 19/02 "Bumpers, i.e. impact receiving or absorbing members for protecting vehicles or fending off blows from other vehicles or objects".

Combinations of bumpers with other devices is provided for by group B60R 19/48 (B60R 19/00: "… Fittings damping bouncing force in collisions" - B60R 19/02: "Bumpers, i.e. impact receiving or absorbing members for protecting vehicles or fending off blows from other vehicles or objects" - B60R 19/48: "combined with … other devices or objects, e.g. bumpers combined with road brushes …**").** There is no subgroup that specifically provides for the combination of bumpers and air inlet ducts, so classification must be made in **B60R 19/48**.

Since I1 reflects the invention as a whole, its classification should be presented first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Only relevant subclass	B60K	Common rule, only relevant main group and most specific subgroup.	B60K 11/08 (2006.01)
I2	Scope of subclass defined by its main groups	B60R	Common rule, only relevant main group and subgroup.	B60R 19/48 (2006.01)
I3	Only relevant subclass	B60K	Common rule, only relevant main group and most specific subgroup.	B60K 11/04 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
B60K 11/08 (2006.01)
B60K 11/04 (2006.01)
B60R 19/48 (2006.01)

Training Example M28

Categories

1a, 1b , 2a, 2b1, 2e

Documents (Classification is Based on US 4 209 289 A)

US 4 209 289 A
FR 2 456 600 A
DE 3 016 731 A

Short Version of the Disclosure

The invention relates to a mould for making soft contact lenses, comprising a lower female part and an upper male part that together form a moulding cavity. The female part has a concave moulding surface and a radially extending circumferential mating surface that are situated inside a conical recess. The male part has a convex moulding surface and a corresponding circumferential mating surface, and fits tightly inside the conical recess. Between the moulding surface and the mating surface of the male part there is a concave groove that shapes the finished edge of the lens. The advantage of the invention is that the finished lenses are accurately shaped and have no flash, which means they do not require any additional machining.

Invention Information

I1: A two-piece mould for making contact lenses, having a particular geometry that ensures accurate positioning and avoids flash.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	making CONTACT LENSES from plastics or substances in a plastic state	B29D 11/00
I1	Catchword Index	MOULD(S) for shaping plastics or substances in a plastic state in general	B29C (various)

Analysis and Selection of Classification Symbols

The Catchword Index indicates that production of optical elements, e.g. lenses, from plastics or from substances in a plastic state, is classified in group B29D 11/00. However, Note (1) following the title of B29D directs the user to Note (3) following the title of class B29. This Note prescribes that "the working of plastics is, as far as possible, classified primarily according to the particular shaping technique used, e.g. in subclass B29C", and that "classification according to production of particular articles in subclass B29D is restricted to

aspects which are characteristic for the production of a particular article and combined operations for making the particular article, and not classifiable in subclass B29C or B29B".

Therefore it has to be investigated whether I1 is classifiable in any of these subclasses. B29B is not relevant, but B29C is indicated by the Catchword Index as the place for moulds. B29C among other things provides for "Shaping or joining of plastics; Shaping of plastic substances in general".

"Shaping by casting, i.e. by introducing the moulding material between confining surfaces without significant moulding pressure" is covered by main group B29C 39/00. There are two relevant one-dot groups. B29C 39/02 covers apparatus "for making articles of definite length, i.e. discrete articles". It has no relevant subgroups. B29C 39/22 covers "Component parts, details or accessories", its two-dot group B29C 39/26 covers "moulds or cores" and the three-dot group B29C 39/28 "with means to avoid flashes" is relevant for classifying I1.

The Common Rule applies in B29C. Paragraph 124 of the Guide states that no general priority rules apply in the common rule areas of the IPC, but mentions two principles of priority that can be applied to limit unnecessary multiple classification and to select groups that most adequately represent the technical subject to be classified:

"(a) Groups for more complex matter take priority over groups for less complex matter. For example, groups for “whole things” take priority over groups for “details.”

(b) Groups for more specialised subject matter take priority over groups for less specialised subject matter. For example, groups for matter with means for solving particular problems take priority over more general groups."

B29C 39/02 provides for the mould as a whole, as opposed to B29C 39/28, which only provides for details and should therefore take priority according to (a). On the other hand, B29C 39/28 provides specifically for the means that solve the particular problem that is the object of the invention and should therefore take priority according to (b).

In this case it is clear that classification in **B29C 39/28** gives more useful information about the invention, and it should therefore be chosen for classification of I1. **B29C 39/02** can be given as additional information.

Main group B29C 33/00 provides for "Moulds or cores; Details thereof or accessories therefore". However, Note (3) after the title of B29C states that "component parts, details, accessories or auxiliary operations which are applicable to more than one moulding technique are classified in groups B29C 31/00 to B29C 37/00" and "component parts, details, accessories or auxiliary operations which are only applicable or only of use for one specific shaping technique are classified only in the relevant subgroups of groups B29C 39/00 to B29C 71/00". I1 is not disclosed for use with any of the moulding techniques covered by main groups B29C 41/00 to B29C 71/00 and can not be used for any of them. Therefore classification in B29C 33/00 is not appropriate.

Since I1 can be classified in B29C classification should not be made in B29D.

The last Note after B29C states that when classifying in this subclass, it is desirable to add the indexing codes of subclasses B29K and B29L.

B29K is an indexing scheme associated with subclasses B29B, B29C or B29D, relating to moulding materials or to materials for reinforcements, fillers or preformed parts. The material from which the contact lenses are made is not mentioned explicitly in the example document, only by reference to other patent documents, so indexing in B29K is not appropriate.

B29L is an indexing scheme associated with subclass B29C, relating to particular articles. Its main group **B29L 11/00** relates to "Optical elements, e.g. lenses", which is an appropriate entry. It has no subgroups.

B29C 39/28 is presented first, since it reflects the invention information. B29L 11/00, being an indexing code, must be presented after the classification symbols.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Notes after class B29	B29C	Common rule, Note after subclass B29C, paragraph 124 of the Guide	B29C 39/28 (2006.01)
I1	Notes after class B29	B29C	Common rule, Note after subclass B29C, paragraph 124 of the Guide	B29C 39/02 (2006.01)
I1	Note after subclass B29C	B29L	Common rule	B29L 11/00 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
B29C 39/28 (2006.01)
B29C 39/02 (2006.01)
B29L 11/00 (2006.01)

Training Example M29

Categories

1b, 2a, 2b4, 2e, 2f

Documents (Classification is Based on US 4 546 710 A)

US 4 546 710 A
FR 2 514 864 A
DE 3 249 058 T1

Short Version of the Disclosure

The document relates to a burner head for combusting solid fuels such as straw, peat, chips or coal, which comprises two concentric tubes. The inner tube forms a charging opening for the fuel and a discharge opening for flue gases. The gap between the tubes is intended to communicate with a supply source for combustion air and communicates with the interior of the inner tube via apertures in the wall of the inner tube. The apertures form two groups, one for creating a zone of incomplete combustion and one for creating a zone of complete combustion. A screw conveyor, having an outlet matching the charging opening, feeds fuel into the combustion space. The burner head is intended for mounting in the wall of a boiler.

Invention Information

I1: A tubular burner head for solid fuel that is fed into the combustion chamber by a screw conveyor

The component parts and subsystems of the apparatus, for example for fuel feeding and air feeding, are either conventional or of no interest for combustion apparatus in general.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1	Catchword Index	BURNERS	F23D
I1	Catchword Index	COMBUSTION apparatus or processes using only solid fuel	F23B

Analysis and Selection of Classification Symbols

The Catchword Index identifies two potential subclasses, F23D "Burners" and F23B "Methods or apparatus for combustion using only solid fuel", which could both appear to cover I1. However, Note (1) after class F23 defines a burner as "a device by which fluent fuel is passed to a combustion space where it burns to produce a self-supporting flame". Fuels such as straw, peat, chips or coal can not be considered as fluent. Furthermore, the first note after F23B states that this subclass covers "apparatus for combustion of solid fuel … wherein

the main body of fuel is … mechanically transported, as opposed to pneumatically transported or suspended in air, during combustion", which applies to I1. The synonyms and keywords section of the Definitions of F23B further states that in patent documents the word "burner" is often used in patent documents with the broader meaning "combustion apparatus", and not in the restricted meaning used in the IPC. This is obviously the case here. Therefore F23B is the correct subclass.

According to Note (2) after subclass F23B the first place priority rule is applied in this subclass. Going from the top main group downwards, the first main group that fits the invention is F23B 40/00 "Combustion apparatus with driven means for feeding fuel into the combustion chamber". The only relevant subgroup is F23B 40/06 "the fuel being fed along the fuel-supporting surface". Its subgroup is not relevant, so **F23B 40/06** is the correct classification.

The Notes after subclass F23B also state that "in this subclass, it is desirable to add the indexing codes of groups F23B 101/00-F23B 103/00". Main group F23B 103/00 provides for "Adaptation of combustion apparatus for placement in or against an opening of a boiler, e.g. for replacing an oil burner". Its subgroup 103/02 covers "producing an essentially horizontal flame". Since the construction of the "burner head" is obviously adapted for placement in or against an opening of a boiler (see column 1, lines 57-59) and since this information might be of interest for searching it is appropriate to add these indexing codes. As can be seen from figure 3 and its corresponding text (column 4, lines 3-6) the apparatus can be used for producing both horizontal and slightly inclined flames. In the context of boilers it is natural to regard those slightly inclined flames as "essentially horizontal". Therefore the indexing code **F23B 103/02** is selected.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Notes after F23 and F23B, Definitions of F23B	F23B	First place priority	F23B 40/06 (2006.01)
I1	Notes after F23 and F23B, Definitions of F23B	F23B	Note after F23B. Indexing scheme, common rule	F23B 103/02 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
F23B 40/06 (2006.01)
F23B 103/02 (2006.01)

Training Example M30

Categories

1a, 1b, 2a, 2b1, 2b4, 2e, 3a, 3b

Documents (Classification is Based on US 4 331 126 A)

US 4 331 126 A
FR 2 463 360 A
DE 2 932 224 A

Short Version of the Disclosure

The document relates to a solid fuel furnace with means for conveying the fuel though the combustion chamber. The means consist of a rotatable tube with hollow fuel-feeding blades, which extends through a grate trough along the bottom of the combustion chamber. The blades have radially extending nozzle openings that communicate with the interior of the tube for feeding air to the combustion chamber. The tube is fed with air from a blower via fittings at one end. Fuel is fed to one end of the combustion chamber via a vertical tube.

Representative Prior Art

A solid fuel furnace with a hollow fuel-conveying auger with perforated helical flights (see US 4 231 304 A)

Invention Information

I1: A solid fuel furnace with a rotatable fuel-conveying and air-feeding tube.
I2: As a subcombination, a grate in the form of a rotatable fuel-conveying and air-feeding tube.
I3: As a subcombination, the fittings (11 and 16 in the drawings) for feeding air into the rotating tube and to the nozzles.

Additional Information

A1: The fuel-feeding arrangement via a vertical tube is considered to be of search interest together with the fuel-conveying tube

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, A1	Catchword Index	FURNACES in general	F27B
I1, A1	Catchword Index	COMBUSTION apparatus or processes using only solid fuel	F23B
I2, I3	Catchword Index	Air supply for COMBUSTION in general	F23L
I2	Catchword Index	Fire GRATES	F23H

Analysis and Selection of Classification Symbols

I1: The Catchword Index identifies two potential subclasses, F27B "Furnaces… in general …" and F23B "Methods or apparatus for combustion using only solid fuel". The titles of both subclasses appear to cover I1. However, Note (1) after class F27 states that this class covers furnaces for heat treatment of materials and articles. Note (2) after class F27 states that this class does not cover combustion apparatus per se. This means that only F23B is appropriate.

According to Note (2) after subclass F23B the first place priority rule is applied in this subclass. Going from the top main group downwards, the first main group that fits the invention is F23B 30/00 "Combustion apparatus with driven means for agitating the burning fuel; Combustion apparatus with driven means for advancing the burning fuel through the combustion chamber". The one-dot group F23B 30/02 "with movable …fuel-supporting surfaces" is appropriate, .as is the two-dot group F23B 30/06 " with fuel-supporting surfaces that are specially adapted for advancing the fuel through the combustion zone" and the three-dot group **F23B 30/10** " with fuel-supporting surfaces having fuel advancing elements that are movable, but remain essentially in the same place".

Indexing: The Notes after subclass F23B also state that "in this subclass, it is desirable to add the indexing codes of groups F23B 101/00-F23B 103/00". Main group F23B 101/00 provides for "Adaptation of combustion apparatus to boilers in which the combustion chamber is situated inside the boiler vessel, e.g. surrounded by cooled surfaces". From figures 1 and 2 it is obvious that the combustion apparatus is placed inside a cylindrical boiler vessel, and from figure 2 it appears like the apparatus as a whole is indeed adapted for such a boiler. Since this information might be of interest for searching it is appropriate to add the indexing code **F23B 101/00.**

I2: The Catchword Index identifies two potential subclasses, F23L "Air supply …" and F23H "Grates …". The titles of both subclasses appear to cover I2, and there are no references or notes to help making the choice. However, a grate is inherently an air supply device and a look at the main groups of the two subclasses makes it clear that F23H is the most relevant of the subclasses.

F23H is a common rule subclass. The most relevant of the main groups is F23H 9/00 "Revolving grates …". **F23H 9/02** "Revolving cylindrical grates" is the only relevant subgroup.

I3: Subclass F23L "Air supply …" is obviously the correct subclass. F23L is a common rule subclass. F23L 1/00 "Passages or apertures for delivering primary air for combustion" is the only relevant main group. It could be considered to classify I3 in the subgroup F23L 1/02 "by

discharging the air below the fire", but for the fittings that are considered the point of discharging of the air is immaterial. Therefore **F23L 1/00** is the appropriate group.

A1: When classifying I1, the aspect of the method of fuel feeding (A1) can not be reflected, since classification has to be made in the first possible main group. However, for classification of further aspects groups further down in the scheme can be considered. Main group F23B 50/00 provides for "Combustion apparatus in which the fuel is fed into or through the combustion zone by gravity, e.g. from a fuel storage situated above the combustion zone", which is appropriate for A1. Its subgroup **F23B 50/12** provides for apparatus where the fuel is "fed to the combustion zone by free fall or by sliding along inclined surfaces, e.g. from a conveyer terminating above the fuel bed". This is the correct place for A1.

Since F23B 30/10 best reflects the invention as a whole it is given first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Notes after F27	F23B	First place priority rule	F23B 30/10 (2006.01)
I1	Notes after F27	F23B	Note after F23B. Indexing scheme, common rule	F23B 101/00 (2006.01)
I2	Most appropriate subclass	F23H	Common rule, most relevant main group	F23H 9/02 (2006.01)
I3	Only appropriate subclass	F23L	Common rule, most relevant main group	F23L 1/00 (2006.01)
A1	Notes after F27	F23B	First place priority rule	F23B 50/12 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int. Cl.
F23B 30/10 (2006.01)
F23H 9/02 (2006.01)
F23L 1/00 (2006.01)
F23B 50/12 (2006.01)
F23B 101/00 (2006.01)

Training Example M31

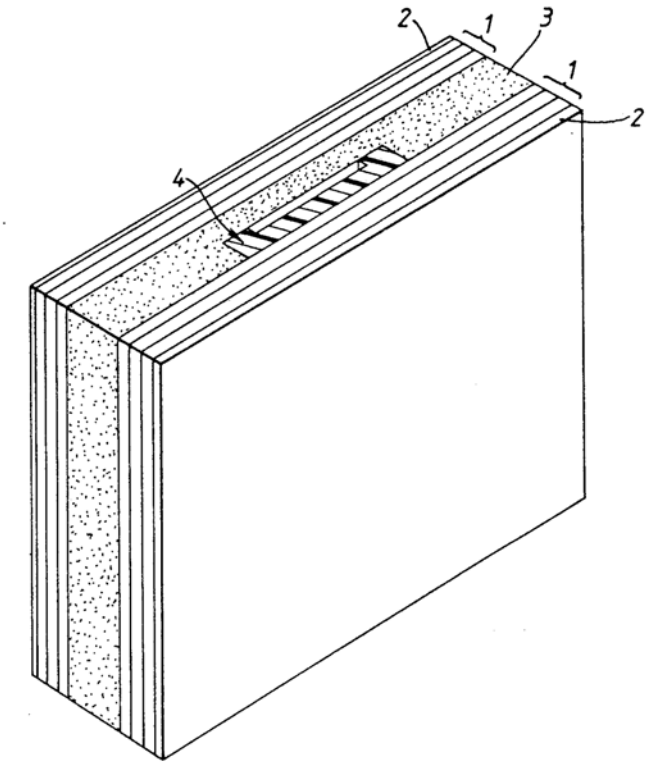
Categories

1a, 1b, 2a, 2a1, 2b1, 2b4, 3a, 3c

Documents

This is an artificial example.

Brief Description of the Artificial Example



The present invention relates to laminated panels. More particularly, but not exclusively, it relates to panels suitable for use in building vehicle bodies, containers or buildings, especially pre-fabricated buildings.

Laminated panels are well known. One type widely used comprises one or more layers of plywood bounded on both external surfaces by glass fibre reinforced plastic (GRP). This gives a substantially rigid structure, and, while the GRP remains in place, it is substantially waterproof. One problem which has been encountered with such laminated materials is the need to fix to them a lashing rail or other device to aid in retention of any load carried within the vehicle constructed of the panels. These are attached by means of screws or rivets to the laminate, but ideally, the screws or rivets should not penetrate to the exterior surface of the laminate since that may firstly spoil the appearance of the constructed vehicle body, and second impair its water resistance. Furthermore, the plywood itself, unless it is very thick, is generally not strong enough to hold the lashing rail in place against the loads imparted to it.

In an attempt to overcome this problem, one solution has been to make channels in at least one surface of one of the plywood layers, and insert into these channels steel bars. These steel bars then act as securing points for the lashing rail to be attached. However, steel is a comparatively heavy material and therefore may have a disadvantageous effect on the load carrying ability of the vehicle. Furthermore, the process of making the channels and inserting the steel bars into them is time consuming and therefore expensive.

It is an object of the present invention to provide a laminated panel which overcomes the above disadvantages.

An embodiment of the present invention will now be more particularly described by way of example and with reference to the accompanying figure, which shows a cross-section of a small portion of a panel embodying the invention.

The panel comprises two sheets of plywood 1, each 4 mm thick. To the outside face of each is bonded a layer 2 of GRP which is approximately 1 mm thick. Separating the two layers of plywood 1 is a core of foamed polystyrene 3, which in the embodiment shown is approximately 6 mm thick. This panel would be useful for dry freight vehicles, although if an insulated vehicle is required, the core may be made thicker.

Within the polystyrene core 3 are located a plurality of elongate inserts 4, made of ABS (acrylonitrile-butadiene-styrene copolymer). These are approximately 3 mm thick and are spaced at centres of approximately 50 cm. As shown in the drawing, the inserts 4 of ABS are located within the core adjacent one of the plywood layers. The ABS insert may be rectangular in cross-section or may have a cutout on the side remote from the plywood layer to which it is adjacent. ABS is a tough plastics material with a good impact strength. It is also able to accept self-tapping screws or star-rivets without tearing. Thus the lashing rail may be attached on the interior face of the vehicle body by self-tapping screws which locate in an ABS insert.

The laminated panels are preferably made up to a size of 8 ft (244 cm) whatever length may be required, with the ABS inserts arranged to be vertical in use.

The invention is:
A laminated panel for use in the construction of vehicle bodies or buildings, comprising a pair of substantially rigid outer layers, separated by a core of foamed plastics material, said core including a plurality of spaced elongate inserts of hard plastics material, said inserts being capable of acting as anchor points for attachment of lashing rail means externally of one of said outer layers.

Invention Information

I1: A laminated panel comprising a pair of substantially rigid outer layers, separated by a core of foamed plastics material, said core including a plurality of spaced elongate inserts of hard plastics material that are capable of acting as anchor points.

I2: The application of I1 for the construction of vehicle bodies.

I3: The application of I1 for the construction of buildings.

Identification of Potential Subclasses

Subject Matter	Tool	Query	IPC Places
I1, I2, I3	IPCCAT	The text of the abstract	B60P, E04B, B32B
I3	Catchword Index	LAYERED PRODUCTS – laminated sheets or panels for building purposes	E04C 1/40
I3	Catchword Index	PANEL(S) as constructional or building elements	F16S, E04C 2/00

Analysis and Selection of Classification Symbols

I1: From the titles it is obvious that B32B "Layered products …" and F16S "Constructional elements in general …" are the most relevant of the proposed subclasses for the general aspects of I1. The only relevant main group of F16S is F16S 1/00, which provides for sheets and panels. However, it contains a reference pointing "layered products" to B32B, so classification of I1 in F16S is not appropriate. It is clear from Note (4) after B32B that I1 is a layered product and there is nothing elsewhere in the notes after B32B that rules out classification in that subclass.

According to its Note (5), the first place priority rule is used in the majority of B32B. Starting from B32B 1/00 and going downwards, the first appropriate main group is B32B 3/00 "Layered products essentially comprising a layer with external or internal discontinuities or unevennesses …". This group, rather unnecessarily considering the first place priority rule, contains a precedence reference to B32B 1/00, which can be disregarded. B32B 3/00 also contains a reference to B32B 5/18 for foamed layers. B32B 5/18 provides for layered products that are "characterised by features of a layer containing foamed or specifically porous material". However, the foamed layer in itself is conventional, so this reference can also be disregarded.

The first one-dot group of B32B 3/00 is B32B 3/02 "characterised by features of form at particular places …", which is appropriate for I1. The only relevant two-dot group is **B32B 3/08** "characterised by added members at particular parts". This is the correct group, since it has no subgroups. B32B 3/06 "for attaching the product to another member, e.g. a support" could be considered, but it is a subgroup to B32B 3/02 and its title should be read together with that of the hierarchically higher group. I1 is a flat panel with no external features, so as a product it has no "features of form … for attaching the product to another member". Therefore classification in B32B 3/06 is not correct.

One-dot group B32B 3/10 "characterised by a discontinuous layer, i.e. apertured or formed of separate pieces of material" is not appropriate, since the inserts are widely spaced and cannot be considered as a "layer".

As stated above, the foam layer is conventional and classification of that aspect as invention information is therefore not correct. However, it can be of use for search to record this information as additional information. Therefore **B32B 5/18** can be given as additional information.

I2: B60P "Vehicles adapted for load transportation or to transport, to carry or to comprise special loads or objects" is indicated by IPCCAT. The Note after B60P draws attention to the Note after class B60, which indicates that I2 is likely to be covered by one of its subclasses.

However, a thorough search of the different subclasses of B60 indicates that no place for laminated panels, or even vehicle body materials in a broader sense, exists in the class.

This leaves two possibilities for classification of I2, either in a residual place or by applying the rules for classifying subject matter in an appropriate place that does not explicitly cover it. According to paragraph 164 of the Guide, the latter strategy should be applied. Paragraph 97 of the Guide prescribes that if no place exists for an article, it is classified in the appropriate function-oriented place (i.e., according to the function performed by the article) or, if this is not possible, according to the field of use. The function of the panel is to enable securing of loads in a vehicle.

This matter is covered by B60P. The only relevant main group is B60P 7/00 "Securing or covering of load on vehicles". Its subgroup B60P 7/06 "Securing of load" is appropriate, as is its subgroup **B60P 7/08** "Securing to vehicle floor or sides". The two precedence references in B60P 7/08 are irrelevant for I2.

I3: IPCCAT and the Catchword Index propose two subclasses, E04B and E04C. E04B provides for "walls", but its most relevant main group, E04B 2/00, contains a reference saying "(building elements of relatively thin form for parts of buildings E04C 2/00)". Therefore it is not appropriate to classify I3 in E04B.

E04C has the title "Structural elements; Building materials". This provides for I3 and there are no references or notes to contradict it. E04C 2/00 has the title "Building elements of relatively thin form for the construction of parts of buildings, e.g. sheet materials, slabs, or panels". This clearly provides for I3, and none of the references are relevant to I3. This main group has two possible one-dot groups, E04C 2/02 "characterised by specified materials" and E04C 2/30 "characterised by the shape or structure", which according to paragraph 144 (b) (ii) of the Guide are both appropriate, since they provide for different aspects and no priority can be determined.

The only relevant subgroup of E04C 2/02 is E04C 2/10 "of wood, fibres, chips, vegetable stems, or the like; of plastics; of foamed products". The precedence reference in E04C 2/10 should not be taken into account, since all materials mentioned in E04C 2/26 are covered by E04C 2/10. E04C 2/10 has a subgroup **E04C 2/24** "laminated and composed of materials covered by two or more of groups E04C 2/12, E04C 2/16, E04C 2/20", which exactly provides for I3 and has no subgroup.

The only relevant subgroup of E04C 2/30 is **E04C 2/52** "with special adaptations for auxiliary purposes, e.g. serving for locating conduits", which doesn't have a subgroup. E04C 2/38 "with attached ribs, flanges, or the like" is not considered relevant, since the inserts of I3, which could possibly be regarded as ribs, are internal and cannot be considered to be "attached" to the panel.

Since I1 defines the invention in its broadest context its classification should be given first.

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I1	Reference in F16S	B32B	First place priority rule	B32B 3/08 (2006.01)
	Reference in F16S	B32B	First place priority rule, additional information	B32B 5/18 (2006.01)
I2	The Guide, paragraphs 164 and 97	B60P	Common rule	B60P 7/08 (2006.01)

Subject Matter	Analysis of Subclass Selection	Subclass	Analysis of Group Selection	IPC
I3	Reference in E04B 2/00	E04C	Common rule, material aspect	E04C 2/24 (2006.01)
I3	Reference in E04B 2/00	E04C	Common rule, structural aspect	E04C 2/52 (2006.01)

Complete Classification

The complete classification for this document based on the above analysis is as follows:

Int.Cl.
B32B 3/08 (2006.01)
B60P 7/08 (2006.01)
E04C 2/24 (2006.01)
E04C 2/52 (2006.01)
B32B 5/18 (2006.01)

Annex I

Simplified Document of Training Example E23 (Artificial Example)

Multiple Resonant Tunneling Circuits for Positive Digit Range-4 base-2 to Binary Conversion

Abstract

Multiple resonant tunneling devices offer significant advantages for realizing circuits which efficiently convert values represented by multivalued number systems to conventional binary representation. In one form of the invention, a number represented by a range-4 base-2 word is converted into a conventional binary word (range-2 base-2) having the same value. The conversion is accomplished by a series of decomposition stages 53, each decomposition stage 53 producing an interim range-4 base-2 word and a binary digit, which becomes one of the digits of the binary output word. Preferably, the decomposition at each stage is accomplished by a set of range-4 base-2 to binary converters 50, each of which operates on a single digit of the interim word. Preferably, summation circuits 52 sum outputs of adjoining range-4 base-2 converters 50 to form the new interim word. The least significant digit of the output of the decomposition stage becomes a digit of the output binary word. Preferably, the range-4 base-2 to binary converters 50 are multi-level folding circuits 54 connected by a voltage divider. Preferably, the multi-level folding circuits contain multiple-peak resonant tunneling transistors 56 (e.g. an FET 58 and a multiple-peak resonant tunneling diode 60) which exhibit multiple negative differential transconductance. The novel circuits presented allow the results of multivalued logic operations to be translated to binary representation at very high speed. Additionally, because they make use of resonant tunneling devices, the novel converter circuits described herein may be fabricated with very few components.

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Claims

What is claimed is:

1. An apparatus for converting a range-N digit into an L-digit binary word, said apparatus comprising:

a voltage divider network having an input; and

a first level and second level folding circuits, the input of each of said first and second level folding circuits connected to said network and the output being a digit in said L-digit binary word, wherein when said range-N digit is applied to said voltage divider input, said L-digit binary word representing the same numerical value as that of said range-N digit.

7. An apparatus, for converting a base-2 range-4 input word into a binary word including non-negative digits, comprising;

a least significant digit of said word being binary, said base-2 range-4 word having digits S(0) through S(L), where S(0) is the least significant digit and said base-2 range-4 binary word having digits B(0) through B(L+1), B(0) being the least significant digit;

decomposition stages D(1) through D(L), decomposition stage D(n) having an input for an n digit range-4 base-2 word I(n), an output for an n-1 digit range-4 base-2 word O(n) and a binary bit output B(n), the input of D(n) connected to O(n+1), wherein, for each decomposition stage, I(n)=2O(n)+B(n);

whereby when the range-4 base-2 word S(1) through S(L) is applied to I(L), the value of the binary word having digits B(0) through B(L+1) where B(0)=S(0) and is the same as the value of said input word, and wherein said decomposition stage D(n) for i=2 to L comprises n range-4 base-2 to binary converters and n-1 summation circuits;

wherein said range-4 base-2 to binary converters comprise two multi-level folding circuits connected by a voltage divider.

Description

1. Field of the Invention

This invention generally relates to integrated circuit devices and more particularly to multivalued logic circuits comprising resonant tunneling devices.

2. Background of the Invention

Without limiting the scope of the invention, its background is described in connection with resonant tunneling devices and multivalued logic.

SUMMARY OF THE INVENTION

Multivalued logic (MVL) computing circuits offer substantial gains in both speed and density over traditional binary implementations; however, because MVL integrated circuits will not stand alone in the near term, interoperability with conventional binary circuits is necessary. An efficient implementation of a multivalued to binary converter which does not mitigate the performance benefits of multivalued logic processors is highly desired.

It has been discovered that the multiple resonant tunneling devices offer significant advantages for realizing circuits which efficiently convert values represented by multivalued number systems to conventional binary representation. The operations necessary to convert multivalued words to binary words can be realized very efficiently by circuits which make use of the negative differential resistance exhibited by resonant tunneling devices.

Generally, and in one form of the invention, a number represented by a range-4 base-2 word is converted into a conventional binary word (range-2 base-2) having the same value. The conversion is accomplished by a series of decomposition stages, each decomposition stage producing an interim range-4 base-2 word and a binary digit, which becomes one of the digits of the output word. Preferably, the decomposition at each stage is accomplished by a set of range-4 base-2 to binary converters, each of which operates on a single digit of the interim word. Preferably, summation circuits sum outputs of adjoining range-4 base-2 converters to form the new interim word. The least significant digit of the output of the decomposition stage becomes a digit of the output binary word. Preferably, the range-4 base-2 to binary converters are multi-level folding circuits connected by a voltage divider. Preferably, the multi-level folding circuits contain multiple-peak resonant tunneling transistors which exhibit multiple negative differential transonductance.

The invention disclosed herein is apparently the first logic circuit operable to convert values represented by multivalued number systems to conventional binary representation. It is also apparently the first circuit containing resonant tunneling devices operable to perform conversion from multivalued logic to binary.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention itself, as well as other features and advantages thereof, will be best understood by reference to the detailed description which follows, read in conjunction with the accompanying drawings.

In the drawings:

FIG. 1 is a block diagram of a redundant positive digit range-4 base-2 adder;

FIG. 3 is a block diagram of the preferred embodiment of a positive digit range-4 base-2 to binary converter;

FIG. 4 is a schematic of the preferred embodiment of a range-4 base-2 to binary converter;

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The carry propagation problem can be eliminated if data operands are encoded and processed using a multivalued representation. This approach uses a higher range to represent information so that ripple carries are never produced, and carry propagation delays are eliminated. The numbers from the previous example can be added without the need for carry generation when represented in base-2 range-3, where each column of bits is separately added using numerical rather than binary addition. The range-3 representation of the result makes carry ripple unnecessary:

$$\begin{array}{l} 01111 = 15(\text{base } 10) \\ +\ 00001 = \ \ 1(\text{base } 10) \\ \hline 01112 = 0*(16) + 1*(8) + 1*(4) + 1*(2) + \\ \qquad\quad 2*(1) = 16(\text{base } 10) \end{array}$$

It is important to note that, even though the range of the result is higher, the base of the number system used to represent the result has not changed. That is, the unit value of each digit position still increases in the base-2 progression of 1, 2, 4, 8, and so on. The use of range-N numeration to encode information in base-M progression is called redundant digit M,N coding. If the digits may take on only positive values, then the numeration system is referred to as redundant positive digit M,N coding. The numeration system of the example above is therefore redundant positive digit 2,3 coding. A numeration system which allows positive and negative digit values is referred to as redundant signed digit M,N coding.

The block diagram of an adder of numbers represented by a redundant positive digit 2,4 coding scheme is shown in FIG. 1. Digits may take on the values 0, 1, 2, and 3 (positive digit range-4). The progression of the numeration system is base-2. The block diagram is for input words of up to three digits in word width, although the technique may obviously be extended to arbitrary word widths. Positive redundant digit 2,4 coding is used to represent base-2 information in a redundantly encoded (range-4) representation so that ripple carries are never produced. This means that any output digit, e.g. R.sub.2, is completely determined by the first six input digits of equal or lower significance, e.g. X.sub..sub.2, Y.sub.2, X.sub.1, Y.sub.1, X.sub.0 and Y.sub.0. Addition is performed in three steps:

Step 1: S.sub.i =X.sub.i +Y.sub.i

Step 2: 4D.sub.i+2 +2C.sub.i+1 W.sub.i =S.sub.i

Step 3: R.sub.i =W.sub.1 +C.sub.i +D.sub.i

where the base-10 value of the result is given by $\sum_{i=0}^{n-1} 2^i R_i$ where n is the number of digits in the output word.

With reference to FIG. 1, Pairs of input digits (X.sub.i, Y.sub.i) are first summed using a two-input summation circuit 40 to produce outputs digit sums S.sub.i =X.sub.i +Y.sub.i (Step 1, above). Each digit sum is then converted into a 3-bit binary code using a range-7 multivalued-to-binary converter (hereinafter referred to as R7MBC) 42. The R7MBC 42 performs the decomposition function of Step 2, above. Finally, the binary outputs from the adjoining R7MBCs 42 are shared and summed by three-input summation circuits 44 to produce a range-4 output result (Step 3, above). The adder shown can be extended to compute the sum of two numbers of arbitrary word width. The speed of the circuit is independent of the number of input digits because only local intermediate results are shared within the circuit.

Multivalued logic (MVL) computing circuits offer substantial gains in both speed and density over traditional binary implementations; however, because MVL integrated circuits will not stand alone in the near term, interoperability with conventional binary circuits is necessary. FIG. 2 is a block diagram of a multivalued logic processor 46 which produces an output word of width L+1 digits, labelled S.sub.0 through S.sub.L. The multivalued to binary converter 48 receives the multivalued word S and converts it to the binary word B having M+1 digits, labelled B.sub.0 through B.sub.M. (A converter from binary base-2 to multivalued base-2 is not necessary because a multivalued processor may accept a conventional binary word as input without modification.) An efficient implementation of a multivalued to binary converter 48 which does not mitigate the performance benefits of multivalued logic processors is highly desired.

It has been discovered that the operations necessary to convert multivalued words to binary words can be realized very efficiently by circuits which make use of the negative differential resistance exhibited by resonant tunneling devices.

Preferred embodiment

The block diagram of the preferred embodiment of a positive digit range-4 base-2 to binary converter is shown in FIG. 3. The input is a positive digit range-4 base-2 word S which is the output word of the positive digit range-4 base-2 adder of FIG. 2, consisting of the digits S.sub.0 through S.sub.4, where S.sub.0 is the least significant digit. In general, the most significant and least significant digits of S are binary (i.e., they may only take on values 0 or 1) due to the design of the adder. Similarly, the next-most significant and next-least significant digits of S may only take on the values 0, 1, and 2. The preferred embodiment multivalued to binary converter, described hereinbelow, operates on such input words.

In FIG. 3 the input word S is shown to be 5 digits wide, although the converter can obviously be extended to operate on input words of arbitrary width. Digits are decomposed by range-4 base-2 to binary converters 50. The output of each converter 50 is a two digit binary word which has the same value as the multivalued input digit (the carry digit C is the most significant binary digit, W is the least significant). The C and W outputs from adjoining converters 50 are summed by summation circuits 52, which produce interim range-3 digits. These interim range-3 digits are in turn decomposed by additional range-4 base-2 to binary converters 50. As shown in FIG. 3, each decomposition stage 53 is a set of range-4 base-2 to binary converters and the associated summation circuits. A decomposition stage operates on an range-4 base-2 word which is W digits wide and produces a W-1 digit wide range-4

base-2 word and one binary bit (the W output of the least significant converter of the decomposition stage is necessarily a binary output digit). Generally, L decomposition stages are required for an input word which is L+1 digits wide.

The preferred embodiment of the range-4 base-2 to binary converter 50 is shown in FIG. 4. The circuit comprises two multi-level folding circuits 54 connected by a voltage divider (the resistors labeled R). Each multi-level folding circuit comprises an active load 62 and a multiple negative differential transconductance device, which preferably is a multiple peak resonant tunneling transistor 56. In the preferred embodiment, the multi-peak resonant tunneling transistor 56 is the combination of a switching transistor 58 and a multiple-peak resonant tunneling diode 60 integrated into the transistor source, or, alternatively, a discrete transistor with an M-RTD or multiple single peak RTDs connected to the source. The input voltage to the second multi-level folding circuit is one-half the input voltage S, due to the voltage divider (resistors R).

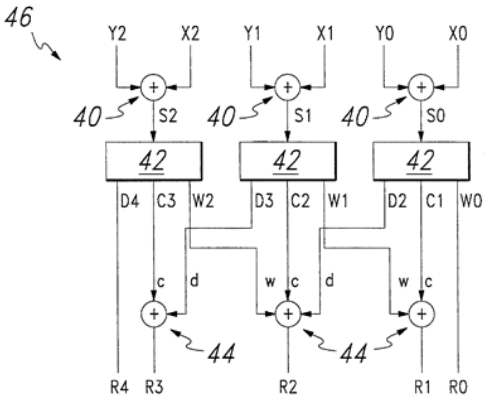

Fig. 1

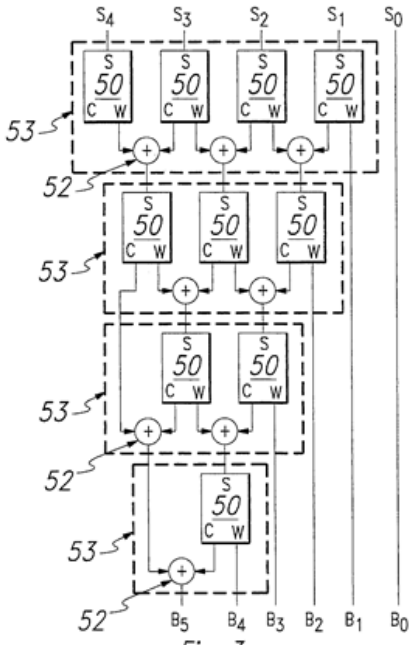

Fig. 3

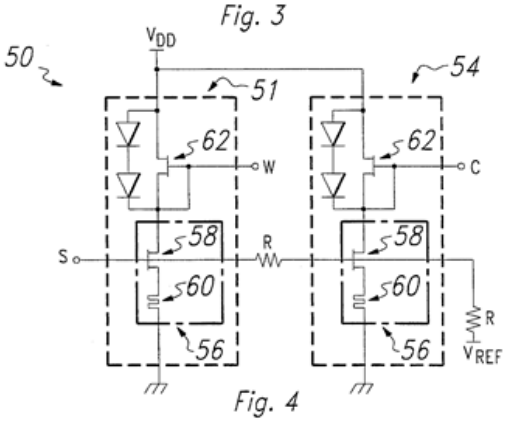

Fig. 4