



Inventing the Future – The Role of Utility Models and Patents in Leveraging Technical Innovation

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**Source: The Enforcement of Intellectual Property Rights: A Case Book, WIPO
Inventing the Future, An Introduction to Patents for SMEs, WIPO
European Patent Academy, www.epo.org**

Patents

Invention - Patent



■ Invention:

- a product or process, which is
- novel,
- involves an inventive step (non-obvious), and
- is industrially applicable (useful).



■ Patent:

It consists of a set of exclusive rights granted by a sovereign state to an inventor or their assignee for a limited period of time in exchange for the public disclosure of an invention.

- Territorial right
- Protection for 20 years from the filing date
- Exclusive right to prevent others from making, using, selling or distributing the invention

Why should you consider patenting

- **Strong market position and competitive advantage.**
- **Higher profit or returns on investment.**
- **Additional income from licensing or assigning the patent.**
- **Access to technology through cross-licensing.**
- **Access to new markets.**
- **Diminished risks of infringement.**
- **Enhanced ability to obtain grants and/or raise funds at a reasonable rate of interest.**
- **A powerful tool to take action against imitators and free riders.**
- **Positive image for your enterprise.**

Is it wise to apply for patent protection

- **Are there potential licensees or investors who will be willing to help to take the invention to market?**
- **Is it easy to “reverse engineer” your invention from your product or “design around” it?**
- **Do the expected profits from an exclusive position in the market justify the costs of patenting?**
- **Will it be easy to identify violation of the patent rights and are you ready to invest time and financial resources for enforcing your patents?**

Patent vs. Trade Secret: Advantages

- **Trade secrets involve no registration costs**
- **Trade secret protection does not require disclosure or registration with a government office and the invention is not published**
- **Trade secret protection is not limited in time**
- **Trade secrets have immediate effect**

Patent vs. Trade Secret: Disadvantages

- **If the secret is embodied in an innovative product, others may be able to “reverse engineer” it, discover the secret and, thereafter, be entitled to use it**
- **Trade secret protection is effective only against improper acquisition, use or disclosure of the confidential information**
- **If a secret is publicly disclosed, then anyone who obtains access will be free to use it**
- **A trade secret is difficult to enforce, as the level of protection is considerably weaker than for patents**
- **A trade secret may be patented by others who may independently develop the same invention by legitimate means**

What can be patented

- **Consists of patentable subject matter**
- **Is new (novelty requirement)**
- **Involves an inventive step (non-obviousness requirement)**
- **Is capable of Industrial application (utility requirement)**
- **Is disclosed in a clear and complete manner in the application (disclosure requirement)**

Patentable subject matter

- **Examples of some of the areas that may be excluded from patentability**
- **Discoveries and scientific theories**
- **Aesthetic creations**
- **Mere discoveries of substances as they naturally occur in the world**
- **Inventions that may affect public order, good morals or public health**
- **Diagnostic, therapeutic and surgical methods of treatment for humans or animals**

New or Novel

- **An invention is new or novel if it does not form part of the prior art.**
- **Prior art: all the relevant technical knowledge available to the public anywhere in the world prior to the first filing date of the relevant patent application**
- **Prior art definition: any information disclosed to the public anywhere in the world in written form, by oral communication, by display or through public use**
- **Acts that could destroy the novelty: the publication of the invention in a scientific journal, its presentation in a conference, its use in commerce, its display in a company's catalogue**

Grace Period

- **The legislation of some countries provide “grace period” of 6 or 12 months, from the moment an invention was disclosed by the inventor or the applicant until the application is filed, in which the invention does not lose its patentability because of such disclosure.**

Inventive step

- **When taking into account the prior art, the invention would not have been obvious to a person skilled in the particular field of technology.**
- **Ensure patents are not granted to developments that a person with ordinary skill in the field could easily deduce from what already exist.**
- **Example: mere change of size, making a product portable, the reversal of parts, the change of materials, mere substitution by an equivalent part of function**

Capable of industrial application / Disclosure requirement

- **An invention must be useful and provide practical benefit.**
- **A patent application must disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the specific field.**

How to get a Patent

Where should you start

- **Perform a prior art search**

- **The importance of searching patent databases**
 - **The R&D activities of current and future competitors**
 - **Current trends in a given field of technology**
 - **Technology for licensing**
 - **Potential suppliers, business partners or sources of researchers**
 - **Relevant patents of others to ensure that your products do not infringe them**
 - **Relevant patents that have expired and technology that has come into the public domain**
 - **Possible new developments based on existing technologies**

How to apply for patent protection

- **Patent application has to be prepared and submitted to the relevant national or regional patent office.**

- **Patent application**
 - full description of the invention
 - patent claims that determine the scope of the patent
 - drawings
 - abstract

Structure of a patent application

■ Request

- title of invention, date of filing, priority date, name and address of the applicant and inventor

■ Description

- must describe the invention in a sufficient detail so that anyone skilled in the same technical field can reconstruct and practice the invention from the description without putting in further inventive effort

■ Claims

- determine the scope of protection of a patent
- In patent litigation the claim is generally the first step in determining whether the patent has been infringed.

■ Drawings

■ Abstract

Processing an application

- **Filing of Patent Application**
- **Formal Examination**
- **Publication of Application**
- **Search and Substantive Examination**
- **Grant and Publication**
- **Opposition Proceedings**

How much does it cost to patent an invention

- **Prior art search**
- **Official filing fees**
- **Patent agent/attorney**
- **Maintenance or renewal fees**
- **Patent abroad: relevant official filing fees, translation costs, patent agents**

Do you need a patent agent to file a patent application?

- **Legal or technical assistance is generally not mandatory it is strongly recommended**
- **Making a prior art search in order to identify any prior art that renders your invention unpatentable**
- **Writing the claims and full description of the invention**
- **Corresponding with the national or regional patent office especially during the substantive examination of the patent application**
- **Making the necessary amendments to the application requested by the patent office**

Patenting abroad

Why apply for patent abroad?

When should you apply for patent protection abroad?

- **Territorial rights:** If you are not been granted a patent with effect in a given country, enabling anybody else to make, use, import or sell your invention in that country.
- **Priority date:** the date of your first application for a given invention
- **Any subsequent applications in other countries filed within 12 months will benefit from the earlier application and will have priority over other applications for the same invention filed by others after the priority date.**

Where should you protect your invention?

- **Where is the patented product likely to be commercialized?**
- **Which are the main markets for similar products?**
- **What are the costs involved in patenting in each target market and what is my budget?**
- **Where are the main competitors based?**
- **Where will the product be manufactured?**
- **How difficult will it be to enforce a patent in a given country?**

How do you apply for patent protection abroad?

■ The national route

- apply to the national patent office of each country of interest
- by filing a patent application in the required language and paying the required fees.

■ The regional route

- when a number of countries are members of a regional patent system, use this route
- example of the regional patent office: the European Patent Office

■ The International route: the Patent Cooperation Treaty

- By filing one international application, you may seek protection in the member countries of PCT

Commercializing patented technology

To take a patented invention to market

- **Commercializing the patented invention directly**

- **Selling the patented to someone else**
 - **assigning patent, it will permanently transfer ownership**
 - **receive an agreed-upon payment once, get the value immediately**

- **Licensing the patent to others**
 - **obtain the benefit of royalties for the remainder of the life of the patent**

- **Establishing a joint venture or other strategic alliance with others having complementary assets**

Licensing 1

- **Authorizing others to commercialize patented invention through a licensing agreement will enable you to obtain an additional source of revenue**
- **Licensing is useful if the company that owns the invention is not in a position to make the product or in sufficient quantity to meet a given market need, or to cover a given geographical area.**
- **Lump-sum payment, recurring royalties, combination of both**
- **Exclusive license: a single licensee has right, even the patent owner can not use the patent**
- **Sole license: a single licensee, patent owner have right to use the patent**
- **Non-exclusive license: several licensees and the patent owner have right to use the patented technology**

Licensing 2

- **Exclusive licensing:** when the product needs one company to invest heavily to commercialize the product (for example, a pharmaceutical product that requires investments in performing clinical trials)
- **Non-exclusive licensing:** If a technology can become a standard that is needed by all players in a specific market to perform their business, widely held license would be the most advantageous
- **Cross-licensing:** where a number of patents covering a wide range of complementary inventions are held by two or more competitors
 - Such competing companies seek to ensure their freedom to operate by obtaining the right to use patents owned by their competitors while providing the right to use their own patents to the competitors

Enforcing patents

Why should you enforce patent rights

- **The exclusive rights granted by a patent give the patent owner the opportunity to prevent or stop competitors from making products and using processes that infringe on its rights and seek compensation suffered.**
- **Enforcing your rights when you believe that your patented invention is being copied may be crucial to maintaining your competitive edge, market share and profitability.**
- **As a patent owner, you are responsible for monitoring the use of your invention in the market place, identifying any infringers and deciding whether, how and when to take action against them.**

What should you do if patent is being used by others without authorization

- **As a first step, you need to collect information about infringement parties and their use of the infringing product or process.**
- **In some cases, when infringement is detected, companies choose to send a letter (“cease and desist letter”) informing the alleged infringer of a possible conflict between your rights and the other company’s business activity.**
- **Sometimes, surprise is the best tactic in order to avoid giving the infringer time to hide or destroy evidence.**
 - **It might be appropriate to go to court without giving notice to the infringer and to ask for an “interim injunction” in order to surprise the infringer by a raid, at his business premises.**

What should you do if patent is being used by others without authorization

- Where the company decides to initiate civil proceedings, the courts generally provide a wide range of civil remedies to compensate aggrieved owners of patent rights.
- In order to prevent the importation of goods infringing patents, measures at the international borders may be available to patent holders in some countries through the national customs authorities.

The Function of the Claims

- **All essential integers must be taken before there can be an infringement of the claim**

- **AZUKO PTY LTD v. OLD DIGGER PTY LTD [2001] FCA 1079 [Australia]**
 - **Infringement requires that all integers of the claim be taken, with the exception of the substitution of a mechanical equivalent of an inessential integer.**

 - **Populin v. HB Nominees (1982) 41 ALR 471 held that “the patentee must show that the defendant has taken each and every one of the essential integers of the patentee’s claim. Therefore if, on its true construction, the claim in a patent claims a particular combination of integers and the alleged infringer of it omits one of them he will escape liability.”**

Interpretation and Infringement

- **The need for interpretation: In order to determine the scope of the claims, it is necessary to interpret them.**

- **WHIRLPOOL CORP v. CAMCO INC 2000 SCC 67 [Canada]**
 - **A patent must not of course be construed with an eye on the allegedly infringing device in respect of infringement or with an eye to the prior art in respect of validity to avoid its effect.**
 - **Claims construction cannot be allowed to become a results-oriented interpretation.**

Infringement Determination in US

- 1. Determine the scope of the claims**
- 2. Compare the elements of the claim to the composition or method accused of infringement using the “all elements” rule: every element required by the claim must be present in the accused composition or method either literally or**
- 3. Under Doctrine of Equivalents**
- 4. Prosecution History Estoppel**

Claim Construction

- 1. Words of a claim are generally given their ordinary and customary meaning.**
- 2. It is necessary to review the specification to determine whether the inventor has used any terms in a manner inconsistent with their ordinary meaning. The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication.**
- 3. Prosecution History**

Infringement Example

■ The claim

- An apparatus, comprising : A, B and C.

■ The infringing product contains

- A, B and C : Infringement
- A and B : No infringement
- A, B and C' : Apply Doctrine of Equivalents

Doctrine of Equivalents in US

- **The doctrine of equivalents is an alternative theory of infringement available to a patentee. The Doctrine may expand a patent claim beyond its literal scope of coverage to encompass an accused product that does not literally infringe.**
- **The doctrine is based on the idea that an infringer should not be permitted to escape liability by merely changing insubstantial details of an invention while retaining the essential identity of invention.**
- **The Triple Identity Test : if it performs substantially the same function in substantially the same way to obtain same result.**

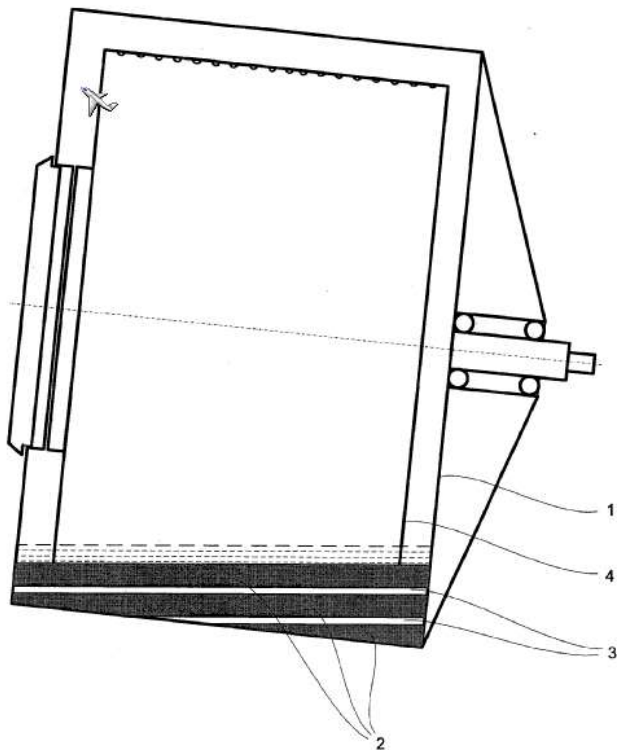
Prosecution History Estoppel in US

- **Prosecution History Estoppel is a limitation on the doctrine of equivalents. It may bar application of the doctrine when a claim is narrowed for any reason related to patentability.**
- **Where the original application once included a potential equivalent, but the patentee narrowed the claim to obtain the patent, the patentee generally cannot assert the surrendered equivalent in an infringement suit.**
- **A patentee cannot recapture what it gave up to succeed in obtaining a patent from the Patent Office.**

Patent Examination Sample

The invention

A **heating element** for a washing machine which is cheap and compact and helps to reduce water consumption.



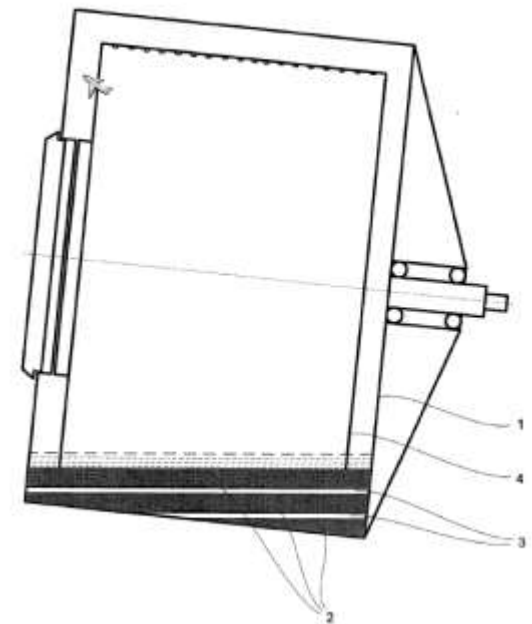
The heating element is a foil heating element at the bottom of the tub of a washing machine.

The invention

A **heating element** for a washing machine which is cheap and compact and helps to reduce water consumption.

How can you protect it from imitation?

- "cheap", "helps to reduce ..."
→ too vague and subjective
- "compact"
= technical function → patent



How to patent this invention: claim it!

Patent Claim:

"A heating element for a washing machine which is compact ..."

No, this is stating the technical problem. Problems cannot be patented – only specific solutions.

What are the **technical features** that solve the problem and make the heating element compact?

Patent Claim: "A washing machine with a heating element for heating **water** inside the tub of the washing machine wherein the heating element is arranged in and adapted in its shape to **the bottom of the tub.**"

You don't want anyone circumventing the patent by heating something other than water or by arranging the heating element at a different point not exactly at the bottom of the tub.


How to patent this invention: claim it!

Patent claim: "A washing machine with a heating element for heating **a medium** inside the tub of the washing machine, wherein the heating element is arranged in and adapted in its shape to **the tub**."

A prior art search will show whether the invention
– **as claimed** – is actually **new**.

Result of the prior art search

The prior art search found a document that shows a similar heating element for a washing machine.


 European Patent Office
 European Patent Office
 Office européen des brevets

Publication number: **0 352 499 A2**

EUROPEAN PATENT APPLICATION

Application number: 87118654 Int. Cl.: D06F 39/04, D06F 58/25

Date of filing: 05.06.87

Priority: 28.07.86 IT 487588

Date of publication of application: 23.07.88 Bulletin 8/88

Designated Contracting States: DE FR GB IT NL SE

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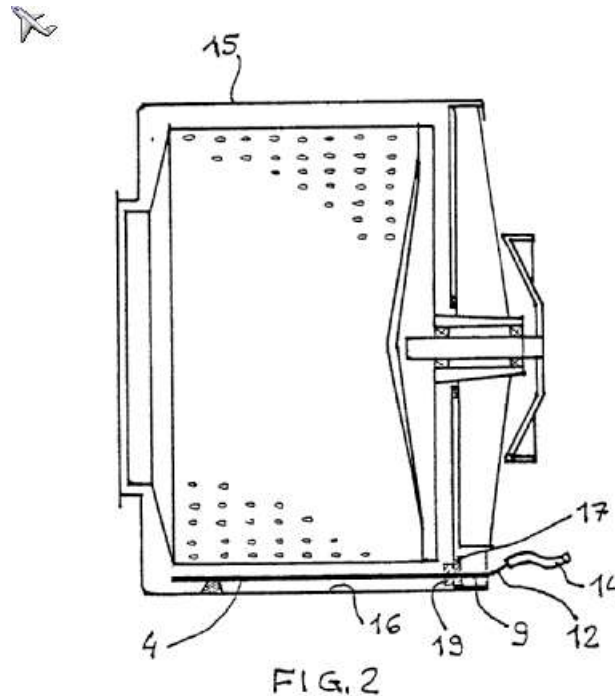
A heating device for washing and/or drying machines for laundry.

A heating device for washing and/or drying machines for laundry, comprising a parallelepiped plate (1) made of electrically insulating material having applied to one surface thereof, by the ink screen process or similar procedure, at least one electrical resistor (2) based on electrically conductive material powder's mixed with glass (3), the resistor having a wavy or other pattern.
 The plate (1) is placed inside the vessel of the washing or drying machine for laundry and the corresponding terminals (4, 7) of the resistor (2) are then connected with the power supply network of the machine.

One thin vitreous or vitreous heat-insulating varnish of the plate (1) is applied to effect rapid heating of the latter by the electric energy of all of the resistors in operation.

FIG. 1

EP 0 352 499 A2



"... curved plate of electrically insulating material with electrically conductive material applied to at least one surface thereof ..."

Comparison of the two inventions

The invention
as claimed

"A washing machine with a **heating element** for heating a medium inside the tub of the washing machine wherein the heating element **is arranged in** and adapted in its shape to the tub."

"... a foil heating element ... which is fitted to and adapted in its shape to the tub ..."

EP 0 352 499 A2

"The heating device ... is mounted in correspondence with the bottom wall ... of the vessel, and expediently spaced therefrom."

- New ("foil heating element" and "fitted to the tub" are not disclosed in EP...)
- Inventive step (technical effect: lower water level in the tub is possible)

Claim to protect the invention

Claim to be filed:

"A washing machine with **a foil heating element** for heating a medium inside the tub of the washing machine, wherein the heating element **is fitted to** and adapted in its shape to the tub."

Use of dependent claims to improve protection

An independent (broader) claim helps prevent the patent from being circumvented.

Dependent (more specific) claims are tailored to fit exactly to potential infringing products.

Main claim

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graph TD; A[Main claim] --- B[Specific claim A]; A --- C[Specific claim B];
```

Specific claim A

Specific claim B

Application filed with the EPO

Claim 1:

A washing machine with **a foil heating element** for heating a medium inside the tub of the washing machine, wherein the heating element **is fitted to** and adapted in its shape to the tub.

Claim 2: The washing machine of claim 1, characterised in that the foil heating element is glued to the inside of the tub.

Claim 3: The washing machine of claim 1, characterised in that the foil heating element is an integral constituent of the tub and has been formed in the tub during injection moulding thereof.

The EPO will perform its own prior art search and then consider whether the invention **AS CLAIMED** is new and non-obvious.

Additional prior art found by the EPO

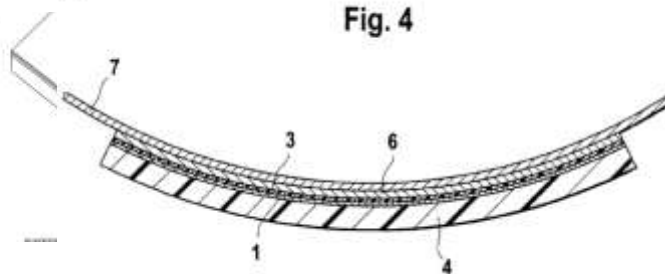
"Heating device for a household appliance"



Die folgenden Angaben sind den vom Anmel-

- 54 Heizeinrichtung für ein Haushaltsgerät
- 51 Bei einer Heizeinrichtung für ein Haushaltsgerät ist zwischen einer zu beheizenden Fläche 2 des Geräts und einer elektrisch leitenden Heizfolie 1 als elektrische Isolation eine keramikgefüllte Polymerschicht 3 angeordnet.

Fig. 4



[0022] Beim Ausführungsbeispiel nach Fig. 4 weist die Heizeinrichtung zusätzlich ein wärmeleitendes, metallisches Formteil 6, beispielsweise Aluminium-Formteil, auf, das der zu beheizenden Fläche, im Beispielsfall dem Bottich 7 einer Waschmaschine, angepasst ist.

[0023] Zwischen dem Isolations-Formkörper 4 und dem wärmeleitenden Formteil 6 liegen die Heizfolie 1 und die Polymerschicht 3, wobei die Polymerschicht 3 zwischen der Heizfolie 1 und dem wärmeleitenden Formteil 6 vorgesehen ist. Durch die Klebeeigenschaften der Polymerschicht 3 sind das Formteil 6 und die Heizfolie 1 miteinander verklebt. Auch der Isolations-Formkörper 4 kann mit der Heizfolie 1 verklebt sein. Er kann jedoch auch – ähnlich wie bei Fig. 3 – an die Heizfolie 1 gedrückt sein.

DE 100 25 539 A1:

"Heating device ... comprising a foil heating element (1) ... adapted and attached to a tub (7) of a washing machine ..."

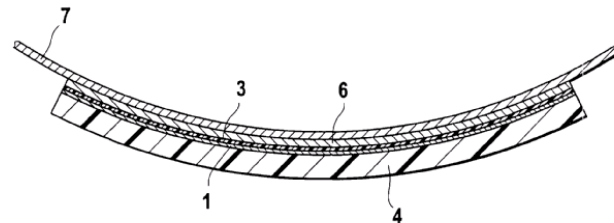
The opinion of the EPO

DE 100 25 539 A1

Applicant's claim:

"A washing machine with a **foil heating element** for heating a medium inside the tub of the washing machine, wherein the **heating element is fitted to and adapted in its shape to the tub.**"

Heating device ... comprising a foil heating element (1) ... adapted and attached to a tub (7) of a washing machine ...



This is already shown in
DE 100 25 539 A1

EPO response:

Please amend your claims if you want your invention protected!

Further analysis

Did the EPO overlook any important features of the invention?

Applicant's reply:

Amendments to the application, explanation of the relationship between the invention and the prior art

How can the claims be amended to reflect the invention in such a way that it is new (considering all the prior art)?

Comparison of the invention with the prior art

	EP 0 352 499 A2	DE 100 25 539 A1
Technical features of the invention		
Adapted in its shape to the tub	✓	✓
Foil heating element	No	✓
Glued to outside of tub	No	✓
During injection moulding	No	No
Advantages/technical result		
Compact + excellent heat transfer + easy assembly with fewer parts	No	No

Result of the analysis

It is known in the prior art to fit and adapt a foil heating element to the bottom of the tub of a washing machine.

However, the present invention suggests that the foil heating element can be formed in the tub during the injection moulding of the tub.

This particular way of fitting the foil heating element to the tub is **not known** and produces **new, unique benefits**.

There is no hint in the prior art to take a foil heating element and to form it in a tub during injection moulding of the tub.

→ The inventive step requirement is fulfilled!

The claim must be changed to distinguish it from DE 100 25 539 A1.

New claim

"A washing machine with a foil heating element for heating a medium inside the tub of the washing machine, wherein the heating element is fitted to and adapted in its shape to the tub, characterised in that the foil heating element is an integral constituent of the tub and has been formed in the tub during injection moulding thereof."

The original description filed with the EPO supports the amendments to the claims

The **object of the invention** is to provide an electrical heating device for a domestic appliance ... cheap ... easy to assemble ... requires less space ... offers the possibility of reducing energy and water consumption.

... the foil heating element allows a very compact arrangement ... at the same time ... an optimal heat transfer ...

... the foil heating element is integrated during the production of the tub, for instance during the injection moulding ... requires only a few production steps; it does not require complex tools, either ...

Supports inventive step: different technical result

Claim 3: The washing machine of claim 1, characterised in that the foil heating element is an integral constituent of the tub and has been formed in the tub during injection moulding thereof.

Difference to prior art

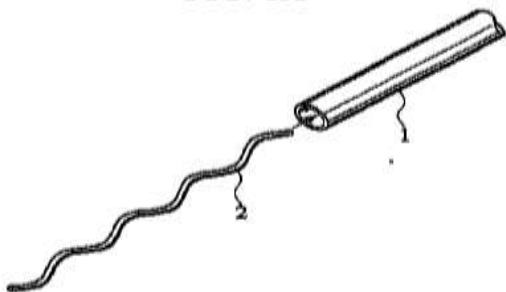
The patent is finally granted

Response from EPO: granted!

(19)	 <div style="display: inline-block; border: 1px solid black; padding: 2px; font-size: 8px;"> Europäisches Patentamt European Patent Office Office européen des brevets </div>	
	(11)	EP 1 342 827 B1
(12)	EUROPÄISCHE PATENTSCHRIFT	
(45)	Veröffentlichungstag und Bekanntmachung des Hinweises auf die Patenterteilung: 09.04.2008 Patentblatt 2008/15	(51) Int Cl.: D06F 39/04^(2006.01) A47L 15/42^(2006.01)
(21)	Anmeldenummer: 03005120.5	
(22)	Anmeldetag: 07.03.2003	
(54)	Elektrisch beheizbares Haushaltgerät Electrically heatable household appliance Appareil ménager chauffé électriquement	
(84)	Benannte Vertragsstaaten: AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR	(72) Erfinder: <ul style="list-style-type: none"> • Bolduan, Edwin 13629 Berlin (DE) • Stolze, Andreas, Dr. 14612 Falkensee (DE) • Wiemer, Horst 14532 Kleinmachnow (DE)
(30)	Priorität: 07.03.2002 DE 10209975	
(43)	Veröffentlichungstag der Anmeldung: 10.09.2003 Patentblatt 2003/37	
(73)	Patentinhaber: BSH Bosch und Siemens Hausgeräte GmbH 81739 München (DE)	(56) Entgegenhaltungen: EP-A- 0 352 499 DE-A- 10 025 539 DE-A- 19 935 987 DE-U- 1 823 414 US-A- 5 444 228

The invention

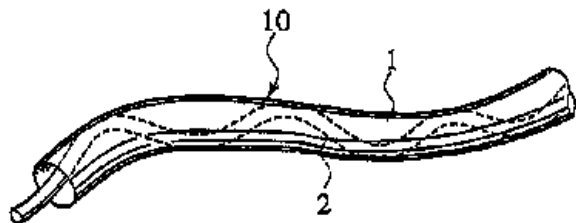
- The invention relates to a double pipe and a method of manufacturing it. The double pipe is preferably employed in a vehicle air conditioner for circulating coolant in dual passages.
- According to the invention an inner pipe 2 is formed in a spiral or wavy configuration and is securely held by an inner circumferential face of an outer pipe 1.
- The technical effects of the invention are twofold:
 - ease of manufacturing the double pipe
 - suppression of chattering noise due to vibrations.



The invention

A first method of manufacturing the double pipe 10 comprises the following steps:

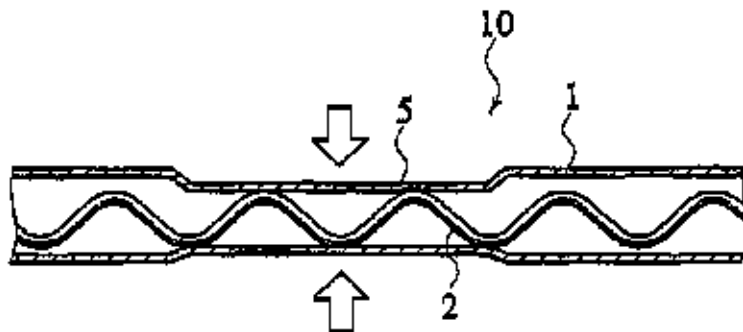
1. Spirally forming an independent inner pipe 2, the outer diameter of the spiral being equal to or slightly smaller than the inner diameter of an outer pipe 1.
2. Inserting the spiral inner pipe 2 into the outer pipe 1.
3. Curving the outer pipe 1 into a predetermined shape according to a piping layout as shown in Fig. 1B, so that each curved part of the outer pipe 1 presses the inner pipe 2 against an inner wall of the outer pipe.



The invention

A second method of manufacturing the double pipe 10 comprises the following steps:

1. Spirally forming an independent inner pipe 2, the outer diameter of the spiral being equal to or slightly smaller than the inner diameter of an outer pipe 1.
2. Inserting the spiral inner pipe 2 into the outer pipe 1.
3. Crushing a part of the wall of the outer pipe 1 to form a flattened cross-section 5, thus fixing the outer pipe 1 and inner pipe 2 to each other.



How to patent this invention: claim it!

1. Try: "A double pipe that is easy to manufacture."

Making a double pipe "easy to manufacture" is a technical problem. Problems cannot be patented - only solutions.

2. Try: "An air-conditioner double pipe comprising an outer pipe and an inner pipe arranged inside the outer pipe."

You don't want anyone circumventing the patent by employing the double pipe in a technical field different from air conditioners.


3. Try: "A double pipe comprising an outer pipe and an inner pipe, the inner pipe being securely fixed within the outer pipe."


This patent claim is as broad as possible and adequately defines the invention for the time being.

A prior art search will show whether the invention
– **as claimed** – is actually **new**.

Result of the prior art search

The prior art search revealed European patent application No. 1 138 997 A, which discloses a similar invention.

(18)  **Europäisches Patentamt**
European Patent Office
Office européen des brevets

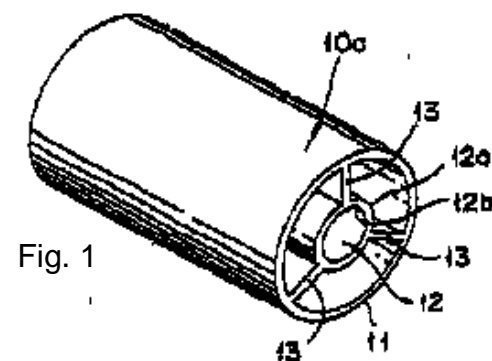
(11)  **EP 1 138 997 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication: **04.10.2001** Bulletin 2001/40 (51) Int. Cl. 7: **F16L 9/18, F16L 39/00**

(21) Application number: **01107256.4**

(22) Date of filing: **23.03.2001**

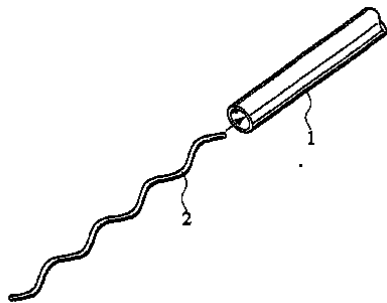


As shown in Fig. 1, a duplex pipe 10 to be used as a work is formed in such a manner that an outer pipe 11, an inner pipe 12 and connecting ribs 13 for connecting together the outer and inner pipes 11 and 12 are moulded of aluminium material by extrusion working or by drawing working into an integrated body. Preferably, the duplex pipe 10 is used as a refrigerant pipe in the cooling cycle of an air conditioner for a car.

Comparison of the two inventions

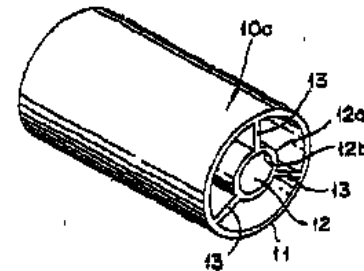
The invention
as claimed

"A double pipe comprising an outer pipe and an inner pipe, the inner pipe being securely fixed within the outer pipe."



EP 1 138 997 A as prior art

"A duplex pipe 10 ... [with] an outer pipe 11, an inner pipe 12 and connecting ribs 13 for connecting together the outer and inner pipes 11 and 12."



Since all of the claimed features are anticipated by the prior art, the claimed subject-matter is not new!

Delimiting the invention over the prior art

In order to delimit the invention over the prior art you have to add additional features that restrict the scope of protection.

For example, the claim could be re-phrased in the following way:

"A double pipe comprising:

an outer pipe; and

an inner pipe having a spiral or wavy shape configured to be held by an inner circumferential face of the outer pipe."

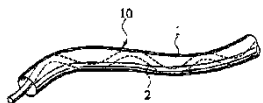
This claim is certainly new over EP 1 139 997 A because the inner tube disclosed therein is straight and does not have a spiral or wavy shape.

The technical effect of the spiral or wavy inner tube can be seen in that the inner pipe can be securely fixed within the outer tube without having to provide radially extending ribs. This facilitates the manufacturing process of the double pipe.

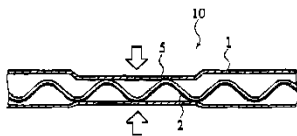
Claims filed with the European Patent Office

Claim 1:

"A double pipe comprising:
an outer pipe; and
an inner pipe having a spiral or wavy shape configured to be held by an inner circumferential face of the outer pipe."



Claim 2: "A double pipe according to claim 1, characterised in that the diameter of the spiral or an amplitude of the wavy shape of the inner pipe is equal to or less than an inner diameter of the undeformed outer pipe; and the outer pipe is curved to hold the inner pipe at each curved part."



Claim 3: "A double pipe according to claim 1, characterised in that the diameter of the spiral or an amplitude of the wavy shape of the inner pipe is equal to or less than an inner diameter of the undeformed outer pipe; and the outer pipe has locally crushed parts extending inwardly in a diametrical direction to hold the inner pipe at each crushed part."

Introductory part of the description as filed

The present invention relates to a double pipe and a method of manufacturing the same. Preferably, the double pipe is used as a refrigerant pipe in the cooling cycle of an air conditioner for a car.

Technical field of the invention

A conventional double pipe is disclosed in EP 1 138 997 A, for example, that arranges connecting ribs between an outer pipe and an inner pipe of the double pipe. The double pipe with the connecting ribs is usually produced by extruding or drawing an aluminium material through dies.

Discussion of prior art

The extruding or drawing process to form the double pipe having the connecting ribs requires complicated metal dies. In addition, the double pipe with the connecting ribs involves a cutting process of the connecting ribs when terminating ends of the double pipe. These necessities increase the manufacturing cost of the double pipe.

Problem arising from prior art

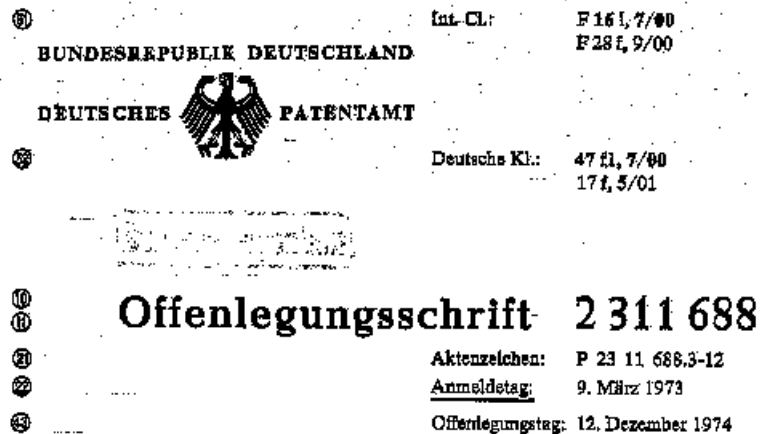
An object of the present invention is to provide a low-cost double pipe which is easy to manufacture.

Objective technical problem

In order to accomplish the object, the present invention provides a double pipe including an outer pipe and an inner pipe that is spirally or wavy formed and is held by an inner circumferential face of the outer pipe.

Solution to the problem

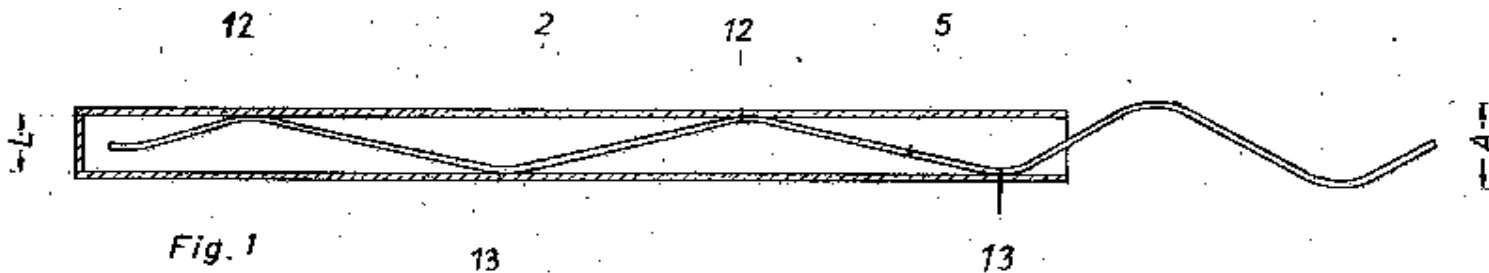
Additional prior art found by the EPO



The EPO found a very relevant piece of prior art.

"Rohr mit einer durch seinen Innenraum geführten, an der Rohrwandung gehaltenen Rohrleitung"

"Pipe with a tube being guided within the lumen of the pipe and being held at the inner pipe wall"



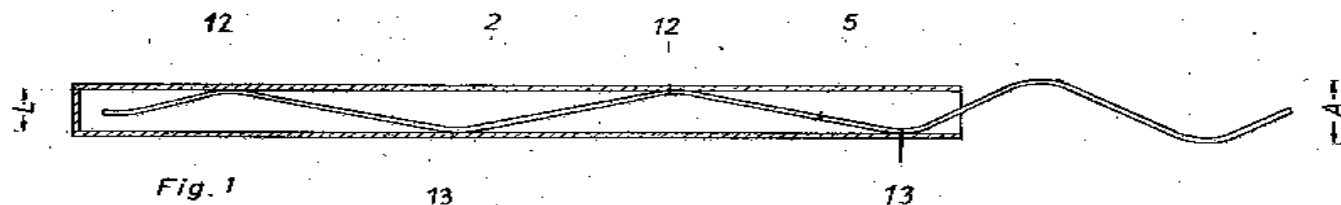
Additional prior art found by the EPO

Claim 1 of DE 2 311 688 translated into English reads as follows:

"Pipe 2 with a tube 5 being guided within the lumen of the pipe 2 and being held at the inner pipe wall ...,

characterised in that the tube 5 is provided with periodic bends along at least a part of its length whose amplitude A is greater than the inner diameter L of the pipe 2,

such that the tube 5 is deformed when being introduced into the pipe 2 and contacts the pipe wall 2 under pressure due to the tube's restoring force."



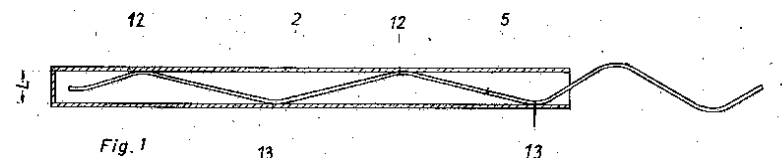
The opinion of the EPO

Applicant's claim:

"A double pipe comprising:
an outer pipe; and
an inner pipe having a spiral or wavy shape configured to be held by an inner circumferential face of the outer pipe."

CLAIM of DE 2 311 688:

"Pipe 2 with a tube 5 being guided within the lumen of the pipe 2 and being held at the inner pipe wall ..., characterised in that the tube 5 is provided with periodic bends along at least a part of its length ..."



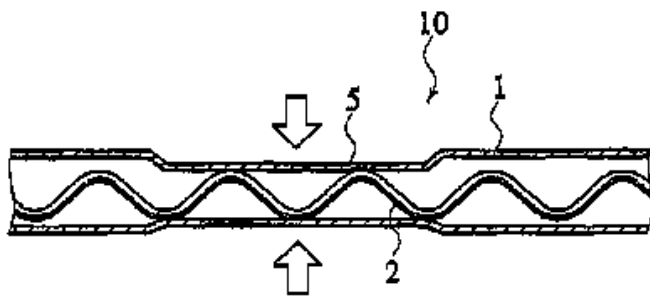
All of the features of the applicant's claim are fully anticipated by the disclosure of DE 2 311 688.

EPO response:

Please amend your claims if you want your invention protected!

Further analysis

In the present case, the applicant was particularly interested in the embodiment according to claim 3 and chose to focus on that.



Comparison of the invention with the prior art

	Technical features of the invention	EP 1 138 997 A	DE 2 311 688
Claim 1	Double pipe with inner and outer pipe	✓	✓
	Inner pipe having a spiral or wavy shape	No	✓
Claim 3	Diameter of the spiral or amplitude of the wavy shape of the inner pipe being equal to or less than an inner diameter of the undeformed outer pipe, the outer pipe having locally crushed parts extending inwardly in a diametrical direction to hold the inner pipe at each crushed part	No	No

Result of the analysis

Document DE 2 311 688 does not show the features of claim 3 as filed.

In particular, the outer tube disclosed in DE 2 311 688 is not provided with any crushed parts.

Furthermore, before the inner pipe is introduced into the outer pipe, the amplitude of the wavy shape of the inner pipe is greater than the inner diameter of the undeformed outer pipe.

The technical effect of these distinguishing features is twofold:

1. Suppression of chattering noise caused by vibrations, thanks to the reliable fixation of the inner pipe within the outer pipe by the crushed parts.
2. Facilitation of the insertion of the spiral or wavy inner pipe into the outer pipe due to the small diameter of the spiral or the small amplitude of the wave, respectively.

Result of the analysis

The problem to be solved by the present invention may therefore be regarded as the provision of a double pipe which is capable of suppressing any chattering noise between an inner pipe and an outer pipe due to vibrations. Furthermore, the double pipe should allow easy manufacturing.

None of the documents cited discloses a solution according to claim 3 or teaches how to combine two or more distinct disclosures to arrive at the claimed invention. Therefore, the subject-matter of claim 3 is inventive.

Result of the analysis

As a result, the applicant filed an amended claim based on a combination of claims 1 and 3 as filed:

"A double pipe comprising:
an outer pipe; and
an inner pipe having a spiral or wavy shape configured to be held by an inner circumferential face of the outer pipe,
characterised in that
the diameter of the spiral or an amplitude of the wavy shape of the inner pipe is equal to or less than an inner diameter of the undeformed outer pipe; and
the outer pipe has locally crushed parts extending inwardly in a diametrical direction to hold the inner pipe at each crushed part."

The applicant also filed an independent claim directed to a method of manufacturing a double pipe corresponding to this product claim.

The original description filed with the EPO supports the amendments to the claims

"Accordingly, unlike the conventional double pipe employing connecting ribs, the double pipe 10 needs no complicated extrusion dies. Without the connecting ribs, the double pipe 10 involves a **simple termination process, to thereby reduce manufacturing cost.**" [0016]

"When inserting the spiral inner pipe 2 into the outer pipe 1, there is a gap between the outer pipe 1 and the inner pipe 2, and therefore **no excessive force is needed for the insertion of the inner pipe.**" [0018]

"On the other hand, any one of the embodiments firmly fixes the outer and inner pipes of a double pipe to each other to **suppress a chattering noise** without restricting the shape of each bend of the double pipe."
[0043]

The patent is finally granted on the basis of the amended claim

(19)	 <p>Europäisches Patentamt European Patent Office Office européen des brevets</p>	 (11) EP 1 447 606 B1
(12)	EUROPEAN PATENT SPECIFICATION	
(45)	Date of publication and mention of the grant of the patent: 30.08.2006 Bulletin 2006/35	(51) Int. Cl.: <i>F16L 7/00</i> (2006.01) <i>F28D 7/02</i> (2006.01) <i>F16L 9/19</i> (2006.01)
(21)	Application number: 04003546.1	
(22)	Date of filing: 17.02.2004	
(54)	Double pipe and method of manufacturing the double pipe Doppelrohr und Verfahren zu dessen Herstellung Tuyau double et procédé de production associé	

Claims

1. A double pipe comprising:

- an outer pipe (1); and
- an inner pipe (2) having a spiral or wavy shape configured to be held by an inner circumferential face of the outer pipe (1),

characterized in that

a diameter of the spiral or an amplitude of the wavy shape of the inner pipe (2) is equal to or less than an inner diameter (D2) of the undeformed outer pipe (1); and
the outer pipe (1) has locally crushed parts (5) extending inwardly in a diametrical direction to hold the inner pipe (2) at each crushed part (5).

Thank You for Your Attention!

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