

(19)



(11)

**EP 2 723 929 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:  
**25.11.2015 Bulletin 2015/48**

(51) Int Cl.:  
**D06F 37/20<sup>(2006.01)</sup> D06F 37/22<sup>(2006.01)</sup>**

(21) Application number: **12729977.4**

(86) International application number:  
**PCT/EP2012/062334**

(22) Date of filing: **26.06.2012**

(87) International publication number:  
**WO 2013/000899 (03.01.2013 Gazette 2013/01)**

**(54) A WASHER/DRYER COMPRISING SHOCK ABSORBERS**

WASCHMASCHINE/TROCKNER MIT STOSSDÄMPFERN

MACHINE À LAVER SÉCHANTE COMPRENANT DES AMORTISSEURS DE CHOC

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

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(30) Priority: **27.06.2011 TR 201106330**

(43) Date of publication of application:  
**30.04.2014 Bulletin 2014/18**

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**EP 2 723 929 B1**

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## Description

**[0001]** The present invention relates to a washer/dryer comprising shock absorbers that damps the vibrational movements of the tub.

**[0002]** In washers/dryers, particularly in washing machines, the tub, wherein the drum rotates with the laundry loaded therein, makes oscillatory and vibrational movements depending on the load conditions and the number of revolutions per minute during operation. The tub is generally attached to the casing with the shock absorbers from the lower part and while the shock absorbers function to damp the vibrations of the tub, thereby decreasing the transfer to the body also behave like an energy transmission pathway that transfer the vibrations to the body and this causes generation of noise. The shock absorbers prevent the tub from bumping to the body by damping the high amplitude vibrations when the washing machine passes from the washing step to the spin drying step. When the spin drying step is reached, the amplitude of vibration decreases and if single effect shock absorber is being used, the shock absorber, that is adjusted for frictional forces with respect to high amplitude vibrations, generally transfer the low amplitude vibrations to the body without damping. As a result of gradually increasing consumer demands for damping both high and low amplitude vibrations and to wash laundry with greater capacity, the utilization of shock absorbers that damps more energy is required. In order to meet this requirement, dual effect, electronic or hydraulic shock absorbers are used however the cost of these is high. Various types of elastic elements are used in the tub and/or body connections of shock absorbers in order to achieve a dual effect shock absorber by increasing the damping effect of simple structured, for example, single effect dry friction shock absorbers.

**[0003]** A washer/dryer with the features of the preamble of claim 1 is known from DE 10 2005 008239A1.

**[0004]** In the United States Patent Application No. US20040025545, the damper that attenuates the movements of the tub in a washing machine is connected to the body with an elastic member. The vibrational amplitude of the elastic member is controlled by upper and lower limiters.

**[0005]** In the European Patent Application No. EP1111116, the damper is connected to both the washing machine body and the tub by elastic elements and the oscillation movements that force the damper to bend are damped by these elastic elements.

**[0006]** In the European Patent Application No. EP0501102, the damper is connected to the washing machine body and the tub with an elastic and locking structure. The bearing bolt of the damper is fitted into U or V shaped channels disposed in the bearings located on the main casing and the tub of the washing machine and the bearing shaft is prevented dislodging from the channels by providing a flexible connection with an elastic safety lock.

**[0007]** The aim of the present invention is the realization of a washer/dryer comprising shock absorbers that damps both low and high amplitude vibrational movements of the tub by improving the connection method to the body.

**[0008]** In the washer/dryer realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, the tub, which makes vibrational movements during operation with the effect of the drum wherein the laundry is placed, is connected to the body with the shock absorbers for damping the vibrations. More than one bracket is disposed on the body and the tub that provide the connection of the shock absorber. At least one hole is disposed on each of the bracket and the shock absorber, aligned with one another during assembly. The shock absorber is provided to be secured to the bracket by inserting the pin through the holes. The pin comprises a hollow sleeve and a shaft disposed in this sleeve. During assembly, first the sleeve is inserted through the holes and afterwards the shaft is placed into the sleeve thus providing securing. Aligning the shaft to be mounted easily to the sleeve is provided by a channel that is formed longitudinally on the shaft and a protrusion situated on the inner surface of the sleeve which is seated into the channel.

**[0009]** A stopper is situated at the section of the channel close to the end in the shaft placement direction. While the shaft is placed into the sleeve, the protrusion passes over this stopper, passing to the portion of the channel following the stopper and can no longer move in the opposite direction. Thus, the shaft is provided to be locked into the sleeve.

**[0010]** A ramp is situated in the channel, prior to the protrusion, extending from the base of the channel towards the stopper in order to facilitate passing of the protrusion over the stopper. The protrusion reaches the stopper by moving forward on the ramp and is again seated in the channel after passing over the stopper. Thereafter, the shaft cannot be dislodged from the sleeve without being damaged even if a force is exerted thereon in the opposite direction. Because, the protrusion will prevent movement in the opposite direction by bearing against the stopper. The protrusion is preferably configured in the shape of a detent means in order to easily provide the said movement.

**[0011]** The pin comprises a skirt disposed peripherally at the end of the sleeve wherefrom the shaft is inserted and extending outwards from the sleeve. A flange is located on the shaft, again peripherally, that rests on the skirt when the shaft is placed into the sleeve. Thus, the shaft is prevented from moving any further inside the sleeve after passing over the stopper.

**[0012]** In an embodiment of the present invention, at least one slit is situated on the sleeve so as to enable the sleeve to partially expand when the shaft is pushed thereinto. Thus, the sleeve expands when the shaft is placed thereinto providing the shock absorber to be tightly secured to the brackets.

**[0013]** By means of the present invention, ease of assembly is provided for the pin that is used for the aim of providing the connection between the shock absorber and the body and/or the tub.

**[0014]** The washer/dryer realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the schematic view of a washer/dryer.

Figure 2 - is the partial view of a washer/dryer.

Figure 3 - is the view of detail A in Figure 2.

Figure 4 - is the exploded partial view of the shock absorber and the bracket.

Figure 5 - is the perspective view of a pin before assembly.

Figure 6 - is the perspective view of a pin in the locked position.

Figure 7 - is the perspective view of a sleeve.

Figure 8 - is the perspective view of a shaft.

**[0015]** The elements illustrated in the figures are numbered as follows:

1. Washer/dryer
2. Body
3. Drum
4. Tub
5. Shock absorber
6. Bracket
7. 107. Hole
8. Pin
9. Shaft
10. Sleeve
11. Channel
12. Protrusion
13. Stopper
14. Ramp
15. Skirt
16. Flange
17. Slit
18. Handle

**[0016]** The washer/dryer (1) comprises

- a body (2),
- a drum (3) wherein the laundry is placed,
- a tub (4) that makes vibrational movement during operation with the effect of the drum (3) rotating therein,
- more than one shock absorber (5), supporting the tub (4) from below, providing the tub (4) to be con-

nected to the body (2) and damping the vibrational movements of the tub (4),

- more than one bracket (6) disposed on the body (2) and the tub (4), providing the shock absorber (5) to be connected to the body (2) and the tub (4),
- at least one hole (7, 107) situated on each of the bracket (6) and the shock absorber (5), aligning with each other during assembly and
- a pin (8) having a shaft (9) and a sleeve (10) surrounding the shaft (9), wherein the shaft (9) is placed, which is inserted through the holes (7, 107), providing the shock absorber (5) to be secured to the bracket (6)

**[0017]** (Figure 1, Figure 2, Figure 3 and Figure 4).

**[0018]** The pin (8), furthermore, comprises

- at least one channel (11) located on the shaft (9), opened longitudinally along the shaft (9),
- at least one protrusion (12) situated on the sleeve (10), guiding the movement of the shaft (9) by being seated in the channel (11) while the shaft (9) is placed into the sleeve (10) and
- a stopper (13) located on the channel (11) in the direction the shaft (9) is placed into the sleeve (10), wherefrom the protrusion (12) passes over while the shaft (9) is placed into the sleeve (10) and thus prevents the movement of the shaft (9) in the sleeve (10) in the opposite direction (Figure 5, Figure 6, Figure 7 and Figure 8).

**[0019]** Consequently, the shaft (9) is provided to be easily placed into the sleeve (10) and to be locked in its final position.

**[0020]** When the shock absorber (5) is to be connected to the bracket (6) by means of the pin (8), the sleeve (10) is inserted through the holes (7, 107) by aligning the holes (7, 107) on the shock absorber (5) and the bracket (6). Afterwards, the shaft (9) is placed into the sleeve (10) thus providing securing. When the shaft (9) is to be placed into the sleeve (10), the protrusion (12) is aligned with the channel (11). Thus, while the shaft (9) is pushed into the sleeve (10), the protrusion (12) moves forwards inside the channel (11). When the protrusion (12) reaches the stopper (13), the shaft (9) is continued to be pushed and the protrusion (12) passes over the stopper (13). The protrusion (12) is again seated in the channel (11) after passing over the stopper (13). However, the protrusion (12) is locked with the stopper (13) and the shaft (9) cannot be dislodged from the sleeve (10) anymore even if it is pulled back.

**[0021]** In an embodiment of the present invention, the pin (8) furthermore comprises a ramp (14) disposed in front of the stopper (13) in the placement direction of the shaft (9) into the sleeve (10). Thus, passing of the protrusion (12) over the stopper (13) is provided to be made easier.

**[0022]** In an embodiment of the present invention, the

protrusion (12) is configured as a flexible detent means to easily pass over the stopper (13) but not allowing to move in the opposite direction. Thus, it is possible to easily realize the operations of mounting and locking.

**[0023]** In an embodiment of the present invention, the pin (8) comprises a peripheral skirt (15) at the end of the sleeve (10) wherein the shaft (9) enters thereto, extending outwards from the sleeve (10) and again a peripheral flange (16) on the shaft (9), that bears against the skirt (15) when the shaft (9) is placed into the sleeve (10). Thus, while the movement of the shaft (9) in one direction is prevented by the protrusion (12) - stopper (13) pair, the movement in the other direction is prevented by the skirt (15) - flange (16) pair and complete locking is provided.

**[0024]** In the preferred embodiment of the present invention, both the sleeve (10) and the shaft (9) are configured in cylindrical shape. Consequently, the shaft (9) is provided to easily move forwards while being placed into the sleeve (10).

**[0025]** In an embodiment of the present invention, the pin (8) comprises at least one slit (17) disposed on the sleeve (10), providing it to partially expand when the shaft (9) is placed into the sleeve (10). Consequently, when the shaft (9) is placed into the sleeve (10), the shaft (9) is provided to widen by expanding and bear against the periphery of the holes (7, 107) and thus the shock absorber (5) to be tightly connected to the bracket (6).

**[0026]** In an embodiment of the present invention, the pin (8) comprises a handle (18) situated at the portion of the shaft (8) remaining behind the flange (16). Thus, it is possible to hold the shaft (9) by means of the handle (18) and place into the sleeve (10) during assembly.

**[0027]** By means of the present invention, the pin (8) is provided to be mounted easily and correctly during assembling of the shock absorbers (5) to the bracket (6).

**[0028]** It is to be understood that the present invention is not limited by the embodiments disclosed above and a person skilled in the art can easily introduce different embodiments. These should be considered within the scope of the protection postulated by the claims of the present invention.

## Claims

### 1. A washer/dryer (1) comprising

- a body (2),
- a drum (3) wherein the laundry is placed,
- a tub (4) that makes vibrational movement during operation with the effect of the drum (3) rotating therein,
- more than one shock absorber (5), supporting the tub (4) from below, providing the tub (4) to be connected to the body (2) and damping the vibrational movements of the tub (4),
- more than one bracket (6) disposed on the body

(2) and the tub (4), providing the shock absorber (5) to be connected to the body (2) and the tub (4),

- at least one hole (7, 107) situated on each of the bracket (6) and the shock absorber (5), aligning with each other during assembly and

- a pin (8) having a shaft (9) and a sleeve (10) surrounding the shaft (9), wherein the shaft (9) is placed, which is inserted through the at least one hole (7, 107), providing the shock absorber (5) to be secured to the bracket (6), **characterized by** the pin (8) having

- at least one channel (11) located on the shaft (9), opened longitudinally along the shaft (9),

- at least one protrusion (12) situated on the sleeve (10), guiding the movement of the shaft (9) by being seated in the channel (11) while the shaft (9) is placed into the sleeve (10) and

- a stopper (13) located on the channel (11) in the direction the shaft (9) is placed into the sleeve (10), over which the protrusion (12) passes while the shaft (9) is placed into the sleeve (10) and thus preventing the movement of the shaft (9) in the sleeve (10) in the opposite direction.

2. A washer/dryer (1) as in Claim 1, **characterized by** a pin (8) comprising a ramp (14) disposed in front of the stopper (13) in the direction the shaft (9) is placed into the sleeve (10).

3. A washer/dryer (1) as in Claim 1 or 2, **characterized by** the protrusion (12) configured as a flexible detent means so as to easily pass over the stopper (13) but not allow to move in the opposite direction.

4. A washer/dryer (1) as in any one of the above Claims, **characterized by** the pin (8) comprising a peripheral skirt (15) at the end of the sleeve (10) wherein the shaft (9) enters thereto, extending outwards from the sleeve (10) and again a peripheral flange (16) on the shaft (9), that bears against the skirt (15) when the shaft (9) is placed into the sleeve (10).

5. A washer/dryer (1) as in any one of the above Claims, **characterized by** the cylindrical shaped shaft (9) and sleeve (10).

6. A washer/dryer (1) as in any one of the above Claims, **characterized by** the pin (8) comprising at least one slit (17) disposed on the sleeve (10), providing the sleeve (10) to partially expand when the shaft (9) is placed therein.

7. A washer/dryer (1) as in any one of the above Claims, **characterized by** the pin (8) comprising a handle (18) situated at the portion of the shaft (9) remaining behind the flange (16).

## Patentansprüche

### 1. Wasch-/Trockenmaschine (1), umfassend:

- einen Gehäusekörper (2),
- eine Trommel (3), in die die Wäsche gegeben wird,
- einen Waschbehälter (4), der während des Betriebs eine Vibrationsbewegung vollzieht, derart, dass die Trommel (3) darin rotiert,
- mehrere Stoßdämpfer (5), die den Waschbehälter (4) von unten abstützen und dafür sorgen, dass der Waschbehälter (4) mit dem Gehäusekörper (2) verbunden ist, und die Vibrationsbewegungen des Waschbehälters (4) dämpfen,
- mehrere Halterungen (6), die am Gehäusekörper (2) und am Waschbehälter (4) angeordnet sind und dafür sorgen, dass der Stoßdämpfer (5) mit dem Gehäusekörper (2) und dem Waschbehälter (4) verbunden ist,
- wenigstens eine Öffnung (7, 107), die jeweils an der Halterungen (6) und dem Stoßdämpfer (5) angeordnet ist, wobei die Öffnungen während des Zusammenbauens miteinander übereinstimmen,
- ein Stift (8), der eine Welle (9) und eine Hülse (10) aufweist, die die Welle (9) umgibt und in der die Welle (9) angeordnet ist und die durch die wenigstens eine Öffnung (7, 107) hindurchgeführt ist und dafür sorgt, dass der Stoßdämpfer (5) an der Halterung (6) gesichert ist, **dadurch gekennzeichnet, dass** der Stift (8) Folgendes aufweist
- wenigstens einen Kanal (11), der an der Welle (9) angeordnet ist und sich in Längsrichtung entlang der Welle (9) öffnet,
- wenigstens einen Vorsprung (12), der an der Hülse (10) angeordnet ist und die Bewegung der Welle (9) führt, indem er in dem Kanal (11) sitzt, während die Welle (9) in der Hülse (10) angeordnet ist, und
- einen Anschlag (13), der an dem Kanal (11) in der Richtung angeordnet ist, in der die Welle (9) in der Hülse (10) angeordnet ist, und über den der Vorsprung (12) tritt, während die Welle (9) in der Hülse (10) angeordnet ist, und dadurch die Bewegung der Welle (9) in der Hülse (10) in der entgegengesetzten Richtung verhindert.

2. Wasch-/Trockenmaschine (1) nach Anspruch 1, **gekennzeichnet durch** einen Stift (8), der eine Rampe (14) umfasst, die in der Richtung, in der die Welle (9) in der Hülse (10) angeordnet ist, vor dem Anschlag (13) angeordnet ist.

3. Wasch-/Trockenmaschine (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Vorsprung (12) als ein flexibles Arretierungsmittel konfiguriert

ist, um leicht über den Anschlag (13) zu gelangen, aber keine Bewegung in der entgegengesetzten Richtung zuzulassen.

4. Wasch-/Trockenmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Stift (8) eine Umfangseinfassung (15) am Ende der Hülse (10), in die die Welle (9) eintritt und die sich von der Hülse (10) nach außen erstreckt, und außerdem einen Umfangsflansch (16) an der Welle (9) umfasst, der an der Einfassung (15) anliegt, wenn die Welle (9) in der Hülse (10) angeordnet ist.

5. Wasch-/Trockenmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Welle (9) und die Hülse (10) zylindrisch sind.

6. Wasch-/Trockenmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Stift (8) wenigstens einen Schlitz (17) umfasst, der an der Hülse (10) angeordnet ist und dafür sorgt, dass sich die Hülse (10) teilweise erweitert, wenn die Welle (9) darin angeordnet ist.

7. Wasch-/Trockenmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Stift (8) einen Griff (18) umfasst, der an dem Abschnitt der Welle (9) angeordnet ist, der hinter dem Flansch (16) bleibt.

## Revendications

1. Une machine à laver/sécher (1) comprenant un corps (2),

- un tambour (3) dans lequel le linge est placé
- une cuve (4) qui fait un mouvement vibratoire pendant le fonctionnement par l'effet du tambour (3) y tournant,
- plus d'un amortisseur de chocs (5) qui supporte la cuve (4) par le bas, qui permet à la cuve (4) d'être reliée au corps (2) et qui absorbe les mouvements vibratoires de la cuve (4),
- plus d'une équerre (6) qui est disposée sur le corps (2) et la cuve (4), permettant à l'amortisseur de chocs (5) d'être reliée au corps (2) et à la cuve (4),
- au moins un trou (7, 107) qui est arrangé sur chacun de l'équerre (6) et de l'amortisseur de chocs (5), s'alignant l'un avec l'autre pendant l'assemblage et
- une goupille (8) qui présente un arbre (9) et une chemise (10) entourant l'arbre (9), dans laquelle l'arbre (9) est placé et qui est insérée à travers l'au moins un trou (7, 107), permettant

- la fixation de l'amortisseur de chocs (5) à l'équerre (6),  
**caractérisée par** la goupille (8) présentant  
 - au moins un canal (11) situé sur l'arbre (9), s'ouvrant longitudinalement le long de l'arbre (9), 5  
 - au moins une protubérance (12) qui est située sur la chemise (10) et qui guide le mouvement de l'arbre (9) en étant placée dans le canal (11) lorsque l'arbre (9) est placé dans la chemise (10) 10  
 et  
 - une butée (13) qui est située sur le canal (11) dans la direction du placement de l'arbre (9) dans la chemise (10), sur laquelle la protubérance (12) passe lorsque l'arbre (9) est placé dans la chemise (10) et donc empêchant le mouvement de l'arbre (9) dans la chemise (10) dans la direction opposée. 15
2. Une machine à laver/sécher (1) selon la Revendication 1, **caractérisée par** une goupille (8) comprenant une rampe (14) qui est disposée devant la butée (13) dans la direction de placement de l'arbre (9) dans la chemise (10). 20
3. Une machine à laver/sécher (1) selon la Revendication 1 ou 2, **caractérisée par** la protubérance (12) configurée comme une détente élastique de manière à passer facilement sur la butée (13) mais ne pas se déplacer dans la direction opposée. 25 30
4. Une machine à laver/sécher (1) selon l'une quelconque des revendications précédentes, **caractérisée par** la goupille (8) comprenant un rebord périphérique (15) à l'extrémité de la chemise (10) dans laquelle l'arbre (9) entre, s'étendant vers l'extérieur à partir de la chemise (10) et une bride périphérique (16) sur l'arbre (9), qui s'appuie sur le rebord (15) lorsque l'arbre (9) est placé dans la chemise (10). 35 40
5. Une machine à laver / sécher (1) selon l'une quelconque des revendications précédentes, **caractérisée par** l'arbre (9) et la chemise (10) qui sont en forme cylindrique. 45
6. Une machine à laver/sécher (1) selon l'une quelconque des revendications précédentes, **caractérisée par** la goupille (8) comprenant au moins une fente (17) qui est disposée sur la chemise (10) et qui permet à la chemise (10) de se gonfler partiellement lorsque l'arbre (9) y est placé. 50
7. Une machine à laver/sécher (1) selon l'une quelconque des revendications précédentes, **caractérisée par** la goupille (8) comprenant une poignée (18) située à la partie de l'arbre restant derrière la bride (16). 55

Figure 1

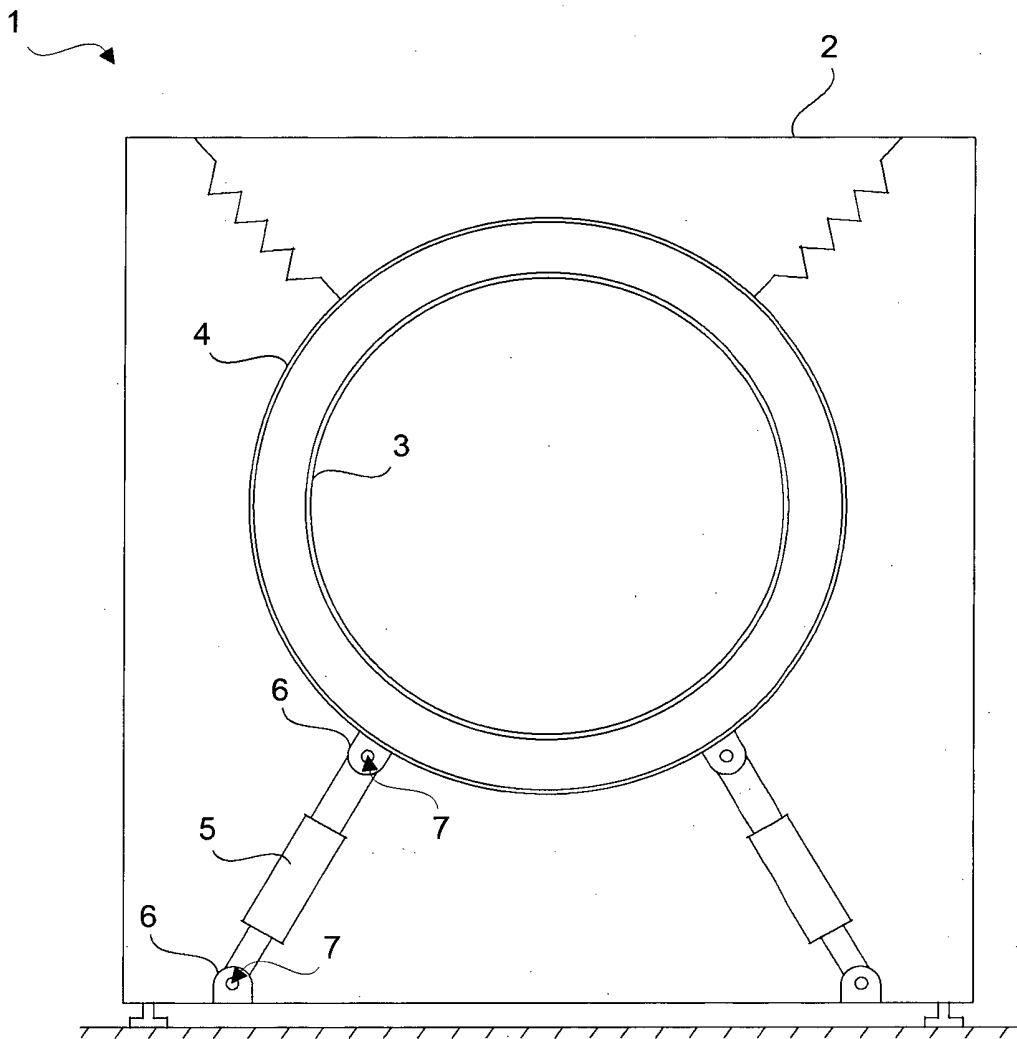


Figure 2

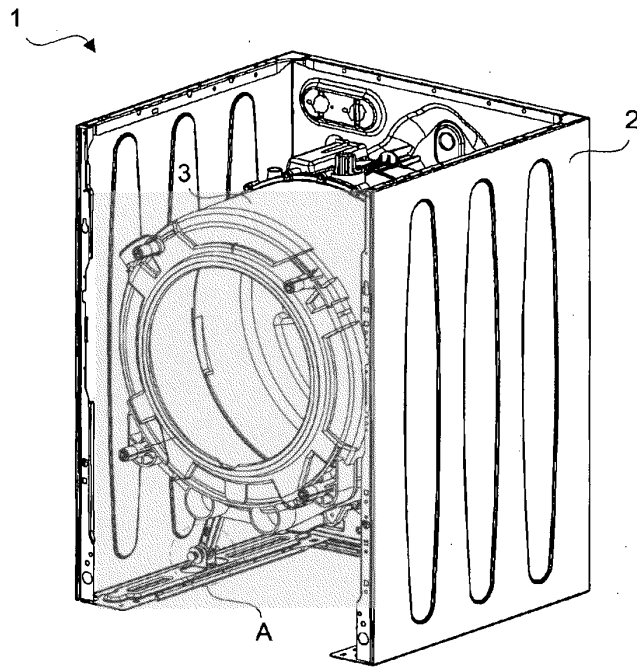


Figure 3

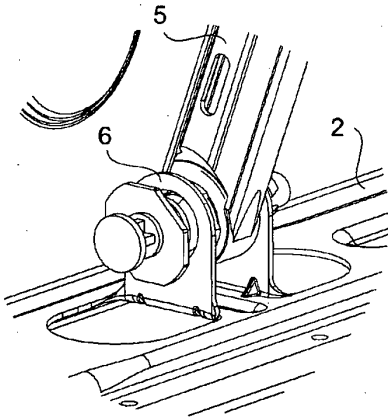


Figure 4

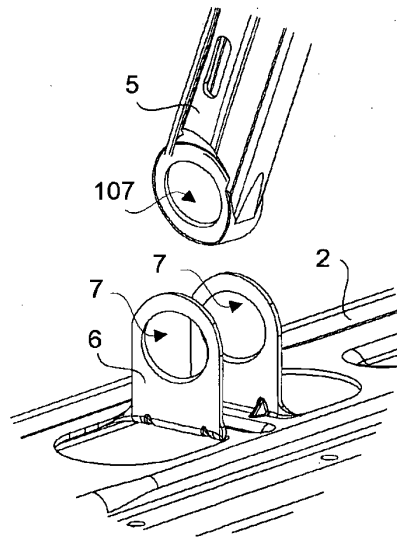




Figure 5

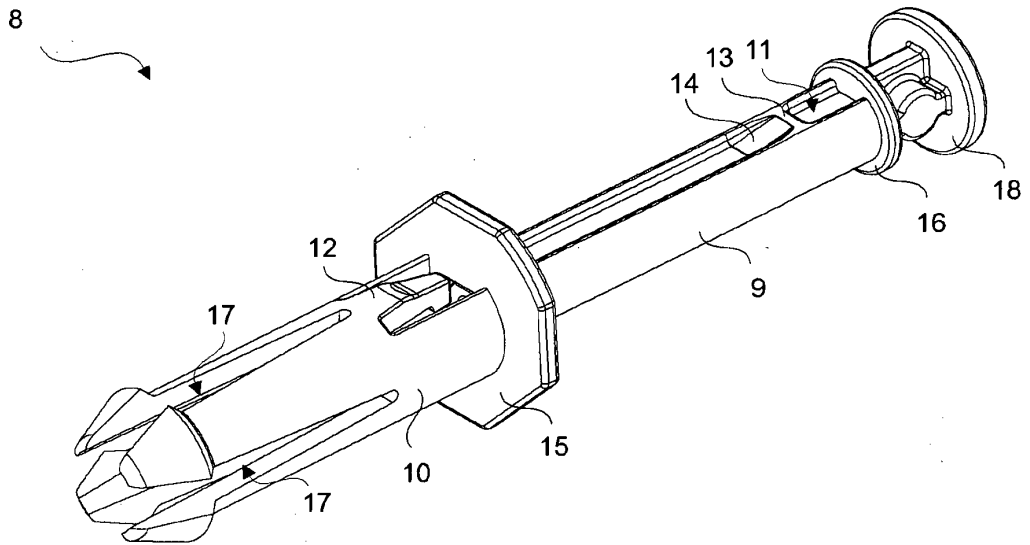


Figure 6

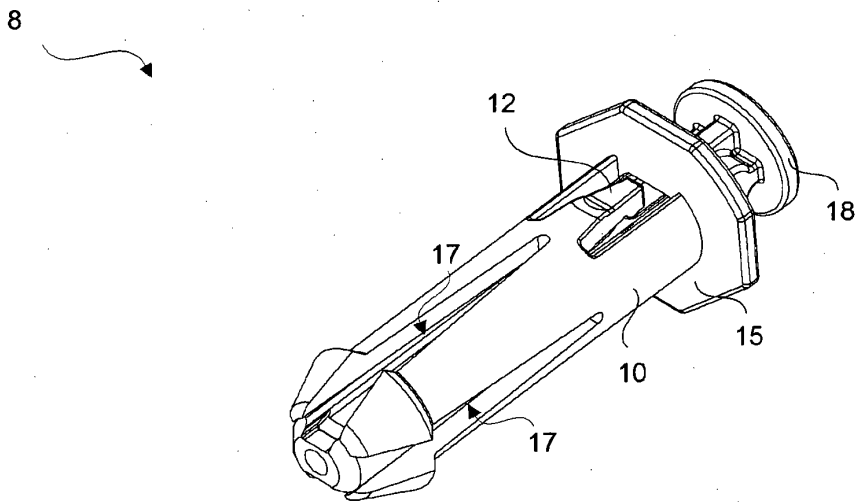


Figure 7

10

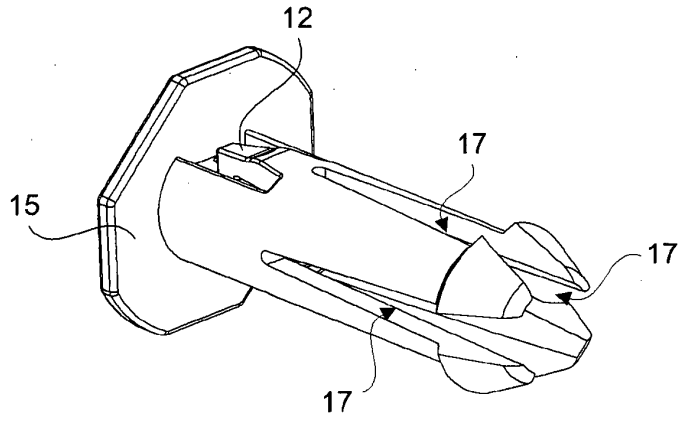
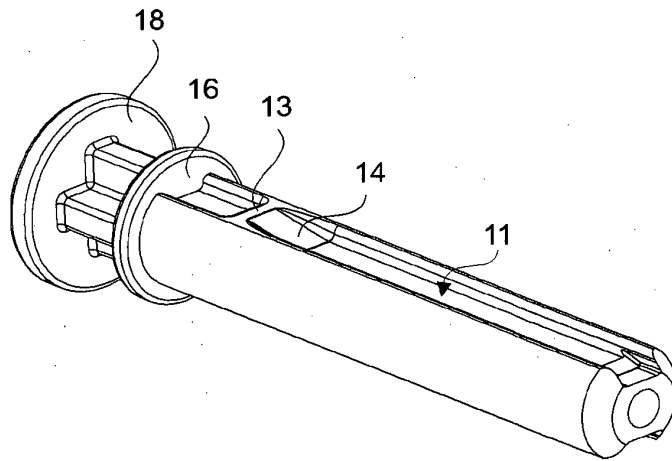


Figure 8

9



**REFERENCES CITED IN THE DESCRIPTION**

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