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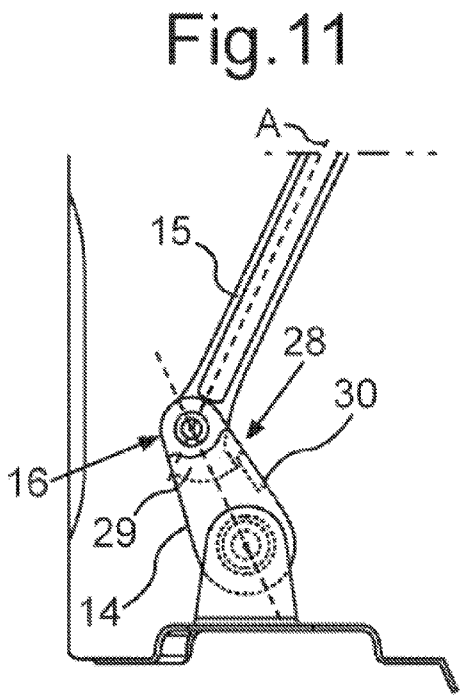
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(57) Abstract: The invention relates to an articulation shock absorber (12, 13) of household appliance (1) comprising two rods (14, 15) connected by means of an articulation (16), and capable of being moved relative to each other about a rotation axis (17); wherein a rod (14) is connectable to housing (2) by means of an articulation (19) defined by a rotation axis (20) and the other rod (15) is connectable to tub (4) of the household appliance (1) by means of an articulation (32) defined by a rotation axis (35); and rods (14, 15) are arranged in such a way that a complete rotation about the first rotation axis (17) is prevented, in such a way that the articulation shock absorber (12, 13) in addition to the complete rotation prevention comprises a rotary movement limitation device (28, 28'), by which the rotary movement of the two rods (14, 15) relative to each other is further limited.

WO 2018/109602 A1

ARTICULATION SHOCK ABSORBERAND A HOUSEHOLD APPLIANCE COMPRISING THE ARTICULATION SHOCK ABSORBER

DESCRIPTION

The invention relates to an articulation shock absorber and a household appliance comprising the articulation shock absorber.

From the prior art household appliances for the care of pieces of laundry, such as for instance a washing machine, are known, which comprise a laundry drum mounted to be capable of rotating about a horizontal axis and moreover can oscillate in the housing. The shock absorbers connected with the housing bottom can be linear dampers, such as are for instance oil dampers or the like. In these embodiments two components of the shock absorber are coaxially aligned in their respective longitudinal axes and can move towards each other along these longitudinal axes.

Moreover, also radial shock absorbers, which are articulation shock absorbers, are known. These commonly have two joint rods, which are connected to each other. Such design is known for instance from the DE 1 842 817 U.

In the very case of this type of shock absorbers, however, during operation of the household appliance situations may occur, in which the oscillating system and thus in particular also the laundry drum is exposed to relatively strong deflections and thus deflection amplitudes occur, which tilt a working orientation of the joint rods relative to each other in an undesired way. This means that these joint rods then no longer can move in a desired working orientation relative to each other and to the laundry drum, but are arranged in an undesired non-working orientation. In such a tilted position of the joint rods relative to each other the oscillating behavior of the joint rods is limited and thus also the damping effect of the articulation shock absorber is limited. In this design then undesired hard impacts at the end positions of the oscillatory joint rods can occur, which can lead to damages to the components. In particular by such a non-working orientation of joint rods then also the entire oscillating system remains only functional to a limited degree so that

the damping effect is restricted. In particular from these also undesired imbalances of the laundry drum can result so that here, too, a corresponding wear can occur.

It is the task of the present invention to provide an articulation shock absorber, which is improved and thus an undesired tilting of the joint rods towards each other is prevented, and a household appliance for the care of pieces of laundry comprising this articulation shock absorber.

This task is solved by an articulation shock absorber, and a household appliance for the care of pieces of laundry comprising an articulation shock absorber according to the independent claims. Preferred embodiments of the invention are disclosed in the dependent claims.

An articulation shock absorber of household appliance according to the invention is configured to comprise a first joint rod, which comprises a first end and a second end opposite to the first end, and a second joint rod, which comprises a first end and a second end opposite to the first end, wherein the first end of the second joint rod is connected with the first end of the first joint rod by means of a first articulation, wherein the joint rods are capable of being moved relative to each other about a first rotation axis of the first articulation; wherein the second end of the first joint rod is connectable to a housing of the household appliance by means of a second articulation defined by a second rotation axis and the second end of the second joint rod is connectable to a tub of the household appliance by means of a third articulation defined by a third rotation axis; and the joint rods are arranged in such a way that a complete rotation about the first rotation axis is prevented, wherein the articulation shock absorber in addition to the complete rotation prevention comprises a rotary movement limitation device, by which the rotary movement of the two joint rods relative to each other about the first rotation axis of the first articulation is limited in such a way that the joint rods in the rotary movement interval limited thereby, which is smaller than the interval by which the complete rotation is limited, can only be arranged in a working orientation relative to each other.

Thereby the prevention of the rotation of the joint rods relative to each other by 360º due to the construction design is achieved and a further limitation of the rotary movement of the

joint rods relative to each other is achieved, whereby an undesired independent adjusting of a non-working orientation of the joint rods is avoided.

Articulation shock absorber comprises at least an articulation that provides frictional resistance to rotation also called a friction articulation. In an articulation shock absorber, an articulation that provides frictional resistance to rotation or a friction articulation is to be understood as an articulation in which the friction values during a rotation of the same exceed 10 N, the values ranging preferably from 20 N to 120 N and, more preferably, from 30 N to 60 N.

The articulation providing frictional resistance to rotation comprises a bushing which is crossed in the rotation axis by a bolt fixedly arranged at at least one leg, so that a friction element is arranged being trapped between the bushing and the bolt. In a preferred manner, the bolt is fixedly connected to two legs preferably arranged in a U-shaped configuration, each on one side of the bushing, what makes the structure of the articulation more rigid. Another possibility is that the articulation providing frictional resistance to rotation comprises a bushing which is crossed in the rotation axis by a bolt connected to at least one leg, so that a friction element is arranged being trapped between the bushing and the at least one leg. In a preferred manner, the bolt is connected to two legs preferably arranged in a U-shaped configuration, each on one side of the bushing, what makes the structure of the articulation more rigid. Both legs can clamp the bushing strongly and have a friction element between the bushing and the same. Obviously, the articulation providing frictional resistance to rotation can have the friction element between the bushing and the bolt and between the bushing and the at least one leg at the same time. In this manner, the friction surface is increased if necessary.

The bushing can be arranged at an end of one of the joint rods and, then, the legs can be arranged at an end of the other joint rod and/or in the tub and/or in the housing, or the bushing can be arranged in the tub and/or in the housing and the legs can be arranged at an end of one of the joint rods. With this, the articulation providing frictional resistance to rotation can be arranged in any of the three, i.e. first, second and third articulation of the articulation shock absorber. Preferably, the friction element is made of a high-compression material, in particular an expanded polyurethane sponge, e.g. from Cellasto ®.

In particular the rotary movement limitation device is configured in such a way that in the working orientation of the joint rods a relative rotary movement between the two joint rods is limited to an angle of maximum 180°, relative to each other. Thereby the above-named advantages are improved once again.

In particular it is envisaged that in a working orientation of the joint rods a relative rotary movement between the two joint rods is limited to an angle of maximum 180° relative to each other. 180º is the limitation for the maximum value of the smallest angle defined by two joint rods. It is clear that two joint rods create in their rotation axis two angles, which are both of them conjugated. That means that the sum of both of them is 360º. Therefore when the smallest angle is for example 130º the biggest one will be 230º (both angles are conjugated). Thereby also the tilting of the joint rods into the non-working orientation is thus reliably avoided because this smaller angle in an initial position is limited to a maximum value of 180º.

In a particular embodiment of the invention, the articulation shock absorber comprises a rotary movement limitation device, that is a first rotary movement limitation device arranged in the first articulation and comprises a rotary movement limitation element which is arranged at a first end of the second joint rod, for rotary movement limitation of the joint rods relative to each other depending on the rotary position of the two joint rods, which stops against the first joint rod, or the rotary movement limitation element is arranged at a first end of the first joint rod, for rotary movement limitation of the joint rods relative to each other depending on the rotary position of the two joint rods, which stops against the second joint rod. Rotary movement limitation element can be arranged in any part of the joint rod being able to collide against any part of the other joint rod.

This rotary movement limitation element arranged in one of both joint rods collides against the other joint rod limiting the movement between both joint rods around the first articulation of the articulation shock absorber. This embodiment has the advantage of having a rotary movement limitation device in the joint rods of the shock absorber itself creating a robust design. Functionality of the rotary movement limitation device is ensured in the articulation shock absorber itself and does not depend on the system where the articulation shock absorber is going to be mounted.

In a particular embodiment of the invention, the articulation shock absorber in a mounting position in the household appliance comprises a rotary movement limitation device, which is a second rotary movement limitation device arranged in the second and/or third articulation, which comprises a rotary movement limitation element arranged in the first and/or second joint rod limiting the rotation around the second and/or third articulation by colliding against the housing and/or the tub.

The articulation shock absorber of this embodiment has additional alternatives to limit the rotation by including rotary movement limitation device in the second and/or the third articulation which offers many alternatives to ensure the correct working orientation of the articulation shock absorber.

In this way a plurality of rotary movement limitation devices can be arranged on the articulation shock absorber. That creates a much safer articulation shock absorber which ensures a correct working orientation through additional rotary movement limitation devices which act in case the first rotary movement limitation device fails or is damaged.

In a particular embodiment of the invention, the articulation shock absorber has a rotary movement limitation element which protrudes from the second end of the first or second joint rod in the form of a bolt, in particular is orientated on the longitudinal axis of the first or second joint rod facing away from the second end so that a rotary movement of the first joint rod rotating around the second rotation axis is limited by stopping against the housing or the second joint rod rotating around the third rotation axis is limited by stopping against the tub.

The main advantage of this particular embodiment is that the limitation of the movement can be produced in and easy and cheap way by the collision of two parts. The rotary movement limitation element can be integrated in the joint rod or in the joint rod receptacle or it can be an additional part joint to the joint rod or to the housing or to the tub. If the rotary movement limitation element is an additional part can be joined by any known method. For example glued, welded, screwed, over molded, riveted, over injected.

It can be limited the rotation of the joint rods of the articulation shock absorber in a very easy way around second and/or third articulation in order to ensure that the articulation shock absorber is always working in the desired working orientation.

The rotary movement limitation element can also protrude from the housing or from the tub in order to collide against any of the joint rods of the articulation shock absorber in order to limit the rotation around the second and/or third rotation axis.

In a particular embodiment of the invention, the articulation shock absorber comprises a first joint rod receptacle connectable to the housing to which the second end of the first joint rod is connected, and/or the third articulation comprises a second joint rod receptacle connectable to the tub to which the second end of the second joint rod is connected.

This embodiment has the advantage of a much easier calibration of the articulation shock absorber in case the friction articulation is arranged on the second and/or the third articulation. Articulation shock absorber can be measured and calibrated in the own articulation shock absorber production line and it can be delivered with the wished friction force.

In a particular embodiment of the invention the rotary movement limitation device is a second rotary movement limitation device arranged in the second and/or third articulation having a rotary movement limitation element, at the second end of a joint rod which stops against the joint rod receptacle for rotary movement limitation of the joint rods relative to each other depending on the rotary position of the two joint rods and/or having a rotary movement limitation element in the joint rod receptacle which stops against the second end of a joint rod for rotary movement limitation of the joint rods relative to each other depending on the rotary position of the two joint rods.

The main advantage of this configuration is that the rotation movement can be limited in an easier way because the collision is produced between the joint rod receptacles and the joint rods being easier to design a configuration which ensures the limitation of the rotation around rotation axis.

A joint rod receptacle can have different embodiments. One of the preferred embodiments for the joint rod receptacle is a U-shape joint rod receptacle. U-shape joint rod receptacle has two lateral legs and a part joining both legs.

U-shape joint rod receptacle has the advantage of being a robust and easy to produce joint rod receptacle.

In a particular embodiment of the invention the rotary movement limitation element protrudes from the second end of the first or second joint rod in the form of a bolt, in particular is orientated on the longitudinal axis of the first or second joint rod facing away from the second end so that a rotary movement of the first or second joint rod rotating around the second or third rotation axis is limited by stopping against the joint rod receptacle.

In a particular embodiment of the invention, the second rotary movement limitation device comprises at least a rotary movement limitation element, which is configured on at least one first leg of the joint rod receptacle, to which the first or second joint rod is connected, and is orientated in the direction of a second leg of the joint rod receptacle so that a rotary movement of the first or second joint rod rotating around the second or third rotation axis and between the legs is limited by a stopping against the rotary movement limitation element.

The second rotary movement limitation device can comprise a rotary movement limitation element arranged in one of the legs facing away in the direction to the opposite leg. This rotary movement limitation element can even join both legs in order to reinforce the U-shape structure.

The invention relates also to a household appliance for the care of pieces of laundry, comprising a housing, in which an oscillating system having a tub is mounted, wherein the oscillating system comprises at least one shock absorber that is configured for damping vibrations of the oscillating system against the housing, and the shock absorber is an articulation shock absorber according to any of the preceding embodiments.

In this case even in the very infrequent case of strong deflections happen, a desired working orientation of the articulation shock absorber is always achieves and ensured.

The desired working orientation in the case of household appliance for the care of pieces of laundry is the orientation having the first articulation in the closest side of the nearest housing lateral side.

The invention relates also to a household appliance for the care of pieces of laundry, wherein the housing comprises a joint rod receptacle and/or the tub comprises a joint rod receptacle, wherein the rotary movement limitation device additionally creates a mounting encoding for defining the position of the assembly of the articulation shock absorber in the joint rod receptacle.

If the joint rod receptacle is included or is a part of the housing and/or in the tub the rotary movement limitation device which is limiting the movement around the second and/or third rotation axis in a dynamical situation is also helping the assembly line worker for the correct assembly of the articulation shock absorber in the household appliance. The rotary movement limitation device is also a barrier in order to avoid that the articulation shock absorber is assembled in the no working orientation. The rotary movement limitation device collides against the articulation shock absorber in case the assembly line worker tries to assemble it in a no working orientation position avoiding this assembly and ensuring the correct one. Therefore it creates this mounting encoding for the correct assembly of the articulation shock absorber in the desired working orientation in the household appliance.

With indications „top“, „bottom“, „front“, „rear“, „horizontal“, „vertical“, „depth direction“, „width direction“, „height direction“ etc. the positions and orientations are indicated for intended use and intended arrangement of the appliance and for a viewer looking into the direction of the device.

Further features of the invention derive from the claims, the figures, and the description of the figures. The features and feature combinations previously mentioned in the description as well as the features and feature combinations named in the following in the description of the figures and/or shown in the figures alone can be used not only in the respectively

indicated combination, but also in other combinations, without leaving the scope of the invention. Thus, also embodiments of the invention are to be considered as comprised and disclosed, which are not explicitly shown and explained in the figures, however derive through separated feature combinations from the explained embodiments and can be generated therefrom. Also embodiments and feature combinations are to be considered as disclosed, which thus do not have all features of an originally formulated independent claim. Moreover, explanations and feature combinations are to be considered as disclosed, in particular by the embodiments set out in the above, which go beyond the feature combinations set out in the back-references of the claims or deviate therefrom.

Embodiments of the invention are explained in more detail in the following by reference to schematic drawings. These show in:

Fig. 1 a schematic front view of an embodiment of a household appliance according to the invention with components arranged in a housing of the household appliance;

Fig. 2 a representation of an articulation shock absorber according to an embodiment of a household appliance according to the invention, wherein the joint rods of this articulation shock absorber in their working orientation are shown in a first position;

Fig. 3 the representation according to Fig. 2, wherein here the joint rods of the articulation shock absorber in their working orientation are shown in a second position, which is different from Fig. 2, wherein in the second position a rotation limitation position is achieved;

Fig. 4 a representation of the joint rods in a non-working orientation, which is prevented by the invention;

Fig. 5 a perspective representation of an embodiment of a first joint rod of the articulation shock absorber according to Fig. 2 and Fig. 3;

Fig. 6 a perspective representation of a further embodiment of an articulation shock absorber with rotary movement limitation elements that are different from Fig. 2, Fig. 3 and Fig. 5;

Fig. 7 an embodiment alternative to Fig. 6;

Fig. 8 a representation of the joint rod of the articulation shock absorber according to Fig. 6 and 7, in which rotary movement limitation elements such as in Fig. 6 and Fig. 7 as well as a rotary movement limitation element according to Fig. 2, Fig. 3 and Fig. 5 are formed and a joint rod receptacle according to Fig. 6 is realized; and

Fig. 9 an embodiment according to Fig. 8, in which a joint rod receptacle according to the embodiment in Fig. 7 is formed.

Fig. 10 a front view of a further embodiment of an articulation shock absorber in a first position of the joint rods relative to each other; and

Fig. 11 a front view of a further embodiment of an articulation shock absorber according to Fig. 10 in a second position of the joint rods relative to each other.

In the figures same elements and elements having the same function are equipped with the same reference signs.

In Fig. 1 a simplified front view a household appliance 1 for the care of pieces of laundry is shown, which in particular is a washing machine, however, can also be a washer-dryer. It can be seen that the household appliance 1 comprises a housing 2, wherein in Fig. 3 a view into the interior is shown and components present therein can be seen. The household appliance 1 in this connection comprises an oscillating system 3, which comprises a tub 4 and a laundry drum 5. In the laundry drum 5 pieces of laundry 6 to be washed are arranged in an exemplary way. The laundry drum 5 is mounted in a way rotary about a rotation axis 7 which is perpendicular to the figure plane, wherein for this purpose in particular a drive motor 8, such as for instance a belt drive motor can be envisaged.

The oscillating system 3 moreover comprises in the embodiment two springs 9 and 10, by means of which the tub 4 and the washing drum 5 are movably mounted in the housing 2 in particular in the top area.

Moreover, a damper arrangement 11 is envisaged, which in the embodiment comprises at least two articulation shock absorbers 12 and 13. In particular the tub 4 is rested against this damper arrangement 11. For the very damping of large amplitudes the articulation shock absorbers 12 and 13 are employed.

Articulation shock absorber 13 is different from articulation shock absorber 12 because comprises at least a joint rod receptacle connectable to a housing or to a tub. Both of them offer similar functionality related the disclosed invention.

In Fig. 1 the articulation shock absorbers 12 and 13 are shown in their working orientation. For the corresponding further explanation reference is made to Fig. 2. Therein it can be seen that the articulation shock absorber 12, 13 comprises a first joint rod 14 and a second joint rod 15. The two joint rods 14 and 15 are separate parts and each configured to be rigid in itself. The first joint rod 14 is joined by the first articulation 16 with the second joint rod 15 in an articulated way. The rotation axis 17 of the first articulation 16 is orientated perpendicularly to the figure plane. The joint rods 14 and 15 are capable of being rotated about the rotation axis 17, which is orientated perpendicular to the longitudinal axes A and B. Moreover the joint rods 14 and 15 at the articulation 16 are guided one within the other so that a rotary movement of the joint rods 14 and 15 relative to each other is already limited and this to an interval smaller than 360°.

Moreover, the first joint rod 14 is connected in an articulated way with a joint rod receptacle 18, by means of a second articulation 19, wherein a rotation axis 20 of this second articulation 19 is orientated equally perpendicularly to the figure plane. The second joint rod 15 is connected at its end 15b (Fig. 1) facing away from the first joint rod 14 with the tub 4. With a first end 15a the second joint rod 15 is connected with the first joint rod 14 in an articulated manner.

In this working orientation the two joint rods 14 and 15 are orientated with their longitudinal axes A and B at an angle that is different than 180° relative to each other. Moreover the first joint rod 14 is orientated in such a way that it is orientated with an end 14a connected with the second joint rod 15 facing a housing wall 2a adjacent the articulation shock absorber 12, 13. This means that in this working orientation this first joint rod 14 with this end 14a faces away from the opposite vertical housing wall 2b. This is the vertical wall of the housing 2, which is further away from the articulation shock absorber 12, 13.

In this working orientation the two joint rods 14 and 15 can move relative to each other so that an angle α between the longitudinal axes A and B changes correspondingly during oscillation. As can be seen, the first joint rod 14 is rotatably mounted spaced apart from a bottom 21 of the joint rod receptacle 18. In this working orientation this end 14a of the first joint rod 14 is arranged to be tilted to face also away from the laundry drum 5 and also the tub 4. At a second end 14b of the first joint rod 14, by which the first joint rod 14 is coupled with the second articulation 19, a rotary movement limitation element 22 is integrally formed, which extends away from the second end 14b in a bolt-like or pin-like manner. In the shown embodiment it is envisaged that this rotary movement limitation element 22 is orientated to face away from the second end 14b and extends along the longitudinal axis B.

By this rotary movement limitation element 22 a rotary movement of the first joint rod 14 about the rotary axis 20 is limited. By this rotary movement limitation element 22 a component of a rotary movement limitation device 28' is configured, by means of which going beyond the complete rotation prevention of the joint rods 14 and 15 as explained in the above a defined rotary movement limitation is configured, which limits the rotary movement in an interval smaller than the interval of the complete rotation prevention and in which the joint rods 14, 15 are held in a working orientation relative to each other. In particular this rotary movement limitation element 22 is configured and arranged in such a way that the rotary movement about the rotation axis 20 as a maximum is possible by an angle smaller or equal a tilting angle. This tilting angle defines that rotary movement position of the first joint rod 14, as from which the joint rods 14 and 15 would tilt from the working orientation into a non-working orientation. In this non-working orientation then the first joint rod 14 then would be orientated to face the housing-interior as it is indicated in Fig. 4 in an exemplary way. In this non-working orientation shown in Fig. 4 the damping

effect of this articulation shock absorber 12 is restricted. By the envisaging of at least the first rotary movement limitation element 22 this tilting of the joint rods 14 and 15 from the working orientation shown in Fig. 2 into the non-working orientation shown in Fig. 4 can be prevented.

In Fig. 3 the embodiment according to Fig. 2 is shown, wherein here the joint rods 15 and 14 in their working orientation are shown in a relative position to each other that is different from Fig. 2, in which the angle α is larger. In Fig. 3 a further position of the joint rods 14 and 15 relative to each other is reached, which now is the limited end position, since the rotary movement limitation element 22 has stopped against the bottom 21 and thus the further clock-wise rotary movement of the joint rod 14 about the rotation axis 20 is no longer possible.

In Fig. 5 in a perspective view an embodiment of a first joint rod 14 is shown. With two legs 14c and 14d the first joint rod 14 is grasped at its further end 14b.

In Fig. 6 in a perspective view a further embodiment is shown, in which in contrast to the hitherto explanations a rotary movement limitation element 23 is configured. In this embodiment thus the rotary movement limitation element 22 is not present at the first joint rod 14. The rotary movement limitation about the rotation axis 20 is reached by these rotary movement limitation elements 23. The rotary movement limitation element 23 in this connection is integrally formed on a leg 25, 26 of this joint rod receptacle 18 and is bent in the direction of the opposite leg 25, 26 of this joint rod receptacle 18. Thus the rotary movement limitation element 23 extends in a rotary path, which is performed by the first joint rod 14 in a rotation about the rotary axis 20 and serve in this connection equally as corresponding stop, in order to limit a clock-wise rotary movement of the first joint rod 14. In particular it is envisaged that by the rotary movement limitation element 22 or at least a rotary movement limitation element 23 an angle position between the two joint rods 14 and 15 in their working orientation is limited to a maximum of 180° relative to each other. In particular thus the longitudinal axes A and B of these two joint rods 14 and 15 are offset by a maximum of 180° relative to each other in the working orientation. The joint rod receptacle 18 in this case is one more piece of the articulation shock absorber 13 but it could be an integrated piece in the housing 2 as will be shown in Fig. 7 or it could be an additional piece joining between the articulation shock absorber 12 and the housing 2.

Fig. 6 shows the union of the articulation shock absorber 13 to the bottom side of the housing 2, but similar configuration is possible for joining the articulation shock absorber 13 to the lateral side of the housing 2 even to the front/rear side of the housing 2.

Similar configuration is possible for the union of articulation the shock absorber 12, 13 to the tub 4 in the upper part. Therefore the rotary movement limitation element 23 can limit the anti clock-wise rotary movement of the second joint rod 15 around the third rotation axis 35 of the third articulation 32.

In Fig. 7 a further embodiment is shown, in which the components according to Fig. 6 are shown. In this embodiment the joint rod receptacle 18 is integrated into a part of a housing 2 and the legs 25 and 26 are created by punching out and bending. In this embodiment an articulation shock absorber 12 without any additional piece as joint rod receptacle 18 is used.

In Fig. 8 an embodiment is shown, in which a combination of the rotary movement limitation elements is realized and both the rotary movement limitation element 22 as well as the rotary movement limitation element 23 are present. The joint rod receptacle 18 here is configured just in an exemplary way according to the embodiment in Fig. 6.

In Fig. 9 a further embodiment is shown, in which equally the rotary movement limitation elements 22 and 23 are preferably present, the joint rod receptacle 18, however, in contrast to Fig. 8, however, according to the embodiment in Fig. 7 is realized.

In Fig. 10 in a front view a further embodiment of the articulation shock absorber 12, 13 is shown. In this embodiment the first rotary movement limitation device 28 comprises a rotary movement limitation element 29, which is configured at the first end 15a of the second joint rod 15. At the first joint rod 14 a further rotary movement limitation element 30 is configured. In the position of the joint rods 14 and 15 relative to each other shown in Fig. 10 these two separate rotary movement limitation elements 29 and 30 are not yet in contact. In Fig. 11, however, these are contacted and a further clock-wise rotation of the joint rods 14 and 15 relative to each other is prevented.

Also in this embodiment the rotary movement of the joint rods 14 and 15 relative to each other is limited to an interval smaller than or equal 180°, in particular here the angle α is smaller than or equal 180°. In particular thereby the tilting angle is given.

In both positions, as they are shown by Fig. 10 and Fig. 11, the joint rods 14 and 15 are in a working orientation.

Additionally or instead, the second end 15b of the joint rod 15 at a third articulation 32 (Fig. 1) can be connected in an articulated manner with a component of the household appliance 1, in particular of the oscillating system 3. In particular the component is the tub 4. At this end 15b and/or on the tub 4 a rotary movement limitation element 22, 23 can be configured. Thereby the rotary movement of the joint rod 15 relative to this component is limited and thus also the rotary movement of the joint rods 14 and 15 relative to each other.

List of References

1	household appliance
2	housing
2a	housing wall
2b	second housing wall
3	oscillating system
4	tub
5	laundry drum
6	pieces of laundry
7	rotation axis
8	drive motor
9	spring
10	spring
11	damper arrangement
12	articulation shock absorber
13	articulation shock absorber
14	first joint rod
14a	first end
14b	second end
14c	leg
14d	leg
15	second joint rod
15a	first end
15b	second end
16	first articulation
17	first rotation axis
18	joint rod receptacle
19	second articulation
20	second rotation axis
21	bottom
22	rotary movement limitation element
23	rotary movement limitation element
25	first leg

26	second leg
28	first rotary movement limitation device
28’	second rotary movement limitation device
29	rotary movement limitation element
30	rotary movement limitation element
32	third articulation
33	joint rod receptacle
35	third rotation axis
A	longitudinal axis
B	longitudinal axis
α	angle

CLAIMS

1. Articulation shock absorber (12, 13) of household appliance (1) comprising a first joint rod (14), which comprises a first end (14a) and a second end (14b) opposite to the first end (14a), and a second joint rod (15), which comprises a first end (15a) and a second end (15b) opposite to the first end (15a), wherein the first end (15a) of the second joint rod(15) is connected with the first end (14a) of the first joint rod (14) by means of a first articulation (16), wherein the joint rods (14, 15) are capable of being moved relative to each other about a first rotation axis (17) of the first articulation (16); wherein the second end (14b) of the first joint rod (14) is connectable to a housing (2) of the household appliance (1) by means of a second articulation (19) defined by a second rotation axis (20) and the second end (15b) of the second joint rod (15) is connectable to a tub (4) of the household appliance (1) by means of a third articulation (32) defined by a third rotation axis (35); and the joint rods (14, 15) are arranged in such a way that a complete rotation about the first rotation axis (17) is prevented, **characterized in that** the articulation shock absorber (12, 13) in addition to the complete rotation prevention comprises a rotary movement limitation device (28, 28'), by which the rotary movement of the two joint rods (14, 15) relative to each other about the first rotation axis (17) of the first articulation (16) is limited in such a way that the joint rods (14, 15) in the rotary movement interval limited thereby, which is smaller than the interval by which the complete rotation is limited, can only be arranged in a working orientation relative to each other.

2. Articulation shock absorber (12, 13) of household appliance (1) according to claim 1, characterized in that the rotary movement limitation device (28, 28') is configured in such a way that in the working orientation of the joint rods (14, 15) a relative rotary movement between the two joint rods (14, 15) is limited to an angle of maximum 180°, relative to each other.

3. Articulation shock absorber (12, 13) of household appliance (1) according to any one of the preceding claims, characterized in that the rotary movement limitation device (28, 28') is a first rotary movement limitation device (28) arranged in the first articulation (16) and comprises a rotary movement limitation element (29, 30), which is arranged at a first end (15a) of the second joint rod (15), for rotary movement limitation of the joint rods (14, 15) relative to each other depending on the rotary position of the two joint rods (14, 15),

which stops against the first joint rod (14), or the rotary movement limitation element (29, 30) is arranged at a first end (14a) of the first joint rod (14), for rotary movement limitation of the joint rods (14, 15) relative to each other depending on the rotary position of the two joint rods (14, 15), which stops against the second joint rod (15).

4. Articulation shock absorber (12, 13) of household appliance (1) according to any one of the preceding claims, characterized in that in a mounting position of the articulation shock absorber (12, 13) in the household appliance the rotary movement limitation device (28, 28') is a second rotary movement limitation device (28') arranged in the second and/or third articulation (19, 32), which comprises a rotary movement limitation element (22) arranged in the first and/or second joint rod (14, 15) limiting the rotation around the first articulation (16) by colliding against the housing (2) and/or the tub (4).

5. Articulation shock absorber (12, 13) of household appliance (1) according to claim 4, characterized in that a rotary movement limitation element (22) protrudes from the second end (14b, 15b) of the first or second joint rod (14,15) in the form of a bolt, in particular is orientated on the longitudinal axis (A,B) of the first or second joint rod (14, 15) facing away from the second end (14b, 15b) so that a rotary movement of the first or second joint rod (14, 15) rotating around the second or third rotation axis (20, 35) is limited by stopping against the housing (2) or the tub (4).

6. Articulation shock absorber (13) of household appliance (1) according to any one of the preceding claims, characterized in that either the second articulation (19) comprises a first joint rod receptacle (18) connectable to the housing (2) to which the second end (14b) of the first joint rod (14) is connected, and/or the third articulation (32) comprises a second joint rod receptacle (33) connectable to the tub (4) to which the second end (15b) of the second joint rod (15) is connected.

7. Articulation shock absorber (13) of household appliance (1) according to claim 6, characterized in that the rotary movement limitation device (28, 28') is a second rotary movement limitation device (28') arranged in the second and/or third articulation (19, 32) having a rotary movement limitation element (22), at the second end (14b, 15b) which stops against the joint rod receptacle (18, 33) for rotary movement limitation of the joint rods (14, 15) relative to each other depending on the rotary position of the two joint rods

(14, 15), and/or having a rotary movement limitation element (23), in the joint rod receptacle (18, 33) which stops against the second end (14b, 15b) for rotary movement limitation of the joint rods (14, 15) relative to each other depending on the rotary position of the two joint rods (14, 15).

8. Articulation shock absorber (13) of household appliance (1) according to claims 6 or 7, characterized in that a rotary movement limitation element (22) protrudes from the second end (14b, 15b) of the first or second joint rod (14,15) in the form of a bolt, in particular is orientated on the longitudinal axis (A, B) of the first or second joint rod (14, 15) facing away from the second end (14b, 15b) so that a rotary movement of the first or second joint rod (14, 15) rotating around the second or third rotation axis (20, 35) is limited by stopping against the joint rod receptacle (18, 33).

9. Articulation shock absorber (13) of household appliance (1) according to claims 6 to 8, characterized in that the second rotary movement limitation device (28') comprises at least a rotary movement limitation element (23), which is configured on at least one first leg (25) of the joint rod receptacle (18, 33), to which the first or second joint rod (14, 15) is connected, and is orientated in the direction of a second leg (26) of the joint rod receptacle (18, 33) so that a rotary movement of the first or second joint rod (14, 15) rotating around the second or third rotation axis (20, 35) and between the legs (25, 26) is limited by a stopping against the rotary movement limitation element (23).

10. Household appliance (1) for the care of pieces of laundry, comprising a housing (2), in which an oscillating system (3) having a tub (4) is mounted, wherein the oscillating system (3) comprises at least one shock absorber that is configured for damping vibrations of the oscillating system (3) against the housing (2), and the shock absorber is an articulation shock absorber (12, 13) of any one of the preceding claims.

11. Household appliance (1) for the care of pieces of laundry, according to claim 10, wherein the housing (2) comprises a joint rod receptacle (18) and/or the tub (4) comprises a joint rod receptacle (33), characterized in that the rotary movement limitation device (28') additionally creates a mounting encoding for defining the position of the assembly of the articulation shock absorber (12, 13) in the joint rod receptacle (18, 33).

Fig.1

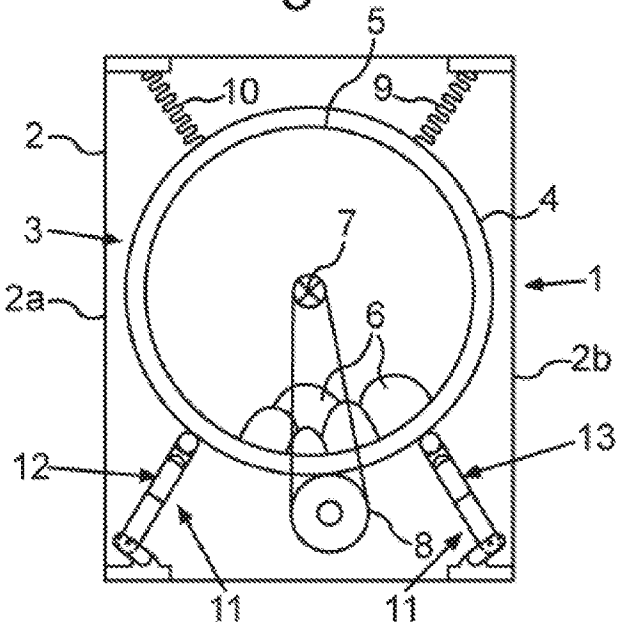

5
10
9
2
4
3
7
1
2a
6
2b
13
12
8
11
11

Fig.2

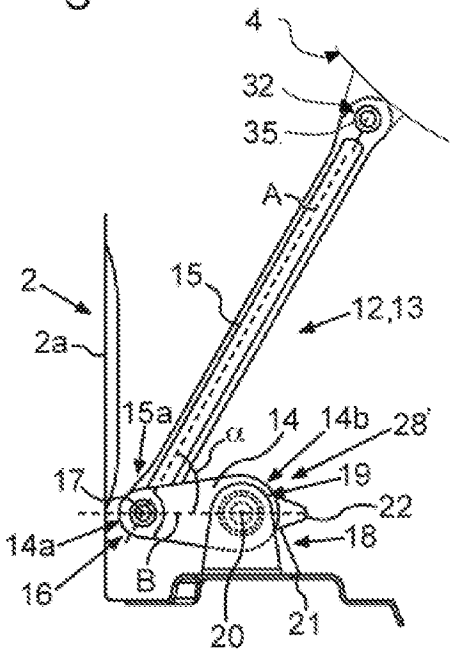

4
32
35
A
2
15
12,13
2a
15a
α
14
14b
28'
17
19
22
14a
18
16
B
20
21

Fig.3

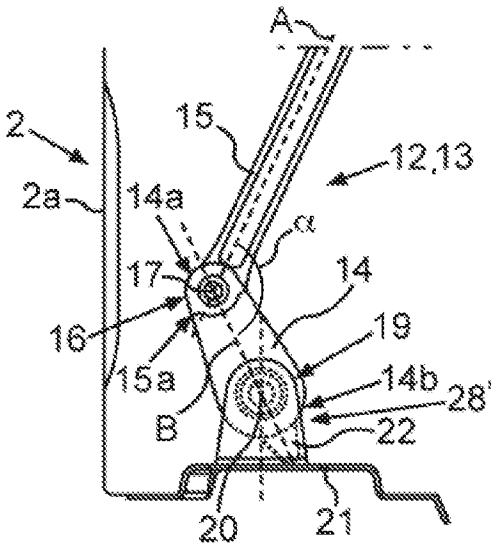


Fig.4

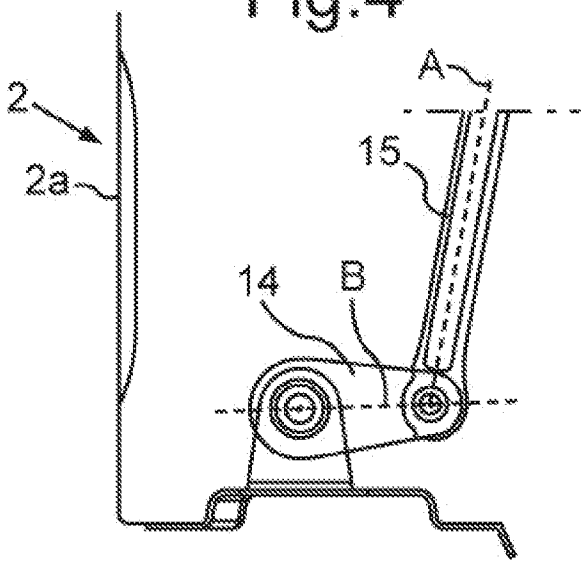


Fig.5

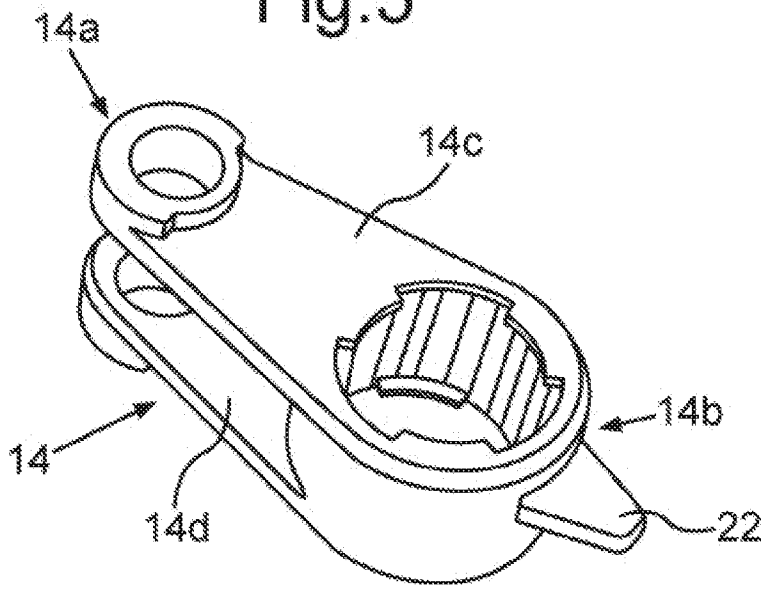


Fig.6

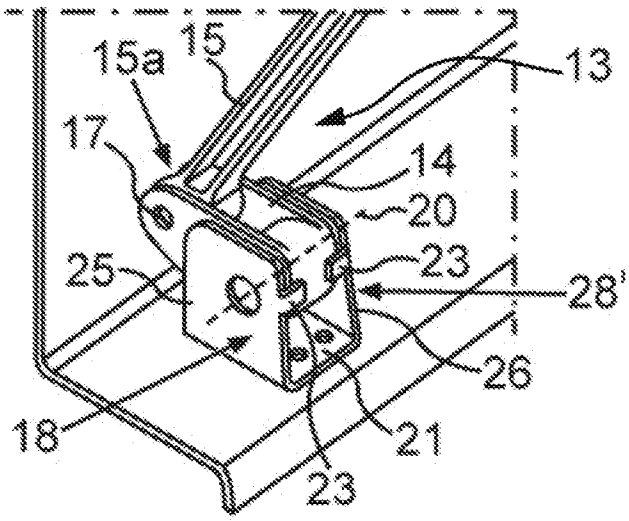


Fig.7

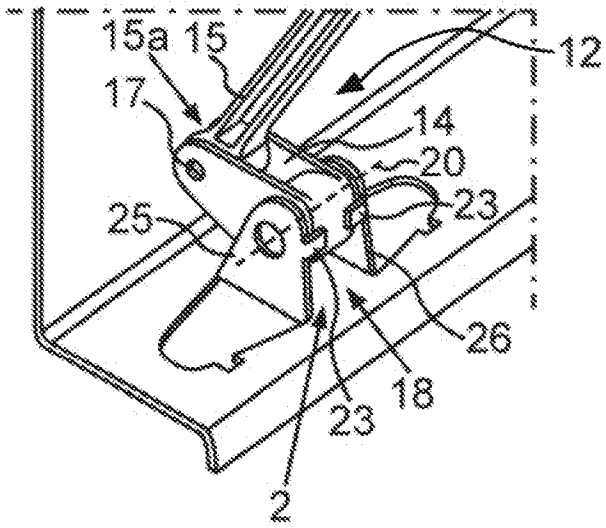

15a
15
12
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14
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23
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18
23
2

Fig.8

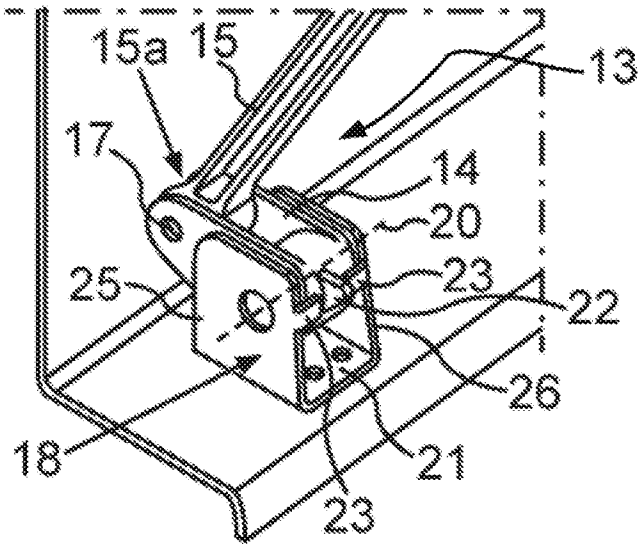

15a
15
13
17
14
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23
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22
26
18
21
23

Fig.9

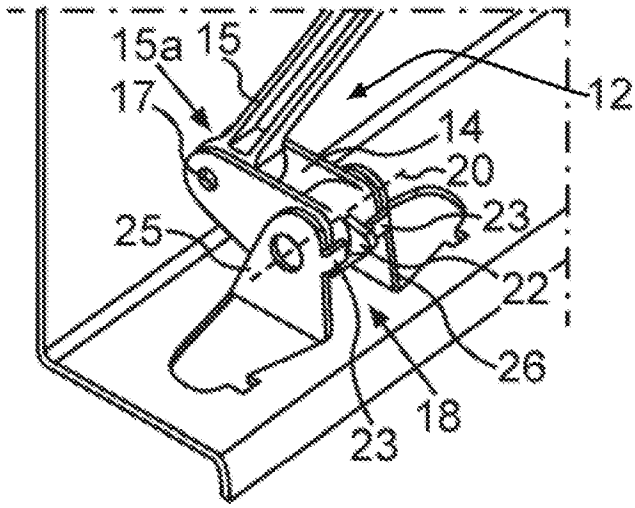


Fig.10

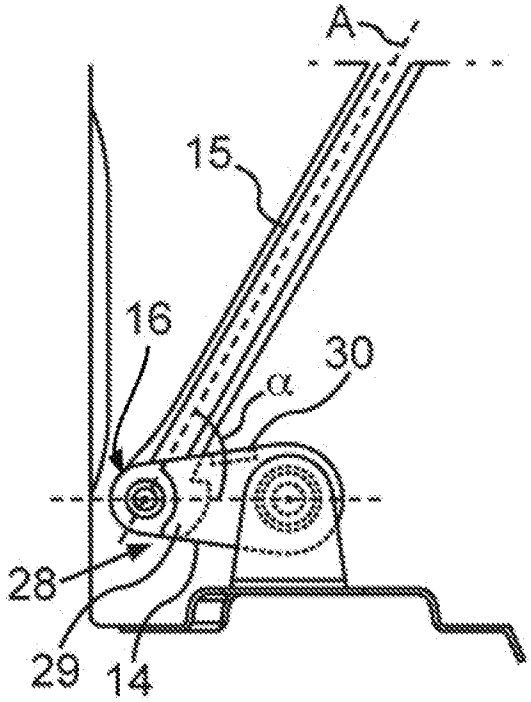
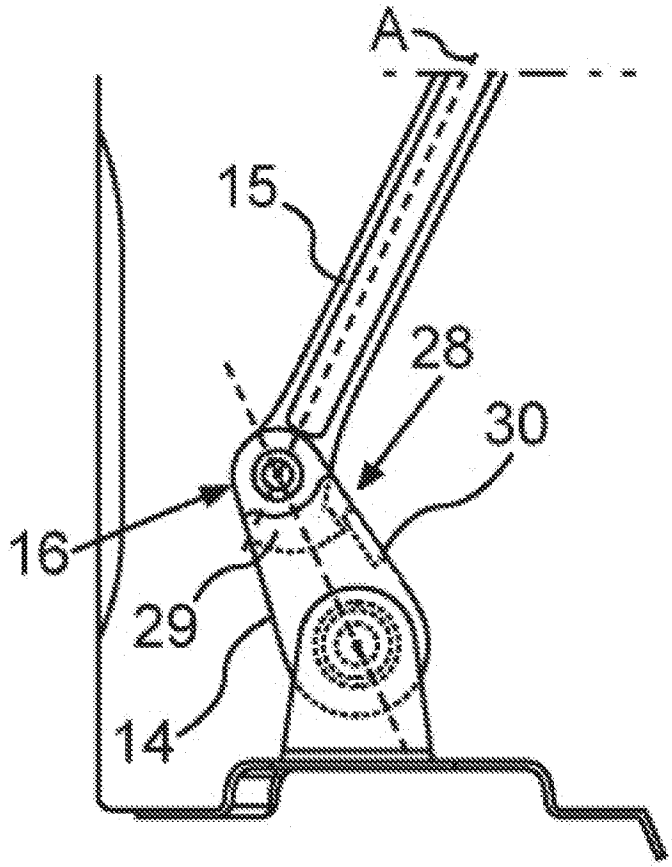


Fig.11



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2017/057529

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06F37/22 D06F49/06 D06F37/20
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 12 11 555 B (CONSTRUCTA WERKE GMBH) 24 February 1966 (1966-02-24)	1,2,10
Y	column 3, line 54 - column 4, line 5; figure 2	6,11
Y	ES 2 372 835 A1 (BSH ELECTRODOMESTICOS ESPANA [ES]) 27 January 2012 (2012-01-27) figure 6	6,11
A	WO 2015/151020 A1 (BSH HAUSGERÄTE GMBH [DE]) 8 October 2015 (2015-10-08) figures 2,3,11	1,6,10
A	WO 2014/072860 A2 (BSH BOSCH UND SIEMENS HAUSGERÄTE GMBH [DE]) 15 May 2014 (2014-05-15) page 10, line 17 - page 11, line 8; figures 3,10	1,10

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 January 2018	09/02/2018

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Kising, Axel

1

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2017/057529

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2011/070092 A1 (BOSCH & SIEMENS HOME APPLIANCES CO LTD) 16 June 2011 (2011-06-16) figures 2-4	1,10
A	US 3 197 983 A (ERWIN ILMER) 3 August 1965 (1965-08-03) figures 1,3	1,10
A	FR 1 256 198 A (BOSCH GMBH ROBERT) 17 March 1961 (1961-03-17) figures 1,2	1,10

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2017/057529

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 1211555 B	24-02-1966	NONE	
ES 2372835 A1	27-01-2012	NONE	
WO 2015151020 A1	08-10-2015	CN 106133230 A	16-11-2016
		EP 3126560 A1	08-02-2017
		ES 2547364 A1	05-10-2015
		WO 2015151020 A1	08-10-2015
WO 2014072860 A2	15-05-2014	CN 104769177 A	08-07-2015
		EP 2917396 A2	16-09-2015
		ES 2460393 A2	13-05-2014
		PL 2917396 T3	28-02-2017
		RU 2015118325 A	27-12-2016
		WO 2014072860 A2	15-05-2014
WO 2011070092 A1	16-06-2011	CN 102652193 A	29-08-2012
		EA 201290462 A1	30-01-2013
		EP 2510143 A1	17-10-2012
		WO 2011070092 A1	16-06-2011
US 3197983 A	03-08-1965	BE 608306 A	15-01-1962
		DE 1290908 B	20-03-1969
		GB 970656 A	23-09-1964
		US 3197983 A	03-08-1965
FR 1256198 A	17-03-1961	NONE	