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(54) **Device for the suspension of a washing tub of a laundry washing machine**

(57) Device for the suspension of a washing tub inside a cabinet of a laundry washing machine, comprising a telescopic damper (2) with terminal heads (6) provided with respective holes (7) for the hooking to the cabinet (11) of the washing machine (10). Such suspension device (1) also comprises elastic means (3) that are wound around the telescopic damper (2) and hooked to the terminal heads (6).

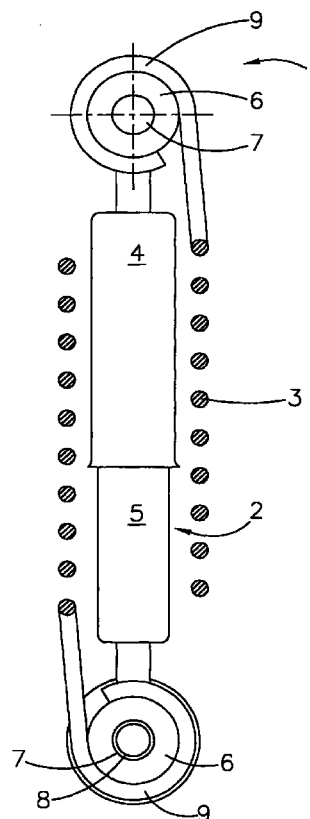


FIG. 1

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Description

[0001] The present invention refers to a device and apparatus for the suspension of a washing tub of a laundry washing machine.

[0002] It is generally known that in modern laundry washing machines a washing tub in which the drum for the laundry to be washed is turningly mounted, is equipped with suspension means that allow it to remain suspended inside the washing machine cabinet. Such suspension means not only must support the washing tub elastically but they must be able to absorb the vibrations due to the rotary motion of the drum inside it, thus maintaining the tub in position. In addition, because of the not homogeneous composition of the laundry and of its arrangement in a random way inside the washing drum, a non-uniform rotation of the washing drum that violently stresses the washing tub can occur. In this case the suspension means must effectively oppose this non-uniform rotation and bring the washing tub back in position when the rotation of the drum stops.

[0003] Such suspension means are usually of two types, that is helicoidal springs provided with hooks for the anchorage of the tub, that are used especially to connect the washing tub with the top plane of the washing machine cabinet, or telescopic dampers, that are used especially to connect the washing tub with the bottom plane of the cabinet of the washing machine.

[0004] Having to avail of the two functions of elastic suspension and of shock absorber, the washing machine must evidently use both types of suspension means with consequent storage problems.

[0005] In view of the state of the art herein described, object of the present invention is to realise a device and an apparatus for the suspension of a washing tub of a laundry washing machine that is capable to carry out both the function of elastic suspension and the one of shock absorber by using a single device.

[0006] According to the present invention, such object is attained by means of a suspension device for a washing tub inside a cabinet of a laundry washing machine, comprising a telescopic damper with terminal heads provided with respective holes for the hooking to the cabinet of said washing machine, characterized in that in addition it comprises elastic means that are wound around said telescopic damper and hooked to said terminal heads.

[0007] Owing to the present invention a single suspension device is utilisable in order to elastically suspend and in a balanced way and at the same time to cushion the vibrations of a washing tub of a laundry washing machine.

[0008] In addition, owing to the transverse rigidity of the telescopic damper and to the presence of terminal heads with hooking holes, such device is particularly efficient in the case of washing tub in compact structures of washing machines with minimum oscillations on the axis of rotation of the washing drum.

[0009] Owing to the present invention it is also possible to realise an apparatus for the suspension of a washing tub of a laundry washing machine that is made with the aforesaid devices in order to realise the suspension of the washing tub in a balanced manner.

[0010] The characteristics and the advantages of the present invention will be made evident from the following detailed description of an embodiment thereof, that is illustrated as a non limiting example in the enclosed drawings, in which:

Figure 1 shows, in front view, a device for the suspension of a washing tub of a laundry washing machine according to the invention;

Figure 2 shows a side view of the bottom part of the suspension device in Figure 1;

Figure 3 shows a side view of a laundry washing machine with washing tub suspended by means of suspension devices as the ones in Figure 1.

[0011] In Figure 1 a suspension device 1 according to the present invention is shown. Such device 1 is made up of a telescopic damper generally indicated by 2 that is wound up by a helicoidal spring 3. The telescopic damper 2 is made up of an external tubular part 4 and an internal tubular part 5 that is capable to slide in the external tubular part 4. The free ends of both tubular parts 4 and 5 are each connected with a circular head 6 that is provided with an internal hole 7 for the anchorage of the suspension device 1 and a bush 8, visible in figure 2, is inserted on one of such holes 7 in order to allow the possible sliding of the device 1 on appropriate guides. The spring 3 is hooked to the heads 6 by means of extensions 9 of its ends that partially surround each head 6.

[0012] In Figure 3 a possible use of the suspension device 1 is shown. A front load laundry washing machine that is globally indicated by 10 comprises a cabinet 11 in which a washing tub 12 is suspended centrally by means of the suspension devices 1. The washing tub 12 contains a cylindrical drum 13, with axis perpendicular to the back wall 14 of the cabinet 11, destined to contain the laundry to be washed, which is turningly mounted in the same tub.

[0013] The washing tub 12 is suspended inside the cabinet by means of lower and upper pairs of suspension devices 1. The suspension devices belonging to the upper pair are anchored in 15 to the top part of the washing tub 12 by hooking of the same with the heads 6 integral with the internal tubular parts 5, while the heads 6 integral with the external tubular parts 4 and provided with bushes 8 are slidingly coupled with upper supports 16 having perpendicular ends hooked to the upper plane 18 of the cabinet 11. The suspension devices belonging to the lower pair are connected with the washing tub 12 too, in its bottom part, by hooking at in 15 of the heads 6 integral with the internal tubular parts 5, whereas the heads 6 integral with the external

tubular parts 4 and provided with bushes 8 are slidingly coupled with bottom supports 17 having perpendicular ends are hooked to the bottom plane 19 of the cabinet 11.

[0014] The telescopic dampers 2 of the devices 1 have the purpose not only to hold the washing tub 12 in suspension but to make the system consisting of the washing tub 12 and of the devices 1 auto-balancing, with suspension in traction, damping and position. The telescopic dampers also have the task to curb the reaction of the spring 3 in the case of extension or compression of the same spring.

[0015] As it becomes evident possible vibrations or lateral displacements of the washing tub 12 are opposed by the devices 1 in order to bring the washing tub always back in substantially central position, by limiting the extent of the dynamic oval that is caused by the load in the washing tub.

[0016] The elastic deformation and calibration loads both of the helicoidal spring 3 and of the damper 2 must be set as a dynamic function of the required oscillation while considering the volume inside the cabinet 11 and the weight of the washing tub 12. For example it is possible to use either two lower and upper pairs of devices 1 with an elastic capacity comprised between 40 % and 70% of the weight of the washing tub 12 or several devices 1 by re-proportioning the supporting and action capacity of the system under particular conditions of weight or in the case of the use of assisted electronics for the programming of the centrifugal drying stage.

[0017] The use of the devices 1 together with other known damping devices for the suspension of the washing tub 12 inside the cabinet 11 is also possible.

[0018] Such suspension devices can also be used in top load washing machines, by positioning them in suitable manner inside the structure of the washing machine cabinet.

[0019] Such suspension devices allow the construction of a new apparatus for the suspension of a washing tub of a washing machine.

[0020] An apparatus for the suspension of a washing tub inside a washing machine comprises suspension devices that are made up of telescopic dampers 2 with terminal heads 6 provided with respective holes 7 for the hooking to the cabinet 11 of the washing machine 10 and provided with elastic means 3, for example helicoidal springs, that are wound around the telescopic dampers 2 and hooked to said terminal heads 6. Such suspension devices 1 are arranged in such a way as to suspend the washing tub 12 of the washing machine 10 in a balanced manner.

[0021] An apparatus of the type above described is easily assemblable since it utilises the same suspension devices in the lower and upper parts of the washing machine.

[0022] Such apparatus can use different suspension devices inside the cabinet of the washing machine

in order to suspend the washing tub in a balanced way.

[0023] The suspension devices previously described allow the construction of a new type of washing machine.

[0024] A washing machine comprising a washing tub 12 inside a cabinet 11 and suspension devices 1 of the washing tub 12. The suspension devices 1 are made up of telescopic dampers 2 with terminal heads 6 provided with respective holes 7 for the hooking to the cabinet 11 of the washing machine 10 and provided with elastic means 3, for example helicoidal springs, that are wound around the telescopic dampers 2 and hooked to the terminal heads 6. Such suspension devices 1 are arranged in a such a way so as to suspend the washing tub 12 of the washing machine 10 in a balanced manner.

Claims

1. Device for the suspension of a washing tub inside a cabinet of a laundry washing machine, comprising a telescopic damper (2) with terminal heads (6) provided with respective holes (7) for the hooking to the cabinet (11) of said washing machine (10), characterized in that it also comprises elastic means (3) that are wound around said telescopic damper (2) and hooked to said terminal heads (6).
2. Suspension device according to claim 1, characterized in that said elastic means (3) are made up of a helicoidal spring.
3. Apparatus for the suspension of a washing tub inside a cabinet (11) of a laundry washing machine (10), characterized in that it comprises suspension devices (1) that are made up of telescopic dampers (2) with terminal heads (6) provided with respective holes (7) for the hooking to the cabinet (11) of said washing machine (10) and provided with elastic means (3) that are wound around said telescopic dampers (2) and hooked to said terminal heads (6), being said suspension devices (1) arranged in such a way as to suspend the washing tub (12) of said washing machine (10) in a balanced manner.
4. Apparatus according to claim 3, characterized in that said elastic means (3) are made up of a helicoidal spring.
5. Laundry washing machine comprising a washing tub (12) inside a cabinet (11) and suspension devices (1) of said washing tub (12), characterized in that suspension devices (1) are made up of telescopic dampers (2) with terminal heads (6) provided with respective holes (7) for the hooking to the cabinet (11) of said washing machine (10) and provided with elastic means (3) that are wound around said telescopic dampers (2) and hooked to

said terminal heads (6), said suspension devices being arranged in such a way as to suspend the washing tub (12) of said washing machine (10) in a balanced manner.

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6. Washing machine according to claim 5, characterized in that said elastic means (3) are made up of a helicoidal spring.

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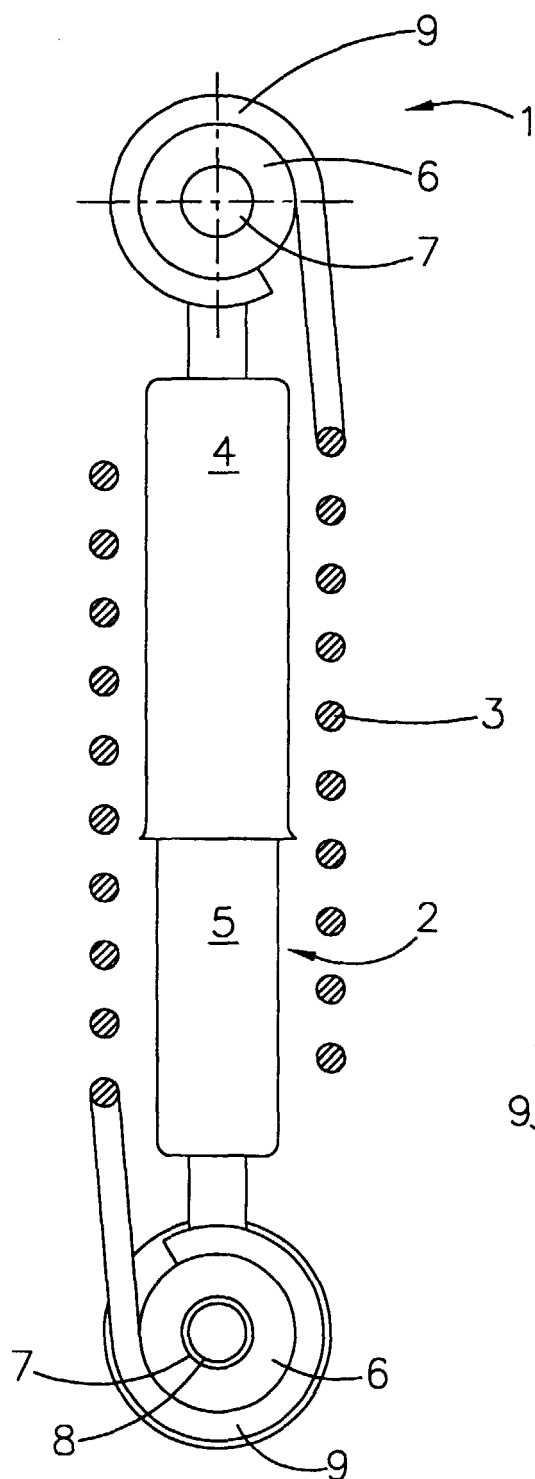


FIG. 1

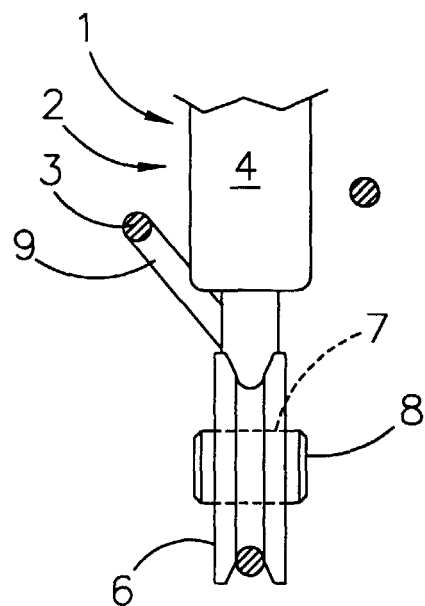


FIG. 2

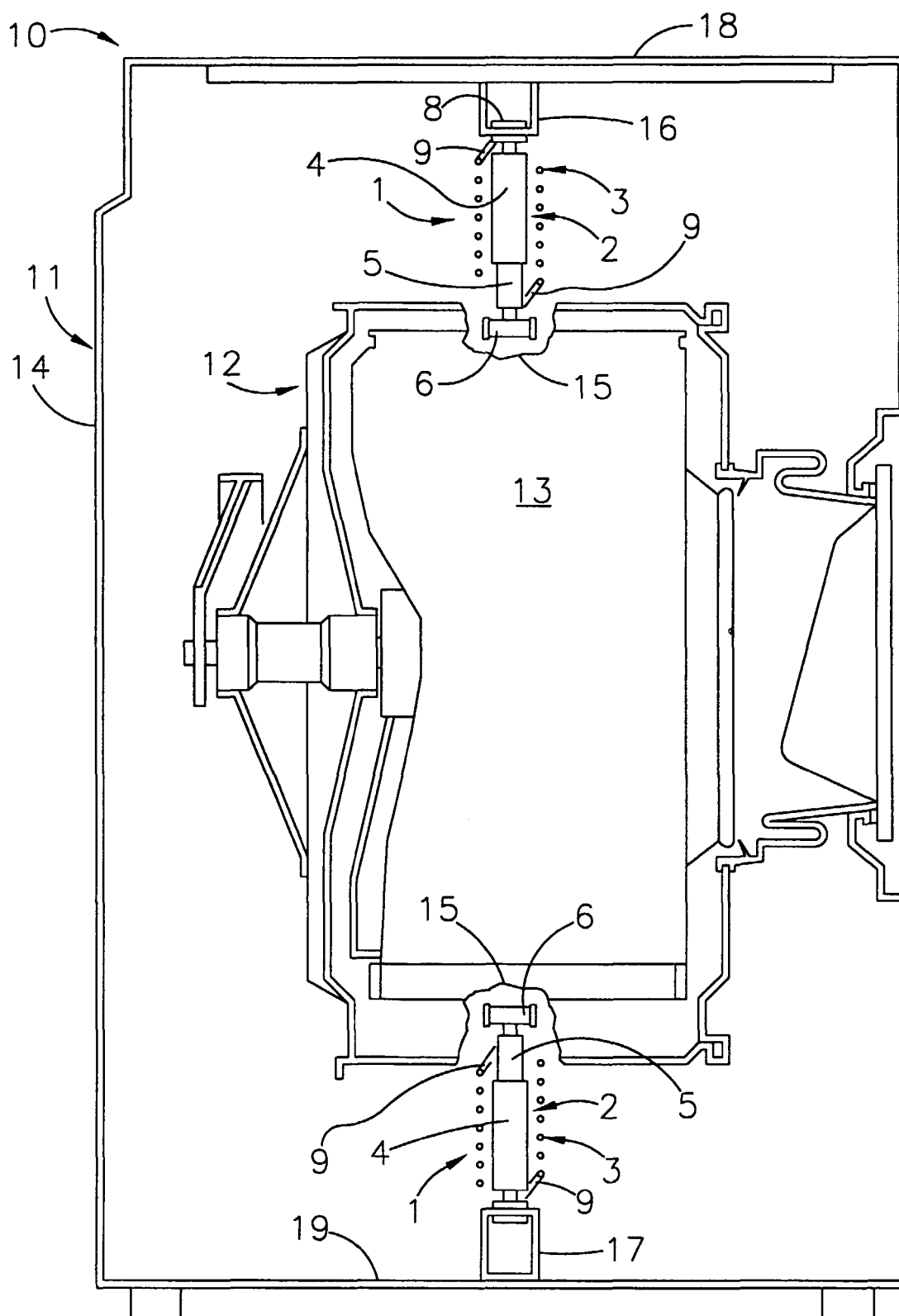


FIG.3



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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 3477

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			D06F
Place of search		Date of completion of the search	Examiner
THE HAGUE		13 February 2001	Fairbanks, S
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EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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