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(54) **Braked hinge for household appliance door.**

(57) A braked hinge for household appliance door includes a first bracket (1), to be secured to the door, that is pivoted onto a second bracket (2), to be secured to the structure of the household appliance, through a first pin (3), as well as a second pin (4) that provides the pivoting onto the first bracket (1) of a tie-rod (5) that acts on a hollow body (6) that slidably houses two opposite slide pads (7) between which there is arranged a friction spring (8) that tends to push the pads (7) out of the ends of the

hollow body (6), a plurality of hold springs (9) being arranged between the hollow body (6) and a front abutment (11b) of a double-guide member (11), pivoted onto the second bracket (2) through a third pin (12), that houses the hollow body (6) and the hold springs (9) and is provided with slide surfaces (11a) for the pads (7). This hinge structure simplifies the manufacturing and assembling phases, resulting in a cost reduction, and assures an effective and reliable operation.

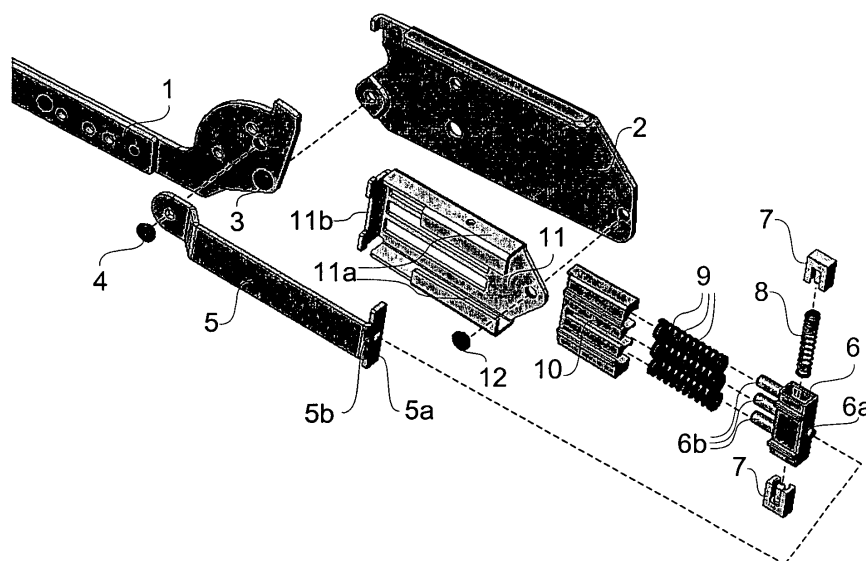


Fig. 3

Description

[0001] The present invention relates to hinges used for household appliance doors, and in particular to a braked hinge for a door rotating around a horizontal axis. Specific reference will be made in the following to a dishwasher door, while it is clear that what is being said is also applicable to other types of household appliances such as ovens, washing machines, etc.

[0002] It is known that a dishwasher door is usually hinged to the machine frame along its bottom side through fixed fulcrum hinges, constructionally simple and particularly reliable, that often also have the function of "balancing" the door by means of slide pads used as brakes. In other words, the hinge is able to hold the door at any intermediate position between the closed position and the open position thanks to the friction exerted by said pads against suitable guides.

[0003] An example of a known hinge can be found in EP-A-1302150 that discloses a hinge with a pair of pads that slide along substantially vertical guides. Although functional, said known hinge has various drawbacks both in manufacturing and operation, that can be summarized as follows:

- a) the hinge is made as an assembly of several mutually pivoted members connected through a plurality of pins or the like, at least 5 in the simplest embodiment, which implies a complex assembling phase;
- b) the door holding spring is mounted afterwards because its size does not allow for an integration thereof into the hinge, and this poses a problem in that the mounting of the holding spring on the assembly line requires a particular care due to the strength of the spring;
- c) the hinge is normally first mounted on the dishwasher door and subsequently the assembly is applied to the machine structure by securing the hinge to the frame; this kind of mounting is usually difficult in that the hinges tend to take by gravity a position that is different from the screwing position, whereby the operator is forced to manoeuvre in order to perform the mounting;
- d) the slide pads are pivoted to the relevant carrying members through rivets that, in particular in case the pad material is "soft", tend to cut them making the connection loose and thus jeopardizing the correct operation of the hinge.

[0004] Therefore the object of the present invention is to provide a hinge which overcomes said drawbacks. This object is achieved by means of a hinge having the characteristics disclosed in claim 1. Other advantageous features of the present hinge are disclosed in the dependent claims.

[0005] A first important advantage of the hinge according to the present invention stems from the fact that it

can provide the required hold to the door without the need for a separate holding spring. As a consequence, the holding spring mounting step is dispensed with since the function of said spring is integrated into the hinge.

[0006] A second significant advantage of said hinge is the ease of mounting on the door in that, thanks to the integrated spring, it takes automatically and naturally the correct mounting position.

[0007] A further great advantage of this hinge is that the slide pads are assembled into the hinge without using rivets or the like, whereby it is possible to use also a soft material having a high friction coefficient without risks of malfunctioning of the hinge. In fact, the operating pressure is distributed over a larger area so as to decrease the specific local pressure.

[0008] Still another advantage of the present hinge is its structural simplicity, since a lower number of parts assembled through 3 pins only allows for an automatic or semi-automatic assembling, which reduces the manufacturing cost and assures a high reliability.

[0009] These and other advantages and characteristics of the braked hinge according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the annexed drawings wherein:

Fig. 1 is a diagrammatic side view of the hinge applied to a household appliance, in the position corresponding to the closed door;

Fig. 2 is a partially see-through view similar to the preceding one; and

Fig. 3 is a perspective exploded view of the above-mentioned hinge.

[0010] With reference to said figures, there is seen that a hinge according to the present invention conventionally includes a first bracket 1, integral with the door, that is pivoted onto a second bracket 2, integral with the structure of the household appliance, through a first pin 3, while a second pin 4 provides the pivoting on bracket 1 of a tie-rod 5, which transmits the door movement to the resilient hold and brake members.

[0011] The novel aspect of the present hinge resides in the number and arrangement of said resilient members and of the other members cooperating therewith.

[0012] More specifically, the rear end of tie-rod 5 (i.e. the end toward the inside of the machine) is shaped with a perpendicular flange 5a in which there is formed a hole 5b suitable to engage a corresponding peg 6a formed on the rear face of a hollow vertical body 6, which is provided with three horizontal spindles 6b on the front face thereof.

[0013] Inside the hollow body 6 there are slidably arranged two opposite slide pads 7, between which there is arranged a vertical friction spring 8 that tends to push said pads 7 out of the ends of the pad-holding body 6. Three horizontal hold springs 9 are slipped at one end onto spindles 6b, and at the other end are introduced into corresponding horizontal seats formed in a guide mem-

ber 10.

[0014] The group of members 6-10 is housed in a double-guide member 11, provided with slide surfaces 11 a for pads 7 and with a front abutment 11 b for the spring guide 10. Surfaces 11 a are substantially horizontal and preferably slightly converging to the front, as illustrated in figs. 1 and 2.

[0015] This double guide 11 is also pivoted onto the second bracket 2 through a third pin 12, while the rear abutment that retains members 6-10 within the double guide 11 is flange 5a of tie-rod 5. Moreover, for a greater stability of the hinge, in the side of the pad holder 6, of the spring guide 10 and of the front abutment 11b facing tie-rod 5 there are preferably formed seats suitable to receive said tie-rod 5.

[0016] In the light of the description above, the simple and reliable operation of the hinge according to the present invention is readily understood.

[0017] Starting from the closed position of figs. 1-2, during the opening of the door the first bracket 1 rotates around the first pin 3 and through the second pin 4 takes therewith tie-rod 5 that in turn, through flange 5a, pulls the pad holder 6 causing a progressive compression of the hold springs 9. At the same time, pads 7 slide along surfaces 11 a of the double guide 11 coming closer due to the convergence of surfaces 11a, and thus generating an increasing friction thanks to the ever increasing push toward the double guide 11 caused by the progressive compression of the friction spring 8.

[0018] Through a proper selection of springs 8 and 9 it is thus possible to obtain a braked hinge that also performs the door holding function.

[0019] It is clear that the above-described and illustrated embodiment of the hinge according to the invention is just an example susceptible of various modifications. In particular, the number of springs 9 and therefore of spindles 6b and seats in the spring guide 10 can change according to specific needs, and also the shape of the pad holder 6 and of pads 7 can be different from the rectangular cross-section illustrated in the drawings.

[0020] Similarly, the exact shape of the other members such as tie-rod 5 or double guide 11 can be changed if need arises, for example by forming the seats for springs 9 into the double guide 11 and thus dispensing with the spring guide 10.

[0021] Furthermore, it should be noted that the references to the horizontal or vertical direction of the various members that make up the hinge are to be construed as merely exemplificative, since the hinge could operate even with a different orientation as long as tie-rod 5 is connected to the pad holder 6 in a way suitable to transmit the movement of the door.

[0022] Finally, it is obvious that the coil springs 8, 9 illustrated in the drawings can be replaced with other equivalent resilient members.

Claims

1. Braked hinge for household appliance door including a first bracket (1), to be secured to the door, that is pivoted onto a second bracket (2), to be secured to the structure of the household appliance, through a first pin (3), as well as a second pin (4) that provides the pivoting onto said first bracket (1) of a tie-rod (5) suitable to transmit the door movement to resilient hold and brake members, **characterized in that** said tie-rod (5) acts on a hollow body (6) that slidably houses two opposite slide pads (7) between which there is arranged a friction spring (8) that tends to push said pads (7) out of the ends of said hollow body (6), a plurality of hold springs (9) being arranged between the hollow body (6) and a front abutment (11b) of a double-guide member (11), pivoted onto said second bracket (2) through a third pin (12), that houses the hollow body (6) and said hold springs (9) and is provided with slide surfaces (11a) for the pads (7).
2. Braked hinge according to claim 1, **characterized in that** the slide surfaces (11a) are slightly converging to the front.
3. Braked hinge according to claim 1 or 2, **characterized in that** the front ends of the hold springs (9) are introduced into corresponding seats formed in a guide member (10) also housed within the double-guide member (11).
4. Braked hinge according to one of the preceding claims, **characterized in that** the rear end of the tie-rod (5) is shaped with a perpendicular flange (5a) in which there is formed a hole (5b) suitable to engage a corresponding peg (6a) formed on the rear face of the hollow body (6).
5. Braked hinge according to one of the preceding claims, **characterized in that** the rear ends of the hold springs (9) are slipped onto corresponding spindles (6b) formed on the front face of the hollow body (6).
6. Braked hinge according to one of the preceding claims, **characterized in that** in the side of the hollow body (6), of the guide member (10) and of the front abutment (11b) facing the tie-rod (5) there are formed seats suitable to receive said tie-rod (5).
7. Braked hinge according to one of the preceding claims, **characterized in that** the hollow body (6) and the slide pads (7) have a cylindrical shape with a rectangular cross-section.

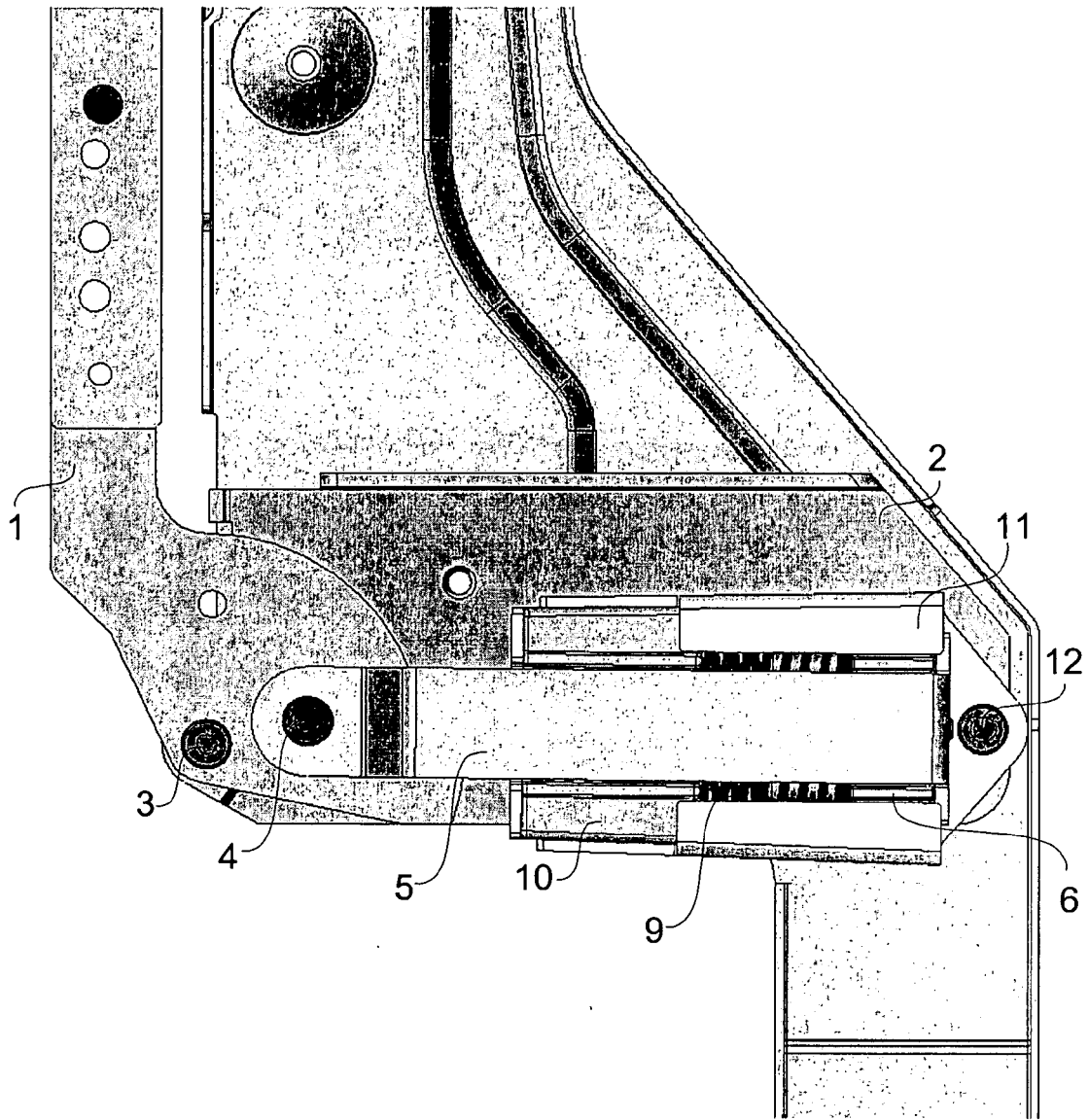


Fig. 1

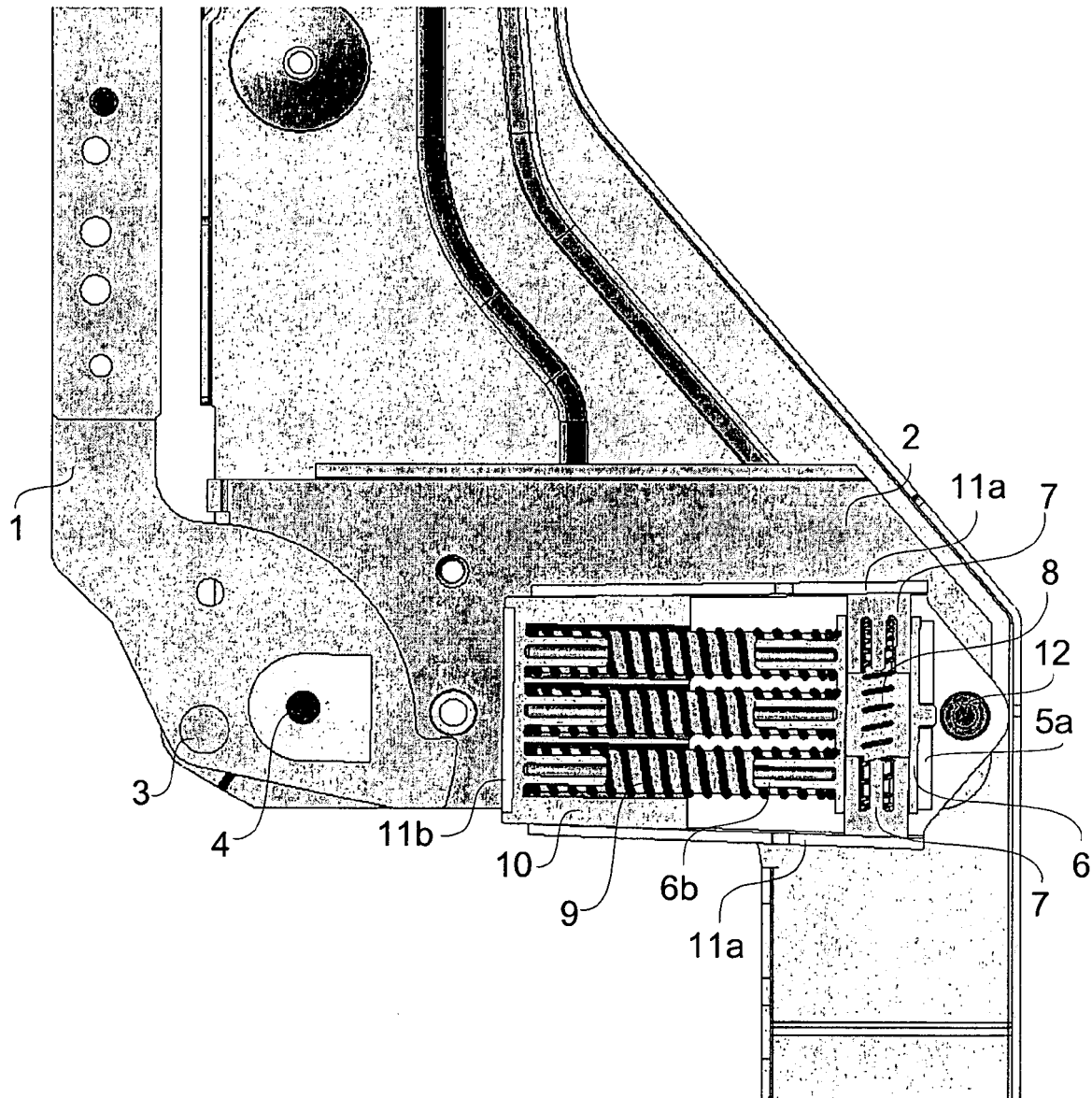


Fig. 2

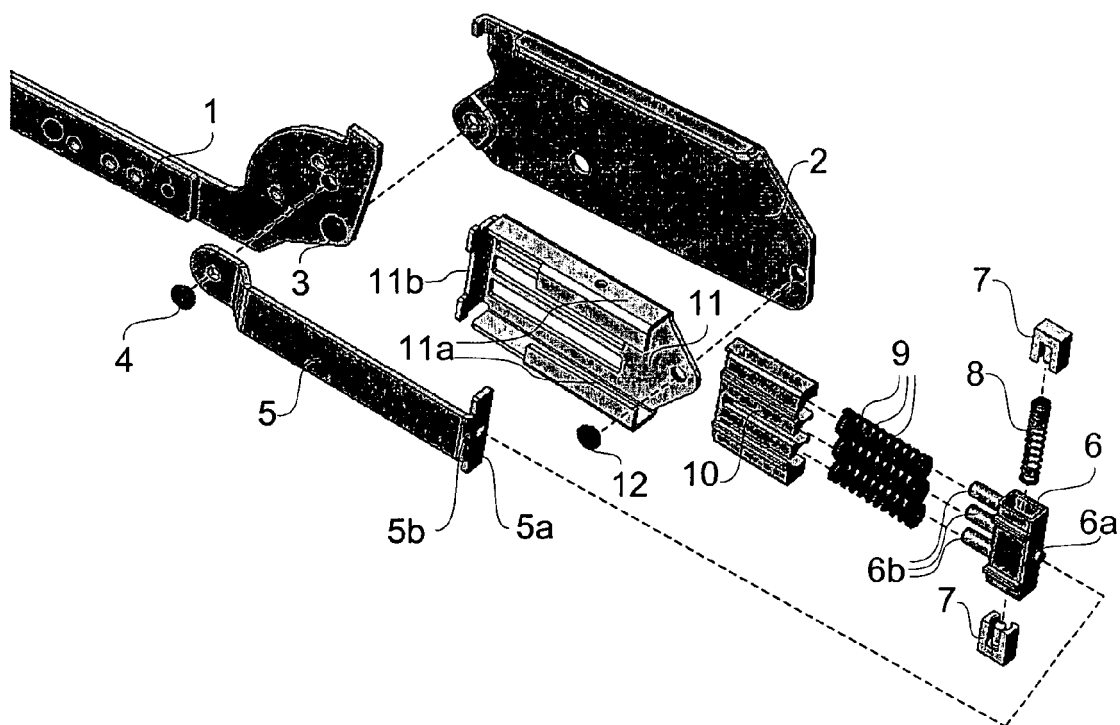


Fig. 3



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 06 42 5567

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	EP 1 302 150 A (C M I S R L [IT]) 16 April 2003 (2003-04-16) * paragraph [0014] - paragraph [0029]; claims; figures * -----	1,2	INV. A47L15/42 F24C15/02
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		8 January 2007	Courrier, Gilles
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EPO FORM 1503, 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 42 5567

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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08-01-2007

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REFERENCES CITED IN THE DESCRIPTION

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