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(54) Support and sealing assembly for the drum of a laundry dryer.

(57) A laundry dryer (4) is described having a housing (5) and a drum (6) mounted therein for rotation about a horizontal axis and formed of a peripheral wall (7) and two end walls (8, 9). Rear end wall (9) is of circular shape and mounted on the rear wall of housing (5). Front end wall (8) is formed with a central circular opening (10) surrounded by an upstanding rim having a horizontal portion (11) and a rearwardly curved end portion (12).

An annular support collar (13) secured to the front wall of housing (5) is of substantially S-shaped cross-sectional configuration comprising an inner portion (14) disposed within drum opening (10) and an outer portion (15) facing rearwardly curved end portion (12). Inner portion (14) carries a fixed lower bearing member (18) and a pair of upper bearing members (16, 17) biased radially outwards by paired springs (20) into engagement with horizontal rim portion (11).

Outer collar portion (15) contains a support (25) carrying a sealing element (24) and biased towards drum (6) by associated compression springs (30) so as to engage sealing element (24) with rearwardly curved rim end portion (12). The bearing components and sealing components thus act in mutually perpendicular directions, so that wear of one component does not impair the effectiveness of the other.

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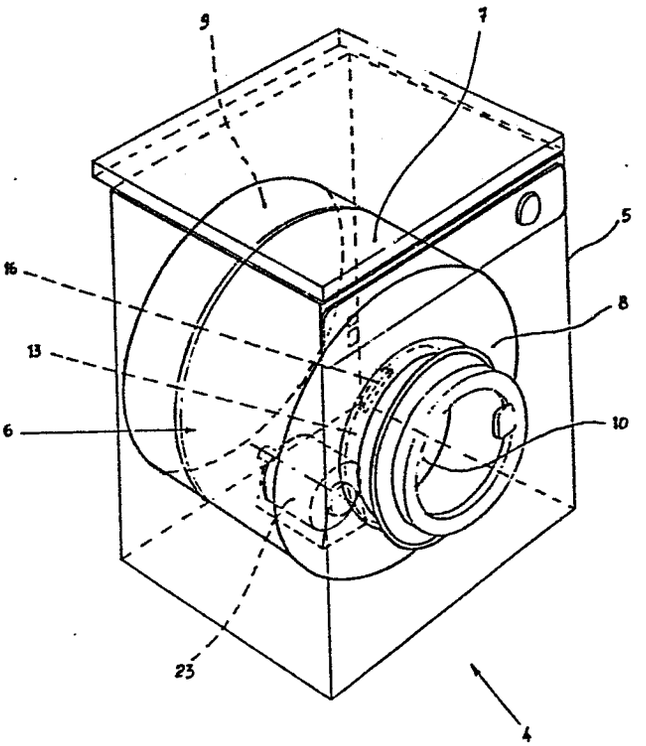

Fig. 1

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Support and Sealing Assembly for the Drum of a Laundry Dryer

Description

The present invention generally relates to a laundry dryer provided with a rotatable drum adapted to contain the laundry to be dried and supported in a sealing manner within an outer housing of the machine.

As generally known, conventional laundry drying machines are provided with a drum adapted to permit the passage of a drying air flow therethrough and formed of a cylindrical peripheral wall and two end walls, a forward and a rearward one, each of which may be supported within the housing of the machine. In particular, the forward end wall is formed with a circular opening surrounded by a raised rim portion adapted to be rotatably received in a circular support element secured to the front wall of the housing and provided on its outer periphery with fixed roller and/or frictional bearing elements, for example rollers, bearing shells or the like formed of a low-friction material.

Between the front end wall of the drum and the annular support there is usually disposed a sealing gasket formed of felt or another low-friction material capable of being resiliently compressed in the radial direction into engagement with the edge of the drum by means of annular elements formed of rubber or a synthetic foam material so as to prevent the circulated hot air from escaping from the drum towards the housing of the machine. Due to the inevitable friction with the front end wall of the drum, the sliding support or bearing elements are worn, at times even in a non-uniform manner, resulting in a progressively irregular rotation of the drum. In this case there is no longer a continuous contact between the edge portion of the drum and the bearing elements, resulting in a non-uniform contact

also of the sealing elements, permitting the drying air to escape from the drum so as to correspondingly reduce the thermal efficiency of the machine. In addition, the irregular contact may result in the laundry getting caught between the drum and the bearing elements, with the resultant danger of the laundry being damaged. It is also to be noted that the resilient annular elements made of rubber or a foamed synthetic material and used for radially biasing the sealing elements into engagement with the surface of the drum may be unable to produce a sufficient oscillation of the sealing elements for the latter to remain in contact with the irregularly rotating drum. Also, in the presence of particularly humid environmental conditions, the material of the annular biasing elements may be subjected to degradation so as to lose the resilient properties required for functioning properly. Also to be taken into account are the manufacturing tolerances between the stationary elements and the movable parts as well as a possible overloading of the drum with laundry to be dried which may prejudice the regular rotation of the drum and thus the proper function of the supporting and bearing components.

In view of the above, it is an object of the present invention to provide a laundry drying machine of the type having a rotatable drum, wherein the components employed for mounting the drum are capable of compensating any play caused by wear and/or by manufacturing tolerances of the components subjected to frictional wear.

Another object of the invention is the provision of a laundry drying machine of the type defined above provided with sealing means which are not readily degraded and designed to ensure a continuous and reliable contact with an associated portion of the drum, so as to provide an air-tight seal.

These and other objects are attained according to the invention by asupport and sealing assembly for the drum of a

laundry dryer comprising a housing in which said drum for containing the laundry to be dried is mounted for rotation about a horizontal axis, said drum having a cyclindrical peripheral wall, a rear end wall mounted within the housing of the machine, and a front end wall formed with a central opening supported in a corresponding collar disposed interiorly of said housing and provided with bearing means for rotatably mounting said drum and sealing means for retaining the drying air stream passing through said drum, said support and sealing assembly being characterized in that said support collar for said front end wall of said drum comprises a portion projecting into said opening of said drum and adapted to accommodate fixed bearing means and resilient bearing means oscillating in the radial dircection of said drum, and a portion adapted to accommodate air sealing means displaceable in a direction parallel to the axis of said drum, said bearing means and said sealing means being adapted to cooperate respectively with a horizontal rim portion and a rearwardly curved end portion of said drum front end wall.

Further characteristics and advantages of the invention wil become more clearly evidetn from the following description, given by way of a non-limiting example with reference to the accompanying drawings, wherein:

fig. 1 shows a diagrammatical perspective front view of a laundry dryer provided with a support and sealing assembly according to the invention,

fig. 2 shows a partially sectioned front elevational view of the rotatable mounting of the drum front end wall, and

fig. 3 shows an enlarged cross-sectinal view taken along this line III-III in fig. 2.

A laundry dryer generally indicated at 4 in fig. 1 is pro-

vided with a support and sealign assembly according to the invention, and itself comprises an outer housing 5 with a cylindrical drum 6 mounted therein for rotation about a horizontal axis. Drum 6 is formed of a peripheral wall 7 and two end walls 8, 9, a front end wall 8 being of annular shape and formed with a central opening 10 corresponding to the charging window of laundry dryer 4, and a rear end wall 9, both end walls being rotatably supported within housing 5. In particular, rear end wall 9 may be provided with a central stub axle (not shown) cooperating with bearing means (likewise not shown) secured to the interior rear wall of housing 5. Opening 10 of front end wall 8 is surrounded by an upstandign rim projecting towards the front wall of housing 5 and having a horizontally extending rim portion 11 terminating in a rearwardly curved end portion 12.

Secured to the interior front wall surface of housing 5 at a position facing the rim of opening 10 of front end wall 8 is a circular support collar 13 having a configuration similar to the letter "S" in cross-section as shown in fig. 3.

This radial cross-sectional configuration of collar 13 is composed of an inner portion 14 disposed interiorly of opening 10 of front end wall 8 at a location underlying the rectilinear rim portion 11, and an outer portion 15 located opposite rearwardyl curved end portion 12 of the above mentioned rim. Inner portion 14 of collar 13 accommodates three bearing members 16, 17 and 18 of a low-friction material (fig. 2) for rotatably retaining therebetween rim portion 11 of drum 6.

Two such bearing memebrs 16 and 17 are located at the upper arcuate portion of collar 13 in symmetrical relationship with respect to the vertical axis x-x of drum 6, while the third bearing member 18 is disposed at the lower portion of collar 13 in alignment with axis x-x of drum 6.

Lower bearing member 18 is of the fixed type usually employed in laundry dryers, while the two upper bearing members 16 and 17 are mounted for resilient oscillation in a substantially radial direction within corresponding openings 19 formed in inner portion 14 of collat 13 opposite horizontal rim portion 11 of drum 6. Each upper bearing member 16, 17 is resiliently biased towards rim portion 11 of drum 6 by a pair of compression springs 20 disposed between the radially inner surface of the respective bearing member 16 or 17 and a seat 21 formed at the bottom of inner portion 14 of collar 13 as shown in fig. 3. In addition, upper bearing members 16, 17 are formed with a projecting shoulder 22 adapted to seat on the interior rims of opening 19 for preventing the respective bearing member from escaping from support collar 13 as long as they are not retained therein by rim portion 11 of drum 6. The force of springs 20 is suitably calculated for compensating the compressive loads exerted by the weight of the drum and the laundry contained therein and by the reactive force of a transmission belt extending between a motor 23 and drum 6 of the laundry dryer.

In the laundry dryer according to the invention, air-tight sealing of drum 6 adjacent front end wall 8 is accomplished by means of an annular element 24 (fig. 3) made of felt or a similar material and having an inverted C-shaped cross-sectional configuration, the free end portions of which are secured to a circular support 25 slidingly received in a horizontal direction within outer collar portion 15 as shown in fig. 3.

The insertion of slidable support 25 into collar portion 15 is facilitated by chamfered surface portions 27 formed along the edge 26 of collar 13. On its side facing towards the front of laundry dryer 4, circular support 25 is provided with a plurality of horizontally projecting pins 29 each surrounded by a compression spring 30 for biasing support 25 towards the rim of drum 6 so as to compressively engage

annular felt element 24 with rearwardly curved end portion 12 ot the rim of drum 6.

For preventing support 25 from escaping from collar portion 15 under the biasing force of springs 30, edge 26 of collar 13 is formed with a plurality of inwards directed stop projections 28 adjacent chamfered surfaces 27 for retaining support 15.

From the above description it is evident that the laundry dryer according to the invention is superior to known laundry dryers of similar type as regards it efficiency and reliability in operation. The resilient bearing members 16 and 17 are effective to compensate the varying charging conditions and orientation of drum 6 so as to keep the latter aligned with its ideal axis of rotation in cooperation with the fixed lower bearing member 18 which has for its main function the centering of the rotating drum.

The upper bearing members 16, 17 are continually kept in contact with the rim of drum 6 by the combined action of the associated pairs of springs 20. In this manner they contribute equally to the support of the drum resulting in their being worn in a more uniform manner, whereby their useful life is extended.

In the described manner, the gap existing between the bearing surfaces of the bearing members and the rim of the drum is kept substantially constant over an extended period of time, whereby numerous causes for heat losses and for laundry being damaged are eliminated. In addition to the descriebd advantages, the laundry dryer according to the invention derives further advantages from the employ of a spring-biased support for the air-tight sealing gasket, which support is not subjected to noticeable degradation and is capable of moving over a sufficient distance for reliably keeping the sealing gasket 24 in continuous contact with the end portion 12 of the rim of the drum 6. This

particular feature in combination with the described configuration of the felt gasket ensure an effective air-tight seal even in the case of excessive manufacturing tolerances between stationary and moving components.

Finally to be underlined is the advantageous combination of supporting and sealing components acting in two directions perpendicular to one another. As a result, any wear of the radially-acting supporting components will be of no consequence for the effectiveness of the axially acting sealing components.

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Support and Sealing Assembly for the Drum of a Laundry Dryer

Patent Claims

1. A support and sealing assembly for the drum of a laundry dryer comprising a housing in which said drum for containing the laundry to be dried is mounted for rotation about a horizontal axis, said drum having a cylindrical peripheral wall, a rear end wall mounted within the housing of the machine, and a front end wall formed with a central opening supported in a corresponding collar disposed interiorly of said housing and provided with bearing means for rotatably mounting said drum and sealing means for retaining the drying air stream passing through said drum, characterized in that said support collar (13) for said front end wall (8) of said drum (6) comprises a portion (14) projecting into said opening (10) of said drum and adapted

to accommodate fixed bearing menas (18) and resilient bearing means (16, 17) oscillating in the radial direction of said drum, and a portion (15) adapted to accommodate air sealing means (24) displaceable in a direction parallel to the axis of said drum (6), said bearing means (16, 17, 18) and said sealing means (24) being adapted to cooperate respectively with a horizontal rim portion (11) and a rearwardly curved end portion (12) of said drum front end wall (8).

2. A support and sealing assembly according to claim 1, characterized in that said bearing means (16, 17, 18) for said drum (6) comprises at least two bearing members (16, 17) located at the upper arcuate portion of said collar (13) in symmetric relationship with respect to the longitudinal axis of said drum (6), each said bearing member (16, 17) cooperating with at least one compression spring (20) capable of causing it to resiliently oscillate in a radial direction within a corresponding opening (19) formed in the respective portion (14), and a fixed bearing member (18) secured to the lower portion of said collar (13) in alignment with the longitudinal axis of said drum (6).

3. A support and sealing assembly according to claim 1 or 2, characterized in that said air sealing means comprises an annular element (24) formed of a low-friction material and having an inverted C-shape cross-sectional configuration, the two free end portions of which are secured to an annular support (25) mounted for horizontal sliding displacement in the respective portion (15) of said collar (13) and provided with a plurality of horizontal pins (29) carrying respective compression springs (30) adapted to resiliently bias said support (25) and said annular element (24) into engagement with the rearwardly curved end portion (12) of the rim of said drum (6).

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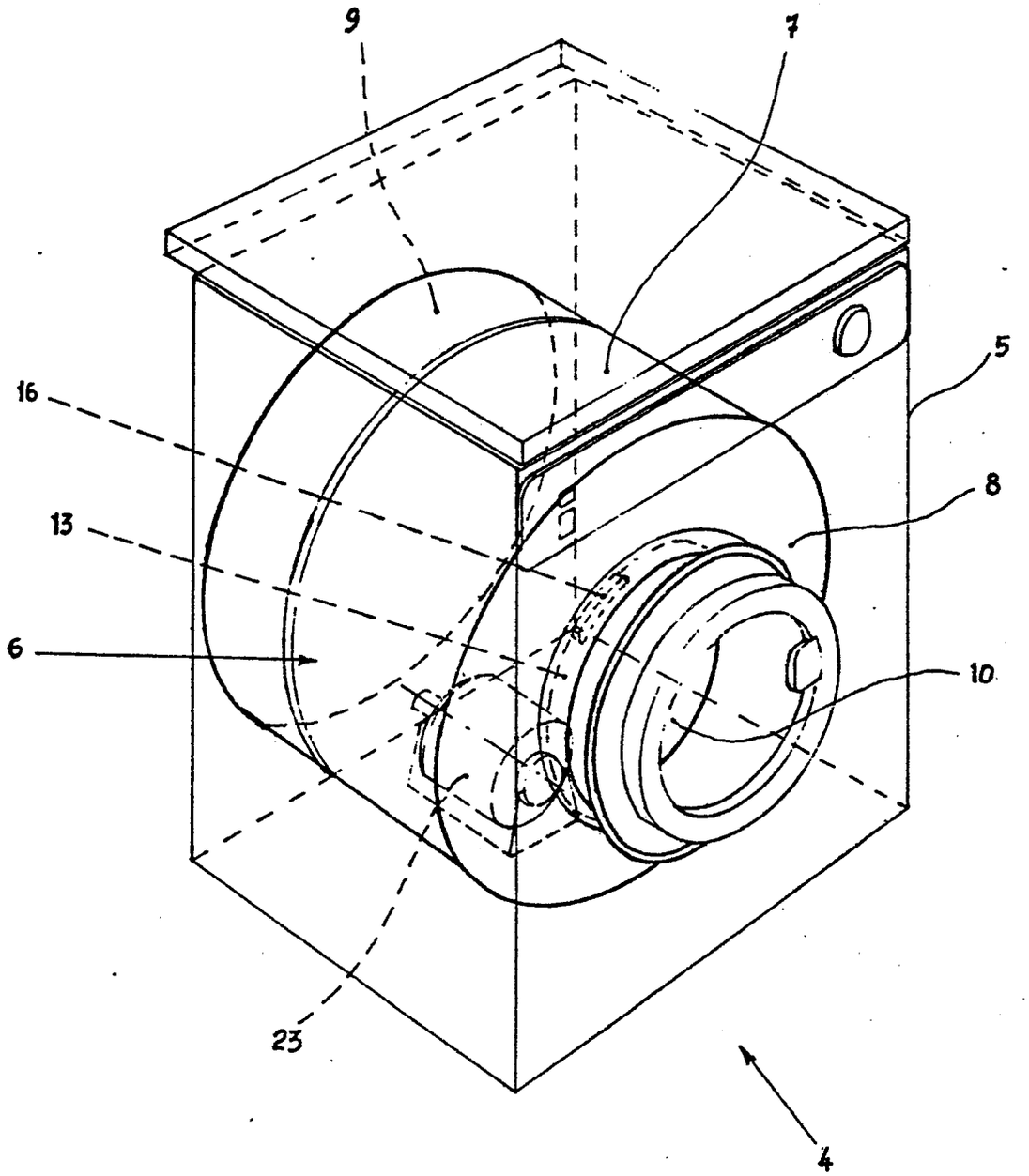

Fig. 1

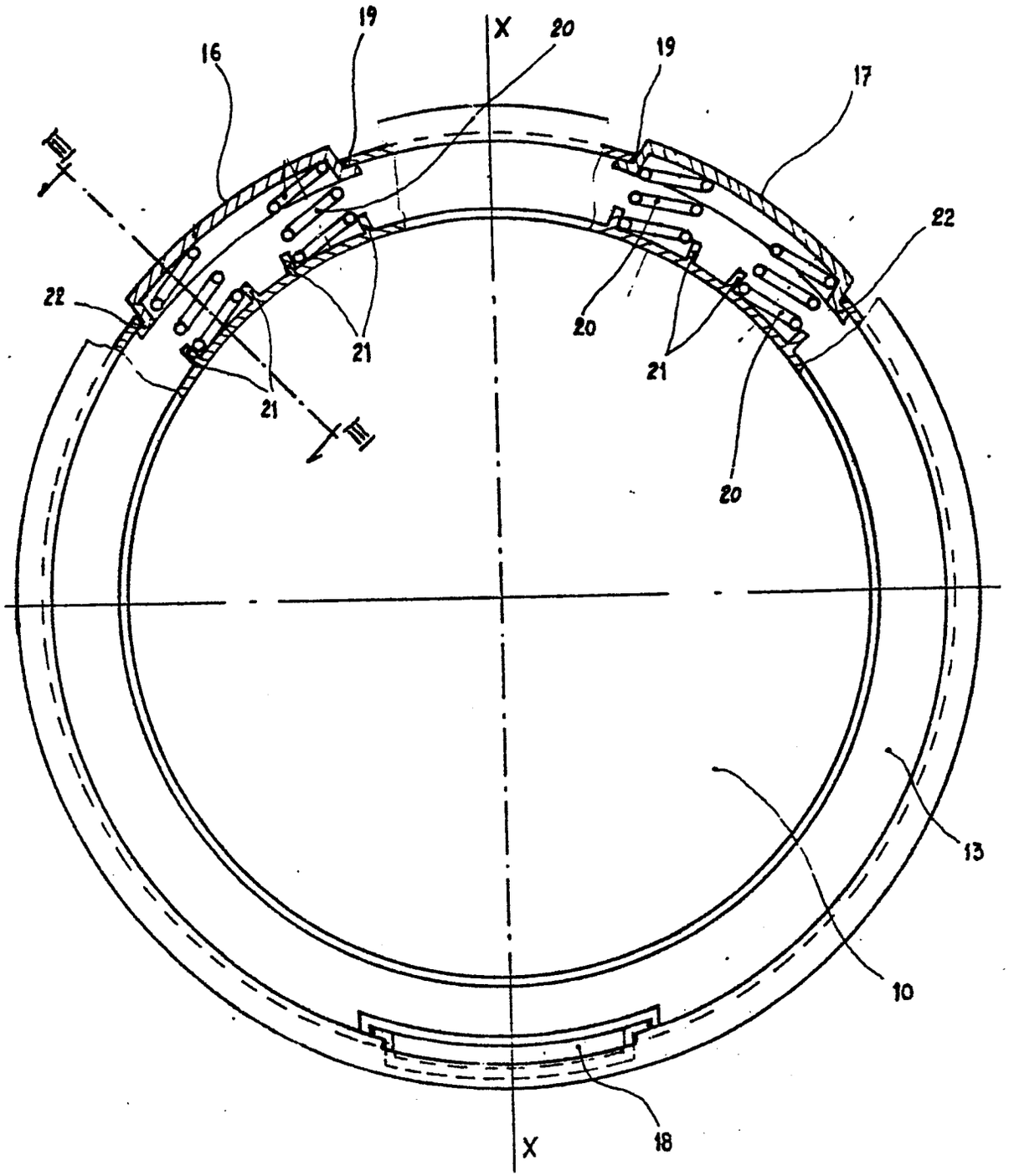

Fig. 2

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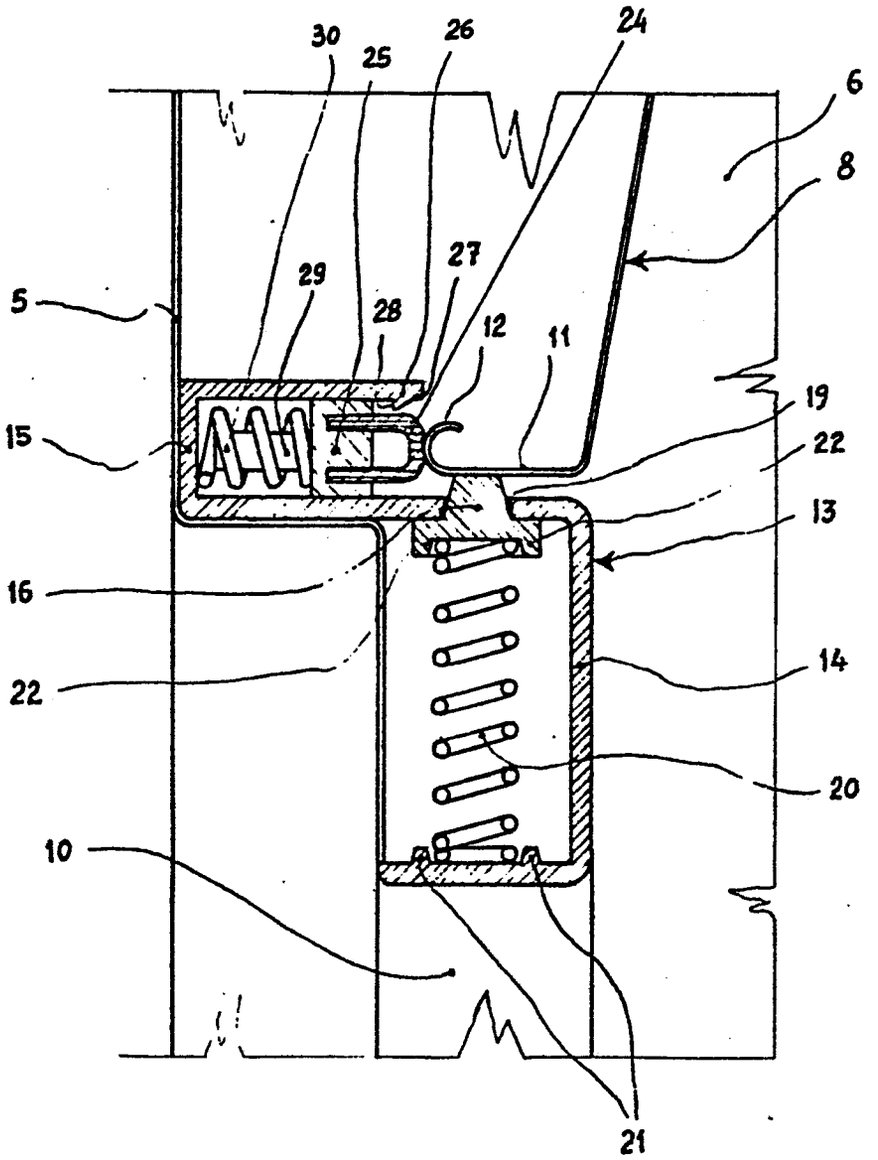

Fig. 3