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(54) A safety device for a dishwasher for canteens.

(57) A safety device for a dishwasher for canteens comprising a washing tank (6) and a protective cover (8) disposed above the tank (6) and adapted to rest thereon or be raised therefrom, the cover being moved vertically and balanced by a spring system (14) provided with a spring (15), a rigid rod (16) and a tie rod (17) jointed together and connected with a bracket (22). The spring (15) is supported by a vertical rod (21) supported by a bracket (22) and the hook (20) of this rod is connected with a spring (40) that tends to move a further rod (28), also connected with the rod (21), into the position in which it locks together the tank (6) and the protective cover (8). As long as the spring balance system (14) functions correctly it permits the cover (8) to be raised from and lowered onto the tank (6), preventing any bond therebetween, but if this system should break down or function incorrectly the rod (28) produces a bond between the tank (6) and the cover (8) when the latter is raised, thus preventing the cover from dropping undesirably and endangering the users of the machine.

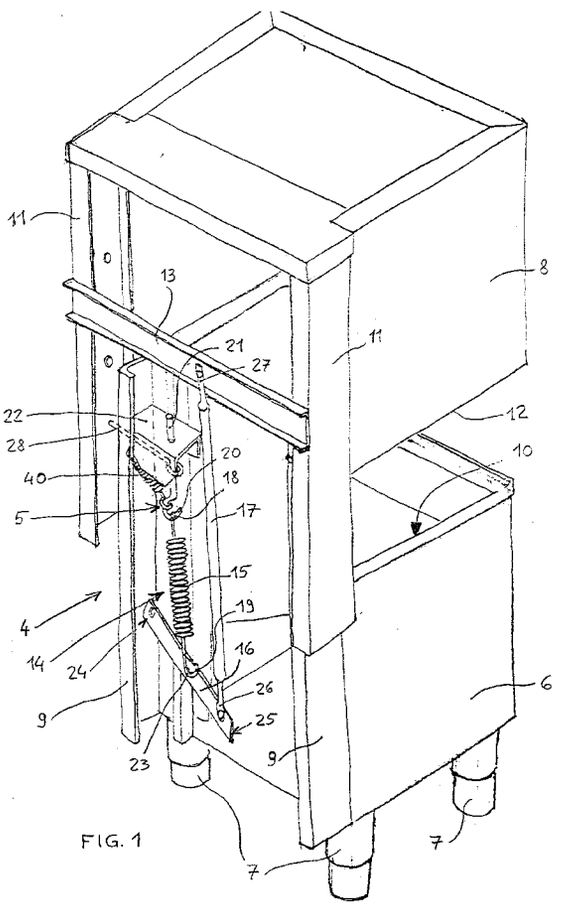

FIG. 1

EP 0 578 862 A1

The present invention relates to a safety device for a dishwasher, in particular for canteens, provided with a vertically sliding cover having a spring balance system, said device being coupled with the cover for preventing it from dropping undesirably when moved into its raised position in case of accidental breakdowns of the spring system.

Dishwashers, in particular dishwashers for canteens, are known which comprise a large-capacity washing tank in which the spray arms and all the mechanical and electric components of the dish washing system are mounted, the tank being provided at the back with two vertical columns extending upward beyond the upper outer edge of the tank, and also comprising a protective cover fitting on the tank and provided at the back with two elongate vertical runners extending downward from the lower outer edge of the cover, the runners sliding vertically along the vertical columns of the tank so as to be able to move the protective cover from a lowered working position in which the cover rests on the tank so as to cover it, thus permitting the washing of the dishes introduced into the tank, to a raised idle position in which the cover is raised vertically from the tank to permit access to the inside of the tank for removing the dishes already washed and introducing others to be washed.

To permit the protective cover to be raised from and lowered onto the tank, every dishwasher of this type is furthermore provided with a spring balance system comprising at least one pull spring engaged at each end with a bracket fixed to the back of the tank along one of its vertical columns, and with a rigid rod jointed along the same column in which the bracket is fixed, in a position below the bracket, the rod being connected via an elongate tie rod with a horizontal crosspiece fixed at the back against the vertical runners of the protective cover. This balance system is dimensioned in such a way that when the protective cover is moved into its lowered working position the cover is maintained in this position under the action of its weight, and when the cover is moved into its raised idle position it is maintained in this position by the force of the pull spring that exceeds the action of the weight of the cover.

Although it ensures efficient operation the spring balance system in question does not meet absolute safety conditions, particularly when the protective cover is moved into its raised position, since if the spring breaks accidentally or the system functions deficiently the contrast action adapted to keep the protective cover raised is lacking, so that the cover can drop undesirably and therefore endanger the users of these dishwashers.

The present invention is based on the problem of eliminating these disadvantages by means of a safety device coupled with the protective cover of the machine that permits the cover to be raised and lowered and prevents it from dropping from its raised position in case of accidental breakage or deficient operation of the above-described spring balance system.

This safety device is realized with the constructional features substantially described, with particular reference to the adjoined claims of the patent.

The invention will be better understood from the following description, intended to be merely exemplary and nonrestrictive, and with reference to the adjoined drawings in which:

Fig. 1 shows a perspective view of a dishwasher provided with the safety device according to the invention;

Figs. 2 and 3 show a lateral sectional view of the part of the machine of Fig. 1 in which the above-mentioned safety device is mounted, said device being moved into two different operating positions.

Fig. 1 illustrates schematically a dishwasher 4 for canteens incorporating safety device 5 according to the invention.

As apparent from this figure, the machine substantially comprises a large-capacity tank 6 for containing the dishes to be washed and in which the spray arms, the recirculating pump and the pump for draining the washing liquid as well as all the mechanical and electric components of the washing system of the machine (that are not represented in the figure) are mounted, the tank being provided on the bottom with four feet 7 for supporting it on the floor. The machine furthermore comprises a protective cover 8 disposed so as to fit on tank 6. In particular, tank 6 is provided at the back with two vertical columns 9 formed by corresponding L-shaped sections that are applied laterally to the tank and extend upward by the same height beyond upper outer edge 10 of the tank.

In its turn, protective cover 8 is provided at the back with two vertical runners 11 formed by corresponding L-shaped sections that are applied laterally to the cover and extend downward by the same length beyond lower outer edge 12 of the cover. The runners are joined together via a horizontal crosspiece 13 fixed to the back thereof and fit corresponding vertical columns 9 of the tank.

Thus, when protective cover 8 is mounted on tank 6 vertical runners 11 of the cover engage vertical columns 9 of the tank, thus permitting the cover to slide vertically from a lowered working position, in which it rests on tank 6 so as to cover it during the washing of the dishes introduced into the tank, to a raised idle position, shown in Fig. 1, in which the cover is raised vertically from the tank to permit access to its interior for removing the dishes already washed and introducing others to be washed.

As usual, the dishwasher is provided with a spring balance system 14 for protective cover 8 adapted to permit the cover to be raised from and lowered onto the tank and substantially comprising at least

one spring 15, preferably a pull spring, a straight rigid rod 16 and a straight tie rod 17.

In particular, pull spring 15 respectively engages with its hook-shaped ends 18 and 19 a hook 20 provided with a vertical elongate rod 21 supported by a rigid bracket 22 fixed against the inside surface of one of vertical columns 9 of tank 6, and a hook 23 protruding from the central zone of rigid rod 16. In its turn the rigid rod is pivoted with its end 24 against the inside surface of the same column 9 in which bracket 22 is fixed, in a position below the bracket, and jointed with its other, free end 25 with lower end part 26 of tie rod 17.

This tie rod 17 is furthermore connected in jointed fashion with its upper end part 27 with the outer back surface of horizontal crosspiece 13.

Thus, with expedient dimensioning of the tension of spring 15 and the moments generated by the lever system consisting of straight rod 16 and straight tie rod 17, it is possible to balance the weight of protective cover 8 when it is moved into its lowered working position and maintained in this position under the action of its weight, and it is furthermore possible to move this protective cover toward its raised idle position, maintaining it in this position with a force exceeding that exerted by the weight of the cover. Referring now to Figs. 2 and 3, one sees the safety device according to the invention substantially comprising an elongate rod 28 adapted to slide horizontally and inserted through a bush 29 inserted into a through hole 30 formed in lateral wall 31 of the section constituting vertical column 9 in correspondence with the position in which bracket 22 is fixed, the elongate rod being provided with a hook-shaped end 32 that engages elongate rod 21 of hook 20, and with a free end 33 that can be inserted within corresponding through holes 34 formed in the vertical direction along lateral wall 35 of vertical runner 11 of the protective cover, which is disposed adjacent vertical column 9 under consideration. In its turn, elongate rod 21 is threaded on the outside to permit three nuts 36, 37 and 38 to be screwed along it. Nut 36 is applied on the upper part of vertical elongate rod 21 and furthermore rests on plane upper surface 39 of bracket 22, thus acting as a support for this vertical rod 21 and permitting it to oscillate to a limited degree through an arc along a vertical plane, in the way described below. Nuts 37 and 38 are applied close to one and the other side of hook 32, thus limiting any lateral excursions of this hook and of connected elongate rod 28 with respect to its horizontal sliding plane, where nut 37 is furthermore applied close to the plane lower surface (not indicated in the figure) of bracket 22 opposite abovementioned upper surface 39 and serves to limit any vertical raising of rod 21 during operation of the machine since it hits against the plane lower surface.

The present safety device furthermore comprises at least one spring 40, preferably a compression spring, whose hook-shaped ends 41 and 42 are respectively connected with hook 20 of vertical rod 21 and with a corresponding seat 43 formed along the inside surface of vertical column 9 in which bracket 22 is fixed, in a position below horizontal rod 28 previously described.

In particular, this spring 40 is loaded so as to urge vertical rod 21 to move in the direction indicated by arrow A, along an arc in a vertical plane, in which state this vertical rod urges hook 32 and connected horizontal rod 28 to move in direction B, identical to A, thus maintaining free end 33 of the horizontal rod in light contact with the opposite inside surface of lateral wall 35 of vertical runner 11 of protective cover 8. Still examining Fig. 2, one can see that when protective cover 8 is raised from tank 6, end 33 of the horizontal rod is always kept away from corresponding through hole 34 in lateral wall 35 formed in a position opposite this end, thanks to the action of spring balance system 14 that exceeds that of spring 40. Conversely, Fig. 3 represents the state assumed by the components in the case of accidental breakage of spring 15 or deficient operation of balance system 14. In this state lacking the contrast action of spring 15, horizontal rod 28 is driven by spring 40 such that its end 33 penetrates one of holes 34, thus locking together vertical column 9 of tank 6 and corresponding vertical runner 11 of protective cover 8 and preventing any mutual displacement so that protective cover 8 cannot drop from this raised position. To release horizontal rod 28 from vertical runner 11 in order to move protective cover 8 into another operating position, it is sufficient to move this horizontal rod manually so as to disengage it from corresponding through hole 34 and return protective cover 8 to the lowered working position.

It is therefore evident that the safety device according to the invention is realized and functions in a simple way and reliably prevents the protective cover from dropping from its raised position if the above-described functional difficulties should occur, thus excluding any danger for the users of these dishwashers.

Claims

1. A safety device for a dishwasher, in particular for canteens, comprising a tank for washing the dishes provided with spray arms and the various mechanical and electric components of the dish washing system and also having a protective cover fitting on the tank and adapted to move vertically from a lowered working position to a raised idle position in which the protective cover rests on and is raised from the tank, respectively, the tank being provided at the back and laterally with two vertical columns extending upward by the same

height beyond the upper outer edge of the tank, and the protective cover being provided at the back and laterally with two vertical runners extending downward by the same length beyond the lower outer edge of the cover, the runners slidingly engaging the corresponding columns when the protective cover is mounted on the tank, the machine furthermore comprising a spring balance system for the protective cover adapted to permit the cover to be raised from and lowered onto the tank and substantially comprising at least one spring, a rigid rod and a straight tie rod, the spring respectively engaging with its ends a hook provided with a vertical elongate rod supported by a rigid bracket fixed against one of the columns, and the central zone of the rigid rod, and the rigid rod being respectively pivoted with its ends with the vertical column in a position below the bracket, and with the lower end part of the tie rod, its upper end part being jointed with a crosspiece fixed to the back of the protective cover, characterized in that it comprises at least one sliding element (28) cooperating with the vertical rod (21) and urged by at least one spring (40) or similar elastic means so as to engage the vertical column (9) and the corresponding vertical runner (11) only when the protective cover (8) is raised from the tank (6) in case of accidental breakage of the spring (15) or deficient functioning of the spring balance system (14).

2. The safety device of claim 1, characterized in that the sliding element comprises a horizontally sliding elongate rod (28) inserted through a bush (29) or the like inserted into a through hole (30) in the lateral wall (31) of the vertical column (9), in correspondence with the position in which the bracket (22) is fixed, the horizontal rod (28) being provided with a hook-shaped end (32) engaging the vertical rod (21) and with a free end (33) insertable through corresponding through holes (34) formed in the vertical direction along the lateral wall (35) of the relevant vertical runner (11).

3. The safety device of claim 2, characterized in that the spring (40) is preferably embodied by a compression spring provided with hook-shaped ends (41, 42) respectively connected with the hook (20) of the vertical rod (21) and with a corresponding seat (43) of the vertical column (9) in a position below the horizontal rod (28), the spring (40) being adapted to urge continuously, via the vertical rod (21), the end (33) of the horizontal rod (28) toward the through holes (34).

4. The safety device of the above claims, characterized in that the vertical rod (21) is provided with a first, a second and a third nut (36, 37, 38) disposed close together along the rod, the first nut (36) being applied on the upper part of the rod (21) and resting on the plane upper surface (39) of the bracket (22) so as to support the vertical rod (21) in oscillating fashion, and the second and third nuts (37, 38) being applied on each side of the hook (32) of the horizontal rod (28) to limit any lateral excursions thereof relative to the horizontal sliding plane thereof.

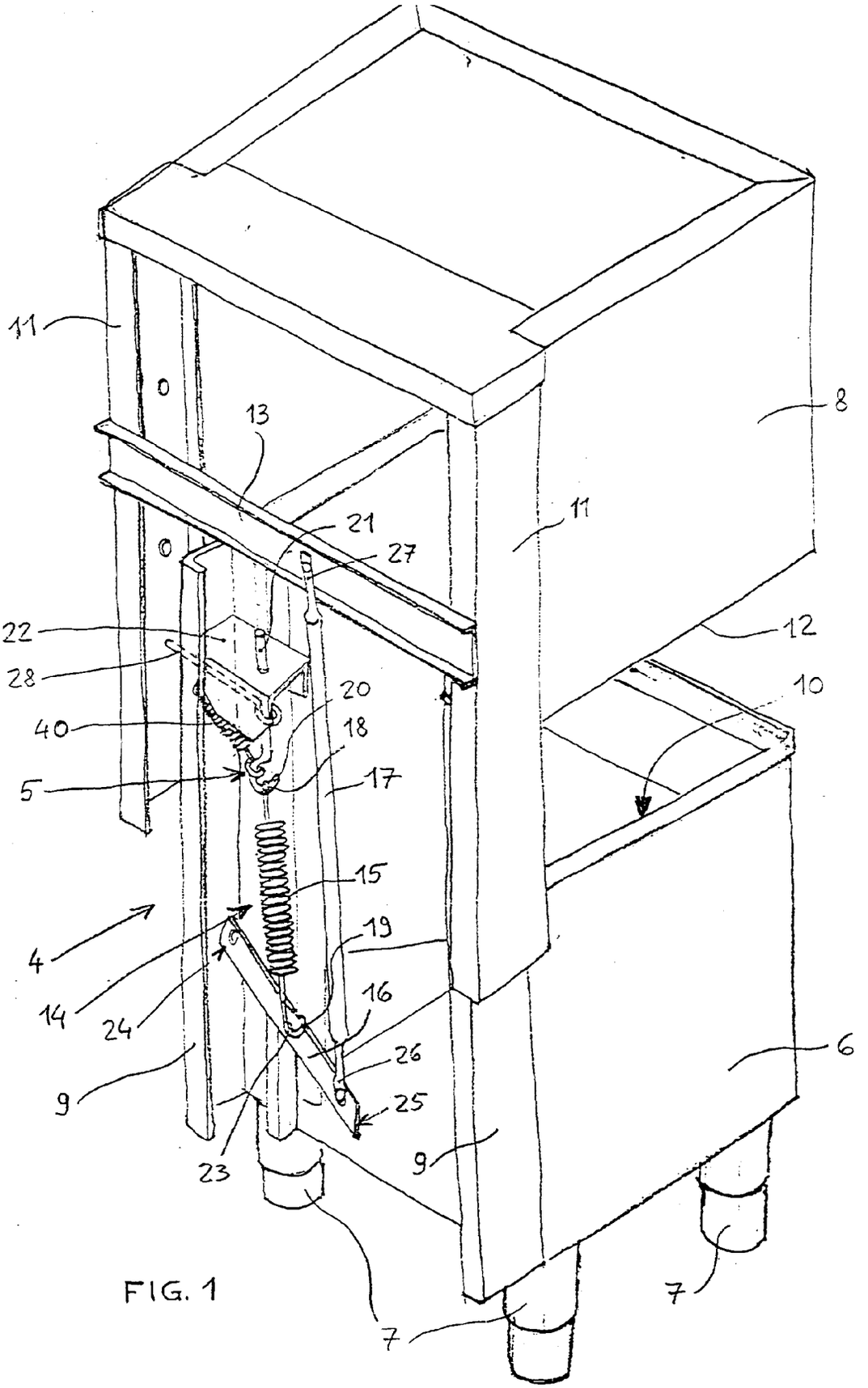
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FIG. 1

FIG. 2

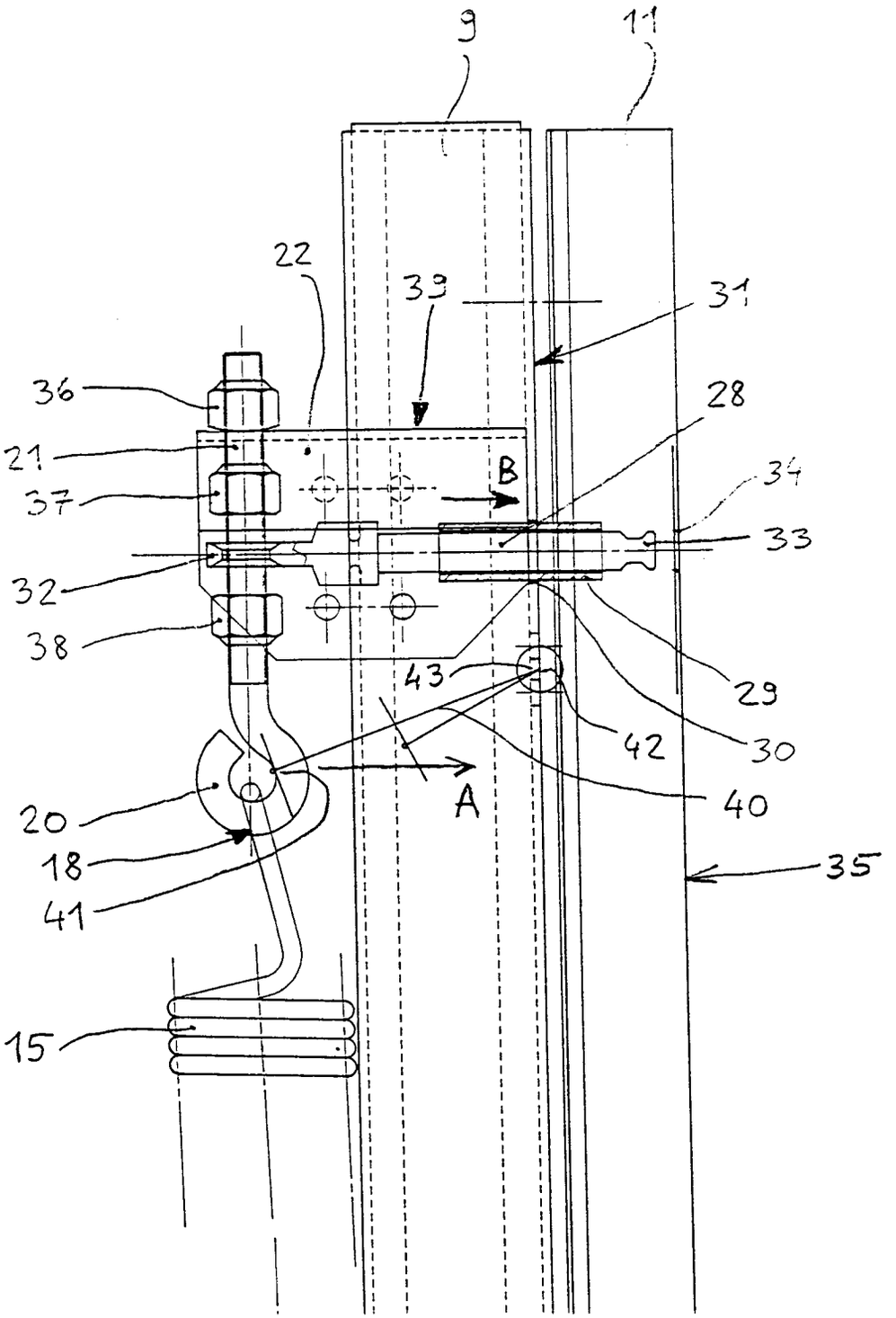
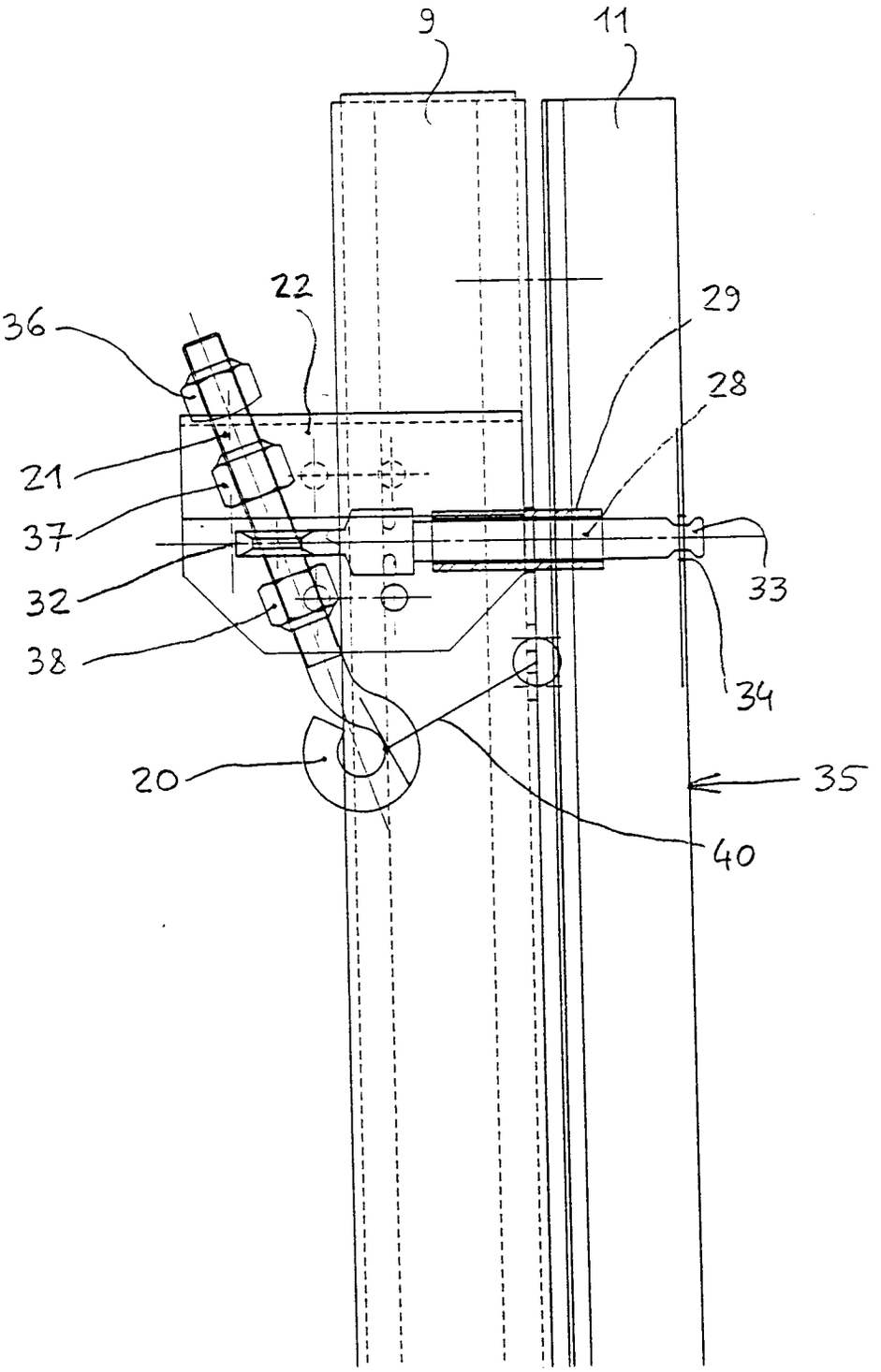


FIG.3



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EUROPEAN SEARCH REPORT

Application Number
EP 92 11 2275

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-3 949 772 (S.G. HARTMANN) * the whole document *	1	A47L15/42
A	US-A-4 088 145 (T.H. NOREN) * the whole document *	1	
A	US-A-2 063 746 (D.A. MEEKER) * figures 1,11-13 *	1	
A	FR-A-2 352 527 (R. THIRODE)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27 APRIL 1993	KELLNER M.

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