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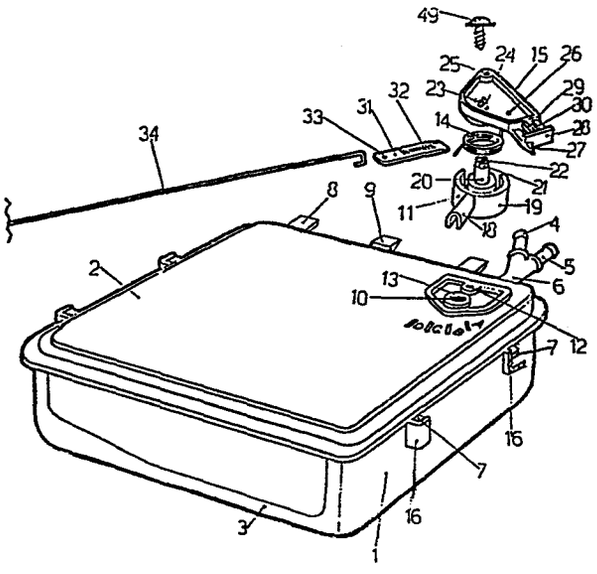
(54) Water supply device for a washing machine.

(57) It is described a water supply device for a washing machine comprising a programmer, a water dispenser (11), means for detecting the different phases of a wash cycle (36, 37, 47) and means (33, 34, 35) for the connection between the means for detecting the different phases of a wash cycle (36, 37, 47) and the water dispenser (11) characterized in that it comprises means (28, 29, 30, 31, 32) embodying both the adjustment for a correct position of the dispenser (11) and the clamping of the connection means (33, 34, 35) between the means for detecting the different phases of a wash cycle (36, 37, 47) and the water dispenser (11).



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"Water supply device for a washing machine"

It is described a water supply device for a washing machine comprising a programmer, a water dispenser, means for detecting the different phases of a wash cycle and means for the connection between the means for detecting the different phases of a wash cycle and the water dispenser.

It is known that the present washing machines use the wash water for the draw of detergents or bleaching products or "softeners" (that will be called hereafter generically additives), that before entering the wash tank is made flow in the vessels containing the additives, so that it may carry them in the wash tank. It is also known that in order to draw the additives from the various vessels during the various wash phases, the supply of water is carried out by using various ways solenoid valves and various connecting pipes among the various ways of the valves and the vessels. The inconveniences of said kind of water supply are evident, since it is expensive, encumbering and rigid. In fact a number of pipes and ways of solenoid valves equal to the number of vessels for the additives have to be used, consequently if more than two or three vesselss have to be supplied, four for example, we will be compelled to use two two-ways valves and four pipes, and if we would arrange also the supplying of hot water the costs and especially the encumbrances of solenoid valves and pipes would become excessive.

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It is also known that said inconveniences have been overcome by means of supply systems that use a water dispenser for sending the water to the various pipes and permitting the use of a single one-way solenoid valve and of a single pipe. Said dispenser being operated by the timer of the washing machine by means of a cam wheel and a rod or a system of levers and springs. But also these devices present various inconveniences. In fact in the devices using a connection rod, for adjusting the right initial position of the dispenser, a small hole is carried out in the rod and suitably adjusting the opening of said small hole the length of the rod is adjusted and consequently also the initial position of the dispenser. Said adjustment method is however very rough and it may occur that part of the water used for a certain vessel goes also in the neighbouring vessels. The systems using groups of levers and springs permits a better adjustment of the initial position of the dispenser, but they are very complex and expensive.

Thus aim of the present invention is to overcome the abovesaid inconveniences and to show a wash water supply device for a washing machine using a very simple, not too expensive dispenser permitting in the meantime a precise adjustment of the initial position of the dispenser, and permitting the draw of the additives with hot or cold water in all the wash phases.

With these aims in view the present invention relates to a water supply device for a washing machine comprising a programmer, a water dispenser, means for detecting the different phases of a wash cycle and means for the connection between the means for detecting the different phases of a wash cycle and the water dispenser characterized in that it comprises means embodying both the adjustment for a correct position of the dispenser and the clamping of the connection means between the means for detecting the different phases of a wash cycle and the water dispenser.

Further aims and advantages of the present invention will result

clear from the following detailed description and from the attached drawings given only as an explanatory and non-restrictive example, in which:

figure 1 shows an exploded view of the main components forming the supply device being subject of the present invention, with a partial particular,

figure 2 shows a partial top view of the essential components of the supply device being subject of the present invention after their mounting,

figure 3 shows a cross section of a particular shown in figure 2, and

figure 4 shows a partial view of the washing machine timer and of a detector lever according to the present invention.

With reference to figures 1,2,3,4, we can note a container 1 formed by a cover 2 and by a body 3 for the draw and the distribution of water to the various vessels. On the cover 2 are got a first pipe 4 and a second pipe 5 for the draw of hot or cold water converging in a single inlet pipe 6 inside the container 1; four tabs 7 along its sides, one of which is sectioned, two exterior guides 8 and a hooking tooth 9 on its bottom, for its hooking to the body 3 of the container 1; a circular clearance hole 10, through which it is inserted a dispenser 11; a cavity 12; a projecting ring 13 surrounding the hole 10, around which it is positioned a resetting spring 14 and four reference notches A,B,C and D one of which is used for the initial positioning of a small lever 15 and the other ones for a check, during the test, of the position of said small lever 15. In the inner part of the cover 2 four pipes are got, not visible in the figures, that radially diverge in the zone in which the dispenser 11 is placed and that converge in four upper tanks, not visible in the figures, drilled along their perimeter for permitting the water drain. Said water will touch the sides of four lower tanks not visible in the figures presented by a drawer that is inserted between the cover 2

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and the body 3 of the container 1, in which are placed the additives for the wash of clothes.

The body 3 of the container 1 presents along its sides, in correspondence of the tabs 7 of the cover 2, four brackets 16, one of which is sectioned, and in its bottom three openings not visible in the figures in correspondence of the guides 8 and of the tooth 9 of the cover 2 permitting the hooking and the fastening of the cover 2 of the body 3 of the container 1.

The dispenser 11 is made of a spout 18, for the dispensing of water in the various pipes of the cover 2, which is partially in the air for getting an air gap in the way of the water according to the safety rules and by an inlet hole, not visible in the figure, which is countersunk for making easier the inlet of water coming from the inlet pipe 6 of the container 1. The inlet of the dispenser 11 is surrounded by a semicylinder 19 acting as a guard for eventual spots of water that might escape from the inlet and is topped by a cylinder 20, that in its upper part presents a rectangular projection 21 and in its middle a hole 22.

The small lever 15 presents a first central hole 23 around which, in the lower part of the small lever 15, is got a rectangular recess 24; a second lateral hole 25, for the initial positioning of the small lever 15; a third hole 26 for the fastening of an end of the resetting spring 14; a sharp projection 27 in correspondence of the reference notches of the cover 2, with a function of index and a lodging 28, presenting an elastic reed 29 at whose lower end is present a check tooth 30 of triangular shape. In the slot 28 a tongue 31 is inserted presenting various triangular teeth 32 and a hole 33. In the figure 1 is also visible a screw 49 used for fastening the small lever 15 on the dispenser 11. In the hole 33 of the tongue 30 an end of a tie rod 34 is inserted, whose other end is fastened to a hook 35 of a detector lever 36.

The detector lever 36 presents also a first projection 37; a

second projection 38, at whose end there is a spacer 39 and a flexible hinge (thin film plastic) 40 that connects it to a foot 41. The foot 41 presents a number of lateral grooves 42 and a tooth 43, by which the detector lever 36 is hinged on a sheet 44 presenting a carving, not visible in the figures, and a hole 45. The sheet 44 is then fastened to the frame-work of the washing machine by means of screws, bolts or rivets 46. The first projection 37 of the detector lever 36 is pressed against a cam wheel 47, steadily connected to the timer of the washing machine, whereas the second projection 38 of the detector lever 36, by means of its spacer 39 that touches a bracket not visible in the figures, assures that the first projection 37 always remains in the plane of the cam wheel 47. In the figure 4 it is also visible a wheel 48 of the washing machine timer.

The mounting of the water supply device being subject of the present invention is carried out by making respectively the following operations: the foot 41 of the detector lever 36 is connected to the sheet 44 by inserting the lateral grooves 42 in the proper carving and by pressing till the tooth 43 of the detector lever 36 goes to hinge in the hole 45 of the sheet 44; an end of the tie rod 34 is connected to the hook 35 of the detector lever 36; the cylinder 20 of the dispenser 11 is inserted in the hole 10 of the cover 2 of the container 1; the resetting spring 14 is positioned around the projecting ring 13 of the cover 2, clamping an end of the resetting spring to the cover; the small lever 15 is inserted on the dispenser 11, so that the rectangular projection 21 of the cylinder 20 can be inserted in the corresponding rectangular recess 24 of the small lever 15 and at the same time the other end of the spring 14 is inserted in the hole 26 of the small lever 15; the screw 49 has to be inserted and screwed so that the dispenser 11 and the small lever 15 remain steadily connected; the other end of the tie rod 34 has to be connected to the hole 33 of the tongue 31 and the latter has to be inserted in the slot 28 of the small lever 15.

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In order to understand the adjustment of the initial position of the dispenser 11 please note, with particular reference to figure 3, how the shape of the check tooth 30, of the slot 28 and of the teeth 32 of the tongue 31 is such that when the tongue 31 is pulled in a first direction, the teeth 32 push upwards the elastic reed 29 and the reciprocal sliding between the slot 28 and the tongue 31 results possible, whereas when the tongue 31 is pulled in the opposite direction the check tooth 30 touches one of the teeth 32 of the tongue 31, the sliding results impossible and the clamping of the tongue 31 in the slot 28 occurs. For carrying out said initial adjustment it is necessary to act on the total length of the tie rod 34 and of the tongue 31 in the following way: the washing machine timer is to be positioned in a precise working condition; a pin is to be inserted in the hole 25 of the small lever 15 and in the corresponding cavity 12 of the cover 2, so that the small lever 15 is clamped in that point; in these conditions the projection 27 of the small lever 15 is in correspondence of one of the four notches A,B,C or D; at last the tongue 31 has to be pulled till the block consisting of the tie rod 34 and the tongue 31 is stretched. The adjustment of the distance between the tie rod 34 and the tongue 31, and consequently the initial position of the dispenser 11, can be adjusted with very high precision since even very little displacements are possible, as the distance between the teeth 32 is very little (about a millimetre).

After the adjustment of the initial position of the dispenser 11 the pin is taken off from the hole 25 and from the cavity 12 and the small lever 15 together with the dispenser 11 connected with it may turn around their rotation axis. The resetting spring 14 assures that the tie rod 34 is stretched and consequently that the projection 37 of the detector lever 36 is always in touch with the cam wheel 47. The position of the dispenser 11 and of the small lever 15 depends on the position of the cam wheel 47, which is determined by the washing

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machine timer.

Please note how the detector lever 36 changes its slope according to the position of the cam wheel 47 bending more or less around its flexible hinge 40, and how with said solution the use of a pin and of a bolt is avoided.

Please also note how the two pipes 4 and 5 for the draw of hot or cold water, by converging in a single inlet pipe 6 that sends the water to the inlet of the dispenser 11 permit the draw of the additives with hot or cold water in all the wash phases.

Please note at last how the tabs 7, the exterior guides 8 and the hooking tooth 9 of the cover 2 and the corresponding brackets 16 and openings of the body 3 of the container 1 permit a clamping fastening of the cover 2 on the body 3, thus avoiding the use of screws. In fact the procedure of hooking of the cover 2 on the body 3 is the following: the cover 2 is inserted and made slide on the upper part of the body 3 till the exterior guides 8 of the cover 2 insert themselves inside the lateral openings of the body 3 and the tooth 9 of the cover 2 inserts itself inside the central opening of the body 3 and hooks to it. In this position also the tabs 7 of the cover 2 are inserted inside the brackets 16 of the body 3 and the cover 2 results fastened to the body 3 without any possibility of displacements in any direction. At last the body 3 of the container 1 is fastened to the frame-work of the washing machine by means of screws.

From the description effected the advantages of the water supply device for a washing machine being subject of the present invention result clear.

In particular they are represented by the fact that said device permits a very precise initial adjustment of the dispenser, the draw of the additives for the wash with hot or cold water in all the wash phases, and the working of the detector lever by using a flexible hinge, the mounting of the cover on the body by means of a clamping

fastening and at last it is very simple , reliable and not too expensive.

It is clear that numerous variations are possible to the water supply device described as an example, for the man skilled in the art, without departing from the scope of the present invention. One of them is to use an electronic programmer and proper means for detecting the wash cycle phases and the translation of the electric information into mechanical positions.

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CLAIMS

1. Water supply device for a washing machine comprising a programmer, a water dispenser (11), means for detecting the different phases of a wash cycle (36,37,47) and means (33,34,35) for the connection between the means for detecting the different phases of a wash cycle (36,37,47) and the water dispenser (11), characterized in that it comprises means (28,29,30,31,32) embodying both the adjustment for a correct position of the dispenser (11) and the clamping of the connection means (33,34,35) between the means for detecting the different phases of a wash cycle (36,37,47) and the water dispenser (11).

2. Water supply device according to claim 1, characterized in that said adjustment and clamping means comprise a lodging (28) and a tongue (31).

3. Water supply device according to claim 2, characterized in that said lodging (28) presents an elastic reed (29) and a check tooth (30), whereas said tongue (31) presents a set of teeth (32).

4. Water supply device according to claim 3, characterized in that said check tooth (30) of said lodging (28) and said teeth (32) of said tongue (31) have a complementary shape, permitting the sliding of said tongue (31) in said lodging (28), when said tongue (31) is pulled in a first direction, whereas when said tongue (31) is pulled in the opposite direction it assures the clamping of said tongue (31) in said lodging (28).

5. Water supply device according to claim 4, characterized in that said check tooth (30) of said lodging (28) and said teeth (32) of said tongue (31) have triangular shape with the sides facing each other, so that they can adhere ones to the others.

6. Water supply device according to claim 2, characterized in that said lodging (28) is made in a small lever (15) presenting also a projection (27) having a function of index and a lateral hole (25) for the adjustment of the proper position of the dispenser (11).

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7. Water supply device according to claim 6, characterized in that said small lever (15) is steadily connected to said dispenser (11), which is hinged so as to change a rectilinear movement set to it into a rotatory movement of said dispenser (11).

8. Water supply device according to claim 7, characterized in that said connection is carried out by means of a central hole (23) and a rectangular recess (24) presented by said small lever (15), a central hole (22) and a rectangular projection (21) presented by said dispenser (11) and a screw (49).

9. Water supply device according to claim 1, characterized in that said dispenser (11) presents a countersunk inlet for making easier the water inlet and a spout (18) partially in the air for making an air gap on the way of the water.

10. Water supply device according to claim 9, characterized in that said inlet of said dispenser (11) is surrounded by a semicylinder (19) acting as a guard for eventual sprays of water.

11. Water supply device according to claim 1, characterized in that said dispenser (11) presents in its upper part a cylinder (20) permitting its rotation inside a circular hole (10) presented by a cover (2) of a container (1) comprised in the water supply device.

12. Water supply device according to claim 11, characterized in that said cover (2) presents a number of reference notches (A,B,C,D) that connected to said projection (27) of said small lever (15) show the right adjustment of said dispenser (11) during the check and a cavity (12) that, when is connected to said hole (25) of said small lever (15) is used for the positioning and the initial adjustment of said dispenser (11).

13. Water supply device according to claim 1, characterized in that said means for detecting the different phases of a wash cycle comprise a cam wheel (47) steadily connected to said programmer of said washing machine and a detector lever (36).

14. Water supply device according to claim 13, characterized in

that said detector lever (36) comprises a first projection (37) in contact with said cam wheel (47) and a spacer (39) assuring that said first projection (37) substantially remains in the plane of said cam wheel (47).

15. Water supply device according to claim 14, characterized in that said spacer (39) is included in a second projection (38) presented by said detector lever (36).

16. Water supply device according to claim 13, characterized in that said detector lever (36) comprises a foot (41) that is fastened to the frame-work of said washing machine and a flexible hinge (40) permitting the movement of the detector lever.

17. Water supply device according to claim 16, characterized in that said foot of said detector lever (36) presents a number of lateral grooves (42) and a hooking tooth (43).

18. Water supply device according to claim 17, characterized in that said foot (41) of said detector lever (36) is fastened to said frame-work of said washing machine by means of a sheet (44) presenting a carving and a hole (45), in which are inserted respectively said lateral grooves (42) and said tooth (43) of said foot (41) of said detector lever (36).

19. Water supply device according to claims 1,2,13, characterized in that said connection means comprise a tie rod (34), a hole (33) presented by said tongue (31) and a hook (35) presented by said detector lever (36).

20. Water supply device according to one or more of the preceeding claims, characterized in that said tie rod (34) is stretched and said detector lever (36) is kept in contact with said cam wheel (47) by a resetting spring (14).

21. Water supply device according to claim 20, characterized in that said resetting spring (14) is connected between said small lever (15) and said cover (2) of said container (1).

22. Water supply device for a washing machine comprising a

container (1) for drawing and distributing water to the various vessels containing the additives for the wash, characterized in that said container (1) presents two pipes (4,5) for drawing hot or cold water converging in a single inlet pipe (6).

23. Water supply device according to claim 22, characterized in that said single inlet pipe (6) supplies a water dispenser (11) that according to the various phases of a wash cycle sends the water in one of the various vessels containing additives for the clothes wash, thus permitting to draw said additives with hot or cold water during all the phases of the wash cycle.

24. Water supply device according to claim 22, characterized in that said container (1) consists of a cover (2) and of a body (3) which are steadily connected by means of positioning and clamping fastening means.

25. Water supply device according to claim 24, characterized in that said positioning means comprise tabs (7) and guides (8) presented by said cover (2) and brackets (16) and lateral openings presented by said body (3), said tabs (7) inserting themselves inside said brackets (16) and said guides (8) inserting themselves inside said lateral openings.

26. Water supply device according to claim 24, characterized in that said release hooking means comprise a hooking tooth (9) presented by said cover (2) and a central opening presented by said body (3), said hooking tooth (9) hooking itself to said central opening.

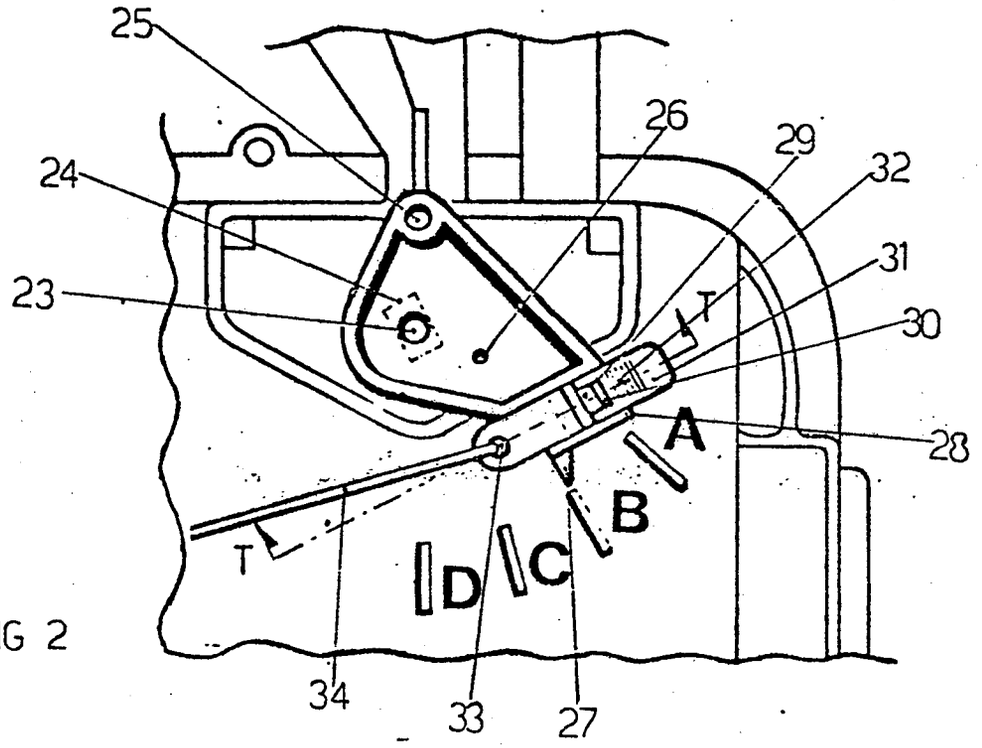

FIG 2

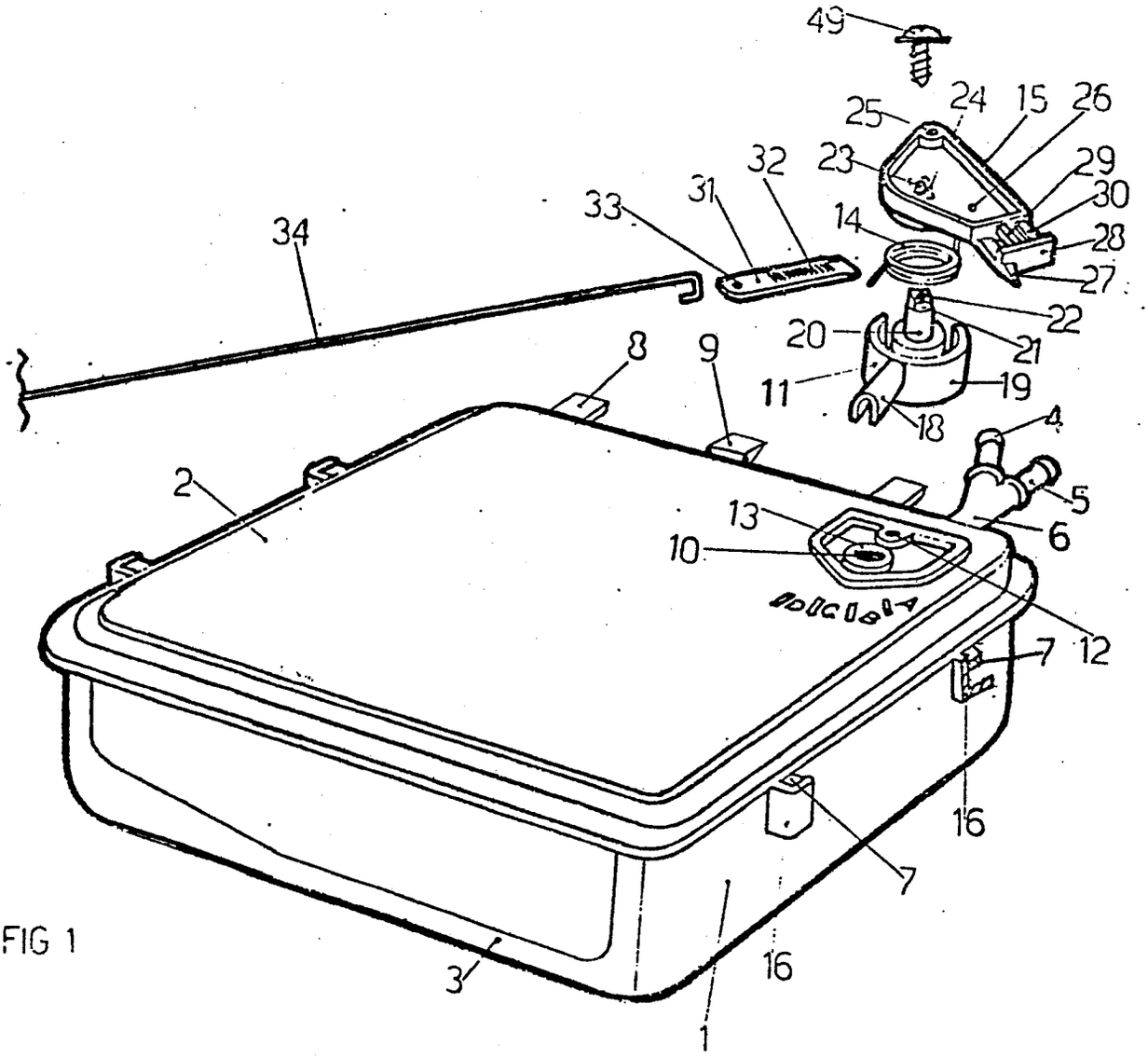

FIG 1

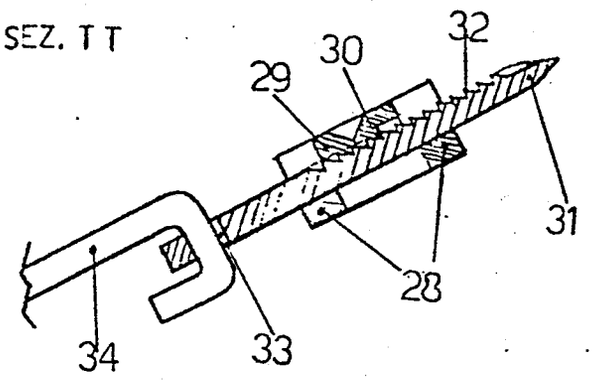

FIG 3

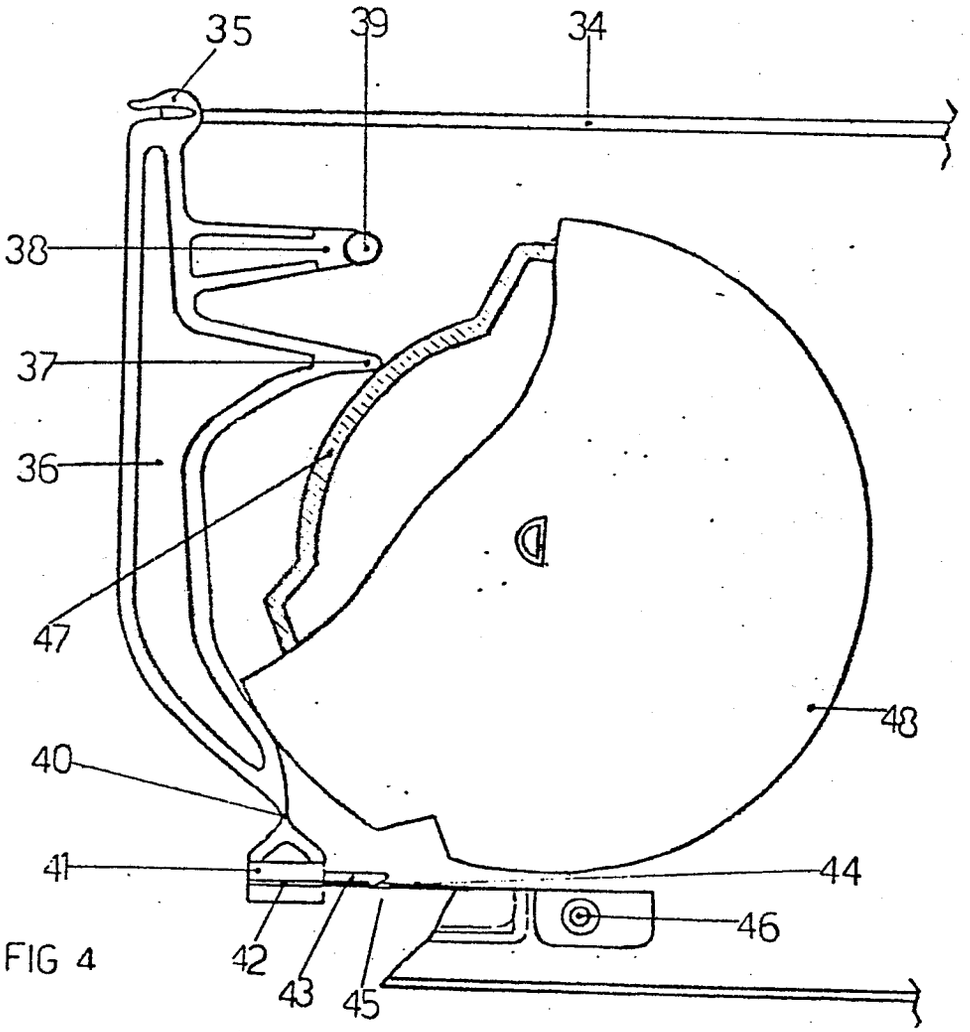

FIG 4