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(54) An assembly for the selective supply of washing agents to a working tub of a top-loader washing machine

(57) An assembly (23) for the selective supply of washing agents to the tub (34) of a machine for washing articles of laundry with top loading, wherein said machine has a frame provided with vertical side containing walls and an upper opening (14) for inserting and removing articles subjected to washing in said machine; said assembly (23) being of the type comprising a body (25) for housing the washing agents in appropriate containing compartments (18, 20, 22, 24) and valve means (27) controlled to send selectively to each of said compartments (18, 20, 22, 24) of the detergent agents a respective flow of water for removing the detergent agent and for transporting the same into the washing tub (34) of the machine, wherein means for supporting the valve means comprise a portion (40) which extends from said washing agents housing body (25). Said extension portion (40) being arranged in such a way as to position said valve means (27) supported by the latter between said tub (34) containing the drum (16) holding the articles to be washed and a vertical wall (13) of the frame of said machine.

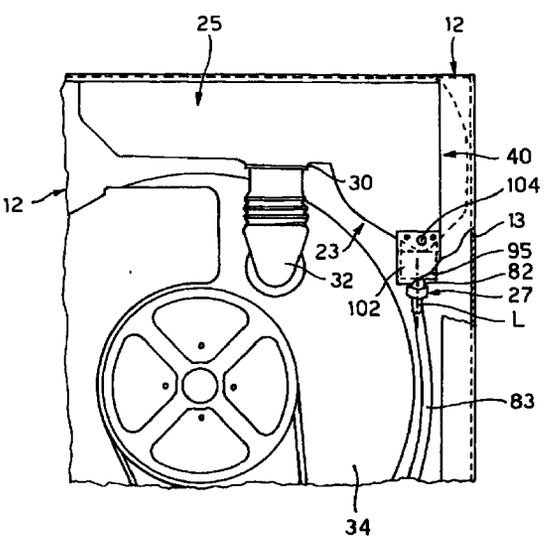

FIG. 2

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Description

[0001] The present invention relates to an assembly for the selective supply of washing agents in washing machines of the type with top loading of the articles to be washed.

[0002] Such a type of assembly having substantially the features of the preamble of claim 1 and which can be used in washing machines with front loading is known from EP 0 688 895 owned by the same Applicant. Currently, in top-loader washing machines, devices are provided for housing detergents which generally comprise a plastic block or body which defines one or more vessels for housing a respective washing agent, which vessels are placed in the upper part of the washing machine, to the side of the upper opening provided, in said washing machines with top loading, for insertion of the garments to be washed in the rotating drum of the machine.

[0003] In the devices for housing detergents and other agents, such as fabric conditioners and beaches, hitherto used in washing machines with top loading, the block defining said vessels is attached to the frame of the washing machine and appropriate valves, suitable for sending respective flows of water for removing the washing agents, are placed in said machine in positions distant from said washing agents housing block, whereto said removal flows are sent via hoses extending into said machine and connected firmly by their ends to nozzles of said valves and of said washing agents housing block by means of appropriate clamping clips.

[0004] The transfer, by the aforementioned washing agents housing block of the flows of water full of the detergent substances and the like to the washing tub of the washing machine, is actuated by means of a union formed in the base of the block, where all the flows of water entering said block are conveyed by falling.

[0005] The valves for sending the flows of water to the various compartments of the washing agents housing body consist of electrically controlled valves which are in general attached to the base of the support frame of the washing machine. This arrangement entails a problem in the case of leaks of water inside the machine. Indeed, in the event of leaks, the water which deposits on the base of the machine can come into contact with the electric control parts of said solenoid valves, jeopardising operation thereof.

[0006] Moreover, assembly of said vessel support devices for housing detergents and the like involves a series of operations, such as attachment of the block to the frame of the machine, arrangement of the valves inside said machine, provision of the connection between the valves and washing agents housing block by means of the connection of the conveying hoses and clamping of relative clips. The performance of these operations requires considerable assembly times with consequent increase in the costs of assembly of the machine.

[0007] For top-loader washing machines the need is therefore felt to avoid any risk of malfunctioning of the valve means for conveying the flows towards said compartments of the washing agents housing block.

[0008] Another need at the root of the present invention is that of reducing the times and consequent costs required for assembly of the machine and in particular for assembly on the machine of the relative washing agents housing block and of the corresponding valves for feeding flows of water for removing the washing agents.

[0009] A further requirement to be borne in mind concerns the need to avoid the aforementioned disadvantages of the known art without creating excessive overall dimensions, instead safeguarding the dimensional types of the machines already known.

[0010] The aforementioned needs are fulfilled thanks to an assembly for the selective supply of washing agents to the washing drum of a washing machine having the features of claim 1 attached.

[0011] The provision in the present assembly of means for supporting the valve means which comprise a portion which extends from said washing agents housing block, and wherein said extension portion is arranged in such a way as to position said valve means supported by the latter between said tub containing the drum which holds the articles to be washed and a vertical wall of the frame of said machine, allows the valve means to be placed in a raised position, distant from the base, and any disturbance caused to the valve means by leaks of water which occur inside the washing machine to be avoided.

[0012] Moreover it is possible for assembly of the valve means on the washing agents housing body to be carried out directly by the firms which manufacture these means, which firms then send the pre-mounted assembly to the firms which assemble washing machines, which in turn mount this assembly on the machine. This operation of mounting the assembly at the manufacturers of the washing machine is performed with extreme rapidity; in fact only attachment of the assembly to the frame of the washing machine and engaging of a single water feed pipe onto said valve means have to be performed.

[0013] The separate performance, at different organisations, of assembly of the construction formed by the washing agents housing block and the valve means and subsequent positioning of this construction on the washing machine, allows savings to be made in the time and costs hitherto required for assembly of these parts on the machine.

[0014] The secondary claims relate to special and advantageous embodiments of the present invention.

[0015] Further features and advantages will in any case be made clearer on reading of the following description, relating to a preferred embodiment of the invention, to be read with reference to the accompanying drawings, in which:

Figure 1 is a view from above of a top-loader washing machine;

Figure 2 is a detail of the side view of the washing machine without the external protection shell and showing the assembly for the selective supply of washing agents to the washing tub of a washing machine, according to the preferred embodiment of the present invention;

Figure 3 is a view from above of the assembly according to the present preferred embodiment, showing in particular the vessels for housing the washing agents;

Figure 4 is a view from above of the assembly according to the present preferred embodiment without the containers forming the vessels for housing the washing agents;

Figure 5 is a side view of the assembly according to the present preferred embodiment;

Figure 6 is a front view of the assembly according to the present preferred embodiment;

Figure 7 is a front view of only the vessel housing the washing agents of the assembly according to the present preferred embodiment;

Figure 8 is a sectioned view taken along line 8-8 of the figure and relating to only the container of the washing agents.

[0016] Figure 1 shows the upper part 10 of a top-loader washing machine 12 of a wholly common type.

[0017] Said washing machine has a support frame having an external shell and provided with vertical side containing walls, 13 denoting in Figure 2 the front vertical wall of said frame. In said upper part 12 of the machine a large opening 14 is also provided for loading the laundry to be washed into the drum 16 which is mobile during operation of the machine in the washing tub of the same machine.

[0018] In order to allow easy performance of said operations of inserting and removing from the drum 16 for washing laundry, said opening must have the largest possible dimensions. For this purpose the vessels for containing the washing agents are provided at the side of said loading opening 14.

[0019] In the washing machine embodiment shown here, four vessels 18, 20, 22, 24 are provided, horizontally aligned one with the other respectively, to house a quantity of detergent for the prewash, a quantity of detergent for washing, a bleach and a fabric conditioner.

[0020] With reference to the subsequent Figures 2 to 6, it is possible to see how the assembly 23 of the present preferred embodiment comprises a body 25 for housing the washing agents and suitable valve means 27 for conveying flows for removing said washing agents. More particularly said body 25 for housing washing agents has, as shown in Figure 4, a large housing 26 which opens upwards and wherein a container with two compartments 28 is housed, which compartments form said vessels 22 and 24 for the bleach and the fabric conditioner. Said container 28 is placed in a substantially central position in said upper housing 26 so as to form with its own end walls and the walls of said housing the other two vessels 18 and 20 for the prewash detergent and for the actual washing detergent respectively.

[0021] In the figures, and particularly in Figure 4, the lower union 30 is also shown, wherefrom the flows of water conveyed towards the various vessels of the washing agents, after having removed the agent contained in the latter, are made to exit from the block and are fed, thanks to a hose 32, to the washing tub 34 of the washing machine, as shown in Figure 2.

[0022] Figures illustrates a possible way of obtaining the passage of the flows full of the washing agents from the vessels to the union 30 for discharge to the tub of the machine. More particularly the vessels for the fabric conditioner and the bleach are fitted with respective discharge siphons 36 and 38, while the passage from the vessels for the washing and prewash detergents takes place directly.

[0023] The components described hitherto of the washing agents housing block of this preferred embodiment conform to a type which is fully known to an expert in the field and therefore do not require further explanations.

[0024] Advantageously, the assembly 23 has means for supporting the valve means 27 which comprise a portion 40 which extends from said washing agents housing body 25.

[0025] As shown particularly in Figure 2, said extension portion 40 is arranged in such a way as to position said valve means 27, supported by said portion, between said tub 34 containing the drum 16 for holding articles to be washed and a vertical wall 13 of the frame of said machine.

[0026] With special reference to the section of Figure 8, the extension portion 40 forms conduits for conveying the flows of water exiting said valve means. These consist of, in particular, a conduit 42 for a flow of water for removing the prewash detergent entering from the nozzle 44 and outflowing into said vessel 18 via a passage 46, a conduit 48 for a flow of water for removing the actual washing detergent entering from the nozzle 50 and outflowing into said vessel 20 via a passage 52 and a conduit 54 for a flow of water for removing the bleach entering from the nozzle 56 and outflowing into said vessel 22 via a passage 58. For removing the fabric conditioner provision is however made for using a conduit 60 outflowing into a passage 62 for transfer of the flow to the vessel 24 and wherein the flow of water is fed

thanks to the converging of the flows traversing the first section of the conduits 42 and 48, in the point of intersection 49 between said conduits 42 and 43. This allows a number of valve means to be used for sending the flows of water to the washing agents housing compartments which is lower than the effective number of these compartments.

[0027] Said extension portion 40 also houses a conduit 64 for direct feeding of a flow of water to the washing tub. This flow is used in the tub during drying of the laundry. To avoid any return of the water present in the tub to the water supply system, an air break device 66 is formed in said conduit 64 having a lower hole 68 for the return into the tub of the possible current of water returning to the mains. 70 and 72 denote in the figures the end nozzles of the conduit 64. As is clear from Figure 8, this is therefore an air break arranged vertically and provided integral with the body of the device to the side of the vessel 18 for the prewash detergent. It is nevertheless understood that said air break could also be provided on said extension portion 40.

[0028] More particularly it can be seen from Figure 2 that said extension portion 40, which holds the valve means 27, extends from said washing agents housing body 25 downwards from a longitudinal end 25' of the latter.

[0029] As is clear from the figures, the extension portion 40 is in the form of an element with a substantially flattened configuration which extends and is positioned to the side of said washing agents housing body 25 and said valve means 27 are supported by said extension 40 in such a way that at least a part of them is contained within the transverse outline of the portion of the body 25 which forms said washing agents housing vessels.

[0030] As shown particularly in Figure 6, the valve means 27 comprise four solenoid valves 74, 76, 78, 80 respectively connected to the nozzles 44, 50, 56 and 70 for the sending into the conduits of these respective flows of water.

[0031] The valve means also comprise a manifold element 82 having an inlet 84 for the mains water, transversely whereto said solenoid valves 74, 76, 78, 80 extend and which communicate for sending water with the internal chamber of said manifold 82 through passage apertures opened and respectively closed by mobile gate valves (not shown in the figures) controlled by the operating programme of the washing machine.

[0032] Said valve means extend along a longitudinal extension axis L and are positioned, during use, in such a way that said L axis is positioned vertically. This arrangement enables the valve means to adopt a position, starting from a position close to said upper wall 10 of the machine, near the side wall 13 of the frame. In this way most of the space between an upper corner of the external shell of prismatic shape of the frame and the circular profile tub 34 is exploited, as shown clearly in Figure 2. This arrangement also allows the manifold 82 to be connected to the mains by means of a hose 83 coming from the lower part of the washing machine and extending in the narrow passage between the washing tub 34 and the external wall 13. This arrangement therefore allows a washing machine with definitely restricted overall dimensions to be produced.

[0033] According to a further advantageous feature, said conduits 42, 48, 54, 60 for conveying the flows towards said compartments for containing washing agents are arranged in a substantially flattened lateral portion 88 of the body for housing the washing agents. Said crossing 49 between the conduits 42 and 43 is situated on said lateral part of the body of the device. Obviously it could also be foreseen to position said point of crossing 49 on said support extension 40. Said portion 88 for housing the conveying conduits is positioned substantially vertically and has said openings for feeds of the vessels 46, 52, 58, 62 which open transversely to the portion 88.

[0034] Means are also provided for attaching the valve means 27 directly to said support portion 40, which means comprise, on the portion 40, several holes 90 for the insertion of corresponding attachment screws 92 inserted in cylindrical inserts 94 extending from the valve means as shown by Figure 6. Said holes 90 having an axis parallel to the axis of the nozzles 44, 50, 70, 56 for feeding and connection to the valve means.

[0035] Said means for attaching of the valve means comprise a bracket 96 extending at one end of the extension 40, longitudinally to the valve means, and comprising a transverse face 98 for supporting the end of the manifold of said valve means.

[0036] Said bracket 96 for supporting said valve means being above all formed near the free end 95 of the support portion.

[0037] As shown in Figure 4, on said washing agents housing body means are provided, consisting of holes 100 for the insertion of suitable attachment screws, for attachment of the device to the washing machine.

[0038] Referring to Figure 2, it can also be seen that a small plate 102 extends from said support frame and has holes 104 for the insertion of similar attachment screws or other means to allow attachment of the valve means support extension 40 directly to the frame of the machine.

[0039] Said support and flows conveying portion 40 and the body 25 for housing washing agents are made in a moulded plastic material and form a single body. More particularly, as shown in particular in Figures 3 and 4, the lateral portion 88 for housing conduits for the flows and the extension 40 are made in two parts which are made to face each other and are welded by a hot blade along the linear weld 106.

[0040] It must naturally be understood that what has been written and shown with reference to the preferred embodiment of the present invention has been given purely by way of a non-limiting example of the principle claimed.

Claims

1. An assembly for the selective supply of washing agents to the tub of a machine for washing articles, more particularly a machine for washing articles of laundry with top loading, wherein said machine has a frame provided with vertical side containing walls and an upper opening for inserting and removing articles to be washed in said machine; said assembly being of the type comprising a body for housing washing agents in appropriate containing compartments and valve means controlled to send selectively to each of said compartments of the detergent agents a respective flow of water for removing the detergent agent and transporting the same into the washing tub of the machine; characterised in that means for supporting the valve means (27) comprise a portion (40) which extends from said washing agents housing body (25), said extension portion (40) being arranged in such a way as to position said valve means (27) supported by the latter between said tub (34) containing the drum (16) for holding the articles to be washed and a vertical wall (13) of the frame of said machine.

2. An assembly according to claim 1, characterised in that said extension portion (40) forms conduits (42, 48, 54, 60) for conveying flows of water which are released from said valve means (27), which conveying conduits (42, 48, 54, 60) are directly connected to the nozzles (44, 50, 56) of said valve means (27) and transfer the flows of water directly to the compartments for containing the detergent agents.

3. An assembly according to any one of the previous clams, characterised in that said extension portion (40) extends transversely from said washing agents housing body (25).

4. An assembly according to claim 3, characterised in that said extension portion (40) extends from said washing agents housing body (25) downwards from one longitudinal end of the latter.

5. An assembly according to any one of the previous claims, characterised in that said extension portion (40) comprises an element with a substantially flattened configuration which extends on one side of said washing agents housing body (25), said valve means (27) being supported by said extension (40) with at least part of them remaining within the transverse outline of the body (25) for housing the washing agents.

6. An assembly according to any one of the previous claims, characterised in that said valve means (27) have a longitudinal extension axis which during use is positioned vertically.

7. An assembly according to any one of the previous claims, characterised in that said conduits (42, 48, 54, 60) for conveying flows towards said compartments for containing washing agents are arranged in a lateral portion of the body (25) for containing washing agents.

8. An assembly according to any one of the previous claims, characterised in that means are provided for directly attaching the valve means (27) to said support portion (40), which means comprise one or more holes (90) for insertion of attachment screws (92), said holes (90) having an axis parallel to the axis of the nozzles (44, 50, 70, 56) for feeding and connection to the valve means (27).

9. A device according to claim 8, characterised in that said attachment means comprise a bracket (96) longitudinal to the valve means (27) which extends from the free end (95) of said extension portion (40) and has a part extending transversely from the support portion (40) for supporting said valve means (27).

10. An assembly according to any one of the previous claims, characterised in that means (100) are provided, on said washing agents housing body (25), for attachment of the device to the washing machine.

11. An assembly according to any one of the previous claims, characterised in that said portion (40) for support and conveying flows and the body (25) of the device for housing washing agents are made in a plastic material and define a single body.

12. An assembly according to any one of the previous claims, characterised in that it comprises, integral with the body (25) of the device and/or of the extension portion (40), an air break (66) having a lower hole (68) for the return into the tub of a possible current of water returning to the mains which flows along a conduit (64) for direct feeding of water to said tub of the machine.

13. An assembly according to any one of the previous claims, characterised in that said conduits (42, 48, 54, 60) which convey the flows of water to the compartments for the washing agents comprise an intersection (49) between at least two (42, 48) of said conduits to send, when said crossed conduits (42, 48) are traversed by a respective flow of water, a resulting flow of water in a further conduit (60) extending from said point (49) of crossing, and in that said point (49) of crossing is provided integral with the edge of the device and/or with said exten-

sion portion (40).

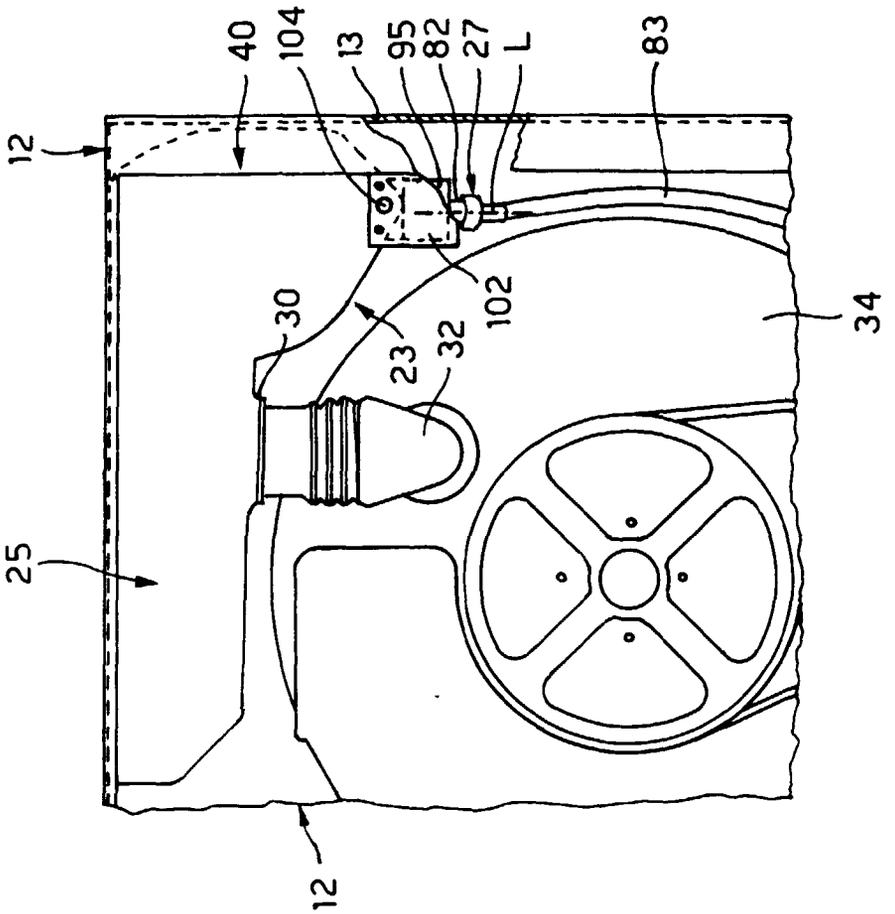
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FIG. 2

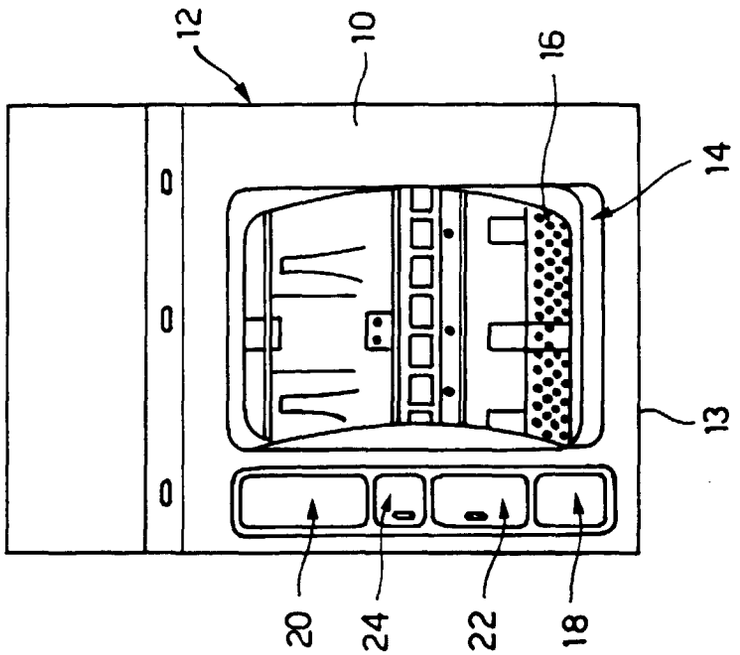
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FIG. 1

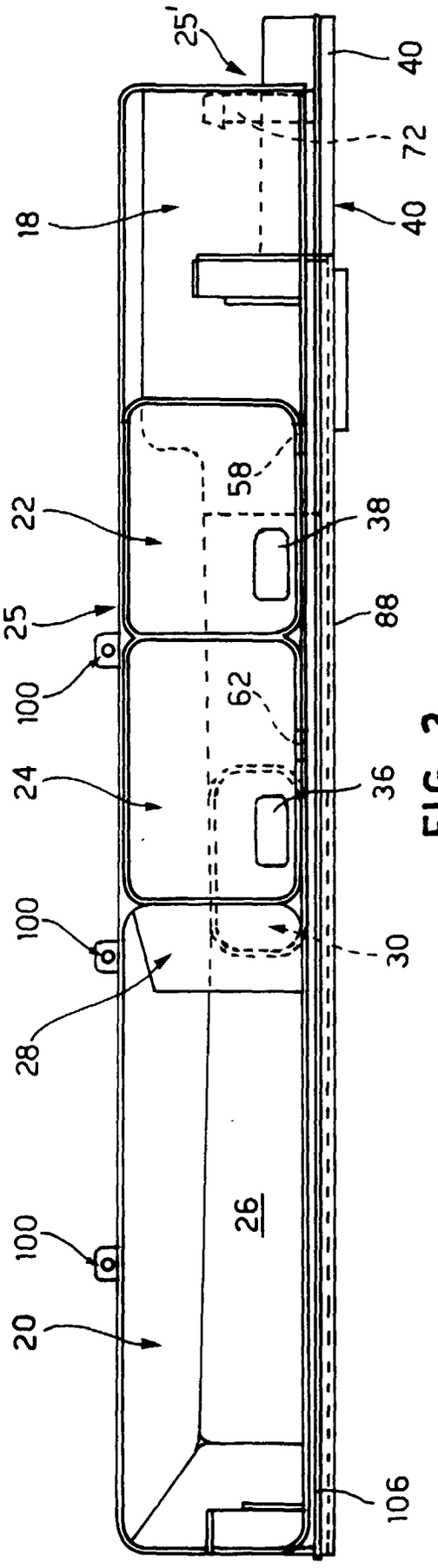
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FIG. 3

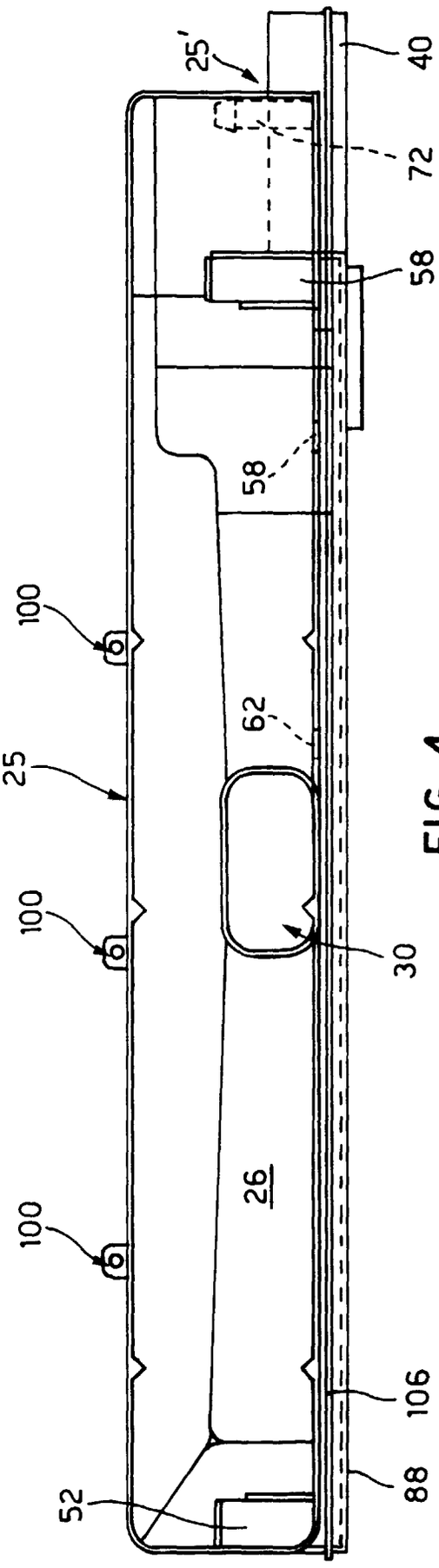
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FIG. 4

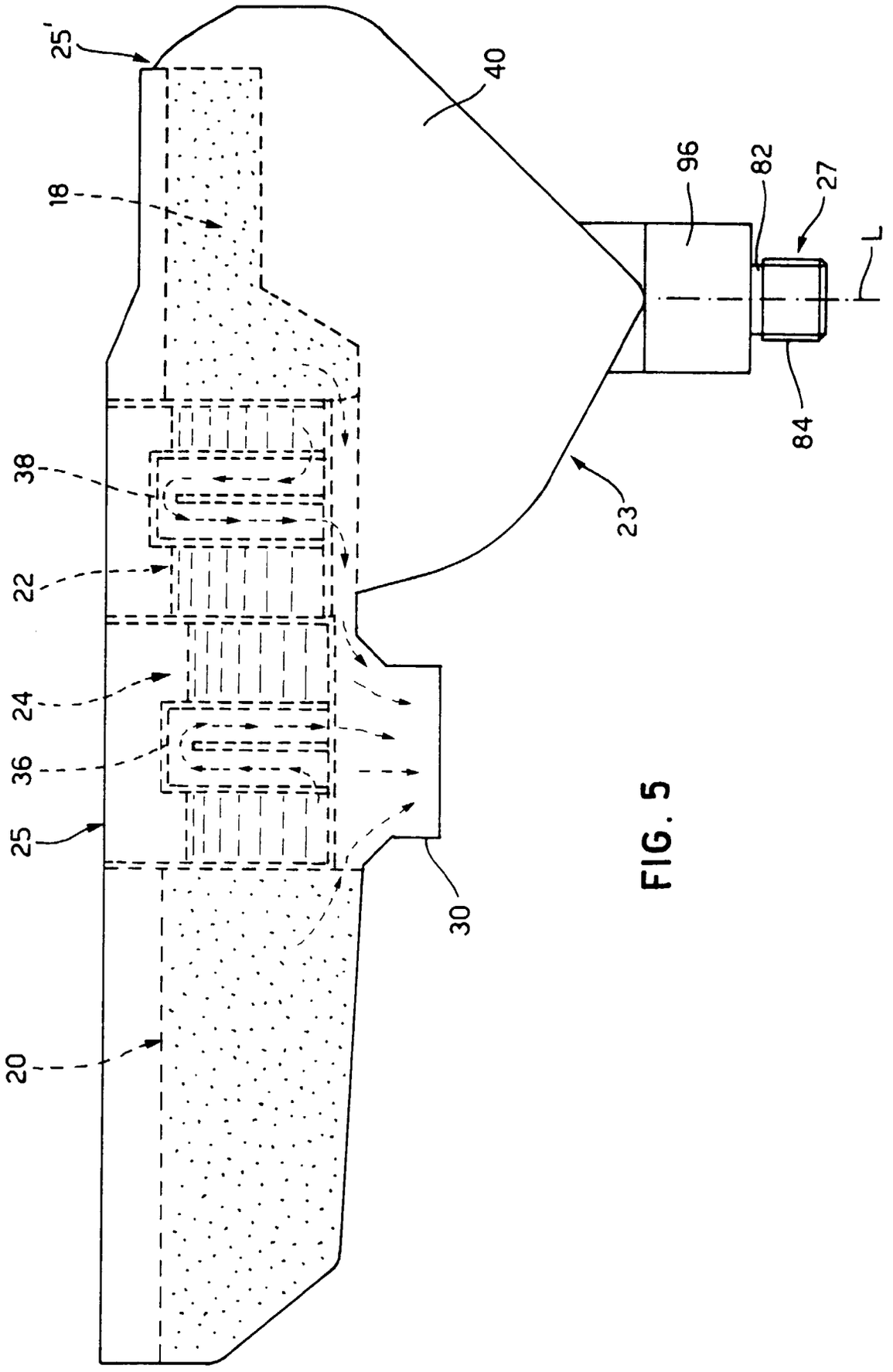

FIG. 5

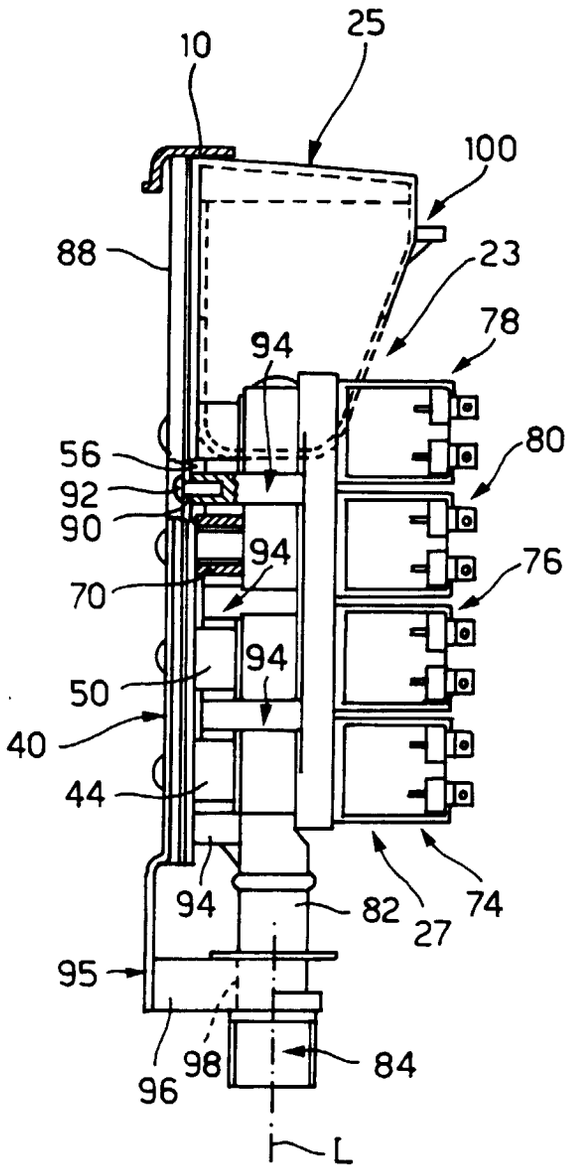
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FIG. 6

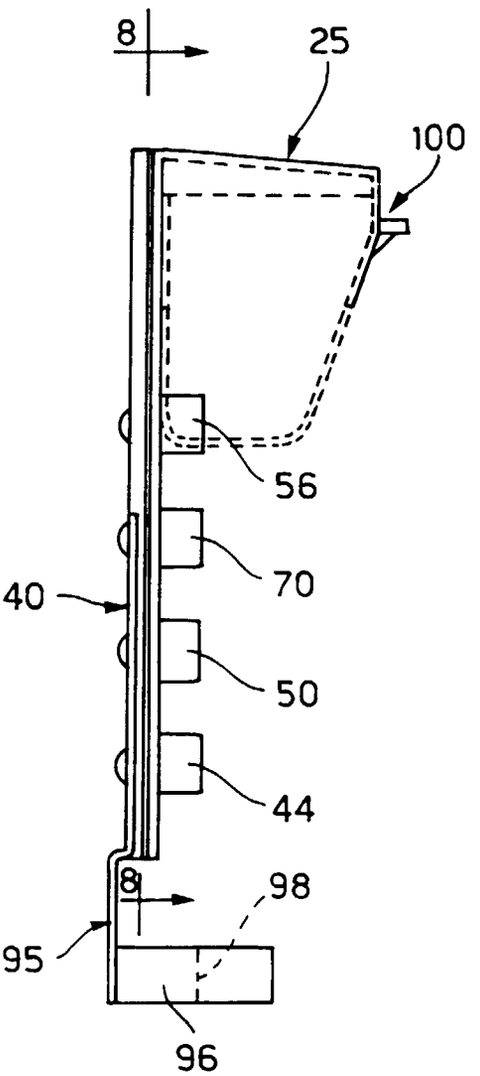
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FIG. 7

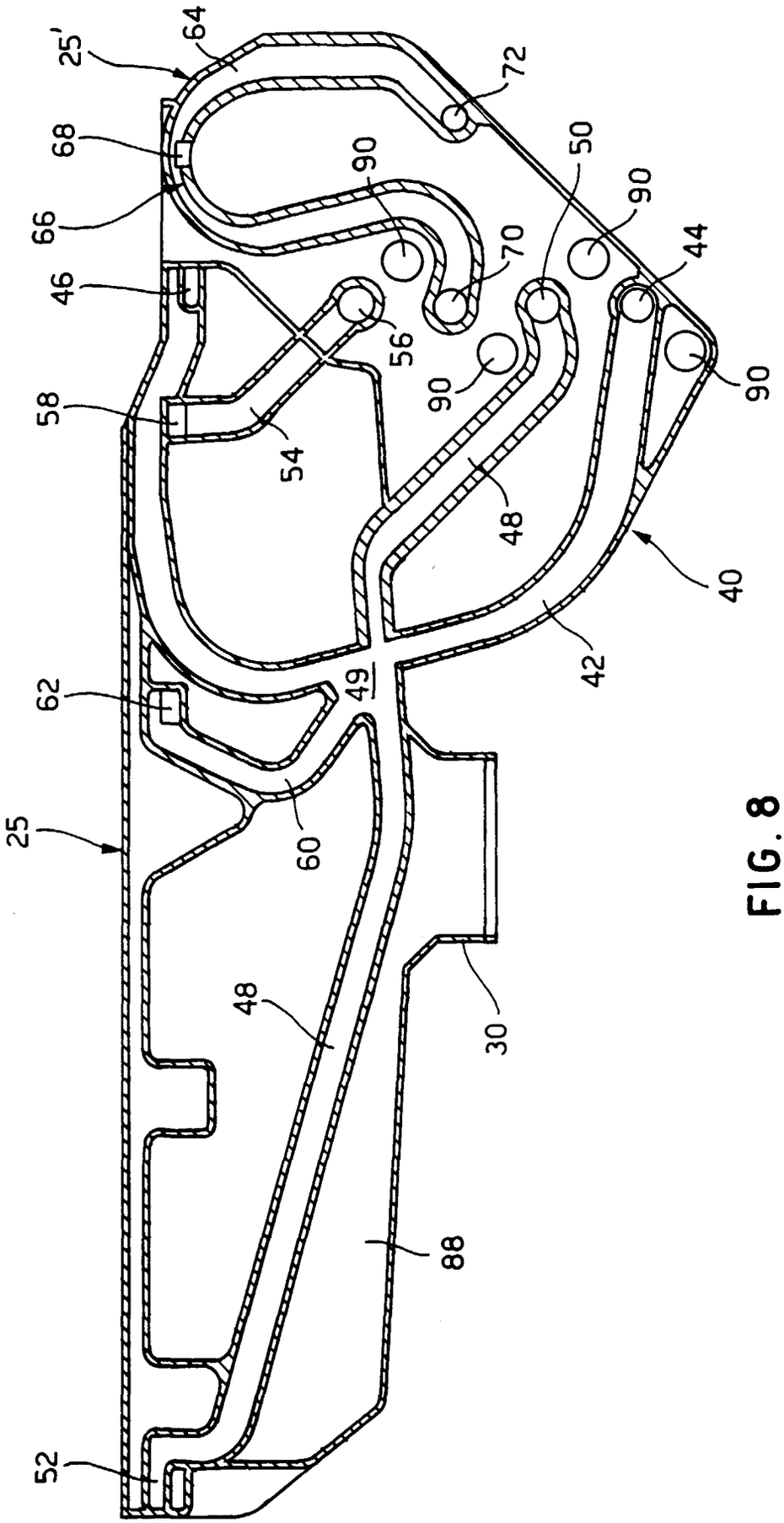
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FIG. 8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 12 4212

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.6)
A	US 5 582 039 A (MUELLER DALE E ET AL) 10 December 1996 * figures 1,3 *	1	D06F39/02
A	EP 0 125 627 A (ZANUSSI A SPA INDUSTRIE) 21 November 1984 * figure 1 *	1	
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A	GB 2 127 045 A (BOSCH SIEMENS HAUSGERAETE) 4 April 1984		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28 April 1999	Debard, M

CATEGORY OF CITED DOCUMENTS

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28-04-1999

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