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(72) Inventors:
• **Borroni, Giuseppe**
21040 Origgio, Varese (IT)
• **Carli, Carlo**
21100 Varese (IT)

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(74) Representative:
Petruzzelli, Antonio
European Patent Attorney
C.so Italia, No. 43
20122 Milano (IT)

(71) Applicant: **T & P - S.p.A.**
21049 Tradate (Varese) (IT)

(54) **A perfected assembly for the selective supply of washing agents to a working tub of a washing machine**

(57) An assembly for selective supply of washing agents to a working tub of a washing machine. The assembly being of the type comprising a drawer for holding washing agents in appropriate housing compartments and valve means (42) having at least one inlet for connection to an external conduit (206) for feeding water of the water supply system inside the machine and being controlled to send to each of said compartments of the detergent agents a respective flow of water for removing the detergent agent and for transporting into the washing tub of the machine. Means for support-

ing the valve means (42) extend from said body (20) of said drawer of the washing agents and being shaped such as to position the inlet of the flow of water to said valve means (42) at an access (204) for the external conduit (206) of the mains water provided in the external covering framework (202) of the machine to allow easy connection of said external conduit (206) for the external mains water to said inlet of the valve means (42).

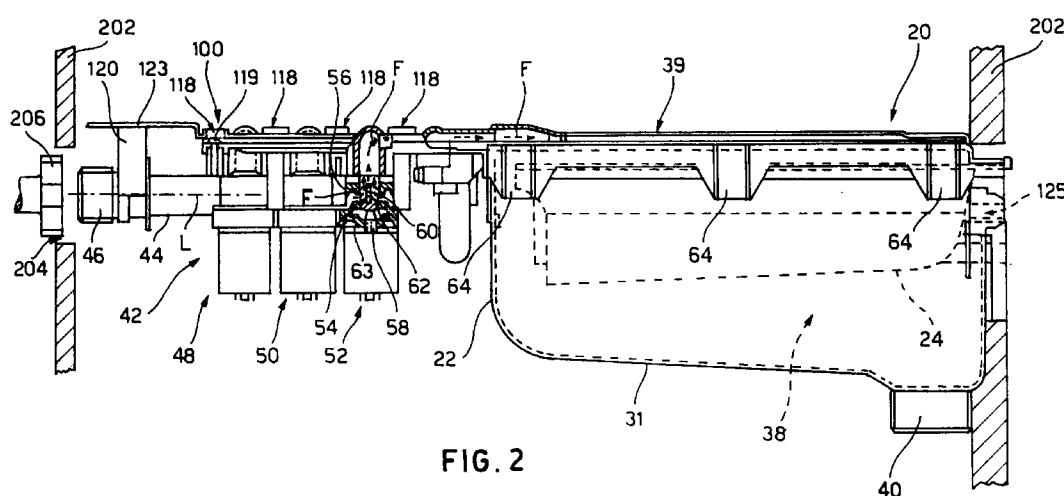


FIG. 2

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Description

[0001] The present invention relates to an assembly for the selective supply of washing agents to a work tub of a machine for washing articles, in particular articles of laundry.

[0002] More particularly said assembly is of the type comprising a drawer for holding the washing agents in appropriate housing compartments and valve means having at least one inlet for connection to an external conduit for feeding water of the water supply system inside the machine and are controlled to send to each of said compartments of the detergent agents a respective flow of water for removing the detergent agent and transporting into the washing tub of the machine.

[0003] In machines for washing laundry known to date provision is made for said machine to have an external containing framework wherein there is at least one access for allowing a connection of the conduit for feeding into the machine external mains water to the valve device for the offtake of appropriate flows of water used inside the washing machine.

[0004] In these traditional machines the valve device is attached to the frame of the machine with its inlet positioned at said access for feeding mains water in order to allow coupling of the thread on the external part of said inlet of the valve device directly to the ring nut for connection at the free end of said external conduit for feeding mains water, while the drawer is attached to the same frame, positioned at a distance from the valve device, and is connected thereto for selective transmission to the latter of appropriate flows of water, by means of hoses and clamping clips.

[0005] For assembly of these traditional systems for the supply of detergent or other to the washing tub it was therefore necessary for the manufacturer of the washing machine to attach first the valve means and the drawer to the frame of the machine and then connect them thanks to said hoses, with a considerable waste of time for the person in charge of assembly.

[0006] In order to allow faster assembly of the system composed of the valve device and the detergent drawer, the present Applicant has developed an assembly for the selective supply of washing agents to a working tub of a machine for washing articles as described in the document EP-A-0 688 895. This assembly comprises a drawer for holding the washing agents in appropriate housing compartments and valve means having at least one inlet for connection to said conduit for feeding the external mains water and being controlled to send to each of said compartments of the detergent agents a respective flow of water for removing the detergent agent and transporting into the washing tub of the machine, wherein the outlet nozzles from the valve means are directly connected to the inlet nozzles in the drawer compartments provided on a wall of the drawer itself and wherein the valve means have been attached directly to said drawer.

[0007] According to the assembly arrangement provided in said document EP-A-0 688 895, the valve device has a collecting chamber or manifold with a substantially cylindrical shape and arranged parallel to the side of the drawer where to said valve device is attached, with the result that the end opening of the manifold for feeding the flow of water coming from the mains, or the opening at which the external conduit for the mains water should be attached, is positioned inside the washing machine far from the external framework of the machine. In order to send the mains water to said valve device it is no longer possible to connect directly the external conduit of the mains water to the valve means of the assembly, but it is necessary, contrarily, to provide a supplementary hose which can be connected by one of its ends to the inlet of the valve means and whose other end is integrated with the support structure of the machine at said access opening for attachment to the external conduit for the mains water.

[0008] The object of the present invention is to perfect the assembly of the document EP-A-0 688 895, allowing avoidance of the use of the aforementioned additional pipe for connection between the external conduit of the mains water and the inlet in said valve means, also avoiding the corresponding costs for the supply of this supplementary pipe and for assembly of the same.

[0009] The previous objects are achieved by providing an assembly having the features of claim 1 attached hereto.

[0010] The use of means for supporting the valve means, which extend from said body of said drawer of the washing agents and are shaped so as to position the inlet of the flow of water to said valve means at said access for the external conduit of the mains water provided in said external covering framework, allows easy connection of said external conduit for the external mains water to said inlet of the valve means, avoiding the use of the aforementioned extension pipe used in the prior art and the relevant costs.

[0011] Moreover the present drawer assembly for holding washing agents and valve device likewise allows maintaining of the advantage of being provided in the form of a single pre-connected body, suitable for being mounted in a unitary manner on the washing machine with a considerable saving in times and costs of assembly.

[0012] The present invention will be made clearer on reading the following description, relating to preferred embodiments of the invention, to be read with reference to the accompanying drawings, in which:

Figure 1 is a schematic perspective view of a washing machine;

Figure 2 is a side view, partially sectioned, of the assembly according to a preferred embodiment of the present invention, coupled to relative valve means;

Figure 3 is a front view of the assembly according to the preferred embodiment of the present invention, again coupled to relevant valve means;

Figure 4 is a view from above of only the device for holding the washing agents according to the preferred embodiment of the present invention;

Figure 5 is a side view of only the device for holding the washing agents according to the preferred embodiment of the present invention;

Figure 6 is a view from the rear side of only the device for holding the washing agents according to the preferred embodiment of the present invention;

Figures 7A and 7B are respectively a view from above and from below of the components which face each other and are welded one to the other to define the upper part of the body of the device for holding the washing agents according to the preferred embodiment of the present invention.

[0013] Figure 1 shows a washing machine 10 for domestic use of a wholly common type. It comprises a front opening 11 fitted with a closure door 12 for loading laundry inside the laundry drum or washing tub of the machine, and a device for selective sending of detergent agents and/or other agents which can be used in washing laundry articles, in this case it is an extractable drawer 13 for housing detergents or other additives to the washing tub.

[0014] The washing machine also comprises a timer 14 for setting a programmed washing cycle, a knob 15 for controlling the washing cycle and any other control push-buttons 16.

[0015] For the selective supply of detergents or other additives to the washing tub of a washing machine, suitable valve means (not shown in Figure 1) send selectively, controlled by the timer 14, a respective flow of water to each of the compartments of the detergent drawer to remove the detergents or additives contained in these compartments and transport them into contact with the laundry in the washing tub.

[0016] As is clear with reference also to Figures 2 and 3, the device for housing the washing agents or drawer comprises a body of the device, denoted overall by reference numeral 20, which body consists of a fixed part 22, to be connected rigidly to the frame of the washing machine, and a mobile part 24, which can be extracted outside of the washing machine as shown in Figure 1, for depositing various washing agents, such as detergents, bleach and fabric conditioner, in respective housing means in the form of compartments or drawers or the like.

[0017] More particularly, as shown by Figure 1, the drawer shown here comprises two end compartments 26 and 28 respectively for housing the quantity of pre-

wash and washing detergent and the compartments 30 and 32 for housing the quantity of bleach and of fabric conditioner respectively.

[0018] It must nevertheless be understood henceforth that the teachings of the present invention are not to be considered in any way limited to such a kind of drawer for holding washing agents and could very well be applied also in other types of devices for housing these washing agents, also of the type which do not use extractable mobile parts in any way, as also the fact that these teachings can be used in devices holding washing agents which can be related to other types of washing machines intended for use on articles of any kind, different from those mentioned hitherto.

[0019] In the present embodiment the fixed part 22 of the body of the drawer or device for housing the washing agents comprises a lower part 31 in the form of a container with a substantially prismatic shape and open on one side for inserting and extracting the mobile part 24 which is housed therein.

[0020] The relative movement of the mobile part 24 in relation to the fixed part is obtained thanks to the guide 34 of the fixed part and respectively the surface 36 for the sliding on this guide of the mobile part of the drawer, shown by a dotted line in Figure 2.

[0021] Said lower part of said fixed part 22 defines therefore an internal chamber 38 for collecting the flows of water passing into said device for housing washing agents, which discharges them directly into the washing tub of the washing machine by means of the lower nozzle 40. In this Figure 2 and in Figure 3 it is also indicated how, to the body of the device for housing washing agents, and in particular to the fixed part of the latter, a valve device 42 has also been directly attached, suitable for sending, in a selective manner under the control of the timer and washing program of the machine, a predetermined flow of water to each of the compartments of the drawer for removing and transporting to the washing tub the detergent or other washing agent contained in the latter.

[0022] As shown in Figure 2, the valve device adopted here comprises, in addition to a manifold conduit or element 44 at one of whose ends a pipe 206 is connected by a threaded coupling 46 for feeding mains water, a first, a second and a third valve 48, 50 and 52 respectively, whereof the lower part wherein the electrical winding is housed for actuating the respective gate valve is fully evident in the Figure.

[0023] In order not to overload said Figure 2 excessively, it shows, sectioned, only the valve element 52; the other two valve elements 48 and 50 are in any case wholly similar structurally and functionally to this valve element 52.

[0024] The valve element 52 of the valve means therefore comprises, in a known manner, a membrane gate valve 54 shown in Figure 2, which gate valve can be actuated to close the aperture 56 for passage of the flow in a backward position to allow passage of the water

from the manifold 44 towards a corresponding compartment of the device for housing washing agents, as shown by the arrows F in Figure 2.

[0025] The gate valve 52 has an internal hole at the upper end 60 with axial passages 62 of a magnetic rod 58 driven to move by said electrical actuation winding 63, and is also attached externally to the internal chamber of the valve element.

[0026] As shown in Figure 2 the external containing framework 202 of the machine has at the rear an access 204 to allow a connection of the conduit or pipe 206, for feeding into the machine external mains water, to said valve means of the assembly.

[0027] According to the teachings of the present invention means are provided for supporting the valve means which extend from said body of said drawer of the washing agents, which means are shaped so as to position the inlet of the flow of water to said valve means at said access for the external conduit of the mains water provided in said external covering framework to allow easy connection of said external conduit for external mains water to said inlet of the valve means.

[0028] Referring also to the subsequent Figures 4, 5 and 6, it can be seen how, in an advantageous manner, the means for supporting the valve means extending from the drawer have a portion with a substantially flattened shape 100, which portion is made in one single part with the body of the device for housing detergent agents and extends from the rear side which is opposite the one wherefrom the mobile part 24 of the drawer is extracted.

[0029] As shown in Figure 4, in the portion 100 conduits 102, 104, 106 and 108 are formed, in relief in relation to a support surface 109, of which the conduits 102, 104, 106 are for conveying the flows of water towards said means of housing the washing agents, that is to say towards the compartment of the bleach, towards the prewash compartment and towards the washing compartment respectively, while said conduit 108 conveys a flow of water towards an air break device built into the body of the drawer.

[0030] As shown in Figure 5, the support portion 100 has nozzles 110, 112, 114, 116 extending below from the support surface 109, provided to receive by insertion a corresponding emission nozzle of the valve means.

[0031] Advantageously means are also provided for directly attaching said valve means 42 to said support portion 100.

[0032] Said means for directly attaching the valve means to said support portion 100 comprise holes 118 for the insertion of special attachment screws, only one of these, denoted by reference numeral 119, being shown in Figure 2. Said holes 118 having an axis parallel to the axis of the feed nozzles 114, 112, 116 and connection to the valve means. This enables the forming of the connection between the valve means and the support portion by acting in one single direction of coupling

and therefore does not require the operator to move the part to connect and attach the valves to the device, allowing a saving in assembly times or the possibility of automating this assembly operation.

[0033] Said means of attachment between valve means and support portion also comprise a bracket 120 extending downwards for supporting said valve means and having a shaped end 122 defining a housing suitable for holding a shaped part correspondingly of the valve means.

[0034] As shown, said bracket 120 for supporting said valve means is made in one part with the end portion 123 at the free end of the support portion 100.

[0035] On the same portion 100 for supporting the valve means, means are also provided for attaching the washing agents container device to the frame of the washing machine, which are here in the form of holes 124 for the insertion of corresponding attachment screws (not shown) which can be screwed in the same direction of insertion of the screws for attaching the valve means 42 to the support portion 100. Other means of attachment to the framework comprise holes, only one, denoted by 125, being shown in Figure 2, for suitable attachment screws, positioned on opposite sides of the lower part 31 of the fixed body of the detergent container device.

[0036] Said portion 100 for supporting and conveying extends from the upper edge of the body of the device substantially parallel to the upper portion of covering of the latter.

[0037] According to a further advantageous feature, said manifold or said collecting chamber 44 has a longitudinal axis L which is oriented parallel to the longitudinal axis along which the mobile part of the drawer is extracted in order to extend at the access opening 204 provided in the wall 202 of the external framework of the machine opposite the one 202' for extraction of said mobile part of the drawer.

[0038] Moreover said feed nozzles 110, 112, 114, 116 formed in the support and conveying portion are aligned one with the other and the line of alignment of said feed nozzles formed in the support and conveying portion is oriented perpendicularly to the side of the body of the device wherefrom said support and conveying portion extends.

[0039] The fixed part 22 of the body of the device for housing detergents comprises, in addition to the lower component defining the collection chamber 38, an upper component 39 which is attached to the lower part 31 by means of snap hooking tabs 64 on the two sides of the upper component, coupling in an attachment action with corresponding surfaces provided on the lateral edge of the lower component of the body of the device.

[0040] In turn the upper component 39 of the body of the detergent container device consists of two parts 20A and 20B, shown in the subsequent Figures 7A, 7B, which match and are integral one with the other by weld-

ing, generally performed with a hot blade.

[0041] The rear support portion 100 forms part of this upper portion and therefore also consists of two parts, 100A and 100B respectively, belonging to the components 20A of Figure 7A and 20B of Figure 7B respectively, which have respective conduit portions 108A and 108B for defining the conduit for conveying the flow towards the air break, and portions of conduit 102A, 104A, 106A on the component 7A and 102B, 104B and 106B on the component 7B for defining the conduits for feeding flows of water to the washing agent compartments.

[0042] In the upper component 20 of the body of the device the parts for distributing the flows of removing water to the various compartments housing the washing agents are also formed in a known manner.

[0043] Said distribution parts comprise, as shown in Figure 7A which shows the underlying part of the upper component, a first plurality of holes 66 suitable for allowing to fall, in a distributed manner in said compartment for the prewash, a flow of liquid conveyed via a conduit defined by the shaped walls 68A and 68B respectively of Figures 7A and 7B.

[0044] Said distribution parts also comprise, as shown in Figure 7A, a second plurality of holes 70 suitable for allowing to fall, in a distributed manner in said compartment for washing, a flow of liquid conveyed via a conduit defined by the walls 72A and 72B of the two parts of Figures 7A and 7B respectively.

[0045] The aforementioned distribution parts finally comprise, as shown in Figure 7A, a pair of openings 74 suitable for allowing to fall in a distributed manner in said compartment for the fabric conditioner a flow of liquid conveyed via a conduit defined by the walls 76A and 76B of the two parts of Figures 7A and 7B respectively.

[0046] It should also be noted that, in relation to the preferred embodiment shown here, the aforementioned valve element 52 admits a flow of liquid from the mains towards a short conduit suitable for defining an air break, while the other valve elements 50 and 48 are used, if actuated individually, to send a flow of water towards the compartment containing the quantity of detergent for the prewash and towards the one containing the quantity of detergent for actual washing and, if actuated together, to send the flow of liquid towards the fabric conditioner compartment.

[0047] In this version of the detergent drawer-valve assembly, valves are not provided for sending water towards the bleach compartment which is therefore intended to remain unused and the relevant conduits blocked. Obviously nothing precludes the fact of this bleaching function also being activated, as also the fact that other valve elements can be excluded.

[0048] 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 for the washing of laundry articles, wherein said machine has an external containing framework wherein there is an access for allowing a connection of an external conduit for feeding water coming from an external source into said machine; said assembly being of the type comprising a drawer for holding washing agents in appropriate housing compartments and valve means having at least one inlet of connection to said conduit for feeding external mains water and being controlled to send 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 (42) extend from said body (20) of said drawer of the washing agents, said means for supporting the valve means (42) being shaped such as to position the inlet of the flow of water to said valve means (42) at said access (204) for the external conduit (206) of the mains water provided in said external covering framework (202) to allow easy connection of said external conduit (206) for the external mains water to said inlet of the valve means (42).
2. An assembly according to claim 1, characterised in that said support means comprise an elongated portion (100) for supporting the valve means (42) for feeding one or more flows of water to said device for housing the washing agents, and in that one or more conduits (102, 104, 106, 108) for conveying the flows of water towards said means for housing the washing agents and/or said conduit defining the air break are formed in said elongated portion (100) for supporting the valve means (42).
3. An assembly according to claim 2, characterised in that said one or more conveying conduits (102, 104, 106, 108) in the support portion have a respective feed nozzle (110, 112, 114, 116) directly connected to a corresponding emission nozzle of the valve means (42).
4. An assembly according to any one of the previous claims, characterised in that means are provided for directly attaching the valve means (42) to said support portion (100).
5. A device according to claim 4, characterised in that said means for directly attaching the valve means (42) to said support portion (100) comprise one or more holes (118) for inserting attachment screws (119), said holes (118) having an axis parallel to the axis of the nozzles (110, 112, 114, 116) for feeding

and connection to the valve means (42).

6. A device according to any one of the previous claims from 4 to 5, characterised in that said attachment means comprise a bracket (120) extending transversely from the support portion (100) for supporting said valve means (42) and having a shaped end (122) defining a housing suitable for holding a shaped part correspondingly of the valve means (42). 5
7. An assembly according to claim 6, characterised in that said bracket (120) for supporting said valve means (42) is formed near the free end of the support portion (100). 10
8. An assembly according to any one of the previous claims, characterised in that means for attachment of the device to the washing machine are provided on said portion (100) for supporting the valve means (42). 15
9. An assembly according to any one of the previous claims, characterised in that means for attachment to said support framework are provided on the body (20) of the drawer. 20
10. An assembly according to any one of the previous claims, characterised in that said support and conveying portion (100) has a substantially flattened configuration. 25
11. An assembly according to any one of the previous claims, characterised in that said conveying conduits (102, 104, 106, 108) of the support portion (100) lie substantially on the same plane. 30
12. A device according to any one of the previous claims, characterised in that said support and conveying portion (100) extends substantially horizontally. 35
13. An assembly according to any one of the previous claims, characterised in that said portion (100) for supporting the valve means (42) extends from the upper edge of the body (20) of the drawer, in that said feed nozzles (110, 112, 114, 116), made in the support and conveying portion (100), are formed on the lower side of the latter to position the valve means (42) within the outline of the transverse section of the body (20) of the drawer. 40
14. An assembly according to any one of the previous claims, characterised in that said valve means (42) comprise a substantially cylindrical collecting chamber (44) having at one end an opening for the feeding of the water coming from the external source, said collecting chamber (44) having a longi-

tudinal axis oriented parallel to the longitudinal axis of the drawer to extend at an access opening (204) provided in the wall (202) of the external framework of the machine opposite that (202') of extraction of said mobile part of the drawer.

15. An assembly according to any one of claims 3 to 14, characterised in that said feed nozzles (110, 112, 114, 116) formed in the support and conveying portion (100) are aligned one with the other.
16. An assembly according to claim 15, characterised in that the line of alignment of said feed nozzles (110, 112, 114, 116) formed in the support and conveying portion (100) is oriented perpendicularly to the side of the body (20) of the device wherefrom said support and conveying portion (100) extends.
17. An assembly according to any one of the previous claims, characterised in that said portion (100) for support and conveying flows and the body (20) of the device for housing the detergent agents are made in one single piece.
18. An assembly according to any one of the previous claims, characterised in that said body (20) of the device has a substantially flat upper covering part (20B) and a substantially flat part (20A) having openings for the transfer of flows of water coming from the valve means (42) to respective means for housing the washing agents and in that said support portion (100) defining one or more conveying conduits (102, 104, 106, 108) is formed by the reciprocal coupling between said covering parts (20B) and parts (20A) for transfer of the removal flows.

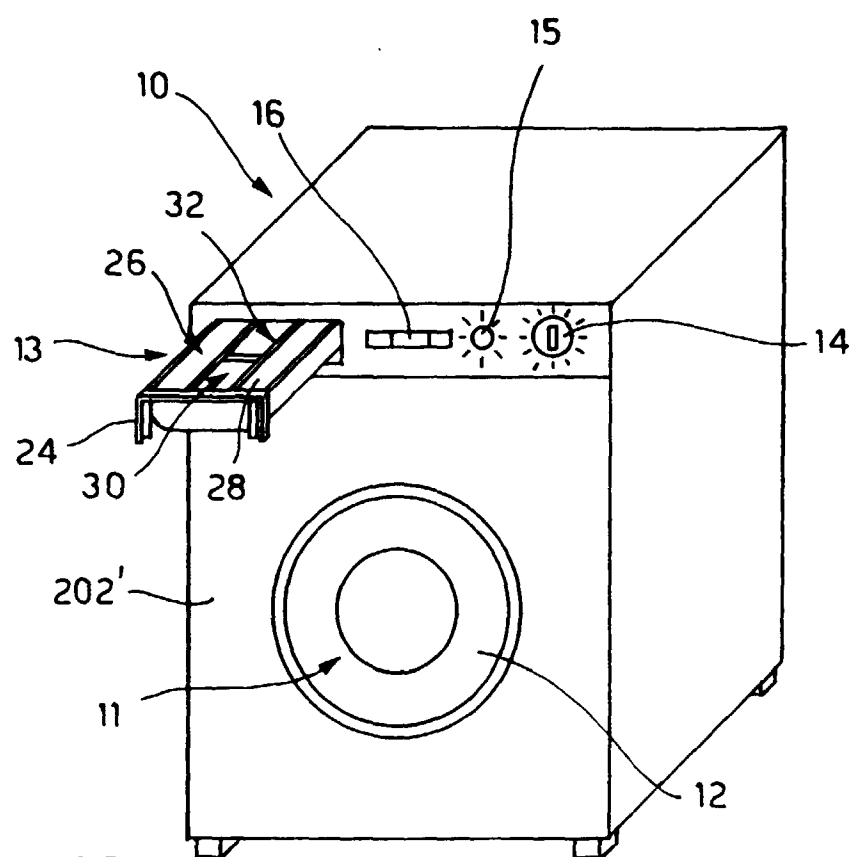


FIG. 1

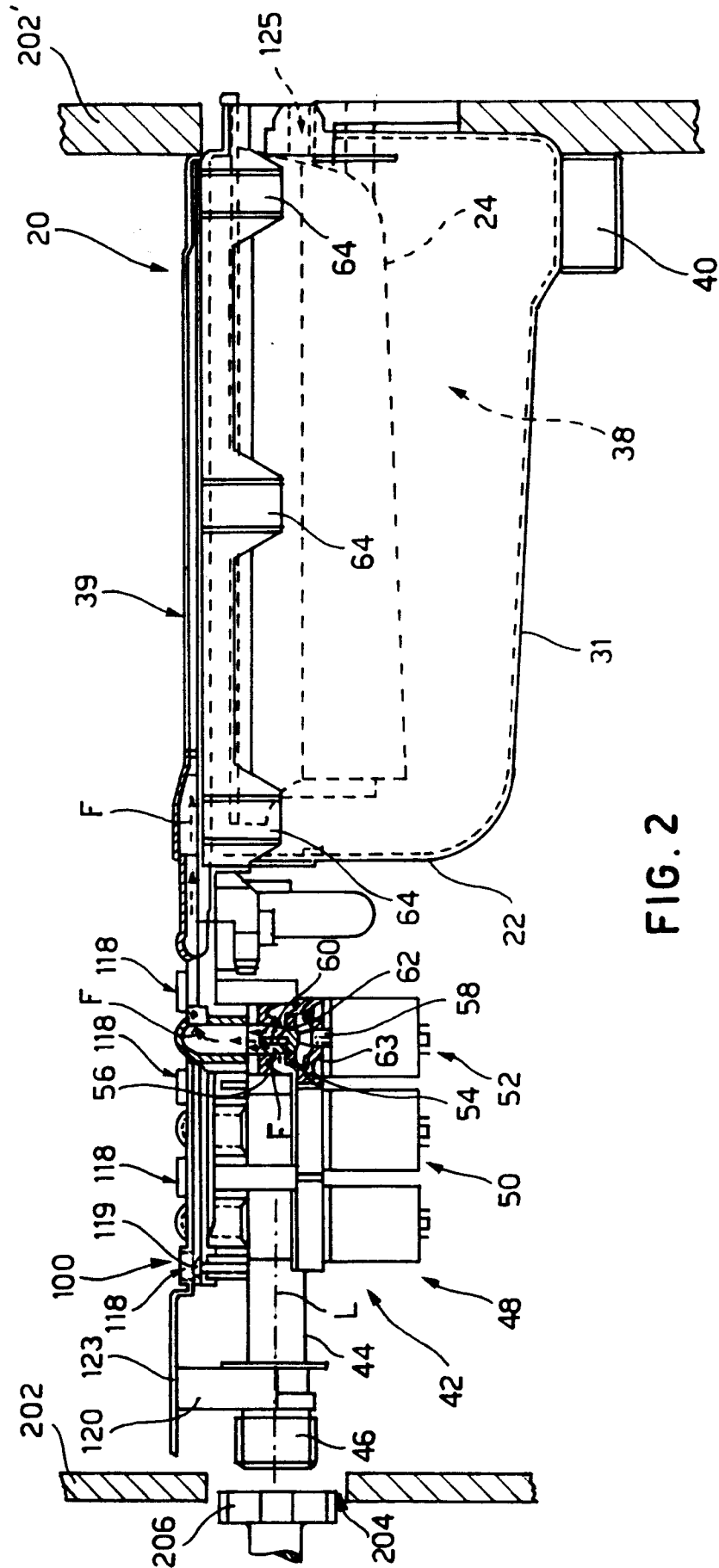


FIG. 2

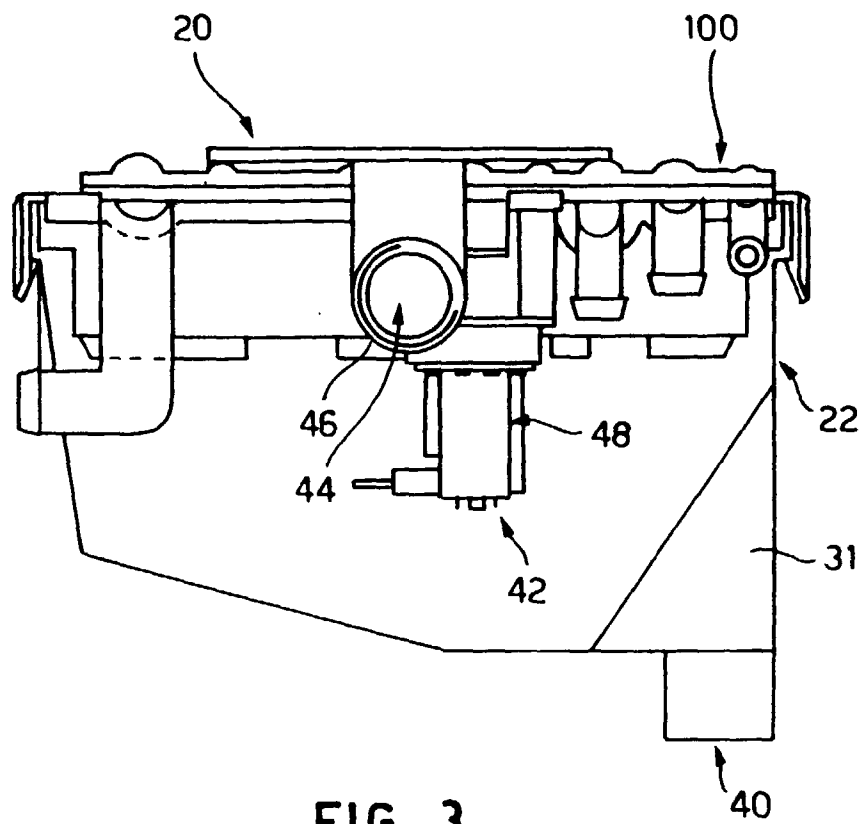


FIG. 3

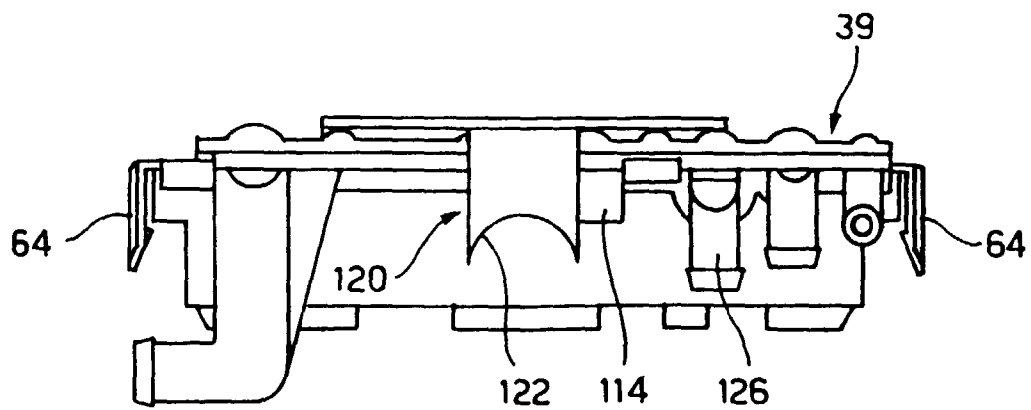


FIG. 6

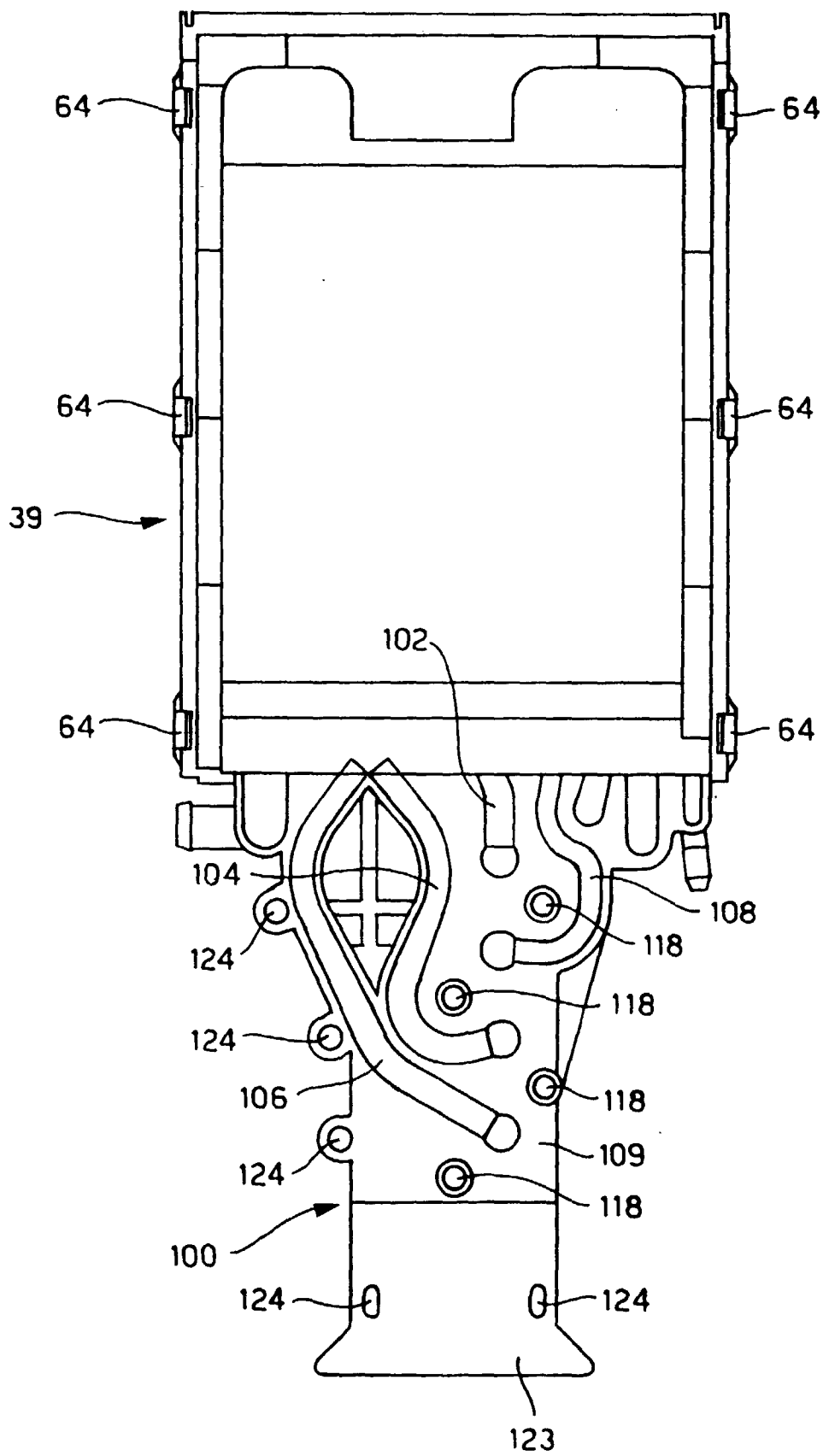


FIG. 4

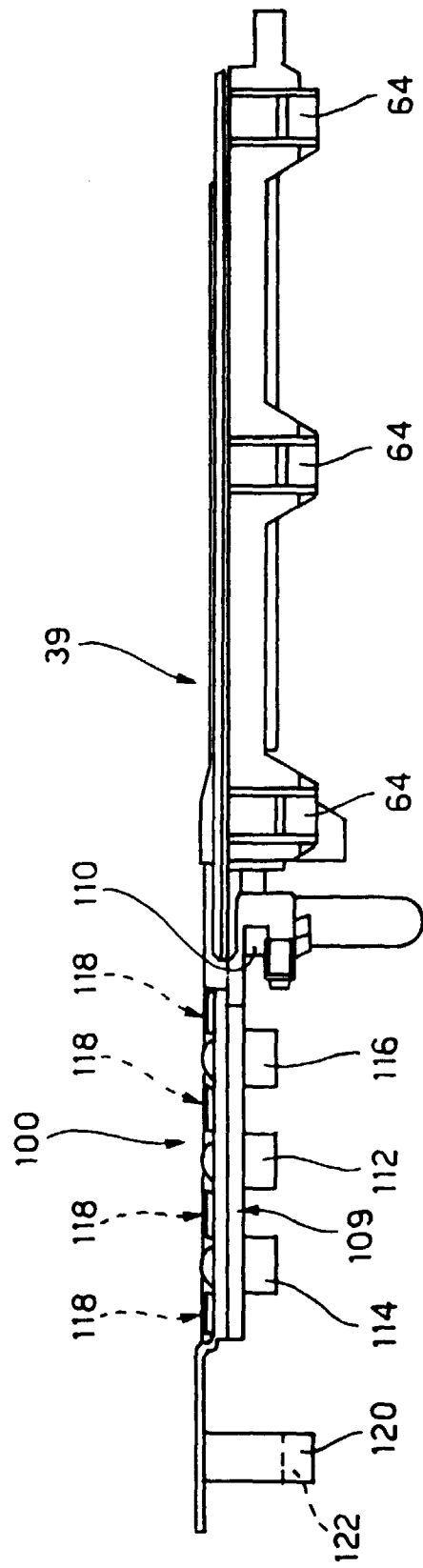


FIG. 5

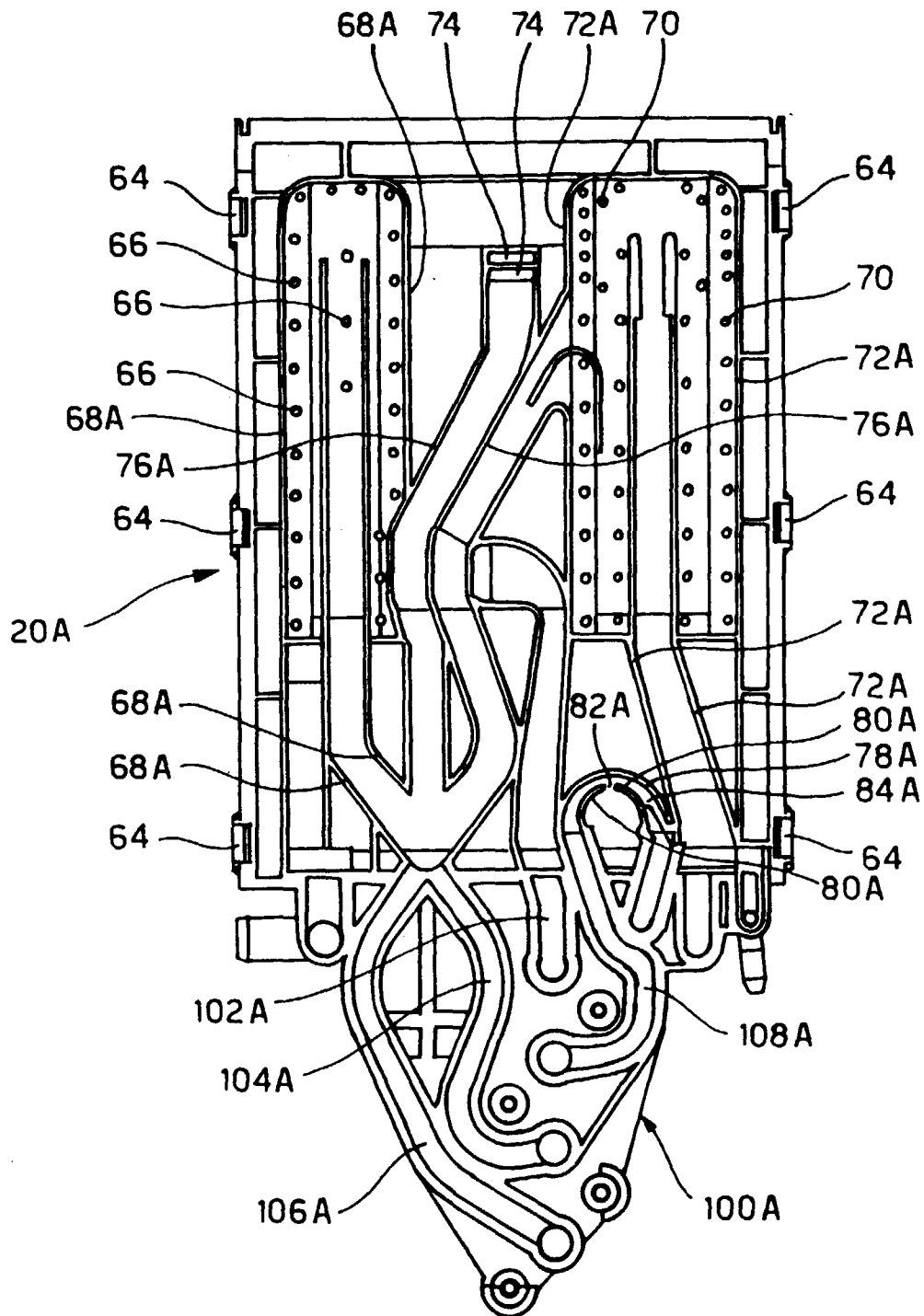


FIG. 7 A

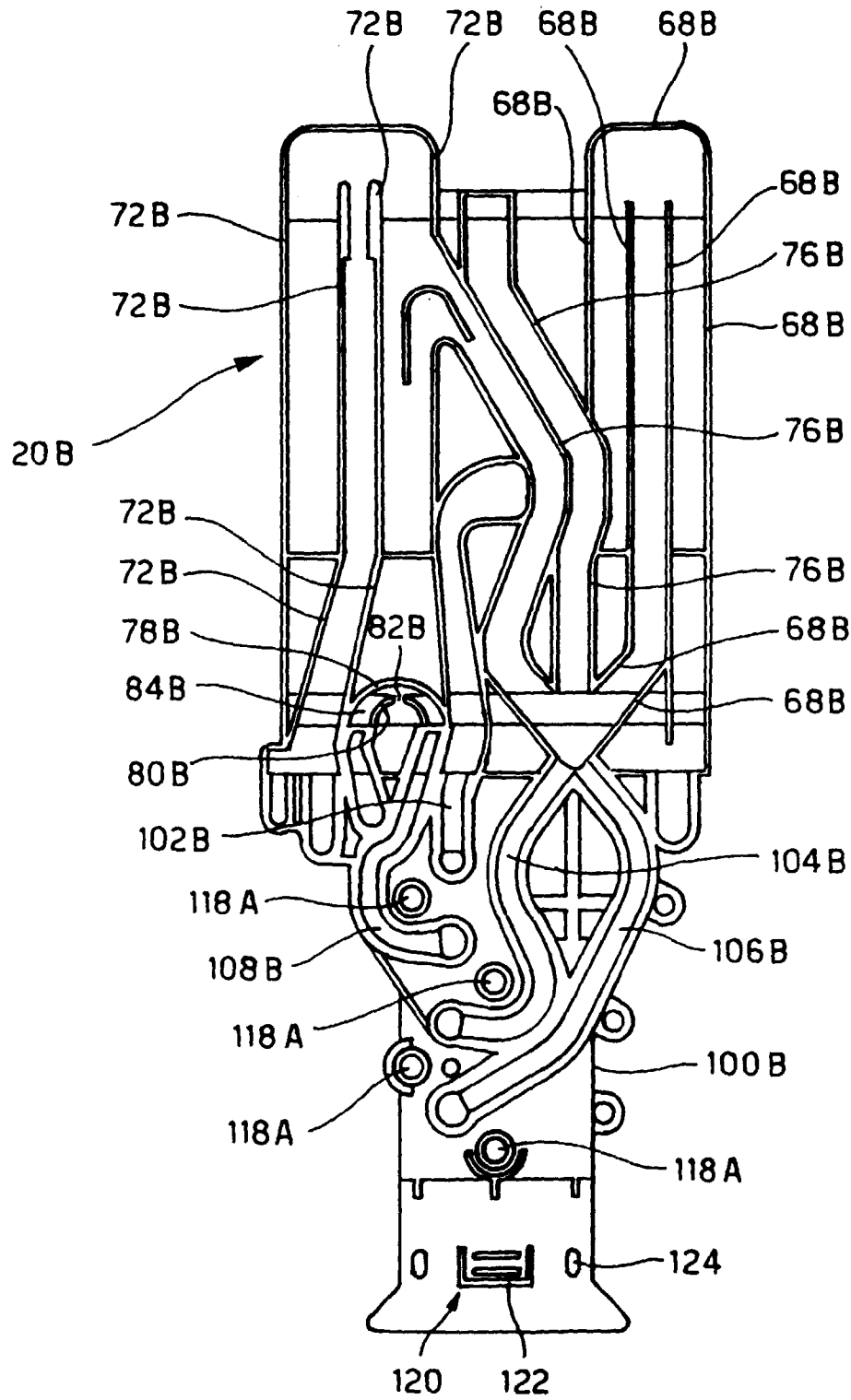


FIG. 7 B