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(71) Applicant: **W.P.R. S.r.l.**
31049 Valdobbiadene (Prov. of Treviso) (IT)

(72) Inventor: **Pincin, Antonio**
31044 Montebelluna (Treviso) (IT)

(74) Representative: **Modiano, Guido, Dr.-Ing. et al**
Modiano & Associati SpA
Via Meravigli, 16
20123 Milano (IT)

(54) Applicator for hot-melt adhesive

(57) An applicator (1) for hot-melt adhesive, of the type that comprises a supporting frame (2) for a first temperature-controlled tank (5) for the adhesive, at least one pump (6), a temperature-controlled melting hopper (7) and temperature-controlled application devices. The applicator (1) comprises a second tank (8) for cleaning material, and upstream of the pump a selector valve is provided which is suitable to select connection to the first or second tanks (5,8), so as to allow the flow of the adhesive or of the cleaning material.

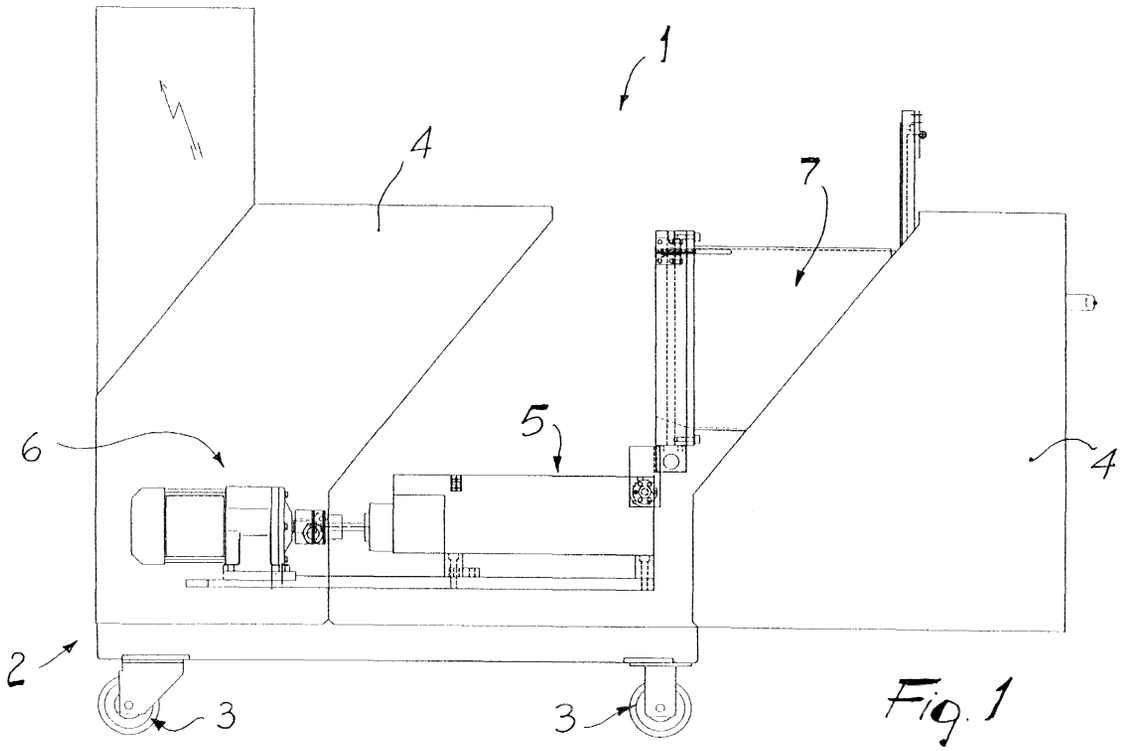

Fig. 1

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Description

[0001] The present invention relates to an applicator for adhesive of the type known as "hot melt".

[0002] Applicators of adhesives known as nonreactive or reactive hot melt, i.e., adhesives which after melting in an appropriate temperature-controlled melting hopper can deteriorate irreversibly, char and/or react chemically, with the result of defects or mechanical damage to the application system, are currently known.

[0003] These applicators for such adhesives are schematically composed of a single temperature-controlled tank for the adhesive, by a temperature-controlled melting hopper often also provided with a pre-melting grid, by a pump of the gear or pneumatic piston type, by a bypass (flow control valve), optional filtering assemblies, temperature-controlled piping and guns, dispensers, heads and/or other temperature-controlled application devices.

[0004] When reactive hot melt adhesives are used in applicators, it is sometimes necessary to perform ordinary maintenance operations in order to avoid the accumulation of deteriorated adhesive in the internal ducts of the system, such as the pump, the bypass, the outlet circuits, the piping and the dispensing devices.

[0005] Ordinary maintenance is performed according to the following sequence: first of all it is necessary to completely remove the adhesive that is present in the tank/hopper, which leads to increased costs due to the downtime of the system, the waste of adhesive and the disposal of said adhesive.

[0006] It is then necessary to introduce in the tank/hopper a cleaning product which mixes with the residues of the adhesive.

[0007] It is then necessary to wait for the cleaning product to melt and then remove it completely through internal ducts of the system and therefore through the pump, the bypass, the output circuits, the piping and the dispensing devices.

[0008] Fresh adhesive has then to be introduced in the temperature-controlled tank, which requires an appropriately assigned operator, and then wait for the adhesive to melt, subsequently performing a purging operation before resuming production.

[0009] These known applicators therefore have several drawbacks which can be summarized as high operating costs caused by their maintenance, which entails long system downtimes, waste of adhesive, excessive consumption of cleaning product, labor costs, excessive disposal costs, and production rejects due to possible residues of different products in the system.

[0010] The aim of the present invention is therefore to solve the above noted problems, eliminating the drawbacks of the cited known art, by providing an applicator for hot-melt adhesive which allows to reduce system downtime during ordinary maintenance.

[0011] Within this aim, an important object is to provide an applicator for hot-melt adhesive which allows to keep used adhesive wastage at very low levels.

[0012] Another important object is to provide an applicator in which a great reduction in consumption of cleaning product is achieved.

[0013] Another object is to provide an applicator in which even substantial reductions in labor costs can be achieved.

[0014] Another object is to provide an applicator for hot-melt adhesive which has reduced disposal costs.

[0015] Another object is to obtain an applicator for hot-melt adhesive which achieves a reduction in production rejects caused by possible residues of different products therein.

[0016] Another object is to provide an applicator for nonreactive or reactive hot-melt adhesives which associates with the above characteristics that of being structurally simple as well as reliable and safe in use.

[0017] This aim and these and other objects which will become better apparent hereinafter are achieved by an applicator for hot-melt adhesive, comprising a supporting frame for a first temperature-controlled tank for said adhesive, a pump, a temperature- controlled melting hopper and temperature-controlled application devices, characterized in that it comprises a second tank for cleaning material and in that upstream of said pump a selector valve is provided which is suitable to select connection to said first or second tanks.

[0018] Further characteristics and advantages of the invention will become better apparent from the detailed description of a particular embodiment of the present application, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a side view of the applicator according to the invention, in which the melting hopper is overturned;

Figure 2 is a view, similar to Figure 1, in which the supporting frame is omitted;

Figures 3 and 4 are schematic views of the first tank and of the selector valve respectively in the conditions for interconnection to the cleaning material and to the adhesive;

Figure 5 is a schematic sectional view of the flows of the adhesive and of the cleaning material to the pump;

Figures 6 and 7 are two sectional views of the selector valve, respectively in the adhesive discharge position and in the cleaning position, i.e., the position for the passage of the cleaning material.

[0019] With reference to the figures, the reference numeral 1 designates an applicator for hot-melt adhesives, comprising a frame 2 which is mounted on wheels 3 for supporting a housing 4 which contains a first temperature-controlled tank 5 for the adhesive, at least one pump 6, a temperature-controlled melting hopper 7, optional filtering assemblies, temperature-controlled piping and temperature-controlled application devices, not

shown in the figures.

[0020] The applicator 1 is also constituted by a second tank 8 for cleaning material.

[0021] A selector valve is also provided which is suitable to select connection to the first tank or the second tank.

[0022] The selector valve, which is for example of the axial type, comprises a hollow body 10 which has a first radial hole formed approximately in a median region as well as two second annular holes or openings 12a and 12b adjacent to the first hole 11 and preferably arranged on a plane which is rotated through 90 degrees.

[0023] The axial movement of the valve 9 causes the first hole 11 to be arranged axially at a first duct 13 which is connected to the second tank 8 for the cleaning material; in this condition, the second holes 12a and 12b are arranged at suitable second ducts 14a and 14b for connection to the pump or pumps 6.

[0024] In this condition, shown in Figure 3, the valve 9 simultaneously closes third ducts 15a and 15b which are connected to the first tank 5, so as to allow the cleaning material drawn from the second tank 8 to flow through an appropriately provided fourth discharge duct 16.

[0025] A further axial movement of the valve 9, shown in Figure 4, instead places the first delivery hole 11 at one of the third ducts 15a, 15b, while the first duct 13 is closed.

[0026] In this condition, therefore, the adhesive contained in the first tank 5 is sent to the pumps 6 by means of the second ducts 14a, 14b.

[0027] Finally, the hopper is articulated, by means of an appropriately provided hinge, to the frame in order to allow it to be overturned, so that the lower part of said first tank can be accessed for maintenance.

[0028] The operation of the applicator thus provides for the activation of the valve 9 in two separate active positions, and therefore in a position which allows to draw the melted adhesive from the first tank 5 and send it to the appropriately provided application devices, such as a dispensing gun or head.

[0029] When maintenance is necessary, the valve 9 is moved into a separate active position, shown in Figure 3, in which the cleaning material that is present is sent to the pump; therefore, contrary to the above mentioned prior art, the present invention allows recirculating operations of the cleaning product be performed simply by actuating the selector valve by means of a manual or servo control.

[0030] It has thus been found that the invention has achieved the intended aim and objects, an applicator having been provided in which it is possible to reduce system downtime, adhesive waste, consumption of cleaning product, labor costs, disposal costs and production waste caused by any residues of different products in the applicator.

[0031] The invention is of course susceptible of numerous modifications and variations, all of which are within the scope of the same inventive concept.

[0032] The materials used, as well as the dimensions that constitute the individual components of the invention, may of course be more pertinent according to requirements.

[0033] The disclosures in Italian Patent Application No. TV2000A000048 from which this application claims priority are incorporated herein by reference.

[0034] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An applicator for hot-melt adhesive, comprising a supporting frame for a first temperature-controlled tank for said adhesive, at least one pump, a temperature-controlled melting hopper and temperature-controlled application devices, **characterized in that** it comprises a second tank for cleaning material and **in that** upstream of said pump a selector valve is provided which is suitable to select connection to said first or second tanks.

2. The applicator according to claim 1, **characterized in that** said valve, which is preferably of the axial type, has a hollow body provided with a first delivery through hole formed approximately in a median region and two second holes adjacent to said first hole and arranged on a plane which is rotated through 90 degrees.

3. The applicator according to claims 1 and 2, **characterized in that** the axial movement of said valve places said first hole at a first duct which is connected to said second tank for said cleaning material, said pair of second holes being arranged, in this condition, at second ducts for connection to said at least one pump.

4. The applicator according to claims 1 and 3, **characterized in that** in the condition in which said first hole is arranged at said first duct, said valve simultaneously closes third ducts which are connected to said first tank, thus allowing the cleaning material drawn from said second tank to flow through a fourth output duct.

5. The applicator according to claims 1 and 3, **characterized in that** an axial movement of said valve places said first discharge hole at one of said third ducts, while said first duct is closed.

6. The applicator according to claims 1 and 5, **characterized in that** in the condition in which said first discharge hole is arranged at one of said third ducts, said adhesive contained in said first tank is sent to said at least one pump through said second ducts.

7. The applicator according to one or more of the preceding claims,
characterized in that said hopper is articulated to said frame in order to allow it to be overturned so that the lower part of said first tank can be accessed for maintenance.

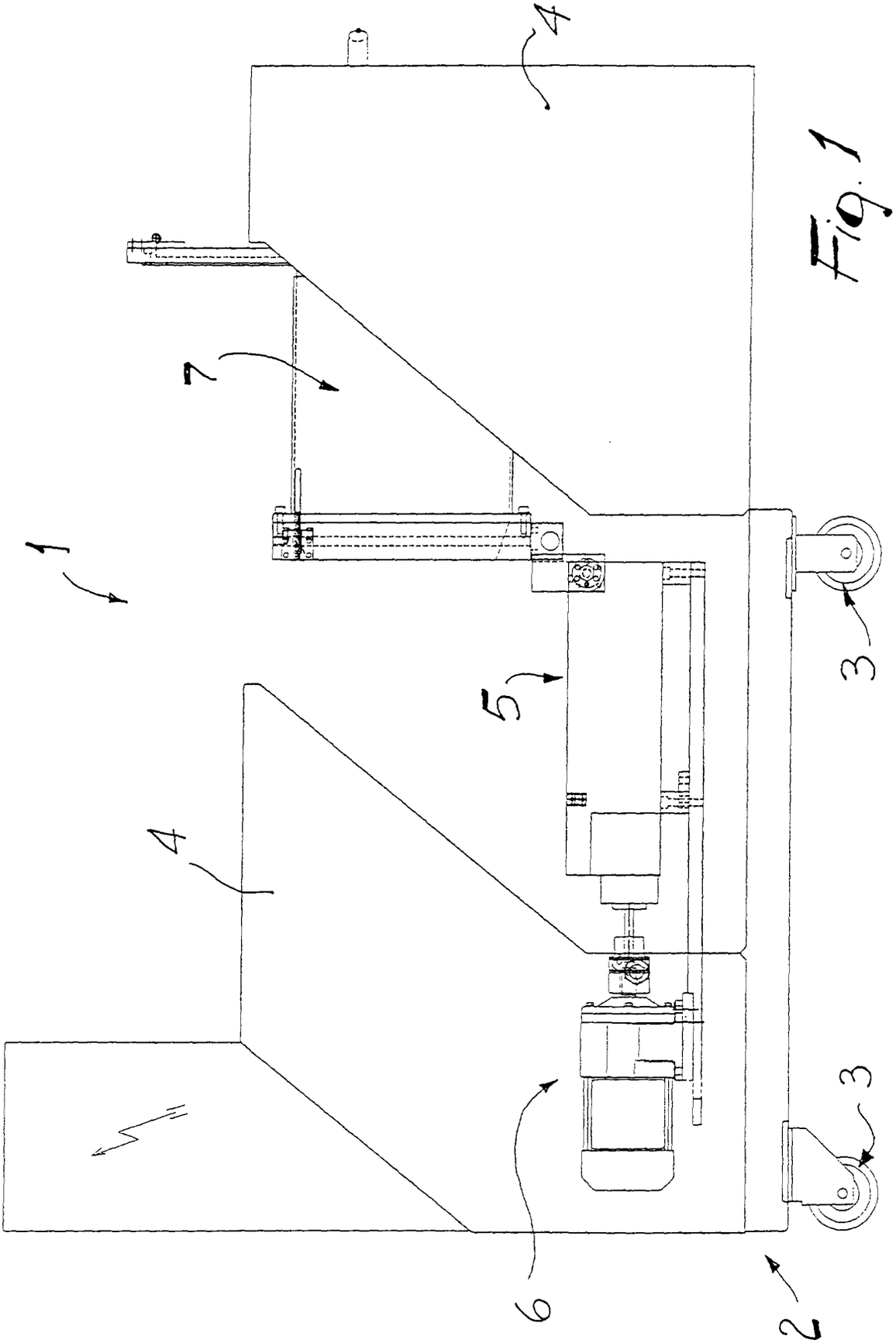

Fig. 1

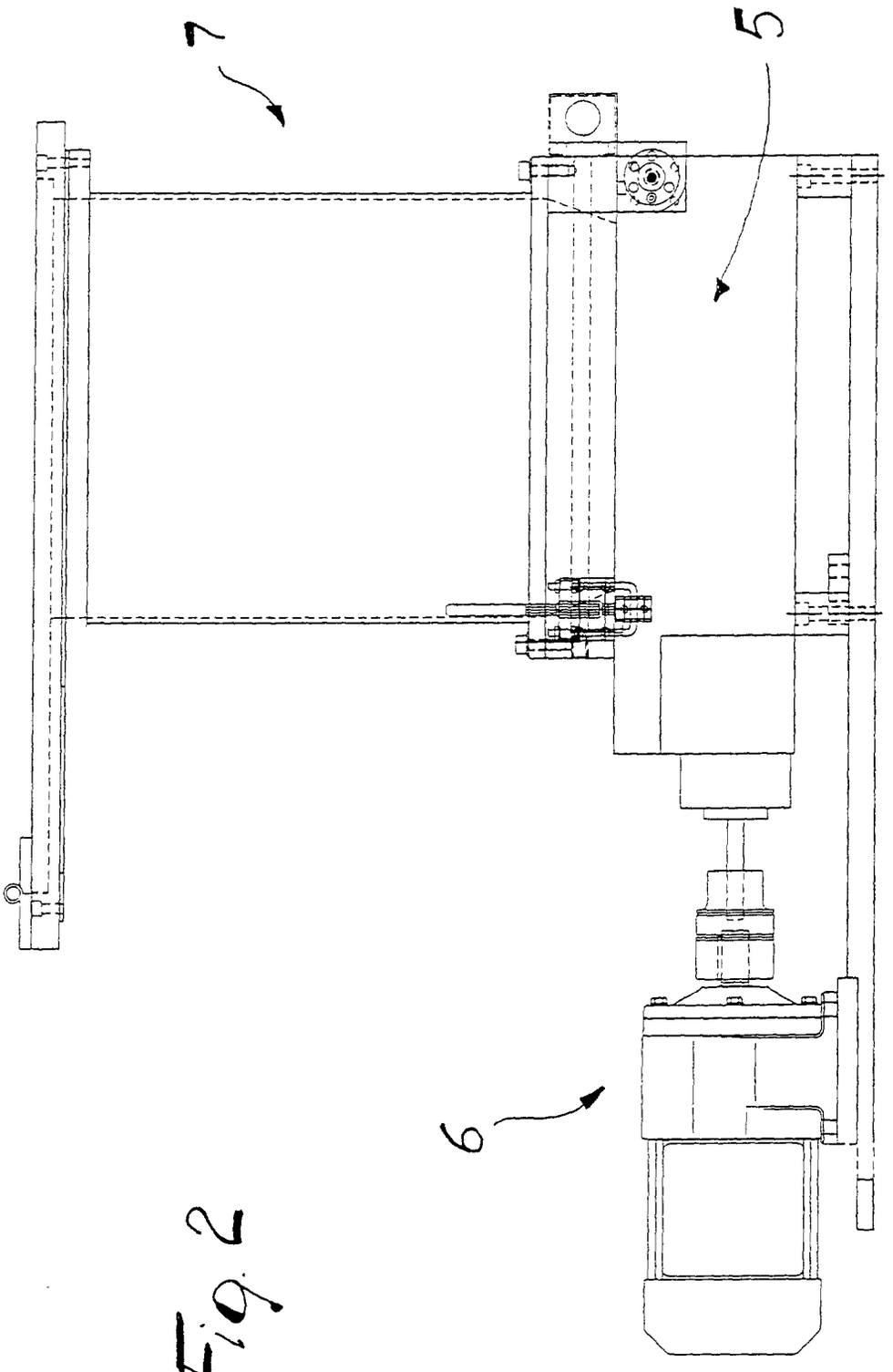

Fig. 2

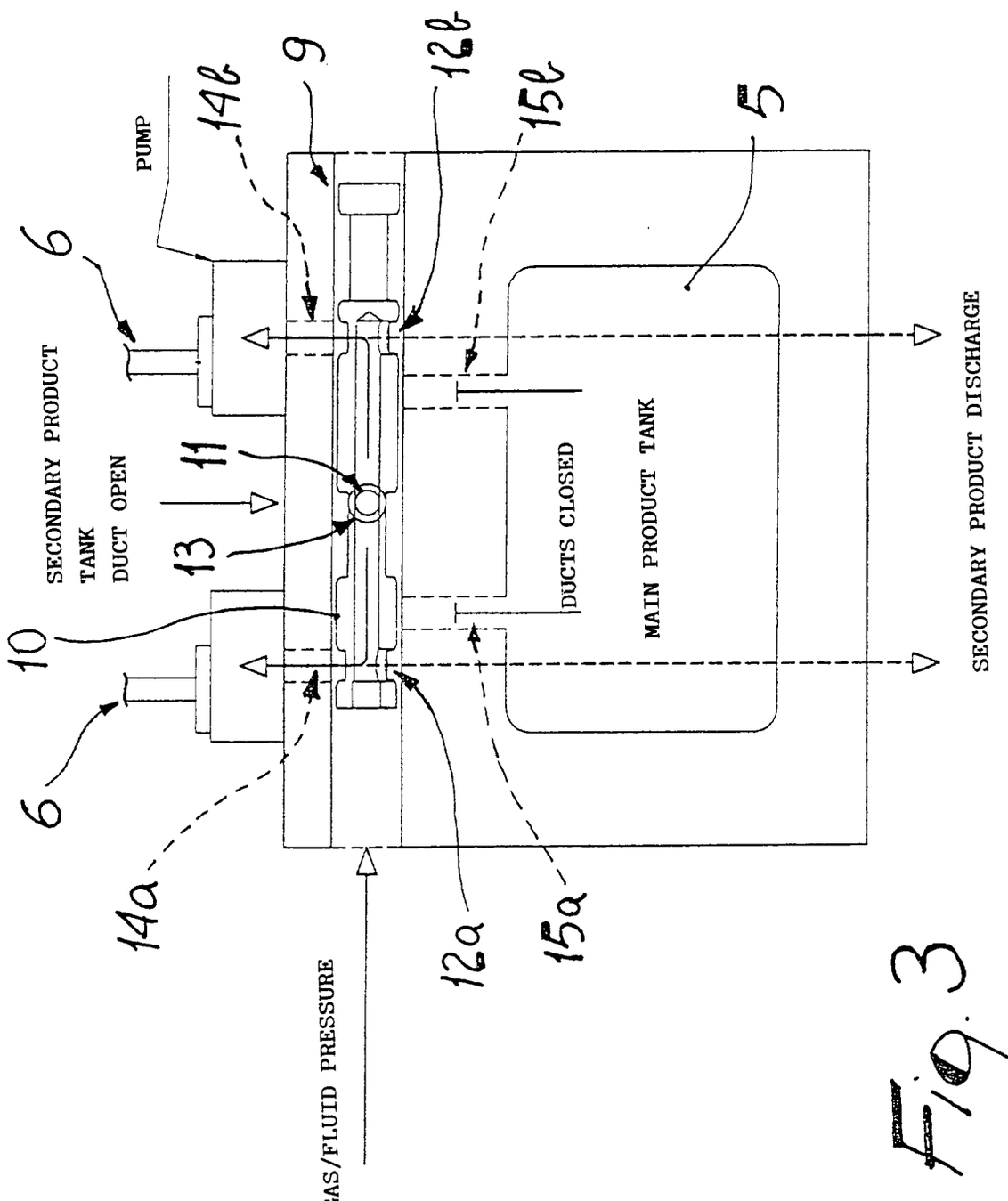
PUMP
14b
9
12b
15b
5
6
SECONDARY PRODUCT
TANK
DUCT OPEN
11
13
10
DUCTS CLOSED
MAIN PRODUCT TANK
SECONDARY PRODUCT DISCHARGE
6
14a
12a
15a
GAS/FLUID PRESSURE

Fig. 3

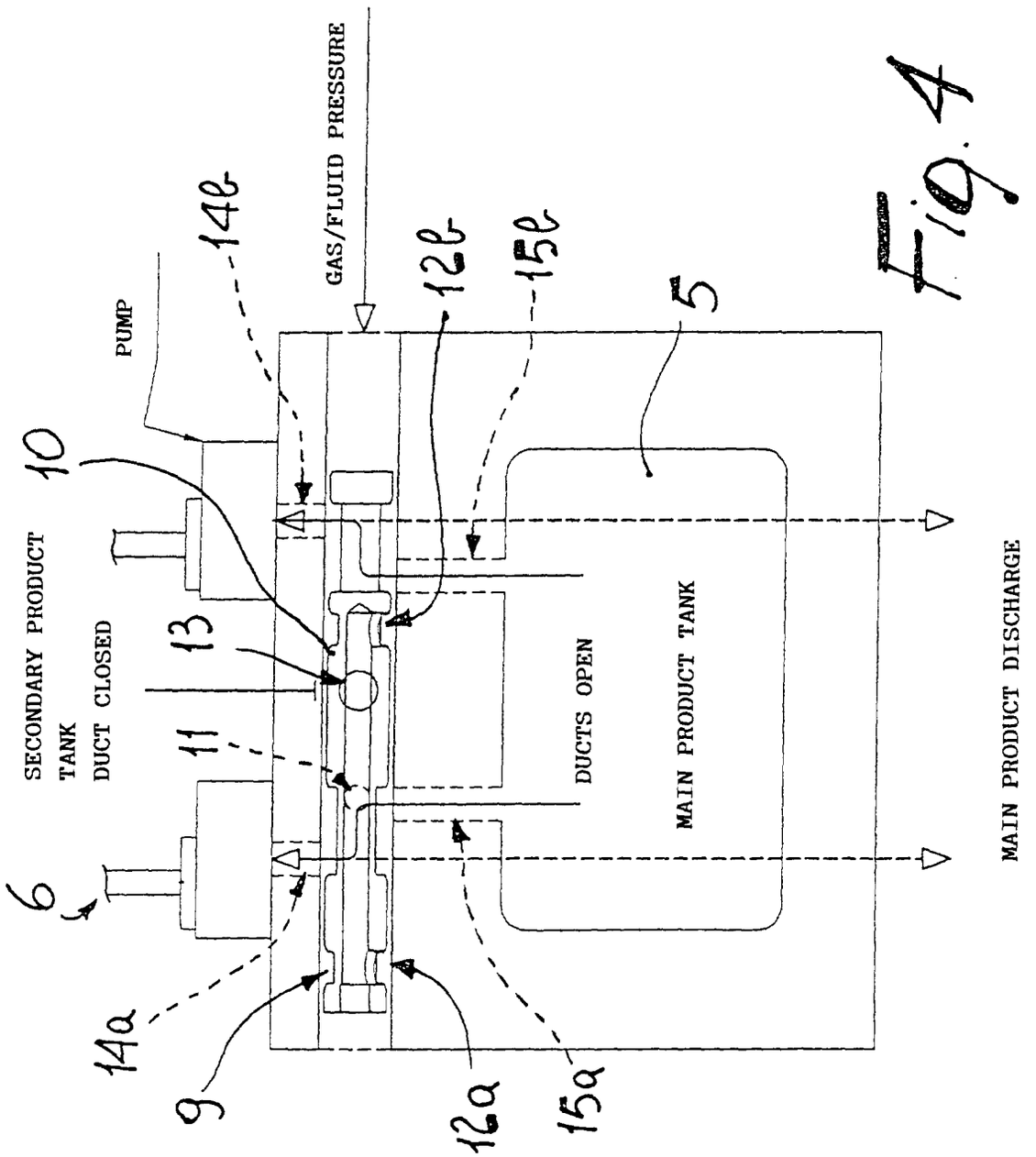
GAS/FLUID PRESSURE
PUMP
SECONDARY PRODUCT TANK
DUCT CLOSED
DUCTS OPEN
MAIN PRODUCT TANK
MAIN PRODUCT DISCHARGE
6
9
10
11
13
5
14a
14b
12a
12b
15a
15b

Fig. 4

Fig. 5

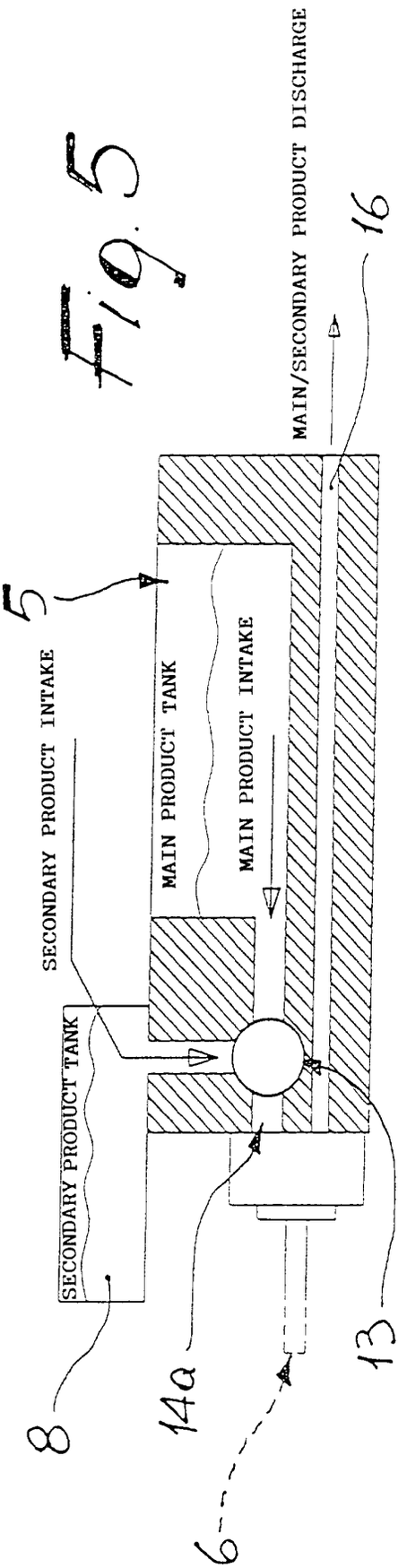
MAIN/SECONDARY PRODUCT DISCHARGE
16
5
SECONDARY PRODUCT INTAKE
MAIN PRODUCT TANK
MAIN PRODUCT INTAKE
SECONDARY PRODUCT TANK
8
14a
13
6

Fig. 6

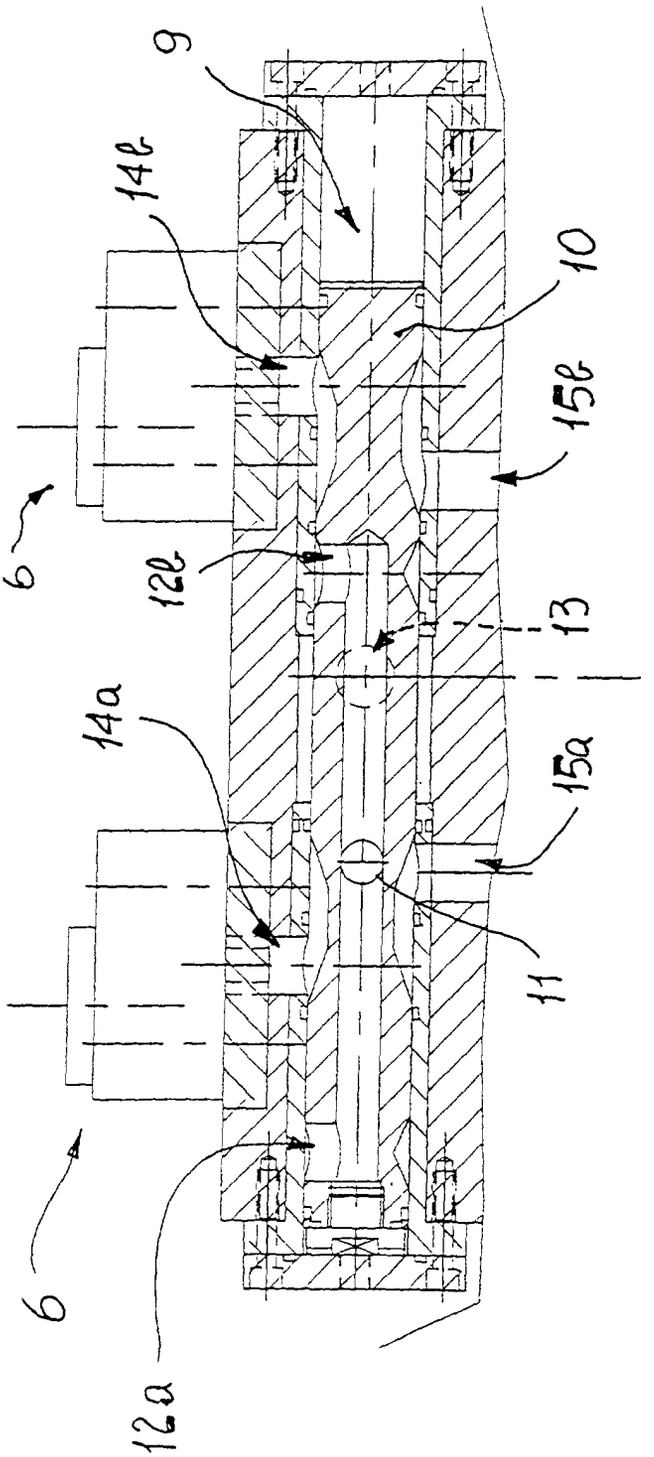

Fig. 7