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(54) **Filling device**

(57) There is disclosed a filling device (10'), comprising: a tank (6); a first fluidic line (12) extending between tank (6) and a pouring opening (14); a shutter (15) displaceable between an open position and a closed position in which it prevents the passage of pourable product at a section (19) of first fluidic line (12); a first chamber (60'); a second fluidic line (22, 61') fluidically connected with opening (14) and with first chamber (60') to allow a first aeriform to flow out from article (2) when shutter (15) is in open position or to convey a second aeriform within article (2) when shutter (15) is in closed position; and a third fluidic line (41') fluidically connectable with a segment of first fluidic line (12) placed upstream of section (19); first chamber (60') is selectively connectable to tank (6) or to an exhaust (46'); fluidic line (22, 61') is connected to chamber (60'); a first valve (62') interposed along second fluidic line (22, 61') and displaceable in an open position in which it allows the flow of first aeriform present in article (2) towards first chamber (60'); a second valve (50') interposed along third fluidic line (41') and displaceable to a position in which it allows the flow of pourable product towards first chamber (60'), when shutter (15) is in closed position and first chamber (60') is fluidically connected to tank (6). (Figure 5)

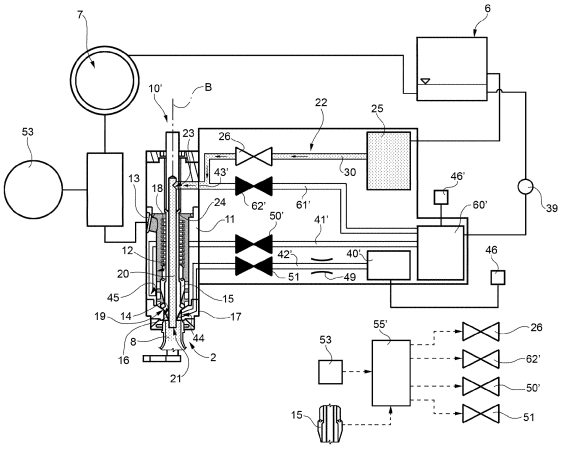

FIG. 5

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Description

[0001] The present invention relates to a filling device for filling an article with a pourable product, in particular a pourable food product.

[0002] In particular, the filling device according to the present invention is adapted to perform a "hot" filling, i. e. to fill the articles with a pourable food product at a temperature higher than room temperature, for example 80 degrees centigrade.

[0003] This type of filling is generally used with especially perishable pourable products, for example energy drinks, to which a relevant amount of preservative cannot be added.

[0004] The filling device according to the present invention is also adapted to fill the article with a carbonated pourable product, i.e. a product containing dissolved carbon dioxide, at a room temperature, i.e. at a temperature in the range between 4 and 22 degrees centigrade.

[0005] Filling machines are known, comprising a filling station fed with empty articles and adapted to provide articles filled with the pourable food product.

[0006] The filling station substantially comprises a carousel conveyor rotating about a rotation axis, a tank containing the pourable food product and carbon dioxide, and a plurality of filling devices supported by the carousel in a position radially external with respect to the rotation axis of the carousel.

[0007] In greater detail, the carousel is provided with a plurality of support elements for respective articles provided to arrange filling mouths of respective articles in a lower position with respect to the respective filling devices and to displace the articles along a circumferential arc trajectory about the above said rotation axis integrally to the respective filling devices.

[0008] Filling devices are known, for example from patent application US2010/0071802, which are connected to the carousel and can fill the articles with a hot pourable food product and fill the articles with a carbonated room temperature pourable food product.

[0009] In greater detail, the filling devices disclosed in the above cited application comprise:

- a first fluidic line connected to a lower portion of the tank and having a pouring opening facing the filing mouth of the respective article;
- a sliding shutter between an open position in which it defines an opening with the first fluidic line and a closed position in which it blocks a section of the first fluidic line;
- a first duct housable within the article to be filled;
- a first chamber fluidically connected with the duct; and
- a second fluidic line, which fluidically connects the first duct with the first chamber.

[0010] The filling devices of the known type also comprise:

- a second chamber fluidically connected, on one side, with a heat generator and a pump, and on the other side with a portion of the first fluidic line arranged downstream of the tank and upstream of the section blocked by the shutter; and
- a first valve displaceable between an open or closed position in which it respectively allows or prevents the flow of the pourable product from the portion of the first fluidic line arranged upstream of the section closed by the shutter towards the second chamber.

[0011] When the shutter is arranged in the open position, the pourable product flows along the first fluidic line within the article and at the same time the gas contained within the article returns, by means of the first duct and the second chamber, within the tank.

[0012] In particular, the second fluidic line essentially comprises:

- a second duct fluidically connected with the first chamber;
- a third and fourth duct both fluidically connected with the first duct;
- a fifth duct fluidically connected with the second duct and having a throttle;
- a second valve displaceable between an open position and a closed position in which it respectively allows or prevents the fluidic connection of the third and the second duct; and
- a third valve displaceable between an open position and a closed position in which it respectively allows or prevents the fluidic connection between the fourth and the fifth duct.

[0013] In other words, the first chamber is connected to the first duct by means of two paths incident to one another in the second duct.

[0014] More precisely, the first path comprises the third and the second duct and is controlled by the second valve while the second path comprises the fourth, the fifth and the second duct and is controlled by the third valve.

[0015] In case the article must be filled with a carbonated product, the second valve is displaced in the respective open position while the shutter and the first valve are maintainer in the respective closed position.

[0016] An operation of pressurisation of the article is subsequently performed. This operation is performed by also displacing the third valve in the respective open position. Thereby, carbon dioxide flows from the tank to the first chamber, and therefrom, by means of the second fluidic line, reaches the first duct and, then, the article.

[0017] Once the pressurisation step is completed, the shutter is displaced in the open position and a high speed filling of the article is performed.

[0018] During the high speed filling step, the gas flowing out from the article flows through the first duct and partially flows along the third and the second duct towards the first chamber and partially along the fourth and fifth

duct until it reaches the second duct.

[0019] Subsequently, the second valve is displaced in the respective closed position and a low speed filling step is performed. As a matter of fact, once the second valve is arranged in the closed position, the gas flowing out from the article can reach the second duct only by means of the fourth and the fifth duct, which has a throttling.

[0020] At the end of the low speed filling step, the shutter is arranged in the closed position.

[0021] In order to perform the filling with the hot pourable product, the components of the filling device must be maintained hot when the operation of the filling machine is interrupted.

[0022] For this purpose, the filling devices shown in the above cited patent application also allow the circulation of the hot pourable product between the first fluidic line, the second chamber, the source of heat and the tank.

[0023] When the operation of the filling machine is interrupted, the first valve is displaced in the respective open position and the shutter is maintained in the respective closed position. Thereby, the pourable product recirculates between the first fluidic line, the second chamber and the tank, and is maintained at the desired temperature by the heat source.

[0024] A need is also felt in the sector to reduce the risk that especially sensitive pourable products are contaminated by the gas flowing out from the articles, during the filling step thereof.

[0025] The aforementioned object is achieved by the present invention as it relates to a filling device as defined in claim 1.

[0026] One preferred embodiment is hereinafter disclosed for a better understanding of the present invention, by way of non-limitative example and with reference to the accompanying drawings, in which:

- figures 1 to 4 show a cross section of an embodiment of a filling device shown only for illustrative purposes, in respective operative steps;
- figures 5 to 8 show a cross section of an embodiment of a filling device made according to the present invention, in respective operative steps; and
- figure 9 diagrammatically shows a filling machine incorporating the filling device of figures from 1 to 4 or of figures 5 to 8.

[0027] With reference to figure 9, numeral 1 indicates a filling machine limitedly to a station for filling articles 2 with a pourable food product.

[0028] In particular, the filling station is adapted to fill articles 2 with a pourable product, in particular a pourable food product, at a high temperature, for example 80 degrees centigrade or with a carbonated product, i.e. within which carbon dioxide is dissolved at a room temperature.

[0029] The term room temperature indicates a temperature in the range between 4 and 22 degrees centigrade.

[0030] In particular, the product is a food product and could be an energy drink.

[0031] In greater detail, the filling station essentially comprises:

- a carousel 3 rotating about an axis A, which is vertical in the case shown, along a circular path P;
- a plurality of filling devices 10 adapted to fill respective articles 2 with the pourable food product and supported by a peripheral edge external to axis A of carousel 3;
- an inlet conveyor 4, in particular a star wheel, feeding carousel 3 with articles 2 to be filled, at a station I of path P; and
- an outlet conveyor 5, in particular a star wheel, fed by carousel 3 with articles 2 filled with the pourable product, at a station O of path P.

[0032] More precisely, path P comprises:

- a working segment R extending from station I to station O; and
- a return segment S extending from inlet station O to inlet station I.

[0033] Conveyor 4 is mobile along a circular path Q1 tangent to path P, at station I.

[0034] Conveyor 5 is mobile along a circular path Q2 tangent to path P, at station O.

[0035] Filling machine 1 also comprises (Figures 1 to 4):

- a tank 6 which is fixed with respect to axis A and common to all filling devices 10 and containing the pourable food product and carbon dioxide; and
- a plurality of tanks 7 associated to respective filling devices 10, rotatable about axis A integrally to respective filling devices 10 and fluidically connected with tank 6.

[0036] Each article 2 comprises:

- a mouth 8 adapted to allow the filling of article 2 by means of filling machine 1 and the following pouring of the food product from article 2; and
- a bottom wall (not shown) opposite to mouth 8.

[0037] Article 2 is in the case shown a container made of glass, plastic or cans.

[0038] For simplicity, the following description will refer to only one device 10, to relative tank 7 and to relative article 2, as devices 10 are identical to one another.

[0039] Device 10 substantially comprises:

- a frame 11 fixed to carousel 3;
- a fluidic line 12 defined by frame 11 and comprising, on opposite sides thereof, an inlet mouth 13 connected with tank 7 and a pouring opening 14, which is defined by frame 11 and faces mouth 8 of article 2;

- a shutter 15 sliding parallel to axis B within fluidic line 12 and mobile between an open position (shown in Figure 2) in which it allows the fluidic connection between mouth 13 and opening 14 and a closed position (shown in Figures 1, 3 and 4) in which it prevents the fluidic connection between mouth 13 and opening 14.

[0040] In greater detail, shutter 15 comprises, on the side of opening 14, a conical end portion 16 having axis B.
[0041] Frame 11 also comprises a bell element 17 fixed with respect to axis B and defining annular opening 14.
[0042] End portion 16 abuts against a section 19 of element 17 when shutter 15 is in the closed position, so as to block opening 14.
[0043] Differently, end portion 16 is lifted and, thus spaced along axis B, from bell element 17, when shutter 15 is in the open position so as to allow the flow of the pourable product through opening 14.
[0044] More precisely, shutter 15 is elastically loaded by a spring 18 towards the respective closed position and is displaceable, for example by pneumatic operation means, towards the open position.
[0045] In the case shown, spring 18 is helical and extends along axis B.
[0046] Frame 11 further defines:

- a duct 20 having an end 21 housable within mouth 8 of article 2, during a filling step of article 2;
- a chamber 25 fluidically connected with duct 6; and
- a fluidic line 22 extending between a mouth 23, opposite to end 21, of duct 20 and chamber 25.

[0047] Duct 20 is at least partially housed within a cylindrical element 24 having axis B. Spring 18 is fixed to element 24, on the side opposite to duct 20, and to shutter 15.
[0048] Device 10 also comprises a valve 26 interposed along fluidic line 22 and displaceable between:

- an open position (Figure 1 and 2) in which it fluidically connects duct 20 and chamber 25; and
- a closed position (Figure 3 and 4) in which it prevents the fluidic connection between duct 20 and chamber 25.

[0049] Fluidic line 22 defines a single fluidic path for an aeriform between opening 14 and chamber 25.
[0050] In particular, fluidic line 22 is formed by a single duct 30 extending between mouth 23 and chamber 25.
[0051] In other words, the aeriform can move between opening 14 and chamber 25 only through duct 30.
[0052] This aeriform is the gas flowing out from article 2 through duct 20 during a filling step of article 2 (Figure 2).
[0053] In the case in which the pourable product is carbonated, this aeriform could be carbon dioxide delivered to article 2 by means of duct 20 during a step of pressurising article 2 preceding the filling of article 2 (Figure 1).
[0054] Device 10 further comprises:

- chamber 40;
- a fluidic line 41 extending between chamber 40 and opening 45 of fluidic line 12 arranged upstream of section 19 of bell element 17, proceeding along the path of the pourable product from tank 7 to opening 14;
- a fluidic line 42 extending between an opening 44 of fluidic line 12 arranged downstream of section 19 of shutter 15 against bell element 17; and
- a throttling 49 interposed along fluidic line 42 between valve 51 and chamber 40.

[0055] In greater detail, chamber 40 is selectively connected fluidically to an exhaust 46 at an ambient pressure or to a heat source 39 and to tank 6.
[0056] In other words, chamber 40 is:

- fluidically connected with exhaust 46 and fluidically isolated from heat source 39 and from tank 6; or
- fluidically connected with heat source 39 and tank 6, and fluidically isolated from exhaust 46.

[0057] Device 10 further comprises:

- a valve 50 interposed along fluidic line 41 and displaceable between an open position (figure 4) or closed position (Figures 1 to 3) in which it respectively allows or prevents the pourable product from flowing from opening 45 towards chamber 40 along fluidic line 41;
- a valve 51 interposed along fluidic line 42 and displaceable between an open position (figure 3) or closed position (Figures 1, 2 and 4) in which it respectively allows or prevents the gas contained in article 2 from flowing from opening 44 towards chamber 40 along fluidic line 41;
- a flow rate measurer 53 adapted to measure the pourable product flow rate which flows from tank 7 towards fluidic line 12 and which therefore fills article 2;
- a control unit 55 (only diagrammatically indicated in Figures 1 to 4) configured to displace valves 26, 50, 51 and shutter 15 between the respective open and closed positions, depending on the operation cycle which filling device 10 must perform.

[0058] Control unit 55 is also controlled by flow rate measurer 53.
[0059] The operation of filling machine 1 is disclosed hereinafter, with reference to only one filling device 10 and a single corresponding article 2.
[0060] More precisely, the operation of filling machine 1 is disclosed hereinafter during a filling cycle of article 2 with a carbonated pourable food product, i.e. containing

dissolved carbon dioxide, at a room temperature, i.e. a temperature in the range between 4 and 22 degrees centigrade.

[0061] During this cycle, control unit 55 maintains chamber 40 connected to exhaust 46 at an ambient pressure and prevents (not shown) the fluidic connection between chamber 40 and heat source 39.

[0062] Carousel 3 receives article 2 to be filled from conveyor 4 at station I of path P, and feeds filled article 2 to conveyor 5 at station O of path P.

[0063] More precisely, article 2 is arranged so that mouth 8 is below pouring opening 14 of duct 20 and duct 20 passes therethrough.

[0064] From a condition in which valves 26, 50, 51 and shutter 15 are all maintained by control unit 55 in respective closed positions, filling device 10 performs the following operations:

- pressurisation of article 2 with the introduction of carbon dioxide within article 2 in order to bring the pressure in article 2 to a value present in tank 7 (Figure 1) ;
- filling article 2 with the carbonated product (Figure 2); and
- depressurising article 2 (Figure 3).

[0065] In greater detail, control unit 55 displaces, during the step of pressurisation, valve 26 in the open position so that carbon dioxide contained in tank 6 can flow along fluidic line 22 and duct 20, until it reaches mouth 8 of article 2 (Figure 1).

[0066] Once the step of pressurising is completed, control unit 55 displaces shutter 15 in the open position against the action of spring 18. Accordingly, the pourable product flows from fluidic line 12 within article 2. At the same time, the gas contained in article 2 passes through duct 20 and fluidic line 22 until it reaches tank 6 (Figure 2).

[0067] When flow rate measurer 53 has detected that the correct amount of pourable product has passed through fluidic line 12 and thus has filled article 2, control unit 55 displaces shutter 15 in the closed position, thus interrupting the filling of article 2 (Figure 3).

[0068] At this point, control unit 55 displaces valve 51 to the open position, so that the gas contained in the neck portion of the article flows out from opening 44 and, by means of fluidic line 42, reaches chamber 40 and therefore exhaust 46.

[0069] Thereby, article 2 is depressurised.

[0070] Then, valve 51 is returned by control unit 55 to the closed position and article 2 filled with the pourable product is withdrawn from conveyor 5 at station O and moved away from filling device 10.

[0071] A filling cycle of article 2 with a non-carbonated "hot" - i.e. at a temperature higher than room temperature - pourable product is disclosed hereinafter, limitedly to the steps in which it differs from the filling cycle of article 2 with a previously disclosed carbonated product.

[0072] This "hot" filling cycle differs from the previously disclosed filling cycle with a carbonated product in that control unit 55 maintains chamber 40 connected to tank 6 and to heat source 39, and maintains at the same time chamber 40 isolated from exhaust 46.

[0073] This "hot" filling cycle also differs from the previously disclosed filling cycle with a carbonated product by not comprising the steps of pressurising and depressurising article 2 respectively before and after the step of filling article 2. Accordingly, valve 42 is maintained by control unit 55 in the closed position, during the filling cycle of article 2 with the pourable product at a temperature higher than room temperature.

[0074] Finally, the "hot" filling cycle differs from the previously disclosed filling cycle with a carbonated product in that, when filling machine 1 is in an operative step in which articles 2 are not filled, the pourable product is recirculated between opening 45, fluidic line 41, chamber 40, heat source 39 and tank 6 (Figure 4).

[0075] More precisely, with shutter 15 arranged in the closed position, control unit 55 arranges valve 50 in the open position.

[0076] The pourable product thus passes through heat source 39 and is maintained at a temperature higher that room temperature.

[0077] When the filling of article 2 needs to be resumed, control unit 55 displaces valve 50 to the closed position.

[0078] Then, control unit 55 arranges shutter 15 in the respective open position.

[0079] With reference to figures 5 to 8, numeral 10' indicates, as a whole, a filling device according to a different embodiment of the present invention. Filling device 10' is similar to filling device 10 and will be described hereinafter only as far as it differs therefrom; corresponding or equivalent parts of filling devices 10 and 10' will be indicated where possible by the same reference numbers.

[0080] In particular, filling device 10' differs from filling device 10 by comprising:

- a chamber 60' fluidically connectable with an exhaust 46' or with a heat source 39 and tank 6;
- a fluidic line 61' extending between a segment 43' of fluidic line 22 interposed between mouth 23 and valve 26 and chamber 60', and along which a valve 62' is interposed; and
- a fluidic line 41' extending between chamber 60' and opening 45 of fluidic line 12, and along which a valve 50' is interposed.

[0081] The operation of filling device 10' is similar to the operation of filling device 10 and differs therefrom, in that, during the filling cycle of article 2 with a room temperature carbonated product, valve 26 is maintained by control unit 55 in the closed position and valve 62' is arranged by control unit 55' in the respective open position (Figure 6).

[0082] Chamber 60' is also connected fluidically by control unit 55' with exhaust 46'.

[0083] Thereby, during the step of filling article 2 with the pourable product, the gas flowing out from article 2 flows exclusively along fluidic line 61' towards chamber 60' and exhaust 46'.

[0084] Accordingly, the gas flowing out from article 2 does not return to tank 6 and is not mixed with the pourable product present in tank 6.

[0085] According to an alternative configuration of control unit 55 (not shown), during the filling cycle of article 2 with a room temperature carbonated product, valve 26 is maintained by control unit 55 in the open position and valve 62' is arranged by control unit 55' in the respective closed position.

[0086] Thereby, during the step of filling article 2 with the pourable product, the gas flowing out from article 2 flows exclusively along fluidic line 22 towards chamber 25 and tank 6.

[0087] Differently, with reference to the filling of article 2 with a room temperature pourable product and in a step of interrupting the operation of filling machine 1, control unit 55 maintains valves 26, 51 and 62' in the respective closed positions and arranges valve 50' in the respective open position. Control unit 55 fluidically also connects chamber 60' with heat source 39 (Figure 8).

[0088] Thereby, in case of interruption of the filling step, the pourable product is recirculated between opening 45, fluidic line 41', chamber 60', heat source 39 and tanks 6 and 7.

[0089] From an analysis of the features of device 10' according to the present invention, the advantages it allows to obtain are apparent.

[0090] In particular, filling device 10' is particularly suitable to fill articles 2 with particularly perishable pourable products.

[0091] Indeed, the gas flowing out from article 2 is conveyed along fluidic line 61' towards chamber 60' and exhaust 46'. Thus, this gas is not mixed with the pourable product present in tank 6.

[0092] This avoids particularly perishable products from being contaminated when stored in the tank 6, by the gas flowing out from article 2, during the filling step thereof.

[0093] Finally, it is apparent that modifications and variants not departing from the scope of protection of the claims may be made to filling device 10'.

Claims

1. A filling device (10') for filling an article (2) with a pourable product, comprising:

- a tank (6) fillable with said pourable product;
- a first fluidic line (12) extending between said tank (6) and a pouring opening (14), through which said pourable product can pass during a filling step of said article (2);
- a shutter (15) displaceable between an open position in which it allows the passage of said pourable product from said tank (6) to said opening (14) through said first fluidic line (12), and a respective closed position in which it prevents the passage of said pourable product at a section (19) of said first fluidic line (12);
- a first chamber (60');
- a second fluidic line (22, 61') fluidically connected with said opening (14) to allow a first aeriform to flow out from said article (2) when said shutter (15) is in said open position or to convey a second aeriform within said article (2) when said shutter (15) is in said closed position; and
- a third fluidic line (41') fluidically connectable with a segment of said first fluidic line (12) placed upstream of said section (19);

characterised in that:

- said first chamber (60') is selectively connectable to said tank (6) or to an exhaust (46');
- said second fluidic line (22, 61') is connected to said first chamber (60');

said filling device (10') further comprising:

- a first valve (62') interposed along said second fluidic line (22, 61') and displaceable in an open position in which it allows the flow of said first aeriform present in said article (2) towards said first chamber (60'), when said shutter (15) is in the respective said open position and said first chamber (60') is fluidically connected to said exhaust (46'); and
- a second valve (50') interposed along said third fluidic line (41') and displaceable to a respective open position in which it allows the flow of said pourable product towards said first chamber (60'), when said shutter (15) is in said respective closed position and said first chamber (60') is fluidically connected to said tank (6).

2. A filling device according to claim 1, **characterized by** comprising a second chamber (25) fluidically connected to said tank (6);
said second fluidic line (22, 61') being fluidically with said second chamber (25);
said second fluidic line (22, 61') defining a single path (30) for said first or second aeriform between said opening (14) and said second chamber (25).

3. The device according to claim 1 or 2, **characterised in that** said third fluidic line (41') is connected with said first chamber (60');
said second valve (50') also being displaceable to a respective closed position, in which it prevents the flow of said pourable product along said third fluidic line (41').

4. The device according to claim 3, **characterised by** comprising a third valve (26) interposed along said second fluidic line (22, 61') and displaceable between a respective open or closed position in which it respectively allows or prevents the flow of said first or second aeriform through said second fluidic line (22, 61');
said second fluidic line (22, 61') comprising: a first segment (43') interposed between said opening (14) and said third valve (26), and a second segment interposed between said first chamber (60') and said segment (43') and along which said first valve (62') is interposed.

5. The device according to any of the preceding claims, **characterised by** comprising:

- a third chamber (40') fluidically connected with another exhaust (46);
- a fourth fluidic line (42') fluidically connectable with the inner volume of said article (2) and fluidically connected with said third chamber (40');
- a fourth valve (51) interposed along said fourth fluidic line (42') and displaceable to a respective open position in which it allows the flow of another aeriform from said opening (14) to said third chamber (40'), when said shutter (15) is in the respective said open position and said third chamber (40') is connected to said further exhaust (46') so as to reduce the pressure within said article (2) at the end of a filling step of the article (2);
said fourth valve (51) being displaceable to a respective closed position, in which it prevents the flow along said fourth fluidic line (42').

6. The device according to claim 4 or 5, **characterised by** comprising a control unit (55').

7. The device according to claim 6, **characterised in that** said control unit (55') is configured to:

- displace said shutter (15) in the respective said open position, so as to fill said article (2) with said pourable product;
- maintain said third valve (26) in the respective said closed position, in which it prevents said first aeriform to reach said second chamber (25);
- fluidically connect said first chamber (60') and said first exhaust (46');
- displace said first valve (62') in the respective said open position so as to allow said first aeriform to reach said first chamber (60') and said first exhaust (46').

8. The device according to claim 6 or 7, **characterised in that** said control unit (55') is also configured, in case said article (2) is filled with a pourable product at a higher temperature than room temperature, to:

- displace said shutter (15) to said closed position at the end of a filling step of said article (2) with said pourable product;
- fluidically connect said first chamber (60') with said heat source (39) and said tank (6); and
- displace said second valve (50) to the respective said open position, so as to create a continuous circulation of said pourable product between said third fluidic line (41'), said heat source (39), said tank (6) and said first fluidic line (12).

FIG. 1

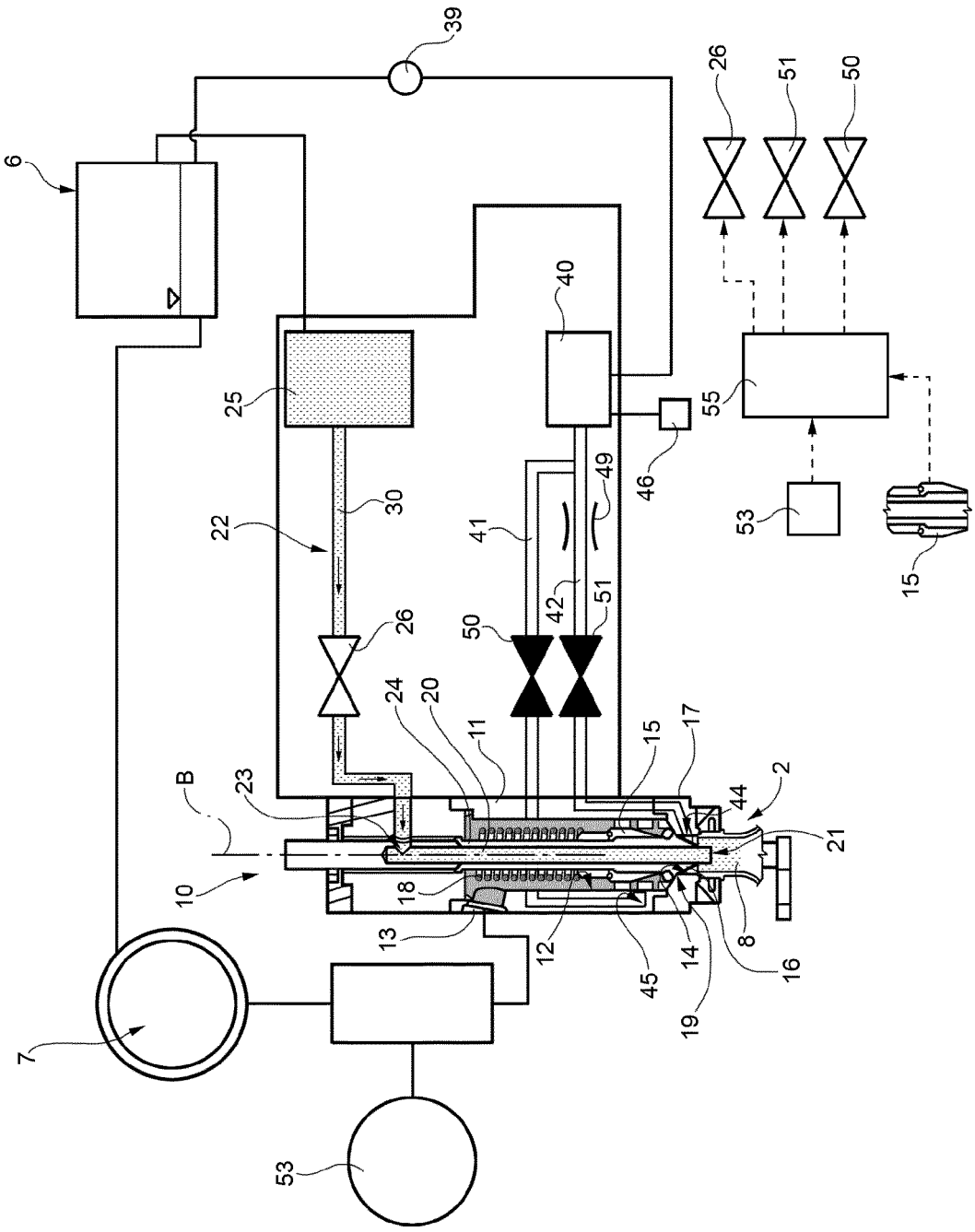
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FIG. 2

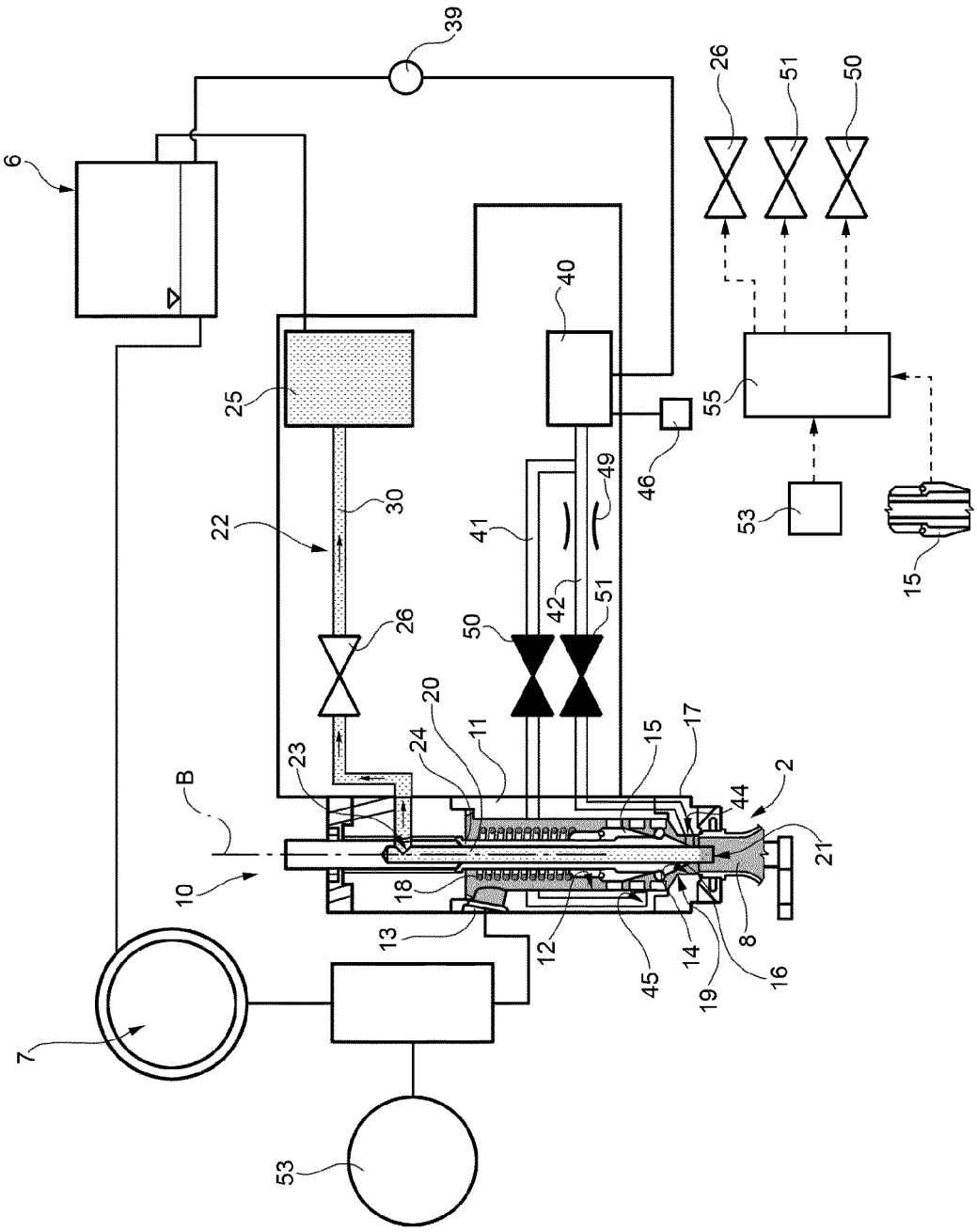
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FIG. 3

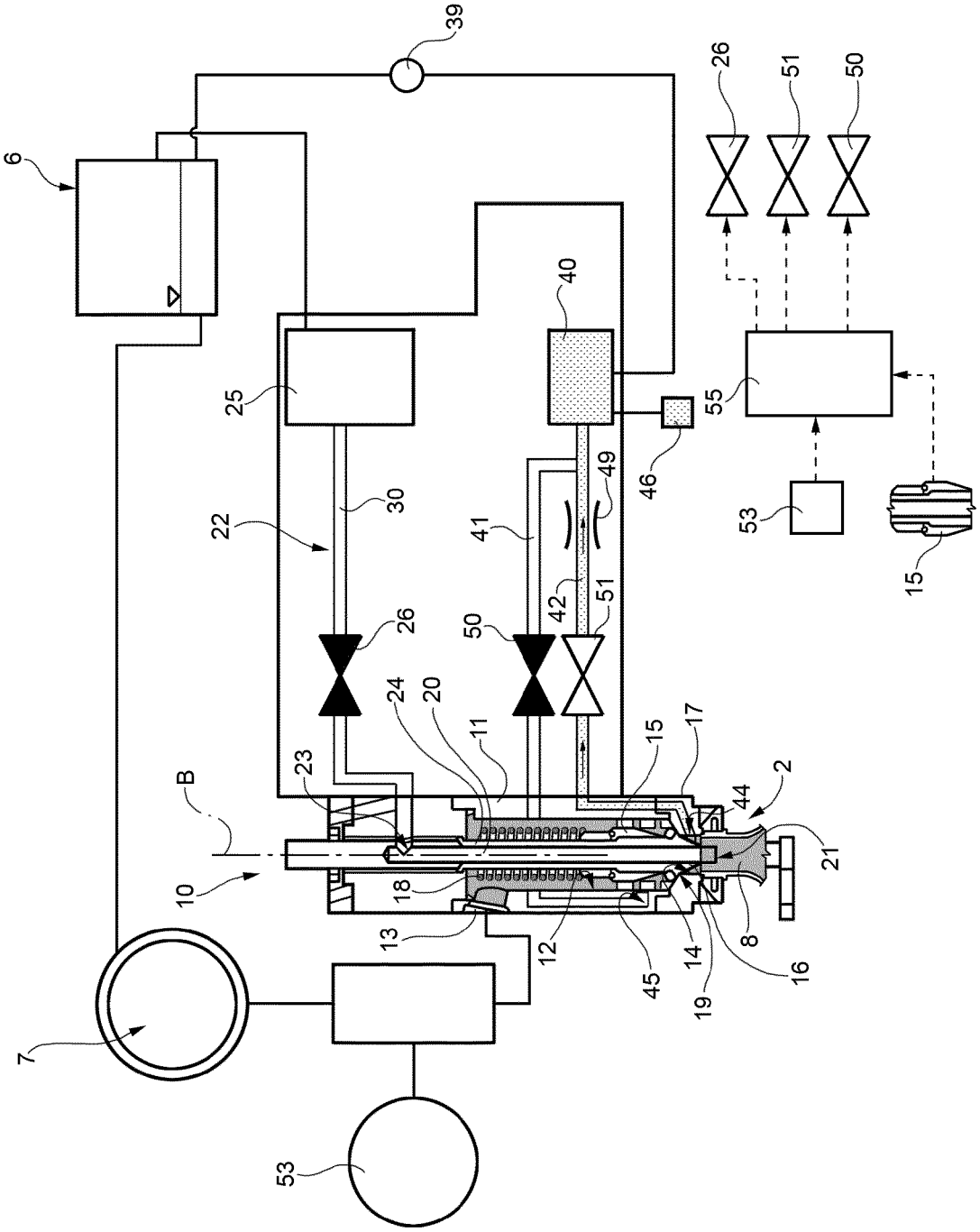
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FIG. 4

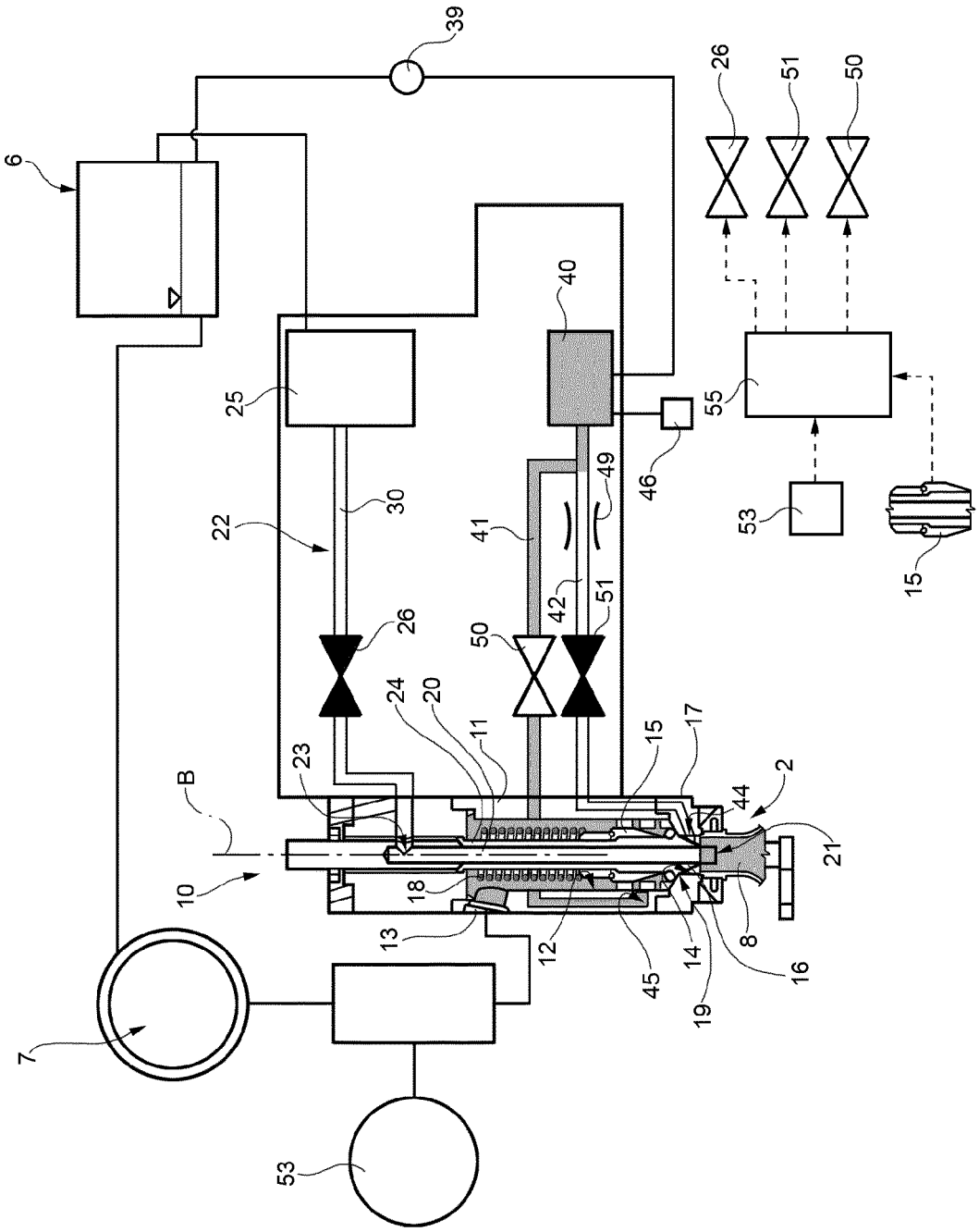
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FIG. 5

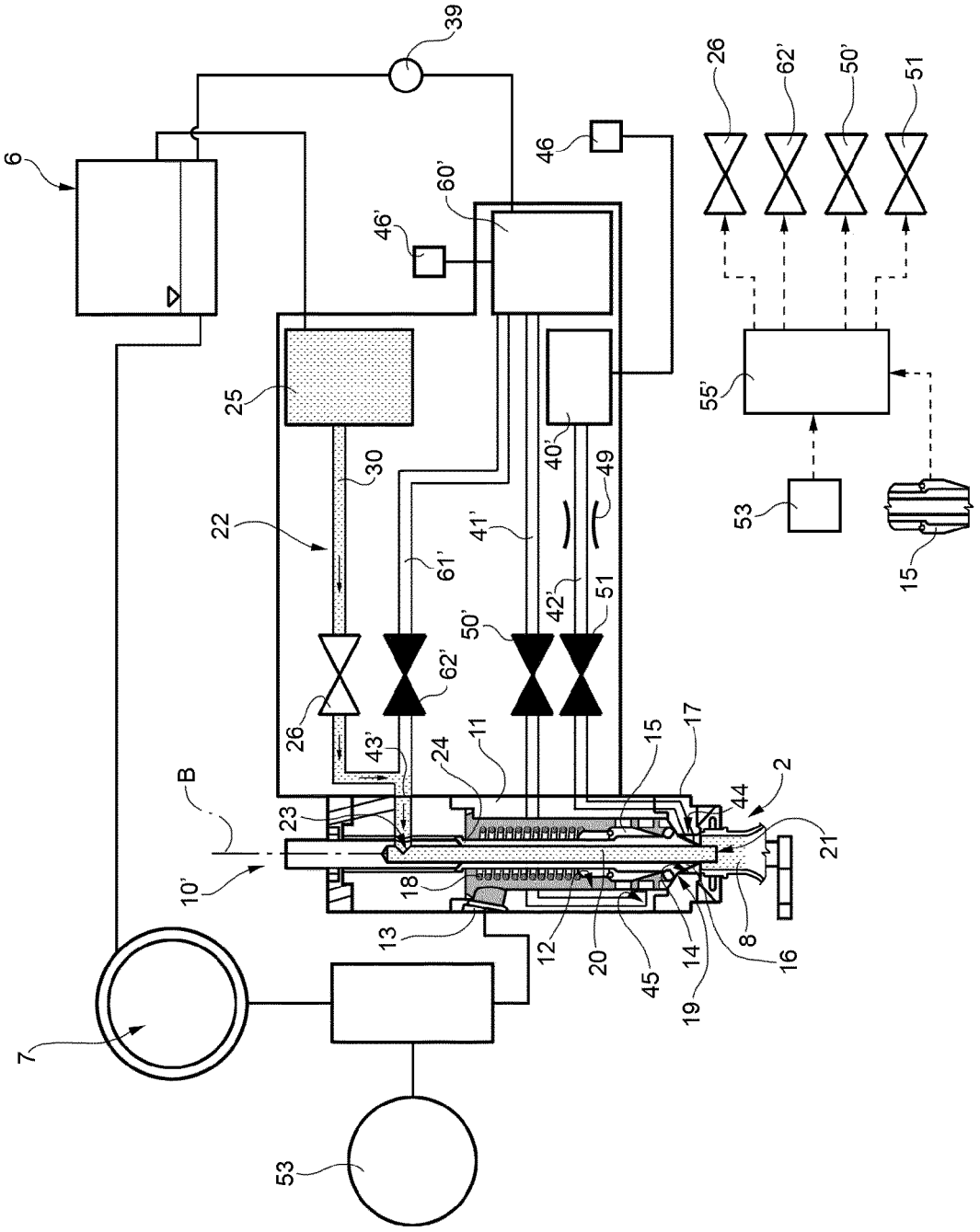
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FIG. 6

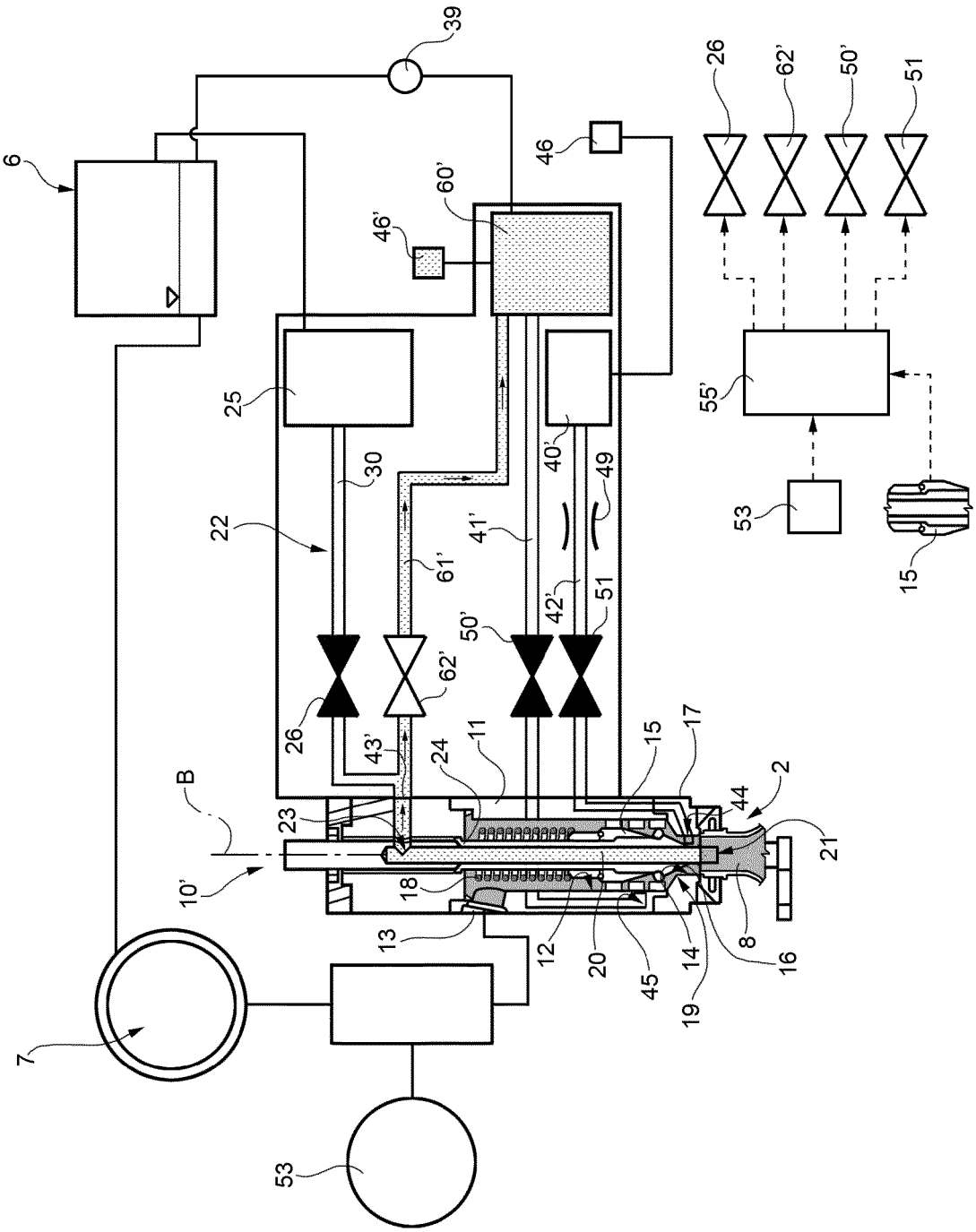
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FIG. 7

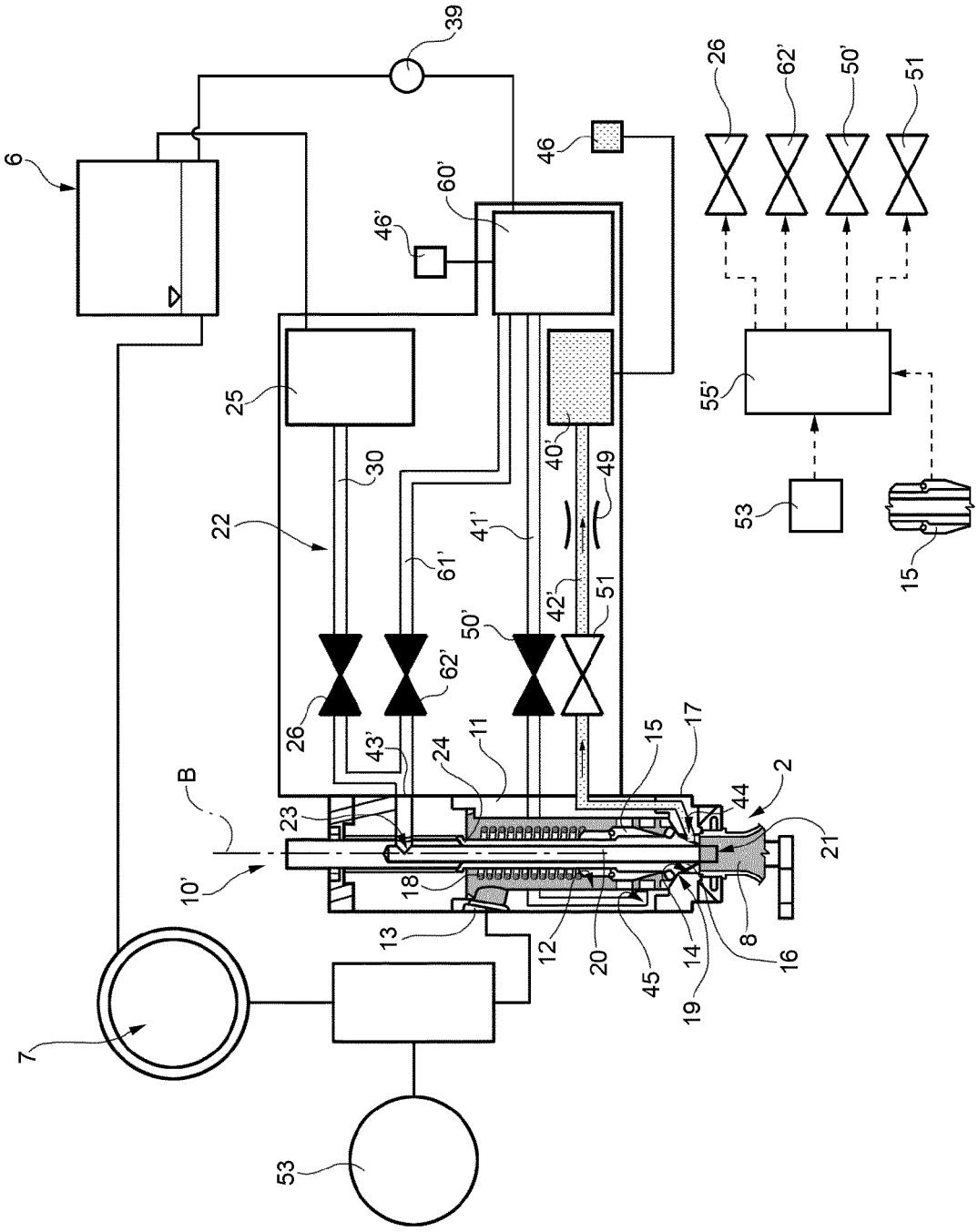
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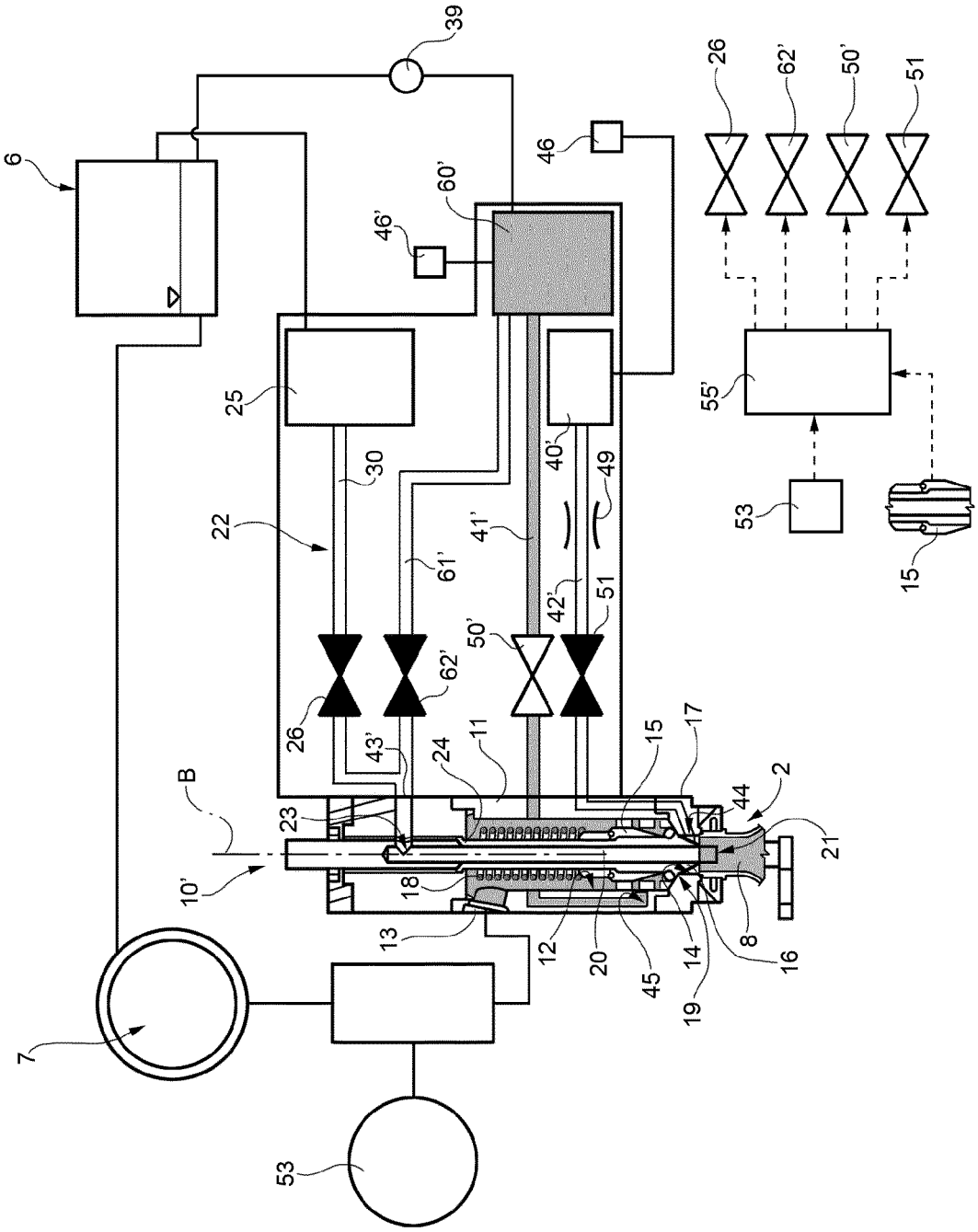
FIG. 8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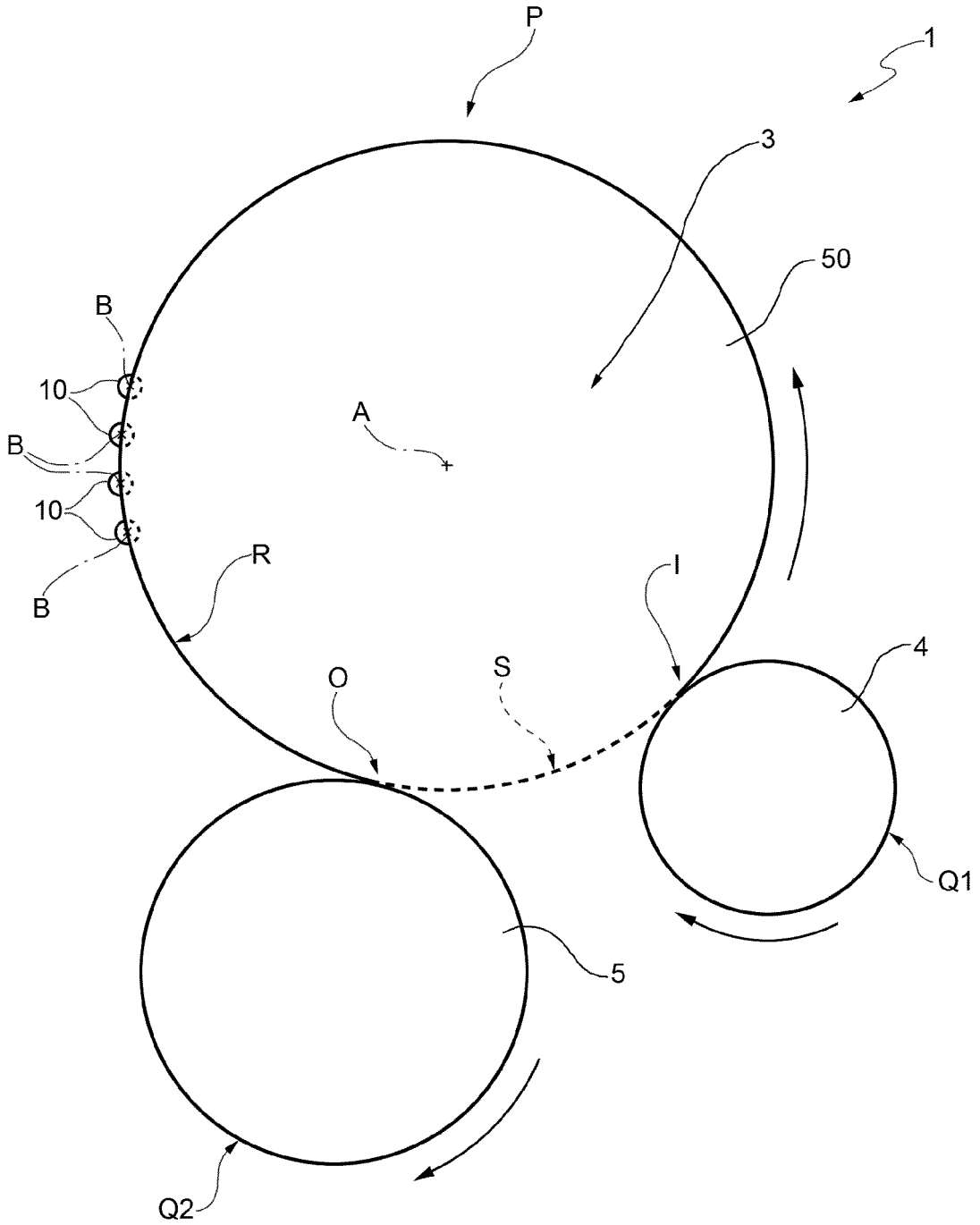

FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 13 19 9887

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A	EP 1 584 601 A1 (KHS MASCH & ANLAGENBAU AG [DE] KHS AG [DE]) 12 October 2005 (2005-10-12) * figure 1 * * paragraphs [0008] - [0023] *	1	INV. B67C3/14 B67C3/26
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Place of search	Date of completion of the search	Examiner
The Hague	23 January 2014	Pardo, Ignacio

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EPO FORM 1503 03.82 (P04C01)

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