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(54) **VALVE FOR A POURABLE PRODUCT AND FILLING MACHINE HAVING A VALVE FOR A POURABLE PRODUCT**

(57) There is described a valve (1) for a pourable product, in particular of a feeding valve (1) for feeding a pourable product. The valve (1) comprises a flow channel (2) having an inlet opening (3) for receiving the pourable product and an outlet opening (4) for allowing an outflow of the pourable product from the flow channel (2). The valve (1) comprises a control member (5) arranged within the flow channel (2) and configured to control a flow rate of the pourable product within the flow channel (2) and to the outlet opening (4). The control member (5) comprises one or more apertures (9) configured to allow for a fluidic connection between the inlet opening (3) and the outlet opening (4). The control member (5) is configured such to allow for a modification and/or variation of an active portion of the one or more apertures (9), the active portion being a section of the one or more apertures (9), which, in use, establishes a fluidic connection between the inlet opening (3) and the outlet opening (4).

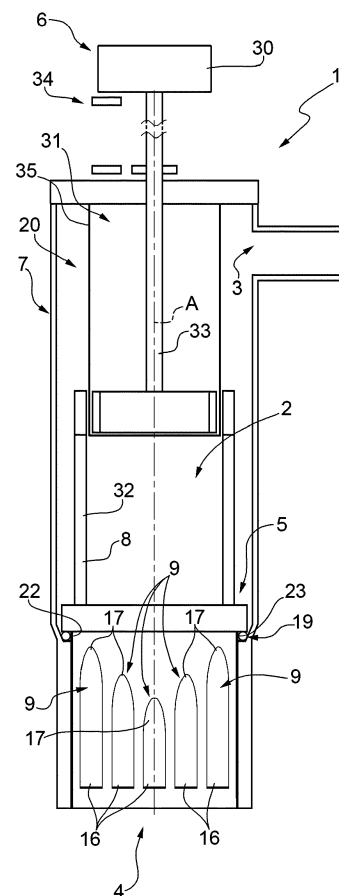


FIG.1

Description

TECHNICAL FIELD

[0001] The present invention relates to a valve for a pourable product, in particular a pourable food product such as water, carbonated beverages, or the like, even more particular a pourable food product containing pieces such as pulp and/or fruit pieces.

[0002] The present invention also relates to a feeding valve for feeding a pourable product, in particular a pourable food product such as water, carbonated beverages, or the like, even more particular a pourable food product containing pieces such as pulp, fibers and/or fruit pieces.

[0003] The present invention also relates to a filling machine for filling receptacles, in particular bottles, with a pourable product, in particular a pourable food product, even more particular a pourable food product containing pieces such as pulp, fibers and/or fruit pieces, and comprising a valve for the pourable product, in particular a feeding valve for feeding the pourable product, even more particular a feeding valve for feeding the pourable product to a product reservoir of the filling machine.

BACKGROUND ART

[0004] Rotary-type filling machines are known to comprise a carousel rotatable around a vertical rotation axis, a reservoir containing a pourable product and a plurality of filling units peripherally arranged on the carousel and being controllable into fluidic connection with the reservoir.

[0005] Each filling unit is configured to feed, in use, a predetermined volume of pourable product into one respective receptacle at a time, while both the respective receptacle and the filling unit are advanced along a respective advancement path due to the rotary motion imparted by the carousel.

[0006] A typical filling machine also comprises a feeding valve configured to control the feeding of the pourable product from a supply device to the reservoir. In particular, such a feeding valve is configured to control the flow rate of the pourable product to the reservoir for maintaining a determined level of the pourable product within the reservoir.

[0007] A typical feeding valve comprises:

- a flow channel having an inlet opening for receiving the pourable product from the supply device and an outlet opening for feeding the pourable product out of the flow channel and to and into the reservoir;
- a valve member, which is arranged within the flow channel in a sliding manner and is movable along the flow channel so as to allow or prevent the outflow of the pourable product through the outlet opening; and
- actuator means configured to control the movement of the valve member within the flow channel.

[0008] Typically, each valve member is movable inside the flow channel between at least:

- a full closing position, in which the valve member seals interrupts the outflow of the pourable product out of the outlet; i.e. the flow rate of the pourable product is at a minimum; and
- a full opening position, in which the valve member allows the pourable product to flow out of the outlet at a maximum flow rate.

[0009] It is also known that each valve member is positionable in at least one intermediate position between the full closing position and the full opening position for controlling an intermediate flow rate of the pourable product flowing out of the outlet.

[0010] In particular, in the case of aseptic processing, it is essential to avoid any contact with contaminations possibly originating from an outer environment.

[0011] Therefore, a known type of feeding valve relies on a stainless steel bellow for obtaining a hermetical seal.

[0012] It has, however, been found that these stainless steel bellows may form cracks due to the continuous mechanical stress, which threatens the hermetic sealing.

[0013] It is further known in the sector that the operation of the known feeding valves becomes critical with respect to the need to fill pourable food products containing pieces such as pulp, fibers and/or fruit pieces. In particular, it has been observed that from time to time the correct operation of the known feeding valves is prevented by pieces impeding the respective valve member to engage the respective full closing position.

[0014] Therefore, there is the need felt in the sector to provide a valve overcoming at least one of the aforementioned inconveniences.

[0015] In particular, the need is felt in the sector to improve the known valves in order to improve the reliability during aseptic processing conditions.

[0016] In particular, the need is felt to provide a valve guaranteeing the hermetical sealing also after significant working times.

[0017] In particular, the need is also felt in the sector to avoid that the respective valve member may not stay in its full closing position because of pieces impeding the respective valve member to reach its full closing position.

DISCLOSURE OF INVENTION

[0018] It is therefore an object of the present invention to provide in a straightforward and low-cost manner an improved valve, in particular an improved feeding valve, for a pourable product, in particular a pourable food product such as water, carbonated beverages, or the like, even more particular a pourable food product containing pieces such as pulp, fibers and/or fruit pieces.

[0019] It is a particular object of the present invention to provide in a straightforward and low-cost manner an improved valve, in particular an improved feeding valve,

which guarantees production under aseptic conditions.

[0020] It is another object of the present invention to provide in a straightforward and low-cost manner an improved valve, in particular an improved feeding valve, which guarantees its correct operation for pourable products containing or not containing pieces such as pulp, fibers or fruit pieces.

[0021] According to the present invention, there is provided a valve according to independent claim 1.

[0022] Further advantageous embodiments of the valve are specified in the dependent claims.

[0023] According to the present invention, there is also provided a filling machine according to claims 14 and 15.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Two non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a schematic side view of a valve according to a first embodiment of the present invention and being in a first configuration, with parts removed for clarity;

Figure 2 is a schematic side view of the valve of Figure 1 and being in a second configuration, with parts removed for clarity;

Figure 3 is a schematic side view of the valve of Figure 1 and being in a third configuration, with parts removed for clarity;

Figures 4a, 4b and 4c are schematic side views of a detail of the valve of Figures 1 to 3 and when being respectively in the first configuration, the second configuration and the third configuration, with parts removed for clarity;

Figure 5 is a perspective view of a detail of the valve of Figures 1 to 3, with parts removed for clarity; and Figure 6 is a schematic side view of a valve according to a second embodiment of the present invention, with parts removed for clarity.

BEST MODE FOR CARRYING OUT THE INVENTION

[0025] With particular reference to Figures 1 to 3, number 1 indicates as a whole a valve, in particular a feeding valve, for a pourable product, in particular a pourable food product, such as non-carbonated beverages (e.g. water, fruit juices,...), carbonated beverages (e.g. sparkling water, soft drinks, beer,...), or the like, even more particular for a pourable food product containing pieces such as pulp, fibers and/or fruit pieces.

[0026] It should be noted that the term pieces indicates any larger particles, which are arranged within a bulk liquid such as water, milk, fruit juice and the like. Example pieces are fruit pieces present within the bulk fruit juice or fruit fibers or pulp. It is clear that different types of pieces can be present within a pourable product.

[0027] According to a preferred non-limiting embodi-

ment, valve 1 is configured to be arranged and/or is arranged within a filling machine (not shown and known as such) for filling receptacles, such as bottles, containers and the like, with the pourable product.

[0028] According to a preferred non-limiting embodiment, the filling machine comprises:

- a conveying device, in particular a carousel rotatable around a rotation axis, preferably having a vertical orientation, and being adapted to advance the receptacles along an advancement path, preferably the advancement path being arc-shaped;
- a reservoir (temporarily) containing and/or (temporarily) storing the pourable product;
- a plurality of filling units configured to fill the receptacles during their advancement along the advancement path and being in fluidic connection or being controllable into fluidic connection with the reservoir; and
- valve 1 configured to control feeding of the pourable product to and/or into the reservoir, in particular for controlling a flow rate of the pourable product to and into the reservoir, even more particular for controlling and/or maintaining a (pre)determined level of the pourable product within the reservoir.

[0029] According to a preferred non-limiting embodiment, valve 1 is fluidically connected and/or connectable to the reservoir by means of a duct (of the filling machine).

[0030] According to a preferred non-limiting embodiment, valve 1 is also fluidically connected and/or connectable to a product supply and/or conditioning device (e.g. of the filling machine itself or of a production site within which is arranged the filling machine) for at least supplying, in particular for also conditioning, the pourable product. In particular, valve 1 is interposed between the reservoir and the product supply and/or conditioning device. In other words, valve 1 is arranged downstream of the product supply and/or conditioning device and upstream of the reservoir (with respect to the flow direction of the pourable product from the product supply and/or conditioning device to the reservoir).

[0031] With particular reference to Figures 1 to 3, each valve 1 comprises:

- a flow channel 2, in particular extending along a central axis A and, having an inlet opening 3 for receiving the pourable product, in particular from the product supply and/or conditioning device, and an outlet opening 4 for allowing an outflow of the pourable product from valve 1 and/or flow channel 2, in particular for feeding the pourable product to and/or into the reservoir; and
- a control member 5 arranged, in particular moveably arranged, within flow channel 2, in particular moveably arranged into an axial direction parallel to axis A, and configured to control a flow rate of the pourable product within flow channel 2 and to, and in

particular out of, outlet opening 4.

[0032] According to a preferred non-limiting embodiment, valve 1 also comprises an actuating device 6 operatively connected to control member 5, in particular for controlling operation of control member 5, in particular for (axially) moving control member 5 within flow channel 2, even more particular for varying the axial position of control member 5 within flow channel 2 (and along axis A).

[0033] According to a preferred non-limiting embodiment, valve 1 comprises a valve body 7 having flow channel 2, in particular valve body 7 having a (substantially) tubular configuration. In particular, valve body 7 extends along central axis A.

[0034] Preferentially but not necessarily, outlet opening 4 is arranged at an axial end of flow channel 2 and/or valve body 7.

[0035] Preferentially but not necessarily, the duct is connected to valve 1 in the area of, in particular at, outlet opening 4.

[0036] According to a preferred non-limiting embodiment, valve body 7 comprises an inner lateral surface 8 delimiting flow channel 2.

[0037] According to a preferred non-limiting embodiment, flow channel 2 has a (substantially) circular cross-section. In particular, the size of the circular cross-section may vary along the axial extension of flow channel 2.

[0038] With particular reference to Figures 1 to 5, each control member 5 comprises a plurality of apertures 9 configured to allow and/or to determine a fluidic connection between inlet opening 3 and outlet opening 4.

[0039] Advantageously, each control member 5 is configured such to allow for modification of an active portion of the one or more apertures 9. In particular, the active portion being a section of the one or more apertures 9, which, in use, establishes a fluidic connection between inlet opening 3 and outlet opening 4.

[0040] In particular, in use, apertures 9 comprise the active portion and an inactive portion, the inactive portion being a section of apertures 9, which does not establish a fluidic connection between inlet opening 3 and outlet opening 4.

[0041] In other words, the active portion is the section of apertures 9, which allows a flow of the pourable product through the active portion. The inactive portion is the portion of apertures 9, which does not receive, in use, a flow of the pourable product (the inactive portion is blocked). The inactive portion impedes a flow of the pourable product through this particular section.

[0042] E.g., Figures 4a and 4c illustrate different situations, which may occur in use. Figure 4a illustrates the case that the inactive portion of apertures 9 are at a maximum (and the active portion is at a minimum), meaning that control member 5 impedes any flow of the pourable product from inlet opening 3 to outlet opening 4. Figure 4c illustrates the case that the active portion is at a maximum (and the inactive portion is at a minimum) at which

also the flow rate of the pourable product from inlet opening 3 to outlet opening 4 is at a maximum. Figure 4b illustrates a situation intermediate between the cases shown in Figures 4a and 4b. None of the active portion and the inactive portion is at a maximum or minimum, thereby obtaining an intermediate flow rate.

[0043] With particular reference to Figures 1 to 4c, control member 5 is controllable at least between:

- a closed configuration (see Figures 1 and 4a) at which the active portion is at a minimum, in particular zero (i.e. the fluidic connection between inlet opening 3 and outlet opening 4 is interrupted), for interrupting any flow of the pourable product within flow channel 2 and to outlet opening 4;
- an open configuration (see Figures 3 and 4c) at which the active portion is at a maximum for controlling a maximum flow rate of the pourable product within flow channel 2 and to outlet opening 4; and
- an intermediate configuration (see Figures 2 and 4b) at which the active portion is between its minimum and its maximum for controlling an intermediate flow rate within flow channel and to outlet opening 4.

[0044] Preferentially but not necessarily, control member 5 is controllable such to take a plurality of intermediate configurations, each one resulting in a distinct and different flow rate of the pourable product.

[0045] Preferentially but not necessarily, control member 5 is moveably arranged, in particular along central axis A, within flow channel 2, and in particular between a first limit position and a second limit position at which control member 5 is respectively in its closed configuration and its open configuration. Even more particular, control member 5 is also moveable such to take at least one intermediate position between the first limit position and the second limit position and at which control member 5 is in its intermediate configuration.

[0046] Preferentially but not necessarily, each control member 5 is moveable such to take a plurality of intermediate positions, each one being interposed between the first limit position and the second limit position and each one being distinct from the others and resulting each one in a distinct and different flow rate of the pourable product.

[0047] According to a preferred non-limiting embodiment, control member 5 is interposed between inlet opening 3 and outlet opening 4.

[0048] According to a preferred non-limiting embodiment, each control member 5 is coaxially arranged within the respective flow channel 2.

[0049] According to a preferred non-limiting embodiment, control member 5, in particular tube portion 13, encloses a respective inner space 10 being in fluidic connection with one of outlet opening 4 and inlet opening 3 and apertures 9 are configured to establish a fluidic connection between the other one of outlet opening 4 and inlet opening 3. In the specific embodiment disclosed,

outlet opening 4 is in fluidic connection with inner space 10 and apertures 9 are configured to allow, in particular in dependence of the (axial) position of control member 5 within flow channel 2, the establishment of a fluidic connection between inlet opening 3 and inner space 10.

[0050] In particular, in the specific embodiment disclosed there is always a (there is a continuous) fluidic connection between inner space 10 and outlet opening 4, while the fluidic connection between inner space 10 and inlet opening 3 is determined by the active portion of apertures 7; i.e. it depends on the (axial) position of control member 10. In other words, according to such an embodiment, apertures 9 are configured to allow, in dependence of the (axial) position of the respective control member 5, for the flow of the pourable product into inner space 10 from which the pourable product flows to (and out of) outlet opening 4.

[0051] Alternatively, it could be possible to design control member 5 such that there is always a fluidic connection between inlet opening 3 and inner space 10 and the fluidic connection between outlet opening 4 and inner space 10 is determined by the active portion of aperture 7; i.e. it depends on the (axial) position of control member 10. In other words, in use, the pourable product entering into flow channel 2 flows into inner space 10 and, in dependence of the position of control member 5, further flows with the specific flow rate to (and through) the respective outlet opening 4.

[0052] With particular reference to Figure 5, control member 5 comprises a tube portion 13, in particular having a circular cross-section, carrying and/or comprising the one or more apertures 9, and in particular delimiting inner space 10.

[0053] In particular, tube portion 13 and flow channel 2 are coaxial.

[0054] According to a preferred non-limiting embodiment, tube portion 13 comprises an open end 14 and a closed end 15 opposed to open end 14. In particular, open end 14 faces outlet opening 4.

[0055] In particular, inner space 10 is delimited by open end 14, closed end 15 and lateral walls of tube portion 13 extending between open end 14 and closed end 15.

[0056] In particular, apertures 9 are configured to allow for the pourable product to enter tube portion 13 and open end 14 is configured to allow for the outflow of the pourable product from tube portion 13 and to outlet opening 4.

[0057] According to a preferred non-limiting embodiment, each control member 5 comprises at least one aperture 9, which is of a first type and/or format and at least another aperture 9 is of at least a second type and/or format, the second type and/or format being different from the first type and/or format. In the specific case shown, each aperture 9 of the first type and/or format presents a different longitudinal extension (parallel to axis A) than the ones of the first type and/or format.

[0058] In particular, according to the specific non-limiting embodiment, control member 5 also comprises apertures 9 being of at least a third type and/or format.

[0059] According to some non-limiting embodiments, each aperture 9 comprises a respective opening area. In particular, each opening area of apertures 9 of the first type and/or format is different from the respective opening area of apertures 9 of the second type and/or format.

[0060] According to the specific non-limiting embodiment shown, each aperture 9 comprises a respective rectangular portion 16 and a half-circular portion or a half-elliptical portion 17, in particular attached to the rectangular portion 16. E.g. such a configuration defining a specific format of apertures 9.

[0061] With particular reference to Figures 1 to 3, each valve 1 comprises a sealing member 19, such as a sealing gasket or washer, configured to cooperate with control member 5 and to define together with control member 5 the active portion of apertures 9. In particular, sealing member 19 guarantees in cooperation with control member 5 that the pourable product flows to outlet opening 4 only by passing through apertures 9, and in particular any flow of pourable product between inner lateral surface 8 and the lateral walls of tube portion 13 is impeded.

[0062] Preferentially but not necessarily, each sealing member 19 is configured to divide flow channel 2 into a first flow portion 20 and a second flow portion 21, in particular downstream from first flow portion 20 with respect to the flow direction of the pourable product. In particular, first flow portion 20 is arranged upstream of sealing member 19 and second flow portion 21 is arranged downstream of sealing member 19 (with respect to the flow direction of the pourable product within flow channel 2).

[0063] In particular, each control member 5 is moveable such to arrange varying sections of control member 5 within flow channel 2, in particular in dependence on the (axial) position of control member 5. E.g. with reference to Figures 1 and 3, most of control member 5 is arranged within the respective second flow portion 21 and within the respective first flow portion 20 with control member 5 being arranged in respectively the first limit position and the second limit position.

[0064] It can also be understood that the portions of apertures 9 being positioned within first flow portion 20 define the active portion, and in particular the portions of apertures 9 being positioned within second flow portion 21 define the inactive portion.

[0065] It is furthermore clear that by moving control member 5 between the first limit position and the second limit position, it is possible to arrange smaller or larger portions of apertures 9 within first flow portion 20. Thereby, it is possible to control the active portion and, accordingly, the flow rate of the pourable product.

[0066] Even more particular, each sealing member 19 comprises an inner lateral sealing surface 22 facing into flow channel 2 and at least one portion of an external lateral surface 23 of control member 5, in particular of tube portion 13, is in contact with inner lateral sealing surface 22, in particular so that the pourable product can enter into second flow portion 21 only by passing and flowing through the active portion of apertures 9.

[0067] Thus, in use, the pourable product enters into first flow portion 20 and by defining the size of the active portion of apertures 9 (by defining the axial position of control member 5) it is possible to define and/or determine the flow rate of the pourable product into inner space 10 and to outlet opening 4.

[0068] With particular reference to Figures 1 to 3, actuating device 6 is configured to control the respective control member 5 into at least one of the closed configuration, the open configuration and the intermediate configuration, in particular actuating device 6 is configured to move control member 5 between the first limit position and the second limit position, even more particular actuating device 6 is configured to arrange control member 5 in the first limit position, in the second limit position or in the intermediate position(s).

[0069] According to the non-limiting embodiment shown, actuating device 6 is configured to actuate a linear movement into one and the other direction of control member 5.

[0070] Preferentially but not necessarily, actuating device 6 comprises an actuator 30, e.g. an electrical motor such as a stepper motor or any other linear motor, and a coupling assembly 31 operationally coupled to actuator 30 and control member 5.

[0071] Preferentially but not necessarily, coupling assembly 31 comprises a respective first coupling portion 32 being mechanically connected to control member 5 and a second coupling portion 33 being mechanically connected to actuator 30 and configured to transfer a motion of actuator 30 to first coupling portion 32. In particular, first coupling portion 32 and second coupling portion 33 being operationally coupled to one another, in particular by means of a magnetic coupling e.g. by relying on an Halbach array or similar.

[0072] According to some preferred non-limiting embodiments, first coupling portion 32 is arranged within flow channel 2 (and within valve body 7).

[0073] According to some preferred non-limiting embodiments, valve 1, in particular valve body 7, comprises an internal housing pocket 35 arranged within flow channel 2 and defining a space fluidically isolated from flow channel 2.

[0074] In particular, at least a portion of second coupling portion 33 is arranged within the space defined by internal housing pocket 35 (and the other portions being arranged outside of valve body 7). In this manner, it is guaranteed that second coupling portion 33 does not get into contact with the pourable product flowing and/or being, in use, present within flow channel 2. In other words, second coupling portion 33 is at least partially arranged within flow channel 2 in an isolated manner.

[0075] According to some preferred non-limiting embodiments, actuation device 6 also comprises a magnet assembly 34 configured to keep the respective control member 5 in the first limit position and the second limit position (and allowing to deactivate actuator 30 without risking of any change in the (axial) position of control

element 5).

[0076] According to some preferred non-limiting embodiments, each valve 1 also comprises a respective sensor device (not shown) configured to determine and/or measure the (axial) position of the respective control member 5 within flow channel 2, in particular for controlling the flow rate of the pourable product.

[0077] In use, the filling machine fills the receptacles during their advancement along the advancement path.

[0078] In particular, each filling unit fills one respective receptacle.

[0079] Furthermore, valve 1 is configured to control a flow of the pourable product (from the product supply and/or conditioning device) to and into the reservoir, in particular for controlling and/or maintaining a determined level of the pourable product within the reservoir.

[0080] Control element 5 is controlled such to obtain the desired flow rate of the pourable product.

[0081] Control element 5 is controlled, in particular by means of the respective actuation device 6, in the closed configuration, the open configuration or the intermediate configuration.

[0082] In particular, control element 5 is positioned in the respective flow channel 2 in the first limit position, the second limit position or the intermediate position.

[0083] By controlling the (axial) position of control element 5 it is possible to determine the active portion of apertures 9; i.e. the section of apertures 9, which allow for the pourable product to flow from inlet opening 3 to outlet opening 4. In particular, the active portion of apertures 9 is determined and/or defined by the section of apertures 9, which is positioned within first flow portion 20.

[0084] In more detail, the active portion allows for the pourable product to enter into inner space 10.

[0085] In particular, actuating device 6 linearly moves the respective control element 5 within flow channel 2.

[0086] With particular reference to Figure 6, number 1' indicates a second embodiment of a valve according to the present invention. Valve 1' is similar to valve 1 and for this reason is described below only in terms of the differences with respect to valve 1, by indicating with the same reference numbers parts equal or equivalent to parts already described.

[0087] In particular, valve 1' differs from valve 1 in comprising actuating device 6'.

[0088] As actuating device 6' is similar to actuating device 6, the following description is limited to the differences with respect to actuating device 6 and indicating with the same reference numbers parts equal or equivalent to parts already described.

[0089] In particular, actuating device 6' differs from actuating device 6 in that second coupling portion 33 is arranged outside of flow channel 2. In particular, second coupling portion 33 is arranged outside of valve body 7. In other words, only first coupling portion 32 of actuating device 6' is arranged within flow channel 2.

[0090] Even more particular, at least a portion of sec-

and coupling portion 33 surrounds a portion of valve body 7.

[0091] In particular, valve 1' differs from valve 1 also in not comprising internal housing pocket 35.

[0092] As operation of valve 1' is similar to operation of valve 1, reference is made to the above-provided description of the operation of valve 1.

[0093] The advantages of valves 1 and 1' according to the present invention will be clear from the foregoing description.

[0094] In particular, valves 1 and 1' come along with a simple and resistant configuration limiting the risk of the formation of any cracks due to mechanical stress.

[0095] Another advantage resides in that by providing for apertures 9, valves 1 and 1' work very well, when handling pourable products having pieces.

[0096] Clearly, changes may be made to valves 1 and 1' as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

[0097] In an alternative embodiment not described in detail, valves 1 and 1' could operate as filling valves.

Claims

1. A valve (1) for a pourable product, in particular of a feeding valve (1) for feeding a pourable product; the valve (1) comprises a flow channel (2) having an inlet opening (3) for receiving the pourable product and an outlet opening (4) for allowing an outflow of the pourable product from the flow channel (2); the valve (1) comprises a control member (5) arranged within the flow channel (2) and configured to control a flow rate of the pourable product within the flow channel (2) and to the outlet opening (4); wherein the control member (5) comprises one or more apertures (9) configured to allow for a fluidic connection between the inlet opening (3) and the outlet opening (4); wherein the control member (5) is configured such to allow for a modification and/or variation of an active portion of the one or more apertures (9), the active portion being a section of the one or more apertures (9), which, in use, establishes a fluidic connection between the inlet opening (3) and the outlet opening (4).
2. Valve according to claim 1, wherein the control member (5) encloses a respective inner space (10) being in fluidic connection with one of the outlet opening (4) and the inlet opening (3); wherein the one or more apertures (9) are configured to establish a fluidic connection between the other one of the outlet opening (4) and the inlet opening (3).
3. Valve according to claim 1 or 2, wherein the control member (5) is controllable at least between:

- a closed configuration at which the active portion is at a minimum for interrupting any flow of the pourable product within the flow channel (2) and to the outlet opening (4);
- an open configuration at which the active portion is at a maximum for controlling a maximum flow rate of the pourable product within the flow channel (2) and to the outlet opening (4); and
- an intermediate configuration at which the active portion is between its minimum and its maximum for controlling an intermediate flow rate within the flow channel and to the outlet opening.

4. Valve according to claim 3, wherein the control member (5) is moveably arranged within the flow channel (2) and between a first limit position and a second limit position at which the control member (5) is respectively in its closed configuration and its open configuration; wherein the control member (5) is also moveable such to take at least one intermediate position between the first limit position and the second limit position and at which the control member (5) is in its intermediate configuration.
5. Valve according to claim 4, wherein the control member (5) and the flow channel (2) are coaxial with respect to a common axis (A); wherein the control member (5) is moveable along the common axis (A).
6. Valve according to any one of claims 3 to 5, and further comprising an actuating device (6, 6') configured to control the control member (5) into at least one of the closed configuration, the open configuration and the intermediate configuration.
7. Valve according to claim 6, comprises an actuator (30), in particular an electrical motor, and a coupling assembly (31) operationally coupled to the actuator (30) and the control member (5).
8. Valve according to claim 7, wherein the coupling assembly (31) comprises a first coupling portion (32) being mechanically connected to the control member (5) and a second coupling portion (33) being connected to the actuator (30) and configured to transfer a motion of the actuator (30) to the first coupling portion (32); in particular, the first coupling portion (32) and the second coupling portion (33) are operationally coupled to one another by means of a magnetic coupling.
9. Valve according to any one of the preceding claims, wherein the control member (5) comprises a tube portion (13) comprising the one or more apertures (9).

10. Valve according to any one of the preceding claims, further comprises at least one sealing member (19) having a sealing surface (22) facing into the flow channel (2) ;
wherein at least one portion of a surface (23) of the control member (5) is in contact with the sealing surface (22) . 5
11. Valve according to any one of the preceding claims, wherein the control member (5) comprises a plurality of apertures (9) and at least one aperture (9) is of a first type and/or format and at least another aperture (9) is of at least a second type and/or format, the second type and/or format being different from the first type and/or format. 10
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12. Valve according to claim 11, wherein each aperture (9) comprises a respective opening area and the opening area of the aperture (9) of the first type and/or format is different from the opening area of the aperture (9) of the second type and/or format. 20
13. Valve according to any one of the preceding claims, wherein each aperture (9) comprises a rectangular portion (16) and a half-circular or half-elliptical portion (17). 25
14. A filling machine for filling receptacles with a pourable product;
the filling machine comprises at least one valve (1) according to any one of the preceding claims. 30
15. The filling machine according to claim 14, further comprising a reservoir containing the pourable product, a plurality of filling units configured to fill receptacles with the pourable product and being in fluidic connection or being controllable into fluidic connection with the reservoir and the valve (1) being configured to control a flow rate of the pourable product into the reservoir. 35
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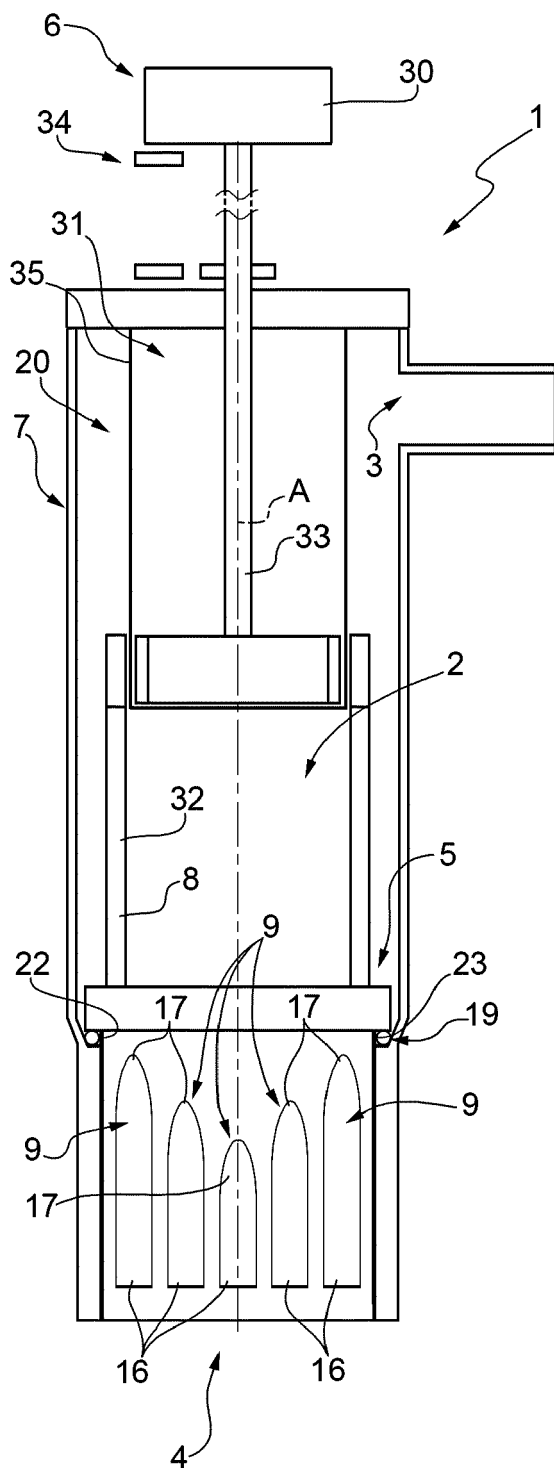


FIG.1

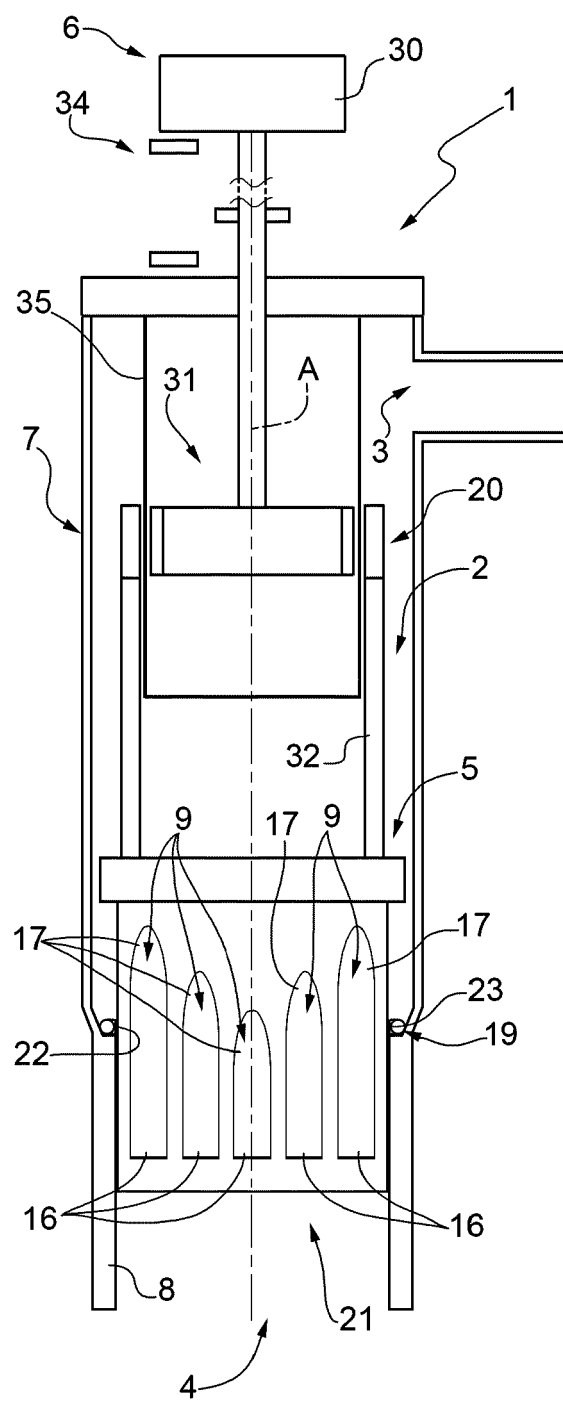


FIG.2

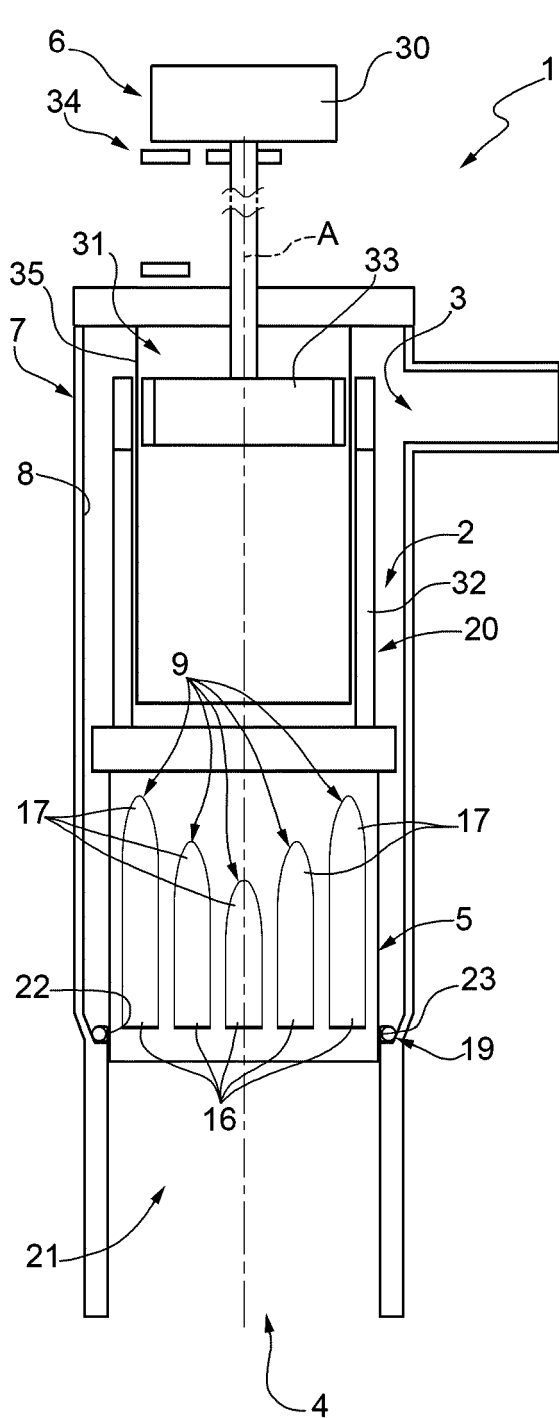


FIG. 3

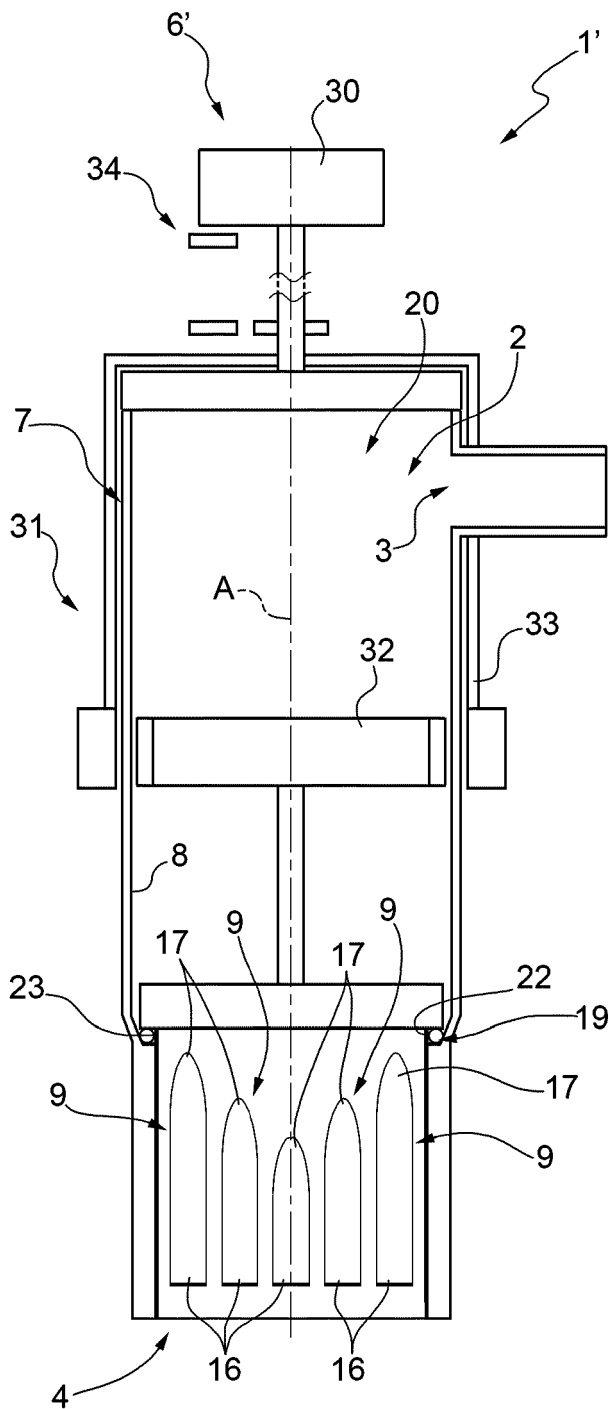


FIG. 6

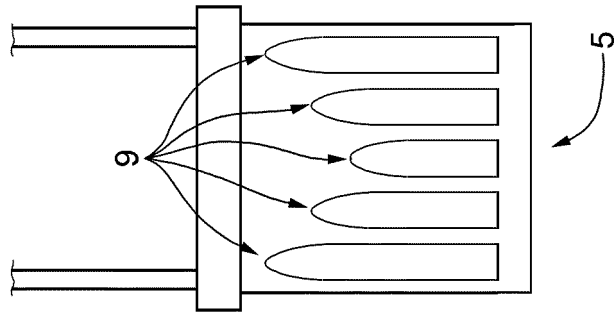


FIG. 4a

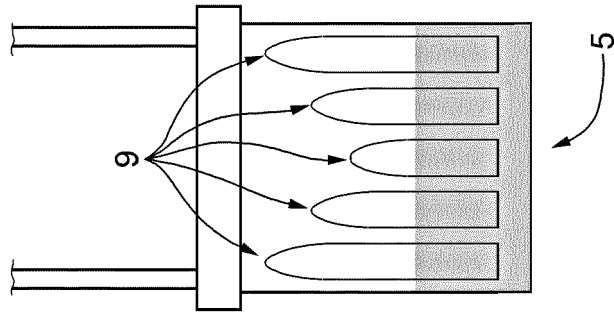


FIG. 4b

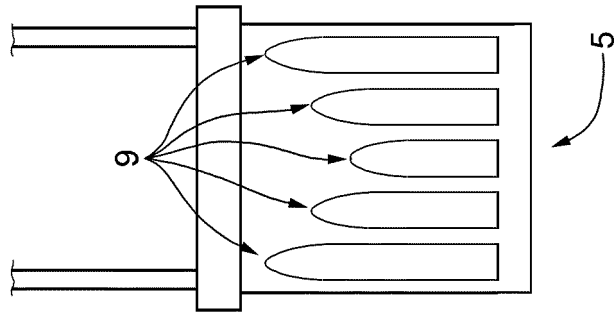


FIG. 4c

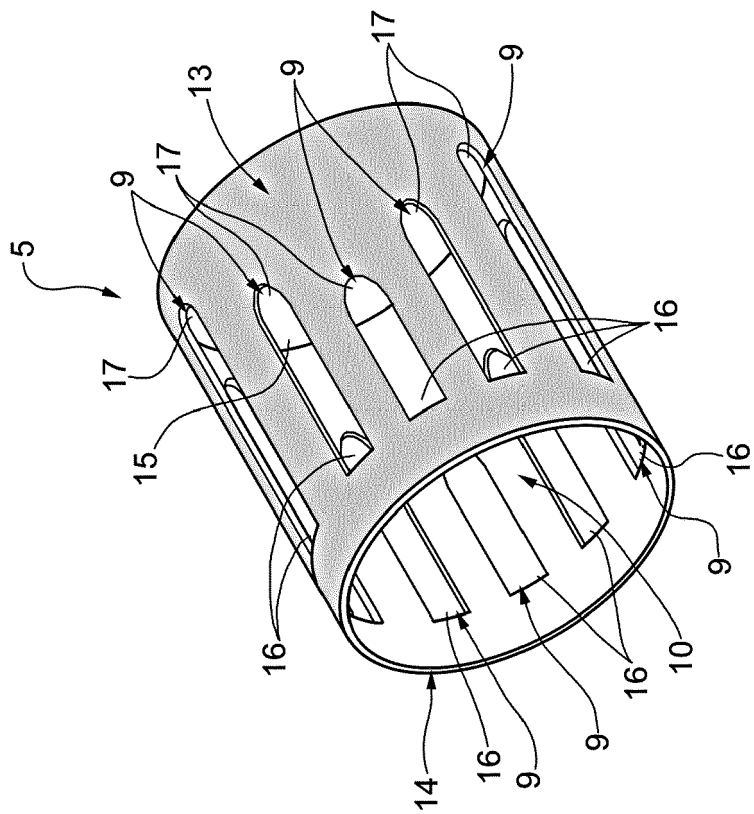


FIG.5



EUROPEAN SEARCH REPORT

Application Number
EP 19 30 6154

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X	WO 2012/016604 A1 (KHS GMBH [DE]; CLUESSEERATH LUDWIG [DE]) 9 February 2012 (2012-02-09) * figures 1,2 * * page 5, line 26 - page 10, line 23 * -----	1,2,9, 10,14,15	TECHNICAL FIELDS SEARCHED (IPC) B67C B65B
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Place of search The Hague		Date of completion of the search 16 March 2020	Examiner Pardo Torre, Ignacio
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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