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(54) Beverage dispensing valve, in particular for a household refrigeration appliance

(57) The present invention relates to a beverage dispensing valve (10), in particular for a household refrigeration appliance (1), said valve (10) having a main body (20) comprising:
- a first portion (21) for the entrance of the beverage into said valve (10);
- an intermediate portion (20I) for said beverage to flow through the valve (10), said intermediate portion (20I) comprising at least one opening (20A) that allows the beverage to flow out of said intermediate portion (20I);
- a second portion (22) extending substantially parallel to an axis (A) of the valve (10), a sealing member (23) being associated with said second portion (22) in the proximity of a terminal part (22A) thereof.

The invention is characterized in that said valve (10) comprises a spacer member (50), which is adapted to be associated with the first portion (21) of the main body (20) to impart a universal character to the valve (10) and allow it to be associated with elements of different sizes and/or doors (3P, 4P) of different thicknesses.

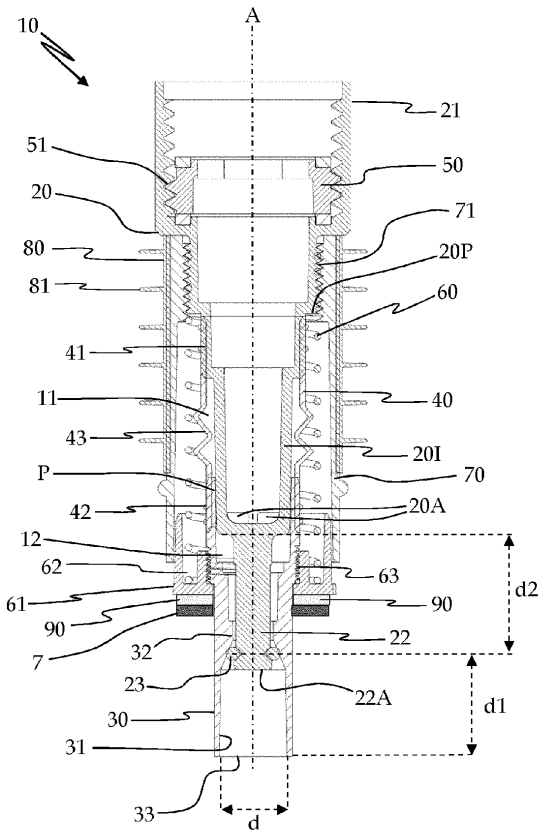

Fig. 3a

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Description

[0001] The present invention relates to a beverage dispensing valve, in particular for a household refrigeration appliance, according to the preamble of claim 1.

[0002] The present invention also relates to a respective household refrigerating appliance comprising said beverage dispensing valve.

[0003] Reference will be prevalently made in the following description to a refrigeration appliance for household use, even though the present invention is not strictly limited to such an appliance.

[0004] It is known in the art a refrigeration appliance, in particular for household use, of the type comprising a structure with at least one compartment formed therein for food preservation.

[0005] Refrigeration appliances known in the art typically comprise two compartments which are kept at different temperatures, thus providing at least two different food preservation states, in particular a refrigerator compartment suitable for preserving fresh food at a temperature between 0°C and 10°C and a freezer compartment suitable for preserving frozen food at a temperature between -15°C and -30°C; such refrigeration appliances are commonly referred to by those skilled in the art of household refrigeration as "double-door" or "combined" refrigerators, depending on the relative position of the two compartments. In a "double-door" refrigeration appliance, the freezer compartment is above the refrigerator compartment, whereas in a "combined" refrigeration appliance the freezer compartment is located at the bottom.

[0006] It is also known in the art that a refrigeration appliance, in particular for household use, may include a device for dispensing a beverage outside said refrigeration appliance, said device comprising a beverage dispensing valve. Usually said valve is associated, whether directly or indirectly, with a reservoir located inside a compartment of the refrigeration appliance, in particular said reservoir being typically positioned in a refrigerator compartment; said valve is operated by an actuator element associated therewith and positioned externally to the refrigeration appliance, said actuator element being operated by a user wanting the beverage to exit the valve.

[0007] Refrigeration appliances with such features have been very common for decades in the USA; actually, the refrigeration appliances widespread on the American market are equipped with dispensers capable of dispensing not only refrigerated water, but also ice and, in some cases, refrigerated soft drinks. These refrigeration appliances are usually fitted with two doors arranged side by side, and are therefore very bulky; the dispenser and the valve are associated with one door, the valve typically extending through the door, so that it protrudes both inside and outside the refrigeration appliance; furthermore, a recess is normally present on said door, outside the refrigeration appliance, where the valve or the associated ducts come out for dispensing the beverage; in said recess, the user can lay, for example, a glass or another container suitable for receiving the dispensed beverage.

[0008] In Europe, refrigeration appliances equipped with a dispenser have begun to catch on in quite recent times. It must be pointed out that the European market demands rather different products from those sold in the United States, i.e. products being much less bulky (60 or 70 cm wide) and usually dispensing refrigerated water only; moreover, such products must not be too expensive and therefore must use simple but effective technical solutions.

[0009] The valves known in the art are associated with an actuator element positioned externally to the refrigeration appliance, preferably said actuator element being operable via a thrust exerted by a user wanting the beverage to exit the valve.

[0010] It has however been observed that the refrigeration appliances known in the art suffer from a number of drawbacks, which are substantially due to the particular realization of the beverage dispensing valve.

[0011] In fact, the realizations of the valves known in the art lack versatility, in that each one of them is conceived for being associated with a refrigeration appliance with walls and/or elements having specific dimensions, without the possibility of associating said valve with walls and/or elements having different dimensions than the predetermined ones.

[0012] Moreover, it is known in the art to associate the actuator element in a manner such that some space remains between it and the valve itself; as a consequence, said actuator element may remain loose or vibrate, thus causing the entire beverage dispensing device to operate in a non- optimal way and representing a disturbance in the environment surrounding the refrigeration appliance.

[0013] A further drawback of the coupling between the actuator element and prior-art valves is that the activation of said valve often occurs unintentionally, e.g. upon fortuitous contact with the actuator element by a user; it is clear that such undesired valve activation is particularly unpleasant and annoying, since it implies wasting beverage and soiling both the refrigeration appliance and the user.

[0014] Furthermore, the valves known in the art are so realized as to cause beverage dripping even when the user has already removed the container suitable for receiving the dispensed beverage.

[0015] It is clear that such dripping, in addition to wasting beverage, will inevitably soil both the refrigeration appliance and the surrounding area.

[0016] As a consequence, said dripping of the valves known in the art inevitably leads to much discomfort for the user.

[0017] Moreover, the valves known in the art are usually so realized as to not ensure a homogeneous exit of the beverage; it is clear that also this drawback is particularly annoying, in that it may cause the beverage to be

improperly dispensed, thus increasing the risk of spilling beverage on the refrigeration appliance and on the surrounding area.

[0018] In this frame, it is the main object of the present invention to provide a beverage dispensing valve, in particular for a household refrigeration appliance, and a respective refrigeration appliance which are adapted to overcome the above-described drawbacks, thus proving to be particularly efficient and economical.

[0019] It is another object of the present invention to provide a beverage dispensing valve, in particular for a household refrigeration appliance, which is so realized as to ensure particular versatility, said valve being so conceived that it can also be associated with walls and/or elements of a refrigeration appliance having different dimensions than the predetermined ones.

[0020] It is a further object of the present invention to provide a beverage dispensing valve, in particular for a household refrigeration appliance, which is so realized that it can be optimally associated with an actuator element, in particular without causing the entire beverage dispensing device to operate in a non-optimal manner and without representing a disturbance in the environment around the refrigeration appliance.

[0021] It is another object of the present invention to provide a beverage dispensing valve which is so realized as to prevent any unintentional and undesired activation thereof by a user.

[0022] It is a further object of the present invention to provide a beverage dispensing valve, in particular for a household refrigeration appliance, which is so realized as to prevent, or at least to limit, a possible dripping of beverage, in particular when the user has already removed the container suitable for receiving the dispensed beverage, so as to not waste beverage and soil the refrigeration appliance and/or the surrounding area.

[0023] It is yet another object of the present invention to provide a beverage dispensing valve, in particular for a household refrigeration appliance, which is so realized as to ensure a homogeneous exit of the beverage and a proper dispensation thereof.

[0024] Said objects are achieved by the present invention through a beverage dispensing valve, in particular for a household refrigeration appliance, and a respective refrigeration appliance which incorporate the features set out in the appended claims, which are an integral part of the present description. Further objects, features and advantages of the present invention will become apparent from the following detailed description and from the annexed drawings, which are supplied by way of non-limiting example, wherein:

- Fig. 1 is a sectional side view of a refrigeration appliance according to the present invention;
- Fig. 2 is an exploded view of a beverage dispensing valve according to the present invention;
- Figs. 3a and 3b are sectional views of the valve of Fig. 2, respectively in a first and a second operating conditions;
- Figs. 4a and 4b are perspective views of a first and a second components, respectively, of the valve according to the present invention;
- Figs. 5a and 5b respectively show the valve without (Fig. 5a) and with (Fig. 5b) the second component shown in Fig. 4b.

[0025] Said description and said drawings are to be considered as non-limiting examples.

[0026] Referring now to the annexed drawings, Fig. 1 shows a schematic sectional view of a refrigeration appliance, in particular for household use, in accordance with the present invention, designated as a whole by reference numeral 1.

[0027] Said refrigeration appliance 1 comprises a structure 2 within which at least one compartment 3, 4 is obtained for preserving foodstuffs, which is adapted to be closed by at least one door 3P, 4P.

[0028] Preferably, said at least one compartment 3, 4 comprises:

- a refrigerator compartment 3, in particular suitable for preserving fresh food at a temperature between 0°C and 10°C, and adapted to be closed by a first door 3P,
- a freezer compartment 4, in particular suitable for preserving frozen food at a temperature between -15°C and -30°C, and adapted to be closed by a second door 4P.

[0029] It should be noted that the refrigeration appliance 1 shown in Fig. 1 is a "combined" one, in that the freezer compartment 4 is located under the refrigerator compartment 3; it is however clear that the refrigeration appliance 1 according to the present invention may be of a different type as well.

[0030] Also, Fig. 1 shows rather thick walls of the structure 2, to indicate the presence of a layer of thermally insulating material; normally, the thickness of the insulating material depends on the type of cell (i.e. on the cell's operating temperatures) and, of course, on the type of insulating material in use; this is common and well known to those skilled in the art.

[0031] The refrigeration appliance 1 comprises a beverage dispensing device, designated as a whole by reference numeral 5, said dispensing device 5 being associated with the structure 2 of the refrigeration appliance 1, in particular with said at least one door 3P, 4P.

[0032] Said dispensing device 5 comprises a valve 10 for dispensing said beverage. In the example of embodiment shown in Fig. 1, the valve 10 is associated with the first door 3P; in this embodiment, the valve 10 of the present invention preferably also acts as a duct for dispensing the beverage outside the refrigeration appliance 1, in particular by conducting the beverage to a recess 3N formed on said first door 3P. It is however clear that

said valve 10 and said recess 3N may be associated with other parts of the structure 2, and that the valve 10 may be associated with a suitable duct (not shown in the drawings) for conducting the beverage outside the refrigeration appliance 1 and into said recess 3N.

[0033] The valve 10 according to the present invention (and according to the example of embodiment shown in Fig. 1) is preferably associated with a reservoir 6 arranged inside the refrigeration appliance 1, in particular within the refrigerator compartment 3; it is however clear that the valve 10 may also be associated, whether directly or indirectly, with a drinking water distribution main.

[0034] Furthermore, the valve 10 is associated with an actuator element 7 positioned outside the refrigeration appliance 1, said actuator element 7 being preferably of the type that can be operated via a thrust exerted by a user wanting the beverage to exit the valve 10 (e.g. said thrust being exerted by means of a container, designated by reference C in Fig. 1) .

[0035] The valve 10 is shown in more detail in Figures 2 to 3b, wherein Fig. 2 shows an exploded perspective view and Figs. 3a and 3b show sectional views of the valve 10 in a first and a second operating conditions, respectively.

[0036] Said valve 10 comprises a main body 20 comprising:

- a first portion 21 for the entrance of the beverage into said valve 10;
- an intermediate portion 20I for said beverage to flow through the valve 10, said intermediate portion 20I comprising at least one opening 20A that allows the beverage to flow out of said intermediate portion 20I;
- a second portion 22 extending substantially parallel to an axis A (indicated by a dashed-dotted line in Figs. 3a and 3b) of the valve 10, a sealing member 23 being associated with said second portion 22 in the proximity of a terminal part 22A thereof.

[0037] In accordance with the present invention, the valve 10 comprises a spacer member 50, which is adapted to be associated with the first portion 21 of the main body 20 to impart a universal character to the valve 10, i.e. to make it suitable for being associated with elements of different sizes and/or doors 3P, 4P of different thicknesses.

[0038] Said spacer member 50 has substantially the shape of a ring having a hole 50F (shown in Fig. 4b, which is a perspective view of the spacer member 50) for the passage of the beverage to be dispensed.

[0039] Moreover, said spacer member 50 comprises fastener means 51 for firmly coupling it within said first portion 21 of the main body 20; in particular, said fastener means 51 comprise a thread adapted to be coupled to a mating thread formed within said first portion 21.

[0040] The valve 10 according to the present invention preferably comprises a first gasket G1 (shown in Fig. 2), which must be positioned within said first portion 21 prior to associating the spacer member 50 with the latter.

[0041] In addition, the valve 10 according to the present invention may comprise a second gasket G2 (also shown in Fig. 2) to be positioned between the first portion 21 of the main body 20 and a further element to be associated with the valve 10.

[0042] The provision of the spacer member 50 allows to provide a valve 10 which is so realized as to have particular versatility, in that said spacer member 50 allows the valve 10 to be associated also with elements of different sizes and/or with doors 3P, 4P of different thicknesses than the predetermined ones; in fact, in order to associate the valve 10 with doors 3P, 4P of different thicknesses, it will be sufficient to use a spacer member 50 having a size suitable for a specific door 3P, 4P, without necessarily having to use a specific valve 10 for that specific door 3P, 4P.

[0043] Figures 5a and 5b show the valve 10 of the present invention associated with a reservoir 6 arranged inside a refrigeration appliance 1; in particular, said valve 10 is shown in:

- a first view, where it is associated with the reservoir 6, in particular with an outlet 6A of the reservoir 6, without interposition of the spacer member 50 in the first portion 21 of the main body 20 (see Fig. 5a);
- a second view, where it is associated with the reservoir 6, in particular with said outlet 6A of the reservoir 6, with interposition of the spacer member 50 in the first portion 21 of the main body 20 (see Fig. 5b).

[0044] By comparing Figures 5a and 5b, it can be observed that, a first length L1 of the valve 10 being fixed, the use of the spacer member 50 will allow to position an outlet section 33 of the valve 10 at a third length L3 from the reservoir 6, greater than a second distance L2, said second distance L2 being the distance between the outlet section 33 and the reservoir 6 when the spacer member 50 is not used; as a consequence, it is clear that the use of a suitably sized spacer member 50 will allow to adapt the valve 10 to doors 3P, 4P of different thicknesses, without necessarily having to use a specific valve 10 for each one of said doors 3P, 4P of different thicknesses.

[0045] Fig. 4b shows a perspective view of the spacer member 50 according to the present invention.

[0046] As can be seen in said figure, the spacer member 50 comprises operating means 52 to ensure a stable coupling of said spacer member 50 within said first portion 21 of the main body 20; in particular, said operating means comprise at least one straight portion 52 of said spacer member 50, in particular said straight portion 52 being located near the hole 50F of said spacer member 50; it is clear that said straight portion 52 allows using a tool (not shown in the drawings) for tightening the spacer member 50 within said first portion 21, said tightening being in particular obtained through the action of the fastener means 51.

[0047] In addition, the valve 10 comprises a lower body 30, which is associated with the main body 20 in such a way as to encircle said second portion 22 and said at least one opening 20A of the intermediate portion 20I, said lower body 30 being adapted to slide axially (i.e. substantially parallel to said axis A of the valve 10) over said intermediate portion 20I and second portion 22, so as to move:

- from a first operating condition (shown in Fig. 3a), in which an inner surface 31 of the lower body 30 cooperates with said sealing member 23 to prevent the beverage from coming out of said valve 10,
- to a second operating condition (shown in Fig. 3b), in which at least one gap L (also shown in Fig. 3b) is formed between said inner surface 31 and said sealing member 23 to allow the flow of the beverage, and vice versa (i.e. said lower body 30 is adapted to slide axially from the second operating condition to the first operating condition).

[0048] In accordance with the present invention, said valve 10 comprises a coupling element 90 located between an actuator element 7 and said valve 10.

[0049] In particular, said coupling element 90 is made of a soft and/or elastic material, such as open-cell or self-modelling foam.

[0050] Said coupling element 90 is preferably located (as can be seen in Figs. 3a and 3b) in such a position as to at least partially encircle the lower body 30 of the valve 10; also, said coupling element 90 is preferably placed in contact with a connection element 61 of the valve 10, in particular said connection element 61 being adapted to associate an elastic member 60 with the lower body 30 of the valve 10.

[0051] The special provision of the coupling element 90 provides numerous advantages.

[0052] In fact, said coupling element 90 allows to constitute a support surface for the actuator element 7, so as to take up any construction tolerances and prevent said actuator element 7 from being loose or vibrating (which would be the case if the coupling element 90 were absent), since the actuator element 7 will meet the soft and/ or elastic material of the coupling element 90.

[0053] Furthermore, the coupling element 90 allows to avoid any undesired activation of the valve 10, since the soft and/or elastic material it is made of makes it necessary to exert an adequate thrust upon the actuator element 7 in order to activate said valve 10.

[0054] In a preferred embodiment, said valve 10 comprises a sleeve 40 having:

- a first end 41, which is adapted to be coupled to said main body 20;
- a second end 42, which is adapted to be coupled to said lower body 30;
- an intermediate part 43 made of an elastic material, which is adapted to move from a substantially stretched state, occurring when the lower body 30 is in said first operating condition, to a contracted state, occurring when the lower body 30 is in said second operating condition, and vice versa, the intermediate part 43 of the sleeve 40 allowing a depression to be formed in said stretched state to prevent dripping downstream of the sealing member 23.

[0055] In practice, when the intermediate part 43 of the sleeve 40 contracts, it reduces the inner volume of the sleeve 40; when, on the contrary, the intermediate part 43 of the sleeve 40 stretches, it increases the inner volume of the sleeve 40, thereby reducing the pressure within said sleeve 40 and creating a depression suitable for preventing dripping downstream of the sealing member 23. Substantially, said intermediate part 43 of the sleeve 40 is so positioned as to encircle the intermediate portion 20I of the main body.

[0056] As a consequence, as clearly shown in Figs. 3a and 3b, the valve 10 according to the present invention comprises:

- a first chamber 11 formed between the main body 20 and the sleeve 40, in particular between the intermediate portion 20I of the main body 20 and the intermediate part 43 of the sleeve 40,
- a second chamber 12 formed between the second portion 22 of the main body 20 and the inner surface 31 of the lower body 30,

said first chamber 11 and second chamber 12 communicating through a passage P present between the main body 20 and the lower body 30.

[0057] In particular, the intermediate portion 20I of the main body 20 has slightly smaller dimensions than the inner surface 31 of the lower body 30, said dimensions being such as to allow obtaining said passage P; as a consequence, the dimensions of the passage P are such that said first chamber 11 and said second chamber 12 are put in communication with each other, without however the beverage being allowed to flow from the second chamber 12 to the first chamber 11.

[0058] The special provision of the sleeve 40 thus allows a depression to be created in the first chamber 11, in the passage P and in the second chamber 12 that contains the beverage to be dispensed, said depression being adapted to prevent dripping downstream of the sealing member 23, in particular when the user wants to stop dispensing the beverage and causes the lower body 30 to move from the second operating condition (shown in Fig. 3b, i.e. a condition in which at least one gap L is formed between the inner surface 31 of the lower body 30 and said sealing member 23, and in which the intermediate part 43 of the sleeve 40 is in the contracted state) to the first operating condition (shown in Fig. 3a, i.e. a condition in which the inner surface 31 of the lower body 30 cooperates with the sealing member 23 to prevent the beverage from coming out of the valve 10, and in which

the intermediate part 43 of the sleeve 40 is in the stretched state).

[0059] In particular, said elastic material that the intermediate part 43 of the sleeve 40 is made of is a silicone-based material; furthermore, said first end 41 and second end 42 are made of substantially the same material used for the intermediate part 43 of the sleeve 40.

[0060] Preferably, said intermediate part 43 is shaped substantially like a bellows (as shown in Figures 2, 3a and 3b, 5a and 5b) , wherein the folds of said bellows are more extended or elongated when the lower body 30 is in said first operating condition than when it is in the second operating condition.

[0061] In an alternative embodiment (not shown in the drawings), said intermediate part 43 may have the shape of a substantially ellipsoidal or spherical balloon, in said second operating condition said balloon being more flattened and having a smaller inner volume than in said first operating condition.

[0062] It is clear that the special provisions of the present invention allow to provide a beverage dispensing valve 10, in particular for a household refrigeration appliance 1, which is so realized as to prevent, or at least to limit, a possible dripping of beverage, in particular when the user has already removed the container C suitable for receiving the dispensed beverage.

[0063] Therefore, the valve 10 allows to avoid wasting beverage and soiling the refrigeration appliance 1 and/or the surrounding area.

[0064] As a result, the valve 10 according to the teachings of the present invention turns out to be particularly efficient and economical.

[0065] Preferably, the inner surface 31 of the lower body 30 comprises a narrowing 32, which is adapted to cooperate, in particular in said first operating condition, with the sealing member 23 to prevent the beverage from coming out of the valve 10.

[0066] As can be seen in Fig. 4a, which is a perspective view of the main body 20, the second portion 22 of said main body 20 substantially has the shape of a rod and comprises at least one slit 22F extending longitudinally along said second portion 22, in particular said at least one slit 22F being formed in such a manner as to be associated with said at least one opening 20A of the intermediate portion 20I and to terminate at the sealing member 23.

[0067] Consequently, said at least one slit 22F allows the beverage coming out of said at least one opening 20A of the intermediate portion 20I to be collected and brought towards the sealing member 23.

[0068] In a preferred embodiment, the second portion 22 of the main body 20 comprises a plurality of slits 22F and said at least one opening 20A comprises a plurality of openings 20A, in particular the number of slits 22F corresponding to the number of openings 20A; preferably, the number of slits 22F and openings 20A is four.

[0069] The particular shape of the second portion 22 of the main body 20 allows to provide a valve 10 which is so realized as to ensure a homogeneous exit of the beverage and a proper dispensation thereof.

[0070] In fact, the presence of the slits 22F provides beverage flows that rejoin downstream of the sealing member 23 and of the terminal part 22A of the second portion 22; it is therefore apparent that such rejoining of the beverage flows running through the slits 22F ensures that the beverage will flow out and be dispensed homogeneously.

[0071] Preferably, the second portion 22 of the main body 20 comprises a groove 22S adapted to receive the sealing member 23, in particular said groove 22S extending substantially perpendicular to said at least one slit 22F; the provision of the groove 22S allows for a proper and safe positioning of the sealing member 23.

[0072] In a preferred embodiment, when the lower body 30 is in said first operating condition (shown in Fig. 3a), the sealing member 23 is associated with the second portion 22 of the main body 20:

- at a first distance d1 from an outlet section 33 of the lower body 30, said first distance d1 being comprised between 10 mm and 30 mm;
- at a second distance d2 from said at least one opening 20A of the intermediate portion 20I, said second distance d2 being comprised between 20 mm and 40 mm.

[0073] Furthermore, in said preferred embodiment the inner surface 31 of the lower body 30 has a diameter d comprised between 16 mm and 20 mm, in particular of about 18 mm, in the section comprised between the terminal part 22A of the second portion 22 and said outlet section 33. In particular, said diameter d is substantially constant over the section of inner surface 31 downstream of the terminal part 22A of the second portion 22.

[0074] It should be noted that said diameter d, first distance d1 and second distance d2 are indicated in Fig. 3a by means of dashed lines.

[0075] Such particular dimensions of the components of the valve 10 according to the present invention cooperate to prevent, or anyway to minimize, a possible dripping of beverage, in particular when the user has already removed the container C suitable for receiving the dispensed beverage, so as to avoid wasting beverage and soiling the refrigeration appliance 1 and/or the surrounding area.

[0076] In fact, the optimal provision of the first distance d1 allows to reduce the beverage volume downstream of the sealing member 23, thus reducing the time interval between when the valve 10 closes and when dripping stops.

[0077] In addition, the particular dimensions of the components of the valve 10 (i.e. the first distance d1, the second distance d2 and the diameter d) allow to provide a valve 10 which is so realized as to ensure a homogeneous exit of the beverage and a proper dispensation thereof, in that they allow to prevent the flow of beverage

that must be dispensed from becoming turbulent in the section of the valve 10 downstream of the terminal part 22A of the second portion 22 and of the sealing member 23.

[0078] Referring back to Figures 2 to 3b, there is shown that the valve 10 comprises at least one elastic member 60 associated with the lower body 30 and/or with the main body 20, said elastic member 60 exerting a thrust upon the lower body 30, such as to allow the latter to move from the second operating condition (Fig. 3b) to the first operating condition (Fig. 3a) and/or such as to hold it in said first operating condition, thus preventing the beverage, by closing said at least one gap L, from coming out of the valve 10.

[0079] In a preferred embodiment, said elastic member 60 is associated with the lower body 30 through a connection element 61, in particular said connection element 61 comprising a housing 62 adapted to receive the elastic member 60.

[0080] In addition, the connection element 61 is preferably secured to the outer surface of the lower body 30 through second fastener means 63 known in the art; for example, as shown in Figures 3a and 3b, said second fastener means 63 comprise threads on the lower body 30 and on the connection element 61, which cooperate together to fasten the connection element 61 to the lower body 30; it is however clear that the connection element 61 may be formed as one piece with the lower body 30.

[0081] The elastic member 60 is positioned in such a way as to abut against a wall 20P of the main body 20.

[0082] The valve 10 according to the present invention further comprises an external body 70 adapted to be associated with the main body 20 and to house the elastic member 60 and, at least partially, said connection element 61, in particular said external body 70 comprising retaining means (not shown in the drawings) adapted to limit the movement of the assembly constituted by the elastic member 60, the connection element 61 and the lower body 30.

[0083] In the annexed drawings (particularly in Figs. 3a and 3b), said external body 70 is secured to the main body 20 through third fastener means 71, in particular a thread that allows fastening said components; it is however clear that said fastening may also be obtained through other fastener means known in the art. The valve 10 according to the present invention preferably also comprises a covering element 80 adapted to be fitted onto said external body 70, said covering element 80 comprising at least one centering element 81 made of elastic material and extending substantially radially with respect to the body of the covering element.

[0084] Preferably, said at least one centering element 81 is shaped substantially like a ring or a fin that extends radially from the covering element 80; as can be seen in Figs. 2 to 3b, said at least one centering element 81 comprises a plurality of centering elements 81 allowing the valve 10 to be optimally positioned into an opening (not shown in the drawings) of the refrigeration appliance 1.

[0085] The following will describe a method of assembly of a beverage dispensing valve 10, in particular for a household refrigeration appliance 1, said valve 10 having a main body 20 comprising:

- a first portion 21 for the entrance of the beverage into said valve 10;
- an intermediate portion 20I for said beverage to flow through the valve 10, comprising at least one opening 20A that allows the beverage to flow out of said intermediate portion 20I;
- a second portion 22 extending substantially parallel to an axis A of the valve 10.

[0086] In accordance with the present invention, said method of assembly comprises the step a) of associating a spacer member 50 with the first portion 21 of the main body 20.

[0087] In particular, said step a) is carried out through a step a1) of obtaining a stable coupling of said spacer member 50 within said first portion 21 of the main body 20 through fastener means 51.

[0088] Preferably, said step a1) is carried out by coupling fastener means 51 comprising a thread to a mating thread formed within said first portion 21.

[0089] In addition, said step a1) of obtaining a stable coupling of the spacer member 50 within said first portion 21 may be carried out by acting upon operating means 52 of the spacer member 50, in particular said operating means comprising at least one straight portion 52 of said spacer member 50.

[0090] In a preferred embodiment, said method comprises the following steps:

b) inserting said second portion 22 and said at least one opening 20A of the intermediate portion 20I into a lower body 30;

c) associating a sealing member 23 with said second portion 22, in particular said sealing member 23 being positioned in the proximity of a terminal part 22A of said second portion 22,

so that said lower body 30 can slide axially along said intermediate portion 20I and second portion 22 to move from a first operating condition (shown in Fig. 3a), in which an inner surface 31 of the lower body 30 cooperates with said sealing member 23 to prevent the beverage from coming out of said valve 10, to a second operating condition (shown in Fig. 3b), in which at least one gap L is formed between said inner surface 31 and said sealing member 23 to allow the flow of the beverage, and vice versa.

[0091] In accordance with the present invention, the method of assembly of the valve 10 according to the present invention comprises the following step:

d) positioning a coupling element 90 between an actuator element 7 and said valve 10, in particular said

coupling element 90 being made of a soft and/or elastic material and being so arranged as to at least partially encircle the lower body 30 of the valve 10 and be in contact with a connection element 61 of the valve 10.

[0092] In particular, said connection element 61 is adapted to associate an elastic member 60 with the lower body 30 of the valve 10.

[0093] Furthermore, the method of assembly of the valve 10 according to the present invention comprises the following step of:

e) coupling a first end 41 of a sleeve 40 to said main body 20 and a second end 42 to said lower body 30, said sleeve 40 comprising an intermediate part 43 made of an elastic material, which is adapted to move from a substantially stretched state, occurring when the lower body 30 is in said first operating condition, to a contracted state, occurring when the lower body 30 is in said second operating condition, and vice versa, the intermediate part 43 of the sleeve 40 allowing a depression to be formed in said stretched state to prevent dripping downstream of the sealing member 23.

[0094] Preferably, said step e) is followed by a step e1) of moving the lower body 30 to a condition in which the inner surface 31 of the lower body 30 abuts on said sealing member 23; this allows to properly find the first operating condition of the lower body 30 and the substantially stretched state of said intermediate part 43 so as to optimally close the valve 10, in that the thrust of the elastic member 60 alone might be insufficient to ensure the proper stretching of the intermediate part 43 of the sleeve 40, thus causing beverage to leak from the valve 10.

[0095] The method of assembly of the valve 10 according to the present invention may further comprise one or more of the following steps:

f) associating an external body 70 with the main body 20, in particular said external body 70 being secured to the main body 20;

g) fitting a covering element 80 onto said external body 60, said covering element 80 comprising at least one centering element 81 made of elastic material and extending substantially radially with respect to the body of the covering element;

h) inserting at least one elastic member 60 between said main body 20 and external body 70;

i) securing to the lower body 30 a connection element 61 that allows associating the elastic member 60 with said lower body 30, in particular said connection element 61 comprising a housing 62 adapted to receive the elastic member 60.

[0096] In particular, said step a) according to the method of assembly of the present invention may be carried out prior to a step 1) of coupling the valve 10 to a dispensing device 5, in particular of a household refrigeration appliance 1, for dispensing a beverage, in that said step a) allows to impart a universal character to the valve 10 and to make it suitable for being associated with doors 3P, 4P of different thicknesses; as an alternative, said step a) may preferably be carried out prior to step b) of inserting said second portion 22 and said at least one opening 20A of the intermediate portion 20I into a lower body 30.

[0097] It is however clear that said step a) may be carried out at any moment while assembling the valve 10 according to the present invention.

[0098] The features and advantages of a beverage dispensing valve and of the associated refrigeration appliance according to the present invention are apparent from the above description.

[0099] In fact, the provision of the spacer member 50 according to the present invention allows to provide a valve 10 which is so realized as to have particular versatility, in that said spacer member 50 allows the valve 10 to be associated also with elements of different sizes and/or with doors 3P, 4P of different thicknesses than the predetermined ones; in fact, in order to associate the valve 10 with doors 3P, 4P of different thicknesses, it will be sufficient to use a spacer member 50 having a size suitable for a specific door 3P, 4P, without necessarily having to use a specific valve 10 for that specific door 3P, 4P.

[0100] In addition, the special provision of the coupling element 90 allows the valve 10 to be optimally associated with the actuator element 7, in particular without leaving any space between the latter and the valve 10.

[0101] As a result, said coupling element 90 allows to constitute a support surface for the actuator element 7, so as to take up any tolerances and prevent said actuator element 7 from being loose or vibrating (which would be the case if the coupling element 90 were absent); it is apparent that such a provision ensures an optimal operation of the entire beverage dispensing device 10.

[0102] In addition, the coupling element 90 allows to avoid any undesired activation of the valve 10, in that the soft and/or elastic material it is made of makes it necessary to exert an adequate thrust upon the actuator element 7 in order to activate said valve 10.

[0103] The special provision of the sleeve 40 according to the present invention allows to provide a beverage dispensing valve 10, in particular for a household refrigeration appliance 1, which is so realized as to prevent, or at least to minimize, a possible dripping of beverage, in particular when the user has already removed the container C suitable for receiving the dispensed beverage. The valve 10 thus allows to avoid wasting beverage and soiling the refrigeration appliance 1 and/or the surrounding area; as a result, the valve 10 according to the teachings of the present invention turns out to be particularly efficient and economical.

[0104] Another advantage of the present invention is that the particular shape of the second portion 22 of the main body 20 allows to provide a valve 10 which is so realized as to ensure a homogeneous exit of the beverage and a proper dispensation thereof. In fact, the presence of said at least one slit 22F provides beverage flows that rejoin downstream of the sealing member 23 and of the terminal part 22A of the second portion 22; it is therefore apparent that such rejoining of the beverage flows running through the slits 22F ensures that the beverage will flow out and be dispensed homogeneously.

[0105] A further advantage of the present invention is that the optimal provision of the first distance d1 allows to reduce the volume of beverage downstream of the sealing member 23, thereby speeding up the closing of the valve 10 and reducing the time interval between when the valve 10 closes and when dripping stops.

[0106] In addition, the particular dimensions of the components of the valve 10 (i.e. the first distance d1, the second distance d2 and the diameter d) allow to provide a valve 10 which is so realized as to ensure a homogeneous exit of the beverage and a proper dispensation thereof, in that they allow to prevent the flow of beverage that must be dispensed from becoming turbulent in the section of the valve 10 downstream of the terminal part 22A of the second portion 22 and of the sealing member 23.

[0107] It is however clear that many changes may be made to the beverage dispensing valve and to the associated refrigeration appliance according to the present invention, and that in its practical implementation the various components may have different shapes and arrangements or be replaced with other technically equivalent elements without departing from the novelty spirit of the inventive idea.

[0108] It can therefore be easily understood that the present invention is not limited to the above-described beverage dispensing valve and the associated refrigeration appliance, but may be subject to many modifications, improvements or replacements of equivalent parts and elements without departing from the inventive idea, as clearly specified in the following claims.

Claims

1. A beverage dispensing valve (10), in particular for a household refrigeration appliance (1), said valve (10) having a main body (20) comprising:

   - a first portion (21) for the entrance of the beverage into said valve (10);
   - an intermediate portion (20I) for said beverage to flow through the valve (10), said intermediate portion (20I) comprising at least one opening (20A) that allows the beverage to flow out of said intermediate portion (20I);
   - a second portion (22) extending substantially parallel to an axis (A) of the valve (10), a sealing member (23) being associated with said second portion (22) in the proximity of a terminal part (22A) thereof,

   said valve (10) being **characterized in that** it comprises a spacer member (50), which is adapted to be associated with the first portion (21) of the main body (20) to impart a universal character to the valve (10) and allow it to be associated with elements of different sizes and/or doors (3P, 4P) of different thicknesses.

2. A valve (10) as claimed in claim 1, **characterized in that** said spacer member (50) has substantially the shape of a ring having a hole (50F) for the passage of the beverage to be dispensed.

3. A valve (10) as claimed in one or more of the preceding claims, **characterized in that** said spacer member (50) comprises fastener means (51) for firmly coupling it within said first portion (21) of the main body (20), in particular said fastener means (51) comprising a thread adapted to be coupled to a mating thread formed within said first portion 21.

4. A valve (10) as claimed in one or more of the preceding claims, **characterized in that** said spacer member (50) comprises operating means (52) allowing a stable coupling of said spacer member (50) within said first portion (21) of the main body (20), in particular said operating means comprising at least one straight portion (52) of said spacer member (50), in particular said straight portion (52) being formed in the proximity of the hole (50F) of said spacer member (50).

5. A valve (10) as claimed in one or more of the preceding claims, **characterized in that** it comprises a lower body (30) associated with the main body (20) in encircling relation to said second portion (22) and said at least one opening (20A) of the intermediate portion (20I), said lower body (30) being adapted to slide axially over said intermediate portion (20I) and second portion (22) to move:

   - from a first operating condition, in which an inner surface (31) of the lower body (30) cooperates with said sealing member (23) to prevent the beverage from coming out of said valve (10),
   - to a second operating condition, in which at least one gap (L) is formed between said inner surface (31) and said sealing member (23) to allow the flow of the beverage, and vice versa.

6. A valve (10) as claimed in claim 5, **characterized in that** it comprises a sleeve (40) having:

- a first end (41), which is adapted to be coupled to said main body (20);
- a second end (42), which is adapted to be coupled to said lower body (30);
- an intermediate part (43) made of an elastic material, which is adapted to move from a substantially stretched state, occurring when the lower body (30) is in said first operating condition, to a contracted state, occurring when the lower body (30) is in said second operating condition, and vice versa, the intermediate part (43) of the sleeve (40) allowing a depression to be formed in said stretched state to prevent dripping downstream of the sealing member (23).

7. A valve (10) as claimed in one or more of the preceding claims 5 and 6, **characterized in that** the inner surface (31) of the lower body (30) comprises a narrowing (32), which is adapted to cooperate, in particular in said first operating condition, with the sealing member (23) to prevent the beverage from coming out of the valve (10).

8. A valve (10) as claimed in one or more of the preceding claims, **characterized in that** it comprises at least one elastic member (60) associated with the lower body (30) and/or the main body (20), said elastic member (60) exerting a thrust upon the lower body (30) to allow it to move from the second operating condition to the first operating condition and/or to hold it in said first operating condition.

9. A beverage dispensing valve (10), in particular for a household refrigeration appliance (1), said valve (10) having a main body (20) comprising:

- a first portion (21) for the entrance of the beverage into said valve (10);
- an intermediate portion (20I) for said beverage to flow through the valve (10), said intermediate portion (20I) comprising at least one opening (20A) that allows the beverage to flow out of said intermediate portion (20I);
- a second portion (22) extending substantially parallel to an axis (A) of the valve (10), a sealing member (23) being associated with said second portion (22) in the proximity of a terminal part (22A) thereof,

said valve (10) having a lower body (30) associated with the main body (20) in encircling relation to said second portion (22) and said at least one opening (20A) of the intermediate portion (20I), said lower body (30) being adapted to slide axially over said intermediate portion (20I) and second portion (22) to move:

- from a first operating condition, in which an inner surface (31) of the lower body (30) cooperates with said sealing member (23) to prevent the beverage from coming out of said valve (10),
- to a second operating condition, in which at least one gap (L) is formed between said inner surface (31) and said sealing member (23) to allow the flow of the beverage, and vice versa,

said valve (10) being **characterized in that** it comprises a coupling element (90) located between an actuator element (7) and said valve (10).

10. A valve (10) as claimed in claim 9, **characterized in that** said coupling element (90) is made of a soft and/or elastic material, in particular said coupling element (90) being located in such a position as to at least partially encircle the lower body (30) of the valve (10).

11. A valve (10) as claimed in one or more of claims 9 and 10, **characterized in that** said coupling element (90) is placed in contact with a connection element (61) of the valve (10), in particular said connection element (61) being adapted to associate an elastic member (60) with the lower body (30) of the valve (10).

12. A valve (10) as claimed in claim 9, **characterized in that** it comprises a sleeve (40) having:

- a first end (41), which is adapted to be coupled to said main body (20);
- a second end (42), which is adapted to be coupled to said lower body (30);
- an intermediate part (43) made of an elastic material, which is adapted to move from a substantially stretched state, occurring when the lower body (30) is in said first operating condition, to a contracted state, occurring when the lower body (30) is in said second operating condition, and vice versa, the intermediate part (43) of the sleeve (40) allowing a depression to be formed in said stretched state to prevent dripping downstream of the sealing member (23).

13. A valve (10) as claimed in claim 9, **characterized in that** the inner surface (31) of the lower body (30) comprises a narrowing (32), which is adapted to cooperate, in particular in said first operating condition, with the sealing member (23) to prevent the beverage from coming out of the valve (10).

14. A valve (10) as claimed in one or more of the preceding claims 9 to 13, **characterized in that** it comprises a spacer member (50), which is adapted to be associated with the first portion (21) of the main body (20) to impart a universal character to the valve (10).

15. A valve (10) as claimed in one or more of the preceding claims 9 to 14, **characterized in that** it comprises at least one elastic member (60) associated with the lower body (30) and/or the main body (20), said elastic member (60) exerting a thrust upon the lower body (30) to allow it to move from the second operating condition to the first operating condition and/or to hold it in said first operating condition.

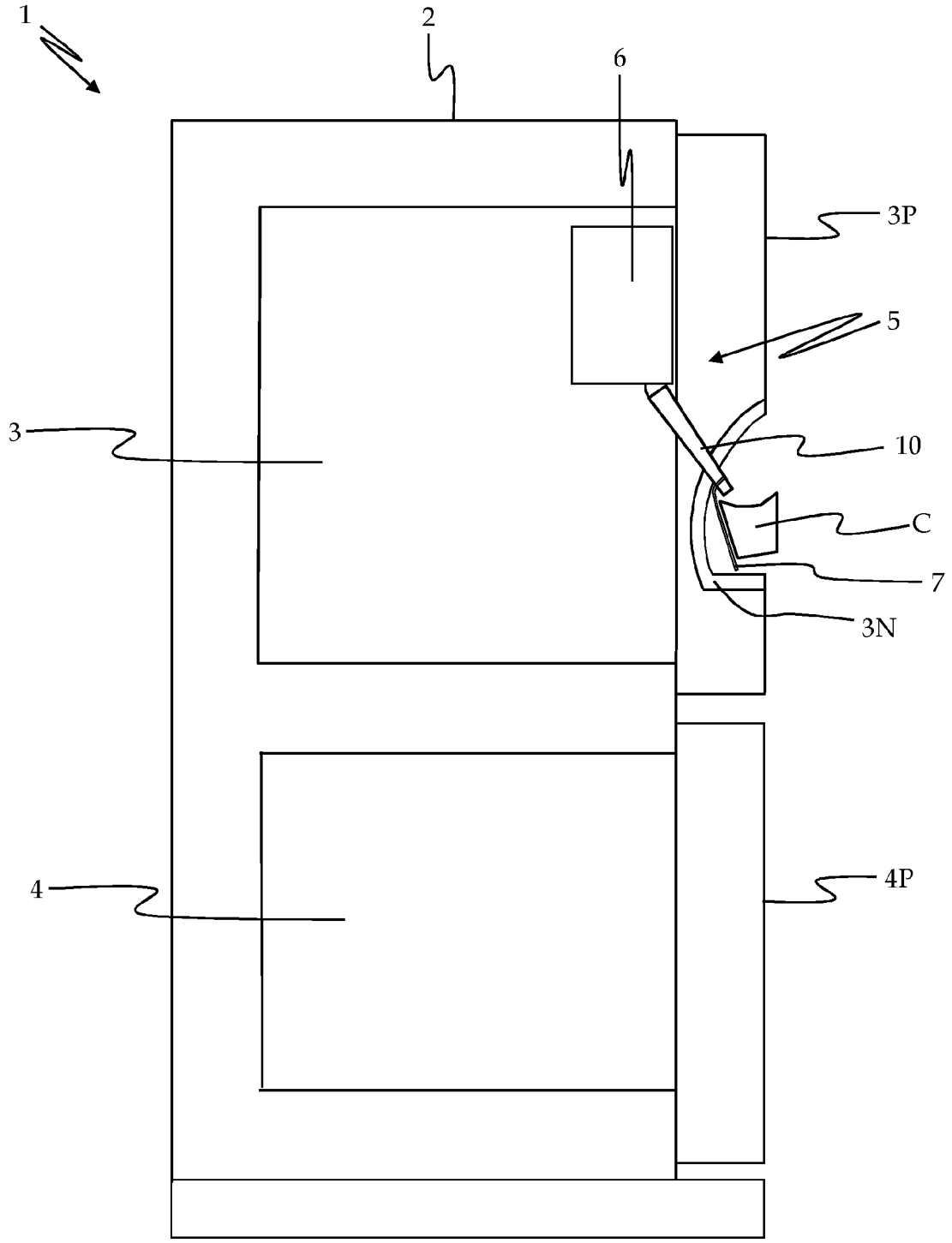
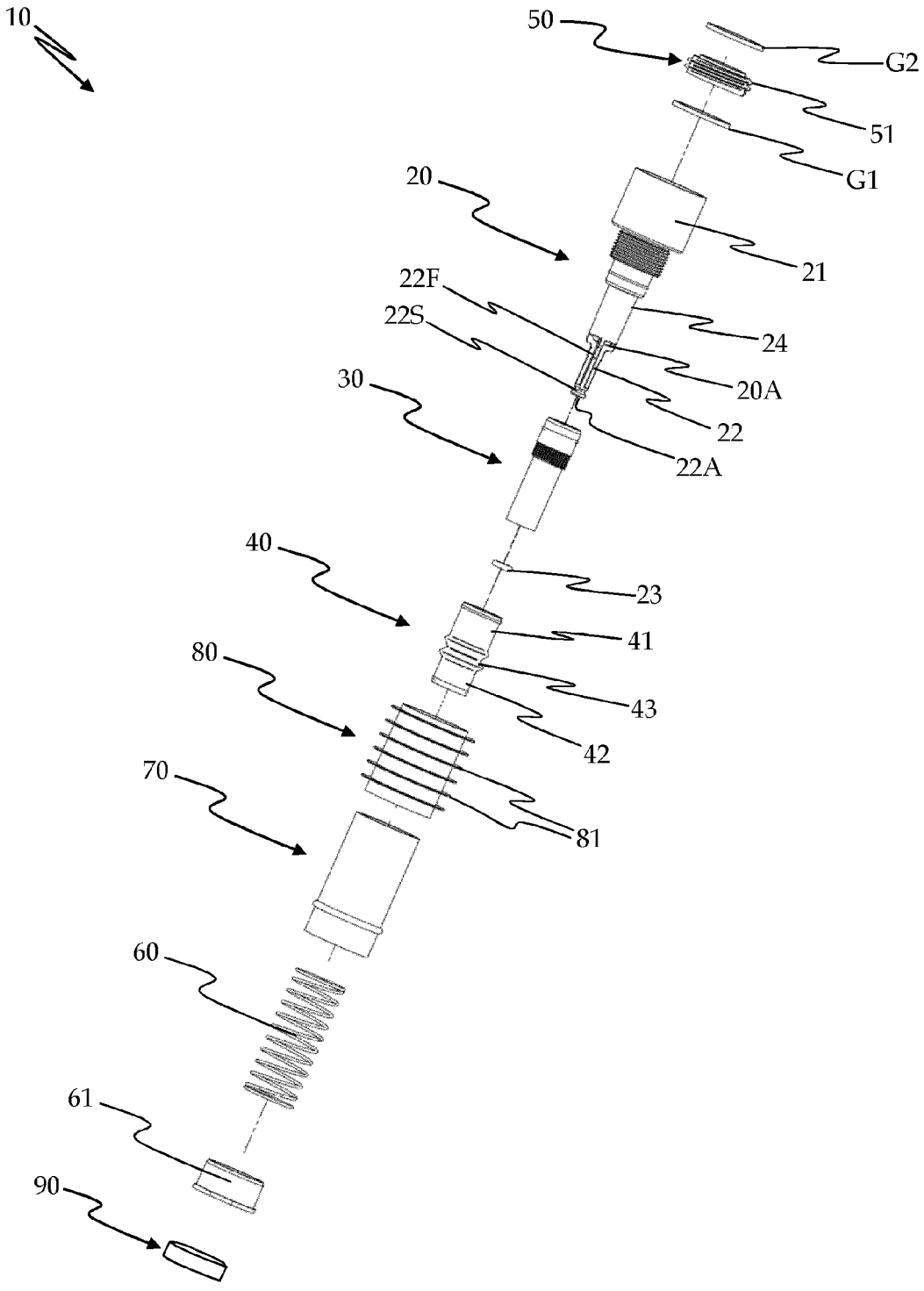


Fig. 1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G1
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22F
22S
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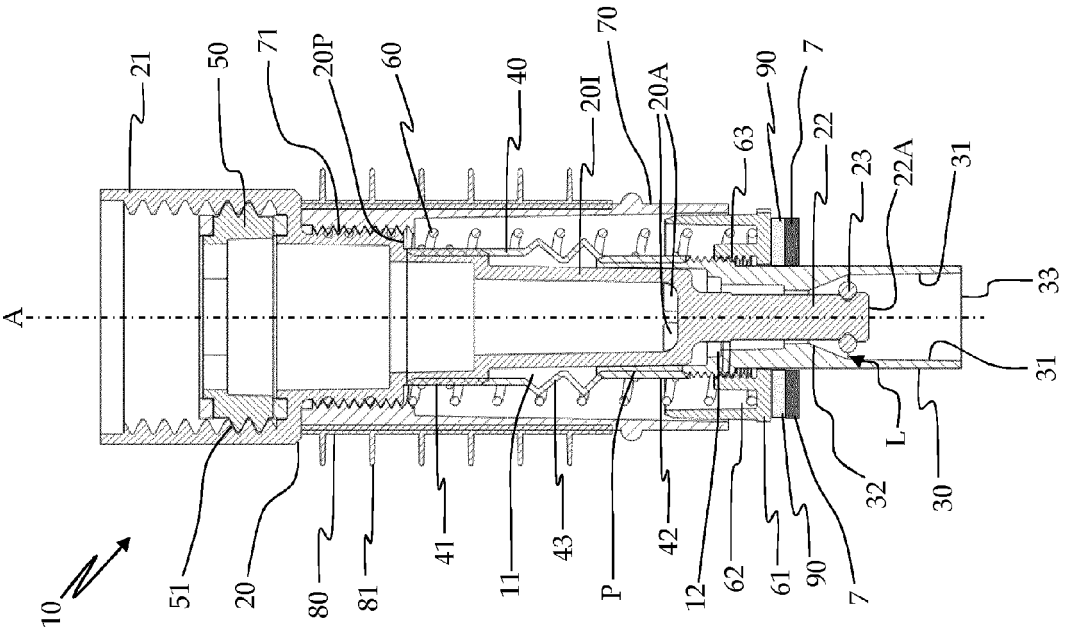
61
90

Fig. 2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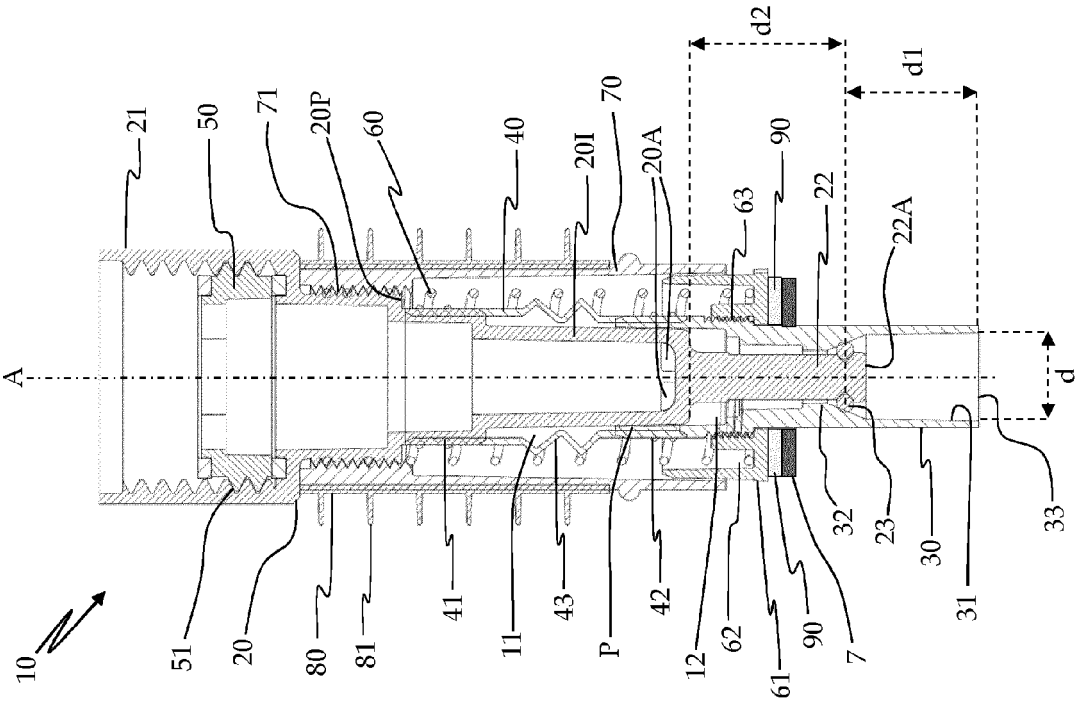
30
31

Fig. 3b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31
33

Fig. 3a

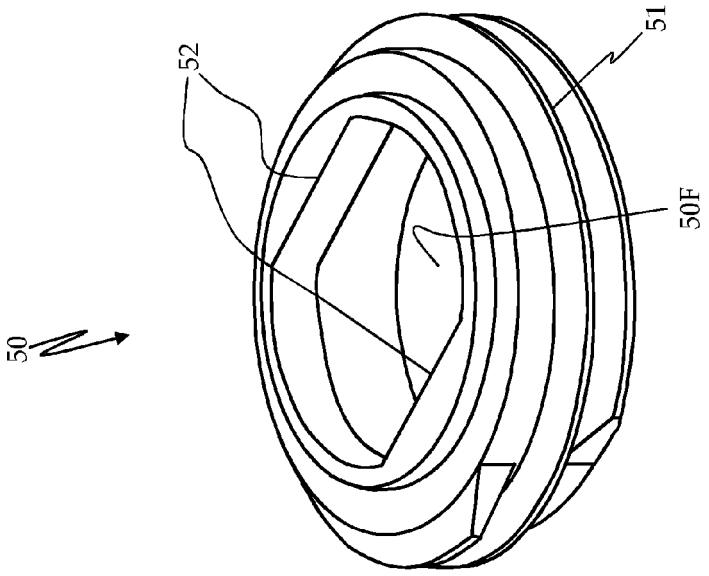

Fig. 4b

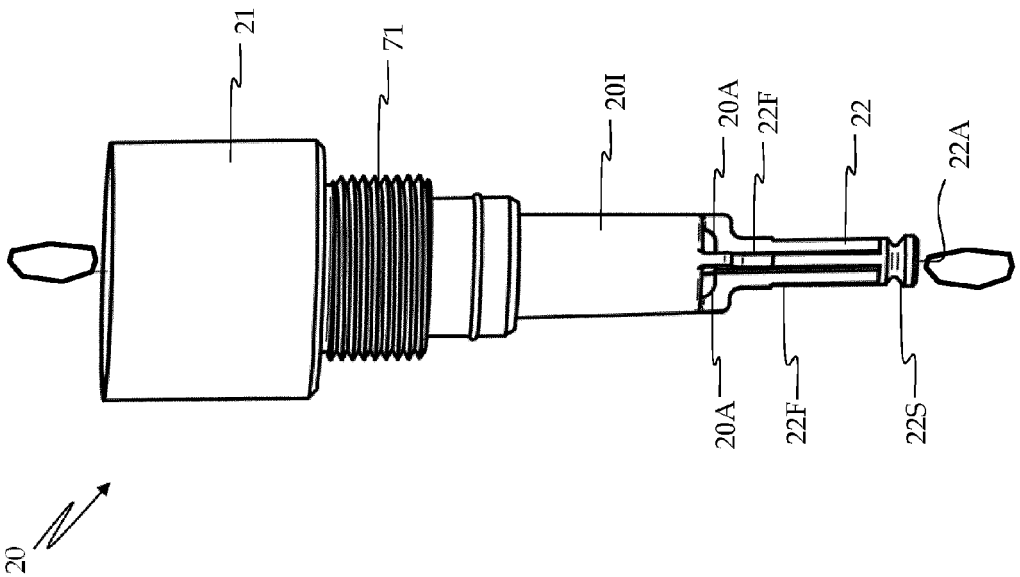

Fig. 4a

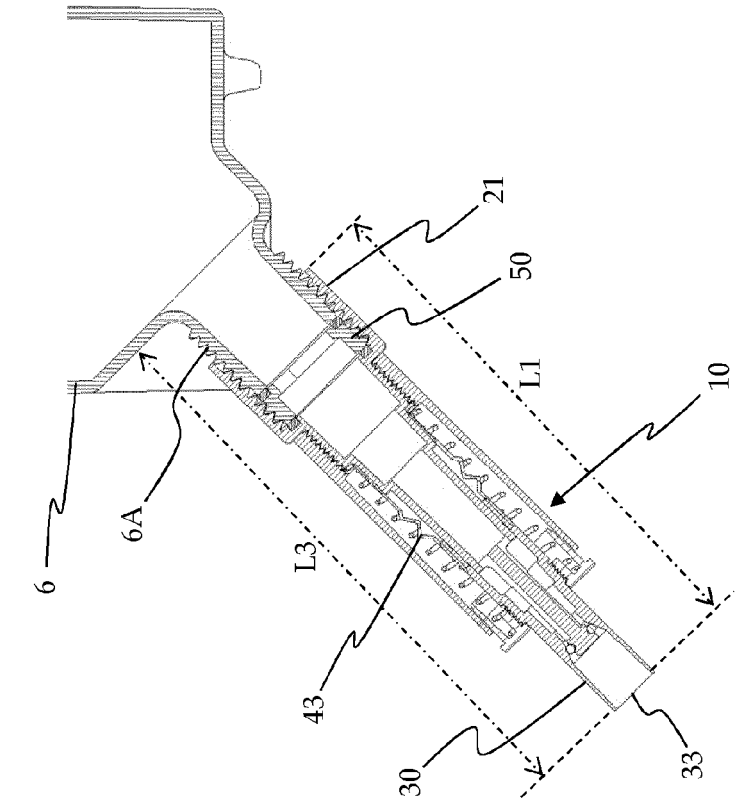

Fig. 5b

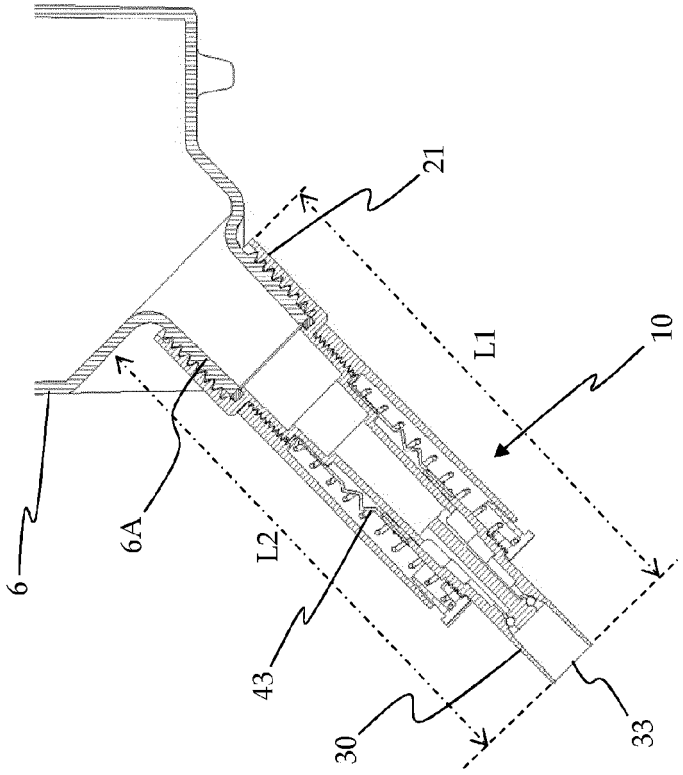

Fig. 5a