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(54) **Valve for dispensing a carbonated beverage**

(57) A valve for dispensing a carbonated beverage, particularly beer, comprises a housing (1) with an inlet passage (2) for liquid, a valve chamber (4) with a valve body (3) interacting with a valve seat (7) and laterally directed discharge outlets (10). The valve body (3) is slidably seated in a hole (9) at the bottom of the housing (9). A valve stem (6) can be actuated by a bottom of a glass such that the valve body (3) allows passage of beverage through the chamber (4), leaving through the outlets (10).

The device according to the invention is peculiar by having throttle means (20) that can be manually adjusted so as to partially cover the discharge outlets (10). Hereby the degree of foaming of the beverage can be controlled according to wish and according to the nature of the beverage.

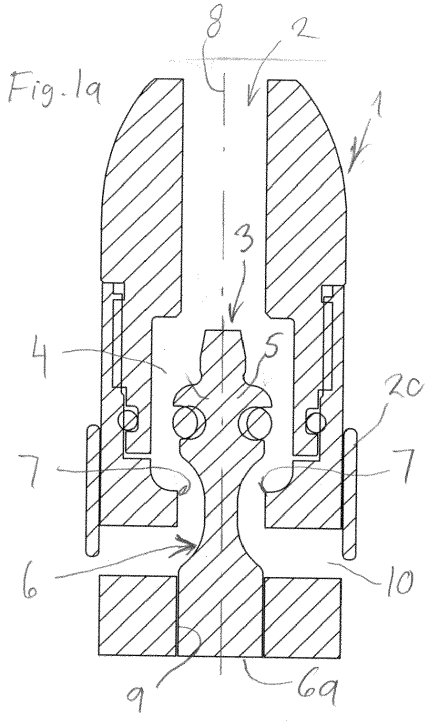

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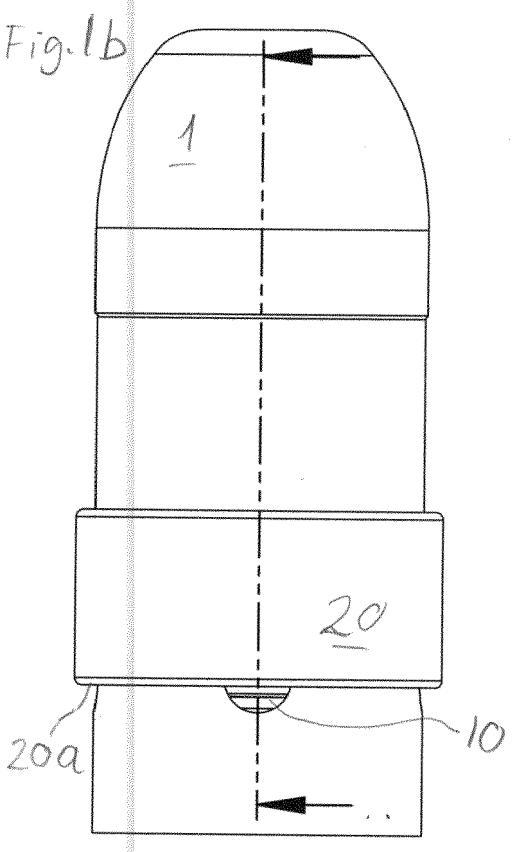
Fig. 1b



Description

Field of the Invention

[0001] The present invention relates to a device and a method for dispensing a carbonated beverage, for example beer.

Background of the Invention

[0002] In the art a number of devices have been designed in order to dispense a liquid under pressure, such as for example soft drinks or beer. One such example is disclosed in EP 0077910 in which an issuing nozzle is disclosed. The nozzle comprises an outer tubular member and an inner tubular member arranged coaxially one inside the other. The inner coaxial member is provided with a resilient sealing element at a distal end and the outer tubular member has been provided with a nozzle shaped open-end. By displacing the inner tubular member relative to the outer tubular member along the common access the resilient member will be brought into or out of contact with the outlet opening in the outer tubular member whereby liquid flow will be opened or closed depending on the position of the inner tube relative to the outer tube. The inner tube is activated for example by electromagnetic means pulling the inner tube up relative to the outer tube. The nozzle may therefore be activated anywhere by activating the electromagnetic means.

[0003] In WO 01/52621 is disclosed an apparatus for dispensing a carbonated beverage, such as for example a soft drink or beer, where the apparatus comprises a dispensing nozzle which nozzle at a distal end is provided with electric or electronic switch means which when encountering the bottom of a container activates a controller in the apparatus. The controller carries out a number of processes before the liquid is dispenses such as for example reducing the pressure in the liquid to be dispensed which is forwarded beforehand to an intermediate reservoir. The apparatus furthermore includes an elevator for the container such that the container for example in the shape of a cup may be placed on the elevator and the apparatus activated in order to dispense liquid. After activation the cup is elevated until the bottom of the cup comes into contact with the electronic switch means arranged in the distal end of the nozzle. The liquid in the intermediate reservoir is pressure reduced to a suitable pressure close to atmospheric pressure after which the liquid is dispensed into the cup. After the dispensing has terminated, the elevator lowers the now filled cup and makes it available for the user.

[0004] WO 2011/069513 discloses a device for dispensing a liquid under pressure, in particular a carbonated beverage, where said device comprises connection means for connecting said device to the source of liquid, and where the device in the opposite end of the connection means has an valve which valve may be brought into a closed position where no liquid is dispensed, and an open position where liquid is dispensed. The valve incorporates a separate valve body cooperating with a valve seat, the valve body having a head portion and a stem portion. The stem portion in the closed position extends out of the valve, and a surface of said head portion in the closed position is in contact with said valve seat and in said open position is out of contact with said valve seat. The head portion is moved from the closed to the open position when the stem portion is actuated by external means, e.g. by a bottom of a glass, thereby mechanically urging the stem and thereby the head portion out of contact with the valve seat, and such that when the stem is released from being actuated by the external means, the head portion will return into contact with the valve seat under the action of the pressure from the beverage. By this prior art device it is possible to control foaming of the beverage when filling a glass as the liquid exits the valve. When the valve opens, the liquid will flow out at the bottom of the glass under the liquid level formed in the glass. The jet of liquid will not be exposed to free air and the turbulence is minimised so that the foaming will not be excessive. The degree of foaming is constant from time to time and is defined by the configuration of the valve and the shape of the outlet.

Object of the Invention

[0005] It is an object of the invention to provide a device for dispensing a carbonated beverage in a controlled way where the foaming can be varied from time to time.

[0006] It is a further object of the invention to provide a device for dispensing a carbonated beverage wherein the degree of foaming can be varied in a simple way.

[0007] It is a further object of the invention to provide a dispensing device with variable foaming action incorporating a simple design and reliable operation.

[0008] It is a still further object of the invention to provide a method for dispensing a carbonated beverage into a glass or similar drinking means so as to control the foam formation according to wish or according to the nature of the beverage.

Description of the Invention

[0009] By the invention there is provided a device for dispensing the device comprising connection means for connecting said device to a source of carbonated beverage, and

where the device at the opposite end of the connection means has a valve that may be brought into a closed position where no beverage is dispensed, and an open position where beverage is dispensed,

[0010] the valve comprising a valve housing provided internally with an annular valve seat and an axially symmetric valve body which is displaceable along its axis of symmetry so that the valve body can interact with the valve seat, where the valve body includes a head portion and a stem portion,

where the stem portion extends from the head portion at the side of the head portion facing the valve seat, the stem portion further extending through an opening, the opening being concentric about the axis of symmetry of the valve body, and

where a contact surface of the head portion is in contact with the valve seat in the closed position and is out of contact with said valve seat in the open position, respectively, the head portion being urged into contact with the valve seat under the action of the beverage supplied through the connection means in the closed position,

where the head portion can be moved from the closed to the open position when the free end of the stem portion is actuated in a direction along the axis of symmetry by external means, e.g. by a bottom of a glass, thereby mechanically urging the stem and thereby the head portion out of contact with the valve seat, and wherein the valve is provided with at least one discharge outlet for the beverage.

[0011] The dispensing device according to the invention is peculiar in that throttle means is/are arranged at the discharge outlet(s) for constricting a cross-sectional area of the discharge outlet(s) through which the beverage is to pass when the head portion is in the open position, the throttle means arranged such the cross-sectional area of the discharge outlets can be adjusted by moving the throttle means manually.

[0012] The method according to the invention comprises dispensing a carbonated beverage into a glass, using a dispensing device including a valve provided with a valve body and a stem projecting out of the valve, comprising actuating the valve body by an inner surface of the glass so that the beverage can flow out through at least one discharge outlet of the dispensing device. The inventive method is peculiar by including manually setting a throttle means provided at the discharge outlet of the dispensing device so as to control foam formation in the carbonated beverage when the beverage exits the discharge outlet.

[0013] According to the invention it is possible to set the throttle means and thereby control the degree of foaming when dispensing a beverage into a glass, a mug or similar cup. The cup is applied to the dispensing device such that the valve is opened, typically by pushing the projecting part the valve body with the bottom of the cup, causing the beverage to flow out into the bottom of the cup. The cup is then filled from the bottom up while the discharge outlet(s) of the dispensing device is/are covered by the rising liquid. Throttling is applied by limiting the cross-sectional area of the discharge outlet of the dispensing device, i.e. limiting the cross-sectional area at the discharge outlet by adjusting the throttling means before the dispensing operation. If no or a slight throttling is applied, the beverage will flow out into the cup with modest turbulence and no or small pressure drop, why the gas in the liquid beverage will cause less foaming; conversely, strong throttling will enhance turbulence in the outflowing beverage, releasing the contained gas and thus increase the foam in the cup.

[0014] The manual throttling enables individual adjustment for each dispensing operation such that the foaming can be adapted to the wish of the consumer to the size or shape of cup or glass, or to the nature of the beverage where particularly different beers vary much with regard to their foaming properties and the inherent properties of the foam.

[0015] The throttling means also enables the dispensing personnel to provide beverages with a substantially constant level of foam - this regardless of the person operating the dispensing unit. In order to create a substantially constant foam level it is necessary to provide the liquid to the dispensing unit under substantially constant pressure and temperature. Once the throttle is set (and temperature and pressure is substantially constant) all dispensed beverages will be provided with the same or substantially same foam layer.

[0016] In a simple embodiment of the dispensing device, at least two discharge outlets formed in the valve are arranged so as to direct the flow of liquid laterally in relation to an axis of symmetry of the valve body.

[0017] A particularly simple embodiment of the throttling means of the dispensing device can be provided when the throttle means is provided substantially as a ring member which is slidably seated on a cylindrical outer side of the valve. Such a ring member is easily operated by the person dispensing beverage and individual adjustment of the throttling action and thereby the foaming effect is readily enabled.

[0018] In one embodiment, the ring member can mounted so as to enable a linear displacement of the ring member in parallel with the axis of symmetry of the valve body between an active position in which the ring member at least partially covers the discharge outlets, and an inactive position in which the ring member is not covering any part of the discharge outlets.

[0019] In another embodiment, the ring member is configured and mounted so as to enable a rotational displacement of the ring member about the axis of symmetry of the valve body between an active position in which the ring member at least partially covers the discharge outlets, and an inactive position in which the ring member is not covering any part of the discharge outlets.

[0020] In a further embodiment of the throttle means of the inventive dispensing device, a partial covering of the discharge outlets by the ring member can be provided by apertures with a cross-sectional area less than the cross-sectional area of the discharge outlets. The apertures, acting as diaphragms, can optionally be placed opposite the discharge outlets, and the degree of throttling will be determined by the cross-sectional area of the apertures. The dispensing device according to the invention can thereby be provided with pre-set degrees of throttling, and the user can simply select the throttling desired for the particular beverage or dispensing condition. This embodiment of the throttle means can be varied in several ways, such as having apertures with different cross-

sectional areas distributed on a ring-shaped throttle member so that different apertures are engaged for different foaming effect.

[0021] In a further embodiment of the dispensing device according to the invention, the throttle means includes one or more throttle members which are provided seated within the valve adjacent to one or more discharge outlets and such that the throttle member or members can be manually displaced in parallel with the axis of symmetry of the valve body and into the flow path of the liquid transversely thereto. Adjustment of the throttling is thereby performed by moving the said part or parts up and down along the axis of symmetry, whereby the flow path of the liquid is more or less constricted.

[0022] In a still further embodiment of the dispensing device according to the invention, the valve comprises a two-part housing, of which a lower housing part is provided with the discharge outlets and the valve seat and an upper housing part is provided with the connection means for connecting said device to the source of liquid, the upper housing part partially enclosing the lower housing part as a skirt, and wherein the upper and lower housing parts are mutually displaceable so that the upper housing part can operate as the throttle means, the upper housing part capable of being manually positioned in an active position where the throttle means at least partially covers the discharge outlets, and in an inactive position where the throttle means is not covering any part of the discharge outlets. Adjustment of the throttling is performed by moving the upper housing part relative to the lower housing part.

[0023] In an further embodiment of the dispensing device according to the invention, the valve comprises a housing with a central bore in which the valve seat and an opening through which the stem portion extends is formed, the stem portion of the valve body provided at its end opposite the head portion with a widened disc-shaped bottom end extending across the opening and across the free end face of the housing such that at least one discharge outlet is formed between the free end of the housing and the disc-shaped bottom end of the stem portion, and wherein the cross-sectional area of the discharge outlet or outlets can be adjusted by one or more adjustable members in the form of pins extending through the disc-shaped bottom end towards the free end of the housing. The position of the adjustable members will then determine the cross-sectional area of the discharge outlet or outlets, and throttling can be adjusted by moving the members relative to the disc-shaped bottom of the stem of the valve body.

[0024] For easy setting and remembering the position of the throttle means, the throttle means can be provided with a scale in the form of marks or notches indicating various degrees of throttling of the discharge outlet or outlets.

Description of the Drawing

[0025] Example embodiments of the invention will now be described in detail with reference to the drawings in which Fig. 1a-5d show five different embodiments of a dispensing device according to the invention.

Description of Example Embodiments

[0026] In the following description reference number will be repeated when designating identical parts of the various embodiments.

[0027] In a first embodiment of the dispensing device according to the invention, see Figs. 1a - 1d, of which 1a and 1c are sectional views of 1b and 1d, respectively, there is provided a valve housing 1 having an inlet passage 2 for conducting a pressurised liquid in the form of a carbonated beverage from a not shown source into a valve arranged inside the housing 1. A valve body 3 is arranged in a valve chamber 4 inside the housing 1. The valve body 3 comprises a head portion 5 and a stem portion 6. The valve chamber 4 includes a valve seat 7 on which an O-ring seal of the head portion 5 of the valve body can bear under the action of pressurised liquid coming through the passage 2. It appears that the stem portion 6 extends from the side of the head portion 5 facing the valve seat 7. The valve parts designated 2, 3, 4, 5, 6 and 7 are shaped and arranged concentrically about an axis of symmetry 8 extending longitudinally of the valve.

[0028] It appears from Figs. 1a and 1c that the stem portion 6 is slidably seated in a hole 9 at a bottom of the valve housing 1, the hole 9 configured to guide the valve body 3 in relation to the valve housing 1 and the chamber 4 in a reciprocating movement along the axis of symmetry 8.

[0029] The valve housing 1 is provided with discharge outlets 10 for dispensing the carbonated beverage at right angles to the axis of symmetry. Two outlets 10 are shown in the sectional views 1a and 1c, but three or more outlets are possible. Alternatively, the dispensing device according to the invention can be configured with one discharge outlet within the scope of the claims.

[0030] In Figs. 1a-1d the valve body 3 is seen when the free end 6a of the stem portion has been actuated into an open position of the valve where there is no contact between the valve seat 7 and the head portion 5, thus providing a free passage of beverage from the passage 2, through the valve chamber 4 and out through the outlets 10.

[0031] The above described features of the dispensing device are generally such as in common with the prior art, e.g. as disclosed in WO 2011/069513. By this dispensing device, dispensing is performed by pushing a glass or similar up around the device until the bottom of the glass comes in contact with the free end 6a of the stem portion, and then moving the glass further so that the valve body 3 reaches the position shown in Figs. 1a-1d. The glass is then filled from the bottom up.

[0032] In the first embodiment of the invention, there is provided a throttling means in the form of a manually slidable ring 20. The ring 20 is provided externally of the housing 1 and seated so that it can be slid up and down in parallel with the axis of symmetry 8. Figs. 1a and 1b show the ring 20 in a throttling position where a lower edge 20a of the ring 20 partially covers the discharge outlets 10, reducing the cross-sectional area of the outlets 10. The carbonated beverage flowing out of the outlets 10 is thereby throttled and experiences a pressure drop, thus releasing the gas in the carbonated beverage. The degree of foaming of the carbonated beverage can be adjusted by moving the ring 20 up and down so as to cover more or less of the outlets 10. When the least degree of foaming is desired, the ring 20 is slid to its uppermost position shown on Figs. 1c and 1d, thus exposing the full cross-sectional area of the outlets 10.

[0033] Turning to Figs. 2a-2e there is depicted a second embodiment of the dispensing device according to the invention. Fig. 2a is a section on the line C-C on Fig. 2b, and Figs. 2d and 2e are sections on the lines A-A and B-B on Figs. 2b and 2c, respectively.

[0034] By this embodiment, the throttle means is a rotary ring 30 with apertures 31. By manually rotating the ring 30, the apertures 31 can be positioned opposite the four discharge outlets 10, thereby causing the least possible foaming when the valve body 3 opens for flow through the valve, see Fig. 2a. When rotating the ring 30, the areas allowed for beverage flowing through the outlets 10 are reduced, thus causing increased pressure drop and enhanced foaming of the outflowing beverage.

[0035] In a not shown variant of the second embodiment on Figs. 2a-2e, the apertures could have a smaller diameter or a different shape than the discharge outlets 10. In particular there may be apertures with different diameters distributed along the circumference of the ring 30 so that predefined cross-sectional areas can be applied by positioning opposite the outlets 10 without needing to make a fine adjustment of the overlapping between apertures 31 and outlets 10 as shown on Figs. 2c and 2e.

[0036] Furthermore, the above embodiment could be adapted with notches or markings 32 on the ring 30 that indicate certain degrees of constriction of the flow area so that easy setting can be done before dispensing a certain beverage. This is particularly important in the case of changing between various types of beer.

[0037] Turning to Figs. 3a - 3d, there is depicted a third embodiment of the dispensing device according to the invention, where Figs. 3a and 3b are sectional views of Figs. 3c and 3d, respectively. Here, the throttling means are provided in the form of four throttle members 40 seated in holes 41 at the bottom of the valve housing 1, one at each outlet 10. Each member 40 can be independently displaced in parallel with the axis of symmetry 8 from an inactive position shown in Figs. 3a and 3c to an active position shown in Figs. 3b and 3d. In the active position, the throttle members 40 will partly constrict the flow through the discharge outlets 10, causing increased foaming when the beverage exits the outlets 10. The members 40 are retained by friction in the holes 41; it is possible to vary the foaming effect by sliding only one or two of the throttle members to cover the flow passages at respective discharge outlets 10 partly or entirely.

[0038] Some of the Figures mentioned above show the housing 1 as an assembly of two parts that are joined by a screw connection for assembly purposes, but the housing 1 is to be regarded functionally as a unit.

[0039] Turning to Figs. 4a - 4d, there is depicted a fourth embodiment of the dispensing device according to the invention, where Figs. 4a and 4b are sectional views of Figs. 4c and 4d, respectively. Here, the throttling means are provided by a two-part housing 51, 52, a top part 51 for connecting to a source of carbonated beverage and a bottom part 52 containing the valve seat and discharge outlets 50. The valve chamber 54 is formed as a cavity by the combination of the parts 51 and 52.

[0040] In the fourth embodiment of the invention, the top part 51 forms a skirt 51a that slidingly receives the bottom part 52. The lower circumferential rim 51b of the skirt 51 can thereby act as a throttle means. Figs. 4a and 4c show the inactive position where the discharge outlets 50 are completely exposed and the beverage can flow unhindered out. Figs. 4b and 4d show the active position of the throttle means where the skirt rim 51b partly covers the discharge outlets 50, causing increasing foaming effect. It is envisaged that the top part 51 is retained by friction between the inner side of the skirt 51a and outer side of the bottom part 52.

[0041] Alternatively, a screw thread (not shown) or a snap-action fit could be provided for the connection between the top and bottom parts 51 and 52.

[0042] Turning to Figs. 5a - 5d, there is depicted a fourth embodiment of the dispensing device according to the invention, where Figs. 5a and 5b are sectional views of Figs. 5c and 5d, respectively. This embodiment is peculiar in that the housing 61 is shortened and that the discharge outlet or outlets 60 is/are formed by a gap between an end face 61a of the housing 61 and a widened, disc-shaped end 67 of the stem portion 66 of the valve body 63. The disc-shaped end 67 extends across an opening of the central bore 62 in the housing 61 and across the end face 61a. The liquid beverage will then flow through the bore 62 and between the end face 61a and disc-shaped end 67 through outlets 60.

[0043] Here, the throttling means is provided by adjusting pins 68 seated frictionally in holes in the disc-shaped end 67. Moving the pins 68 up and down relative to the end 67 will reduce and increase, respectively, the foaming effect of the dispensing device according to the invention.

Claims

1. A device for dispensing a carbonated beverage, in particular beer, under pressure,

the device comprising connection means for connecting said device to a source of carbonated beverage, and
where the device at the opposite end of the connection means has a valve that may be brought into a closed position where no beverage is dispensed, and an open position where beverage is dispensed,
the valve comprising a valve housing provided internally with an annular valve seat and an axially symmetric valve body which is displaceable along its axis of symmetry so that the valve body can interact with the valve seat, where the valve body includes a head portion and a stem portion,
where the stem portion extends from the head portion at the side of the head portion facing the valve seat, the stem portion further extending through an opening, the opening being concentric about the axis of symmetry of the valve body, and
where a contact surface of the head portion is in contact with the valve seat in the closed position and is out of contact with said valve seat in the open position, respectively, the head portion being urged into contact with the valve seat under the action of the beverage supplied through the connection means in the closed position,
where the head portion can be moved from the closed to the open position when the free end of the stem portion is actuated in a direction along the axis of symmetry by external means, e.g. by a bottom of a glass, thereby mechanically urging the stem and thereby the head portion out of contact with the valve seat, and wherein the valve is provided with at least one discharge outlet for the beverage, **characterised in that** throttle means is/are arranged at the discharge outlet(s) for constricting a cross-sectional area of the discharge outlet(s) through which the beverage is to pass when the head portion is in the open position, the throttle means arranged such the cross-sectional area of the discharge outlets can be adjusted by moving the throttle means manually.

2. Device according to claim 1, wherein at least two discharge outlets formed in the valve are arranged so as to direct the flow of liquid laterally in relation to an axis of symmetry of the valve body.

3. Device according to claim 2, wherein the throttle means is provided substantially as a ring member which is slidably seated on a cylindrical outer side of the valve.

4. Device according to claim 3, wherein the ring member is mounted so as to enable a linear displacement of the ring member in parallel with the axis of symmetry of the valve body between an active position in which the ring member at least partially covers the discharge outlets, and an inactive position in which the ring member is not covering any part of the discharge outlets.

5. Device according to claim 3, wherein the ring member is configured and mounted so as to enable a rotational displacement of the ring member about the axis of symmetry of the valve body between an active position in which the ring member at least partially covers the discharge outlets, and an inactive position in which the ring member is not covering any part of the discharge outlets.

6. Device according to claim 4 or 5, wherein partial covering of the discharge outlets by the ring member is provided by apertures with a cross-sectional area less than the cross-sectional area of the discharge outlets.

7. Device according to claim 2, wherein the throttle means includes one or more throttle members which are provided seated within the valve adjacent to one or more discharge outlets and such that the throttle member or members can be manually displaced in parallel with the axis of symmetry of the valve body and into the flow path of the liquid transversely thereto.

8. Device according to claim 2, wherein the valve comprises a two-part housing, of which a lower housing part is provided with the discharge outlets and the valve seat and an upper housing part is provided with the connection means for connecting said device to a source of liquid, the upper housing part partially enclosing the lower housing part as a skirt, and wherein the upper and lower housing parts are mutually displaceable so that the upper housing part can operate as the throttle means, the upper housing part capable of being manually positioned in an active position where the throttle means at least partially covers the discharge outlets, and in an inactive position where the throttle means is not covering any part of the discharge outlets.

9. Device according to claim 1 or 2, wherein the valve comprises a housing with a central bore in which the valve seat and the opening through which the stem portion extends is formed, the stem portion of the valve body provided at its end opposite the head portion with a widened disc-shaped bottom end extending across the opening and across the free end of the housing such that at least one discharge outlet is formed between the free end of the housing and the bottom end of the stem portion, and wherein the cross-sectional area of the discharge outlet or outlets can be adjusted by one or more adjustable members in the form of pins extending through the disc-shaped bottom end towards the free end of the housing.

10. Device according to any of claims 2 - 9, wherein the

throttle means is provided with a scale in the form of marks or notches indicating various degrees of throttling of the discharge outlet or outlets.

11. A method for dispensing a carbonated beverage into a glass, using a dispensing device including a valve provided with a valve body and a stem projecting out of the valve, comprising actuating the valve body by an inner surface of the glass so that the beverage can flow out through at least one discharge outlet of the dispensing device, **characterised in that** the method includes manually setting a throttle means provided at the discharge outlet of the dispensing device so as to control foam formation in the carbonated beverage when the beverage exits the discharge outlet.

Fig. 1a

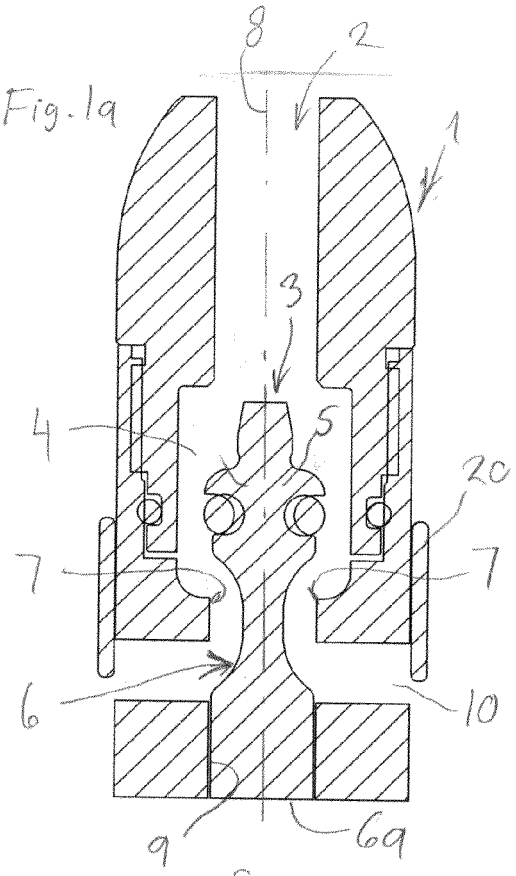


Fig. 1b

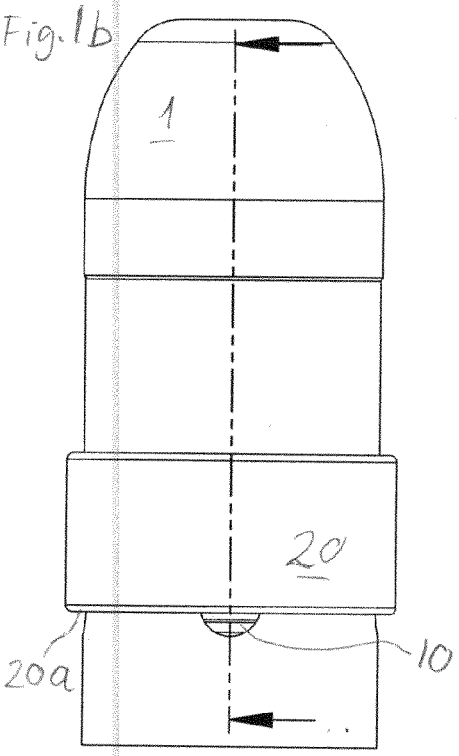


Fig 1c

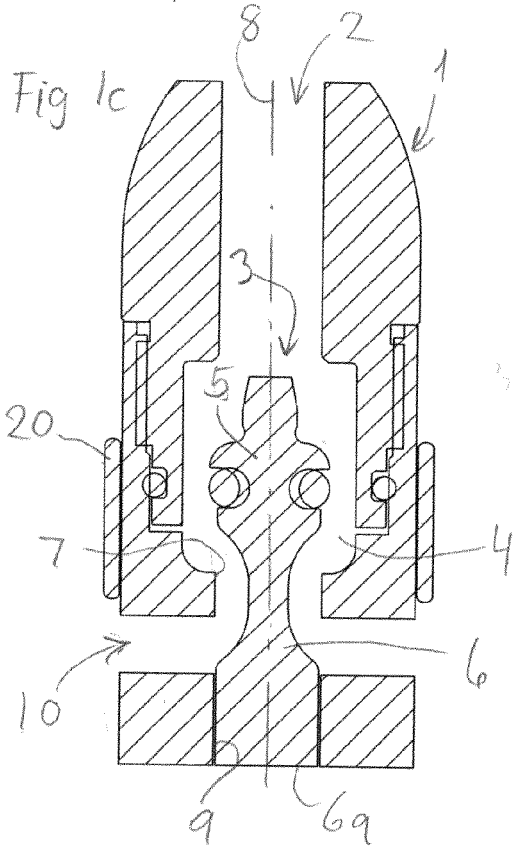
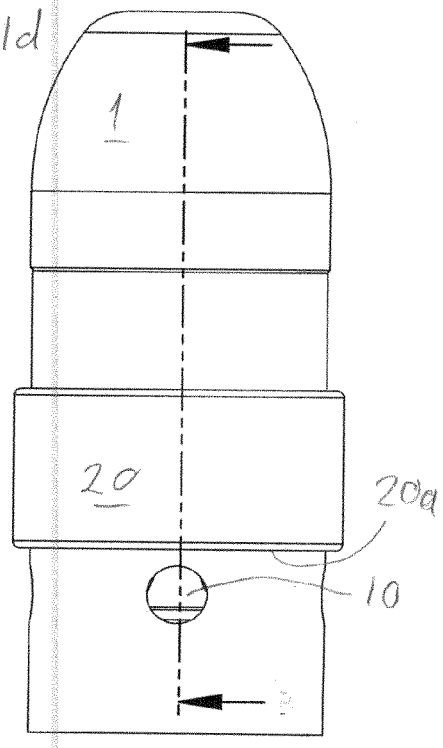


Fig. 1d



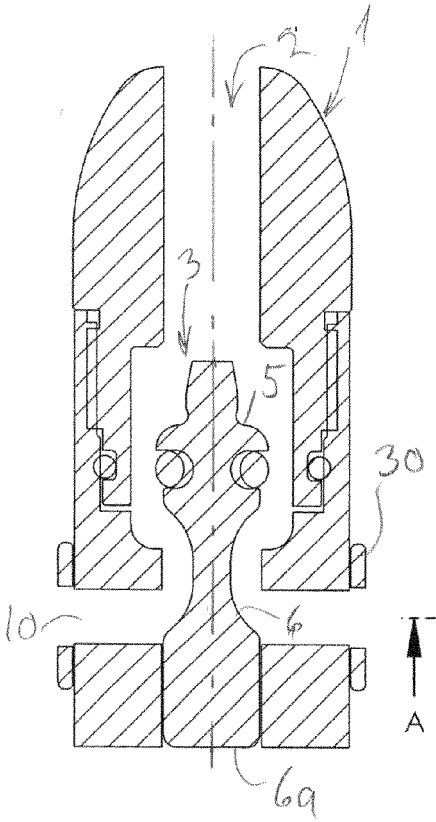


Fig. 2a

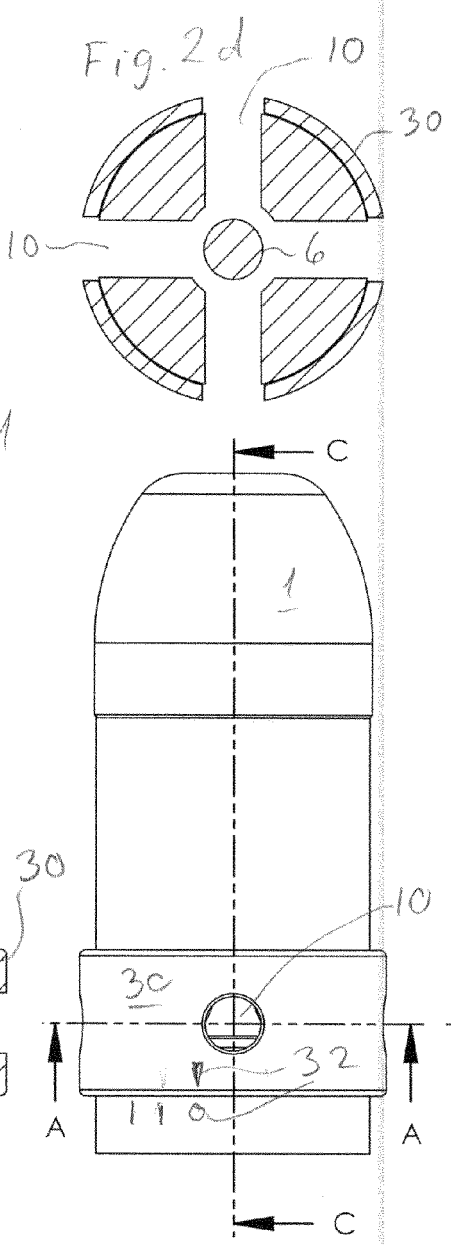


Fig. 2b

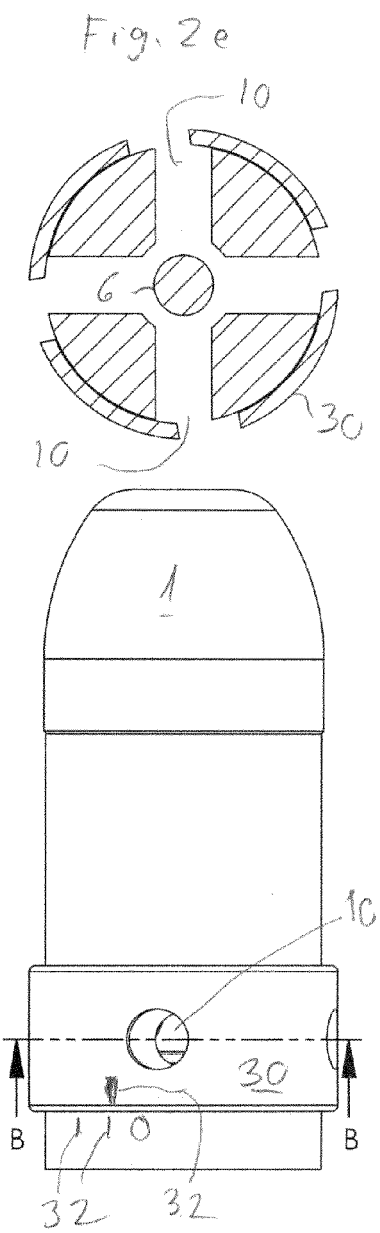


Fig. 2c

Fig. 3a

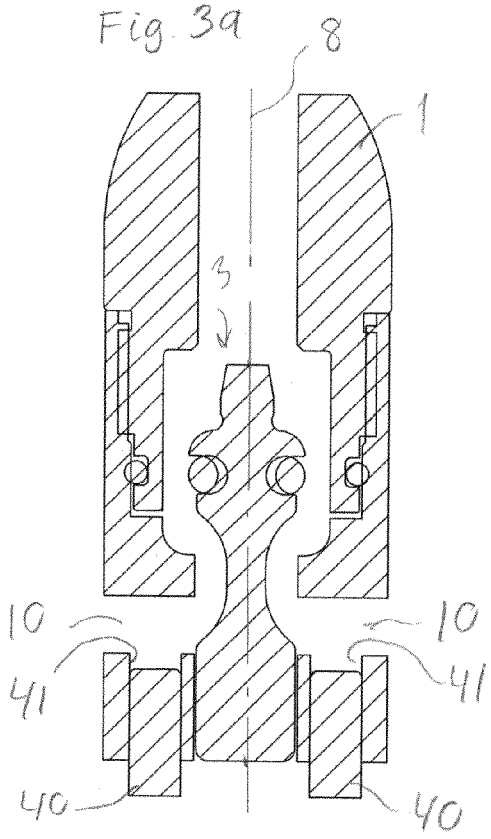


Fig. 3b

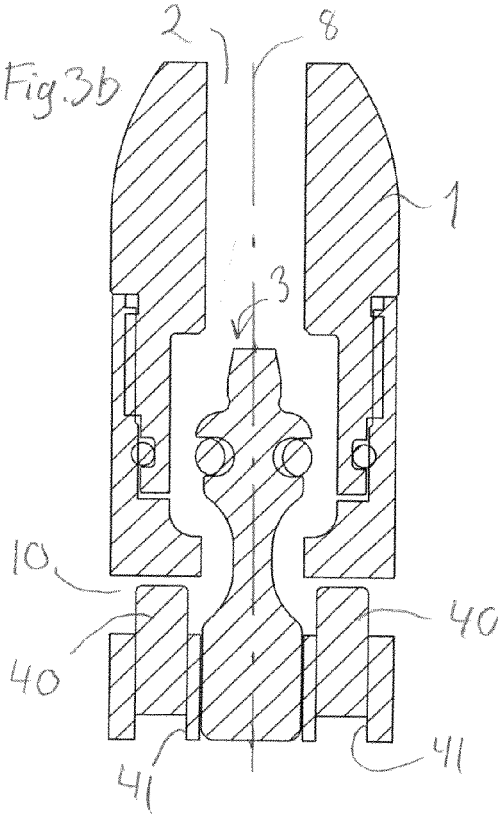


Fig. 3c

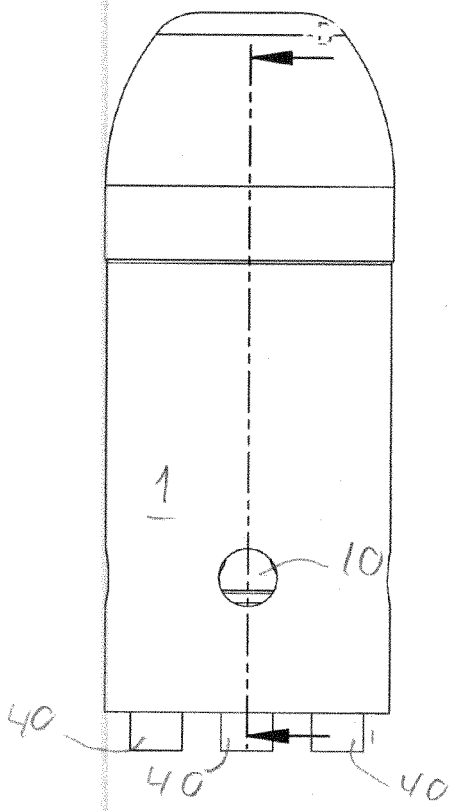
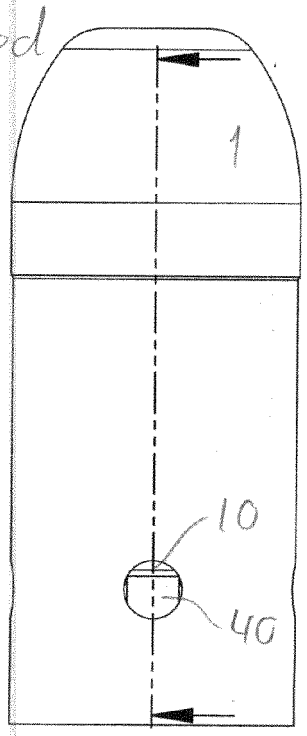


Fig. 3d



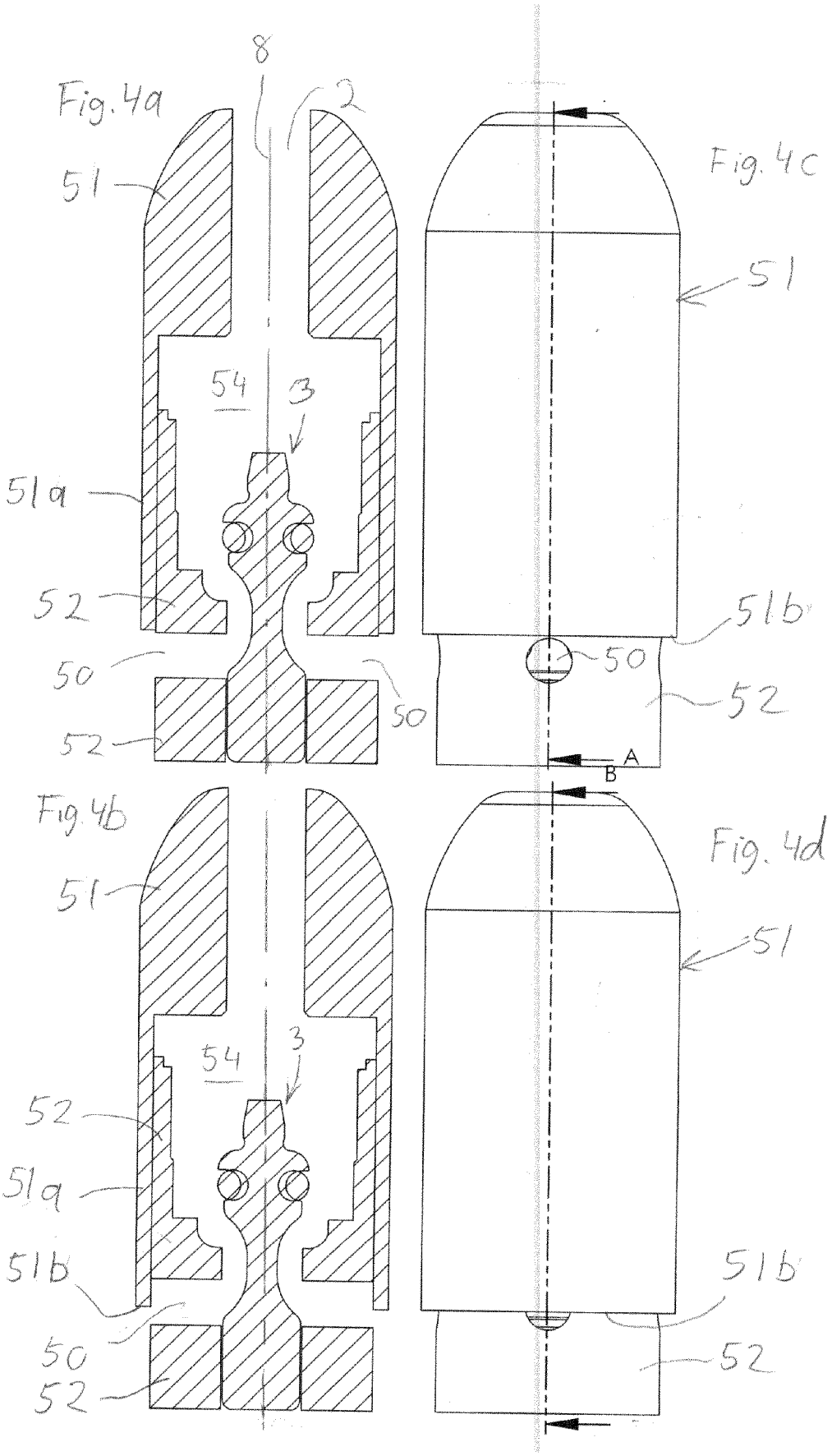


Fig. 4a
8
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51
54
3
51a
52
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52
Fig. 4c
51
51b
50
52
A
B
Fig. 4b
51
54
3
52
51a
51b
50
52
Fig. 4d
51
51b
52

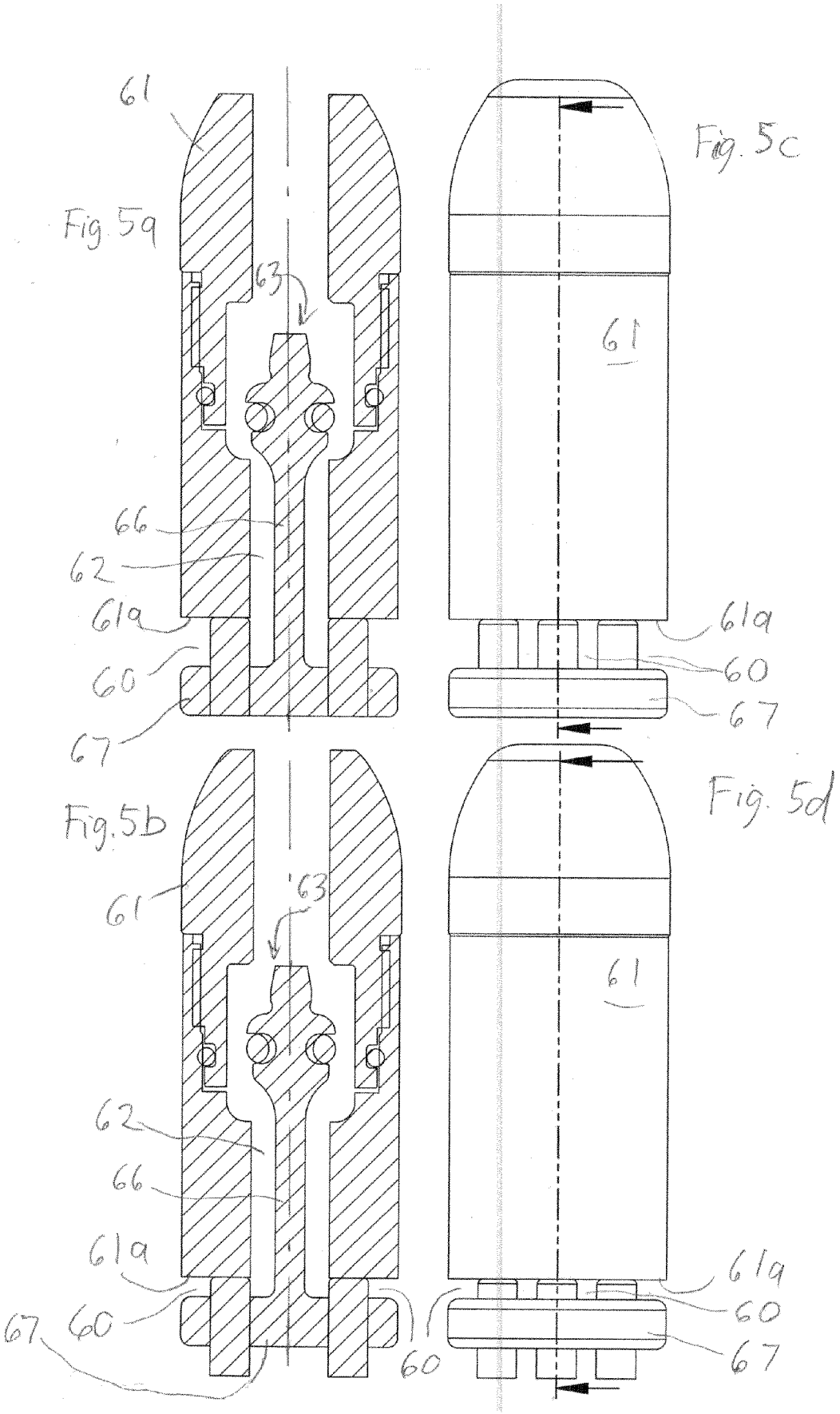

Fig. 5a

Fig. 5c

Fig. 5b

Fig. 5d

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EUROPEAN SEARCH REPORT

Application Number
EP 14 19 8164

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	4 May 2015	Desittere, Michiel

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