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(54) **Method and device for connecting a discharge conduit to a liquid storage container**

(57) Method and device for connecting a control fluid conduit and a discharge conduit to a standard beer keg wherein the device comprises an housing, provided with a second standard engaging connector, which second standard engaging connector is complementary with and suitable for engagement in, on or around the first standard engaging connector of the keg, wherein the housing comprises a first fluid connector suitable for connecting the control and/or an expel fluid conduit to the housing, wherein the housing accommodates an opening element, suitable for opening the closing valve of the keg, wherein the opening element is connected to a piston, and is configured to open the closing valve of the standard liquid storage container by means of a pressurised control fluid and wherein the opening element is configured to form a first fluid connection between the interior of the standard liquid storage container and the discharge conduit.

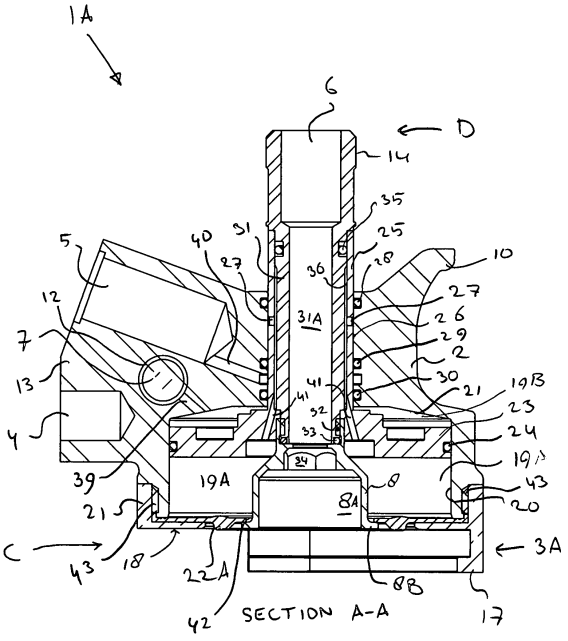

FIG 5

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Description

[0001] The invention relates to connecting devices for liquid storage containers. More specific, the invention relates to connecting devices for standard beverage containers such as e.g. beer kegs or non-alcoholic carbonaceous drink containers. Such standard liquid containers are typically provided with an internal closing valve that provides an outward directed sealing action against a seat, mounted in the storage container. These valves are generally spring biased and can further experience an internal pressure, that can provide an additional sealing force.

[0002] This closing valve can close off two compartments of the storage container. A first compartment, connected to the interior of a dip pipe, through which the liquid can flow and a second through which an expelling gas can be dosed in order to force the liquid out of the container.

[0003] These two compartments are generally sealed off by the closing valve simultaneously, wherein the valve is provided with an annular closing member. The outer circumference of the annular closing member can close of the gas/vapour space of the inner side of the container, while the inner circumference of the closing member can close of the interior of the dip pipe.

[0004] Such standard liquid containers are further equipped with a standard closing engaging connector.

[0005] Typically in the art a connecting device can be engaged with the engaging connector of the liquid storage container and after a tight engagement, an opening element of the connector can be forced into the container, opening the closing valve of the liquid storage container. By opening the closing valve of the liquid storage container, a beverage can be transported to a discharge conduit, which on its turn can for instance be connected to a tap or other dispensing device.

[0006] In general the opening element of the connector can open the closing valve of the standard liquid container by manually pressing a lever down, such that the opening element which is coupled to the lever is forced into the interior of the container.

[0007] This lever can be provided with a retaining mechanism for holding the opening element and the lever in an operating position such that the closing valve of the liquid storage container can remain in its open position. Such an opening system is for instance described in the international application W02009/036759.

[0008] However this pushing down of the lever requires a considerable amount of force. Especially when the storage containers are placed in a confined space such as below or in bar furniture, this pushing down of the lever is particularly awkward and cumbersome. Furthermore, when the connecting device is ill placed, during the force exerted on the lever, it can abruptly detach from the engaging connector of the liquid container. This unwanted sudden disengagement can provide a dangerous situation for the person operating the connecting device.

[0009] Accordingly it is an object of the invention to mitigate or solve these above described and/or other problems of connecting devices in the art, while maintaining the advantages thereof.

[0010] This object is reached by a device suitable for connecting a control fluid conduit and a discharge conduit to a standard liquid storage container, such as a standard beer keg, wherein the standard liquid storage container comprises a closing valve suitable for closing off the liquid storage container and wherein the liquid container comprises a first standard engaging connector, wherein the device comprises an housing, provided with a second standard engaging connector, which second standard engaging connector is complementary with and suitable for engagement in, on or around the first standard engaging connector of the liquid storage container, wherein the housing comprises a first fluid connector suitable for connecting the control and/or an expel fluid conduit to the housing, wherein the housing accommodates an opening element, suitable for opening the closing valve of the liquid container, wherein the opening element is connected to a piston, wherein the opening element is configured to open the closing valve of the standard liquid storage container by means of a pressurised control fluid and wherein the opening element is configured to form a first fluid connection between the interior of the standard liquid storage container and the discharge conduit.

[0011] With this device, no force is needed to make a connection between the liquid and the discharge conduit. Furthermore this device no longer needs a lever to push down the valve opener, such that this device is having less protruding parts and less recesses where dirt and/or contaminations such as bacteria can build up.

[0012] A further aspect of the invention is that the piston can be connected to a guiding sleeve, which guiding sleeve can be axially moveable and axially extending through the housing. The guiding sleeve can be provided with an inner pipe, forming a liquid channel. The guiding sleeve of the connecting device can on its external end be provided with a third fluid connector, suitable for connecting the discharge conduit to the device.

[0013] By these features, the liquid can be discharged from the liquid storage container in a substantially straight line, thus reducing the unwanted premature release of carbon dioxide gas inside the discharge conduit. A further advantage of this straight line is that here again no dirt or contaminations can build up, since recesses, corners and dead spaces are substantially prevented.

[0014] In operation, a first conduit of the device can be connected to a control and/or an expel gas, and the discharge conduit can be connected to a dispensing device such as a tap.

[0015] In the device, the housing can comprise a cylinder suitable for substantially gastight guiding the piston.

[0016] Another aspect of the invention is a method of connecting a first conduit to a standard liquid storage container such as a beer keg, wherein a standard liquid storage container is provided, comprising a closing valve

suitable for closing off the liquid storage container, wherein a device as described above is applied, which is connected to a standard liquid storage container by engaging the second engaging connector of the device in the complementary engaging connector of the standard liquid storage container, wherein control and/or an expel gas are applied in order to force the piston and the thereto connected opening element in an opening direction of the closing valve of the standard liquid container, thus opening the closing valve.

[0017] In order to further elucidate the invention, exemplary embodiments will be described with reference to the drawing. In the drawing:

Figures 1A and 1B represent schematic perspective top side views of a first embodiment of a device according to the invention,
figures 1C and 1D represent schematic perspective bottom side views of a first embodiment of a device according to the invention,
figure 2A represents a schematic side view of a first embodiment of a device according to the invention,
figure 2B represents a schematic front view of a first embodiment of a device according to the invention,
figure 3 represents a schematic top side view of a first embodiment of a device according to the invention,
figure 4 represents a schematic bottom side view of a first embodiment of a device according to the invention,
figure 5 represents a schematic sectional side view through line A-A of a first embodiment of a device according to the invention,
figure 6 represents a schematic sectional top side view through line F-F of a first embodiment of a device according to the invention,
figures 7A and 7B represent schematic perspective top side views of a piston assembly of the first embodiment of the device according to the invention,
figures 7C and 7D represent schematic perspective bottom side views of a piston assembly of the first embodiment of the device according to the invention,
figure 8A represents a schematic side view of the piston assembly of the first embodiment of a device according to the invention,
figure 8B represents a schematic front view of the piston assembly a first embodiment of a device according to the invention,
figure 9 represents a schematic sectional side view through line A-A of the piston assembly according the first embodiment of the device according to the invention,
figure 10 represents a schematic sectional top side view through line F-F of the piston assembly according to the first embodiment of the device according to the invention,
figure 11 represents a schematic sectional side view through line A-A of a second embodiment of a device according to the invention,
figure 12A represents a schematic side view of the piston assembly of the second embodiment of a device according to the invention,
figure 12B represents a schematic front view of the piston assembly the second embodiment of a device according to the invention,
figure 13 represents a schematic sectional side view through line A-A of the piston assembly according to the second embodiment,
figure 14 represents a schematic sectional top side view through line F-F of the piston assembly according to the second embodiment,
figures 15A and 15B represent schematic perspective top side views of a piston assembly of the second embodiment,
figures 15C and 15D represent schematic perspective bottom side views of a piston assembly of the second embodiment,
figure 16 represents a schematic sectional side view through line A-A of the piston assembly according to a third embodiment of the invention,
figure 17 represents a schematic sectional side view through line A-A of a fourth embodiment of a device according to the invention,
figure 18 represents a schematic sectional side view through line A-A of the piston assembly according to the fourth embodiment of the invention,
figure 19 represents a schematic sectional side view through line A-A of a fifth embodiment of a device according to the invention,
figure 20 represents a schematic sectional side view through line A-A of a sixth embodiment of a device according to the invention,
figure 21 represents a schematic sectional side view through line A-A of the piston assembly according to the sixth embodiment of the invention,
figures 22A and 22B represent schematic perspective bottom side views of the sixth embodiment of a device according to the invention,
figures 23A-F represent different views of a seal applied in the first embodiment of the invention (of figure 5),
figures 24A-F represent different views of a seal applied in the second embodiment of the invention (of figure 11),
figures 25A-D represent top and sectional views of the housing of the device according to a further embodiment and
figures 26A-D represent top and sectional views of the housing of the device according to yet a further embodiment.

The figures represent specific exemplary embodiments of the inventions and should not be considered limiting the invention in any way or form. Throughout the figures the same or corresponding reference numerals are used for the same or similar elements.

[0018] The expression "a standard liquid storage container" is to be understood as though not limited to a liquid container, adapted with standard engaging connector such as a connector known in the technical field of beverage storage and distribution. These engaging connectors are for example known as a D-type system or US Sankey system, S-type European Sankey or cage system, A-type or flat system, G-type system, U-type system and/or M-type system. All of which are widely used.

[0019] The expression "expel gas" is to be understood as though not limited to a gas that is or can be used to force out the liquid from the liquid storage container. Typical gasses that can be used for this purpose are air, nitrogen, carbon dioxide, oxide and/or mixtures thereof. Other gasses can be used as well provided these gasses are non toxic.

[0020] The expression "control gas" is to be understood though not limited to a gas that can be used to force a piston assembly of a connecting device in a certain direction, as will be explained in more detail hereinafter. The control gas can be the very same gasses as the expel gasses. In some applications the control gas is provided under a different pressure than the expel gas, though it can also be the very same gas, under the same pressure as is further elucidated hereinafter.

[0021] Figures 1A-D represent schematic perspective views of a first embodiment of a device according to the invention. In these figures a connecting device 1A is shown. This device 1A comprises a housing 2 which is provided with a standard engaging connector 3A. The standard engaging connector 3A is in this embodiment an A-system type connector. In the device an opening element 8 is shown, which is explained in more detail further below.

[0022] The connecting device 1A further comprises a first fluid connector 4 for connecting the device 1A to a control pressure conduit and a second fluid connector 5 for connecting the device to a expel fluid conduit and a third fluid connector 6 for connecting the device 1A to a liquid discharge conduit. In the housing 2, a switch 7 is provided for operating the device 1A as further explained herein below.

[0023] In figures 2A a more detailed side view of the housing 2 of the connecting device 1A is presented. The housing 2 comprises a cylindrical portion 9, on which the engaging connector 3A is mounted. On the cylindrical portion 9 different types of engaging connectors 3 can be mounted. These can be chosen dependent on the type of complementing engaging connector that is used on the liquid storage containers.

[0024] The housing 2 is further comprising a handle section 10 for facilitating easy manipulation. The handle section 10 comprises a gripping edge 11, which further facilitates easy handling and manipulation of the connecting device, for instance when the device is wet or otherwise slippery.

[0025] In the housing 2 a gas connection portion 13 is provided wherein a expel gas connector 5 and an control gas connector 4 are provided. These connectors 4 and 5 can be provided with any kind of available connection appendages, such as or instance NPT connectors. In the gas connection portion 13 an opening 12 is foreseen in which a switch 7 is provided by means of which an internally arranged operating valve can be controlled. Details of this valve are explained herein further below.

[0026] Figures 3 and 4 represent a top and a bottom view of the device of figures 1A-2B. In figure 4, the engaging connector 3A comprises a horse shoe shaped element 17 that can connect in a sliding manner around a collar of a standard complement engaging connector of a liquid storage container. When this engaging connector is applied on a complement connector of a liquid storage container, the surface 18 abuts against the topside of the collar of the engaging connector.

[0027] Figure 5 depicts a sectional view through line A-A (see figure 2B) of the connection device 1A. The housing 2 of the connection device comprises a chamber 19, which is surrounded by a cylindrical wall 20. The chamber 19 is on a discharge side D confined by an annular surface 21, and on a container side C confined by an annular seal. Within the chamber 19, a piston 23 is moveably arranged. Between the piston 23 and the cylindrical wall, an O-ring type packing 24 can provide a gas tight seal. The piston 23 is connected to a cylindrical sleeve 25, which is moveably arranged inside cylindrically shaped opening 26.

[0028] The cylindrical sleeve is provided with two holes 27, through which the expelling gas can flow as hereinafter explained. The cylindrically shaped opening 26 is provided with three O-ring type seals 28, 29 and 30, which seal off the annular space between the sleeve 25 and the cylindrical opening 26 of the housing 2.

[0029] Within the sleeve 25, a discharge channel 31A is provided within a removable inner pipe 31. This inner pipe 31 is removable for instance for safety reasons. It is this inner pipe that is in direct contact with the discharged beverage, and therefore need to be easily cleaned and replaced. At the container side of the inner pipe 31, the opening element 8 is connected. This connection can for instance be made by complementary screw thread 32. Thus similarly the opening element 8 which is also in direct contact with the beverage can be easily replaced and cleaned as well. By un tightening the thread 32, the inner pipe 31 and the opening element 8 can be disassembled and e.g. cleaned. Between the inner pipe and the opening element, a further O-ring type packing 33 is arranged in order to provide a close connection between the opening device 8 and the inner pipe 30. Thus unwanted leakage of expelling and or control gas into the discharged beverage can be prevented. Within the opening element a hexagonally confined area is provided. This can be of use when the inner pipe 31 and the opening element are thus tightly connected that tools need to be applied. A hexagonal tool that fits snugly into the hexagonal area 34 can prevent the opening element 8 from turning when a wrench is applied to rec-

tangular area 15 of the discharge side D of the inner pipe 31.

[0030] The inner pipe is on the discharge side D sealed within the sleeve 25 by means of packing 35, which prevents expelling gas from escaping. In between the sleeve 25 and the inner pipe 31, an annular opening 36 is provided. When pressurised control gas is connected to the control gas connector 6, this control gas pressurises through channel 37 (see figure 25D) a first valve chamber 38 of the switch 7. When the switch 7 is put in the operating position, as is depicted in figure 6, the first valve chamber 38 is simultaneously connected to channel 39. This channel 39 is in contact with the portion 19B of the chamber 19. The portion 19B, which is positioned on the discharge side of the piston 23 can force the piston 23 in the container side direction of the connecting device 1.

[0031] When the piston is forced down, the opening element 8 is forced down and as such can abut and can open a closing valve of a liquid container. It is noted that the opening element fits on the annular topside of the closing valve of a liquid container, such that the inner side 8A of the opening device is in fluid contact with the inner side of the dip pipe of the liquid container, such that liquid can flow consecutively through the dip pipe, through the opened closing valve, through the inner space 8A of the opening element of the connecting device through the discharge channel 31A of the inner pipe, through the discharge conduit connector 6 and finally through the discharge conduit itself.

[0032] Meanwhile, in order to expel the liquid, an expelling gas can be guided to the gas compartment of the liquid container. When the piston 23 is forced into the direction C, the sleeve 25 is forced in direction C as well. Thus the holes 27 are placed on the C side of the packing 29, which provide a fluid connection between the channel 40 and the annular space 36. Thus expelling gas can be caused to enter from the expelling gas connector 5, through a channel 40 to enter the annular space 36 between the sleeve 25 and the inner pipe 31.

[0033] Since this annular space 36 is connected to the container side portion 19A of the chamber 19 by means of channels 41, the C side portion 19A is experiencing the expelling gas pressure. This expelling gas can enter the gas side portion of the interior space of the liquid container through the annular opening 42 in between the packing 22A and the outer circumference of the cup shaped opening element 8. Since the annular end 8b can abut and force the closing valve of the liquid container to open, the gas can enter the gas compartment of the liquid container and thus can expel the liquid inside the container.

[0034] The housing 2 of the connecting device 1 is thus constructed that different standard engaging connectors 3A, 3B, 3C can be mounted on the housing. In figure 5 as described above an A-type engaging connector is applied. In a similar fashion, a G-type engaging connector 3B can be applied, as can be seen in figure 19, or "D-type" Sankey engaging connector 3C can be applied as is depicted in figures 20-22D. Other standard connectors, as e.g. listed above can be applied in a similar way without departing from the framework of the current invention.

[0035] In figure 6, a sectional view through line F-F (see figure 2A) is depicted. In this figure an operating position of switch 7 is shown. The switch 7 is a double acting valve, provided with two valve chambers 38 and 44. These valve chambers can be shifted from an operating position as depicted in figure 6, shifted to a relief position (not shown). In the operating position as described above, the control gas can enter portion 19B of the chamber 19 and can actuate the piston 23.

[0036] In the relief position, the portion 19B of the chamber 19is connected via the channel 40 and the second valve chamber 44 through channel 45 (see figure 25C) to a relief opening 16 (see figure 3, 25C). Thus the portion 19B of the chamber 19 is confronted with an ambient pressure and thus the spring of the closing valve of the liquid storage container can force the opening device 8, the piston 23 and the sleeve 25 back in its relief position. When the piston assembly is moved back to a relief position, the connecting device 1 can be removed from the liquid container and placed on another possibly full liquid container.

[0037] Thus the operator of the connecting device 1 only needs to shift (in case of e.g. an A-type engaging connector) or screw on (in case of e.g. a S-type Sankey and/or a G-type engaging connector) the connecting device, after which he can push the switch 7 from a relief position into an operating position. Thus a saver and more user friendly system is provided that is easily placed on a standard liquid storage container.

[0038] In figures 7A-D the piston assembly 23A is depicted in schematic perspective views. The only beverage contacting parts of the piston assembly 23A are the inner part 8A of the cup shaped opening element 8 and the discharge channel 31A on the inside of the inner pipe 31.

[0039] In figures 8A and 8B a side and a front view of the piston assembly 23A is presented. In the piston 23, on the outer circumference, a groove 24A is machined to accommodate the packing 24, which can be of an O-type packing. Further the rectangular area 15 of the sleeve 25 is shown.

[0040] In figure 9 a cross section through line A-A (see figure 2B) is depicted. Here again the fluid connection between the annular space 36 between the sleeve 25 and the inner pipe 31 on the one side and the container side C of the piston 23 can be appreciated.

[0041] In figure 10 a top side sectional view through line F-F (see figure 8a) is depicted. From this figure it can be seen that eight channels 41 are provided.

[0042] In figure 11 an alternative internal structure of the chamber 19 of the connecting device is proposed. In this embodiment, two sliding annularly shaped rings 46 and 47 are provided that seal of portion 19C of the chamber 19 in a telescopic way. The outer annularly shaped sliding ring 48 is connected to the container side C of the

piston 23 by means of a screw on annular containment ring 48. The containment ring 48 is provided with an inward protruding rim 49 which engages and contains an outwardly protruding rim 50 of the outer annularly shaped ring 46. In the outwardly protruding rim 50, a groove 51A is machined wherein a O-type packing 51 is accommodated, which can form a gas tight seal between the container side C of the piston and the outer annular ring 46. The outer annular ring is further provided with an inwardly protruding rim 52 which engages and contains an outwardly protruding rim 53 of the inner annular ring 47. In the outwardly protruding rim of the inner annular ring 47, a groove 54A is machined which accommodates O-type packing 54. The packing 54 can provide a gas tight seal between the inner annular ring 47 and the outer annular ring 46.

[0043] The inner annular ring 47 is provided with an inwardly protruding rim 56, in which an inwardly facing groove 55A is machined. This groove accommodates an O-type packing 55, which can provide a gas tight seal between the cup shaped portion of the opening element 8. The channels 41A provide a fluid connection between the annular space 36 and channels 57.

[0044] Through the containment ring 48, radially extending through bores 48A are provided. These through bores 48A can equalise the pressure between the space 19A and an annularly shaped space formed between the telescopic annular rings 46 and 47 when the piston is in its downward, active position.

[0045] The annularly shaped rings 46 and 47 are provided mainly because the control pressure can thus be reduced. In the portion 19A of the chamber 19, ambient pressure is maintained. The ambient pressure is kept by an open connection with the surroundings through the holes 58 in the packing 22B (see figure 24A-F). In the portion 19B of the chamber 19 a control pressure is maintained through the expel gas connector 4, the channel 37 (see figure 25D) the valve chamber 38 (see figure 6) and the channel 39. In the portion 19C of the valve chamber 19 the expel pressure is maintained through expel pressure connector 5, channel 40, openings 27, annular space 36, channels 41A, annular space 59, channels 57 and channels 57A.

[0046] Thus the piston is experiencing on its container side C only partly the expel pressure and partly ambient pressure, whereas in the first embodiment of the invention, as depicted in figure 5, the full container side C of the piston 23 is experiencing the expel pressure.

[0047] Thus less force is acting from the container side C on the piston 23 and accordingly less control pressure is necessary to force the piston 23 in the direction of the container in order to open the closing valve thereof.

[0048] In figures 12A and 12B, a side and a front view of the piston assembly of figure 11 is depicted. In these pictures the channels 57A can be seen, that are only partially entering the wall of the opening element 8 to reach to the ends of the channels 57, which run in axial direction through the wall of the opening device 8, as is visualized in figure 11. In this figure, the through bores 48A in the containment ring 48 can be seen.

[0049] In figure 13 a sectional view through line A-A of the piston assembly of figure 12B is shown. Here again the telescopic arrangement of the annular rings 46 and 47 can be visualized. When the piston and the opening element are pushed down in a operating position, the rings 46 and 47 are positioned side by side within the annularly shaped area 23A, provided for on the container side C of the piston 23.

[0050] In figure 14 a sectional view through line F-F of the piston assembly of figure 12A is depicted. In this figure a top side view on the annular space 36 is provided, wherein at the lower side, the openings of the channels 41A can be seen.

[0051] The figures 15A-D represent schematic perspective views of the piston assembly of figures 12A and 12B.

[0052] The figure 16 represents a further alternative piston assembly. In this assembly the annular telescopically arranged rings 46 and 47 are replaced by a single annular ring 58. Here even less control pressure is needed in order to force the piston 23 in the direction C of the liquid container.

Figure 17 represents a connecting device for standard engaging connector of the Combi type. In this embodiment, the opening device 8 is provided with bores 8C and with a packing collar 60. The engagement connector 3B is adapted to fit on the standard combi-type engagement connector of the liquid storage container.

Figure 18 represents the valve assembly as applied in the embodiment depicted in figure 16. In this assembly the telescopically arranged annular rings 46 and 47 are depicted.

Figure 19 represents a G-type Grundy-system standard engagement connector 3C. This connector is configured to fit onto a G-type standard connector of a liquid storage container.

Figure 20 represents an S-type Sankey type standard engaging connector also known as a cage type connector. This connecting device is provided with a sankey engaging connector 3D, provided with an elongated neck 61, which can enter into the cage shaped complement connector of a liquid container. In the neck 61, an annular channel 62 is provided which can connect the expel pressure to the gas portion of the liquid container. In the opening device 8, an open portion 8D is provided for connecting the fluid from the container to the discharge channel 31A. In the neck, an packing 63 is foreseen which can seal off the space between the neck 61 and a extension sleeve 64.

Figure 21 represents the piston assembly of the connecting device of figure 20. In the opening device an packing groove 65A can be machined for packing 65. This packing can eventually be dispensed with,

since packing 63 seals off the expel pressure of in the annular channel 62 from ambient pressure in portion 19A of the chamber 19.

[0053] In this figure, the container side C of the neck 61 is to be provided with a packing (not shown) that can be attached around groove 65 for a sturdy fitted connection. This latter packing will seal off the surroundings from the expel gas coming through the annular channel 62.

Figures 22A and 22B represent schematic perspective views of a connection device comprising a Sankey S-type engaging connector device, as shown in figures 20 and 21. Here the engaging connector 3D is provided with closure ribs 66, that fit into the cage like complement engagement connector on a standard liquid storage container.

Figures 23A-23F represent the packing 22A as applied in the connecting device represented by figure 5. The packing 22A is provided with a annular rib 68, wherein recesses 67 are provided. The annular rib 68 can abut the container side C of the piston 23 in operating position. The recesses 68 are provided that the pressure can equalize within the portion 19A of the chamber 19, even when the piston abuts the annular rib 68. The packing 22A is further provided with a lower annular rib 69, provided with annular grooves 70. The lower annular rib 69 with the annular grooves 70 can seal of the upper surface of an A-type standard engagement connector of a standard liquid storage container.

Figures 24A-24F represent the packing 22B as applied in the connecting device shown in figure 11. The packing 22B is similarly provided with a lower annular rib 69, which again can seal off the space between the connecting device 1 and the upper flat face of a standard A-type engagement connector of a standard liquid container. In the packing holes 58 are provided for equalizing the pressure in the portion 19A of the chamber 19 and the ambient pressure.

Figures 25A-25D depict several sectional views of the housing 2, wherein the channels 37 and 45 are depicted. In all the embodiments shown a expel pressure is applied for expelling the beer from the standard liquid container, and an control pressure is applied for pushing the piston in the direction C of the liquid container, in order to open the closing valve inside the liquid container.

[0054] Alternatively, the control pressure alone can be applied for both functions. In that case, the channel 37A is connected to the control pressure conduit 5 instead to the expel pressure connector 4.

[0055] The invention is to be understood not to be limited to the exemplary embodiments shown in the figures and described in the specification. For instance the connecting devices can readily be adapted to other less known or common standard connectors such as for instance the U-type engaging connector, the G-type (Grundy) engaging connector. The control pressure to be applied for opening the closing valve is generally higher than the expel pressure for expelling the liquid. In order to simplify the connecting device 1, a control pressure can be applied wherein a pressure reducer is applied for the expel pressure. This pressure reducer can be integrated within the connecting device 1 or can be mounted on the control gas connector 4, with a branch off conduit from the reduced pressure side to the expel pressure connector 5. When such reducer is applied, only one gas conduit needs to be applied. In all the embodiments shown, the housing 2 and the piston 23 can be the same such that a readily adaptable modular standard connecting device 2 is provided.

[0056] The switch 7 that is applied to switch the control pressure, is throughout the above presented specification, described as a push button 7 running through the housing 2.

[0057] In certain instances, when the connecting device 2 needs to be screwed on to the standard liquid container, it might be unintentionally be switched on or off. In thar case the switch can be provided as a turning switch, that is less likely to be unintentionally operated. Alternatively the switch 7 might be adapted with a safety pall.

[0058] The A-type and the combi-type connecting devices 2 need to be shifted on a collar of the complement engaging connector of the standard liquid storage container. In order that the operator knows that a sufficiently closed position is reached, a spring operated ball might be applied, that provides a tactile click, such that the operator senses when the connecting device is shifted on the complement engaging connector.

[0059] These and other modifications are considered to be variations that are part of the framework, the spirit and the scope of the invention outlined in the claims.

Claims

1. A device suitable for connecting a control fluid conduit and a discharge conduit to a standard liquid storage container, such as a standard beer keg, wherein the standard liquid storage container comprises a closing valve suitable for closing off the liquid storage container and wherein the liquid container comprises a first standard engaging connector;

   - wherein the device comprises an housing, provided with a second standard engaging connector, which second standard engaging connector is complementary with and suitable for engagement in, on or around the first standard engaging connector of the liquid storage container;
   - wherein the housing comprises a first fluid connector suitable for connecting the control and/or

an expel fluid conduit to the housing;
- wherein the housing accommodates an opening element, suitable for opening the closing valve of the liquid container;
- wherein the opening element is connected to a piston;
- wherein the opening element is configured to open the closing valve of the standard liquid storage container by means of a pressurised control fluid and
- wherein the opening element is configured to form a first fluid connection between the interior of the standard liquid storage container and the discharge conduit.

2. A device according to claim 1, wherein the piston is connected to a guiding sleeve, which guiding sleeve is axially moveable and axially extending through the housing.

3. A device according to any of the preceding claims wherein the guiding sleeve is provided with an inner pipe, forming a liquid channel.

4. A device according to any of the preceding claims wherein the guiding sleeve is on its external end provided with a third fluid connector, suitable for connecting the discharge conduit to the device.

5. A device according to any of the preceding claims, wherein the first conduit is connected to a control and/or an expel gas, and wherein the discharge conduit is connected to a dispensing device such as a tap.

6. A device according to any of the preceding claims, wherein the housing comprises a cylinder suitable for substantially gastight guiding the piston.

7. A method of connecting a first conduit to a standard liquid storage container such as a beer keg, comprising the following steps:

- providing a standard liquid storage container comprising a closing valve suitable for closing off the liquid storage container
- providing a device according to claim 1
- connecting the device to the standard liquid storage container by engaging the second engaging connector of the device in the complementary engaging connector of the standard liquid storage container;
- applying a control and/or an expel gas to force the piston and the thereto connected opening element in an opening direction of the closing valve of the standard liquid container, thus opening the closing valve.

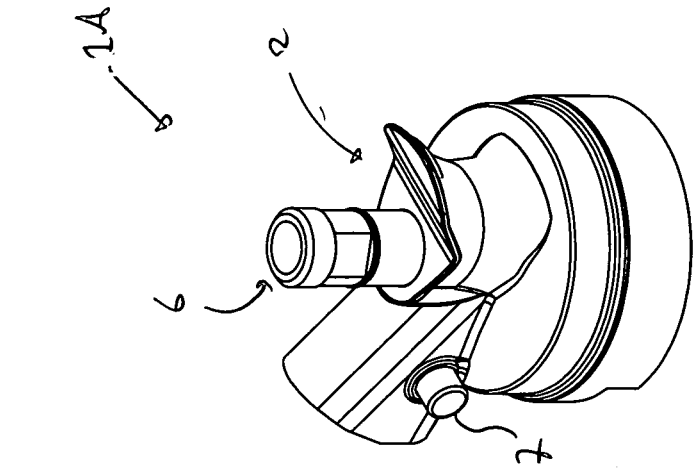


FIG 1B

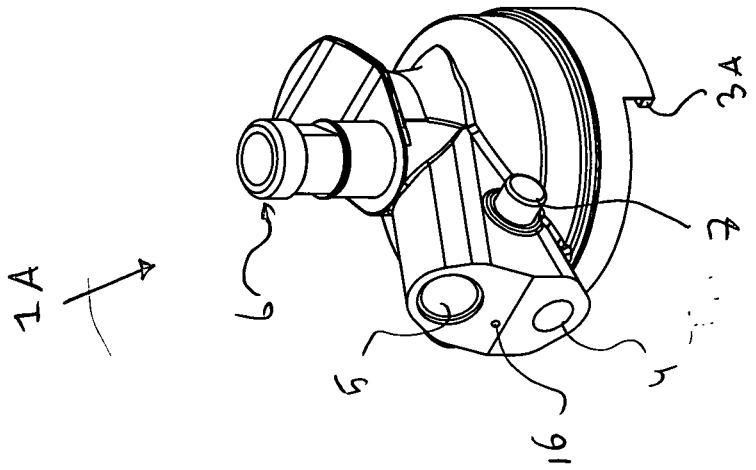


FIG 1A

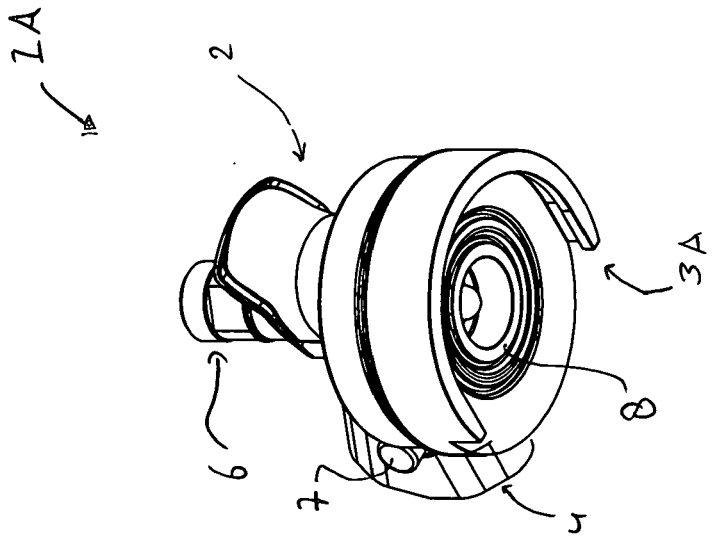


FIG 1D

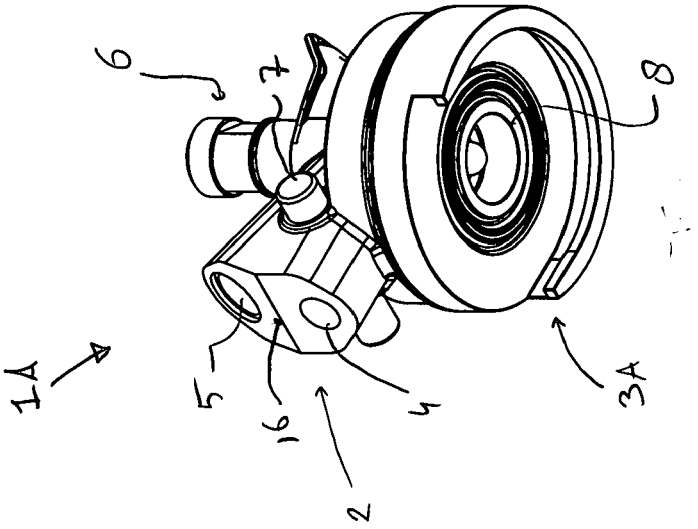


FIG 1C

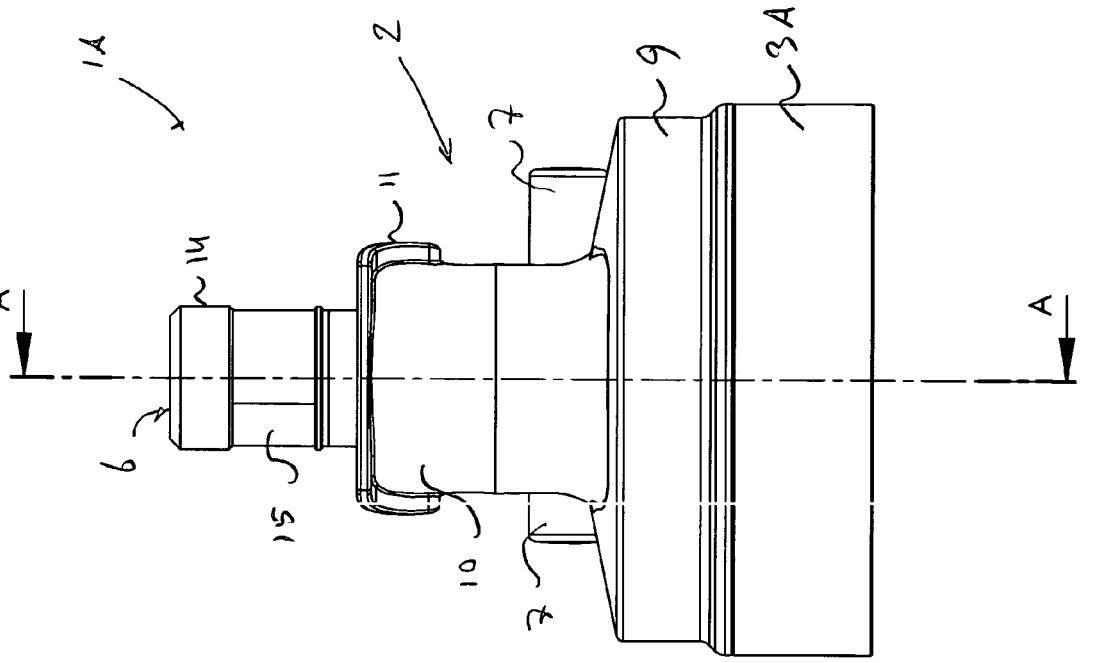


FIG 2B

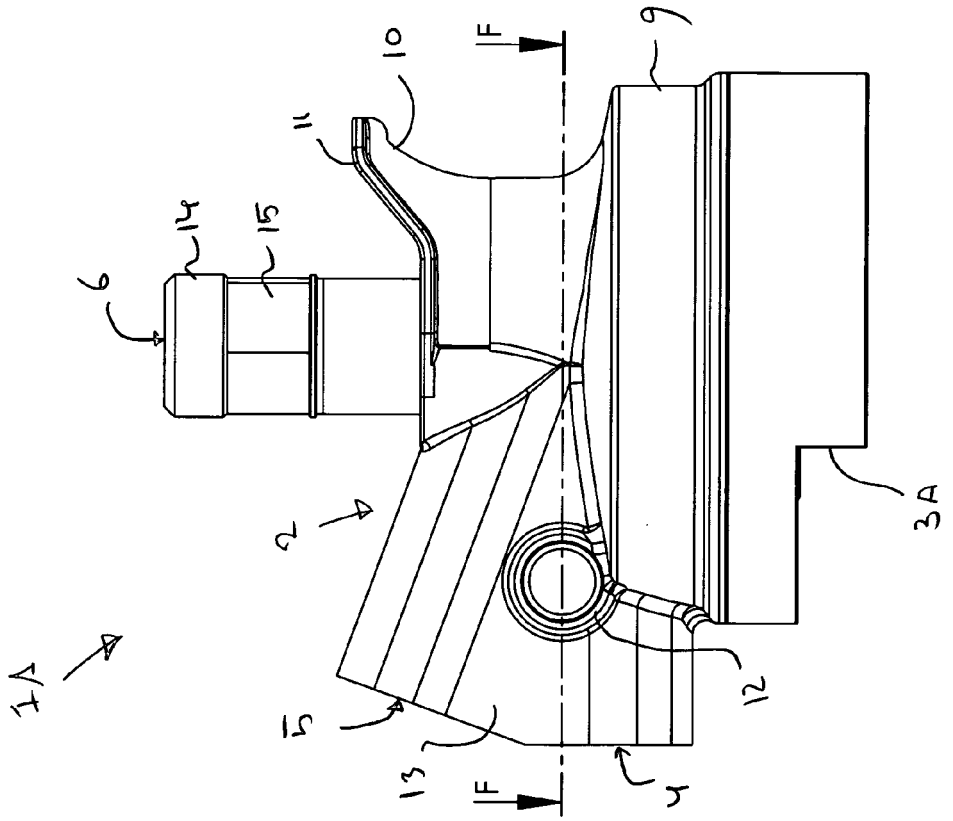


FIG 2A

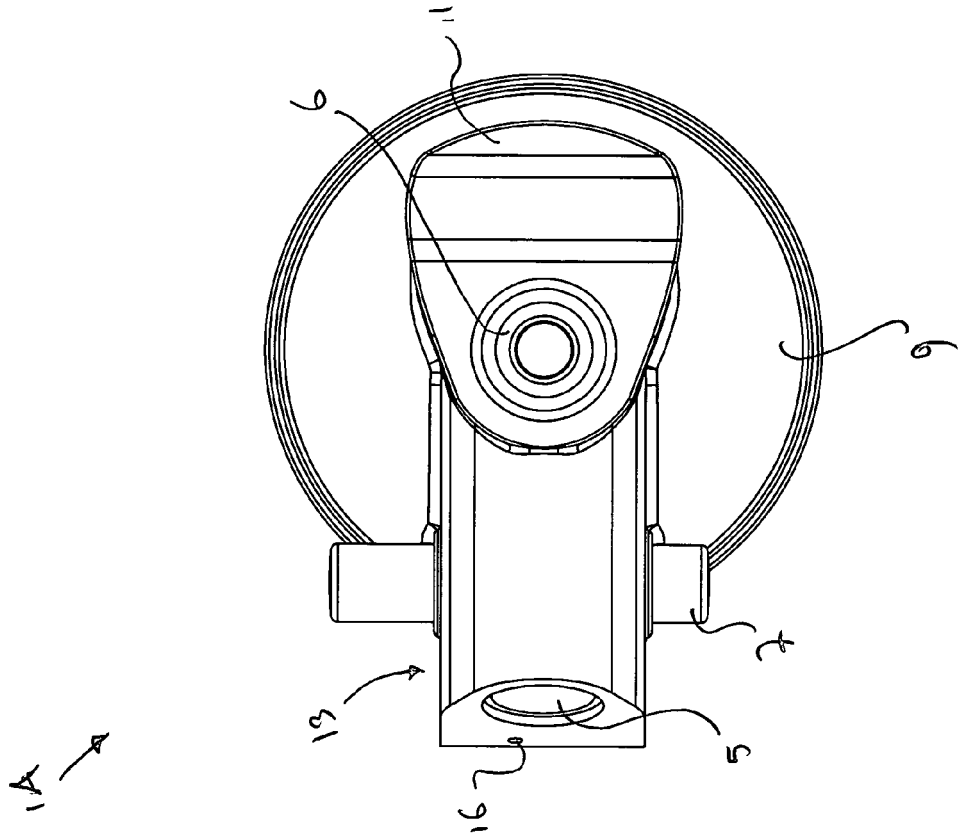


FIG 3

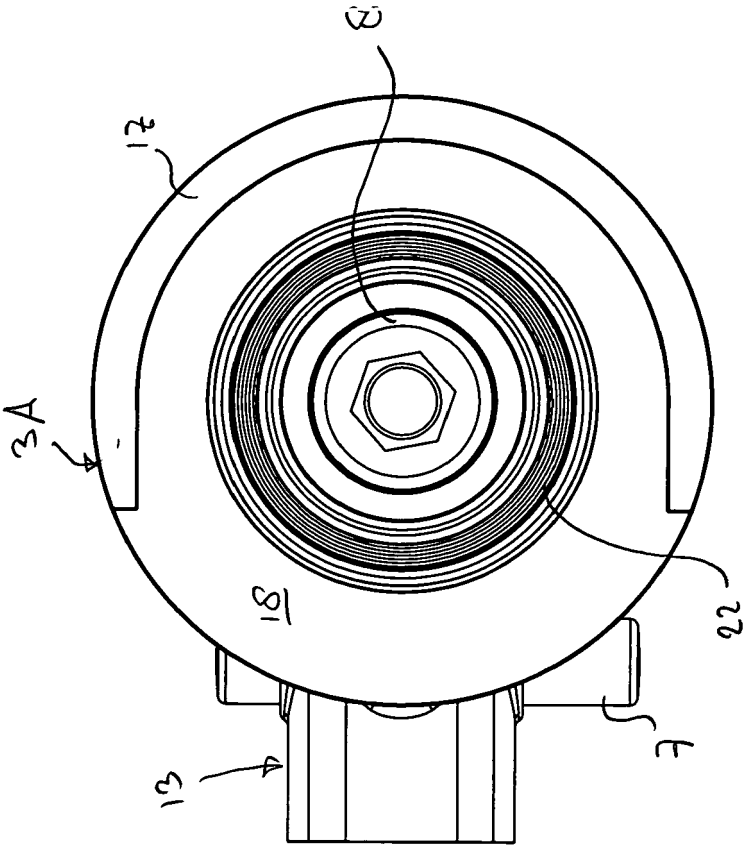


FIG 4

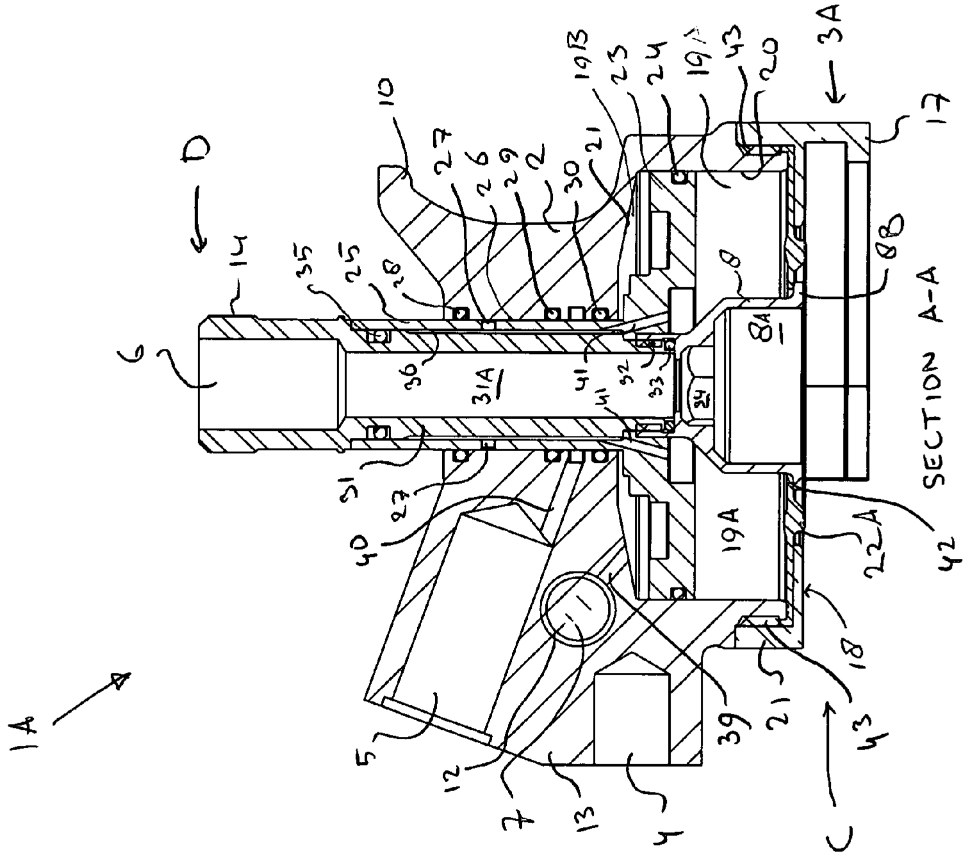
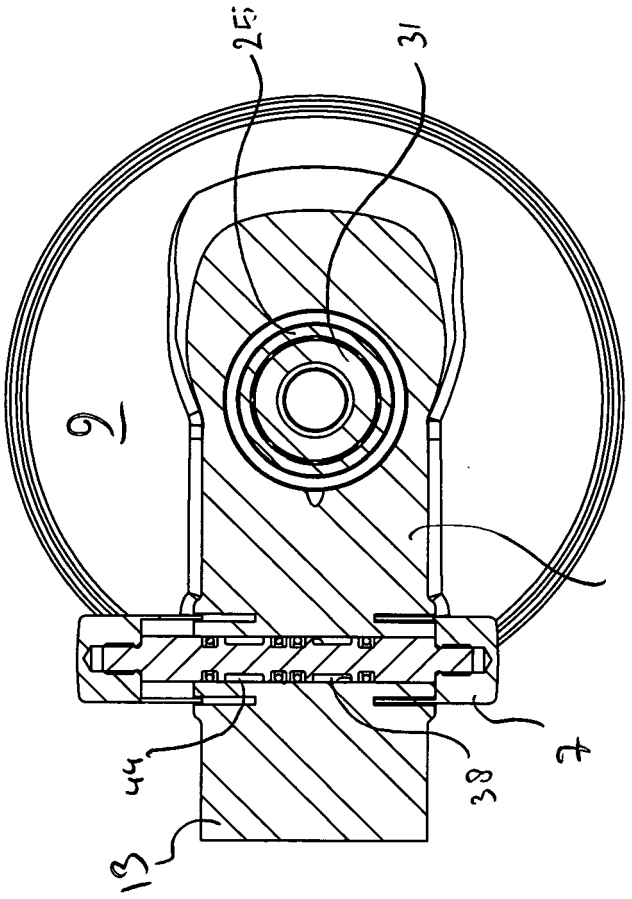


FIG 5



SECTION F-F

FIG 6

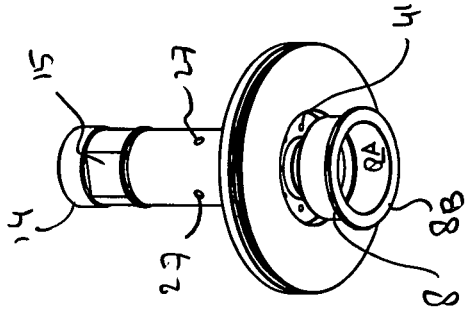


FIG. 7D

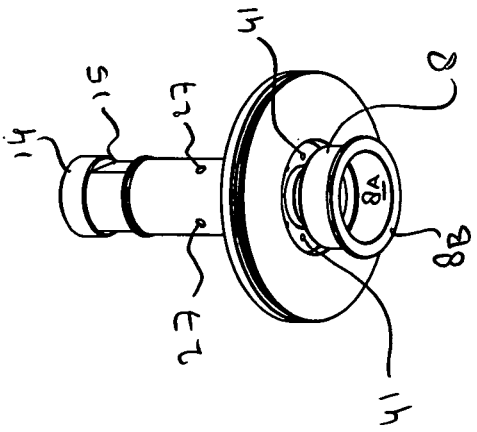


FIG. 7C

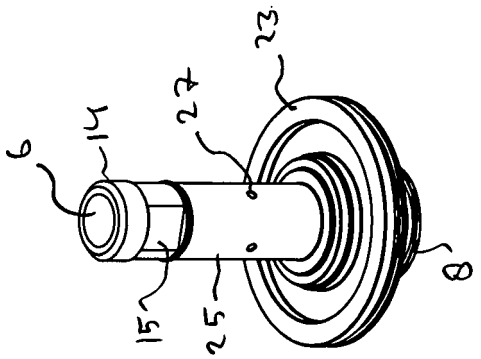


Fig 7B

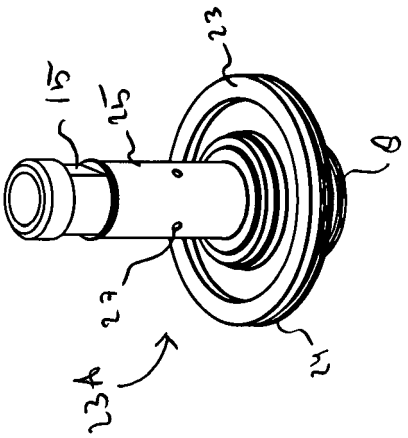


Fig 7A

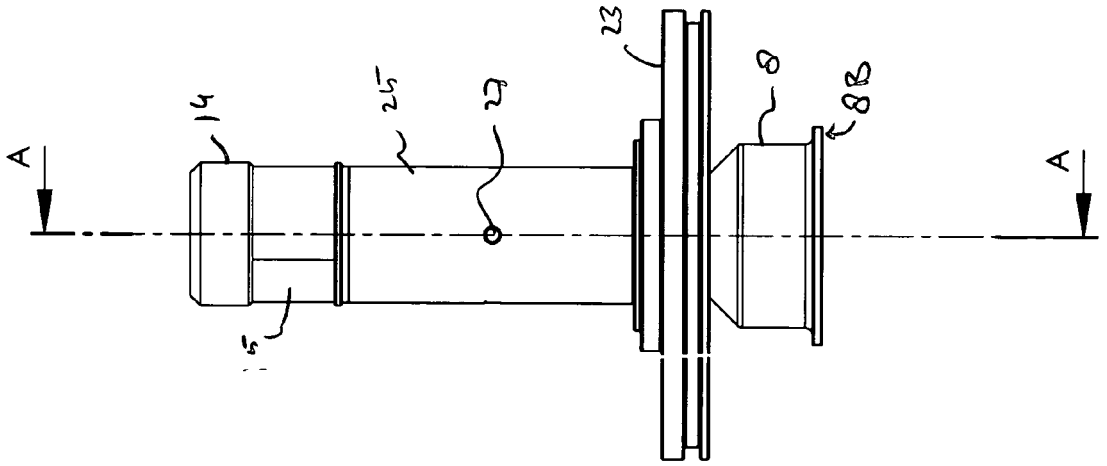


FIG 8B

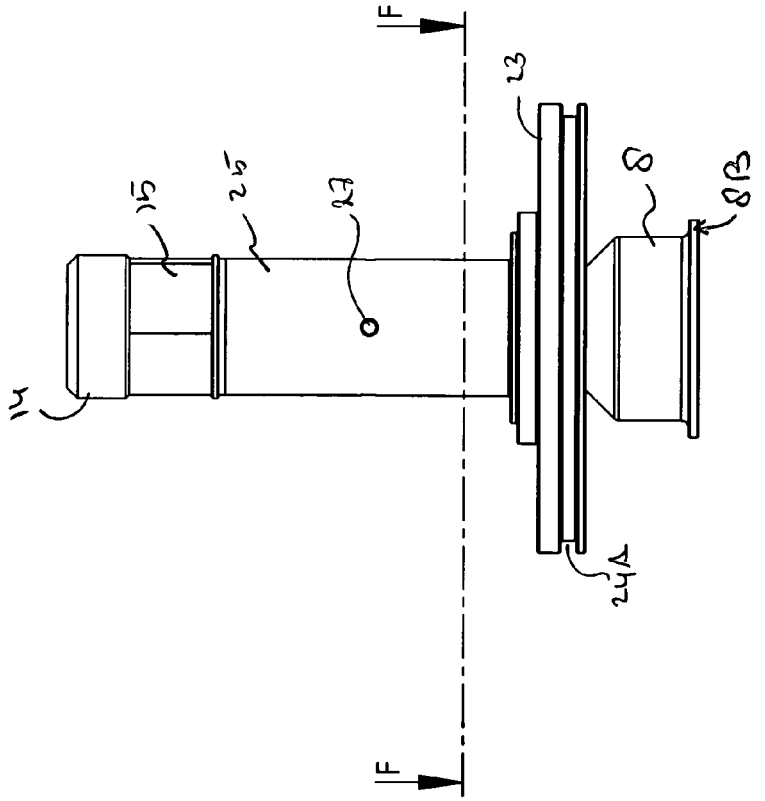
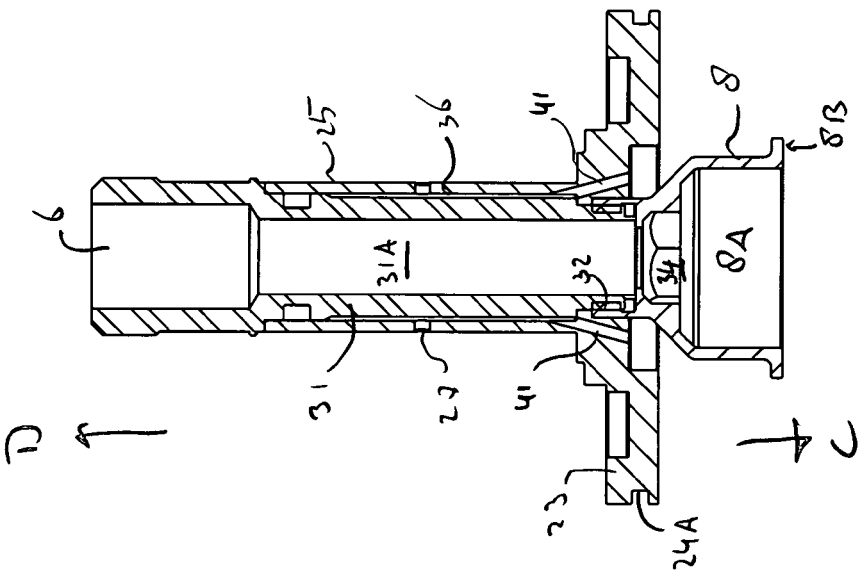
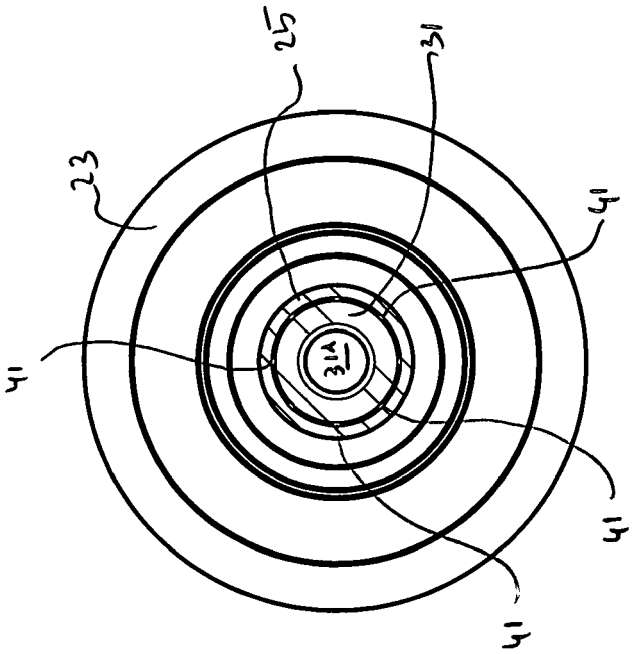


FIG 8A



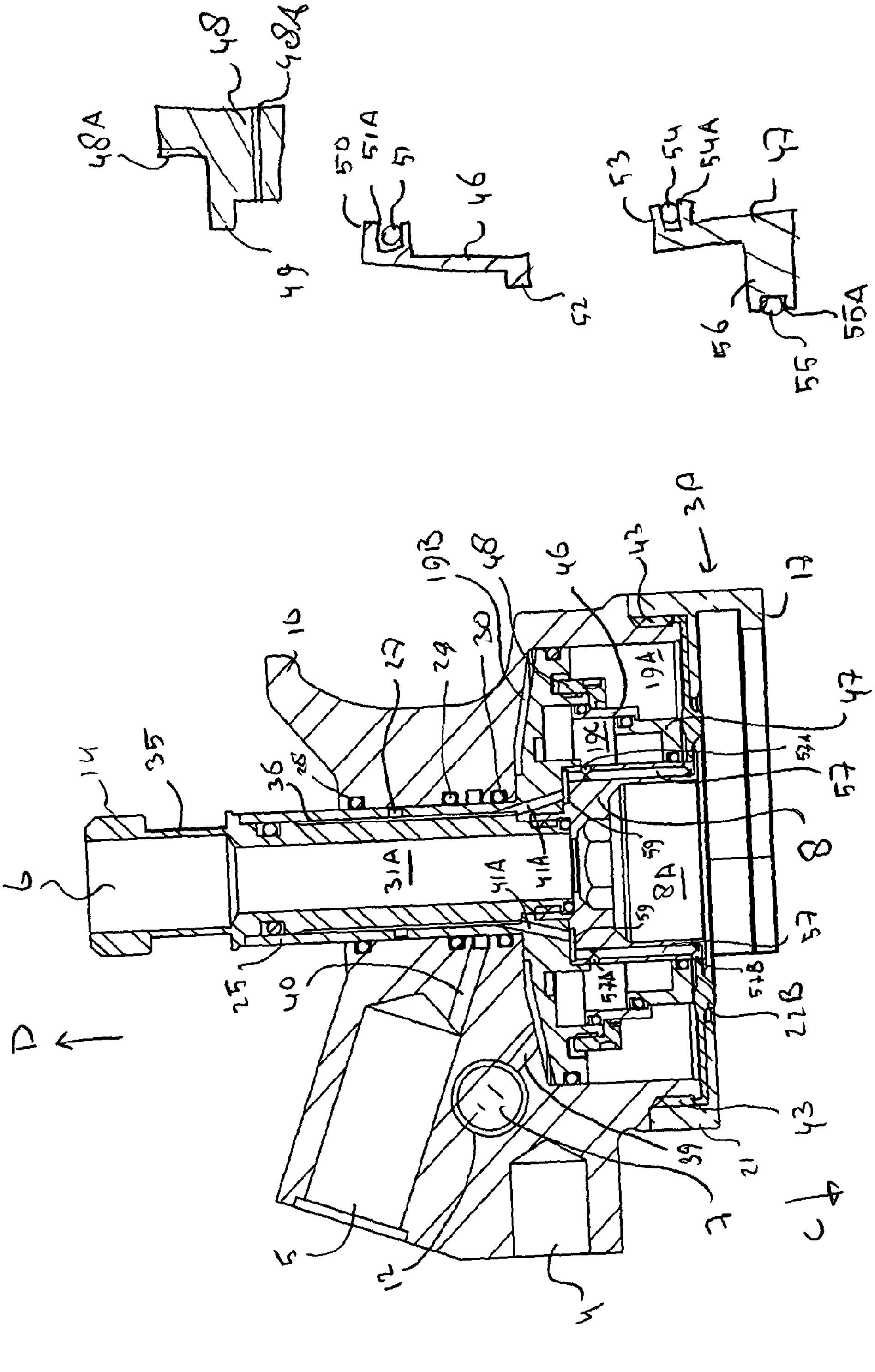
SECTION A-A

FIG 9



SECTION F-F

FIG. 10



SECTION A-A

FIG 11

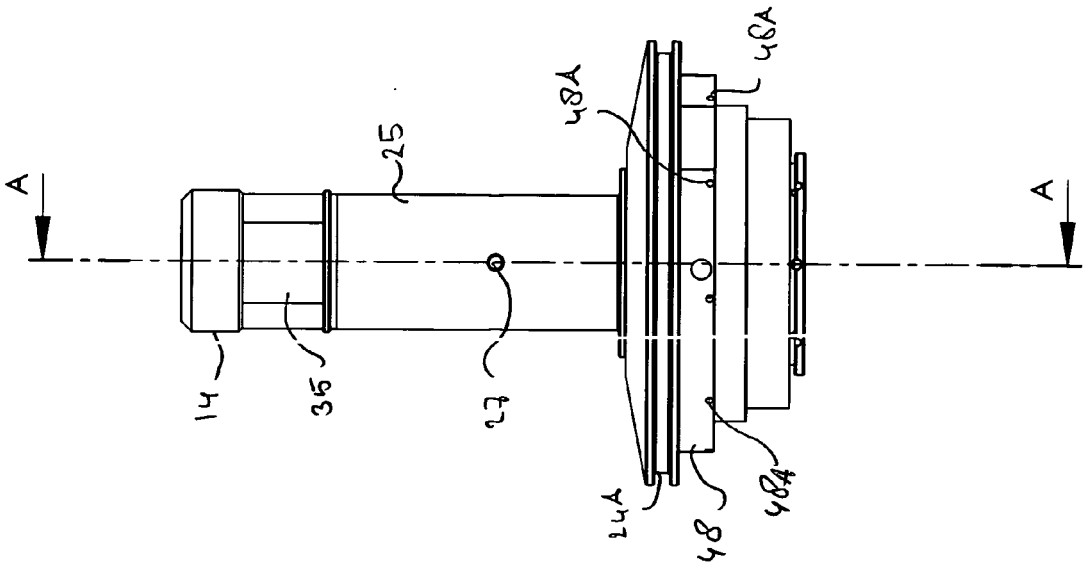


FIG 12B

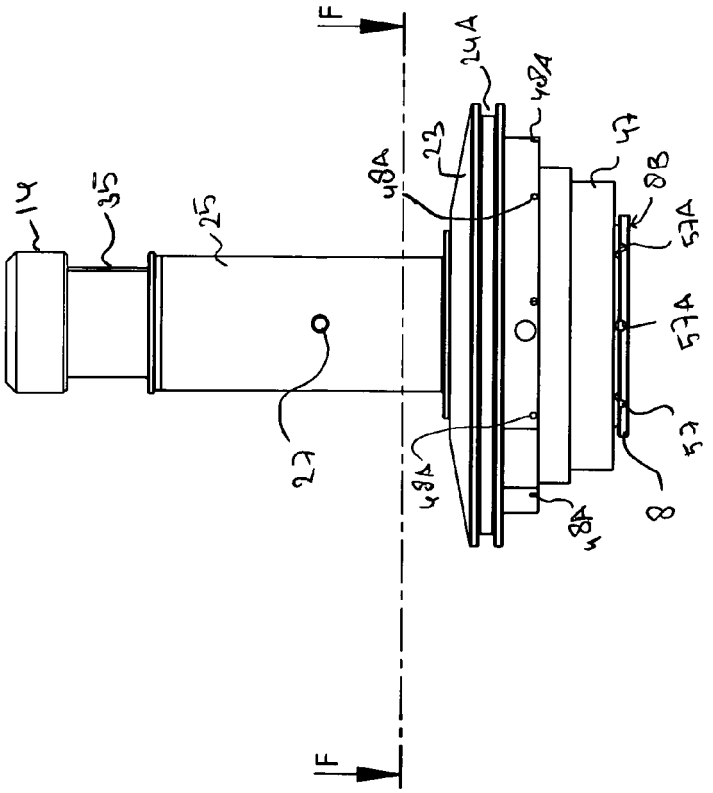
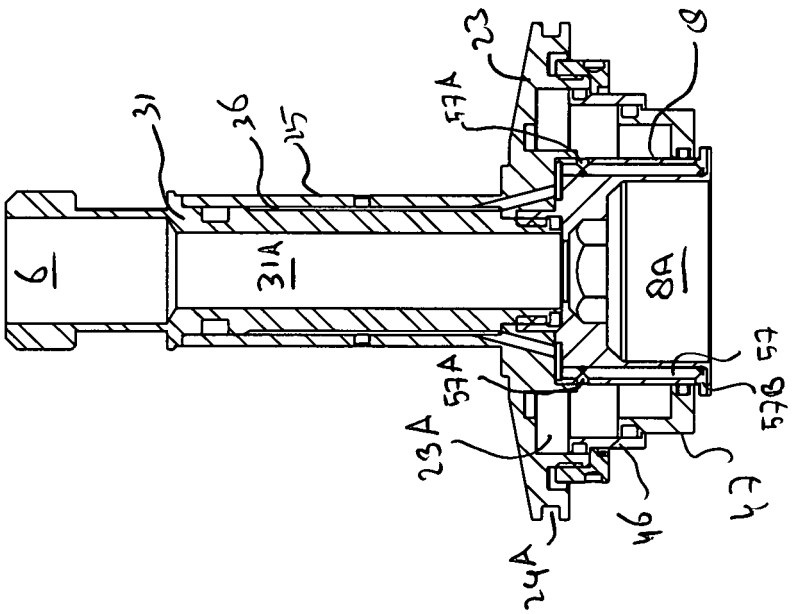


FIG 12A



SECTION A-A

FIG 13

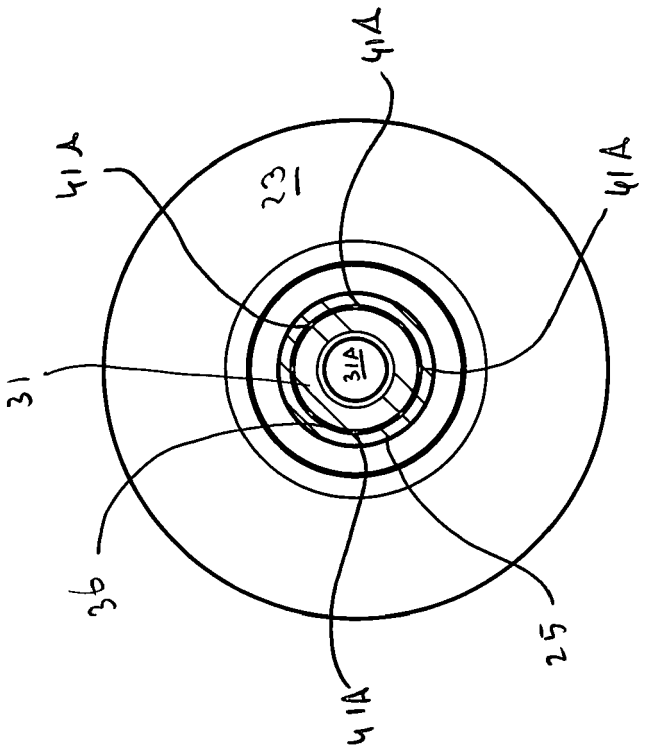


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FIG 14

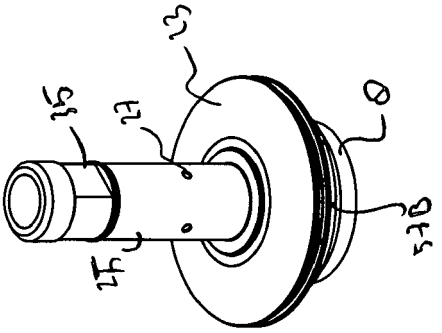


FIG 15B

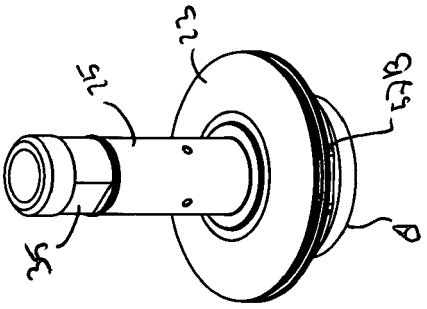


FIG 15A

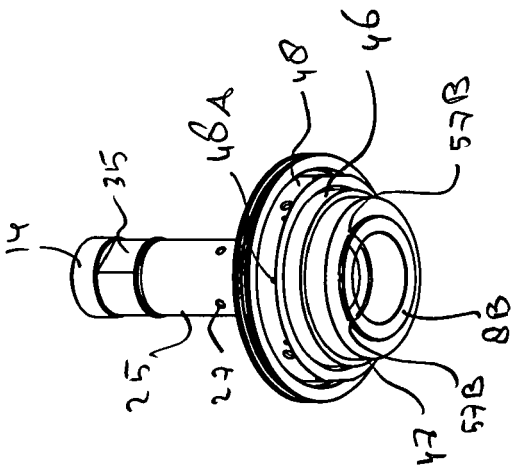


FIG 15D

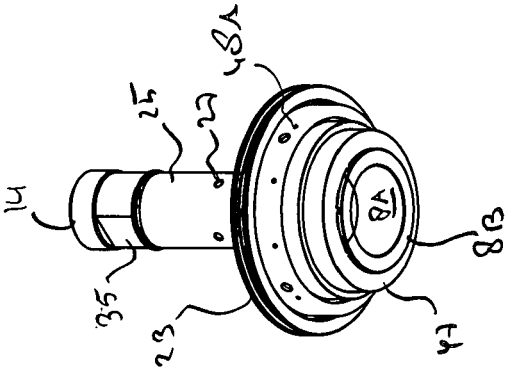


FIG 15C

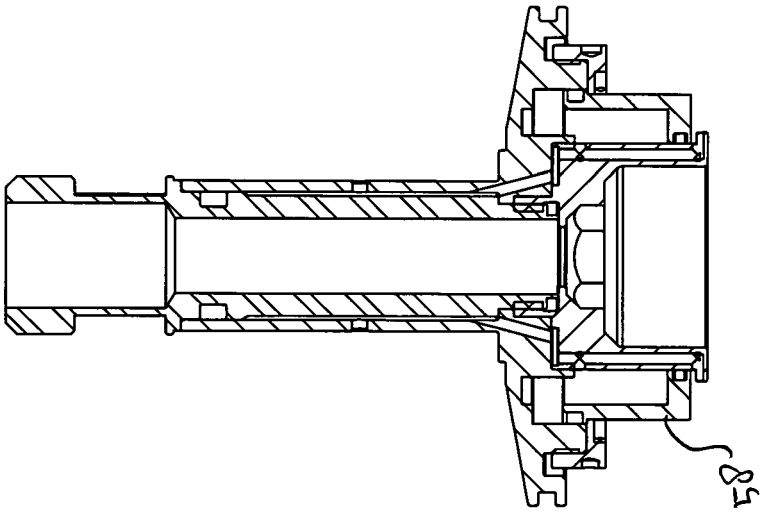


FIG 16

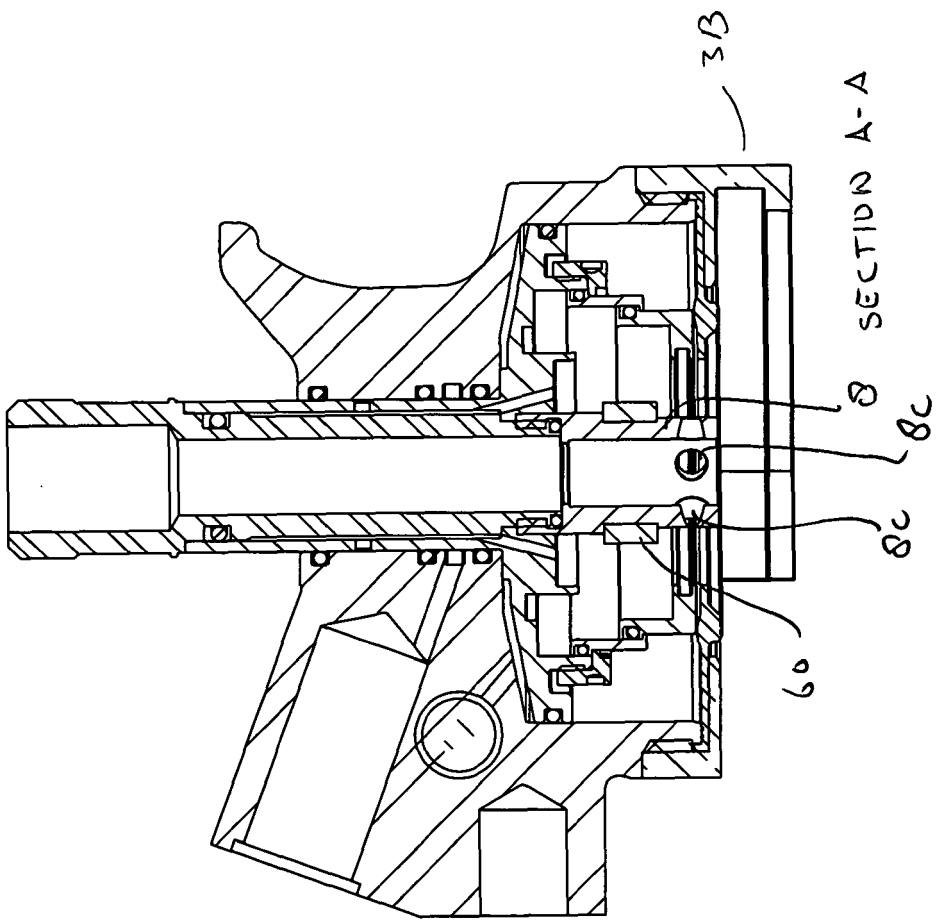


FIG 17

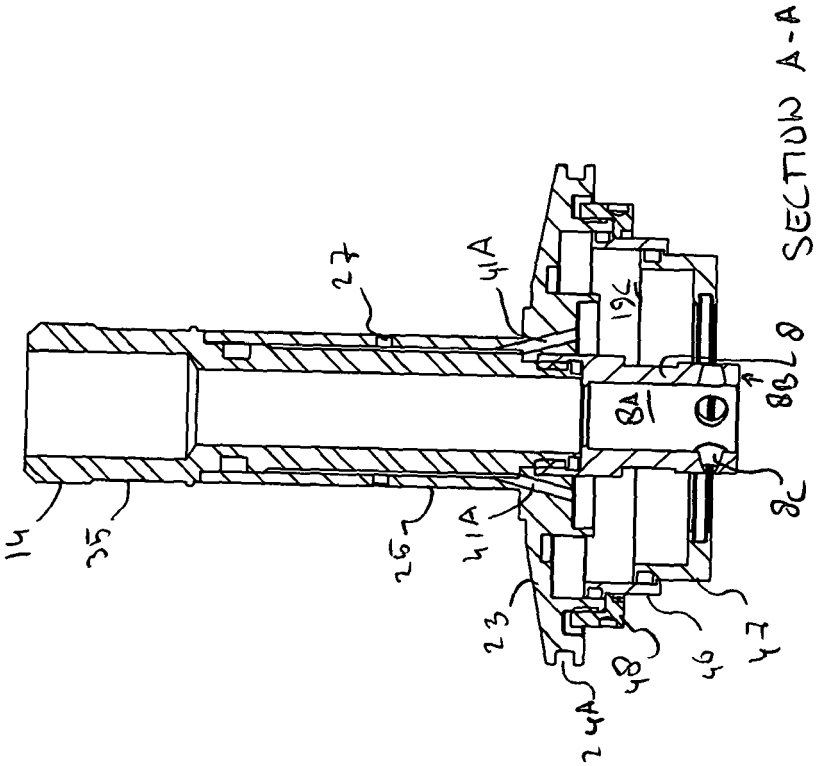


FIG 18

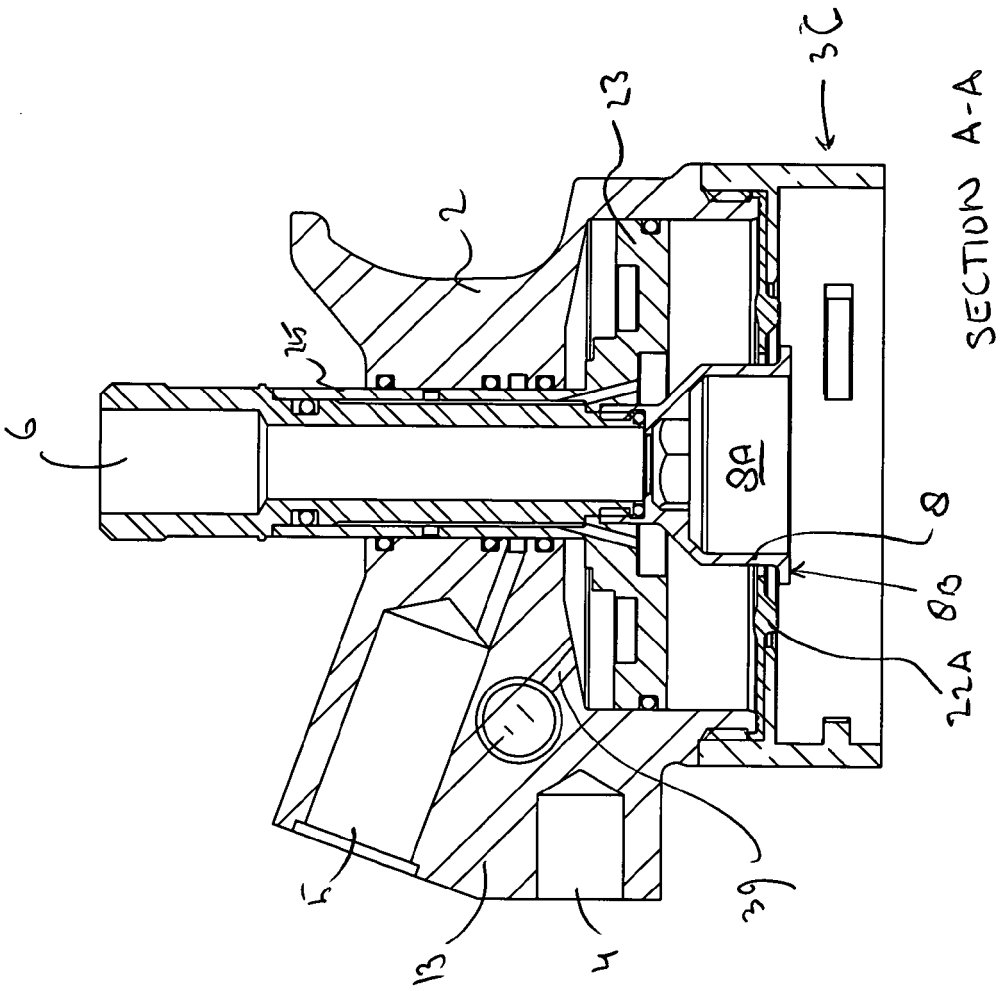
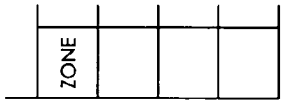


FIG 19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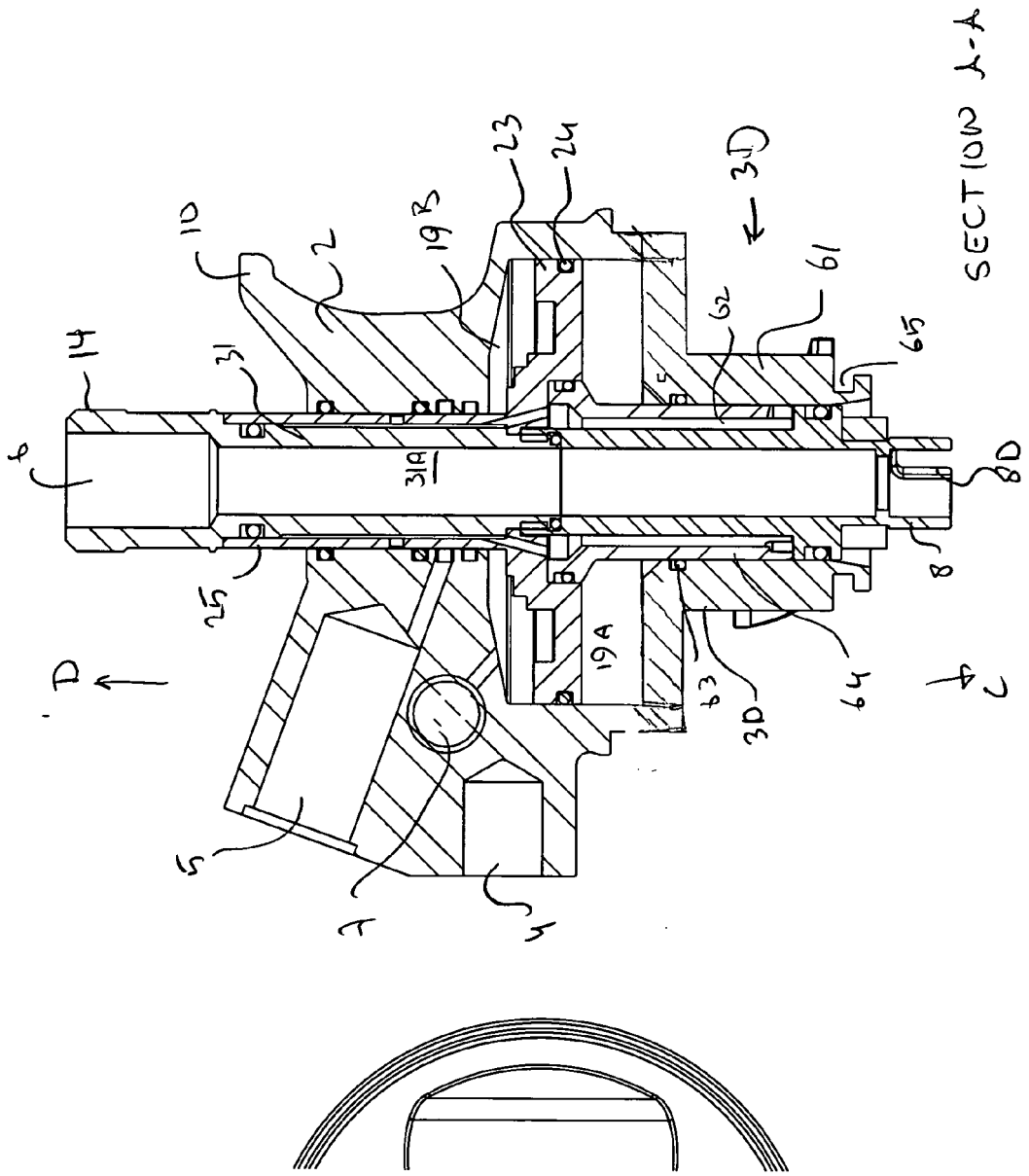
SECTION A-A
FIG 20
10
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19B
23
24
3D
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62
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14
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31A
8D
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19A
63
64
3D
D
C
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7
4

ZONE	REV.
	A
	B
	C

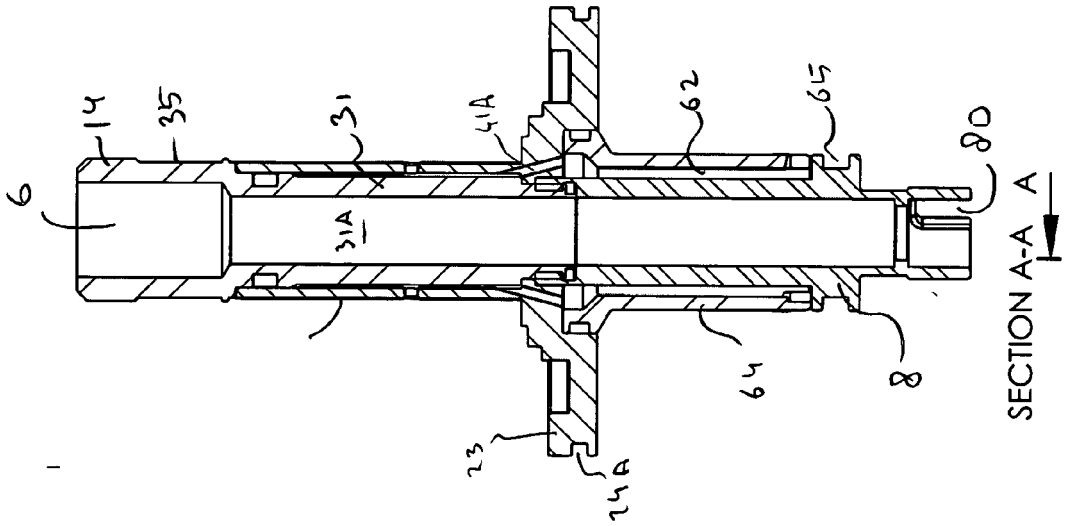

FIG. 21

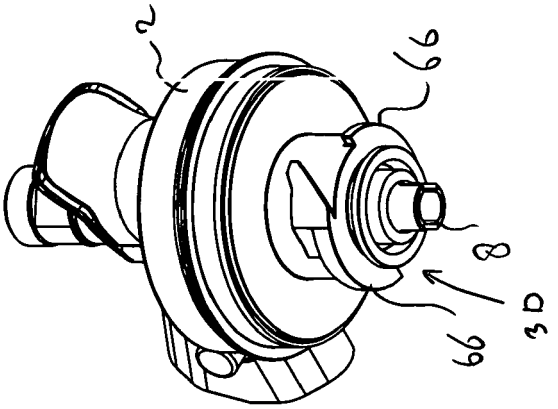

FIG 22B

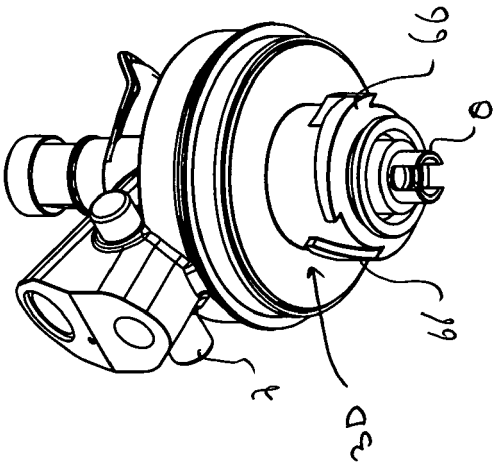

FIG 22A

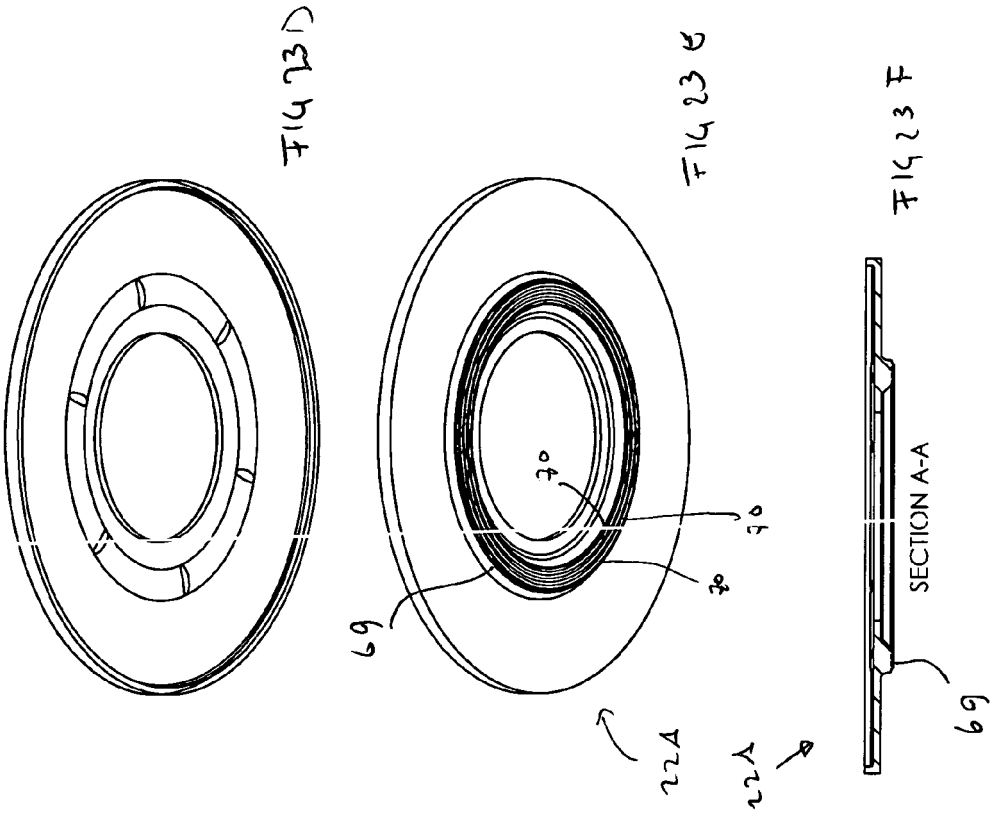
FIG 23D
FIG 23E
FIG 23F
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22A
22A
SECTION A-A
69

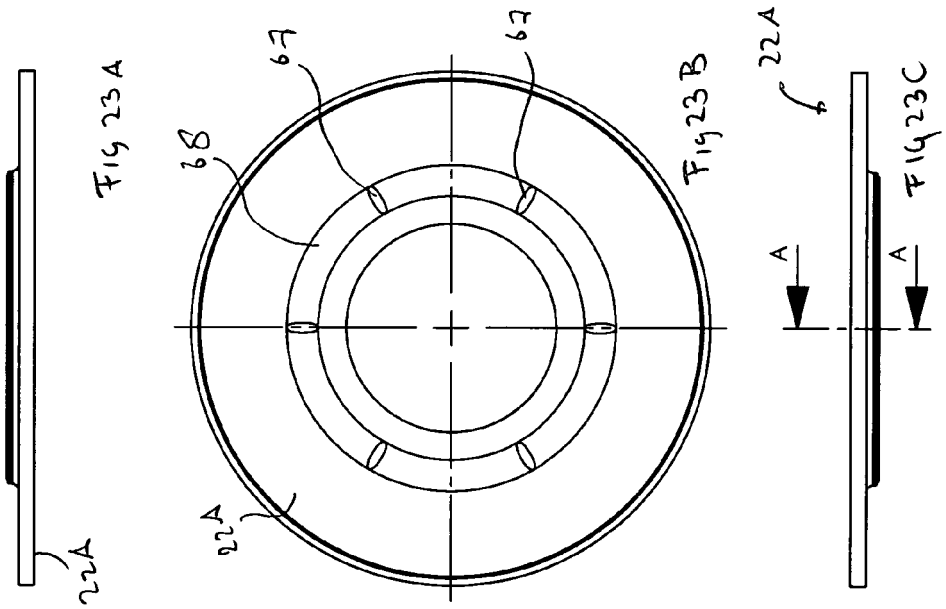
FIG 23A
FIG 23B
FIG 23C
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22A
22A
A
A

FIG. 23

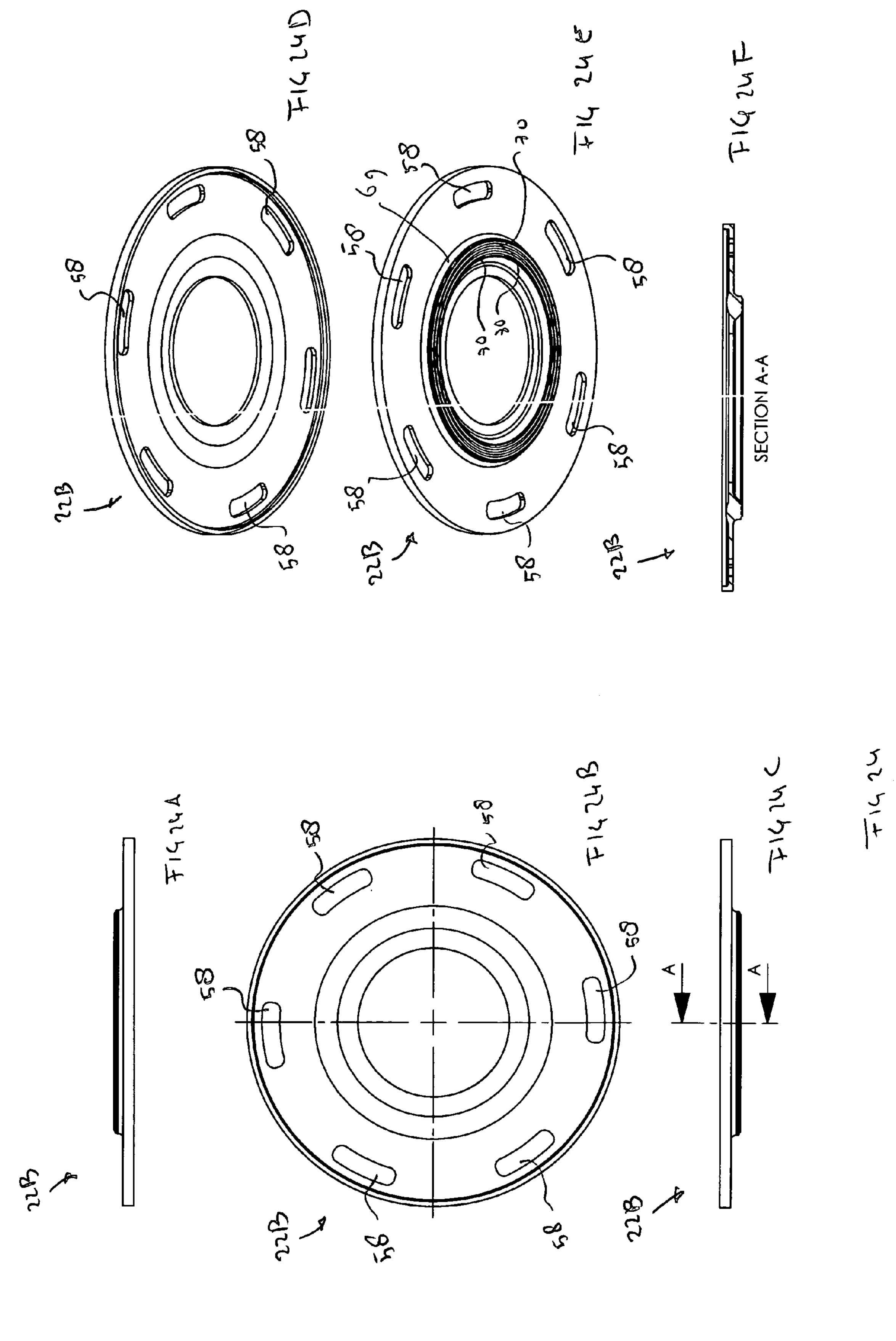
FIG 24D
FIG 24E
FIG 24F
SECTION A-A
FIG 24A
FIG 24B
FIG 24C
FIG 24
22B
58
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70
A

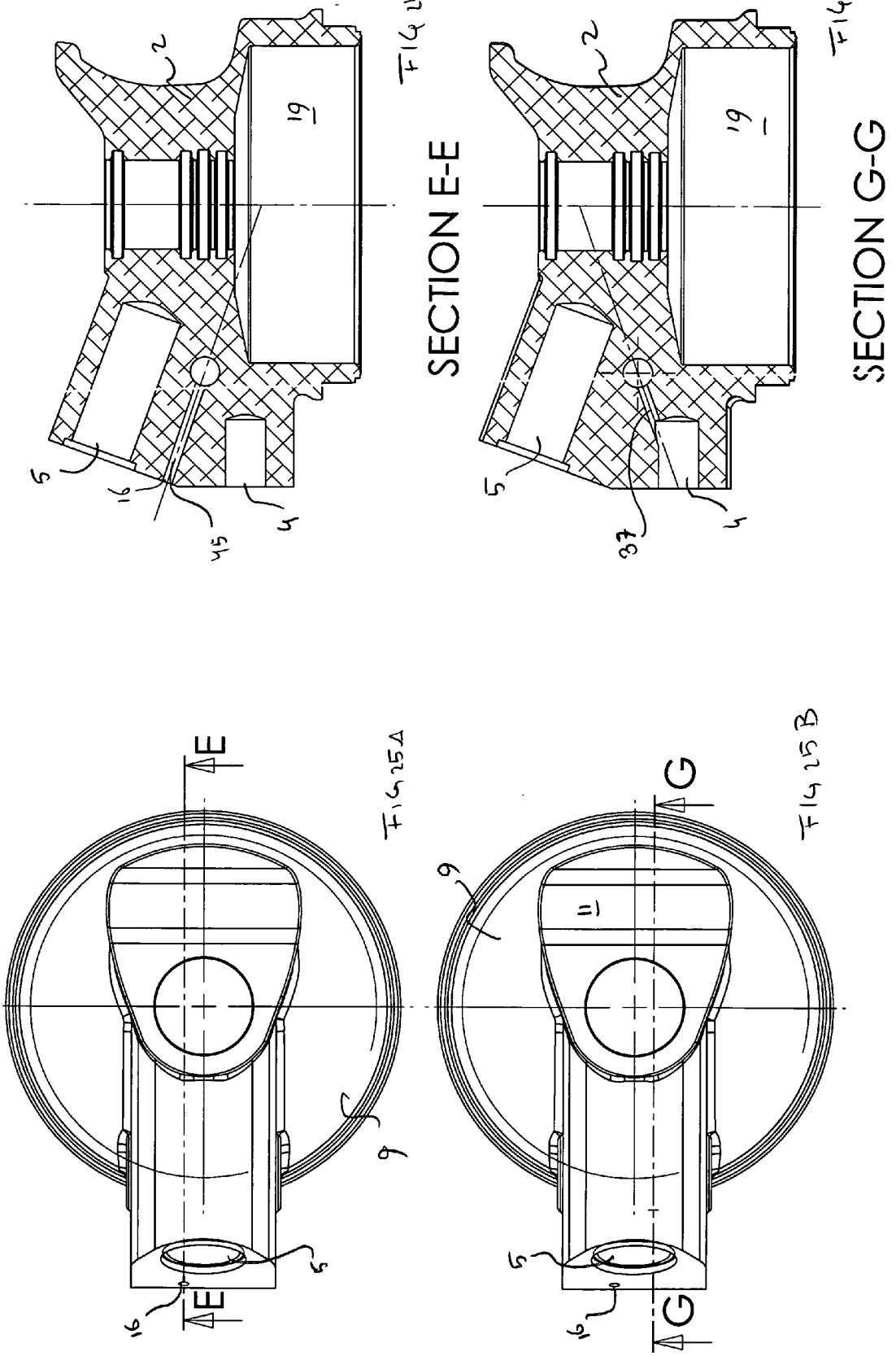

Fig 25

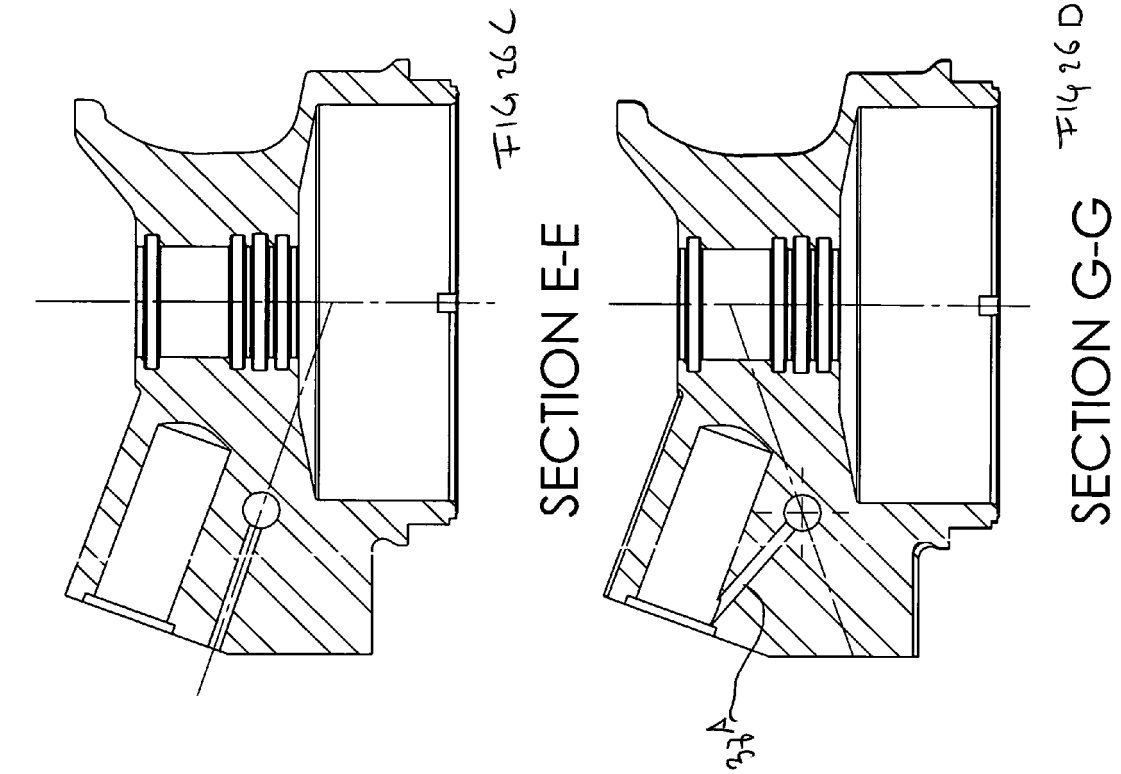

FIG 26A

FIG 26B

FIG 26C

FIG 26D

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EUROPEAN SEARCH REPORT

Application Number
EP 09 00 6751

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 759 409 A1 (TILL RUDOLF [DE]) 26 February 1997 (1997-02-26) * column 1, line 33 - column 2, line 10; figures 1,2 * -----	1-7	INV. B67D1/08
X	US 4 212 414 A (BEYENS JOZEF [BE]) 15 July 1980 (1980-07-15) * column 3, line 5 - line 16; figures 2,3 * -----	1-7	
X	EP 0 269 152 A2 (ODL SRL [IT]) 1 June 1988 (1988-06-01) * column 2, line 10 - line 50; figure 2 * -----	1-7	
			TECHNICAL FIELDS SEARCHED (IPC) B67D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 December 2009	Desittere, Michiel

CATEGORY OF CITED DOCUMENTS

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08-12-2009

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		DE 29513213 U1	19-10-1995
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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Patent documents cited in the description

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