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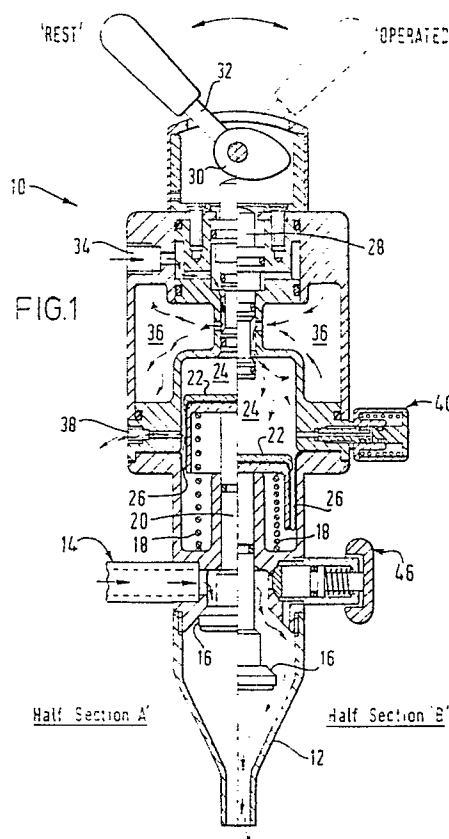
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(54) **Fluid dispenser.**

(57) A dispenser (10), suitably for beer, has an inlet (14), a dispensing outlet (12), and a fluid path between the inlet and the outlet through which fluid may pass in use.

A regulating valve (16) is provided for controlling the flow of the fluid from the inlet (14) to the outlet (12), and an actuating fluid may be selectively applied to a chamber (24) in the dispenser for controlling the opening movement of the regulating valve (16) by applying a positive pressure operative to open the valve against means (18) biasing the valve into the closed position. The chamber for the actuating fluid includes a bleed valve (38) for allowing release of the pressure over a period of time so that the regulating valve is returned to the closed position. The amount of fluid to be dispensed in use is dictated by the length of time the regulating valve is held open by the actuating fluid.



## FLUID DISPENSER

This invention relates to a fluid dispenser, in particular a dispenser for dispensing quantities of beer, lager or the like at a bar.

There are many well-known and widely used devices for dispensing fluids from some source into a receptacle, a very common example being the household tap. When a certain quantity of fluid is to be repeatedly delivered through the same dispenser, as is the case with, for example, a beer tap or a lavatory cistern, then it is advantageous to have the dispenser automatically shut off when the required quantity is delivered. This allows an operator to repeatedly, dispense the correct quantity of fluid and also allows him to perform other tasks while the fluid is being dispensed, thereby requiring less of his time and judgement.

In existing dispensers it is known to measure the required quantity of fluid before delivery takes place, by filling a reservoir, interposed between the source and the dispenser, to a predetermined level before being dispensed as required by the operator. Another method of measuring this quantity is to allow a given fluid flow rate through the dispenser for a given period of time, a method which, by doing away with the need for a reservoir, allows the dispensing apparatus to be made more compact.

An object of this invention is to provide an improved fluid dispenser.

According to this invention there is provided a fluid dispenser comprising: valve means for controlling a flow of a first fluid being dispensed in use; a chamber containing an actuating fluid, the valve means being operable in response to the pressure of the actuating fluid; and means for controlling the pressure of the actuating fluid within the chamber over a period of time, whereby the flow rate of the first fluid is also controlled over a period of time.

Preferably the actuating fluid in use is at a positive pressure which is released in a controlled manner to atmosphere by means of a bleed valve. In a preferred embodiment the actuating fluid is a gas supplied under pressure on manual manipulation of an operating lever.

This invention also includes a fluid dispenser comprising a regulating valve which controls the flow rate of a fluid through a dispensing outlet, the regulating valve being operable in response to the pressure of an actuating fluid in a chamber, wherein the chamber is connected to a further body of fluid by means which allow the fluid pressures of the chamber and the body, when different, to approach one another at a controlled rate, the resulting change in the pressure within the cham-

ber, over a period of time, causing a corresponding change in the opening of the regulating valve.

In a preferred embodiment the further body of fluid is the atmosphere, so that the fluid within the chamber approaches ambient pressure, at which point the regulating valve shuts off the fluid flow through the dispensing outlet. The initial pressure in the chamber may be higher or lower than ambient pressure, but is preferably higher, and the actuating fluid is preferably a gas such as carbon dioxide.

This invention will now be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a cross-sectional view of a preferred embodiment of the invention, showing two half-sections, each representing a different operative state; and

Figures 2 to 7 are enlarged cross-sectional views of details of Figure 1.

Referring to Figure 1, which shows a preferred embodiment of this invention, a fluid dispenser 10 is shown in two operative states, one in each of half-sections A and B. The embodiment shown is particularly suitable for dispensing effervescent beverages such as beer, lager or the like at a bar and is thus described hereinafter in this context, although it will be clear to those skilled in the art that the dispenser of this invention can be used to dispense any fluid.

Dispenser 10 has a dispensing outlet 12 at its lower end as shown and as in use, through which beer or other fluid can flow, the beer being supplied from a source (not shown) via an inlet pipe 14 which is connected into one side of the dispenser. Between inlet pipe 14 and dispensing outlet 12 is a duct through which the beer can pass, the beer flow being controlled by a regulating valve 16 situated within the duct on the longitudinal axis of the dispenser, which is axially movable between the fully closed and fully open positions shown in half-sections A and B respectively. Suitably, regulating valve 16 has frusto-conical seating surfaces as shown, which are preferably resilient to facilitate sealing.

The regulating valve 16 is attached to a rod 20 which has a piston 22 rigidly connected to its upper end, the rod 20 extends along the axis of the dispenser 10 and is slideable along that axis. An axially-compressed spring 18, located beneath the piston 22 as represented in the drawing, acts to urge the valve 16 upwardly into its closed position. Accordingly the opening of valve 16 is directly linked to the axial position of piston 22. Piston 22 is movable within a chamber 24 and is connected to

a rolling diaphragm 26 which seals one end of the chamber, whereby a force may be exerted upon piston 22 by creating a pressure differential across the diaphragm. Therefore the opening of valve 16 is determined by the balance between the forces exerted by the coil spring 18 and by the pressure of fluid within chamber 24.

Above chamber 24 as shown is a shuttle valve 28, which is movable along the longitudinal axis of dispenser 10 by means of a cam 30, operable by manual manipulation of a lever 32. In the rest position, shown in half-section "A" in Figure 1, the shuttle valve 28 allows fluid communication, via an annular duct, between a pressurised gas inlet 34 and an annular chamber 36, thereby filling the annular chamber 36 with gas at the supplied pressure. With the shuttle valve 28 in this position, the chamber 24 is sealed off from the annular chamber 36 and from the pressurised gas inlet 34, and contains gas at a lower pressure than that in annular chamber 36 as will be explained.

When a quantity of beer is to be dispensed, lever 32 is moved into its operating position shown in half section "B" of Figure 1, which moves the shuttle valve 28 along its axis as shown by means of the cam 30. Cam 30 suitably has an over-centre action to urge the lever into this position until deliberately released. In this position the shuttle valve 28 closes off gas inlet 34, preventing the intake of further pressurised gas, and also connects chamber 24 to annular chamber 36, which equalises the pressure within both chambers. As a result, the pressure within chamber 24 is raised to an extent which forces the piston 22 and diaphragm 26 to move against the force of spring 18 and so fully open the regulating valve 12. This allows the beer or whatever other fluid is being dispensed to flow from the inlet pipe 14 through the dispensing outlet 12, under its own pressure or pressure derived from some external pumping means.

The pressure within chamber 24 is then gradually reduced by the controlled release of gas to the surrounding atmosphere via a micrometer control needle valve 38. As the pressure within chamber 24 drops, thereby exerting less force on piston 22, spring 18 is allowed to extend, progressively closing regulating valve 16 until, after a period of time, the flow of beer through the dispensing outlet 12 is stopped. Lever 32 can then be moved back to its rest position whereupon the dispenser 10 is ready to dispense the required amount of beer again.

The amount of beer or other fluid dispensed by each operation of the dispenser 10 is principally dictated by the length of time over which the regulating valve 16 is open, and to what extent it is open over that period. It is clearly desirable to have some control over the amount dispensed per op-

eration, and this control may be conveniently achieved by making the needle valve 38 adjustable so as to control the rate at which the gas within the chamber 24 is allowed to escape. Some adjustment of the needle valve 38 or the source of gas pressure is desirable in order to make the dispenser more versatile and to accommodate fluctuations in the pressure of the fluid being dispensed.

The dispenser 10 shown in Figure 1 incorporates refinements which facilitate its use dispensing drinks in a bar. These include an override control 40 which allows a barman to abort the dispensing operation before the full pre-set amount is dispensed, as is desirable if, for instance, a customer changes his mind after ordering a drink. As shown in the enlarged views of Figures 2 and 3, override control 40 comprises a spring-loaded pull sleeve 42 which, when pulled out as shown in Figure 3, uncovers an exhaust port 44, thereby quickly reducing the pressure in chamber 24 so as to allow regulating valve 16 to shut.

A further refinement is a top-up control 46 which allows the barman to dispense any volume of drink, irrespective of the pre-set volume. This provision is particularly useful for compensating for any volume changes which may occur as a result of temperature changes in the beer as it is delivered, as occurs when the initial slug of beer in the dispenser is warmer than that in the supply source. The top-up facility is also useful for delivering non standard quantities of beer, or for allowing the dispenser to be used if for any reason it fails with the regulating valve 16 shut.

As shown in the enlarged views of Figures 4 and 5, top-up control 46 comprises a spring-loaded pull valve 48 having a resilient frusto-conical seating surface 50 seating on cross ports 52, which by-pass the seated regulating valve 16. Accordingly, when valve 48 is pulled out as shown in Figure 5 beer can flow through cross ports 52 and out of the dispensing outlet 12 even when regulating valve 16 is closed. Alternatively the top-up control 46 comprises a rotary screwed valve 48 having a resilient frustoconical seating surface 50 seating on cross ports 52 which by-pass the seated regulating valve 16. Accordingly, when valve 48 is unscrewed as shown in Figure 6 beer can flow through cross ports 52 and out of the dispensing outlet 12 even when regulating valve 16 is closed.

The pressurised gas such as CO<sub>2</sub> required by dispenser 10 is suitably derived from the high pressure stage of a two-stage gas bottle pressure reducing set, the low pressure stage typically being about 5 psi lower in pressure and connected to a beer keg in the normal way. Accordingly only the beer source need be connected to the normal cellar gas supply with the pressurised gas air or CO<sub>2</sub> being obtained from a separate source such

as a compressor or a second gas bottle. The use of CO<sub>2</sub> gas is envisaged here only because it is likely to be readily to hand in a cellar, but it will be clear to those skilled in the art that a liquid could equally well be used in this or any other application.

One further feature is that the dispensing outlet 12 is readily interchangeable with outlets specifically designed for the dispense of specialist beers. An example is shown in Fig. 7 for dispensing 'GUINNESS' where the outlet 12 is provided with a nozzle 60. The nozzle 60 has an orifice plate 61 seated by means of an 'O' ring 62 and through which beer is dispensed via a flow straightener 63.

### Claims

1. A fluid dispenser comprising valve means for controlling a flow of a first fluid being dispensed in use, a chamber containing an actuating fluid, the valve means being operable in response to the pressure of the actuating fluid, and means for controlling the pressure of the actuating fluid within the chamber over a period of time, whereby the flow rate of the first fluid is also controlled over a period of time.

2. A fluid dispenser according to claim 1 wherein the actuating fluid in use is at a positive pressure which is released in a controlled manner to atmosphere by means of a bleed valve.

3. A fluid dispenser according to claim 1 or 2 wherein the actuating fluid is a gas supplied under pressure on manual manipulation of an operating lever.

4. A fluid dispenser comprising a regulating valve which controls the flow rate of a fluid through a dispensing outlet, the regulating valve being operable in response to the pressure of an actuating fluid in a chamber, wherein the chamber is connected to a further body of fluid by means which allow the fluid pressures of the chamber and the body, when different, to approach one another at a controlled rate, the resulting change in the pressure within the chamber, over a period of time, causing a corresponding change in the opening of the regulating valve.

5. A fluid dispenser according to claim 4 wherein the further body of fluid is the atmosphere, so that the fluid within the chamber approaches ambient pressure, at which point the regulating valve shuts off the fluid flow through the dispensing outlet.

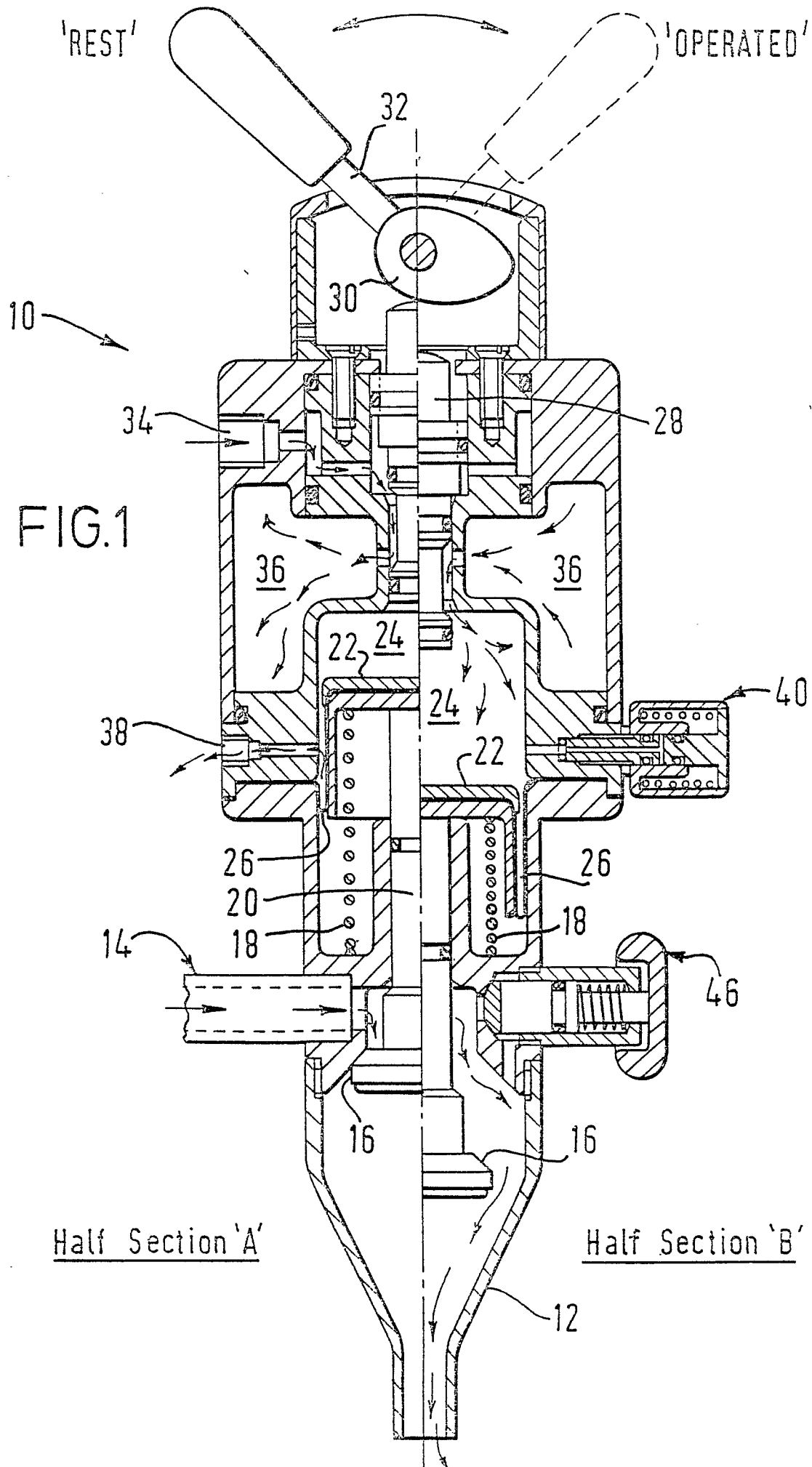
6. A fluid dispenser according to claim 4 or 5 wherein the initial pressure in the chamber is higher than ambient and the actuating fluid is a gas such as carbon dioxide.

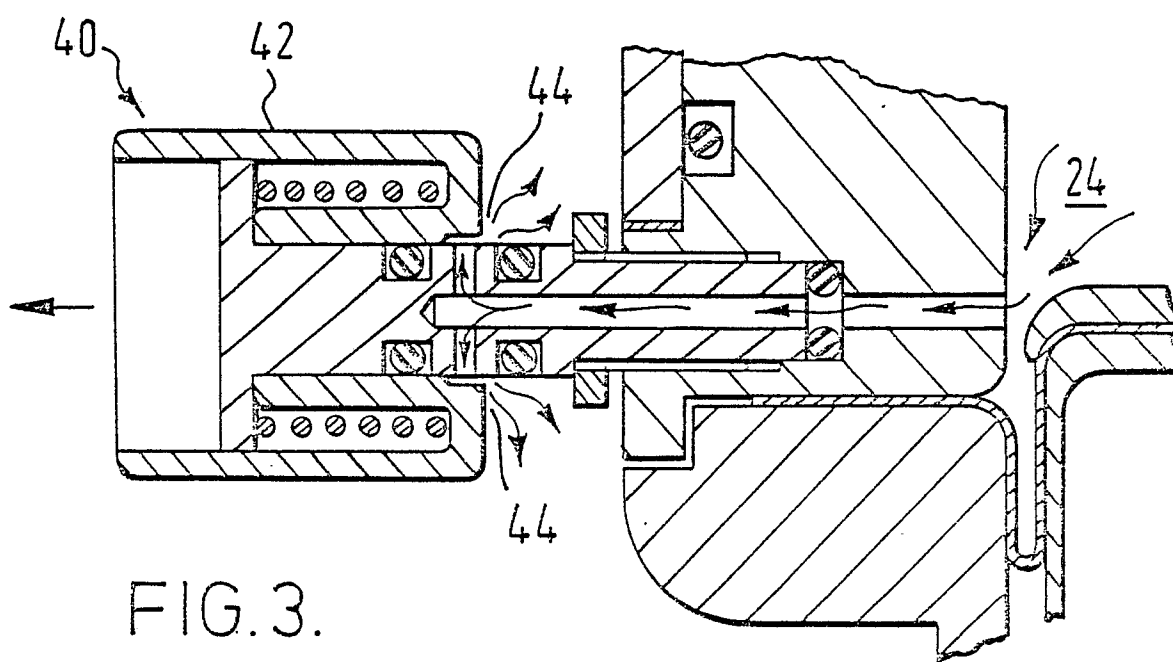
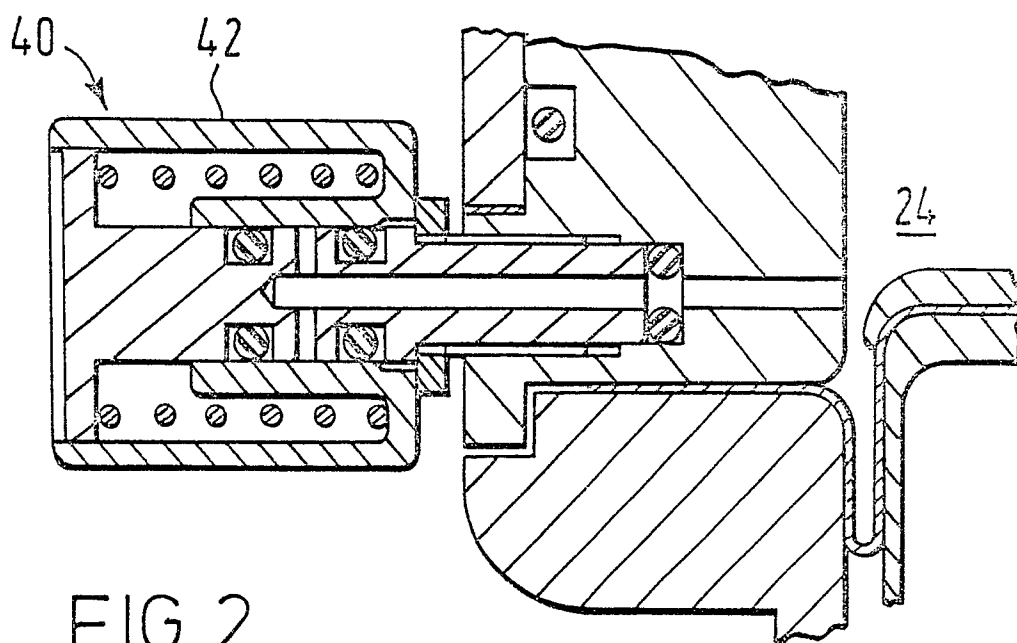
7. A beer dispenser comprising an inlet for beer, a dispensing outlet, a fluid path between the inlet and the outlet through which beer may pass in use, a regulating valve for controlling the flow of beer from the inlet to the outlet, pressure means for controlling the opening movement of the regulating valve by applying a positive pressure operative to open the valve against means biasing the valve into the closed position, and pressure release means for allowing release of the pressure over a period of time whereby the regulating valve is returned to the closed position, the amount of beer to be dispersed in use being dictated by the length of time the regulating valve is held open by said pressure means.

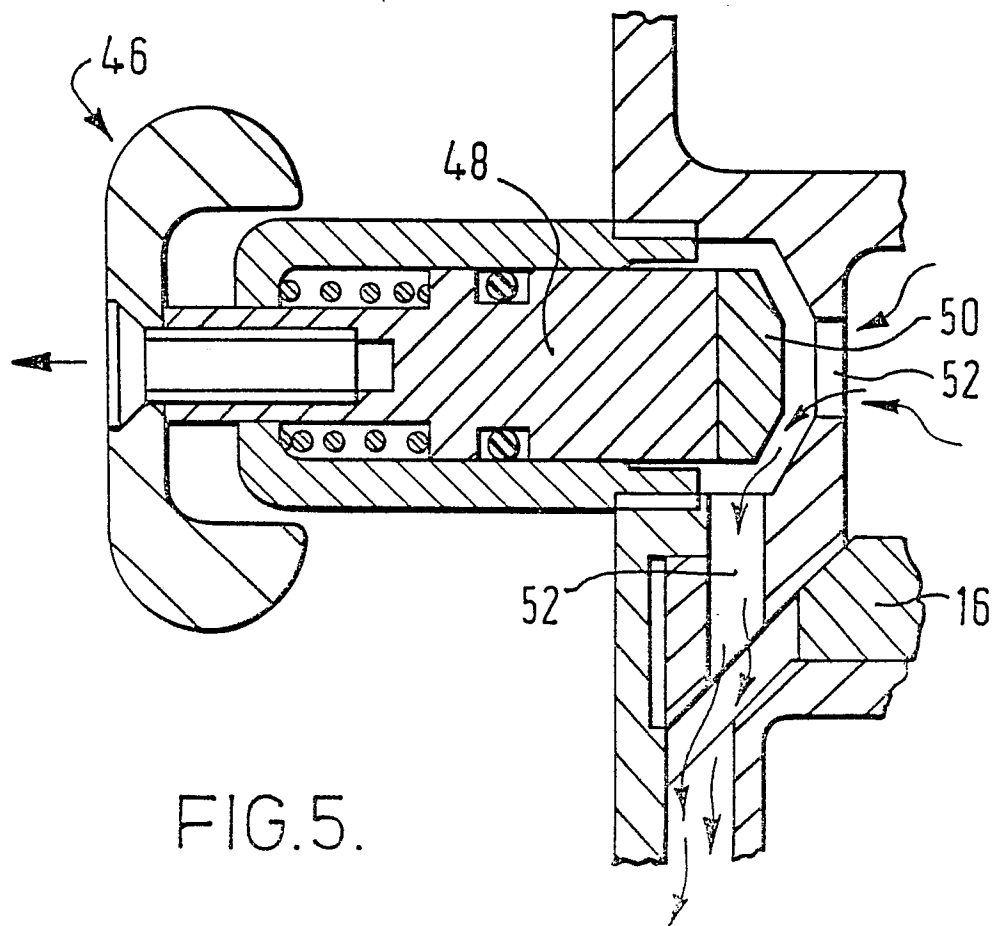
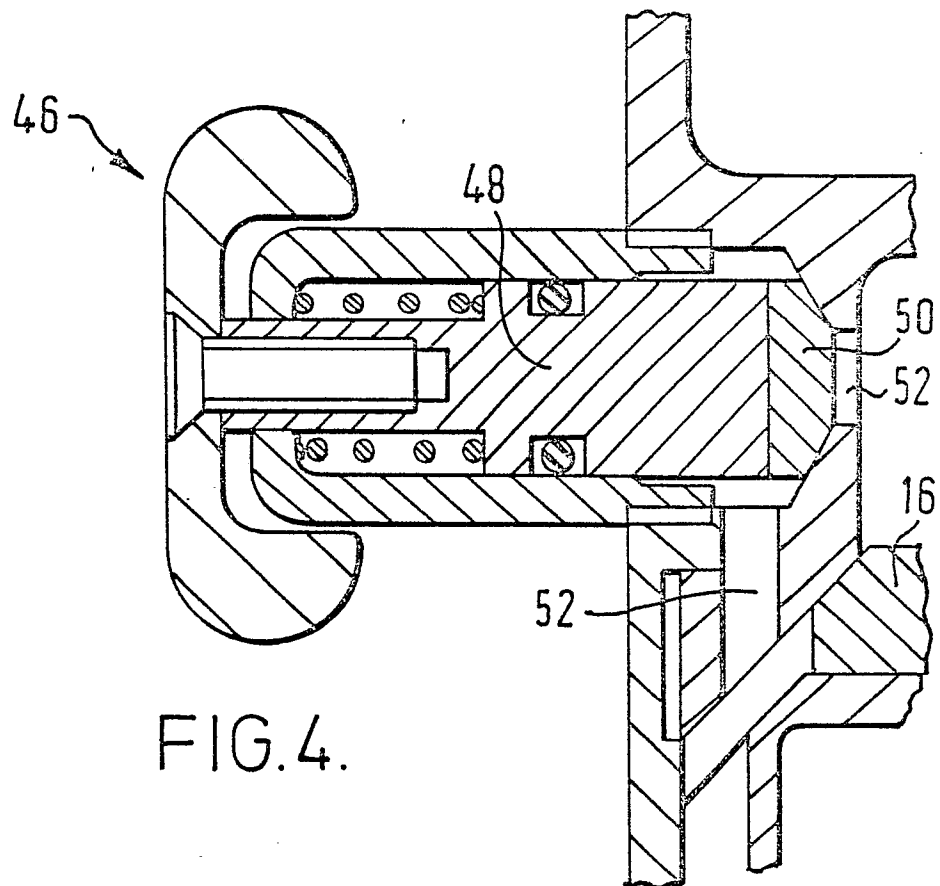
8. A beer dispenser according to claim 7 wherein the pressure means comprises a chamber arranged to receive a predetermined amount of pressure actuating fluid which is operative to effect movement of the regulating valve into the open position.

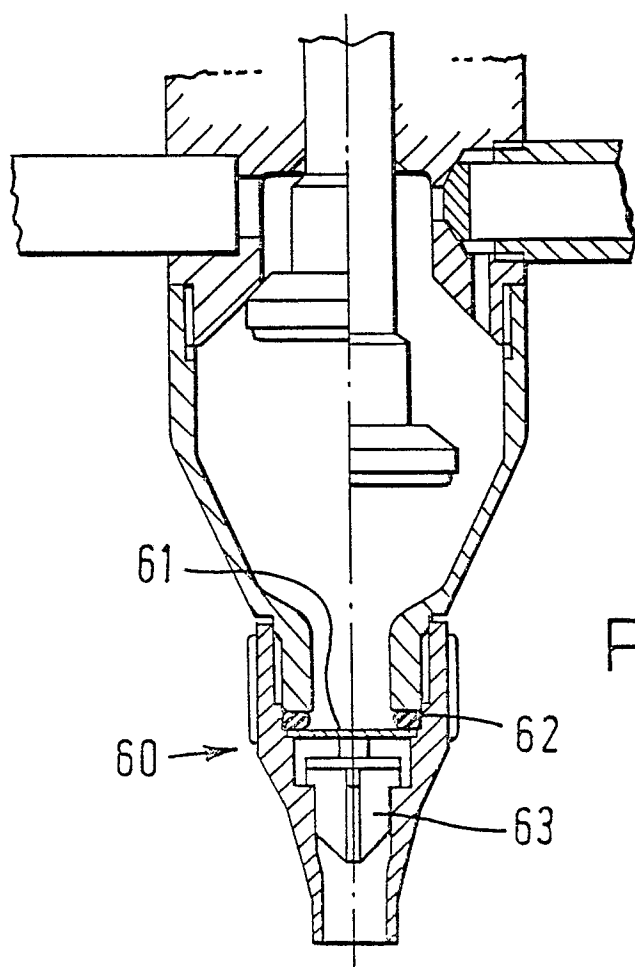
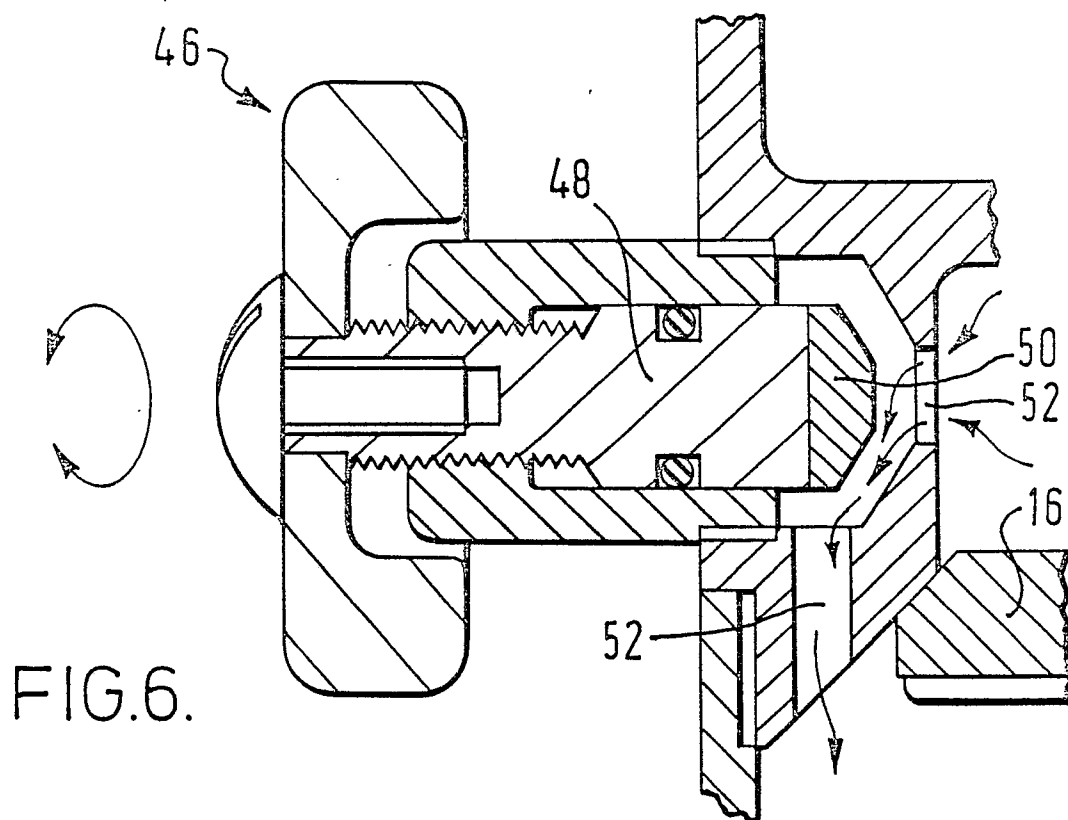
9. A beer dispenser according to claim 8 wherein the pressure release means comprises an adjustable bleed valve allowing release of the actuating fluid from the chamber over said period of time.

10. A beer dispenser according to claim 8 or 9 wherein the actuating fluid is supplied on manual manipulation of an operating lever.











| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                    |                                                |                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------|------------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages      | Relevant to claim                              | CLASSIFICATION OF THE APPLICATION (Int. Cl. 4) |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US-A-4 226 343 (FLING)<br>* Figures 2,4,5; column 4, line 61 - column 6, line 56 * | 1-10                                           | B 67 D 1/14                                    |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US-A-4 381 099 (KNEDLIK)<br>* Figure 1; claim 1 *                                  | 1,4,7                                          |                                                |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GB-A-2 145 396 (START)                                                             |                                                |                                                |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GB-A-1 067 848 (SLOAN VALVE CO.)                                                   |                                                |                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                    |                                                | TECHNICAL FIELDS SEARCHED (Int. Cl.4)          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                    |                                                | B 67 D                                         |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                    |                                                |                                                |
| Place of search<br>THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                    | Date of completion of the search<br>04-10-1988 | Examiner<br>DEUTSCH J.P.M.                     |
| <b>CATEGORY OF CITED DOCUMENTS</b><br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |                                                                                    |                                                |                                                |