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(54) Drink delivery system.

(57) In a drink delivery system, drink is sent from alternative liquid supplies (1a,1b) along a supply line (92,93) to a dispensing point (8), e.g. at a bar. The present disclosure relates to features of the supply line operated by pressurised gas. In particular, a shut-off valve (6) may be positioned in the supply line downstream of the supply (1a,1b), and closable by the action of compressed gas triggered by a switch (107) at the bar. On the same switched line (106), an input (46) for clearing the line by displacing the residual drink using pressurised gas is provided. Means for switching automatically between one supply and the other (1a,1b) are also described. A gas-driven changeover valve (2) is positioned in the supply line upstream of a single changeover valve (3), such as a float-controlled valve, which is operated when a current supply approaches exhaustion, to actuate the gas-driven changeover valve (2) and thereby connect the other supply.

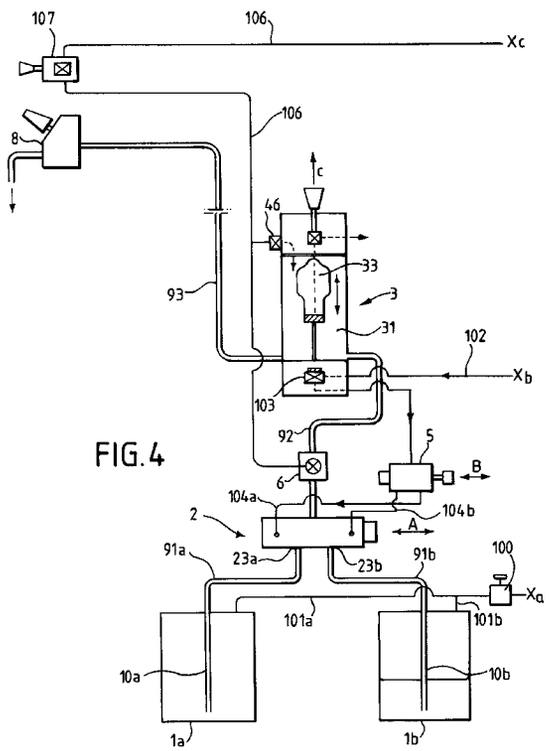

FIG.4

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This invention relates to drink delivery systems.

In a bar, drinks are generally stored in kegs, barrels or other large containers which, for reasons of convenience, are kept at some distance from the bar itself. For example, beer kegs are usually held in a cellar or a separate room, connected to drink dispensers - usually hand pumps or electric pumps - in another room. Most bars serve a variety of drinks, and so the bar may be supplied by way of a number of long flexible tubes, each connected to an appropriate supply container in the cellar or adjoining room. For convenience, these tubes are usually bundled together in a flexible outer sleeve to form what is sometimes known as a python.

For reasons of health, safety, and for keeping a good flavour, drink delivery systems must be cleaned out at regular intervals using a cleaning fluid. In existing systems, all drinks occupying the supply lines at the time of cleaning are lost. With long tubes, several drinks and regular cleaning, this loss can be a significant one.

In the prior art, see EP-A-269152 and US-A-4582226.

In one aspect we aim to provide a novel drink delivery system, and means which can be used for modifying an existing system, which can at least to some extent overcome the problems mentioned above.

In this aspect, our invention uses a supply of pressurised gas which can be fed into a drink supply line between the drink supply location and the drink dispensing location. The pressurised gas can be used to displace liquid from the line when the main drink supply has been shut off, ensuring that a minimum is wasted.

In one specific aspect, our invention provides a drink supply system having

a supply line communicating between a supply station and a dispensing station;

a shut-off, for shutting off supply to the supply line from the supply station;

means for feeding a pressurised gas into the supply line downstream of the shut-off, and

an actuator for initiating operation of the gas feed into the supply line.

Preferably the gas feed enters the supply line at or near the supply station, to minimise the amount of drink wasted.

It is highly preferred that the gas feed and shut-off operate in tandem, and preferably the actuator actuates the shut-off as well as initiating the gas feed.

The actuator may be a tap or valve on a gas line communicating between a pressurised gas supply station and the gas feed.

It is particularly preferred that the shut-off be gas actuated, so that shut-off and gas feed can be initiated together simply by opening a gas line.

However, other ways may be used whereby the shut-off could be connected to the gas feed so as itself to be actuated when gas feed is initiated.

In another specific aspect, relating particularly to the system when installed, the invention provides a drink supply installation in which a drink supply is connected to a hand-operable tap or pump for dispensing drinks by a supply line, a shut-off is provided which is operable to shut off the supply of drink along the supply line from the drink supply, and a pressurised gas supply is arranged to be operable to feed pressurised gas into the supply line downstream of the shut-off.

Particulars of the installation may be as for the system aspect described above. The following further possibilities should also be mentioned.

In particular, typically the tap or pump will be at a first location while the drink supply is at a second location substantially inaccessible from the first, connected by the supply line. This may correspond to the situation in a public bar. For example, the first and second locations may be at least five meters apart. They may be on separate levels of a building, or separated by a wall.

It is particularly preferred that the actuator for initiating gas feed be at the first location, i.e. the location at which drinks are dispensed. Normally the gas feed itself will be at the second location. To achieve this remote control, the actuator may govern an actuating gas line which has an upstream portion communicating between the gas supply (at the second location) and the actuator (at the first location), and a downstream portion communicating back from the actuator to the gas feed into the supply line at the second location.

The drink supply line and the upstream and downstream portions of the actuating gas line may extend together along the same path e.g. in a common bundle of supply lines which may be surrounded by a sleeve. Many bars have a pre-existing pressurised gas supply used for forcing drink from the drink supply along the supply line. Typically, carbon dioxide is used for this. This gas supply can conveniently be put to use to supply also the gas feed of our invention. The two applications are entirely distinct, since a gas input for driving supply from the drink supply will be upstream of the shut-off. Also, it will not need to be subject to an actuator as mentioned above.

We find that the feed pressure used for our concept is also desirably greater than that typically used for drink supply e.g. at least twice as great. Where the same gas supply is used to serve both purposes, an individual pressure regulator may be used on one or both lines to achieve the required differential.

In a typical case there will be plural drink supplies with respective drink supply lines, and the invention may therefore provide plural respective shut-offs and gas feeds for these. Desirably, the plural shut-off and feeds would be under the control of a single common actuator.

In another aspect, we provide a method of mod-

ifying a drinks supply system in which drink is fed under pressure from a drink supply along a supply line to a dispensing station, the pressure being provided from a pressurised gas supply connected to the drink supply. The modification comprises adding a shut-off to the supply line and leading a gas feed into the supply line downstream of the shut-off - the gas feed preferably being provided from the same pressurised gas supply as drives the drink supply - and also providing an actuator for initiating operation of the gas feed and shut-off of the supply line.

Again, particulars of the modification could be in line with the various preferred features explained above in relation to the previous aspects. However it will be seen that in many cases the modification will require relatively little disruption of an existing gas-pressurised system. Of course, the invention is not applicable only to drink supply systems which are already gas-pressurised, but that is a primary area of applicability.

In a fourth aspect, we provide a method of cleaning a drink supply system, the system comprising a drink supply, a drink dispenser and a supply line connecting them, the method comprising the steps of

shutting off the supply of drink through the supply line from the supply;

connecting the supply line to a supply of pressurised gas; and

using the pressurised gas to displace residual drink from the supply line through the dispenser, so that the pressurised gas occupies the supply line.

By these means, drink can be cleared from the supply line(s) in a controlled, tidy way without waste necessarily being involved, before subsequent cleaning steps (which may be conventional) are carried out.

In another aspect the present disclosure concerns developments in the technology for switching automatically from one liquid supply to another when the first liquid supply becomes exhausted or imminently exhausted. Previous proposals for such systems may be noted in EP-A-235437, GB-A-2210680 and EP-A-353104 (having common inventorship with the present application).

Previous drink supply changeover concepts have been proposed in which the line from each supply incorporated a device for detecting exhaustion or imminent exhaustion of that supply. A switching or changeover valve for shifting the connection of a single supply outlet between the various supplies required a complex construction, seeking to determine which of various supplies was and was not connected at any given time. Furthermore, the system relied on the supplies being gas-pressurised. These complicated systems suffer reliability problems. They are also expensive to make.

It would be desirable to provide novel changeover techniques.

In one independent aspect, we now provide apparatus for switching liquid supply between first and second supply sources, comprising

a switching valve having first and second inlets for connection to the first and second sources respectively, a common outlet, and a relatively movable valve component drivable by pressurised gas selectively between first and second conditions, in which respectively the first inlet only and the second inlet only are connected to the common outlet;

a supply exhaustion detector having a fluid chamber which can receive liquid from either the first or the second supply source, comprising means for detecting a state of exhaustion or imminent exhaustion of the supply source connected to it and means for initiating, when that state is detected, an operating supply of pressurised gas to the switching valve, and

a gas pathway selector which is movable, in accordance with the identity of the supply source currently connected to the outlet, between respective conditions in which it directs the operating supply of pressurised gas (initiated by the supply exhaustion detection) so as to operate the switching valve in a sense which disconnects the currently connected supply from the outlet and connects instead the other supply.

Using this arrangement, it is possible to monitor two liquid supplies using a single detection chamber, preferably a float-activated gas-valve device which may be of a general type already known.

The gas pathway selector may be manually operable, since human intervention is in any case generally necessary at the time of replacing the exhausted supply source. It may however if wished be connected to be operated automatically to the appropriate condition, by some appropriate means which can determine the status of the supply sources.

In one embodiment, the gas pathway selector simply directs a single gas supply along a selected one of two gas passages, each leading to a respective operating chamber for moving the switching valve device to a respective one of its conditions.

The valve may be a spool valve having an elongate valve body movable axially in a valve housing, with piston portions to be acted on by the pressurised operating gas in addition to the seals and clearances necessary for governing liquid flow direction.

Most preferably, the gas supply initiated by the exhaustion detection is derived from a constant pressure gas source, such as a pressure-regulated main, to ensure consistent operation of the valve. In the context of drink dispensing, this may render the supply changeover function self-contained, so that it can be used irrespective of whether the drink supplies are themselves driven by pressurised gas. The device could be used to change between kegs of hand-pumped beers, for example.

Features as described above may be combined with features of a drink supply system as described in the other aspects above. In one particular aspect, the shut-off of a drink supply system of the aspects above is provided in the liquid supply line downstream of the switching valve of the switching system i.e. in the single outlet line from the switching valve, so that a single shut-off can serve plural liquid supplies. The system may have a float-controlled valve to initiate a supply of pressurised gas to operate the switching valve, in response to exhaustion or imminent exhaustion of a currently-connected supply. The shut-off of the line-clearing system is desirably connected upstream of the float-controlled valve, while the pressurised gas feed used for clearing the line may be provided at the chamber of the float-controlled valve so that the chamber is cleared together with the line.

Embodiments of the concepts are now described by way of example, with reference to the accompanying drawings in which:

Figure 1 is a schematic side view of a drink supply system;

Figure 2 is an axial cross-section of a shut-off valve positioned on a supply line of the system;

Figure 3 is an axial cross-section of a push-pull actuator for controlling a supply of pressurised gas;

Figure 4 shows schematically a system for delivering beer from two kegs;

Figure 5 shows a float-operated valve of the system, and

Figure 6 shows the interaction of a gas pathway selector and supply switching spool valve of the system, and also a shut-off valve.

Figure 1 shows a drink supply system in which a beer keg 1 is connected to a dispenser tap 202 at a bar (not shown) by a long, flexible plastic supply tube 203. Particularly the keg 201 is in a cellar area, on a level below the bar as shown by the dotted line "F" indicating a floor level.

Also in the cellar is a high-pressure carbon dioxide (CO_2) container 204. A supply pipe 205 leading from this has a regulator 206 to keep the supply pressure at 30psi (200kPa). Adjacent the keg 201, the supply line 205 divides into a beer supply branch 207 and an actuating gas line 208. The beer supply branch 207 is connected into the top of the keg 201 by way of a regulator 209 keeping the beer supply pressure down to about 10psi (about 70kPa). This pressure enables the continuous supply of the beer from the keg 201 to the tap 202.

The actuating gas line 208 - which may be a flexible plastics tube like a conventional drink supply line - extends up with the drink supply line 203 to the bar area. At the bar area a gas actuator 210 is mounted. The gas line 208 is connected through this actuator and a downstream portion 211 thereof returns, side-by-side along the same route, to the cellar area. This downstream portion 211 of the gas line then itself branches at a T-piece 212 into a gas feed branch 213 and a shut-off branch 214.

The gas feed branch 213 includes a non-return valve 215 (which may be conventional) and communicates into the drink supply line 203 at a T-piece 216. This communication into the supply line is generally only a short distance, e.g. less than 1 metre, downstream of the keg 201.

A shut-off valve 217 is positioned on the drink supply line 203 a short distance upstream of the gas feed T-piece 216. The shut-off valve 217 is gas-actuated, and connected to the shut-off branch 214 of the gas line 211.

When the shut-off valve closes, beer from the keg 201 can no longer flow past it along the supply line 203. Conversely, gas from the gas feed branch 213 will be able to enter the supply line 203 in the portion between the valve 217 and the dispenser tap 202. Because of the non-return valve 215, no reverse flow of gas, or flow of beer from the line 203 into the gas system, is possible.

Figure 2 shows the shut-off valve 217 in more detail. It has a body 220 with threaded inlet and outlet ports 221,222 into which ends of the supply tube 203 are connected. The inlet and outlet ports 221,222 are connected through the body by a link passage 223. An obturator 224 is operable to block this link passage by a gas-actuated, spring-biased mechanism indicated generally at 225.

The mechanism 225 has a cylinder housing 226 projecting transversely relative to the supply line outlet link passage direction. The end of the housing 226 is connected by a spigot 227 to the shut-off branch 214 of the gas line. The obturator 224 is mounted on the end of a connecting rod 228 whose outer end is fixed in a piston 229 which is axially movable in the housing 226. A ring seal 230 seals around the piston 229, creating a gas working space 231 at the outer end of the housing 226. A biasing spring 232 acts between the valve body 220 and the piston 229, tending to urge the piston outwardly and hence keep the valve in the open condition i.e. with the obturator 224 clear of the link passage 223.

Figure 2 shows the valve in the closed condition, wherein gas pressure from the line 214 has forced the piston 229 against the bias of the spring 232, moving the obturator 224 to block the passage 223.

Thus, shut-off valve 217 will remain open, allowing beer to flow, unless gas line branch 214 is pressurised to overcome the spring bias thereof.

Fig. 3 shows the gas actuator 210 in more detail. It has a body 240 with a through-bore 241 in which a plunger 242 is recriprocably movable. An inlet passage 243 and an outlet passage 244, having respective spigots 245,246 for connection to the sections of the tubular gas line 208,211, enter the bore 241 at ax-

ially staggered locations. The plunger 242 seals against the bore 241 at two axially-spaced locations 247,248 between which is a flow clearance 249. With the plunger in the outward position (as in Fig. 3), the inlet 243 communicates into the flow clearance 249 but is isolated from the outlet by the inner seal 248. When the plunger 242 is pushed in, the flow clearance 249 registers with both inlet 243 and outlet 244, allowing gas to flow from the permanently pressurised upstream portion 208 of the gas line through the actuator 210 into the downstream portion 211 of the gas line.

The actuator is preferably fitted to the bar somewhere easily accessible to a person operating the bar.

The parts having been described, operation of the system is relatively easy to understand.

When it is desired to clear the lines - typically for cleaning - the bar operator pushes in the actuator plunger 242. This puts high-pressure carbon dioxide (30 psi) into communication with the gas feed 213 and shut-off valve 217. The pressure of the gas promptly shuts the valve 217, cutting off supply from the keg 201. Via the non-return valve 215, newly-pressurised gas in the branch 213 pressurises the residual drink in the supply line 203. Thus, drink can still be dispensed from the tap 202 under that gas pressure so that the drink is not wasted. Since the entire system is operated from the bar, it is economical of time and manpower. Furthermore, since all the components are operated by the pressure of the gas supply, no components need be electrically-powered.

It will be also be understood that an existing gas-driven supply system (which in effect would have only one gas pipe 205,207) can be modified by adding extra tube sections 208,211 communicating to the bar, an actuator 210 at the bar and a shut-off valve 217 and gas introduction point 216 for the supply line 203.

Referring to Fig. 4, a supply system for beer delivers the beer from first and second kegs 1a,1b to a dispensing tap 8. Typically the tap 8 is at a bar, and the kegs 1a,1b at some practically remote place e.g. in a separate room or cellar. The purpose of the system is to supply beer from only one of the kegs 1b until that keg is empty, and then automatically change over to supply from the other, full keg la without human intervention, as the first keg becomes exhausted. How this is done is explained below. The system also includes elements of the system described above, for clearing beer from the dispensing line to avoid wastage e.g. before cleaning of the system.

The kegs 1a,1b are conventional, with dip tubes 10a,10b feeding respective keg branch lines 91a,91b, which lead to the respective inlet ports 23a,b of a keg changeover valve 2. According to the condition of the changeover valve 2, one or other of the branch lines 91a,b communicates with a single intermediate beer line 92 which runs, via a gas-operated shut-off-valve 6, to a float-operated valve 3. This corresponds in general function to the valve disclosed in GB-A-2210680 although the present embodiment differs in several respects as will be described below. Briefly, it has a float chamber which is normally full of beer but which empties as the connected keg starts to become exhausted, allowing the float 33 to fall in the float chamber 31. The fall of the float 33 initiates changeover to the other (full) keg.

From the outlet of the float chamber 31, a final beer line 93 extends to the dispensing tap 8. Typically this line is the longest line, with the float chamber and switching apparatus being sited closely adjacent the kegs 1a,b.

Operation of the system is dependent on the use of pressurised gas, usually CO_2 gas available from a high-pressure source near the kegs. A conventional pub cellar will have a gas main with numerous outlets available. Firstly, to pump the beer, gas from a first mains outlet X_a is reduced in pressure by a regulator 100 to a suitable keg pressure e.g. 10, 20 or 30 psi, depending on the type of drink, and fed along respective branch tubes 101a,b into the tops of the kegs 1a,b. This is a conventional technique. In alternative embodiments, the beer may be pumped by a drawing pressure e.g. a hand pump at the dispensing outlet.

The keg changeover is also driven by pressurised gas. A changeover-driving gas line 102 is taken from the mains at X_b and, governed by the float-controlled valve 103, leads to a gas pathway selector 5 which directs any gas flow to one side or the other of the changeover valve 2. In this embodiment, the pathway selector 5 is a manually-operated slide device. Two valve-driving branch lines 104a,b lead from it to respective gas working chambers of the switchover valve 2.

Thus, when the beer level in the float chamber falls causing the float to fall and operate (open) the float-controlled valve 103, the mains-pressure gas line 102 is put into communication with the gas pathway selector 5 which is preset to lead the gas along that one of the branches 104a,b which will drive the changeover valve 2 to its other condition, and hence switch over the connection to the other keg 1a.

It will be noted that, unlike the systems described in EP-A-235437, GB-A-2210680 and EP-A-353104, the embodiment described here uses a single float chamber which can monitor the exhaustion of either of the kegs, by being placed downstream of the changeover valve 2. Furthermore the manually-operable pathway selector 5 (itself an independent aspect of this invention) is more simple and hence more reliable than previous devices for determining which keg was and was not connected. The complicated pressure sensors in earlier switchover valve proposals lacked reliability in operation and, even when operating, saved little work since it is always

necessary in any case to visit the keg location to replace the exhausted keg. The extra operation of switching the pathway selector 5 when installing and bleeding the fresh keg is a negligible burden.

Integrated with the keg changeover components is a system for clearing beer from the lines, substantially as described above in relation to Figs. 1 to 3. The shut-off valve 6 of the line-clearing system is interposed between the changeover valve 2 and the float-operated valve 3 of the beer line. The gas injection point 46 is at the top of the float chamber, to ensure clearing of the substantial volume which this chamber holds. The system is driven from a gas mains take-off X_c, leading into a beer-clearing gas line 106 which has branches to the gas injection point 46 and to the shut-off valve 6, after communicating to an operating plunger 107 which when pressed opens the line 106 and is positioned at the bar adjacent the dispenser tap 8.

The components of the system are now described in more detail.

Firstly, with reference to Fig. 5, the float-operated valve comprises an upright cylindrical float chamber 31 defined by a transparent tubular wall 32 and top and bottom units 48,49, typically plastics mouldings. A vertical central metal rod 34 extends up through the chamber, and can be lifted a short distance, using top knob 44, against a restoring spring. The hollow plastics float 33, having a metallic "keeper" 35 for attraction by magnet at its bottom end, is slidable on the metal rod 34 to guide it as it floats up and down. Pulling the knob 44 to lift the rod 34 can release the float 33 from the magnetic attraction of the magnetic body 36 in the bottom unit 49. Lifting the rod also opens a bleed valve 43 so that any pressurised gas within the chamber 31 can escape through a small clearance between the rod 34 and the top moulding 48, the bleed valve 43, and a bleed outlet 45 (which may if wished be connected to a collecting vessel to avoid mess caused by escaping foam etc).

Beer from the intermediate beer line 92 enters the chamber 31 through the beer inlet 38, and leaves it through the oppositely-disposed beer outlet 39. These are moulded into the lower cap unit 49.

A gas passage having an inlet 40 and outlet 41 is also moulded through that lower cap unit 49, and has a central vertical portion with a pointed nozzle which can be closed by a vertically-movable magnetic valve body 36, having a sealing pad 37, positioned centrally directly below the float. When the float chamber 31 is substantially full of beer and the float is floating, the weight of the magnetic body 36 holds the nozzle 42 closed, so that gas pressure from the mains take-off X_b is shut off from the pathway selector 5 and changeover valve 2. When the currently-connected beer supply starts to become exhausted, however, the level in the chamber 31 begins to fall as further beer is dispensed and the float falls too. Fall of the float 33 is halted by the bottom limit surface under the keeper 35, which thereby lifts the magnetic body 36 and opens the gas nozzle 42, allowing mains pressure gas to flow to the pathway selector 5 and along the open one of the branch lines 104a,b to the changeover valve 2. This happens while there is still substantial beer in the chamber, because a lower stem extension 33a of the float spaces its main buoyancy from the keeper.

Fig. 5 also indicates the gas injection point 46 for the line-clearing system. This comprises a union and unidirectional valve 47 fitted into the top cap moulding 48, with a gas injection passage defined through that moulding and opening through the ceiling of the chamber 31.

Fig. 6 shows in detail the gas pathway selector 5 and changeover valve 2.

The changeover valve 2 comprises an elongate solid housing body 20 with an axial generally cylindrical bore 21 into which two beer inlets 23a,b communicate on one side and from which a beer outlet 24 communicates on the other side. Effectively it is a spool valve, having a sliding valve body 22 having a central annular beer-controlling seal 25 operating in a central beer chamber 26 of the bore 21, and an annular gas seal 73a,b at each end operating in a respective gas working space 72a,b.

Each end of the spool valve body 22 has a push-button portion 27a,b which can protrude through an opening in the end of the housing so that the valve is also manually operable.

Pressurised gas for operating the gas work spaces 72a,b is introduced via gas intakes 71a,b defined through insert bodies fitting through the main housing body 20, and which also form a wall separating the beer chamber 26 from the gas workspaces. The central spindle of the valve body 22 penetrates these walls, sealed by polypropylene gas seals 75, the insert bodies 70a,b themselves being sealed into the housing body 20 by neoprene rubber seals 74.

The annular seals 25,73 on the valve body 22 are all of polypropylene which has a good resistance to a beery environment. Furthermore, unlike earlier proposals for such valves, only one of the spool seals (the central seal 25) is directly exposed to beer during operation.

It should be noted that the spool valve design prevents crossover mixing of beer from one keg with beer from another; this is generally necessary to comply with brewery regulations.

The gas pathway selector 5 is a simple device whose housing 58 may in practice conveniently be fixed on the housing 20 of the changeover valve 2. All of these bodies may be of injection-moulded engineering plastics. The gas pathway selector body 58 has a through-bore 59 in which a slider 50 operates, having two spaced seals 55,56 defining a communi-

cation chamber 57 within the bore 59. A single gas input 53 communicates into the bore from one side, and two axially-spaced gas outputs 54a,b communicate from the bore on the other side. The slider 50 has a push button 51 at each end, by means of which it may be pushed between first and second conditions in which respectively one or the other of the outlets 54a,b is connected to the inlet 53.

Fig. 6 shows the valve condition before changeover from keg 1a to keg 1b. The changeover valve body 22 is in the right-hand position, putting the first beer inlet 23a into communication with the single outlet 24 of the valve 2. The slider 50 of the selector 5 is also in the right-hand position, putting the valve-driving gas line 102 in communication with the gas working chamber 72a via branch gas line 104a. It will readily be understood that, when pressurised gas is supplied along the gas line 102 in response to lifting of the float-operated valve 103, that gas will enter the left-hand gas work space 72a and drive the valve body 22 to the leftward position, shutting off the exhausted keg 1a and connecting up the fresh keg 1b.

Subsequently, a person can choose a convenient time to replace the exhausted keg with a fresh one, bleed accumulated gas from the float chamber 31 by raising the top knob 44, and shift the selecting slider 50 to the other position so that the changeover valve 2 will operate in the other direction next time.

The gas branch lines 104a,b from the selector 5 are crossed over, as shown, so that the initial positions of the selector slider 50 and the valve body 22 correspond. This makes it conceptually simple to set up the system. For initial set-up, for example, a first keg is connected to one inlet, the changeover valve body 22 pushed towards that side (using the push button 27), gas from the keg is bled from the float chamber, the valve body is pushed back again and gas from the other keg and any other residual gas is also bled through the float chamber. Finally, the valve body 22 and the selector slider 50 are both pushed back to the same position.

Previous systems have adopted complicated arrangements for accommodating spent gas from one gas chamber of the changeover valve 2 when the valve moves across. In the present system using the pathway selector 5, this problem is obviated by positioning the slider seals 55,56 so that the disconnected gas line branch connects into the selector bore 59 outside the seals. The spent gas can therefore escape freely through the branch line and bore to the exterior. In the present embodiment the push buttons 51 might hinder that, so a bevelled clearance 52 is provided on each to facilitate gas escape.

Previous proposals have operated a changeover valve using the keg pressure gas lines. The present device uses mains gas pressure to operate the changeover valve, resulting in more positive, reliable operation and enabling the use of relatively small pistons in the gas working spaces. This simplifies changeover valve design.

An advantage of keg changeover using a float chamber is a "fobbing" effect. With normal keg-by-keg dispensing, the last pint or two of each keg is tainted and messy because gas gets into the delivery line in an uncontrolled manner. Because of this gas invasion, the first pints from the fresh keg may also be messy and need to be discarded. From every keg, a few pints may be lost in this way. With the present system, the beer always present in the float chamber acts to smooth over the transition, with the main delivery line from that chamber remaining always full. Upstream of the full line, the float chamber allows any gas to accumulate so that it can be bled off. The result is less wasted beer.

Fig. 6 shows the shut-off valve 6 of the line-clearing system. This is connected into the intermediate beer line 92 immediately downstream of the beer outlet 24 of the changeover valve 2. It operates by an obturator 63 which, when driven by a piston 64 in response to high pressure gas entering inlet 65 (controlled by the plunger control 107 at the bar) blocks the beer line passage extending between the beer inlet 61 and beer outlet 62 of the shut-off valve 6. The construction and operation of this valve are as described for Fig. 2, but its interposition in the keg changeover system, downstream of the changeover valve 2, is different. The provision of its gas injection inlet at the top of the float chamber also enables the chamber to be entirely cleared when the system is cleared, so this substantial volume is not lost.

A single line-clearing control at the bar (such as the illustrated plunger 107) may be used to control shut-off and line-clearing gas supply for a whole set of kegs e.g. perhaps twenty kegs, not all of which need necessarily be gas-pumped kegs; they might be hand-pumped or the like.

The more numerous and longer the supply lines, the greater the saving achievable by the feature of shutting-off and dispensing drink remaining in the lines as described in our earlier application. Particular advantage is envisaged in the situation in which a large-output installation e.g. a large bar has two or more supply systems having respective independently-operable shut-offs, and preferably with each of the systems supplying a similar repertoire of drinks. It then becomes possible to save all residual drink in t he lines without any substantial inconvenience. When one system is ready for cleaning, it can be shut-off and the residual drinks dispensed according to demand. Once those lines are empty, those drinks can be supplied from the other system. All or nearly all of the lines of the first system can be totally cleared and subsequently cleaned, while the second system meets demand. After the first system has been cleaned, its operation can resume and it can meet demand when the second system is cleared and

cleaned in a corresponding manner. Such a multi-system installation could be used without the keg changeover device, if wished.

An advantage of the changeover device as described, however, is that it gives a ready visual indication, even from a distance, that a keg needs replacing because the fallen float is easily seen.

Claims

1. A drink supply system comprising
   a supply line communicating between a supply station and a dispensing station;
   a shut-off, for shutting off supply to the supply line from the supply station;
   means for feeding a pressurised gas into the supply line downstream of the shut-off, and
   an actuator for initiating operation of the gas feed into the supply line;
   in which the gas feed enters the supply line at or near the supply station, the gas feed and shut-off operate in tandem because the actuator both actuates the shut-off and initiates the gas feed, the actuator is a tap or valve on a gas line communicating between a pressurised gas supply station and the gas feed, the shut-off is gas actuated, and the shut-off and gas feed are operable together by opening a single gas line.

2. A drink supply installation in which a drink supply is connected to a hand-operable tap or pump for dispensing drinks by the supply line of a system according to claim 1.

3. An installation according to claim 2 in which the tap or pump is at a first location and the drink supply is at a second location at least five meters from the first location, and/or on separate levels of a building, and/or separated by a wall.

4. An installation according to claim 3 in which the actuator for initiating gas feed is at the first location.

5. A drink supply installation according to any of claims 2 to 4, comprising apparatus for switching the liquid supply between first and second supply sources, said switching apparatus comprising
   a switching valve having first and second inlets for connection to the first and second sources respectively, a common outlet, and a relatively movable valve component drivable by pressurised gas selectively between first and second conditions, in which respectively the first inlet only and the second inlet only are connected to the common outlet;
   a supply exhaustion detector having a fluid chamber which can receive liquid from either the first or the second supply source, comprising means for detecting a state of exhaustion or imminent exhaustion of the supply source connected to it and means for initiating, when that state is detected, an operating supply of pressurised gas to the switching valve, and
   a gas pathway selector which is movable, in accordance with the identity of the supply source currently connected to the outlet, between respective conditions in which it directs the operating supply of pressurised gas (initiated by the supply exhaustion detection) so as to operate the switching valve in a sense which disconnects the currently connected supply from the outlet and connects instead the other supply.

6. A drink supply installation according to claim 5 in which the shut-off is provided in the liquid supply line downstream of the switching valve of the switching apparatus.

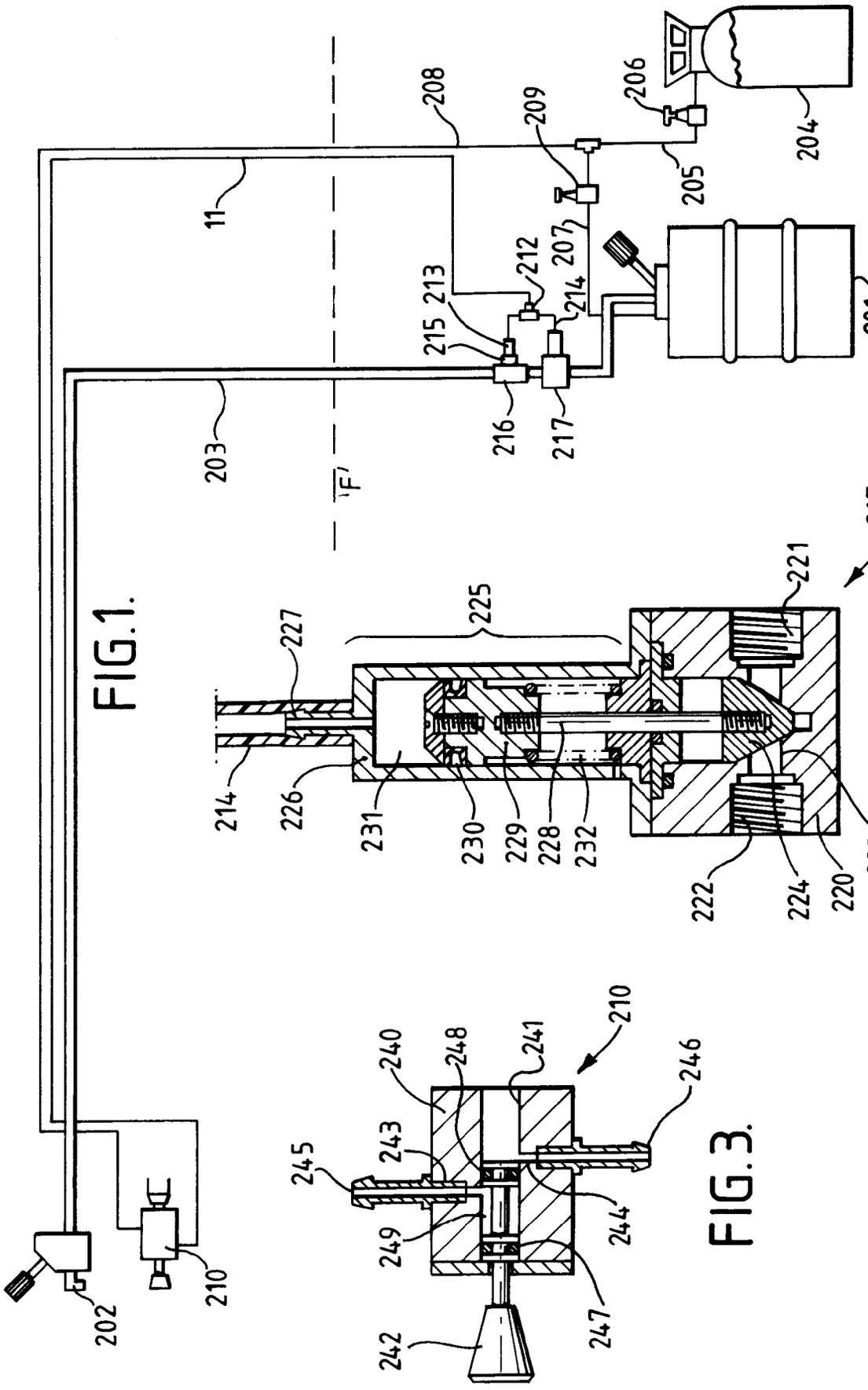

FIG.1.

FIG.2.

FIG.3.

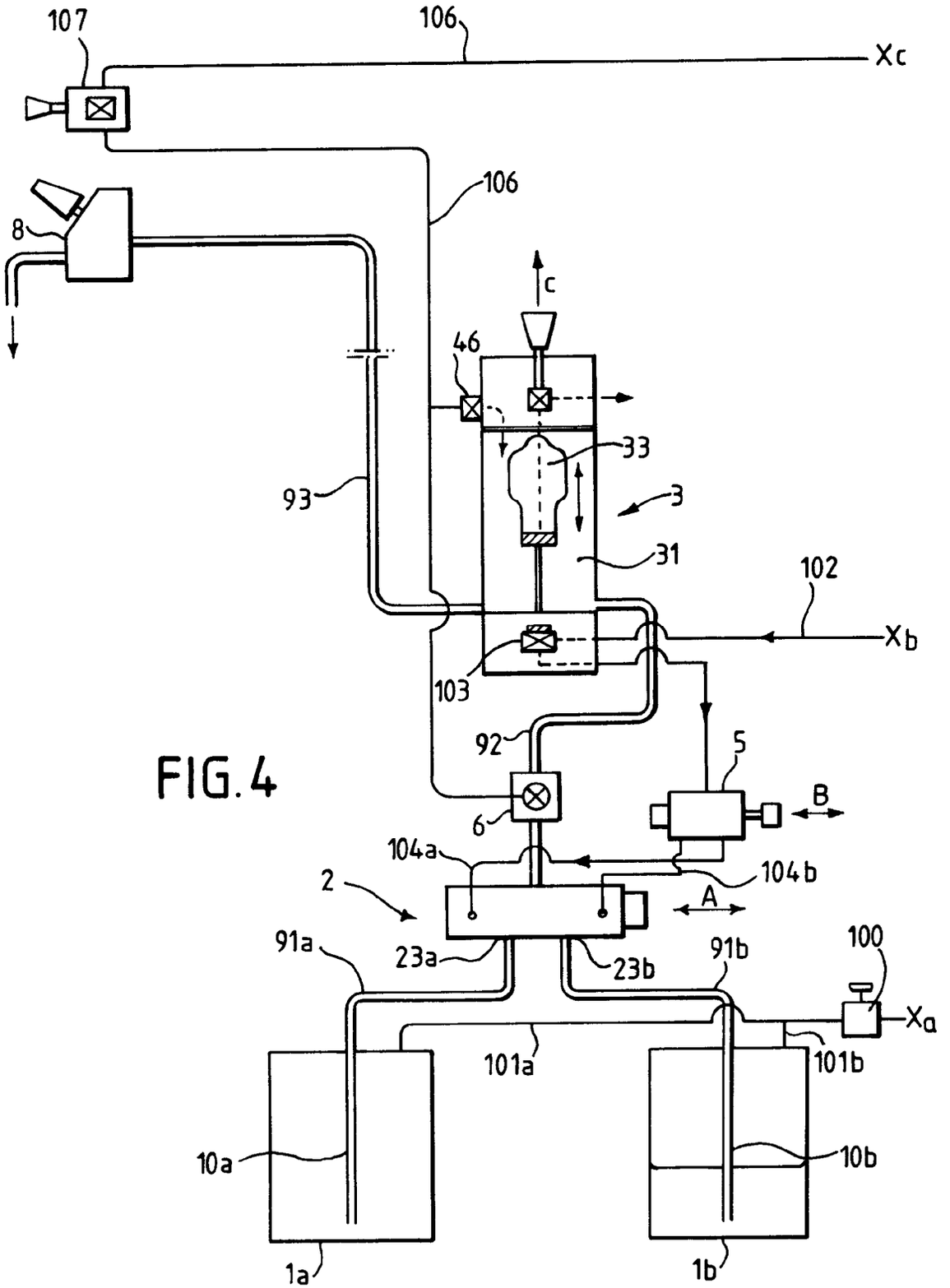
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FIG. 4

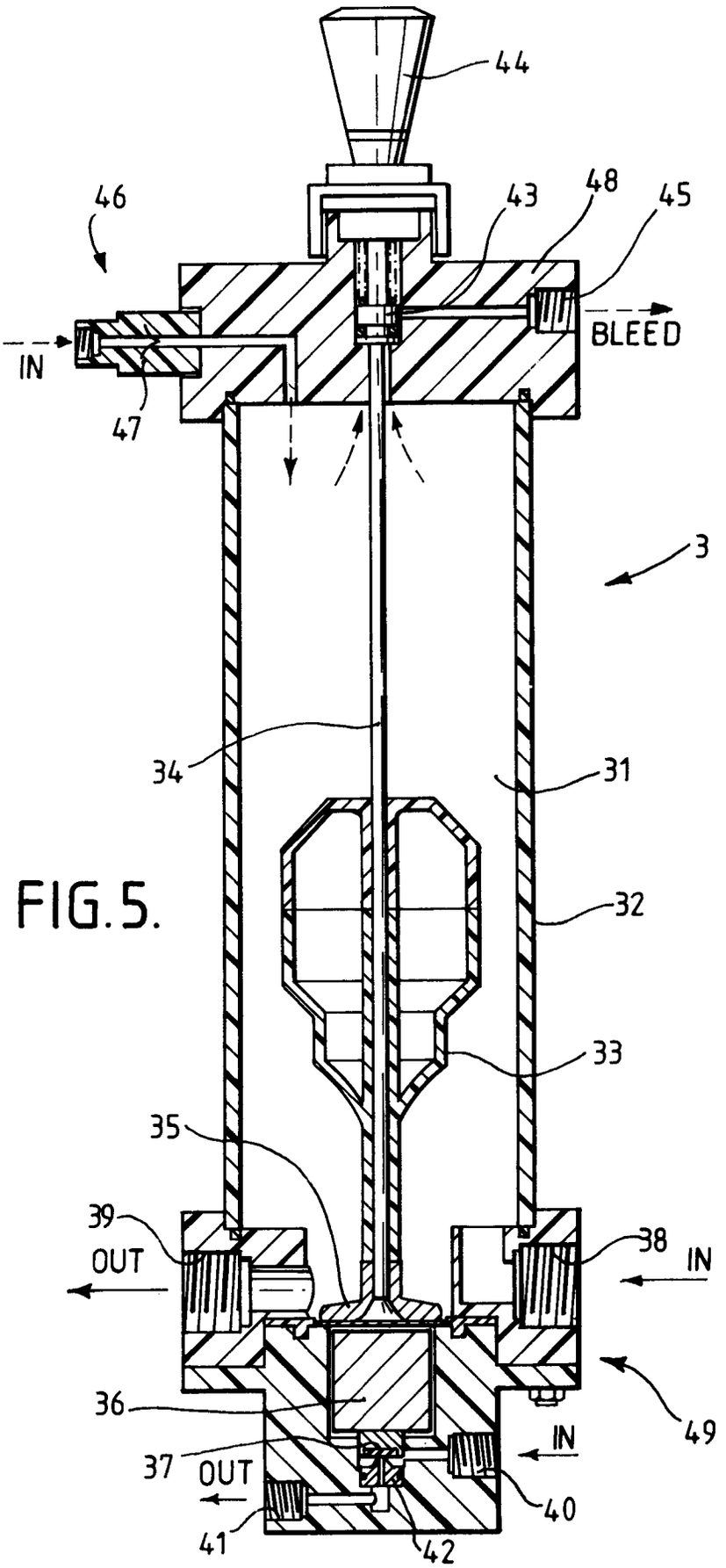
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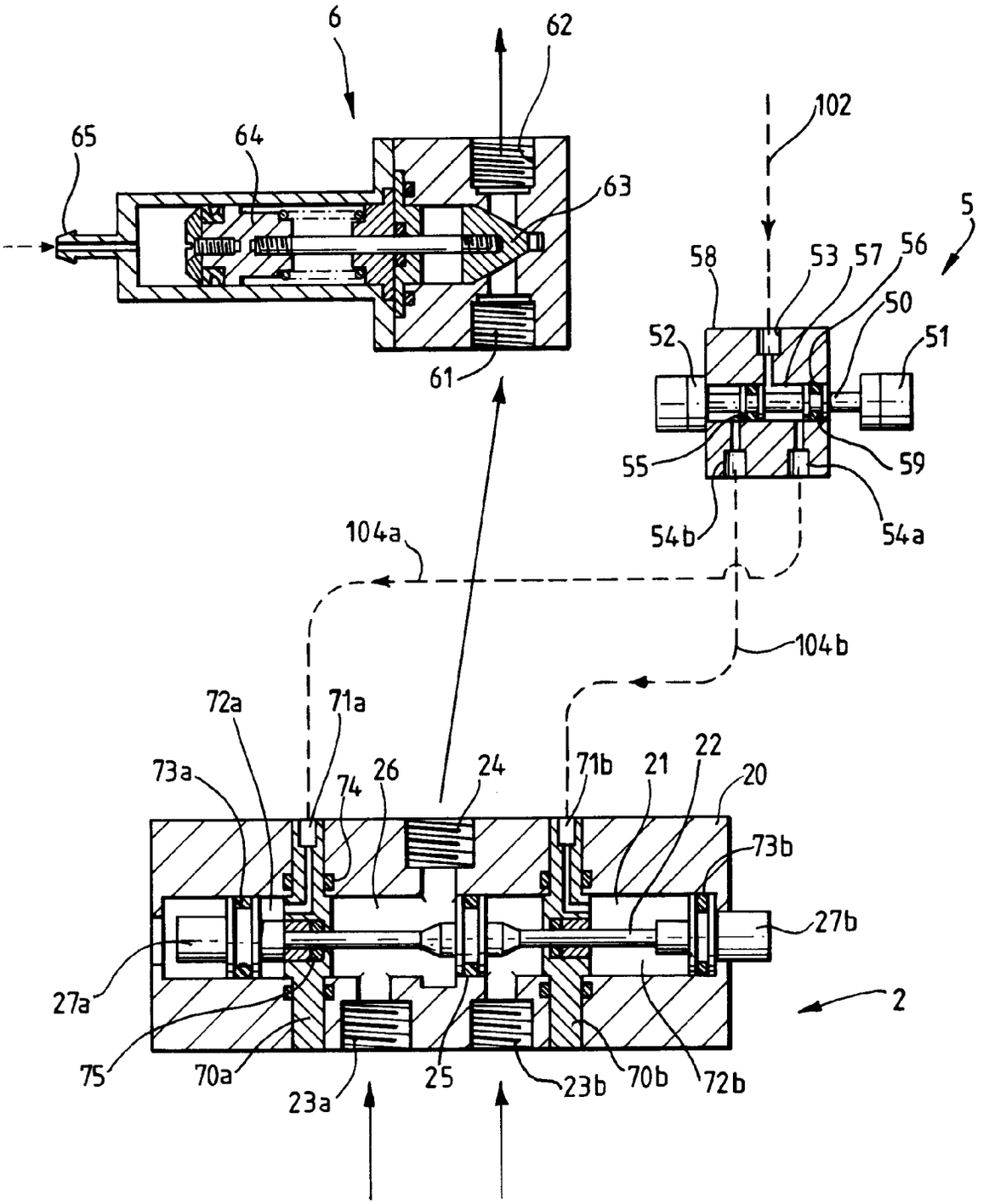
FIG.5.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71b
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22
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27a
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70a
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25
23b
70b
72b

FIG.6.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 30 9204

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.5)
Y	DE-A-25 04 366 (RUTHER-HUSKEN) * claims 1,2; figures 1,2 *	1-4	B67D1/07 B67D1/12
Y	DE-A-35 39 165 (MANSTEIN) * column 2, line 26 - line 36; figures *	1-4	
A	DE-C-153 315 (WEGNER & SCHUMANN)		
A	FR-A-2 333 750 (KOOT)		
D,A	EP-A-0 353 104 (WHITFORD)		

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

B67D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	8 March 1994	Deutsch, J-P

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