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(54) **Filling machines**

(57) A rotatable counterpressure filling machine comprises a plurality of filling elements (23) each provided with a controlled pressurising gas valve means comprising a valve and control unit, with vessel centring means (34) comprising a centring tulip (35) mounted on rods (37) guided to be movable up and down, and with retaining and releasing means for locating the centring means in and releasing the centring means from an upper setting. The retaining and releasing means of each filling element comprises a locking device (43) which is controllable for the locking and releasing of the centring means (34) and which, as shown, engages a recess 45 in at least one of the rods (37) of the centring means. The locking device may be associated with the gas valve, Figures 9 and 10 (not shown).

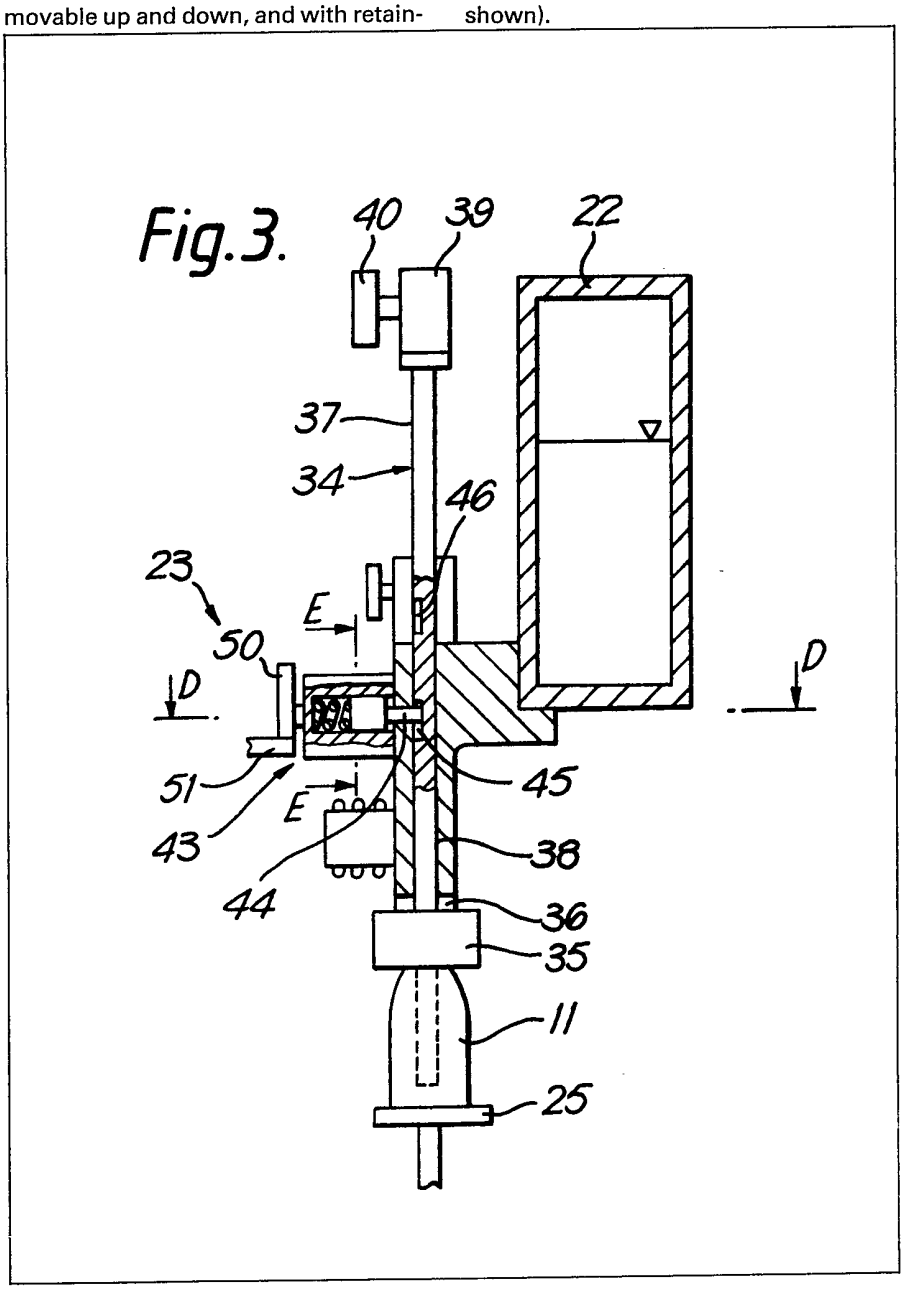

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Fig.1.

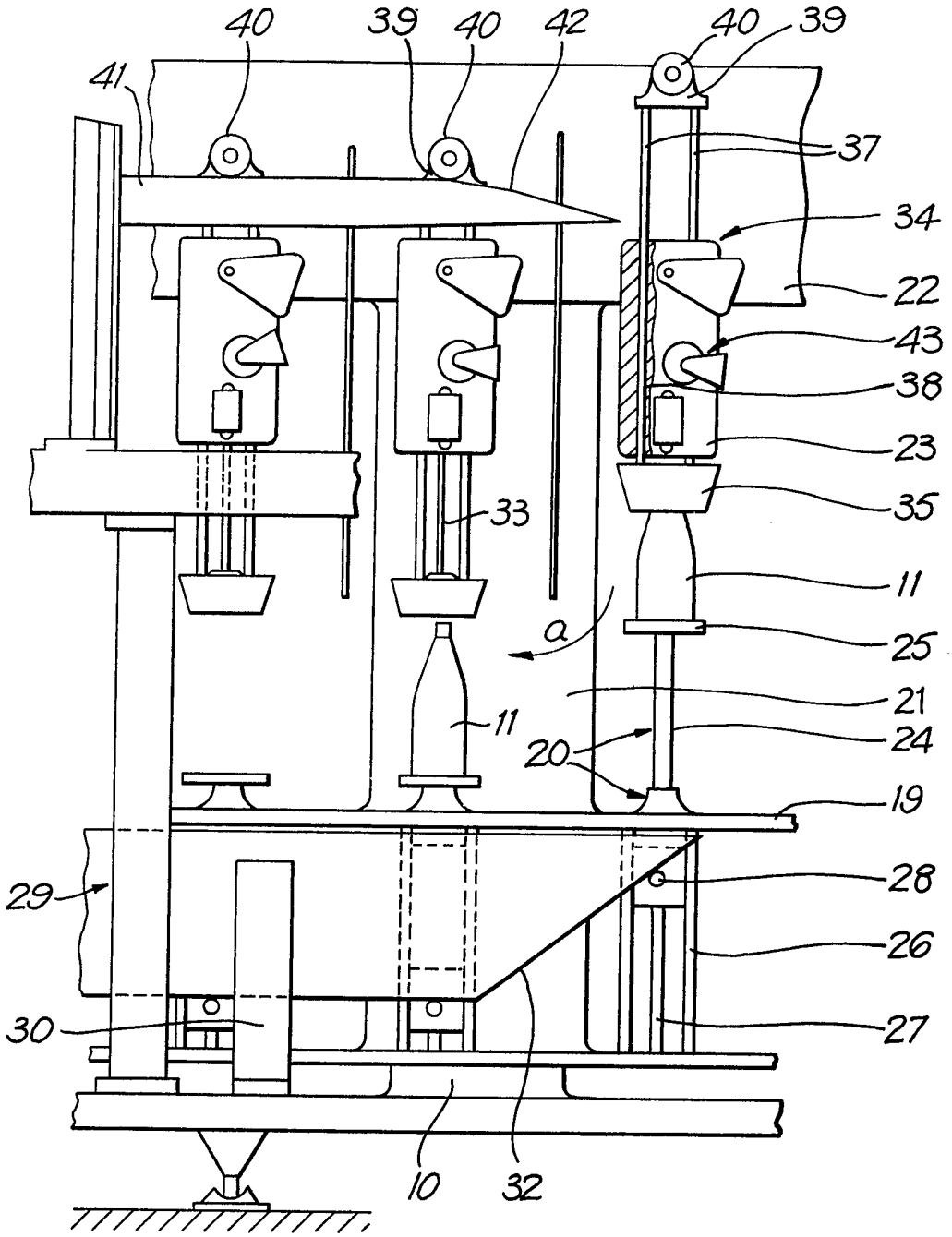
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Fig.2.

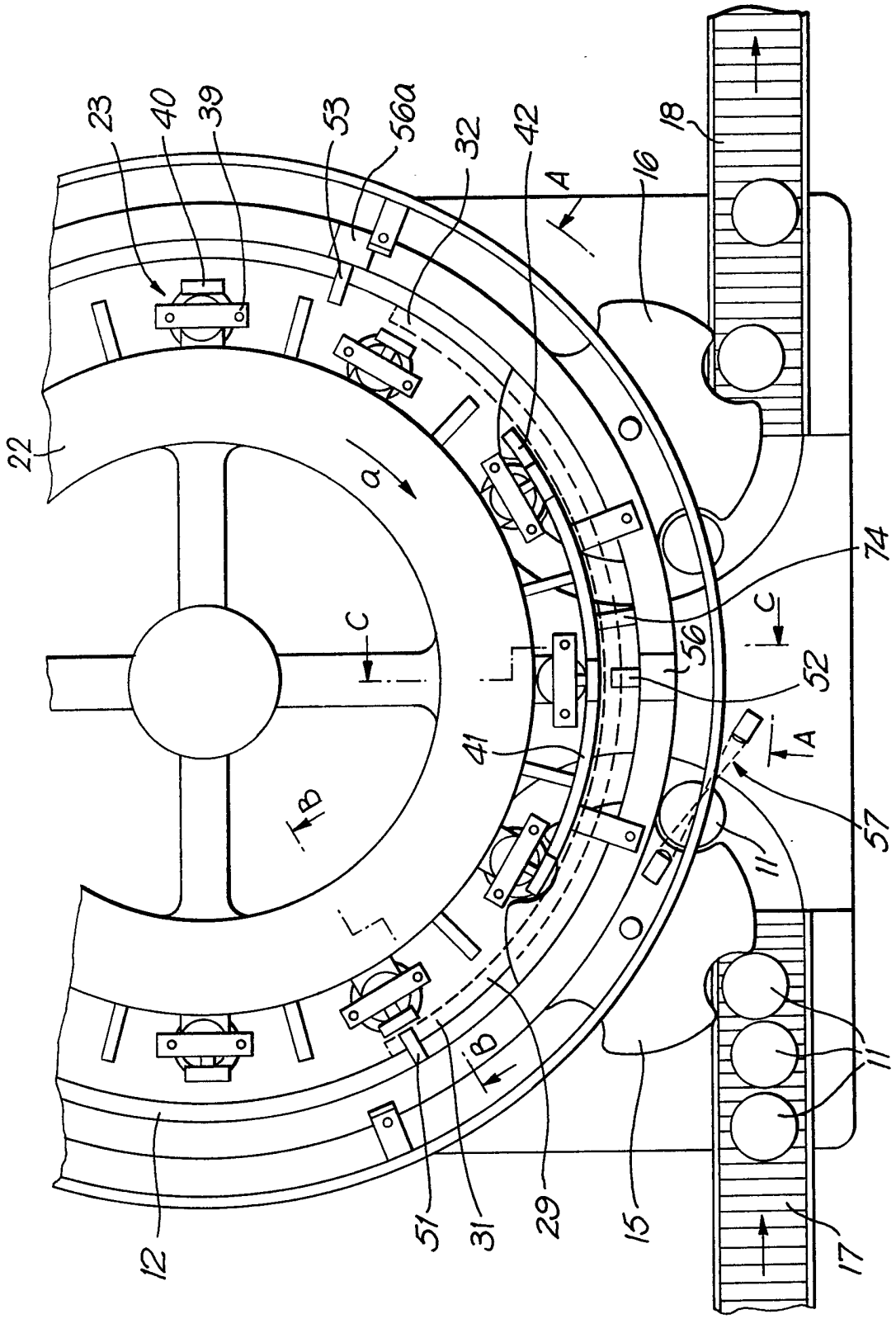
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Fig.3.

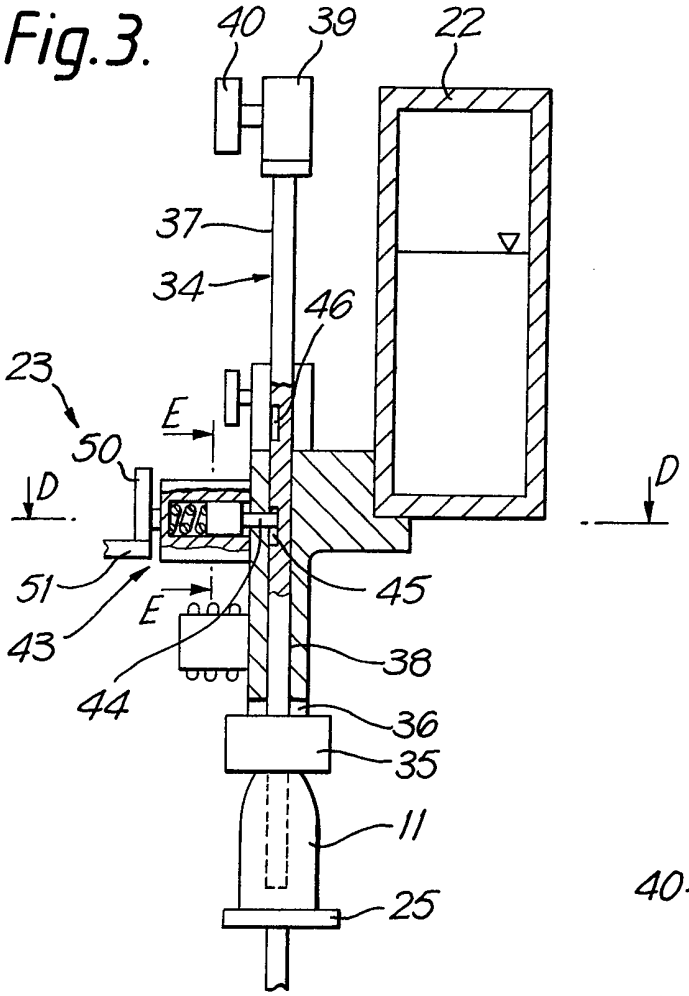
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Fig.4.

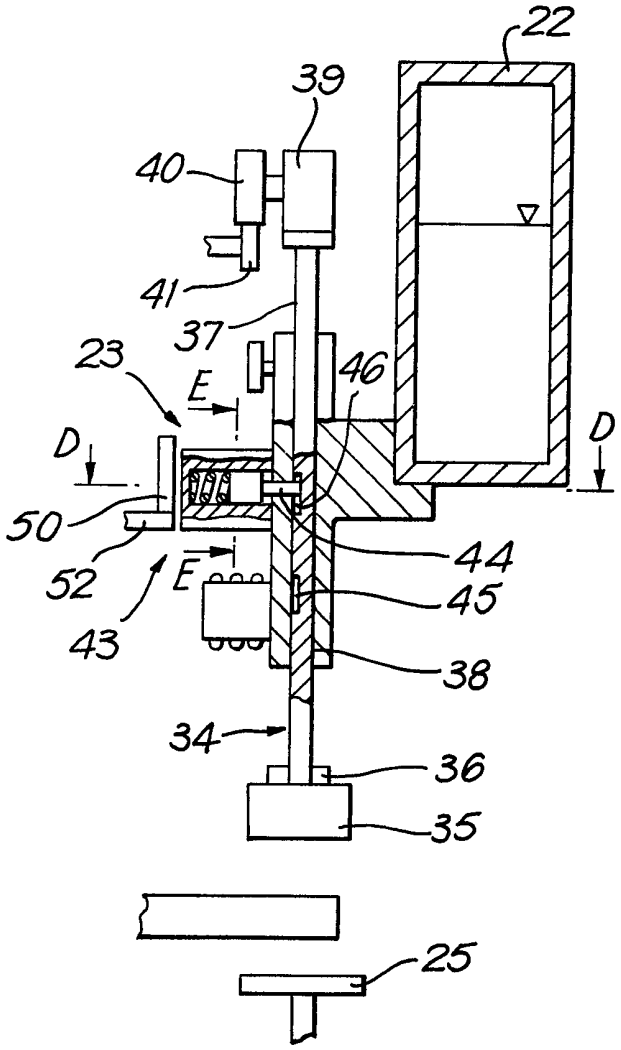
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Fig.5.

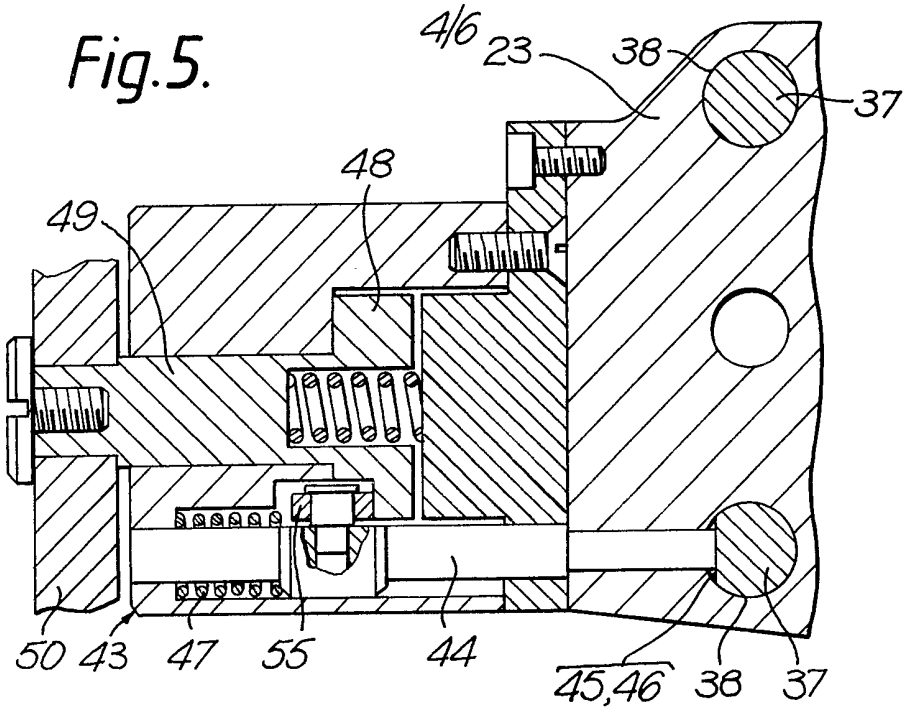


Fig.6.

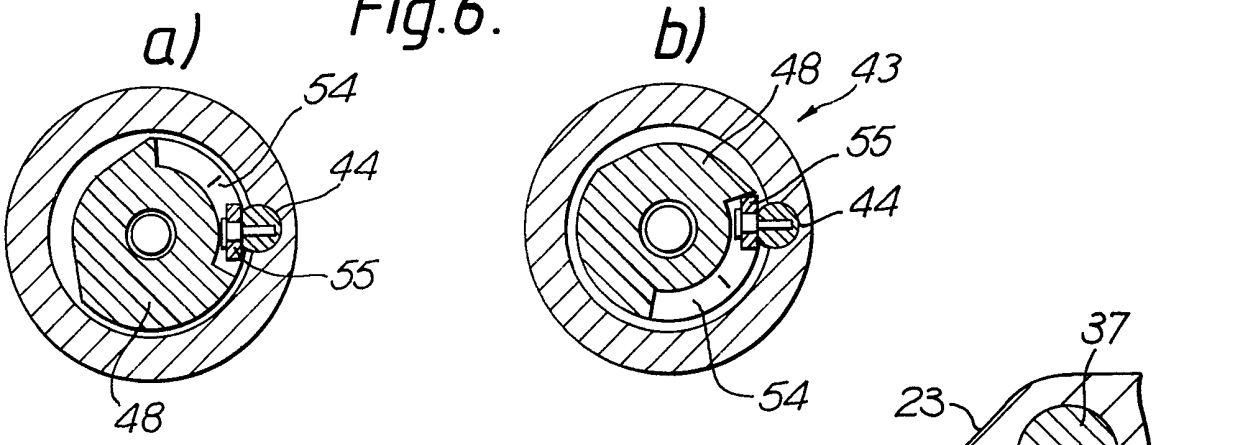


Fig.7.

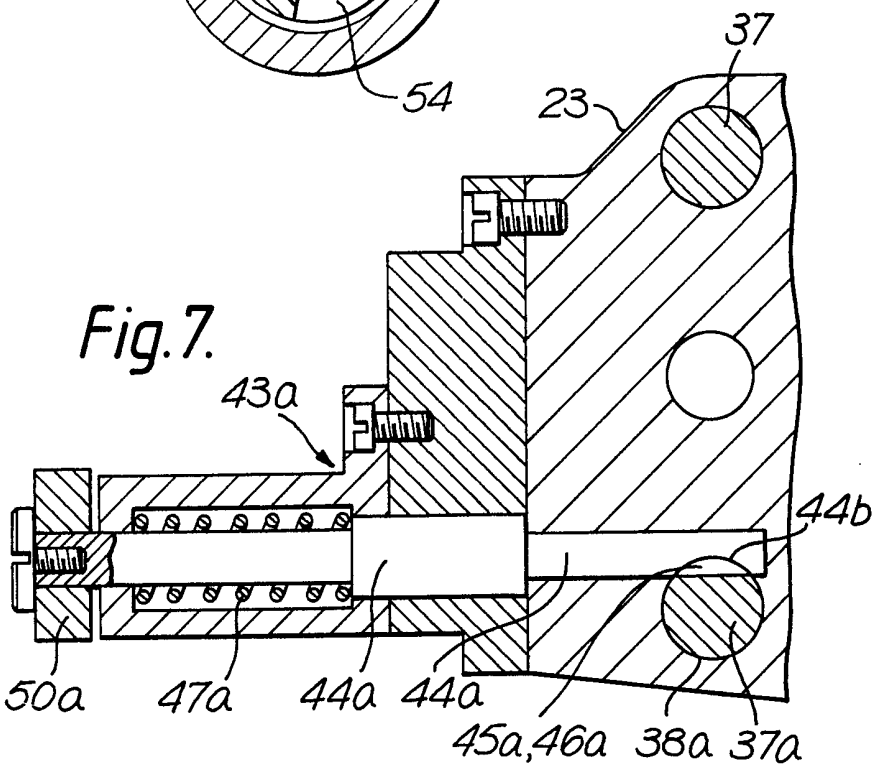


Fig.8.

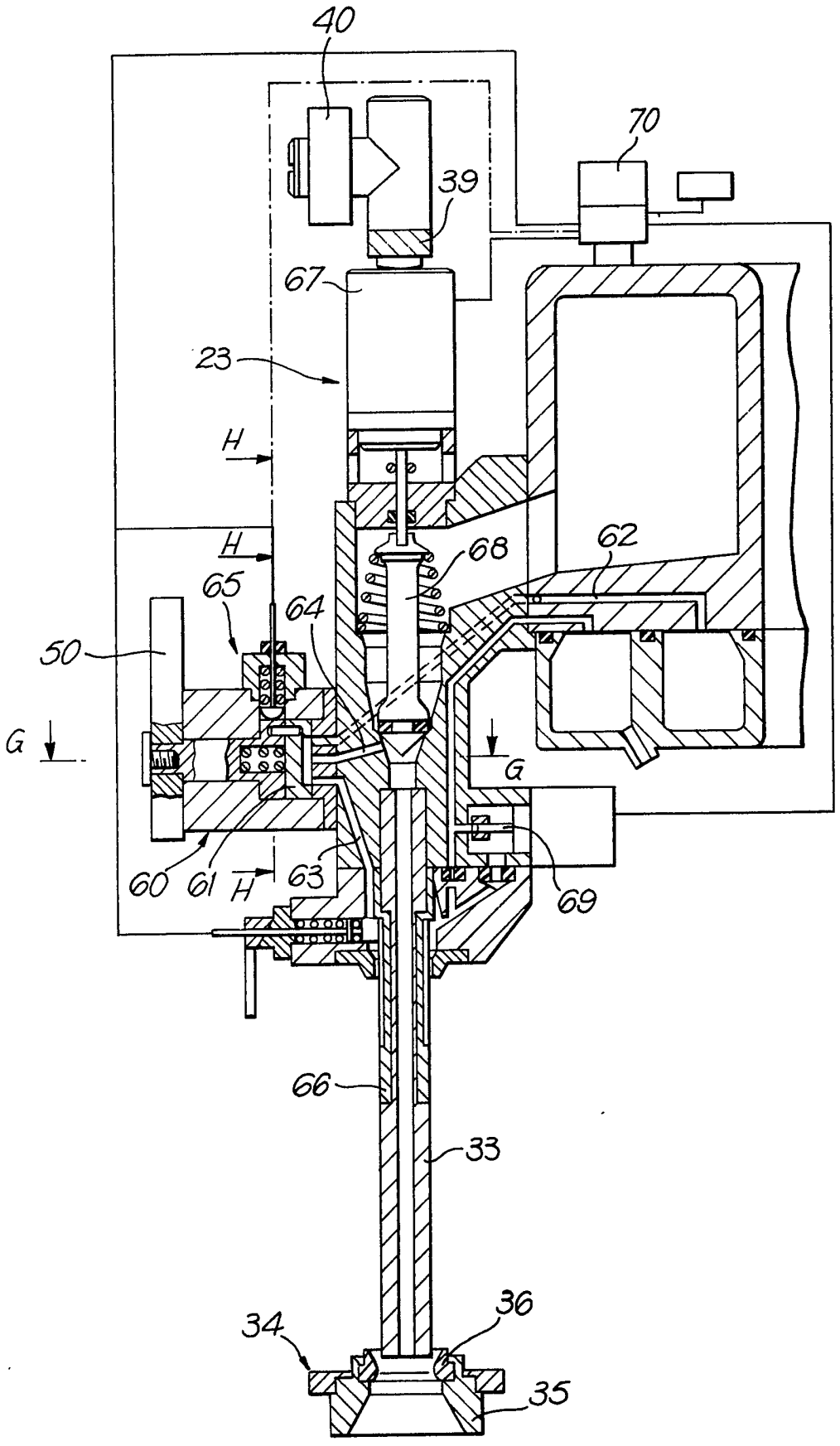
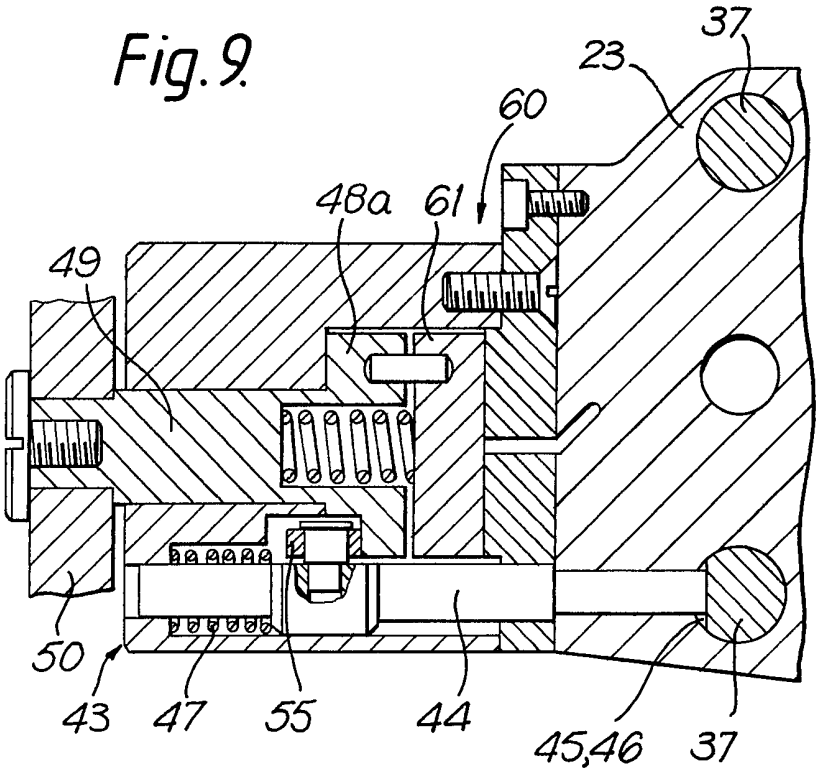


Fig.9.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48a
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45,46
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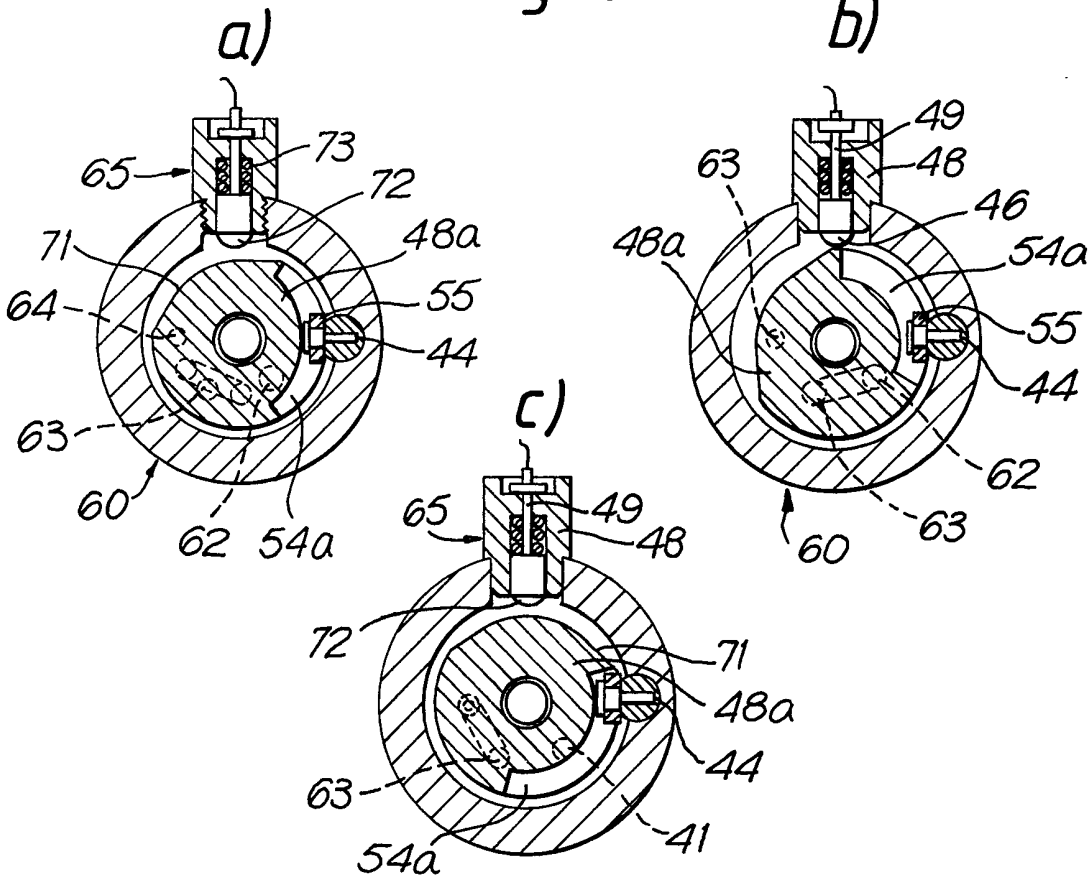
Fig.10.


a)
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b)
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c)
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54a

SPECIFICATION

Filling machine

The present invention relates to a filling machine for filling vessels with a substance against a gas counterpressure.

In DE-OS 27 13 562 there is disclosed a rotating counterpressure filling machine in which retaining means for locating vessel centring devices in upper settings are formed by magnets on filling elements of the machine. For the release of each centring device from the associated magnets, thus for initiation of the downward movement of the centring device by the release means common to all filling elements, apprecaible forces are required, which have a disadvantageous effect on the bearing of the rods. Thus, the mounting of the centring tulips in the known filling machine tends to cant and to remain hanging in the centring devices. The retaining means becomes effective in this known machine only when the mounting of the centring tulip is raised into its highest setting relative to a vessel to be filled when the vessel is raised into a filling setting. When a filling location is not occupied in the known machine, then the retaining means formed does not become effective and the mounting of the centring tulip remains down, so that the plate of a lifting device for the vessels to be filled may, at worst, hit against the underside of the centring tulip and may cause this to be contaminated with bacteria injurious to the substance to be filled into the vessels. In the known filling machine, it is possible to avoid dropping of the centring device, once released from the retaining means, onto the withdrawn, filled vessel only if an additional compensating element is provided to compensate for the height differences of the vessels to be filled. This dropping of the centring device onto the filled vessel is particularly disadvantageous if liquid containing released gases, for example drinks containing carbondioxide, are being filled because, due to the impact on the filled vessels, the contents thereof are disturbed.

There is accordingly a need for a retaining and releasing means for centring devices in a counterpressure filling machine whereby each centring device can be individually controlled for retaining as well as for releasing, and wherein the retaining means can controllably engage the centring device and release it in a controlled manner without loading by lateral forces and without auxiliary means being needed to prevent dropping of the centring device onto a withdrawn filled vessel.

According to the present invention there is provided a filling machine for filling vessels with a substance against a gas counterpressure, the machine comprising a plurality of filling elements movable on an endless path and each provided with valve means for controlling supply of pressurising gas to a vessel to be filled by the filling element, with a centring device for centring individual such vessels relative to the filling element, the centring device comprising a vessel centring element mounted on support means to be movable upwardly and downwardly, and with retaining and releasing means controllable to retain the centring device in and release the centring means from an upper setting thereof, the retaining and releasing means comprising a locking device so engageable with the support means of the centring device as to lock the centring device in said upper setting.

By means of such a locking device, a secure locking and secure releasing of the centring device, which is movable up and down, is possible with precise control and without any appreciable force being necessary, especially in releasing of the centring device. In particular, the onset of the downward movement of the centring device takes place relatively smoothly and free of shock on release. In addition, the controlled locking device affords the possibility of locking the centring device in a raised or partially raised setting in the event that the one or more filling elements of the machine is or are unoccupied. Moreover, no auxiliary means are required to prevent dropping of the centring device onto filled vessels.

Preferably, at least one of the rods of each centring device is provided with at least one recess, and the locking device comprises a locking pin which is mounted to be axially displaceable and engageable in and withdrawable from the recess. Alternatively, it is possible to provide at least one of the rods of each centring device with at least one locking recess, and the locking device may comprise a locking pin which is mounted to be pivotable and which, by means of a lateral recess therein, is turnable into and out of the recess of the rod.

Since the upward and downward movement of the centring devices is preferably synchronous with the control of the valve means, it can be particularly advantageous to form the locking device and the valve means - the latter comprising a valve and a control unit - as a component unit, so that the locking device can be controllable together with the valve means. For this purpose, the valve means can, for example, comprise a valve member which is provided with flow passage means and which is settable by rotation into desired operational settings in which the passage means co-operate with a surface containing openings of gas flow ducts. Expediently, at least one control element for the actuation of the locking pin is provided on the circumferential region and/or a stem of the valve member and/or on a substantially disc-shaped carrier for the valve member.

In uniting of the control element with the valve member or its carrier, it is expedient to mount the locking pin in the valve and control unit to be axially withdrawable against spring force parallelly to the axis of the valve member and to arrange the control element controlling the locking pin on a rear side of the valve member or its carrier. As a result, any mutual disturbance of the valve function and the function of the control element is completely excluded. In addition, the possibility is offered of arranging for additional control functions to be associated with the valve member or the carrier. For example, the circumference of the valve member or its carrier can be constructed as cam for the actuation of an additional control element such as an

electrical switch.

If the possible vertical travel of each centring device is such that, with the centring device lowered and in the absence of a vessel, a vessel support element could on its way into an upper setting thereof abut against the centring element, it may be desirable to provide a simple additional locking control to avoid this by holding the centring device in at least partially raised setting. This additional locking control can consist in the provision in at least one of the rods of each centring device of at least one further recess above the first-mentioned recess effective for the upper setting of the centring device. In connection therewith, an additional control device, which is selectively settable in an operative or inoperative state, can be arranged in an inlet region of the machine and operatively connected with a device which monitors the inlet for the vessels to be filled and which sets the additional control device into the inoperative state during consistent flow into the machine of vessels and into operative state when the absence of such a vessel is detected. This means that the centring device, which is raised before the inlet, can be held in this raised state by this additional control.

An embodiment of the present invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side elevation of part of a counter-pressure filling machine according to the said embodiment, in correspondence with the region A-A of Figure 2,

Figure 2 is a plan view of part of the filling machine of Figure 1,

Figure 3 is a partial cross-section on the line B-B of Figure 2,

Figure 4 is a partial cross-section on the line C-C of Figure 2,

Figure 5 is a cross-section, to an enlarged scale, on the line D-D of Figures 3 and 4, showing a locking device of a filling element of the machine,

Figures 6a and *6b* are cross-sections on the line E-E of Figures 3 and 4, showing two different positions of a control for the locking device,

Figure 7 is a view corresponding to that of Figure 5 but showing a modified locking device,

Figure 8 is a sectional elevation of a modified filling element of a filling machine, wherein the locking device for a centring device of the filling element is combined with a valve and control unit,

Figure 9 is a cross-section, to an enlarged scale, on the line G-G of Figure 8, showing the combined locking device with valve and control unit, and

Figures 10a to *10c* are cross-sections, on the line H-H of Figure 8, showing different operational settings of the combined locking device and valve and control unit.

Referring now to the drawings, in the embodiment of Figures 1 to 6 the filling machine comprises a stationary part and a rotatable part. The stationary part includes a column 10 on which the rotatable part is mounted to rotate in the sense of the arrow a. Also associated with the stationary part of the machine are input and output stars 15 and 16 (Figure 2) and a supply and a removal conveyor belt 17 and 18, respectively, arranged upstream and downstream of the two stars.

The rotating part of the machine comprises a machine table 19 with a plurality of raisable and lowerable bottle carriers 20, which are mounted thereon in predetermined pitch spacing, and a filling vat 22, which is connected through a central column 21 with the table 19 and which carries a plurality of filling elements 23 at like pitch spacing at its circumference, the elements being vertically aligned with the carriers 20. The bottle carriers 20 each consist of a vertical pipe 24, projecting beyond the upper table plane, with bottle support plates 25 mounted thereon. The lower pipe end portion telescopically slides on a guide rod 27 within a guide 26 and carries a roller 28.

A control cam 29, which corresponds with the rollers 28, is fastened by means of supports 30 to the stationary part of the machine. Starting from the input star 15, the cam 29 extends up to the output star 16 and possesses an upwardly leading portion 31 in the region of the input star 15 and a downwardly leading portion 32 in the region of the output star 16.

The filling elements 23 in the illustrated embodiment are equipped with a filling pipe 33, which may be exchangeable, and a centring device 34, which is movable up and down. This centring device 34 consists of a centring tulip 35, arranged underneath the filling element housing, a contact pressure rubber 36 (Figures 3 and 8) inserted above the centring tulip, and a guide means, which is formed of parallel vertical rods 37 and at the lower end of which the tulip 35 is fastened. The rods 37 extend in bores 38 in the filling element housing and are connected by a bridge 39, which carries a control roller 40, at the upper rod ends projecting beyond the housing.

Also fastened to the machine frame 12 is a further control cam 41. It projects into the circulating path of the control roller 40 in front of the output region of the machine and possesses an upwardly leading section 42 in front of the output star 16 and a downwardly leading region in the region of the input star 15.

Provided for each centring device 34 is a retaining and releasing means in the form of a locking device 43, which comprises a locking pin 44 mounted to be axially displaceable. The locking pin 44 extends into the guide bore 38 of one of the rods 37 of the centring device 34. This rod 37 is provided with two locking recesses 45 and 46 arranged at an axial spacing from each other for co-operation with the inner end of the locking pin 44. As shown in Figure 3, the lower recess 45 of the rod 37 lies opposite the inner end of the locking pin 44 when the centring device 34 has been raised into its uppermost setting, in which setting the contact pressure rubber 36 is pressed tightly against the housing of the filling element 23 by a bottle 11 to be filled and the associated support plate 25. Figure 4 shows that the upper recess 46 of the rod 37 lies opposite the inner end of the locking pin 44 when the centring device 34 is diaposed in an intermediate setting, in which the

roller 40 runs onto the horizontal path of the control cam 41 for raising of the centring device 34 in the region of the output star 16 and the input star 15. Figure 4 shows a setting, in which a filling element 23 and the respective plate 25 are disposed in the region between the input and output stars.

The axial movement required for actuation of the locking pin 44 is produced, in the example shown in Figures 3 to 6, by an engaging spring 47 pressing the locking pin 44 axially in the direction of the rod 37 and a rotatable control disc 48 for withdrawing the locking pin 44 from the rod. The control disc 48 is rotatably mounted by a shank 49 thereof in the housing of the locking device 43 and is connected at its outer end with a control lever 50, which impinges against control elements 51, 52, 53 or 74 mounted in different planes on the machine frame 12. The control elements 51 and 52 shown in Figures 3 and 4 are so arranged as to pivot the control lever 50 to cause a cam surface 54, which includes a valley, and which is provided on a rear face of the disc 48, to be so positioned that a take-off roller 55 mounted on the locking pin 44 rests in the valley of the surface 54, which has the result of causing the locking pin 44 to be pushed by the spring 47 into the locking recess 45 or 46 of the rod 37. Thereagainst, the control elements 53 and 74 shown in Figure 2 are each constructed to pivot the control lever 50 so that the control disc 48 is moved into a setting shown in Figure 6b in which the roller 55 rests on a raised part of the cam surface 54 and thereby withdraws the locking pin 44 out of the locking recess 45 or 46 of the rod 37 against the effect of the spring 47.

As indicated in Figure 2, the control element 51 is firmly mounted on the machine frame 12 (apart from a setting and adjustment capability) in front of that region in which pressurising by gas of a bottle to be filled is undertaken, thus in front of that region of the filling machine in which there is increased danger of breakage of the bottles to be filled. At this place, each bottle to be filled is raised into the filling setting and the centring device 34 is brought into its uppermost setting, as shown in Figure 4.

The control element 52, as Figure 2 shows, is arranged on the machine frame 12 between the output star 16 and the input star 15. The control element 52 is connected with a controller 56 and is held by this in an operative position in one control setting and in inoperative position in another control setting. The controller 56 is connected to light barrier means 57, by which it is ascertained whether a bottle 11 to be filled has been taken up from the input star 15. When such a bottle 11 transported by the input star 15 passes the light barrier means 57, the controller 56 sets the control element 52 into the inoperative position. When set in its operative position in response to the detected absence of a bottle 11, i.e. in the case of a star gap, the control element 52 acts on the control lever 50 in like manner as the control element 51.

The control element 53 is, as Figure 2 shows, arranged substantially locally fixed on the machine frame 12 and at a place before the lower control rollers 28 run below the cam track 29, i.e. before the plate 25 is lowered. The control element 53 is likewise connected with a controller 56a and is held by this in operative position in one control setting and in an inoperative position in another control setting. The operative position is set whenever the filling element 23 is occupied (Figure 3). The inoperative position is assumed by the control element 53 on the passage of an unoccupied filling element 23 and is effected by a control signal triggered by, for example, a switch, particularly a proximity switch, which is arranged in the circulatory direction a in front of the control element 53 at the height of the centring tulip 35, in the case of the intermediate setting of the centring device 34 shown in Figure 4.

The control element 74 is substantially locally fixed and is arranged in the circulatory direction a in front of the control element 52 on the machine frame 12 at the height of the control element 53. The element 74 serves, in the case of an operative setting of the control element 53, to cancel the locking of a centring device 34 standing in the intermediate setting according to Figure 4.

In normal operation, thus on the running of a bottle 11 into the input star 15 and passage through the light barrier means 57, the control element 52 is brought into its inoperative position. The bottle 11 is transferred onto the appropriate plate 25 and moved below a filling element 23. The control roller 40 on the centring device 34 of this filling element runs down the control cam 41 and the centring device 34 lowers the centring tulip 35 over the bottle 11 to be filled. On further circulation of the machine, the plate 25 is raised so that the bottle 11, with raising of the centring device 34, is lifted up to the underside of the filling element housing and seated there-against. The filling element 23 then moves past the control element 51, which through the control lever 50 running up thereon pivots the control disc 48 into the position shown in Figure 6a. In this position, the locking pin 44 assumes the setting shown in Figures 3 and 5 and thereby engages the one rod 37 to lock the centring device 34 in its uppermost setting. The introduction of the pressurising gas into the bottle 11 and subsequently filling of the bottle 11 with liquid then take place through the control in known manner of the pressurising gas valve arrangement. The filling element 23 with the filled bottle than moves past the control element 53, which through the control lever 50 pivots the control disc 48 back into the initial setting according to Figure 6b, while the locking pin 44 is withdrawn from the recess 45 of the rod 37. As soon as the roller 28 of the plate 25 runs up to the incline of the control cam 29, the filled bottle 11 is lowered, while the centring device 34 supported on the bottle opening also moves downwardly. This transition has taken place in Figure 1 between the filling element shown at the right and the one shown centrally. In this case, the control roller 40 of the centring device 34 runs over the upwardly leading section 42 of the control cam 41, whereby the centring device 34 is raised for the release of the filled bottle 11 to be shunted out, as indicated for the central filling element in Figure 1.

If breakage of the bottle occurs in operation, then the centring device 34 is held in upper setting through the locking of its one rod 37 until the

corresponding filling element has reached the control element 53. As described above, the locking is then cancelled by this control element 53.

In the case of an interruption in the supply of the bottles 11 to be filled, so that empty places are present in the input star 15, this is ascertained by the light barrier means 57 and the controller 56 is actuated to bring the control element 52 into its operative position. As a result, the centring device 34 is locked in the partially raised setting determined by the control cam 41, as described with reference to Figure 4. Since the control element 52 through the control lever 50 pivots the control disc 48 in like sense as the control element 51, no further displacement can occur at the control element 51. The locking device 43 therefore remains inserted and the centring device 34 is locked in its partially raised state until the respective filling element 23 after movement past the inoperative control element 53 reaches the control element 74. Through pivotation of the control disc 48 back into the initial setting according to Figure 6b, the locking pin 44 is withdrawn from the recess 46 of the rod 37 and the centring device 34 is released.

Figure 7 shows a modification of the locking device in which the locking pin 44a is rotatably mounted in the housing of the locking device 43a. The spring 47a in such a case serves merely for the defined bearing of the locking pin 44a against an axial sliding surface. The locking pin 44a in this example extends laterally through the guide bore 38a of the one rod 37a and is constructed with a lateral recess 44b in the region of intersection. The free end portion of the rotatable locking pin 44a extends out of the housing of the locking device 43a and carries the control lever 50a directly thereon. By means of this control lever 50a, the locking pin 44a can be pivoted through the control elements 51 and 52 into the locking setting, while the control elements 53 and 57 are arranged to pivot the control lever 50a and with it the locking pin 44a back into the release setting. Otherwise, the mode of operation of this device is the same as that of Figures 1 to 6.

To increase operational reliability, a force-locking connection by means of an incorporated spring could be provided in the locking pin 44a so as to prevent breakage of any part of the locking device 43a during pivotation of the control lever 50a when the locking pin 44a lies opposite a solid part, i.e. not the recess 45a or 46a of the rod 47a.

In Figures 8 to 10 there is shown a modification in which the locking device is assembled with a valve and control device into one unit 60, as is apparent from Figure 9. This unit 60 includes a valve disc 61, which is provided with bores and transverse channels, so that in a "pressurising setting" (Figure 10b) it can connect a pressurising gas introduction channel 63, which leads along the outside of the filling pipe 33 towards the interior of a bottle placed thereon, with a pressurising gas feed channel 62. In the pressure equalising setting (Figure 10c), the channel 63 is connected by the valve disc 61 with a pressure equalising channel 64 leading to the interior of the pipe 33. Finally, in the filling setting of the valve disc 61 (Figure 10a), the connection between the channel 62, the channel 63 and the channel 64 is eliminated. As Figure 9 shows, the valve disc 61 is mounted on a carrier 48a, which is provided on its rear side with a cam surface 54a on which a take-off roller 55 mounted on the control pin 44 runs in like manner as in the example of Figures 1 to 6.

The locking pin 44 in that case is constantly subjected to the force of the pressure spring 47, which endeavours to move the locking pin 44 axially towards the rod 37 of the centring device 34. The setting of the locking pin 44 with respect to the rod 37 is thereby determined by the cam surface 54a as in the example of Figures 1 to 6.

As in the case of the example according to Figures 1 to 6, the carrier 48a, acting as a control disc, has a shank 49 which at its outer end carries a control lever 50. This control lever 50 also serves for actuation of the valve disc 61 and for control of the locking pin 44 of the locking device 43 included in the unit 60. The filling element according to Figures 8 to 10 is also equipped with an electrical control switch 65 which, together with an electrical control device 66 mounted on the filling pipe 33, co-operates with a control device 70 to control an electromagnetic closure device 67 for a liquid valve 68 and an electromagnetic actuating device for a pressurising gas outlet valve 69. The switch 65 is, as particularly shown in Figure 10, controlled by a cam surface 71, provided on the circumferential surface of the carrier 48, in conjunction with a follower element 72 and a spring 73. The control of the switch 65 thus takes place simultaneously with the setting of the valve disc 61 and the control of the locking pin 44. This combined control takes place as follows:

In the pressure equalisation setting shown in Figure 10c, the emptying of the filling pipe of liquid takes place through the connection of the pressure equalising channel 64 with the gas introducing channel 63. The roller 55 in that case lies on a raised part of the cam surface 54a. The control switch 65 is opened. However, the device 67 for control of the liquid valve 68 is switched on because the corresponding control current circuit is closed by liquid contact at the control device 66 of the filling pipe 33. The pressure equalisation setting illustrated in Figure 10c is at the same time the initial setting for the switching into the pressurising setting and corresponds to a position of the respective filling element 23 after running past the control element 53 or 74 illustrated in Figure 2.

When the control lever 50 of the unit 60 is brought into the pressurising setting represented in Figure 10b during the running of the respective filling element 23 past the control element 51 or the additional control element 52 held in the operative setting, then a connection is created at the valve disc 61 between the gas feed channel 62 and the gas introducing channel 63, so that a pressurising gas is introduced into the bottle placed on the filling element. At the same time, a valley part of the cam surface 54a moves under the roller 55 so that the locking pin 44 is pushed by the spring 47 into the oppositely disposed recess 45 of the rod 37. In addition, the control switch 65 in the setting accord-

ing to Figure 10b is closed through contact of the follower 72 with the circumferential cam surface 71, so that the electromagnetic closure device 67 of the liquid valve 68 is switched on and prevents opening of the liquid valve. Additionally to the arragements shown in Figures 1 to 7, a further control element (not shown) is mounted on the machine frame in the example of Figures 8 to 10, namely in that region in which filling of bottles by liquid takes place. Through this further control element the valve disc 61 and the carrier 48a are pivoted into the filling setting represented in Figure 10a. In this filling setting, the switch 65 is opened through the follower 72 running freely off the cam surface 71, and the control device 66, which is mounted to the filling pipe 33, is still free of liquid. The electromagnetic closure device 67 for the liquid valve 68 is thereby switched off so that the valve 68 opens.

In this case, the valve disc 61 has interrupted any connections between the pressure gas feed channel 62, the pressure gas introducing channel 63 and the pressure equalising channel 64, so that on inflow of the liquid only the gas can flow away through the outlet channels shown in Figure 8 and the nozzles contained therein, wherein the narrower nozzle shown in Figure 8 leads to a constantly open channel and the wider nozzle to the gas outlet valve 69. The valve 69 is opened in a controlled manner during the forward flow of the liquid. However, the electrical control provided for this does not form part of the subject of this application.

In the filling setting shown in Figure 10a, the roller 55 of the locking pin 44 is still disposed in the valley of the cam surface 54a, so that the locking pin 44 is still engaged in the recess 45 of the rod 37. Only when the respective filling element on circulation of the machine reaches the control element 53 (Figure 2) and the valve disc and carrier are thereby turned by means of the control lever 50 into the pressure relief setting represented in Figure 10c, does the withdrawal of the locking pin 44 from the recess 45 take place.

The mode of operation of the filling machine is otherwise the same as that according to Figures 1 to 6, particularly in respect of the mode of operation of the control elements 52,53 and 74 in the case of bottle breakage, bottle gaps and interrupted bottle feed, and the possibility of the provision of two locking recesses 45 and 46 in the rod 37.

The mechanical actuation by means of the control lever 50 or 50a as explained above can also be replaced by pneumatic, hydraulic or electrical actuation of the locking device 43 and 43a or of the valve, control and locking unit 60. The electrical actuation is particularly advantageous when the filling machine is equipped with electrical cycle control.

CLAIMS

1. A filling machine for filling vessels with a substance against a gas counterpressure, the machine comprising a plurality of filling elements movable on an endless path and each provided with valve means for controlling supply of pressurising gas to a vessel to be filled by the filling element, with a centring device for centring individual such vessels relative to the filling element, the centring device comprising a vessel centring element mounted on support means to be movable upwardly and downwardly, and with retaining and releasing means controllable to retain the centring device in and release the centring means from an upper setting thereof, the retaining and releasing means comprising a locking device so engageable with the support means of the centring device as to lock the centring device in said upper setting.

2. A machine as claimed in claim 1, the support means of the centring device of each filling element being provided with at least one recess and the locking device comprising a pin which is axially displaceable to be engageable in and withdrawable from the recess.

3. A machine as claimed in claim 1, the support means of the centring device of each filling element being provided with at least one recess, the locking device comprising a pin engageable in the recess to lock the support means relative to the pin, and the pin being provided with a lateral recess and being turnable to so align the recess of the pin with the recess of the support means as to release the support means from its locked setting.

4. A machine as claimed in either claim 2 or claim 3, wherein the valve means and locking device of each filling element are constructed as a component unit and are controllable by common control means.

5. A machine as claimed in claim 4, wherein the valve means of each filling element comprises a valve member, which is provided with gas flow passage means and which is rotatable between different settings in which the passage means co-operate in different ways with gas duct openings in a surface adjacent to the member, and a control element associated with the valve member and rotatable therewith to actuate the pin of the locking device of that filling element.

6. A machine as claimed in claim 5 when appended to claim 2, wherein the pin of the locking device of each filling element is mounted in the valve means of that filling element to be axially displaceable parallel to the axis of rotation of the respective valve member and to be withdrawable from said recess against a resilient bias, the control element for that pin being arranged in a rearward region of the valve member.

7. A machine as claimed in any one of claims 2 to 6, the support means of the centring device of each filling element being provided with at least one further recess above said one recess.

8. A machine as claimed in any one of the preceding claims, comprising control means arranged on a support structure of the machine and co-operable with the centring device to raise the vessel centring elements.

9. A machine as claimed in any one of the preceding claims, comprising a control device arranged in the region of vessel inlet means of the machine and selectively settable in an operative or inoperative state to actuate or leave unactuated the locking device of each filling element approaching

the inlet means, and monitoring means for monitoring the flow of vessels through the inlet means for for causing the control device to be in the inoperative state when the flow is regular and to be in an operative state when the flow is interrupted.

10. A filling machine substantially as hereinbefore described with reference to Figures 1 to 6 of the accompanying drawings.

11. A machine as claimed in claim 10 and modified substantially as hereinbefore described with reference to Figure 7 of the accompanying drawings.

12. A machine as claimed in claim 10 and modified substantially as hereinbefore described with reference to Figures 8 to 10 of the accompanying drawings.

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