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(54) Self-service distribution device for liquid foodstuffs

(57) The self-service device provides the distribution of the product from the original container (1) by means of a level sensor consisting of a photoelectric cell (6) connected on line (7) with a computer (8) also connected with a keyboard (10) and with an electronic valve (12). To draw the product, the customer digits the quantity of product to buy on the keyboard (10) so causing the going out of the same through the electronic valve (12) and its discharge, through an output device, into a carry-way container (17) placed in station (18).

Said output device provides on a fixed frame (19) an air cylindr (20) controlled by an electronic valve for the vertical translation of the mobile part of the frame with two pipes with a 90° angle of which the horizontal pipe (23) gets into the other vertical pipe (25) with a larger diameter stabilized in a coaxial guide (26) of the fixed frame and providing a servomotor (27) to translate inside itself an axial pipe (28). When in non-delivery condition, the axial pipe (28) obstructs with its lower blocking end (31) with hole (35) the delivery mouth (33) sets between the inside wall (30) of the coaxial pipe (25) and the outside wall (34) of the axial pipe (28).

On receiving of the delivering order of the product (13), the electronic valve (22) actuates the coming of the mobile part of the frame (23-25) to the lower limit stop with introduction into the container (17) of the lower tract (40) of the pipe (25) with blocking end (31) and conic gasket (42). The computer (8) then starts the servomotor (27) bringing in downward sliding the axial pipe (28) so opening, through the lowering of the blocking end (31), the delivery mouth (33) so that the product (13), through the horizontal duct (45) and vertical duct (46), comes out to the mouth (33) to fill up the container (17).

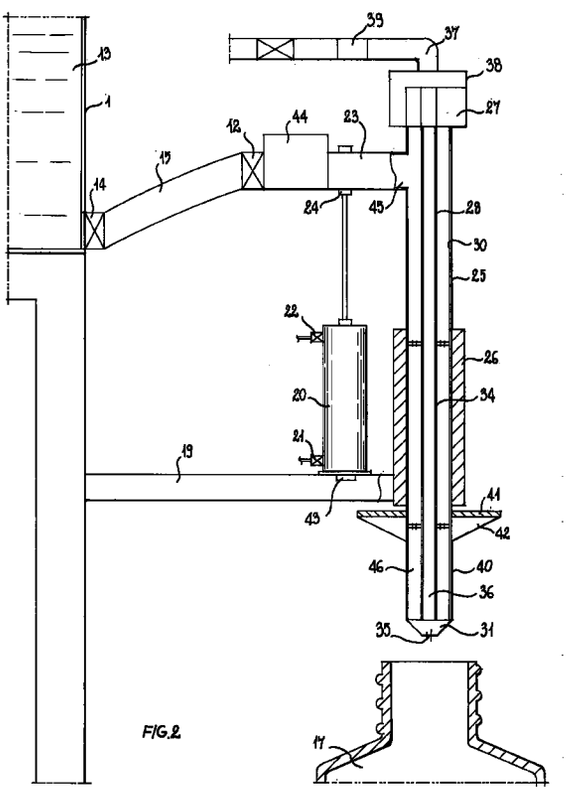

FIG.2

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Description

The present invention refers to a self-service device for the retail distribution of loose liquid foodstuffs and of liquid products in general for home consumption to be distributed, from the original container, by means of a computerized system with a digital process into a take-way container. Principally the invented device ensures the following advantages: a) a reduction of operational times as both the phases for the control and acquisition of the product and the issue of cash vouchers are completely automatic and no vending staff's presence is needed; b) the same original container is reusable for several times; c) a selling method which prevents all risks of forgery as the present system with its computerization can issue a printed form of the discharged product; e) the best hygienic conditions of the delivering part as the product flows inside pipes.

In order to achieve all the above stated advantages the self-service device here described features a completely automatic order and drawing of the product according to control and withdrawing sequences which take place mnemonically without the presence of the selling staff. The invented self-service device features the distribution of the product directly from its original packing, consisting of a container 1, with a volumetric compensation actuated by an inert gas contained inside a bottle 2 with a valve 3, a pressure gauge 4 and an inlet duct 5 and where said container is operated by a level sensor consisting of a photoelectric cell 6. Said photocell 6 connected on a line 7 with a computer 8, which is also connected on line 9 with a keyboard 10 and on a line 11 with an electronic drive valve 12. To draw the product, the customer digits his request of the quantity of product to buy on the keyboard 10 so causing the emission of the product 13 through an electronic drive safety valve 14 into a duct 15, and a further electronic valve 12 and relative discharge, through an output duct 16, into a carry-way container 17 featured in station 18. To dispense the product 13 on a fixed frame 19 an air cylinder 20 controlled by an electronic inlet valve 21 and a return electronic valve 22 is provided to get the vertical translation of the mobile part of the frame with two rectilinear communicating pipes with a 90° angle. The said rectilinear communicating pipes consist of the horizontal pipe 23 fixed up by a holding ring 24 onto the stem of the cylinder itself, the said pipe 23 gets into the vertical pipe 25 having a larger diameter stabilized with the device movement through a coaxial guide 26 of the fixed frame.

On the vertical pipe 25 a servomotor 27 is provided to translate inside the vertical pipe itself a pipe 28 with an axial arrangement set by a series of stabilizers 29 with a drilled circular bearer, the said stabilizers are hold by the inside wall 30 of the vertical pipe 25. When in non-delivery condition, the axial pipe 28 obstructs with its lower blocking end 31, to be provided with an O-ring 32, the delivery mouth 33 sets between the inside wall 30 of the coaxial pipe 25 and the outside wall 34 of the axial pipe 28. The blocking end 31 features a hole 35 leading to the inside duct 36 of the axial pipe 28. As a procecution of the inside duct 36, a duct tract 37 is featured fixed to the body 38 of the servomotor 27, on which a sensor 39 is operating to sense the presence of the product 13.

The product outlet device features a part to be introduced into the container 17, such part to be introduced consists of an outside wall tract 40 of the pipe 25 with at the bottom the blocking end 31 and at the top a relief 41 with circular bearer that acts as a support of a conic gasket 42. On receiving the corresponding order the computer 8 sets the electronic valve 22 thus -for the reentering of the stem of che cylinder 20- the mobile part of the frame 23-25 can reach the lower limit switch. When the frame mobile part is in the said lower position, if a sensor 43 does not check the presence of a container 17 in the station 18, it orders -by operating the electronic valve 21- the back movement of the upper limit end of the frame mobile part 23-25 while, with a container 17 in station. 18, the coming of the mobile part 23-25 towards the lower limit end thus determining the positioning of the delivery mechanism inside the container 17 with a seal ensured by the gasket 42 provided that the piston has not reached the limit stop. Then the computer 8 activates the servomotor 27 and causes the downward sliding of the axial pipe 28 in the series of stabilizers 29, thus through the lowering of the blocking end 31 it determines the opening of the delivery mouth 33. By means of the electronic valve 12, the product 13 flows both through a homologated liter-counter 44, where the liquid quantity to be dispensed is measured, and the horizontal duct 45, then it reaches the vertical delivery duct 46 and comes out of the mouth 33 to fill up the container 17. At the same time the downflow air reascend the duct 36 through the hole 35. The invented delivery system prevents the forming of foam on the product 13 as it fills up the container by producing a thin liquid film which flows along the container walls. In case of an over-delivery of liquid into the container 17, the product 13 -through the hole 35 and the duct 36- comes into contact with the measurement sensor 39 which controls the filling cycle break. The computer 8 on line 47 activates a printer 48 which releases a cash voucher with the order data. Customers can use the said self-service machine by operating a keyboard 10 provided that a container 17 of a suitable capacity has been placed into station 18. Said keyboard 10, through line 9, controls the computer which, by means of line 11, activated the electronic valve 12. Through the safety valve 14 and the duct 15, the liquid reaches the electronic valve 12 and the outlet 16 with device A. By adjusting the manometer 4 on line 49 through the computer 8, the gas pressure for the delivery of the product 13 can be charged, thus changing the speed of the delivery phase. The sealed container 1 can be reusable for several times for its filling up by means of valve 50. The invented

device is illustrated in schematic way in the drawings of sheets 1, 2 and 3. In sheet 1, fig. 1 shows a schematic view of the gravitation system to fill up the container 17. In sheet 2, fig. 2 is a longitudinal section view of the output device of the product 13 with the frame movable parts 23-25 during the rising phase. In sheet 3, fig. 3 is a detailed longitudinal section view of the output device of the product 13 with the frame movable part lowered inside the container 17. Fig. 4 is a side detailed view of the output device of the product 13 with the delivery part lowered into the container 17 seen from a section view and with the delivery mouth 33 during its lowering phase.

Claims

1. Self-service distribution device for liquid foodstuffs providing the distribution of the product directly from its original container (1) with a volumetric compensation actuated by an inert gas contained inside a bottle (2) with a valve (3), a pressure gauge (4) and an inlet duct (5), where said container (1) si operated by a level sensor consisting of a photoelectric cell (6) connected on a line (7) with a computer (8) also connected on line (9) with a keyboard (10) and on a line (11) with an electronic drive valve (12); and in that to draw the product the customer digits his request of the quantity of product to buy on the keyboard (10) so causing the emission of the same product through an electronic drive safety valve (14) with passage into a duct (15), a further electronic valve (12) and discharge, through an output device, into a carry-away contained (17) featured in station (18); characterized in that:

   - the output device of the product (13) provides on a fixed frame (19) an air cylinder (20) controlled by an electronic inlet valve (21) and a return electronic valve (22) to get the vertical translation of the mobile part of the frame with two rectilinear communicating pipes with a 90° angle, of which the horizontal pipe (23) is fixed up by a holding ring (24) onto the stem of the cylinder itself and it gets into vertical pipe (25) having a larger diameter stabilized with the device movement through a coaxial guide (26) of the fixed frame and providing a servomotor (27) to translate inside the vertical pipe itself a pipe (28) with an axial arrangement set by a series of stabilizers (29) with a drilled circular bearer hold by the inside wall (30) of the vertical pipe (25);
   - in non-delivery condition of the product (13) the axial pipe (28) obstructs with its lower blocking end (31), providing with a hole (35) leading to the inside duct (36) of the axial pipe (28) and equipped with an O-ring (32), the delivery mouth (33) set between the inside wall (30) of the coaxial pipe (25) and the outside wall (34) of the axial pipe (28);
   - on receiving the delivering order of the product (13), given by the computer (8), the electronic valve (22) is set so determining, for the reentering of the stem of the cylinder (20), the coming of the mobile part of the frame (23-25) to the lower limit stop, so to introduce into the container (17) the outside wall tract (40) of the pipe (25) with at the bottom the blocking end (31) and at the top a relief (41) with circular bearer that acts as a support of a conic gasket (42);
   - with the lower tract of the axial pipe (25) inserted into the container (17), the computer (8) activates the servomotor (27) bringing in downward sliding the axial pipe (28) in the series of stabilizers (29), thus through the lowing of the blocking end (31) opening the delivery mouth (33) so that the product (13), through the horizontal duct (45), reaches the vertical delivery duct (46) and comes out to the mouth (33) to fill up the container (17),

2. Self-sevice distribution device, as per claim 1), characterized in that on receiving the delivering order the sensor (43), not taking the presence of a container (17) in the station (18), orders by operating the electronic valve (21) the back movement to the upper limit stop of the frame mobile part (23-25).

3. Self-service distribution device, as per claim 1), characterized in that between the electronic valve (12) and the horizontal duct (45) a liter counter (44) is provided which measures the quantity of product (13) to be dispensed.

4. Self-service distribution device, as per claim 1), characteriized in that during the delivering of the product (13) the downflow air reascends the duct (36) of the axial pipe (28) through the hole (35).

5. Self-service distribution device, as per claim 1), characterized in that in case of an over-delivery of liquid into the container (17), the product (13) through the hole (35), the duct (36) and the other duct (37) comes into contact with the measurement sensor (39) which controls the filling cycle break.

6. Self-service distribution device, as per claim 1), characterized in that producing a thin liquid film which flows along the container walls during the filling up is prevented the forming of foam on the product (13).

7. Self-service distribution device, as per claim 1), characterized in that it is started by a customer, without vending staff's presence, by a keyboard

(10) of a computer (8) after to have placed in station (18) a suitable container (17).

8. Self-service distribution device, as per claim 7), characterized in that at the end of the delivering the computer (8) on line (47) activates a printer (48) which releases a stamp with the product indications and the fiscal data.

9. Self-service distribution device, as per claim 1), in that through the computer (8) on line (49) the manometer (4) is to be adjusted to change the gas pressure for the delivery of the product (13), thus changing the speed of the delivery phase.

10. Self-service distribution device, as per claim 1), characterized in that the sealed container (1) is to be reusable for several times for its filling up by means of a valve (50).

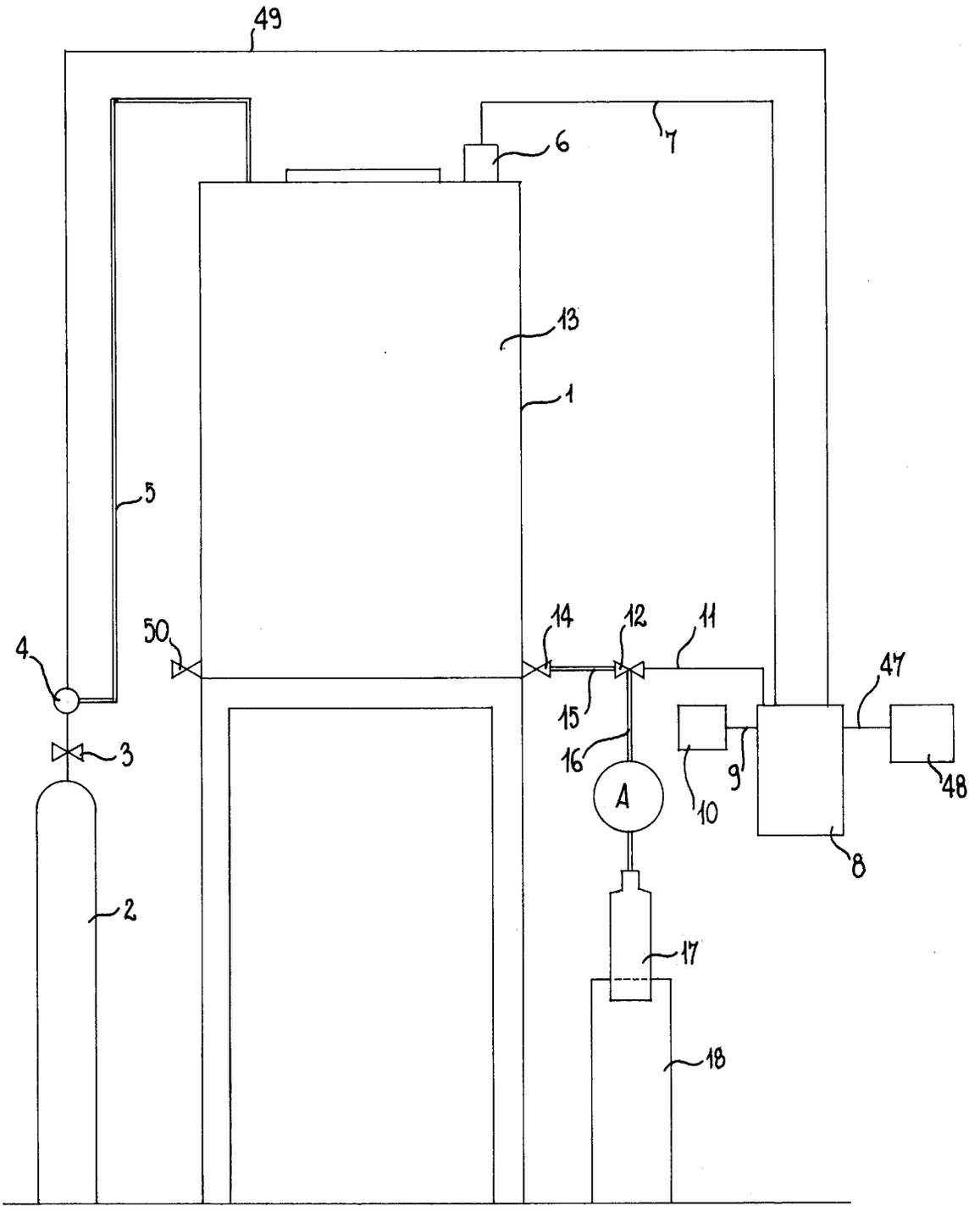

FIG. 1

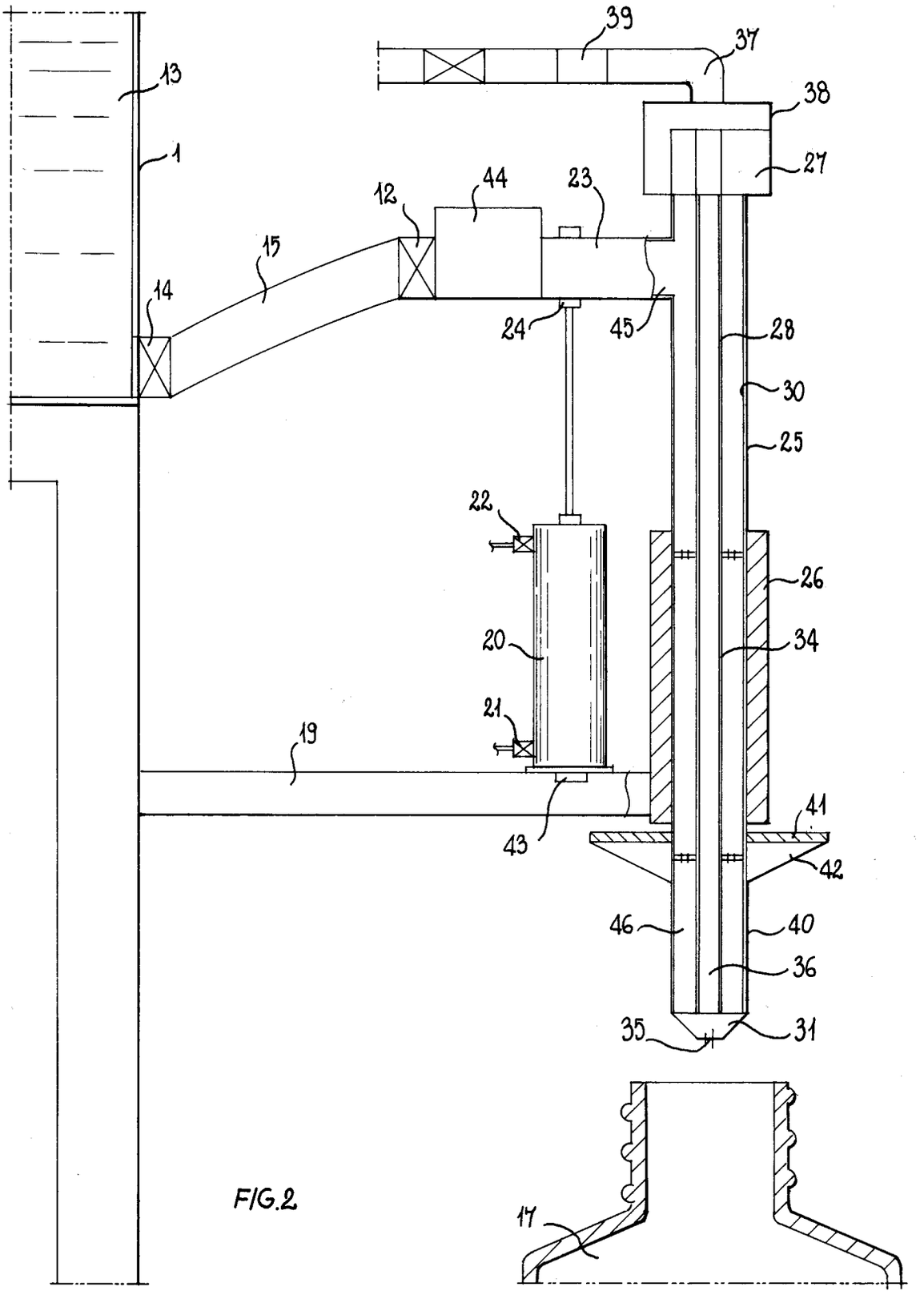
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FIG.2

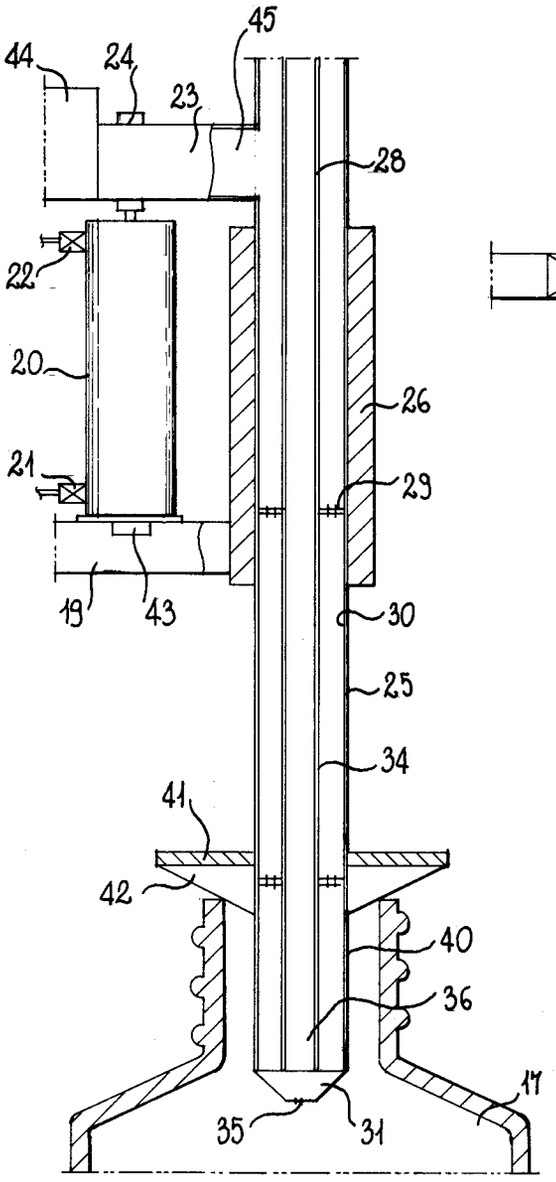
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FIG.3

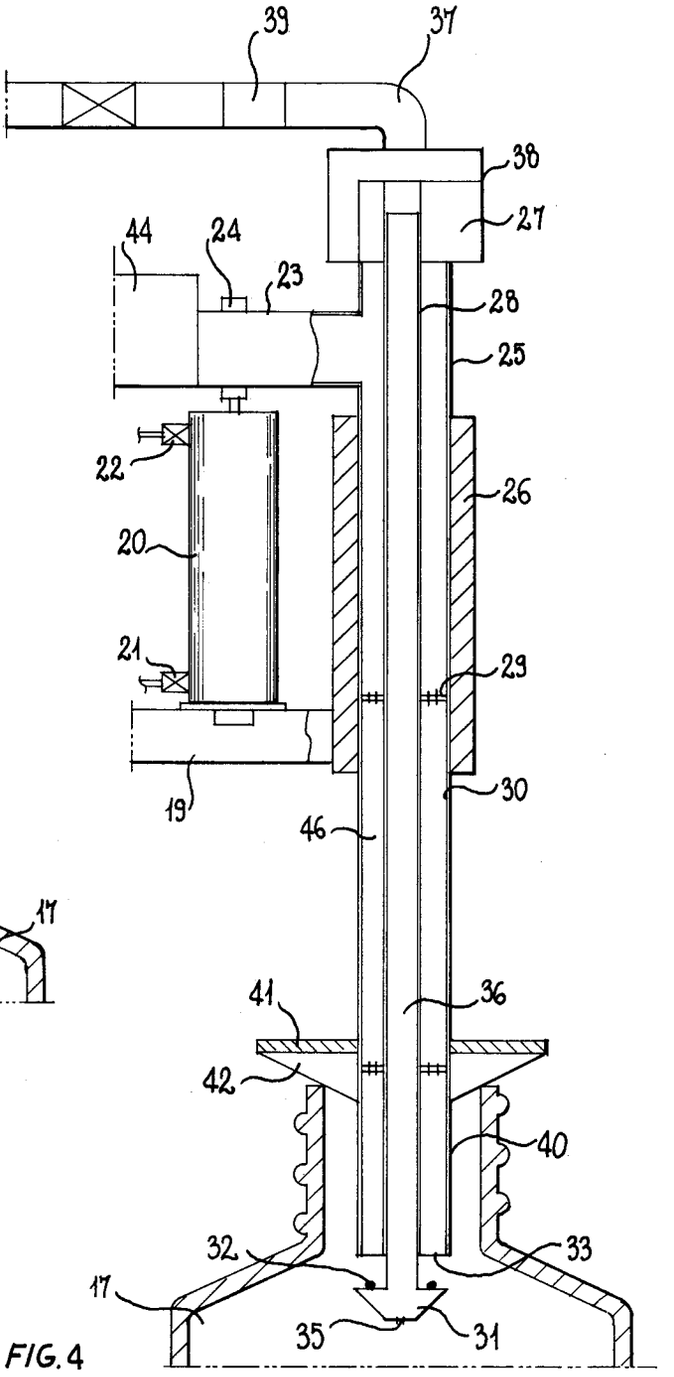
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FIG.4

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EUROPEAN SEARCH REPORT

Application Number
EP 97 83 0362

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.6)
A	US 4 911 212 A (BURTON) * the whole document *	1-4,7,10	G07F13/02
A	US 4 469 150 A (GRIMALDI) * the whole document *	1	
A	FR 2 589 705 A (ULIVI JEAN ANTOINE ET COPPIN RENÉ ALAIN) * the whole document *	1-3,7,8	
A	US 5 133 393 A (MCGINNIS) * the whole document *	1-3	
A	WO 92 08671 A (HETPER) * the whole document *	1	
A	US 5 339 874 A (CRAGUN) * the whole document *	1-3,10	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

G07F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 January 1998	Meulemans, J-P

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