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(11)

EP 1 170 055 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
09.01.2002 Bulletin 2002/02

(51) Int Cl.7: **B01F 13/10**
// B01F3/08

(21) Application number: **01116008.2**

(22) Date of filing: **02.07.2001**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **07.07.2000 IT MI001540**

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(54) **Tank with metering syringe for manual tinting system**

(57) Tank with metering syringe for manual tinting system, comprising a tank (A) for the fluid to deliver, a pumping unit (B) and a delivery valve (C) and provided in said tank (A) with means (2) for transmitting motion to stirring means (1) of the fluid to be delivered, also comprising means (3, 4, 5, 6, 33, 43) for automatic release of said stirring means (1) from said means for transmitting motion to perform maintenance or for inspection of the tank (A).

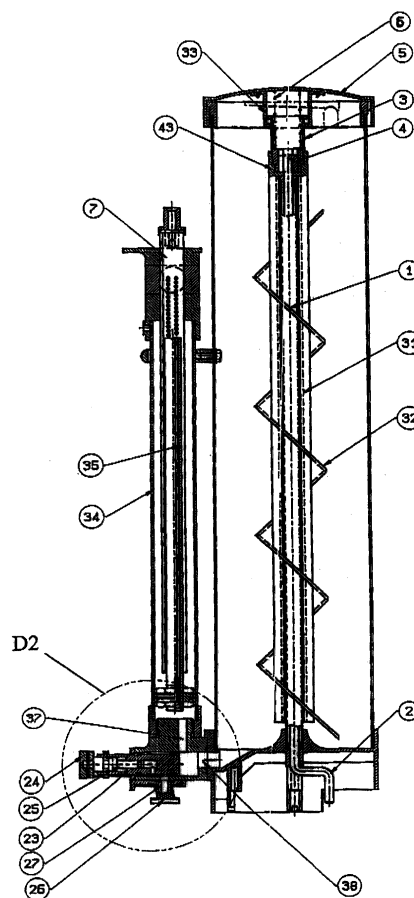


FIG.1

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Description

Field of the invention

[0001] The present invention relates to the sector for the distribution of fluid substances, and more in particular relates to a component to be fitted preferably in a bank in a more complicated machine, known as tinting system, which allows appropriate quantities of several base colours to be dispensed to obtain a specific tint according to the colour chart.

Prior Art

[0002] It is known that the object of tinting systems currently widely used is to allow companies manufacturing paints not to be obliged to prepare an excessively high number of different shades of colours, thus limiting the stock of colour tins that are difficult to sell but must necessarily be available for any requests from customers.

[0003] These prior art apparatus, in different sizes and with different characteristics, are currently used both by retail dealers and big industries that use them to prepare semi-finished products, known as bases, destined to be coloured by retail dealers to obtain the final shade required by the customer.

[0004] As a result, while big industries require a machine with speed and automation, the medium and large-scale dealer requires a machine only with features of automation while for the small-scale retail dealer the most important characteristics are low cost and user-friendliness.

[0005] For the small-scale retail dealer the market currently offers a few machines that satisfy the requirements of low cost and user-friendliness exploiting the principle of manual delivery by means of a graduated syringe.

[0006] Nonetheless, prior art machines have some problems as their safe use is not always satisfactory, especially when performing maintenance and/or inspections, as the presence of moving parts makes its use potentially dangerous for the operator in these phases and in the filling phase.

Object of the invention

[0007] A first object of the invention is to propose a tank for manual tinting systems which is inexpensive to produce, simple and ergonomic to use and at the same time extremely safe for the user.

[0008] A second object is to propose a tank for manual tinting systems that is easy to perform maintenance on and highly reliable.

Summary of the invention

[0009] This object has been attained according to the

invention by producing a tank with a syringe for manual tinting systems, in which the stirring blade of the tank is provided with an automatic release mechanism activated when inspecting or filling the tank.

[0010] According to another characteristic, the tank is provided with a push-button delivery valve with anti-drip device, in place of prior art valves and lever.

[0011] According to another characteristic, the tank is provided with a mechanism to be fitted in a bank on a manual tinting system.

[0012] All possible parts have preferably been made of solvent-proof plastic in order to optimize the quality-to-price ratio of the device.

[0013] The advantages attained consist essentially in the fact that this type of tank is highly flexible to be fitted in series in a manual tinting system and is more functional and ergonomic to use.

[0014] Moreover, it is possible to attain high levels of precision with total safety for the user.

List of the figures

[0015] These and other advantages shall be better understood by all technicians in the field from the description below and accompanying drawings, provided as a nonlimiting example, in which:

- fig. 1 shows a right side section of a tank according to the invention;
- fig. 2 shows a front section of the tank in fig. 1;
- fig. 3 shows a left side view of the tank in fig. 1;
- fig. 4 shows in detail a top section of the measuring system of the secondary cylinder of the tank in fig. 1;
- fig. 5 is an enlargement of the detail D2 in fig. 1;
- fig. 6 is an enlargement of the detail D1 in fig. 2;

Detailed description

[0016] With reference to the accompanying figures, in a preferred embodiment a tank with a metering syringe for manual tinting systems according to the invention comprises:

- a tank A for the fluid to deliver;
- an element B for pumping the fluid;
- a valve C to control delivery of the liquid.

[0017] With reference to figure 1, the blade 1 of the tank A is composed of a hollow cylindrical body 31 on which finning is wound 32. The blade 1 receives motion from a stirring shaft 2 by means of a joint 3 capable of rotating inside a socket bearing 33 of the cover 5 with interlocking closing of the tank A and held engaged by a compensation spring 6.

[0018] The joint 3 is engaged, by its hexagonal geometrical shape, with the male hexagonal terminal 4 of the shaft 2 and with the top end 43 of the body 31 with female hexagonal profile.

[0019] Advantageously with this solution, once the cover has been removed, the tank A can be inspected, for example to perform maintenance or for filling, without the risk of the blade 1 accidentally starting to operate endangering the safety of the operator.

[0020] At the lower end, the stirring shaft 2 preferably has a "Z" shape to be controlled by an eccentric mechanism. With this solution it is advantageously possible to fit several tanks in a bank connecting the stirring shafts to a single eccentric element capable of providing them with motion simultaneously.

[0021] With particular reference to figures 1 and 2, a pumping element B according to the invention is composed of a primary cylinder 34, also said external syringe, in the stem of which a secondary cylinder 35 is obtained, also referred to as secondary syringe, coaxial to the first cylinder and with a smaller diameter.

[0022] The primary and secondary syringes have respective graduated rods 8, 7 that regulate the quantities delivered by the two syringes, the first being characterized by a high flow rate and low delivery precision, the second by a lower flow rate with high precision.

[0023] Both rods 8, 7 are provided with regulation means that allow the user to fix the desired quantities of fluid to be delivered.

[0024] In particular, the rod of the primary cylinder has a knob 9 that can be extracted counter to the action of a return spring 11 in order to release a locking pin 10 from one of a series of engaging holes 29 made along the rod 8 and hence free the rod 8.

[0025] The rod 7 has a similar regulation mechanism composed of a knob 12 that acts on a block 13 housed in the flange 14 counter to the action of a spring 30.

[0026] Unlike the mechanism of the rod 8, in this case the rod 7 has two series of engaging holes staggered in height from each other so that only one of the two pins is engaged and it is possible to obtain double resolution, equal to half of the pitch existing between the holes of the rod.

[0027] The regulating mechanism of the rod 7 is contained in the block 13 housing a pair of locking pins 15 cushioned by a pair of springs 16.

[0028] Advantageously, the solution adopted allows high resolution which, in a preferred embodiment, allowed controlled delivery of a quantity of fluid with a resolution equal to 0.08 cc.

[0029] The primary and secondary cylinders 34, 35 have two plungers 20, 19 controlled from above by corresponding handles 18 and 17 that may be raised from a lower abutting position to a mechanical stop established by the regulation position of the rods 7 and 8.

[0030] Below the unit B a three-way valve C is fitted composed of a delivery nozzle 27, a duct 37 through which fluid flows to and from the unit B and a fluid suction duct 38 from the tank A to the cylinders 34, 35.

[0031] The valve C is normally in the suction position (position in figure 1) with the nozzle 27 closed and with the cylinders 34, 35 communicating with the tank A by

means of the ducts 37, 38.

[0032] This position is held thanks to a spring 21 that acts on a horizontal column 22 in order to hold an exchange stem or head 23 in traction by means of a push button 24.

[0033] The valve C also comprises a drip-proof plunger 25, coaxial in relation to the stem 23 of the valve, operated by the push button 24 and an automatic cap 26 composed of a plate 42 to close the nozzle 27 and an articulated arm 39 rotating around a fixed pin 40 and provided with an intermediate slot 41 inside which a pin 28 integral with the travel of the column 22 is fitted.

[0034] When operating, the valve C is as said in normal suction position and the regulations rods are initially positioned according to the desired quantity of fluid to deliver.

[0035] The handles 17 and 18 are raised from a lower position to the mechanical stop regulated by means of the rods 7 and 8 and the fluid in the tank A is sucked up by the plungers 19, 20 and flows through the ducts 37, 38 to fill the primary and secondary syringes 34, 35.

[0036] For delivery the push button 24 is pressed, consequently pushing the column 22 and causing the anti-drip plunger 25 to advance filling the delivery chamber (the space between the two plungers of the stem 23) and hence causing the stem 23 of the valve C to advance until the syringes 34, 35 are in communication with the delivery nozzle 27. Simultaneously, the pin 28 integral with the motion of the column 22 causes the arm 39 of the cap 26 to rotate around the pin 40 in order for the plate 42 to free the outlet of the nozzle 27.

[0037] When delivery terminates the push button 24 is released and moves backward on account of the spring 21.

[0038] Advantageously, on account of the backward movement of the push button 24, the fluid remaining in the delivery chamber is sucked up by the plunger 25 and after that the stem 23 also moves back and the plate 42 returns to the closed position preventing any all risk of dripping from the delivery duct 27.

[0039] The present invention has been described with reference to preferred embodiments, although equivalent modifications may be made by any technician in this field without departing from the scope of the protection granted by this patent.

Claims

1. Tank with metering syringe for manual tinting system, comprising a tank (A) with the fluid to be delivered, a pumping unit (B) and a delivery valve (C) and said tank (A) being provided with means (2) for transmitting motion to stirring means (1) of the fluid to be delivered, **characterized in that** it comprises means (3, 4, 5, 6, 33, 43) for automatic release of said stirring means (1) from said means for transmitting motion to perform maintenance or for in-

spection of the tank (A).

2. Tank as claimed in claim 1, **characterized in that** said stirring means comprise a blade (1) comprises a hollow cylindrical body (31) on which finning (32) is wound and which receives motion from a stirring shaft (2).

3. Tank as claimed in claim 2, **characterized in that** said means for releasing the blade (1) from the motion transmitted by the shaft (2) are composed of a joint (3) engaged by geometric coupling with the top terminal of the shaft (2) and with the top end (43) of the body (31) and capable of rotating inside a socket bearing (33) of the cover (5) for closing the tank (A) held engaged by a compression spring (6) so that once the cover (5) is raised, the joint (43) loses the geometric coupling with the shaft (2) and the body (31) and blade (1) cannot start to operate.

4. Tank as claimed in claim 3, **characterized in that** the joint (3) is engaged by means of its hexagonal geometrical shape, with the male hexagonal terminal (4) of the shaft (2) and with the top end of the body (31) with female hexagonal profile.

5. Tank as claimed in claim 1, **characterized in that** said valve (C) is a manual three-way valve, composed of a delivery nozzle (27), a duct (37) through which fluid flows to and from the unit (B) and a fluid suction duct (38) from the tank (A) to the syringes (34, 35), in which the valve is changed from the suction position to the delivery position by means of the pressure of a push button (24) called delivery push button.

6. Tank as claimed in claim 5, **characterized in that** the valve (C) is normally in the suction position with the nozzle (27) closed and with the cylinders (34, 35) communicating with the tank (A) by means of the ducts (37, 38).

7. Tank as claimed in claim 6, **characterized in that** the normally open position is maintained thanks to a spring (21) that acts on a horizontal column (22) to hold an exchange stem (23) in traction by means of a push button 24.

8. Tank as claimed in claim 5, **characterized in that** the valve (C) comprises an anti-drip plunger (25), coaxial in relation to the stem (23) of the valve, operated by the push button (24).

9. Tank as claimed in claim 5, **characterized in that** the valve (C) comprises an automatic cap (26) composed of a plate (42) to close the nozzle (27) and an articulated arm (39) rotating around a fixed pin (40) and provided with an intermediate slot (41) fit-

ted into which is a pin (28) integral with the travel of the column (22).

10. Tank as claimed in claim 2, **characterized in that** the lower part of said shaft (2) has a "Z" shape in order to be driven by an eccentric mechanism.

11. Tank as claimed in claim 1, **characterized in that** said pumping element (B) is composed of an external syringe (34) in the stem of which a secondary syringe (35), coaxial to the first and with a smaller diameter, is obtained.

12. Tank as claimed in claim 11, **characterized in that** said external and secondary syringes have respective graduated rods (8, 7) that measure the regulated quantities delivered by the two syringes, the first syringe being **characterized by** a high flow rate and low delivery precision, the second syringe by a lower flow rate with high precision.

13. Tank as claimed in claim 12, **characterized in that** said rods (8, 7) are provided with regulation means that allow the user to fix the desired quantities of fluid to be delivered.

14. Tank as claimed in claim 13, **characterized in that** said regulation means of the external syringe (34) are composed of a knob (9) that can be extracted counter to the action of a return spring (11) in order to release a locking pin (10) from one of a series of engaging holes (29) made along the rod (8) and hence allow controlled vertical movement of the rod (8).

15. Tank as claimed in claim 13, **characterized in that** said means to regulate the rod (7) are composed of a knob (12) that acts on a block (13) housed in a flange (14) counter to the action of a spring (30) in order to release a pair of locking pins (15) from two series of engaging holes (29) staggered in height from each other so that only one of the pins is engaged.

16. Tank as claimed in claim 13, **characterized in that** said regulating means can be extracted in a block.

17. Tank as claimed in claim 8, **characterized in that** said regulations means have a resolution equal to or lower than 0.08 cc.

18. Tank as claimed in one or more of the claims 11-17, **characterized in that** said external and secondary syringes (34, 35) have two plungers (20, 19) which can be driven from above with corresponding handles (18 and 17) which may be raised from a lower abutting position to a mechanical stop established by the regulation position of the rods (7 and 8).

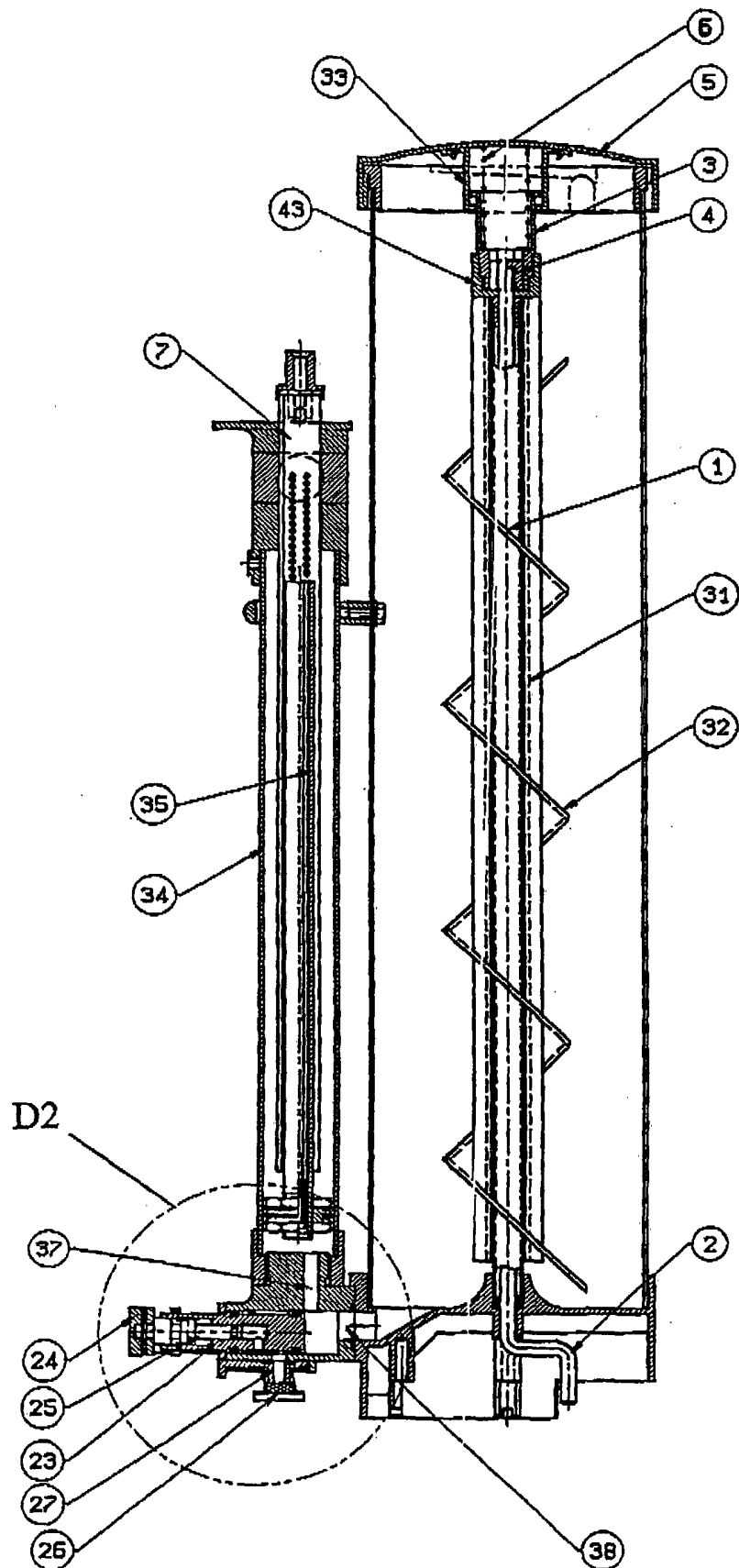
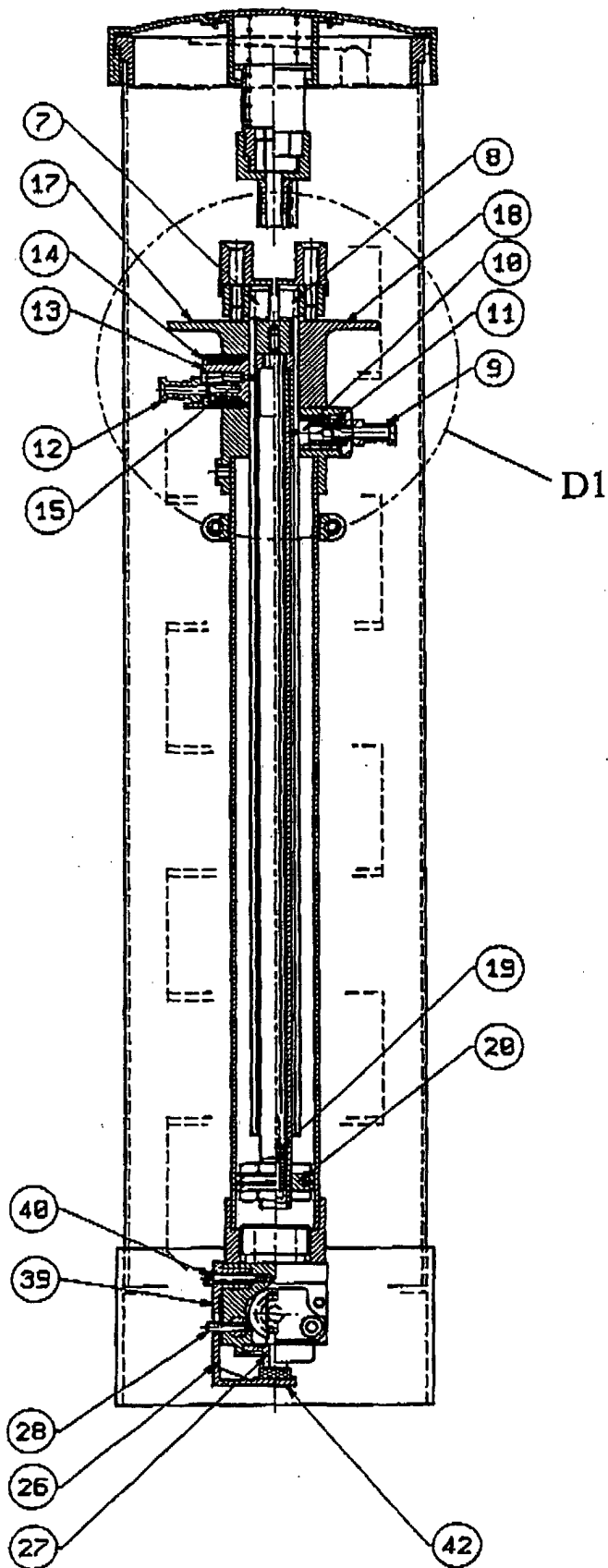
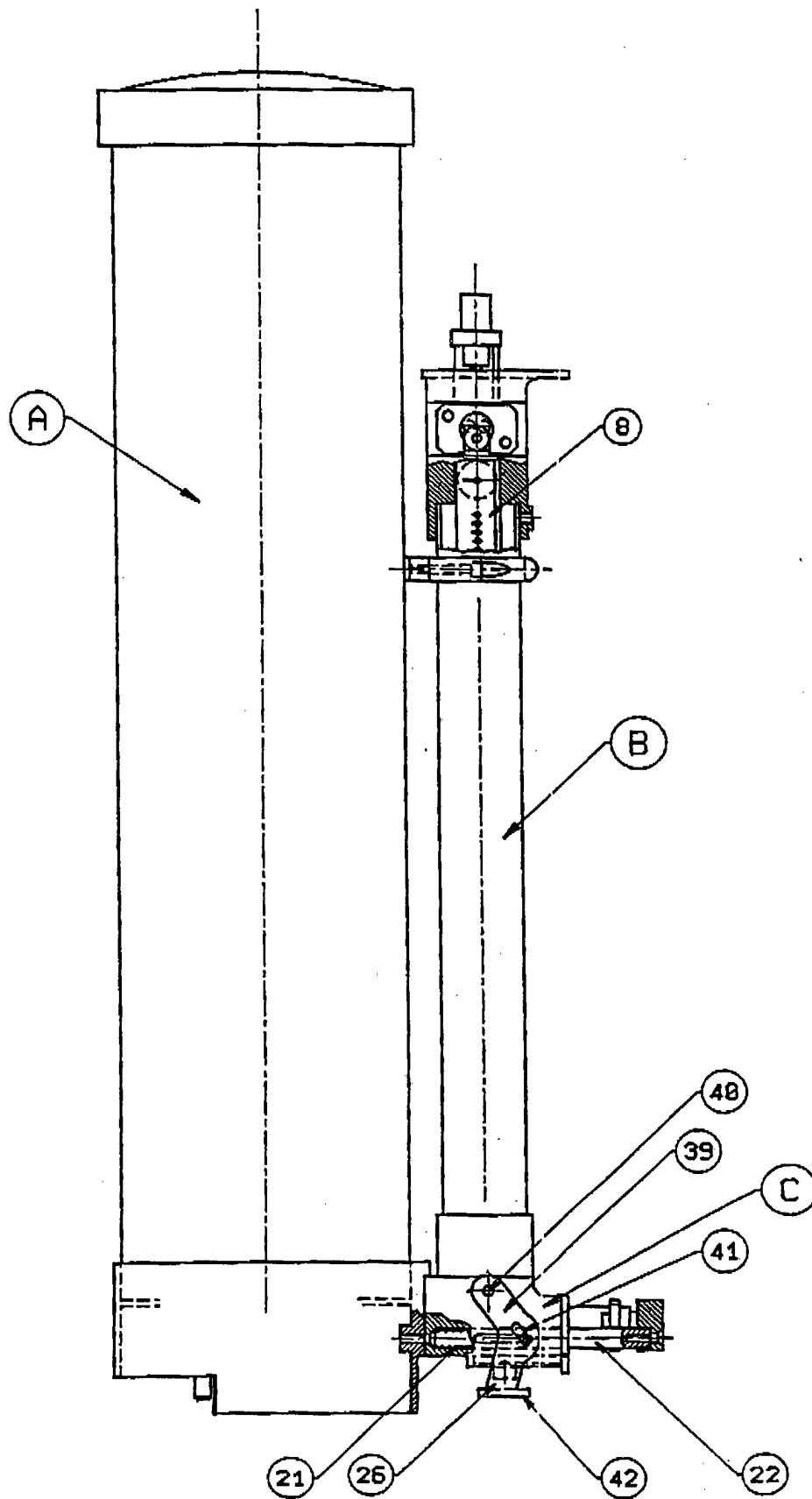


FIG.1





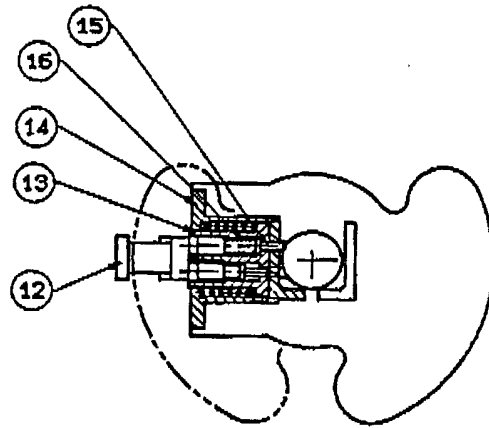


FIG. 4

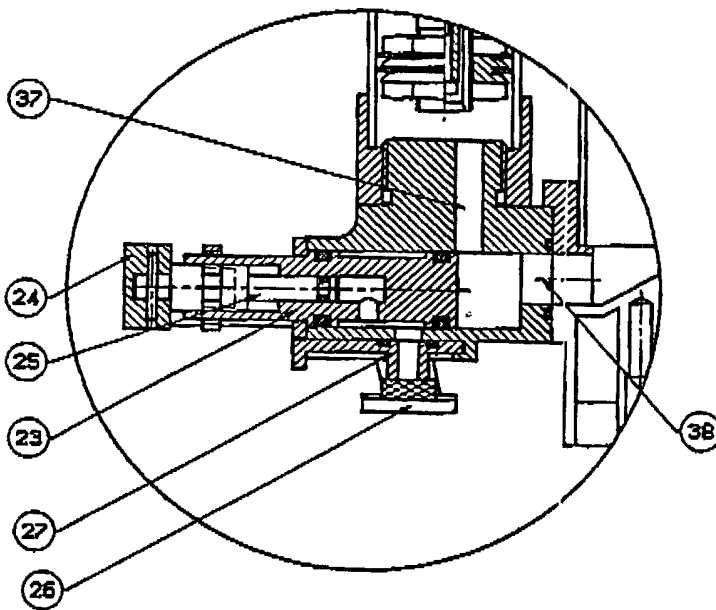


FIG. 5

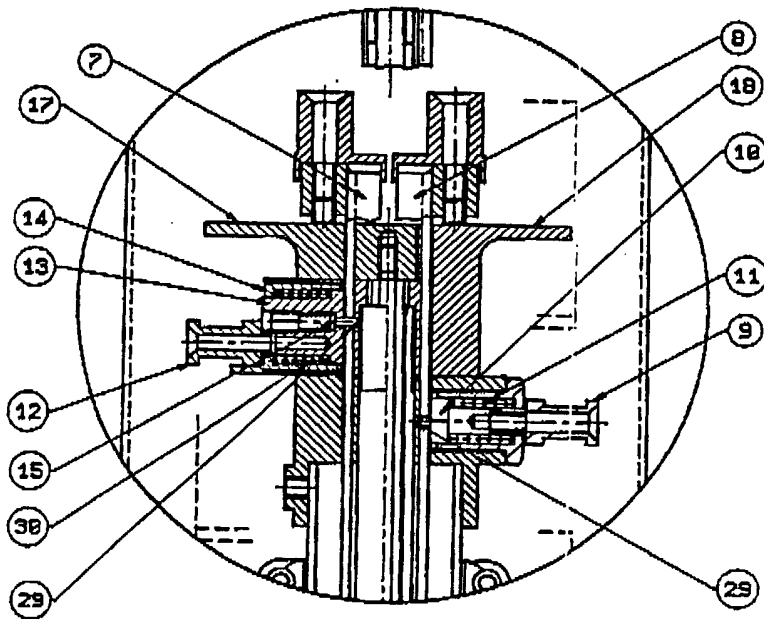


FIG. 6