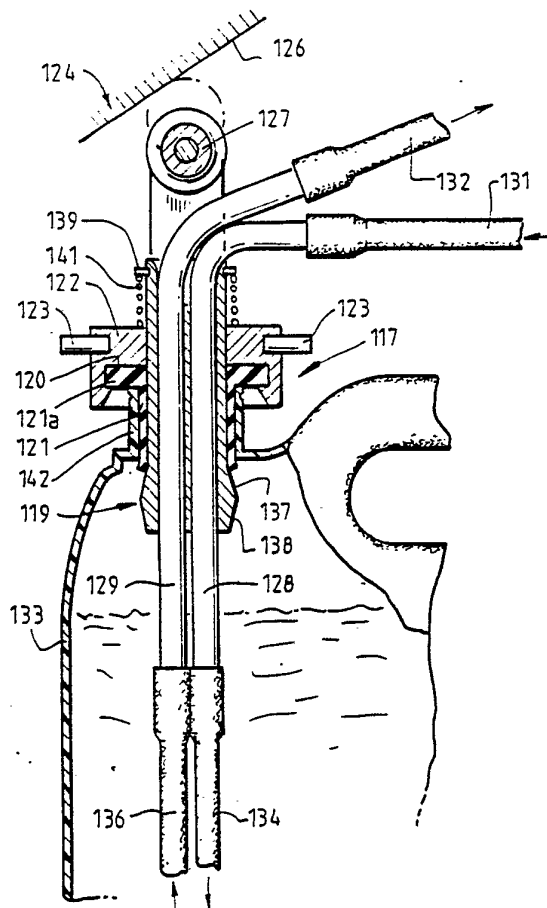




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(54) Title: DISPENSING APPARATUS (57) Abstract Dispensing apparatus has a resilient, hollow seal member (47, 121) engaged on an expending member (38, 137) which is tapered so that relative axial movement causes the seal member (47, 121) to be radially expanded into contact with the neck (56, 142) of a container (10, 133) of material to be dispensed. Dispensing fluid enters the container (10, 133) through a fluid inlet passage (35, 128) which passes through the expanding member (38, 137). Dissolved or slurried material passes from the container (10, 133) through an outlet passage (28, 129) which also passes through the expanding member (38, 137).		



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DISPENSING APPARATUSFIELD OF THE INVENTION

This invention relates to a dispenser particularly adapted to dispense liquids, powders, solids, slurries or material in any other non-gaseous state from a container of such material.

The apparatus of the present invention may be used for dispensing detergents or any other material in an industrial or commercial process. The invention is particularly adapted, however, for the dispensing of detergents, rinsing aids and water softener materials to commercial dishwashing and laundry machines. The invention will be described in connection with the dispensing of such materials in commercial dishwashing machines.

BACKGROUND OF THE INVENTION

Many forms of dispensing apparatus are known. In one arrangement for dispensing detergent powder, a container of the powder is affixed to a dispensing head, typically by using an external screw thread on the container to engage within an internal thread on the dispensing head. Water is supplied to the dispensing head under pressure to spray, jet or otherwise enter the container in a stream which either dissolves some of the detergent powder or forms a slurry therewith. Such slurry or dissolved powder is forced from the container through an outlet in the dispensing head and is conveyed by an appropriate pipe, hose or the like to the end use location, such as the dishwasher.

Such a typical dispensing arrangement has a number of severe disadvantages. Thus, the engagement between the container and the dispensing head is prone to leakage such that the detergent material, which is generally extremely caustic, in dissolved or slurry form is exposed to the surrounding environment.

If the detergent container is upright, when all powder has been slurried or dissolved and the container is substantially empty of the detergent powder, the container is full of water. To replace the container, it must be unscrewed from the dispensing head and this can result in spillage of water from the container. While such water is substantially diluted, it will still contain some dissolved detergent and any spillage is undesirable and may be dangerous.

In another form of dispensing apparatus, the container of detergent is

inverted over a water inlet. The detergent in the container may be in solid form, in which case a water jet is used to dissolve a predetermined amount of detergent for use, or in powder form, in which case a fine mesh screen or the like is used to hold the powder in the container while it is inverted. The powder is dissolved by a jet of water directed into the container through the filter.

While an inverted container is relatively safe when empty, all the water-detergent having been drained therefrom, problems can still arise with partly emptied containers and with leaks developing where the container is locked onto the dispensing apparatus.

Also of particular importance is the potential problems caused by detergent finding its way into the water supply by being sucked back into the water supply inlet. With the typical dispensing apparatus, if a low pressure does occur in the water supply, it is possible for the detergent in dissolved or slurry form to enter the water supply pipes and be discharged elsewhere. This could be particularly hazardous.

The dispensing of powders has always proved to be difficult due to the tendency for powders, in a moist environment, to solidify. It is not uncommon for solidified detergent powder to block the injection system in a commercial dishwashing machine and, when such blocking occurs, the tendency for a powder slurry to be forced into the water supply system is greatly increased. Where, in a dispensing system, the powder container is inverted over a vertically or horizontally mounted water jet inlet, falling powder within the container can also cause the water inlet jet to block. While this problem may be overcome by placing the water inlet jet horizontally, a deflector is required in the container directing the water spray upwards into the container.

It is therefore desirable to provide a dispensing apparatus which avoids or at least ameliorates most, if not all, of the disadvantages of known dispensing systems.

It is also desirable to provide a dispensing apparatus which substantially avoids dissolved or slurried material being sucked into the water supply.

It is also desirable to provide a dispensing apparatus which is simple and easy to use and which is economical to manufacture and supply.

It is also desirable to provide a dispensing apparatus which is able to be

simply adapted for use with different container types or sizes or shapes for many dispensing applications.

SUMMARY OF THE INVENTION

5 According to one aspect of the invention there is provided a dispensing apparatus comprising a dispensing head having a dispensing fluid inlet passage communicating with a fluid delivery means, a fluid outlet passage, both inlet and outlet passages passing through an expanding member of a container mounting, said
10 expanding member mounted coaxially with a flexible, resilient seal member, a carrier for the seal member, and moving means for moving the expanding member relative to the seal member.

In one form of the invention, the expanding member has a tapering surface which, on relative movement, contacts and expands the seal member. Preferably, the outer end of the expanding member tapers inwardly to facilitate engagement of a container with the container mounting.

15 In one embodiment, the expanding member is formed of a rubber, synthetic rubber or synthetic plastic material, the seal being adapted to engage within a top or neck of a container which holds material to be dispensed, with the expanding member disposed within the container. Relative movement of the expanding member and the seal member causes engagement and outward expansion of the seal into
20 sealing engagement with the container top or neck, depending on the size and type of container used.

In another embodiment of the invention, the carrier for the seal member is pivotally located on a mounting support to permit pivotal movement of the container mounting. The expanding member extends through the carrier and is
25 provided with a circlip which forms a shoulder for a spring mounted between the carrier and the circlip. The spring urges the expanding member into expanding engagement with the seal member.

The upper end of the expanding member is provided with a cam follower, preferably in the form of a roller, which engages with a cam surface located adjacent
30 the mounting support. The cam surface is disposed so that pivotal movement of the container mounting causes relative movement between the expanding member and the seal member. A detent is provided in the cam surface to retain the carrier mounting in a position in which the biasing spring is compressed and the expanding member

has been moved away from expanding engagement with the seal member. In this position, the outlet opening, or neck, of a container is able to engage over the expanding member and seal member so that reverse pivotal movement causes the seal member to be expanded within the mouth of the container.

5 The invention also includes a fluid dispensing system in which water is pumped into a container of material to be dispensed such as detergent, and the resultant solution or slurry passes out of the container for use. With one arrangement, resultant solution or slurry is pumped out of the container so that there is no buildup of fluid within the container. When the material to be dispensed is exhausted, the
10 container is substantially empty, thus minimizing the risk of spillage during removal.

 Alternatively, the water pumped into the container can be used to pressurize the container which forces the resultant solution or slurry through the fluid outlet passage.

 Preferably, the dispensing fluid inlet passage and outlet passage comprise
15 or include electrodes adapted to be used to sense if the level of water in the container exceeds a predetermined level indicating a fault in the dispensing apparatus. Preferably, both inlet and outlet passages comprise metal tubes which extend a predetermined distance into the container, and appropriate electrical measuring circuits are used to detect if the level of fluid in the container reaches the electrodes.

20 It will be appreciated that, if the material being dispensed is a liquid, then no inlet passage need be provided. The liquid material may be simply dispensed by pumping from the liquid container. A relief valve will be provided in the dispensing head to permit air to enter the container on removal of fluid therefrom.

 In accordance with another aspect of the invention there is provided
25 dispensing apparatus comprising a dispensing head having a dispensing fluid inlet means communicating with a fluid delivery passage, a vent open to atmosphere communicating with the fluid delivery passage, and a fluid outlet passage, the delivery passage and outlet passage both extending through a container support means having an internally expandable seal to sealingly engage within a container neck.

30 In one particular form, the dispensing head includes a chamber into which the fluid inlet means leads. The vent also communicates with the chamber through a bleed hole.

 In one form of this embodiment of the invention, the fluid delivery

passage and the fluid outlet passage are substantially coaxial, the fluid delivery passage extending from the chamber to a container mounting while the fluid outlet passage comprises a tube which passes inside the delivery passage, through the chamber to an outlet in the dispensing head.

5 In order that the invention is more readily understood, embodiments thereof will now be described with reference to the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

Figure 1 is a side elevational view of dispensing apparatus in accordance with one embodiment of the present invention,

10 Figure 2 is a cross-sectional side elevational view of the dispensing apparatus of Figure 1 in an enlarged scale,

Figure 3 is a perspective view of dispensing apparatus in accordance with another embodiment of the present invention,

15 Figure 4 is a schematic, cross-sectional elevational view of the dispensing head of one embodiment of the invention,

Figure 5 is a detail view of the cam follower, and

Figure 6 is a schematic view illustrating use of the dispensing head of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

20 Referring to Figures 1 and 2 of the drawings, the dispensing apparatus of this embodiment comprises a dispensing head 12 incorporating a manifold assembly 14 and a container mounting assembly 16. The manifold assembly 14 has a water manifold 17 defining a chamber 18 with a water inlet 19. A vent 21 communicates with the chamber 18 through a vent bleed hole 22.

25 The upper end of chamber 18 is enclosed by a product manifold 23 mounted on the water manifold 17 by screws 24 and an O-ring 26. The product manifold 23 has a product outlet 27 and is connected to a product riser pipe 28 which extends from the manifold 23 through the chamber 18 and through the container mounting assembly 16.

30 The container mounting assembly 16 comprises a tube 31 the upper end of which is located in the water manifold 17 by set screws 32. The upper end of the tube 31 is located in or adjacent the chamber 18 and the tube is sealed in the water manifold 17 by appropriate O-ring seals 33. The tube 31 has an external screw thread

34 to receive a threaded lock-nut 36 with radial operating handles 37.

5 An expanding member 38 is either secured to or formed integral with the lower end of the tube 31. The expanding member 38 is preferably of a truncated conical shape, but may be of any other desired tapered shape for the purpose hereinafter described.

The bore of the tube 31 is of a diameter greater than the outer diameter of the product riser pipe 28 which passes therethrough. This provides an annular passage 35 leading from the chamber 18 to the lower end of the tube 31 through which water may pass from the chamber 18.

10 The container mounting assembly 16 further includes a tubular seal 41 having a radial flange 42 at its upper end. The seal 41 is preferably formed of a flexible, resilient material such as rubber, synthetic rubber, synthetic plastic material or other similar material able to be expanded radially outwardly by the expanding member 38 so as to seal in the neck 56 of a container 10 mounted on or engaged with
15 the mounting assembly 16. The lower inner surface of the tubular seal 41 may be tapered, as at 43, to increase the flexibility of the seal at the lower end. The flange 42 of the tubular seal 41 is held in a relatively rigid holder 44 having radial handles 46.

20 In this embodiment, the product riser pipe 28 has fitted on its lower end a telescopic product carrier tube 29 of two or more sections (Figure 1) which are able to move downwardly with a telescopic action as the level of product in the container 10 falls.

25 The dispenser apparatus of this embodiment is designed particularly for dispensing a powdered detergent supplied in the container 10. The detergent powder is dispensed with water, although it will be appreciated that any dispensing fluid may be used in the performance of the invention. The water supply is connected to the dispensing head 12 through an inlet pipe 51 from a solenoid controlled valve 52.

30 The container 10, full of detergent powder, is mounted to the dispensing head 12 by passing the expanding member 38 and the unexpanded tubular seal 41 into the container neck 56. When the seal 41 is in position in the container neck 56 as shown in Figure 2, the lock-nut 36 is rotated until it contacts the upper surface of the holder 44. Continued rotation of the lock-nut 36 then produces relative movement of the expanding member 38 and the seal 41 whereby the seal is expanded into sealing

contact with the container neck 56, as schematically indicated in Figure 1. The seal is enhanced by fluid being introduced under pressure into the container, such pressure assisting in forcing the expanding member against the seal.

5 Under the control of a process controller, which may be a dishwasher sequence controller or the like, when it is necessary to supply detergent to the dishwasher, the solenoid valve 52 is actuated and water from a normal water supply passes through the inlet pipe 51 to the chamber 18. From the chamber 18, water passes down the annular passageway 35 between the outside of the riser pipe 28 and the bore of the tube 31 and into the detergent container 10. Because of the relative
10 constriction of the passageway 35, and the pressure of the supply water, the water passes into the container with some force thus forming jets which mix with the detergent and either dissolve the detergent or form a slurry.

As the container fills with the slurry and/or dissolved detergent, the product is caused to rise up the riser pipe 28 to the product manifold 23 from which
15 it is discharged through a discharge pipe 57 leading to the dishwasher chamber (not shown). After a predetermined time, or after a measured amount of product has been discharged, the solenoid valve 52 is closed so that no more water enters the container 10.

Water in the water chamber 18 in the dispensing head 12 also passes
20 through the vent bleed hole 22 into the vent pipe 21. The amount of water bled from the chamber 18 will be dependent on the size of the bleed hole and, in one form of the invention, the bleed hole 22 may be adjustable by using an appropriate needle valve or the like. The water discharged through the vent pipe 21 preferably passes into the dishwasher chamber and may be used as a supply of rinse water at the
25 location where product is discharged into the dishwasher to flush the product from the dishwasher bulkhead. Alternatively, the vent may discharge to a drain or to any other suitable location.

It will be seen that, if any blockage occurs in the product discharge pipe 57 or the riser pipe 28, any excess pressure which may build up in the chamber 18 is
30 relieved through the bleed hole 22. If desired, a pressure release valve may be incorporated into the vent to fully open the relief vent if pressure builds up to a predetermined limit which might be considered dangerous or undesirable.

The location of the vent 21 communicating with the chamber 18 also

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ensures that, if any low pressure occurs in the water supply inlet pipe 51 but, instead, air will be drawn through the vent line 21 to vent the chamber 18. The vent 21 also acts to vent the chamber 18 to atmosphere on cessation of the water supply, relieves pressure in the system and prevents siphoning which might otherwise occur with a low pressure in the water inlet supply line.

If the product discharge pipe 57 is connected with a pump to assist the supply of product from the container 10 to the dishwashing chamber, the pump may be used to substantially totally drain the container 10 following operation of the solenoid valve 52 to shut off the water supply. With this arrangement, when the detergent container 10 is empty, it may be replaced as an empty container rather than one which is full of water with a low chemical concentration.

To replace a detergent container 10, the lock nut 36 is rotated away from the holder 44 to a position similar to that shown in Figure 2. The handles 46 and, if necessary, 37 are able to be used to relatively move the tubular seal 41 and the expanding member 38 to a position whereby they can be removed from the container neck 56. The container is then replaced as previously described.

Referring to Figures 3 to 6 of the drawings, Figure 3 illustrates a form of dispensing apparatus in accordance with the invention wherein two detergent powder dispensers 112, a rinse aid dispenser and a control module 116 are mounted in an assembly. Each of the detergent dispensers 112 has a dispensing head 117 (Figure 4) and is connected to a fluid supply pump (not shown) mounted in the control module 116.

A fluid reservoir, also located in the control module 116 is connected to a water supply system through a ball valve or similar control system and the fluid supply pump supplies water from the reservoir to each of the detergent dispensers 112, as determined by the requirements of the system which are pre-programmed into control circuits operated by the control module 116.

The dispensers 112 may also be connected to a solution delivering pump (not shown) located in the control module 116 for delivery of solution from either of the dispensers, or both. A further delivery pump may also be provided for delivery of liquid rinse aid from the rinse aid dispenser 114. Both the detergent dispensers 112 and the rinse aid dispenser 114 have lift-up lids 118 permitting access to the respective dispensing heads 117.

Each dispensing head 117 comprises a seal carrier 122 pivoted to the body 124 of the dispenser 112 by pivot pins 123 engaged in appropriate pivotal supports (not shown). The seal carrier 122 supports a seal member 121 which has a radial flange 121a engaged within a circumferential recess 120 in the seal carrier 122.

5 An expanding member 119 passes through the bore of the seal member 121. The upper end of the expanding member 119 carries a cam roller 127 which is adapted to engage with a cam surface 126 formed on the body 124 of the dispenser 112. The lower end of the expanding member is formed with a shape of two opposed, truncated cones which provides a tapered, expanding surface 137 adapted to engage
10 with an inner surface of the seal member 121 to thereby expand the seal member upon relative movement of the seal member and the expanding member 119. The lower tapered surface 138 of the expanding member provides a guide surface for the engagement of the mouth of a container 133 with the seal member 21.

The expanding member 119 is provided with a circlip 139, and a
15 compression spring 141 engages between an upper surface of the seal carrier 122 and the circlip 139 to bias the expanding member into expanding engagement with the seal member 121.

A fluid inlet tube 128 and a solution outlet tube 129 sealingly engage, and pass through the expanding member 119 to provide communication between the fluid
20 supply pump and solution outlet or delivery pump and the interior of a container 133 engaged with the dispensing head 117. Flexible inlet and outlet pipes 131 and 132 connect with the inlet and outlet tubes 128 and 129, respectively, while, at their lower end, the inlet and outlet tubes 128 and 129 may be connected to flexible tubes 134 and 136 disposed within the container and which are able to follow the level of
25 powder within the container during the dispensing thereof over a period of time.

In operation of the dispensing head according to this embodiment of the invention, and referring to Figure 6 of the drawings, a container 133 which contains detergent, is formed with a neck at the mouth 142 of the container which is adapted to engage over the seal member 121 when the expanding member is in the lowermost,
30 disengaged position. This position is achieved by rotation of the seal carrier 122 about the axis of the pivot pins 123 so that the cam roller 127 moves along the cam surface 126 thus compressing the spring 141 and causing the expanding member 5 move downwardly relative to the seal member 121. The cam surface 126 is preferably

in the form of rail, rib or similar structure and the cam roller 127 is flanged to positively engage with the cam surface 126.

5 A detent 142 in the cam surface holds the cam roller 127 at the disengaged position and maintains the seal carrier 122 at an appropriate angular relationship which enables the mouth 142 of a container 133 to be engaged with, or disengaged from the seal member 121. The shape of the lower surface 138 of the expanding member 119 facilitates guiding of the container mouth 142 into the appropriate position. When the container mouth 142 is appropriately located against or adjacent the radial flange 121a of the seal member 121, rotational movement of the
10 container and, hence, the seal carrier 122 about the axis of the pivot pins 123 enables the spring 141 to force the expanding member 119 against the seal member 121 to thereby seal the mouth 142 of the container 133. The container is rotated to an upright position at which it is supported both by the dispensing head 117 and by an appropriate shelf 143 in the body 124 of the dispenser 112.

15 The inlet and outlet tubes 128 and 129 enable water to be pumped into the container 133 and slurry or solution to be discharged or pumped therefrom, as determined by the pre-programmed control system. If, as a result of a fault in the pumping system, the water level in the container 133 rises beyond a predetermined level, electrodes which are attached to or comprise the inlet and outlet tubes 128 and
20 129 sense the high water level and deactivate the pumping system. An appropriate audible and/or visual alarm may also be initiated on the control panel 116. As this dispensing system incorporates two detergent dispensers 112, the malfunction of one dispenser can automatically initiate operation of the second dispenser.

25 It will be appreciated that the tilt action of the dispensing apparatus of this embodiment enables quick, easy and safe removal and replacement of containers of detergent powder, or other material, in the dispensing apparatus. The lift-up lids 118, which may be of a transparent plastic material, can provide additional safety by preventing actuation of a dispenser while the lid is in the raised position and by providing a physical shield between the dispensing head and the face and body of an
30 operator.

It will also be appreciated that, with the preferred removal of the solution or slurry of detergent by pumping, the container 133 does not need to be pressurized and, therefore, most commercial forms of containers having relatively standard mouth

dimensions may be used with the apparatus of the invention. However, it will be understood that the invention is not limited to apparatus with pump removal of the solution or slurry of detergent and the invention is equally applicable to other forms of solution removal, such as by pressurizing the container.

5 The control module 116 of the dispensing apparatus preferably includes microprocessor control pre-programmed to effect the desired operational control of the apparatus. This will include control of pump motors (when used), temperature sensing, conductivity sensing, input signal sensing (from the dishwashing machine(s) with which the apparatus is associated) and bar code readers or sensors 144. These
10 readers or sensors 144 are located on each dispenser 112 and 114 in front of each container 133, and the containers 133 are provided with an appropriate bar coding (not shown) which identifies the nature of the product in the container. Thus, a detergent will have a pre-assigned code while a rinse aid will have a different code.

 The control module 116 is programmed to permit operation of the
15 apparatus only when the correct containers are located in the correct positions in the apparatus. Thus, if by an error, a rinse aid container is located in a position occupied normally by a detergent container, the bar code reader senses the error and prevents operation of the apparatus.

 Also, the bar code readers sense the absence of a container from any
20 location to prevent the operation either of the apparatus as a whole or, preferably, of the particular station from which the container has been removed.

 Various displays may be provided in the control module 116 including alpha/numeric displays, indicator lights and the like. Provision may be provided for remote programming of the microprocessor.

25 In one particular form of control system, the control module 116 will monitor inputs from the dishwashing machine waiting for a machine cycle to commence. If the control system senses a product bar code on a container does not match the programmed container positions then the control display will indicate the incorrect bottle position and will prevent actuation of the system. A reset button may
30 be provided to recommence the control operation.

 When the correct containers are in position, and while the unit is waiting for a machine cycle to commence, it will periodically scan the canisters to ensure they are not changed or removed.

When the water fill line from a machine becomes active, the control module 116 will begin to dose the machine with the appropriate chemical. A timer is actuated to detect if the process of reaching the desired conductivity, determining chemical concentration, exceeds a predetermined maximum. The chemical is then
5 dispensed to the machine by a detergent pump, the appropriate amount of detergent being a predetermined measure.

The system will generally choose one of the detergent containers before the other from which to dispense detergent. However, if that container is empty, as measured by the conductivity measurements taken through the inlet/outlet tubes, the
10 machine automatically switches to dispense detergent from the other container.

It is preferred that when the conductivity measurement of the solution in a container indicates that the detergent has been exhausted, a pump is actuated to empty that container of any solution. This then enables that container to be removed without danger of spillage of detergent solution.

Alternatively, a pushbutton may be used to manually flush a container
15 which is indicated as being empty of detergent. The flush button is operable only when the system has detected that a container is exhausted, and will only run the flush pump for as long as the flush button is pushed.

Claims.

1. A dispensing apparatus comprising a dispensing head having a dispensing fluid inlet passage communicating with a fluid delivery means, a fluid outlet passage, both inlet and outlet passages passing through an expanding member of a container mounting, said expanding member mounted substantially coaxially with a flexible, resilient seal member, a carrier for the seal member, and moving means for moving the expanding member relative to the seal member.
2. Dispensing apparatus according to claim 1 wherein the expanding member has a tapering surface to contact and expand the seal member.
3. Dispensing apparatus according to claim 1 or claim 2 wherein a lower end of the expanding member tapers inwardly to form a guide surface for engagement of a container mouth therewith.
4. Dispensing apparatus according to any one of claims 1 to 3 wherein said seal member includes flange means engaged with the seal carrier.
5. Dispensing apparatus according to any one of the preceding claims wherein said expanding member is integral with, or fixed to, a stem movable axially relative to the seal carrier.
6. Dispensing apparatus according to claim 5 wherein said stem is hollow and has an upper end which engages within a fluid delivery manifold, the fluid outlet passage comprising a tube substantially concentrically mounted within the stem and having an upper end passing through the fluid delivery manifold to terminate in a product delivery manifold, the annular space between the tube and the hollow stem constituting the fluid inlet passage.
7. Dispensing apparatus according to claim 5 or claim 6 wherein said stem has an external screw thread and the relative movement between the seal member and expanding member is effected by nut means engaged with the thread and co-acting with the seal carrier.
8. Dispensing apparatus according to claim 5 or claim 6 wherein said fluid delivery manifold has a vent communicating with atmosphere.
9. Dispensing apparatus according to claim 8 wherein said vent is adjustable to provide sufficient bleed air to the manifold to prevent syphoning.
10. Dispensing apparatus according to claim 8 wherein said vent comprises a biased valve adapted to close when pressure in the manifold exceeds atmospheric

pressure and to open when the manifold pressure is less than atmospheric pressure.

11. Dispensing apparatus according to claim 5 wherein said seal carrier is mounted to a housing and is pivotally movable relative thereto, and said stem is caused to move axially relatively to the seal carrier by said relative pivotal movement.

12. Dispensing apparatus according to claim 11 wherein said seal carrier has pivot means and said relative pivotal movement is about a transverse axis through said pivot means.

13. Dispensing apparatus according to claim 11 wherein said housing includes cam surface means engageable by said container mounting, said cam surface means causing said relative axial movement during said relative pivotal movement.

14. Dispensing apparatus according to claim 13 wherein said stem terminates in a cam surface follower which engages said cam surface means.

15. Dispensing apparatus according to claim 13 or claim 14 wherein said cam surface means includes detent means to retain said seal carrier in a desired pivotal position.

16. Dispensing apparatus according to claim 5 wherein said seal carrier has opposed pivot journals carried by a housing permitting pivotal movement of the container mounting about a transverse axis, and said stem includes a cam follower engageable with a cam surface on the housing, biasing means on the stem acting between a shoulder on the stem and the seal carrier to bias the expanding member into engagement with the seal member, whereby pivotal movement of the container mounting results in relative axial movement between the stem, and the expanding member, and the seal member due to movement of the cam follower along the cam surface.

17. Dispensing apparatus according to claim 16 wherein said shoulder on the stem is formed by a circlip or pin.

18. Dispensing apparatus according to claim 16 or claim 17 wherein said fluid inlet passage and fluid outlet passage comprise tubes passing through the stem and expanding member into a container engaged with the container mounting.

19. Dispensing apparatus according to any one of claims 16 to 18 wherein said housing includes a container support shelf and a pivotal lid to cover the container mounting when in use.

20. Dispensing apparatus according to any one of claims 16 to 19 wherein

sensor means are provided on the housing to sense the presence or otherwise of indicator means on the container, and control means responsive to said sensor means controls said fluid delivery means.

21. Dispensing apparatus according to any one of the preceding claims wherein said inlet passage and said outlet passage are sealed in the expanding member.

22. Dispensing apparatus according to any one of the preceding claims wherein said fluid delivery means comprises a water reservoir and pump means to deliver water therefrom to the fluid inlet passage.

23. Dispensing apparatus according to any one of claims 1 to 21 wherein said fluid delivery means comprises a water supply mains and a solenoid control valve.

24. A dispensing system for dispensing solid, powder, liquid or other material from a container comprising at least one dispensing module having a dispensing head with a fluid delivery means communicating with a fluid inlet passage, a fluid outlet passage, both inlet and outlet passages extending through a container support means having an internally expandable sealing member to sealingly engage within a neck of the container.

25. A system according to claim 24 wherein said sealing member comprises a deformable member, and said container support means includes deforming means selectively movable to cause the sealing member to deform and so engage the container neck.

26. A system according to claim 24 or claim 25 wherein said container support means includes a pivotal carrier for the sealing member, a relatively movable stem through which the inlet and outlet passages pass, and cam means associated with the stem, the cam means being operable on pivotal movement of the sealing member carrier to effect expanding or contracting of the sealing member.

27. A system according to any one of claims 24 to 26 wherein a control module is associated with the dispensing module, said control module housing a water reservoir, a plurality of pumps and control means, one of the pumps comprising an inlet pump to pump water from the reservoir to the fluid delivery means and inlet passage, and said control means controlling the operation of the pump.

28. A system according to claim 27 wherein a second of said pumps pumps fluid from said outlet passage.

29. A system according to claim 27 or claim 28 wherein at least two dispensing modules are connected with said control module, and said control means electronically controls the operations thereof in accordance with pre-programmed control instructions.

30. A system according to any one of claims 27 to 29 wherein the or each dispensing module includes a housing, lid means pivotally mounted on the housing to cover the dispensing head, sensor means to sense the presence of a container, and electrode means to extend into the container.

31. A system according to claim 30 wherein the electrode means comprises fluid inlet and fluid outlet tubes comprising the inlet and outlet passages, respectively.

32. Dispensing apparatus substantially as hereinbefore described with reference to the accompanying drawings.

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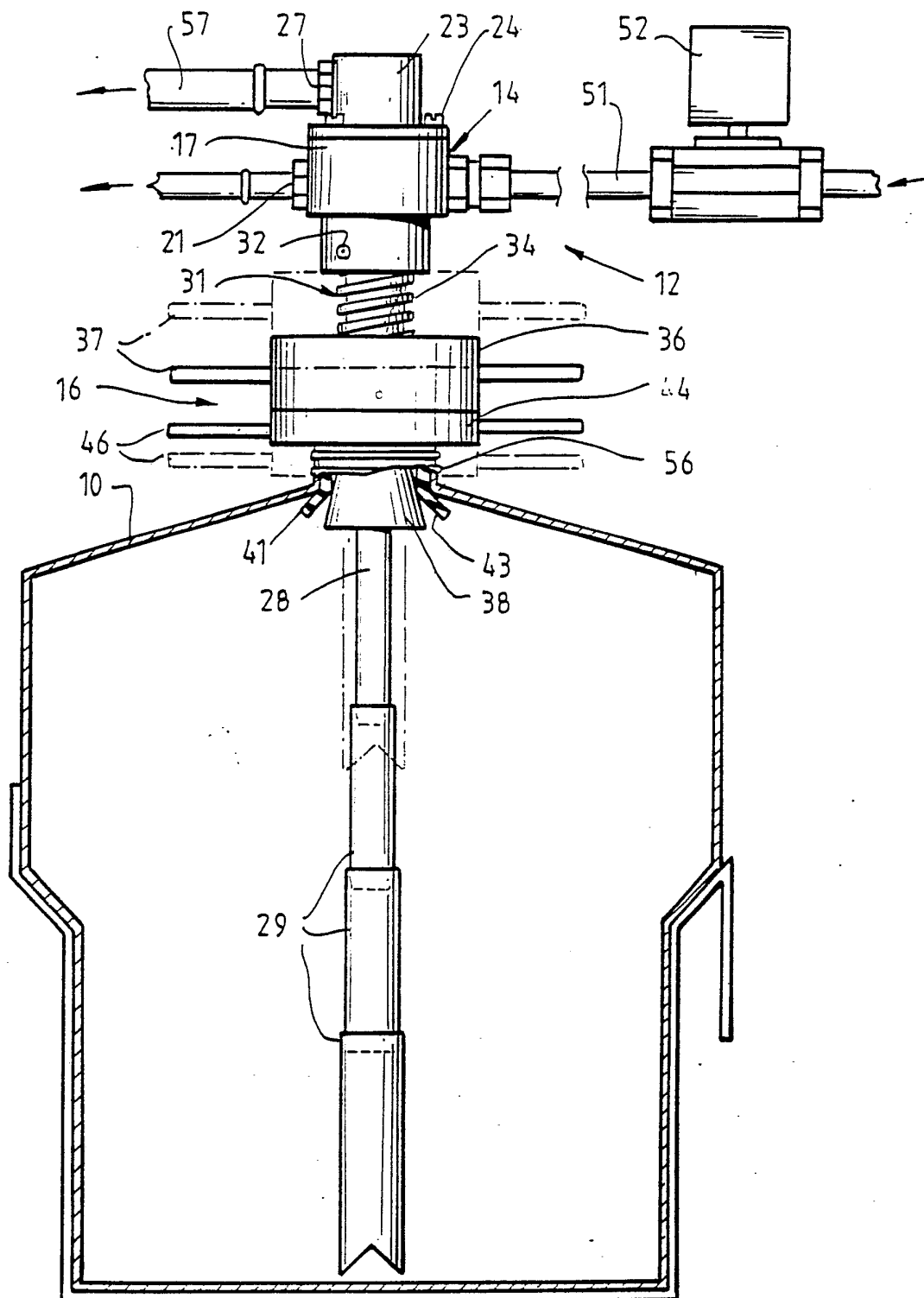
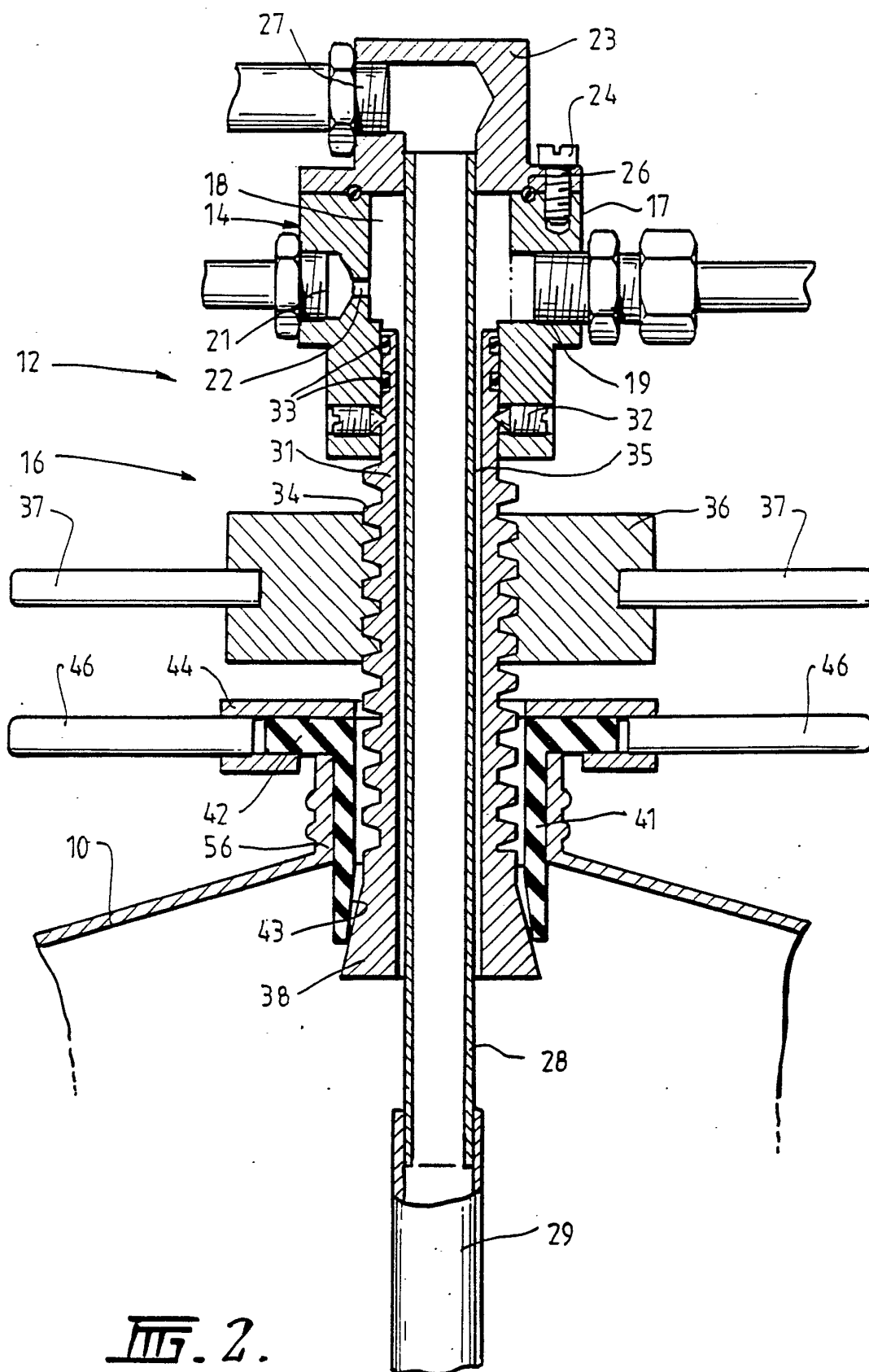


FIG. 1.

$2\frac{1}{4}$ 

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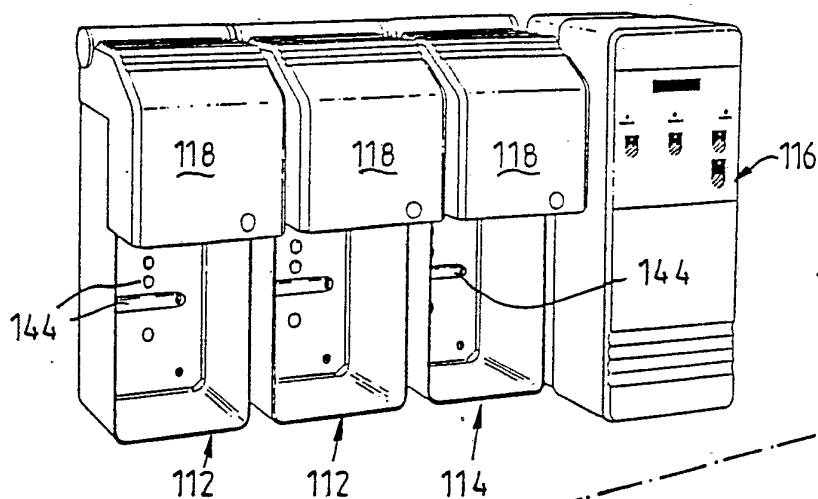


FIG. 3.

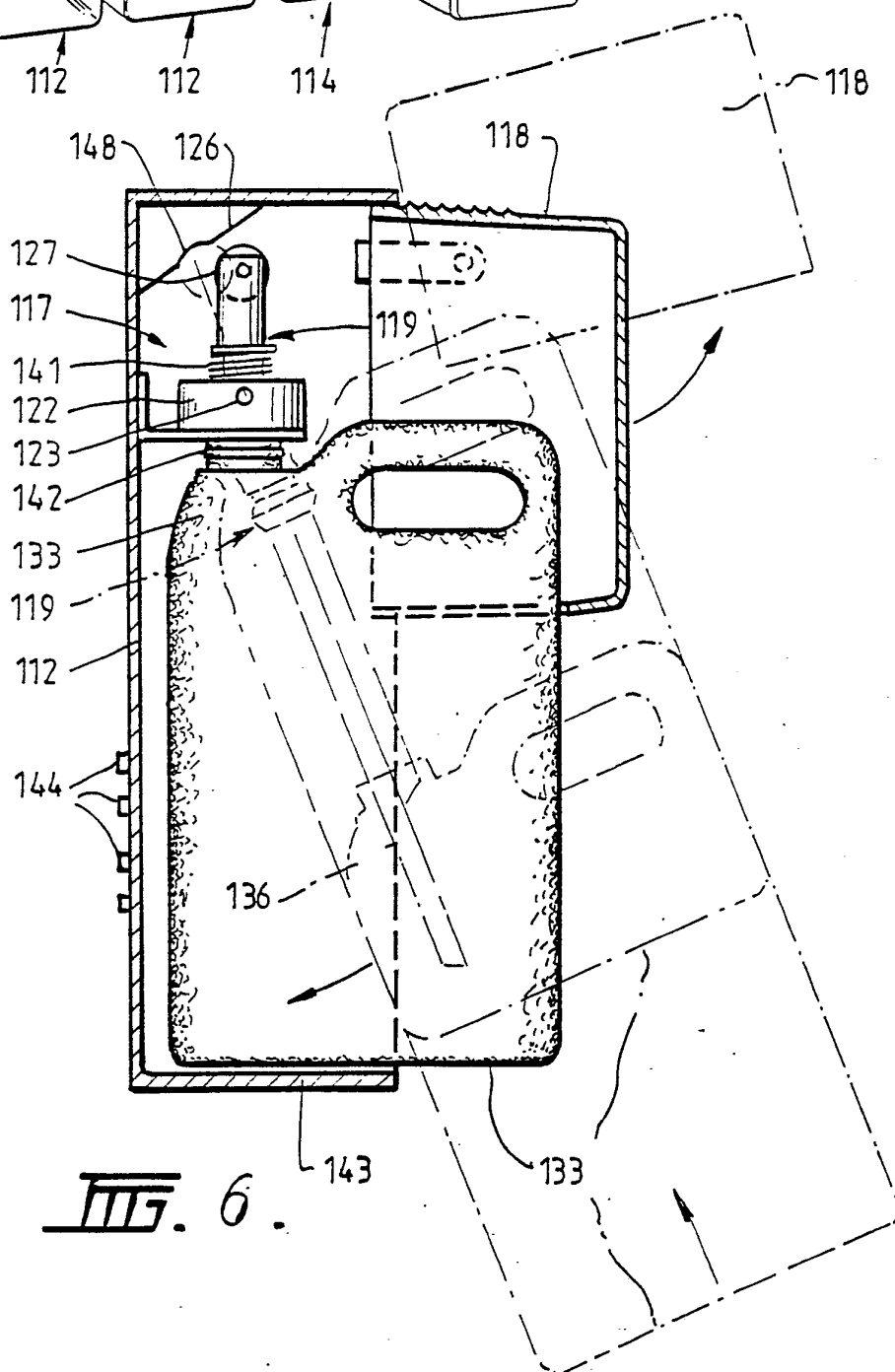


FIG. 6.

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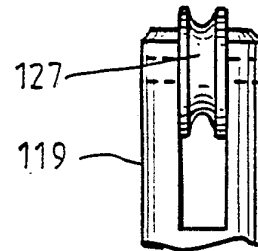
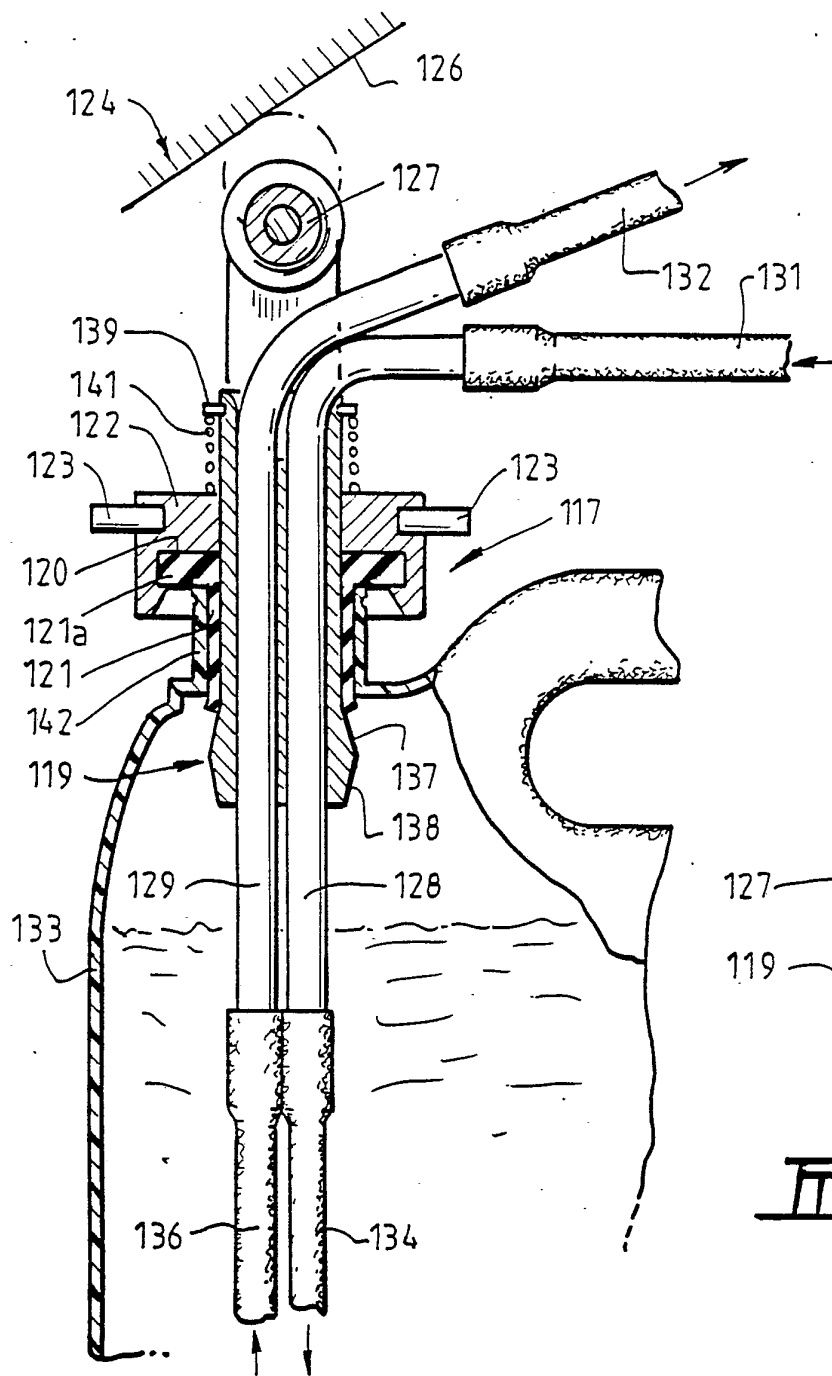
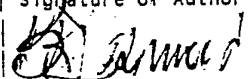


FIG. 5.

FIG. 4.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 90/00352

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. ⁵ B65D 39/12		
II. FIELDS SEARCHED		
Minimum Documentation Searched 7		
Classification System	Classification Symbols	
IPC	A47K 5/06, A47L 15/44, B65D 39/12, D06F 39/02	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8		
AU : IPC as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT 9		
Category*	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
A	AU,A, 19095/20 (CLARK) 10 January 1922 (10.01.22) (Column 2 line 4 to Column 3 line 9 and figure 1)	
A	AU,A, 10162/32 (BARNES) 1 March 1934 (01.03.34) (Column 2 line 20 to Column 3 line 52 and figure 2)	
A	AU,A, 17366/34 (BARNES ENGINEERING PTY LTD) 11 July 1935 (11.07.35) (Column 4 line 41 to Column 10 line 53 and figures 1 to 16)	
A	AU,B, 16529/47 (136553) (FREEMAN) 18 December 1947 (18.12.47) (Column 4 line 1 to Column 6 line 51 and figures 1 to 21)	
A	AU,B, 813/54 (202737) (BRITISH VACUUM FLASK COMPANY LIMITED) 9 December 1954 (09.12.54) (& GB,A, 750912) (page 2 line 2 to page 3 line 29 and figure 1) (contd)	
* Special categories of cited documents: 10 "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
19 October 1990 (19.10.90)	30 October 1990	
International Searching Authority	Signature of Authorized Officer	
Australian Patent Office	 B.R. DASHWOOD	

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

A	EP,A, 300819 (DIVERSEY CORPORATION) 25 January 1989 (25.01.89) (Column 3 line 6 to Column 6 line 4 and figures 1 and 2) (& AU,A, 19257/88)	
A	FR,A, 1066502 (KAISER) 8 June 1954 (08.06.54) (Column 1 line 38 to Column 3 line 12 and figures 1 and 2)	
A	FR,A, 1082007 (ALTHUSER) 24 December 1954 (24.12.54) (page 1 and figures 1 to 3)	
A	FR,A, 1101804 (PRISLAN) 11 October 1955 (11.10.55) (page 2 and figures 1 to 3)	
A	US,A, 2292726 (TRIPPENSEE) 11 August 1942 (11.08.42) (page 1 and figures 1 to 3)	(contd)

V. [] OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE 1

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [] Claim numbers ..., because they relate to subject matter not required to be searched by this Authority, namely:

2. [] Claim numbers , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. [] Claim numbers ..., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (a):

VI. [] OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING 2

This International Searching Authority found multiple inventions in this international application as follows:

1. [] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. [] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. [] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. [] As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

- [] The additional search fees were accompanied by applicant's protest. .
- [] No protest accompanied the payment of additional search fees.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category*	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	US,A, 2538288 (WHITSEL) 16 January 1951 (16.01.51) (Column 1 line 44 to Column 4 line 50 and figures 1 to 5)	

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON
INTERNATIONAL APPLICATION NO. PCT/AU 90/00352

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document
Cited in Search
Report

Patent Family Members

EP 300819

AU 19257/88

DK 4116/88

END OF ANNEX