AEROSOL CONTAINERS AND VALVES THEREOF

Filed July 9, 1970 5 Sheets-Sheet 1

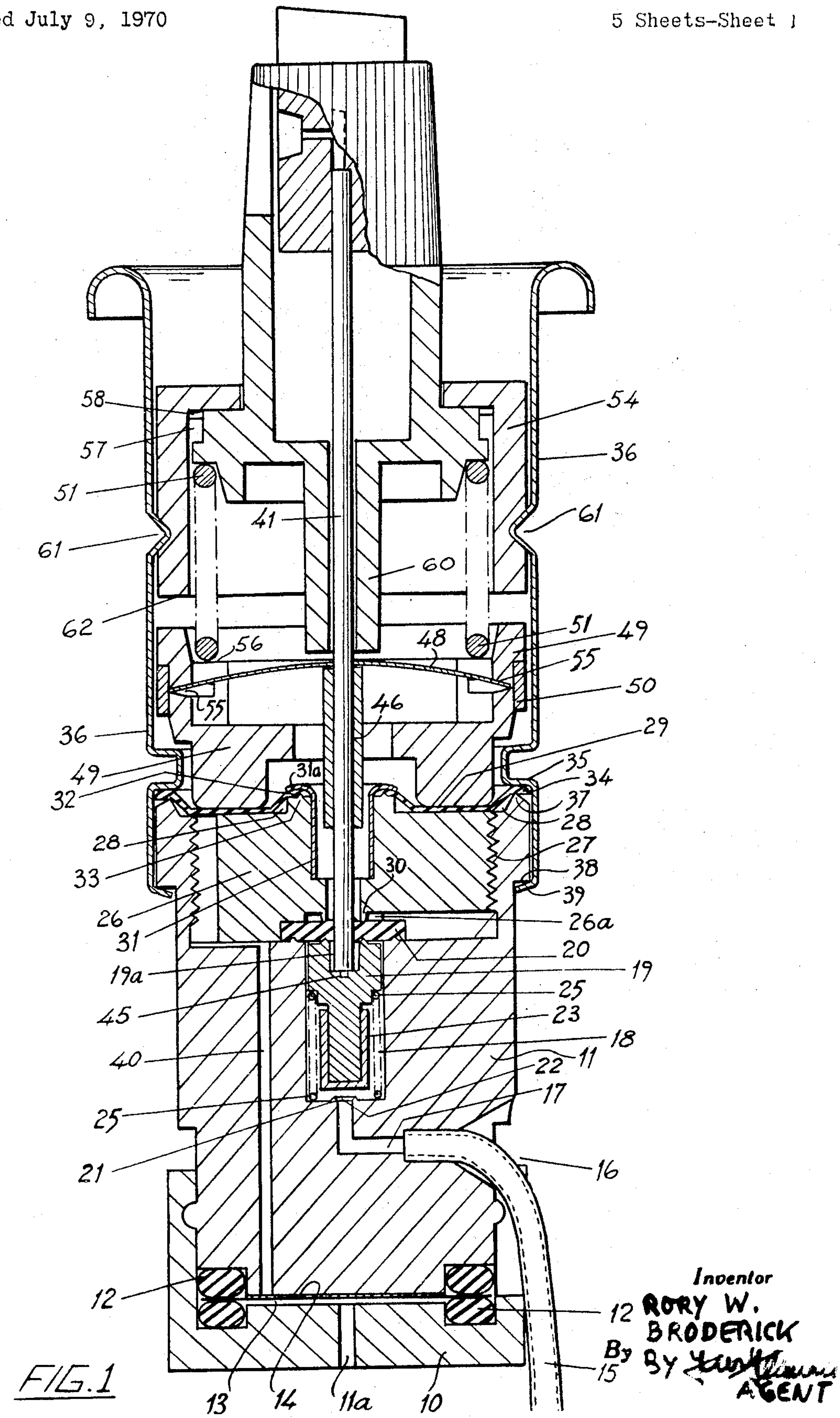

FIG. 1

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AEROSOL CONTAINERS AND VALVES THEREOF

Filed July 9, 1970 5 Sheets-Sheet 2

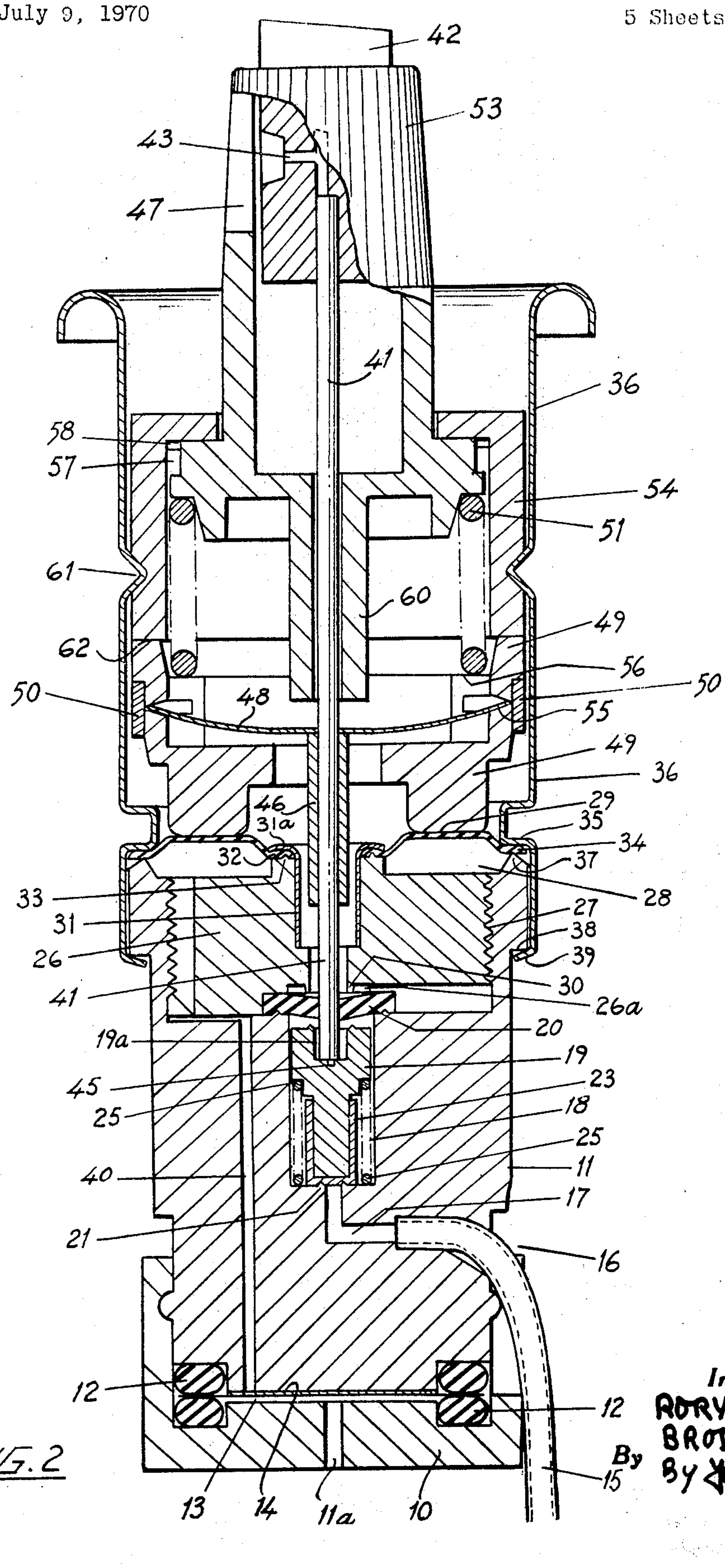

FIG. 2

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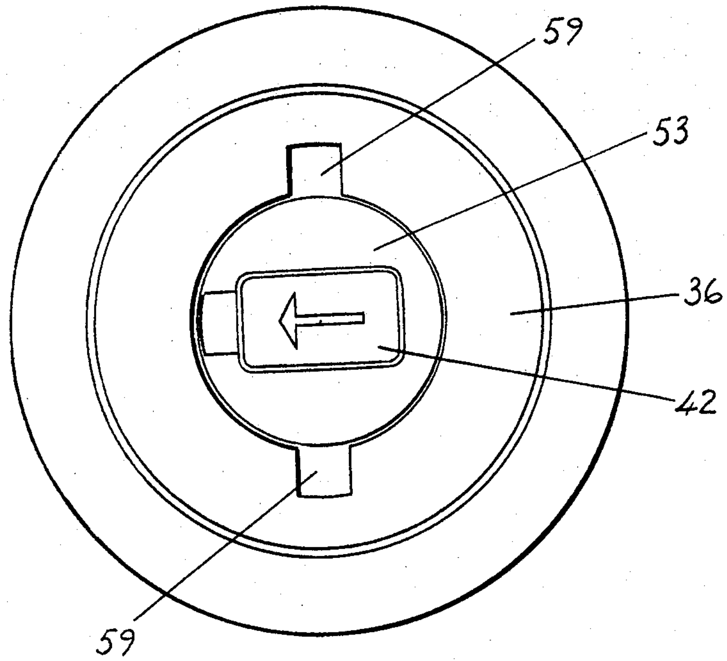

FIG. 3

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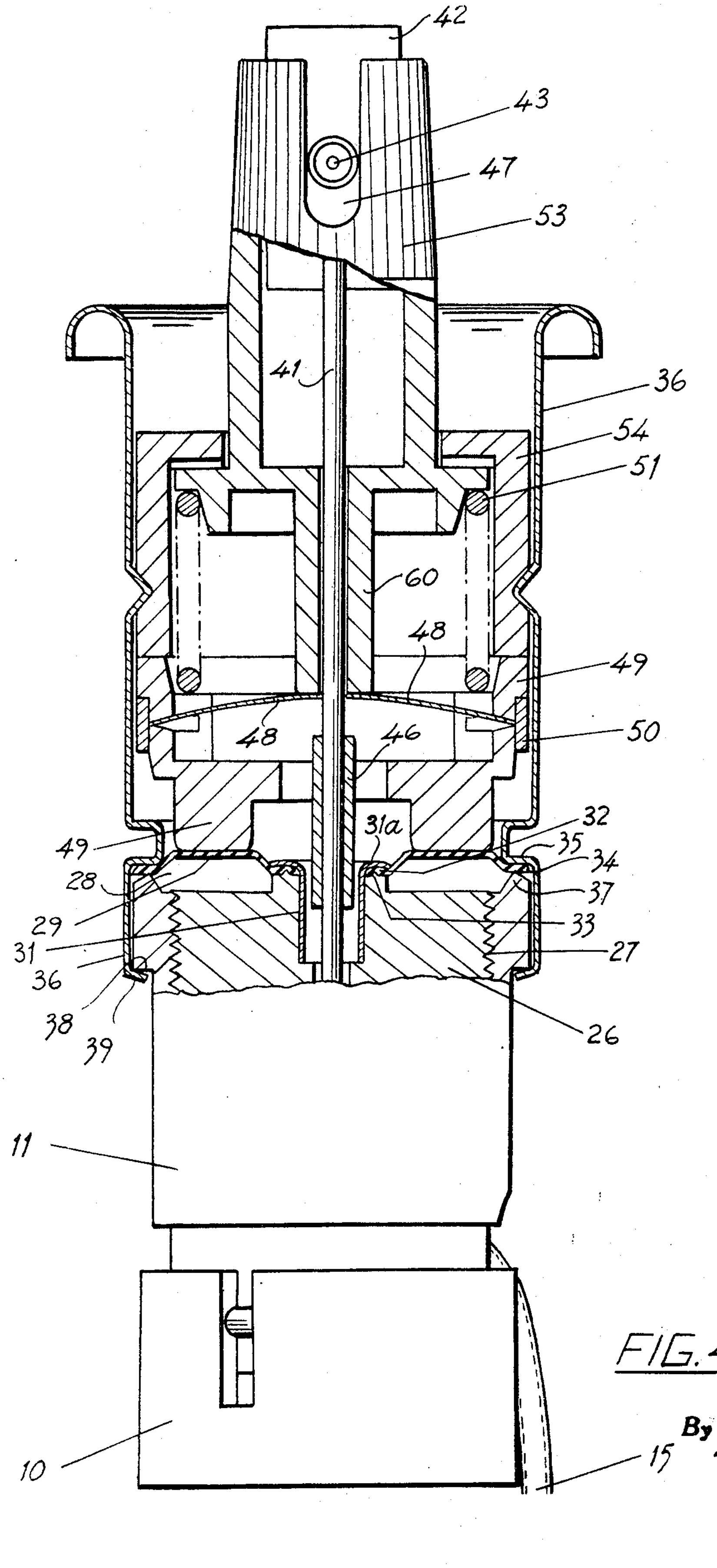

FIG. 4

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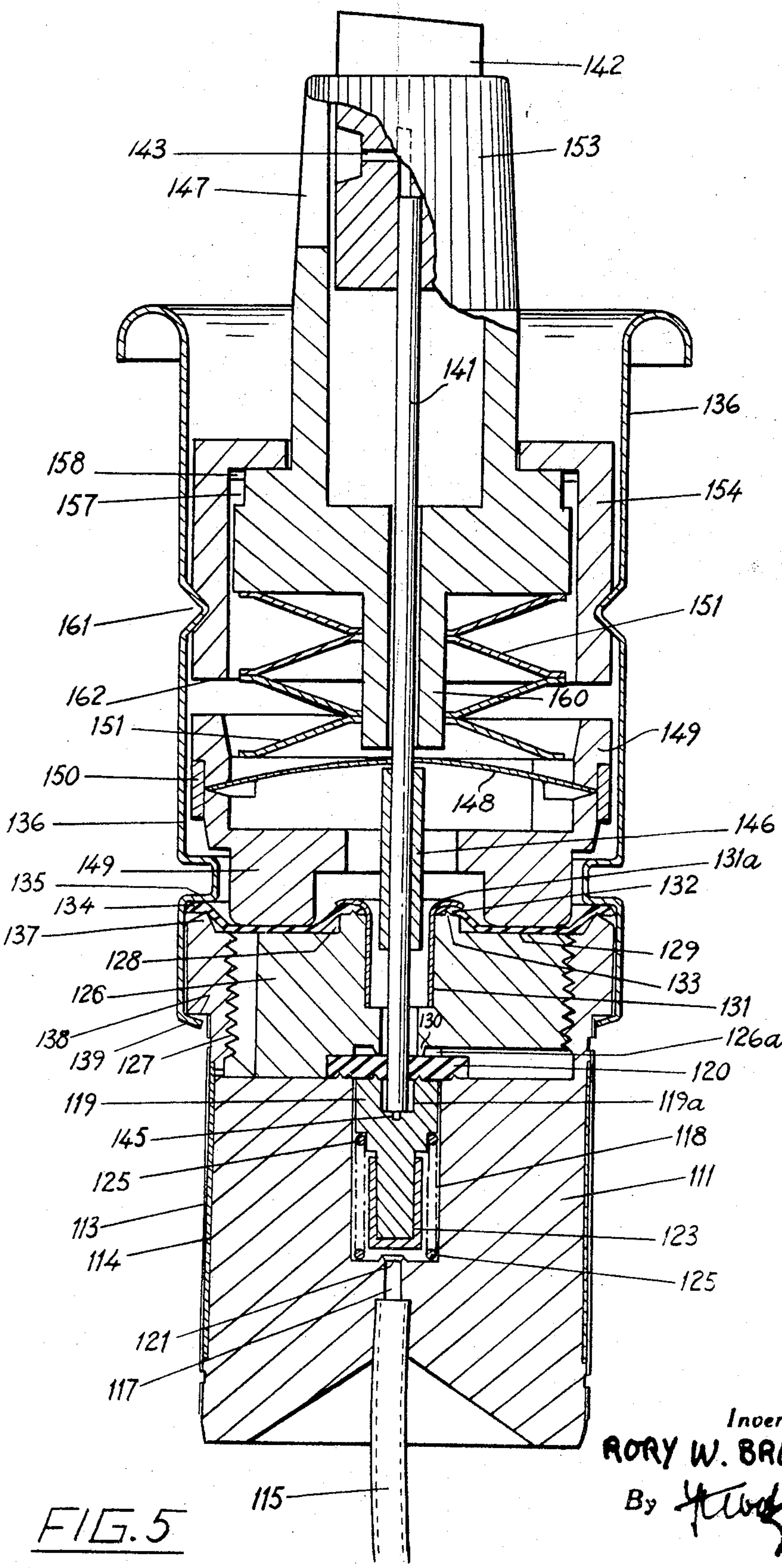

FIG. 5

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AEROSOL CONTAINERS AND VALVES THEREOF

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Int. Cl. B67d 5/08
U.S. Cl. 222—61 24 Claims

ABSTRACT OF THE DISCLOSURE

The disclosure illustrates a valve which may be used for the automatic or manual actuation of a dispenser for pressurised fluids. The valve incorporates a permeable membrane, for example a low density polyethylene film, which allows vapour from the dispenser to permeate into the valve and give rise to a pressure build-up under a sealed diaphragm. The pressure build-up eventually causes the diaphragm to release a spring mechanism to actuate the spray or aerosol discharge. Once discharge is complete the vapour under the diaphragm is discharged and the mechanism automatically reset to start the cycle again.

The present invention relates to aerosol containers and particularly to valves for use in said containers. The term aerosol containers is intended to refer to enclosed containers charged with a fluid under pressure that is adapted to be expelled from the container by the pressure therein or more briefly a dispenser for pressurised fluids.

Conventional aerosol containers are normally provided with a valve operable by finger pressure to open the valve and thereby enable fluid in the container to issue to atmosphere. A demand exists, however, for aerosol containers that automatically discharge fluid under pressure at predetermined intervals of time to achieve for example, insecticidal control in kitchens and food warehouses, and for the purpose of controlling odor and freshening air in lavatories and other public places.

The demand referred to has been partially met in practice by the provision of mechanically or electro-mechanically operable means external to the container for opening the valve in an aerosol container at predetermined intervals and one of said means comprises a cam for intermittently operating the valve to permit periodic emission of fluid from the aerosol container.

With a view to avoiding the expense involved in providing mechanically or electro-mechanically operable means for dispensing fluid from aerosol containers, a primary object of the present invention is to provide, for use in such a dispenser for pressurised fluids, a valve which is manually operable and which is operable automatically to dispense at regular intervals of time, a quantity of fluid from the dispenser.

According to the invention, there is provided a valve for a dispenser for pressurised fluids, said valve comprising a valve housing incorporating a permeable membrane and pressure responsive means, the permeable membrane which allows vapour under pressure in the dispenser to penetrate into the valve housing to build-up pressure in the valve housing, the said built-up pressure actuating the pressure responsive means in the valve housing to open the valve, to discharge through the valve, pressurised fluid from the dispenser.

Advantageously, the permeable membrane which enables vapour to enter the valve housing from the interior of the dispenser, permits a build-up of pressure in the valve housing over a time period substantially in excess of the time period during which the pressure responsive

means serves to open the valve to enable a quantity of fluid to discharge from the dispenser. The process of penetration of vapour through the permeable membrane is generally thought to be a solution or absorption of vapour on the surface of the membrane followed by diffusion of the vapour through the membrane. The vapour penetration rate is approximately inversely related to the thickness of membrane used and also approximately linearly related to the pressure difference across the membrane. Thus for example the time period of the automatic cycle may readily be controlled by merely varying the thickness of membrane used.

In a preferred construction according to the invention, the valve comprises:

(a) A bottom enclosure adapted to hold in sealed engagement a permeable membrane and to house a sealing cup within a metering chamber which is connected by a dip tube to the pressurised fluid in the dispenser.

(b) A mounting cup adapted at one end for fluid tight mounting on the dispenser the other end of the mounting cup engaging the bottom enclosure, housing a capillary stem seated, at one end thereof, in the sealing cup and pressure responsive means

(c) An actuator which projects to atmosphere from the mounting cup and contains a spray button with an orifice open to atmosphere, the orifice being connected to the capillary stem at that end thereof remote from the metering chamber.

The pressure responsive means utilised may to advantage comprise a flexible diaphragm mounted above a core, a cradle member, a snap spring mounted on the cradle member, a collar fixedly mounted on the capillary stem and a cradle return spring, whereby a build-up of pressure due to the pressurised vapour penetrating into the valve housing causes the flexible diaphragm to move away from the core above which it is mounted and force the cradle to move in the same axial direction, until the snap spring isactuated to depress the collar and hence the capillary stem and the sealing cup to open the valve to dispense the pressurised fluid in the metering chamber to atmosphere and allow discharge of the pressurised fluid which has penetrated into the valve housing to atmosphere.

Preferably the permeable membrane is a polyethylene film though ethylene vinyl acetate film, polytetrafluorethylene and fluorosilicone rubber have also been found to be most suitable.

The invention will be more clearly understood from the following description of preferred embodiments of the invention given by way of example only with reference to the accompanying drawings in which

FIG. 1 is an elevation in section of a valve in the closed position thereof, with the valve set for automatic operation

FIG. 2 is an elevation similar to FIG. 1 but showing the valve in the open or spray discharge position

FIG. 3 is a plan view of the valve

FIG. 4 is an elevation similar to FIG. 1 showing the valve in a closed position and set for manual actuation

FIG. 5 is an elevation in section of a modified construction of valve, the valve being shown in the closed position and set for automatic operation.

Referring to FIGS. 1–4 of the drawings, the construction of the valve is described for the sake of clarity from its lower end, in its normal position of use, as shown in the drawings.

A membrane sealing cap **10** having vertical slits in its sides to allow the sides to flex during the assembly operation, is snap fitted on to the bottom enclosure **11**. The sealing cap **10** compresses a pair of O ring rubber seals **12** which seal the periphery of a permeable membrane **13**, for example a low density polyethylene film, located between the sealing cap **10** and the bottom enclosure **11**. A channel **11***a*, allows the pressurised vapour in the dispenser access to the permeable membrane **13**. A disc of porous paper **14** lies between the permeable membrane **13** and the bottom of the bottom enclosure **11**. A dip tube **15** is push fitted into an opening **16** in the side of the bottom enclosure **11** and the opening **16** communicates via a bore **17** and via an inlet port **21**, with a metering chamber **18** within the bottom enclosure **11**. The metering chamber **18** is provided with a spring loaded sealing cup **19** which normally engages under the action of spring **25** a rubber seal **20** positioned at the top of the metering chamber **18**. The bore **17** from the dip tube **15** to this metering chamber **18** terminates in the bottom of the metering chamber **18** in the inlet port **21** which is provided with a raised ridge **22**. This ridge **22** allows a rubber ferrule seal **23** on the sealing cup **19** to seal off this inlet port **21** when the sealing cup **19** is pressed downwards against it.

A plastic core **26** is located in the bottom enclosure **11**, above the metering chamber **18**. The core **26** is held in the bottom enclosure **11** by screw threads **27** or alternatively, it may be ultrasonically welded into place. With either assembly method, the core **26** compresses the periphery of the rubber seal **20** above the metering chamber **18** and ensures that the rubber seal **20** prevents the leakage of fluid (vapour or liquid) from the metering chamber **18** into a timing chamber **28**, which is substantially filled by the plastic core **26**, and is beneath a flexible rubber diaphragm **29**. An annular valve seat **30** projects down from a recess provided in the bottom face of the core **26**. The rubber seal **20** above the metering chamber **18** is normally pressed against this seat by an upwards spring influenced thrust of the sealing cup **19** in the metering chamber **18**. During the automatic cycle of the valve, the pressure of the contents of the metering chamber **18** also press the rubber seal **20** against this valve seat **30**, as the pressure in the metering chamber **18** is the same as the dispenser contents pressure (except when the chamber is emptied and the valve is resetting) and the pressure above the rubber seal **20** is considerably lower.

The flexible rubber diaphragm **29** is fastened above the top of the core **26** by a hollow rivet **31**. The rivet **31** passes through a hole in the centre of the diaphragm **29** and is a tight fit in a hole in the core **26**. The head **31***a* of the rivet **31** compresses a bead **32**, which is around the edge of the hole in the diaphragm **29** against a ridge **33** formed in the core **26** and thereby creates a permanent seal here. The outer edge of the diaphragm **29** also contains a thickened bead **34** and this bead is compressed against a ledge **35** in a valve mounting cup **36**, by a raised edge **37** on the top of the bottom enclosure **11**. The bottom edge **39** of the valve mounting cup **36**, a deep drawn metal component, is crimped in during assembly, under a step **38** in the outside wall of the bottom enclosure **11**, to hold the bottom enclosure **11** in this position. This creates a permanent seal at the peripheral edge of the diaphragm **29** which serves two purposes, namely:

(a) To prevent the container contents from leaking upwards past the ledge in the valve mounting cup and

(b) To contain vapour, which has permeated into the space under the diaphragm.

From the foregoing, it may be seen that the timing chamber **28** is normally sealed from the atmosphere and also always sealed from the dispenser contents, except for the slow permeation of vapour through the membrane **13**.

Within this timing chamber **28** vapour flow paths or channels are provided on the bottom and sides of the core **26** to ensure that permeated vapour, rising through a vertical hole **40** from the membrane **13**, may readily flow to the timing chamber **28** which is on the underside of the diaphragm **29**. These channels also allow the flow of this vapour to the core recess **26***a* where the annular valve seat **30** is located.

A hollow capillary stem **41** extends from the top of the valve, down through the pressure responsive means and the timing chamber **28** into the metering chamber **18**. A spray button **42** is located on the top of this stem **41** and the spray button **42** is provided with an exit orifice **43** for the discharge spray. The stem **41** is free to slide in the parts through which it runs and the bottom of the stem rests in a well **19***a* provided with an orifice groove **45**, in the sealing cup **19**. A collar **46**, which is a tight fit, is located around portion of the stem **41**.

In the top half of the valve mounting cup **36** above the diaphragm **29** there is located a pressure responsive mechanism. The pressure responsive means consists of a snap spring **48**, a cradle **49**, a cradle ring **50**, a helical return spring **51**, an "automatic-manual" actuator **53** and a cover **54**. The snap spring **48** is a flat strip of spring steel which bows up when inserted into the cradle **49**. The cradle contains locating slots **55** to orient the snap spring **48** and the slots **55** are tapered to allow flexing of the ends of the snap spring **48**. The slots **55** run around portion of opposite sides of the cradle **49** and are slightly wider than the snap spring **48**. The narrowest part of the slots **55** open to the outside wall of the cradle **49** and thus ensure that the end-thrust of the snap spring **48** is taken by a steel cradle ring **50** which is pressed over the cradle **49**. The bottom of the cradle **49** rests on the diaphragm **29** and it is pressed against the diaphragm **29** by the helical return spring **51**. Two opposite portions of the bottom coil of this return spring **51** rest on two opposite ledges **56** formed on the inside face of the cradle **49**.

The top of the helical return spring **51** presses the "automatic-manual" actuator **53** upwards against the cover **54** of the valve. Two raised ribs **57** are provided on the face of the actuator **53** which is close to the top inside face of the valve cover **54**. When the actuator is in the automatic position, these ribs rest in two shallow grooves **58** provided in the top inside face of the valve cover **54**. When the actuator **53** is in the manual position, the raised ribs **57** nest inside two slots **59** provided in the top of the valve cover **54**. The slots **59** are shown in the plan view of the valve FIG. 3. The rotation of the actuator **53** from the automatic to the manual position thus has the effect of retracting upwards by a predetermined amount, a finger **60** which has projected downwards from the actuator **53** into close proximity with the centre of the snap spring **48** for automatic operation of the valve.

The sides of the valve mounting cup **36** are crimped in at **61** to hold the valve cover **54** in place. The bottom edge **62** of the valve cover **54** acts as a cradle stop to limit upwards movement of the cradle **49**.

The valve may be operated manually by finger tip pressure to give either:

(1) A continuous spray which is obtained by exerting slight finger pressure on the spray button or

(2) A metered spray which is obtained by exerting a greater finger pressure on the spray button.

Both of these modes of manual spraying may be obtained with the "automatic-manual" actuator set in either the automatic or manual position. Detailed working is as follows:

(1) Continuous spray.—Downward movement of the spray button **42** causes the capillary stem **41** to push the sealing cup **19** away from the rubber seal **20**, against which the sealing cup **19** has been pressed by the action of the spring **25**. The seal formed between the lip on the top of the sealing cup **19** and the rubber seal **20** is thus opened and this allows the product propellant mixture to flow from the metering chamber **18** into the well **19***a* in the sealing cup **19** and from there, via the orifice groove **45** in the well **19***a*, into the capillary stem **41** to emanate as a spray from the spray button orifice **43**. If no further downward motion of the spray button **42** takes place, there will be a continuous flow of fluid into the metering chamber **18** from the dip tube **15**, to maintain it full, so long as some pressurised contents remain in the dispenser.

(2) Metered spray.—If a metered spray is required to be obtained manually, a larger amount of finger pressure

is applied initially to the spray button **42** and this causes the sealing cup **19** to open as before but also ensures that the ferrule seal **23** closes off the inlet port **21** into the bottom of the metering chamber **18** and isolates the fluid in the metering chamber **18**. This isolated portion of fluid, since it contains propellant, will be sprayed from the spray button orifice **43** as before. Removal of finger pressure from the spray button **42** allows the sealing cup **19** to reseal and opens the inlet port **21** into the metering chamber **18** which then refills for the next operation.

Automatic operation

FIG. 1 shows the valve parts in their position at the start of the automatic cycle. The bottom enclosure **11** of the valve, which houses the permeable membrane **13** may be below the liquid level of the product/propellant mixture in the dispenser if the container is relatively full, or alternatively if the dispenser contents have been partially used, the membrane **13** may be above the liquid level and in the vapour phase alone. The liquid level in the dispenser dose not affect the functioning of the valve. It may be assumed that the vapour pressure under the diaphragm **29**, at the commencement of the cycle is at atmospheric. The pressure of the propellant in the dispenser is above atmospheric pressure and typically will be about 4 to 5 atmospheres. Because of this pressure difference, propellant vapour, from either the liquid or vapour phase, gradually permeates through the permeable membrane **13**. The porous paper backing **14** under the membrane **13** allows sideways transmission of this vapour to the vertical hole **40** in the bottom enclosure **11** which communicates with the timing chamber **28** under the diaphragm **29**. The timing chamber **28** is partially occupied by the core **26** and since the timing chamber **28** is sealed from the atmosphere, the pressure will gradually rise in the chamber **28** with a consequent extension upwards of the diaphragm **29**. This causes the cradle **49** to move gradually upwards against the restraining action of the return spring **51** and the snap spring **48**. The finger **60** projecting down from the "automatic-manual" actuator **53** limits the upward movement of the centre of the snap spring **48**. When the edges of the snap spring **48**, held in the cradle **49**, reach a point level with or slightly above the bottom of the finger **60** the snap spring **48** snaps "over-centre." As the bottom edge **62** of the cover **54** acts as a "cradle stop" further upward movement of the cradle **49** is only possible to a marginal extent. Thus the snap spring **48** reacts downwards on the collar **46** of the capillary stem **41** and depresses the capillary stem **41** and sealing cup **19**.

FIG. 2 shows the position of the valve parts during this discharge portion of the automatic cycle. As the inlet port **21** in the bottom of the metering chamber **18** has been closed by the ferrule seal **23**, the product/propellant mixture, isolated in the metering chamber **18**, will issue as a spray from the spray button orifice **43**.

The emptying of the metering chamber **18** causes a resultant drop in pressure in it. The propellant vapour under the diaphragm **29** is in communication with the core recess **26*a*** above the rubber seal **20** which is above the metering chamber **18**. The resultant pressure difference across this seal **29** causes it to deflect downwards slightly into the metering chamber **18** and thereby move away from the annular valve seat **30** in the core **26**. The deformation of this seal **20**, as shown in FIG. 2, allows the vapour, trapped under the diaphragm **29** to escape to atmosphere. Its path in doing so follows a small channel formed in the vertical side and bottom of the core **26** which communicates into the core recess **26*a***. If the annular valve seat **30** in the core **26** is unsealed, the vapour can vent to atmosphere up along the clearance between the capillary stem **41** and the holes of the parts through which the stem slides. The cradle **49**, pressed down by the return spring **5**, forces the diaphragm **29** to deflate and expel the vapour. As the cradle **49** moves down during this deflation of the diaphragm **29**, the snap spring **48** reacts against the collar **46** on the capillary stem **41** which forces the snap spring **48** to subsequently snap back "over centre" into its original position. This allows the sealing cup **19** to move up in the metering chamber **18** again to its original position of sealing against the rubber seal **20** above metering chamber **18**. The automatic cycle will now commence again.

The "automatic-manual" actuator **53** projects upwards through the cover **54** of the valve and partially surrounds the spray button **42**. An opening **47** in the side of the actuator **53** provides clearance for the spray from the exit orifice **43** of the spray button **42**. The spray button **42** projects above the top of the actuator **53** to allow finger pressure to be applied to the button **42** for manual spraying.

As previously mentioned a finger **60** projects down into the valve from the actuator **53** and this finger **60**, in the automatic mode of the valve, serves to compress the snap spring **48** during upward movement of the cradle **49**, and thus causes the snap spring **48** to snap over to the down position. Retraction upwards of the actuator **53** and finger **60** to the position shown in FIG. 4 switches the valve from the automatic to the manual mode. Upwards movement of the cradle **49** with the actuator **53** in this position does not now impose compression on the snap spring **48** and hence it will remain in the up position.

From the user's point of view, the valve is switched from the automatic to the manual mode as follows: A metered spray is first dispensed by manual pressure on the spray button **42**. The "auto-manual" actuator **53** is then grasped between the fingers, pressed down slightly and rotated a quarter turn to the manual position where it is released as it clicks into position. The same procedure is followed to revert to the automatic position.

The initial manual spraying of a metered burst is necessary before turning the "auto-manual" actuator **53** as this serves to reset the cradle **49** to the position it normally has at the start of the automatic cycle. In this position the snap spring **48** is not reacting against the finger **60** of the actuator **53** and the upwards force of the cradle return spring **51** against the actuator **53** is at a minimum. Thus the actuator **53** can be easily depressed and rotated.

The switching of the actuator **53** from the automatic to the manual position does not immediately stop penetration of vapour through the permeable membrane **13**. Penetration of vapour continues for some time and will cease only when the vapour pressure under the disphragm **29** has reached equilibrium with the pressure in the dispenser. FIG. 4 shows the valve in this manual position and this would normally be the position of the parts during storage of the dispenser (aerosol container) prior to sale or use.

A second embodiment of the invention is illustrated in FIG. 5 of the accompanying drawings. In FIG. 5 like valve parts to those shown in FIGS. 1–4 illustrating the first embodiment, are given the same reference numeral proceeded by the digit one, for the sake of clarity. In this second embodiment the permeable membrane geometry has been altered and the form of the cradle return spring varied. The valve operates however in substantially the same manner as described in relation to the first embodiment.

The disc type of permeable membrane as illustrated in FIGS. 1, 2 and 4 of the accompanying drawings must be limited in area, if the valve is to fit into the standard one inch opening of dispensers for pressurised fluids (aerosols). Accordingly, in applications of the valve where a fairly frequent intermittent spray is required, a different geometry of permeable membrane may be adopted to allow a larger effective area of permeable membrane for vapour penetration. The cylindrical type of permeable membrane shown in FIG. 5 covers this requirement. Here the cylindrical permeable membrane **113**, in the form of a length of tubular low density polyethylene film, is heat shrunk or slipped as a tight fit over the exterior surface of the bottom enclosure **111**. If the bottom enclosure **111** has been manufactured from a compatible plastic material, the two ends of the cylindrical permeable membrane **113** may be heat sealed or bonded with an adhesive to the exterior cylindrical surface of this bottom enclosure **111** to form hermetic joints in these areas. A sleeve of porous paper **114** is interposed between the cylindrical permeable membrane **113** and the bottom enclosure **111**, except in the area at the ends where the sealing takes place. This sleeve of porous paper **114** lies in a shallow groove formed on the exterior cylindrical surface of the bottom closure **111**. The porous paper **114** allows transmission of vapour, which has penetrated through the membrane **113**, to a hole which communicates with the timing chamber **128**.

With this form of construction, a very large area of permeable membrane **113** can be obtained readily. It also allows the more conventional bottom entry of the dip tube **115** into the valve.

FIG. 5 also illustrates an alternative geometry for the cradle return spring **151**. Here a stack of disc springs have been substituted for the helical spring shown in the FIGS. 1, 2 and 4 of the accompanying drawings. These disc springs **151** may be full discs or alternatively may have radial cut outs so that each disc has a number of fingers projecting either radially inwards from a solid periphery or radially outwards from the centre portion of the disc. The springs **151** may be manufactured from conventional spring materials such as stainless steel or spring steel or alternatively may be manufactured from a bimetal spring material.

In some applications of the valve, the use of a bimetal material here may be necessary, in order to reduce the variation in frequency with temperature of the automatic intermittent operation. The pressure in a dispenser container normally increases with a rise in the ambient temperature, because of the properties of the propellant fluid. This results in a more rapid penetration of vapour through the membrane **113** and, with the valve construction shown previously, a faster automatic cycle. This may be an advantage in both insecticidal and air freshening applications, where higher temperatures normally result in more insects or more odours. In other applications, however, such as the automatic lubrication of machinery, a dispensing frequency which is relatively independent of ambient temperature may be required. In such an application, the disc springs **151** may be made of bimetal spring material, so arranged that the thrust of the springs **151** against the snap spring cradle **149** increases with temperature. A higher pressure under the diaphragm **129** is thus required to operate the valve and this, compensating for the higher pressure in the can, results in a relatively uniform automatic dispensing frequency.

What we claim is:

1. A valve for a dispenser for pressurized fluid, said valve comprising a valve housing incorporating a permeable membrane, a timing chamber in communication with the permeable membrane, pressure responsive means, an exit orifice, a fluid supply under pressure, and a valve disposed intermittent the exit orifice and fluid supply, said permeable membrane allowing vapor under pressure in the dispenser to penetrate by diffusion into the valve housing along one path to build-up pressure in the timing chamber, said timing chamber being enclosed at least in part by a flexible diaphragm which can move in response to the build-up of pressure to actuate the pressure responsive means to open the valve and discharge fluid under pressure through a second path by way of the valve and exit orifice.

2. The valve of claim **1** wherein the pressure responsive means includes a snap spring which in response to

the build-up of pressure in the timing chamber can snap over from a first position to a second position to open the valve.

3. The valve of claim **1** includes a metering chamber within said second path, a closable inlet thereto in communication with the interior of the dispenser, a closable outlet therefrom in communication with atmosphere, and means for holding said inlet closed while said outlet is open, and vice versa.

4. The valve of claim **1** wherein there is included:

(a) a bottom enclosure adapted to hold in sealed engagement the permeable membrane and to house a sealing cup within a metering chamber which is connected by a dip tube to the pressurized fluid in the dispenser;

(b) a mounting cup adapted at one end for fluid tight mounting on the dispenser, the other end of the mounting cup engaging the bottom enclosure (a), housing a capillary stem seated, at one end thereof, in the sealing cup and pressure responsive means; and

(c) an actuator which projects to atmosphere from the mounting cup and contains a spray button with the orifice exit to the atmosphere, the orifice exit being connected to the capillary stem at that end thereof remote from the metering chamber.

5. A valve for a dispenser for pressurized fluids, said valve comprising:

(a) a bottom enclosure adapted to hold in sealed engagement a permeable membrane and to house a sealing cup within a metering chamber which is connected by a dip tube to the pressurized fluid in the dispenser;

(b) a seal member located between the sealing cup and the core, said seal member in co-operation with the sealing cup and the core being adapted to prevent vapor passing along the exterior and/or interior of the capillary stem between the metering chamber and atmosphere and along the exterior of the capillary stem between the timing chamber and atmosphere when the valve is closed, the said seal member being adapted to deform following discharge of the contents of the metering chamber to allow the vapor in the timing chamber, which has built up a pressure under the flexible diaphragm, to discharge to atmosphere, closing of the valve serving to allow the seal member reverse to its undeformed sealing position;

(c) a mounting cup adapted at one end for fluid tight mounting on the dispenser, the other end of the mounting cup engaging the bottom enclosure, housing a capillary stem seated, at one end thereof, in the sealing cup and pressure responsive means; and

(d) an actuator which projects to atmosphere from the mounting cup and contains a spray button with an orifice open to atmosphere, the orifice being connected to the capillary stem at that end thereof remote from the metering chamber.

6. A valve as claimed in claim **3** which includes means responsive to the evacuation of pressurised fluid from the metering chamber for releasing the pressure in the timing chamber and means responsive to the release of pressure from the timing chamber for closing the valve.

7. A valve as claimed in claim **6** wherein the means for closing the valve serve to close the outlet from the metering chamber and to open the inlet thereto.

8. A valve as claimed in claim **1** in which the permeable membrane is polyethylene film.

9. A valve as claimed in claim **1** in which the permeable membrane is ethylene vinyl acetate film.

10. A valve as claimed in claim **1** in which the permeable membrane is polytetrafluorethylene.

11. A valve as claimed in claim **1** in which the permeable membrane is flurosilicon rubber.

12. A valve as claimed in claim **5** in which the bottom enclosure is provided with a membrane sealing cap which is snap fitted to the bottom enclosure to compress sealing members to seal in position a permeable membrane mounted upon the bottom enclosure, the membrane sealing cap having a channel therein to provide an access for the pressurised vapour in the dispenser to the permeable membrane.

13. A valve as claimed in claim **5** in which the permeable membrane is mounted upon a portion of the exterior surface of the bottom enclosure and heat sealed at its edges to the bottom enclosure.

14. A valve as claimed in claim **12** in which a layer of porous paper is provided between the permeable membrane and the bottom enclosure, the bottom enclosure having a communicating passage therein to allow the pressurised vapour penetrating the permeable membrane to pass to a timing chamber immediately adjacent a flexible diaphragm on a core side thereof.

15. A valve as claimed in claim **5** in which the bottom enclosure is provided with a metering chamber which houses a spring mounted sealing cup, the bottom of the metering chamber being provided with an inlet port connected to the dip tube, the sealing cup having mounted thereon a seal member which closes the inlet port when the sealing cup is depressed upon the opening of the valve.

16. A valve as claimed in claim **5** in which the sealing cup is provided with a well having an orifice groove which communicates with the end of the capillary stem within the well for discharge to atmosphere of the contents of the metering chamber when the valve is open.

17. A valve for a dispenser for pressurised fluids as claimed in claim **5** in which the pressure responsive means comprises a flexible diaphragm mounted above the core, a cradle member, a snap spring mounted on the cradle member, a collar fixedly mounted on the capillary stem and a cradle return spring, whereby a build-up of pressure due to the pressurised vapour penetrating into the valve housing causes the flexible diaphragm to move away from the core above which it is mounted and force the cradle to move in the same axial direction, until the snap spring is actuated to depress the collar and hence the capillary stem and the sealing cup to open the valve to dispense the pressurised fluid in the metering chamber to atmosphere and allow discharge of the pressurised vapour which has penetrated into the valve housing to atmosphere.

18. A valve as claimed in claim **17** in which the flexible diaphragm is of rubber and is sealed on the bottom enclosure at its outer edge portions by the mounting cup and at its centre by a rivet mounted about the capillary stem.

19. A valve as claimed in claim **17** in which the snap spring of the pressure responsive means is a strip spring which bows when mounted in locating slots provided in the cradle said slots being adapted to locate and accommodate the end edge portions of the snap spring and to allow complete flexing of the snap spring.

20. A valve as claimed in claim **17** in which the cradle of the pressure responsive means is provided with a cradle ring to provide a suitable bearing surface for the end edges of the snap spring.

21. A valve as claimed in claim **17** in which the cradle return spring is a helical spring mounted around the capillary stem and between the cradle and the actuator.

22. A valve as claimed in claim **17** in which the cradle return spring is a stack of disc springs of bimetal material responsive to a variation in temperature.

23. A valve as claimed in claim **17** in which the actuator is provided with a finger which embraces the capillary stem and which is constrained for limited axial movement relative to the capillary stem for setting of the valve for automatic or manual operation, the finger almost abutting against the snap spring when the valve is set for automatic operation and in an axially retracted position from the snap spring when the valve is set for manual operation.

24. A valve as claimed in claim **23** in which the actuator is provided with a cover fixedly mounted on the mounting cup and adapted to co-operate, by means of a complimentary rib and groove arrangement, with the actuator for setting of the valve for automatic or manual operation.

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