Nov. 1, 1966 L. D. BARGER 3,282,293

MEANS FOR EXITING A FLUID FROM A COMPARTMENT

Original Filed Nov. 24, 1958

Fig. 1

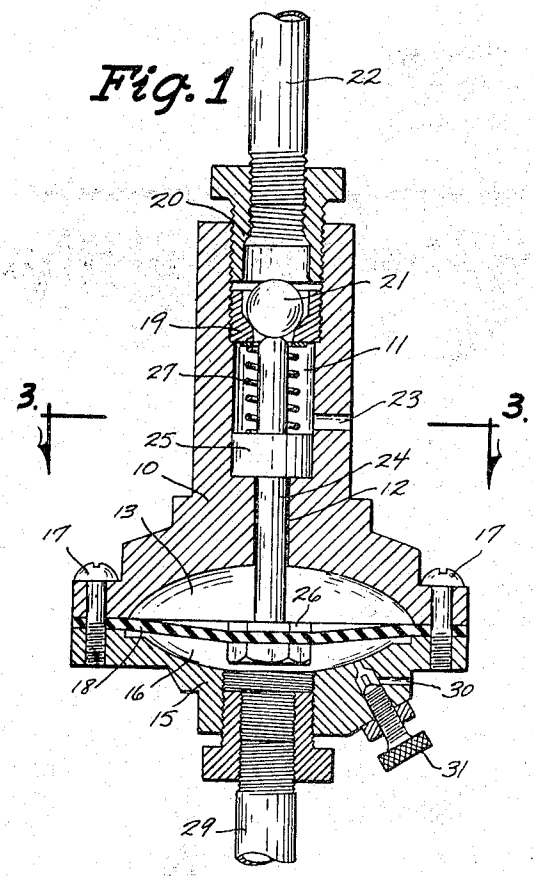


Fig. 2

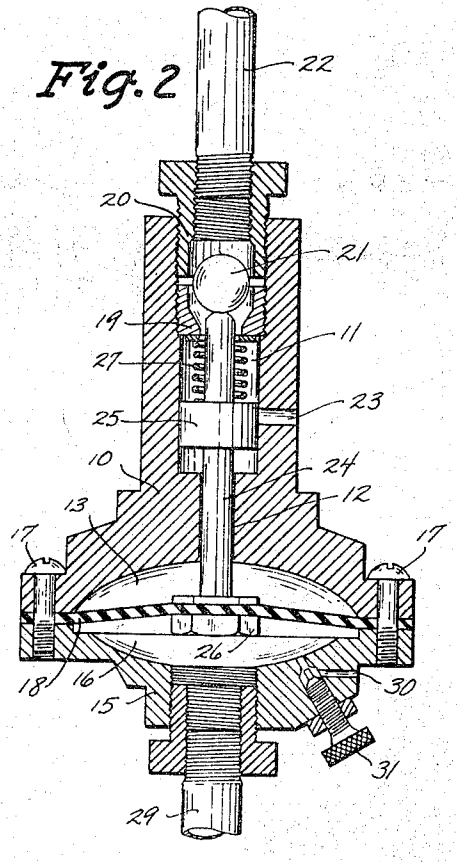


Fig. 3

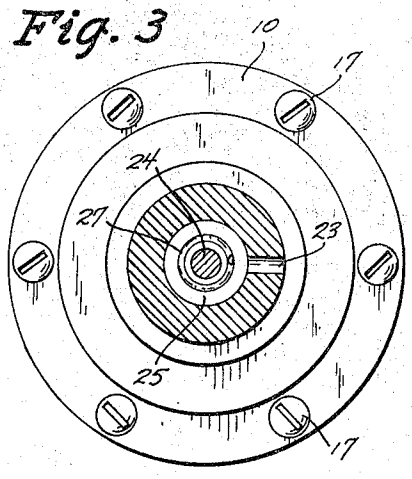
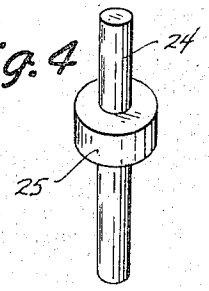


Fig. 4



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MEANS FOR EXITING A FLUID FROM A COMPARTMENT

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Continuation of application Ser. No. 776,093, Nov. 24, 1958. This application May 23, 1963, Ser. No. 282,812

5 Claims. (Cl. 137—614.19)

This application is a continuation of my application filed November 24, 1958, Serial No. 776,093, now abandoned.

This invention relates to a means for exiting a fluid from a compartment and more particularly to a device for releasing entrapped liquids such as water from a collection chamber.

There are many instances in modern equipment where the presence of moisture or water is most objectionable. An illustration is air lines leading to such tools as air pressure paint sprayers, air suspension means of vehicles, vehicle air brakes, and like. The objectionable presence of water in the system not only adversely affects the end result of the device, but in freezing weather may render the equipment completely inoperative. In the case of air brakes, this might well be disastrous to both life and property. Some effort has been made to remove moisture from air pressure lines by utilizing the intermittent flow of the air through the line. However, in such devices, the flow of the air must be intermittent and also considerable air and air pressure are lost in actuating the mechanism.

Therefore, one of the principal objects of this invention is to provide a moisture expelling device that is capable of using pressure either without loss or waste pressure as the power means to actuate the water expelling mechanism.

More specifically the object of this invention is to utilize air pressure such as air pressure that comes into the air line of vehicle air brakes, when the brakes are used, or utilizes the waste air after the release of the brakes, to open an exit valve means communicating with the water collecting chamber.

A still further object of this invention is to provide a moisture separating device that in case of any malfunctioning for any reason, the main air supply line will continue to function.

Still further objects of this invention are to provide a means for exiting a fluid from a chamber that is economical in manufacture and durable in use.

These and other objects will be apparent to those skilled in the art.

This invention consists in the construction, arrangements, and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

FIG. 1 is a longitudinal sectional view of the device with the parts in position for permitting liquid to drain from the device,

FIG. 2 is a longitudinal sectional view of my device with the parts in position for permitting liquid to collect in an exit compartment,

FIG. 3 is a cross sectional view of the unit taken on line 3—3 of FIG. 1 and more fully illustrates its construction, and

FIG. 4 is a perspective view of the valve actuating rod.

While the device is described as particularly adapted for use in conjunction with the air brake system of automotive vehicles such as trucks, buses, trains and the like, it may be used for various needs, including even the measuring and dispensing of liquids.

In the drawings the numeral **10** designates a base housing having an enlarged well **11** in its top, and a vertical shaft bore **12** communicating at its top with the inside bottom center of the well **11**, as shown in FIG. 1.

The numeral **13** designates an upwardly extending concave depression in the bottom of the base housing and communicating with the bottom end of the bore **12**. The numeral **15** designates an inverted cap having a downwardly extending concave depression **16** in its top and which complements the depression **13** as shown in FIG. 2. This inverted cap is detachably secured to the bottom of the housing by screws **17**. The numeral **18** designates a resilient flexible plate of rubber or like imposed between the bottom of the base housing and the top of the cap **15** and functions as a resilient diaphragm.

The numeral **19** designates a valve seat open at its center and detachably threaded in the well **11**. The numeral **20** designates an opposed valve seat and fixture open at its center, detachably threaded in the upper end area of the well **11** and spaced above the valve seat **19**. The numeral **21** designates a ball valve loosely arranged in and between the valve seats **19** and **20**, capable of sealing the valve seat **19** when in lowered position for preventing the passage of matter through the valve seat and into the lower area of the well **11**. If the ball valve were to be elevated to its maximum vertical upward movement it would seat in the valve seat **20**. However, in most uses of the device, the ball valve will not operate to this elevation and will serve merely as a ball retaining means.

The numeral **22** designates a pipe adapted to have its upper end communicating with the inside bottom of an air tank, or communicating with the low area of an air pressure line. The lower end of this pipe **22** is threaded into the seat **20**. The well **11** is of a diameter substantially greater than that of the bore **12** and below the valve seat **19** and substantially above the bottom of the well is a fluid outlet passageway **23** extending through the wall of the base housing. The numeral **24** designates the valve actuating rod slidably extending through the bore **12**.

The numeral **25** designates a valve piston on the rod **24**, in and slidably engaging the wall of the well **11**. When the rod is in a lowered position, this piston is below the outlet passageway **23** as shown in FIG. 1. However, when the rod is elevated, this piston valve is closing the exit passageway **23** as shown in FIG. 2. The lower end of the rod **24** is secured to the diaphragm **18** by bolt means **26**.

The numeral **27** designates a coil spring, embracing the rod **24**, having one end bearing on the piston **25** and its other end bearing on the valve seat **19** for yieldingly holding the rod in a lowered sliding position. The numeral **29** designates a pipe adapted to communicate at desired times with a source of pressure. This pipe **29** communcates with the cavity **16** below the diaphragm **18**. The numeral **30** designates a passageway through the cap **15**, adjustably closable by a needle valve **31**.

It will be noted that there are two fluid collecting compartments, i.e., in the bore below the valve seat **19** and above the ball valve **21**. When the actuating rod **24**

is in a lowered position, the ball valve **21** will be seated in the valve seat **19** and the inside of the pipe **22** will be closed to the discharge port **23**. Any fluid, however, that has passed into the lower area of the bore and below the ball valve will drain out through the discharge port **23**. In use, however, fluid such as water will accumulate in the lower end of the pipe **22** and in the housing above the ball valve **21**. When pressure is placed in the pipe **29**, the under side of the diaphragm **18** will be instantly raised as shown in FIG. 2.

Two phases will occur by the raising of the rod **24** by the diaphragm. Firstly, the valve piston **25** will close the discharge port **23**, and secondly, the upper end of the rod **24** will engage and raise the ball valve **21**. With the ball valve **21** in raised position, accumulated water above the ball valve will pass downwardly through the valve seat **19** and into the lower area of the well **11**. With the release of pressure in the pipe **29**, the spring **27** will move the rod **24** downwardly, thereby permitting the ball valve **21** to seat the valve seat **19**, and also move the piston valve **25** below the discharge port **23**. The fluid that has accumulated below the valve seat **19** will then exit through the discharge port **23**.

If the device is used, as an illustration, on the air brake system of vehicles, the pipe **29** may be in communication with the air brake system so that when the brakes are actuated by air pressure, this same air pressure will communicate with the inside of the pipe **29** automatically. Or, if desired, the escaping air, after the brakes have been released, may be used to provide a like temporary pressure of air inside the pipe **29**. If the pipe **22** and pipe **29** are in communication with the same air pressure, the manual operating means should include valve means for not only opening the pipe **29** but the closing of the pipe **22** so that there will be sufficient air pressure under the diaphragm to overcome pressure acting downwardly on the ball valve **21**..

In many uses, however, the air pressure intermittently used in the pipe **29** will be of a greater pressure than that of the fluid pressure in the pipe **22**. In such a case, the pressure inside the pipe **22** may remain constant. It will be noted that with the valve **31** closed there will be no loss of pressure during the actuating of the device in the pipe **29**. Also there will be substantially no loss of air pressure in the pipe **22** inasmuch as the piston valve **25** will close the discharge passageway **23** at the same time that the ball valve is unseated.

From the above it will be seen that a simple mechanism is provided for exiting undesired moisture accumulations and without any material loss in the fluid pressure system. In some cases, it may be desired to slow down the sensitivity in the diaphragm **18**, and this may be accomplished by adjusting the opening of the needle valve **31** so that the lower side of the diaphragm will partially communicate with the outside atmosphere.

Some changes may be made in the construction and arrangement of my means for exiting a fluid from a compartment without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. A fluid releasing means, comprising in combination:
- a housing having a well formed in its upper area and a cavity formed in its lower area,
- said housing having a bore formed therein extending between said well and said cavity,
- a valve seat at the upper end of said well,
- a supply conduit operable to transmit fluid from a source external said housing, through said valve seat into said well at times,
- a valve normally closing said valve seat to block the path of fluid into said well at times,

- said housing having a single discharge port formed therein for communicating said well to the atmosphere, intermediate the length thereof,
- a rod slidably extended through said bore from said cavity to said well; and
- being movable to raised and lowered positions with respect to said cavity, said rod engageable with said valve to dislodge it from seating engagement with said valve seat when in a raised position,
- a piston valve on said rod, slidable in said well below said discharge port when said rod is in a lowered position,
- and means operable within said cavity to slidably reciprocate said rod between its raised and lowered positions,
- said piston valve operable to simultaneously close said discharge port when said rod dislodges said valve from its seating engagement with said valve seat thereby causing said well to be in communication only with said supply conduit and being operable to simultaneously open said discharge port when said rod moves to its lowered position to permit said valve to engage said valve seat thereby causing said well to be in communication only with the atmosphere through said discharge port.

2. A fluid releasing means as defined in claim **1**, and further wherein said means comprises a pressure actuated diaphragm stretched across said cavity and secured to the lower end of said rod, said housing having an opening formed in the lower end thereof opening said cavity to a source of pressure.

3. A fluid releasing means as defined in claim **1**, and further wherein spring means are mounted within said housing to normally bias said rod to its lowered position.

4. A fluid releasing means, comprising in combination:
- a housing having upper and lower ends; said housing having an elongated vertically disposed well formed in its upper area and a cavity formed in its lower area,
- said housing having an elongated vertical bore formed therein extending between said well and said cavity,
- a valve seat at the upper end of said well,
- a supply conduit operable to transmit fluid from a source external said housing through said valve seat into said well at times,
- said housing having a single discharge port formed therein for communicating said well to the atmosphere intermediate the length of said well,
- a rod slidably extended through said bore from said cavity to said well and being movable to raised and lowered positions; said rod being engageable at its upper end with said valve to dislodge it from seating engagement with said valve when in a raised position,
- a piston valve on said rod, slidable in said well and being positioned below said discharge point when said rod is in a lowered position,
- said piston valve operable to simultaneously close said discharge port when said rod dislodges said valve from its seating engagement with said valve seat thereby causing said well to be in communication only with said supply conduit and being operable to simultaneously open said discharge port when said rod moves to its lowered position to permit said valve to engage said valve seat thereby causing said well to be in communication only with the atmosphere through said discharge port,
- and a horizontally disposed pressure operated diaphragm means operable within said cavity to slidably reciprocate said rod between its raised and lowered position.

5. The device of claim **4** wherein said housing has a passageway formed therein below said diaphragm for communicating said cavity to the atmosphere and a needle

valve means mounted thereon for selectively closing said passageway at times.

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