July 10, 1951 E. J. WHALEN 2,559,692

AUTOMATIC DRAIN FOR AIR LINES

Filed Oct. 18, 1944 2 Sheets-Sheet 1

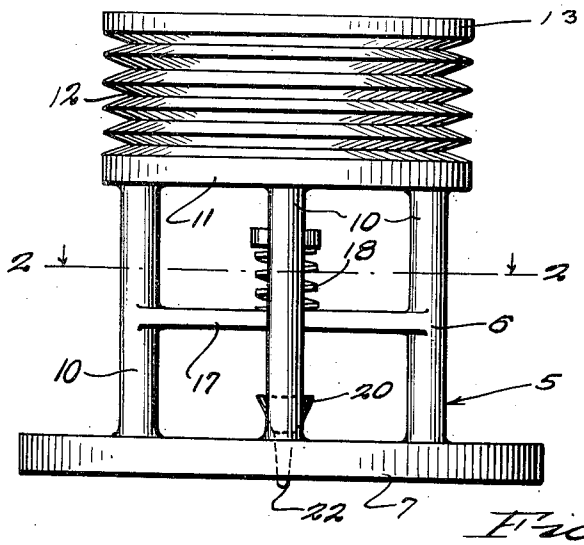


Fig. 1.

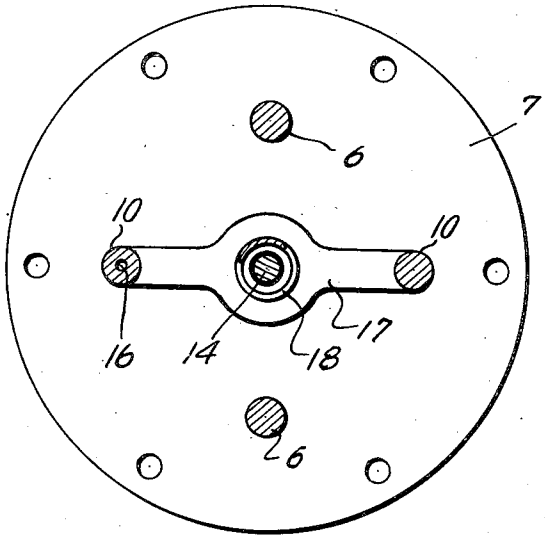


Fig. 2.

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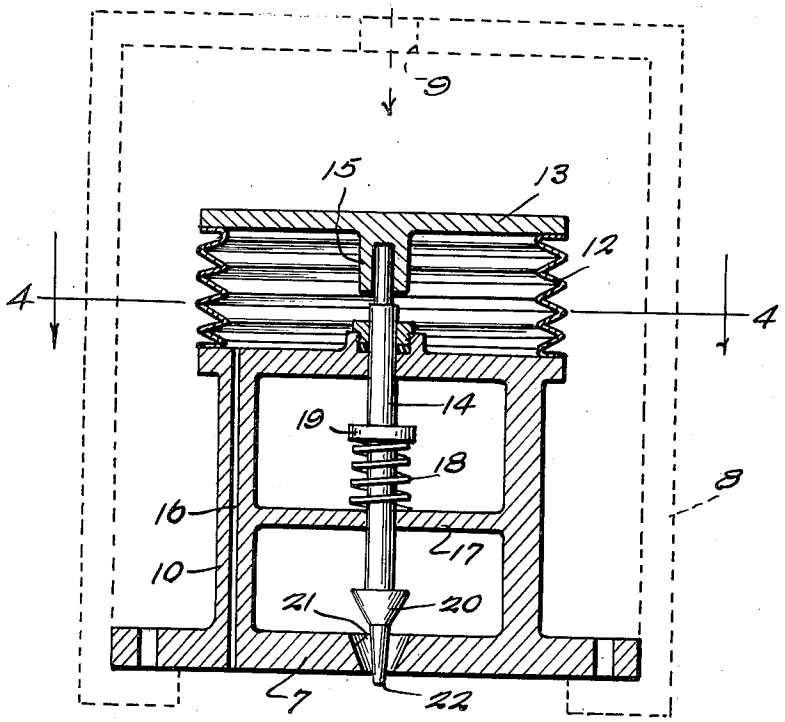


Fig. 3.

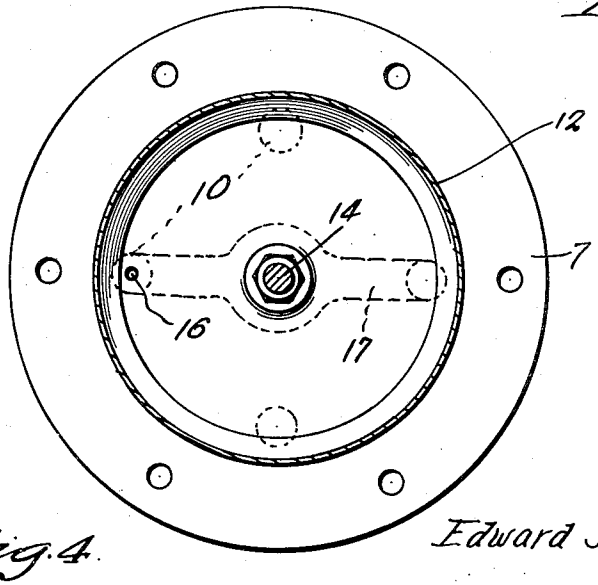


Fig. 4.

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UNITED STATES PATENT OFFICE

2,559,692

AUTOMATIC DRAIN FOR AIR LINES

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Application October 18, 1944, Serial No. 559,292

1 Claim. (Cl. 137—34)

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The present invention relates to new and useful improvements in means for draining condensed water and oil from air lines such as used in humidifying installations using atomizers and wherein it is necessary at frequent intervals to drain water and oil which enters the system and which causes damage to the surrounding equipment when water or oil is sprayed from the atomizers instead of pure air. In such installations it is the usual practice to employ hand valves for draining the system, but through carelessness the valves are not opened at proper intervals.

It is accordingly an object of the present invention to provide automatically operated drain valves which function in conjunction with the automatic controls in textile mills which work on the average of several times an hour so that each time the machine is shut down the automatic drain will open to properly drain the air lines.

A further important object of the present invention is to provide a drain valve of this character embodying spring means for urging the valve into open position and subjecting the valve to air pressure in the line to close the valve while the atomizer is functioning, the spring serving to open the valve when pressure in the line is relieved.

A still further object is to provide a device of this character of simple and practical construction, which is efficient and reliable in performance, relatively inexpensive to manufacture and install in the air system and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a side elevational view of a valve unit embodying one form of the present invention.

Figure 2 is a sectional view taken substantially on a line 2—2 of Figure 1.

Figure 3 is a vertical sectional view of the valve unit shown mounted in a housing in the air line.

Figure 4 is a sectional view taken substantially on a line 4—4 of Figure 3.

Referring now to the drawings in detail, the numeral 5 designates a valve unit generally which includes a base 6 of open frame construction rising from a base plate 7 and adapted for mounting in the bottom of a valve housing designated generally at 8, the plate 7 closing the bottom of the housing and the top of the housing having an air inlet 9 for connection with the air line of an air system, such as a humidifying installation, or after-coolers, air receivers, air filters, or other air systems where it is necessary to frequently drain condensation and oil therefrom.

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The frame 6 includes legs 10 rising from the base plate 7 connected at their upper ends by a plate 11 on which is mounted a bellows 12 which is closed at its upper end by a plate 13 to thus provide a closed chamber for the bellows.

A valve stem 14 is slidably mounted in the plate 11 with its upper end seated in a socket 15 projecting downwardly from the underside of the upper plate 13 of the bellows. An air vent for the bellows is designated at 16 which extends downwardly from the bellows chamber through one of the legs 10 and out through the bottom or base plate 7. A valve guide 17 is attached to an intermediate portion of the legs 10 forming an abutment for the lower end of a coil spring 18 mounted on the valve stem and having its upper end engaging a collar 19 on the valve stem to yieldably urge the valve 20 into an open position, the valve being adapted to engage the valve seat 21 in the base plate 7, the valve seat forming a drain port for water, oil and the like collected in the housing 8.

An extension 22 is formed on the lower end of the valve 20 which works in the port 21 to keep the same free of sediment and thus clean the port.

In the operation of the device pressure of air entering the housing 8 through the opening 9 will act on the bellows 12 to close the valve 20 and upon release of the air pressure in the system the spring 18 will serve to expand the bellows, thus opening the valve 20 to permit drainage of the liquid from the housing.

From the foregoing it will be apparent that all of the several forms of the invention herein disclosed function in an identical manner so that when a predetermined pressure of air is contained in the system the valve will be closed and when air pressure in the system is released the valves will be opened to drain water, oil and other liquids from the system.

It is believed that the details of construction and manner of use of the device will be readily understood from the foregoing without further detailed explanation.

Having thus described the invention, what I claim is:

An automatic drain valve unit for a compressed

air line comprising a base plate having a central valve seat therein, legs arising from said plate in surrounding relation to said seat, a top plate supported by said legs, a bellows supported on said top plate for direct exposure to pressure from said line and including a closure plate having a socket therein, a valve stem slidable through said top plate with an upper end seated in said socket whereby upon collapse of said bellows said stem is moved downwardly, a valve on said stem adapted to engage said seat upon downward movement of said stem, and an air vent for the bellows extending through said base and top plates, and one of said legs.

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