March 16, 1926.

O. H. ROHRIG

1,576,675

AUTOMATIC SUCTION LINE VALVE

Filed March 11, 1925 2 Sheets-Sheet 1

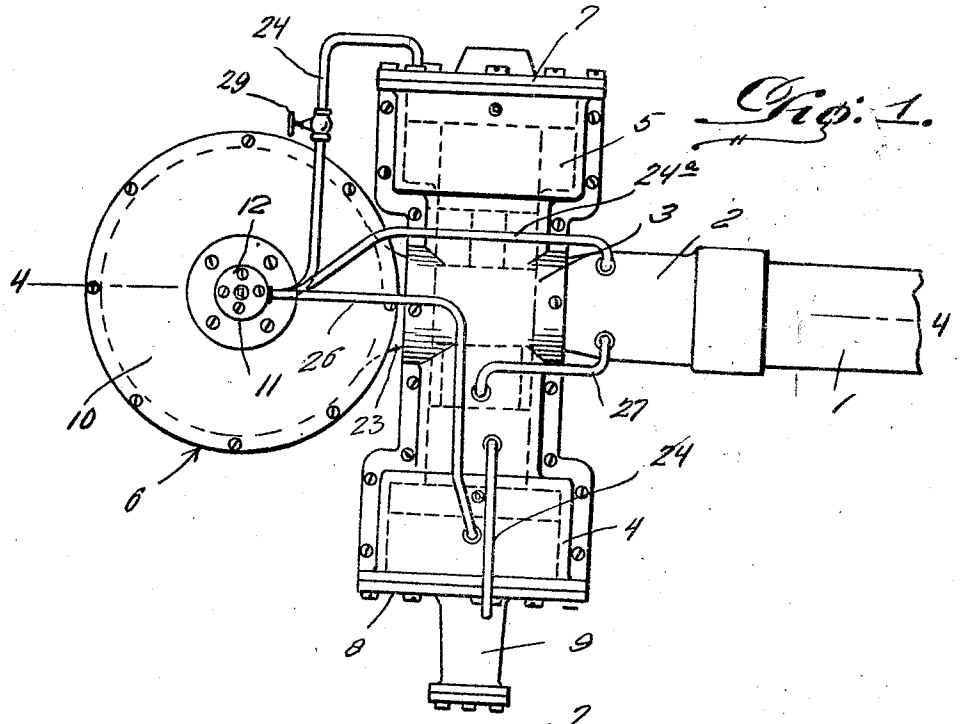


Fig. 1.

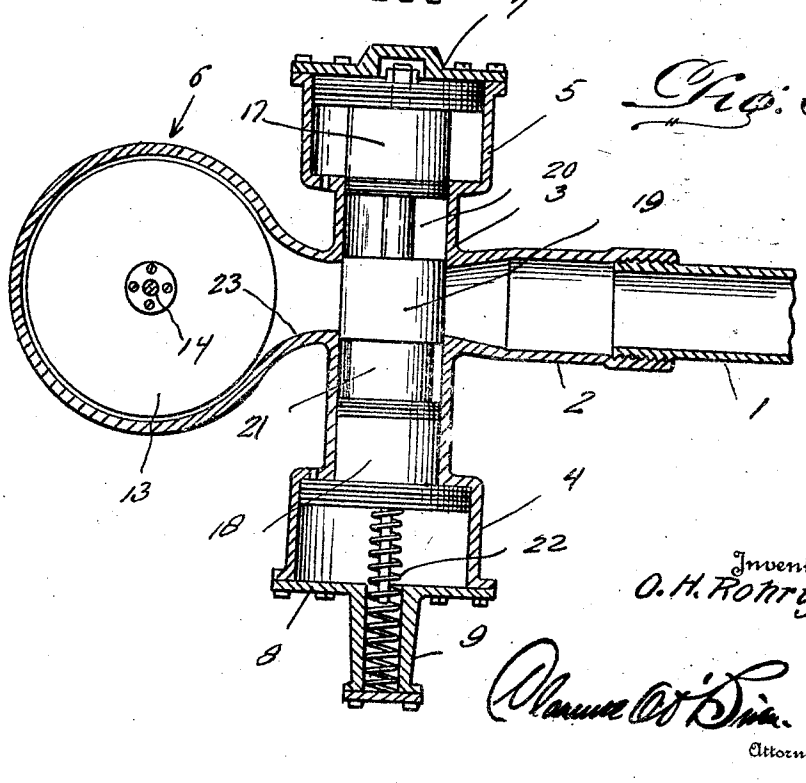


Fig. 3.

Inventor
O. H. Rohrig,

Attorney

March 16, 1926. 1,576,675

O. H. ROHRIG

AUTOMATIC SUCTION LINE VALVE

Filed March 11, 1925 2 Sheets-Sheet 2

Fig. 2.

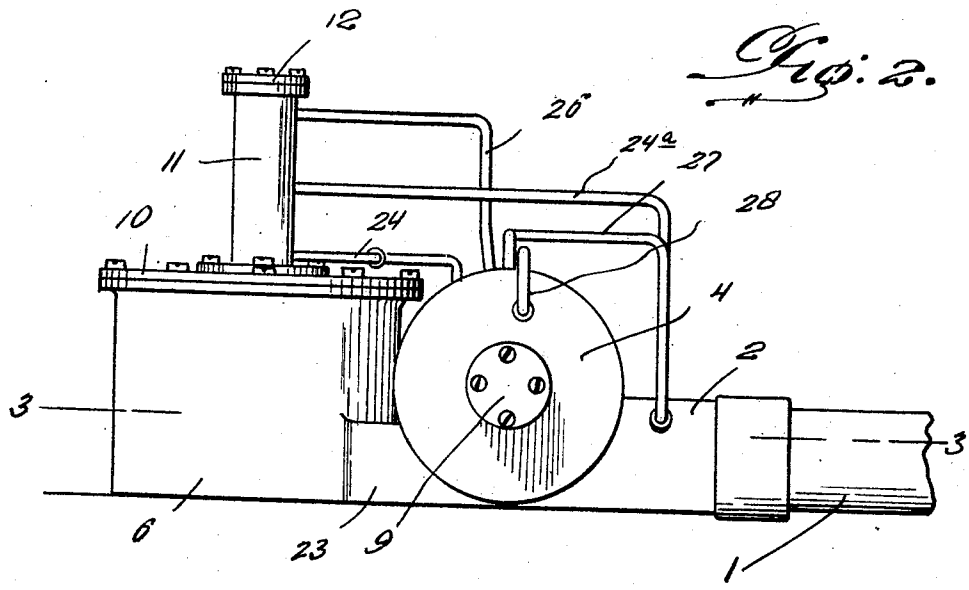
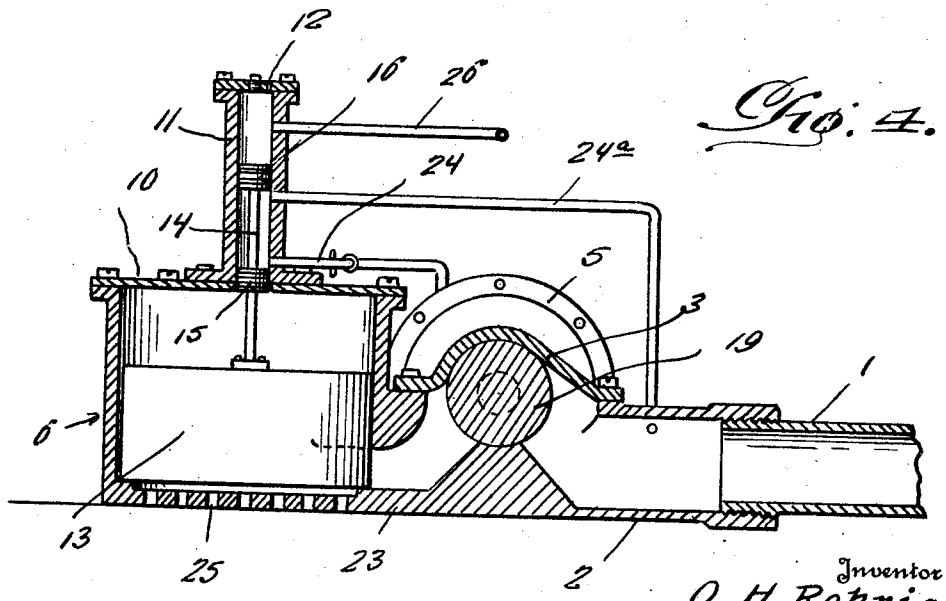


Fig. 4.



Inventor
O. H. Rohrig,

By Clarence A. O'Brien

Attorney

Patented Mar. 16, 1926. 1,576,675

UNITED STATES PATENT OFFICE.

OLIVER H. ROHRIG, OF DANA, WEST VIRGINIA.

AUTOMATIC SUCTION-LINE VALVE.

Application filed March 11, 1925. Serial No. 14,764.

To all whom it may concern:

Be it known that I, OLIVER H. ROHRIG, a citizen of the United States, residing at Dana, in the county of Kanawha and State of West Virginia, have invented certain new and useful Improvements in an Automatic Suction-Line Valve, of which the following is a specification.

This invention relates to an improved valve structure which may be entitled an automatic suction line valve, the same having been designed especially for use in mine entries and rooms for permitting accumulated water to be conducted therefrom to a pump to be carried to an appropriate place of deposit.

Briefly described, the invention comprises branch pipes which lead from selected points to a main suction conduit connected with an appropriate suction pump. In accordance with my idea, there will be a branch pipe leading into each room and connected with the same main suction conduit leading to steam or electrically operated suction pump.

It is on the intake end of the branch pipe the improved automatically operable valve which I have designed is mounted and the construction of this valve will become clearly apparent from the following description and drawing.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same;

Figure 1 is a top plan view of a device constructed in accordance with the present invention.

Fig. 2 is an end elevation thereof.

Fig. 3 is a horizontal section taken approximately upon the plane of the line 3—3 of Fig. 2, and

Fig. 4 is a central longitudinal vertical section taken approximately upon the plane of the line 4—4 of Fig. 1.

Referring to the drawings in detail, the reference character 1 designates the so-called branch pipe which extends from the interior of a mine room outwardly through the exit and is adapted to be connected to a main suction line (not shown). The improved automatic control device is connected thereto through the medium of a nipple 2 or any other appropriate connection. This connection 2 constitutes a part of a novel casting which is molded to provide a substantially angularly disposed cylindrical portion 3 (see Fig. 3) at the opposite ends of which are enlarged open ended cups 4 and 5 respectively.

Connected to the intermediate portion of the cylinder 3 is a float chamber or housing 6. Cylinder 5 is closed by a removable cover plate 7, cylinder 4 is closed by a removable plate 8 carrying an extension forming a socket 9, and the float housing has its upper open end covered by a closure plate 10. The plate 10 is provided at its center with an opening and a tube 11 rises vertically from this, this tube forming a cylinder as will be apparent later. If desired, the tube may be provided with a removable top 12.

Operable within the housing 6 as shown in Figs. 3 and 4, is an appropriate float 13 having a stem 14 connected therewith and rising therefrom and extending into the tube 11. This stem is provided with a lower valve 15 and an upper valve 16.

A suction controlled valve is slidable within the parts 3 and 4 and 5. Observing Figure 3, it will be seen that the shaft comprises pistons 17 and 18. At the center is a solid portion 19 which fits snugly within the cylinder 3 and normally closes the point of communication with the pipe 1. On opposite sides of the portion 19 are grooves 20 and 21 respectively.

It will be observed that a coiled spring 22 is located between the piston 18 and the adjacent end of the device, the opposite end of the spring extending into the aforesaid socket 9. Normally, this spring serves to maintain the solid part 19 in a position to sever communication with the suction line. It will be noted from this figure that a reduced neck 23 serves to afford commmunication between the float chamber and the pipe 1 when the part 19 is moved to one side.

Referring to Fig. 1, it will be seen that pipes 24 and 24ª each connect with the valve tube 11. The pipe 24ª is connected at its opposite end with the connection 2, while the pipe 24 is connected at its opposite end with the cup 5. When the float 13 is fully seated to cover the water intake openings 25, the valves 15 and 16 are in a position to permit passage of the suction from the pipe 1

through the pipe 24a, tube 11 and pipe 24, into the cup 5.

Connected to the tube 11 above the pipe 24 is an additional and similar pipe 26 which extends over and is connected with the cup 4. These cups 4 and 5 actually serve as chambers as is obvious. Observing Fig. 1, it will be seen that a by-pass pipe 27 extends from the connection 2 and is connected with a predetermined portion of the cylinder 3 and an additional by-pass 24 connects with this cylinder 3 and extends over and around and communicates with the chamber 4.

Normally, there is a suction created from the main suction pump (not shown) through the pipe 1 and small suction pipes 24a, tube 11, and the pipe 24 connected to the head of the piston 17 which, in conjunction with the spring 22, serves to maintain the part 19 closed as shown in Fig. 3. In the event that water collects in the room, it passes upwardly through the opening 25, raising the float 13 and lifting the stem 14 so that suction is created through the by-pass 24a, pipe 26, and in the chamber 4 acting on the piston 18 to overbalance the spring 22 and to bodily slide parts 17 and 19 over to uncover the pipe 1 by bringing the groove 20 opposite the intake end thereof. The piston 18 moves slowly over under the action of the vacuum or suction which has just been created in the chamber.

When the closing of the valve, or parts 17 and 19, move to the right, groove 21 establishes communication between the by-pass pipes 27 and 28 and thus maintains the vacuum in cup 4 and keeps the valve open. Otherwise, when the water begins to recede, the communication between pipes 24 and 26 would be broken when valves 15 and 16 begin to descend, destroying vacuum in cup 4, if it were not that groove 21 continued to keep by-pass pipes 27 and 28 in communication with the suction line, maintaining the vacuum in cup 4.

As the water recedes, the float moves downwardly moving the valves 15 and 16 to their normal positions, producing suction in the first chamber 5 to act upon valve 17 to place the parts in readiness to close the valve 19. At this time the suction in the chambers at the opposite ends of the device is practically of an equal degree and the parts are balanced, thus the additional pressure of the spring 22 against the piston 18 serves to overbalance the suction on line side, and thus automatically returns the valve 19 to closed position. If desired, the pipe 24 may be provided with a hand controlled valve 29 as seen in Fig. 1.

It is thought that the foregoing description taken in connection with the accompanying drawings, will enable persons skilled in the art to which the invention relates to obtain a clear understanding of the invention. Therefore, a more lengthy description is deemed unnecessary.

Attention, however, is called to the following features:

The provision of the improved automatic valve permits a practical substitution to be made for expensive check valves, the gate and globe valves now frequently used upon suction lines. The improved automatic valve possesses all of the necessary requirements for a device which will effectively accomplish the results sought. A single attendant can care for a multiplicity of these valves, thus obviating the employment of numerous persons as has heretofore been necessary.

The device makes for greater efficiency in operation of the pump by preventing the running of a steam pump for instance upon air from a condition frequently encountered with the present forms of valves. The improved device permits the so-called rooms to be kept substantially dry at all times, permitting the miner to efficiently clean his coal and entirely eliminating undesirable trouble experienced in cold weather when wet coal is dumped over the tipple; the wet coal standing in the mine paths, freezing and requiring transportation to some warmer part to thaw out.

Furthermore, by automatically draining the water from the room in rapid succession and under the automatic operation permitted, softening of the floor and upheavel of the ground, causing breakage in timber, and falling of the roof, is prohibited.

There are of course other features and advantages obvious to those skilled in the art and these need not be enumerated. Therefore, a more lengthy description is thought unnecessary.

Although the preferred embodiment of the invention has been shown and specifically described, it is to be understood that changes coming within the field of invention claimed may be resorted to if desired.

Having thus described my invention, what I claim as new is:—

1. In a structure of the class described, an open ended cylinder, a valve slidable in said cylinder, suction chambers at the opposite ends of said cylinder, suction operated pistons connected with said valve and reciprocable in said cylinder, a suction line connected with said cylinder, a float chamber connected with said cylinder, a float operable in said chamber, a valve carried by said float, and suction by-pass pipes affording automatically controlled suction for said chambers.

2. In a structure of the class described, an open ended cylinder provided at its opposite ends with open cups, closures for said cups forming piston chambers at the ends

of said cylinders, a suction supply pipe nipple connected with the intermediate portion of the cylinder, a float housing having a conducting neck connected with the intermediate portion of the cylinder, a valve slidable in said cylinder for simultaneously controlling the passage of fluid through said neck and nipple, pistons connected to said valves, spaced therefrom and movable in said chambers, a tube rising from said float housing, a float in said housing, a stem carried by said float, valves carried by said stem, and suction pipes connected with said tube and controlled by said last named valves.

In testimony whereof I affix my signature.

OLIVER H. ROHRIG.