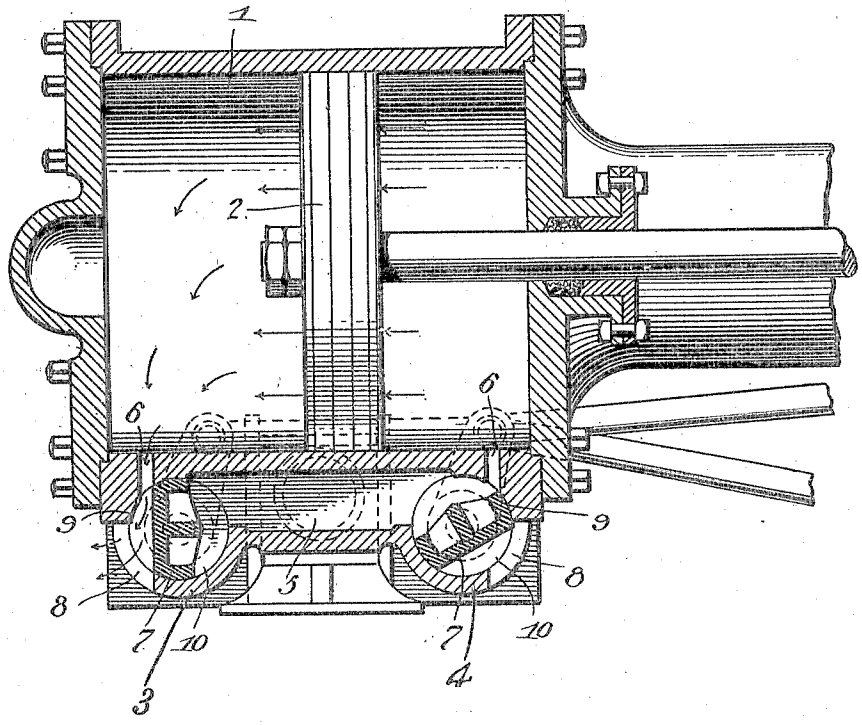
No. 821,663. PATENTED MAY 29, 1906.

T. J. MITCHELL.

FLUID PRESSURE CYLINDER.

APPLICATION FILED SEPT. 13, 1902.



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UNITED STATES PATENT OFFICE.

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FLUID-PRESSURE CYLINDER.

No. 821,668. Specification of Letters Patent. Patented May 29, 1906.

Application filed September 13, 1902. Serial No. 123,367.

To all whom it may concern:

Be it known that I, THOMAS J. MITCHELL, a citizen of the United States, residing at Connellsville, in the county of Fayette and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Fluid-Pressure Cylinders, of which improvement the following is a specification.

This invention relates to certain improvements in fluid-pressure cylinders, especially cylinders of that class used in mine-pumps where the pumps are actuated by compressed air.

One of the principal difficulties attendant in the use of compressed-air pumps is that the sudden expansion of the air leading from the exhaust port or ports will absorb the heat at a point of discharge and the moisture in the air will become congealed and accumulate at the exhaust-ports, in some cases entirely closing the same and seriously interfering with the operation of the pump.

The principal object of the invention is to so arrange and construct the exhaust-ports and control the valves that the air exhausted from the cylinder may pass directly into the outer air the expansion and consequent reduction in temperature occurring at a point distant from the valves and exhaust-port.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

The accompanying drawing illustrates in sectional elevation a pump-cylinder constructed in accordance with the invention.

The cylinder 1 is arranged to contain a piston 2, of ordinary construction. On the lower side of the cylinder are two valve-chambers 3 and 4, arranged at or near the ends of the cylinder and connected to a chest 5, to which the air-pressure-supply pipe extends. These valve-chambers are connected with the cylinder by ports 6, and within said chambers are oscillatory valves 7, which may be turned to permit the passage of air under pressure from the chest through the port at one end of the cylinder and to permit the discharge of the exhaust-air through the cylinder-port to the outer air. The outer walls of the valve-chambers are cut away at points adjacent to the ports 6, only so much of the walls of said chambers being left between the openings 6 and the openings 8, formed in said wall, as to provide seats 9 for the valves when the latter are turned to permit the flow of air under pressure into the cylinder.

Each valve is cut away on its outer side to form a straight wall-port, which may be brought into alinement with the inner wall of the port 6, which it controls, and these straight wall-ports extending nearly the full length of the valves, cylindrical portions 10 being left at the ends to form the valve-journals.

It will be readily understood that by reducing to a minimum the distance to be traversed by the fluid from the cylinder to the open air no material expansion will occur until the air has passed beyond any surfaces on which condensation could occur. I have found by experience that in mines where the air is very moist there is practically no collection of congealed moisture around the outlets, and when, as in the preferred construction, the outlets are arranged on the under side of the cylinder the fluid cooled by expansion will fall away from the parts likely to be chilled thereby.

Having thus described the invention, what is claimed is—

1. The combination with a fluid-pressure cylinder having a valve-chamber provided with a circular wall in which are two ports of different area, the larger port being open, and at all times permitting free communication between the valve-chamber and the outer air, and an oscillatory valve arranged within said chamber and having a straight wall-port that is movable to a position in alinement with one of the walls of the smaller port leading from the cylinder, the ports opening downward to permit the escape of moisture by gravity.

2. The combination with a fluid-pressure cylinder having a valve-chamber in which a portion is cut away to form an exhaust-port of extensive area, open at all times to the atmosphere, a cylinder-port leading between the cylinder and the valve-chamber, and an oscillatory valve disposed within said cham-

ber and movable to place the port either in communication with a source of pressure-supply, or directly with the outer air, the discharge-opening formed by the valve and its casing at the end of said cylinder-port, being of gradually-increasing area from the end of the cylinder-port to the final discharge-port.

In testimony whereof I have hereunto set my hand.

THOMAS J. MITCHELL.

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