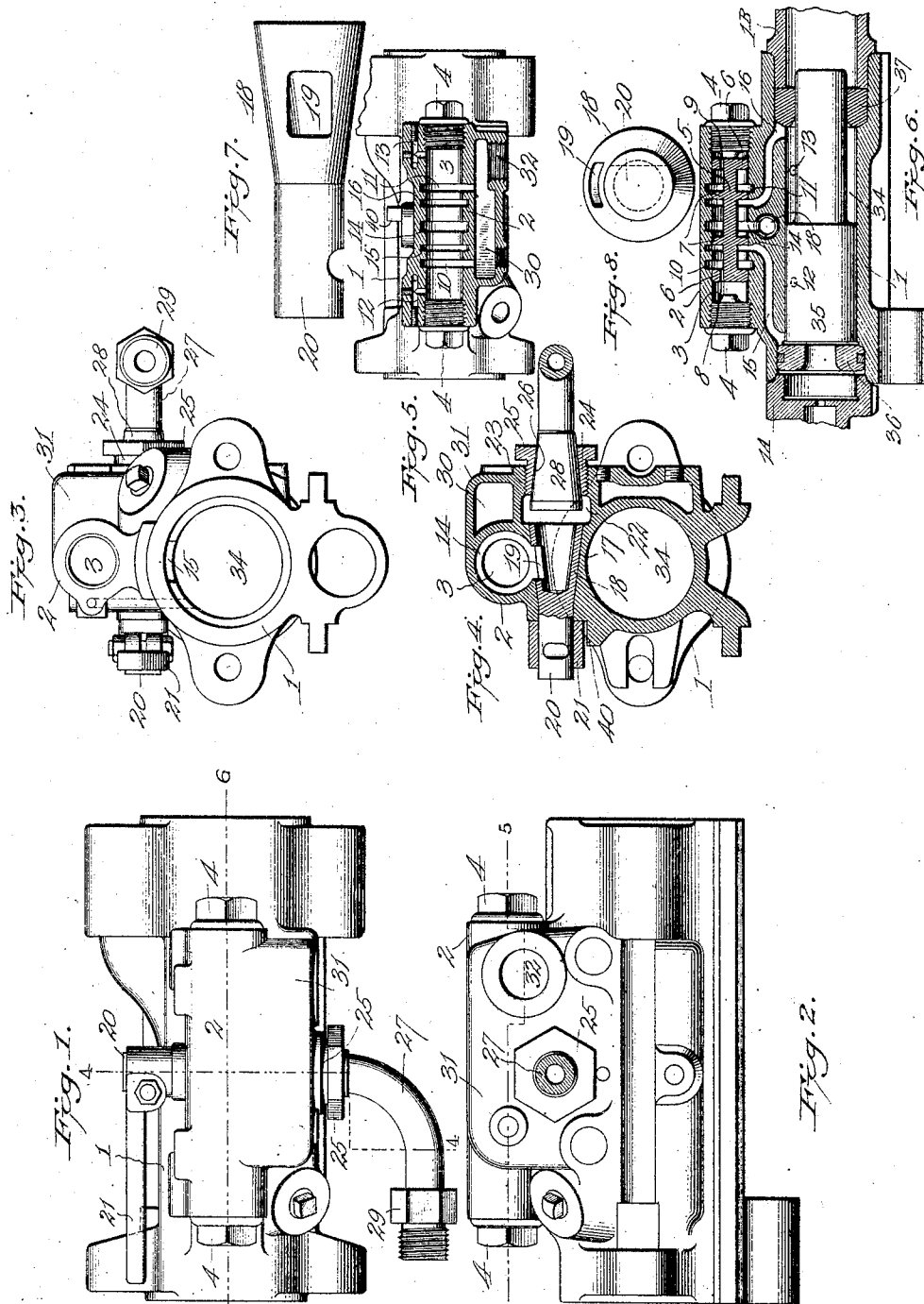


J. G. LEYNER.
AIR CONTROLLING VALVE FOR ROCK DRILLING ENGINES.
APPLICATION FILED AUG. 15, 1911.

1,039,972.

Patented Oct. 1, 1912.



Witnesses:
C. Sargent Elliott.
Elizabeth Smith.

Inventor:
John George Leyner
By H. S. Bailey Attorney.

UNITED STATES PATENT OFFICE.

JOHN GEORGE LEYNER, OF DENVER, COLORADO.

AIR-CONTROLLING VALVE FOR ROCK-DRILLING ENGINES.

1,039,972.

Specification of Letters Patent.

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Application filed August 15, 1911. Serial No. 644,154.

To all whom it may concern:

Be it known that I, JOHN GEORGE LEYNER, a citizen of the United States of America, residing in the city and county of Denver and State of Colorado, have invented a new and useful Quick-Acting Air-Controlling Valve for Rock-Drilling Engines, of which the following is a specification.

My invention relates to improvements in quick acting air controlling valve mechanism for rock drilling engines, and the objects of my invention are: first, to provide a simple positively sealing valve that will turn on or shut off the air instantly by a short part circle rotary movement, and that will not stick or freeze in its seat. And second, to provide a valve controlled and air inlet mechanism for rock drilling engines, in which the air entrance to the cylinder and its valve mechanism is provided with a rotary swiveling hose connecting elbow, and with a quick port opening and closing valve arranged to receive air directly from said elbow and in which the valve or elbow cannot stick or freeze in their seats. I attain these objects by the mechanism illustrated in the accompanying drawings, in which:

Figure 1, is a plan view of a cylinder of a rock drilling engine, provided with my quick acting valve and air inlet swiveling hose connection. Fig. 2, is a side elevation of Fig. 1. Fig. 3, is an end elevation of Figs. 1 and 2. Fig. 4, is a section of Fig. 1, on line 4—4. Fig. 5, is a horizontal sectional view on the line 5—5 of Fig. 2. Fig. 6, is a vertical longitudinal sectional view of the cylinder on the line 6—6 of Fig. 1, showing the same provided with cylinder heads and with a piston hammer. Fig. 7, is a side elevation of the valve. And Fig. 8, is an end elevation of the valve shown in Fig. 7.

Similar letters of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1 designates the cylinder of a rock drilling engine, and I have preferably illustrated my improved valve applied to the cylinder of a rock drilling engine as it was especially designed for use on the type of rock drilling engine illustrated in my pending United States application No. 570,339, filed July 5th, 1910, although it can be used on other types of air using rock drilling engines and on other kinds of air or steam using machines

that require a hand operating quick opening and closing valve.

In order to show the coöperative relation of my improved air inlet valve, it is necessary to describe the port and valve mechanism, and the controlling relation of the valve to them.

The cylinder is provided with a front head 1^A and with a rear head 1^B, only fragments of which are shown. The top of the cylinder is also provided with a valve chest 2, which preferably is positioned centrally on top of and lengthwise of it. This valve chest contains a cylindrical bore 3, that extends entirely through it, the opposite ends of which are provided with an interior thread in which plugs 4 are screwed, which form removable heads for it. A round stem-shaped valve 5 is reciprocally mounted in the bore of the valve chest. The stem portion of the valve is provided at its opposite ends with collar portions 6, and it is also provided with collar portions 7 intermediate of its ends, which are positioned preferably at equal distances from their adjacent end collar portions. The collar portions of the valve 5 fit closely but reciprocally in the bore 3 of the valve chest, while the stem portion is made enough smaller in diameter than the collar portions to form spaces between the collars for the compressed air to flow into and from them into the cylinder inlet and exhaust ports. The end collar portions are provided with port apertures 8 and 9, that extend through them from side to side. These apertures 8 and 9 communicate with the opposite end portions of the valve chest and with the exhaust ports 10 and 11, that are formed in the inner peripheral circumferential wall of the valve chest. These port apertures 8 and 9 are arranged to permit the live compressed air that flows into the opposite ends of the cylinder and that flows from the opposite ends of the cylinder through the ports 12 and 13 into the opposite end portions of the valve chest, to flow through them into the exhaust ports 10 and 11 after the live air in the opposite ends of the valve chest has started and moved the valve in alternate order away from the opposite ends of the valve chest on its reciprocal strokes in controlling unison with each reciprocal movement of the hammer piston. An air inlet port 14 is formed in the valve

chest midway between the cylinder ports 15 and 16, and the port 14 communicates with a conical valve seat 17, which extends transversely through the cylinder casing, between the valve chamber and the hammer piston cylinder, and in this valve seat is seated a hollow conical valve 18, having a port 19, which is adapted to register with the inlet port 14, to admit air to the valve chest.

One end of the valve terminates in a stem 20, to which an operating handle 21 is secured. The opposite end of the valve is open and communicates with a chamber 22, having a threaded inlet aperture 23. The threaded air inlet aperture 23 of the valve chest is preferably provided with a bushing 24, which I term the inlet bushing, and which is threaded into the inlet aperture and is provided with a wrench receiving outer end portion 25, which enables it to be removably secured to the said threaded inlet aperture. This bushing is provided with an inwardly flaring conical aperture 26. One end of an elbow 27, which is provided with an enlarged tapering head portion 28, the outer end portion of which is the larger in diameter, is adapted to fit revolvably in the conical aperture 26 in the bushing. The opposite end of the elbow is threaded to receive a hose coupling member 29, which is adapted to be connected to a hose which extends to a supply of compressed air under pressure enough to operate the drilling engine.

The exhaust ports 10 and 11, which are formed in the valve chest between the cylinder inlet ports and the opposite end collar portions of the valve, convey the exhaust air from the cylinder and its inlet ports into an exhaust chamber 30 formed in a lateral extension 31 on one side of the valve chest, from which the exhaust air flows through a threaded exhaust outlet aperture 32 in which is screwed an exhaust ell, not shown.

The inlet and exhaust ports of the valve chest are all preferably circumferential grooves formed in the wall of the bore of the valve chest.

The cylinder is provided with a piston hammer bore 34, in which a drill bit driving piston hammer 35 is reciprocally mounted. The opposite ends of the cylinder are provided with cylinder rings 36 and 37, and with the cylinder heads 1^A and 1^B, only fragments of which are shown.

The above description of the cylinder and its valve chest and valve ports has been given in order to show the cooperative relation of my improved quick acting swiveling air inlet hose connecting elbow and of my quick acting valve. The taper construction and the seating arrangement of the valve and of its swiveling inlet portion and of their seats prevents them from sticking or binding or freezing in their seats, and the

action of the valve in admitting and shutting off the air as it is turned by its handle is quick and positive.

The operation is as follows: A hose from a supply of compressed air can be led to the swiveling elbow from any direction, and the elbow be turned to be connected thereto. The handle of the valve is preferably arranged in such a relative position to the air port of the valve that it stands in a horizontal position against the lug 40 when the port 19 registers open to the air port 14. Consequently to close the valve the handle is grasped and moved to a vertical position, which moves the port 19 to stand at right angles to the port 14, and when the operator desires to open the valve he has only to throw the handle against the lug 40. When the port 19 of the valve registers with the port 14, the air enters the swiveling elbow and passes into the hollow conical portion of the valve and up through its port 19 into and through the port 14, into the valve chest's bore and between the collars 7 of the valve, which it reciprocates automatically in the valve chest, which permits the air to flow to the opposite ends of the cylinder through the ports 15 and 16, and then to exhaust through the same ports and also through the ports 10 and 11 into the exhaust chamber 30, from which it exhausts through the exhaust outlet 32 to the atmosphere.

My invention provides a positively working quick action valve that enables the full volume of air to be turned on in a fraction of a second or to be instantly shut off.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a rock-drilling engine, a main cylinder; a valve-chamber mounted thereon and having its axis parallel to the axis of said main cylinder; a valve in said valve-chamber; a fluid-inlet in said valve-chamber; a hollow, transversely-disposed throttle-valve having a port adapted to register with the fluid-inlet of said valve-chamber, and provided with an operating handle at one side of the cylinder and valve-chamber; and a main fluid-inlet on the opposite side of said cylinder for supplying motive-fluid to the interior of said throttle valve.

2. In a rock-drilling engine, a main cylinder; a valve-chamber mounted thereon and having its axis parallel to the axis of said main cylinder; a valve in said valve-chamber; said cylinder having fluid passages leading from said valve-chamber to either end of said main cylinder; a fluid-inlet in said valve-chamber; a hollow throttle-valve transversely-disposed in the wall of said cylinder, between said fluid passages, having a port adapted to register with the fluid-inlet of said valve-chamber, and provided with an

operating handle at one side of the cylinder and valve-chamber; and a main fluid-inlet on the opposite side of said cylinder for supplying motive-fluid to the interior of said throttle-valve.

5 3. In a rock-drilling engine, the combination of a casing comprising a cylinder, a valve-chamber parallel to the cylinder; said casing having a passage therethrough between the cylinder and valve-chamber; a fluid-inlet connected to said passage on one

side; and a throttle-valve located in said passage; said casing having also conduits for conveying the motive-fluid to the valve-chamber, and from the valve-chamber to the cylinder.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN GEORGE LEYNER.

Witnesses:

G. SARGENT ELLIOTT,
ELIZABETH SMITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."