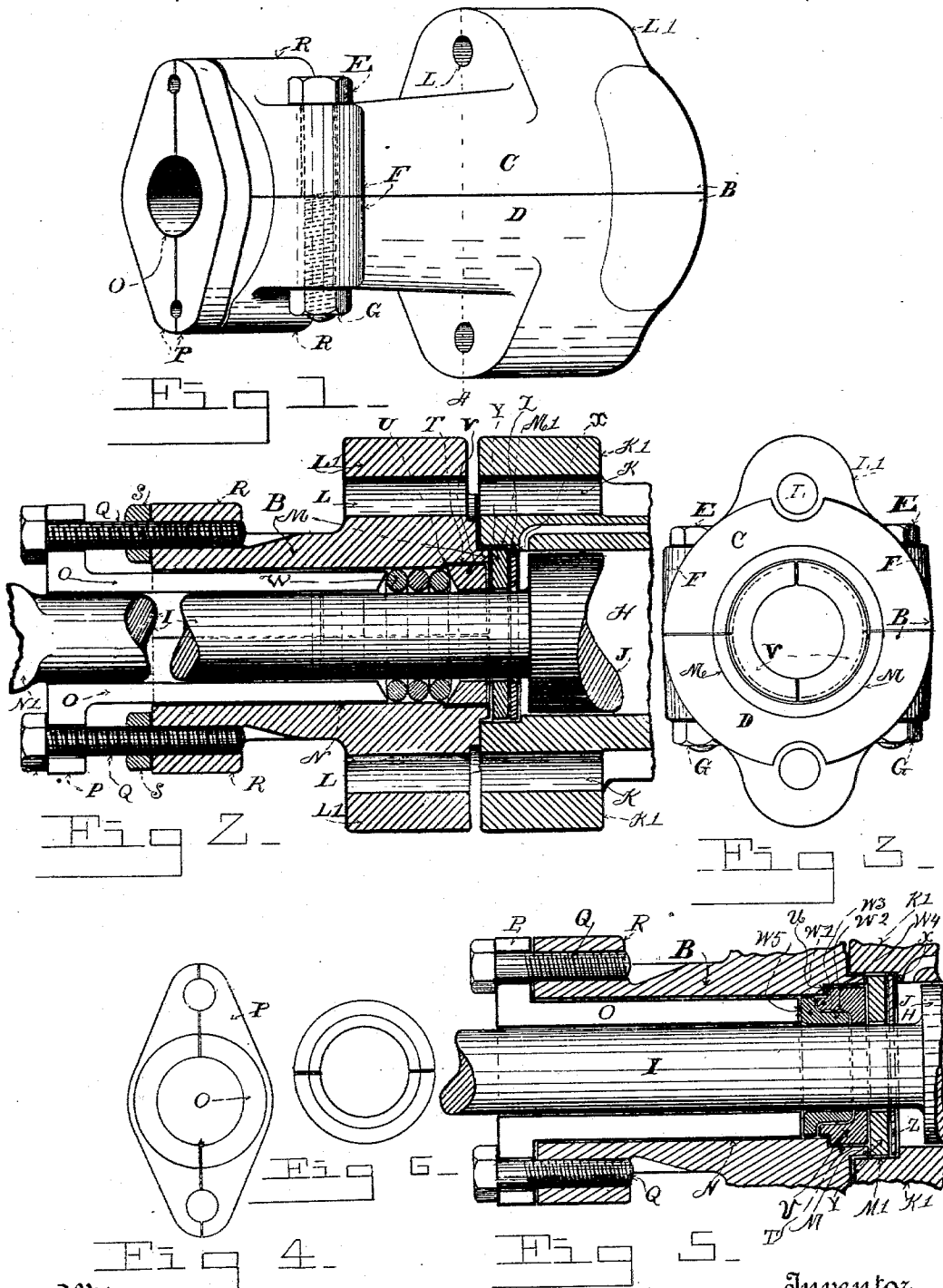


(No Model.)

J. G. LEYNER.
CYLINDER HEAD FOR ENGINES.

No. 561,676.

Patented June 9, 1896.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN GEORGE LEYNER, OF DENVER, COLORADO.

CYLINDER-HEAD FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 561,676, dated June 9, 1896.

Application filed October 21, 1895. Serial No. 566,354. (No model.)

To all whom it may concern:

Be it known that I, JOHN GEORGE LEYNER, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in the Cylinder-Heads of Engines through which the Piston-Rod Operates; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to the art of packing the piston-rods of pumps, air-compressors, direct-acting, and especially the piston-rods of rock-drilling engines; and the objects of my invention are, first, to provide a stuffing-box in the cylinder-head, having its rear wall and piston-fitting portion of the cylinder-head, which forms the bottom of the packing-chamber or stuffing-box, independent of the cylinder-head and removably secured therein; second, to make this removable wall in such a manner that it can be placed on the piston-rod without removing it from the cylinder; third, to provide means for securing it in the cylinder-head; fourth, to provide a gland and connections which will afford a substantial bearing for the piston-rod in the cylinder-head. I attain these objects by the mechanism illustrated and described in the accompanying drawings and specification, in which—

Figure 1 represents a perspective view of the front cylinder-head of a rock-drilling engine. Fig. 2 represents a section of the same on line A of Fig. 1 with a section of a fragment of a cylinder and a piston-rod and piston-head. Fig. 3 represents an end elevation of the rear end of the cylinder-head. Fig. 4 represents an end elevation of the gland. Fig. 5 represents a fragment of the front cylinder-head and other parts of a rock-drilling engine, showing the gland and the removable inner wall-ring of the packing-chamber adapted to receive a divided cupped packing-ring instead of the common circular packing shown in Fig. 2. Fig. 6 represents the cupped packing-ring in elevation.

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

Referring to Fig. 1, B designates the front cylinder-head of a rock-drill. This cylinder-head is divided centrally into two equal parts C and D. These parts or halves are bolted together by cap-screws E, which pass through holes drilled through lugs F, which project from opposite sides of the halves. One of the lugs of each half is threaded, and the screws are adapted to pass freely through one lug and to screw into and through the opposite lug, thereby bolting the two halves together. A check-nut G is placed on the ends of the cap-screws and tightened against the lug to prevent the studs from turning and working loose.

In Fig. 2 a section of the cylinder-head is represented through line A of Fig. 1 with a fragment of a cylinder H and a piston-rod I and piston-head J. The cylinder-head is adapted to be bolted to the cylinder by long bolts, which are not shown. These bolts pass through the perforations K of the lugs K' of the cylinder and the perforations L of the lugs L' of the cylinder-head, this arrangement for securing the two together being a common one.

The cylinder-heads are generally provided with a projecting step M, which fits into a counterbore M', made in the end of the cylinder. Through the center of the cylinder-head and in axial alinement with the axis of the cylinder I bore a hole N completely through the head enough larger than the diameter of the piston-rod to form a suitable chamber or stuffing-box for the piston-packing. The piston-rod extends centrally through the cylinder-head and contains a chuck-head N', a fragment of which is shown and which is adapted to carry the cutting-drills. A gland O, which is divided centrally into two equal halves, is bored to fit freely but snugly the piston-rod in order to support it axially with the cylinder, and it is also turned to fit freely and snugly the packing-chamber in the cylinder-head. The divided gland is provided with a divided flanged follower P, which is perforated partially in each half to receive the cap-screws Q. These screws Q are threaded and screwed tight into oppositely-arranged lugs R, formed on the halves of the cylinder-

head. These cap-screws are provided with check-nuts S, which are screwed tightly against the lugs to prevent them working loose and out. They also assist to secure the screws very rigidly to the head. This arrangement enables the cap-screws to firmly support the gland at its outer end. I also make the gland very long in order that it may have a long bearing in the cylinder-head, which gives it a long bearing on the piston-rod and enables it to firmly support the piston-rod in the cylinder-head.

In general practice the stuffing-boxes of cylinder-heads comprise a bored hole somewhat larger than the diameter of the piston-rod. This hole does not extend through the cylinder-head, but terminates in an integral end wall with a concaved or inwardly beveled face. Through this wall a hole is bored centrally and adapted to fit freely but snugly the piston-rod. This construction is very objectionable in rock-drills, the piston-rods of which are subjected to very severe transverse and torsional strains, due to the fact that they are rapidly reciprocated in the cylinder and violently impinged against uneven and hard surfaces. They are also exposed to grit, which, with the severe lateral strains the piston is subjected to, cuts out the hole through the cylinder-head into the stuffing-box and also the hole through the gland very rapidly, necessitating at frequent intervals the discarding of the worn cylinder-heads and glands and their replacement by new ones. It requires but very little wear of the gland and the hole into the stuffing-box to render a drill practically worthless, as a very little play in the head and gland makes the drill cutting-point unsteady and the drilling unsatisfactory. It also throws the strain onto the piston-head and wears the cylinder.

The principal object of my invention is to construct the stuffing-box in the cylinder-head in such a manner that the gland and the rear wall or inner terminal wall of the stuffing-box shall be independent of the cylinder-head, easily detachable therefrom, and inexpensive to replace when necessary. I preferably carry out this feature of my invention in the following manner:

From the inner end of the cylinder-head I counterbore a hole T a little larger in diameter than the bore through the cylinder, which forms the stuffing-box or packing-chamber, and of suitable depth to receive a substantial ring. In this counterbore and against the step U formed thereby I place a metal ring V, which, when applied to rock-drilling piston-rods or to piston-rods having both ends enlarged, is divided centrally into halves, as shown in Fig. 3. This ring is made of the same depth as the counterbore in the cylinder-head. For ordinary kinds of packing the side of the divided wall-ring which faces the gland is concaved or inwardly beveled in order to wedge the packing W against the pis-

ton-rod; but as some operators of drilling-engines prefer to use, especially when drilling in soft rock, a cupped packing-ring I arrange both the wall-ring and the end of the gland to fit the form of a cupped packing-ring W', as shown in Fig. 5. In order to adapt the wall-ring to receive and fit the outline of the cupped packing-ring, I bore a circular recess W² in it to receive the hub portion W³ of the cupped packing-ring, and in order to secure sufficient depth in the ring for this hub I provide it with a step W⁴, which extends into the packing-chamber and forms an abutment for the flange portion W⁵ of the cupped packing-ring. I also form the end of the gland to abut squarely against the flange portion of the packing-ring. The cupped packing-ring is divided centrally, as shown in Fig. 6. The halves of the ring are inserted in the packing-chamber, as are also the common packing-rings shown in Fig. 2, by removing the gland from the cylinder-head and sliding them in the chamber on the piston-rod from the front of the cylinder-head. I also counterbore the end of the cylinder H to form a step X, and in this counterbore and between the step X and the cylinder-head and the divided ring I place a rubber buffer-ring Y and a steel buffer-ring Z, both of which are divided centrally into halves.

W designates a common form of the piston-rod packing, which I preferably use in the form of rings, cutting each ring to surround the piston-rod and arranging each ring to break joints with the ring preceding it.

The packing-chamber wall-ring V is inexpensive and can be taken out and a new one inserted by simply detaching the cylinder-head from the cylinder and sliding the halves of the wall-ring on the piston-rod into the counterbore in the rear end of the cylinder-head, and this ring, with the gland, are the only metal parts about the cylinder-head which wear and require renewing. The expense of frequently purchasing a new cylinder-head is thus obviated, as the head now becomes a non-wearing and more permanent part of the drilling-engine than as commonly constructed.

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

1. The combination with the piston-rod and the cylinder of a divided cylinder-head having a packing-chamber through which the piston-rod passes, a divided ring surrounding said piston-rod and seated in said packing-chamber and adapted to form the bottom or inner wall of the said packing-chamber, a counterbore in the end of said cylinder, a rubber buffer-washer and a steel buffer-washer in said counterbore between its step and the cylinder-head adapted to confine said ring in the cylinder-head.

2. In a divided cylinder-head the cap-screws for clamping the halves of the cylinder-heads

together, the gland cap-screws, the lock-nuts and the divided gland, all combined substantially as shown.

3. In a divided cylinder-head for direct-acting engines, the lugs and cap-screws adapted to clamp the halves of the cylinder-head together, the check-nuts thereon, the gland cap-screws, the check-nuts thereon, the divided gland, the packing-chamber, the counterbore therein, the divided ring, and means for confining said ring in the cylinder-head.

4. The combination of the divided head having a packing-chamber through which the piston operates, the divided gland adjustably secured to said cylinder-head, the divided ring in said packing-chamber, the piston-rod, the cylinder having the end counterbore, and the buffer-washers therein adapted to confine said ring in said cylinder-head.

5. The combination with the cylinder and the piston-rod of a divided cylinder-head having a packing-chamber through which the piston passes, a divided cupped packing-ring in said chamber surrounding said piston-rod, a counterbore in the inner end of said packing-chamber, a divided metal ring in said counterbore surrounding said piston-rod and adapted to form the bottom or inner wall of

said packing-chamber and a circular recess and a stepped projection in one side of said ring adapted to form an abutment for said cupped packing-ring.

6. The combination of the cylinder-head, the divided gland, the packing-chamber therein, the cupped packing-ring, the inner wall-ring, the gland adapted to said cupped packing-ring, the cylinder, the piston and the buffers.

7. The combination with the cylinder and the piston, of a piston-packing cylinder-head having a packing-chamber, a divided gland in said chamber, means for adjusting said gland, a divided removable ring forming the bottom or inner wall of said packing-chamber, a divided cupped-shaped packing-ring in said packing-chamber surrounding said piston, and a stepped projection and circular recess in said wall-ring adapted to receive and register with the form of said cupped packing-ring.

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

JOHN GEORGE LEYNER.

Witnesses:

FREDERIC S. WATKINS,
FRED L. EMERSON.