

No. 624,181.

Patented May 2, 1899.

H. V. CONRAD.

ROCK DRILL.

(Application filed July 26, 1898.)

(No Model.)

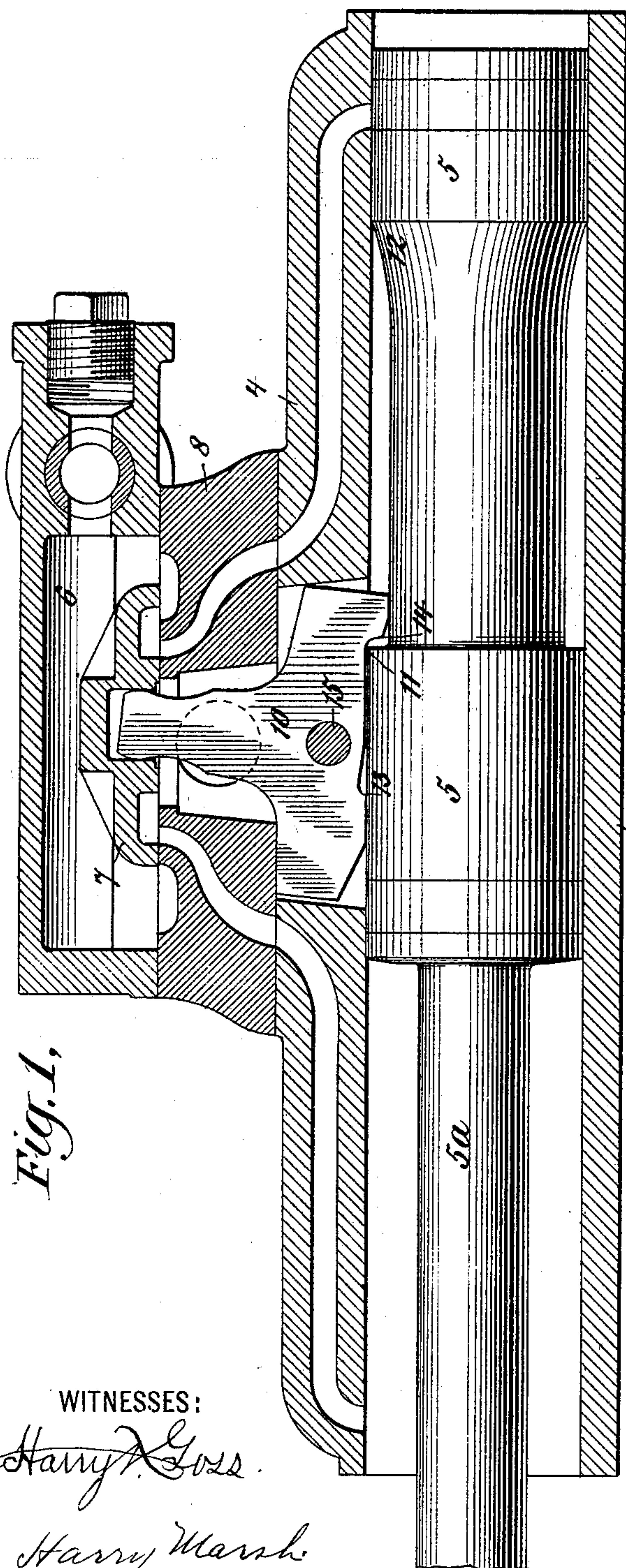


Fig. 1,

WITNESSES:

Harry A. Goss.

Harry Marsh.

Fig. 3,

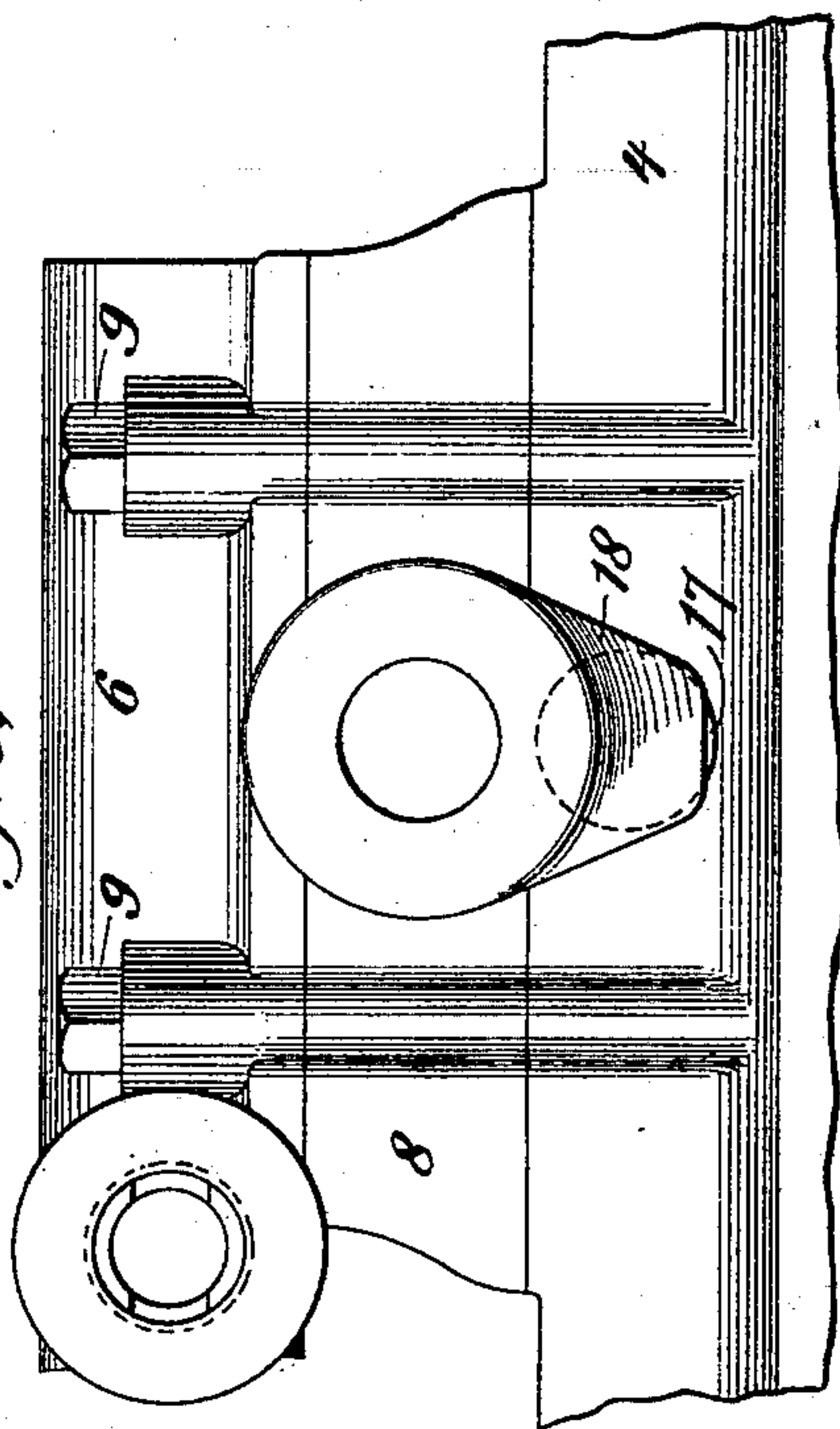
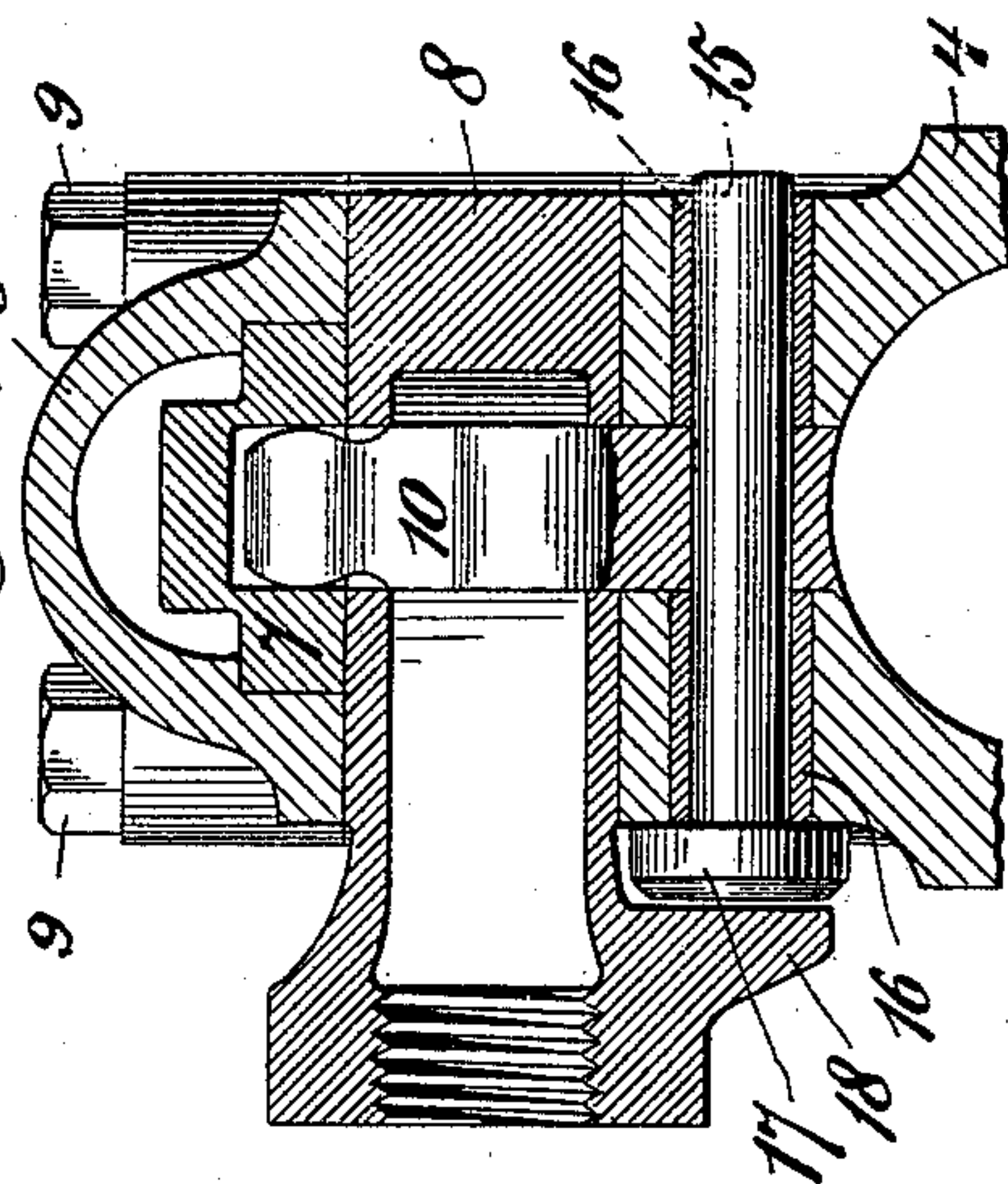


Fig. 2, 6



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ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 624,181, dated May 2, 1899.

Application filed July 26, 1898. Serial No. 686,966. (No model.)

To all whom it may concern:

Be it known that I, HUGH V. CONRAD, a citizen of the United States of America, and a resident of North Tarrytown, in the county of Westchester and State of New York, have invented a new and useful Improvement in Rock-Drills, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in rock-drills; and it consists in the provision of a certain novel means for holding against accidental displacement the bearing or pivot pin of the rocker-arm which actuates the valve and in the provision of means for reducing the wear from friction in these parts to a minimum.

The objects of my invention are to hold the bearing or pivot pin by such means as shall not be liable to derangement or accidental displacement, to provide such means as shall permit of the ready replacement of the pin when necessary by those skilled in the use of tools, but render it unlikely that those who are unskilled shall attempt same, and, furthermore, to so arrange the parts that the wearing, if any, shall come upon the pivot-pin and not upon the rocker.

My invention furthermore consists in certain novel arrangement and combination of parts, as shall hereinafter be more fully set forth.

I will now proceed to describe a device embodying my improvement and will then point out the novel feature in the claims.

In the drawings, Figure 1 represents a central longitudinal section of a rock-drill cylinder and piston, with valve-chest, valve, rocker, and its pivot-pin, showing relationship of parts. Fig. 2 is a transverse section on the line *xx* of Fig. 1 and showing means embodying my invention for retaining the rocker-pin. Fig. 3 is an outside view in detail, taken from the opposite side with reference to Fig. 1, of a portion of the cylinder, intermediate exhaust-chamber, and valve-chest.

Similar reference characters denote corresponding parts throughout the several figures.

Reference character 4 designates a cylinder provided with a reciprocating piston 5,

having a piston-rod 5^a, to the opposite end of which may be secured the drill-head.

6 designates the valve-chest, and 7 the slide-valve for controlling the admission and exhaust of the compressed motive fluid, such as steam or air, through the ports to and from the cylinder.

8 designates the intermediate exhaust-chamber, and the said exhaust-chamber and valve-chest are together secured to the cylinder by bolts and nuts 9, as shown.

10 designates the rocker, which is mounted in a cut-away portion of the cylinder and which passes through the intermediate exhaust-chamber and engages with the valve. When the piston approaches the limit of its stroke in either direction, the shoulders 11 or 12, engaging with the portions 13 14 of the rocker, throw the same in one direction or the other. This reciprocates the valve and controls the passage of fluid. The rocker 10 is mounted upon the pivot-pin 15, which passes through steel bushings 16 in the cylinder-casting. The shank of the pivot pin or bolt is of uniform diameter throughout and is provided at one end with a head 17.

Referring now particularly to Figs. 2 and 3, it will be seen that the casting 8 is provided with a depending lug 18, which overhangs the bolt-head 17 of the pivot-pin 15 and which when in position will prevent longitudinal movement of the said pin in one direction, the head itself limiting the movement in the other direction. The parts are assembled by dropping the rocker into position in its recess in the cylinder and then inserting the pivot-pin from the right-hand side (looking toward the front end of the cylinder) before the intermediate casting 8 or valve-chest 6 are set in position. When the rocker and pin have been inserted as just stated, the intermediate casting 8 is slipped over the extension of the rocker, with the lug 18 in front of the bolt-head. Next the valve is put in position in engagement with the extension of the rocker, and, lastly, the valve-chest is placed in its position on the casting 8, and the two parts—the casting 8 and the valve-chest—are together bolted down to the cylinder.

Numerous attempts have been made to pro-

vide means for simply and securely fastening or retaining the rocker pivot-pin in position, but hitherto none of the means have been entirely satisfactory. A bolt with a threaded end and a nut or nuts is unsatisfactory, not only for the reason that the nuts are liable to jar loose and get lost, but also for the reason that should they become screwed up too far they would lock the pin from turning and cause wear upon the rocker. Taper-pins have been used and were more or less satisfactory when comparatively new; but as they were drawn up to compensate for wear which would occur in the casting in which they were always set directly they would gradually be brought to such a point that they would jam the rocker. Furthermore, if the pin were arranged to rotate with the rocker the taper would cause the pin very readily to jam in its bearing, besides the danger arising from drawing the pin too far up when adjusting same. If, on the other hand, the pin were locked stationary in its position, the wear on the rocker itself would be excessive. The element of wear in machinery of this kind, which is subjected to extreme conditions, is a serious one, and I have in my present invention reduced same to a minimum. I have provided the cylinder-casting, which is likely to be of such material as would not make a good bearing for the pivot-pin, with bearing-bushings 16, as previously described. In these bushings the pin is arranged to fit easily. I then preferably make the pin a drive fit in the rocker, so that the rocker and its pivot-pin will turn together. In this way wear that does occur will occur in the pivot-pin and not in the rocker, the advantage being of course that the pin is a very much easier and less expensive piece to replace than the rocker. Furthermore, on account of the greater length of bearing-surface and the better distribution of same the said wear is enormously reduced. I have also provided and shown an extremely simple and efficient means for absolutely retaining the pin against accidental displacement and also provided against the damage likely to ensue from the possibility of the pin being tampered with by unskilled attendants.

What I claim is—

1. In a rock-drill, the combination with the cylinder and the piston arranged to reciprocate therein, a valve-chest and a valve for controlling the supply and exhaust of the motive fluid to and from the cylinder, of a rocker actuated by the movement of the piston to control the movement of the valve, a cylindrical pivot-pin upon which said rocker is mounted, and a retaining device, secured

to the frame which carries the rocker and pin, but independent of the pin itself, whereby longitudinal movement of the pin is prevented, substantially as specified.

2. In a rock-drill, the combination, with the cylinder and the piston arranged to reciprocate therein, a valve-chest and a valve for controlling the supply and exhaust of the motive fluid to and from the cylinder, of a rocker actuated by the movement of the piston to control the movement of the valve, a cylindrical pivot-pin upon which said rocker is mounted, and a lug or overhanging ear upon a portion of the frame of the drill removably secured to that portion of the frame carrying the rocker-arm and pin, said lug being in close proximity to and adapted to prevent longitudinal movement of the pin, substantially as specified.

3. In a rock-drill, the combination, with the cylinder and the piston arranged to reciprocate therein, a valve-chest and a valve for controlling the supply and exhaust of the motive fluid to and from the cylinder, of a rocker actuated by the movement of the piston to control the movement of the valve, a cylindrical pivot-pin upon which said rocker is mounted, said pin being provided with a head or shouldered portion for preventing longitudinal movement in one direction, and a lug or overhanging ear upon a portion of the frame, for preventing longitudinal movement in the other direction, substantially as specified.

4. In a rock-drill, the combination, with the cylinder and the piston arranged to reciprocate therein, a valve-chest and a valve for controlling the supply and exhaust of the motive fluid to and from the cylinder, of a rocker mounted in the cylinder-casting, a cylindrical pivot-pin upon which said rocker is mounted, a head or shouldered portion on the said pivot-pin for preventing longitudinal movement of the pin in one direction, an intermediate chamber between the cylinder-casting and the valve-chamber, a lug or overhanging ear upon the said intermediate chamber adapted to prevent the longitudinal movement of the pin in the other direction, and means for securing the valve-chest, intermediate chamber, and cylinder together, substantially as specified.

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

HUGH V. CONRAD.

Witnesses:

D. HOWARD HAYWOOD,
HARRY N. GOSS.