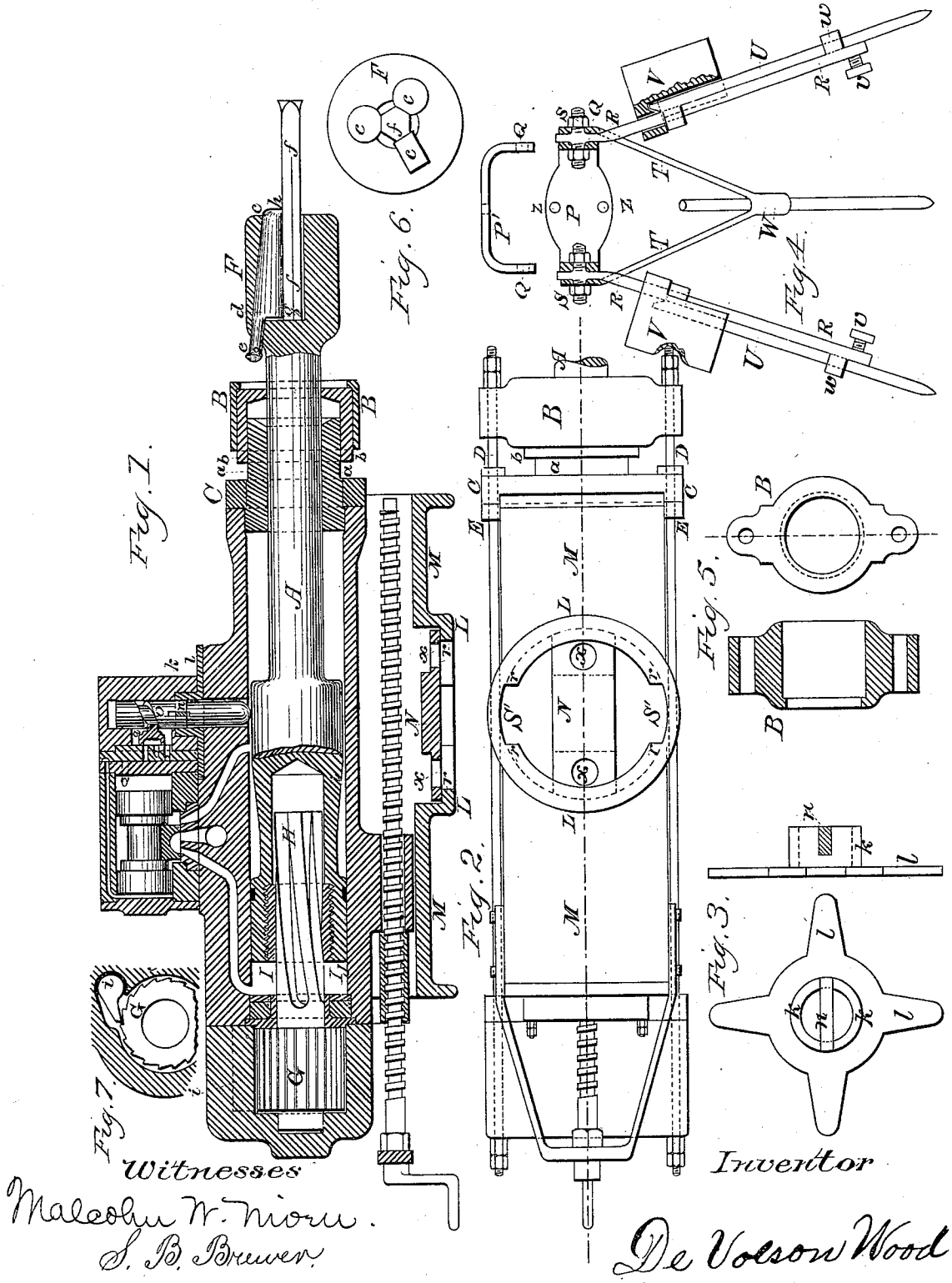
(No Model.)

DE VOLSON WOOD.

ROCK DRILL.

No. 319,653. Patented June 9, 1885.



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DE VOLSON WOOD, OF BOONTON, NEW JERSEY.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 319,653, dated June 9, 1885.

Application filed June 12, 1882. Renewed August 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, DE VOLSON WOOD, a citizen of the United States, residing at the city of Boonton, county of Morris, and State of New Jersey, have invented new and useful Improvements in Rock-Drills, of which the following is a specification.

My invention relates to improvements upon machines for drilling rocks, operated by steam or compressed air; and it consists in the elements hereinafter described, and particularly pointed out in the claims.

Figure 1 is a longitudinal section of the machine through its axis; Fig. 2, a view of the back side of the slide; Fig. 3, plan and side view of the adjuster; Fig. 4, a view of the tripod; Fig. 5, section and end view of the stuffing-box; Fig. 6, end view of the chuck; Fig. 7, end view of ratchet and click.

Heretofore the packing at the front end of the drill-cylinder for making it steam-tight about the piston-rod has been secured by a follower screwed into the head or onto a projection of the head. In either case the follower was held by screw-threads, either on its outside or inside, as the case might be; but the constant jar to which the machine is subjected as the drill strikes the rock causes the thread to wear rapidly and soon become worthless, causing expensive repairs.

In my invention I make the gland and stuffing-box without screw-threads upon either, and support the follower by simple bolts, which may be easily renewed.

In Figs. 1 and 2, *a a* is the gland, through which passes the piston-rod A, and may be cylindrical externally. The box *b b* fits the gland *a*, forming a recess for receiving the packing, and is supported by the piece B B. (Shown also in Fig. 5.) The rods E E, which secure the front head, C, to the cylinder in any of the well-known ways, are extended, as shown at D D, passing through the supporting-piece B, before referred to, and receive the nuts which secure the stuffing-box. In the figure the stuffing-box *b b* is in segments, so as to permit the piston J, piston-rod A, and enlarged part F to be one solid piece. When the construction permits, the supporting-piece B may itself form the box and be supported in the same manner.

I am aware that glands and stuffing-boxes without screw-threads upon them are in common use on steam-engines and secured by stud-bolts inserted into the cylinder-head, but the compact structure of the rock-drill, and the severe use to which it is subjected, prevents the use of the ordinary ways.

The chuck or tool-holder is constructed as follows: Into the front end of the piston-rod A, or the end enlarged, if necessary, as shown at F, Figs. 1 and 6, are several holes or sockets *c c c*, the outer surfaces of which, *c d*, are inclined to the axis of the tool *f f*, so that the line *d c*, prolonged, will meet the axis of the tool somewhat in advance of the chuck, as shown. Into these sockets are inserted pieces or gibs *g e*, of corresponding form, and slope at their outer surfaces, but whose inner faces, *g h*, are parallel to the axis of the tool. The back end, *d g*, of the gib being thicker than the front end, *h c*, will, when forced forward, wedge in between the face of the socket and the tool *f f*, and thus hold the tool. When the drill strikes the rock, it suddenly stops the forward movement of the piston, when the gibs, by virtue of their momentum, chuck forward automatically and seize the drill, as above described. A tail-piece, *e*, may extend back and through the enlarged part F, as shown, by means of which the gib may be driven forward, when desired, by blows from a hammer. If the gibs are cylindrical, as shown for two of them in Fig. 6, the tail-piece will prevent the gib from rotating on its axis, and keep the proper face toward the axis of the drill.

To perform the rotation of the tool, the nut I, secured to the piston J, reciprocates along the spiral bar H, to which is secured the ratchet G, which during the forward stroke of the piston is engaged by the click *i*, Fig. 7, thereby preventing the rotation of the ratchet G and bar H, and forcing the rotation of the piston J and tool *f* during the forward stroke. During the back-stroke of the piston the teeth of the ratchet G are permitted to pass freely under the click *i* in the well-known way, and thus permit the tool to be drawn back from the bottom of the hole without being rotated.

The adjuster *l*, by means of which the length of the stroke of the piston is adjusted, as shown in Patent No. 138,777, is here placed between

the steam-chest and body of the cylinder, as shown in Fig. 1, so as to be less exposed to injury in handling the machine. A bar, *n*, Figs. 1 and 3, carried by the adjuster *k l*, passes through a slot in the lower end of the valve-stem *o*, so that when the adjuster is stationary the stem *o* will be prevented from rotating on its axis, while it is free to move up and down, the bar *n* working freely in the slot. Turning the adjuster *k l* on its axis turns with it the stem *o*, in which the spiral groove operating on a projection on the back of the valve *q* raises or lowers the valve as desired. As the piston J moves back in the cylinder, the slope on the piston, as shown, forces the stem *o* outward, thus operating the valve *q* in one direction, and the higher it is set by the adjuster in the manner above described the earlier in the back-stroke of the piston will it pass the port, when, by operating on the main valve in the well-known way, it will secure a shorter stroke of the piston J. The stem *o* is forced constantly against the piston by the pressure of steam acting on its upper end, and thus secures the reversal of the valve *q* in the opposite direction.

The drill-cylinder is supported by the shield or slide M, on the back of which is an annular projection, L L, containing an annular seat, *r r*, for receiving the ends of a bar or plate, N N, Figs. 1 and 2. The drill is secured to the body P of the tripod, Fig. 4, by passing bolts through the plate N and holes *z z* and tightening them with nuts on the bolts in the well-known way. When the nuts are loosened, the drill may be turned about an axis perpendicular to the base of the annulus L L, so as to point the drill in different directions.

The tripod is constructed as follows: P, Fig. 4, is the body or back of the tripod, of which P′ is the plan. The side parts of the body P are nearly or quite perpendicular to the seat of the drill-slide, as above explained, and have pivot-holes Q Q, opposite or nearly opposite the axis of the drill, to prevent a twisting stress on the bolts at Q Q when the drill is operating. The upper end of the side leg, R, carries a double-ended bolt, S S, to which it is secured in any suitable manner, one end of which passes through the hole Q, previously described, and by means of a suitable nut secures the body of the tripod P firmly to the side leg, while the other end of S passes through the upper end of the rear leg, T, and by means of a nut firmly secures it. By this arrangement any one of the three legs may be free to turn on the bolt S, while the other two are firmly secured to the body of the tripod, while, by loosening the inside nuts the drill may be free to swing on the bolt S, while the three legs are firmly bolted together. The extensible part U of the leg is extended to the main part R of the side leg, and may be secured to the latter at any desired point by means of the set-screw *v*, or in any other suitable manner. The extensible part passes through an eye, *n*, on the main part R, the upper end being guided and held in any suitable manner.

The drawings also show how anchor-weights may be attached, when desired, and also how the rear leg, T, may be adjusted for length. By means of this construction the side legs may be constructed of solid forgings, and thus avoid the more common telescopic legs which are so liable to get out of order.

I have included in this specification a description of a stuffing-box and gland for the purpose of pointing out all that is new in the rock-drill illustrated. Said parts, however, are not claimed herein, but I propose to make them the subject of a separate application for Letters Patent.

What I claim and desire to secure by Letters Patent is—

1. In a rock-drill, the piston-rod provided upon its front end with the chuck or tool-holder having a central opening to receive the shank end of the tool and beyond and opening into this central opening a series of holes or sockets, which incline inward, and in which are placed the gibs, which, when given a longitudinally forward movement, have also a forced radially inward movement and clasp the tool, substantially as set forth.

2. The chuck or tool-holder adapted to receive the end of the tool, and provided with a series of holes or sockets which incline inward and in which are placed the gibs, which fit or nearly fit the back and sides of the sockets, but the inner side of which, lettered *g h*, are about parallel to the axis of the drill, the arrangement of the gibs being such that when given a longitudinally forward movement they will have also a forced radially inward movement and clasp the tool, substantially as set forth.

3. A tripod for supporting a rock-drill, which consists of the legs R R and T and the back or seat P, the legs and seat being secured in position by the double-ended screws S S, the said ends projecting beyond each side of the legs R R, and one end being adapted to secure the said legs R R T together and the other the seat P in position, substantially as set forth.

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