H. OSTERKAMP.

ROCK DRILL.

No. 106,197. Patented Aug. 9, 1870

Fig: 3

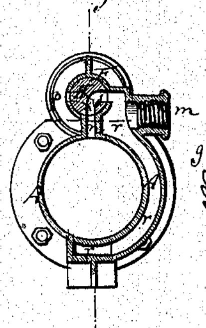


Fig: 1

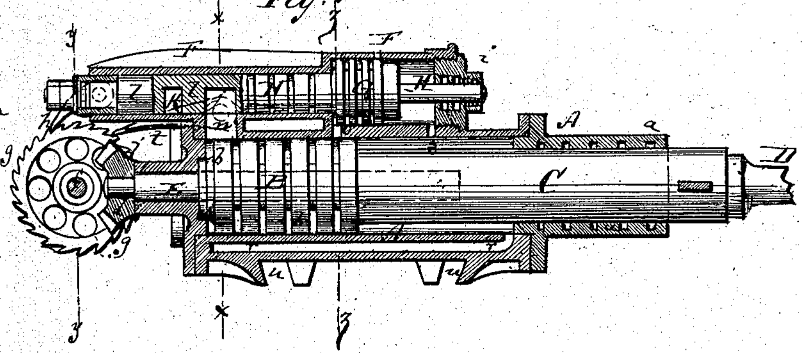


Fig: 4

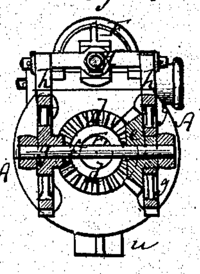


Fig: 2

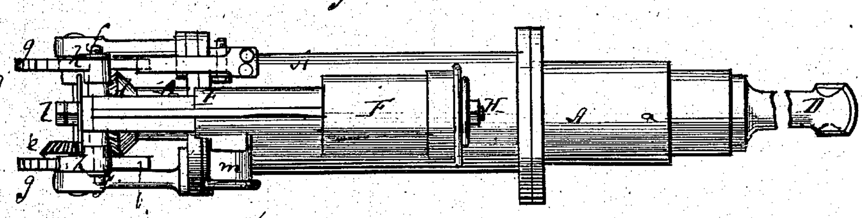


Fig 6

Fig: 7

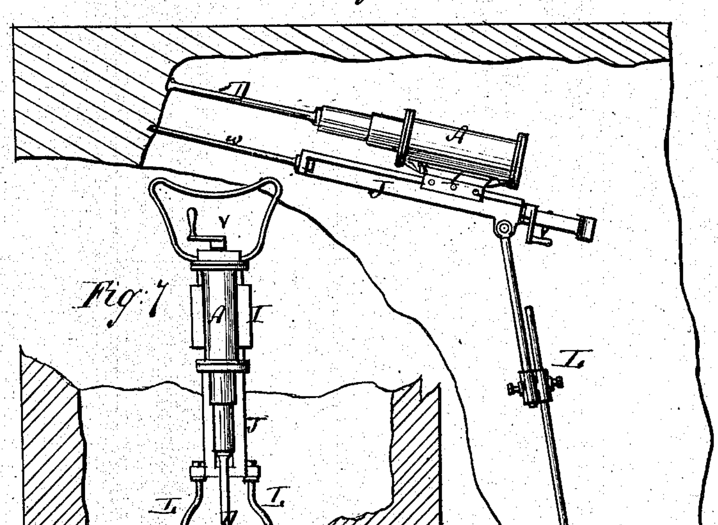
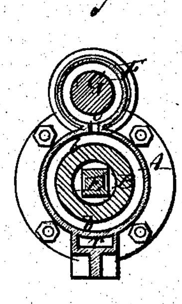


Fig: 5



Witnesses:

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HERMANN OSTERKAMP, OF ESCHWEILER CITY, PRUSSIA.

Letters Patent No. 106,197, *dated August* 9, 1870.

IMPROVEMENT IN ROCK-DRILLS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HERMANN OSTERKAMP, of Eschweiler, in the province of Rhein and Kingdom of Prussia, have invented a new and improved Rock-Drill; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to rock-drills, such as are operated by compressed air or gas, &c., and consists in the construction and arrangement of the parts particularly specified in the claim, whereby the drill is reciprocated and rotated in an efficient manner, the construction of the machine being comparatively simple, the cost small, and the liability of the same getting out of order very slight.

In the accompanying drawing—

Figure 1 represents a longitudinal section of my improved rock-drill.

Figure 2 is a side view of the same.

Figure 3 is a transverse section of the same, taken on the line *x x*, fig. 1.

Figure 4 is a transverse section of the same, taken on the line *y y*, fig. 1.

Figure 5 is a transverse section of the same, taken on the line *z z*, fig. 1.

Figure 6 is a side view, on a reduced scale, of the same, showing it set up.

Figure 7 is a front view of the same set up.

Similar letters of reference indicate corresponding parts.

A in the drawing represents the main cylinder of my improved atmospheric drill.

Within it is arranged a piston, B, which is fastened to a piston-rod, C, as shown.

The piston-rod projects through the lower end of the cylinder A, and is packed in a stuffing-box, *a*, that is arranged therein, as shown in fig. 1.

The piston is caused to work tight in the cylinder by means of packing-rings, *b b*, formed or applied around it.

The drill D is secured to the outer end of the piston-rod.

In the upper end or head *c* of the cylinder is formed the steam-tight bearing of a shaft, E, which has its inner end made of square or polygonal cross-sections, as shown in fig. 5. With this square end the shaft E fits into a corresponding recess or aperture of the piston.

The outer end of the shaft E carries a toothed wheel, *d*, which gears into a toothed wheel, *e*, that is mounted on a short transverse arbor, *f*, as shown in fig. 4.

The arbor *f* has its bearings in ears, *g*, that project from the upper end of the cylinder.

Upon the arbor *f* are mounted two ratchet-wheels, *g g*, which are revolved by pawls, *h h*, as hereinafter more fully described, so that, by their rotation, the shaft E may be also turned to revolve the piston, piston-rod, and drill.

The last-named three parts are, while being thus turned, free to move longitudinally on the squared part of the shaft E.

Upon the cylinder A is secured another smaller cylinder, F, which contains, also, a packed piston, G, on a piston-rod, H.

The lower part of the piston-rod H passes through a packing-box, *i*, while that portion *l* which projects from the upper face of the piston fits tight into a smaller portion of the cylinder F, as shown.

There are two ports or apertures, *j* and *k*, cut through the upper part *l* of the piston G, as shown.

When the two aforesaid pistons B G are in the highest position, as in fig. 1, and when, then, the compressed air is allowed to enter the smaller cylinder F, through a pipe, *m*, fig. 3, such air will pass through the aperture *j* and through a port, *n*, into the large cylinder, pushing the piston B downward and forward. After the piston B has been thus moved a certain distance, it will lay open the port *o*, through which the air will pass into the small cylinder, directly ahead of the piston G, pushing the same also downward; thereby the other aperture *k* is brought in line with a discharge-opening, *p*, in the small cylinder, allowing the air formerly applied to the moving of the piston to escape. Thereby the compressed air which was admitted into the lower part of the large cylinder, through the opening channel *r*, is allowed to force the piston B upward again.

The surface against which the air, pressing upward, acts, is smaller on account of the thickness of the piston-rod C, than that against which the air acts while pressing such piston down. The air in the lower part of the cylinder can, therefore, not prevent the downward passage of the piston.

When the piston B, during its upward motion, has cleared the port *s*, the air enters also the lower end of the small cylinder, and forces the piston G upward until the aperture *j* is again in line with the port *n*. The downward motion of the pistons is then again resumed, as aforesaid.

The pawls *h* are pivoted to the upper end of the rod *l*, and serve to convert the reciprocating motion of said rod into rotary motion of the arbor *f*, shaft E, piston-rod C, and drill D. The latter is thus revolved, and, by the motion of the piston B, also moved back and forth.

A click, *t*, on the tube F, holds the wheels *g* from turning backward.

The apparatus above described is, by a dovetailed projection, *u*, fastened to a block, I, which slides on

a frame, J, being moved therefrom by means of a crank and screw, V, as indicated in fig. 6.

The frame J is supported by one or more extension-legs, L, and held in any suitable position by means of a projecting pointed arm, *w*.

By this construction of frame, the drill can be held in any desired position and direction for operation.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

The improved drill, formed by the combination of the cylinders A and F, pistons B G, and their rods C H, the piston-rod *l*, (with its ports *j k*,) the pawls *h*, ratchet-wheels *g*, bevel-gears *d e*, shafts *f* and E, when said parts are constructed and arranged as shown and described.

The above specification of my invention signed by me this 7th day of December, 1869.

HERMANN OSTERKAMP.

Witnesses:

CHARLES HABER,

ANDREAS HUTH.