

(No Model.)

H. H. BEACH & B. W. ARNOLD.

STEAM MINING DRILL.

No. 245,433.

Patented Aug. 9, 1881.

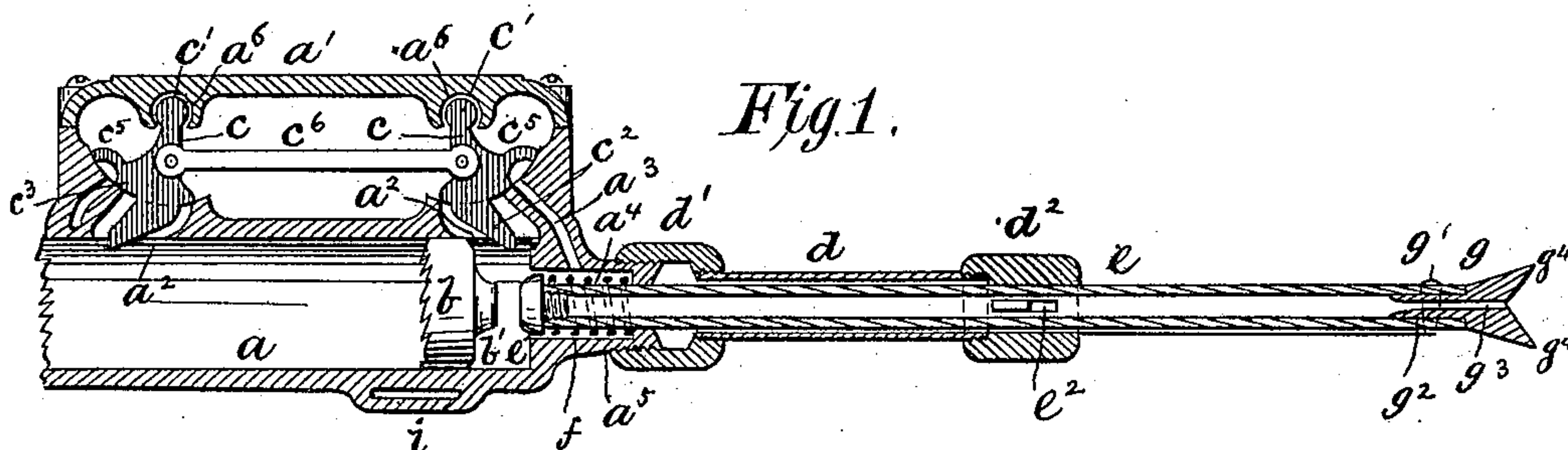


Fig. 2.

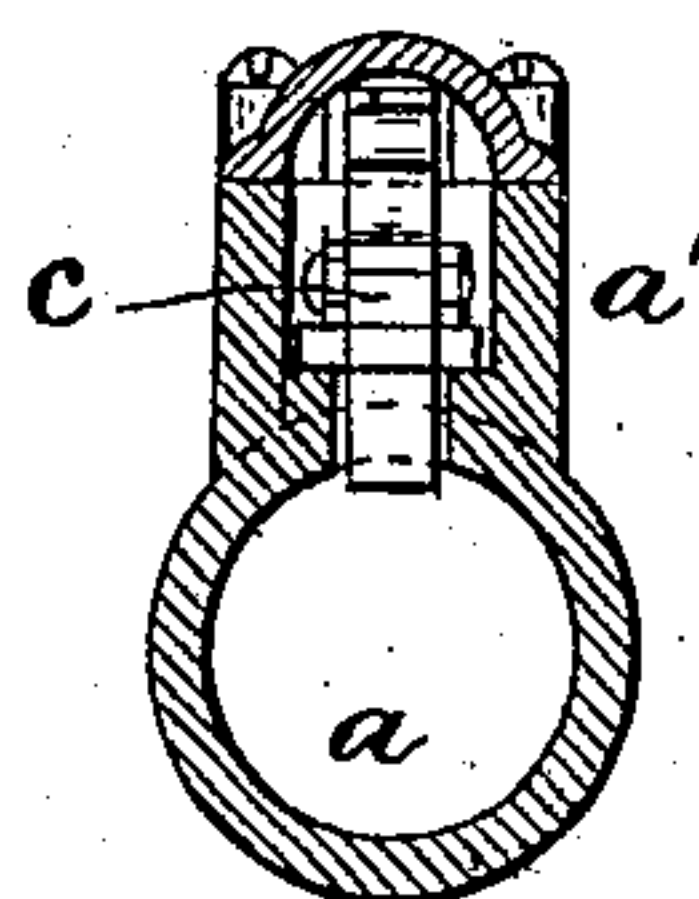


Fig. 3.

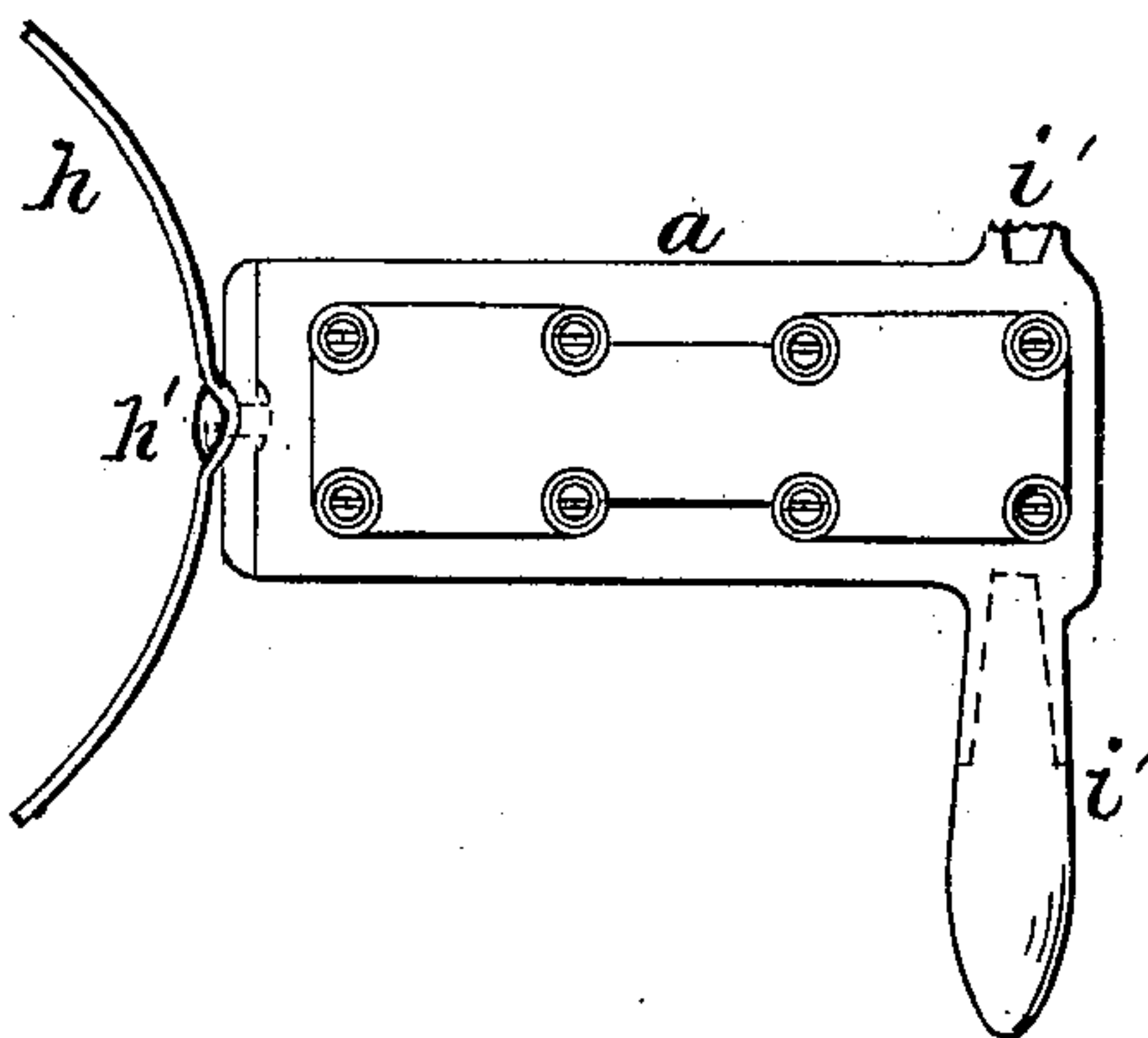


Fig. 4.

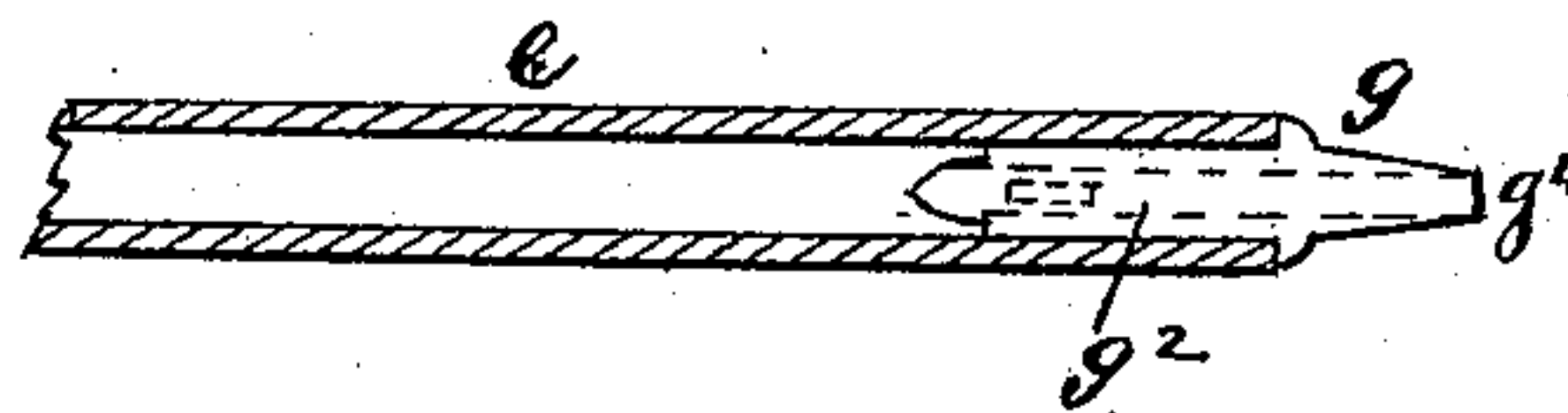
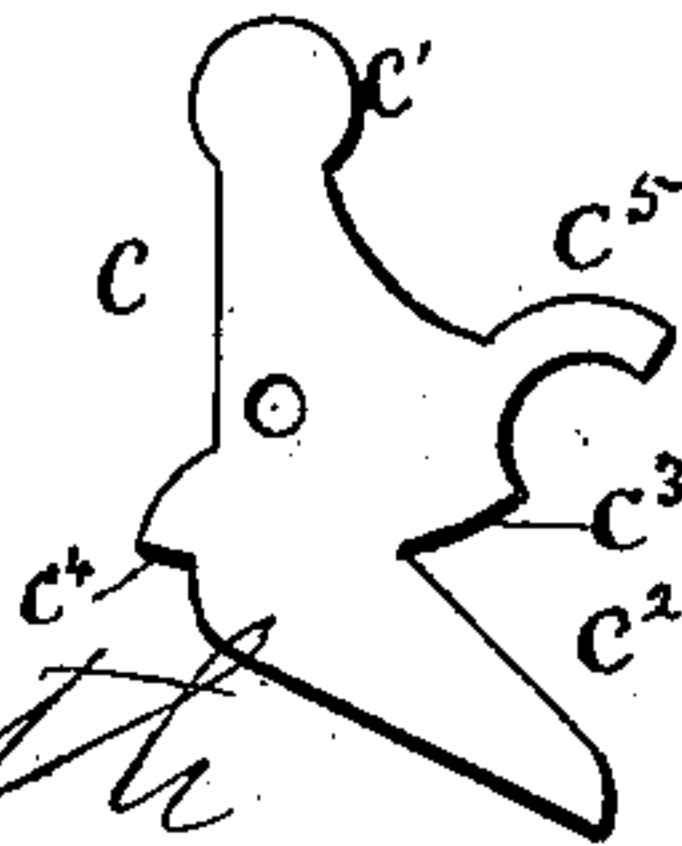


Fig. 5.



Witnesses!

M. M. Lucas

Richard Smith

Inventor

Henry H. Beach
Bernard W. Arnold

By R. S. & A. Lacey Attys:

UNITED STATES PATENT OFFICE.

HENRY H. BEACH AND BERNARD W. ARNOLD, OF LITCHFIELD, ILLINOIS.

STEAM MINING-DRILL.

SPECIFICATION forming part of Letters Patent No. 245,433, dated August 9, 1881.

Application filed May 14, 1881. (No model.)

To all whom it may concern:

Be it known that we, HENRY H. BEACH and BERNARD W. ARNOLD, citizens of the United States, residing at Litchfield, in the county of Montgomery and State of Illinois, have invented certain new and useful Improvements in Mining-Drills; and we do hereby 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 letters or figures of reference marked thereon, which form a part of this specification.

This invention has for its object to furnish a hand mining-drill to be operated by air or steam, and in which the difficulties attending the use of ordinary drills are overcome.

It consists in the construction of the tool-stock and piston or hammer in separate pieces, in the peculiar form of valve with lever-arm, and in other mechanism, all of which will be hereinafter fully explained, and pointed out in the claims.

In the drawings, Figure 1 is a vertical longitudinal section of a drill made according to our invention. Fig. 2 is a cross-section of the cylinder and steam-chest. Fig. 3 is a side view of the cylinder and breast-plate. Fig. 4 is a detail view of the tool-stock, and Fig. 5 shows one of the valves.

a is the cylinder, in which is placed the piston or hammer b . a' is the steam or air chest formed on the side of, and having openings a^2 through which the valve-levers project into the cylinder. The steam or air chest is provided with the necessary inlet and exhaust ports. The exhaust-port a^3 opens into the chamber a^4 , in which the head of the tool-stock is placed.

The valves c are of peculiar form and arrangement. Each one is provided with a ball or head, c' , and is suspended in a socket, a^6 , in the side of the steam or air chest so that it swings freely to and fro. Each has an extension or lever arm, c^2 , which extends through the opening a^2 into the cylinder, so that it will be struck by the end of the hammer b . It is provided with the curved bearings $c^3 c^4$, which are seated on the side of the chest, and with an arm, c^5 , which curves over the inlet or exhaust ports and opens the latter. The valves

are moved to and fro by the blow of the hammer on the lever-arms c^2 . The two valves are connected together by the coupling-bar c^6 , so that they are moved simultaneously. The hammer b , when making the blow on the drill, strikes the lever-arm of the valve nearest the tool-stock and opens the ports, so that the steam or air enters the cylinder and drives the hammer to the opposite end, where it strikes the lever-arm of the valve at the opposite or outer end and opens the reverse ports, and the steam or air enters and again drives the hammer against the head of the tool-stock.

The hammer b is made of any suitable material, and has a nose or projection, b' , which strikes the head of the tool-stock.

The cylinder has formed on it a nipple or extension, a^5 , on which is cut a thread, to which is connected a hollow arm or shaft, d , having a stuffing-box, d' , at its inner end, and a guide-nut or head, d^2 , at its outer end.

e is the hollow tool or bit stock placed in the arm d . On its inner end there is placed a head, e' , which projects a little ways into the cylinder and receives the blow from the extension b' of the hammer b . The head e' fits snugly to the contour of and slides back and forth in the chamber a^4 . The tool-stock is thrown back, after having been driven outward by the blow of the hammer, by a spring, f , coiled around its end and bearing against the head e' and the end wall of the chamber a^4 . The inner end of the tool-stock is provided with suitable openings, so that the exhaust steam or air from exhaust-port a^3 enters and passes through to the outer end thereof. The stock, at the point where it rests in the guide-nut d^2 , is provided with a feather, e^2 , which fits into a groove in the guide-nut and limits its inward movement when thrown back by the spring f .

g is the tool or drill bit. It is constructed with a shank, g' , which slides into the end of the tool-stock, where it is held by a key, g^2 , or other suitable fastening. It is made with a longitudinal opening, g^3 , for the escape of steam or air from the tool-stock.

h is the curved breast-plate, which is to be placed against the breast of the operator. It is held to the end of the cylinder by a bolt, h' , so that it turns freely thereon.

i is a loop formed on the side of the cylinder,

in which to put a strap for holding the device, and *i'* are the handles by which the drill is turned part round to give effectiveness to the bit in cutting the hole into the mineral.

5 In the construction of this device the drill or tool stock is detached from the hammer or piston. This is done to relieve the operation from the shock of the hammer.

In drills where the tool-stock and hammer 10 are connected together the return-stroke of the hammer gives a shock which is impossible for the operator to long endure. This is overcome in our device. Less power is required to throw the hammer back and less to stop it and drive 15 it forward.

This device is intended more particularly for mining coal, and to take the place of the pick in making in-bearings.

The exhaust at the rear end is it at the side 20 of the chest, while at the forward or drill end the exhaust passes through the tool-stock *e* and bit *g*, and passes out laterally between the points *g*⁴ *g*⁴ of the latter, and blows the dust away from the drill.

25 Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination, substantially as herein- 30 before set forth, of the cylinder *a*, provided with an extension, *a*⁵, containing chamber *a*⁴, the chest *a'*, the exhaust *a*³, leading directly from the chest *a'* into the chamber *a*⁴, the hollow stock *e*, provided with the head *e'*, placed within

the chamber *a*⁴ and between the end of the ex- 35 haust-port *a*³ and the inner end of the cylinder, and spring *f*, substantially as set forth.

2. The combination, with the swinging valves *c c*, pivoted in the chest *a'*, of the horizontal 40 bar or pitman *c*⁶, placed within the chest *a'* and having its ends pivoted to the valves *c c*, substantially as set forth.

3. The combination, with the cylinder hav- 45 ing a neck, *a*⁵, and chamber *a*⁴, of the arm *d*, provided with stuffing-box *d'* and guide-nut *d*², tool-stock *e*, provided on its inner end with a head, *e'*, fitting the chamber *a*⁴ and held in the arm *d* with a limited to-and-fro movement, and the spring *f*, substantially as set forth.

4. In a mining-drill operated by steam or air, 50 the valves *c c*, hinged by ball-and-socket joint to the side of the chest, and provided with lever-arms *c*², and curved bearing *c*³, to cover the exhaust-port, substantially as set forth.

5. In a hand mining-drill, the combination, 55 with the cylinder *a*, of the swiveled breast-plate *h*, arranged on the outer end, the handles *i'*, projecting laterally from the opposite end, and the loop *i*, arranged at the side, substantially as set forth.

In testimony whereof we affix our signatures 60 in presence of two witnesses.

HENRY H. BEACH.

BERNARD WELLS ARNOLD.

Witnesses:

JACOB T. MILES,
W. M. MARTIN.