

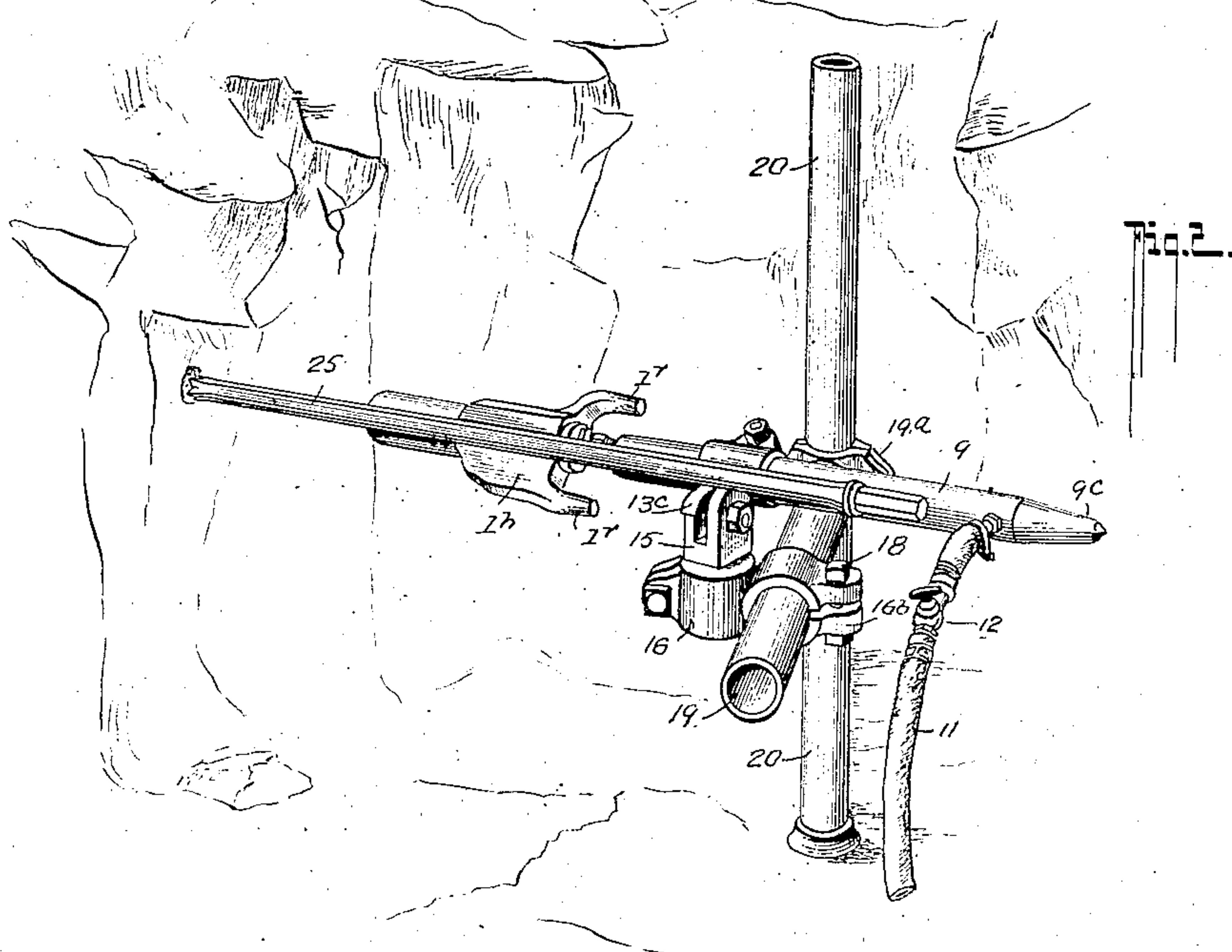
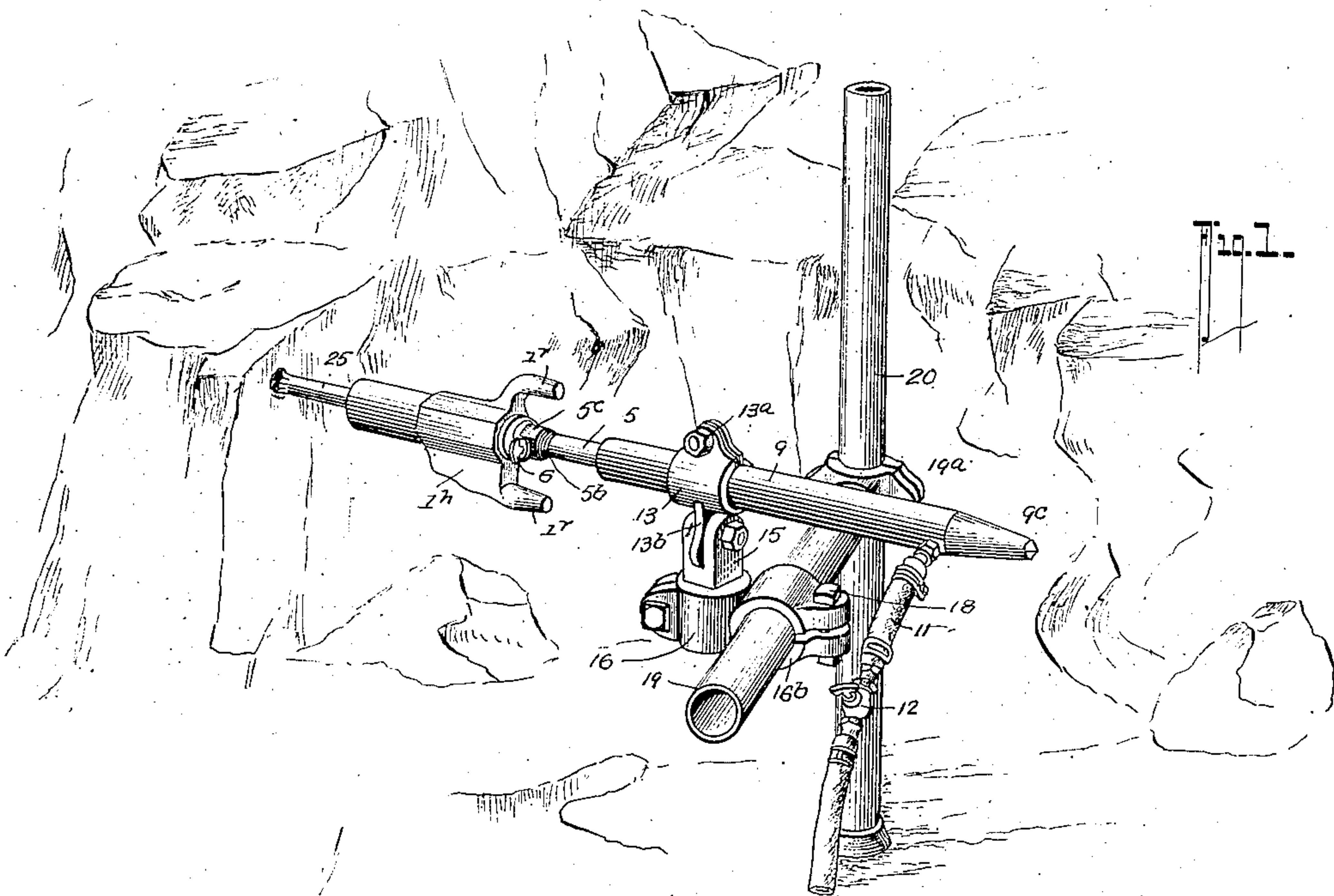
No. 835,261.

PATENTED NOV. 6, 1906.

C. J. SMITH.  
ROCK DRILL.

APPLICATION FILED AUG. 12, 1905.

2 SHEETS—SHEET 1.



WITNESSES:

John J. Schrott,  
May E. Immich

**INVENTOR**

Clark J. Smith

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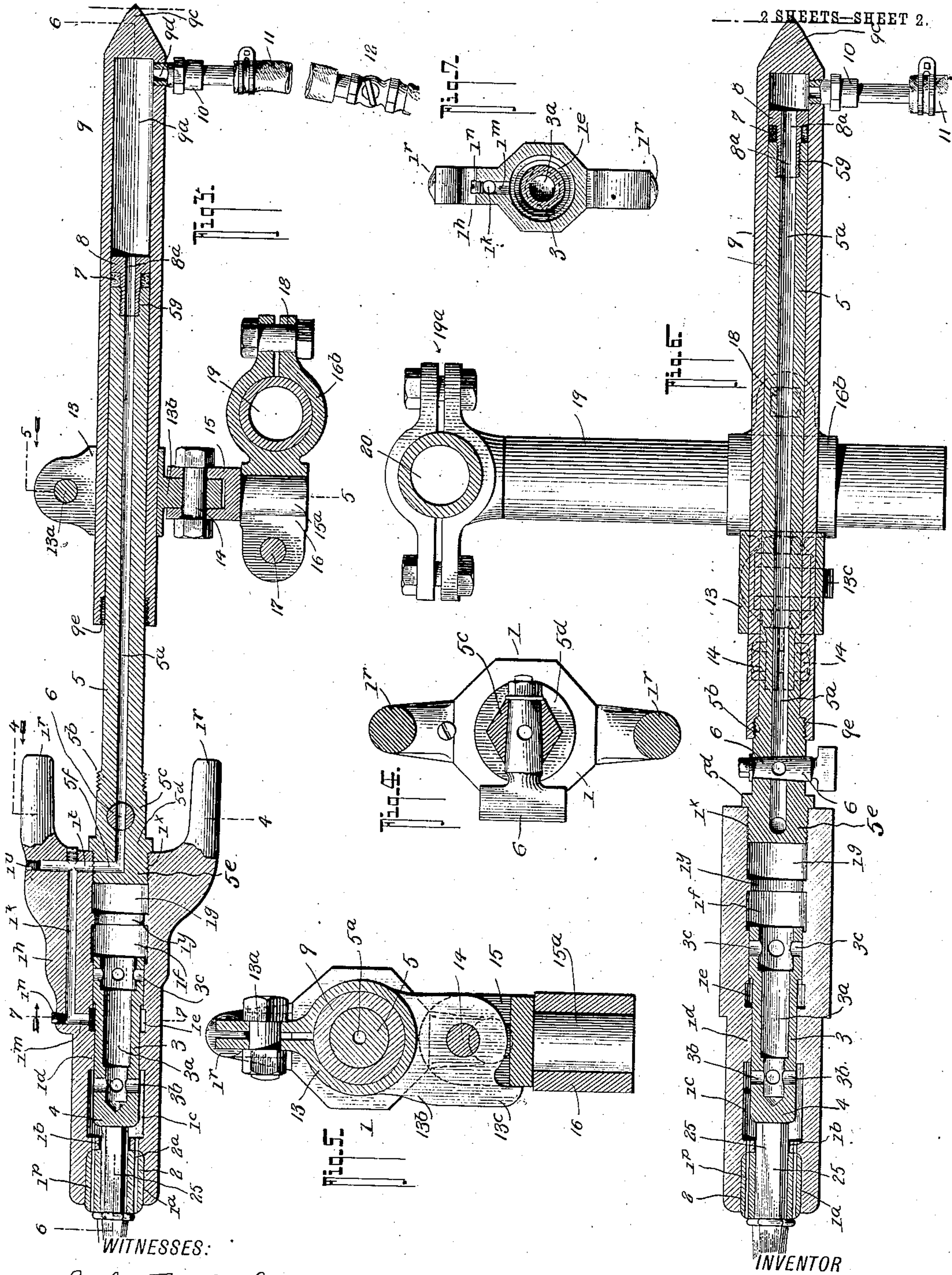


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# UNITED STATES PATENT OFFICE.

CLARK J. SMITH, OF OTTUMWA, IOWA, ASSIGNOR TO THE HARDSOCC  
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## ROCK-DRILL.

No. 835,261.

Specification of Letters Patent.

Patented Nov. 6, 1906.

Application filed August 12, 1905. Serial No. 273,930.

*To all whom it may concern:*

Be it known that I, CLARK J. SMITH, residing at Ottumwa, in the county of Wapello and State of Iowa, have invented certain new and useful Improvements in Rock-Drills, of which the following is a specification.

My invention relates to certain new and useful improvements in rock-drills; and it particularly has for its object to provide a drill of the pneumatic-drill type that can be operated either on a column, arm, post, or bar or can be used as an unmounted drill and operated by placing the butt-end thereof against some solid abutment—as, for instance, the side of a wall or roof or anything that is solid enough to support it in the position desired to drill, or the drill can be used as a hand-drill unmounted, if desired.

My invention has for its object to provide a drill of this character of a very simple and effective construction which can be easily and cheaply manufactured and which will readily and effectively serve its intended purposes and in which the parts are so constructed and arranged as to be readily separated or assembled for cleaning purposes or replacing worn parts.

In its generic nature my invention comprises a hammer-casing, a pneumatic hammer reciprocally mounted therein, a drill-holding chuck held by the casing for receiving the drill, a pair of arms integrally formed with a casing by means of which the same can be turned on its axial line, a piston secured to the hammer-casing and forming a closure for one end thereof, which piston has a valve-controlled passage longitudinally there-through which is in communication with the interior of the hammer-casing, a casing for the piston in which the piston has longitudinal movement and an air-pipe connection, means for admitting working agent into the piston-casing, and means for locking the piston and piston-casing together at times.

Again, my invention seeks to provide an improved mount for the drill so arranged that the operative mechanism of the drill can be swung clear of the drill when it is desired to change drills.

With other objects in view than have heretofore been enumerated the invention also comprises certain novel construction, operation, combination, and arrangement of parts,

all of which will be first described in detail and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view showing my invention as applied for use. Fig. 2 is a similar view showing the position of the parts just after the mechanism has been swung clear of the drill and after pulling the drill out of the hole to change drills. Fig. 3 is a vertical central longitudinal section of my invention. Fig. 4 is a cross-section on the line 4 4 of Fig. 3. Fig. 5 is a similar view on the line 5 5 of Fig. 3. Fig. 6 is a horizontal section on the line 6 6 of Fig. 3, showing the piston and piston-casing locked together. Fig. 7 is a detail cross-section on the line 7 7 of Fig. 3.

Referring now to the accompanying drawings, in which like numerals of reference indicate like parts in all of the figures, 1 designates the hammer-casing, which is provided with a central bore including a chuck-receiving portion 1<sup>a</sup> to receive the drill-chuck 2, an internal rib 1<sup>b</sup> 1<sup>d</sup>, and internal annular channels 1<sup>c</sup> 1<sup>e</sup> 1<sup>f</sup> 1<sup>g</sup>, the channels 1<sup>f</sup> 1<sup>g</sup> being separated by supplemental internal annular ribs 1<sup>v</sup>, as shown. The hammer-casing also is provided with a pair of handle members 1<sup>r</sup> 1<sup>r</sup>, integrally formed therewith, and an enlarged rib portion 1<sup>h</sup>, formed with an internal bore 1<sup>k</sup>, which merges with the cross-bore 1<sup>m</sup>, that communicates with the chamber 1<sup>o</sup>, a closure-plug 1<sup>n</sup> being provided for the outer end of the bore 1<sup>m</sup>, as shown. The hammer-casing is also provided with a transverse bore 1<sup>t</sup>, that communicates with the bore 1<sup>k</sup>, and the bore 1<sup>t</sup> has its shoulder end closed by a screw-plug 1<sup>v</sup>.

The hammer 3 has the usual head 4 or internal annular chamber 3<sup>a</sup>, which has radial apertures at each end, numbered, respectively, 3<sup>b</sup> 3<sup>c</sup>, those 3<sup>b</sup> communicating with the chamber 1<sup>o</sup> when in the forward position of its movement and with the chamber 1<sup>o</sup> when in the rear position, while those 3<sup>c</sup> communicate with the chambers 1<sup>f</sup> 1<sup>g</sup> as the hammer moves toward the other limit of its movement.

The hammer-casing 1 at its rear end has its internal chamber provided with internal threads 1<sup>x</sup>, as shown, to receive the threaded head 5<sup>e</sup> of the piston 5, which is screw-threaded and has a shoulder 5<sup>d</sup> to abut the



casing 1, as shown. The piston 5 has a longitudinal bore 5<sup>a</sup> extending from end to end, the bore 5<sup>a</sup> being closed and out of communication with the chamber 1<sup>c</sup> of the casing 1 1 and merging with a transverse groove 5<sup>t</sup>, that communicates with the groove 1<sup>t</sup>, as shown. The piston 5 also has an enlarged squared or nut portion 5<sup>c</sup>, that is provided with a stop-cock 6, whereby the bore 5<sup>a</sup> can be cut off from communication with the hammer-casing, the nut portion 5<sup>c</sup> terminating at its juncture with the main piston 5 in the screw-threaded portion 5<sup>b</sup> for a purpose presently understood. At the free end the piston 5 receives a screw-plug 8, which has an annular central bore 8<sup>a</sup> communicating with the bore 5<sup>a</sup> of the piston 5 and screwed into said piston at 5<sup>c</sup>, as shown, a washer 7 being interposed between the head of the plug 8 and the piston 5, as clearly shown in Fig. 3.

9 designates the piston-casing, which is of tubular form to receive the piston 5, and the casing 9 has an internal annular threaded end 9<sup>a</sup> to cooperate with the threaded portion 5<sup>b</sup> of the piston 5 to lock the two together, as clearly shown in Fig. 6. The piston-casing 9 has an internal chamber 9<sup>a</sup> to receive the piston 5, which has an aperture 9<sup>d</sup> to receive the threaded connection 10 from the air-pipe 11, which air-pipe has a control-valve 12, as shown. The rear end of the casing 9 is formed with a center 9<sup>c</sup> to abut a fixed support when the drill is to be used unmounted.

13 designates a clamp screwed to the casing 9 by a bolt 13<sup>a</sup>, which clamp has a wing 13<sup>b</sup>, provided with a lug 13<sup>c</sup>, as shown, to be received between the ears 15 of the clamp member, to which it is secured by the bolt 14, as shown, the connection between the wing 13<sup>b</sup> and the clamp member 15 being such as to permit the clamp 13 being swung on the bolt 14 in one direction, as shown. The clamp 15 has a bearing portion 15<sup>a</sup> to fit into the socket portion of a clamp 16, which is held thereon by a bolt 17, as shown, and the clamp 16 is in the nature of a double clamp having a second clamping portion 16<sup>b</sup> at right angles to the clamping portion 16<sup>a</sup>, and the clamping portion 16<sup>b</sup> is clamped around the horizontal support 19 and held secured by a bolt 18, as shown. The support 19 is in turn secured to a vertical support 20 by a clamp 19<sup>a</sup>, as clearly shown in Figs. 1 and 2 of the drawings. The drill 25 is placed in the chuck 2, as shown, the chuck 2 and the annular flange 1<sup>b</sup> having alining apertures 1<sup>b</sup> 2<sup>a</sup> to permit passage of the working agent from the chamber 1<sup>c</sup>.

The manner in which my invention operates can be best explained as follows: The parts are assembled as shown in Fig. 1 and the stop-cock of the valve 12 is open, the valve 6 being closed, thus forcing the tool into tight engagement with the rock, and the apparatus is now ready to work. The opera-

tor next opens the valve 6 to permit the working agent entering the hammer-casing to reciprocate the hammer 3, the drill being turned the desired amount by means of the arms 1<sup>r</sup> 1<sup>r</sup>, and as the air-pressure in the chamber 9<sup>a</sup> is always present the piston 5 will be forced forward toward the work and the drill always kept in engagement with the work. As soon as it is desired to change drills the operator shuts off the valve 12 and leaves the valve 6 open. He can then pull the piston 5 back into the casing 9 and relieve the drill from the chuck 2, the apparatus being then swung on the pivot-bolt 16 in the position shown in Fig. 2, when the drill can be drawn out, as shown in Fig. 2. It is then only necessary to insert the longer drill into the hole and swing the apparatus back into position on the pivot-bolt 14, when a new drill can be placed into the chuck 2 and the drilling proceeded with, it being understood that by reason of the connection between the clamp 13 and the member 15 the drilling-machine will always be swung up in the same alinement with the hole regardless of how many changes of drills is made. When it is desired to use my invention as a hand-drill without a mount, the hammer or casing 9 is secured onto the piston 5. The drill then can be dismounted from the bearing 13 and used as a hand-drill. Also, if desired, the drill can be used by placing the screw 9<sup>c</sup> against a suitable back support and permitting the apparatus to work as before mentioned.

From the foregoing it will be seen that I have provided a very simple and effective form of drill that can be easily and quickly manipulated and will readily and effectively serve its intended purpose and in which means are provided for keeping the drill braced against the rock being drilled, while simultaneously supplying air to operate the hammer, and in which means are provided for swinging the drilling mechanism out of alinement with the hole when it is desired to change the drill, as shown in Fig. 2.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete operation, construction, and many advantages of my invention will be readily understood by those skilled in the art to which it appertains, and I desire to say that many slight changes in the detailed construction, arrangement, and combination of parts may be made without departing from the scope of the invention or the appended claims.

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

1. An apparatus of the class described, comprising a hammer-casing, a hammer reciprocally mounted therein, a drill-chuck at the front of the hammer-casing for receiving



the drill, a piston secured to the hammer-casing at the rear thereof, a piston-casing for receiving said piston, said piston having a longitudinal channel, said hammer-casing 5 having a channel communicating with the longitudinal channel of the piston and with the interior of the hammer-casing to operate the hammer, means formed integrally with the hammer-casing whereby the same can 10 be turned on its longitudinal axis, a control-valve carried by the piston for closing off its longitudinal channel, said piston and said piston-casing having interlocking screw portions, means for feeding working agent into 15 the piston-casing to operate the piston and the hammer, substantially as shown and described.

2. An apparatus of the class described, comprising a hammer-casing, and a hammer 20 reciprocally mounted therein, a piston secured to the hammer-casing, and projected rearwardly therefrom, a piston-casing for receiving said piston and means for forcing said piston forward to feed the drill and 25 simultaneously feeding working agent to the hammer-casing, and means for supporting said piston-casing, and means for swinging said piston-casing and its carried parts out of alinement with the drilled aperture at 30 times without changing the position of the

supporting means, substantially as shown and described.

3. An apparatus of the class described comprising a hammer-casing including an internal bore, a hammer-piston reciprocally mounted 35 therein, a drill-receiving chuck at the front end of the hammer-casing, a piston having a portion to fit into the rear end of said hammer-casing and having a screw connection therewith, said piston having a central longitudinal bore and a transverse bore, a valve 40 in said longitudinal bore for controlling the same, said hammer-casing having a pair of rearwardly-projecting arms whereby the same can be turned on its longitudinal axis, 45 and a channel communicating with the transverse channels of the piston and with the interior of the hammer-casing, for supplying working agent thereto, a piston-casing for receiving said piston, screw connections between said piston and said piston-casing 50 whereby they can be locked together at times, means for admitting working agent to the piston at the rear of the piston-casing, and means for supporting said piston-casing, 55 substantially as shown and described.

CLARK J. SMITH.

Witnesses:

ERNEST THORNTON,  
H. J. COOK.