

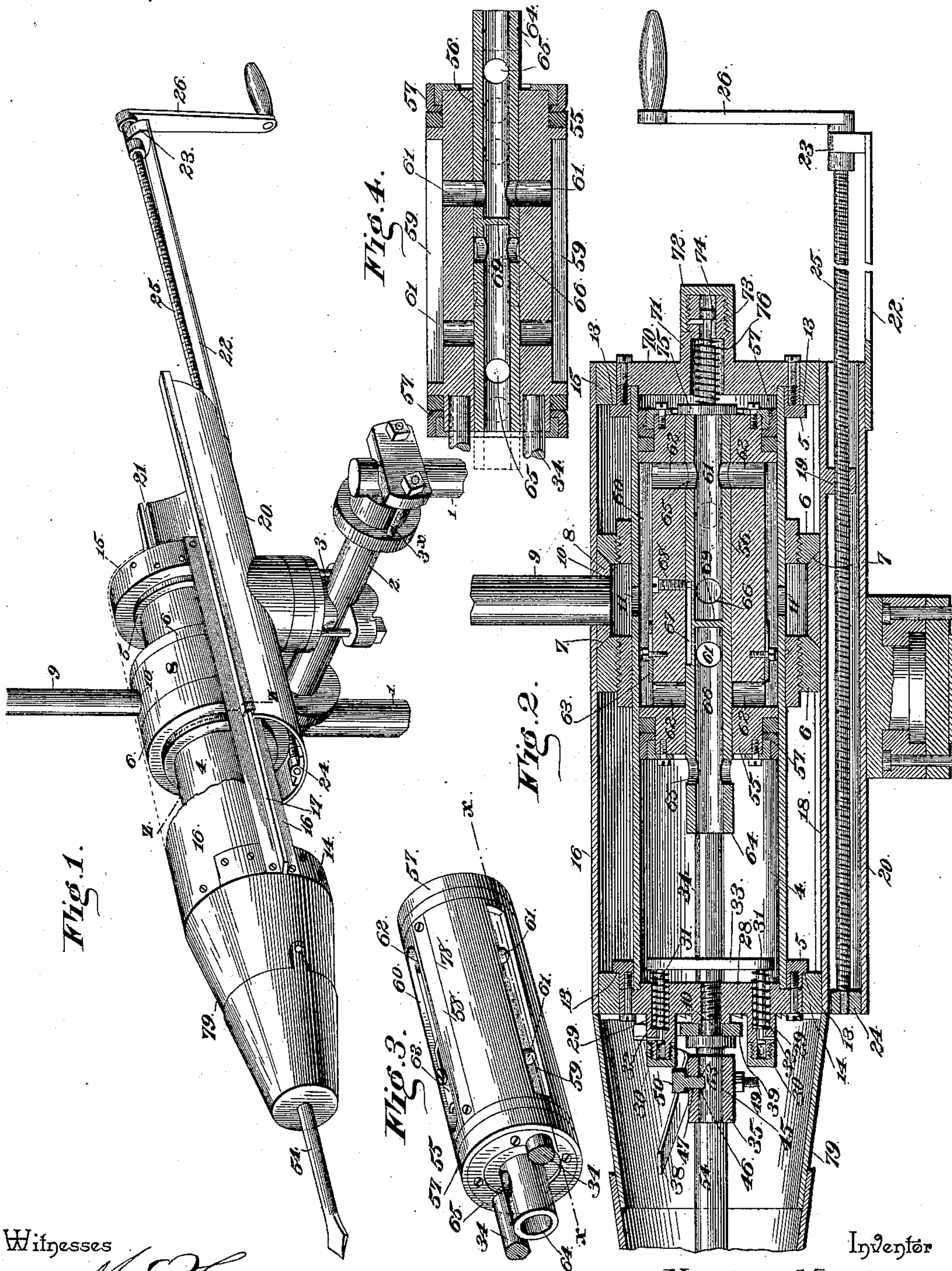
(No Model.)

2 Sheets—Sheet 1.

N. MONDAY.
ROCK DRILL.

No. 486,567.

Patented Nov. 22, 1892.



Witnesses

M. Fowler
Chas. B. Hyer

By his Attorneys,

C. A. Snow & Co.

Inventor

Newton Monday

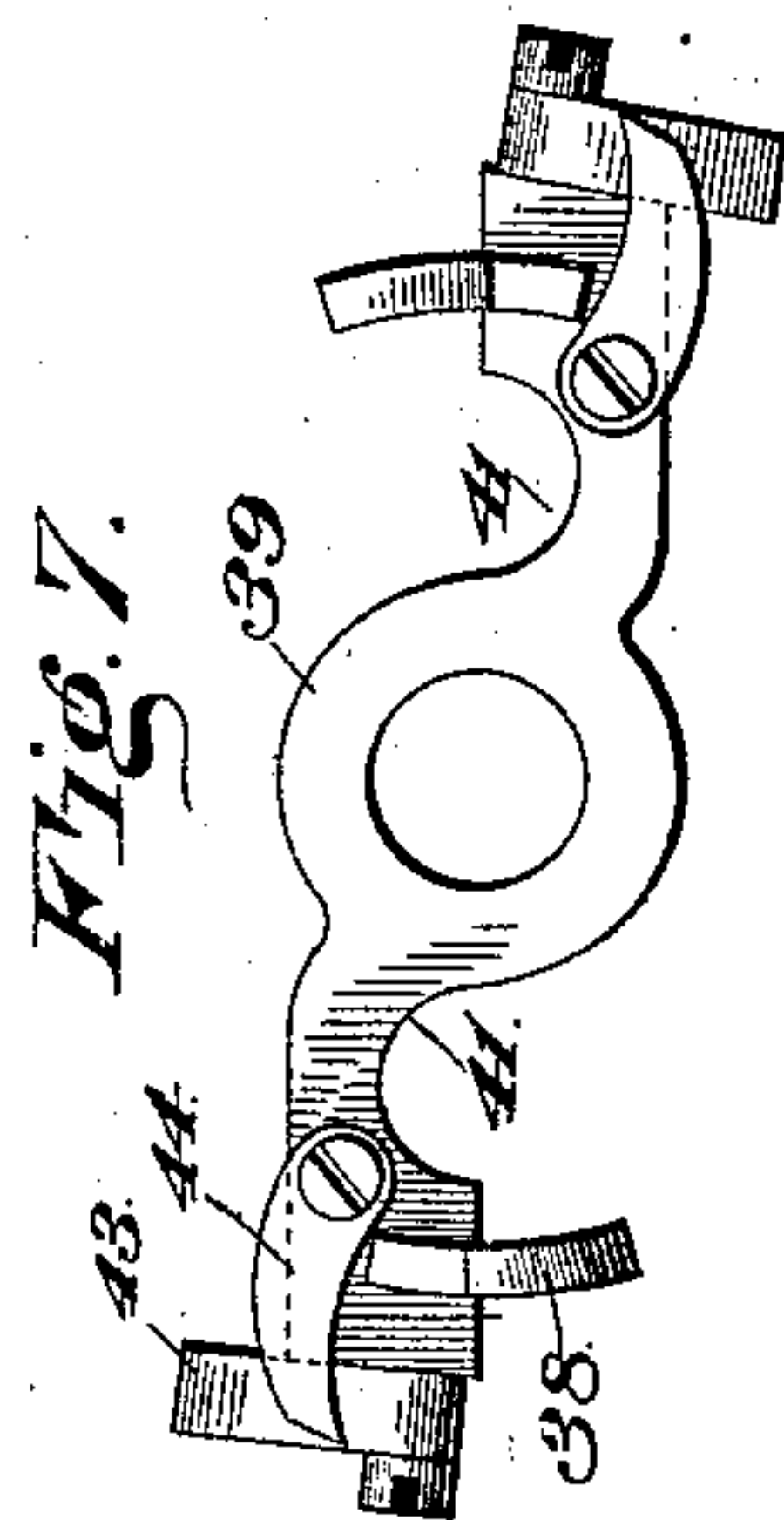
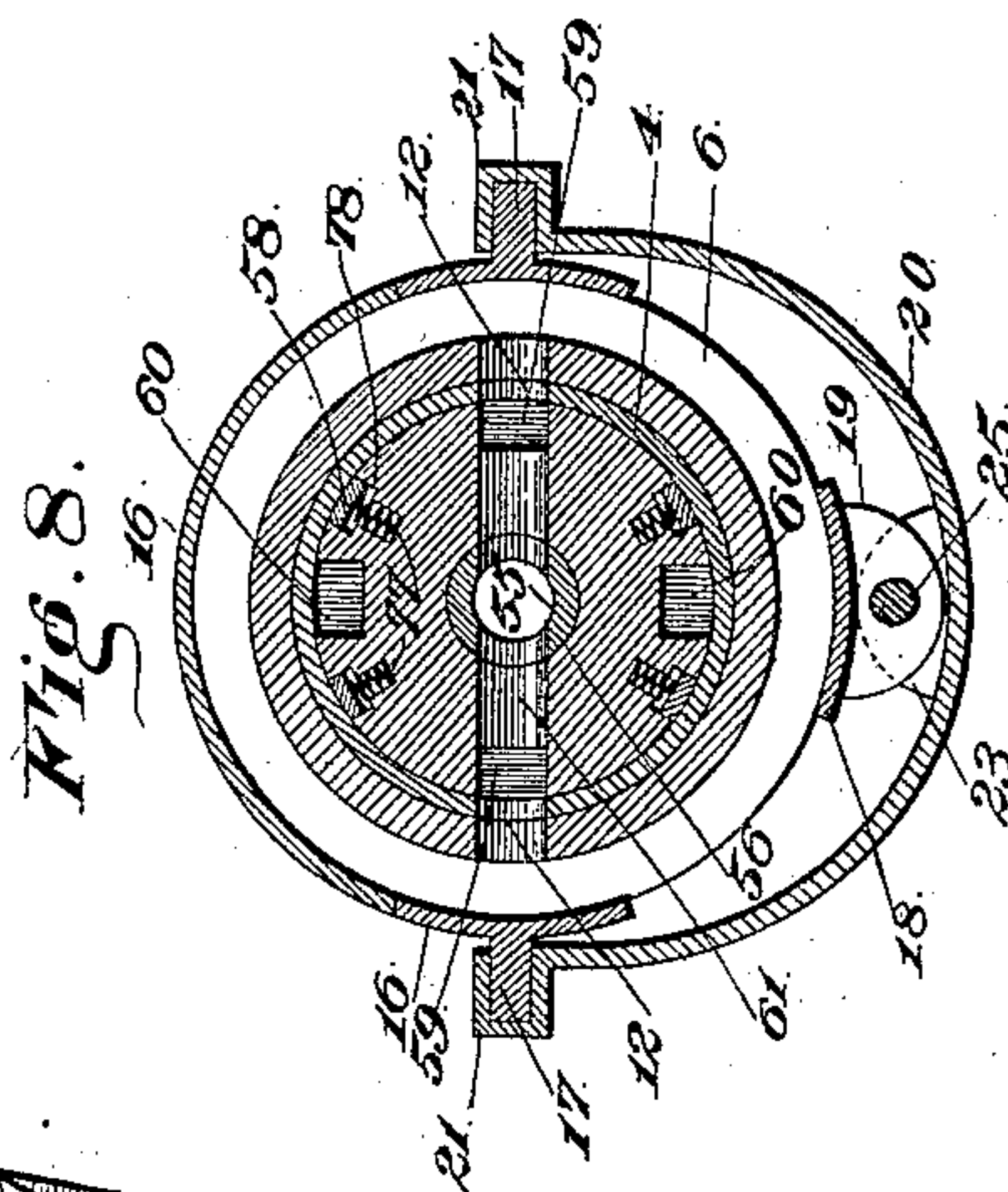
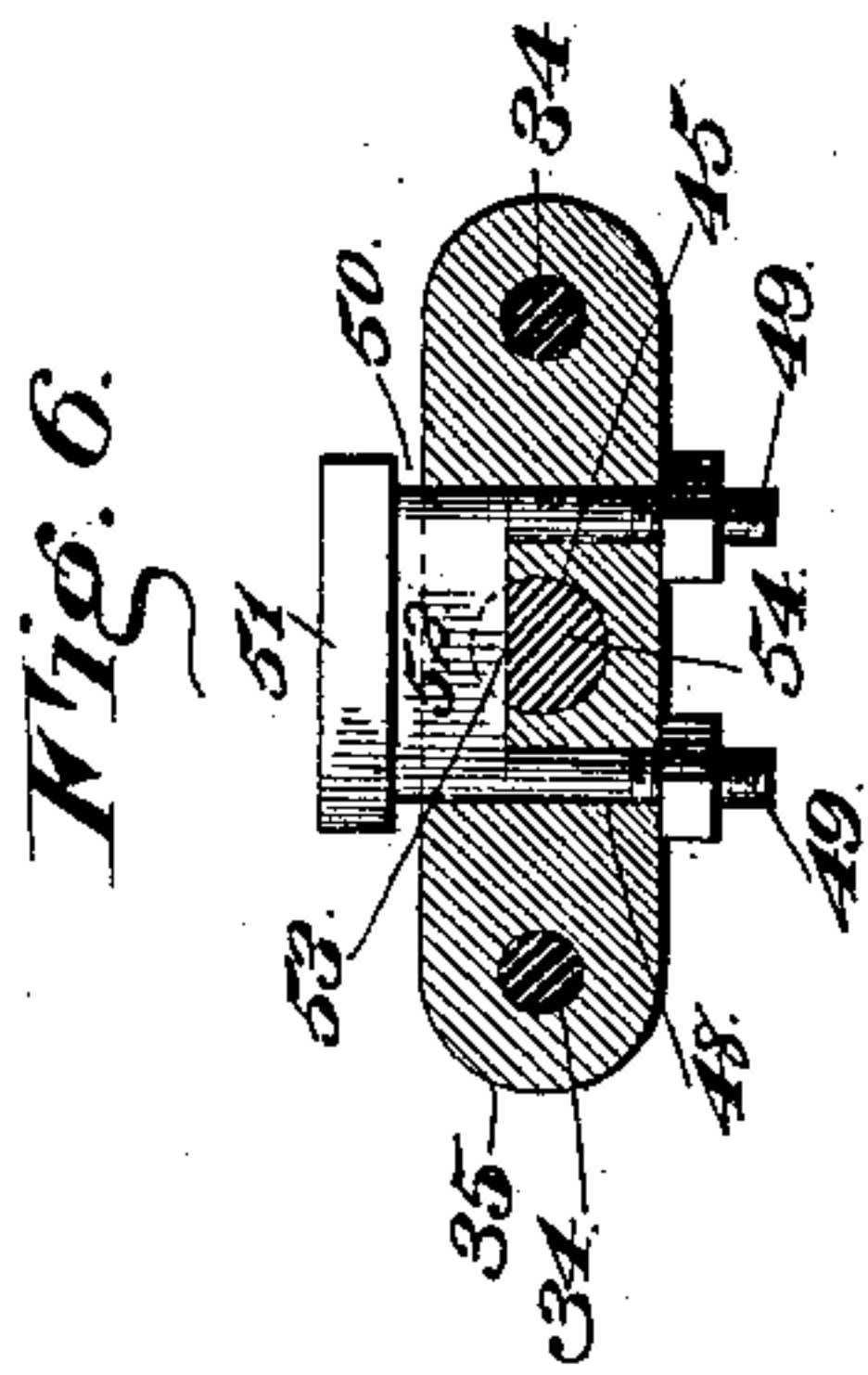
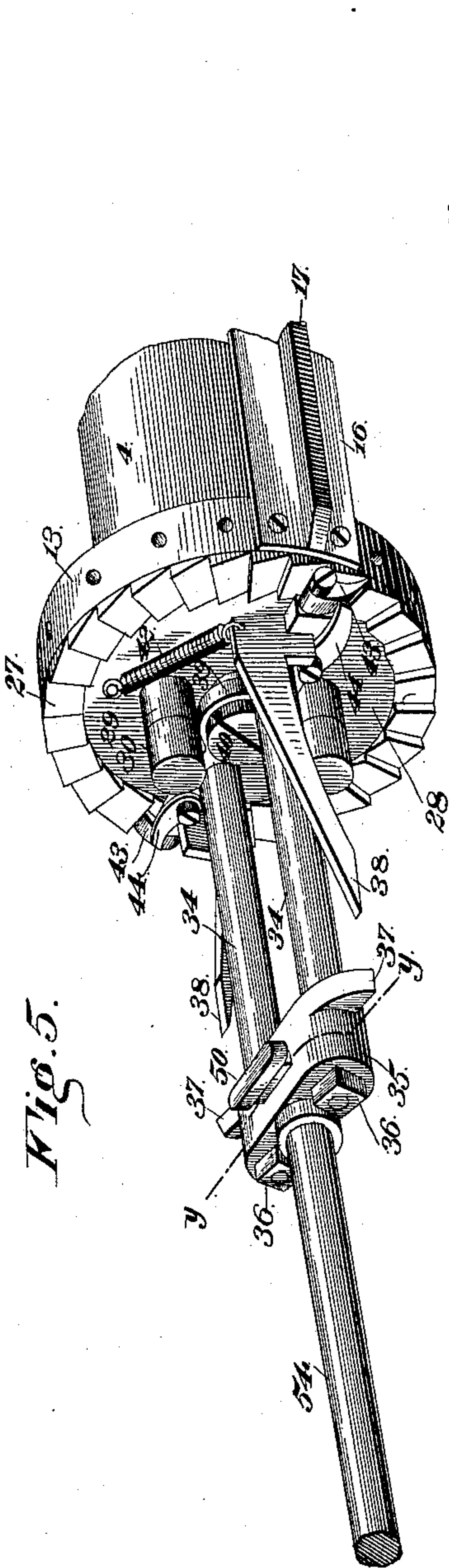
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UNITED STATES PATENT OFFICE.

NEWTON MONDAY, OF LATHROP, MISSOURI, ASSIGNOR OF ONE-HALF TO
JAMES M. O'CARR, OF SAME PLACE.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 486,567, dated November 22, 1892.

Application filed April 16, 1892. Serial No. 429,403. (No model.)

To all whom it may concern:

Be it known that I, NEWTON MONDAY, a citizen of the United States, residing at Lathrop, in the county of Clinton and State of Missouri, have invented a new and useful Rock-Drill, of which the following is a specification.

This invention relates to certain new and useful improvements in rock-drills; and it consists in the construction and arrangement of the parts thereof, as will be more fully hereinafter described and claimed.

The object of this invention is to provide simple and convenient means to facilitate the manipulation of a rock-drill and to so arrange the parts as to render them operative by pneumatic means.

In the drawings, Figure 1 is a perspective view of a rock-drill mounted on a portion of standards and showing a part of the casing removed, the same embodying the invention. Fig. 2 is a longitudinal vertical section taken centrally of the entire drill. Fig. 3 is a detail perspective view of the piston and its connections shown removed. Fig. 4 is a longitudinal vertical section on the line *x x*, Fig. 3, showing the valve dotted in several positions. Fig. 5 is a detail perspective view of a portion of the front end of the cylinder and the mechanism for operating the drill. Fig. 6 is a transverse section on the line *y y*, Fig. 5. Fig. 7 is a detail perspective view of one of the parts. Fig. 8 is a transverse section on the line *z z*, Fig. 1.

Similar numerals of reference indicate corresponding parts in the several views.

Referring to the drawings, the numeral 1 designates suitable standards or pillars of the mounting of the drill, having a cross-shaft 2, clamped to the upper end thereof, to which is secured a clamp 3, connected to part of the casing of the drill and by means of which the said drill may be adjusted at an angle or held stationary in horizontal position and is supported fixedly in either of said positions. The cross-shaft 2 has clamps 3^x at the ends thereof, which embrace the standards or pillars 1, to thereby provide means for adjusting the drill in a vertical plane and control its elevation.

The cylinder 4 consists of an integral casting having end heads or rings 5, projecting therefrom in the form of flanges, and interme-

diate collars 6, whose inner faces are beveled. These collars are screw-threaded and secured to flanges 7 7, formed integrally with the cylinder, and loosely receive a sleeve 8, which is air-tight in its connection, but has sufficient play to allow the said cylinder to rotate, while the said sleeve 8 remains stationary by virtue of the connection therewith of an air-feeding tube or pipe 9, fitted to an opening 10 in the said sleeve. Between the flanges 7 7 are air-ingress ports 11, and at the outer edges of the said flanges are located exhaust-ports 12. As the sleeve 8 is supported clear of the cylinder 4, a chamber is formed between the same and the said cylinder, which receives the air from the air tube or pipe 9, so that it may pass around said chamber and enter the ports 11. The ports 11 and 12 are not in alignment, and therefore engage different portions of the piston, as will be hereinafter referred to, at different times. The end heads or rings 5 of the cylinder are shouldered circumferentially, as at 13, and are rotatably fitted in rings 14 and 15, held in position on the said rings 5 by the dust-casing 16, which incloses this part of the drill, and also by guide-strips 16, having flanges 17 projecting at an angle therefrom. On the under side of the rings 14 and 15 is secured a strip or plate 18, which has a lug 19 projecting therefrom and provided with a screw-opening extending through the same. The flanges 17 are engaged by a carrier 20, having its edges formed with guideways 21 and an extension 22 projecting from one end thereof, having a lug 23 thereon, provided with a plain opening extending horizontally through the same. The opposite end of the carrier also has a lug 24 connected thereto and provided with a horizontally-disposed plain opening. The lugs 19, 23, and 24 are normally arranged in alignment, so that the screw-openings thereof may be properly centered with relation to each other, and therein is mounted an adjusting-screw 25, which is formed with left threads and provided with a crank or handle 26 for operating the same. By this means the drill body or cylinder and its attachments may be adjusted to and from the work operated upon thereby. The lug 23 on the extension 22 forms a swivel for the

end of the guide-screw 25 to assist in its proper operation of moving the cylinder or body of the drill, as will be readily understood. The clamp 3 is connected to the carrier 20, and thereby a fixed support is sustained.

The ring 14 has an annular rack-plate 27 connected thereto, whose teeth are arranged in such manner as to have the shoulders thereof in radial lines to a common center, and within the end of the cylinder 4, to which the annular rack-plate is secured, is attached a head 28, having nipples 29, projecting therefrom and provided with caps 30. Within the nipples 29 are mounted pins or rods 31, encircled by coiled springs 32, the said pins or rods 31 being secured to a cushion-plate 33, extending transversely across the inner side of the head 28 and at a distance therefrom. Projecting through suitable openings in the head 28 are parallel bars 34, which are secured to the piston at their inner ends and have a cross-head 35, connected to the outer ends of the same by suitable nuts 36, engaging screw ends of the said bars 34. Projecting from opposite sides of the said cross-head 35 at the inner portion thereof are lugs 37, which have oppositely-disposed cam-faces and adapted to be engaged by guides 38, obliquely arranged on opposite edges of a swinging or movable plate 39, carried by a stud 40, centrally secured to the head 28 between the openings through which the bars 34 extend. This swinging or movable plate is formed with recesses 41 in opposite edges thereof, adapted to partially take over the bars 34, and by this means a limit of movement for the said plate is provided to in a measure counteract the effect of a retractile spring 42, secured to one edge of said plate. The opposite ends of the plate 39 have pawls 43 secured thereto, engaged by springs 44, which normally press the said pawls downward. The said pawls 43 engage the rack-plate 27, and thereby hold the drill in its adjusted position. The cross-head 35 is formed with a tubular opening 45, a portion of whose walls, as at 46, are cut away by the formation of a transverse opening 47, extending inward from the side of the cross-head, the said transverse opening having end continuations in the form of apertures, as at 48, for the reception of legs 49 of a key 50. The said key 50 has a flanged head 51 and a web 52, extending across the same between the legs thereof and which takes into the cut-away portion of the walls of the tubular opening 45 and into a shouldered recess 53 in the stock 54 of the drill, which is removably fitted in the said tubular opening and held in position by the said key. The legs 49 are screw-threaded and extend through the cross-head 35 to receive nuts for clamping the key in connected position.

A revolving cylindrical piston 55 is provided and formed with a central tubular opening 56, extending longitudinally therethrough; also, the said cylinder is provided with suit-

able end packings 57, which may be applied thereto in any preferred manner. Along the outer portion of the body of the piston are secured yielding metallic packings 58, and between the said packings are grooves 59 and 60, extending longitudinally of the piston. The grooves 59 have openings or ports 61, extending from the inner or base portions thereof through the said piston and are arranged at a distance from the ends of the said grooves. The grooves 60 have ports 62, extending inward through the piston therefrom and are located directly in the ends of the said grooves. The openings 62, which form ports, have a portion thereof provided with slides 63, adjustable thereover and located in the grooves 60, and by means of which the size of the said ports 62 may be adjusted to regulate the air on the back or lift motion of the machine. Within the said piston is mounted a tubular elongated valve 64, whose opposite ends are open and have ports 65 extending through the same adjacent to the ends thereof and a pair of ports 66 intermediate of said end ports 65 and extending transversely through the valve 64 at right angles to the ports 65. In the top portion of the valve 64 is a groove or recess 67, which is engaged by the end of a pin or screw 68, extending through the piston to thereby hold the valve intact with the piston, but at the same time allow proper and required movement thereof. Between the ports 66 is a partition or web 69, which divides said ports from each other, and also divides the ports 65 and arranges one set of ports 65 and 66 at one end of the valve separate and apart from a similar set at the opposite end of said valve. The rear end of the cylinder 4 is provided with a head 70, having a tube 71 integrally formed therewith, which is screw-threaded to receive a cap 72. An opening 73 is formed in the said head 70, and therein is mounted the spindle 74, which holds the valve-stop 75, the said spindle or rod 74 being seated movably in the tube 71 and surrounded by a rebound-spring 76.

The metallic packings 58 are normally pressed outward by springs 77, seated under the same in the piston, the said packings being mounted in grooves 78, and the said springs located in said grooves at the base thereof. The packings are constructed of thin metallic strips and secured at their opposite ends only, and the said springs 77 are located intermediate of the ends of the packings in order to permit an outward extension of the same to produce a tight fitting within the cylinder 4.

Over the end of the cylinder and covering the ratchet-and-pawl mechanism, together with the guides, as heretofore set forth, and a portion of the drill-stock, is a conical-shaped dust-casing 79, which prevents the dust from the rock being drilled from entering the said mechanism and clogging the parts. This casing is removable to permit manipulation of the mechanisms which it covers.

The operation of the drill is as follows:

The air is forced in through the tube or pipe 9 under pressure and through the ingress-ports 11 to the piston and the valve in said piston. The valve when in dead-center with- in the piston, closes all the ports of said piston. When the said valve is moved to the left until the opening or port 62 at the right is opened, the exhaust-ports 61 at the left are then simultaneously opened. When the said valve is moved to the right, the port 62 at the left is opened and the exhaust-ports 61 at the right simultaneously opened, as in the instance just mentioned. In operating the several ports to open the same all of them are closed before opening in either movement of the valve. The movement of the valve is regulated by the recess 67 therein, which is engaged by the pin or screw 68, and when the end wall at opposite portions of said recess is engaged by the pin or screw 68 the opening operation of the ports just described is obtained. The air, entering the port 62 at the left, forces the piston forward, carrying therewith the drill through the medium of the connecting-bars heretofore set forth. When the piston reaches the front portion of the cylinder, the end of the valve which is projecting from the end of the piston strikes the cushion-plate 33 and is driven backward, thereby shutting off the air for feed and opening the exhaust, and from the rebound the piston is driven backward in the cylinder and the rear end of the valve strikes the valve-stop 75 and is forced forward in the said piston, thereby opening up the exhaust at the front of said piston, as well as opening the rear ingress-port. This operation becomes continuous and the piston moves backward and forward in the cylinder. During this operation the exhaust-air escapes through ports 12, and the drill-stock, as well as the drill carried thereby, is rotated by means of the guides and ratchet-and-pawl mechanism, heretofore set forth. It will be observed that this rotation of the drill-stock and drill is automatic and is effective in obtaining quick work or drilling action.

It will be understood that suitable packings will be inserted and fixed at all necessary points in order that an air-tight construction of the parts may be obtained. It will be further understood that suitable valves will be used in connection with the air tube or pipe in order that the supply of air may be made regulable.

Having thus described the invention, what is claimed as new is—

1. In a rock-drill, a rotatable cylinder, a piston mounted in said cylinder, a valve in said piston, a rock-drill secured to said piston, and means for automatically holding the said drill in its adjusted position, the said parts being operated by pneumatic pressure, substantially as described.

2. In a rock-drill adapted to be operated by pneumatic pressure, the combination of a rotatable cylinder having flanges thereon and

ingress and exhaust ports therein, rings on said flanges having inner beveled faces, a sleeve embracing said rings and having an opening therein, an air-tube fitted to said sleeve over the opening thereof, a piston in said cylinder having a drill connected to the same, a valve in said piston, and means for sustaining the rotative adjustment of the drill, substantially as described.

3. In a rock-drill, the combination of a cylinder, a carrier in which said cylinder is adjustably fitted, having a clamp connected thereto, a cross shaft or bar to which said clamp is adjustably fitted, and standards or mountings to which the ends of said cross-bar are adjustably connected, substantially as described.

4. In a rock-drill, the combination of a cylinder and a dust-casing therefor which has a conical front portion which is removably fitted to the body of said casing, substantially as described.

5. In a rock-drill, the combination of a cylinder, a piston in said cylinder, bars or rods connected to said piston and extending through the head of said cylinder, a cross-head on said bars or rods, and a drill-stock connected to said cross-head, substantially as described.

6. In a rock-drill, the combination of a cylinder having an annular rack-plate secured to the front head thereof, a piston mounted in said cylinder and having parallel bars secured thereto, a swinging or movable plate engaging said bars and carrying pawls at the opposite ends thereof, guides projecting upward from said plate, a cross-head on said bars having lateral projections, and a drill removably carried by said cross-head, substantially as described.

7. In a rock-drill, the combination of a cylinder, a piston movably mounted in said cylinder, an annular rack-plate secured to the front end of the cylinder, bars secured to the piston and extending through the head of the cylinder, a swinging or movable plate attached to a stud centrally located in the said head of the cylinder and having pawls at the opposite ends thereof and recesses to partially take over the said bars, a spring connected to said swinging or movable plate, guides projecting upward from said plate in reverse planes, a cross-head secured to said bars and having lateral projections to engage said guides, and a drill connected to said cross-head, substantially as described.

8. In a rock-drill, the combination of a cylinder, a piston movably mounted in said cylinder and containing a valve, a cross-head connected to said piston, having a tubular opening therein and intersected by a transverse opening, a drill-stock having a recess with a shoulder and fitted into said tubular opening, and a key extending through the transverse opening of said cross-head and engaging in the recess of the drill-stock, substantially as described.

9. In a rock-drill, the combination of a cylinder, a piston therein having grooves with ports at the ends thereof and slides adjustably fitted over a portion of said ports and
5 other grooves with ports inside of the ends of the same, and a valve in said piston, the drill being connected directly to said piston, substantially as described.

10. In a rock-drill, the combination of a cylinder, a piston therein having suitable ports,
10 a tubular valve longitudinally movable in said piston and provided with a dividing partition or web and a recess or groove in the upper portion thereof, a pin projecting through said
15 piston and engaging said recess to limit the movement of the valve, said valve being provided with ports, as set forth, and a drill connected to said piston, substantially as described.

11. In a rock-drill, the combination of a cylinder, a piston movably mounted in said cylinder and having a drill connected thereto, said piston being formed with grooves and ports, as set forth, a longitudinally-movable
20 divided tubular valve having ports therein
25 at right angles to each other, and valve-stops or cushion-plates arranged at opposite ends of said cylinder, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as
30 my own I have hereto affixed my signature in the presence of two witnesses.

NEWTON MONDAY.

Witnesses:

GEO. ECKERT,
W. K. MARET.