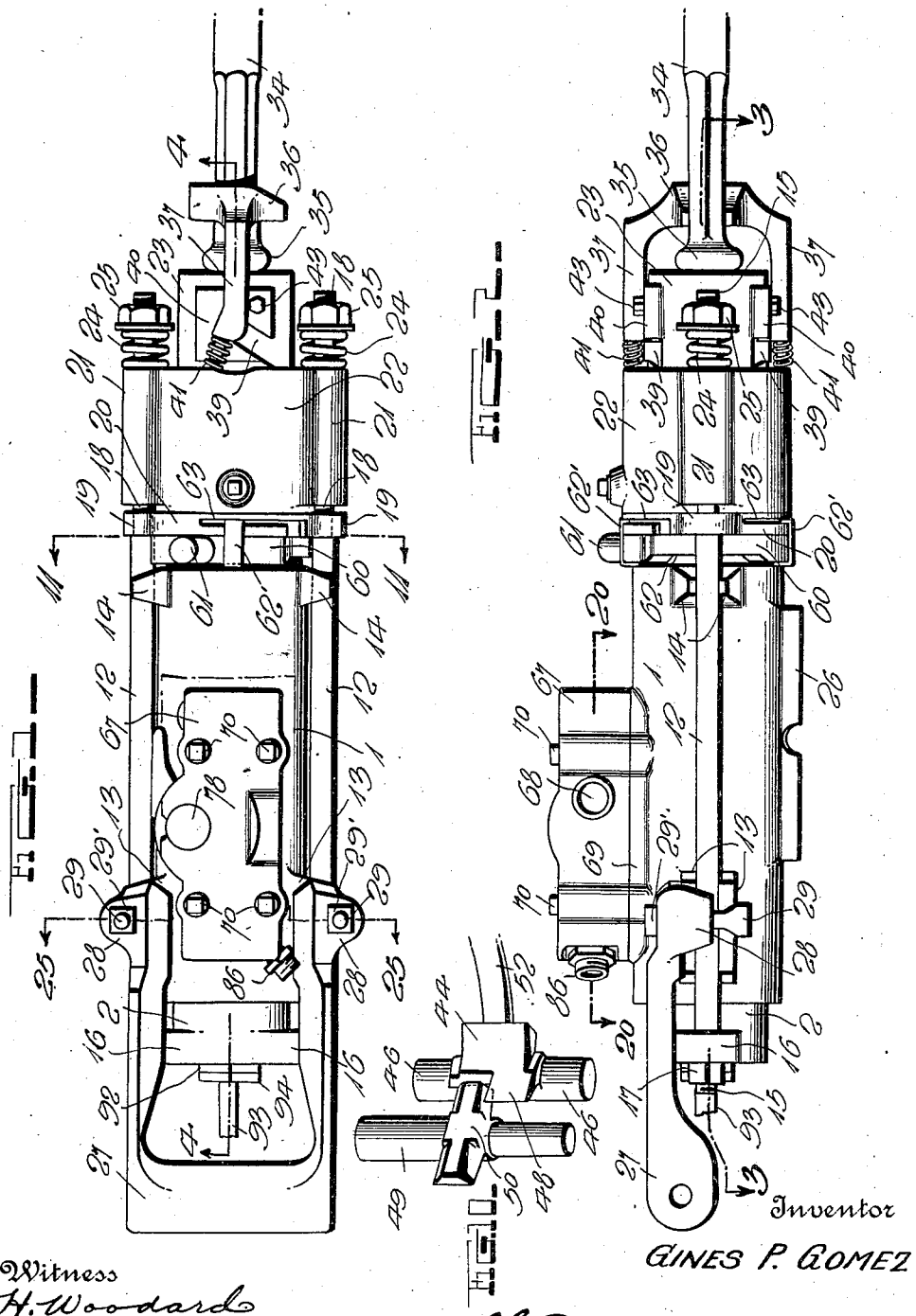
Oct. 9, 1923. 1,470,074

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COMPRESSED AIR DRILL

Filed April 17, 1922 6 Sheets-Sheet 1



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COMPRESSED AIR DRILL

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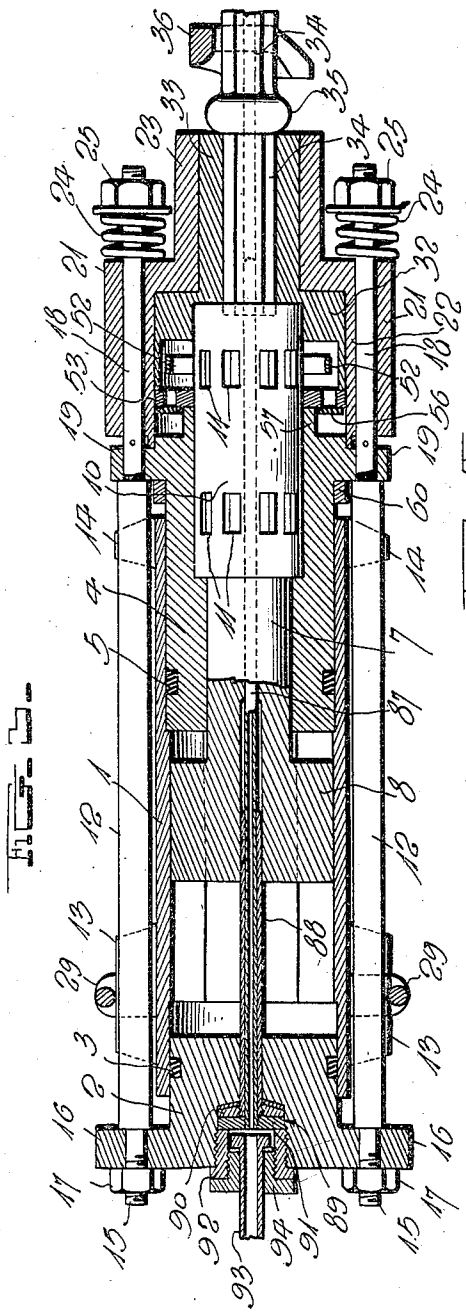


Fig. 5.

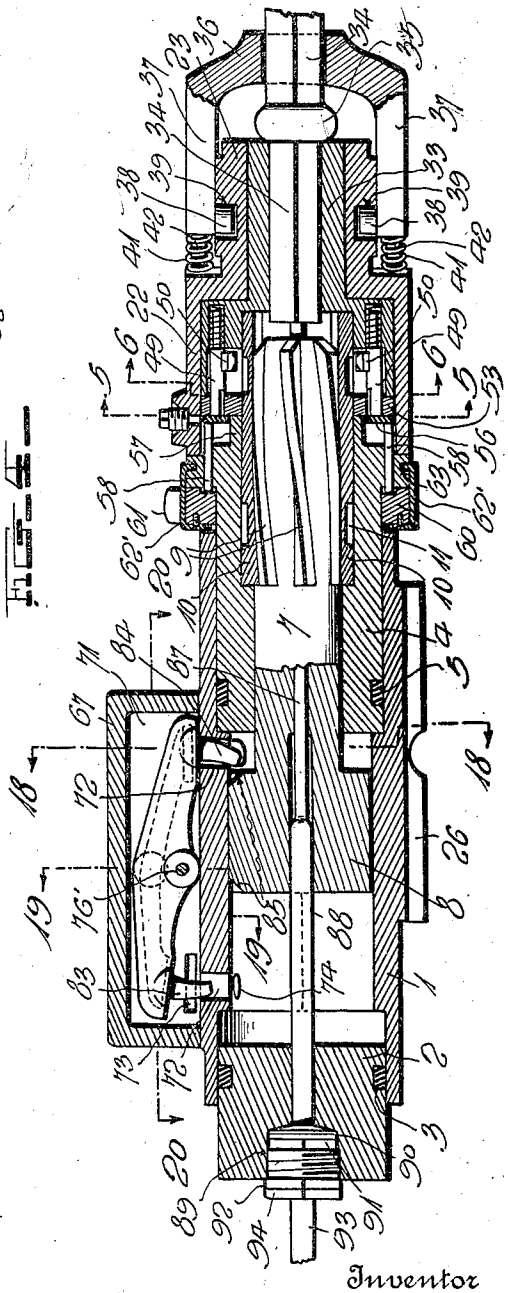


Fig. 4.

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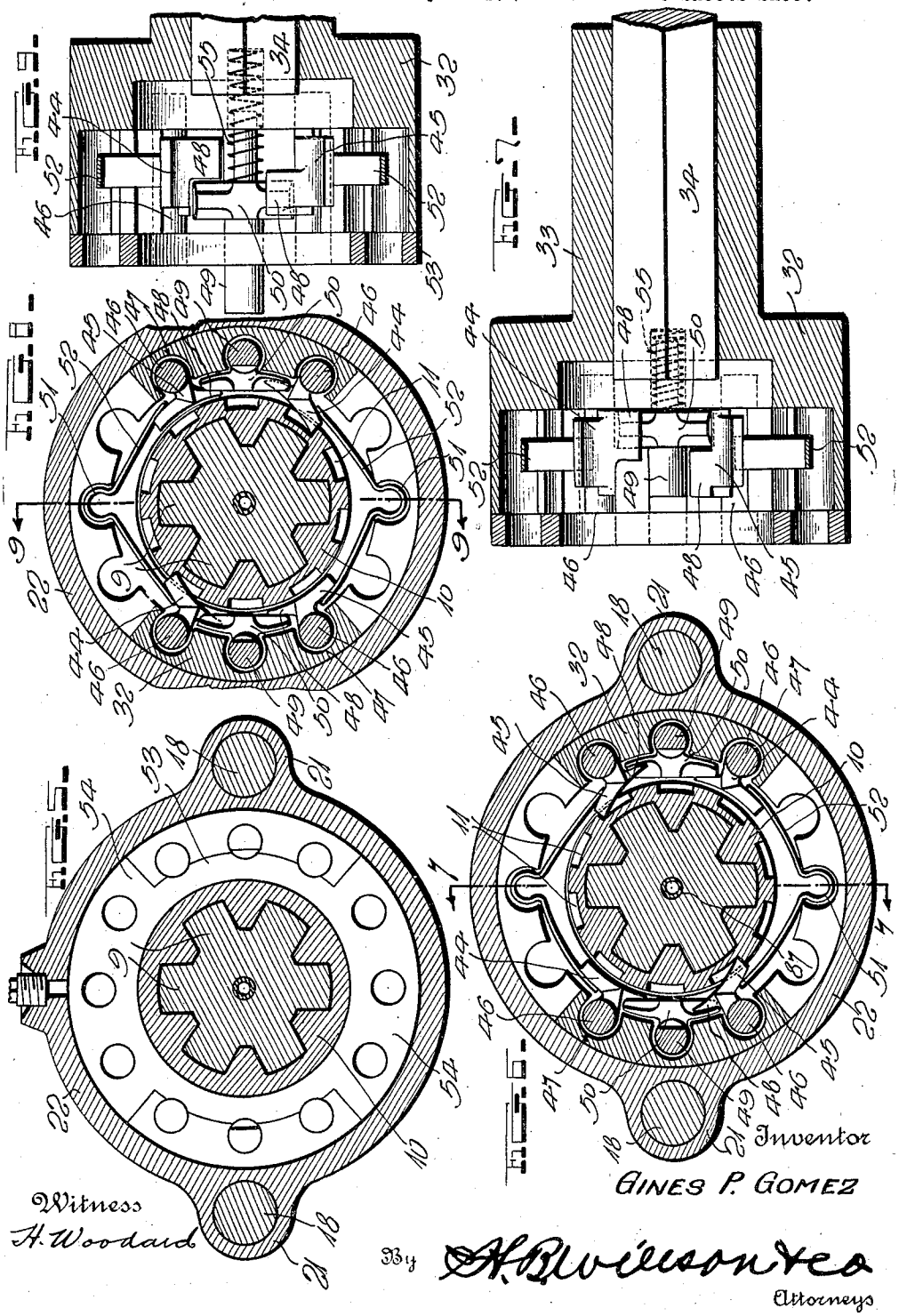
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COMPRESSED AIR DRILL

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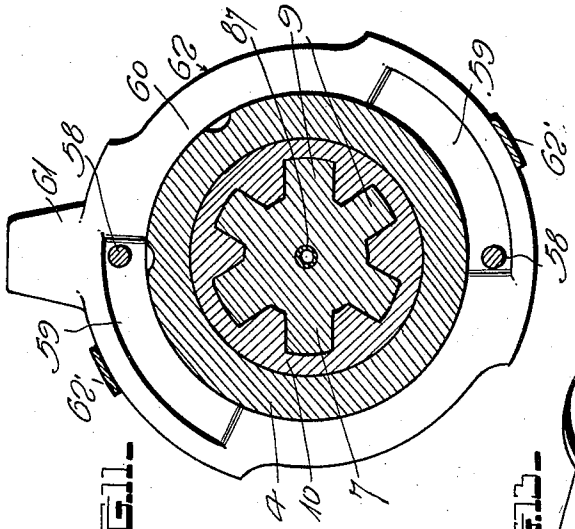


FIG. 1.

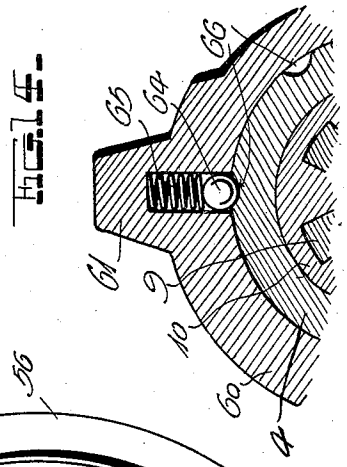


FIG. 4.

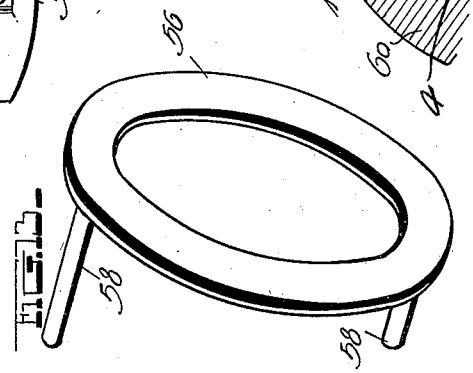


FIG. 3.

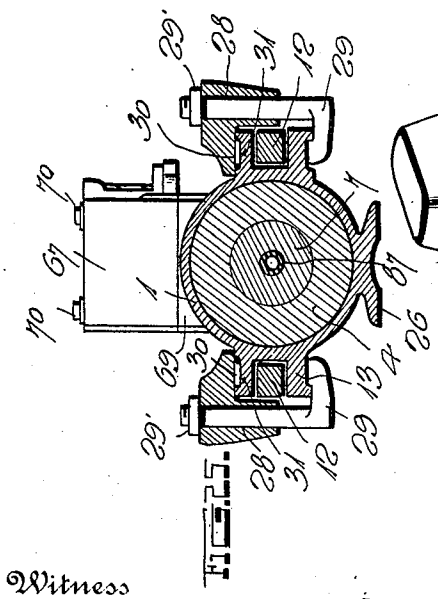


FIG. 5.

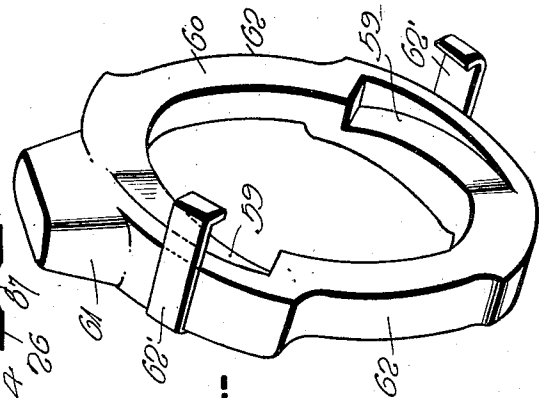


FIG. 2.

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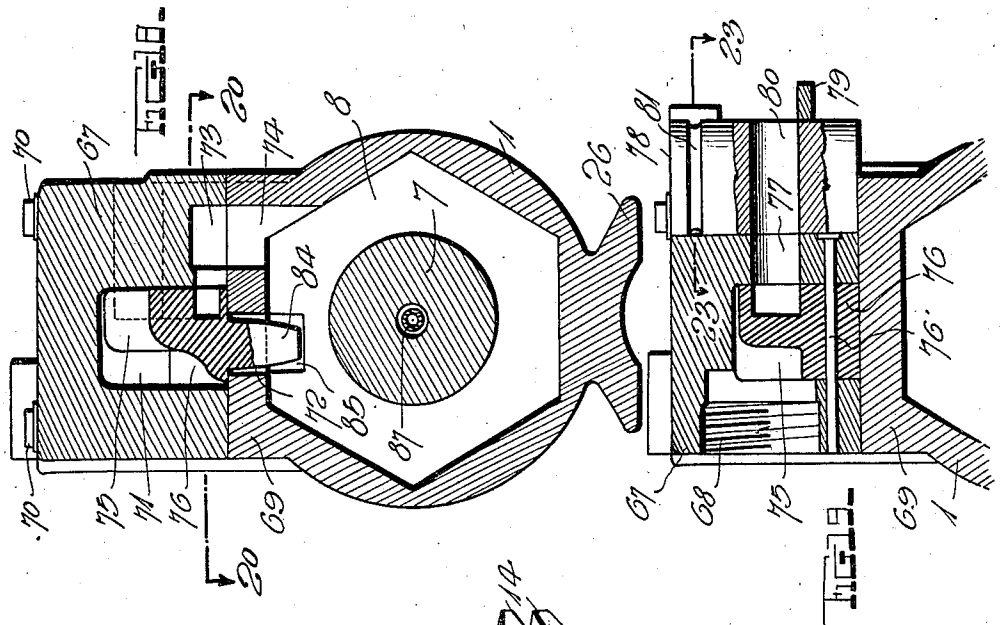
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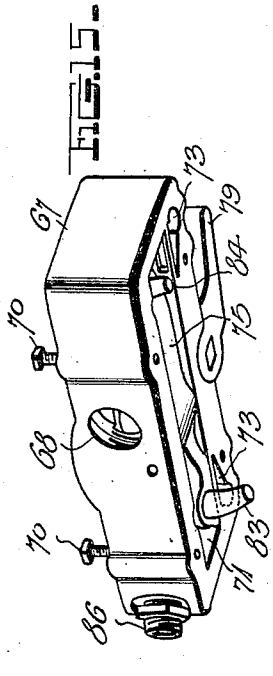
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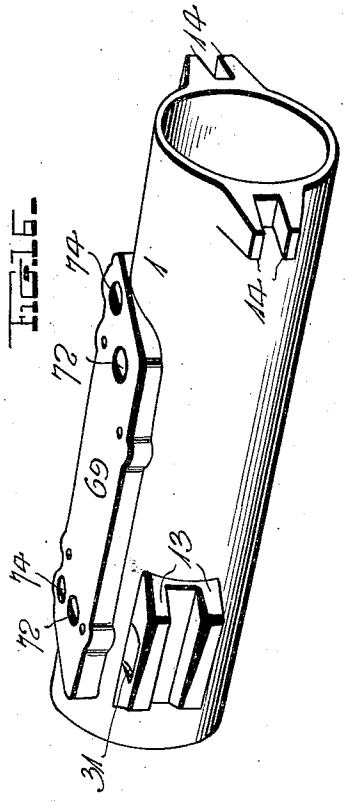
G. P. GOMEZ

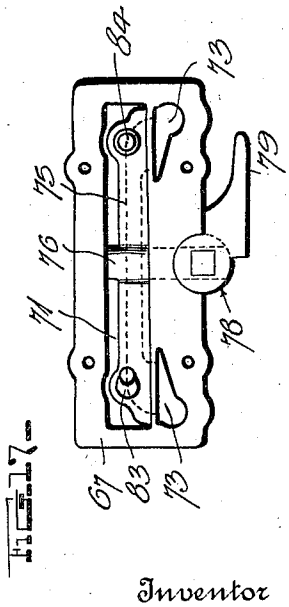
COMPRESSED AIR DRILL

Filed April 17, 1922 6 Sheets-Sheet 5









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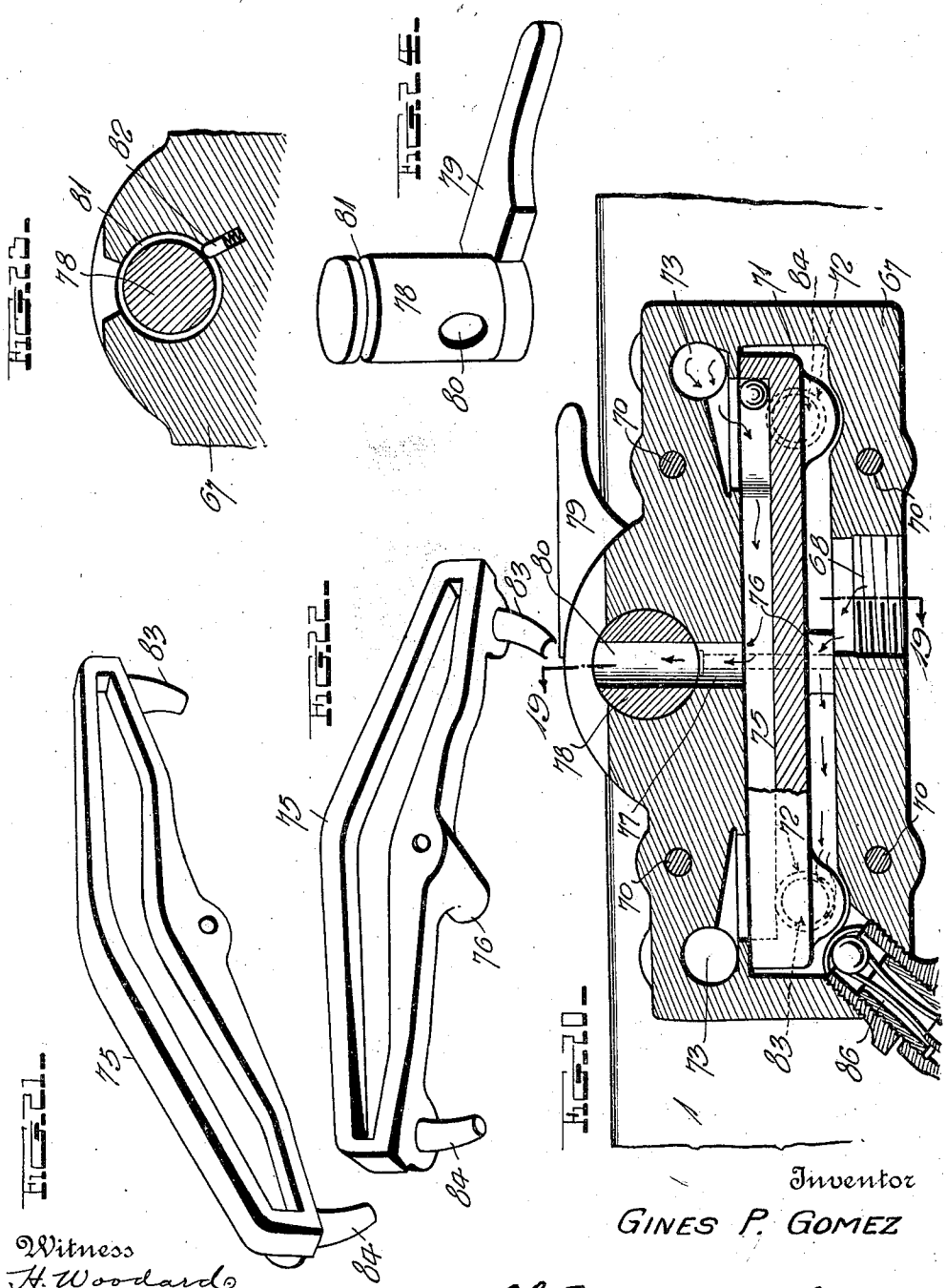
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COMPRESSED AIR DRILL

Filed April 17, 1922. 6 Sheets-Sheet 6



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Patented Oct. 9, 1923. 1,470,074

UNITED STATES PATENT OFFICE.

GINES PEREZ GOMEZ, OF MIAMI, ARIZONA.

COMPRESSED-AIR DRILL.

Application filed April 17, 1922. Serial No. 553,731.

To all whom it may concern:

Be it known that I, GINES P. GOMEZ, a subject of the King of Spain, residing at Miami, in the county of Gila and State of Arizona, have invented certain new and useful Improvements in Compressed-Air Drills; and I do 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.

This invention relates to an improved compressed air drill and one object of the invention is to provide a compressed air drill having an improved type of hammer for striking the inner end of a drill steel carried by the improved drill or gun as it may be termed, and to further provide an improved type of chuck for carrying the drill steel, the chuck being rotatably mounted and provided with improved pawls engaging a ratchet sleeve mounted in the body portion of the gun and having threaded engagement with the reciprocating hammer so that as this hammer reciprocates the ratchet sleeve will be oscillated and impart step-by-step rotary movement to the chuck.

Another object of the invention is to so mount the hammer in the body of the gun that when desired it may be permitted to strike a plug which closes the rear end of the body portion of the gun and thus a drill steel permitted of being easily removed from a hole which has been drilled in a rock, the hammer ordinarily not having contact with the closure plug for the rear end of gun and having sliding movement in the interior of the barrel of the gun without striking the plug when moving rearwardly.

Another object of the invention is to provide an improved type of valve for controlling the passage of compressed air into and out of the barrel of the gun, the valve being actuated by the enlarged inner end portion of the hammer and the valve serving to control passage of air into the expansion chamber of the barrel and further serving to provide a conduit through which a draft air may pass to the exhaust port of the valve housing.

Another object of the invention is to so construct this valve housing and rocker valve that the valve housing may be removably connected with the barrel of the gun and the rocker valve mounted in the housing and pivotally mounted intermediate its length with its end portions extending longitudinally of the valve housing and provided with lugs extending through openings into the expansion chamber of the barrel and into position for engagement by the enlarged portion of the hammer as the hammer reciprocates.

Another object of the invention is to so construct the ratchet sleeve that it may be easily put in place upon the hammer with one end portion extending beyond the barrel and into the chuck for engagement by the pawls of the chuck, the sleeve and hammer being provided with co-operating rifle threads for imparting oscillating movement to the ratchet sleeve and the pawls of the chuck being so constructed that the chuck and drill steel carried thereby may be caused to rotate in a desired direction and also prevented from rotating if so desired.

Another object of the invention is to provide an improved type of hood for the chuck and improved means to retain the hood in place, the securing means for the hood consisting of rods or bolt elements which extend upon opposite sides of the barrel and carry the plugs for closing the rear end of the barrel, as well as carrying the hood, the barrel being slidable upon the rods so that the barrel may be moved to effect striking of the closure plug by the rear end of the hammer when so desired.

Another object of the invention is to provide improved means for imparting movement to the pawls and adjust the position of the pawls to cause the chuck to rotate in a desired direction when the drill is in use.

Another object of the invention is to so mount these pawls that they will be normally held in position to turn the chuck in one direction by spring controlled cam elements having stem portions which extend for engagement by a ring moved to engage the stems and move the cams against the action of the springs when it is desired to adjust the pawls, the cams when in one position holding certain of the pawls in an inopera-

tive position and when moved first moving the pawls to render all of the pawls inoperative and further movement of the cams completing adjustment to cause rotation of the chuck in an opposite direction.

Another object of the invention is to provide a drill of the character described which can be readily taken apart for cleaning and repairing when so desired and to further so construct it that when put together, it will be very efficient in operation and not liable to readily get out of order or have any parts easily broken.

Another object of the invention is to provide improved means for holding the drill steel in engagement with the chuck and limit movement of the steel away from the chuck when struck by the hammer thus preventing the drill from slipping out of the chuck when in use and further permitting the means controlling movement of the drill to have engagement with a collar when the plug closing the rear of the barrel is struck by the hammer so that the drill may be easily removed from a hole which has been drilled in a rock.

This invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a top plan view of the improved air drill.

Figure 2 is a side elevation of the same.

Figure 3 is a longitudinal sectional view through the air drill taken along the line 3—3 of Fig. 2.

Figure 4 is a longitudinal sectional view taken along the line 4—4 of Fig. 1.

Figure 5 is a transverse sectional view taken along the line 5—5 of Fig. 4.

Figure 6 is a sectional view taken along the line 6—6 of Fig. 4 with the ratchet mechanism adjusted for turning the drill steel in one direction during operation of the drill.

Figure 7 is a sectional view taken along the line 7—7 of Fig. 6.

Figure 8 is a view similar to Fig. 6 showing the ratchet mechanism adjusted to rotate the drill steel in an opposite direction.

Figure 9 is a sectional view taken along the line 9—9 of Fig. 8.

Figure 10 is a perspective view of one of the ratchet tube members together with the actuating plunger for the same.

Figure 11 is a sectional view taken along the line 11—11 of Fig. 1.

Figure 12 is a perspective view of the cam collar forming part of the ratchet shifting mechanism.

Figure 13 is a perspective view of a ring moved by the collar of Fig. 12.

Figure 14 is a fragmentary sectional view showing the latch means for releasably holding the collar against turning.

Figure 15 is a perspective view of the valve housing for controlling passage of compressed air through the air drill.

Figure 16 is a perspective view of the sleeve upon which the valve housing will be secured.

Figure 17 is a bottom plan view of the valve housing.

Figure 18 is a sectional view taken along the line 18—18 of Fig. 4.

Figure 19 is a sectional view taken along the line 19—19 of Fig. 4, or along the line 19—19 of Fig. 20.

Figure 20 is a longitudinal sectional view through the valve housing taken along the line 20—20 of Figs. 2 and 4.

Figure 21 is a perspective view of a rocker element mounted in the valve housing and forming a portion of the valve mechanism.

Figure 22 is a perspective view of this rocker arm looking at the bottom and open side thereof.

Figure 23 is a sectional view taken along the line 23—23 of Fig. 19.

Figure 24 is a perspective view of a valve plug for controlling the outlet of the valve housing.

Figure 25 is a transverse sectional view taken along the line 25—25 of Fig. 1.

This improved compressed air drill or gun as it may be called, is provided with a barrel 1 which is open at its forward and rear ends and has its rear end closed by a cap or plug 2 which fits into the rear end portion of the barrel 1 and is provided with a packing ring 3 so that leakage of compressed air around this closure plug will be prevented. A sleeve or filler 4 fits into the forward end portion of the barrel 1 and is provided with a packing ring 5 so that leakage of air around this sleeve will be prevented. The hammer 7 is provided with an enlarged rear end portion forming a head 8 which is positioned in the expansion chamber of the barrel and serves as a piston element by means of which reciprocating movement may be imparted to the hammer as will be hereinafter brought out. This hammer 7 extends through the sleeve 4 and has its forward end portion provided with rifle threads 9 which fit into co-operating rifle grooves formed in a ratchet sleeve 10 which fits upon the forward end portion of the hammer 7 and within the enlarged forward end portion of the passage through the center of the sleeve 4. The head 8 of the hammer is non-circular when viewed in end elevation and will be preferably six-sided as shown in Fig. 18 but may be provided with any number of side faces desired. The interior of the barrel 1 between the portion which receives the plug 2 and a portion which receives the sleeve 4 corresponds in shape to the head 8 and it will thus be seen that although the hammer may slide longitudinally in the barrel, it cannot rotate therein. Therefore, when the hammer is reciprocating in the barrel and sleeve 4, the rifling of the hammer and

ratchet sleeve 10 will cause this ratchet sleeve to have oscillating movement. Recesses 11 which provide ratchet teeth are formed about the end portions of the ratchet sleeve, one set of ratchet teeth being provided at each end of the ratchet sleeve so that when assembling the ratchet sleeve may be put in place with either end innermost and thus always have the outer end portion of the ratchet sleeve provided with the ratchet teeth. Side bars 12 which are rectangular in cross section throughout the greater portion of their length extend between the side arms 13 and 14 of the barrel 1 and are provided at their rear ends with reduced extensions 15 forming bolt elements which extend through the perforated side ears 16 of the plug 2 and carry securing nuts 17. The forward end portions 18 of these bars 12 are also reduced to provide pin extensions which extend through the perforated ears 19 of the sleeve 4, these ears 19 being provided at opposite sides of a flange 20 formed adjacent the outer end of the sleeve. It should be noted that the pins 18 are elongated so that they may extend through the sleeves 21 formed at the sides of the hood 22 and project upon opposite sides of the neck portion 23 of this hood and carry bumper springs 24 and securing nuts 25 to hold the springs in place. With the securing nuts 17 and 25 tightened the desired amount, the parts will be assembled as shown in Fig. 3 and the barrel will be permitted of longitudinal adjustment so as to bring the plug 2 into position to be struck by the rear end of the hammer head 8 when it is desired to have a drill steel extracted from a hole which has been drilled. Under ordinary circumstances, the barrel will be positioned so that the hammer head will not strike the inner end of the plug 2 and will further be so positioned that sufficient space will be provided between the inner face of the plug and the hammer so that an air cushion will be provided between the rear end of the hammer and the inner face of the plug. A base 26 is provided for the barrel 1 so that when desired this air gun may be mounted upon a suitable support. There has further been provided a handle 27 which extends upon opposite sides of the barrel and has each arm provided at its forward end with a socket 28 for receiving the shank portion of a clamp 29. Each of these clamps 29 is provided at its lower end with a foot which extends beneath the lower side arm 13 at its side of the barrel and each arm of the handle 27 is provided adjacent its free end with a depending lug 30, the lugs 30 fitting into recesses or seats 31 formed in the upper side arms 13 and serving to hold the handle against longitudinal movement when the securing nuts 29′ are tightened. From an inspection of Fig. 25, it will be readily seen that when the securing nuts 29′ are tightened, the arms 13 will be brought into tight binding engagement with the side bars 12 and the barrel will be securely held in a desired position and prevented from having longitudinal movement.

The chuck 32 rotatably fits in the hood 22 and is provided with a socket portion 33 which extends through the neck 23 of the hood. The passage through the socket portion 33 of the chuck is non-circular in cross-section and conforms to the contour of the rear end portion of the drill steel 34 so that when the chuck is rotated, the drill steel will also be rotated. A shoulder 35 is formed upon the drill steel so that the drill steel will be prevented from moving inwardly beyond a desired amount and further so that the drill steel can be prevented from slipping out of the socket of the chuck. In order to prevent the drill steel from slipping out of the chuck, there has been provided a hook 36 having arms 37 which extend rearwardly from the drill-engaging portion of the hook and upon opposite sides of the neck 23 of the hood. Pivot pins 38 extend inwardly from the arms 37 and fit into grooves 39 which are cut in the thickened side portions 40 of the neck 23. Springs 41 fit upon pin extensions 42 of the arms 37 and engage the end face of the hood at the inner end of the neck 23 to provide means for yieldably holding the steel-engaging hook against pivotal movement. It will be further noted that abutment screws 43 are provided to limit the tilting of the hook in one direction and prevent the hook from tilting to a position which will permit removal of the springs and movement of the hook to bring the side pins 38 out of the seats 39. With the hook swung to the operative position shown in Figs. 1 and 2, the hook will engage the drill steel and through engagement with the shoulder 35 will serve to prevent the drill steel from becoming disconnected from the socket of the chuck. When however it is desired to remove the drill steel, it is simply necessary to swing the hook to an inoperative position where it will be out of engagement with the drill steel and permit ready removal of the same. When the barrel 1 has been adjusted to bring the plug into position to be struck by the hammer when the hammer moves rearwardly, the plug, side bars, and hood will be drawn rearwardly and since the hook will engage the shoulder 35, the drill steel will be extracted from a hole which has been drilled in a rock.

When drilling, it is necessary to turn the drill steel for a portion of a rotation before each blow is received and in order to do so, the chuck which carries the drill steel has been provided with pawls for engaging the ratchet teeth of the ratchet sleeve 10. The

pawls are arranged in sets and each set includes a pawl 44 for imparting rotary movement to the chuck and drill steel in a left-hand direction and a pawl 45 for imparting rotary movement in a right-hand direction. Each pawl is provided with a stem portion in the form of a pin 46 which fits into one of the sockets 47 of the chuck and is further provided with a lip or tongue extension 48 which is approximately one-half the depth of the toothed portion of the pawl as shown in Fig. 10. It should be noted that the lip portion 48 of the pawl 44 extends from the lower end portion of its pawl whereas the lip portion of the pawl 45 will extend from the upper portion of the toothed portion of its pawl. Plungers 49 are slidably mounted in sockets which are similar to the sockets which receive the stems of the pawls and these plungers which are positioned between the pawls 44 and 45 carry cross heads 50 which extend upon opposite sides of the plungers and are adapted to engage the lip extensions of the pawls. It should be noted that the cross head 50 has its extended end portion provided with upper and lower bevel faces so that movement can be imparted to the pawls when the plungers are moved. By having the end portions of the cross heads 50 provided with beveled upper and lower portions cams will be provided to cooperate with the beveled inner faces of the lips 48 and serve to rock the pawls to bring the ratchet engaging teeth of the pawls 44 out of an operative position when the plungers are moved in one direction and when moved in the opposite direction bring the ratchet-engaging teeth of the pawls 45 out of engagement with the ratchet teeth of the sleeve. It should be noted that when the plungers are only moved for a portion of their movement, both of the pawls will be held with their teeth out of engagement with the ratchet sleeve. In order to normally hold the pawls in position with their teeth extending for engaging the teeth of the ratchet sleeve, there has been provided springs each having a bolt portion 51 which fits into a socket of the chuck and arms 52 which extend beneath and engage the teeth of the pawls. The pawls will therefore be normally held in the operative position and may be selectively held out of an operative position by proper adjustment of the plungers. In order to hold the pawls and plungers in place, there has been provided a retainer ring 53 which serves to limit outward movement of the pawls and plungers and is held in place by flared end portions 54 which fit between the portions of the chuck carrying the pawls and plungers. A spring 55 is provided upon the inner end portion of each of the plungers beneath the cross head 50 so that the plungers will be normally held in the extended position shown in Fig. 9 with the pawls 44 in the operative position as shown in Fig. 8. In order to press upon the extended ends of the plungers and move them inwardly against the action of the springs 55 there has been provided a ring 56 which fits upon the neck extension 57 of the sleeve 4 and is provided with pins 58 which pass through openings formed in the collar 20 and engage the cam surfaces 59 of the ring 60. It will be readily seen that when this ring 60 is turned by means of the side extensions 61, the action of the cam surfaces 59 against the pins 58 will cause the ring or disk 56 to be moved and press the plungers inwardly against the action of the springs 55. When the ring is turned in an opposite direction, the springs will force the plungers outwardly and the pins 58 will thus be at all times held in engagement with the cam surfaces 59. This ring 50 is cut away at opposite sides as shown at 62 so that shoulders will be provided to engage the side bars 12 and limit rotation of the ring and clips 62′ are carried by the ring and fit into grooves 63 formed in the collar 20 so that the ring will be held against movement longitudinally of the sleeve 4 and prevented from moving out of the proper position when the barrel is shifted rearwardly. A friction ball 64 is mounted in a socket formed in the ring 50 beneath the side arms 61 and engaged by a spring 65 so that the collar may be turned but will be releasably held in an adjusted position due to the ball 64 being pressed into seats 66 formed in the sleeve 4. It will thus be seen that a very efficient means has been provided for adjusting the pawls to cause the chuck to receive a step by step movement in either a right-hand or a left-hand direction and further that the structure is so arranged that rotation of the chuck may be entirely prevented if so desired.

This drill is to be operated by compressed air which will be fed from a suitable source of supply and will enter a valve housing 67 through an inlet port 68. This valve housing is secured upon a seat 69 formed upon the upper portion of the barrel 1 and is secured by removable fasteners 70. The chamber 71 within the housing is open through the underface thereof and has its end portions communicating with the inlet ports 72 of the expansion chamber forming portion of the cylinder. This housing has its chamber 71 further provided with side ports 73 which communicate with the chamber 71 through the side walls thereof as shown in Figs. 15 and 20 and register with the exhaust ports 74 of the expansion chamber. A rocker valve 75 which is open at one side extends longitudinally in the valve housing and is provided with a side arm 76 which forms a bearing sleeve to receive the pivot pin 76′ carried by the valve housing. This rocker

valve 75 is mounted in the chamber 71 of the valve housing as shown in Fig. 20 with its open side against the wall of the valve housing from which extends the exhaust port 77 of this valve housing. Passage of air through this exhaust port 77 is controlled by a plug valve 78 rotatably mounted and actuated by a lever 79 so that it may be turned into and out of position to bring its air passage 80 into and out of position to register with the port 77. This plug valve is provided with an annular groove 81 which receives the spring pressed latch pin 82 so that the latch pin may serve to hold the plug valve against longitudinal movement. From an inspection of Fig. 20, it will be readily seen that when the rocker valve is in the position shown in Fig. 4, air from the inlet port 68 may enter the chamber 71 and pass through the ports 72 and through ports 73 and 74 into the expansion chamber to act upon the hammer and move it outwardly into striking engagement with the inner end of the drill steel. As the hammer is moving outwardly, air in the opposite end portion of the expansion chamber will be forced through the ports 74 at this end and this exhausting air will pass upwardly through the ports 73 and side ports 74 into the interior of the hollow rocker shaft through which it will pass to the exhaust port 77. In order to impart movement to the rocker valve and permit of its being moved to admit air into the proper end of the expansion chamber and permit air to pass out of the opposite end thereof, there has been provided lugs 83 and 84 which are curved somewhat as shown in Fig. 22 and are positioned to fit into the openings 72. These lugs 83 and 84 extend into the valve housing so that as the hammer moves, the beveled portions 85 of the hammer head 8 will strike these and impart rocking movement to the valve. It should be further noted that these lugs serve to close the openings 72 and thus cause the exhausting air to pass through the exhaust ports 74 and 73. If desired the housing can be provided with a port in one corner which receives a valve-controlled coupling 86, the coupling 86 being preferably constructed as shown in Fig. 20 and provided so that a pipe may be connected with this coupling and air led to an air control feed for the drill. When the pipe is removed from the coupling, the valve which may be forced inwardly to an open position will close and escape of air through that port will be prevented.

During operation of the drill, it is desired to supply water to the bottom of the hole which is being drilled so that dust can be prevented and the point of the drill steel prevented from being overheated. There has therefore been provided a water pipe 87 which passes through the hammer and has its forward end portion insertible into a water passage which is formed longitudinally in the drill steel. This pipe 87 passes through a tube 88 which passes through the plug 2 and into the rear end portion of the hammer, the opening in the hammer which receives the pipe 87 being enlarged to permit the hammer to slide freely upon this tube 88. Within the pocket 89 which is formed in the plug 2, the tube 88 is provided with a head or collar 90 and the pipe 87 is also provided with a head or collar 91 which is held in close contact with the head 90 by means of an internally and externally threaded sleeve 92 which is screwed into the threaded outer portion of this pocket 89. The feed pipe 93 which receives water from a suitable source of supply is provided with an enlarged end portion engaged by a packing gland 94 which is screwed into the sleeve 92. It will thus be seen that when the gland 94 is screwed tightly into place, water from the pipe 93 can pass through the pipe or tube 87 and into the passage of the drill steel.

When this improved drill is in use, the air is admitted to the inlet port 68 by means of a suitable conductor pipe leading from a source of compressed air supply and this compressed air in the chamber 67 of the valve housing will pass through the port 74 at one end thereof and move the hammer longitudinally with the head 8 of the hammer acting as a piston. As the hammer moves longitudinally of the barrel, the air in front of the head is driven out through the exhaust port at that end of the expansion chamber and passes through the rocker valve and out through the exhaust port of the valve housing. Upon reaching the end portion of the expansion chamber, the head of the hammer will strike the lug which projects into the expansion chamber, thus rocking the rocker valve and moving it to reverse its position thus closing the inlet port at one end and opening the inlet port at the end through which the air previously was exhausted. The air will now pass into the expansion chamber and will move the hammer in a reverse direction and the air will exhaust through the opposite end portion of the rocker valve. The hammer will thus be reciprocated longitudinally and will act of itself to adjust the rocker valve to move the rocker valve to the desired position for a reverse movement. When moving rearwardly, the air between the head of the hammer and the inner end of the plug 2 will provide an air cushion to prevent the hammer from striking the plug and when moving forwardly, a similar air cushion in the forward end of the expansion chamber will prevent excessive noise and prevent

breakage when the hammer is stopped in its forward movement towards the sleeve 4. As this hammer reciprocates, the rifle threads will cause the ratchet sleeve 10 to oscillate and with the collar or ring 60 set in the proper position, the chuck will receive a step-by-step rotary movement. The chuck will thus be rotated a portion of a revolution each time the hammer moves to strike the inner end of the drill steel and therefore the hole drilled in the rock will be properly drilled without danger of the drill steel being wedged in the hole being drilled. The hook 36 serves to support and guide the drill steel and further serves to prevent the drill steel from moving entirely out of the socket portion of the chuck. In withdrawing the drill steel from the hole which has been drilled, it is simply necessary to grasp the handle 27 and draw the gun away from the rock in which the hole is being drilled. The hook 36 will engage the shoulder 35 and the drill steel can be easily withdrawn. The drill steel can be left in place if desired or the hook can be swung to one side so that it will not engage the reduced portion of the steel thus releasing the drill steel and permitting of its removal from the socket portion of the chuck. If when attempting to withdraw the steel from the hole which has been drilled, it is found that the steel cannot be easily withdrawn, the barrel will be drawn rearwardly by means of the handle 27 thus causing the plug 2 to extend into the rear end portion of the barrel to a greater extent than shown. The rear end of the hammer will now strike the inner end of the plug and tend to drive the plug rearwardly. Since the side bars 12 are connected with this plug, they will be moved rearwardly with the plug and a blow will be delivered to the hood to cause the hook to strike the shoulder 35 and cause the drill to be extracted from the hole. By providing the springs 24 cushions are provided which serve to take up the force of the blow received when the hammer strikes the inner end of the plug and breakage of the more delicate parts of the gun prevented. When the valve 78 is moved from the open position shown in Fig. 20 to a closed position, air entering the expansion chamber to the rear of the piston may pass through the opening of the hammer through which the water pipe 87 passes and through the drill steel to thoroughly clean the drill steel and hole which has been drilled in the rock.

It will thus be seen that there has been provided an air drill which will be very efficient in operation and in which the drill steel may be caused to rotate in a step-by-step movement in either a left-hand or a right-hand direction. It will be further noted that there has been provided very efficient pawls and adjusting means for these pawls and also that there has been provided an improved type of hammer and ratchet sleeve actuated by the hammer. It will be further noted that there has been provided improved valve mechanism for controlling passage of air into and out of the expansion chamber.

I claim:

1. An air drill comprising a barrel including an expansion chamber, a hammer including a piston forming portion in the expansion chamber, a plug slidably fitting into the rear end portion of the barrel and forming a rear head for the expansion chamber, a drill steel carrier in front of said barrel for holding a drill steel in operative relation to said hammer, side bars carried by the drill steel holder and plug to hold the same in spaced relation and having engagement with the barrel to slidably mount the barrel and prevent rotation thereof, and a handle element carried by the barrel for sliding the barrel longitudinally and control the extent to which the plug extends into the barrel, the hammer having striking engagement with the plug when the barrel is drawn rearwardly and having striking engagement with a drill steel when the barrel is moved forwardly.

2. An air drill comprising a barrel having an expansion chamber provided with valve controlled inlet and exhaust ports, a sleeve extending into the forward end of the barrel and forming a forward head for said chamber, a plug fitting into the rear end of the barrel and forming a rear head for said chamber, a hammer slidable in said sleeve and having its inner end portion extending into the expansion chamber and enlarged to form a piston, drill steel holding means including a chuck and a hood for the chuck, side bars carried by the plug, hood and forward end portion of said sleeve and engaging said barrel to mount the barrel for longitudinal sliding movement and prevent rotary movement of the barrel, the barrel being normally in position to prevent striking of the plug by the piston when moving rearwardly and movable rearwardly to project the plug inwardly into position for striking by the piston, and drill steel engaging means carried by the hood for holding a drill steel in the chuck.

3. An air drill comprising a barrel, a sleeve extending into the forward end of the barrel, a plug fitting into the rear end of the barrel, the portion of the barrel between the plug and sleeve receiving portions forming an expansion chamber and having air inlet and outlet ports adjacent its ends, a hammer slidably fitting in the sleeve and having its inner end portion positioned in the expansion chamber and enlarged to provide a piston, a valve housing carried by

said barrel and communicating with the expansion chamber through said ports, valve means in the housing for controlling passage of air through said ports, drill steel carrier mechanism including a hood carried by the forward end portion of said sleeve, side bars carried by the hood, sleeve and plug and engaging the barrel to permit sliding movement thereof and hold the barrel against rotation, and handle means carried by said barrel whereby the barrel may be moved longitudinally to project the plug inwardly into position for striking by the hammer.

4. The structure of claim 3 having the plug and sleeve firmly held upon the side bars and the hood slidable upon the forward end portions of the side bars, and means for retaining the hood upon the rods and limiting sliding movement of the hood and bars relative to each other.

5. The structure of claim 3 having the plug and sleeve firmly held upon the side bars and the hood slidable upon the forward end portions of the side bars, fasteners carried by the forward ends of said bars, and cushioning means between the hood and fasteners.

6. The structure of claim 3 having the plug and sleeve firmly held upon the side bars and the hood slidable upon the forward end portions of the side bars, fasteners carried by the forward ends of said bars, and cushioning springs about the bars between the hood and fasteners to take up shocks received when the hammer strikes the plug forming the head for the rear end of the expansion chamber.

7. The structure of claim 3 having the barrel provided with sets of side arms extending above and between the side bars, the handle for the barrel being provided with arms having heads for engaging the upper side arms, and clamps carried by the heads for engaging the lower side arms and clamping the side arms to hold the handle in place.

8. The structure of claim 3 having the barrel provided with sets of side arms extending above and between the side bars, the handle for the barrel being provided with arms having heads for engaging the upper side arms, and clamps carried by the heads for engaging the lower side arms and clamping the side arms to hold the handle in place, the heads of the arms of said handle being provided with lugs fitting into seats formed in the upper side arms and said heads having depending perforated side portions forming bearings, the clamps having feet extending beneath the lower side arms and stems extending through the bearings and having fasteners upon their upper end portions.

9. An air drill comprising a barrel including an expansion chamber, a hammer slidable in the barrel and having a piston forming portion positioned in the expansion chamber of the barrel, valve controlled means for permitting air to enter and leave the expansion chamber and impart movement to the hammer, a sleeve extending into the forward end portion of the barrel about the hammer and forming a head for the forward end of the expansion chamber, a plug in the rear end portion of the barrel forming a rear head for the expansion chamber, a hood fitting upon the forward end portion of said sleeve, a drill steel carrying chuck within the hood, means actuated by the hammer for imparting rotary movement to said chuck, side bars carried by the plug, sleeve and hood and guiding sliding movement of the barrel and holding the barrel against rotary movement, a handle carried by said barrel, the barrel when moved rearwardly by said handle projecting the plug inwardly beyond the normal extent for engagement by the rear end of the hammer, and means carried by said hood for engaging a drill steel and drawing the steel rearwardly when the plug is struck by the hammer.

10. The structure of claim 2 having the hood provided with a reduced forward portion having its side portions provided with diagonally extending grooves open at their rear ends and closed at their forward ends, the drill steel engaging device being in the form of a hook having arms extending rearwardly upon opposite sides of the hood and provided with side pins fitting into the grooves to pivotally mount the hook, end pins extending from the arms and springs about the end pins engaging the hood at the rear end of the reduced forward portion to frictionally hold the hook against pivotal movement.

In testimony whereof I have hereunto set my hand.

GINES PEREZ GOMEZ.