

No. 768,894.

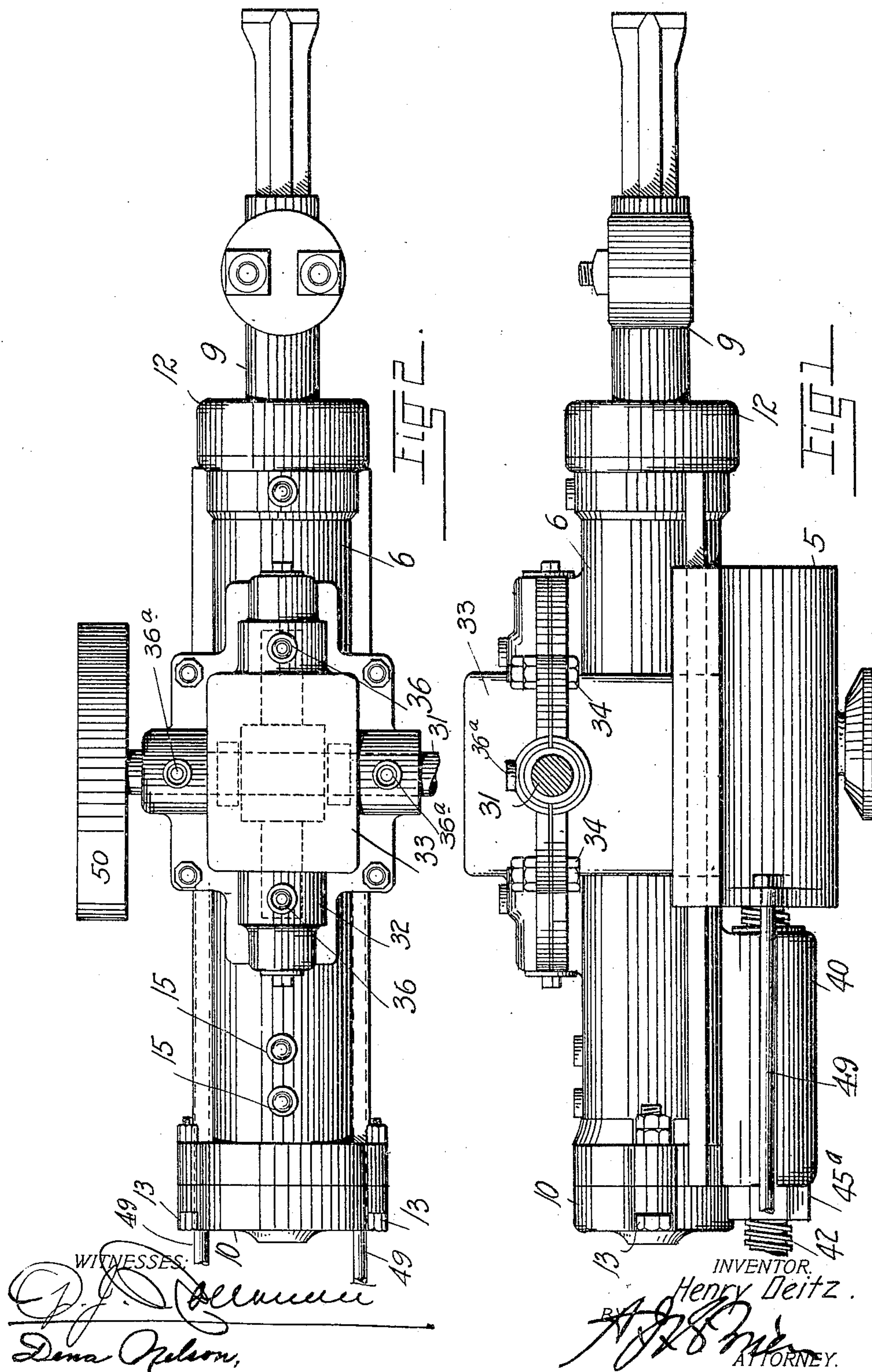
PATENTED AUG. 30, 1904.

H. DEITZ.
ROCK DRILL.

APPLICATION FILED SEPT. 22, 1902. RENEWED JAN. 30, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



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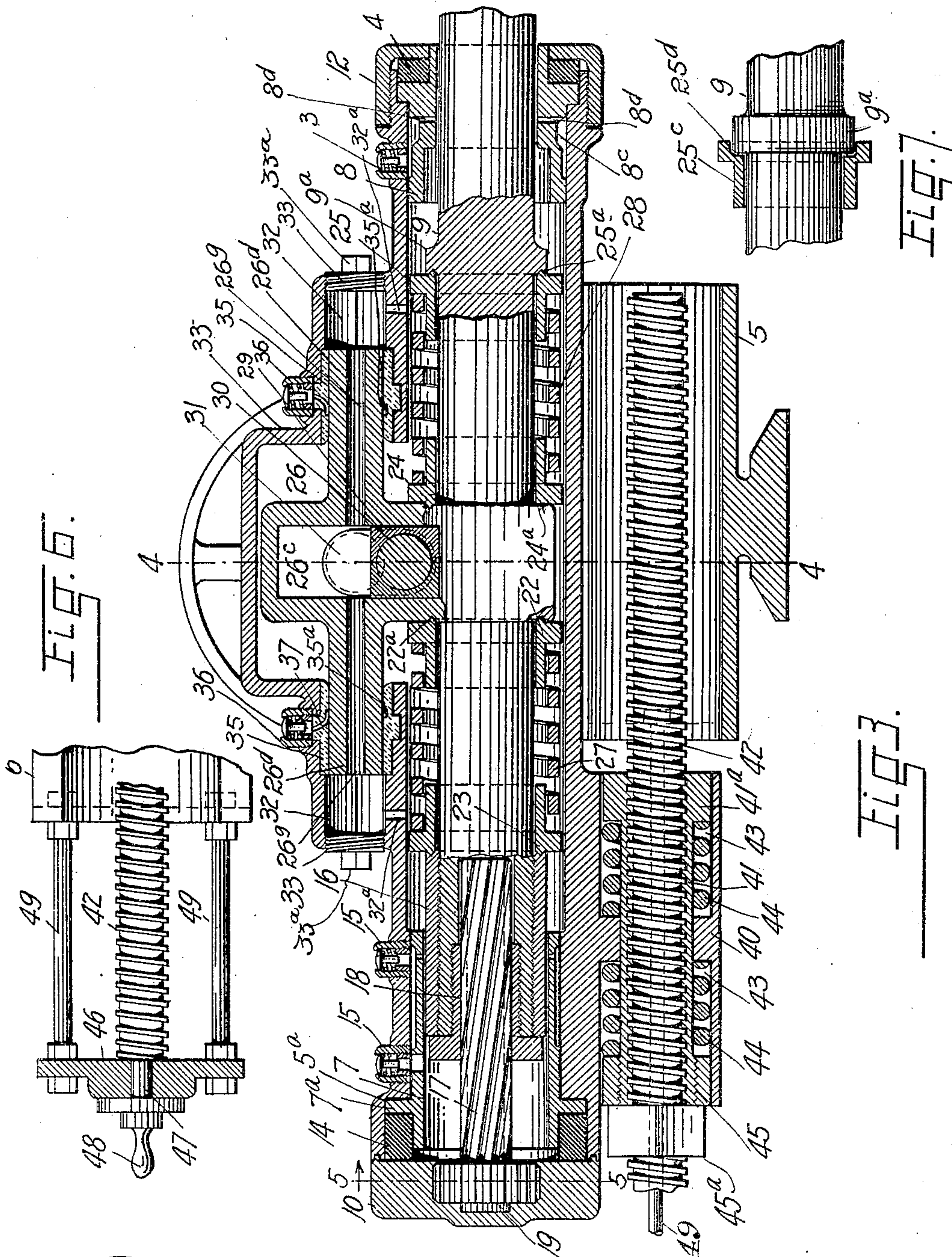
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3 SHEETS—SHEET 2.



WITNESSES:

J. J. Bellander
Dena Nelson

INVENTOR.

Henry Deitz

BY

A. J. Smith
ATTORNEY.

No. 768,894.

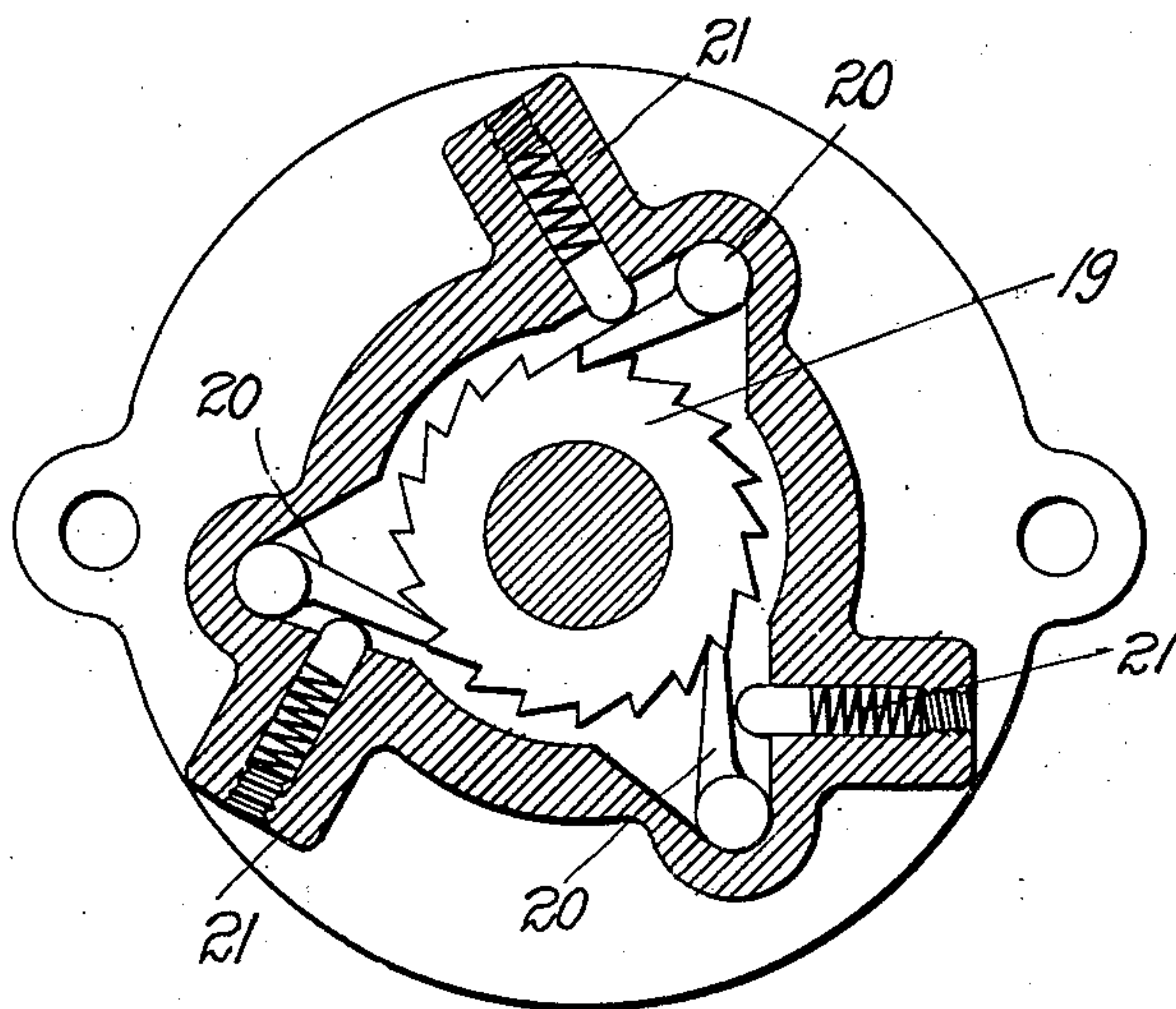
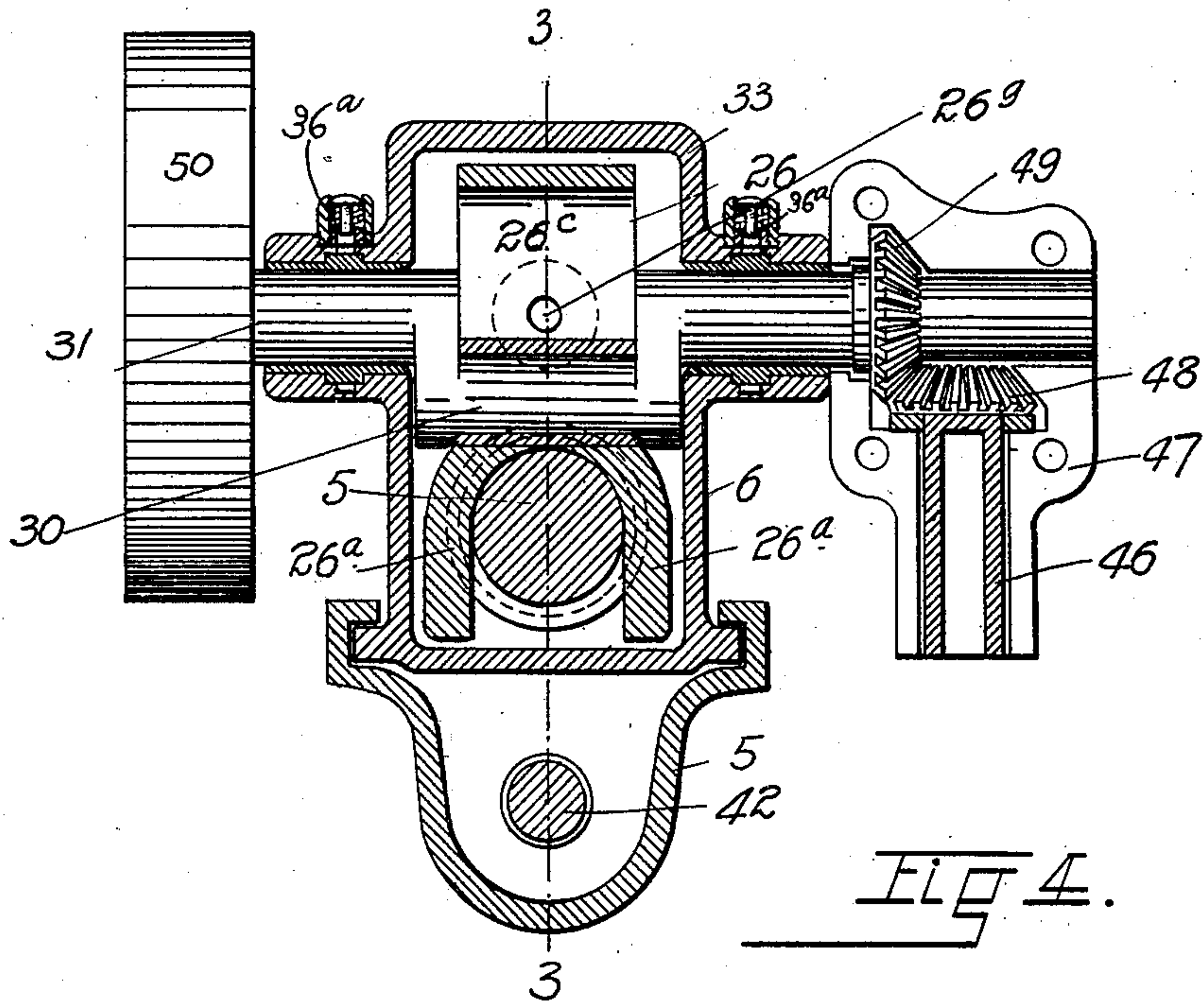
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NO MODEL.

3 SHEETS—SHEET 3.



WITNESSES:
J. D. Ballantyne
Dena Nelson.

INVENTOR.
Henry Deitz
BY *H. Deitz*
ATTORNEY.

UNITED STATES PATENT OFFICE.

HENRY DEITZ, OF DENVER, COLORADO, ASSIGNOR TO LEWIS DEITZ, OF ALBANY, NEW YORK.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 768,894, dated August 30, 1904.

Application filed September 22, 1902. Renewed January 30, 1904. Serial No. 191,392. (No model.)

To all whom it may concern:

Be it known that I, HENRY DEITZ, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Rock-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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in rock-drills; and it consists of the features, arrangements, and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of my improved drill. Fig. 2 is a top or plan view of the same. Fig. 3 is a vertical longitudinal section of the drill, taken on the line 3 3, Fig. 4. Fig. 4 is a section taken on the line 4 4, Fig. 3. Fig. 5 is a section taken through the rotating mechanism on the line 5 5, Fig. 3. Fig. 6 is a fragmentary top view of the guide-shell, showing the connection therewith of the cross-bar, in which the feed-screw is journaled, the said bar being shown in horizontal section. Fig. 7 illustrates another form of construction for holding the collar extensions free from the drill-holder.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the guide-shell, and 6 the casing, slidable thereon in the usual manner. In the casing extremities are mounted bearing-sleeves 7 and 8 for the reciprocating drill-holder 9. These bearing-sleeves are held in place by caps 10 and 12. The cap 10 is connected with the casing by bolts 13. Between this cap and a collar 7^a on the sleeve 7 is located a cushion 14, preferably composed of rubber. The collar 7^a is located between the cushion and a shoulder 5^a, formed on the casing. The rear portion of the casing, or that farther to the left in Fig. 3, is provided

with two oil-cups 15, through which lubricating material may be passed to the inner surface of the bearing-sleeve, which is provided with openings registering with the oil-cup opening of the casing. To the rear extremity of the drill-holder, which is threaded for the purpose, is screwed a sleeve 16. The rear portion of the drill-holder is hollow to receive the rifle-bar 17, and into it is screwed a hollow nut 18, having a head which engages the rear extremity of the sleeve 16 and locks the latter against unscrewing. The hollow portion of the drill-holder and the nut 18 are rifled or grooved to engage the ribs of the rifle-bar, which projects thereinto. The rear extremity of the rifle-bar is provided with a ratchet-disk 19, located in the chamber in the cap 10, within which is located a number of dogs 20, which are held in operative engagement with the teeth of the ratchet by springs 21. (See Fig. 5.)

The drill-holder is surrounded by four loose collars 22, 23, 24, and 25, each of which is provided with a reduced extension. The collars 22 and 23 are located in the rear of a reciprocating yoke 26, whose lower portion is bifurcated, as shown at 26^a, to straddle the drill-holder. The arms 26^a, which straddle the drill-holder, engage the two collars 22 and 24, the collar 22 being located in the rear of said arms and the collar 24 forward of the arms. These collars 22 and 24 are provided with angular V-shaped ribs, (designated 22^a and 24^a, respectively,) which engage counterpart grooves formed in the adjacent part of the yoke, whereby the collars are supported in position to prevent friction between the latter and the reciprocating drill-holder. Collars 22 and 23 are separated by a coil-spring 27, which surrounds the drill-holder and the collar extremities and bears against the shoulders of the collars. The collar 23 is provided with a V-shaped rib engaging a counterpart groove formed in the forward extremity of the sleeve 16 in the drill-holder. The collars 24 and 25 are separated by a coil-spring 28, which surrounds the drill-holder and the collar extensions and bears against the shoulders of the latter. The front part of the collar 25

engages a shoulder 9^a on the drill-holder. The collar is provided with a V-shaped rib 25^a, engaging a counterpart groove formed in the adjacent face of the shoulder 9^a.

5 The upper part of the reciprocating yoke 26 is provided with a vertical slot 26^c, in which is movably mounted a block 29. The crank 30 of a shaft 31 is journaled in this block and imparts the reciprocating movement to the
10 yoke, which is provided with guide-stems 26^d, located on opposite sides thereof. One of these stems extends forwardly and the other rearwardly from the body of the yoke. As shown in the drawings, the stems 26^d are hollow or provided with longitudinal openings 26^e. These stems engage bearings 32, formed partly in the body of the casing and partly in the cap 33, which is secured to the casing by bolts 34 and forms a housing for the yoke.
15 The chambers formed by the bearing parts 22 for the yoke guide-stems are closed at their extremities by screw-plugs 33, whose outer extremities are shaped to receive a wrench, as shown at 33^a. The bearing parts are interiorly threaded to receive the screw-plugs.
25 These bearing parts are also provided with bushings 35. Above these bushings are formed openings into which are screwed oil-cups 36. The bushings are provided with ducts 37, leading from the oil-cups to the guide-stems of the yoke. The openings 26^e of the yoke guide-stems extend from the extremities of these stems to the slot 26^c of the yoke, whereby the lubricating material is
35 allowed to circulate freely between the chambers of the guide-stem bearings and the yoke-slot. A circular groove 35^a is formed in each bushing 35. These grooves communicate with the ducts 37 and facilitate distribution of the
40 oil supplied to the oil-cups 36.

Between the cap 12 and the shoulder formed on the forward extremity of the sleeve 8 is a shoulder 4, which relieves the jar incident to the engagement of the collar 9^a on the drill-holder with the shoulder 8^a of the sleeve when the drill-holder has reached its forward limit of movement. The forward part of the casing is provided with a threaded opening into which is screwed an oil-cup 3. Communicat-
50 ing with the oil-cup opening is a circular recess 8^c, formed in the collar 8 and from which lead ducts 8^d, through which the lubricating material introduced by way of the oil-cup passes to the drill-holder.

55 Openings 32^a, communicating with the chambers 32, in which the stems of the yoke move, are formed in the casing to allow the lubricating material to pass from the said chambers to the chamber of the drill-holder.

60 The lower part of the casing 5 is provided with a depending projection 40, which is bored to receive an interiorly-threaded sleeve 41, engaged by the feed-screw 42. The projection 40 is counterbored from opposite ends to form
65 chambers 43 for coil-springs 44. One of

these springs bears at one extremity against a shoulder 41^a, formed on one end of the sleeve 41, while the other spring bears at one extremity against a nut 45, screwed upon the
70 extremity of the sleeve 41 remote from the shoulder 41^a. The inner extremities of both springs 44 bear against the central shoulder of the projection 40, located between the two spring-chambers. This construction allows the drill-casing a limited sliding movement in
75 either direction against the springs 44, which form independent or additional cushions or buffers to prevent injury to the parts of the mechanism by jar or concussion incident to the operation of the machine, and particularly
80 the reciprocating movement of the drill-holder. The nut 45 is provided with a head 45^a, adapted to receive a wrench. The feed-screw 42 is journaled in a cross-bar 46, as shown at 47, the said bar being located at the rear
85 extremity of the machine and connected with the rear extremity of the guide-shell 6 by rods 49. (See Fig. 6.) The feed-screw is provided with a hand-crank 48.

In Fig. 7 is illustrated another form of construction for the collars 22, 23, 24, and 25. This collar is designated 25^c and is cut out, as shown at 25^d, to allow the shoulder 9^a of the drill-holder to enter, whereby the extension-collar is supported from contact with the drill-
95 holder.

The manner of mounting the drill in operative position on a column is not illustrated, as nothing is claimed thereon. The construction, as shown in Fig. 4, is especially designed
100 for operation by an electric motor and a flexible shaft, (not shown,) the latter to be connected with a spindle 46, journaled in a housing 47 and provided with a gear 48, at one extremity meshing with a gear 49, fast on a
105 crank-shaft 41, which is journaled in the casing, as best shown in Fig. 4. This crank-shaft is provided with a balance-wheel 50. It is evident that the crank-shaft may be rotated by any suitable power.
110

From the foregoing description the operation of the drill will be readily understood. As the crank-shaft is rotated a reciprocating movement is imparted to the yoke 26 through the instrumentality of the crank 30 of said
115 shaft, during which operation the bearing-block 29 has a vertical reciprocating movement in a slot 26^c of the yoke. This reciprocating movement of the yoke imparts a corresponding movement to the drill-holder by virtue of the engagement of the depending yoke-arms 26^a with the collars 22 and 24. The yoke supports these collars from contact with the drill-holder, this obviating the friction which otherwise would result from the en-
125 gagement of the drill-holder with the collars during the rotary action of the holder and its reciprocating movement therein. It is evident that the drill-holder has a limited sliding movement in the collars, which are en-
130

gaged by the yoke. During each rearward movement of the drill-holder it is given a partial rotation by virtue of its engagement with the rifle-bar, which is prevented from rotation in the opposite direction by the dogs 20 engaging the teeth of the ratchet 19, as will be readily understood. During the rearward movement of the drill-holder the collar 23 strikes the forward extremity of the sleeve 7, which limits the rearward movement of said collar. The drill-holder may, however, move rearwardly after the collar 23 engages the said stop-sleeve, thus relieving the mechanism from jar or concussion. The cushion 14 also prevents the jar incident to the engagement of the collar 23 with the stop extremity of the said sleeve. This jar is further relieved by virtue of the movement of the depending part 40 of the casing on the sleeve 41 and against one of the springs 44, as heretofore explained.

During the forward movement of the drill the collar 25 engages the rear extremity of the sleeve 8, which forms a stop against further forward movement of the collar. The drill-holder may, however, continue its forward movement until the shoulder 9^a of the drill-holder strikes the shoulder 8^a of the sleeve 8. During the forward movement of the drill-holder the machine is relieved from the injurious effects incident to undue jar or concussion by the spring 28, the cushion 4, and one of the springs 44, as heretofore explained.

The drill-casing is moved forward and back on the guide-shell by the feed-screw 42, which is journaled in the bar 46 and threaded in the sleeve 41, as heretofore explained. The crank-shaft bearings (see Figs. 1, 2, and 4) are provided with threaded openings, into which are screwed oil-cups 36^a to facilitate the introduction of lubricating material to the journals of said shaft. These bearings are provided with bushings 36^c, having oil-openings 36^d registering with the oil-cups 36^a.

Having thus described my invention, what I claim is—

1. In a drill, the combination of a casing having a central guideway and a longitudinal guideway located laterally of said central guideway, a drill-holder mounted to reciprocate in said central guideway, a tool-actuating part located laterally with relation to the drill-holder and bifurcated to straddle the latter, a projection extending from the tool-actuating yoke and fitting in the lateral longitudinal guideway to be limited thereby to movement in a path parallel to that of the drill-holder, suitable bearings mounted on the drill-holder on opposite sides of the bifurcated yoke portion, and suitable means for reciprocating the yoke.

2. The combination of a casing having a central guideway and a longitudinal guideway located laterally of said central guideway and communicating therewith, a drill-holder mounted to reciprocate in said central guide-

way, a tool-actuating part located laterally with relation to the drill-holder, a projection extending from the tool-actuating part and fitting in the lateral longitudinal guideway to be limited thereby to movement in a path parallel to that of the drill-holder, the tool-actuating part being bifurcated to straddle the drill-holder and having a slot formed beyond its bifurcated portion, a bearing-block movably mounted in said slot, an operating crank-shaft whose crank engages said bearing-block, the yoke having guide-stems located on opposite sides of its slotted portion and engaging bearings formed in the casing.

3. In a rock-drill, the combination of a casing having a central guideway, and a longitudinal guideway located laterally of said central guideway and communicating therewith, a drill-holder mounted to reciprocate in said central guideway, a tool-actuating yoke located laterally with relation to the drill-holder and having a projection fitting in the lateral longitudinal guideway whereby it is limited to movement in a path parallel to that of the drill-holder, a suitable operative connection between the yoke and the drill-holder, the yoke being provided with a slot formed beyond the drill-holder, and a crank-shaft whose crank passes through said slot.

4. In a rock-drill, the combination with a casing, of a drill-holder mounted to reciprocate therein, a yoke also mounted to reciprocate in the casing, a suitable operative connection between the yoke and the drill-holder, the yoke being provided with a slot formed above the drill-holder to receive the crank of an operating-shaft, the yoke having guide-stems located on opposite sides of its slot, the casing having chambers for the yoke-stems which are provided with longitudinal openings extending from their outer extremities to the slot to permit the lubricating material to circulate.

5. In a rock-drill, the combination of a casing having a central guideway, and a longitudinal guideway located laterally of said central guideway and communicating therewith, a drill-holder mounted to reciprocate in the central guideway, a yoke located laterally with relation to the drill-holder and provided with a projection fitting the lateral longitudinal guideway and limited thereby to movement in a path parallel with the drill-holder, the said yoke having arms straddling the drill-holder, spring-held collars mounted on the opposite sides of the yoke-arms, forming a yielding connection between the yoke and the drill-holder, and means for reciprocating the yoke.

6. In a rock-drill, the combination of a casing having a central guideway and a longitudinal guideway located laterally of said central guideway and communicating therewith, a drill-holder mounted to reciprocate in the central guideway, a yoke located laterally

with relation to the drill-holder and provided with a projection fitting the lateral longitudinal guideway and limited thereby to movement in a path parallel with the drill-holder, 5 collars loosely mounted on the drill-holder on opposite sides of the yoke, springs surrounding the drill-holder engaging said collars, the yoke having a part passing between the collars whereby as the yoke is reciprocated, a 10 corresponding movement is imparted to the drill-holder, and suitable means for reciprocating the yoke.

7. The combination with a casing, of a drill-holder mounted to reciprocate therein, a yoke 15 also mounted to reciprocate in the casing and bifurcated to straddle the drill-holder, spring-held collars mounted on the drill-holder on opposite sides of the yoke, and a connection between the yoke and the collars whereby the 20 latter are supported from contact with the drill-holder, substantially as described.

8. The combination of a casing provided with a central guideway and a longitudinal guideway located laterally of said central 25 guideway and communicating therewith, a drill-holder mounted to reciprocate in the central guideway, a tool-actuating yoke located laterally with relation to the drill-holder and provided with a projection fitting the lateral 30 longitudinal guideway, whereby it is limited to movement in a path parallel to that of the drill-holder, the yoke being arranged to straddle the drill-holder and provided with a slot, an operating crank-shaft whose crank passes 35 through said slot, and yielding collars mounted on the drill-holder on opposite sides of the yoke.

9. In a rock-drill, the combination with a casing, of a drill-holder mounted to reciprocate 40 therein, a yoke also mounted to reciprocate in the casing and provided with arms arranged to straddle the drill-holder, the yoke being slotted above the drill-holder to receive the crank of an operating-shaft, and provided with 45 front and rear stems extending parallel with the drill-holder, two collars loose on the drill-holder on each side of the yoke, coil-springs separating the two pairs of collars, the foremost collar of one pair and the rearmost col- 50 lar of the other pair engaging the yoke-arms, while the other collars engage shoulders on the drill-holder, and a suitable connection between the yoke and its engaging collars whereby the latter are supported from contact with 55 the drill-holder.

10. In a rock-drill the combination with a casing, of a drill-holder mounted to reciprocate therein, a yoke also mounted to reciprocate in the casing and provided with arms arranged 60 to straddle the drill-holder, the yoke being slotted above the drill-holder to receive the crank of an operating-shaft, and provided with front and rear stems extending parallel with the drill-holder, two collars loose on the drill- 65 holder on each side of the yoke, coil-springs

surrounding the drill-holder and separating the two pairs of collars, the front collar of one pair and the rear collar of the other pair, engaging the yoke-arms, while the other collars engage shoulders of the drill-holder, and a 70 suitable connection between the last-named collars and the shoulders of the drill-holder, whereby the interior surface of the said collars is normally free from contact with the drill-holder. 75

11. In a rock-drill, the combination with a casing, of a drill-holder mounted to reciprocate therein, a yoke also mounted to reciprocate in the casing and provided with arms arranged 80 to straddle the drill-holder, the yoke being slotted above the drill-holder to receive the crank of an operating-shaft, and provided with front and rear stems extending parallel with the drill-holder, a pair of collars loose on the drill-holder on each side of the yoke, a coil- 85 spring separating the individual collars of each pair, the foremost collar of one pair and the rearmost collar of the other pair engaging the yoke-arms, while the other collars engage shoulders on the drill-holder, the drill-casing 90 being provided with stops located in the front and rear for limiting the movement of the foremost and rearmost collars.

12. In a rock-drill, the combination with a casing, of a drill-holder mounted to reciprocate 95 therein, a yoke also mounted to reciprocate in the casing and bifurcated to straddle the drill-holder, the yoke having front and rear guide-stems engaging chambers formed in the casing, and being provided with a slot located 100 intermediate the guide-stems, and adapted to receive the crank of an operating-shaft, two pairs of collars surrounding the drill-holder, one pair being located on each side of the yoke, each collar having a reduced extension, the 105 rearmost collar on one side of the yoke and the foremost collar on the opposite side of the yoke, engaging the latter, coil-springs surrounding the drill-holder, interposed between the two pairs of collars and surrounding the 110 collar extensions, one collar of each pair engaging a shoulder on the drill-holder, and a suitable connection between the collars and their engaging parts whereby their interior surfaces are normally held free from the drill- 115 holder.

13. In a rock-drill, the combination with a guide-shell and a casing slidable thereon, of a drill-holder mounted to reciprocate in the casing, the latter being provided with means for 120 limiting the movement of the drill-holder in both directions, the casing being provided with a projection having an opening, a sleeve inserted in said opening and interiorly threaded, a feed-screw journaled in a part connected 125 with the guide-shell, and engaging the threads of the said sleeve, springs surrounding the sleeve on opposite sides of the casing projection through which the sleeve passes, the sleeve having shoulders engaged by the springs, 130

whereby the projection of the casing has a sliding movement on the sleeve against the springs, substantially as described.

14. The combination with a guide-shell, a casing, a reciprocating drill-holder mounted in the casing, and a feed-screw connected with the guide-shell, of a sleeve within which the feed-screw is threaded, the casing having a projection through which the said sleeve passes, whereby the casing is slidable on the sleeve, and springs surrounding the sleeve and forming buffers or cushions against which the projection of the casing bears, substantially as described.

15. The combination with a guide-shell, a drill-casing and feed-screw, of a nut in which the feed-screw is threaded, the said nut having a slidable connection with the casing, springs surrounding the nut on opposite sides of the casing connection, and stops on the nut to prevent longitudinal movement of the springs.

16. The combination with a drill-casing, of a feed-screw nut slidably mounted thereon, and buffer-springs forming a yielding connection between the casing and nut on opposite sides of the casing part through which the nut passes.

17. The combination with a drill-casing having a projection provided with an opening and counterbored to form spring-chambers, a sleeve-nut passed through the opening of the projection and slidable therein, and springs surrounding the nut and located in said chambers, the nut having shoulders whereby the springs are confined in the chambers, substantially as described.

18. The combination with a drill-casing, of a feed-screw nut with which the casing is slidably connected, and a resilient device mounted on the nut on opposite sides of the casing connection, the said devices forming buffers for the drill-casing in both directions.

19. In a rock-drill, the combination with a casing, of a drill-holder mounted to reciprocate therein, an exterior sleeve screwed upon the rear extremity of the drill-holder which is

hollow to receive a rifle-bar for rotating purposes, and a nut screwed into the hollow portion of the drill-holder and having a head engaging the rear end of the sleeve to lock the latter against unscrewing for the purpose set forth.

20. In a rock-drilling machine, the combination of a casing and guide-shell, of a drill-holder mounted to reciprocate in the casing, a yoke arranged to reciprocate in the casing and bifurcated to straddle the drill-holder, its central portion being slotted, a journal-box slidable in the slot of the yoke, a crank-shaft engaging said box and journaled in the casing, two collars loosely mounted on the drill-holder on each side of the yoke, each collar of each pair having reduced extensions, a coil-spring located between the collars of each pair, and the drill-holder having stops to engage the foremost and rearmost collars respectively of each pair, substantially as described.

21. In a machine of the class described, the combination with a guide-shell and a casing slidable thereon, of a drill-holder mounted to reciprocate in the casing, means for operating the drill-holder, a collar mounted on the drill-holder on each side of the operating means, a coil-spring surrounding the drill-holder in front of one collar and in the rear of the other collar, loose collars surrounding the drill-holder and respectively engaging the forward extremity of one spring and the rear extremity of the other spring, stops on the drill-holder which the front and rear collars respectively engage, and stops on the casing to limit the forward movement of the foremost collar and the rearward movement of the rearmost collar, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY DEITZ.

Witnesses:

DENA NELSON,
A. J. O'BRIEN.