

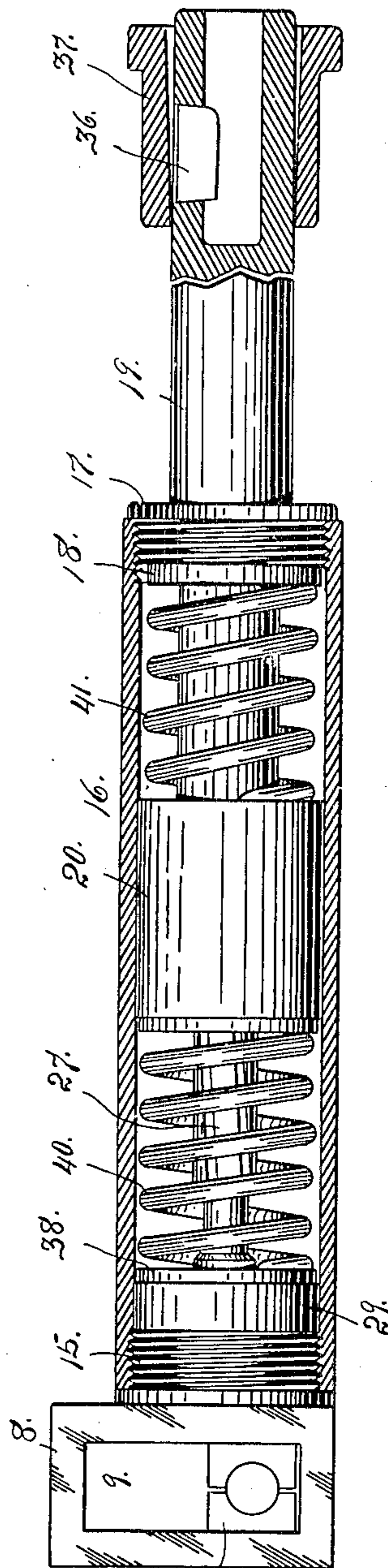
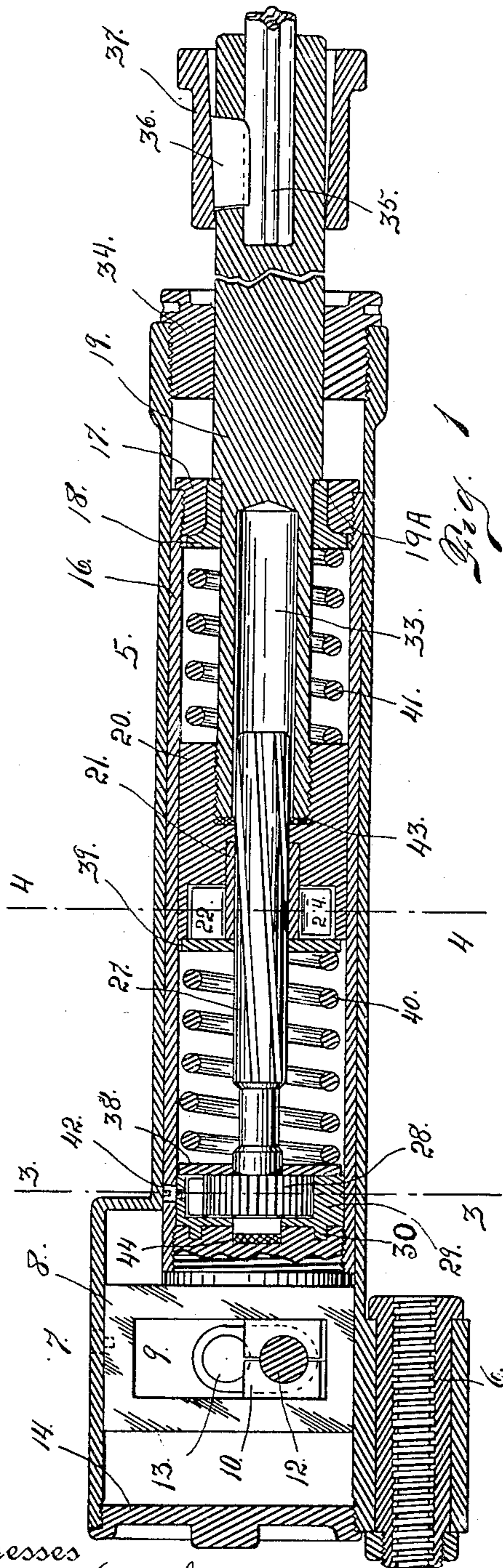
No. 844,582.

PATENTED FEB. 19, 1907.

H. DEITZ.
ROCK DRILL.

APPLICATION FILED JUNE 2, 1905.

2 SHEETS—SHEET 1.



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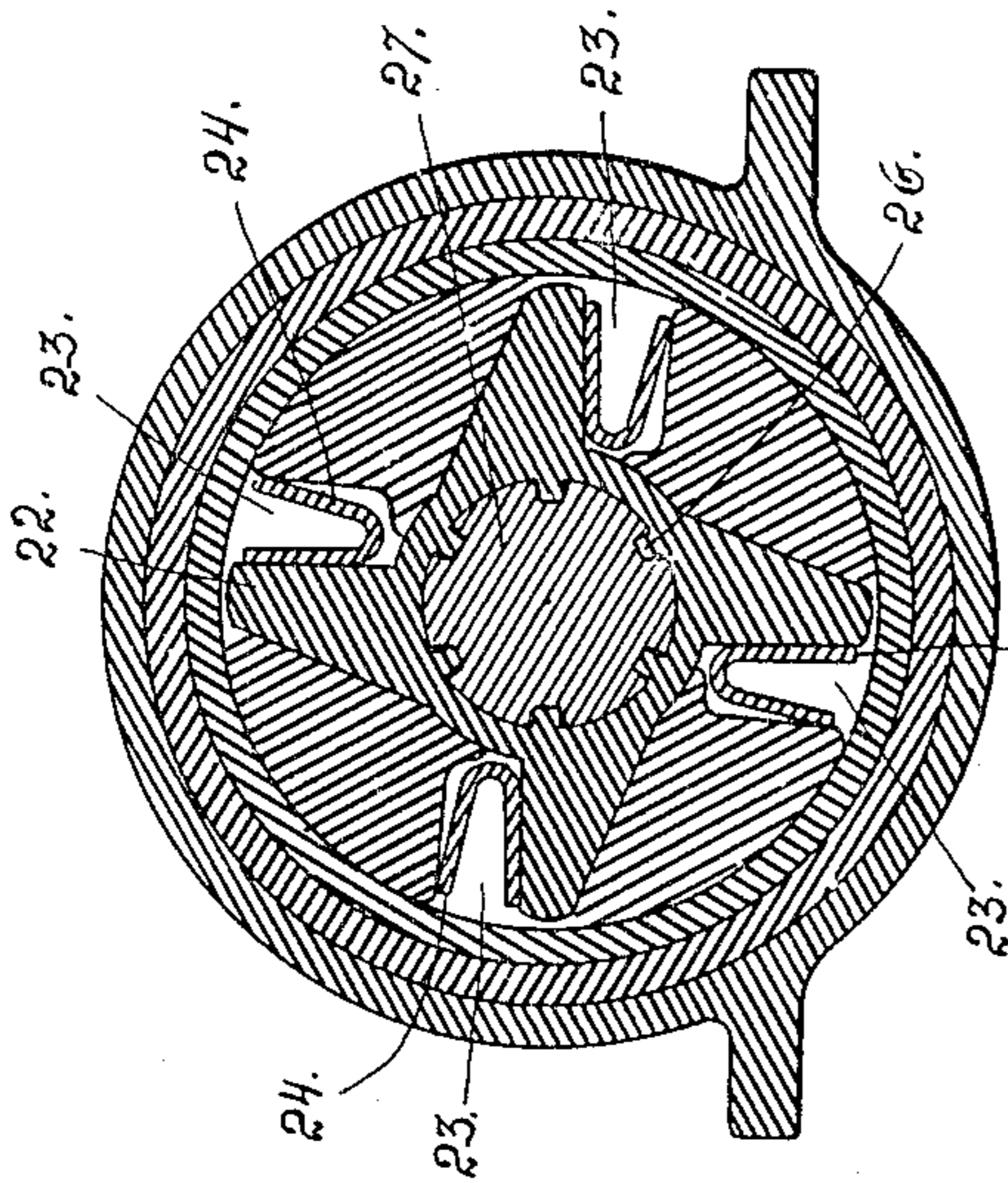


Fig. 4.

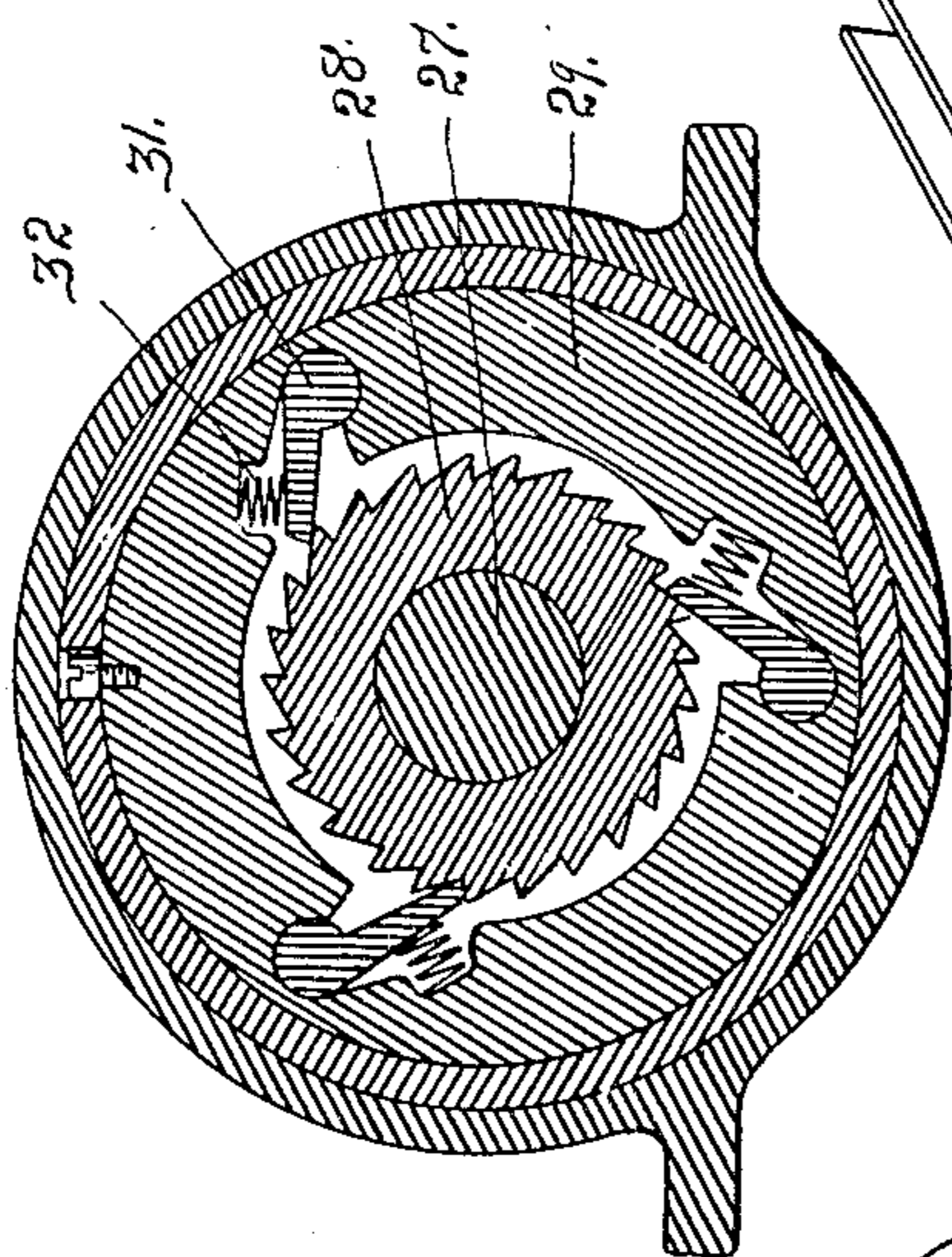


Fig. 3.

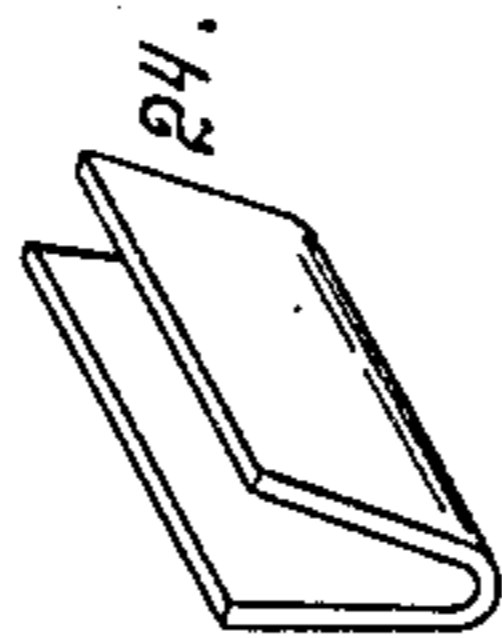


Fig. 6.

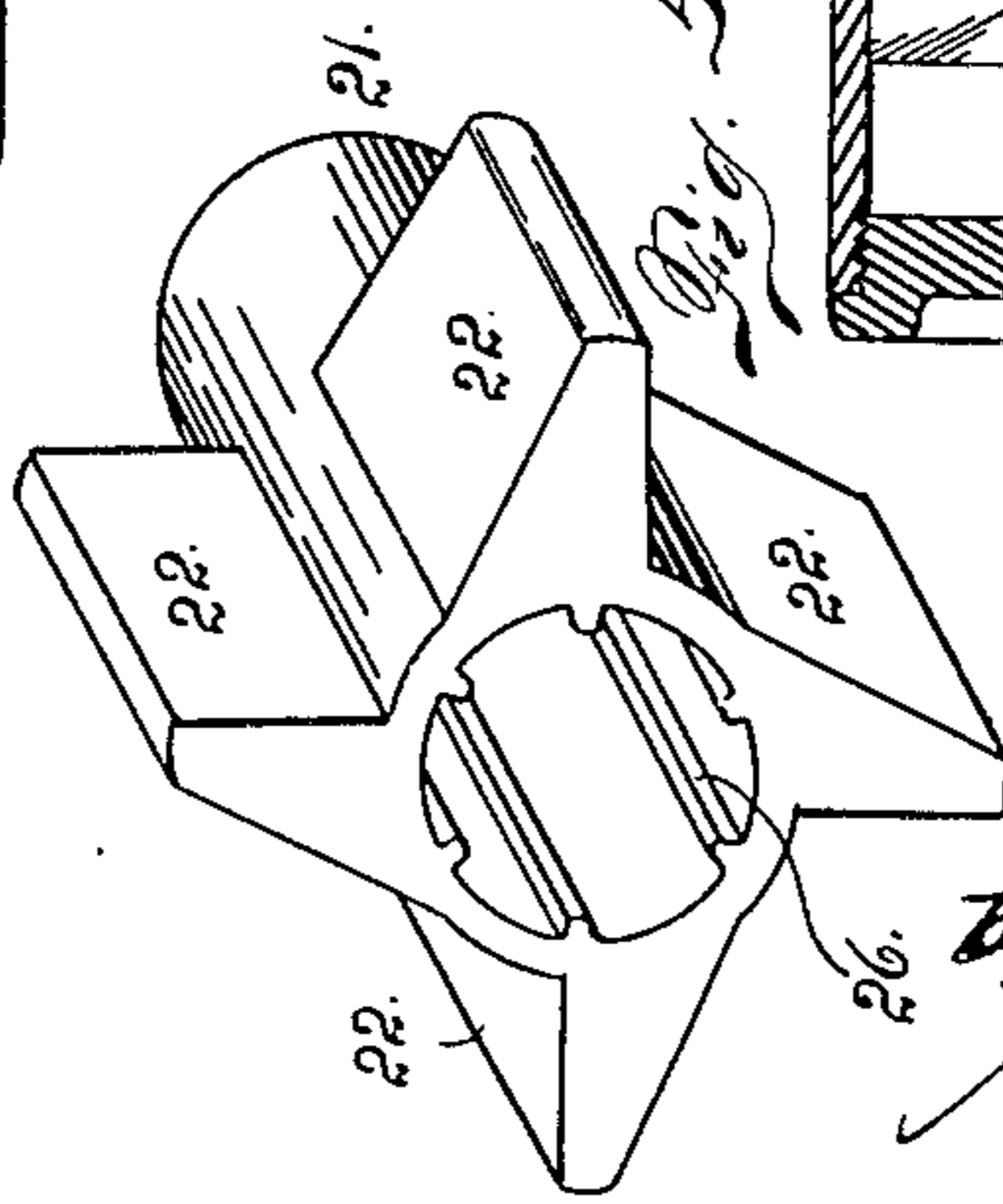


Fig. 5.

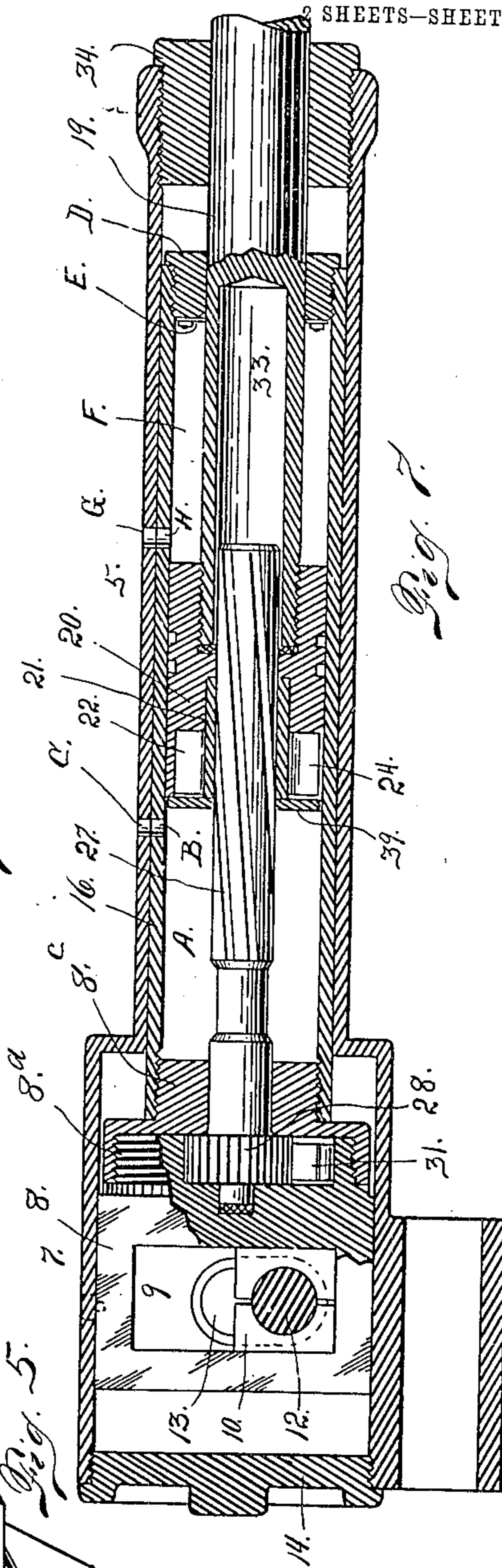


Fig. 7.

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UNITED STATES PATENT OFFICE.

HENRY DEITZ, OF DENVER, COLORADO

ROCK-DRILL.

No. 844,582

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed June 2, 1905. Serial No. 263,366.

To all whom it may concern:

Be it known that I, HENRY DEITZ, a citizen of the United States, residing at the city and county of Denver 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 letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in rock-drills, and consists of the features 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 vertical longitudinal section taken through my improved machine. Fig. 2 is a detail view showing the reciprocable yoke, the drill-holder, and their connections, the said parts being shown in the assembled relation. Figs. 3 and 4 are sections taken on the lines 3 3 and 4 4, Fig. 1. Fig. 5 is a perspective view in detail of a winged sleeve carried by the drill-holder and engaging the rifle-bar for rotating the drill-holder. Fig. 6 is a spring-plate or yielding device interposed between the wings of the rifle-bar sleeve and the drill-holder. Fig. 7 is a view similar to Fig. 1, but illustrating a modified form of construction.

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

Let the numeral 5 designate the drill-casing, which may be mounted in any suitable manner. As nothing is claimed on the mechanism for supporting the drill-casing and feeding it back and forth on the supports these features are not illustrated in the drawings and will only be referred to in a very general way in the specification. This casing is provided with a nut 6, adapted to receive a feed-screw, (not shown,) whereby the casing may be moved back and forth on its support in the ordinary way. The casing 5 is provided at its rear extremity with an enlargement 7, in which is located a yoke 8, provided with a slot 9, in which is located a two-part box 10, surrounding the crank 12 of a shaft 13. In the rear of the yoke the

casing is provided with a head 14, screwed thereto.

The forward extremity of the yoke is provided with a threaded extension 15, upon which is screwed a hollow cylindrical member 16, whose forward extremity is provided with a screw-sleeve 17, engaging a loose collar 18, surrounding the drill-holder 19, which is provided with a shoulder 19^A, located in front of the loose collar and forming a stop therefor. The rear extremity of the drill-holder is threaded into a piston 20, located within the cylinder 16.

The rear part of the piston 20 is provided with a sleeve 21, loose therein and provided with wings 22, which enter recesses 23 formed in the rear portion of the piston. Between the wings 22 and one wall of each recess 23 is located a spring-plate 24, having a certain degree of yielding capacity, whereby the winged sleeve may be allowed a partial rotation while the piston remains stationary, as when the drill is stuck, for instance.

The winged sleeve is provided with ribs 26, adapted to engage the grooves of the rifle-bar 27, whereby the drill-holder is rotated during the rearward movement of the yoke and its cylinder.

The rear extremity of the rifle-bar is made fast to a ratchet 28, located within a casing 29, the latter being provided with rearwardly-projecting lugs 30, adapted to engage counterpart recesses formed in the threaded extension 15 of the yoke, whereby the rifle-bar is prevented from rotating and made to impart the rotary movement to the drill-holder. This ratchet 28 is engaged by pawls 31, mounted in the casing 29, the said pawls being acted on by springs 32. These pawls prevent the ratchet from moving in one direction, but allow it to move freely in the opposite direction.

The rear extremity of the drill-holder is provided with a cavity 33, which the rifle-bar enters. The drill-holder passes through a screw-plug 34, inserted in the forward extremity of the casing. The forward or chuck extremity of the drill-holder is provided with a socket, in which the drill-bit 35 is inserted and engaged by a key 36 passing through an opening in the chuck, and entering one of the longitudinal grooves of the cruciform drill-bit. When the drill is in place, the key 36 protrudes beyond the chuck to engage with a locking-sleeve 37, having its

interior walls tapering. The cavity of the sleeve is smallest at the rear and increases in diameter forwardly. Hence as the locking-sleeve is moved forwardly it acts on the key to tighten the latter on the drill-bit.

Immediately in front of the ratchet-casing 29 is located a disk 38, through which the rifle-bar passes. This disk closes the chamber of the ratchet-casing. Immediately in the rear of the piston 20 is located a smaller disk 39, which surrounds the rifle-bar and closes the recesses of the piston in which the springs 24 are located. Between the disks 38 and 39 is located a coil-spring 40, the said spring surrounding the rifle-bar. Between the forward extremity of the piston and the loose collar 18 is located a coil-spring 41, which surrounds the drill-holder.

The ratchet-casing 29 is connected with the cylindrical member 16 by a suitable fastening device, as a set-screw 42.

From the foregoing description the use and operation of my improved construction as thus far described will be readily understood. As the crank-shaft 13 is rotated by connecting the same with any suitable power the yoke 8 is reciprocated within the enlarged rear extremity 7 of the casing 5. By enlarging the yoke extremity of the casing I am permitted to employ a larger yoke 6, making a longer stroke possible than with a casing whose rear extremity is the same size as the body of the casing.

As the yoke is reciprocated a corresponding movement is imparted to the cylindrical member 16. As the yoke and said member are driven forwardly the forward movement is imparted to the piston 20, connected with the drill-holder as aforesaid. During the initial forward movement of the yoke and cylinder the spring 40 is somewhat compressed, after which the piston and drill-holder are moved forwardly to the limit of the yoke's stroke. When the yoke and the cylindrical member cease their forward movement, the drill-holder, by virtue of its momentum, may continue its forward travel, whereby the spring 41 is compressed. As soon as the drill strikes the rock the recoil of the drill-holder resulting from the force of the blow will be taken up by the two springs 40 and 41 in a manner that will be readily understood. Now as the yoke and cylindrical member move rearwardly the initial movement compresses the spring 41, which, acting on the piston 20, carries the drill-holder rearwardly with the cylindrical member until the yoke and the last-named member reach the rearward limit of the stroke permitted by the crank. When this occurs, the momentum of the piston 20 and the drill-holder carries these parts rearwardly, compressing the spring 40. This rearward movement of the drill-holder and piston after the yoke and cylindrical member have

ceased their rearward movement is sufficient to impart the necessary partial rotation to the drill-holder by virtue of the engagement of the winged sleeve 21 with the rifle-bar 27. Assuming now that the drill is stuck in the hole so that the drill-holder cannot turn, if the yoke, the cylindrical member, and the rifle-bar are reciprocated, the rotary action of the winged sleeve imparted by the rifle-bar will be expended on the springs 24, since the latter have sufficiently yielding capacity to compensate for this action of the winged sleeve without breaking any of the parts.

Between the rear extremity of the drill-holder and the socket of the piston which it enters is placed a suitable packing 43. Also between the rear extremity of the rifle-bar, where it passes through the ratchet 28, is located a packing 44. These packing-pieces relieve the rigidity of the parts between which they are interposed and introduce a yielding element to the construction, which is desirable in mechanism of this class.

In the form of construction shown in Fig. 7 the yoke 8 is provided with an enlarged screw-threaded extension 8^a, to which is applied the rear extremity of a plug 8^c, to which the cylindrical member 16 is attached, the part 8^c closing the rear extremity of the cylinder. In this case the threaded extension 8^a of the yoke forms the casing for the ratchet 28. Between the closed extremity of the cylinder and the piston 20 is located an air-chamber A, provided with an orifice B, adapted to register with an orifice C in the casing when the parts are in the position shown in Fig. 7 or when the cylindrical member is centrally located. The forward extremity of the cylinder 16 is closed by a plug D, which fits the drill-holder 19 closely, and is further provided with a packing-washer E to prevent the escape of air around the drill-holder. Between the plug D and the piston is located an air-chamber F, communicating with the atmosphere by registering orifices G and H, formed in the casing and cylinder, respectively. In the operation of this form of the mechanism as soon as the yoke and the cylinder 16 begin their forward movement the orifices B and C are immediately thrown out of register, whereby the air cushions between the rear head 8^c of the cylinder and the piston 20, whereby the drill-holder is driven forwardly. As soon as the cylinder reaches its forward limit of movement the drill-holder is allowed a possible further forward movement by virtue of its momentum, resulting in cushioning the air between the front head of the cylinder and the piston. As soon as the drill-bit strikes the rock the recoil of the drill-holder is taken up by the air cushions in the chambers A and F, which cushions in this form of construction take the place of the springs in the form shown in Figs. 1 and 2.

Having thus described my invention, what I claim is—

1. In a rock-drill, the combination with a casing, of a reciprocable yoke located therein, a hollow member connected to move with the yoke, a piston located in the hollow member, a drill-holder connected with the piston, a loose collar surrounding the drill-holder, the latter having a stop to limit the forward movement of the collar thereon, the hollow member also having a stop for the loose collar forward of the latter, a rifle-bar and ratchet carried by the hollow member and connected with the drill-holder for rotating the latter, and a yielding connection between the drill-holder piston and the hollow member, substantially as described.

2. The combination with a casing, a yoke and hollow member rigidly connected together and reciprocable in the casing, a drill-holder entering the casing and provided with a loose collar surrounding the same, the drill-holder having a stop to limit the forward movement of the collar thereon, the hollow member having a plug against which the front end of the loose collar of the drill-holder

bears, a piston located in the hollow member and connected with the drill-holder, and cushions located within the hollow member on opposite sides of the drill-holder piston.

3. The combination with a casing, a member reciprocable in the casing, a rifle-bar and ratchet carried by the reciprocable member, a piston yieldingly connected with the reciprocable member, a drill-holder connected with the piston, and a winged sleeve carried by the piston and cooperating with the rifle-bar to impart the reciprocating movement to the drill-holder, the piston being recessed to receive the wings of the sleeve, the said recesses being larger than the wings, and springs interposed between the wings and the walls of the piston-recesses on one side of the wings, the winged sleeve being loose in the piston for the purpose set forth.

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

HENRY DEITZ.

Witnesses:

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A. J. O'BRIEN.