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SELF TIGHTENING ROCK DRILL CHUCK.

APPLICATION FILED JAN. 21, 1907.

920,788.

Patented May 4, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

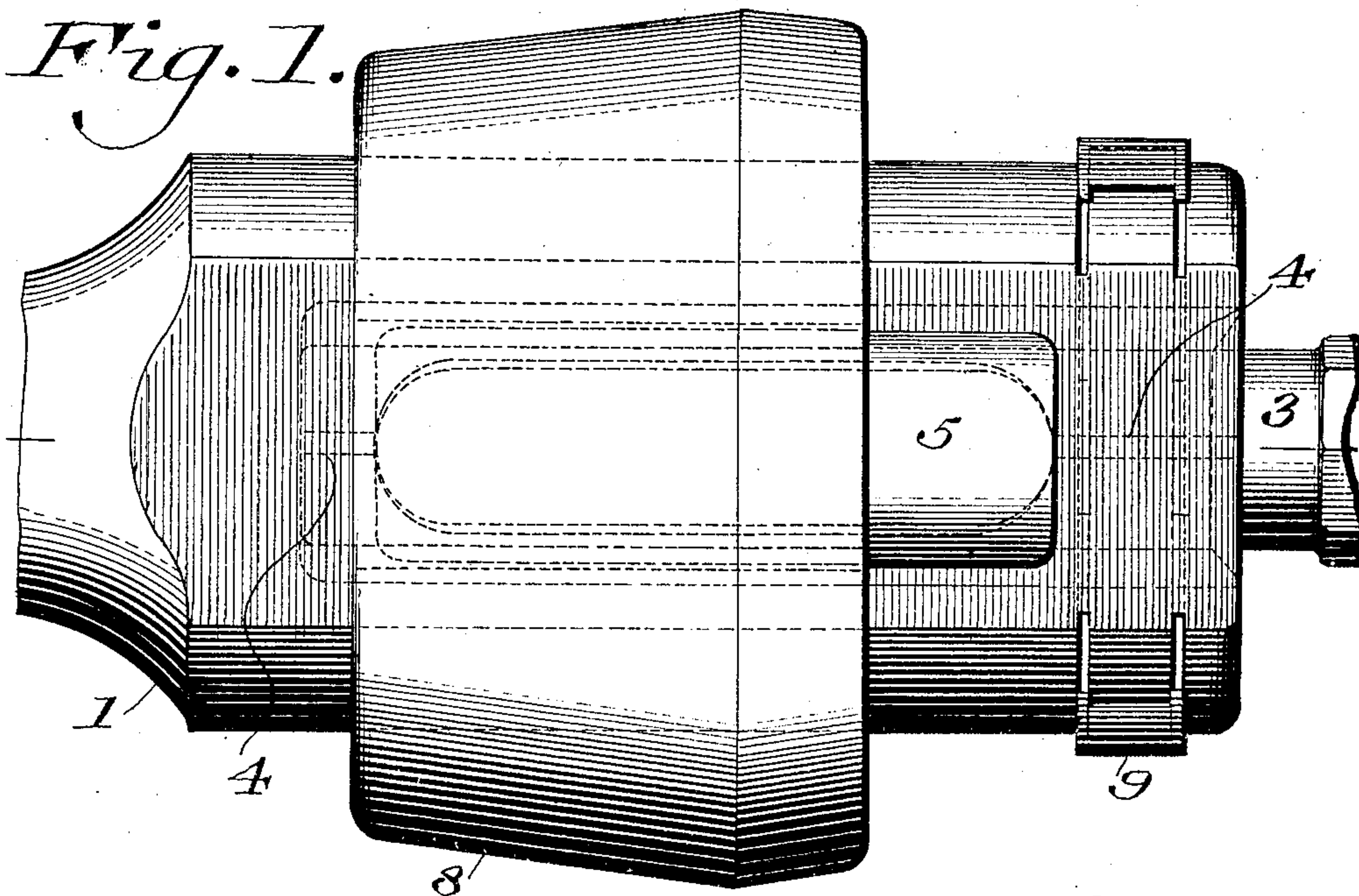
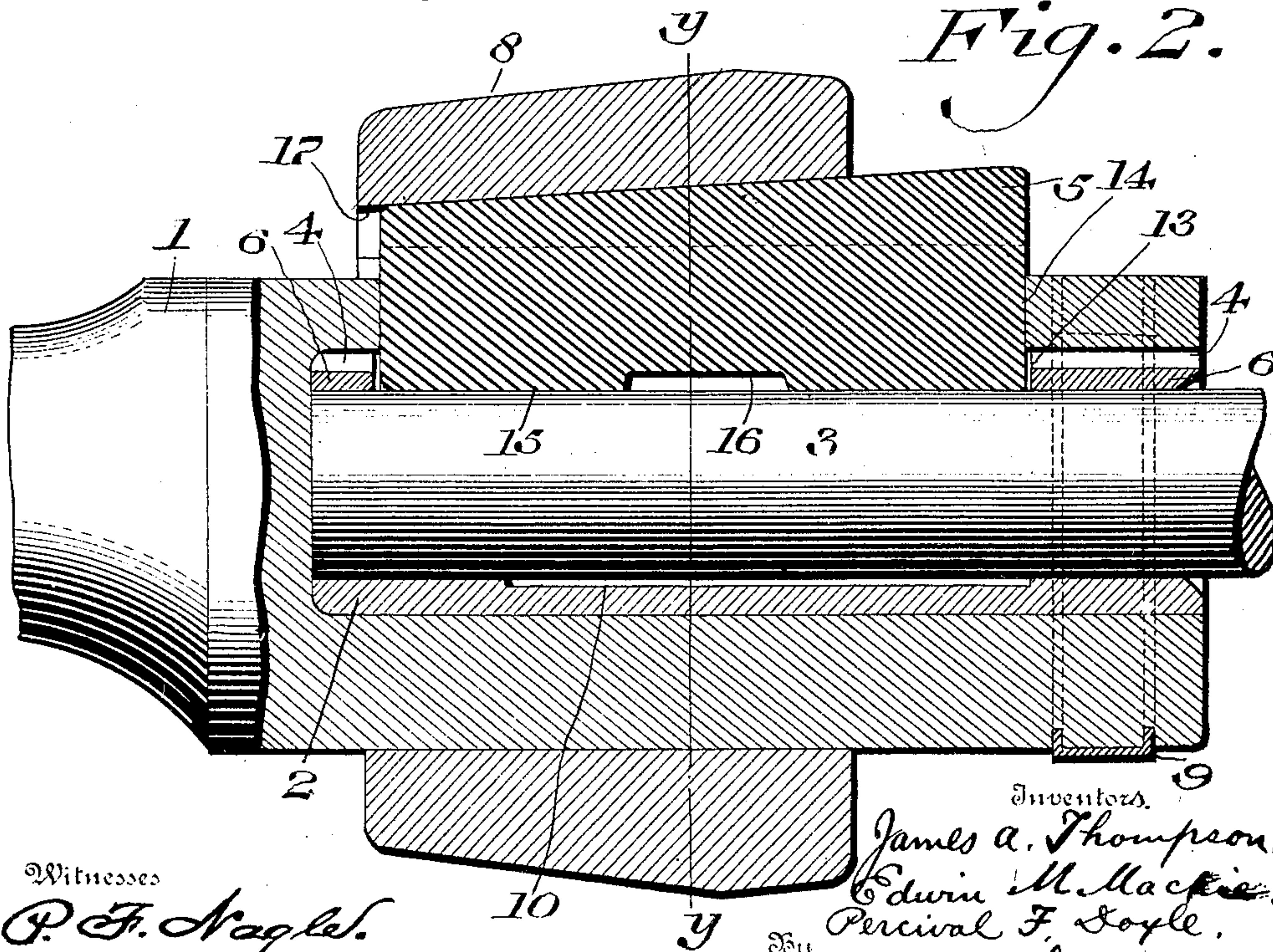


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

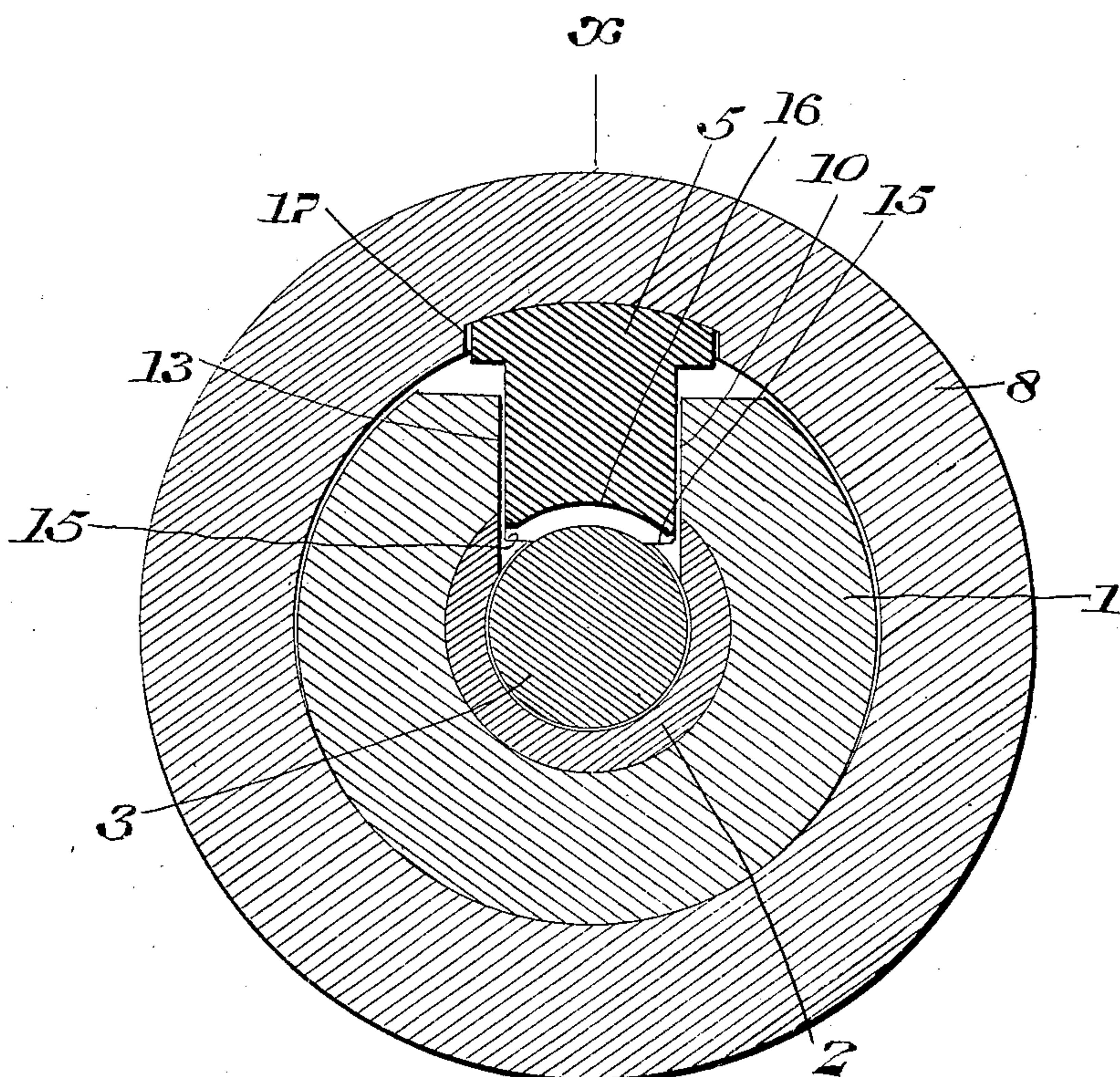
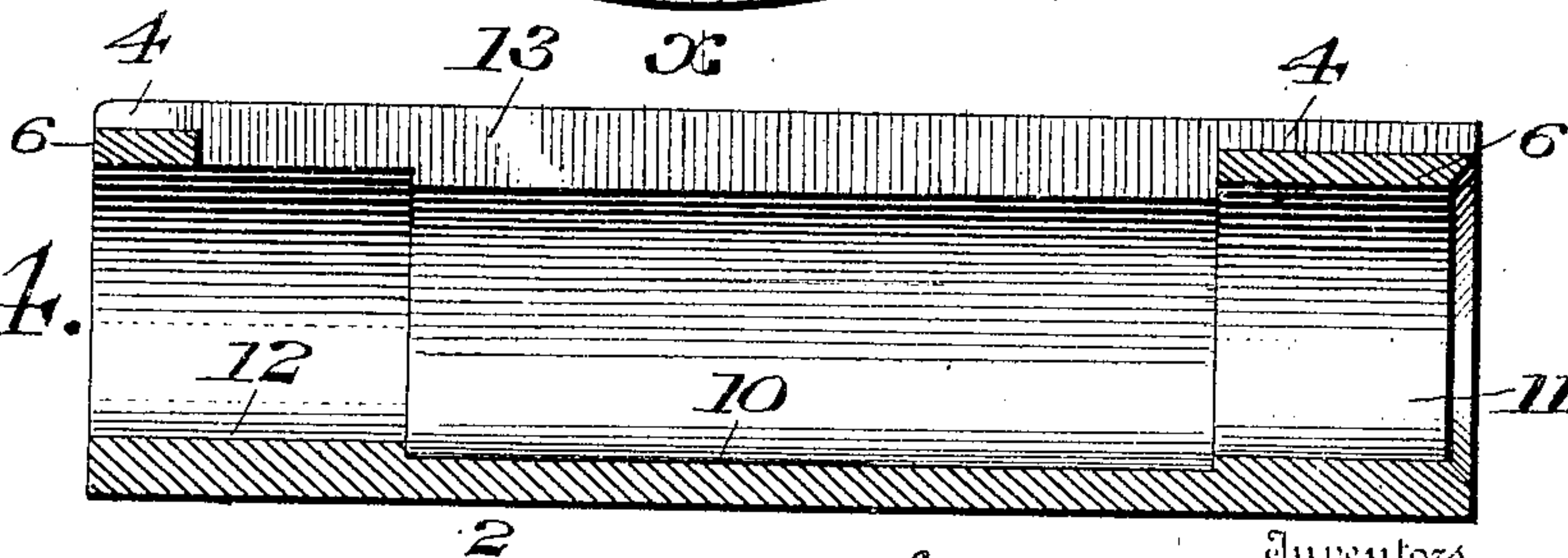


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

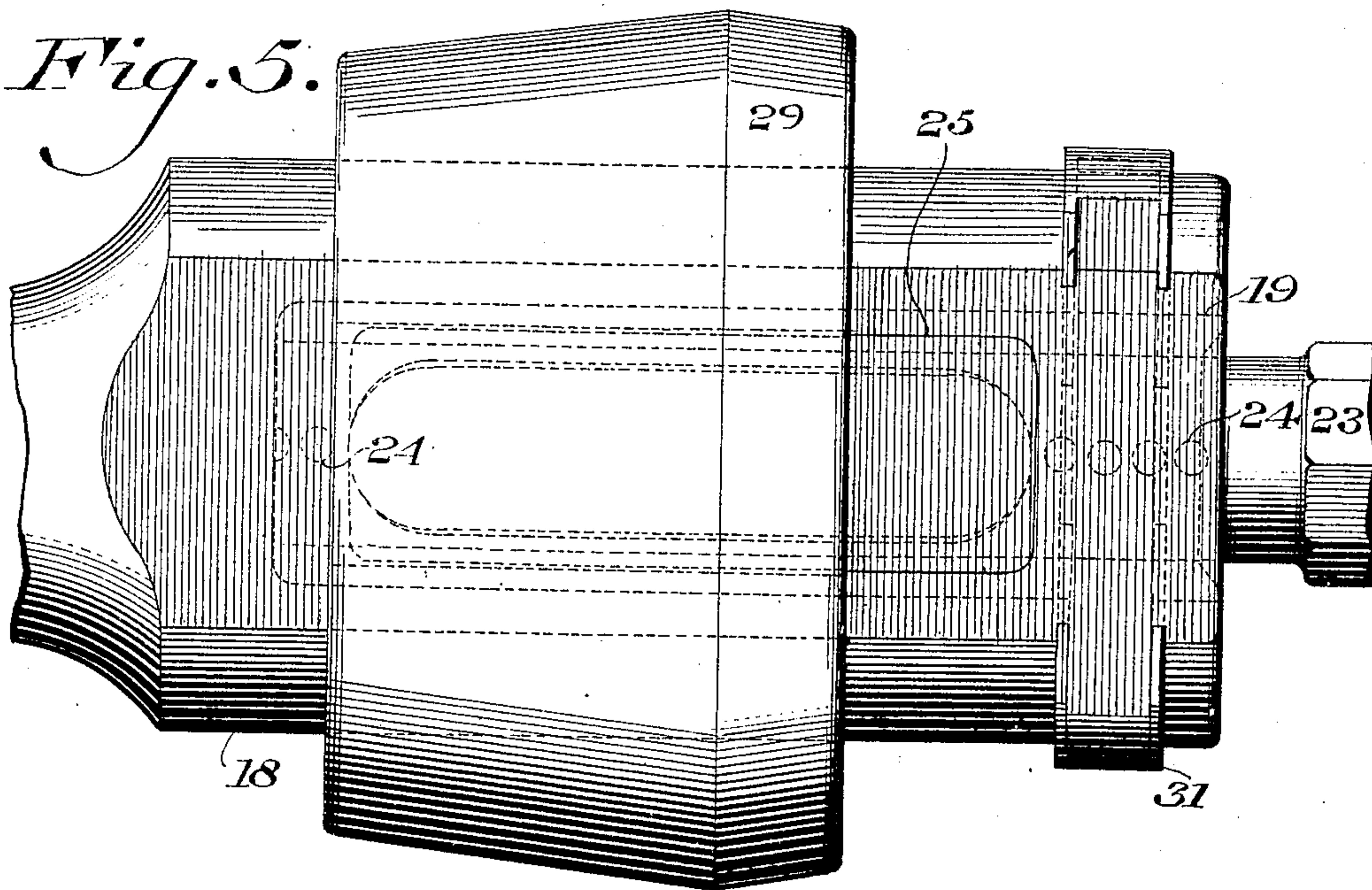
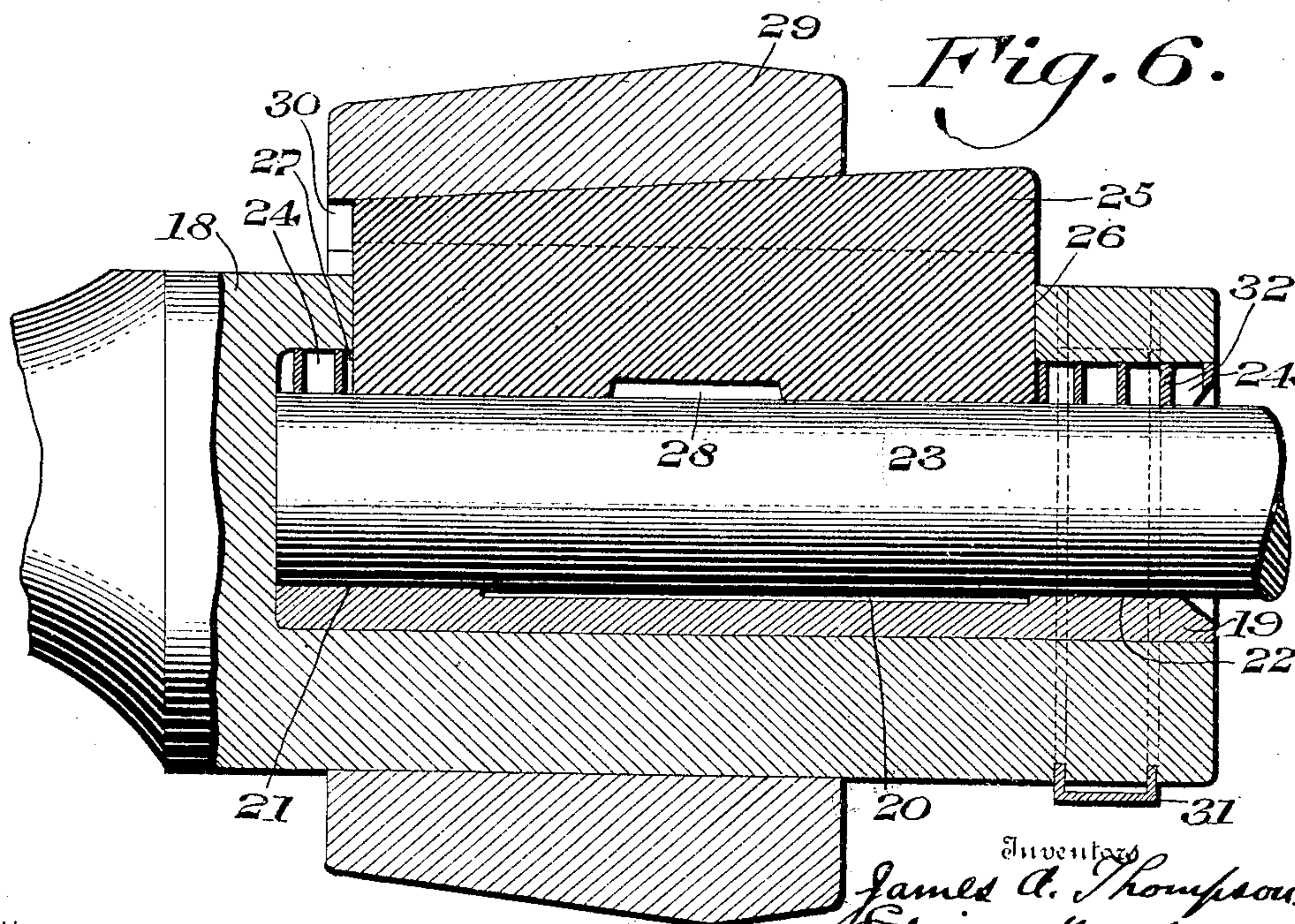


Fig. 6.



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UNITED STATES PATENT OFFICE.

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SELF-TIGHTENING ROCK-DRILL CHUCK.

No. 920,788.

Specification of Letters Patent.

Patented May 4, 1909.

Application filed January 21, 1907. Serial No. 353,282.

To all whom it may concern:

Be it known that we, JAMES A. THOMPSON and EDWIN M. MACKIE, citizens of the United States, and PERCIVAL F. DOYLE, a subject of the King of Great Britain, all residing in the city of Chicago, county of Cook, State of Illinois, have invented a new and useful Self-Tightening Rock-Drill Chuck, of which the following is a specification.

Our invention consists of a novel construction of a self tightening rock-drill chuck, consisting of an improved construction of chuck body and chuck bushing, drill steel, chuck key, keying ring and spring clip stop and their adjuncts constructed and assembled in a novel manner, whereby a labor and time saving device is produced which will secure and hold the drill steel in the drill-chuck under all conditions, irrespective of all working conditions to which the device may be subjected.

For the purpose of illustrating our invention, we have shown different forms of devices, as these embodiments best illustrate the principle of our invention, although it is obvious that the principal instrumentalities of which our invention consists, can be variously arranged and organized, and in the accompanying drawings we have shown embodiments thereof which we have found in practice to give satisfactory results, although it is to be understood that our invention is not limited to the specific arrangement and organization of these instrumentalities, as herein shown.

To the above ends, our invention consists broadly of a novel construction of self-tightening rock-drill chuck, whose novel features will be hereinafter fully set forth and pointed out in the claims.

Figure 1 represents a side elevation of a self-tightening rock-drill chuck embodying our invention. Fig. 2 represents a sectional view of our novel chuck, the section being taken on line $x-x$, of Fig. 3. Fig. 3 represents a section on line $y-y$, Fig. 2. Fig. 4 represents a sectional view of our novel bushing in detached position. Fig. 5 represents a side elevation of another embodiment of our invention. Fig. 6 represents a sectional view of Fig. 5.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—As seen in Fig. 1, 1 designates the chuck body which is

composed of suitable material and constructed to suitably fit and receive the other component parts.

2 designates a renewable hardened steel bushing which is relieved by recessing its inner surface as indicated at 10, so as to provide suitable bearings 11 and 12 at each end for the drill steel 3, it being apparent that the outer diameter of the bushing 2 is made sufficiently large to allow said bushing to be pressed tightly into the seat provided for it in the chuck body 1. To facilitate the removal of the bushing when worn, it is provided with longitudinal grooves 4 on its outer surface, which extend outwardly at each end from the chuck key slot 13 provided for the chuck key 5, it being apparent that to remove the chuck bushing 2, the drill steel, chuck key and keying ring being first removed, a suitable drift is driven in the opening or groove 4 to break the thin walls 6, of the chuck bushing, whereupon by breaking in said walls 6, said chuck bushing will be loosened in the chuck and easily removed, whereupon a new bushing can be readily pressed in or placed in position. The chuck key 5 is made to fit end-wise in the chuck slot 14 therefor and its inner face 15 is slightly concaved or made to fit the contour of the drill steel 3, as will be apparent from Fig. 3, and the bearing of said chuck key on said drill steel 3 is also relieved as indicated at 16 and being opposite to the relieved part 10 of the chuck bushing 2, provides an elastic grip when the device is keyed up, as will be evident to those skilled in the art.

The upper face of the chuck key 5 is constructed with a liberal bearing area and is suitably tapered lengthwise to fit the contiguous tapering slot 17 in the keying ring 8, which is made of suitable material and bored out to suitably fit the outer surface of the chuck rod 1 and is also provided with a tapering slot to fit the contiguous chuck-key 5.

To prevent the keying ring 8 from slipping off the chuck 1, when the chuck-key 5 has been removed, a spring clip stop 9 is provided which has another important function, since it will be apparent that in case it should become necessary to remove the keying ring 8 for repairs or to replace it with a new one, it will not be necessary to remove the piston and chuck-rod 1 from the machine, because by forcing off the spring slip 9, the keying ring 8 can then be slipped off the chuck 1, the

chuck-key 5 having been removed and a new ring 8 can then be slipped on the chuck and the resilient ring 9 again readily sprung in place without necessitating dismantling or stopping of the drill to any extent.

The operation of this embodiment of our invention will be apparent to those skilled in the art, since it will be seen that it is only necessary for the operator to slip the keying ring 8 along the chuck 1 toward the drill until the chuck-key 5 is free enough to allow the shank of the drill steel 3 to be slipped into place in the chuck bushing 2, after which the key 5 is pressed against the drill steel shank and then the keying ring 8 is pushed tightly into position upon said key 5. It will thus be seen that this will hold the drill steel in its place in the chuck until the machine is made to strike a blow, whereupon the momentum of the keying ring 8 will force it more tightly on the tapering chuck key 5 and each succeeding blow will hold the grip, as is evident.

In the embodiments seen in Figs. 5 and 6 we have shown a self-tightening rock-drill chuck in which a slightly modified form of bushing is employed and in this embodiment 18 designates the chuck body which is similar to the construction shown in Figs. 1 to 3 inclusive. 19 designates a renewable hardened steel bushing which is relieved by recessing its inner surface at 20 so as to form bearings 21 and 22 at each end with which the drill steel 23 engages. In this embodiment instead of employing the longitudinally extending grooves, such as 4, as indicated in Figs. 1, 2 and 4, we weaken the bushings by a plurality of radially drilled holes 24 at each end, as will be readily apparent from Figs. 5 and 6. The chuck key 25 fits into the chuck slot 26 and slot 27 in the bushing 19, it being understood that the inner face of the chuck key 25 is slightly rounded in a manner similar to that already described with reference to Figs. 1 to 3 inclusive. The inner face of the chuck key 25 is relieved as indicated at 28, the opposite portion 20 of the bushing 19 thus providing an elastic grip when the device is assembled. 29 designates a keying ring which is slotted or recessed as at 30 in order that improper lateral movement of the parts when in assembled position will be prevented, it being understood that this slot 30 is tapered in order that when the machine is made to strike a blow the momentum of the keying ring 29 will force it more tightly on the tapered chuck key 25 and each succeeding blow will hold the grip in precisely the same manner as before described with reference to Figs. 1 to 3 inclusive. 31 designates the spring clip. Since this embodiment differs from the embodiment seen in Figs. 1 to 4, inclusive, only in the construction of the chuck bushing, we have deemed it unnecessary to describe in detail the manner of as-

sembling the parts, since it will be similar to that before described. When it is necessary to remove the bushing the same may be readily accomplished by cutting away the walls 32 of the radially disposed apertures 24 by the employment of a suitable chisel or equivalent device.

It will be apparent that the tapering surfaces on the key and the slot of the keying ring are made so as to give sufficient wedge action to securely hold the drill steel 3 and to also allow the keying ring 8 to be easily unkeyed by striking it a blow on its large end, a suitable set hammer being, in practice, provided to hold against the keying ring to prevent its being injured in unkeying. It will thus be apparent to those skilled in the art that by our novel construction and manner of assembling the drill steel 3, chuck-bushing 2, chuck-key 5 and keying ring 8, that we have provided a labor and time saving device which will secure and hold the drill steel in the drill chuck under all conditions, in a positive and effective manner, no matter how hard the service may be to which the drill is put.

It will be further apparent to those skilled in the art that by reason of our novel construction of bushing 2, having the recessed portion 10, correlated and co-acting with the chuck key slot 13 having the key 5 assembled as shown, with the relieved portion 16 thereof, combined with the means as 8 for retaining these parts in assembled position for thus automatically increasing the strength of the grip, we have produced a simple, cheap and effective device wherein the necessary amount of elasticity to produce the most efficient results is present, as will be apparent to those skilled in the art.

It will also be apparent that slight changes may be made by those skilled in the art in the manner of assembling and constructing the co-acting parts comprising our invention and we do not, therefore, desire to be limited in every instance to the exact construction we have herein shown and described.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character stated, the combination of a chuck body, a drill steel, a bushing therefor having an inner relieved portion intermediate its ends, and a slot opposite said relieved portion, a chuck key in said slot having an inclined top, and means engaging said chuck body and chuck key for retaining the parts in assembled condition.

2. In a device of the character stated, the combination of a chuck body, a drill steel, a bushing therefor, having weakened ends, an inner relieved portion intermediate its ends, and a slot opposite said relieved portion, a chuck key in said slot having an inclined top, and means engaging said chuck body and

chuck key for retaining the parts in assembled condition.

3. In a device of the character stated, the combination of a chuck body, a drill steel, a bushing therefor, having an inner relieved portion intermediate its ends, and a slot opposite said relieved portion, a chuck key in said slot having an inclined top, means engaging said chuck body and chuck key for retaining the parts in assembled condition, and a resilient member for limiting the forward movement of said means.

4. In a device of the character stated, the combination of a chuck body, a drill steel, a bushing therefor, having an inner relieved portion intermediate its ends, and a slot opposite said relieved portion, a chuck key in said slot having an inclined top, and a keying ring engaging said chuck body and chuck key for retaining the parts in assembled condition.

5. In a device of the character stated, the combination of a chuck body, a drill steel, a bushing therefor, having an inner relieved portion intermediate its ends, and a slot opposite said relieved portion, a chuck key in said slot having an inclined top, and a keying ring engaging said chuck body and chuck key for retaining the parts in assembled condition, said ring having an inclined slot with which the inclined top of said key coacts.

6. In a device of the character stated, the combination of a chuck body, a drill steel, a bushing therefor, having an inner relieved portion intermediate its ends, and a slot opposite said relieved portion, a chuck key in said slot having an inclined top, a keying ring engaging said chuck body and chuck key for retaining the parts in assembled condition.

dition, said ring having an inclined slot with which the inclined top of said key coacts, and a spring clip carried by said chuck body for limiting the movement of said ring.

7. In a self tightening rock drill chuck, the combination of a chuck body, a chuck-bushing therefor having an inner relieved portion intermediate its ends, a drill steel contained within said chuck-bushing, a chuck-key, and a keying ring surrounding said chuck-key and adapted to retain the latter in position.

8. In a self tight ring rock drill chuck, the combination of a chuck body, a bushing therefor, the inner surface of which is relieved to form bearings, a drill steel contained within said bushing and engaging said bearings, a key adapted to bear on said drill steel opposite the relieved inner surface of said bushing, and a keying ring surrounding said chuck body and engaging said key to retain the parts in assembled condition.

9. In a self-tightening rock-drill chuck, the combination of a chuck body, a bushing therefor, the inner surface of which is relieved to form bearings, a drill steel contained within said bushing and engaging said bearings, a key having its inner face relieved intermediate its ends and adapted to bear on said drill steel opposite the relieved inner surface of said bushing, and a keying ring surrounding said chuck body and engaging said key to retain the parts in assembled condition.

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