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SELF TIGHTENING ROCK DRILL CHUCK.

APPLICATION FILED FEB. 6, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

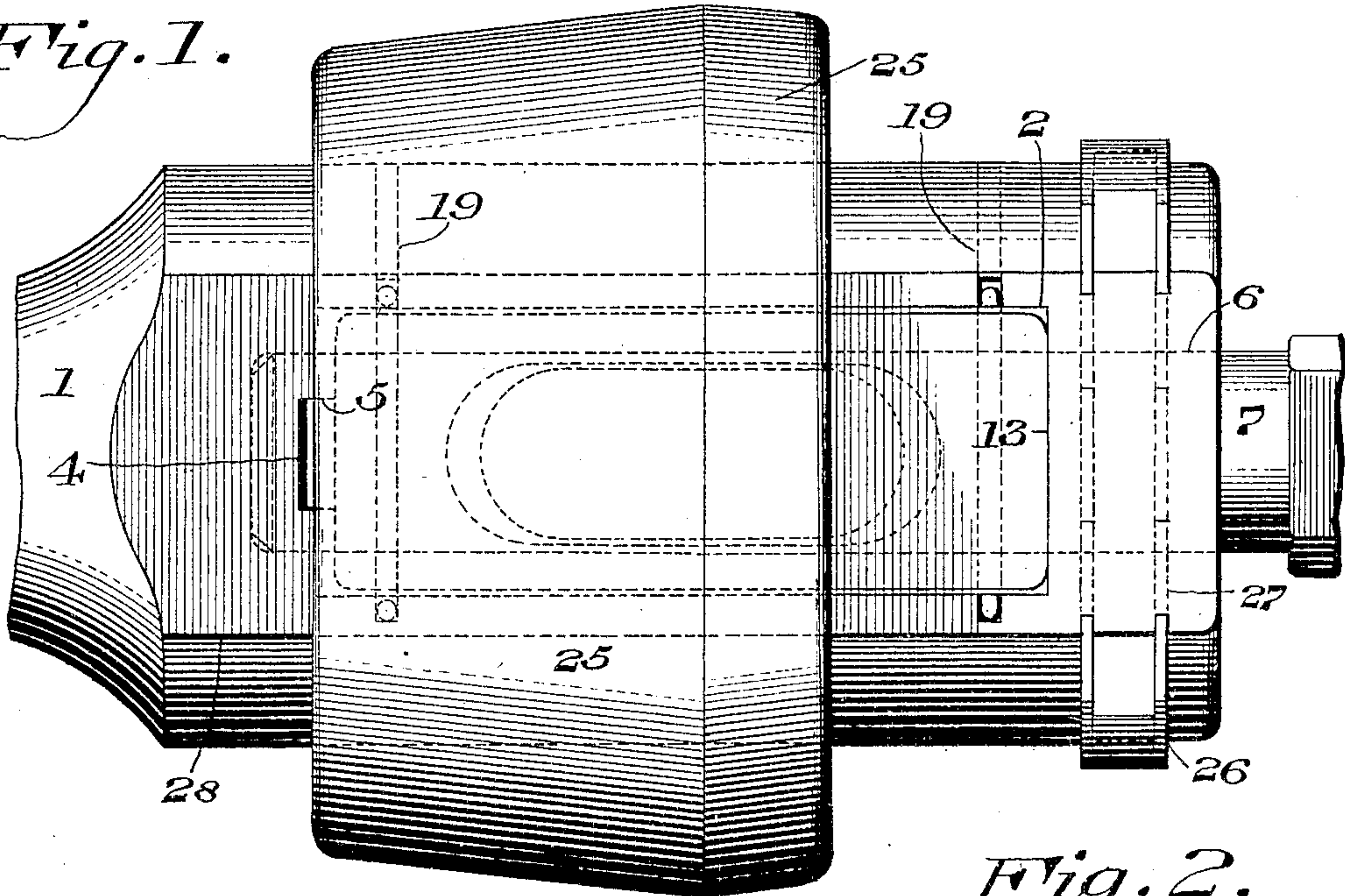
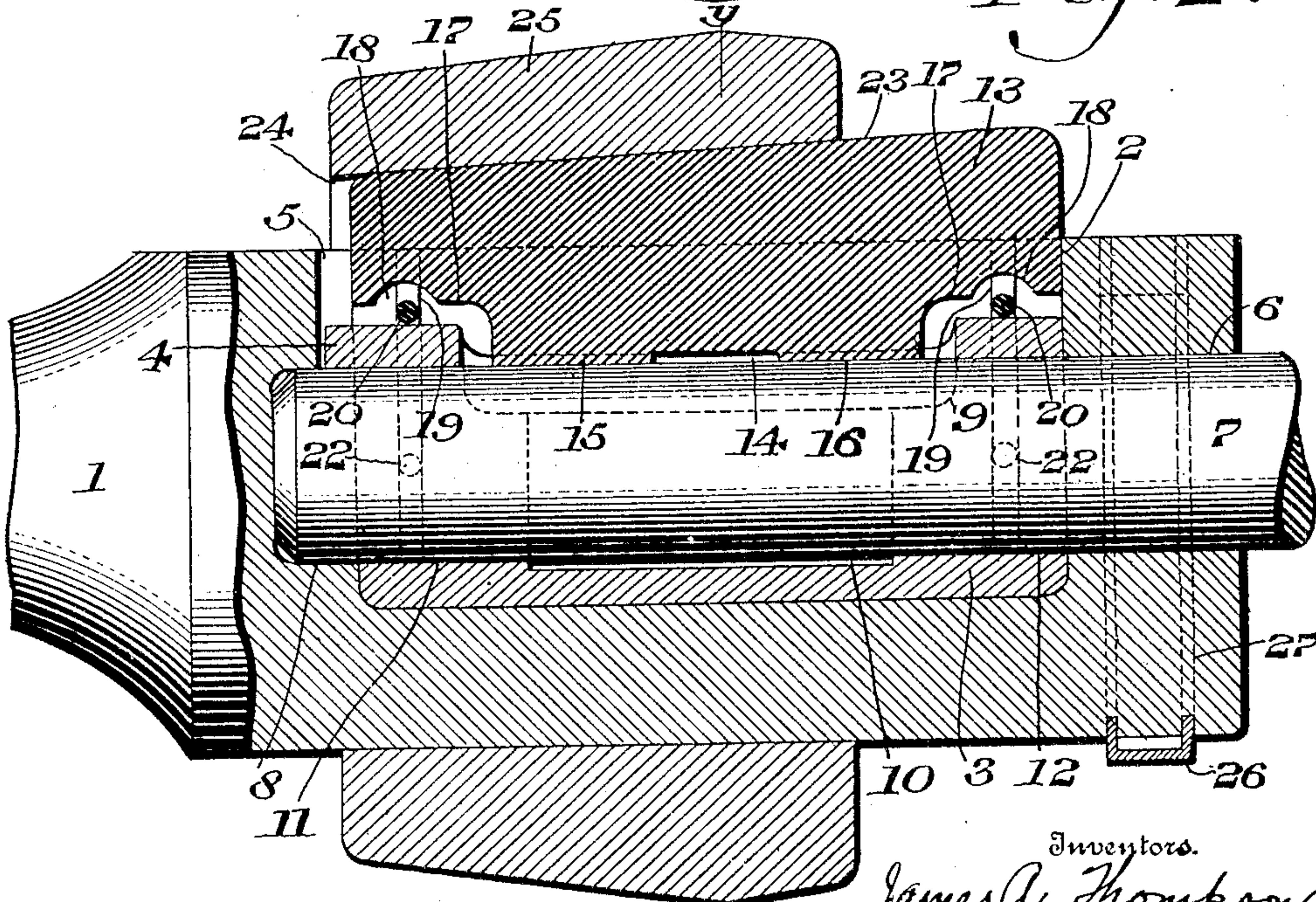


Fig. 2.



Witnesses
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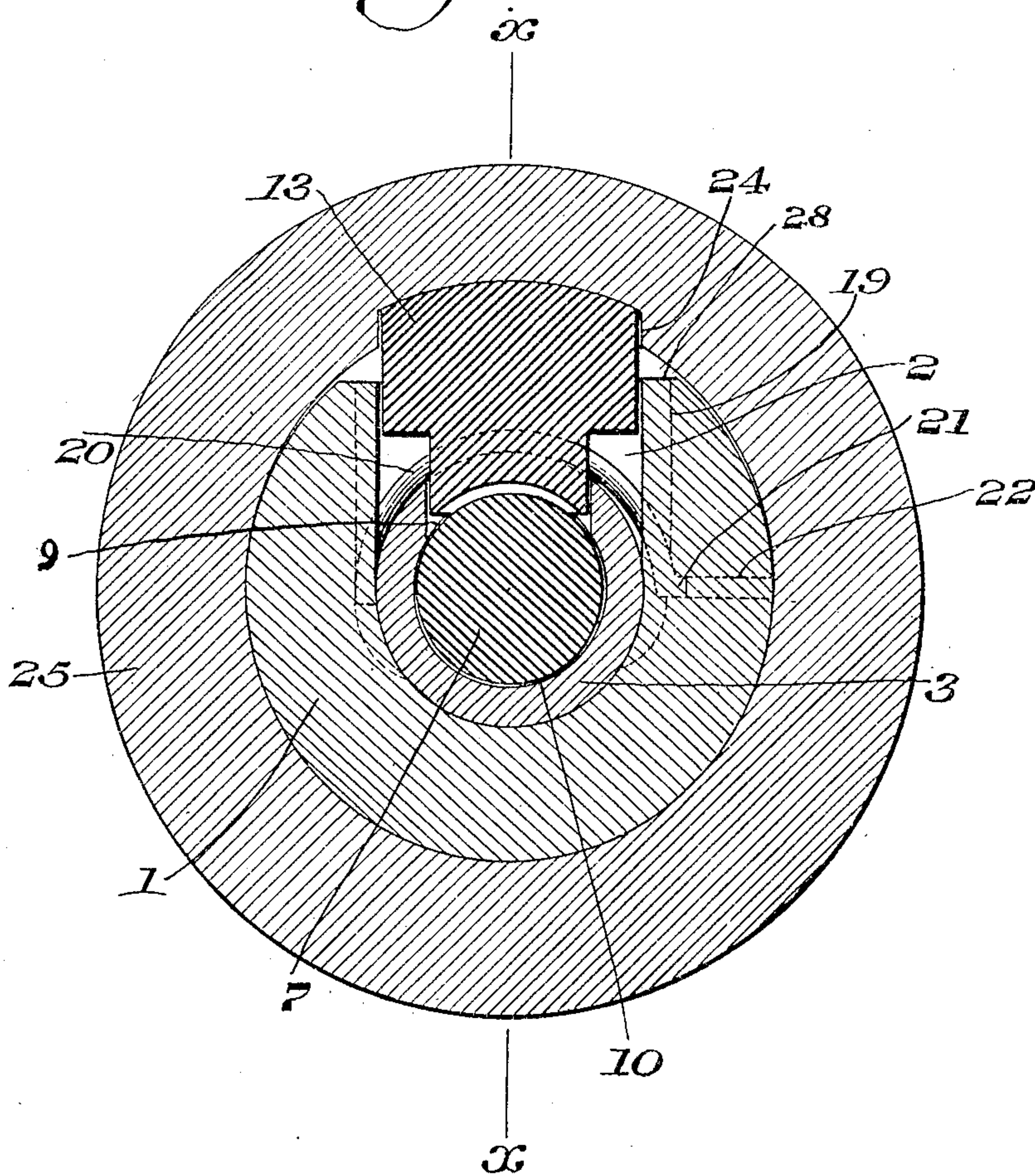
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2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES A. THOMPSON, EDWIN M. MACKIE, AND PERCIVAL F. DOYLE, OF CHICAGO, ILLINOIS, ASSIGNORS TO CHICAGO PNEUMATIC TOOL COMPANY, A CORPORATION OF NEW JERSEY.

SELF-TIGHTENING ROCK-DRILL CHUCK.

No. 871,972.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed February 6, 1907. Serial No. 356,020.

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.

In a co-pending application, filed January 21st, 1907, Serial No. 353,282, we have described and broadly claimed a novel construction of self-tightening rock-drill chuck consisting of a novel construction of piston rod, chuck bushing, drill steel, chuck key, keying ring and spring clip stop and their adjuncts which are constructed and assembled in a novel manner in order that the drill steel will be held in the chuck under all conditions, irrespective of all working conditions to which the device may be subjected and whereby the labor and time essential to replace the drill is reduced to a minimum.

Our present invention while embodying some of the novel features of the above mentioned application has for its object more particularly the production of a novel construction of a drill chuck in which the bushing may be more readily renewed and novel means for retaining this bushing in assembled position.

It further consists of a novel construction of a drill chuck provided with a slotted face into which our novel construction of chuck bushing may be readily inserted and novel means for alining the bushing with respect to the chuck.

It further consists of a novel construction of a chuck key which is adapted to co-act with locking means independent of the chuck and ring to prevent any improper movement of the chuck bushing and its adjuncts when the parts are in assembled position.

It further consists of a novel construction and arrangement of the co-acting parts and other novel features of construction, all as will be hereinafter fully set forth.

For the purpose of illustrating our invention, we have shown one form of a device as this embodiment best illustrates the principle of our invention, although it is obvious that the principal instrumentalities of which our invention consists can be variously ar-

ranged and organized and in the accompanying drawings, we have shown one embodiment thereof which we have found in practice to give satisfactory and reliable results, although it is to be understood that our invention is not limited to this specific arrangement and organization of these instrumentalities.

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 $x-x$, Fig. 3. Fig. 3 represents a section on line $y-y$, Fig. 2.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—1 designates a chuck body, which is provided on its face with a chamber or slot 2 into which a chuck bushing 3 is adapted to be inserted, it being noted that in the present instance, this chuck bushing instead of being driven into an aperture in the end of the chuck is simply slipped into the chuck body from its upper face.

The chuck bushing 3 is provided with a tongue or lug 4, which engages a slot or aperture 5 in the chuck body 1, so that any improper movement of the same will be prevented when the chuck is being disassembled.

6 designates an aperture through the end of the chuck body 1 which communicates with the chamber 2 therein, said aperture 6 being adapted to form a bearing for a drill steel 7, which passes through the bushing 3 and has a bearing at its inner end in a recess or chamber 8 in the chuck body 1. The chuck bushing 3 in the present instance is larger than the diameter of the aperture 6, so that any longitudinal movement of said bushing will positively be prevented.

9 designates a slot or key way in the chuck bushing 3, it being noted that the chuck bushing opposite the slot 9 is relieved as seen at 10 in order to form bearings 11 and 12 for the drill steel.

13 designates the chuck key which is adapted to fit the slot 2 in the chuck body 1. The inner face of said key is slightly concaved or of such a contour as to closely fit the drill steel 7 and the bearing of said chuck key 13 on the drill steel 7 is relieved as indicated at 14 in order to form bearings 15 and 16.

Owing to the manner in which the chuck

key is relieved and the fact that this relieved part is opposite the relieved portion 10 in the chuck bushing 3, an elastic grip is provided when the parts are in assembled position, as
5 will be readily understood by those skilled in the art to which this invention appertains.

The chuck key 13 is cut away at each end as seen at 17 in order to prevent the key engaging the chuck bushing 3 and it is also recessed as indicated at 18.
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19 designates slots or grooves in the sides of the chamber 2 adjacent the bearings 11 and 12 of the chuck bushing 3.

20 designate spring clips which as most
15 clearly seen in Fig. 3 are adapted to partially surround the chuck bushing 3 owing to the provision of the slots or apertures 19. One end of the spring clips 20 is deflected as indicated at 21 in Fig. 3 and this end is
20 adapted to engage the apertures 22 in the chuck body 1. The upper face of the chuck key 13 is tapered as indicated at 23 and this tapered portion is adapted to coact with the tapered slot 24 in the keying ring 25, which
25 surrounds the chuck body 1.

26 designates a spring clip which engages grooves 27 on the forward end of the chuck body 1 and owing to the provision of this clip, the keying ring 25 is prevented from
30 slipping off the chuck body 1 when the chuck key 13 has been removed, and it will further be seen that in case it becomes necessary to remove the keying ring 25 from the machine for repairs or other purposes, it will not be
35 necessary to remove the chuck 1 from the machine, since by forcing off the spring clip 26, the chuck key 13 having been first removed, a new keying ring such as 25 may be readily placed in position without dismantling or stopping of the drill for any material
40 length of time.

One face of the chuck body 1 is faced off as most clearly seen at 28, in Figs. 1 and 3. In practice the chuck body is suitably hardened
45 in order to prevent the undue wear of the drill steel 7 in the apertures or bearings 6 and 8.

The operation of assembling and dismantling the rock-drill chuck will be readily apparent from the drawings.
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The chuck bushing 3 is placed in the aperture so that the tongue 4 of the chuck bushing engages the aperture 5 in the chuck body 1. The spring clips 20 are forced or sprung
55 into position, the deflected ends 21 thereof engaging the apertures 22 in the chuck body. The keying ring 25 is moved towards the drill and the chuck key 13 is placed in position, after which the keying ring is moved towards
60 the working tool.

It will now be apparent, owing to the construction of the tapered slot 24 with which the tapered key 23 co-acts, that when the machine is caused to strike a blow the momentum of the keying ring 25 will force the
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same more tightly on the tapered chuck key 13 and each succeeding blow will hold the grip, as is evident. The keying ring 25 may readily be removed by striking it a blow on its large end and in practice a suitable set
70 hammer is provided which is adapted to be held against the keying ring to prevent the same from being injured in unkeying.

It will further be apparent that owing to the novel manner in which our novel construction of chuck bushing is assembled with respect to the piston rod or chuck, that the same may be readily removed whenever it is deemed necessary without removing the
75 chuck from the machine. Furthermore 80 when the chuck key 13 has been removed the chuck bushing will be maintained in position, owing to the employment of the resilient members 20 which co-act therewith and with the chuck body 1. 85

It will be apparent to those skilled in this art that when a construction embodying our invention is employed there is no necessity of weakening the chuck bushing in any manner in order to provide for the removal of the
90 same, thereby greatly prolonging the life of the chuck bushing.

It will now be apparent from the foregoing that we have devised a novel and useful construction of self-tightening rock-drill chuck
95 which embodies the features of advantage enumerated as desirable in the statement of invention and the above description and while we have, in the present instance, shown and described an embodiment thereof which
100 has been found in practice to give satisfactory and reliable results, it is to be understood that our invention is susceptible of modification in various particulars without departing from the spirit and scope of the
105 invention or sacrificing any of its advantages.

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 described, the combination of a chuck body having its side face apertured intermediate its ends, a bushing therefor, provided with a slot and adapted to be laterally inserted in said aperture, a chuck key engaging said aperture and
110 slot, and means co-acting with said chuck body and chuck key for maintaining the parts in assembled position. 115

2. In a device of the character described, the combination of a chuck body having an apertured face, a bushing therefor having an inner relieved portion intermediate its ends and a slot opposite said relieved portion, said bushing being adapted to be laterally inserted in said aperture, a chuck key in said
120 slot and aperture, and means engaging said chuck body and chuck key for maintaining the parts in assembled condition. 125

3. In a device of the character described, the combination of a chuck body having an
130

apertured face, a bushing therefor adapted to be laterally inserted in said aperture and having an inner relieved portion intermediate its ends and a slot opposite said relieved portion, a chuck key having an inclined top engaging said slot and aperture, and means engaging said chuck body and chuck key for retaining the parts in assembled condition.

4. In a device of the character described, the combination of a chuck body having an apertured face, a bushing therefor, adapted to be laterally inserted in said aperture and having an inner relieved portion intermediate its ends and a slot opposite said relieved portion, a chuck key having an inclined top engaging said slot, means for preventing relative lateral movement of said bushing and said chuck body, and means engaging said chuck body and chuck key for retaining the parts in assembled condition.

5. In a self-tightening rock-drill chuck, the combination of a chuck body having an apertured face, a bushing therefor having an inner relieved portion intermediate its ends, and a slot opposite said relieved portion, means for resiliently securing said bushing in said aperture, a chuck key engaging said slot and aperture and having an inclined top, a device engaging said chuck body and chuck key to maintain the parts in assembled condition, and means for limiting the forward movement of said device when the chuck key is removed.

6. In a self-tightening rock-drill chuck, the combination with a chuck body having an apertured face, of a chuck body bushing having a lug thereon, said chuck body having a recess therein with which said lug engages, said bushing having an inner relieved portion intermediate its ends and a slot opposite said relieved portion, a chuck key engaging said aperture and said slot, and provided with 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 co-acts.

7. In a self-tightening rock-drill chuck, the combination of a chuck body having an apertured face, a chuck bushing therefor having an inner relieved portion intermediate its ends and a slot opposite said relieved portion and adapted to be seated in said aperture, there being grooves in said chuck body, resilient means engaging said bushing and said grooves to maintain said bushing in assembled condition, a chuck key having an inclined top engaging said aperture and said slot, and a keying ring engaging said top and said chuck body.

8. In a self-tightening rock-drill chuck, the combination of a chuck body having an apertured face, a chuck bushing therefor having an inner relieved portion intermediate its ends and a slot opposite said relieved

portion and adapted to be seated in said aperture, resilient means engaging said bushing and said chuck body to maintain said bushing in assembled condition, a chuck key having an inclined top engaging said aperture and said slot, and a keying ring engaging said top and said chuck body.

9. In a self-tightening rock-drill chuck, the combination of a chuck body having one face apertured intermediate its ends, a bushing seated in said aperture and having an inner relieved portion intermediate its ends and a slot opposite said relieved portion, there being an aperture in the end of the chuck body registering with said bushing, said aperture and said bushing being adapted to receive a drill steel, a chuck key within said slot and aperture adapted to bear on said drill steel, and means engaging said chuck key for automatically increasing the strength of the grip during the operation.

10. In a self-tightening rock-drill chuck, the combination of a chuck body having an apertured face, a chuck bushing adapted to be seated in said aperture and having an inner relieved portion intermediate its ends, and a slot opposite said relieved portion, there being an aperture through the end of said chuck body registering with said bushing, said aperture and said bushing being adapted to receive a drill steel, the inner end of said chuck body being recessed contiguous the bushing to form a bearing for the inner end of said drill steel, yielding means for normally maintaining said bushing in assembled position, a chuck key within said aperture and slot adapted to engage said drill steel, and a keying ring engaging said chuck body and chuck key.

11. In a self-tightening rock-drill chuck, the combination of a chuck body having an apertured face, a chuck bushing seated in said aperture and having an inner relieved portion intermediate its ends, a slot opposite said relieved portion and an outwardly extending lug, there being a recess in said chuck body with which said lug engages, there being an aperture in the end of said chuck body registering with said bushing, said aperture and said bushing being adapted to receive a drill steel, a chuck key within said aperture and slot adapted to engage said drill steel, the upper face of said key being inclined, and a keying ring having an inclined slot with which the inclined face of said key co-acts to maintain the parts in assembled condition.

12. In a self-tightening rock-drill chuck, the combination of a chuck body having an apertured face, said aperture terminating intermediate the ends of said chuck body a chuck bushing seated in said aperture and having an inner relieved portion intermediate its ends, a slot opposite said relieved portion and an outwardly extending lug,

there being a recess in said chuck body with which said lug engages, there being an aperture in the end of said chuck body registering with said bushing, said aperture and said bushing being adapted to receive a drill steel, a chuck key within said aperture and slot adapted to engage said drill steel, the upper face of said key being inclined and the inner face thereof being relieved to form a plurality of bearings, and a keying ring having an inclined slot with which the inclined face of said key co-acts to maintain the parts in assembled condition.

13. In a self-tightening rock-drill chuck, the combination of a chuck body having an apertured face, a chuck bushing therefor having an inner relieved portion intermediate its ends and a slot opposite said relieved portion and adapted to be seated in said aperture, resilient means engaging said bushing and said body to maintain said parts in assembled condition, a chuck key having an inclined top engaging said aperture and said slot, a keying ring engaging said top and said chuck body for retaining a drill steel within said bushing, and a spring stop carried by said chuck body adapted to co-act with said keying ring to limit the movement thereof.

14. In a self-tightening rock-drill chuck, the combination of a chuck body having an apertured face and a recess contiguous said aperture, a chuck bushing seated in said aperture, the inner face of which is relieved intermediate its ends to form a plurality of bearings and having a slot opposite said relieved portion, there being an aperture in the forward end of said chuck body registering with said bushing and an aperture in the inner end of said chuck body contiguous said bushing forming bearings, said bearings being adapted to receive a drill steel, means for preventing the rotation of said bushing, resilient means for maintaining said bushing in its aperture, a chuck key having an inclined top and adapted to engage said drill steel, and a keying ring engaging said chuck key for retaining the parts in assembled condition, said ring having an inclined slot with which the inclined top of said key co-acts.

15. In a device of the character described,

the combination of a chuck body having an apertured side face, a bushing adapted to be seated in said aperture and having a slot, said chuck body having an aperture in the end thereof registering with said bushing and having a different diameter than the outside diameter of said bushing, a key engaging the aperture of said bushing, and means coacting with said chuck body and key for maintaining the parts in assembled condition.

16. In a device of the character described, the combination of a chuck body having an apertured side, a bushing having a slot and adapted to be inserted in said aperture, said body having an apertured end with which said bushing registers, resilient means for retaining said bushing in position, a chuck key engaging the slot in said bushing, and means co-acting with said key and chuck body for maintaining the parts in assembled condition.

17. In a device of the character described, the combination of a chuck body having an apertured side face, a bushing adapted to be seated in said aperture and having a slot, said chuck body having an aperture in the end thereof registering with said bushing and having a different diameter than the outside diameter of said bushing, a key engaging the aperture of said bushing, means co-acting with said chuck body and key for maintaining the parts in assembled condition, and a spring retaining device for said means.

18. In a device of the character described, the combination of a chuck body having an apertured side and an apertured end communicating therewith, a bushing adapted to be seated in said apertured side and having a greater outside diameter than said apertured end, said bushing having a slot intermediate the ends thereof, yielding means for retaining said bushing in place, a chuck key in the slot of said bushing, and a sliding sleeve engaging said key.

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Witnesses:

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