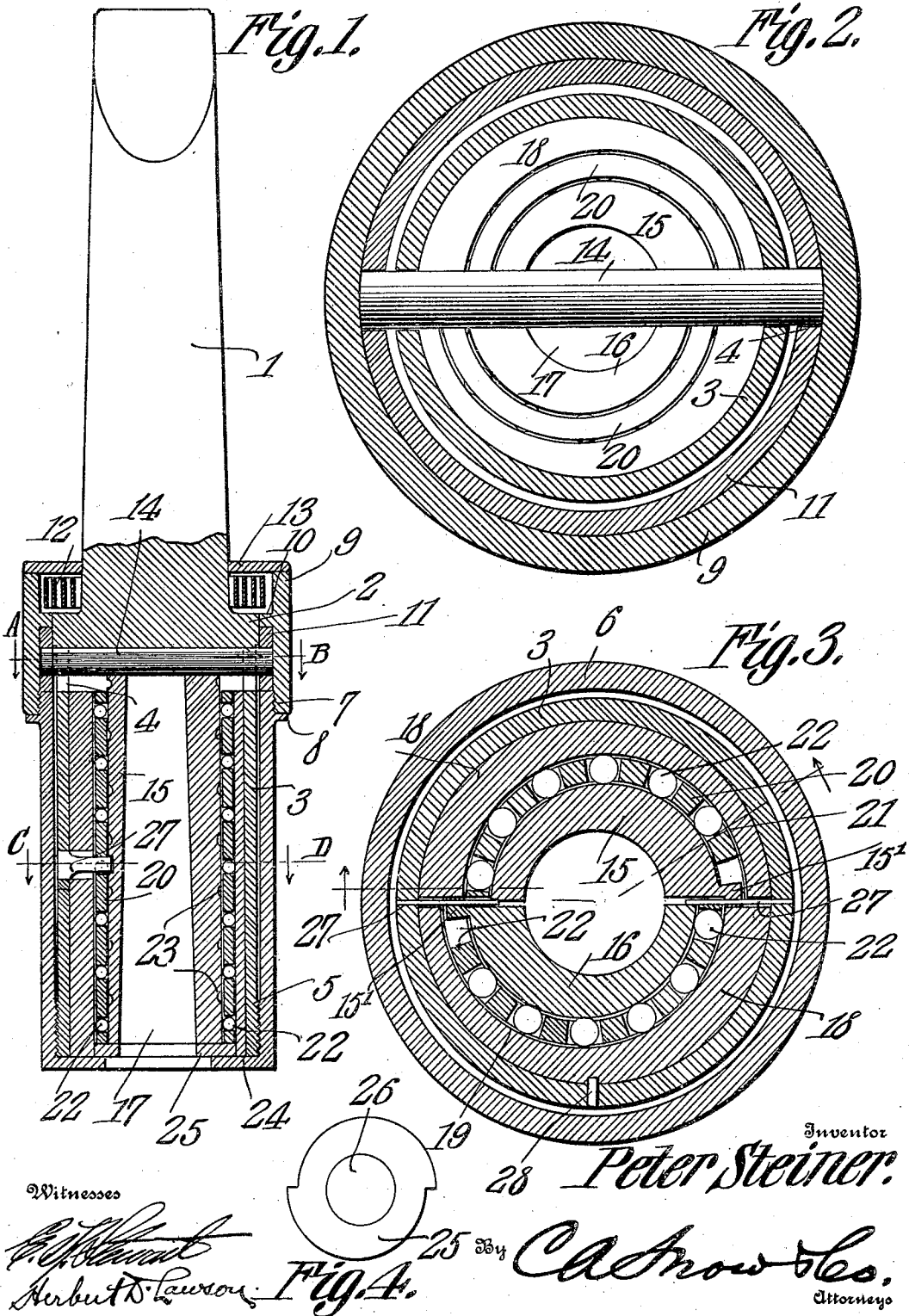


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DRILL CHUCK.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PETER STEINER, a citizen of the United States, residing at Lima, in the county of Allen and State of Ohio, have invented a new and useful Drill-Chuck, of which the following is a specification.

This invention relates to chucks of that type especially designed for use in connection with driving drills and its object is to provide means whereby the drill can be quickly and firmly secured within the chuck, means being employed whereby said drill can be readily released.

A further object is to provide a chuck having a plurality of jaws cooperating so as to bind firmly upon the inserted drill, the binding action increasing in proportion to the resistance to which the drill is subjected during the rotation thereof.

With these and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a longitudinal section through a chuck embodying the present improvements. Fig. 2 is an enlarged section on line A—B Fig. 1. Fig. 3 is an enlarged section on line C—D Fig. 1. Fig. 4 is a detail view of a washer used in connection with the chuck.

Referring to the figures by characters of reference 1 designates the tapered shank of the chuck, the same being provided at one end with a head 2 cylindrical in form and having a cylindrical tubular body 3 extending therefrom and provided close to the head with diametrically opposed slots 4. The free end of the body 3 is exteriorly screw-threaded as indicated at 5 and engaged by the interior threads in a sleeve 6 which surrounds the body 3 and is provided at that end thereof nearest the head 2 with exterior threads 7 and an annular shoulder 8. These threads 7 engage interior threads in a ring 9 which surrounds the head 2 and has an interior flange 10 overhanging the end of sleeve 6 and cooperating therewith to hold a ring 11 loosely in position. A spiral spring 12 is secured at one end to the inner face of the ring 9 and at its other end to the shank 1, and a cap 13 is preferably secured upon or formed with one end of the ring 9 so as to inclose the spring and prevent the admis-

sion of dirt etc., thereto. The shoulder 8 constitutes an abutment for the ring 9 and said ring and the sleeve are designed to move as one piece, the rotation of the parts in one direction causing the spring 12 to be contracted, while the rotation of the parts in the opposite direction causes the spring to partly unwind. A pin 14 is secured at its ends within the ring 11 and extends diametrically within said ring, said pin also extending through the slots 4 and bearing upon the upper ends of the inner jaws 15 and 16 of the chuck. These jaws are oppositely disposed and similar in construction, the inner faces of the jaws cooperating to form a substantially cylindrical socket 17 for the reception of the shank of a bit or drill, while the outer or convexed faces of these jaws are arranged concentrically with relation to the inner faces thereof, each jaw thus gradually diminishing in thickness from one edge to the other, as clearly indicated in Fig. 3. Projections extend outwardly along radial lines from the thick edges of these jaws as shown at 15'. Inasmuch as the jaws are oppositely disposed the narrow edge of each jaw will be disposed directly opposite the broad edge of the adjoining jaw.

Interposed between the jaws 15 and 16 and the body 3 is a pair of outer jaws 18 and 19 similar in form to the jaws 15 and 16 but having their outer faces cooperating to form a cylinder, while their inner faces are disposed eccentrically with relation to the outer faces but concentric with the outer faces of the jaws 15 and 16. It will be apparent therefore that semi-cylindrical spaces of uniform width are formed between the jaws 15 and 16 and the adjoining jaws 18, these spaces being indicated at 19 and each being designed to receive a concavo-convexed filling plate 20 in which superposed series of pockets 21 are formed. Each pocket contains a ball 22 designed to contact with the adjoining faces of the inner and outer jaws, each series of pockets being arranged parallel with the remaining series. Moreover the projections 15' bear against the thick ends of the jaws 18 so as to gage the normal size of the opening 17, said projections being held against the ends of the jaws 18 by means of the springs 27 hereinafter referred to.

Grooves 23 are formed annularly within the outer faces of the jaws 15 and 16 and are so disposed that when the said jaws are

shifted longitudinally with relation to the plates 20 the balls 22 will become seated within the grooves and thus permit the jaws 15 and 16 to spread apart to a limited extent.

5 A flange 24 extends inwardly from the free end of the sleeve 6 and laps a washer 25 which, as shown in Fig. 4, is so shaped at its margin as to fit snugly between the outer jaws 18 but to extend over the lower or outer
10 ends of the jaws 15 and 16 and constitute a rest therefor, the opening 26 in the washer registering with the socket 17.

Springs 27 are secured at one end to the body 3 and extend between the jaws 18, plates 20 and jaws 15 and 16, these springs
15 serving to hold the jaws 15 and 16 always in proper relation to each other.

It is of course to be understood that when the parts are in their normal positions the flange 24 bears against the end of body 3
20 and the pin 14 assumes a position within the upper ends of the slots 4. This is the position assumed by the parts while the shank of a drill is in position within the socket 17. When the parts are thus dis-
25 posed the jaws 15 and 16 bind upon the said shank and any tendency of the shank to turn between the jaws will result in an annular movement of the jaws 15 and 16, which will
30 thus travel upon the balls 22, which will in turn move along the eccentric inner faces of the outer jaws 18, thus causing the inner jaws 15 and 16 to more firmly clamp upon
35 the shank. This contraction of the jaws 15 and 16 is permitted in view of the fact that their ends are spaced apart normally slight distances. It is of course to be understood
40 that when the parts are thus located the balls 22 are positioned out of the grooves 23. When it is desired to remove the shank of the drill the sleeve 6 is rotated so as to wind
45 the spring 12 and the ring 11 and pin 14 are thus moved toward the flanged end of the body 6, because the said sleeve will work along the threads 5 upon the body 3. The
50 pin 14 will push the jaws 15 and 16 longitudinally upon the balls 22 and the grooves 23 will thus ultimately become located directly opposite the balls which will there-
55 fore be free to move thereinto and thus permit the jaws 15 and 16 to spread apart a slight distance, this movement being sufficient to release the shank of the tool. As soon as the shank of the tool has thus been
60 released the sleeve 6 can also be released and the coil spring 12 will immediately operate to automatically return the sleeve 6 and the other parts of the chuck to their normal positions. The outward pressure of the jaws
65 18 against the wall of the body 3 is such as to ordinarily prevent said jaws from rotating in the body. If desired however a key or pin 28 may be extended through the body and into a notch or recess in one of the jaws as shown in Fig. 3.

It is of course to be understood that various changes may be made in the construction and arrangement of the parts without departing from the spirit or sacrificing the advantages of the invention.

What is claimed is:—

1. A chuck comprising a tubular body, a sleeve threaded thereon, a spring for rotating the sleeve in one direction, oppositely
75 disposed tool-gripping jaws within the body and having eccentrically arranged faces, jaws interposed between the body and the tool-gripping jaws and having eccentric faces, anti-friction devices interposed be-
80 tween the two sets of jaws and bearing upon the eccentric faces, said tool-gripping jaws having annular grooves therein, and means operated by the sleeve for shifting the tool-
85 gripping jaws to bring the grooves into register with the anti-friction devices.

2. A chuck comprising a tubular body, inner and outer sets of jaws within the body, the adjoining faces of said jaws being ec-
90 centrically arranged with relation to the longitudinal axis of the body but concentric to each other, the jaws of one set having annular grooves therein, anti-friction devices interposed between the eccentric faces of the jaws, and spring-controlled means for
95 shifting one of the jaws to bring the grooves in register with said anti-friction devices.

3. A chuck comprising a cylindrical body, outer and inner sets of jaws within the body, the meeting faces of the jaws of the two sets being eccentrically arranged with relation
100 to the body, said faces being concentric with each other, anti-friction devices interposed between the eccentric faces of the inner and outer jaws, the jaws of one set having grooves for the reception of said devices,
105 means adjustably mounted upon the body for shifting the grooved jaws to bring the grooves into register with the anti-friction devices, and means for automatically returning the parts to their initial positions.

4. A chuck comprising a tubular cylindrical body, oppositely disposed similar inner jaws within the body, oppositely dis-
115 posed similar outer jaws within the body, the adjoining faces of the inner and outer jaws being concentric with each other but eccentric with the body, anti-friction devices interposed between the eccentric faces of the inner and outer jaws, said inner jaws having
120 annular grooves normally removed from the anti-friction devices, means adjustably mounted upon the body for shifting the inner jaws to bring the grooves into register with the anti-friction devices, and means
125 for automatically returning the parts to their initial positions.

5. A chuck comprising a tubular cylindrical body, spaced outer and inner jaws within the body, the adjoining faces of the
130 outer and inner jaws being concentric with

each other but eccentric with the body, anti-friction devices interposed between said faces, the inner jaws being provided with annular grooves normally removed from said devices, a ring slidably mounted upon the body, a pin arranged diametrically within and movable with the ring, said pin bearing upon the inner jaws, a sleeve adjustably mounted upon the body and engaging the ring to slide the same, said ring and pin being movable in one direction to bring the grooves into register with the anti-friction devices, and means for automatically returning the parts of the chuck to their initial positions.

6. A chuck comprising a tubular cylindrical body, spaced outer and inner jaws within the body, the adjoining faces of the outer and inner jaws being concentric with each other but eccentric with the body, anti-friction devices interposed between said faces, the inner jaws being provided with an-

nular grooves normally removed from said devices, a ring slidably mounted upon the body, a pin arranged diametrically within and movable with the ring, said pin bearing upon the inner jaws, a sleeve adjustably mounted upon the body and engaging the ring to slide the same, said ring and pin being movable in one direction to bring the grooves into register with the anti-friction devices, and means for automatically returning the parts of the chuck to their initial positions, and resilient means carried by the body and engaging the jaws for limiting the rotative movement of the jaws within the body.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

PETER STEINER.

Witnesses:

W. L. ROGERS,

H. L. DRAKE.