G. H. GILMAN.

SELF CENTERING CHUCK FOR ROCK DRILLS.

APPLICATION FILED JAN. 6, 1913.

1,207,549. Patented Dec. 5, 1916.

Fig. 1.

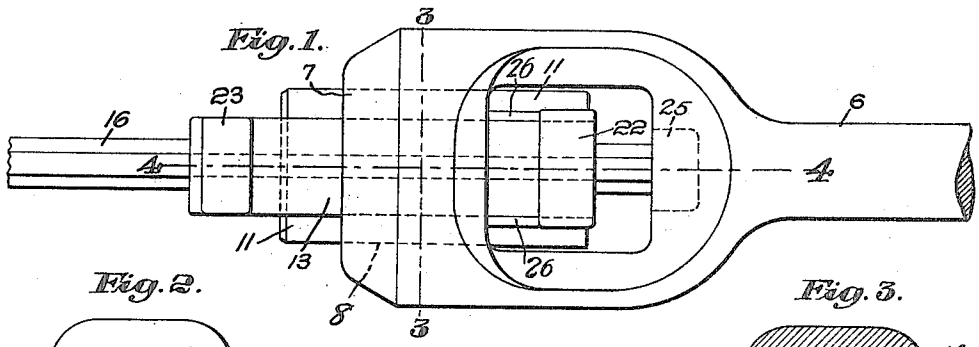


Fig. 2.

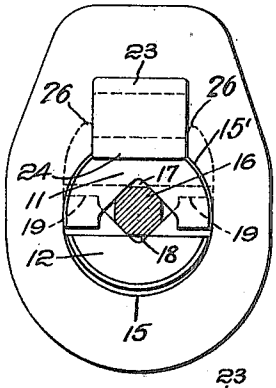


Fig. 6.

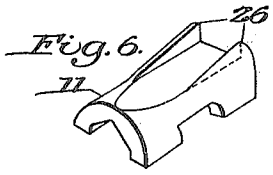


Fig. 3.

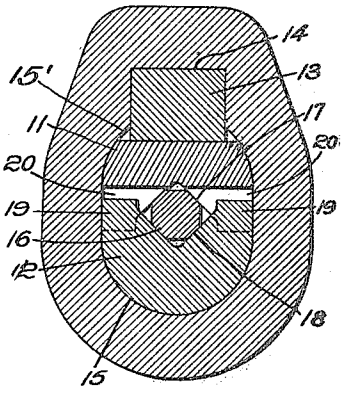


Fig. 4.

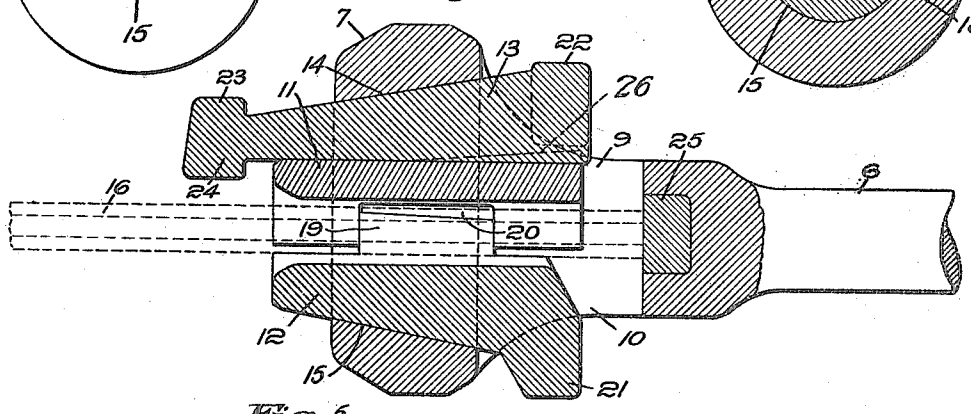
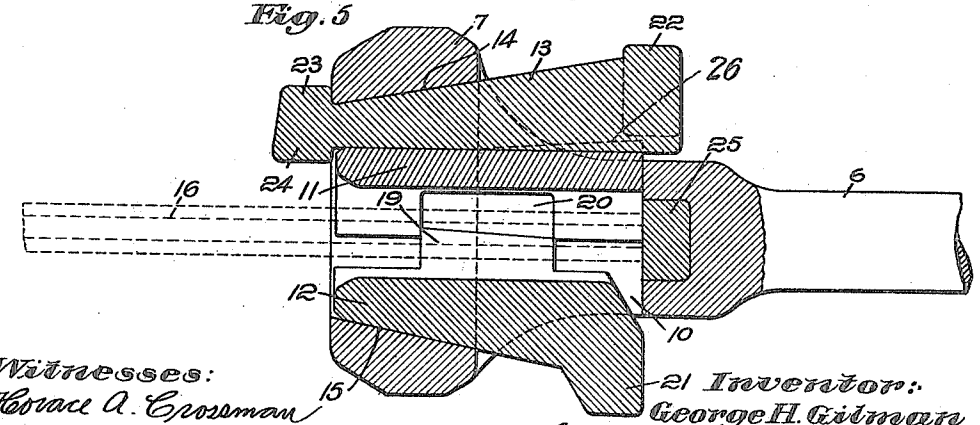


Fig. 5



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UNITED STATES PATENT OFFICE.

GEORGE H. GILMAN, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SULLIVAN MACHINERY COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SELF-CENTERING CHUCK FOR ROCK-DRILLS.

1,207,549. Specification of Letters Patent. Patented Dec. 5, 1916.

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To all whom it may concern:

Be it known that I, GEORGE H. GILMAN, a citizen of the United States, and a resident of Claremont, county of Sullivan, and State of New Hampshire, have invented an Improvement in Self-Centering Chucks for Rock-Drills, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to drill-holding chucks, and more especially, though not exclusively, to rock drill chucks, and will be best understood by reference to the following specification, when taken in connection with the accompanying illustration of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings:—Figure 1 is an elevation of a drill-holding chuck embodying my invention; Fig. 2 is an end elevation of the chuck, as viewed from the left-hand side of Fig. 1; the drill steel being shown in section; Fig. 3 is a cross-sectional view on line 3—3 of Fig. 1; Fig. 4 is a longitudinal sectional view on line 4—4 of Fig. 1, the drill steel and drill-clamping blocks being shown in elevation; and Fig. 5 is a similar section, showing the blocks and wedge retracted, the blocks being shown in their non-clamping position. Fig. 6 is a perspective view of one of the holding blocks or drill engaging members.

Referring to the drawings, and to the embodiment of my invention which I have there disclosed for illustrative purposes, I have there shown a piston rod 6, having an enlarged end portion 7, which constitutes the holder of the chuck. This holder is provided with a longitudinally tapered recess 8, opening out of the forward end thereof, and is provided with a plurality of lateral apertures, herein two, designated by the numerals 9 and 10, leading outward from said recess, preferably at the rear end of the latter.

The recess 8 receives a plurality of chuck blocks, or drill-engaging members, herein two designated by the numerals 11 and 12. The exterior surface of the block 12 has a taper corresponding to the taper of the recess 8, while the exterior surface of the block 11 converges forwardly, with relation to the adjacent surface of the recess, and between the latter surfaces there is placed a tapered key or wedge 13, for a purpose which will presently appear. The opposed converging bearing surfaces 14 and 15 of the recess 8 are preferably so shaped as to insure a full bearing for the wedge 13 and block 12 at all positions. To this end, the surfaces 14 and 15 are preferably of substantially uniform cross-sectional shape throughout their respective lengths, and herein, the surface 14 is flat, while the surface 15 is substantially semi-cylindrical, and the wedge 13 and block 12 are correspondingly shaped. It should also be noted that the recess 8 is provided opposite the semi-cylindrical surface 15 with a corresponding semi-cylindrical surface 15′, and that the block 11 (see Figs. 2 and 4) has a corresponding semi-cylindrical shape, except that it is flattened at 14, as already described, for engagement with the wedge 13. It should also be noted that the block 11 is grooved for approximately one-half its length from the rear end toward the front end thereof to receive the wedge 13, whereby on both sides of the latter, there is provided a ridge which is indicated at 26 by dotted lines in Figs. 2, 4 and 5. It will now be evident that the block 11 has a tapered formation from front to rear, and that its obliquely disposed cylindrical surface corresponds exactly with the obliquely disposed cylindrical surface 15 of the block 12, whereby they may be caused automatically to center the drill by simply providing suitable interengaging means to cause them to move simultaneously in an axial direction. It will be understood, however, that the cross-sectional shape of these surfaces may be appropriately varied to suit the requirements.

The inner surfaces of the blocks 11 and 12 are suitably shaped to receive a drill steel 16, which may be of any suitable cross-sectional shape, the blocks for this purpose being provided with longitudinal grooves 17 and 18, respectively. The blocks are provided with suitable interengaging means to effect their mutual longitudinal movement, and prevent them from coming out of place except when properly manipulated by the operator, such means herein comprising a pair of lugs 19—19 on the block 10, projecting into the corresponding recesses 20—20 in the block

11, the depth of these recesses being such as to permit the blocks to approach each other to a sufficient extent to grip the smallest drill steel within the capacity of the chuck. The shape of the blocks is such that, when the drill steel is removed, they may be withdrawn rearwardly and then outwardly through the apertures 9 and 10.

Preferably, the block 12 is provided at its rear end with a lug 21, enabling the block to be conveniently manipulated and driven in either direction by striking on the lug with a hammer. Preferably, the wedge 13 is similarly provided at its rear end with a lug 22 for a similar purpose. Preferably, the wedge is also provided at its forward end with a lug 23, by means of which the wedge may be driven in a rearward direction, by striking thereagainst with a hammer. If desired, the forward end of the wedge may be provided also with a lug 24, constituting a stop adapted to engage the forward end of the block 11 to carry the latter rearwardly.

The drill steel is first placed between the chuck blocks with the latter retracted, as shown in Fig. 5, and the rear end of the drill steel abutting against a suitable abutment, herein in the form of a hardened block of steel 25, inserted in a holder at the rear end of the recess 8. The wedge 13 is placed in its retracted position shown in Fig. 5, after which the blocks 11 and 12 are pushed forward and driven lightly into place, so as to grip the drill steel therebetween. Finally, the tapered wedge or key 13 is driven forward, and its taper is such as to cause the blocks to grip the drill steel with a very firm clamping action, and yet permit them to be released very readily by driving the wedge in a rearward direction. When in operation, the chuck is automatically self-tightening, due to the fact that with each blow of the drill steel on the work, the inertia of the blocks automatically tends to drive them forward in their holder. The interlocking nature of the blocks accomplishes the desired self-centering of the drill with relation to the piston and piston rod, since the blocks must always move in unison. It will be understood, of course, that if the blocks were not interlocking, one might be forced ahead of the other, in which case, the drill would be thrown out of line with the piston rod. To remove the drill, it is only necessary to first drive the wedge 13 in a rearward direction, until the lug 23 brings up against the front face of the holder 7, after which a light tap on the lug 21 will serve to fully retract the blocks 11 and 12, thus freeing the drill steel, and allowing the latter to be withdrawn.

While I have herein shown and described one embodiment of my invention for illustrative purposes, and have disclosed and discussed in detail the construction and arrangement incidental to one specific application thereof, it is to be understood that the invention is limited neither to the mere details or relative arrangement of parts, nor to its specific embodiment herein shown, but that extensive deviations from the illustrated form or embodiment of the invention may be made without departing from the principles thereof.

Having thus described my invention, what I claim and desire by Letters Patent to procure is:—

1. A chuck having, in combination, means for utilizing the blow of the drill upon the work for centering and maintaining the drill in centered position, and means for clamping said first mentioned means.

2. The combination, with a drill, of a chuck having means for utilizing the blow of the drill upon the work to maintain the drill in centered position, and means for producing a drill clamping action of said first mentioned means.

3. A chuck having, in combination, a holder, means coöperating therewith including a plurality of blocks having forwardly converging surfaces for utilizing the blow of the drill upon the work for maintaining the drill in centered position, and means for producing a drill clamping action of said blocks.

4. A self-centering chuck having, in combination, a holder inertia-controlled means coöperating therewith including a plurality of longitudinally slidable clamping members for utilizing the blow of the drill upon the work for maintaining the drill in centered and clamped position by their longitudinal sliding action, and a wedge interposed between one of said clamping members and a relatively fixed surface of said holder.

5. A chuck having, in combination, a holder provided with a recess opening out of its forward end, a plurality of members located in said recess and having their outer surfaces converging toward the forward end, one of said members being engageable with a drill and another drill engaging member interposed between the first-mentioned members.

6. A drill chuck having, in combination, a holder provided with a recess having opposite sides converging toward the forward end of the holder, a plurality of chuck blocks located in said recess, and a tapered key interposed between one of said blocks and the adjacent surface of said recess.

7. A drill chuck having, in combination, a holder provided with a recess opening out of its forward end and having opposed surfaces converging toward the forward end, a plurality of drill-engaging members located in said recess and between said con-

verging surfaces, one of said members being tapered and a tapered member interposed between and having converging surfaces engaging the other of said drill-engaging members and the adjacent internal surface of said recess.

8. A drill chuck having, in combination, a holder provided with a longitudinally tapered recess opening out of one end thereof and having opposite sides converging toward said open end, a plurality of chuck blocks located in said recess, one of said blocks being tapered and a wedge interposed between the other of said blocks and the adjacent side of said recess, said wedge having its wedging surfaces converging toward the forward end of said chuck.

9. A drill chuck having, in combination, a holder provided with a longitudinally tapered recess having opposite sides converging toward the longitudinal median line of the chuck, a plurality of inter-engaging chuck-blocks located in said recess, one of said blocks engaging one of said sides, and a wedge interposed between and having its wedging surfaces engaging the other side of said recess and the external surface of the adjacent chuck-block.

10. A drill chuck having, in combination, a holder provided with a longitudinally tapered recess opening out of one end thereof, and lateral apertures leading out of said recess, a plurality of clamping blocks located in said recess, one of said blocks engaging the adjacent surface of said recess, and a wedge interposed between the other of said blocks and the adjacent surface of said recess.

11. A drill chuck having, in combination, a holder provided with a longitudinally tapered recess opening out of one end thereof, and lateral apertures leading out of said recess, a plurality of clamping blocks located in said recess, one of said blocks engaging the adjacent surface of said recess, and a wedge interposed between the other of said blocks and the adjacent surface of said recess, said wedge being provided with a lug projecting out of one of said apertures.

12. A drill chuck having, in combination, a holder provided with a longitudinally tapered recess opening out of one end thereof, and lateral apertures leading out of said recess, a plurality of clamping blocks located in said recess, one of said blocks being provided with a lug projecting out of one of said apertures, said block engaging the adjacent surface of said recess, and a wedge interposed between the other of said blocks and the adjacent surface of said recess, said wedge having a lug projecting from the other of said apertures.

13. A self-centering chuck having, in combination, a holder inertia-controlled means coöperating therewith including a plurality of clamping members for utilizing the blow of the drill upon the work for maintaining the drill in centered and clamped position, and a wedge interposed between one of said clamping members and a relatively fixed surface of said holder, said wedge being provided with a lug adjacent one end thereof.

14. A self-centering chuck having, in combination, a holder inertia-controlled means coöperating therewith including a plurality of clamping members for utilizing the blow of the drill upon the work for maintaining the drill in centered and clamped position, and a wedge interposed between one of said clamping members and a relatively fixed surface of said holder, said wedge being provided with lugs adjacent opposite ends thereof.

15. A chuck having, in combination, a holder, means coöperating therewith for utilizing the blow of the drill upon the work for maintaining the drill in centered position, means for clamping said first mentioned means, and means for limiting the movement of said last mentioned means.

16. In a drill chuck, a holder having a tapered longitudinally disposed recess therein, coöperating drill engaging members disposable on opposite sides of the drill and having coöperating tapered surfaces engaging the wall of the recess in said holder, one of said members also having a flat face, and a wedge interposed between said face and said holder.

17. In a drill chuck, a holder having a tapered longitudinally disposed recess therein provided with a communicating recess, coöperating drill engaging members disposable on opposite sides of the drill and having coöperating tapered surfaces engageable with the wall of the tapered recess in said holder, one of said members also having a flat face, and a wedge member engageable with said flat face and receivable in the communicating recess in said holder.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE H. GILMAN.

Witnesses:
E. J. BURCHARD,
IRENE KELLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."