

April 5, 1932.

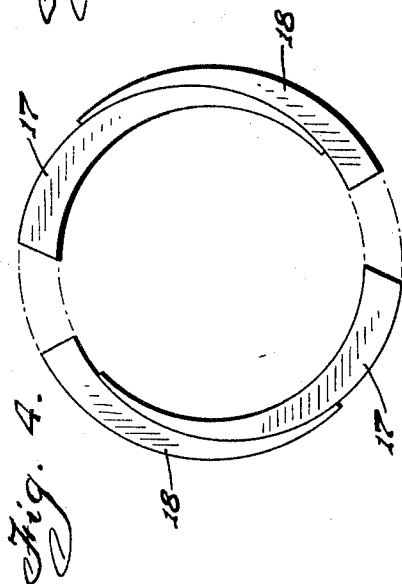
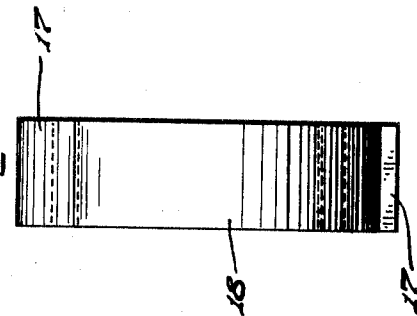
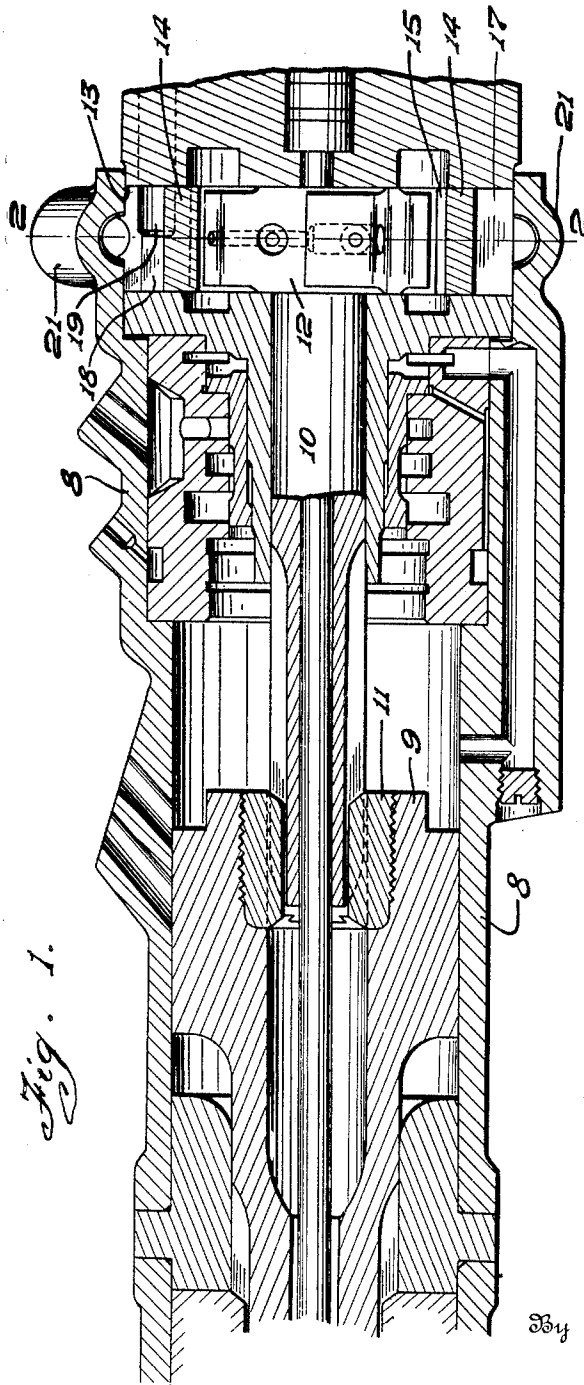
B. R. SHEETS

1,852,339

SLIP ROTATION FOR ROCK DRILLS

Filed June 22, 1928

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 2.

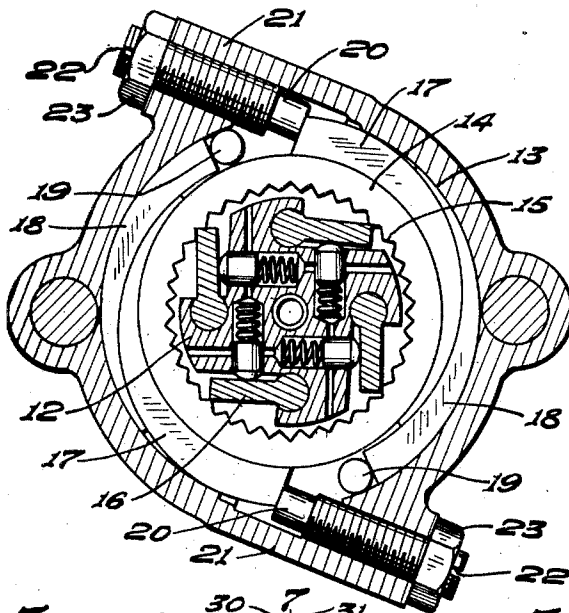


Fig. 3.

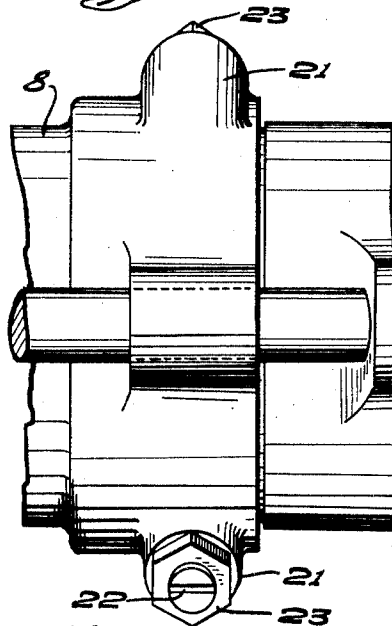


Fig. 6.

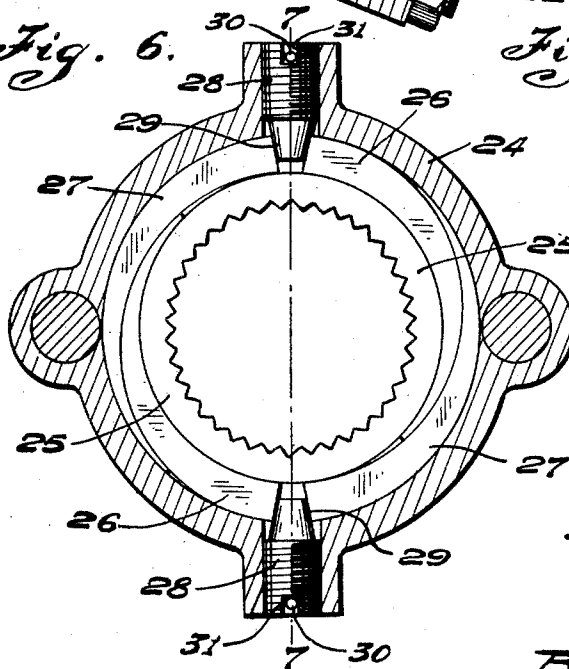
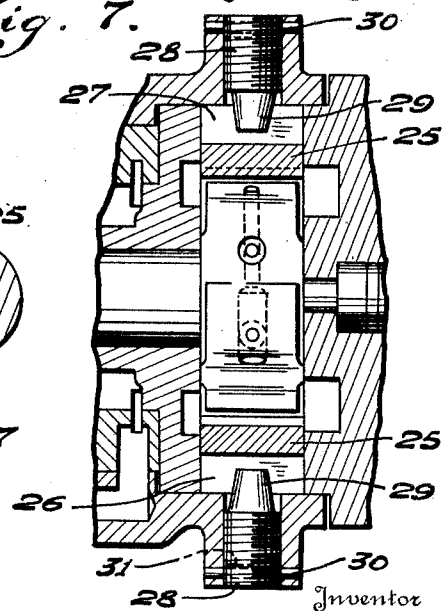


Fig. 7.



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UNITED STATES PATENT OFFICE

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SLIP ROTATION FOR ROCK DRILLS

Application filed June 22, 1928. Serial No. 287,510.

The present invention relates to mechanism for effecting the rotation of a reciprocatory drill for the purpose of rotating the drill steel.

5 The object is to provide novel, simple and effective means that will insure proper rotation of the piston and steel, but will permit the slipping of the ratchet mechanism in case the drill becomes stuck or held against
10 rotation, thereby preventing the rotation of the tool body.

In the accompanying drawings:

Figure 1 is a longitudinal sectional view through a portion of a drilling apparatus,
15 equipped with the novel means.

Figure 2 is a cross sectional view on the line 2—2 of Figure 1.

Figure 3 is a side elevation of the portion of the cylinder member that houses the
20 ratchet mechanism.

Figure 4 is a detail view in elevation of the clutch wedges.

Figure 5 is an edge view of the same.

Figure 6 is a cross sectional view showing
25 a modified form of construction.

Figure 7 is a sectional view on the line 7—7 of Figure 6.

In the embodiment disclosed, a cylinder member 8 is employed, in which is a reciprocatory piston 9 that operates on a drill steel and effects the rotation thereof, being itself rotated in a manner well understood. Included in the rotating mechanism, is as usual a rifle bar 10 having a slidable interfitting engagement with a nut 11 secured in the rear end of the piston 9. This rifle bar is provided at its rear end with a ratchet head 12 located in a chamber 13 formed in the rear end of the cylinder member 8. Surrounding the ratchet head 12 is a ratchet ring 14, also located in the chamber 13, and having internal teeth 15. The ratchet head 12 is provided with outwardly pressed pawls 16 that are adapted to engage the ratchet ring. If the ratchet ring 14 is held against rotation as the piston reciprocates, the pawls 16 will ride the teeth 15 when said piston moves in one direction and engage behind them when the piston moves in the opposite direction, thereby rotating said piston step-by-step.
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Means are provided for frictionally holding the ratchet ring 14 against rotation. In the structure shown in Figures 1-5 inclusive, there are provided sets of oppositely disposed overlapping clutch wedges 17 and 18. The inner wedges 17 have their inner faces curved to conform to the periphery of the ratchet ring 14 and frictionally bear against the same. The outer wedges 18 are interposed between said wedges 17 and the peripheral wall of the chamber 13. These latter wedges 18 have their larger ends abutted against stop pins 19. The larger ends of the inner clutch wedges 17 are engaged by the inner ends of adjusting bolts 20 tangentially disposed and threaded into enlargements 21 formed on the rear end of the cylinder member. The outer ends of the bolts 20 are provided with kerfs 22 to receive a screw driver or other tool and jamb nuts 23 are preferably provided to hold said bolts against accidental turning.
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With this structure, and as will be clear by reference particularly to Figure 2, if the wedges 17 are properly adjusted, they will bear with sufficient force against the periphery of the ratchet ring 14 to prevent the rotation of said ring under normal drilling conditions, or in other words, when the drill steel will rotate properly. If, however, the steel becomes lodged so that it cannot turn readily, then the ring will slip. The resistance to this slipping movement can of course be varied by adjusting the bolts 20.
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In Figures 6 and 7 a slightly modified form of construction is illustrated. Therein the cylinder member is designated 24 and the ratchet ring is shown at 25. The wedges are in sets and are designated respectively 26 and 27. So far the structure is substantially the same as that above described. In the present embodiment, however, it will be noted that adjusting plugs 28 are employed that are radially disposed and have tapered inner ends 29 that are interposed between and bear against the inner clutch wedge 26 of one set, and the outer wedge 27 of the other set. By moving these plugs inwardly, frictional pressure is brought between the inner clutch wedges 26 and the periphery of the clutch
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ring 25. The plugs in this instance are held against rotation by cross pins 30 engaged in the tool-receiving slots 31 formed in the outer ends of said plugs 28.

5 From the foregoing, it is thought that the construction, operation, and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

15 What I claim is:

1. The combination with a cylinder member and a reciprocatory piston therein capable of rotary movement, of means for effecting its rotation including a normally stationary ratchet ring, and coacting wedge elements that frictionally hold the ring against rotation in either direction until abnormal force operates thereon to turn it and thereby make the rotation means ineffective, and means for adjusting the wedge elements with respect to each other for varying the frictional pressure against the ring.

2. The combination with a cylinder member having a chamber for ratchet mechanism, and a reciprocatory piston operating in the cylinder member and being capable of rotary movement therein, of ratchet mechanism in the chamber for effecting a step-by-step rotation of the piston and including a rotatable ring, oppositely disposed coacting wedge members interposed between the ring and chamber wall for holding the ring against rotation until abnormal force operates on said ring to rotate it and thereby make the ratchet mechanism ineffective, and means for adjusting the wedge members with respect to each other for varying their frictional contact with the rotatable ring.

3. The combination with a cylinder member having a chamber for ratchet mechanism, and a reciprocatory piston operating in the cylinder member and being capable of rotary movement therein, of ratchet mechanism in the chamber for effecting a step-by-step rotation of the piston and including a rotatable ring, oppositely disposed coacting wedge members interposed between the ring and chamber wall for holding the ring against rotation until abnormal force operates on said ring to rotate it and thereby make the ratchet mechanism ineffective, and means for relatively moving the wedges to vary their frictional pressure against the ring.

4. The combination with a cylinder member having a chamber for ratchet mechanism, and a reciprocatory piston operating in the cylinder member, and being capable of rotary movement therein, of ratchet mechanism in the chamber for effecting a step-by-

step rotation of the piston and including a rotatable ring, oppositely disposed coacting wedge members interposed between the ring and chamber wall for holding the ring against rotation until abnormal force operates on said ring to rotate it and thereby make the ratchet mechanism ineffective, and a screw threaded in the cylinder member and bearing against one of the wedges for relatively moving the wedges to vary their frictional pressure against the ring.

5. The combination with a cylinder member and a piston operating therein and capable of rotary movement also, of mechanism for effecting the rotation of the piston including a rifle bar having a ratchet head, a ratchet ring surrounding the head and rotatable, pawls for connecting the head and ring, oppositely disposed wedges, one of which bears against the ring to hold it against rotation under normal drilling conditions, and means for adjusting the wedges to vary the frictional pressure against the ring.

6. The combination with a cylinder member and a piston operating therein and capable of rotary movement also, of mechanism for effecting the rotation of the piston including a rifle bar having a ratchet head, a ratchet ring surrounding the head and rotatable, sets of oppositely disposed overlapping wedges, the inner wedges being curved and fitting the periphery of the ratchet ring, and means for relatively moving the wedges.

7. The combination with a cylinder member and a piston operating therein and capable of rotary movement also, of mechanism for effecting the rotation of the piston including a rifle bar having a ratchet head, a ratchet ring surrounding the head and rotatable, sets of oppositely disposed overlapping wedges, the inner wedges being curved and fitting the periphery of the ratchet ring, and adjusting screws having wedge portions interposed between the sets of wedges and each operating on wedges of the different sets.

8. In combination with a cylinder member and a piston operating therein and capable of rotary movement also, of mechanism for effecting rotation of the piston including a rifle bar having a ratchet head, a ratchet ring surrounding the head and rotatable, pawls for connecting the head and ring, a pair of oppositely disposed wedges positioned between the ratchet ring and cylinder, one of which bears against the ring to hold it against rotation under normal drilling conditions, a second set of oppositely disposed wedges engageable by the first set and one of which bears against the ring to hold it against rotation, and means disposed within each set of wedges for varying their frictional engagement with the ratchet ring.

In testimony whereof, I affix my signature.

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