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G. C. PEARSON

1,940,693

SLIP ROTATION FOR ROCK DRILLS

Filed June 22, 1928

2 Sheets-Sheet 1

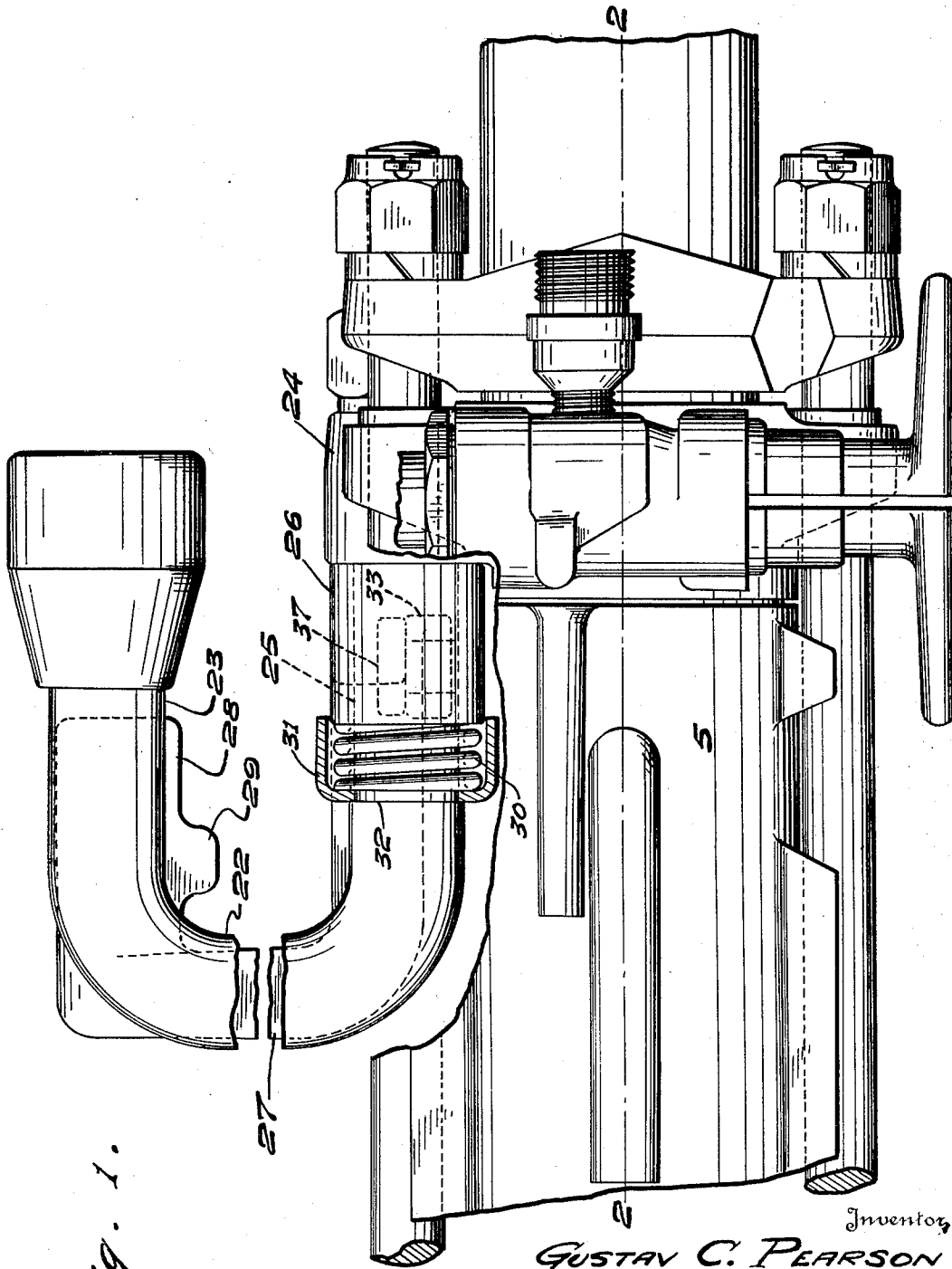


Fig. 1.

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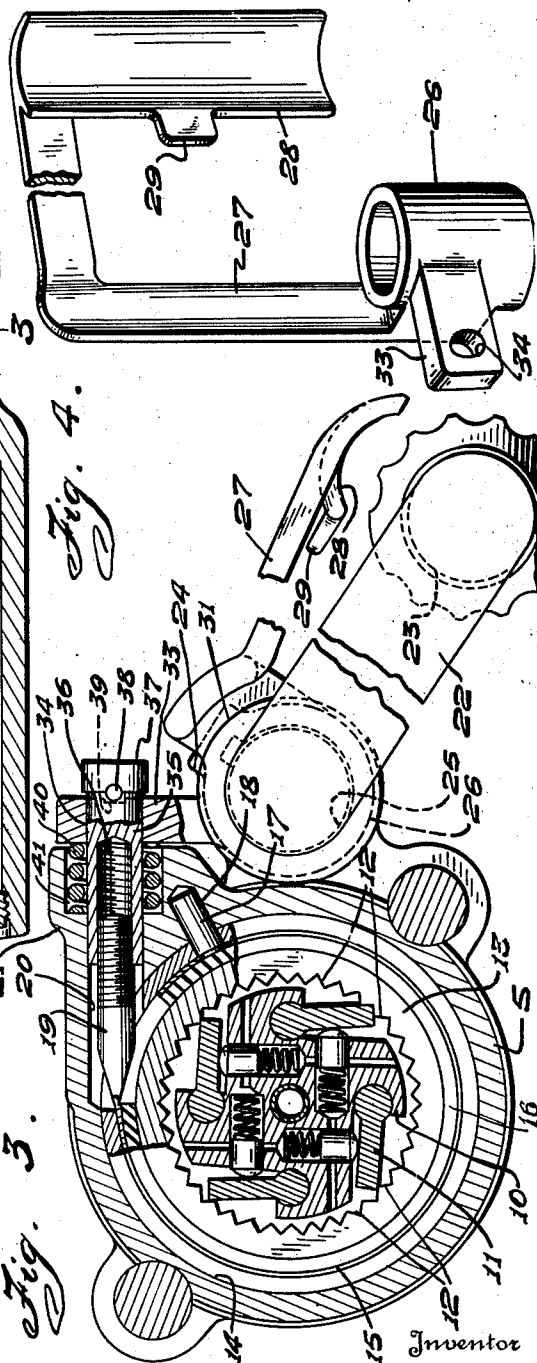
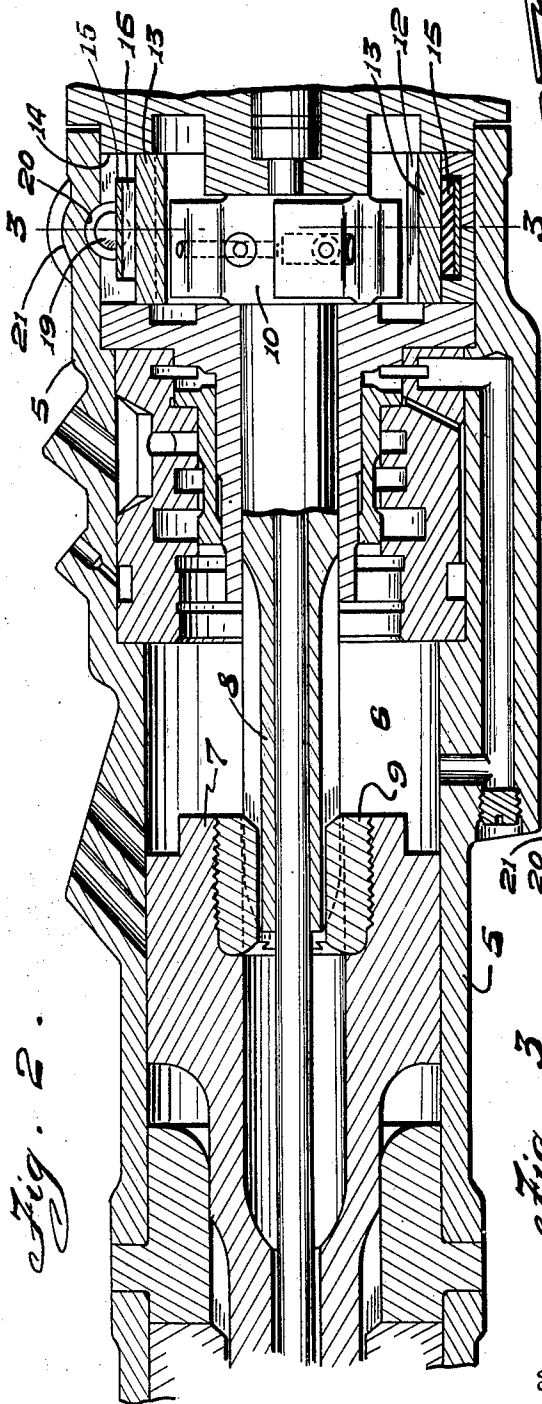
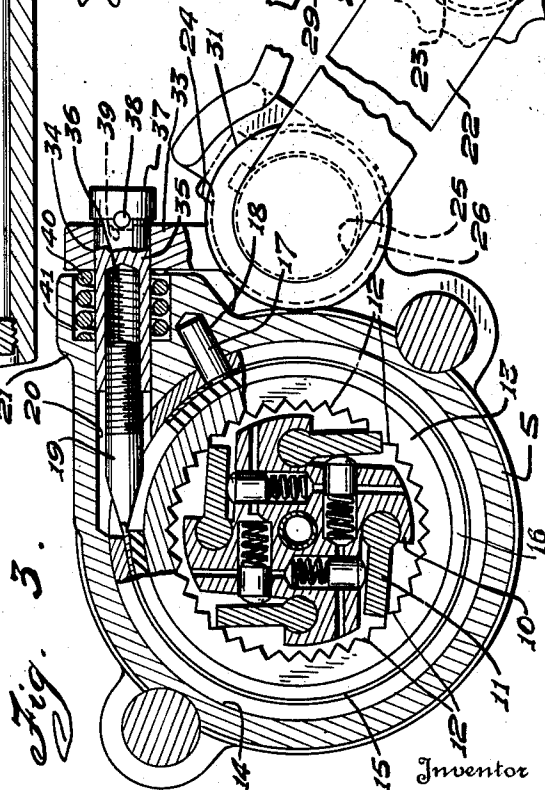


Fig. 4.



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UNITED STATES PATENT OFFICE

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SLIP ROTATION FOR ROCK DRILLS

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12 Claims. (Cl. 121-7)

The object of the present invention is to provide novel means of an effective character and under the control of the operator for holding the rifle bar ratchet mechanism of a rock drill normally in operative condition, but permitting it to slip under abnormal conditions so as to prevent the cylinder member being rotated, as for instance when the steel becomes stuck and held against rotation.

10 In the accompanying drawings:

Figure 1 is a view in elevation of a portion of a rock drill equipped with the novel mechanism.

Figure 2 is a longitudinal sectional view on the line 2-2 of Figure 1.

15 Figure 3 is a cross sectional view on the line 3-3 of Figure 2.

Figure 4 is a detail perspective view of the controlling handle.

In the embodiment disclosed, a cylinder member 5 is employed, having a chamber 6, in which is a reciprocatory piston 7 that is capable of rotary movement. This piston as usual, has an inter-fitting sliding engagement with the chuck of a tool holder for the purpose of rotating the latter and thereby the steel or tool engaged therein. The rotary movement of the piston is effected by means of a rifle bar 8 slidably engaged in a nut 9 fixed in the rear end of the piston. This rifle bar has at its rear end a ratchet head 10 provided with pivoted outwardly spring pressed pawls 11. These pawls engage the internal teeth 12 of a ratchet ring 13 rotatably mounted in a chamber 14 formed in the rear end of the cylinder member. If the ratchet ring 13 is free to rotate the piston 7 will not be rotated, but if the ring 13 is held against rotation, then the piston is given a step-by-step rotation.

Surrounding the ratchet ring 13 is a clutch band or ring 15 having a suitable friction clutch lining 16 that engages the periphery of the ratchet ring 13. One end of the clutch band 15 is anchored by a pin 17 secured thereto and engaged in a socket 18 in the cylinder member. The other end of the band terminates in a bolt 19 that is externally threaded and is located in a tangential socket 20 formed in an enlargement 21 on one side of the cylinder member.

Fixed to the cylinder member is a U-shaped tool holding handle 22 having an offset, longitudinally disposed handle grip 23. This handle has adjacent to its mounting 24 a bearing portion 25, on which is journaled the eye 26 of a clutch controlling handle. This handle consists of an L-shaped shank 27 terminating in a grip 28 that overlies the grip 23 and has a thumb-piece

projection 29. The handle eye 26 is urged against the mounting 24 by a coiled spring 30 mounted on the main handle and bearing against one end of the eye. This spring is housed within a shield cup 31 also carried by the main handle and abutting against a shoulder 32 formed thereon. The handle 26 is provided with an offset lug or arm 33 provided with an opening 34, through which passes a rotatable stem 35. This stem has a socket 36, the walls of which are externally threaded and are screwed upon the bolt 19 of the clutch band. The stem 35 terminates at its outer end in a head 37, by which it can be rotated and is also provided with a cross pin 38 adapted to engage in seats 39 formed in the arm of the lug 33. Bearing against the inner side of the lug or arm 33 is a coiled spring 40 surrounding the stem 35 and located in a socket 41 formed in the enlargement 21.

With this construction, it will be evident that the spring 40 pressing the arm or lug 33 outwardly, will cause the lining of the friction band 15 to frictionally bear against the periphery of the ratchet ring 13. The amount of tension upon the band by the spring 40 can be varied by turning the stem 35 so as to thread the bolt 19 more or less into the same. This stem is however, held against rotation by the cross pin 38 engaging in the notches 39.

When an operator holds the tool by the grip 23 he also holds the hand grip 28 and consequently he puts sufficient tension on the clutch band 15 to hold the ratchet ring 13 against rotation in the cylinder member. The piston 7 is therefore during its reciprocation given a step-by-step rotation in a manner well understood. Should the handle fly out of the hand of the operator as may be the case when the steel becomes stuck, the frictional action of the clutch band 15 is greatly reduced and the danger of the tool rotating on the piston and striking the operator is minimized. More than that, should the operator desire to manually turn the entire tool for the purpose of turning the drill steel, when it becomes stuck, he has only to grip the handles 23 and 28 tightly together, whereupon he more securely holds the clutch ring 13 so that the entire tool can be turned to turn the steel. The grip 28 it will be noted is directly adjacent to the terminal hand grip 23 of the main holding handle and consequently the fingers of the operator's hand grasping the hand grip 23 can also freely operate on the grip 28, which thus constitutes a finger piece. The opposite thumb piece 29 on the other hand is so located that

the operator can press upon it and at the same time release his finger pressure on the part 28, thus swinging the supplemental handle away from the main handle 23 and releasing the gripping action of the ring 15—16 on the ratchet ring 13.

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.

What I claim, is:

1. The combination with a cylinder member and a reciprocatory piston therein, of means for effecting the rotation of the piston including a rifle bar having a ratchet head, a ratchet ring with which the head cooperates said ring being rotatably mounted in the cylinder member, a friction clutch band that engages the ring to hold it from rotating, a handle for holding the cylinder member, and a second handle pivotally mounted on the first handle and connected to the band for clamping it against the ring.

2. The combination with a cylinder member and a reciprocatory piston therein, of means for effecting the rotation of the piston including a rifle bar having a ratchet head, a ratchet ring with which the head cooperates, said ring being rotatably mounted in the cylinder member, a clutch ring anchored in the cylinder member and engaging the ratchet ring, a handle for holding the cylinder member, a clutch handle having a pivotal mounting on the holding handle, a spring operating on the clutch handle to cause it to tighten the clutch ring on the ratchet ring, and an extensible connection between the clutch handle and clutch ring.

3. The combination with cylinder member and a reciprocatory piston therein, of means for effecting the rotation of the piston including a rifle bar having a ratchet head, a ratchet ring with which the head cooperates, said ring being rotatably mounted in the cylinder member, a clutch ring anchored in the cylinder member and engaging the ratchet ring; a handle for holding the cylinder member; a clutch handle having a pivotal mounting on the holding handle, a spring operating on the clutch handle to cause it to tighten the clutch ring on the ratchet ring, and a stem rotatably mounted in the clutch handle and having a threaded engagement with the clutch ring.

4. The combination with a cylinder member and a reciprocatory piston therein, of means for effecting the rotation of the piston including a rifle bar having a ratchet head, a ratchet ring with which the head cooperates, said ring being rotatably mounted in the cylinder member, a clutch ring encircling the ratchet ring and frictionally engaging the same, an anchor for one end of the clutch ring, a threaded bolt on the other end, a handle for holding the cylinder member a handle having a pivotal mounting on the holding handle, a stem rotatably mounted in the second handle and having a threaded engagement with the bolt, and a coiled spring bearing against the second handle.

5. The combination with a cylinder member and a reciprocatory piston therein, of ratchet mechanism for rotating the piston including a rotatable ratchet ring, a handle for holding the

cylinder, and means for holding the ratchet ring against rotation including a device engaging the ring and a movable supplemental handle having a connection with the device for operating it and having a finger grip and an offset thumb piece for respectively moving said handle in opposite directions by a hand grasping the holding handle.

6. The combination with a cylinder member and a reciprocatory piston therein, of ratchet mechanism for rotating the piston including a rotatable ratchet ring, a handle for holding the cylinder having a terminal hand grip, and means for holding the ratchet ring against rotation, including a device engaging the ring and a movable handle having a connection with the device for operating it and having a finger piece that lies alongside the holding handle and adjacent to the grip for engagement by the fingers of a hand that grasps said grip to move the movable handle in one direction, said movable handle having an offset thumb piece also adjacent to the grip and adapted to be pressed against by the thumb to move the movable handle in the opposite direction.

7. The combination with a cylinder member and a reciprocatory piston therein, of ratchet mechanism for rotating the piston including a rotatable ratchet ring, a handle for holding the cylinder having a terminal hand grip, and means for holding the ratchet ring against rotation, including a friction contractile clutch ring that engages the ratchet ring, and a movable handle having a connection with the clutch ring for moving it, said movable handle having a finger piece that lies alongside the holding handle and adjacent to the grip for engagement by the fingers of a hand that grasps said grip to move the movable handle in one direction, said movable handle having an offset thumb piece also adjacent to the grip and adapted to be pressed against by the thumb to move the movable handle in the opposite direction.

8. The combination with a cylinder member and a reciprocatory piston therein, of means for effecting the rotation of the piston including a rifle bar having a ratchet head, a ratchet ring with which the head co-operates, said ring being rotatably mounted in the cylinder member, a friction clutch band movably engaging the ring to hold it from rotating, a handle for holding the cylinder member, and a second handle movably mounted on the first handle and adjustably connected to the band for controlling its clamping action against the ring.

9. The combination with a cylinder member and a reciprocatory piston therein, of means for effecting the rotation of the piston including a rifle bar having a ratchet head, a ratchet ring with which the head co-operates, said ring being rotatably mounted in the cylinder member, a clutch band surrounding and frictionally engaging the ratchet ring, a holding handle for the cylinder member, a clutch operating handle pivotally mounted on the cylinder member and disposed adjacent the holding handle, and an adjustable connection between the band and the clutch operating handle to regulate the frictional engagement of the band upon the ring.

10. The combination with a cylinder member and a reciprocatory piston therein, of means for effecting the rotation of the piston including a rifle bar having a ratchet head, a ratchet ring with which the head co-operates, said ring being rotatably mounted in the cylinder member, a clutch ring anchored in the cylinder member and

engaging the ratchet ring, a holding handle for the cylinder member, a clutch operating handle movably mounted on the cylinder member and disposed adjacent the holding handle, said clutch
 5 operating handle having an offset arm, and adjustable means mounted in the arm and connected to the clutch ring for regulating the frictional engagement of the clutch ring upon the ratchet ring.

10 11. The combination with a cylinder member and a reciprocatory piston therein, of ratchet mechanism for rotating that piston, including a rotatable ratchet ring, a handle for holding the cylinder, means for holding the ratchet ring
 15 against rotation, including a movable supplemental handle that is adjacent to the holding handle and operated by a hand grasping the holding handle, and a band encircling the ratchet

ring and having means for varying its clamping action thereupon, and said means being engageable by the supplemental handle for increasing the clamping action of the band upon the ring above that controlled by the means. 80

12. The combination with a cylinder member and a reciprocatory piston therein, of ratchet mechanism for rotating the piston, including a rotatable ratchet ring, a holding handle for the cylinder, a supplemental handle movably
 85 mounted upon the cylinder, an element engageable with the ratchet ring to hold it against rotation and having means for varying its engagement therewith, and said means being movable upon the movement of the supplemental handle
 90 for increasing the engagement of the element with the ring above that controlled by the means.

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