

Dec. 1, 1931.

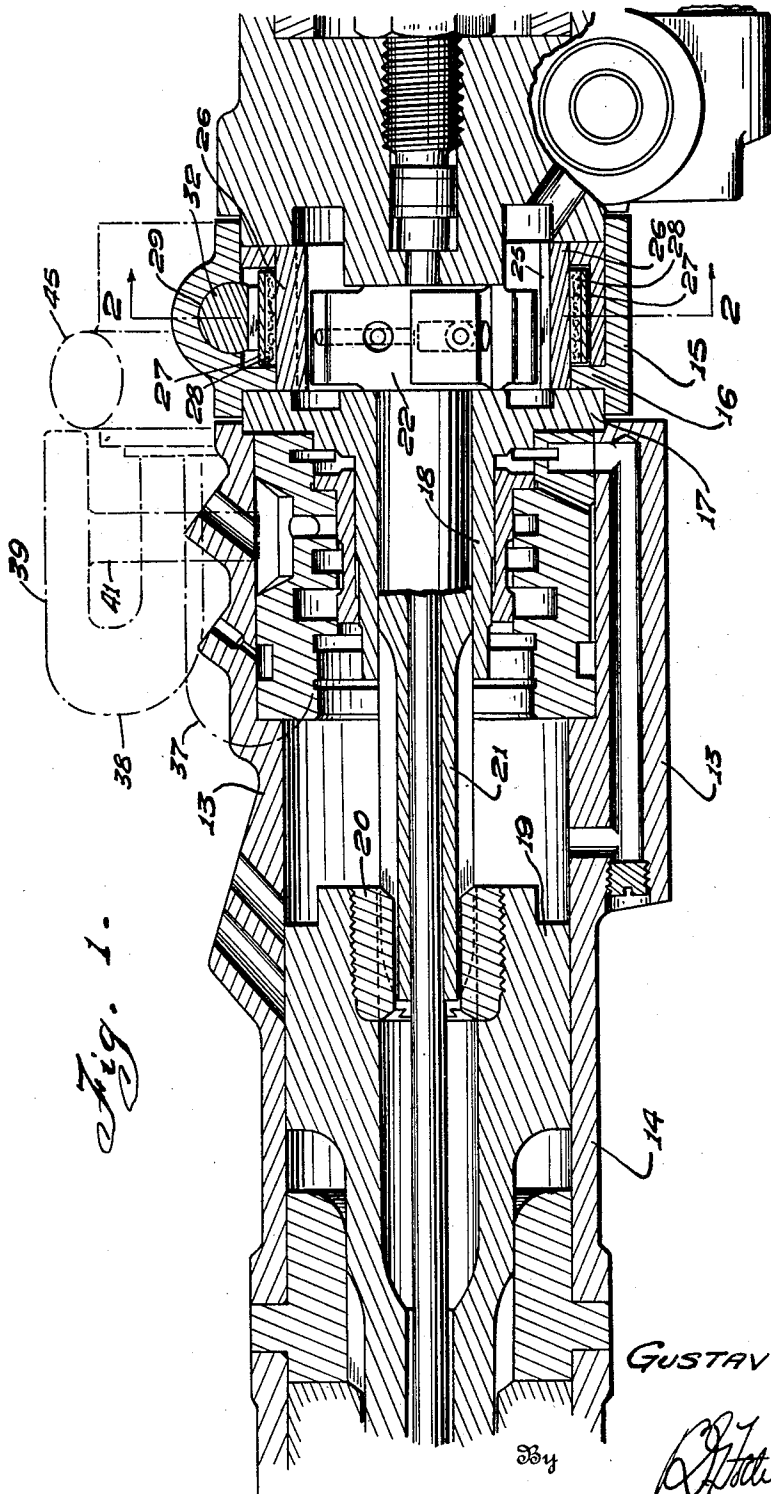
G. C. PEARSON

1,834,727

SLIP ROTATION FOR ROCK DRILLS

Filed July 31, 1928

5 Sheets-Sheet 1



Inventor  
GUSTAV C. PEARSON

*G.C.P.*

Attorney

Dec. 1, 1931.

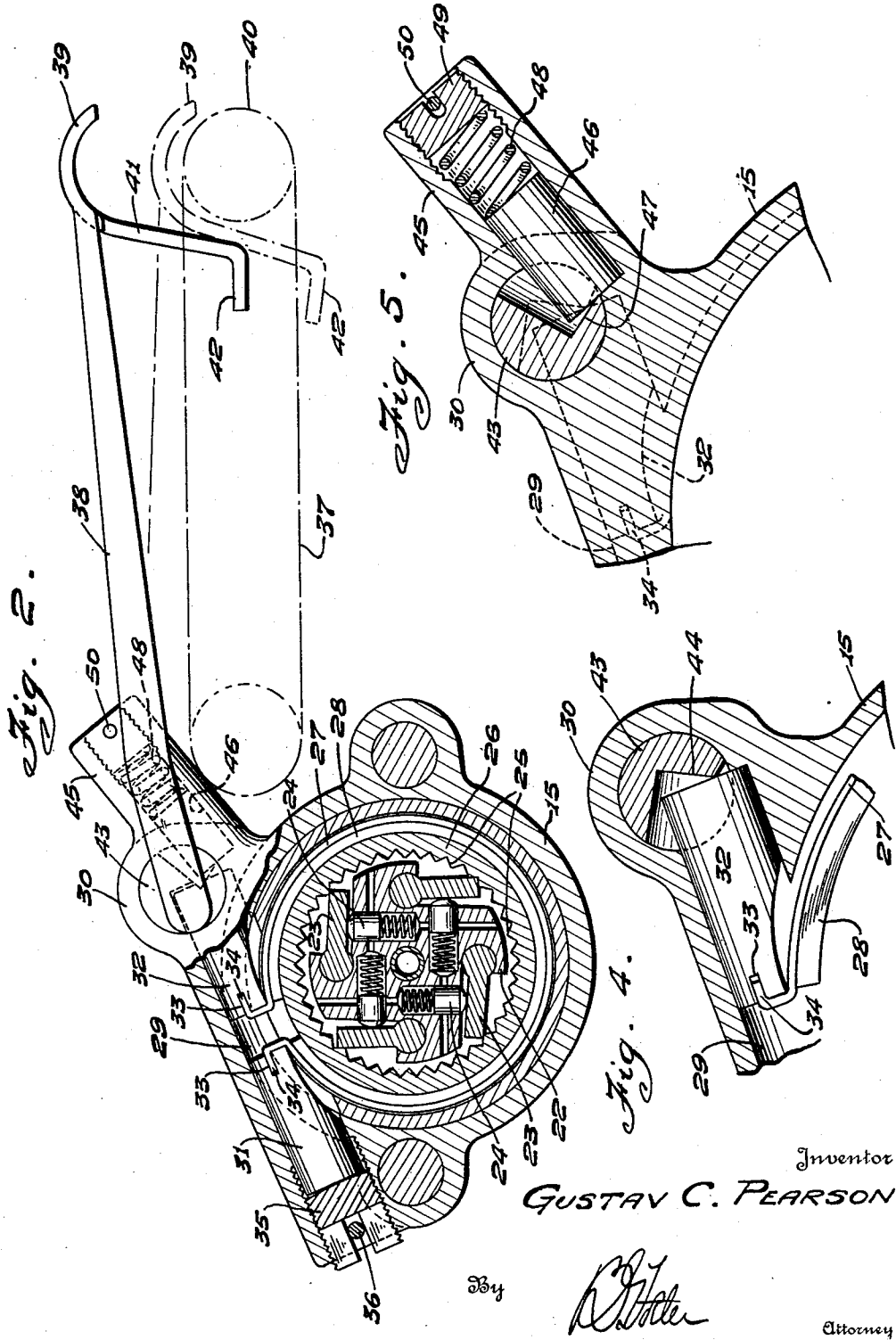
G. C. PEARSON

1,834,727

SLIP ROTATION FOR ROCK DRILLS

Filed July 31, 1928

5 Sheets-Sheet 2



Dec. 1, 1931.

G. C. PEARSON.

1,834,727

SLIP ROTATION FOR ROCK DRILLS

Filed July 31, 1928

5 Sheets-Sheet 3

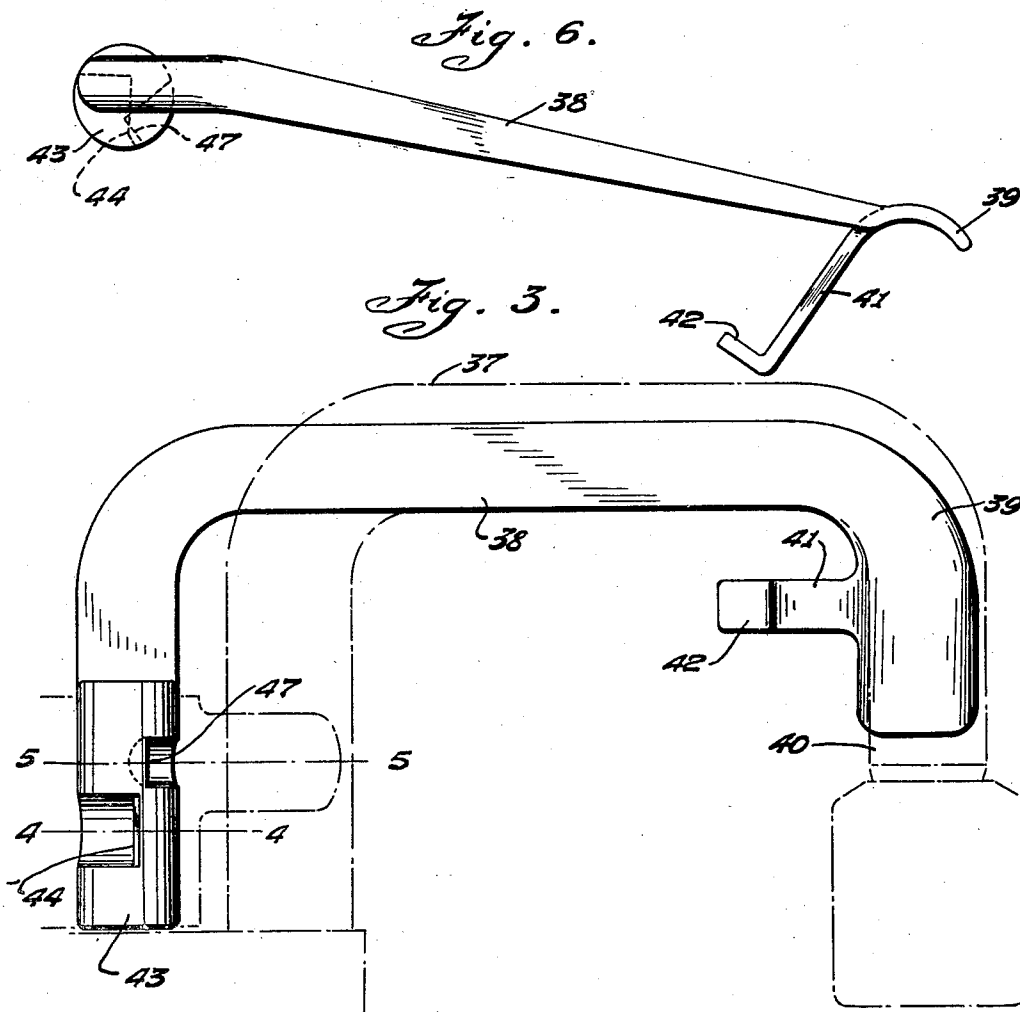
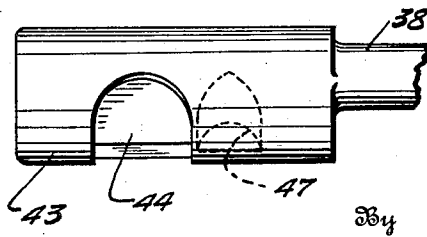


*Fig. 7.*



Inventor  
GUSTAV C. PEARSON

By *[Signature]*

Attorney



Dec. 1, 1931.

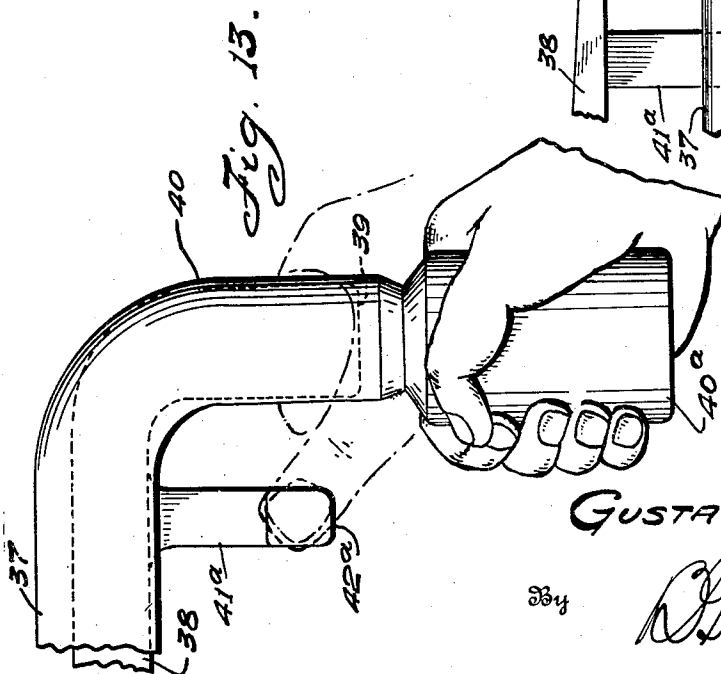
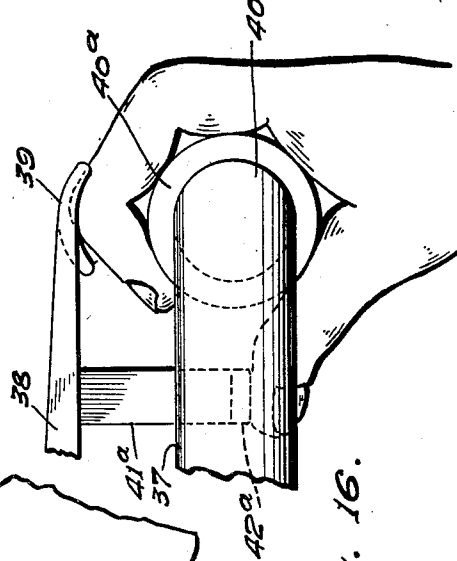
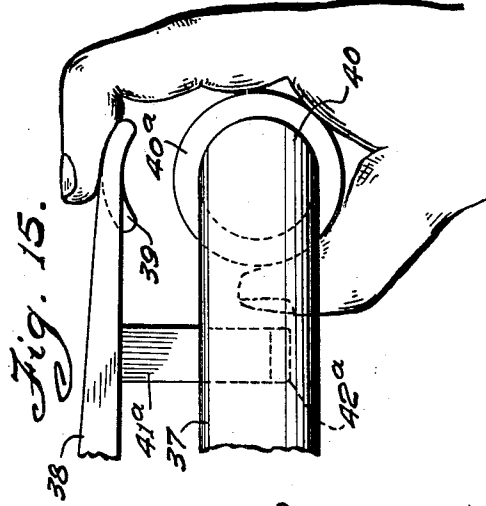
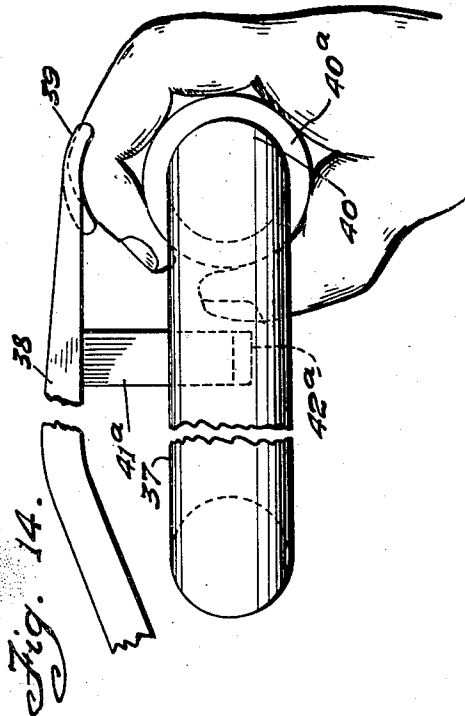
G. C. PEARSON

1,834,727

SLIP ROTATION FOR ROCK DRILLS

Filed July 31, 1928

5 Sheets-Sheet 5



Inventor

GUSTAV C. PEARSON

334

*[Signature]*

Attorney

## UNITED STATES PATENT OFFICE

GUSTAV C. PEARSON, OF DENVER, COLORADO, ASSIGNOR TO GARDNER-DENVER  
COMPANY, OF DENVER, COLORADO, A CORPORATION OF DELAWARE

## SLIP ROTATION FOR ROCK DRILLS

Application filed July 31, 1928. Serial No. 296,599.

The object of the present invention is the provision of a simple, novel and effective means for holding the ratcheting mechanism that effects the rotation of the piston and drill steel of a drilling machine active, and yet will permit its becoming inactive in emergencies as when a steel becomes lodged so that it will not rotate readily.

A further and important object is to provide means for effectively securing the ratchet mechanism to permit the tool and steel being turned by hand.

In the accompanying drawings:

Figure 1 is a longitudinal sectional view through a portion of a tool equipped with the novel mechanism.

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

Figure 3 is a detail view in elevation of the controlling handle and indicating its position with respect to the usual drill handle.

Figures 4 and 5 are cross sectional views on the lines 4—4 and 5—5 of Figure 3, when mounted on the tool.

Figure 6 is a detail view in elevation of the controlling handle.

Figure 7 is a view in elevation of the journal portion or said handle.

Figure 8 is a longitudinal sectional view of a modified form of construction.

Figure 9 is a cross sectional view of the same on the line 9—9 of Figure 8.

Figure 10 is a detail view of the journal portion of the handle of Figures 8 and 9.

Figure 11 is a sectional view taken on the line 11—11 of Figure 10.

Figure 12 is a detail side elevation of the mounting for the parts.

Figure 13 is a detail side elevation of portions of the handle, indicating their association and the manner in which they are normally used.

Figure 14 is a plan view of the structure when used as illustrated in Figure 13.

Figure 15 is a view similar to Figure 14 but illustrating the manner in which a tighter grip is secured on the ratchet ring.

Figure 16 is a similar view illustrating the manner in which the ratchet ring is released by the operator.

In the embodiment illustrated in Figures 1—7 inclusive, a cylinder member 13 is employed, which includes a barrel 14, on the rear end of which is mounted a separate housing 15. The parts may, however, be of one piece. As shown, the housing 15 is provided with an inwardly extending flange 16 that clamps against the rear end of the barrel 14, the flange 17 of a bushing 18 that projects into the barrel 14. A reciprocatory piston is shown at 19, and is of the well-known type that is capable of rotation for the purpose of effecting the rotation of the drill steel. This piston has in its rear end a nut 20 that has a slidable interfitting engagement with a rifle bar 21 extending rearwardly through the bushing 18 and carrying at its rear end a ratchet head 22 located in the housing 15. This ratchet head is provided with pawls 23 pressed outwardly by spring plungers 24. The pawls are adapted to contact with the internal teeth 25 of a ratchet ring 26 surrounding the head 22 and therefore also located in the housing 15 within the flange 16.

The ratchet ring 26 is rotatable, but is normally held against rotation by a clutch ring. This clutch ring preferably consists of a contractile band 27 carrying a lining 28 that frictionally engages the periphery of the ratchet ring 26.

The housing 15 is provided with a tangential bore 29 that intersects the chamber containing the above described ratchet mechanism, and this bore opens into a journal box 30 formed on said housing at one end of the bore and disposed longitudinally of the cylinder member. In the bore 29 are oppositely disposed slidable plungers 31 and 32 having notches 33 in their inner ends. The ends of the band 27 are formed into hooks 34 engaged in said notches. The plunger 31 has its outer end borne against by an adjusting plug 35 threaded into one end of the bore and held against accidental turning by a cross pin 26. The outer end of the other plunger 32 projects into the bore of the bearing box 30.

The usual handle by which the tool is held and can be rotated is indicated at 37. It is U-shaped in formation and is suitably secured to the tool. Alongside this handle 37

there is located a controlling handle 38 having a handle grip 39 disposed alongside the handle grip 40 of the tool 37. This grip 39 is also provided with an offset arm 41 terminating in a thumb-piece 42. The controlling handle 38 has a cylindrical bearing portion 43 journaled in the bearing box 30. This journal portion 43 is cut away to provide a shoulder 44 which as shown in Figure 4 constitutes a cam that bears against the outer end of the plunger 32. Obviously therefore if the handle 38 is swung toward the handle 37 the cam 44 will act to force the plunger 32 inwardly, thereby contracting the clutch ring upon the ratchet ring. Projecting outwardly from the box 30 and out of line with the bore 29 is a tubular portion 45 in which is a spring-pressed plunger 46 that bears against another cam portion 47 formed by cutting away the journal portion 43 of the handle 38 (see Figure 5). This cam portion 47 is in opposition to the cam portion 44 and consequently the plunger 46 operates in a direction to urge the plunger 32 inwardly.

The plunger 46 is borne against by a coiled spring 48 that is in turn borne against by an adjustable plug 49 threaded into the outer end of the tubular portion 45 and normally held against accidental rotation by a cross pin 50. By adjusting the plug 49, the tension of the spring 48 can be altered.

With this construction, the operator of the tool can control the rotation of the clutch ring 26, that is to say, he can put sufficient pressure upon the plunger 32 to hold the ring 26 against rotation during the normal operation of the drill. If, however, the steel becomes stuck so that it will not readily rotate then the ring 26 will rotate instead and if the handle should fly from his hand, the action will be such that the frictional engagement between the clutch ring 28 and ratchet ring 26 will be lessened and the rotation of the body of the tool will not continue. Should it become necessary or desirable to clamp the ratchet ring more tightly in order to turn the tool by hand, then the handle 38 is drawn down closer to the main operating handle 37.

In the modified form of construction, the principal difference is in the relation of the spring-pressed plunger which operates on the controlling handle and therefore the other parts have been given the same reference numerals. It will be noted by reference to Figure 9 that the tubular portion in this structure and which is designated 45a is made parallel to the bore 29, but is located at one side of the same. It contains a plunger 46a that operates against a cam portion 47a formed on the journal portion 43a of the tool and operating in opposition to the cam portion 44a against which the plunger 32 bears. This relation of parts is not only more compact, but it has been found to lessen

the vibration that may occur in the operation of these parts. The thumb piece 41a—42a also extends from the shank of the handle 38 instead of from the grip or finger piece 39 and thus gives better space for the manipulation of the fingers. Thus, as illustrated in Figures 13 and 14 under ordinary conditions, the operator simply grasps the terminal grip 40a of the handle 40, the supplemental handle being free. Under such circumstances, the spring 48 is operating to hold the clutch ring 27—28 in sufficient frictional engagement with the ratchet ring 26 to maintain the latter against rotation. If the operator wishes to place a greater frictional tension on the clutch ring, he slides his fingers over the finger piece 39 and draws it closer to the hand grip. On the other hand if he wishes to release the ratchet ring 26 to permit it to turn, then he presses against the thumb piece 42a as indicated in Figure 15, thereby compressing the spring 48 and permitting the clutch ring 27—28 to expand.

A still further feature of advantage in this structure is the adjustment that can be obtained by manipulating the two plugs 35 and 49. This adjustment places the supplemental handle 39 at any desired distance away from the main handle 40. For example, if it is desired to adjust the handle 39 toward the handle 40, the operator withdraws the plug 35 and screws inwardly the plug 49. This relieves pressure upon one side of the handle trunnion and applies pressure upon the other. When it is desired to move the handle 39 away from the handle 40, the operation is reversed.

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 capable of rotation, of means for effecting the rotation of the piston including a rotatable ratchet ring, a contractile clutch ring that surrounds the ring and frictionally engages the same, a handle lever fulcrumed on the cylinder member and having means engaged with one end of the clutch ring for contracting it, and an anchor plunger adjustably mounted in the cylinder member and engaged with the other end of the clutch ring.

2. The combination with a cylinder member having a chamber and a transverse bore, of a reciprocatory piston in the cylinder member and capable of rotation, means for effecting the rotation of the piston includ-

ing a ratchet ring, a contractile clutch ring surrounding the ratchet ring and frictionally engaging the same, an anchor plunger slidable in the bore and engaged with one end of the clutch ring, an adjusting screw threaded in the bore and bearing against the plunger, a second plunger slidably mounted in the bore and engaged with the clutch ring, and means for moving the second plunger inwardly.

3. The combination with a cylinder member having a chamber and a transverse bore, of a reciprocatory piston in the cylinder member and capable of rotation, means for effecting the rotation of the piston including a ratchet ring, a contractile clutch ring surrounding the ratchet ring and frictionally engaging the same, an anchor plunger slidable in the bore and engaged with one end of the clutch ring, an adjusting screw threaded in the bore and bearing against the plunger, a second plunger slidably mounted in the bore and engaged with the clutch ring, and a handle fulcrumed on the cylinder member and having a bearing against the second plunger to move it inwardly.

4. The combination with a cylinder member and a reciprocatory piston therein capable of rotation, of means for effecting the rotation of the piston including a rotatable ratchet ring, a contractile clutch ring that surrounds the ring and frictionally engages the same, a plunger slidably mounted in the cylinder member and operating to contract the clutch ring, and a handle for moving the plunger inwardly.

5. The combination with a cylinder member and a reciprocatory piston therein capable of rotation, of means for effecting the rotation of the piston including a rotatable ratchet ring, a contractile clutch ring that surrounds the ring and frictionally engages the same, a plunger slidably mounted in the cylinder member and movable to contract the clutch ring, and a handle fulcrumed on the cylinder member and having a portion adjacent the fulcrum bearing against the plunger to move it inwardly.

6. The combination with a cylinder member and a reciprocatory piston therein capable of rotation, of means for effecting the rotation of the piston including a rotatable ratchet ring, a contractile clutch ring that surrounds the ring and frictionally engages the same, a plunger slidably mounted in the cylinder member and operating to contract the clutch ring, a handle fulcrumed on the cylinder member and having a portion adjacent the fulcrum bearing against the plunger to move it inwardly, and a spring also acting on the plunger to move it inwardly.

7. The combination with a cylinder member and a reciprocatory piston therein capable of rotation, of means for effecting the rotation of the piston including a rotatable ratchet ring, a contractile clutch ring that

surrounds the ring and frictionally engages the same, a plunger slidably mounted in the cylinder member and operating to contract the clutch ring, a handle fulcrumed on the cylinder member and having a portion adjacent the fulcrum bearing against the plunger to move it inwardly, and a spring having a bearing against the handle and acting there-through on the plunger to move it inwardly.

8. The combination with a cylinder member and a reciprocatory piston therein capable of rotation, of means for effecting the rotation of the piston including a rotatable ratchet ring, a contractile clutch ring that surrounds the ratchet ring and frictionally engages the same, a plunger slidably mounted in the cylinder member and movable to contract the clutch ring, and a handle having a shaft portion journaled in the cylinder member, said shaft portion having a cam portion bearing against the plunger to move it.

9. The combination with a cylinder member and a reciprocatory piston therein capable of rotation, of means for effecting the rotation of the piston including a rotatable ratchet ring, a contractile clutch ring that surrounds the ratchet ring and frictionally engages the same, a plunger slidably mounted in the cylinder member and operating to contract the clutch ring, a handle having a shaft portion journaled in the cylinder member, said shaft portion having a pair of cam portions, one of which bears against the plunger, and a spring operating against the other.

10. The combination with a cylinder member and a reciprocatory piston therein capable of rotary movement, of means for effecting such rotary movement including a rifle bar having a ratchet head, a ratchet ring surrounding the head, a contractile clutch ring surrounding the ratchet ring, a plunger that engages the clutch ring, and a manually actuated handle fulcrumed on the cylinder member and having a bearing against the plunger to urge it inwardly and contract the ring.

11. The combination with a cylinder member having a chamber, a transverse bore that intersects the chamber, and a bearing box into which the bore opens, of a reciprocatory piston in the cylinder member and capable of rotation, a rifle bar with which the piston is slidably interfitted, said rifle bar having a ratchet head in the chamber, a ratchet ring surrounding the head, a contractile clutch ring surrounding the ratchet ring, plungers in the bores engaged with the ends of the clutch ring, a threaded plug bearing against one of the plungers, a handle journaled in the bearing box and having a cam portion operating against the other plunger, and a spring bearing against the handle to cause it to urge the plunger in a direction to contract the clutch ring.

12. The combination with a cylinder member and a reciprocatory piston therein capable of rotation, of means for effecting the rotation of the piston including a ratchet ring, a clutch for holding the ratchet ring against rotation, a main holding handle, a supplemental movable handle associated with the main handle and connected to the clutch for operating it, and means for adjusting the supplemental handle to place it in normal position at different distances from the main handle.

13. The combination with a cylinder member and a reciprocatory piston therein capable of rotation, of means for effecting the rotation of the piston including a ratchet ring, a clutch ring for holding the ratchet ring against rotation, a main holding handle, a supplemental movable handle associated with the main handle and connected to the clutch ring for contracting it, means for adjusting the clutch ring and thereby the handle, a spring that operates against the handle, and an adjustable bearing for said spring.

In testimony whereof, I affix my signature.  
GUSTAV C. PEARSON.