J. S. HARLOW.

ROCK DRILL.

APPLICATION FILED SEPT. 21, 1907.

955,591. Patented Apr. 19, 1910.

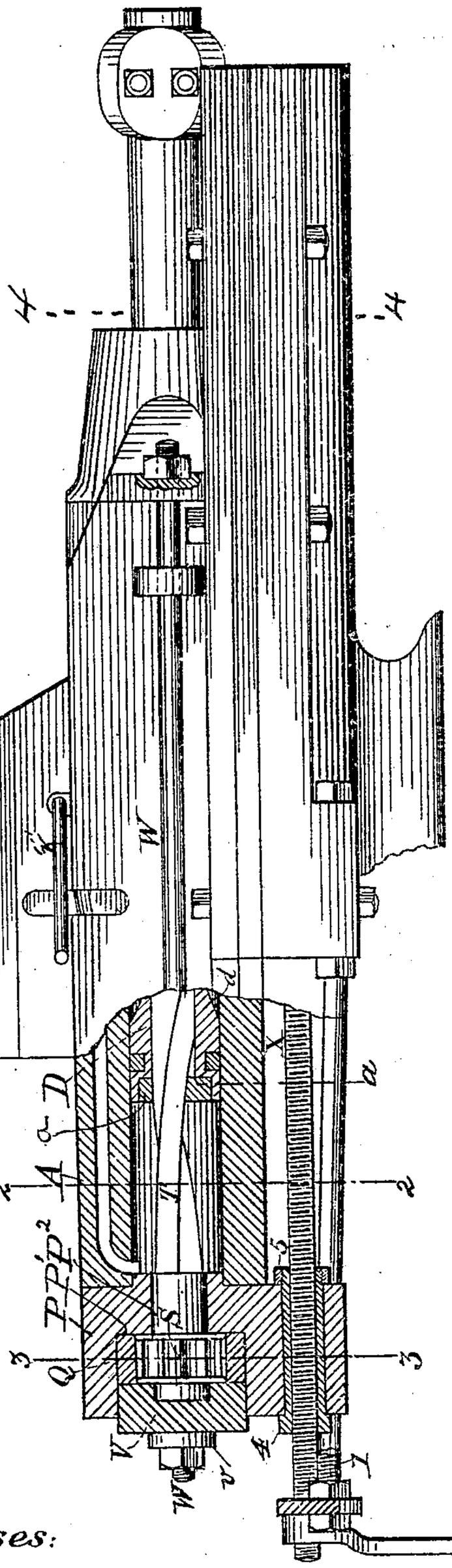

Fig. 1.

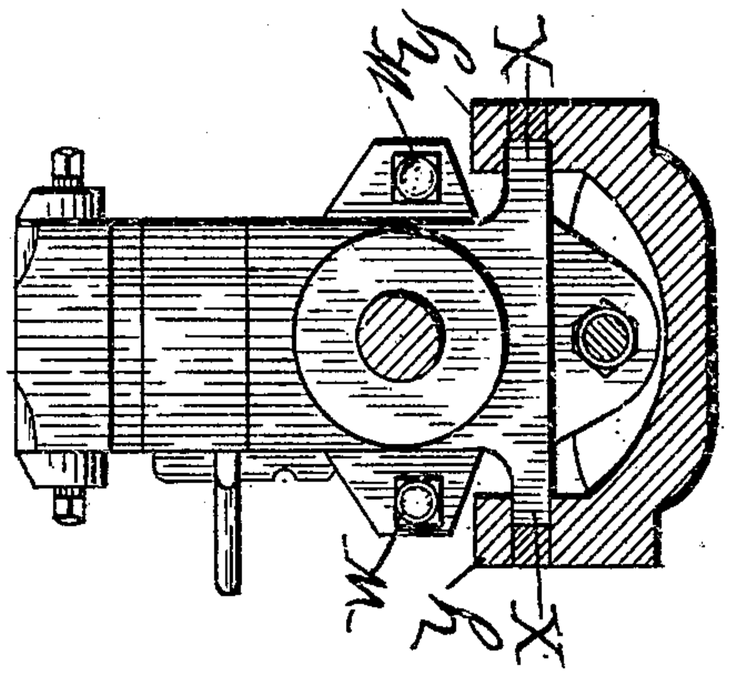

Fig. 4.

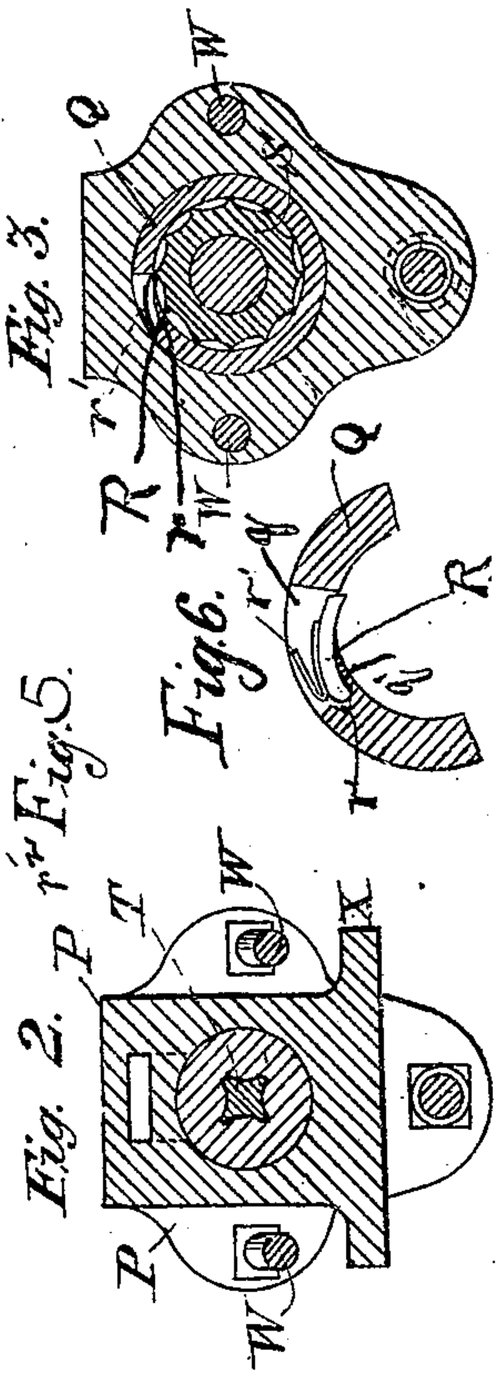

Fig. 3.

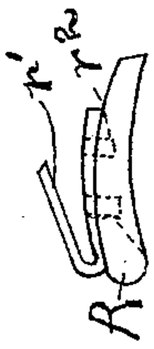

Fig. 5.

Fig. 2.

Fig. 6.

Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES S. HARLOW, OF MINERAL, VIRGINIA.

ROCK-DRILL.

955,591. Specification of Letters Patent. Patented Apr. 19, 1910.

Original application filed June 13, 1907, Serial No. 378,829. Divided and this application filed September 21, 1907. Serial No. 393,928.

To all whom it may concern:

Be it known that I, JAMES S. HARLOW, a citizen of the United States of America, residing at Mineral, in the county of Louisa and State of Virginia, have invented certain new and useful Improvements in Rock-Drills, of which the following is a specification.

This invention relates to rock drills and particularly to mechanism for releasing the strain on the drill and its operating parts when the operation of the drill is impeded by being caught in the rock, there being sufficient friction between the rotating mechanism and the fixed portion of the cylinder to insure the rotation of the drill under ordinary conditions.

This application is for subject matter divided out of my application No. 378,829, filed June 13, 1907.

My invention consists of a frictionally held ratchet ring operating in conjunction with a ratchet wheel having a shank provided preferably with four shoulders, though the number of shoulders may be varied to suit particular requirements, the said shoulders being twisted and concaved to coact with the interior of the end of the piston which is provided with shank engaging means.

It is the object of this invention to provide means for turning the drill step by step, the friction being such as to retain the ring against rotation under ordinary conditions, the pressure, however, on the friction ring being yieldable, as stated, in order that undue strain on the drill will permit the friction ring to rotate freely. In other words, the pressure on the friction ring is sufficient to prevent its rotation, while the drill is operating under normal conditions, but is less than is necessary to prevent the rotation of the friction ring should the drill encounter unusual obstruction.

With the foregoing and other objects in view, the invention consists in the details of construction and in the combination and arrangement of parts hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawing, forming part of this specification wherein like characters denote corresponding parts in the several views, in which—

Figure 1, is a side elevation of a rock drill, partly in section. Fig. 2, is a transverse sectional view on the line 2—2 of Fig. 1. Fig. 3, is a sectional view on the line 3—3 of Fig. 1. Fig. 4, is a sectional view on the line 4—4 of Fig. 1. Fig. 5, is a detail view of the pawl. Fig. 6, is an enlarged detail of a fragment of the friction ring and the pawl applied.

In these drawings A denotes an ordinary cylinder which may be provided with valve mechanism, similar to that shown in my original application heretofore mentioned, or the said invention may be applicable to other cylinders.

D is the piston operating in the cylinder and it has means for receiving a drill.

The cylinder head P is provided with a friction ring Q, having a dog R, pivoted in it with its nose projecting beyond its interior walls, for the purpose of engaging the ratchet wheel S. The ratchet wheel has a shank T, with four shoulders twisted and transversely concaved, adapted to fit in a bushing *a*, applied to the end of the piston D, said piston being hollow in order that it may slide on the shank. As the piston is reciprocated on the shank T, in one direction, it rotates the ratchet wheel a suitable distance, and on the reverse movement of the piston, the ratchet wheel is held against rotation and the piston is partially rotated.

The cylinder head P has a chamber P′ in which the ratchet wheel S, and friction ring Q, are seated, the said friction ring being engaged by the plug (to be hereinafter referred to). The cylinder head also has an aperture P^2, and said cylinder head at this point forms a bearing for the shank T, of the ratchet wheel, the said shank being rotatable in the cylinder head as heretofore described. The plug is of the same diameter as the recess in the cylinder head and is freely movable in the recess to the point of contact with the friction ring. The friction ring Q, is wider than the ratchet wheel S, so that the plug V, bears against the friction ring to prevent the rotation of the said friction ring under ordinary conditions. The plate *v* shown in elevation, Fig. 1, bears against the plug and is held in place by the nuts *w* on the rods W. The nuts may be adjusted to increase or diminish the pressure of the plate *v* on the plug V, and the frictional engagement of the plug with the friction ring may thereby be regulated.

As heretofore stated, the friction ring car-

rying the dog is held against movement when the piston and drill are operating under ordinary conditions. Should the drill become "stuck" and fail to permit the rotation of the piston, the force exerted by the piston will overcome the friction of the ring and permit the ring to rotate in order that there be no fracture in the said cylinder. The rods pass through apertured lugs of the cylinder, cylinder head and stuffing box, and the head of the rods or nuts thereon lie in recesses in the lugs of the stuffing box to prevent the rotation of said head or nuts, in order that the nuts which are applied to the opposite ends of the rods, and which engage the plate contacting with the plug, may be drawn up to cause the plate to exert the proper pressure on the plug; this pressure is preferably regulated to hold the friction ring against rotation under ordinary conditions, but to permit it to rotate when the drill is prevented from rotating. The cylinder is provided with flanges X, at its lower edges, which flanges are slidable in the guides Y, of the base, which base is of ordinary construction, and is designed for the purpose of being connected to the tripod.

From an inspection of Fig. 5 it will be seen that the pawl and spring are removably secured together in order that the pawl may be renewed when worn, or a new spring may be applied to the unworn ratchet, should the spring become impaired.

What I claim is:

1. In a rock drill operating mechanism, a piston having an opening in its rear end, a cylinder for said piston, a cylinder head having a recess and aperture, a ratchet wheel rotatable in the cylinder head, a shank on said ratchet wheel having twisted shoulders with concaved surfaces, a friction ring in which the ratchet wheel rotates, a pawl in the ring adapted to engage the ratchet wheel and means for yieldably retaining the friction ring against movement.

2. In a rock drill, a cylinder, a cylinder head having an opening and a recess, a friction ring seated in the recess, a ratchet wheel in the friction ring, a pawl connected to the friction ring to engage with the ratchet wheel, means for holding the friction ring against movement under ordinary strain, but yieldable to permit the rotation of the ring under abnormal strain, a shank rotated with the ratchet wheel, said shank having twisted shoulders with concaved surfaces and a piston having an opening in its end to permit the said piston to operate on the shoulder of the shank.

3. In a rock drill, a cylinder, a cylinder head having an opening and a recess, a friction ring seated in the recess, a ratchet wheel in the friction ring, a pawl provided with a curved spring having one end adapted to bear against the cylinder head, means for holding the friction ring against movement under ordinary strain but yieldable to permit rotation of the ring under abnormal strain, a shank rotated with the ratchet wheel, said shank having twisted shoulders with concaved surfaces and a piston having an opening in its end to permit the said piston to operate on the shoulder of the shank.

4. In a rock drill, a cylinder, a cylinder head having an opening and a recess, a friction ring seated in the recess of the cylinder head, a ratchet wheel in the friction ring, having uninterrupted edges forming bearings to permit the free rotation of the ratchet wheel, a pawl provided with a curved spring having one end adapted to bear against the cylinder, means for holding the friction ring against the movement under ordinary strain but yieldable to permit the rotation of the ring under abnormal strain, a shank rotated with the ratchet wheel, said shank having twisted shoulders with concave surfaces and a piston having an opening in its end to permit the said piston to operate on the shoulder of the shank.

5. In a rock drill, a cylinder, a cylinder head having an opening in its end, a friction ring in the opening, said friction ring having a recess, a pawl having a spring seated in the recess, a ratchet wheel rotatable in the friction ring engaged by the pawl, a shank on the wheel, a piston adapted to reciprocate on the shank, means whereby the shank causes the piston to intermittently rotate, a friction block bearing on the friction ring and being movable in the recess of the cylinder head to take up wear.

6. In a rotating device for rock drills the combination with a cylinder head provided with an aperture and a chamber, of a rifle bar extending through said aperture into the chamber, a bushing in the chamber surrounding the portion of the rifle bar within said chamber, means whereby the bushing and bar will be locked together when the bar is rotated in one direction and the bar being permitted to rotate independently of the bushing in the opposite direction and means for yieldably holding the bushing against rotation in said cylinder head.

In testimony whereof I affix my signature in the presence of two witnesses this 14" day of August, 1907.

JAMES S. HARLOW.

Witnesses:
WM. L. SALTER,
L. A. SANDS.