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W. A. SMITH

AIR FEED LOCK

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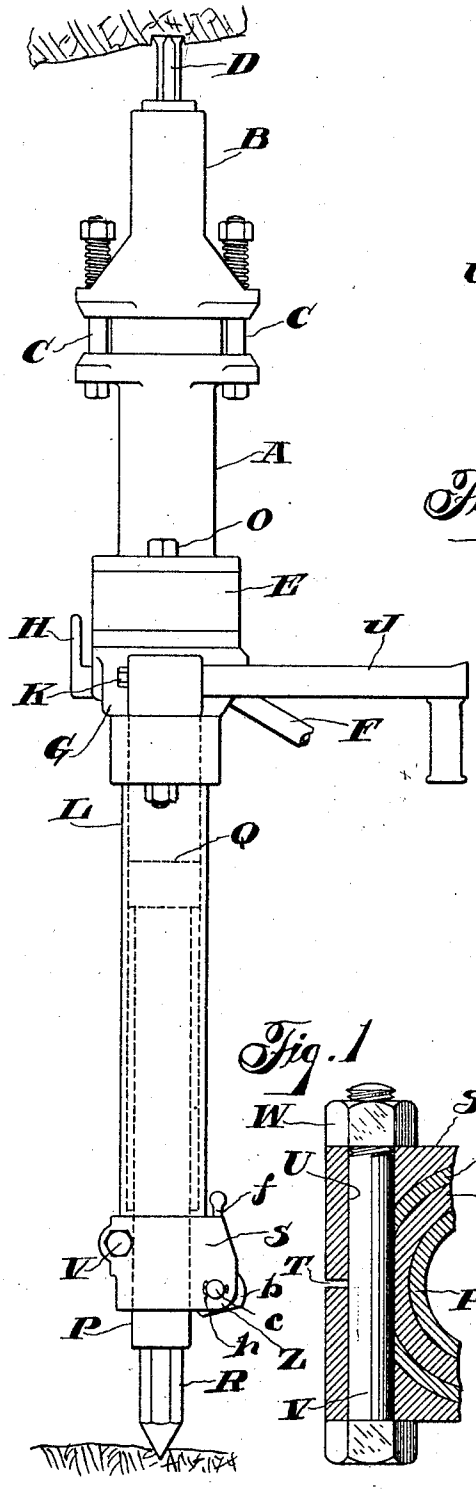


Fig. 1

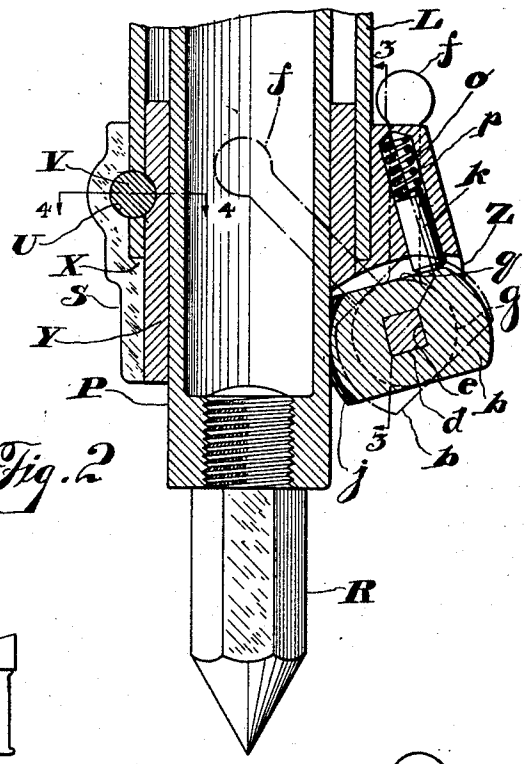


Fig. 2

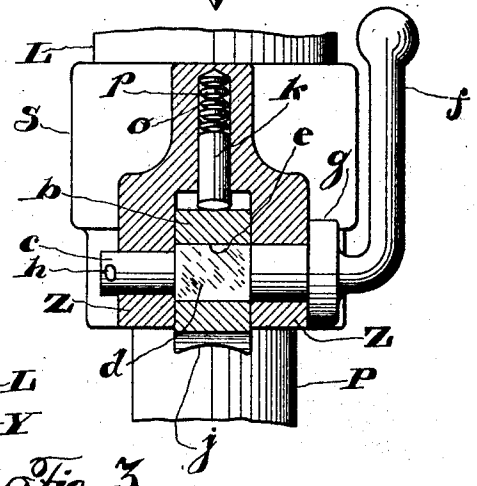


Fig. 3

Fig. 4

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UNITED STATES PATENT OFFICE.

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AIR-FEED LOCK.

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This invention relates to fluid actuated rock drills, but more particularly to an air feed lock for rock drills of the stoper type.

An object of the invention is to prevent accidental withdrawal of a rock drill from the working face.

Another object is to equip the feeding element of the rock drill with a lock for preventing recoil of the machine caused by the hammer piston striking the drill steel.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention consists of the combination of elements, features of construction and arrangement of parts, having the general mode of operation substantially as hereinafter described and more particularly pointed out in the appended claims and illustrated in the accompanying drawings, in which—

Figure 1 is a view of a rock drill in elevation equipped with an air feed lock constructed in accordance with the practice of the invention,

Figure 2 is an enlarged detailed view in elevation and partly in section showing the manner in which the air feed lock is secured to the feeding cylinder and the manner in which the locking device cooperates with the piston rod for preventing downward movement of the cylinder with respect to said rod,

Figure 3 is a view taken through Figure 2 on the line 3—3 looking in the direction of the arrows, and

Figure 4 is a view taken through Figure 2 on the line 4—4 looking in the direction of the arrows.

Referring to the drawing in which is illustrated one embodiment of the invention, A designates a hammer cylinder supporting at its forward end a front head B. The cylinder A and the front head B are held in operative position by means of spring pressed side bolts C. Disposed within the front head B is a drill steel D to receive the blows of a hammer piston (not shown) reciprocating within the cylinder A. Any suitable method may be employed for rotating the drill steel within the drill hole. In this instance, a gear motor (not shown) is arranged at the rearward end of the cylinder A and encased by a gear casing E. Pressure fluid to the drill is supplied through a suitable conduit F connected to a back head G which forms a closure for the rearward ends of the cylinder A and the gear motor casing E. The pressure fluid entering the back head to the various parts of the machine is controlled by a suitable throttle valve (not shown) having a throttle lever H. In order to prevent rotation of the drill with the drill steel, a rotation handle J is secured at one end to the back head G and is held against removal by means of a nut K.

To the end that the drill may be advanced toward the working face as the drill steel D penetrates the rock, a feed cylinder L is secured to the back head as by means of bolts O which extend through the back head G, the motor casing E and the cylinder A for holding said members in operative position with respect to each other. Disposed freely rotatable within the cylinder L is a piston rod P carrying a piston head Q at one end and having at the other end a rock engaging pointer R.

In accordance with the practice of the invention, a bearing member S, split longitudinally on one side as at T, is arranged at the front end of the cylinder L. Any suitable means may be provided for securing the member S against movement with respect to the cylinder L. In this instance, a hole U is formed through one side of the member S to receive a bolt V provided with a suitable nut W whereby the member S may be clamped firmly in position. In order to insure greater rigidity between the member S and the cylinder L, said member S is provided with an inwardly extending shoulder X to abut the end of the cylinder L. A bushing Y is in this instance inserted in the front end of the cylinder L to serve as a guide for the rod P.

Suitable means are provided for preventing accidental withdrawal of the drill from the working face and also to prevent recoil of the machine while the drill is in operation. To this end, a pair of lugs Z are formed on the member S to serve as guiding members and bearings for an eccentric member *b*, which in this instance is provided with a removable shaft *c* journalled in the lugs Z. The shaft *c* is preferably provided with a polygonal portion *d* to cooperate with a correspondingly formed bore *e* formed in the eccentric member *b* for preventing relative rotative movement between

the said eccentric *b* and the shaft *c*. Any suitable means may be provided for manually operating the member *b*; in this instance a lever *f* is formed integrally with the shaft *c* and a flange *g* formed at the juncture of the lever *f* and the shaft *c* serves as a stop for preventing longitudinal movement of the shaft in one direction. Movement of the shaft in the opposite direction may be prevented by inserting a pin *h* through the end of the shaft *c* or by any other suitable and convenient means.

In order to increase the line of contact between the eccentric member *b* and the piston rod P, the contacting face *j* of said member is formed concave to conform to the periphery of said piston rod. To the end that the eccentric member *b* may be normally held in frictional engagement with the piston rod P, a plunger *k* is arranged slidably in a bore *o* formed in the bearing member S. A spring *p* arranged in back of the plunger *k* forces the plunger downwardly against a flat face *q* formed on the member *b* and thus holds said member in engaging position.

In the operation of the device, assuming that the machine is in operation and consequently is being fed in the direction of the work as the drill moves upwardly along the piston rod P, the member *b* slides freely along the face of said rod. When the hammer piston strikes the drill steel D, the machine tends to recoil, and since the plunger *k* holds the member *b* constantly in readiness for engaging the piston rod P, downward movement, or recoil, of the drill is prevented. Similarly, if the air supply to the drill should suddenly become cut off, or fail for other reasons, the drill would be prevented from falling away from the work. In order to lower the drill, the eccentric member *b* may be moved manually to the position shown by the dot and dash lines in Figure 2. The pressure fluid from the feeding cylinder may then be released.

I claim:

1. In an air feed lock for rock drills, the combination of a feeding cylinder with a piston rod rotatable in the cylinder, a bearing secured to the cylinder, and means supported by the bearing in frictional engagement with the rod for preventing recoil of the cylinder during the operation of the drill.

2. In an air feed lock for rock drills, the combination of a feeding cylinder with a piston rod freely rotatable in the cylinder, a bearing clamped to the cylinder, and means supported by the bearing to cooperate frictionally with the rod for automatically preventing recoil of the cylinder on the rod during the operation of the drill.

3. In an air feed lock for rock drills, the combination of a feeding cylinder with a piston rod freely rotatable in the cylinder, a bearing clamped to one end of the cylinder, and a locking member supported by the bearing in constant frictional engagement with the rod to prevent recoil of the cylinder with respect to the rod during the operation of the drill.

4. In an air feed lock for rock drills, the combination of a feeding cylinder with a piston rod freely rotatable in the cylinder, a bearing clamped to one end of the cylinder, and an eccentric locking member supported by the bearing for frictionally engaging the rod to prevent recoil of the cylinder with respect to the rod during the operation of the drill.

5. In an air feed lock for rock drills, the combination of a feeding cylinder with a piston rod freely rotatable in the cylinder, a bearing clamped to one end of the cylinder, an eccentric locking member supported by the bearing for frictionally engaging the rod to prevent recoil of the cylinder on the rod, and means for holding said member normally in engaging position.

6. In an air feed lock for rock drills, the combination of a feeding cylinder with a piston rod, a bearing on one end of the cylinder, a bolt for clamping the bearing on the cylinder, said bolt engaging one side of the cylinder for preventing relative movement between the cylinder and the bearing, an eccentric locking member mounted pivotally in the bearing and having a concave face for engaging the rod to prevent movement of the cylinder in one direction with respect to the rod, and a spring pressed plunger associated with the locking member for holding said concave face normally against the rod.

7. In an air feed lock for rock drills, the combination of a feeding cylinder with a piston rod, a bearing on one end of the cylinder, a bolt for clamping the bearing on the cylinder, said bolt engaging one side of the cylinder for preventing relative movement between the cylinder and the bearing, an eccentric locking member mounted pivotally in the bearing and having a concave face for engaging the rod to prevent movement of the cylinder in one direction with respect to the rod, a spring pressed plunger associated with the locking member for holding said concave face normally against the rod, and a handle whereby said locking member may be oscillated manually.

In testimony whereof I have signed this specification.

WILLIAM A. SMITH.