

Oct. 25, 1938.

W. A. SMITH, SR

2,134,420

CONTROLLING DEVICE

Filed March 3, 1937

2 Sheets-Sheet 1

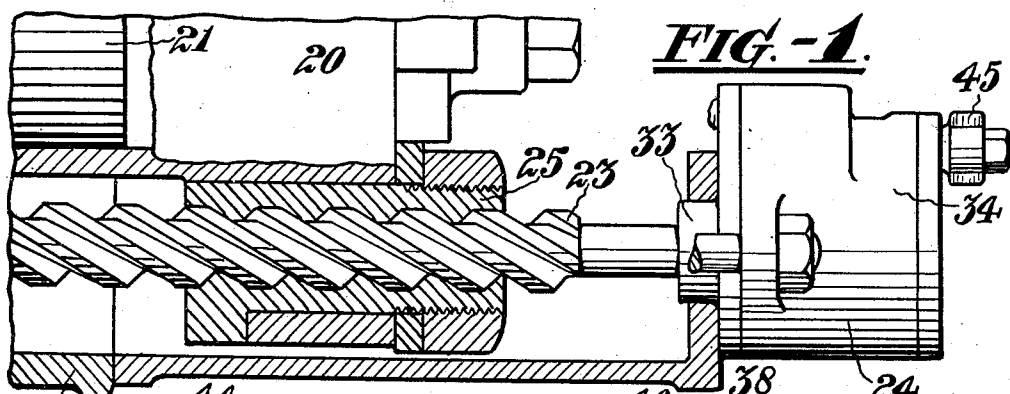
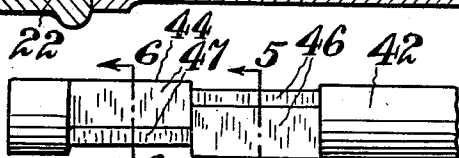


FIG. -4.



FIG. -5.



FIG. -6.

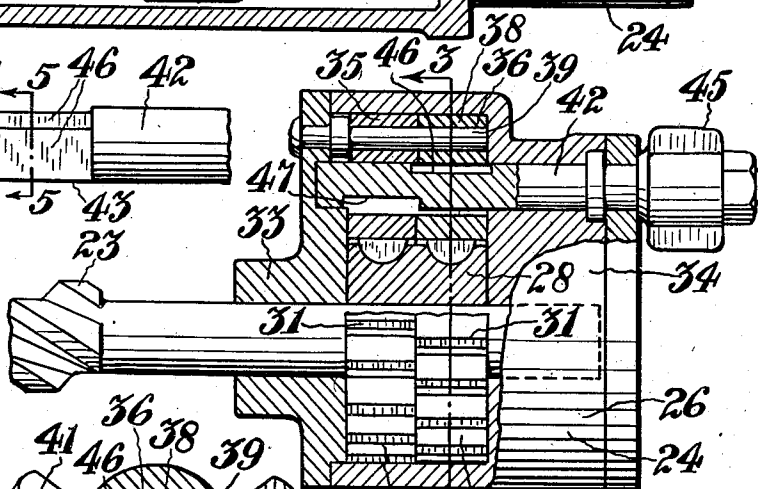


FIG. -2.

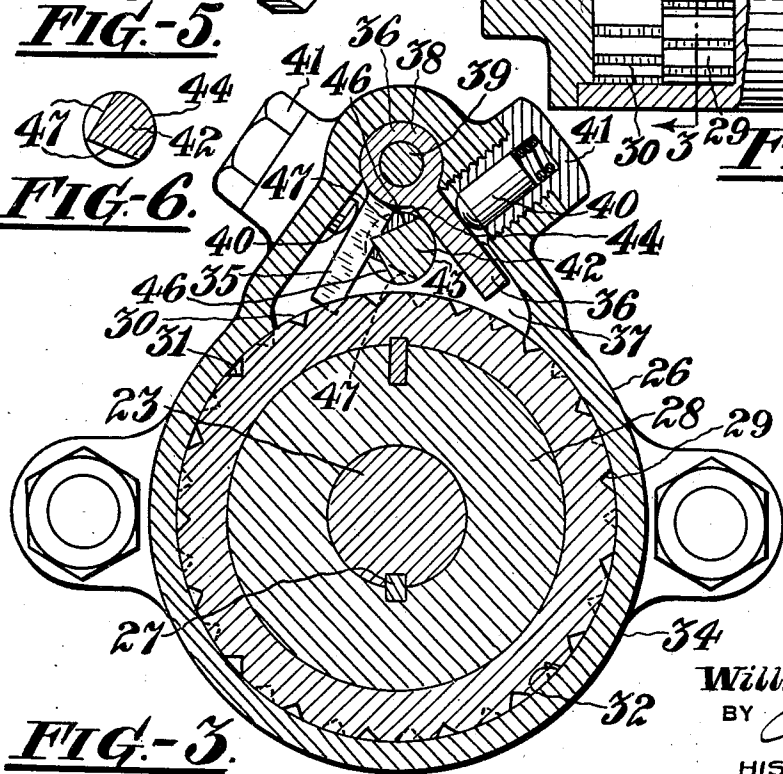


FIG. -3.

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2 Sheets-Sheet 2

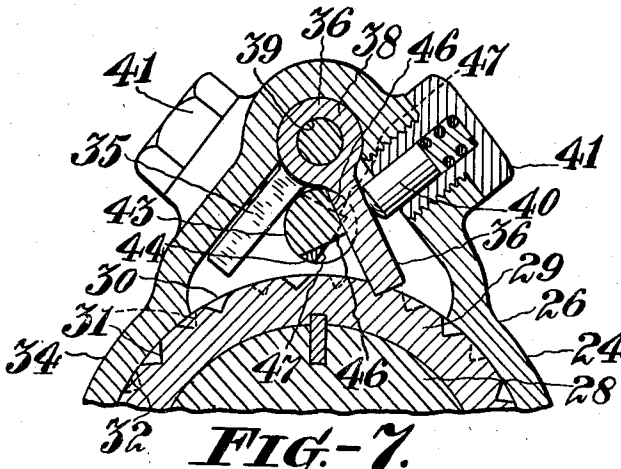


FIG.-7.

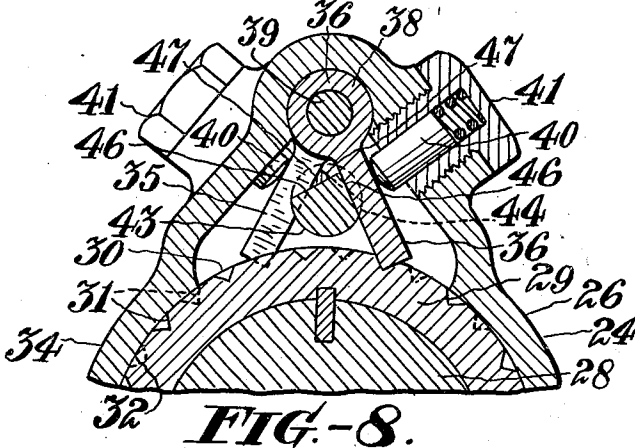


FIG.-8.

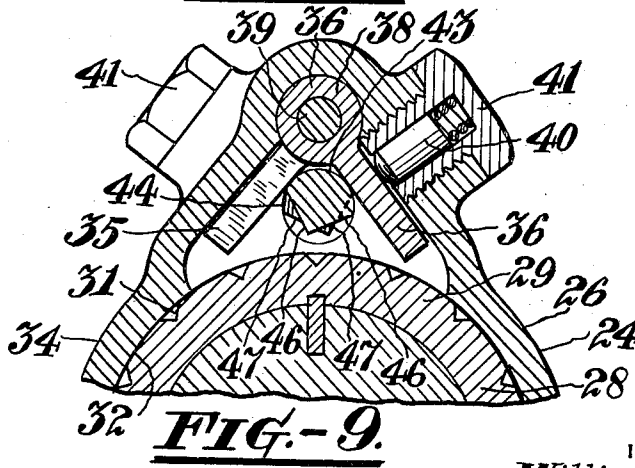


FIG.-9.

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UNITED STATES PATENT OFFICE

2,134,420

CONTROLLING DEVICE

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Application March 3, 1937, Serial No. 128,767

3 Claims. (Cl. 188—81)

This invention relates to controlling devices, and more particularly to a controlling device for a rotatable member.

One object of the invention is to prevent unauthorized rotation of the rotatable member.

Another object is to selectively control the direction of rotation of the rotatable member.

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

In the drawings accompanying this specification and in which similar reference numerals refer to similar parts,

Figure 1 is a longitudinal elevation, partly broken away, of a rock drilling mechanism equipped with a controlling device constructed in accordance with the practice of the invention.

Figure 2 is a longitudinal side view, partly broken away, of the controlling device.

Figure 3 is a transverse view taken through Figure 2 on the line 3—3 looking in the direction indicated by the arrows,

Figure 4 is a longitudinal side view of a detail, Figures 5 and 6 are transverse views taken through Figure 4 on the lines 5—5 and 6—6, respectively, and

Figures 7, 8 and 9 are views similar to Figure 3 showing various positions which the controlling device may assume in practice.

Referring more particularly to the drawings, the invention is shown embodied in a drilling mechanism comprising a rock drill, only a portion of the cylinder 20 and its piston 21 being shown, a shell 22 serving as a support for the rock drill, a feed screw 23 and a feed controlling mechanism 24 secured to the rear end of the shell 22.

The feed screw is in threaded engagement with the rock drill or, more particularly, with a feed nut 25 carried by the rock drill, and the threads of the feed screw and feed nut are of such inclination that the feed screw may be readily rotated by moving the rock drill longitudinally of the shell. The front end of the feed screw may be journaled, in a well known manner, in the corresponding end of the shell, and the rear end of the feed screw 23 extends into the casing 26 of the feed controlling mechanism and is suitably secured, as by means of a key 27, to a flange 28 in the casing 26.

On the periphery of the flange 28 and keyed thereto are a pair of ratchet rings 29 and 30 having teeth 31 and being of slightly smaller diameter than the interior of the casing 26 so that the inner surface 32 of the casing may serve as a bearing for the rings. The rear end of the feed screw 23 is, however, additionally supported by

inner and outer heads 33 and 34, respectively, of the casing 26.

To the end that the direction of rotation of the feed screw 23 may be conveniently controlled, a pair of pawls 35 and 36 are arranged within the casing 26 to oscillate within a cavity 37 within the casing. The pawls incline in different directions and have hub portions 38 which are bored to accommodate a pivot pin 39 supported by the head 33. The pawls are arranged in end to end fashion. They may abut each other and the pawl designated 35 lies in the same transverse plane as the ratchet 30 while that designated 36 lies in the transverse plane of the ratchet wheel 29.

In order that the pawls may be constantly urged toward the teeth 31 for engagement therewith spring-pressed plungers 40 are disposed in the wall of the casing to seat against the pawls. As a preferred form of construction, however, the plungers and their springs are arranged in caps 41 threaded into the casing. Thus, whenever the plungers 40 become worn or their springs require replacement the caps 41 may be conveniently unscrewed from the casing for purposes of replacement or inspection.

The means employed for shifting the pawls to their various controlling positions comprises a rod 42 having a pair of cams 43 and 44 to bear against the pawls 36 and 35, respectively, for moving said pawls out of engagement with the teeth 31. The rod is journaled in the heads 33 and 34 and is provided with a lever 45 arranged on the projecting end of the rod for rotating the rod. The portions of the rod adjacent the pawls are recessed to provide flat surfaces 46 and 47 adjacent the cams 43 and 44, respectively. The surfaces adjacent each cam are arranged angularly with respect to each other and may serve as bearing surfaces for the pawls in their tooth engaging positions.

During the operation of the device and assuming that the pawls are out of engagement from the teeth 31 the ratchets and the feed screw may be rotated freely in either direction. In a structure such as that illustrated and wherein the rock drill is in threaded engagement with the feed screw, a force tending to move the rock drill longitudinally of the shell 22 will, therefore, rotate the feed screw 23. In the arrangement shown the force employed for this purpose is that of the jar imparted to the rock drill casing by the piston 21 at the instant of reversal of the piston in the ends of the cylinder 20. Thus, when the piston 21 reaches the rear extremity of its stroke the shock imparted to the cylinder 20 tends to move

the rock drill in the direction of the casing 26. In like manner, when the piston reverses its direction of movement in the front end of the cylinder 20 the consequent jar tends to carry the rock drill in the direction of the work and, in the absence of suitable restraining devices, will rotate the feed screw 23.

When drilling a hole in the work, therefore, it is desirable that the feed screw be prevented from rotating when the piston 21 is reversed in the rear end of the cylinder 20 and that it be permitted to rotate when the piston reaches the end of its stroke in the front end of the cylinder so that the rock drill will be gradually advanced toward the work in accordance with the degree of penetration of the working implement into the work.

In order to assure this movement of the rock drill the rod 42 is rotated to a position to permit engagement of the pawl 35 with the teeth 31 and to maintain the pawl 36 out of the path of movement of the teeth. The rock drill will then gradually advance toward the work and the feed screw 23 will be intermittently rotated to new positions and held stationary momentarily by the engaging pawl to prevent retrograde movement of the rock drill at the instant of reversal of the piston 21 in the rear end of the cylinder.

This operation may continue until the drill steel has been driven into the rock to the limit of its extent. The rod 42 is then rotated to a position in which the pawl 36 engages the teeth 31 and the pawl 35 is moved out of engagement with the teeth, as illustrated in Figure 7.

In the new position of the parts the feed screw is restrained against rotation permitting further forward movement of the rock drill and, thereafter the jars applied to the rear end of the cylinder by the piston will rotate the feed screw

and enable the rock drill to move rearwardly to its initial position where it may be held by both pawls, as illustrated in Figure 8.

I claim:

1. In a controlling device, the combination of a casing and a rotatable member in the casing, teeth on the rotatable member, a pair of pawls to engage the teeth and lying in different transverse planes in the casing, a common pivot for the pawls, means constantly tending to press the pawls into engagement with the teeth, and a single control member in the casing shiftable to different positions and having cams movable into and out of contact with the pawls to move either pawl separately or both pawls simultaneously out of engagement with the teeth and to permit simultaneous engagement of both pawls with the teeth.

2. In a controlling device, the combination of a casing and a rotatable member therein, teeth on the rotatable member, a plurality of pawls in the casing arranged in end to end fashion, a common pivot for the pawls, spring-pressed plungers to press the pawls into engagement with the teeth, and means in the casing rotatable to different positions to selectively move the pawls separately or simultaneously out of engagement with the teeth and to permit simultaneous engagement of all the pawls with the teeth.

3. In a controlling device, the combination of a casing and a rotatable member therein, teeth on the rotatable member, a plurality of pawls in the casing arranged in end to end fashion, a common pivot for the pawls, spring-pressed plungers to press the pawls into engagement with the teeth, a rod rotatable in the casing, and cams on the rod to lift the pawls singly or collectively out of engagement with the teeth.

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