Oct. 2, 1945. O. J. SCHORER 2,385,946

FEEDING MECHANISM

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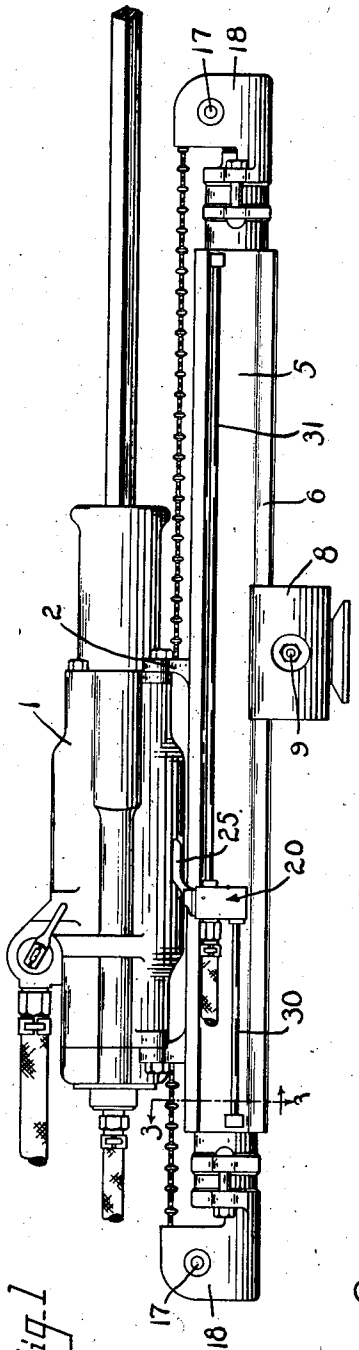


Fig. 1

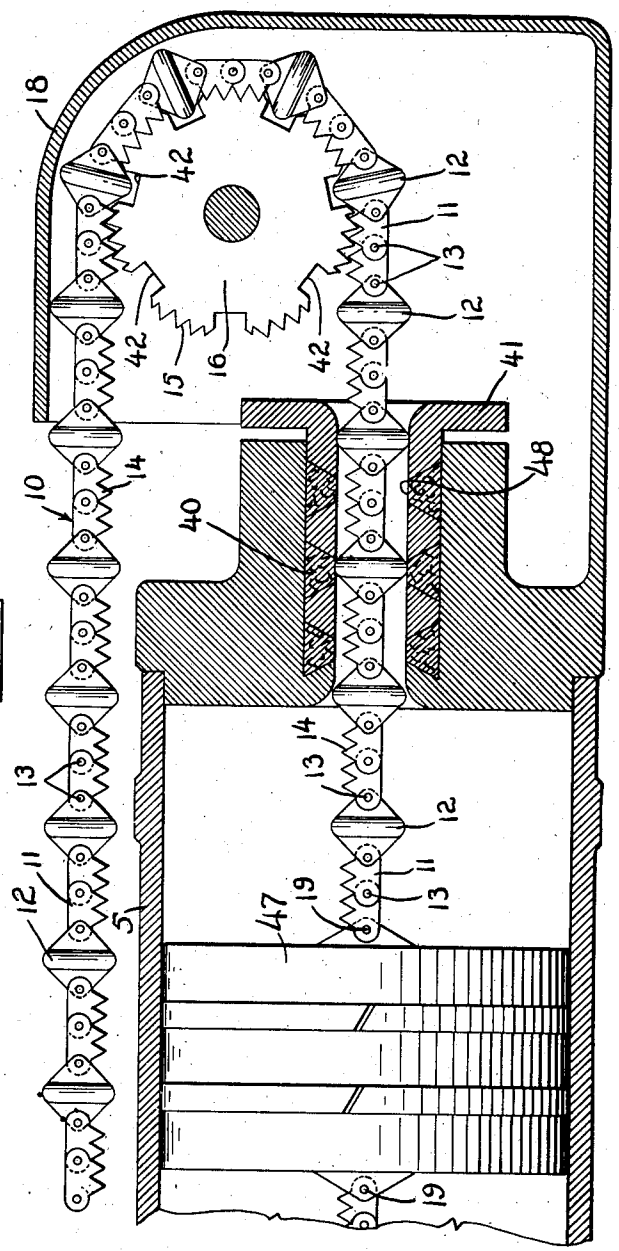


Fig. 2

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Fig. 3

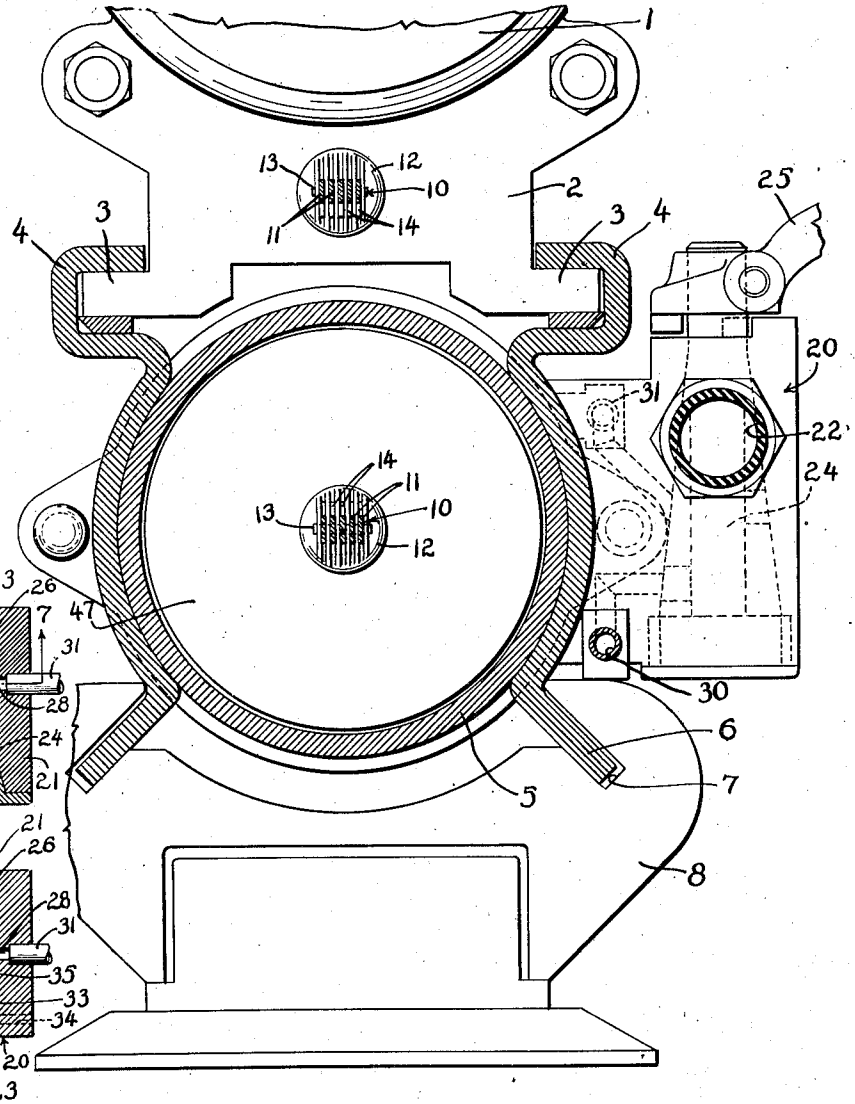


Fig. 6

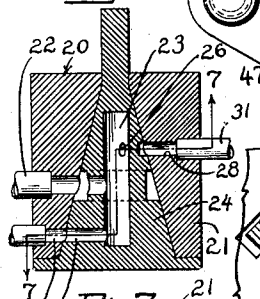


Fig. 7

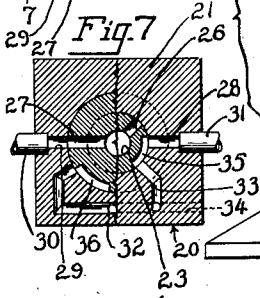


Fig. 4

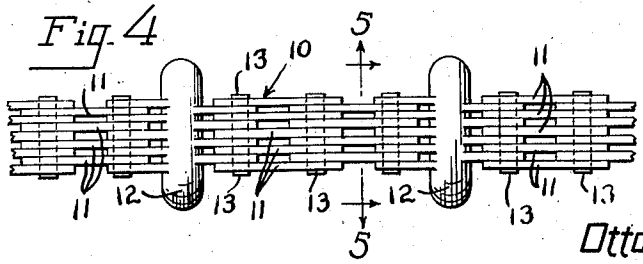
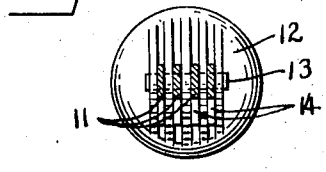


Fig. 5



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UNITED STATES PATENT OFFICE

2,385,946

FEEDING MECHANISM

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Application July 30, 1942, Serial No. 452,923

4 Claims. (Cl. 121—9)

This invention relates to feeding mechanisms or movement-effecting mechanisms wherein an object is moved through a predetermined limited range by action of a suitable pressure medium acting upon a piston.

An object of the present invention is to provide a movement-effecting or feeding mechanism which is strong, durable, compact and positive acting, embodying a piston operated by pressure fluid acting directly against the piston. A flexible movement-effecting element is connected to the piston.

Another object of the invention is to provide novel means whereby the cylinder openings, through which the flexible movement member moves, will be sealed against leakage of operating pressure fluid.

While the feeding or movement-effecting mechanism of the present invention is particularly adaptable for feeding percussive tools, such as rock drills, to their work, it is applicable to a wide variety of uses wherein it is desirable to move an object through a limited range by action of a pressure fluid.

With these and other objects in view, as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with the accompanying drawings, showing a feeding mechanism of the preferred form embodying the invention, and the features forming the invention will be specifically pointed out in the claims.

In the drawings:

Figure 1 is a side elevation of a rock drill, showing the improved feeding mechanism applied thereto.

Figure 2 is a fragmentary longitudinal section through the improved feeding mechanism.

Figure 3 is a fragmentary vertical section taken on the line 3—3 of Figure 1.

Figure 4 is a fragmentary plan view of the flexible movement-effecting element.

Figure 5 is a cross-section through the flexible movement-effecting element taken on the line 5—5 of Figure 4.

Figure 6 is a diagrammatic vertical section through the valve mechanism employed for controlling the delivery of pressure fluid to the feeding mechanism.

Figure 7 is a horizontal section taken on the line 7—7 of Figure 6.

Referring more particularly to the drawings, 1 indicates a rock drill, of any approved construction, which is mounted upon a supporting cradle 2. The cradle 2 is slidably supported, as shown at 3, by suitable guide ways 4 carried by the feed cylinder 5. The feed cylinder 5 is in turn slideably supported, through the medium of guide rails 6 and guide ways 7, by a support 8, and the feed cylinder 5 is held in adjusted positions relative to the support 8 by means of the clamp bolt 9.

A flexible movement-effecting element, in the form of a chain 10, is attached to the cradle 2, as indicated in Figure 1 of the drawings. The flexible movement-effecting element 10 comprises a plurality of alternate toothed links 11 and sealing discs 12, all of which are pivotally connected by means of suitable pivots 13, as is usual in the construction of flexible chains. The teeth 14 are formed on the inner edges of the links 11 and cooperate or mesh with the peripheral teeth 15 formed on the guide sprockets 16. One of the guide sprockets 16 is rotatably supported at each end of the feed cylinder 5 by suitable shafts 17, which are in turn carried by housings 18 attached in any suitable manner to the feed cylinder.

A piston 47 is mounted for reciprocatory movement in the feed cylinder 5. The feed cylinder 5 has axially disposed openings 48 in each end thereof through which the chain or flexible movement-effecting element 10 passes. The ends of the chain 10 are pivotally attached, as shown at 19, to the opposite ends of the piston 47 so that upon reciprocatory movement of the piston 47 in the cylinder 5, the rock drill 1 will be moved or fed to its work or moved away from its work, depending upon the direction of movement of the piston 47.

Air pressure or other suitable pressure fluid for operating the piston 47 is fed to the cylinder from a suitable supply source (not shown) through the valve structure 20, and by operation of the valve 20 the direction of movement of the piston 47 may be controlled.

Any suitable type of valve structure may be employed, and one such construction is illustrated in Figures 6 and 7 of the drawings, wherein the pressure fluid enters the valve body 21 through the inlet passage 22, and passes into the axial bore 23 formed in the rotatable valve cone 24. The valve cone 24 is rotated manually by any suitable type of handle, as indicated at 25. The valve cone 24 has radially extending passages 26 and 27 therein which communicate with the axial bore 23, and the valve body 21 is provided with passages 28 and 29 which communicate, through suitable piping 30 and 31, with the interior of the rear and forward ends, respectively, of the feed cylinder 5. When it is desired to move the rock

drill 1 away from its work, the valve cone 24 is rotated to bring the passage 27 into communication with the passage 29, which will feed or deliver pressure fluid, through the piping 30, into the rear end of the cylinder 5 behind the piston 47 (such position is shown in Figure 7 of the drawings). When it is desired to move the rock drill 1 toward its work, the valve cone 24 is rotated to move the passage 26 into communication with the passage 28. The valve body 21 is provided with exhaust passages 32 and 33 which join and open out to the atmosphere through a discharge port 34, and the valve cone 24 is provided with cut-out portions 35 and 36 so that when the passage 27 is in communication with the passage 29 the cut-out portion 35 will establish communication between the passage 28 and the exhaust passage 33, thus allowing the air or pressure fluid to bleed out from the forward end of the cylinder when pressure fluid is being admitted to the opposite end of the cylinder. When pressure fluid is being admitted to the cylinder, through the passages 26 and 28, the cut-out portion 36 will establish communication between the passage 29 and the exhaust passage 32, so as to permit exhaust of pressure fluid from behind the piston 47.

The openings 48 in the ends of the cylinder 5 are packed with suitable packing, as indicated at 40, and this packing may be held in place by a packing gland 41. The gland 41 and packing 40 cooperate to form a stuffing box. The sealing discs 12, carried by the chain 10, are of such diameter that during the movement of the chains through the openings 48 the perimeters of the discs will engage the packing 40 and form fluid-tight seals, so as to prevent the leakage of the pressure fluid out of the cylinder 5 through the openings 48.

As shown in the drawings, the guiding sprockets 16 are provided with cut-out portions 42, which receive the discs 12 during the movement of the chain about the guiding sprockets.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown, but that they may be widely modified within the invention defined by the claims.

What is claimed is:

1. In a feeding mechanism for percussive tools, the combination of a stuffing box having a bose, a flexible movement effecting element extending through and movable axially of said bore, sealing discs carried by said element for co-axial movement through said bore, said discs having peripheral faces sealingly engageable with the wall face of said bore, and the discs being spaced one from the other distances less than the axial length of said bore to maintain at least one of the discs in sealing relationship with the wall face of the bore in any position of said element.

2. In a feeding mechanism for percussive tools, the combination of a sealing means having an opening therethrough, a movement effecting chain extending through said opening, rigid sealing members interposed in said chain and passable in succession through said opening, said sealing members being perimetrically, sealingly engageable with the wall face of said opening, and said sealing members being spaced one from the other distances less than the axial length of said opening to maintain at least one of the sealing members in sealing engagement with the wall face of said opening in any position of said chain.

3. In a feeding mechanism for percussive tools, the combination of a support having an opening, a flexible movement effecting element extending through and movable axially of said opening, spaced and rigid sealing bodies carried by said element for movement through said opening, said bodies being perimetrically, sealingly engageable with the wall face of said opening, and said bodies being spaced one from the other distances less than the axial length of said opening to maintain at least one of said bodies in sealing relationship with the wall face of said opening in any position of said element.

4. In a feeding mechanism for percussive tools, a movement effecting chain, axially spaced sealing discs carried by said chain, said discs being of larger diameters than the largest cross sectional dimension of the chain, sprockets for guiding said chain, said sprockets being provided with peripheral recesses to receive the discs passing about the sprockets, and teeth on said sprockets between said recesses for meshing engagement with said chain.

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