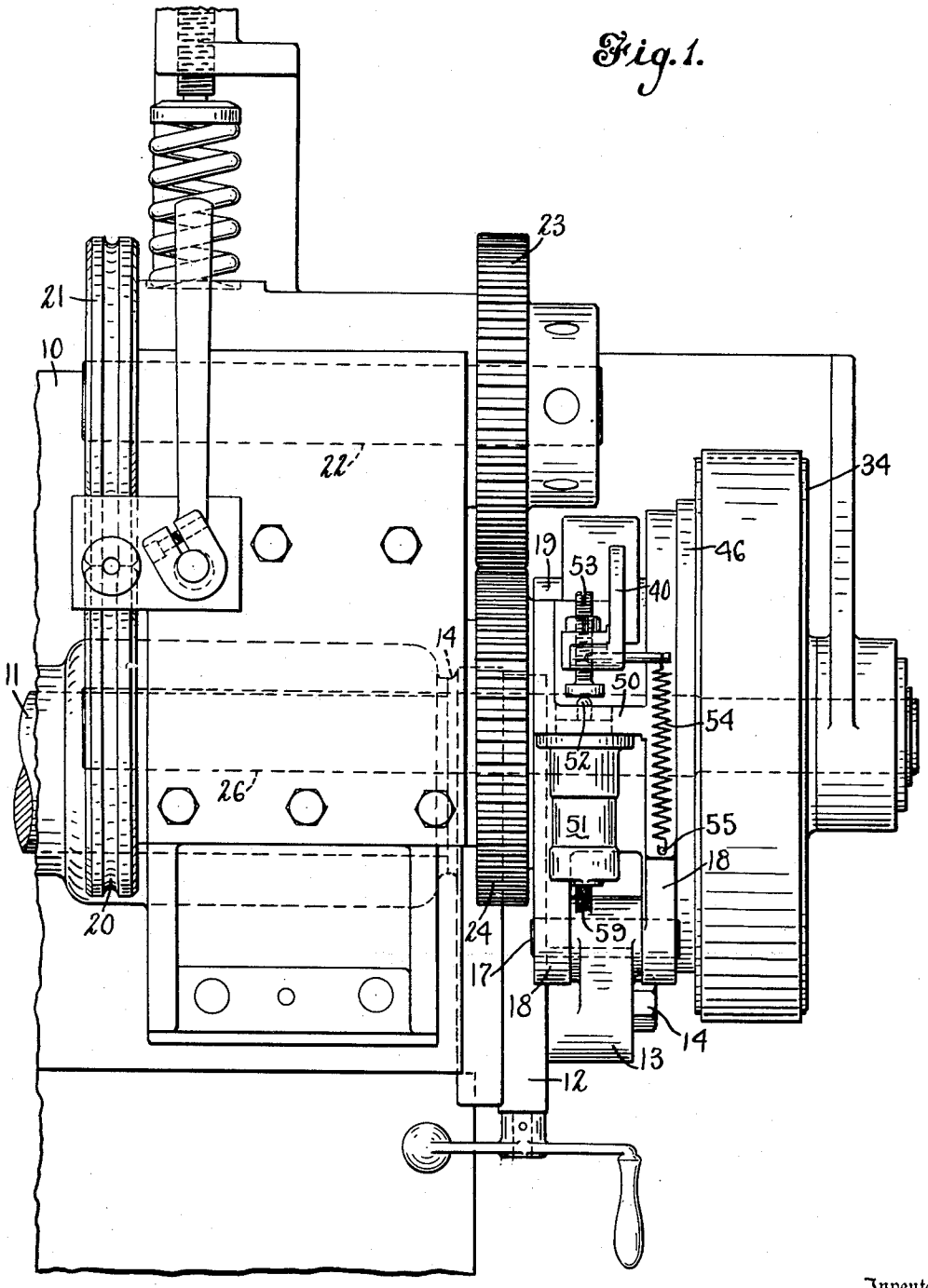
June 19, 1956 E. B. BYAM 2,750,818

WIRE FEED MECHANISM AND CONTROL OF SAME

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Fig. 1.



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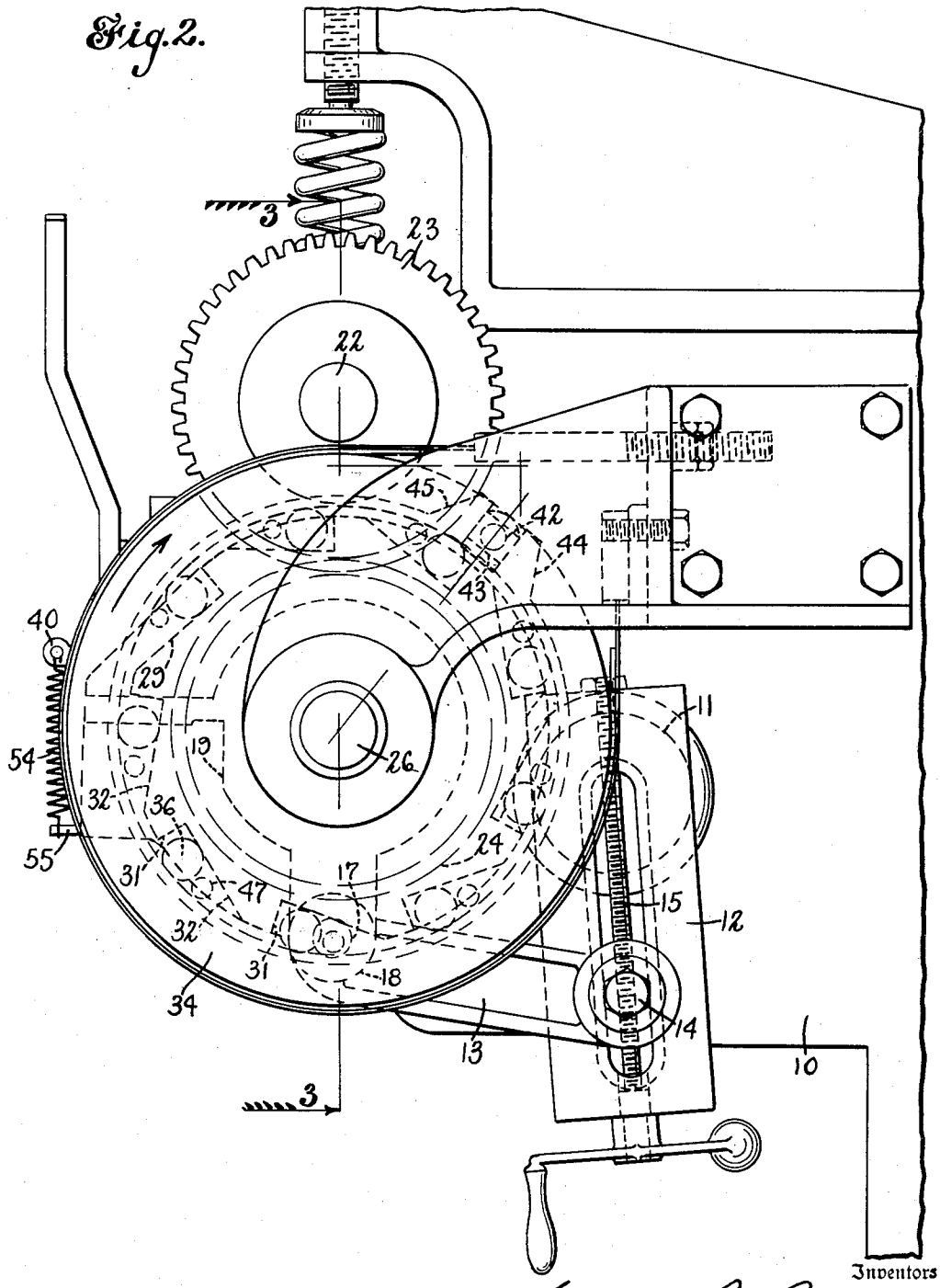
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WIRE FEED MECHANISM AND CONTROL OF SAME

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Fig. 2.



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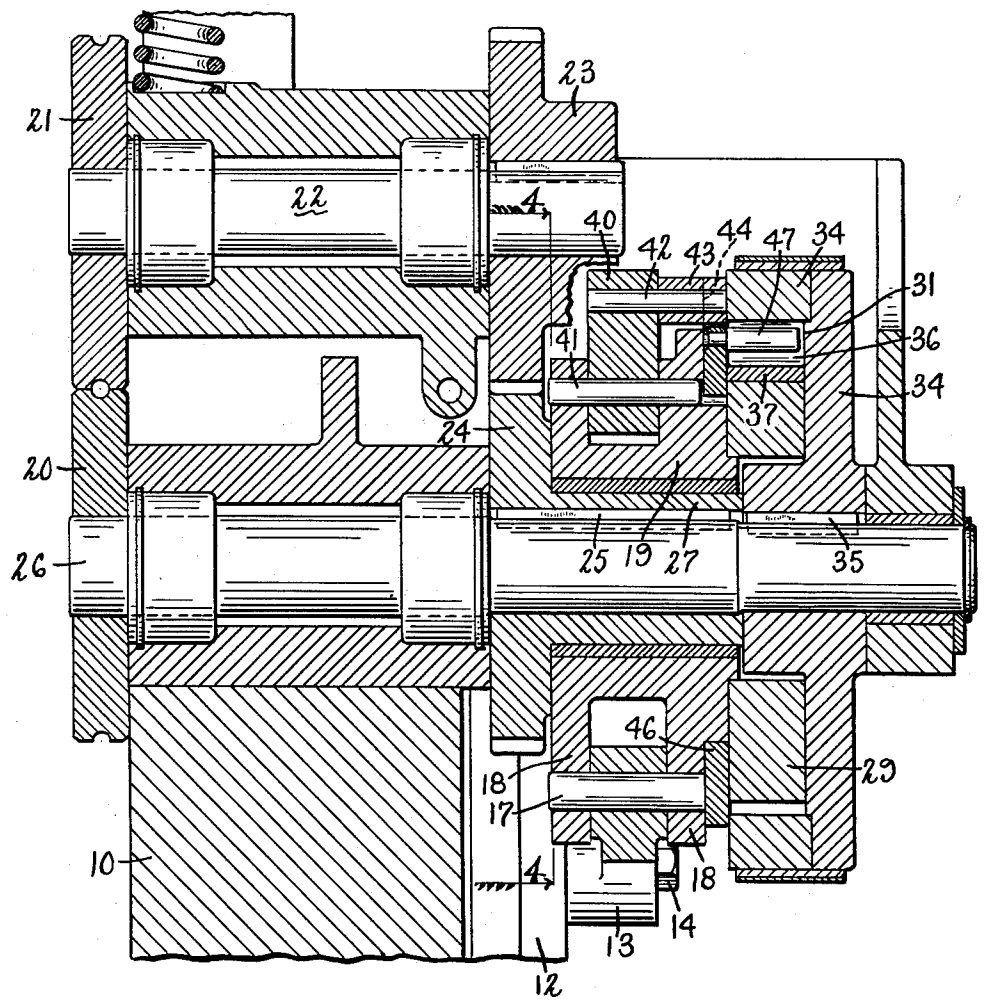
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WIRE FEED MECHANISM AND CONTROL OF SAME

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Fig. 3.



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WIRE FEED MECHANISM AND CONTROL OF SAME

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Fig. 4.

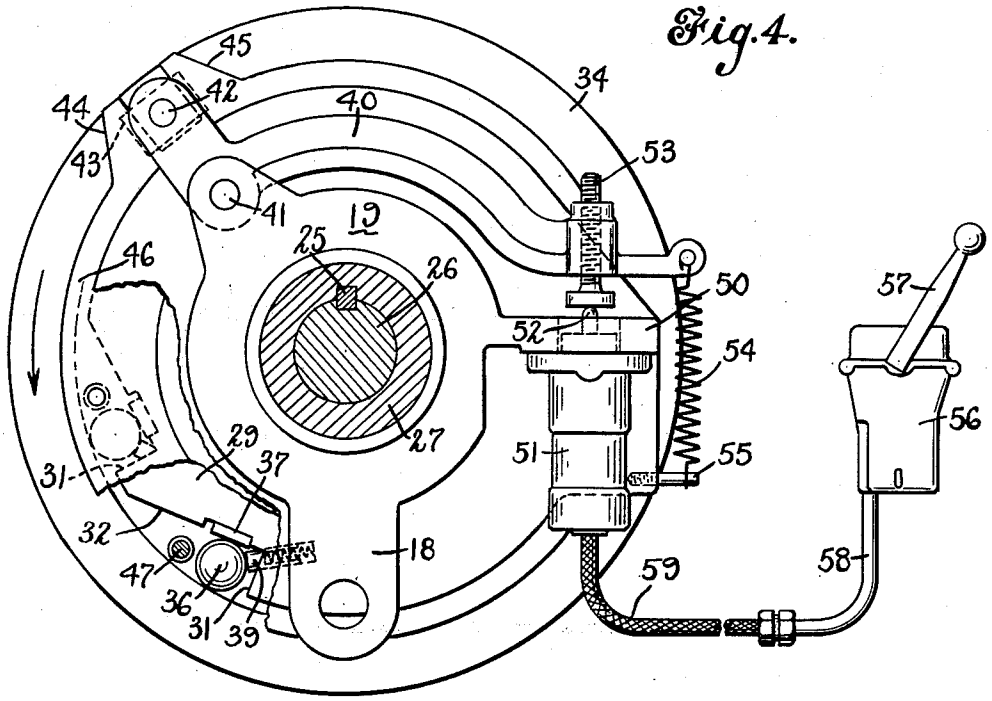
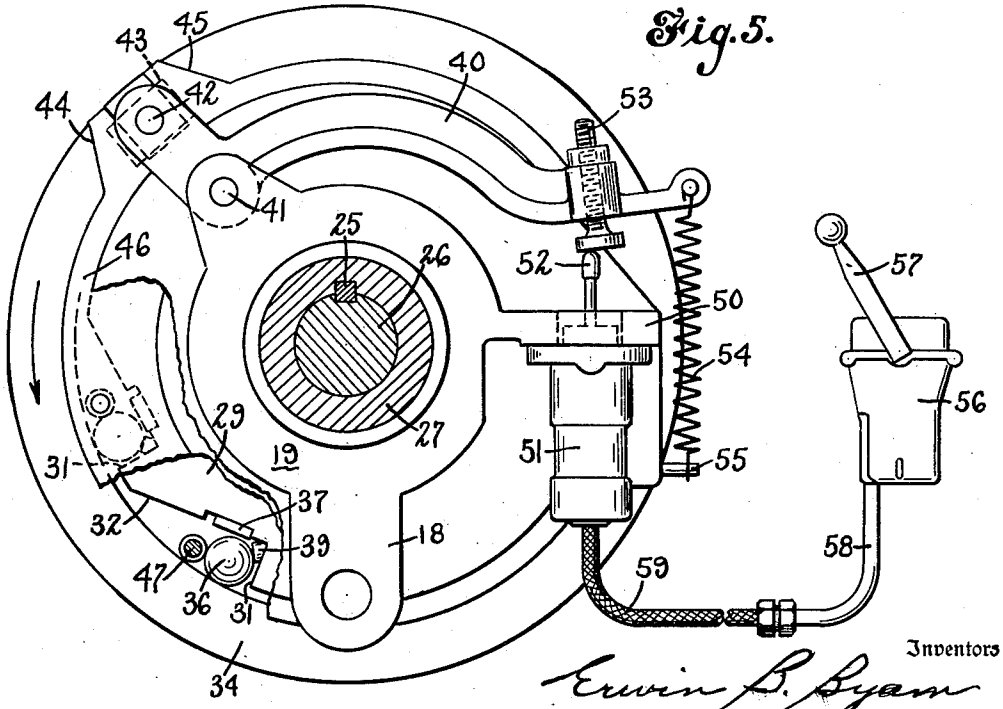


Fig. 5.



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WIRE FEED MECHANISM AND CONTROL OF SAME

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Fig. 6.

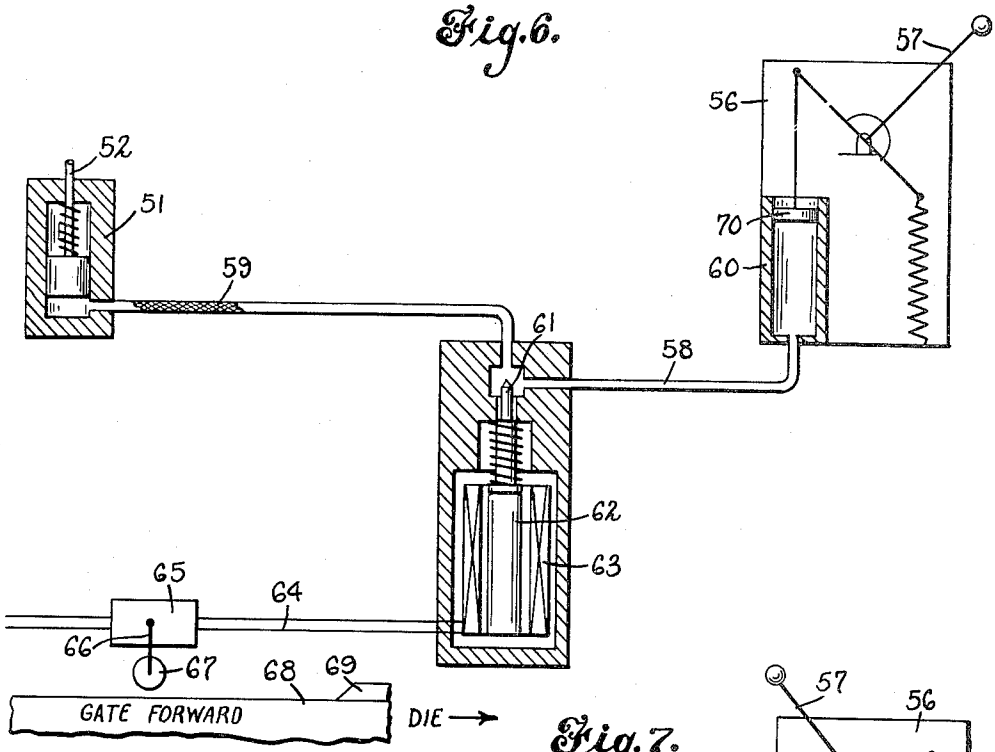
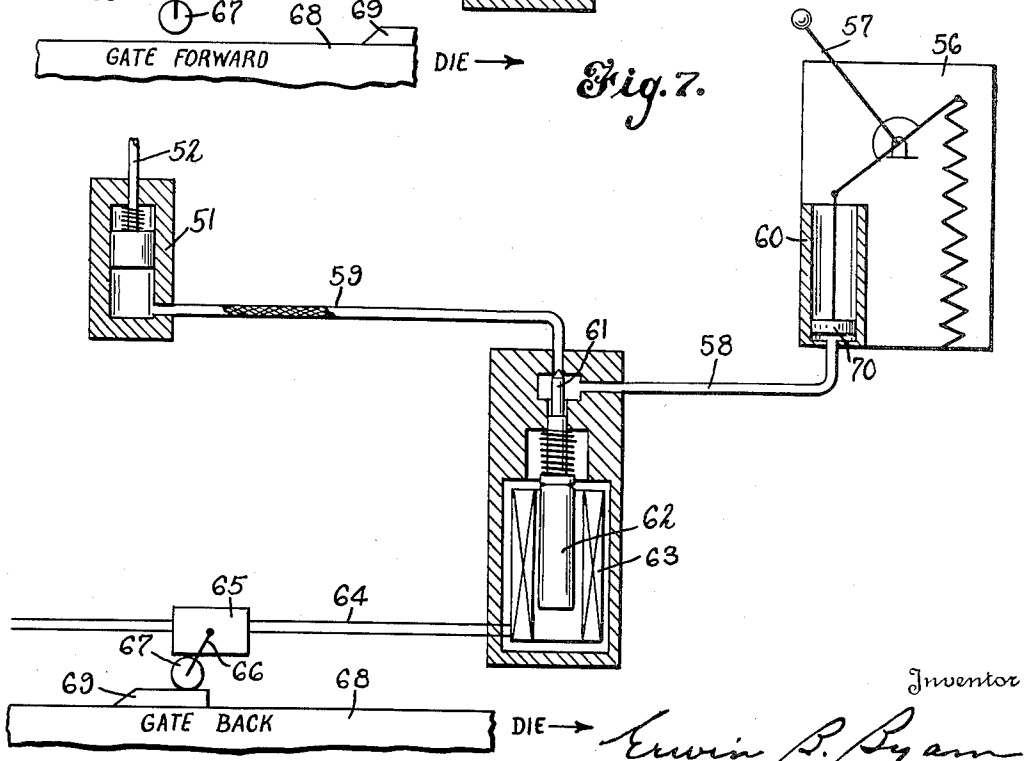


Fig. 7.



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2,750,818

WIRE FEED MECHANISM AND CONTROL OF SAME

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Application February 16, 1951, Serial No. 211,289

3 Claims. (Cl. 78—97)

This invention relates to a feed mechanism for headers or like machines, and more particularly to a release for such feed mechanism, which release may be operated from a remote point on the machine so as to be more convenient to the operator of the device.

In feeding the work, such as wire or rod stock for example, to a header or similar machine, it is customary to employ a pair of cooperating feed rolls between which the wire is gripped and fed forwardly when the rolls are rotated. Mechanism is usually provided for rotating these rolls in a step-by-step movement so as to feed a given length of stock to the machine at each operation. This step-by-step movement is effected in the present instance by an oscillatable or rocking member, this member being connected to the feed rolls by a one-way driving connection so that the feed rolls will be rotated when the rocker member or rocker arm is moved in one direction, but will not be rotated when the rocker arm is operated in a reverse direction.

In the operation of such machines, it is sometimes necessary to start and stop the feed mechanism and also to permit manual rotation of the feed rolls in a reverse direction so that the stock may be withdrawn from the rolls.

It is, therefore, desirable to provide means to release the feed mechanism or release the driving connection between the rocker arm and the feed rolls so as to stop the feed and, if desired, permit the feed rolls to be rotated freely in a reverse direction with a minimum of effort. Moreover, it is also desirable that this feed release may be actuated from a convenient point on the header or other machine to which the feeding mechanism is applied, and that the control or actuating means for the release be so connected to the release mechanism itself as not to involve a complicated system of links, levers or other devices to connect the remote control to the release mechanism.

In the present instance, the drive mechanism is the oscillatable rocker arm comprising an inner spider or disk having a plurality of inclined surfaces thereon, and an outer ring within which this spider is disposed. Rollers are placed between the inclined surfaces of the driving spider of the adjacent surfaces of the ring which latter member is connected with the feed rolls. When the spider is rotated in one direction, the rolls will ride up upon the inclined surfaces and lock the spider to the ring so that the latter will be positively driven. When, however, the spider, which is given an oscillating movement, is moved in the other direction, the rollers will ride down the inclined surfaces and permit the spider to turn idly within the ring so that the feed rolls will not be driven in a reverse direction. The grip or feed release mechanism, as illustrated, comprises means for holding the rollers at the lower ends of the inclined surfaces of the spiders so that they will not be gripped between these surfaces of the spider and the inner ring, and will not, therefore, effect a driving engagement between these parts. Remote control means, such as an hydraulic unit, is provided to actuate this grip release mechanism, the hydraulic unit being

controlled from a remote point and connected to the control mechanism by flexible tubing or the like so as to allow for the oscillating movement of the driving mechanism with relation to the bed or frame of the machine upon which the control is mounted.

Moreover, the pipes which connect the control to the hydraulic unit (the latter being mounted upon the feed mechanism so as to oscillate therewith) may be readily mounted upon the machine in convenient position with respect to the various parts of the machine so that the control of the release from a remote point is rendered comparatively simple.

One object of the present invention is to provide a release mechanism for the feeding means of headers or like machines in order that the feed may be stopped or started at the will of the operator and at the proper time in the operation of the machine so that a blank of the proper length will always be delivered to the forming dies.

A further object of the invention is to provide a release mechanism of the character described above, which release mechanism should be located adjacent the feeding means but which may be operable from a remote point on the frame of the machine.

A still further object of the invention is to provide a release mechanism of the character described in which the controlling means for the release mechanism may be mounted on a fixed part of the frame and at the same time be operatively connected to the release mechanism mounted on a movable part of the machine.

A still further object of the invention is to provide a feed mechanism for headers or like machines, which mechanism comprises inner and outer driving and driven members, one of which is given an oscillating movement and which drives the other member in a step-by-step movement in one direction, with hydraulically operated means to release or disconnect the driving engagement between such members so as to permit the driven member to move freely in a reverse direction.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a front elevational view of a feed mechanism embodying my improvements;

Fig. 2 is a side elevational view of the parts shown in Fig. 1;

Fig. 3 is a sectional view on line 3—3 of Fig. 2;

Fig. 4 is a sectional view on line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 4 but showing the parts in feed release position;

Fig. 6 is a diagrammatic view of a slightly modified form of feed control mechanism; and

Fig. 7 is a view similar to Fig. 6, but showing the parts in other positions.

To illustrate a preferred embodiment of my invention, I have shown in the drawings a portion of a header or similar machine comprising a frame **10**, this frame supporting a shaft **11** which is oscillated by the usual mechanism. Secured to the shaft **11** and shown more especially in Fig. 2, is a crank arm **12** which is oscillated by the movement of the shaft **11**. A link **13** is pivoted at **14** to the arm **12** so that the throw of this link may be adjusted by means of the adjusting screw **15**. The other end of this link is pivoted at **17** (Fig. 3) to spaced lugs **18** upon a rotatably mounted collar **19**.

As illustrated in Fig. 3, feed rolls **20** and **21** are provided between which the stock is gripped to be advanced in the usual manner. The feed roll **21** is secured to one end of a shaft **22**, and to the other end of this shaft is secured a gear **23**, the teeth of which are in mesh with those of a gear **24**, secured by the key **25** to the shaft **26** which carries the feed roll **20**.

As shown in Fig. 3, the shaft 26 is extended to the right, and the gear 24 is provided with a sleeve 27 upon which the collar 19 is rotatably mounted so that while the gear 24 is rigid with the shaft 26, the collar 19 may oscillate with respect to this shaft.

To the collar 19 is secured a spider 29, this spider being provided, as shown in dotted lines in Fig. 2, with a plurality of notches 31, the bases of which are inclined, as shown at 32. This spider lies within a ring member 34 secured to the shaft 26 by the key 35 so that when the ring member 34 is rotated, the shaft 26 will be rotated, and likewise the feed rolls 20 and 21.

It will be apparent, therefore, that the spaces between the surfaces 32 of the notches 31 and the inner surface of the ring 34 are considerably smaller at one end than at the other, and within these spaces are mounted driving rollers 36 which, when the spider is rotated in one direction, i. e. in a counter-clockwise direction, as shown in Fig. 4, will be gripped between the inner periphery of the ring and wear plates 37 on the spider 29. Spring pressed plungers 39 normally urge the driving rollers into engaging relation.

From the above, it will be apparent that, upon oscillation of the arm 12 and the link 13 which is pivoted to the collar 19, this collar, together with the spider 29, which is secured to the collar, will also be oscillated, and that upon each movement in a counter-clockwise direction, as shown in Fig. 4, the ring 34 will also be driven. Upon movement of the collar 19 in a reverse or clockwise direction, the ring 34 will remain stationary. As the ring 34 is keyed to the shaft 26, and as the gear 24 is also keyed to this shaft, the feed rollers 20 and 21 will be rotated in a step-by-step movement.

It will also be noted that the ring 34 cannot be moved in a reverse or clockwise direction, as shown in Fig. 4, without causing driving engagement of the rollers 36 with the spider 29, and in order to release this driving engagement so that the ring 34 may be reversed in direction when it is desired to reverse the feed rollers 20 and 21, it is necessary to hold the rollers out of driving engagement with the inclined surfaces 32, as is shown in Fig. 5.

To effect this result, a lever 40 is pivoted at 41 to the collar 19, and upon one end of this lever is carried a pin 42 upon which is mounted a block 43 slidably mounted between projecting ears 44 and 45 provided upon a carrier ring 46 rotatably mounted between the collar 19 and the spider 29 so that when the lever 40 is moved about its pivot 41, the carrier ring 46 will be oscillated.

The carrier ring 46 is provided with a plurality of pins 47, one for each of the gripping rollers 36 so that when the ring is moved in the proper direction, these pins will engage the rollers 36 and hold them out of gripping relation between the inner surface of the ring 34 and the inclined surfaces 32 of the spider 29. In this position, reverse rotation or rotation in a clockwise direction, as shown in Figs. 4 and 5 of the ring 34, will be freely permitted without moving the spider 29 and parts connected thereto.

The oscillating collar 19 is provided with an arm 50 upon which is carried an hydraulic cylinder 51. A plunger 52 within this cylinder bears against an adjustable bolt 53 threaded into the lever 40 so that movement of the plunger upwardly, as shown in Figs. 4 and 5, rocks the lever 40 about its pivot from its inoperative position to the position shown in Fig. 5 to disengage the elements of the feeding mechanism. A spring 54 secured at one end to the arm 40 and at its other end to a pin 55, secured in a part of the member 50, normally urges the arm 40 in a clockwise direction so as to maintain the bolt 53 in engagement with the plunger 52.

A control casing 56 for the hydraulic cylinder is shown diagrammatically in Figs. 4 and 5, the admission of hydraulic pressure to the cylinder being controlled by a lever 57. This control box 56 is connected to the cylinder by a tubular member 58 having a flexible portion 59 which may freely flex in order to permit the oscillation of the collar 19, it being understood that the control box 56 will normally be mounted on a stationary part of the machine while the collar 19 oscillates during the operation of the feed mechanism. This flexible tubing will permit such oscillation while at the same time the control or release of the feed may be readily effected.

When the machine is in operation, the parts are in the position shown in Fig. 4. In this position the spring 54 holds the lever arm 40 so that the bolt 53 engages the plunger 52, and the pins 47 are out of engagement with the gripping rollers 36. The gripping rollers are then operated freely as intended, and will effect the step-by-step feed of the ring 34 when the collar 19 is oscillated. If it is desired to release the feed, the control handle 57 is moved to the position shown in Fig. 5, admitting hydraulic pressure to the cylinder 51 to raise the plunger 52, and thus swing the lever 40 about its pivot 41 in a counter-clockwise direction. This effects a slight rotation of the ring 46 in a counter-clockwise direction, and causes the pins 47 to engage the gripping rollers 36 and hold these rollers in the large ends of the notches 31 so that the latter will be out of gripping engagement between the spider 29 and ring 19. The feed rollers may thereupon be rotated in a reverse direction if desired, this movement only effecting rotation of the shaft 26 and ring 34 without carrying along the spider 29 and associated parts.

It will be obvious that the control box 56 may be mounted on any desired part of the machine and as the tubular member 58 may be readily carried to any desired place, the employment of hydraulic mechanism for actuating the lever arm 40 permits the operator to control the feed from any desired point on the machine so that the feed may be stopped at will, and, if desired, the stock may be withdrawn from between the feed rollers.

It will be understood that the feed is sometimes discontinued or thrown out of operation by the means above described during the operation of the machine. If this occurs during the movement of the feed rolls, or if the feed mechanism is re-engaged during a movement of the feed rolls, it will result in a blank of short length being delivered to the fabricating mechanism. It is, therefore, advantageous to provide means for preventing the operation of the feed control mechanism except at the proper time in the operation of the device, and particularly when the control mechanism is operated to re-engage the feed so as to assure that a full-length blank will be fed to the dies. Means for accomplishing this result is shown diagrammatically in Figs. 6 and 7 of the drawings.

As illustrated, the conduit 58, which leads from the cylinder 60 of the control box 56, is provided with a controlling valve 61 actuated by the plunger 62 of a solenoid 63. The wires 64 from this solenoid lead to a microswitch 65 adapted to be closed by an arm 66 having a cam follower 67 thereon.

The gate of a header or like machine is shown diagrammatically at 68, and upon this gate is mounted a cam 69 designed to contact the cam follower 67 and throw the arm 66 to close the switch 65.

As shown in Fig. 6, the gate is in a forward position, i. e., a position toward the fabricating dies, and it will be noted that the cam 69 is out of engagement with the cam follower 67 so that the solenoid is de-energized and the valve 61 is in such a position that the line 58 is open. At this time the control handle 57 may be thrown from the position shown in Fig. 6 to that shown in Fig. 7, to move the plunger 70 downwardly in the cylinder 60 and thus force the plunger 52 upwardly to disconnect the feed. When the gate is in this position the handle can, of course, be thrown in the opposite direction to be restored to its initial position so that the feeding operation will be resumed.

In Fig. 7 the gate is shown at the back end of its stroke,

that is, in a position remote from the dies, and at this time the cam **69** engages the follower **67** so as to close the switch **65**, thereby energizing the solenoid **63** and moving the valve **61** to a position to shut off the line **58**. At this time the control handle **57** cannot be operated to actuate the plunger **52**, or to permit the plunger to drop to its lower position if it has been raised, so that, while the gate is in this position, the feed cannot be thrown in. As the feeding takes place when the gate is at the rear end of the stroke, such an arrangement will prevent the resumption of the feeding operation at a time when a blank shorter than that required would be delivered to the dies. The timing of the resumption of the feeding operation will, of course, be controlled by the position of the cam **69** on the gate, so that, regardless of the position of the gate when the feeding occurs, the cam can be positioned at such a point as to prevent the throwing in of the feed except at the desired time.

It will of course be understood that the control cam, shown at **69**, may be mounted upon other moving parts of the machine such as the crank shaft or cam shaft, and the same result would be effected.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the claims.

What I claim is:

1. Drive mechanism for the feeding means of headers or like machines having a reciprocating gate, said mechanism comprising a rotatable driven member and means for effecting step-by-step rotation of said member including an oscillatable driving member, means drivingly connecting said driven and driving members upon movement of the latter in one direction, hydraulically operated means to render said connecting means inoperative, and means

controlled by the position of said gate for preventing operation of said hydraulically operated means.

2. In a header or like mechanism having work feeding means and a reciprocal gate, driving means for said feeding means comprising a rotatable driven member, means for effecting step-by-step rotation thereof including an oscillatable driving member, hydraulically actuated means for connecting and disconnecting said driving and driven members, and means controlled by the position of said gate for delivering fluid pressure to said hydraulically actuated means.

3. In a header or like mechanism having work feeding means and a reciprocal gate, driving means for said feeding means comprising a rotatable driven member, means for effecting step-by-step rotation thereof including an oscillatable driving member, hydraulically actuated means for connecting and disconnecting said driving and driven members, and means mounted on a movable part of the machine for preventing operation of said hydraulically actuated means.

References Cited in the file of this patent

UNITED STATES PATENTS

663,396	Stone	Dec. 4, 1900
944,346	Reece	Dec. 28, 1909
1,550,996	Wilcox	Aug. 25, 1925
2,159,137	Doty	May 23, 1939
2,301,099	Upp	Nov. 3, 1942
2,423,006	Chambers et al.	June 24, 1947
2,442,868	Dare	June 8, 1948
2,534,034	LaBrie	Dec. 12, 1950
2,563,584	Crookston	Aug. 7, 1951

FOREIGN PATENTS

227,666	Switzerland	Sept. 16, 1943
296,243	Great Britain	Aug. 30, 1928