April 4, 1961 R. F. HERR 2,978,158

FEED APPARATUS

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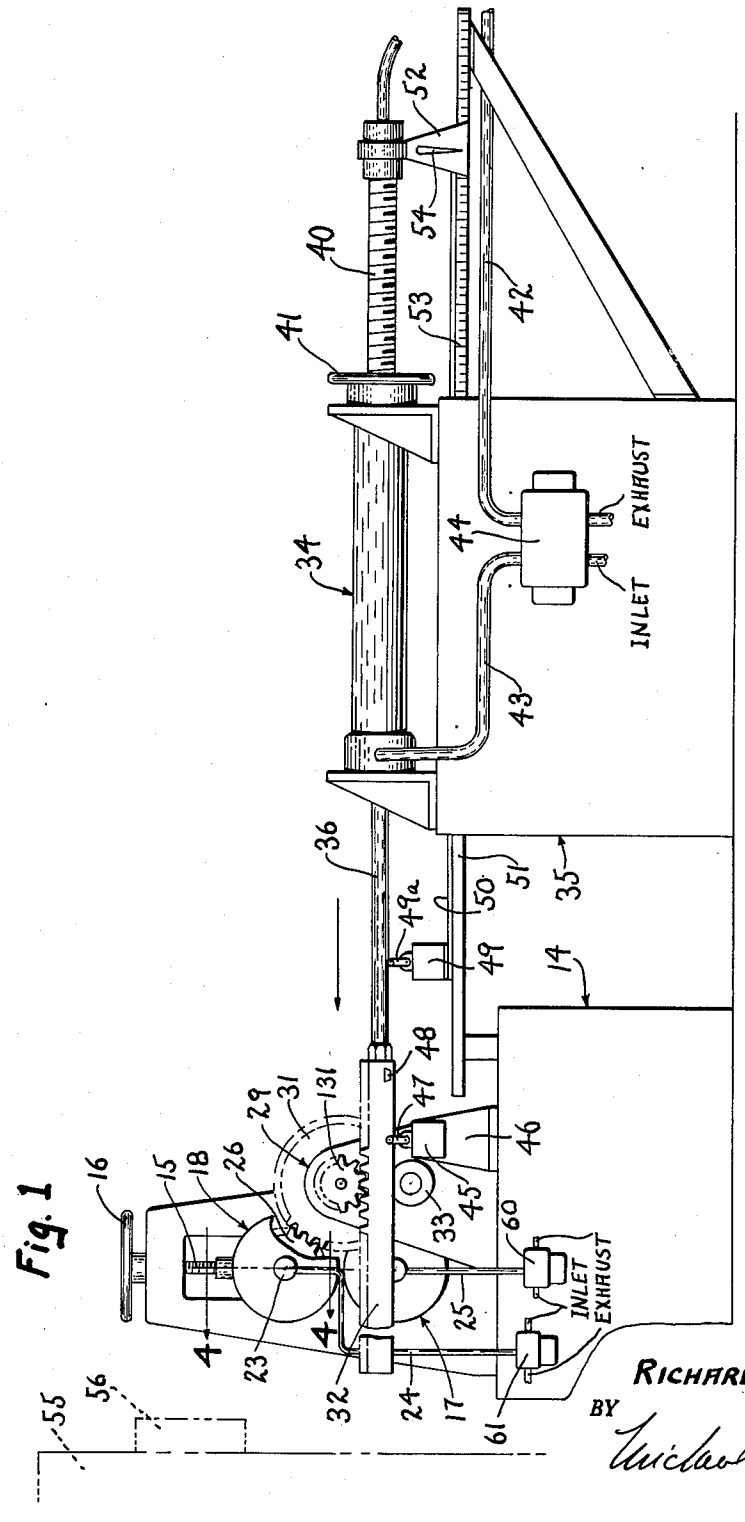


Fig. 1

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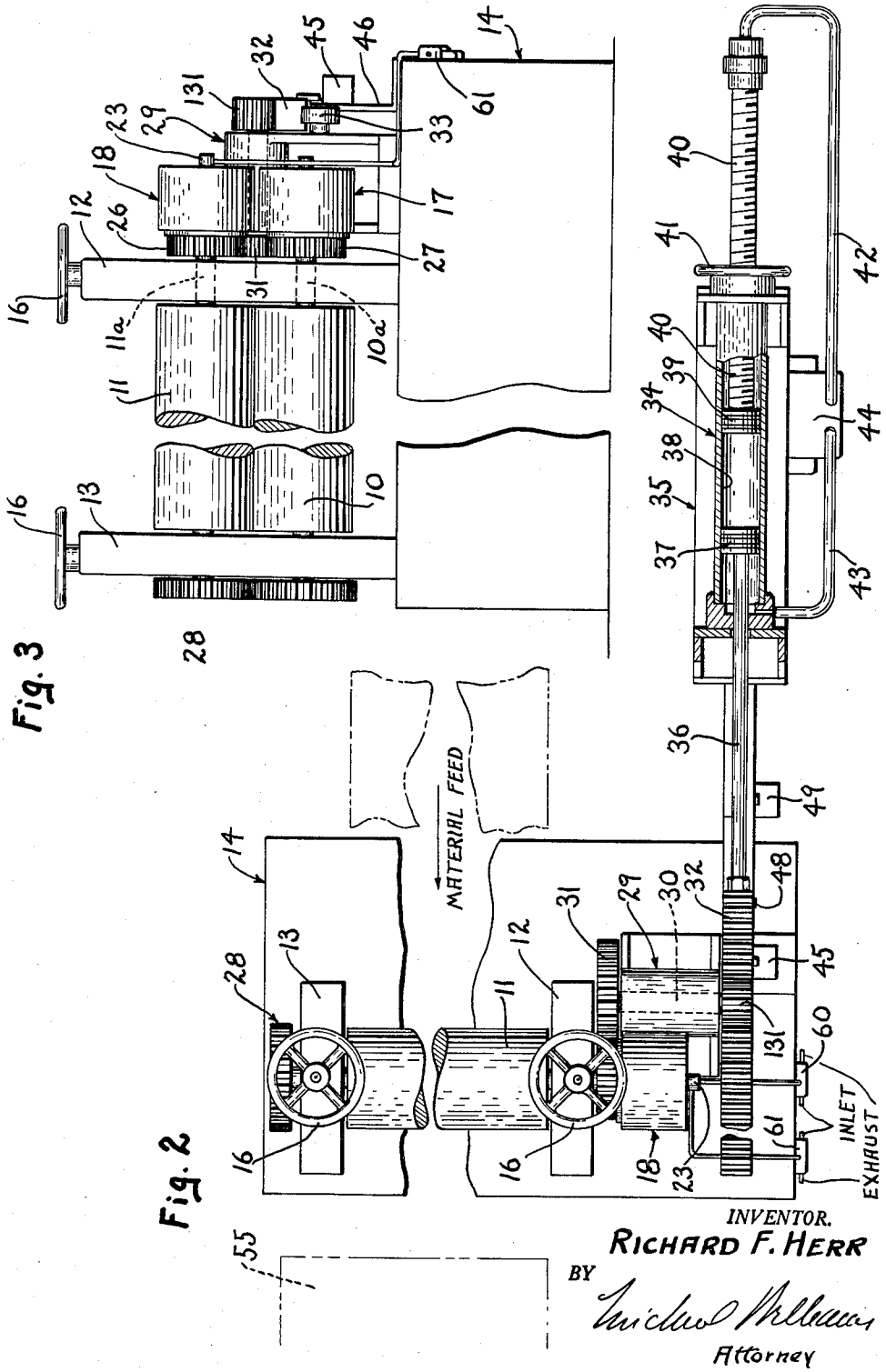


Fig. 3

Fig. 2

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Fig. 5

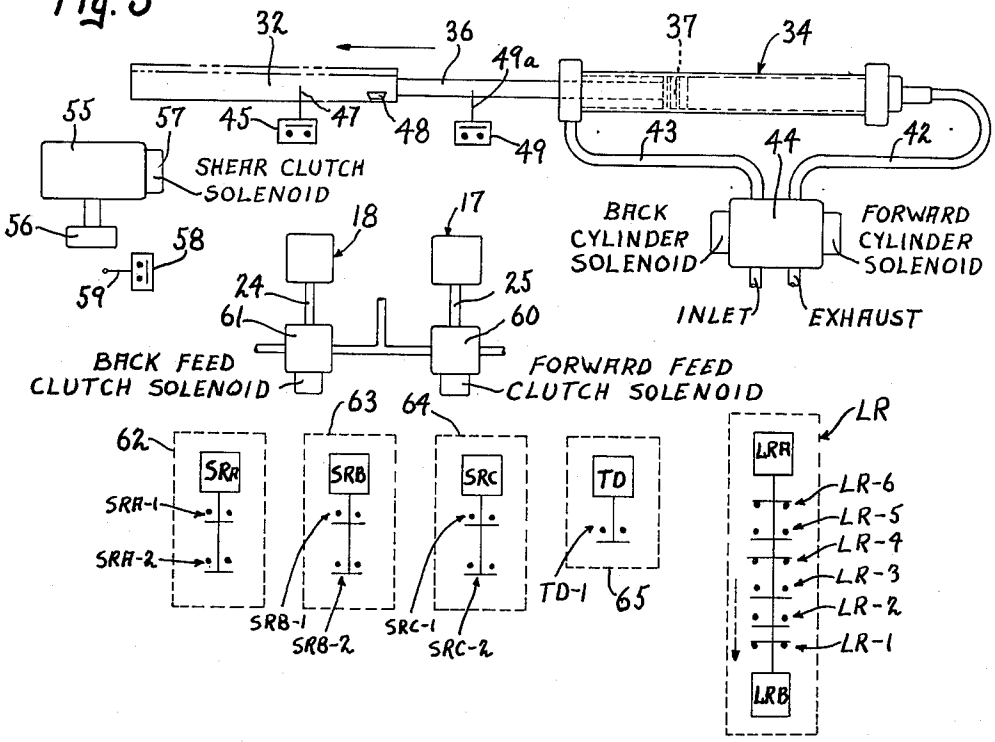
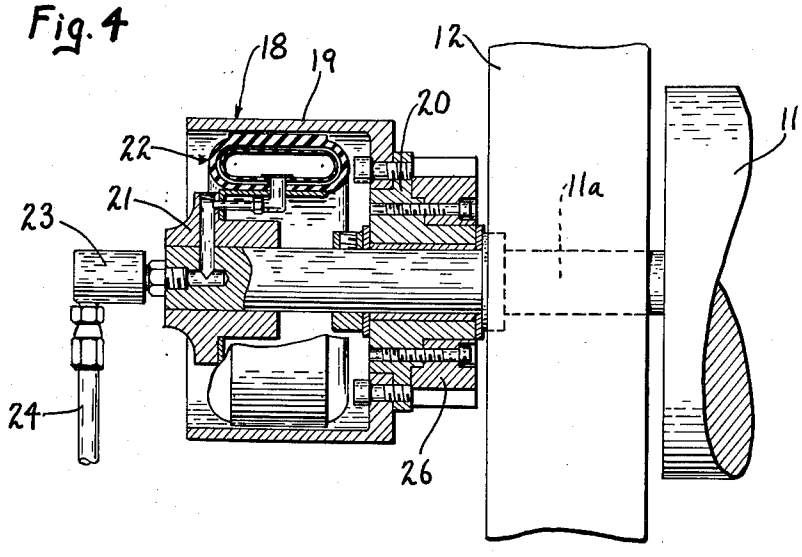


Fig. 4



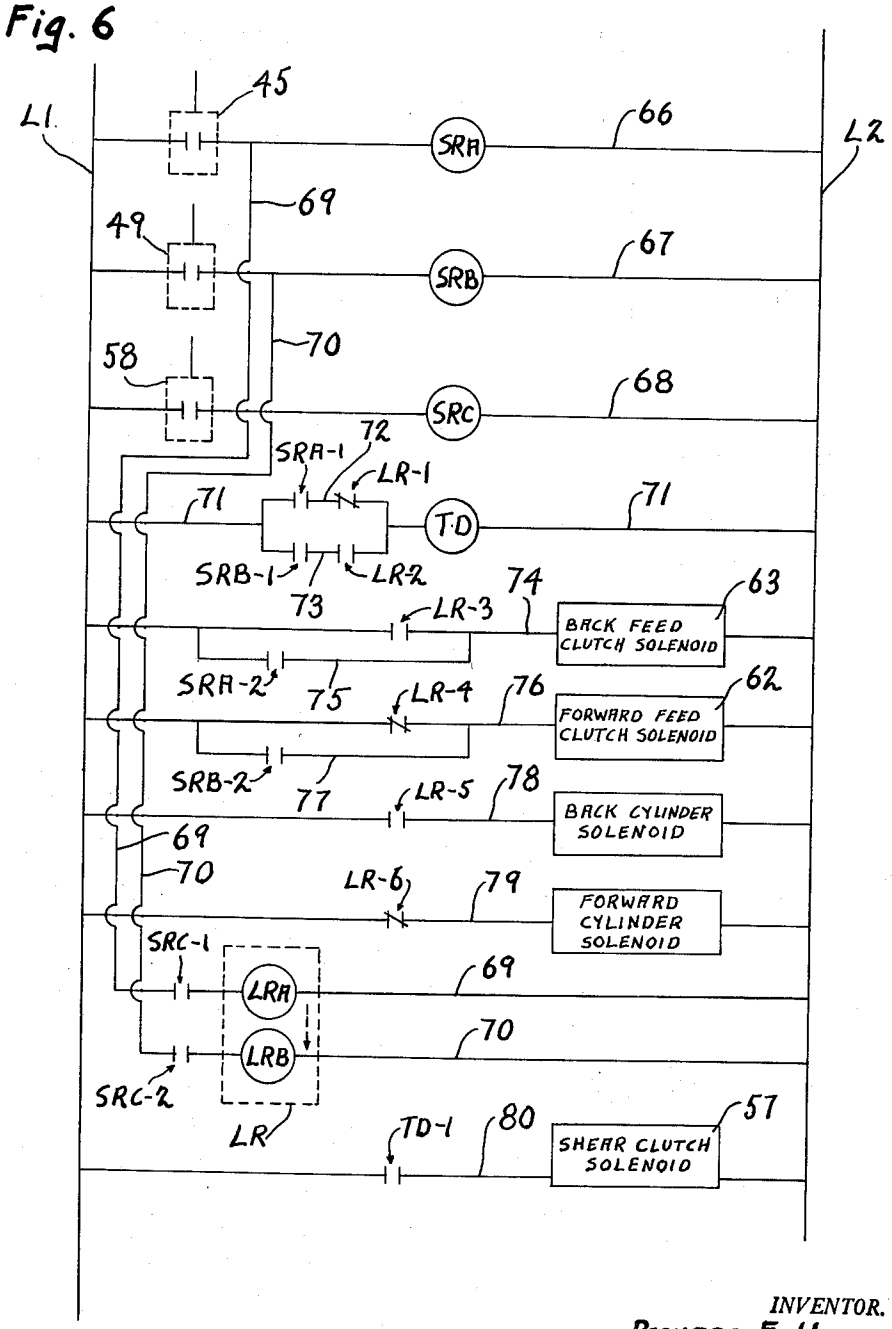
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Fig. 6



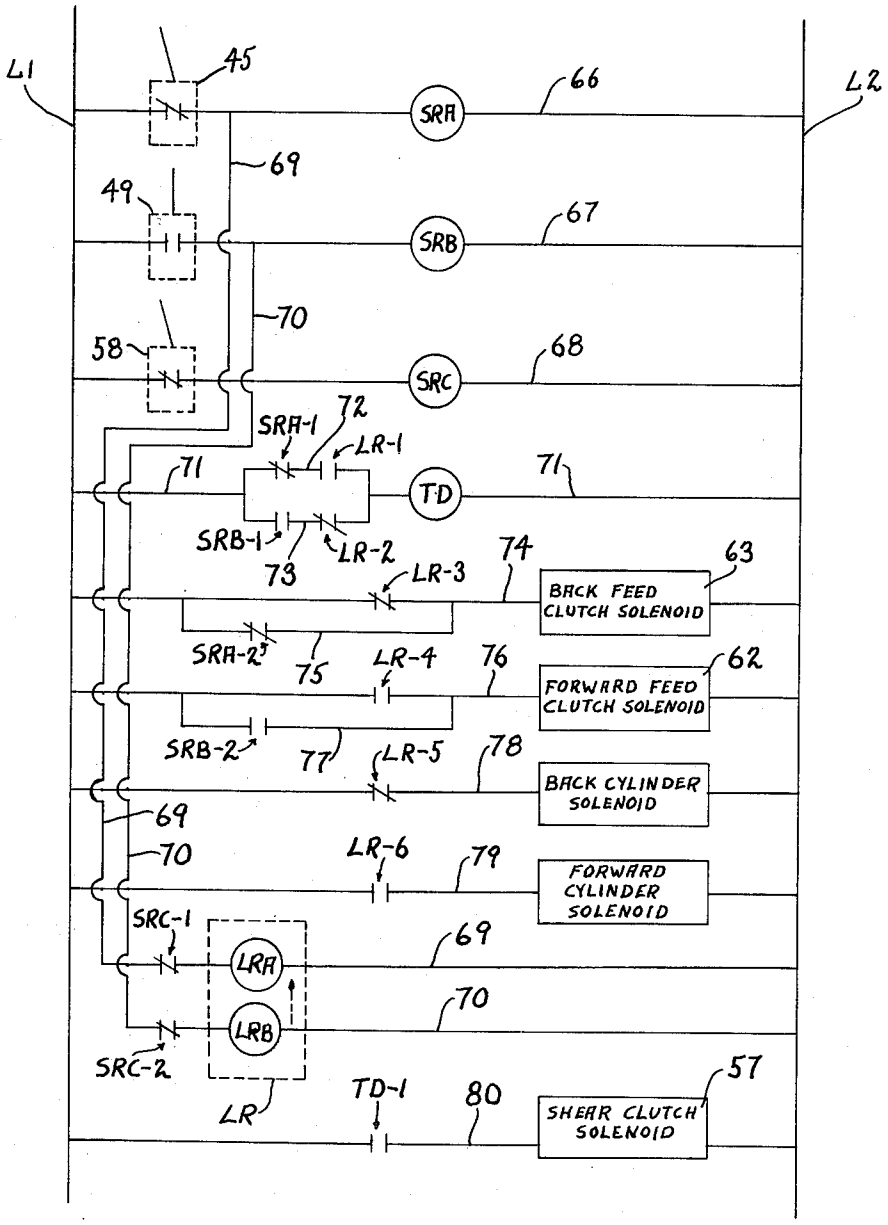
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Fig. 7



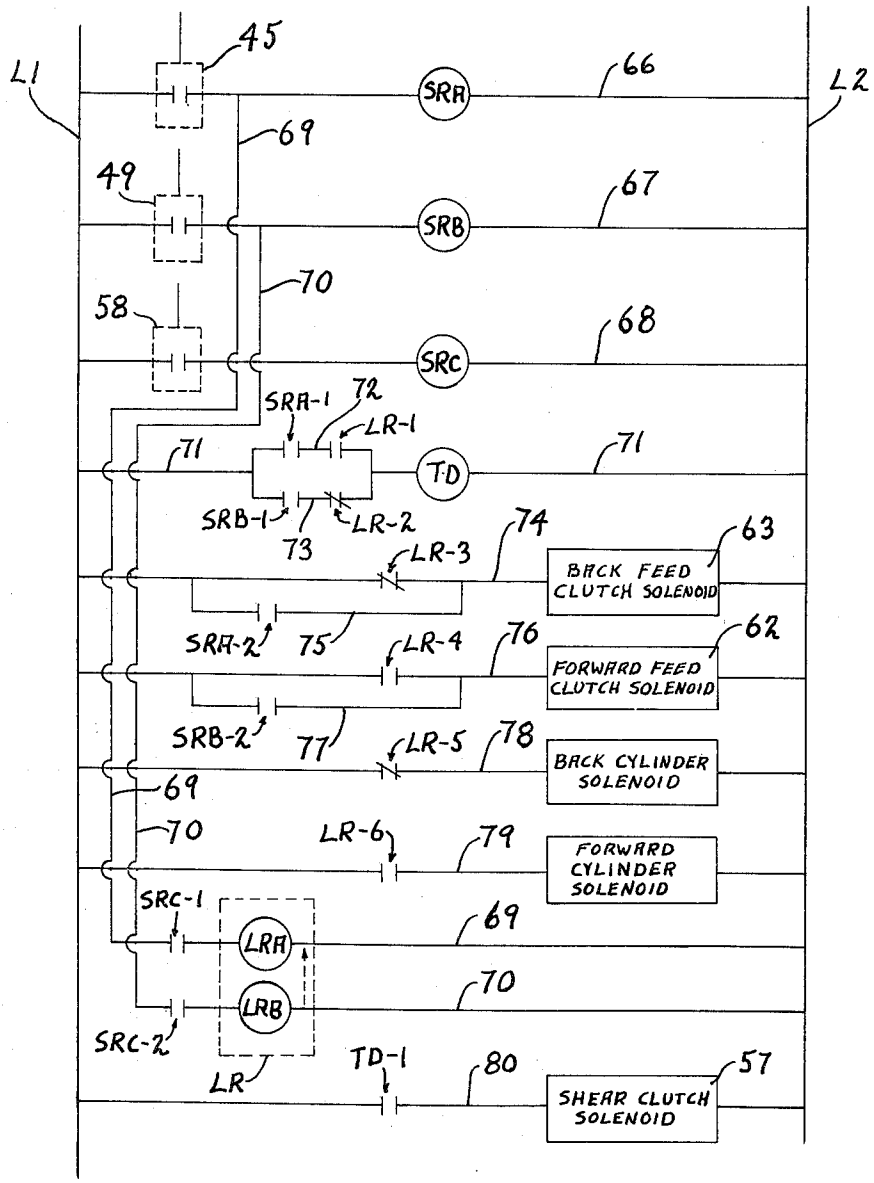
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Fig. 8



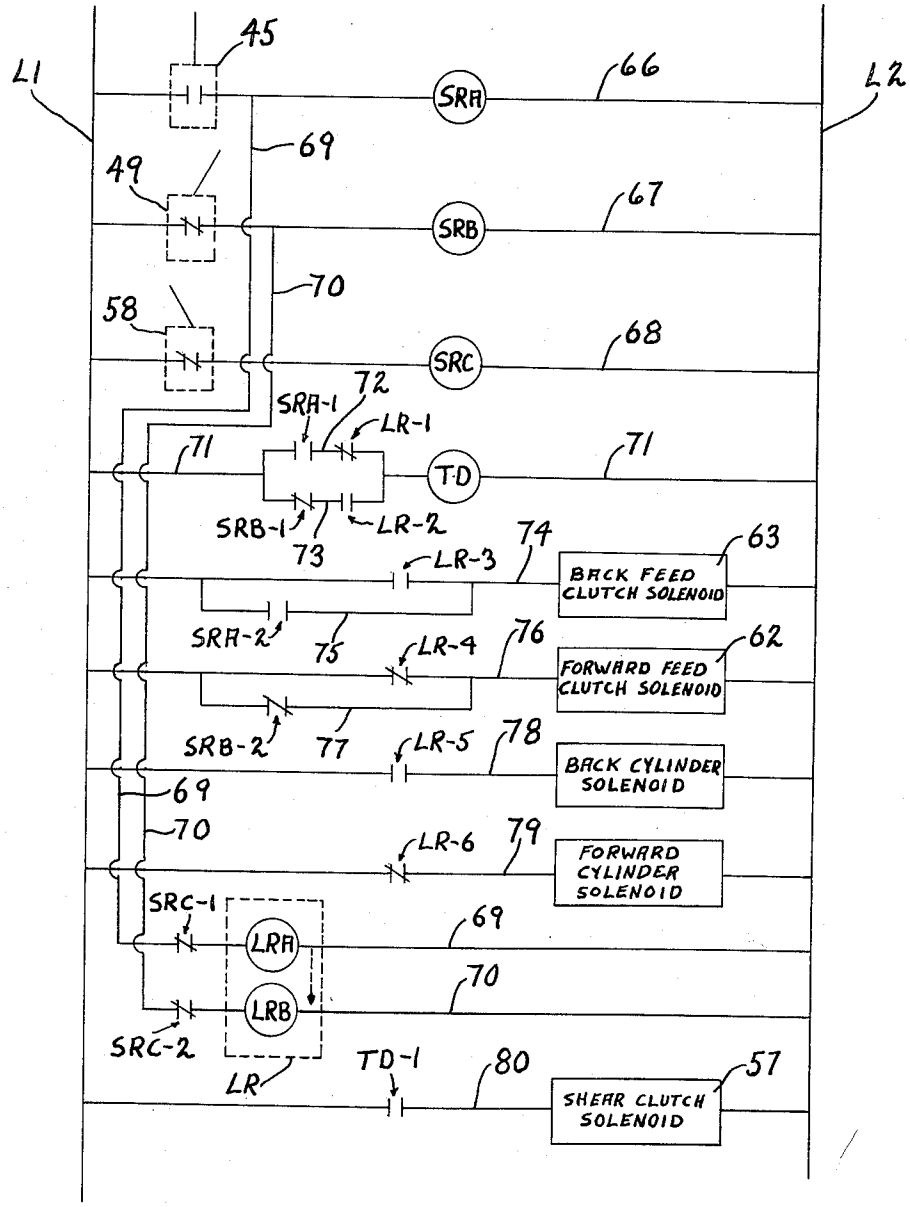
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Fig. 9



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United States Patent Office 2,978,158 Patented Apr. 4, 1961

2,978,158

FEED APPARATUS

Richard F. Herr, Warren, Ohio, assignor to The Herr Equipment Corporation, Warren, Ohio, a corporation of Ohio

Filed Oct. 24, 1955, Ser. No. 542,351

8 Claims. (Cl. 226—46)

My invention relates to apparatus for translating reciprocating movement to unidirectional rotational movement, more particularly to feeding apparatus employing a reciprocating member to effect unidirectional rotation of one or more feed rolls, and the principal object of my invention is to provide new and improved apparatus of the character described.

With the increasing use of high-speed, automatic equipment, there has long been a need for dependable apparatus which will intermittently and accurately feed predetermined lengths of material to equipment such as high-speed shears, presses and the like. Apparatus of the character described has been developed for feeding relatively light material at relatively slow speeds; however, such prior art apparatus has not been satisfactory for use with heavy material, high speeds, and long feeds.

In contrast, my invention is suitable for use in applications wherein prior art apparatus is unsatisfactory. Furthermore, my invention possesses other advantages which will become apparent from a study of the following description and of the drawings appended hereto.

In the drawings accompanying this specification and forming a part of this application there is shown, for purpose of illustration, an embodiment which my invention may assume, and in these drawings:

Figure 1 is a side elevational view of a preferred embodiment of my invention,

Figure 2 is a top plan view of the apparatus shown in Figure 1, certain parts being shown partly in section to illustrate interior construction,

Figure 3 is an end elevational view of the apparatus shown in Figures 1 and 2,

Figure 4 is an enlarged, fragmentary sectional view generally corresponding to the line 4—4 of Figure 1,

Figure 5 is a diagrammatic view illustrating the various controls presently employed to effect the desired operation of the invention, and

Figures 6, 7, 8 and 9 are schematic views in various stages of operation of the control circuit.

As shown in Figures 1, 2 and 3, the embodiment of my invention therein illustrated comprises a pair of pinch rolls **10** and **11**, each rotatably supported by spaced-apart housings **12** and **13** which are suitably secured to a base **14**. As will be clear, the rolls **10**, **11** provide a pass for the material to be fed, such material, in the present embodiment, being in the form of an elongated strip S (see Figure 2). It is presently preferred to support the lower roll **10** in the housings **12**, **13** for rotational movement only while the upper roll **11** is adapted to be shifted toward and away from the lower roll to provide for adjustment of the spacing between the rolls so that various thicknesses of material may be accommodated. To this end, any suitable construction may be employed; for example, the roll **11** may be rotatably supported adjacent its ends by chocks which are slidably secured to the housings **12**, **13**. As will be understood, each chock may be shifted toward and away from the

roll **10** by means of an adjusting screw **15** and a handwheel **16**.

Each pinch roll **10**, **11** has a respective shaft portion **10***a*, **11***a* which extends beyond housing **12** and to which a respective clutch **17**, **18** is secured. Since clutches **17**, **18** are identical, only clutch **18** (associated with roll **11**) will be described in detail.

As seen in Figure 4, clutch **18** comprises a drum **19** having one end secured to a hub **20** which is rotatably carried by roll shaft portion **11***a*. Affixed to shaft portion **11***a* by means of a hub **21** and positioned within drum **19** is an annular expansible clutch element **22**. When fluid under pressure is admitted to the interior of element **22**, the element will expand into engagement with the internal surface of drum **19** and thus lock shaft portion **11***a* and drum **19** together for unitary rotation.

When fluid under pressure is exhausted from the interior of element **22**, the element will contract to the position shown in Figure 4 wherein it is disengaged from the drum so as to allow relative rotation between the latter and shaft portion **11***a*. A commercially available rotary sealing device **23** is employed to connect a fluid conduit **24** with clutch **18**, a similar construction being employed to connect a fluid conduit **25** with clutch **17**. For a purpose later to be disclosed, a gear **26** is secured to hub **20** and forms a unitary assembly with the hub and with drum **19**, and a similar gear **27** is secured to the corresponding portion of clutch **17**.

In the present embodiment, it is preferable to interconnect the rolls **10**, **11** for unitary rotation. Accordingly, each shaft **10***a*, **11***a* is extended beyond the housing **13** and one gear of a pair of intermeshed gears **28** is secured to each of the shafts, as shown, by any suitable means.

In the present embodiment, a housing **29** is supported by the base **14** adjacent the housing **12**. Housing **29** rotatably supports a shaft **30** which extends beyond each side of the housing. Secured to one end of shaft **30** is a gear **31** which meshes with each of the gears **26**, **27** (see Figure 1, particularly) and secured to the other end of the shaft **30** is a gear, or pinion, **131**.

Means are provided for effecting rotation of the rolls **10**, **11** through the aforementioned gears and such means presently comprises a reciprocable rack **32** whose teeth are in mesh with the pinion **131**. As best shown in Figure 3, the under surface of rack **32** is provided with a longitudinally extending channel, and a roller **33**, rotatably mounted upon housing **29**, is seated in the channel to guide the rack and hold it in mesh with pinion **131**.

In the present embodiment, a fluid-operated cylinder **34** is employed to effect reciprocation of rack **32**. Cylinder **34** is supported adjacent base **14** by means of a base **35** and the cylinder has a piston rod **36** extending from one end thereof and secured to rack **32** as shown.

As illustrated in Figure 2, cylinder **34** is of the adjustable stroke type and comprises a piston **37** reciprocable within the bore **38** of the cylinder. Another piston-like member **39** is also disposed within the bore **38**, member **39** having a hollow, externally threaded rod **40** secured thereto. Rod **40** extends from the end of cylinder **34** opposite to that from which piston rod **36** extends and the rod **40** is threadably engageable with an adjusting wheel **41** which is rotatably secured to cylinder **34** by any suitable means.

The hollow interior of rod **40** communicates with the portion of the bore **38** between the piston **37** and the member **39**, and the free end of rod **40** is connected to a flexible conduit **42** which is adapted to pass fluid to and from the cylinder. Another conduit **43** is adapted to pass fluid to and from cylinder **34** at the left-hand side of piston **37** (in the position of parts shown in Figure 2) and conduit **43**, together with conduit **42**, is connected

to a suitable, commercially available solenoid operated control valve 44. Valve 44 is of the type having two solenoids adapted to be alternately energized. When one solenoid (labeled Forward Cylinder Solenoid in Figures 5 through 9) is energized, valve 44 will pass fluid under pressure through conduit 42 and allow fluid to escape through conduit 43. This will move piston 37 of cylinder 34 and, consequently, rack 32 to which it is attached forward (or to the left as viewed in Figures 1 and 5). Energization of the other solenoid (labeled Back Cylinder Solenoid) will effect movement of piston 37 and consequent movement of rack 32 in the opposite direction (or to the right).

As will be understood, rotation of adjusting wheel 41 will effect movement of member 39 within bore 38 toward and away from piston 37 and thus adjustment of the length of the stroke of the piston 37 will be effected.

As best shown in Figure 1, means comprising limit switches are provided to control operation of valve 44 so that fluid flow to cylinder 34 may be controlled to effect reciprocation of rack 32. Accordingly, a limit switch 45 is affixed to the base 14 by means of a bracket 46, the actuator 47 of switch 45 being engageable with a projection 48 carried by rack 32 when piston 37 reaches the left-hand end of its stroke.

Another limit switch 49 is positioned adjacent rack 32 in position whereby its actuator 49*a* will be tripped by projection 48 when the rack moves to the right. Switch 49 is mounted upon one end of a slide 50 which is slidable on a suitable track 51. The opposite end of slide 50 is secured to the aforementioned free end of rod 40 by means of any suitable connecting member 52. A portion of the track 51 carries markings 53 which are cooperable with a pointer 54 carried by connecting member 52 to indicate the stroke setting of cylinder 34.

It will be understood that as rod 40 is shifted in the manner previously described to adjust the stroke of cylinder 34, limit switch 49 will be automatically positioned to engage with projection 48 when piston 37 reaches the right-hand end of its stroke.

The present embodiment of the invention is adapted to feed accurately predetermined lengths of strip material to subsequent apparatus. Such subsequent apparatus may take many forms; however, for purpose of illustration, such apparatus will be described as comprising a shear which transversely cuts the material fed to it by the present invention. A suitable shear 55 is fragmentarily shown by dot dash lines in Figure 1 (and shown diagrammatically in Figure 5) and includes a vertically movable member 56, or platen, which carries the usual movable knife (not shown). As will be understood, downward movement of platen 56 carries the movable knife into juxtaposition with a stationary knife (not shown) to sever material positioned therebetween.

Any suitable arrangement may be employed for moving platen 56 down to sever the material and for returning the platen to the top of its stroke. Whatever drive arrangement is employed, the present embodiment of the invention utilizes a solenoid 57 (see Figure 5) to trigger the shear at the proper time to coordinate its operation with the feeding of the material. It is to be understood that when solenoid 57 is energized platen 56 will move down to sever the material and will then return to its elevated position shown wherein the drive mechanism will disengage and the platen will await the next energization of solenoid 57. For a purpose to be seen, a limit switch 58 having normally open contacts will be so positioned that its actuator 59 will be engaged by platen 56 during its upstroke (after it has severed the material) to momentarily close the switch contacts. Downstroke of the platen will have no effect on switch 58, its contacts remaining open until the platen moves upwardly.

As best seen in Figure 1, but also shown diagrammatically in Figure 5, clutch 17 is connected to a solenoid actuated valve 60 by means of conduit 25, whereas clutch 18 is connected to a similar solenoid actuated valve 61 by means of conduit 24. Each valve 60, 61 has respective solenoids labeled Forward Feed Clutch Solenoid and Back Feed Clutch Solenoid in Figures 5 through 9 which, when energized, cause the respective valve to pass fluid under pressure from the inlet of the valve to the respective clutch to which the valve is connected to expand the clutch element and engage the clutch. Upon de-energization of the solenoid, fluid pressure within the clutch element will be exhausted and the clutch will thereupon disengage.

As best seen in Figure 5, but also shown schematically in Figures 6 through 9, further means employed to control operation of the present embodiment include conventional solenoid actuated relays 62, 63 and 64. Relay 62 has a solenoid SRA and normally open contacts SRA–1 and SRA–2, relay 63 has a solenoid SRB and normally open contacts SRB–1 and SRB–2, and relay 64 has a solenoid SRC and normally open contacts SRC–1 and SRC–2. These relays are all of the type which close their contacts when their solenoids are energized and which open their contacts when their solenoids are de-energized.

There is also provided a time delay relay 65 having a solenoid TD and normally open contacts TD–1. When solenoid TD is energized, contacts TD–1 close after a short time interval. When the solenoid is de-energized, contacts TD–1 open immediately.

There is further provided a latching relay LR having solenoids LRA and LRB and having contacts LR–1, LR–2, LR–3, LR–4, LR–5 and LR–6. This relay is of the type wherein momentary energization of solenoid LRB, for example, closes contacts LR–1, LR–4 and LR–6 and opens contacts LR–2, LR–3 and LR–5 (see especially Figure 5). The contacts will remain in this position, despite de-energization of solenoid LRB, until solenoid LRA is energized. Upon energization of solenoid LRA, contacts LR–1, LR–4 and LR–6 will open and contacts LR–2, LR–3 and LR–5 will close. The contacts will remain in this position, despite de-energization of solenoid LRA, until solenoid LRB is once again energized.

In the position of parts shown in Figures 5, 6 and 9, the operating parts of latching relay LR are in what will be termed their down position (indicated by an arrow) wherein contacts LR–1, LR–4 and LR–6 are closed and contacts LR–2, LR–3 and LR–5 are open. In the position of parts shown in Figures 7 and 8, the operating parts of latching relay LR are in what will be their up position (also indicated by an arrow) wherein contacts LR–1, LR–4 and LR–6 are open and contacts LR–2, LR–3 and LR–5 are closed.

Briefly, operation of the invention is as follows: During each stroke of rack 32, material will be fed in the direction of the arrow (Figure 2) to shear 55 whose movable platen 56 is positioned at the top of its stroke. When the rack reaches the end of its stroke, the rolls 10, 11 will immediately be braked (in a manner to be disclosed) and operation of the shear initiated. The shear will perform its cutting operation and return to its uppermost position. Rack 32 will then be shifted in the opposite direction by cylinder 34 to begin another feeding cycle which will be followed by yet another shearing cycle.

In order to carry out the above described cycle of operations, the various components shown in Figure 5 are arranged as follows (see schematic Figures 6, 7, 8 and 9): Solenoid SRA of relay 62 is connected across power lines L1, L2 through the contacts of limit switch 45 by means of a circuit 66, and solenoid SRB of relay 63 is connected across the power lines through the contacts of limit switch 49 by means of a circuit 67. Solenoid SRC of relay 64 is connected across the power lines through the contacts of limit switch 58 by means of a circuit 68. The contacts of limit switch 45 are also interposed in

a circuit 69, connected across the power lines, which includes contacts SRC–1 (controlled by solenoid SRC of relay 64) and solenoid LRA of latch relay LR. The contacts of limit switch 49 are interposed in a circuit 70, connected across the power lines, which includes contacts SRC–2 (controlled by solenoid SRC of relay 64) and solenoid LRB of latch relay LR.

Solenoid TD of time delay relay 65 is connected across the power lines by means of a circuit 71 which has parallel branches 72 and 73. Interposed in branch circuit 72 are contacts SRA–1 of relay 62 and contacts LR–1 of latch relay LR. Interposed in branch circuit 73 are contacts SRB–1 of relay 63 and contacts LR–2 of the latch relay.

Solenoid 63 of valve 61, which controls operation of back feed clutch 18 and referred to as the back feed clutch solenoid, is connected across the power lines by means of a circuit 74 in which are interposed contacts LR–3 of latch relay LR. A circuit 75, having contacts SRA–2 of relay 62 interposed therein, shunts around contacts LR–3 in circuit 74.

Solenoid 62 of valve 60, which controls operation of forward feed clutch 17 and referred to as the forward feed clutch solenoid, is connected across the power lines by means of a circuit 76 in which are interposed contacts LR–4 of latch relay LR. A circuit 77, having contacts SRB–2 of relay 63 interposed therein, shunts around contacts LR–4 in circuit 76.

The cylinder back solenoid of valve 44 (that solenoid which, when energized, moves rack 32 in a direction opposite to that shown by the arrows in Figures 1 and 5) is connected across the power lines by means of a circuit 78 in which are interposed contacts LR–5 of latch relay LR. The cylinder forward solenoid of valve 44 (that solenoid which, when energized, moves rack 32 in the direction shown by the arrows in Figures 1 and 5) is connected across the power lines by means of a circuit 79 in which are interposed contacts LR–6 of latch relay LR.

Solenoid 57 (that solenoid which, when energized, effects a single cycle operation of shear 55 and hereinafter referred to as the shear solenoid) is connected across the power lines by means of a circuit 80 in which are interposed contacts TD–1 of time delay relay 65.

Assuming that the respective inlets of valves 44, 60 and 61 are suitably connected to the proper sources of inlet pressure, that the strip material being fed is gripped between the rolls 10 and 11, and further assuming that current is being supplied to power lines L1 and L2, operation will be as follows: With the various parts in the position shown in Figures 1, 5 and 6, (note that latch relay LR is in its lower position wherein contacts LR–1, LR–4 and LR–6 are closed and contacts LR–2, LR–3 and LR–5 are open as before described) the only closed circuits will be circuit 76 through the forward feed clutch solenoid, since contacts LR–4 are closed, and circuit 79 through the cylinder forward solenoid, since contacts LR–6 are closed.

With the forward feed clutch solenoid energized, only clutch 17 will be engaged, whereas with the cylinder forward solenoid energized fluid will be admitted to the right-hand end of cylinder 34 thus moving rack 32 in the direction of the arrow. In the position of parts shown in Figures 1, 5 and 6, rack 32 is shown in an intermediate position; that is, after it has started its stroke in the direction of the arrow and before it has completed its stroke in this direction.

With the rack moving in the direction of the arrow, pinion 131 and gear 31 will be rotated in a clockwise direction, whereas gears 26, 27, secured to the respective drums of clutches 18, 17 and meshed with gear 31, will be rotated in a counter-clockwise direction. Since clutch 17 is engaged, roll 10 will be driven in a counter-clockwise direction and roll 11 will be rotated by roll 10 in the opposite direction through intermeshed gears 28. Clutch 18, being disengaged at this time, will permit gear 26 to revolve freely relative to roll 11. With rolls 10, 11 rotating as described, material will be fed to shear 55 until rack 32 reaches the end of its outstroke.

Referring particularly to Figure 6, when piston 37 reaches the left-hand end of cylinder 34, projection 48, carried by rack 32, will simultaneously trip actuator 47 of limit switch 45 and thus close the contacts of this switch to complete circuit 66 and energize solenoid SRA of relay 62. Energization of solenoid SRA will close contacts SRA–1 in circuit 72 and contacts SRA–2 in circuit 75.

Closing of contacts SRA–2 will energize the back feed clutch solenoid to engage clutch 18. It will be noted that the engagement of clutch 18, since clutch 17 is already engaged, will act as a brake to prevent over-running of the rolls after the rack has reached the end of its stroke and to lock the rolls against further rotation at this time. Closing of contacts SRA–1 will complete circuits 71, 72 and energize solenoid TD of the time delay relay. After a short time delay (this delay insuring that rolls 10, 11 have been locked by the engagement of clutch 18), contacts TD–1 in circut 80 will close to energize shear solenoid 57. Upon energization of the shear solenoid, movable platen 56 of the shear will descend to shear the material and will then return to its uppermost position.

As platen 56 returns to its uppermost position after shearing the material, it will momentarily trip limit switch 58 and momentarily close the latter's contacts (see Figure 7). Closing of the contacts of limit switch 58 in circuit 68 will energize solenoid SRC of relay 64 to close contacts SRC–1 in circuit 69 and contacts SRC–2 in circuit 70. Circuit 70 will remain open since the contacts of limit switch 49 are open; however, circuit 69 will be completed through the closed contacts of limit switch 45 to thus energize solenoid LRA of latch relay LR.

Energization of solenoid LRA will shift the contacts of latch relay LR to open contacts LR–1, LR–4 and LR–6 and to close contacts LR–2, LR–3 and LR–5. The opening of contacts LR–1 in circuit 72 will de-energize solenoid TD which will open circuit 80 and de-enerize the shear solenoid to permit the movable shear platen to stop when it reaches its uppermost position. Closing of contacts LR–2 in circuit 73 will not energize solenoid TD at this time since contacts SRB–1 in this circuit are open. Closing of contacts LR–3 in circuit 74 will have no effect on the back feed clutch solenoid since it is already energized by closed contacts SRA–2 in shunt circuit 75.

Opening of contacts LR–4 in circuit 76 will de-energize the forward feed clutch solenoid and opening of contacts LR–6 in circuit 79 will de-energize the cylinder forward solenoid. Closing of contacts LR–5 in circuit 78 will energize the cylinder back solenoid to thereupon shift piston 37 and, accordingly, rack 32 to the right.

With rack 32 moving in the opposite direction from that shown in Figures 1 and 5, pinion 131 and gear 31 will be rotated in a counter-clockwise direction, whereas gears 26, 27, secured to the respective drums of clutches 18, 17 and meshed with gear 31, will be rotated in a clockwise direction. Since clutch 18 is now engaged, roll 11 will be driven in a clockwise direction and roll 10 will be rotated in the opposite direction through the intermeshed gears 28. Clutch 17, being disengaged at this time, will permit gear 27 to revolve freely relative to roll 10. With the rolls thus rotating, material will once again be fed to the shear.

As rack 32 moves away from limit switch 45, the contacts of this switch in circuit 66 will open thus de-energizing solenoid SRA and opening contacts SRA–1 in circuit 72 and contacts SRA–2 in shunt circuit 75 (see Figure 8). The opening of these contacts will have no effect upon operations since circuit 72 is already broken by open contacts LR–1, and circuit 74 through the back feed clutch is being completed by closed contacts LR–3.

It will be noted that the latch relay remains in its upper position (that position to which it was shifted by energization of solenoid LRA) despite the fact that solenoid LRA is no longer energized.

When piston 37 reaches the right-hand end of cylinder 34, projection 48 will simultaneously trip actuator 49*a* of limit switch 49 and thus close the contacts of this switch to complete circuit 67 and energize solenoid SRB of relay 63. Energization of solenoid SRB will close contacts SRB–1 in circuit 73 and contacts SRB–2 in circuit 77.

Closing of contacts SRB–2 will energize the forward feed clutch solenoid to engage clutch 17 and thus brake the rolls since clutch 18 is already engaged. Closing of contacts SRB–1 will complete circuits 71, 73 and energize solenoid TD of the time delay relay. After a short time delay, contacts TD–1 in circuit 80 will close to energize the shear solenoid. Upon energization of the shear solenoid, movable platen 56 of the shear will descend to shear the material and will then return to its uppermost position.

As platen 56 returns to its uppermost position after shearing the material, it will momentarily trip limit switch 58 and momentarily close the latter's contacts (see Figure 9). Closing of the contacts of limit switch 58 in circuit 68 will energize solenoid SRC to close contacts SRC–1 in circuit 69 and contacts SRC–2 in circuit 70. Circuit 69 will remain open since the contacts of limit switch 45 are open; however, circuit 70 will be completed through the closed contacts of limit switch 49 to thus energize solenoid LRB of latch relay LR.

Energization of solenoid LRB will shift the contacts of latch relay LR to close contacts LR–1, LR–4 and LR–6 and to open contacts LR–2, LR–3 and LR–5. The opening of contacts LR–2 in circuit 73 will de-energize solenoid TD which will open circuit 80 and de-energize the shear solenoid to permit the movable shear platen to stop when it reaches its uppermost position. Closing of contacts LR–1 in circuit 72 will not energize solenoid TD at this time since contacts SRA–1 in this circuit are open. Closing of contacts LR–4 in circuit 76 will have no effect on the forward feed clutch solenoid since it is already energized by closed contacts SRB–2 in shunt circuit 77.

Opening of contacts LR–3 in circuit 74 will de-energize the back feed clutch solenoid and opening of contacts LR–5 in circuit 78 will de-energize the cylinder back solenoid. Closing of contacts LR–6 in circuit 79 will energize the cylinder forward solenoid to thereupon once again shift piston 37 and rack 32 to the left to begin another feed cycle. When rack 32 has moved to the left sufficiently to disengage projection 48 from limit switch 49, the parts will once again be in the position shown in Figures 1, 5 and 6.

It will be clear that each time rack 32 has been shifted an amount determined by the stroke for which cylinder 34 has been set, a predetermined length of material will be fed to shear 55 through the pass provided by rolls 10, 11. In the event it is desired to change the length of material fed, it is only necessary to adjust the stroke of the cylinder, such adjustment automatically positioning limit switch 49 for proper operation.

In the present embodiment, it will also be clear that each time rack 32 is shifted by cylinder 34 (regardless of the direction of movement of the rack) material will be fed in but a single direction to the shear and that the termination of each feeding cycle will initiate and be followed by a shearing cycle whose termination will initiate and be followed by yet another feeding cycle.

In view of the foregoing it will be apparent to those skilled in the art that I have accomplished at least the principal object of my invention and it will also be apparent to those skilled in the art that the embodiment herein described may be variously changed and modified, without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described, hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. Material feeding apparatus comprising a rotatably mounted feed roll, a rack member reciprocable between spaced-apart positions and effecting a feeding cycle during movement from one of said positions to the other, a pair of gears interposed between said rack member and said feed roll for translating the reciprocating movement of the former to rotational movement of the latter, one of said gears effecting rotation of said feed roll in one direction upon movement of said rack member in one direction and said other gear effecting rotation of said feed roll in said one direction upon movement of said rack member in the opposite direction, and clutch means interposed between respective gears and said feed roll and during engagement each connecting said feed roll with a respective gear, both of said clutch means being simultaneously engaged to lock said feed roll against rotation in said one direction when said rack member is in either of said positions at the termination of a feeding cycle and one of said clutch means being disengaged at the commencement of a feeding cycle to unlock said feed roll and provide for movement of said rack member from one of said positions to said other position and the other of said clutch means being disengaged at the commencement of the next successive feeding cycle to unlock said feed roll and provide for movement of said rack member from said other position to said one position.

2. Material feeding apparatus comprising a pair of juxtaposed, rotatably mounted feed rolls providing a pass for the material to be fed, a rack member reciprocable between spaced-apart positions and effecting a feeding cycle during movement from one of said positions to the other, gear means interposed between said rack member and said feed rolls for translating the reciprocating movement of the former to rotational movement of the latter and comprising a first gear for effecting rotation of one of said feed rolls in one direction upon movement of said rack member in one direction and a second gear for effecting rotation of said other feed roll in the opposite direction upon movement of said rack member in the opposite direction, and clutch means interposed between each gear and its respective feed roll and each during engagement connecting such gear with such roll, both of said clutch means being simultaneously engaged to lock said feed rolls against rotation in respective said directions when said rack member is in either of said positions at the termination of a feeding cycle and one of said clutch means being disengaged at the commencement of a feeding cycle to unlock said feed rolls and provide for movement of said rack member from one of said positions to said other position and the other of said clutch means being disengaged at the commencement of the next successive feeding cycle to unlock said feed rolls and provide for movement of said rack member from said other position to said one position.

3. Material feeding apparatus comprising a pair of juxtaposed, rotatably mounted rolls providing a pass for the material to be fed, a rack member reciprocable between spaced-apart positions and effecting a feeding cycle during movement from one of said positions to the other, a fluid cylinder for reciprocating said rack member, gear means interposed between said rack member and said feed rolls for translating the reciprocating movement of the former to rotational movement of the latter and comprising a first gear for effecting rotation of one of said feed rolls in one direction upon movement of said rack member in one direction and a second gear for effecting rotation of said other feed roll in the opposite direction upon movement of said rack member in the opposite direction, clutch means interposed between each gear and

its respective feed roll and each during engagement connecting such gear with such roll, both of said clutch means being simultaneously engaged to lock said feed rolls against rotation in respective said directions when said rack member is in either of said positions at the termination of a feeding cycle and one of said clutch means being disengaged at the commencement of a feeding cycle to unlock said feed rolls and provide for movement of said rack member from one of said positions to said other position and the other of said clutch means being disengaged at the commencement of the next successive feeding cycle to unlock said rolls and provide for movement of said rack member from said other position to said one position, and means responsive to the position of said rack member for controlling engagement of said clutches and flow of fluid to said cylinder in accordance therewith.

4. Material feeding apparatus comprising a pair of juxtaposed feed rolls providing a pass for the material to be fed, a member reciprocable between predetermined positions, drive means interposed between said member and one of said rolls for effecting rotation thereof upon member movement from one of its said positions to the other, means responsive to the position of said member and locking said one roll against rotation upon disposition of said member in said other position, and means for releasing said locking means to provide for rotation of said one roll when said member is to be shifted from its said one position to its other.

5. Material feeding apparatus comprising a pair of juxtaposed feed rolls providing a pass for the material to be fed, a member reciprocable between predetermined positions, drive means interposed between said member and one of said rolls for effecting rotation thereof in one direction upon member movement in one direction from one of its said positions to the other and for effecting rotation of said one roll in the same direction upon movement of said member in the opposite direction from said other position to said one, means responsive to the position of said member and locking said one roll against rotation and said member against movement upon disposition of the latter in either of its said positions, and means for releasing said locking means to provide for rotation of said roll and movement of said member when the latter is to be shifted from either of its said positions to effect rotation of said one roll.

6. Material feeding apparatus comprising a pair of juxtaposed feed rolls providing a pass for the material to be fed, a member reciprocable between predetermined positions, drive means interposed between said member and one of said rolls for effecting rotation thereof in one direction upon member movement in one direction from one of its said positions to the other and for effecting rotation of said one roll in the same direction upon movement of said member in the opposite direction from its said other position to said one, and a pair of clutches forming a part of said drive means and simultaneously

engaged to lock said roll against rotation and said member against movement upon disposition of the latter in either of its said positions, one of said clutches disengaging and the other remaining engaged when said member is to be shifted from one of its said positions to the other to provide for member movement in one direction and consequent rotation of said one roll and the other of said clutches disengaging and said one remaining engaged when said member is to be shifted from the other of its said positions to said one to provide for member movement in the opposite direction and consequent rotation of said one roll.

7. Material feeding apparatus comprising a pair of juxtaposed feed rolls providing a pass for the material to be fed, a member reciprocable between predetermined positions, drive means interposed between said member and one of said rolls for effecting rotation thereof in one direction upon member movement in one direction from one of its said positions to the other and for effecting rotation of said one roll in the same direction upon movement of said member in the opposite direction from said other position to said one, a pair of clutches forming a part of said drive means to effect engagement and disengagement of said member with said one roll, and means responsive to the position of said member and simultaneously engaging said clutches to lock said one roll against rotation and said member against movement upon disposition of the latter in either of its said positions, said means disengaging one of said clutches and retaining the other engaged when said member is to be shifted from one of its said positions to the other to provide for member movement in one direction and consequent rotation of said one roll and said means disengaging the other of said clutches and retaining said one engaged when said member is to be shifted from the other of its said positions to said one to provide for member movement in the opposite direction and consequent rotation of said one roll.

8. The construction of claim 7 wherein said member comprises a reciprocable rack, wherein said drive means comprises a pair of gears, wherein said clutches are fluid pressure actuated, and wherein said means comprises valve means for controlling flow of fluid to respective said clutches.

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