Jan. 6, 1953 F. KOCH 2,624,575

SLIDE FEED

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Fig. 6.

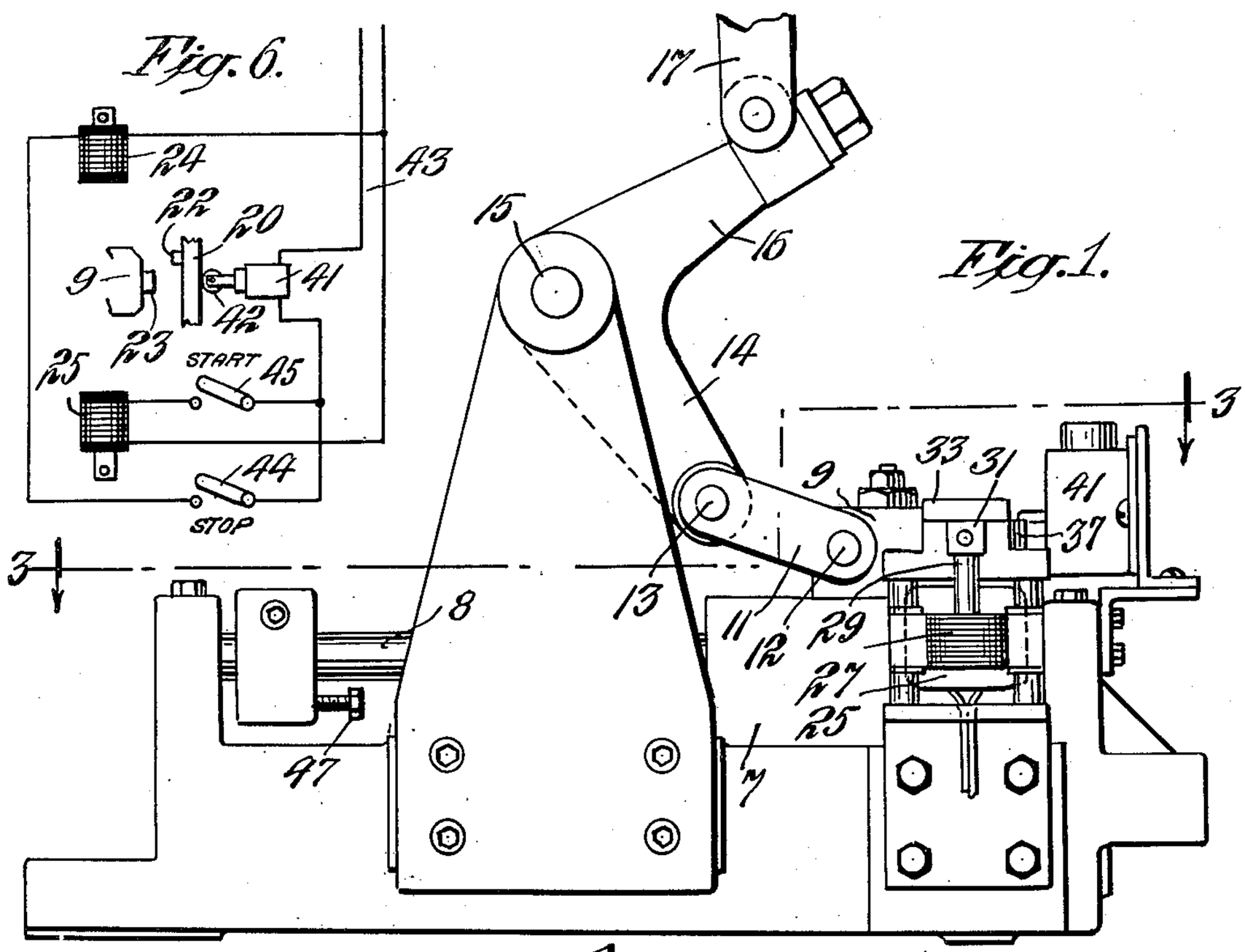

Fig. 1.

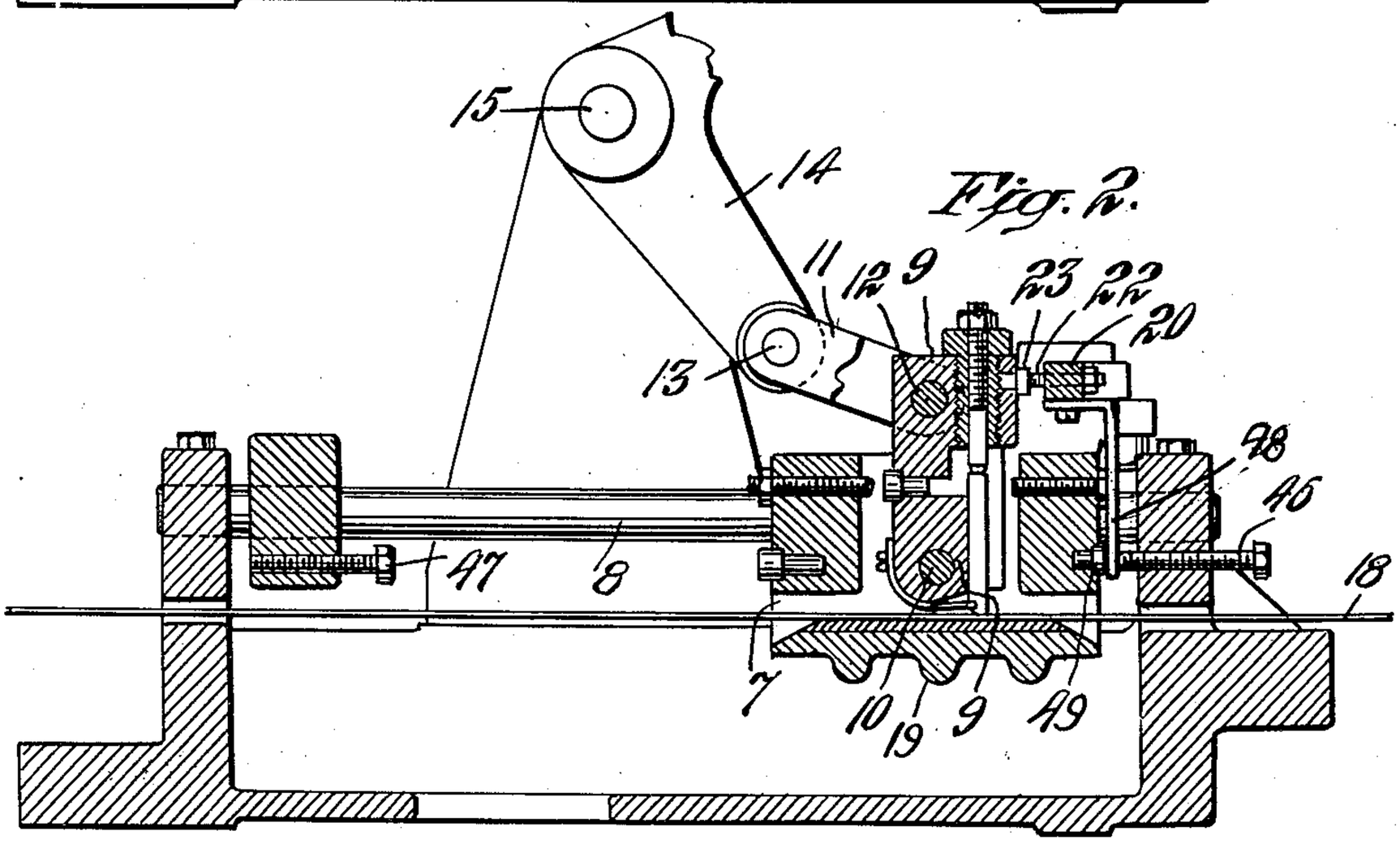

Fig. 2.

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Fig. 3.

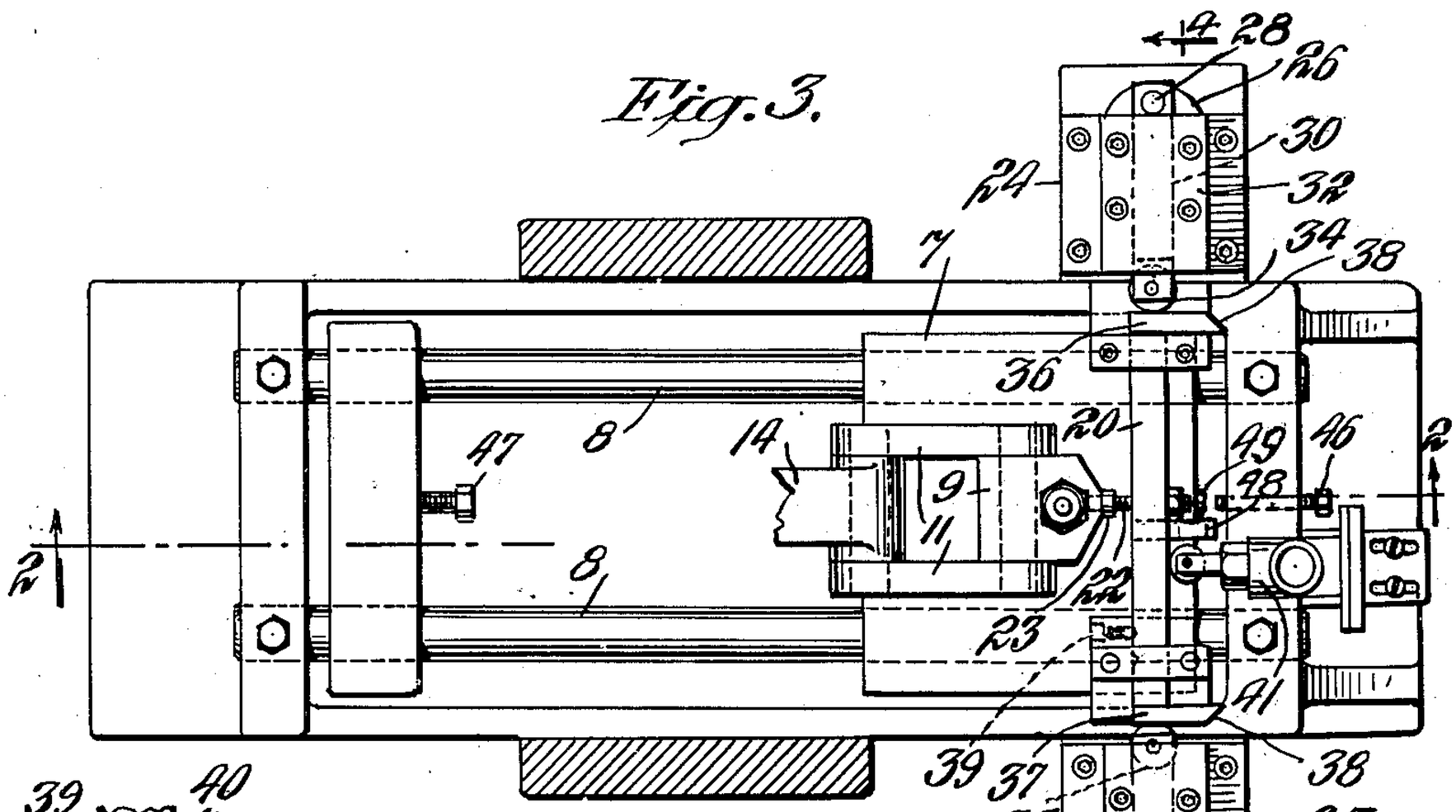

Fig. 5.

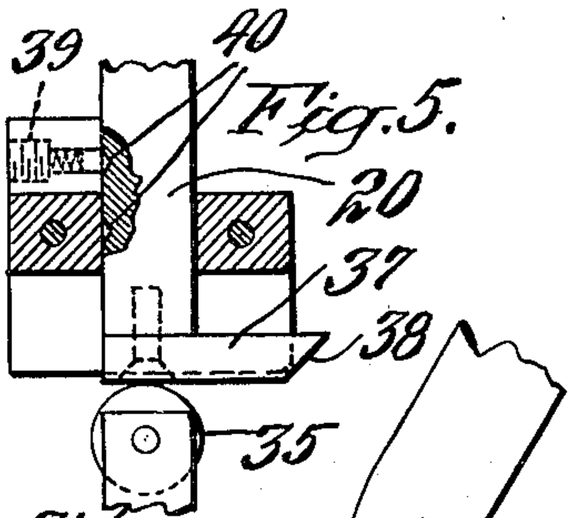

Fig. 4.

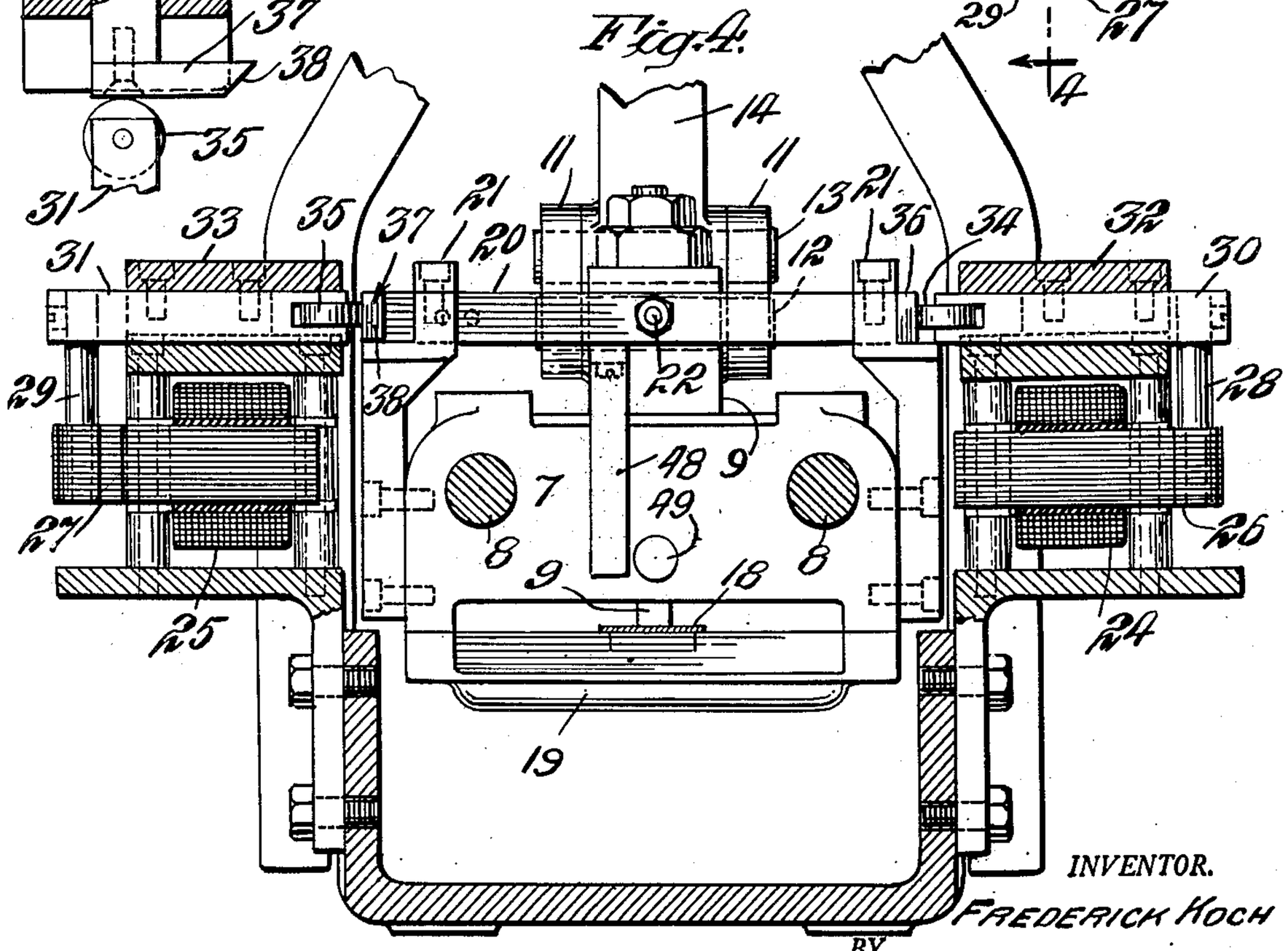

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Fig. 7.

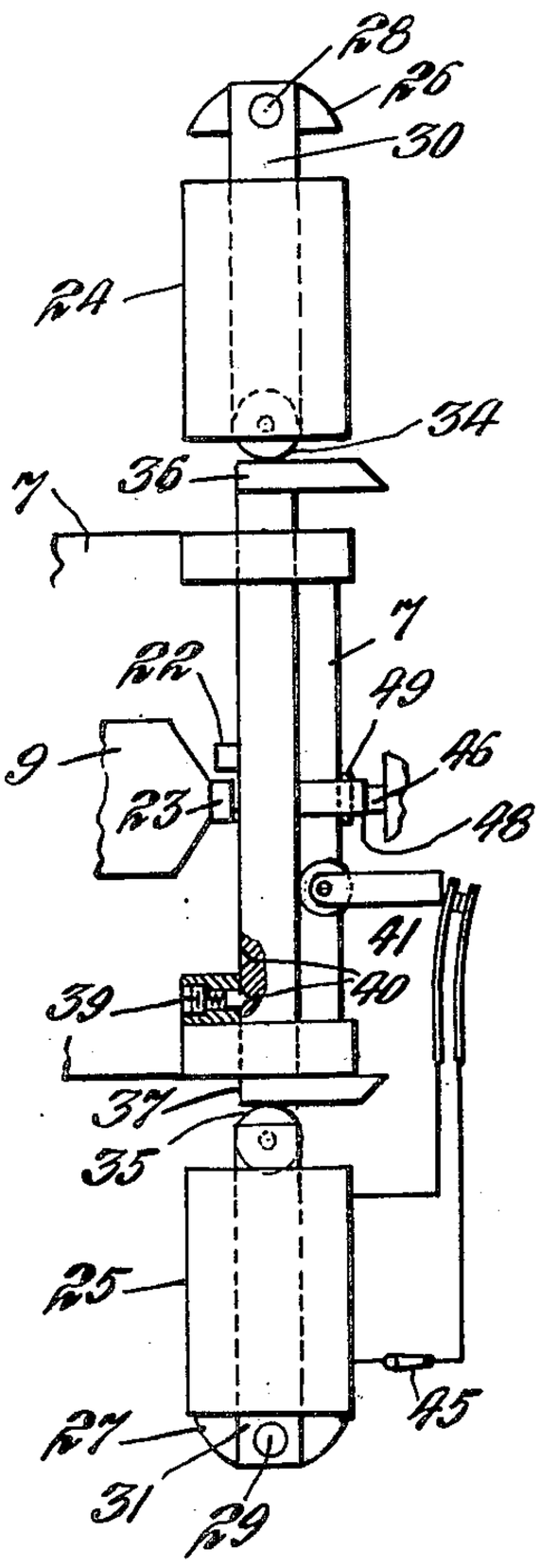
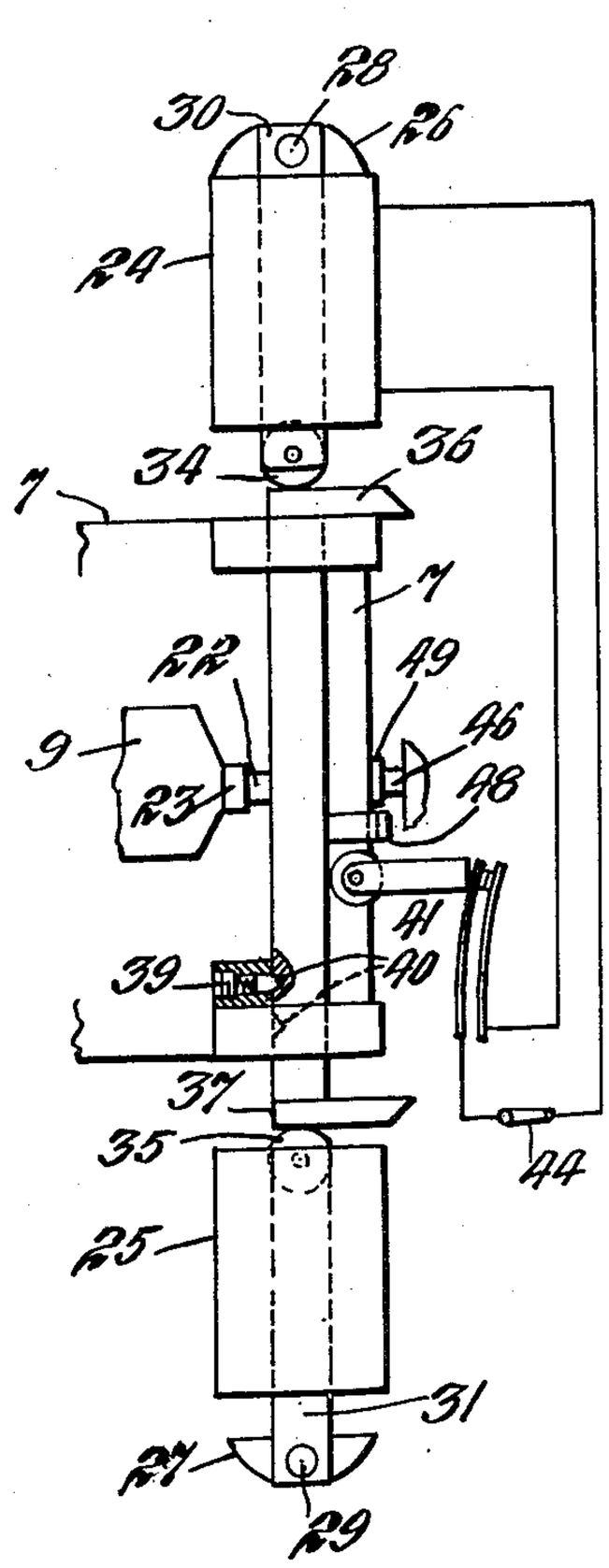


Fig. 8.



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Patented Jan. 6, 1953

2,624,575

UNITED STATES PATENT OFFICE

2,624,575

SLIDE FEED

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Application August 2, 1951, Serial No. 239,880

10 Claims. (Cl. 271—2.5)

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The invention disclosed in this patent relates to the slide feeds used for advancing stock to power presses and other such machines.

At times it may be desirable to keep such a slide feed in action without actually advancing the stock.

It is a prime purpose of the present invention to provide simple, practical and reliable means for controlling the stock advancing operation without interrupting the reciprocating movement of such a feeding device.

This is accomplished in the present invention through the provision of means, operable under push-button control or the like, for limiting the throw of the stock gripping lever which is mounted in the reciprocating feed block.

It is important that the feed of stock be not stopped at some intermediate point which would leave the machine with a short piece of stock to work upon.

Accordingly, it is another important object and feature of the invention to insure and to provide means that will enforce a complete feed stroke of the slide before it will stop the feeding action.

The same in starting the feeding action, it is requisite that when started again the slide make a full back stroke to grip and feed a full length of stock. The invention provides also for this.

Other important objects of the invention are to provide feed control for slide feeds which will be relatively inexpensive, considering advantages gained, and which may be readily applied to existing machines.

Other desirable objects attained by the invention are set forth or will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate a present commercial embodiment of the invention. Structure, however, may be modified and changed as regards the immediate illustration, all within the true intent and broad scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawings is a broken front elevation of a slide feed having the present invention incorporated therein;

Fig. 2 is a broken vertical sectional view of the same, the sectioned portions appearing as on substantially the plane of line 2—2 of Fig. 3;

Fig. 3 is a horizontal section and plan view as taken on substantially the plane of line 3—3 of Fig. 1;

Fig. 4 is a broken vertical cross sectional view as on substantially the plane of line 4—4 of Fig. 3;

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Fig. 5 is an enlarged broken sectional detail showing the detent for holding the sliding cross bar in the positions to which it is shifted by the actuating magnets;

Fig. 6 is a wiring diagram;

Fig. 7 is a diagrammatic view illustrating relation of parts during feeding of stock, and Fig. 8 is a similar view showing relation of the parts in the non-feeding action.

The slide feed illustrated comprises a feed block or slide block 7 operating on guide rods 8 and having a stock gripping lever 9 pivoted thereon at 10 and actuated by link 11 pivoted to the lever 9, at 12 and pivotally connected at 13 with the lower arm 14 of a bell crank pivotally supported at 15 and having its other arm 16 pivotally connected with a rod 17 usually operated from a crank or eccentric on the cam shaft of the power press or other machine with which the feed slide is used.

As shown in Fig. 2, the rocking movement imparted to the grip lever 9 by oscillation of the bell crank will ordinarily cause the lower end of this lever to alternately grip and release the stock 18 in relation to the bottom plate 19 of the feed block.

By controlling the extent of this rocking movement the grip lever may be made either to grip the stock or not to grip the stock, and this without interfering with the reciprocating movement imparted to the slide block.

To effect this control a cross bar 20 is slidingly mounted in guides 21 on top of the feed block 7, and this bar carries a stop screw 22 located either to engage or not to be engaged by a stop pin 23 on the upper end of the rocking grip lever, according to how the bar is positioned laterally of the feed block.

In Fig. 3 the bar 20 is shown shifted downwardly in that view to position stop screw 22 in direct line with the stop pin 23 on lever 9, thus to prevent a full stock gripping movement of the lever.

In the wiring diagram, Fig. 6, bar 20 is indicated shifted upwardly to carry the stop 22 out of line with the companion stop 23, thus to permit the lever 9 to make a full stock gripping stroke.

Means for shifting the trip bar 20 in opposite directions is shown in the illustration in the form of electromagnets 24, 25, at opposite sides of the machine and near the forward end of the feed block movement and having armatures 26, 27, connected by studs 28, 29, with transverse slides 30, 31, operating in guides 32, 33, and carrying at their inner ends rolls 34, 35, for engagement by

shoes **36**, **37**, on the ends of the trip or cross bar **20**.

Wedge inclines **38** on the forward ends of these shoes facilitate free, smooth entry of the shoes between the armature rolls **34**, **35**.

The trip bar **20** is yieldingly retained in either of the two positions described, by a spring pressed detent indicated at **39**, Fig. 3, engageable with appropriately located seats **40** in the side of the bar.

To assure completion of the feed stroke on which the feed block may be started, a switch **41** is located at the forward end of the feed block movement, having a roll **42** to be engaged by the trip bar at the end of the full forward feed stroke.

This limit switch **41**, as shown in Fig. 6, is connected in on the supply circuit **43** for the two magnets **24**, **25**, and is arranged when engaged by the bar **20**, to close and arm the supply circuit for the two magnets so that either of said magnets may then be energized upon operation of the stop and start switches **44**, **45**.

These switches for stopping and starting the feed action may be of the push-button type and be located in any convenient position on the machine, preferably at some point to be within easy reach while observing the feeding action or the operation of the press or other machine which is being supplied with stock by the slide feed.

As usual in feeds of this character, front and back stops **46**, **47**, may be provided for the slide block **7**.

The tripping or stopping of the stock grip lever **9**, by reason of limiting the forward rocking action of this lever, results in a slight additional forward movement of the slide block. To prevent this block from then striking the forward stop screw **46** with additional force, which would result in producing a "hammer" in the machine, it is contemplated that when the feed is tripped the effect of the front stop will be removed or reduced. This is accomplished in the illustration by interposing a stop piece **48** carried by the trip bar **20**, in front of the stop button **49** on the front of the slide bar **20** and which will be shifted to one side, clear of the front stop screw **46** when the feed action is stopped.

The trip bar **20** thus, through the connections indicated, may be caused to remove or, in effect, back off the front stop to prevent shock from overstroke of the slide block occasioned by shortening the stock gripping stroke of the grip lever **9**.

The entire control mechanism, as shown in the drawings, is readily applicable to existing slide feeds at relatively slight additional expense and is all located at a low point in the machine where it is out of the way of all usual operations.

With the invention applied a slide feed may be continued in reciprocating movement without affecting feed of the stock and be thrown into or out of feeding operation at any time and without shortening or otherwise interfering with the last feed stroke on which the machine may be operating. The limit switch **41** prevents any change from feeding or non-feeding action to be made until after the slide block has completed its full forward feeding stroke. Consequently the slide feed will complete any feed stroke on which it may be started irrespective of the position of parts when the stop button is operated and conversely, it will not start feeding again until it has completed a full forward stroke and then gone back all the way to begin the next feed stroke.

Fig. 7 shows relation of the parts during normal feeding operations. The bar **20** is held by detent **39** in the upper position in this view, with the stop screw **22** thereon out of register with the stop pin **23** on the grip lever, so that this lever can complete its full forward swing to grip the stock in each forward stroke of the slide block **7**.

In these feeding operations the stop piece **48** on the cross bar **20** is located over stop button **49** on the slide block in line with the stationary stop screw, to determine the full forward feed stroke of the slide block.

If during these running conditions the start button **45** is pressed no harm will result, as the start magnet **25** will simply be energized at completion of the forward feeding stroke through closing of the limit switch **41** by the cross bar **20**. This bar, though, is already in the shifted position shown in Fig. 7, so no change takes place.

To stop the feeding action the stop switch **44** is closed, as indicated in Fig. 8, and then on completion of a full forward feed stroke limit switch **41** will be closed to energize the stop magnet **24**.

Referring back to Fig. 7, it will be noted that under running conditions the stop screw **22** on cross bar **20** is disposed to one side of stop pin **23** on the grip lever, so that said pin will block transverse movement of stop screw **22** and cross bar **20**. However, as grip lever **9** reverses movement at the end of the feed stroke, the pin **23** is pulled back out of the transverse path of screw **22** and this enables the stop magnet **24** which because of continued closure of limit switch **41** during this slight interval of reversal of movement, has remained energized, to shift the cross bar over as shown in Fig. 8, to locate the stop screw **22** in line with stop pin **23**, so that on completion of the back stroke and start of the feed stroke the grip lever **9** will be stopped in its swinging motion before making gripping engagement with the stock, as in Fig. 3, and the intermediate stop element **48** will be shifted out of line with the stop **49** on the slide and the stationary stop **46**, as in Fig. 8, to permit the slide block to have a slightly lengthened forward stroke sufficient to avoid hammer or injury to the parts.

In the tripped relation shown in Fig. 8, the feed may be started at any time by simply closing the starting switch **45** to energize starting magnet **25** and restore the parts to the relation shown in Fig. 7, the actual feeding action being resumed only after completion of a full forward stroke, as in Fig. 8, followed by a full return stroke.

Thus the construction disclosed assures that the feed slide will complete a full feed stroke before stopping the feeding action and will return to a full back stroke before resuming feeding operation.

The invention makes it possible to stop or start feeding action by simply pressing the appropriate switch **44** or **45** and holding it closed for the slight time required for the feed slide to complete the cycle of operation in which it was engaged at the time that particular switch button was pressed.

What is claimed is:

1. Feed control for slide feeds comprising in combination with a reciprocating slide block, a stock gripping lever pivoted on said block to grip the stock to be fed and arranged to impart the reciprocating movement to the block, means for oscillating said lever to reciprocate said block and to rock said lever into and out of gripping engagement with the stock to be fed, a trip bar mounted to slide transversely on said reciprocating slide block and shiftable into and out of position to limit rocking movement of the stock gripping lever to a point where the lever will not grip the

stock, magnets at opposite sides of the path of movement of the slide block and armatures operable by said magnets to shift said trip bar in opposite directions.

2. Feed control for slide feeds comprising in combination with a reciprocating slide block, a stock gripping lever pivoted on said block to grip the stock to be fed and arranged to impart the reciprocating movement to the block, means for oscillating said lever to reciprocate said block and to rock said lever into and out of gripping engagement with the stock to be fed, a trip bar mounted to slide transversely on said reciprocating slide block and shiftable into and out of position to limit rocking movement of the stock gripping lever to a point where the lever will not grip the stock, magnets at opposite sides of the path of movement of the slide block and armatures operable by said magnets to shift said trip bar in opposite directions, switches and circuit connections for selectively energizing the respective magnets and a limit switch operable at the end of the forward feeding stroke of the slide block to effect arming of said magnet energizing circuit connections.

3. Feed control for slide feeds comprising in combination with a reciprocating slide block, a stock gripping lever pivoted on said block to grip the stock to be fed and arranged to impart the reciprocating movement to the block, means for oscillating said lever to reciprocate said block and to rock said lever into and out of gripping engagement with the stock to be fed, a trip bar mounted to slide transversely on said reciprocating slide block and shiftable into and out of position to limit rocking movement of the stock gripping lever to a point where the lever will not grip the stock, magnets at opposite sides of the path of movement of the slide block and armatures operable by said magnets to shift said trip bar in opposite directions, a limit switch positioned for actuation by said slide block at the end of its travel in one direction and individual control switches for said magnets connected in circuit with said limit switch.

4. Feed control for slide feeds comprising in combination with a reciprocating slide block, a stock gripping lever pivoted on said block to grip the stock to be fed and arranged to impart the reciprocating movement to the block, means for oscillating said lever to reciprocate said block and to rock said lever into and out of gripping engagement with the stock to be fed, a trip bar mounted to slide transversely on said reciprocating slide block and shiftable into and out of position to limit rocking movement of the stock gripping lever to a point where the lever will not grip the stock, magnets at opposite sides of the path of movement of the slide block and armatures operable by said magnets to shift said trip bar in opposite directions, and detent means on the feed block for releasably retaining said trip bar in either of the feeding or non-feeding positions.

5. Feed control for a slide feed comprising a longitudinally reciprocating slide block, a trip bar mounted in transversely slidable relation on said slide block, transverse guideways in fixed relation at opposite sides of the path of movement of the slide block, transverse slides operable in said guideways, electromagnetic means for shifting said transverse slides into position to effect reverse shifting movements of said transversely slidable trip bar, a stock gripping member movably mounted on said slide block, means for imparting reciprocating movement to said slide

block and stock gripping and releasing movements to said movable stock gripping member and means operated by said transversely slidable trip bar for controlling the stock gripping movements of said stock gripping member.

6. Feed control for a slide feed comprising a longitudinally reciprocating slide block, a trip bar mounted in transversely slidable relation on said slide block, transverse guideways in fixed relation at opposite sides of the path of movement of the slide block, transverse slides operable in said guideways, electromagnetic means for shifting said transverse slides into position to effect reverse shifting movements of said transversely slidable trip bar, a stock gripping member movably mounted on said slide block, means for imparting reciprocating movement to said slide block and stock gripping and releasing movements to said movable stock gripping member and means operated by said transversely slidable trip bar for controlling the stock gripping movements of said stock gripping member, said slides having abutment rolls on the inner ends of the same and the trip bar having shoes on opposite ends of the same with inclines for engagement with said rolls in the longitudinal reciprocating movement of the slide block.

7. Feed control for a slide feed comprising a longitudinally reciprocating slide block, a trip bar mounted in transversely slidable relation on said slide block, transverse guideways in fixed relation at opposite sides of the path of movement of the slide block, transverse slides operable in said guideways, electromagnetic means for shifting said transverse slides into position to effect reverse shifting movements of said transversely slidable trip bar, a stock gripping member movably mounted on said slide block, means for imparting reciprocating movement to said slide block and stock gripping and releasing movements to said movable stock gripping member and means operated by said transversely slidable trip bar for controlling the stock gripping movements of said stock gripping member, adjustable stop means for limiting the longitudinal movement of the slide block and means operable by said trip bar for automatically adjusting said stop means each time the trip bar is operated.

8. Feed control for a slide feed comprising a longitudinally reciprocating slide block, a trip bar mounted in transversely slidable relation on said slide block, transverse guideways in fixed relation at opposite sides of the path of movement of the slide block, transverse slides operable in said guideways, electromagnetic means for shifting said transverse slides into position to effect reverse shifting movements of said transversely slidable trip bar, a stock gripping member movably mounted on said slide block, means for imparting reciprocating movement to said slide block and stock gripping and releasing movements to said movable stock gripping member and means operated by said transversely slidable trip bar for controlling the stock gripping movements of said stock gripping member, said electromagnetic means including electromagnets located below said guideways and armatures in line with said electromagnets and having operating connections extended upwardly to said slides.

9. Feed control for a slide feed comprising a longitudinally reciprocating slide block, a trip bar mounted in transversely slidable relation on said slide block, transverse guideways in fixed relation at opposite sides of the path of movement of the slide block, transverse slides oper-

able in said guideways, electromagnetic means for shifting said transverse slides into position to effect reverse shifting movements of said transversely slidable trip bar, a stock gripping member movably mounted on said slide block, means for imparting reciprocating movement to said slide block and stock gripping and releasing movements to said movable stock gripping member and means operated by said transversely slidable trip bar for controlling the stock gripping movements of said stock gripping member, said electromagnetic means including electromagnets located below said guideways and armatures in line with said electromagnets and having operating connections extended upwardly to said slides and control circuits for said electromagnets including a limit switch positioned for actuation by said slide block at the end of its reciprocating movement in one direction.

10. Feed control for a slide feed comprising a longitudinally reciprocating slide block, a trip bar mounted in transversely slidable relation on said slide block, transverse guideways in fixed relation at opposite sides of the path of movement of the slide block, transverse slides operable in said guideways, electromagnetic means for shifting said transverse slides into position to effect reverse shifting movements of said transversely slidable trip bar, a stock gripping member movably mounted on said slide block, means for imparting reciprocating movement to said slide block and stock gripping and releasing movements to said movable stock gripping member and means operated by said transversely slidable trip bar for controlling the stock gripping movements of said stock gripping member and control circuits for said electromagnetic means including a limit switch positioned for operation by said slide block at the end of its travel in one direction.

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