Oct. 14, 1958 G. J. WEYMOUTH 2,856,186

OPEN THROAT AIR-OPERATED SLIDE FEED FOR POWER PRESSES AND SPECIAL MACHINES

Filed April 7, 1955 5 Sheets-Sheet 1

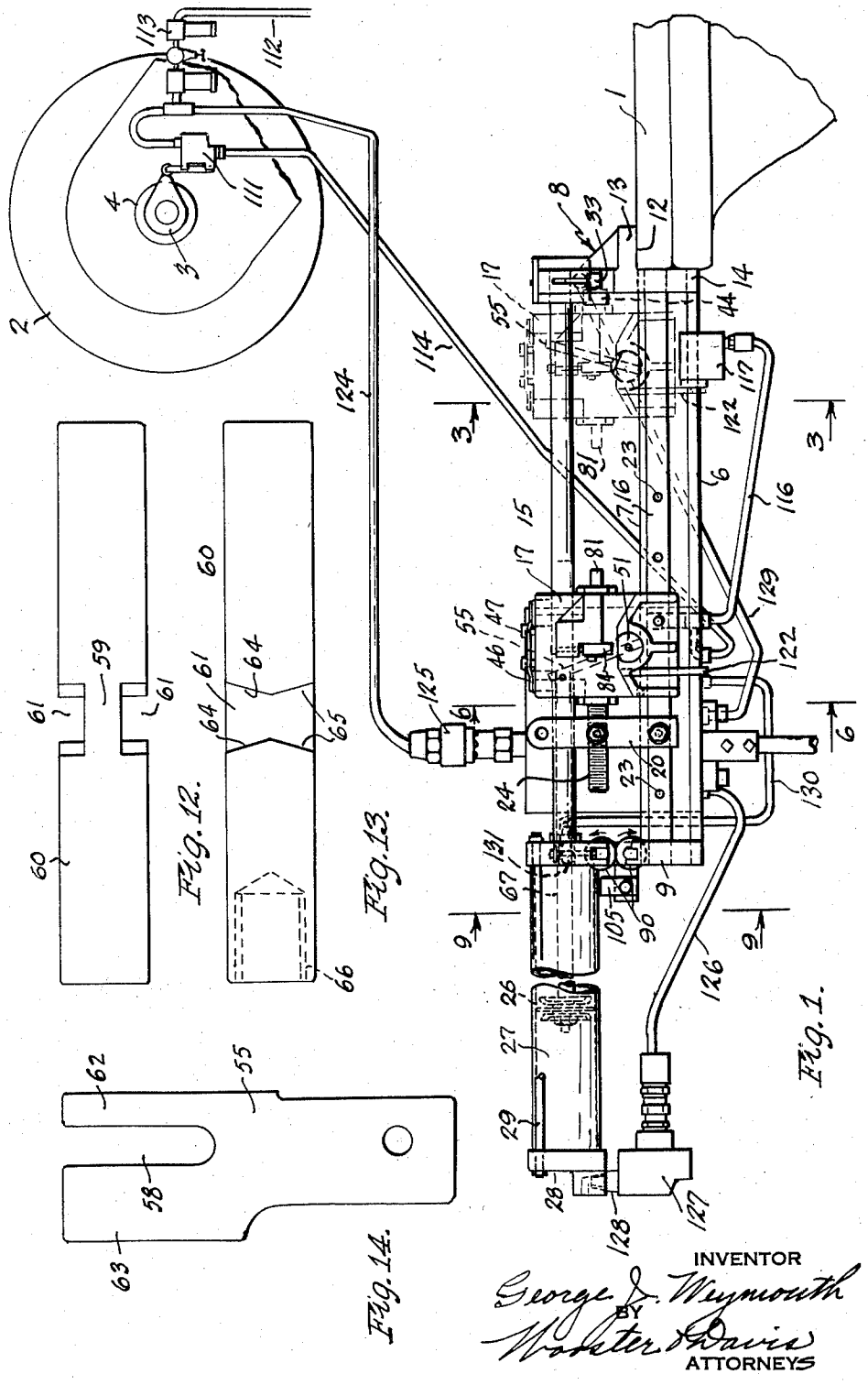


Fig. 1.

Fig. 12.

Fig. 13.

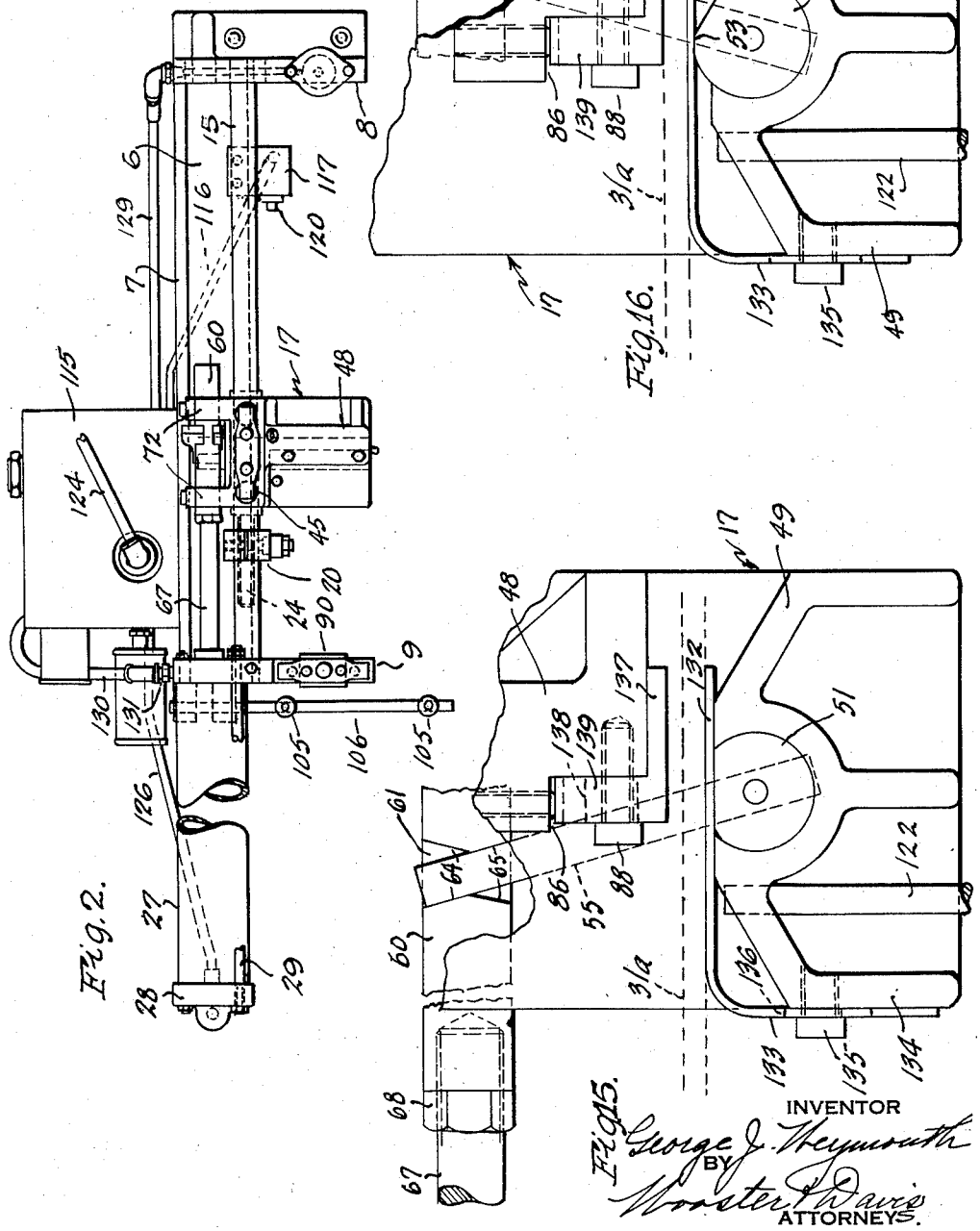
Fig. 14.

INVENTOR
George J. Weymouth
BY
Webster & Davis
ATTORNEYS

Oct. 14, 1958 G. J. WEYMOUTH 2,856,186

OPEN THROAT AIR-OPERATED SLIDE FEED FOR POWER PRESSES AND SPECIAL MACHINES

Filed April 7, 1955 5 Sheets-Sheet 2



INVENTOR
George J. Weymouth
BY
Worster & Davis
ATTORNEYS.

Oct. 14, 1958 G. J. WEYMOUTH 2,856,186

OPEN THROAT AIR-OPERATED SLIDE FEED FOR POWER PRESSES AND SPECIAL MACHINES

Filed April 7, 1955 5 Sheets-Sheet 3

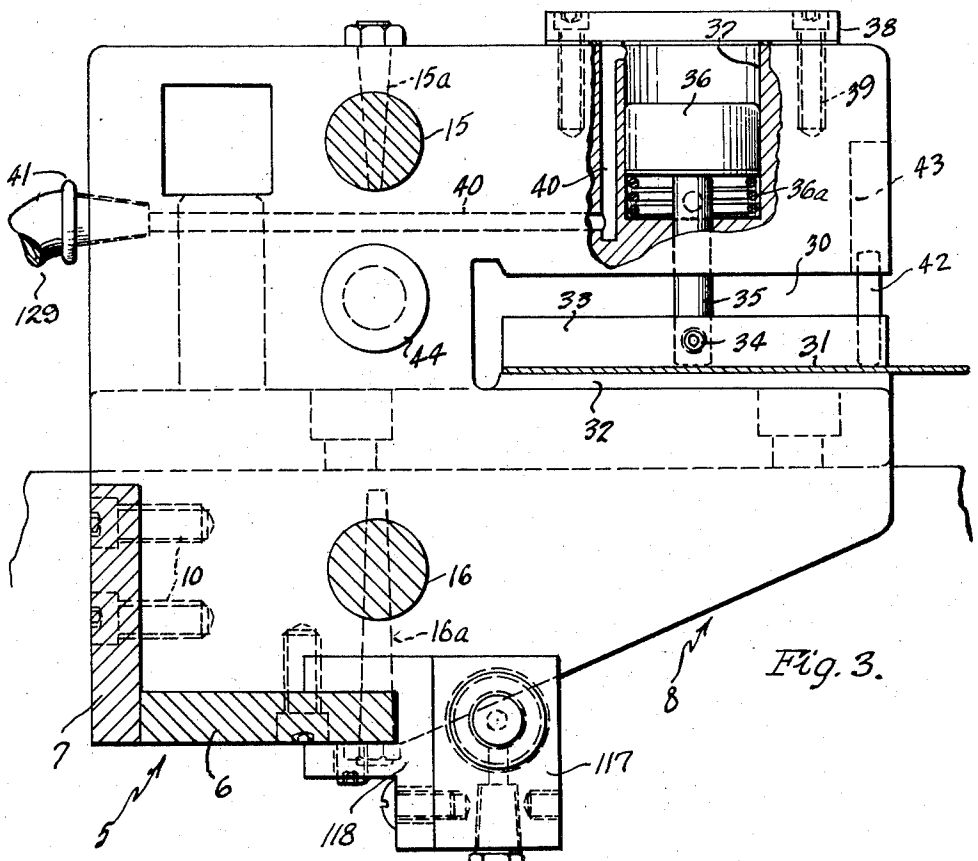


Fig. 3.

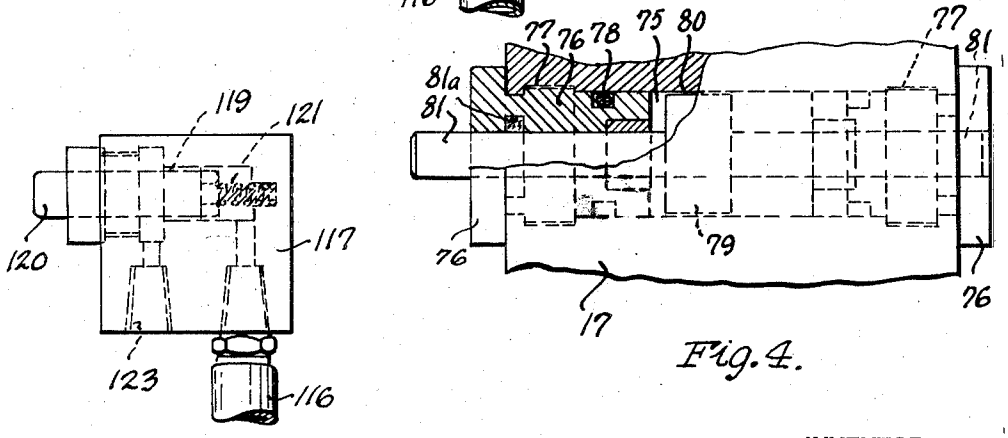


Fig. 4.

Fig. 5.

INVENTOR
George J. Weymouth
BY
Webster & Davis
ATTORNEYS

Oct. 14, 1958 G. J. WEYMOUTH 2,856,186

OPEN THROAT AIR-OPERATED SLIDE FEED FOR POWER PRESSES AND SPECIAL MACHINES

Filed April 7, 1955 5 Sheets-Sheet 4

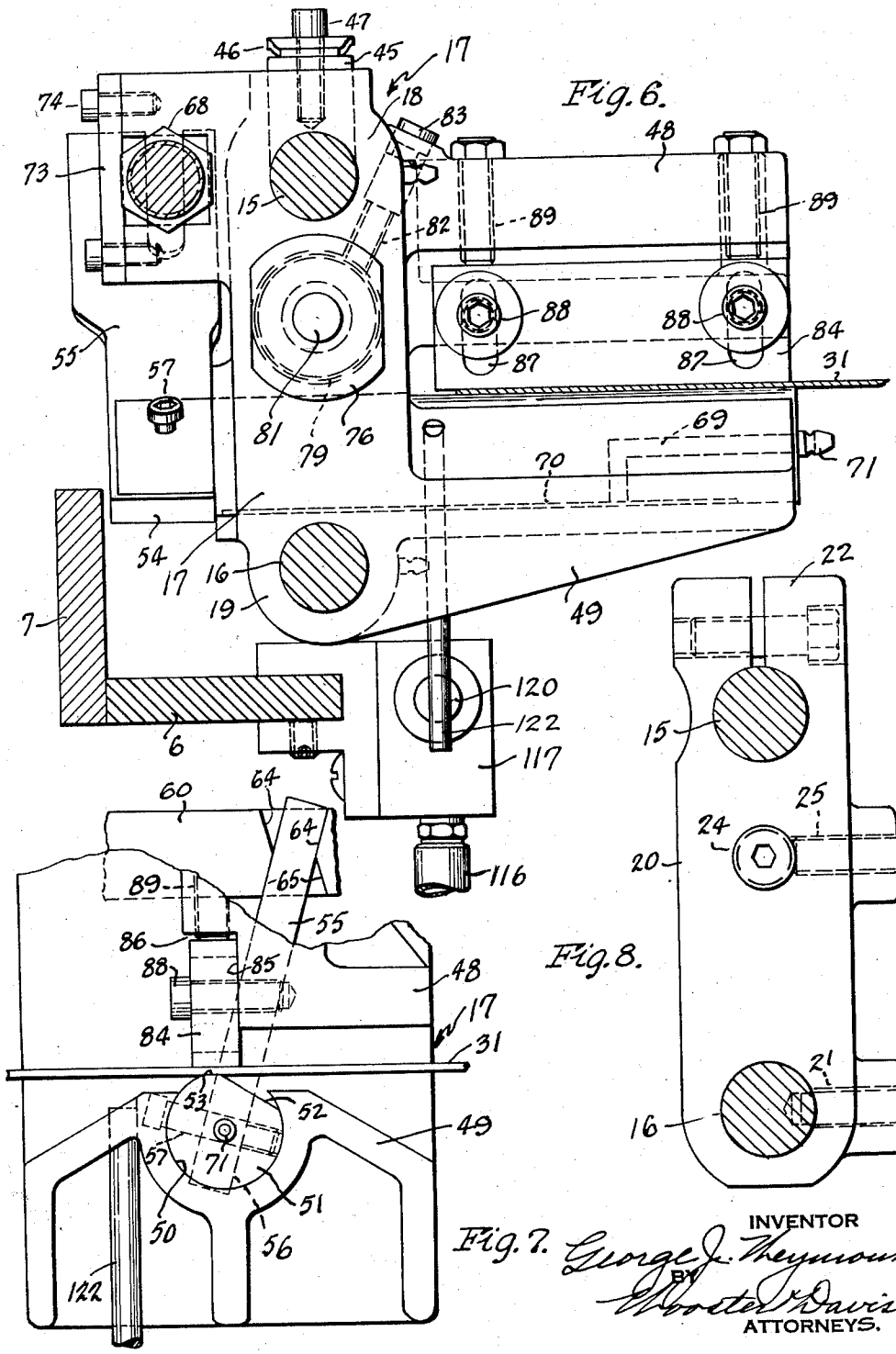


Fig. 6.

Fig. 8.

Fig. 7.

INVENTOR
George J. Weymouth
BY
Worcester & Davis
ATTORNEYS.

Oct. 14, 1958 G. J. WEYMOUTH 2,856,186

OPEN THROAT AIR-OPERATED SLIDE FEED FOR POWER PRESSES AND SPECIAL MACHINES

Filed April 7, 1955 5 Sheets-Sheet 5

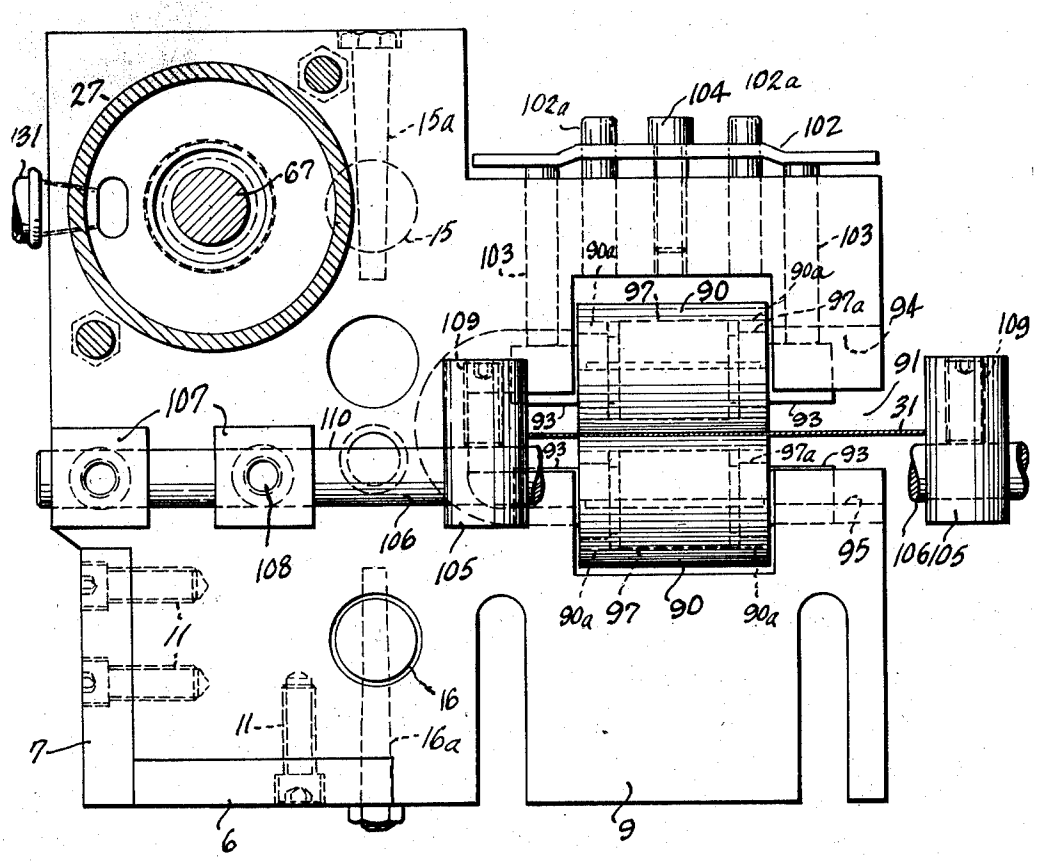


Fig. 9.

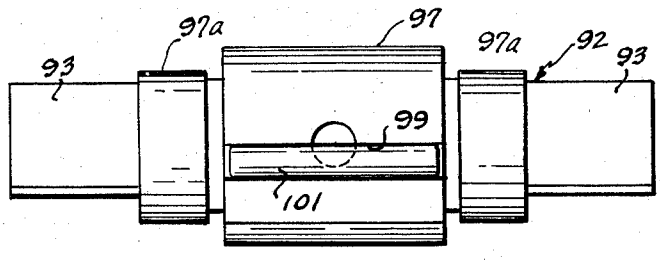


Fig. 10.

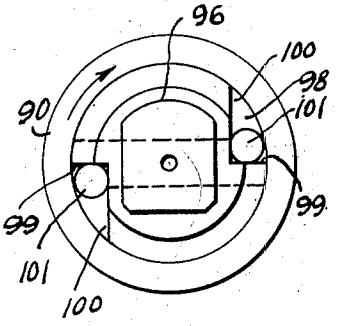


Fig. 11.

INVENTOR
George J. Weymouth
BY
Wooster & Davis
ATTORNEYS.

United States Patent Office 2,856,186 Patented Oct. 14, 1958

2,856,186

OPEN THROAT AIR-OPERATED SLIDE FEED FOR POWER PRESSES AND SPECIAL MACHINES

George J. Weymouth, Fairfield, Conn., assignor to Cooper Weymouth, Incorporated, Bridgeport, Conn., a corporation of Connecticut

Application April 7, 1955, Serial No. 499,938

14 Claims. (Cl. 271—2.5)

This invention relates to a stock feeding device for power presses and the like particularly to an open throat air-operated slide feed for power presses and special machines, and has for an object to provide a device of this character which is of simple construction and has a novel and effective gripping means for positively gripping stock and feeding it forwardly accurately and with minimum chance of slippage; that is, it will positively and accurately feed the stock to the press or other machine and may be easily or quickly adjusted or regulated to feed the proper amount of stock on each operation.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawings forming a part of this specification. It is, however, to be understood the invention is not limited to the specific details of construction and arrangement shown, but may embody various changes and modifications within the scope of the invention.

In these drawings:

Fig. 1 is a side elevation of the device;

Fig. 2 is a top plan view;

Fig. 3 is a transverse section substantially on line 3—3 of Fig. 1 showing the front base casting in elevation and with parts broken away to more clearly show the construction;

Fig. 4 is a partial side view and partial section of a portion of the feed block showing the hydraulic cushion or check;

Fig. 5 is a side view of the poppet valve control;

Fig. 6 is a transverse section substantially on line 6—6 of Fig. 1 showing an elevation of the feed block;

Fig. 7 is a front view of a portion of this block showing the operation of the gripper for the stock being fed;

Fig. 8 is a rear view of the rear or back stop;

Fig. 9 is a transverse section substantially on line 9—9 of Fig. 1 showing the rear base casting in elevation, together with the stock guides and check rolls;

Fig. 10 is an elevation of the clutch for one of the rolls;

Fig. 11 is an end view looking from the right of Fig. 10 but showing a roll in position;

Fig. 12 is a plan view of the grip regulator;

Fig. 13 is a side view thereof;

Fig. 14 is a side view of the gripper rocker lever;

Fig. 15 is a front view of a portion of the feed block showing a modified gripper arrangement, and showing the gripper in released position, and

Fig. 16 is a similar view showing the gripper in gripping position.

This feeding device may be assembled as a unit and attached as such to the press or other machines with which it is to be used for feeding the stock, such, for example, as flat metal strips, wire, rod or other stock, to the press or machine, and in the drawing it is shown as applied to the bolster plate or table **1** of a power press the remainder of which is not shown except for the flywheel **2** and the control cam **3** on the crank shaft **4** of the press. It will be understood that in this position

this feed will advance the stock such, for example, as one or more flat strips of metal, to the dies of the press, the stock being advanced step by step and at the proper amount for each feeding operation for each stroke of the press.

The device comprises a base section **5** comprising two flat bars **6** and **7**, the lower bar **6** being horizontal, and the other bar **7** being upright forming in effect an angle bar section, and these bars are secured at their opposite ends to the longitudinally spaced front base casting **8** and the rear base casting **9** respectively, by any suitable means such, for example, as the machine screws **10** and **11**. The front base casting **8**, as shown in Fig. 1, is recessed at **12** providing a horizontal flange portion **13** to rest on a table **1** and an upright portion **14** positioned against the edge of this table. The front and rear base castings are connected by upper and lower guide rods **15** and **16**, respectively, on which is mounted to slide the feed block **17** which extends between these two rods and is therefore held in the proper upright position by these rods, and this block can slide back and forth on the rods during the feeding operations by the respective bearings **18** and **19** for these rods (Fig. 6). These rods are supported and secured at their opposite ends in the front and rear base castings **8** and **9**. Their ends extend into openings in these members and are secured by pins **15***a* and **16***a*. Also mounted on and extending between these guide rods is the rear or back stop **20** adjustable along the rods to different positions but secured in different adjusted positions by the set screw **21** and the split clamp **22**. The screw **21** may be seated in longitudinally spaced sockets **23** in the lower bar **16** and then the upper end clamped to the upper bar by the split end **22**. This stop member carries an adjustable stop screw **24** which may be secured in adjusted positions by the screw **25**. The feed block is reciprocated back and forth on the guide rods **15** and **16** for the feeding operation by a piston **26** in an air cylinder **27** mounted at its forward end in the rear base casting **9** and at its rear end in a cylinder cap **28** connected to the rear base casting by the tie rods **29**.

The front base casting **8** is provided with a transverse notch or opening **30** therethrough through which the stock passes to the press or other machine. A flat strip of metal is shown at **31**, the lower wall or notch of this recess being a lower jaw **32**, and above this is a vertically reciprocable stop clamp **33** comprising in this case a rectangular bar connected at **34** to the rod **35** of a piston **36** mounted to reciprocate in a cylinder **37** in the upper part of the casting **8**, the upper end of this cylinder being closed by a cap **38** secured by suitable screws **39**, and in the walls of this casting **8** is a passage **40** leading to the upper end of this cylinder above the piston from a suitable hose connection **41** in the upright rear edge of the casting. A guide pin **42** carried by the clamp **33** runs in a channel **43** in the front edge of the casting **8** to prevent turning of this clamp **33**. This casting also carries a front positive stop **44** for a purpose presently to be described. A spring **36***a* normally retains the piston **36** and clamp **33** in the released upper position.

The feed block **17** has in its top portion downwardly extending sockets in which are placed a pair of drag plugs **45** having transverse recesses at their lower ends seating on the upper guide bar **15** and are pressed against this bar to provide a frictional drag thereon by means of a flat spring **46** pressing against the tops of these plugs, and the pressure of the spring may be adjusted to secure the proper drag or friction by means of the adjusting screws **47**. The spring and plugs are adjusted to permit longitudinal feeding movement of the feed block **17**, but provide friction to prevent free movement of the block.

The plugs **45** may be of any suitable material such, for example, as a molded plastic with fibre.

Projecting forwardly from the front portion of this block are upper and lower projections 48 and 49, respectively, spaced vertically from each other, thus providing a transverse space between them in which is the gripping means for feeding the stock 31 forwardly. In the arrangement of Figs. 1, 6 and 7 the lower extension 49 is provided with a longitudinal cylindrical recess 50 open at its top in which is mounted a gripper 51 in the form of a cylindrical bar or shaft having a longitudinal flat 52 on its top surface and a narrower flat 53 at one edge of this flat 52. These flats are exposed at the open top of recess 50. This gripper 51 extends through the body of the feed block and has a bearing therein, and its projecting rear end 54 is secured to the gripper rocker or control lever 55, this lever being flat and seated at its lower end in a transverse channel or notch 56 in the gripper and secured therein by a suitable screw 57. This lever is forked at its upper end, as indicated at 58, Figs. 6 and 14, and in this fork is the reduced connecting bar 59, Fig. 12, of the gripper regulator or operator 60 shown in detail in Figs. 12 and 13. This in the form shown is a substantially square bar notched at its opposite sides 61 to receive the opposite sides 62 and 63 of the fork in the lever 55, as shown in Fig. 7, the opposite edges of the notches 61 being inclined as shown at 64 and 65 for a purpose presently to be described. This gripper regulator bar is connected at one end, as by the tapped opening 66, to the threaded end of the piston rod 67 connected to the piston 26 in the cylinder 27, and it may be secured in adjusted position by the lock nut 68. The bearing for the gripper 51 in the transverse bearing 50 may be lubricated through an oil passage 69 leading from the end of the gripper to an oil groove 70 in the bottom of the gripper 51 and connected with a pressure nipple 71 by means of which a suitable grease under pressure may be fed to the passage 69. The gripper regulator bar 60 is mounted at its opposite ends for longitudinal sliding movement in the bearings 72 projecting from the rear side of the feed block, and it may be secured therein by the cover plates 73 and suitable screws 74.

Mounted on the upper wall 48 and above the gripper 51 is a gripper plate 84 adapted to cooperate with the gripper 51 to grip the stock 31 to feed it forwardly during the forward movement of the feed block. In the form shown in Figs. 1, 6 and 7, this plate comprises a rectangular upright plate mounted against the upright wall 85 of a recess 86 in the lower part of wall 48, and this plate 84 is mounted for vertical adjusting movement with respect to the lower gripper 51, the lower edge of this plate therefore providing an upper gripping jaw above and in alignment with the lower gripper 51. For adjustment, this plate 84 is provided with elongated slots 87 with suitable clamping screws 88 to secure it in adjusted positions. There are also a pair of upright adjusting screws 89 in the top portion of wall 48 engaging at their lower ends against the top edge of the plate 84 to provide a positive backing for this plate.

Mounted in this feed block 17 is a hydraulic cushion or check to cushion and check movements of this feed block at the opposite ends of its movement and to prevent a solid blow in arresting its movement. As shown in Fig. 4, the body of the feed block is provided with a transverse opening 75 threaded into which from its opposite ends are bearing bushings 76, the threads being indicated at 77, and they are sealed against leakage by a suitable sealing means 78 such, for example, as O rings in channels in these guide sleeves. In the space between these guides is a plunger or piston 79 of a somewhat smaller diameter than the diameter of the passage 75 to provide a small clearance passage 80 around the piston, and at the opposite ends of this piston are reduced stems 81 guided for sliding movement in the guide sleeve 76 and with their opposite ends projecting from the outer ends of these sleeves 76. Leakage past them may be prevented by packing 81*a*. When the space in the passage 75 between the inner ends of the guides 77 is filled with oil, it operates as a cushion or check against rapid longitudinal movement of the piston 79, but it will permit checked back and forth shifting movements of the piston by passage of oil from one side to the other of the piston through the restricted passage 80. A filling opening 82 sealed by a suitable removable plug 83 is provided leading to this space to permit retaining the proper amount of oil in the piston chamber.

Mounted in the rear base casting 9 is a pair of feed check rolls 90. This casting 9 is provided with a transverse notch or space 91 in which these rolls are mounted one above the other, as indicated in Figs. 1 and 9, with the stock strip 31 passing between them. Each roll is mounted on a support 92 provided with substantially square ends 93 seating in recesses 94 and 95 in the upper and lower walls above and below the notch 91, one side of these ends being in the arc of a circle, as indicated at 96, to seat in similarly curved walls at the bottoms of the recesses 94 and 95. The flat side walls prevent turning of these supports in these recesses. At the center of each of these supports is a cylindrical portion 97 notched at its opposite sides at 98, each notch having a radial side wall 99 and a laterally outwardly extending wall 100 at right angles thereto, and in this notch is a cylindrical roller 101. The roll 90 is a cylindrical hollow roll having a bearing on the central portion 97 to turn thereon and to close this portion together with the rollers 101. They are also supported at their opposite ends by suitable anti-friction bearings such, for example, as roller or needle bearings 90*a* on the portions 97*a*. They are arranged so that the two rolls 90 may turn to permit forward movement of the stock 31 between them, that is, the upper roll will turn counterclockwise as viewed in Fig. 1, while the lower roll will turn clockwise. That is, the lower roll is shown in Fig. 11, and it is free to turn clockwise as indicated by the arrow, and this movement will retain the rollers 101 in the wider portion of the notches 98 and against the walls 99, but as soon as there is any tendency for the roll 90 to turn in the opposite direction the rollers 101 will be forced into the narrower portion of these notches 98 and will bind so as to prevent rotation of the roll 90 in the opposite direction. This thus provides a one-way clutch which will permit free rotation of the rolls 90 to permit forward feeding movement of the stock 31, but will lock the rolls 90 against reverse movement, and will thus prevent backward movement of the stock during backward movement of the feed block 17. The pressure of these rolls 90 on the stock may be adjusted by the flat spring 102 mounted on the top of the casting and pressing at its opposite ends on upwardly extending plugs 103 engaging at their lower ends on the top of the end portions 93 of the mounting for the upper roll 90. The spring is held against turning by guide pins 102*a*. The pressure of the spring and therefore the pressure between the rolls may be adjusted by a suitable adjusting screw 104.

The stock 31 is guided as it is fed through the rolls 90 by a pair of laterally spaced stock guides 105. In the form shown these comprise upright cylindrical blocks mounted for lateral sliding movement on a supporting bar 106 mounted in suitable supports 107 secured to and projecting from the rear wall of the casting 9. They may be mounted in the casting by a suitable screw, and have transverse openings through which the support 106 passes and may be secured in adjusted positions by the set screw 108. The guides 105 have transverse openings for the support 106 on which they may be adjusted, according to the width of the stock 31, and secured in adjusted positions by the set screws 109. To prevent turning of the guides on the bar 106 this bar may be flattened on its top wall as shown at 110 against which the set screws 109 engage.

The operation of the feed block 17 and the gripping means thereon to grip the stock 31 and feed it forward-

ly is by the piston rod 67 connecting the piston 26 in the air cylinder 27 to the gripper regulator or operator 60. The air control valves for controlling the feed of air to the cylinder at opposite sides of the piston 26 to shift this piston back and forth are not shown in detail as they of themselves form no part of the present invention. They are shown connected to a control valve 111 on the press operated by the cam 3 on the crankshaft 4 of the press to feed air to the cylinder 27 to operate the feed forwardly in proper timed relation with each stroke of the press. This valve is connected to the air supply 112 from any suitable source of compressed air through a suitable lubricating device 113 for feeding the proper amount of lubricating oil to the air, and is connected by a suitable hose 114 to an air control assembly (not shown) in the control box 115, and also connected by the hose 116 to the poppet release valve 117 mounted by any suitable support 118 on the lower member 6 of the base structure, as shown in Figs. 1 and 6. This valve has a reciprocable control plunger 119 projecting from the front of the body at 120 and held normally in this position by air pressure back of it, as well as the spring 121, and this projecting end is in a line with the path of movement of the depending valve trip bar 122 carried by the feed head 17, which at the end of its movement will engage the projecting end 120 of this valve plunger and force it inwardly to open the valve to permit escape of air pressure from the hose 116 through the outlet opening 123 for control of the reverse movement of the piston 26, as will presently be described. There is also a connection from the air supply 112 to the control valves and mechanism control assembly in the box 115 by the hose 124 connected by the cut-off connection 125 at the top of the box. The valve 111 is controlled by the cam 3 to control the supply of air to the left hand end of the cylinder 27 through the hose 126 and the quick-exhaust valve 127 connected to this end of the cylinder at 128 through the cylinder head 28. As this pressure is applied to the cylinder 27 it will force the piston 26 to the right or forwardly, as viewed in Fig. 1, and through the piston rod 67 will operate the gripper control 60 to operate the gripper 51 to grip the stock 31 between this gripper and the gripper plate 84, and will then shift the feed head 17 forwardly to feed the stock to the press.

The stock is also gripped between feeding operations, to prevent its sagging and also dropping out of the line of feed during backward movement of the head 17, by the stock clamp 33 (Figs. 1 and 3). For this purpose a suitable hose connection 129 leads from the control valves and mechanism in the box 115 to the connection 41 (Fig. 3) at the back of the forward casting 8 and is connected through the passage 40 to the top of the cylinder 37 above the piston 36, and this is controlled by the control valves so that immediately after the forward feeding movement of the feed head 17 is arrested air pressure is applied to this piston 36 to clamp the stock 31 by the clamp 33 against the lower jaw 32. This will hold the stock during backward or reverse movement of the feed head 17 and prevent this free end from dropping downwardly out of the passage 30 through this forward passage, and will guide the work strip or stock on the next forward or feeding movement of the feed head 17, the air pressure in the meantime being released as the air is supplied to the left hand end of cylinder 27 to shift the piston 26 and the feed head 17 to the right on its next feeding movement. Air is supplied to the right hand end of the cylinder 27 through the hose connection 130 from the control valves in the box to the right hand end of the cylinder as indicated at 131, to effect the back or reverse movement of piston 26.

A modified form of gripping means on the feed head 17 for the stock is shown in Figs. 15 and 16. In this form mounted on the lower extension 49 and extending across the top over the gripper 51 is a feed finger 132 comprising a spring plate of suitable width depending

on the width of the stock being fed, and it has a downwardly extending portion 133 secured to the rear wall 134 of the head 17 by means of suitable clamping screws 135 passing through elongated slots 136 in this portion. This permits vertical adjustment of the plate 132, and the horizontal portion 132 of this plate may, if desired, be longitudinally slotted to provide separate or individually movable portions for separately feeding a plurality of stock strips 31*a* side by side. Cooperating with this feed plate or finger 132 is a feed finger pressure plate 137 secured on the upper extension 48 in the notch 86 in place of the gripper plate 84. This is somewhat similar to the plate 84 and is adjustable vertically by means of securing screws 88 used for mounting the plate 84 and passing through elongated slots 138 in the upright portion 139 of the plate 137, the only difference being that this plate is provided with an elongated horizontal portion 137 above the spring plate or feed finger 132 to cooperate therewith in gripping the stock 31*a* to provide a greater bearing or gripping surface on this stock and reduce the tendency to mar the surface of the stock. These two gripping members are shown released in Fig. 15, but are shown gripping stock 31*a* in Fig. 16. That is, turning of the gripper 51 by the control lever 55 on advance movement of the piston 26 will turn this gripper 51 to move the flat 53 upwardly against the plate 132, and will force it upwardly to clamp the stock 31*a* against the under side of the feed finger pressure plate 137 to grip the stock for the forward feeding movement.

The operation is as follows:

As the cam 3, Fig. 1, trips the control valve 111 it will supply air through the hose 114 to the control valve mechanism or control assembly in the box 115, and will supply compressed air from the hose 124 through the hose 126 and valve 127 to the left hand end of the cylinder 27. This will force the piston 26 forwardly or to the right as shown in Fig. 1, and through the piston rod 67 will shift the gripper control or operator 60 forwardly to the right in its bearings in the feed head 17. As this member 60 is shifted forwardly it will carry with it the free or forked end of the gripper rocker lever 55 which is in the notches 61 of the member 60. The rearward position of this lever is indicated in dotted lines of Fig. 1, and the gripper 51 is in the released position, with its flat top surface 52 horizontal. This is also the position of Fig. 15. In this position the forked end of the lever 55 is seated against the rear inclined wall 64 and the forward inclined wall 65 of the notches 61, as shown in Fig. 15. The forward feeding movement of the member 60 by the piston 26 will swing the lever 55 to the right to the position of Figs. 7 and 16, and this movement will rotate the member 51 clockwise to raise the flat 53 thereon to either grip the stock 31 and clamp it against the under edge of the plate 84, as shown in Fig. 7, or will raise the lower gripping plate 132 to clamp the stock 31*a* against the upper gripping plate 137, as shown in Fig. 16. The parts are so adjusted that this gripping action is completed when the upper forked end of the lever 55 rests against the forward upper inclined surface 64 and the left hand lower inclined surface 65 of the notches 61, which is the position of Figs. 7 and 16. Because of these surfaces the lever cannot swing forward any further, and therefore further forward movement of the member 60 under action of the piston 26 will shift the feed head 17 carrying these grippers forwardly and will feed the stock, either 31 or 31*a*, forwardly through the stock clamp 33 and to the press. This forward or feeding movement will be continued until it is arrested by the front positive stop 44 on the front casting 8. However, this stopping movement is cushioned by the plunger 79 in the hydraulic cushion or check carried by the head 17. That is, the forward projecting end 81 of this plunger engages this stop and forces the plunger 70 to the left in its oil filled chamber 75, thus cushioning the feed head

17 and bringing it to a stop without a blow or jar. Thus with this device the forward movement of the piston 26 first operates the stock grip 51 to grip the stock, and then continued forward movement of the piston, still operating through the control lever 55, will shift the feed head 17 forwardly for the feeding action.

At the end of its forward stroke, the depending valve trip bar 122 on the head 17 will engage the projecting end 120 of the poppet release valve 117, releasing the air pressure in the hose 116 and through this connection to the control box by hose 126 to the quick exhaust valve 127, in which drop of pressure will permit this valve to open and release the pressure in the left hand end of the cylinder 27. At the same time this release of pressure in the hose 116 will cause the control in the box 115 to feed compressed air from the supply pipe 124 through the connecting hose 130 to the right hand end of the cylinder 27 to shift the piston 26 backwardly or to the left as viewed in Fig. 1 for its reverse movement to its retracted position preparatory to the next feeding operation. At the beginning of its backward movement the feed head 17 remains stationary in its forward position, indicated by the dotted lines Fig. 1, and the first movement of the piston 26 will shift the gripper regulator or operator 60 to the left as viewed in Figs. 1, 7 and 16. This will swing the lever 55 to the left and turn the gripper 51 counterclockwise to release its grip on the stock 31 or 31*a*. That is, the lever 55 moves to its left hand or retracted position of Figs. 1 and 15, until it engages the rear upper inclined wall 64 and forward lower inclined wall 65 in the notches 61. At this time further swinging movement of the lever 55 is arrested, but at this point the gripper 51 has been shifted to its released position. Further backward movement of the member 60 then acts through the lever 55 to shift the feed head 17 backwardly or to the left to its retracted position. As it reaches this position, the projecting left hand end 81 of the plunger extension 79 in the hydraulic cushion or check in the head 17 engages the rear stop screw 24 and stop the rearward movement of the feed head with a checking or cushioning action. The feed head is now positioned for the next forward feeding movement as determined by the control valve 111 and the cam 3 on the crank shaft of the press. During this backward movement of the feed head 17 the forward portion of the stock 31 is gripped and held by the stock clamp 33 in the front base casting 8. Also backward movement of the stock is prevented by the check rolls 90 held against reverse movement by the one-way clutches 97 in these rolls.

It will be understood from the above that the feeding movements and the retracting movements are automatically controlled and may be timed to correspond with the timing of the operation of the machine with which it is connected, in the arrangement used for illustration, the dies of the press operated by the crank shaft 4; that the gripping and feeding of the stock is a positive operation with no slippage involved, and that the forward and rearward movements are accurately controlled so that each forward feeding of the stock is accurate and the successive movements are all the same or uniform. Forward movement is automatically arrested and controlled by forward movement of the head itself, and it is then automatically returned to its retracted position preparatory to the next feeding operation, which is controlled by the cam on the press.

A particular feature of this device is the arrangement of the air operating cylinder offset to one side and in back of and therefore away from the plane of the stock line. This permits mounting of accessories, such for example as stock straighteners, without interference with the feed operating means. Also the recess and fork connection between the operator 60 and gripper and feed operating lever 55 permits relative lateral movement between the lever and this bar so the bar may be positively guided for proper alignment with the piston.

Having thus set forth the nature of my invention, I claim:

1. In a slide feed of the character described, a stationary guide means, a reciprocable feed block mounted on said guide means, stock gripping means on the block comprising spaced upper and lower gripper jaws between which the stock may pass, the lower jaw comprising a rotatable cylindrical member having a flat surface opposite the upper jaw so that the surface at one edge of the flat is movable toward the other jaw to clamp the stock between them, an operating lever connected to the rotatable member and having a forked free end portion, a reciprocable operator mounted on the feed block comprising a bar having notches in its opposite side walls in which the sides of the fork on the lever are located, the sides of the notches being inclined to grip the sides of the lever and arrest rocking movement of this lever after operating the jaw to grip the stock, and operating means for the operator bar to first shift this bar relative to the block to operate the lever and after arresting rocking movement of this lever to then shift the bar relative to the stationary guide to shift the feed block and feed the gripped stock.

2. In a slide feed of the character described, a base structure including longitudinally spaced forward and rear base castings, spaced guide rods connecting said castings, a feed block mounted on the rods between the castings and slidable on these rods for reciprocating feeding movements, a stock gripper carried by the feed block, a stock clamp in the forward base casting, a one-way stock check in the rear base casting to prevent backward movement of the stock on reverse movement of the feed block, operating means for first operating the gripper means to grip the stock and operable to then shift the feed block forwardly to advance the stock through the stock check and the stock clamp, and means to operate the stock clamp means in certain timed relation with operation of the gripper and feed block operating means.

3. In a slide feed of the character described, a base structure including longitudinally spaced forward and rear base castings, guide means connecting the castings comprising upper and lower spaced guide rods mounted at their opposite ends in the castings, a feed block mounted on the rods between the castings having bearings through which the guide rods extend forming means to slidably support the block on said rods, stock clamping means in the forward casting, stock check means in the rear casting to prevent backward movement of the stock extending between the castings, stock gripper means carried by the feed block, means on the block to operate the gripper means to grip the stock, and means on the block to then shift the block to feed the gripped stock forwardly from the stock check through the stock clamping means.

4. In a slide feed of the character described, a stationary guide means, a reciprocable feed block mounted on said guide means, stock gripping means on the block comprising spaced upper and lower gripper jaws between which the stock may pass, the lower jaw comprising a rotatable cylindrical member having a flat surface opposite the upper jaw so that the surface at one edge of the flat is movable toward the other jaw to clamp the stock between them, a spring plate mounted at one end on the feed block and including a free end portion extending over the lower jaw in position to be shifted by operation of this jaw toward the upper jaw to grip the stock between this plate and the upper jaw, and operating means connected to the rotatable member to turn it to grip the stock and including means to then shift the block to advance the gripped stock.

5. In a slide feed of the character described, a base structure including stationary guide means, a feed block mounted on the guide means for reciprocating feeding movements, a stock gripper carried by the feed block, means to operate the gripper to grip the stock and shift

the feed block on the guide means including an air cylinder and a piston in the cylinder, stationary stops forwardly and rearwardly of the feed block, and a hydraulic cushioning means in the block comprising a liquid chamber in the block, a piston in the chamber with a restricted communicating passage for liquid between opposite sides of the piston, and stems connected with the piston extending from the opposite sides thereof and projecting from the opposite sides of the block to engage said stops to arrest forward and reverse movement of the block.

6. In a slide feed of the character described, a base structure including longitudinally spaced forward and rear base castings, guide means connecting the castings, a feed block mounted on the guide means for longitudinal reciprocating movement, stock clamping means in the forward casting, stock check means in the rear casting to prevent backward movement of the stock extending between the castings comprising a pair of rolls arranged to engage opposite sides of the stock, at least one of the rolls comprising a hollow cylinder, a support for the roll comprising an inner cylindrical member within the roll having a recess in one side comprising a radial wall at one side and an inner wall extending laterally from the inner edge of the first wall to the outer wall of the cylinder to thus provide a tapered recess, and a clamping roller in the recess engaging the inner wall of the roll to be shifted thereby toward the first wall of the recess on rotation of the roll in one direction and to shift said roller toward the narrow part of the recess on rotation of the roll in the opposite direction to lock the roll against rotation in this direction.

7. In a slide feed of the character described, a base structure including a longitudinal guide means, a feed block mounted for longitudinal reciprocating movements on the guide means, stock gripping means in the feed block, stock check means to the rear of the block to prevent backward movement of the stock during reverse movements of the feed block comprising a pair of rolls arranged to engage opposite sides of the stock, at least one of the rolls comprising a hollow cylinder, a support for the roll comprising an inner cylindrical member within the roll having a recess in one side comprising a radial wall at one side and an inner wall extending laterally from the inner edge of the first wall to the outer wall of the cylinder to thus provide a tapered recess, and a clamping roller in the recess engaging the inner wall of the roll to be shifted thereby toward the first wall of the recess on rotation of the roll in one direction and to shift said roller toward the narrow part of the recess on rotation of the roll in the opposite direction to lock the roll against rotation in this direction, and means for operating the gripper means on the block and reciprocating this block.

8. In a slide feed of the character described, a reciprocable feed block, stock gripping means on the block comprising upper and lower gripper jaws between which the stock may be placed, one of said gripper jaws comprising a rotatable member extending transversely of the line of feed having a gripping surface shiftable toward the other jaw by turning movement of this member to grip the stock between the jaws, a lever connected to the rotatable member for operating it by a turning movement, an operator means for the lever including a connection to the lever permitting limited rocking movement of the lever to rotate the member to grip the stock, said connection from the operating means to the lever including stop means to arrest turning movement of the lever and provide a connection from the lever to the block adapted by further movements of the operator to shift the feed block to advance the gripped stock.

9. In a slide feed of the character described, a reciprocable feed block, stock gripping means on the block comprising upper and lower gripper jaws between which the stock may be placed, one of said gripper jaws being movable toward the other jaw to grip stock to be fed between them, means for operating the movable jaw to grip the stock comprising a lever connected with the movable jaw and including a free end portion, means on the block comprising a slidable member provided with spaced stop means on opposite sides of said free end portion of the lever positioned to permit free movement of the lever to operate the jaw to grip the stock and then arresting movement of the jaw operating means after this jaw has gripped the stock, and said stop means and lever forming means for then operating through the arrested jaw operating means by further movement of the slidable member to shift the block to feed the stock.

10. In a slide feed of the character described, a stationary guide means, a reciprocable feed block mounted on said guide means, stock gripping means on the block comprising spaced gripper jaws between which the stock may pass, one of said jaws comprising a rotatable cylinder flattened on one side forming a jaw movable toward the other to grip the stock between them, an operative lever connected to said cylinder, an operator member on the block movable relative thereto and connected to the lever for operating the movable jaw to grip the stock, said connection to the lever including stop means for arresting further movement of the jaw operating means relative to the block after the stock is gripped, and said stop means then forming a connection from the operator member to the lever operable by further movement of said member to then shift the arrested jaw operating means relative to the stationary guide means to shift the block thereon and feed the gripped stock.

11. In a slide feed of the character described, a stationary guide means, a reciprocable feed block mounted on said guide means, stock gripping means on the block comprising spaced gripper jaws between which the stock may pass, one of said jaws being a rotatable member including a gripping surface movable toward the other jaw to grip the stock between them, an operating lever connected to the rotatable member, said lever including a free end portion, an operator comprising a slidable member mounted on the block provided with spaced stop means, and the free end portion of the lever being located between said stop means forming a connection from the operator member to the lever for operating said lever, and said lever cooperating with said stop means to permit limited rocking movement of the lever to operate the movable jaw to grip the stock and then arrest rocking movement of the lever so that further movement of the operator member will shift the feed block to advance the gripped stock.

12. In a slide feed of the character described, a stationary guide means, a reciprocable feed block mounted on said guide means, stock gripping means on the block comprising spaced gripper jaws between which the stock may pass, one of said jaws being a rotatable member including a gripping surface movable toward the other jaw to grip the stock between them, an operating lever having a free end portion, the other end of said lever being connected to the rotatable member to turn it to and from the stock gripping position, a reciprocable operating member on the block, said operating member having spaced walls between which the free end portion of the lever is located, said walls being sufficiently spaced to permit free rocking movement of the lever to shift the jaw sufficiently to grip the stock and then to engage the lever and provide stops to arrest the rocking movement of the lever and provide an operative connection from the operating member to the block through said lever, and said operative connection adapted by further movement of the operating member to act through the arrested lever to shift the block to advance the stock, and means for operating the operating member.

13. In a slide feed of the character described, a stationary guide means, a reciprocable feed block mounted on said guide means, stock gripping means on the block comprising spaced upper and lower gripper jaws between which the stock may pass, the lower jaw comprising a

rotatable cylindrical member having a flat surface opposite the upper jaw so that the surface at one edge of the flat is movable toward the other jaw to clamp the stock between them, operating means connected to the rotatable member to turn it to clamp the stock between the jaws, and said operating means also forming an operative connection to the block adapted by further movement of the operating means to shift the block to advance the gripped stock.

14. In a slide feed of the character described, a base structure including longitudinally spaced forward and rear base castings, spaced guide rods connecting said castings, a feed block mounted on the rods for reciprocating feeding movements, a stock gripper carried by the feed block, a lever connected to the gripper for operating the gripper to grip and release the stock and also adapted to shift the feed block on the guide rods, an operating means comprising a reciprocable bar provided with a transverse notch in one side, said notch having opposite side edges tapered inwardly from opposite sides of the bar with the narrowest part of the notch spaced from the

opposite edges of the bar, said lever having a free end seated in said notch whereby reciprocating movement of the bar first shifts the lever by a swinging movement to operate the gripper to grip the stock and the sides of the notch form stop means to engage the lever to prevent further swinging movement of the lever and by further action on the lever shifts the block forwardly and feeds the stock forwardly.

References Cited in the file of this patent

UNITED STATES PATENTS

2,250,530	Hafecost	July 29, 1941
2,263,721	Lorme	Nov. 25, 1941
2,428,493	Haller	Oct. 7, 1947
2,582,656	Sher	Jan. 15, 1952
2,611,609	Hagopian	Sept. 23, 1952
2,665,905	Lyon	Jan. 12, 1954
2,696,380	Adams	Dec. 7, 1954
2,721,649	Powers	Oct. 25, 1955