

Dec. 31, 1946.

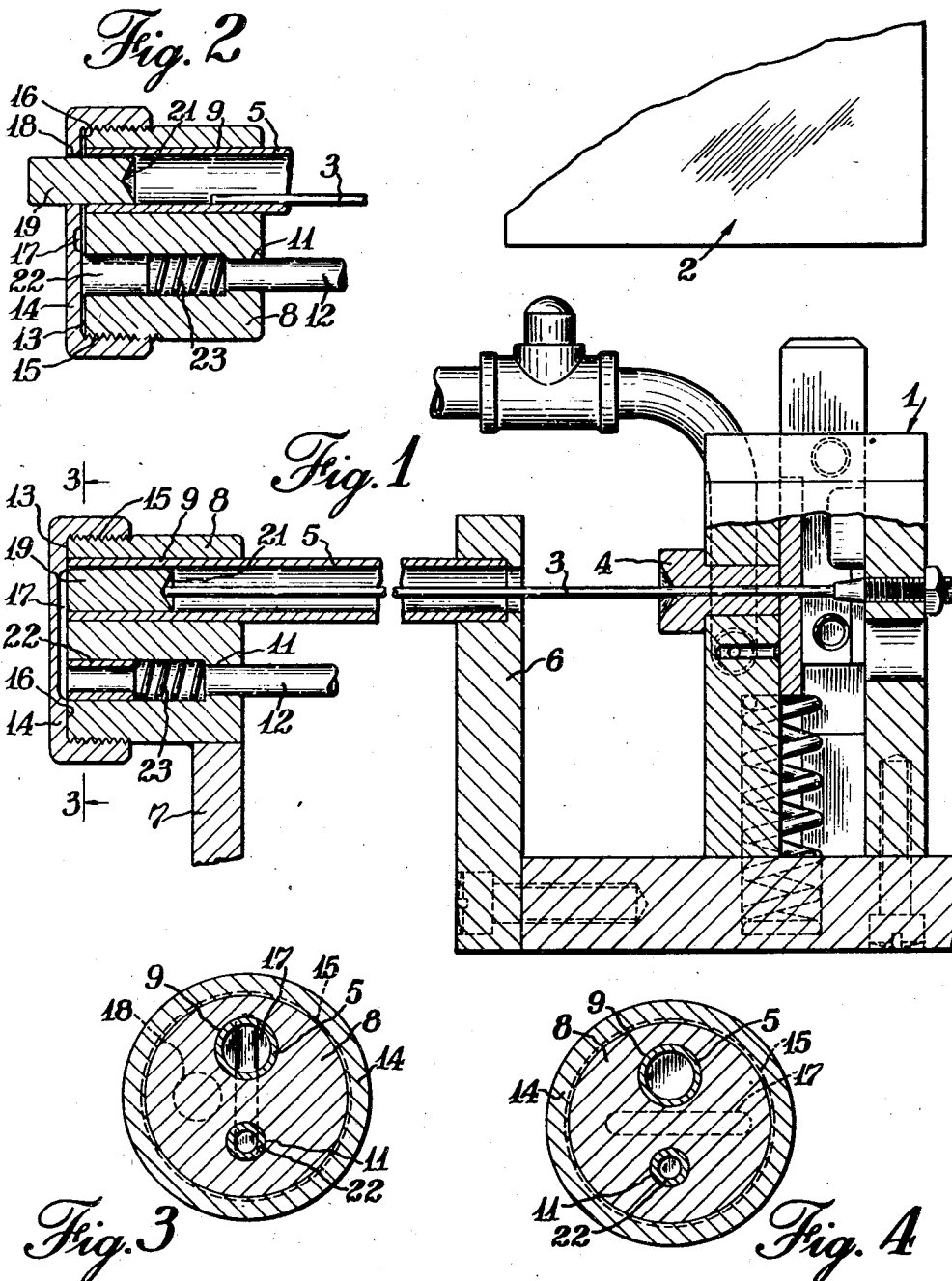
J. MacBLANE

2,413,638

WIRE OR STRIP FEEDING MECHANISM FOR PUNCH PRESSES

Filed Oct. 26, 1942

2 Sheets-Sheet 1



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Fig. 6

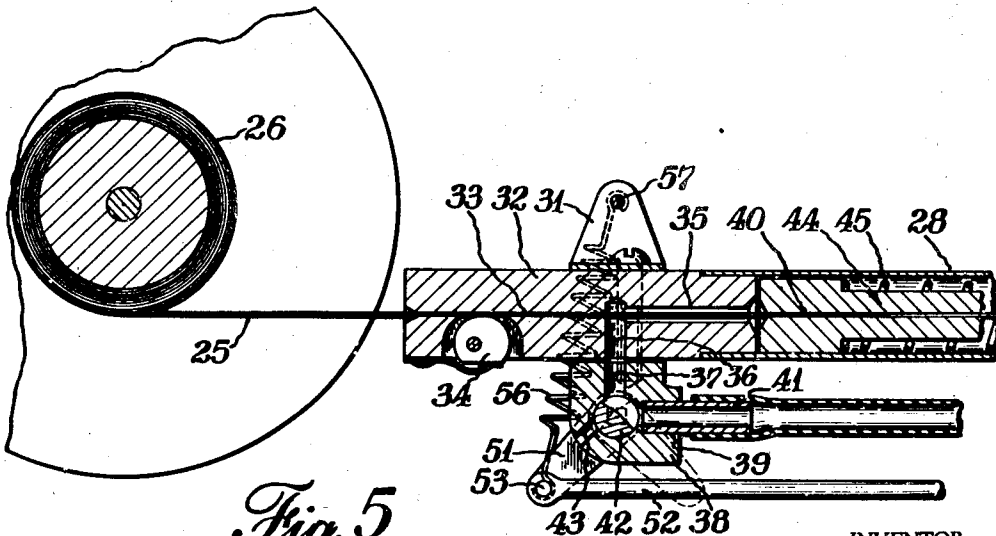
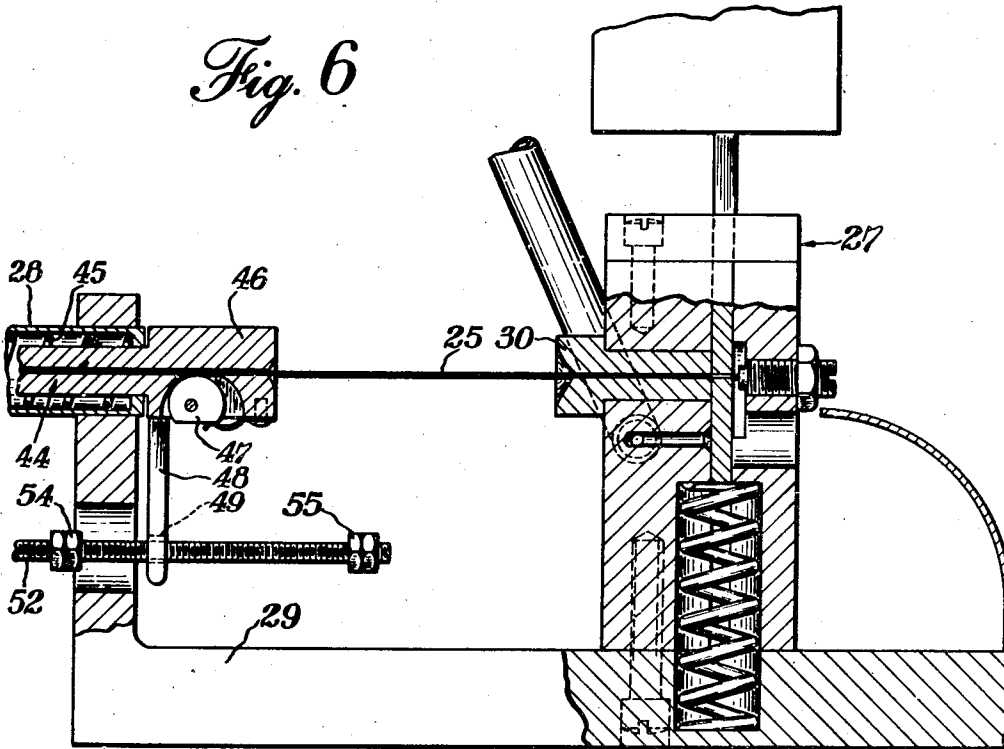


Fig. 5

Witness:
Burr W. Jones

INVENTOR.
James MacBlane
BY *Clinton S. Jones*
ATTORNEY

UNITED STATES PATENT OFFICE

2,413,638

WIRE OR STRIP FEEDING MECHANISM
FOR PUNCH PRESSESJames MacBlane, Elmira Heights, N. Y., assignor
to Bendix Aviation Corporation, South Bend,
Ind., a corporation of Delaware

Application October 26, 1942, Serial No. 463,427

4 Claims. (Cl. 271—2.5)

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The present invention relates to wire or strip feeding mechanism for punch presses and more particularly to means for maintaining a substantially constant feed pressure on the stock at all times.

Various forms of automatic feed for wire or strip stock have been worked out, but so much difficulty has been encountered in securing such an arrangement which will maintain uniform feed pressure without undue complication and expense, that hand feed is still very largely used.

It is an object of the present invention to provide a novel feeding arrangement for raw material in the form of wire or strip stock which maintains a substantially constant feed pressure irrespective of the travel of the stock in the feeder.

It is another object to provide such a device which may be adapted for feeding cut lengths of strip or rod stock, or for feeding wire or ribbon stock from a spool or roll.

It is another object to provide such a device which causes but a small amount of stock to be wasted.

It is another object to provide such a device which is simple and economical in construction and efficient and reliable in operation.

Further objects and advantages will be apparent from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation partly in vertical section of a preferred embodiment of the invention as used to feed the bar stock into a forming die actuated by a punch press.

Fig. 2 is a detail of the end of the feed cylinder showing the method of introducing the raw material and actuating piston;

Fig. 3 is a section taken substantially on the line 3—3 of Fig. 1;

Fig. 4 is a view similar to Fig. 3 showing the valve-closure member in the loading position as illustrated in Fig. 2; and

Figs. 5 and 6 show in side elevation partly in section an embodiment of the invention adapted for the continuous feed of wire or ribbon stock from a spool or roll, Fig. 5 showing the receiving end of the device and Fig. 6 showing the delivery end thereof.

In Fig. 1 of the drawings there is illustrated a cut-off and forming die indicated generally by numeral 1 which is arranged to be actuated by the ram 2 of a punch press. This die mechanism is not a part of the present invention and is described in detail in the joint application of MacBlane and Van Ness, Serial No. 458,754, so that further description thereof is believed to be unnecessary.

The raw material 3 used in the formation of the product is in the form of a rod or bar cut to

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as great a length as may be conveniently handled, and the present invention is concerned with the provision of means for feeding this raw material through the bushing 4 of the die 1 as the rod is used up in forming the product. As here shown this is accomplished by means of a guide cylinder 5 which is made slightly longer than the rod of raw material and is supported at one end adjacent the die 1 by a suitable bracket 6, and at its other end by a bracket 7. The bracket 7 has at its upper end a receiver block 8 which is drilled at 9 for the reception of the end of cylinder 5, and is also drilled at 11 to receive the end of a conduit 12 conveying any suitable form of fluid pressure such as compressed air. The face 13 of block 8 is formed as a plane surface, and a valve-closure member 14 in the form of a cap is threaded on the block 8 as indicated at 15 and is provided with an interior plane surface 16 having a bearing fit on the surface 13 of the block.

The cap member 14 is provided with an interior groove 17 which is so positioned that when the cap is screwed up tightly against the block, the groove is in registry with the openings 9 and 11 in the block so as to form a passage for the fluid pressure from the conduit 12 to the cylinder 5. Cap 14 is provided with an opening 18 therethrough which is arranged to come into registry with the opening 9 of the block when the cap is unscrewed sufficiently to move the groove 17 out of registry with openings 9 and 11.

Means for actuating the rod 3 of raw material is provided in the form of a piston 19 slidably mounted in the cylinder 5 and provided with a socket 21 for receiving the end of the rod and imparting pressure thereto when the fluid pressure is admitted to the cylinder.

A sleeve 22 is slidably mounted in the opening 11 of the block and is pressed against the interior of the cap 14 by suitable means such as a spring 23 so as to prevent escape of compressed air from the conduit 12 when the cap member is turned to its charging position as shown in Fig. 4.

In the operation of this embodiment of the invention, the valve cap member 14 is rotated to the position shown in Fig. 4 so as to close the air pressure conduit and give access to the end of cylinder 5. A rod of stock 3 is then inserted in the cylinder and started through the bushing 4 of the die. The piston 19 is then placed in the end of the cylinder 5 and the valve cap 14 rotated to operative position as shown in Fig. 3. The air pressure is then transmitted through the groove 17 to the cylinder 5, causing the piston 19 to maintain a constant feed pressure on the stock 3 to cause it to be advanced into the die as fast as it is used up. When the stock is substantially exhausted, the piston 19 emerges from

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the end of the cylinder 5 and the operation of charging the feeding mechanism is repeated.

In the embodiment of the invention illustrated in Figs. 5 and 6, a continuous wire or strip 25 is arranged to be fed from a spool 26 into the bushing 30 of a cut-off and forming die 27 of the type above set forth. This is accomplished by means of a guide cylinder 28 mounted at one end in a bracket 29 adjacent the die 27 and at its other end in a fixed bracket 31 adjacent the spool of raw material. The receiving end of the cylinder 28 is provided with a closure plug member 32 which is drilled at 33 to permit passage of the stock 25 and is provided with a gripping device 34 which permits the stock to be fed therethrough, but prevents retrograde movement thereof.

The closure member 32 is provided with an axial passage 35 leading into the cylinder 28 and a radial passage 36 communicating therewith and registering with a passage 37 in a block 38 fixed in the bracket 31. The block 38 is also provided with an opening 39 for the reception of a conduit 41 for fluid pressure, and with a rotary valve member 42. Valve 42 is so formed as illustrated that in one position it connects the passage 37 with the opening 39 so as to admit fluid pressure to the cylinder 28, and in the other position as illustrated in dotted lines in Fig. 5, it closes off the fluid pressure and vents the cylinder to an outlet 43.

A piston member 44 which is axially drilled as shown at 40 to permit passage of the stock therethrough, is slidably mounted in the cylinder 28 and is normally maintained in the retracted position illustrated by means of a light return spring 45. The piston member 44 projects from the discharge end of cylinder 28 as shown at 46 and is there provided with a gripping device 47 which is arranged to transmit feeding pressure from the piston to the stock, but permits the piston to return to its normal position without transmitting backward movement to the stock.

According to the present invention, means controlled by the movement of the piston are provided for actuating the valve 42 to cause reciprocation of the piston. As here shown this is accomplished by means of an arm 48 attached to the projecting end 46 of the piston and provided with an opening 49 through its lower end. Valve 42 is provided with an actuating crank 51, and a link member 52 is pivoted to one end of the crank as shown at 53. The opposite end of the link 52 is arranged to traverse the opening 49 in the arm 48, and adjustable abutments 54 and 55 are mounted on the link in position to be engaged by said arm shortly before the piston reaches the end of its travel in either direction. In order to assure full travel of the valve 42, a toggle spring 56 is preferably provided, pivoted at one end at 57 to the bracket 31 and at its other end to the pivot 53 in the valve crank 51.

In the operation of this embodiment, the stock is started through the opening 33 in plug 32 and through the piston 44 into the bushing 30 of the die 27. Fluid pressure is then supplied to the conduit 41 which acts on the piston 44 (valve 42 being open) and causes the stock to be fed into the die. As the stock is cut off and used by the die in forming the product, the piston advances toward the die until the arm 48 engages the abutment 55 on link 52. This causes the crank 51 to swing the valve 42 to its dotted line position, thus cutting off the fluid pressure and venting

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the cylinder, whereupon the piston 44 is returned to its normal position by the spring 45. When the arm 48 is thus caused to engage the abutment 54 on link 52, the valve 42 is thereby moved to its open position and the feeding operation is repeated.

Although but two embodiments of the invention have been shown and described in detail, it will be understood that other embodiments are possible and that various changes may be made in the design and arrangement of the parts without departing from the spirit of the invention as defined in the claims appended hereto.

What is claimed is:

1. In an automatic stock feeding device for punch presses and the like, a guide cylinder for the stock, a piston slidably mounted in the cylinder and connected to advance the stock into the press, a source of fluid pressure adjacent the end of the cylinder remote from the press, and means for actuating the piston by said fluid pressure comprising an opening for admitting the stock to said end of the cylinder and means preventing escape of air while the stock is being advanced.

2. In a continuous raw material feeding device for punch presses and the like, a cylindrical guide for the raw material, a piston slidably mounted therein, gripping means for transmitting longitudinal movement of the piston to the raw material in a direction to advance it into the press, gripping means for preventing retrograde movement of the raw material, means for admitting fluid under pressure to the cylinder to advance the piston, means for withdrawing the piston, and valve means actuated by the movement of the piston for controlling the fluid pressure to cause reciprocation of the piston.

3. In a continuous raw material feeding device for punch presses and the like, a cylindrical guide for the raw material, a piston slidably mounted therein, gripping means for transmitting longitudinal movement of the piston to the raw material in a direction to advance it into the press, gripping means for preventing retrograde movement of the raw material, means for admitting fluid under pressure to the cylinder to advance the piston, spring means for withdrawing the piston, and valve means actuated by the movement of the piston for admitting fluid pressure to the cylinder until the piston reaches the end of its stroke, and then cutting off the pressure and venting the cylinder to allow return movement of the piston by the spring.

4. In a feeding mechanism for strip stock, a cylinder of such length as to receive a strip of stock, open at one end adjacent a tool for operating on the stock, a piston in the cylinder adapted to engage and feed the stock through the open end of the cylinder, a rotatable closure for the other end of the cylinder, said closure having an opening therein as large as the bore of the cylinder and also having a diametrically arranged passage, a source of fluid pressure having a port covered by said closure, said closure being so arranged that in one angular position the passage registers with the port and with the end of the cylinder so as to admit pressure to the cylinder and in another angular position the port is closed and said opening is in registry with the bore of the cylinder to permit introduction of the stock and piston.

JAMES MACBLANE.