March 22, 1960 G. J. WEYMOUTH 2,929,626

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

Filed July 30, 1958 4 Sheets-Sheet 1

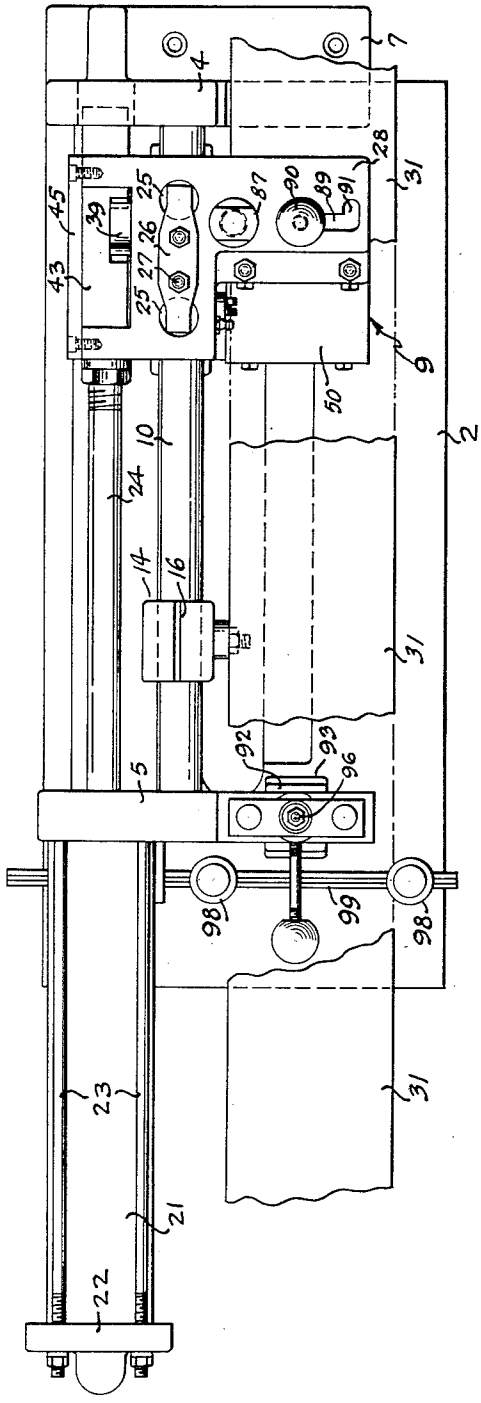


Fig. 1.

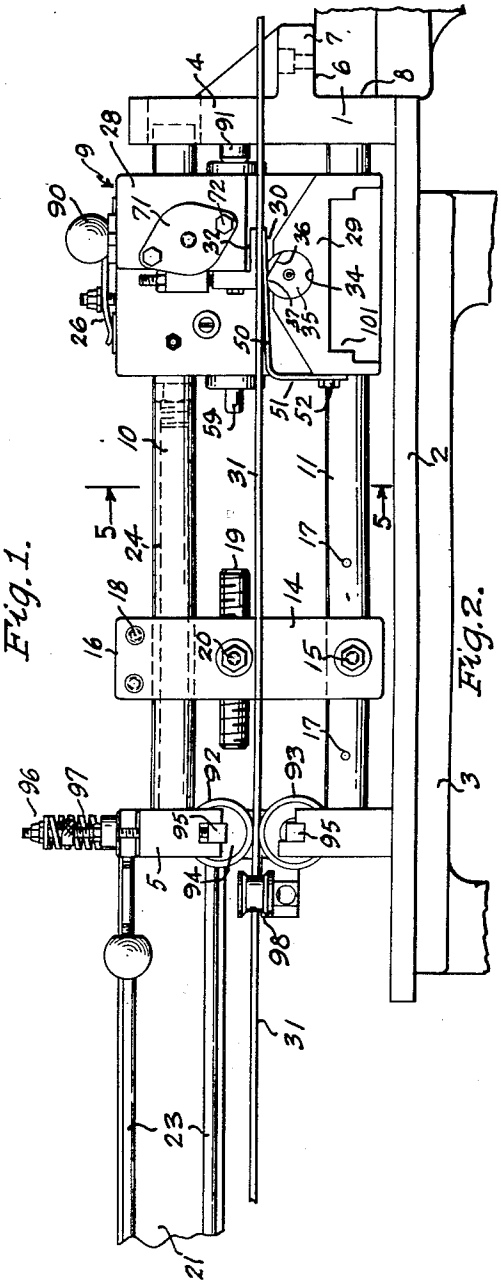


Fig. 2.

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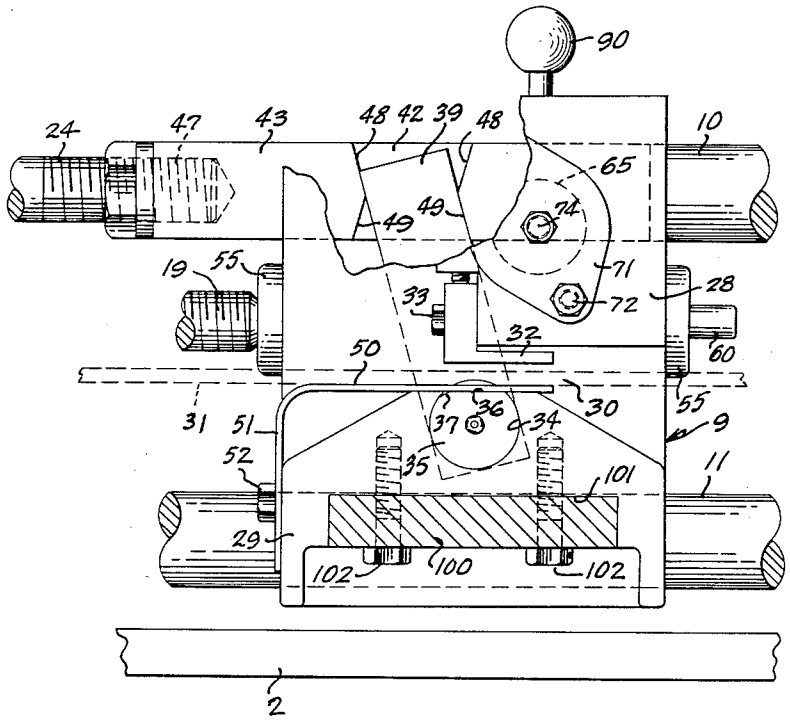


Fig. 3.

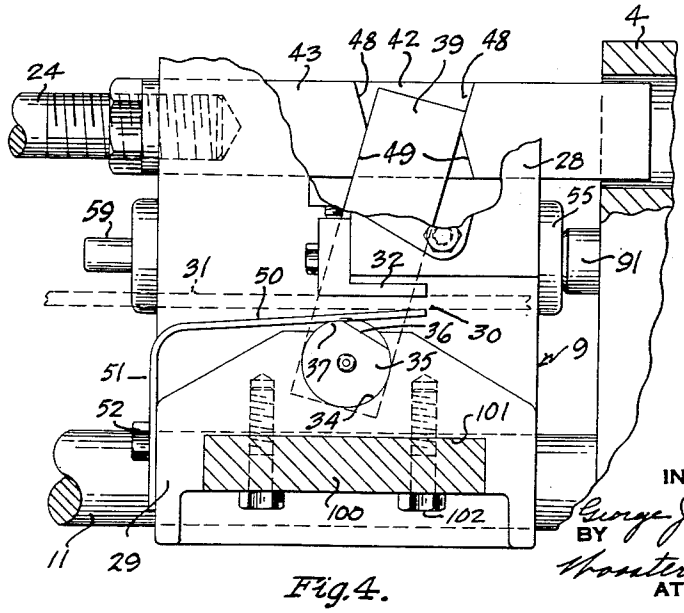


Fig. 4.

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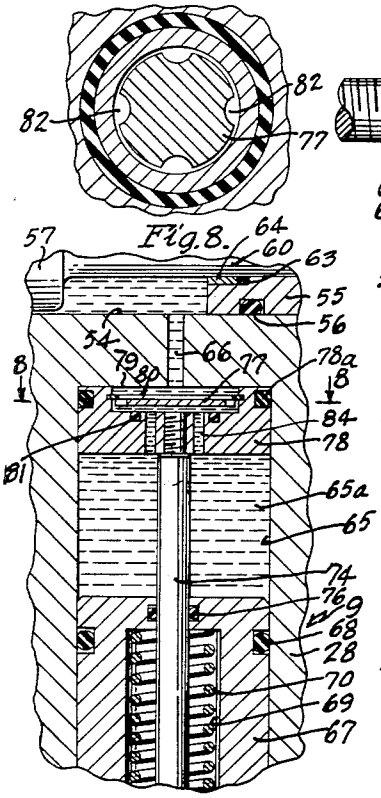


Fig. 8.

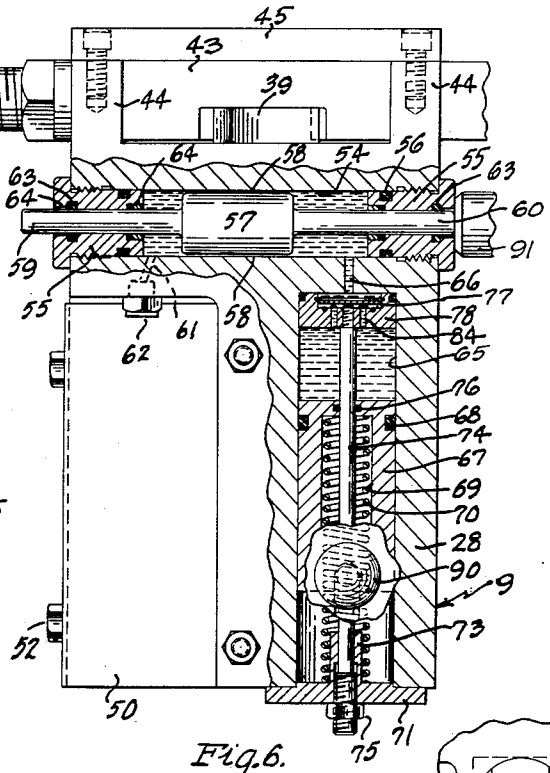


Fig. 6.

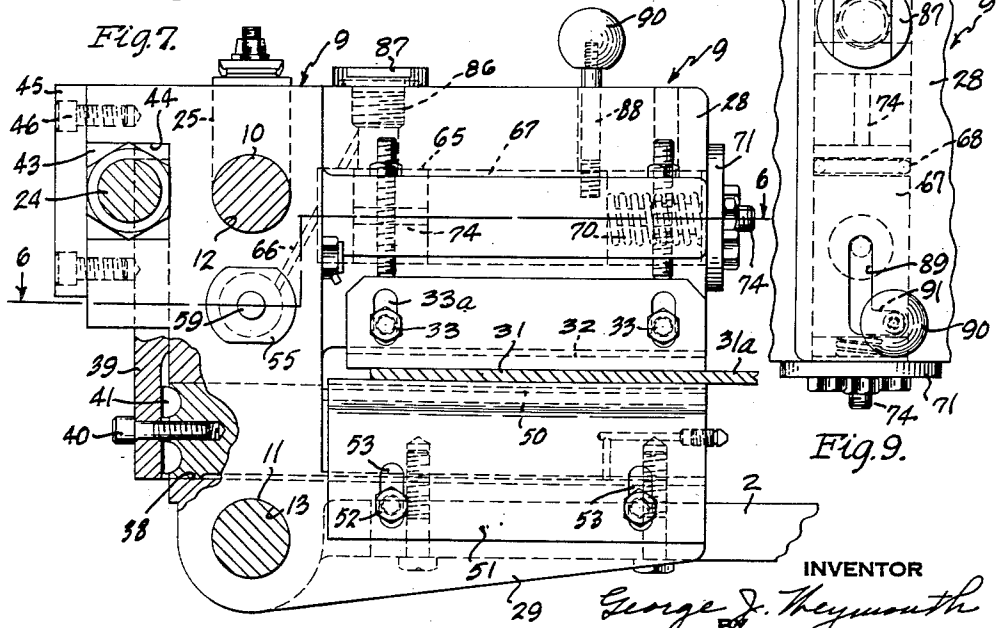


Fig. 5.

Fig. 9.

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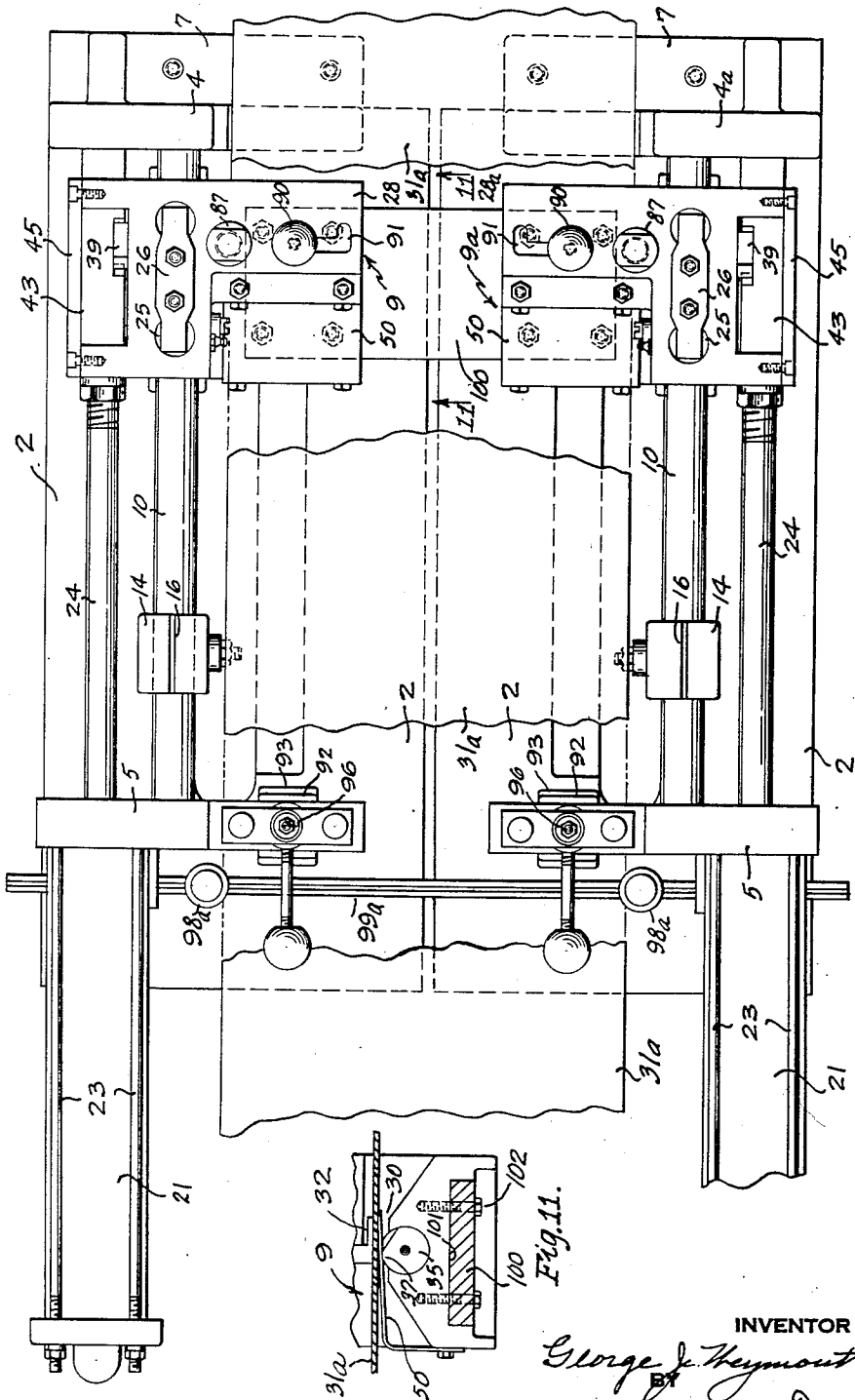


Fig. 10.

Fig. 11.

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United States Patent Office 2,929,626 Patented Mar. 22, 1960

2,929,626

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

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Application July 30, 1958, Serial No. 752,113

10 Claims. (Cl. 271—2.5)

This invention relates to an open throat air-operated slide feed for power presses and similar machines, and has for an object to provide an improved stock-feeding device for power presses and similar machines in which the feeding means has a feeding throat for the stock, which throat is open at the front side for permitting unobstructed operation of the feeding means and examination of the stock, such, for example, as flat metal strips, wire or other stock, and also in which the same feed mechanism can be used for feeding such stock as flat metal strips of a large variation in width.

Another object is to provide such a feed in which two feeds may be located on opposite side edges of a wide flat strip of metal and connected together to operate in unison to effectively feed such a wide strip.

Another object is to provide such a feed with an air-operated cylinder for operating it, together with improved hydraulic cushioning means to cushion the feed block as its motion is arrested at opposite ends of the feed stroke, with means to automatically supply and compensate for any leakage of liquid from said cushioning means.

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 top plan view of this improved feed with parts broken away to more clearly show the construction;

Fig. 2 is a front view thereof;

Fig. 3 is a front view of the feed block and its guide means in retracted position at the beginning of the feed stroke, with parts broken away to more clearly show the construction, and with a tie plate or bar, if used for a double feed, shown in section;

Fig. 4 is a similar view showing the feed block at the end of the feed movement;

Fig. 5 is a transverse vertical section substantially on line 5—5 of Fig. 2 and on a larger scale;

Fig. 6 is a partial plan view and partial section of Fig. 5, the section being substantially on line 6—6 of Fig. 5;

Fig. 7 is a detail section of a portion of the oil control to the cushioning cylinder on an enlarged scale;

Fig. 8 is a transverse section substantially on line 8—8 of Fig. 7;

Fig. 9 is a plan view of a portion of the feed head of Fig. 5 showing the plunger for the oil supply in retracted position to permit feed of oil to the supply reservoir;

Fig. 10 is a plan view showing the use of two of these feed devices arranged for feeding an extra wide flat strip of metal, and

Fig. 11 is a detail section substantially on line 11—11 of Fig. 10.

This feeding device may be assembled as a unit and attached as such to the press or other machine with which it is to be used for feeding stock, such, for example, as flat metal strips, wire, rod or other stock to the press or machine, and in the drawings it is shown as applied to one edge of the bolster plate or table 1 of a power press, the remainder of which is not shown. 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, this 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 suitable base section 2 on which the parts of the device are mounted, and which may be supported from a floor by any suitable support 3, in addition to support of the forward end on the bed 1 of the power press or other machine. This feed device comprises a pair of base castings 4 and 5 mounted on and suitably secured to the base 2. The forward casting 4, as shown in Fig. 2, is recessed at 6 providing a horizontal flange portion 7 to rest on the table 1 of a power press or other machine with which this device is used, and an upright portion 8 adapted to be positioned against the edge of this table. Extending between the forward and rear base castings 4 and 5 is any suitable stationary guide means for a feed block or head 9. In the arrangement shown this guide means comprises upper and lower guide rods 10 and 11 respectively on which the feed block 9 is mounted to slide. These two rods extend between the base castings 4 and 5 and extend at their opposite ends into openings (not shown) in these blocks and are secured therein by any suitable means (not shown). The feed block 9 extends between the two guide rods 10 and 11, and has suitable bearings thereon, and it is therefore held in the proper upright position on these rods, and this block can slide back and forth on the rods during the feeding operation on the bearings 12 and 13 (Fig. 5) in this block through which the guide rods extend.

Also mounted on and extending between these guide rods is a rear or back stop 14, which is adjustable along the rods to different positions, but may be secured in different adjusted positions by a set screw 15 and a split clamp 16. A screw 15 may be seated in different longitudinally spaced sockets 17 in the lower bar 11, and then the upper end clamped to the upper bar by a split end 16 and the clamping screws 18. This stop member carries an adjustable stop screw 19 which may be secured in adjusted positions by the set screw 20. The feed block 9 is reciprocated back and forth on the guide rods 10 and 11 for the feeding operations by a piston (not shown) in an air cylinder 21 mounted at its forward end in the rear base casting 5 and at its opposite end in a cylinder cap 22 connected to the casting 5 by suitable tie rods 23. The feed block 9 is connected to the piston in the cylinder 21 for operation by this piston, by a suitable connecting rod 24 and operating means presently to be described. The feed block 9 has in its top portion downwardly extending sockets in which are placed a pair of drag plugs 25 resting at their lower ends on the upper guide bar 10, and are pressed against this bar to provide a frictional drag thereon by means of a flat spring 26 pressing against the tops of these plugs, and the pressure of the spring may be adjusted by means of the adjusting screws 27 to secure the proper drag or friction on this rod to secure smooth and uniform operation of the feed block and prevent free movement of this block, although permitting longitudinal feeding movement under action of the piston in the cylinder. Plugs 25 may be of any suitable material, such, for example, as a molded plastic with fiber.

Projecting forwardly from the forward or front side of the feed block 9, and therefore located entirely at the

front side of the guide rods **10** and **11**, are integral upper and lower projecting portions **28** and **29** respectively of this block, providing between them a forwardly extending feed throat **30** open at the front of the block and at the outer or free ends of these extensions. This open end is at the opposite end of this throat from the closed rear or inner end located at the front side of the body of the block and at the front of the guide rods **10** and **11**. In this open throat is provided gripping means for the stock being fed, in the drawings shown as a flat strip of metal **31**. As this throat is open at the front, the front edge of this strip is exposed and visible at all times, and strips of various widths, even strips which are of a width to project from the open end of this throat, may be fed in this device, as indicated in Fig. 1.

The gripping means for feeding the stock **31** forwardly, as shown in the drawings, comprises an upper gripping jaw **32** mounted for vertical adjustment on the extension **28** by suitable screws **33** in vertical elongated slots **33***a*, this jaw being located above the metal strip. The lower extension **29** is provided with a longitudinal cylindrical recess **34** open at its top in which is mounted to turn about its longitudinal axis a gripper **35** in the form of a cylindrical bar or shaft having a longitudinal flat **36** on its top surface and a narrower longitudinally extending flat **37** at one edge of the first flat **36**. These flats are exposed at the open top of the recess **34**, and as the narrower flat **37** is spaced from the axis of the gripper **35**, rotation of this gripper will shift this flat toward and from the upper jaw **32** and the strip of stock between them to form a gripping and release action on the strip. This gripper **35** extends through the feed block **9** in a bearing **38** therein (Fig. 5) and its projecting rear end is secured to a gripper rocker or control lever **39** by any suitable means, such, for example, as the screw **40**, and the keys **41**, so that this gripper is operated by this lever. This lever at its upper end extends into a transverse recess or notch **42** in one side of an operating bar or shuttle **43** mounted for longitudinal reciprocating movement in suitable bearings **44** at the rear side of the upper portion of the block **9**. These bearings comprise open-sided recesses in extensions **44** on the block, over which open sides is a retaining plate **45** secured by suitable screws **46** to retain the bar **43** in the bearings. This bar is secured at its rear end to the piston rod **24** for operation thereby by any suitable means, as indicated at **47**. As shown, the bar **43** is substantially square or rectangular in cross section, the notch **42** to receive the operating lever **39** being located in its front side. The opposite edges of this notch are inclined in opposite directions, as indicated at **48** and **49**, each for about one-half the width of the bar.

Cooperating with the gripper **35** for gripping stock and feeding it forward on forward movements of the feed block **9** is a feed clamp **50** comprising a spring plate of suitable width (depending on the width of the stock being fed) extending over the top of the gripper **35** and between it and the upper gripping jaw **32**. This plate includes a downwardly extending portion **51** secured to the rear wall of the head or block **9** by suitable clamping screws **52** in vertically extending elongated slots **53** in the plate, permitting vertical adjustment of the member **50**. The horizontal portion of this plate **50** may be longitudinally slotted if desired to provide separate or individually movable portions for separately feeding a plurality of stock strips **31** side by side. This plate and the upper plate or jaw **32** provide a greater bearing or gripping surface on the stock and reduce the tendency to mar the surface of the stock. In Fig. 3 these two gripping members are shown released, the feed block **9** being in its rear or retracted position at the beginning of the feeding operation. In this position the piston in the cylinder and the operating bar **43** are in their retracted position with the upper end of the operating lever **39** inclined to the left as shown in Fig. 3, and resting against the rear edge **48** of the top portion of the notch **42** and the forward edge **49** of the lower portion of this notch. On forward movement of the rod or bar **43** on action of the piston in the cylinder to the position of Fig. 4, it carries with it the upper end of the operating lever **39** to a forwardly inclined position, as shown in Fig. 4. This turns the gripper **35** clockwise, moving the narrower flat **37** upwardly against the under side of the plate **50**. This raises the plate **50** and clamps it against the under side of the strip of stock **31** to be fed and clamps this stock against the under side of the upper jaw **32** as shown in Fig. 4. Then as the upper end of the lever **39** is now resting against the forward upper inclined wall **48** of the notch, and the lower rear end wall **49**, the lever cannot turn further in this notch, and these walls therefore form a stop which grips this lever and acting through it feeds block **9** forwardly, and as the strip of stock **31** is now gripped between the jaws **32** and the plate **50**, this strip of stock is fed forwardly with the block.

Mounted in the feed block **9** is a hydraulic cushion or check to cushion and check movements of this feed block at the opposite ends of its forward and rearward movements to prevent a solid blow in arresting these movements. As shown in Fig. 6, the body of the feed block **9** betwen the guide rods **10** and **11** is provided with a cylinder opening or passage **54** extending longitudinally through the block and closed at its opposite ends by bearing bushings or caps **55**. These bushings are threaded into the opposite ends of this cylindrical passage and are sealed against leakage of oil past them by means of a suitable seal **56** which may be an O ring. In the space between these guides or caps is a plunger or piston **57** of a somewhat smaller diameter than the diameter of the passage **54** to provide a small or restricted clearance passage **58** around the piston, and projecting from the oposite ends of this piston are reduced stems **59** and **60** guided for sliding movement in the bearing bushings **55** also forming guide sleeves for the stems with their opposite ends adapted to project alternately from the outer ends of these sleeves. When the space in the passage **54** between the inner ends of the sleeves **55** is filled with oil or other suitable liquid, it operates as a cushion or check against rapid longitudinal movement of the piston **57**, but 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 **58**. A bleeder passage **61** leading from the space **54** and closed by a suitable plug **62** may be provided for draining liquid from the space. Leakage about the stems **59** and **60** is prevented by suitable packing **63** which may be O rings retained in channels in the guide passage through the sleeves **55** by means of retainers **64**.

Improved means is provided for maintaining the cylinder passage **54** filled with this liquid, and automatically supplying to it any liquid which may leak from it. This comprises a chamber **65** in the extension **28** of the feed block **9** communicating at its inner end with the cylinder passage **54** by a passage **66**. In this chamber **65** is a slidable plunger **67** provided with a packing **68** in its outer wall, which may be an O ring, to prevent leakage of oil or other liquid past the plunger. Leading from the opposite end of the plunger is a socket **69** in which is a coil spring **70** resting at its inner end against the bottom of the socket **69** and at its other end against a cap **71** closing the open end of the chamber **65** and secured against the block by any suitable means, such, for example, as screws **72** (Figs. 2 and 3). There may be a cylindrical extension **73** from the cap embraced by this end of the spring. Extending through the plunger **67** and embraced by the spring **70** is a check valve support rod **74**. This passes through and is threaded to the cap **71** and is held in adjusted positions by a lock nut **75**. It passes through the inner end of the plunger **67** and

leakage about this rod is prevented by a packing 76 which may be an O ring.

At the inner end of the chamber 65 is a check valve 77 comprising a flat disc mounted in a body member 78 at the inner end of the chamber 65. Leakage around this member is prevented by a packing 78a. This body member has a recess 79 in its inner end in which the valve 77 is held for limited movement to and from the bottom of the recess by a retainer ring 80. In a circular channel in the bottom wall of the recess is a suitable packing 81 which may be an O ring forming a seat for the check valve 77. This valve is preferably in the form of a disc provided with a suitable number of notches 82 in its outer edge outwardly of the packing 81, but extending inwardly of the ring 83 to permit passage of liquid past this valve when it is raised from the seat 81. Passages 84 extend through the body member 78 from the chamber 65 to the under side of the valve 77 inwardly of the valve seat 81. The body member 78 is held in position by the support rod 74, the body being threaded on the end of this rod, as indicated at 85.

With this arrangement the spring 70 tends to force the plunger 67 inwardly, or upwardly as viewed in Figs. 6 and 7, and force the liquid 65a in the chamber 65 through the passages 84 in the body 78, lift the check valve 77 from its seat and pass through the notches 82 and the passage 66 to the cylindrical chamber 54, thus automatically maintaining the chamber 54 full of oil or other liquid and compensating for any leakage from this passage past the stems 59 and 60. The flow of liquid in the opposite direction is prevented by the check valve 77 seating on the packing 81.

A filling opening 86 closed by a removable closure plug 87 is provided leading to the chamber 65 for feeding oil or other liquid to this chamber when required. Means is provided for holding the plunger 67 retracted during the filling operation to prevent forcing oil out of this opening from the chamber by the spring-operated plunger 67 when the closure plug 87 is removed. For this purpose a pin 88 is threaded into one side of the plunger 67 and passes through an L-shaped slot 89 in the wall of the block to the outside thereof, and on the end of this pin is a hand knob 90. When it is desired to add oil to the chamber 65, the plunger 67 is retracted or forced downwardly as viewed in Fig. 6 by means of the hand grip 90 to carry the pin 88 opposite the angular end portion 91 of the slot 89, and then the plunger 67 and this rod may be turned to carry the pin 88 into the angular portion of this slot. This will retain the plunger 67 in its retracted position against action of the spring 70 during the operation of filling the chamber 65 with oil, after which operation and replacing of the closure plug 87 the plunger may be released by turning the handle 90 and the plunger back to its original position. The position of the pin 88 in the slot 89 indicates the amount of oil in chamber 65. The ends of the stems 59 and 60 projecting from the outer ends of the guide sleeves 55 are adapted to engage suitable bumpers or stops at the opposite ends of the movement of the feed block 9. That is, on movement of this feed block to its retracted position preparatory to the feeding operation, the projecting end of the stem 59 engages the end of the adjustable stop 19 to secure the cushioning effect of the piston or plunger 57. At the end of the movement of the feed block in the opposite direction for the feeding operation the projecting end of the stem 60 will engage a similar stop 91 mounted in the base casting 4, as shown in Figs. 2 and 6, to secure the cushioning effect at the end of the feeding operation. This action of the plunger 57 causes the reduced stems 59 and 60 to be alternately extended to their positions for engaging the stops 19 and 91 for the cushioning action.

Mounted in the rear base casting 5 is a pair of feed check rolls 92 and 93. This casting 5 is provided with a transverse space or notch 94 in which these rolls are mounted one above the other, as indicated in Fig. 2, with the stock strip 31 passing between them. Each roll is mounted on a support provided with substantially square ends 95 seating in recesses in the upper and lower walls of the block 5 above and below the notch 94, one of these rolls, in this case the upper roll, being adjustable vertically by means of adjusting screws 96 and pressed downwardly by a spring 97 to permit yielding of the upper roll. Guide rolls 98 for the opposite side edges of the feed strip 31 may be provided mounted for adjustment on a suitable support 99. Either one or both of the rollers are nonreturn rollers, or that is, is provided with a one-way clutch, as disclosed in my prior application Ser. No. 499,938, filed April 7, 1955, now Patent No. 2,856,186. These clutches permit the rolls to rotate in a direction to permit forward movement of the feed strip 31 in the feeding operation, but prevent reverse movement of the rolls, to thus prevent backward movement of this feed strip during the reverse or backward movement of the feed block 9. The rolls 98, nonreturn rolls 92, 93 and base block or casting 4 provide horizontally arranged guide means for the stock strip being fed.

The operation of the feed block 9 and the gripping means thereon to grip the stock 31 and feed it forwardly is by the piston rod 24 connected to the piston in the air cylinder 21 and to the gripper regulator or operator bar 43. The air control valves for controlling the feed of air to the cylinder at opposite sides of the piston to shift the piston back and forth are not shown, as they of themselves form no part of the present invention. They are connected to a control valve on the press with which this device is being used, and operated by the crank shaft of the press, as shown in Fig. 1 of my prior application above identified, to feed air to the cylinder 21 to operate the feed forwardly in proper timed relation with each stroke of the press. This valve is connected to the adjacent members by a connection from any suitable source of compressed air, as will be clearly understood. As air pressure is applied to the outer or left hand end of the cylinder 21 it will force the piston in this cylinder to the right or forwardly as viewed in Figs. 1 to 4, and through the piston rod 24 will operate the gripper control bar 43 to operate the gripper 35 to grip the stock 31 between the plate 50 operated by this gripper and the upper jaw 32, and then will shift the feed block or head 9 forwardly to feed the stock to the press. When the feed block or head 9 is in its retracted position as shown in Fig. 3, or is moving from the forward position to this position, the gripper control 43 is in its left hand or retracted position, and the gripper lever 39 is inclined to the left, as shown in Fig. 3, so that the gripper 35 is released and the lever 39 is gripped and held between the upper left hand inclined surface 48 and the lower right hand inclined surface 49 of the recess 42 in the bar 43. Movement of the bar 43 to the left therefore retains the stock gripper in the released position and also shifts the feed block 9 to this retracted position. As it approaches this position the projecting end of the stem 59 of the hydraulic cushioning plunger 57 engages the stop 19 and cushions the stopping movement of the feed block. On the next forward or feeding movement the piston-operated rod 24 shifts the control bar 43 forwardly or to the right, as viewed in Figs. 3 and 4. This movement carries with it the upper end of the gripper control lever 39 to the inclined position to the right, as shown in Fig. 4. This turns the gripper 35 to cause the flat 37 thereon to raise the plate 50 and clamp the stock strip 31 between this plate and the upper jaw 32. In this position the upper end of the lever 39 is gripped between the left hand lower inclined wall 49 and the right hand upper inclined wall 48 of the notch 42 in the bar 43. The lever cannot therefore pivot any further in this notch, and further forward movement of the bar 43 acts through the lever 39 to shift the feed block or head 9 forwardly and carry with it the strip of stock 31 to feed it to the press. At the end of

this movement the projecting end of the stem **60** of the plunger **57**, which was shifted to this position by engagement of the stem **59** with the stop **19**, will engage the stop **91** and give a cushioning stop to the forward movement of the feed block.

It will be seen from Figs. 1, 2 and 5 that due to the open outer ends of the notch or throat **30** between the extensions **28** and **29** on the front side of the feed block, through which the feed strip **31** passes, the feed line of this strip and the strip itself are located at the front of the feed block, and therefore are located to the front of the guide rods **10** and **11**. That is, the vertical plane of the feed line and the entire feed strip is located forwardly of the vertical plane of the guide rods **10** and **11**. Also, the operating piston rod **24** is located on the opposite side of the guide rods **10** and **11**, or to the rear of the vertical plane of these rods, and is therefore located on the opposite side of this vertical plane from the vertical feed line and the feed grip, as well as the strip of a stock fed by this grip. Therefore, the operating means for the feed block and the guide means for this block are located to the rear of the vertical plane of the feed line and the vertical plane of the strip being fed, leaving the strip and the space both above and below the horizontal plane thereof free and unobstructed of any of this operating means, and the entire strip is therefore visible at all times and capable of unobstructed inspection. Furthermore, as the outer end of the throat is open, the forward edge of the strip **31** may project outwardly from or beyond this throat, as indicated at **31*a***, Fig. 5, thus permitting feeding of strips of stock of different widths and even of greater width than the length of the throat.

This construction and arrangement further permits the use of two of these feed devices in combination to feed much wider strips than would normally be fed by a single unit. This is shown in Fig. 10 in which two units are shown but reversed so that the front or open sides of the feed blocks **9** and **9*a*** and therefore the open ends of the throats **30**, are opposed or facing each other. This permits feeding of a much wider strip **31*a*** of the metal stock to the drill press or other machine as the feeding grippers **50** and **32** on the two feed heads grip opposite edge portions of the strip **31*a***. This strip, as shown in Fig. 10, extends at its opposite edges into these throats between the gripping jaws on each feed head, and each feed head is operated by a separate cylinder **21**, as indicated, and each head is supported on suitable guide means such as the guide rods **10** and **11**, one pair of these rods being employed for each feed head. Each feed head is also operated by a piston rod **24** of a piston in each of the cylinders **21** through the gripper control and feed head advancing means **43**, the same as described in connection with Figs. 1 to 9 inclusive. In order to insure that the two feed heads **9** and **9*a*** operate in unison to feed the strip **31*a*** straight and uniformly, they are connected by a transverse tie plate or bar **100** connected at its opposite ends to the two feed heads **9** and **9*a***. For this purpose each feed head is recessed on its under side, as indicated at **101** in Figs. 3 and 4, as well as Fig. 11, in which the opposite ends of this tie bar **100** are seated, and which are rigidly secured to the feed heads **9** and **9*a*** by suitable securing screws **102**. Each of the feed heads and their operating and control means are the same as described in connection with Figs. 1 to 9 inclusive, except that the arrangement of feed head **9*a*** and its operating and control means is reversed from that of the feed head **9**, so that as indicated above the two heads are opposed to each other at opposite side edge portions of the strip **31*a*** being fed, thus permitting the feeding of stock strips of practically any width desired. The opposite edges of this strip may be guided by guide rollers **98*a*** adjustably mounted on an elongated support **99*a*** extending between the two devices.

It will be seen from the above that this feed device is of a very simple and effective construction for feeding stock such as flat strips of metal, wire, bars, rods or similar material, to a power press or similar machine, and may be applied to such machine as a unit without requiring the reconstruction of this machine, and also that it is adapted for feeding flat strips of material of great variations in width, that is, from very narrow strips to quite wide strips.

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

1. A slide feed for a wide strip of stock comprising a pair of feed units arranged side by side, each unit comprising longitudinally extending guide means and a feed block mounted for longitudinal feeding movements on the guide means, each feed block provided with a transverse feed throat for the strip each open at its free end opposed to the other block with the two throats arranged to receive the opposite side edge portions of the strip being fed, gripper means in each throat, operative means for each gripper mounted on the respective feed block, power operative means connected with the said operative means of each unit to operate its gripper and shift its feed block to advance the strip, and a rigid connecting means extending between and connected to the feed blocks to cause them to move in unison during their feeding movements.

2. A slide feed for a wide strip of stock comprising a pair of feed units, each unit comprising a horizontally arranged guide means, a reciprocable feed block mounted on each guide means provided with a transverse feed throat located wholly at one side of and extending laterally from its guide means and open at its outer end spaced farthest from the guide means, said units being arranged side by side with the feed blocks extending toward each other from their respective guide means and with the open ends of their feed throats opposed in position to receive the opposite edge portions of the strip being fed, stock gripper means on each feed block to grip the strip for the feeding operation, each unit including an air cylinder includnig a piston and located at one side of the line of feed of the strip, operative means for each gripper also located to one side of the line of feed of the strip, an operative connection from each piston to the operative means for the gripper of its respective unit for operating this gripper to grip the stock and also connected to its respective feed block for reciprocating it to feed the gripped stock, and a rigid tie bar extending between and connected to the feed blocks to cause them to move in unison during their feeding movements.

3. A slide feed for a wide strip of stock comprising a pair of feed units, each unit comprising a pair of horizontally arranged vertically spaced guide bars, a feed block mounted for longitudinal feeding movements on each pair of bars provided with a transverse feed throat extending laterally from and located wholly at one side of the respective bars and open at its outer free end farthest from said bars, said units being arranged side by side with the feed blocks extending toward each other from their respective guide bars and with the open ends of their feed throats opposed in position to receive the opposite edge portions of the strip being fed, stock gripper means in the throat on each feed block, operating means for the gripper and feed block located on this block, an air cylinder in each unit including a piston, means connecting the piston of each unit to the operating means of that unit to operate the gripper and shift the feed block to feed stock passing through its throat, and a rigid tie bar extending between and connected to the feed blocks to cause them to move in unison during their feeding movements.

4. A slide feed for a wide strip of stock comprising a pair of feed units arranged side by side, each unit comprising longitudinally extending guide means and a feed block mounted for longitudinal feeding movements on the guide means, each feed block provided with a transverse feed throat for the strip each open at its free end

opposed to the other block with the two throats arranged to receive the opposite side edge portions of the strip being fed, gripper means in each throat, an air cylinder and piston for each unit, operative means for each gripper mounted on the respective feed block, means connecting the piston of each unit with the operative means of that unit to operate its gripper and shift it feed block to advance the strip, and a rigid tie bar extending between and connected to the feed blocks to cause them to move in unison during their feeding movements.

5. A slide feed comprising 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, a hydraulic cushtioning 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, and means to automatically maintain the liquid chamber filled with liquid comprising a chamber in the block providing a reservoir for liquid, a passage leading from said reservoir chamber to the first chamber, a movable plunger in the reservoir chamber, and a spring acting on the plunger and tending to shift it forwardly to force liquid from the reservoir chamber to the first chamber.

6. A feed slide according to claim 5 in which there is a nonreturn check valve between the reservoir chamber and the first chamber.

7. A feed slide according to claim 5 in which there is a nonreturn check valve controlling reverse movement of liquid from the first chamber to the reservoir chamber comprising a body member located in the reservoir chamber provided with a recess on the opposite side from the plunger and at least one passage leading from the resevoir chamber to said recess, a valve seat in the recess surrounding said passage, and a valve disc in the recess mounted for limited movement in the recess to and from the valve seat to control reverse movement of liquid through said latter passage.

8. A feed slide according to claim 5 in which there is a liquid supply opening to the reservoir chamber, a removable closure plug for said opening, and releasable retaining means for holding the plunger in a retracted position against action of the spring when said closure plug is removed.

9. A feed slide according to claim 5 in which there is a liquid supply opening to the reservoir chamber, a removable closure plug for said opening, and releasable retaining means for holding the plunger in a retracted position against action of the spring when said closure plug is removed comprising an elongated L-shaped slot in a side wall of the reservoir chamber, and a stem secured to the plunger and projecting through said slot and providing a hand grip to first retract the plunger and compress the spring and then turn the plunger to carry the stem into the transverse portion of the L-shaped slot to retain the plunger in this position.

10. A slide feed comprising 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 feans including an air cylinder and a piston in the cylinder, stationary stops forwardly and rearwardly of the feed block, a hydraulic cushioning means carried by the feed block comprising a liquid chamber, 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 in opposite directions forwardly and rearwardly of the block to engage said stops to arrest forward and reverse movements of the block, and means to automatically maintain the liquid chamber filled with liquid comprising a chamber providing a reservoir for liquid, a passage leading from said reservoir chamber to the first chamber, a movable plunger in the reservoir chamber, and a spring acting on the plunger and tending to shift it forwardly to force the liquid from the reservoir chamber to the first chamber.

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