March 2, 1954 N. M. MARSILIUS 2,670,953

STOCK FEEDING MEANS

Filed Sept. 1, 1949

2 Sheets-Sheet 1

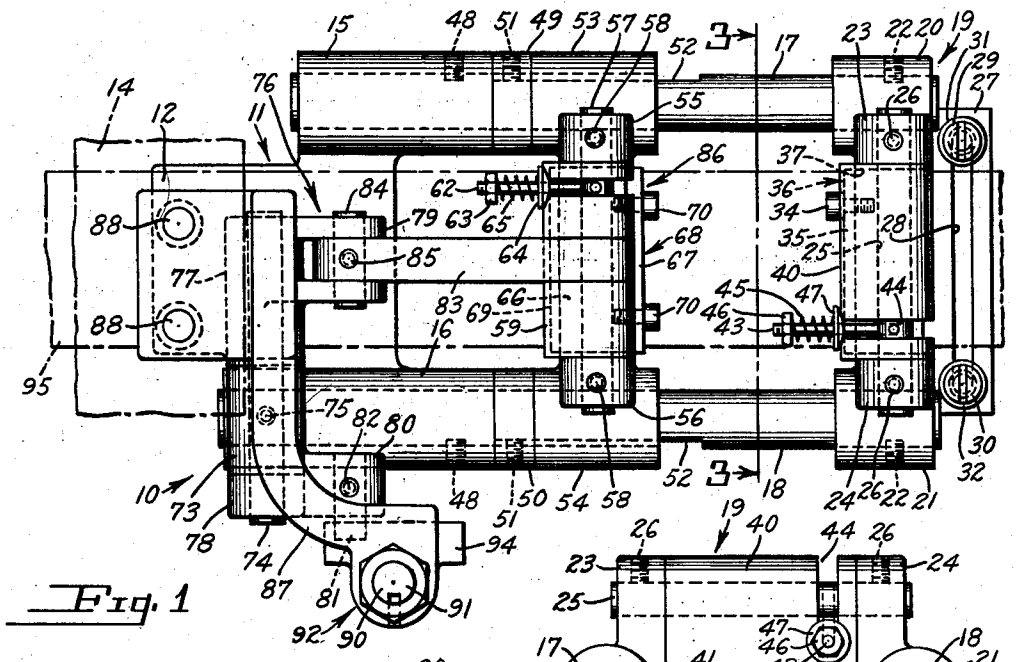


Fig. 1

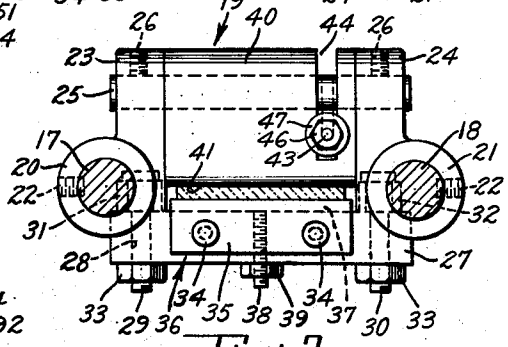


Fig. 3

Fig. 2

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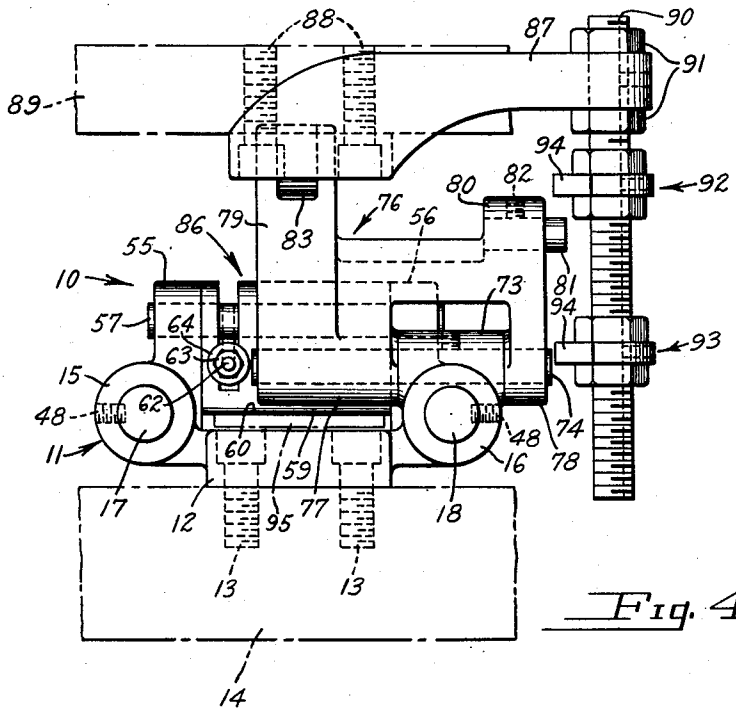


Fig. 4

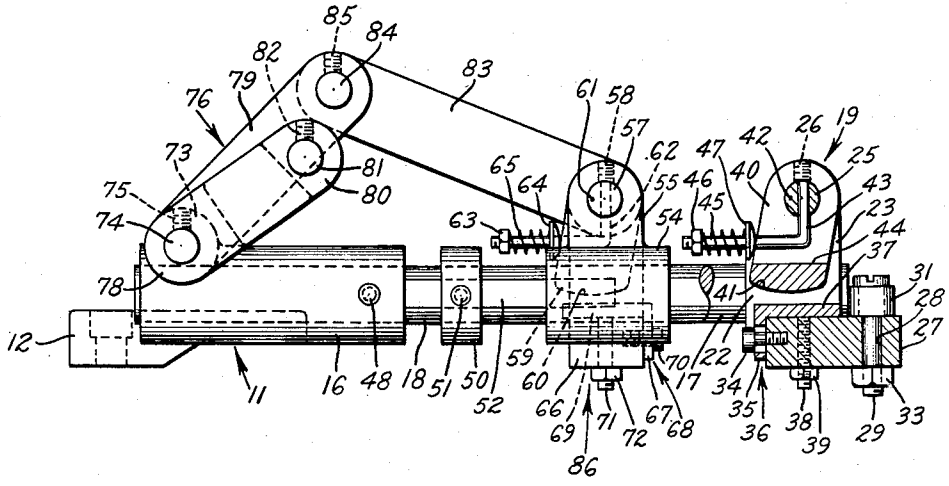


Fig. 5

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STOCK FEEDING MEANS

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2 Claims. (Cl. 271—2.5)

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This invention relates to new and useful improvements in work or stock feeding means and has particular relation to a reliable means or device for the feeding of flat stock in equal increments.

An object of the invention is to provide a simple yet reliable apparatus or device operable in timed relation with movements of a press for the feeding of flat stock in accurate predetermined increments to the press.

Another object is to provide a device or means for the purpose stated and which is of simple and rugged construction adapted for long periods of use without the likelihood of becoming deranged and which is adjustable for widths and thicknesses of material, within limits, and is also adjustable or variable as to the length of feeding increments of work or stock.

Other objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein a satisfactory embodiment of the invention is shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawings:

Fig. 1 is a top plan view showing the device of the invention as mounted on a press, portions only of the latter being shown;

Fig. 2 is a side elevational view looking as from the lower side of Fig. 1;

Fig. 3 is a transverse sectional view take along the line 3—3 of Fig. 1;

Fig. 4 is an end elevational view taken as looking from the left in Fig. 2; and

Fig. 5 is a side elevational view of the stock feeding means of the invention, a portion thereof being shown in transverse section.

Referring in detail to the drawings, my improved stock feed, generally designated 10, as shown, includes a base structure comprising a casting 11 having an extension 12 to be fastened as by screws 13 to a die bed 14 of a press. Integral with casting 11 are a pair of cylindrical or sleeve portions 15 and 16 located one at each side of and projecting above the forward end portion of the casting 11 and respectively receiving the rear end portions of frame bars 17 and 18 also comprising guides along which parts are moved, as will later be set forth.

On the outer end portions of the bars 17 and 18 is a stock securing or holding means, generally designated 19 and adapted, as will later fully appear, to permit of forward movement of stock or of work but to prevent backward movement or retrogression of the stock. The means 19 includes a pair of ring-like or short cylindrical sections 20 and 21 mounted on the forward end portions of the bars 17 and 18, respectively, and secured in place as by set screws 22. Integral with each of the portions 20 and 21 are upstanding bracket-like portions 23 and 24 at their upper ends receiving the respective end portions of a shaft or bar 25 rigidly secured in place by set screws 26.

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Suitably supported by the members 20 and 21 or their portions 23 and 24 and extending between the lower sides of such members and also extending rearwardly of them is a stationary flat shelf-like portion 27 having a longitudinally extending slot 28 passing vertically therethrough. Mounted in this slot or extending through this slot are a pair of bolts 29 and 30 between the heads of which and the upper side of said shelf 27 are rollers 31 and 32, respectively. On loosening of nuts 33 on said bolts, but at the under side of the shelf 27, the bolts may be shifted toward and from one another along slot 28 whereby to adjust the distance between the adjacent portions of the rollers or collars 31 and 32 to the width of stock which is to be fed.

Screws 34 on the inner or forward side of shelf 27 pass through the short arm 35 of a transversely L-shaped plate 36, the longer arm 37 of which extends over the upper side of the shelf 27. The openings through which the screws 34 pass through the plate arm 35 are of slightly enlarged diameters whereby on loosening of said screws 34 and the adjustment of a jack screw 38, passing vertically upwardly through the shelf 27 to engage the under side of arm 37 of plate 36, the latter may be adjusted vertically.

If the screw 38 is adjusted upwardly it will force the plate 36 upwardly and if the screw 38 is adjusted downwardly the plate 37 may be forced downwardly. A jam nut 39 is provided for securing the screw 38 in adjusted position. Plate 36 is adjustable whereby to adapt the present device for use in the feeding of stock of somewhat varying thicknesses. That is, when a certain thickness of stock is to be fed, the plate is adjusted accordingly and thereafter no adjustments of the plate are required until a stock of a different thickness is to be fed. In other words, any adjustment of the plate 36 is a part of the setting up procedure.

Mounted for turning movement about the fixed

bar or rod 25 is a gate 40 shown as comprising a single piece of considerable width and extending between the uprights 23 and 24 and having a lower cam surface 41. This surface 41 is an arc of a circle, the center of which is eccentric with respect to the bar or shaft 25 and in the structure actually illustrated, is the point 42 (see Figs. 2 and 5).

While the gate 40 is free to swing on the bar or shaft 25, means are provided for biasing said gate in a counterclockwise direction as the device is viewed in Figs. 2 and 5. Such means comprises an L-shaped rod 43 having its short arm anchored in the stationary bar 25 and having its longer arm passing forwardly through a slot 44 in the gate 40 and inwardly or forwardly of the gate having a light coil spring 45 thereon. Spring 45 presses at its respective ends against an adjustable nut 46 and a washer 47 having a convex side bearing against the inner side of the gate 40.

Clearly, the nut 46 may be adjusted to add to the compression of the spring 45 and the spring thrusting against washer 47 maintains the latter against the inner or forward side or surface of the gate 40 and the spring is therefore constantly tending to swing the gate in a counterclockwise direction. However, the spring is a light spring and does not exert any great pressure, just enough to add slightly to the gravitational swing of the gate 40 toward a centered, depending position with respect to the shaft 25.

The inner or forward end portions of the bars 17 and 18 are secured in the cylinders or sleeves 15 and 16 in the desired positions as by means of set screws 48. On such bars, immediately outwardly with respect to said cylinders or sleeves, are collars 49 and 50 adjustable on the bars for purposes which will be set forth and adapted to be secured in adjusted positions on tightening of set screws 51. As best shown in Fig. 1, these set screws bear against flats 52 formed in the outer sides of the bars 17 and 18. On loosening of screws 48, the bars 17 and 18 may be adjusted longitudinally, if desired, to provide for greater lengths of feeding strokes of the device.

Also, on said bars, but outwardly with respect to the collars 49 and 50, are a pair of short sleeve or cylindrical sections 53 and 54 adapted to slide or be reciprocated outwardly and inwardly on the bars 17 and 18, the latter functioning as supporting and guiding means for such short sleeves or cylinders 53 and 54.

The sleeves or cylinders 53 and 54 rigidly support and may be integral or otherwise made rigid with uprights 55 and 56 which, in their upper portions, support the respective ends of a bar or shaft 57. Here it is noted that the uprights 55 and 56 correspond, respectively, with the uprights 23 and 24 of the means 19 and are spaced a like distance and mount the shaft or bar 57 in alignment with the bar 25 of the means 19. This bar 57 is fixed in the uprights 55 and 56 by set screws 58 and turnable on such bar or shaft is a gate 59 of the width of gate 40 and having a lower cam surface 60 and the gate is otherwise of the construction of the gate 40. The cam surface 60 of the gate 59 is the arc of a circle, the center of which is the point 61 located within the shaft or bar 57 but eccentric with respect thereto.

An L-shaped rod 62 has its shorter arm fixed in the shaft 57 and its longer arm passes through the inner face of the gate 59 and mounts an adjustable nut 63 and a washer 64, the latter having a convex face. A light coil spring 65 about such longer arm of the L-shaped rod 62 bears at its respective ends against the adjustable nut 63 and the inner face of the washer 64 and is constantly biasing the gate 59 for swinging movement in a counterclockwise direction about the shaft or bar 57. Thus, the gate 59 is constructed and mounted and biased in the same manner as the gate 40.

A shaft 66 extends between the lower portions of the cylinders 53 and 54 and is located at the underside of the guide bars 17 and 18. Against the forward side of this shelf is the short arm 67 of a transversely L-shaped plate, generally designated 68, the longer arm 69 of which extends over the upper side of the shelf. Screws 70 pass through enlarged openings in the short arm 67 of the shelf and may be tightened to secure the shelf in place and may be loosened to permit of vertical adjustment of the plate.

Upward vertical adjustment may be forced by a jack screw 71 passing vertically through the shelf and engaging the under side of the plate and if this jack screw is threaded downwardly, the plate may be forced downwardly. A jam nut 72 is provided for securing the jack screw in adjusted position. The plate 68 is adjusted for the reasons above set forth in describing adjustments of the plate 36. Thus, shelf 66, the short cylinders 53 and 54, the uprights 55 and 56, the bar or shaft 57 together with gate 59 and its biasing means, all constitute parts of a carriage or stock advancing means generally designated 86.

The cylinder or sleeve 16 is somewhat longer than the cylinder or sleeve 15 and extends inwardly slightly beyond the latter and on the upper side of this inner portion mounts a short transversely extending sleeve 73 integral or otherwise rigid with the sleeve 16. Passing through this sleeve 73 is a shaft or bar 74 fixed in the sleeve as by a set screw 75.

An arm device, shown as comprising a one-piece structure generally designated 76, includes a tubular bearing portion 77 turnable about one end portion of the shaft or bar 74 and a second tubular portion 78 turnable on the other end portion of said shaft or bar. Thus, the device 76 straddles the transversely extending short sleeve or cylinder 73. Additionally, arm device 76 includes a relatively long arm 79 which forms part of a toggle-like structure to be described, and then includes a shorter arm 80 mounting a short heavy pin 81 projecting laterally from one side of said arm 80 and made rigid therewith as on tightening of a set screw 82.

The arm 79 is bifurcated for a considerable portion of its length and through its upper end and, in the upper end of its bifurcation receives the inner end of a link 83. Such end of the link has a short shaft 84 passing therethrough and secured thereto by a set screw 85 and this short shaft has bearing in the upper end portions of the bifurcated arm 79. The forward end of the link 83 is pivotally mounted for turning movement about the intermediate portion of the bar or shaft 57 of the carriage previously described and here generally designated 86 and comprising the work or stock advancing means of the invention.

With this construction, it will be understood that on rocking of the device 76 in a clockwise direction on the shaft or bar 74, there will be a forward thrust from the arm 79 through the link 83 to the stock advancing means 86 whereby the latter will be moved from its inner position as shown in Fig. 2 through the intermediate position of Fig. 5 to an outer position. In the latter position, the short cylinders 53 and 54 of the stock advancing means 86 will be brought against

the inner faces of the short cylinders 20 and 21 of the means 19 whereupon further outward movement of the device 86 is prevented. Then, on reverse swinging movement of the device 76, i. e., on swinging movement of said device in a counterclockwise direction, its bifurcated arm 79 swings inwardly and draws rearwardly on the link 83 thereby drawing the stock advancing means 86 inwardly or forwardly back through the position of Fig. 5 as to the position of Fig. 2 or to a position intermediate that of Figs. 5 and 2.

The position to which the stock advancing means 86 is withdrawn depends upon the setting of the collars or stops 49 and 50 which are adjustable along the guide bars 17 and 18 to control the movement of the stock advancing means 86 and therefore the length of feed of the stock. During use of the stock feed of the invention, the means 19 remains in one position on the outer ends of the guide bars 17 and 18 while the stock advancing means 86 is reciprocated along said guide bars. Such reciprocation is under the control of the press to which the means of the invention is applied. Thus, the extension 12 having been secured to the die bed 14, an arm 87 is secured to the punch holder of the press as by screws 88, in the drawings a portion of the punch holder being indicated by broken lines at 89.

Arm 87 extends outwardly laterally, or otherwise, depending upon the press construction, and at its outer end has rigidly fixed to it a vertical screw 90. In the drawings, this screw is shown as fixed to the outer end of the rigid arm 87 by being clamped thereto by nuts 91. On and adjustable along the depending portion of the screw 90 are upper and lower dogs 92 and 93 threadedly adjustable on the screw and each including a flat plate-like portion 94 of substantial length measured longitudinally of the guide bars 17 and 18. The arm 87 is located to dispose the plate-like portions 94 of the dogs 92 and 93 above and below the projecting stud or heavy pin 81 as clearly shown in Fig. 4.

With this arrangement, it will be seen that on the punch holder 89 descending, the plate-like portion 94 of the dog 92 will engage the pin 81 and move the stock advancing means 86 toward the means 19. Thereafter, on upward movement of the punch holder, the plate 94 of the dog 93 will be brought against the lower side of the pin 81 raising the latter and swinging device 76 in a counterclockwise direction on the bar or shaft 74 and drawing the stock advancing means 86 inwardly or toward the position of Fig. 2.

It has been above suggested that means 19 prevents backward movement or retrogression of the stock being fed and the means 86 is the stock advancing means. In the drawings, the stock is designated 95 and when the present device is to be used, the stock is laced through the holding means 19 and the stock advancing means 86 by threading the stock between gate 40 and plate arm 37 and between gate 59 and plate arm 69, respectively. It will be understood that in Figs. 1 and 2, the stock is being fed from right to left and the rollers 31 and 32 are adjusted to guide the longitudinal edge portions of the stock and it will be understood that the plates 39 and 68 have been properly adjusted. Also, depending on the length of each increment of feed desired, the collars 49 and 50 are adjusted.

The high point of the cam surface 41 of the gate 40 is lightly engaging the stock 95 but should there be any attempt of this stock to move outwardly under this gate, i. e., toward the right in Fig. 2, the gate binds on the stock and instantly locks it against such retrogression. However, as the stock is drawn inwardly or forwardly under this gate, the gate offers little or no resistance to such movement of the stock.

With respect to the gate 59 of the stock advancing means 86, when such means is shifted outwardly or toward the right in Fig. 2, the gate yields and passes over the stock, the stock at this time being held against rearward movement or retrogression by the gate 40. On the return stroke of the advancing means 86, it is attempting to pass the "wrong way" over the stock and its cam surface binds on the stock gripping the latter between such cam surface and the arm 69 of the plate 68. Thus, as the advancing means 86 moves from the right toward the left to advance the stock into the dies of the press, such means 86 is gripping the stock and drags it forwardly under the cam surface of the gate 40.

When the short cylinders 53 and 54 of means 86 engage the adjusted collars 49 and 50, movement of the stock ceases. The arm 87, together with the screw 90 and dogs 92 and 93 is moved upwardly and downwardly with the punch holder of the press or by the crank of the press, etc. The only requirement is attaching of the arm 87 to a part which will impart a reciprocating movement to the screw 90 and thus to the dogs on the screw, all in timed relation with the operations of the press.

To set up the device and to have the dogs 92 and 93 properly adjusted, the die is set to give the proper blank. Then the ram or the punch holder or the crank is shifted to bring the press to the bottom of its down stroke. The stock advancing means 86 is positioned to properly relate the forward face of its cylinders 53 and 54 to the inner faces of the cylinders or sleeves 20 and 21. That is, such opposing faces of the respective pairs of cylinders are brought into engagement. Thereafter, the dog 92 is adjusted to engage the upper side of the pin 81.

Next, the press is shifted to its "up" position and a size block or gage or the like is inserted between the opposing faces of the cylinder 54 and the short cylinder 21, such size block or gage determining the length of feed. Then, the stop collars 49 and 50 are advanced and secured in adjusted relation against the rear faces of the cylinders 53 and 54 and are locked in position by tightening of the screws 51. Thereafter, the dog 93 is adjusted upwardly on the screw 90 until the plate 92 of such dog engages the under side of pin 91. The feeding mechanism is now mounted and adjusted for operation to provide a feed for flat strip stock in increments represented by the size of the gage or size block employed, as above described.

Thereafter, as the ram of the press descends, the stock advancing means 86 will be fed outwardly towards the locking means 19 to engage a new length of stock as the punching operation is performed. Then, after the press ram starts upwardly, there is a slight delay in the plate 94 of the dog 93 engaging the pin 81, this delay permits of the tools clearing the stock. As the upward movement continues, such plate of the dog will engage pin 81 and withdraw the work advancing means 86 advancing a length of stock into the press. Such movement will, of course, be limited by engagement of the cylinders 53 and 54 with the forward faces of the collars 49 and 50, and, of course, this takes place at the upward limit of movement of the ram of the press.

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

1. In a device for feeding flat strip stock, a base structure including a pair of longitudinal sleeves and a transverse portion rigidly connected to and mounting said sleeves in transversely opposed spaced parallel relation, a pair of transversely opposed supporting and guide bars having their inner end portions engaged in the respective sleeves and longitudinally adjustable therein and projected from the outer ends of said sleeves to provide adjustable length guide portions, securing means movably mounted in said sleeves and cooperatively engageable with said bars to rigidly secure the adjusted position of said bars in said sleeves; a stock holding means rigidly secured upon the outer end portions of said bars in outwardly spaced relation to the outer ends of said sleeves extending transversely between said bars and including a rigid shelf for supporting engagement beneath a strip of stock, means carried by said holding means arranged to grip said strip against outward movement and to permit free inward movement; a stock advancing means comprising a carriage including a pair of sleeve portions respectively engaged for longitudinal sliding movement upon said bars between said sleeves of said base structure and said stock holding means, a rigid shelf in longitudinal alignment with said shelf of said stock holding means for supporting engagement beneath said strip of stock, and means carried by said advancing means arranged to grip and feed said strip during inward movement of said carriage and to pass freely over it during outward movement; a pair of stop members, one mounted on each of said bars for longitudinal adjustment on said bars between said sleeves of said base structure and said carriage, securing means movably mounted in said stop members and cooperatively engageable with said bars to rigidly secure the adjusted position of said stop members; longitudinal adjustment of said bars and said stock holding means rigidly secured thereto determining the outward limit of movement of said carriage, and longitudinal adjustment of said stop members determining the inward limit of movement; and feeding means connected to said carriage to impart inward and outward movement thereto.

2. The invention as defined in claim 1 further characterized by a transverse shaft mounting

sleeve fixed upon the upper side of one of said longitudinal sleeves and in that said feeding means comprises toggle linkage including a transverse shaft fixed in said transverse sleeve and having end portions projecting from the inner and outer ends thereof, an arm pivotally mounted at one end upon the inner end portion of said shaft, a link having a pivotal connection at one end to the free end of said arm and having a pivotal connection at its other end to said carriage, a second arm rigid with said first arm and pivotally mounted at one end upon the outer end portion of said shaft, an outwardly projected transverse pin carried by the free end of said second arm, a vertical bar to be vertically reciprocated by a moving part of a press in timed relation with movements of the press part, a pair of vertically spaced dogs on and relatively adjustable vertically along said bar, and securing means cooperating between said bar and dogs to fix the adjusted relation of the latter, and said dogs being positioned to alternately engage said pin as said bar is reciprocated vertically to extend and contract said toggle linkage and thus reciprocate said carriage outwardly and inwardly.

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