STOCK FEEDING MECHANISM FOR PUNCH PRESSES AND THE LIKE
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The present invention relates to stock feeding mechanisms by means of which predetermined lengths of stock material may be fed from a continuous supply of such material to any given machine operation. Stock feeding apparatus of the type with which the present invention is concerned are widely used in connection with the feeding of strip or sheet stock to the dies of punch presses and similar machines and, accordingly, the invention has been illustrated and described herein in connection with such use. It will be understood however that other uses for the apparatus are contemplated and that stock feeding mechanism embodying the principles of the present invention may be employed for feeding a wide variety of stock, regardless of its cross sectional shape, from a continuous supply of such stock, for example from a coil, reel, spool, drum or the like; from elongated straight or linear stock; or from the extruding dies by means of which such stock is formed and from which it issues continuously. Furthermore, the present apparatus is adaptable, without appreciable modification, for stock feeding purposes in connection with machines other than punch presses, as for example the feeding of coiled materials to multi-station progressive dies, blanking, stamping, piercing or shearing dies, tube or rod bending machines, spring coiling machines, and the like. The variety of forming, shaping or severing mechanisms too numerous to mention. Irrespective however of the particular use to which the invention may be put, or of the nature of the materials being fed, the essential features of the invention are at all times preserved.

The invention is specifically concerned with stock feeding apparatus of the type commonly referred to as the slide feed type, such apparatus involving essentially in its general organization a reciprocable feed head which alternately grips the material during the feed stroke thereof and releases the material during its return stroke preparatory to engaging another length of the material, together with a stationary drag or check device which operates in reverse, gripping the material during the return stroke of the feed head to prevent the material from backing up, and releasing the material during the feed stroke of the feed head to allow the material to be pulled forward. Slide feed mechanisms of the character briefly outlined above may be divided into two general types, based upon the manner in which the stock is gripped by the feed head for stock-advancing purposes. In one type of slide feed mechanism, the feed head is equipped with releasable pressure clamping means in the form of a gripper or finger which forces the material against an anvil during the feed stroke of the head and releases the material during the return stroke thereof. In the other type of slide feed mechanism, a spring-pressed cam gripping finger bears against the material undergoing feeding and is so biased that when the feed head moves forwardly, the finger, by an automatic wedging operation, binds the material against the anvil. During the return stroke of the feed head, the wedging action is automatically released so that the cam finger may slide upon the stock material. When a given stock feeding apparatus employs one or the other of these two types of clamping mechanisms for stock feeding purposes, it invariably employs a similar type of drag or check device on the retainer head. The present invention specifically relates to slide feed apparatus of the cam gripping type set forth above.

Slide feed mechanisms of this sort may also be classified according to the specific means employed for effecting reciprocation of the stock feed carriage which supports the gripper head. In one type of apparatus, reciprocation of the stock feed carriage is controlled by movement of the ram associated with the punch press or other forming machine, there being a direct mechanical connection between the ram and the feed carriage. In another type of apparatus, the carriage is reciprocated under the control of a piston and cylinder arrangement so that the length of the carriage stroke is not dependent upon the length of the ram stroke although the movements of the ram and carriage may be correlated by suitable trip mechanism operable under the control of the ram. The stock feeding apparatus of the present invention is specifically concerned with the latter type of mechanism wherein there is no direct mechanical connection between the ram and the stock feeding carriage.

In brief then, the stock feeding apparatus of the present invention is of the slide feed type, employs a cam type stock-gripping head, a cam type stock-retaining head, and utilizes a piston and cylinder arrangement for effecting reciprocation of the feed carriage which supports the gripping head. Stock feeding apparatus of the type briefly outlined above, and with which the present invention is concerned, is possessed of numerous limitations and, principal among these is the lack of an efficient adjustment for differences in stock thickness. Variability of stock thickness makes no provision whatsoever for variations in stock thickness and the customer is supplied by the manufacturer with a feed head in which the gripping finger or plate will accommodate only a very slight variation in thicknesses of the stock undergoing feeding, the accommodation being within the range of the gripping finger itself and not involving any repositioning of the finger. Other manufacturers make provision for limited shifting of the gripping finger, but the extent of the adjustment is slight and, at best, will accommodate but a few thousandths of an inch difference in stock thickness. Still other apparatus is equipped with anvils, the height of which may be adjusted by the application thereto, or the removal therefrom, of shims. These shims however will not accommodate wide variations in stock thickness. Furthermore, the cam type stock gripping fingers associated with stock feeding apparatus of the slide feed type are of relatively lightweight construction and they are floatingly mounted so that the presence of dirt or other foreign material which may become lodged in the vicinity thereof may shift their effective pivot point and after their cam eccentricity. Furthermore, because of their floating nature, after the stock has run out, such gripping plates will move against the anvil and preclude the introduction of new stock between the anvil and plate without first readjusting the position of the plate. The present invention is designed to overcome the above noted limitation that is attendant upon the construction and use of conventional cam type gripper plates or fingers and, toward this end, it contemplates the provision of a gripping head wherein the gripping face has a relatively long effective length, which is pivoted within the feed head at a point far removed from the plane of the stock undergoing feeding, is positively held against torsional or twisting movements so that the gripping edge thereof exerts a uniform pressure against all portions of the stock with which it comes into contact, and is carried by and is movable bodily with a vertically adjustable supporting block, the latter being capable of selective positioning throughout a wide range.
of movement toward and away from the plane of the stock so that the gripping finger carried thereby will accommodate wide variations in stock thickness.

The provision of a stock feeding mechanisms of the character briefly outlined above being among the principal objects of the invention, a similar and related object is to provide such a mechanism wherein the supporting block for the gripping plate or finger, after being moved to a given position for plate-adjusting purposes, may be effectively locked in such position whereby the gripping plate is firmly supported for swinging movement about a fixed axis so that the finger, except for the pivotal movement of which it is capable, cannot yield in any direction.

Another related object of the invention is to provide a novel means for spring-biasing the cam gripping finger against the stock for gripping purposes, provision being made for effectively varying the pressure of the finger without appreciably varying its inclination relative to the stock, and provision also being made whereby when stock run out occurs, the gripping edges of the finger will remain spaced from the anvil to permit ready introduction of new stock into gripping position.

A further limitation that is attendant upon the construction of present day slide stock feeding apparatus is concerned with adjustment of the length of the stroke of the feed carriage. Where piston and cylinder actuated feed carriages are concerned, adjustable limit stops have been provided for varying the amplitude of the carriage stroke, these limit stops assuming the form of elongated stop screws the length of which must necessarily be great if wide variations in stroke are desired. Manipulation of such adjusting screws is a time consuming operation and frequently requires careful measurement of distances and other calculations. The present invention contemplates the provision of a simpler means for varying the amplitude of the carriage stroke and involves means whereby an initial coarse adjustment of the limit stop embodying large increments of distance may be made, and thereafter a fine or infinite adjustment may be effected to complete the overall adjustment.

The provision of such an adjustment means constitutes another important object of the invention and, in carrying out such object, it is contemplated that the coarse adjustment of the limit stop be made by bodily shifting the position of the retaining head in the direction of stock feed, the adjustable limit stop being in the form of a limit stop screw mounted on the retaining head. Cooperating locating means on the retaining head and feed carriage guide rails establish the aforementioned coarse adjustment, while the infinite adjustment may be made by turning the limit stop screw after an initial positioning of the retaining head has been effected. By an arrangement of this character, not only are wide variations in feed carriage strokes easily accommodated, but certain advantages accrue from positioning the retaining head closer to the punch press or other stock treating machine, especially where light stock materials are concerned.

Yet another advantage arising from the present invention resides in the provision of removable and replaceable hardened steel inserts on the gripper finger, these inserts accommodating different stock shapes or configurations so that the apparatus may readily be converted for use, for example, from handling flat strip or sheet stock to the handling of corrugated stock, or stock which otherwise is provided with curved or other irregular surfaces. This feature of the invention, when coupled with means for adjusting the elevation of the gripping fingers which carry such inserts, allows the apparatus to accommodate a wide variety of stock having widely varying cross sectional shapes and thicknesses.

The provision of a stock feeding apparatus of the slide feed type which is extremely simple in its design and construction and which is comprised of a minimum number of parts, none of which are of an intricate nature, so that the apparatus may be manufactured at a low cost; one which reduces the number of moving parts to a minimum so that the apparatus is unlikely to get out of order; one which is rugged and durable and will therefore withstand rough usage; one which is capable of numerous adjustments for various purposes and all of which adjustments may securely be locked in position after being made; one which has been so designed so that there will be no shifting of parts or stock drive during actual machine operation; one which is capable of ease of assembly and disassembly for purposes of inspection of parts, replacement or repair thereof; one which is smooth and silent in its operation; one which is attractive in its appearance and pleasing in its design; and one which is otherwise is well adapted to perform the services required of it, are further desirable features which have been borne in mind in the production and development of the present invention.

Numerous other objects and advantages of the invention, not at this time enumerated, but which will become apparent as the following description ensues, are inherent in the present invention.

In the accompanying three sheets of drawings forming a part of this specification, one illustrative embodiment of the invention has been shown.

In these drawings:
FIG. 1 is a perspective view of a stock feeding apparatus constructed according to the principles of the present invention;
FIG. 2 is an enlarged fragmentary perspective view of a portion of the apparatus shown in FIG. 1 in the vicinity of the feed carriage and stock carriages,
FIG. 3 is a fragmentary detail exploded perspective view of a stock width adjustment assembly employed in connection with the present invention;
FIG. 4 is an exploded perspective view of a retainer head employed in connection with the invention,
FIG. 5 is an enlarged sectional view taken substantially centrally, vertically and longitudinally through the retainer head of FIG. 4;
FIG. 6 is a sectional view taken substantially along the line 6-6 of FIG. 5;
FIG. 7 is an enlarged sectional view taken substantially along the line 7-7 of FIG. 5;
FIG. 8 is a schematic perspective view illustrating the principles of operation of a gripper finger assembly employed in connection with the invention;
FIG. 9 is an enlarged sectional view taken transversely through the stock feed and in the vicinity of the retainer finger assembly, showing the apparatus in operation on a length of cylindrical stock; and
FIG. 10 is a sectional view similar to FIG. 9, showing the apparatus in operation on a length of corrugated stock.

Referring now to the drawings in detail and in particular to FIGS. 1 and 2, a stock feeding apparatus constructed according to the principles of the present invention has been designated in its entirety at 10 and it is shown as operating upon a continuous length of flat
strip stock S issuing from a suitable source of such stock, as for example a coil or the like (not shown). The function of the apparatus is to feed predetermined lengths of the stock S forwardly in the direction indicated by the arrow in these views to the operating dies of a punch press and a similar operating machine (not shown), the press being positioned as close as practicable to the forward end of the apparatus.  

The apparatus 10 involves in its general organization a stationary framework 12 adapted to be bolted or otherwise secured in position on the press bed. The framework 12 is of elongated design and includes a pair of spaced apart parallel base members 14 and 16, together with a transversely extending member 18 having open-ended slots 20 therein for reception therethrough of suitable clamping bolts by means of which the framework as a whole may be secured to the press bed. The upper edges of the base members 14 and 16 serve to support thereon a pair of elongated guide rails 22 and 24 which are substantially coextensive with the frame members 14 and 16 and which may be in the form of flat strips of bar stock. The guide rails 22 and 24 serve to slidably support thereon a reciprocating feed carriage assembly 30 (hereinafter referred to as the feed carriage) and to fixedly support thereon a longitudinally positionable stock retainer carriage assembly 32 (hereinafter referred to as the retainer carriage). The feed carriage 30 serves to support thereon a feed head 34, the details of which will be made clear presently, while the retainer carriage 32 serves to support thereon a retainer head 36 which is similar in its construction to the feed head 34. 

The carriage 30 further serves to support a removable and interchangeable anvil 40 in the form of a hardened steel insert which is secured in position within a recess 42 by means of fastening screws 44. A similar anvil 46 is carried by the carriage 32. The anvil 40 is designed for cooperation with a stock gripping finger assembly 48 for impelling the stock S forwardly during forward motion of the carriage 30, while the anvil 46 is designed for cooperation with a stock retainer finger assembly 50 in clamping the stock S against reverse or backward movement during the return stroke of the carriage 30, all in a manner that will be made clear presently. 

An adjustable edge guide 52 in the form of an elongated transversely extending arm having a guide roller 54 mounted thereon is designed for cooperation with a pair of similar guide rollers 56 (see also FIG. 5) in centering the forward regions of the stock S above the anvil 40 at all times during the operation of the apparatus. The carriage 30 is in the form of a relatively thick flat rectangular arm having a guide roller 54 mounted thereon which is designed to cooperate with portions of the guide rails 22 and 24 which overhang the sides of the longitudinal frame members 14 and 16 and serve to slidingly support the carriage 30 and feed head 34 as a unit on the guide rails. The retainer carriage 32 similarly is in the form of a rectangular plate of somewhat less width than the plate which comprises the carriage 30 and it is similarly supported on the guide rails 22 and 24 by recessed clamping members 64. The carriage 32 however is not slidably on these guide rails but, instead, it is adapted to be selectively positioned at predetermined spaced regions along the rails for a purpose that will be made clear presently. Positioning of the carriage 32 at such predetermined spaced regions is facilitated by means of locating pins 66 (FIG. 2) which are provided at spaced regions along the guide rails 22 and 24 respectively, and which cooperate with locating pins 68 which depend from the underside of the carriage 32. 

The feed head 30 and the retainer head 32 are similar in their general construction and organization and, therefore, it is believed that a description of one of these carriages will, to a large extent, suffice for the other, it being remembered however that the carriage 30 is reciprocable on the guide rails 22 and 24, while the carriage 32 is stationary in any selected position thereof. 

The retainer head 32 may be best seen in FIGS. 1, 4 and 5 and it involves in its general organization an L-shaped base support 70 including a horizontal leg 72 secured by screws 74 to the base 12 and a vertical leg 76. The leg 76 is provided with a vertically extending threaded socket 78 which receives therein an upward extending adjustment post 80. A vertically adjustable finger-supporting block 82 is provided with a lateral extension 84 at the upper end thereof which overlies the upper end of the leg 76 and is provided with a hole 86 therethrough through which the adjustment post 80 loosely extends. The post 80 projects upwardly above the extension 84 and receives therein a knurled adjustment nut 86 by means of which the elevation of the supporting block 82 may be controlled. A pair of L-shaped angle pieces 88 are secured by screws 90 to the vertical leg of the supporting block 82 and the opposed side edges of the angle pieces 90 extend slidably into grooves 94 which extend vertically on opposite sides of the block 82. A locking screw 96 of the Allen head type is threadedly received through a threaded bore 98 provided in the lateral extension 84 and the opposed end of the screw is adapted to seat upon the upper end of the vertical leg 76 of the support 70 so that when the locking screw 96 is tightened against the leg 76, the edges of the angle pieces 90 will bind in the grooves 94 and securely lock the supporting block 82 in any selected elevation to which it has been adjusted by the adjusting nut 86. By removing the adjusting nut 86 completely from the upper end of the adjustment post 80, the entire head assembly, exclusive of the fixed base support 70, may be removed from the carriage for purposes of inspection of parts, replacement and the like. 

The stock retaining finger assembly 90 constitutes a part of the retaining head 34 and is in the form of an elongated bar 100 which is generally square in transverse cross section and which has its lower end face bevelled as at 102 (see particularly FIG. 4). The leading or forward side 104 of the bar 100 is received as at 106 to receive a stock-engaging and -retaining insert 108 in the form of a hardened steel plate (see also FIG. 8) which, when flat strip stock such as the stock S is undergoing feeding by the apparatus, is provided with a relatively sharp linear edge 110. The bar 100 is pivoted at its ends to the outer side face 112 of the supporting block 82 by means of a shoulder bolt 114, the pivotal point being preferably slightly above the longitudinal center of the bar. The distance from the point of pivotal connection of the bar 100 to the horizontal plane of the upper surface of the stock S passing over the anvil 46 is slightly less than the distance from this pivot point to the gripping edge 110 so that when the edge 110 rests upon the stock as shown in FIG. 8, a transverse plane such as the plane represented by the line x--x of FIG. 8 will extend at an angle of approximately 11° from a vertical plane as is customary in connection with conventional gripper fingers. This angle is however not critical and a greater or lesser angle may be employed for the inclination of the plane x--x, depending upon the nature of the stock undergoing feeding and taking into consideration such factors as its hardness, the coefficient of friction offered to the edge 110, and the extent of the water contact presented by the edge 110. It will be observed at this point that the true axis of the bar is inclined rearwardly and downwardly, but the effective axis of the bar, i.e., the axis represented by the line x--x in FIG. 8, is inclined forwardly and downwardly so that the stock engaging and -retaining insert 108 will allow the stock material S to slide forwardly between the edge 110 and the anvil 46 but will, by a binding action, resist rearward movement of the stock material. 

Referring now to FIGS. 1, 4 and 7, the bar 100 is spring biased by two spring assemblies 120 and 122.
respectively on opposite sides of the bar. The two spring assemblies 120 and 122 are substantially identical so a description of one of them will suffice for them both. The spring assembly 120 is comprised of an adjustable arm 124 which has its proximate end secured by a clamping screw 126 to the forward side of the supporting block 92 and which carries at its distal end a plunger assembly including a hollow exteriorly threaded tubular sleeve 128, a plunger proper 130, a spring 132 and a backing plug 134 for the spring. The sleeve is adjustable in the distal end of the arm 126 and may be clamped in any desired adjusted position by means of a lock nut 156. The plunger 130 projects outwardly of the sleeve 128 and is adapted to have its outer end bearing against the upper region of the bar 100. The spring assembly 122 is identical with the assembly 120 but the arm 124 thereof is secured to the face of the supporting block 92 which is opposite the face to which the corresponding arm of the assembly 120 is clamped so that the plunger thereof bears against the rear side of the bar 100. From the above description it will be observed that the two spring assemblies 120 and 122 serve to bias the bar 100 in opposite directions so that the bar, in the free state thereof, will assume a final adjusted position. This floating position has been illustrated in full lines in FIG. 8 and represents the position of the bar 100 and stock-gripping insert 108 when there is no stock in the apparatus or resting upon the anvil 46. The dotted line position of the bar and insert in this view represents the stock-gripping portion thereof while the broken line position represents the position which the bar assumes when the stock is sliding forward over the surface of the anvil and in the direction indicated by the arrow. As previously stated, the feed head 36 is substantially identical with the retaining head 34 and it is similarly mounted upon the carriage 30. To avoid needless repetition of description, identical reference numerals have been applied to the corresponding parts of this latter feed head in the various views of the drawings. Since the carriage 30 is reciprocable in a longitudinal direction along the guide rails 22 and 24, the function of the stock-engaging insert 108 and anvil 40 is to impel the stock 5 forwardly during forward movement of the carriage 30 and to allow relative slipping movement between the insert and anvil during the return stroke of the carriage. The function of the insert 108 and anvil 46 is to allow slippage of the stock during forward motion of the carriage 30 and to prevent reverse movement of the stock during the return stroke of the carriage.

As best seen in FIG. 1, reciprocation of the carriage 30 is effected under the control of a pneumatic cylinder and plunger assembly 150. This assembly includes a cylinder proper 152 having front and rear heads 154 and 156 respectively, the front head being secured to the rear end faces of the longitudinal frame members 14 and 16 so that the axis of the cylinder is coaxial with the framework 12. The cylinder 152 is provided with a plunger 160 which extends horizontally between the two frame members 14 and 16, passes beneath the retaining carriage 32, and has its forward end secured in a block 164 (FIGS. 2 and 3) secured by screws 166 to the underside of the carriage 30. A portion of the plunger 160 is flattened as at 168 to facilitate threading of the extreme forward end of the plunger into a threaded hole 170 provided in the block 164. The extreme forward position of which the feed carriage 30 is capable of assuming is determined by the throw of the plunger 160 and the rear position of the selected setting of the retaining carriage 32 which carries an adjustable limit stop in the form of a stop screw 172 which is threadedly received in the forward side of the carriage and is adapted to be locked in its adjusted position by a lock nut 174.

In the operation of the apparatus 10, the leading portion of the stock 5 which may issue from a coil of such stock 5 is slid edgewise over the face of the two carriages 30 and 32 and is caused to be inserted between the two anvils 40 and 46 and their respective stock-engaging inserts 108. The two inserts are substantially identical but the insert 108 associated with the head 30 is a stock-impelling insert while the insert 108 associated with the head 32 is a stock-retaining insert. The stock 5 may then be pulled forwardly and the extreme forward region thereof lined up in operative relationship with the punch press or other machine with which the apparatus 10 is associated.

The cylinder and plunger assembly 150 may be actuated in timed relationship with the movements of the press ram or other moveable element of the press or other machine which operates upon the stock 5. The control mechanism by which means of which the cylinder and plunger assembly 150 is thus operated forms no part of the present invention and has not been disclosed herein and various electrical and pneumatic control devices are available for this purpose. It will be understood, of course, that the cylinder 152 is provided with fluid ports such as the ports shown at 180 and 182 adjacent the opposite ends thereof for the selective admission of air to the cylinder to drive the plunger 160 in opposite directions.

When air is admitted through the port 182, the plunger and feed carriage 30 will be moved forwardly on the guide rails 22 and 24 and the stock-gripping and impelling finger assembly 48 will bend the stock 5 against the anvil 40 in the manner previously described and by a pinching action; so to speak, carry the strip of stock forwardly. At this time, during forward movement of the carriage 30, the stock retaining finger assembly 50 will release the stock as previously described and allow the same to slide forwardly over the anvil 46. The stroke of the carriage 30, as determined by the particular location of the carriage 32, coupled with the adjustment of the limit stop screw 172, will determine the exact amount or length of stock which is fed forwardly during forward travel of the carriage 30.

Preferably, but not necessarily, the adjustment holes 66 provided in the guide rails 22 and 24 are spaced on one inch centers, while the effective reach of the adjustable limit stop screw 172 is at least one inch. Thus, for example, if a six and one half inch feed is required, the locating pins 68 will be set into the two holes labelled "16" in FIGS. 1 and 2, and the limit stop screw 172 will be turned so that it projects one half inch forwardly from the end face of the carriage 32, the above manipulations being predicated upon the fact that the first hole in each series of holes will be positioned one inch from the rear end face of the carriage 30 when the latter is in its extreme forward position.

It will be understood that prior to operation of the apparatus in the manner set forth above, the two stock-engaging finger assemblies 48 and 50 will be adjusted for height by means of the adjustment screws 87 and then locked in position by means of the locking screws 96 to bind the angle pieces 88 in the grooves 84 of the support blocks 82 as previously described. Additionally, the various spring assemblies 120 and 122 will be adjusted to afford the desired yieldable pressure against the bars 108 of the two finger assemblies 48 and 50 to attain the previously described floating condition of these assemblies in their free state.

Reference to FIGS. 9 and 10 will indicate that by interchanging anvils 40 and 46 with specially designed anvils such as those shown at 146 and 246 in FIGS. 9 and 10 respectively, and also changing the gripper plate inserts 56 for inserts 156 or 256, as the case may be, and which are counterparts of the anvils 146 and 246, the apparatus 10 may be readily changed over to the feeding of stock
other than flat stock and which may be of widely varying cross sectional configuration. In FIG. 9, the stock S' undergoing feeding is in the form of cylindrical rod stock and, accordingly both the anvil 146 and gripper plate 156 carried at the lower end of the retaining finger bar 160 are formed with trough-like depressions 148 and 158 respectively of conformable shape. In FIG. 10 the stock undergoing feeding is corrugated stock S' and, similarly, the anvil 246 and gripper plate 256 have conformably shaped mating surfaces 248 and 258 respectively.

Referring again to FIGS. 2 and 3, the adjustable edge guide 52 is available for use in connection with practically all shapes of stock which it is contemplated that the apparatus may handle, whether the stock be flat strip stock, wide sheet stock, or stock having appreciable thickness such as the rod stock of FIG. 9. Certain runs of stock may have fairly wide tolerances in their width dimension and, in such cases, the edge guide 52 will be set so that the roller 54 thereon just clears the outer running edge of the stock so that during the return stroke of the carriage 30, this roller will clear the stock but, nevertheless, remaining close proximity to the stock to prevent undue stock drift in a lateral direction. After a particular adjustment of the edge guide 52 has been made for stock width, the guide may be clamped in position by means of a clamping block 190 which is clamped against the stock by means of a clamping screw 192 which passes through the block and is threadedly received in the upper face of the carriage 30.

The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction may be resorted to without departing from the spirit of the invention. Therefore, only so far as the invention has particularly been pointed out in the accompanying claims is the same to be limited.

Having thus described the invention, what I claim and desire to secure by Letters Patent is:

1. In an apparatus for feeding stock material forwardly from a supply of the material to a given machine operation, a framework including a pair of horizontally disposed guide rails, a reciprocable feed carriage slidably mounted on said guide rails and moveable between advanced forward and retracted rear positions respectively, a retainer carriage on said framework, means for reciprocating said feed carriage, and a stock material gripping head on each of said carriage, each gripping head comprising a base support, a vertical locking screw threadedly received over the portion of the block and having its lower end engageable with the base support for engaging the block into engagement with the adjustment nut, a stock-engaging finger pivoted to said finger-supporting block and having its lower end engageable with the stock, and means yieldingly biasing said stock-engaging finger for swinging movement in a direction to force the same against the stock and bind the latter against the respective carriage with which it is associated.

2. In an apparatus for feeding stock material forwardly from a supply of the material to a given machine operation, in combination, a stationary framework, a pair of guide rails mounted on said framework and extending in the direction of stock material feed, a reciprocable feed carriage slidably on said guide rails and moveable between a forward advanced position and a rear retracted position, a positionable retainer carriage on said framework, a plurality of spaced apart locating holes formed in said guide rails, locating pins on the retainer carriage and selectively receivable in said holes whereby the retainer carriage may be positioned in the framework at selected longitudinal positions therealong, a longitudinally adjustable limit stop screw on said retainer carriage and engageable with the feed carriage to determine the retracted position of the latter, cooperating locking means on the retainer carriage and guide rails for clamping the retainer carriage in any selected position thereof, a cylinder and plunger assembly for reciprocating said feed carriage, and a stock material gripping head on each of said carriages and comprising a base support, a threaded adjustment post projecting upwardly above said base support, a finger-supporting block slidably vertically on said adjustment post and having a portion thereof overlying said base support, an abutment on the upper end of said adjustment post above said block and engageable with the block for limiting the upper position of the block on the post, a vertical locking screw threadedly received through the portion of the block and having its lower end engageable with the base support for elevating the block into engagement with the abutment on the upper end of the adjustment post, and a stock-engaging finger pivotable to said finger-supporting block and yieldingly biased so as to swing against the stock and bind the same against the respective carriage with which it is associated.

3. In an apparatus for feeding stock material forwardly from a supply of the material to a given operation, the combination set forth in claim 1, wherein said means for yieldingly biasing said stock-engaging finger comprises an adjustable arm having its proximate end clampingly secured to the finger-supporting block, a spring-pressed plunger mounted on the distal end of said arm and yieldingly bearing against said stock-engaging finger.

4. In an apparatus for feeding stock material forwardly from a supply of the material to a given operation, the combination set forth in claim 1, wherein said means for yieldingly biasing said stock-engaging finger comprises an adjustable arm having its proximate end clampingly secured to a forward face of said finger-supporting block, a spring-pressed plunger mounted on the distal end of said arm and yieldingly bearing against the forward side of said stock-engaging finger, a second adjustable arm having its proximate end clampingly secured to a rear face of said finger-supporting block, a spring-pressed plunger mounted on the distal end of said second arm and yieldingly bearing against the rear side of said stock-engaging finger, the two spring pressed-plungers normally yieldingly biasing the stock-engaging finger to a floating position wherein the lower end of the finger is out of contact with the respective carriage with which it is associated.

References Cited in the file of this patent

UNITED STATES PATENTS

2,379,002 Haller June 26, 1945
2,670,953 Marsilius Mar. 2, 1954
2,678,722 Marsilius May 18, 1954
2,856,186 Weymouth Oct. 14, 1958
3,036,647 Grimm June 12, 1962