

Jan. 14, 1941.

L. BERKEBIL

2,228,748

COMBINED FEEDING AND COLD DRAWING MECHANISM FOR HEADING MACHINES AND THE LIKE

Original Filed June 27, 1938

3 Sheets-Sheet 1

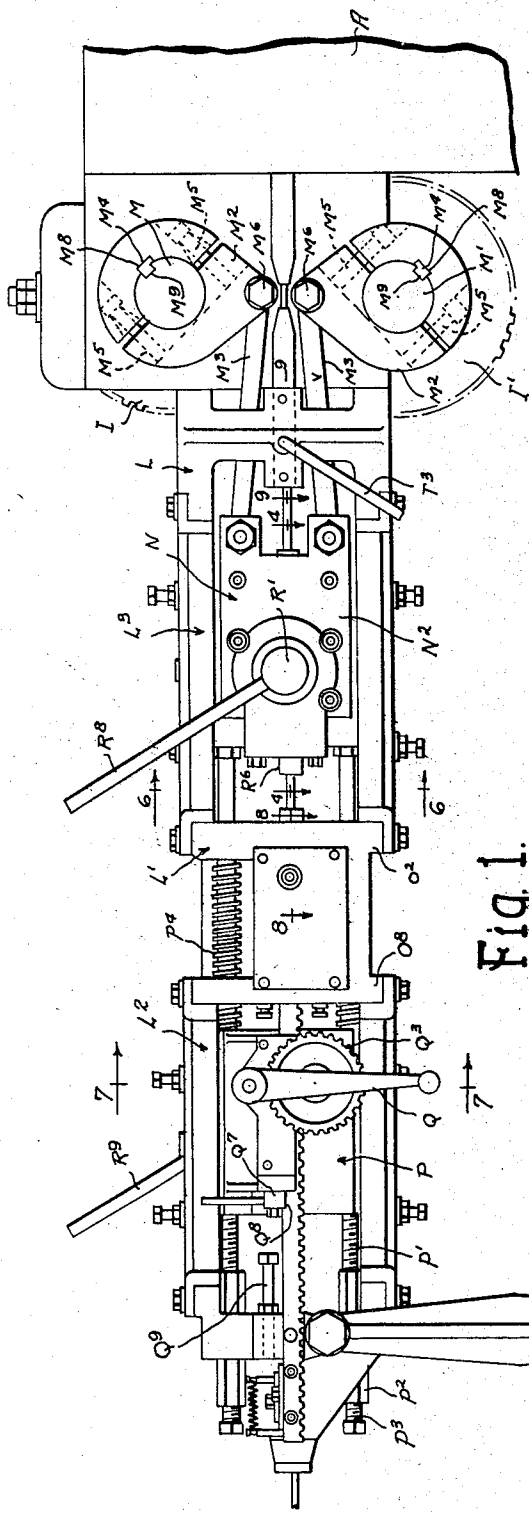


Fig. 1.

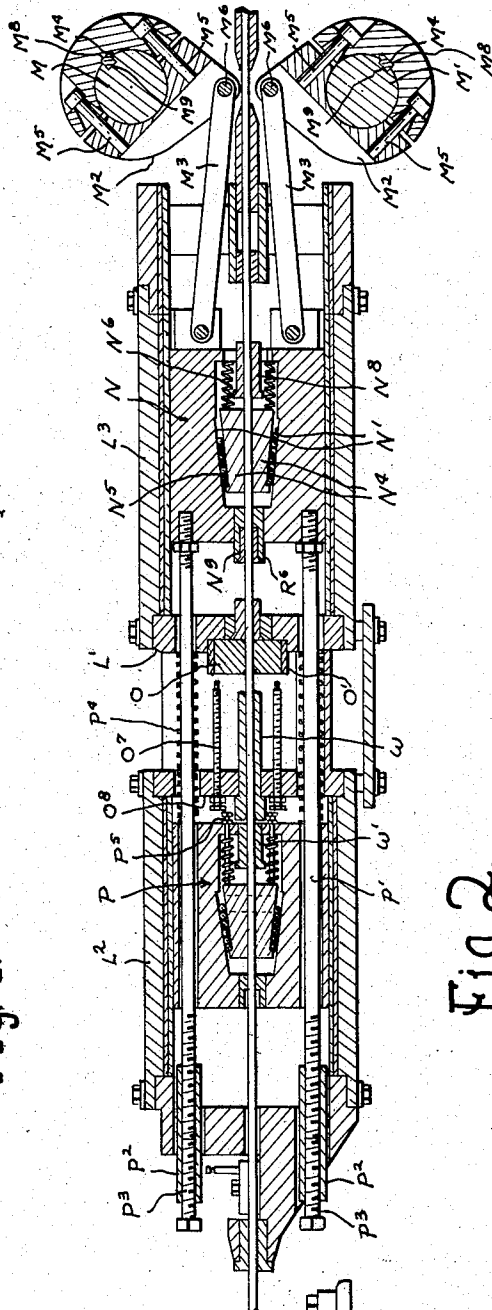


Fig. 2.

INVENTOR.
Lee Berkebil
BY *Whitman, Kullback & Berkman*
ATTORNEYS

Jan. 14, 1941.

L. BERKEBIL

2,228,748

COMBINED FEEDING AND COLD DRAWING MECHANISM FOR HEADING MACHINES AND THE LIKE

Original Filed June 27, 1938

3 Sheets-Sheet 2

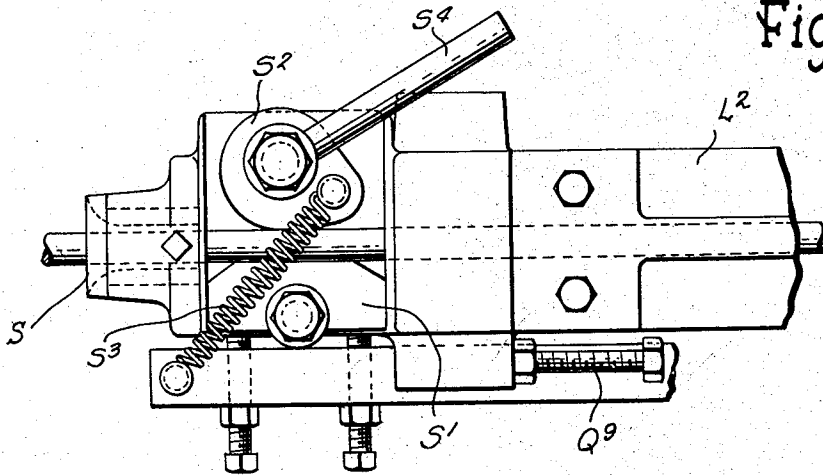


Fig. 3.

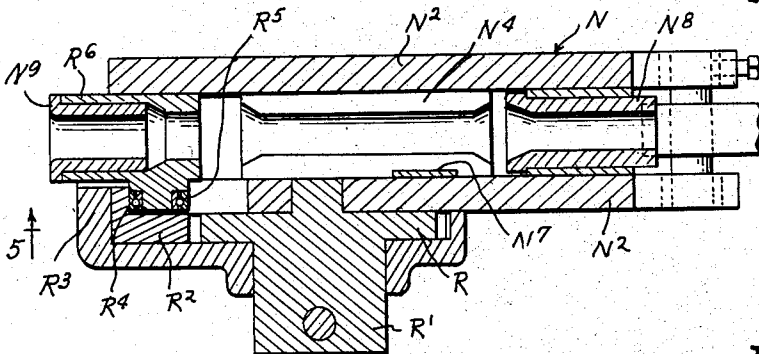


Fig. 4.

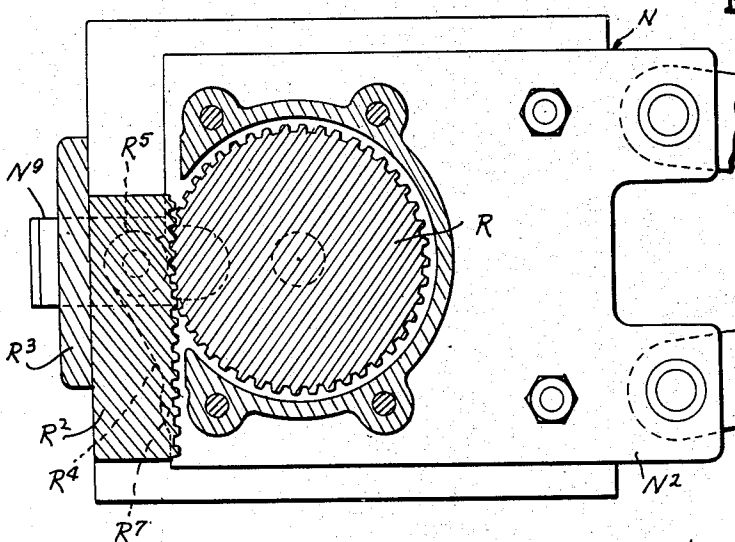


Fig. 5.

INVENTOR.

Lee Berkebil

BY

William H. Huxley & Secump
ATTORNEYS

Jan. 14, 1941.

L. BERKEBIL

2,228,748

COMBINED FEEDING AND COLD DRAWING MECHANISM FOR HEADING MACHINES AND THE LIKE

Original Filed June 27, 1938

3 Sheets-Sheet 3

Fig. 6.

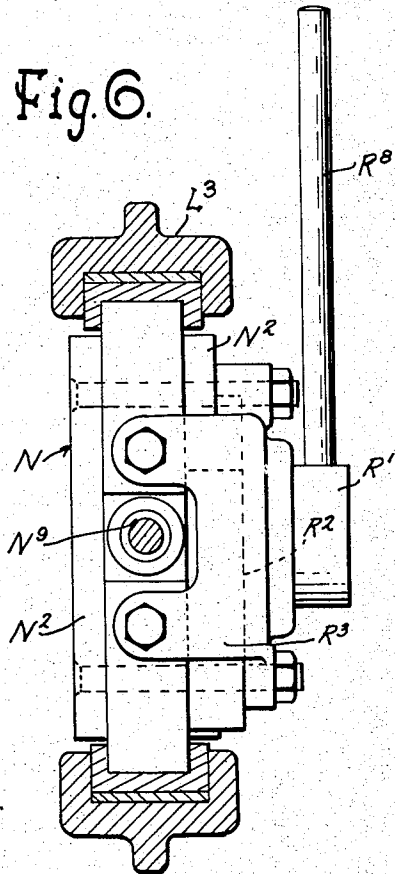


Fig. 7.

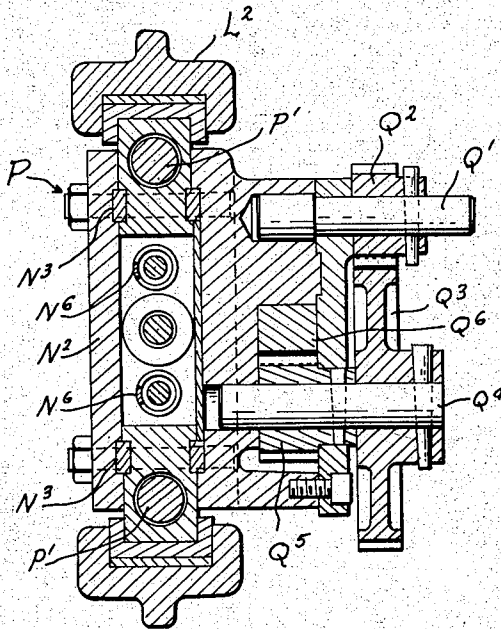


Fig. 8.

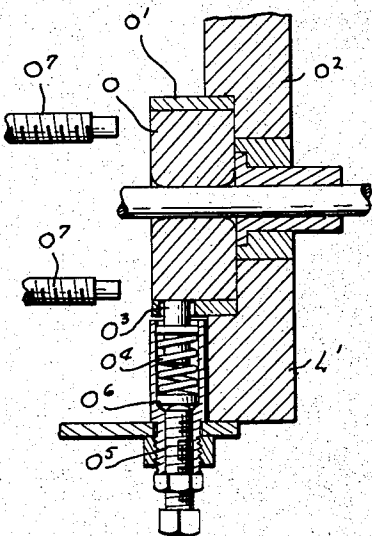
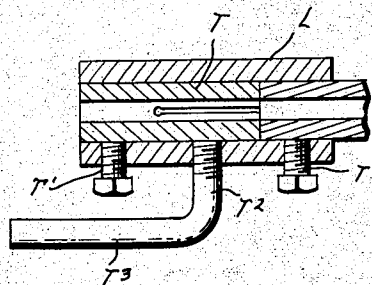


Fig. 9.



INVENTOR.
Lee Berkebil

BY *Whitman, Huber & Berkebil*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,228,748

COMBINED FEEDING AND COLD DRAWING
MECHANISM FOR HEADING MACHINES
AND THE LIKELee Berkebil, Detroit, Mich., assignor to B. W.
Manufacturing Company, Detroit, Mich., a cor-
poration of MichiganOriginal application June 27, 1938, Serial No.
216,134. Divided and this application May 8,
1939, Serial No. 272,485

43 Claims. (Cl. 140—130)

This invention relates generally to combined feeding and cold drawing mechanism for heading machines and the like and constitutes a division of my application filed June 27, 1938, bearing Serial No. 216,134.

One of the essential objects of the invention is to provide an improved feeding mechanism having reciprocating stock gripping jaws that are operable during the forward movement thereof to grip and advance the stock and are released sufficiently during rearward movement thereof to slide freely over the stock without moving the latter.

Another object is to provide feeding mechanism of this type wherein provision is made for separating the jaws before the same are used as feeders to permit stock to be inserted by hand therebetween.

Another object is to provide a feeding mechanism wherein means is provided for holding the jaws in such separated position until the stock has been inserted between the jaws as aforesaid.

Other objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is a side elevation of feeding mechanism embodying my invention;

Figure 2 is a vertical central longitudinal sectional view through the mechanism shown in Figure 1;

Figure 3 is an enlarged plan view of a portion of the mechanism shown in Figure 1;

Figure 4 is an enlarged horizontal sectional view taken substantially on the line 4—4 of Figure 1;

Figure 5 is a vertical sectional view taken substantially on the line 5—5 of Figure 4;

Figure 6 is a cross sectional view taken substantially on the line 6—6 of Figure 1;

Figure 7 is a cross sectional view taken substantially on the line 7—7 of Figure 1;

Figure 8 is an enlarged horizontal section through the sizing die, substantially on line 8—8 of Figure 1;

Figure 9 is a horizontal sectional view taken substantially on the line 9—9 of Figure 1.

Referring now to the drawings, L is a frame connected to a bed A of a heading machine and having a central die-holding section L' and sections L² and L³ on opposite sides thereof which constitute slideways for stock feeders. The outer end of the frame L is also floatingly supported by a pivotal link member L⁴ which rises

from a supporting base L⁵. The stock is advanced through the frame L in a direction from left to right, Figures 1 and 2, and for convenience in description, I will designate the portion to the right as forward and that to the left as rear.

Extending across the bed A and the forward end of the frame L are a pair of shafts M and M' which are in the same vertical plane and are connected to each other at one end by the intermeshing gear wheels I and I' fixed to the respective shafts. In central alignment with the frame L are rock arms M² which are connected by links M³ with a sliding head N forming the forward feeder. As this feeder has heavy work to perform, it is quite essential that the links M³ should be properly aligned so that the direction of pull will be parallel to the slideways and with no tendency to tilt the slide N therein. Inasmuch as the shafts M and M' are driven through the medium of intermeshing gear wheels, it is necessary that the rock arms M² should be very accurately positioned on said shafts to produce this parallel movement of the links M³ and head N. This is accomplished by first connecting each rock arm to its shaft through the medium of a key M⁴ having a wide portion M⁸ engaging the keyway in the rock arm and a narrow right angularly extending portion M⁹ engaging a keyway in the shaft. Thus by reversing the key M⁴ the rock arm will be circumferentially adjusted upon the shaft a distance equal to the variation in widths of the portions M⁸ and M⁹. Further and more accurate angular adjustment is accomplished by forming the rock arm in two sections embracing the shaft and connected to each other by clamping screws M⁵. Sufficient clearance is provided between the adjacent faces of these sections, so that by loosening one screw and tightening the other, one section may be angularly adjusted with respect to the other. The section which has the pivot pin M⁶ connecting with the link M³ is the adjustable section, while the other section contains the key M⁴ for attachment to the shaft. Thus by means of these two adjustments the required accuracy and positioning of the rock arms may be accomplished.

The slide head N of the forward feeder has spaced upper and lower portions forming wedge surfaces N' which taper from forward to rear. These portions are held in rigid relation to each other by side plates N² and splines N³. N⁴ are clamping jaws within the recess and having their outer surfaces parallel to the surfaces N' with rollers N⁵ arranged therebetween. The jaws N⁴ embrace the stock which is to be fed and

during the forward movement of the head N the resistance or load will tend to draw the jaws rearward, thereby wedging the same to tightly grip the stock. On the other hand, when the member N is moved rearward, this will instantaneously release pressure on the jaws so as to permit the same to slide rearward over the stock. Springs N⁶ within the recess and bearing against the forward ends of the jaws will hold the same in frictional engagement with the stock. A spline N⁷ extending vertically and engaging spline ways in the jaws N⁴ hold the same in alignment while permitting movement toward or from each other. There are also bushings N⁸ and N⁹ in the sliding head N for guiding the stock passing there-through.

The intermediate section L' holds the die member O through which the stock is passed to slightly reduce the diameter and finish the surface thereof. This die member, as shown in Figure 8, is mounted to permit a slight longitudinal movement thereof against frictional resistance. For this purpose the die is surrounded by an annular member O' which is fixed in the forward wall O² of the section L'. A friction shoe O³ extending through a recess in the annular member O' bears against the die O, and a spring O⁴ places a tension on the shoe. This tension may be varied by an adjusting screw O⁵ which bears against the follower O⁶ forming an abutment for the spring. To limit the sliding movement of the die within the annular member O' screws O⁷ extend through threaded apertures in the rear wall O⁸ of the section L' into proximity to the die, and these screws may be adjusted to obtain the desired amount of movement.

The feeder N being forward of the die O, it is obvious that some additional means must be provided to advance the forward end of the stock through the die before it can be engaged by said feeder. For this purpose I have provided a second feeder P which is substantially the same in construction as the feeder N and, therefore, will not be described in detail. This second feeder is actuated by the feeder N through the medium of rods P'. The forward ends of these rods threadedly engage the head N and extend rearward therefrom through apertures in the walls O² and O⁸ into the section L² of the frame L. The rear ends of these rods are also threaded and have engaged therewith correspondingly threaded sleeves P² which form shoulders that may be adjusted into different positions. A screw P³ engaging the rear portion of the sleeve P² and bearing against the rod P' serves to lock these members in any desired position of adjustment. The rods P' also pass through channels in the feeder P, and springs P⁴ sleeved on the rods forward of the feeder P yieldably press said feeder rearward toward the limiting stops formed by the sleeves P². There is, however, provision for holding the feeder P forward against the tension of the springs P⁴ so that the rods P' will merely slide through the channels. This means is shown in Figures 7 and 1 and comprises a crank arm Q mounted on a shaft Q' which is journaled in a side plate of the feeder, and a pinion Q² on the shaft intermeshes with the gear wheel Q³ to form a step-down transmission. The gear wheel Q³ is upon a shaft Q⁴ also journaled in the side plate and having a pinion Q⁵ which is in mesh with a stationary rack Q⁶ on the frame L. Thus by rotating the crank Q the pinion Q⁵ will be caused to travel along the rack Q⁶ carrying with it the feeder P. If the

movement of the crank is sufficient the feeder will be moved completely out of the path of the sleeves P² and may be locked in this position by a cam lever Q⁷ engaging a notch Q⁸ in the top of the rack Q⁶. When it is desired to throw the feeder into action the cam Q⁷ is disengaged from the notch Q⁸ whereupon the tension of the springs P⁴ will return the member P to its normal position. The reciprocation of the rods P' and sleeves P² will then correspondingly reciprocate the feeder P. The crank handle Q is detachable from the shaft Q', but the gears Q², Q³ and Q⁵ together with their shafts Q' and Q⁴ will be oscillated during the reciprocation of the feeder P. It is sometimes desirable to limit the stroke of the feeder P which is accomplished by a stop screw Q⁹ secured to the frame L at its rear end and adjustable into the path of the feeder.

The feeder P when thrown into operation may be used for advancing the stock through the die O and into engagement with the forward feeder N. However, before this is done it is convenient to separate the jaws of the rear feeder against the closing tension of the springs N⁶ so that the stock may be easily inserted by hand therebetween. This is accomplished by the mechanism illustrated in Figures 4, 5 and 6, and the same construction may be applied to both the feeders N and P, but on the former for emergency use only. As shown, a gear wheel R having a stub shaft R' is mounted on one of the side plates N² and is in mesh with a rack bar R² which is vertically slidable in guideways R³ at the rear end of said plate. This rack bar has a cam portion R⁴ contacting with a roller R⁵ on a sleeve R⁶ which latter carries the bushing N⁹. Thus, by rotating the gear wheel R the rack bar can be moved into a position where the sleeve R⁶ will contact with the rear ends of the jaw members N⁴ moving them forward against the tension of the springs N⁶ and thus permitting them to separate a sufficient distance for the insertion of the stock therebetween. A notch R⁷ at the end of the cam will hold the parts in this position until the stock has been inserted through the jaws. As shown in Figure 2, this adjustment means is on the front side of the head N and is provided with an operating handle R⁸ for actuating the same. A similar mechanism is placed on the back side of the member P, being operated by a handle R⁹.

The bushings N⁸ and N⁹ for the feeder N may be selected with respect to the diameter of stock to be passed therethrough, and similar bushings are provided for the feeder P which are of a diameter corresponding to that of the stock before it passes through the sizing die O. Still another bushing S is mounted at the rear end of the frame L and the stock is first fed through this bushing and into operative relation to the jaws of the rear feeder P. During the initial operation of the feeder P, it is necessary to hold the stock from moving rearward when the feeder moves in this direction. This function is performed by the mechanism shown in Figure 3, comprising a shoe S' on one side of the stock and a cam shoe S² on the other side of the stock actuated by a spring S³ to produce the required amount of friction. This is greater than the friction of the feeder jaws when moved rearward over the stock so that the latter remains stationary until the jaws again grip the same for a succeeding step forward. The shoe S² is only left in this position during the feeding of the stock through the sizing die O, 75

after which the friction of the latter will be sufficient to hold it from rearward movement, and the cam shoe S^2 can be thrown out of action by a handle S^4 for rotating the same. As soon as the spring S^3 passes the center of the cam, its tension will act to hold the cam in this position.

It sometimes happens that a section of stock will be bent or fouled in the machine, and it is necessary to withdraw it before the machine can be further operated. The high friction of the portion of the stock which is in engagement with the sizing die O would render it difficult to withdraw it from the die by hand power. I have, therefore, provided a means of locking the jaws of the feeder P upon the stock passing therebetween, so that they will clamp the stock even when the feeder is moved in a rearward direction. This locking means comprises screws P^5 which threadedly engage the forward end of the member P and adapted to be adjusted against the forward end of the jaws to force the same rearward until they firmly clamp the stock. This clamping is effected when the feeder P has been adjusted to its forward position, as shown in Figure 1, where the cam Q^7 locks it to the rack bar Q^6 . This cam may then be released and the crank handle Q engaged with the shaft Q^7 and rotated in the direction to move the feeder P rearward. If the amount of movement is not sufficient to completely withdraw the stock from the die O the screws P^5 may be adjusted to release the jaws while the member P is again moved forward by the crank handle Q, after which the screws P^5 are again adjusted to clamp the jaws and the member P is again drawn rearward. In this way fouled stock can easily be extracted from the machine.

When a stock bar is fed forward to the point where its rear end disengages from the sizing die O, it will be relieved from the friction of this die. It then becomes necessary to provide other means than the friction of the die O to hold the stock bar from rearward movement when the feeder N moves in this direction. A device for this purpose is shown in Figures 1 and 9 and comprises a split bushing T arranged forward of the feeder and held in position in the frame L by a screw T^1 . A second screw T^2 engaging the split portion of the bushing is revoluble by means of a handle T^3 to contract said bushing and to place the desired friction on the stock. Thus, the forward feeding of the stock can continue until its rear end disengages from the forward feeder N, after which it is still fed forward by a succeeding stock bar. Thus, the only waste is an end portion too short to form a blank of the required length.

Operation

In operation, the stock which is preferably hot-rolled and coiled is placed in a suitable holder, not shown, and its forward end is passed through the bushing S into engagement with the rear feeder P. Prior to this the handle R^9 has been moved to adjust the mechanism shown in Figures 4, 5 and 6, so as to move the jaws of the feeder forward and to permit the same to separate sufficiently for the insertion of the end of the stock bar. The handle R^9 is then turned into its normal position which permits the jaws to grip the stock bar and to feed it forward in successive steps. However, the friction device, illustrated in Figure 3, is adjusted into the position shown in said figure where it will hold the stock bar from moving rearward with the feeder P. After the required number of reciprocations of the feeder P

the stock bar will be advanced into engagement with the die O and then forced through the latter. The friction device S^2 can then be adjusted into its inoperative position shown in Figure 3, and the friction of the die O depended upon for holding the stock against rearward movement other than that permitted by the movement of the die against the stops O^7 . The forward advancement by the rear feeder is continued until the forward end of the stock bar which has been sized by the die O comes into operative engagement with the forward feeder N. The rear feeder may then be thrown out of action by adjustment of the mechanism shown in Figures 1 and 7, the crank handle Q being engaged with the shaft Q^7 and the latter revolved to transmit motion to the pinion Q^5 causing it to travel forward on the rack Q^6 . At the end of this movement the cam lever Q^7 is engaged with the notch Q^8 which will hold the feeder P forward and in its inoperative position. Thus, while the forward feeder N continues to reciprocate and moves with it the rods P^1 and sleeves P^2 , the latter do not come in contact with the member P. At the same time the handle R^9 is thrown forward, locking the jaws of the rear chuck open, thus preventing them from wearing out.

When the rear end of a stock bar passes beyond the die O, the friction clamp T shown in Figure 9 is used to hold the bar from rearward movement during the succeeding steps of the feed.

If at any time it should become necessary to remove a portion of the stock bar from the machine, this can be accomplished, as previously described, by adjusting the screws P^5 and clamping the jaws of the rear feed member P, after which the crank handle Q and mechanism operated thereby can be actuated to withdrawn the stock in a rearward direction. The rear feeder P when not in use for advancing the stock still performs the function of straightening the rod as it is drawn therethrough by the forward feeder.

The floating support of the frame L by the pivotal link L^4 permits any slight movement thereof occasioned by the stresses to which it is subjected while maintaining a rigid connection with the main frame or bed A.

When the stock is being advanced by the rear feeder it is necessary to support the portion which is between the feeder and the die, so as to avoid bending or buckling of the same. This is accomplished by supporting sleeves or bushings surrounding the stock and as shown in Figure 2, there is a long sleeve W attached to the rear wall of the section L^1 and extending forward into proximity to the die O, but leaving sufficient clearance for the floating movement of said die. There is also a shorter bushing W^1 at the forward end of the feeder P which extends into proximity to the forward ends of the gripping jaws. There is, however, one portion of the stock between the gripping jaws and the die which necessarily remains unsupported, viz: the portion which is between the sleeves W and W^1 when the feeder P is withdrawn to its rearmost position. For large diameter stock, such for instance as one inch rod, this distance is not enough to materially reduce the rigidity, but with smaller stock for instance one-half inch in diameter, there might be danger of buckling. To avoid such objection the stroke of the rear feeder may be diminished as much as desired, by means of the adjustment screw Q^9 . This forms a stop

which limits the rearward movement of the feeder P, so that by adjusting said stop forward the amount of clearance can be reduced to the desired degree. When such adjustment is effected, the stock will be advanced by the rear feeder in short steps, so that the unsupported portion will be relatively short in length.

What I claim as my invention is:

1. In a machine of the character described, means for advancing the stock comprising a reciprocating member, stock gripping jaws carried by said member and having a wedge engagement therewith, resilient means at one end of said jaws for urging said jaws rearward into said wedge engagement, and means carried by said reciprocating member at the other end of said jaws for moving said jaws forward and thereby releasing the same from said wedge engagement for the easy insertion of the stock therebetween.

2. In a machine of the character described, means for advancing the stock comprising a reciprocating member, stock gripping jaws carried by said member and having a wedge engagement therewith, resilient means in advance of said jaws for urging said jaws rearward into said wedge engagement, and means for releasing said jaws for the insertion of the stock therebetween comprising a sleeve surrounding the stock in rear of said jaws, and means on said reciprocating member for moving said sleeve forward against said jaws.

3. In a machine of the character described, means for advancing the stock comprising a reciprocating member, stock gripping jaws carried by said member and having a wedge engagement therewith, resilient means for urging said jaws rearward into said wedge engagement, and means for releasing said jaws for the insertion of the stock therebetween comprising a sleeve surrounding the stock in rear of said jaws, a gear wheel mounted on said reciprocating member, a rack engaging said gear wheel and movable thereby transversely of said member, a handle for rotating said gear, and a cam carried by said rack operatively engaging said sleeve to move the same forward against said jaws.

4. In a machine of the character described, means for advancing stock comprising a reciprocating head having spaced inclined upper and lower portions forming wedge surfaces, clamping jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, spring means within the head at one end of said jaws for moving said jaws relative to said wedge surfaces to operative clamping position, and means carried by said head at the other end of said jaws for moving said jaws relative to said wedge surfaces to inoperative position to permit the easy insertion of stock between said jaws.

5. In a machine of the character described, means for advancing stock comprising a reciprocating head having spaced inclined upper and lower portions forming wedge surfaces, clamping jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, spring means within the head in advance of said jaws for moving said jaws relative to said wedge surfaces to operative clamping position, and means for moving said jaws relative to said wedge surfaces to inoperative position to permit the easy insertion

of stock between said jaws including a sleeve for stock in rear of said jaws, and means carried by said head for moving said sleeve against said jaws.

6. In a machine of the character described, means for advancing stock comprising a reciprocating head having spaced inclined upper and lower portions forming wedge surfaces, clamping jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, spring means within the head in advance of said jaws for moving said jaws relative to said wedge surfaces to operative clamping position, and means for moving said jaws relative to said wedge surfaces to inoperative position to permit the easy insertion of stock between said jaws including a sleeve for stock in rear of said jaws, a gear carried by said head, a rack engaging said gear and movable thereby transversely of said head, and a cam carried by said rack operatively engaging said sleeve to move the same forward against said jaws.

7. In a machine of the class described, means for advancing the stock comprising a reciprocating head, stock gripping jaws carried by said head and having a wedge engagement therewith, resilient means for urging said jaws into said wedge engagement, and means for releasing said jaws from said wedge engagement, including a sleeve engageable with said jaws, a slidable rack having a cam for actuating said sleeve, and a gear for actuating said rack.

8. In a machine of the class described, means for advancing the stock comprising a reciprocating head, stock gripping jaws carried by said head and having a wedge engagement therewith, resilient means for urging said jaws into said wedge engagement, and means for releasing said jaws from said wedge engagement, including slidable means substantially in axial alignment and engageable with an end of said jaws, and means for actuating said slidable means including a member slidable at substantially right angles to said slidable means.

9. In a machine of the class described, means for advancing the stock comprising a reciprocating head, stock gripping jaws carried by said head and having a wedge engagement therewith, resilient means for urging said jaws into said wedge engagement, and means for releasing said jaws from said wedge engagement, including a gear carried by said head, a rack actuable by said gear and having a cam portion, and a sleeve for the stock actuable by said cam portion against said jaws.

10. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for moving the jaws against the yieldable means so that work may be inserted by hand therebetween, including a longitudinally movable member at the other end of the jaws, and means for moving said member toward said yieldable means.

11. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming

wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for moving the jaws against the yieldable means so that work may be inserted by hand therebetween, including a longitudinally movable member at the other end of the jaws, and a cam for moving said member toward said yieldable means.

12. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for moving the jaws against the yieldable means so that work may be inserted by hand therebetween, including a bushing for the work at the other end of the jaws, and a sleeve for said bushing engageable with said jaws.

13. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for moving the jaws against the yieldable means so that work may be inserted by hand therebetween, including a tubular work-receiving member at the other end of said jaws and engageable therewith.

14. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for moving the jaws against the yieldable means so that work may be inserted by hand therebetween, including a bushing for work at the other end of said jaws, a sleeve for said bushing engageable with said jaws, and actuating means for the sleeve including a longitudinally movable member having a cam portion, and a projection on the sleeve engaging said cam portion.

15. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for moving the jaws against the yieldable means so that work may be inserted by hand therebetween, including a longitudinally movable tubular member at the other end of and engageable with the jaws, and actuating means for the tu-

bular member including a cam, and a projection on the tubular member engaging said cam.

16. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for moving the jaws against the yieldable means so that work may be inserted by hand therebetween, including a longitudinally movable member at the other end of and engageable with said jaws, a projection on said member, a cam engaging the projection, and means for moving said cam.

17. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for moving the jaws against the yieldable means so that work may be inserted by hand therebetween, including a longitudinally movable member at the other end of and engageable with said jaws.

18. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for moving the jaws against the yieldable means so that work may be inserted by hand therebetween, including a longitudinally movable member at the other end of said jaws, and means for moving said member toward said yieldable means including a longitudinally movable rack having a cam portion, a projection on the longitudinally movable member engaging said cam portion, and a manually operable gear meshing with said rack.

19. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for moving the jaws against the yieldable means so that work may be inserted by hand therebetween, including a longitudinally movable member at the other end of said jaws, and means for moving said member toward said yieldable means including a longitudinally movable rack having a cam portion and a notch, and a projection on the longitudinally movable member engageable with the cam portion to move the longitudinally movable member and engageable

with the notch to hold the parts in a predetermined position.

20. In a machine of the class described, reciprocating jaws for feeding the work forwardly, and means operable during the initial operation of said jaws to hold the work against rearward movement when the jaws move rearward, including opposed work-engaging shoes, one being adjustable relative to the work, the other being a cam, and actuating means for the cam shoe including a spring capable of exerting through the cam shoe upon the work a greater force than that exerted by the jaws upon the work.

21. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, means for locking the jaws upon the stock passing therebetween including screws threadedly engaging the head and engageable with the jaws at one end thereof.

22. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head; anti-friction means between said parallel portions; means for locking the jaws upon the stock passing therebetween including screws threadedly engaging the head and engageable with the jaws at one end thereof, and means sleeved on said screws and operable when the latter are released for moving the jaws relative to the wedge surfaces to operative clamping position.

23. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of the jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means for locking the jaws upon the stock including screws threadedly engaging the head and engageable with the jaws.

24. In a machine of the class described, a frame, a sizing die, a reciprocating means for feeding stock relative to the die, and means for holding the stock against rearward movement when the feeding means moves rearward, including a split bushing in the frame forward of the feeding means, a screw carried by the frame for holding the bushing in position, and a handle actuated screw carried by the frame and engaging the split portion of the bushing, said last mentioned screw being adapted to contract the split portion of the bushing upon the stock.

25. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of the head, anti-friction means between said parallel portions, yieldable means at one end of said jaws for moving the jaws relative to the wedge surfaces to operative clamping position, and means

for moving the jaws against the yieldable means so that work may be inserted by hand therebetween.

26. In a machine of the class described, reciprocating jaws for feeding the work forwardly, and means operable during the initial operation of said jaws to hold the work against rearward movement when the jaws move rearward, including opposed work-engaging shoes, one being adjustable relative to the work, the other being a cam, and means for actuating the cam shoe including means capable of exerting through the cam shoe upon the work a greater force than that exerted by the jaws upon the work.

27. In a machine of the class described, a stock advancing mechanism including a reciprocating head having spaced inclined portions forming wedge surfaces, work-engaging jaws between said wedge surfaces and having inclined portions substantially parallel to the inclined surfaces of said head, anti-friction means between said parallel portions, and means carried by the head and engageable with one end of the jaws for locking the jaws upon the stock passing therebetween.

28. In a machine of the class described, means for advancing the stock including a reciprocating head having wedge surfaces, stock gripping jaws carried by said head and actuable by said wedge surfaces into clamping engagement with the stock, and resilient means carried by the head and bearing against one end of the jaws to hold said jaws wedged by said surfaces against the stock, means for moving said jaws against the tension of said resilient means to free the jaws from said wedge surfaces, and means for retaining the jaws in such freed position.

29. In a machine of the class described, a pair of opposed stock clamping jaws, a reciprocating head carrying the jaws and having wedge surfaces for moving the jaws transversely of the head to clamped position against the stock, and two means movable lengthwise of the head and bearing against one end of the jaws to hold said jaws wedged by said surfaces against the stock, one of said means being a manually operable member.

30. In a machine of the class described, a pair of opposed stock clamping jaws, a reciprocating head carrying the jaws and having wedge surfaces for moving the jaws transversely of the head to clamped position against the stock, and an adjusting screw movable lengthwise of the head against one end of the jaws to hold the jaws wedged by said surfaces against the stock.

31. In a machine of the class described, a pair of opposed stock clamping jaws, a reciprocating head carrying the jaws and having wedge surfaces for moving the jaws transversely of the head to clamped position against the stock, and a manually operable member movable lengthwise of the head against one end of the jaws to hold the latter wedged by said surfaces against the stock.

32. In a machine of the class described, a frame, a sizing die carried by said frame, means for feeding stock relative to the die, and means also carried by the frame for holding the stock against rearward movement when the feeding means moves rearward, including a member carried by said frame forward of the feeding means and adapted to be contracted upon the stock, an adjustable element carried by the frame for holding the contractible member in position, and means carried by the frame for contracting the contractible member upon the stock.

33. In a machine of the class described, a frame, a sizing die carried by said frame, means for feeding stock relative to the die, and means also carried by the frame for holding the stock against rearward movement when the feeding means moves rearward, including a member carried by the frame forward of the feeding means and having a portion adapted to be contracted upon the stock, an adjustable element carried by the frame for holding said member in position, and a manually operable member carried by the frame and engaging the contractible portion of said member, said manually operable member being adapted to contract the contractible portion of said member upon the stock.

34. In a machine of the class described, reciprocating jaws for feeding the work forwardly, and means operable during the initial operation of said jaws to hold the work against rearward movement when the jaws move rearward, including opposed work-engaging shoes, one being adjustable relative to the work, and means for actuating the other shoe to exert upon the work a greater force than that exerted by the jaws thereon.

35. In a machine of the class described, a die for sizing stock, a feeder for moving stock relative to said die, and means operable when the stock is relieved of friction of the die to hold the stock from rearward movement during rearward movement of the feeder, including a split bushing, and manually operable means for contracting the bushing upon the stock.

36. In a machine of the class described, a pair of opposed stock clamping jaws, a reciprocating head carrying the jaws and having wedge surfaces for moving the jaws transversely of the head to clamped position against the stock, and means threadedly engaging the head and bearing against one end of the jaws to hold said jaws wedged by said surfaces against the stock.

37. In a machine of the class described, a pair of opposed stock clamping jaws, a reciprocating head carrying the jaws and having wedge surfaces for moving the jaws transversely of the head to clamped position against the stock, and manually operable means adjustably engaging the head and engageable with the jaws at one end thereof for holding said jaws wedged by said surfaces against the stock.

38. In a machine of the class described, a reciprocating head having transversely opposed longitudinally extending wedge surfaces, a pair of opposed stock clamping jaws carried by said head between and actuable by said opposed wedge surfaces to clamped position against the stock, and two different means movable lengthwise of the head and bearing against one end of the jaws to hold said jaws wedged by said surfaces against the stock, one of said means being operable to lock the jaws upon the stock.

39. In a machine of the class described, means for advancing the stock including a reciprocating head having opposed longitudinally extending wedge surfaces, stock gripping jaws carried by said head between and actuable by said wedge surfaces into clamping engagement with the

stock, means carried by said head and bearing against one end of the jaws to hold said jaws wedged by said surfaces against the stock, and manually operable means for moving said jaws against the action of said holding means to separate the jaws for the insertion of stock therebetween.

40. In a machine of the class described, a reciprocating head having opposed wedge surfaces work clamping jaws between and actuable by said wedge surfaces into gripping engagement with the work, spring means urging the jaws into engagement with the wedge surfaces, and manually operable means for moving the jaws against the tension of the spring means to permit the insertion of stock between the jaws, including a slidable element engageable with said jaws at one end thereof, a roller carried by said element, and a longitudinally movable member having a cam portion contacting said roller.

41. In a machine of the class described, a reciprocating head having opposed wedge surfaces, work clamping jaws between and actuable by said wedge surfaces into gripping engagement with the work, spring means urging the jaws into engagement with the wedge surfaces, and means for moving the jaws against the tension of the spring means to permit the insertion of stock between the jaws, including a slidable element engageable with said jaws at one end thereof, a roller carried by said element, a longitudinally movable member having a cam portion contacting said roller, and manually operable means for moving said member.

42. In a machine of the class described, a reciprocating head having opposed wedge surfaces, work clamping jaws between and actuable by said wedge surfaces into gripping engagement with the work, spring means urging the jaws into engagement with the wedge surfaces, means for moving the jaws against the tension of the spring means to permit the insertion of stock between the jaws, including a slidable element engageable with said jaws at one end thereof, a roller carried by said element, a longitudinally movable member having a cam portion contacting said roller, and means for moving said member, said cam portion having a notch for receiving the roller to detain the slidable element in a predetermined position relative to the jaws after said member has moved a predetermined distance in one direction.

43. In a machine of the class described, a reciprocating head having opposed wedge surfaces, work clamping jaws between and actuable by said wedge surfaces into gripping engagement with the work, spring means urging the jaws into engagement with the wedge surfaces, means for moving the jaws against the tension of the spring means to permit the insertion of stock between the jaws, including a slidable element engageable with said jaws at one end thereof, a roller carried by said element, and a longitudinally movable member having a cam portion contacting said roller, and a guide bushing for the work carried by said slidable element.

LEE BERKEBIL.