Oct. 22, 1935. H. J. HOGUE 2,018,211

WIRE DRAWING MACHINE

Filed Nov. 21, 1934 4 Sheets-Sheet 1

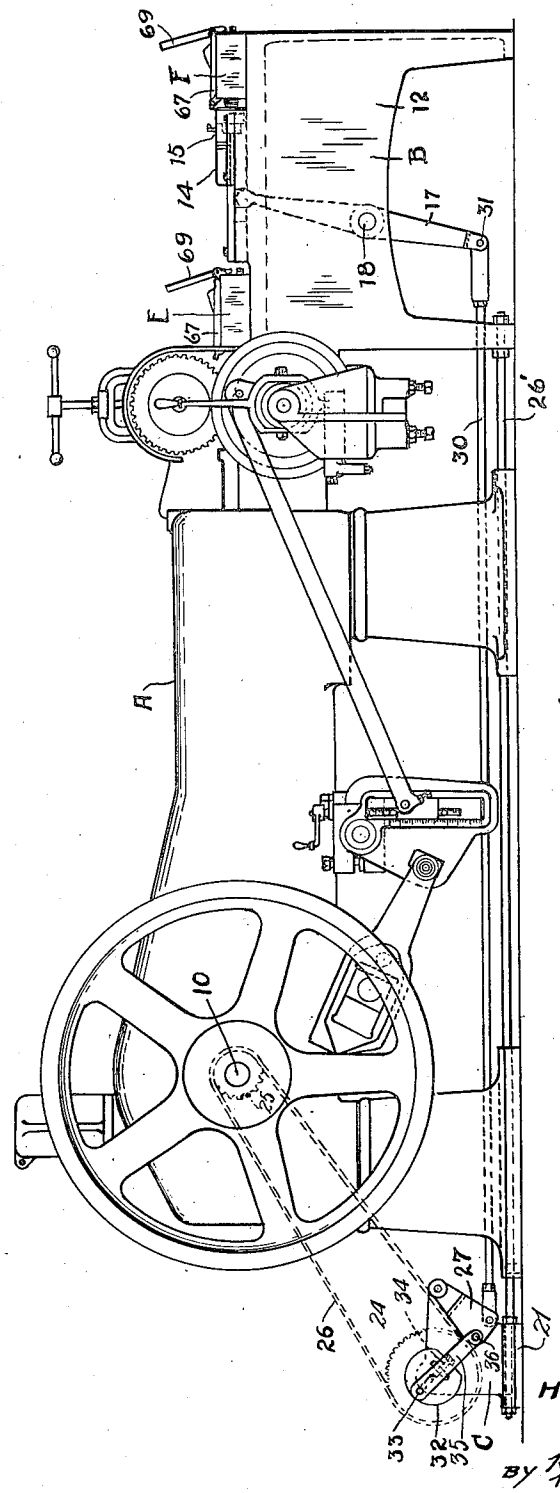

FIG. 1.

INVENTOR
HENRY J. HOGUE.

BY Lewis Hudson & Kent
ATTORNEYS.

Oct. 22, 1935. H. J. HOGUE 2,018,211

WIRE DRAWING MACHINE

Filed Nov. 21, 1934 4 Sheets-Sheet 2

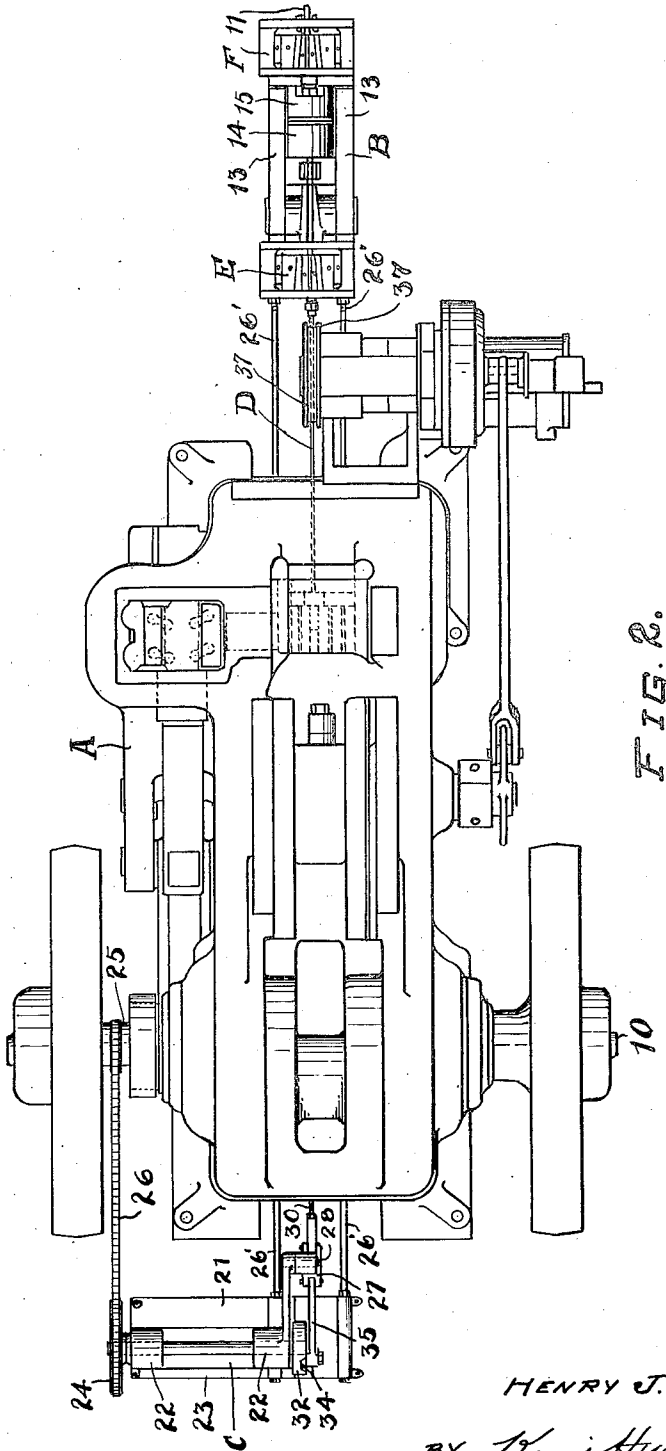

FIG. 2.

INVENTOR
HENRY J. HOGUE.

BY Lewis Hudson & Heat.
ATTORNEYS

Oct. 22, 1935. H. J. HOGUE 2,018,211

WIRE DRAWING MACHINE

Filed Nov. 21, 1934 4 Sheets-Sheet 3

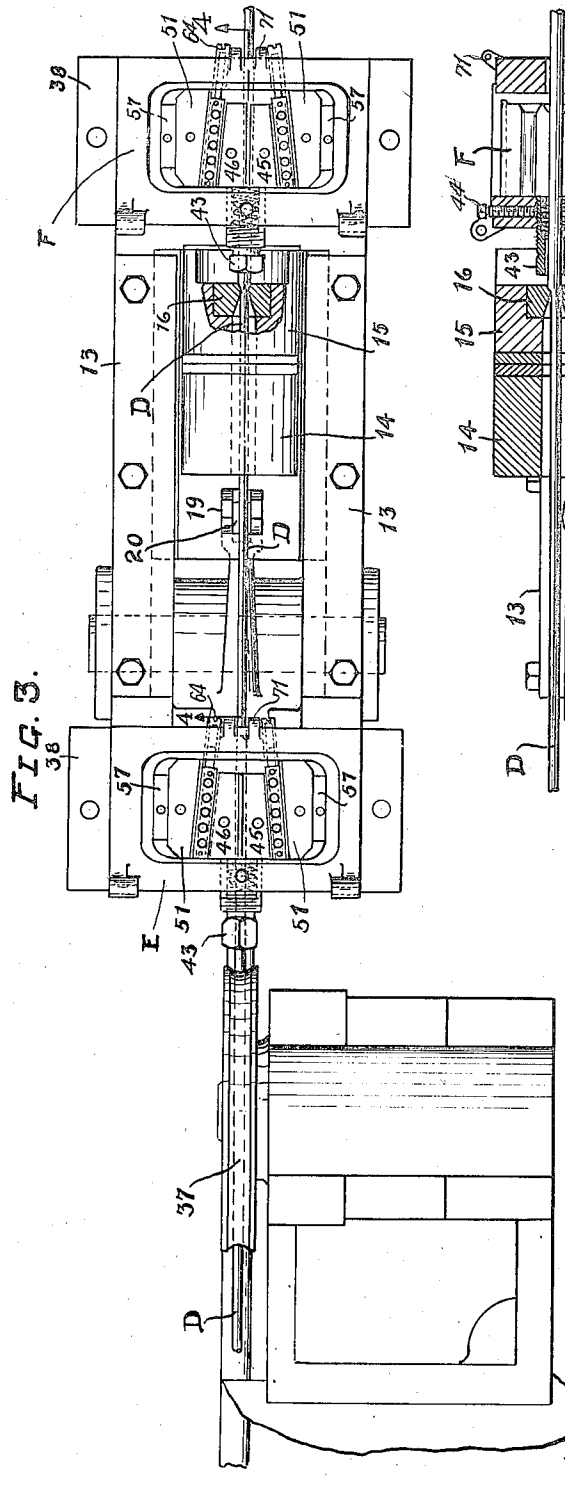

FIG. 3.

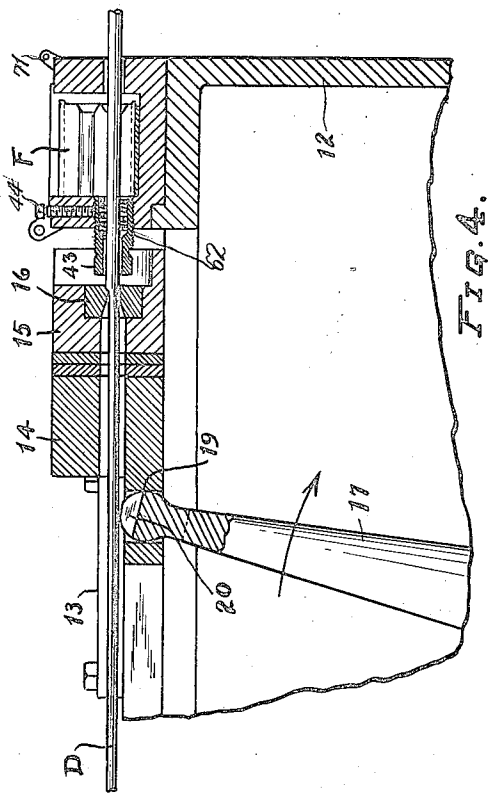

FIG. 4.

INVENTOR
HENRY J. HOGUE.
By Lewis Hudson & Kent
Attorneys.

Oct. 22, 1935. H. J. HOGUE 2,018,211

WIRE DRAWING MACHINE

Filed Nov. 21, 1934 4 Sheets-Sheet 4

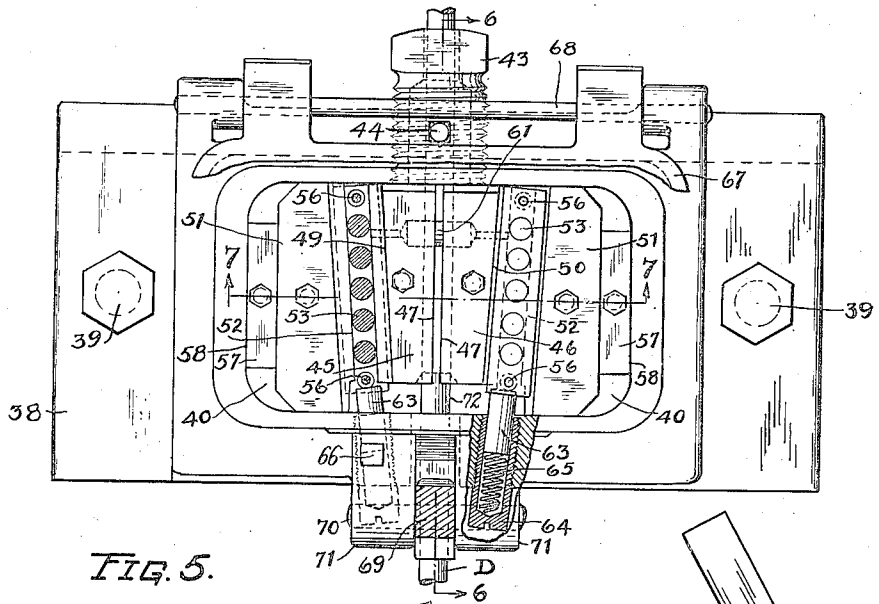

FIG. 5.

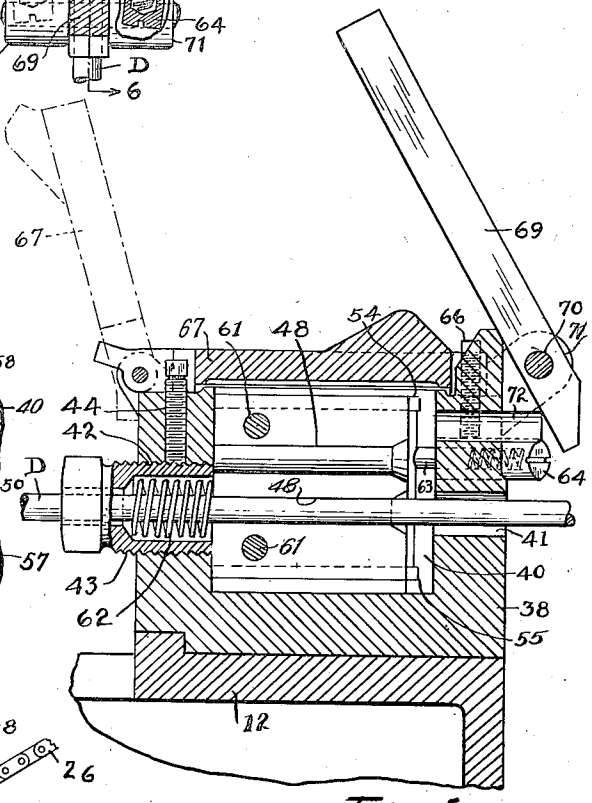

FIG. 6.

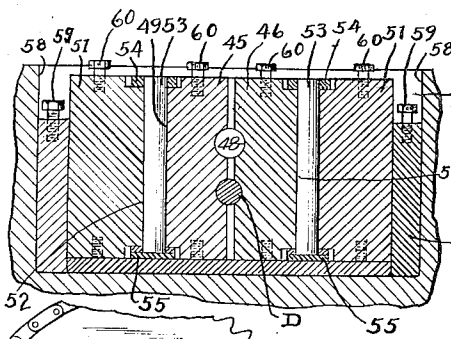

FIG. 7.

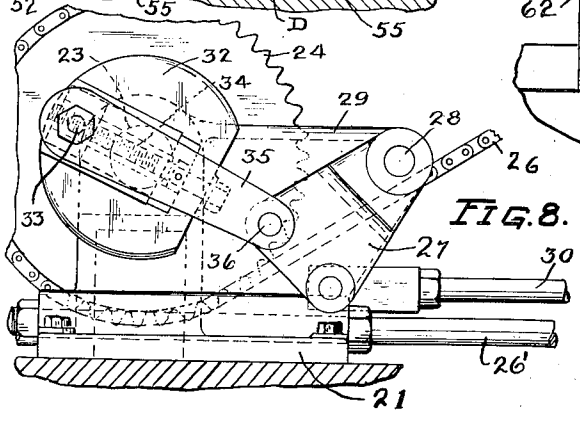

FIG. 8.

INVENTOR,
HENRY J. HOGUE.
By Kwis Hudson & Kent
Attorneys.

Patented Oct. 22, 1935 2,018,211

UNITED STATES PATENT OFFICE

2,018,211

WIRE DRAWING MACHINE

Henry J. Hogue, Lakewood, Ohio, assignor of one-third to Charles L. Wasmer and one-third to John C. Wasmer, both of Lakewood, Ohio

Application November 21, 1934, Serial No. 754,105

6 Claims. (Cl. 29—33)

This invention relates to wire-drawing machines for use in tandem with a wire fabricating machine, such as a bolt header or other machine for cutting the wire into fixed lengths and converting the same into finished articles or blanks which are to receive additional fabricating operations in order to complete the finished article. The invention relates to certain improvements in the apparatus described and claimed in my prior Patent No. 1,934,466, granted November 7, 1933.

It is one of the objects of the invention to provide an improved form of stock-gripping means for holding the stock stationary while it is being operated upon by the reciprocating drawing die.

It is a further object of the invention to provide an improved form of driving mechanism for the wire-drawing machine that may be installed separate from and unattached to the fabricating machine, and yet driven therefrom in such a manner that the wire-drawing machine will operate in exact synchronism with the fabricating machine.

Other objects of the invention and the features of novelty will be apparent from the following description taken in connection with the accompanying drawings of which

Fig. 1 is a side elevation of an apparatus embodying my invention;

Fig. 2 is a plan view thereof;

Fig. 3 is an enlarged plan view of the wire-drawing machine;

Fig. 4 is a longitudinal section on the line 4—4 of Fig. 3;

Fig. 5 is an enlarged plan view showing the details of my improved stock-gripping and holding mechanism;

Fig. 6 is a longitudinal section thereof on the line 6—6 of Fig. 5;

Fig. 7 is a transverse section on the line 7—7 of Fig. 5, and

Fig. 8 is an enlarged side elevation of the driving mechanism for the wire-drawing machine.

Referring to Figs. 1 and 2, A represents, generally, a bolt header of a well known type in which the wire stock is intermittently fed and cut into lengths and these lengths then formed into blanks for bolts and screws. The bolt header has a main power shaft 10 to which power may be applied, in any preferred manner, for operating the header. B represents, generally, the wire-drawing machine, and C represents, generally, the drive therefor. The wire-drawing machine B and the driving mechanism C are mounted on a suitable foundation independently of the header A and are in tandem relation with the header, the wire-drawing machine being at one end of the header and the driving mechanism at the other.

The stock is indicated at D and enters the wire-drawing machine at 11 from a coil that is supported on a reel, (not shown), in accordance with the usual practice of feeding stock to a fabricating machine, such as the header A.

The wire-drawing machine comprises a frame 12 having slides 13 for the cross-head 14 and the die carrier 15. These parts are shown in detail in Figs. 3 and 4. The die carrier has a wire-drawing die 16 mounted therein and is free to recirocate in the slides 13.

The cross-head 14 is actuated by an oscillating lever 17 that is mounted on a shaft 18 and this shaft is mounted in suitable bearings in the frame 12. The upper end of the lever 17 extends into a slot 19, in the cross-head 14, as will be seen from Fig. 4, sc that the oscillation of the lever will reciprocate the cross-head in the ways 13. The upper end of the lever 17 is bifurcated, as shown at 20, so that it will not interfere with the stock D.

The driving mechanism C comprises a frame 21 having bearings 22 for the rotating shaft 23. The shaft 23 carries a sprocket 24 at one end and this sprocket is driven from a sprocket 25, on the shaft 10 of the fabricating machine, by means of a chain 26, so that the shaft 23 will at all times rotate in exact synchronism with the shaft 10 from which the various mechanisms of the fabricating machine are actuated. The frame 21 is mounted on the foundation, independently of the fabricating machine, and is held in definitely spaced relation with the wire-drawing machine B by means of a pair of tie-bolts 26' which extend beneath the fabricating machine and are adjustably connected, at their opposite ends, to the frame 21 and the frame 12. A rocker arm 27 is mounted on a stub shaft 28 that is carried by a bracket 29 on the frame 21. The lower end of the rocker arm 27 is bifurcated and has connected therewith a connecting rod 30, which extends beneath the fabricating machine and is operatively connected with the lower end of the lever 17, as indicated at 31.

The shaft 23 carries a crank disk 32 on which there is a crank pin 33 that is adjustable radially of the shaft 23, by means of the screw 34, to vary the throw of the crank pin. A link or connecting rod 35 connects the crank pin 33 with a pin 36 on the rocker arm 27, so that the rotation of the shaft 23 will effect the oscillation of the rocker

arm 27 and the movements of the rocker arm 27 will be transmitted to the lever 17 by the connecting rod 30.

From the foregoing general description of the apparatus it will be seen that the driving mechanism C will be actuated in synchronism with the fabricating machine A and that the cross-head 14, being positively actuated from the driving mechanism C, will also operate in exact synchronism with the fabricating machine.

The fabricating machine A will be provided with suitable stock feeding means, such as a pair of rolls 37 which are actuated by suitable mechanism to intermittently feed the stock into the fabricating machine. The driving mechanism C is so timed that the lever 17 will be actuated in the direction of the arrow, in Fig. 4, during the periods that the stock D is at rest, and the lever 17 will move in the opposite direction during the periods that the stock is being fed into the fabricating machine. The die 16 operates on the stock to reduce its diameter and provide the necessary surface on the stock to facilitate the operations in the fabricating machine. Therefore, when the stock D is fed forward into the fabricating machine, the die carrier 15 will be carried along with the stock and the operation of the lever 17 is so timed that it will move slightly in advance of the die carrier 15 and thus not interfere with the latter. When the stock comes to rest the cross-head 14 starts on the reverse stroke, indicated by the arrow in Fig. 4, and comes into engagement with the die carrier 15 and moves the latter along the stock to perform the wire-drawing operation. Since the wire-drawing operation tends to draw the stock backward and out of the fabricating machine, it is necessary to provide suitable means for preventing this backward movement of the stock and at the same time not interfere with the forward or feeding movement thereof. To accomplish this I have provided the holding or gripping mechanism, indicated generally at E in Figs. 1, 2 and 3. This holding mechanism is shown in detail in Figs. 5, 6 and 7 and consists of a frame 38 that is secured on the frame 12 in any suitable manner, such as the bolts 39. The frame 38 has a cavity 40 in which the stock gripping mechanism is located.

As will be seen from Fig. 6, the stock D passes through an opening 41 in the frame 38, across the cavity 40 and through a threaded opening 42 in the opposite wall. In this opening 42 there is a rather large hollow set screw 43 through which the stock D passes and this set screw may be secured in any position to which it is adjusted by means of a smaller set screw 44. A pair of wedge-shaped reversible jaw members 45 and 46 are arranged in the cavity 40 and provided with parallel stock gripping faces 47 which have one or more grooves 48 to engage the stock. The rear faces 49 and 50 of the jaw members 45 and 46, respectively, are in diverging relation to each other and to the faces 47, in the direction of the movement of the stock, as will be clearly seen from Fig. 5.

Backing members 51 are arranged in the cavity 40 with their faces 52 respectively parallel with the faces 49 and 50, but spaced therefrom, and two series of cylindrical rollers 53 are arranged in these spaces. The rollers of each series are mounted in cages consisting of an upper plate 54 and a lower plate 55 which are secured together by suitable means, such as the spacing rivets 56. These cages hold the rollers 53 in definitely spaced relation and make it convenient for removing or replacing either set of rollers. The backing members 51 are held in position by blocks 57 which respectively engage the walls 58 of the cavity 40, (see Fig. 7). The blocks 57 may be provided with bolts 59, at their upper ends, for convenience in inserting or removing them when necessary, and, similarly, bolts 60 may be provided in the jaw members 45 and 46 and the backing members 51.

In order to hold the jaw members in alignment with each other, pins 61 are provided, these pins loosely engaging sockets in the opposed faces 47 in the jaw members and preventing relative movement between the jaw members longitudinally of the stock, although permitting freedom of movement laterally of the stock.

A coil spring 62 is mounted in the set screw 43 and bears against the ends of the jaw members 45 and 46 so that it tends to press these members backward with respect to the feeding movement of the stock. On account of the diverging relation of the faces 49 and 50, such backward movement of the jaw members results in their being forced into gripping engagement with the stock by the rollers 53, as the latter roll along the faces of the backing members. This results in the jaw members being constantly pressed against the stock so that if there is any tendency for the stock to move backward the immediate wedging action of the jaw members prevents such backward movement to any appreciable extent. At the same time, forward movement of the stock would tend to carry the jaw members 45 and 46 along with it and this would effect the release of the gripping pressure and thus permit the stock to freely move forward.

In order to hold the sets of rollers in proper position between the jaw members and the backing members, plungers 63 are mounted in set screws 64 and springs 65 are arranged in these set screws to press the plungers outwardly against the roller cages to move them in the direction of forward movement of the stock, as will be clearly understood from Fig. 5. The set screws 64 may be secured in any position to which they are adjusted by means of the smaller set screws 66. For convenience a hinged cover 67 may be provided on the frame 38, to cover the cavity 40, this cover being hinged on a pin 68. In Fig. 5 the major portion of the cover 67 is broken away in order to more clearly illustrate the gripping mechanism.

It is sometimes necessary to draw the stock backward out of the wire-drawing machine and normally the action of the jaw members 45 and 46 would prevent this, but, in order to facilitate the withdrawal of the stock, a lever 69 is fulcrumed at 70 on a pair of ears 71, on the frame 38, and the lower end of this lever engages with a pin 72, which is slidably mounted and engageable with the jaw members 45 and 46 by swinging the upper end of the lever 69 to the right in Fig. 6.

When it is desired to start the end of a coil of stock into the wire-drawing machine, it is necessary to have holding means to prevent the die 16 from pushing the stock back, and, for this purpose, I have shown a gripping mechanism F that is, in all respects, similar to the gripping mechanism E and mounted on the frame 12, as shown in Figs. 3 and 4. In this case the stock may be forced through the gripping mechanism manually and the die carrier 15 may be positioned a short distance to the left (in Fig. 3) from the end of its wire-drawing stroke. The machine is then started either manually or by power to move the die to the end of its oper-

ating stroke and the gripping mechanism F will hold the stock against backward movement and thus permit the die 16 to move upon the stock. The die carrier 15 is then moved slightly away from the end of its drawing stroke and the operation repeated until a sufficient amount of the stock has been fed through the apparatus to enter the end of the stock into the feeding means of the fabricating machine, after which the stock may be automatically fed according to the usual functioning of the apparatus.

While I have illustrated and described what I now consider to be the preferred embodiment of my invention, it will be understood that various changes may be made in the details of the construction and arrangement of the parts without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. In apparatus of the class described, comprising a reciprocating wire-drawing die, the combination of a gripping mechanism for holding the stock during the operating strokes of the die comprising a frame, a pair of wedge-shaped jaw members having opposed parallel faces for engaging the stock, the sides of said jaw members opposite to said faces being relatively divergent in the direction of movement of the stock, backing means having faces which are respectively parallel with said sides and spaced therefrom, sets of rollers in the spaces between said jaw members and said backing means with each set mounted in a cage whereby the rollers are held in definitely spaced relation, spring means for normally pressing said jaw members backward with respect to the direction of movement of the stock, and spring means cooperating with said cages to move them in the direction of movement of the stock.

2. In apparatus of the class described, comprising a reciprocating wire-drawing die, the combination of a gripping mechanism for holding the stock during the operating strokes of the die comprising a frame, a pair of wedge-shaped jaw members having opposed parallel faces for engaging the stock, the sides of said jaw members opposite to said faces being relatively divergent in the direction of movement of the stock, backing means having faces which are respectively parallel with said sides and spaced therefrom, sets of rollers in the spaces between said jaw members and said backing means with each set mounted in a cage whereby the rollers are held in definitely spaced relation, an adjustable hollow member through which the stock passes, and a coil spring mounted in said hollow member and adapted to press said jaw members backward with respect to the direction of movement of the stock.

3. In apparatus of the class described, comprising a reciprocating wire-drawing die, the combination of a gripping mechanism for holding the stock during the operating strokes of the die comprising a frame, a pair of wedge-shaped jaw members having opposed parallel faces for engaging the stock, the sides of said jaw members opposite to said faces being relatively divergent in the direction of movement of the stock, backing means having faces which are respectively parallel with said sides and spaced therefrom, sets of rollers in the spaces between said jaw members and said backing means with each set mounted in a cage whereby the rollers are held in definitely spaced relation, an adjustable hollow member through which the stock passes, a coil spring mounted in said hollow member and adapted to press said jaw members backward with respect to the direction of movement of the stock, and lever actuated means on said frame for moving said jaw members in opposition to said coil spring to release the stock from the grip of the jaw members.

4. In apparatus of the class described, the combination of a power-driven fabricating machine for wire stock, a wire-drawing machine arranged in tandem with said fabricating machine for reducing the size of the stock before it enters said fabricating machine, said wire-drawing machine embodying a reciprocating wire-drawing die and an oscillating lever for actuating said die, an actuating mechanism for said lever separate from said fabricating machine and arranged on the opposite side of said fabricating machine from said wire-drawing machine and embodying a rotating shaft and a rocking member actuated thereby, driving means for connecting said shaft with said fabricating machine so as to rotate the shaft in definitely timed relation to the operating cycle of the fabricating machine, and a connecting rod between said rocking member and said lever for operatively connecting the same.

5. In apparatus of the class described, the combination of a power-driven fabricating machine for wire stock, a wire-drawing machine arranged in tandem with said fabricating machine for reducing the size of the stock before it enters said fabricating machine, said wire-drawing machine embodying a reciprocating wire-drawing die and an oscillating lever for actuating said die, an actuating mechanism for said lever separate from said fabricating machine and arranged on the opposite side of said fabricating machine from said wire-drawing machine and embodying a rotating shaft and a rocking member actuated thereby and having a crank pin thereon the stroke of which is adjustable, driving means for connecting said shaft with said fabricating machine so as to rotate the shaft in definitely timed relation to the operating cycle of the fabricating machine, and a connecting rod between said crank pin and said lever for operatively connecting the same.

6. In apparatus of the class described, the combination of a power-driven fabricating machine for wire stock, a wire-drawing machine arranged in tandem with said fabricating machine for reducing the size of the stock before it enters said fabricating machine, said wire-drawing machine embodying a reciprocating wire-drawing die and an oscillating lever for actuating said die, an actuating mechanism for said lever arranged on the opposite side of said fabricating machine from said wire-drawing machine and embodying a rotating shaft and a rocking member actuated thereby and having a crank pin thereon the stroke of which is adjustable, driving means for connecting said shaft with said fabricating machine so as to rotate the shaft in definitely timed relation to the operating cycle of the fabricating machine, a connecting rod between said crank pin and said lever for operatively connecting the same, and adjustable spacing means extending from said wire-drawing machine to said actuating mechanism to hold the same in definitely spaced relation.

HENRY J. HOGUE.