No. 701,375. Patented June 3, 1902.

A. H. NILSON & M. OLSON.

WIRE STRAIGHTENING AND CUTTING MACHINE.

(Application filed July 17, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

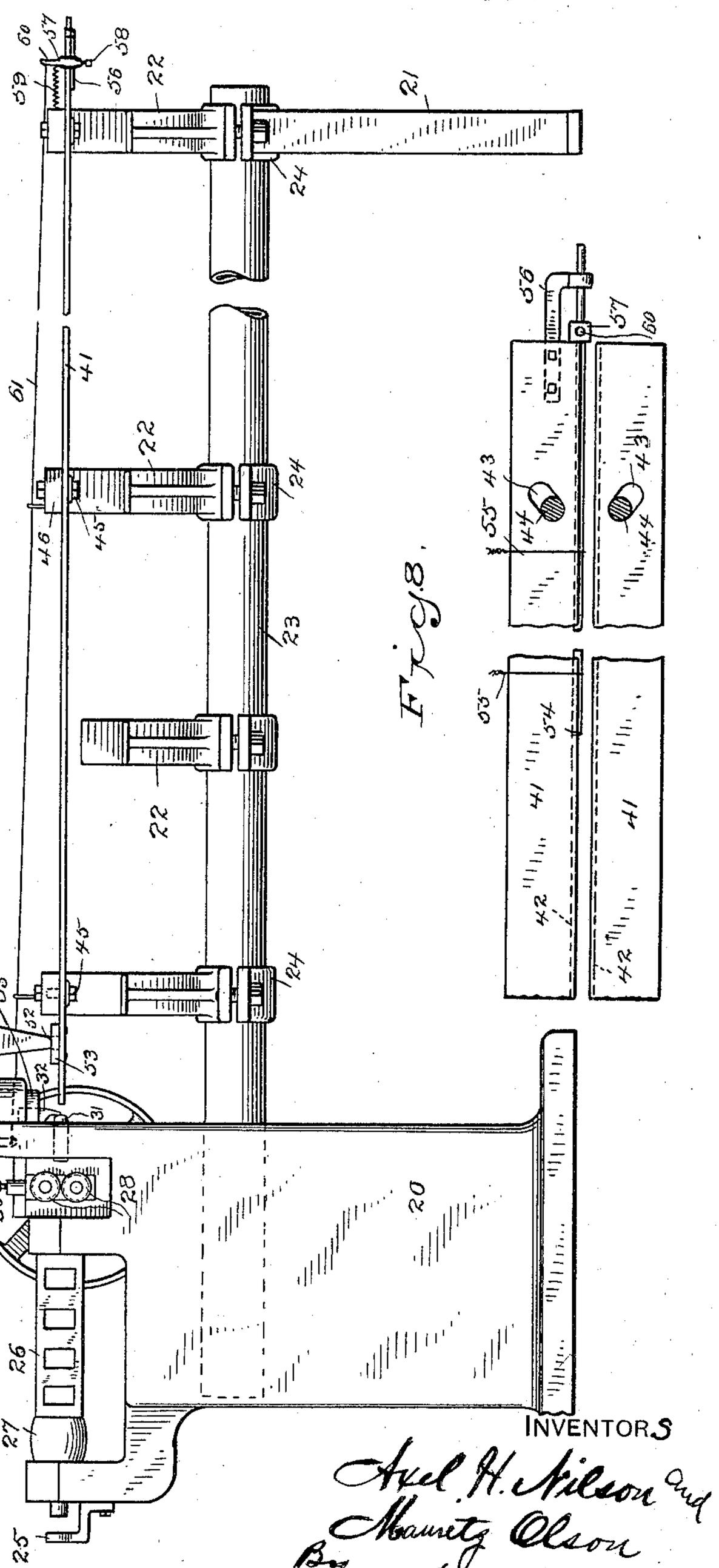


Fig. 2.

Fig. 3.

WITNESSES.

H. A. Lamb.

S. H. Atherton.

INVENTORS

Axel H. Nilson and
Mauritz Olson
By A. Wallbooster, atty.

No. 701,375. Patented June 3, 1902.

A. H. NILSON & M. OLSON.

WIRE STRAIGHTENING AND CUTTING MACHINE.

(Application filed July 17, 1901.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 1.

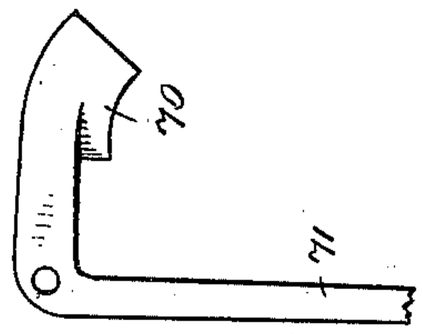


Fig. 3.

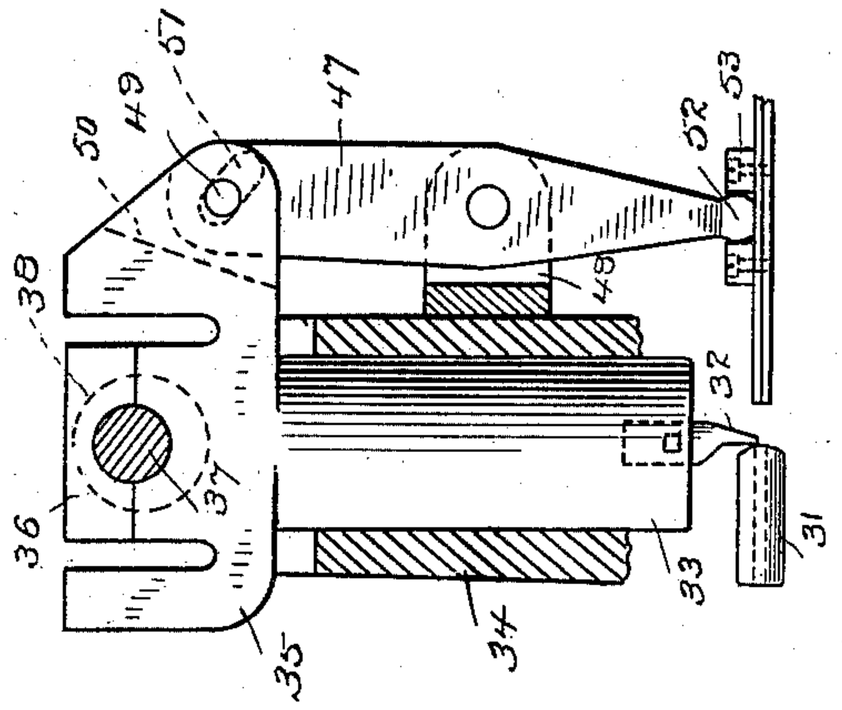


Fig. 4.

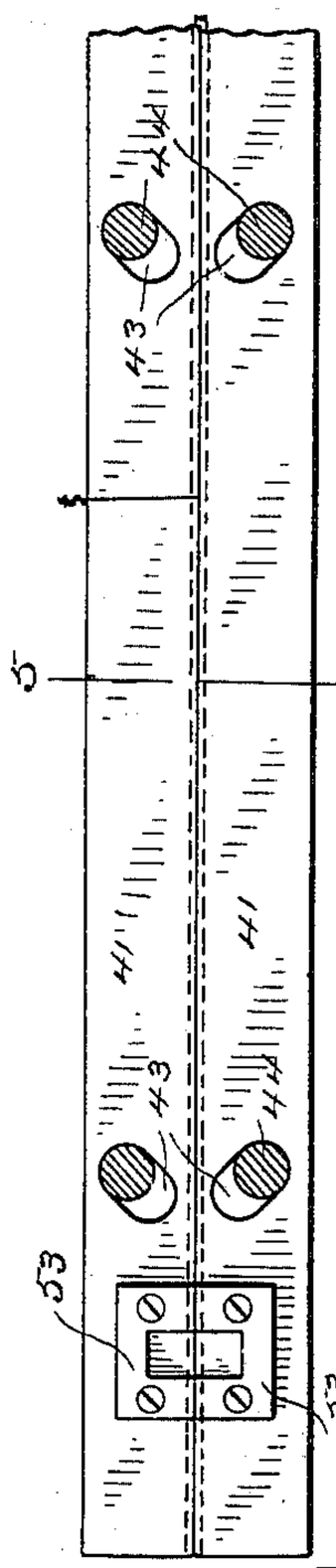


Fig. 5.

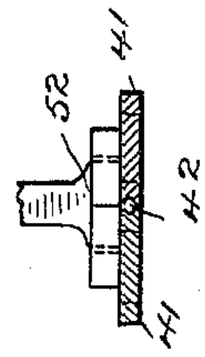


Fig. 2.

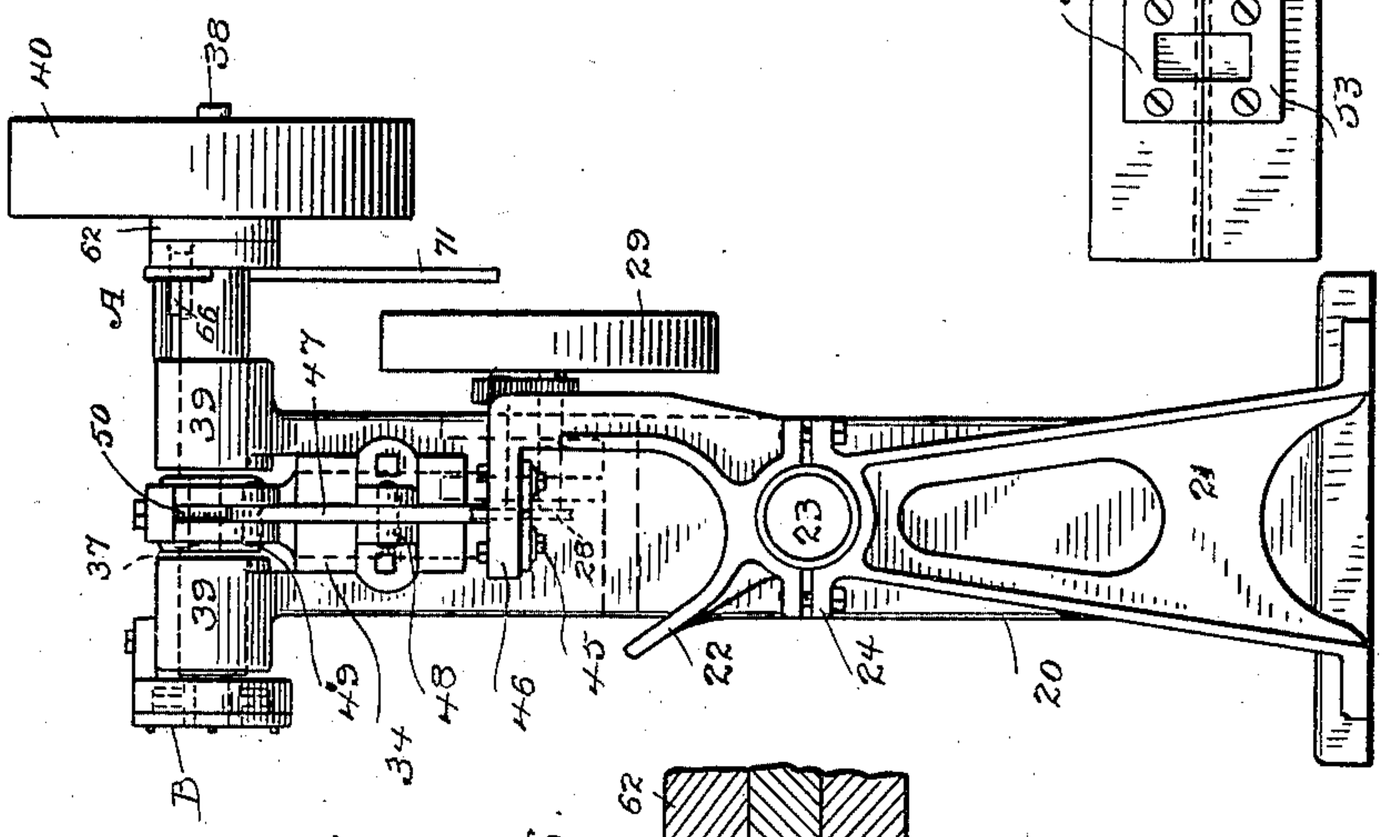
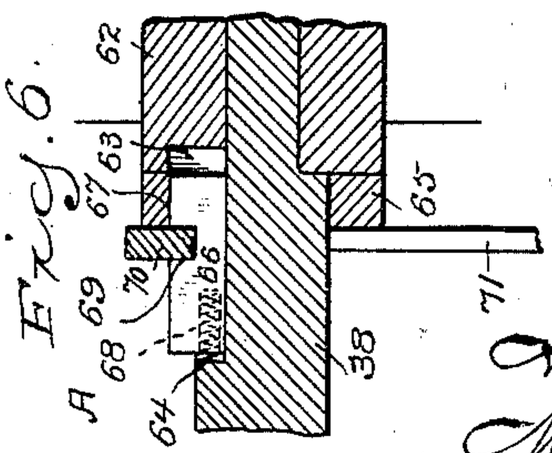


Fig. 6.



WITNESSES.

H. A. Lamb.

S. H. Atherton.

INVENTORS

Axel H. Nilson and

Manity Olson

By A. M. Wooster, Atty.

UNITED STATES PATENT OFFICE.

AXEL H. NILSON AND MAURITZ OLSON, OF BRIDGEPORT, CONNECTICUT, ASSIGNORS TO THE A. H. NILSON MACHINE COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

WIRE STRAIGHTENING AND CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 701,375, dated June 3, 1902.

Application filed July 17, 1901. Serial No. 68,642. (No model.)

To all whom it may concern:

Be it known that we, AXEL H. NILSON and MAURITZ OLSON, citizens of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented a new and useful Wire Straightening and Cutting Machine, of which the following is a specification.

Our invention has for its object to provide a simple, durable, easily-adjusted, quick-operating, and relatively inexpensive machine for straightening all sizes of wire within the capacity of the machine and for cutting it into such lengths as may be required.

With these ends in view we have devised the novel straightening and cutting machine of which the following description, in connection with the accompanying drawings, is a specification, reference characters being used to designate the several parts.

Figure 1 is a side elevation of our novel machine complete except that the friction device is removed; Fig. 2, an end elevation as seen from the right in Fig. 1, the clutch-operating mechanism being omitted for the sake of clearness; Fig. 3, a detail sectional view, on an enlarged scale, illustrating the cutting and releasing mechanism; Fig. 4, a detail plan view to be considered in connection with Fig. 3 and illustrating the guide-plates in the closed position; Fig. 5, a section on the line 5 5 in Fig. 4; Fig. 6, a detail sectional view on the same scale illustrating a clutch for connecting the shaft with the fly-wheel; Fig. 7, a detail view of the clutch-operating lever; Fig. 8, a detail view, on the same scale, showing the outer end of the guide-plates and also illustrating the stop which determines the length of the wire blanks, and Fig. 9 is a detail view to be considered in connection with Fig. 8 and showing in side elevation the guide-plate that carries the clutch-operating mechanism and also showing the stop device and its connection with the clutch-operating mechanism.

20 denotes the base of the machine, which may be of any ordinary or preferred design; 21, an end piece; 22, receivers for wire blanks, and 23 a support, in the present instance a tube, by which any required number of receivers may be carried, depending, of course, upon the length of wire blanks to be cut. The inner end of the support engages the base in any suitable manner and the outer end rests in the end piece. The receivers are shown as secured to the support by means of clamps 24.

The wire to be operated upon—*i. e.*, straightened and cut into blanks—passes into the machine at the left, as seen in Fig. 1, first passing through a guide 25, then through a rotary straightener 26, to which power is applied by means of a belt (not shown) passing over a belt-pulley 27. In view of the fact that this straightener may be of any ordinary or preferred construction, the special details thereof being wholly unimportant so far as our present invention is concerned, we have not deemed it necessary to illustrate the straightener in detail. The wire is drawn into the machine by means of drawing-rollers 28, which are suitably geared together, the gearing not being shown in the drawings, and are driven by means of a belt (not shown) passing over a belt-pulley 29.

30 denotes one of the usual adjusting-screws for regulating the pressure of the drawing-rollers.

Immediately in front of the drawing-rollers is the cutting mechanism, which comprises, essentially, a tube 31, which is rigidly secured in the base and through which the wire passes, and a cutter 32, carried by a plunger 33, and closely engaging the outer face of tube 31, as clearly shown in Fig. 3. The plunger reciprocates in a suitable standard 34, which is cast integral with or rigidly secured to the base. At the upper end of the plunger is a cross-head 35, carrying a box 36, in which is journaled an eccentric 37 on a shaft 38, itself journaled in boxes 39 upon the standard.

40 denotes a fly-wheel which is loose on shaft 38 and which receives power by means

of a belt (not shown) passing over the fly-wheel itself. The fly-wheel is connected to and disconnected from the shaft by means of a clutch, (see Fig. 6,) which as a whole we designate as A. We shall presently give a brief description of the operation of this clutch, but wish to make clear that our invention is not limited to any special form of clutch mechanism. It should be understood that in use fly-wheel 40 is always running, but the shaft is normally disconnected therefrom, with the cutter in the raised position, as in Fig. 3.

The wire after passing through tube 31 passes between guide-plates 41, which are normally held in the closed position, as in Fig. 4, and are provided in their contiguous edges with grooves 42, which together form a receiving-socket. As these plates merely serve as guide-plates, the wire having been straightened before passing into the socket formed by the grooves, it is not required that the wire fit the socket closely, a single pair of guide-plates therefore serving for all sizes of wire within the capacity of the machine. These guide-plates (see Figs. 1, 2, and 4) rest upon and are supported by the heads 45 of studs 44, which pass upward through oblique slots 43 in the guide-plates and engage arms 46. The arms 46 are shown as formed integral with certain of the blank-receivers 22, as clearly shown in the drawings, it being unnecessary to attach the guide-plates to all the receivers and unimportant to how many receivers the guide-plates may be attached, so long as they are firmly held in place, but in such a manner as to permit them to move freely. The guide-plates are opened and closed simultaneously with the movement of the plunger, in the manner which we will now describe.

47 denotes a lever pivoted in any suitable manner to standard 34. In the present instance we have shown the lever as pivoted to ears 48, bolted to the standard. The upper end of the lever is provided with a cross-pin 49, and the corresponding end of the cross-head is provided with a slot 50, which receives the upper end of the lever, and with corresponding oblique slots 51, which receive the ends of the cross-pin. The lower end of the lever engages the guide-plates in any suitable manner. We have shown the lower end of the lever as provided with a head 52 and the guide-plates as provided with corresponding socket-plates 53, which receive the head of the lever, as clearly shown in Fig. 3. It will be obvious, therefore, that when the plunger, cross-head, and cutter are at the raised position, as in Fig. 3, the guide-plates will be at the closed position, as in Figs. 4 and 5, and that when the plunger moves downward, as in cutting off a wire blank, the action of the lever through its engagement with the socket-plates must be to move the guide-plates forward, and that through the engagement of studs 44 with the walls of oblique slots 43 the guide-plates will be moved from the closed position, as in Fig. 4, to the open position, as in Fig. 8, which permits a severed wire blank to drop down into the receivers. The opening of the guide-plates and the cutting off of a blank take place during the first half-revolution of the shaft. The last half of the revolution of the shaft closes the guide-plates and returns the cutter to the raised position, as will be more fully explained.

As a means of determining the length of the blanks we provide a stop 54, which lies in the socket formed by the grooves in the edges of the guide-plates, the stop being preferably made large enough to practically fill the socket, so as to render it impossible for a fine wire to pass it. In order to prevent the stop from dropping out when the guide-plates are opened, as in Fig. 8, we secure the stop loosely to one of the guide-plates in any suitable manner, as by bands of wire 55, which pass around the stop and the guide-plate, as clearly shown in Fig. 8, but loosely enough to leave the stop free to be moved longitudinally. This stop is simply a piece of wire and extends outward beyond the guide-plate as far as may be required to provide for cutting different lengths of blanks.

56 denotes a guide carried by the guide-plate that carries the stop and through which the stop passes, and 57 a block adjustably secured to the stop in any suitable manner, as by a set-screw 58. In use the wire that is being operated upon engages the stop and forces it forward until the movement is stopped by engagement of the block with the guide. A spring 59, connected to this block and to a fixed portion of the machine, as to one of the arms 46, acts to normally hold the block in engagement with the end of the guide-plate which carries it, as in Fig. 8. We have shown the spring as attached to a stud 60, extending upward from the block.

61 denotes a connection, preferably a wire, extending from the block or the stud, as most convenient, to the clutch.

In order that the operation of the machine may be clearly understood, we will describe briefly the well-known form of clutch illustrated in Fig. 6, although it should be understood that any ordinary or preferred form of clutch may be used and that specifically the clutch forms no portion of our present invention.

The fly-wheel 40, which, as already stated, is loose on shaft 38, is provided with a hub 62, having a socket 63. (See Fig. 6.) The shaft is provided with a groove 64 and with a collar 65, which lies in contact with the hub of the fly-wheel.

66 denotes a sliding key which lies in the groove and in a corresponding socket 67 in the collar and is adapted to be moved for-

ward into socket 63, thereby locking the fly-wheel to the shaft, so that the latter will be carried by the fly-wheel. We have shown the sliding key as normally forced toward the locking position by a spring 68 and as provided with a transverse groove 69, which is adapted to be engaged by a wedge 70 on a clutch-lever 71, which is pivoted to the cross-head. (See dotted lines, Fig. 1, in connection with Fig. 7.) Wire 61, which extends to block 57 on the stop, is connected to the long arm of the starting-lever. It will be understood, therefore, that when this connection is pulled by movement of the stop and block, caused by engagement of the wire that is being operated upon with the stop, the starting-lever will be oscillated and wedge 70 will be lifted out of groove 69. Spring 68 will then force the sliding key forward and cause it to engage socket 63 in the hub of the fly-wheel, so that the motion of the fly-wheel will be communicated to the shaft. Rotation of the shaft causes the cutter to move downward and cut off the blank that is lying between the guide-plates, and simultaneously lever 47 will have opened the guide-plates, as in Fig. 8, so that as soon as a blank is cut off it will drop down into the receiver. As the rotation of the shaft approaches completion, wedge 70 will again enter groove 69 in the sliding key and will draw the key outward, as in Fig. 6. A suitable friction device (indicated as a whole by B) is provided, which prevents the shaft from acquiring any momentum, so that the instant the sliding key is withdrawn from socket 63, which will be at the completion of a revolution of the shaft, the shaft will stop, leaving the cutter at the raised position, as in Fig. 3, and the guide-plates closed, as in Fig. 4.

The operation of the machine as a whole will, it is thought, be clearly understood from the drawings. We will, however, describe it briefly. The wire to be operated upon is drawn into the machine by drawing-rollers 28 and is straightened by the rotary straightener. As the cutter is normally held at the raised position, the wire passes freely through tube 31 and into the socket formed by the slots in the edges of guide-plates 41. The length of the blanks to be cut is determined by the adjustment of stop 54. As the wire is fed forward it will engage the stop and carry the latter forward against the power of spring 59 until stopped by engagement of block 57 with guide 56, thereby operating clutch-lever 71 in the manner described, connecting the shaft with the fly-wheel, causing an actuation of the cutter and an opening and closing of the guide-plates, the clutch operating automatically to disconnect the shaft from the fly-wheel at the end of the revolution.

Having thus described our invention, we claim—

1. In a machine of the character described, the combination with independently-operated feeding and cutter-operating mechanisms, a cutter, and horizontally-movable guide-plates, of a stop, a clutch, and a connection between the stop and the clutch, the parts being so combined and arranged that when the stop is engaged by the wire connection will be made with the cutter-operating mechanism, a blank will be severed and released, and the guide-plate and cutter will be returned to their normal position and the cutter-operating mechanism disconnected.

2. The combination with guide-plates having grooves in their contiguous edges which together form a receiving-socket, of means for opening and closing the guide-plates so that blanks may drop out.

3. The combination with guide-plates having grooves in their contiguous edges and oblique slots 43, of studs 44 which pass through the slots and a lever engaging the guide-plates and acting in connection with the studs and slots to open and close the guide-plates.

4. The combination with guide-plates having grooves in their contiguous edges which together form a receiving-socket, of a stop for the wire adapted to lie within the socket, a cutter and means for opening the guide-plates to permit severed blanks to drop out.

5. The combination with guide-plates having grooves in their contiguous edges which together form a receiving-socket, of an adjustable stop for determining the length of blanks, means for loosely connecting said stop to one of the guide-plates, a cutter and means for opening and closing the guide-plates.

6. The combination with guide-plates having grooves in their contiguous edges which together form a receiving-socket, of an adjustable stop carried by one of the guide-plates, a cutter, means for opening and closing the guide-plates and receivers into which the blanks drop when the guide-plates are opened.

7. The combination with guide-plates having grooves in their contiguous edges which together form a receiving-socket, means for opening and closing the guide-plates and an adjustable stop adapted to lie in the socket, of feeding and driving mechanisms, a cutter, a clutch and a connection between the stop and the clutch, whereby when the stop is engaged by the wire the cutter is actuated and the guide-plates caused to release the severed blank.

8. The combination with drawing-rollers and a cutter, of guide-plates having grooves in their contiguous edges to receive the wire, means for opening and closing the guide-plates, a stop carried by one of the guide-plates and intermediate connections whereby when the stop is engaged by the wire the cutter and guide-plates are actuated.

9. The combination with feeding and driving mechanisms, guide-plates having grooves in their contiguous edges and a stop carried by one of the guide-plates, of a plunger carrying a cutter and a cross-head having oblique slots, a lever pivoted to the plunger and engaging the guide-plates and having a cross-pin engaging the oblique slots, a clutch and a connection between the clutch and the stop, so that when the latter is engaged by the wire connection will be made with the driving mechanism and the plunger reciprocated.

In testimony whereof we affix our signatures in presence of two witnesses.

AXEL H. NILSON.
MAURITZ OLSON.

Witnesses:
A. M. WOOSTER,
S. W. ATHERTON.