

(No Model.)

3 Sheets—Sheet 1.

D. I. ECKERSON.

MACHINE FOR STRAIGHTENING AND CUTTING WIRE.

No. 344,819.

Patented July 6, 1886.

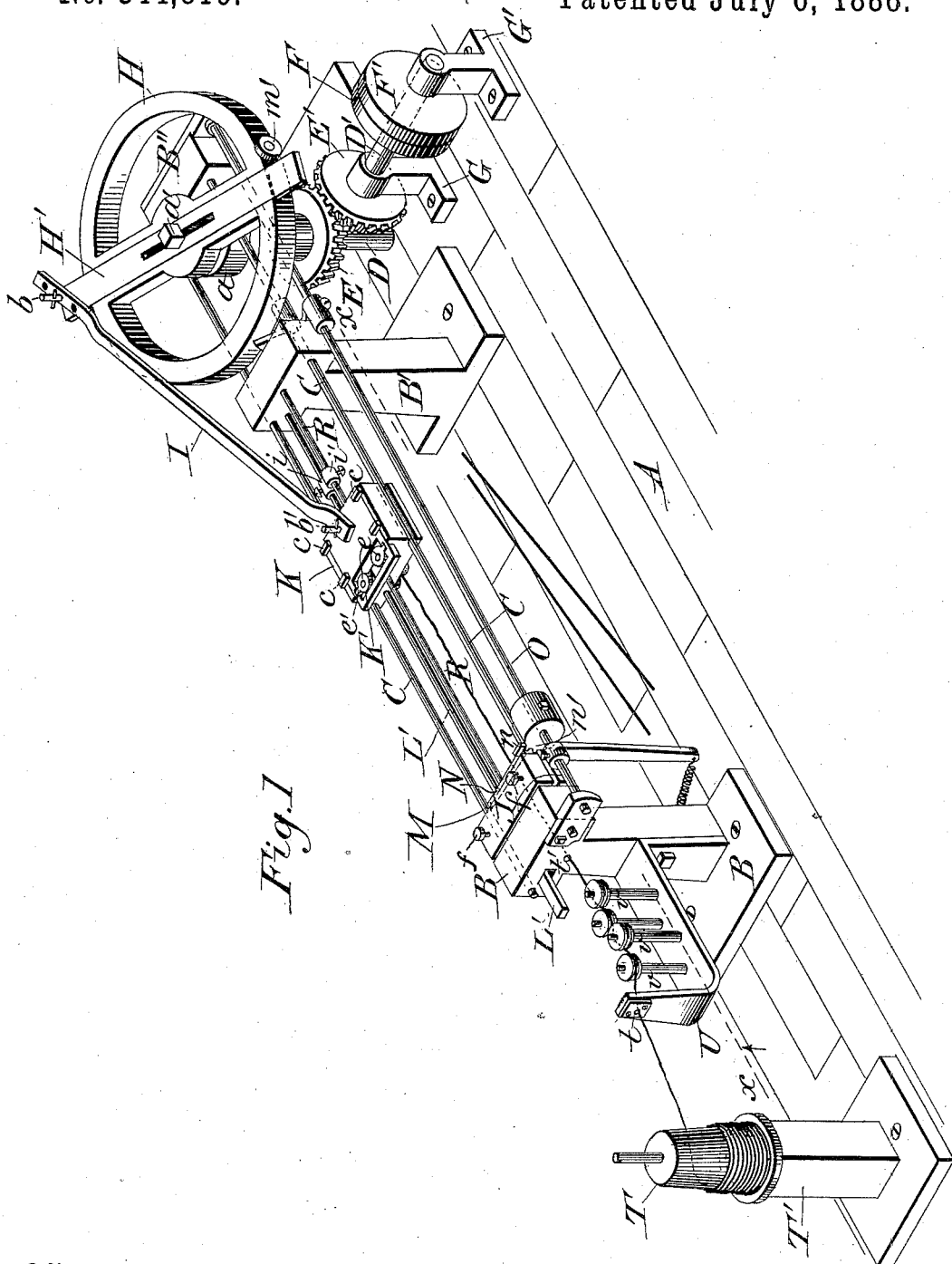


Fig. 1

Witnesses
F. H. Schott
A. Dufurding

Inventor
D. I. Eckerson

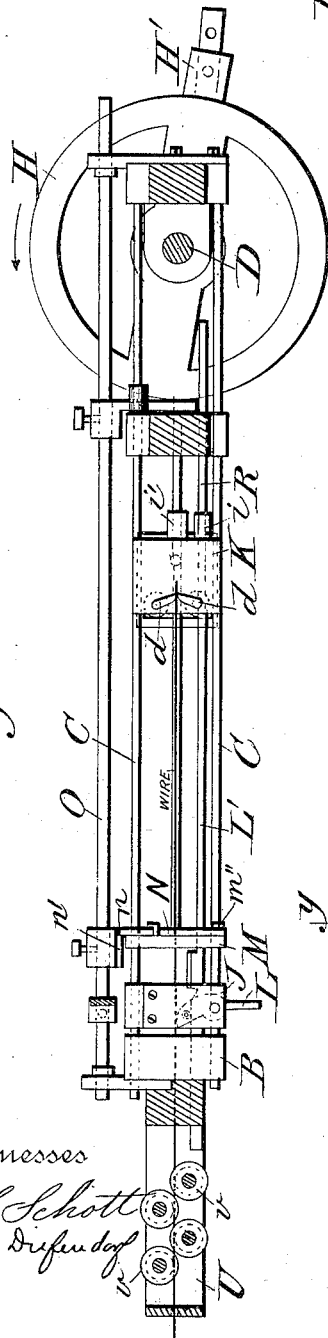
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Fig. 2.



Witnesses
H. H. Schott
Abram Diefendorf

Fig. 3.

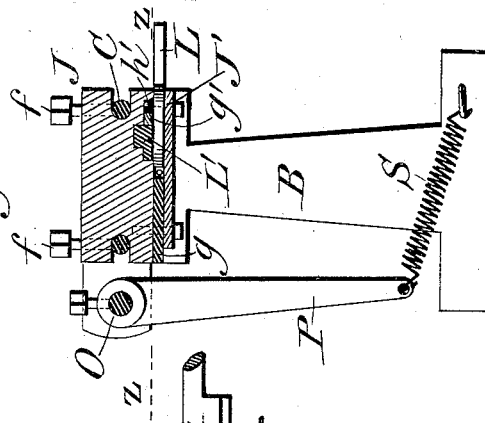


Fig. 5.

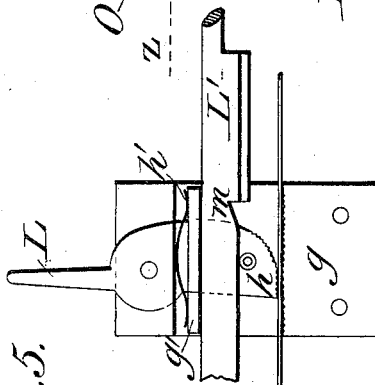


Fig. 4.

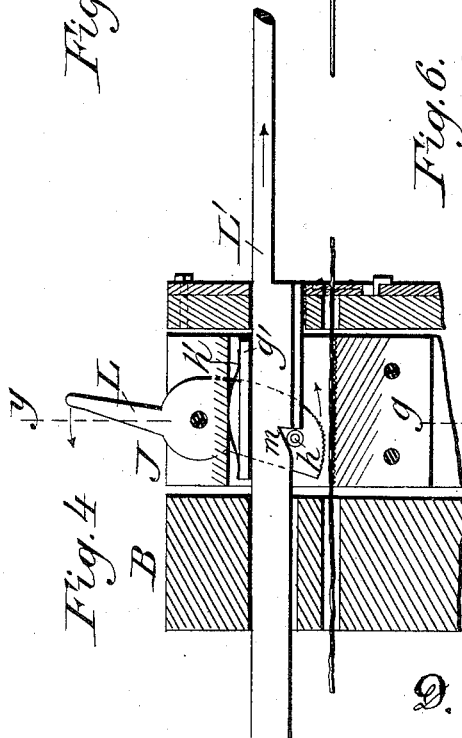
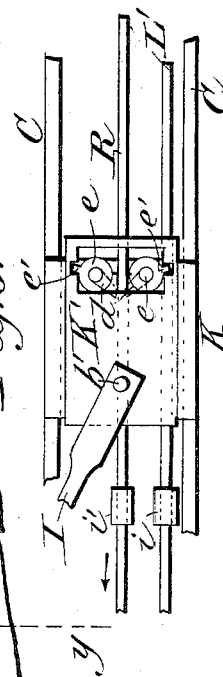


Fig. 6.



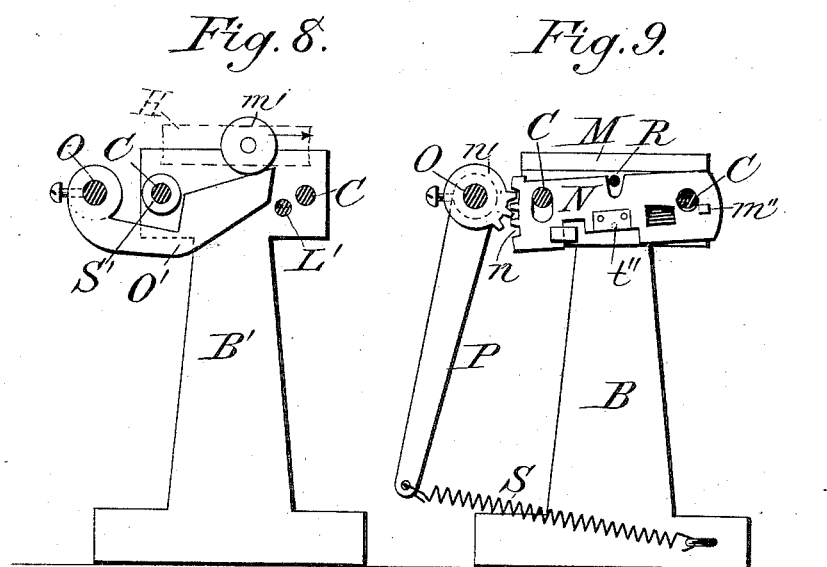
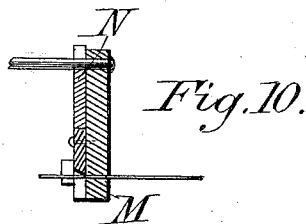
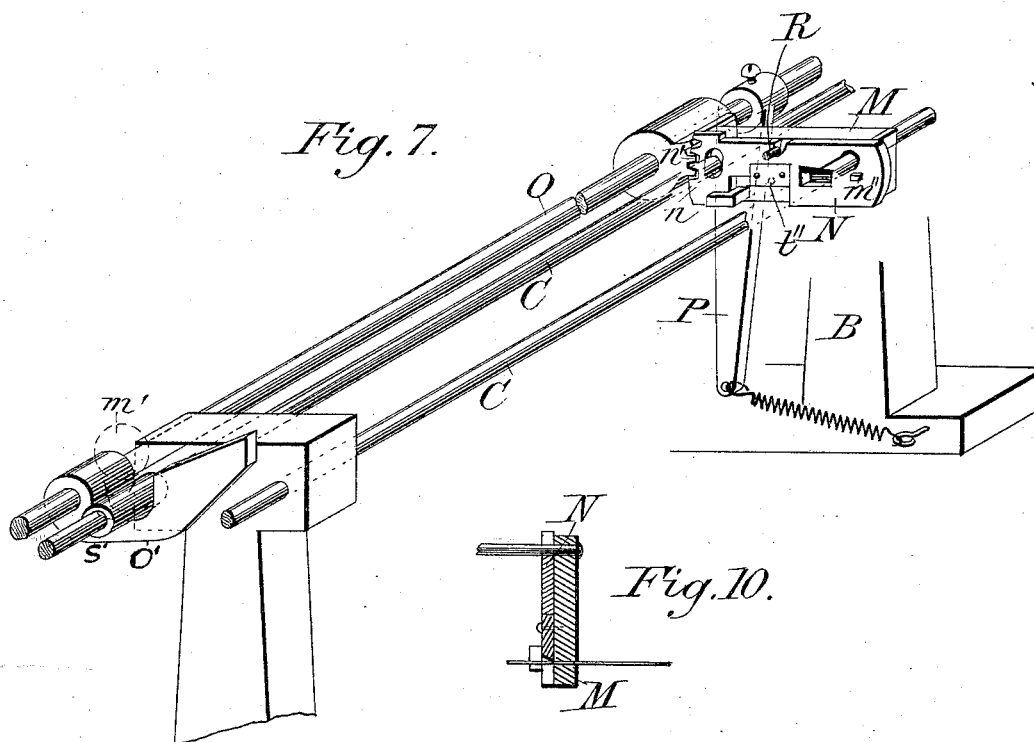
Inventor
D. I. Eckerson

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F. H. Schott
A. Diefendorf

Inventor
D. I. Eckerson

UNITED STATES PATENT OFFICE.

DAVID I. ECKERSON, OF WORCESTER, NEW YORK, ASSIGNOR TO HIMSELF
AND ABRAHAM DIEFENDORF, OF SAME PLACE.

MACHINE FOR STRAIGHTENING AND CUTTING WIRE.

SPECIFICATION forming part of Letters Patent No. 344,819, dated July 6, 1886.

Application filed April 23, 1886. Serial No. 199,922. (No model.)

To all whom it may concern:

Be it known that I, DAVID I. ECKERSON, a citizen of the United States, residing at Worcester, in the county of Otsego and State of New York, have invented certain new and useful Improvements in Machines for Straightening and Cutting Wire; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in that class of machines employed for the purpose of cutting wire into lengths for bale-ties, or any other use in which the pieces of wire require to be straightened as well as cut from the coil. The machine may therefore be called a "wire-stretcher, straightener, and cutter," as its functions are to draw the wire from the coil, stretch each separate length, thereby straightening it, and then to cut off the stretched portion and drop it into a receptacle, which may be placed beneath the machine to receive it. All of these operations are carried on automatically and continuously by the machine, the only attendance needed being to supply the reel with coils of wire and remove the stretched and cut lengths as they accumulate.

The invention consists in the special construction and arrangement of the friction-sheaves and other parts over and through which the wire passes between the coil and the operative parts of the machine, and in the construction and arrangement of parts by which the wire is grasped and held during the operation of drawing it forward into the machine and then stretching it, and, further, in the construction and arrangement of devices for automatically cutting the wire after it has been drawn out to the desired length and suitably stretched; and it consists, lastly, in the construction and arrangement of certain details and devices, which will be hereinafter fully described, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of the machine complete,

and showing the general arrangement of parts. Fig. 2 is a horizontal section on the line *x x*, Fig. 1, showing the upper part of the machine turned over, to illustrate the position of the parts in the act of stretching a wire. Fig. 3 is a vertical section on the line *y*, Fig. 4, showing the arrangement of the wire-clamps upon the stationary cross-head. Fig. 4 is a horizontal section on the line *Z Z*, Fig. 3, illustrating the construction of the clamp in the stationary cross-head and a part of its operating devices. Fig. 5 is a face view of the stationary clamp and clamp-plate. Fig. 6 is a plan view of the movable cross-head, a part of its connections, and the guide-rods upon which it reciprocates. Fig. 7 is a perspective illustrating the construction and arrangement of the devices which cut the wire after it is stretched. Fig. 8 is an end elevation showing the cam-lever and its operating-roller through which the cutting mechanism is actuated. Fig. 9 shows the cutter and the segment-gear by which it is operated, and Fig. 10 is a vertical section through the cutter and its supporting-plate.

In Fig. 1 of the drawings, A represents the floor of a room or a suitable bed-plate upon which the machine is erected, the operative parts being carried upon suitable standards secured to said floor or bed-plate. Two of these standards, B and B', are each provided with a broad base, which spreads sufficiently to insure a firm and steady support to the standard when bolted or otherwise secured to the bed or floor. The upper part of these standards is expanded laterally, forming T-heads, through which pass the guide-rods CC.

In rear of the standard B' is placed an additional standard, B'', having a similarly-shaped T-head, and being firmly secured to the floor or bed in the same manner as the others. This standard B'' carries at its upper end a journal-box, *a*, in which revolves a vertical shaft, D, its lower end resting in a step secured to the bed or other suitable support.

Motion may be imparted to the shaft D from a horizontal shaft, D', revolving in suitable bearings in the supports G G', through the medium of bevel-gears E E', the first of which gears is secured upon the vertical shaft D, and the last upon the horizontal shaft D'. This

shaft is also provided with a tight pulley, F, and loose pulley F', from which tight pulley the shaft receives motion through a belt passing to any suitable source of power. It will be understood that this method of supplying power to operate the machine may be changed in many ways; or, in the case of small machines designed for stretching the lighter kinds of wire, the power may be applied by the hand of the operator directly to the fly-wheel H, secured upon the upper end of the shaft D. A movable slide-bar, H', traverses the top of this fly-wheel diametrically, being secured in a suitable groove, preferably of dovetail cross-section, formed in the wheel for its reception, and in which groove it is secured by means of a set-screw, *a*, which passes through an elongated slot in the slide-bar, the whole so arranged that the bar may be moved and secured at any desired point to carry the crank-pin *b*, attached to one end of said slide-bar, to a greater or less distance from the axis of the shaft D, thus forming a crank with a variable throw, by which means the machine is enabled to cut various lengths of wire.

Connected with the crank-pin *b* by the pitman I and pin *b'* is the cross-head K, which has a reciprocating movement along the guide-rods C C, the amount of which is determined by the position of the crank-pin *b* with relation to the axis of fly-wheel H. The upper side of this cross-head is longitudinally recessed to receive the slide K', which has a limited sliding movement upon the part K within the recess, being retained therein by the lugs *c c*.

Journalled in the part K of the cross-head are two short shafts, which carry upon their lower ends the wire-gripping jaws *d d*, and upon their upper ends the toothed wheels *e e*. These wheels *e e* enter a rectangular slot formed in the part K' of the sliding cross-head, the teeth entering notches *e e'* in the ends of said slot. From this arrangement of devices it will be apparent that whenever the direction of movement is changed the movement of the slide K' will cause the wire-grasping jaws *d d* to open when the cross-head moves in one direction, and to close when its motion is reversed.

Adjustably secured upon the guide-bars C C, by means of set-screws *f f*, is the holding-block J, provided with mechanism for clamping and holding the wire during the operations of stretching and cutting off. This mechanism is constructed and operated as follows: On the under side of the block J is secured an edge-serrated plate, *g*. The serrated edge of this plate is on the line traveled by the wire as it passes through the machine. Opposite to this plate *g* is pivoted a cam-jaw, L, (see Figs. 4 and 5,) the inner end of which is also serrated, so as to clamp the wire firmly, when desired, between the edge of the plate *g* and the serrated end of the said cam-jaw. To operate this cam-jaw L, it is provided near its inner end with a projecting stud carrying a friction-roller, *h*, which comes in contact with one

edge of the cam-bar L', which at this point is rectangular in cross-section, and slides through a suitable recess in the block J and mortise in the head of standard B, which serves as an additional guide, a round extension of the bar passing through a recess in the under side of the sliding cross-head K, with its end resting in and being guided by a suitable orifice in the head of standard B'. Upon this rounded part of the cam-bar is placed the collar *i*, adjustably secured by a set-screw, so that it may be moved to any desired point thereon. The rectangular portion of the bar rests against a wear-plate, *g'*, which is in turn supported by a spring, *k*, by which means the edge of the cam-bar is always retained in contact with the roller on the cam-jaw. The bar is also provided with a notch, *m*, at one point in its edge, into which the roller *h* falls when the parts are in the proper position to release the wire. From this description of the construction of these parts it will be obvious that while the roller *h* is in the notch *m* of the cam-bar the serrated end of the cam-jaw L will not bear against the edge of the plate *g*, but a free opening will be left between them, through which the wire is drawn by the jaws *d d* of the reciprocating cross-head K; but when this cross-head strikes the collar *i* on the bar L' the latter, will be drawn forward, and the inclined side of the notch *m*, acting upon the cam-jaw L, will force it into contact with the edge of the plate *g*, where it is retained by the straight part of the bar L', thus holding firmly the wire which is between the jaw and plate, and preventing it from being drawn farther through, while the continued movement of the cross-head K draws upon and stretches the wire until the tension is relieved by the cutting apparatus, which severs the wire and allows the stretched portion to fall from the machine. This cutting apparatus is best illustrated in Fig. 7, M being a movable block or cutter-carrier placed upon the guide-bars C C, in close proximity to the cross-piece J, but not touching it. To one side of this block M is secured by the pivot *m''*, upon which it oscillates, a cutter-bar, N, provided at its outer end with segment-gear *n*, which engages with gear *n'* upon the shaft O. This shaft is carried in journal-bearings *p p'*, attached to the standards B and B', and has a rocking motion imparted to it by the cam-wheel *m'*, secured to the periphery of the fly-wheel H, which, as it revolves, causes the cam-wheel to come in contact with a cam, O', secured upon the shaft O. The cam-wheel in passing over the cam O' depresses the latter, causing it to give a rotating movement to shaft O in one direction. This movement is conveyed to the cutter-bar N through the gears *n* and *n'*, depressing the bar, and causing its cutting-edge to come in contact with and sever the wire which passes through a hole in the block M, which forms the opposite cutting-edge. It will be evident that these cutting-edges may be placed so as to cut the wire at

right angles or at any desired angle therefrom, so as to give the wire an oblique cut, if desired.

In order to return the parts to their normal position, an arm, P, is attached to the shaft O, extending downward from said shaft, and its lower end connected to a spring, S, the tension of which returns the shaft and its connected mechanism to the proper position for the next cut.

To prevent jar and damage to the parts by the sudden reaction caused by the spring S, a rubber or other elastic cushion, S', is placed on one of the guide-rods, or in other suitable place, against which the cam O' strikes as it is returned to its normal position by the spring.

In order that the jaws *d d* of the sliding cross-head may advance far enough to grasp the end of the wire after it has been cut, the block M is allowed to move upon the rods C C, so that as the grasping-jaws advance to grasp the end of the wire the block is pushed back into close proximity with the holding-block J; but as the wire is drawn out the block M is caused to advance and take the proper position for making the cut by means of the rod R, attached at one end to said block M, passing through the cross-head K, and provided with an adjustable collar, *i*, against which the cross-head strikes and draws the cutting apparatus into its proper position for making the next cut.

In order to supply the wire in proper position for the action of the machine, the coils are placed upon a reel, T, carried by the standard T', which may be secured in any suitable position. From this reel the wire passes to a guide-orifice, *t*, formed in the upturned end of the bracket U, which is secured to the standard B. This bracket also carries four or more vertical spindles, *v*, placed in a zigzag form, each of the spindles being provided with a loose sheave or pulley, *v'*, properly grooved to receive the wire.

If desired, any of the usual devices for straightening the wire may be placed between this apparatus and the stretching and cutting mechanism; but when annealed wire is used such straightening devices are not needed, as the act of stretching straightens the wire perfectly. It will also be apparent that more than one straightening, stretching, and cutting apparatus may be carried by the same standards and operated from the same fly-wheel, it being only needed to duplicate the clamping-jaws and the orifices for the passage of the wire.

The operation of the machine will be readily understood from the foregoing description of its construction and the accompanying drawings; but to make it perfectly clear it will now be described step by step. A coil of wire being placed upon the reel, one end is passed through the orifice *t* in the bracket, thence between the sheaves *v'*, and if a straightener is used, through it, as the proper place for such a device would be between the sheaves

and the head of the standard B, to which it may be attached, or to the bracket, as most convenient. The end is then passed through the orifice *t'* in the standard B, and between the jaws of the block J, from which it is prevented from dropping by a plate, J', secured to the block beneath the cam-jaw and serrated plate *g*. The wire is then carried still farther forward through the orifice *t''* in the cutter-carrier M, and projects a short distance in front of the same, when it will be in position to start the machine.

Motion may be imparted to the apparatus by a belt upon the pulley F, or by other means, the main point being to impart a rotary motion to the shaft D and fly-wheel H in the direction of the arrow, Fig. 2. The revolution of the fly-wheel will, through the medium of the pitman attached thereto, carry the cross-head K toward the block J, pushing back the cutter-carrier until the end of the wire passes between the jaws *d d* on the bottom of the cross-head, which, having now reached the end of its travel in this direction, is drawn back by the pitman. As the latter is attached to the slide K', instead of directly to the cross-head, the slight movement of said slide before it begins to act upon the cross-head causes the jaws *d d* to firmly grasp the wire, drawing it forward as the cross-head moves backward, until the latter has nearly reached the limit of its travel in that direction, when the cross-head strikes the collar *i* upon the cam-rod L', causing the latter to act upon the cam-jaw L, so as to firmly grasp the wire between its serrated end and the serrated edge of the plate *g*, thus preventing any further length of wire being drawn from the reel; but as the cross-head still continues to move in the same direction for a short time, the result is, that the wire between the clamping-jaws is stretched, which takes from it all kinks and twists and all liability to recover the same after it leaves the machine, thus delivering the pieces of wire in a perfectly straight condition, in which they will remain unless bent by some new force. Before reaching the end of its stroke the cross-head strikes the collar *i* upon the rod R, which pulls forward the cutter-carrier into the position it is to occupy while the act of cutting the wire is being performed. This cutting is done by the cutting-blade attached to the plate N, which has a vertically-swinging movement produced by the gear upon the shaft O, which shaft is actuated in cutting by the cam-wheel *m'*, attached in the proper position to the periphery of the fly-wheel H.

As the throw of the crank and length of the pitman are adjustable, as well as the position of the collars *i* and *i'*, it is evident that the machine may be made to cut the wires to different lengths, as desired.

I am aware that machines have been heretofore constructed which would both stretch and cut the wires into lengths. I do not therefore claim such a machine, broadly; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In a machine for stretching and cutting wire, the combination of a reciprocating cross-head having wire-clamping jaws connected to shafts carrying toothed wheels, with a slide having a limited movement on said cross-head and provided with recesses which engage the teeth of said wheels and operate the jaws, and means for reciprocating the slide, as set forth.

2. In a wire stretching and cutting machine, the block J, adjustably secured to guide-bars by set-screws or other suitable means, in combination with the plate having a serrated edge, the cam-jaw pivoted to said block, and the mechanism for operating the cam-jaw, substantially as shown and described.

3. In a wire cutting and stretching machine, the cutter-carrier provided with an oscillating cutter-bar, in combination with the rocking shaft and means, substantially as shown and described, for operating the cutter-bar by the movement of the rock-shaft, as set forth.

4. In a wire stretching and cutting machine, the combination of the cutter-bar, rock-shaft, and cam-lever with the fly-wheel and its attached cam-wheel, adapted to give motion to the cutter-bar, as specified.

5. The combination, in a wire-cutter, of the swinging cutter-bar attached to a movable carrier, the rock-shaft, the cam-lever, and cam-wheel for giving motion to the cutter in one

direction, and the arm and spring attached to the shaft for the purpose of returning the parts to their first position, as set forth.

6. In a wire cutting and stretching machine, the block J, provided with wire-grasping devices, said block being adjustable upon the guide-rods, and the reciprocating cross-head, also provided with wire-grasping devices and sliding upon said guide-rods, in combination with the cutter-carrier and swinging cutter-bar, all arranged for joint operation in the manner shown and described.

7. The combination, in a machine for cutting wire, of the sliding cross-head having wire-grasping devices, rod R, provided with adjustable collar *i*, and the movable cutter-carrier, arranged and operating as set forth.

8. The combination, in a wire-stretching machine, of the cross-head K, provided with devices for grasping the end of the wire, the adjustable block J, also provided with wire-grasping devices, with the cam-rod L', having adjustable collar *i*, the several parts arranged and adapted to grasp and stretch the wire, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID I. ECKERSON.

Witnesses:

ABRAM DIEFENDORF,
M. T. E. CHANDLER.