(No Model.)

LE ROY S. WHITE.

ELECTRICALLY CONTROLLED CUTTING DEVICE.

No. 460,695. Patented Oct. 6, 1891.

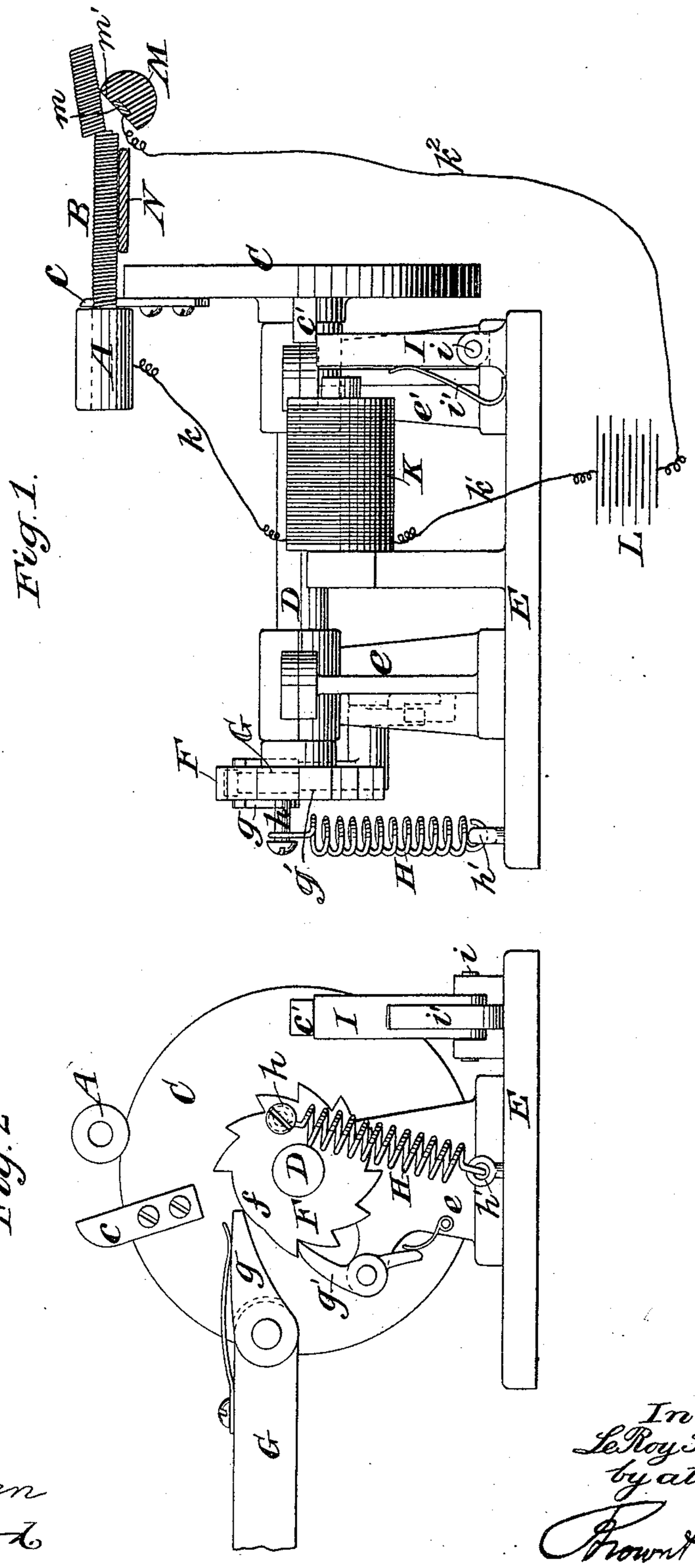

Fig. 1.

Fig. 2.

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LE ROY S. WHITE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO HIMSELF AND SAMUEL A. CHAPMAN, OF SAME PLACE.

ELECTRICALLY-CONTROLLED CUTTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 460,695, dated October 6, 1891.

Application filed January 16, 1891. Serial No. 377,965. (No model.)

To all whom it may concern:

Be it known that I, LE ROY S. WHITE, of Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Automatic Cutting Devices, of which the following is a specification.

My invention relates to an improvement in automatic cutting devices in which a cutter receives a rapid movement at the moment of its coming in contact with the thing to be cut, the moment of cutting being determined by the passage of the end of the thing to be cut, a predetermined distance from the plane of the cutter.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents a view of the cutting device in side elevation, and Fig. 2 represents an end view.

I have shown the cutting device and the means for setting it in operation, in the present instance, in connection with certain parts of a machine for forming coil-springs; but it is obvious that it might be employed, generally, to sever parts of equal length from a continuously-advancing bar, coil, or tube. It is particularly desirable that the cutter for severing a continuously-formed rod or coil-spring should sever the coil as quickly as possible and at the exact moment, to insure a uniformity of length. Hitherto the moment of severing the piece from the continuously-formed rod has depended upon the number of revolutions of the machine or upon the passage of a certain interval of time, rather than upon the passage of a certain length of coil past the plane of the cutter. As a slight variation in winding or in the diameter of the wire is liable to occur, it has been found necessary in fine work to keep watch of the passage of the coil and by actual gage determine the time of cutting. My object is to do away with the necessity of such special watching and to provide means for determining the moment of cutting without regard to the number of revolutions or the time, the length of the rod, tube, &c., which actually passes the plane of the cutter being the regulator as to the moment of cutting.

A represents the die from which in the present instance the continuously-formed coil-spring B, formed by suitable machinery, (not shown herein,) travels.

A cutting-blade *c* is secured to and projects from the periphery of a disk C, the latter being mounted upon a suitable shaft D in such position that when the disk is rotating the cutter will pass across the path of the continuously-traveling rod or coil B. The shaft D is journaled in a suitable supporting-frame, consisting, in the present instance, of the base E, having uprising standards *e e'*, having suitable bearings in their upper ends for the reception of the shaft. The disk C is fixed to rotate with the shaft D, and there is also fixed to rotate with said shaft a mutilated ratchet-wheel F.

A longitudinally-reciprocating bar G, carrying a pawl *g*, is supported and operated by suitable well-known means, (not shown herein,) so that when the pawl *g* is in engagement with the toothed portion of the ratchet-wheel it will rotate it, and hence the shaft D and disk C by a step-by-step motion. When, however, the pawl *g* reaches that portion *f* of the ratchet-wheel F where the teeth are omitted for a space, it will play back and forth upon the periphery of the ratchet-wheel without tending to advance it.

A spring H, secured at one end externally to the ratchet-wheel F—as, for example, at *h*—and at its opposite end to the supporting-frame, as at *h'*, tends to draw its point of attachment *h* downwardly, and hence when said point *h* occupies any position in the course of its revolution with the wheel F other than that point nearest the point of attachment *h'*, the spring will have a tendency to rotate the wheel F, and hence the shaft D and disk C. For the purposes of my present invention the said disk C is held normally in such position that the spring H shall be under strong tension and the point of attachment *h* shall be located, as shown, for example, in Fig. 2, at that point where the leverage of the spring upon the wheel F shall be near its maximum limit and in such position that the cutting-blade *c* will be held at rest a short distance from the path of the rod or coil B, the intention being that the blade shall reach its point of contact with

the rod or coil at about the same moment that the leverage of the spring H upon the wheel F reaches its maximum limit. To hold the parts in such adjustment, I provide a stop (here shown as a lug c') projecting from the face of the disk C and adapted to engage the free end of a swinging arm or dog I, pivoted to the frame, as at i. A spring i', resting against the swinging arm or dog I, tends to hold it in position to engage the stop c.

An electro-magnet K is so located with respect to the swinging dog or arm I that when energized it will draw the free end of said arm toward it, and in so doing will release the disk C and leave it free to turn under the impulse of the spring H. An electric circuit through the magnet K is adapted to be completed by the passage of a predetermined length of the rod or coil B past the blade of the cutter. In the present instance I have shown such circuit as formed by connecting the die A with one pole of the battery L through the electro-magnet K by means of wires k k', the opposite poles of said battery being connected by a wire k^2 with an electrical conductor m, set in the face of an insulating-piece M. The insulating-piece M is so placed that its face m', in which the electrical conductor or contact-piece m is located, shall be inclined in the path of the rod or coil B, and so located with respect to the cutter that when the free end of the rod or coil B comes in contact with the contact-piece m, the desired length to be cut will have passed the cutting-blade. The contact-piece m is so located that the rod or coil B will first contact with it, and in the further travel of the rod or coil under the impulse of the part traveling through the die A it will ride up the inclined surface m' out of contact with the piece m.

From the above arrangement it follows that the moment the end of the rod or coil B comes in contact with the piece m the circuit will be complete through the electro-magnet, the swinging arm or dog I will be attracted, the disk C released, and under the impulse of the spring H the cutter will be thrown rapidly across the path of the rod or coil B, severing it. As soon as the piece has been severed and pushed endwise by the part traveling from within the die, the circuit will be broken by the passage of the end of the rod or coil off the contact-piece m onto the insulating material, and the arm or dog I will be returned under the impulse of the spring i' into position to stop the disk C, as before. As soon as the disk C has been rotated a partial revolution under the impulse of the spring H, the pawl g on the reciprocating piece G will have come into engagement with the teeth on the ratchet-wheel F, and by a step-by-step movement will rotate the disk C around into the position shown in Fig. 2, ready for the next cut.

A retaining-pawl g' is employed to prevent the backward movement of the disk C while being forced around by the pawl g into position for a new cut.

The rod or coil B may be conducted from the end of the die A to the contact-plate M by means of a trough N or other well-known and suitable guides.

What I claim is—

1. The combination, with a cutter and a motor for operating the cutter, of a stop for arresting the motor, an electro-magnet for withdrawing the stop, and an electric circuit in which said magnet is placed, the opening and closing of said circuit being under the control of the material to be cut, substantially as set forth.

2. The combination, with a cutter for cutting a moving piece of metal to a given length, of a motor for operating the cutter, a stop for arresting the motor, an electro-magnet for withdrawing the stop, an electric circuit in which said magnet is placed, and a fixed contact-plate placed at a predetermined distance from the cutter, the material to be cut forming a closure of the circuit when it reaches the contact-plate, substantially as set forth.

3. The combination, with a cutter, a guide for conducting the material to be cut across the path of the cutter, and an oblique-faced insulating-piece provided upon its oblique face with a contact-piece located in the path of the material to be cut, of a motor for operating the cutter, an electro-magnet for releasing the motor, an electric circuit through the electro-magnet, the said electric circuit being completed by the material to be cut when in engagement with said contact-piece, substantially as set forth.

4. The combination, with the rotary disk carrying the cutter and the mutilated ratchet-wheel fixed to rotate with the disk, of a motor tending to rotate the said disk throughout a portion of its revolution, a stop for holding the said motor, a device for rotating the said disk to set the motor, and means for automatically releasing the said stop, said releasing means being under the control of the material to be cut, substantially as set forth.

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