

G. D. BANCROFT.

MACHINE FOR WINDING SPIRAL SPRINGS.

No. 175,587.

Patented April 4, 1876.

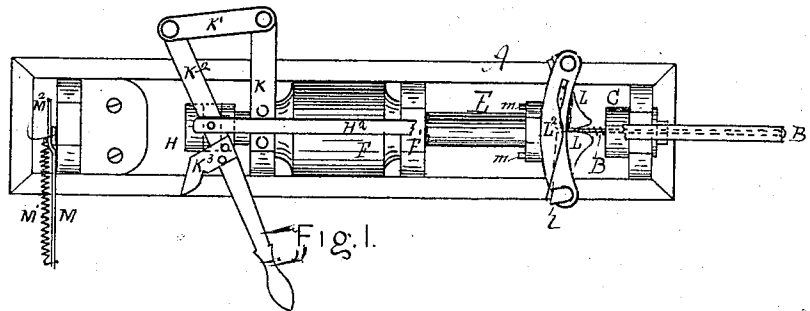


Fig. 1.

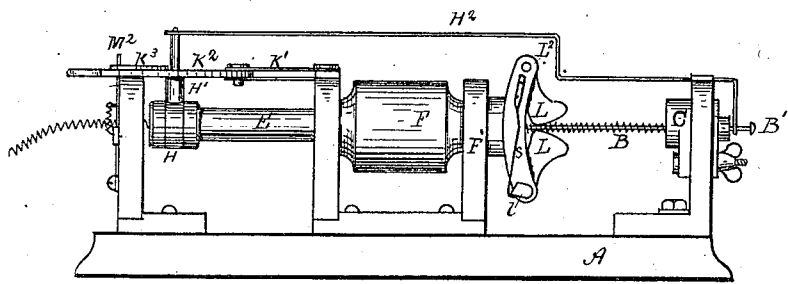


Fig. 2.

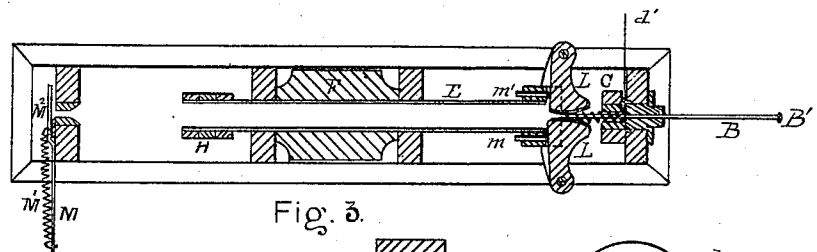


Fig. 3.

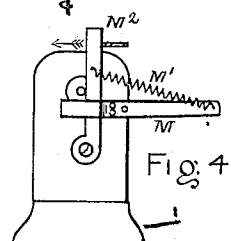


Fig. 4.

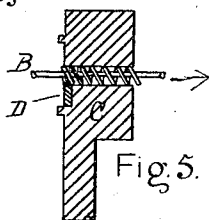


Fig. 5.

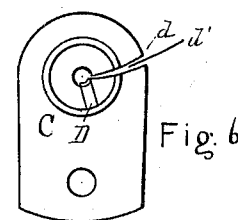


Fig. 6.

WITNESSES

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A. Henry Berry

INVENTOR

George D. Bancroft  
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# UNITED STATES PATENT OFFICE.

GEORGE D. BANCROFT, OF LYNN, MASSACHUSETTS, ASSIGNOR OF ONE-HALF HIS RIGHT TO NATHAN W. EDSON, OF SAME PLACE.

## IMPROVEMENT IN MACHINES FOR WINDING SPIRAL SPRINGS.

Specification forming part of Letters Patent No. 175,557, dated April 4, 1876; application filed October 19, 1875.

### *To all whom it may concern:*

Be it known that I, GEORGE D. BANCROFT, of Lynn, in the county of Essex and State of Massachusetts, have invented an Improvement in Machines for Winding Spiral Springs, of which the following is a specification:

The nature of my invention consists in combining with a wire-guide a loose mandrel and a set of sliding and revolving jaws hung upon a hollow arbor, said arbor being made to revolve by power, thus forming the spring, which action causes the arbor to retreat as the spring is formed. The spiral spring pressing through the center of the arbor, when the arbor has pressed back its whole length, the jaws relieve the wire, and the arbor is sent forward by hand. Also, in combining with above a cutting-off device.

Figure 1 is a plan of my invention. Fig. 2 is an elevation of the same. Fig. 3 is a horizontal section of the same. Fig. 4 is an end elevation, showing the cutting-off device. Fig. 5 is a vertical section, enlarged, showing the wire-guide. Fig. 6 is an elevation of the wire-guide.

Let A represent the frame or base of the machine; B, the sliding mandrel upon which the wire is wound to form the spiral spring. This mandrel B slides freely through the wire-guide C. H<sup>2</sup>, Figs. 1 and 2, is a slide attached to the lever K<sup>2</sup>. The mandrel B passes through the bent end of this slide, as shown at B', and is free to revolve; but being provided with a head at B', it must follow the slide when it is moved forward by the hand-lever K<sup>2</sup>. The wire d', Figs. 3 and 6, enters the wire-guide C at the opening d, and is directed onto the mandrel B by the gage-piece D. The position and thickness of the gage-piece D govern the openness of the spring. E is a hollow arbor, which is made to revolve by a pulley, F, attached to it by key and keyway, so that, though the arbor is free to slide back and forth in the pulley, it must always revolve with it. L and L' are toggle-jaws, attached to the arbor E by the cross-head L<sup>2</sup>. Each of the jaws has attached to it a steady-boss, l, Figs. 1 and 2, which is

acted upon by a spring, S, arranged to hold the jaw away from the spiral spring on the mandrel while the jaws are being moved forward. m and m' are short sliding pins placed just back of the jaws L L', as shown in Figs. 1 and 3, so arranged that when the arbor is thrown back, as in Fig. 2, the pins m m' will strike the housing l' and be forced forward against the jaws L L', thus throwing them open, as indicated in Fig. 2, and relieving the spiral and mandrel. K, Fig. 1, is a fixed arm, to which the lever K<sup>2</sup> is attached by the link K<sup>1</sup>. This lever K<sup>2</sup> is connected to the arbor E by a sleeve, H, and stem H', Fig. 2, so that by moving the lever the arbor may be pushed forward.

The device for cutting off the spirals is shown at Fig. 4, and consists of the upright swinging knife M<sup>2</sup>, the draw-back spring M<sup>1</sup>, and the fixed arm M. K<sup>3</sup>, Fig. 1, is a projecting arm attached to the lever K<sup>2</sup>, so arranged that when the lever is thrown back the arm K<sup>3</sup> will come in contact with the knife M<sup>2</sup>, and, pushing it in the direction indicated by the arrow, Fig. 4, cause the spiral to be cut.

The operation of my machine is as follows: The end of the wire to be used is wound into a short spiral, which is then placed in the guide-piece C, which is removed from the machine, so that this may be done; then the guide-piece C is replaced and the mandrel inserted, as shown in Figs. 1 and 2, the spiral being long enough to project beyond the guide-piece C, as shown. Now, the arbor E is pushed forward until the jaws L L' are made to clamp the spiral, as they will by coming in contact with the face of the piece C. The revolving motion imparted to the arbor and jaws will be transmitted to the mandrel and spiral, and the spring or spiral rapidly formed. As the spiral forms it will crowd the arbor and jaws back, which action will continue until the small pins m m', Figs. 1 and 2, come in contact with the housing l'; then the jaws L L' will be thrown out and the spiral released, as shown in Fig. 2. This completes the operation, and the arbor may be pushed back again to repeat the

operation. The spiral, as it forms, passes through the arbor, as shown in Fig. 2, so that it may be made of any desired length.

Having now described the construction and operation of my invention, what I claim is as follows:

1. The combination of the loose mandrel B with the guide-piece C, operating substantially as described, and for the purpose set forth.

2. The combination of the loose mandrel B with the revolving jaws L L' and arbor E, operating substantially as described, and for the purpose set forth.

3. The combination of the arbor E, lever K<sup>2</sup>, plate-rod H<sup>2</sup>, and mandrel B, all operating together substantially as described, and for the purpose set forth.

4. The combination of the lever K<sup>2</sup> and the arm K<sup>3</sup> with the cutting-off knife M<sup>2</sup>, all operating together substantially as described, and for the purpose set forth.

GEORGE D. BANOROFF.

Witnesses:

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FRANK G. PARKER.