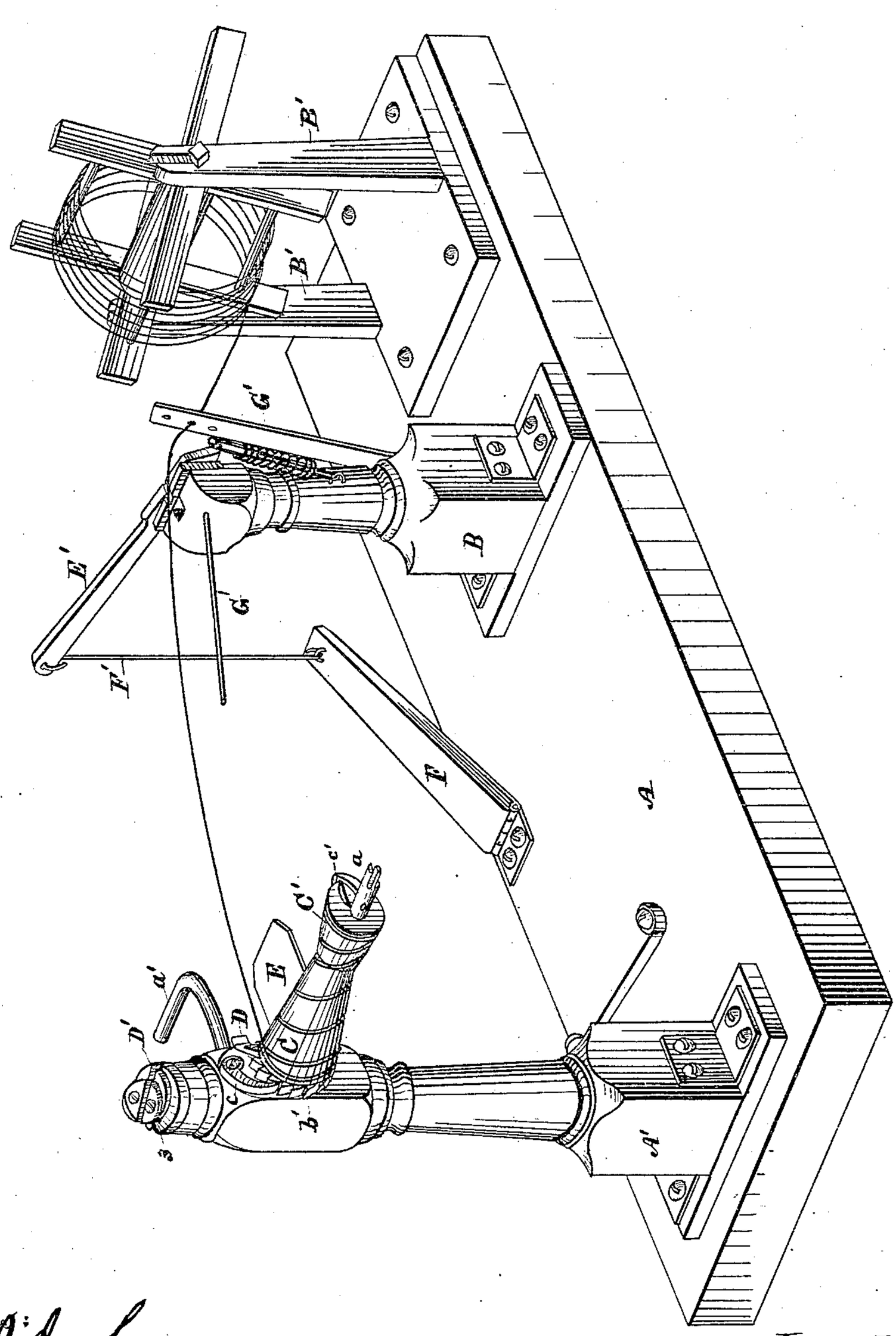
(Model.) 2 Sheets—Sheet 1.

LA F. WILDERMUTH.

WIRE COILING MACHINE.

No. 245,683. Patented Aug. 16, 1881.

Fig. 1.



Witnesses:
Lyman J. Jackson.
James F. Fouley

Inventor:
La Fayette Wildermuth.

(Model.)

2 Sheets—Sheet 2.

LA F. WILDERMUTH.

WIRE COILING MACHINE.

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Fig. 3.

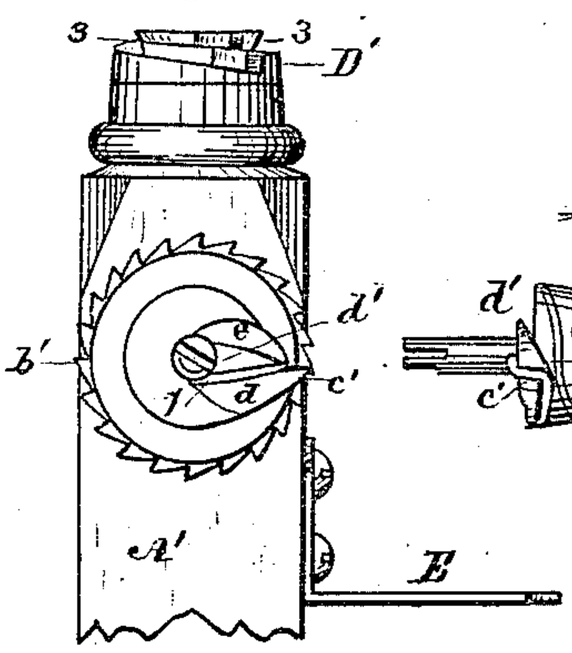


Fig. 2.

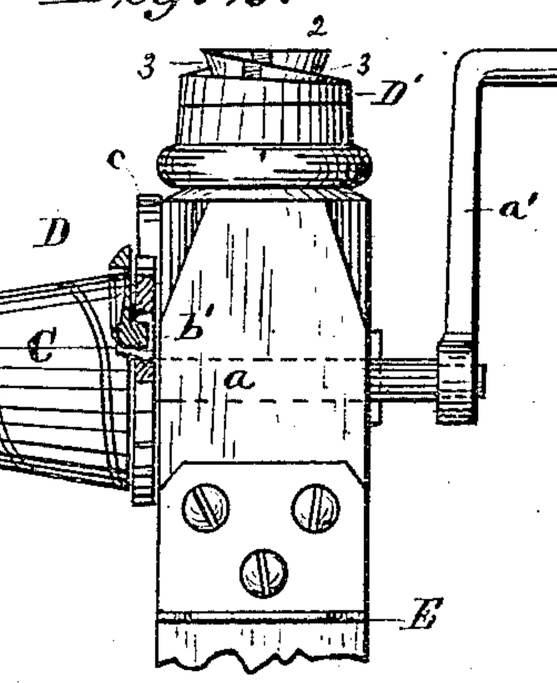
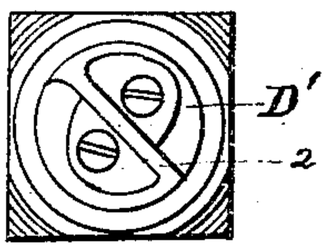


Fig. 4.



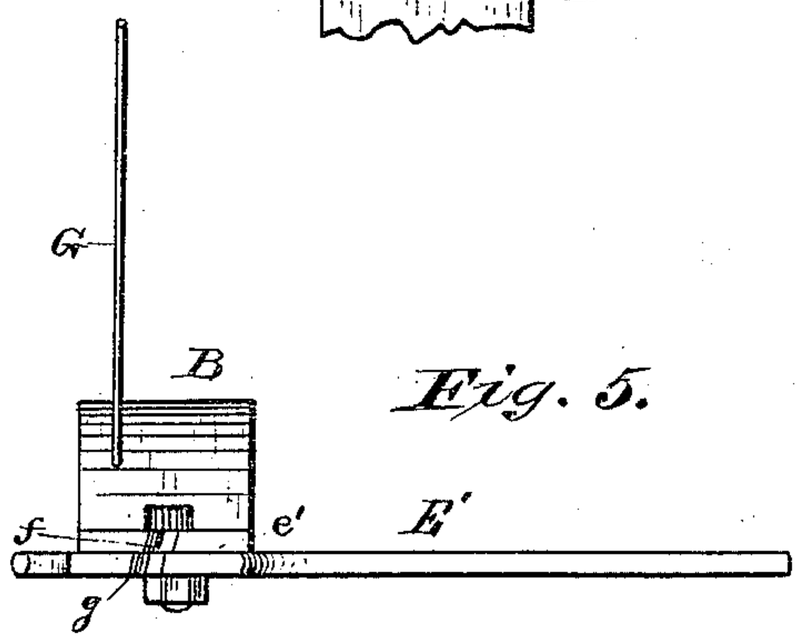
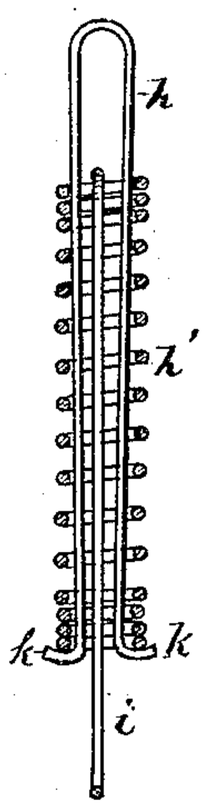


Fig. 5.

Fig. 7.



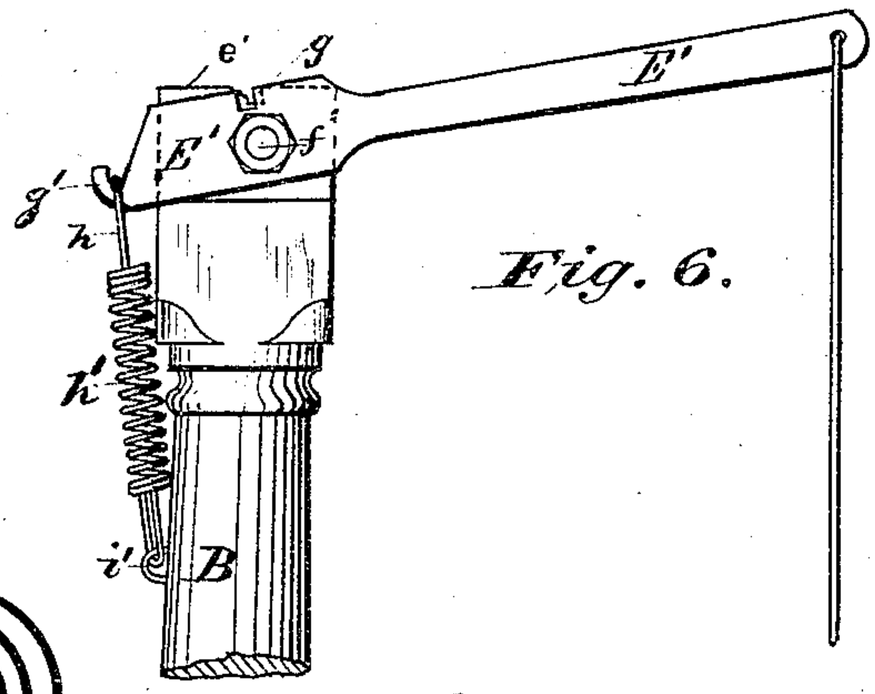


Fig. 6.

Fig. 8.

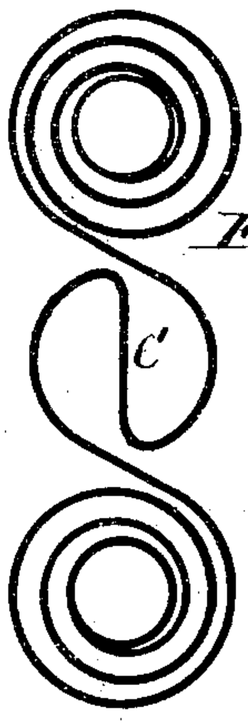
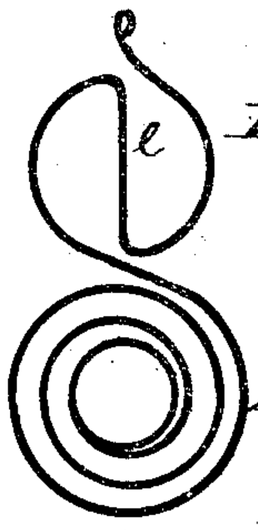


Fig. 9.



Witnesses:
Lyman J. Jackson
James H. Corby

Inventor:
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UNITED STATES PATENT OFFICE.

LA FAYETTE WILDERMUTH, OF NEW LEXINGTON, OHIO.

WIRE-COILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 245,683, dated August 16, 1881.

Application filed June 1, 1881. (Model.)

To all whom it may concern:

Be it known that I, LA FAYETTE WILDERMUTH, a citizen of the United States of America, residing at New Lexington, in the county of Perry and State of Ohio, have invented certain new and useful Improvements in Wire-Coiling Machines; and I do hereby 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 letters or figures of reference marked thereon, which form a part of this specification.

My present invention has reference more particularly to improvements in a wire-coiling machine for which Letters Patent were granted to me February 11, 1879, No. 213,482, and to that class of spring-coilers used for making double truncated springs for bed-bottoms and other analogous purposes; and to this end my invention consists in a hook formed upon the outer end of the wire-coiling mandrel, in connection with a raised projection or shoulder, by which the wire forming the heel of the spring is held to its place during the coiling operation.

My invention consists, further, of a segmental projection or guide, also formed on the outer end of the wire-coiling mandrel, whereby the spring-loop which forms the heel of the spring can be readily slipped over onto the smaller part of the mandrel or coiler, and the removal of the spring from the mandrel facilitated.

My invention consists, further, in attaching a spring-hook to the inner end of the mandrel, whereby the wire is held securely in its coiled condition on the mandrel while the wire is being cut to the proper length.

My invention consists, further, in a grooved plate attached to the top of the post on which the mandrel is mounted, whereby the central portion, or the wire which connects the double spring and the extended arm of the single spring, is bent into two semicircles joined by a straight section, as will hereinafter more fully appear.

My invention consists, further, in certain details of construction hereinafter more fully described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a view, in perspective, of my device. Fig. 2 is a side elevation of the wire-coiling mandrel mounted on a shaft in the supporting-post, with operating crank, pawl, and ratchet. Fig 3 is an end view of the coiling-mandrel, looking in the direction of the arrow, Fig. 2, toward the post. Fig. 4 is a top view of the mandrel-supporting post, showing the grooved plate in which the connecting or central portion of the double spring and the extended arm of the single spring, as shown in Figs. 8 and 9, are formed. Fig. 5 is a top view of the cutter and post on which the cutter is mounted, with the measuring-rod for the single spring attached thereto. Fig. 6 is a side view of the cutter. Fig. 7 is a sectional and detached view of the spring which holds the cutting-knife in an open or elevated position. Fig. 8 is a plan view of the double spring as formed on my machine, showing the central or connecting portion as bent to form in the grooved plate. Fig. 9 is a plan view of a single spring with arm bent to form in the grooved plate.

A is the bed-plate, on which are secured the posts A′ and B.

B′ B′ are standards secured to the bed-plate A, in which the wire-supporting reel is mounted. This being of the ordinary construction, no further reference to it or detailed description of it is deemed necessary.

In the post A′ is mounted, in suitable bearings, a crank-shaft, *a*, with crank *a′* attached to one end, by which it is turned or operated.

On the shaft *a* is secured the wire-coiling mandrel C, which is composed of two parts, C and C′, the part C being rigidly secured to the shaft *a* and adapted to be rotated therewith, while the part C′ is loosely mounted on the shaft—*i. e.*, it is capable of being removed endwise from the shaft, and when drawn out on the shaft far enough to free it of the lugs or offsets *b* it is capable of being rotated on the shaft. The general outline of these two parts of the wire-coiling mandrel is that of two frusta of a cone joined at their apices by means of interlocking offsets or shoulders *b*, as before stated.

The mandrel is divided into two sections, in order that the operator may remove the newly-coiled spring therefrom. The mandrel being of smallest diameter at the frusta of the cones, the small coils at the center would not pass over the large end of section C′, and hence it has to be withdrawn. The end or shank of the spring is

released from the hook *c'* and abutment *d*, hereinafter more fully described, and the coil is readily released from section C', which section is removed from the shaft *a*. The large part of the coil is now readily released from the section C, and the entire spring or coil is removed.

The large end of section C of the mandrel is provided with a ratchet, *b'*, secured thereto, which lies contiguous to the post A'', and said post has a pawl, *c*, attached thereto, which drops into the teeth of the ratchet and prevents the mandrel from turning backward and uncoiling the wire in case of an accident before the wire reaches the hook D ready to cut off. The surface of the mandrel is provided with a spiral groove into which the wire is coiled, and which prevents the wire from slipping out of place. The end of the shaft opposite the crank is bifurcated, and a portion of one side of one of the prongs is cut down so as to serve as a wrench in making bends for small loops or hooks or eyes. The other portion of the prongs are left intact, over or on which larger loops or bends are made.

So far the description of the wire-coiling mandrel and shaft is substantially the same as that described in my patent heretofore referred to, and the improvements I have made thereto I will now proceed to describe.

On the other end of the mandrel C', and eccentric to its axis, is formed an elliptical or partially elliptical enlargement or projection, *d*, which terminates in a hook, *c'*, for holding the wire while it is being wound on the mandrel. A further enlargement or abutment, *d'*, is formed on the enlargement *d*, against which the bend of the wire abuts in the process of winding, and prevents the wire from slipping or becoming slack or displaced, as indicated at 1, Fig. 3. A groove may be made in the enlargement *d* to receive the wire instead of the abutment *d'*, and this I consider within the scope of my invention. A semicircular projection or guide, *e*, is also formed on or combined in the enlargement *d*, which allows the loop or clasp of the spring to be slipped over onto the smaller part of the mandrel without bending the same out of shape. The small portion of the mandrel C can then be slipped off of the end of the shaft *a*.

In the rear end of the mandrel, and in front of the ratchet-wheel, is secured a spring-hook, D, for holding the wire on the mandrel after the spring has been formed thereon, while the operator is free to give his undivided attention to cutting the wire to the proper length.

D' is a grooved plate secured to the top of the post A', and on or in which the peculiar shape is given to the elastic connecting portion of the wire which joins the double springs, and also the elastic extension or arm of the single spring is formed therein. The form of spring, both single and double, with the elastic extension and connecting portions, shown in Figs. 8 and 9, are the same for which Letters Patent were granted to me October 14, 1879, No. 220,557.

E is a bracket secured to the post or standard A, on which the springs are settled after they are taken from the mandrel by the pressure of the palm of your hand, which finishes the spring.

e is a plate, of steel or other suitable material, secured to the top of the standard B, and is provided with a diagonal notch, *f*, in its upper edge.

E' is a bar or plate of steel pivoted at *f'* to the standard B, and is also provided with a diagonal notch, *g*, on its upper edge.

The notched plate *e* and notched bar E' form the cutting device by which the wire is severed, the cutting-edges of each being formed by making the notches diagonal, and in operation act on the principle of shears, it being understood that the wire to be cut is placed into the diagonal notches and the other end of the bar E' is forced down by means of a rod, F, which connects it with a foot-treadle, and by which it is operated. The bar E' is provided with a hook, *g'*, on its rear end, over which the upper loop, *h* of the spring *h'* is secured. A similar loop, *i*, of the spring is secured to the post B at *i'* by a staple or other convenient fastening. This spring draws down the rear end of the bar E' and keeps the front end of the bar and the foot-treadle in an elevated position, ready for use at all times.

In Fig. 7 I have shown an enlarged sectional view of the spring, which consists of an ordinary coiled spring with open ends, links of metal passing through the interior of the coil at right angles to each other, and having the open ends of said links bent over, as at *k*, to embrace the coil, with the loops *h* and *i* projecting above and below the coil, and whereby they are attached to the bar E' and post B. By this construction I have a strong and reliable spring, in which the strain is taken up at both ends thereof and distributed equally toward the center, which makes the spring less liable to get out of order.

G is a wire projecting from the post D in the direction of the coiling-mandrel, and is used as a measure or gage to determine the length of wire required to form the single spring with its arm, as shown in Fig. 9. The distance of the cutter-post from the coiling-mandrel, (five feet seven and one-half inches,) as heretofore stated, determines the length of wire required for the double spring, with its bent connecting portions *l'*, as shown in Fig. 8.

G' is the wire guide and holder, and consists of a steel or other bar secured to the post B, or to the base A, in any suitable manner. I have shown it in Fig. 1 as attached to the post, and at an angle thereto. It is provided with any desired number and size of holes, through which the wire passes, said holes having sharp edges, by which the wire is caught and held when cut off. The angle at which the wire approaches and enters the holes in said guide from the reel tends to pull the wire to one side of the hole when the wire is cut off and cause it to impinge strongly against the front and rear edges

of the hole, and thus the end of the wire will be held within easy reach of the operator.

Having thus described my invention, I will now proceed to briefly state the mode of operation.

The end of the wire is bent by inserting it in a hole in the crank-shaft and then turning said shaft, or it is inserted in the bifurcation in the end of the shaft to form bends or loops, as may be desired, and also to form the open loop, which embraces the slat of the bed. This open loop is then placed over the hook *c'* on the end of the coiling-mandrel, with the bent portion of the wire lying in the face or front portion of the mandrel against the projection *d*, which prevents the wire from moving out of position. The mandrel is now turned with the right hand of the operator, while the wire is held taut and guided around the projection *e*, and thence into the grooves in the periphery of the mandrel with the left hand. After the spring has been formed the spring-hook is brought into action to hold the coil on the mandrel, while the operator is free to use both hands to hold and cut the wire to the proper length. After the wire has been cut to the proper length the spring-hook is disengaged from the wire and the mandrel turned back sufficiently to free the wire from the grooves in the mandrel and the heel released. The loop which forms the heel of the spring is now lifted over the hook *c*, the mandrel is now turned forward, the operator still holding to the heel of the spring until the wire passes over at the projection *e* on guide *d* onto the smaller part of the loose mandrel C. The end C' of the loose mandrel is then taken off of the crank-shaft, thus enabling the completed spring to be removed from the mandrel. The wire having been cut the proper length to form a double spring the projecting or straight end of the wire is then coiled into a spring, as in the first instance. That portion of the wire which now connects the two coils is straightened, and in order to form it into two semicircles joined by a straight central section, as shown in Fig. 8, I place said central portion centrally in the groove 2 of the plate D' and bend it end for end around in the grooves 3 3. This comples the double spring. The projecting arm of the single spring is curved in the same manner as the above. (See Fig. 9.)

What I claim, and desire to secure by Letters Patent, is—

1. In a wire-coiling machine, the wire-coiling mandrel C', provided with the hook *c*, cast thereon or made part thereof, ledge *d'*, and guide *e*, whereby the wire is held firmly on the mandrel during the coiling operation, as set forth.

2. In a wire-coiling machine, the wire-coiling mandrel C, abutment *d'*, segmental guide *e*, all cast thereon or made part thereof, whereby the wire clasp and loop is raised over onto the smaller part of the mandrel by the turning of the mandrel forward without being bent or injured, as set forth.

3. In a wire-coiling machine, the mandrel C, provided at its rear or spring-finishing end with a spring-hook, D, whereby the wire is securely held on the mandrel after the coil is formed.

4. In a wire-coiling machine, the post A', provided with the plate D', having formed therein the straight groove 1 and curved grooves 3 3, whereby the connecting portion of the double springs and the arm of the single spring are formed, having two semicircles joined by a straight central section, as and for the purpose set forth.

5. In a wire-coiling machine, the combination of the wire-coiling mandrel provided with the hook *c'*, guide *d*, and the spring-hook D, with the cutting device, constructed substantially as described, and with the guide and holder G', as set forth.

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

LA FAYETTE WILDERMUTH.

Witnesses:

LYMAN J. JACKSON,

JAMES F. CONLY.