

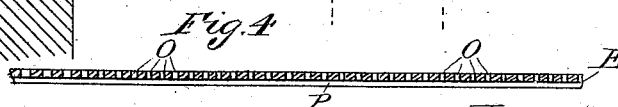
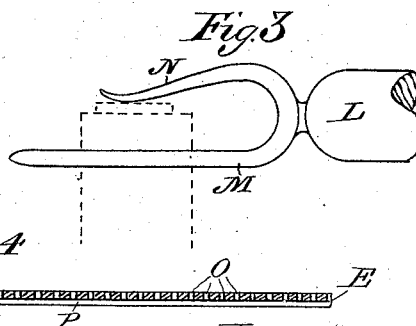
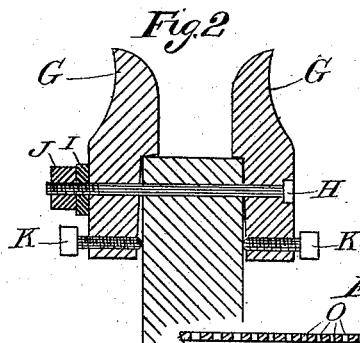
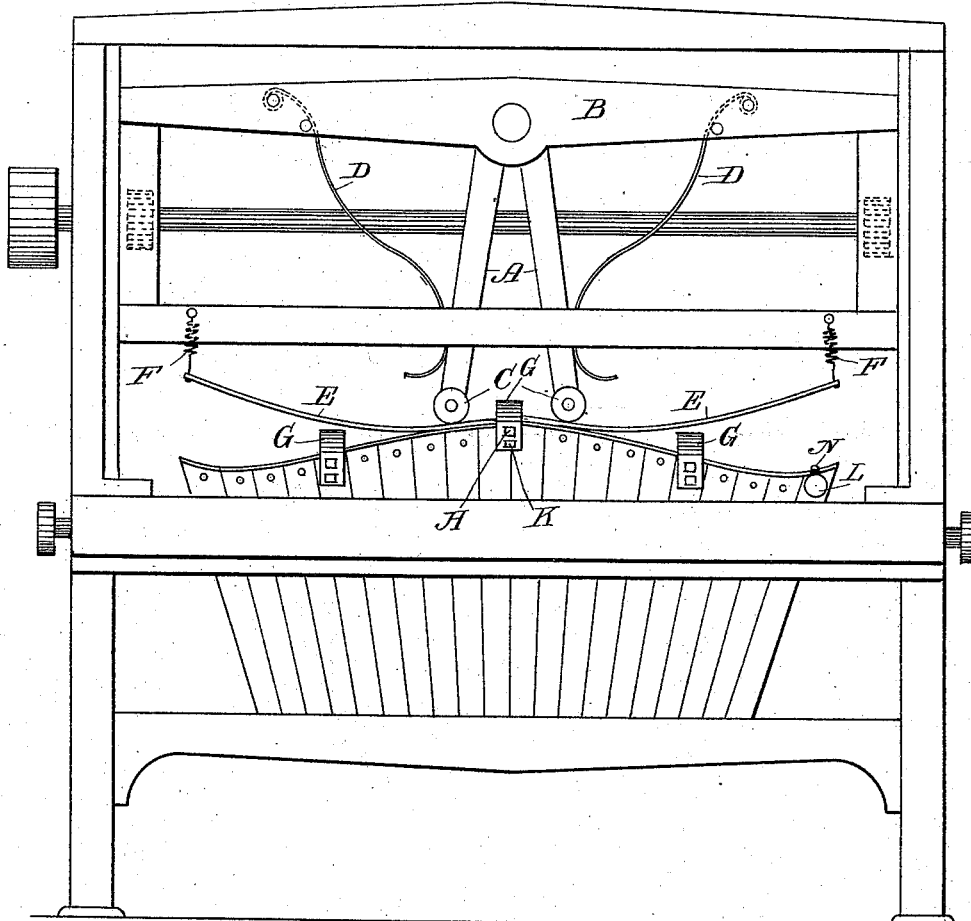
(No Model.)

G. NORWOOD.

MACHINE FOR FORMING SPRINGS.

No. 305,707.

*Fig. 1* Patented Sept. 23, 1884.



Witnesses  
*S. L. Williamson*  
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# UNITED STATES PATENT OFFICE.

GEORGE NORWOOD, OF BRIDGEPORT, CONNECTICUT.

## MACHINE FOR FORMING SPRINGS.

SPECIFICATION forming part of Letters Patent No. 305,707, dated September 23, 1884.

Application filed June 23, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE NORWOOD, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Spring Forming and Bending 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.

My invention relates to certain novel and useful improvements in machines for bending springs, but is more especially intended as an improvement on the construction shown and described in my pending application No. 111,804, filed in the Patent Office November 15, 1883, and has for its object to simplify the means provided for directly bending and shaping the spring, and furthermore to provide devices readily detachable for confining and holding the spring on the former-bars; and with these ends in view my invention consists in the details of construction and combination of elements hereinafter fully and in detail explained, and then specifically designated by the claims.

In order that those skilled in the art to which my invention appertains may more fully understand its construction and operation, I will proceed to describe the same in detail, referring by letter to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a front elevation of a spring-bending machine constructed in accordance with my improvement. Fig. 2, a detail sectional view, shows the manner of attaching the clips to the former-bars; Fig. 3, a side elevation of the spring-clamp in proper position, and Fig. 4 a detail longitudinal section of the spring-strip.

Similar letters denote like parts in the several figures of the drawings.

It is not deemed necessary to enter into any detailed description of the construction and operation of the machine proper, as this forms no part of my present invention, and, moreover, is preferably the same as in my application above referred to.

A are the presser-bars, which are pivoted to the upper part of the carrier B, half-way between the ends thereof, and constructed after

the manner of a pair of compasses. C are rolls journaled within the lower extremities of said bars, and D are springs attached to the carrier at one end and with their free ends bearing against the outer faces of the presser-bars. These springs merely serve to bring said bars together when no force is exerted to force them apart, and they constitute an improvement over the wires and weights used in my former construction.

E is a strip of thin spring metal, connected at its extremities to the carrier-frame by means of coil-springs F in such manner that said strip is immediately below the presser-bars and in the same vertical plane therewith.

In my previous construction, and in all machines of this description where the spring is acted upon directly by rolls or other similar shaping device, a slight track or mark is usually left on the surface of the spring, and it becomes necessary to remove this defect by grinding, polishing, or plating; but in my present construction, by placing the intermediate spring-strip between the operating-rolls and the spring proper, I am enabled to overcome this difficulty, and to produce a spring with a very desirable finish. As the carrier descends, the strip E yields readily to the action of the rolls on the presser-bars, and the spring itself is thereby acted upon throughout its entire length, both at the outer and inner movements of said bars. The coil-springs F not only form connections between the strip and carrier-frame, but they also keep said strip in constant contact with the rolls, so that there is no wobbling of the strip or any liability of its displacement.

G are jaws adapted to be attached to the extreme ends of the former-bars by means of a bolt, H, passed through said jaws and bars. These jaws slightly overlap the upper surface of the bars, as shown at Fig. 2.

I is a washer of rubber or other suitable yielding material, which is placed over the bolt and next to one of the jaws, and J is a nut on said bolt against said washer, and operates to clamp the jaws against the former-bars.

K are set-screws which extend through the lower extremities of the jaws and bear directly against the bars. The function of the elastic washer is to allow the jaw to yield in order to accommodate springs of only slightly-varying

widths. In order to clamp springs of a narrow gage, the screws K are set back and the nut J moved forward, thereby forcing the jaws against the spring. The screws K are then set forward, in order to take up any lost motion at the upper extremities of the jaws.

L is a clip formed with a forked projection, M N, the former of which is to be inserted in holes in the bars, the latter being of a spring nature and capable of exerting a downward pressure against the spring proper, as will be readily understood by reference to Fig. 3. These clips are designed to be placed at the extreme ends of the spring, in order to hold the same securely at these points while it is being bent and formed.

The strip E is constructed with perforations O, extending longitudinally and centrally thereof, and a channel, P, is formed in the under surface of the said strip and in the same longitudinal plane with the perforations O.

In my improvements the cooling of the springs is begun immediately after the presser-bars have been distended against the spring and before their return movement, by introducing a stream of water within the perforations O throughout their entire length. The water flows into the channel P, and thereby cools the spring from its center, for the obvious purpose of effecting uniform contraction.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a spring bending and forming machine, a vertically-reciprocating carrier-frame having pivoted thereto presser-bars adapted to be distended against the action of springs, in combination with the spring-strip connected at its extremities to said frame by means of springs, and held thereby in contact with the operating ends of said bars, substantially as set forth.

2. In a spring bending and forming machine, a spring-strip having a yielding connection at its extremities, with a vertically-reciprocating

carrier-frame, and held in constant contact with the presser-bars, whereby the latter may operate to bend and form the spring without immediate contact against the same, substantially as shown and described.

3. In a spring bending and forming machine, jaws overlapping the former-bars and secured thereto by means of a bolt passed through said jaws and bars, said bolt being provided with an elastic washer and nut, as described, in combination with set-screws passed through the lower extremities of said jaws and bearing against the bars, substantially as and for the purpose set forth.

4. In a spring bending and forming machine, the intermediate elastic strip of metal provided with perforations extending centrally throughout its entire length, and a channel in its under surface, into which said perforations open, substantially as described.

5. The combination of the presser-bars A, pivoted to the reciprocating carrier B, and having at their lower extremities rolls C, springs D, attached to said carrier, and with their free ends bearing against the outer edges of said bars, and spring-strip E, connected to the carrier-frame by means of coil-springs F, substantially as set forth.

6. The combination of the jaws G, secured to the former-bars by bolt H, elastic washer I, nut J, and set-screws K, substantially as set forth.

7. The clip L, having projection M, adapted to be inserted within the former-bars, and elastic projection N, adapted to extend over the spring and exert a downward pressure thereon, substantially as described.

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

GEORGE NORWOOD.

Witnesses:

S. S. WILLIAMSON,  
W. J. HAVILAND.