(No Model.) 2 Sheets—Sheet 1.

O. S. & W. S. FOSTER.

MACHINE FOR MAKING SPIRAL SPRINGS.

No. 303,717. Patented Aug. 19, 1884.

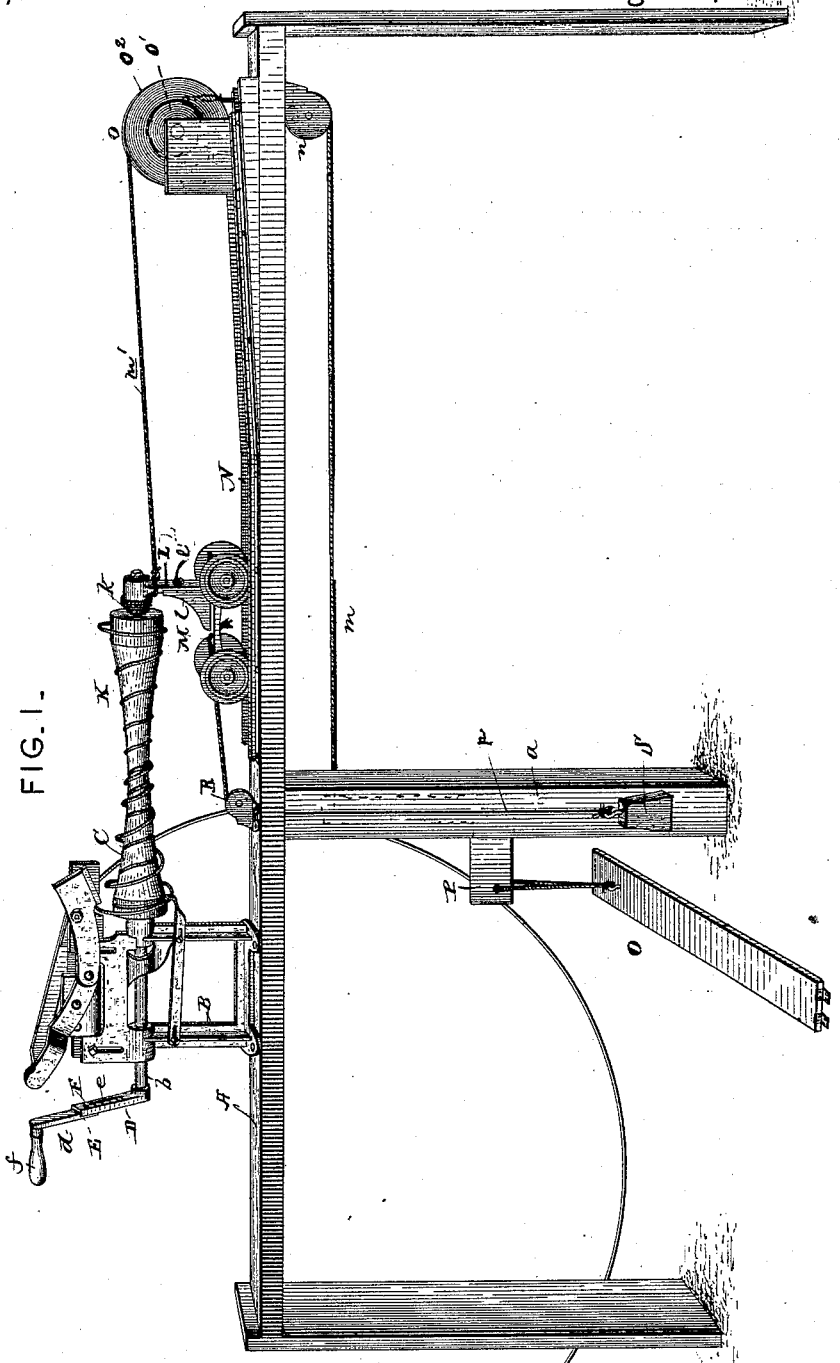

FIG. 1.

ATTEST.
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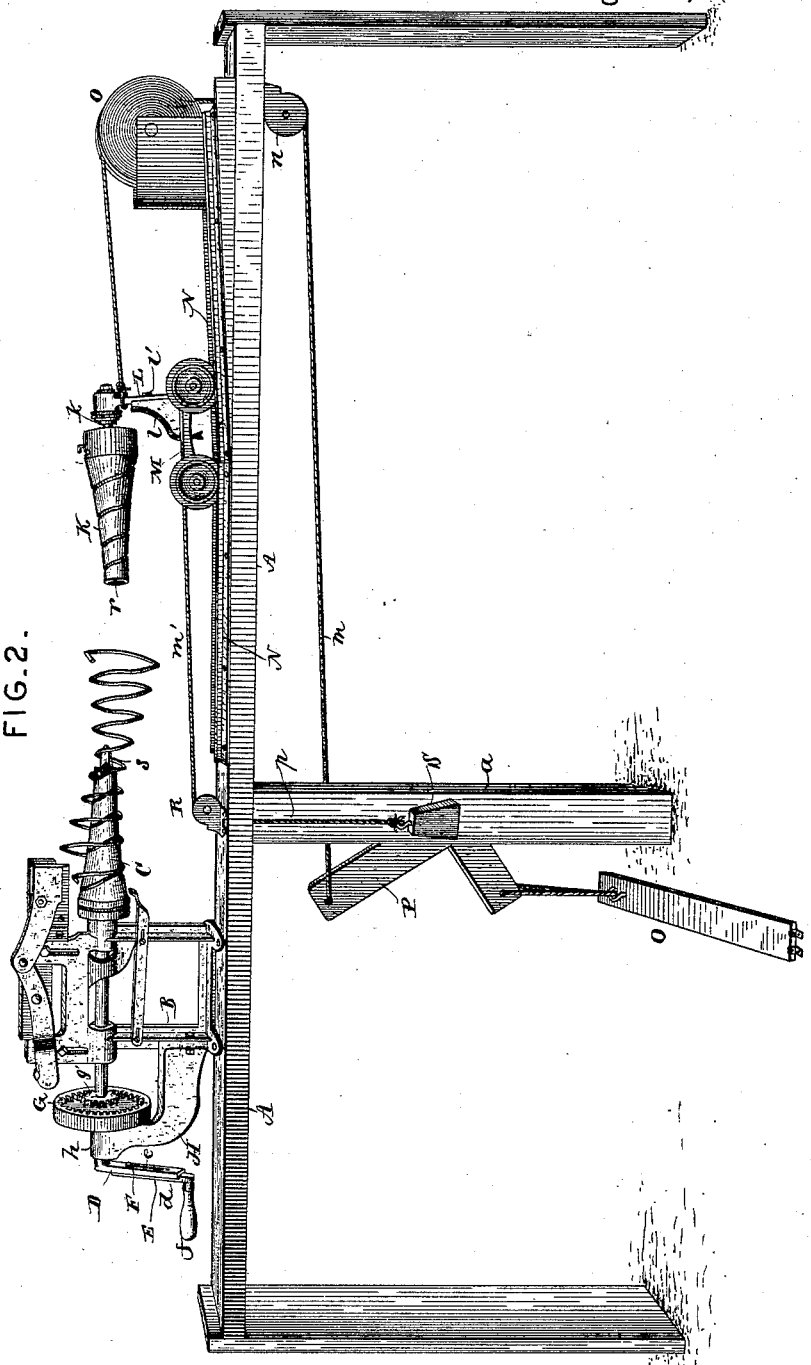
FIG. 2.



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UNITED STATES PATENT OFFICE.

OSCAR S. FOSTER AND WILLIAM S. FOSTER, OF UTICA, NEW YORK.

MACHINE FOR MAKING SPIRAL SPRINGS.

SPECIFICATION forming part of Letters Patent No. 303,717, dated August 19, 1884.

Application filed March 31, 1884. (No model.)

To all whom it may concern:

Be it known that we, OSCAR S. FOSTER and WILLIAM S. FOSTER, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Machines for Making Spiral Springs; and we 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.

Our invention relates to an improvement in machines for manufacturing spiral springs. Hitherto the prevailing practice in the manufacture of double-cone or furniture springs has been to have a square shaft run through the entire double cone, this shaft fitting tightly in the section next to the machine and loosely in the other section, so as to allow it to be moved back and forth for the purpose of taking off the spring. This method is objectionable, first, because of the tendency which the unsupported end has to wabble, and, secondly, because of the inconvenience experienced in taking the spring off when completed, the operator really needing three hands to take it off conveniently—viz., one to hold the wire, one to remove one-half of the double cone, and one to take off the spring.

The object of our invention is to provide improved devices for handling one-half of the double cone; and with this end in view it consists in the parts and combination of parts, as will be more fully described, and pointed out in the claims.

Our invention further consists in certain features of construction and combinations of parts, as will be fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective of our machine with cone-sections in contact, and showing a detached view of the multiplying-gear. Fig. 2 is a view in perspective, showing gear in position and cone-sections separated.

A represents a supporting-table of any convenient form and suitable material. A framework, B, preferably of iron, is rigidly secured upon the table A, and serves to support the shaft *b* of the cone-section C, and also the cutting and bending devices, a full description of which is set forth in Letters Patent No. 280,923, granted us July 10, 1883, and is here omitted as forming no part of our present invention. The shaft *b*, on which the cone-section C is rigidly secured, is caused to rotate by a crank consisting of the sections D and *d*. The section D is conveniently provided with a threaded perforation adapted to receive the threaded end of the shaft *b*, and said section D is further provided with a groove, E, and elongated closed slot *e*, constructed to receive, respectively, the section *d* and clamping-screw F, and thereby lock the section *d* at any desired distance from the shaft *b* within the limits of the slot *e*. The section *d* is provided with a suitable handle, *f*.

For the purpose of working the lighter grades of wire more rapidly, we have provided a simple and easily-adjusted gear, consisting of the annular gear-wheel G and pinion *g*. The pinion *g* is conveniently provided with a threaded perforation, *g'*, at its center, adapted to receive the end of the shaft *b*. The annular gear-wheel G is provided with a cylindrical stud, g^2, at its center, which rests in suitable bearings, *h*, in the upper end of an arm or standard, H, the latter being secured to the frame B or table A, as may be found most convenient. The end of the stud g^2 is threaded to register with the threaded perforation in the section D of the crank, and the annular gear-wheel G is supported in such a position as to engage the pinion *g* when the latter is in its position on the end of the shaft *b*. A single revolution of the wheel G causes the pinion *g*, and hence the shaft *b*, to revolve twice, and the sectional crank is conveniently constructed, so that the length of the circumference described when the crank is fully extended is twice the length of the circumference described when the crank is drawn in as short as possible. It will readily be seen that by this simple construction we are enabled to obtain any degree of velocity or power required.

The section K of the double cone is swiveled or otherwise loosely journaled on the arm *k* of the standard L; or the cone can be rigidly secured to said arm, and the latter journaled at its outer end to the upper end of the standard. The standard L is adjustably secured to a bracket, *l*, on a carriage, M, by a clamp-nut, *l'*, or other suitable means. The carriage

M is constructed to be reciprocated on ways N, thereby alternately removing the cone-section K from and bringing it in contact with the section C. The carriage M is caused to recede from the section C by the pressure of the foot on a treadle, O, connected to the lower end of an angle-lever, P, the latter being pivoted to an upright post, *a*, the motion of the treadle being communicated to the carriage by a rope, strap, or other equivalent device, *m*, secured to the upper end of the lever P, and passing from thence about the under pulley, *n*, and upward over the lesser section, *o'*, of the double pulley *o*, as shown in dotted lines, Fig. 1, to the periphery of which section it is securely attached. A second rope, strap, or equivalent device, *m'*, is securely attached at one end to the periphery of the greater section, o^2, of the double pulley *o*, and passing around said section leads to the carriage M. By this arrangement a slight movement of the foot will cause the carriage to move a sufficient distance. The carriage is caused to automatically approach the section C by a weight, S, attached to the end of a rope, *p*, said rope passing about a roller, R, and thence to the carriage.

In order to overcome the momentum which the carriage acquires by the sharp pressure of the foot in separating the cone-sections, the ways N gradually rise toward the outer end. This arrangement also serves to give the carriage a quick start when allowed to return, and obviates the necessity of a heavy weight.

An angular perforation, *r*, in the small end of the cone-section K receives the projecting end *s* of the axle *b*, when the sections are brought in contact, and thereby causes the section K to rotate with the section C. By means of this simple and inexpensive mechanism the operator may remove one of the cone-sections by his foot, while his hands are at liberty to manipulate the wire; and, furthermore, a substantial bearing is formed for the outer section, whereby improved work is performed.

It is evident that many changes may be made in the form and construction of the several parts embraced in our improvements without departing from the spirit and scope of our invention—as, for instance, the second cone-section might be rigidly secured on the axle-arm and said arm be allowed a rotary motion in the standard; or, again, the first cone-section might possibly be mounted loosely on the shaft *b*, and the two cone-sections and shaft-sections be constructed to interlock, thus causing the whole to rotate; hence we do not wish to be understood as limiting ourselves strictly to the description herein set forth; but,

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a machine for manufacturing double-cone springs, the combination, with a cone-section secured on a revolving shaft, of a second cone-section removably secured to the first-named cone-section, and a reciprocating carriage supporting the second cone-section, substantially as set forth.

2. In a machine for manufacturing double-cone springs, the combination, with a cone-section rigidly secured on a revolving shaft, of a second cone-section secured to a reciprocating carriage, and constructed to engage and disengage the first-named section, substantially as set forth.

3. In a machine for manufacturing double-cone springs, the combination, with a cone-section rigidly secured on a revolving shaft, of a second cone-section revolvably mounted on a carriage, and mechanism for moving the carriage, whereby the cone-section is brought into contact with and moved away from the first-mentioned cone-section.

4. In a machine for manufacturing double-cone springs, the combination, with a cone-section secured on a revolving shaft, of a second cone-section adjustably mounted on a carriage, and devices for reciprocating the carriage, thereby removing the second cone-section from and bringing it in contact with the first-named cone-section, substantially as set forth.

5. In a machine for manufacturing double-cone springs, the combination, with a cone-section secured on a revolving shaft, of a second cone-section adjustably mounted on a carriage, a treadle, and connecting devices for causing the carriage to recede from and automatic devices for causing the carriage to approach the first-named cone-section, substantially as set forth.

6. In a machine for manufacturing double-spiral springs, the combination, with a revolving cone-section, of a second cone-section mounted on a reciprocating carriage, and inclined ways upon which the carriage is reciprocated, substantially as set forth.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

OSCAR S. FOSTER.
WM. S. FOSTER.

Witnesses:
M. W. VAN AUKEN,
JOHN FRANKLIN.