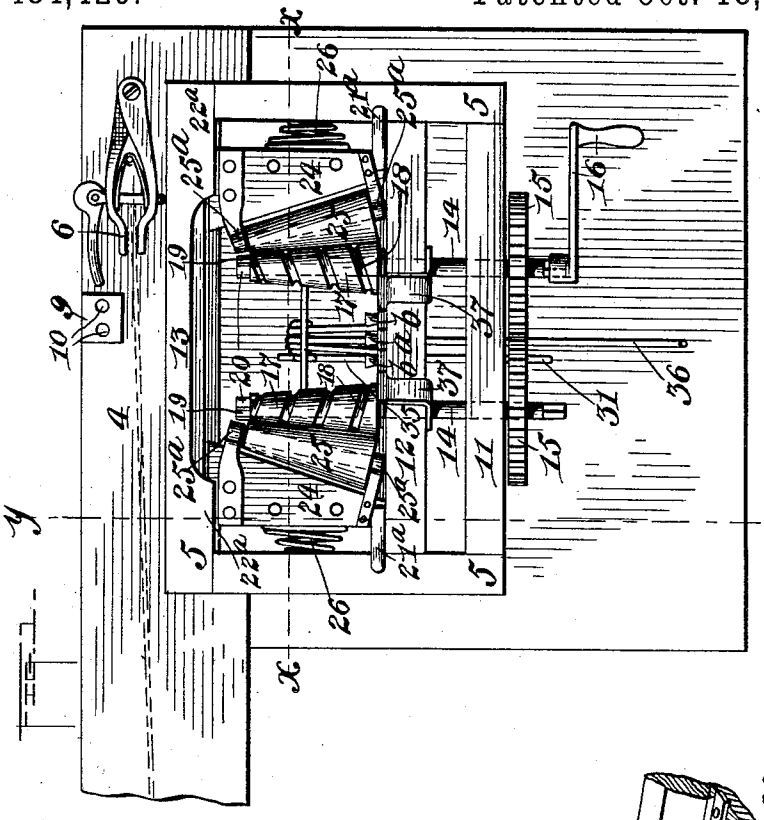
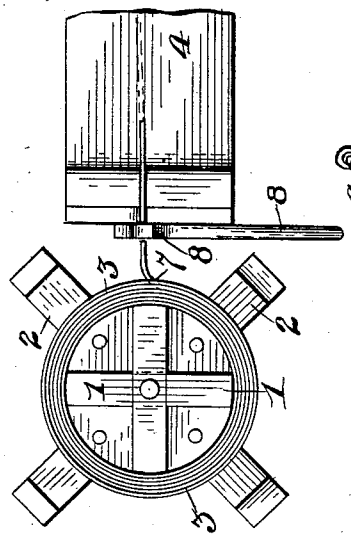
(No Model.) 3 Sheets—Sheet 1.

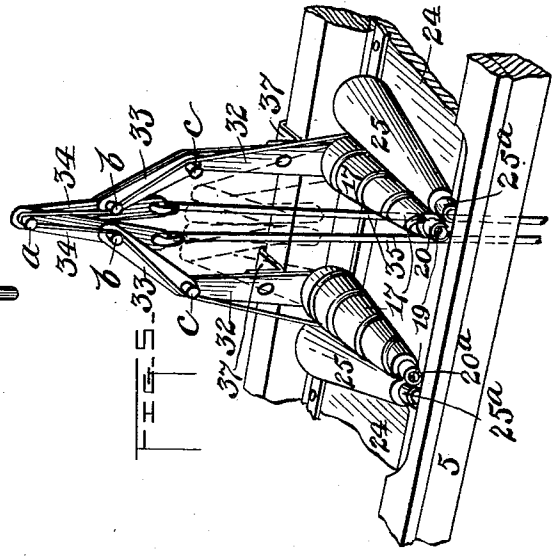
A. M. HARTLEY.

WIRE COILING MACHINE.

No. 484,426. Patented Oct. 18, 1892.







Witnesses
Severance
E. J. Fennick

Inventor
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by J. B. Lawyer,
Attorney

(No Model.) 3 Sheets—Sheet 2.

A. M. HARTLEY.

WIRE COILING MACHINE.

No. 484,426. Patented Oct. 18, 1892.

FIG. 2.

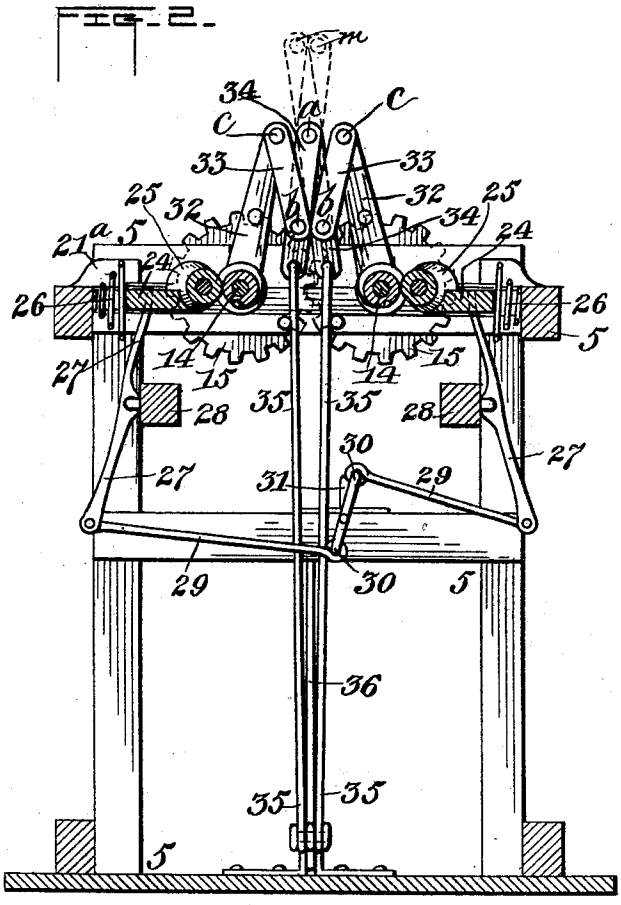
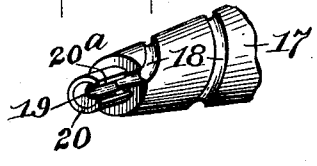


FIG. 4.



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(No Model.) 3 Sheets—Sheet 3.

A. M. HARTLEY.

WIRE COILING MACHINE.

No. 484,426. Patented Oct. 18, 1892.

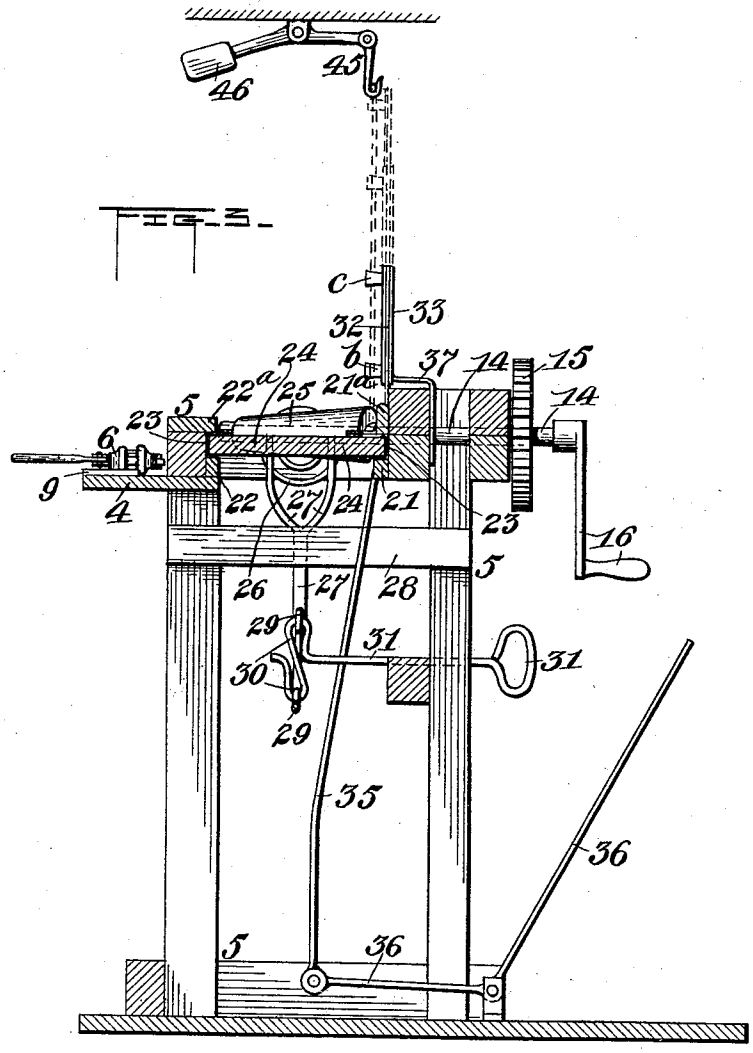

FIG. 5.

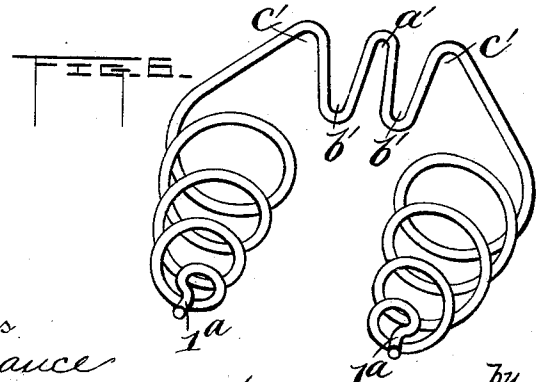

FIG. 6.

Witnesses
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UNITED STATES PATENT OFFICE.

ASA M. HARTLEY, OF BENTONVILLE, ARKANSAS.

WIRE-COILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 484,426, dated October 18, 1892.

Application filed February 1, 1892. Serial No. 419,977. (No model.)

To all whom it may concern:

Be it known that I, ASA M. HARTLEY, a citizen of the United States, residing at Bentonville, in the county of Benton and State of Arkansas, have invented certain new and useful Improvements in Wire-Coiling Machines; and I do 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 the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to certain improvements in that class of inventions known in the art as "wire-coiling machines," in which wire of a definite length has its ends coiled by being drawn over revolving mandrels; and it consists in means whereby the central portion of the wire between the coils on the ends thereof may be formed into undulations upon which the upholstery may rest, through the medium of a series of movable points against which the body of the wire bears while the mandrels are forming the end coils; and it also consists in the construction, arrangement, and combination of the parts of which it is composed, substantially as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings, in which corresponding parts are designated by corresponding marks of reference, Figure 1 is a plan view of a coiling-machine having my improvements applied thereto. Fig. 2 is a vertical section thereof, the bending-links being depressed, the section being taken on line *x x* of Fig. 1. Fig. 3 is a vertical section taken on line *y y* of Fig. 1. Fig. 4 is a detail of the end of a mandrel-shaft and the ferrule thereon. Fig. 5 is a detail showing the relative arrangement of the coiling-mandrels and the links, the latter being shown in full lines as elevated and in dotted lines as depressed, the wire being shown as threaded thereon. Fig. 6 is a detail view of a completed spring formed by a machine constructed in accordance with this invention.

A wire-reel 1 is mounted on a suitable support 2, the reel being formed by a plurality of radial arms and revolving within a casing 3, inside of which and on the ends of the arms the wire is laid. The support 2 is contiguous to one end of a table 4, forming a continuation of the main frame 5, while nippers 6 are secured to the top of the latter, near the rear edge thereof, the said nippers being adapted to seize the outer end of the wire, which is led thereto through an aperture 7 in the side of the reel-casing. It will thus be seen that after the end of the wire has been led to the nippers and caught therein if the reel be so turned as to draw the unreeled wire taut the latter can be cut by the pivoted knife 8 on the outer end of the table near the reel, the distance from the knife to the nippers being equal to the proper length of the wire to be fed to the coiling mechanism.

A plate 9 is secured to the frame 5 near the nippers, and has two holes 10 therein of the size of the wire to be coiled, the ends of the said wire being inserted in the said holes after the wire is removed from the straightening and cutting table, the wire being bent down flush with the surface of the plates, thereby forming on each end thereof a bent portion or tail 1^a at right angles to the body of the wire.

To the top of the frame 5 are secured the three parallel cross-pieces 11, 12, and 13, being the front, intermediate, and rear cross-pieces, respectively. A mandrel-shaft 14 has bearing in the front and intermediate cross-pieces on each side of the middle of the frame, the shafts being thus opposite each other, each of the said shafts having in front of the first-named cross-piece a pinion 15, which gears with the corresponding pinion upon the opposite shaft, in order that the said shafts may revolve in unison when motion is imparted to one of them through the medium of the crank 16, which is adapted to be placed on the squared forward end of either of the shafts. A mandrel 17 is carried by the rear end of each of the shafts, the said rear ends of the shafts projecting from the rear face of the intermediate cross-piece 12 and being unsupported at their rear ends. The mandrels 17 are each in the form of a frustum of a cone and have spiral grooves 18 therein, the direction of the said grooves in the opposite mandrels being in opposite di-

rections, as shown in Fig. 1. A longitudinal slot 19 is formed in the extreme rear end of each of the mandrels, the said slots communicating with the rear ends of the grooves in the mandrels and being adapted to be covered and uncovered by the rotation of the ferrules 20, one of which is mounted on each shaft and is split, as at 20^a, which split portion may by the rotation of the ferrule on the shaft be caused to register with the slot 19 in the latter. As will be seen from an inspection of the drawings, the larger ends of the mandrels bear against the rear face of the intermediate cross-piece 12. Strips 21 and 22 are secured to the rear face of the intermediate cross-piece 12 and the forward face of the rear cross-piece 13, respectively, near their lower edges, while corresponding strips 21^a 22^a are secured thereto slightly above the ends of the first-named strips, forming opposite guideways 23 at each side of the frame 5, (see Fig. 3,) in which guideways 23 blocks 24 are contained and are adapted to slide one of the said blocks on the outer side of each of the said mandrels. A conical roller 25 is carried by bearings 25^a, projecting from each of the said blocks, the axes of the said rollers being at an angle to the axes of the mandrels, whereby each roller and the corresponding mandrel will bear upon each other throughout their entire length, a spring 26, contained between the frame 5 and each of the blocks, causing a constant pressure between the said mandrels and rollers. In order to afford means for retracting the rollers from the mandrels when removing the completed coil, a lever 27 is pivoted to each block at its upper end, the central portions of the said levers being fulcrumed in suitable bearings in side pieces 28 and the lower portion of each of the said levers being connected to the outer end of a rod 29, the inner ends of each of said rods being engaged by one of the two cranks 30 on the handle 31, the said handle having a bearing in the frame 5, in which it may be turned, thus withdrawing or releasing the blocks, and it will be seen that by turning the handle 31 until the rods 29 have passed their center the blocks will be held back without the necessity of catches, &c.

A link 32 has its lower end perforated and surrounding each of the mandrel-shafts, while each of the links 32 has its upper end pivoted to the upper end of an intermediate link 33, the lower end of each of which intermediate links is pivoted to an inner link 34, the upper ends of the said inner links being pivoted together, while the lower ends of the said inner links are extended below their point of attachment to the intermediate links, the said extension of each link being secured to the upper end of a rod 35, the lower ends of the said rods being secured to the rear end of the bent lever 36, pivoted on a fixed support, such as the floor, and it will thus be seen that on depressing the front end of the lever 36, thus raising the rear end, the links will assume the position shown in full lines in Fig. 5, while upon the opposite movement of the lever the links will be depressed.

A strap 37 is secured to each of the outer links 32 near its central portion, and after passing horizontally over the intermediate cross-piece has its lower end mounted upon the corresponding mandrel-shaft between the front and intermediate cross-pieces. The pivotal points between the several links are formed by studs projecting rearwardly from the links, the stud connecting the inner straps being lettered *a* in the drawings, the studs connecting the intermediate and inner straps being lettered *b b*, and the studs connecting the outer and intermediate links being lettered *c c*.

Such being the construction of my invention, its mode of operation is as follows: The ends of the wire having been bent, as at 1^a, by means of the holes 10 in the plate 9, as before described, such bent portions are inserted in the longitudinal grooves 19 in the shafts 14 and locked therein by the rotation of the split ferrules 20, one end of the wire being thus secured to each of the shafts, which are then rotated in the proper direction to draw the ends of the wire down between the mandrels and the rollers, the wire being rolled up upon the former and resting in the grooves thereof. In order to facilitate the handling of the wire, I prefer to swing the latter above the machine in the cradle 45, provided with the counterpoise 46, and it will thus be seen that the wire will be kept straight until it is fed to the mandrel. When the grooves in the mandrels have been filled throughout their entire length with the wire, the rotation of the mandrels is stopped and the center of the wire caught above the stud *a* on the links, while the wire on each side thereof is caught under and on the inner sides of the studs *b* and on the outer and upper sides of the studs *c*, the links being elevated, as shown in full lines in Fig. 5. The links are now depressed by means of the bent lever 36 and assume the position shown in dotted lines in Fig. 5 and in full lines in Fig. 2. As will be seen in these figures, the outer links 32 are pushed outwardly and apart and the studs *a* and *b b* sink. The effect of the separation of the outer links is to put the wire under tension and to draw its ends closely within the grooves in the mandrel, while the depression of the studs bends the central portion of the wire, as at *a'*, *b'*, and *c'*, Fig. 6, which is desirable, in order to afford a bearing for the upholstery, &c. The coiled wire is removed from the machine by withdrawing the blocks 24 and removing the coils from the mandrels.

In dotted lines in Fig. 2 is shown a construction in which the inner links 34 34 extend above their common pivotal point and are provided on such extended portions with studs *m*, such as before described, over which

last-named studs the center of the wire may be passed instead of over the stud *a;* but the effect upon the completed spring will be evidently the same, with the exception of a slight change in the shape of the bends in the central portion thereof.

Having thus described my invention, what I claim is—

1. The combination, with oppositely-placed mandrels, of a series of pivoted links having projecting studs adapted to engage the wire, substantially as described.

2. The combination, with a plurality of geared shafts having mandrels thereon, of an outer link pivoted to each of the said shafts and a series of intermediate links connecting the said outer links, the connections between the links being formed by projecting studs adapted to engage the wire, substantially as described.

3. In a wire-coiling machine, the combination, with oppositely-placed geared shafts, of a conoidal grooved mandrel carried by each of the said shafts and a spring-pressed roller bearing on each of the said mandrels, substantially as described.

4. In a wire-coiling machine, the combination, with oppositely-placed geared shafts, of a conoidal grooved mandrel carried by each of the shafts. a spring-pressed roller bearing on each of the said mandrels, and a series of pivoted links placed between the said mandrels and carrying projecting studs adapted to engage the wire, substantially as described.

5. In a wire-coiling machine, the combination, with oppositely-placed driven mandrels, of a series of pivoted links between the mandrels, carrying projecting studs adapted to engage the wire, and means for varying the position of the links, substantially as described.

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

ASA M. HARTLEY.

Witnesses:
M. L. WOOD,
Z. E. WATSON.