

(No Model.)

3 Sheets—Sheet 1.

G. RICH.

MACHINE FOR MAKING SPRINGS FOR UMBRELLAS OR PARASOLS.

No. 422,835.

Patented Mar. 4, 1890.

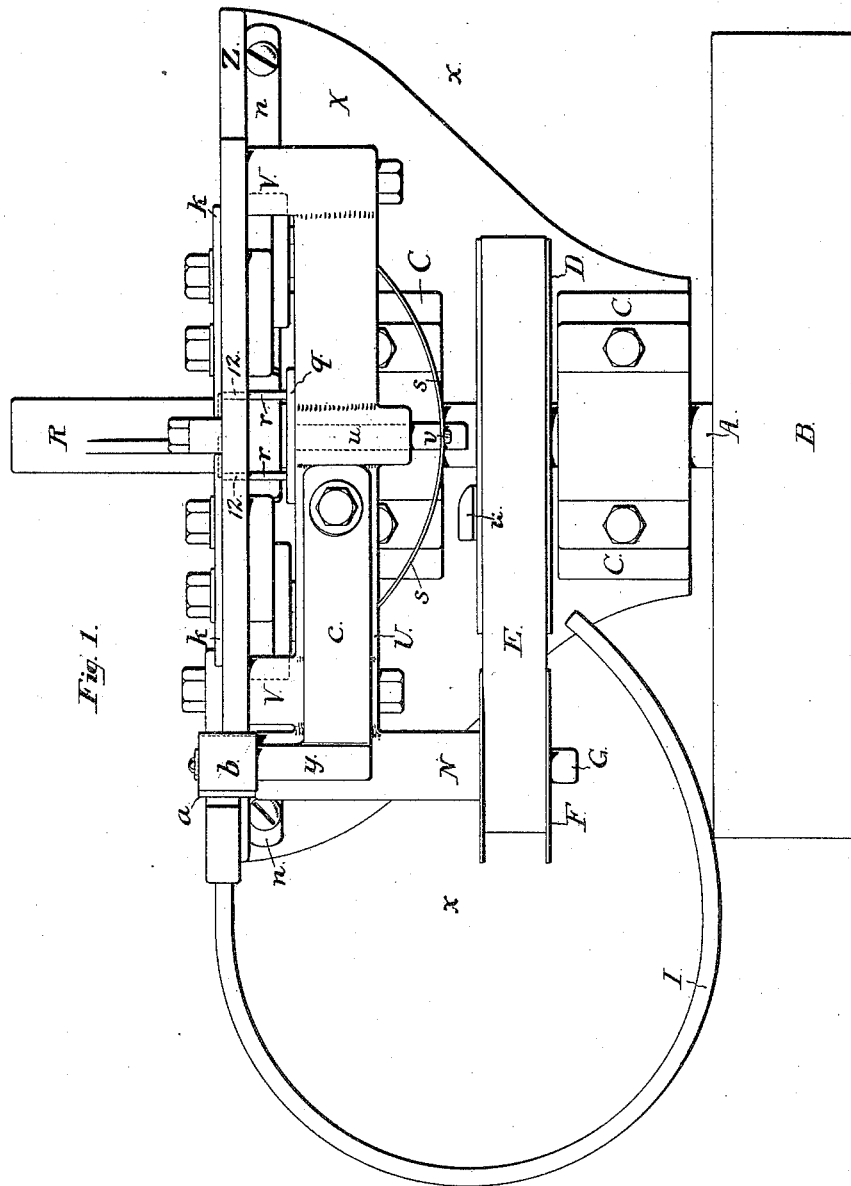


Fig. 1.

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R. D. Keller

Inventor

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per
Mark W. Collier
attorney.

(No Model.)

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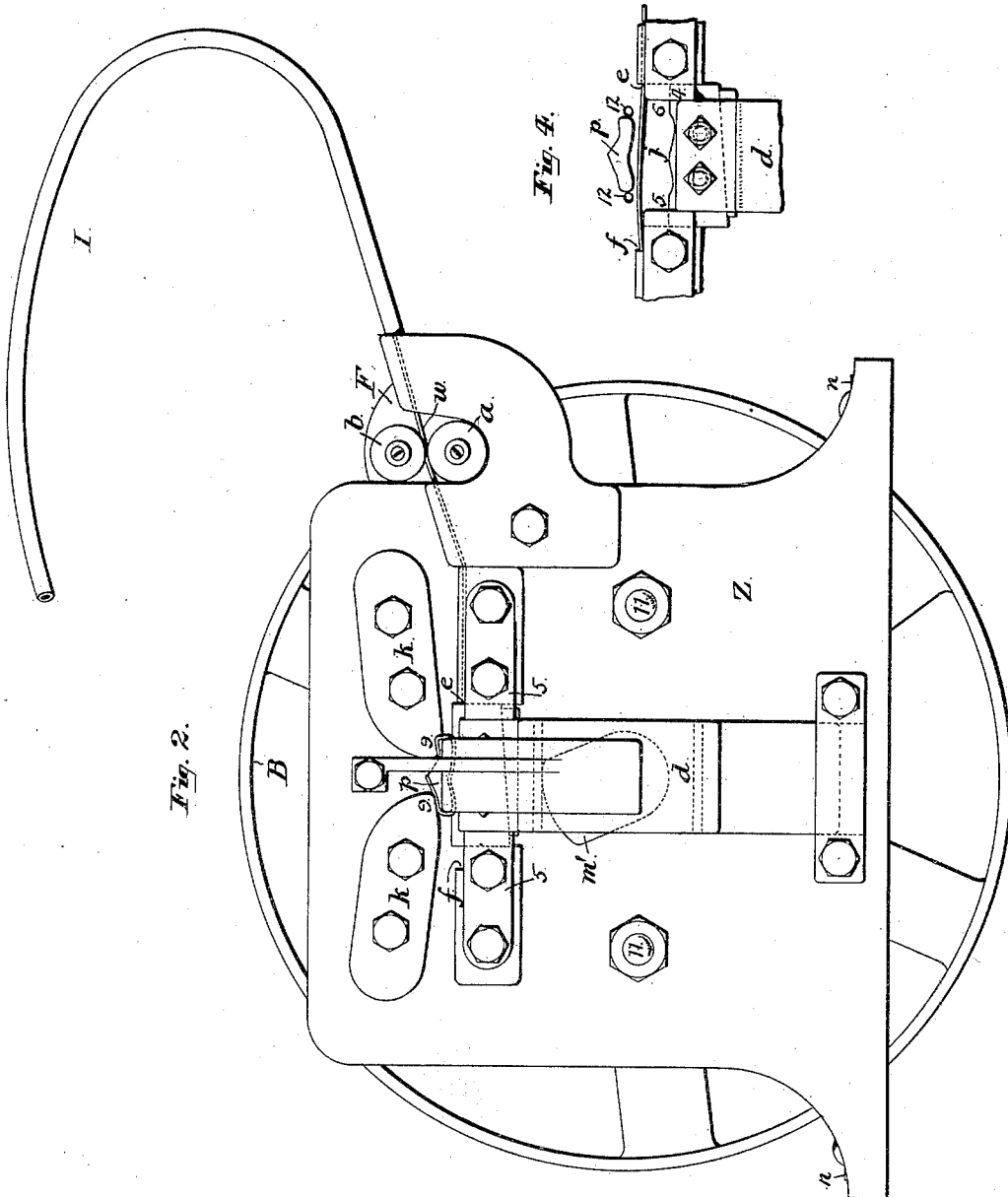


Fig. 2.

Fig. 4.

Witnesses:

G. W. Parit,
Rd Collier

Fig. 5.

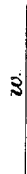


Fig. 6.



Fig. 2.



Inventor

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(No Model.)

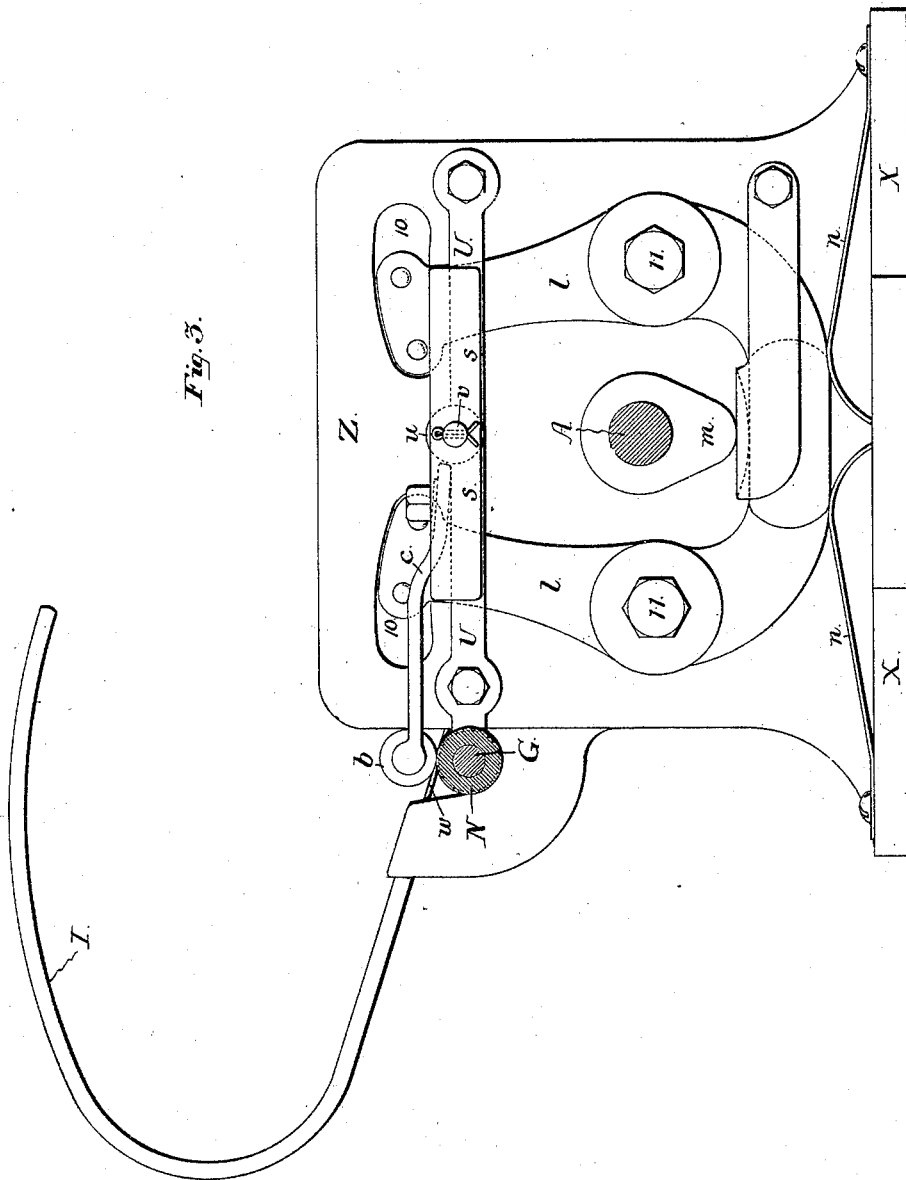
3 Sheets—Sheet 3.

G. RICH.

MACHINE FOR MAKING SPRINGS FOR UMBRELLAS OR PARASOLS.

No. 422,835.

Patented Mar. 4, 1890.



Witnesses:

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UNITED STATES PATENT OFFICE.

GEORGE RICH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO CHARLES J. FOLLMER, LEVIN H. CLOGG, THEOPHILUS BUTTS, AND JAMES L. BROWN.

MACHINE FOR MAKING SPRINGS FOR UMBRELLAS OR PARASOLS.

SPECIFICATION forming part of Letters Patent No. 422,835, dated March 4, 1890.

Application filed August 10, 1889. Serial No. 320,413. (No model.)

To all whom it may concern:

Be it known that I, GEORGE RICH, of Philadelphia, in the State of Pennsylvania, have invented a new and useful Machine for Making Springs for Umbrellas and Parasols, of which the following is a specification, reference being had to the drawings annexed.

The main object of my invention is to prepare directly from a coil of wire by the automatic action of a machine the springs used in the handles of umbrellas and parasols to retain the runner in place when the umbrella or parasol is open or closed. These springs have heretofore been made exclusively by hand labor.

My machine consists, essentially, of a cutting device cutting the wire into sections of suitable lengths for the springs, of a die or anvil against which the springs are shaped, and of formers acting on different sides of the anvil or die to shape the spring into the desired form.

Among the secondary objects of my invention are, first, to provide a device by which the wire may be fed to the parts of the machine above mentioned and cut in lengths suitable for the springs, and, second, a device by which the springs are thrown off the anvil after the action of the formers.

Figure 1 is a plan view of the machine. Fig. 2 is a front elevation. Fig. 3 is a rear elevation on the line *xx* in Fig. 1. Fig. 4 shows the details of cutter and former with a section of the anvil in a plane parallel to the plane of the face-plate 2, the chute or spout being removed. Fig. 5 shows a wire section; Fig. 6, the shape of the same after the action of one of the formers, but before the application of the other two; Fig. 7, a completed spring.

Mounted upon the bed-plate X, and supported by the stanchions C C, is the shaft A, through which power is communicated to the device from the pulley B, set on the end thereof. This shaft A bears the cams *m'* and *m*, which latter drives the formers *k k*. These cams are set at an angle with each other sufficient to allow the cam *m'*, which drives the former carrying the wire section to the anvil, to bring this former up against the anvil before the cam *m* moves the other formers *k k*

into coincidence therewith. Upon this shaft A, I also place a pulley-wheel D, that drives by the belt E the pulley-wheel F, that rotates in a sleeve N (which I preferably attach to the face-plate) a shaft G, bearing a feed-roller on its forward extremity. By means of this feed-roller *a* and the tension-roller *b*, pressed against it by the spring *c*, the wire is fed into the machine. These wheels *a* and *b* may bear on their extremities, if desired, pinions meshing into each other, by means of which the feeding is done in a more regular manner. Their diameters and those of the pulley-wheels D and F should be so contrived that the surface of the feed-rollers may move rapidly enough to drive the wire across the head of the former *j* during the time the latter's head is below the slot *e*, through which the wire is fed.

To the face-plate Z, I usually attach for convenience in guiding the wire to the machine a tube I, which may be bent into any desired curve, and in the face-plate leading to and from the plate where the tube I is secured I make a channel or slot 1 1, leading to an opening in the face-plate, through which project the two rollers *a* and *b*, between which the wire *w* is placed, whence it passes by means of the slot or channel 2 2 to the slot *e*. These slots or channels need not be continuous, and may consist of any suitable guiding device for leading the wire from the rollers *a* and *b* to the cutting mechanism.

Moving in ways in the face-plate Z by the action of the cam *m'* against the projections *h h* on its back is the slide *d*, having its upper portions sliding between the guides 5 5, in one of which the slot E, which should not be much greater in diameter than the diameter of the wire, is placed. The slide *d* carries a knife 4 on that side of the head which slides against the guide containing the slot *e*, by means of which the wire is cut by a scissors action between the knife and the slot. On the face-plate at a distance corresponding to the length of the wire section desired for the spring in the direction of motion of the wire from the slot *e* is placed a stop *f*, by which the length of the wire section to be cut off by the cutting-edge 4 is regulated.

On the face-plate Z in the line of motion

of the slide *d* is placed the anvil or die *p*, having its circumference the shape of the inside of the spring desired to be manufactured. On the top of the slide *d* a die or former *j*, which may be made integral with the slide, is placed, having a central portion cut away of a width a little greater than the length of the anvil or die, and shaped in a width equal to the length of the section of the die or anvil *p*, to approximately correspond therewith, and having the two extremities 7 7 of the head of former *j* left slightly higher in order to bend the ends of the wire section around the ends of the anvil or die *p*. Above and to each side of the die or anvil *p* are arranged the formers *k k*, having their hammer ends 9 9 so shaped that they will correspond approximately with the portion of the die or anvil *p* upon which they impinge when operated. In practice I mount these formers upon levers *l l*, which extend through the plate *Z* by the aperture 10 10, and which are pivoted at 11 11 to the back of the plate *Z* at such points as will allow a free motion in such a diagonal as will bring the heads 9 9 of the formers *k k* in contact with the ends of the wire sections bent around the ends of the anvil *p* by the die or former *j*. (Shown in Fig. 6.) I then bend the lower ends of the levers *l l* inward and extend them under the shaft *A* and beneath the cam *m*, and at such a distance from the shaft *A* that the cam *m* will at every revolution of the shaft press the heads of the formers *k k* down upon the die or anvil *p*, so as to bend the wire into the shape desired. Underneath the bent ends of the levers *l l*, I place the springs *n n*, by means of which the formers *k k* are moved away from the anvil *p* after the passage of the cam *m*. Sufficiently close to the anvil *p* to be covered by the completed spring I place two holes or openings 12 12, cut in the face-plate *Z*, in which fit loosely two studs *r r*, which are designed by a forward motion out of the holes 12 12, in which they are normally retained, to throw the completed springs off the die or anvil *p* after the backward motion of the formers. To hold these studs in their normal position above described, I attach them to a plate *q*, which is held by means of a stud *v* and a spring *s* against the front of a frame *V*, bolted to the rear of the face-plate *Z*, but held by the shoulders *V' V'* at a suitable distance from it. Through this form the stud *v* passes by means of the bearing *W*, in which it loosely fits. To give the studs *r r* their motion, I place upon the pulley-wheel *D* an inclined cam *u* at such an angle with reference to the same shaft *A* with the cams *m* and *m'* that when they have moved sufficiently to allow the formers to be retracted from the die or anvil *p* the cam *u* will strike the rear end of the stud *v*, and, pressing it forward, will push the studs *r r* through the holes 12 12 against the completed spring left by the formers upon the die or anvil *p* and throw it off. Upon the cam *u* passing the rear end of the stud *v* the

studs *r r* are immediately retracted by the spring *s* and the die or anvil *p* left free for another operation. Upon the front of the face-plate *Z* is secured the chute or trough *R*, placed to receive the completed springs thrown off from the anvil or die *p* and to carry them to some convenient receptacle. This chute or trough can be made of any desired form and of any slope sufficient to carry off the springs, or can be made of an endless apron, in which case no slope would be required. I prefer, however, to make it of the approximate shape of the die or anvil *p*, and continuous therewith, and to bend it into the arc of a circle.

The operation of the device is as follows: The wire for the springs is passed from the coil through the tube *I* and slots or channels 1 1 and between the rollers *a* and *b* and through the slot *E*. The machine is then started. The feed-roller *a* and the tension-roller *b* feed the wire *w* through the slot to the side of the slide *d*, where it is stopped until the slide *d* has moved the knife 4 below the edge of the slot *E*, when the wire is released and will move under the impulse of the feeding device across the head of the former *j* until it reaches the stop *f*. The slide *d* is then driven upward by the cam *m'*, the knife 4 cuts the wire *w* at the edge of the slot *E*, and the former *j* carries the cut-off section of wire against the side of the anvil or die *p* and by means of the depressed portion of its head and of the slightly-raised portions on each side into the shape shown in Fig. 6. The other formers are then forced down upon the anvil or die *p* by the cam *m* pressing upon the bent ends of the levers *l l*, and their heads 9 9 strike against the ends of the wire section bent around the ends of the anvil or die *p*, force them down thereon, and press them into the desired shape of the spring between the heads of the formers and the sides of the die or anvil. By the rotation of the shaft *A* the formers are retracted from the die or anvil *p*, and the cam *u*, striking against the bolt *v*, throws the bolts *r r* out of the holes 12 12 against the completed spring left upon the die or anvil *p*, and after the passage of cam *u* are retracted by the spring *s*, the spring being meanwhile carried off to its desired receptacle by the chute or trough *R*.

Many changes may be made by a mechanic of ordinary skill in the mechanism for feeding the wire into the machine. For instance, an ordinary intermittent feed device may be substituted for the continuous feed and stopping mechanism. Moreover, if the machine be operated slowly, the whole feeding mechanism may be dispensed with and the wire fed by hand and the springs removed in the same manner, and if the machine be inclined the springs may be removed without the use of the spout or chute *R*. Moreover, the motive mechanism operating the cutting device can be altered without affecting the nature of my invention, and in the same way for the cams and springs actuating the formers other equivalent elements may be used.

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

1. The combination of a die placed directly upon the face-plate of the machine, on which the spring is left after the action of the formers thereon, with horizontally-moving studs, a spring holding said studs normally withdrawn, a wheel, and a cam placed on said wheel, by means of which the studs are thrown out from said face-plate, substantially as and for the purpose set forth.

2. The combination of a die or anvil *p*, a die or former, as *j*, mechanism bringing said dies directly toward each other, the feeding mechanism bringing the wire directly between the said dies, a vibrating slide moving against a guide in which is cut a hole, through which the wire is fed into the space between the said dies, and cams or their equivalents adapted to move the slide over said hole while the dies *p* and *j* are being brought against each other, substantially as described.

3. The combination of a vibrating slide moving in guides, in one of which is cut a hole substantially of the size of the wire, through which the wire is fed into the space between the dies, as *j* and *p*, said hole being surrounded by a wall, an edge of which is sharpened, and said slide having the edge which moves against the guide in which the hole is cut and strikes the wire on its side opposite the sharpened side of the wall of the hole, which is sharpened to a cutting-edge, substantially as and for the purpose set forth.

4. The combination of a solid former-die, a feeding device, cutter, and stop, with an anvil-die, said cutter-die having a central portion corresponding to the portion of the die or anvil on which it impinges, and having at the sides of this central portion projections extending up at the sides of the said die or anvil and adapted to bend the ends of the wire sections upward around the ends of the said die or anvil, substantially as and for the purpose described.

5. The combination of a die or anvil, shaped substantially to the shape of the interior of an umbrella or parasol spring, with formers impinging on different sides of said die or anvil, and having the portions of the same impinging on said die of a shape corresponding to substantially the shape of the die or anvil, substantially as described, and for the purpose set forth.

6. In a machine for making springs for the handles of umbrellas and parasols, the combination of a die or anvil upon which the springs are made, studs operated substantially as described, and a chute or trough adapted to carry off said springs, substantially as described.

7. In a machine for making the springs of umbrellas and parasols, having a die or anvil, and a die or former impinging directly against each other, between which the wire is fed, the combination of the following instrumentalities: first, a pair of constantly-rotating

feed-rollers; second, a guide having a hole cut therein, through which the wire is fed; third, a knife-edged slide sliding against said guide and alternately covering and uncovering said hole, and, fourth, a stationary stop placed at a distance from the slot and hole equal to the desired length of the wire section desired to form the spring, all substantially as and for the purpose set forth.

8. In a machine for making springs for the handles of umbrellas and parasols, the combination of a knife, a slot, a die or anvil, formers impinging thereon, and studs, all operating substantially as described.

9. In a machine for making springs for the handles of umbrellas and parasols, the combination of a feeding device, a cutter, a stop, a die or anvil, formers impinging thereon, studs, and a conveying device, all operating substantially as described.

10. The combination of a die or anvil *p*, having the shape of the interior of an umbrella-spring, a die or former, as *j*, the head of which as to the central portion thereof corresponds substantially in shape with the portion of the die or anvil *p* on which is pressed the long side of the spring, and having projections placed at the extremities of the said central portions adapted to press the ends of the wire sections around the ends of the die or anvil *p*, diagonally-moving dies or formers, as *k*, adapted to press down the ends of said wire section upon the die or anvil *p*, and mechanism adapted to move said dies or formers consecutively against the die or anvil *p*, substantially as described.

11. The combination of a die or anvil having substantially the shape of the interior of an umbrella-spring, a former corresponding substantially in shape with the side of said die on which the long side of the spring is shaped, diagonally-moving dies or formers, projections moving at the side of said die or anvil adapted to bend the ends of the wire section into the path of the diagonally-moving formers, and mechanism giving a consecutive motion to these parts, all being and operating substantially as described.

12. The combination of a die or anvil *p*, having substantially the shape of the interior of an umbrella-spring, the section of said die being in substantially a vertical plane, a die or former, as *j*, shaped to correspond with one portion thereof and moving in a substantially vertical plane against said die or anvil, dies or formers, as *k*, impinging on the other sides of said die or anvil *p*, mechanism adapted to feed sections of wire of a length suitable for the said springs above said vertically-moving former, as *j*, and mechanism bringing said dies or formers consecutively against said die or anvil, substantially as described.

13. The combination, with a vertical face-plate of a machine-frame, having placed thereon a die having a vertical section substantially of the shape of the interior of an umbrella-handle spring, of a feeding device, a guiding

mechanism adapted to guide the wire from the feeding mechanism to the cutter, a cutter, and a die or former placed above a slide and moving vertically upward in close proximity to said face-plate against said die or anvil
5 and adapted to carry said cut-off wire sections upward against the same, and by its proximity to said face-plate to prevent them from falling into the machine, projections thereon

adapted to bend the ends of said wire section, and diagonally-moving dies or formers adapted to press down said ends of said wire section upon the anvil, all substantially as described.

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