

(No Model.)

G. KELLY.

METHOD OF AND MACHINE FOR MAKING FLAT COILED SPRINGS.

No. 426,386.

Patented Apr. 22, 1890.

FIG. 1.

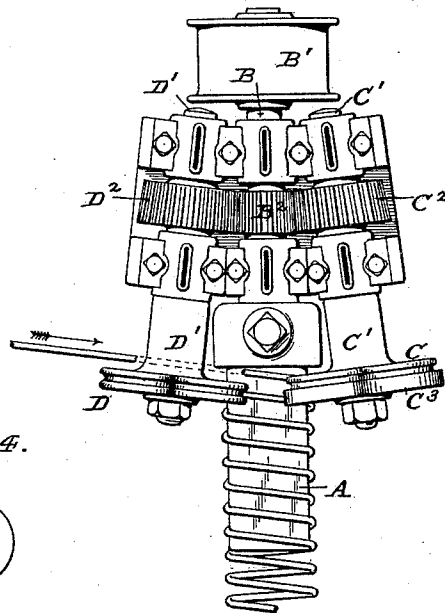


FIG. 3.

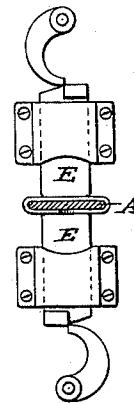


FIG. 4.

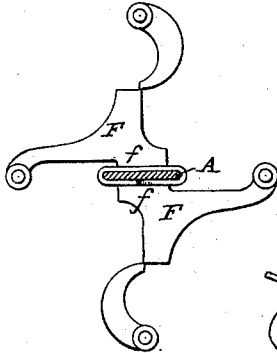


FIG. 5.

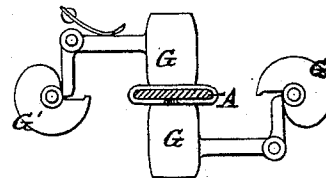
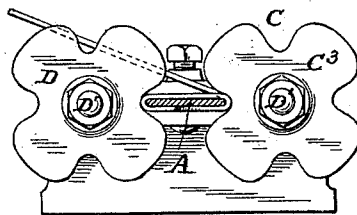


FIG. 2.



ATTEST:

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METHOD OF AND MACHINE FOR MAKING FLAT COILED SPRINGS.

SPECIFICATION forming part of Letters Patent No. 426,386, dated April 22, 1890.

Application filed September 9, 1889. Serial No. 323,448. (No model.)

To all whom it may concern:

Be it known that I, GEORGE KELLY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Methods of and Machines for Making Flat Coiled Springs; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

The present invention relates to certain improvements in the manufacture of flat coiled springs, set forth in the subject-matter of Letters Patent No. 397,861, issued to me February 12, 1889, for method of making flat coiled springs; and the present improvement has for its objects, first, to provide a simple, continuous, and effective mode of making such springs, in which each coil or wrap is "set" as fast as it is formed upon the flat forming-mandrel; second, to provide a durable and compact machine for such purpose embodying the features of a support for the forming-mandrel during the "setting" operation, so as to support and retain such mandrel in proper axial position, and a "pushing-off" appliance for forcing the metal coil off from the mandrel as fast as formed, and at the same time insure an even distance between each coil or wrap. I attain such objects by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of a machine constructed in accordance with my present invention; Fig. 2, a front elevation of the same; and Figs. 3, 4, and 5, diagram views of modified appliances for effecting the set in each individual coil or wrap as the same is formed.

Similar letters of reference indicate like parts in the several views.

The preferred manner of carrying out my present invention in the mode of making flat coiled springs is illustrated in Figs. 1 and 2. In this the flat mandrel A is secured by means of a chuck or other equivalent means, to the arbor B, carrying a driving-pulley B', by which motion is imparted to the machine. On each side of the mandrel A are arranged the cam-shaped or lobular disks C and D, the

carrying-shafts C' D' of which have bearing in the supporting head or frame of the machine and gear with and are driven by the arbor B through gears B³ C² D². The periphery of the disks C and D are formed on epicycloid curves, so that at all times contact will exist between the periphery of said disks and the mandrel or the coil of metal thereon, the effective setting pressure upon the individual coil or wrap being an intermittent one, that occurs at the time when the edge of the flat mandrel moves in the recess between contiguous lobes of the disk C to bend the coil of metal around the mandrel's edge, such setting pressure being repeated by the coaction of the mandrel's edge and the recess between the contiguous lobes of the auxiliary disk D when such disk is employed.

In the arrangement illustrated in Figs. 1 and 2 the disk C will be the "feeder in" of the rod, wire, or band to coil the same upon the mandrel, and at the same time impart by pressure the proper intermittent setting to the coil or wrap as formed, which intermittent setting may be further intensified by the auxiliary disk D, which performs the additional function of a support for said mandrel to hold it in axial position against the lateral pressure exerted against it by the feeding-in disk C. Where round wire is being manipulated these disks C and D will preferably be grooved, as shown, so as to have a surer and better bearing upon the wire and prevent any liability of flattening the same.

To insure an even and uniform space between the coils, I provide either of the disks C or D—preferably the disk C, as shown—with a forward extension C³, the periphery of which is formed on epicycloid curves and which bears at all times against the mandrel and within the space between adjacent coils. By this provision an even spacing of the coils is effected, and at the same time the coils, as formed, are positively and automatically pushed off from the forming-mandrel.

In the construction shown in Fig. 2 the mandrel will make two revolutions to one of the cam-disk C or D, and consequently such cam-disks are formed with four recesses or spaces around their periphery, as shown. It is, however, evident that such cam-disks can be suitably

proportioned with relation to the mandrel, so as to have two, three, or other suitable number of such depressions, as may be found desirable, and without departing from the spirit of this part of my invention.

I do not limit my present mode of setting each coil or wrap as fast as formed to the above-described mechanism, as the said setting can be accomplished in a less perfect degree by either of the following mechanisms:

A pair of intermittently-reciprocating pressure-heads E E, arranged at each side of the mandrel A and adapted to clamp and set the coil or wrap when the flat surface of the mandrel assumes a position parallel to the faces of such heads, as illustrated in Fig. 3; or a pair of intermittently-moving pivoted levers F F, having pressure-faces *f f* and acting in a manner similar to the above, as illustrated in Fig. 4; or a pair of hammers G, acting on opposite sides of the mandrel and operated by suitable cams G' to strike from opposite sides a setting blow upon the coil or wrap when the mandrel assumes the proper position between the faces of such hammers, as illustrated in Fig. 5.

With my present improved mode and construction a continuous flattened spiral can be produced of any desired length, and owing to the setting of each individual coil or wrap as fast as formed, the power required to operate the machine is reduced to a minimum and rendered uniform during a continued action of the machine.

I am aware that prior to my invention it was common in making round coiled springs to press the same upon a rotating cylindrical mandrel by means of pressure-rollers arranged to travel parallel with the mandrel, the pressure upon the coils or convolutions of wire being constant and uniform. I therefore do

not claim any such mode or combination, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The herein-described improvement in the art of making flattened spiral springs, the same consisting in winding the spring upon a flattened mandrel and setting by an intermittent pressure or impact each individual coil or wrap as fast as the same has been wound upon the flattened coiling-mandrel, substantially as set forth.

2. In a machine for making flattened spiral springs, the combination of the flattened mandrel A and driving-arbor B with the peripherally-recessed feeding-in disk C, adapted to coil or wrap the wire, rod, or band upon the mandrel and impart the proper set to the same, essentially as set forth.

3. In a machine for making flattened spiral springs, the combination of the flattened mandrel A and driving-arbor B with the pair of peripherally-recessed cam-disks C D, adapted to coil or wrap the wire, rod, or band upon the mandrel and impart the proper set to the same, essentially as set forth.

4. In a machine for making flattened spiral springs, the combination of the flattened mandrel A and driving-arbor B with the pair of peripherally-recessed cam-disks C D, carried upon shafts geared to the arbor B, one of said disks being provided with a forward extension C³, peripherally recessed and adapted to bear against the mandrel between the coils, essentially as set forth.

In testimony whereof witness my hand this 6th day of September, 1889.

GEORGE KELLY.

In presence of—

ROBERT BURNS,
GEO. H. ARTHUR.