J. HARRISON, Jr.

MACHINE FOR MAKING CONICAL COILED SPRINGS.

No. 24,557. Patented June 28, 1859.

UNITED STATES PATENT OFFICE.

JAMES HARRISON, JR., OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR MAKING UPHOLSTERY-SPRINGS.

Specification forming part of Letters Patent No. **24,557**, dated June 28, 1859.

To all whom it may concern:

Be it known that I, JAMES HARRISON, Jr., of the city, county, and State of New York, have invented a new and useful Improvement in Machinery for Making Conical Coiled Springs for Upholstery and other Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side view of a machine for making coiled springs fitted with the improvement. Fig. 2 is a transverse vertical section of the same. Figs. 3 and 4 are detail views of parts of the machine.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to the machinery for which I obtained Letters Patent dated January 27, 1857; and it consists in a certain mode of applying and operating one or more of the forming-rollers by whose aid the wire is coiled upon the mandrel, whereby the coiling of the wire is effected in a superior manner and a spring of better quality is produced.

A is the stationary frame or bed-piece of the machine, supported on standards B B, and carrying the bearings S S′ of the rotating shaft C, at the front end of which is the taper mandrel D.

M is a double or forked lever hung on two fulcrum-pins, *m m*, arranged in line with each other, and having bolted to it a slide, E, which corresponds in character and position with the adjustable bed described in the specification of my Letters Patent before referred to, and has fitted to it the sliding carriage F, to which are bolted two plates, G G′, carrying the two grooved rollers *g g′*, which are caused to press the wire against the mandrel by the action of springs *p p*, which pull down one end of the lever M, and thus force up the other end, on which the carriage F is supported.

I is a bar fitted to guides in the frame A, to slide longitudinally parallel with the axis of the shaft C in guides attached to the stationary bed-piece A, and connected by a pin, *a*, with the sliding carriage F, said bar having attached to it the swiveling fork K, that works in a crossed-threaded traverse-screw, J, on the shaft C, by which the rotary motion of the said shaft is made to impart through the said fork a motion to the carriage F back and forth along the slide E, to cause the rollers *g g′* to travel along the mandrel D.

L is a frame of lever-like character working on two fulcrum-pins, *c c*, in a standard, *d*, erected upon the top of the journal-box S of the shaft C, said frame being provided with parallel ways *d* d**, to which is fitted a carriage, N, which carries a roller, g^2, of larger diameter than the largest part of the mandrel, which roller, like the rollers *g g′*, is intended to press the wire against the taper mandrel, springs *q q* being applied to the frame L to give the required pressure to the said roller g^2. The axle *y* of this roller is connected by a link, *b*, and two universal joints, *z z*, with a shaft, P, that is arranged parallel with the mandrel-shaft C, and fitted to a bearing in a standard, *d′*, on the top of the journal-box S′, and another bearing in the top of a frame, Q, which is rigidly attached to the sliding bar I, and which surrounds the mandrel-shaft C, as is shown in Fig. 3, which exhibits a transverse section of the mandrel-shaft and the bar I and the shaft P. The shaft P has two collars, *r r*, firmly secured to it, one each side of the frame Q, to compel it to move longitudinally with the bar I, to which the said frame Q is rigidly attached, and is fitted with a feather and groove to slide longitudinally through a collared sleeve-journal, *l*, turning in the standard *d′*, which journal carries a spur-gear, *m*, gearing with a spur-gear, *n*, of similar size, on the shaft C, for the purpose of imparting a rotary motion to the shaft P and roller g^2 from the shaft C. The longitudinal movement of the shaft P, corresponding with that of the bar I, causes the roller g^2 to have a longitudinal movement along the mandrel corresponding with that of the rollers *g g′*, the universal joints and link connecting the axle of the said roller with the shaft P admitting of the roller following the taper profile of the mandrel. The rollers *g g′* g^2 and their carriages are severally so adjusted as to guide the wire in the proper spiral direction as it wound upon the mandrel D by the rotary motion of the latter, and the operation of the machine is the same as that of my patented machine before referred to, except

that the roller g^2, which is the last roller between which and the mandrel the wire passes in being coiled, has a positive motion imparted to it, and that the motion of its periphery, being faster than that of the surface of the mandrel, causes a drawing action like that of drawing-rollers to be produced between it and the mandrel, which drawing action, owing to the greater velocity of the periphery of the roller being greatest on the outer portion of the wire, tends to coil the wire, so that with this improvement the forming of the coil is not entirely a bending operation, as when all the forming-rollers are caused to rotate by the friction of the wire upon them.

By the above-described drawing action greater solidity of the metal of the spring is produced, and the springs are not only made more sound but more elastic. The operation would be rendered still more perfect by giving the roller g^2 a movement at a progressively increasing and diminishing velocity, always in the same proportion to the velocity of the surface of the mandrel as it moves toward the larger and smaller portions of the mandrel. This may be effected by making the gears m n eccentric, or by other means well known to mechanics of producing a movement of a progressively increasing or diminishing velocity.

It may be observed that the roller g^2 need not be of larger diameter than the mandrel, as the velocity of its periphery may be made to exceed that of the periphery of the mandrel by giving it a greater number of revolutions. More than one, and indeed all, of the forming-rollers employed may be applied and operated in the same manner as the roller g^2.

The cutting off the springs as fast as each one or any desired number of connected ones are completed may be effected by a chisel-edged cutter attached to a swinging arm, which may be operated by a cam-and-ratchet movement actuated by the traverse-screw.

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

1. Giving one or more of the forming-rollers a positive rotary motion at a velocity which causes its or their periphery or peripheries to move faster than the periphery of that part of the mandrel in conjunction with which it or they at any time are in operation, substantially as and for the purpose set forth.

2. Connecting the axle of the roller g^2 or any of the forming-rollers by a link and two universal joints with a shaft having a longitudinally-sliding and also a rotary motion for the purpose of giving the said roller a rotary motion and a motion along the mandrel, and allowing it to accommodate its position to the varying diameter of the mandrel, substantially as herein described.

JAS. HARRISON, JUN.

Witnesses:
W. TUSCH,
WM. HAUFF.