(122.) F. W. RHINELANDER & J. L. HORNIG.

Improvement in Machine for Coiling Springs.

No. 122,523. Patented Jan. 9, 1872.

Fig. 1.

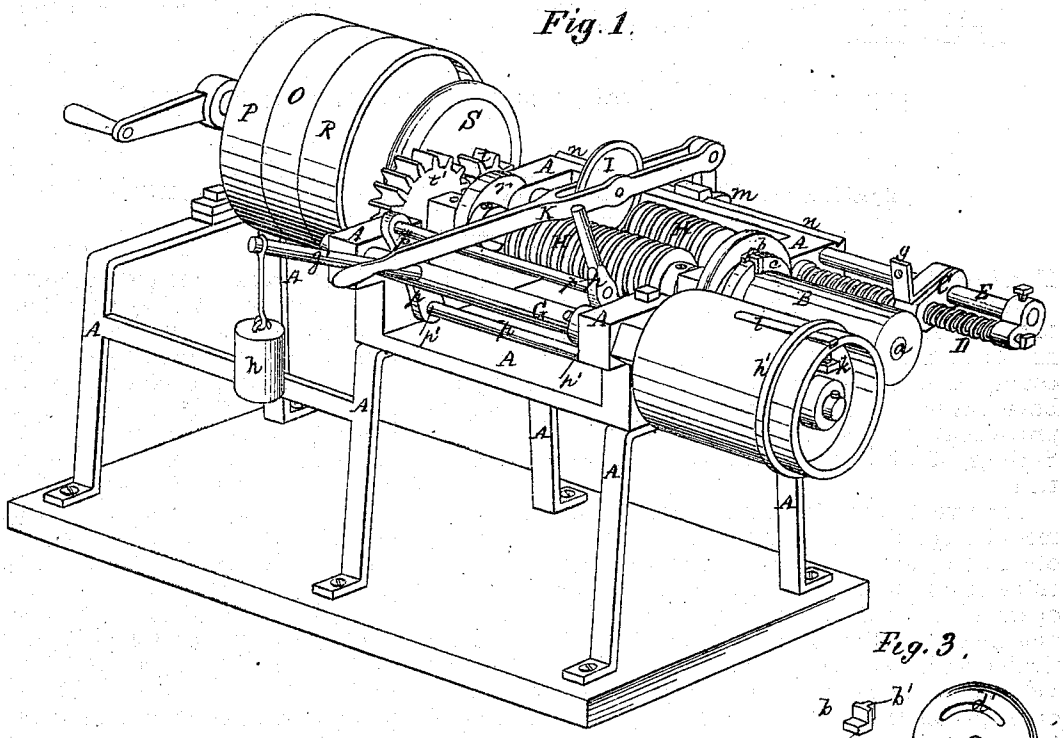


Fig. 3.

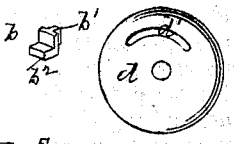
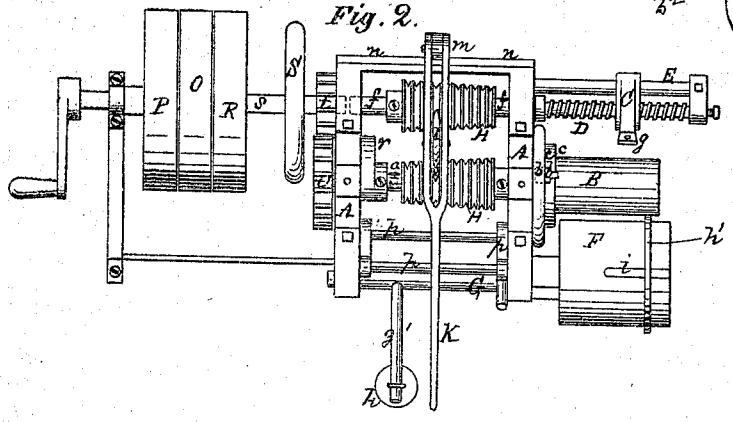


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN MACHINES FOR COILING SPRINGS.

Specification forming part of Letters Patent No. 122,523, dated January 9, 1872.

To whom it may concern:

Be it known that we, FREDERICK W. RHINELANDER, of the city and State of New York, and JULIUS L. HORNIG, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Machines for Coiling Metallic Springs, of which the following is a specification:

Our invention relates to machines for coiling metallic spiral springs for railway cars and other uses; and its object is to produce a machine of this kind which shall be simple, easily operated, and will perform its work more surely and effectively than has heretofore been practicable with existing machines; also, to provide means for readily regulating the feed, in order to coil the folds of the spring more or less closely together, as may be found desirable; for determining the length of the spiral and making the spiral of uniform length; and for more securely holding the end of the bar to be coiled upon the coiling-mandrel. The nature of our invention and the manner in which the same is or may be carried into effect will be readily understood by reference to the accompanying drawing, in which—

Figure 1 is a perspective view of a machine embodying our invention. Fig. 2 is a plan view of the same. The remaining figures are views of details hereinafter referred to.

The working parts of the machine are supported in and by a frame, A, of suitable size and structure. The coiling-mandrel, or form around which the metal bar is wound, is represented at B. It is of suitable shape for the style of spiral desired, and can be changed for other mandrels of different sizes, in order to produce spirals of any required dimensions. It moves in unison with the main spindle *a*, and is, therefore, mounted upon and so as to revolve with the same. With the mandrel is combined a dog, *b*, shown more clearly in Fig. 3, capable of sliding up and down, away from, or toward the same, and, to this end, provided with flanges which fit in a groove formed in a projection, *c*, on the inner end of the mandrel, as shown in Fig. 1. The jaw b^1 of the dog projects through the projection *c*, so as to overhang the mandrel, and when moved down toward the same will press tightly upon the end of the box inserted between it and the mandrel. The movements of the dog are effected by means of a dog-wedge plate, *d*, mounted loosely on the main spindle *a*, just behind the projection or collar *c* of the mandrel, and provided with an eccentric slot, *d'*, in which the projecting foot or flange b^2 of the dog is received. By turning the wheel or plate *d* the dog, by means of action of the eccentric slot *d'* on its foot b^2, will be caused to move up or down, according to the direction in which the plate is turned. In lieu of this arrangement an eccentric fin or ridge may take the place of the slot *d'*, and a forked or grooved foot embracing said ridge may be substituted for the foot or flange b^2. The result in either case will be substantially the same. Opposite and in line with the coiling-mandrel is the feed-nut C, which encircles the feed-screw D, and has its rear end bored to fit the brace-bar E projecting from the frame of the machine and arranged parallel with the feed-screw. The screw forms the prolongation of and of course moves with the feed-spindle *f*, and its outer end is supported in a bearing attached to the outer end of the brace-bar. When the feed-screw is rotated the feed-nut will travel in the direction of the length of the coiling-mandrel, its movement being determined by the direction in which the feed-screw is rotated. A suitable guide, *g*, is provided on the feed-nut, through which the end of the bar to be coiled is passed. On the opposite side of the coiling-mandrel is a press-roller, F, adapted to move to and from the mandrel and to press against it, so as to hold the folds of the spring-bar down on the mandrel during the coiling operation. To this end we mount the roller loosely upon an eccentric or crank-stud on the outer end of a shaft, G, supported so as to turn in suitable bearings on the frame of the machine. An arm, *g'*, is attached to the shaft, from the extremity of which is hung a weight, *h*, which serves to turn the shaft in such manner as to hold the press-roller up against the coiling-mandrel, the degree of pressure exercised by the roller being governed by the weight em-

ployed and the length of the arm or lever g'. For the purpose of making the spirals of uniform length we provide a ring or annular gauge, h', on the press-roller, which can be slid along the roller and adjusted at different distances from its end, being held in any desired position by means of suitable wedge or holding devices, consisting, in this instance, of the bar or strip i let into the face of the roller and a screw, K, at the outer end of the same, which can be turned so as to press outwardly against the end of the bar i, and thus wedge it against the ring. In order to vary the feed or the rate of travel of the feed-nut relatively to the rotation of the coiling-mandrel we place on the spindles a f grooved feed-cones H, one on each spindle, the two being arranged upon parallel axes, but with their apexes or smaller ends in opposite directions, so that the smaller end of one will be opposite the larger end of the other. In order to connect these cones so that the one on the main spindle may impart a variable feed-motion to the one on the feed-spindle various devices may be employed. The arrangement shown in the drawing in illustration of our invention consists of a friction-wheel, I, supported in a linked lever, K, and having a wedge-shaped edge to fit the correspondingly-inclined sides of the grooves in the feed-cones. The lever is linked or hinged to a slide, m, which is formed with a dovetailed groove to fit a correspondingly-shaped way, n, formed on or attached to the frame of the machine in parallelism with the spindles a and f. The friction-wheel is arranged over the space between the two cones, and is of such size that when lowered it will fit into the two grooves in the two feed-cones which are directly opposite to each other at the point where the wheel may happen to be. It will be seen that when the wheel is midway between the ends of the cones at the point where the two are of equal diameter the motion of the one cone will be equal to that of the other; but if, for instance, the friction-wheel be moved to the right of the machine, and then made to engage with the feed-cones, the cone on the feed-spindle, being smaller in diameter at that point than the cone on the main spindle, will cause the feed-spindle to revolve faster than the coiling-spindle, and vice versa if the friction-wheel be moved to the left of the machine. In this simple way the travel of the feed-nut may be varied with relation to the rotary movement of the coiling-spindle and the spring can be coiled more or less closely, as desired.

The lever of the friction-wheel can be operated by hand, if desired; or a better arrangement is to suspend a weight from the end of the lever sufficient to hold the wheel down with the requisite power to insure its engagement with the feed-cones. A disconnecting or lifting lever-frame is provided, as seen at p, hinged at p' to the frame of the machine, and capable of being moved forward or backward to lift or let drop the lever of the friction-wheel. The feed mechanism can be made self-starting by providing a cam, r, on the main spindle, which, when said spindle is put in revolution, will strike the lifting-lever frame p and force it back so as to release and let fall the friction-wheel lever.

We prefer, on the whole, the device shown and described as an intermediary for communicating a variable motion from one cone to the other. But it is manifest that other intermediaries may be employed, operating substantially in the same manner, to communicate motion from one cone to the other and admit of the variable feed specified; and we do not therefore limit ourselves to the employment, with the coiling-mandrel, feed-nut, and cones, of the special intermediary between the two cones hereinbefore described in illustration of our invention.

The feed-spindle, of course, derives its motion solely from the main spindle. The latter is actuated from the main or driving-shaft s through the medium of gears t t', as seen in the drawing. Upon the main shaft s are mounted the usual fast or driving-pulley O and loose pulleys P R, for the right and left belts, by means of which the feed-nut can be moved in the one direction or the other. Upon the main shaft is also mounted the hand-wheel S.

The operation of this coiling-machine is as follows: The end of the bar to be coiled is passed through the guide on the feed-nut to rest on the mandrel under the jaw of the dog. The dog is then pressed down onto the bar end by turning the dog-wedge plate in such direction as to force the dog, by means of the eccentric slot, toward the mandrel. By means of the hand-wheel S on the pulley-shaft the mandrel can be placed so that the dog will stand vertically over the mandrel ready for grasping the bar, this hand-wheel also answering for coiling by hand. Whenever the intermediate friction-wheel is admitted to operate motion is transmitted to feed-spindle and screw, which carries the feed-nut accordingly. The press-roller during this operation bears against the mandrel to make the coil as tight as desirable. The sliding band or gauge on press-roller, secured thereto at such distance as length of spiral demands, regulates the uniform length of spirals.

The transmission of feed motion through grooved cones gives a great variety of feeds and allows of easy connection and disconnection; and the whole machine, while simple and easily managed, does its work effectively, quickly, and economically.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In machines for coiling metallic springs, the combination of the coiling-mandrel and feed-nut and screw with the grooved feed-cones and their spindles and the adjustable friction-wheel or equivalent intermediary for communicating motion from one cone to the other, substantially as herein shown and described.

2. In combination with the elements named in the preceding clause, the press-roller oper

ating in connection with the coiling-mandrel, substantially as herein shown and set forth.

3. The press-roller, when provided with an adjustable gauge or band for regulating the length of the spirals, in combination with the coiling-mandrel, substantially as herein shown and set forth.

4. The combination, with the coiling-mandrel, of the dog for holding the end of the bar to be coiled, the dog-wedge plate, and the slotted and grooved collar or projection in which the dog works, said parts being arranged for joint operation in the manner shown and set forth.

5. The feed-cones, in combination with the intermediate friction-wheel and its linked lever and slide mounted on the frame of the machine, substantially as shown and set forth.

6. The combination of the coiling-mandrel, the dog and devices for operating the same, the press-roller, feed-nut, and feed-screw with the feed-cones, their adjustable intermediary for producing a variable feed, and the means herein described for imparting movement to the main spindle-cone, arranged and operating substantially as shown and set forth.

In testimony whereof we have signed our names to this specification before two subscribing witnesses.

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Witnesses:
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