(No Model.)

C. A. V. HÄLLGREN.

MACHINE FOR MAKING SPIRAL WIRE SPRINGS.

No. 562,529. Patented June 23, 1896.

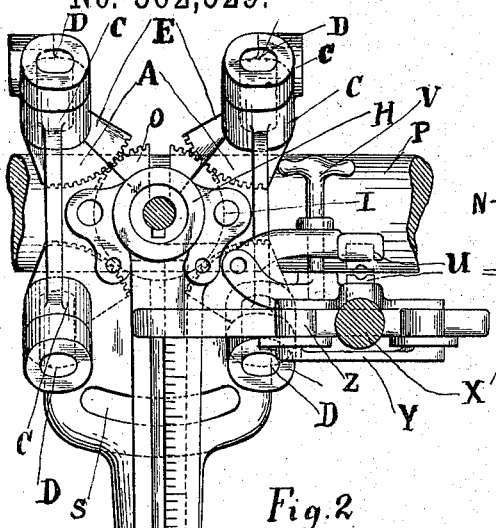


Fig. 2

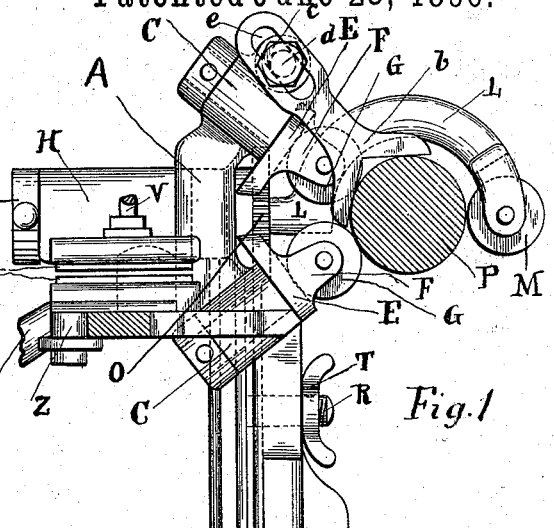


Fig. 1

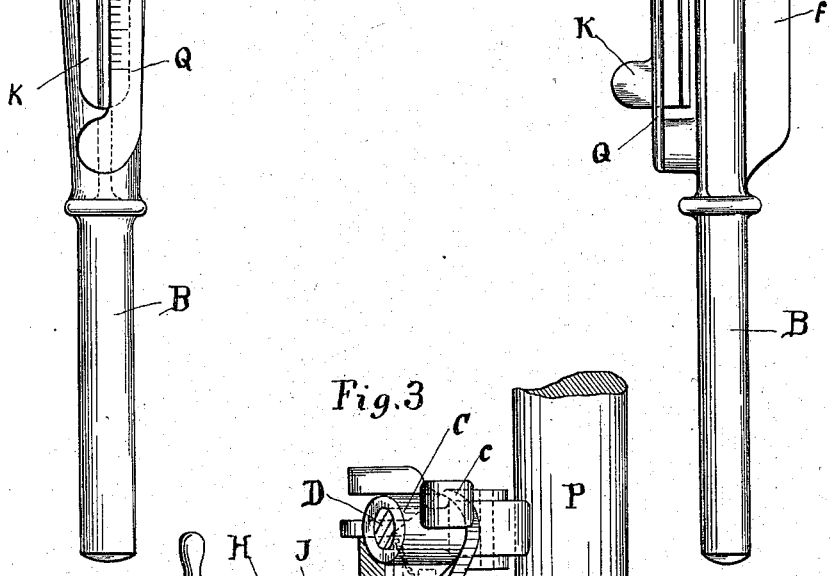
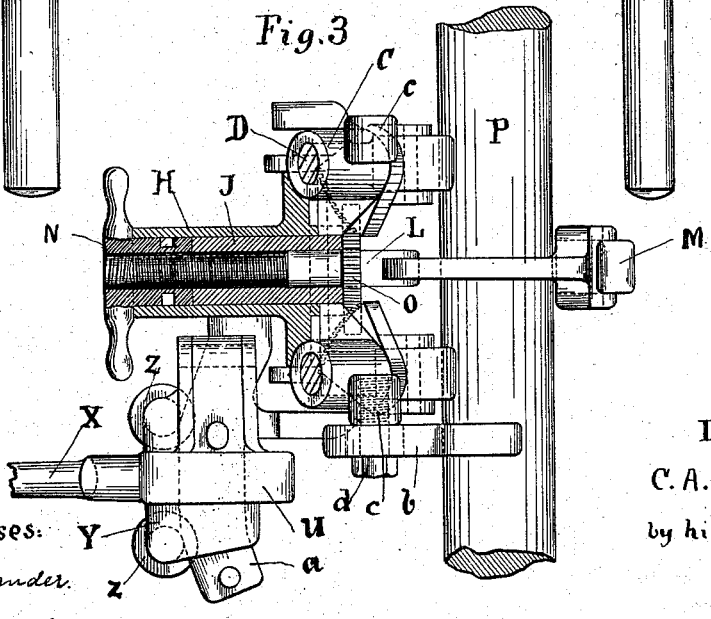


Fig. 3



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UNITED STATES PATENT OFFICE.

CARL ANDREAS VIKTOR HÄLLGREN, OF STOCKHOLM, SWEDEN.

MACHINE FOR MAKING SPIRAL WIRE SPRINGS.

SPECIFICATION forming part of Letters Patent No. 562,529, dated June 23, 1896.

Application filed September 6, 1895. Serial No. 561,668. (No model.)

To all whom it may concern:

Be it known that I, CARL ANDREAS VIKTOR HÄLLGREN, a subject of the King of Sweden and Norway, and a resident of 9 Gref Maguigatau, in the city of Stockholm and Kingdom of Sweden, have invented a new and useful Improvement in Apparatus for Use in Making Spiral Springs, of which the following is a specification, reference being had to the drawings accompanying and making a part of the same.

Hitherto spiral springs have generally been made by putting a mandrel in a lathe and winding the wire thereon. The pitch of the spring has then to be regulated by letting a piece of wire or the like, of the thickness of the space between each coil, follow the wire between the same and the coil already wound. This method is possessed of several disadvantages. In the first place a lathe has to be employed; secondly, a different follower has to be used for every kind of pitch wanted, and different for different sizes of wire, and, lastly, it is not possible to wind a spring whose initial tension is very strong, inasmuch as in that case the different coils have to be laid very hard against each other, which is a very hard thing to do, without special arrangements therefor.

The object of this invention is to provide an apparatus for use in making spiral springs, which does not possess any of the above-mentioned disadvantages, but is suitable for producing spiral springs of any desired diameter and pitch and of uniform size.

One form of my invention is shown in the accompanying drawings, in which—

Figure 1 is a plan view of such an apparatus. Fig. 2 is a side view of the same, and Fig. 3 is an end view partially in section.

Referring to the drawings by letter, A represents a frame, which is extended so as to form a handle B. On each side the frame is provided with hubs C, which form bearings for bolts or shafts D, which pass through and are fastened so as to be revoluble therein. Each of said bolts is at its inner end provided with a bevel gear-sector E and a jaw F, in which a roller G is centered, so as to be able to revolve. In between the said hubs is a sleeve H, fastened by the bolts in the holes I to the said frame. Another sleeve J, provided with a handle K, is placed inside the first-mentioned sleeve, so that the handle K projects through a recess in the sleeve J. A bolt or shaft L, whose one half is formed as a semicircle and at the end provided with a jaw and therein centered roller M, passes through and is by a fetter fastened to the sleeve J, so as to turn with the same. The bolt is at the end provided with a screw-thread, and a nut N serves to draw the bolt more or less through the sleeve J. A gear-wheel O is fastened to the sleeve J, and meshes into the before-mentioned bevel gear-sectors E, so that by moving the handle K the bolt L will be turned in one direction at the same time that the bolts D are turned in an opposite direction. When the rollers G and M are of the same size, as is preferable, the pitch diameter of the gear-wheel O and of the bevel gear-sectors E will have to be the same.

Alongside the handle K is placed an empirically-graduated scale Q, and the handle K is provided with a bolt R, that moves in a groove S in the frame A. By means of a nut T the handle can be held fast in any desired position.

To guide and hold the spring-wire, a clamp U is provided. The jaws of said clamp can be tightened by the screw V around the wire, so as to give it the proper tension. The clamp is carried by a carriage Y, which by means of rollers Z rests on a curved arm *a*, which extends from the frame A. By means of the handle X the carriage and clamp may be moved into the position that is required for giving the proper direction to the wire while being wound.

When making springs, a mandrel P of the proper size is placed between the rollers, and by means of the nut N the rollers G and M are pressed against the mandrel P, so that the mandrel is held fast between the rollers, as shown, and when the mandrel is turned the rollers will revolve against the mandrel. At the same time they will roll along it, according to the amount the bolts and rollers are turned, whereby the proper pitch of the spring will be obtained. It is hardly necessary to point out that it is preferable to have the rollers G and M slightly rounded off, or that they may be made to grip better in the mandrel by being provided with small riffles on their rolling

surface. To obtain a certain pitch on a certain size of mandrel, the handle K is moved so that the distance of the same from the scale is equal to the desired pitch at the place of the scale, which corresponds to the diameter of the mandrel that is used.

The scale may be placed on one side or the other, according to whether a right or left handed wound spring is wanted. For the sake of simplicity the drawings show the rollers standing centrally or for no pitch.

When making springs with a good initial pull tension, it is necessary that each succeeding layer be laid quite hard upon the foregoing. In such a case the follower B is placed so as to press the wire hard against the coil already wound. Said follower is by the cap-screw *d* fastened to lugs *c* in the frame A, and the screw moves in the slot *e* in the follower, so that the same can be adjusted to suit the size of mandrel.

The handle B is provided with a web *f*, which is suitable to be placed in a vise for holding the apparatus with the rollers upward. In such case the mandrel may be turned by hand, and a lathe does not need to be occupied. When big springs are to be made, it is best to put the mandrel so as to be turned by machine power.

The use of the apparatus is obvious. The wire is fixed or held to the mandrel in a suitable way and the apparatus placed so that the rollers G and M press against several sides of the mandrel, as shown in the drawings. The wire is next laid in the clamp, which is tightened by means of the screw until the proper tension is obtained. The wire should be lubricated by placing some oiled waste around it outside the clamp. When a tightly-coiled spring with big initial pull tension is wanted, the pitch will be just that of the diameter of the wire. In this case the handle K is placed so that the wire fits snugly between the handle and the scale at the place corresponding to the diameter of the mandrel, and the follower is placed so as to press tightly against the last-wound coil. The mandrel is now set revolving in the right direction, and the wire will be coiled on the mandrel with the proper closeness to make the initial strength of the spring as big as possible to obtain.

When bigger pitch is wanted, it will be obtained by setting the handle to correspond. It is unnecessary to mention that the apparatus can be made in several different ways, well understood by anybody skilled in the art to which it appertains, without departing from this invention. So can, for instance, two mandrels be used, the apparatus rolling on one of them while the spring is wound on the other, the mandrels being placed side by side or one above the other and suitably geared together so that their rotations are synchronous.

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

1. In an apparatus for winding spiral springs, rollers pressing against several sides of the mandrel, on which the spring is wound, and receiving motion from said mandrel, and means for changing the angle of the rotation of said rollers, so that their path on the mandrel will be spirals of the same pitch as the spring that is to be wound, substantially as and for the purpose set forth.

2. In an apparatus for winding spiral springs, a carriage provided with suitable clamps for directing the wire, and with friction-rollers pressing and rolling against a mandrel on three sides, and means for changing the direction of the rotation of said rollers according to the pitch that is wanted on the spring that is to be wound, substantially as described.

3. In an apparatus for coiling spiral springs, the combination of a carriage having rollers that may be pressed against several sides of the mandrel, on which the spring is to be wound, and whose angle of rotation can be adjusted so that the paths of the rollers on the mandrel will be spirals of the same pitch as desired in the spring, and a clamp that is movable on the carriage, and through which the wire can be tightly drawn, substantially as and for the purpose set forth.

4. The combination with an apparatus for winding spiral springs, having rollers that roll against the mandrel on several sides, so that the apparatus is moved along the mandrel to correspond with the pitch of the spring, of a curved arm extending one side of the apparatus and carrying a movable and adjustable clamp through which the wire to be coiled is drawn, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 21st day of August, 1895.

CARL ANDREAS VIKTOR HÄLLGREN.

Witnesses:
BERTIE BRANDER,
EDLA ANDERSON.