(No Model.)

G. H. SCOTT.

MACHINE FOR MAKING SPIRAL SPRINGS.

No. 346,322. Patented July 27, 1886.

Fig. 1.

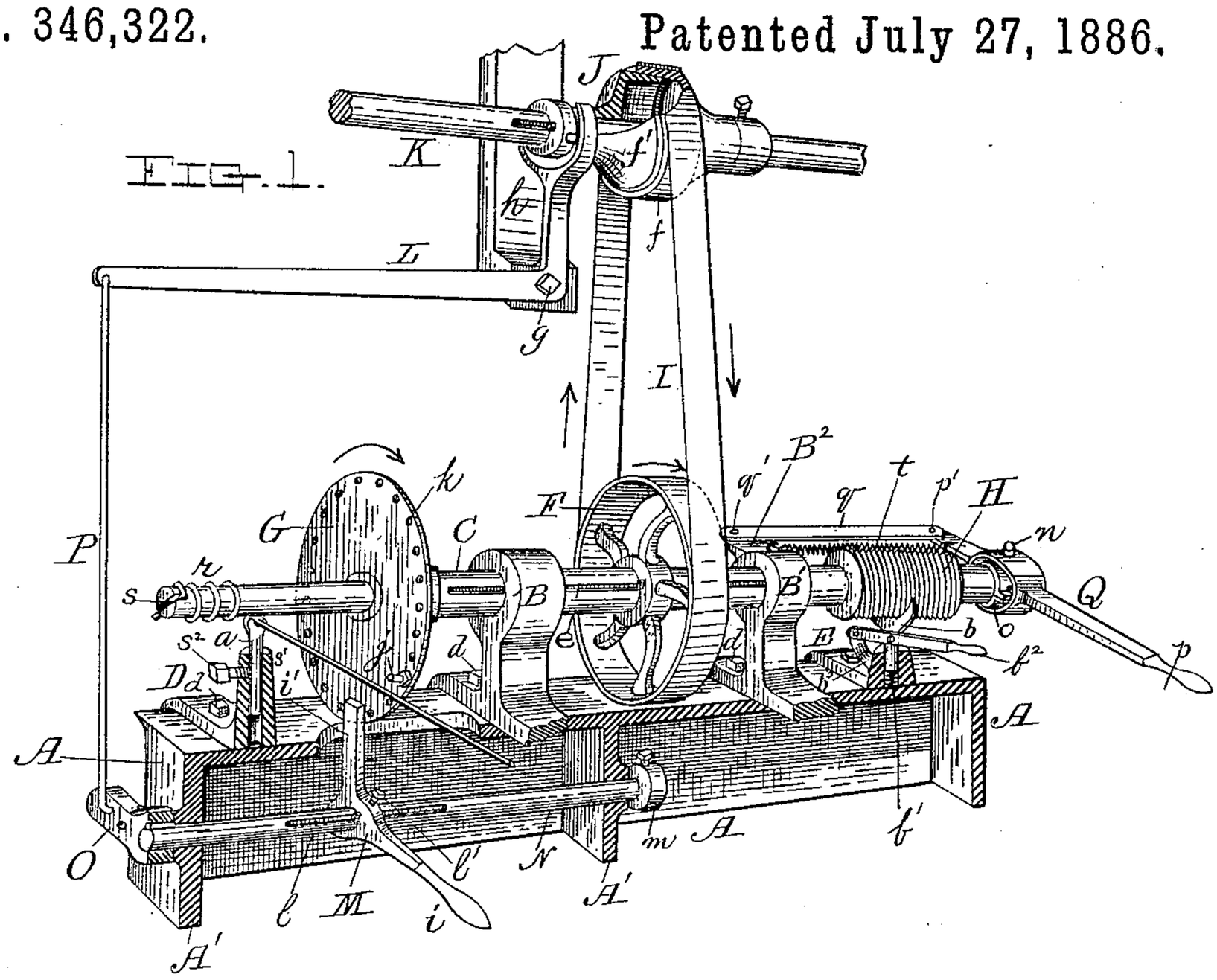


Fig. 2.

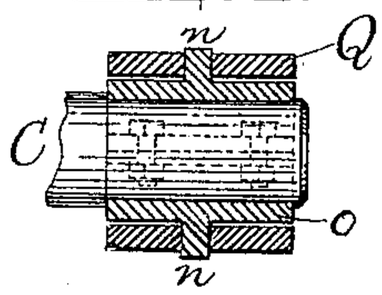


Fig. 3.

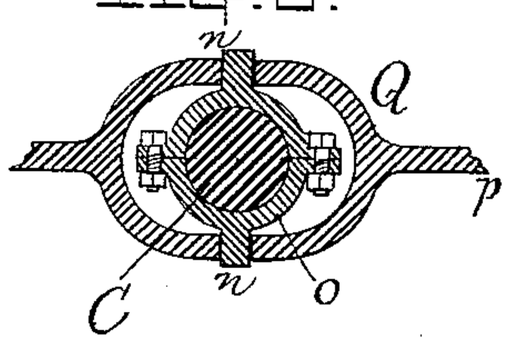


Fig. 5.

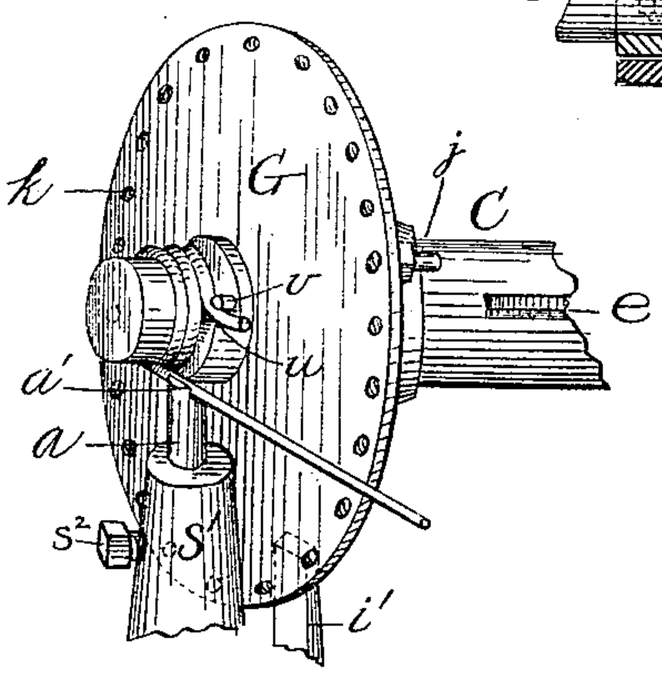
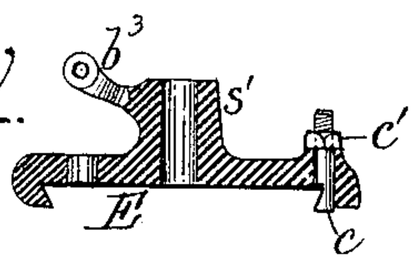


Fig. 4.



Witnesses;

Walter B. Nourse,

Lucius W. Briggs.

Inventor;

George Haskell Scott.

By A. A. Baker.

Attorney.

UNITED STATES PATENT OFFICE.

GEORGE HASKELL SCOTT, OF WORCESTER, MASSACHUSETTS.

MACHINE FOR MAKING SPIRAL SPRINGS.

SPECIFICATION forming part of Letters Patent No. 346,322, dated July 27, 1886.

Application filed November 9, 1885. Serial No. 182,197. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HASKELL SCOTT, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making Spiral Springs; 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 a part of this specification, in which—

Figure 1 represents so much of a machine for making spiral springs as is necessary to illustrate my improvements thereon, portions of said machine being shown in section, to more clearly show the construction and operation thereof, hereinafter more fully described. Figs. 2, 3, and 4 represent enlarged views of parts of the machine not fully shown in Fig. 1; and Fig. 5 represents a modification upon an enlarged scale, hereinafter more fully explained.

The object of my invention is to provide a means for making a special class of spiral springs, hereinafter described, in a more perfect and expeditious manner than has heretofore been done by other means; and it consists in a machine working in part automatically and partly by hand, constructed and arranged to operate in combination with suitable driving mechanism, as hereinafter more fully set forth, for producing the aforesaid results.

To enable those skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe it more in detail.

The particular class of spiral springs for which my improved machine is more especially designed, are those made for special uses, having one or both ends thereof projecting out for a short distance, and which ends are required to occupy exactly the same positions in each spring of any particular shape or design in relation to the spiral coils of said springs.

Previous to my invention the above class of springs have been made by hand by means of simple twisting devices or by the use of crude machines imperfectly constructed, both of which are not only slow and laborious methods, but also produce unsatisfactory results, as no two springs could thus be made exactly alike, whereas by the use of my machine every spring of any particular desired style or shape may be made exact duplicates of each other in every respect, and in a very convenient and expeditious manner, as will at once be seen from the following description with reference to the drawings.

In said drawings the parts marked A represent the frame-work of the machine, only one half of which is shown in Fig. 1. The other half being similarly constructed, does not require illustration. To said frame or bed A are secured the bearings B B′ for the main shaft C, which is arranged horizontally over the center of said frame, the bearing D for supporting the adjustable guide *a*, and the bearing E, for supporting the adjustable fork *b*, hereinafter described. All of said bearings may be adjusted lengthwise of the frame, being made with dovetailed grooves upon their under sides, like the one shown in Fig. 4, and the long outer edges of the top of the frame or bed beveled to correspond therewith. Said bearings are fastened in position after adjustment by means of the tightening-bolts *c* and nuts *c′*, at one side, and the set-screws *d* upon the other side. If desired, the latter may be dispensed with, as the parts are held quite firmly without them.

The main shaft C, which turns in the bearings B B′, has mounted upon it the driving-pulley F, the perforated disk G, and the threaded part or worm H, all of which are keyed so as to turn with said shaft C.

In order that the driving-pulley F may be adjusted on the shaft so that the latter may have sufficient longitudinal movement for the purpose hereinafter described, a key-slot, *e*, is formed in said shaft, whereby said pulley may be fastened at any desired point for a considerable distance at each side thereof. It is driven by means of a belt, I, passed over the loose pulley *f* of a friction-clutch, J, arranged upon a driving-shaft, K, in turn driven by any suitable and convenient mechanism. The tight pulley *f′*, which turns with shaft K, is clutched and unclutched to and from the loose pulley *f* of the clutch J to ship and unship the driving-power to and from the machine by means of the forked angular lever L, which is hinged at the point *g* to the stationary part *h*. Said lever L is in turn operated by the double-

armed lever M on shaft N; through the crank-lever O and connecting-rod P, being operated by hand to ship the power to the machine by depressing or pushing down the handle *i* of lever M, and automatically to unship said power by means of a stud or pin, *j*, fastened in the disk G, which, striking the arm *i'* of lever M as said disk revolves, forces said lever back into its normal position and thus unships the power.

The disk G is provided with a series of threaded openings, *k*, entirely around its outer edge, as shown in Figs. 1 and 5, so that the position of the stud or pin *j* may be varied at pleasure, for the purpose hereinafter described, said stud being provided with a thread at one end to correspond to the threaded openings aforesaid, and with a nut for turning the same into said openings.

Although I prefer the above method of fastening the stud *j*, I do not limit myself to the same, as any other convenient and well-known means may be adopted for the purpose.

The shaft N is provided with a key-slot, *l*, so that by unscrewing and tightening up the set-screw *l'* of lever M, the latter may be adjusted toward or from the disk G in adjusting the arm *i'* of said lever M to the stud or pin *j* of said disk.

The shaft N is fitted to turn in suitable bearings in the parts A' A' of frame A, being held in position longitudinally by a collar, *m*, at its inner end and the hub of the crank-lever O, both of which are fastened to said shaft.

In making the spiral springs, as hereinafter described, the main shaft C is moved forward in the direction of the disk G automatically and back by hand in the following manner: By the threaded part or worm H working in the stationary swivel-fork *b*, hereinbefore alluded to, the rotary motion of the shaft causing said forward feed motion, which continues until the stud or pin *j* in the disk G strikes and forces back the arm *i'* of lever M, thereby stopping the machine by unshipping the power, as hereinbefore described, which operation completes the spring, after which it is moved back by hand into its normal position by means of the slotted hand-lever Q, arranged to turn horizontally on vertical studs or pins *n n*, formed on a collar or bearing part, *o*, in which the outer end of the shaft C turns. (See Figs. 2 and 3.) The end of lever Q, opposite from its handle *p*, is hinged at *p'* to a lever, *q*, hinged at its other end at *q'*, to the stationary part B^2, formed upon or fastened to the back side of bearing B'. It is obvious that by thus coiling the springs and stopping the machine automatically at the completion thereof, each spring will be an exact counterpart of another, the coils thereof will be perfectly formed equidistant from each other, and the operation performed very expeditiously. Upon the completion of each spring the shaft C and parts attached thereto are moved back toward the right, preparatory to forming the next spring by hand, by means of the lever Q, the fork *b*, which is forced up by a spiral spring, *b'*, under the same, being depressed or forced down by its lever b^2, previous to said operation of returning the shaft and its parts to their normal positions, as above described. Said lever b^2 is hinged to the side of fork *b*, and at its rear end to a stationary part, b^3, projecting out rearward from the bearing E.

Preparatory to making a quantity of a special length and style of springs, the wire is cut into sections of the proper length to make said springs. To ascertain the length of said sections, I make the first spring by turning the machine by hand. After having arrived at the proper point in said turning operation to form the desired length of spring and the angle at which I desire the end or ends to project therefrom, I stop said machine, and, removing the striking stud or pin *j*, insert it in the hole just in advance of the arm *i'* of lever M, so that said stud or pin will just touch said lever, and by further rotation of disk G would unship the power, as hereinbefore described. I then cut the wire so as to leave the end of the desired length, thus completing the first spring, which I use as a gage in making the rest, as hereinbefore described.

In making a spiral spring as aforesaid, one end of the section of wire is first inserted in a slot, *s*, formed in the end of the shaft C, to hold the same during the twisting or coiling operation, the body of the wire at the same time during said coiling operation being held in advance of the coil being formed close up to the surface of the shaft by means of the holding part or guide *a*, hereinbefore alluded to, whose upper end comes a little in front of the center of the under side of the shaft, and is grooved to receive the wire, as shown in Fig. 1 of the drawings. It is held in the desired position in the vertical hollow part *s'* of the bearing D by means of a set-screw, s^2, thus admitting of the adjustment of said part *a* up or down, as desired. The spaces between the coils of the springs may be varied to a greater or less extent by correspondingly varying the size and pitch of the thread formed on the part H, a coarse thread forming wide openings and the reverse for closer-coiled springs. Said variation may also be controlled to a certain extent by varying the angle at which the sections of wire are held to the shaft C by the guide *a* during the coiling operation.

By means of the aforesaid adjustment it will be seen that spiral springs may be made not only with quite open joints, as shown in Fig. 1, but also of any desired width of openings up to an ordinary close-coiled spring.

In Fig. 5 I have shown another method, whereby the springs may be coiled in a reverse direction along the coiling-shaft by arranging the stud *j* and its stop-lever M upon the opposite side of disk G from that hereinbefore described. In the latter instance I dispense with the threaded part H and its fork, hereinbefore described, and in place thereof employ a spiral spring, *t*, for producing a for-

ward pressure toward the left to insure a tight coil being made, said spiral spring being fastened at one end to the stationary projection on the bearing B′, and at its other end to the hinged lever Q, as shown in Fig. 1.

It will be understood that although my machine is designed more especially for making a special class of spiral springs, hereinbefore described, I do not limit its use to the making of such springs, as any kind of spiral springs may be made thereon without materially changing the character and principle of my invention.

Having described my improved machine for making spiral springs, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. In a machine for making coiled springs, the combination of a circular disk mounted on the coiling-shaft thereof and having an adjustable stud near its periphery, with the means for supporting, rotating, and moving said disk in the direction of its axis, and a stop-lever connected with ordinary shipping mechanism, against which lever said adjustable stud is adapted to strike in its rotation, and thus unship the driving mechanism from the machine, substantially as shown and described.

2. The combination of a machine for making spiral springs, consisting of the frame or bed A, the bearings B B′ D E, the horizontal shaft C, having mounted thereon the perforated disk G, provided with stud or pin *j*, the driving-pulley F, and threaded part H, adjustable wire-guide and supporting part *a*, fork *b*, its spring and hinged hand-lever, and the means for operating the shaft C forward and back by hand, with the means for driving said machine, and the means for automatically shipping and unshipping said driving-power to and from the same, substantially as shown and described.

3. The combination of the shaft C, having a wire-holding slot, also fitted to turn in bearings B B′, and driven by suitable mechanism, and the threaded part H, with the fork *b*, its spring and hand-lever, the adjustable wire-supporting part or guide *a*, its set-screw, the bearings D E, and bed A, substantially as and for the purpose set forth.

4. The combination of the shaft C, having a wire-holding slot, also having mounted upon it the disk G, provided with the threaded openings *k* and stud *j*, driving-pulley F, threaded part H, and driving mechanism, with the bearings B B′ D E, frame A, fork *b*, its spring and hand-lever, the wire holding and guiding part *a*, its set-screw s^2, lever M, and connections between the same and friction-clutch J, substantially as and for the purpose set forth.

5. The combination of the disk G on coiling-shaft C, provided with threaded openings *k* and stud or pin *j*, with said coiling-shaft C, means for sliding the same, lever M, provided with arms *i i′*, set-screw *l′*, shaft N, bed A, crank-lever O, connecting-rod P, lever L, and friction-clutch J, substantially as and for the purpose set forth.

6. The combination of frame or bed A, bearing E, fork *b*, its spring and hand-lever, and bearings B B′, with the coiling-shaft C, having mounted upon it the disk G, provided with openings *k* and stud *j*, driving-wheel F, threaded part H, and having a wire-holding slot in its forward end, bearing D, wire holding and guiding part *a*, its holding-screw s^2, and lever M, operatively connected with a device for stopping the machine, substantially as shown and described.

7. The combination of the coiling-shaft C, fitted to turn and slide in bearings B B′, and the means for turning said shaft and for operating it forward and back, with the disk G, provided with openings *k* and stud or pin *j*, and the lever M, operatively connected with a device for stopping the machine, substantially as and for the purpose set forth.

8. The combination of the coiling-shaft C, the means for supporting and rotating the same, and the threaded part H on said shaft, with the fork *b*, its spring *b′*, its hand-lever b^2, bearing E, and frame or bed A, substantially as and for the purpose set forth.

GEO. HASKELL SCOTT.

Witnesses:

WALTER B. NOURSE,

LUCIUS W. BRIGGS.