(No Model.)

3 Sheets—Sheet 1.

C. A. HART.

WIRE COILING MACHINE.

No. 456,512. Patented July 21, 1891.

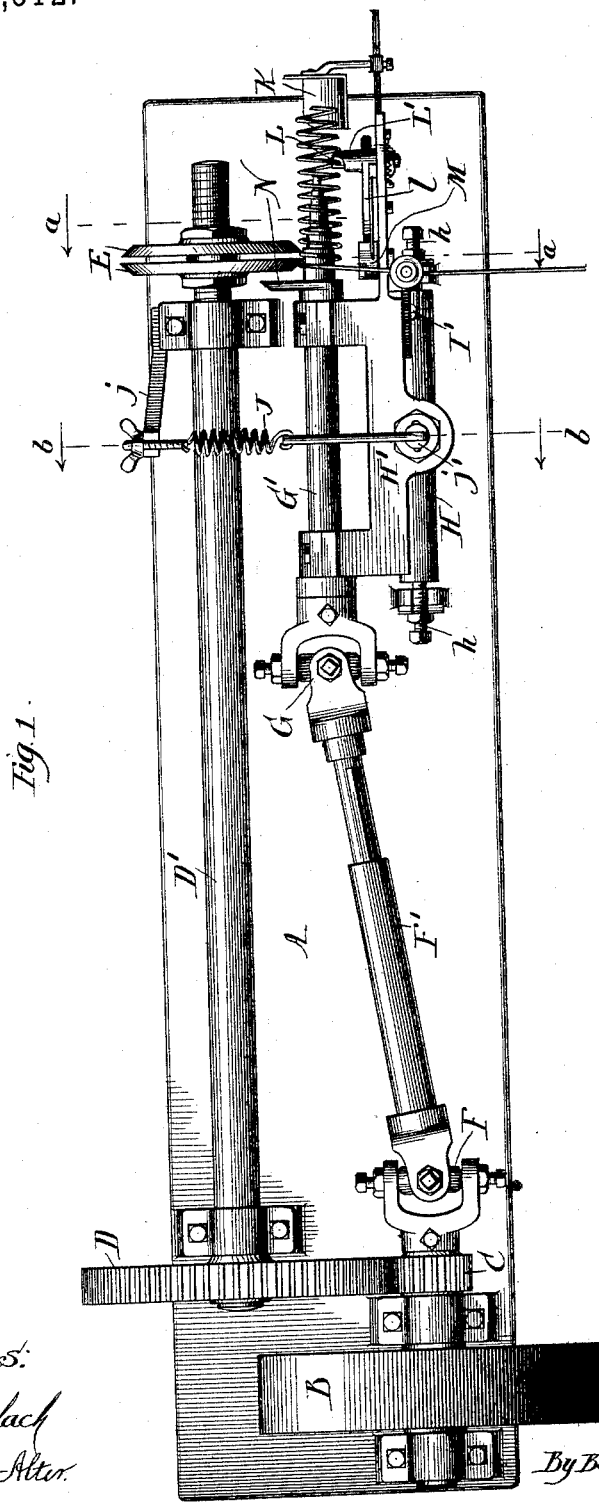

Fig. 1.

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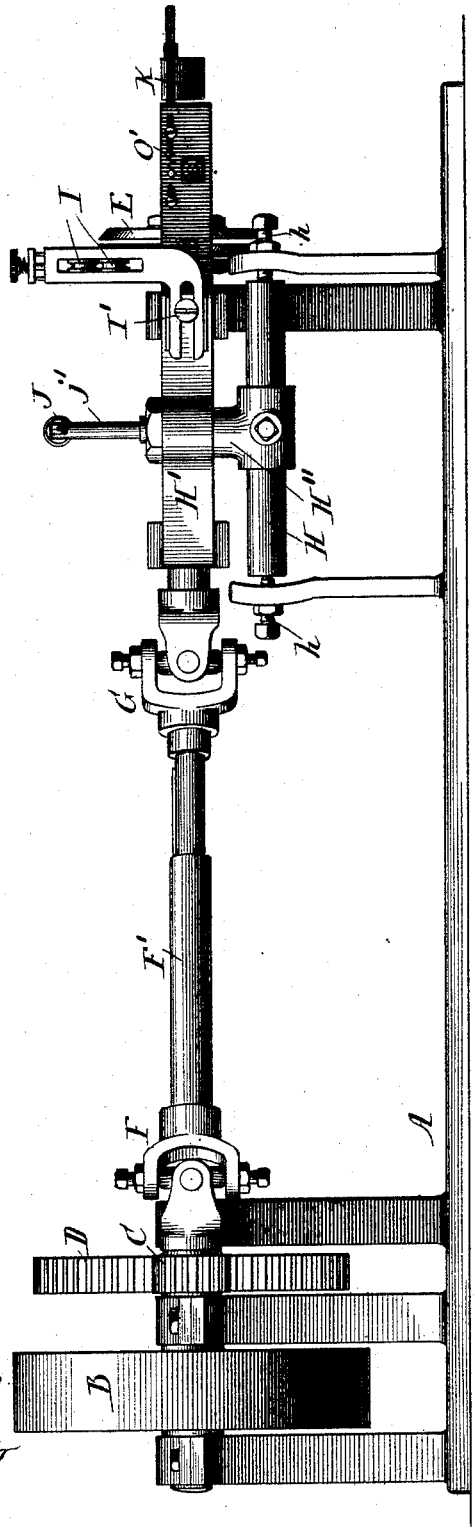

Fig. 2.

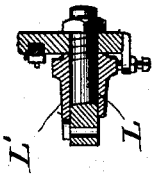

Fig. 10.

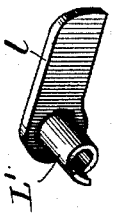

Fig. 9.

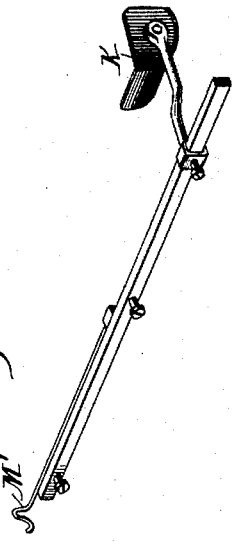

Fig. 8.

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WIRE COILING MACHINE.

No. 456,512. Patented July 21, 1891.

Fig. 3.

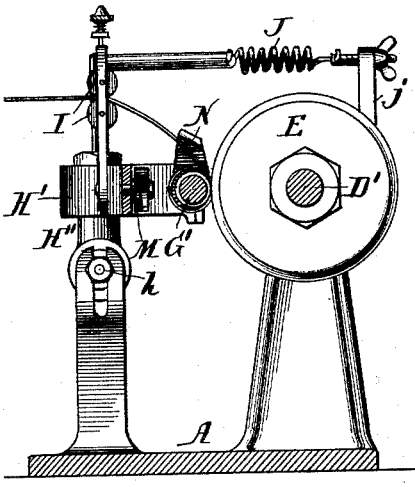


Fig. 4.

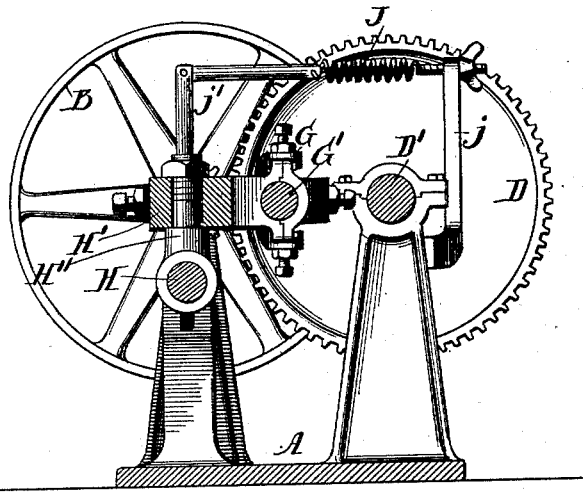


Fig. 5.

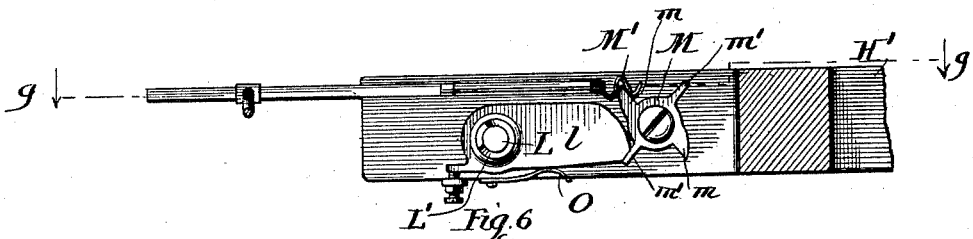


Fig. 6

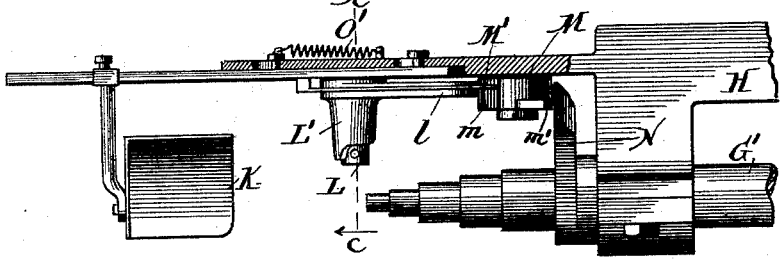
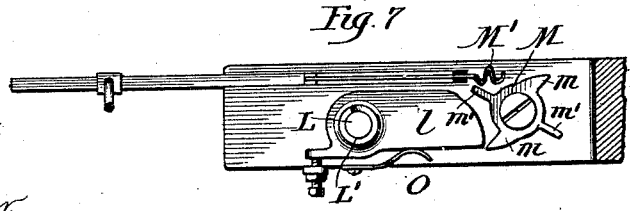


Fig. 7



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UNITED STATES PATENT OFFICE.

CHARLES A. HART, OF CHICAGO, ILLINOIS, ASSIGNOR TO WENDELIN SENG, OF SAME PLACE.

WIRE-COILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 456,512, dated July 21, 1891.

Application filed August 26, 1890. Serial No. 363,090. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. HART, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Wire-Coiling Machines, of which the following is a specification.

The object of my invention is to make a machine for coiling wire for different purposes and automatically cutting off the coils as the wire is drawn through; and my invention consists in the features and details of construction hereinafter described and claimed.

In the drawings, Figure 1 is a plan view of my improved wire-coiling machine. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical section taken through the line *a* of Fig. 1, looking in the direction of the arrows. Fig. 4 is a vertical section taken in the line *b* of Fig. 1, looking in the direction of the arrows. Fig. 5 is a rear elevation of the automatic cut-off. Fig. 6 is a plan view of the same, taken in the line *g* of Fig. 5, looking in the direction of the arrows. Fig. 7 is a rear elevation of the automatic cut-off immediately after the cutting operation; and Figs. 8, 9, and 10 are details of parts used in the cut-off.

In making my improved wire-coiling machine I arrange the parts on a suitable bench or table A and support them in brackets or standards or other suitable frame-work. I mount on the table, in suitable supports, a pulley B, adapted to receive a belt and to be rotated by any convenient motive power. The shaft of this pulley carries a pinion C, which engages with a gear D on a shaft D′, arranged in suitable supports on the table, so that as the pulley-shaft is rotated the shaft D′ may also be rotated.

At a convenient point on the shaft D′, but preferably near the end, I arrange a pair of disks E, which may be beveled on their edges, as shown in the drawings, or not, as may be desired. These disks are adjustable lengthwise of the shaft D′, so that they may be arranged opposite the point in the coiling-shaft (hereinafter described) desired, and are held in the proper position, preferably, by means of nuts, as shown in Fig. 1. They are also adjustable with respect to each other by interposing a washer between them, so that they may be held closer together or farther apart, as may best adapt them to wires of different size or gage, as may be necessary in making the coils of one size of wire or another. By adjusting the disks on the shaft D′ with respect to the coiling-shaft, so as to be nearer to or farther from a point opposite to that from which the wire is fed onto the coiling-shaft, the pitch of the coil may be varied or determined, and by adjusting them closer to or farther from each other different sizes of wire may be accommodated. As these disks are simply intended as the means for drawing the wire onto the coiling-shaft, they may be modified or other means employed in their place, as desired. Unless specifically mentioned in the claims, I do not wish, therefore, to confine myself to disks only for drawing wire onto the coiling-shaft. A knuckle-joint F is arranged at the end of the pulley-shaft, and an adjustable link F′ is arranged between such knuckle-joint and a knuckle-joint G on the end of the mandrel or coiling-shaft G′. This coiling-shaft is arranged on a pivoted vertically-adjustable support H, carrying a bracket H′, which affords the journals in which the coiling-shaft G′ rotates. The support H is vertically adjustable through means of the bolts *h*, so that the coiling-shaft may be vertically adjusted to the pitch of the particular style of coil being made, so that the wire of the coil will be kept parallel with the disks E. The bracket H′ is also adjustable in its horizontal plane on the standard H″, which connects it to the pivoted support H. The object of this horizontal adjustment is to permit coils of different diameter to be made on the same mandrel by causing the wire either to pass directly or diagonally around it. The wire is drawn in through tension-rollers I by means of the disks E, which bear against the sides of the wire and draw it through as they rotate. The tendency of the wire as it coils around the shaft G′ is to draw such shaft away from the disks, and to prevent this I have arranged a spring J, connecting an arm *j*, preferably fastened to the supports of the shaft D′, with a rod *j*′, extending up from the bracket H′.

This spring is arranged to be adjustable by means of a nut, as shown in Fig. 1, so that its tension may be regulated to the kind of wire being worked into coils, so as to constantly hold the coiling-shaft in its proper relation to the disks.

In order to automatically cut off the wire as the coils are formed, I arrange a gage K in such position that the wire of the coil will come against it whenever it has attained the desired length. As the wire is coiled around the mandrel it is constantly advancing forward, and in beginning the operation the end of the wire is passed through a hole in a stud or pin L, supported and held in proper position in any convenient manner. A sleeve or collar L′, to operate as a cutter, is arranged around the pin and provided with an arm *l*, extending out from it a desired distance. At the end of this arm is pivoted a cam M, provided with extending arms *m* and *m′*. A wire or rod M′ extends from the gage K to the cam M and engages with one of the arms *m* of the cam, but in a way that will permit it to be disengaged when force is applied. While it is engaged with the arm *m* it holds the cam in a position where the arm N on the coiling-shaft does not strike or engage with it in its rotations. As soon, however, as the gage K is forced out by the pressure of the advancing coil the wire connecting it with the cam M is also moved out, and as it moves it turns the cam M on its pivot. This brings the other arm *m* into the path of the arm N, rotating on the coiling-shaft. The arm N then engages with it and forces the cam M around until its arm *m* has been moved out of its path. This causes the other arm *m*, with which the rod from the gage K was engaged, to be thrown around, so as to move the arm *l* enough to allow it to pass its end, as shown in Fig. 7. As the arm *l* is thus thrown around it throws the cutter L′ around the stud L into cutting position, so as to cut off the wire passing through the hole in the pin. A spring O is arranged to instantly throw the arm *l* and the cutter back into their initial position and to permit the wire to continue its advance through the hole in the stud. As the arm N again comes around in the rotation of the coiling-shaft it strikes one of the arms *m′* and carries the cam again around enough to force one of its arms *m* into engagement with the rod extending forward to the gage, which has been again brought into its original position by the spring O′, so as to be in readiness for another operation when the coils of the wire have again pressed the gage out. In this way, as the wire always engages with the gage after the same number of coils have been formed and as the gage is moved out under the same pressure each time, I am able to cut off the coils at substantially a uniform length and to perform the cutting operation automatically.

Nothing is required after the machine is set in operation but to supply it with wire, which is furnished from a reel, to continue the operation of forming and cutting off the coils as long as desired. Where it is desired to make the coils either open or closed or to change the degree of openness by changing the pitch of the coil, all that is necessary is to adjust the tension-rollers I in the one direction or the other, as provided for by the bolt I′, so as to supply the wire to the mandrel from the proper position to secure the pitch desired.

Of course various modifications may be made in the forms and details of construction of the parts that enter into my improved coiling-machine. As an example of such modifications, I would say that the coiling-shaft G′ need not be made as long relatively as it is shown in the drawings, nor need it be in the shape of a stepped cone, as shown, but may be made of any length and shape desired to admit of the wire being turned around it to form the coils. In like manner mechanical changes in the construction and arrangement of other parts can be introduced, as may be found convenient or desirable. I therefore do not desire to limit myself to exact details of construction, except as the same may be specified in the claims.

What I regard as new, and desire to secure by Letters Patent, is—

1. In a wire-coiling machine, the combination of a rotatable coiling-shaft onto which the wire is drawn, and means adjustable to different sizes of wire for drawing the wire onto the coiling-shaft, substantially as described.

2. In a wire-coiling machine, the combination of a rotatable coiling-shaft onto which the wire is drawn, and rotatable disks to draw the wire onto the coiling-shaft adjustable toward and from each other, substantially as described.

3. In a wire-coiling machine, the combination of a rotatable coiling-shaft onto which the wire is drawn, a stud provided with a hole through which the wire passes as it leaves the coiling-shaft, a cutter movable past the hole in the stud to cut off the wire, and means periodically set into operation by the advancing coil to automatically move the cutter past the hole in the stud, substantially as described.

4. In a wire-coiling machine, the combination of a rotatable coiling-shaft onto which the wire is drawn, rotatable disks to draw the wire onto the coiling-shaft, adjustable toward and from each other, a stud provided with a hole through which the wire passes as it leaves the coiling-shaft, a cutter movable past the hole in the stud to cut off the wire, a gage against which the advancing end of the coil strikes, and movable out by the pressure of the coil, and mechanism set into operation by the moving out of the gage to cause the cutter to move past the hole and cut off the wire, substantially as described.

5. In a wire-coiling machine, the combination of a rotatable coiling-shaft onto which

the wire is drawn, means for drawing the wire onto the coiling-shaft, a cutter movable into position to cut off the wire, a gage against which the advancing end of the coil strikes, and movable out by the pressure of the coil, an arm on the coiling-shaft rotatable with the shaft, a cam provided with arms connected with the gage, which arms lie out of the path of the rotating arm on the coiling-shaft, but which are movable into such path as the gage is moved out, so as to be struck by the rotating arm and moved enough to permit the arm to pass, and a connection between the cutter and the cam, operated by the moving of the cam by the revolving arm to move the cutter into position to cut off the wire, substantially as described.

CHARLES A. HART.

Witnesses:
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HELEN M. CHADWICK.