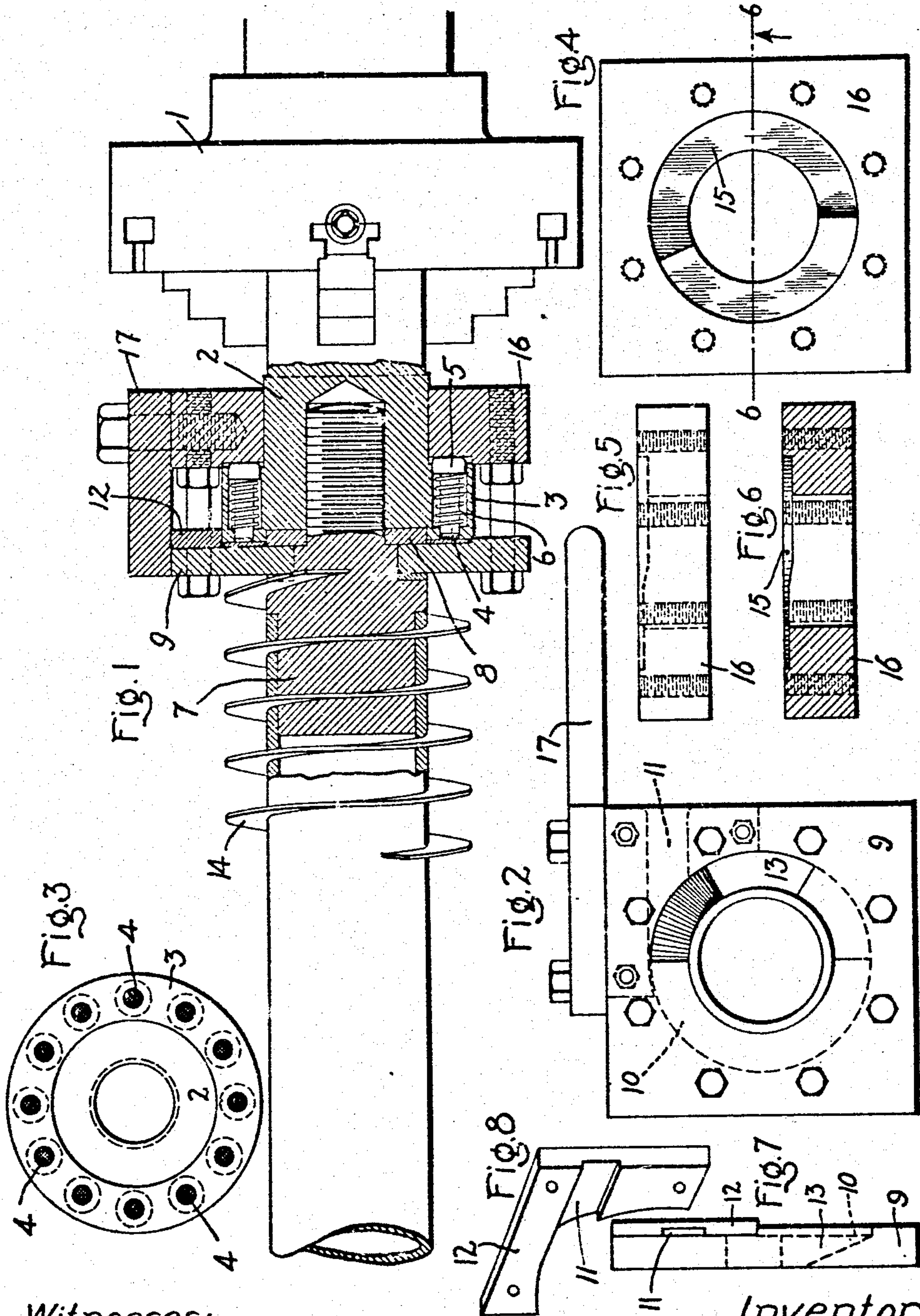


H. L. BARNHOLDT.
EDGEWISE WINDING MACHINE.
APPLICATION FILED OCT. 17, 1907.

917,401.

Patented Apr. 6, 1909.



Witnesses:

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UNITED STATES PATENT OFFICE.

HAROLD L. BARNHOLDT, OF PITTSFIELD, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

EDGEWISE-WINDING MACHINE.

No. 917,401.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed October 17, 1907. Serial No. 397,829.

To all whom it may concern:

Be it known that I, HAROLD L. BARNHOLDT, a subject of the King of Sweden, residing at Pittsfield, county of Berkshire, State of Massachusetts, have invented certain new and useful Improvements in Edgewise-Winding Machines, of which the following is a specification.

This invention relates to machines for bending a thin flat strip of metal in a circle in its own plane. When the operation is continuously performed on a long narrow strip or ribbon, a helical coil is produced. Such edgewise wound coils are now largely used in dynamo-electric machines, as the windings for field magnets, end rings for induction motors, and the like. In the machines heretofore employed for this purpose, a certain amount of stock is wasted in starting the coil owing to the necessity for fastening the end of the ribbon, or inserting it far enough into the winding head to enable the starting pin to engage with it. This left a long end at the beginning of the coil which had to be trimmed off.

The object of the present invention is to provide a simple and efficient machine of this class which will wind coils without any waste, thereby enabling one to make coils from predetermined lengths of ribbon and containing any number of convolutions even no more than one, if desired.

The machine consists of a stationary guide and former, a rotating gripper head, and stationary cams for operating the grippers, all as hereinafter set forth and particularly pointed out in the claims.

In the accompanying drawing, Figure 1 is a longitudinal sectional elevation of the working parts of my device; Fig. 2 is an end elevation of the same; Fig. 3 is an end view of the gripper head; Fig. 4 is an elevation of the cam plate which actuates the grippers; Fig. 5 is an edge view of said plate; Fig. 6 is a cross section of the same on the line 6-6, Fig. 4; Fig. 7 is an edge view of the forming plate, and Fig. 8 is a perspective view of the guide plate.

Secured in a lathe chuck 1, or otherwise attached to a rotating arbor, is a cylindrical hub 2 having a flange 3 containing a plurality of sockets whose axes are parallel with the axis of the hub, the sockets being arranged in a circle concentric with said axis. In each socket is a plunger 4 having at its

rear end a head 5, between which and the end of the socket a helical spring 6 is confined. The front end of the plunger projects through the flange 3 and is formed with teeth, as shown in Fig. 3.

A circular mandrel 7 is screwed into the end of the hub, forming an axial extension thereof. Clamped between the hub and a shoulder on the mandrel is a ring 8 of hardened steel, which projects beyond the flange 3 by an amount equal to the thickness of the metallic ribbon which is to be coiled edgewise, say six hundredths of an inch.

A stationary plate 9 is journaled on the mandrel, and contains a circular recess 10 concentric with the axis of the hub and mandrel. The ring 8 sets into said recess and abuts closely against the bottom thereof. The diameter of the ring determines the inner diameter of the edgewise wound coil, and the diameter of the circular recess in the plate 9 corresponds with the outside diameter of said coil, while the depth of said recess equals the thickness of the metallic ribbon. The annular recess or chamber formed by the ring, the recess and the flange 3, is thus adapted to receive the ribbon and form it into a circle as the ribbon is fed through a groove 11 in a guide-plate 12 which is let into the plate 9 so that said groove is in the same plane as the annular forming chamber, and communicates therewith on a tangent.

An oblique passageway 13 is cut through the plate 9 at a point just below where the strip is fed into the guide-plate, which serves to direct the strip from the plane of the forming chamber and guide it out around the mandrel.

The ribbon 14 is dragged around through the annular forming chamber by means of the toothed or roughened ends of the plungers which project into said chamber from the flange 3. An annular cam 15 is arranged adjacent to the heads 5 of said plungers, and the cam surface is so designed as to force the grippers into engagement with the metallic ribbon 14 the instant they arrive in line with the feeding groove 11, and allow the springs to disengage them from the ribbon just as it reaches the oblique delivery slot or passageway 13. The cam 15 is concentric with the hub, being formed on a plate 16 having a central hole in which said hub rotates freely. The plates 9 and 16 are rigidly bolted together, and a handle 17 may be secured to

them to enable the workman to hold the plates from rotating with the hub and mandrel.

In operation, the ribbon 14 is pushed into the tangent guide-groove 11 until its end enters the circular forming-chamber concentric with the ring 8, where it is gripped by the roughened ends of the plungers 4 and dragged around through said chamber until its end is delivered through the oblique slot 13, the successive coils sliding out along the mandrel 7. Ribbons of any length can be used. There is no waste of stock, and the machine operates with great rapidity and accuracy.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. An edgewise winding machine comprising a rotatable hub, a plurality of grippers carried thereby, and a stationary plate having a circular recess with which said grippers cooperate.

2. An edgewise winding machine comprising a rotatable hub, a plurality of gripper plungers carried thereby, a stationary plate having an annular recess, and a cam for giving movement to said gripping plungers.

3. An edgewise winding machine, comprising a rotatable hub, a plurality of grippers carried thereby, a stationary plate having a circular recess concentric with said hub, and a guide-plate having a feeding groove tangent to said recess.

4. An edgewise winding machine comprising a rotatable hub, a plurality of grippers carried thereby, a stationary plate having a circular recess concentric with said hub, and an oblique slot, and means for carrying said grippers to engage with and release the ribbon being wound.

5. An edgewise winding machine comprising a rotatable hub having a flange containing sockets, spring actuated plungers in said sockets, a stationary cam-plate cooperating with said plungers, a stationary forming-plate having a circular recess concentric with said hub, and a guide-plate having a feeding groove tangent to said recess.

In witness whereof, I have hereunto set my hand this twelfth day of October, 1907.

HAROLD L. BARNHOLDT.

Witnesses:

P. A. SMITH,
F. G. LARAMEE.