T. H. WURMB & R. BAUMANN.

MACHINE FOR WINDING WIRE ON THERMOSTATIC SPRINGS.

APPLICATION FILED AUG. 29, 1910.

1,028,519. Patented June 4, 1912.

4 SHEETS—SHEET 1.

Fig. 1.

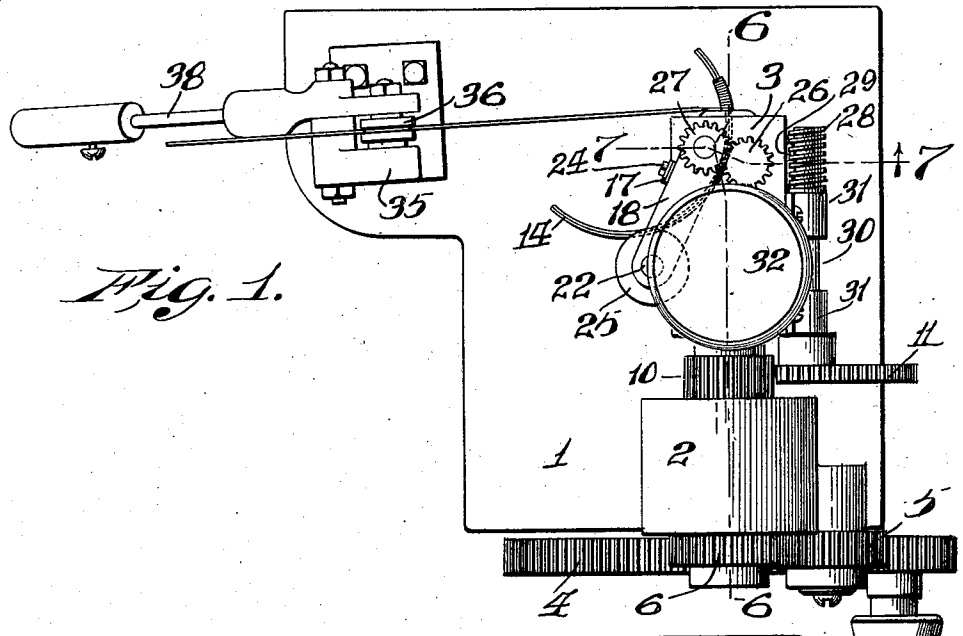
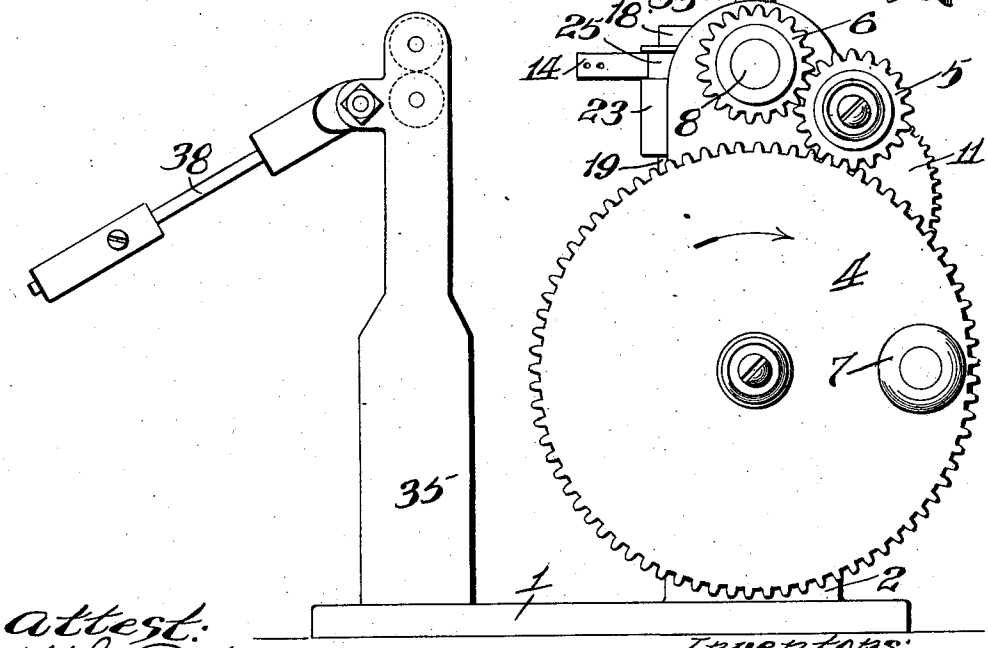


Fig. 2.



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4 SHEETS—SHEET 2.

Fig. 4.

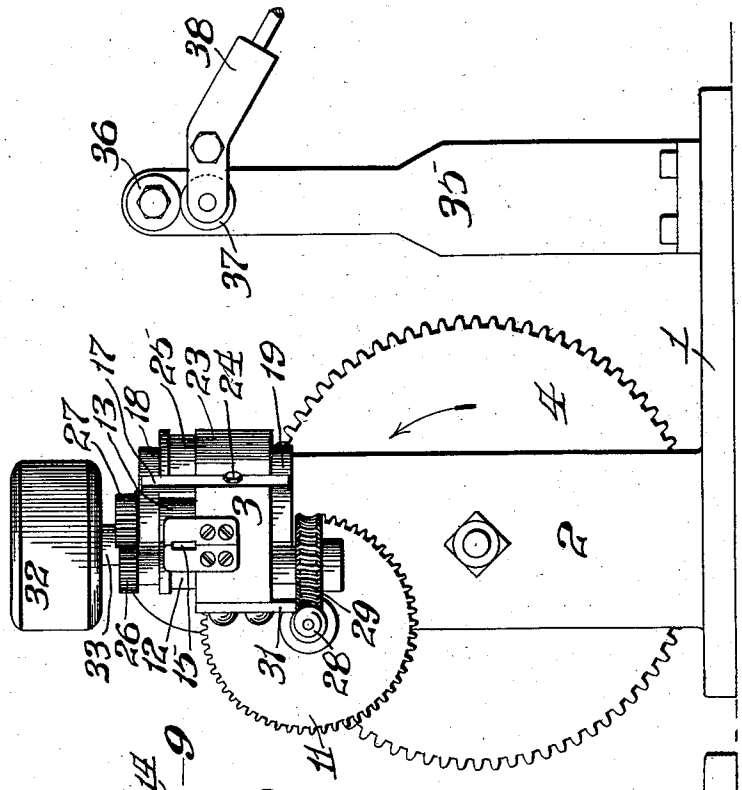
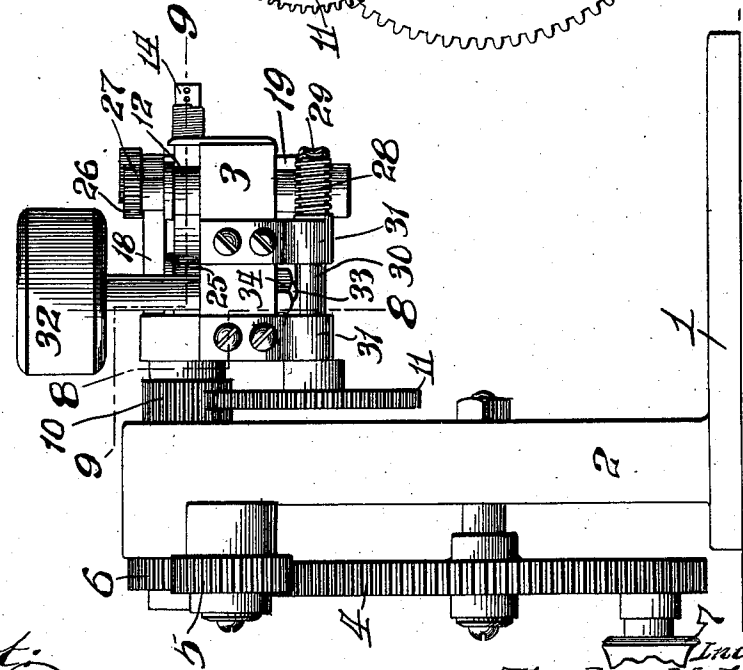


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 5.

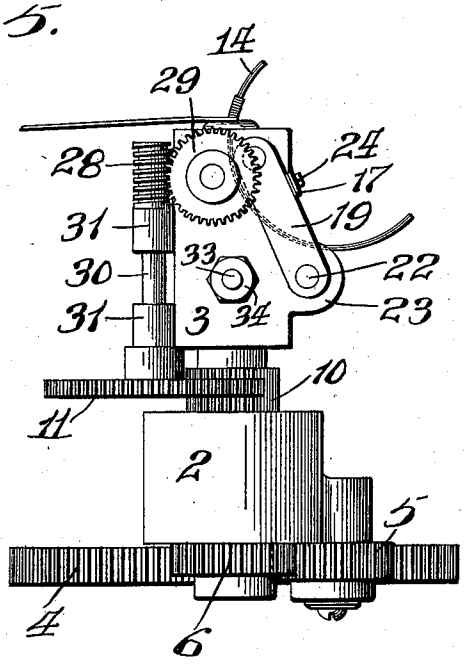
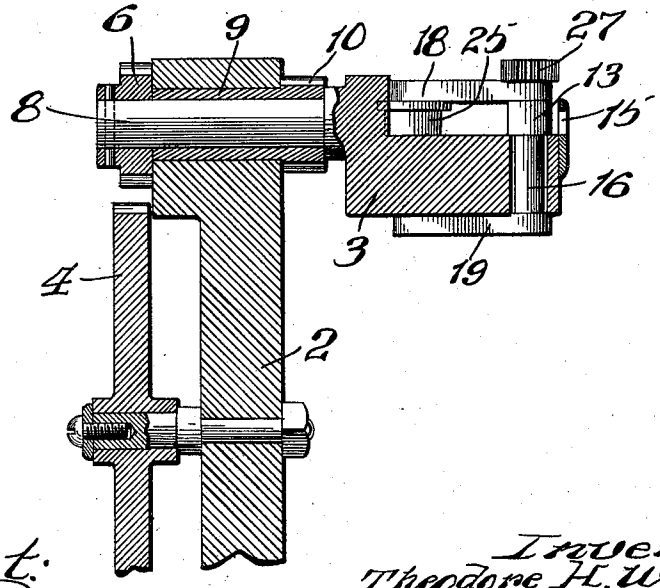


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 7.

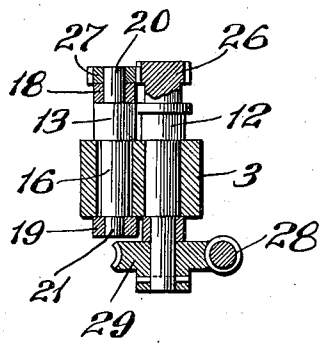


Fig. 8.

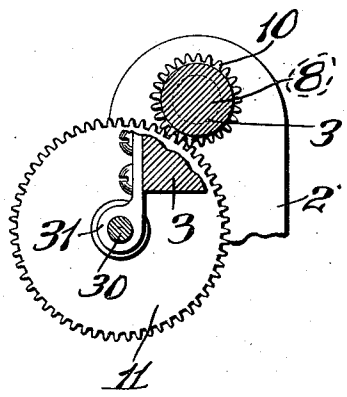
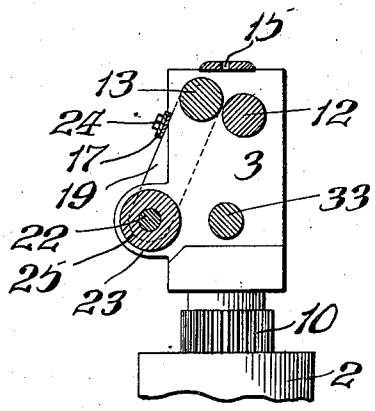


Fig. 9.



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UNITED STATES PATENT OFFICE.

THEODORE H. WURMB AND ROBERT BAUMANN, OF ST. LOUIS, MISSOURI, ASSIGNORS TO NATIONAL CLOCK & ELECTRIC MANUFACTURING CO., OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

MACHINE FOR WINDING WIRE ON THERMOSTATIC SPRINGS.

1,028,519. Specification of Letters Patent. Patented June 4, 1912.

Application filed August 29, 1910. Serial No. 579,457.

To all whom it may concern:

Be it known that we, THEODORE H. WURMB and ROBERT BAUMANN, citizens of the United States, and residents of St. Louis, Missouri, have invented certain new and useful Improvements in Machines for Winding Wire on Thermostatic Springs, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to a machine for winding wire on thermostatic-springs, and it consists in the novel construction and arrangement of parts hereinafter described and pointed out in the claims hereof.

The more specific object of our invention is the provision of a machine which shall rapidly and satisfactorily cover with wire the curved thermostatic-springs heretofore disclosed by us in our two United States Letters-Patent, numbered and dated respectively, 770,345 and 857,709, September 20, 1904 and June 25, 1907; but our present invention may of course be used for any other purpose to which it is adapted.

In the drawings, Figure 1 is a plan-view of a machine embodying our invention. Fig. 2 is an end elevation of same. Fig. 3 is an elevation of one side of same. Fig. 4 is an elevation of the end opposite that shown in Fig. 2. Fig. 5 is a detail plan of the revolving-head and its feeding and driving trains of gearing. Fig. 6 is a detail-section of the revolving-head, the section being taken on line 6—6 of Fig. 1. Fig. 7 is a section through said head on line 7—7 of Fig. 1. Fig. 8 is a detail-section on line 8—8 of Fig. 3. Fig. 9 is a detail-section through the rotating feed-rolls carried by the revolving head.

A suitable base-plate or table 1 is provided, and from this rises the main-standard 2 carrying at its upper end the revolving-head 3. A gear-wheel 4 and two pinions 5 and 6 are also carried by said standard 2, the same being mounted on proper studs or pins, to drive said revolving-head in the same direction in which said gear-wheel turns. In the present instance we have shown a handle 7 applied to said gear-wheel 4 for the purpose of driving same by hand; but it is obvious that the same may be driven by steam, electric or any other known power. Said head 3 is provided with a journal 8 which projects horizontally from one end of said head, leaving the opposite end of the head free; and said journal is mounted in a bearing 9 in the top of said main-standard 2, while the pinion 6 is pinned, keyed or otherwise fixed upon the end of said journal which projects beyond the end of said bearing. Formed integral with the inner end of said bearing 9 is a fixed-pinion 10 about which a planetary-gear wheel 11 travels, for the purpose of driving the feed-rolls 12 and 13, which latter are carried by said revolving-head. Of course, said fixed-pinion may be fixed against movement in any other desired manner, as it is only incidentally shown as an integral part of said bearing 9. Said feed-rolls 12 and 13 are mounted in suitable bearings in the free end of said revolving-head, at a right-angle to the axis of said head, so that said rolls will revolve when said head is revolved, and will feed the flat curved metal springs, as 14, from a guide-plate having a central aperture 15 located substantially in alinement with the longitudinal-axis of said head. The journal of the said roll 13 is somewhat smaller than its bearing, as indicated by the numeral 16, and shown more clearly in Figs. 6 and 7, so that said roll may move away from its companion roll 12 when the curved springs are inserted between said rolls, and also perform the function of a yielding-roll, to exert a yielding pressure upon the springs while being fed by said rolls. A yielding-pressure is exerted upon said yielding-roll 13 by a flat spring 17 bearing upon the swinging pressure bars 18, 19, in the free outer ends of which reduced-journals 20 and 21 of said yielding-roll are mounted. The inner ends of said pressure-bars 18, 19 are connected by a transverse shaft 22 which is mounted in a bearing 23 on one side of the revolving-head, and the said spring 17 is secured to the head by means of a suitable bolt or screw 24 passed through said spring at a point about midway of its length and into the head, and it is evident that by adjusting said bolt or screw the pressure of said spring may be varied as required. A flanged guide-roller 25 is mounted on said shaft 22 in the space between said bearing 23 and said pressure-bar 18. Said feed-rolls 12 and 13 are geared together by pinions 26 and 27 on the pro-

jecting ends of said rolls, so that both rolls may be positively driven. Motion is imparted to the roll 12 by a worm 28, which engages a worm-wheel 29 on the projecting end of the roll-journal, and said worm is driven by said planetary gear-wheel 11, upon the shaft 30 of which said worm is fixed. Said shaft 30 is mounted in bearings 31 secured to the side of the revolving-head 3 which is opposite the side to which said spring 17 is bolted. A counter-balance, in the form of a solid cylinder of metal 32 is applied to said revolving-head by means of a bolt 33 which passes through said head and is secured by a nut 34, said counter-balance being located at the outer end of said bolt, on the side of said head which is opposite said nut; and said counter-balance has sufficient weight to balance the weight of the planetary-wheel 11 and other parts, in order that the revolving-head and all parts carried thereby may rotate rapidly without causing undue vibration of the machine.

For the purpose of guiding the wire to the work, we provide a guide-roll stand 35, at the upper end of which is a peripherally-grooved roller 36, beneath which is mounted a movable roller 37 also having a groove in its periphery and carried by the inner-end of a hand-lever 38. Said hand-lever 38 is fulcrumed on said stand.

The operation is as follows: The curved thermostatic-springs 14, to be covered with wire, are fed to the machine one at a time, it, of course being necessary to stop the machine each time a spring is inserted in the revoluble-head. While the machine is standing still the operator grasps one of the curved-springs 14 and inserts its end into the space between the periphery of the guide-roller 25 and the spring 17 (see Fig. 1; also Figs. 5 and 9) and continues the movement until said end of the spring comes in contact with the feed-rolls 12 and 13, when the operator (by hand, or by means of a common tool) forces the yielding-roll outwardly a slight distance, separating its periphery a sufficient distance from the periphery of its companion roll 12 to admit the spring 14 between said rolls and to be passed between the rolls a sufficient distance for the end of the spring to pass beyond said rolls through the aperture 15 of the guide-plate on the outer end of said revoluble-head; then the wire from a suitable spool or coil (not shown) is placed between the guide-rolls 36 and 37 of the guide-roll stand 35 so that said wire will be located in the grooves of said rolls, and then said wire is drawn toward the revoluble-head and its end inserted in one of the small holes with which the spring is provided. Now, upon starting up the machine, the revoluble-head carrying the spring to be covered, starts to revolve and bends the end of the wire at right angles across the face of said spring, thereby preventing the wire from being withdrawn; and as the head continues to revolve the feed-rolls 12 and 13 will feed said spring through said guide-plate aperture 15 at such a rate of speed as will place one convolution of wire on said spring for each revolution of said head, thereby covering the surface of said spring with wire as long as the head continues to revolve, and winding it as tightly as desired, depending upon the tension of the wire in the space between the guide-rolls 36 and 37 and the spring being covered. This tension should, of course, be sufficient to cause the wire to be tightly wound upon said spring. After a sufficient amount of wire has been wound on the spring, the wire is cut at a point near the spring, the machine shut down, and the wound spring removed from the head, the operation being repeated for each spring to be covered.

The machine is to be driven in the direction indicated by the arrow.

In the finished springs, the ends of the wire are usually secured to the springs by solder.

The operation of the trains of gears between the large gear-wheel 4 and the revoluble-head, and between the fixed pinion 10 and the feed-rolls 12 and 13, is so obvious that further explanation will not be necessary to the mind of a skilled mechanic.

What we claim is:

1. A machine for winding-wire or the like upon curved articles, such as thermostatic-springs, the same comprising a revoluble-head for holding and feeding the curved articles from a point on one side of said head to a point located approximately at the axis of rotation of the head; and suitable means for supplying wire to the articles while they are being revolved by said head, in combination with means for causing said head to revolve.

2. A machine for winding wire on curved springs, comprising a revoluble-head, feeding-devices carried by said head for automatically feeding the curved springs from the side of said head to a point approximating the axial-line thereof; means for revolving said head; and means for simultaneously causing said feeding-devices to feed the curved springs.

3. In a machine of the class described, a driven shaft, a head carried by said shaft, a pair of article carrying and feed rolls carried by said head and bodily rotatable therewith, a gear wheel connected with each roll, a fixed pinion embracing the driven shaft, a planetary gearing revoluble with said head and meshing with said fixed pinion for the rotation of said feed rolls and a fixed source of wire supply.

4. A machine for winding wire on flat

articles, comprising a revoluble-head; a pair of feed-rolls mounted on said head to rotate therewith and revolve in their bearings to feed the articles; swinging pressure-bars; a spring for engaging said pressure-bars; means for revolving said head; means for revolving said feed-rolls to feed the articles while said head is revolving; and means for guiding the wire to the articles carried by said head.

5. In a machine of the class described, a driven shaft, a head carried by said shaft, a pair of article carrying and feed rolls carried by said head and bodily rotatable therewith, a gear wheel connected with each roll, a fixed pinion embracing the driven shaft, a planetary gearing revoluble with said head and meshing with said fixed pinion for the rotation of said feed rolls, a guide plate carried by the head and a fixed source of wire supply.

In testimony whereof, we have signed our names to this specification, in presence of two subscribing witnesses.

THEODORE H. WURMB.
ROBERT BAUMANN.

Witnesses:
E. L. WALLACE,
N. G. BUTLER.