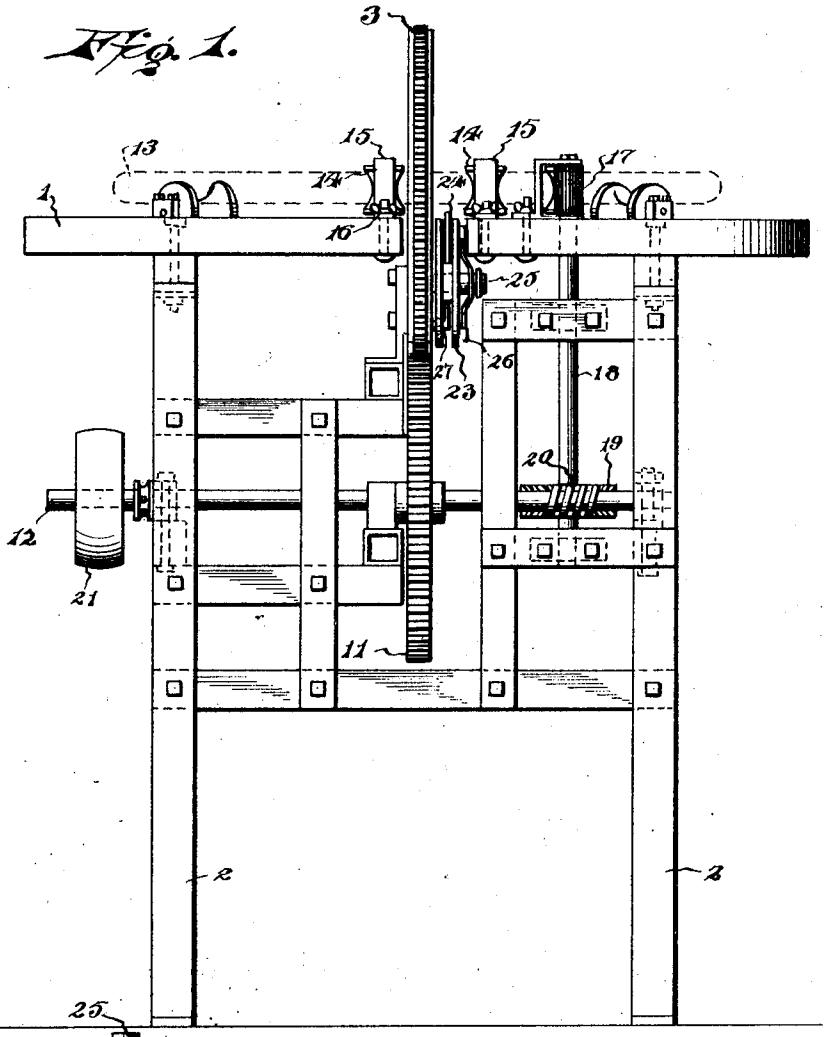
Aug. 7, 1928. 1,679,804

W. S. BISEL ET AL

WIRE WINDING MACHINE

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Fig. 1.



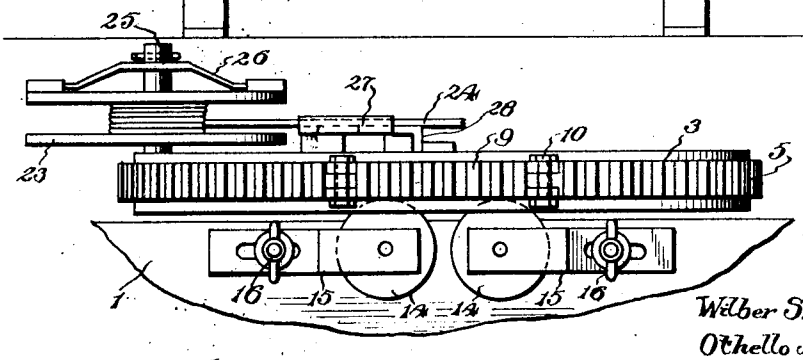


Fig. 7.

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Fig. 2.

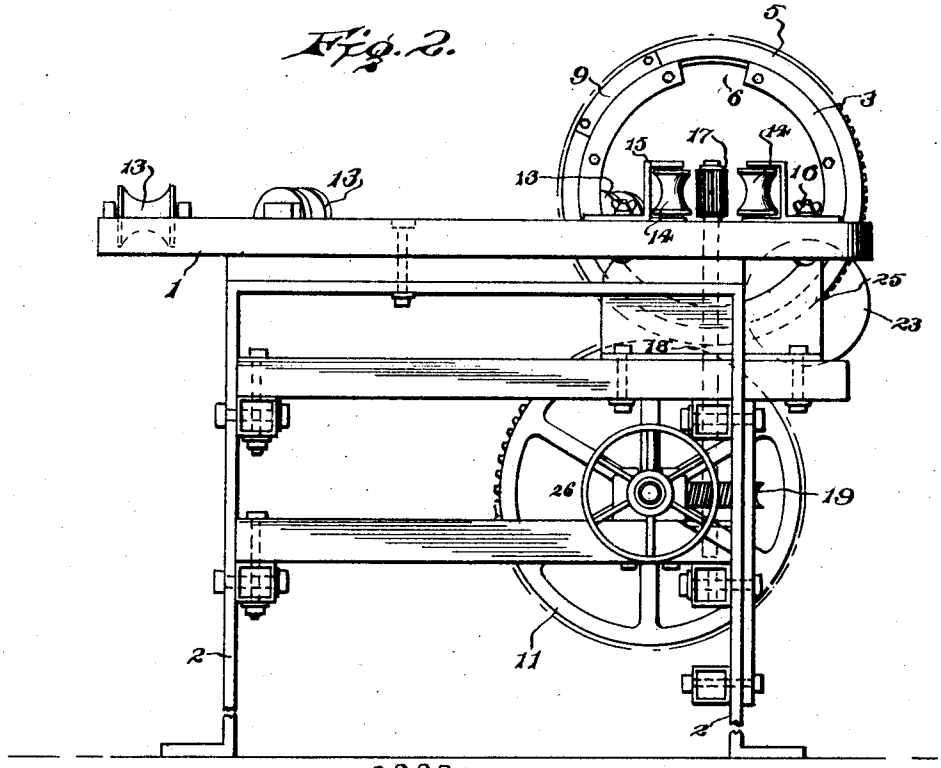
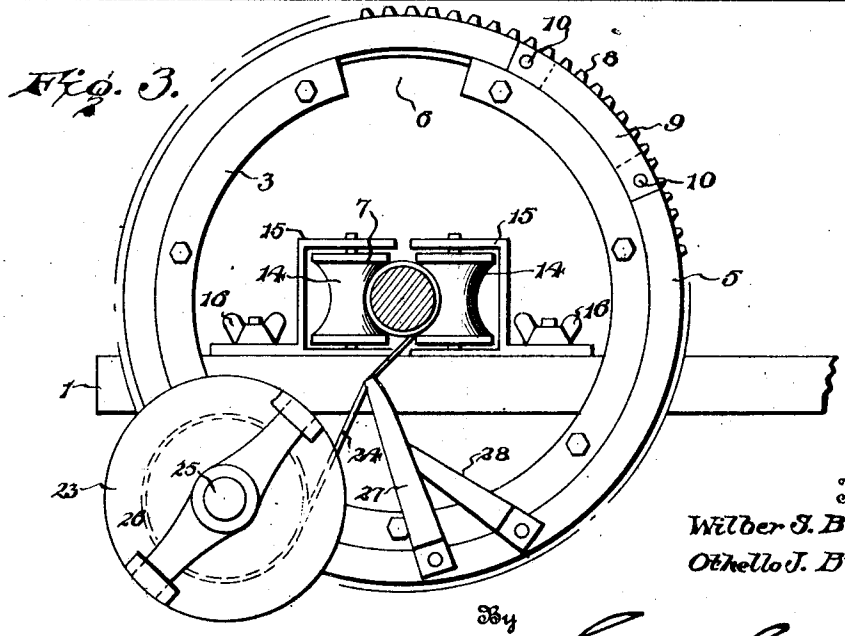


Fig. 3.



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Fig. 4.

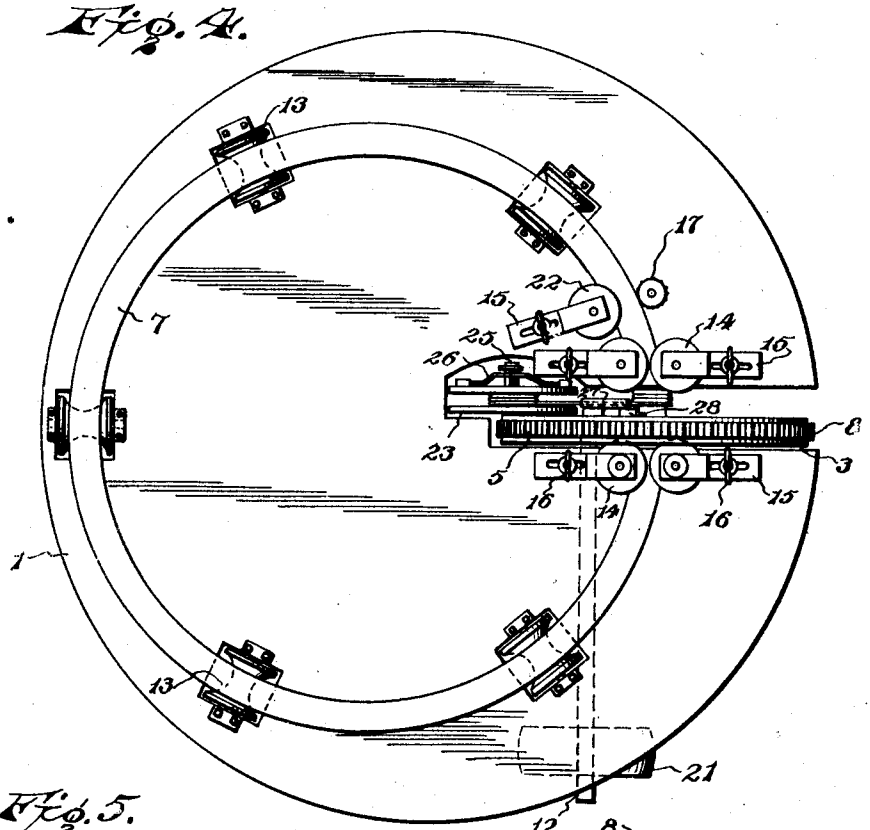


Fig. 5.

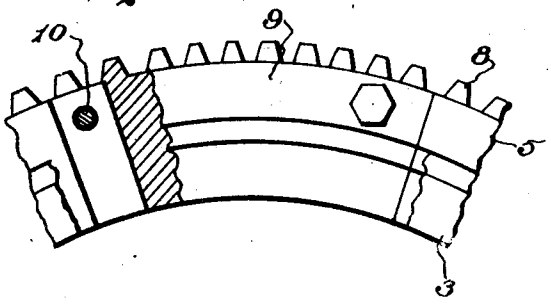
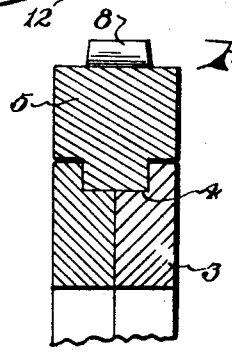


Fig. 6.



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UNITED STATES PATENT OFFICE.

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WIRE-WINDING MACHINE.

Application filed January 26, 1927. Serial No. 163,785.

The specific intention of this invention is the provision of a machine for winding a spring wire about an object, such as a core, which may be circular, straight or of other form, and which may be yieldable, or not, and solid or tubular and of any cross sectional outline.

One of the principal objects of the invention is the provision of a machine for the purpose aforesaid which is rapid and automatic, in operation, simple in construction, efficient in action and capable of producing an article uniform in structure and appearance throughout.

While the drawings illustrate a preferred embodiment of the invention, it is to be understood that in adapting the means to meet specific needs and requirements the design may be varied and such other changes in the minor details of construction may be resorted to within the scope of the invention as claimed, without departing from the spirit thereof.

For a full understanding of the invention and the merits thereof, reference is to be had to the following description and the drawings hereto attached, in which,—

Figure 1 is a front view of a wire winding machine embodying the invention.

Figure 2 is a side view of the machine.

Figure 3 is a detail view in side elevation of the reel, the carrier for the reel, the circular track upon which the reel carrier is mounted and a pair of guide rollers for the core, the latter being in section.

Figure 4 is a top plan view of the machine.

Figure 5 is a detail view of a portion of the reel carrier and the supporting track therefor.

Figure 6 is an enlarged transverse sectional view of the reel carier and its track.

Figure 7 is an enlarged plan view of the operating mechanism.

Corresponding and like parts are referred to in the following description and designated in the several views of the drawings by like reference characters.

The machine embodies a supporting frame including a bed 1 and supporting legs or uprights 2, which are connected by suitable cross pieces which likewise receive and support certain parts. The bed 1 is preferably of circular outline and its middle portion is omitted, as indicated most clearly in Figure 4, for lightness and to admit of ready access to all parts of the work. A side portion of the bed is narrow and the opposite side portion wide, as shown most clearly in Figure 4, and the operating mechanism is associated with the wide portion of the bed. A circular track 3 is mounted upon the wide portion of the bed 1 and is disposed perpendicular thereto. The track 3 is formed in its outer periphery with a channel 4 in which the reel carrier 5 is mounted. For convenience of construction and assembling of the parts the track 3 comprises complemental parts, as shown most clearly in Figure 6, which are bolted or otherwise connected. A portion of the track 3 is cut away, as indicated at 6, to provide for the ingress and egress of the core, and this cut away portion is preferably located at the top, as shown most clearly in Figure 3. The track 3 is disposed so that its center coincides with the core 7 about which the wire is to be wound.

The carrier 5 consists of a ring which is toothed upon its outer peripheral edge, as indicated at 8. The carrier 5 is seated in the channel 4 of the track 3 and a portion is removable, as indicated at 9, to provide for the ingress and egress of the core 7. The removable portion 9 is retained in place by matching tongues and grooves and bolts 10, or like fastenings, passing transversely through the matching elements when the part 9 is in place. When the bolts 10 are removed the part 9 may be detached and when the carrier 5 is adjusted to bring the space formed by removal of the part 9 in registering position with the gap or cut away portion 6 of the track 3 the annular core 7 may be readily placed in position or removed from the machine as required. The carrier 5 is adapted to be rotated by means of a gear wheel 11 which is fast to a shaft 12, the teeth of the gear wheel 11 meshing with the teeth 8 of the carrier 5.

A plurality of rollers 13 are mounted upon the bed 1 and disposed about the same in suitable position and number to properly support the core 7 about which the wire is to be wound. The axes of the rollers 13 are disposed horizontally and radially and the rollers are so positioned as to support the core 7 a proper distance above the bed 1 to coincide with the center of the circular track 3. Outer rollers 14 are provided in pairs and are located upon opposite sides of the track 3 to

sustain the core 7 during the action of winding the wire therearound. The axes of the rollers 14 are disposed vertically and said rollers are grooved to receive the core 7, as indicated most clearly in Figure 3 to prevent vertical displacement thereof in the winding of the wire thereon. The rollers 14 are adjustable laterally and are mounted in brackets 15 which are clamped to the bed 1 in the required adjusted position by means of thumb nuts 16 mounted upon the upper ends of bolts passing vertically through the bed 1. The rollers 14 are moved apart to admit of the ingress and the egress of the core 7 and when the core is in position the rollers 14 are brought together to engage opposite sides of the core and prevent vertical and lateral movement thereof during the winding of the wire thereon.

A feed roller 17 is provided for advancing the core 7, as the wire is wound therearound. The feed roller 17 is corrugated, or otherwise roughened to insure a positive feed and is fixed to the upper end of a vertical shaft 18 which is suitably mounted in bearings applied to the supporting frame. A worm gear 19 fast to the shaft 18 is in mesh with a worm 20, forming a part of the shaft 12. The shaft 12 may be driven in any determinate way and when power is taken from an engine the same will be transmitted by a drive belt, not shown, adapted to cooperate with a belt pulley 21 fast to the outer end of the shaft 12. A groove pulley 22, similar to the pulleys 14 is adjustably mounted upon the bed 1 and coacts with the feed pulley 17, the core 7 being held between the pulleys 17 and 22 with sufficient pressure to insure a positive feed of the core 7 when the machine is in operation. The pulley 22 is mounted in a bracket 15, similar to that forming a mount for the pulleys 14 and this bracket is adapted to be secured to the bed in the required adjusted position, and is made adjustable to admit of the core being placed between the pulleys 17 and 22 or removed therefrom, as required.

A suitable reel 23 is mounted upon the carrier 5 and receives the wire 24 which is adapted to be wound about the core 7. The reel 23 is loosely mounted upon an axle 25 mounted in the carrier 5 and a tension device 26 mounted upon the axle 25 exerts a pressure against a side of the reel to insure a resistance being offered to the rotation thereof, whereby to tension the wire 24 and insure its uniform winding about the core 7. A guide 27, secured at its outer end to the carrier 5, has its inner end positioned to direct the wire 24 and insure its uniform winding about the core. The guide 27 consists of an arm which is braced by means of a stay 28 which is likewise attached at its outer end to the carrier 5.

The core 7 of annular formation is placed in position upon the rollers 13 applied to the bed 1 by passing it through the registering spaces or gaps of the track 3 and carrier 5, after the part 9 of the latter has been removed. The pairs of rollers 14 and the rollers 17 and 22 are spaced apart to receive the core and after the latter has been properly positioned upon the bed the part 9 of the carrier 5 is replaced and the several rollers, previously spaced apart are brought together against opposite sides of the core to maintain it in place. The end of the wire 24 is attached to the core 7 in any determinate way and the machine is set in motion with the result that the annular carrier 5 is rotated about the circular track 3, thereby carrying the reel 23 around the core 7 and winding the wire thereon. At the same time the core is advanced by the rotation of the feed roller 17, the movement being such as to wind the wire 24 uniformly and closely about the core, it being understood that the mechanism is timed so as to effect the desired result. The wire 24 possesses a spring action and is of required gage. After the core 7 has been completely covered with a winding of the wire the machine is stopped and the part 9 removed from the carrier and the latter adjusted to bring its space in register with the space 6 of the track and the several pulleys between which the core is held are separated to release the core and admit of its removal from the machine, the ends of the wire being secured or made fast in any determinate way.

Having thus described the invention, we claim:

1. A winding machine of the character specified, comprising horizontally disposed rollers for supporting the work, vertically disposed rollers adapted to receive the work therebetween and adjustable laterally to provide for the ingress and the egress of the work, a rotary carrier and a reel mounted upon the carrier and rotatable therewith to carry the strand and wind it about the work.

2. A wire winding machine of the character specified, comprising horizontally disposed work supporting rollers, vertically disposed rollers adapted to receive the work therebetween and adjustable laterally to provide for the ingress and the egress of the work, a feed roller adapted to cooperate with one of the vertically disposed rollers for adjusting the work, a rotary carrier and a reel mounted upon the carrier and rotatable therewith to wind the strand about the work.

3. A machine for winding wire about an annular core of a tire, the same comprising a bed, horizontally disposed core supporting rollers, vertically disposed rollers for receiving the core therebetween, means for adjusting the vertical rollers laterally, a feed roller, a circular track having an upper por-

tion cut away, an annular carrier mounted upon the track, and toothed upon its outer edge and having a part removable and adapted to register with the cut away portions of the track to provide for the ingress and the egress of the core, a reel for receiving the wire mounted upon the rotary carrier, means for creating a tension upon the reel to offer a resistance to the unwinding of the wire therefrom, a guide for the wire attached to and rotatable with the carrier, and means for imparting a rotary movement to the feed roller and the reel carrier.

In testimony whereof we affix our signatures.

WILBER S. BISEL. [L. S.]
OTHELLO J. BISEL. [L. S.]