C. BODERCK.

BANDING OR WINDING MACHINE.

APPLICATION FILED JUNE 10, 1907.

921,668.

Patented May 18, 1909.

2 SHEETS—SHEET 1.

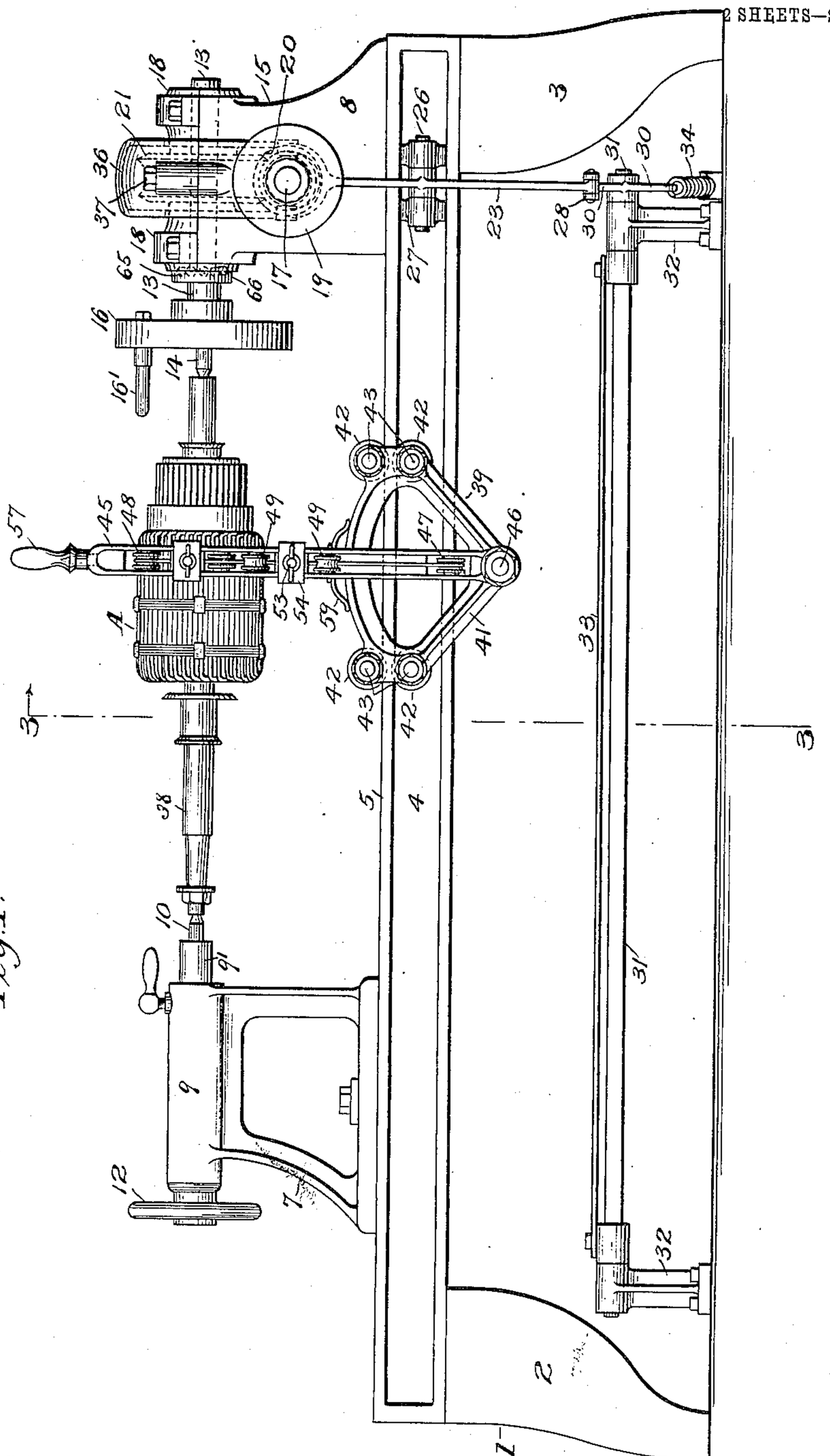

Fig. 1.

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Inventor:
Carl Boderck
by his Attys:
Philipp Sawyer Rice & Kenway

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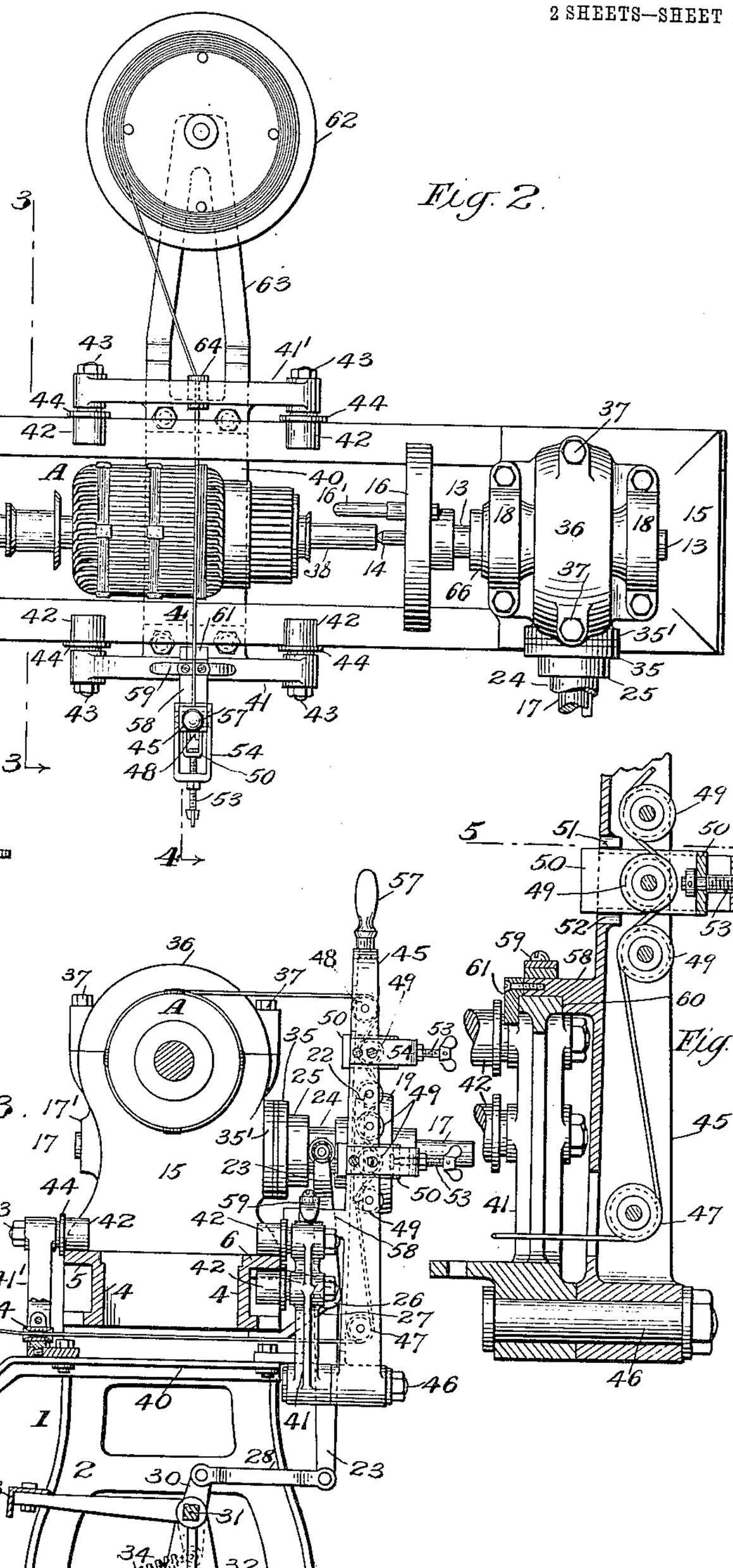

Fig. 2.

Fig. 5.

Fig. 3.

Fig. 4.

Witnesses:

Inventor:
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UNITED STATES PATENT OFFICE.

CARL BODERCK, OF BROOKLYN, NEW YORK, ASSIGNOR TO AMERICAN GENERAL ENGINEERING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

BANDING OR WINDING MACHINE.

No. 921,668. Specification of Letters Patent. Patented May 18, 1909.

Application filed June 10, 1907. Serial No. 378,144.

To all whom it may concern:

Be it known that I, CARL BODERCK, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Banding or Winding Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in winding machines, and particularly to that class of winding machines known as banding machines, the especial object of the invention being to produce a simple machine for winding a number of bands of material (wire, in this instance) on the work, a sufficient number of convolutions of wire being wound to form a band, the winding mechanism then being moved along the work to wind bands on other portions thereof.

With this object in view, the invention consists generally of a rotatable work-support, a suitably supported carrier for the wire movable longitudinally of the work on which the wire is to be wound, and a tension device mounted on the carrier for maintaining the wire under tension as it is drawn to and wound on the work, this tension device being so arranged as to move automatically relatively to the carrier and the work, so that the successive turns of each band will be laid preferably side by side.

For a better understanding of the invention, a detailed description of the same will be given in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a machine embodying the invention. Fig. 2 is a plan view of part of the machine shown in Fig. 1, certain parts being broken away. Fig. 3 is a view partly in section, taken on the line 3—3 of Figs. 1 and 2. Fig. 4 is a vertical section on an enlarged scale, of the improved tension device, taken on line 4—4 of Fig. 2; and Fig. 5 is a detail sectional view of a part of the tension device, the section being taken on line 5—5 of Fig. 4.

Referring now to said drawings, illustrating the invention in its preferred form, 1 indicates the frame of the machine, which comprises two supporting standards 2, 3, one at each end of the machine. On the standards 2, 3 is supported a track 4, provided with flanges 5, 6, the function of which will be hereinafter referred to. Mounted on this track 4, at the ends of the machine, are a tail stock 7 and a head stock 8, secured on the track in any suitable manner, and in which are mounted the means for supporting and also rotating the work, as for instance, an armature A, on which wire is to be banded. Tail stock 7 has at its forward end a bearing 9, in which is slidably mounted a dead spindle 9′, carrying a dead center 10 for engaging one end of the work; this bearing 9 having a clamping device such as that usually employed in lathes, by which spindle 9′ may be clamped against rotation, when adjusted endwise to the desired position in the tail stock. Dead spindle 9′ is so adjusted in the manner usual in lathes, that is, by means of a hand wheel 12 and a threaded spindle of the usual form (not shown) therefrom entering a threaded opening in the end of spinde 9′.

In the head stock 8 is mounted a live spindle 13, having a center 14 for engaging the work to be rotated; said spindle being rotated by gearing contained in the oil-tight casing 15 in which spindle 13 is journaled in bearings 18. A face plate 16 is provided which is detachably connected to shaft 13 and carries a stud 16′ for engaging a dog (not shown) on the armature and thus turning the latter as shaft 13 is rotated. The means for rotating spindle 13 during the winding or banding operation, consists of a driving shaft 17 mounted in bearings 17′ (Fig. 3) in the head stock 8, and driven, from any suitable source of power (not shown), by a pulley 19 (Fig. 3), though, if desired, it may be directly driven by an electric motor or in any other suitable manner. This shaft 17 has formed thereon a worm 20 (see dotted line, Fig. 1), which engages a worm gear 21 fast on the spindle 13, by which the latter is driven. It is desirable that the operator should be able to stop the rotation of the spindle 13 and the work at the point when a sufficient amount of wire has been wound on the latter to form a band, and for this purpose the following mechanism is employed. The pulley 19, by which the shaft is driven, is loosely mounted on the shaft and is continuously rotated from the source of power. This pulley 19 is cut out on one side to receive an endwise movable clutch member 22 (shown in dotted lines in Fig. 3), which is splined to shaft 17. This clutch member 22 is forced into and out of engagement with the pulley by a yoke shaft arm 23, the upper end

of which engages the grooved portion 24 of the hub 25 of clutch member 22. The arm 23 is fulcrumed at 26 on a bracket 27 secured to the frame of the machine, and is connected at its lower end to a link 28, this link in turn being connected to an arm 30, fast to a rock shaft 31 mounted in standards 32 and having secured to it a foot treadle 33 extending along the side of the machine. The arm 23 through link 28 and arm 30 is rocked by downward pressure on the treadle 33 to engage the clutch 22 with pulley 19 against the action of a spring 34, which, when the treadle is released, rocks the arm 23 in the opposite direction and disengages the clutch from the pulley, thus stopping the rotation of the work support. A friction clutch 35, 35′ is preferably employed for assisting in stopping rotation of the work, one member 35′ being stationary and the other carried by hub 25, these two members coming into engagement when clutch member 22 is thus moved away from pulley 19.

The worm gear 20 and the gear 21 are, as before stated, inclosed in an oil tight case 15, which is filled with proper lubricating grease or oil. To enable the operator to get at the gears for oiling or any other purpose, the case is provided with a removable top portion 36, secured to the body of the casing by suitable bolts 37.

The work which is to be wound or banded with wire, which, in the instance shown, is a power armature A, is supported between the spindles 9′, 13, the centers 10, 14 of the spindles being forced against the ends of the armature shaft 38.

The means for carrying the wire used in winding or banding the work, and the means for maintaining the wire under suitable tension while being drawn to the work, will now be described.

In the construction shown, there is provided a carriage consisting of a base plate 40 (see Fig. 2) extending across the machine, and side frames 41, 41′. The frames 41, 41′ are provided with rollers 42 carried by studs or bolts 43. These rollers 42 are arranged to ride along the flanges 5, 6 of the track 4 of the machine and are, as shown (see Fig. 3), flanged, as at 44, so that they will hold the carriage on the track.

The tension device which will now be described, is mounted on the carriage, so as to move with it, and so that during the operation of winding or banding the armature or other work, it will move or swing automatically relatively to the carriage, and thus lay the successive turns of wire properly side by side on the armature. The tension device consists of a plurality of guiding and tension sheaves supported on a wire-feeding arm 45 (see Figs. 3, 4) pivoted on a stud 46 to one of the side frames (41) of the carriage. In the particular construction shown, there are provided two guiding sheaves, one (47) being located below the tension sheaves, and guiding the wire to the tension sheaves, and the other (48) located above the tension device and guiding the wire therefrom to the work. The tension sheaves (five in number) are marked 49, and are arranged so that two of them (namely, the second and fifth) are adjustable so that they can be staggered with relation to the others in order to vary the amount of tension on the wire. To provide for such adjustment of these two center sheaves 49, they are each mounted in a sliding support 50 movable between guides 51-52, and engaged at its outer end by a screw 53 threaded in a bracket 54 fixed to the arm 45. By turning screw 53, the support 50 and its sheave 49 may be adjusted inwardly or outwardly to any position desired. With this construction, any desired tension may be given to the wire while it is being wound on the armature or other work.

It will be understood, of course, that in the operation of winding, the carriage 39 will be moved by hand along the rails 4, 5 to a position in line with that portion of the armature or other work which is to be banded with wire (the operator in so moving the carriage, using the handle 57 of arm 45), and that, when the carriage is in its proper position, with relation to the armature or other work, the wire will be connected with the armature or other work and the latter then rotated through the mechanism heretofore described, or by means of the hand wheel 16. As the operation of banding or winding increases, the arm 45 being pivotally mounted on the carriage 39, will swing automatically on said carriage in the direction in which the wire is wound or banded on the armature or other work, and thus cause the several turns of wire to be laid thereon successively in proper position side by side. Arm 45 is provided with an inward extension 58 carrying a spring 59 bearing against the upper edge of the carriage side frame 41 (which is arc shaped, as shown), the engagement of this spring with the upper edge of said frame retaining arm 45 frictionally in the position to which it may be moved by the operator or to which it is thus automatically moved. Extension 58 is also provided with a downwardly extending shoulder 60, and a downwardly extension lip 61, which, engaging opposite faces of the frame 41, aid in retaining arm 45 in proper position with relation to the carriage, and prevent any movement thereof to or from the work being banded as the wire is fed therefrom to such work.

The wire which is to be wound on the armature is supplied from a bobbin 62 carried by an extension 63 of the base plate 40 of the carriage, this extension being located on the side of the machine opposite to the side on which the arm 45 is pivoted. The wire

passes from bobbin 62 through a guide 64 located on the side frame 41′ to the lower guiding sheave 47, then between the tension sheaves 49, and around the guiding sheave 48, to the armature or other work. By thus mounting the wire on the carriage, the wire supply is moved along its work with the tension device, and thus is always fed to the work in proper relation thereto.

As the end thrust on shaft 13 is considerable during the rotation of said shaft and the armature, I prefer to interpose a ball bearing 65 (see Fig. 1) between a collar 66 fast to shaft 13 and the adjacent face of the bearing 18 in which said shaft is journaled.

What I claim is:—

1. In a machine of the character described, the combination with means for supporting and rotating the work, of a carriage for the wire mounted to move parallel to the axis of rotation of the work, a wire feeding arm mounted on the carriage, and a tension device on said arm, said arm being movably connected to the carriage so as to move automatically relatively thereto in the direction in which the wire is wound on the work.

2. In a machine of the character described the combination with means for supporting and rotating the work, of a carriage for the wire mounted to move parallel to the axis of rotation of the work, a wire feeding arm mounted on the carriage, and a tension device on said arm, said arm being pivotally connected to the carriage so as to move automatically relatively thereto in the direction in which the wire is wound on the work.

3. In a machine of the character described, the combination with means for supporting and rotating the work, of a carriage for the wire mounted to move parallel to the axis of rotation of the work, a wire feeding arm pivotally connected to said carriage so as to move automatically relatively thereto in the direction in which the wire is wound on the work, a tension device on the arm, and means for frictionally holding said arm in position on the carriage including a spring on one engaging the other.

4. In a machine of the character described, the combination with means for supporting and rotating the work, of a carriage for the wire mounted to move parallel to the axis of rotation of the work, a wire feeding arm pivotally connected to said carriage so as to move automatically relatively thereto in the direction in which the wire is wound on the work, a tension device on the arm, and means for frictionally holding said arm in position on the carriage including a curved member on one end and a spring on the other engaging said curved member.

5. In a machine of the character described, the combination with means for supporting and rotating the work, of a carriage for the wire mounted to move parallel to the axis of rotation of the work, an arm movably mounted on the carriage so as to move automatically relatively thereto in the direction in which the wire is wound on the work, and a plurality of relatively adjustable sheaves carried on the arm and through which the wire is fed to the work under tension.

6. In a machine of the character described, the combination with means for supporting and rotating the work, of a carriage for the wire mounted to move parallel to the axis of rotation of the work, an arm pivotally mounted on the carriage so as to move automatically relatively thereto in the direction in which the wire is wound on the work, and a plurality of relatively adjustable sheaves carried on the arm and through which the wire is fed to the work under tension.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

CARL BODERCK.

Witnesses:
J. A. GRAVES,
PHILIP V. TILDEN.