No. 652,572. Patented June 26, 1900.

S. W. WARDWELL, JR.

WINDING MACHINE.

(Application filed Apr. 18, 1899.)

(No Model.)

3 Sheets—Sheet 1.

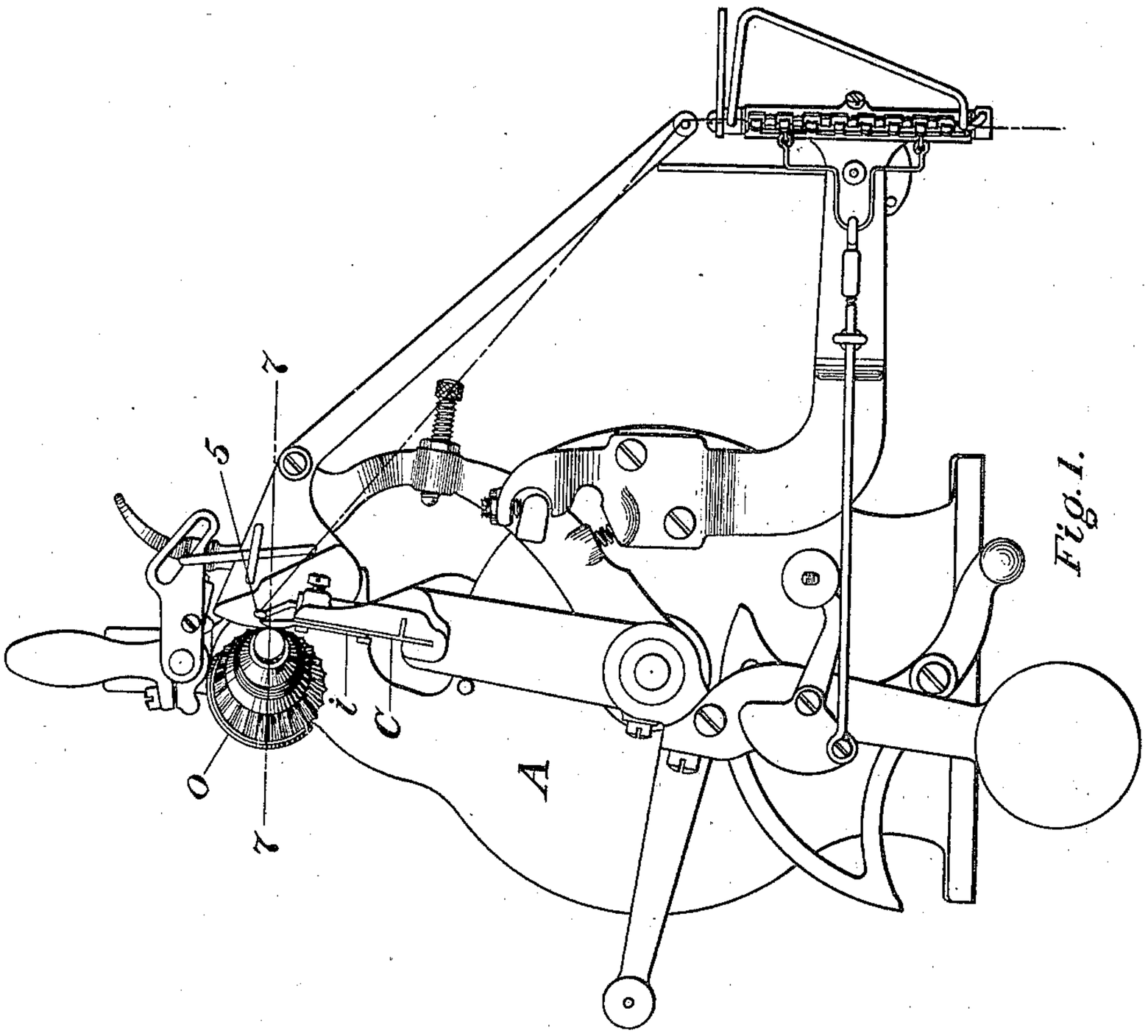

Fig. 1.

WITNESSES

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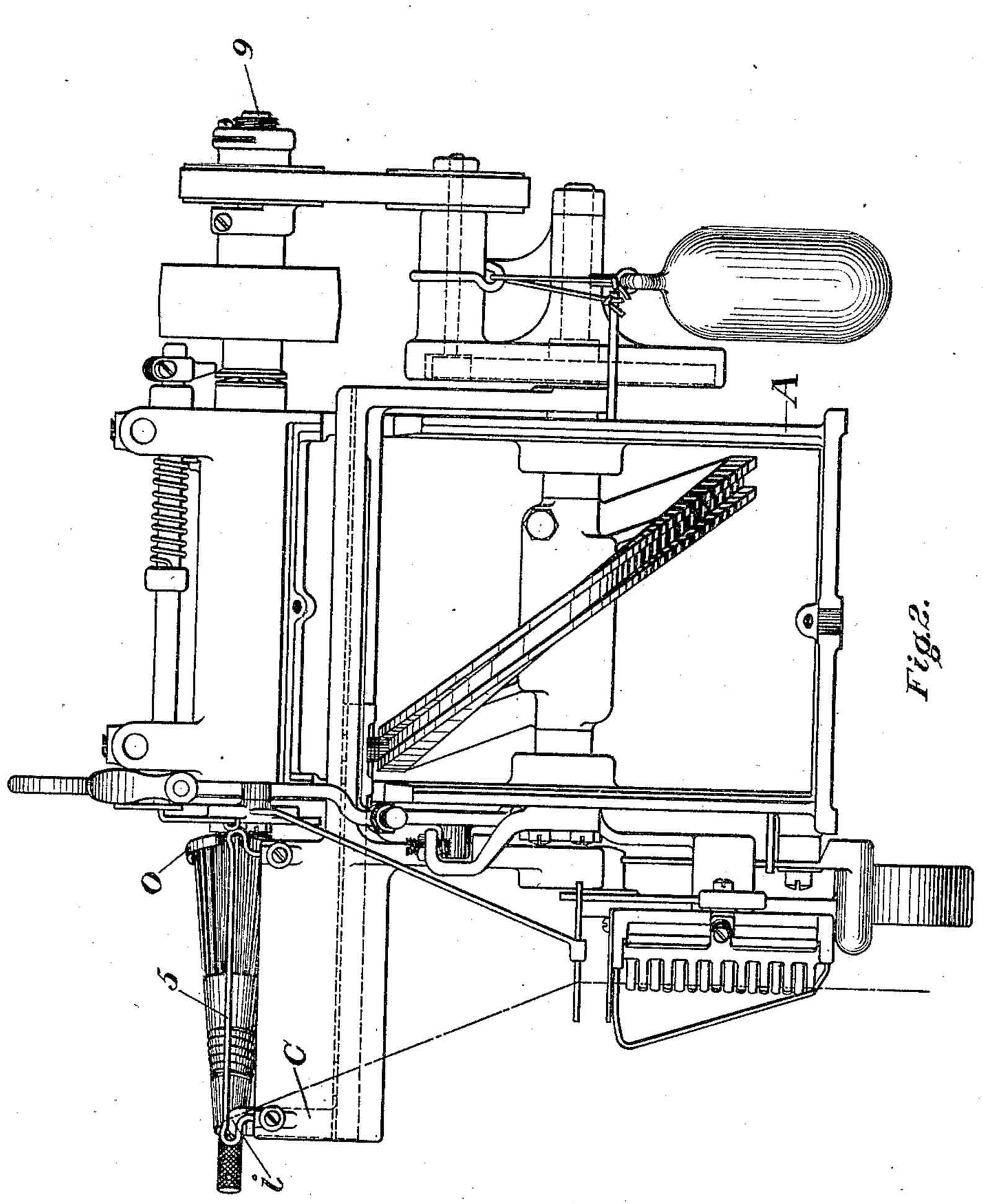

Fig. 2.

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3 Sheets—Sheet 3.

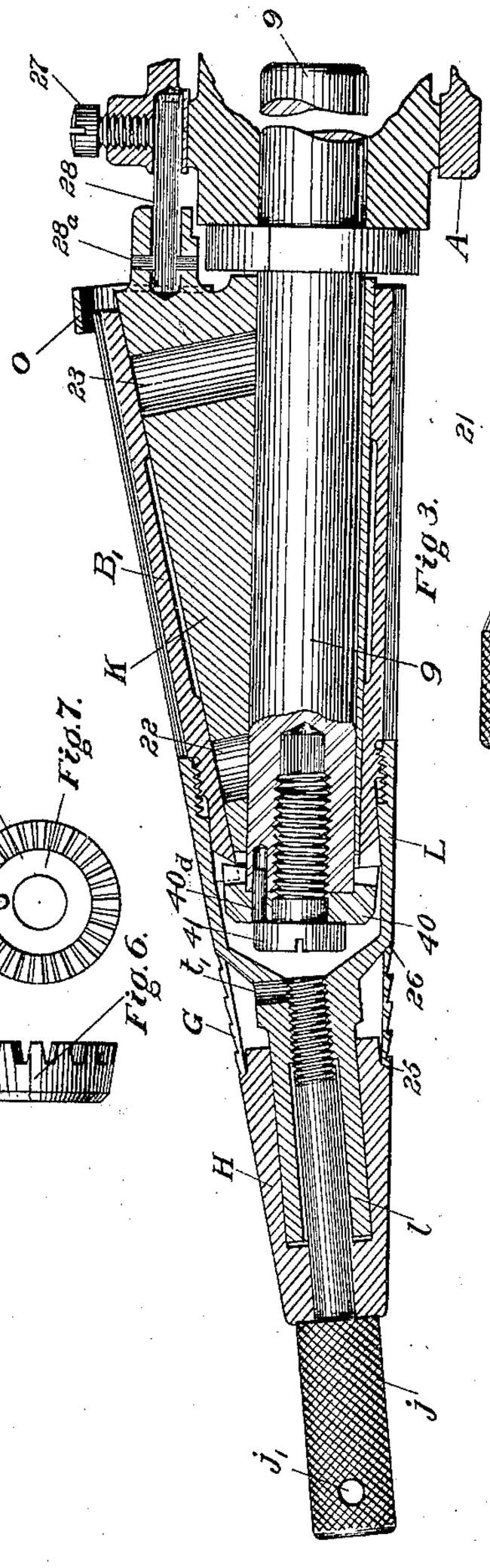

Fig. 3.

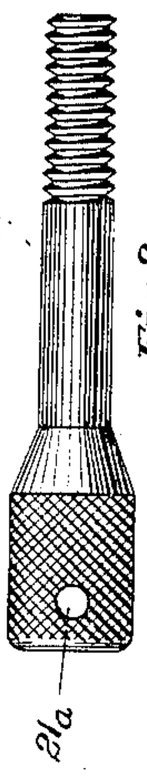

Fig. 8.

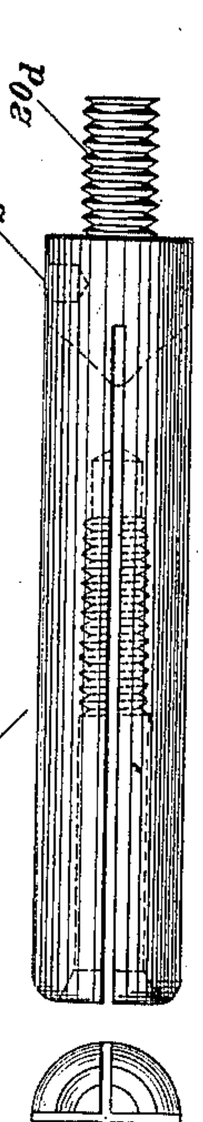

Fig. 4.

Fig. 5.

Fig. 6.

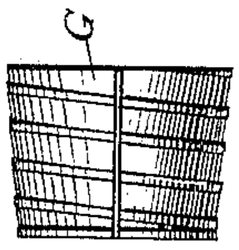

Fig. 9.

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UNITED STATES PATENT OFFICE.

SIMON W. WARDWELL, JR., OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE UNIVERSAL WINDING COMPANY, OF PORTLAND, MAINE.

WINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 652,572, dated June 26, 1900.

Application filed April 18, 1899. Serial No. 713,501. (No model.)

To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, Jr., a citizen of the United States, residing in the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Winding-Machines, of which the following is a specification.

My invention relates to devices for winding conical cops and to providing means whereby a winding-machine may be readily adapted to wind either cylindrical or conical packages and for securing the paper cone or tube on which the material is wound in place, to which end I construct the parts as fully described hereinafter and shown in the accompanying drawings, in which—

Figure 1 is a front view of a winding-machine with my new coning device attached. Fig. 2 is a side view of the same. Fig. 3 is a sectional view of the coning device, taken on line 7 7. Fig. 4 is a view of an attachment for adapting the cone-spindle for winding cylindrical packages. Fig. 5 is an end view of same. Figs. 6, 7, 8, and 9 show details of the construction.

The coning device is similar to the one described in Patent No. 562,263 in that it is supported on the winding-spindle with its axis so inclined thereto in a horizontal plane that the element of the cone along which the traversing guide travels is parallel to the line of travel of said guide. I have, however, made improvements in the structure set forth in said patent—notably, in providing improved means for securing in place the paper cone or tube on which the material is wound, in providing means for taking up the wear between the tube-carrier and its bearing, in the arrangement of the gearing, and in other features which will be indicated in the specification.

I preferably describe my invention as applied to a machine such as is described in Letters Patent Nos. 536,672 and 567,871, in which the winding-spindle and the traversing guide are so connected that the relative speed of the two can be adjusted for the size of material to be wound. As the structure of these machines has been fully set forth in the Letters Patent above referred to, I will not repeat a description of them, but will confine myself to a description of the devices referred to in this specification.

Upon the rotating spindle 9 is temporarily supported the cone member or bearing K, prevented from turning with or about said spindle by means of the pin 28, extending into a hole in the frame A of the winding-machine and fastened therein by means of the screw 27. In order that the pressure of the screw 27 upon the pin 28 shall not force the member K against the winding-spindle, thereby causing undue friction, I pivot said pin to the bearing K by a pin 28^a, so as to move slightly on the pin 28^a to and from the winding-spindle.

The axis of the member K does not correspond with that of the spindle 9, but is inclined thereto at such an angle that each element of the cone-tube or of the cone-package being wound shall when rotated between the spindle and the traversing guide *i* be substantially parallel to the line of travel of said guide.

Upon the bearing K is carried and rotates the conical sleeve or tube-carrier B, driven from the spindle 9 by means of an internal bevel or crown gear 40, which is attached to the spindle by means of the screw 41 and the dowel-pin 40^d. The teeth of the pinion mesh with corresponding teeth in the sleeve B equal in number to those in the pinion, so that the sleeve B makes the same number of rotations as the spindle.

To permit the sleeve B to run freely and smoothly without excessive play and to adjust it to take up wear, the member K is pushed toward the pinion 40 until the play is eliminated and is held firmly against longitudinal movement by means of the pin 28 and the screw 27, which extends through an opening in the frame and bears on an inclined face or seat on the side of the said pin. This inclined seat is provided because in pushing the cone tubes onto the carrier B the tendency is to force the bearing K away from the pinion, thereby causing or increasing play between the sleeve B and the member K. With the pin beveled, as indicated, it is impossible to force the member K back without first loosening the screw 27. Other means to effect this result may be employed.

To insure that the bearing-surfaces be-

tween the spindle 9, the sleeve B, and the member K shall be maintained well lubricated, I provide in the member K suitable chambers 22 and 23, which are filled with an absorbent adapted to retain a quantity of oil and deliver it to the bearing-surfaces as needed. Oil is introduced into the device through a suitable hole, as the hole *t* in the stem *l* of a detachable cap L, which is suitably adapted to the tube-carrier and constitutes a prolongation thereof. As the coning device rotates the oil works back through the gearing, along the spindle 9, and between the member K and the tube-carrier B, lubricating the surfaces and replenishing the oil-chambers. As some of the oil will work out at the rear or base of the carrier B, I provide a guard O, which serves to intercept any drops which may be thrown off by the centrifugal action which is incident to the high speed at which the tube-carrier B rotates. This is a very desirable feature, inasmuch as the winding-machines are set side by side, and any oil thrown from one winding-spindle will spatter and damage the package being wound on the spindle next adjoining.

The outer surface of the tube-carrier B is provided with longitudinal corrugations to hold the paper cone tube from slipping rotatively. To prevent the tube from slipping longitudinally, I use the split ring G, encircling the tube-carrier or otherwise arranged and circumferentially corrugated or otherwise provided with a retaining-surface and adapted to be expanded. A sleeve H is adapted to slide on a stem *l* of the cap L and is adjusted thereon by means of the screw *j*, adapted to an internally-threaded axial hole in said stem. The cap L at 26 and the sleeve H at 25 have suitably-beveled bearing-faces to correspond with an internal taper or bevel at each end of the split ring G, so that the ring can be expanded or contracted by changing the relative positions of the bearing-faces.

I do not limit myself to a corrugated ring, though a ring provided with a continuous spiral corrugation, as shown, is preferably adapted by use. The object of this corrugation is to adapt the ring to make a firmer contact with the paper tube. This can be attained in several ways—as, for instance, by making a ring with a knurled surface or by forming on the surface a series of circular rings.

The screw *j* is provided with a knurled head which, abutting the end of the sleeve H, advances the latter along the stem *l*, thereby expanding the split corrugated ring G and imparting to it at the same time a slight linear movement toward the base of the cone. As the ring expands the tops of the projections or corrugations are forced into the tube, and the linear movement of the ring tends to press the tube more firmly upon the longitudinal corrugations. When the screw *j* is loosened, the ring G contracts, due to its elasticity, forcing back the sleeve H and leaving the tube on the package wound free to be removed.

When the coning device is in operation, the end of the screw *j* obstructs the oil-hole *t*, so that no oil can leak out. When it becomes desirable to oil the device, the screw *j* is withdrawn sufficiently so that the split ring may be drawn back to uncover the oil-hole *t* and render it accessible.

The new arrangement of gearing herein described is greatly superior to that previously employed in that larger and stronger gears can be used, reducing backlash and the extent of play at the periphery of the package. Furthermore, when, with the previous construction, the teeth of the gears became damaged it was necessary to replace the whole spindle 9. With the present construction it is necessary to replace only the pinion 40 or the tube-carrier B, either of which is a less expensive piece than the spindle 9.

When desired, the same machine can be readily adapted to wind cylindrical packages as follows: A tube-holder for cylindrical tubes is secured by extending the spindle 9. One means consists in the use of a section 20, Fig. 4, adapted to be suitably attached to the spindle 9, as by means of a screw portion 20^d, which fits the hole provided for the pinion-screw 41. The arrangement for holding the tubes is a part of the section 20 and is of a construction commonly employed—that is, the end of the holder is split and adapted to be expanded by means of a screw 21. A hole 20^a is provided for a suitable wrench, whereby the tube-holder can be turned to bind it securely to the spindle 9.

While I have shown the parts H G *j* in connection with the other parts, the latter may be used alone or with other means for prolonging the holder and for securing the cone-tube thereon.

Without limiting myself to the precise construction and arrangement shown, I claim—

1. The combination in a winding-machine, of a winding-spindle, a cone-tube carrier, means for driving said tube-carrier from the spindle, and a bearing for said tube-carrier adjustable longitudinally on the spindle, and means for securing the bearing after adjustment and for holding it from rotation, substantially as set forth.

2. The combination in a winding-machine, of a winding-spindle, a cone-tube carrier connected to be driven from said spindle, a conical bearing for said tube-carrier supported on the spindle, and a pin flexibly attached to said bearing and longitudinally adjustable on the frame of the machine, and affording means for retaining the tube-carrier in its longitudinal position on the spindle, substantially as set forth.

3. The combination in a winding-machine, of a winding-spindle, a cone-tube carrier connected to be driven from said spindle, a conical bearing for said tube-carrier supported on the spindle, and a pin, flexibly attached

to said bearing, and provided with an inclined seat, and a screw bearing on said seat, substantially as set forth.

4. The combination in a winding-machine, of a winding-spindle, a cone-tube carrier, a non-rotatable conical bearing for said cone-tube carrier supported on the spindle so as to be longitudinally movable thereon, and means for retaining the bearing in position on the spindle after longitudinal adjustment, and for rotating the carrier on the bearing, substantially as set forth.

5. The combination in a winding-machine, of a winding-spindle, a cone-tube carrier, a cone-bearing for supporting the cone-tube carrier, means for supplying oil between the two, and an oil-guard at the large end of the cone-tube carrier, substantially as described.

6. The combination in a winding-machine, of a winding-spindle, a cone-tube carrier having longitudinal corrugations and constructed to be expanded at one point and provided with circumferential corrugations at said point, means for expanding and contracting the part of the device having circumferential corrugations, and means for connecting said tube-carrier to turn with the spindle about an axis at an angle to that of the spindle, substantially as set forth.

7. The combination in a cone-tube holder, of means for preventing the tube from slipping rotatively, a split ring adapted to engage with said tube, and means for expanding said ring and imparting thereto a linear movement to force the tube against the holder, substantially as set forth.

8. The combination in a winding-machine, of a winding-spindle turning in fixed bearings, means for positively driving said spindle, a traversing guide traveling parallel to the axis of said spindle, and means whereby said winding-spindle can be adapted to retain and wind either cylindrical or conical packages, substantially as set forth.

9. The combination in a winding-machine, of a winding-spindle and a traversing guide traveling parallel to the spindle, the spindle constructed to receive parts adapted to support either cylindrical or conical cop-tubes, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SIMON W. WARDWELL, JR.

Witnesses:
EDWIN C. SMITH,
THOMAS M. CHILDS.