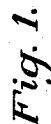


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4 SHEETS—SHEET 1.



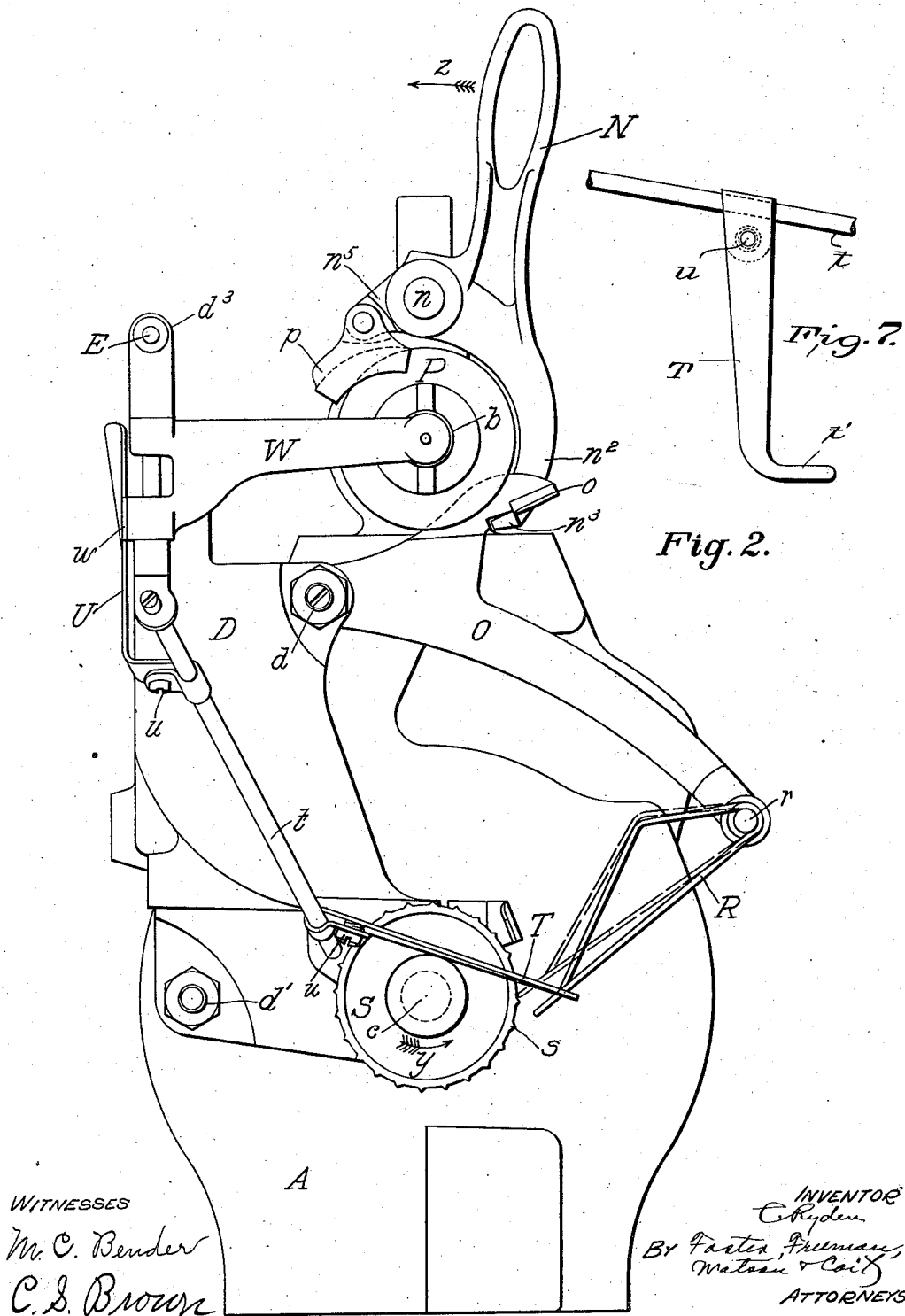
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C. RYDEN.
WINDING MACHINE.
APPLICATION FILED OCT. 5, 1910.

1,028,609.

Patented June 4, 1912.

4 SHEETS—SHEET 2.



WITNESSES

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4 SHEETS—SHEET 3.

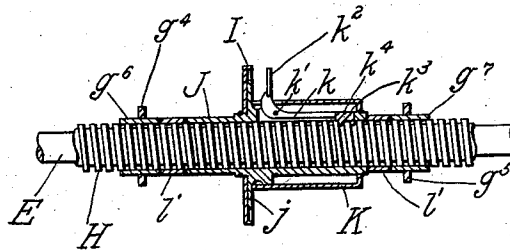


Fig. 4.

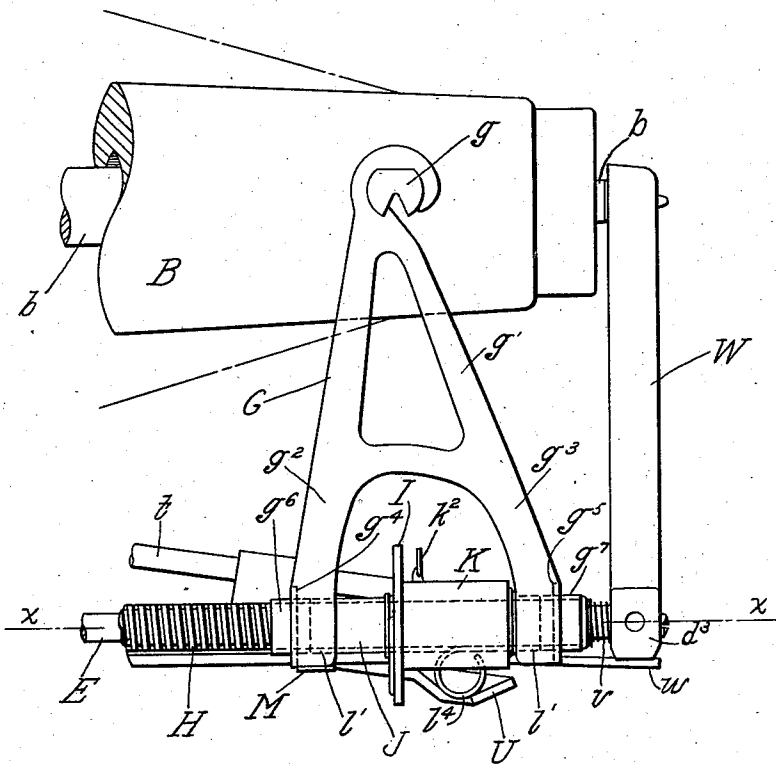


Fig. 3.

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4 SHEETS—SHEET 4.

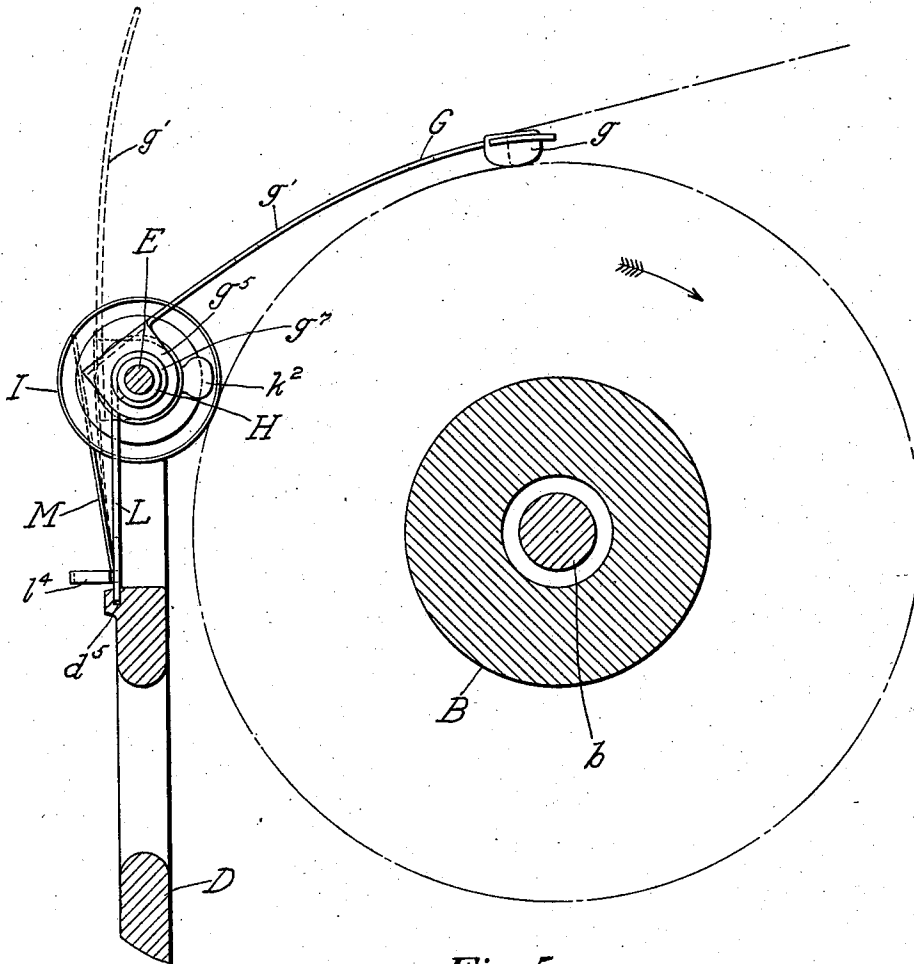
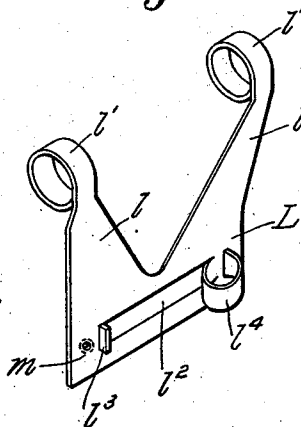


Fig. 5.

Fig. 6.



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WINDING-MACHINE.

1,028,609.

Specification of Letters Patent.

Patented June 4, 1912.

Application filed October 5, 1910. Serial No. 585,451.

To all whom it may concern:

Be it known that I, CLAES RYDEN, a citizen of the United States, residing at Providence, in the county of Providence and 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 winding machines for winding cops or bobbins and particularly to that class of machines in which an oscillating thread-guide bears on the conical surface of the winding and advances progressively along the axis of the winding spindle.

My invention consists of improvements in the thread-guide mechanism and has for its object to provide means for effecting a smooth, even feeding movement of the guide along its traverse rod and for applying pressure to the guide to maintain its delivering eye in constant contact with the winding.

The essential features of the invention are fully described in the following specification, illustrated by the accompanying drawings, in which:—

Figure 1 is a front elevation of the main portion of a winding machine showing my improved thread-guide mechanism applied thereto; Fig. 2, an enlarged end elevation of the same; Fig. 3, an enlarged plan view of the thread-guide mechanism; Fig. 4, an enlarged sectional view of the guide-feeding mechanism, taken on the line $x-x$ of Fig. 3; Fig. 5, an end elevation of the thread-guide mechanism, with the supporting bracket and bobbin mandrel shown in section; Fig. 6, an isometric projection of the thread-guide slide or runner; Fig. 7, a detail view of the lever T.

The machine in general is of well known type of construction and comprises the main frame A carrying bearings for the horizontal shaft b and c . The shaft b overhangs the front of the frame and serves as a winding spindle for carrying the tube or bobbin B on which the yarn is wound. The shaft c is arranged below the shaft b and carries a cam C adapted to impart a reciprocatory movement to the thread-guide G. The two shafts b and c are connected to rotate together by a belt or gearing, not here shown, and usually means are provided to regulate

their relative speeds to control the laying of the coils of winding.

Fastened to the front of the frame A is an overhanging bracket D which projects outward opposite to and parallel with the winding spindle. Preferably the bracket D is mounted on the end of the cam shaft c and bolted to the frame at d and d' . Secured in bearings d^2 and d^3 at either end of the bracket D is a horizontal traverse-bar or rod E on which the thread-guide G and its correlated mechanism is mounted.

The bracket D has an extension d^4 reaching in toward the cam C and formed with a bearing for the pivoted lever or rocker-arm F. The lower arm f of the lever F extends downward adjacent the cam C and at its end carries a stud or roll f^2 which engages the groove in the periphery of the cam. The upper arm f' of the lever F is connected by a link h to a sleeve H which slides on the traverse-rod E and is traversed back and forth by the movement of the cam C. The sleeve H is formed with screw-threads on its periphery and carries the thread-guide G, the latter being provided with means to engage the threads to advance the guide along the sleeve. These means comprise a friction progression-wheel I adapted to be rotated by contact with the winding and acting to feed the guide progressively along the winding spindle during the winding of the bobbin.

The guide-advancing mechanism is shown in detail in Fig. 4 and consists of the following arrangement:—Adapted to slide on the threaded sleeve H is a bushing J having a flange j to which the progression or contact wheel I is secured. Surrounding the bushing J is a cylindrical thimble or casing K which incloses a pawl k . The pawl k is pivoted at k' in a slot in the bushing J and one arm k^2 extends upward through an opening in the casing K. The arm k^2 is formed at its end with a flat finger-piece through which it is operated manually. The other arm of the pawl k terminates in a segmental head k^3 formed with partial screw-threads adapted to engage the threads on the sleeve H. A spring ring k^4 , held in a groove in the bushing J, bears on the top of the segment k^3 and normally retains the latter with its threads in engagement with the threads on the sleeve H. It

will be understood that when the arm k^2 of the pawl k is pressed toward the flange j the segment k^3 will be lifted from engagement with the threads on the sleeve H and the bushing J can then be slid along the sleeve; but when the machine is operating, the pawl k is in engagement with the threads of the sleeve and hence, when the wheel I is turned through contact with the winding, the bushing J will be caused to feed along the sleeve.

Referring now to Figs. 1 and 6 I provide a bifurcated member L formed with two legs l, l , having their ends curled up at l', l' to surround the sleeve H, and adapted to straddle the bushing J. The member L acts as a guiding runner and reaches down to the bracket D with its lower edge adapted to slide in a longitudinal slot d^5 formed in the upper horizontal arm of said bracket, see Fig. 5. The thread-guide G consists of a slotted button g held in the end of the arm g' which is mounted to oscillate on the traverse-rod E. The arm g' is preferably constructed of sheet metal shaped like the letter A and having the legs g^2 and g^3 swiveled on the sleeve H. As shown in Figs. 3 and 5 the extremities of the legs g^2 and g^3 have ears g^4 and g^5 bent down at right-angles to the main portions and pierced with holes in which are secured the bushings g^6 and g^7 . The inner ends of the bushings g^6 and g^7 abut the ends of the portions l', l' on the runner L and the three elements, guide G, bushing J and runner L, are thus assembled to move in conjunction. Fastened at m on the runner L is a flat spring M which reaches up and bears on the end of the leg g^2 of the thread-guide arm g' , see Figs. 1, 3 and 5. As illustrated in Fig. 5, the spring M acts to control the swinging movement of the arm g' . When the arm g' is in the position shown by full lines the pressure of the spring M tends to rock the arm to move the guide g down toward the axis of the winding spindle b . The cop or bobbin is wound on the tube B in the form indicated by the dot-and-dash lines in Fig. 1, and the thread-guide g traverses up and down the incline of the conical nose end of the bobbin. The arm g' oscillates up and down on the axis of traverse-bar E to allow this movement of the guide. The spring M pressing on the end of the guide-arm g' keeps the guide g constantly in contact with the conical surface of the bobbin and the coils of yarn are thus disposed regularly and systematically on the nose of the bobbin. In piecing-up or repairing breaks in the yarn it is more convenient to move the guide away from the bobbin in order to locate the broken end. When this is required the arm g' is swung up to the position shown by dotted lines in Fig. 5, and the spring M will then engage the flat side of the leg g^2 of the guide-arm and main-

tain the guide raised away from the bobbin until the machine is ready to operate again. The arm g' is then simply pressed downward by the operator until the guide g bears on the bobbin and the spring M exerts a yielding pressure on the arm to maintain the guide in constant contact with the winding.

The runner L has a slot l^2 running longitudinally of its lower edge and at one end the metal is bent up to form the lug l^3 , see Fig. 6, which abuts the side of the spring M and serves to hold the latter against side play. The greater portion of the metal cut away from the slot l^2 is curled up at l^4 to form a projection adapted to coact with the stopping mechanism of the machine to cause the arrest of operation of the latter when the bobbin is completed. The arrangement and method of operation of the stopping device is as follows:

Referring to Fig. 2, the operation of the machine is controlled through a starting handle N. The handle N is mounted on a rocker-shaft n which is connected at the rear end of the machine to the clutch- or belt-shifting devices which control the driving-mechanism. These devices may be of any usual construction and are not here shown or described since they are familiar to those versed in the art and form no part of the present invention. The handle N has a downwardly extending arm n^2 formed at its end with a detent shoulder n^3 . This shoulder engages a corresponding shoulder o on a lever O which is pivoted at d on the frame of the machine. The rocker-shaft n is operated by a spring or other suitable means, not here shown, to move the handle N in the direction indicated by the arrow z and such movement disengages the driving mechanism to arrest the operation of the machine. An arm n^5 on the handle N carries a brake-shoe p which is adapted to bear on the disk P on the spindle b to brake the latter after the driving devices are disconnected. When the machine is operating, the handle N is held in the position illustrated in Fig. 2 by the engagement of the detent shoulders n^3 and o . By raising the lever O the detents are released to allow the handle N and shaft n to move to stop the machine as just described. The lever O is moved by the following described instrumentalities: Pivoted at r on the lower end of the lever O is a trip-lever R reaching down toward the cam-shaft c . Mounted on the end of the cam-shaft and rotating therewith is a wheel or disk S formed with teeth s on its periphery. The wheel S rotates in the direction indicated by the arrow y and when the lever R is raised to engage the teeth s , as shown by dash lines in Fig. 2, the turning of the wheel acts to force the lever outward to raise the lever O. This

disengages the detents n^3 and o and releases the handle N. Normally the trip-lever R is maintained out of range of the wheel S through gravity and its end rests on an off-set toe t' at the end of the lever T, see Figs. 2 and 7. The lever T is secured at its opposite end to a rod t , see Figs. 1 and 2, which rocks in bearings in the frame D. Adjustably secured to the rod t by the screw u is an arm U reaching up in the path of the runner L. The upper end of the arm U is twisted or bent to form a beveled surface adapted to be engaged by the rounded projection l^4 on the runner L. The arm U is adjusted along the rod t according to the length of bobbin to be wound on the spindle b and as the guide G feeds along sleeve H the runner L eventually reaches a point opposite the arm. As the guide G moves outward in its traverse the projection l^4 engages the beveled face of the arm and rocks the latter outward to turn the rod t and lift the lever T to engage the lever R with the wheel S.

As before stated, the bracket D serves as a support for the traverse-rod E and adjacent the bearings d^2 and d^3 are coiled springs v, v which act as buffers for the ends of the sleeve H as the latter reciprocates back and forth on the rod. The bracket D also carries an outboard bearing for the end of the spindle b to support the overhanging portion of the latter. This consists of a hinged arm W, see Fig. 2, which has a conical bore adapted to fit the tapered end of the spindle. A flat spring w is fastened to the bracket at w' and its end bears on the flat edge of the arm, see Fig. 1, to hold the latter in position. The arm W can be swung away from the end of the spindle to allow the bobbin tube to be placed in position and for doffing the bobbin when the latter is completed.

The operation of the whole machine is as follows: The bobbin tube B is placed on the spindle b and the bearing arm W snapped over the end of the latter. The guide G is next adjusted to a position at the inner end of the traverse-rod E by releasing the pawl k and sliding the bushing J along the sleeve H. The thread-guide button g will then bear on the conical face B' of the tube B with the spring M tending to maintain it in contact therewith. The throw of the cam C is arranged to give a traverse to the thread-guide equal in length to the tapered portion B' of the tube B and as the guide reciprocates back and forth, under influence of the movement of the lever F, a layer of yarn is wound on the conical face of the tube. As this layer of yarn is completed the progression wheel I traversing back toward the point of greatest diameter of the winding contacts with the surface of the yarn and a slight rotative impetus is im-

parted to the wheel. This turns the bushing J and, as the pawl k is in engagement with the screw-threads on the sleeve H the bushing and its correlated parts are advanced along the sleeve. The feeding of the thread-guide along the winding spindle is continued intermittently and the layers of winding advance progressively outward along the bobbin tube. The bobbin thus grows by longitudinal extension and when completed is of a familiar form having a cylindrical body and conical delivery end or nose, as illustrated by dot-and-dash lines in Fig. 1.

As previously explained the arm U can be adjusted in position along the rod t so that it is engaged by the slide L at a predetermined point in the winding, according to the length of bobbin required. When this engagement takes place the arm U is tilted to rock the rod t and lift the lever T to operate the stopping mechanism of the machine as before described.

The novel and essential feature of my invention which shows improvement over previous devices consists of the arrangement of the slide or runner L which guides the movement of the thread-guide and guide-advancing devices, and through which pressure is applied to the guide to maintain the latter in contact with the winding. In previously used devices of this type the thread-guide arm which supports the guide button has been arranged to straddle the nut or bushing on which the contact wheel is mounted. With such an arrangement there must necessarily be friction between the two elements and this prevents a free and easy rotation of the progression wheel. The wheel I must be operated from a very slight contact with the winding, as otherwise the pressure against the bobbin will chafe and abrade the yarn. To prevent hindrance to the turning of the wheel I interpose the bearings, l, l of the runner L between the ends of the bushing J and the bushings g^6 and g^7 of the guide-arm g' . The arm g' has a constant oscillatory movement as the guide rides up and down the incline of the winding surface and in previously known devices, where the arm is arranged to bear against the ends of the nut or bushing J, this movement has a tendency to influence the turning movement of the contact wheel. In some cases the guide-arm will bind the wheel bushing and prevent its turning and such interference prevents the proper feeding of the tread-guide. If the guide does not move regularly and evenly along the traverse-bar the layers of winding will not be properly formed and the bobbin will be imperfect. In other words, where the feeding of the guide is hindered the layers of yarn will be unevenly spaced and the surface of the bobbin will have hollows and

ridges. A bobbin malformed in such a way will not deliver the yarn freely in unwinding and hence cannot be used to advantage in the transferring processes for which it is intended. In my new device the slide L is held from turning on the traverse-bar by the guiding groove in the bracket D and hence its bearings on the sleeve H are fixed rotatively in relation to the bushing J so that the latter is not cramped or held from free rotation. A further improvement of my arrangement is the means on the runner L for applying pressure to the guide. Heretofore, it has been necessary to provide a bearing-bar pivoted on the traverse-bar and arranged to bear on the guide arm through the use of springs or weights. The spring M takes the place of such a pressure device and besides being exceedingly simple in arrangement and of cheap construction it also acts automatically to hold the guide away from the winding in piecing up and therefore provides for greater convenience in operating the machine.

It will be evident that various modifications might be made in the structure and arrangement of my new device without departing from the spirit or scope of the invention.

Therefore, without limiting myself to the precise construction shown and described, what I claim is:—

1. In a winding machine, the combination with the winding spindle, of a screw-threaded traverse-bar arranged opposite said spindle, a thread-guide mounted on the bar, means to reciprocate the thread-guide, a bushing adapted to feed the guide along the bar, a progression wheel mounted on said bushing and adapted to contact with the winding to turn the bushing, and a slide having bearings on the bar abutting the ends of the bushing, said slide arranged to move with the bushing but held from turning on the bar.

2. In a winding machine, the combination with the winding spindle, of a screw-threaded traverse-bar arranged opposite said spindle, a thread-guide mounted on the bar, a bushing adapted to rotate to feed the guide along the bar, a slide having bearings on the bar abutting the ends of the bushing, and means to hold the slide from turning on the bar.

3. In a winding machine, the combination with the winding spindle, of a screw-threaded traverse-bar, a thread-guide mounted on the bar, a bushing rotatable to feed the guide along the bar, a slide having bearings on the bar abutting the ends of the bushing, and guiding means arranged to allow the slide to move along the bar while preventing it from turning on the latter.

4. In a winding machine, the combination with the winding spindle and screw-thread-

ed traverse-bar, of a thread-guide mounted on the bar, a bushing to feed the guide along the bar, a slide having bearings on the bar abutting the ends of the bushing and formed with a runner portion, and means adjacent the bar formed with a guiding track for the runner portion of the slide.

5. In a winding machine, the combination with the winding spindle and screw-threaded traverse-bar, of a bracket having bearings for the traverse-bar and formed with a track running parallel to said bar, a thread-guide mounted on the bar, a bushing to feed the guide along the bar, and a slide having bearings on the bar abutting the ends of the bushing and formed with a runner portion adapted to slide on the track.

6. In a winding machine, the combination with a winding spindle, of a screw-threaded traverse-bar adjacent said spindle, a thread-guide mounted to oscillate on the bar, a bushing to feed the guide along the bar, a slide having bearings on the bar arranged between the bearings of the thread-guide and the ends of the bushing, and means to prevent the slide from turning on the bar.

7. In a winding machine, the combination with the winding spindle, of a traverse-bar adjacent said spindle, a thread-guide having a bifurcated arm formed with two legs terminating in bearings surrounding the bar, a bifurcated slide formed with bearings on the bar abutting the inner ends of the bearings of the thread-guide arm, means to prevent the slide from turning on the bar, a bushing rotatable on the bar between the bearings of the slide, and means whereby the rotation of the bushing feeds the slide and thread-guide along the bar.

8. In a winding machine, the combination with the winding spindle, of a traverse-bar arranged opposite said spindle, a thread-guide having an arm with two separated bearings on the traverse-bar, a slide formed with two separated bearings abutting the inner ends of the bearings of the thread-guide arm, means to guide the slide in its movement along the bar to prevent it from turning on the bar, a bushing on the bar arranged between the bearings of the slide, a contact wheel on said bushing, and means whereby the turning of the contact-wheel causes the bushing to feed the slide and guide along the bar.

9. In a winding machine, the combination with the winding spindle, of a traverse-bar arranged opposite the spindle, a bracket formed with a track extending parallel to the traverse-bar, a slide having separated bearings on the traverse-bar and formed with a runner portion engaging the track, a bifurcated thread-guide arm having bearings on the bar straddling the bearings of the slide, a bushing on the bar arranged between the bearings of the slide, and means

whereby the rotation of the bushing acts to feed the guide and slide along the bar.

10. In a thread-guide mechanism for winding machines, the combination with a traverse-bar, of a sheet-metal slide formed with two separated bearings surrounding the bar, a thread-guide having a bifurcated sheet-metal arm formed with two legs terminating in bearings abutting the outer ends of the bearings of the slide, means to prevent the slide from turning on the bar, a bushing arranged between the bearings of the slide, and means whereby the rotation of the bushing acts to feed the guide and slide along the bar.

11. In a thread-guide mechanism for winding machines, the combination with a member H formed with threads on its periphery, of a bushing J slidable on said member, means on the bushing adapted to engage the threads on the member H, a slide L formed with bearings abutting the ends of the bushing, means to prevent the slide from turning on the member H, and a thread-guide G having an arm g' formed with bearings abutting the outer ends of the bearings of the slide.

12. In a winding machine, the combination with a traverse-bar E, of a sleeve H slidable on the bar and formed with external threads, means to reciprocate the sleeve on the bar, a bushing J on the sleeve H, means on the bushing for engaging the threads on the sleeve, a slide L having bearings on the sleeve abutting the ends of the bushing, means to prevent the slide from turning on the sleeve, and a thread-guide G having an arm g' formed with bearings abutting the outer ends of the bearings of the slide.

13. In a thread-guide mechanism for winding machines, the combination with a traverse-bar, of an oscillating thread-guide having an arm formed with bearings on the bar, a slide formed with bearings adjacent the ends of the bearings of the thread-guide arm, and means on the slide for engaging the thread-guide arm to apply pressure to the latter.

14. In a thread-guide mechanism for winding machines, the combination with a traverse-bar, of a thread-guide mounted to

oscillate on the bar, a slide on the bar, means to prevent the slide from turning on the bar, and means on the slide to apply pressure to the thread-guide to control its oscillating movement.

15. In a thread-guide mechanism for winding machines, the combination with a traverse-bar, of a thread-guide pivoted to oscillate about the axis of the bar, a slide on the bar held from turning on the axis of the latter, and a spring on the slide adapted to apply pressure to the thread-guide to control its oscillating movement.

16. In a thread-guide mechanism for winding machines, the combination with a traverse-bar, of a thread-guide having an arm mounted to oscillate about the axis of the bar, a slide held from turning on the bar, and a spring on the slide adapted to bear on the end of the thread-guide arm to apply pressure to the latter.

17. In a winding machine, the combination with the winding spindle, of a traverse-bar arranged opposite said spindle, a thread-guide having an arm pivoted on the bar to oscillate toward and away from the spindle, a slide held from turning on the bar, and a spring on the slide arranged to bear on the end of the thread-guide arm to force the latter toward the winding spindle and adapted to engage the flat side of the arm to hold the latter away from the winding spindle.

18. In a winding machine, the combination with a winding spindle, of a traverse-bar arranged opposite said spindle, a thread-guide arm pivoted on the bar to oscillate toward and away from the spindle, a slide having bearings on the bar and a runner portion extending below the bar, a track engaging the runner to prevent the slide from turning on the bar, and a flat spring secured to the slide and adapted to bear on the end of the thread-guide arm to control the oscillating movement of the latter.

In testimony whereof I affix my signature in presence of two witnesses.

CLAES RYDEN.

Witnesses:

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EUGENE H. VAUGHN.