

April 22, 1941.

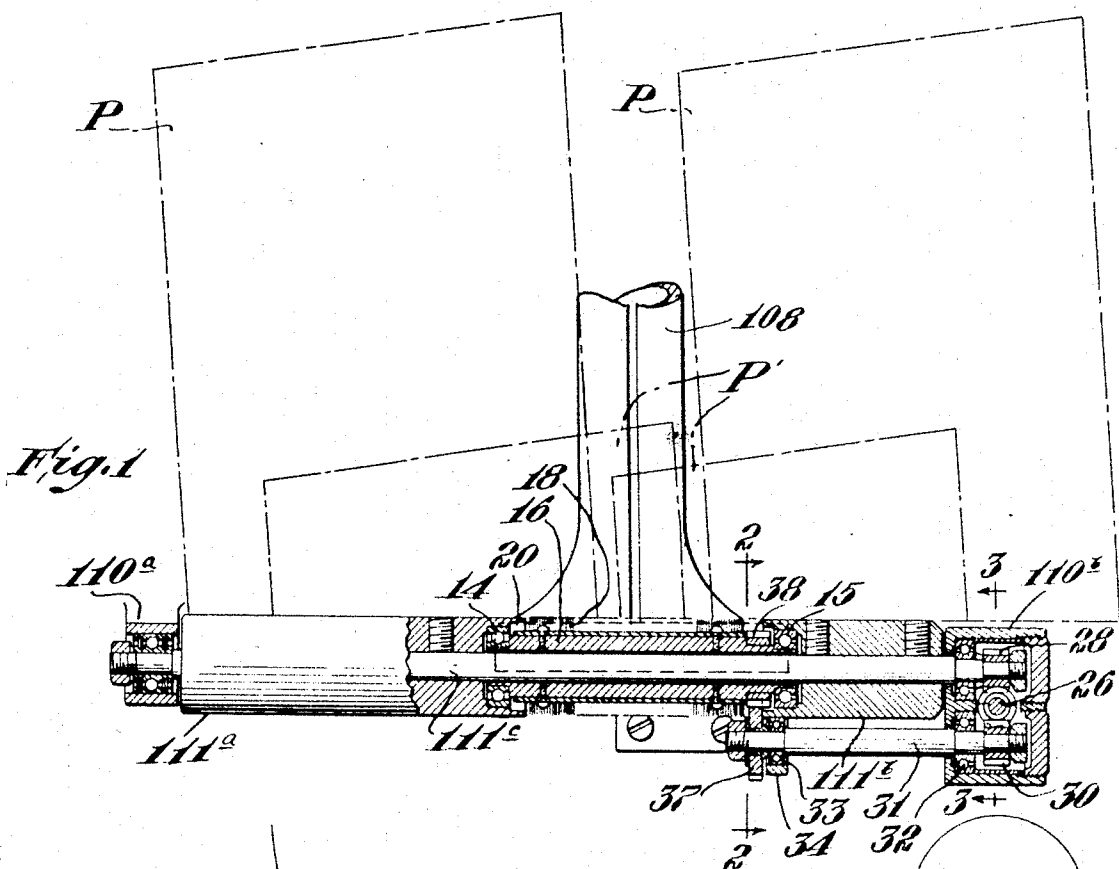
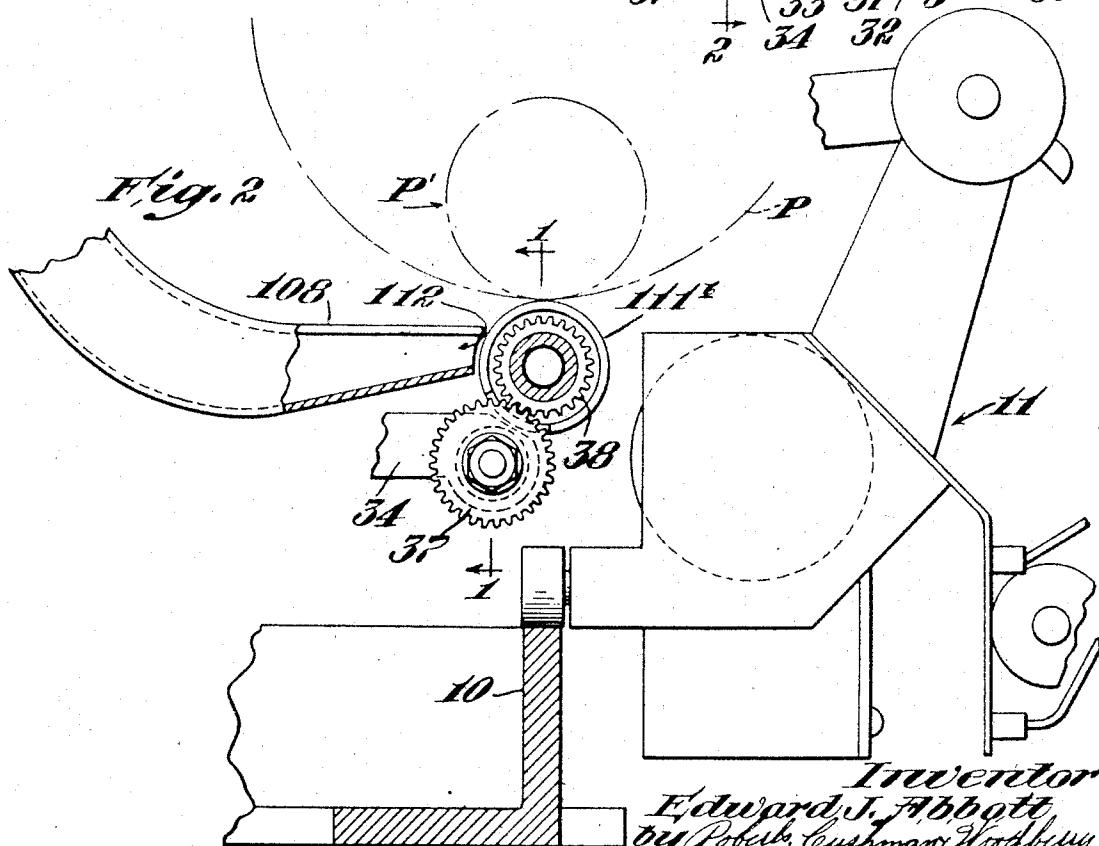
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2,238,923

WINDING MACHINE

Filed Nov. 6, 1939.

2 Sheets-Sheet 1



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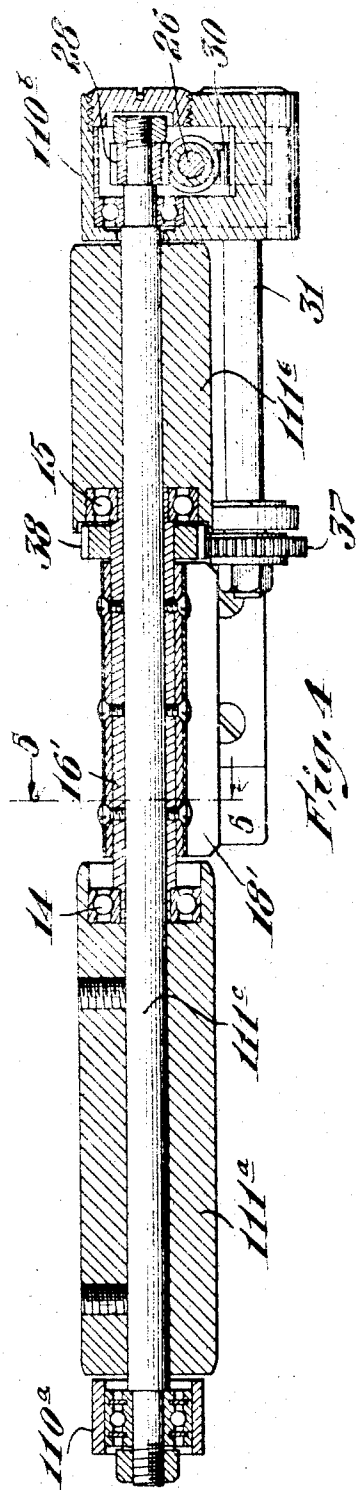


Fig. 1

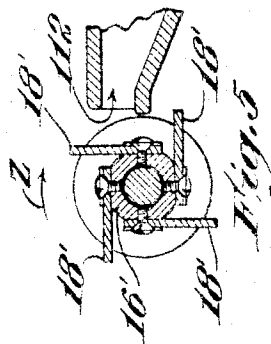


Fig. 5

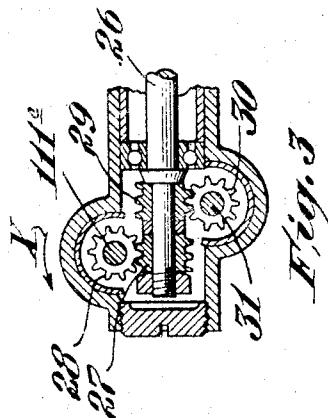


Fig. 3

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UNITED STATES PATENT OFFICE

2,238,923

WINDING MACHINE

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Application November 6, 1939, Serial No. 302,994

16 Claims. (Cl. 242—35.6)

This application is a continuation in part of application Serial No. 240,620 filed November 16, 1938.

This invention relates to winding machines of the type having mechanism for automatically rotating the normally winding package in an unwinding direction, and during such rotation, finding the end of a broken or exhausted yarn on the surface of the winding package. In this operation it is desirable to provide a means for brushing against the surface of the wound package to lift up the end of yarn and detach it from the package, and United States Reissue Patent No. 18,310 discloses one such form of mechanism for simultaneously rotating the package in an unwinding direction and brushing its surface.

United States patent application Serial No. 726,524 filed May 19, 1934, Patent No. 2,177,763, October 31, 1939, discloses an improved form of an automatic winding machine in which the winding packages are conveyed in a procession and, at one end of the machine, are slid onto a reversely-rotating unwinding roll located near the entrance nozzle of the suction tube adapted to carry the end of yarn from the package over to a knoter. United States patent application Serial No. 63,542, filed February 12, 1936, (Patent No. 2,177,680, October 31, 1939) discloses an automatic winding machine provided with end-finding mechanism having a traveling unwinding roll and suction nozzle adapted to move along from one package to the next in a machine in which the packages do not travel. The general type of automatic machine of these two applications, while allowing the packages to be subjected to the end-finding operation in quick succession, has the disadvantage of failing to provide for brushing up the end of yarn lying on the surface of the package. In attempting to provide for brushing up the end of yarn on the surface of the package in a machine of this type the brushing element and the unwinding roll should both be located near the entrance to the suction tube which catches the brushed-up end. Due to the fact that packages of widely varying diameters have to be accommodated by the same end-finding mechanism, it has heretofore been a difficult problem to provide for both an unwinding roll and a brushing element to act simultaneously on the package.

Accordingly the principal object of the invention is to provide an improved and simplified construction of end-finding mechanism in an automatic winding machine, capable of permitting

the use of both an unwinding roll and a brushing element adjacent to the entrance to the suction conduit, and capable of efficiently treating packages of widely varying diameters.

The invention further provides in a preferred embodiment an improved form of brushing element in which the yarn package, turning in an unwinding direction, is brushed by a brush element including a flap of flexible sheet material.

In the drawings:

Fig. 1 is a front elevation of a portion of an automatic winding machine, constructed generally according to the said United States patent application Serial No. 726,524, but showing the unwinding roll of the end-finding mechanism as constructed according to this invention, the unwinding roll being shown in vertical section on the line 1—1 of Fig. 2;

Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a vertical sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view through the axis of a modified and preferred form of the invention; and

Fig. 5 is a vertical sectional view on the line 5—5 of Fig. 4.

In Fig. 1, one of the normally winding packages of almost complete size, is indicated in two successive positions at P, and a smaller less nearly completed package is similarly indicated at P'. In Fig. 2, the upper rail of the track of the machine is indicated at 10 and one of the traveling winding units is indicated in a fragmentary manner at 11, the packages P and P' being shown in outline. It will be understood that the relative motion between the winding package and the end-finding mechanism is such that, for instance, the packages are successively lowered onto the end-finding roll at the right side at Fig. 1, remain on the roll during the end-finding, and then are lifted off near the left end of the roll. The end-finding roll, which may be driven in any convenient manner, for example as described in the above application, consists of two axially spaced portions 111^a and 111^b, each fast on a central shaft 111^c which is rotatably mounted at its opposite ends in bearing housings 110^a and 110^b suitably supported on the frame of the machine.

In the rear of the unwinding roll there is located a slotted suction tube 108 (Fig. 2) having a mouth 112 (also shown in dotted lines in Fig. 1) which lies closely adjacent to the two por-

tions 111^a and 111^b of the unwinding roll, this suction tube 108 serving to draw in and carry over to the bobbin magazine and knotter, the end of yarn unwound by the roll 111^a and 111^b.

In between the two sections 111^a and 111^b of the roll there is rotatably mounted in ball bearings 14 and 15 on the shaft 111^c a roll 16 having a surface-covering of thick plush 18 of which the outer surface has a diameter only slightly smaller than that of the roll portions 111^a and 111^b. The roll portion 111^a is recessed at 20, and the small roll 16 extends within the recessed end portion of roll 111^a so as to prevent yarn from being wound up upon the shaft 111^c.

The plush covering 18 of the central roll 16 thus contacts with the surface of each package almost as soon as the package has begun to be rotated by the roll section 111^b and continues to contact with the package surface after the package slides along onto the roll section 111^a.

This central roll 16 is operated as a brush by driving it in the opposite direction from that of the rotation of the two roll sections 111^a and 111^b. This may be done by any separate drive for the central plush-covered roll 16, but is more easily accomplished by gearing from the driving connections for the roll shaft 111^c, as will now be described.

As shown in Figs. 1 and 3, the shaft 111^c is driven by means of a cross-shaft 26, through a worm 27 and worm-wheel 28, the arrow X in Fig. 3 indicating the direction of rotation of shaft 111^c and roll sections 111^a and 111^b. A second worm 29, driven by cross-shaft 26, drives a worm-wheel 30 fast on a shaft 31, the pitch of the worm 29 and worm-wheel 30 being such that shaft 31 is driven in the same direction as shaft 111^c. Shaft 31 is mounted in a bearing 32 in the housing 110^b and in a bearing 33 carried by a bracket 34 which is attached to the frame of the machine. A gear 37 fast on shaft 31 meshes with a gear 38 fast on the central roll 16, thus driving this central roll in the opposite direction from that of roll sections 111^a and 111^b.

The surface portions of the brush roll 16 and the unwinding sections 111^a and 111^b which act upon the packages are substantially tangential to the packages along substantially the same straight line. The mouth 112 of the suction tube 108, can therefore be located as shown in Fig. 2, close to this common line of tangency, in position to receive the brushed-up yarns from packages of any diameters that may be encountered by the rolls 111^a and 111^b.

The plush-covered surface of the roll 16 need not bear with any substantial force against the yarn package, and good results are secured by having this plush-covered surface of slightly smaller diameter than the roll portions 111^a and 111^b, so that the plush covering merely skims lightly over the surface of the package, picks up the loose end of yarn and throws it back toward the field of action of the suction nozzle. Once the end of yarn is detached from the surface of the package, the continued unwinding of the package by means of roll sections 111^a and 111^b supplies a loop of yarn which is readily drawn into the suction nozzle 112, and thereafter supplies a length of yarn sufficient to travel along the slotted tube to the knotter.

In the modified and preferred form of brush element shown in Figs. 4 and 5 the parts are designated by reference numerals similar to those of Figs. 1 and 2. In Figs. 4 and 5, the roll 16',

corresponding to the roll 16 previously described, is provided with a flap 18' of flexible sheet material, such for example as leather secured tangentially thereto by screws, and arranged to brush against the surface of the package as the roll 16' turns in the direction of the arrow Z and carry the brushed-up end of yarn to the suction nozzle 112. Preferably four such flaps 18' are provided. Where leather is employed for the flaps 18', the fleshy side of the leather is preferably outermost, so as to contact with the package. In this preferred modification, as in that of Figs. 1 and 2, the surfaces of the unwinding roll and brush element are positioned to act on the surface of the package on approximately a common line. Thus packages of various sizes and degrees of taper can be accommodated without change in the relative positions of the roll and brush elements.

I claim:

1. In an automatic winding machine, an end-finding mechanism comprising an unwinding roll for frictionally rotating a wound yarn package in an unwinding direction, and a brush element driven in the opposite direction from the direction of rotation of the unwinding roll and positioned to cooperate with the package being rotated to brush up the end of yarn on the surface of the package, the surfaces of the unwinding roll and of the brush element being positioned to act on the surface of the package on approximately a common line.

2. In an automatic winding machine, an end-finding mechanism comprising an unwinding roll for frictionally rotating a wound yarn package in an unwinding direction, a brush element driven in the opposite direction from the direction of rotation of the unwinding roll and positioned to cooperate with the package being rotated to brush up the end of yarn on the surface of the package, the surfaces of the unwinding roll and of the brush element being positioned to act on the surface of the package on approximately a common line, and a suction nozzle located adjacent to the line of action of the roll and brush to receive the brushed-up end of yarn.

3. In an automatic winding machine, an end-finding mechanism comprising an unwinding roll for frictionally rotating a wound yarn package in an unwinding direction, and a brush element including a flap of flexible sheet material having a surface adapted to contact with the surface of the package, the brush element being driven in the opposite direction from the direction of rotation of the unwinding roll and positioned to cooperate with the package being rotated to brush up the end of yarn on the surface of the package, the surfaces of the unwinding roll and of the brush element being positioned to act on the surface of the package on approximately a common line.

4. In an automatic winding machine, an end-finding mechanism comprising an unwinding roll for frictionally rotating a wound yarn package in an unwinding direction, and a brush element including a plurality of flaps of flexible sheet material each having a surface adapted to contact with the surface of the package, the brush element being driven in the opposite direction from the direction of rotation of the unwinding roll and positioned to cooperate with the package being rotated to brush up the end of yarn on the surface of the package, the surfaces of the unwinding roll and of the brush element being po-

sitioned to act on the surface of the package on approximately a common line.

5. In an automatic winding machine, an end-finding mechanism comprising an unwinding roll for frictionally rotating a wound yarn package in an unwinding direction, and a fabric-covered brush element driven in the opposite direction from the direction of rotation of the unwinding roll and positioned to cooperate with the package being rotated to brush up the end of yarn on the surface of the package, the surfaces of the unwinding roll and of the brush element being positioned to act on the surface of the package on approximately a common line.

6. In an automatic winding machine, an end-finding mechanism comprising an unwinding roll for frictionally rotating a wound yarn package in an unwinding direction, the unwinding roll being in axially spaced sections, and a brush element between the two sections of the unwinding roll, the brush element being driven in the opposite direction from the direction of movement of the surface of the unwinding roll and positioned to cooperate with the package to brush up the ends of yarn on the surface of the package, as the package is rotated by the unwinding roll.

7. In an automatic winding machine, an end-finding mechanism comprising an unwinding roll for frictionally rotating a wound yarn package in an unwinding direction, the unwinding roll being in axially spaced sections, and a rotary brush element, between the two sections of the unwinding roll, the brush element being driven in the opposite direction from the direction of rotation of the unwinding roll and positioned to cooperate with the package to brush up the end of yarn on the surface of the package as the package is rotated by the unwinding roll.

8. In an automatic winding machine, an end-finding mechanism comprising an unwinding roll for frictionally rotating a wound yarn package in an unwinding direction, the unwinding roll being in axially spaced sections and a brush element between the two sections of the unwinding roll and coaxial therewith, the brush element being driven in the opposite direction from the direction of rotation of the unwinding roll and positioned to cooperate with the package to brush up the end of yarn on the surface of the package as the package is rotated by the unwinding roll.

9. In combination in an automatic winding machine having relative traveling movement between a plurality of yarn packages and a replenishing mechanism; a yarn end-finding mechanism comprising axially-spaced roll sections for driving the yarn package in an unwinding direction, a brush element between the roll sections adapted to brush up an end of yarn on the surface of the package, and means for driving the brush element in a direction opposite to the direction of rotation of the package, the roll sections and brush element being so disposed that the said relative traveling movement carries the package axially along both roll sections in order to subject substantially the entire peripheral surface of the package to the action of the brush element.

10. In combination in an automatic winding machine having relative traveling movement between a plurality of yarn packages and a replenishing mechanism; a yarn end-finding mechanism comprising axially-spaced roll sections for driving the yarn package in an unwinding direction, a brush element between the roll sections

adapted to brush up an end of yarn on the surface of the package, and means for driving the brush element in a direction opposite to the direction of rotation of the package, the brush element and roll sections having an approximately common line of action with respect to the package.

11. In combination in an automatic winding machine having relative traveling movement between a plurality of yarn packages and a replenishing mechanism; a yarn end-finding mechanism comprising axially-spaced roll sections for driving the yarn package in an unwinding direction, a brush element between the roll sections adapted to brush up an end of yarn on the surface of the package, means for driving the brush element in a direction opposite to the direction of rotation of the package, the brush element and roll sections having an approximately common line of action with respect to the package, and means located adjacent to said common line of action for receiving the brushed-up end of yarn.

12. In combination in an automatic winding machine having relative traveling movement between a plurality of yarn packages and a replenishing mechanism; a yarn end-finding mechanism comprising axially-spaced roll sections for driving the yarn package in an unwinding direction, a brush element between the roll sections adapted to brush up an end of yarn on the surface of the package, means for driving the brush element in a direction opposite to the direction of rotation of the package, the brush element and roll sections having an approximately common line of action with respect to the package, and a suction nozzle having an opening located adjacent to said common line of action for receiving the brushed-up end of yarn.

13. In an automatic winding machine, an end-finding mechanism comprising means for rotating a wound yarn package in an unwinding direction, a brush element including a flap of flexible sheet material, and means for driving the brush element so that the flap of flexible sheet material brushes against the surface of the rotating package.

14. In an automatic winding machine, an end-finding mechanism comprising means for rotating a wound yarn package in an unwinding direction, a brush element including a plurality of flaps of flexible sheet material, and means for driving the brush element so that the flaps of flexible sheet material brush against the surface of the rotating package.

15. In an automatic winding machine, an end-finding mechanism comprising means for rotating a wound yarn package in an unwinding direction, means for receiving an end of yarn of the thus rotating package, and a brush element including a flap of flexible sheet material driven so as to contact with the surface of the package and carry an end of yarn therefrom to the said receiving means.

16. In an automatic winding machine, an end-finding mechanism comprising means for rotating a wound yarn package in an unwinding direction, a suction nozzle adapted to receive an end of yarn of the thus rotating package, and a brush element including a flap of flexible sheet material driven so as to contact with the surface of the package and carry an end of yarn therefrom to the suction nozzle.

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