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2,018,497

WINDING MACHINE

Filed Nov. 10, 1933

2 Sheets-Sheet 1

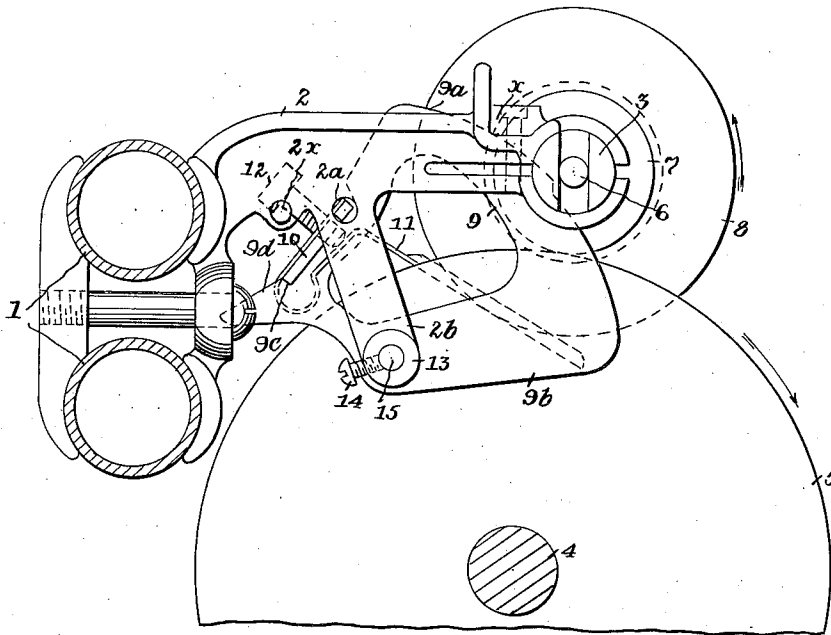


Fig. 1.

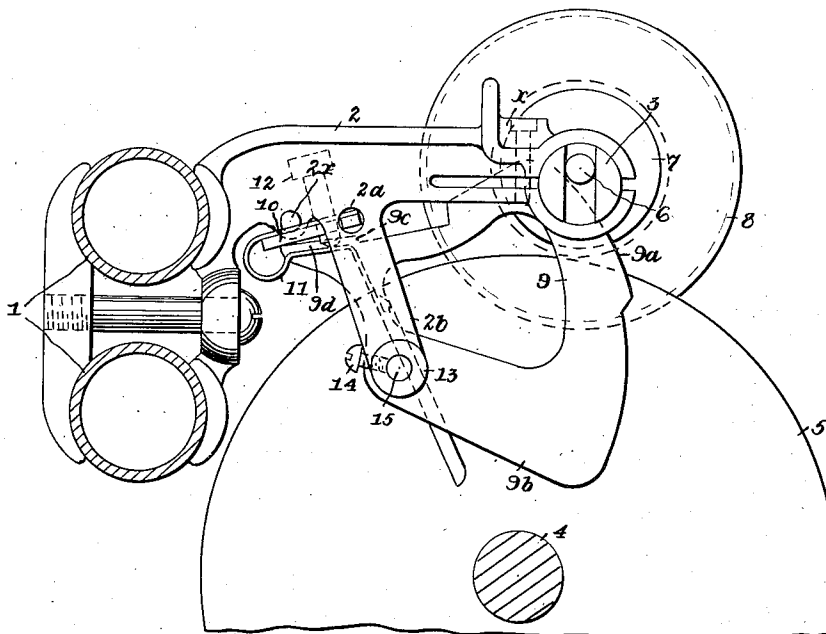


Fig. 2.

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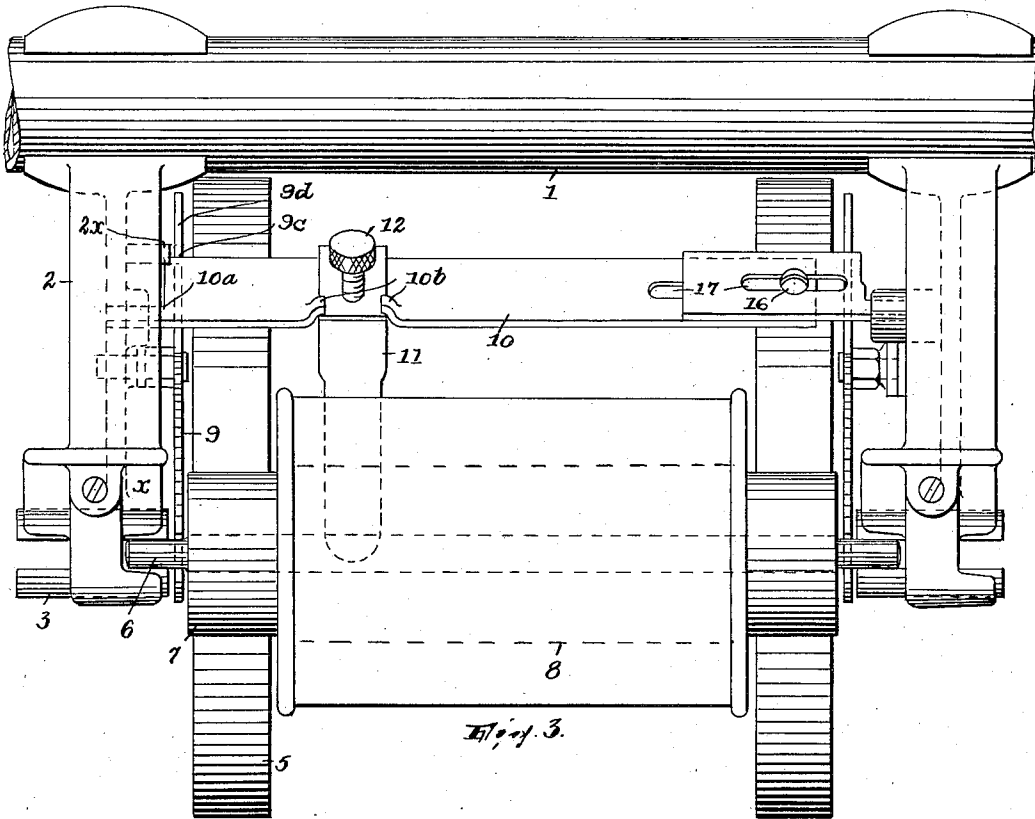


Fig. 3.

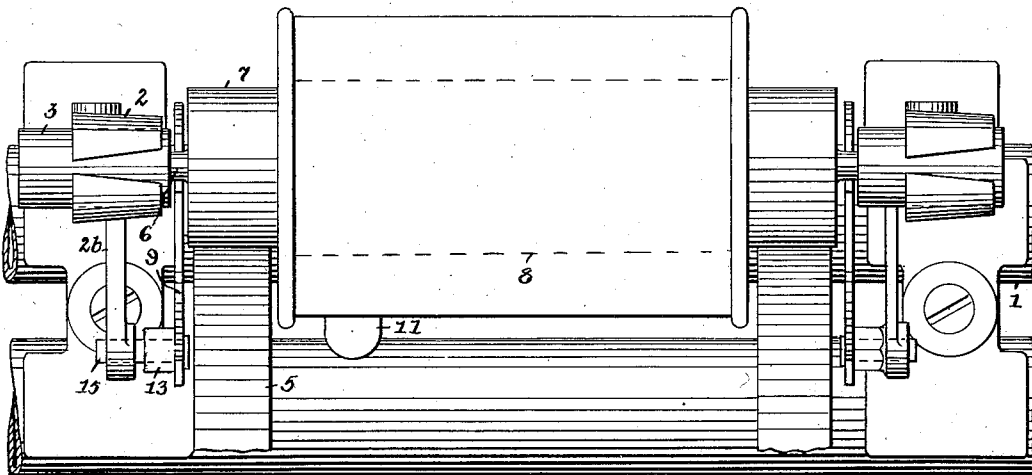


Fig. 4.

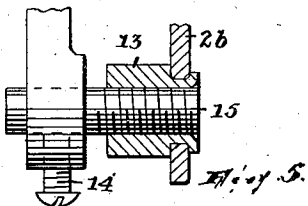


Fig. 5.

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## UNITED STATES PATENT OFFICE

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## WINDING MACHINE

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8 Claims. (Cl. 242—39)

This invention relates to winding machines in which the yarn package is movable away from its rotating driver when its propulsion thereby is to cease, as when the winding is completed or the yarn breaks.

The invention contemplates means for causing movement of the package away from the driver which shall operate without straining or unduly rubbing the yarn and also so as to cause the taking up of any slack in the yarn that usually develops on such movement between the package and the revoluble swift or equivalent supply from which the yarn is drawn; which shall be adapted to be put into action by the growing wound mass when the latter attains a predetermined diameter, that is, when a predetermined extent of yarn has been wound, and for that purpose be possible of adjustment so that any predetermined diameter of the completed mass may be possible; and which shall be simple in construction, readily applicable to conventional and existing winding machines without material change therein, and reliable and efficient in operation.

In the drawings,

Fig. 1 is a sectional view of a winding machine of the class indicated in a vertical plane at one side of one of its core structures and showing the improved means in idle condition;

Fig. 2 is a similar view, showing said means in the condition it assumes for holding said structure displaced from the driver;

Figs. 3 and 4 are, respectively, a plan and a front elevation of what is shown in Figs. 1 and 2 with said means in the position of Fig. 1 and the spool nearly filled; and

Fig. 5 shows a detail.

Let 1 be the fixed horizontal upper and lower bars and 2 the spaced brackets clamped thereto of the frame or fixed structure of a winding machine of the class indicated, said brackets having the slotted guides 3 (substantially as in the Sipp Patent No. 1,631,292) at, as clamped, in their free ends and whose slots here extend substantially vertically. Let 4 be the usual constantly rotated shaft having driving wheels 5 between the brackets and thereby constituting the mentioned driver. And let the spindle 6, whose ends form trunnions engaged in the slots of the guides 3, the whirls 7 thereon (one of which is removable) and the spool 8 on the spindle between the whirls together form the core structure of the package adapted by contact of its whirls with the driver (to wit, with its wheels 5) to be rotated thereby whereby yarn, coming from a rev-

oluble switch or equivalent supply (not shown) and suitably traversed, will be wound on the spool portion of the core structure in layers extending from end to end thereof. The direction of rotation of the driver is as per the arrow in Fig. 1.

Ordinarily, when the yarn being wound breaks or when the mass of windings appears to approximate some predetermined diameter the attendant grasps the package and deposits it, clear of the driver, with its spindle ends resting in sockets, as x, of the brackets. The attendant may strain the yarn in so doing and usually the sudden stopping of the package produces slack between the latter and the yarn supply; moreover the attendant cannot accurately gage just how much extent of yarn is wound on the core structure, in consequence of which in a run of the wound core structure some will carry appreciably more and some appreciably less extent of yarn than intended. When the means of this invention is incorporated in the machine the possible straining of the yarn and its overrunning and the consequent slack therein and all appreciable friction thereon are avoided and a run of wound core structures will be found to carry substantially the same extent of yarn.

Shifters in the form of cam devices, movable on the frame, are adapted by acting upon the core structure to cam it away from and support it clear of the driver. In the example these are segment-shaped levers 9 movable in planes crossing the axis of the core structure and each having a peripheral cam portion 9a arranged on movement of the lever to engage the spindle of said structure to bring into effect their camming action. When the winding starts these shifters are in retracted position (that is, in the example the levers forming them are up, Fig. 1), so that the portions 9a permit the core structure to rest on and thus be driven by the driver; but when rotation of the core structure should cease they are made to assume the position of Fig. 2, where they have cammed the core structure clear of the driver, guided by the slots of the guides 3. In the example, and preferably, the shifters are normally urged, as here by gravity by weighting at 9b the levers forming them, to the position of Fig. 2, being releasably held in the position of Fig. 1 as follows:

An elongated plate 10 has end trunnions 10a journaled in bearings 2a in the brackets and by which it is pivotally suspended, its other or lower long edge engaging (Fig. 1) abutments 9c on the shifters which face in the direction in which

the shifters tend to turn. The plate thus forms a detent, and if this detent be moved clockwise the shifters will be freed to move forward to assume the position of Fig. 2. Inasmuch as gravity tends to urge the plate to vertical position it acts also latch-fashion, i. e., to catch and hold the shifters when they are retracted to the position of Fig. 1. This retraction may be effected by direct manual action, or it may be effected indirectly through the detent or latch whereby both shifters may be returned by a single effort, to wit: The abutment of each shifter forms one side of a salient angle of an arm 9d of the shifter, the other side being coactive cam-fashion with the lower edge of the detent (plate 10). The shifters being down movement of the detent counter-clockwise involves the camming of the shifters by the detent counter-clockwise, and this may continue until the detent assumes obstructing relation to the shifters by coming into engagement with their abutments 9c. In short, the lower edge portion of the detent and the salient angular portion of each shifter form portions coactive with each other on the movement of the detent in one direction first to retract the shifter and then obstruct its forward movement.

The detent has an arm (constituting a part of the lever formed thereby) consisting of a plate-spring 11 one end of which laps the face of the detent opposite to that wiped by arm 9d and is held under lugs 10b thereon and the other end portion of which is rebent to oppose said face of the detent and then bent off so as to be opposite the barrel of the spool 8. The described manual resetting of the shifters at retracted position, as well as the release thereof, may be effected manually by means of this arm as a handle. The arm also serves as a feeler or detector to cause releasing movement of the detent when a predetermined extent of yarn has been wound on the spool and it is adjustable for this purpose as follows: Tapped into the detent is a screw 12 which bears upon the said rebent end portion of the spring 11. By turning this screw and so shifting the arm relatively to the body or plate portion of the detent the distance between the free or feeling end of the arm and the spool barrel in that position of the detent where it holds the shifters retracted may be varied. When a predetermined extent of yarn has been wound on the spool according to the adjustment of the arm the wound mass obviously trips the detent so that the shifters fall and displace and support the wound core structure clear of the driver.

The action of the shifters to displace and support the core structure clear of the driver is always assured by the traction, once established, between the rotating spindle and the cam surfaces 9a. And the minimum of friction between the narrow cam surfaces 9a and the core structure, taken with the fact that the shifters engage the slender trunnion parts of the core structure so that the momentum of the latter remains fully effective, permits the core structure to come gradually to a stop so that any slack that might otherwise form between the core structure and the yarn supply is taken up whenever the stopping occurs with the yarn intact.

Since the camming action is here directly applied to the core structure, that is, not to the yarn mass, and since the latch lever is very sensitive to movement by the wound mass to trip the shifters there is no undue rubbing of the yarn.

The shifters may be fulcrumed as shown in Fig.

5 where in an arm 2b of each bracket is fast an internally threaded bushing 13 and the corresponding shifter has held therein by a screw 14 a threaded stud 15 which is tapped into and revolves freely in the bushing.

The latch plate is shown in two sections connected by a bolt 16 penetrating a longitudinal slot 17 in one section so that the plate may be adjusted to suit different spacings of the brackets 2.

In these machines the driver frequently has only one wheel 5 and the core structure only one whirl 7 to coast therewith, in which case stopping of rotation of the core structure is effected by tilting the latter to clear the whirl from the driver. In the application of my invention to such a case only the shifter for the whirl end of the core structure need be present.

Having thus fully described my invention what I claim is:

1. In combination, with the frame, a rotating driver journaled therein on a substantially horizontal axis, a revoluble core structure for the yarn windings confined by the frame to movement toward and from and normally held in peripheral contact with and thereby adapted to be driven by the driver and having a relatively slender axial portion, and a cam device movable in the frame against said axial portion to cam the core structure clear of the driver.

2. In combination, with the frame and a rotating driver journaled therein, the frame having means to support in peripheral contact with the driver but so as to be movable clear of the same the revoluble package to be wound, a shifter normally movable to shift the package clear of the driver, and a detent normally restraining the shifter against such movement and movable to release the same, said shifter and detent being pivoted in the frame on parallel axes.

3. In combination, with the frame and a rotating driver journaled therein, the frame having means to support in peripheral contact with the driver but so as to be movable clear of the same the revoluble package to be wound, a shifter normally movable to shift the package clear of the driver, and a detent normally restraining the shifter against such movement and movable to release the same, said shifter and detent being pivoted in the frame on axes parallel with the axis of the driver.

4. In combination, with the frame and a rotating driver journaled therein, the frame having means to support in peripheral contact with the driver but so as to be movable clear of the same the revoluble package to be wound, a shifter movable in the frame and normally urged forwardly to shift said package clear of the driver and being retractable from the package, and a detent movable back and forth in the frame, said shifter and detent having portions coactive with each other on the movement of the detent in one direction first to retract the shifter and then obstruct forward movement of the shifter.

5. The combination set forth in claim 4 in which means the detent is normally urged in said direction.

6. The combination set forth in claim 4 in which the detent is arranged to limit the retracting movement of the shifter.

7. The combination set forth in claim 4 in which the shifter and detent are both pivotally movable.

8. In combination, with the frame and a ro-

tating driver journaled therein, the frame having means to support in peripheral contact with the driver but so as to be movable clear of the same the revoluble package to be wound, a shifter fulcrumed in the frame on an axis parallel with that of the driver and normally urged forwardly to shift said package clear of the driver and being retractive from the package,

and a detent pivoted in the frame on an axis also parallel with the driver to move back and forth, said shifter and detent having portions coactive with each other on the movement of the detent in one direction first to retract the shifter and then obstruct forward movement of the shifter.

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