Sept. 13, 1938. E. J. ABBOTT 2,129,660

WINDING MACHINE

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Fig. 1

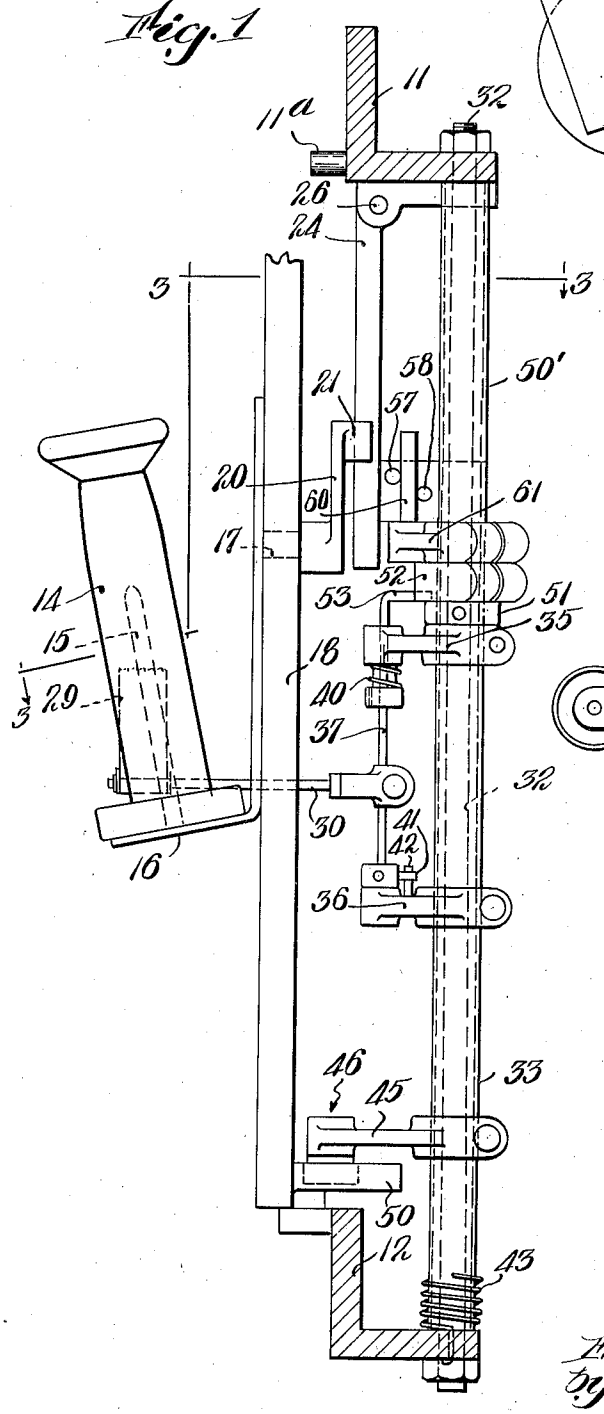
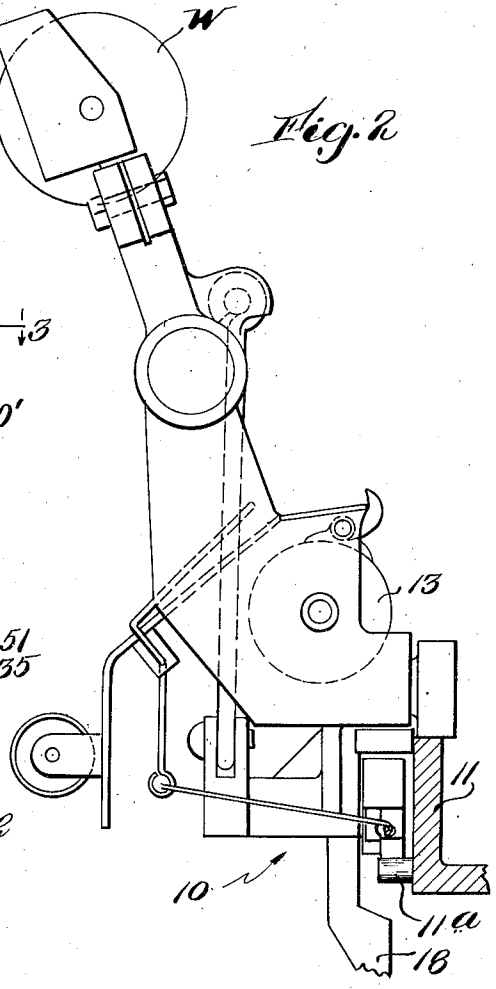


Fig. 2



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Fig. 3

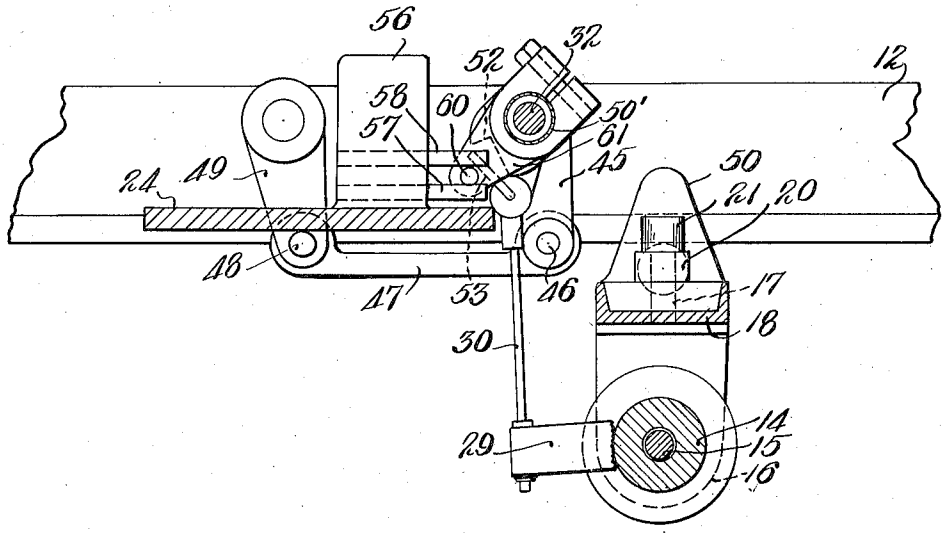


Fig. 4

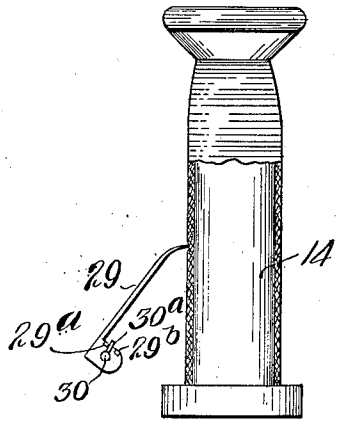
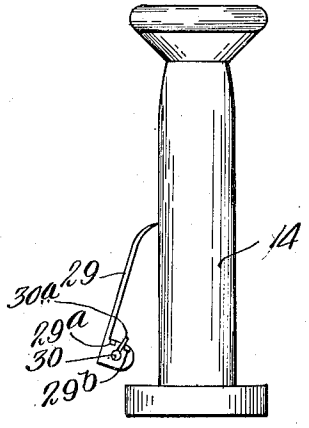


Fig. 5



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UNITED STATES PATENT OFFICE

2,129,660

WINDING MACHINE

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Application November 24, 1934, Serial No. 754,635

12 Claims. (Cl. 242—35.5)

This invention relates to winding machines and is especially applicable to machines in which some or all of the operations related to replenishment are automatically performed or controlled. In winding machines having a plurality of winding units periodically attended by an operator, or by an operator with the aid of automatic replenishing mechanism, or by automatic replenishing mechanism alone, most efficient use of the several units requires that they be handled differently, depending upon the condition of the strand in each. The present invention provides mechanism adapted to feel the supply cores in the several units in succession and to control any desired operation of the machine in accordance with whether supply strand is or is not felt on the cores. An application of Edward J. Abbott and Joseph E. Ring, Serial No. 726,524, filed May 19, 1934, discloses an automatic multiple winding machine in which the supply strand is felt by detecting fingers or the like between the supply core and the slub catcher and if present is automatically tied onto the found end of the partially wound package through the actuation of mechanism which prevents the doffing of the supply core and subsequent acts of replenishment. The present invention is useful in such a machine for the purpose of causing the empty cores to be doffed and collected in one group separately from the cores which contain strand not adapted to cooperate with the detecting fingers and uniting mechanism of said application.

The present invention is also useful in multiple winding machines generally for the purpose of selectively doffing those cores which are empty, leaving the other cores retained in their respective units. For simplicity of description and illustration the invention will be explained as adapted for this purpose of selectively doffing those cores which are empty, it being understood that the strands of those cores which are not doffed by the device of this invention can either be tied up to their corresponding packages by an operator or can be subjected to the action of detector mechanism, to the action of further doffing mechanism acting in accordance with the availability of the strand for uniting, and as a final operation to automatically uniting mechanism, these mechanisms preferably operating in the manner described in said Abbott and Ring application, which may be referred to for a full explanation. In either case the device of the present invention selectively removes the empty supply cores from the machine, leaving the other supply cores in position for further unwinding.

Principal objects of the invention therefore are to provide for the accomplishment of the above operations, to provide detector mechanism adapted to operate successively on the supply cores on the number of units, and to provide mechanism adapted to determine whether or not the core is to be doffed and to accomplish the selective doffing in the short time in which the detector mechanism is associated with any given unit. Other objects of the invention and features of novelty and utility will be apparent from this specification and drawings wherein the invention is explained by way of example. In the drawings:

Fig. 1 is a vertical section through the tracks on one side of a traveling-unit multiple winding machine, showing the present invention applied thereto, and showing the lower portion of one of the traveling winding units;

Fig. 2 is a similar view, showing the upper portion of the winding unit of Fig. 1;

Fig. 3 is a horizontal section on the line 3—3 of Fig. 1; and

Figs. 4 and 5 are fragmentary views showing the feeler element encountering a partially exhausted bobbin and an empty bobbin respectively.

The multiple unit machine to which the invention is shown as applied includes a stationary frame defining a closed path having straight sides and semi-circular ends about which the several winding units are moved, and as indicated in Fig. 1, a winding unit 10 rests on and is conveyed along upper and lower rails 11 and 12, its winding package W and traverse cam 13 being driven during a part of the travel by suitable means such for example as the drive roll of Reissue Patent No. 18,310. The unit 10 is shown as being moved about the closed path of travel in a clockwise direction and in Fig. 1 is moving away from the observer. The winding package W is shown in Fig. 2 as having passed the winding driving means and as having been raised to an inactive position by stop mechanism constructed as described and claimed in my application Serial No. 476,776, filed August 21, 1930, including a stationary pin 11a on the rail 11 and cooperating package-lifting mechanism on the traveling unit. The unit is thus prepared for attention by the operator or by automatic mechanism such as described in said reissue patent or such as described in said Abbott and Ring application.

A suitable holder for an unwinding supply core 14 may, for example, consist of a pin 15 extending from a bent plate 16 which is fast on a shaft 17 rotatably mounted in the upright 18 of the unit. The core carrying pin 15 of the unit is normally upright, as indicated, but is adapted to be inverted by the relative motion between the several units and suitable core doffing mechanism. An arm 20 fast on the shaft 17 carries a projection 21 adapted to be detained by a relatively stationary doffing cam 24 which is mount-

ed on the frame. Thus each time a unit passes the cam 24 there is an opportunity for the core 14 to be doffed and this doffing will occur unless the cam 24, which is pivoted at 26, is retracted from the path of projection 21.

A preferred form of means for controlling the doffing cam 24 includes a feeler 29 adapted to swing into the path of the cores 14 of the several units, contact with the core and the yarn thereon, detect whether yarn is present on the core or whether the core is bare, and swing out of the path of movement. The feeler 29, in the form of a sheet metal plate having a toothed and slightly bent upper extremity, is rotatably mounted on a horizontal rod 30 carrying a pin 30a extending between two shoulders 29a and 29b on the feeler, so that the feeler normally lies at about 45° to the vertical as indicated in Fig. 4, but is capable of swinging up to an almost vertical position, as in Fig. 5. Between the upper and lower rails 11 and 12 there extends a stationary rod 32 around which turns a sleeve 33 carrying fast thereon a pair of brackets 35 and 36. In these brackets 35 and 36 is rotatably mounted a rotatable rod 37 to which the horizontal feeler rod 30 is fastened. A spring 40 yieldingly urges the rods 37 and 30 to turn about the axis of rod 37 in a direction to move the feeler 29 opposite to the direction of travel of the units and toward the observer in Fig. 1, such yieldingly urged movement with respect to the brackets 35 and 36 and sleeve 33 being checked by contact of a pin 41 on the rod 37 with a pin 42 on the bracket 36.

A spring 43 acts on the sleeve 33 to turn it to the position of Fig. 1, that is, to retain the feeler element 29 in the path of the core which is approaching the feeler from the point of view of the observer in Fig. 1.

The general motion of the feeler 29 is controlled by the traveling movement of the winding units past the detecting and controlling mechanism of this invention. On the lower end of sleeve 33 is fastened an arm 45 pivotally connected at 46 to one end of a horizontal link 47 of which the other end is pivoted at 48 to a rotatably mounted arm 49. Link 47 extends into the path of movement of a cam 50 projecting from the lower part of upright 18 of the winding unit, with the result that passage of the unit swings the arm 45, turns the sleeve 33, and swings brackets 35 and 36 which support the feeler element 29 in a clockwise path in Fig. 3 and away from the observer in Fig. 1. The feeler element 29 is pressed against the core 14 or the yarn thereon by the action of spring 40. During this contact the angular position assumed by the feeler element 29, horizontal rod 30 and vertical rod 37 with respect to the brackets 35 and 36 depends upon whether the feeler engages only a bare core or a core containing yarn. If a bare core is engaged, the feeler is able to swing upward about the horizontal rod 30, the serrated outer end of the feeler sliding upward in contact with the smooth bare core, thereby permitting the outer end of rod 30 to lie nearer to the core, as shown in Fig. 5. If yarn is on the part of the core engaged by the feeler, the yarn prevents the serrated end of the feeler from sliding upward on the core, and thereby prevents the feeler from swinging about rod 30 and holds rod 30 as indicated in Fig. 4 farther away from the core than in the case of a bare core. The angular relation between the feeler 29 and rods 30 and 37 on the one hand and the sleeve 33 on the other hand is thus governed through the agency of the feeler 29 by the presence or absence of yarn on the core 14. The angular relation, thus governed, is employed to control the operative engagement of the sleeve 33 with the element to be selectively actuated, which in the illustrated device is the doffing cam 24.

An upper sleeve 50' is adapted to rotate about the rod 32 between a stationary bushing 51 and the upper rail 11, and is normally unaffected by rotation of the lower sleeve 33. On the lower end of this upper sleeve 50' is fastened a ratchet 52 which is adapted to be engaged by the horizontally bent upper end portion 53 of the vertical rod 37. Contact of the feeler 29 with yarn on the core 14 turns rod 37 sufficiently to engage portion 53 with ratchet 52 when the lower sleeve 33 is rotated by the passing unit, so as to cause the upper sleeve 50' to be rotated. On the other hand, contact of the feeler 29 with a bare bobbin leaves the portion 53 and the ratchet 52 disengaged during the rotation of lower sleeve 33. By this means the upper sleeve 50' will be rotated each time the feeler engages a core containing yarn, but is left stationary in the event that a bare core is encountered.

The pivoted doffing cam 24 is provided with a rearwardly extending portion 56 carrying two pins 57 and 58 between which there extends a vertical pin 60 which is carried by a bracket 61 fast on upper sleeve 50'. Thus when the upper sleeve 50' is rotated by the detection of yarn on a core, the pin 60 swings doffing cam 24 about pivot 26, out of the way of the projection 21 on the doffing lever 20, and the core 14 containing yarn is not doffed. After passage of the doffing arm 20, the doffing cam 24 returns to the vertical by gravity, carrying the upper sleeve 50' and ratchet 52 to their original positions. When a bare core is encountered, the doffing cam is not swung by the mechanism described, and accordingly acts to doff the core.

In this preferred form of mechanism, following the feeling of the core or yarn thereon, the feeler element is swung out of the way of the core, and then almost immediately is returned by the spring 43 into position to feel the next following core or yarn thereon.

Obviously, the form of mechanism employed to provide relative movement between the detecting mechanism and the several units may be changed, and the specific form of detecting and controlling mechanism may be changed without departing from the principle of automatically feeling the supply cores of the several units in succession and controlling the treatment of the cores individually in accordance with whether the feeler contacts with only a bare core or with yarn on the core.

When applied to a multiple unit winding machine equipped with bobbin-replenishing mechanism such as described in the said Abbott and Ring application, the bobbin-feeling and doffing mechanism described above operates as a preliminary to replenishing of the exhausted bobbins of the several units. For example, the bobbin-feeling and doffing mechanism described above can be placed on the frame of the Abbott and Ring machine a short distance in advance of the strand detecting, bobbin-doffing, automatic bobbin-replenishing and strand-uniting mechanism of that application, which may be referred to for a full description of these mechanisms. In that event, the bobbin-feeling and doffing mechanism of this application takes over from the doffing mecha-

nism of the machine of the Abbott and Ring application, the function of doffing all those bobbins which are empty, leaving to the doffing mechanism of the machine of the Abbott and Ring application the function of doffing those bobbins which are not empty but which do not have an end of strand adapted to be united to the package. Since each bobbin encounters first the feeling and doffing mechanism of this application, and is doffed if the feeler detects an exhausted condition, the bare spindle which then passes the strand-detecting mechanism of the Abbott and Ring application will allow the replenishing mechanism to place a new full supply bobbin on that spindle, and tie the end thereof to the winding package. By this means, the empty doffed bobbins are deposited in a group in any suitable receptacle below the doffing mechanism described in this application; the partially full doffed bobbins are similarly deposited below the doffing mechanism described in the Abbott and Ring application, those bobbins containing an end of strand adapted to be united to the winding package are so united, and all doffed bobbins are replaced by new full bobbins tied into the winding package of their respective units.

I claim:

1. A machine for winding strand onto packages having therein means for holding the core of a supply strand mass, means for feeling the said core, and means controlled by said feeling means for doffing the core.

2. A machine for winding strand onto packages having therein means for holding the core of a supply strand mass, means for stopping winding, means operative after the operation of said stopping means for feeling said core, and means controlled by said feeling means for doffing the core.

3. A machine for winding strand onto packages having therein means for holding a core for a wound supply strand mass, detector means adapted to contact with the wound supply strand mass to detect its condition, and means controlled by said detector means for doffing the core from its holder.

4. A textile machine having a plurality of winding units each including means for holding a core of a supply strand mass, a detector element, means adapted to associate the detector elements with the respective winding units one after the other, in position to contact with a core held by the holding means of the winding unit, means adapted to doff the several cores from their holders, and means responsive to contact of the detector element with strand on a core to prevent operation of said doffing means.

5. A textile machine having therein a plurality of winding units each including means for holding a core of a supply strand mass, means adapted to doff such core from its holding means, means for associating said doffing means with the respective units one after the other, a detector element associated with said doffing means, means for urging the detector element toward contact with the cores in succession, and means responsive to contact of the detector element with strand on a core to render said doffing means ineffective with respect thereto.

6. A machine for winding strand onto packages having therein means for holding a supply strand mass having a core, means periodically actuated for doffing a core from said holding means, means for suspending operation of the doffing means, a detector element contacting with said supply mass and responsive to presence of strand on its core, and means whereby said response of the detector element causes said doffing suspending means to be actuated.

7. A textile machine having therein a plurality of winding units, means for moving said units in a procession about the machine, holders on the units for supply mass cores, a detector element movably mounted adjacent to the path of travel of said cores, means for carrying said detector element into said path to permit the detector to contact the cores, means for doffing cores from their holders, means adapted to be actuated by the travel of the units for preventing operation of the doffing means, and means whereby the position attained by said detector in respect to a core controls the doffing-preventing means.

8. A textile machine having therein a plurality of winding units, means for moving said units in a procession about the machine, holders on the units for supply mass cores, means for doffing the passing cores, a detector element movably mounted adjacent to the path of travel of said cores, means for yieldingly urging said detector element into the path of a traveling core, and means controlled by the relative position assumed by the detector in relation to the core for controlling the doffing means.

9. A textile machine having therein a plurality of winding units, means for moving said units in a procession about the machine, holders on the units for supply mass cores carrying strand for unwinding, a detector element movably mounted adjacent to the path of travel of said cores, means for yieldingly urging said detector element into the path of the traveling core, and doffing means controlled by the detector element and adapted to doff a core only in the event of the core being contacted by the detector element.

10. In a textile machine having a plurality of winding units movable in a procession and holders for supply mass cores carrying strand for unwinding thereon; detector mechanism adapted to respond to the condition of the supplies on several units, said detector mechanism comprising a detector element mounted adjacent to the path of travel of the cores and yieldingly urged toward contact therewith, and mechanism responsive to the relative position assumed by the detector element in relation to a core as the core moves in said path.

11. A multiple unit strand-winding machine having holders for the cores for carrying supply strand to be wound in the respective units, supply-core doffing means, means for associating the supply-core doffing means and the several supply holders of the respective winding units one by one, and means for preventing doffing of the supply core of a winding unit of which the supply core carries strand.

12. A multiple unit strand-winding machine having holders for the cores for carrying supply strand to be wound in the respective units, supply-core doffing means, means for moving the winding units in a procession past the doffing means so as to associate the supply-core holders one by one with the doffing means, and means for preventing doffing of the supply core of a winding unit of which the supply core carries strand.

EDWARD J. ABBOTT.