

Feb. 11, 1941.

E. J. ABBOTT

2,230,992

WINDING MACHINE

Filed Aug. 4, 1938

3 Sheets-Sheet 1

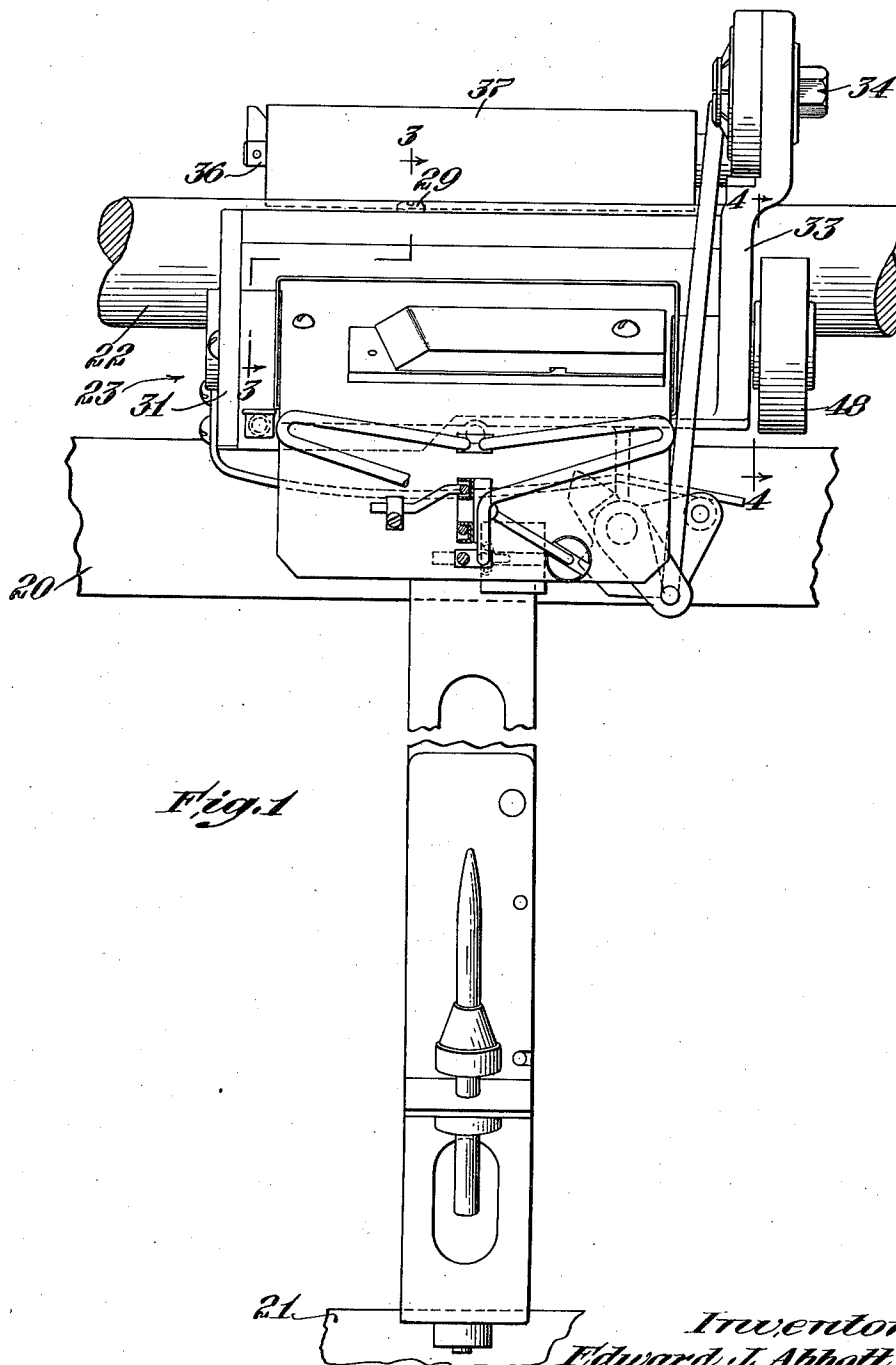


Fig. 1

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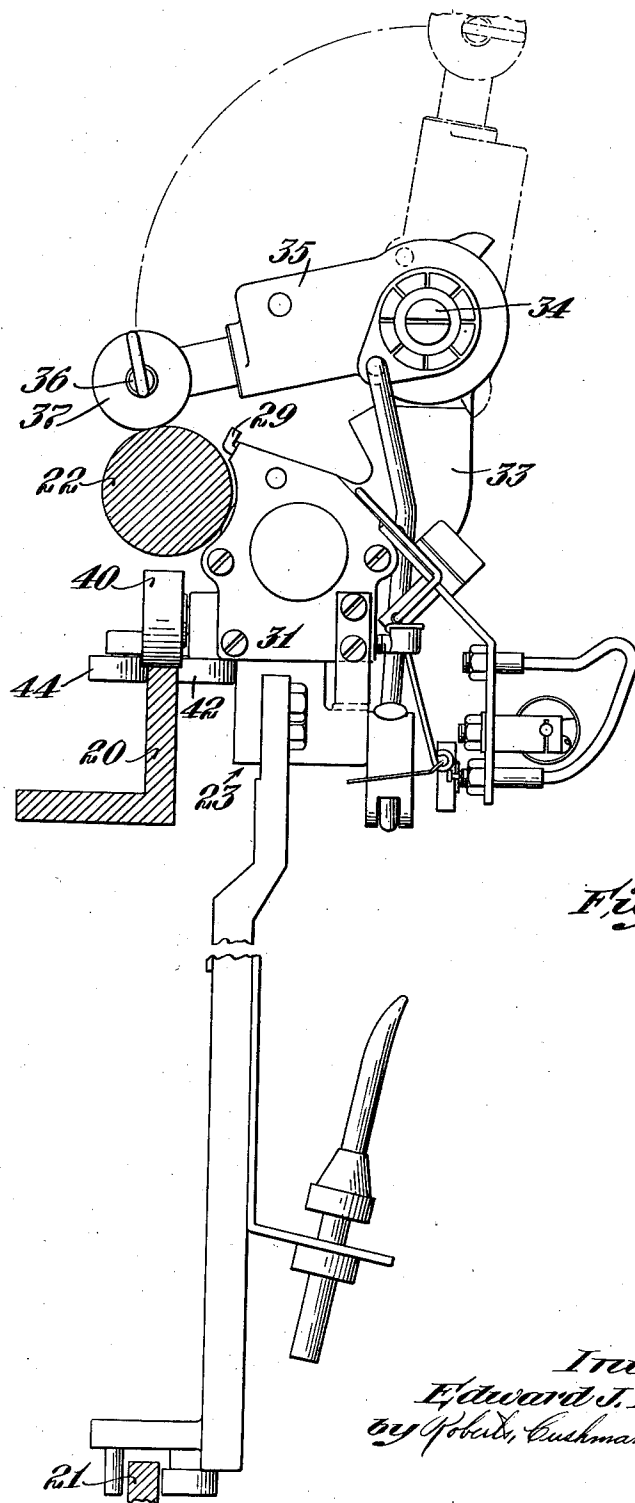
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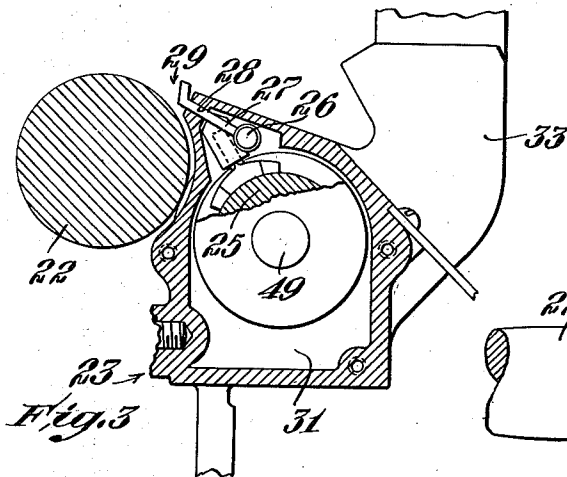


Fig. 3

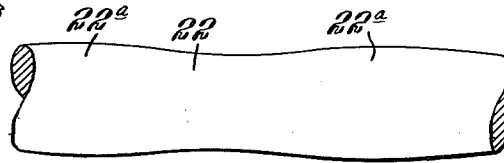


Fig. 6

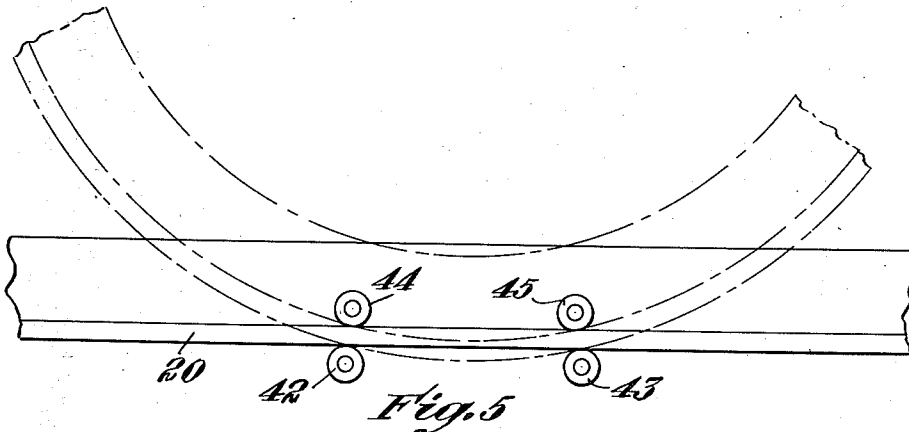


Fig. 5

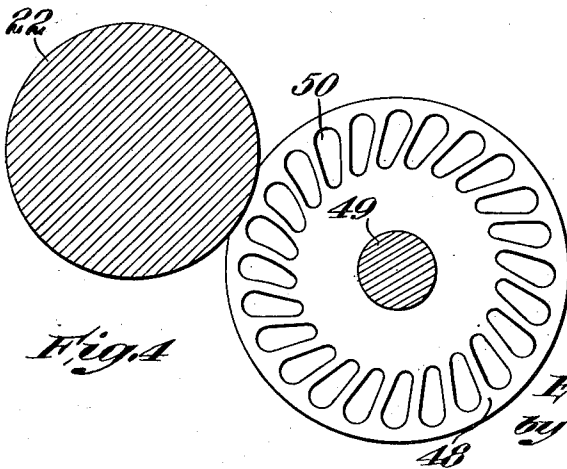


Fig. 4

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UNITED STATES PATENT OFFICE

2,230,992

WINDING MACHINE

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Application August 4, 1938, Serial No. 222,957

7 Claims. (Cl. 242—35.5)

This invention relates to traveling spindle winding machines of the type in which a plurality of winding units are carried in an endless path during the winding and in which long non-traveling tractor rolls are provided along each side of the machine for rotating the winding packages and driving the traverse devices of the traveling units.

The principal object of the invention is to simplify the construction of winding units of this type. Other objects of invention and features of advantage and utility will be apparent from this specification and its drawings.

In the drawings:

Fig. 1 is a front elevation of one of the winding units of the machine according to the invention;

Fig. 2 is a vertical sectional view through one side of the machine, showing the winding unit of Fig. 1 in left elevation;

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

Fig. 4 is a sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a plan view of a portion of the upper rail on which the winding units travel, showing diagrammatically the relative positions of the guide rollers on the winding unit which restrain the winding unit from moving in or out with respect to this rail, and showing in dotted lines a portion of a curved part of this rail; and

Fig. 6 is a diagrammatic view of the tractor roll showing its wavy contour on an exaggerated scale.

A machine of this invention like that of United States reissue Patent No. 18,310 is provided with a stationary frame defining an endless track for its traveling winding unit in the form of long straight side portions connected by semi-circular ends, this frame including an upper rail 20 and lower rail 21 as indicated in Figs. 1 and 2. The winding units shown in Figs. 1 and 2 travel in an endless path around the machine running on the upper rail 20.

Along the two opposite straight sides of the machine, above the vertical flange of the rail 20 there are provided long non-traveling tractor rolls 22 which serve the double purpose of driving the winding packages by frictional contact and driving the traverse devices of the individual winding units.

Referring to Figs. 1, 2 and 3, each winding unit includes a head portion designated generally by reference character 23 which, as shown in Fig. 3 consists largely of a hollow casing containing the traverse cam 25, a rod 26 and a slider 27 mounted on the rod 26 and reciprocated by the traverse cam. As shown in Fig. 3, an end portion of the slider 27 extends out of the casing through a slot 28 and is provided with an

up-turned slotted portion 29 which constitutes the traversing yarn guide. The opposite ends of the casing are closed by plates 31, one of which is shown in Figs. 1 and 2, and the other in Fig. 3, these plates fixedly retaining the bearings for the shaft 49 of the traverse cam 25.

An upward extension 33 of the casing carries at 34 a pivot on which the spindle-carrying arm 35 is adapted to swing. A spindle 36 on this arm carries a suitable winding package core 37 adapted to receive the winding yarn as the winding package is frictionally driven by contact with the tractor roll 22.

The weight of the winding unit is carried by rolls 40 which run on the upper edge of the vertical flange of the rail 20.

The winding unit is restrained against horizontal movement perpendicular to the rail 20 by four rollers carried in fixed positions on the head of the winding unit and running against the vertical faces of rail 20. As indicated in Fig. 5, two rolls 42 and 43 are arranged to run against the outer face of rail 20 and two rolls 44 and 45 are arranged to run against the inner face of rail 20. The inner rolls 44 and 45 are located closer to each other than the outer rolls 42 and 43 so that when the winding unit reaches the semi-circular portion of rail 20 as indicated in dotted lines in Fig. 5, these rolls can accommodate the curve of the rail.

The tractor rolls 22 are formed with a wavy contour, as shown in an exaggerated manner in Fig. 6 the larger diameter portions 22^a of the roll preferably being spaced apart approximately the length of the winding package so that the traveling winding package is always subjected to the driving action of at least one of the major diameter portions of the roll and hence turns in a constant linear speed. The traverse cam which is also driven by this roll 22 through the action of a tire described below, is driven at a continually varying speed dependent upon the portion of the roll 22 with which the traveling tire is in contact. In this manner, there is brought about a variation between the speed of the traverse cam and the winding speed, so as to prevent the phenomenon of "ribbon winding."

Power for driving the traverse cam is taken off from the tractor roll 22 by means of a tire 48 mounted on the cam shaft 49 which extends through the right side plate 38 of the cam casing. As shown in Fig. 1, this tire 48 is located outside of the casing, and at the extreme right end of the winding unit, so that it is easily accessible for removal, renewal or repair, without removal of the cam 25.

In order to insure that there will be good driving contact between the tractor roll and tire notwithstanding possible inaccuracies in manufacturing the machine and notwithstanding the

wavy contour of the tractor roll, the tire 48 is relatively thick and constructed of a very resilient material, preferably cork, so that in normal running, the tire is deformed inwardly by the tractor roll 22 a substantial amount (for example $\frac{1}{8}$ inch) as shown in Fig. 4. It will be observed that because of the rollers 42 to 54 inclusive, the winding unit cannot move inwardly or outwardly with respect to the rail 20 and that the traverse cam and its shaft 44 which are fastened in fixed bearings on the winding unit are likewise definitely positioned with respect to the rail 20. The thick deformable tire 48 renders it unnecessary to provide any movable bearings for the traverse cam or any springs or the like for forcing the traverse cam into contact with the tractor roll. The thick deformable tire also compensates for inevitable slight inaccuracies in the positions of the tractor roll and rail 20 and compensates for inevitable slight inaccuracies in the manufacture of the traveling unit.

In order to contact with the tractor roll 22, the outer diameter of the tire is, of course, larger than that of the cam. Unlike a tire mounted on the periphery of the cam, the resilient material of the tire of this invention can extend inwardly to a materially smaller diameter than that of the cam. As shown in Fig. 3, the shaft 49 on which the tire is mounted is of much smaller diameter than the cam 25.

The ability of the tire 48 to be distorted inwardly by the tractor roll 22 is preferably increased by the provision of a series of perforations 50 around the tire near its periphery.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. A traveling spindle winding machine of the type having a plurality of winding units, a track defining an endless path of travel therefor and a tractor roll extending along the path, each winding unit including a traverse cam having a fixed position in the unit, rollers engaging the track and fixing the position of the unit laterally of the track while permitting the unit to travel along the track, and a tire associated with the cam, the tire being of sufficiently thick and resilient material to maintain effective driving contact with the roll and being so positioned with reference to the tractor roll as to be deformed inwardly a substantial amount by the tractor roll in normal running.

2. A traveling spindle winding machine of the type having a plurality of winding units, a track defining an endless path of travel therefor and a tractor roll extending along the path, the roll having a wavy contour, each winding unit including a traverse cam having a fixed position in the unit, rollers engaging the track and fixing the position of the unit laterally of the track while permitting the unit to travel along the track, and a tire associated with the cam, the tire being of sufficiently thick and resilient material to maintain effective driving contact with the roll and being so positioned with reference to the tractor roll as to be deformed inwardly a substantial amount by the tractor roll in normal running.

3. A traveling spindle winding machine of the

type having a plurality of winding units, a track defining an endless path of travel therefor and a tractor roll extending along the path, each winding unit including a traverse cam having a fixed position in the unit, rollers engaging the track and fixing the position of the unit laterally of the track while permitting the unit to travel along the track, and a tire associated with the cam, the tire being of sufficiently thick cork to maintain effective driving contact with the roll and being so positioned with reference to the tractor roll as to be deformed inwardly a substantial amount by the tractor roll in normal running.

4. A traveling spindle winding machine of the type having a plurality of winding units, a track defining an endless path of travel therefor and a tractor roll extending along the path, each winding unit including a traverse cam having a fixed position in the unit, rollers engaging the track and fixing the position of the unit laterally of the track while permitting the unit to travel along the track, and a tire associated with the cam, the tire being of sufficiently thick and resilient perforated material to maintain effective driving contact with the roll and being so positioned with reference to the tractor roll as to be deformed inwardly a substantial amount by the tractor roll in normal running.

5. A traveling spindle winding machine of the type having a plurality of winding units and a track defining an endless path of travel for the winding units, the track having straight sides and curved ends, each winding unit including two rollers inside the track and running against the inner face of the track and two rollers outside the track and running against the outside face of the track, the four rollers restraining the unit against horizontal movement perpendicular to the track, the inside rollers being closer together than the outside rollers so that the unit can run around the curved ends of the machine.

6. A traveling spindle winding machine of the type having a plurality of winding units and a track defining an endless path of travel for the winding units, each unit having a head portion including side portions, a traverse cam between the side portions, the head portion substantially enclosing the traverse cam, a cam shaft extending through one side portion, a tire of resilient material on the shaft outside the head portion, the resilient material of the tire extending inwardly in thickness from a diameter greater than that of the cam to a diameter materially smaller than that of the cam, thereby providing a relatively thick tire, and the machine including a non-traveling tractor roll by which said tire is driven.

7. A traveling spindle winding machine of the type having a plurality of winding units and a track defining an endless path of travel for the winding units, each unit including a traverse cam, a cam shaft for the traverse cam, and a tire of resilient material mounted on the cam shaft, and the machine including a non-traveling tractor roll adapted to drive the tire, the resilient material of the tire extending inwardly in thickness from a diameter greater than that of the cam to a diameter materially smaller than that of the cam, thereby providing a relatively thick tire.

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