

June 26, 1934.

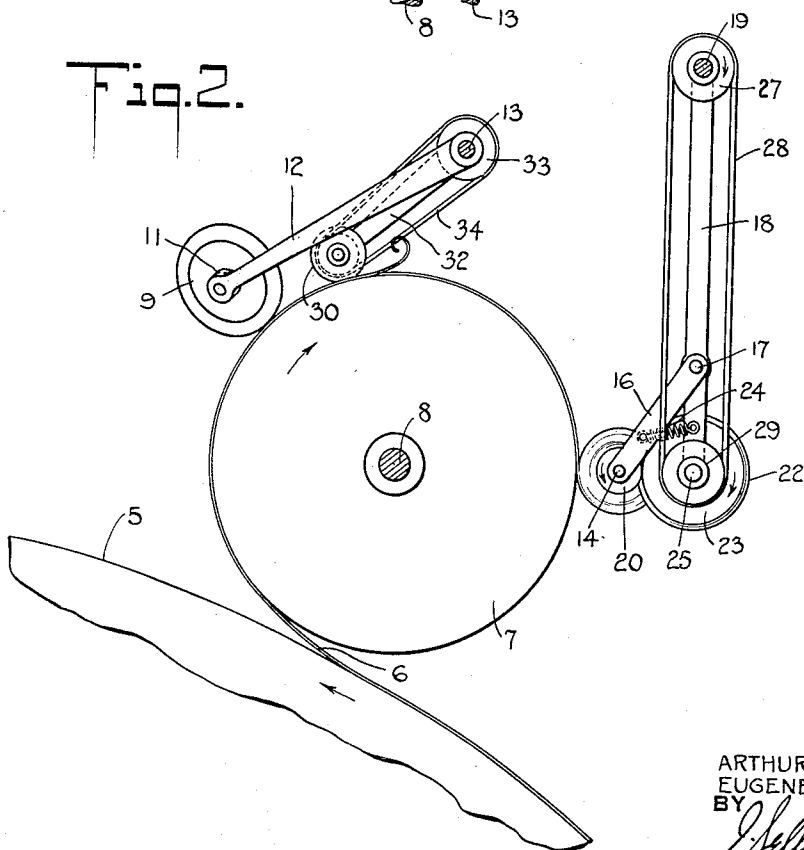
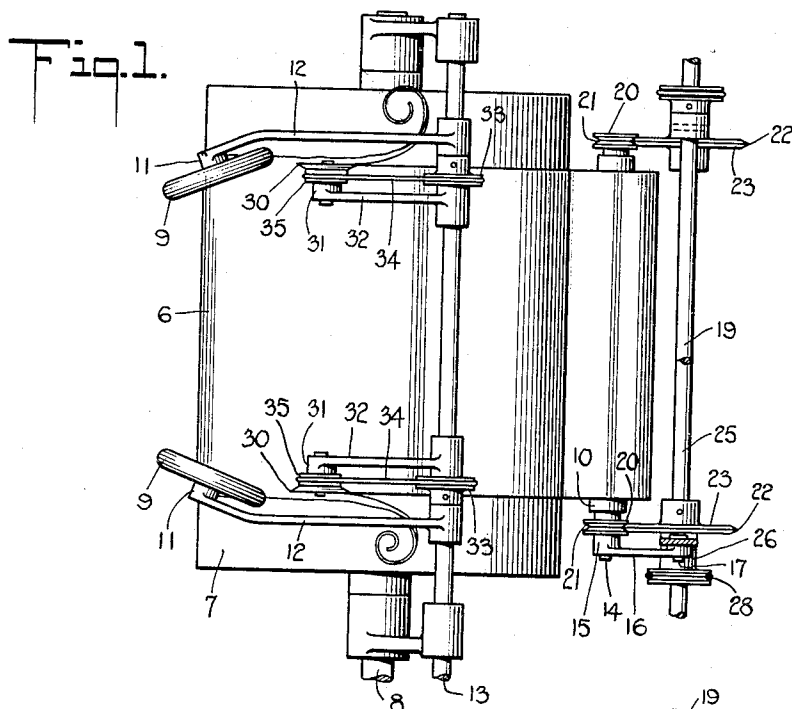
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1,964,076

WINDING MACHINE

Filed Dec. 4, 1930

2 Sheets-Sheet 1



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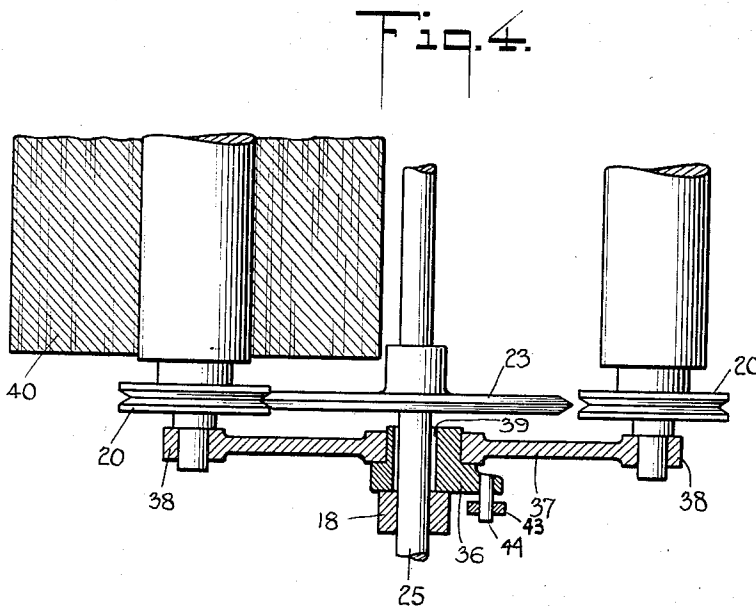
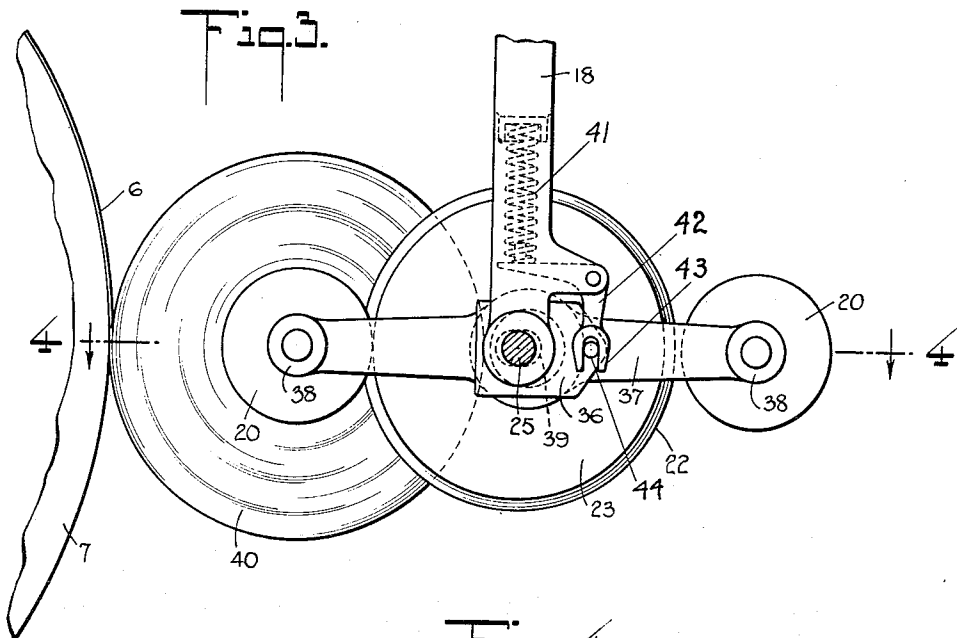
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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

1,964,076

## WINDING MACHINE

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6 Claims. (Cl. 242—65)

Our present invention relates to winding machines and more particularly to machines for winding thin, flexible material such as foil and the like.

In machines of the type referred to, as heretofore commonly constructed, the web of foil was stripped from the surface of the wheel, belt or band, on which it was cast, by means of a pair of positively driven pinch rolls and wound upon a core or mandrel which was slightly over-driven through a cone-clutch which compensated for the change in the peripheral speed of the roll as it grew larger. This type of machine was used with great success for winding photographic film but it proved very unsatisfactory when employed for winding the very much thinner foil. The pull of the pinch rolls caused wrinkles to be built up in the web and these wrinkles were pressed in as the web passed through the pinch rolls. Furthermore, it was found that it was impossible to wind a roll free from wrinkles if the foil was in free suspension before it was wound, as was necessarily the case where a cone-clutch was used.

It is accordingly an object of this invention to provide an improved apparatus for winding thin, flexible material which will be free from the above-mentioned and other disadvantages and which will be simple in construction and efficient in operation.

In one aspect the invention comprises a rotatable drum placed in close proximity to the casting surface from which the web of foil is stripped and a core around which the foil is wound suspended or mounted in such a manner that the roll of foil is in contact with the drum surface continuously, so that there is no space or air gap between the drum and the roll being wound that is likely to cause wrinkles to be formed therein.

Another object of this invention is the provision of means co-operating with the drum for smoothing out wrinkles in the web.

Still another object of the present invention is to provide means for removing a roll of foil and placing a new core in position with minimum loss of time and material.

A further object of the invention is to provide means for cutting the edges of the web prior to the winding thereof whereby a smoother roll is obtained.

Other objects and advantages of this invention, together with certain details of construction and combinations of parts, will be described in the specification and pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a top plan view of our improved winding arrangement;

Figure 2 is a side elevational view of the same;

Figure 3 is an enlarged detail view of a modified roll-changing mechanism; and

Figure 4 is a cross-sectional view taken on line 4—4 of Figure 3.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings wherein the preferred embodiment of our invention is set forth, the reference numeral 5 indicates a section of a casting surface which may be a wheel, belt or band and from which the web of foil 6 is stripped by means of a drum 7 fixed to a shaft 8 driven by any suitable means (not shown) at such a speed that the surface of the drum moves at the same speed as the casting surface. The web is then passed under wheels 9 and given a turn about a core, or mandrel, 10 upon which the roll of foil is to be wound.

The wheels 9 are rubber tired and are journaled in bearings 11 formed in the ends of arms 12 which are pivotally supported on shaft 13. The axes of the wheels are not parallel to the axis of the drum 7 but are arranged so that the wheels are toed in or cambered, the construction being such that the wheels, which are frictionally driven by the drum, are adapted to pull out any longitudinal wrinkles in the web and cause the web to lie flat on the drum.

The core 10 is carried by a shaft 14 journaled in bearings 15 formed in the ends of links 16 which are pivotally attached at 17 to arms 18. These arms are supported for pivotal movement by a shaft 19 adapted to be rotated by any suitable means (not shown) for a purpose hereinafter set forth. The position of shaft 19 is preferably such that when the arms 18 hang free, the core 10 is in contact with the surface of the drum 7 and as the roll of foil gets larger, the arms swing about shaft 19 as a center.

For the purpose of preventing the formation of cross wrinkles in the web ahead of the roll and to remove any that may be present therein and to permit an adjustment for desired tightness of roll, means are provided for placing a longitudinal tension on the foil web. To this end the shaft 14 is provided adjacent its ends with pulleys 20, the peripheries of which are grooved, as at 21, to receive the wedge shaped edges 22 of discs 23. The wedge angle is such as to provide good frictional contact between the pulleys 20 and the discs 23 when held one

against the other by a spring 24 secured to link 16 and arm 18. The discs are fixed adjacent the ends of a shaft 25 journaled in bearings 26 which are formed in the lower extremities of arms 18.

5 The shaft 25, which is driven from shaft 19 through pulleys 27, belt 28 and pulleys 29, tends to rotate the core 10 at such a speed that the peripheral speed of said core is slightly greater than the surface speed of the drum. By the arrangement above outlined a longitudinal tension is placed on the foil and there is also slip between pulleys 20 and discs 23 which slip allows the roll to increase in size which would have a tendency to decrease the speeds of rotation of pulleys 20 and still permit discs 23 to rotate at constant speed.

Scoring cutters 30, which co-operate with the drum, are provided to trim the thick edges of the web. These cutters are journaled in bearings 31 formed in the ends of arms 32 pivoted on shaft 13 and are driven from the shaft 13 through pulleys 33, belt 34 and pulleys 35 at such a speed that the cutting edges move slightly faster than the foil in order to prevent wrinkles from building up ahead of the cutters. By trimming off the thick edges, not only is a roll of even diameter obtained but wrinkles are prevented and distortion during seasoning eliminated.

Referring to Figures 3 and 4 wherein there is shown an arrangement which permits of quick replacement of a full roll by an empty core with little or no loss of foil and without stopping production, the shaft 25 carries a bearing 36 on which is rotatably mounted an arm 37 having in its extremities the bearings 38 in which are journaled the shafts carrying the cores. The bearing 36 has an elongated opening 39 which allows the arm 37 to be held eccentric from the center of the shaft 25 as is clearly shown in Figure 4. When the roll 40 has reached the desired size, the foil is cut at a suitable point on the drum, the arm 37 is rotated 180° bringing the fresh core into contact with the drum 7 and the end of the web wound about the core. The roll may be then removed and replaced by an empty core. Pulley 20 is held in contact with disc 23 by means of spring 41 and bell-crank lever 42, one arm of the latter being bifurcated at 43 to straddle and be held in position by a pin 44 fixed in bearing 36.

While only one side of the roll changing mechanism is shown, it will be understood that there is a similar arrangement on the other side.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that matter contained in the above

description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described our invention what we claim as new and desire to secure by Letters Patent of the United States is:

1. In apparatus of the character described, means for feeding a web of material, a shaft, arms suspended from said shaft, a core upon which said web is adapted to be wound carried by said arms, pulleys on said core and means for applying a tension on said core comprising rotatable discs carried by said arms and cooperating with said pulleys, the peripheral speed of said discs being greater than that of the core.

2. In apparatus of the character described, means for feeding a web of material, a shaft, arms suspended from said shaft, a core upon which said web is adapted to be wound carried by said arms, pulleys on said core, means for applying a tension on said core comprising rotatable discs carried by said arms and cooperating with said pulleys and means for holding said discs in contact with said pulleys.

3. In apparatus of the character described, means for feeding a web of material, a shaft, arms suspended from said shaft, a core upon which said web is adapted to be wound carried by said arms, pulleys on said core, means for applying a tension on said core comprising rotatable discs carried by said arms and cooperating with said pulleys and spring means for holding said discs in contact with said pulleys.

4. In apparatus of the character described, means for replacing a full roll of material by a core comprising a shaft, arms carried thereby, a second shaft journaled in said arms, bearings carried by said second shaft, arms rotatably mounted on said bearings and core and roll supporting shafts journaled in said rotatable arms.

5. In apparatus of the character described, means for replacing a full roll of material by a core comprising a shaft, arms carried thereby, a second shaft journaled in said arms, bearings having elongated openings therein carried by said second shaft, arms rotatably mounted on said bearings and core and roll supporting shafts journaled in said rotatable arms.

6. In apparatus of the character described, means for replacing a full roll of material by a core comprising a shaft, arms carried thereby, a second shaft journaled in said arms, bearings carried by said second shaft, arms mounted on said bearings and adapted to rotate eccentrically with respect to said second shaft and core and roll supporting shafts journaled in said rotatable arms.

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