Feb. 13, 1934. E. J. McILVRIED 1,946,802

WINDING APPARATUS

Original Filed July 26, 1930 2 Sheets-Sheet 1

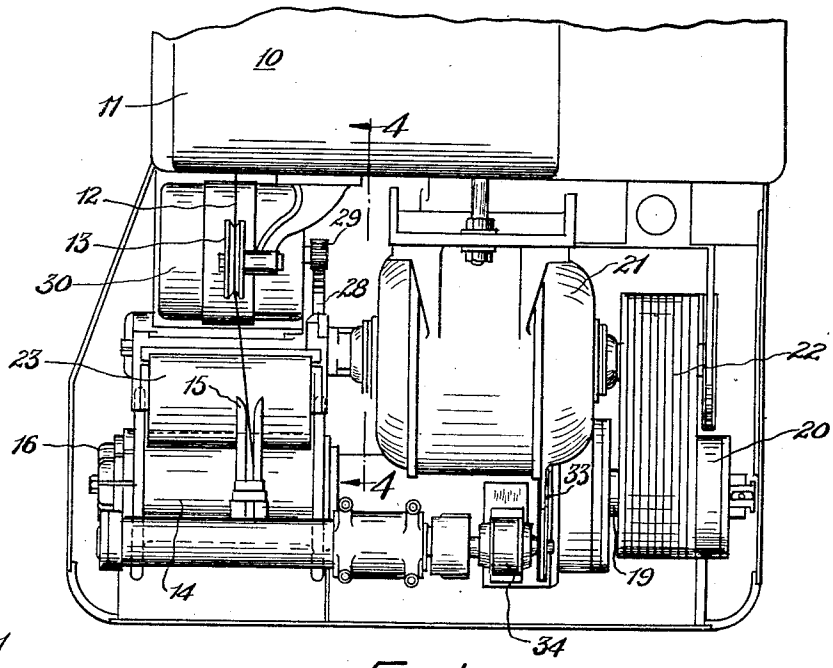

FIG. 1

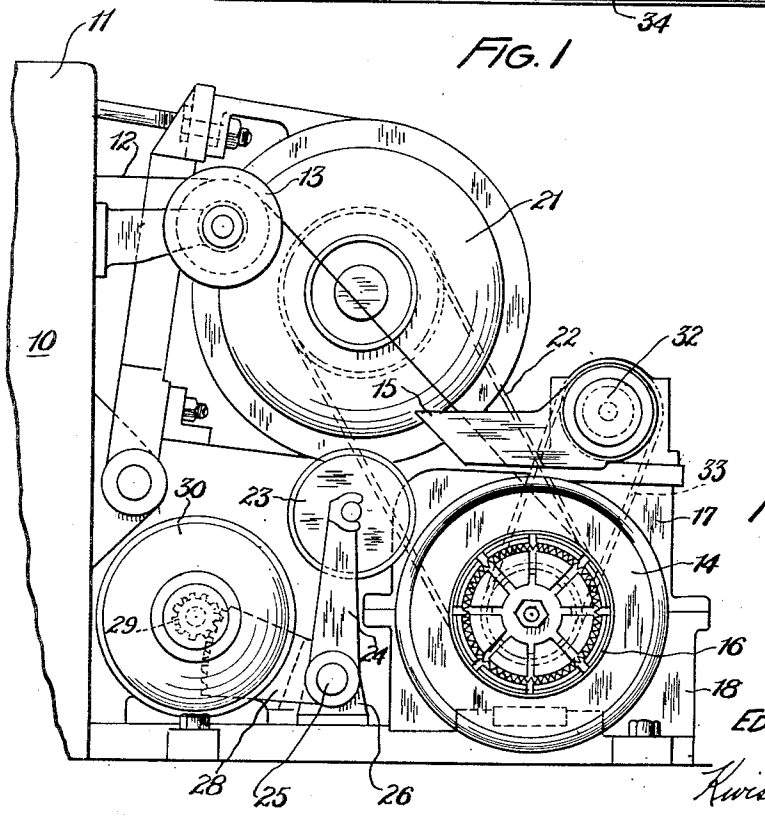

FIG. 2

INVENTOR:
EDWIN J. McILVRIED

Kerr Hudson & Kent
ATTORNEYS

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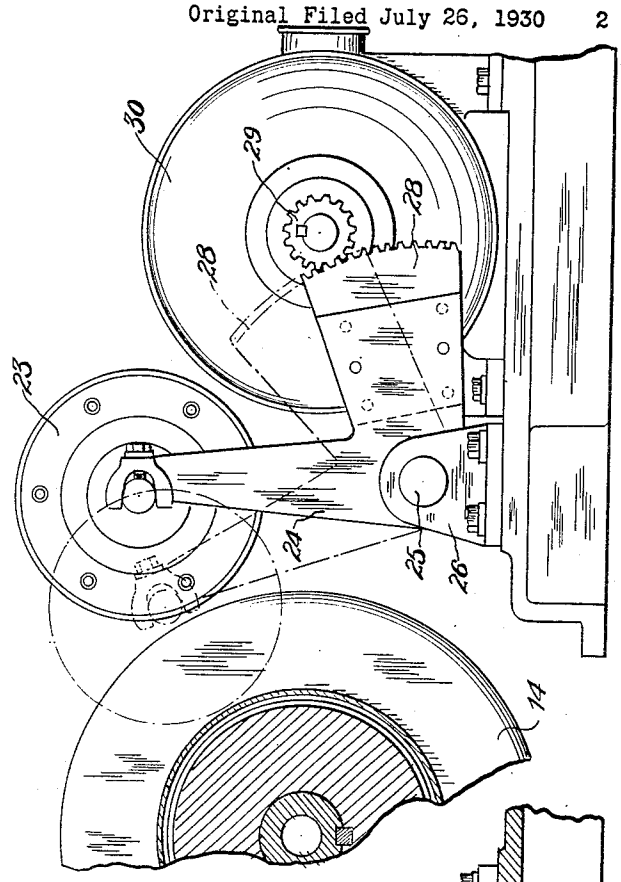

FIG. 4

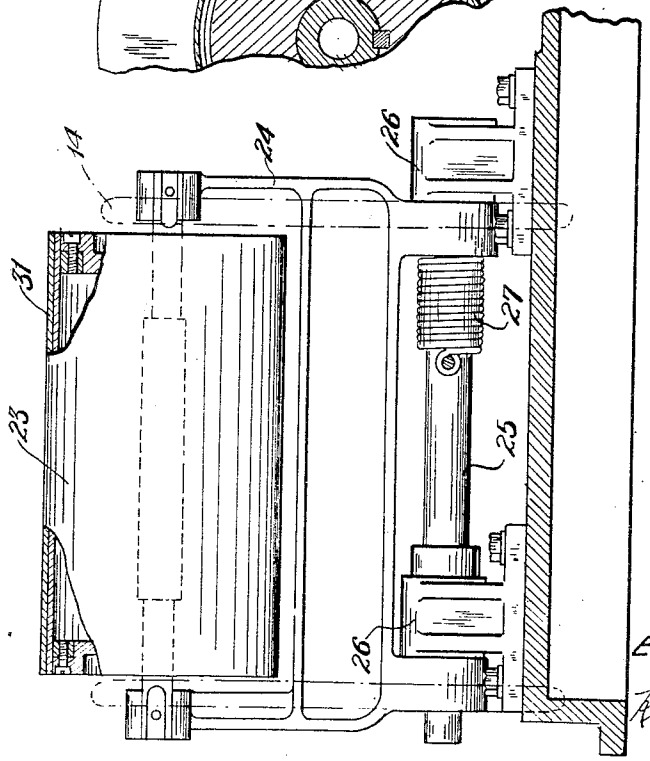

FIG. 3

INVENTOR:
EDWIN J. McILVRIED.
Kerr, Hudson & Kent.
ATTORNEYS.

Patented Feb. 13, 1934

1,946,802

UNITED STATES PATENT OFFICE

1,946,802

WINDING APPARATUS

Edwin J. McIlvried, Akron, Ohio, assignor to The Vaughn Machinery Company, Cuyahoga Falls, Ohio, a corporation of Ohio

Original application July 26, 1930, Serial No. 470,889. Divided and this application September 14, 1931. Serial No. 562,642

5 Claims. (Cl. 242—25)

This invention relates to winding apparatus for use with various kinds of machinery from which material to be wound is continuously delivered in strand or strip form, such as wire drawing machinery and the like.

This application is filed as a division of my original application for Winding apparatus, Serial Number 470,889 filed July 26, 1930.

My invention, which will be described in detail hereinafter, aims to provide an improved form of winding apparatus embodying means for preventing unwinding of the material which has already been wound.

More specifically my invention aims to provide winding apparatus in which means for preventing unwinding of material from the spool, is automatically actuated upon the opening of the circuit of the spool driving means.

Another object of this invention is to provide winding apparatus wherein roller means is pressed against the material already wound to prevent unwinding of the same upon the supply of power to the spool driving means being interrupted in response to a no-load condition, incident to the breaking of the strand, or to the stopping, of the machine either by the manual act of the operator, or automatically upon the spool becoming full.

The invention may be further briefly summarized as consisting in certain novel combinations and arrangements of parts hereinafter described and particularly set out in the appended claims.

In the accompanying sheets of drawings which illustrate a practical embodiment of the invention,

Fig. 1 is a top plan view showing winding apparatus constructed according to my invention.

Fig. 2 is an elevational view thereof.

Fig. 3 is a partial elevational view showing the means for preventing the unwinding of the strand, and

Fig. 4 is another partial elevational view of the means for preventing unwinding of the strand.

In illustrating the winding apparatus, which embodies my invention, I have shown this apparatus as being used in connection with a wire drawing machine, but it should be understood however that the utility of my invention is by no means limited to the one practical embodiment disclosed in this application.

The wire drawing machine or the like, with which my winding apparatus is used, is indicated generally by the reference character 10, and comprises a casing 11 which houses suitable strand working apparatus. The wire or strip of material which issues from the machine 10, is indicated at 12 and for convenience will be termed a "strand". As shown in Figs. 1 and 2, this strand passes over a sheave 13 arranged near the casing 11, and thence to the reel or spool 14 upon which it is wound. During the winding operation the stand of material is guided by the fingers 15 which move back and forth in timed relation with the speed of rotation of the spool, in a well-known manner.

The spool 14, upon which the material is to be wound, is removably mounted upon, and is driven by a carrier or arbor 16. This carrier is rotatably mounted upon a horizontally extending hollow spindle (not shown) which is clamped between the frame members 17 and 18. A hollow drive shaft 19 extends through the opening of the hollow spindle, and at one end thereof this shaft is drivingly connected to the carrier 16. The opposite end of the drive shaft is provided with an enlargement 20 forming a pulley which is driven from the electric motor 21 by means of the belt 22.

As disclosed in my original application mentioned above, the control means for the driving motor 21 is such as to automatically bring the spool to a stop when the same has been filled with wound material. This control means also permits the motor 21 to be stopped at any time by the operator, and also automatically stops the motor upon the occurrence of a no-load condition caused by the breakage of the strand being wound.

Because of the resiliency of the strand which has been wound upon the spool, there is usually a tendency for the strand to unwind when its continuity has been interrupted by accidental breakage, or by cutting thereof to permit removal of a filled spool. To prevent this unwinding of the strand from the spool I provide a rotatable roll 23 which is adapted to be moved into engagement with the material wound upon the spool at substantially the instant that the tension on the strand is relieved. The roll is movably supported by the bracket 24 which is mounted upon the shaft 25, and this shaft in turn is pivotally supported in the bearing members 26. A coil spring 27 surrounds the shaft 25 and has one end thereof secured to the shaft and its other end secured to the bracket 24. This spring tends to maintain the bracket in a normally upright position, as illustrated in Figs. 2 and 4 of the drawings. For moving the bracket 24 against the action of the spring 27 I provide a sector-shaped rack 28 which is engaged by the driving pinion 29 of the torque motor 30. This motor is of well-

known construction, and when energized tilts the bracket 24 to move the roll towards the spool and retains the roll in contact with the material wound on the spool until its supply of energizing current is interrupted. When the current to the torque motor is cut off, the spring 27 swings the bracket 24 back to its normal position thereby moving the roll out of engagement with the spool. While the construction of the roll 23 may be of any suitable form, I prefer to provide this roll with a covering of rubber 31 so that its engagement with the material wound upon the spool will be substantially noiseless and will not mar this material.

The supply of energizing current for the torque motor is controlled by a suitable relay associated with the control system for the motor 21, so that substantially simultaneously with the opening of the circuit of the motor 21 the relay is actuated to close the circuit of the torque motor. The control system which I prefer to use for the motor 21 is substantially the system disclosed in copending application Serial No. 433,713, filed March 6, 1930, in the name of Charles H. Rippl now Patent 1,867,280, issued July 12, 1932. This system includes a no-load relay so arranged that it will open the circuit of the motor 21 upon the occurrence of a no-load condition such as would result from breakage of the strand being wound. Thus with this arrangement the torque motor 30 is energized and the roll 23 is pressed against the material wound on the spool instantly upon the circuit of the motor 21 being opened either as the result of the limit switch (not shown) being thrown when the spool has been filled, or by the action of the no-load relay when the strand breaks, or as the result of the manual act of the operator.

I have already referred to the fingers 15 as a means for guiding or laying the strand as it is wound upon the spool and, while this device does not form an essential part of my invention. I point out that these fingers are reciprocably movable upon the cylindrical guide 32 and are actuated as a suitable screw which is housed within the guide, and which is rotated by means of the belt 33 through a suitable speed reducing device 34.

From the foregoing description of the winding apparatus of my invention it will be readily seen that I have provided novel means for preventing unwinding of the material from the spool, which means is automatically actuated when the circuit of the spool driving motor has been opened, either as a result of a no-load condition caused by breaking of the strand, or as a result of the spool becoming filled, or by the manual act of the operator.

Throughout the specification and claims I have used the term "spool' to designate the device upon which the strand of material is wound, and it should be understood that I do not use this term in the narrow sense in which it is used to designate the conventional form of spool having flanged ends, but I use this term in the broader sense in which it designates any form of drum, reel or arbor on which a strand is wound or taken up.

While I have described the apparatus of my invention in a detailed manner, it should be understood, however, that I do not intend to limit myself to the precise details shown and described, but regard my invention as including such changes and modifications as do not involve a departure from the spirit of the invention and the scope of the appended claims.

Having thus described my invention, I claim:

1. In apparatus of the character described the combination of a rotatable spool carrier, driving means for rotating said carrier for winding material upon a spool, roller means mounted for movement relative to said spool, and means for pressing said roller means against the material wound on said spool including electromagnetic means adapted to be energized upon interruption of the supply of power to said driving means.

2. In apparatus of the character described the combination of a rotatable spool carrier, driving means for rotating said carrier for winding material upon a spool, roller means adapted to be pressed against the material wound on said spool, movable means for supporting said roller means, and means for actuating said movable means to press said roller means against the material including a torque motor adapted to be energized upon interruption of the supply of power to said driving means.

3. In apparatus of the character described the combination of a rotatable spool carrier, driving means for rotating said carrier for winding a strand upon a spool, roller means adapted to be pressed against the material wound on the spool to prevent unwinding of the same, a pivoted member for movably supporting said roller means, a torque motor adapted to be energized upon the opening of the circuit of said driving means, gear means operably connecting said torque motor and said pivoted member for moving said roller means against the material, and spring means normally holding said roller means out of contact with the material.

4. In apparatus of the character described the combination of a winding arbor, means for rotating said arbor to wind material thereon, a movable support adjacent said arbor, a roller carried by said support, and electromagnetic means operably connected with said support and adapted when energized to move said support toward said arbor for pressing said roller against the wound material.

5. In apparatus of the character described the combination of a winding arbor, means for rotating said arbor to wind material thereon, a support movable toward and away from said arbor, a roller carried by said support, electromagnetic means operably connected with said support and adapted when energized to move said support toward said arbor for pressing said roller against the wound material, and means normally biasing said support away from said arbor.

EDWIN J. McILVRIED.