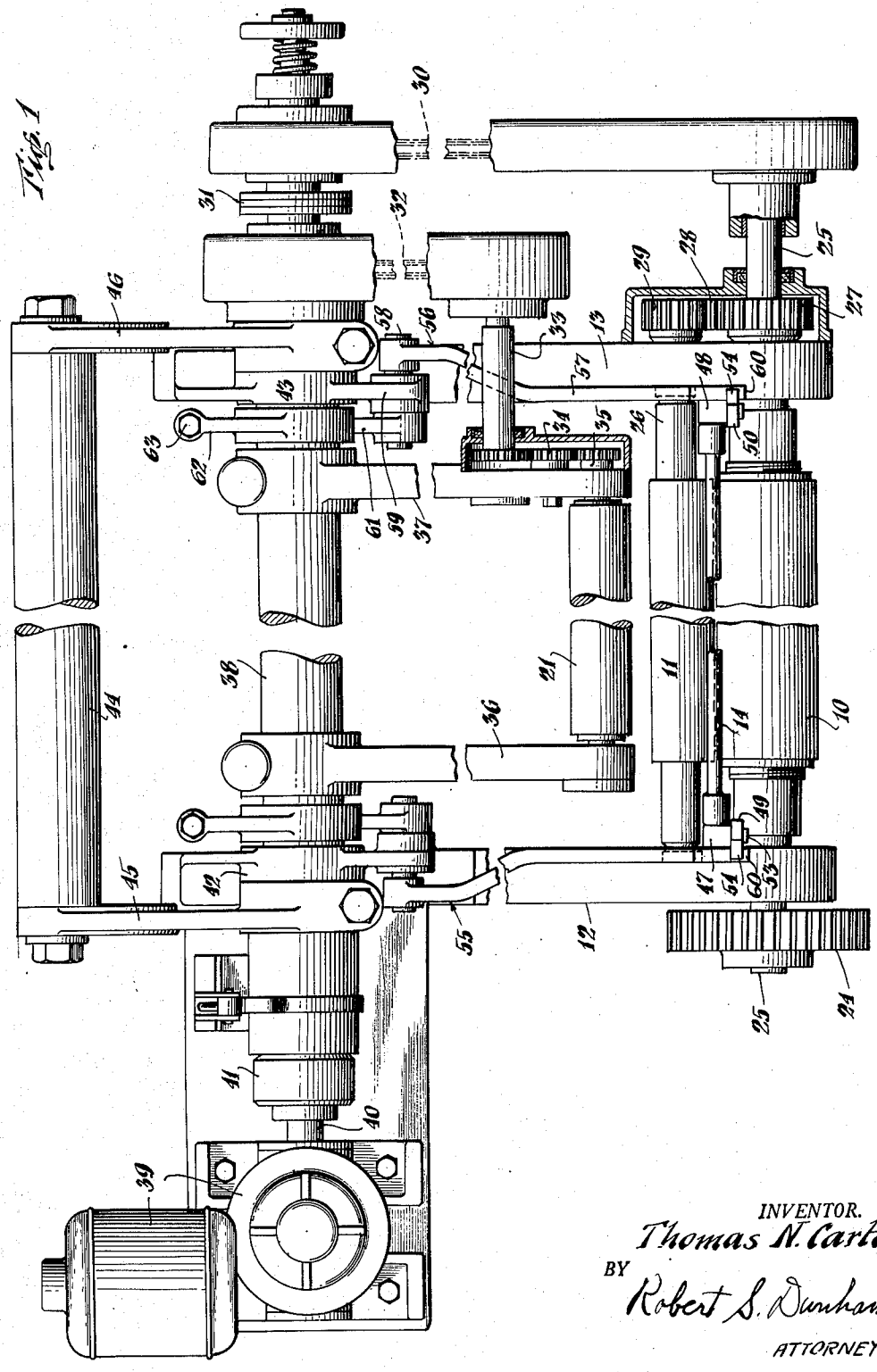
Nov. 11, 1952 T. N. CARTER 2,617,608

WINDING MACHINE

Filed Dec. 23, 1949 2 SHEETS—SHEET 1

Fig. 1



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Fig. 2

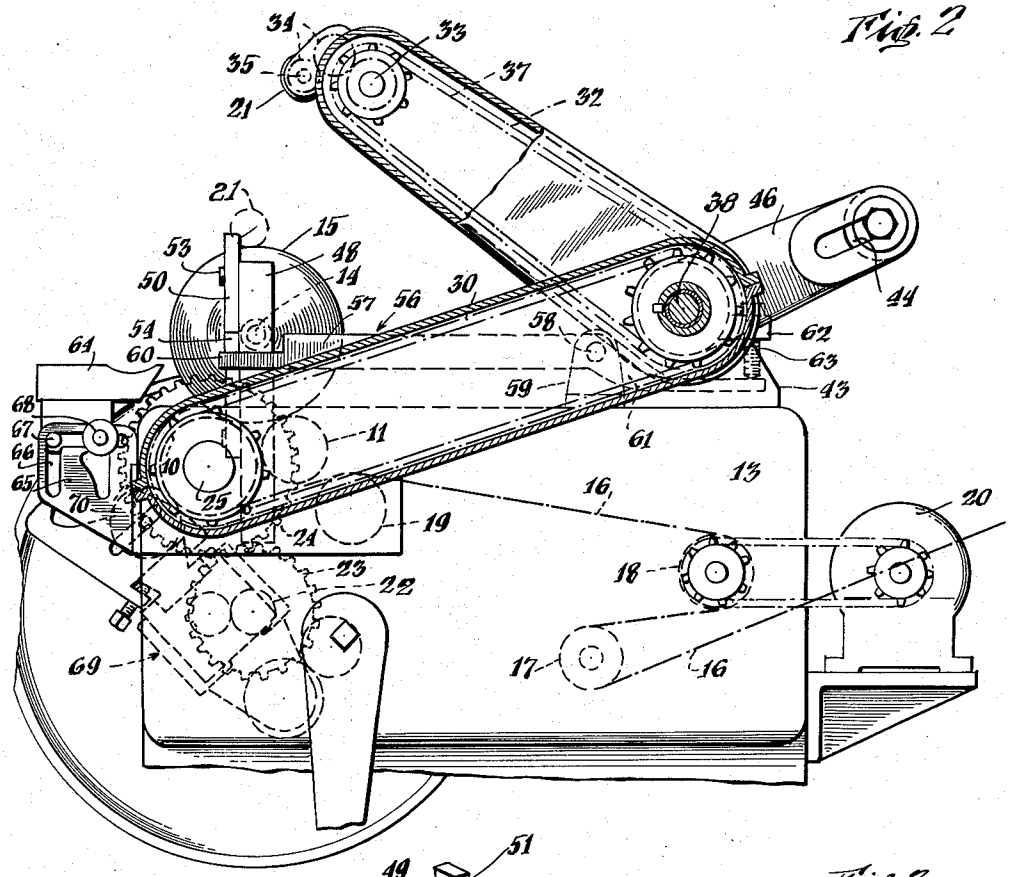
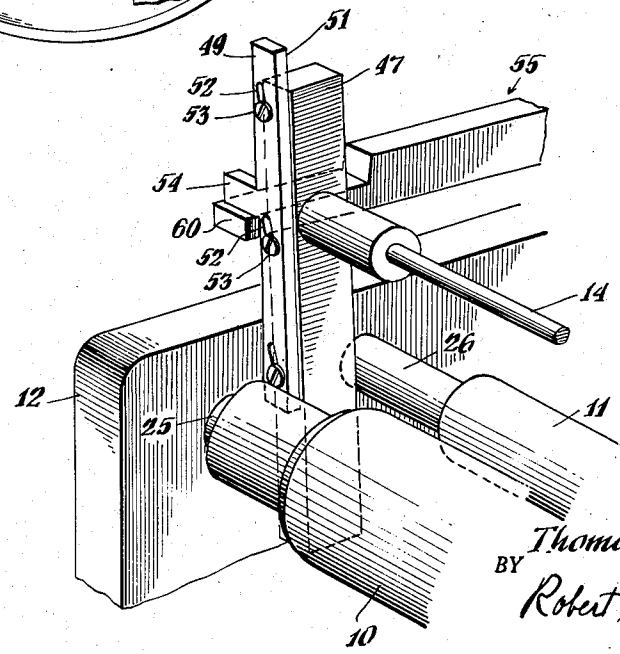


Fig. 3



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WINDING MACHINE

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7 Claims. (Cl. 242—66)

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This invention relates to machines for winding webs of flexible material into rolls.

Machines for winding webs of flexible material commonly employ two surface winding rollers rotatable in the same direction and spaced apart for supporting a core or a winding shaft in the valley between the rollers. The winding rollers frictionally engage the surface of the flexible web on the winding shaft and cause the material to be accumulated thereon. A top-pressure surface riding roller which rests upon the roll of material being wound is usually employed to control the compactness of the roll of wound material and to otherwise assist in the winding of the material.

Among the objects of the invention is to provide mechanism for assuring that the roll of material being wound on the winding shaft will be constrained within the valley between the winding rollers as the winding operation proceeds and the diameter of the roll being wound increases. To this end the mechanism of the present invention includes a pair of keepers which are movably supported adjacent the ends of the winding shaft in such a manner as to overlap and tangentially engage the ends of the winding shaft during a winding operation and so prevent the winding shaft from being laterally displaced from its upward path of travel during a winding operation, and which are adapted to be moved in directions endwise of the winding shaft in order to permit the withdrawal of the roll of material and the shaft when a winding operation has been completed. The winding machine illustrated in the drawings has a pivot shaft with arms which guide a riding roller as the riding roller rests on the roll of material. Means controlled by the pivot shaft are provided for positioning the keepers in overlapping relationship with the ends of the winding shaft when the riding roller is lowered onto the winding shaft preliminarily to a winding operation, and for moving the keepers out of overlapping relationship with the ends of the winding shaft when the riding roller is raised at the conclusion of a winding operation. An embodiment of the invention is illustrated in the accompanying drawing in which,

Fig. 1 is a view in plan showing an application of the mechanism of the present invention to a winding machine in which a winding shaft is illustrated as resting on a pair of winding rollers;

Fig. 2 is an elevation of the machine as viewed from the right end of Fig. 1 and illustrating a roll of material supporting the winding shaft in an elevated position above the winding rollers; and

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Fig. 3 is a perspective view showing the relationship of one of the keepers to its controlling mechanism.

Referring to the drawing, the winding rollers 10 and 11 are rotatably mounted in bearings on the frame side members 12 and 13 in such a manner as to provide therebetween a valley for supporting the cylindrical winding shaft 14 and the roll 15 of flexible material which is wound around the winding shaft. The web of flexible material 16 (Fig. 2) is drawn from a supply spool (not shown) and travels over the guide roll 17, measuring roll 18, idling roll 19, winding roller 10, and around the winding shaft 14 on which the roll 15 is formed. A measuring clock 20 is driven from the measuring roll 18. The top surface riding roller 21 rests on top of the material around the shaft 14 and cooperates with the winding rollers 10 and 11 in the winding of the material.

The drive for the winding roller 10 is transmitted from a power-driven shaft 22 (Fig. 2), through gears 23 and 24 to the shaft 25 (Fig. 1), which carries the winding roller 10. The winding roller 11 on the shaft 26 is rotated from the winding roller 10 by gears 27, 28 and 29 intermediate the two winding roller shafts, Fig. 1. The two winding rollers are driven at the same surface velocity and in the same direction.

The riding roller 21 is driven from the shaft 25 through a sprocket and chain connection 30, a friction disk 31, a sprocket and chain connection 32, the shaft 33 and gearing 34 which is directly connected to drive the riding roller shaft 35. The winding rollers 10 and 11 and the riding roller 21 all rotate clockwise, Fig. 2. The riding roller 21 is supported in bearings carried by a pair of arms 36, 37, which are secured to a rotatable pivot shaft 38.

While manually operable mechanism may be used for raising and lowering the riding roller between winding operations the use of power for performing these functions is highly desirable. The power drive illustrated in the drawing comprises a standard reversible motor and speed reducing unit 39 (Fig. 1), whose operation is controlled by a reversible switch (not shown) which is manually operable to control the direction of rotation of the motor. The speed reducing mechanism provides for high reduction of speed and is capable of being driven only from the motor. This power unit drives a shaft 40 which is connectable to the pivot shaft 38 by a one-way or over-running clutch 41 by which the riding roller 21 is raised when the shaft 40 is rotated clock-

wise (Fig. 2), and is allowed to lower under the pull of gravity when the shaft 40 is rotated counterclockwise.

The pivot shaft 38 is rotatably supported in bearings 42 and 43 carried by the side frame members of the machine. The pressure which the riding roller 21 exerts on the roll of material being wound is a function of the resultant moment of the pivot shaft system which is affected by all devices secured to the pivot shaft. In the machine illustrated the resultant moment may be varied by variably locating a bar 44 with respect to the axis of the pivot shaft. The bar is adjustably supported from the pivot shaft by the arms 45 and 46.

At the beginning of a winding operation the winding shaft 14 is located between the winding rollers 10 and 11 as illustrated in Fig. 1, and is engaged by the leading edge of the web of material to be wound. The riding roller is then lowered and allowed to rest upon the winding shaft and the winding rollers are then rotated until a roll of material is produced. So much of a winding machine has been described as to provide an understanding of the relationship of the present invention thereto. The winding machine is more fully described in the copending United States Patent applications Serial No. 134,751, filed December 23, 1949, and Serial No. 134,753, filed December 23, 1949, now Patent No. 2,579,791 of December 25, 1951.

Extending upwardly from the frames 12 and 13 of the machine there are provided two vertical standards 47 and 48, Fig. 1, which are located, respectively, opposite each end of the valley between the winding rollers 10 and 11. The standards are spaced apart a distance equal to the length of the winding shaft 14 and provide abutments for preventing longitudinal movement of the shaft.

The standards 47 and 48 carry complementary keepers 49 and 50, respectively, as best seen in Figs. 2 and 3, each of which has a vertical guiding surface 51 so disposed as to prevent the winding shaft 14 from moving laterally over the winding roller 10 during a winding operation. Since the winding rollers 10 and 11 are driven in the clockwise direction, Fig. 2, the roll of material 15 is influenced to move forwardly over the roller 10 owing to its reaction. Because of this it is necessary to prevent deviation of the winding shaft from its upward path of travel only in one direction.

Each keeper is in the form of a bar or plate whose movements are controlled by cam means such as a series of inclined slots 52 which are engaged by stud screws 53 fastened to the front face of the standard over which the keeper is slidable. The relationship of the slots and stud screws is such that a keeper will slide to a position in which it will overlap and tangentially engage the end of the winding shaft 14 unless it is restrained from doing so. When the keeper is lifted the stud screws and the slots direct the movement of the keeper away from overlapping relationship with the end of the winding shaft. Each keeper is provided with a lug 54 by which the keeper may be lifted to effect its withdrawal from overlapping relationship with the end of the winding shaft 14. The two keepers are similarly constructed but are so related to their respective standards 47 and 48 as to be movable towards and away from each other and endwise of the shaft 14.

There are two similar mechanisms for controlling the positions of the two keepers, one of which includes a lever 55 and the other of which includes a lever 56. It will suffice to describe one of said mechanisms. The lever 56, Figs. 1 and 2, has an arm 57 which is pivotally mounted on a shaft 58 supported by a bearing 59. A finger 60 at the front end of the lever extends to the underside of the lug 54 of the keeper. An arm 61 is carried by the shaft 58 and extends rearwardly of the pivot shaft 38. The pivot shaft 38 carries a bracket 62 and an adjustable screw 63 which extends downwardly for engaging with the arm 61 when the pivot shaft 38 is rotated clockwise, Fig. 2. The screw 63 constitutes an adjustable stop by which the timing of the initiation of the movement of the lever 56 is determinable. The adjusted position of the screw 63 is such that it will come into contact with the arm 61 and raise the arm 57 and thereby displace the keeper over the front face of its supporting standard and away from overlapping relationship with the end of the winding shaft when the riding roller 21 has been raised a predetermined distance as shown in Fig. 2.

There is a lever and associated controlling mechanism at each end of the machine for controlling the movements of the two keepers adjacent the opposite ends of the winding shaft. When the pivot shaft is rotated and the riding roller 21 has been elevated to a predetermined position (Fig. 2), the two keepers are lifted and, at the same time, are moved beyond the ends of the winding shaft 14. With the keepers in these positions the winding shaft and the roll of material accumulated thereon may be rolled over the winding roller 10 and onto the platform 64. Manual lifting of the roll from the rollers 10 and 11 is rendered unnecessary and saving in time in removing the roll and in placing a winding shaft for another winding operation is attained by the mechanism of the present invention.

A fresh winding shaft may be readily placed over the rollers 10 and 11 while the keepers are held clear of the facing surfaces of the standards 47 and 48. Upon lowering the riding roller 21 into contact with the winding shaft, the levers 55 and 56 are relieved from support by the screws 63 and the keepers immediately drop and slide edgewise into tangential engagement with the ends of the winding shaft.

The platform 64 is supported by a pair of brackets 65, one at each end of the machine. The brackets have slots 66 which are engaged by studs 67 and 68 and the slots are so shaped as to enable tilting of the platform to different positions. By fastening the platform in a rearwardly tipped position the slitting mechanism 69 comprising a slitting disk 70 is made accessible to an operator. The operation of the machine will be apparent to those skilled in the art in view of the foregoing disclosure.

The principle of the invention, together with mechanism considered to represent the best embodiment of the invention which has been contemplated, has been described, but it is desired that it be understood that the mechanism disclosed is only illustrative and that the invention can be carried out by other means within the scope of the appended claims. While it is proposed to use the various features and elements in the combinations and relationships described, some of these may be altered and others omitted without departing from the invention.

What is claimed is:

1. In a winding machine having a winding shaft to be frictionally driven by means that engage the surface of a roll of flexible material accumulated thereon, two surface winding rollers rotatable in the same direction and spaced apart to support said roll in the valley between them, and means for driving at least one of said winding rollers to cause flexible material to be accumulated on said winding shaft, the combination comprising means abutting the ends of said winding shaft for preventing longitudinal movement thereof while permitting said shaft to travel upwardly from said winding rollers, means located adjacent the ends of said winding shaft and having substantially vertically disposed surfaces tangentially engageable with cylindrical surfaces of said shaft for preventing lateral deviation of said shaft from the upward path of travel thereof, and means for moving said last-named means towards each other and into overlapping relationship with said winding shaft when moved in one direction, and away from each other and out of overlapping relationship with said winding shaft when moved in another direction.

2. In a winding machine having a winding shaft to be frictionally driven by means that engage the surface of a roll of flexible material accumulated thereon, two surface winding rollers rotatable in the same direction and spaced apart to support said roll in the valley between them, and means for driving at least one of said winding rollers to cause flexible material to be accumulated on said winding shaft, the combination comprising means abutting the ends of said winding shaft for preventing longitudinal movement thereof while permitting said shaft to travel upwardly from said winding rollers, means located adjacent the ends of said winding shaft and tangentially engageable with cylindrical surfaces of said shaft for preventing lateral deviation of said shaft from the upward path of travel thereof, a pivot shaft, and means controlled by said pivot shaft for moving said last-named means towards each other and into overlapping relationship with said winding shaft when said pivot shaft is rotated in one direction and for moving said last-named means beyond the ends of said winding shaft when said pivot shaft is rotated in the opposite direction.

3. In a winding machine having a winding shaft to be frictionally driven by means that engage the surface of a roll of flexible material accumulated thereon, two surface winding rollers rotatable in the same direction and spaced apart to support said roll in the valley between them, and means for driving at least one of said winding rollers to cause flexible material to be accumulated on said winding shaft, the combination comprising a pair of vertically extending standards, said standards being spaced apart and located opposite the ends of said winding shaft to restrain longitudinal movement of said winding shaft, keepers carried by said standards and engageable in overlapping relationship with the ends of said winding shaft, means carried by said standards for limiting the movements of said keepers into and out of overlapping relationship with the ends of said winding shaft, a pivot shaft, and means for controlling the positions of said keepers, said last-named means being controlled by said pivot shaft for moving said keepers into overlapping relationship with the ends of said winding shaft when said pivot shaft is rotated in one direction and for moving said keepers out of overlapping relationship with the ends of said winding shaft when said pivot shaft is rotated in the other direction.

4. The combination set forth in claim 3 in which the means controlled by said pivot shaft for moving said keepers comprise pivoted levers, each lever having an arm adapted to engage one of said keepers, and means carried by said pivot shaft for engaging said levers to cause them to move said keepers out of overlapping relationship with the ends of said winding shaft when said pivot shaft has been rotated a predetermined distance in one direction and to cause movement of said levers to move said keepers into overlapping relationship with the ends of said winding shaft when said pivot shaft is rotated in the reverse direction.

5. In a winding machine having a winding shaft to be frictionally driven by means that engage the surface of a roll of flexible material accumulated thereon, two surface winding rollers rotatable in the same direction and spaced apart to support said roll in the valley between them, and means for driving at least one of said winding rollers to cause flexible material to be accumulated on said winding shaft, the combination comprising a pair of vertically extending standards, said standards being spaced apart and located opposite the ends of said winding shaft to restrain longitudinal movement of said winding shaft, keepers engageable with cylindrical surfaces of said winding shaft, cam means for controlling the movements of said keepers in the longitudinal direction of said winding shaft, said cam means serving to direct the movements of said keepers away from each other and towards each other into engaging relationship with said winding shaft, a pair of levers, each lever having one end in contacting relationship with one of said keepers, a pivot shaft, a pair of stops carried by said pivot shaft, said stops being adapted to engage said levers when said pivot shaft has been rotated in one direction to a predetermined position and cause said cam means to move said keepers out of overlapping relationship with said winding shaft and to cause said cam means to move said keepers into overlapping relationship with winding shaft when said pivot shaft is rotated in the opposite direction.

6. In a winding machine having a winding shaft to be frictionally driven by means that engage the surface of a roll of flexible material accumulated thereon, two surface winding rollers rotatable in the same direction and spaced apart to support said roll in the valley between them, and means for driving at least one of said winding rollers to cause flexible material to be accumulated on said winding shaft, the combination comprising a pair of vertically extending standards, said standards being spaced apart and located opposite the ends of said winding shaft to restrain longitudinal movement of said winding shaft, keepers engageable with cylindrical surfaces of said winding shaft, cam means for controlling the movements of said keepers in the longitudinal direction of said winding shaft, said cam means serving to direct the movement of said keepers away from each other and out of engaging relationship with said winding shaft when said keepers are elevated and moved towards each other into engaging relationship with said winding shaft when said keepers are lowered, and means for controlling the movements of said keepers.

7. In a winding machine having a winding shaft to be frictionally driven by means that engage the surfaces of a roll of flexible material accumulated thereon, two surface winding rollers rotatable in the same direction and spaced apart to support said roll in the valley between them, and means for driving at least one of said winding rollers to cause flexible material to be accumulated on said winding shaft, the combination comprising a pair of vertically disposed standards spaced apart and together providing guiding surfaces which engage said winding shaft and prevent axial movement thereof as said winding shaft is lifted by the material being wound thereon, means having substantially vertically disposed surfaces engageable with said winding shaft for restraining said winding shaft from moving in a direction laterally to the vertical plane of travel of the axis of said winding shaft as determined by the continuing change of the diameter of the roll of material being wound thereon, said restraining means being displaceable with respect to said standards and from restraining position with respect to said winding shaft so as to enable movement of said winding shaft laterally to said vertical plane, and means for holding said restraining means in position for restraining said winding shaft from moving from said vertical plane as the diameter of the roll of material changes.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,484,843	O'Clair	Feb. 26, 1924