

Nov. 22, 1966

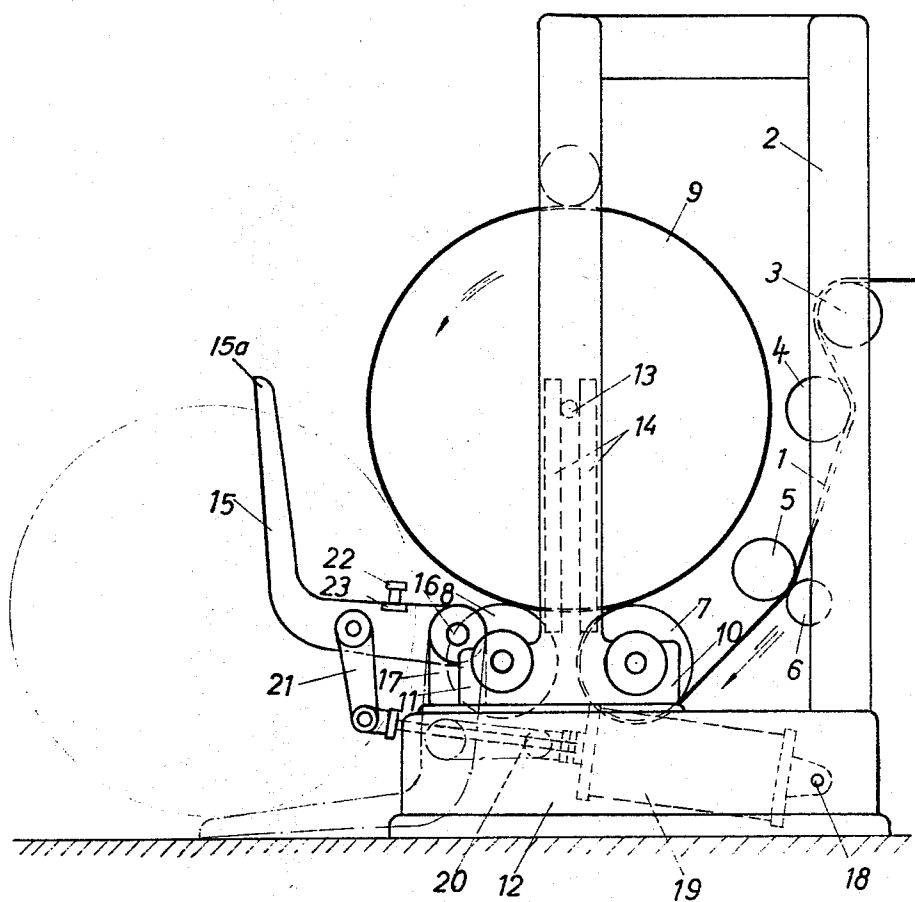
E. KUSEL
PROTECTIVE AND LOWERING MEANS FOR THE
PAPER ROLL OF WINDING MACHINES

3,286,944

Filed May 12, 1964

2 Sheets-Sheet 1

Fig. 1



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Fig. 2

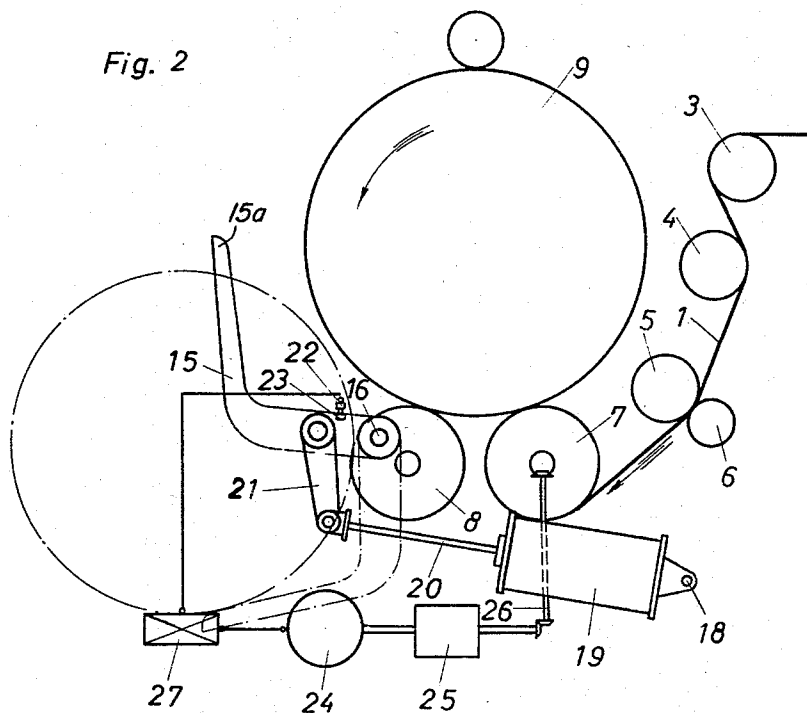
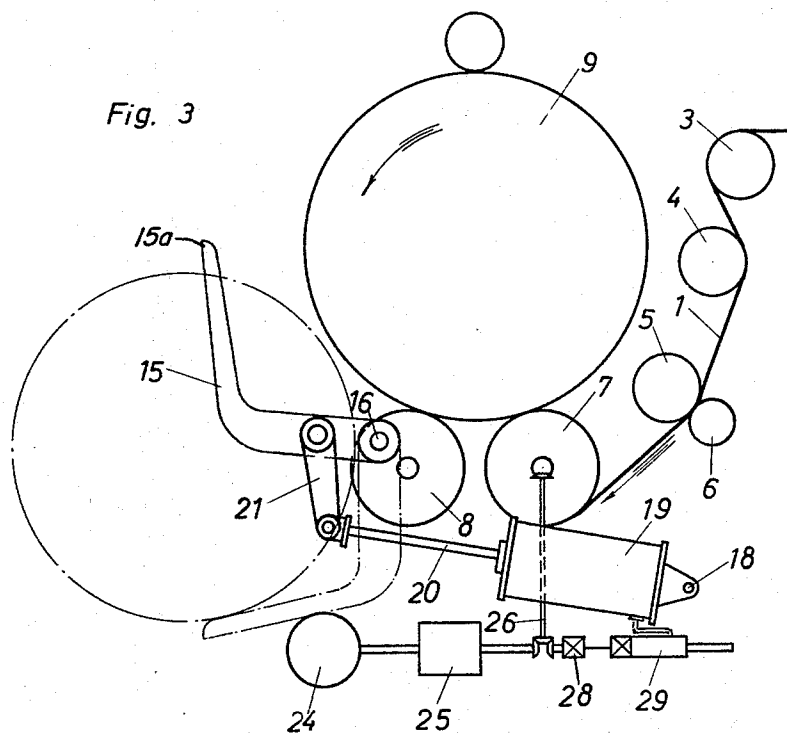


Fig. 3



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PROTECTIVE AND LOWERING MEANS FOR THE PAPER ROLL OF WINDING MACHINES

Ernst Kusel, Dusseldorf-Lohausen, Germany, assignor to Jagenberg-Werke AG., Dusseldorf, Germany

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4 Claims. (Cl. 242—66)

The present invention relates to paper machinery and more particularly to machines for winding webs of paper, cardboard and similar material, wherein the winding roll is supported by a roller bed such as double support rollers and embodies means for protecting the operators and equipment against injury as well as serving as a lowering component for the completely wound roll.

In double support roller arrangements, the high operating speeds require the provision of special measures which, during winding, function to prevent an accidental or unintentional dislodging of the paper roll from the double support rollers. The tendency of a heavy winding roll to move from the roller bed is augmented with an increasing roll diameter in conjunction with the high operating speeds. In other words, with an increasing roll diameter in conjunction with the high operating speeds. In other words, with an increasing roll diameter, constantly increasing forces develop which are capable of throwing the roll from the roller bed. This is particularly true where the roll is unbalanced such as when the roll is out of round.

In the case of double support roller arrangements which operate with "axle-less winding," that is, the web is wound on a group of shells, provided with short pins in lieu of continuous shafts and located side by side on the roller bed, the danger of the rolls being "thrown" from the bed is particularly great.

For the above reasons, it has become the practice in the art to provide safety or protective means which is moved into the zone of the center of gravity of the winding roll on the service or operator side of the machine and at the termination of the winding cycle, such safety means is displaced away from such zone.

Aside from the fact that such safety or protective devices involve a substantial monetary expense, the known assemblies provide merely a protective means which is effective solely against the "throwing" of the roll and affords no protection as to the operator reaching into the working area or zone. Furthermore, it is customary in the handling of the heavy roll after the conclusion of the winding operation, to associate with the double roller support bed, lowering means which, at the termination of the winding cycle, receives the roll discharged from the bed and lowers such roll to the floor or equivalent level.

One of the objects of the present invention is to provide an assemblage which, without additional expenditures or space requirements, provides an effective shield or protective means for preventing the "throwing" of the winding roll from the roller support bed during the winding cycle as well as protecting the operator or equipment from injury.

To accomplish the above and other advantageous objects, the protective means is defined by a trough-like component which is pivotable about a stationary axis and which is provided with height and width dimensions such that any unintentional removal of the winding roll from the support roller bed as well as access into the danger zone of the machine by the operator is prevented. More specifically, the trough-like component has a width dimension substantially corresponding to the axial extent of the winding roll and a height dimension such that

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when the trough-like component is swung about its stationary axis into the operative or raised position, the upper or free edge thereof is located above the zone of the center of gravity of the winding roll.

The invention further comprehends the provision of means which only permits the winding cycle to be initiated when the trough-like component is in the operative or raised position and such means includes an end switch provided in the zone of movement of the trough-like component and which end switch is cooperable with the machine drive for preventing initiation of the winding operation as long as the trough-like component is in its inoperative or lowered position. The trough-like component may be maintained in the operative or raised position by electrical, mechanical or other suitable locking means which prevents a movement of the trough-like component from the raised position to the lowered position while the machine is in operation.

Additional objects and advantages of the invention will become more readily apparent to one skilled in the art from the following detailed description and annexed drawings of an embodiment thereof, in which drawings:

FIG. 1 is an elevational view of a winding machine embodying the invention, and

FIGS. 2 and 3 are diagrammatic views of the interlocking safety systems.

From the drawings it will be seen that a winding roll 9 is supported by a roller bed and a protective means is operatively associated with the roll 9. The roller bed includes support rollers 7 and 8 mounted in bearings 10 and 11 on base 12 of the machine frame. The axle of the winding roll is defined by short pins 13 mounted in vertical guides 14 of machine stand 2 in a known fashion.

Paper web 1 emanating from a supply roll (not illustrated) travels by way of guide rollers 3 and 4 carried by the stand 2 into the area of a cutting unit defined by circular knives 5 and counter-knives 6. After leaving the cutting unit, the web passes about the support roller 7 and is guided onto the winding roll 9. Of course, the rollers 7 and 8 which support the winding roll operate at high speed as is well known in the art.

The protective means which is located on the service side of the machine is constituted by a trough-like component 15 which, in addition to serving as a protective means for the operator and the equipment, provides a lowering means for the completely wound roll. The width of the component 15 corresponds essentially to the axial extent of the roll and the height of the component is such that upper or free edge 15a is located above the center of gravity of the winding roll 9 when the component is in the operative or raised position as shown in the full lines in FIG. 1.

The trough-like component 15 is pivotally mounted about an axle 16 mounted in bearings 17 carried by the forward end of the base 12 with such axle defining a stationary axis of rotation for the component 15. To actuate the trough-like component, there is provided a pneumatic or hydraulic cylinder 19 which is pivotally mounted on the base 12 as shown at 18 and piston rod 20 thereof is operably attached to the component 15 by lever 21. Obviously, when fluid is admitted into the cylinder to extend the piston rod, the component 15 is swung about the axle 16 to its operative or raised position (full lines) while upon retraction of the piston rod the component is swung to its lower position (dot-dash lines).

During the winding operation, the trough-like component is moved to the raised position and in such position functions as a protective shield at the service side of the machine and also prevents the discharge of the winding roll 9 from the bed defined by the support rollers 7 and 8. At the same time, the component 15 will pre-

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vent the operator from reaching into the danger zone and subjecting himself to possible injury.

At the conclusion of the winding cycle, the fully wound roll is moved from the roller support bed by known means in the direction of the service side and placed upon the trough-like component 15. The piston-cylinder unit 20, 19 is then actuated to lower the component 15 about the axle 16 so that the wound roll is moved to the floor level as depicted by the dot-dash lines in FIG. 1.

In order to prevent the starting of the machine when the trough-like component 15 is not in the raised position, it will be seen that a switch 22 on the machine frame and located in the pivotal zone of the component and operably associated with the machine drive is only activated to initiate the drive when a lug or abutment 23 on the component engages the switch in the raised position of such component. This is clearly shown in the full line position of FIG. 1 and in FIG. 2.

As indicated in FIG. 2 the support rollers 7, 8 are driven by means of motor 24, gear 25 and mechanical power transmission 26. The motor 24 is controlled via switching means 27 in the form of a valve or relay which is operated by switch 22. As already mentioned, the interlocking safety system is so designed that the motor 24 and therefore the machine drive can only be engaged if the component 15 is in its topmost position.

A further interlocking safety system is illustrated by FIG. 3. In this case the component 15 cannot be lowered so long, as the support rollers 7, 8 and therefore the winding roll 9 are rotating. Lowering of the component 15 is locked in such a manner that the drive of the support roller 7 operates a speed responsive control 28 which, with the help of a magnetic valve 29, prevents the lowering of cylinder 19 when the machine is running.

With respect to the speed responsive control above described, attention is directed to Patent No. 3,185,402, issued May 25, 1965, particularly with respect to the electro-magnetic control for the safety device disclosed therein.

The invention is not to be confined to any strict conformity to the showing in the drawings but changes or modifications may be made therein so long as such changes or modifications mark no material departure from the spirit and scope of the appended claims.

What is claimed is:

1. In a machine for winding webs of paper, cardboard and similar materials, a roll on which the web is to be wound, a pair of rollers constituting a bed for said roll, means for driving at least one of said rollers for impart-

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ing rotary movement to said at least one roller and means defining a protective device during winding and a lowering device for the completely wound roll, said means including a trough-like component pivotally mounted in proximity to the bed for the roll and extending axially of the roll, means operably coupled to said trough-like component operative to swing said component to a raised position for serving as a protective shield during winding and to a lowered position after winding for lowering the completely wound roll to floor level, and means for permitting activation of said driving means only when said trough-like component is in the raised position.

2. The machine as claimed in claim 1, in which said trough-like component is provided with height and width dimensions for preventing accidental removal of the roll from the bed and access to the roll by an operator when said component is in the raised position.

3. The machine as claimed in claim 1, in which said trough-like component is provided with a width dimension substantially corresponding to the axial extent of the roll and a height dimension whereby the free edge of said component is located above the center of gravity of the roll when said component is in the raised position thereby preventing accidental removal of the roll from the bed and access to the roll by an operator.

4. The machine as claimed in claim 1, in which said last named means is switch means located in the zone of pivotal movement of the trough-like component and an abutment on said trough-like component is engageable with said switch means when the component is in the raised position.

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FRANK J. COHEN, *Primary Examiner*.

MERVIN STEIN, *Examiner*.

W. S. BURDEN, *Assistant Examiner*.