

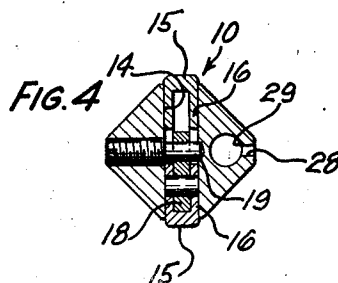
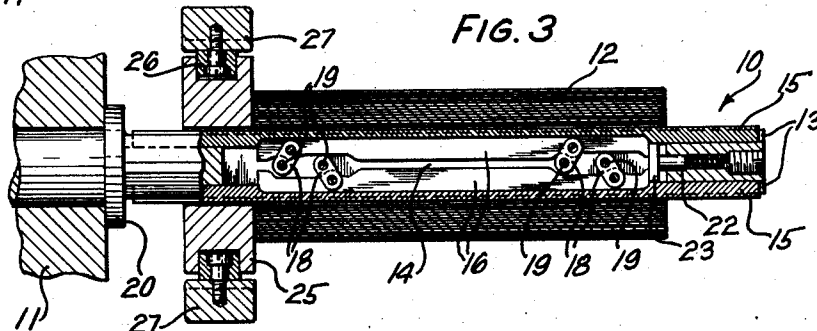
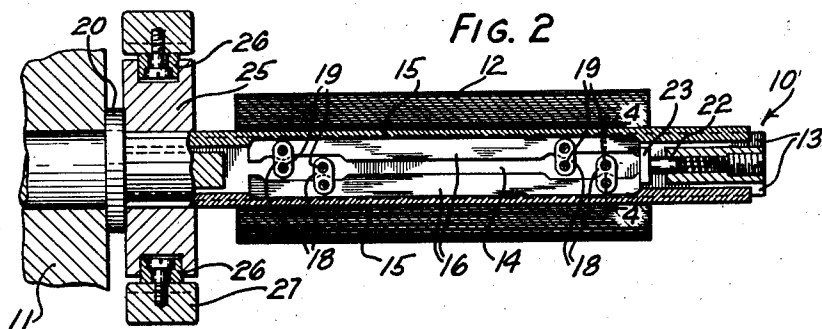
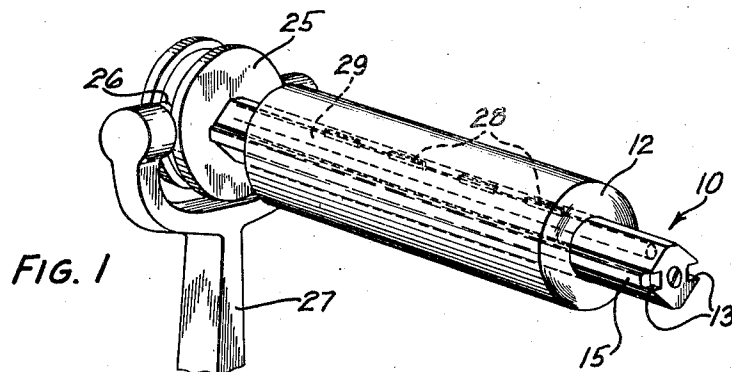
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WINDING MACHINE

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WINDING MACHINE

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3 Claims. (Cl. 242—72)

This invention relates to winding machines, and more particularly to machines for winding sheet or strand material into rolls or coiled units.

The invention is particularly applicable, although not limited so, to winding machines in which sheet or strand material is wound on a rotating arbor and then stripped therefrom in the form of a self supporting roll or coiled unit.

An object of the invention is to provide an improved winding arbor constructed to facilitate the removal of a wound unit therefrom, preferably without stopping the rotation of the arbor.

In accordance with this object, one embodiment of the invention contemplates the provision of a collapsible winding arbor having an ejector collar slidable longitudinally thereof for stripping a wound unit therefrom, the arbor being constructed so that it is automatically collapsed or reduced in cross section by the pressure of the ejector collar on the wound unit being stripped from the arbor, whereby the wound unit is rendered freely removable from the arbor.

Other features and advantages of the invention will become apparent in the following detailed description, when read in conjunction with the accompanying drawing, in which

Fig. 1 is a perspective view of a winding arbor having a roll or condenser unit wound thereon;

Fig. 2 is a longitudinal section through the arbor and wound condenser unit, showing the collapsible portions of the arbor in their expanded positions.

Fig. 3 is a similar section, showing the collapsible portions of the arbor retracted and the wound condenser unit being stripped from the arbor by the ejector collar; and

Fig. 4 is an enlarged transverse section on line 4—4 of Fig. 2.

The invention is herein illustrated and described in connection with the winding of condenser units comprising alternate layers of paper and metal foil. However, it will be obvious that the novel features of the invention are equally applicable to winding arbors upon which wire, thread or other material may be wound and then stripped therefrom as a unit, and if desirable, without stopping the rotation of the arbor.

Referring now to the drawing, wherein like reference characters designate corresponding parts in the several views, an arbor 10 is rotatably journaled, at one end, in the winding machine framework, a portion of which is indicated at 11. It will be understood that the arbor is rotated by any suitable means (not shown) and through such rotation superposed layers of sheet or strand

material are wound upon the arbor in the form of a roll or coiled unit. In the drawing, a paper and metal foil condenser unit 12 is shown wound upon the arbor.

The winding arbor 10, in the present embodiment of the invention, is of substantially rectangular cross section, as shown in Fig. 4. It is obvious, of course, that the invention is equally applicable to arbors of circular or any other cross section that may be found best suited to the particular winding operation to be performed thereon. The rectangular or square winding arbor has been found very satisfactory for winding condenser units.

Two diametrically opposed corner edges of the arbor 10 are formed with longitudinally extending grooves 13, 13, which extend the full length of the arbor. Except for a short distance from each end of the arbor, the central portion of the arbor between the grooves 13 is cut away to provide an elongated slot 14 of the same width as the grooves. Slidable within each of the grooves 13 is a toggle slide 15 provided intermediate its ends with inwardly turned flanges 16 which extend into the central slot 14 wherein they are pivotally connected by means of spaced toggle links 18, 18 to studs 19, 19 secured to the arbor.

Longitudinal movement of the toggle slides toward the inner end of the arbor is limited by the engagement of the inner ends of the slides with an annular flange 20 on the inner end of the arbor, at which time the toggle links 18 are disposed substantially perpendicular to the axis of the arbor, and the toggle slides are in their expanded positions, as shown in Fig. 2. A spring pressed plunger 22 is slidably mounted in an axial bore in the outer end portion of the arbor and has an enlarged rectangular head portion 23 slidable in the central slot 14 and designed to press inwardly against the outer ends of the inwardly turned flanges 16 of both toggle slides, thus serving to normally hold the toggle slides in their expanded positions, wherein they project outwardly beyond the slotted corner edges of the arbor.

Longitudinal movement of the toggle slides 15 from their expanded positions shown in Fig. 2 toward the outer end of the arbor causes a pivotal movement of the toggle links 18 about their fixed pivots 19, whereby the toggle slides are drawn inwardly or retracted into the grooves 13, thus reducing the cross section of the arbor. The inward or retractal movements of the toggle slides are limited by the engagement of the end portions of the slides with the bottom of the grooves 13 in the end portions of the arbor, as shown in

Fig. 3 wherein the toggle slides are shown in their retracted positions.

Slidable on the arbor and rotatable therewith is an ejector collar 25 having an annular groove 5 for slidably receiving a pair of rollers 26, 26 carried by a bifurcated end of an actuating lever 27. Through the movement of the lever 27 by any well known means (not shown) the ejector collar 25 is moved longitudinally of the rotating arbor 10 from its normal position shown in Figs. 1 and 2 toward the outer end of the arbor, to thereby strip a wound unit from the arbor.

As shown in Fig. 1, the arbor is provided with several vacuum ports 28, 28 spaced longitudinally 15 along a corner edge of the arbor other than the corner edges within which the toggle slides are mounted. These vacuum ports 28 are connected by a longitudinal orifice 29 to a suitable vacuum system (not shown), whereby the forward end of 20 the sheet or strip material to be wound is readily grasped by the rotating arbor to start the winding operation.

The operation is as follows: The forward end of the sheet or strip material to be wound is advanced to a position adjacent the rotating arbor, 25 where it is automatically picked up by the vacuum in the ports 28, thus starting the winding of the material upon the rotating arbor, which at this time is maintained expanded by the spring pressed plunger 22, as above described. When a 30 predetermined amount of material has been wound, it is severed from the supply preferably without stopping the rotation of the arbor. After disconnecting the vacuum ports 28 from the 35 vacuum system in any well known manner, the lever 27 is actuated to move the ejector collar 25 toward the outer end of the rotating arbor and thereby strip the wound unit from the arbor. In the event that the wound unit tends to stick to 40 the arbor or does not move freely thereon the resulting pressure of the moving ejector collar on the end of the wound unit moves the toggle slides toward the outer end of the arbor against the action of the plunger 22, as shown in Fig. 3, thus 45 causing them to be retracted as described above.

This obviously reduces the cross section of the arbor, thus releasing the wound unit and facilitating its removal by the continued movement of the ejector collar. The ejector collar then returns to its normal position and the spring pressed 80 plunger 22 expands the arbor to its normal position ready to start the winding of another unit.

It is to be understood that the present invention is not limited to the specific details of construction and arrangement of parts herein illustrated and described, except in so far as is defined by the appended claims. 85

What is claimed is:

1. In a winding machine, a winding arbor comprising a rigid portion and a portion movable longitudinally and radially thereof for varying the cross sectional area of the arbor, yieldable means for moving the movable portion in one direction to increase the cross sectional area of the arbor, and a collar slidable on the arbor and operative 90 by its engagement with material wound on the arbor for moving the movable portion in another direction to decrease the cross sectional area of the arbor, and for simultaneously stripping the wound material from the arbor. 95

2. In a winding machine, a winding arbor having a slot extending longitudinally thereof, a toggle bar slidable in said slot, a spring for longitudinally moving the toggle bar in one direction to thereby move said bar radially outwardly of 100 the arbor and into frictional engagement with material wound on the arbor, and means movable longitudinally of the arbor for stripping wound material therefrom and for simultaneously retracting the toggle bar against the force of the 105 spring. 110

3. In a winding machine, a winding arbor having a collapsible portion, yieldable means for normally holding said portion in its expanded position to frictionally engage material wound on the 115 arbor, and means movable longitudinally of the arbor for stripping wound material therefrom and for simultaneously retracting said collapsible portion against the force of said yieldable means.

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