

Dec. 30, 1969

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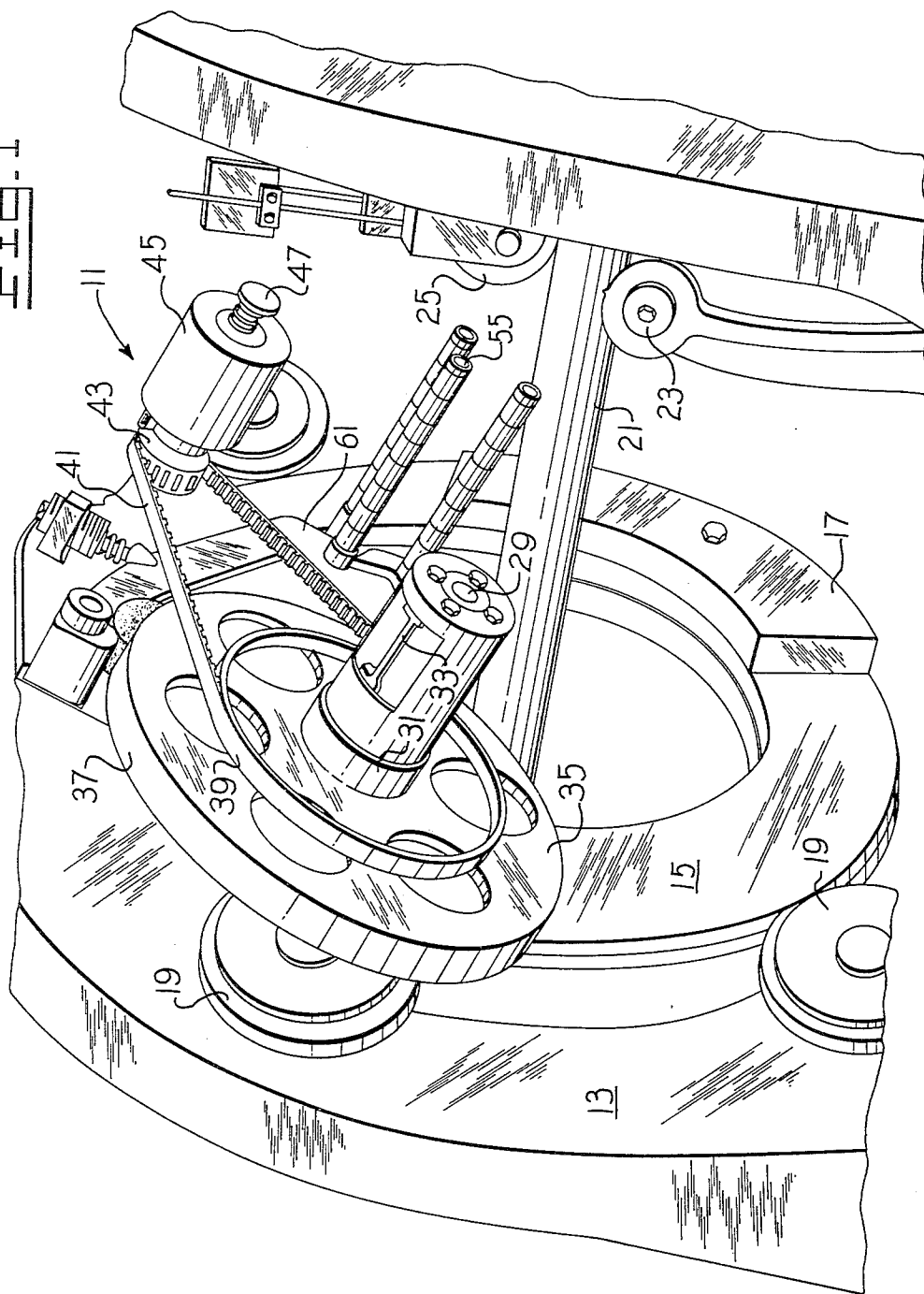
3,486,317

TENSIONING DEVICE FOR HELICAL WRAPPING

Filed Jan. 26, 1968

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FIG. 1



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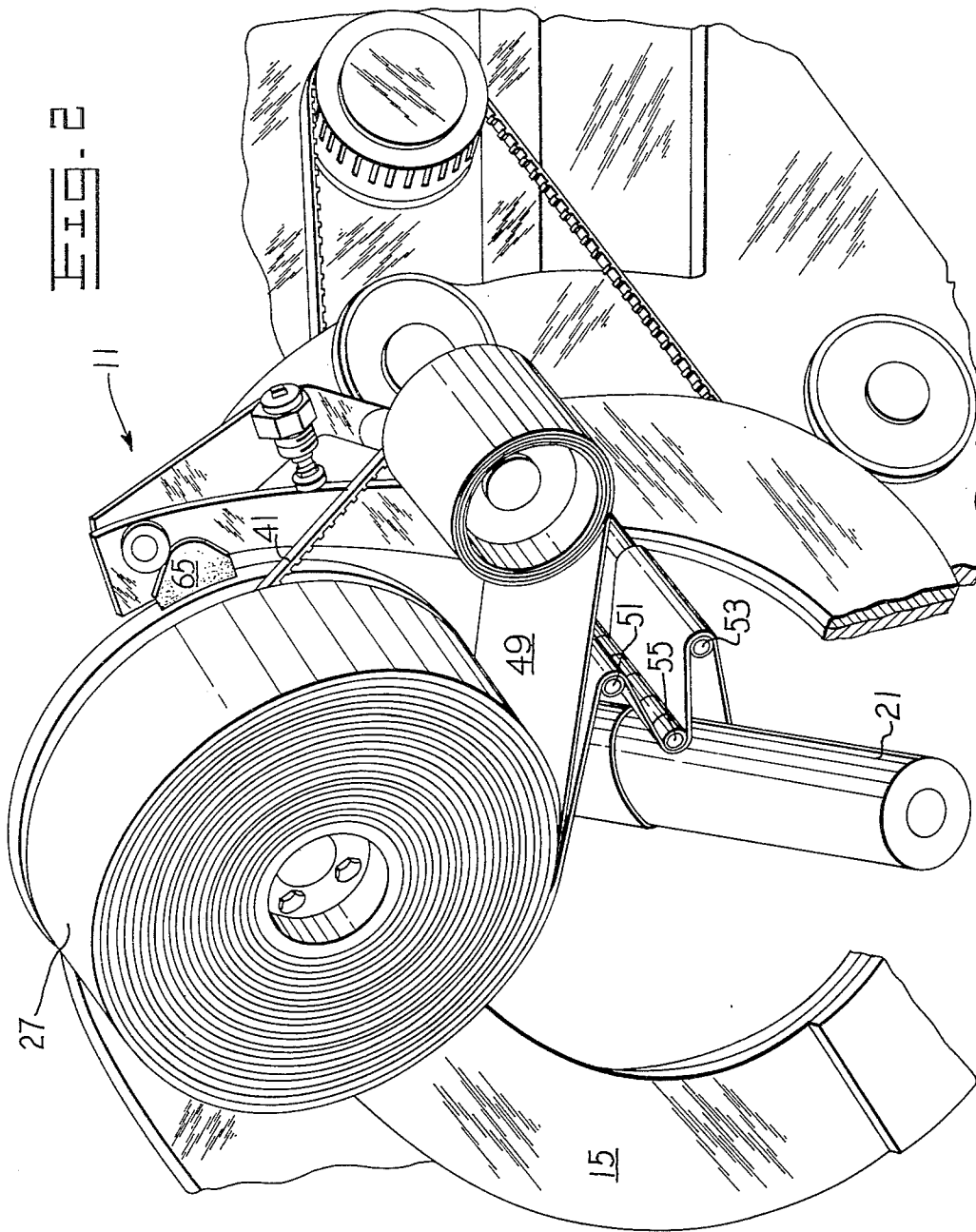
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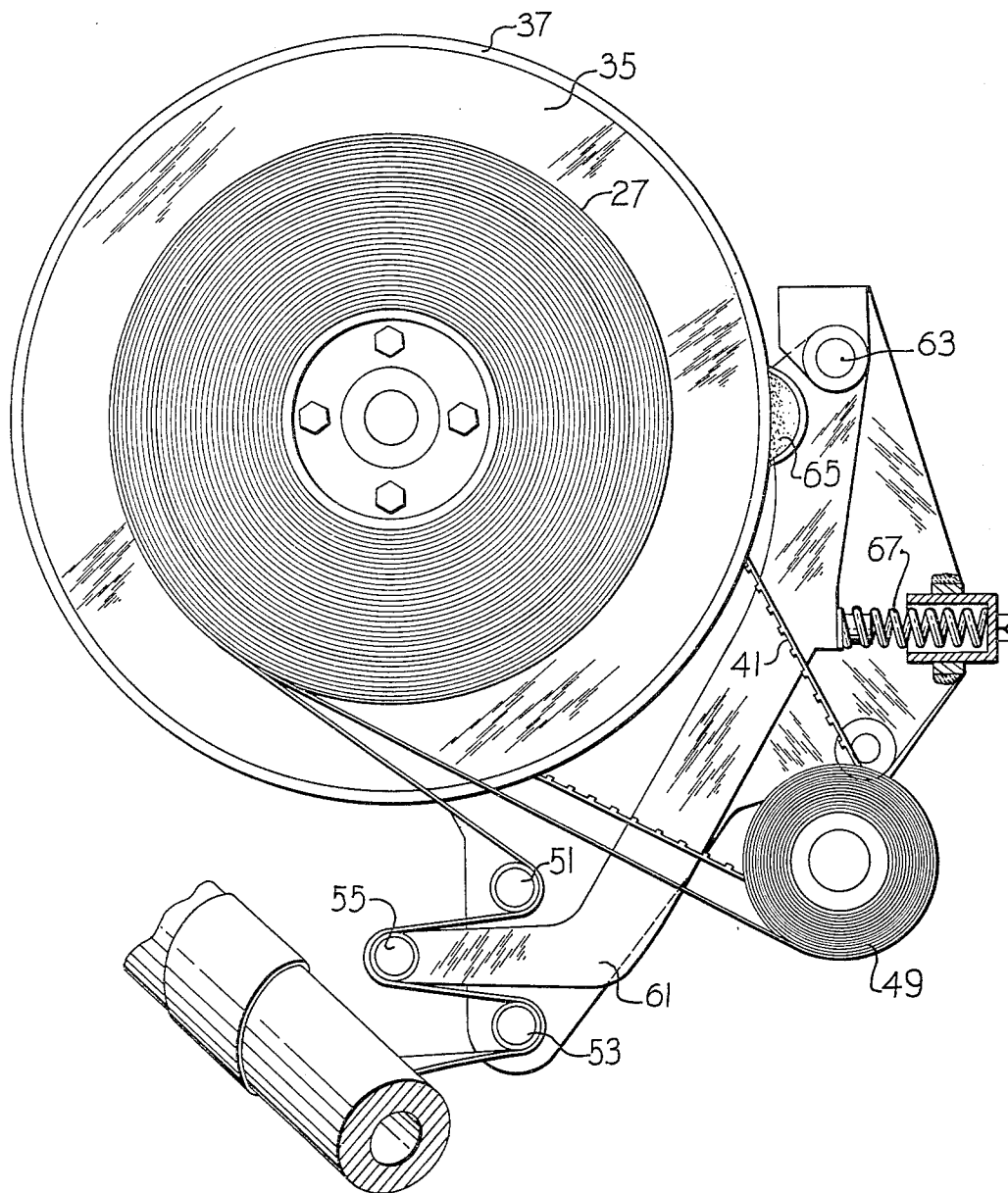
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FIG. 3



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TENSIONING DEVICE FOR HELICAL WRAPPING
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Filed Jan. 26, 1968, Ser. No. 700,820
Int. Cl. B65h 81/00, 81/08

U.S. Cl. 57—3

2 Claims

ABSTRACT OF THE DISCLOSURE

A device for providing control of tension during the unwinding operation in applying helical strips from a roll onto a mandrel embodying a lever over which the material drawn from the roll is passed thereby transferring a force through the lever to a brake shoe attached thereto, which brake shoe controls the tension of the material on the roll being unwound.

This invention relates to the constant tensioning of a roll from which material is unwound preparatory to helically wrapping on a mandrel carried workpiece at the same time that an interleaving material is wound upon a separate spool.

In unwinding material from a roll by machine and wrapping the unwound material upon a workpiece, a general problem arises in maintaining uniform size, shape, and quality of the wrap from one end of the mandrel to the other. Since tension in the material is a function of the radius of the roll from which material is being drawn, without some means of tensioning, the beginning of the wrap would be more loosely wrapped, thicker in cross-section, and wider in lap thickness than that at the other end of the wrap length. Some positive means is required for controlling tension in the wrap as it comes off the storage roll and is wrapped on the workpiece and the instant invention provides a positive, simple, and inexpensive means of accomplishing this end.

It is therefore an object of the present invention to provide a device which produces constant tension during the unwinding operation of material from a roll for application in helical strips onto a workpiece.

It is also an object of the present invention to provide a device which produces constant tension upon the unwound portion of material by controlling the speed of rotation of the roll of material from which it is being drawn.

It is also an object of this invention to provide a tensioning device which is small in size, compact in nature, and light in weight so that it may be rotated rapidly around a mandrel without introducing large stress in the support mechanism, and thus accomplish the wrapping function in a shorter period of time.

It is also an object of the present invention to provide such a tensioning device which is inexpensive to manufacture and maintain, while producing the optimum result.

Other objects of the invention will become obvious to those skilled in the art when the following detailed description is read in light of the accompanying drawings.

In the drawings:

FIGS. 1 and 2 show perspective views of the invention with the material removed from the device in FIG. 1 but in place on the device in FIG. 2; and

FIG. 3 shows a simplified view of the invention detailing the manner in which the material acts to control the braking means.

Now referring to the drawings in greater detail, there is shown a conventional wrapping machine 11 consisting of a support frame 13, a rotating shuttle 15 with a counterweight 17, and shuttle support roller 19.

A mandrel 21 about which helical strips are to be wrapped is shown passing through the shuttle and being drawn longitudinally by power rollers 23 and pressure rollers 25.

For supporting the roll 27 from which material is to be unwrapped, a spindle 29 is provided having a hub 31 with a locking means 33 thereon for holding the roll on the hub. A wheel 35 having a braking surface 37 and an integrally fixed timing pulley 39 are also suitably mounted on the spindle. The timing pulley serves to drive a belt or chain 41 which in turn operates a pulley 43 attached to a separating paper takeup roll holder 45. A friction disc, not shown, within pulley 43 permits slippage at the required rate, such rate being a function of the speed ratios of material roll 27 and rewind roll 49. This takeup roll holder, which has a torque adjusting screw 47, is utilized for taking up a roll of separating material 49 utilized between layers of the wrapping material on the original roll 27 to prevent adhesion of the wrapping material to to itself during storage.

Referring to FIGS. 2 and 3, a roll of prepared material is mounted and locked on the spindle and the wrapped material is drawn over two stationary pins 51 and 53 having anti-friction sleeves and a tension sensing pin 55 in the manner shown. The interleaving material is drawn about and wrapped upon the takeup roll holder so that it will not interfere with the wrapping operation and also, if desired, so that it may be reused.

As shown in FIG. 3, the tension sensing pin is mounted upon a lever arm 61 which is pivotally mounted on a pivot pin 63 and which contains a friction member 65 which is kept in constant contact with the braking surface of the flange wheel of the spindle assembly. As shown, a braking preload mechanism, mounted on the machine 11, contains a spring or other biasing means 67 which urges the lever in such a manner that the friction material is brought into contact with the braking surface. As the wrapped material is drawn from the roll, the force it exerts on the tension sensing pin 55 will serve to pivot the lever against the force of the biasing means.

In practice, it has been found that the braking torque achieved by the use of the friction shoe must be equal to the takeoff torque of the wrapping material roll plus the torque from the interleaving material as the wrapped material is pulled onto the workpiece, in order to maintain equilibrium in the force system. As the radius of the takeoff roll decreases during the winding operation, the brake torque should decrease nearly a proportional amount so as to insure that constant tension is maintained.

When the roll radius decreases, there is a tendency for the tension to increase as material is pulled onto the work. This increase in force is sensed by the tension sensing pin 55 and the lever 61 is forced to the right as shown in FIG. 3, thereby diminishing the braking force on the braking surface 37 of the wheel 35 by means of a lessened pressure of the friction shoe 65 against the surface.

As the end of the wrapped material is drawn from the roll, it will cause a complete release of all force from the tension sensing pin, thereby allowing the biasing means 67 to urge the friction shoe against the braking surface, thereby bringing the spindle assembly to a stop so that a new roll may be placed on the spindle without either waiting an undue length of time for the spindles to cease rotation or injuring the hands of the operator by manually stopping the spindle.

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Thus the applicants have provided a device constituting an improvement in the art of unwinding a roll of material which is useful due to both its novelty and its simplicity.

We claim:

1. In a device for wrapping a material in helical strips
on a workpiece, 5
a support through which the workpiece extends,
a shuttle mounted on said support for rotation about
the workpiece,
a wrapping material support means mounted on said 10
shuttle,
a hub member mounted on said wrapping material
support means and having
a braking surface thereon,
a lever pivotally mounted at a first end thereof on the 15
shuttle adjacent said hub and having
a friction material mounted thereon in a position
to act against said braking surface,
pin means mounted on said shuttle over which the
wrapping material is passed when drawn from said 20
hub for delivery to the workpiece,
pin means mounted on the second end of said lever
over which the wrapping material is passed in co-
operation with the passage thereof over said shuttle-
mounted pin means so as to tend to pivot said lever 25
to withdraw said friction material from said braking
surface, and

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means intermediate the first and second ends of said lever tending to pivot said lever to a position where- in said friction material is in contact with said brak- ing surface.

2. The device of claim 1 including
means mounted on said shuttle for receiving material
separating the layers of wrapping material as the
wrapping material is withdrawn from said hub for
delivery to the workpiece, and
means interconnecting said hub and said receiving
means for driving said receiving means in timed
relation to said hub.

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