Jan. 13, 1931. T. L. DANIEL 1,788,564

REWINDING DEVICE

Filed Sept. 3, 1925 3 Sheets-Sheet 1

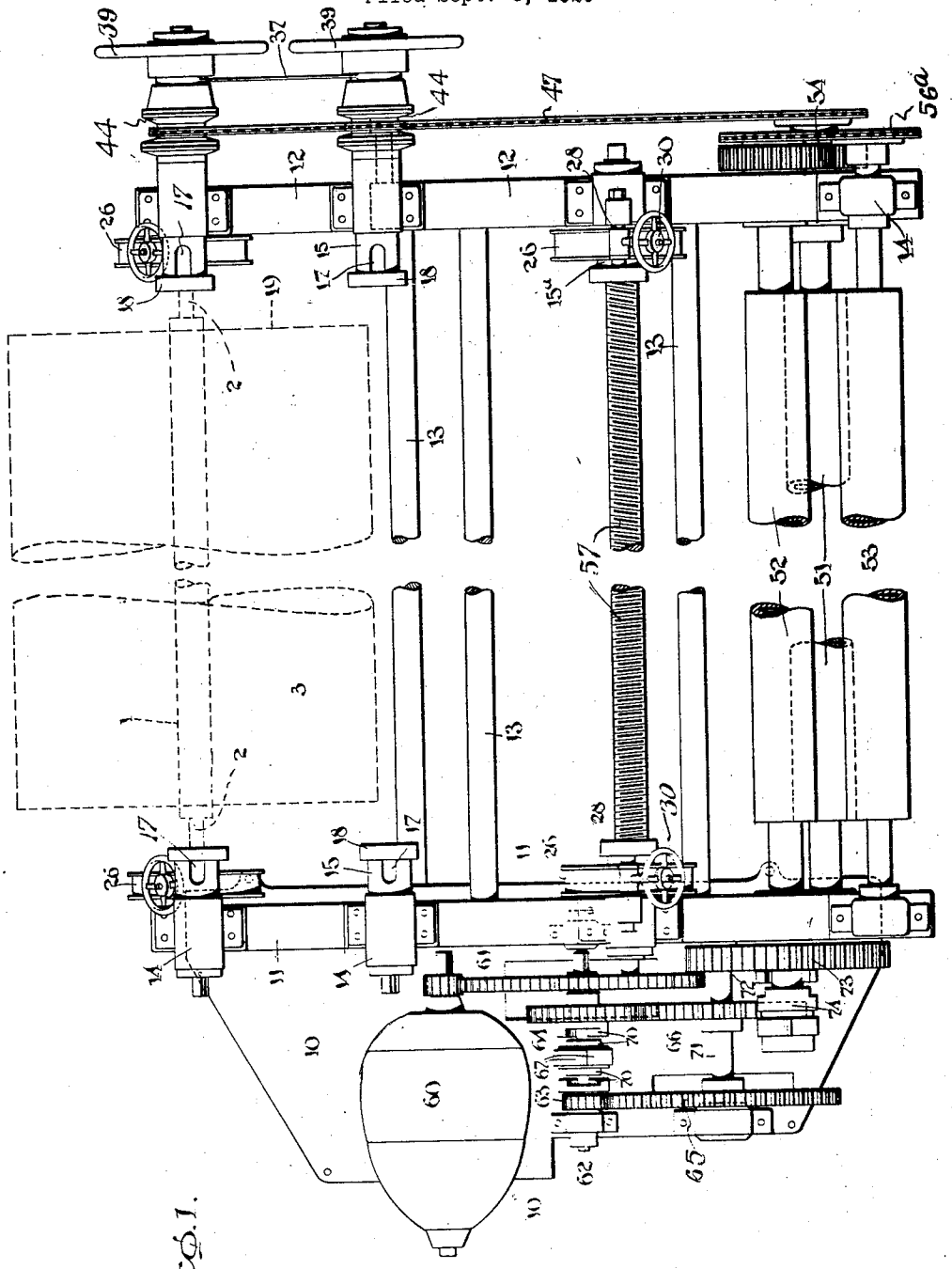


Fig. 1.

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REWINDING DEVICE

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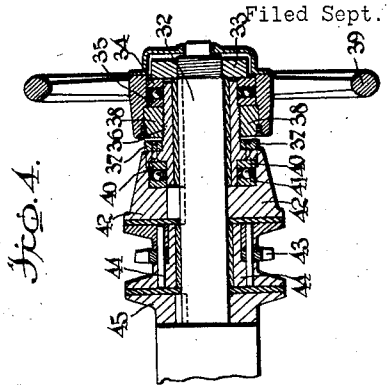


Fig. 4.

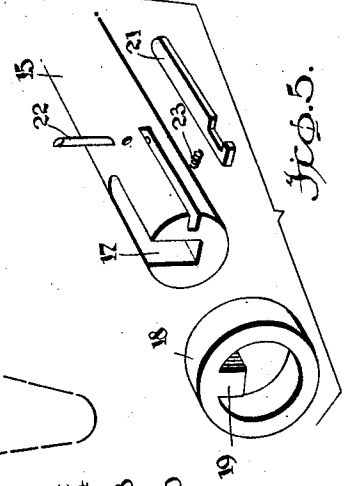


Fig. 5.

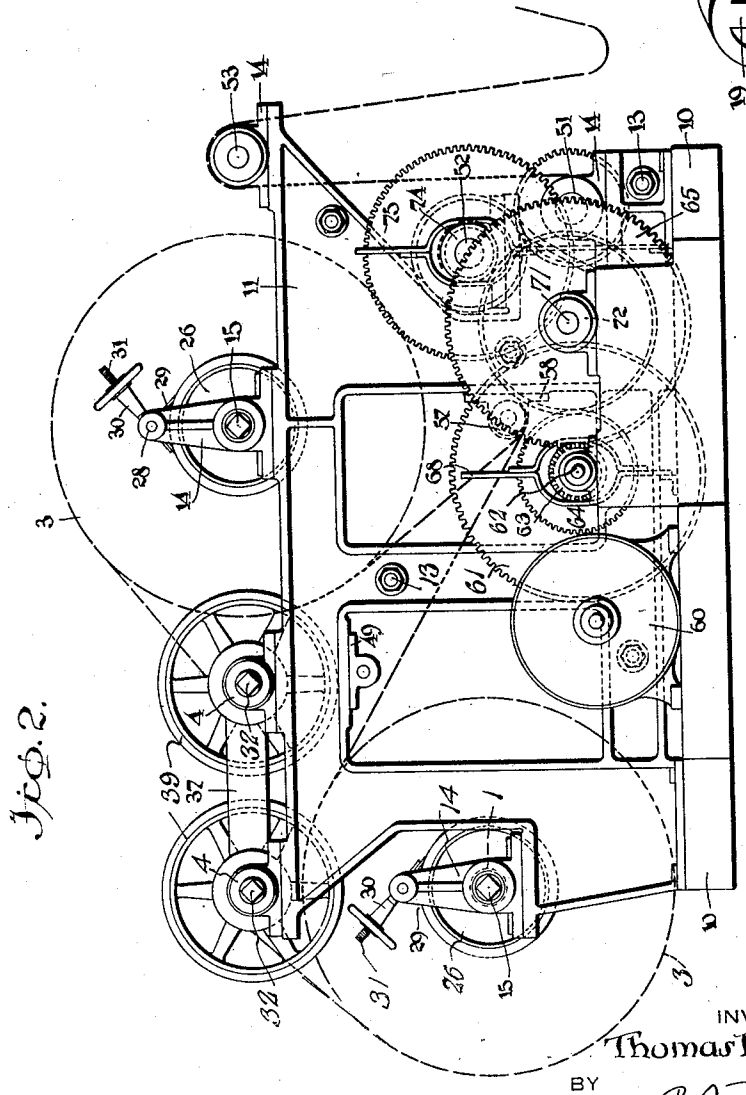


Fig. 2.

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REWINDING DEVICE

Filed Sept. 3, 1925 3 Sheets-Sheet 3

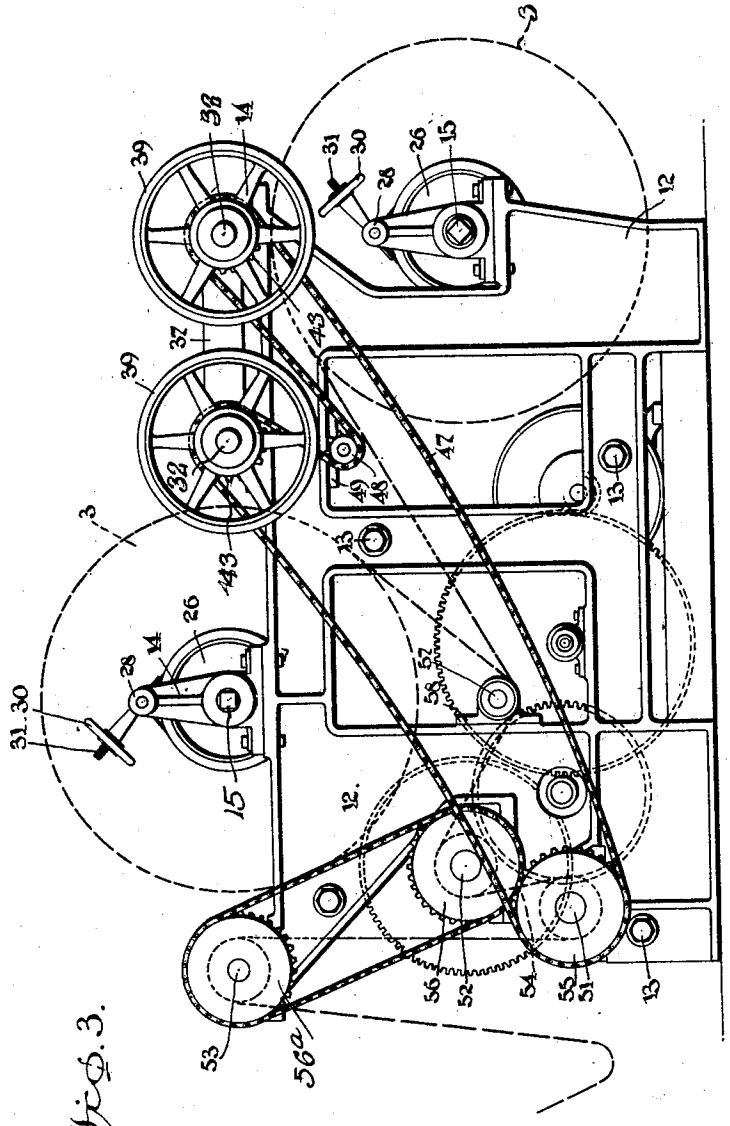



Fig. 3.

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# UNITED STATES PATENT OFFICE

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## REWINDING DEVICE

Application filed September 3, 1925. Serial No. 54,229.

My invention relates to machines for manipulating rolls of sheet material, and it is particularly directed to machines of the above designated character, which are adapted to unwind rolls of lined material having adhesive properties.

The object of my invention is to provide a machine which will continuously strip and rewind the liner from rolls of rubberized fabric.

By reason of its adhesive properties, a fabric which is impregnated with uncured rubber cannot be wound in roll form without inserting a material having a relatively non-adhesive properties between adjacent convolutions. For the purpose, duck is universally employed. However, I have found that the fibers thereof become firmly embedded in the rubber and it is often extremely difficult to free the rubberized fabric of the inserted material.

According to my invention, I have provided a machine having shafts adapted to rotate rolls of stock, each shaft being provided with a retarding device, such for example as a brake appliance. Power driven shafts, not unlike those which support the lined stock roll, but provided with tensioning devices, wind the lining material as it is stripped from the rubberized fabric.

I have likewise provided several shafts to deliver the tacky fabric sheet while under tension, thus obviating any danger of wrinkles or folds.

A better understanding of my invention may be had by referring to the drawings, in which:

Fig. 1 is a plan view of a machine, broken through the middle portion, constructed in accordance with the principles of my invention:

Fig. 2 is an elevational view of one side of the machine embodying the source of power;

Fig. 3 is also an elevational view of the machine and showing the side opposite to that shown in Fig. 2;

Fig. 4 is a cross sectional view, on a larger scale, showing in detail certain features of the tensioning device; and

Fig. 5 is a view of the several parts comprising the roll supporting mechanism, likewise on a larger scale.

In its essentials, the machine consists of means for supporting a lined stock roll of rubberized fabric which operates in conjunction with similar means for winding up the liner. As the roll of fabric is unwound, it is freed of the liner and the rubberized fabric is subsequently conducted under tension about a plurality of rolls to the next succeeding step in the process of manufacture. The device illustrated is adapted for continuous performance in that it is provided with two sets of stock rolls and liner supports. Thus, while one roll is being unwound and the liner rewound, the other unit may be replenished and held in readiness for later utilization. Obviously, it will be unnecessary to describe both units, inasmuch as their construction is identical.

It is standard practice to impregnate both cord and woven fabric with plastic compositions by passing the textile material through a calender. After the material is so processed, it is arranged in superimposed alignment with a sheet of non-adhesive material commonly known as liner and subsequently wound up on a hollow metallic cylinder 1. A steel rod 2, which is coaxial with the cylinder, extends beyond either end thereof and supports the cylinder and fabric wound thereon. Such rods are usually of rectangular cross-section and fit openings of slightly greater dimension at either end of the cylinder. In this way, it is possible to reduce the number of supporting rods and at the same time the roll suffers no distortion.

The present improvement provides for a

suitable base 10 and two vertically disposed frame members 11 and 12 held in parallel alignment by several spacing bars 13. The frame members support a plurality of standards, or brackets, 14 in which are mounted stub shafts 15 that are adapted to retain the roll axles 2. Each shaft 15 extends a short distance beyond its journal and is there provided with a deep keyway 17 in which the supporting axle 2 may be inserted. A collar member 18, circumjacent with each shaft 15, but in slidable relation therewith, has a lug 19 integral with its inner periphery. The lug is disposed in the keyway in which the axle 2, supporting the roll 1, is inserted, and maintains the latter in operative relation. A latch 21 is pivotally retained in a slot in the side of each stub shaft by means of a pin 22. A spring 23 is imbedded in the wall of the slot to force the latch into engagement with the collar 18 and maintain the collar in a fixed position on the shaft.

Each of the roll supporting shafts 15 is provided with a retarding device which comprises a flanged pulley 26 keyed to the shaft, and an adjustable brake band appliance 29. One end of the band is supported by a short shaft 28 which is connected rigidly to the bracket 14. The other end is joined to a threaded pin 31 that passes through an opening in the shaft 28. The band is tensioned by rotating, in the appropriate direction, a hand wheel 30 which rests against the shaft and is screw-threaded upon the pin 31.

The rewind mechanism is actuated through a clutch device illustrated in Fig. 4. It includes a burr 33 which is screwed upon the end of a stub shaft 32, and is in engagement with one race ring 34 of a ball bearing. The other race ring 35 rests against a shoulder portion of a threaded sleeve 36 which is loosely mounted on the shaft. The sleeve is held stationary by a stay bar 37 which interconnects a similar member of another unit. In addition, the second race ring 35 engages a collar 38, which is threaded upon the sleeve 36 and is rigidly joined to a hand wheel 39. The sleeve member 36 is likewise in engagement with a race ring 40 of a second ball bearing, whose complementary race ring 41 rests firmly against a friction cone member 42 which is keyed to the shaft 32. A sprocket wheel 43 is secured to a collar 44 which rotates freely about the shaft. It is engaged on both sides by similar friction cones, one of which has already been referred to, the other being indicated at 45, both of the cones being faced with friction material. It will be noted that as the hand wheel 39 is rotated, the sleeve member will be forced in the direction of the sprocket wheel. The resultant thrust will vary with the force applied at the wheel. In this way, it is possible to control the torque exerted by the wind-up mechanism. If the hand wheel be rotated in reverse direction, the friction between the cone members and the sprocket wheel is reduced and the torque on the wind-up mechanism will overcome the resistance offered by the cone clutch. It will be observed that as the roll of liner increases in diameter, its speed of rotation must decrease in order to provide for approximately constant linear movement of the liner. The tension device permits a decrease in the speed of rotation of the liner roll in that it permits slippage between the sprocket 42 and cones 43 and 45. Since the retarding device 26 is adjustable to exert a greater resisting force than the pull exerted by the wind-up mechanism upon the liner, it will be apparent that a slippage in the rotary movement of the liner will occur before the frictional resistance of the retarding device can be overcome by the wind-up mechanism to increase the linear speed of the fabric. Even though slippage occurs, the torque of the wind-up mechanism after adjustment remains approximately constant. It is apparent therefore that the adjustable tensioning device and retarding device have a particular coaction relatively and with the associated parts of the machine.

Power is transmitted to the tension devices through the agency of a heavy chain 47 which engages the sprockets 43 and also is trained about an idler sprocket wheel 48 that is journaled in a suitable bracket 49, which in turn is bolted to the frame.

Three power driven friction rollers 51, 52 and 53 are journaled in the frame members in staggered parallel relationship to provide a greater surface of contact. The bottom roller 51 is actuated by the middle roller 52 through a gear connection 54. It is also provided with a sprocket wheel 55, which serves as the drive member for the chain drive 47 of the clutch wind-up. A similar sprocket wheel 56 is keyed to the middle roller 52 and drives the upper roller 53 through a chain connection and cooperating sprocket wheel 56*a*. It is to be noted that the friction rollers are merely hollow steel cylinders and may have either a smooth or corrugated surface. I have experienced no difficulty in securing sufficient traction between the fabric and rollers, however, by employing an idler roller 57, supported by brackets 58 which are bolted to the end members of the frame, whereby it is possible to secure a greater surface of contact. I prefer to have this roll corrugated and have found that a spiral or helical design is satisfactory.

The source of power, a variable speed motor 60 is provided with a pinion which meshes with a gear 61. This gear, in turn, is keyed to a shaft 62, upon which are freely

mounted gears 63 and 64, meshing respectively with complementary gears 65 and 66, both of which are keyed to a shaft 71. The freely mounted gears 63 and 64 are actuated by a double acting catch clutch 67, which is operated by a hand lever 68. The clutch consists of a collar member 69, keyed to the shaft and adapted to move parallel thereto. Lugs 70 which are integral with the collar are adapted to engage similar means provided on the gears. The power is transmitted from the shaft 62 through the clutch 67 to either of the freely disposed gears which the clutch engages and thence to the shaft 71. A gear 72 is keyed to the shaft 71 and engages a freely moving gear 73, mounted on an extending portion of the friction roller 52. The power is transmitted to the roller by means of a single acting catch clutch 74, which is keyed thereto.

In operating my machine, I insert the supporting axle 2 of a stock roll of lined fabric 3 into the keyways 17 of the complementary stub shafts 15. The collar member 18 is then drawn over the inserted portion of the axle, whereupon the latch 21 automatically engages the collar and locks the axle 2 in operative position. A portion of the free liner is then wrapped about a cylinder which has been inserted into the adjacent liner wind-up shown at 4. The rubberized fabric is subsequently threaded through the machine by passing it under the idler roller 57, over the middle friction roller 52, beneath the lower roller 51 and over the top roller 53, as illustrated by the dotted line in Fig. 2. The motor is then started and motion is transmitted from the pinion on the motor shaft through the large gear 61 to the shaft 62, thence to the shaft 71 optionally by means of the gear 63 or 64, according to the setting of the double clutch 67 on the shaft 62. The middle fabric feeding roller 52 is then actuated through the engagement of the clutch 74 with the freely rotating gear which has received motion through its corresponding gear on the shaft 71. The tensioning device is then adjusted to secure the necessary torque to overcome the adhesion between the fabric and liner, and a speed of operation is selected in conformity with the rate of consumption. This adjustment may be secured by employing the proper gear ratio, as provided by the catch clutch 67, to operate the device through either the gear 65 or the gear 66, or by suitable rheostatic control of the energizing circuit of the motor.

In order that the fabric will at all times be under tension, rollers 52, 51 and 53 may have a progressively greater diameter or each may be rotated at a slightly greater speed than the one preceding. The brake device is set in order to overcome any premature unwinding that results from starting the machine too abruptly. It should not be set so tightly however as to consume an appreciable amount of power. Often it is entirely unnecessary, when the rate of the consumption is reasonably uniform.

After a stock roll has been unwound completely, the tension device is released. In the meantime the other unit has been placed in readiness by inserting a new stock roll 3 and winding a small portion of the liner about one of the cylinders 1. The free end of the fabric is subsequently stitched to the end of the previous roll, after which the unwinding operation may be resumed by merely connecting the tension rollers 51, 52 and 53 to the source of power and adjusting the clutch wind-up. To remove the rewound liner, the stub shafts 15 are positioned so as to have their keyways 17 directed vertically upward. The latch 21 is then pressed inwardly, the collar 18 is caused to recede and the liner along with its cylinder 1 and axle 2 are hoisted as a unit. In the same way, the empty cylinder may be withdrawn. When inserting and removing rolls an overhead crane may be employed advantageously inasmuch as the total weight often aggregates several hundred pounds.

It will be noted that I have shown no guards for the gears or chains. These have been omitted for the sake of illustration, but they are nevertheless desirable.

Although I have disclosed but a single embodiment of my invention, it will be realized that the principles set forth may be subjected to many variations without departing from the scope thereof. I desire therefore that only such limitations shall be imposed as are consistent with the appended claims.

What I claim is:

1. In a machine for removing a liner from rolls of material having plastic properties, axial supporting means for the rolls of material, journaled members provided with grooves adapted to hold the axial supporting means of the rolls substantially co-axially therewith, and an adjustable collar surrounding the journaled member provided with a latch member for maintaining the collar in position to secure the roll supports within the grooves.

2. A power driven machine for feeding rubberized fabric rolled in a liner to a bias cutting machine comprising means for supporting a plurality of stock rolls, means for releasably supporting a plurality of rollers for rewinding the liner, means for conducting the fabric to succeeding steps in its process of manufacture, a common means for driving the rewinding rollers, and means for disconnecting either liner roller from such driving means.

3. A power driven machine for feeding rubberized fabric rolled in a liner to a bias

cutting machine comprising means for supporting a plurality of stock rolls, means for releasably supporting a plurality of rollers for rewinding the liner, means for conducting the fabric to succeeding steps in its process of manufacture, a common means for driving the rewinding rollers, and adjustable, releasable connecting means between each liner roller and the driving means.

In witness whereof, I have hereunto signed my name.

THOMAS L. DANIEL.