July 21, 1931. H. F. GAYLORD 1,815,250

APPARATUS FOR REWINDING ROLLS OF MATERIAL

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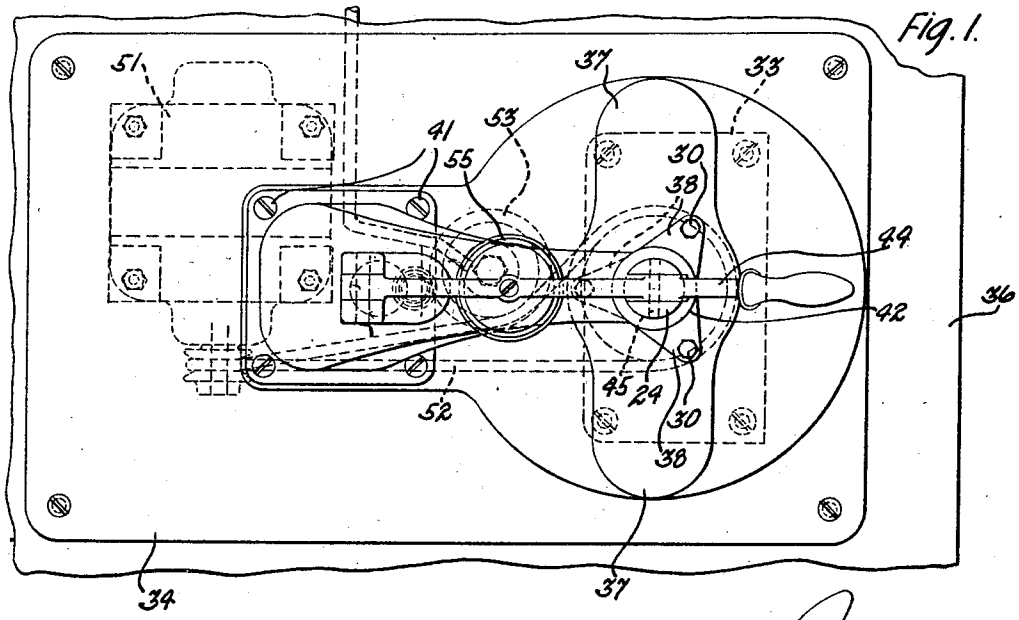

Fig. 1.

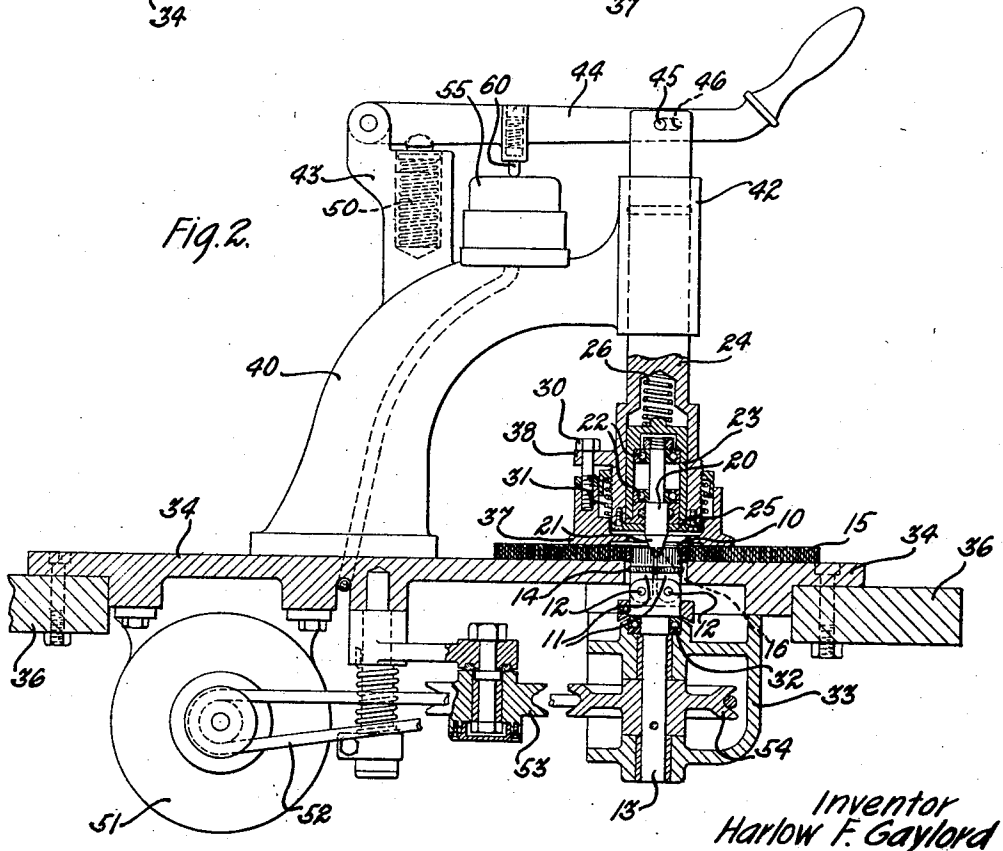

Fig. 2.

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Fig. 3.

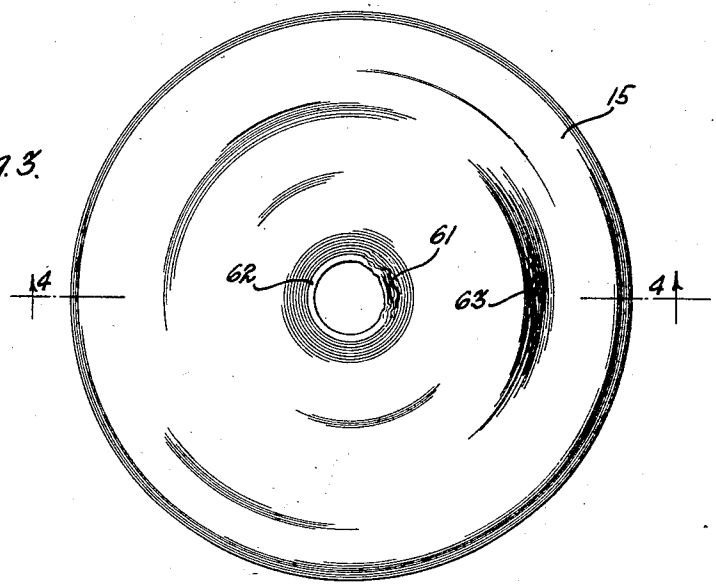


Fig. 4.

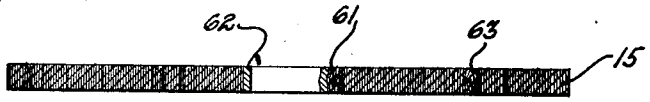
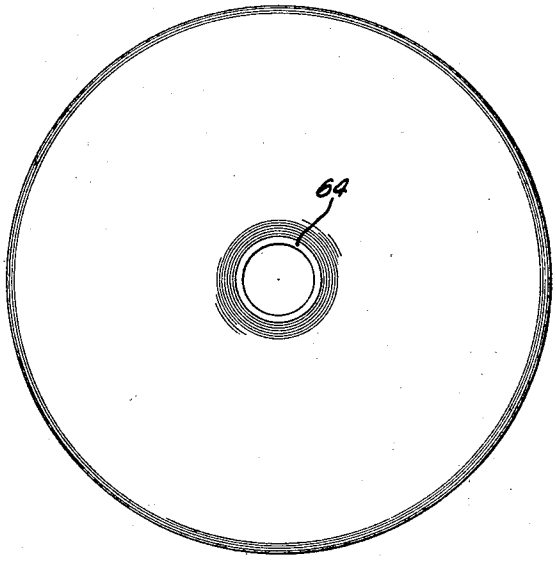


Fig. 5.



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Patented July 21, 1931 1,815,250

UNITED STATES PATENT OFFICE

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APPARATUS FOR REWINDING ROLLS OF MATERIAL

Application filed March 10, 1928. Serial No. 260,751.

This invention relates generally to an apparatus for rewinding a roll of material, and more particularly to an apparatus for rewinding a roll of paper tape.

In the insulation of wire used in telephone cables, rolls of paper are employed upon the serving heads of the insulating machines. These rolls are provided with a short annular member of paper or pressboard in their center, which provides a core or thimble having an opening through which the spindle of the serving head projects during the serving operation. It sometimes happens during the handling of these rolls before they are placed on the machine that the pressboard core or annular member becomes damaged so that they cannot be placed directly on the machine.

An object of this invention is to provide an apparatus for rewinding a sufficient amount of the inner end of the paper upon a new thimble or core so that the roll may be used for the purpose for which it was originally intended.

In accordance with the general features of the invention there is provided an apparatus having a knurled arbor for projecting within and rotating an annular core or thimble of pressboard inserted in the center of a roll of paper tape and pasted to the inner end of the roll. The arbor and thimble operate to coil a sufficient number of the inner convolutions of the roll tightly around the thimble to effect a roll of sufficient firmness to sustain its form on the arbor of an insulating machine. For aiding in this rotation a clamping means is provided for frictionally securing the lateral edges of the roll.

A clear understanding of the invention may be had from the following detailed description of one embodiment thereof as illustrated in the accompanying drawings, wherein

Fig. 1 is a plan view of a rewinding apparatus;

Fig. 2 is a vertical longitudinal view taken substantially through the middle of the apparatus, showing portions in cross-section;

Fig. 3 is a plan view of a roll of paper tape to be rewound;

Fig. 4 is a cross-sectional view of the roll through its center, and

Fig. 5 is a plan view of the roll after it is rewound.

Referring now to the drawings in detail in which like numerals designate like parts throughout the several views, there is disclosed a cylindrical arbor 10 having a knurled outer surface, and consisting of two symmetrical parts 11 of semicircular cross-section, each of which is secured at its lower extremity by means of a pivot 12 to a vertical, rotatable shaft 13. A coiled spring 14 encircling the arbor 10 functions to normally retain the two parts 11 in a vertical closed position with their inner surfaces in contact. A roll of paper tape 15 is shown placed over the arbor and undergoing rewinding.

A vertically positioned freely rotatable spindle 20 having a cone shaped tip 21 is mounted in bearings 22 housed within a cylindrical journal box 23 which is slidably mounted within the hollow lower end of a cylindrical piston member 24 and held therein by a plate 25 secured to the bottom of the piston. The cone shaped tip is adapted to fit a correspondingly shaped aperture 16 within the center of the arbor 10, and to force the two parts 11 of the arbor apart when it is forced within this aperture. A spring 26 secured within the piston member resiliently presses the journal box 23 against the plate 25 and permits the journal box 23 and consequently the spindle 20 to be adjusted vertically in a resilient manner when the tip end 21 thereof is forced within the aperture 16 and against the two halves 11 of the arbor 10 which is held together by the spring 14.

A roll retaining member 37 resiliently secured to the lower end of the piston member 24 by means of three bolts 30 and a coiled spring 31 serves to frictionally constrain the outer portions of the roll of paper tape 15 and to keep the lateral edges of the roll even while the arbor 10 is being rotated therewithin. The bolts 30 are slidable within lugs 38 integral with the piston member 24 and

are rigidly secured to the roll retaining member 37. The shaft 13 which supports the arbor 10 is rotatably secured in a bearing 32 journaled within a housing 33 which is mounted on a base 34 sustained by a support 36.

An arm 40 secured to the base 34 provides a sleeve 42 and one member 43 of a hinge. The sleeve 42 acts as a guide for the cylindrical piston 24, and a hand lever 44, hinged to the member 43, and connected to the cylindrical piston 24 by means of a pin 45, slidable within a slot 46, serves to raise and lower the piston within the sleeve. The hand lever is here shown in the lower position, as it would be held by an operator for rewinding the roll of paper tape 15; normally the hand lever is held in an upper position by a compression spring 50.

A motor 51 connected to a belt 52 guided by an idler or belt tightening pulley 53 serves to drive the shaft 13 through a pulley 54 connected thereto. The motor is controlled by a push button switch 55 and cooperating pin 60 connected to the hand lever 44, the pin 60 closing the switch to cause the motor to run while the hand lever 44 is in the lower position.

The operation of the device will now be described. The roll of tape 15 to be rewound, referring to Figs. 3 and 4, is usually damaged or distorted at its center, having damaged central convolutions 61, and a damaged annular pressboard core 62. The roll may also have distortions at points removed from the center, such as in convolutions 63. The damage at the center of the roll prevents the roll from fitting the arbor of an insulating machine and the use of the roll in the machine, and it is the purpose of this invention to remedy this difficulty. The first steps toward accomplishing the purpose is the manual removal of the entire damaged central portion of the roll and the manual insertion of a new annular core or thimble 64 of pressboard within the center of the roll 15. The outer surface of the thimble is covered with adhesive material which causes the end portion of the tape to adhere to the thimble. The roll with the inserted thimble therein is placed on the base 34 of the apparatus, with the inserted thimble 64 encompassing the knurled arbor 10. The operator pulls down the handle 44 to engage the roll retaining member 38 with the top of the roll 15, concurrently forcing the tip 21 of the spindle 20 within the central aperture 16 of the hinged arbor 10, and also actuating the button switch 55 to start the motor 51. Thus, contemporaneously the shaft 13 and arbor 10 are rotated and the arbor parts 11 are expanded against the compression of the retaining spring 14, causing the arbor parts 11 to grip the inner surface of the thimble 64 to rotate it and the end of the paper tape adhering thereto. The thimble 64 is of course rotated in the proper direction to draw up on the inner convolutions of the roll, and this rotation is continued until the whole inner portion of the roll is tight enough so that the whole roll will retain its form. The rotation may be continued farther than the inner portion and may be carried on until the outer distortions 63 are straightened, especially if these distortions happen to be of sufficient size to interfere with the unwinding of the roll. Furthermore, if the roll happens to be loose throughout the winding operation may be extended to the whole roll to produce a solid unit. The roll retaining member 37 during this rotating operation functions to frictionally engage the top edges of the outer convolutions of the roll to prevent rotation in those portions so that the inner convolutions of the roll will be tightened around the thimble 63, but the outer convolutions will also later be tightened and diminished in diameter, as the slight frictional holding of the member 25 so permits.

To allow the inner convolutions of the roll to rotate while the outer convolutions are being held it is desirable that the roll retaining member 37 be constructed as shown, with its inner portion slightly raised or hollowed out so as not to contact with the roll. This inner portion should not be raised to any great extent however, as such construction would permit the lateral edges of the roll 15 to become uneven. The drawing up of the roll around the thimble 63 is usually carried out only to the extent that will effect the firm adherence of the whole roll to the core or thimble, or in other words until the roll will retain its form, and it is usually not necessary to tighten the whole roll as the roll has been previously wound so tight as to allow for a loosening of the outer portion and yet not fall apart. However, if it is desired to take the time to tighten the convolutions of the whole roll or to straighten out distortions in outer convolutions thereof, the construction of the apparatus so permits, and the finished roll in diminished diameter will appear as is shown in Fig. 5. After the roll has been sufficiently rewound the operator allows the handle 44 to return to the upper position due to the actuation of the compression spring 50. The rewound roll is then removed and another inserted, and the same operation as just described is then carried out.

The above description in connection with the accompanying drawings present one embodiment of an invention for effectively and economically rewinding rolls of material from the central opening. It is, of course, to be understood that the invention is not limited to this one embodiment but is

susceptible of various modifications within the scope of the appended claims.

What is claimed is:

1. An apparatus for rewinding a roll of material, comprising means for supporting the roll, a radially expansible means for engaging and rotating the center of the roll, means for clamping the roll to the supporting means, rotatable means for expanding the means for rotating the center of the roll, means movable axially of the roll and resiliently supporting the clamping and the expanding means, a guide for the movable means, means for actuating the movable means, means for driving the means for rotating the center of the roll, and controlling means connected with the actuating means for operating the driving means concurrently with the application of the expanding means and the means for clamping the roll.

2. An apparatus for rewinding a roll of material, comprising means for supporting the roll, an expansible arbor for engaging and rotating the center of the roll, means for expanding the arbor into engagement with the roll, power driven means for driving the arbor, and common means for actuating the arbor driving means and the arbor expanding means.

3. An apparatus for rewinding a roll of material, comprising means for supporting the roll, means for clamping the roll to the supporting means, an arbor for engaging and rotating the center of the roll, means for driving the arbor, and common means for rendering effective the roll clamping means and the arbor driving means.

4. An apparatus for rewinding a roll of material, comprising means for supporting the roll, means for clamping the roll to the supporting means, an expansible arbor for engaging and rotating the center of the roll, means for expanding the arbor into engagement with the roll, and common means for simultaneously rendering effective the roll clamping means and the arbor expanding means.

5. An apparatus for rewinding a roll of material, comprising means for supporting the roll, means for yieldably clamping the roll to the supporting means, an expansible arbor for expanding and engaging the center of the roll, means for expanding the arbor into engagement with the roll, means for rotating the arbor, and common means for simultaneously rendering effective the roll clamping means, the arbor expanding means and the arbor rotating means.

6. An apparatus for rewinding a roll of material, comprising a base plate for supporting the roll and having an aperture, an expansible arbor projecting through the aperture and above the base plate for engaging and rotating the center of the roll, means movable into engagement with the upper surface of the roll for yieldably clamping the roll to the base plate, freely rotatable means for expanding the arbor into engagement with the roll, means for rotating the arbor, and means for simultaneously rendering effective the roll clamping means, the arbor expanding means and the arbor rotating means.

In witness whereof, I hereunto subscribe my name this 29th day of February, A. D. 1928.

HARLOW FARWELL GAYLORD.