April 14, 1936. D. HEYER 2,037,233

COTTON ROLLING MACHINE AND METHOD OF MAKING COTTON ABSORBENT ROLLS

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Fig. 1

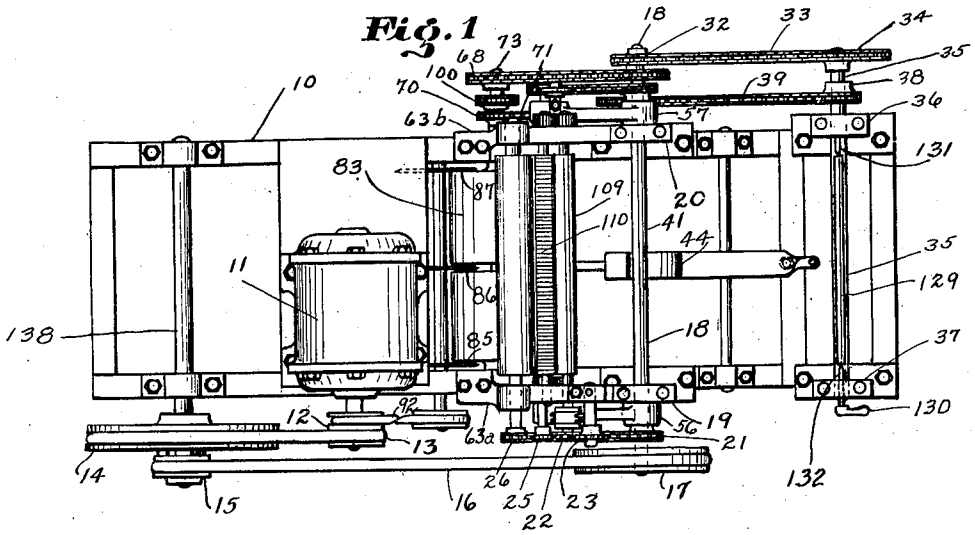
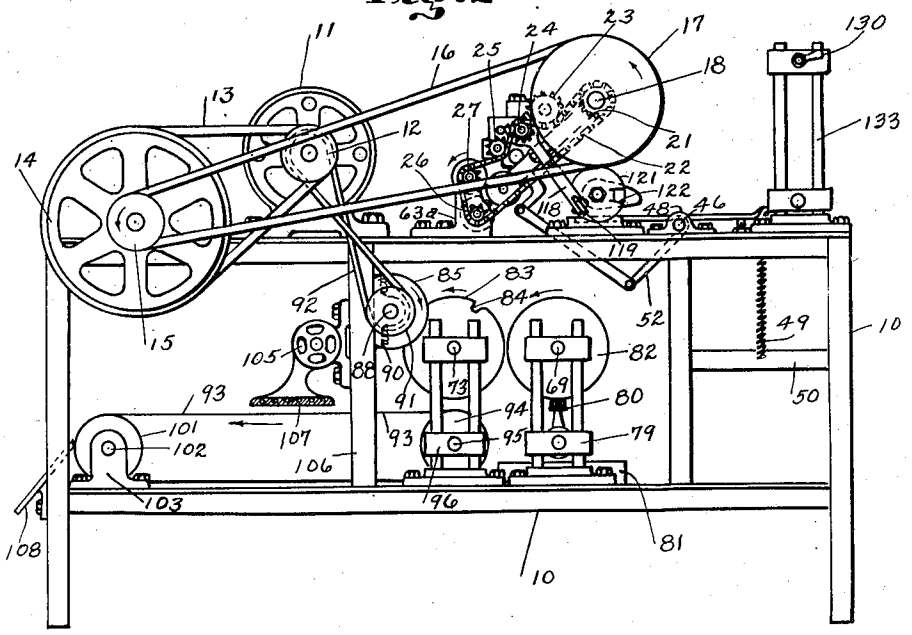


Fig. 2



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Fig. 11

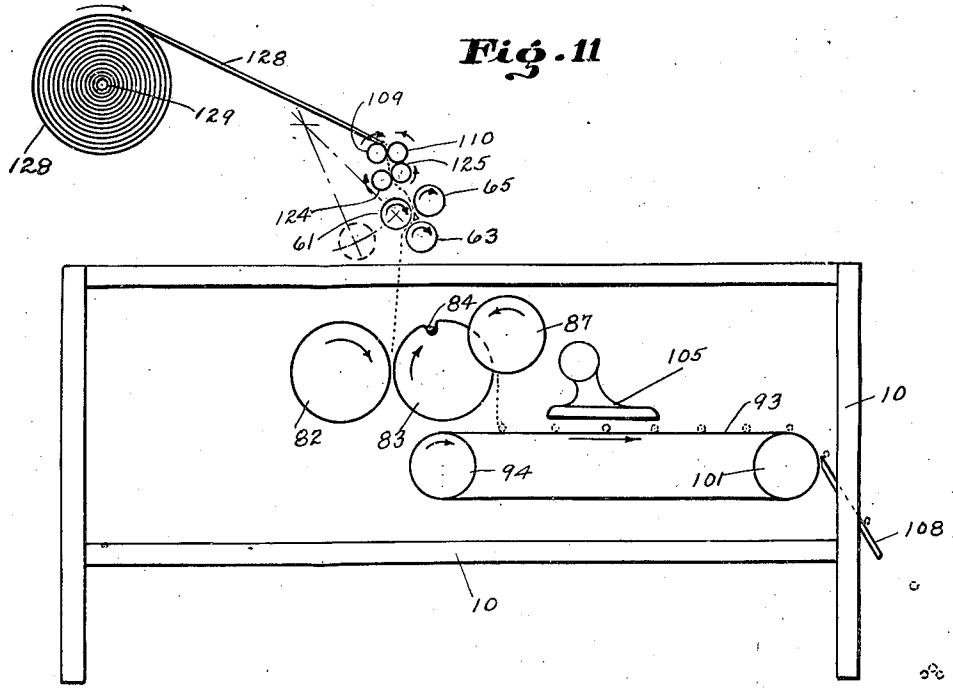


Fig. 3

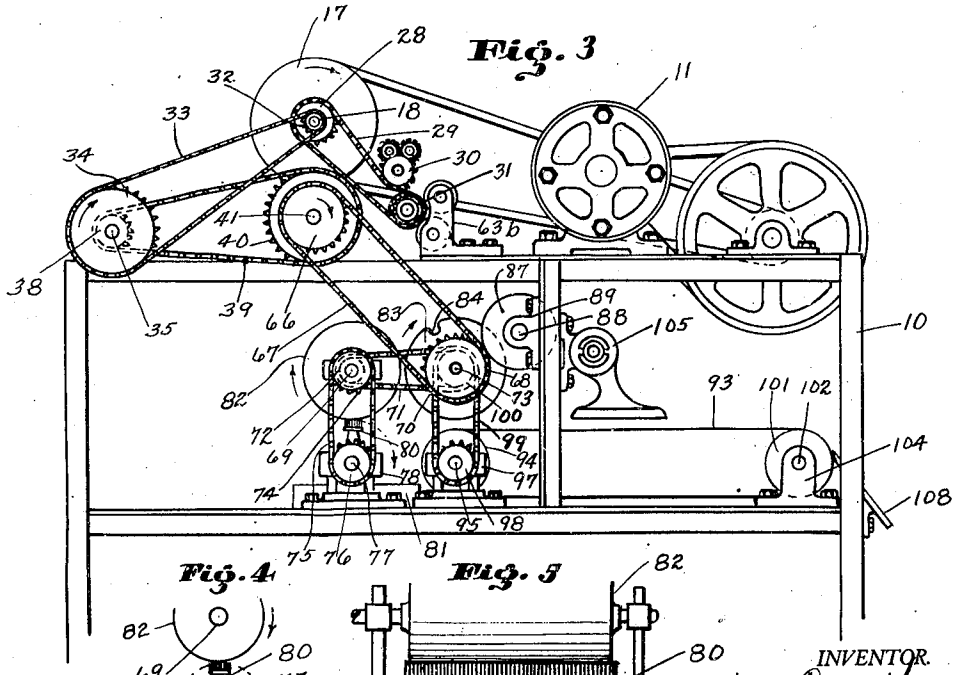


Fig. 4

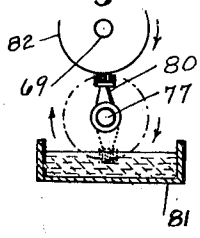
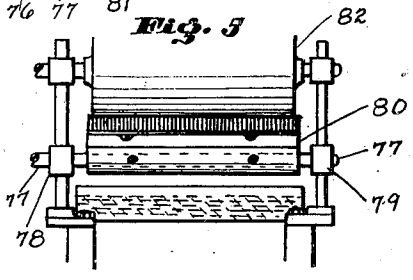


Fig. 5



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Fig. 6

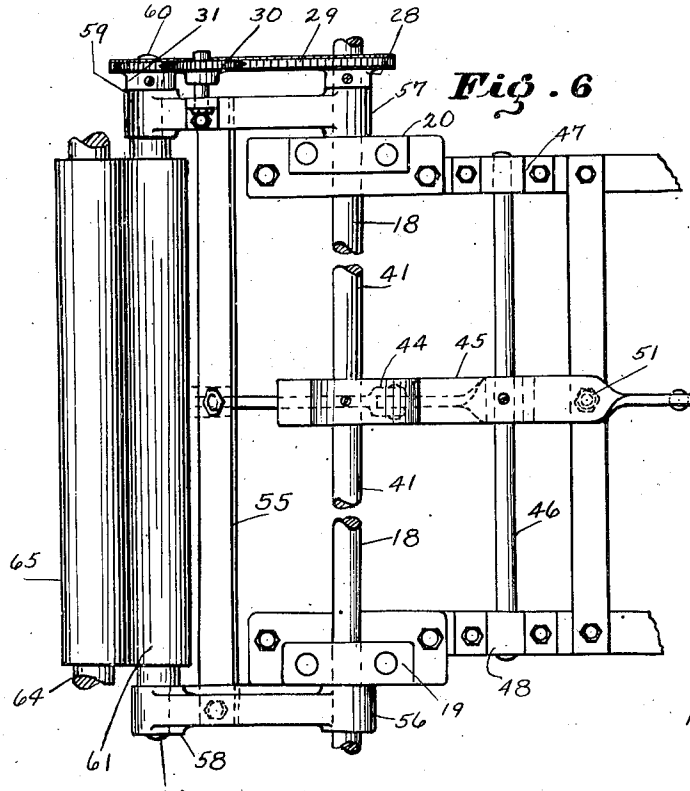


Fig. 7

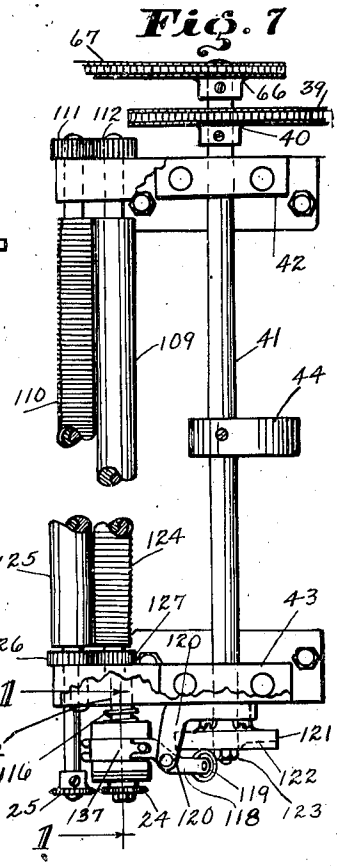


Fig. 8

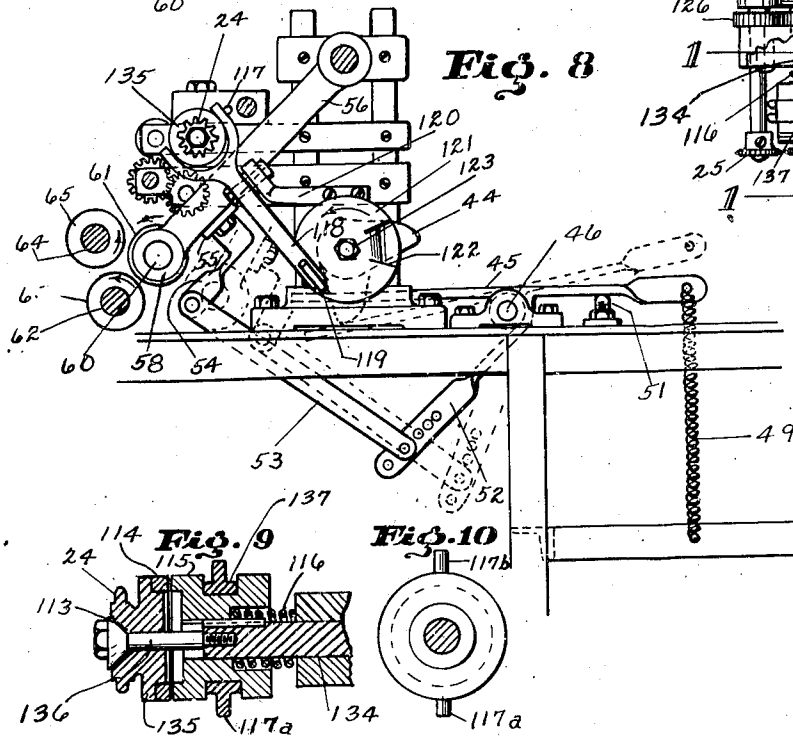


Fig. 9

Fig. 10

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UNITED STATES PATENT OFFICE

2,037,233

COTTON ROLLING MACHINE AND METHOD OF MAKING COTTON ABSORBENT ROLLS

Don Heyer, Los Angeles, Calif., assignor, by mesne assignments, to Universal Cotton Roll Company, Los Angeles, Calif., a corporation of California

Application April 22, 1933, Serial No. 667,380

10 Claims. (Cl. 19—149)

This invention relates to the manufacture of rolls formed of absorbent cotton. Such rolls are now commonly used in connection with dental and medical practice. For example, such rolls may be used in small pieces as wads for absorbing moisture placed between the gums and the lips of a patient; or for analogous uses in medical operations.

Such cotton rolls have been largely manufactured by tedious and expensive hand process; and it is one of the objects of this invention to make it possible to produce such absorbent rolls by the aid of machinery.

It is another object of this invention to make it possible to adjust such a machine for making a wide range of sizes of such rolls.

Still another object of the invention is the provision of a machine for rolling, coating, drying and cutting the roll to size and delivering the roll in a finished state.

It is a further object of the invention to make it possible to produce such cotton absorbent rolls at low cost.

My invention possesses many other advantages, and has other objects which may be made more easily apparent from a consideration of one embodiment of my invention. For this purpose I have shown a form in the drawings accompanying and forming part of the present specification. I shall now proceed to describe this form in detail, which illustrates the general principles of my invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of my invention is best defined by the appended claims.

Referring to the drawings:

Figure 1 is a plan view of one form of my invention;

Fig. 2 is a side elevation thereof;

Fig. 3 is a view similar to Fig. 2, looking at the opposite side of the machine;

Fig. 4 is a sectional view of the paste applicator and tank;

Fig. 5 is a view of the paste applicator;

Fig. 6 is a plan view of the rolls and cam arrangement;

Fig. 7 is a top elevation showing the feed rolls and mechanism;

Fig. 8 is an end elevation of the various mechanisms;

Fig. 9 is a sectional view taken as indicated by line 1—1 of Fig. 7;

Fig. 10 is a rear view of the sliding clutch collar; and

Fig. 11 is a diagrammatical figure illustrating the path of the cotton material from the sheet stock through the rolling process to the cut and finished size.

The raw material for the manufacture of the absorbent rolls can be in the form of cotton sheet stock 128 (Fig. 11) wound in the form of a large roll and mounted on a shaft 129 (Figs. 1 and 11). This shaft is shown in Figs. 1 and 2 as being supported on a pair of pivot points 131 and 132, which in turn are supported in standards 133 mounted on the main frame 10 of the machine. One of these pivot pins such as 132 can be provided with a handle 130 and can be threaded in the standard 133 for making it possible to retract the pin 132 for the removal of shaft 129 between the pivot supports.

The sheet stock 128 can be of any standard width and thickness. Lengths of the sheet stock 128 can be readily separated from the source of supply without the necessity of cutting it, as the cotton fibers of such stock usually extend longitudinally of the sheet and therefore can readily be pulled apart. This faculty of the stock is made use of for feeding definite lengths of the sheet stock into the machine for subsequent treatment therein.

To accomplish this result the sheet stock 128 is fed between two feed rollers 109 and 110 (Figs. 1, 7 and 11). These feed rollers 109, 110 are driven in opposite directions as indicated in Fig. 11. One of these rollers such as feed roller 110 can be grooved, and the other roller 109 can be smooth; and these two feed rollers are placed close enough together as to grip the sheet stock 128 between them. The grooving on feed roller 110 serves to grip the sheet stock securely and avoids slipping.

A definite length of stock (which length may be varied by appropriate adjustment as hereinafter described) is fed intermittently by causing intermittent actuation of the feed rollers 109 and 110. Between the periods of actuation these feed rollers are maintained stationary gripping the sheet stock firmly and permitting that part of the sheet stock which has been fed between the feed rollers to be separated by a pulling action. This pulling action is accomplished by continuously driven supplementary feed rollers 124 and 125 (Figs. 7 and 11).

There will now be described the intermittent driving mechanism for the feed rollers 109 and 110.

Both of these feed rollers 109 and 110 are rotatably mounted in a portion of the main frame 10 and may be connected together for simul-

taneous operation. For example, each of the feed roller shafts may carry interengaging pinions 111, 112 (Fig. 7), at the other end of the shaft. The shaft 134 of roller 109 (Figs. 7 and 9) projects from the main frame 10, and is arranged to be intermittently driven by the aid of a sprocket 24. This sprocket 24 is continuously driven through a transmission mechanism to be hereinafter described. The intermittent clutching between sprocket 24 and shaft 134 can best be explained in connection with Figs. 7, 8 and 9.

Thus sprocket 24 carries an integral flange 135 and is furthermore mounted for rotation on a stud 136 fastened into the end of shaft 134. This stud 136 has a conical surface 113 adapted to engage a corresponding conical depression in the left hand side of sprocket 24. It may be urged into frictional driving contact with conical surface 113 by urging flange 135 toward the left. For this purpose a collar 115 is keyed to shaft 134. This collar is urged toward engaging position with a friction ring 114 supported on the right hand side of the flange 135, by the aid of a compression spring 116. When so urged into frictional engagement it is apparent that sprocket 24 drives shaft 134 by the friction that exists between members 114 and 115 as well as by the friction between sprocket 24 and conical surface 113. These parts thus form a friction clutch. If desired a serrated tooth clutch could be used for this same purpose.

However, during a portion of the time, collar 115 is held out of engagement; as indicated in Fig. 9 as by the aid of a shift fork 118. This shift fork engages the diametrically opposite pins 117*a*, 117*b* projecting from a shift collar 137 mounted in a groove in collar 115.

Shift fork 118 is pivoted on a bracket 120 and has an arm carrying a cam roller 119. Spring 116 acts to supply a force for holding this roller 119 against the active surface of a cam disc 121. This cam 121 is mounted on the end of a shaft 41 journalled in the main frame 10. In order to hold the cam 121 detachably against a shoulder on shaft 41 use is made of a nut 123 engaging a threaded extension of shaft 41. Cam 121 has a depressed surface 122, and for each revolution of shaft 41 roller 119 is permitted to move inwardly while it passes over this depressed portion, permitting spring 116 to place sprocket 24 into driving relation with roller 109. It is apparent that the amount of angular motion of feed roller 109 is thus dependent upon the angular extent of depressed portion 122. By having a number of interchangeable cams 121 provided with depressions 122 of different angular extent the amount of sheet stock 128 intermittently fed between rollers 109 and 110 can be controlled, whereby the diameters of the finished absorbent rolls is controllable.

Sprocket 24 as shown in this instance is engaged by a chain 22, which also acts to drive other parts of the mechanism to be hereinafter referred to. Chain 22 is driven, as shown most clearly in Figs. 1, 2 and 3, by the aid of a sprocket 21 mounted on a shaft 18 appropriately supported in bearings on main frame 10. Shaft 18 in turn is driven by the aid of a pulley 17 connected as by a flexible belt 16 to a driving pulley 15. Driving pulley 15 is driven from a shaft 138 upon which is mounted a pulley 14 connected as by a flexible belt 13 to a pulley 12 mounted on a shaft of electric motor 11.

By appropriate choice of pulleys and sprocket sizes an appropriate reduction in the speed of transmission is secured for operating the shaft of feed roller 109.

If desired, an idler sprocket 23 (Figs. 1 and 2) can be provided for properly tensioning driving chain 22.

As soon as rollers 109 and 110 are stopped from rotating by roller 119 rising out of the depression 122 the sheet stock 128 is torn or separated at the bite of the rollers 109 and 110 by virtue of the fact that the rollers 124 and 125 continue to grip and pull the sheet stock. These rollers 124 and 125 are continuously rotated, and one of them, such as 124 (Fig. 7), may be grooved to produce proper frictional drive between these rollers and the sheet stock. Rotation is secured for these rollers by the aid of a sprocket 25 engaged by the sprocket chain 22, the two rollers being joined together for simultaneous rotation by the aid of the small gears 126 and 127.

The length of sheet stock so separated is fed between a series of rollers 61, 63, 65 (Figs. 8 and 11). These rollers, as indicated in these figures, all rotate in the same direction. The sheet stock is rolled in the substantially triangular space defined within the peripheries of these rollers, and is rolled into the desired roll form.

Rollers 63 and 65 are respectively supported on shafts 62 and 64. These shafts are mounted for rotation in suitable brackets 63*a* and 63*b* (Fig. 1). Furthermore, these two rollers derive their power from sprocket chain 22, which passes over sprockets 26 and 27 respectively connected to shafts 62 and 64. It is thus apparent that the winding rollers 63 and 65 are continually driven for winding up the sheet stock into the desired cylindrical form.

The third winding roller 61 is preferably rubber covered and is also continuously driven, and is mounted on a shaft 60. However, this roller is so arranged that it may be swung away from cooperative relation with the other two winding rollers 63 and 65, in order to permit the wound sheet stock to drop out from the space between the rollers. The manner in which roller 61 is mounted and rotated will now be described.

Thus shaft 18, which is driven by motor 11, as heretofore described, carries a sprocket 28 driving the chain 29 (Figs. 3 and 6) which serves to impart rotation to sprocket 31 mounted on shaft 60 of roller 61. An idler sprocket 30 serves to hold the chain 29 in proper tension.

Shaft 60 is mounted for rotation in suitable bearings 58 and 59. These bearings are formed near the ends of the oscillatable arms 56 and 57 mounted for oscillation coaxially with shaft 18. At predetermined intervals arms 56 and 57 are swung in a counterclockwise direction as viewed in Fig. 8, or in the clockwise direction as viewed in Fig. 11, to cause the rolled cotton product to drop from between the winding rollers. This intermittent oscillation of arms 56 and 57 is secured by a mechanism now to be described.

Thus there is a transverse bar 55 (Figs. 6 and 8) connecting the two arms 56 and 57. Fastened at the central portion of this transverse bar is a lever arm 54. A link 53 connects the arm 54 with a lever arm 52. The link 53 and lever arm 52 can be mutually adjusted to control the extent of throw as by providing a series of optional pivots in arms 52 for link 53.

This arm 52 is formed as an extension of a lever 45 fastened to a shaft 46 appropriately supported in bearings on the main frame 10. In order to rock arm 45 intermittently to pull the arms 56 and 57 to the dotted line position of Fig.

8, lever 45 has a left hand extension adapted to be urged downwardly by a cam 44 mounted on shaft 41. This shaft 41, as heretofore described, also carries the feed roller control cam 121, and it derives its rotation at a greatly reduced speed through the following transmission mechanism: shaft 18 carries a sprocket 32 (Figs. 1 and 3). This sprocket 32 in turn operates the sprocket 34 mounted on shaft 35 through chain 33. On this shaft is rigidly mounted a sprocket wheel 38 driving a chain 39 in driving relation with the sprocket 40 mounted on shaft 41. The ratio of reduction is such that ample time is given for the rolling operation prior to the severing of a succeeding length of sheet stock. Shaft 41, as indicated in Fig. 7 can be appropriately supported in bearing standards 42 and 43.

As the cam 44 strikes the lifter lever 45, the shaft 46 is oscillated in its bearings 47, 48.

The lever 45 has a right hand extension connected to a tension spring 49, the other end of which is secured to a bracket 50. The spring 49 retains the lifter lever 45 always in proper relation to cam 44. An adjustable abutment, such as a screw 51, limits the return of the lifter 45.

The next operation in the manufacture of the cotton rolls is the application of an adhesive to the outer surface of the roll so that it will retain its rolled shape. This adhesive can be in the form of a thin substantially nonviscous liquid which hardens upon drying.

For applying this adhesive to the cotton roll use is made of an adhesive applying roller 82 (Figs. 2, 3, 4, 5, and 11). This adhesive roller is appropriately mounted on shaft 69 in standards fixed to main frame 10. Shaft 69 can be appropriately driven from shaft 41 as by the aid of a sprocket 66 (Figs. 3 and 7) mounted on shaft 41. This sprocket in turn operates chain 67 which rotates sprocket 68 mounted on a shaft 73. On shaft 73 there is a sprocket 70 which drives chain 71. This chain 71 drives the sprocket 72 mounted on shaft 69.

In order to apply the paste or adhesive to the periphery of the roller 82, use is made of a brush or applicator 80 mounted upon a rotatable shaft 77 (Fig. 4). Shaft 77 is supported in the appropriate bearing standard 78 and 79. As shaft 77 rotates, the applicator 80 successively dips into an adhesive carried in a pan or tank 81, and contacts with the periphery of roller 82. Rotation is imparted to shaft 77 by way of a chain 75 connecting sprockets 74 and 76 respectively mounted on shafts 69 and 77.

The roller absorbent, dropping from between the winding rollers is held in contact with the periphery of roller 82 by the aid of a supplemental roller 83 mounted on shaft 73. After substantially one revolution of roller 82, the adhesive coated roll is permitted to drop into a groove 84 located in the periphery of roller 83, thus serving to extract the adhesive coated roll from between the bite of the adhesive coated rollers 82 and 83. The relative angular positions of the rollers 82 and 83 are such in relation to the dropping of the rolled cotton that groove 84 will not pick up the coated cotton roll until after substantially one revolution has occurred of roller 82. This is accomplished by causing the absorbent roll to drop just behind the slot 84.

The extractor roller 83 carries the coated roll in groove 84 to a position to be cut into the desired lengths. For this purpose roller 83 is preferably made in two sections. As illustrated in Fig. 1, it permits the entry between them of the rotary dividing knife 86, and trimmer knives 85 and 87. These knives 85, 86, and 87 are mounted for rotation on a shaft 88 and serve to cut the absorbent roll in the center and to trim the ends. Shaft 88 is mounted for rotation in bearing structures 89 and 90 and is driven at high speed by the aid of a grooved pulley 91 (Fig. 2) and a belt 92 is directly driven from the double grooved pulley 12 mounted on the shaft of motor 11, said belt engaging the groove nearest the motor.

It is apparent that the rotary knives 85, 86 and 87 are in position to extend inwardly beyond the groove 84 to cut the absorbent roll to the desired length. The absorbent roll in its severed condition is guided still further along in groove 84 and is dropped onto a moving conveyor belt 93.

This conveyor belt 93 is driven by the aid of a roller 94. This roller is mounted on a shaft 95 which revolves in the bearing structure 96 and 97. Rotation is imparted to shaft 95 as by the aid of a sprocket 98 which is driven by a chain 99 and sprocket 100 joined to shaft 73. The opposite end of the conveyor belt 93 is supported and guided in proper driving relation by an idler roller 101 on shaft 102 supported by bearing structures 103 and 104.

While the cotton rolls are being transported toward a discharging guide 108 they are subjected to a drying action. For this purpose there is an electric blower and drier 105 (Figs. 2, 3 and 11). This drier is mounted on frame 106 secured to the main frame 10. The electric heating coils 107 for the drier 105 are illustrated in Fig. 2. Air is forced over the coils 107 and issues out of the discharge end as hot air to the belt 93. As the absorbent rolls slowly pass under the drier 105, they are rapidly dried and continue to the discharge guide 108, whence they drop into any suitable container.

A short resumé of the operation of the machine will now be set forth. The feed rollers 109 and 110 hold the sheet stock at intermittent intervals whereby the sheet stock is drawn over the supplemental feed rollers 124 and 125, at the bite of the rollers 109 and 110. The separated cotton sheet is fed between the winding rollers 61, 63 and 65. The winding roller 61 moves outwardly and permits the wound absorbent roll to drop between the adhesive applying roller 82 and the extracting roller 83. Soon thereafter the roll drops into the groove 84 and is passed against the rotatable knives 85, 86 and 87. After the cutting operation the severed rolls drop onto the moving conductor 93 and are acted upon by a blast of warmed air passing from the drier 105. They are finally discharged upon the guide 108.

I claim:

1. In mechanism for making rolls of absorbent material, means for severing a definite length of the material from a source of supply, means for rolling said length into a roll, said means including a plurality of rollers, means for releasing the rolled length from between said rollers, an adhesive applying roller onto which the rolled length is delivered, a cutter for trimming the rolled length to a desired length, and means for feeding the adhesive treated rolled length to the cutter.

2. In mechanism for making rolls of absorbent material, means for severing a definite length of the material from a source of supply, means for rolling said length into a roll, said means including a plurality of rollers, means for releasing the rolled length from between said rollers, an adhesive applying roller onto which the rolled length is delivered, a cutter for trimming the rolled

length to a desired length, and means for feeding the adhesive treated rolled length to the cutter, comprising a roller having a longitudinal peripheral groove into which said rolled length is received, said grooved roller being sectional to permit the entry of the cutter between the sections.

3. The combination as set forth in claim 2, with the addition of a conveyor onto which the cut rolled length is deposited by the grooved roller.

4. In mechanism for making rolls of absorbent material, means for severing a definite length of the material from a source of supply, means for rolling said length into a roll, said means including a plurality of rollers, and means for releasing the rolled length from between said rollers, comprising a swinging support for one of the rolling rollers, a link connected to said support, and a cam for intermittently actuating said link.

5. In mechanism for making rolls of absorbent material, means for severing a definite length of the material from a source of supply, means for rolling said length into a roll, said means including a plurality of rollers, means for releasing the rolled length from between said rollers, a gang of disc cutters, and means for moving the rolled length to the cutters for cutting it into a number of shorter rolled material.

6. In a machine for making absorbent rolls from a supply of absorbent material, means for mounting a continuous supply of material, a pair of feed rollers, means for continuously rotating said feed rollers, a second pair of rollers engaging said material between said supply and said continuously operating feed rollers, means for intermittently rotating said second pair of rollers at the same speed as the said feed rollers, for a predetermined length of time and then stopping the same, whereby a predetermined length of material is fed from said supply and torn therefrom by a force exerted in the direction of feeding of said material, a plurality of rolling rollers disposed to receive material from said feed rollers and rotatable about axes transverse to the direction of movement of said predetermined length of material for rolling each predetermined length of material upon itself, means mounting one of said rolling rollers for movement toward and away from the others of said rolling rollers, means for moving said movable roller coordinated with the rotation of said rolling rollers for moving said movable roller away from the others of said rolling rollers while said rollers are rolling said material, to limit the diameter of said rolled material and finally to eject said rolled material from said rolling rollers.

7. In a device for making rolls of absorbent material, means for tearing predetermined lengths of material from a sheet of material, roller means for receiving said predetermined lengths of material and for rolling the material upon itself, pasting means disposed to receive said rolled material from said roller means and for applying pasting material thereto, including a pair of pasting rolls, and means for rotating said pasting rolls in the same direction relative to each other.

8. In a device for making rolls of absorbent material, means for tearing predetermined lengths of material from a sheet of material, rolls means for receiving said predetermined lengths of material and for rolling the material upon itself, pasting means disposed to receive said rolled material from said roller means and for applying material thereto, including a pair of pasting rolls, and means for rotating said pasting rolls in the same direction relative to each other, one of said pasting rolls having a radially extending depression therein for receiving said pasted roll of material and for ejecting the same from said pasting rollers.

9. In a device for making rolls of absorbent material, means for tearing a predetermined length of sheet material from a supply of material, rolling means for rolling said predetermined length of material upon itself, means for moving said roll of rolled material in a direction transverse to the axis of said rolled material, a plurality of knives disposed in spaced relation in the direction of the axis of said rolled material for engaging said material and for cutting the same into predetermined lengths.

10. In a device for making rolls of absorbent material, means for tearing a predetermined length of material from a sheet of material, rolling means for rolling each length of material upon itself, means for applying paste to said roll of material including a pasting roller having a radially extending depression formed therein for receiving said rolled material and for transporting the same in a direction transverse to the axis of said rolled material, a plurality of knives disposed relative to each other in the direction parallel to the longitudinal axis of said rolled material, and means mounting said knives for engaging said material while in said depression for cutting said material into predetermined lengths.

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