

Nov. 3, 1942.

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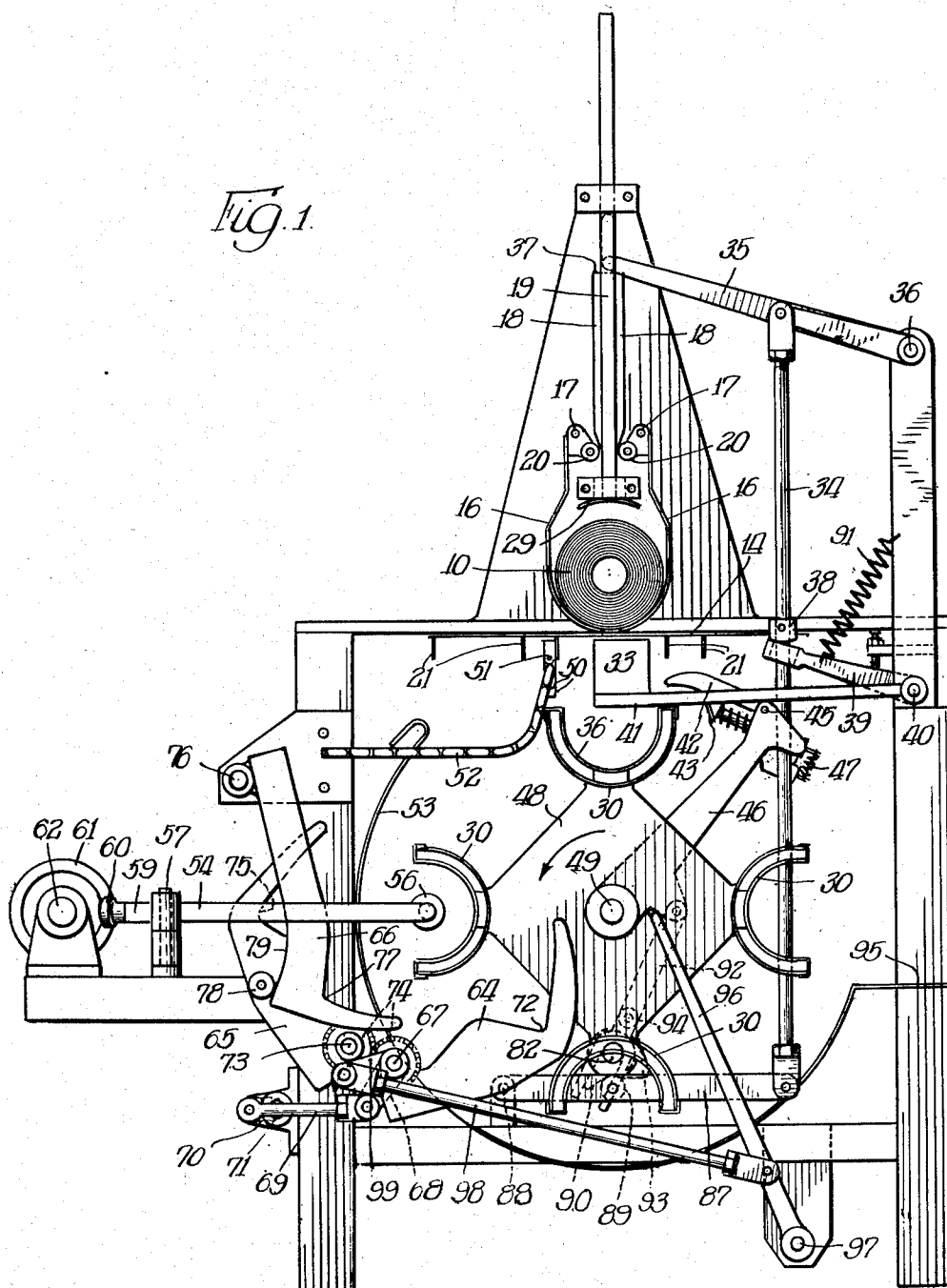
2,301,016

MACHINE FOR WRAPPING ROLLS OF TOILET PAPER AND THE LIKE

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4 Sheets-Sheet 1

Fig. 1.



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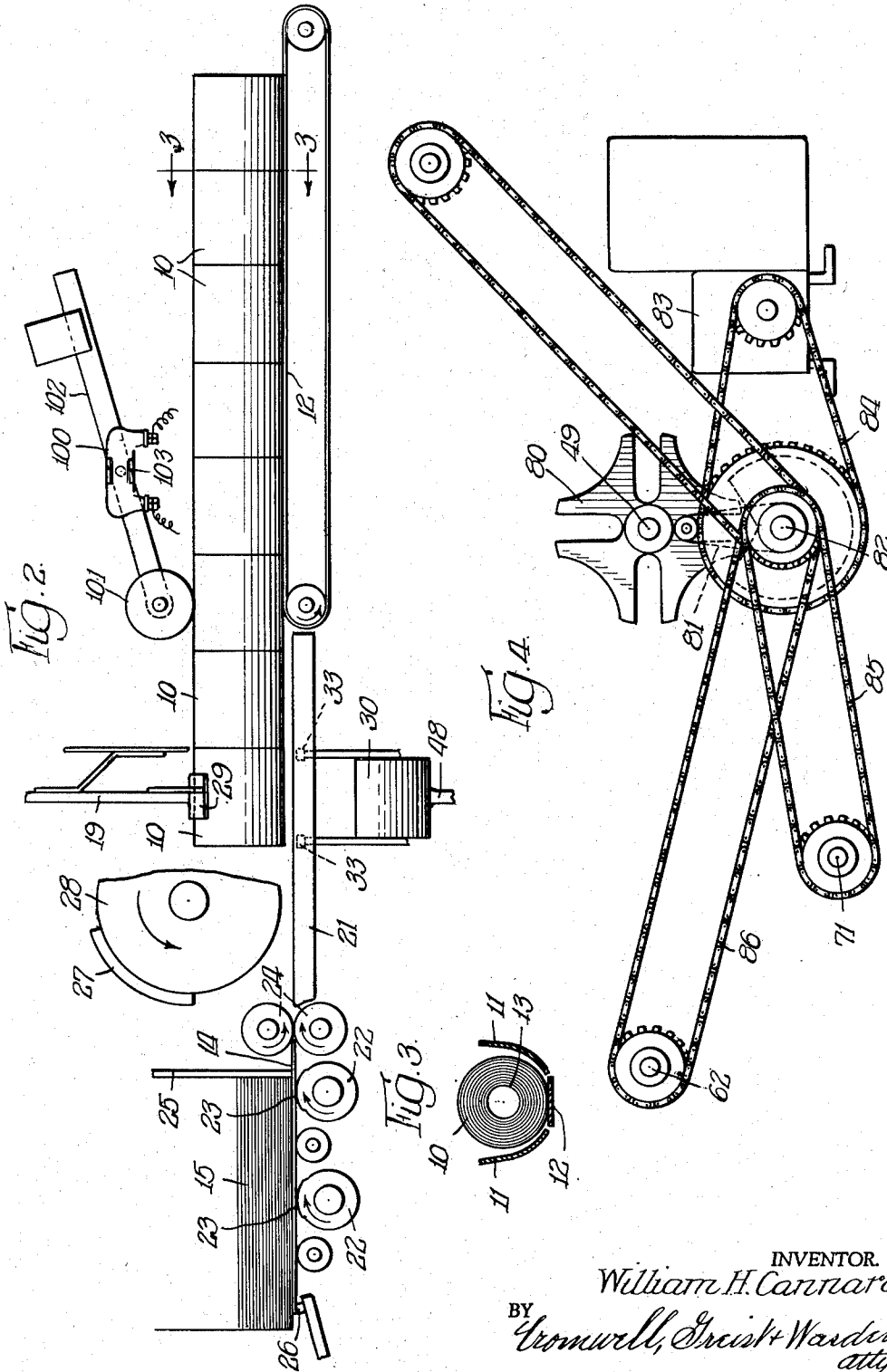
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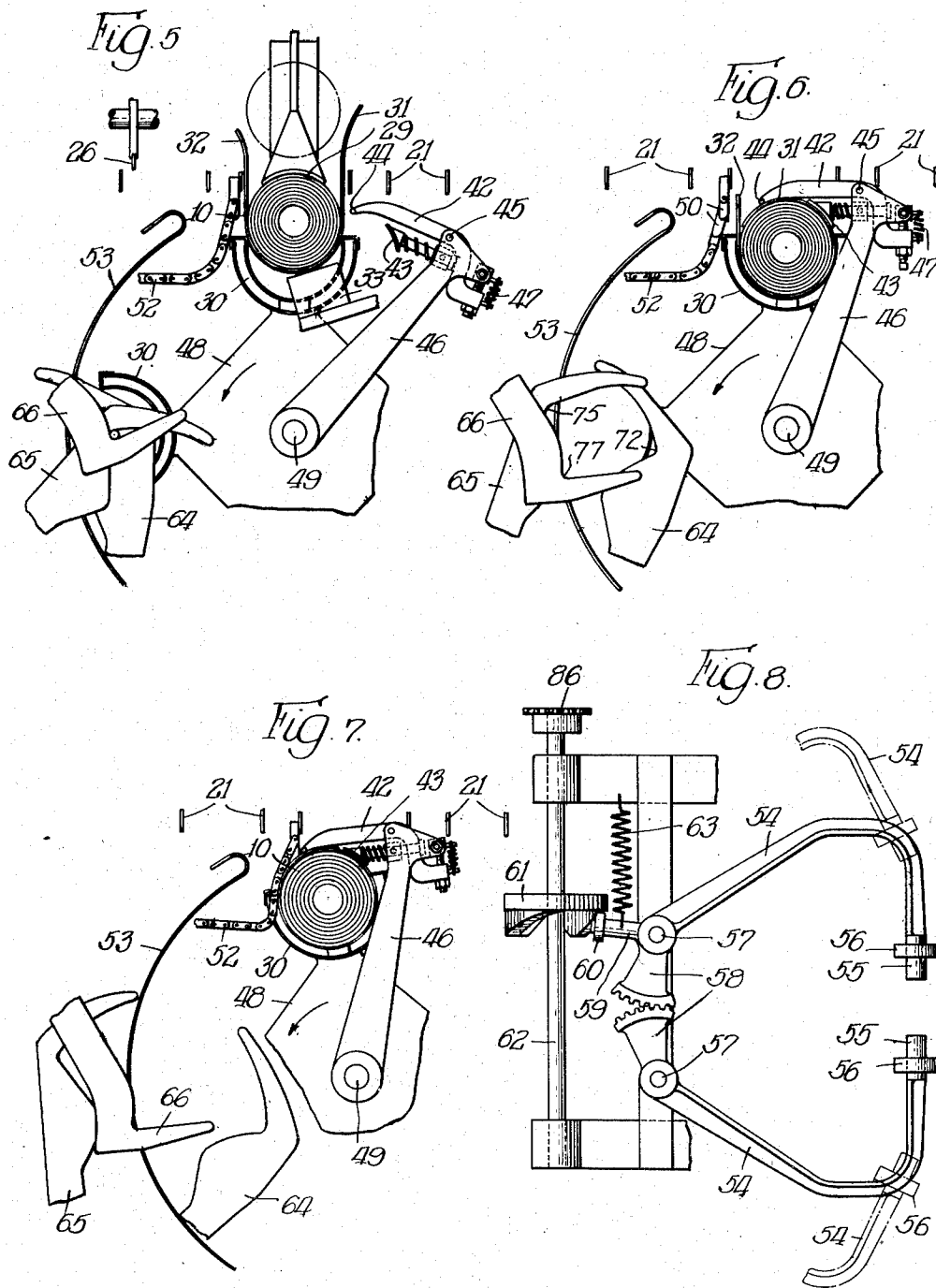
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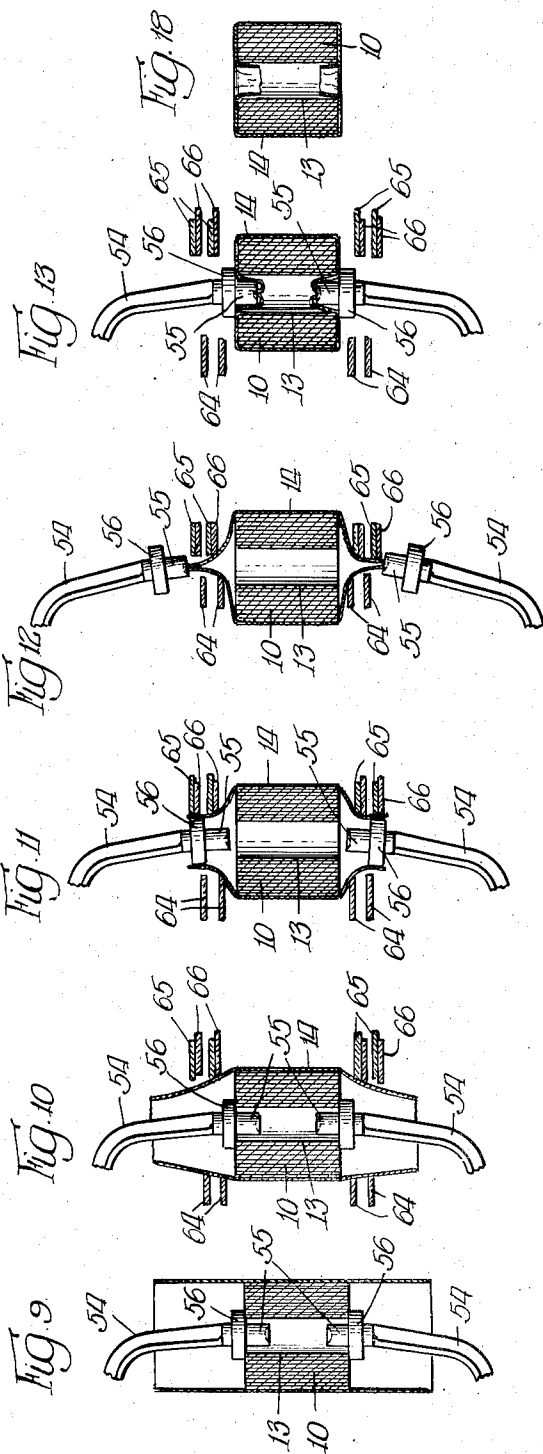
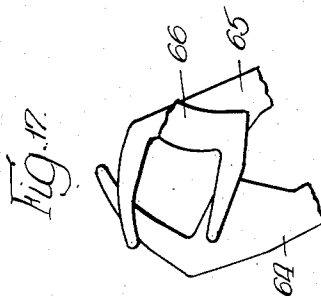
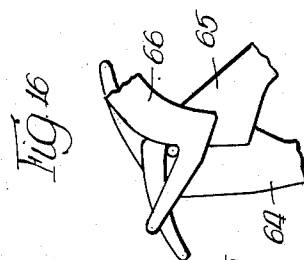
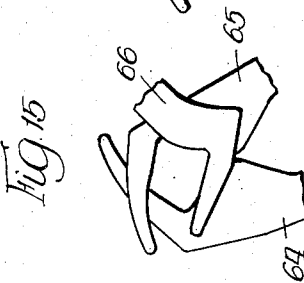
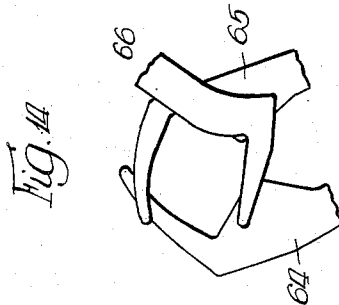
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UNITED STATES PATENT OFFICE

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MACHINE FOR WRAPPING ROLLS OF TOILET
PAPER AND THE LIKE

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Application December 12, 1940, Serial No. 369,775

5 Claims. (Cl. 93-7)

The object of this invention is to provide an improved machine for automatically wrapping rolls of toilet paper and the like. While the machine is especially applicable to the wrapping of rolls of toilet paper—and will be referred to hereinafter in that connection—it should be understood that the machine is also applicable to the wrapping of hollow centered rolls of other kinds of material.

The improved machine embodies a number of novel features which cooperate to produce wrapped rolls in which the label or other sheet serving as the wrapper is smoothly, neatly and securely applied, in a fully automatic manner, and at a high rate of speed.

While the foregoing statements are indicative in a general way of the nature of the invention, other more specific objects and advantages will be apparent to those skilled in the art upon a full understanding of the construction, arrangement and operation of the various parts of the machine.

A preferred embodiment of the invention is presented herein for the purpose of exemplification, but it will of course be understood that the invention is capable of being embodied in other structurally modified forms coming equally within the scope of the appended claims.

In the accompanying drawings:

Fig. 1 is a side view of the improved machine, with the label feeding mechanism and certain of the other parts removed for clearness of illustration;

Fig. 2 is a somewhat schematic end view of the upper portion of the machine, likewise with certain of the parts removed for clearness;

Fig. 3 is a vertical transverse section through the roll feeding guideway, taken on the line 3—3 of Fig. 2;

Fig. 4 is a side view of certain of the driving connections in the machine;

Figs. 5, 6 and 7 are each similar to a portion of Fig. 1 and show respectively (1) a roll as it is being pushed downwardly on a wrapper into one of the carriers, (2) the same roll after the leading margin of the wrapper has been wrapped about the upper portion of the roll with the roll fully seated in the carrier, and (3) the same roll after the spider supporting the carrier has started to move and the following margin of the wrapper on the roll has been wiped down into overlapping association with the leading margin of the wrapper;

Fig. 8 is a plan view of the tucker arms;

Fig. 9 is a horizontal diametric section through

one of the rolls at the second station in the machine, where the projecting ends of the wrapper are folded inwardly against the ends of the roll and tucked into the hollow center of the latter;

Figs. 10, 11, 12 and 13 are views, similar to Fig. 9, which show the various stages in the progressive actions of the tucking arms and wrapping fingers at the second station;

Figs. 14, 15, 16 and 17 are side views of the wrapping fingers in the various positions assumed by the latter in Figs. 10, 11, 12 and 13 respectively; and

Fig. 18 is a diametric section through a finished roll, as wrapped and discharged by the machine.

In the machine shown in the drawings the rolls 10 which are to be wrapped are fed into the wrapping mechanism of the machine along a trough-shaped guideway 11. The rolls 10 within the guideway rest upon a conveyor belt 12 which serves to advance the rolls along the guideway to the wrapping mechanism.

The rolls 10 are provided at their centers with hollow tubular cores 13. These rolls are adapted to be wrapped in suitably printed wrappers 14 of tissue paper or other material. The wrappers 14 are arranged in a stack 15 a short distance beyond the delivery end of the guideway 11. The wrappers 14 are somewhat longer than the rolls 10 and are adapted to be wrapped around the rolls, with the projecting end portions of the wrappers folded flatly in against the ends of the rolls and tucked securely into the openings present in the cores.

The conveyor belt 12 of the guideway 11 projects the rolls 10, one at a time, into a position between two laterally spreadable holders 16 which are located just beyond the end of the guideway 11 between the latter and the wrapper feeding mechanism.

The holders 16 are curved inwardly toward each other at their lower ends into positions beneath the foremost roll, and are pivoted at 17 to a portion of the frame of the machine. At the proper time in the operation of the machine the holders 16, which are normally urged toward each other by suitably located spring means (not shown), are forced apart by cams 18 on a vertically reciprocating rod 19, which cams engage rollers 20 on the holders 16.

Before the foremost roll 10 is released by the holders 16, one of the wrappers 14 will have been fed from the stack 15 along guide strips 21 to a position directly beneath the foremost roll, in centered relation to the latter. The feeding

mechanism for the wrappers consists of two rotating rolls 22 beneath the stack 15. These rolls are provided with arcuate projecting portions 23 which engage frictionally with the lowermost wrapper in the stack 15 and project the same at the proper time in the operation of the machine into a position between a pair of opposed feed rolls 24. During this projection the stack 15 of wrappers is held against movement by one of the walls 25 of the magazine in which the stack is located, and the wrapper immediately above the lowermost one is held against movement by a pin 26, which pin moves upwardly into engagement with the same as soon as the lowermost wrapper has started to move. The rolls 24 move the lowermost wrapper 14 into a centered position beneath the foremost roll 10 on the strips 21, and during this movement one of the margins of the wrapper (hereinafter referred to as the following margin) may have glue applied thereto by a suitably supplied arcuate pad 27 on another rotating roll 28.

At the time that the holders 16 release the foremost roll 10 a pusher 29 on the lower end of the vertically movable rod 19 engages with the upper surface of the roll and forces it downwardly through an opening between the strips 21 on which the wrapper 14 is resting, causing the wrapper to move downwardly with the roll and curve itself about the lower portion of the latter, as shown in Fig. 5. The pusher 29 projects the roll 10 and wrapper 14 into a semi-cylindrical carrier 30 below the holders 16, leaving the leading and following margins 31 and 32 of the wrapper extending upwardly from the sides of the roll. The carrier 30 is of substantially the same radius as the roll but is shorter than the latter.

During the downward movement of the roll 10 and wrapper 14 into the carrier 30, the roll and wrapper are prevented from dropping away from the pusher 29 by a pair of spaced supports 33 which are located beneath the upper edges of the guide strips 21 immediately beyond the ends of the carrier 30. The supports 33 move downwardly in synchronism with the pusher 29. The arm 19 which carries the pusher 29 is reciprocated by a vertically movable rod 34. This rod is pivoted at its upper end to a pivoted lever 35. The lever 35 is pivoted to a portion of the arm of the machine at 36 and bears at its free end against an abutment 37 on the rod 19. The rod 34 is provided intermediate its ends with a lug 38 which engages with the free end of a lever 39 carried by a rock shaft 40. The supports 33 are mounted on the ends of levers 41, and the levers 41 are in turn secured to the rock shaft 40. Consequently, when the rod 34 is moved downwardly, the pusher 29 will descend and the supports 33 will also descend.

After the roll 10, with its wrapper 14, has been positioned in the carrier 30 the pusher 29 will return to its uppermost position again and a wrapping finger 42 will advance across the top of the roll from one side of the latter, wiping the leading margin 31 of the wrapper down into engagement with the top of the roll, as shown in Fig. 6. The wrapping finger 42 is provided with a spring-pressed pressure plate 43 which moves with the finger 42 but is set back with respect to the tip 44 of the latter. The plate 43, upon engaging with the wrapper and pressing it against the roll, will yield resiliently as the finger 42 continues its advance, allowing the tip 44 of the latter to press the extreme edge of the

leading margin 31 into engagement with the roll. The finger 42 is pivotally mounted at 45 to the upper end of a lever 46, and a spring 47 tends to bias the tip 44 of the finger downwardly, whereby to cause the tip to follow the contour of the roll during its movement across the top of the latter.

The carrier 30 is mounted on an intermittently rotating spider 48. The spider 48 is secured at its center to a shaft 49 and is provided with three other carriers which are identical with the carrier 30. The four carriers 30 are spaced 90° apart about the periphery of the spider, and each time that the spider comes to rest during its intermittent movement one of the carriers will be located in an upwardly facing position directly beneath the foremost roll 10. The spider 48 remains stationary while the foremost roll 10 is being projected in the manner above described into the uppermost carrier 30 and while the wrapping finger 42 is folding the leading margin 31 of the wrapper about the upper portion of the roll seated in the carrier.

After the wrapping finger 42, with the pressure plate 43, has folded over the leading margin 31 of the wrapper on the roll in the uppermost carrier 30, the spider 48 will start to rotate in the direction indicated by the arrow thereon. As this rotation takes place a plurality of pivotally mounted depending fingers 50, preferably of different lengths, pivoted at 51 to one of the guide strips 21, and preferably supplemented by a loosely suspended chain 52, will wipe the following margin 32 of the wrapper down into overlapping engagement with the leading margin 31, forming the wrapper into a tube. As the spider 48 continues to rotate to a point where the following margin 32 of the wrapper on the roll moves out of the range of the chain 52 resting on the same, the following margin 32 will be engaged by a circular guide 53 and will thereafter be retained by the guide 53 in its overlapping position. When the carrier 30 has moved through an angle of 90°, from its initial position (hereinafter referred to as the first station), it will come to rest in its second position (hereinafter referred to as the second station).

At the second station a pair of tucker arms 54 are provided, which arms upon actuation move toward each other into positions wherein cylindrical bosses 55 on the ends of the arms project into the ends of the core 13 of the roll 10 and annular shoulders 56 on the arms engage with the ends of the roll, as shown in Fig. 9. The tucker arms 54 are pivotally mounted at 57 to a portion of the frame of the machine (see Fig. 8) and are caused to move toward and away from each other equally and to the same extent by intermeshing sector gears 58 on the arms. One of the arms is provided with a projection 59 which carries a roller 60, and this roller engages with an end-face cam 61 on a shaft 62. Rotation of the shaft 62 causes the tucker arms 54 to be moved away from each other and a spring 63 causes them to be moved toward each other, all at the proper times in the operation of the machine. Figs. 9 to 13 inclusive show the various positions assumed by the arms 54 during one complete operating cycle.

At this second station two sets of folding fingers are also provided, one at each side of the carrier 30. As both sets are the same, only one set need be described. Each set consists of three thin, flat, hook-shaped fingers 64, 65 and 66. The finger 64 is secured to a rock shaft 67. The

corresponding finger 64 of the other set is secured to the same rock shaft. The rock shaft 67 is oscillated by an arm 68 on the shaft, and the arm 68 is connected with a pitman 69 which is operated from an eccentric 70 on a shaft 71. The finger 64 is provided with a generally V-shaped crotch at 72, which crotch coincides with the center of the roll in the carrier 30 when the finger 64 is moved toward such center. The rock shaft 67 is connected with a second rock shaft 73 by intermeshing gears 74, and a finger 65 is secured to the shaft 73 in parallel practically contiguous relation to the finger 64. The corresponding finger 65 of the other set is also secured to the rock shaft 73. The finger 65 is provided with a generally V-shaped crotch 75, which coincides with the center of the roll in the carrier when the finger 65 is moved toward that center. The third finger 66 is pivoted to the frame at 76, in parallel practically contiguous relation to the finger 65, and is provided with a generally V-shaped crotch 77 which coincides with the center of the roll when the finger is moved in that direction. The finger 66 is actuated from the finger 65 by a roller 78 on the finger 65 which cams against a surface 79 on the back of the finger 66. When the rock shaft 67 is oscillated, the crotches in all three fingers will approach each other, gathering in the projecting end of the tubular wrapper and folding the same flatly against the end of the roll. As the fingers 64, 65 and 66 converge upon the projecting end of the wrapper the size of the opening defined by the fingers progressively decreases, as shown in Figs. 14 and 15, until all of the material in the projecting end of the wrapper is brought down into a circle of small size, as shown in Fig. 16. As the fingers come together from the position shown in Fig. 15 to the position shown in Fig. 16, the tucker arms 54 are withdrawn, resulting in a tightly compacted formation of uniform shape. As soon as this formation has been effected, as shown in Figs. 12 and 16, the fingers 64, 65 and 66 are opened up and the tucker arm 54 is moved inwardly again, forcing the compacted formation produced by the fingers into the hollow end of the core 13, completing the wrap. The end of the cylindrical boss 55 on the tucker arm 54 is preferably concave in order to receive and center the compacted formation resulting from the closing of the folding fingers.

The spider 48 is intermittently rotated by a Geneva gear 80 which is secured to the shaft 49. This gear is actuated intermittently by a continuously revolving arm 81 on a shaft 82. Every time that the shaft 82 makes one complete revolution the Geneva gear 80, with the spider 48, will be caused to make one-quarter of a revolution. The shaft 82 is driven from an electric motor 83 by a chain and sprocket connection 84. The shaft 71 on which the eccentric 70 is mounted is driven from the shaft 82 by a chain and sprocket connection 85. The shaft 62 on which the cam 61 is mounted is driven from the shaft 82 by a chain and sprocket connection 86. The rod 34 which operates both the pusher 29 and the underlying roll supports 33 is connected at its lower end to a lever 87 which is pivoted at 88 to a portion of the frame. Intermediate its ends the lever 87 is provided with a roller 89 which is engaged by a cam 90 on the shaft 82 once during each revolution of that shaft. When the cam 90 engages with the roller 89 it swings the lever 87 downwardly, forcing the rod 34 downwardly. The rod 34 is returned to its up-

permost position again by means of a spring 91 which extends between the lever 89 and a portion of the frame of the machine. The lever 46 on which the wrapping finger 42 and pressure plate 43 are mounted is oscillated by a link 92 which is connected at one end with the lever and is bifurcated on the other end for sliding engagement with the shaft 82. The shaft 82 is provided with a cam 93 which upon each revolution of the shaft 82 engages with a roller 94 on the link 92 which causes the latter to shift endwise and oscillate the lever 46.

After the projecting tubular ends of the wrapper 14 on the roll 10 have been folded in flatly against the ends of the roll and tucked securely into the openings in the ends of the core of the roll the spider rotates through another 90°, bringing the finished roll into a third station at the bottom of the machine. In this third station no further work is performed upon the wrapper. If glue has been used on the wrapper the momentary stopping of the roll in this third position will enable the glue to take better effect prior to the discharge of the roll.

From the third station the roll is advanced on the next movement of the spider 48 to a fourth station, from which it is discharged onto a table-like support 95 by a stripping arm 96. The arm 96 is pivoted at 97 to a portion of the frame and is connected by a pitman 98 to an eccentric 99 on one end of the rock shaft 67.

An electrical control device 100 is preferably located just above the guideway 11 at the delivery end of the conveyor belt 12. This device includes a downwardly spring-pressed roller 101 which rides on the tops of the rolls 10 and holds the latter firmly in engagement with the belt at the point of delivery. The roller 101 is preferably mounted on a lever 102 which is connected with an electric switch 103 for controlling the operation of the motor 83. Should no roll be in a position ready to be discharged from the delivery end of the belt 12, the lever 102 carrying the pressure roller 101 will swing downwardly, opening the switch and stopping the motor. As soon as a roll 10 moves along the guideway to the delivery end of the latter, the lever 102 will be raised, closing the switch and placing the machine in operation again.

The two sets of folding fingers 64, 65 and 66 at opposite sides of the carrier 30 at the second station have been described as of single blade construction, but the fingers are preferably duplicated at each side so as to engage with the projecting tubular ends of the wrapper not only right at the ends of the roll but also a short distance outwardly therefrom. This duplication or multiply construction of the blades is illustrated in Figs. 10, 11, 12 and 13.

I claim:

1. In a machine for wrapping hollow centered rolls, means for wrapping a wrapper about the periphery of a roll, with portions of the wrapper projecting beyond the ends of the roll, and means for folding in and securing each projecting end of the wrapper flatly against the end of the roll, comprising a set of folding fingers at each end of the roll, means for moving the fingers together in planes parallel to the end of the roll to constrict the projecting portion of the wrapper, a tucker which holds the projecting portion of the wrapper against closing fully during the first part of the closing movement of the fingers, and means for withdrawing the tucker during the latter part of said movement and then returning it

to tuck the resulting compacted wrapper formation into the open center of the roll.

2. In a machine for wrapping hollow centered rolls, a generally semi-circular carrier, means for projecting a roll into a position opposite the carrier, laterally separable means for temporarily supporting the roll in that position, means for projecting a wrapper into a position between the roll and the carrier, means for forcing the roll out from between the laterally separable means and against the wrapper into the carrier with the wrapper curved about the bottom of the roll and with its margins projecting from the carrier, means for folding in the projecting end portions of the wrapper against the ends of the roll, and means for tucking the thusly compacted wrapper formations into the open ends of the roll.

3. In a machine for wrapping hollow centered rolls, a generally semi-circular carrier, means for positioning a roll in the carrier upon a wrapper with the margins of the wrapper projecting from the carrier at opposite sides of the roll, and means for wrapping one of the projecting margins about the roll, said means consisting of a plurality of yieldable fingers of different lengths in the path of movement of the projecting margin of the wrapper, and means for moving the carrier with the roll and wrapper therein past said fingers, whereby to cause the latter to wrap the projecting margin about the roll.

4. In a machine for wrapping hollow centered rolls, means for wrapping a wrapper about the

periphery of a roll, with portions of the wrapper projecting beyond the ends of the roll, and means for folding in and securing each projecting end of the wrapper flatly against the end of the roll, comprising a set of folding fingers at each end of the roll, means for moving the fingers together to constrict the projecting portion of the wrapper, means for holding the projecting portion of the wrapper against closing fully during the first part of the closing movement of the fingers, means for withdrawing said last mentioned means during the latter part of said movement, and means for thereafter tucking the resulting compacted wrapper formation into the open center of the roll.

5. In a machine for wrapping hollow centered rolls, a carrier movable in an arcuate path, means for positioning a roll in the carrier upon a wrapper with the margins of the wrapper projecting from the carrier at opposite sides of the roll, and means for wrapping one of the projecting margins about the roll, said means consisting of an arm which is oscillatable about the center of movement of the carrier, an inwardly spring-pressed wrapping finger pivotally mounted on the arm for engagement at its free end with the wrapper to press the latter against the roll in the direction of the carrier and a forwardly spring-pressed pressure plate which is carried by the arm for engagement with the wrapper at a point behind the finger.

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