March 12, 1946. C. A. GERLACH 2,396,417

ADHESIVE APPLICATOR FOR WRAPPING MACHINES

Original Filed Feb. 7, 1941 4 Sheets-Sheet 1

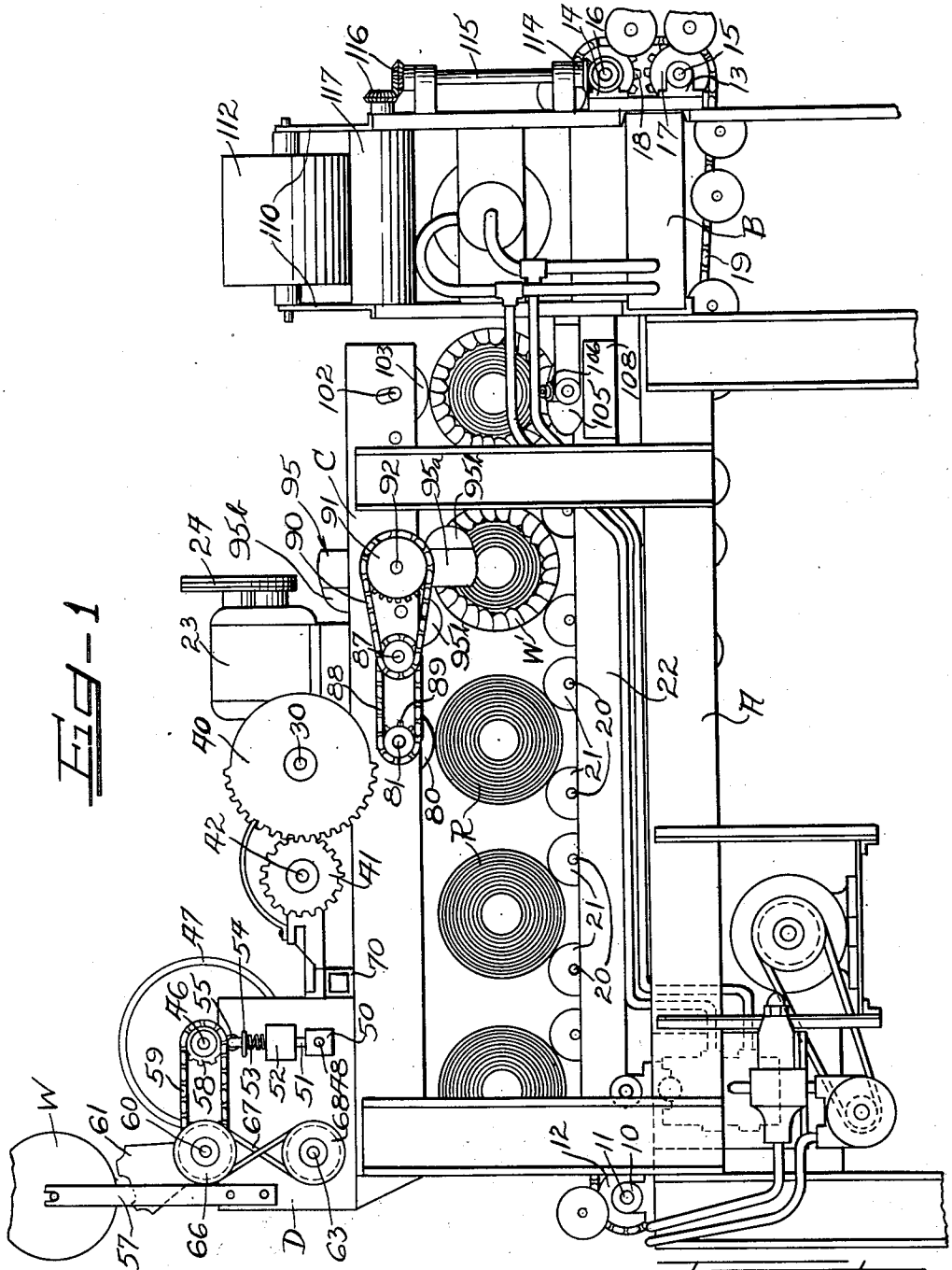


Fig-1

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ADHESIVE APPLICATOR FOR WRAPPING MACHINES

Original Filed Feb. 7, 1941 4 Sheets-Sheet 2

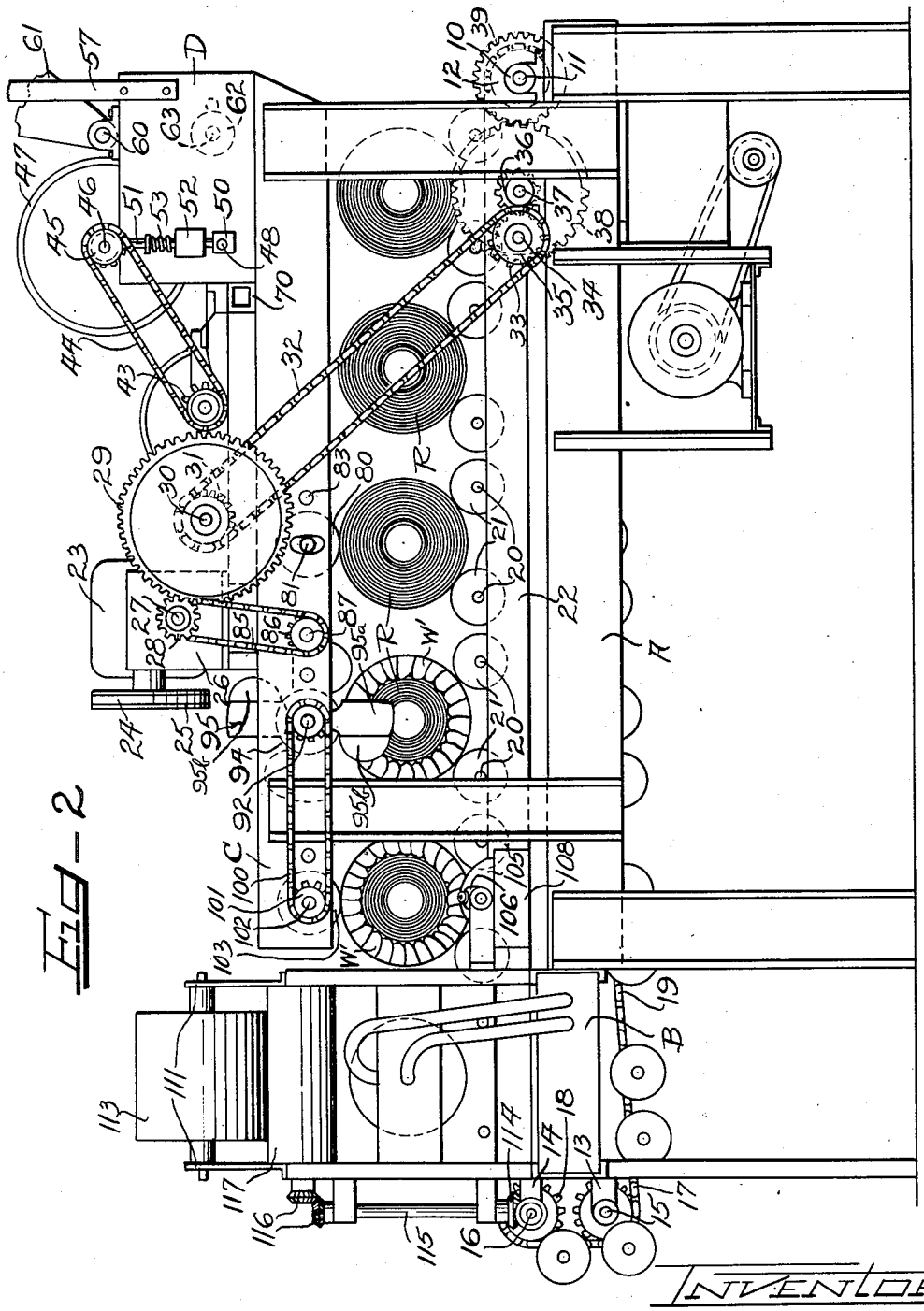


Fig-2

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ADHESIVE APPLICATOR FOR WRAPPING MACHINES

Original Filed Feb. 7, 1941 4 Sheets-Sheet 3

Fig-3

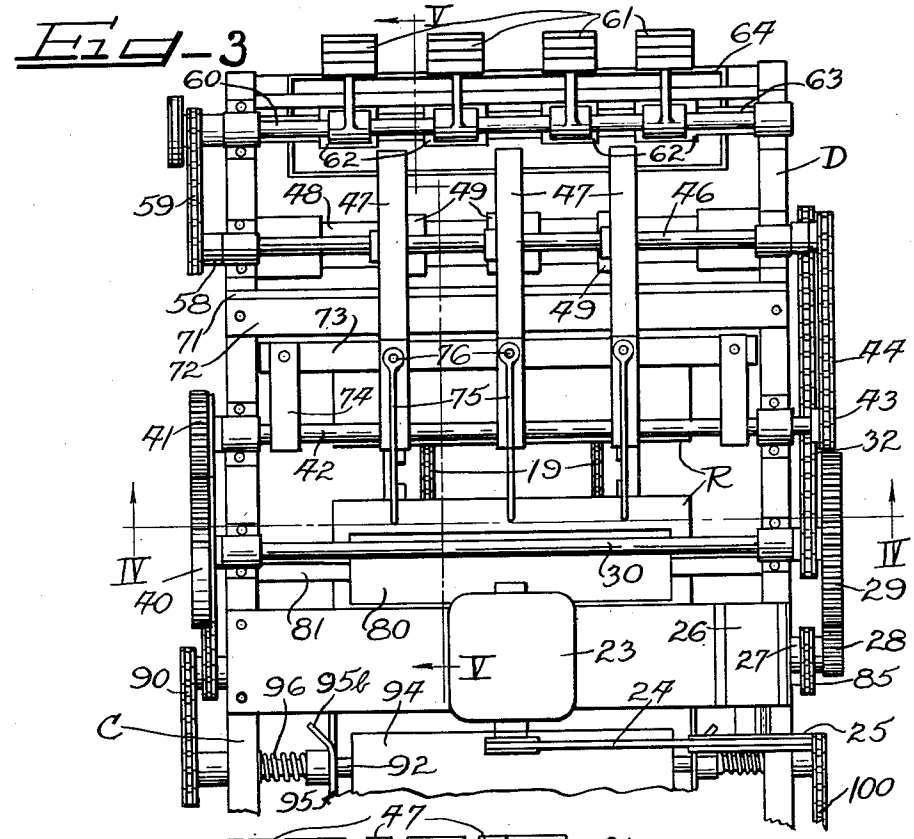
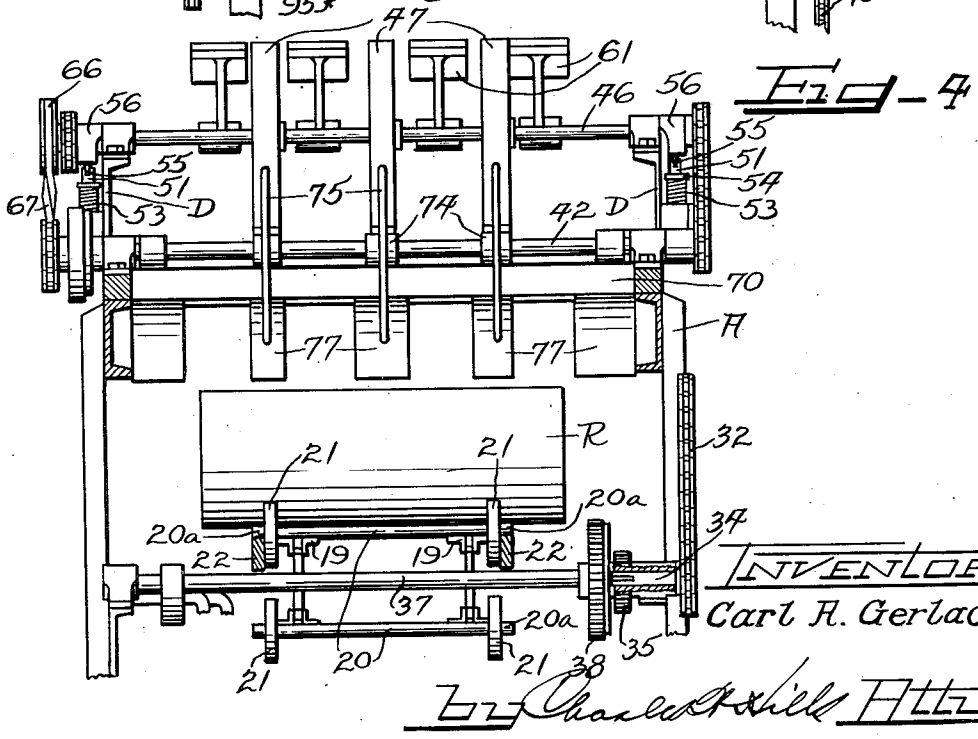


Fig-4



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ADHESIVE APPLICATOR FOR WRAPPING MACHINES

Original Filed Feb. 7, 1941 4 Sheets-Sheet 4

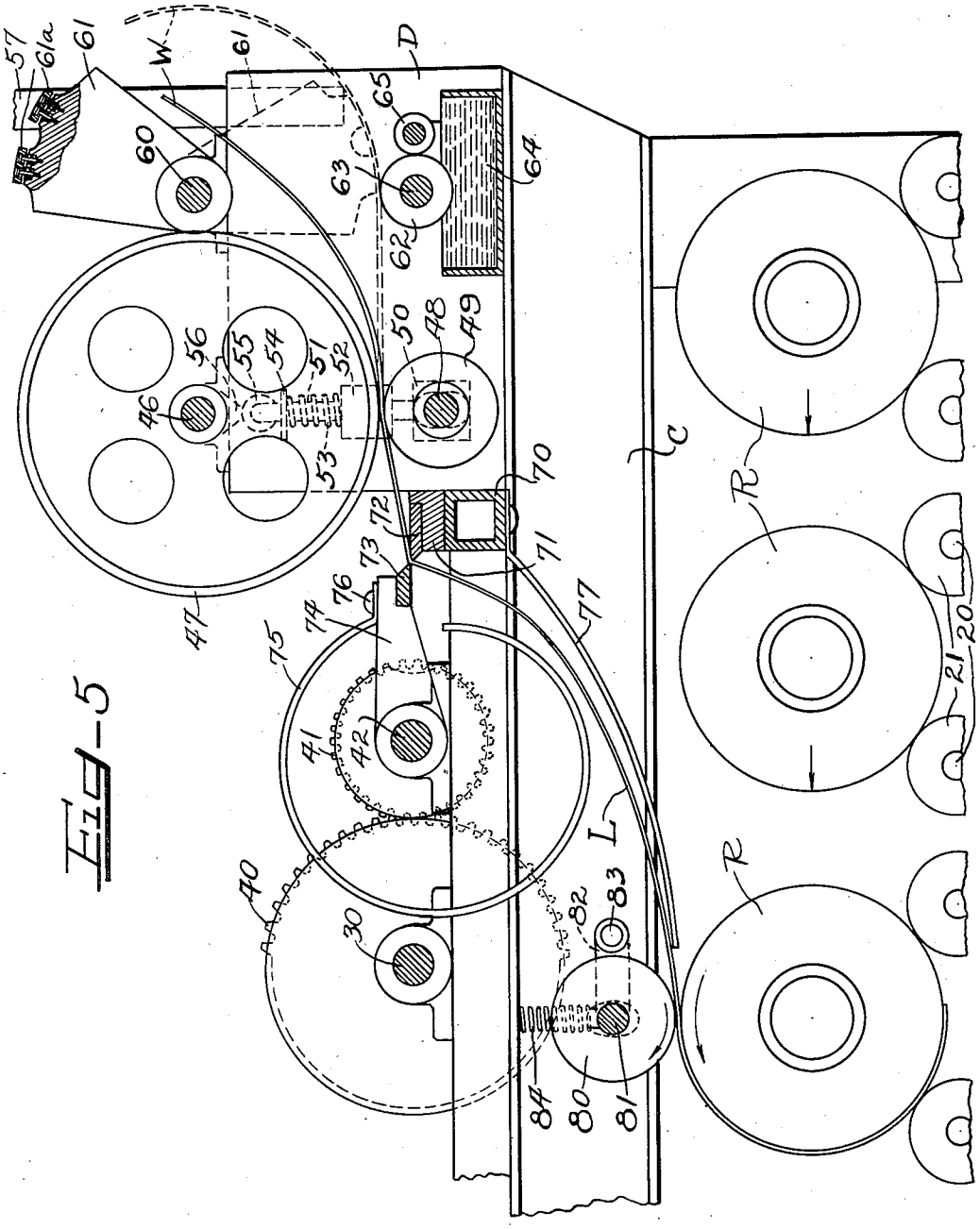


Fig-5

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Patented Mar. 12, 1946 2,396,417

UNITED STATES PATENT OFFICE

2,396,417

ADHESIVE APPLICATOR FOR WRAPPING MACHINES

Carl A. Gerlach, Spring Lake, Mich.

Original application February 7, 1941, Serial No. 377,827. Divided and this application May 1, 1944, Serial No. 533,527

8 Claims. (Cl. 91—14)

This invention relates to wrapping machines and more specifically to adhesive applicator equipment for wrapping machines which wrap rolls of paper to cover the ends as well as the sides or peripheries of the rolls.

This application is a division of my application entitled: "Wrapping machine," U. S. Serial No. 377,827, filed February 7, 1941.

While the invention will be hereinafter specifically described as embodied in a machine for wrapping rolls of paper such as butchers' wrapping paper, it should be understood that the invention includes adhesive applicator machines in general and especially machines for applying adhesive on wrappings for cylindrically shaped articles.

According to the invention, wound rolls of paper are fed through the machine on a conveyor with rotatable supports for the rolls. The machine includes a station for rolling a sheet of wrapping paper around the periphery of the roll to cover the full length of the roll and to project beyond the ends of the roll. This sheet of wrapping paper is supplied from a roll mounted on the machine and is automatically fed to the wrapping mechanism through a cutting device which severs the sheet into a length somewhat greater than the circumference of the roll being wrapped in order that the ends of the sheet may be overlapped and glued together. The feeding mechanism includes glue spotting devices for applying spots of glue to the portions of the sheet that are overlapped in order that the wrapped sheet will be secured around the roll.

The roll with the wrapper thereon then advances to another station of the machine for pleating or tucking of the projecting ends of the wrapper against the ends of the roll. The tucking mechanism covers the marginal portions of the roll ends with the wrapper.

The tucked wrapper and roll then advance to another station where glue is applied to the tucked portions of the wrapper. The glued roll and wrapper next pass to another station of the machine at which end covers or disks of sheet material are pasted onto the tucked ends of the wrapper for producing a completely wrapped roll.

It is, then, an object of this invention to provide mechanism for feeding sheet material to a cylindrically shaped object for wrapping around said object while applying glue to predetermined portions of the sheet material for subsequent uniting together of the ends of the sheet material around the object.

A further object of the invention is to provide a coating machine for glue-spotting localized areas of sheet material.

A further object of the invention is to provide an adhesive applicator including a feed device for sheet material and sheet-deflecting mechanism for moving the sheet material into the path of an adhesive-applying mechanism.

A further object of the invention is to provide a coating machine including feed rolls for sheet material, a coating applicator, and sheet-deflecting mechanism acting on sheet material advancing to the feed rolls for moving the sheet material into the path of the coating applicator.

A further object of the invention is to provide a coating machine including rotatably mounted shoes for deflecting sheet material against coaters to effect coating of localized areas of the sheet material.

Other and further objects of the invention will be apparent to those skilled in the art from the following detailed description of the annexed sheets of drawings which, by way of preferred example, illustrate one embodiment of the invention.

On the drawings:

Figure 1 is a front side fragmentary elevational view of a wrapping machine equipped with a glue applicator according to this invention.

Figure 2 is a fragmentary rear side elevational view of the machine shown in Figure 1.

Figure 3 is a fragmentary top plan view of the glue applicator end of the machine shown in Figures 1 and 2.

Figure 4 is a transverse vertical cross-sectional view, with parts omitted, and with parts in elevation, taken substantially along the line IV—IV of Figure 3.

Figure 5 is a fragmentary longitudinal vertical cross-sectional view taken substantially along the line V—V of Figure 3.

As shown on the drawings:

In Figures 1 and 2, the reference character A designates the main frame for the machine. A secondary frame B is secured to the discharge end of the main frame A, and a top frame C is mounted above the main frame A.

As also shown in Figures 1 and 2, the main frame A carries bearing supports 10 at the inlet end thereof rotatably supporting a cross-shaft 11. A pair of spaced sprockets 12 is secured on this shaft 11.

The frame B carries, at the discharge end of the machine, pairs of superimposed bearing brackets 13 and 14 rotatably supporting cross-shafts 15 and 16 respectively. Each of the cross-shafts 15 and 16 has affixed thereon pairs of spaced sprockets 17 and 18 respectively.

As shown in Figures 1, 2, and 4, a pair of conveyor chains 19 is trained through the machine around the sprockets 12 at the inlet end of the machine and around the superimposed sprockets 17 and 18 at the discharge end of the machine. The chains carry a plurality of cross-shafts 20 which rotatably support wheels or disks 21 near the ends thereof. Portions 20a of the shaft 20

project beyond the outer faces of the wheels 21 and ride on tracks 22 extending throughout the length of the machine, as best shown in Figures 1 and 2.

As shown in Figures 1 and 2, the shafts 20 and wheels 21 are arranged on the chains 19 in spaced pairs to receive rolls of paper R thereon along their upper runs over the tracks 22. The wheels of adjacent pairs are spaced close together while the wheels of each pair are spaced apart for a sufficient distance to support the rolls R.

As best shown in Figures 1, 2 and 3, a motor 23 is mounted on top of the frame C and drives a belt 24 which, in turn, rotates the pulley 25 of a gear box 26. A driven shaft 27 projects from the gear box at the rear side of the machine and carries a gear 28 meshing with a large gear 29 secured on a cross shaft 30. A sprocket 31 on this cross-shaft 30 drives a chain 32 extending downwardly along the rear face of the machine to a sprocket 33 on a stub shaft 34 carried by the main frame A, as shown in Figures 2 and 4. This stub shaft 34 drives a gear 35 meshing with a small gear 36 on another cross-shaft 37. A half-gear 38 is driven by the shaft 37 and meshes, during about one-half of a full turn, with a driving gear 39 on the shaft 11 carrying the sprockets 12. In this manner the conveyor chains are intermittently driven to advance rolls of paper R through the machine.

As shown in Figures 1 and 3, a half-gear 40 is affixed to the shaft 30 at the front side of the machine, and this gear meshes, during one-half of a turn, with a gear 41 on another cross-shaft 42 driving a sprocket 43 as shown in Figures 2 and 3, at the rear side of the machine. The sprocket 43, in turn, drives a chain 44 meshing with a sprocket 45 on a cross-shaft 46 carried by the vertical plate D mounted on the frame C at the inlet end of the machine. The shaft 46 has three web-driving wheels 47 affixed thereon in spaced relation.

An idler shaft 48 (Figures 1, 2, 3 and 5) is rotatably mounted for vertical movement in said plates D under the shaft 46. This idler shaft 48 carries rollers 49 under each wheel 47 to cooperate therewith.

The ends of the shaft 48 are fitted in heads 50 (Figures 1, 2, 4 and 5) of rods 51 which are slidably mounted through bosses 52 formed on the plates D. Coil springs 53 are disposed around the rods 51 above the bosses 52 and are held between the tops of the bosses and collars 54 affixed to the upper ends of the rods. The upper ends of the rods carry cam rollers 55 in the path of cams 56 carried by the ends of the shafts 46. The springs 53 urge the shaft 48 upwardly toward the shaft 46 to bring the rollers 49 into nip engagement with the wheels 47. However, when the shaft 46 is rotated to bring the high spots of the cams 56 against the rollers 55, the rods 51 will be forced downwardly against spring pressure to space the rollers 49 away from the wheels 47 as shown in Figure 5.

A roll of wrapping paper W is rotatably mounted on standards 57 projecting above the plates D. The wrapping paper W is threaded downwardly from the roll through the nip between the feed wheels 47 and their corresponding rollers 48 as best shown in Figure 5.

As shown in Figures 1 and 3, the shaft 46 has a sprocket 58 secured on an end thereof at the front side of the machine for driving a chain 59 to rotate another cross-shaft 60 rotatably mounted on top of the plates D. This cross-shaft 60 carries four paper-directing shoes 61 mounted to straddle the feed wheels 47. As shown in Figure 5, the shoes 61 are moved by the shaft 60 into the path of the wrapping paper W between the roll on which it is mounted and on the feed wheels 47 for deflecting the paper sheet against four fountain rolls 62 (Figure 3) carried on a shaft 63 which is rotatably mounted in the plates D beneath the shaft 60.

The fountain rolls 62 are partially immersed in a bath of adhesive material carried in a trough or pan 64 mounted across the frame C. A doctor roll 65 cooperates with each fountain roll 62 to provide an even uniform film of adhesive material to the wrapping paper W whenever the shoes 61 move downwardly as shown in dotted lines in Figure 5 to direct the paper against the fountain rolls. The shoes 61 each have a pair of spaced spring-urged pads 61a for resiliently but firmly engaging the paper to press the same against the fountain rolls and effect application of two spaced spots of glue to the paper by each fountain roll. Thus the trailing end of one length and the leading end of the next length are spotted with glue at each revolution of the shoes 61.

Alternatively, the four fountain rolls 62 can be replaced with a single roller, and paper-supporting fingers can rest on top of the roller to hold the paper web away from the roller except when the shoes deflect localized portions of the web against the roller to apply the glue spots.

The fountain rolls 62 are driven from a pulley 66 on the shaft 60 through a belt 67 and a pulley 68 on the shaft 63 as shown in Figure 1.

It will be noted from Figure 3 that the shoes 61 and fountain rollers 62 alternate with the feed wheels 47 and rollers 49 so that the wrapping paper W has spots of adhesive applied to the under face thereof at points not contacted by the rollers 49 during the feeding operation at the glue-spotted areas thereof.

As best shown in Figures 2, 3 and 5, a cross-beam 70 is mounted on the frame C in front of the nip between the wheels 47 and rollers 49 and carries a knife-support 70 for the fixed mounting of a cutter knife 72. The cutter knife 72 extends across the full width of the machine as shown in Figure 3 and receives the wrapping paper W thereover as shown in Figure 5, but, since the paper W is directed over the rollers 49, its under side only contacts the cutter 72 at the very cutting edge thereof.

A rotary cutter knife 73 cooperates with the fixed knife 72 and is carried by a plurality of arms 74 fixedly mounted on the shaft 42. The intermediate arms 74 have looped guides 75 secured to the free ends thereof by means of bolts or rivets 76 above the cutter knife 73. The guides 75 are looped around the shaft 42 and serve to direct the wrapping paper W downwardly onto guide plates or fingers 77 carried by the cross beams 70 as best shown in Figures 4 and 5. These guide plates 77 are spaced so as to contact the under side of the wrapping paper W only at the unglued areas thereof.

The looped guides 75 also serve to feed a severed length of wrapping paper W to the nip between a roll R and a wrapping roll 80, as best shown in Figure 5. This roll 80 is mounted on a shaft 81 carried by arms 82 which are pivoted at 83 to the frame C. Springs 84 urge the shaft downwardly to move the winding roll 80 into pressure engagement with the roll R therebeneath. As shown in Figure 2, another sprocket on the shaft 27 projecting from the gear box 26 drives a chain 85

for driving a sprocket 86 on a cross shaft 87 rotatably mounted in the frame C. As shown in Figure 1, the front end of the shaft 87 carries a sprocket driving a chain 88 trained around a sprocket 89 on the shaft 81 for the winding roller 80. The winding roller is thus driven to rotate the roll R and wrap a severed length L of the wrapping paper W around the roll R. Both the trailing and the leading ends of this severed length will carry glue spots imparted thereon by the fountain rollers 62 when the shoes press the wrapping paper against the fountain rolls since the spaced pads on the shoes form two glue spots on the paper and the knives sever the paper between these two glue spots. The glued leading end is affixed to the roll R while the glued trailing end overlaps the leading end wrapped on the roll R so that the ends of the lengths will be glued together in overlapping relation. The pressure between the winding roll 80 and the roll R being wound is sufficient to effect a sealing of the ends of the lengths L and for initially affixing the leading end to the roll R.

The chain 88 may be relatively loose so as to allow the springs 84 to urge the roll 80 tightly against the roll R. The mounting wheels 21 are freely rotatable on their shafts 20 so that the roll R can be readily rotated by the winding roller 80.

The wrapping paper W is wider than the length of the roll R so as to project beyond the ends of the roll. The roll with the wrapping paper wound therearound by the winder roll 80 is then advanced to the next station of the machine by movement of the conveyor. At this next station of the machine, the projecting ends of the wrapping paper are tucked or pleated to lie flat against the ends of the roll.

As shown in Figure 1, the cross shaft 87 carries another sprocket which drives another chain 93 for rotating a sprocket 91 on a tucker shaft 92. A roll-rotating drum 94 (Figure 3) is affixed to the intermediate portion of the shaft 92 and is driven thereby to rotate the roll R with the wrapper therearound. Tucker plates 95 are slidably keyed on the shaft 92 beyond the ends of the drum 94 and are spring-urged by means of springs 96 toward the ends of the roll R. These tucker plates 95 have a plurality of flat fingers 95*a* each provided with an outturned leading edge 95*b*.

The leading outturned ends of the fingers of the tucker plates will guide the projecting ends of the wrapping paper toward the ends of the roll R, thereby effecting a fold or pleat in the paper. The flat portion of the finger 95*a* irons out this fold tightly against the end of the roll to provide a pleated end for the wrapping paper as shown in Figures 1 and 2 at W'.

The drum 94 rotates the roll R at least through one complete revolution so that the tucker plate will tuck the entire periphery of the wrapping paper and form a pleated marginal cover for the ends of the roll.

As shown in Figures 2 and 3, the shaft 92 carries another sprocket at the rear side of the machine driving a chain 100. This chain, in turn, drives a sprocket 101 on a shaft 102 carrying a winder drum 103 at the next station of the machine.

The roll with the tucked or pleated wrapping paper thereon is advanced from the tucker station by the conveyor to the gluing station including the winder drum 103.

The shaft 102 is mounted for vertical movement like the shaft 92 and is urged downwardly toward the roll R.

As illustrated in Figures 1 and 2, glue or adhesive-applying disks 105 are rotatably mounted in housings 106 carried from the main frame A. These disks 105 are inclined at angles of about 45° and have beveled glue-applying peripheries dipping into baths of glue in tanks or pans 108. These disks 105 apply glue to the tucked portions W' of the wrapping paper for preparing these portions to receive paper end covers or disks.

The drum 103 rotates the roll R at least through one complete revolution so that glue will be applied around the entire portions W' of the wrapping paper.

The conveyor is then advanced to move the roll to the next station mounted on the frame B.

The frame B carries a pair of standards 110 at the front side of the machine, and a second pair of standards 111 at the rear side of the machine. The standards 110 and 111 rotatably support separate rolls of paper 112 and 113.

As shown in Figures 1 and 2, the ends of the cross-shaft 16 have beveled gears thereon meshing with gears 114 at the lower ends of vertical shafts 115. These vertical shafts are connected at their top ends through gears 116 with the shafts of rollers 117 for feeding paper from the rolls 112 and 113.

Mechanism shown and described in my aforesaid parent application Serial 377,827 filed February 7, 1941, entitled: "Wrapping machine" is provided for cutting end disks from paper fed by the feed rolls 117 from the rolls of paper 112 and 113, and for applying the cut disks to the glued pleated ends W' of the wrapping sheet on the roll R.

Operation of the machine

Wound rolls of paper are sequentially deposited on the wheels 21 of the conveyor in the machine to feed the rolls in spaced relation through the machine. When a roll R reaches the first station of the machine, it is rotated by the winder drum 80. A roll of wrapping paper W is rotatably mounted above the machine and is unwound by the feeding wheels and rollers 47 and 48 to supply a length of wrapping paper past the cutter bar 72. The leading and trailing ends of this length have previously been glue-spotted by moving the shoes 61 to deflect the paper against the fountain rollers 62 which apply films of adhesive or glue from the bath in the pan 64 to localized areas on the under face of the wrapping paper.

When the proper length of wrapping paper has cleared the cutter bar 72, the cutter bar will sever this length while the rolls 49 are moved momentarily into spaced relation from the wheels 47 to stop forward motion of the paper. The guides 75 will cooperate with the guide fingers 77 to move the leading end of the severed length L into the nip between the winding roller 80 and the roll of paper R. The severed length has glue spots on the leading end thereof which are glued to the roll R, and the length is then wrapped around the roll of paper R due to rotation of the roll by the winding roller. The length of paper is longer than the circumference of the roll R, so that the trailing end thereof, with the glue spots on its under face, will overlap the leading end of the length and be affixed to this leading end.

The conveyor is then operated to move the roll of paper to the next station of the machine. During this movement, however, a new length of wrapping paper W is glue-spotted and fed past the cutter bar 72 for application to the next roll R.

At the second station of the machine the roll R is again rotated and the projecting ends of the wrapping paper are acted upon by the tucker plates 95 to pleat the paper against the ends of the roll as illustrated at W'. When the pleating operation is completed, the roll is then advanced to the third station of the machine by the conveyor where it is again rotated and glue is applied to the portion W' of the wrapping by the glue applicators 105.

The roll is next advanced to the fourth and last station of the machine for the affixing of end disks to the portion W' of the wrapping. During the advancing of the rolls of paper between stations by the conveyor, portions of the machine are operative for preparing each station for action. Thus the feed wheels 47 and rollers 48 are operated together with the paper-deflecting shoes to supply the glue-spotted wrapping lengths for use at the first station. Likewise, the feed rolls 117 are operated to supply paper from the rolls 112 and 113 to cutter blocks for the cutting of the end disks to be applied to the portions W'. The second and third stations of the machine need not be active except when the conveyor is at rest.

From the above descriptions it should be understood that the machines of this invention successively act on rolls of paper or other cylindrical objects to apply a wrapping around the full length of the objects, to tuck the projecting ends of the wrapping against the ends of the objects, to apply glue to the tucked portions of the wrapping, and to affix end disks to the tucked portions of the wrapping for sealing the ends of the objects.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. In a wrapping machine, superimposed pairs of laterally spaced rollers, means urging the rollers of each pair together to define feeding nips for sheet material, means for separating the rolls of each pair to open said feeding nips and allow the sheet material to remain stationary, and means alternating with said rolls to spot glue on localized areas of the sheet material lying between the laterally spaced rollers when said nips are open whereby a closing of said nips and rotation of said rollers will feed glue-spotted sheet material without contacting the glue.

2. In a wrapping machine, a support for a roll of wrapping paper, a plurality of laterally spaced feed wheels, a roller cooperating with each feed wheel, spring means urging said rollers against the cooperating feed wheels to define feed nips therebetween for receiving paper from said rolls, cam means acting on said spring means to separate said rollers from said feed wheels for allowing slippage between the rollers and said paper, a plurality of glue applicators, and rotatably mounted shoes between said roll of paper and said feed wheels for deflecting the paper against said glue applicators, said shoes operating in planes between said feed wheels to apply glue spots to areas of said paper not contacting said feed wheels or rollers for preventing smearing of said glue spots upon feeding of the paper through the feeding nips defined thereby.

3. In a coating machine, a plurality of longitudinally spaced pairs of cooperating top and bottom feed rolls for flexible sheet material, a stationary sheet-cutting knife adjacent the bottom feed roll having a sharpened edge, a movable knife cooperating with the pointed end of the stationary knife to sever length segments of sheet material beyond the sharpened edge of the stationary knife, said bottom feed rolls holding the sheet material above the stationary knife to have contact with the stationary knife only at the sharpened edge thereof, means for applying coating to sheet material advancing toward said feed rolls at areas of the sheet material beyond the areas contacting the bottom feed roll, and means for intermittently raising the top feed roll out of engagement with the sheet material, and means for moving said movable knife to sever a portion of the sheet material beyond the sharpened edge of the stationary knife from the remaining portion.

4. An adhesive applicator for a wrapping machine comprising feed rolls defining laterally spaced nips for sheet material, adhesive-applying mechanism in advance of the nips of said feed rolls acting on the sheet material at portions between said nips to apply coatings of adhesive to the sheet material, and a cutter device receiving the sheet material from the feed rollers having a stationary cutting knife with a pointed end cooperating with the bottom feed rollers to receive sheet material only on the pointed end thereof for eliminating smearing of the adhesive.

5. An adhesive applicator for a wrapping machine comprising a plurality of pairs of axially spaced feed rollers, coating mechanism in advance of said feed rollers aligned with the spaces between the pairs of feed rollers, and cutting mechanism beyond the feed rollers having a stationary cutter with a leading cutting edge cooperating with the bottom feed rollers to receive sheet material into initial contact therewith at said leading edge.

6. Adhesive-applying apparatus for wrapping machines comprising a plurality of coaxial axially spaced fountain rollers, supply means from which sheet material is fed over said fountain rollers, shoes intermittently acting on the sheet material to press the same locally against the fountain rollers, and cooperating pairs of coaxial, axially spaced feed rollers defining nips receiving the sheet material from the fountain rollers, and said fountain rollers being in straddling relation with said feed rollers so that the coated portion of the sheet will not contact the feed rollers.

7. In a wrapping machine, a support for a roll of wrapping paper, a plurality of axially spaced coaxial fountain rollers, a plurality of axially spaced coaxial shoes, means for swinging said shoes to intermittently direct sheet material from said roll against said fountain rollers, and cooperating feed rollers receiving the sheet material from the fountain rollers, said feed rollers contacting portions of said sheet material lying between said fountain rollers.

8. In a coating machine, a support for a roll of sheet material, pairs of spaced apart upper and lower cooperating feed rolls receiving said sheet material through the nip therebetween, a glue applicator, and sheet-deflecting mechanism between said roll of sheet material and said feed rolls and rotatable in the spaces between the upper feed rolls for moving the sheet material into the path of the glue applicator.

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