May 19, 1953 A. T. HURTER ET AL 2,638,725

PAPER ROLL WRAPPING MACHINE

Filed May 12, 1950 8 Sheets-Sheet 1

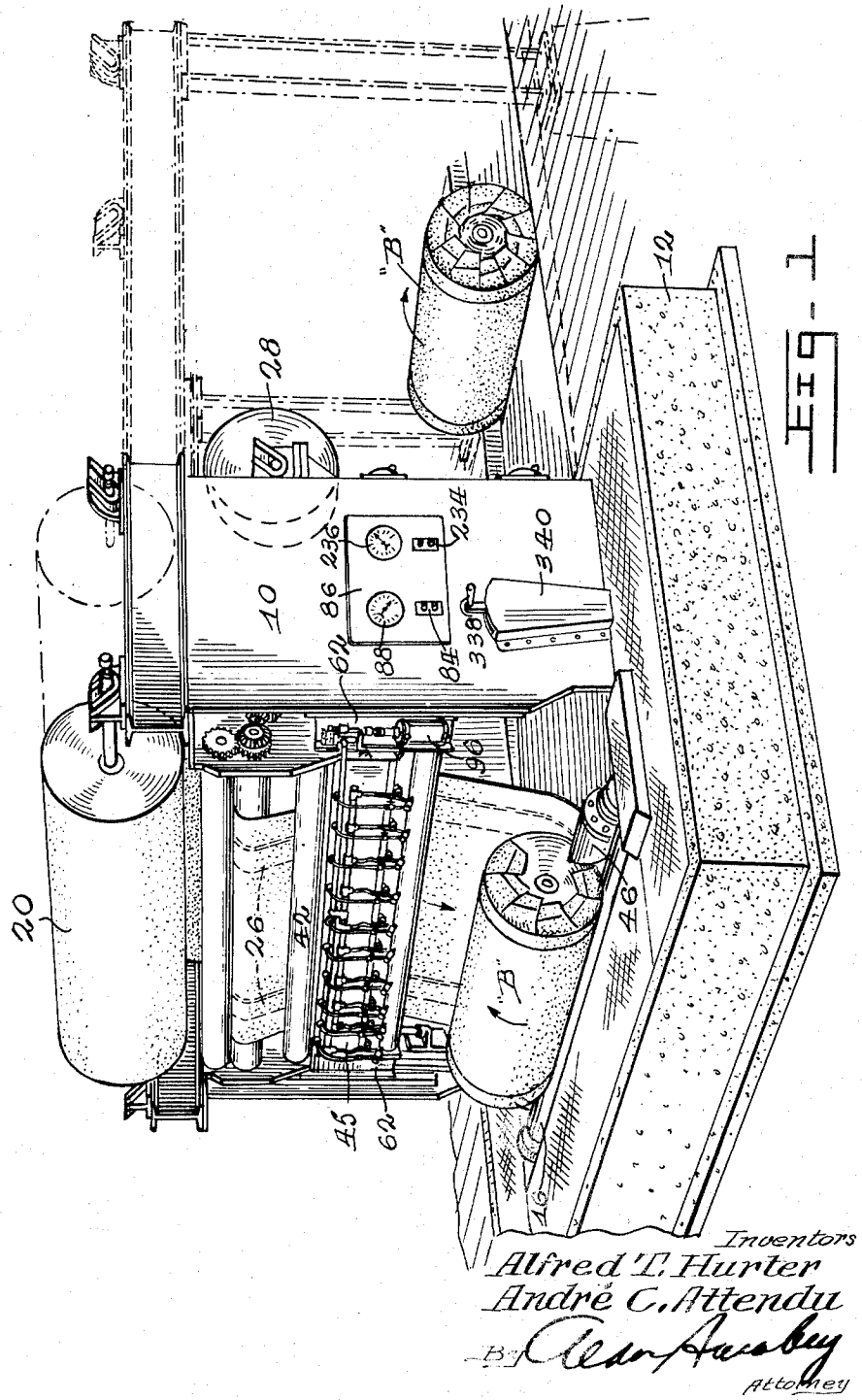


Fig. 1

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PAPER ROLL WRAPPING MACHINE

Filed May 12, 1950 8 Sheets-Sheet 2

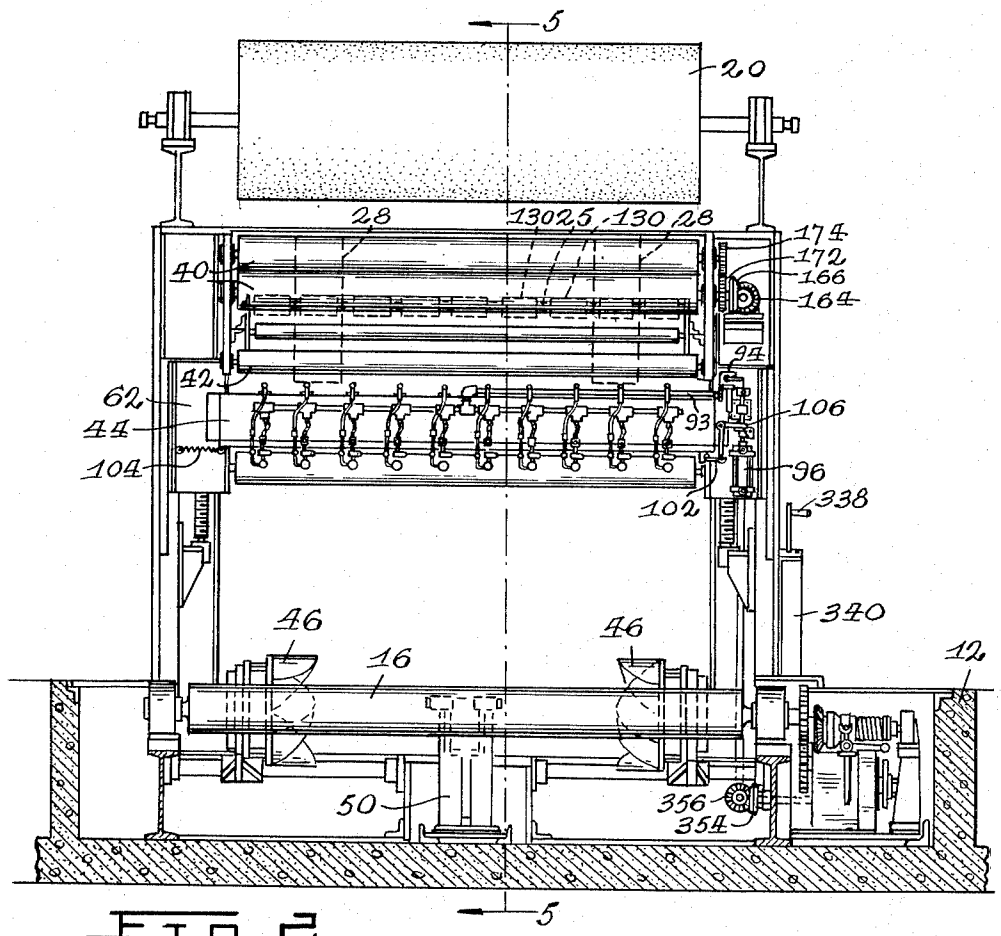


Fig. 2

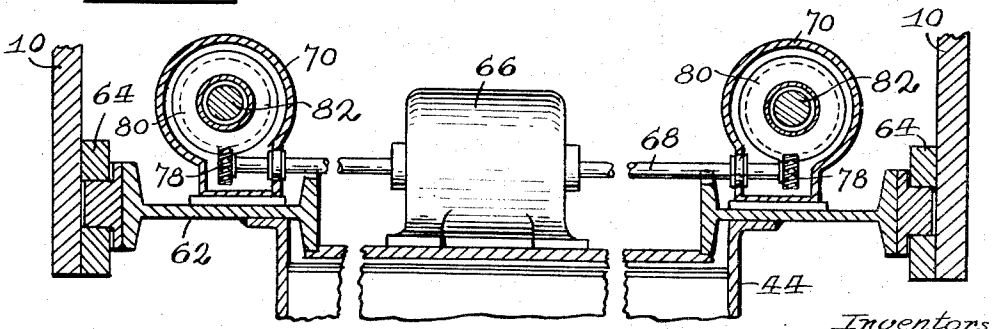


Fig. 3

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PAPER ROLL WRAPPING MACHINE

Filed May 12, 1950 8 Sheets-Sheet 3

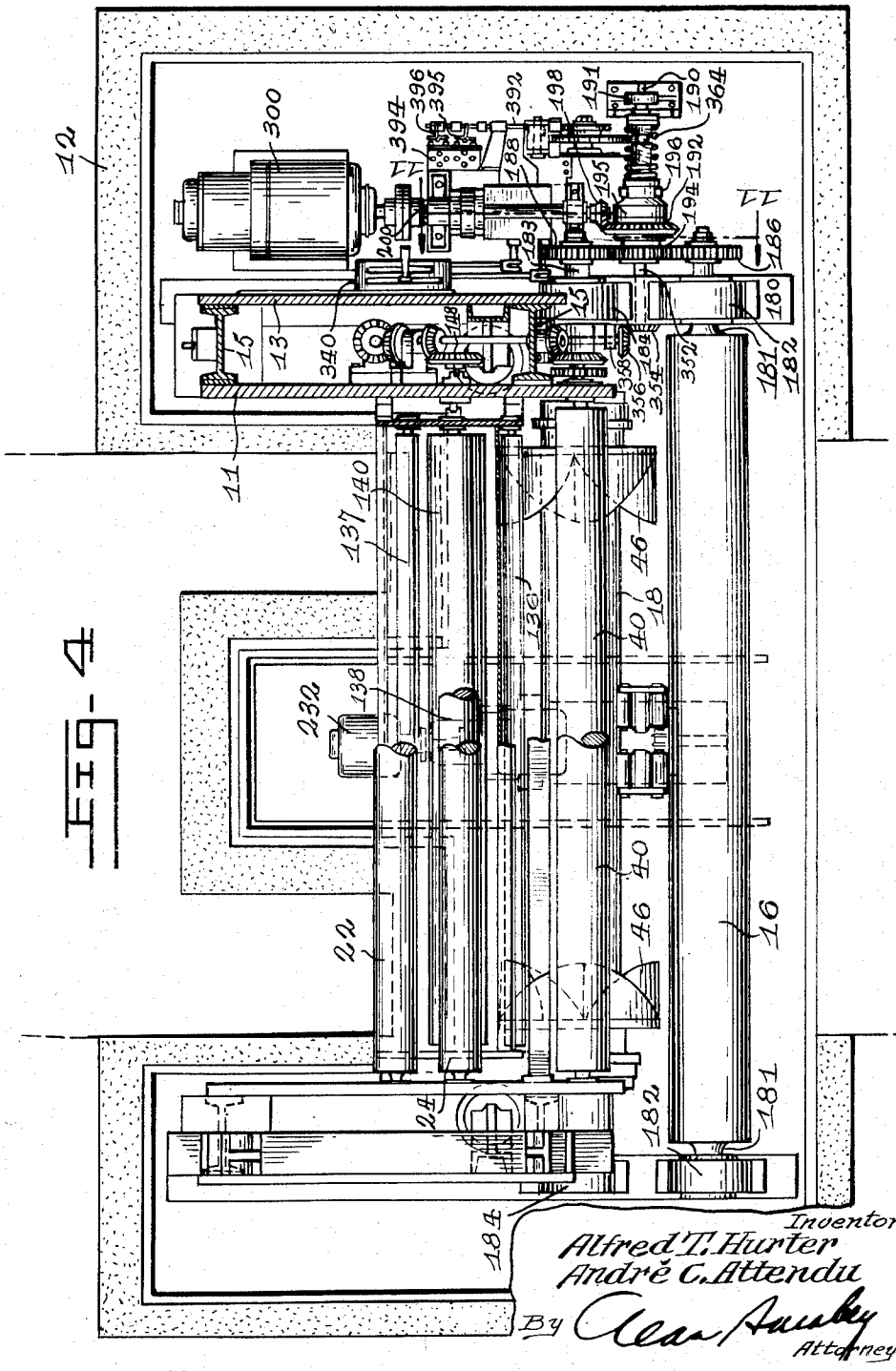


FIG. 4

May 19, 1953 A. T. HURTER ET AL 2,638,725

PAPER ROLL WRAPPING MACHINE

Filed May 12, 1950 8 Sheets-Sheet 4

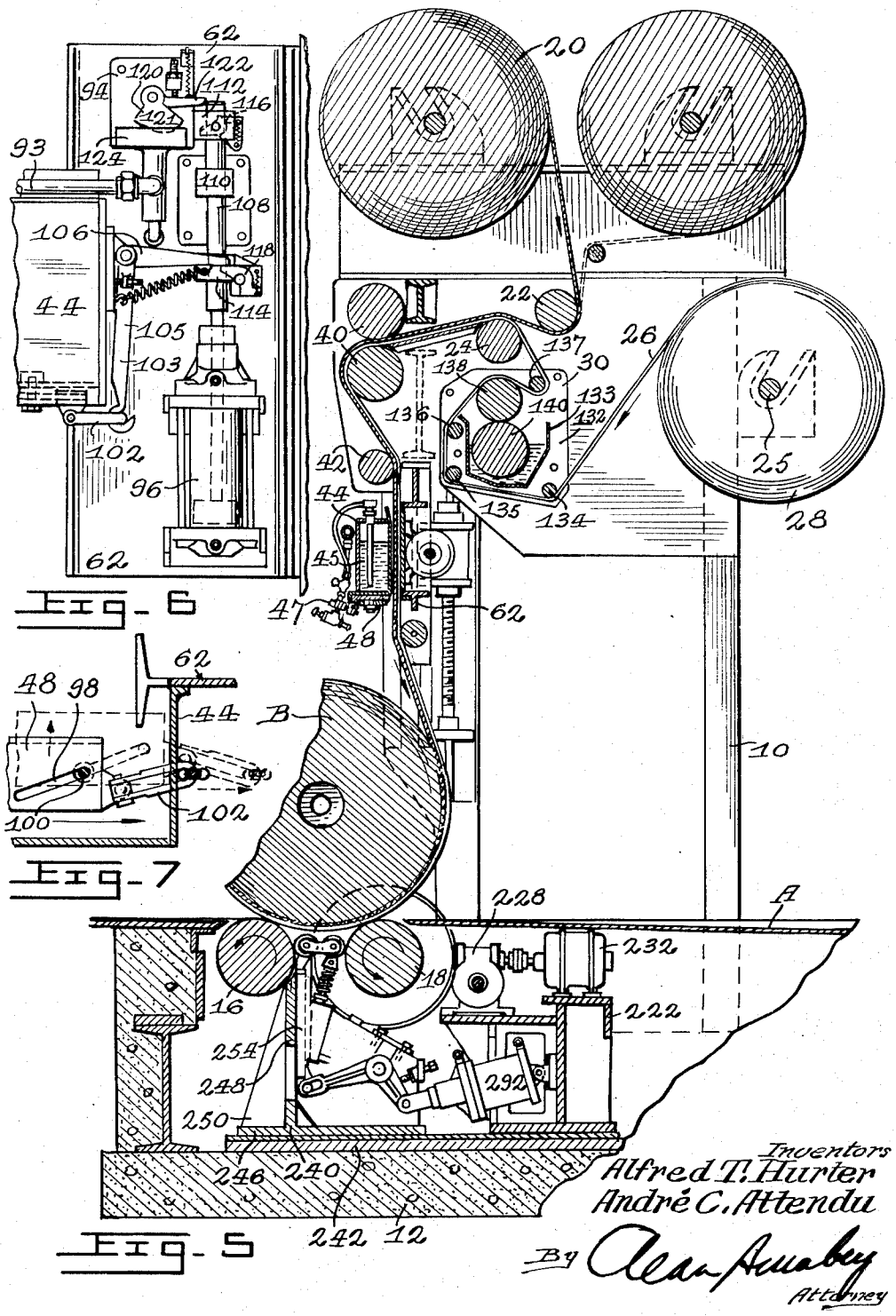


Fig. 6

Fig. 7

Fig. 5

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May 19, 1953 A. T. HURTER ET AL 2,638,725

PAPER ROLL WRAPPING MACHINE

Filed May 12, 1950 8 Sheets-Sheet 5

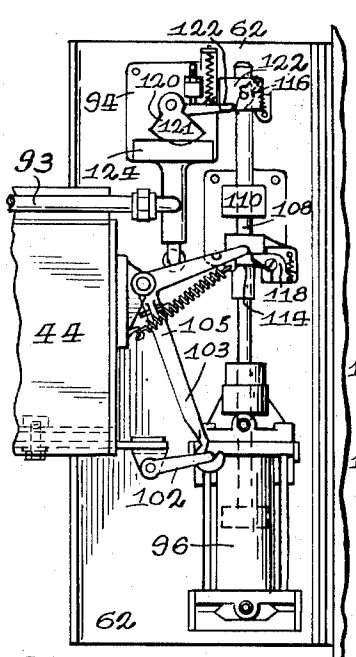


Fig. 9

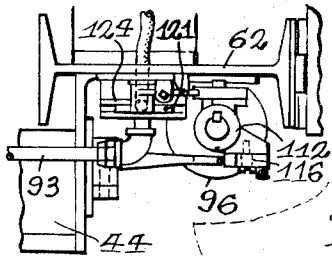


Fig. 10

Fig. 8

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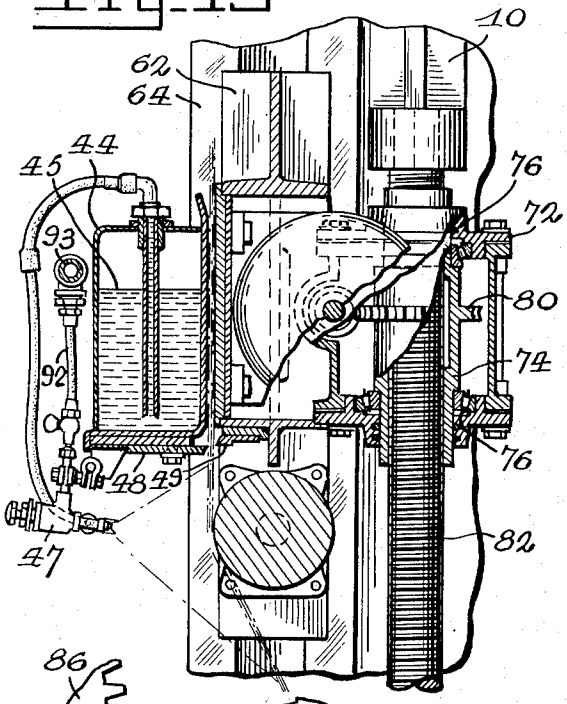
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May 19, 1953 A. T. HURTER ET AL 2,638,725

PAPER ROLL WRAPPING MACHINE

Filed May 12, 1950 8 Sheets-Sheet 6

Fig. 13



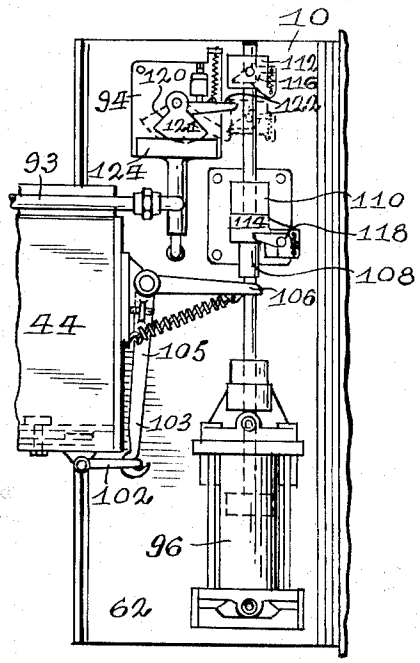


Fig. 12

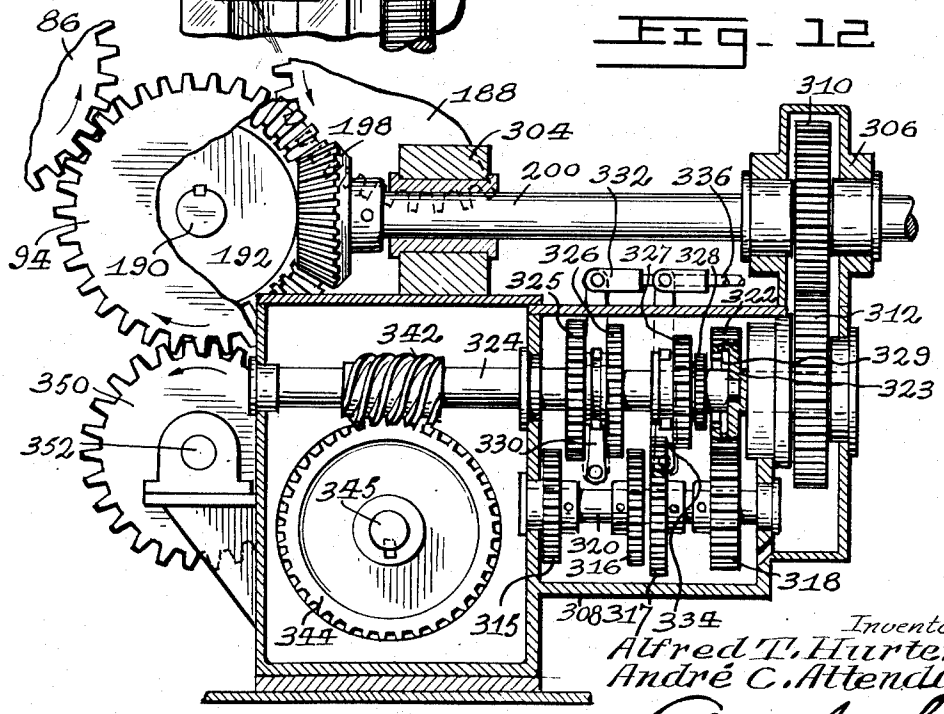


Fig. 11

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May 19, 1953 A. T. HURTER ET AL 2,638,725

PAPER ROLL WRAPPING MACHINE

Filed May 12, 1950 8 Sheets-Sheet 7

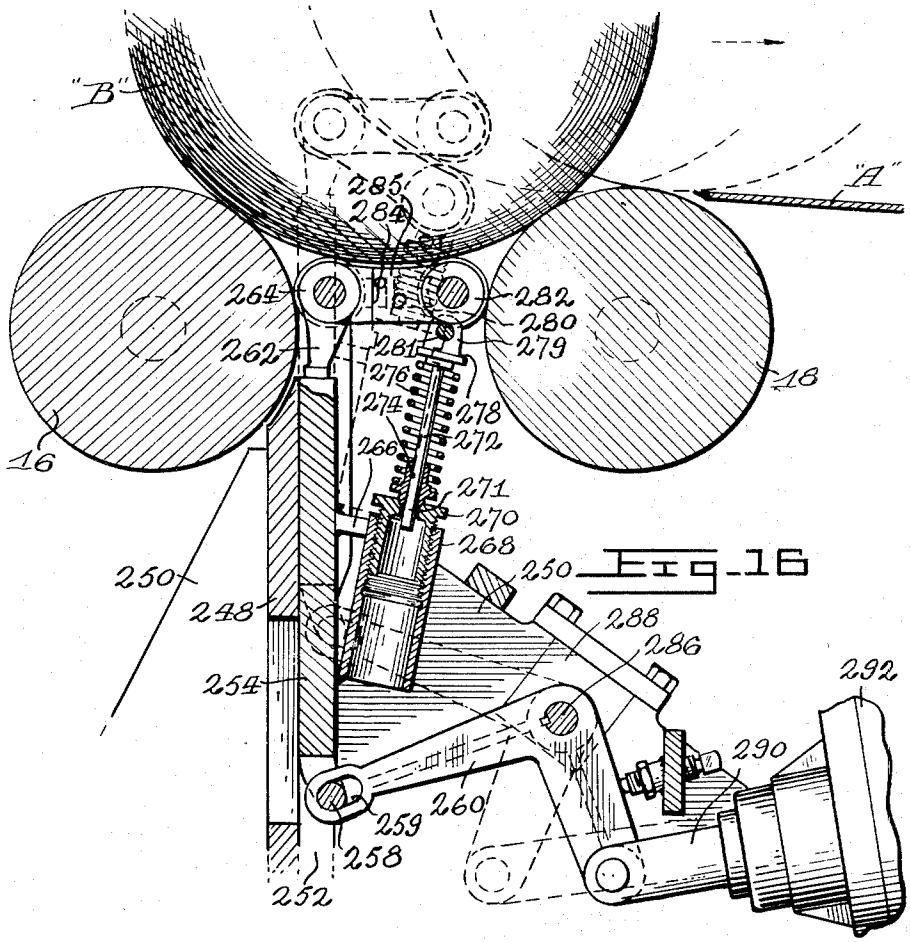


Fig-16

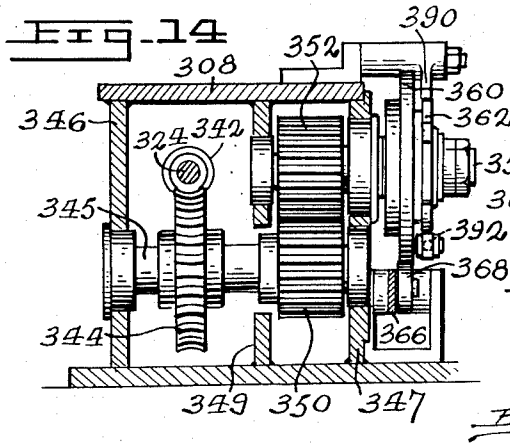


Fig-14

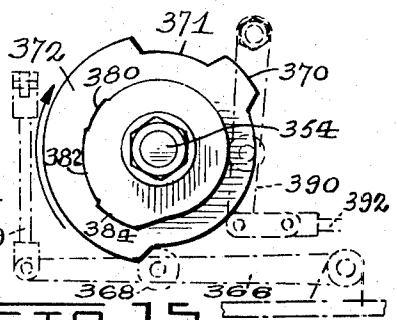


Fig-15

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PAPER ROLL WRAPPING MACHINE

Filed May 12, 1950 8 Sheets-Sheet 8

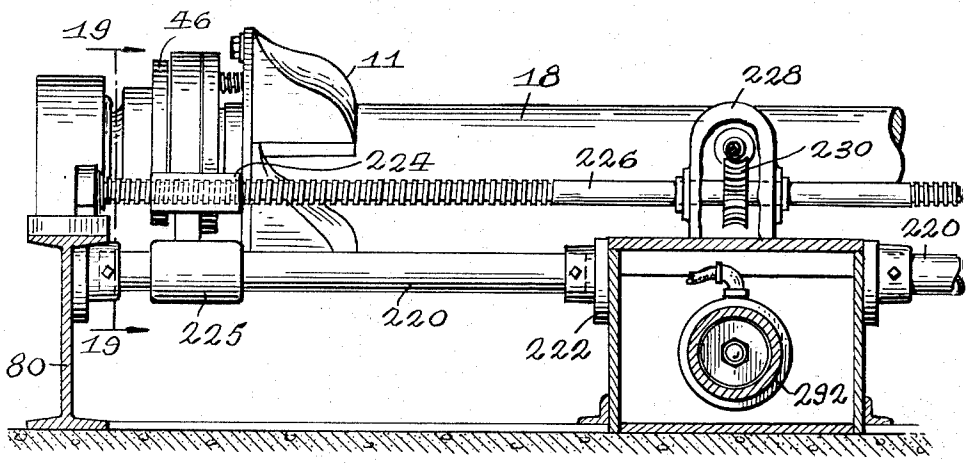


Fig-17

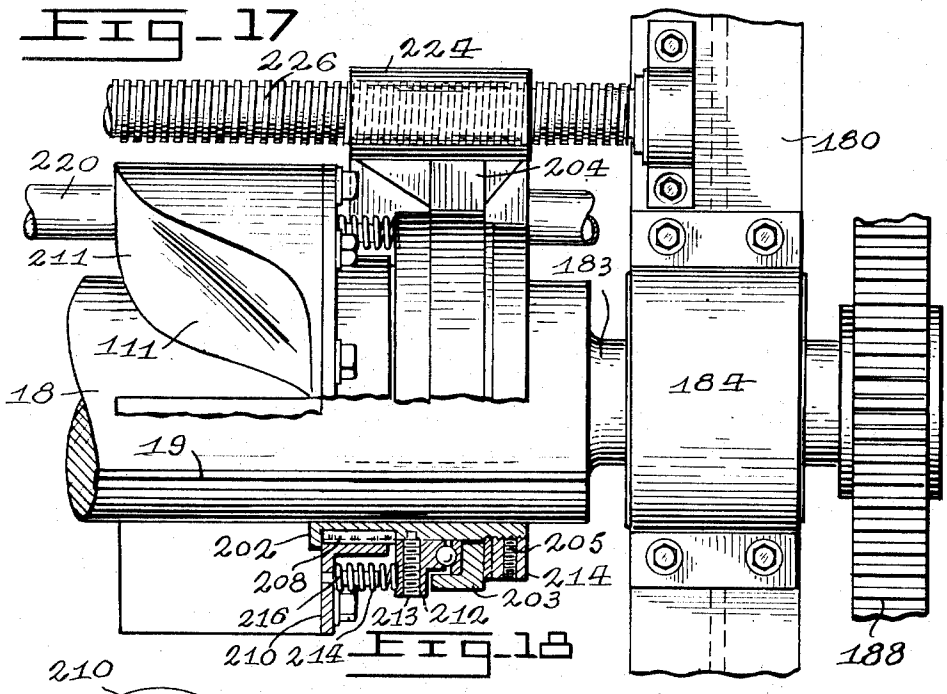


Fig-18

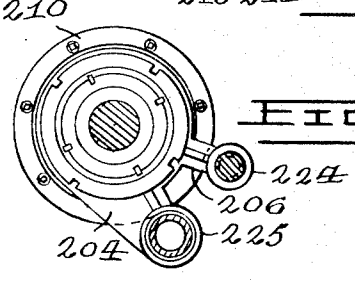


Fig-19

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Patented May 19, 1953

2,638,725

UNITED STATES PATENT OFFICE

2,638,725

PAPER ROLL WRAPPING MACHINE

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Application May 12, 1950, Serial No. 161,554

26 Claims. (Cl. 53—59)

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The present invention relates to roll wrapping machines and are more specifically to machines of this nature adapted to wrap cylindrical rolls of considerable size, for example, rolls of newsprint or the like.

It is common practice in most paper mills to wrap the large rolls of newsprint or other paper in an outer wrapper comprising several layers of covering paper prior to their shipping or storage. As these rolls of paper are so big usually varying in size from about 24" to 44" in diameter and from 18" to 84" in length, the manual performance of this operation consumes a great deal of time and labour and requires a considerable area of clear floor space.

Attempts have been made to overcome this problem by providing various machines designed to perform this wrapping operation mechanically but to date, most of these still require considerable manual handling of the paper rolls, are not sufficiently versatile to meet all the wrapping requirements of the industry, or are so complicated as to be impractical.

More specifically, the following types of apparatus have been suggested. There are those which apply a body wrapper alone to the paper roll. For example, see Patents Ljungstroem, 1,570,266; Gerlach, 2,368,213, and Bryans, 2,533,993. There are those which apply edge bands alone. See for example, Power, Patent 1,026,049. One apparatus is adapted to apply both a body wrapper and edge bands. See for example, Jones et al., Patent 1,764,081. But, the wrapper has to be specially notched at the edges and applied to the paper roll before the edge bands which are applied over the previously applied wrapper. Then the edges of the wrapper and edge bands are crimped or turned in only after they have been wound on the roll. There is one apparatus which suggests the application of the wrapper or simultaneous turning in of the edges of the wrapper but no provision is made for applying edge bands. See for example, Voith, a leaflet published by J. M. Voith, Maschinenfabriken, Heidenheim (Brenz), Wurttembg. und St. Polten, Lower Austria, dated June, 1937.

Moreover, most machines of the type mentioned can only be used on a roll of a single diameter and of a single predetermined width. One machine does make provision for accommodating rolls of varying widths insofar as turning or crimping the edges of a previously applied wrapper. But, this is done at a different station from that at which the wrapper is applied and only after the wrapper has been completely

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wound on to the paper roll. For example, Bryans, Patent 2,533,993.

The present invention aims to provide a fully automatic paper roll wrapping machine designed to reduce manual handling of the rolls to a minimum and to combine in a single machine and at a single station, means for applying simultaneously both a body wrapper and edge bands and for simultaneously turning in the edges of the body wrapper and edge bands. A preferred machine built according to the invention is capable of wrapping paper rolls from 24" to 44" in diameter and from 18" to 84" in length. During the wrapping operation the edges of the composite wrapping constituted by a body wrapper and edge bands at each end of the roll are folded over mechanically and the machine is adapted to wrap paper rolls in the usual 3 layer manner as is common in this country or, alternatively, by a slight modification, can be used to wrap paper rolls in the European manner with any number of layers of thin wrapping paper glued continuously to form a thick rigid covering. Accordingly, the invention is embodied in an automatic paper roll wrapping machine which includes in combination means for bringing together a body wrapper web and edge band webs to form a composite web, means for rolling the composite web as a wrapper about a paper roll, additional means whereby the wrapper is folded in at the ends, as the roll is being wrapped adhesive is applied to the wrapper, the wrapper is cut at the required length, and the finished roll ejected from the machine, all these operations being performed automatically in time-related sequence by means of timing means, for example a cam-actuated control system.

Preferably the machine includes a main supporting frame that is preferably erected on a rigid foundation inset in a floor having a slope towards and past the machine so that paper rolls are fed into and away from the machine by gravity.

A pair of driving rollers extending the width of the frame are mounted on lower extensions of the frame so that their upper surfaces are substantially flush with the floor level and power means are provided to drive these rolls at predetermined constant speed. A pair of crimping heads are mounted in spaced-apart relationship on one of the driving rolls and means are provided whereby these crimping heads can be automatically moved towards and away from each other so as to accommodate paper rolls of various lengths. It is a feature of the invention that the

mechanism for moving the crimping heads is outside the periphery of the driving roller on which the heads are mounted.

Suitable brackets are provided on the frame so as to rotatably support supply rolls of a wide wrapping paper web adapted to envelop a paper roll as well as spaced-apart supply rolls of relatively narrow paper edge band webs used at each end of the roll to reinforce the paper wrapping at the turned-in edges.

Paper feeding rollers are mounted in the frame and driven in conjunction with the driving rollers so as to first draw the edge bands through an adhesive applying arrangement and bring them into juxtaposed relationship with the wrapping paper and then to feed the composite web so formed down the front of the machine towards the driving rollers and crimping heads.

The combined wrapping paper so fed passes through a guide passage in an adjustable apron or carriage extending across the frame and mounted on this apron are means for spraying adhesive on and severing the combined wrappers at the required length. The adhesive spraying and paper cutting arrangement is actuated in time-related sequence with the driving rolls and means are provided on the frame whereby the apron can be automatically raised or lowered to accommodate varying diameters of paper rolls.

All the movable parts of the apparatus are arranged to operate in synchronism so that the relation of each operation to the other is always constant regardless of primary speed. The controls of the mechanisms allowing the machine to be adjusted for various lengths and diameters of rolls and the main speed changing transmission control are mounted on one side of the machine so as to be readily accessible to an operator. The continuous operation of the whole machine requires an operator and a helper, the only manual operation necessary being the placing of the usual protective end discs on the rolls of paper to be wrapped as they roll into the driving rollers of the machine, also the replenishing of wrapping paper rolls as required.

In use, the roll of paper to be wrapped is allowed to roll onto the driving rolls of the apparatus, the end discs are placed in position and the machine starts automatically and the driving rollers revolve for the length of time necessary to wrap for example 2⅔ folds of wrapping paper and edge bands around the roll of paper (American method). The number of revolutions of the driving rolls required for this operation are proportionate to the diameter of the roll to be wrapped and this is automatically controlled by a cam and clutch arrangement. As the roll revolves the edges of the wrapping paper are automatically folded in by the crimping heads, the composite web made up of the body web and edge bands being fed to the roll at a proportional speed.

At the completion of the wrapping operation the machine stops and a further cam arrangement activates the glue spraying apparatus to apply glue to the end of the third wrapping layer of paper and then cut the wrapper at this point. The continued motion of the cams then restarts the driving rollers and the paper roll is rotated so as to complete the sealing of the wrapper. The machine is then automatically stopped and a cam-actuated ejector mechanism ejects the finished roll from the driving rollers so that it rolls out off the machine which is then ready to receive another roll.

The ejecting mechanism is an important feature of the invention.

Detailed description

Having thus generally described the nature of the invention, particular reference will be made to the accompanying drawings, and in which:

Figure 1 is a diagrammatic view in perspective elevation of a preferred construction of an automatic paper roll wrapping machine in accordance with the invention.

Figure 2 is a front elevation of the construction shown in Figure 1.

Figure 3 is an enlarged detail view in plan and partially in section of a portion of the machine frame and gluer and cutter supporting apron to illustrate the driving arrangement for raising and lowering the apron more clearly.

Figure 4 is a top plan view of the construction shown in Figure 1.

Figure 5 is a sectional view in side elevation of Figure 2 along the line 5—5 to illustrate the machine construction in more detail.

Figure 6 is a detail view in front elevation of a portion of the machine construction to illustrate the relative position of the operating mechanism for the glue spraying and cutting apparatus with the actuating cylinder at the end of the down stroke.

Figure 7 is a plan view partially in section and corresponding in location to Figure 6 to illustrate the relative positions of the end of the paper cutting blade and actuating link, with the normal position shown in full lines, the cutting position being shown in dotted lines.

Figure 8 is a view of the construction of Figure 1 in side elevation with portions of the frame and housing shown in section to illustrate more clearly the relative positions of the operating mechanisms.

Figure 9 is a detailed view corresponding in location to Figure 8 showing the relative positions of the glue spraying and cutting apparatus with the actuating cylinder midway in the upstroke.

Figure 10 is a plan view of the detail shown in Figure 9 to illustrate the arrangement more clearly.

Figure 11 is an enlarged detail view partially in section of a portion of the main driving gears and transmission along the line 11—11 of Figure 4.

Figure 12 is a detailed view corresponding in location to Figures 8 and 9 showing the relative position of the glue spraying and cutting arrangement with the actuating cylinder at the beginning of the downward stroke.

Figure 13 is an enlarged detail view partially in section of a portion of the frame and apron to illustrate in more detail the construction and relative position of the glue spraying and apron elevator mechanism.

Figure 14 is a detailed view partially in section substantially along the line 14—14 of Figure 8 to illustrate the cam driving mechanism, with the cams shown in full lines.

Figure 15 is a diagrammatic detailed view of the cams with the valve actuating levers shown in dotted lines to illustrate their relative positions.

Figure 16 is an enlarged detailed view partially in section of the driving rollers and ejector mechanism, with the high positions shown in dotted lines to illustrate their functions more clearly.

Figure 17 is an enlarged detail view in rear

elevation and partially in section of the right hand end of a driving roller and crimping head illustrating the mounting and driving mechanism.

Figure 18 is an enlarged detailed view in plan and partially in section of a right hand end of the driving roller and crimping head to illustrate the construction and mounting of the crimping head in more detail.

Figure 19 is a sectional view of Figure 17 along the line 19—19 to illustrate the construction more clearly.

With particular reference to Figures 1, 2, 5 and 8 of the drawings which are respectively a diagrammatic view in perspective elevation, a front elevation, a complete sectional view in side elevation, and a side elevation in partial section of the general arrangement of the apparatus, a main supporting frame 10 is constructed so as to extend vertically upwards from a suitable foundation 12.

The foundation 12 is inset in the floor "A" of the building housing the machine so that the main driving mechanism is positioned below the level of the floor "A" which is constructed so as to slope towards and beyond the main frame 10.

The main driving rollers 16, 18, adapted to rotate the paper rolls in the wrapping operation, are mounted on a lower extension of the frame 10 with their upper surfaces substantially flush with the sloping floor "A." This arrangement allows the rolls to be wrapped to roll onto the driving rollers 16, 18 and when wrapped and ejected, to roll away from the machine to a suitable disc heading machine and header press preferably placed in line with and at the rear of the wrapping machine.

A supply roll of paper 20 of a sufficient width to wrap a roll of newsprint "B" is rotatably mounted on the upper portion of the machine frame 10. Additional supply rolls may also be mounted as indicated in dotted lines. The end of the roll of the supply roll of wrapping paper 20 is fed through the idler rolls 22, 24 at which point there is adhesively attached a pair of paper reinforcing edge bands 26 which are drawn from a pair of spaced-apart supply rolls 28 mounted for rotation on the rear of the frame 10.

The reinforcing paper edge bands 26 are first led through a pasting arrangement 30 and are then brought into contact with the lower surface of the wrapping paper 20 as it passes over the idler roll 24.

The combined wrapping paper 20 and edge bands 26 are then fed through the feed rollers 40 which are driven in conjunction with the driving rollers 16, 18. The paper is then fed behind the idler roll 42 so as to pass behind the apron 44 to the lower portion of the machine where the end of the combined wrapper is engaged with the crimper heads 46.

The crimper heads 46 are mounted on the driving roller 18 in spaced-apart relationship one at each side of the machine so that as the paper roll "B" is rotated, the ends of the wrapping paper 20 and the edge bands 26 are folded in as shown in Figure 1.

The apron 44 is mounted for slidable up and down vertical movement on the frame 10 and means are provided so that it can be automatically adjusted to suit various diameters of paper rolls. The crimper heads 46 are also provided with automatic adjusting means so that they

can be automatically set to suit paper rolls of various lengths.

With particular reference to Figures 2 and 5, the apron 44 is constructed so as to constitute an adhesive-containing trough 45 and an arrangement of adhesive sprayers 47 are mounted on the outer face so as to extend across the width of the paper. The adhesive sprayers 47 are cam-actuated into spraying action in combination with a paper-cutting blade 48 also mounted on the apron 44 so that the edge of the wrapping paper below the apron 44 is sprayed with adhesive and severed from the main supply when the wrapping operation is nearly completed. This operation is performed in time-related sequence with the number of rotations of the driving rolls required to rotate the paper roll. For example, when the machine is used to wrap in the manner usual in this country, namely, 3 ply wrap of heavy kraft paper, the paper "B" roll is rotated 2⅔ times and then the driving rolls, also the feed rollers, are automatically stopped at this point. On completion of this operation the driving rolls 16, 18 are again automatically started and the paper roll "B" is rotated further to complete the wrapping, this rotation placing the adhesively-coated edge of the wrapping paper 20 in contact with the outer layer of wrapping paper and so completing the seal. Further rotation of the controlling cams of the machine place an ejector mechanism 50 mounted between the driving rolls 16, 18, into operation and so the finished roll is ejected from the machine onto the floor "A" the slope of which causes the finished roll to travel out of the machine towards the disc heading machine and header press (not illustrated).

All the working elements of the machine are arranged to be driven in synchronism so that the relation of each operation to the other is constant regardless of primary driving speed. The main driving rollers 16, 18 are driven at a constant speed and a speed changing transmission is adapted to regulate the relative speed of the controlling cams, with the adjustment of the moveable apron and crimper heads being actuated through separate mechanisms controlled through push-button controls and indicating dials so that the machine can be easily and quickly set to accommodate any diameter and length of paper roll.

In order that the construction of the apparatus be more clearly understood we shall now describe the various portions in more detail.

Main frame

The entire apparatus is designed so that the main frame 10 can be first erected on the foundation 12 in its proper location in the mill and as the various working elements of the machine are constructed and assembled they can be individually tested and then mounted on or in the frame.

The frame 10 comprises the whole machine structure and superstructure and is preferably made of structural steel and steel plates flame cut and arc welded. This frame 10 is erected on a suitable foundation 12 which is inset in the floor "A" of the building housing the machine. As is shown in dotted lines in Figure 1 it is also contemplated that the frame 10 could be extended from the rear of the machine so as to provide a means of supporting additional supply rolls of paper. The floor "A" is sloped towards

and past the machine as shown so that the paper rolls "B" are gravity fed into and away from the apparatus.

Gluer and paper pull rollers

As previously described, the wrapping paper **20** is fed from the supply roll around the idler roll **22** and over the idler roll **24** where it comes into contact with the edge bands **26** after they are passed through the gluing apparatus **30**.

The supply rolls of paper **28** which are used for the edge bands are mounted on a shaft **25** and are maintained in the desired spaced-apart relationship by means of sleeves **130** placed over the shaft. The sleeves **130** are preferably in short lengths so that the rolls **28** can be set at any desired position to suit varying widths of paper rolls being wrapped.

The gluing apparatus **30** is constructed as being a separate assembly that is mounted on four pads to the frame **10** so that it can be slid into place and removed from the machine as a unit. End plates **132** are joined by an adhesive-containing trough **133**, preferably by having angle plates welded to the end plates **132** and having the ends of the trough welded to the angle plates. Idler rollers **134**, **135**, **136**, **137** are journalled in the end plates **132** so as to guide the end bands around and over a glue applying roller **138** also journalled between the end plates **132**. The glue applying roller **138** is driven by frictional contact with a main glue roller **140** which is journalled in the end plates **132** on a shaft **142**. The shaft **142** extends beyond the end plates **132** and a bevel gear **144** mounted on this shaft end is placed in meshed engagement with a bevel gear **146**. The bevel gear **146** is fixedly mounted on a shaft **148** journalled between the bearings **150**, **152** positioned in spaced-apart relationship on the frame **10**. The shaft **148** is driven through a bevel gear **154** which is in meshed engagement with a bevel gear **156** mounted on a second shaft **158** extending vertically upwards from the machine main drive. The upper end of the shaft **158** is journalled in a bearing **160** mounted on the frame **10**, the lower end being journalled to the frame **10** below the floor level and being driven through a bevel gear **162** from an extension of the main drive.

A bevel gear **164** is fixedly mounted on the upper end of the shaft **148** and is in meshed engagement with a bevel gear **166** secured to the end of a shaft **168** mounting the lower of the paper pulling or feed rollers **40**. A toothed gear **172** is mounted on the shaft **168** behind the bevel gear **164** and is in meshed engagement with a further toothed gear **174** mounted on the end of a shaft **176** supporting the upper roller **40** which is adjustable for varied thicknesses of paper so that the feed rollers **40** are driven in counter-rotative movement by the shaft **148**.

The various gears driving the feed rollers **40** and the main glue roller **140** are designed together with the respective diameters of the rollers so that the wrapping paper and edge bands are fed through the machine in synchronism with the speed of the main driving rollers **16** and **18**.

With particular reference to Figure 4 of the drawings, the shafts **148**, **158**, and their respective gears are housed between a frame plate **11** and a frame plate **13** separated by vertical beams **15**, so that the exterior side of the frame **10** on which the controls are placed is free of moving parts which might prove dangerous to an operator.

The adjustable apron

The apron **44** supporting the adhesive sprayers **47** and the paper cutting blade **48** is supported on a framework **62** which extends across the machine and is mounted for vertical sliding movement between a pair of grooved guide bars **64** secured to the frame **10** at each side. (See Figure 13 for detail.)

The framework **62** and the apron **44** supported thereby are adjusted automatically to suit the various diameters of paper rolls by means of the following arrangement. A reversible electric motor **66** is mounted substantially centrally of the framework **62** and is adapted to drive a pair of elongated shafts **68** which extend from each side of the motor to a pair of gear housings **70**. The gear housings **70** are secured to the framework **62** at each side and each includes a fixed outer casing **72** (Figure 13) and a rotatable inner sleeve **74** mounted in bearings **76**. A gear **78** secured to the end of each of the shafts **68** is meshed with a gear **80** surrounding each of the inner sleeves **74** so that rotation of the shafts **68** in either direction also rotates the inner sleeves **74**. As the inner sleeves **74** each fit over and are threadably engaged with a pair of lead screws **82**, one of which is fixedly mounted at each side of the frame **10**, the rotation of the inner sleeves **74** causes the framework **62** to move vertically up or down between the guide bars **64**. The controlling switch **84** for the reversible motor is mounted on the panel **86** secured to the frame **10** and a suitable dial indicator **88** (Figure 1) is mounted over this switch and is actuated from one of the shafts **68** so that the relative position of the framework **62** and the apron **44** is shown as the switch **84** is being operated. It is contemplated in this respect that the drive to the indicator **88** would comprise the usual flexible cable drive and that the indicator dial would be calibrated to show the relative positions necessary to accommodate various diameters of paper rolls.

The apron **44** is constructed so as to provide an internal adhesive containing tank **45** and the adhesive spraying units **47** are mounted below this tank portion with suitable connections to the interior of the tank for the adhesive and further connections **92** to an air supply conduit **93** controlled through a cam-operated air valve arrangement **94** actuated by an air cylinder **96**. The air cylinder **96** is also adapted to actuate the paper cutting blade **48** which is mounted for slidable movement beneath the apron **44** so that it passes a shearing edge **49** secured beneath the framework **62** and so severs the paper across the width of the machine. The cutting blade **48** includes obliquely-disposed elongated slots **98** adjacent each end and bolts **100** pass through these slots to support the blade under the apron **44**. One end of the blade **48** is connected by means of a pivotal link **102** to one arm **103** of a bellcrank **105** pivotally mounted to the apron framework **62**, as shown in detail in Figures 7 and 8, while the other end is connected to a spring **104** attached to the opposite side of the apron framework **62**. With this arrangement raising of the other arm **106** of the bellcrank **105** is adapted to pull the blade **48** inwards in an oblique movement against the shearing edge **49** and release of the bellcrank arm **106** allows the spring **104** to return the blade **48** to its original position.

The actuation of the air cylinder **96** is controlled by a valve system operated in cam-controlled sequence with the driving rollers of the

machine. This portion of the apparatus will be described in more detail later.

The movement of the air cylinder 96 is transmitted to operate the valve arrangement 94 and the bellcrank 105 through a shaft 108 extending from the piston of the cylinder 96. This shaft 108 is mounted so as to extend vertically upwards from the cylinder 96 with the upper end supported for slidable movement in a bearing 110 mounted on the frame 62. A pair of cam carrying blocks 112, 114 are fixedly mounted on the shaft 108 above and below the bearing 110. A spring-biased cam finger 116 is pivotally mounted on the block 112 and a further spring biased cam finger 118 is pivotally mounted on the cam block 114.

The air valve arrangement 94 includes a pivotally mounted cam block 120 having an outwardly-extending arm 122 that is adapted to be contacted by the cam finger 116 on the downward movement of the shaft 108. The depression of the arm 122 pivots the cam block 120 so that the cam surface 121 rocks against the spring controlled valve 124.

The opening of the valve 124 allows air under pressure to pass through the conduit 93 and so cause the adhesive sprayers 47 to spray a stream of adhesive across the edge of the wrapping paper directly below the apron 44. The continued downward movement of the shaft 108 allows the cam finger 116 to pass the end of the cam arm 122 and the cam block 120 is resiliently returned to its original position closing the valve 124.

The pivotal mounting of the cam finger 118 allows it to pass the end of the bellcrank arm 106 without actuation as the shaft 108 descends but as the shaft 108 moves upward on the return stroke the bellcrank arm 106 is engaged pivoting the bellcrank 105 so as to actuate the cutting blade 48 into shearing action.

As the cam finger 116 again contacts the cam block arm 122 on the upward stroke the pivotal mounting allows it to swing past the arm where it is returned to operative position by a suitable spring. The operation of this portion of the apparatus is shown in detail in Figures 12, 6 and 9. Figure 12 shows the shaft 108 at the top of the stroke before the cam fingers 116, 118 have come into operation. Figure 6 illustrates the shaft 108 at the bottom of the downward stroke, the cam finger 116 having completed its operation, the cam block 120 having returned to normal position. Figure 9 illustrates the shaft 108 near the completion of the return upward stroke, the cam finger 118 is in contact with the arm 106 of the bellcrank 105 actuating the cutting blade 48 while the cam finger 116 is just passing the cam block arm 122 without actuation.

Main driving rollers and crimpers

The main driving rollers 16, 18 are mounted for rotation on beams 180 which extend from the lower portion of the frame 10. The shafts 181 extending from the roller 16 are journalled in bearings 182, and the shafts 183 of the rear roller 18 are journalled in bearings 184 secured in spaced-apart relationship to the beam 180 at each side of the frame 10.

One end of the roll shaft 181 extends beyond the bearing 182 journalling the roller 16 and a toothed gear 186 is fixedly mounted on the shaft end. A corresponding toothed gear 188 is fixedly mounted on one end of the roll shaft 183 that extends beyond the bearing 184 journalling the roller 18. A stub shaft 190 is journalled between one of the beams 180 and a bearing support 191 secured to the foundation 12. The shaft 190 is located centrally of the gears 186, 188 and a toothed gear 194 is fixedly mounted on the end of the shaft adjacent the beam 180 and is in meshed engagement with the gears 186, 188 so that rotation of the shaft 190 and the gear 194 in a clockwise direction causes the rollers 16, 18 to rotate simultaneously in a counter-clockwise direction.

The stub shaft 190 is driven through a bevel gear 192 mounted for free rotation on the shaft between the friction discs of a clutch 195 also mounted on the shaft and actuated through a cam-controlled clutch lever 196. The bevel gear 192 is in mesh with a bevel gear 198 secured to the end of the main driving shaft 200 so that the bevel gear 192 is in constant rotation while the machine is in operation but only rotates the shaft 190 when the clutch 195 is operated.

This clutch-controlled rotation of the driving rollers 16, 18, is also transmitted to the driving mechanism of the feed rollers 40 and the glue roller 140 by means of a toothed gear 350 in mesh with the gear 194 and journalled on a stub shaft 352. A bevel gear 354 is fixedly mounted on the other end of the stub shaft 352 and is in meshed engagement with a bevel gear 356 secured to a shaft 358 which extends horizontally rearwardly to adjacent the bevel gear 162 secured to the vertical shaft 158. A bevel gear 360 fixed to the end of the shaft 358 is in meshed engagement with the bevel gear 162 so that rotation of the gear 194 is transmitted to the vertical shaft 158 to drive the paper feed rollers and glue roller.

The crimper heads 46 are mounted in spaced-apart relationship directly on the rear roller 18 so that they are rotated at the same speed and in the same direction. Each crimper head 46 comprises a central sleeve or bush 202 which is a slide fit over the roller 18 and is keyed for rotation therewith in elongated key slots 19 which extend the length of the roller 18. This mounting (see Figures 18 and 19) allows the central sleeve 202 and the crimper head to be moved axially along the roller 18 as is required to suit paper rolls of varying lengths.

The central sleeve 202 of each of the crimper head assemblies 46 slidably fits within an annular bearing support 203 which includes extensions 204, 206 which are adapted to respectively guide and move the crimper head assembly axially of the roller 18.

The sleeves 202 are provided with annular grooves 208 adapted to receive a flanged annular plate 210 on which four crimper head sections 211 are secured in regular spaced-apart relationship by suitable bolts. A bearing ring 212 fits over the sleeve 202 to retain the flanged plate 210 in position and springs 214 mounted on pins 216 extending from the flange of the plate 210 are adapted to bear against the ring 212 which is secured to the inner sleeve 202 by set screws 213, the entire assembly being drawn against the bearing ring 203 by the engagement of a threaded retaining ring 214 with the threaded end of the sleeve 202. Suitable races and bearings are provided between the opposed faces of the ring 212 and the bearing support 203 and the retaining ring 214 is locked in position by set screws 205. Crimper head guide shafts 220 are mounted behind and parallel with the roller 18 so as to extend from each side of the frame 10 to a crimper drive-supporting frame 222 mounted

on the base of the frame 10 substantially centrally of the machine.

The extensions 204 of the bearing support are provided with bearing sleeves 225 which slidably fit on the guide shafts 220 at each side of the frame 10. The extensions 206 are provided with threaded bearing sleeves 224 which are threadably engaged at each side of the frame with one end of a double threaded screw shaft 226 extending across and being journalled in the frame 222 above the guide shafts 220. The screw shaft 226 is journalled centrally in a casing 228 mounted on the top of the supporting frame 222 and is driven through a worm and gear arrangement 230 connected directly to an electric motor 232 mounted on the supporting frame 222. The motor 232 is connected to and controlled by a two-button switch 234 mounted on the control panel 86 and a suitable dial indicator 236 is actuated from the shaft 226, so as to indicate the relative position of the crimper heads 46 as the switch 234 is operated. While the drive connection to the indicator 236 is not illustrated it will be understood that any of the usual flexible drive connections could be employed and that the dial of the indicator is calibrated to show the relative positions of the crimper heads in terms of approximate length of paper rolls.

With this arrangement the actuation of the motor 232 which is of the reversible type, in either direction, rotates the screw shaft 226 moving the bearing sleeves 224 and the bearing supports 203 towards and away from each other causing the sleeves 202 and the crimper heads 46 supported thereby to move in or out as required to suit the various lengths of rolls.

The crimper head sections 111 are all of similar formation and are arranged so that as the crimper heads are rotated with the drive roller 18 the portions of the wrapping 20 and the edge bands 26 extending beyond the ends of the roll of paper being wrapped are pushed in and folded against the ends of the roll in succession by each crimper head section 111. As the wrapping continues and the folded ends of the wrapping build up in thickness the resilient mounting of the flanged crimper assembly plates 210 allow the crimping heads 46 to retract and thus avoid tearing of the end wrappings.

The ejector mechanism

The ejector mechanism 50 and the drive for the crimper heads 46 are preferably assembled as a unit and pre-tested before assembled in the machine. The operative portion of the ejector mechanism is mounted on a support frame 240 erected on a base plate 242 extending from the frame 10.

The ejector support frame 240 is positioned beneath the top surface and centrally of the driving rollers 16, 18 and consists of a base 246, a front plate 248 which extends upwards from the base adjacent the front driving roller 16 and at each side of the front plate 248 are side reinforcing plates 250.

The front plate 248 is constructed so as to include a centrally-disposed guide slot 252 with the sides of the slot tapered outwardly so as to retain a slide plate 254 for sliding movement. One of the tapered sides of the guide slot 252 is constructed as a separate bar that is secured in place to the front plate 248 by suitable bolts so that it may be removed for installation of the slide plate 254 when the support 240 is in erected position. The slide plate 254 is constructed so as to have tapering edges corresponding to the guiding grooves of the front plate 248 with the lower portion projecting outwards and journalling a bolt 258.

The bolt 258 passes through an elongated bearing opening 259 in one arm of a bellcrank 260 pivotally mounted between the support side plates 250 so as to provide a loose pivotal connection therebetween (see detail of Figure 16). The upper portion of the slide plate 254 terminates in a pair of spaced-apart bearing portions 262 on which the ejector rollers 264 are mounted for rotation.

An extension 266 of the slide plate 254 includes a cylindrical tapped sleeve 268 in which is threadably engaged a plug 270. The plug 270 includes a central opening 271 through which the lower end of a shaft 272 is adapted to slidably pass. The opening 271 is larger than the diameter of the shaft 272 and the upper surface of the plug 270 is counterbored axially of the opening so as to provide a hemispherical seat. A spring seat 274 having a hemispherical end is slidably mounted over the shaft 272 and registers in the hemispherical seat of the plug with a compression spring 276 slidably mounted over the shaft 272 and bearing against the spring seat 274 and a roller support assembly 278 fixedly mounted on the upper end of shaft 272.

The roller support 278 is constructed so as to have a pair of spaced-apart lower bearings 279 to which a pair of spaced-apart bearing portions 280 are pivotally mounted by a shaft 281. The bearing portions 280 are adapted to rotatably support the ejector rollers 282 which correspond to and are in alignment with the ejector rollers 264. The two sets of ejector rollers 264 and 282 are pivotally connected to each other by means of link plates 284 extending along each side of and connected to the outer ends of each roller and to a central bearing support 285.

The bellcrank 260 is mounted for pivotal movement on a shaft 286 journalled between bearing blocks 288 secured to the support side plates 250 with the bellcrank arm remote from the slide plate 254 pivotally connected to the shaft 290 of an air cylinder 292. The air cylinder 292 is mounted for restricted pivotal motion on the frame 222 supporting the crimper motor and drive. This cylinder 292 is actuated by a cam-controlled air valve arrangement which will be described in detail later so that the ejector mechanism 50 is automatically operated at the end of the wrapping operation.

In operation, the ejector mechanism 50 raises the roll of newsprint "B" from between the driving rollers 16, 18, rolls the roll "B" onto the rear driving roller 18 and applies the necessary impetus on "kick" to start the roll "B" along the slope of the floor "A." With particular reference to Figure 16 of the drawings which illustrates the operation diagrammatically, the forward motion of the shaft 290 of the cylinder 292 pivots the bellcrank 260 to the position shown in dotted lines. This motion is transferred through the slide plate 254 to the ejector rollers 264, 282, so that the roll "B" is lifted. As the weight of the roll "B" is transferred to the ejector rollers, the rear set of rollers 282 are depressed so that the roll "B" is pushed from one side and thus rolled onto the driving roller 18. The pivotal connections between the two sets of rollers 264, 282 and the rear set of rollers 282 and the bearing portions 280 allow the rollers 282 to descend compressing the spring 276 and sliding the shaft 272

into the plug 270. As soon as the weight of the roll "B" is partially supported by the driving roller 18, the released compression of the spring 276 forces the ejector rollers 282 upwards giving a sharp "kick" to the side of the roll "B" so as to start it in motion off and away from crest of the driving roller "B."

Main drive and cam-operated controls

The motive power for the driving rollers 16, 18 and the controlling cams of the machine is provided by an electric motor 300 mounted on a support 302 extending from the base of the machine. The motor 300 is coupled directly to the main driving shaft 200 so that the driving rollers 16, 18 are driven at a constant speed when the clutch 195 is engaged. The driving shaft 200 is mounted for rotation between a journal bearing 304 and a gear housing 306 projecting from the top of a transmission housing frame 308. A spur gear 310 is fixedly mounted on the shaft 200 within the housing 306 and is in meshed engagement with a main driving gear 312 of a four speed transmission housed within the frame 308.

The four speed transmission includes a lower set of driven gears 315, 316, 317, 318 that are fixed to a shaft 320 journalled in the frame 308. The shaft 320 is driven by the engagement of the gear 318 with a gear 322 journalled in the end of the frame 308. The gear 322 is connected directly to the main driving gear 312, and includes a centrally disposed opening 323 adapted to support one end of a shaft 324 for free rotation.

The shaft 324 is positioned directly above and in parallel alignment with the shaft 320 and suitable gears, 325, 326, 327, 328, are keyed to this shaft so as to be movable axially of the shaft while being rotated. The end gear 328 is adapted to mesh with an internal gear 329 cut in the gear 322 in an enlargement of the opening 323. The gears 325, 326, are combined and are shifted through a lever arm 330 operated exteriorly of the housing frame 308 by a connecting lever arm 332. The gears 327, 328 are also combined and are shifted through a lever arm 334 operated exteriorly of the housing through a connecting lever arm 336. The connecting lever arms 330, 332 are mounted in spaced-apart relationship so as to extend directly beneath a gear shift control arm 338 to which they are operatively connected. The gear shift control arm 338 extends upwardly from the driving mechanism to a gear shift control box 340 mounted on the frame 10 directly below the control panel 86.

The end of the shaft 324 remote from the driving gears passes through a bearing in an interior wall of the transmission frame 308 and is journalled between the interior wall and an exterior wall. A worm 342 is fixed to the shaft 324 at this point and is in meshed engagement with a worm gear 344. The worm gear 344 is secured to a stub shaft 345 journalled between the side plates 346, 347 of the transmission frame 308, and a toothed gear 350 fixedly mounted on the other end of the shaft 345 is in meshed engagement with a toothed gear 352. The gear 352 is secured to a stub shaft 354 journalled between the transmission frame plate 347 and an interior partition 349 and is adapted to drive the shaft on which is mounted the main controlling cams 360, 362.

The cams 360, 362 are mounted in superimposed relationship and are secured to the shaft 354 so that they are rotated together. The cam 360 is adapted to control the engagement and disengagement of the clutch lever 196 in time-related sequence with the number of revolutions made by the driving rollers 16, 18.

As the clutch 195 is normally maintained in operative position by a spring 364 mounted over the shaft, the cam 360 is adapted to disengage the clutch at spaced-apart intervals by means of a cam lever 366 pivotally mounted at one end and on which is rotatably mounted a cam-engaging roller 368. The other end of the lever arm 366 is pivotally connected to a connecting arm 369 which in turn is pivotally connected to the pivotally mounted clutch lever 196.

With this arrangement, depression of the lever 366 is adapted to release the clutch 195 so that the bevel gear 192 rotates freely on the shaft 190 and the driving rollers 16, 18 do not rotate.

As this stopping action must take place in relationship to the overall function of the machine the cam 360 includes a first clutch operating projection 370 which contacts the lever 366 at the completion of the first wrapping operation, or in the present instance after the driving rollers 16, 18 have revolved sufficiently to rotate the roll of paper "B" 2⅔ times. The surface of the cam 360 also includes a depression 371 which allows the clutch 195 to reengage so as to allow the rollers 16, 18 to complete the wrapping operation and following the depression 371 a clutch operating projection 372 which again disengages the clutch removing the drive from the rollers 16, 18. The second cam 362 working in conjunction with the cam 360 includes a cam surface having a first projection 380 adapted to actuate the gluing and paper cutting mechanism at the same time the projection 370 stops the rollers, 16, 18, a further projection 382 which is an idler position, and a third projection 384 which is adapted to actuate the ejector mechanism 50 when the projection 372 of the clutch-operating cam is in operation. The cam 362 controls the operation of the gluer and cutting mechanism and the ejector mechanism by means of a pivotally mounted cam lever arm 390 which is pivotally connected to and adapted to slidably move a shaft 392.

The shaft 392 is journalled in extended portions of an air valve control box 394 which is secured to the transmission housing frame 308. The valve control box 394 contains suitable trip valves 395, 396 which are adapted to open or close air pressure supply lines from a compressor tank, not illustrated, to the air cylinders 96, 292, controlling the adhesive spraying and paper cutting mechanisms and the ejector mechanism respectively.

The shaft 392 carries a first trip lever 398 which is adapted to contact the trip valve 396 at the first outward movement of the shaft as actuated through the cam portion 380 of the cam 362. In the normal position of the valve 396, an air pressure line to the air cylinder 96 is open causing the shaft 108 to stay in the up position. The outward movement of the shaft 392 urges the trip valve 396 to an operative position closing the first air line and opening another to the upper portion of this air cylinder 96 so that the shaft 108 moves downward and actuates the glue spraying arrangement 47. The further outward movement of the shaft 392 urges the trip lever 398 beyond the valve trip lever allowing the valve 396 to return to its normal position closing the second air line and re-opening the first air line to the cylinder 96 causing the shaft 108 to again

move upwards and actuate the paper cutting blade 48.

As the shaft 392 is moved still further by the actuation of the cam portion 382 of the cam 362, a second trip lever 400 contacts the trip valve 395 and opens an air pressure line to the cylinder 292 controlling the ejector mechanism 50. With the release of the actuating portions of the cam 362 as the combined cams complete the operating cycle, the shaft 392 is allowed to return, the initial movement releasing the trip valve 395 so as to close one air line and open another to the air cylinder 292 to return the ejector mechanism 50 to its normal position.

As the trip lever 398 is pivotally connected to the end of the shaft 392, the continued backward movement tilts the lever 398 about the trip valve 396 after which it is returned to operative position by means of a suitable spring.

This cam control arrangement allows the gluer, paper cutting blade, driving rollers and ejector mechanism of the machine to automatically operate in synchronism. The adjustment of the transmission through the control lever arm 338 automatically changes the rate of speed of the cams 360, 362 proportionately to the number of revolutions required by the driving rollers 16, 18 to rotate a paper roll of determined diameter three times for the complete wrapping.

While the foregoing description refers specifically to the method of wrapping usually employed in this country, namely, the American method involving three layers of heavy kraft paper, it will be readily understood that by changing the operating contour of the controlling cams that the number of wraps, or folds could be increased to suit the European method of 9 to 15 layers of thin wrapping paper.

As the driving rollers 16, 18 are driven at a constant speed, the variation in the speed of rotation of the cams 360, 362 allows the various working elements to function in synchronism proportionately to the number of revolutions of the driving rollers.

It is contemplated in this respect that the upper portion of the housing for the control lever arm 338 would include guiding slots graduated for various diameters of paper rolls in relationship to the various gears of the transmission.

While the preceding description describes the cylinders 96 and 292 as being air operated, it is also contemplated that the mechanism could be operated in a similar manner by hydraulic pressure.

We claim:

1. A roll wrapping machine, comprising in combination, supporting rollers for supporting and rotating a roll for wrapping, means for rotating said supporting rollers, means for supporting a supply of a body wrapping web, means for supporting supplies of reinforcing edge bands, primary adhesive applying means for applying adhesive to the inside of the edge bands, respective means for guiding the edge bands carrying adhesive and the body wrapping web from said supplies into juxtaposed relationship one band at each side of the web to form a composite web reinforced at the side margins, means for feeding the composite web so formed, means for retaining and guiding the composite web in a path towards the supporting rollers, secondary adhesive applying means associated with said guiding means for applying adhesive across the composite web and severing means associated with said guiding means for severing the composite web, timing means, control means for starting and stopping the supporting rollers responsive to the timing means, control means for the primary adhesive applying means responsive to the timing means, control means for the secondary adhesive applying means responsive to the timing means, and control means for the severing means responsive to the timing means, crimping means connected to one of said supporting rollers, the rotation of said supporting rollers causing simultaneous winding of the composite web onto the roll and folding in of the edges of the composite web against the end of the roll by said crimping means.

2. A roll wrapping machine, according to claim 1, in which the timing means includes a cam having elements adapted to cause sequential actuation respectively of the roll-supporting rollers, of the primary adhesive applying means, of the secondary adhesive applying means, and of the severing means.

3. A roll wrapping machine, according to claim 1, in which there is a frame, a vertically movable carriage on the frame carrying the secondary adhesive applying means and the severing means, and said carriage carries driving means operatively connected with the frame thereby to raise and lower the carriage independently of the main drive of the mechanism including a prime mover mounted on the carriage to actuate said driving means.

4. A roll wrapping machine, according to claim 1, in which the crimping means includes a pair of spaced apart crimping heads on said one of the supporting rollers and adjusting means outside the periphery of said one roller for moving said crimping heads axially of the roller in either direction, and driving means for actuating said adjusting means, whereby the machine may be adjusted to handle rolls of various widths.

5. A roll wrapping machine, according to claim 1, which includes a carriage mounted for vertical adjustment between the means for feeding the composite web and the supporting rollers, said means for retaining and guiding the composite web is contained on said carriage, said secondary adhesive applying means and said severing means are mounted on said carriage, height adjusting means for moving said carriage up and down, and driving mechanism adapted to actuate said height adjusting means whereby the machine may be adjusted for rolls of various diameters.

6. A roll wrapping machine, according to claim 1, which includes a carriage mounted for vertical adjustment between the means for feeding the composite web and the supporting rollers, said means for retaining and guiding the composite web is contained on said carriage, said secondary adhesive applying means and said severing means are mounted on said carriage, height adjusting means for moving said carriage up and down, driving mechanism adapted to actuate said height adjusting means whereby the machine may be adjusted for rolls of various diameters, said crimping means including a pair of spaced apart crimping heads on said one of the supporting rollers and adjusting means outside the periphery of said one roller for moving said crimping heads axially of the roller in either direction, and driving means for actuating said adjusting means, whereby the machine may be adjusted to handle paper rolls of various widths.

7. A roll wrapping machine, according to claim 1, in which the supporting rollers have fixed axes and there is ejecting means between said

rollers below the normally cradled position of the roll being wrapped, said ejecting means having a positive pressure lifting member adapted to act on said roll to lift it off one of said rollers and about the periphery of the other until it reaches the crest thereof and resilient pressure means adapted to react against the roller so as to push it off said crest.

8. A roll wrapping machine, according to claim 1, which includes a carriage mounted for vertical adjustment between the means for feeding the composite web and the supporting rollers, said means for retaining and guiding the composite web is contained on said carriage, said secondary adhesive applying means and said severing means are mounted on said carriage, height adjusting means for moving said carriage up and down, driving mechanism adapted to actuate said height adjusting means whereby the machine may be adjusted for rolls of various diameters, said crimping means including a pair of spaced apart crimping heads on said one of the supporting rollers and adjusting means outside the periphery of said one roller for moving said crimping heads axially on the roller in either direction, and driving means for actuating said adjusting means, whereby the machine may be adjusted to handle paper rolls of various widths, said supporting rollers having fixed axes, ejecting means between said rollers below the normally cradled position of the roll being wrapped, said ejecting means having a positive pressure lifting member adapted to act on said roll to lift it off one of said rollers and about the periphery of the other until it reaches the crest thereof and resilient pressure means adapted to react against the roll so as to push it off said crest.

9. A roll wrapping machine according to claim 1 in which said secondary adhesive applying means includes actuating means, the control means for the secondary adhesive applying means and said severing means includes a cylinder and a piston operable in said cylinder, said piston having a rod extending beyond said cylinder, and means on said rod for starting and stopping said secondary adhesive applying means, said rod also carrying means for actuating said severing means, whereby movement of the piston causes stopping and starting of the adhesive applying means and also actuates said severing means.

10. A roll wrapping machine, comprising in combination, supporting rollers for supporting and rotating a roll for wrapping, means for rotating said supporting rollers, means for supporting a supply of a body wrapping web, means for supporting supplies of reinforcing edge bands, primary adhesive applying means for applying adhesive to the inside of the edge bands, respective means for guiding the edge bands carrying adhesive and the body wrapping web from said supplies into juxtaposed relationship one band at each side of the web to form a composite web reinforced at the side margins, means for feeding the composite web so formed, means for retaining and guiding the composite web in a path towards the supporting rollers, secondary adhesive applying means associated with said guiding means for applying adhesive across the composite web and severing means associated with said guiding means for severing the composite web, said guiding means including a pair of guide rollers having fixed axes and arranged above said supporting rollers and between said guide rollers and said supporting rollers, a carriage arranged for up and down movement, and means mounted on said carriage for causing up and down movement of said carriage independently of the drive of said supporting rollers, said adhesive applying means and said severing means being mounted on said carriage.

11. A roll wrapping machine, according to claim 10, in which said guiding means for causing movement of the carriage includes a vertically extending threaded shaft and bushing means on said carriage for threadably engaging the shaft, and means for causing relative rotation between the bushing means and said shaft to cause the up and down movement of the carriage.

12. A roll wrapping machine, according to claim 10, to which the means for rotating said supporting rollers includes a gear box, and adjusting means for the gear box whereby the number of revolutions which the supporting rolls make in each cycle may be adjusted in relation to the diameter of the roll to be wrapped and the vertical position of said carriage.

13. A method of wrapping a roll of paper of the tonnage variety which comprises the steps of, drawing from a supply a pair of edge bands of constant width and applying adhesive to said edge bands, at the same time drawing from supply a wrapping web of constant width, and bringing the adhesive-carrying edge bands and web into juxtaposition to form a straight-edged composite web of substantially constant width and having marginal portions reinforced by the edge bands each bordered by a continuous straight edge, applying adhesive to the leading edge of the composite web, feeding said composite web to a paper roll to be wrapped and pressing the adhesive carrying leading edge against the paper roll, rotating said paper roll whereby said composite web is wound about it and at the same time continuously folding in marginal portions of said composite web against the side of the roll, applying adhesive to an area of the paper web adapted to form its trailing edge, and severing said web behind said area of the web to which the adhesive has been applied, and continuing to rotate the roll until the portion carrying the adhesive comes into contact with an area of the composite web already juxtaposed to the paper roll and adheres thereto.

14. A method of wrapping a roll of paper, according to claim 13, in which the roll is rotated at least through two complete revolutions whereby at least two plies of the composite web have been wound on to the roll and the edges folded in in overlapping relationship against the roll edge.

15. A roll wrapping machine, comprising, a pair of spaced apart supporting rollers adapted to support and rotate a roll for wrapping, a crimping mechanism having a pair of spaced apart crimping heads each of which includes an inner sleeve mounted on one of said supporting rollers, said sleeve being connected to the roller to be rotated thereby but movable axially therealong, an outer sleeve mounted on said inner sleeve, means for preventing rotation of said outer sleeve while said inner sleeve rotates relative thereof, adjusting means for moving the outer sleeve axially of said one roller whereby the crimping heads may be moved axially of said one roller in either direction to place them to accommodate rolls of various widths, said adjusting means including a lead screw one side of which has a right hand thread and the other side of which has a left hand thread, said lead screw being outside

the periphery of said one roller, a pair of threaded sleeve bushings each having a threaded portion engaging said lead screw at one side thereof and another portion engaging one of the crimping heads, means for rotating the lead screw in either direction to adjust crimping heads inward or outward for different sized rolls, and means for rotating the supporting rollers.

16. An apparatus according to claim 15, including a frame having spaced apart supporting members, said supporting members being journalled in said supporting frame, said lead screw also being journalled in said supporting members, wherein said means for rotating the lead screw includes a worm gear on said lead screw intermediate the ends thereof, a worm drivably engaging said worm gear, and power means for rotating the worm in either direction.

17. A roll wrapping machine, comprising in combination, a pair of horizontally disposed axially parallel supporting rollers for supporting and rotating a roll to be wrapped, means for driving said rollers thereby to rotate said roll, an ejecting mechanism located between said rollers comprising a pair of spaced apart ejector members both adapted to engage the under surface of the roll being wrapped, each member close to one of said supporting rollers, means for moving a first of said ejecting members through an upward path, the second of said ejector members being mounted for pivotal movement about the axis of the first ejector member, said first ejector member being arranged so that when it moves through said upward path it is urged upward against said roll at a point on said roll removed from the roll's vertical center line whereby the roll is gradually moved upwards on the periphery toward the crest of one of the supporting driving rollers, and means acting on said second ejector member effective only when the roll reaches said crest to push the roll off the crest.

18. A roll wrapping machine, according to claim 17, wherein control means responsive to the stopping of said supporting rollers is adapted to initiate the action of said ejecting mechanism.

19. A roll wrapping machine, comprising, a pair of axially parallel spaced apart driven rollers having fixed axes for supporting a roll to be wrapped with the roll normally resting equally on each of said driven rollers, means for acting on the under surface of said roll near one of said rollers in an upward direction to move the roll upwards on the periphery of the other driven roller to near its crest, and means becoming effective only when said roll is near the crest of said other roller to boost the roll over the crest of said other roller.

20. A roll wrapping machine, comprising in combination, a pair of driven supporting rollers having parallel fixed axes on which rollers a roll of paper is adapted to be cradled for wrapping and between which the weight of the roll is equally distributed during rotation with the paper roll bearing at spaced apart regions on its periphery on respective peripheral regions on said supporting rollers, means for ejecting said roll from said driven rollers including a first ejecting member for acting on the under surface of the roll at a point toward one of said driven rollers offset from the vertical center line of said roll, said first ejecting member being adapted to lift weight of said one roll from said first supporting roller onto the second supporting roller whereby the roll is supported entirely by the second supporting roller and the first ejecting member until the roll reaches the crest of the second supporting roller, and a second ejecting member adapted to act on the roll to move it from said second roller's crest in the direction of ejection.

21. A roll wrapping machine, comprising in combination, first and second spaced apart axially parallel driven supporting rollers for a roll of paper to be wrapped, said rollers being in axially fixed relationship, first ejecting roller means, a mounting member mounting said first ejecting roller means at a point toward said first supporting roller from the vertical center line of said roll, a support means pivotally connected to the axis of said first ejecting roller means and extending towards said second supporting roller, second ejecting roller means mounted on said support means toward the second supporting rollers from the vertical center line of said roll, resilient pressure means acting between said support means and the mounting member in an upward direction whereby said second ejecting roller means is urged against said roll, positive pressure means adapted to act on said mounting member to urge the first ejecting roller means in an upward direction with the support means and said second ejecting roller means whereby the first ejecting roller means is moved upwards thereby cradling the paper roll on the first ejecting roller means and second supporting roller and gradually moving the roll upward onto the crest of the second supporting roller so that the position of the second ejecting roller means is depressed in relation to the axis of the first ejecting roller means thereby compressing said resilient pressure means and when the paper roll becomes balanced at the crest of the second supporting roller the resilient pressure means reacts on the second ejecting roller means to push the roll off the crest of the second supporting roller.

22. A roll wrapping machine, according to claim 21, in which said resilient pressure means includes a spring.

23. A roll wrapping machine, according to claim 21, wherein said positive pressure means includes a fluid pressure piston.

24. A roll wrapping machine, according to claim 21, wherein said resilient pressure means includes a spring and said positive pressure means includes a fluid pressure piston.

25. In a paper roll wrapping machine, a pair of spaced-apart horizontal driving rollers adapted to support therebetween a paper roll to be wrapped, means for rotating said rollers, an ejector mechanism comprising, a pair of spaced-apart independent ejector rollers, one of said ejector rollers being resiliently biased in relation to the other ejector roller said ejector rollers being pivotally linked and being disposed between and sub-adjacent to the upper peripheral surface of said driving rollers, roller support means adapted to move said ejector rollers upwards into contact with a paper roll supported on said driving rollers, whereby upward movement of said ejector rollers is adapted to engage both of said ejector rollers with the lower peripheral surface of said paper roll so as to pivotally urge said paper roll upwards from contact with one of said driving rollers, said resiliently biased ejector roller being adapted to be depressed by the weight of said paper roll during said lifting motion, the continued upward movement of said ejector roller supporting member being adapted to urge said paper roll forwards bringing the

axes of the rear driving roller and paper roll into substantial perpendicular alignment so as to transfer most of the weight of the paper roll to the driving roller, thereby allowing the resilient means between said ejector roller and supporting member to expand and urge said ejector roller against the periphery of the paper roll causing it to roll over said rear driving roller.

26. In a paper wrapping machine, a pair of spaced-apart horizontal driving rollers adapted to support therebetween a paper roll to be wrapped, means for rotating said rollers, an ejector mechanism comprising a substantially vertical guideway, a supporting member movable along said guideway, an ejector roller mounted on said support with its axis parallel to the axes of said rolls, an upwardly extending extension of said supporting member including a seat having an opening adapted slidably to receive a shaft, a roller support mounted on one end of said shaft and a spring between the roller support and said seat, a roller pivotally mounted on the roller support and linked to said first ejector roller to retain its spaced-apart relationship, a cylinder and piston linked to the bottom of said support adapted for moving it upward and downward and controlling means for said piston, the said pair of linked ejector rollers being located between

said supporting rollers and in a position immediately sub-adjacent the paper roll being wrapped, said ejector rollers being adapted on upward movement of said support to lift the paper roll clear of one of said paper supporting rollers, whereupon the weight of the paper roll depresses said second ejector roller against the action of said spring causing the paper roll to move forward into contact with the second driving roller and upon coming into contact with said second driving roller, removing the weight from the second ejector roller, the second ejector roller then being spring actuated against the paper roll causing it to be ejected over said second driving roller.

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