

March 6, 1956

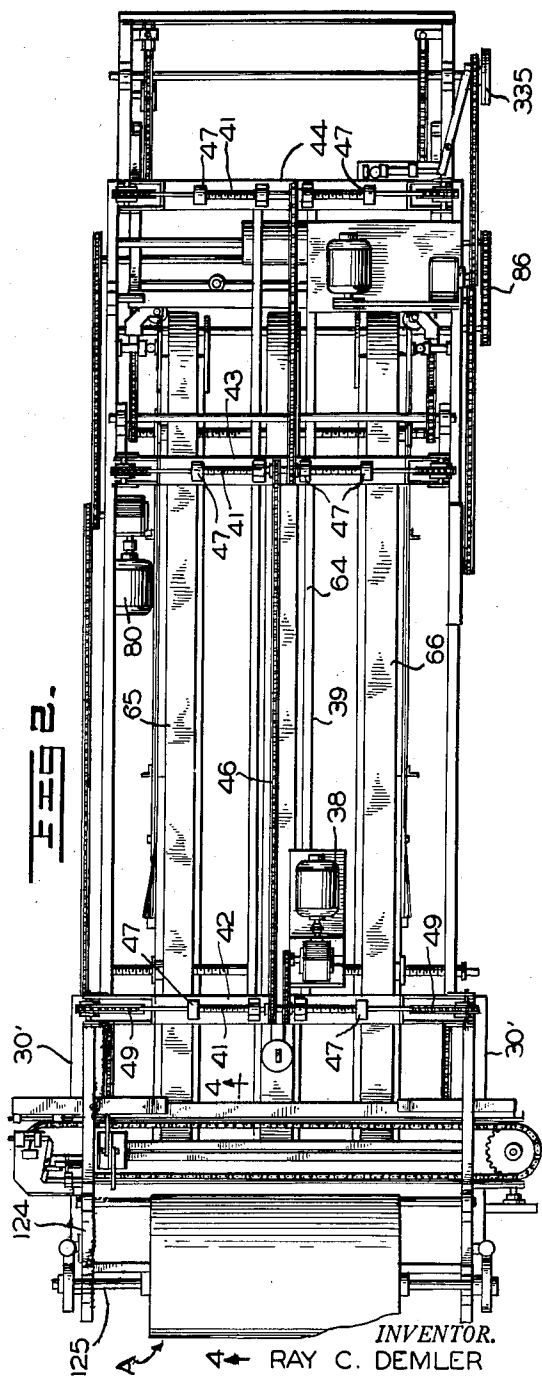
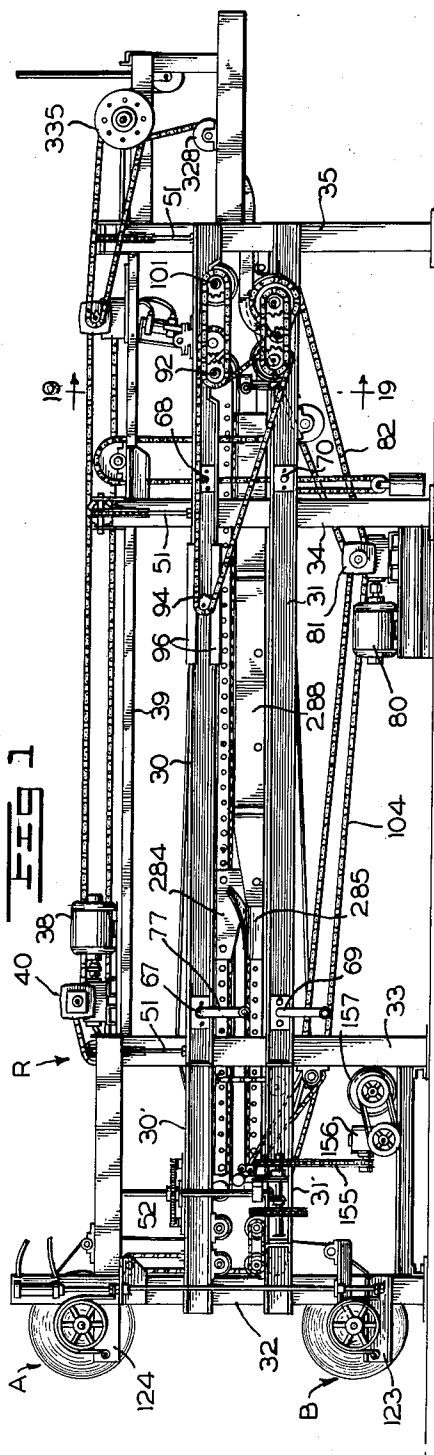
R. C. DEMLER

2,737,002

PACKAGING MACHINE

Filed Dec. 1, 1950

21 Sheets-Sheet 1



INVENTOR.
RAY C. DEMLER
BY
Cushman, Darby & Cushman
ATTORNEYS

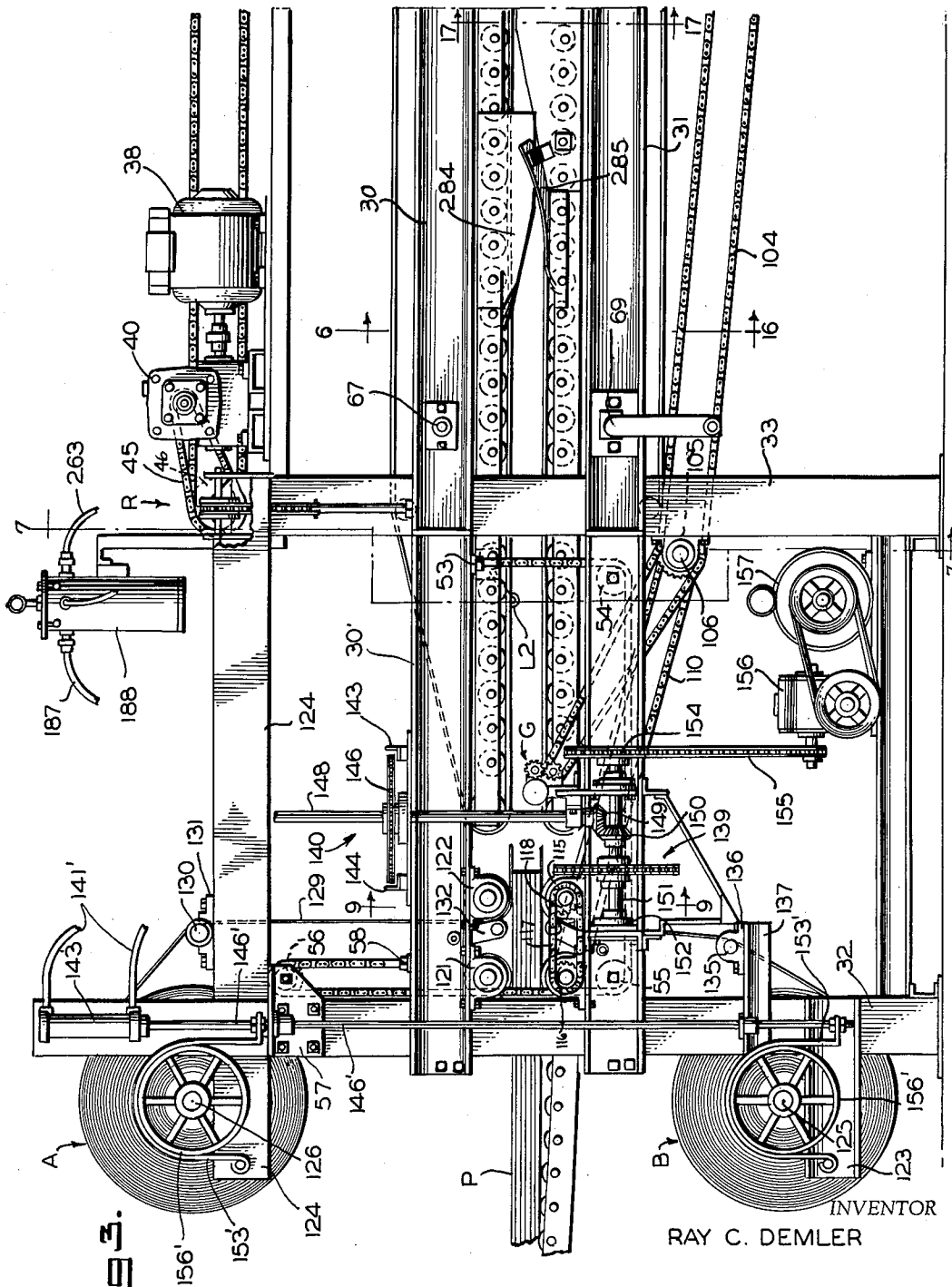
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 2



BY *Cushman, Darby & Cushman*
ATTORNEY

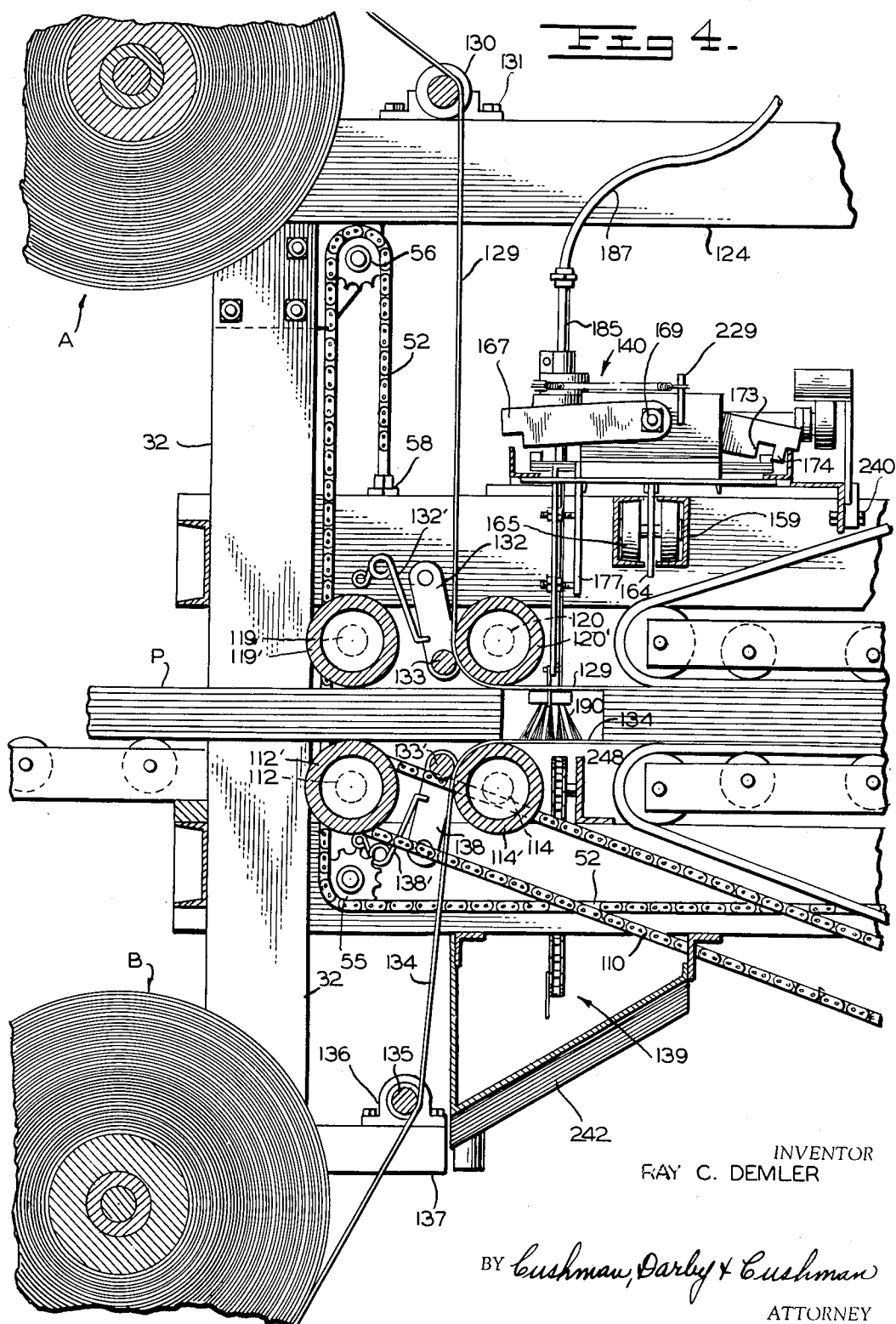
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 3



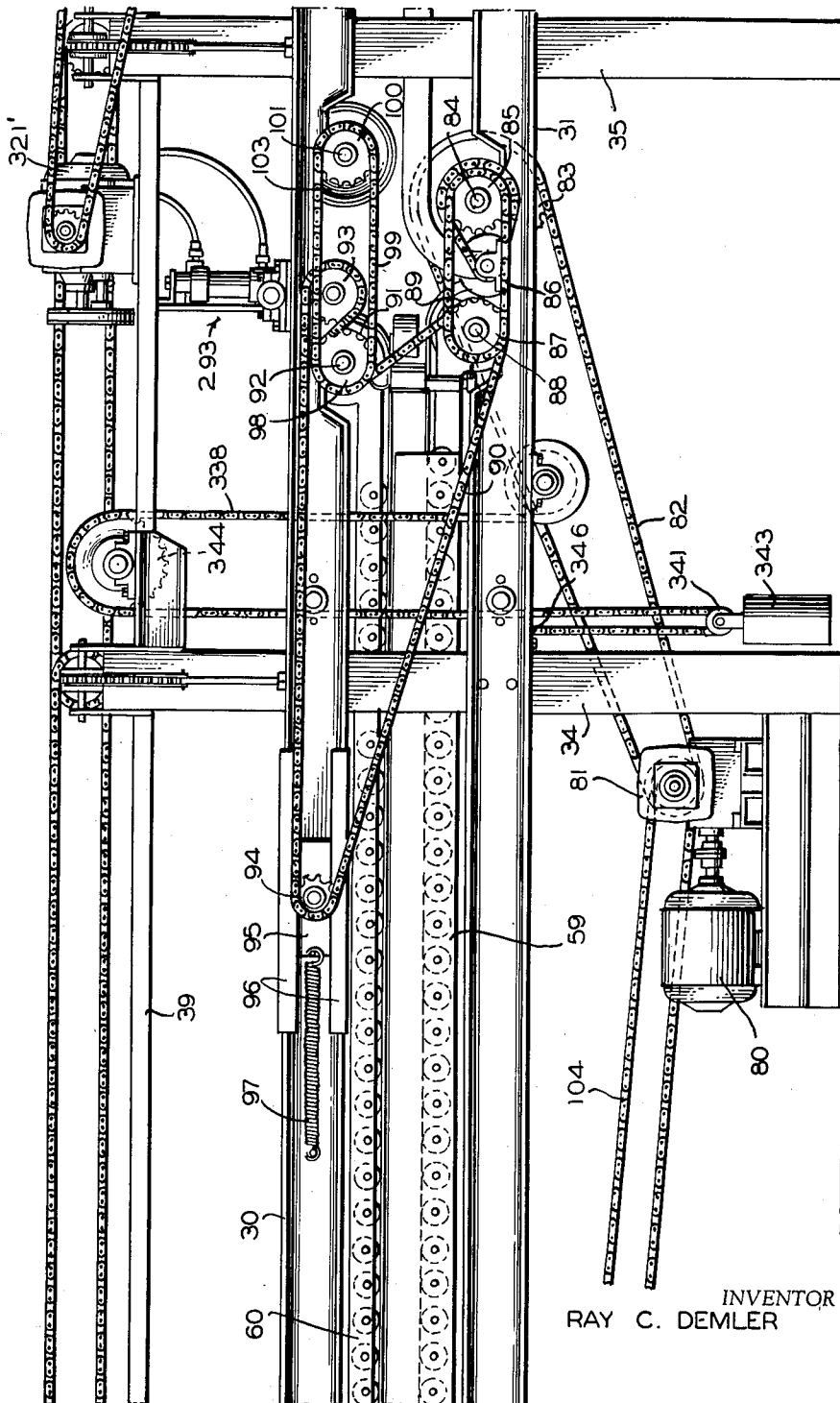
എ

PACKAGING MACHINE

INVENTOR
DEMLER

BY *Cushman, Darby & Cushman*
ATTORNEY

21 Sheets-Sheet 4



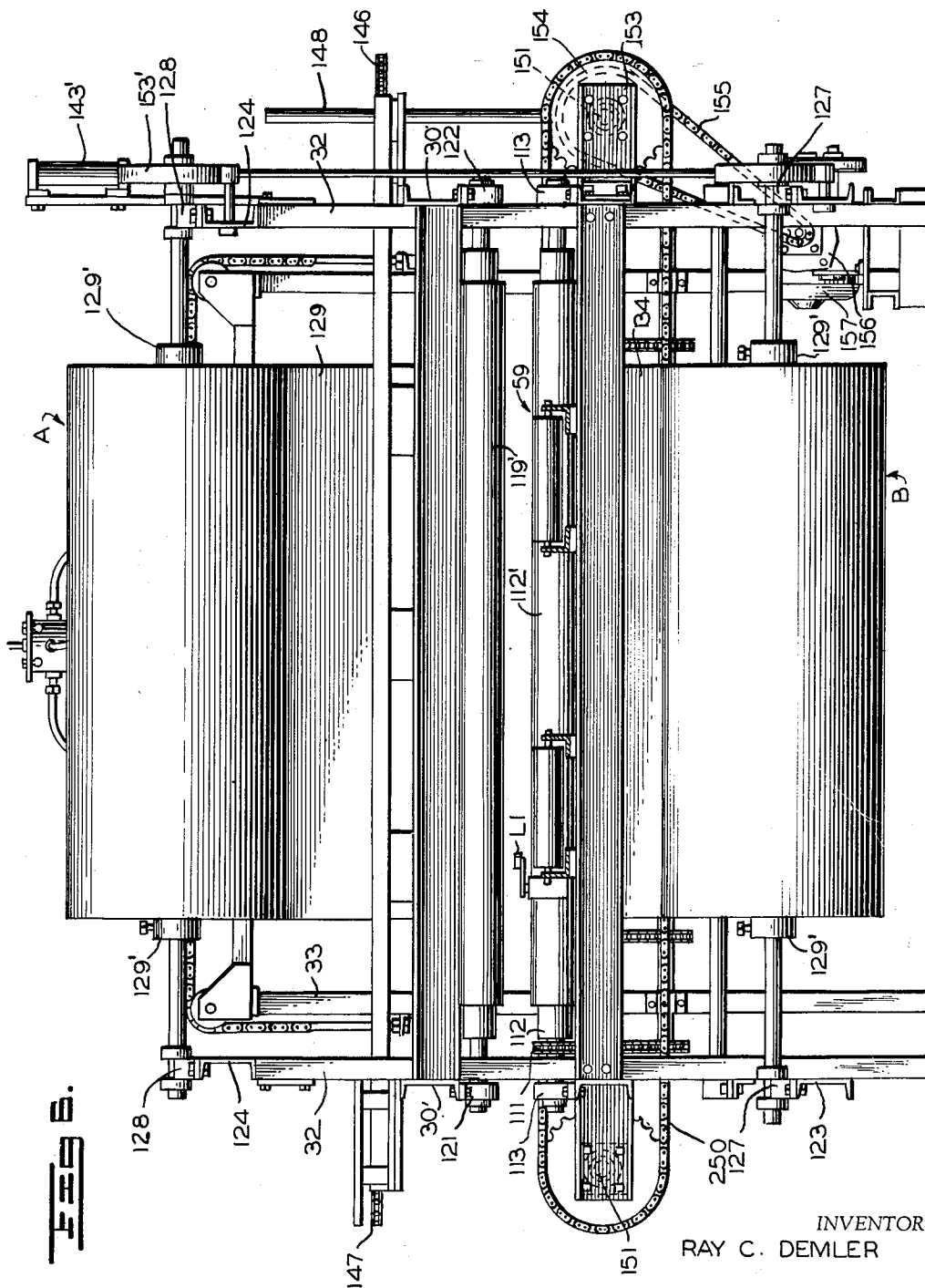
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 5



INVENTOR
RAY C. DEMLER

BY *Cushman, Parby & Cushman*
ATTORNEY

March 6, 1956

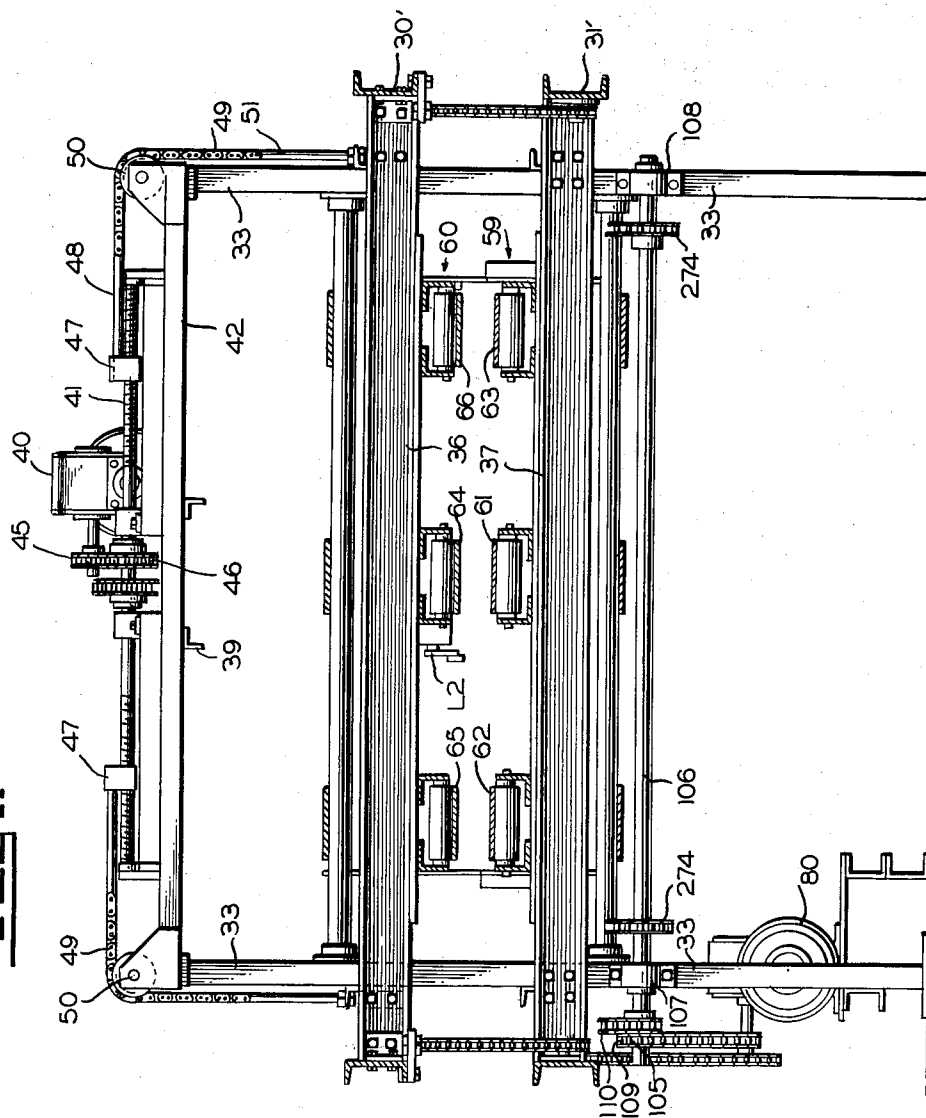
R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 6

Fig. 7.



INVENTOR
RAY C. DEMLER

BY *Cushman, Darby & Cushman*
ATTORNEY

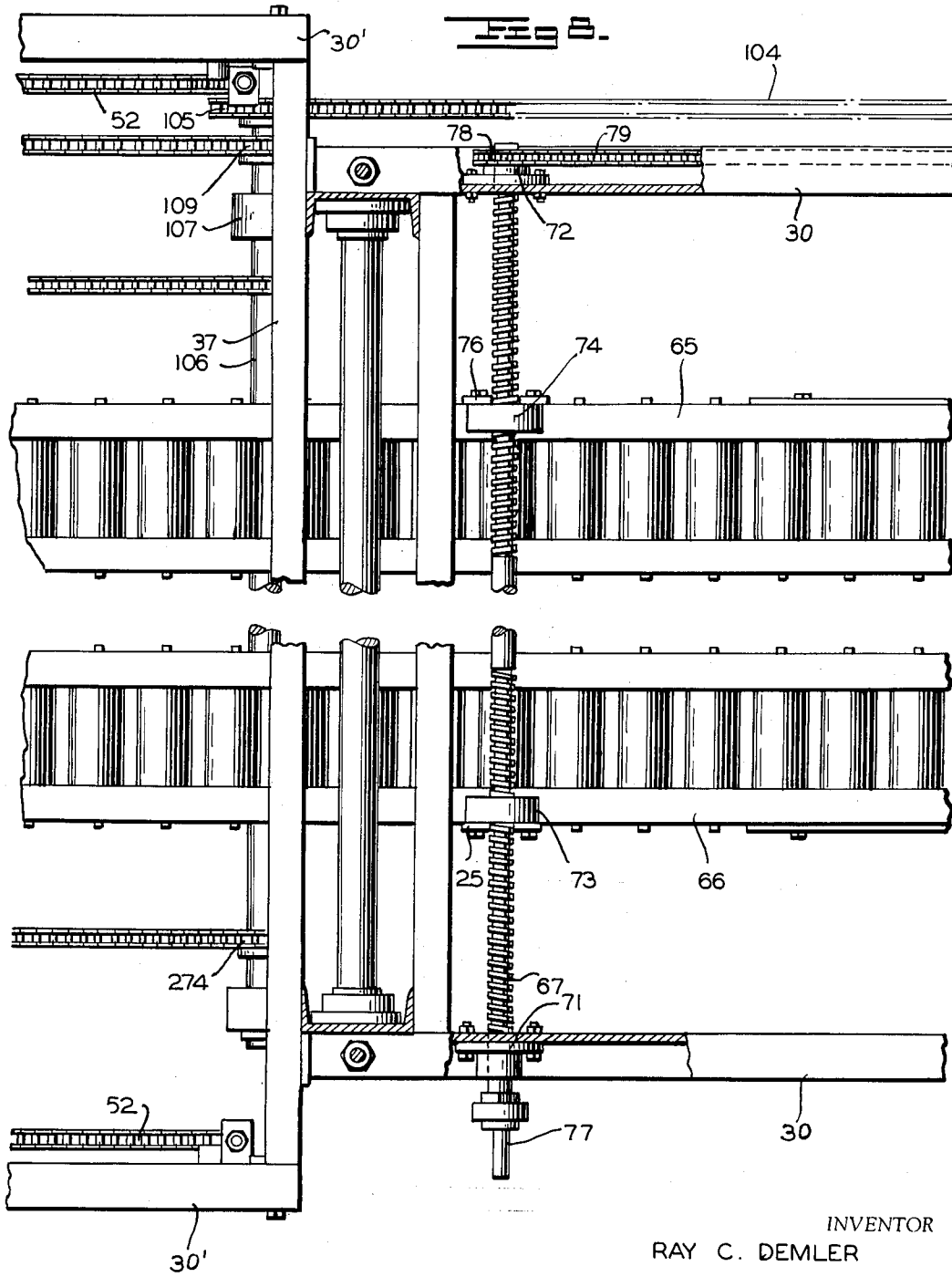
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 7



INVENTOR
RAY C. DEMLER

BY *Cushman, Parby & Cushman*
ATTORNEY

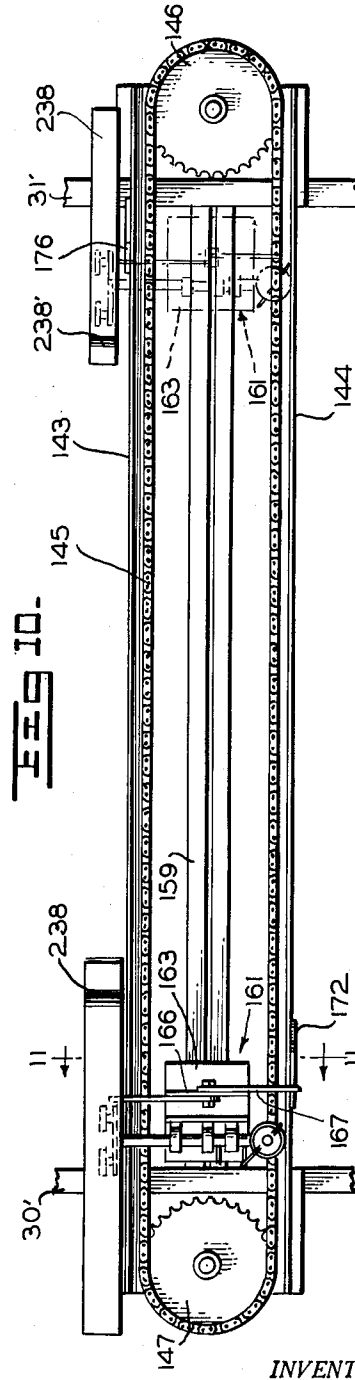
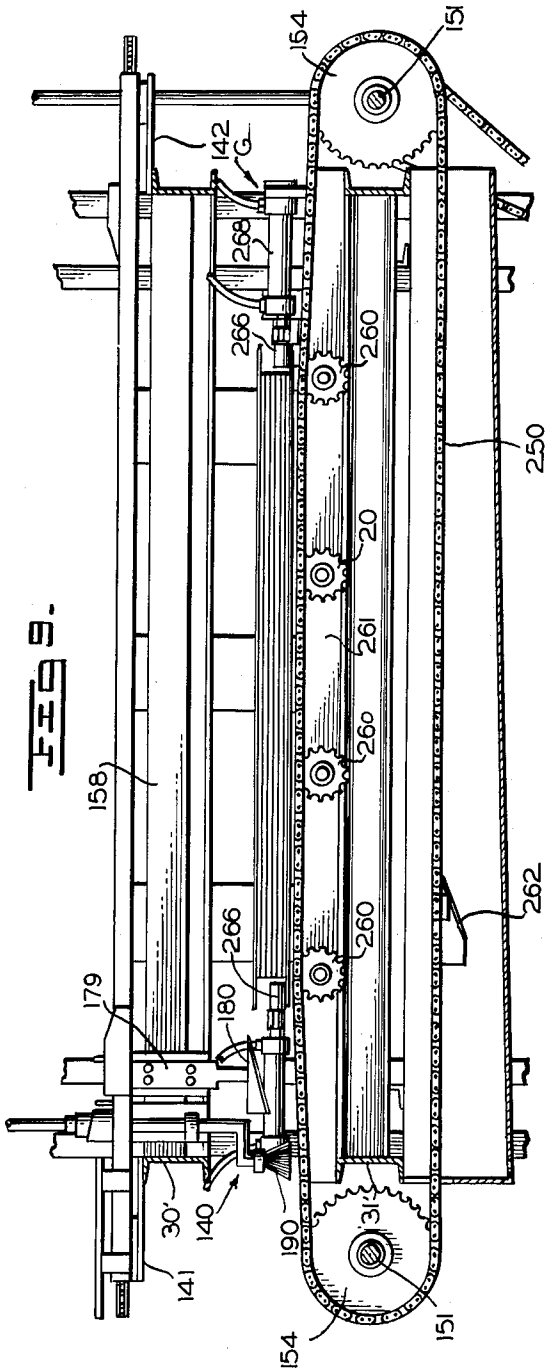
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 8



INVENTOR.
RAY C. DEMLER

BY

Cushman, Darby & Cushman
ATTORNEYS

March 6, 1956

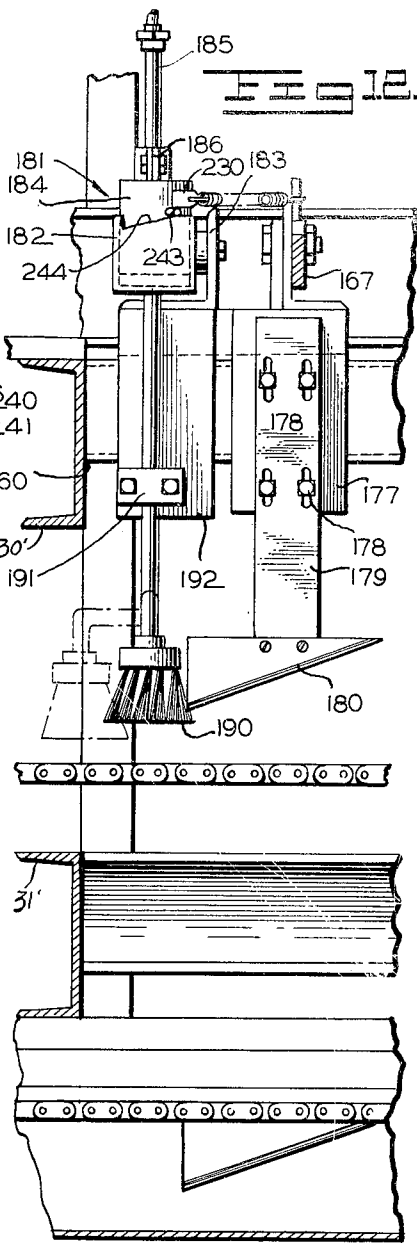
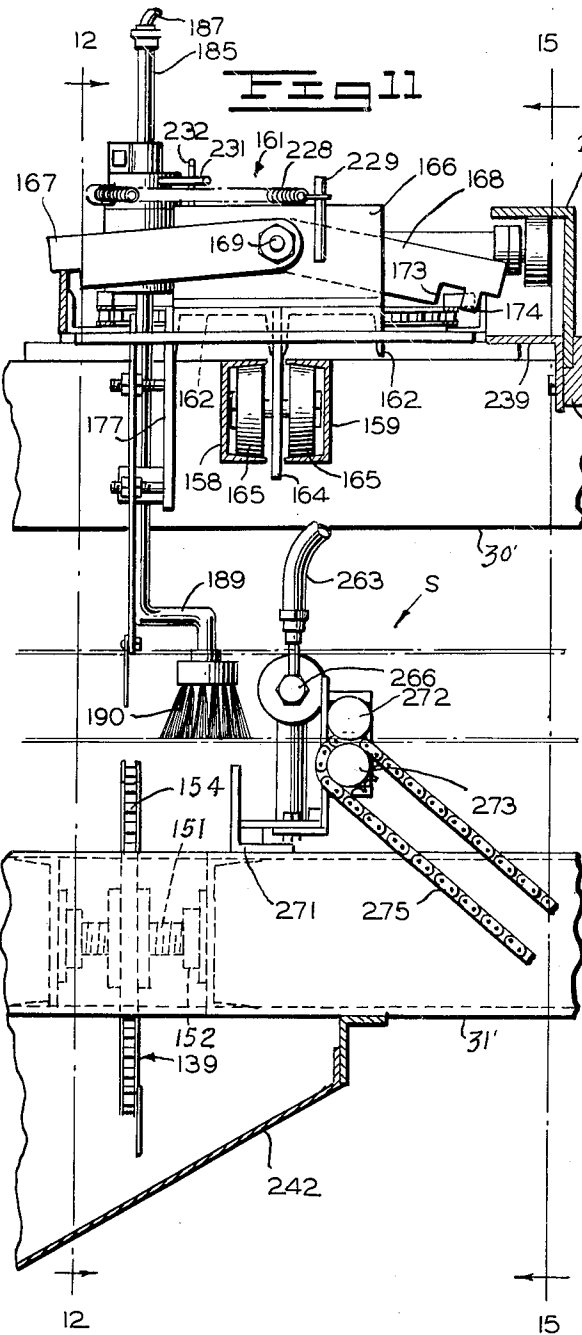
R. C. DEMLER

2,737,002

PACKAGING MACHINE

Filed Dec. 1, 1950

21 Sheets-Sheet 9



INVENTOR.
RAY C. DEMLER

BY

Cushman, Parly & Cushman
ATTORNEYS

March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 10

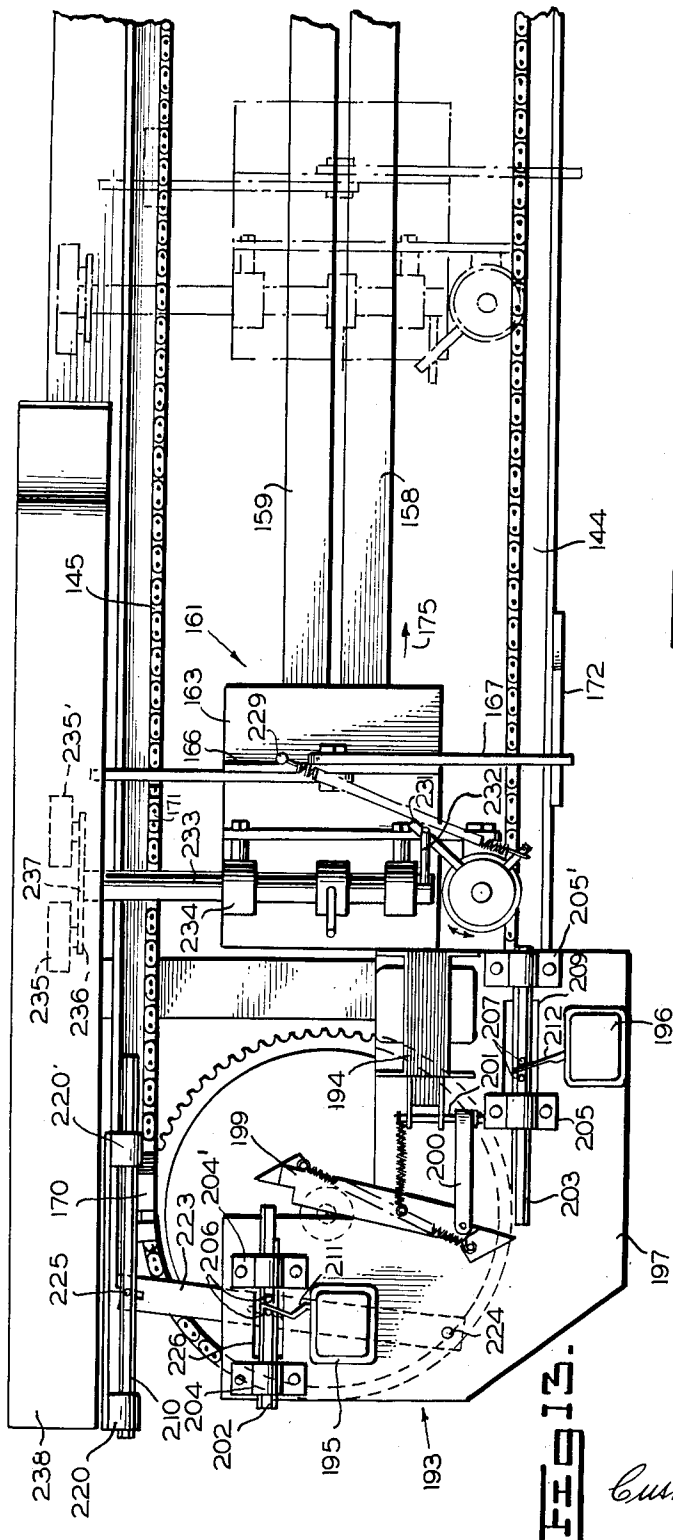


Fig. 13.

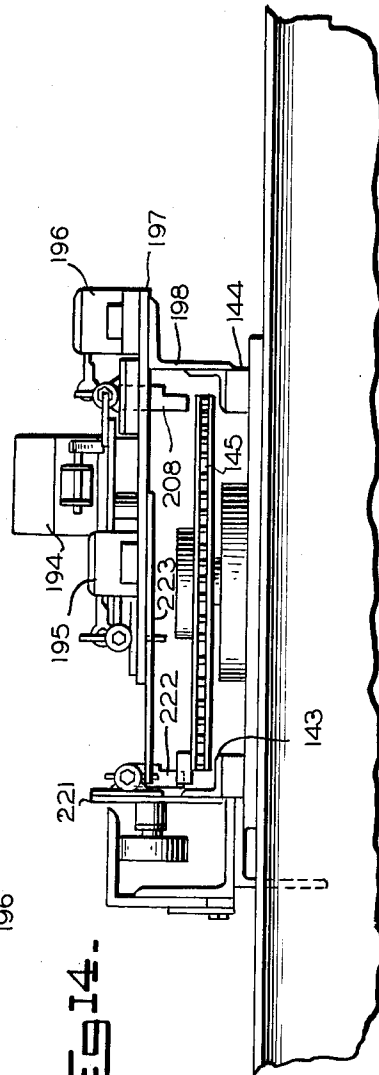


Fig. 14.

INVENTOR.
RAY C. DEMLER

BY

Cushman, Parly & Cushman
ATTORNEYS

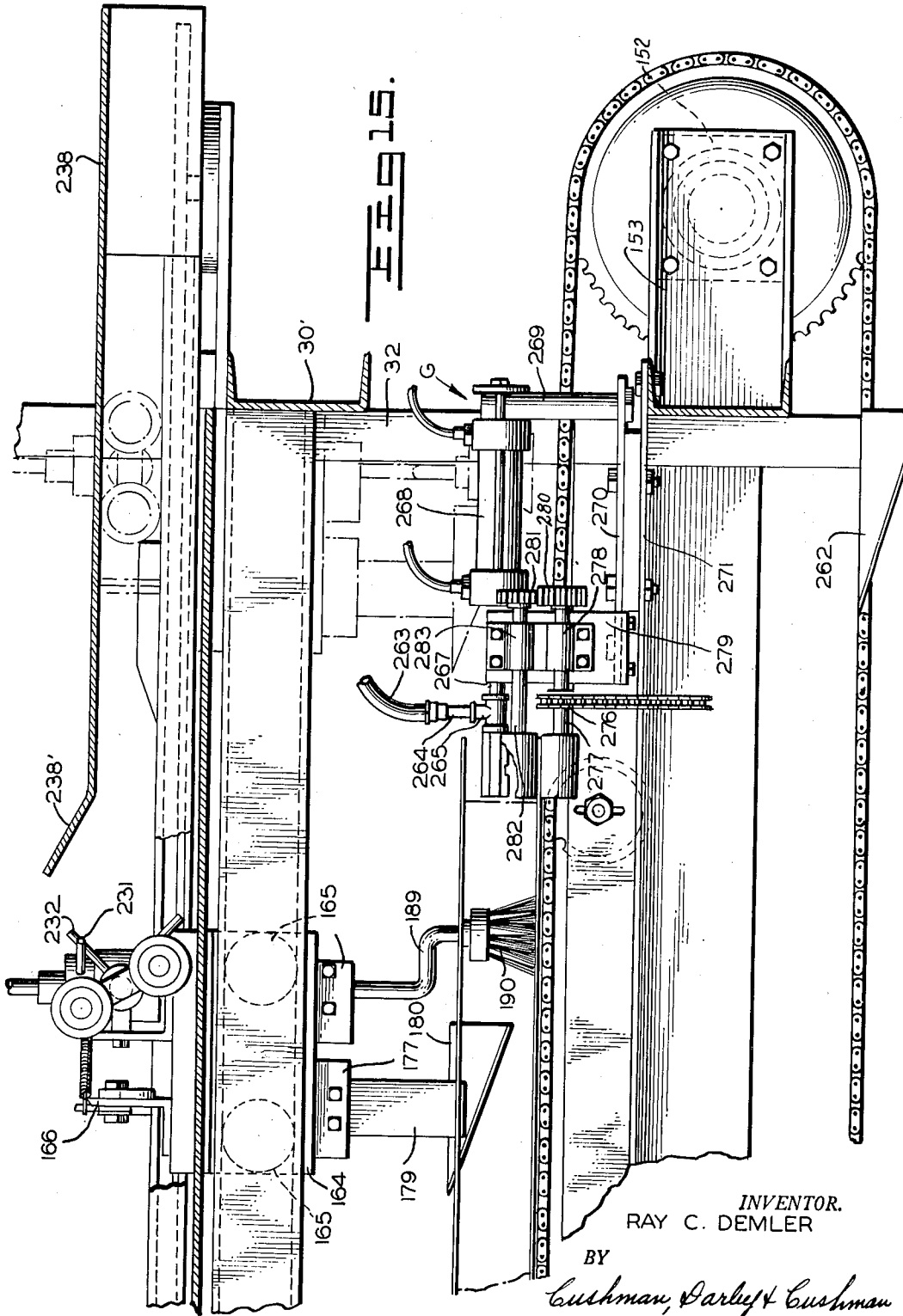
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 11



INVENTOR.
RAY C. DEMLER

BY

Cushman, Darby & Cushman
ATTORNEY

March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 12

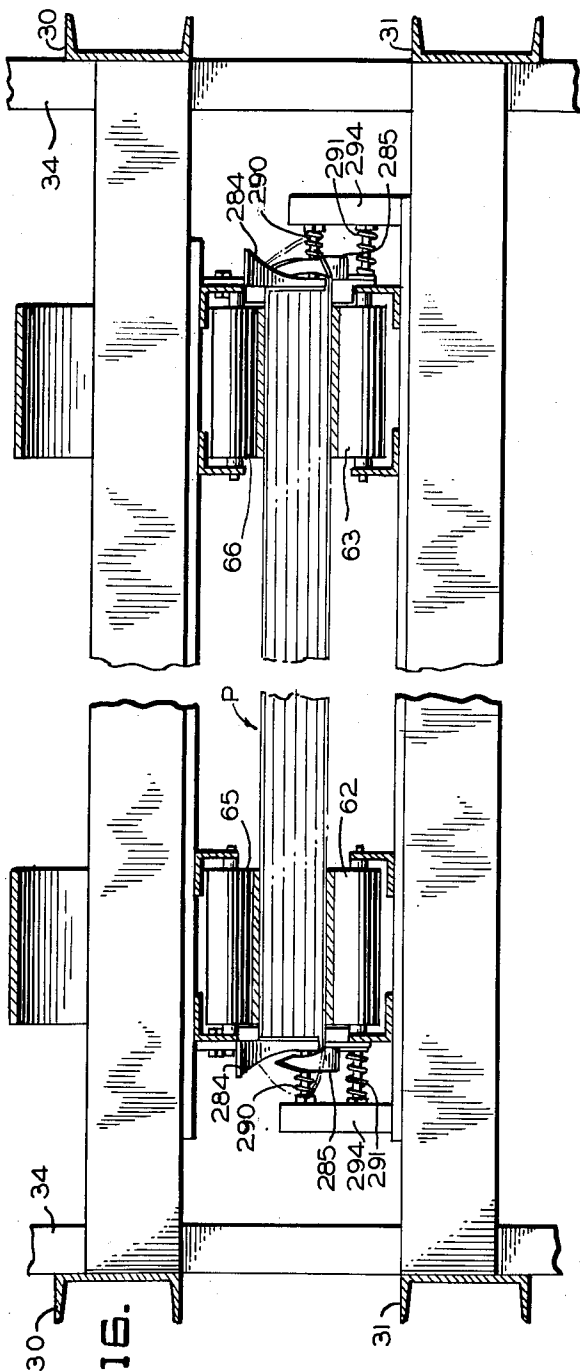


FIG. 16.

FIG. 18.

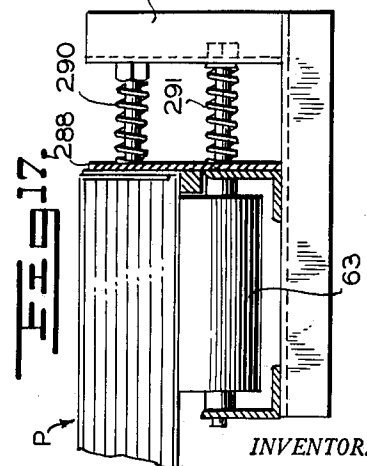
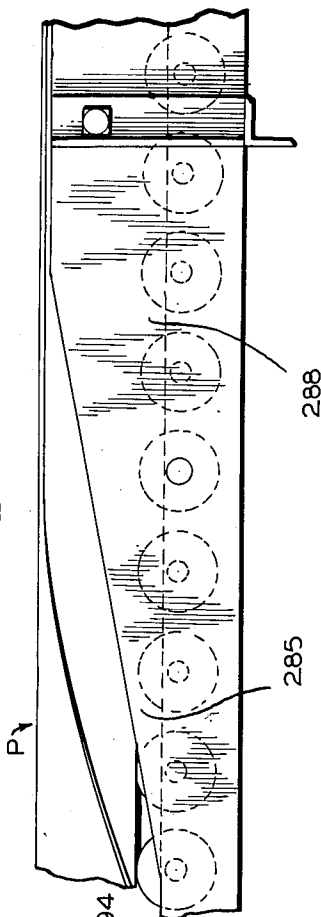


FIG. 17.

INVENTOR.

RAY C. DEMLER

BY

Cushman, Darby & Cushman
ATTORNEYS

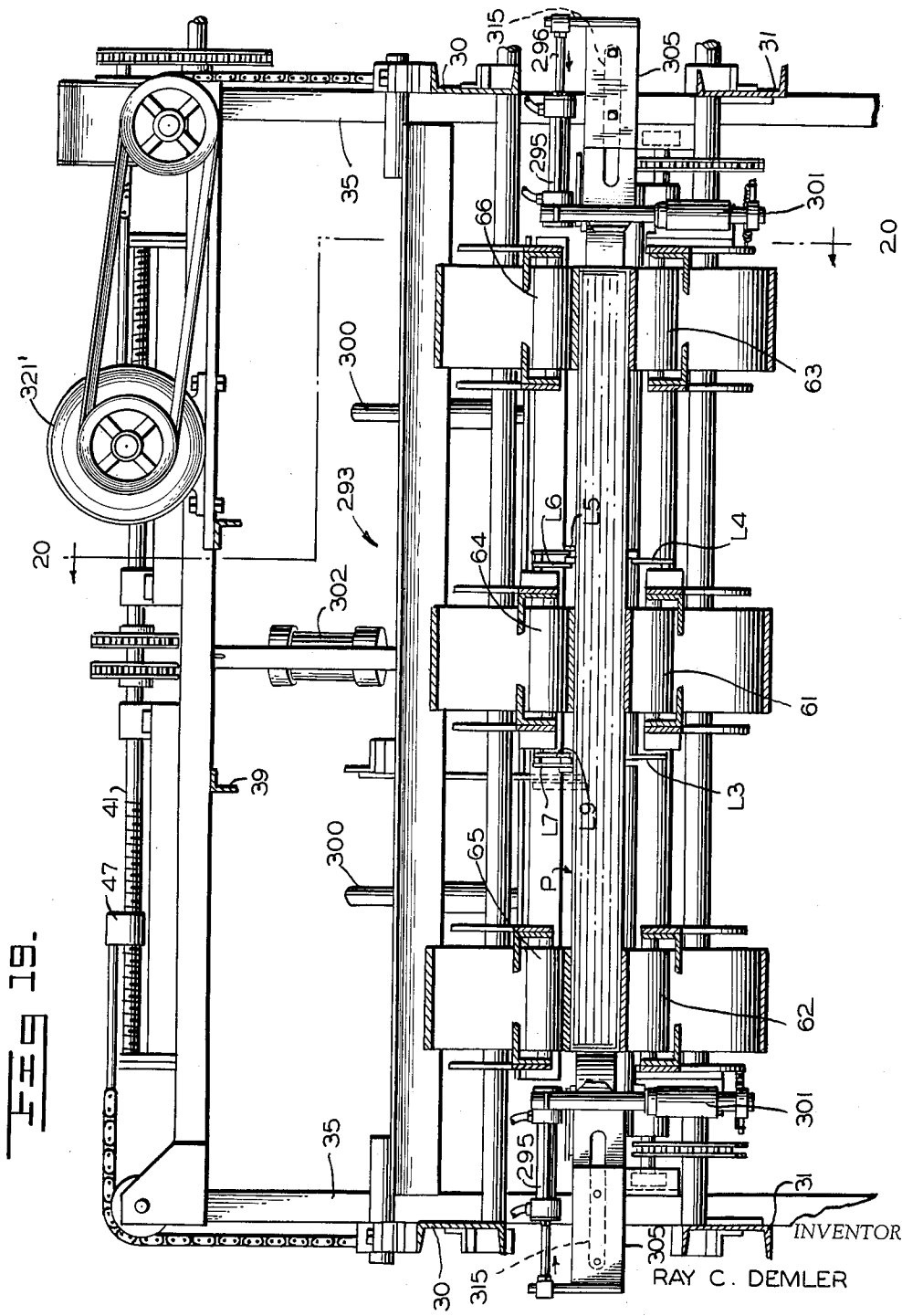
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 13



BY *Cushman, Darby & Cushman*
ATTORNEY

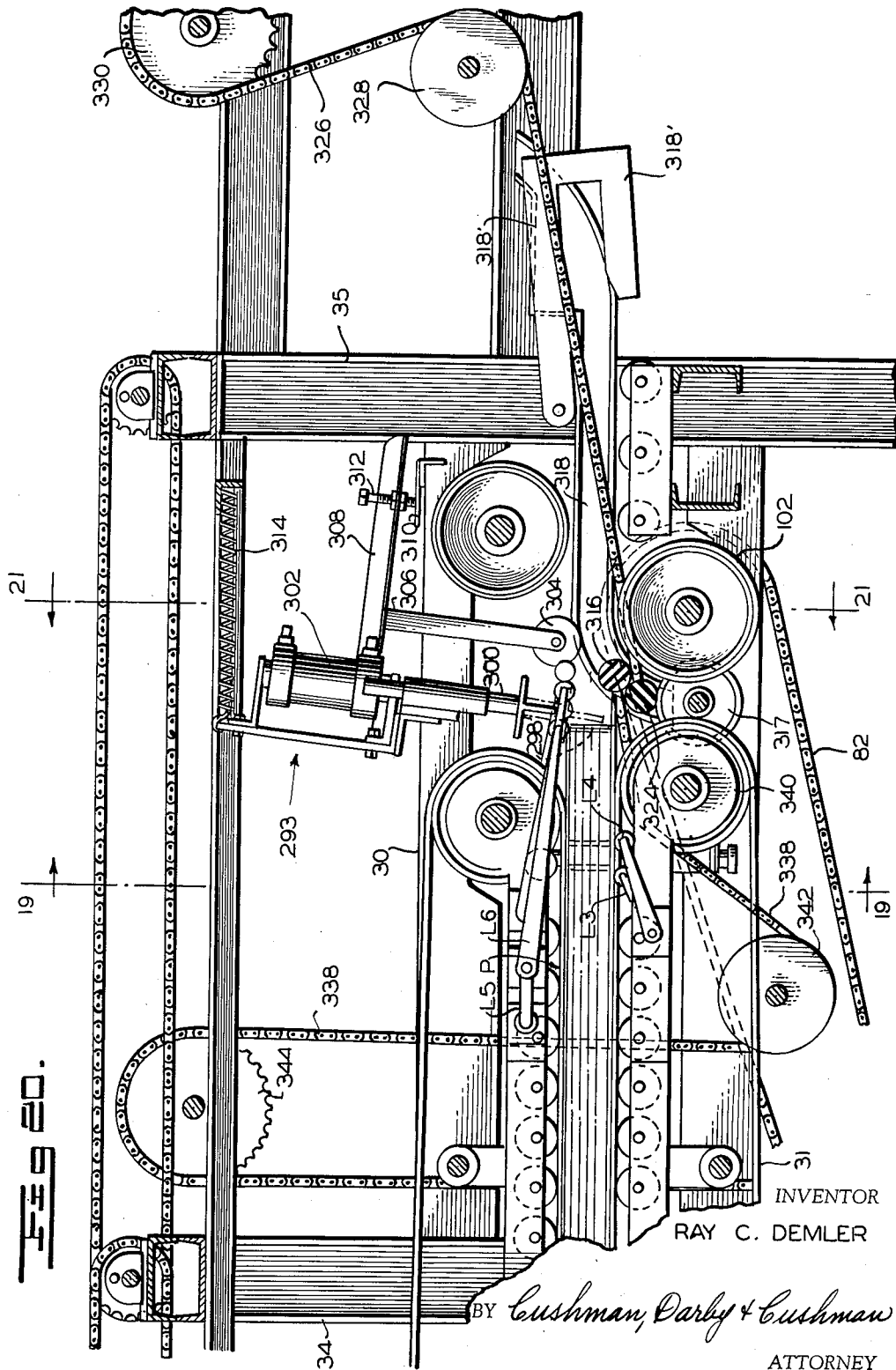
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 14



INVENTOR
RAY C. DEMLER

BY *Cushman, Darby & Cushman*

ATTORNEY

March 6, 1956

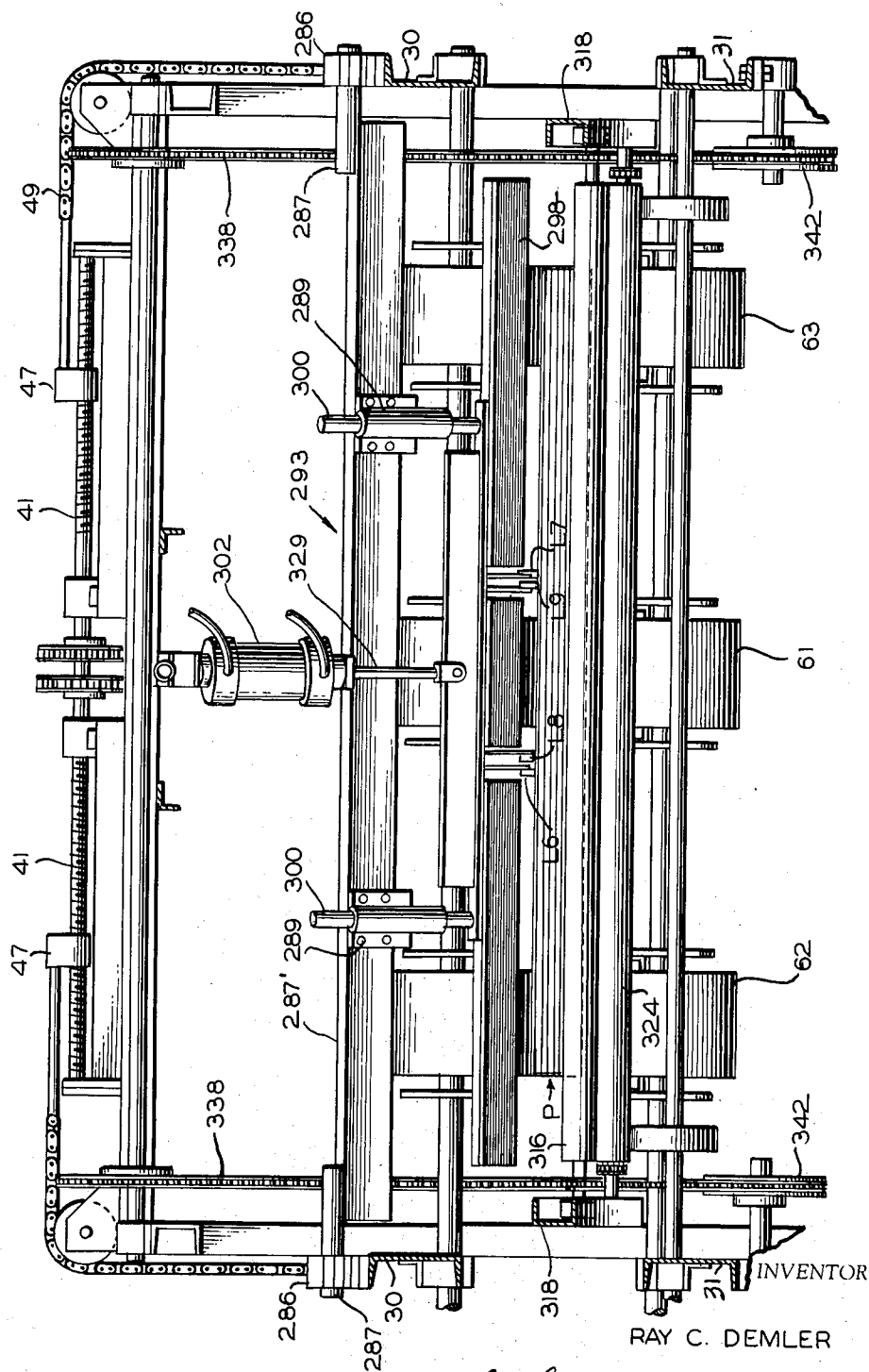
R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 15

Fig. 21.



INVENTOR
RAY C. DEMLER

BY *Cushman, Darby & Cushman*
ATTORNEY

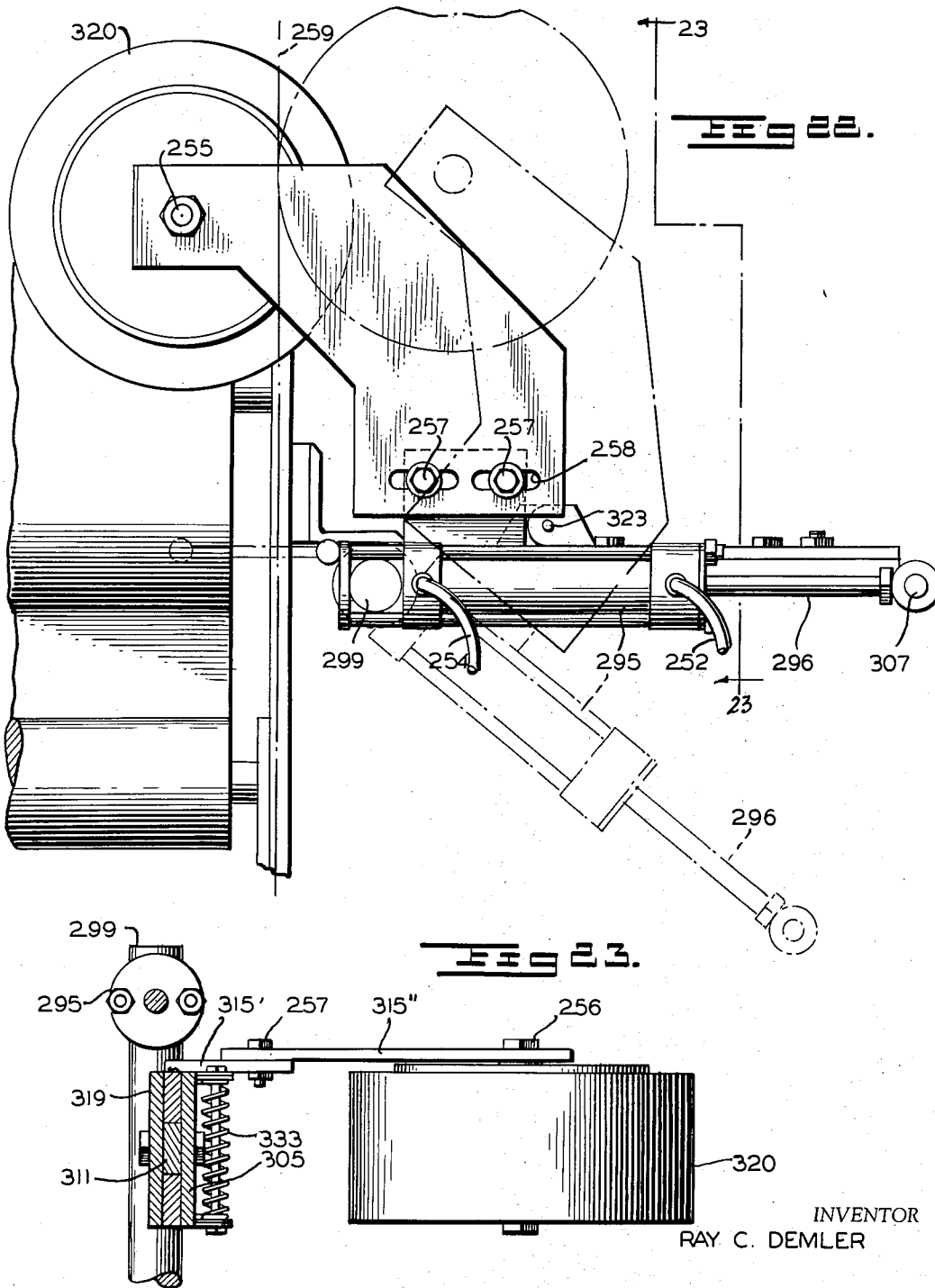
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 16



INVENTOR
RAY C. DEMLER

BY *Cushman, Darby & Cushman*
ATTORNEY

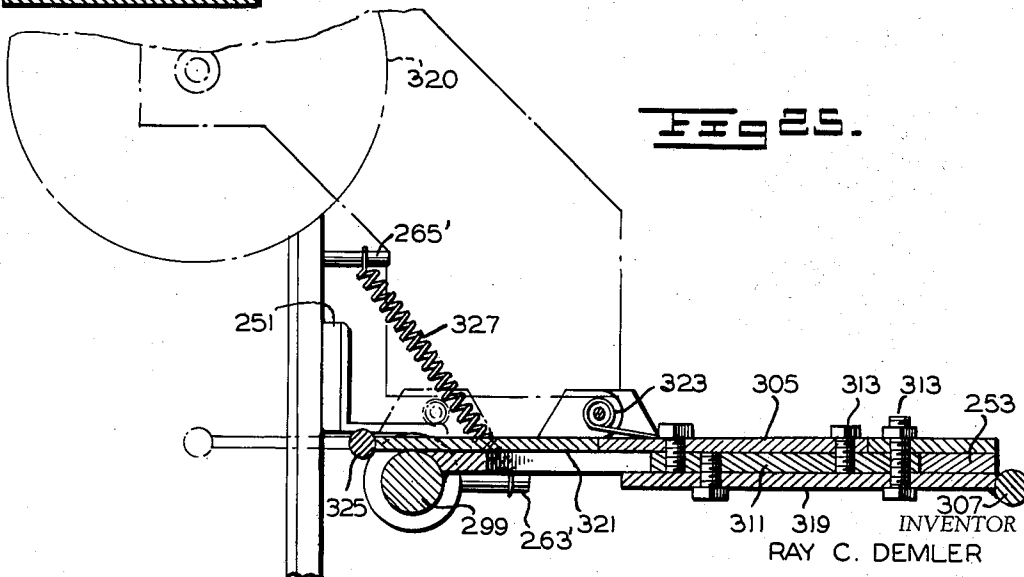
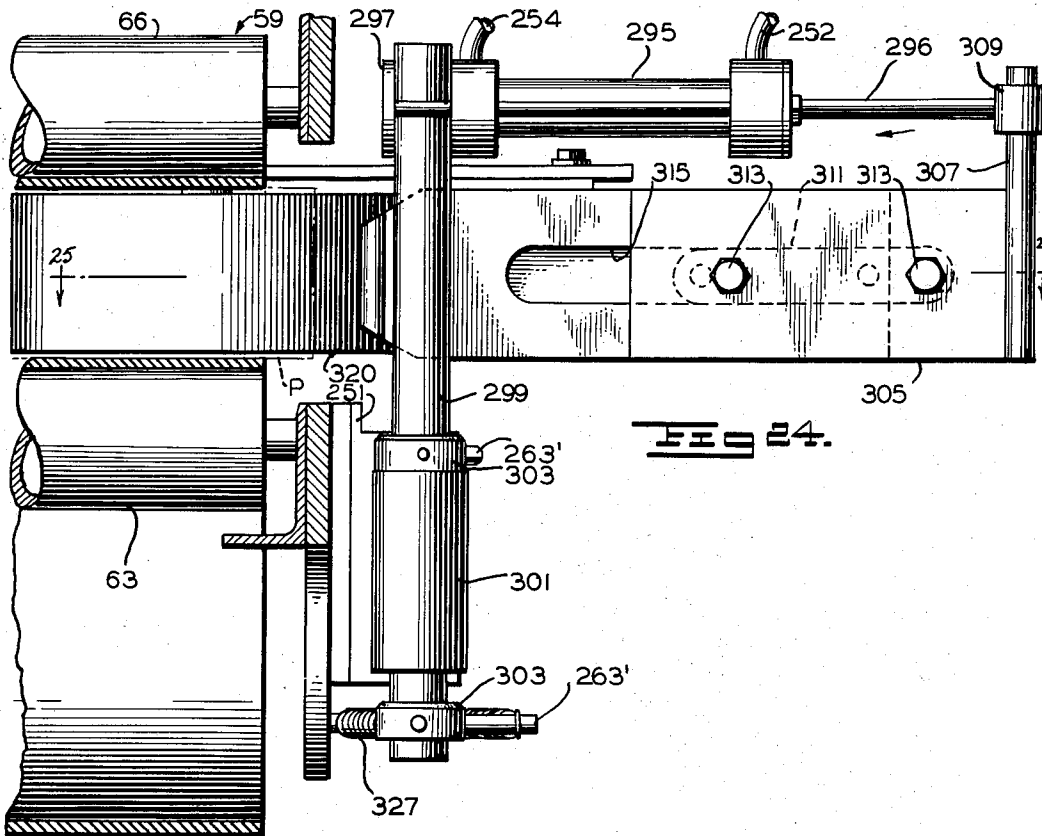
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 17



BY *Cushman, Darby & Cushman*
ATTORNEY

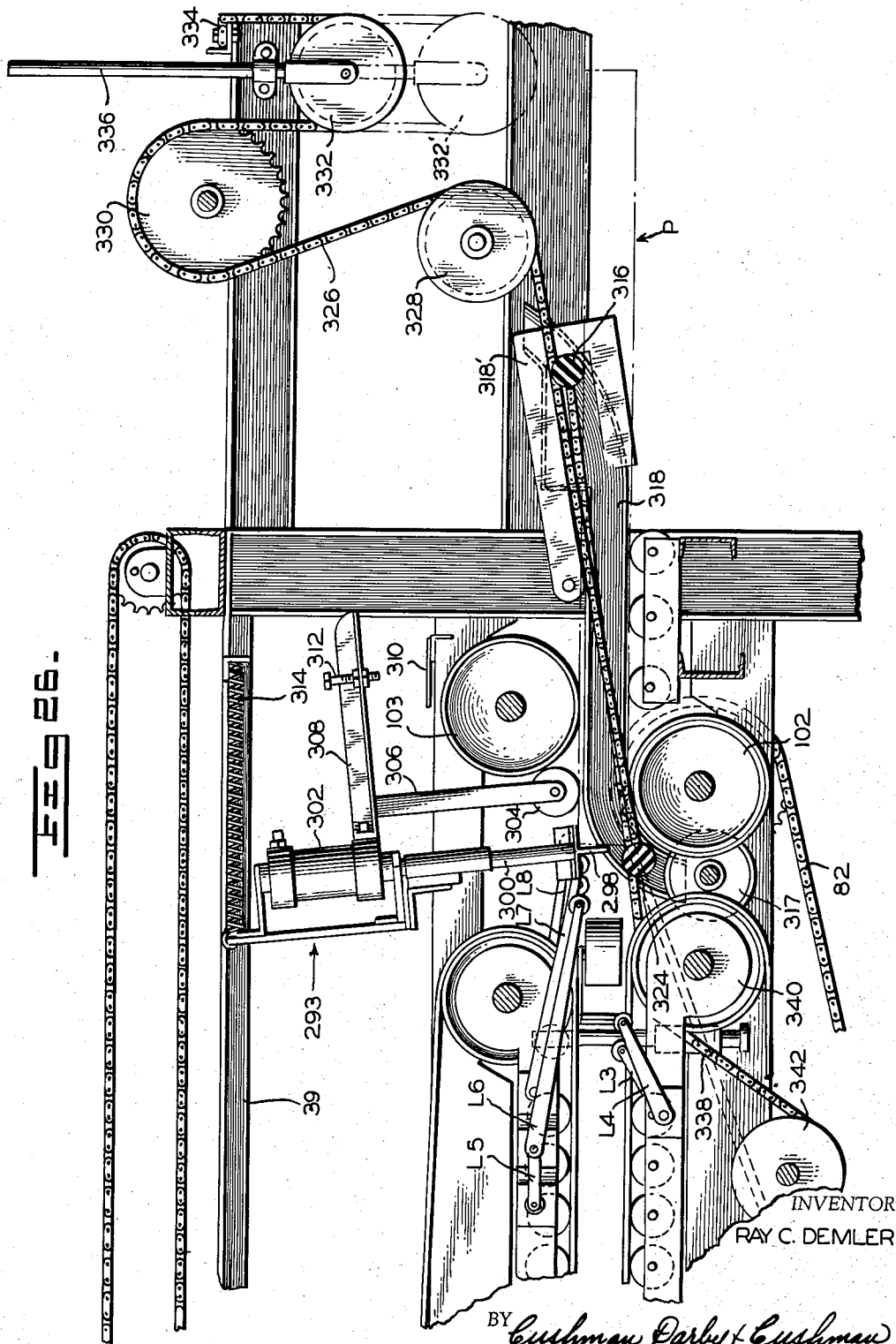
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 18



INVENTOR
RAY C. DEMLER

BY *Cushman, Parly & Cushman*
ATTORNEY

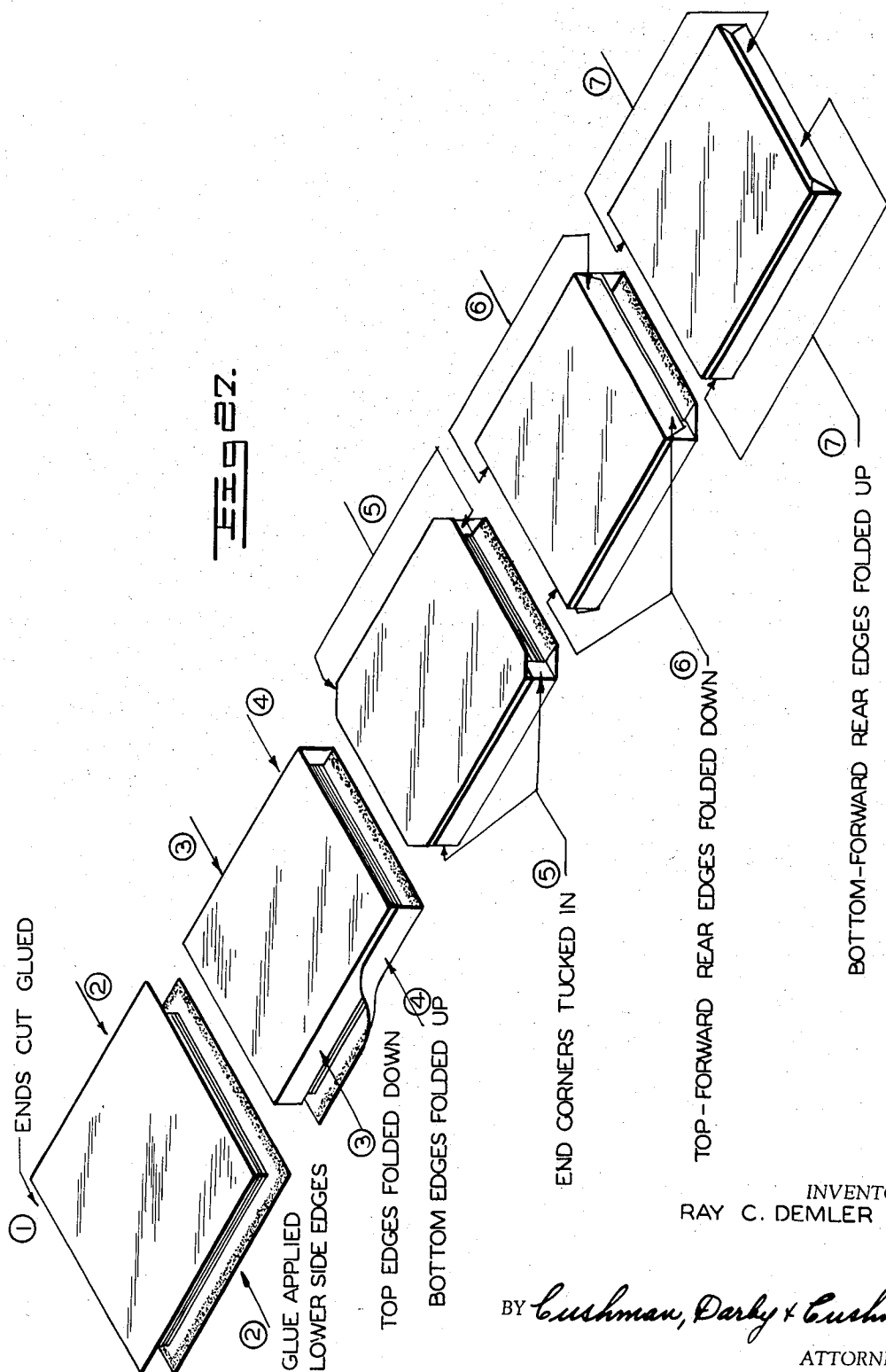
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 19



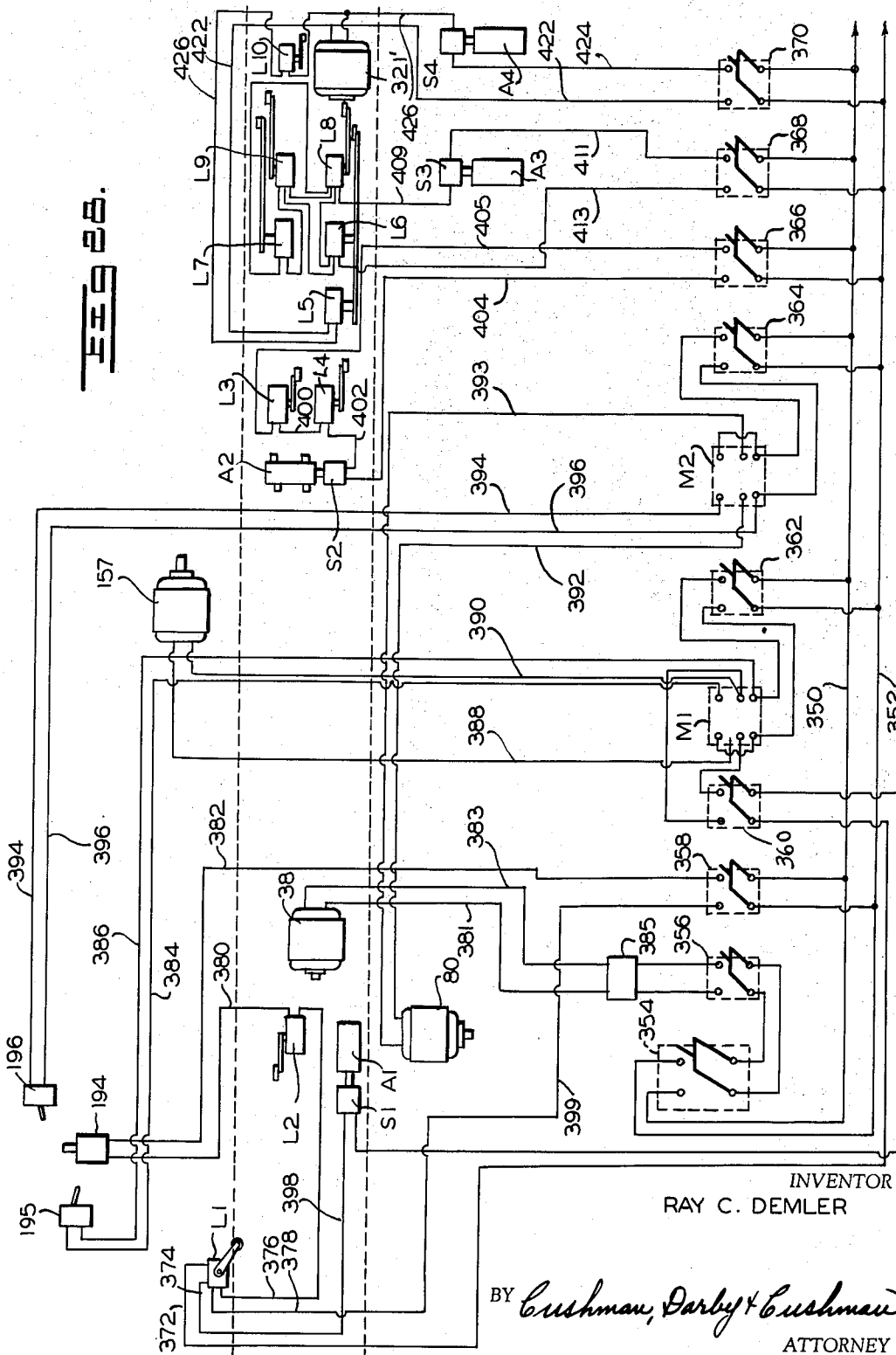
March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 20



March 6, 1956

R. C. DEMLER
PACKAGING MACHINE

2,737,002

Filed Dec. 1, 1950

21 Sheets-Sheet 21

FIG 29.

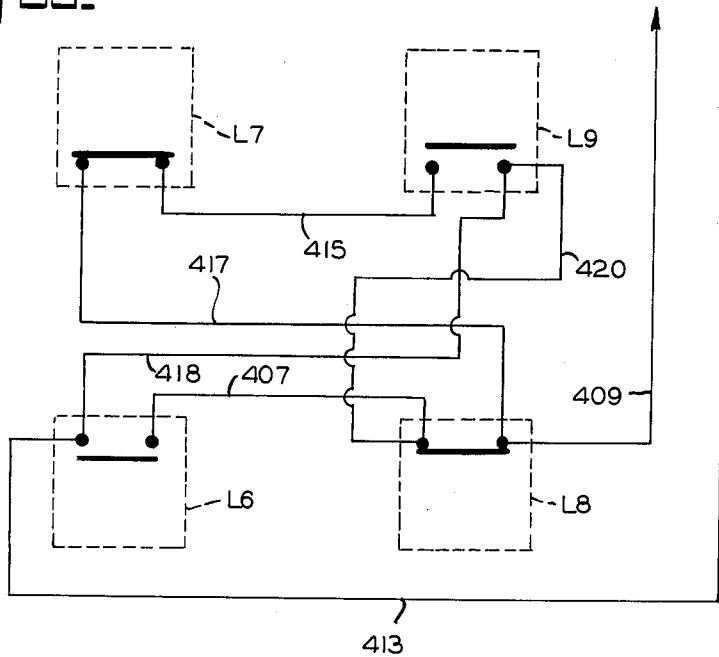


FIG 30.

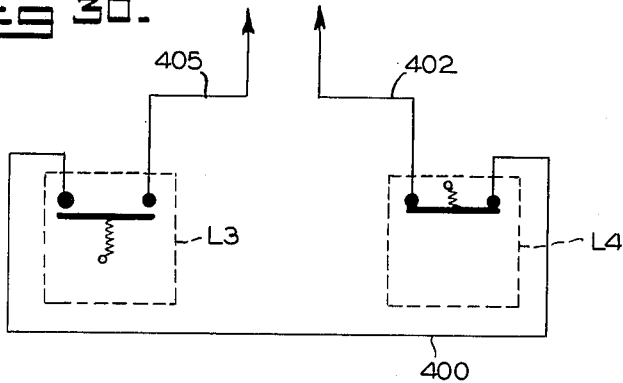
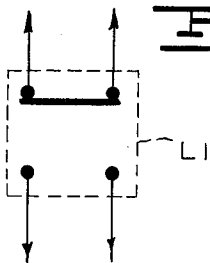


FIG 31



INVENTOR
RAY C. DEMLER

BY *Cushman, Parby & Cushman*
ATTORNEY

1

2,737,002

PACKAGING MACHINE

Ray C. Demler, Tacoma, Wash., assignor to International Packaging Corporation, Tacoma, Wash., a corporation of Washington

Application December 1, 1950, Serial No. 198,711

18 Claims. (Cl. 53—102)

This invention relates to a machine of the straight line type for forming sheet material into bundles or packages and has reference more particularly to apparatus for packaging or wrapping a plurality of superimposed sheets of material, such as plywood, wall board, plaster board, etc.

In the building industry a number of wall boards, plaster boards and plywoods have been developed for use in construction work and related fields. These sheets are usually manufactured in large rectangular pieces, which have been found very difficult to prepare for shipping and handling. In general, boards of this type are shipped with a plurality of such boards in a single package, and an object of this invention is to provide means for forming these boards into compact, tight bundles which may be readily handled and transported.

A further object of this invention is to provide a machine for wrapping a stack of such sheet material in a rapid, efficient, and entirely automatic manner.

A still further object of the invention is to provide a machine which may be adjusted to accommodate sheets of different widths and lengths and bundles of different heights.

Other objects and advantages of this invention will become apparent.

In proceeding according to the principles of the present invention, a stack containing a predetermined number of sheets of material is placed in superimposed relation at the receiving end of the machine and is thence fed automatically forward in the machine to a predetermined point where instrumentalities become automatically actuated to place a top and bottom sheet of wrapping paper, apply glue to both ends and the sides of the bottom sheet of wrapping paper and to fold the top and bottom sheets in a neat and compact manner.

In the accompanying drawings I have illustrated suitable apparatus for proceeding according to the method of the present invention, but it is to be understood that the form shown in the drawings exemplifies the preferred embodiment only.

In the drawings:

Figure 1 is a side elevational view of the entire machine.

Figure 2 is a top plan view of the entire machine.

Figure 3 is an enlarged side elevational view of the forward section of the packaging machine.

Figure 4 is an enlarged detailed section taken along the line 4—4 of Figure 2.

Figure 5 is an enlarged side elevational view of the rear section of the machine.

Figure 6 is an end elevational view.

Figure 7 is a detailed vertical section taken along line 7—7 of Figure 3 showing the adjustable frame features thereof.

Figure 8 is an enlarged fragmentary plan view showing the traversing adjustable features of the conveyor rollers.

Figure 9 is a detailed vertical section taken along line 9—9 of Figure 3 and illustrates the end gluing and side gluing and paper cutting mechanisms.

Figure 10 is a fragmentary top plan view of Figure 9.

2

Figure 11 is an enlarged detailed sectional view taken along line 11—11 of Figure 10.

Figure 12 is a vertical sectional view taken along line 12—12 of Figure 11.

Figure 13 is an enlarged fragmentary plan view of the end gluing mechanism and the control mechanism thereof.

Figure 14 is an end view of Figure 13.

Figure 15 is an enlarged detailed vertical sectional view taken along line 15—15 of Figure 11 showing the end and side gluing mechanisms and the end cutting mechanisms thereof.

Figure 16 is a vertical sectional view taken along line 16—16 of Figure 3 and illustrates the side folding plates.

Figure 17 is an enlarged detailed sectional view taken along line 17—17 of Figure 3 and illustrates one of the side folding plates.

Figure 18 is an enlarged fragmentary side elevational view of Figure 16.

Figure 19 is an enlarged vertical sectional view taken along line 19—19 of Figure 1 and illustrates the corner tucking mechanisms.

Figure 20 is a vertical sectional view taken substantially along line 20—20 of Figure 19 and illustrates the end folding and sealing mechanisms.

Figure 21 is a vertical sectional view taken substantially along line 21—21 of Figure 20 and illustrates an end elevational view of the end folding and sealing mechanisms.

Figure 22 is an enlarged fragmentary plan view of one of the corner tucking mechanisms showing its alternate position in chain lines.

Figure 23 is a transverse section taken along line 23—23 of Figure 22.

Figure 24 is an enlarged detailed end elevational view with parts in section showing one of the front vertical side tucking mechanisms.

Figure 25 is a horizontal sectional view taken along line 25—25 of Figure 24.

Figure 26 is a vertical sectional view similar to Figure 20 and illustrates the alternate positions of the end folding and sealing mechanisms and their associated elements.

Figure 27 is a diagrammatic showing of the various progressive steps in the handling and wrapping of a package.

Figure 28 is a schematic layout of the motors, solenoids, and their associated actuating switch means relative to the path of travel of the package through the machine along with their associated leads.

Figure 29 is a schematic wiring hook up for the limit switches controlling the top front and rear folding mechanism.

Figure 30 is a schematic diagram of the wiring hook up for the limit switches controlling the paper cutting and end gluing carriage.

Figure 31 is a schematic wiring diagram for one of the limit switches controlling the motion of the conveyor.

The machine structure comprises a framework of channel irons for the purpose of supporting the associated mechanisms. The frame comprises a double pair of horizontal, parallel channel members, generally indicated at 30 and 31, and a plurality of vertical supporting members 32, 33, 34, and 35 which are connected to the horizontal members 31 by any suitable means, such as bolting or welding. The horizontal members 30 are adjustably mounted for vertical up and down movement relative to the upright supporting members 32, 33, 34, and 35 to accommodate different sized packages.

The fixed horizontal members 31 and the vertically adjustable horizontal members 30 have secured to their front ends the cross members 36 and 37 (Figure 7). Other similar cross members are employed to form a spaced rectangular supporting area for a conveyor mecha-

nism for moving the material to be packaged between the movable and the fixed horizontal members.

The upper adjustable horizontal member 30 may be lowered or raised in order to accommodate different sized packages by the following arrangement of parts, which will now be described.

Reversible motor 38 is attached to horizontal supporting members 39, disposed above the vertically adjustable members 30. This motor, through a suitable gear reduction box 40, drives a series of transverse shafts 41, disposed at the upper ends of the upstanding channel members 33, 34, and 35. Each of these transverse shafts is supported upon suitable transverse channel members 42, 43, and 44 (Figures 2 and 7). Each of the shafts 41 is medially driven by means of suitable chains and sprockets, indicated at 45 and 46, from the gear reduction unit 40. Thus, it will be seen that upon actuation of the reversible motor 38 through reduction unit 40, the transverse shafts 41 will be rotated in a clockwise or counterclockwise direction through the sprocket and chain arrangement 45 and 46, as illustrated in Figures 1, 2, 3, 5, and 7.

Each of the transverse shaft members 41 is oppositely threaded on its outer ends and carries internally threaded bushings 47, which are connected by means of rods 48 to chain members 49, which are led over suitable sheaves 50 journaled on the upper ends of the upright channel members 33, 34, and 35. The chain members 49 are secured to the adjustable horizontal members 30 by means of suitable rods 51. When it is desired to wrap packages of different depths, the upper frame member with its associated conveyor mechanism, defined by the horizontal members 30, can be readily raised or lowered to accommodate the different sized bundles by means of this arrangement. It will be seen that through actuation of the reversible motor 38 by means of switch 356, mounted on the main switch panel (Figure 28), in one direction through reduction gear unit 40 and then through the above described chains and sprockets the transverse shafts 41 will be rotated in one direction, either clockwise or counterclockwise, as the case may be, and the bushings 47 will be driven in or out to thereby raise or lower the horizontal members 30 by means of the connecting chains 49.

Between the area defined by upstanding members 32 and 33, the horizontal fixed members 31 and the adjustable horizontal members 30 are offset or spaced outwardly from these said members, as shown at 30' and 31'. To support this offset area and move members 30' in synchronism with members 30, a chain 52 is connected to the forward and lower offset portions of 30' by means of a bolt 53. The chain 52 extends downwardly and into engagement with a sprocket 54 rotatably mounted on the inner surface of the fixed offset portions 31' and extends forwardly to a second sprocket 55, also rotatably connected to the inner surface of 31', and then extends upwardly to a third sprocket 56 rotatably mounted on a bracket 57 which is secured to the upstanding column 32. Chain 52 is then led downwardly and secured to the upper portion of the adjustable offset member 30' at 58 (Figure 3).

From the foregoing description it will be understood that the above described adjusting means for the offset portion 30' merely provides a further support for the end portion of the members 30', and the members 30' and 30 are integrally secured, as are the fixed horizontal members 31 and 31'.

As the horizontal member 30 is lowered by means of the raising and lowering means R the offset portion 30' will, likewise, be lowered by means of the chain 52, rotatably secured to sprockets 54, 55, and 56 and secured to the member 30' at 58.

A further adjusting means is provided for varying the width of the conveyor structure. When different widths

of material to be packaged are inserted on the conveyor mechanism a means is provided to properly align the outer edges of the package with the outer edges of the conveyors. When adjustment of the conveyors for the different widths of packages is made, the associated mechanisms for gluing and wrapping will, likewise, be accordingly adjusted.

The mechanism for effecting transverse adjustments in the width of the conveyors comprises, as explained above, moving the positions, inwardly or outwardly, of the upper and lower outer sets of conveyor rollers which move the goods to be packaged through the machine.

The conveyor system comprises three spaced lower endless belts, indicated generally at 59, and three spaced upper endless belts, indicated generally at 60, as will be seen in Figure 7. The lower set of conveyor belts, generally designated at 59, consists in a fixed center conveyor 61 and laterally adjustable conveyors 62 and 63. The upper set of conveyors, generally designated at 60, are similarly provided with a fixed center conveyor 64 and laterally adjustable outer conveyors 65 and 66. From the foregoing it will be seen that, while the lower set of conveyors, generally designated at 59, are laterally adjustable, the upper set, generally designated at 60, may be moved laterally with respect to each other and also may be raised with respect to the lower set of conveyors.

The means for varying the width of the conveyors will now be described. The horizontal members 30 and 31 are provided with transverse adjusting screws 67 and 68 on the horizontal member 30, and similar means are provided on the horizontal member 31, as shown at 69 and 70 in Figure 1. As can be seen in Figure 8, the threaded member 67 is secured to the members 30 by means of bearing blocks 71 and 72. The threaded member 67 is oppositely threaded at its outer ends to receive internally threaded bushings 73 and 74 which are, in turn, secured to the outer flanges of the conveyors 65 and 66, as shown at 75 and 76. One end of the screw member 67 is provided with a crank or handle 77 for the purpose of rotating said screw members. The opposite end of this member is provided with a sprocket 78 and a chain 79 which extends horizontally along channel member 30 to a similar sprocket (not shown) associated with a similar threaded shaft 68 (Figure 1). It will be seen that upon rotation of the crank handle 77 and the threaded member 67, the internally threaded bushings 73 and 74 will be oppositely displaced, thereby moving the outer conveyor members 65 and 66 at their forward ends by means of the sprocket and chain arrangement 78 and 79, which also moves the rear sections of the conveyors 65 and 66 by means of the chain 79. The threaded members 69 and 70, located on the fixed horizontal member 31, are provided with a similar arrangement of parts, as described above.

From the foregoing, it will be apparent that the conveyor mechanism is adjustable both vertically and laterally to accommodate packages of different height and width which it is desired to wrap.

In wrapping the packages of sheet material, a top and bottom sheet of wrapping paper is first placed over and under the package after which the paper is cut and glued at its forward and rear edges by means of a suitable transverse gluing and cutting mechanism, and after which a retractable side gluing mechanism applies a narrow strip of glue or adhesive material to the top surface of the lower piece of wrapping paper on its outer side edges, and from there the package travels by means of the conveyors just described to side folding plates where the top side edge of paper is first folded down on its outer edges after which the glued portion of the bottom sheet is folded upwardly and held into close engagement with the sides of the package to assure proper adhesion. As the article or package continues its travel through the conveyors, a side tucking or folding mechanism is actuated

at the forward and rear edges of the package in order to fold in the vertical side edges of the protruding sections of wrapping paper to form a tucked arrangement after which an end folding unit, in the nature of a "T-bar" arrangement, folds down the top end, forward and rear edges. Upon completion of this fold, the package then engages an end sealing unit which folds up the bottom end, forward and rear edges, and the completed wrapped package is discharged from the machine. The means for performing these operations will now be described in more detail.

A main drive motor 80 is provided for driving conveyors 59 and 60 and also the package receiving rolls 112' and 119' (Figure 4) which are mounted on suitable channel irons beneath the conveyor structure. The motor 80, through a gear reduction unit 81, drives a sprocket chain 82 which, in turn, drives a sprocket wheel 83 which is journaled on the lower fixed horizontal member 31 at its rear end (Figure 5). This provides a main drive connection for the entire conveyor system. The main drive sprocket 83 is secured to a transverse shaft 84 which extends across the machine beneath the conveyor mechanism through suitable journal boxes secured to the opposite horizontal members 31. On the opposite side of the machine from the drive sprocket 83 and secured to the shaft 84 is a sprocket 85 and chain 86. Chain 86 extends forwardly and into engagement with a similar sprocket 87 fixed to a transverse shaft 88 which, in turn, drives the lower conveyors, generally designated at 59. Located adjacent the sprocket 87 is a similar sprocket 89 which engages a chain 90, which extends upwardly and forwardly into engagement with a sprocket 91 to effect a counterclockwise motion to a transverse shaft 92 which provides the driving means for the upper conveyors, generally designated at 60. The chain 90 extends downwardly and rearwardly from sprocket 91 into engagement with an idler sprocket 93 and is then led forwardly to a spring tensioned sprocket 94 rotatably mounted on the outer face of a sliding block 95 (Figure 5) which is slidably secured to guide rails 96 secured to the upper horizontal member 30. A spring 97 secured to the member 30 and to the block 95 provides a tensioning means for the chain 90.

Located adjacent the sprocket 91 is a similar sprocket 98 and chain 99, said chain extending rearwardly and into engagement with a sprocket 100, fixed to a transverse shaft 101, which provides an extension of the upper conveyors to handle the package at the discharge end of the machine.

From this description, it will be seen that the motor 80 and the gear reduction unit 81 provide a driving means for the upper and lower conveyor units, generally designated at 59 and 60 and the end discharge rollers 102 and 103.

The upper conveyors, generally designated at 60, are driven by the sprocket 89 which is located adjacent the sprocket 87 and fixed to the transverse shaft 88. The sprocket 89 receives the tensioned chain 90 and extends upwardly and forwardly into engagement with the sprocket 91 transmitting a counterclockwise rotation to the transverse shaft 92 which provides the driving means for the upper conveyor, generally designated at 60. Adjacent the sprocket 91 and fixed to the shaft 92, the sprocket 98 and chain 99 provide the driving means for the upper extension discharge rollers 103 through sprocket 100, fixed to shaft 101.

A further driving means from the motor 80 through the reduction gear unit 81, is provided by means of a chain 104 extending forwardly from the gear reduction unit to a sprocket 105 which is secured to the outer end of a transverse shaft 106, journaled to the upright members 33, within the bearing blocks 107 and 108 beneath the horizontal fixed frame members 31.

A sprocket 109 (Figure 7), fixed on the transverse shaft 106, is located next to the sprocket 105 and provides

a driving means for a chain 110 which extends forwardly and upwardly to a sprocket 111, fixed to a transverse shaft 112 (Figure 6). The transverse shaft 112 is provided with suitable bearings 113 at its outer ends, and the said bearings are secured to the upper flange of the horizontal fixed channel members 31'. The shaft 112 has secured thereto the lower package receiving roller 112'. The lower paper feed roller 114' is located rearwardly of the roller 112' and is similarly mounted in bearing blocks 115 on the horizontal fixed member 31'. A driving means is provided from the driven shaft 112 to the shaft 114 by means of a sprocket 116 in engagement with a chain 117 to a sprocket 118, fixed to the shaft 114.

Similar shafts 119 and 120 and bearings 121 and 122 are provided on the lower flange of the upper horizontal member 30', as shown in Figures 3 and 4, to provide upper package receiving and paper feed rollers 119' and 120' respectively for introducing the material to be packaged into the conveyor system.

The above-described receiving and conveying system provides motivating means for moving the goods to be packaged from the entrance of the machine to the point of discharge.

Prior to the introduction of the package to be wrapped, it is first necessary to manually thread paper from the webs or rolls A and B around the upper paper feed roll 120' and lower roll 114' to provide the upper and lower wrapping sheets for the package. The means for doing this will now be described.

Referring to Figures 1, 3, 4 and 6, the upstanding members 32 are provided adjacent their lower and upper ends with extending bracket members 123 and 124 to support shafts 125 and 126, suitably journaled in bearings 127 and 128 mounted on the forwardly extending brackets 123 and 124. The shafts 125 and 126 are adapted to carry rolls of paper, generally designated at A and B, and the rolls of paper A and B are held in proper alignment on their respective shafts by means of collars 129. The leading edge of the roll A, shown at 129', is manually threaded downwardly over a roller 130, suitably mounted in bearing blocks 131 on a rearward extension of the bracket 124. The leading edge 129' of the roll A is then threaded downwardly and around the paper feed roller 120'. A holding device is provided by means of downwardly extending arms 132, pivotally mounted to the horizontally adjustable side members 30' to hold the paper 129 firmly against the feed roll 120'. The arms 132 are provided at their lower ends with a transverse shaft 133 extending the length of feed roller 120', which is spring-urged by spring 132' in the direction of roller 120'. The leading edge of the paper roll A is threaded between the transverse shaft 133 and the periphery of roller 120' to prevent the paper from being retracted or becoming loose. The leading edge 134 of the roll of paper, generally designated at B is, likewise, threaded upwardly and over a roller 135, journaled in bearings 136 fixedly mounted to brackets 137 on each side of the machine and which is bolted or otherwise secured to the upstanding members 32. The paper is then threaded upwardly and over roller 114' and is held by frictional contact between shaft 133' and feed roller 114'. Arms 138 hold shaft 133' and are spring-urged by springs 138'.

As the leading edges 129 and 134 of the respective rolls A and B are threaded over the feed rolls 120' and 114', a sufficient excess of paper is allowed so as to permit a front overlapping fold at the front end of the package. As the initial package P of a group to be packaged is introduced into the machine, the upper surface of the edge 134 of the paper roll B is provided with a coat of glue or other adhesive material by means subsequently to be described. Thus, it will be seen that, as the glue is applied to the upper edge 134 and the conveyor mechanism is actuated, the package will be carried forward

and, while moving forward, will make sufficient frictional contact with the upper feed roller 120' and the lower feed roller 114' to pay out paper from the rolls A and B in proportion to the advanced motion of the material to be wrapped.

As the package advances and paper is deposited on the top and bottom surfaces of the stack, and the rear edge of the package reaches a point where sufficient paper has been payed out to allow an overlapping fold for the rear of the package, the conveyors are stopped, thus halting the forward travel of the package on the conveyors. The package is stopped at a point so that the transverse gluing and cutting mechanism can cut the top sheet, apply glue to the bottom sheet and then cut the bottom sheet medially of the glue line, in that order.

To prevent excess paper from being payed out from the rolls A and B when package P stops, as above described, air actuated brakes are provided for the rolls A and B, as seen in Figure 3. Means subsequently to be described, actuated by the movement of the package P, controls the air pressure leading to flexible lines 141' and air cylinder 143' so that when package P stops, the piston rod 146' is forced down, causing brake shoes 153' to grip wheels 156' which are keyed to the shafts 125 and 126, to thereby prevent further movement of the rolls A and B until package P again starts moving forward.

The operation of the transverse cutting and gluing mechanism first cuts the top sheet 129, followed by an application of a glue line to the upper surface at the end of the lower sheet of paper 134, which is followed by the cutting of the lower sheet by a knife mechanism, designated generally at 139, which in its transverse travel cuts the paper medially of the lower glue line providing a glued surface for the rear of the initial package and a similar glued surface for the leading edge of the following package. The cutting and gluing mechanisms, designated at 139 and 140 will now be described in more detail.

Referring to the cutting and gluing apparatus, generally designated at 140 (Figures 3, 6, 9, and 10) a pair of plates 141 and 142 are welded or otherwise secured to the top flange of the horizontal adjustable member 39' and extend outwardly thereof to form a supporting surface to receive a pair of guide rails 143 and 144 to receive an endless chain 145, driven from sprockets 146 and 147 respectively on each side of the machine. A vertical shaft 148 (Figure 3) extends downwardly from the sprocket 146 and has secured at its lower end a bevel gear 149 in engagement with a similar bevel gear 150 secured to a horizontal shaft 151, suitably journaled in bearing blocks 152, which are, in turn, fixed to outwardly extending brackets 153, which are welded or otherwise secured to the fixed horizontal frame member 31'.

The horizontal shaft 151 has at its outer end or rearwardly extending end a sprocket 154 in engagement with a chain 155 extending downwardly to the gear reduction unit 156, in turn, is driven by a motor 157. Thus, it will be seen that upon actuation of motor 157, through the gear reduction unit 156, the shaft 151 is rotated by means of the sprocket and chain 154 and 155, and the vertical shaft 148, in turn, is rotated by means of the bevel gears 149 and 150. The rotation of the shaft 148 will cause the endless chain 145 to rotate in a clockwise direction as seen in Figure 10.

The vertical drive shaft 148 is provided with an elongated keyway in engagement with an internal key on the sprocket 146, so that sprocket 146 can move up or down on drive shaft 148, as the horizontal adjustable members 30' are raised or lowered.

Adjacent the upper edges of the horizontal adjustable members 30' are a pair of spaced channel irons 153 and 159, which extend transversely of the two sides 30' and are welded or otherwise secured thereto, as shown at 160 (Figures 11 and 12). These members provide a

track or guide for a traversing carriage for cutting and gluing the ends of paper. The carriage, generally indicated at 161, consists of a pair of channel irons 162 and a cover plate 163. Extending from carriage 161 is a bracket 164 which is secured between channel members 162 and has a plurality of beveled wheels 165, rotatably mounted thereon (Figure 11). The beveled wheels 165 are disposed on either side of the depending bracket 164 to ride within the channel irons 153 and 159. The spaced relation of the channel irons 153 and 159 provides an opening by which the depending bracket 164 may freely travel with the traversing carriage 161.

Fixedly secured to the cover plate 163 is an upstanding plate 166 adapted to receive a pair of outwardly projecting arms 167 and 168 (Figure 11) which are pivotally secured to the plate 166, as shown at 169, in order that the arms 167 and 168 may have free vertical movement.

The traversing movement of the carriage 161 is effected by the engagement of projecting lugs 170 and 171, fixed to the endless chain 145 with the arms 167 and 168. It will be noted that as the traversing carriage 161 is at its rest or inactive position, as shown in Figure 13, the arm 167 engages a cam surface 172 fixed to the side of the guide 144. Upon the engagement of the arm 167 with the cam surface 172 the arm 167 is brought to a raised position and at this time the oppositely disposed arm 168 is in a lowered position to engage the lug 170, fixed to the endless chain 145. The lug 171 precedes the lug 170 in its travel, and the outwardly extending arm 168 is cut away, as shown at 173 (Figure 11), to allow the free passage of the lug 171 through this cut out portion. The width of the lug 171 is approximately equal to that of the chain, while the lug 170 is of a width greater than the chain and will engage the portion 174 of the arm 168.

To impart movement to carriage 161 when the carriage is at its inactive or rest position motor 157 is started. Through the gear reduction unit 156 and through rotation of the shafts 151 and 148 the endless chain 145 will be rotated. The lugs 170 and 171 will be carried in a clockwise direction as seen in Figure 13, and the lug 170 will engage with the extending arm 168 from the traversing carriage to cause the carriage to be moved in the direction of the arrow 175 (Figure 13).

As the traversing carriage 161 reaches the opposite side of the machine, as shown in the dotted line in Figure 10, the outwardly projecting arm 168 will engage a cam surface 176 secured to the outside of the guide rail 143 and will be raised out of contact with the lug 170, and the motion of the carriage 161 will stop. As the endless chain 145 continues to rotate, carrying lug 170 around the sprocket 146 and into engagement with the lowered outwardly extending arm 167, the carriage 161 will be returned to the position shown in Figure 13 at which time the arm 167, again, engages the cam surface 172, causing this arm to be raised out of engagement with the lug 171.

The motion of the carriage 161 is entirely automatic and is controlled as follows:

After the first bundle to be wrapped has had glue applied to the upper surface of the lower sheet from the roll B by manually throwing the switches motivating the gluing mechanism, the forward or lead package proceeds forwardly in the conveyor system until a limit switch L2 (Figures 3 and 28), situated in the path of its forward motion is tripped, at the same time the trailing edge of package P leaves limit switch L1 (Figure 6). The actuation of this limit switch L2 stops further motion of the package by cutting off current to the main drive motor 50 at which point the forward package is situated with its rear edge in a position to allow sufficient paper to fold over the rear of the forward bundle and the forward end of the following bundle when the paper is cut.

Simultaneous with the stopping of the drive motor 80

the motor 157, which controls the cutting and gluing mechanism, is actuated. The above-described stopping of drive motor 80 and the actuation of the cutting and gluing motor 157 is achieved by means of a control mechanism, generally designated at 193 (Figure 13), and consists of an electric solenoid 194, a limit switch 195, and a second limit switch 196. The above-mentioned solenoid and limit switches are secured to a mounting plate 197, which, in turn, is positioned above the idler sprocket 147 of the endless chain 145 by means of an angle iron 198 welded or otherwise secured to the side guide rail 144.

The actuation of the limit switch L2 serves to energize the electric solenoid 194, and this, in turn, contacts the limit switch 195 to start motor 157. Simultaneous with this, the main driving motor 80 is stopped by means of the limit switch 196. The movement of the limit switches 195 and 196 is achieved by means of a bar 199, pivotally secured to the plate 197. At one end of the bar 199 a forwardly extending link 200 is secured, which is connected to the movable member of the electric solenoid 194 by means of pin 201 at its opposite end. The movement of the solenoid 194 causes counterclockwise rotation of the arm 199 as seen in Figure 13 about its central pivot point, by means of the link 200, adjacent the end of bar 199. The rotation of the bar 199 causes the ends to contact sliding bars 202 and 203 slidably mounted in bearing brackets 204, 204', 205, and 205' secured to the base plate 197. Intermediate of the bearing brackets 204 and 204' is a pair of upstanding pins 206 secured to the movable rod 202. Likewise, intermediate of the bearing brackets 205 and 205' a pair of upstanding pins 207 are secured to the movable rod 203. The purpose of the upstanding pins 206 and 207 is to provide contacting means for the switch arms 211 and 212 of the limit switches 195 and 196. Thus, it will be seen that upon actuation of the electric solenoid 194 and rotation of the arm 199 in a counterclockwise direction its outer ends will contact the ends of the movable arms 202 and 203 to displace them and thus cause the reversal of the normally off limit switch 195 and the normally on limit switch 196.

The switches 195 and 196 are returned to their normal positions by means of a downwardly extending spring member 208 fixed to the lower portion of the movable bar 203 and extending through an elongated slot 209 in the base plate 197. It will be noted that the above-mentioned spring element 208 extends downwardly and adjacent the plane of travel of the endless chain 145. As the upstanding lug 171, fixed to the endless chain 145, returns the traversing carriage to the position shown in Figure 13, the outwardly extending arm 167 is raised by means of the cam surface 172, and the carriage is stopped. The endless chain continues its travel, and in its movement the upstanding lug 171 contacts the spring element 208, fixed to the movable bar 203, to cause the displacement of the bar in the direction of travel of the chain and at the same time causing the switch 196 to be reversed to actuate the main drive motor 80 to carry the packages to a further station on the conveyor system.

The cutting and gluing drive carriage motor 157 is stopped by means of the movable bar 210 (Figure 13), slidably mounted in bearing brackets 220 and 220' secured to an upstanding plate 221, which, in turn, is secured adjacent the side of the guide member 143. A resilient contact element 222 is secured to the movable bar 210 on its under side and intermediate of the bearing brackets 220 and 220', as seen in Figure 13. The movable bar 210 is located in the plane of travel of the wider lug 170 on the endless chain 145. It will be seen that the narrow upstanding lug 171 is permitted free travel past the resilient contact 222, and there is no actuation of the movable bar 210 until the wider lug 170 encircles the idler sprocket 147 of the endless chain 145 and at

that time contacts the member 222 to displace the movable bar 210. The displacement of the bar 210 causes an arm 223, pivotally secured to the under side of the base plate 197 at 224, to be pivoted by means of the pin 225. The movement of the arm 223 causes the displacement of the movable arm 202 by means of one of the upstanding pins 206 which extends downwardly through a slot provided in the base plate 197, as shown at 226. The pin 206, which provides an engaging means for the switch arm 195 on the upper portion of the movable arm 202, passes through the arm and extends downwardly through the slot 226 through the base plate and into engagement with an elongated slot 227 provided in the arm 223.

From the foregoing description it will be understood that as the lug 170 completes its rotation about the idler sprocket 147 it will engage the resilient spring member 222 depending from the movable member 210, thus causing the member to be displaced, and at the same time the arm 223 will be pivoted about its pivot point 224. This movement provides a means for reversing the limit switch 195 when the pin 226 is in engagement with the slot 227 in the arm 223. This reversal cuts off current to the motor 157 for the cutting and gluing mechanisms. The purpose of the traversing carriage 161, as previously stated, is to provide a means by which the top sheet of paper, which is distributed from the roll A, may be cut, and, immediately following the cutting operation, have a strip of glue applied across the end of the upper portion of paper which has been distributed from the roll B. The cutting and gluing elements carried by the carriage 161 will now be described.

Adjacent one of the channel members 162 there is mounted a downwardly extending plate 177 (Figure 12), welded or otherwise secured to the said channel member 162 to provide a means by which a beveled cutting blade and its associated parts may be mounted. Adjacent the mounting plate 177, and adjustably secured thereto by means of bolts 178, is a downwardly extending bracket or plate 179 having at its lower end a triangular-shaped cutting blade 180. The purpose of this cutting blade is to provide a means by which the top sheet of paper from the roll A may be cut in advance of glue brush 190. It will be noted that the cutting and gluing of the paper is obtained by the aforementioned traversing movement of the carriage, generally designated at 161. Other means for cutting the paper may be substituted. The traversing carriage, generally designated at 161, is further provided with a gluing mechanism, generally designated at 181, by which the lower end strip of paper extending from the roll B may be provided with a transverse strip of glue or other adhesive material.

The gluing mechanism, generally designated at 181, consists of a hollow receiving bushing 182 fixedly secured to an upstanding bracket 183, which, in turn, is welded or otherwise secured to the cover plate 163. The bushing 182 provides a receiving means for a second bushing 184, the purpose of which is to receive a downwardly extending pipe 185, said pipe being secured to the bushing 184 by a clamp, as shown at 186. The upper end of the pipe 185 is secured to a flexible hose 187, which, in turn, delivers heated glue under pressure from the glue pot designated at 188. The lower portion of the glue distributing pipe 185 is offset, as shown at 189, and its lower portion is provided with a glue distributing brush 190. A further supporting means for the glue distributing pipe 185 is provided by means of a bearing bracket 191, suitably secured to a downwardly extending bracket 192, welded or otherwise secured adjacent the edge of one of the channel members 162 and positioned rearwardly of the aforementioned bracket 177, as will be seen in Figure 12. From the foregoing description it will be seen that with the transverse movement of the traversing carriage 161 a strip of glue will be applied to the top lower edge of the sheet of paper extending from the roll B by means of the glue

distributing brush 190 and its associated mechanisms secured to the traversing carriage 161. It will also be noted that as the carriage begins its transverse movement, the glue distributing mechanism for applying glue to the lower strip of paper is preceded by the cutting knife 180 whose function is to cut the top strip of paper from the roll A, thus providing an opening or pathway by which the glue applying brush may travel.

A further means is provided by which the glue distributing brush 190 may be offset and raised from the plane of travel of the cutting knife 180, as it clears the edge of paper at each side of the machine, to prevent glue from dripping on the lower cutter, generally designated at 139.

As the traversing carriage 161 is at its rest or inactive position, as shown in Figure 13, the gluing brush 190 is displaced from the plane of travel of the lower paper cutting mechanism, generally designated at 139, as shown in Figure 11. This displacement is accomplished by the rotation of the inner bushing 184 which acts as the retaining means for the glue distributing pipe 185 in association with the collar 186. The means for effecting rotation and raising of the glue brush 190 from the plane of travel of the lower cutting knife will now be described.

A tension spring 228 is fixed at one end to an upstanding pin 229, welded to the upstanding plate 166, and is secured at its opposite end to a radially extending lug 230, welded or otherwise secured to the rotatable inner bushing 184. The spring 228 provides a means by which the glue distributing brush 190 may be held in the plane of travel of the lower cutting chain. A radially extending pin 231 is fixedly secured to the inner bushing 184, and a second radially extending pin 232 is in frictional engagement with the radially extending pin 231. Pin 232 is fixed to a transversely extending shaft 233, suitably journaled in bearing blocks 234 fixed to the upstanding bracket 183 to provide a means by which the gluing brush 190 may be rotated from the plane of travel of the lower cutting chain 139.

A pair of rollers 235 and 235' (Figure 13) are rotatably secured to bracket 236, said bracket being fixedly secured to the rotatable shaft 233, as shown at 237. The guide rollers 235 are held in a horizontal position, as shown in Figures 10, 13, and 15, by means of adjustable guide members 238 at each side of the machine, the said guides being held in spaced relation to the side guide member 143 by means of angle irons 239 (Figure 11) fixed to the plates 141 and 142 by means of welding or the like. Adjacent the angle irons 239 and secured by means of bolts 240 is a slotted plate 241 to provide a means for receiving and holding the guide members 238. It will be noted that the slotted plate 241 extends the entire width of the machine and provides a means by which the guides 238 may be adjusted for different widths of packages to be handled in the machine. As the carriage 161 and its associated mechanisms move transversely of the machine, the rollers 235 and 235' are maintained in an inclined position until the forward roller 235' engages the inclined surface 238' of guide 238 at which time the shaft 233 will rotate in a clockwise direction, as seen in Figure 15, thus initiating an arcuate movement to the radially extending pin 232 which contacts pin 231 to rotate the glue distributing pipe 185 in a counterclockwise direction, as seen in Figure 13. Thus, it will be seen that the glue distributing brush will be turned out of the plane of travel of the lower cutting mechanism, generally indicated at 139, through the tension of the spring 228, previously described.

In order to elevate brush 190, as it is rotated, an outwardly extending pin 243, protruding centrally of the inner bushing 184, is provided to engage a cam surface, shown at 244, on the outer fixed bushing 182, as will be seen in Figure 12. Thus, it will be seen that, as the glue distributing mechanism, comprising the glue distributing brush 190, the glue pipe 185, and the inner bushing 184, is rotated, the protruding pin 243 will engage the cam

surface 244 and will raise the glue distributing brush from the plane of the lower strip of paper. It will also be observed that the operation of rotating and raising of the glue distributing brush 190 is simultaneous.

The glue distributing brush 190 maintains its position in the plane of the travel of the lower cutting mechanism 139 until the rollers 235 and 235' engage the inclined surface 238' of the adjustable side guide 238 located at the terminal ends of the transverse movement of the carriage, as above described. At this point the glue distributing brush is, again, swung from the plane of travel of the lower cutting mechanism, and the glue, which is being discharged through the glue pipe 185 and the glue brush 190, is discharged to a trough 242, suitably mounted on the lower horizontal fixed member 31', and extending across the machine beneath the path of travel of the carriage 161. The glue collected in the trough 242 is returned to the glue pot 188 for reuse. The purpose of rotating the glue distributing brush, as stated, is to allow the glue to be discharged away from the lower cutting mechanism 139 when out of contact with the lower sheet of paper.

As the traversing carriage and its associated mechanism again return to the position as shown in Figure 13 and the glue distributing brush 190 is again turned from the plane of the lower cutting mechanism, a lower cutting means completes its travel across the lower glue line to cut the lower paper medially of the glued area.

The lower cutting mechanism, generally indicated at 139, comprises suitable retaining brackets 153 extending outwardly from the lower horizontal frame member 31' to provide a means by which suitable bearing blocks 152 (previously described) may be secured. The bearing blocks 152 accommodate horizontal shafts 151, located on either side of the machine, upon which are journaled sprockets 154 to form a suitable drive means for an endless chain 250. A plurality of idler sprockets 260 are rotatably secured to a transversely extending angle iron 261 secured at its ends to the upper flange of the horizontal fixed channel members 30'. The idler sprockets 260 provide a means by which the endless chain 250 is raised to a position adjacent the lower sheet of wrapping paper, as seen in Figure 9.

Fixed to the endless chain 250 is a cutting blade 262, which, upon rotation of the conveyor chain, will provide a means by which the lower sheet of paper may be cut. It will be noted that the position of the cutting blade at its inactive position is at the lower left side (Figure 9) of the conveyor chain 250. The shaft 151 provides a driving means for sprockets 154. As was pointed out, the location of the cutter blade 262 is at the lower left hand side of the cutter chain 250, as seen in Figure 9, and upon actuation of the traversing carriage and its associated parts, generally indicated at 161, the lower cutter mechanism is actuated simultaneously since shaft 143 is driven from shaft 151. The previously mentioned position of the knife 262 allows the traversing carriage 161 to be moved to the dotted line position, shown in Figure 10, and to begin its reverse movement before the lower cutting knife reaches the point of contact with the lower paper sheet. Knife 262 on endless chain 250 follows the carriage 161 in its return trip across the paper to cut the bottom sheet of paper medially of the glue line.

As the bundle to be packaged progresses forwardly on the conveyor system after glue is applied to the front and rear transverse ends of the sheet of paper from the roll B, a glue applying means, generally indicated at G, is provided to deposit a glue line on the outer top edges of the sheet of paper from the roll B. This side glue applying means comprises a flexible hose member 263 which receives heated glue under pressure from the same glue pot 188 which supplies glue to the previously described traversing glue brush 190. Hose member 263 is secured by means of a length of connector pipe 264 to a T-shaped joint 265. Threaded to one of the transverse

13

sections of the T joints 265 are perforated hexagonal heads 266 which deposit a thin glue line to the outer edge of the upper surfaces of the lower sheet of paper from the roll B as it is carried beneath the heads 266 in the forward travel of the bundle on the conveyor.

Secured to the opposite side of the T connections 265 are solid piston rods 267 which are associated with air cylinders 268, secured to supporting members 269. The retracting air pistons 268 for the side glue distributor are adjustably mounted with respect to the conveyor mechanism in order to compensate for the different widths of packages which the machine might handle. The side gluing mechanism, generally designated by G, is mounted to a base plate 270, adjustably secured to a slotted base member 271 (Figure 15) so that the positions of cylinders 268 may be varied.

As the package to be wrapped is moved forwardly by means of the conveyors, a line of glue is applied to the outer edges of the lower sheet of paper. Upon contact with the limit switch L1 for actuating the traversing glue mechanism, generally indicated at 161, the piston rod 267 of the air cylinder 268 is simultaneously retracted to allow the stream of glue from the applying means 266 to be deposited in the trough 242, located beneath the fixed horizontal frame members 31'. A series of spreader rolls 272 and 273 are disposed to the rear of glue heads 266 for spreading the glue. The lower sheet of paper from roll B passes between the rolls 272 and 273 after glue is applied. A driving means for these rollers is provided by means of sprockets 274 (Figure 7), fixed to the shaft 106 positioned beneath the lower horizontal frame member 31'. Drive chains 275 (Figure 11) extend upwardly and forwardly into engagement with sprockets 276, fixed to the shaft 277 of the lower spreader roll 273. The shaft 277 is journaled in bearing brackets 278, mounted to an upstanding plate 279 on the adjustable members 270 supporting air cylinders 268. The lower spreader rolls 273 have provided at their opposite ends gears 280 in engagement with similar gears 281 as a means for driving the upper spreader rolls 272 through forwardly extending shafts 282, rotatably secured in bearing brackets 283. The above described mechanism provides a means by which a stream of glue is applied to the outer edges of the lower strip of paper, and the application of glue is then spread by means of the driven spreader rollers to form a constant strip of glue for the purpose of sealing the side edges as they are carried forward and into engagement with a side folding mechanism which will next be described.

After the upper and lower spreader rolls 272 and 273 have distributed the glue evenly over the upper outer edges of the lower sheet of paper, the extending outer edges of the top and bottom sheets of wrapping paper then come in contact with the side folding plates, best seen in Figures 1, 16, 17, and 18. These side folding members comprise the upper rigidly secured plates 284 and the lower rigidly secured plates 285. As the package proceeds along the conveyors, the top protruding edge of paper first contacts plates 284, which fold the excess paper down firmly against the sides of the sheet material. Immediately following this action the protruding edges of paper from the bottom sheet, having a glue line applied, contact the lower plates 285, which fold the bottom sheet of wrapping paper up over the side edges of the package of sheet material and also over the previously folded top sheets of paper. As the forward motion of the package continues, the lower sheet of paper, having glue applied thereto, is held firmly in place to insure proper adhesion by the spring pressed plates 288 associated with the plates 285.

As shown in Figures 16 and 17, the bottom folding plates are urged against the sides of the moving package by means of springs 290 and 291, which are secured by means of upright plates 294, bolted or otherwise secured to the lower conveyor support.

14

After receiving the side fold the package is carried by the conveyor to the end tucking or vertical corner fold means, which will next be described.

Pistons 296 actuated from air cylinders 295, mounted on each side of the machine, forward of the side folding means previously described provide a means by which the side folding pads 325 are moved into the line of travel of the package P. These pistons are actuated by solenoid air valves responsive to switches located in the path of the moving package. As the forward end of the package reaches the position between the folding pads 325, which, as previously pointed out, are located on the outer edges of the right and left hand conveyors toward the discharge ends, air is introduced into cylinders 295 through flexible connections 252 and 254 to move the pistons 296 in the direction of the arrow (Fig. 24) which in turn move the pads 325 to the position shown in broken lines (Fig. 25) to make a vertical corner fold around the forward end edges of the package.

Referring to Figures 19 and 24, the air cylinders 295 are shown in their operative positions mounted on the machine by means of the brackets 251 secured to the sides of the lower conveyor frames. Mounted on brackets 251 are the fixed bushings 301 to receive shafts 299 which pivotally support the air cylinders 295, folding pads 325 and rear tucking wheels 320. Air cylinders 295 are rigidly secured at right angles at the outer end of the shafts 299 by means of collars 297. Piston rods 296 are disposed within air cylinders 295 and are normally extended, as shown in Figure 24, with their outer ends being rigidly secured at right angles to the rods 307, which are, in turn, welded to the plates 319 which form a part of the assembly to which the pads 325 are secured. Detachably secured to plates 319 by set screws 313 are upstanding guide members 311 which are disposed to slide in slots 315 formed in the members 253 which, in turn, are fixed, as by welding or the like, to the shafts 299. Additional set screws 313 detachably secure plates 305 to the guide members 311 so as to dispose the plates 305 on the opposite side of members 253 from plates 319. Plates 305, plates 319 and guide members 311 thus move as a unit within the limits of the slot 315. The folding pads 325 are carried by sections 321 which are connected with the plates 305 by means of the spring-loaded hinges 323, as seen in Figure 25. As the pads 325 are projected into the path of the moving package P at the front end thereof to effect the vertical corner end fold, the forward motion of package P will carry the pads 325 forward a short distance before said pad is retracted. The sections 321 to which pads 325 are attached will pivot slightly and place tension on springs 323 which returns pads 325 to their normal position when the pads are withdrawn. Pistons 296 are actuated to make the front end vertical corner folds only, other means being employed to effect the vertical corner fold at the rear of the package, which will be subsequently described.

In more detail, the operation of the front vertical corner pads 325 is as follows. When the front end of package P contacts the limit switch L3, solenoid S2 is energized to move air valve A2 so as to admit air to the air cylinders 295 through the flexible connections 252. The pistons 296 are thereby moved in the direction of the arrow (Figure 24). Pistons 296 are linked with plates 305 by means of rods 307 so that pads 325 will be moved into the line of travel of the package P as the piston 296 is retracted. The upstanding guide member 311 secured between plate 305 and plate 319 is slidably fitted within the slot 315, which is cut medially of the fixed member 253 which is welded to shaft 299.

Immediately upon actuation of pad 325, the forward front edge of the package contacts the limit switch L4 to reverse solenoid air valve A2 to admit air to the cylinder 295 through flexible connections 254 and thereby return the piston 296 and associated folding pads 325 to their full extended positions.

After receiving the vertical corner fold, piston members 295 are retracted, as described, and the protruding top end sheet of paper is folded down by the means generally designated at 293, which comprises a piston actuated T bar member 298 which is mounted above the path of travel of the package. T bar 298 is supported by stub shafts 300 which are mounted for vertical movement within bearing blocks 289. The bearing or journal members 289 are secured by bolts or welding to the transverse channel member 287' extending across the machine. The entire T bar assembly is supported by stub shafts 287 journalled within bearing blocks 286 mounted on the side frame channel members so that the T bar may be pivoted in order to effect the front and rear folding of the top sheet of paper. Piston 329, depending from air cylinder 302, actuates T bar 298. As the package reaches a position beneath the T bar 298, piston 329 is urged downwardly by the air pressure in the cylinder 302, which is, in turn, controlled by a solenoid air valve responsive to switch means in the path of the material being packaged. As will be seen in Figures 20 and 26 the angle of the T bar 298 is different when folding the rear top sheet down. Figure 26 illustrates the position when making the rear fold, while Figure 20 shows the T bar 298 in position for folding the front end top sheet of paper down. The position of the T bar when in extended position is shown in phantom at 298.

As the package P is carried forward by the upper and lower conveyor means, previously described, the freely rotatable wheel member 304 will be displaced from the position shown in Figure 20 to that shown in Figure 26 by the movement of package P. Wheel member 304 is journalled to the upright supporting member 306 which is secured at its upper end to the arm 303, which, in turn, is secured to the transverse channel member 287' supporting the T bar assembly 293. A stop 310 is secured to the frame structure beneath the arm 303 to receive a limit pin 312, which, it will be noted, is adjustably secured to the arm 303 in order to determine the limit of pivotal movement through which the piston 302 may be displaced. The pivoting of piston 302 by the contact of the package P with roller 304 places tension on spring 314, so that the T bar 298 will be returned to the position of Figure 20 after the rear top sheet of paper is folded down and the package P clears roller 304. The action of T bar 298 in folding down the rear top sheet of paper is controlled by suitable switch means as in folding down the forward top sheet of paper, and will be subsequently described in connection with the electrical system.

At this stage of operations the sides of the package have been sealed; the front vertical corners have been folded in and the top front sheet of paper has been folded down by the T bar 298 just described. Simultaneously with the action of the T bar 298 in making the top folds, the forward protruding edge of the bottom sheet of paper on the package P comes in contact with the rubber covered roller 316, which extends the width of the machine, being supported on each side of the machine by means of the channel tracks 318. The roller 316 is partially in the path of package P and is rotated in a clockwise direction by frictional contact with the rubber roller 324, which is moved counterclockwise by contact with the roller 317, powered by the conveyor drive system. Rollers 316 and 324 are rotated so as to effect an immediate sharp fold of the front and rear bottom sheets of paper. The forward motion of the package P raises the roller 316 and pushes it forward in its track 318 until the roller reaches the curved portion of the track 318 where the roller 316 rises above and out of contact with the package P. The period of time required for the package P to push the roller 316 from the point of first contact to the point of disengagement is sufficient to effect complete folding up of the protruding bottom sheet of paper over the vertical corner folds and the already

folded down top sheet of paper and to allow the glue on the bottom sheet of paper to be firmly bonded to the upper fold.

After air cylinders 295 have actuated their associated pistons to make vertical corner folds at the front of the package, the conveyor system moves the package P forward where it contacts the T bar 298, just described, to make the top end fold. Just after the actuation of the air cylinders 295, the front end of the package contacts the rubber treaded wheel 320 (Figures 22 and 23), which is rotatably mounted on the hanger plate 315' by means of shaft 255 threaded at each end to receive nuts 256, so as to normally extend into the path of the forwardly moving package P. Hanger plates 315' are bolted to a second set of plates 315' which are, in turn, welded to the side of the fixed plate members 253 forming a part of the assembly for actuating side folding pads 325. The bolts 257, which secure hanger plates 315' to the plates 315', extend through slots 258 so that the positions of the rear corner folding wheels may be adjusted to insure a sharp fold at the rear of the package. When the forwardly moving package P contacts wheels 320, these wheels will be displaced to the broken line position shown in Figure 22 where the dotted line 259 represents the side edge of the package P. When wheel 320 is displaced, air cylinders 295 and side tucking pads 325 with their associated assemblies will pivot about shafts 299 supported by journal blocks 301 to the dotted line position of Figure 22. Pins 263, extending from fixed collars 303, strike an abutment on the mounting brackets 251 to limit the rotational movement of shafts 299 and wheels 320. When shafts 299 are rotated by the pivotal movement of wheels 320, the springs 327, which are secured at one end to a pin 263' extending from fixed collar 303 and at the other end to a pin 263' extending from the lower end of brackets 251, are placed under considerable tension. Wheel 320 rides along the side of the package in its pivoted position until the rear of the package is reached at which the time wheels 320, under the force of springs 327, ride sharply around the following vertical end of the package to its full line position, as shown in Figure 22, thereby executing the vertical corner folds at the rear of the package. Springs 327 return air cylinders 295, folding pads 325, and wheels 320 to the full line position as seen in Figure 22.

As the package P continues its travel forward, the T bar 298 is again actuated to fold the top sheet of paper down over the rear vertical corner fold, in the same manner as previously described in connection with the front top fold, the T bar being pivoted as shown in Figure 20 by contact of wheel 304 with the package P.

As the rear of the package progresses beyond the position of the T bar 298, a second rubber covered roller 324, extending the width of the machine and rotated counterclockwise by contact with driven roller 317, contacts the trailing edge of the rear bottom sheet of paper to fold up and hold the bottom sheet of paper in intimate gluing contact with the top and side folds until a firm bond is secured between the two. In more detail, the action of the rubber covered roller 324 for folding up the rear bottom sheet of paper is as follows.

After the rear of the package leaves the position of the T bar 298, rubber roller 324 located in the same track, but beneath the position of roller 316 previously described, is raised upwardly and forwardly in the track 318 by means of the chain 326 which is led around the chain guide 328, sprocket 330 and around sheave 332 where the end is fixedly attached by any suitable means to the frame at 334. A motor driven, air actuated, friction clutch 335 (Figures 1 and 2) is actuated by switch means located in the path of the package P to drive sprocket 330. Sprocket 330 is driven at a slightly greater speed than the speed of advance of the package P, so that the roller 324, as it is raised into contact with the rear end of the package, will quickly fold the rear protrud-

ing lower sheet of paper up and hold the fold firmly against the top and side folds until a film bond is secured. The force exerted by the roller 324 is utilized to push package P out of the machine into a press and stacker unit (not shown). The sheave 332 shown in Figure 26 in moving to the position 332' acts as a counterweight to take up the slack from chain 326 as the roller 324 is brought forward against the rear of the package. Sheave 332 is freely movable in a vertical direction by means of its extended shaft 336. As the roller 324 reaches its maximum limits of travel in the trackway 318 it is in a position abutting the roller 316 which is prevented from further upward travel by suitable stops situated in the trackway 318'. Since further advance of roller 324 is impossible, the friction clutch prevents further rotation of sprocket 330.

After the package P has completely cleared the machine, the air actuated friction clutch is withdrawn from contact with sprocket 330 at which time the rollers 324 and 316 are returned to their starting positions in the track 318 beneath the line of travel of package P. Roller 316 forces the return movement of the roller 324 by means of the chain 338 which moves over chain guide 340, around the sheave 342 and over the sprocket 344 and down around sheave 341 attached to counterweight 343 after which the end of chain 338 is secured to the underside of channel member 31 at 346 (Figures 5 and 20).

As has been previously pointed out the sequence of operations, wherein the bundle of sheet material to be wrapped has top and bottom sheets of wrapping paper applied, glue placed, and the subsequent folding operation, are all automatic operations controlled by various limit switches placed in the path of travel of the package being wrapped. The locations of these switches with the associated wiring layout is best seen in Figure 28. The dotted lines running from left to right the length of this figure represent the path of travel of the package being wrapped.

A source of current is provided by means of leads 350 and 352 to a main switch 354 located on a switch panel at the side of the machine. Manual throw switches 356, 358, 360, 362, 364, 366, 368, and 370 are also mounted on this switch panel to provide a means for breaking the circuits to the electrically actuated mechanisms on an individual basis when such control is desired. It will be assumed in the description that the above-mentioned switches are all in a closed position, thus providing an unbroken circuit to the automatic control switches located in the path of the moving package being wrapped and which will now be described in more detail.

As the package P is introduced into the machine, contact is first made with limit switch L1 to close a circuit through the leads 372 and 374, through the manual throw switch 360, into a magnetic switch M1 mounted on the switch panel. A solenoid S1 is connected across the line 374 from the limit switch L1 and will be energized by means of the above-described circuit to control the four-way air valve A1. The switch 362, mounted on the main switch panel, provides a means for a source of current from the main leads 350 and 352. As the above-described circuit is completed by actuation of the limit switch L1, solenoid S1 is energized, which causes an introduction of air from air valve A1 into the air cylinders associated with the side gluing mechanism previously described, thereby causing the glue jets to be carried into the line of travel of the side edges of the lower sheet of paper.

The forward motion of the package continues, and contact is made with limit switch L2 which has no effect on any of the circuits until the rear edge of the package P leaves the limit switch L1 causing this switch to be reversed to complete a circuit through the leads 376 and 378. It will be noted at this time, that as the limit switch L1 is reversed and a circuit is completed through the leads 376 and 378, the circuit from the leads 372 and 374 is broken to de-energize solenoid S1 causing the air pistons

associated with the side gluing jets to retract by means of the four-way air valve A1.

As the side glue jets are retracted and limit switch L1 reversed when the trailing edge of the package P leaves this switch, the circuit is simultaneously completed to the solenoid 194 through leads 380 and 382. Solenoid 194 is located on the transverse glue carriage and by means of the lugs and toggle arrangement, previously described in connection with Figure 13, operates limit switch 195 to start the transverse glue carriage motor 157. When the leads 384 and 386 leading to the magnetic switch M1, located on the main switch panel, are energized, current is carried to the motor 157 through leads 388 and 390 from magnetic switch M1.

At the same time motor 157 is started, the circuit to motor 80 is broken through leads 392 and 393 leading from magnetic switch M2, also situated on the main switch panel. The breaking of the circuit to the motor 80 is accomplished by means of the solenoid 194 in association with the lugs and toggle arrangement just mentioned. At the same time switch 195 is energized movement of switch 196 also breaks the circuit in leads 394 and 396 leading to the magnetic switch M2 to thereby stop the main conveyor motor 80. A magnetic motor brake (not shown) is associated with the motor 80 to effect instantaneous stoppage of the conveyors. Air valve A1, also admits air to cylinder 143 through connection 141 to stop the delivery of paper from rolls A and B at this point.

The forward motion of the package P is interrupted at this point until the transverse glue carriage makes a complete trip across and back with the glue brush 190 applying glue to the upper surface of the protruding edge of the bottom sheet of paper. When glue brush 190 completes its trip across and back, lugs on drive chain 145 reverse the positions of the switches 195 and 196 (Figure 13) thereby stopping motor 157 and again starting the main conveyor drive 80 through the circuits described. Solenoid 195 is reset to normal position when the rear of the package leaves limit switch L2.

As previously pointed out, when the rear of the package leaves limit switch L1, the circuit is opened to the solenoid S1, which controls the four-way air valve A1 through leads 398 and 399. This retracts the side glue jets 266 which have been applying glue to the upper surface of the protruding side edges of the bottom sheet of paper. The package P is now in the condition indicated generally at 2 in Figure 27. Mechanical means, best seen in Figures 16, 17 and 18, fold the side top sheets down and the side bottom sheets up after glue has been applied, as previously described. The package is now as seen at 3 and 4 in Figure 27.

The front end of the package next contacts the limit switch L3 to complete a circuit to make the end vertical corner folds. The actuation of switch L3 completes a circuit through the lead 400; limit switch L4; lead 402, to the solenoid S2, which controls the four-way air valve A2; leads 404 and 405, and through manual control switch 366. Solenoid S2 moves the air valve A2 to cause the side tucking pads 325 to be thrust toward the package to effect the vertical side tucks in the front end of the package P (Figures 24 and 27).

The package P next contacts limit switch L4 to open the circuit to the solenoid S2 and re-set pads 325 to normal or "out" position. In the "out" position, to make the forward vertical corner folds, folding pads 325 are out of the line of travel of the package and pointed directly across the machine, being held in that position by tension springs 327 (Figure 25). The limit switches L3 and L4 are positioned to cause an instantaneous in-and-out cycle of the pads 325.

After the forward vertical corner folds have been made, the front of the package contacts and opens limit switch L5 and closes limit switch L6, which completes a circuit to the solenoid S3 controlling four-way air valve A3

through the lead 407; switch L8 leads 409 and 411; switch 368 and the lead 413. Four-way air valve A3 controls the T bar end folding means, generally indicated at 293 in Figure 26. The T bar folds down the top end sheet of paper, and, while the T bar 293 is in the down position, the bottom front end sheet of paper is folded up by frictional contact of the moving package with the rubber-covered roller 316 (Figure 20), one-half of the diameter of the roller 316 being in the line of travel of the package P. The front and sides of the package P have now been folded and glued, as seen at 6 and 7 in Figure 27.

As the forward motion of the package P continues, limit switch L7 is opened. Lead 415 connects switch L7 with the limit switch L9, while lead 417 connects with the limit switch L8. It will be noted that the opening of switch L8 by the forward movement of the package P does not break the circuit to the solenoid S3 controlling the end T bar until the limit switch L9 is opened, since the switch L9 is the last to be contacted by the motion of the package, and is in a normally open position.

When the limit switch L3 is opened, the circuit through lead 409; solenoid S3; lead 411; switch 368 and lead 413 to the limit switch L6 is broken, and the end folding T bar is withdrawn from the line of travel of the package P after which the bottom fold up is completed. Switch L9 is closed by the forward motion of the package after limit switch L8 is opened, but, in view of the fact that limit switch L7 has already been opened by the package P, no current flows through leads 417, 418, and 420, and the solenoid S3 is not again energized (Figure 29).

As the package P continues through the machine, the forward bottom folding roll is raised in track 313 (Figure 25) and held in that position by stop latches. The rear side vertical tucking wheels 320, which have been riding under spring tension against the sides of the package P, reach the rear end of the package at this time, as previously described, and make the rear vertical corner folds (Figure 22).

The rear of the package then passes from contact with switches L3 and L4, which close and open in reverse order, so that the solenoid S2 is not again energized. The normal positions of these switches are shown schematically in Figure 29.

An additional normally open limit switch L10 is located in the path of the advancing package. However, this limit switch is not mounted on the packaging machine, but is affixed to the stacker mechanism at the rear of the packaging machine, which does not form a part of the present invention. Limit switch L10 has been shown in Figure 28 in order to complete the circuit and to point out the means for de-energizing motor 321' and solenoid S4 when not in use. The forward motion of the package closes the limit switch L10; however, no circuit is completed until the rear of the package clears limit switch L5, which is normally closed, to complete a circuit through lead 422; panel switch 370; lead 424; solenoid S4; lead 426; switch L10; and lead 425 back to the switch L5. Motor 321' for pulling up the end folding roller 324 also derives current from leads 422 and 425. It will be noted that two actions occur at this point; the motor 321' is started, and the solenoid S4 is energized to move the four-way air valve A4, which controls a friction clutch driven by the motor 321' for contact with the sprocket 330 (Figure 25). The sprocket 330 pulls chain 336, connected to the lower rubber covered roller 324, which is pulled up in the tracks 318 beneath and to the rear of the moving package P to fold up the rear bottom sheet of paper.

Simultaneously with the closing of the switch L5, switch L6 is opened, which again does not affect the condition of the circuit until switch L7 is cleared, which is normally closed, and the solenoid S3 is thereby energized by means of the circuit previously described. Due to the reversed

actuation of these limit switches the path of the circuit is now from switch L6 to switch L9 through lead 418 and from switch L9 to switch L8 through lead 420 and to the solenoid S3 through lead 409. This modification is necessary since switch L6, normally open, has already lost contact with the package P. The solenoid S3 controls the four-way air valve A3 to cause T bar 293 to move down and make the top rear end fold, as shown in Figure 25, where the roller 324 can also be seen coming up into position against the bottom of the package P in its tracks 318.

The limit switches L3 and L9 are then cleared by the rear of the package, thereby de-energizing solenoid S3 after which T bar 293 is returned to the retracted position shown in Figure 20.

When limit switch L10 is cleared, the circuit is broken to the motor 321' and solenoid S4, so that the friction clutch no longer makes driving contact with the sprocket 330, and the rollers 316 and 324 are returned to the position in Figure 20 by suitable counterweights attached to the opposite ends of the drive chain associated with these rollers, as has been described.

At this point the package has cleared the machine and is completely folded in a neat, compact manner ready for shipment.

I claim:

1. A machine for automatically wrapping, folding and sealing paper about stacks of superposed registered plywood panels or the like comprising: a frame; a powered conveyor mounted within said frame; means for feeding stacks of panels onto said conveyor; means for simultaneously feeding first and second webs of wrapping paper wider than said stacks onto the upper and lower faces of one of said stacks of panels; means for interrupting the movement of the stack on said conveyor following the feeding of paper upon the upper and lower faces of said stack; a powered carriage mounted on said frame for transverse reciprocal movement and carrying depending therefrom paper cutting and gluing means for cutting the upper face paper intermediate consecutive stacks followed by gluing of the lower face paper intermediate said stacks; lower face paper transverse cutting means on said frame synchronized to cut said lower paper intermediate the glued area following said first mentioned cutting and gluing means; means for continuing movement of the stack in said conveyor following the cutting of the lower face paper, and in consecutive continuous order: means for gluing the side edges of lower face paper extending beyond the side edges of the stack; side edge sealing means comprising means for folding the upper face paper downwardly along the side edges of the stack, means for folding the lower face paper upwardly against the upper face paper and means for urging the upper and lower face folded portions together until bonded; means for tucking the bonded side edge paper about the leading vertical edges of the stack; front edge sealing means comprising means for folding the upper face paper downwardly along the front edge of the stack, means for folding the lower face paper upwardly against the upper face paper, the last mentioned means urging the upper and lower face folded portions together until bonded; means for tucking the bonded side edge paper about the trailing vertical edges of the stack; rear edge sealing means comprising means for folding the upper face paper downwardly along the rear edge of the stack, means for folding the lower face paper upwardly against the upper face paper, the last mentioned means urging the upper and lower face folded portions together until bonded and including means for moving the stack along the remaining portion of said conveyor.

2. The machine described in claim 1, said conveyor extending in a straight line and being vertically and horizontally adjustable within said frame.

3. The machine described in claim 1, said carriage having a two stroke cycle, the forward stroke bringing said

cutting means into cutting engagement with said upper face paper in advance of said gluing means which is then brought into engagement with said lower face paper, the return stroke returning said cutting and gluing means to the starting point; said lower face paper cutting means being secured to a rotatable endless chain including a flight disposed transversely beneath said lower face paper, said flight moving in the direction of the above mentioned return stroke, said lower face paper cutting means being located on said chain to follow said carriage during its return stroke.

4. The machine described in claim 1, said paper cutting means provided with means controlled to automatically operate said paper cutting means during the before mentioned interruption of movement of said stock on said conveyor.

5. The machine described in claim 1, said gluing means depending from said carriage on a crank-shaped shaft, said shaft being horizontally rotatable and vertically cam elevated for automatically offsetting and raising said gluing means from the plane of travel of said cutting means as said gluing means clears the edge of the paper at each side of the machine.

6. The machine described in claim 1, said carriage being vertically adjustable to accommodate stacks of varying depth.

7. The machine described in claim 1, said means for gluing the side edges of the lower face paper comprising an upwardly retractable glue depositing head, upper and lower glue spreading rolls between which the paper must engageably pass, said head being automatically retractable between stacks, and a glue receiving trough disposed beneath said head for receiving the glue while the head is in a retracted position.

8. The machine described in claim 1, said side edge sealing means comprising a downwardly projecting side plate secured to the upper portion of said conveyor, and flared outwardly on its rear edge to fold the transversely extending top face paper downwardly against the side edge of the stack, an upstanding side plate secured to the lower portion of said conveyor and flared outwardly on its rear edge to fold the glued side edge paper upwardly against the above mentioned folded top face paper, and an upstanding spring biased plate secured to the lower portion of said conveyor and in association with said upstanding side plate for holding said folded portions of paper in bonding engagement, the folded portions being acted upon in the order described.

9. The machine described in claim 1, said means for tucking the side edge paper about the trailing vertical edges of the stack comprising resilient rollers pivotally mounted on each side of the machine having spring means urging said rollers into the path of travel of said stack so as to ride sharply around the vertical corner edges of said stack and fold in said paper.

10. The machine described in claim 1, said means for tucking the side edge paper about the leading vertical edges of the stack comprising sections having pads on the inner ends thereof movable from a normal position out of the path of travel of the stack into an operative position inwardly of the side edge paper, said sections having spring loaded hinges adjacent their outer ends to permit said pads to be carried forwardly with the side edge paper of the stack during the time of contact therewith.

11. The machine described in claim 1, said means for folding downwardly the front and rear protruding edges of the upper face paper comprising an air actuated bar disposed transversely above said moving stack, means for actuating said bar downwardly to fold down the top front and top rear protruding edges of paper respectively as said stack passes beneath said bar, means responsive to the forward motion of said stack for causing said bar to assume a different vertical angle of approach to the rear edge of the stack than the vertical angle of approach to the front edge of the stack.

12. The machine described in claim 1, said means for folding the front edge lower face paper upwardly against the upper face paper comprising a clockwise rotatable, transversely mounted roll, serpentine tracks secured to each side of said frame for carrying the ends of said roll, said tracks being horizontally disposed and having the ends nearest the approaching stack curved downwardly and the opposite ends curved upwardly, said roll being positioned initially in the lower portion of said tracks and in the same horizontal plane as said moving stack, said stack pressing said roll arcuately forward within the confines of said tracks wherein said lower edge paper is firmly bonded against said upper edge paper.

13. The machine described in claim 1, said means for folding the rear edge lower face paper upwardly against the upper face paper comprising a counter-clockwise rotatable, transversely mounted roll, serpentine tracks secured to each side of said frame for carrying the ends of said roll, said tracks being horizontally disposed and having the ends nearest the approaching stack curved downwardly, and the opposite ends curved upwardly, said roll being positioned initially in the lower portion of said track beneath the plane of travel of the stack, means for urging said roll into driving contact with the rear edge of the stack thereby folding said rear edge lower face paper into sealing engagement with said rear edge upper face paper, said roll following the stack within the confines of said tracks and acting as prime mover to push the stack out of said machine, during which time said rear edge folded paper is firmly bonded by the contact of said roll with said stack.

14. The machine described in claim 1, front and rear edge sealing means comprising an upper, clockwise rotatable, transversely mounted roll, a lower, counter-clockwise rotatable, transversely mounted roll, serpentine tracks secured to each side of said frame for carrying the ends of said rolls, said tracks being horizontally disposed and having the ends nearest the approaching stack curved downwardly and the opposite ends curved upwardly, said upper roll being positioned initially in the lower portion of said tracks and in the same horizontal plane as said moving stack, said stack pressing said roll arcuately forward within the confines of said tracks wherein said lower edge paper is firmly bonded against said upper edge paper, said lower roll being positioned initially beneath said upper roll in the lower portion of said tracks beneath the plane of travel of the stack, when the stack has passed over said lower roll means for urging said roll into driving contact with the rear edge of the stack thereby folding said rear edge lower face paper into sealing engagement with said rear edge upper face paper, said roll following the stack within the confines of said tracks and acting as prime mover to push the stack out of said machine, during which time said rear edge folded paper is firmly bonded by the contact of said roll with said stack, and means acting to reset both of said rolls to their initial positions.

15. The machine described in claim 1, said means for gluing the side edges of the lower face paper comprising retractable side glue applicators mounted on each side of the machine out of contact with the wrapping paper, means for extending said applicators transversely into contact with the wrapping paper, and means for supplying liquid adhesive under pressure to said applicators.

16. The machine described in claim 1, including means for delivering liquid adhesive to said gluing means in a continuous manner, means for receiving the adhesive from said gluing means when said gluing means are not in contact with the wrapping paper, and means for returning said adhesive to an adhesive supply chamber for reuse.

17. The machine described in claim 13, including an air actuated driven friction clutch for selective engagement with a sprocket and chain for pulling said roll in contact with the rear of said stack through the path described by said tracks, driving means for said friction

clutch, said driving means causing said roll to be pulled at a speed greater than the normal speed of said conveyor, said driving means and the means for selectively engaging said friction clutch with said sprocket and chain being responsive to limit switches located in the path of the moving stack.

18. A machine for wrapping, folding and sealing paper about stacks of superposed registered plywood panels or the like comprising: means for feeding in the same direction and in parallel relation to each other, a pair of paper webs having a width greater than the width of the stacks sufficient to provide side flaps adapted to be overlapped when folded, means for feeding successive stacks in spaced relation between the pair of paper webs; means for applying a transverse line of adhesive to one of said paper webs intermediate successive stacks; means for cutting both of said paper webs intermediate successive stacks to form upper and lower cover sheets for each successive stack; which extend beyond the ends of the stack sufficiently to provide end flaps adapted to be overlapped when folded; means for moving successive stacks with their respective sheets along a straight path; means disposed along said path for applying an adhesive, folding in overlapping relation, and sealing the side flaps of the sheets of successive stacks along the side edges thereof; means disposed along said path for folding in overlapping relation and sealing the leading end flaps of the sheets of successive stacks along the leading edges thereof; and means for folding in overlapping relation and sealing the

trailing end flaps of the sheets of successive stacks along the trailing edges thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

463,607	Wight	Nov. 17, 1891
547,777	Frantz	Oct. 15, 1895
1,599,993	Duplay	Sept. 4, 1926
1,646,798	Toepfert	Oct. 25, 1927
1,751,390	Brust	Mar. 18, 1930
1,772,143	Grunlee	Aug. 5, 1930
1,857,113	Conti	May 3, 1932
1,946,056	Birdsey	Feb. 6, 1934
2,018,432	Ackley	Oct. 22, 1935
2,024,820	Ellens	Dec. 17, 1935
2,113,549	Neher	Apr. 5, 1938
2,127,028	Hyssen	Aug. 16, 1938
2,215,545	Demler	Sept. 24, 1940
2,260,324	Kottman	Oct. 28, 1941
2,291,645	Nordquist	Aug. 4, 1942
2,292,487	Stevens	Aug. 11, 1942
2,324,401	Kimball	July 13, 1943
2,375,451	Waters	May 8, 1945
2,434,616	Hoppe	Jan. 13, 1948
2,437,198	Kay	Mar. 2, 1948
2,443,327	Salisberg	June 15, 1948
2,456,059	Grupe	Dec. 14, 1948
2,550,928	Kay	May 1, 1951