Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 1

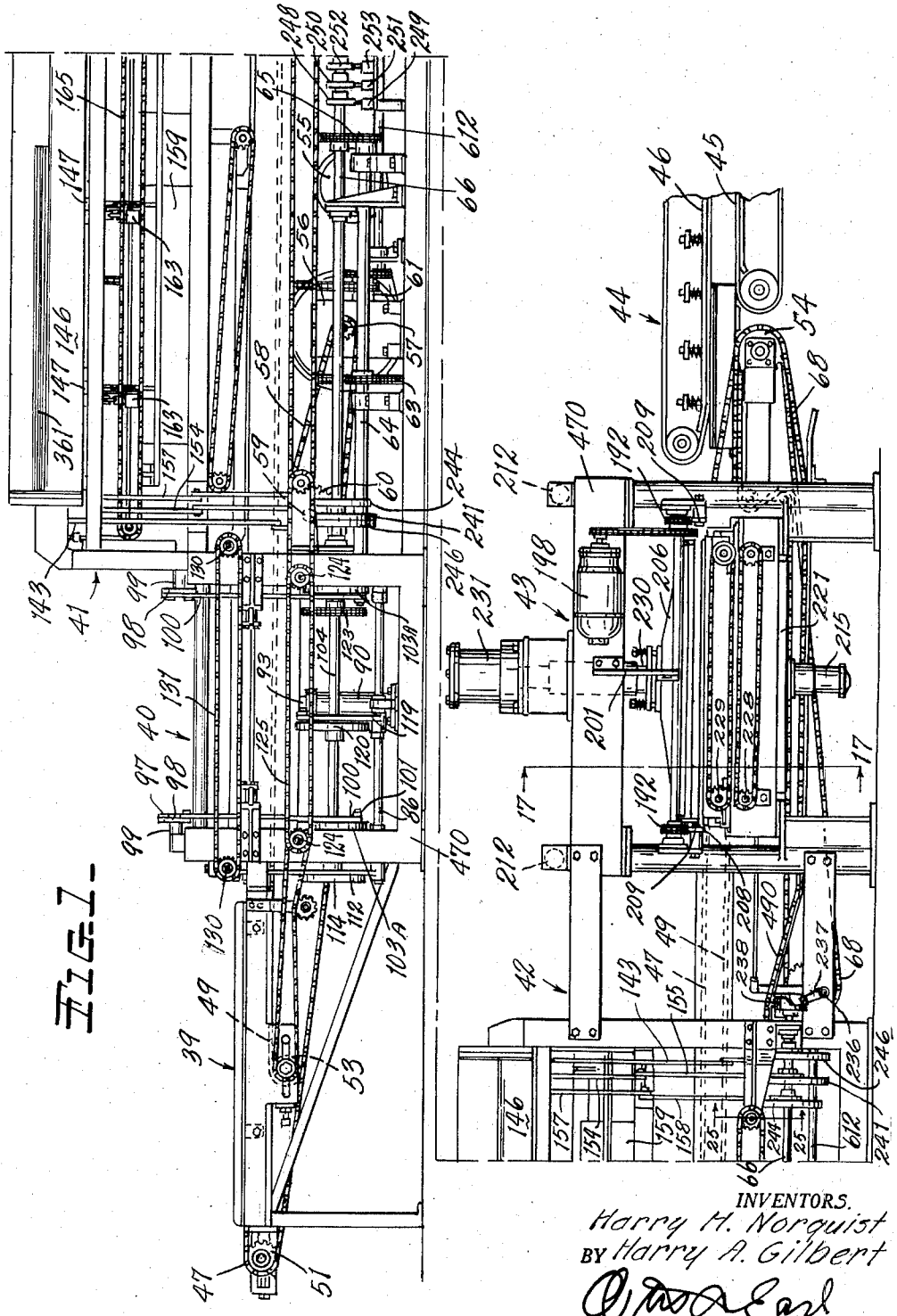


FIG. 1.

INVENTORS.
Harry H. Norquist
BY Harry A. Gilbert
Earl
Attorney.

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 2

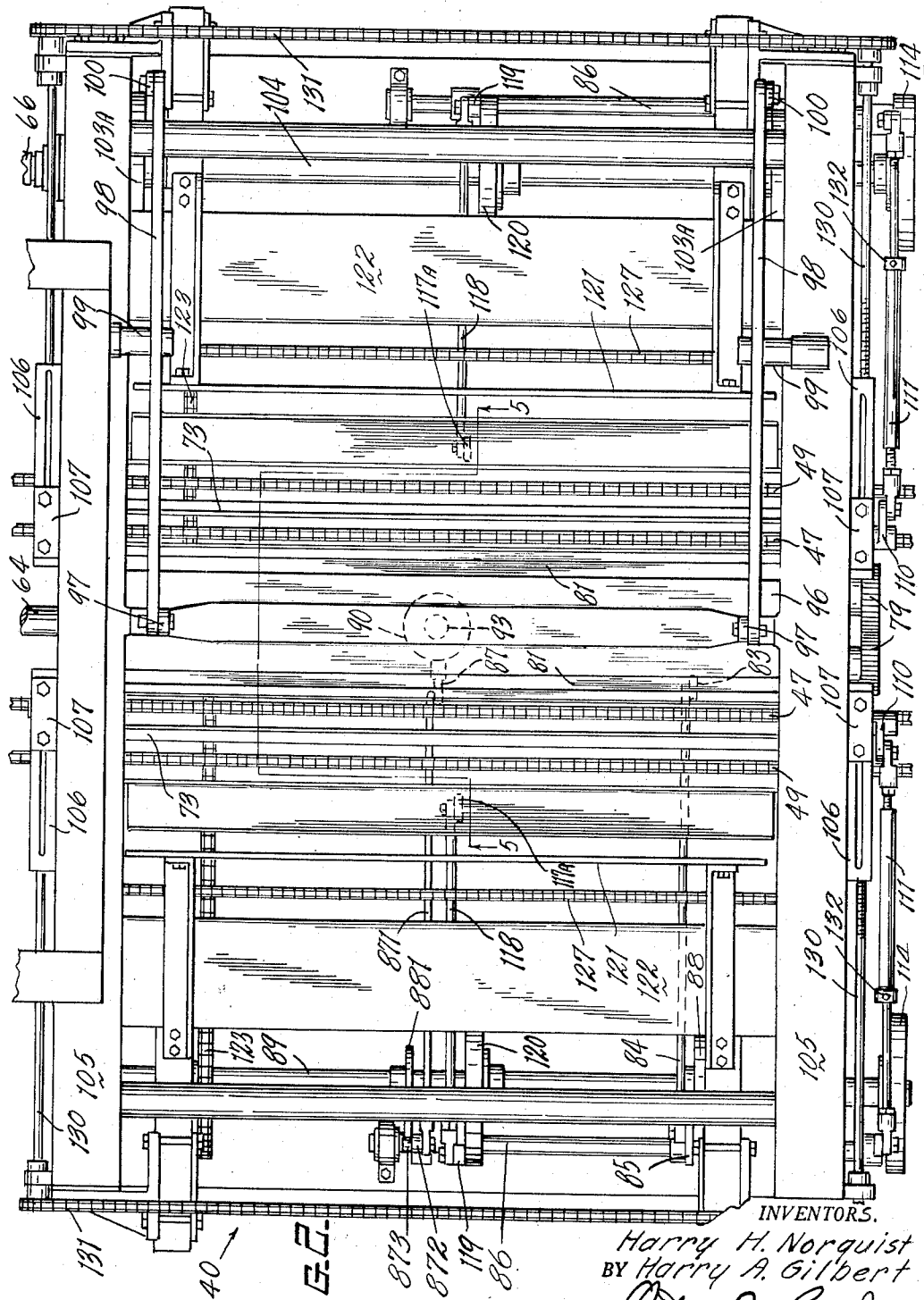


FIG. 2.

INVENTORS.
Harry H. Norquist
BY Harry A. Gilbert
Otto A. Earl
Attorney

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 3

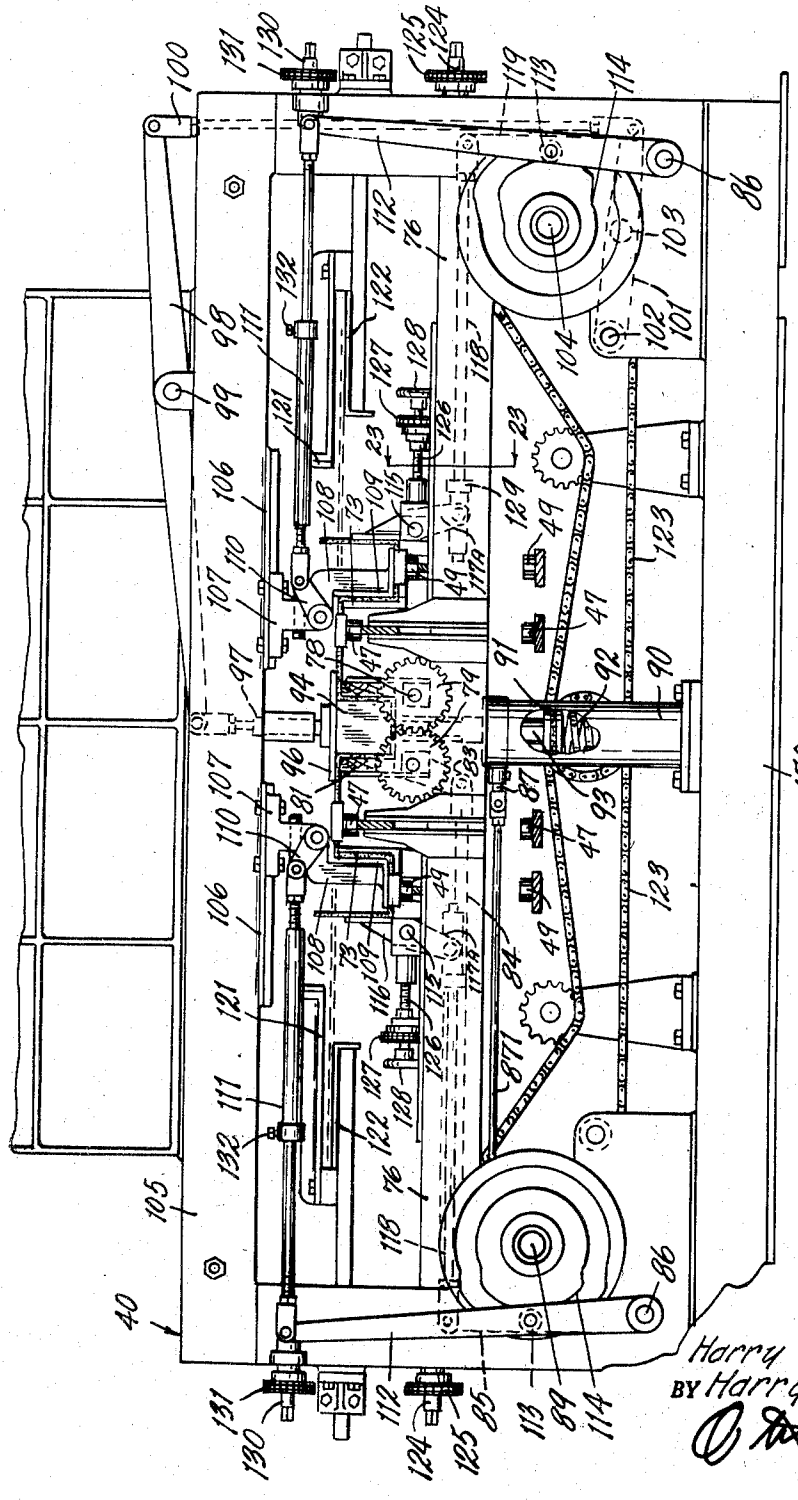


FIG. 3.

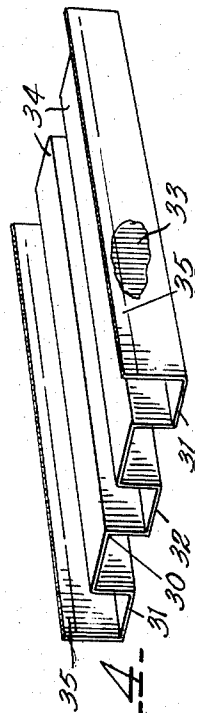


FIG. 4.

INVENTORS
Harry H. Norquist
BY Harry A. Gilbert
Attorney

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 4

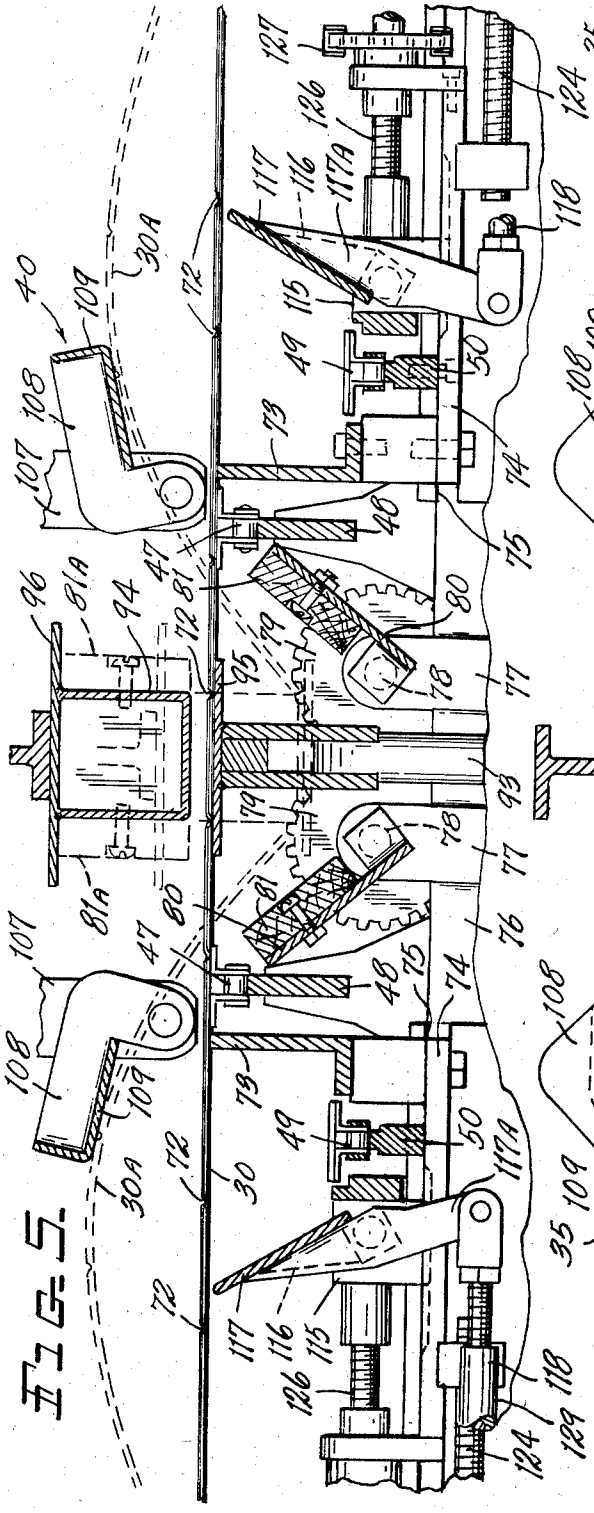


FIG. 5.

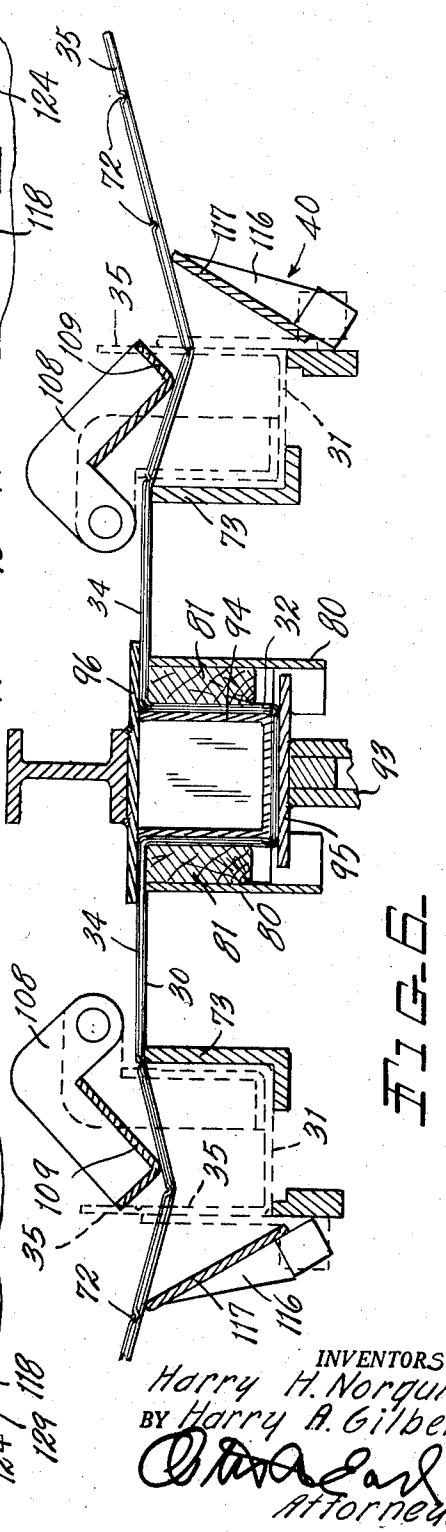


FIG. 6.

INVENTORS.
Harry H. Norquist
BY Harry A. Gilbert
Attorney.

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 5

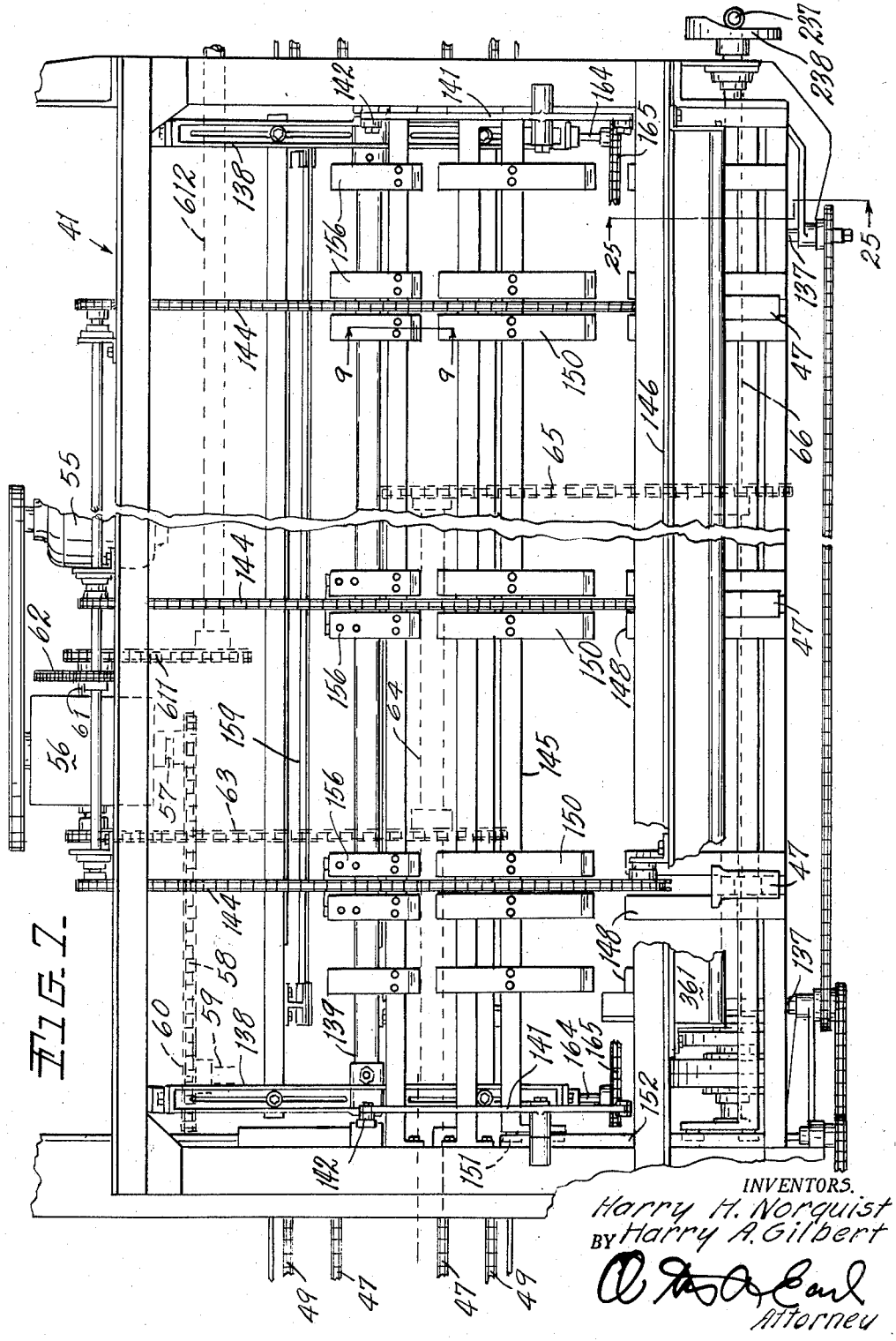


FIG. 7.

INVENTORS.
Harry H. Norquist
BY Harry A. Gilbert
Attorney

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 6

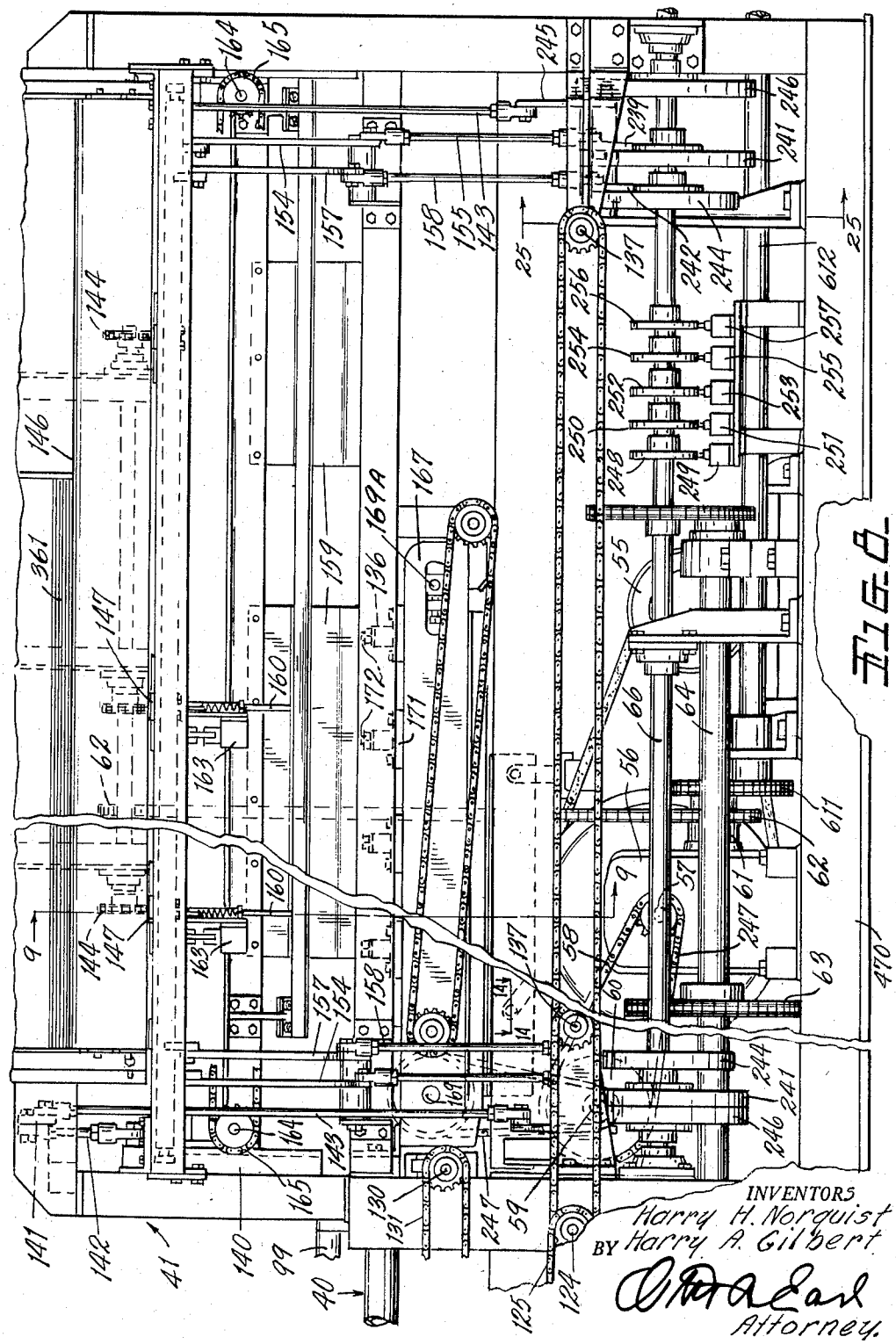


FIG. 8

INVENTORS
Harry H. Norquist
BY Harry A. Gilbert
Attorney.

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 7

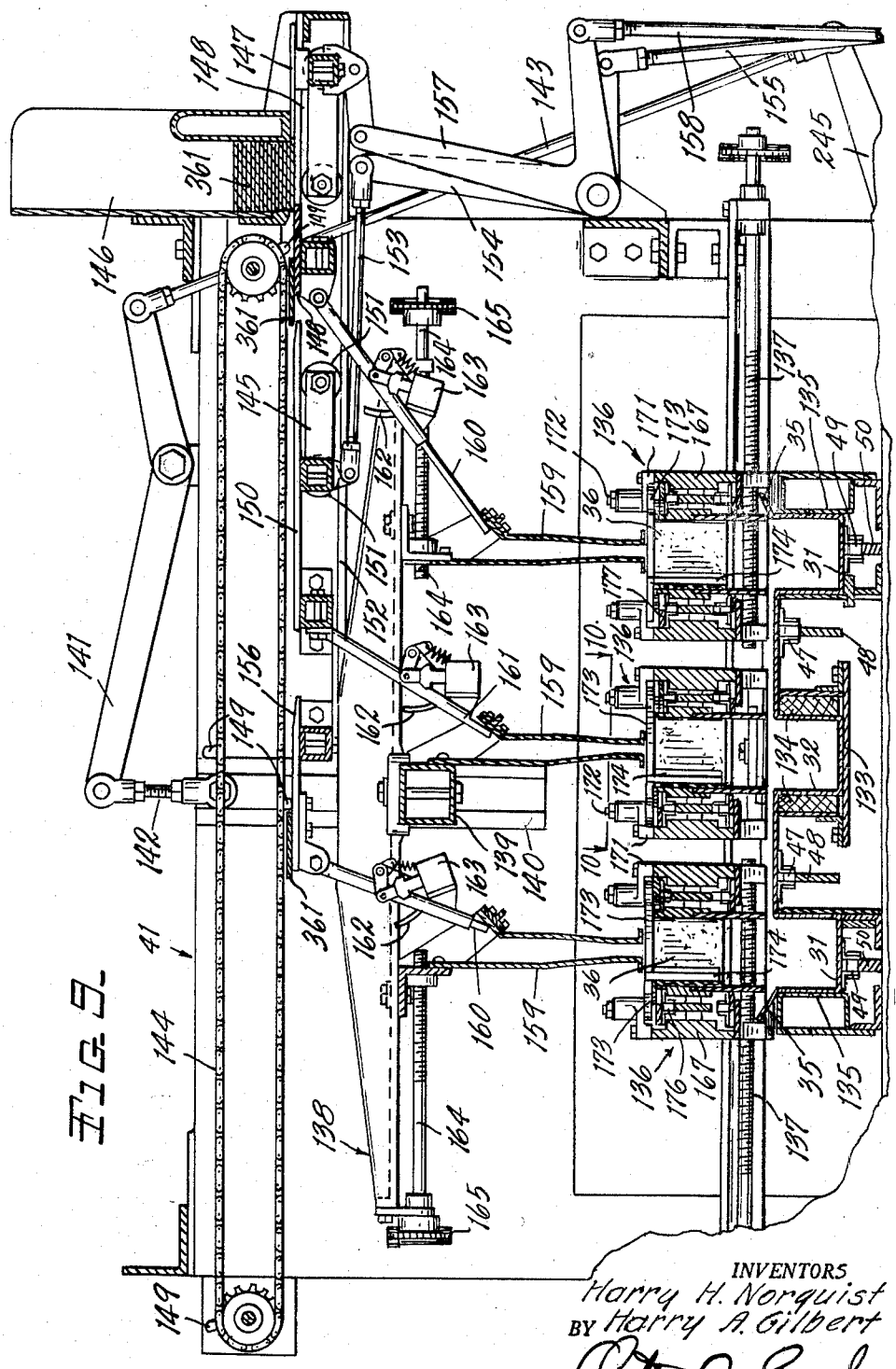


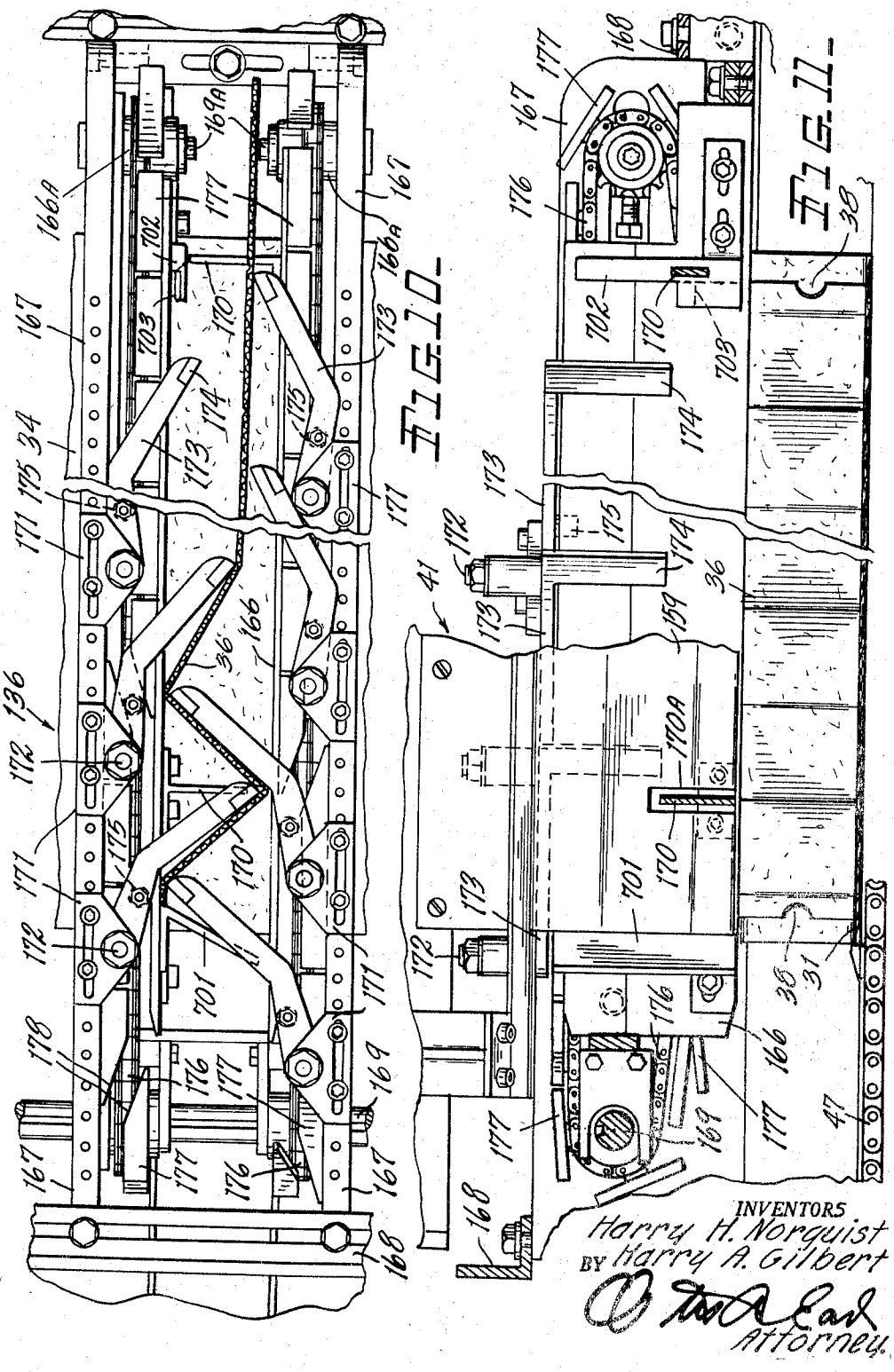
FIG. 9.

INVENTORS
Harry H. Norquist
BY Harry A. Gilbert
Otto A. Earl
Attorney.

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 8



INVENTORS
Harry H. Norquist
BY Harry A. Gilbert
Attorney

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 9

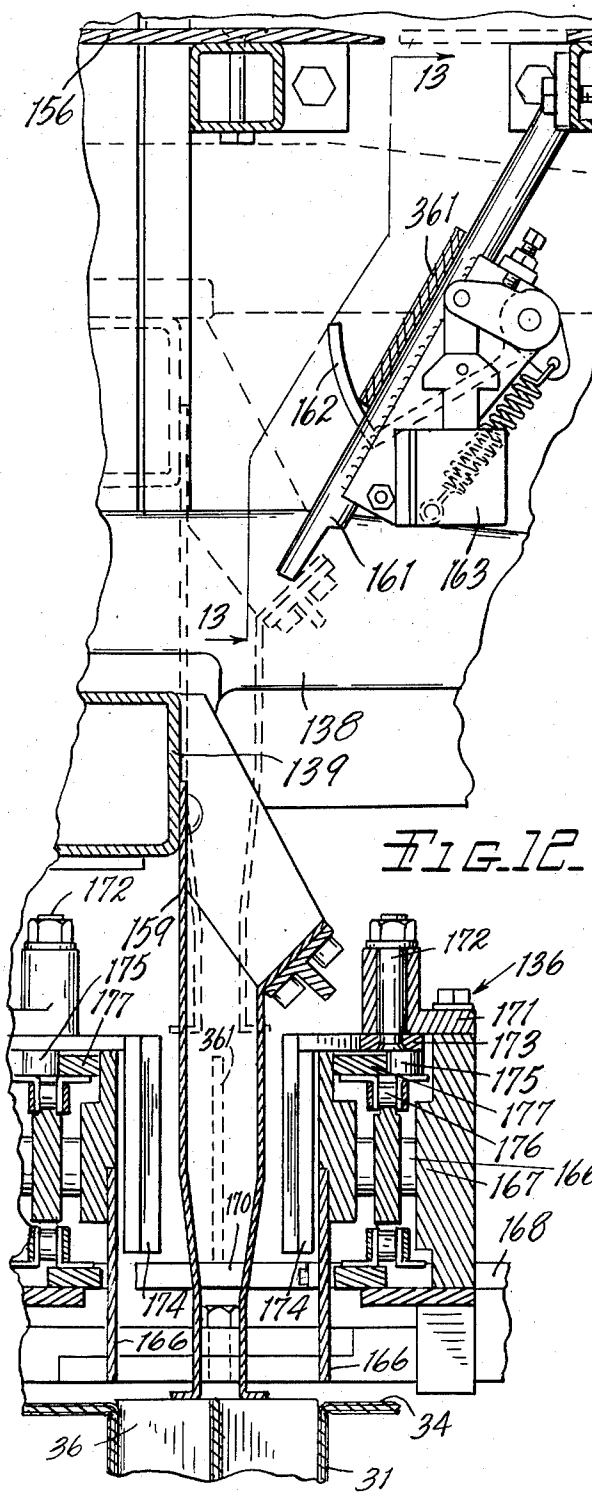


FIG. 12

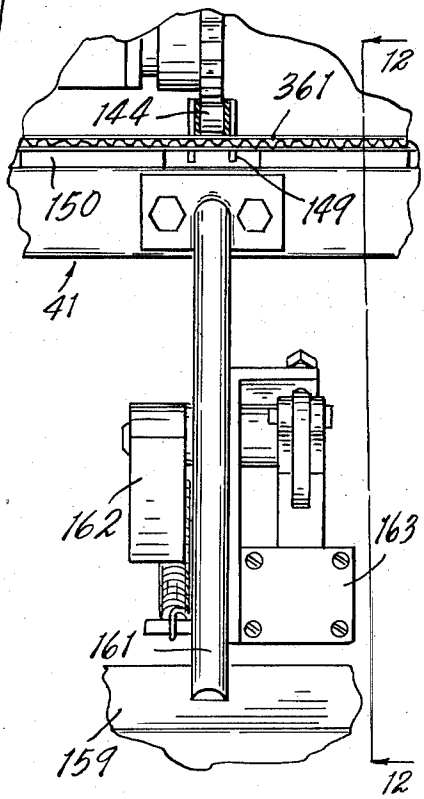


FIG. 13

INVENTORS
Harry H. Norquist
BY Harry A. Gilbert
Attorney

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 10

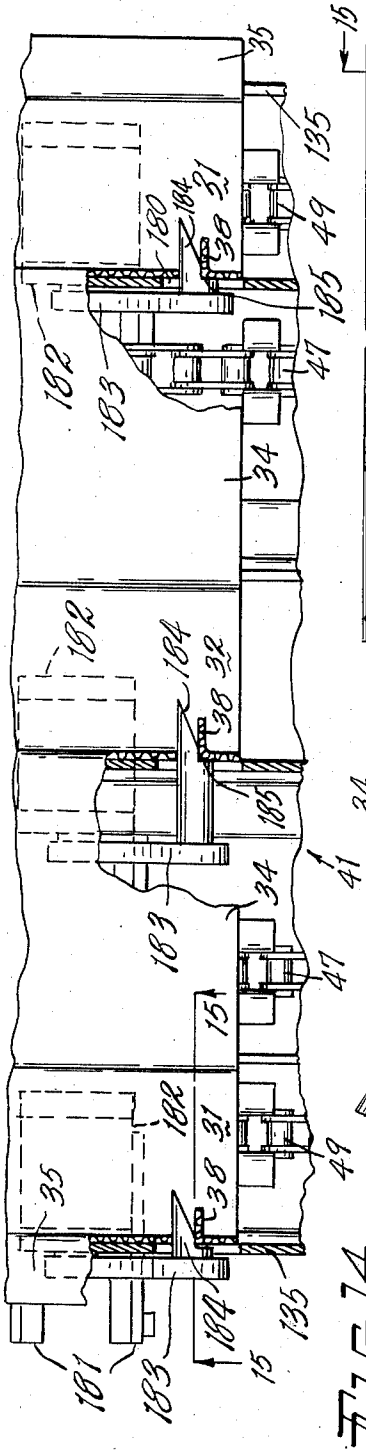


FIG. 14.

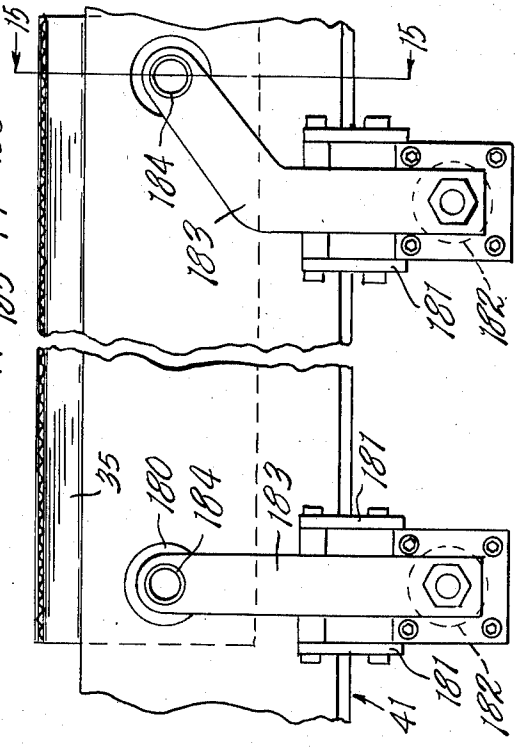


FIG. 16.

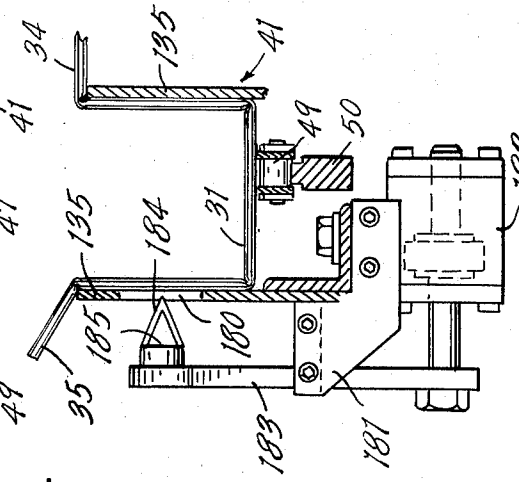


FIG. 15.

INVENTORS
Harry H. Norquist
BY Harry A. Gilbert
Attorney.

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 11

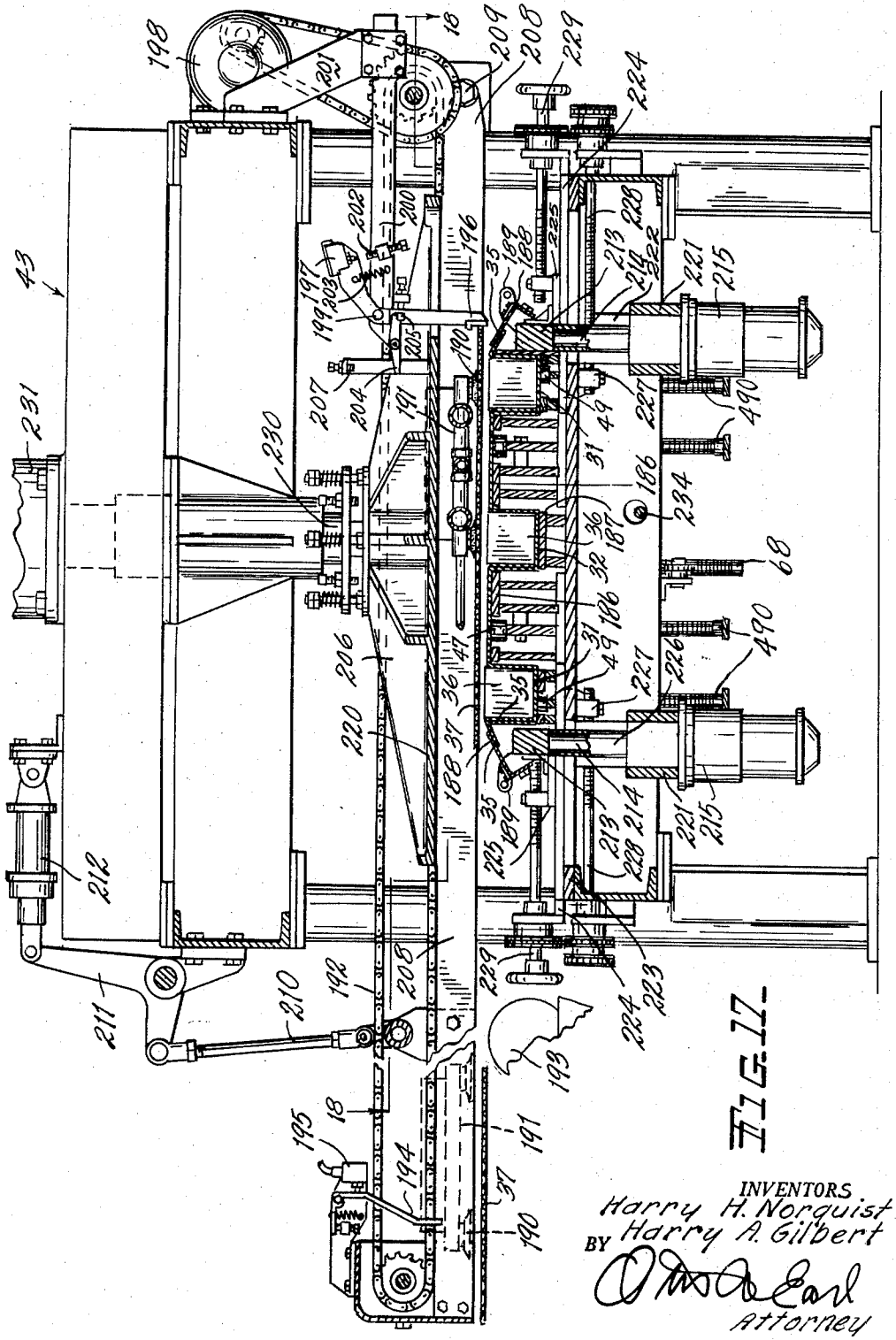


FIG. 17

INVENTORS
Harry H. Norquist
BY Harry A. Gilbert
Attorney

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 12

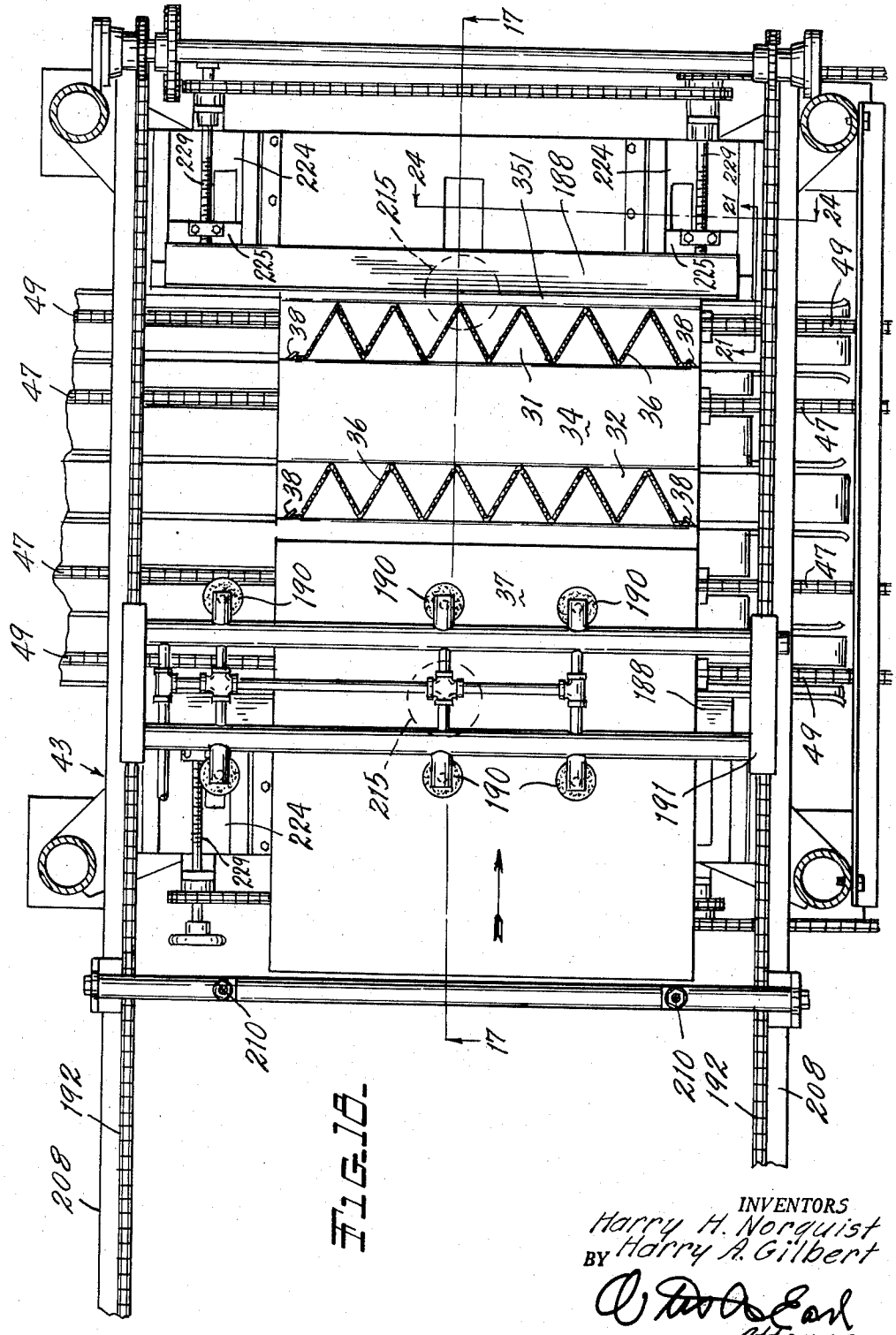


FIG. 10.

INVENTORS
Harry H. Norquist
BY Harry A. Gilbert
Attorney.

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 13

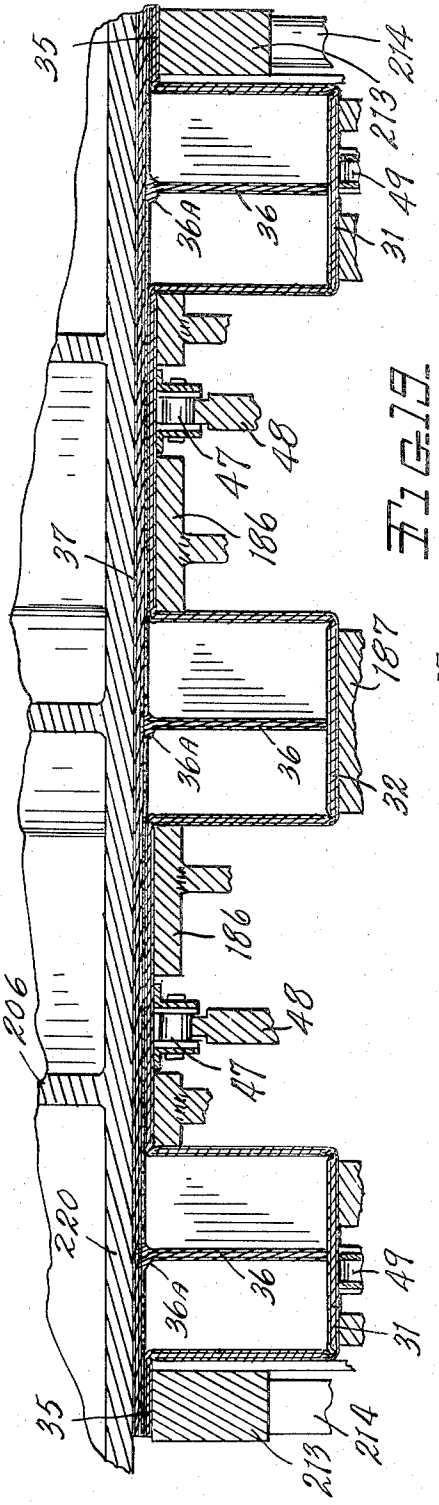


FIG. 19.

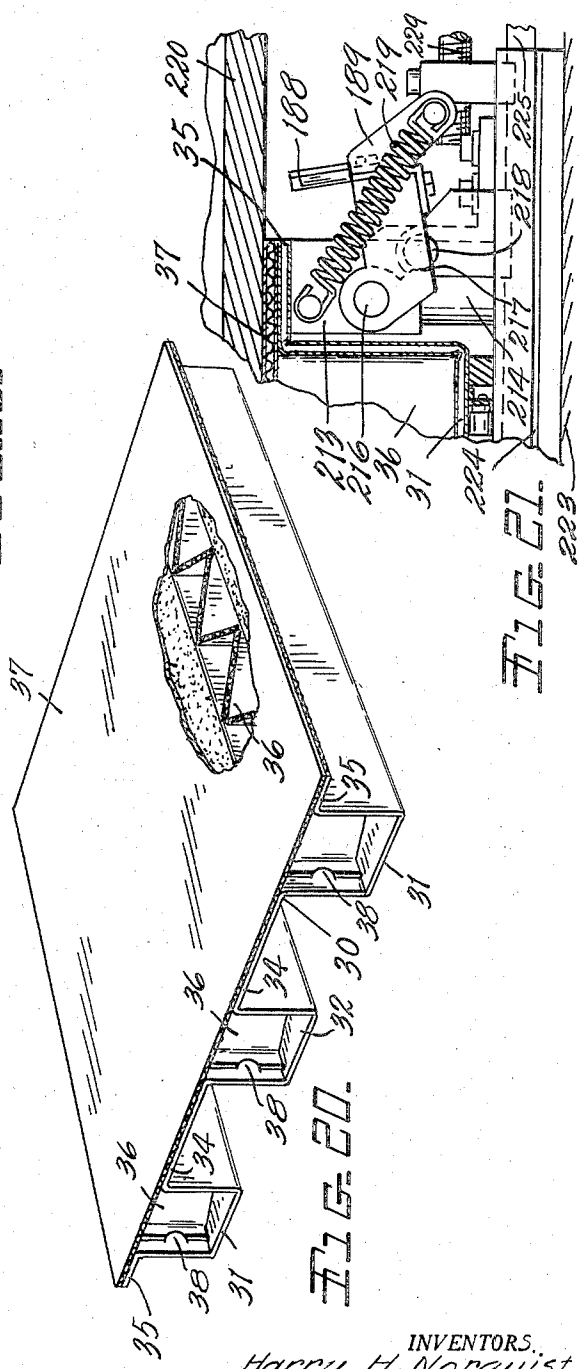


FIG. 20.

FIG. 21.

INVENTORS.
Harry H. Norquist
BY Harry A. Gilbert
Attorney.

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 14

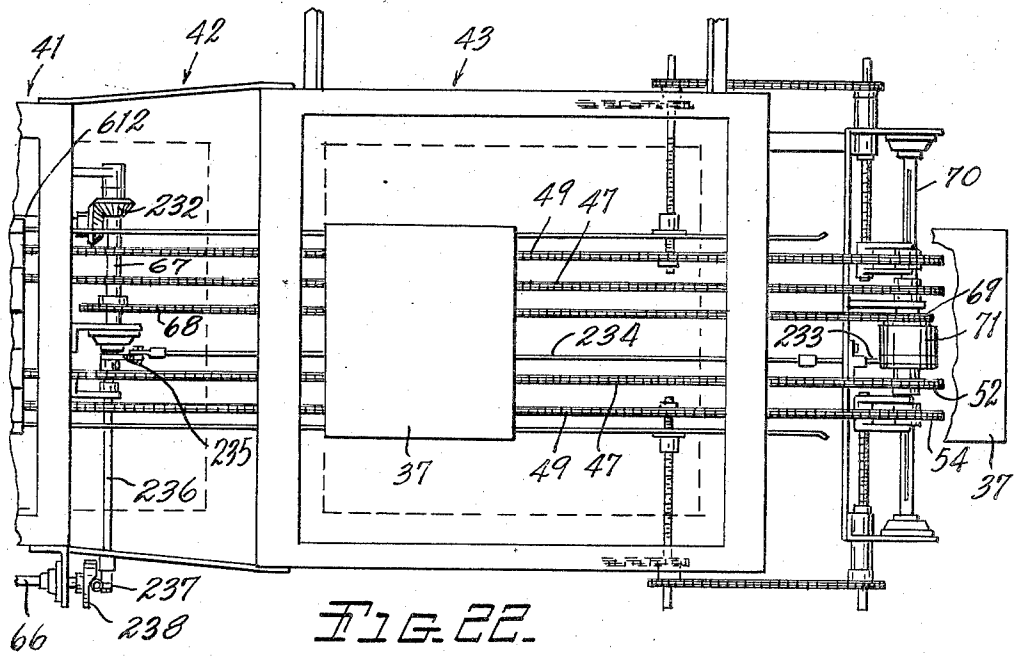


FIG. 22.

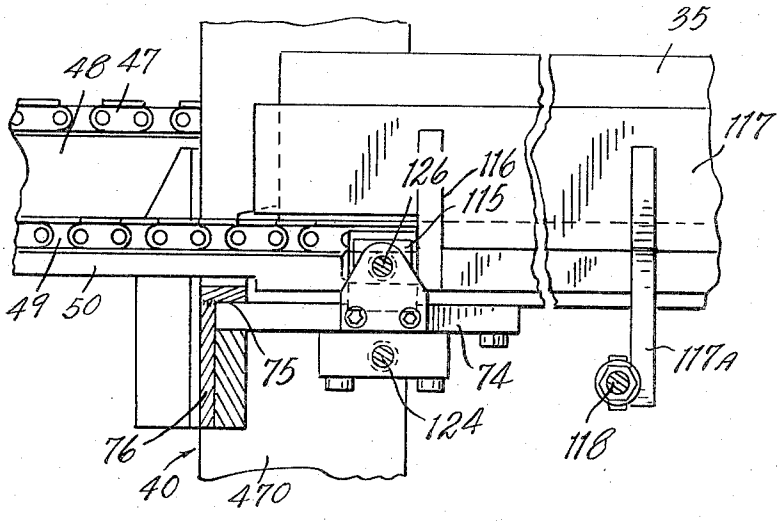


FIG. 23.

INVENTORS
Harry H. Norquist
BY Harry A. Gilbert
Attorney

Oct. 21, 1958 H. H. NORQUIST ET AL 2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Filed April 19, 1957 15 Sheets-Sheet 15

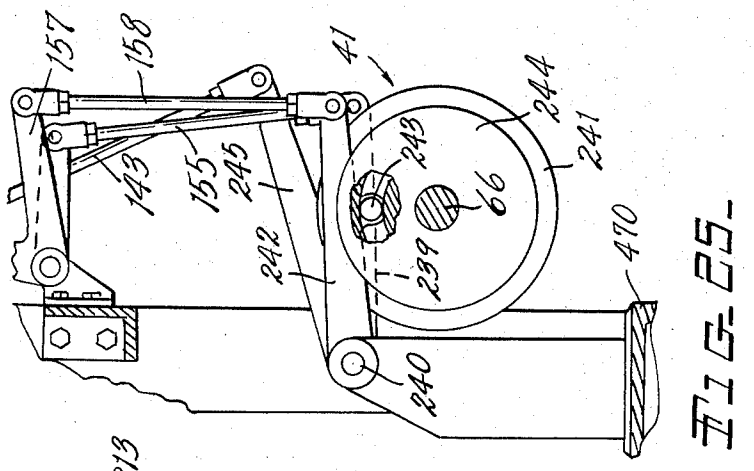


FIG. 25.

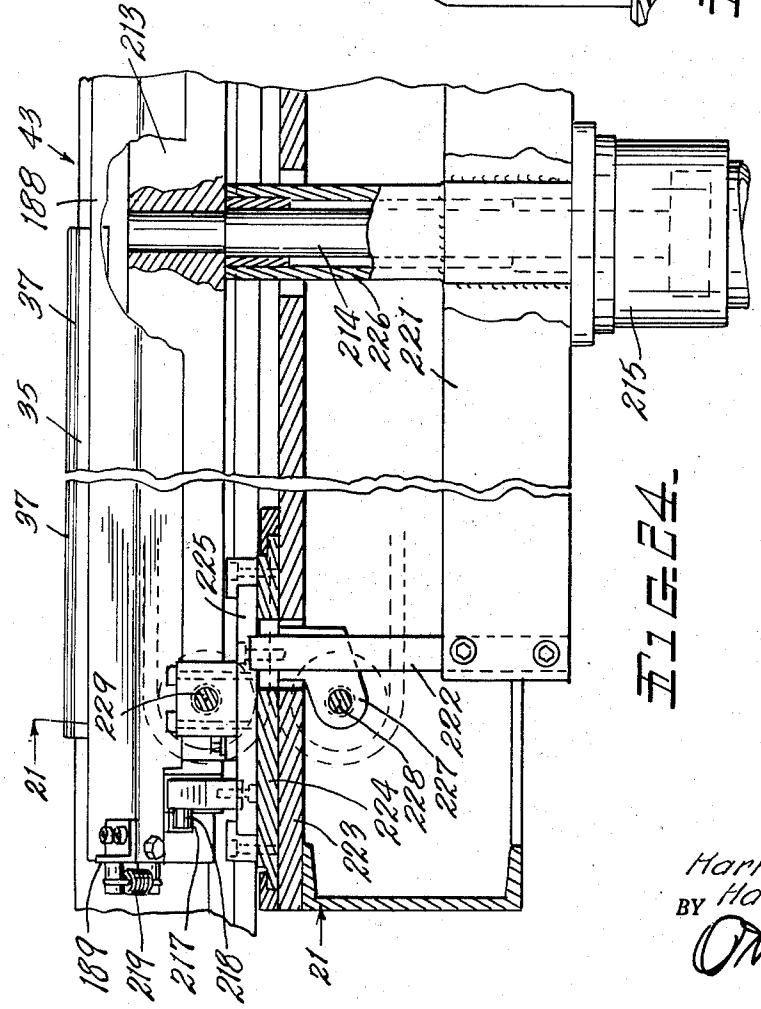


FIG. 24.

INVENTORS.
Harry H. Norquist
BY Harry A. Gilbert
Attorney.

United States Patent Office 2,856,826
Patented Oct. 21, 1958

2,856,826

MACHINE AND METHOD FOR FORMING DISPOSABLE PAPER PALLETS

Harry H. Norquist, Kalamazoo, and Harry A. Gilbert, Hickory Corners, Mich., assignors to Martinson Machine Company, Kalamazoo, Mich.

Application April 19, 1957, Serial No. 654,034

47 Claims. (Cl. 93—1)

This invention relates to improvements in machine and method for forming disposable paper pallets. Disposable paper pallets are defined as platforms formed of corrugated paper and suitably reinforced to support piles of cartons or other articles for handling as a unit. The pallets are designated as disposable in that they can be manufactured and used a single time and discarded at less expense than would be involved in using a wood or metal pallet and returning the pallet for a second use. The principal objects of this invention are:

First, to provide a machine which will successively bend a prescored corrugated bottom panel into a plurality of hollow U-shaped legs connected at the upper edges by coplaner surfaces and then insert horizontally zigzag reinforcing fillers into the U-shaped legs and finally secure a continuous top panel of corrugated paper over the tops of the bottom panel and the zigzag fillers.

Second, to provide a machine having the foregoing properties which can easily be adjusted to form pallets having different spacing between the U-shaped legs and legs of different widths.

Third, to provide a machine for distributing narrow strips of corrugated paper to the U-shaped legs of a bottom panel and folding the strips into zigzag form for insertion into the legs.

Fourth, to provide a mechanical drive including operating and control cams for actuating the conveyor and panel folding elements of the machine in timed relation.

Fifth, to provide means for forming anchors for the ends of zigzag strips within the U-shaped legs of the bottom panel of the pallet.

Sixth, to provide a novel method of forming a pallet in which a bottom panel is folded into spaced and connected U-shaped legs and reinforcing strips are folded into zigzag form and inserted into the hollow legs and retained at the ends after which a top panel is secured across the tops of the bottom panel and reinforcing strips to prevent the bottom panel and its U-shaped legs from opening laterally from their folded positions.

Other objects and advantages of the invention will be apparent from a consideration of the following description and claims. The drawings, of which there are 15 sheets, illustrate a highly practical form of the machine for forming the pallets and the steps involved in the method of forming the pallet.

Fig. 1 is a side elevational view, broken into two consecutive sections, illustrating the general arrangements, of the machine.

Fig. 2 is a fragmentary top plan view of the bottom panel forming station of the machine.

Fig. 3 is a fragmentary end elevational view of the bottom panel forming apparatus and station of the machine.

Fig. 4 is a perspective view of the bottom panel of the pallet as it is formed by the mechanism shown in Fig. 3.

Fig. 5 is a fragmentary transverse cross-sectional view through the bottom panel forming mechanism taken

along the plane of the line 5—5 in Fig. 2 and showing the mechanism and a bottom panel in unfolded starting position. An intermediate position of the bottom panel during the folding operation is indicated by the dotted lines.

Fig. 6 is a fragmentary transverse cross-sectional view showing the structure in Fig. 5 in further actuated bottom panel folding position.

Fig. 7 is a fragmentary top plan view of the reinforcing filler feeding and inserting section of the machine. Portions of the upper parts of the structure are broken away to illustrate lower parts.

Fig. 8 is a fragmentary side elevational view of the reinforcing filler feeding and inserting portion of the machine appearing in Figs. 1 and 7.

Fig. 9 is a fragmentary vertical transverse cross-sectional view through the reinforcing panel feeding and inserting mechanism taken along the plane of the line 9—9 in Fig. 8.

Fig. 10 is a fragmentary top plan view taken along the general plane of the line 10—10 in Fig. 9 illustrating the reinforcing and inserting mechanism in partially actuated zigzag forming position.

Fig. 11 is a fragmentary side elevational view of the structure shown in Fig. 10 with portions of the bottom panel and bottom panel holding mechanism broken away to illustrate the position of the zigzag reinforcing panel.

Fig. 12 is an enlarged fragmentary transverse cross-sectional view taken along the plane of the line 9—9 in Fig. 8 and illustrating in greater detail the reinforcing panel inserting mechanism in fully actuated position.

Fig. 13 is an enlarged fragmentary side elevational view of the reinforcing panel feed and control mechanism illustrated in end elevation in Fig. 12.

Fig. 14 is an enlarged fragmentary horizontal plan view, partially broken away in cross-section, of the reinforcing panel inserting station illustrating the structure for locating and anchoring the ends of the zigzag reinforcing panel in the hollow legs of the bottom panel of the pallet.

Fig. 15 is a fragmentary vertical cross-sectional view taken along the plane of the lines 15—15 in Figs. 14 and 16 and illustrating the abutment forming mechanism in retracted position.

Fig. 16 is an enlarged fragmentary side elevational view of the structure for forming the zigzag panel abutments in the bottom panel.

Fig. 17 is an enlarged fragmentary transverse vertical cross-sectional view through the top panel feeding and attaching section of the machine taken along the plane of the lines 17—17 in Figs. 1 and 18.

Fig. 18 is an enlarged top plan view of the top panel feeding mechanism shown in Fig. 17 with the top panel attaching press broken away along the plane of the lines 18—18 in Fig. 17.

Fig. 19 is an enlarged fragmentary transverse vertical cross-sectional view showing the top panel attaching mechanism in fully actuated position for connecting the flat top panel to the folded bottom panel and zigzag reinforcing panels.

Fig. 20 is a perspective view of the completed disposable pallet with portions broken away to illustrate the internal reinforcing elements thereof.

Fig. 21 is a fragmentary transverse cross-sectional view taken along the plane of the line 21—21 in Figs. 18 and 24 and showing the edge of the top panel attaching mechanism in fully actuated position.

Fig. 22 is a plan view of the trailing end of the pallet conveyor at the top panel attaching station showing the drive connections to the conveyor and the structure for laterally adjusting the conveyor, structure for attaching the top panel being omitted.

Fig. 23 is a fragmentary vertical longitudinal cross-sectional view taken along the plane of the line 23—23 in Fig. 3 and showing the structure for adjusting the spacing at the front end of the machine.

Fig. 24 is a fragmentary transverse vertical cross-sectional view taken along the plane of the line 24—24 in Fig. 18.

Fig. 25 is a fragmentary transverse vertical cross-sectional view taken along the plane of the line 25—25 in Figs. 1, 7 and 8 showing the operating cams for the reinforcing panel folding and inserting mechanism.

The pallet which is formed by the machine and method of the invention is made up entirely of heavy corrugated paperboard of suitable weight. The pallet itself is more clearly illustrated in Figs. 4 and 20 which show the pallet to be made up of an integral bottom panel 30 that is prescored longitudinally and folded into depending side legs 31 and a center leg 32 of upwardly opening rectangular U-shaped cross-section. Desirably the inner corrugations within the panel itself extend transversely of the panel as shown at 33 in Fig. 4 so that the folds forming the legs 31 and 32 extend transversely across the corrugation of the panel. The upper edges of the legs 31 and 32 are connected by flat top surfaces 34 that determine the spacing between the legs. Lateral marginal flanges 35 are left on the outer edges of the outer legs and in the completed pallet these flanges are folded into coplaner relation with the connecting top surfaces 34.

The interiors of the hollow legs 31 and 32 are reinforced by zigzag reinforcing panels 36 that are arranged vertically on edge and folded into horizontal zigzag reaches extending between the opposed side walls of the legs. The open tops of the hollow legs are closed by a continuous flat top panel 37 secured as by gluing to the tops of the connecting surfaces 34 and the marginal flanges 35 and to the upper edges of the zigzag reinforcing panels 36. The longitudinal ends of the zigzag panels 36 are retained longitudinally within the hollow legs by ears 38 struck inwardly from the sides of the legs. Desirably but not necessarily the vertical height of the zigzag panels 36 is slightly greater than the depth of the hollow legs 31 and 32 so that when the top panel 37 is pressed down upon the bottom panel the upper edges of the reinforcing panels 36 are slightly compressed and deformed as appears at 36A in Fig. 19. As thus described the pallet is surprisingly strong and capable of supporting relatively large vertical loads so that fork trucks can be used to handle loads by inserting the forks of the truck between the legs 31 and 32. Because of the ease with which the pallet can be formed with the machine and method described the cost of the pallet is sufficiently low to permit it to be discarded after a single use.

GENERAL ARRANGEMENT OF THE PALLET FORMING MACHINE

The general arrangement of the pallet forming machine appears most clearly in Fig. 1. For the purpose of description the machine may be considered to consist of a receiving or feeding section 39 to which prescored bottom panels 30 are delivered in flat position with the score lines extending longitudinally of the panel and of the machine. Next adjacent to the feeding station 39 on the right as appears in Fig. 1 is the bottom panel folding station 40 the details of which appear most clearly in Figs. 2 to 6. From the bottom panel folding station 40 the folded bottom panels are delivered to the zigzag reinforcing panel feeding and inserting station 41. The details of this station are disclosed in greater detail in Figs. 7 to 16 and 25. From the zigzag forming and inserting station the partially completed pallets are advanced through an idler station 42 to the top panel attaching station 43. The details of the top panel attaching station appear in Figs. 17 to 22 and 24. When the speed at which the machine is to be operated is slow enough to permit setting of the glued connections at the top panel attaching station 43 this will complete the machine. However, when the speed of operation of the machine does not provide sufficient drying time in the attaching station 43 an additional holding station 44 in the form of a supporting conveyor 45 and top panel holding conveyor 46 may be added to hold the top and bottom panels together while the glued connections set.

The several portions and operating elements of the machine are supported by a suitable framework which will be referred to generally by the reference numeral 470. It will be appreciated that various forms of supporting and connecting structures may be devised to support the operating elements of the machine. The pallets and the initial bottom panels 30 on which they are formed are conveyed continuously through the machine in a step by step fashion by a feed conveyor 47 consisting of two transversely spaced link chains supported by suitable rails 48. After the bottom panel has been folded to form the hollow legs 31 and 32, additional conveyor chains 49 supported by rails 50 are provided to assist in supporting and advancing the pallets. The feed conveyor 47 is trained over idler sprockets 51 at the inlet end of the machine and is driven by drive sprockets 52 at the discharge end of the machine. The lower conveyor chains 49 that support the bottoms of the legs are trained over idler sprockets 53 located under the middle of the receiving section 39 (see Figs. 1, 22, and 23) and extend longitudinally through the machine to drive sprockets 54 at the discharge end of the machine. In passing through the top panel attaching station 43, the lower reaches of the chains 47 and 49 are trained downwardly as at 490 in Fig. 1 to clear the supports that support the pallet against the pressure of the top panel press.

Drive connections

The main power source and drive connections of the machine consist of a motor 55 mounted under the reinforcing panel inserting station 41 and connected to a speed reduction transmission 56 (see Figs. 1, 7 and 8). The transmission 56 has a first power take-off shaft 57 projecting transversely of the machine and connected by the chain 58 to a transverse shaft 59 carrying the gear 60. The shaft 59 drives the reinforcing panel folding mechanism as will be described in greater detail presently. A longitudinally extending output shaft 61 of the transmission drives a first gear and chain 62 with the chain extending upwardly to drive the reinforcing panel distributing and feeding mechanism as will be described. At the forward side of the transmission the shaft 61 drives a transversely extending chain 63 (see Figs. 7 and 8) that is trained around a sprocket on the longitudinally extending distribution shaft 64. The shaft 64 is chain connected as at 65 to a longitudinal shaft 66 having cams thereon for actuating various parts of the machine as will appear presently. The transmission shaft 61 also drives a chain 611 to a conveyor drive shaft 612 (see Figs. 1, 7 and 8). A transverse cross shaft 67 located at the rear of the inserting station 41 and under the idler station 42 is driven from the shaft 612 and in turn drives a chain 68 extending rearwardly to a sprocket 69 (see Fig. 22) on the rear drive shaft 70. A clutch 71 drivingly connects the sprocket to the drive shaft for operating the previously described sprockets 52 and 54 and the conveyor chains 47 and 49.

Bottom panel folding station 40

The construction and operation of the bottom panel folding station is disclosed more clearly in Figs. 2 to 6 and 23. The flat bottom panels indicated by the reference character 30 and prescored longitudinally as at 72 are advanced into the folding station 40 where they are supported by the chains 47. Located laterally outwardly from the chains 47 are two longitudinal backing rails 73.

The rails 73 are connected to slides 74 that are transversely slidably supported on slideways 75 (see Fig. 23) on the cross beams 76 of the framework. The slidable mounting of the backing rails 73 is provided for adjusting the machine for forming panels and pallets of different widths as will be described presently. For the time being the backing rails 73 will be considered as stationary.

At each end of the folding station the cross beams 76 are provided with upstanding brackets 77 rotatably supporting stub shaft 78 on which meshing gears 79 are mounted in the transverse center of the machine between the backing rails 73. The shafts 78 carry longitudinally extending folding plates 80 that are thus swingable or rotatable about longitudinal axis to swing between the outwardly inclined portion shown in Fig. 5 and the upwardly extending parallel portion shown in Figs. 3 and 6. The plates 80 have wooden facing strips 81 bolted thereto which can be removed to increase the effective spacing between the folding plates. One of the plates 80 has a crank arm 83 connected thereto (see Figs. 2 and 3) and depending therebelow for connection to a transversely extending push rod 84. The outer end of the push rod 84 is connected to a lever 85 pivotally supported at its lower end on a pivot shaft 86 on the left side of the machine as appears in Figs. 2 and 3. The lever 85 carries a cam follower (not illustrated) engagable with the cam 88 on a cam shaft 89 extending longitudinally along the left side of the machine. Rotation of the cam shaft 89 and cam 88 thus function to oscillate the meshing gears 79 and swing the folding plates 80 between their advanced folding position and retracted open position.

Positioned in the approximate center of the folding station 40 is an upright air cylinder 90 having a piston 91 therein yieldably supported by a spring 92 (see Fig. 3) and air pressure in the cylinder. The spring 92 normally supports its piston and the piston rod 93 carried thereby in elevated position directly under the center of the bottom panel 30. A top pressure rail 94 of rectangular cross-section is supported longitudinally above a longitudinal shoe 95 on the piston rod 93 in opposed relation thereto. The pressure rail 94 can be changed in width by having the wooden facing plates 81 bolted thereto as indicated by the dotted lines 81A in Fig. 5 when the facing plates are removed from the folding plates 80. The pressure rail 94 has a top plate 96 that projects laterally beyond the sides of the rail. Hangers 97 projecting above the pressure rail at each end thereof are pivotally connected to levers 98 extending laterally to the right side of the machine. The levers 98 are pivotally supported at 99 and connected at their outer ends to depending pull rods 100. The pull rods 100 extend downwardly to levers 101 supported at the right side of the machine by pivots 102. The levers 101 have cam followers 103 engaged with cam wheels 103A on a longitudinal cam shaft 104 extending along the right side of the machine. Rotation of the cam shaft 104 thus functions to raise and lower the pressure rail 94 and when lowered the pressure rail presses the center of the bottom panel against the backing shoe 95 on the yieldably supported piston rod 93 and depresses the pressure rail and shoe as shown in Fig. 6. In so doing the bottom panel 30 is bowed downwardly as indicated by the dotted lines at 30A in Fig. 5. After the pressure rail 94 is fully depressed the side folding plates 80 are swung upwardly and inwardly to fold the sides of the center leg 32 of the panel against the sides of the pressure rail 94. The overhanging edges of the top plate 96 of the pressure rail form sharp right angle bends or folds at the upper edges of the center leg as is shown in Fig. 6.

Since it is not desired to raise the shoe 95 immediately or while the pallet bottom panel is still resting thereon, the piston 91 has a sealed sliding fit in the cylinder 90 to draw air into the top of the cylinder through a valve 87. The piston rod has a packed sliding fit (not illustrated) in the upper end of the cylinder. The valve 87 is actuated by a push rod 871 extending from the cylinder to the left side of the machine where it is connected to a lever 872 (see Fig. 2). The lever 872 carries a follower 873 engaged with a cam 881 on the shaft 89. The cam 881 is contoured to hold the valve 87 closed until after the bottom panel 30 is fully formed and has been advanced on to the reinforcing panel inserting station 41. The valve 87 is then opened to let air escape from the top of the cylinder 90 so that the spring 92 raises the shoe 95 to support the next succeeding panel 30 for folding.

Positioned above the cross beams 76 at each end of the folding station 41 are upper cross beams 105. The cross beams 105 have slideways 106 adjustably supporting bearing blocks 107. The bearing blocks 107 rotatably support cranks 108 slightly above and laterally inwardly from the upper edges of the backing plates 73 (see Fig. 5). The outwardly and downwardly facing surfaces of the cranks 108 support upper folding plates 109 of angular cross-section that are thus swingable downwardly into opposed relation to the angled backing plates 73. At the front end of the folding station as appears in Fig. 3 the cranks that support the upper folding plates are provided with actuating levers 110 connected to laterally extending push rods 111. The push rods 111 are connected at their outer ends to upright levers 112 pivotally supported at their lower ends on the pivot shafts 86. The levers 112 carry followers 113 engaged with box cams 114 on the ends of the previously described cam shafts 89 and 104. Rotation of the cam shafts 89 and 104 thus functions to swing the upper folding plates 109 downwardly and fold down the laterally inner side walls of the outer legs 31 of the bottom panel of the pallet. The angled shape of the upper folding plates 109 forms a sharp bend or fold at the bottom of the legs and presses the bottoms of the legs into supported engagement with the previously mentioned lower conveyor chains 49.

Slidably adjustably mounted on the slides 74 and the lower cross beam 76 just outside of the lower chains 49 are bearing blocks 115. The bearing blocks 115 pivotally support levers 116 having longitudinally extending side folding plates 117 supported therebetween. In their center the plates 117 have crank arms 117A pivotally connected to push rods 118 extending laterally outwardly to upstanding levers 119 on the pivot shafts 86. The levers 119 have cam followers engaged with cams 120 on the cam shafts 89 and 104 so that the side folding plates are swung upwardly to fold up the outer sides of the side legs 31. The marginal flanges 35 of the pallet bottom panel are left standing erect but the panel is partially broken at the score line of the marginal flanges by reason of being drawn outwardly underneath longitudinally extending hold down plates 121 (see Figs. 2 and 3) supported over the side edges of the bottom panel by the support bars 122 connected to the sides of the framework. The folded bottom panel is then ready to be advanced to the reinforcing panel inserting station 41.

Drive and adjustment connections of the bottom panel forming station

The cam shafts 89 and 104 which actuate the several folding elements at the folding station are driven from the previously described distributor shaft 64 by laterally extending chain loops 123 (see Fig. 3) trained around sprockets on the distributor shaft and the cam shafts. Rotation of the cam shafts is continuous during the operation of the machine and the angular spacing and configuration of the several cams is adjusted to provide the proper operating sequence of the several folding elements.

The width of the center leg 32 of the pallet can be changed as previously described by removing or chang-

ing the position of the wooden face plates 81 from the center folding plates to the sides of the pressure shoe 94. In order to adjust the machine for a wider pallet the slides 74 that support the backing plates 73 are moved radially outwardly by rotation of laterally extending screw shafts 124 (see Figs. 3, 5 and 23). The shafts 124 extend laterally to the sides of the machine and there is a pair of shafts at the front and back of the folding station. Chain loops 125 are trained around sprockets on the ends of the screw shafts so that all shafts can be adjusted simultaneously.

The bearing brackets 115 which support the side folding plates 117 also must be adjusted to change the width of the leg sections formed and to this end the bearing brackets 115 are slidably mounted on the slides 74 and are adjustable with respect thereto by laterally extending screw shafts 126. The screw shafts 126 extend part way out toward the side of the machine and are connected by chain loops 127 so that adjustment of the hand wheels 128 will adjust the screw shafts 127. The push rods 118 which actuate the folding plates have longitudinally adjustable connections 129 to permit the proper positioning of the crank arms 116 in all adjusted positions of the bearing brackets 115.

The bearing brackets 107 that support the top folding plates are slidably adjustable on the ways 106 and are moved laterally by screw shafts 130. The shafts 130 extend to the sides of the machine where they are connected by chain loops 131 for simultaneous adjustment of the bearing brackets on either side of the machine. The length of the push rods 111 is adjustable by a telescopic section having a releasable clamping connection 132.

Reinforcing zigzag panel inserting station

After the bottom panels have been formed to provide the spaced channel shaped legs as described they are advanced by the conveyor chains 47 and 49 to the reinforming panel inserting station 41, the construction and operation of which is most clearly shown in Figs. 7 to 16. As appears most clearly in Fig. 9 the station consists of a lower support for the chains 47 and 49 and for the bottom of the center legs 32. The support consists of suitable longitudinally extending rails, center rail 133 having side walls 134. Side rails 135 laterally retain the sides of the laterally outer legs. The previously described rails 49 and 50 support the conveyor chains. Positioned immediately above the bottom panel supports are three folding units indicated generally at 136. The center folding unit is fixed over the center leg of the panel and the side units are laterally adjustable by means of the screw shafts 137 to register with the side legs of the panels. Positioned vertically above the folding units is a feed and pressure head 138 supported on a longitudinal beam 139 that is vertically reciprocal by a crank 141 connected by the suspension rods 142 to the head. A push rod 143 actuates the head as will be described. The head includes structure for regulating the feed of reinforcing panels to the several panel folding units as will be described. Positioned above the feed head 138 is a distributor conveyor 144 and control gate 145 that coact with a stationary magazine 146 to distribute a reinforcing panel to each section of the head 138.

Considering first the distributing conveyor 144 and the gate 145 and with particular reference to Figs. 7, 8 and 9 it will be noted that the magazine 146 is supported in a fixed position along one side of the machine and is considerably longer than the length of the pallets to receive and store long flat blanks 361 from which the zigzag reinforcing panels 36 are formed. Laterally reciprocable feed shoes 147 sliding between support rails 148 and across the bottom of the magazine feed individual blank strips 361 out of the magazine and into the path of the feed dogs 149 on the transversely extending distributor conveyor chains 144. The feed dogs 149 advance the strip laterally across the supporting strips 150 of the gate 145. The gate 145 is supported at its front and rear ends by rollers 151 (see Fig. 9) rolling in a transverse track 152. The gate 145 is reciprocated by a push rod 153 connected to the crank 154 and in turn actuated by a push rod 155. In its retracted position toward the right side of the machine as appears in Fig. 9 the supporting strips 150 of the gate approach the edges of the support rails 148 and prevent the panels 361 from falling downwardly at this point. The reinforcing panels are thus conveyed across the supporting strips 150 of the gate and if the gate is in retracted position will fall downwardly over the left edge of the gate. The left edge of the gate is closable in the advanced position of the gate against the ends of fixed support bars 156 so that reinforcing panels can be translated by the conveyor beyond the gate 145. The feed shoes 147 are actuated by link connections to a crank 157 and a push rod 158 in timed relationship with the gate as will be described.

The feed head 138 carries three longitudinally extending laterally spaced feed chutes 159. Inclined guide rods 160 extending between the sides of the side guide chutes and the edges of the fixed support rails 148 and 156 direct reinforcing panels that fall over the edges of the fixed plates into the side chutes 159. Other inclined bars 161 guide panels that fall over the edge of the gate into the center feed chute.

Each of the inclined bars 160 and 161 carries a movable stop finger 162 designed to intercept and support the reinforcing panels prior to entry into the feed chutes. The fingers 162 are swingably mounted and connected to be actuated simultaneously by the electrically operated solenoids 163.

To accommodate the head 138 for adjustment along with the other portions of the machines the side feed chutes 159 are slidably supported and adjustable laterally by screw shafts 164. The shafts 164 are connected on each side of the machine by chain loops 165.

After a reinforcing blank has been distributed to each of the intercepting fingers the solenoids 163 are actuated to drop the reinforcing blanks which are then distributed by the feed chutes 159 to the folding units 136.

The construction and operation of the folding units 136 is most clearly illustrated in Figs. 10 to 12. Each folding unit consists of side plates 166, spaced apart by the same distance as the sidse of the pallet leg positioned therebelow, and laterally outer support bars 167. Each side plate is held in fixed spaced relation to its associated support bar by spacers 166A. The ends of the support bars 167 are adjustably supported from transverse cross beams 168 of the framework of the machine. A transverse shaft 169 extends transversely through both the inner side plates 166 and the support bars 167 of all the folding units while stub shafts 169A project inwardly from the rear ends of the support bars of each folding unit. Transversely projecting seats 170 project from the inner sides of the side plates 166 to intercept and support the edges of the flat reinforcing panels 361 as they are delivered to the folding units by the chutes 159. The lower edges of the chutes are slotted as at 170A in Fig. 11 to clear the seats when the chutes are depressed.

Secured to the upper edges of the outer bars 167 are a plurality of upright bearing brackets 171. The brackets 171 are staggered along opposite sides of the folding unit and support pivot pins 172 about which the laterally outer ends of folding levers 173 are pivoted. The folding levers 173 project inwardly over the side plates 166 and have depending vertical folding arms 174 on their inner ends. Each folding lever 173 carries a depending tappet 175 that is movable laterally between the inner side plate 166 and the outer support bar 167.

The previously mentioned shafts 169 and 169A carry sprockets around which folding chains 176 are trained. The chains carry cam blocks 177 that are selectively positioned and cammed to opposite sides of the chain as indicated at 178 in Fig. 10 to successively engage the

tappets **175** and swing the folding arms **174** inwardly against the flat reinforcing panel and across the space between the side plates **166** to form the flat panels into the zigzag panels as shown in Fig. 10. Adjustment of the bearing brackets **171** permits adjustment of the spacing of the folding arms and the length of the corrugations formed in the reinforcing panel.

The front edge of the flat panel **361** is cammed rearwardly and the first fold is formed therein against the transverse cam plate **701** and succeeding zigzag folds are then formed in the panel thus shortening it to clear the rear seat **170**. The forward seat **170** is located to lay within a corrugation or fold and so no longer supports the panel. The rear edge of the panel is folded and snapped over a guide rib **702** and located above a vertical guide slot **703** so that when the folded reinforcing panel **36** is pressed downwardly from between the side plates its ends are held against expansion and guided into the proper position in the leg of the pallet positioned therebelow.

In order to prevent the newly folded zigzag reinforcing panel from unfolding and expanding longitudinally from the ends of the legs of the pallet the side walls of the pallet legs are slit and bent inwardly in retaining ears **38** formed by structure appearing in Figs. 14 to 16. At the proper positions, the side rails **135** that support the pallet legs below the folding units are apertured as at **180** and guide plates **181** are secured to the bottoms of the side plates to support air cylinders **182**. The guide plates **181** guide upstanding arms **183** connected to the pistons of the air cylinders. The arms **183** carry punch pins **184** that are reciprocated by the air cylinder through the apertures **180** to pierce the side walls of the pallet legs and fold the tabs **38** inwardly. As illustrated the pins **184** are desirably provided with angled shoulders **185** to form sharp bends at the bases of the tabs.

After the three reinforcing panels for each pallet have been folded into zigzag shape, the head **138** and its depending feed chutes **159** are lowered from the retracted position shown in Fig. 9 to an advanced position shown in Fig. 12. The longitudinal extending lower edges of the chutes **159** extend transversely of the upper edges of the reinforcing panels which are now zigzag in shape so that lowering of the feed chutes presses the zigzag reinforcing panels out of the folding units firmly to the bottom of the hollow legs and between the ears **38**. The head **138** is then retracted or elevated and the pallet is ready to advance to the top panel attaching station **43**. During the folding and inserting of the zigzag reinforcing panels, the distributing conveyor **44** and the gate **145** have been operating to distribute an additional set of three flat reinforcing blanks to the intercepting fingers **162** so that the apparatus is ready to immediately commence a succeeding operation.

Top panel attaching station

The folded bottom panels of the pallet with the reinforcing zigzag panels in the legs are advanced by the conveyor chains to the top panel attaching station **43** where the center connecting portions **34** are firmly supported by strong support plates **186** (see Fig. 17). In addition to the conveyor chains the bottoms of the legs of the pallet are firmly supported by plates **187**. The marginal flanges **35** of the bottom panel which have heretofor projected loosely from the bottom panel are drawn downwardly by deflecting plates **188** mounted on crank arms **189** at the ends of the station. In this position the top of the partially completed pallet is clear to receive the top panel of the pallet. The top panel **37** is picked up by suction cups **190** carried by a delivery frame **191**. The frame **191** is movably supported at its front and rear ends by a transverse chain conveyor **192** which reciprocates the frame to a laterally disposed pick-up position as shown in Fig. 17 and advances the top panel across a glue applying roll **193**. A stop finger **194** engageable by the frame **191** actuates a limit switch **195** to stop outward motion of the pickup frame while a limit stop **196** is engaged by the right edge of the top panel to actuate the limit switch **197** and stop inward feeding motion of the top panel and the delivery frame in proper position over the partially completed pallet. The transverse feed conveyor chains **192** are reversably driven by the motor **198** mounted on the side of the machine. Suitable switching controls not illustrated reversably actuate the motor in timed relation with the other elements of the machine.

The limit stop **196** is pivotally supported at **199** on a supporting beam **200** that is slidably adjustable in the bracket **201** at the side of the machine to permit adjustment for different widths of pallets. The switch **197** carried by the limit stop **196** is urged against an adjustable stop screw **202** by the spring **203**. In order to hold the switch **197** out of contact with the stop screw **202** and to prevent the limit stop **196** from exerting a returning pressure on the top panel **37** after it is released by the suction cups **190**, a lock lever **204** is pivoted on the bar **200** and weight biased to fall into blocking engagement with the lug **205** on the stop lever. The switch **197** is thus held in position to reversibly energize the motor **198** until the frame **191** is retracted and until the pressure head **206** is depressed as will be described. The pressure head **206** carries a trip screw **207** that engages the inner end of the lock lever **204** to release the lock and permit the stop lever **196** to assume its operative position.

In order to permit retraction of the frame **191** and the suction cups **190** to the supply stack of top panels without contacting the glue roll **193** the entire conveyor **192** is carried on a cross frame **208** pivoted at the right side of the machine at **209** and supported at the left side by suspension links **210**. The links **210** are actuated by bell cranks **211** operated by air cylinders **212** mounted on top of the top panel attaching station **43**.

After the freshly glued top panel is advanced over the bottom panel and the reinforcing zigzag panels, the marginal flanges **35** and the hold down plates **188** are released by structure shown most clearly in Figs. 17, 21 and 24. Longitudinally extending marginal support bars **213** extend along the sides of the pallet underneath the margin flanges and these bars are supported in the center by the piston rods **214** of air cylinders **215**. At their ends the bars **213** carry pivots **216** to which the inner ends of the crank arms **189** are attached. As the bars **213** are elevated cam surfaces **217** on the crank arms are brought into engagement with fixed pins **218** to cam the crank arms downwardly against the tension of springs **219** as appears in Fig. 21. This causes the hold down plates **188** to swing laterally out of the way and permit the bars **213** to rise and clamp the marginal flanges **35** against the edges of the top panel **37** and in turn against the bottom plate **220** of the hold down head.

In order that the backing bars **213** and the air cylinders **215** by which they are operated may be moved laterally to accommodate pallets of different widths the cylinders **215** are supported between pairs of longitudinally extending plates **221** connected at their outer ends to upright plates **222** that project upwardly through slots in the fixed bottom panel **223** and through slots in the slide plate **224** for attachment to the under sides of flat slides **225** slidable on the slide plates **224**. The upper portion of the air cylinder **215** is flattened and bolted between the plates **221** and has an upstanding journal portion **226** that guides the piston rod **214**. The slide plates **224** which carry the supports for the side legs of the bottom pallet and chain supports **50** have depending ears **227** engaged by the adjusting screws **228** that extend laterally to the sides of the machine. The slide members **225** are adjustable with the side plates and are further adjustable with respect to the side plates by means of screw shafts **229** engaged with ears on the slide members and extending to the sides of the machine.

The previously mentioned pressure head **206** is carried

over the bottom panel in the top panel attaching station 43 by the piston rod 230 of a pneumatic cylinder 231 mounted on top of the apparatus. When the piston rod and attaching head are depressed the glued top panel is firmly attached to the bottom panel and the zigzag folding panels. As previously stated the machine may operate slowly enough for the top panel to adhere to the bottom panel during the time that the piston 230 is advanced. However, in the event that more hold down time is required it may be furnished by the previously mentioned holding conveyors 45 and 46.

Control and timing apparatus

All of the coacting elements of the machine as just described are actuated in timed relationship to automatically advance the pallets through the machine and reference has been made to some of the control cams at the first or bottom panel folding station. As previously described the motor 55 continuously drives the distributor shaft 64 and the longitudinal cam shaft 66 which in turn drives the cam shafts 89 and 104 along the sides of the bottom panel folding station 40. The motor also drives the shaft 612 which is connected by the bevel gears 232 (see Fig. 22) to the previously mentioned cross shaft 67 that continuously drives the central chain 68 to the clutch 71 on the main conveyor drive shaft 70. The clutch 71 carries a pawl 233 that is spring biased to engage the driven part of the clutch with the shaft 70 but which is moved to clutch disengaging position when intercepted by the trip rod 234. The trip rod 234 is reciprocated longitudinally of the machine by the lever 235 mounted on a rock shaft 236 extending to the right side of the machine. A crank arm 237 on the end of the shaft 236 engages the cammed face of a conveyor control cam 238 on the rear end of the continually operating cam shaft 66. The feed conveyor chains 47 and 49 are thus positively driven in a step by step reoccuring cycle.

The action of the cams and cam shafts 89 and 104 in controlling the bottom panel folding mechanism has been described in conjunction with the description of the station 40. The controls and actuation of the reinforcing panel inserting station 41 are as follows: the transverse distributing conveyor chains 144 are continuously driven by the chain 62 from the transmission 56. The reinforcing panels 361 are therefore immediately advanced when delivered from the magazine 146 and their delivery is controlled by the previously described reciprocable feed shoes 147 actuated by crank 157 and the push rods 158. Distribution of the panels is controlled by the gate 145 and push rod 155. The lower end of the push rod 155 is carried by a lever 239 pivotally supported at 240 and having a follower engaged with the cam 241. (See Fig. 25). The rod 158 depends to a lever 242 also pivoted at 240 and having a cam follower 243 engaged with the cam 244. The head 138 which is reciprocated by the crank 141 is under the control of the push rod 143 that extends downwardly to a lever 245 having a cam follower engaged with the cam 246. The cams 241, 244 and 246 and their associated driving linkages are duplicated at each end of the reinforcing panel folding station 42 as appears most clearly in Fig. 8. The cams are mounted on the cam shaft 66 which as previously noted is continuously driven by the chain 65.

No attempt has been made to illustrate the details of the several control cam surfaces as it is believed that their shape and construction will readily be understood when it is pointed out the cam shafts turn continuously and that the conveyor control cam 238 actuates the pallet feeding conveyors intermittently with prolonged dwells for operation of the several sections of the machine. The transverse distributing conveyor 144 operates continuously as stated but the delivery of reinforcing blanks thereto is under the control of the feed shoes 147 and the cams 244. The flat reinforcing blanks may be distributed at any time and delivered to the feed chutes 159 under the control of the gate 145 and the cams 241 as they are intercepted and held by the fingers 162 until needed for each cycle of the machine.

The folding chains 176 that actuate the reinforcing panel folding members 174 are continuously driven from the transverse shaft 59 and a chain 247 (see Fig. 8) but the timing of the folder chains and the position of the cams 177 is such that the folders 174 are inoperative and retracted except during that portion of the cycle of the machine when the bottom panel of the pallet and the reinforcing panels are in proper position in station 41.

The punch pins 184 that bend in the retaining ears 38 at the ends of the legs of the pallet are controlled by regulating the supply of air to the cylinders 182. A cam 248 (see Fig. 8) on the cam shaft 66 actuates a valve 249 that is connected by tubing (not illustrated) to actuate cylinders and punch pins in the proper timed relation to the other elements of the machine. By similar connections, a cam 250 actuates a valve 251 to control the cylinder 212 that raises and lowers the frame 208 supporting the top panel feed conveyor 192. A third cam 252 actuates a switch 253 connected in series with the motor 198 so that the conveyor 192 is operative only when a folded bottom panel is in position to receive a top panel. A fourth cam 254 actuates a valve 255 to actuate the cylinder 231 that lowers the top press head 206.

A fifth cam 256 actuates a valve 257 for regulating the vacuum at the suction cups 190 that deliver the top panel to the top panel attaching station 43.

Having thus described the invention, what is claimed as new and is desired to be secured by Letters Patent is:

1. A machine for fabricating pallets from paperboard comprising a pair of spaced conveyor chains adapted to support and advance scored lower blanks of paperboard with the score lines thereof parallel to the chains, rails supporting the upper reaches of said chains, an elongated folding shoe disposed longitudinally over a folding station along said chains and reciprocable between said chains to depress the central portion of said blanks, a backing element yieldably supporting said blank in opposition to said shoe and depressible against controlled air pressure by said shoe, a first pair of side folding plates extending longitudinally along opposite sides of the advanced position of said shoe, rock shafts supporting the lower edges of said plates, means including meshing gears on the ends of said rock shafts arranged to rock said plates laterally outwardly and inwardly into blank folding engagement with the sides of said shoe, laterally extending flanges on the upper side of said shoe arranged to press said blank over the upper edges of said plates in the inwardly folded positions of the plates, face plates selectively securable to the sides of said pressure shoe or the opposed faces of said side folding plates to vary the width of the rail folded thereby in said panel, stationary backing members laterally adjustably mounted at the outer side of said chains and parallel to the sides of said shoe with their upper edges disposed at the level of the chains, a pair of upper folding plates extending longitudinally over said backing members, crank arms extending laterally inwardly from the tops of said upper folding plates and spaced longitudinally beyond the ends of the folding station, pivots supporting ends of said arms above and inwardly from the lines of the tops of said backing members, means laterally shiftably supporting said pivots, means including laterally outwardly extending push rods connected to rock said cranks whereby said upper plates are retracted upwardly above said blanks and advanced downwardly in folding relation to said blanks and opposed to the outer sides of said backing members, outer folding plates extending longitudinally in spaced parallel relation from the outsides of said backing members, pivot means supporting the lower edges of said outer plates, laterally shiftable supports for said last pivot means, means including other push rods connected

to rock said outer plates into parallel relation to said backing members, lower conveyor chains having their upper reaches extending longitudinally between the lower edges of said backing members and said outer plates, means located beyond said folding station for folding zigzag reinforcing strips and inserting a strip in each leg of said pallet, means for striking retaining tabs inwardly from the side walls of said legs at the ends of said zigzag strips, and means located at a third station of the machine arranged to deliver and press a glued top panel to the tops of said bottom panel and said zigzag reinforcing strips.

2. A machine for fabricating pallets from paperboard comprising a pair of spaced conveyor chains adapted to support and advance scored lower blanks of paperboard with the score lines thereof parallel to the chains, rails supporting the upper reaches of said chains, an elongated folding shoe disposed longitudinally over a folding station along said chains and reciprocable between said chains to depress the central portion of said blanks, a backing element yieldably supporting said blank in opposition to said shoe and depressible against prsesure by said shoe, a first pair of side folding plates extending longitudinally along opposite sides of the advanced position of said shoe, rock shafts supporting the lower edges of said plates, means arranged to rock said plates laterally outwardly and inwardly into blank folding engagement with the sides of said shoe, laterally extending flanges on the upper side of said shoe arranged to press said blank over the upper edges of said plates in the inwardly folded positions of the plates, stationary backing members mounted at the outer side of said chains and parallel to the sides of said shoe with their upper edges disposed at the level of the chains, a pair of upper folding plates extending longitudinally over said backing members, crank arms extending laterally inwardly from the tops of said upper folding plates and spaced longitudinally beyond the ends of the folding station, pivots supporting ends of said arms above and inwardly from the lines of the tops of said backing members, means including laterally outwardly extending push rods connected to rock said cranks whereby said upper plates are retracted upwardly above said blanks and advanced downwardly in folding relation to said blanks and opposed to the outer sides of said backing members, outer folding plates extending longitudinally in spaced parallel relation from the outsides of said backing members, means supporting the lower edges of said outer plates, means connected to rock said outer plates into parallel relation to said backing members, means located beyond said folding station for folding zigzag reinforcing strips and inserting a strip in each leg of said pallet, means for striking retaining tabs inwardly from the side walls of said legs at the ends of said zigzag strips, and means located at a third station of the machine arranged to deliver and press a glued top panel to the tops of said bottom panel and said zigzag reinforcing strips.

3. A machine for fabricating pallets from paperboard comprising a pair of spaced conveyor chains adapted to support and advance scored lower blanks of paperboard with the score lines thereof parallel to the chains, rails supporting the upper reaches of said chains, an elongated folding shoe disposed longitudinally over a folding station along said chains and reciprocable between said chains to depress the central portion of said blanks, a backing element supporting said blank in opposition to said shoe in the depressed position of said shoe, a first pair of side folding plates extending longitudinally along opposite sides of the advanced position of said shoe, means supporting the lower edges of said plates, means arranged to rock said plates laterally outwardly and inwardly into blank folding engagement with the sides of said shoe, laterally extending flanges on the upper side of said shoe arranged to press said blank over the upper edges of said plates in the inwardly folded positions of

the plates, stationary backing members mounted at the outer side of said chains and parallel to the sides of said shoe, a pair of upper folding plates extending longitudinally over said backing members, crank arms connected to the tops of said upper folding plates and spaced longitudinally beyond the ends of the folding station, pivots supporting ends of said crank arms above and inwardly from the lines of the tops of said backing members, means including laterally outwardly extending push rods connected to rock said crank arms whereby said upper plates are retracted upwardly above said blanks and advanced downwardly in folding relation to said blanks and opposed to the outer sides of said backing members, outer folding plates extending longitudinally in spaced parallel relation from the outsides of said backing members, means supporting the lower edges of said outer plates, means connected to rock said outer plates into parallel relation to said backing members, means located beyond said folding station for folding zigzag reinforcing strips and inserting a strip in each leg of said pallet, and means located at a third station of the machine arranged to deliver and press a glued top panel to the tops of said bottom panel and said zigzag reinforcing strips.

4. A machine for fabricating pallets from paperboard comprising a pair of spaced conveyor chains adapted to support and advance scored lower blanks of paperboard with the score lines thereof parallel to the chains, rails supporting the upper reaches of said chains, an elongated folding shoe disposed longitudinally over a folding station along said chains and reciprocable between said chains to depress the central portions of said blanks, a first pair of side folding plates extending longitudinally along opposite sides of the advanced position of said shoe, means supporting the lower edges of said plates, means arranged to rock said plates laterally outwardly and inwardly into blank folding engagement with the sides of said shoe, stationary backing members mounted at the outer side of said chains and parallel to the sides of said shoe, a pair of upper folding plates extending longitudinally over said backing members, crank arms connected to the tops of said upper folding plates and spaced longitudinally beyond the ends of the folding station, pivots supporting ends of said crank arms above and inwardly from the lines of the tops of said backing members, means including laterally outwardly extending push rods connected to rock said crank arms whereby said upper plates are retracted upwardly above said blanks and advanced downwardly in folding relation to said blanks and opposed to the outer sides of said backing members, outer folding plates extending longitudinally in spaced parallel relation from the outsides of said backing members, means supporting the lower edges of said outer plates, means connected to rock said outer plates into parallel relation to said backing members, means located beyond said folding station for folding zigzag reinforcing strips and inserting a strip in each leg of said pallet, and means located at a third station of the machine arranged to deliver and press a glued top panel to the tops of said bottom panel and said zigzag reinforcing strips.

5. A machine for fabricating pallets from paperboard comprising a pair of spaced conveyors adapted to support and advance scored lower blanks of paperboard with the score lines thereof parallel to the conveyors, rails supporting the upper reaches of said conveyors, an elongated folding shoe disposed longitudinally over a folding station along said chains and reciprocable between said conveyors to depress the central portion of said blanks, a backing element supporting said blank in opposition to said shoe in the depressed position of said shoe, a first pair of side folding plates extending longitudinally along opposite sides of the advanced position of said shoe, means supporting the lower edges of said plates, means arranged to rock said plates laterally out-

wardly and inwardly into blank folding engagement with the sides of said shoe, backing members mounted at the outer sides of said conveyors and parallel to the sides of said shoe, laterally slidable supports supporting said rails and the adjacent backing member, a pair of upper folding plates extending longitudinally over said backing members, pivots supporting ends of said upper plates, second laterally slidable supports supporting said pivots, means connected to rock said upper plates upwardly above said blanks and downwardly in folding relation to said blanks and opposed to the outer sides of said backing members, outer folding plates extending longitudinally in spaced parallel relation from the outsides of said backing members, means slidably supporting the lower edges of said outer plates on said second laterally slidable supports, means connected to rock said outer plates into parallel relation to said backing members, means for adjusting said slidable support means, means located beyond said folding station for folding zigzag reinforcing strips and inserting a strip in each leg of said pallet, means for striking retaining tabs inwardly from the side walls of said legs at the ends of said zigzag strips, and means located at a third station of the machine arranged to deliver and press a glued top panel to the tops of said bottom panel and said zigzag reinforcing strips.

6. A machine for fabricating pallets from paperboard comprising a pair of spaced conveyors adapted to support and advance scored lower blanks of paperboard with the score lines thereof parallel to the conveyors, rails supporting the upper reaches of said conveyors, an elongated folding shoe disposed longitudinally over a folding station along said conveyors and reciprocable between said conveyors to depress the central portion of said blanks, a backing element supporting said blank in opposition to said shoe in the depressed position of said shoe, a first pair of slide folding plates extending longitudinally along opposite sides of the advanced position of said shoe, means supporting the lower edges of said plates, means arranged to rock said plates laterally outwardly and inwardly into blank folding engagement with the sides of said shoe, backing members mounted at the outer sides of said conveyors and parallel to the sides of said shoe, laterally slidable supports supporting said rails and the adjacent backing member, a pair of upper folding plates extending longitudinally over said backing members, pivots supporting ends of said upper plates, second laterally slidable supports supporting said pivots, means connected to rock said upper plates upwardly above said blanks and downwardly in folding relation to said blanks and opposed to the outer sides of said backing members, outer folding plates extending longitudinally in spaced parallel relation from the outsides of said backing members, means slidably supporting the lower edges of said outer plates on said second laterally slidable supports, means connected to rock said outer plates into parallel relation to said backing members, means for adjusting said slidable support means, means located beyond said folding station for inserting zigzag reinforcing strips in each leg of said pallet, and means arranged to deliver and press a glued top panel to the tops of said bottom panel and said zigzag reinforcing strips.

7. A machine for fabricating pallets from paperboard comprising a pair of spaced conveyors adapted to support and advance scored lower blanks of paperboard with the score lines thereof parallel to the conveyors, rails supporting the upper reaches of said conveyors, an elongated folding shoe disposed longitudinally over a folding station along said conveyor and reciprocable between said conveyors to depress the central portion of said blanks, a first pair of side folding plates extending longitudinally along opposite sides of the advanced position of said shoe, means movably supporting said plates, means arranged to shift said movable means to move said plates laterally outwardly and inwardly into blank folding engagement with the sides of said shoe, laterally extending flanges on the upper side of said shoe arranged to press said blank over the upper edges of said plates in the inward folding positions of the plates, face plates selectively securable to the sides of said pressure shoe or the opposed faces of said side folding plates to vary the width of the rail folded thereby in said panel, backing members laterally adjustably mounted at the outer side of said conveyors and parallel to the sides of said shoe, a pair of upper folders extending longitudinally over said backing members, means laterally shiftably supporting said folders, means connected to move said upper folders upwardly above said blanks and downwardly in folding relation to said blanks in opposition to the outer sides of said backing members, outer folding plates extending longitudinally in spaced parallel relation from the outsides of said backing members, laterally adjustable means shiftably supporting said outer plates, means connected to advance said outer plates into spaced parallel relation to said backing members and to retract the plates from such advanced positions, lower conveyors having their upper reaches extending longitudinally between the lower edges of said backing members and said outer plates, means located beyond said folding station for folding zigzag reinforcing strips and inserting a strip in each leg of said pallet, means for striking retaining tabs inwardly from the side walls of said legs at the ends of said zigzag strips, and means located at a third station of the machine arranged to deliver and press a glued top panel to the tops of said bottom panel and said zigzag reinforcing strips.

8. A machine for fabricating pallets from paperboard comprising a pair of spaced conveyors adapted to support and advance scored lower blanks of paperboard with the score lines thereof parallel to the conveyors, rails supporting the upper reaches of said conveyors, an elongated folding shoe disposed longitudinally over a folding station along said conveyor and reciprocable between said conveyors to depress the central portion of said blanks, a first pair of side folding plates extending longitudinally along opposite sides of the advanced position of said shoe, means movably supporting said plates, means arranged to shift said movable means to move said plates laterally outwardly and inwardly into blank folding engagement with the sides of said shoe, backing members mounted at the outer side of said conveyors and parallel to the sides of said shoe, a pair of upper folders extending longitudinally over said backing members, means connected to move said upper folders upwardly above said blanks and downwardly in folding relation to said blanks in opposition to the outer sides of said backing members, outer folding plates extending longitudinally in spaced parallel relation from the outsides of said backing members, means shiftably supporting said outer plates, means connected to advance said outer plates into spaced parallel relation to said backing members and to retract the plates from such advanced positions, means for inserting zigzag reinforcing strips in each leg of said pallet, and means arranged to deliver and press a glued top panel to the tops of said bottom panel and said zigzag reinforcing strips.

9. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in a step by step fashion, folding means located at one station of said machine and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions of the panel, parallel series of longitudinally spaced laterally swingable folding members positioned at a second station along said machine and over each side of each leg in a panel located at the second station, a vertically reciprocable frame positioned over said folding members and having depending guide chutes directed between said folding members, a magazine positioned above said framework and adapted

to hold a supply of reinforcing strips, a distributing conveyor extending transversely of said machine from said magazine across said guide chutes, reciprocable feed members arranged to feed strips from said magazine to said distributing conveyor, gate means arranged to control delivery of said strips singly from said conveyor to each of said chutes, actuating tappets on said folding members, drive chains extending along the lines of said folding members and having tappets successively engageable with the tappets on said folding members to successively fold said strips into longitudinally zigzag form, means for lowering said framework and said guide chutes after said strips have been folded to engage the ends of the chutes with the zigzag edges of the strips and press the strips into the U-sections of said legs and thereafter retract the framework and chutes to above said folding members, punches positioned at the ends of said legs, means for actuating said punches to cut and fold retaining lugs inwardly from the side walls of the legs to engage and retain the ends of said zigzag folded strips, and means at a third station on said machine for delivering and securing a top panel across the tops of said lower panel and said zigzag strips.

10. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in a step by step fashion, folding means located at one station of said machine and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions of the panel, parallel series of longitudinally spaced laterally swingable folding members positioned at a second station along said machine and over each side of each leg in a panel located at the second station, a vertically reciprocable frame positioned over said folding members and having depending guide chutes directed between said folding members, a magazine positioned above said framework and adapted to hold a supply of reinforcing strips, means arranged to deliver said strips singly to each of said chutes, actuating tappets on said folding members, drive chains extending along the lines of said folding members and having tappets successively engageable with the tappets on said folding members to successively fold said strips into longitudinally zigzag form, means for lowering said framework and said guide chutes after said strips have been folded to engage the ends of the chutes with the zigzag edges of the strips and press the strips into the U-sections of said legs and thereafter retract the framework and chutes to above said folding members, punches positioned at the ends of said legs, means for actuating said punches to cut and fold retaining lugs inwardly from the side walls of the legs to engage and retain the ends of said zigzag folded strips, and means at a third station on said machine for delivering and securing a top panel across the tops of said lower panel and said zigzag strips.

11. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in a step by step fashion, folding means located at one station of said machine and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions of the panel, parallel series of longitudinally spaced laterally swingable folding members positioned at a second station along said machine and over each side of each leg in a panel located at the second station, a vertically reciprocable frame positioned over said folding members and having depending guide chutes directed between said folding members, a magazine positioned above said framework and adapted to hold a supply of reinforcing strips, means arranged to deliver said strips singly to each of said chutes, actuating tappets on said folding members, drive chains extending along the lines of said folding members and having tappets successively engageable with the tappets on said folding members to successively fold said strips into longitudinally zigzag form, means for lowering said framework and said guide chutes after said strips have been folded to engage the ends of the chutes with the zigzag edges of the strips and press the strips into the U-sections of said legs and thereafter retract the framework and chutes to above said folding members, and means at a third station on said machine for delivering and securing a top panel across the tops of said lower panel and said zigzag strips.

12. In a machine for forming disposable pallets, a conveyor arranged to advance bottom pallets through the machine in a step by step fashion, folding means located at one station of said machine and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions of the panel, parallel series of longitudinally spaced laterally swingable folding members positioned at a second station along said machine and over the legs in a panel located at the second station, means arranged to deliver reinforcing strips in upright position between said folding members, actuating tappets on said folding members, drive chains extending along the lines of said folding members and having tappets successively engageable with the tappets on said folding members to successively fold said strips into longitudinally zigzag form, means arranged to engage the zigzag edges of the strips and press the strips into the U-sections of said legs and thereafter retract to above said folding members, punches positioned at the ends of said legs, means for actuating said punches to cut and fold retaining lugs inwardly from the side walls of the legs to engage and retain the ends of said zigzag folded strips, and means at a third station on said machine for delivering and securing a top panel across the tops of said lower panel and said zigzag strips.

13. In a machine for forming disposable pallets, a conveyor arranged to advance bottom pallets through the machine in a step by step fashion, folding means located at one station of said machine and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions of the panel, parallel series of longitudinally spaced laterally swingable folding members positioned at a second station along said machine and over the legs in a panel located at the second station, means arranged to deliver reinforcing strips in upright position between said folding members, actuating tappets on said folding members, drive chains extending along the lines of said folding members and having tappets successively engageable with the tappets on said folding members to successively fold said strips into longitudinally zigzag form, means arranged to engage the zigzag edges of the strips and press the strips into the U-sections of said legs and thereafter retract to above said folding members, and means at a third station on said machine for delivering and securing a top panel across the tops of said lower panel and said zigzag strips.

14. In a machine for forming disposable pallets, a conveyor arranged to advance bottom pallets through the machine in a step by step fashion, folding means located at one station of said machine and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions of the panel, parallel series of longitudinally spaced laterally swingable folding members positioned at a second station along said machine and over each side of each leg in a panel located at the second station, a vertically reciprocable frame positioned over said folding members and having depending guide chutes directed between said folding members, a magazine positioned above said framework and adapted to hold a supply of reinforcing strips, means for distributing said strips from said magazine to said guide chutes, means for actuating said folding members to successively fold said strips into longitudinally zigzag form, means for lowering said

framework and said guide chutes after said strips have been folded to engage the ends of the chutes with the zigzag edges of the strips and press the strips into the U-sections of said legs and thereafter retract the framework and chutes to above said folding members, punches positioned at the ends of said legs, means for actuating said punches to cut and fold retaining lugs inwardly from the side walls of the legs to engage and retain the ends of said zigzag folded strips, and means at a third station on said machine for delivering and securing a top panel across the tops of said lower panel and said zigzag strips.

15. In a machine for forming disposable pallets, a conveyor arranged to advance bottom pallets, through the machine in a step by step fashion, folding means located at one station of said machine and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions of the panel, parallel series of longitudinally spaced laterally swingable folding members positioned at a second station along said machine and over each side of each leg in a panel located at the second station, a vertically reciprocable frame positioned over said folding members and having depending guide chutes directed between said folding members, a magazine positioned above said framework and adapted to hold a supply of reinforcing strips, means for distributing said strips from said magazine to said guide chutes, means for actuating said folding members to successively fold said strips into longitudinally zigzag form, means for lowering said framework and said guide chutes after said strips have been folded to engage the ends of the chutes with the zigzag edges of the strips and press the strips into the U-sections of said legs and thereafter retract the framework and chutes to above said folding members, and means at a third station on said machine for delivering and securing a top panel across the tops of said lower panel and said zigzag strips.

16. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in step by step fashion, folding means located at a first station and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions and having marginal flanges on the outer edges of the outer legs, means located at a second station of the machine for inserting reinforcing strips of laterally zigzag shape into said legs with the upper edges extending slightly above said connecting portion and the marginal flanges of said panel, a conveyor frame extending transversely across a third station of said machine and pivotally supported at one end, conveyor chains mounted on said conveyor frame, a motor connected to reversably drive said conveyor chains, a top panel feed head reciprocably carried by the lower reaches of said chains and having suction cups arranged to pick up a top panel from a supply point spaced laterally from said machine and advance the top panel to over a bottom panel located at said third station, a glue applying mechanism positioned in the path of said top panel between said supply point and the bottom panel, means for elevating swinging end of said conveyor frame on the retracting stroke of said feed head, a pressure head vertically reciprocable over said bottom panel at said third station, means vertically supporting the connecting portions of said bottom panel, other means vertically supporting the bottoms of the outer legs of said bottom panel at said third station, vertically reciprocable backing bars positioned under said marginal flanges, laterally swingable hold-down plates located at the sides of said third station and spring biased to deflect said marginal flanges below the path of travel of said top panel, tappets on said hold-down plates, cams reciprocable with said backing bars engageable with said tappets to swing said hold-down plates out of engagement with said marginal flanges, means supporting said backing bars from said means supporting said legs, means for laterally adjusting said last means with respect to said leg supporting means, and means for adjusting said leg supporting means laterally of the machine, and control means connected to actuate said transverse conveyor and said conveyor frame lift means and said pressure head and said reciprocable backing bars in timed relation to said pallet advancing conveyor.

17. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in step by step fashion, folding means located at a first station and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions and having marginal flanges on the outer edges of the outer legs, means located at a second station of the machine for inserting reinforcing strips of laterally zigzag shape into said legs, a conveyor frame extending transversely across a third station of said machine and pivotally supported at one end, conveyor chains mounted on said conveyor frame, a motor connected to reversably drive said conveyor chains, a top panel feed head reciprocably carried by the lower reaches of said chains and having suction cups arranged to pick up a top panel from a supply point spaced laterally from said machine and advance the top panel to over a bottom panel located at said third station, a glue applying mechanism positioned in the path of said top panel between said supply point and the bottom panel, means for elevating the swinging end of said conveyor frame on the retracting stroke of said feed head, a pressure head vertically reciprocable over said bottom panel at said third station, means vertically supporting the connecting portions of said bottom panel, other means vertically supporting the bottoms of the outer legs of said bottom panel at said third station, vertically reciprocable backing bars positioned under said marginal flanges, movable hold-down plates located at the sides of said third station and spring biased to deflect said marginal flanges below the path of travel of said top panel, tappets on said hold-down plates, cams reciprocable with said backing bars engageable with said tappets to move said hold-down plates out of engagement with said marginal flanges, means supporting said backing bars from said means supporting said legs, means for laterally adjusting said last means with respect to said leg supporting means, and means for adjusting said leg supporting means laterally of the machine, and control means connected to actuate said transverse conveyor and said conveyor frame lift means and said pressure head and said reciprocable backing bars in timed relation to said pallet advancing conveyor.

18. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in a step by step fashion, folding means located at a first station and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions and having marginal flanges on the outer edges of the outer legs, means located at a second station of the machine for inserting reinforcing strips of laterally zigzag shape into said legs, a conveyor frame extending transversely across a third station of said machine, conveyor chains mounted on said conveyor frame, a motor connected to reversably drive said conveyor chains, a top panel feed head reciprocably carried by the lower reaches of said chains and having means arranged to pick up a top panel from a supply point spaced laterally from said machine and advance the top panel to over a bottom panel located at said third station, a glue applying mechanism positioned in the path of said top panel between said supply position and the bottom panel, a pressure head vertically reciprocable over said bottom panel at said third station, means vertically supporting the connecting portions of said bottom panel, other means vertically

supporting the bottoms of the outer legs of said bottom panel at said third station, vertically reciprocable backing bars positioned under said marginal flanges, laterally movable hold-down elements located at the sides of said third station to deflect said marginal flanges below the path of travel of said top panel, tappets on said hold-down elements, cams reciprocable with said backing bars and engageable with said tappets on said hold-down plates to move said hold-down plates out of engagement with said marginal flanges, means supporting said backing bars from said means supporting said legs, means for laterally adjusting said last means with respect to said leg supporting means, and means for adjusting said leg supporting means laterally of the machine, and control means connected to actuate said transverse conveyor and said pressure head and said reciprocable members in timed relation to said pallet advancing conveyor.

19. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in a step by step fashion, folding means located at a first station and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions and having marginal flanges on the outer edges of the outer legs, means located at a second station of the machine for inserting reinforcing strips of laterally zigzag shape into said legs, a conveyor frame extending transversely across a third station of said machine, conveyor chains mounted on said conveyor frame, a motor connected to reversably drive said conveyor chains, a top panel feed head reciprocably carried by the lower reaches of said chains and having means arranged to pick up a top panel from a supply point spaced laterally from said machine and advance the top panel to over a bottom panel located at said third station, a glue applying mechanism positioned in the path of said top panel between said supply position and the bottom panel, a pressure head vertically reciprocable over said bottom panel at said third station, means vertically supporting the connecting portions of said bottom panel and the bottoms of the outer legs of said bottom panel at said third station, vertically reciprocable backing bars positioned under said marginal flanges, laterally movable hold-down elements located at the side of said third station to deflect said marginal flanges below the path of travel of said top panel, means reciprocable with said backing bars and engageable with said hold-down plates to move said hold-down plates out of engagement with said margin flanges, means supporting said backing bars from said means supporting said legs, and control means connected to actuate said transverse conveyor and said pressure head and said reciprocable members in timed relation to said pallet advancing conveyor.

20. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in a step-by-step fashion, folding means located at a first station and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions and having marginal flanges on the outer edges of the outer legs, means located at a second station of the machine for inserting reinforcing strips of laterally zigzag shape into said legs with the upper edges extending slightly above said connecting portion and marginal flanges of said panel, a conveyor frame extending transversely across a third station of said machine and pivotally supported at one end, conveyor chains mounted on said conveyor frame, a motor connected to reversably drive said conveyor chains, a top panel feed head reciprocably carried by the lower reaches of said chains and having suction cups arranged to pick up a top panel from a supply point spaced laterally from said machine and advance the top panel to over a bottom panel located at said third station, a glue applying mechanism positioned in the path of said top panel between said supply position and the bottom panel, means for elevating the swinging end of said conveyor frame on the retracting stroke of said feed head, a pressure head vertically reciprocable over said bottom panel at said third station, means vertically supporting the connecting portions of said bottom panel, other means vertically supporting the bottoms of the outer legs of said bottom panel at said third station, vertically reciprocable backing bars positioned under said marginal flanges, means supporting said backing bars from said means supporting said legs, means for laterally adjusting said last means with respect to said leg supporting means, and means for adjusting said leg supporting means laterally of the machine, and control means connected to actuate said transverse conveyor and said conveyor frame lift means and said pressure head and said reciprocable members in timed relation to said pallet advancing conveyor.

21. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in a step by step fashion, folding means located at a first station and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions and having marginal flanges on the outer edges of the outer legs, means located at a second station of the machine for inserting reinforcing strips of laterally zigzag shape into said legs, a conveyor frame extending transversely across a third station of said machine, conveyor chains mounted on said conveyor frame, a motor connected to reversably drive said conveyor chains, a top panel feed head reciprocably carried by the lower reaches of said chains and having means arranged to pick up a top panel from a supply point spaced laterally from said machine and advance the top panel to over a bottom panel located at said third station, a glue applying mechanism positioned in the path of said top panel between said supply position and the bottom panel, a pressure head vertically reciprocable over said bottom panel at said third station, means vertically supporting the connecting portions of said bottom panel, other means vertically supporting the bottoms of the outer legs of said bottom panel at said third station, vertically reciprocable backing bars positioned under said marginal flanges, means supporting said backing bars from said means supporting said legs, means for laterally adjusting said last means with respect to said leg supporting means, and means for adjusting said leg supporting means laterally of the machine, and control means connected to actuate said transverse conveyor and said pressure head and said reciprocable members in timed relation to said pallet advancing conveyor.

22. A press station for attaching top panels to a bottom panel of a pallet having upwardly opening channel shaped legs depressed below the surface thereof comprising a fixed support plate, fixed supports on said support plate arranged to support the central portion of said bottom panel, laterally adjustable slides on said support plate, other supports on said slides arranged to support other portions of said bottom panel including laterally outer legs thereof, other laterally adjustable slides mounted on said first slides at the ends thereof and adjustable relative thereto, backing bars extending between the said other slides on each side of the machine to be positioned under marginal flanges at the outer sides of the outer legs of said bottom panel, hangers depending from and connected to said other slides, said first slides and said support plate being slotted to pass said hangers, support bars connected between the lower ends of the hangers on each side of said machine, and fluid operated cylinders mounted on said support bars on each side of said machine and having pistons with upwardly extending piston rods, guide bearings on said cylinders projecting upwardly around said piston rods, the upper ends of said piston rods being connected to the backing

bar positioned thereabove, said support plate being slotted to pass said piston rods and said guide bearings.

23. A press station for attaching top panels to a bottom panel of a pallet having upwardly opening channel shaped legs depressed below the surface thereof comprising a fixed support plate, fixed supports on said support plate arranged to support the central portion of said bottom panel, laterally adjustable slides on said support plate, other supports on said slides arranged to support other portions of said bottom panel including laterally outer legs thereof, other laterally adjustable slides mounted on said first slides at the ends thereof and adjustable relative thereto, backing bars extending between the said other slides on each side of the machine to be positioned under marginal flanges at the outer sides of the outer legs of said bottom panel, hangers depending from and connected to said other slides, said first slides and said support plate being slotted to pass said hangers, support bars connected between the lower ends of the hangers on each side of said machine, and fluid operated cylinders mounted on said support bars on each side of said machine and having pistons with upwardly extending piston rods, the upper ends of said piston rods being connected to the backing bar positioned thereabove, said support plate being slotted to pass said piston rods.

24. A pallet forming machine comprising a conveyor arranged to support and advance a bottom panel of a pallet, folding members positioned at one station along said conveyor, first cams positioned to actuate said folding members to form longitudinally extending depending legs in said bottom panel, means for delivering a reinforcing strip to a position over a leg of a bottom panel at a second station along said conveyor, folding means for folding said strip into zigzag shape, means for pressing the zigzag folded strip into the channel section of the leg, means for securing a top panel to the tops of said bottom panel and said strip at a third station along said conveyor, a continuously operative motor and transmission, a drive connection including a clutch connecting said transmission to said conveyor, said first set of cams being driven by said transmission and arranged to control and drive said first folding members, a control cam and connected linkage driven with said first cams and connected to actuate said clutch to drive said conveyor when said folding members are inoperative, a continuous drive connection between said transmission and said zigzag folding means, said folding means having a rotary operating cycle including an inoperative period timed to coincide with the operational cycle of said conveyor, and a third cam driven with said first cams arranged to actuate and control said means for pressing said zigzag strip into said leg.

25. A pallet forming machine comprising a conveyor arranged to support and advance a bottom panel of a pallet, folding members positioned at one station along said conveyor, first cams positioned to actuate said folding members to form legs in said bottom panel, means for delivering a reinforcing strip to a position over a leg of a bottom panel at a second station along said conveyor, folding means for folding said strip into zigzag shape, means for pressing the zigzag folded strip into the channel section of the leg, means for securing a top panel to the tops of said bottom panel and said strip at a third station along said conveyor, a continuously operative motor and transmission, a drive connection including a clutch connecting said transmission to said conveyor, said first set of cams being driven by said transmission and arranged to control and drive said first folding members, a control cam and connected linkage driven with said first cams and connected to actuate said clutch to drive said conveyor when said folding members are inoperative, a continuous drive connection between said transmission and said zigzag folding means, said folding means having an operating cycle including an inoperative period timed to coincide with the operational cycle of said conveyor, and a third cam driven with said first cams arranged to actuate and control said means for pressing said zigzag strip into said leg.

26. A pallet forming machine comprising a conveyor arranged to support and advance a bottom panel of a pallet, folding members positioned at one station along said conveyor, first cams positioned to actuate said folding members to form longitudinally extending depending legs in said bottom panel, means for delivering a reinforcing strip to a position over a leg of a bottom panel at a second station along said conveyor, folding means for folding said strip into zigzag shape, means for pressing the zigzag folded strip into the channel section of the leg, means for securing a top panel to the tops of said bottom panel and said strip at a third station along said conveyor, a continuously operative motor and transmission, a drive connection including a clutch connecting said transmission to said conveyor, said first set of cams being driven by said transmission and arranged to control and drive said first folding members, a control cam and connected linkage driven with said first cams and connected to actuate said clutch to drive said conveyor when said folding members are inoperative, a continuous drive connection between said transmission and said zigzag folding means, said folding means having a rotary operating cycle including an inoperative period timed to coincide with the operational cycle of said conveyor, a third cam driven with said first cams arranged to actuate and control said means for pressing said zigzag strip into said leg, and a fourth cam driven with said first cams and arranged to control and actuate said means for delivering reinforcing strips.

27. Reinforcing strips distributing folding and inserting apparatus for a pallet forming machine comprising a magazine adapted to hold a supply of strips, feed shoes movable across the bottom of said magazine to advance a single strip therefrom, a continuously operating conveyor having advancing dogs arranged to engage and advance said single strips, fixed support bars located at laterally spaced positions under said conveyor to support said strips, a laterally shiftable gate having other support bars shiftable alternately into coacting strip supporting relation with said spaced support bars whereby delivery of said single strips can be regulated between three positions, guide bars depending below the delivery edges of said support bars and said gate and extending to laterally spaced upright delivery chutes, a vertically reciprocable frame suporting said chutes, strip supporting fingers movably mounted on said guide bars, means connected to retract said fingers to release strips to said chutes, means for laterally adjusting the outer guide chutes on said vertically reciprocable frame, strip folding units supported below said chutes and having transverse supports adapted to support said strips, laterally swingable folding arms positioned at staggered locations on opposite sides of said folding units, chain loops trained along each side of each folding unit and having cams thereon engageable with said folding members to actuate the same, laterally adjustable supports for the outer folding units, a continuously driven shaft arranged to drive said chains, said chain loops having reaches of substantial length arranged to hold said folding members in retracted position, and cam wheels driven in timed relationship with said shaft and said chain loops and having cams thereon arranged and timed to actuate said vertically reciprocable frame while said folding members are retracted and to actuate said feed shoes and said gate, the lower ends of said chutes acting as pressure members to force said strips out of said folding units and into a pallet after said reinforcing strips have been folded.

28. Reinforcing strips distributing folding and inserting apparatus for a pallet forming machine comprising a magazine adapted to hold a supply of strips, feed shoes

movable across the bottom of said magazine to advance a single strip therefrom, a continuously operating conveyor having advancing dogs arranged to engage and advance said single strips, fixed support bars located at laterally spaced positions under said conveyor to support said strips, a laterally shiftable gate having other support bars shiftable alternately into coacting strip supporting relation with said spaced support bars whereby delivery of said single strips can be regulated between three positions, guide bars depending below the delivery edges of said support bars and said gate and extending to laterally spaced upright delivery chutes, a vertically reciprocable frame supporting said chutes, means for laterally adjusting the outer guide chutes on said vertically reciprocable frame, strip folding units supported below said chutes and having transverse supports adapted to support said strips, laterally swingable folding arms positioned at staggered locations on opposite sides of said folding units, chain loops trained along each side of each folding unit and having cams thereon engageable with said folding members to actuate the same, laterally adjustable supports for the outer folding units, a continuously driven shaft arranged to drive said chains, said chain loops having reaches of substantial length arranged to hold said folding members in retracted position, and cam wheels driven in timed relationship with said shaft and said chain loops and having cams thereon arranged and timed to actuate said vertically reciprocable frame while said folding members are retracted and to actuate said feed shoes and said gate, the lower ends of said chutes acting as pressure members to force said strips out of said folding units and into a pallet after said reinforcing strips have been folded.

29. Reinforcing strips distributing folding and inserting apparatus for a pallet forming machine comprising a magazine adapted to hold a supply of strips, feed shoes movable across the bottom of said magazine to advance a single strip therefrom, a continuously operating conveyor having advancing dogs arranged to engage and advance said single strips, fixed support bars located at laterally spaced positions under said conveyor to support said strips, a laterally shiftable gate having other support bars shiftable alternately into coacting strip supporting relation with said spaced support bars whereby delivery of said single strips can be regulated between three positions, guide bars depending below the delivery edges of said support bars and said gate and extending to laterally spaced upright delivery chutes, a vertically reciprocable frame supporting said chutes, strip folding units supported below said chutes and having transverse supports adapted to support said strips, laterally swingable folding arms positioned at staggered locations on opposite sides of said folding units, chain loops trained along each side of each folding unit and having cams thereon engageable with said folding members to actuate the same, a continuously driven shaft arranged to drive said chains, said chain loops having reaches of substantial length arranged to hold said folding members in retracted position, and cam wheels driven in timed relationship with said shaft and said chain loops and having cams thereon arranged and timed to actuate said vertically reciprocable frame while said folding members are retracted and to actuate said feed shoes and said gate, the lower ends of said chutes acting as pressure members to force said strips out of said folding units and into a pallet after said reinforcing strips have been folded.

30. Reinforcing strip distributing folding and inserting apparatus for a pallet forming machine comprising a magazine adapted to hold a supply of strips, feed shoes movable across the bottom of said magazine to advance a single strip therefrom, a continuously operating conveyor having advancing dogs arranged to engage and advance said single strips, fixed support bars located under said conveyor to support said strips, a laterally shiftable gate having other support bars shiftable alternately into and out of coacting strip supporting relation with said support bars whereby delivery of said single strips can be regulated between plural positions, guides depending below the delivery edges of said support bars and said gate and extending to laterally spaced upright delivery chutes, a vertically reciprocable frame supporting said chutes, strip folding units fixedly supported below said chutes and having transverse supports adapted to support said strips, laterally movable folding members positioned at locations along opposite sides of said folding units, chain loops trained along each side of each folding unit and having cams thereon engageable with said folding members to actuate the same, a continuously driven shaft ararnged to drive said chains, said chain loops having reaches of substantial length arranged to hold said folding members in retracted position, and cam wheels driven in timed relationship with said shaft and chain loops and having cams thereon arranged and timed to actuate said vertically reciprocable frame while said folding members are retracted and to actuate said feed shoes and said gate, the lower ends of said chutes acting as pressure members to force said strips out of said folding units and into a pallet after said reinforcing strips have been folded.

31. Reinforcing strips distributing folding and inserting apparatus for a pallet forming machine comprising a magazine adapted to hold a supply of strips, a conveyor having advancing dogs arranged to engage and advance strips from said magazine, fixed support bars located under said conveyor to support said strips, a laterally shiftable gate having other support bars shiftable alternately into and out of coacting strip supporting relation with said support bars whereby delivery of said single strips can be regulated between plural positions, guides depending below the delivery edges of said support bars and said gate and extending to laterally spaced upright delivery chutes, a vertically reciprocable frame supporting said chutes, means for laterally adjusting the guide chutes on said vertically reciprocable frame, strip folding units fixedly supported below said chutes and having transverse supports adapted to support said strips, laterally movable folding members positioned at locations along opposite sides of said folding units, chain loops trained along each side of each folding unit and having cams thereon engageable with said folding members to actuate the same, laterally adjustable supports for the folding units, a continuously driven shaft arranged to drive said chains, said chain loops having reaches of substantial length arranged to hold said folding members in retracted position, and cam wheels driven in timed relationship with said shaft and chain loops and having cams thereon arranged and timed to actuate said vertically reciprocable frame while said folding members are retracted and to actuate said gate, the lower ends of said chutes acting as pressure members to force said strips out of said folding units and into a pallet after said reinforcing strips have been folded.

32. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in a step by step fashion, folding means located at a first station and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions and having marginal flanges on the outer edges of the outer legs, means located at a second station of the machine for inserting reinforcing strips of laterally zigzag shape into said legs, a conveyor frame extending over a third station of said machine, a conveyor mounted on said conveyor frame, means connected to reversibly drive said last conveyor, a top panel feed head reciprocably carried by the lower reaches of said last conveyor and having means arranged to pick up a top panel from a supply point spaced from said machine and advance the top panel to over a bottom panel located at said third station, a glue applying mechanism positioned in the path

of said top panel between said supply position and the bottom panel, a pressure head vertically reciprocable over said bottom panel at said third station, means vertically supporting the connecting portions of said bottom panel, other means vertically supporting the bottoms of the outer legs of said bottom panel at said third station, vertically reciprocable backing bars positioned under said marginal flanges, means supporting said backing bars from said means supporting said legs, means for laterally adjusting said last means with respect to said leg supporting means, and means for adjusting said leg supporting means laterally of the machine, and control means connected to actuate said last conveyor and said pressure head and said reciprocable members in timed relation to said pallet advancing conveyor.

33. In a machine for forming disposable pallets, a conveyor arranged to advance bottom panels through the machine in a step by step fashion, folding means located at a first station and arranged to fold said panels into laterally spaced longitudinally extending legs of upwardly opening U-section connected at their upper edges by connecting portions and having marginal flanges on the outer edges of the outer legs, means located at a second station of the machine for inserting reinforcing strips on edge into said legs with the upper edges extending slightly above said connecting portion and marginal flanges of said panel, a conveyor frame extending over a third station of said machine, a conveyor mounted on said conveyor frame, a motor connected to reversibly drive said last conveyor, a top panel feed head reciprocably carried by said last conveyor and having means arranged to pick up a top panel from a supply point spaced from said machine and advance the top panel to over a bottom panel located at said third station, a glue applying mechanism positioned in the path of said top panel between said supply position and the bottom panel, a pressure head vertically reciprocable over said bottom panel at said third station, means vertically supporting said bottom panel, and control means connected to actuate said last conveyor and said pressure head in timed relation to said pallet advancing conveyor.

34. A press station for attaching top panels to a bottom panel of a pallet having upwardly opening channel shaped legs depressed below the surface thereof comprising a fixed support plate, fixed supports on said support plate arranged to support the central portion of said bottom panel, laterally adjustable slides on said support plates, other supports on said slides arranged to support other portions of said bottom panel including laterally outer legs thereof, other laterally adjustable slides mounted on said first slides at the ends thereof and adjustable relative thereto, backing bars extending between the said other slides on each side of the machine to be positioned under marginal flanges at the outer sides of the outer legs of said bottom panel, hangers depending from and connected to said other slides, said first slides and said support plate being slotted to pass said hangers, support bars connected between the lower ends of the hangers on each side of said machine, and fluid operated expansion devices mounted on said support bars on each side of said machine, the upper ends of said devices being connected to the backing bar positioned thereabove, said support plate being slotted to pass said devices.

35. The method of manufacturing paper pallets which comprises the steps of scoring a flat bottom panel of corrugated paperboard longitudinally across the panel and transversely of the lines of corrugation in the panel, folding the panel along the score lines to form a central upwardly opening U-shaped leg, further folding the panel along other score lines to form laterally spaced upwardly opening U-shaped legs while holding said central leg in shape, striking retaining ears from the portions of the panel forming the sides of said legs to project inwardly of the legs at the ends thereof, folding flat strips of slightly greater width than the depth of said legs into laterally zigzag shape equal to the width of said legs, inserting said zigzag strips into said legs through the open sides of the U-shaped section while holding said legs in U-shape and with the ends of the zigzags retained inwardly behind said ears, bending marginal flanges from the laterally outer edges of said laterally spaced legs, applying a glue coated surface of a flat top panel to the exposed edges of said zigzag strips and the adjacent surfaces of said bottom panel and marginal flanges while retaining lateral folding pressure on the sides of said legs, and applying pressure between the exposed side of said top panel and all opposite sides of said bottom panel to slightly crush the edges of said zigzag strips and while said glue sets.

36. The method of manufacturing paper pallets which comprises the steps of scoring a flat bottom panel of corrugated paperboard longitudinally across the panel and transversely of the lines of corrugation in the panel, folding the panel along the score lines to form a central U-shaped leg, further folding the panel along other score lines to form laterally spaced U-shaped legs while holding said central leg in shape, striking retaining ears from the portions of the panel forming the sides of said legs to project inwardly of the legs at the ends thereof, folding flat strips of the same width as the depth of said legs into laterally zigzag shape equal to the width of said legs, inserting said zigzag strips into said legs through the open sides of the U-shaped section while holding said legs in U-shape and with the ends of the zigzags retained inwardly behind said ears, bending marginal flanges from the laterally outer edges of said laterally spaced legs, applying a glue coated surface of a flat top panel to the exposed edges of said zigzag strips and the adjacent surfaces of said bottom panel and marginal flanges while retaining lateral folding pressure on the sides of said legs, and applying pressure between the exposed side of said top panel and all opposite sides of said bottom panel while said glue sets.

37. The method of manufacturing paper pallets which comprises the steps of scoring a flat bottom panel of corrugated paperboard longitudinally across the panel and transversely of the line of corrugation in the panel, folding the panel along the score lines to form a central U-shaped leg, further folding the panel along other score lines to form laterally spaced U-shaped legs while holding said central leg in shape, striking retaining ears from the portions of the panel forming the sides of said legs to project inwardly of the legs at the ends thereof, folding flat strips of the same width as the depth of said legs into laterally zigzag shape equal to the width of said legs, inserting said zigzag strips into said legs through the open sides of the U-shaped section while holding said legs in U-shape and with the ends of the zigzags retained inwardly behind said ears, applying a glue coated surface of a flat top panel to the exposed edges of said zigzag strips and the adjacent surfaces of said bottom panel while retaining lateral folding pressure on the sides of said legs, and applying pressure between the exposed side of said top panel and all opposite sides of said bottom panel while said glue sets.

38. The method of manufacturing paper pallets which comprises the steps of scoring a flat bottom panel of corrugated paperboard longitudinally across the panel and transversely of the lines of corrugation in the panel, folding the panel along the score lines to form laterally spaced U-shaped legs, striking retaining ears from the portions of the panel forming the sides of said legs to project inwardly of the legs at the ends thereof, folding flat strips of the same width as the depth of said legs into laterally zigzag shape equal to the width of said legs, inserting said zigzag strips into said legs through the open sides of the U-shaped section while holding said legs in U-shape and with the ends of the zigzags retained inwardly behind said ears, applying a glue coated surface of a flat top panel to the exposed edges of said zigzag

strips and the adjacent surfaces of said bottom panel while retaining lateral folding pressure on the sides of said legs, and applying pressure between the exposed side of said top panel and all opposite sides of said bottom panel while said glue sets.

39. A pallet forming machine comprising a conveyor arranged to support and advance a bottom panel of a pallet with legs in said bottom panel, means for delivering a reinforcing strip to a position over a leg of a bottom panel at a station along said conveyor, folding means for folding said strip into zigzag shape, said folding means comprising spaced backing plates with supports between the ends thereof supporting the ends of said strip, other plates spaced outwardly from said backing plates, folder levers pivoted on said other plates and swingable over said backing plates at spaced intervals therealong, folding arms on the ends of said folding levers projecting between said backing plates, driven chain loops trained between said backing plates and said other plates, tappets on said levers, cams on said chains coacting with said tappets, said cams being conformed to shift said levers and said folding arms in predetermined timed relation, and means for pressing the zigzag folded strip into the channel section of the leg.

40. A pallet forming machine comprising a conveyor arranged to support and advance a bottom panel of a pallet with legs in said bottom panel, means for delivering a reinforcing strip to a position over a leg of a bottom panel at a station along said conveyor, folding means for folding said strip into zigzag shape, said folding means comprising spaced backing plates with supports between the ends thereof supporting the ends of said strip, other plates spaced outwardly from said backing plate, folder levers pivoted on said other plates and swingable over said backing plates at spaced intervals therealong, folding arms on the ends of said folding levers projecting between said backing plates, driven chain loops trained alongside said other plates, tappets on said levers, cams on said chains coacting with said tappets, said cams being conformed to shift said levers and said folding arms in predetermined timed relation, and means for pressing the zigzag folded strip into the channel section of the leg.

41. A pallet forming machine comprising a conveyor arranged to support and advance a bottom panel of a pallet with upwardly opening channel shaped legs formed longitudinally in said bottom panel, means for delivering a reinforcing strip to a position over a leg of the bottom panel at a station along said conveyor, folding means for folding said strip into zigzag shape, said folding means comprising spaced backing plates with supports between the ends thereof supporting the ends of said strip, folder levers pivoted alongside of said plates and swingable over said backing plates at spaced intervals therealong, folding arms on the ends of said folding levers projecting between said backing plates, cam means arranged to move longitudinally alongside said plates, tappets on said levers coacting with said cam means, said cam means being conformed to shift said levers and said folding arms in predetermined timed relation, and means for pressing the zigzag folded strip into the channel section of the leg.

42. A machine for forming paper pallets comprising conveyor means for advancing a bottom panel, drive means connected to advance said conveyor means in step by step fashion, an elongated folding shoe reciprocably mounted over said conveyor means at a first station of said machine, means connected to depress said shoe through said conveyor means during a stationary period in the cycle of the conveying means, a backing member yieldably supported in opposition to said shoe, means including a piston depressed by said backing member and a valve for trapping air behind the depressed piston for holding said backing member depressed, means including a control actuated in timed relation to said conveyor means and connected to said valve to open the valve and release said holding means after each folded panel is advanced beyond said first station, folding members spaced transversely of said first station and extending longitudinally thereof, means connected to actuate said folding members to fold said panel against the sides of said shoe and to thereafter fold legs downwardly from the panel at each side of the shoe, folding units spaced transversely at a second station of said machine and extending longitudinally over the legs of a panel located at said second station, feed means actuated in timed relation to said conveyor means and arranged to distribute long narrow strips of a width equal to the depth of said legs to each of said folding units in an edgewise position, means on said folding units including laterally movable folding arms arranged to fold said strips alternately from opposite sides into a zigzag shape, means including chain loops having cams thereon arranged to actuate said means for folding said strips, means including part of said feed means arranged to press the zigzag folded strips through said folding units into said legs, a press positioned over said conveyor means at a third station of said machine, means arranged to support the bottom of said panel and the legs formed therein at said third station, means arranged to deliver a top panel with a glue coated underside to the top of said bottom panel and said reinforcing zigzag strips, and means connected to lower said press on top of said top panel.

43. A machine for forming paper pallets comprising conveyor means for advancing a bottom panel, drive means connected to advance said conveyor means in step by step fashion, an elongated folding shoe reciprocably mounted over said conveyor means at a first station of said machine, means connected to depress said shoe through said conveyor means during a stationary period in the cycle of the conveying means, a backing member yieldably supported in opposition to said shoe, means for holding said backing member depressed, means actuated in timed relation to said conveyor means and connected to release said holding means after each folded panel is advanced beyond said first station, folding members spaced transversely of said first station and extending longitudinally thereof, means connected to actuate said folding members to fold said panel against the sides of said shoe and to thereafter fold legs downwardly from the panel at each side of the shoe, folding units spaced transversely at a second station of said machine and extending longitudinally over the legs of a panel located at said second station, feed means actuated in timed relation to said conveyor means and arranged to distribute long narrow strips of a width equal to the depth of said legs to each of said folding units in an edgewise position, means on said folding units arranged to fold said strips alternately from opposite sides into a zigzag shape, means arranged to actuate said means for folding said strips, means arranged to press the zigzag folded strips through said folding units into said legs, a press positioned over said conveyor means at a third station of said machine, means arranged to support the bottom of said panel and the legs formed therein at said third station, means arranged to deliver a top panel with a glue coated underside to the top of said bottom panel and said reinforcing zigzag strips, and means connected to lower said press on top of said top panel.

44. A machine for forming paper pallets comprising conveyor means for advancing a bottom panel, drive means connected to advance said conveyor means in step by step fashion, an elongated folding shoe reciprocably mounted over said conveyor means at a first station of said machine, means connected to depress said shoe through said conveyor means during a stationary period in the cycle of the conveying means, a backing member yieldably supported in opposition to said shoe, means including a piston depressed by said backing member and a valve for trapping air behind the depressed piston for

holding said backing member depressed, means including a control actuated in timed relation to said conveyor means and connected to said valve to open the valve and release said holding means after each folded panel is advanced beyond said first station, folding members spaced transversely of said first station and extending longitudinally thereof, means connected to actuate said folding members to fold said panel against the sides of said shoe and to thereafter fold legs downwardly from the panel at each side of the shoe.

45. A machine for forming paper pallets comprising conveyor means for advancing a bottom panel, drive means connected to advance said conveyor means in step by step fashion, an elongated folding shoe reciprocably mounted over said conveyor means at a first station of said machine, means connected to depress said shoe through said conveyor means during a stationary period in the cycle of the conveying means, a backing member yieldably supported in opposition to said shoe, means for holding said backing member depressed, means actuated in timed relation to said conveyor means and connected to release said holding means after each folded panel is advanced beyond said first station, folding members spaced transversely of said first station and extending longitudinally thereof, means connected to actuate said folding members to fold said panel against the sides of said shoe and to thereafter fold legs downwardly from the panel at each side of the shoe.

46. A machine for forming paper pallets comprising conveyor means for advancing a bottom panel, drive means connected to advance said conveyor means in step by step fashion, folding members spaced transversely of a first station of said machine and extending longitudinally thereof, means connected to actuate said folding members to fold said panel into a central longitudinal leg and to thereafter fold legs downwardly from the panel at each side of the first leg, folding units spaced transversely at a second station of said machine and extending longitudinally over the legs of a panel located at said second station, feed means actuated in timed relation to said conveyor means and arranged to distribute long narrow strips of a width equal to the depth of said legs to each of said folding units in an edgewise position, means on said folding units including laterally movable folding arms arranged to fold said strips alternately from opposite sides into a zigzag shape, means including chain loops having cams thereon arranged to actuate said means for folding said strips, means including part of said feed means arranged to press the zigzag folded strips through said folding units into said legs, a press positioned over said conveyor means at a third station of said machine, means arranged to support the bottom of said panel and the legs formed therein at said third station, means arranged to deliver a top panel with a glue coated underside to the top of said bottom panel and said reinforcing zigzag strips, and means connected to lower said press on top of said top panel.

47. A machine for forming paper pallets comprising conveyor means for advancing a bottom panel, drive means connected to advance said conveyor means in step by step fashion, folding members spaced transversely of a first station of said machine and extending longitudinally thereof, means connected to actuate said folding members to fold said panel into a central longitudinal leg and to thereafter fold legs downwardly from the panel at each side of the first leg, folding units spaced transversely at a second station of said machine and extending longitudinally over the legs of a panel located at said second station, feed means actuated in timed relation to said conveyor means and arranged to distribute long narrow strips of a width equal to the depth of said legs to each of said folding units in an edgewise position, means on said folding units arranged to fold said strips alternately from opposite sides into a zigzag shape, means arranged to actuate said means for folding said strips, means arranged to press the zigzag folded strips through said folding units into said legs, a press positioned over said conveyor means at a third station of said machine, means arranged to support the bottom of said panel and the legs formed therein at said third station, means arranged to deliver a top panel with a glue coated underside to the top of said bottom panel and said reinforcing zigzag strips, and means connected to lower said press on top of said top panel.

No references cited.