

Aug. 27, 1963

J. E. ULLMAN

3,101,654

CASE FORMER

Filed Jan. 17, 1962

5 Sheets-Sheet 1

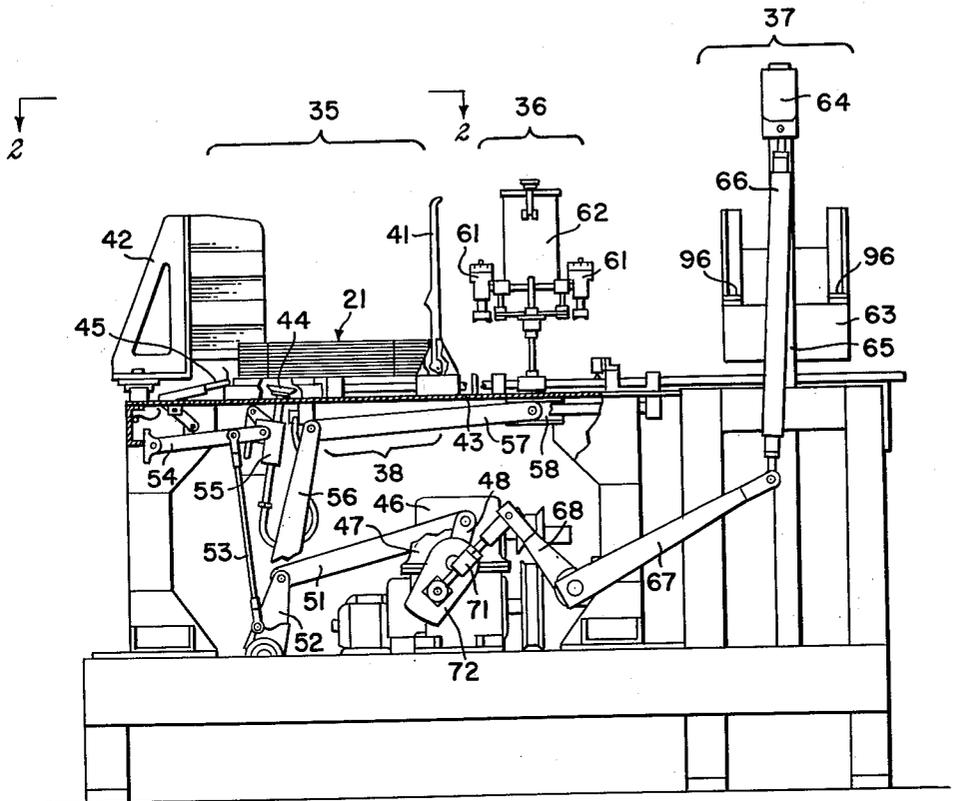


Fig. 1.

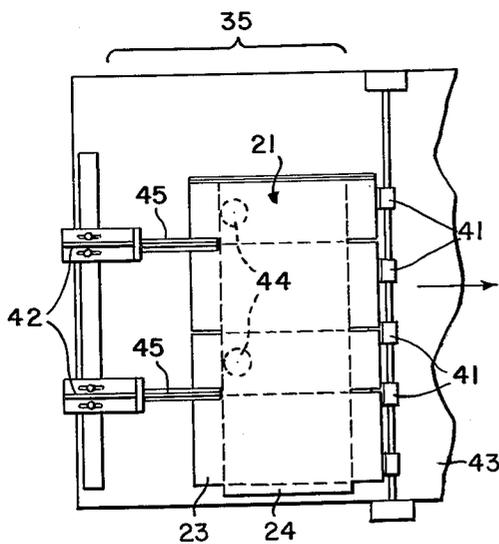


Fig. 2.

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5 Sheets-Sheet 2

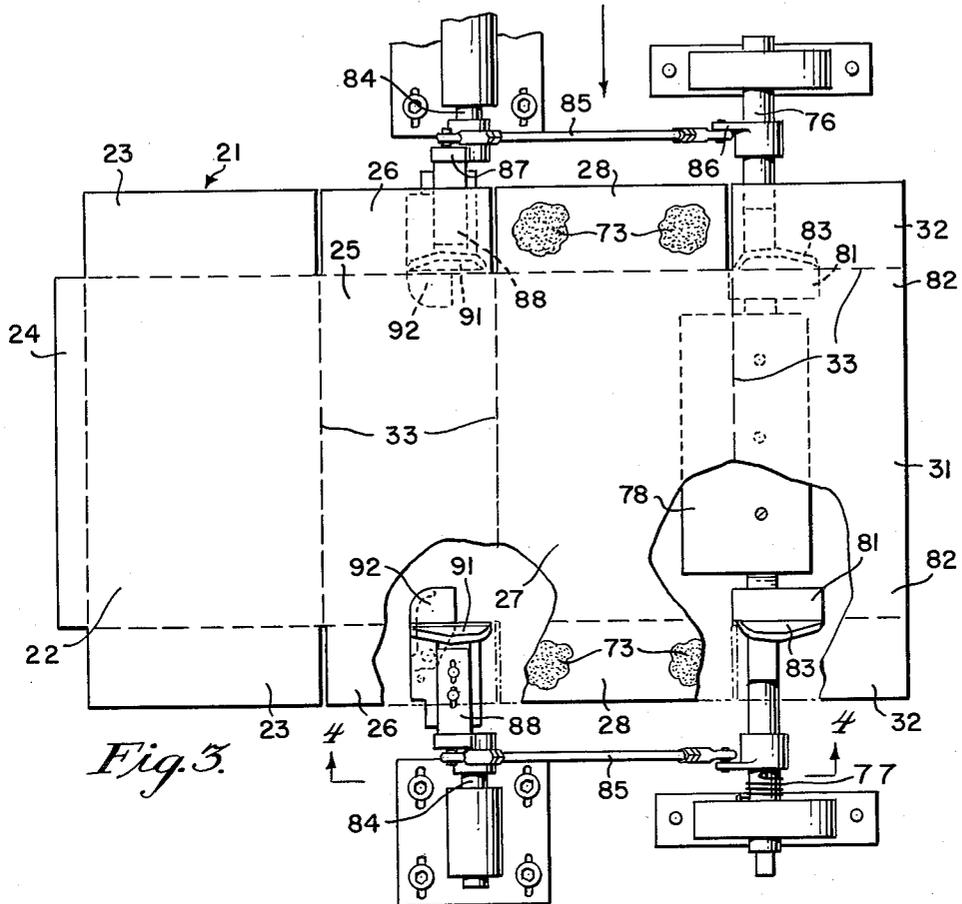


Fig. 3.

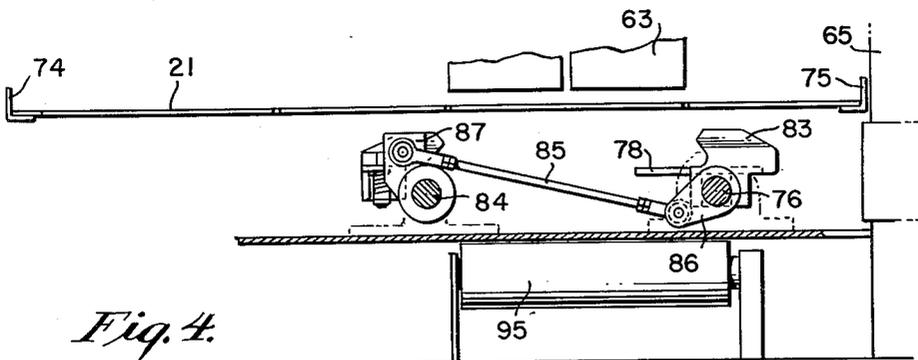


Fig. 4.

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5 Sheets-Sheet 4

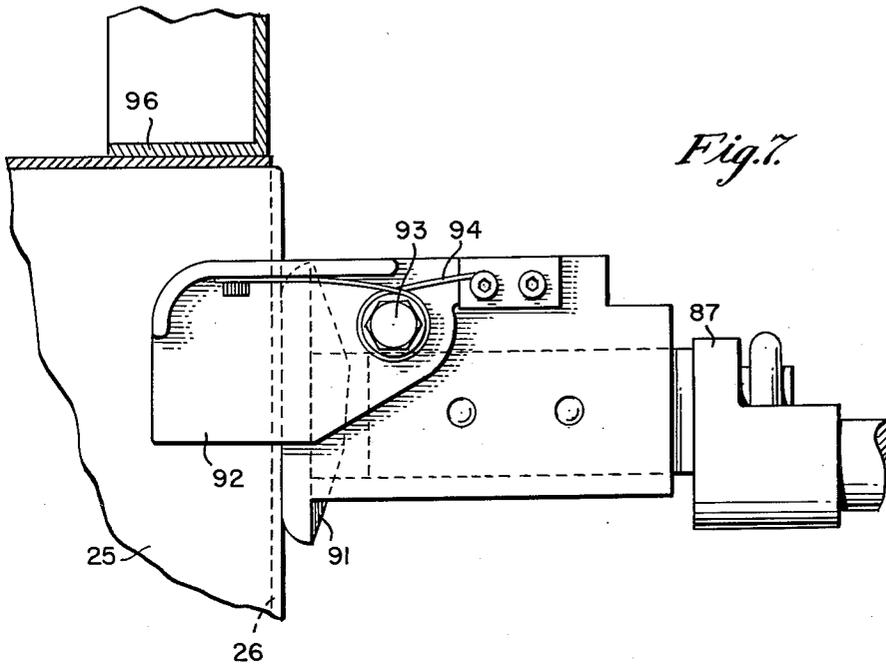


Fig. 7.

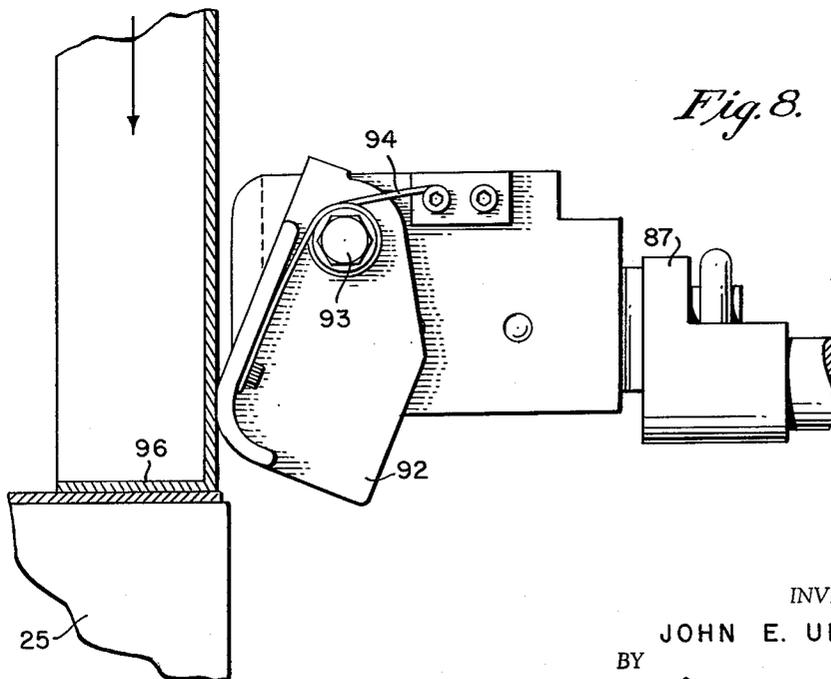


Fig. 8.

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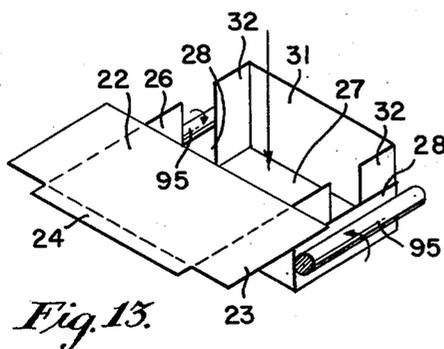
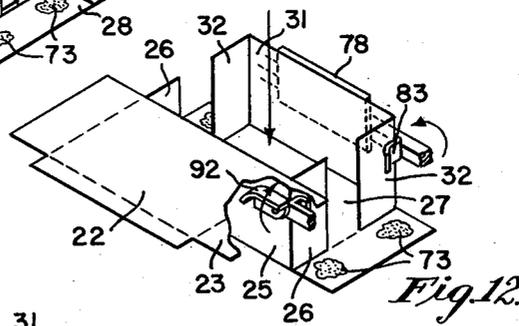
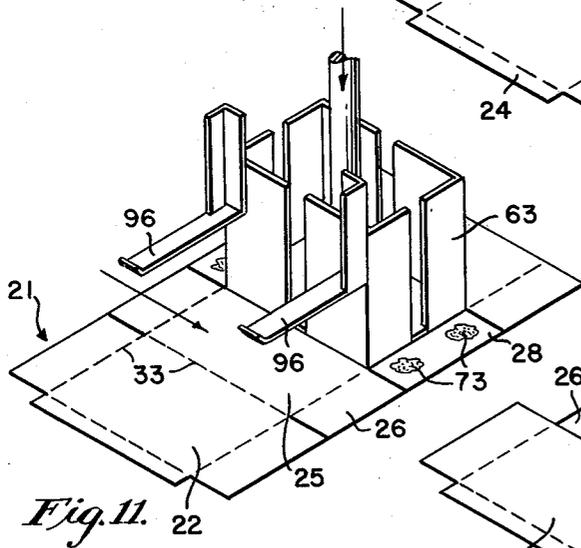
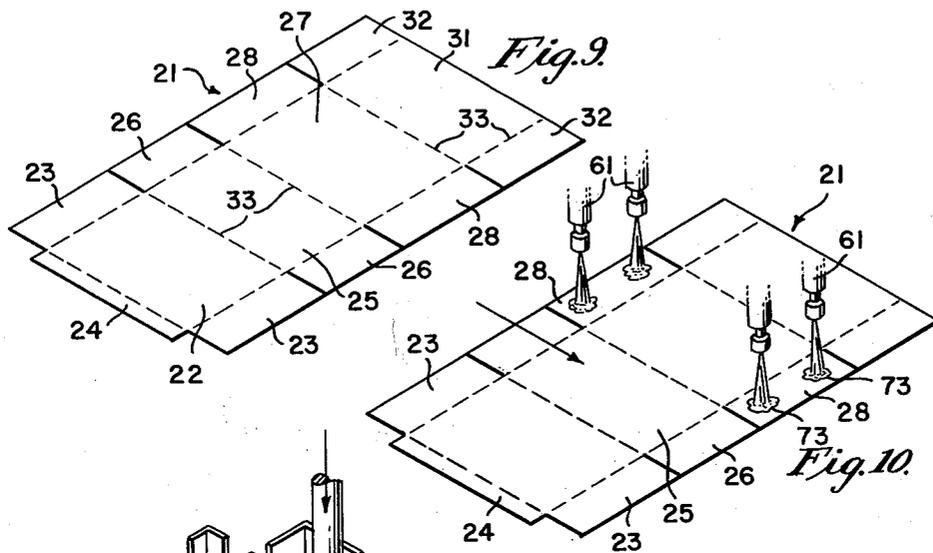
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5 Sheets-Sheet 5



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1

3,101,654

CASE FORMER

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6 Claims. (Cl. 93-49)

This invention relates to improvements in a case former, and more particularly concerns apparatus and method for forming the bottom portion of end-closing cases to adapt them for top loading.

Cases or boxes made of corrugated paperboard or the like are widely used to package cans or similar articles. The blank of an end-opening case normally is smaller, and therefore less expensive, than the blank of a corresponding top-opening case. For example, in packaging a case of 24 cans, an end-opening blank normally used today would require up to 30 percent less paperboard than a top-opening blank. This difference in the amount of board arises from the fact that the flaps on the ends of an end-opening case are smaller than the flaps on the top and bottom of a corresponding top-opening case, because many cases today are long and flat, thus making the area of the end of the case considerably smaller than the area of the top and bottom.

Accordingly, packers have long desired to use end-opening cases instead of top-opening cases because of the savings in paperboard and cost. However, it is difficult to load an end-opening case with cans or the like, especially if a tight package is required. Conventionally, the method of forming and filling an end-opening case is to take such a case as supplied by the manufacturer (in flattened condition with the manufacturer's flap connecting a side panel to the top or bottom panel), erect the top, bottom, and side panels to set-up condition so that it appears as a tube, fill the case with cans by pushing the cans sidewise through one end, and glue and close both ends.

It can be very difficult to shove a load of cans sidewise into a case from one end, especially if the case is a snug fit, and most can packers prefer a tight case because it lessens the likelihood of can damage in handling and shipping.

Accordingly, it is an object of this invention to provide an apparatus and method for adapting an end-opening case for top loading, and which overcomes the heretofore mentioned problems.

Other objects and advantages of this invention, including its simplicity and economy, as well as the ease with which it may be adapted to existing equipment, will further become apparent hereinafter and in the drawings, in which:

FIG. 1 is a view in side elevation, partly cut away, of a case former constructed in accordance with this invention;

FIG. 2 is a fragmentary view in top plan taken as indicated by the lines and arrows 2-2 which appear in FIG. 1;

FIG. 3 is a view in top plan of a carton blank positioned in the forming station in flat condition;

FIG. 4 is a view in section taken as indicated by the lines and arrows 4-4 which appear in FIG. 3;

FIG. 5 is a view in top plan of the carton after its bottom portion has been formed into set-up condition;

FIG. 6 is a view in section taken as indicated by the lines and arrows 6-6 which appear in FIG. 5;

FIG. 7 is a fragmentary view in elevation taken as indicated by the lines and arrows 7-7 which appear in FIG. 6;

FIG. 8 is a view similar to FIG. 7 but showing a

2

later stage in operation with the mandrel in its lower position; and

FIGS. 9-13 are views illustrating various steps in the process of the invention.

Although specific terms are used in the following description for clarity, these terms are intended to refer only to the structure shown in the drawings and are not intended to define or limit the scope of the invention.

Turning now to the specific embodiments of the invention selected for illustration in the drawings, there is shown (FIG. 9) a flat end-opening case blank 21 made of paperboard or the like and having a top panel 22 with the top flaps 23 and manufacturer's flap 24, an inner side panel 25 having side flaps 26, a bottom panel 27 having bottom flaps 28, and an outer side panel 31 having side flaps 32. Panels 22, 25, 27 and 31 are defined by crease lines 33, and when case 21 is filled with cans and is closed the manufacturer's flap 24 is attached to the top portion of outer side panel 31, with flaps 23, 26, 28 and 32 being closed to form the ends of the case.

Referring to FIG. 1, there is shown a case former for end-opening cases constructed in accordance with this invention, which comprises loading station 35 having hopper means for holding a stack of flat end-opening case blanks 21, a glue station 36 having means for applying an adhesive to the bottom flaps 28 of the case blanks 21, a forming station 37 having means for turning side panels 25 and 31, side flaps 26 and 32 and bottom flaps 28 to set-up position, and feed means 38 for feeding case blanks 21 one at a time from loading station 35 to forming station 37.

Loading station 35 includes stacker bars 41 and ripple plates 42 which support the case blanks 21 and move them relative to each other as they move downwardly in the stack toward table 43. The bottom case blank 21 in the stack is pulled down to table 43 by take-down vacuum cup 44, and pivoted hold-down arms 45 hold the blank flat against table 43, against the action of take-down cup 44 in releasing from the bottom case blank by reversing its suction to blow air upwardly.

The mechanism operating take-down cup 44 includes drive motor 46, gear box 47, crank 48, connecting link 51, lever 52, connecting link 53, lever 54, vacuum rod support mounting 55, and vacuum cup 44 which contacts the bottom blank 21 to transfer it from the hopper to table 43.

The mechanism for driving blank 21 from loading station 35 to glue station 36 to forming station 37 includes drive motor 46, gear box 47, crank 48, connecting link 51, lever 52, lever 56, link 57, and a paper-feed cross-head 58 which reciprocates back and forth to deliver blanks 21 from loading station 35 to forming station 37.

Glue station 36 includes spray guns 61 and adhesive tank 62.

Forming station 37 includes a vertically reciprocable mandrel 63 which is connected to a crosshead 64 that is reciprocated vertically along crosshead columns 65 by a drive mechanism which includes a connecting rod 66, levers 67 and 68, adjustable connecting rod 71, adjustable crank plate 72, gear box 47, and drive motor 46.

Referring now more particularly to FIGS. 3-8, forming station 37 receives a flat end-opening case blank 21 having adhesive areas 73 on bottom flaps 28 in the position shown in FIG. 3. Blank 21 is delivered to forming station 37 and is received in angles 74, 75. Mandrel 63 has a bottom which is adapted to contact bottom panel 27 of blank 21 and move it downwardly while the bottom portion of case 21 is being turned into set-up position.

A turner rod 76 having a return spring 77 is mounted in forming station 37 below side panel 31, as shown in FIG. 3. A panel turner plate 78 is mounted on turner rod 76

beneath side panel 31 and extends beneath mandrel 63 so that the mandrel in its downward path pushes against plate 78 to rotate rod 76.

A pair of panel turner arms 81 are mounted on rod 76 with one on each side of plate 78 and are positioned beneath the end portions 82 of side panel 31. Extending at right angles from turner arms 81 are a pair of side flap turner cams 83 which are positioned beneath side flaps 32.

Adjacent the position of inner side panel 25 are mounted a pair of turner rods 84 which are connected to turner rods 76 by connecting links 85 which extend between levers 86 and 87 mounted on turner rods 76 and 84, respectively.

A pair of side flap turners 88 having cams 91 extending at right angles from the axis of turner rods 84 are positioned beneath side flaps 26.

A side panel turner arm 92 is pivotally mounted on each flap turner 88, and arms 92 extend parallel to the axis of turner rods 84 and are positioned beneath side panel 25.

Each turner arm 92 (see FIGS. 7 and 8) is adjustably mounted on a pivot pin 93 and is urged into horizontal position by a spring 94.

Beneath bottom flaps 73 are positioned a pair of bottom flap rollers 95 which roll the bottom flaps 73 into set-up condition during the downward travel of mandrel 63.

A pair of mandrel arms 96 (see FIGS. 6, 11, 7 and 8) are mounted on mandrel 63 and are positioned above the top panel 22 when it is in set-up position as shown in FIGS. 5 and 6.

In operation, mandrel 63 in moving in its downward path pushes panel turner plate 78 to rotate turner arms 76 and 84 and cause turner cams 83 and arms 81 to turn side panel 31 and flaps 32 into set-up position, and cause cams 91 and turner arms 92 to turn side panel 25 and flaps 26 into set-up position.

Bottom flap rollers 95 roll the bottom flaps 28 into set-up position, and top panel 22 is moved into position at right angles to inner side panel 25 by means of its action in contacting mandrel arms 96 when turner arms 92 are turning side panel 25 into position. Then mandrel arms 96 (in moving downwardly with mandrel 63) push the turner arms 92 out of the way about their pivot pins 93 to provide for downward passage of top panel 22. On the upward stroke of mandrel 63, spring 77 acts to return the plate 78 to normal position, and springs 94 return the arms 92 to normal.

The method of forming the bottom portion of an end-opening case 21 so that it is adapted for top loading in accordance with the present invention (see FIGS. 9-13) comprises the steps of taking a flat end-opening case blank 21, applying an adhesive to areas 73 on bottom flaps 28, turning side panels 25 and 31 and side flaps 26 and 32 into set-up position, and turning bottom flaps 28 into set-up position so that the adhesive makes contact with side flaps 26 and 32.

Top panel 22 is turned from the flat case blank position to a position at right angles to the set-up middle side panels 25 when it contacts mandrel arms 96.

Rollers 95 compress together the adhesive surfaces of bottom flaps 28 and side flaps 26, 32 to aid in setting the adhesive.

Side panels 25 and 31 and flaps 26 and 32 are turned into set-up position simultaneously (with side flaps 26 and 32 at right angles to side panels 25 and 31) by turner arms 92, 81 and cams 91, 83. Top panel 22 is simultaneously turned to a position at right angles to middle side panel 25.

It is to be understood that the form of the invention herewith shown and described is to be taken as a presently preferred embodiment. Various changes may be made in the shape, size and arrangement of parts. For example, equivalent elements may be substituted for those illustrated and described, parts may be reversed and cer-

tain features of the invention may be utilized independently of the use of other features, all without departing from the spirit or scope of the invention as defined in the subjoined claims.

The claimed invention:

1. A case former which forms the bottom portion of end-opening cases to adapt them for top loading, comprising a loading station having hopper means for holding a stack of flat end-opening case blanks, a glue station having means for applying an adhesive to the bottom flaps of said blanks, a forming station having means for turning the side panels, side flaps, and bottom flaps into set-up position, said forming station including a reciprocable mandrel having a bottom adapted to contact the bottom panel of a flat end-opening case blank when said blank is positioned in the forming station, first turner means mounted on a turner rod for turning the flaps of the inner side panel into set-up position against the mandrel, second turner means mounted on said first turner means and extending at right angles therefrom for turning the inner side panel into set-up position, third turner means mounted on a turner rod for turning the outer side panel and flaps into set-up position, means mounted on said mandrel for moving said second turner means out of the way to provide for passage of the top panel thereby, and fourth turner means for turning the bottom flaps into set-up position, all of said turner means being positioned adjacent the path of mandrel travel, and feed means for feeding the blanks one at a time from loading station to glue station to forming station.

2. A case former which forms and seals the bottom portion of end-opening cases to adapt them for top loading, comprising a loading station having hopper means for holding a stack of flat end-opening case blanks; a glue station having means for applying an adhesive to the bottom flaps of said blanks; a forming station having means for turning the side panels and side flaps into set-up position, for moving the bottom flaps into set-up position so that their adhesive contacts said side flaps, and for compressing the adhesive surfaces together to aid in setting; said forming station including a reciprocable mandrel having a bottom adapted to contact the bottom panel of a flat end-opening case blank when said blank is positioned in the forming station, a turner rod, a pair of panel turners mounted on said rod and positioned beneath the ends of the outer side panel, a pair of flap turners extending at right angles from said panel turners and positioned beneath the flaps of the outer side panel, a pair of turner rods mounted adjacent the position of the inner side panel and connected to the first said turner rod by connecting links which extend between levers on said turner rods, a pair of flap turners extending at right angles from the axis of the second said turner rods and positioned beneath the flaps of the inner side panel, a panel turner pivotally mounted on the second said flap turners and extending along the axis of the second said turner rods beneath the inner side panel position, and means for actuating said panel and flap turners to turn side panels and flaps into set-up position, and feed means for feeding the blanks one at a time from loading station to glue station to forming station.

3. A forming station for end-opening cases comprising a reciprocable mandrel having a bottom adapted to contact the bottom panel of a flat end-opening case blank when said blank is positioned in the forming station, first turner means mounted on a turner rod for turning the flaps of the inner side panel into set-up position against the mandrel, second turner means mounted on said first turner means and extending at right angles therefrom for turning the inner side panel into set-up position, third turner means mounted on a turner rod for turning the outer side panel and flaps into set-up position, means mounted on said mandrel for moving said second turner means out of the way to provide for passage of the top

5

panel thereby, and fourth turner means for turning the bottom flaps into set-up position, all of said turner means being positioned adjacent the path of mandrel travel.

4. A forming station for end-opening cases comprising a reciprocable mandrel having a bottom adapted to contact the bottom panel of a flat end-opening case blank when said blank is positioned in the forming station, a turner rod, a pair of panel turners mounted on said rod and positioned beneath the ends of the outer side panel, a pair of flap turners extending at right angles from said panel turners and positioned beneath the flaps of the outer side panel, a pair of turner rods mounted adjacent the position of the inner side panel and connected to the first said turner rod by connecting links which extend between levers on said turner rods, a pair of flap turners extending at right angles from the axis of the second said turner rods and positioned beneath the flaps of the inner side panel, a panel turner pivotally mounted on the second said flap turners and extending along the axis of the second said turner rods beneath the inner side panel position, and means for actuating said panel and flap turners to turn said side panels and flaps into set-up position.

5. A forming station for end-opening cases comprising a reciprocable mandrel having a bottom adapted to contact the bottom panel of a flat end-opening case blank when said blank is positioned in the forming station, a turner rod, a pair of panel turners mounted on said rod and positioned beneath the ends of the outer side panel, a pair of flap turners extending at right angles from said panel turners and positioned beneath the flaps of said outer side panel, a pair of turner rods mounted adjacent the position of the inner side panel and connected to the first said turner rod by connecting links which extend between levers on said turner rods, a pair of flap turners extending at right angles from the axis of the second said turner rods and positioned beneath the flaps of the inner side panel, a side panel turner pivotally mounted on each of the second said flap turners and extending along the axis of the second said turner rods beneath the inner side panel position, means for actuating said panel and flap turners to turn said side panels and flaps into set-up position, and a pair of arms mounted on said mandrel

6

above the set-up top panel position, which mandrel arms move the second said panel turners out of the way about their pivots to provide for downward passage of the top panel.

6. A forming station for end-opening cases comprising a reciprocable mandrel having a bottom adapted to contact the bottom panel of a flat end-opening case blank when said blank is positioned in the forming station, a turner rod, a panel turner plate mounted on said rod and positioned beneath the outer side panel, a pair of panel turner arms mounted on said rod with one on each side of said panel turner plate and positioned beneath the ends of the outer side panel, a pair of panel flap turner cams extending at right angles from said panel turner arms and positioned beneath the flaps of the outer side panel, a pair of turner rods mounted adjacent the inner side panel position and connected to the first said turner rod by a connecting link which extends between levers on said turner rods, a pair of flap turners having cams extending at right angles from the axis of the second said turner rods and positioned beneath the flaps of the inner side panel, a panel turner arm pivotally mounted on each of the second said flap turners and extending parallel to the axis of the second said turner rods beneath the inner side panel position, a return spring mounted on the first said turner rod, a pair of mandrel arms mounted on said mandrel above the set-up top panel position, and a pair of bottom flap rollers positioned beneath the bottom flaps, whereby said mandrel in traveling through its downward path pushes said panel turner plate to rotate said turner rods and cause said turner cams and arms to turn the side panels and flaps into set-up condition, said bottom flap rollers turn the bottom flaps into set-up position, and said mandrel arms move the second said panel turner arms out of the way to provide for passage of the top panel.

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