

May 31, 1966

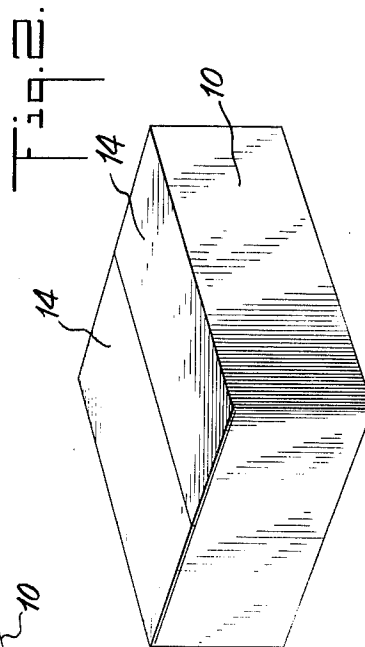
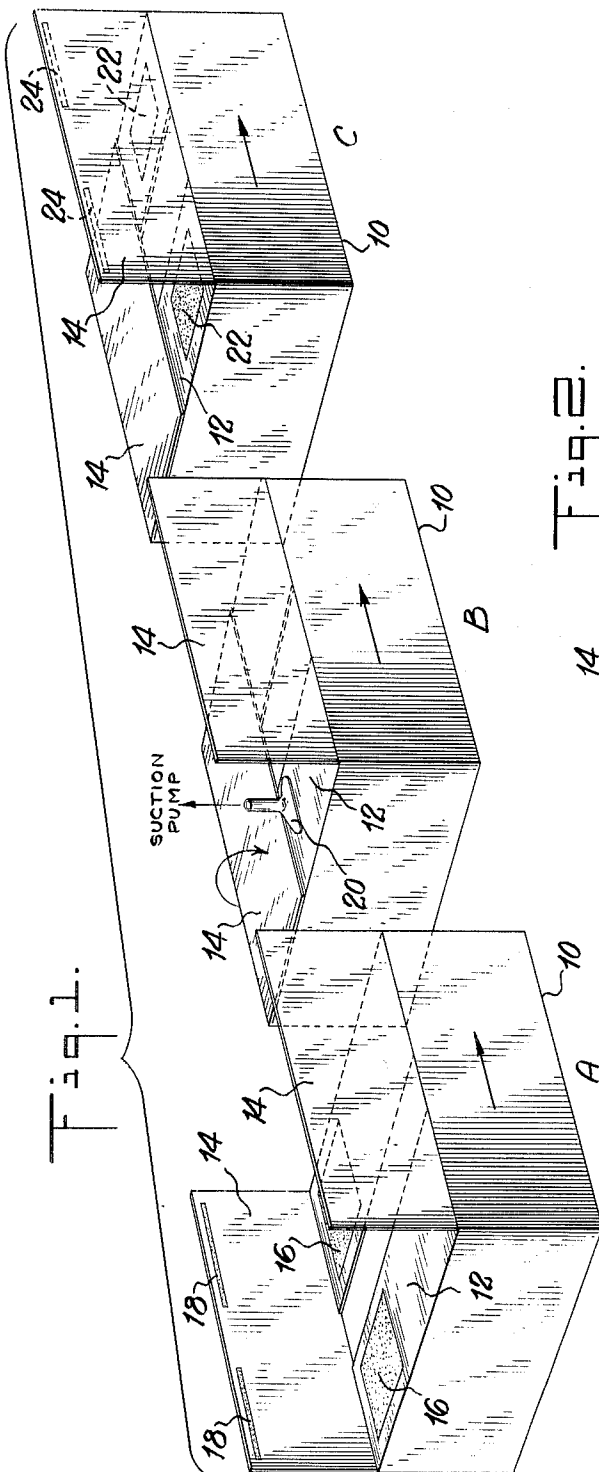
J. A. MILLER ET AL

3,253,389

APPARATUS FOR AUTOMATICALLY SEALING CASES WHOSE INNER
FLAPS ARE UNSUPPORTED BY THE PRODUCT

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3 Sheets-Sheet 1



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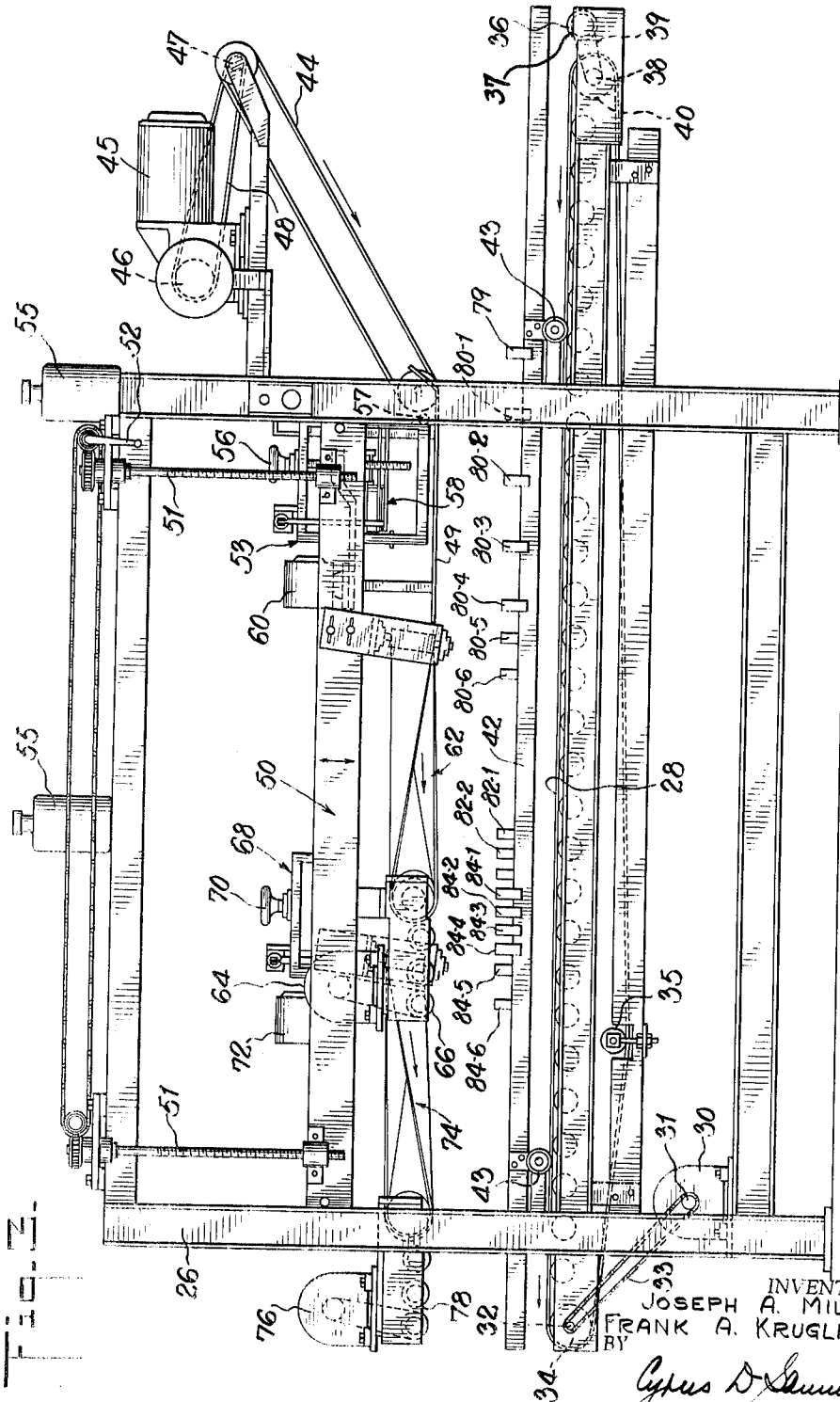
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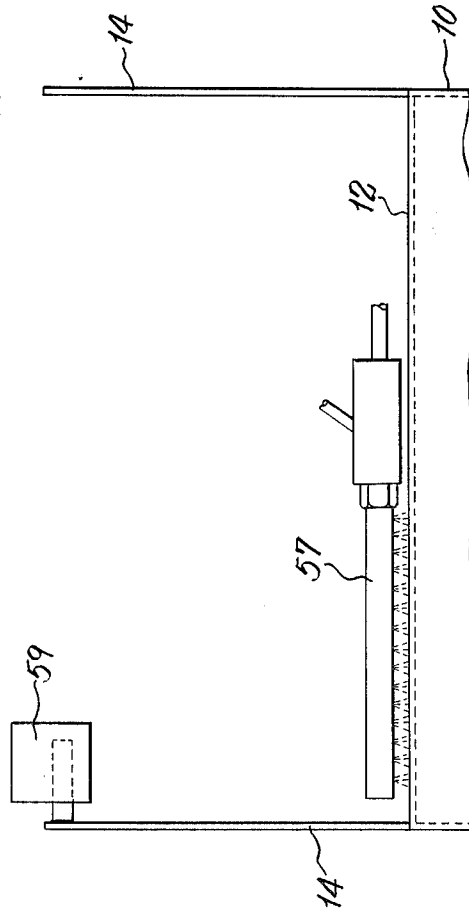
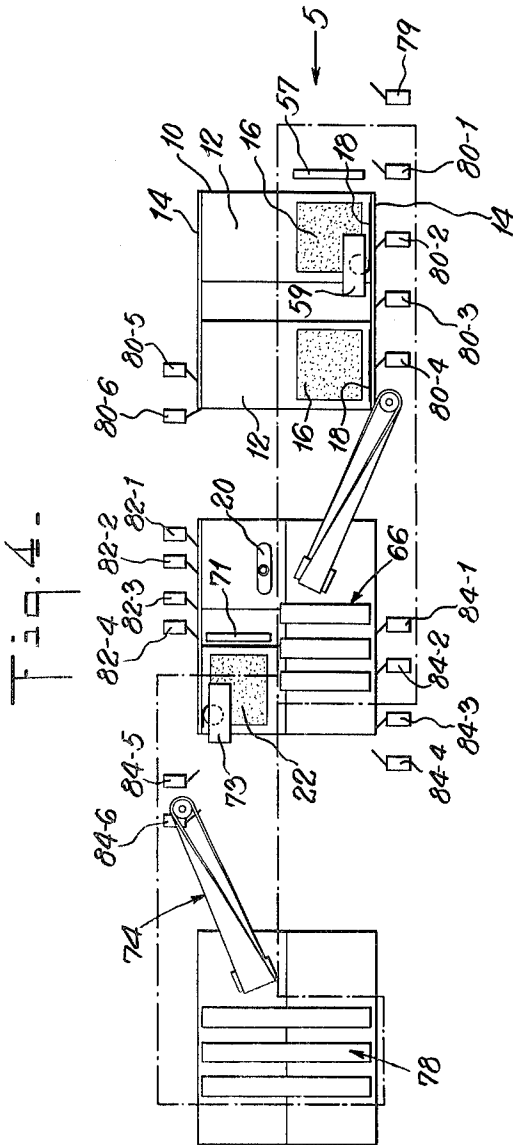
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3 Sheets-Sheet 3



1

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APPARATUS FOR AUTOMATICALLY SEALING CASES WHOSE INNER FLAPS ARE UNSUPPORTED BY THE PRODUCT

Joseph A. Miller, Englewood, and Frank A. Kruglinski, North Bergen, N.J., assignors to General Corrugated Machinery Co., Inc., Palisades Park, N.J., a corporation of New Jersey

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6 Claims. (Cl. 53—374)

The invention relates to apparatus for automatically glue sealing cases whose inner flaps are unsupported by the product packed in the case. In particular, the invention is directed toward providing apparatus for supporting the inner flaps from outside the case until the thermoplastic sets and seals one of the outer flaps to the inner flaps. The present invention is an improvement upon the method and apparatus described in our copending application for United States Letters Patent, Serial No. 150,236, filed November 6, 1961.

The apparatus and method described in our copending application Serial No. 150,236 require that the product within the case supports the inner flaps during the time in which the quick-setting adhesive is setting. If the inner flap is unsupported, the flaps will buckle inward during the sealing process and the sealing will be inadequate or useless. As a consequence, it is not possible to use the method and apparatus described in our copending application or any other prior art method for glue sealing cases of products which cannot be used to support the top flaps during sealing. Consequently, the prior art cases, which are used to contain products such as potato chips in cellophane bags and similar soft, breakable or yieldable materials, are generally sealed with gummed tape. Since gummed tape is considerably more expensive than adhesive, there has existed a need in the packaging field for apparatus for sealing these cases with adhesive.

Accordingly, it is an important object of the invention to provide apparatus for glue sealing cases containing products which do not support the inner top flaps.

It is a further object of the invention to provide apparatus for glue sealing such cases wherein the top outer flaps are successively glued to the top inner flaps.

It is a still further object of the invention to provide apparatus for glue sealing such cases wherein the inner top flaps are pulled into contact with the first of the folded-down outer top flaps by suction applied to the inner top flaps from outside the case.

It is a still further object of the invention to provide apparatus for glue sealing such cases wherein the remaining unglued portion of the inner flaps will be pulled into contact with the remaining folded down, outer flaps by suction applied from the outside to the already glue-sealed portion of the flap area.

These and other objects, advantages, features and uses will be apparent during the course of the following description when taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is a diagrammatic representation showing the steps in sealing cases utilizing the teachings of the invention;

FIGURE 2 is a perspective view of a case sealed utilizing the teachings of the invention;

FIGURE 3 is a side elevational view of apparatus which is used to carry out the teachings of the invention;

FIGURE 4 is a diagrammatic, horizontal plan view of the apparatus of FIGURE 3; and

FIGURE 5 is an end elevational view of the apparatus of FIGURES 3 and 4, somewhat enlarged, viewed in the direction of arrow 5 of FIGURE 4.

Broadly, the invention provides apparatus for glue seal-

2

ing cases which are filled with product which does not support the top inner flaps of the case. This is accomplished by selectively applying wet glue such as dextrin or resin to the outer (upper) surfaces of the top, end panel, inner flaps and a thermoplastic adhesive to the inner (lower) surface of one of the top, side panel outer flaps. The top outer flap is folded down over the folded down inner flaps and the inner flaps are drawn against the outer flap by suction while this side of the case is moved through a short pressure section. Wet glue is then selectively applied to the other portions of the outer surfaces of the inner flaps and thermoplastic adhesive is applied to the inner surface of the other outer flap. The second outer flap is folded down and the case is passed through a short pressure holding section, by which time the thermoplastic adhesive has set. The thermoplastic adhesive holds the case closed until the wet glue sets.

Where conditions will warrant it, suction may also be applied to the previously sealed outer flap to bring about proper, intimate contact between the inner flap and the last outer flap to be closed.

In the drawings, wherein, for the purpose of illustration, are shown a diagrammatic representation of the steps performed in practicing the invention and a preferred embodiment of glue-sealing apparatus of the invention, the numeral 10 designates a case which is to be sealed in accordance with the teachings of the invention.

FIGURE 1 illustrates three stages in the sealing of a case in accordance with the teachings of the invention. At stage A wet glue 16 has been applied to portions of the outer surfaces of inner end flaps 12 and thermoplastic adhesive 18 has been applied to the inner surface of one of the outer side flaps 14. The wet glue and thermoplastic adhesive are placed so that the areas to which they are applied will be between the folded-down top, side panel outer flap and the inner end flaps and will not overlap beyond the longitudinal centerline of the case. The longitudinal centerline of the case is the centerline of the case which is parallel to the direction of movement of the cases during processing. The direction of movement of the cases is indicated by the arrows of FIGURE 1.

At stage B, the flap 14 to which thermoplastic adhesive has been applied is folded down over the portions of flaps 12 to which wet glue has been applied. The figure shows suction unit 20 in position to draw trailing end flap 12 up into contact with folded-down side flap 14. Leading end flap 12 has already been drawn into contact with folded-down side flap 14. Pressure is applied downward on flap 14 while suction unit 20 draws flap 12 upward to cause full contact between flaps in the area where the thermoplastic adhesive has been applied. The suction is obtained from a pump or similar device which is well-known in the art (details not shown). As soon as the thermoplastic adhesive sets, flaps 12 and flap 14 are held in contact thereby.

At stage C wet glue is applied to areas 22 of flaps 12 and thermoplastic adhesive is applied to areas 24 of upstanding flap 14. After leaving stage C, flap 14 is folded down and makes contact with flaps 12 which are held by the first flap 14 to which they have been previously joined. Where conditions warrant it, suction may also be applied to the previously sealed outer flap to bring about proper, intimate contact between the inner flap and the last outer flap to be closed. As soon as thermoplastic adhesive 24 sets, the case is ready for shipment as the thermoplastic adhesive will hold the flaps closed until the wet glue sets. FIGURE 2 illustrates a case which has been sealed in accordance with the method described above.

In FIGURES 3, 4 and 5 there is illustrated apparatus for carrying out the teaching of the invention. It is seen to comprise main frame 26 in which is mounted conveyor 28. Conveyor 28 is driven by motor 30 through

3

sprockets 31 and 32 and chain 33. Roller 34 is mounted on the same shaft as sprocket 32 and serves to drive the belt of conveyor 28. Adjustable take-up 35 is provided to remove any slack in the belt of conveyor 28.

The belt of conveyor 28 drives roller 40 which is mounted on the same shaft as sprocket 38 which in conjunction with sprocket 37 and chain 39 drives indexing roller 36. Indexing roller 36 is used to provide the necessary spacing between cases on conveyor 28. At a conveyor speed of about 140 feet per minute and a sprocket ratio of 2 to 1, an indexing roller 2 3/4 inches in diameter will produce a case spacing of from 6 to 8 inches. This spacing increases in direct relationship with the length of the case.

Side rails 42 are movable transversely to accommodate cases of different widths. The side rails 42 are locked in position by means of nuts 43. The details of this movement and adjustment are described in our copending application Serial No. 150,236.

Folding belt 44 is driven in the direction shown by the arrow of FIGURE 3 by motor 45 through sprockets 46 and 47 and chain 48. Its operation has been described in our copending application. Hold-down bar 49 is provided to hold down the folded down, end flaps during the initial processing steps.

Carriage 50 is movable vertically within frame 26 by means of screws 51 which are controlled by handle 52. The vertical movement of carriage 50 is provided in order to permit cases of different heights to be sealed in accordance with the teachings of the invention. The structure and movement of carriage 50 have been described in our copending application. Subcarriages 53 and 68 which are similar to the single subcarriage of our copending application are mounted on carriage 50 and are moved vertically with respect thereto by adjustment wheels 56 and 70 respectively.

A wet glue applicator assembly is mounted on subcarriage 53 and a similar wet glue assembly is mounted on subcarriage 68. Wet glue is selectively applied by means of applicators 57 and 71 from reservoirs 55 in the manner described in United States Patent 2,898,816. The wet glue applicator described in our copending application may also be used to carry out the teachings of the invention. Thermoplastic adhesive applicator assembly 58, which comprises applicator 59 and motor 60 is mounted on subcarriage 53. A similar assembly comprising applicator 73 and motor 72 is mounted on subcarriage 68. The structure and operation of these assemblies are the same as that of those contained in the apparatus of our copending application. The flow of the adhesive from the applicator box is controlled by metering bars placed across the egress opening. These applicator assemblies are manufactured by the United Shoe Machinery Company of Boston, Massachusetts.

Camming belt assembly 62 and pressure section 66 are driven by motor 64. Similarly, camming belt assembly 74 and pressure section 78 are driven by motor 76. One camming belt is provided in each camming belt assembly since each is used to fold down one top outer flap. Pressure section 66 is not of full width because at the point in the process at which it is used, only one top outer flap has been folded down. Pressure section 76 may be of full width or may be less than full width to accommodate suction when conditions warrant it because both top outer flaps have been folded down when the case reaches that point. The operation of the camming belts and the pressure sections is the same as has been described in our copending application.

The control switches, which are mounted on side rails 42, have been designated 79, 80-1 through 80-6, 82-1 through 82-4 and 84-1 through 84-6 in accordance with the order in which the cases moving along conveyor 28 act on them. As the case moves along the conveyor its leading edge hits switch 79 which starts motor 45 and belt 44. Since belt 44 runs faster than conveyor 28, the

4

trailing end flap is folded down. Switch 79 opens after it is cleared by the case.

The case next trips switch 80-1 which actuates the wet glue applicator assembly to begin applying the wet glue to the leading end flap. The leading end flap has been previously folded down when it contacted the end of bar 49.

Next, the case trips switch 80-2 which deactivates the wet glue applicator, to prevent glue from being applied to the product in the case. At switch 80-3 the wet glue applicator is activated to begin applying wet glue to the trailing end flap. One of the upstanding, top side flaps has been guided between arms similar to those of our copending application to control that flap to bring it in contact with the applicator wheel of the thermoplastic adhesive applicator. When the case trips switch 80-4 the guides controlling the flap are actuated and the flap is moved away from the thermoplastic adhesive applicator. When the case trips switch 80-5 the guides are deactivated and the flap is once again brought into contact with the thermoplastic adhesive applicator. When switch 80-6 is tripped it deactivates the wet glue applicator.

The partially closed case proceeds under camming belt assembly 62 which folds down the side flap to which the thermoplastic, quick-setting adhesive has been applied. As the leading edge of the case passes the end of camming belt assembly 62 it contacts switch 82-1 which turns on the suction connected to suction unit 20 to draw the leading end flap into contact with the folded down side flap. Next, the case actuates switch 82-2 and the suction is turned off.

Next, the case actuates switch 82-3 which turns on the suction to draw the trailing end flap into contact with the folded down side flap. In this position, the leading portion of the folded down side flap and the inner end flaps are drawn upward against the rollers of pressure section 66. Upon the case's contacting switch 82-4, the suction is turned off. The case with one closed side now runs under pressure section 66 and the thermoplastic adhesive sets. The case now trips switch 84-1 which actuates the wet glue applicator assembly to begin applying the wet glue to the untreated side of the leading end flap.

Next, the case trips switch 84-2 which deactivates the wet glue applicator, to prevent glue from being applied to the product in the case. At switch 84-3 the wet glue applicator is activated to begin applying wet glue to the trailing end flap. The remaining, upstanding, top side flap has been guided between arms similar to those of our copending application that control that flap to bring it in contact with the applicator wheel of the thermoplastic adhesive applicator. When the case trips switch 84-4 the guides controlling the flap are actuated and the flap is moved away from the thermoplastic adhesive applicator. When the case trips switch 84-4A the guides and the flap are once again brought into contact with the thermoplastic adhesive applicator. When switch 84-6 is tripped it deactivates the wet glue applicator.

The partially closed case proceeds under camming belt assembly 74 which folds down the side flap. The closed case now runs under pressure section 78, the thermoplastic adhesive sets and the case is discharged for delivery to a conveyor, a truck, pallet or other means for removing the filled, sealed cases in the plant. Where conditions will warrant it, suction may also be applied to the previously sealed outer flap to bring about proper, intimate contact between the inner flap and the last outer flap to be closed.

While we have disclosed our invention in relation to a specific example and in a specific embodiment, we do not wish to be limited thereto, for obvious modifications will occur to those skilled in the art without departing from the spirit and scope of our invention.

Having thus described the invention, we claim:

1. Apparatus for glue sealing flapped cases which have

5

at least one top outer flap and whose top inner flap is unsupported by product comprising:

- a frame;
 - a conveyor within the frame; and the following elements affixed to the frame:
 - means for selectively applying wet glue to one of the flaps of the case;
 - means for selectively applying thermoplastic adhesive to one of the flaps of the case;
 - means for folding down the flaps such that the wet glue and thermoplastic adhesive lie between the folded down flaps;
 - means for drawing the inner flap against the folded down, outer flap; and
 - means for holding down the outer flap until the thermoplastic adhesive sets.
2. Apparatus for glue sealing flapped cases which have more than one top, outer flap and whose top, inner flaps are unsupported by product comprising:
- a frame;
 - a conveyor within the frame; and the following elements affixed to the frame:
 - means for feeding filled cases onto the conveyor in spaced relationship;
 - means for folding down the leading, top, inner, end flap of the case;
 - means for folding down the trailing, top, inner, end flap of the case;
 - means for selectively applying wet glue to the outer surfaces of the top, inner, end flaps of the case over less than all the areas thereof to be covered by one of the top, outer, side flaps;
 - means for selectively applying thermoplastic adhesive to the inner surface of one of the top, outer, side flaps;
 - means for folding down the top, outer, side flap to which thermoplastic adhesive has been applied;
 - means for drawing the top, inner, end flaps against the folded down, top, outer, side flaps;
 - means for holding the folded down, top, outer, side flap against the top, inner, end flaps until the thermoplastic adhesive sets;
 - means for selectively applying wet glue to the outer surfaces of the top, inner, end flaps of the case over

6

less than all the areas thereof to be covered by the other of the top, outer, side flaps;

- means for selectively applying thermoplastic adhesive to the inner surface of the other of the top, outer, side flaps;
- means for folding down the other of the top, outer side flaps to which thermoplastic adhesive has been applied; and
- means for holding the folded down, top, outer side flap against the top, inner, end flaps until the thermoplastic adhesive sets.

3. Apparatus as described in claim 1 wherein the means for drawing the inner flap against the folded down, outer flap comprises a suction unit applied to the upper surface of the inner flap.

4. Apparatus as described in claim 2 wherein the means for drawing the top, inner, end flaps against the folded down, top, outer, side flap comprises a suction unit applied to the upper surfaces of the inner flaps.

5. Apparatus for glue sealing flapped cases which have more than one top, outer flap and whose top, inner flaps are unsupported by product as described in claim 2 including means for drawing the previously sealed top outer flap upward such that the inner flaps are brought into intimate contact with the second of the folded down top outer flaps.

6. Apparatus for glue sealing flapped cases which have more than one top, outer flap and whose top, inner flaps are unsupported by product as described in claim 5 wherein the means for drawing the previously sealed top outer flap upward such that the inner flaps are brought into intimate contact with the second of the folded down top outer flaps comprises a suction unit applied to the upper surface of the top outer flap already affixed to the inner flaps.

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