Feb. 4, 1969 L. M. SHUH ET AL 3,425,393

ADHESIVE APPLICATOR APPARATUS

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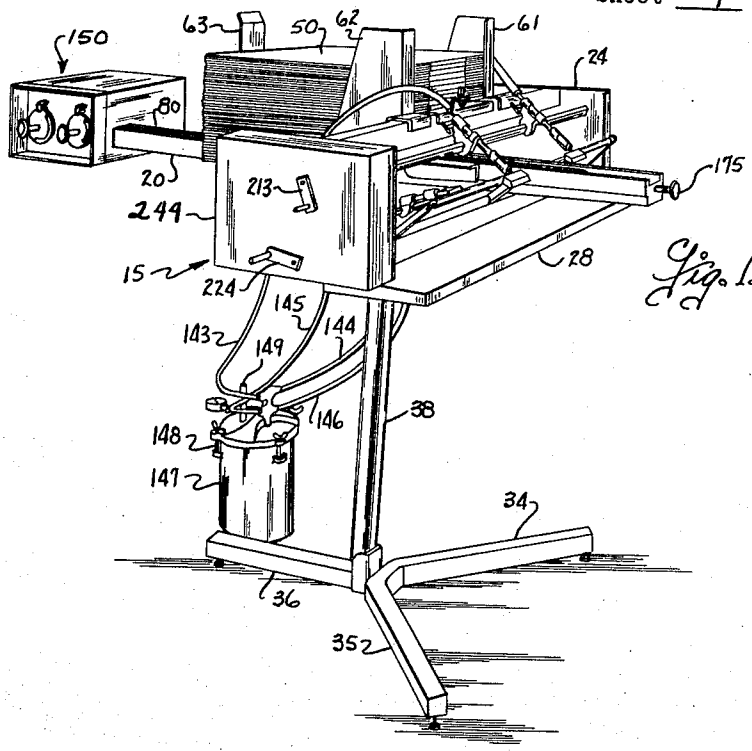


Fig. 1.

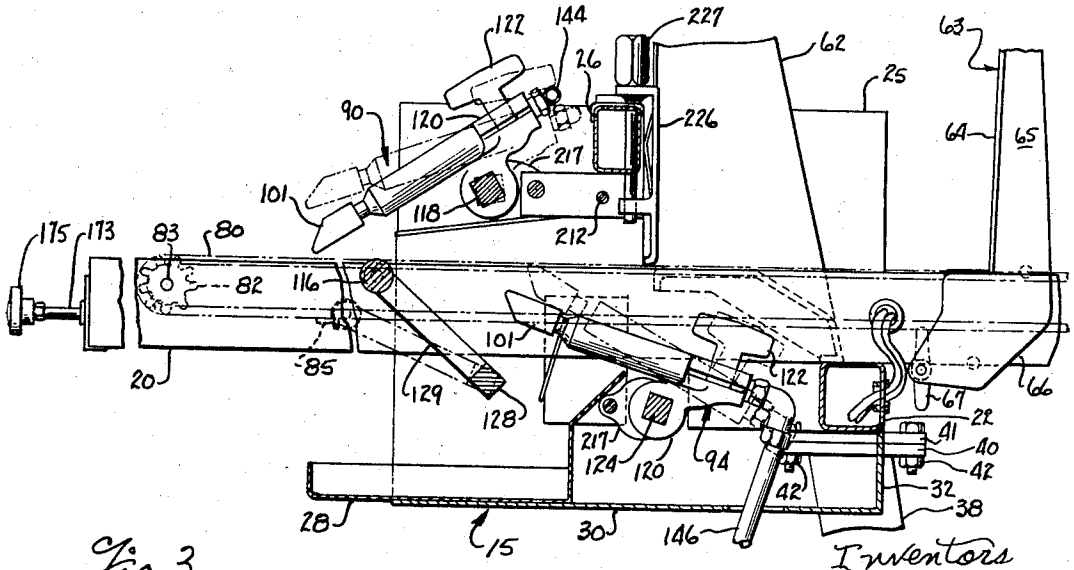


Fig. 3.

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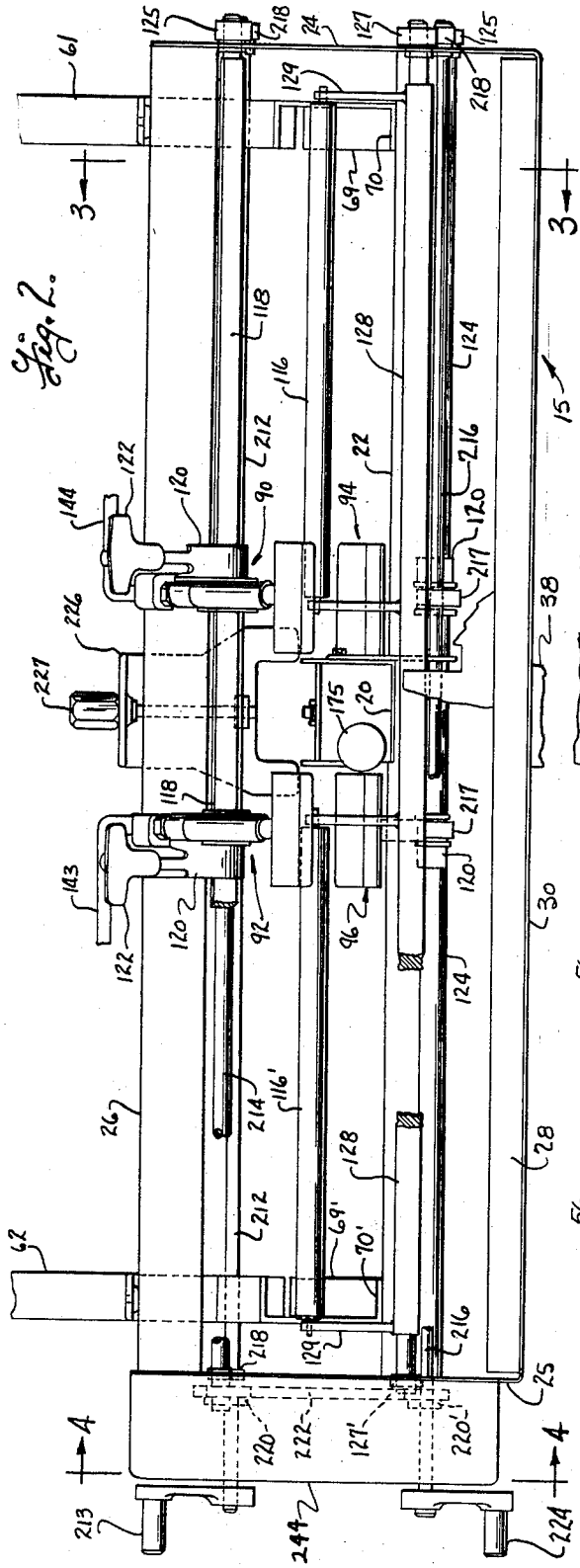


Fig. 2.

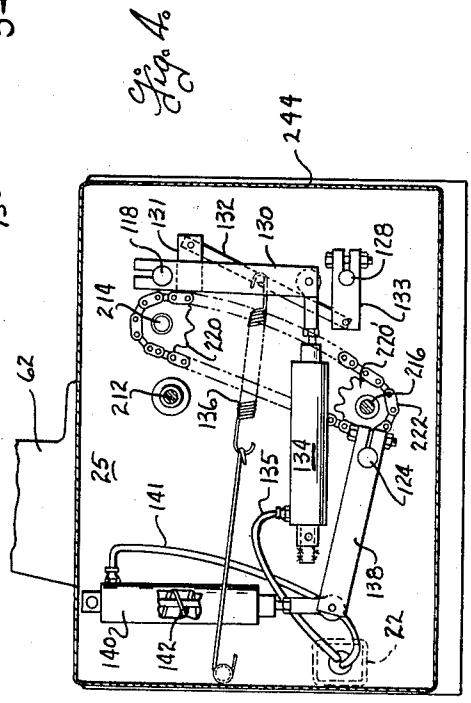


Fig. 4.

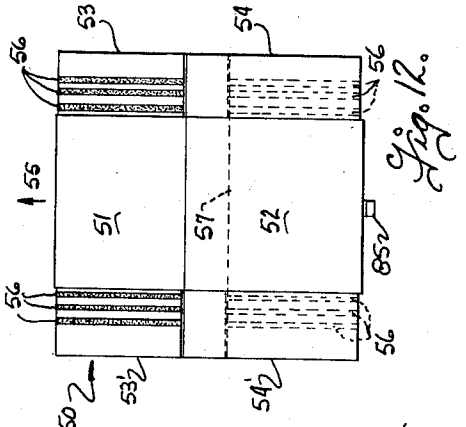


Fig. 12.

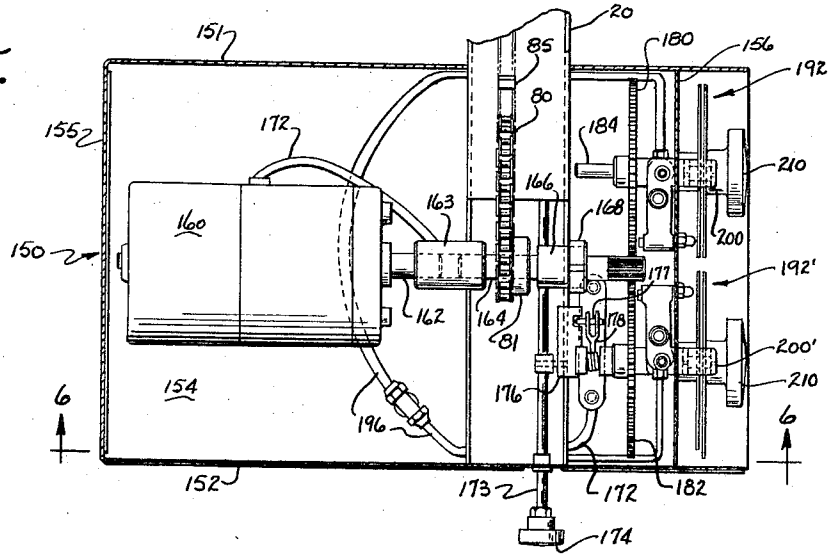
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ADHESIVE APPLICATOR APPARATUS

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Fig. 5.



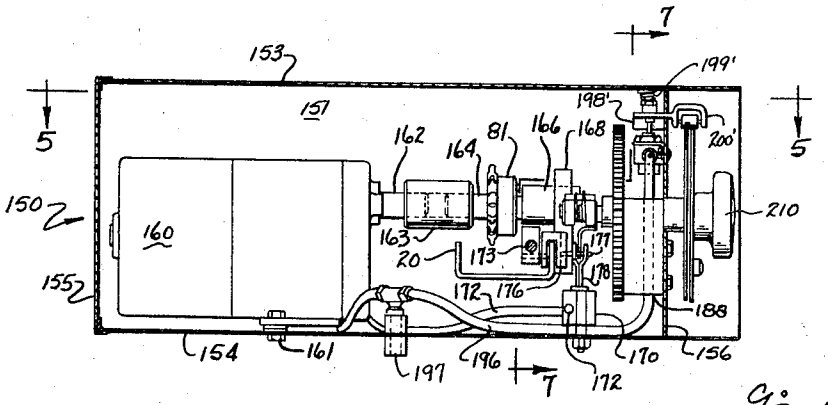


Fig. 6.

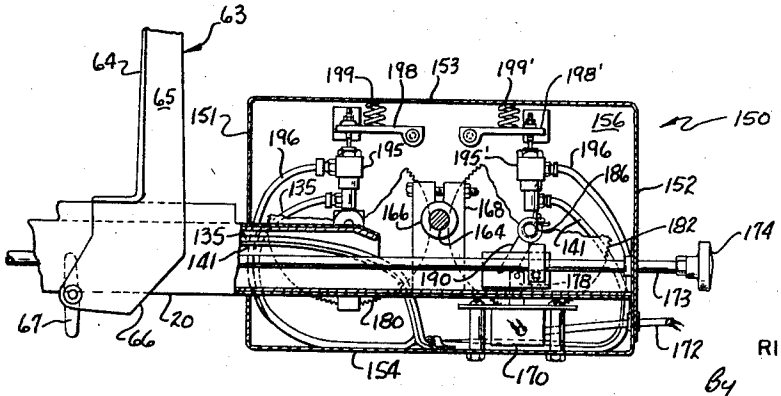


Fig. 7.

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Fig. 8.

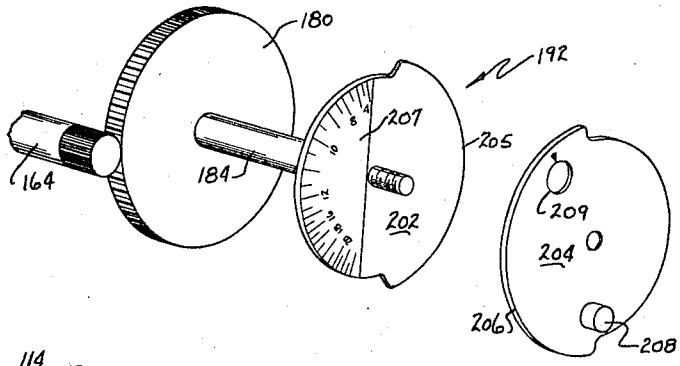
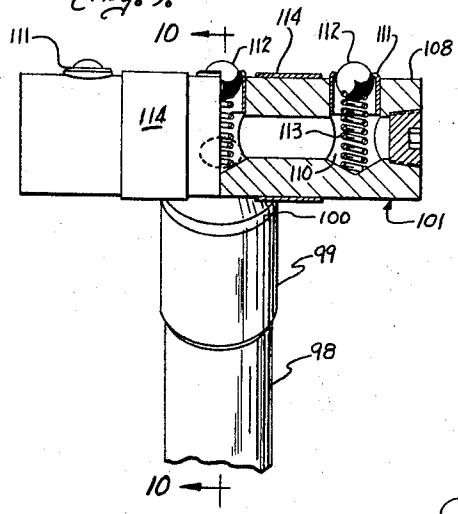


Fig. 9.



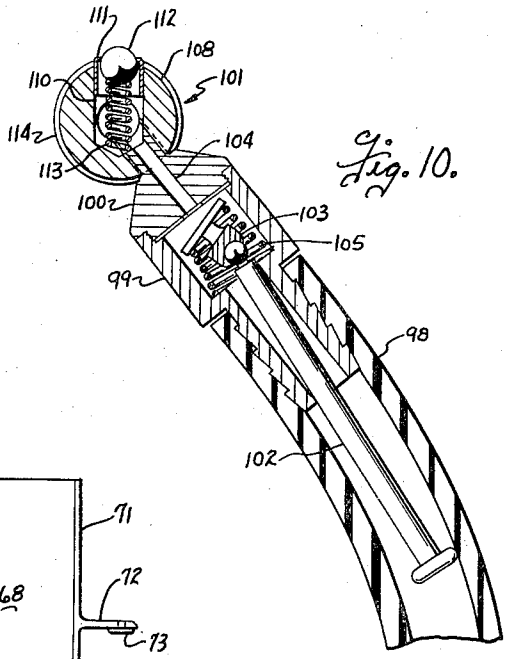


Fig. 10.

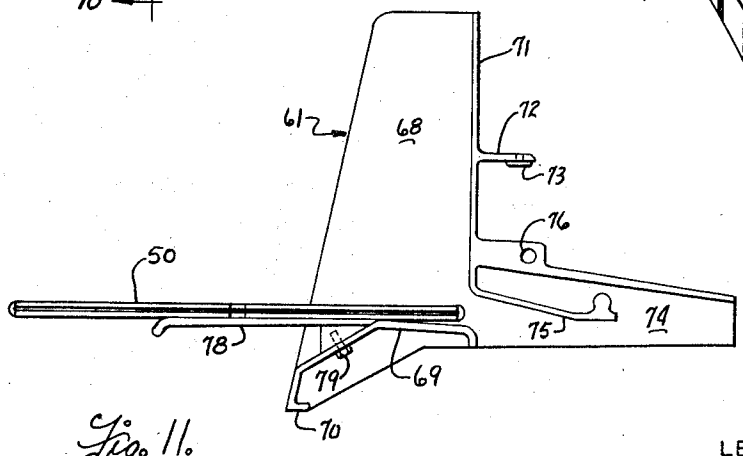


Fig. 11.

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United States Patent Office

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3,425,393

ADHESIVE APPLICATOR APPARATUS

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Filed Apr. 19, 1965, Ser. No. 448,929

U.S. Cl. 118—2 19 Claims

Int. Cl. B05b 7/24; B31b 1/62

ABSTRACT OF THE DISCLOSURE

A conveyor for advancing a carton in flat collapsed condition past upper and lower pairs of adhesive applicators. The upper pair of adhesive applicators being disposed in the path of travel to apply adhesive entirely across the outside of the top lead flaps and then moved to an inoperative position. The lower pair being located away from the carton and then moved into engagement to apply adhesive entirely across the outside of the bottom trailing flaps. A cyclically operable motor drives the conveyor. An adhesive bucket stores the adhesive under pressure of shop air. Controls are provided for adjusting the positions of various parts to accommodate various size cartons.

This invention relates in general to apparatus for applying adhesive to carton flaps and more particularly to apparatus for applying adhesive to the end flaps of a carton while in flat collapsed condition. The apparatus is adapted to operate on cartons of conventional form which are shipped in flat collapsed condition and provided with integral end flaps at opposite ends.

An object of this invention, therefore, is to provide a new and useful machine of simplified construction for applying adhesive to the end flaps of a carton in flat collapsed condition.

Another object is to provide a machine in accordance with the foregoing object and which provides for separation of one carton from a stack of collapsed cartons and advancing the same in one direction past adhesive applicators.

Yet another object of this invention is to provide a unique machine for applying adhesive to cartons in flat collapsed condition and which adhesive is applied to selected portions of their surfaces.

Still another object is to provide a machine in accordance with the foregoing object and which controls the application of adhesive by regulating the applicators relative to the trailing edge of the carton or from the means for advancing the carton.

It is another object to provide a unique machine for applying adhesive to upper and lower portions of a carton in flat collapsed condition and which machine includes a pair of applicators disposed in the path of the advancing carton for applying adhesive to the upper portions and another pair of applicators disposed beneath the carton and spaced away therefrom but movable to engage the bottom portions of the carton for applying adhesive thereto.

Another important object of this invention is to provide a new and useful machine for applying adhesive to cartons in flat collapsed condition and which machine may be quickly and readily adjusted to receive any of various size cartons and for selectively varying the areas of application of adhesive and which adjustments can be easily performed by an unskilled operator.

It is still another object to provide a machine in accordance with the foregoing object and which includes new and useful controls for selectively engaging the lower applicators and selectively disengaging the upper applicators.

A further object is to provide a machine in accordance with the foregoing objects which has few moving parts and which can be operated by a relatively small electric motor and compressed air.

A still further object is to provide a machine of improved and simplified construction for applying adhesive to cartons and which machine is compact and substantially portable, of relatively uncomplicated and economical construction, and yet durable and trouble free.

Additional objects and advantages of this invention will become apparent as the same becomes better understood by reference to the following description when taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a perspective view of an embodiment of the present invention;

FIG. 2 is a partial front elevational view of the apparatus on a larger scale than FIG. 1 and with portions broken away to better illustrate the relationship of the parts;

FIG. 3 is a partial longitudinal sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 2 and showing the interior of the mechanism compartment of the apparatus;

FIG. 5 is a horizontal sectional view taken along line 5—5 of FIG. 6 of the control box at the rear of the apparatus;

FIG. 6 is a transverse sectional view of the control box taken along line 6—6 of FIG. 5;

FIG. 7 is a longitudinal sectional view of the control box taken along broken line 7—7 of FIG. 6 and having a portion broken away to better illustrate the parts;

FIG. 8 is an exploded perspective view of one set of cams and showing their relationship to the gear and drive shaft;

FIG. 9 is a view, in part frontal and in part sectional, of an adhesive applicator for use on the present invention;

FIG. 10 is a longitudinal sectional view of the adhesive applicator taken along line 10—10 of FIG. 9;

FIG. 11 is a side view of a side hopper member and showing an outrigger attachment with a carton in place thereon; and

FIG. 12 is a top view of a carton dispensed from the machine and showing typical locations of adhesive applied to the flaps thereof.

Referring now more particularly to the drawings wherein the same numerals indicate the same parts throughout the several views, a preferred embodiment of the invention will be described. The adhesive apparatus, generally designated by the numeral 15 includes a frame which may be formed of any suitable material, such as steel. It is contemplated that the frame may be shaped in any manner convenient to effectuate the purpose of the apparatus, however, it is herein illustrated as having a longitudinal member 20 joined, as by welding, to transverse member 22, as best shown in FIG. 3. Attached at either end of transverse member 22 are end members 24 and 25. Upper transverse member 26, advantageously box-shaped, is attached at either end to end members 24 and 25. A tray 28 is also conveniently attached to the end members and extends forward thereof for the purpose of catching any adhesive which may accidently drip from the applicators which will hereinafter be described. The apparatus also conveniently has a bottom member 30 and a back panel 32 which are attached to the aforesaid end members in any convenient manner, as by welding. The frame may be supported in any manner desired and is herein illustrated as being supported by a plurality of legs 34–36 mounted on an upright mem-

ber 38. The upright member conveniently is secured to a plate 40 which is adapted to lie contiguous to plate 41 mounted on transverse member 22, as by welding. The plates are held in contiguous relationship as by fasteners 42 thereby supporting the apparatus by the legs and upright member described above.

The apparatus of the present invention is adapted to apply adhesive to cartons while in flat collapsed condition, as illustrated in FIG. 12. A typical box or carton 50 in flat collapsed condition, has an end 51 and a side 52 overlying the opposite side and end, respectively. Likewise, end flaps 53 and 53' and side flaps 54 and 54' respectively overlie the opposite side flaps and end flaps. If the box or carton has a generally square opening, the sides and ends will be of the same length; however, if the box or carton is to provide a rectangular opening, the ends will be somewhat shorter than the sides, as is illustrated.

The apparatus 15 is adapted to store a plurality of cartons in flat collapsed condition, as illustrated in FIG. 1. For this purpose, a hopper or storage means is provided, which comprises hopper sides 61 and 62 and hopper back 63. It is contemplated that other types of storage means may be used, however, the members illustrated are conveniently in the form of castings adapted to be supported by, and ride on the respective frame members. As best shown in FIGS. 3 and 7, hopper back 63 includes a generally smooth wall 64 supported by support member 65. and a body portion 66 adapted to fit around and glide upon longitudinal frame member 20. A wing nut 67 is provided to secure the hopper back in position on longitudinal member 20 and for releasing the same to selectively adjust the hopper for different size boxes. A typical hopper side is illustrated in FIG. 11. Each hopper side conveniently includes a substantially smooth wall 68 and a bottom support 69 for the cartons 50. Bottom support 69 has a base 70 to provide support for the hopper side on transverse frame member 22. A front wall 71 is attached to side wall 68 and an arm 72 extends therefrom. A bearing 73 is conveniently affixed to arm 72 to provide a support for the hopper side on transverse upper frame member 26. An outwardly extending portion 74 extends from the front of the hopper side to aid in guiding the box as it is dispensed through the machine. A backup member 75 is attached to the lower end of front wall 71 and advantageously disposed adjacent member 74, for a purpose which will later become apparent. A threaded hole 76 is preferably provided in each hopper side for selectively adjusting the sides to receive different size boxes in a manner hereinafter described. When a plurality of rectangular boxes are placed in the hopper, as for example a plurality of cartons placed above the carton illustrated in FIG. 12, the bottom carton may be removed by sliding in the direction indicated by arrow 55 without the slots between flaps crossing. In this manner, the boxes slide past each other quite readily. When substantially square boxes are utilized, however, the slots generally overlie each other and there is a danger of binding if one flap is bent. To substantially prevent such bending of the flaps, and the resulting binding of boxes when being removed from the hopper, an outrigger 78 is attached to each hopper side, as by a fastener 79. It should be understood that the outrigger is not required when rectangular boxes are utilized.

As stated above, the bottom carton of the stack in the hopper is removed therefrom and advanced through the machine. For this purpose, a conveyor means is provided and it is herein illustrated as an endless-type chain conveyor 80, as best illustrated in FIGS. 3 and 5. A drive sprocket 81 is conveniently disposed adjacent the rear of the machine and sprocket 82 is mounted adjacent the front of the machine on shaft 83 monted on the sides of longitudinal frame member 20. Means is provided for stripping the bottom carton from the stack in the hopper and it is herein illustrated as a hook 85. There are preferably two such hooks to allow the conveyor to pass through a cycle involving the minimum distance; however, it is contemplated that different numbers of hooks may be used. The means for advancing the conveyor and hooks will be described below.

As a carton 50 is advanced through the machine, adhesive is applied to selective areas of the carton. As shown by the plurality of adhesive stripes 56 in FIG. 12, adhesive may be applied to four different end flaps, two facing upwardly and two facing downwardly. For this purpose are provided a pair of upper adhesive applicators 90 and 92 and a pair of lower adhesive applicators 94 and 96, best shown in FIG. 2. It is contemplated that various types of applicators may be utilized; however, a preferred applicator is illustrated in FIGS. 9 and 10. In general, the applicator includes a flexible body 98, a metal adapter 99 frictionally secured in the body, closure member 100 conveniently threaded into the adapter, and an adhesive head generally designated by the numeral 101. An internal lever 102 is disposed inside the body and the lever and has a ball joint adjacent one end thereof. A valve member 103 is affixed to the ball join. When the body 98 is flexed, the valve is opened, as illustrated in FIG. 10, allowing the adhesive to flow to port 104 in the closure member 100. A spring 105 and the pressure of the adhesive will cause the valve member 103 to close when the body is returned to normal straight position. With the exception of the adhesive head, the parts described above are readily available on the market. One such apparatus is manufactured by Air-Way Pump and Equipment Company of Chicago, Ill., and sold under the trademark "Air-O-Chek." The adhesive head 101 may of any convenient type; however, it is herein illustrated as a hollow housing 108 adapted to be connected to the closure 100 and receive adhesive passed through port 104. A plurality of channels 110 communicate with the interior of the housing. A sleeve 111 is inserted into each channel to retain a ball applicator 112 wich is held in normally off position by a spring 113. Contact of the applicator with a carton depresses the ball 112 and flexes the body 98. This allows the adhesive to flow and be applied to the carton. The housing is conveniently formed of aluminum and a pair of stainless steel rings 114 advantageously encircle the housing to provide a wearing surface. As a flat spot is worn on the ring, it can be conveniently turned to bring a new surface into bearing. It is contemplated that the housing may be of other material than aluminum; for example, it may conveniently be of stainless steel and the rings 114 eliminated. While the applicator has been illustrated as having three adhesive outlets, it should be understood that this is by way of illustration and that different numbers may be utilized. A plurality of adhesive lines 143–146 each lead from an adhesive storage means, herein illustrated as bucket 147, to a respective applicator, as best shown in FIG 1. The bucket is adapted to supply adhesive under pressure and, for that purpose, is provided with a plurality of clamps 148 and an air inlet 149. A supply line (not shown) may be plugged into the inlet to feed the adhesive under pressure to the applicators. Air pressure in the range of 4 to 24 p.s.i. has been found to be advantageous for various operations.

The adhesive utilized is conveniently a polyvinyl acetate which dries by absorption, such as H. B. Fuller #3700 manufactured by H. B. Fuller Co. of St. Paul, Minn. It is contemplated that other types of adhesive may be used; however, the adhesive must be such that it has an "open" time sufficient to complete the desired handling of the carton, such as folding and filling.

As stated above, when a carton 50 is advanced by the conveyor 80 and hook 85, adhesive is applied to selected portions thereof. Upper glue heads 90 and 92, in initial or normal position, are disposed in line for engaging the

carton as it is advanced. Such engagement flexes the flexible body **98**, which operates to open valve **103** and allow adhesive to flow into head **101**. Such engagement also depresses ball applicators **112** and adhesive is applied in a strip as illustrated in FIG. 12. At the end of the application of the adhesive by the upper glue heads, they are moved to a second position generally normal to and away from the advancing cartons as shown in phantom in FIG. 3. Lower glue heads **94** and **96**, in initial or normal position, are disposed away from the advancing carton. At the start of the application of adhesive, they are moved from said normal position to a second position for engaging a carton and are deflected and flexed in a manner described above. To support the carton **50** so that the body **98** will be flexed thereby, there are provided a pair of backup rollers **116** and **116'**. So that these rollers will not engage the adhesive applied by the lower applicators, they, too, are moved to a second position away from the advancing carton simultaneously with the movement of the upper adhesive applicators, as shown in phantom in FIG. 3. The backup support for the lower adhesive applicators is provided by backup member **75** on hopper sides **61** and **62** (see FIG. 11). In this manner, the carton is supported whenever it is engaged by an applicator.

As stated above, the applicators and backup rollers move between a normal position and a second position. It is contemplated that this movement may be accomplished by various means, however, they are preferably mounted on shafts and the shafts rotated through a limited distance. As best illustrated in FIGS. 2 and 3, the upper applicators **90** and **92** are mounted on a shaft **118** by means of casting **120** and the applicator is held in place by means of wing nut **122**. Similarly, lower adhesive applicators **94** and **96** are mounted on shaft **124** by means of casting **120** and wing nut **122**, as best shown in FIG. 3. Shafts **118** and **124** extend transverse of the machine and are supported adjacent their ends on end members **24** and **25** by means of bearings, such as bearing **125** shown in FIG. 2 Backup rollers **116** and **116'** are supported on shaft **128** by means of arms **129**. Shaft **128** also extends transverse of the machine and is mounted on end members **24** and **25** by means of bearings **127** and **127'** as shown in FIG. 2. The apparatus for rotating shafts **118**, **124**, and **128** is conveniently enclosed in housing **244** adjacent end member **25** (see FIGS. 2 and 4). Since the upper applicators **90** and **92** and the backup rollers **116** and **116'** are to be simultaneously moved away from the advancing carton, their respective shafts **118** and **128** are conveniently connected together by linkage, herein illustrated in FIG. 4 as including arms **130–133**. Means for actuating these shafts for simultaneously rotating is in the form of a cylinder **134** pivotally connected at one end to arm **130** and at the other end to end member **25**. Line **135** supplies fluid to this cylinder. A spring **136**, is conveniently attached to arm **130** and end member **25**, holds the shafts in normal position. When a fluid, such as air, is supplied to cylinder **134**, the cylinder moves the shafts a limited distance thus driving the upper applicators and backup rollers away from the carton. An arm **138** is connected to shaft **124** and an acutating means, herein illustrated as a cylinder **140** is pivotally connected thereto. The other end of the cylinder is pivotally connected to end member **25**. Line **141** supplies fluid to cylinder **140**. An internal compression spring **142** is conveniently disposed within cylinder **140** to hold the same in normal retracted position and thus hold the lower applicators in normal position away from the carton. When fluid is supplied through line **141**, cylinder **140** is extended and the lower applicators are driven toward the advancing carton. Lines **135** and **141** are connected to controls and conveniently are disposed within transverse member **22** and longitudinal member **20**. The manner in which the flow of fluid is controlled to the cylinders will be described below.

Disposed adjacent the rear of the machine, is a control box, generally designated by the numeral **150**, mounted on longitudinal frame member **20** by any convenient means, such as welding. The control box is comprised of sides **151** and **152**, top **153**, bottom **154**, and ends **155** and **156**. The mechanism for driving conveyor **80**, for controlling the flow of fluid through lines **135** and **141**, and for controlling an operating cycle of the apparatus are disposed within the control box. The motor **160** is mounted in the control box as by fasteners **161**. In the embodiment illustrated, the motor utilized is a one-tenth H.P. electric motor operating off 110 volt current; however, it is contemplated that various other means may be utilized to drive the apparatus and that different size motors may be required for different machines embodying this invention. Motor shaft **162** is attached to drive shaft **164** by coupling **163**. Sprocket **81** is mounted on shaft **164** and the shaft is secured in a bearing **166** by means of a mounting **168** attached to longitudinal member **20**, as by welding. A switch apparatus **170** is interposed in electrical line **172** for controlling the operation of electric motor **160**. While it is contemplated that the machine may be run continuously, the embodiment illustrated is arranged to be operated through a cycle where one box is dispensed at a time, as called for by an operator. For this purpose, a shaft **173** is disposed within longitudinal member **20** and conveniently has a handle **174** at the rear of the machine (see FIG. 5) and a handle **175** adjacent the front of the machine (see FIG. 3). Shaft **173** is connected to block **176** which slides along longitudinal member **20**. A pin **177** in block **176** throws a toggle **178** thereby operating switch **170**. Thus, an operator can actuate the machine and start a cycle by operating handle **174** or **175** at either end of the machine. When the switch is thrown, electric motor **160** will operate to rotate shaft **164** and drive conveyor **80**. The manner in which a cycle is stopped will be described below.

The outer end of shaft **164** is conveniently toothed, as best shown in FIG. 5, and associated therewith are gears **180** and **182** mounted on shafts **184** and **186**, respectively. Shafts **184** and **186** are rotatably mounted in mountings **188** secured to end wall **156**, as shown in FIG. 6. These gears are preferably arranged to rotate through 360° as the apparatus is operated through a cycle. In this manner, a finger **190**, mounted on shaft **186** as best shown in FIG. 7, operates to return the toggle **178** to off position at the completion of the cycle. Shafts **184** and **186** extend through end wall **156** and a set of cams, generally designated by the numeral **192**, is mounted adjacent the outer end of each shaft. Since each shaft rotates through 360° for each cycle, the cam set will also rotate 360° for each cycle. A typical set of cams **192** is illustrated in FIG. 8 and will be further described below. At the present time, it is sufficient to understand that each set of cams **192** actuates switch for controlling the flow of fluid to cylinders **134** or **140**. In the preferred form illustrated, the switch is in the form of an air valve **195** which controls the flow of air from line **196** into the respective lines **135** and **141**, as best shown in FIG. 7. Connected to line **196** is an inlet **197** (FIG. 6) into which a supply line (not shown) may be connected. Air pressure of approximately 40 p.s.i. has been found to be advantageous to properly operate the cylinders **134** and **140**. Above each valve **195**, is mounted an arm **198** and a spring **199**. A cam follower **200** on arm **198** extends through end wall **156** for engaging the cam set **192**. The spring **199** urges the follower against the cam set, as best shown in FIG. 6. When an indentation of the cam set engages the follower **200**, the spring **199** urges the valve **195** into on position allowing air to flow to the cylinders and thereby operate to move the respective adhesive applicators. When the raised or cammed portion of the cam set engages the follower **200**, arm **198** is raised and valve **195** is closed.

As explained above, the upper applicators are in normal position to engage an advancing box or carton and the lower applicators are in normal position away from the

advancing carton. In this manner, the controls of the application of adhesive are arranged in reference to the trailing edge of the box which is engaged by the hook. Referring to FIG. 12, the hook **85** is shown engaged to the trailing edge of the carton **50**. Notice that the length of the side **52** is the distance from the trailing edge to the slot between flaps **53** and **54**. This is the point where the application of adhesive to flap **53** is to be terminated. Likewise, the width of the box is designated as the distance from hook **85** or the trailing edge, to fold line designated by dotted line **57**. The notch or slot at the underside of the box is colinear with line **57** and represents the point where adhesive would be started by the lower adhesive applicators. By coordinating the cams with respect to the hook **85**, the applicators can be moved to second position at a preselected distance from the hook thereby stopping the application of adhesive from the upper applicators and commencing the application of adhesive by the lower applicators.

Referring now to FIG. 8, the manner in which the cam sets **192** are adjusted will be described. Each cam set includes a pair of cams **202** and **204**, each of which has a raised or cammed portion **205** and **206**, respectively. Cam **202** is preferably fixed to shaft **184** so that its cam portion **205** will engage the extremity **200** immediately prior to the end of the cycle to return the respective applicators to normal position. Cam **202** also has a calibration **207** for purpose which will hereinafter become apparent. Cam **204** is an adjustable cam having a handle **208** for that purpose. An opening **209** in cam **204** and an arrow adjacent one edge thereof provides for alignment of cam **204** in respect to the calibration on cam **202**. The calibration is preferably arranged to indicate the distance from hook **85** at which the actuation of the adhesive applicator is to occur. It is appropriate to recall that the actuation of the upper applicator stops the application of adhesive; while the actuation of the lower applicator starts the aplication of adhesive. It should be pointed out that the distance from the hook at which such actuation will normally occur, when it is desired to apply adhesive to the entire end flap, is equal to the box length for the upper applicators and the box width for the lower applicators. Thus, by choosing this distance on the calibration, cam **204** can be set at the desired selection for controlling the respective upper or lower applicators. Cam **204** is then tightened by nut **210**, shown in FIGS. 5 and 6.

A salient feature of this invention, however, is its adjustability. For example, the embodiment herein illustrated may be easily adapted to receive cartons ranging in size from 6″ x 6″ x 4″ to 24″ x 12″ x 24″ and any size in between, and this adjustment may be quickly and readily made by an unskilled operator. It should be understood that the foregoing sizes of cartons are mentioned by way of illustration, and not limitation, and that it is contemplated that this invention may be adapted to handle boxes of various other sizes.

The manner in which the apparatus is adjusted will now be described. It has already been indicated that hopper back **63** may be selectively adjusted along longitudinal member **20** to accommodate different size cartons. Likewise, hopper sides **61** and **62** are selectively adjustable to accommodate different size cartons. A transverse shaft **212** (see FIGS. 2 and 3), having right and left hand threads, extends through threaded hole **76** (see FIG. 11) in side members **61** and **62**. Shaft **212** conveniently extends outside of housing **244** and has a handle **213** affixed to the outer end thereof. Thus, by turning handle **213**, the shaft will be rotated and the hopper sides will be simultaneously moved an equal distance relative to the center of the machine. The position of hopper sides **61** and **62** shown in FIG. 2 indicates the outer extreme of movement of the hopper sides in this embodiment.

The position of the applicators **90**, **92**, **94**, and **96** may also be adjusted to accommodate different size boxes or to vary the area of application of adhesive or glue to the advancing carton. For this purpose are provided shafts **214** and **216** also having right and left hand threads. A pair of threaded castings **217** (see FIG. 3) are mounted on each screw shaft **214** and **216** and are each engageable with casting **120** of the respective applicator. The shafts are conveniently mounted on end members **24**, **25** as by bearings **218** and extend into housing **244**. As best shown in FIG. 4, sprockets **220** and **220′** are mounted on shafts **214** and **216**, respectively. Chain **222** conveniently connects the two sprockets so that the shafts will rotate simultaneously. One of the shafts, herein shown as shaft **16**, advantageously extends outside housing **244** and has a handle **224** attached to its outer extremity (see FIG. 2). Thus, by rotating handle **224**, both shafts **216** and **214** will be simultaneously adjusted an equal distance relative to the centerline of the machine. The position of the applicators as shown in FIG. 2, illustrates the extreme of movement toward the center of the machine of the present embodiment. Thus, the position of the aplicators indicate the smallest size and the poistion of the hopper sides indicates the largest size to which the present embodiment is adaptable. It should be remembered that backup member **75** of each hopper side serves as a backup for the repsective lower adhesive applicator **94** or **96** and that in an ordinary operation the applicators would be in close proximity to the hopper sides **61** and **62**. The positions indicated in FIG. 2 are chosen to illustrate the adjustability of the machine and to better illustrate the parts and it should be understood that an operable position would have the applicators and the hopper sides in closer proximity, as illustrtaed in FIG. 1.

It will be recalled that the respective applicators are secured in casting **120** by wing nut **122**. By loosening the wing nut, the applicator is adjustable in the casting to vary the pressure on the advancing carton as applied by the applicator head. In this manner, not only may the pressure be varied, but the apparatus may be adapted to accommodate cartons or boxes of different thickness when in collapsed condition.

For further adapting the apparatus to boxes of different thickness in collapsed condition, a casting **226** is mounted on transverse member **26**, as best shown in FIG. 3. A threaded adjusting nut **227** operates to move the casting up and down to assure that only one carton will be dispensed through the apparatus at a time, thereby accommodating the machine to different thickneses of cartons.

When the apparatus has been adapted to accommodate different size cartons, it is usually necessary to adjust the point of actuation of the upper glue head to limit the application of adhesive, and to adjust the point of actuation of the lower applictaor to start the application of adhesive. Adjustable cam **204** serves this purpose for the respective pair of adhesive applicators. By loosening nut **210**, cam **204** may be selectively adjusted in accordance with calibration **207** and the procedure described above. In this manner, the length of the adhesive stripe **56** may be selectively adjusted and controlled.

While we have thus described a preferred embodiment of our invention, this has been done by way of illustration and not limitation, and we do not wish to be limited except as required by the appended claims.

We claim:

1. In a carton gluing apparatus the combination of storage means for supporting a plurality of flat collapsed cartons in a substantially horizontal position, conveyor means disposed beneath said storage means, means on the conveyor means for engaging the bottom carton in said storage means and advancing the same along said conveyor means, first applicator means mounted at a level above said conveyor means, the first applicator means including a first head initially disposed in one position for engaging the carton and applying adhesive to selected portions of the upper surface of the carton as the carton is advanced along the conveyor means and movable from said one position in a direction away from the carton to

a second inoperative position for ceasing application of adhesive, support means initially disposed in one position substantially at the upper level of said conveyor means for supporting the carton to receive adhesive from the first applictaor means, means mounting said support means for movement from said one position to a second position away from the carton and in coordinated movement with the first applicator means, second applicator means including a second head mounted between said first applicator means and said storage means and at a level below said conveyor means and movable from one position away from the carton in a direction toward the carton to a second position for applying adhesive to selected portions of the downwardly facing surface of the carton and means for returning the first and second heads and the support means to each said one position after the carton has passed.

2. The combination of claim 1 including: a drive shaft operable to drive the conveyor means through a cycle when the drive shaft is rotated through a number of revolutions, drive means for rotating the drive shaft, means for initiating an operating cycle of the apparatus, actuating means for moving the first and second heads between their said positions, switch means for controlling the actuating means, cam means operatively connected to the drive shaft and arranged to be driven through one revolution as the drive shaft is driven through said cycle, means associated with the cam means for operating the switch means for moving the heads and thereby controlling application of adhesive, and means for interrupting the drive means to stop the operating cycle.

3. The combination of claim 2 including means for adjusting the cam means for selectively varying the points where the first and second heads are moved to their second positions.

4. In an apparatus for gluing flaps of a carton the combination of storage means for supporting a supply of flat collapsed cartons in a substantially horizontal position, conveyor means disposed beneath said storage means, means on the conveyor means for engaging the bottom carton in said storage means and advancing the same in said flat collapsed condition along said conveyor means, a first pair of adhesive applicators mounted at a level above said conveyor means for applying adhesive in one position to selected portions of the outside of the upwardly facing flaps and movable from said one position in a direction away from the carton to an inoperative position for ceasing application of adhesive, means disposed substantially at the upper level of said conveyor means in one position for supporting the flaps to receive adhesive from the first pair of adhesive applicators and mounted for movement from said one position away from the carton generally simultaneously with the movement of said first pair of adhesive applicators to said inoperative position, a second pair of adhesive applicators mounted at a level below said conveyor means and movable from one inoperative position in a direction toward the carton to a second position for applying adhesive to selected portions of the outside of the downwardly facing flaps.

5. The combination of claim 4 wherein the means on the conveyor means for engaging the bottom carton includes a plurality of hooks equally spaced apart a distance greater than the distance said conveyor means traverses the cartons in the storage means, and including actuating means for moving the conveyor means and the hooks thereon to engage one of the hooks with the bottom carton and for advancing the same a distance equal to the distance between the hooks.

6. The combination of claim 4 including: means for adjusting the storage means to accommodate different size cartons and so arranged that the cartons are substantially centered on the conveyor means, means for mounting each one of both pairs of adhesive applicators a generally equal distance from the centerline of the conveyor means, and means for simultaneously adjusting both pairs of adhesive applicators a generally equal distance from the centerline of the conveyor means to adjust the application of the adhesive to the carton.

7. In an apparatus for gluing the shorter flaps of a carton having different length flaps the combination of a conveyor, storage means disposed above said conveyor for supporting a supply of flat collapsed cartons in a substantially horizontal position with their flaps disposed adjacent either side of the conveyor and with the shorter of the upwardly facing flaps forward of the longer upwardly facing flaps, means on the conveyor for engaging the bottom carton of said supply and advancing the same in said flat collapsed condition in a forward direction along the conveyor, a first pair of adhesive applicators mounted forward of said storage means and at a level above said conveyor, each of said first pair of adhesive applicators including a head initially positioned for engaging and applying adhesive to the shorter upwardly facing flaps as the flat collapsed carton is advanced along the conveyor and movable away from the carton to an inoperative position for ceasing application of adhesive, support means for supporting the shorter upwardly facing flaps in one position to receive adhesive from the first pair of adhesive applicators, means mounting the support means for movement from said one position to a second position away from the carton and in coordinated movement with the first pair of adhesive applicators, and a second pair of adhesive applicators mounted between said storage means and said first pair of adhesive applicators and at a level below said conveyor for applying adhesive to the shorter downwardly facing flaps as the flat collapsed carton is advanced.

8. In an apparatus for gluing flaps of a carton having substantially equal length flaps the combination of a conveyor, storage means disposed above said conveyor for supporting a supply of flat collapsed cartons in a generally horizontal position with their flaps disposed adjacent either side of the conveyor, hook means on the conveyor for engaging the bottom carton of said supply and advancing the same in a forward direction along the conveyor in said flat collapsed condition, means for maintaining the flaps of the cartons while in the storage means in generally coplanar relationship to allow advancing of the bottom carton by said hook means, a first pair of adhesive applicators mounted forward of said storage means and at a level above said conveyor for applying adhesive to selected portions of the upwardly facing flaps as the carton is advanced along the conveyor in said flat collapsed condition, support means for supporting the flaps to receive adhesive from the first pair of adhesive applicators, and a second pair of adhesive applicators mounted between said storage means and said first pair of adhesive applicators and disposed at a level below said conveyor for applying adhesive to selected portions of the downwardly facing flaps as the flat collapsed carton is advanced.

9. An adhesive applying apparatus including storage means for supporting a supply of flat collapsed cartons, conveyor means adjacent the storage means and having a plurality of hooks equally spaced apart a distance greater than the distance said conveyor means traverses the cartons in the storage means, drive means for moving the conveyor means and the hooks thereon for engaging one of said hooks with one carton in said storage means and advancing the same in said flat collapsed condition a distance approximately equal to the distance between hooks, a first pair of applicators for applying adhesive to selected portions of one surface of the flat collapsed carton as it is advanced, a second pair of applicators for applying adhesive to selected portions of an opposite surface of the flat collapsed carton as it is advanced, means for supplying adhesive under pressure to said applicators, each said applicator having a head for distributing adhesive over a desired width and valve means responsive to contact of the head to the carton for controlling flow of adhesive through said applicator, means mounting

said first pair of applicators for movement between a normal position for contacting an advancing carton and a second position away from the carton for ceasing application of adhesive, means mounting said second pair of applicators for movement between a normal position away from the advancing carton and a second position for contacting the advancing carton to apply adhesive thereto, and means coordinating the movement of said conveyor means and said first and second pairs of applicators for applying adhesive to selective portions of the flat collapsed carton.

10. The apparatus of claim **9** including means for adjusting the storage means for accommodating different size cartons.

11. The combination of claim **9** including means for simultaneously adjusting said first and second pair of applicators transverse of the path of the advancing cartons for applying adhesive to selective parts of the carton and so constructed and arranged that said applicators are generally equi-distant from the centerline of the advancing carton.

12. An adhesive applying apparatus including a plurality of applicators, means for supplying adhesive to the applicators, means for advancing an object past the applicators, a drive shaft operable to drive the apparatus through a cycle when the drive shaft is rotated through a number of revolutions, drive means for rotating the drive shaft, means for initiating an operating cycle of said apparatus, first actuating means for moving one of said applicators between a normal position for applying adhesive onto said object and a second position away from said advancing object, second actuating means for moving another one of said applicators between a normal position away from said advancing object and a second position for applying adhesive onto said object, first and second switch means for respectively controlling said first and second actuating means, first and second cam means operatively connected to the drive shaft and arranged to be driven through one revolution as the drive shaft is driven through said cycle, means associated with each cam means for operating a corresponding switch means and moving the respective applicator from their said normal to said second positions to control application of adhesive, means for interrupting said drive means to stop the operating cycle and means for returning said one and another applicators to their normal position at the end of the operating cycle.

13. A carton gluing apparatus comprising an applicator operative for applying adhesive when engaged with a carton, means for supplying adhesive to the applicator, conveyor means having hook means for advancing the carton past the applicator, means mounting said applicator in normal position for engaging said carton when advanced by the conveyor means, actuating means for moving said applicator between said normal position and a second position away from the carton, support means disposed substantially coplanar with the conveyor in one position and opposite the applicator for supporting the carton to receive adhesive from the applicator, means responsive to the actuating means for moving the support means from said one position to a second position away from the carton in coordinated movement with the applicator, means for controlling said actuating means for movement to the second position when the hook means is a preselected distance from the applicator and thereby limiting the application of adhesive, said last mentioned means operative for controlling said actuating means to return the applicator and support means to their normal positions when the carton has been advanced past the applicator.

14. A carton gluing apparatus comprising a plurality of applicators operative for applying adhesive when engaged with a carton, means for supplying adhesive to the applicators, conveyor means having hook means for advancing the carton past the applicators, first means mounting one of said applicators in a normal position for engaging and applying adhesive to said carton as advanced by the conveyor means, first actuating means for moving said one applicator between its normal position and a second position away from the carton, first control means for controlling said first actuating means for movement to the second position when the hook means is a preselected distance from said one applicator to limit application of adhesive, second means mounting another of said applicators in a normal position away from the advancing carton, second actuating means for moving said other applicator between its normal position and a second position for engaging the advancing carton, second control means for controlling said second actuating means for movement to the second position when the hook means is a preselected distance from said other applicator to start application of adhesive, and said first and second control means operative to control the first and second actuating means to return the applicators to their respective normal positions after the carton has passed the applicators.

15. The apparatus of claim **14** wherein said first and second control means each includes means for adjusting the same to selectively vary the preselected distance between the hook means and the respective applicator at which distance the respective actuating means moves the corresponding applicator from said normal to said second position.

16. The apparatus of claim **14** wherein said first and second control means each comprises a switch means for controlling the respective actuating means, cam means arranged to be driven correlative to the movement of said hook means, and means associated with said cam means for operating the switch means for moving the respective applicator.

17. A carton gluing apparatus comprising a plurality of applicators operative for applying adhesive when engaged with a carton, means for supplying adhesive to the applicators, conveyor means having hook means for advancing the carton past the applicators, a drive shaft operable to drive the apparatus through a cycle when the drive shaft is rotated through a number of revolutions, drive means for rotating the drive shaft, means for initiating an operating cycle of said apparatus, first means mounting one of said applicators in normal position for engaging said carton as advanced by the conveyor means, first actuating means for moving said one applicator between its normal position and a second position away from the carton, second means mounting another of said applicators in normal position away from the advancing carton, second actuating means for moving said another applicator between its normal position and a second position for engaging the advancing carton, a pair of switch means each for controlling one of the respective first and second actuating means, a pair of cam means operatively connected to the drive shaft and arranged to be driven through one revolution as the drive shaft is driven through said cycle, a pair of means each associated with one of said cam means for operating one of said switch means, each said cam means arranged for camming said associated last mentioned means for operating the respective switch means when the hook means is a preselected distance from the respective applicator thereby moving the respective applicator from said normal to said second position, each said cam means arranged for releasing the respective switch means after said hook means has moved past the respective applicator thereby moving the respective applicator to normal position, and means on one of said cam means for interrupting the drive means to stop the operating cycle.

18. A carton gluing apparatus comprising a conveyor, storage means disposed above the conveyor for supporting a plurality of flat collapsed cartons in a substantially horizontal position with their flaps disposed on either

side of the conveyor, two pairs of applicators operative for applying adhesive when engaged with a carton, means for supplying adhesive to the applicators, at least two hook means on the conveyor equally spaced apart a distance greater than the distance the conveyor traverses the cartons in the storage means, each said hook means for alternately engaging the bottom carton of said supply and advancing the same in a forward direction past the applicators, a drive shaft operable to drive the apparatus through a cycle when the drive shaft is rotated through a number of revolutions, drive means for rotating the drive shaft, means for initiating on operating cycle of said apparatus, a first shaft disposed at a level above said conveyor and forward of said storage means for mounting one pair of applicators in normal position for engaging the upper surface of the advancing carton, a first actuating means for moving said one pair of applicators between their normal position and a second position away from the carton, a second shaft disposed at a level below the top of said conveyor and between said first shaft and said storage means for mounting the second pair of applicators in normal position away from the advancing carton, second actuating means for moving said second pair of applicators between their normal position and a second position for engaging the advancing carton, said first and second actuating means each including a cylinder having a movable wall therein and a rod connected to said movable wall and extending out of said cylinder, conduit means connected to said cylinder for supplying a fluid thereto for moving the wall in one direction and thereby moving the respective pair of applicators from normal to second position, and return means for moving the wall in an opposite direction to return the respective pair of applicators to normal position, means for supplying fluid to said actuating means, a pair of switch means each for controlling the flow of fluid to the respective actuating means, a pair of cam means operatively connected to the drive shaft and arranged to be driven through one revolution as the drive shaft is driven through said cycle, an arm associated with each said cam means for operating a respective switch means, each cam means arranged for camming said arm for operating the respective switch means when the hook means is a preseletced distance from the respective applicator thereby moving the respective applicator from said normal to said second position, each said cam means arranged for releasing the respective arm after the hook means has moved past the respective pair of applicators thereby allowing said respective return means to operate to move the respective pair of applicators to normal position.

19. The apparatus of claim **18** including means for simultaneously moving said first and second pair of applicators a substantially equal distance relative to the centerline of the conveyor for adapting the apparatus for various size cartons, and means for independently adjusting each said cam means for selectively varying the operation of the respective switch means by the associated arm for varying the distance from the hook means where the respective pair of applicators is moved from said normal to said second position.

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