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LaBantschnig et al.

[11] **3,872,652**

[45] **Mar. 25, 1975**

[54] **GLUING MACHINE**

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[73] Assignee: **Orchard Container Corporation,** Saint Louis, Mo.

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[52] **U.S. Cl.** **53/376,** 53/383

[51] **Int. Cl.** **B65b 7/26**

[58] **Field of Search** 53/376, 377, 383, 387

[56] **References Cited**

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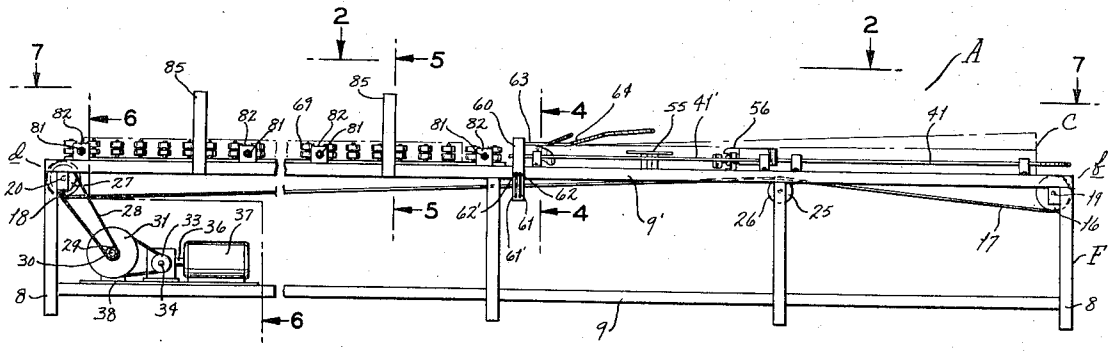
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[57] **ABSTRACT**

A gluing machine for containers primarily of the elongated type, comprising a frame, an endless belt provided on said frame, a prime mover, transmission means connecting said prime mover and said belt to cause the upper course of the same to move from the feed end of said frame to the discharge end. An adhesive dispensing unit adjacent said belt for applying adhesive to one side of a container moving therebeyond; guide members downstream of said adhesive dispensing unit for engaging the normally open top wall of a container to direct same into container-closed condition for disposing a closure flap thereon in confronting relationship to the adhesive-applied side of the container, pressure developing means for holding said flap against said adhesive to assure of setting during subsequent travel of the container. Adjustable guides are provided for laterally supporting a container fed to the machine as well as preventing shifting of same during travel.

4 Claims, 10 Drawing Figures



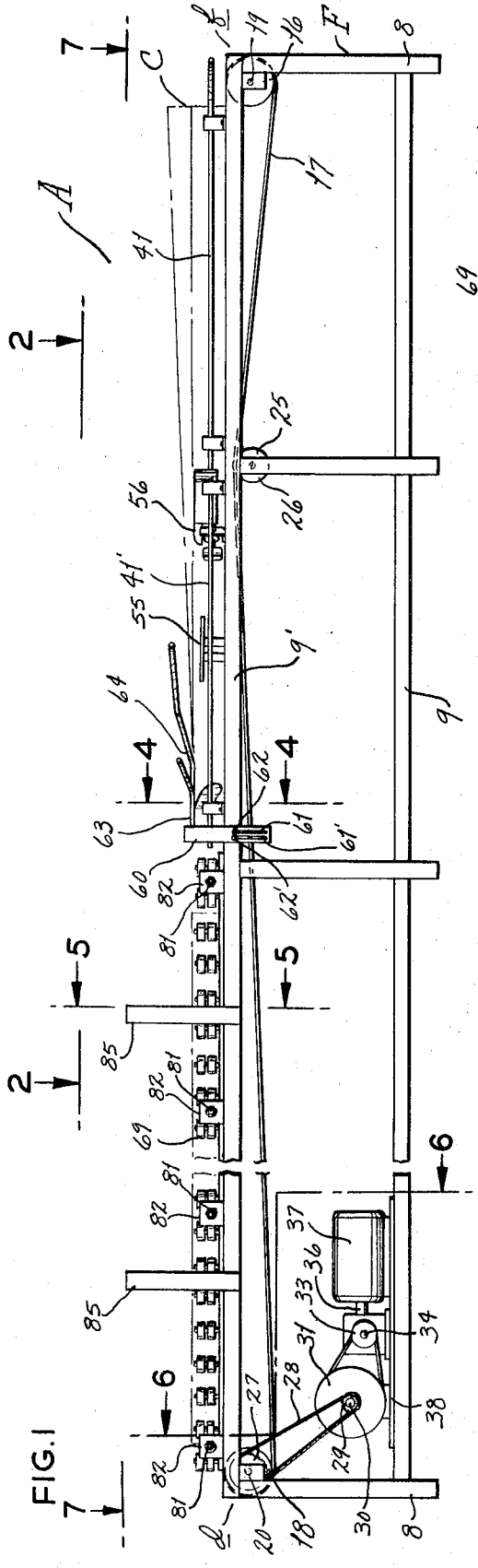


FIG. 1

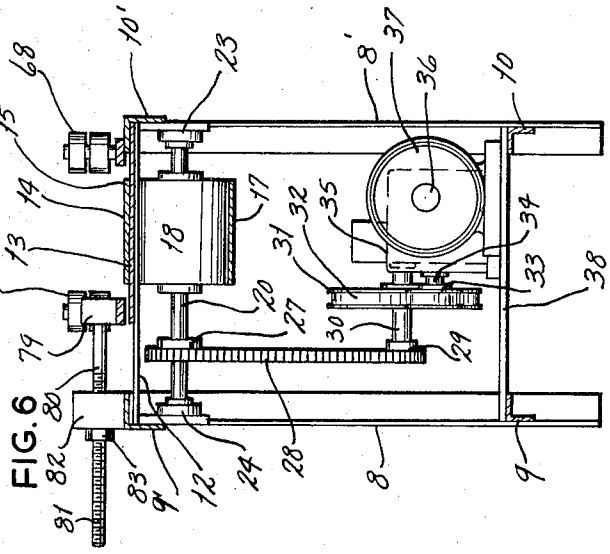


FIG. 6

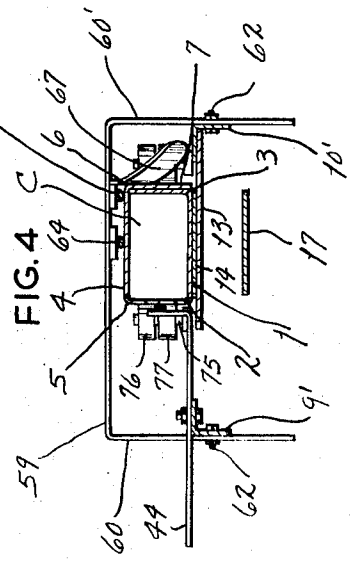


FIG. 4

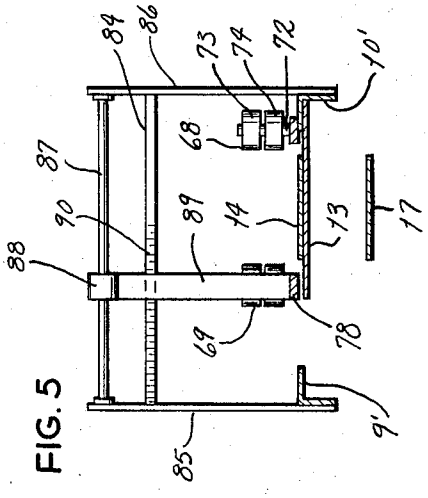


FIG. 5

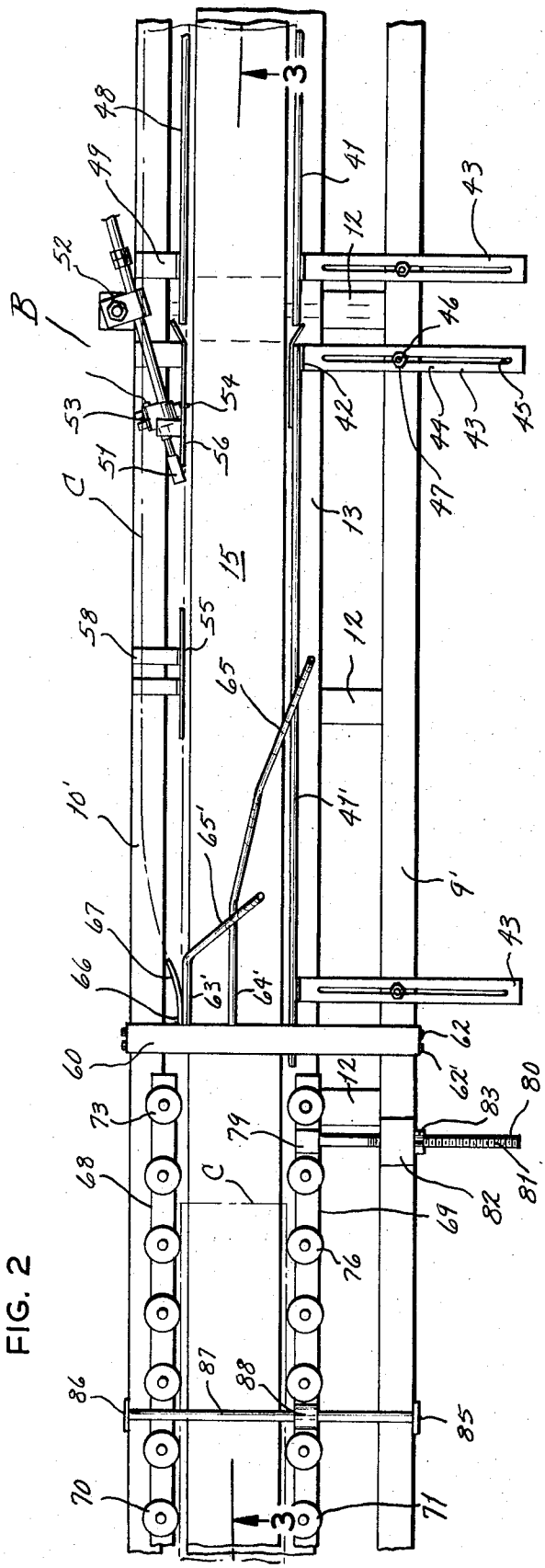


FIG. 2

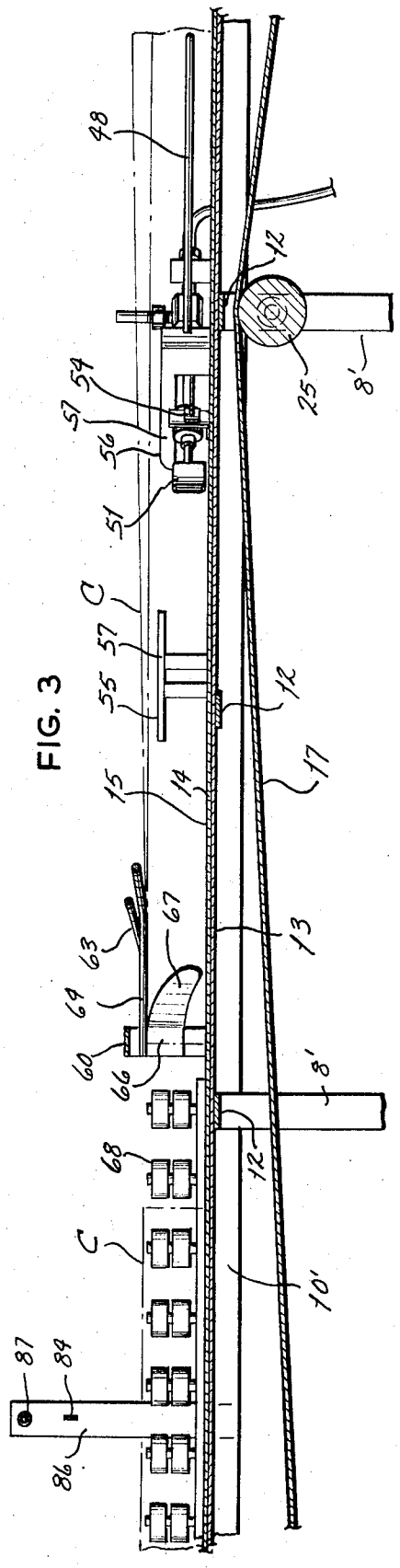


FIG. 3

FIG. 7

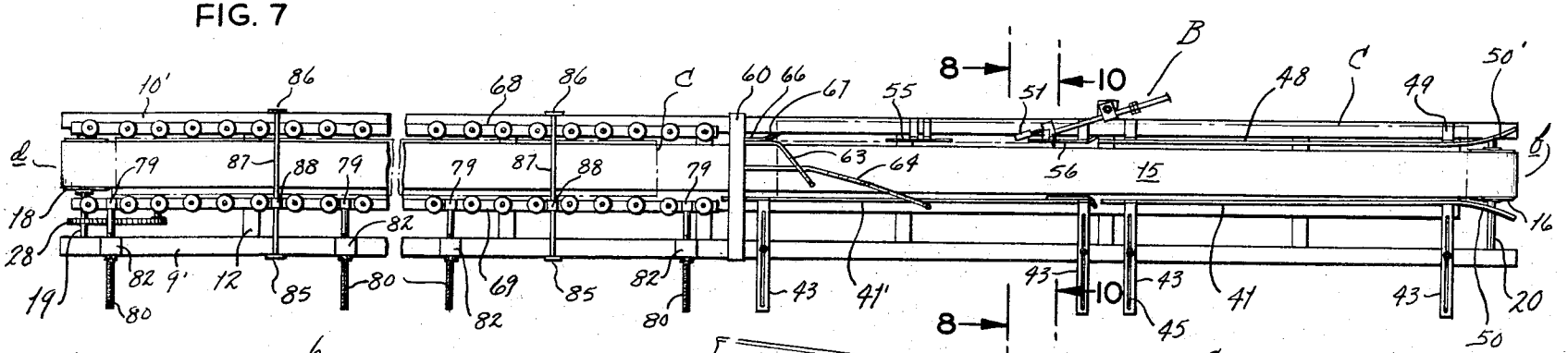
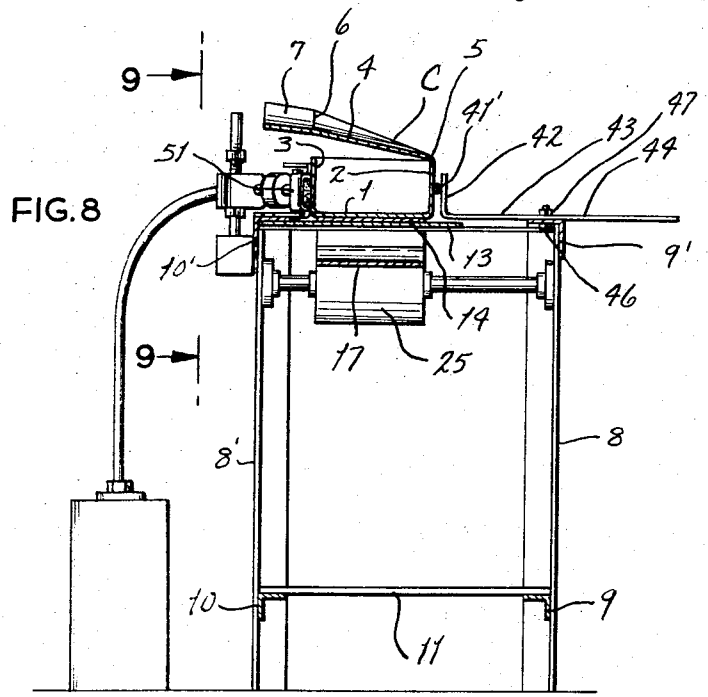


FIG. 8



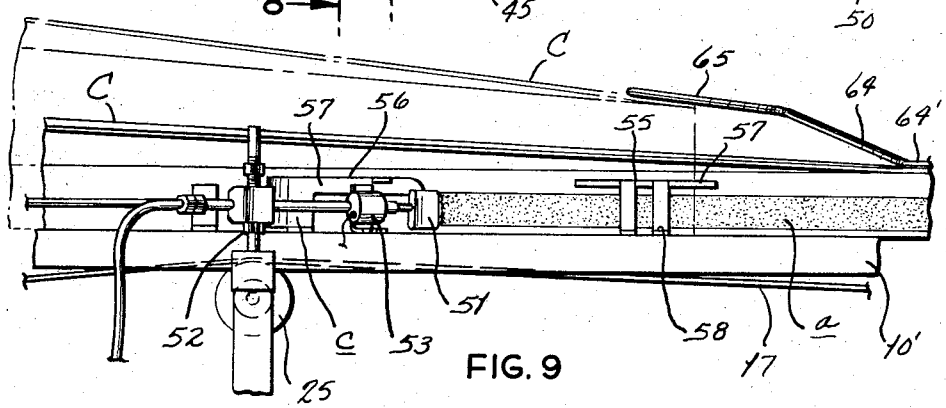
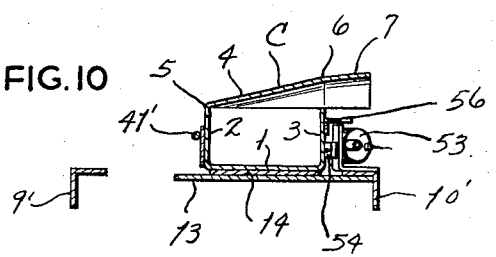


FIG. 9

FIG. 10



GLUING MACHINE

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates in general to packaging equipment and, more particularly, to a gluing machine especially adapted for use with containers of cardboard and the like.

Heretofore the step of securing a closure flap of a container as fabricated of cardboard or the like to an adjacent portion, such as a side wall of said container, has been performed manually, thus representing a substantial item of cost in production. The problem has resided primarily in the extent of the glued area since both the step of applying adhesive in an elongated band or swath and in maintaining an equally elongated flap against such band has been a source of considerable difficulty. Thus by reason of the need to use personnel for bringing about such closing the quality of the adherence has understandably varied from container to container, either as a result of incomplete coating by the adhesive or failure to cause the entire confronting face of the flap to be brought forcefully against such coating prior to setting.

It is a primary object of the present invention to provide a gluing machine adapted for utilization with containers having foldable closures, incorporating means for automatically effecting container closing and securing same in such condition.

It is another object of the present invention to provide a gluing machine having the capacity to apply an adhesive coating to a portion of a container and to bring about securement of the container closure by means of said coating.

It is still a further object of the present invention to

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevational view of a gluing machine constructed in accordance with and embodying the present invention, illustrating in phantom lines one container in the course of the gluing operation and a second container in fully closed condition.

FIG. **2** is a fragmentary top plan view taken on the line **2—2** of FIG. **1.**

FIG. **3** is a vertical transverse sectional view taken on the line **3—3** of FIG. **2.**

FIG. **4** is a vertical transverse sectional view taken on the line **4—4** of FIG. **1,** illustrating in full lines the container being glued.

FIG. **5** is a vertical transverse sectional view taken on the line **5—5** of FIG. **1.**

FIG. **6** is a vertical transverse sectional view taken on the line **6—6** of FIG. **1.**

FIG. **7** is a top plan view taken on the line **7—7** of FIG. **1.**

FIG. **8** is a vertical transverse sectional view taken on the line **8—8** of FIG. **7** with the container being glued illustrated in full lines.

FIG. **9** is an elevational view taken on the line **9—9** of FIG. **8** also showing in phantom lines a container in the initial phase of the cover-bending operation.

FIG. **10** is a vertical transverse sectional view taken on the line **10—10** of FIG. **7** showing the container being glued in full lines.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now by reference numerals to the drawings which illustrate the preferred embodiment of the present invention, A generally designates a gluing machine which is adapted primarily for use with elongated con-

also desirably being formed of angle stock for rigidifying purposes; and said uprights **8'** are similarly interconnected by lower and upper lengthwise members **10,10'**, respectively, horizontally aligned with members **9,9'**. Extending transversely of machine A between lower lengthwise members **9,10** at appropriately spaced intervals throughout the length of machine A there may be bars **11** fixed upon the upper face of the horizontal flanges of members **9,10.** Mounted upon the upper end of uprights **8,8'** for extension spacedly therebetween is a plurality of flat cross bars **12,** the end portions of which are overlaid between horizontal flanges of members **9',10'** (See FIGS. **6** and **7**).

Suitably supported upon cross bars **12** throughout the length of machine A is a narrow plate **13** for disposition beneath the upper course **14** of an endless conveyor belt **15** which, at the feed end of machine A, as indicated by *f*, that is at the right-hand side of FIG. **1,** is trained about a driven drum or pulley **16,** and with its lower course, as at **17,** being thence directed beneath plate **13** toward the other or discharge end, indicated *d*, of machine A whereat the same is directed upwardly about a drive drum pulley **18.** It will be seen that each of said pulleys **16,18** are mounted upon shafts **19,20,** respectively, which extend transversely of machine A and have their ends journaled within bearings **23,24** which are supported from the vertical flanges of members **9',10'** (See FIGS. **6** and **8**). Belt **15** in its lower course **17** may be passed over a guide roller **25** supported upon a shaft **26** extending between uprights **8,8'** between the ends of machine A for belt tensioning purposes.

Shaft **20** mounts a sprocket **27** about which is trained the upper end portion of a drive chain **28,** the lower end of which latter is engaged to a sprocket **29** mounted upon a shaft **30** carrying a relatively large diametered pulley **31** about which is engaged the forward portion of a motion transmitting belt **32.** The opposite or rearward portion of transmitting belt **32** is trained about a relatively small diametered pulley **33** fixed on the end of the output shaft **34** of a gear reductions box **35** which latter is suitably connected to the drive shaft **36** of a prime mover **37.** Prime mover **37,** gear box **35,** and pulley **31** may be disposed upon a mounting plate **38** extending between members **9,10** and suitably fixed upon the upper surfaces of the horizontal flanges thereof (See FIG. **6**).

In view of the foregoing, it is quite apparent that upon energization of prime mover **37,** drum pulley **18** will be caused to rotate in a counter-clockwise direction as viewed in FIG. **1,** so that the upper course **14** thereof will travel from feed end *f* to discharge end *d* and with the lower course **17** thus returning said belt to the feed end *f*.

From the feed end *f* to a point substantially intermediate the length of machine A, or slightly therebeyond, there is provided on one side of machine A a pair of guide rods **41,41'** in end to end relationship, each rod **41,41'** being fixed on the belt-directed vertical flange **42** of an angle shaped mounting member **43** having an elongated horizontal arm **44** extending laterally beyond the adjacent side of machine A (See FIG. **7** and FIG. **8**). For appropriate stabilization each rod **41,41'** is thus supported in its respective end portions by a pair of members **43.** Each arm **44** contains an elongated, substantially coextensive slot **45** for accommodating an adjustment screw **46** engaged within the underlying portion of the horizontal flange of the member **9'**. Each screw **46** carries on its upper projecting end a hold-down nut **47** so that through appropriate manipulation rods **41,41'** may be adjusted laterally or transversely of machine A with respect to belt **15** to serve as guides for the paritcular container C being subjected to machine A. Opposed to rod **41,** on the opposite side of machine A, is a fixed guide rod **48** of substantially the same length and being maintained by angle brackets **49** at each of its ends; said latter being appropriately mounted upon the horizontal flange of members **10'**. Rods **41,48** in their end portions proximate the feed end *f* of machine A are flared outwardly as at **50,50'**, respectively, for facilitating introduction of a container therebetween. With special reference to FIG. **8** it will be seen that the guide rods are of appropriate distance above belt **15** to contact the confronting portions of container C for both laterally supporting same as well as preventing displacement for reasons to be discussed more fully hereinbelow.

Immediately downstream of rod **48,** being on the same side of machine A, is an adhesive discharge unit indicated generally B. The precise construction of such unit B does not form a part of the present invention but is broadly disclosed for the purpose of revealing a unit comprehending a discharge nozzle **51** disposed immediately adjacent the proximate edge of belt **15** and at a preselected heighth thereof so that its discharge will be received upon side wall **3** of the presented container C. It may be observed that nozzle **51** is narrow and somewhat extended vertically so as to emit the material for developing a relatively wide band upon container C as shown in FIG. **9** at *a*. Said nozzle is connected through suitable tubing or conduits as broadly designated c to the discharge side of a pump (not shown) the in-feed side of which is suitably connected to a convenient supply of a liquid adhesive which may, obviously, be stored beneath machine A. Tubing C is appropriately maintained as by a vertically adjustable mount **52** fixedly secured upon the member **10'**. Provided adjacent nozzle **51** for control thereof is a valve **53** activated by a microswitch **54,** the arm of which projects above belt **15** for engagement by a container C to close said switch, thereby opening valve **53** to permit discharge of adhesive through nozzle **51.** Thus as long as container C maintains contact with the arm of microswitch **54,** the glue emitting action will continue. Conversely, upon loss of such contact, valve **53** will return to its normally closed condition.

It will be observed that adjacent unit B in opposition to guide rod **41'** is a plurality of spaced apart, relatively short guide members **55,56,** both of which encompass flat arms **57** mounted upon angle brackets **58** which latter are in turn rigid upon the underlying portion of member **10'**. However, it is to be particularly observed that arm **57** is disposed at a preselected heighth above belt **15** so as to contact container wall **3** in a zone above adhesive band *a* (See FIG. **9**).

Substantially intermediate its length and desirably overlying the downstream end portion of guide rod **41'** is a transverse mounting bar **59** disposed at a predetermined heighth above belt **15** and having at each of its ends depending arms **60,60'** which project downwardly along opposite sides of machine A; each arm **60,60'** having a pair of slots **61,61'**, respectively, for accommodating adjustment screws **62,62'** which at their inner ends are secured within the adjacent portion of the de-

pending flanges of members 9',10'. Thus by appropriate manipulation of screws 62,62' the elevation of bar 59 above belt 15 may be controlled for purposes presently appearing. Secured on the underface of bar 59 in its portion overlying belt 15 but generally to the same side thereof as unit B are the forward end portions of a pair of guiding and hold-down members 63,64. Said members 63,64 may be preferably formed of rod stock and in their forward portions as at 63',64', respectively, are axially parallel for holding-down operational purposes presently to be described. The rearward portion of member 64 as indicated at 65, being designed for guiding purposes, is bent upwardly with respect to forward portion 65' and thence laterally outwardly with its rearward extremity being located above and beyond guide rod 41'.

It will be observed with particular reference to FIGS. 1 and 9 that the rearward portion 65 is thus disposed in the path of travel of closure wall 4 of container C when in upward open condition and thus serves to direct same downwardly as carton C progresses toward discharge end *d* thereby gradually effecting a downward folding of such closure 4 until the top surface thereof comes beneath hold-down section 63'64' of said members 63,64, (See FIG. 4), which thus serve to prevent return of top wall 4 to open condition. With particular reference to FIGS. 2 and 7 it will be seen that member 63 is also provided with a hold-down section or portion as at 65' but the same is relatively short and turned more abruptly laterally and slightly upwardly than the corresponding portion of member 64. It is thus to be seen that members 63,64 are uniquely developed to cause closure 4 of container C to be automatically folded into container-closing condition which action contemporaneously causes closure flap 7 to be brought downwardly into confronting attitude to side wall 3 of container C. Since the latter has had applied thereto the adhesive *a*, the inner face of flap 7 will be fixed thereagainst by reason of arms 57 which will contact portions of flap 7 as closure wall 4 is brought downwardly. Also, immediately adjacent mounting bar 59 in opposition to the laterally aligned portion of guide rod 41' there is presented a flat guide section 66 having a flaring rearward portion 67 thereby compactly engaging container C and holding flap 7 against the adhesive-bearing side wall 3.

From the mounting bar 59 to substantially the discharge end *d* of machine A there are provided two rows of pressure rollers, said rows being indicated at 68,69, each having a multiplicity of rollers 70,71, respectively, which are preferably arranged in transversely aligned pairs. Rollers 70 are each comprised of a short vertically disposed dummy shaft 72 suitably mounted upon the upper suface of members 10' and consisting of a pair of vertically spaced-apart roller members 73,74 freely mounted upon shaft 72. Rollers 71 of row 69 are of like structure as rollers 70 in that the same comprehend a short vertical dummy shaft 75 having a pair of vertically spaced rollers 76,77 disclosed thereon. However, shafts 75 are supported at their lower ends spacedly upon a narrow plate 78, presented on the opposite side of belt 15 than roller row 68 and which spacedly through its extent carries upstanding brackets 79, each of which fixedly receives the inner ends of adjusting rods 80; said latter being externally threaded as at 81 throughout the major extent of their outer portion for extension through guide brackets 82 mounted upon the horizontal flange of member 9'; with there being a locking nut 83 secured upon said adjusting rods 80 for bearing against the outer face of the respective brackets 82 to maintain rods 80 in selected extended disposition. Accordingly by appropriate control by means of rods 80, plate 78 may be moved laterally toward and away from roller row 68 so that the associated rollers 71 may be so positioned with respect to the companion rollers 70 that the respective rows thereof will bear snugly against the adjacent sides of container C subsequent to the gluing operation. Thus rollers 70 will serve to maintain closure flap 7 against the adhesive-coated side wall 3 during the setting period and with the opposite rollers 71 preventing any undesired displacement of container C during this critical period.

The length of the rows 68,69 will be determined initially by the length of container C as well as the desired interval of time, based upon the speed of travel of conveyor belt 15, necessary to allow the particular adhesive to set, whereby when the now closed container C has reached the discharge end *d*, the same may be removed in a reliable manner by either mechanical or manual means, as the case may be, for transportation, storing, and the like.

In order that the adjustment of roller-support plate 78 is adjusted in an accurate manner as opposed to a mere visual determination, there are provided measuring strips 84, which extend transversely of machine A, each of which is supported at its ends within upstanding arms 85,86 rigid at their lower ends upon the vertical flanges of members 9',10', respectively; with each such strip 84 being thus presented spacedly above belt 15 a distance adequate to avoid interference with a container C moving along machine A. With particular reference now being made to FIG. 5, a slide rod 87 extends between the upper ends of each pair of arms 85,86 in axially parallel relationship to the related measuring strip 84 with there being disposed upon each such rod the upper end 88 of a vertically disposed bar 89, the lower end of which is fixed upon plate 78. The upper end 88 of said bar 89 contains an eyelet through which rod 87 extends, whereby bar 89 is thus movable along slide rod 87. It will be seen that bar 89 is disposed in immediate adjacency to measuring strips 84, whereby one or both lateral edges of said strips 84 may serve as a marker for graduations or calibrations 90, inscribed or otherwise, presented upon the adjacent face of measuring strips 84 (See FIG. 5). Accordingly, upon manipulation of adjusting rods 80 the extent of movement of plate 78 may be accurately determined by utilization of calibrations 90. Such determination assures that plate 78 will be so adjusted that roller row 69 will be in axially parallel relationship to companion row 68 throughout the extent of same. As shown in FIG. 1, a pair of measuring strips 84 may be utilized; with the number thereof being a matter of choice as determined by the length of roller rows 68,69.

From the foregoing the operation of machine A should be apparent. However, with prime mover 37 energized and belt 15 traveling in the manner indicated, a container C as suitably loaded will be placed upon belt 15 at the feed end *f* of machine A in which condition closure 4 will be in upper or fully opened position. Container C will thus be carried along belt 15 until said container makes contact with micro-switch 54 which thereupon opens valve 53 to permit adhesive to be discharged through nozzle 51 for receipt upon the outer

face of container side wall **3.** It is apparent that the adhesive discharge continues during the period switch **54** is engaged by container C, whereby adhesive is applied throughout the extent of said side wall **3.** As container C continues to travel, the forward edge of closure **4** will contact the rearward portion of rod **64** and thus be directed both inwardly and downwardly as it moves relatively along said rod being thereby caused to fold into closed position with the associated flap **7** being brought downwardly into confronting relationship to the coated face of side wall **3.** With continued travel, closure **4** is thus directed beneath the forward portion **63',64'** of members **63,64,** which maintains same in fully closed condition and flap **7** is forced against the glued adhesive surface of side wall **3** by means of flat guide section **67,66.**

The container C is thence carried by conveyor belt **15** beyond the forward ends of members **63,64** so that its opposite side portions bar against the rollers **70,71** of roller rows **68,69.** Thus the container C throughout the remainder of its travel through machine A is guided by said rollers and held pressure-wise snugly therebetween with the adhesive between side wall **3** and flap **7** setting.

As developed more fully hereinabove, machine A is suitably adjustable for accommodating container C of varying width as guide rods **41,41'** and lower row **69** may be moved appropriately laterally, and of varying heighth since bar **59** with rods **63,64** may be adjusted vertically.

Machine A thus effectively, reliably, and automatically brings about the closing of elongated containers which have heretofore proved most awkard to handle and have necessitated manual efforts for effecting securement of the same in closed condition.

We claim:

1. For use with containers having a foldable top closure with an edge flap, a gluing machine for presenting said top closure in container closing condition and for securing said top closure edge flap to a side wall of said container comprising an elongated rigid frame, a conveyor provided on said frame and substantially coextensive therewith, said conveyor having a feed end for receiving a container with the top closure in open condition and a discharge end for discharging said containers in closed condition, means for operating said conveyor, elongated rigid guide members disposed on opposite sides of said conveyor adjacent the feed end thereof, an adhesive dispensing unit provided on one side of said frame and comprising an adhesive discharge nozzle located at a height above said frame for dispensing adhesive onto one side wall of the container, control means for activating said adhesive dispensing unit during a predetermined period of travel of a container, said control means comprising a trip arm located in the path of travel of the container, a normally open switch engaged to said trip arm, normally closed valve means whereby upon engagement of said trip arm by a container said switch will be closed and said valve means open for emission of adhesive against said one side wall of the container, said adhesive dispensing unit being located adjacent the end of said elongated guide members remote from said feed end, guide elements provided adjacent said adhesive dispensing unit for engaging the said one side wall of said container above the applied adhesive, there being top closure directing means presented downstream of said guide elements, said directing means comprising a mounting bar located spacedly above said conveyor to permit movement of a closed container thereunder, a first directing member formed of rod stock and fixed at its forward end to said bar and progressing rearwardly in a direction toward the feed end of said conveyor in elevated relationship to said conveyor having a forward portion substantially axially parallel with the path of travel of the conveyor and its rearward portion extending upwardly, rearwardly, and laterally outwardly toward the side of said conveyor opposite that upon which said adhesive dispensing unit is mounted for engaging the normally upper side of the container top closure for cammingly directing same downwardly into folded or container-closed condition, and a second directing member of relatively reduced length with respect to said first directing member being fixed at its forward end to said bar laterally of said first directing member and having a forward portion axially parallel to the forward portion of said first directing member and a rearward portion turned relatively abruptly laterally and slightly upwardly into overlying relationship with respect to the forward portion of said first directing member for cooperating with the latter in maintaining the closure in closed condition, a flat guide section located adjacent said conveyor immediately rearwardly of said bar for engaging said top closure edge flap to urge same against the applied adhesive on said one side wall, and means downstream of said directing means for retaining said container-closed condition during travel to the discharge end.

2. A gluing machine as defined in claim **1** and further characterized by said means for retaining said container in closed condition during travel to the discharge end being pressure rollers arranged in axially parallel rows on either side of said conveyor.

3. A gluing machine as defined in claim **1** and further characterized by said flat guide section having an outwardly and rearwardly flaring portion facilitating introduction of the edge flap to said flat guide section.

4. A gluing machine as defined in claim **2** and further characterized by first and second means for respectively adjusting said elongated guide members and said rows of pressure rollers toward and away from each other for accommodating varying widths therebetween.

* * * * *