United States Patent

Schroeder

[15] **3,690,222**

[45] **Sept. 12, 1972**

[54] **DEVICE FOR CLOSING AND SECURING CARTON FLAPS**

[72] Inventor: **Paul H. Schroeder,** P.O. Box 455, Burlington, Wis. 53105

[22] Filed: **July 10, 1970**

[21] Appl. No.: **53,868**

[52] **U.S. Cl.** .....**93/52,** 53/374, 53/383, 93/36 MM, 118/3

[51] **Int. Cl.**.....**B31b 1/36,** B65b 43/00

[58] **Field of Search**.....53/186, 374, 381, 383, 390; 93/53 R, 36 MM, 52; 118/2, 3, DIG. 3

[56] **References Cited**

UNITED STATES PATENTS

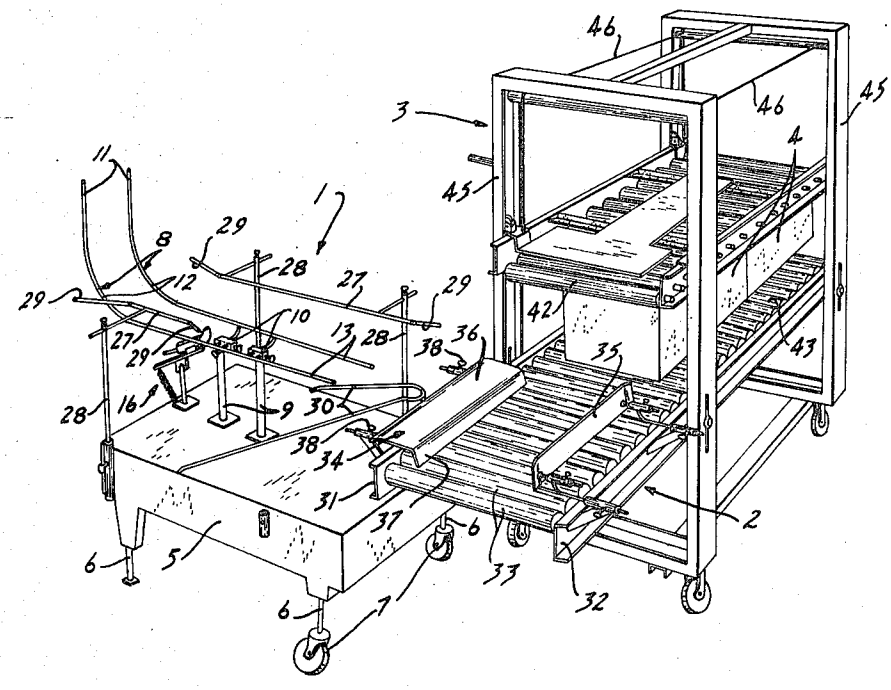
2,572,047	10/1957	Neal	93/36 MM X
3,039,370	6/1962	King et al	53/374 X
3,344,767	10/1967	Talarico	118/2
3,425,393	2/1969	Shuh et al.	118/3 X
3,482,489	12/1969	Neal et al	53/383 X

Primary Examiner—Robert L. Spruill
Attorney—Andrus, Sceales, Starke & Sawall

[57] **ABSTRACT**

A device for use in manually handling shipping cartons include transfer rails having vertical entrance ends which curve into horizontal portions downstream for closing the transversely connected carton bottom flaps. A gluing assembly below the rails is actuatable, at a minimum, by the downward springback of said flaps to apply glue thereto. The glue applicator head is pivotally mounted to assure uniform glue application. A plow closes the longitudinally connected carton bottom flaps, and the still empty carton moves into a packing station which includes gripping means for holding the carton against vertical movement due to spring-back of the bottom flaps. The carton is packed, the top flaps are then closed and glued, and the carton moved through a compression section.

3 Claims, 5 Drawing Figures

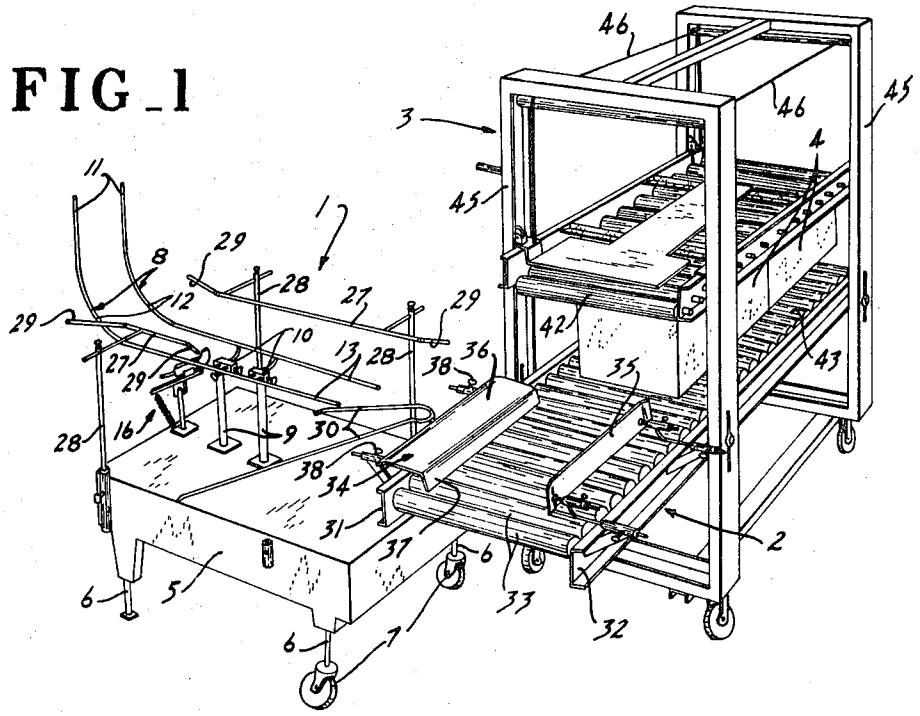


PATENTED SEP 12 1972

3,690,222

SHEET 1 OF 2

FIG_1



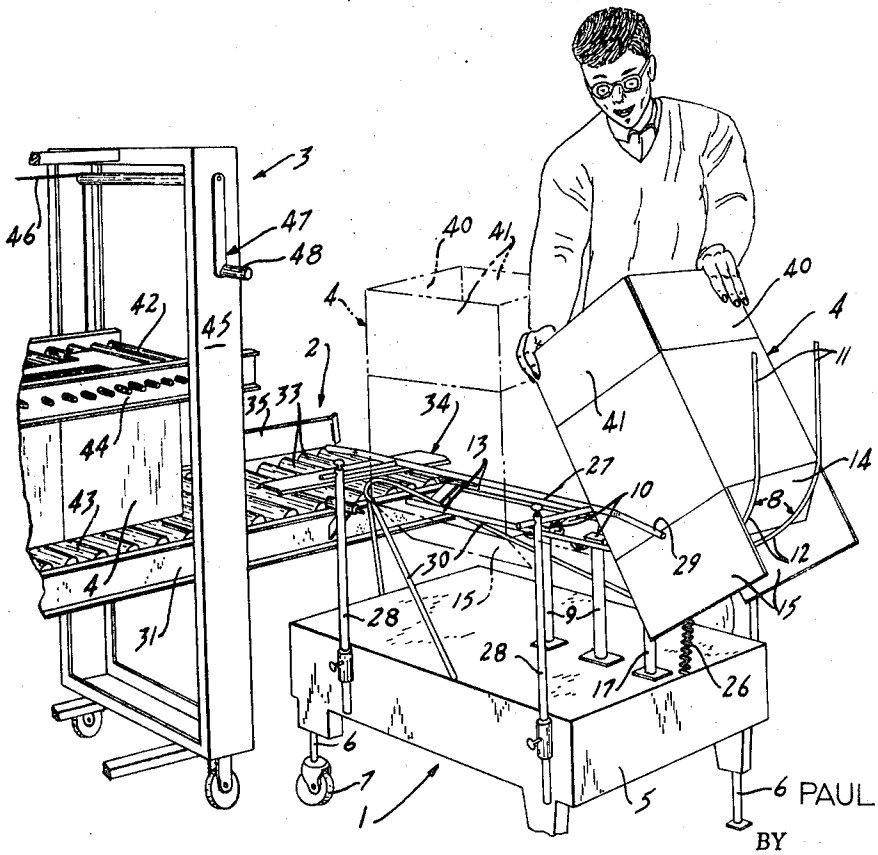
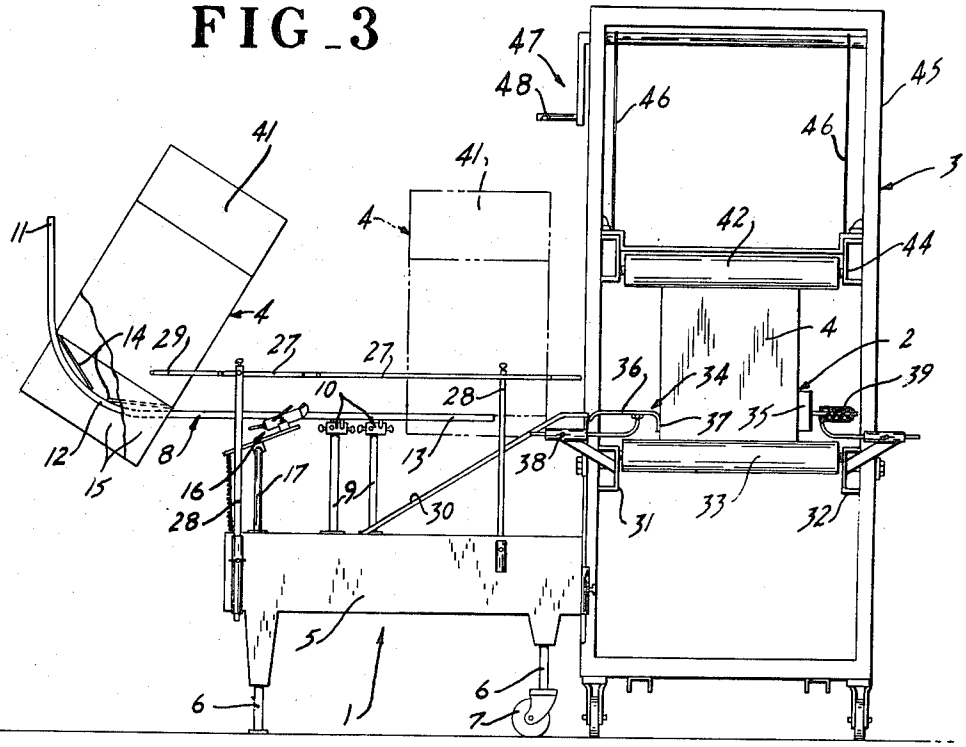


FIG_2

INVENTOR.
PAUL H. SCHROEDER
BY
Andrus, Sceales, Starke & Sawall
Attorneys

FIG_3



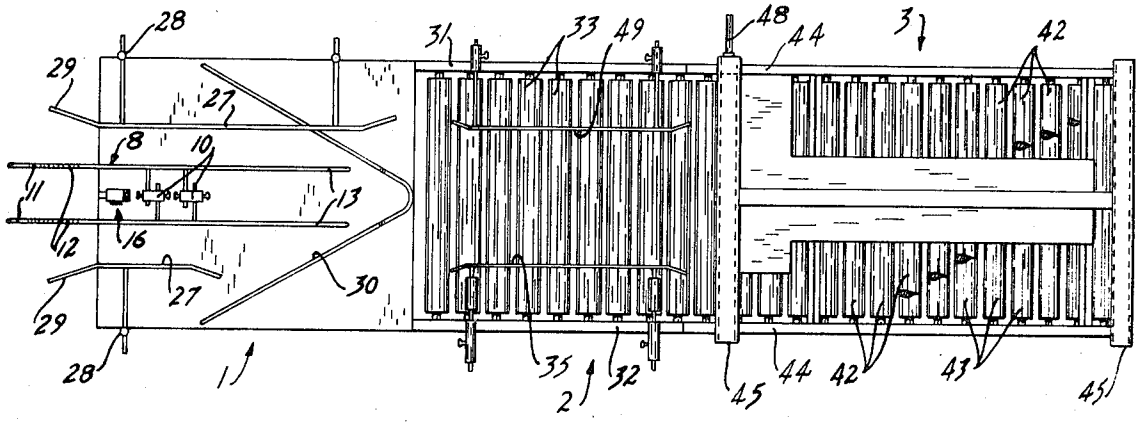


FIG_5

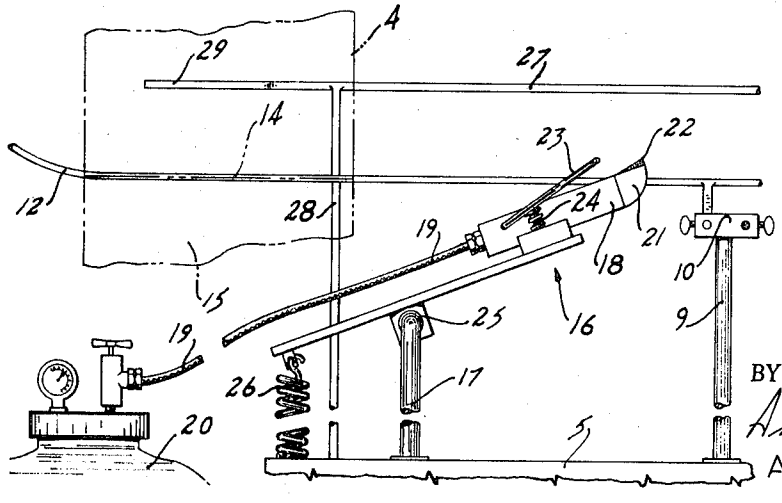


FIG_4

INVENTOR.
PAUL H. SCHROEDER
BY
Andrus, Sceales, Starke & Sawall
Attorneys

DEVICE FOR CLOSING AND SECURING CARTON FLAPS

BACKGROUND OF THE INVENTION

This invention relates to handling of shipping cartons, and more particularly to the opening and forming of corrugated cartons or cases which are to be packed and sealed for shipment.

In recent years, automatic machinery has normally been utilized for carton forming. This machinery is expensive and therefore not economical for many packers to own. For some time there has been a need for relatively inexpensive portable manual carton handling devices for use in low volume packing lines. Various attempts to accomplish this have been made, but with only limited success.

SUMMARY OF THE INVENTION

The device of the present invention satisfies the above-mentioned need, and provides a portable, compact carton handling unit of high quality at relatively low cost.

In accordance with the invention, a carton forming unit includes a unique guide rail system for tucking the bottom flaps of an opened empty carton. Bottom flap gluing means of improved operability automatically glue the bottom flaps of the empty carton during forming. When a packing station is provided, the carton is held under compression so that the newly glued bottom flaps do not spring open and raise the empty carton. The device may include a section for automatically sealing the top flaps after packing.

Movement of a carton through the device is done entirely manually.

DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate the best mode presently contemplated by the inventor for carrying out the invention.

In the drawings:

FIG. 1 is a front perspective view of a device constructed in accordance with the invention;

FIG. 2 is a rear perspective view showing a carton in several positions on the forming section;

FIG. 3 is a front elevation of the device;

FIG. 4 is a schematic showing of the gluing assembly; and

FIG. 5 is a top generally schematic plan view of the apparatus arranged in line.

As shown in the drawings, the device comprises generally a carton forming section 1, and may also include a packing station 2 and compression section 3. A shipping carton or case 4, which is initially flat, is manually unfolded and moved through the device.

In accordance with the invention, carton forming section 1 is used for progressively tucking in the carton flaps and comprises a framework including a base 5 which may be supported on the floor by suitable legs 6. Casters 7 are disposed on the lower ends of at least some of legs 6 for added portability.

Section 1 is adapted to receive an opened carton, and adjust and glue the bottom flaps thereof. For this purpose, a pair of transversely spaced longitudinally extending transfer rails 8 are supported above base 5, as by upstanding rods 9 and yokes 10. The entrance ends

11 of rails 8 are generally vertical and merge through gradually curved portions 12 into horizontal portions 13. Rails 8 support carton 4 during movement therealong, and provide means for closing the pair of initially open transversely connected opposed carton bottom flaps 14. For this purpose, the operator places carton 4 on curved portion 12 of rails 8, presses downwardly at about a 45° angle to provide an initial partial closure of flaps 14 and then manually slides the carton onto and down horizontal rail portions 13 to tuck in and substantially close flaps 14. Curve 12 assists primarily in closing flaps 14.

Subsequent to the above operation, and before the pair of initially open longitudinally connected opposed carton bottom flaps 15 are closed, means are provided to apply a suitable adhesive to the underside of now substantially closed flaps 14. For this purpose, a gluing assembly 16 is pivotally mounted on a support rod 17 so that the assembly is just below and between transfer rails 8 downstream of curved portion 12. Assembly 16 comprises a valve body 18 connected by a conduit 19 to a suitable source 20 of pressurized glue, and an elongated transversely extending applicator head 21. Head 21 is provided with a plurality of glue discharge openings 22 for applying glue in multiple lines to flaps 14. As shown, valve body 18 is provided with a pivotal vertically movable tripper arm 23 which is engaged by flaps 14 as a carton moves through the device, and which in turn actuates the stem 24 of a spring biased normally closed valve within body 18 to open the valve. Since carton 4 is empty as it passes over assembly 16, and since the carton body walls may be slightly above rails 8 with the only downward pressure applied being due to downward spring-back of flaps 14, the spring biasing the stem 24 is relatively weak so that the valve is actuatable, at a minimum, merely by the spring-back force of the flaps.

It sometimes happens that the carton may not be level or perfectly vertically aligned as it moves along transfer rails 8. At the same time it is desirable to provide a uniform glue pattern on flaps 14. To accomplish this desired result, the device of the invention includes means to automatically adjust applicator head 21 so that it's edge is parallel to flaps 14. For this purpose, the pivotal mounting of valve body 18 is mounted on support rod 17 by means of a pivot 25 having a substantial clearance therein to allow freedom of the head 21 to accomodate the flaps 14. A spring 26 counters the weight of body 18 and provides for freedom of the described tilting of the head 21.

It is desirable to maintain a carton in centered position over transfer rails 8 as it moves therealong. This is accomplished by a pair of parallel longitudinal guide rails 27 which are disposed above and slightly outboardly of rails 8. Guide rails 27 are mounted on upstanding arms 28 and may be adjusted transversely to handle cartons of differing widths. Rails 27 provide a channel down which a carton 4 moves, and are flared at their entrance ends 29 adjacent curved rail portions 12 to facilitate entry of a carton into the device. The operator normally applies a pressure to the carton which is not only downwardly but also rearwardly toward rear rail 27. Forward rail 27 acts only as a guide during initial carton movement, and is substantially shorter than rear rail 27. In many instances, the forward rail 27 may be eliminated entirely.

As a carton is moved downstream of gluing assembly **16**, flaps **15** are engaged by an inclined triangular plow **30** and are tucked under and closed onto flaps **14**. The carton may then be discharged from forming section **1** for packing.

The space between the ends of the transfer rails **8** and the top of plow **30** should not be greater than the width of the leading bottom flap **14**.

In the embodiment shown, packing station **2** is disposed proximate the discharge end of forming section **1** and includes a frame comprising a pair of spaced parallel channel members **31, 32**. A plurality of rollers **33** are freely rotatably mounted between members **31, 32** and are disposed in a generally horizontal plane on a level slightly below that of transfer rails **8**. Rollers **33** support a carton **4** in the packing station and also provide the entrance conveyor for compression section **3**.

The glue which has been applied to the bottom carton flaps may not have set completely when the carton reaches packing station **2**. In such a situation, and since the carton is still empty, the spring-back of flaps **14** and **15** may tend to raise the carton body off rollers **33**. To prevent this, compression means are provided to grip the lower wall portions of the carton body and hold it against vertical movement. For this purpose, the carton is discharged from forming section **1**, passes over a horizontal guide plate **34** and engages a stop bar **35**. Plate **34** includes a generally flat top surface **36**, which is in approximately the same horizontal plane as transfer rails **8**, and an inner downwardly inclined flange or lip **37**. Plate **34** is mounted on channel member **31** and may be adjusted horizontally, as by screws **38**. Stop bar **35** is mounted on channel member **32** and is biased toward plate **34**, as by springs **39**.

Plate **34** and bar **35** form a channel therebetween which is adjusted to be normally slightly narrower than a carton. When the forward end of a carton engages stop bar **35**, its trailing end portion is pushed downwardly along lip **37**, causing stop bar **35** to be moved back against the biasing spring force. The carton is thus held tightly in place.

An operator may now pack the carton, manually glue and close the top flaps **40, 41**, and move it on through compression section **3**, which includes upper and lower rollers **42, 43** for assuring a complete seal of the carton flaps.

The upper rollers **42** of compression section **3** are mounted in a floating frame **44** between the vertical guide posts **45**, and which frame may be raised and lowered by cables **46** operated by the windless **47** having manually operable crank **48**.

Normally frame **44** with its rollers **42** rests upon the lower rollers **43**. When a carton has been loaded at station **2** and the top flaps **40** and **41** closed, the operator actuates crank **48** to raise the frame **44** and rollers **42** sufficiently for the carton to be pushed on rollers **43** beneath the rollers **42**. Then the crank **48** is released and frame **44** and rollers **42** will lower until they rest upon the top of the carton, applying a gravity force thereto by reason of the weight of the frame.

The construction illustrated in FIGS. **1** to **3** has the section **1** disposed laterally of sections **2** and **3**.

The construction illustrated in FIG. **5** has the section **1** in line with sections **2** and **3**. For this purpose, the transfer rails **8** will generally be at the same heighth as the lower rollers of section **2**, **33** and rollers **43** of section **3**.

In place of the plate **34** a fixed bar **49** is provided facing the spring biased bar **35** for confining the carton under light spring pressure therebetween.

The bars **49** and **35** may be flared outwardly at their receiving ends to facilitate movement of a carton into the space therebetween from transfer rails **8**.

The device of the invention is simple to operate and maintain, and provides many unique advantages over previous devices of this general type.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. In a device for use in manually handling an opened shipping carton having a carton body, a first pair of opposed transversely connected bottom flaps, and a second pair of opposed longitudinally connected bottom flaps:

a. transfer rail means having an entrance end portion of generally vertical extent which merges through a gradually curved portion to a generally horizontal downstream portion,

b. said curved portion comprising means for initiating the tucking in of said first pair of flaps,

c. said downstream portion comprising means for completing the tucking in of said first pair of flaps and for supporting a carton moved therealong,

d. applicator means disposed below said downstream portion for applying glue to said tucked-in first pair of flaps,

e. plow means for subsequently tucking in said second pair of flaps onto said glue-applied first pair,

f. and means proximate the discharge end of said transfer rail means for gripping the carton body to prevent vertical movement of the carton, said gripping means comprising:

1. a horizontal guide plate member over which the carton travels,

2. a stop bar member disposed parallel to said plate,

3. said members forming a channel normally slightly narrower than the carton width,

4. and spring means on at least one of said members for biasing the latter against a carton disposed between the members.

2. In a device for use in manually handling an opened shipping carton having a carton body, a first pair of opposed transversely connected bottom flaps, and a second pair of opposed longitudinally connected bottom flaps:

a. means for progressively tucking in said first pair of flaps,

b. applicator means for applying glue to said tucked in first pair of flaps, said applicator means including tripper means actuatable by the downward spring-back force of said first pair of flaps for actuating glue application,

c. plow means for subsequently tucking in said second pair of flaps onto said glue-applied first pair,

d. and means for gripping the carton body subsequent to tucking of said second pair of flaps to prevent vertical movement of the carton, said gripping means comprising:

1. a horizontal guide plate member over which the carton travels,
2. a stop bar member disposed parallel to said plate,
3. said members forming a channel normally slightly narrower than the carton width,
4. and spring means on at least one of said members for biasing the latter against a carton disposed between the members.

3. In a device for use in manually handling an opened shipping carton having a carton body, a first pair of opposed transversely connected bottom flaps, and a second pair of opposed longitudinally connected bottom flaps:

a. means for progressively tucking in said first pair of flaps,

b. applicator means for applying glue to said tucked-in first pair of flaps,

c. means for subsequently tucking in said second pair of flaps onto said glue-applied first pair,

d. and means for gripping the carton body subsequent to tucking of said second pair of flaps to prevent vertical movement of the carton, said gripping means comprising:

1. a horizontal guide plate member over which the carton travels,
2. a stop bar member disposed parallel to said plate,
3. said members forming a channel normally slightly narrower than the carton width,
4. and spring means on at least one of said members for biasing the latter against a carton disposed between the members.

* * * * *