United States Patent

Striplin

[15] **3,673,928**

[45] **July 4, 1972**

[54] MACHINE FOR FORMING AND SEALING BLISS STYLE CONTAINERS

[72] Inventor: **Charles D. Striplin,** Concord, Calif.

[73] Assignee: **Weyerhaeuser Company,** Tacoma, Wash.

[22] Filed: **Aug. 27, 1969**

[21] Appl. No.: **853,249**

[52] **U.S. Cl.** .....**93/36.3,** 93/39 R, 93/39.1 P, 93/55, 93/59 PL

[51] **Int. Cl.** **B31b 1/46,** B31b 1/64, B31b 17/02

[58] **Field of Search** .....93/36 MN, 36.3, 39 R, 39.1 P, 93/51 M, 55, 59

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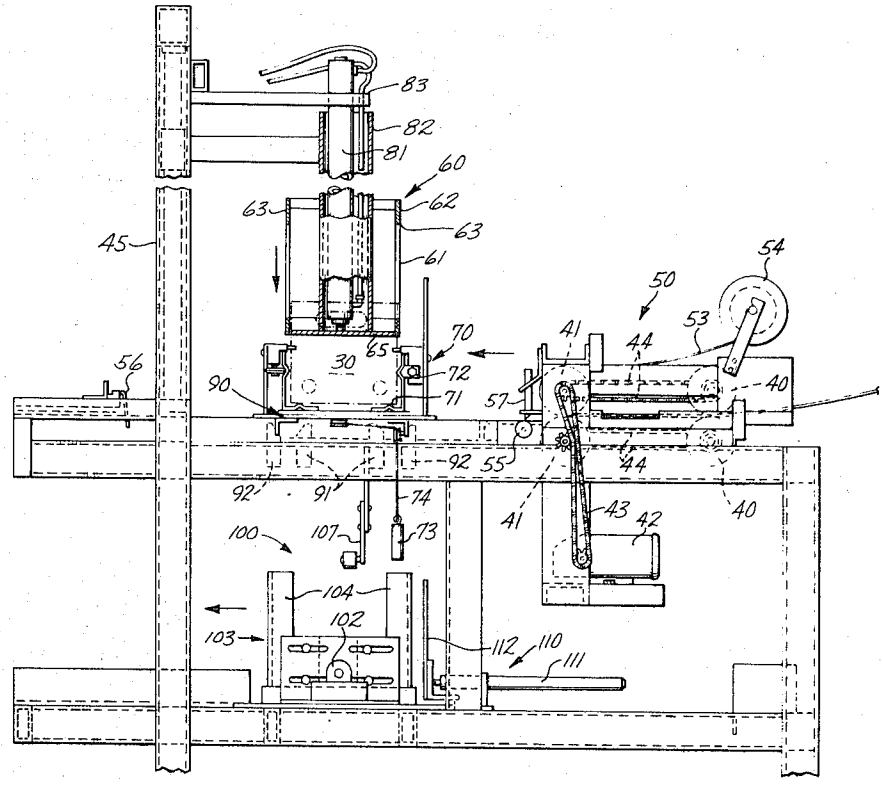
Primary Examiner—Wayne A. Morse, Jr.

Attorney—Patrick D. Coogan, John M. Crawford and Leslie G. Noller

[57] **ABSTRACT**

A machine for forming and gluing a three-part container having two wall panels and a body panel forming the bottom and the other two walls of the container. The body panel is sealed to the wall panels by flanges which are attached to the bottom and walls of the body panel, and which bend over and are contiguous with the faces of the wall panels. The apparatus carries the body panel into position between a mandrel and a die, and positions the wall panels with respect to the body panel. The mandrel then carries the body panel and wall panels through the die cavity to blend the flanges toward the wall panel, and into a compression section. The compression unit has two active positions: the first holds the bent flanges at an included angle of less than 45° and the second compresses the flanges against the wall panels to bond the flanges to the wall panels. When the compression unit retracts, the container is removed from the machine.

2 Claims, 11 Drawing Figures



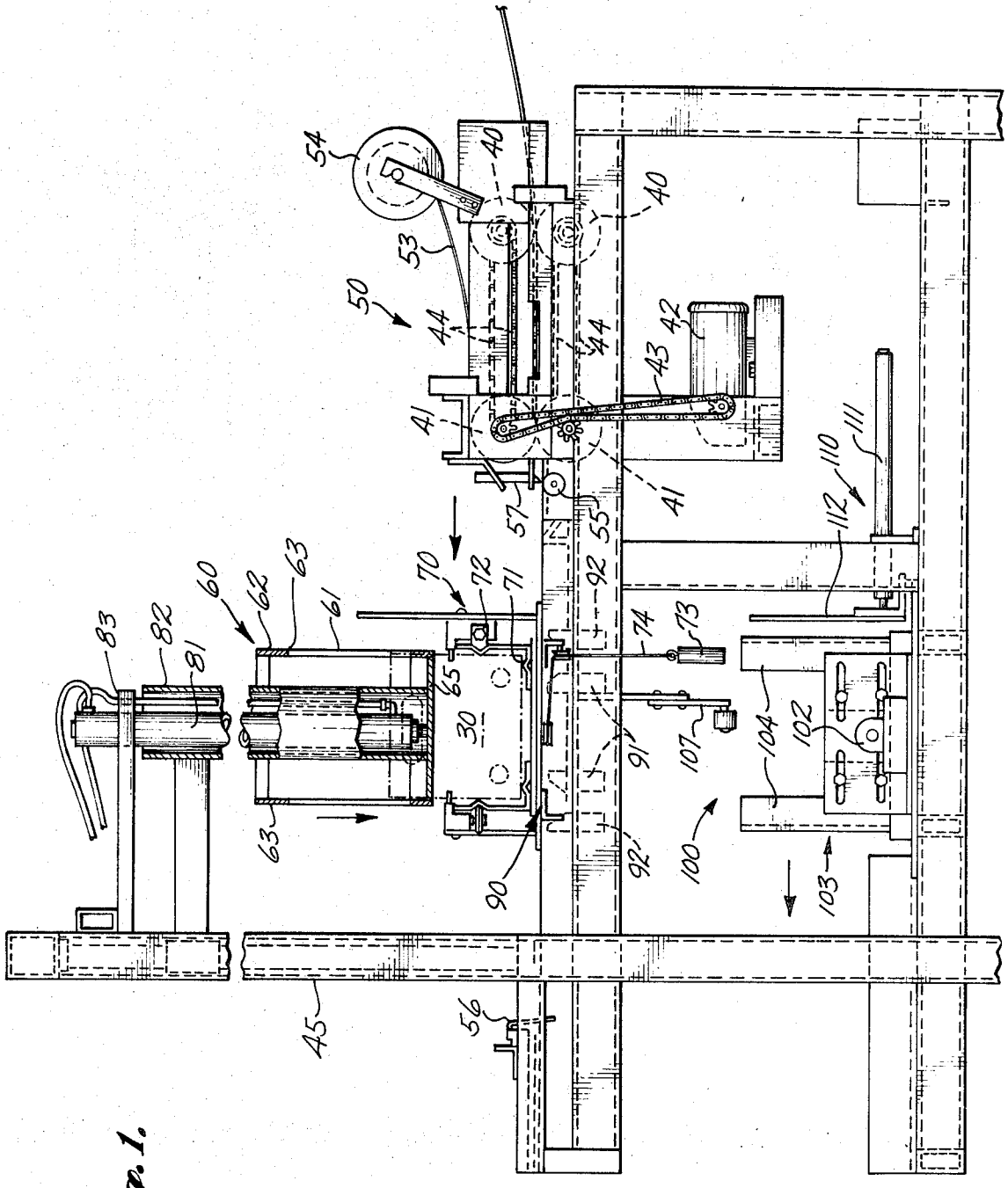


Fig. 1.

INVENTOR:
CHARLES D. STRIPLIN
BY Leslie G. Walker &
John M. Crawford
ATTORNEYS

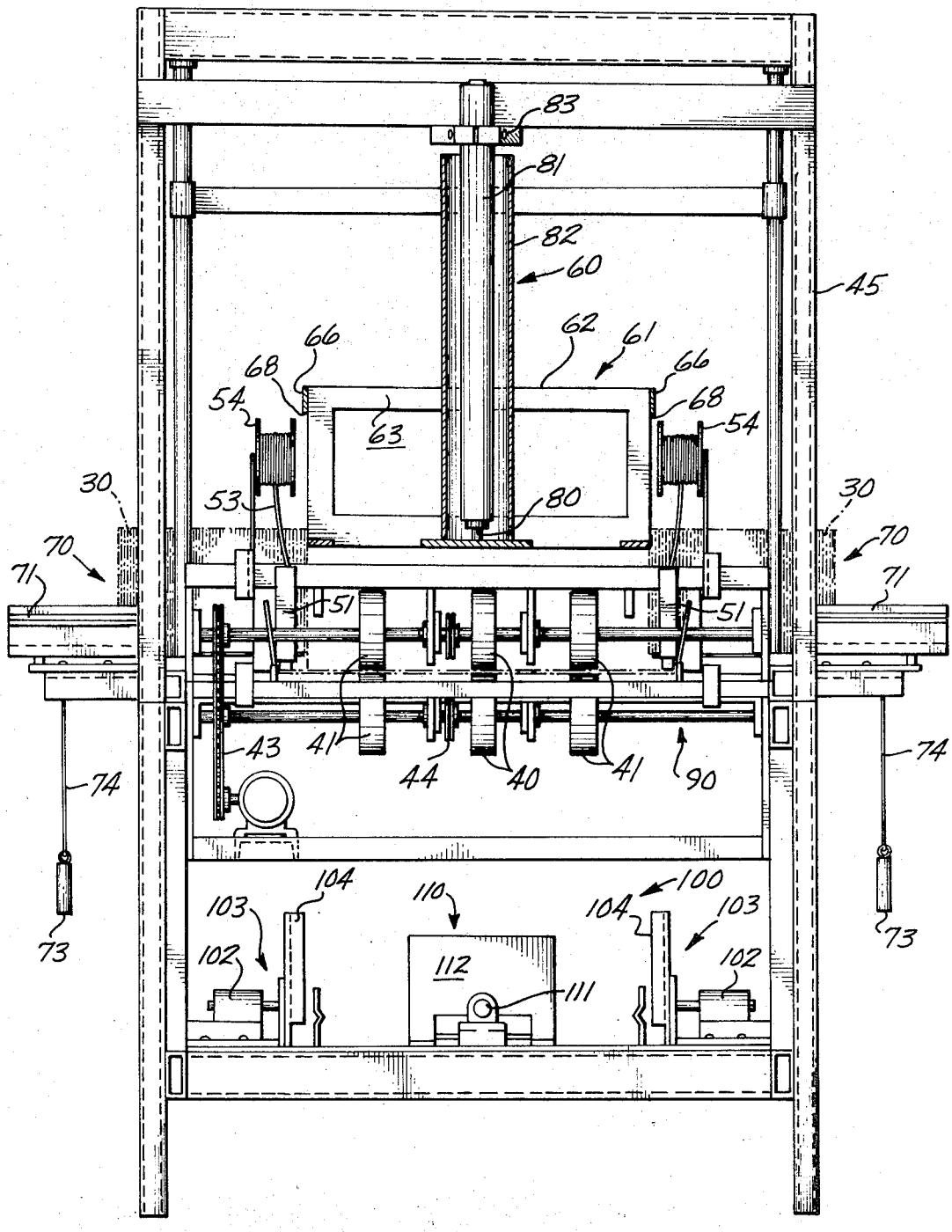


Fig. 2.

INVENTOR:
CHARLES D. STRIPLIN

BY Leslie L. Nolte &
John M. Crawford
ATTORNEYS

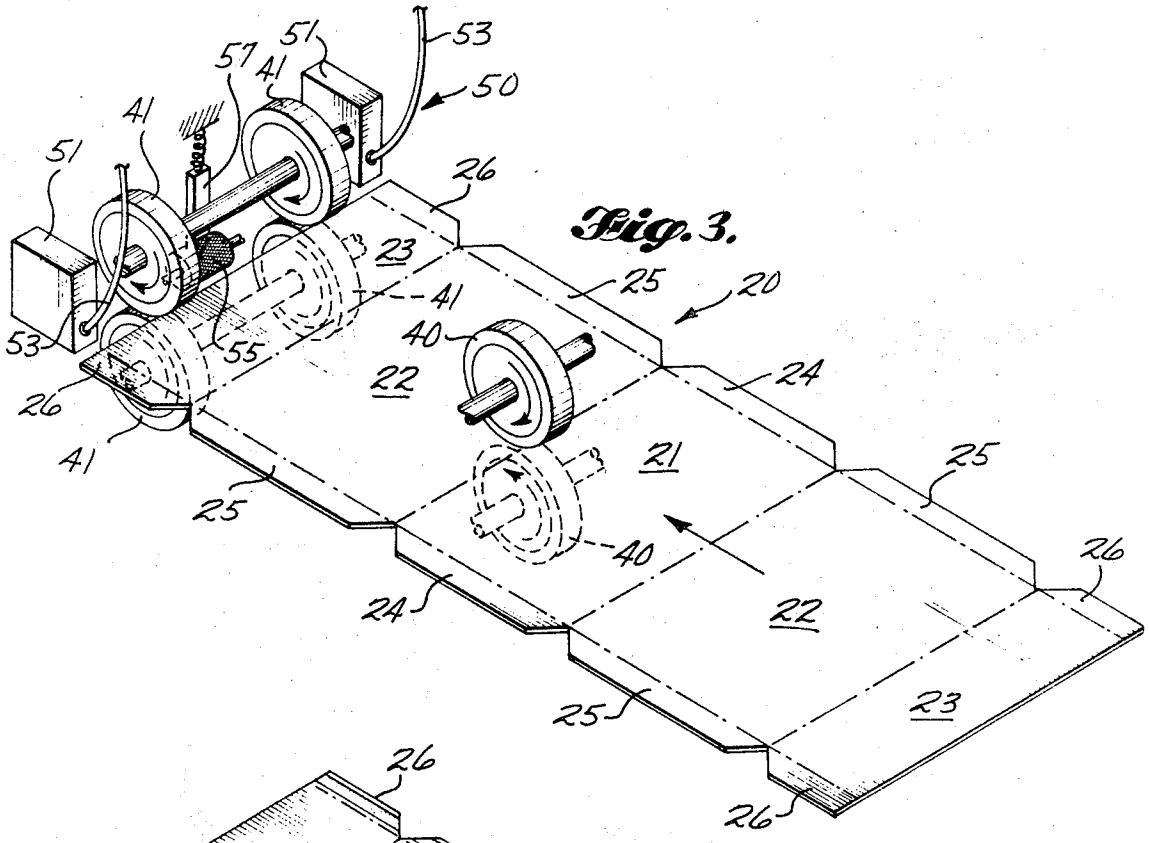


Fig. 3.

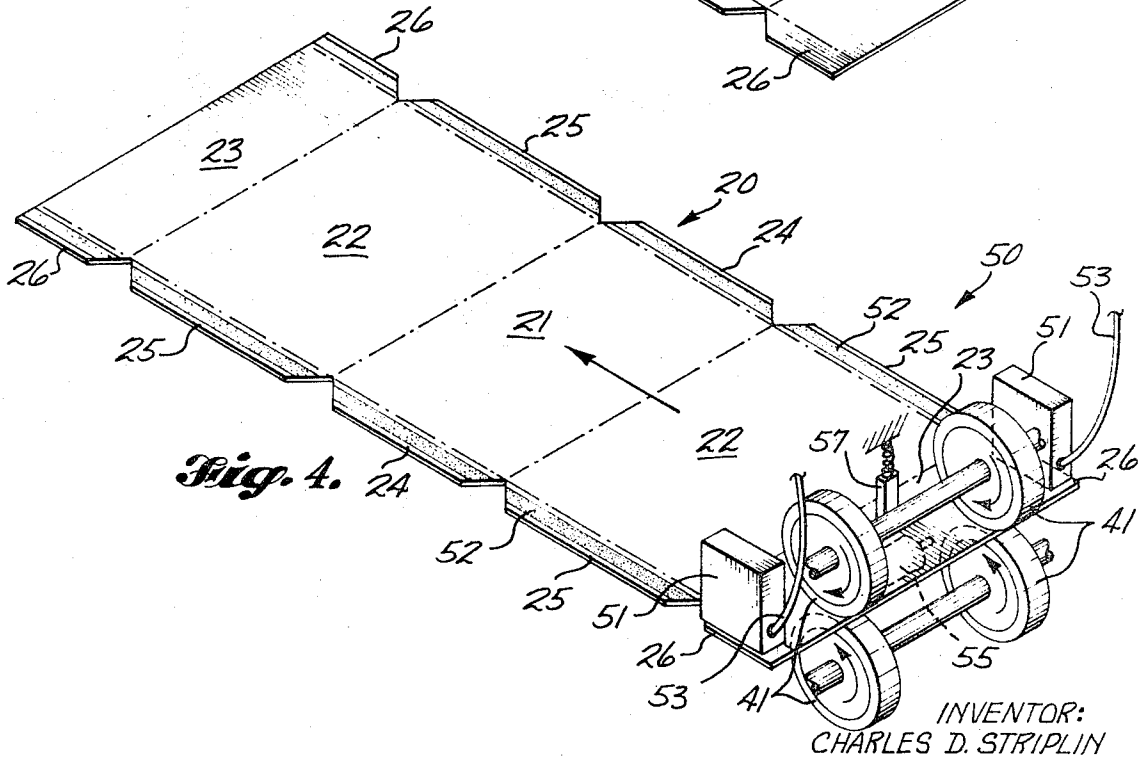


Fig. 4.

INVENTOR:
CHARLES D. STRIPLIN

BY Leslie G. Nolte &
John M. Crawford
ATTORNEYS

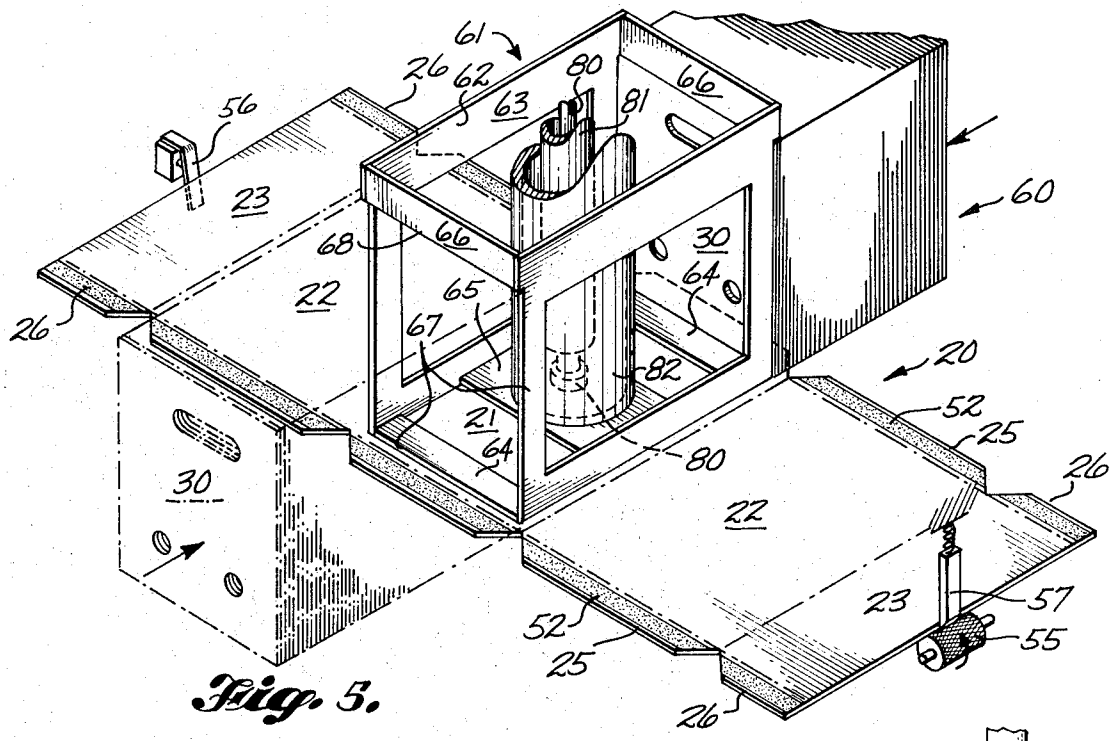


Fig. 5.

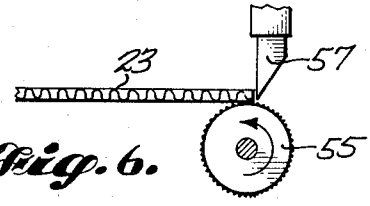


Fig. 6.

Fig. 7.

INVENTOR:
CHARLES D. STRIPLIN

BY Leslie G. Haller &
John M. Crawford
ATTORNEYS

Fig. 8.

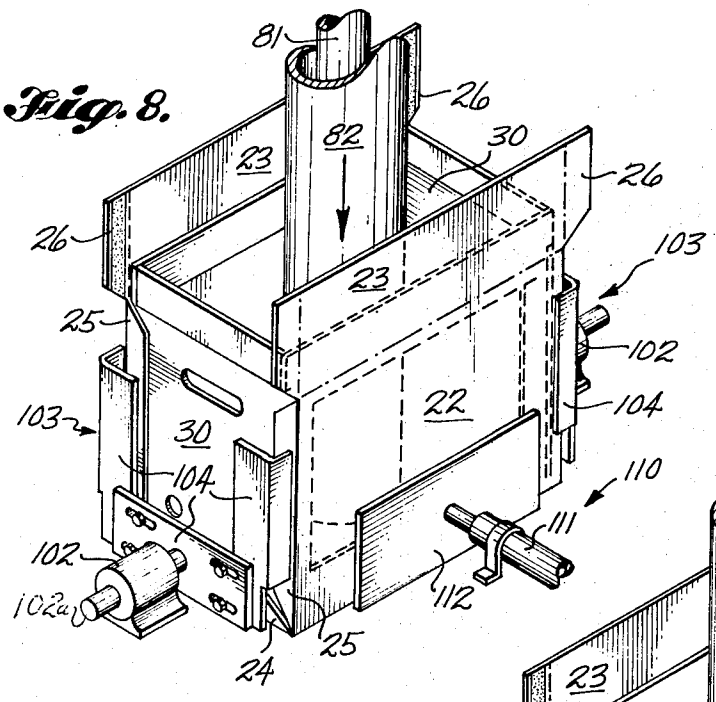
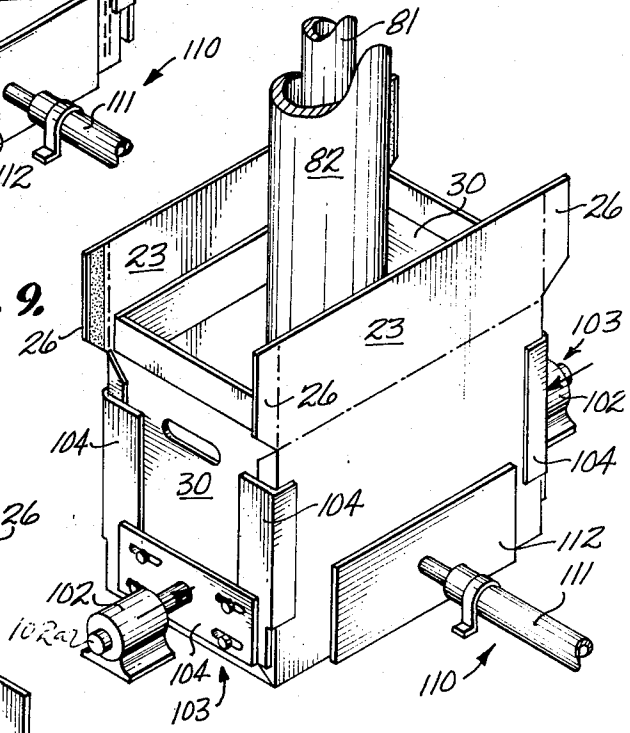


Fig. 9.



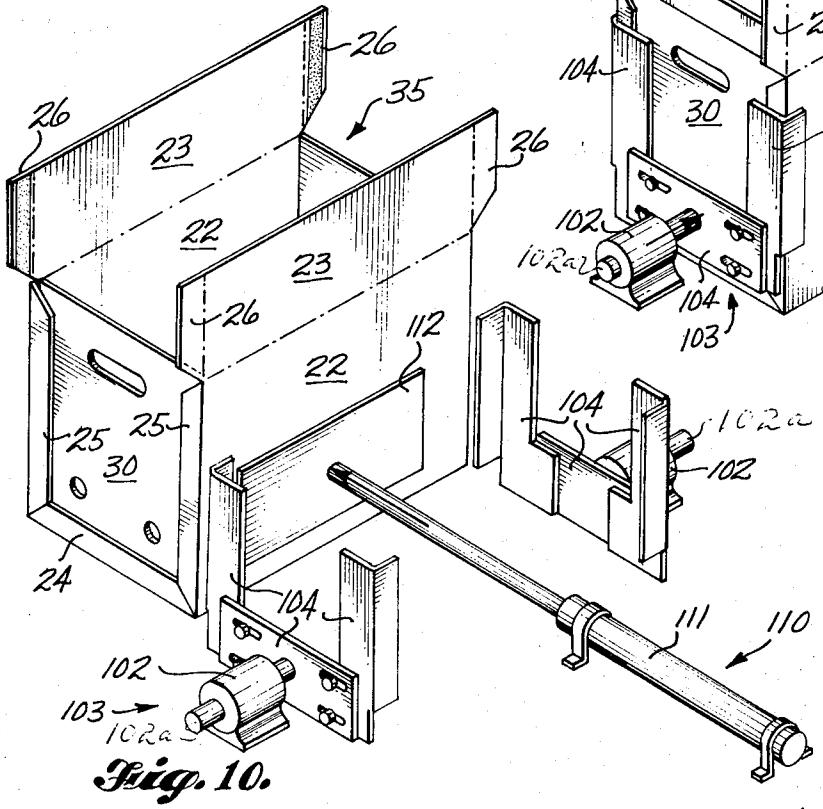


Fig. 10.

INVENTOR:
CHARLES D. STRIPLIN

BY Leslie G. Walker &
John M. Crawford
ATTORNEYS

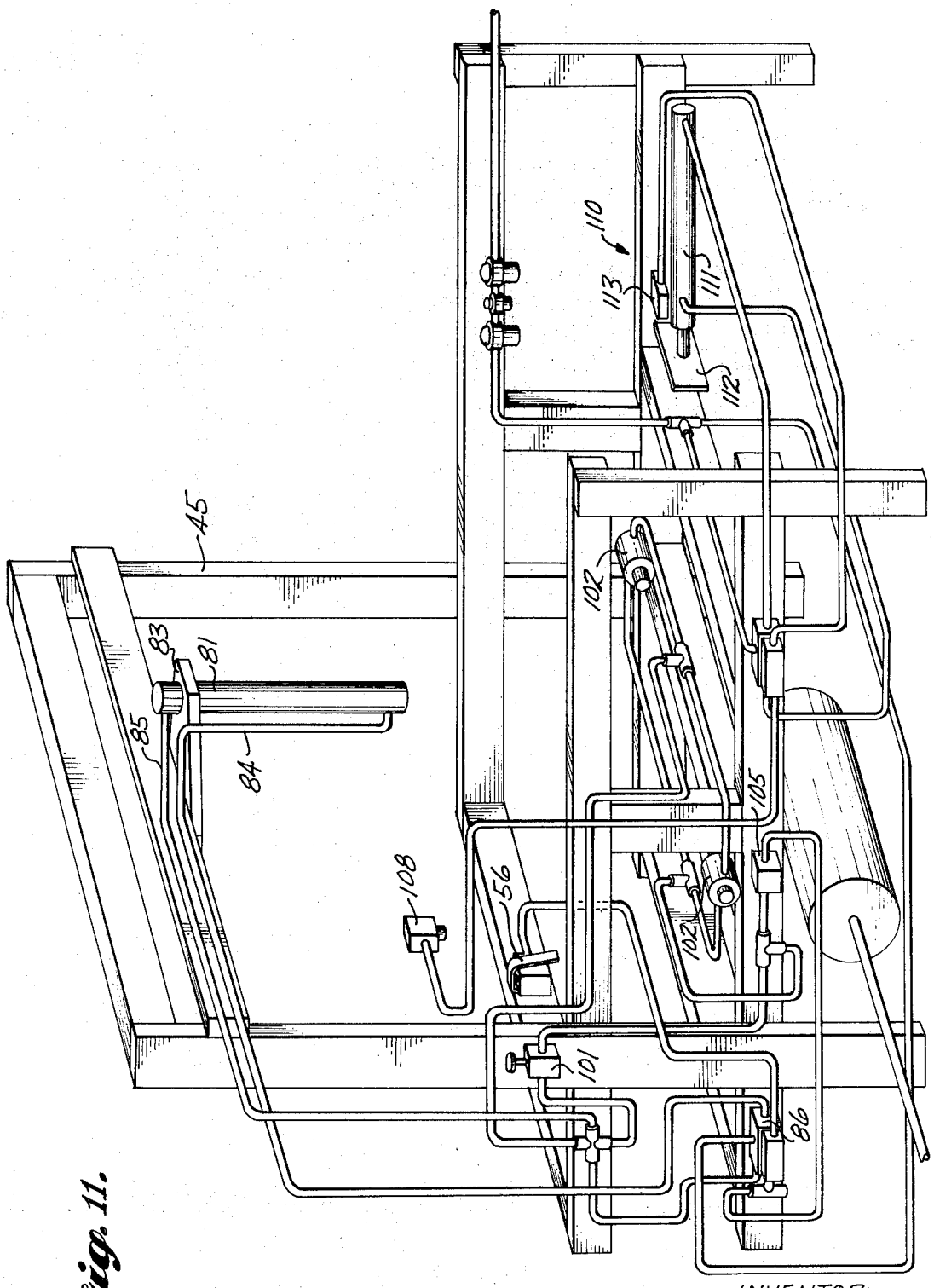


Fig. 11.

INVENTOR:
CHARLES D. STRIPLIN

BY Leslie G. Haller &
John M. Crawford
ATTORNEYS

MACHINE FOR FORMING AND SEALING BLISS STYLE CONTAINERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

A machine for placing together separate pieces to form a container.

2. Description of the Prior Art

Roesner et al U.S. Pat. No. 3,342,116 also discloses a machine for manufacturing Bliss-style containers. In this machine the body blanks are carried into position between the mandrel and the die, and against a trip switch by driven rollers and held in position by the same driven rollers. These rollers wear quickly and it is necessary to replace them if the container is to be formed properly.

The mandrel pushes the wall panels outwardly against the flanges. The outer compression unit or die cavity is fixed. Thus, there is no clearance between the finished container and the die cavity after the container is formed, and the container may not drop from the cavity after it is formed. There is no separate removal unit or split flange-forming plows.

Each step in the operation of the machine is timed in relationship to the other steps. It is possible to increase the time of one step only by increasing the time of all steps in the cycle. Consequently, it is difficult to adjust the machine to obtain a bond between the flanges and the end panels when the humidity and temperature change.

There are other machines presently on the market in which the mandrel is fixed and the outer compression units move in to adhere the flanges to the wall panels. However, these use drive rolls to position the body panel between the mandrel and die, use a fixed time relationship sequence, and do not have separate removal units or split flange-forming plows.

SUMMARY OF THE INVENTION

The present apparatus forms and glues a container having two wall panels and a body panel. The body panel is sealed to the wall panels by flanges on the body panel which are bent over and adhered to the faces of the wall panels. The apparatus moves the body panel into position between the die cavity and the mandrel, and positions the wall panels with respect to the body panel.

An inertia roll and positive stop hold the body panel in position between the mandrel and die, and against the switch operating the mandrel, and prevent the switch from bouncing the panel out of position with respect to the mandrel and die. The inertia roll is not driven, and does not wear as a driven roll would. The mandrel moves the body panel and wall panels into the die cavity to bend the flanges around and toward the wall panels. Split flange-forming plows in the cavity make it possible to bend only certain specified flanges on the container.

The mandrel places the container in a compression section and acts as a fixed backing plate during the compression cycle. The compression unit has two active positions: the first holds the bent flanges at an included angle of less than 45°, and the second compresses the flanges against the wall panels to bond the flanges to the wall panels. The compression time length may be changed without changing the cycle time of the rest of the operation so that the machine may be varied for different temperature, glue and humidity conditions.

After retraction of the compression unit, the container is removed from the compression section. This may be by an ejector or a conveyor.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side plan view of the machine. The arrows show the direction of travel through the machine. Portions are cut away to show details of construction.

FIG. **2** is an end plan view of the apparatus from the drive end.

FIGS. **3–5** and **7–10** are isometric views of the various steps in the machine's operating cycle.

FIG. **6** is a side plan view showing the inertia roll.

FIG. **11** is an isometric view of the machine controls.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIGS. **3–6** and **7–10** are shown the steps of forming a body panel **20** and wall panels **30** into a container **35**. The body panel **20** has a bottom panel **21**, wall panels **22**, and top panels **23**. Each of these panels has end flanges; the bottom panel **21** having flanges **24**, the wall panels **22** having flanges **25**, and the top panels **23** having flanges **26**. The flanges **24** and **25** are bent around and bonded to the faces of the wall panels **30** by the machine.

As shown in FIG. **3**, the body panel is moved into the forming station **60** by drive rolls **40** and **41** of the gluing station **50**. These rolls are driven by motor **42** through drive chains **43** and **44**. The drive rolls **40** and **41** push the body panel **20** through the gluing section in which the glue heads **51** place a bead of glue **52** on the flanges **24**, **25**, and **26**. The glue is shown as being a hot-melt supplied to the glue heads **51** in the form of ropes **53** from reels **54**. However, granules, chunks or liquid adhesive may also be used.

As the body panel **20** leaves the drive rolls **40** and **41**, it is pushed forward by an inertia roller **55** until it contacts a switch **56**. The body panel **20** is prevented from bouncing from the switch **56** by a downwardly biased detent **57** and the continued forward rotation of the inertia roll **55**. This holds the panel **20** in position between the mandrel **61** and the die cavity **90**.

The mandrel **61** has a forming head **62** which has the outer shape of the interior of the container being formed. It has faces **63** which are connected by outer plates **64**, a central plate **65** and side plates **66**. The edges **67** of the faces **63** and the outer plates **64**, and the edge **68** of the plates **66** define the inner dimensions of a wall of the container. The wall panels **30** are carried in against the edges **67** and the edge **68** by the wall panel carrier mechanism **70**.

This mechanism is shown in FIGS. **1** and **2**. The wall panels rest in an upright position on a track **71**. A detent **72** rests against the outer face of the outermost wall panel **30**. The detent **72** is pulled inwardly toward the mandrel by a weight **73** which is attached to the detent by a rope and pulley mechanism **74**. This mechanism will insure that a wall panel **30** will always be against the mandrel in position to form a container.

The forming head **62** is moved into the die cavity **90** by the rod **80** which is moved toward and away from the die cavity by some linear mechanism such as the piston in the cylinder **81**. The rod **80** is attached to the center plate **65** of the forming head. An outer guiding cylinder **82** surrounds the cylinder **81**. The outer end of the cylinder **81** is attached by a cross brace **83** to the frame **45**. Air hoses **84** and **85** cause air to enter and exit from the outer and inner ends of the cylinder **81**, respectively.

The tripping of the switch **56** by the panel **20** adjusts the valve **86** so that air enters the outer end of the cylinder **81** through line **85** and exits from the inner end of the cylinder **81** through line **84**. The forming head **62** moves toward the die cavity **90** carrying the body panel **20** and the two wall panels **30**, held against the edges **68**, into the die cavity **90**. The die cavity **90** consists of inner end plows **91**, outer end plows **92** aligned with plows **91**, and side bars **93**.

Movement of the forming head **62** into the die cavity **90** causes the wall panels **22** of the body panel to contact the side bars **93** and to fold upwardly around the faces **63** of the forming head; the flaps **24** to contact the inner plows **91** and to fold inwardly around the lower edges of wall panels **30**; and the flaps **25** to contact the outer plows **92** and to fold inwardly also. There is a space between the plows **91** and the forming head so that the flaps are not folded into contact with the end panels. The continued movement of the forming head **62** causes the wall panels **22** to come in contact with the faces **63** of the forming head so that the flaps **26** will be aligned with the spaces between the plows **91** and **92** as the flaps pass into the compression section **100**. Consequently, the flaps **26** are not folded inwardly during the forming cycle.

When the forming head **62** has placed the container preform into position in the compression section **100**, an arm (not shown) on the mandrel trips switch **101** (FIG. **11**) causing air to enter the cylinders **102** of the compression units **103**. The cylinders **102** are dual actuated and air enters the cylinders in two streams. The first stream moves the piston **102***a* within the cylinder at the same sequence as the mandrel is moving, causing the compression members **104** attached to the piston to move toward the forming head a distance great enough to hold the flanges **24** and **25** at an angle formed in the wall. In some modifications, the compression members would be in this position normally and need not be moved to this position. The second stream of air into the cylinders **102** places pressure on the piston **102***a* and the compression members **104** to compress and adhere the flanges **24** and **25** to the wall panels **30**. The length of time of the compression is determined by the timer **105** (FIG. **11**). The side flanges **106** hold the wall panels **22** in position against the forming head **62**.

At the end of the compression cycle determined by the timer **105**, air is bled from the cylinders **102** to retract the compression members **104**, and is bled from the outer end of cylinder **81** and enters the inner end of the cylinder **81** to move the forming head **62** away from the compression section **100**. Detent **107** holds the container in the compression section **100** and prevents it from moving with the forming head **62**.

When the mandrel **60** reaches its outermost position it trips switch **108** actuating the ejector unit **110**. The switch **108** causes air to be bled from the front and to enter the rear of cylinder **111** moving the piston within the cylinder and the ejector plate **112** attached to the piston forwardly, pushing the container **35** from the compression section. In its full forward position the ejector mechanism **110** trips valve **113** (FIG. **11**) reversing the operation of the ejector unit by bleeding air from the rear of the cylinder **111** and placing air in the front of the cylinder **111**.

When the ejector plate **112** is in the rearward position shown in FIG. **1** the apparatus is ready for another cycle. If the apparatus is being operated manually the operator notes the position of the plate **112** and then feeds another body panel **20** into the drive rolls **40** and **41**. If the apparatus is automatic a suitable switch is tripped when the ejector plate **112** is in its rearmost position allowing the drive rolls **40** and **41** to carry another body panel into the cycle.

It is also possible to use a conveyor in place of the ejector mechanism shown.

What is claimed is:

1. In an apparatus for forming container blanks into containers in which a blank is conveyed to a work station along a path and is positioned at said work station, said apparatus including first means for conveying said blank, a device adjacent to the exit end of said conveyor and aligned with the conveyor for maintaining the positional relationship of the blank to the apparatus at said work station comprising

second means for positioning the leading edge of said blank positively at said work station,

an inertial roll mounted on said apparatus between said conveyor and said work station and tangential to the path of said blank, the point of tangency of said inertia roll being spaced from said second means a distance equal to the length of said blank,

detent means substantially aligned with the point of tangency of said inertia roll and on the side of said path opposite said inertia roll,

means for moving said detent means toward said inertia roll,

means for forming said blank at said work station, and

means for actuating said forming means, said actuating means being actuated by a leading edge of said blank.

2. In a container-forming device in which a mandrel and die move relative to each other to fold a container around said mandrel, said mandrel having pairs of opposing sides and said die having pairs of opposing sides parallel to said mandrel sides, the improvement for folding certain of said container panels and not folding others comprising

one set of opposing sides of said dies is split into a main section and an additional section and the additional section is spaced outwardly of the outer edge of said mandrel and the outer edge of the main section is spaced inwardly of the outer edge of said mandrel.

* * * * *