Oct. 8, 1968 H. J. FEIGEL ET AL 3,404,507

CONTAINER FORMING DEVICE

Filed March 18, 1966 4 Sheets-Sheet 1

FIG. 1

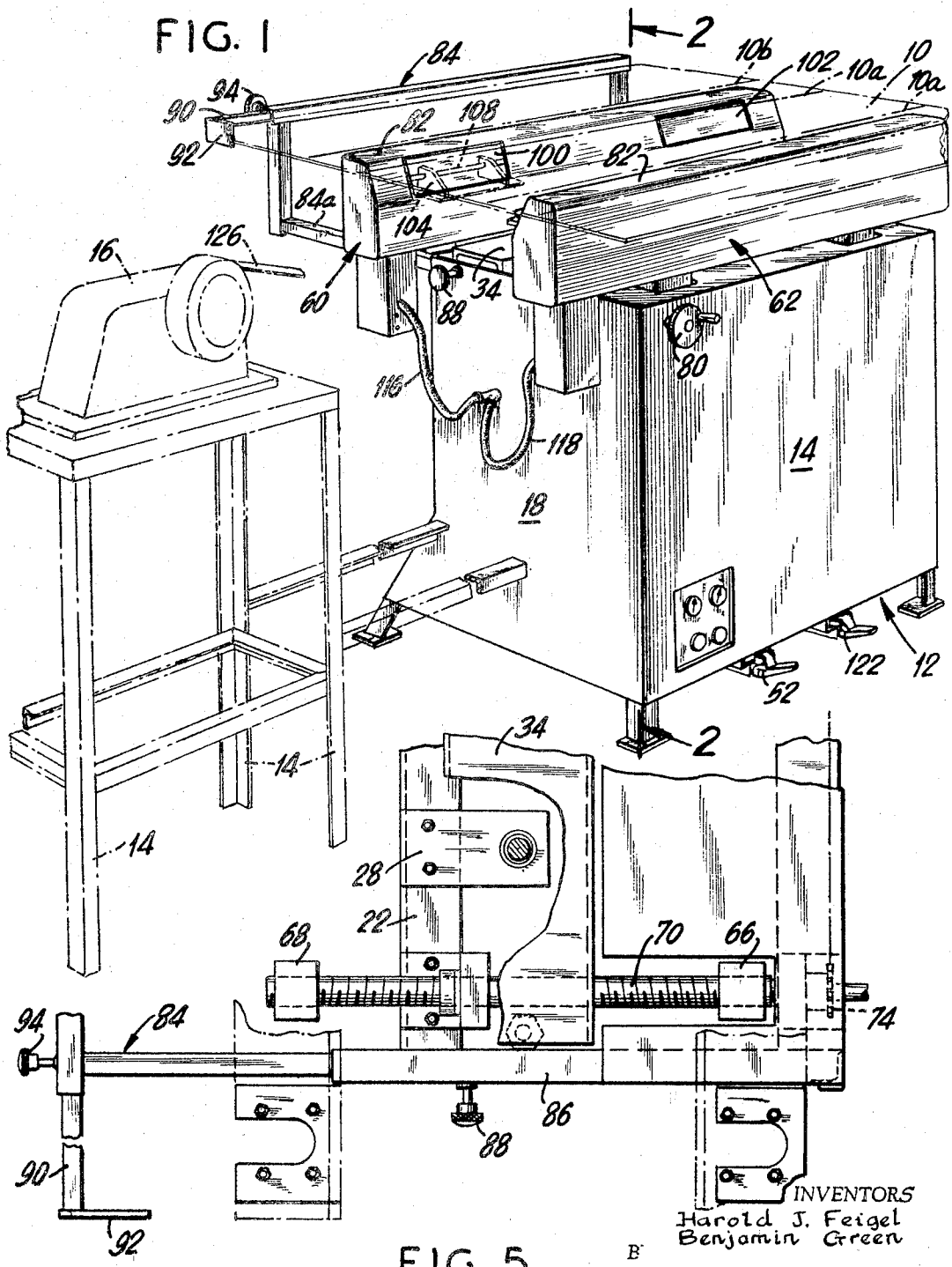


FIG. 5

INVENTORS
Harold J. Feigel
Benjamin Green

McGlew & Toren
ATTORNEYS.

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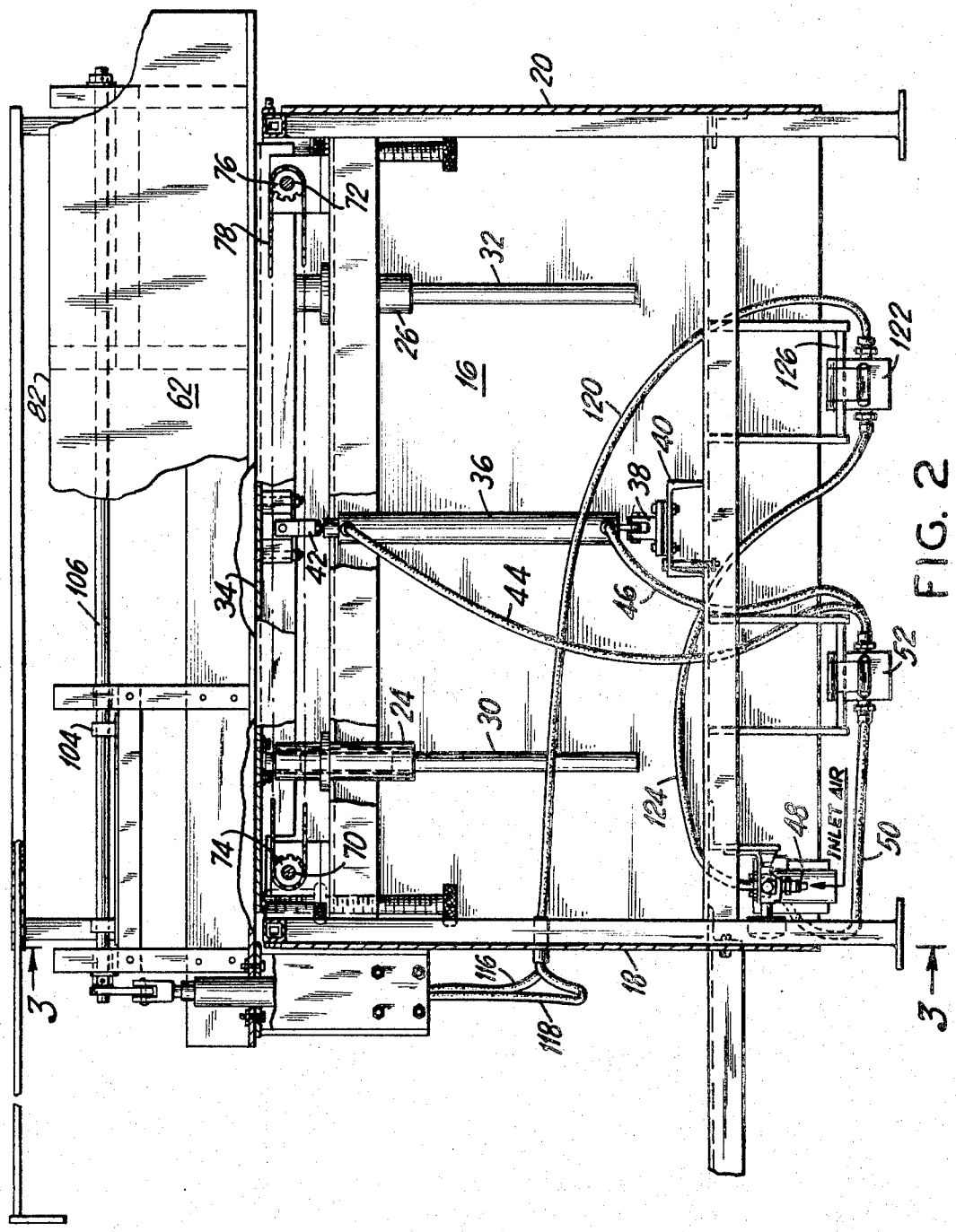


FIG. 2

INVENTORS
Harold J. Feigel
Benjamin Green

McGlew & Toren
ATTORNEYS.

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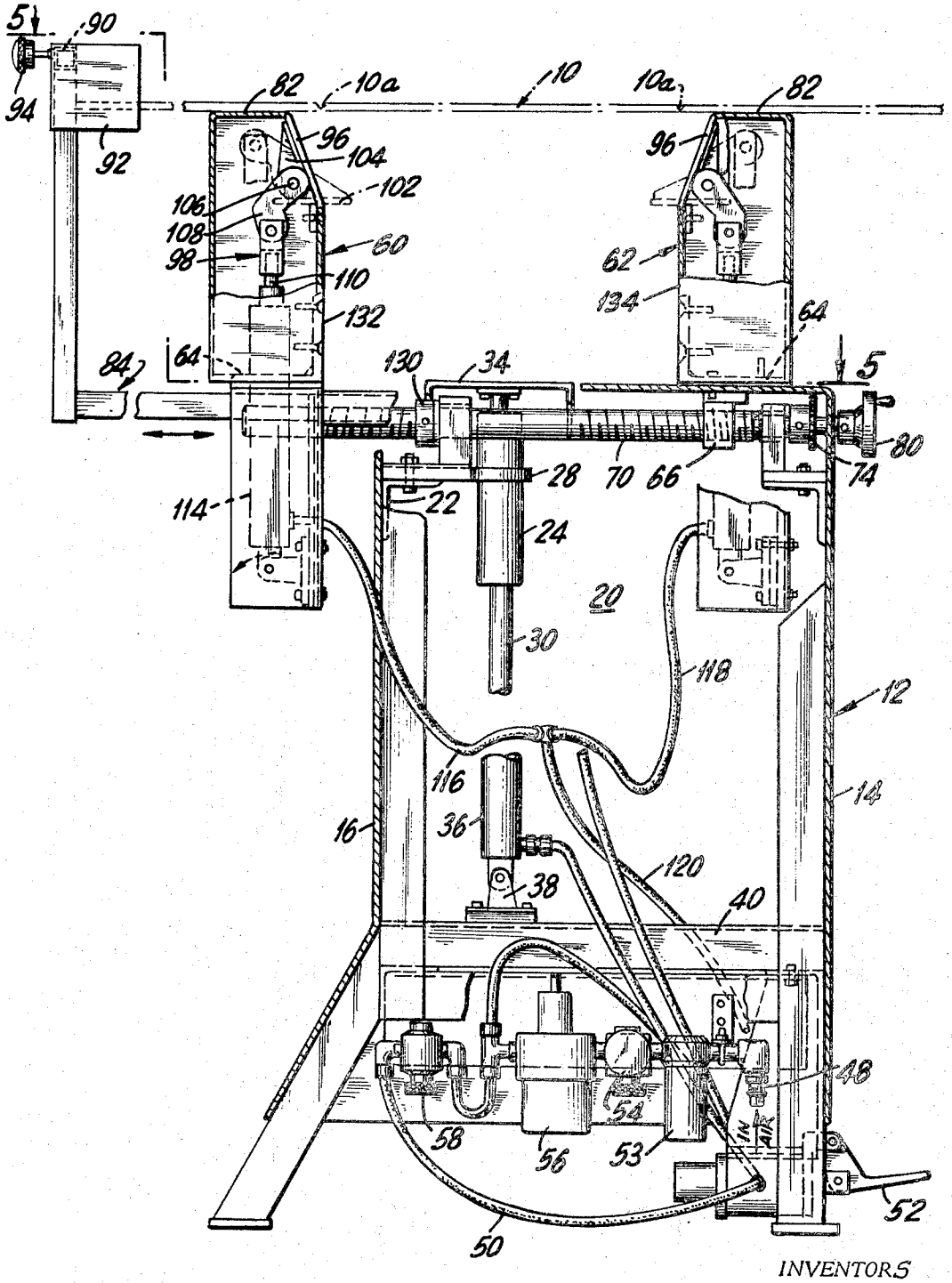


FIG. 3

INVENTORS
Harold J. Feigel
Benjamin Green

McFlew & Toren
ATTORNEYS.

Oct. 8, 1968 H. J. FEIGEL ET AL 3,404,507

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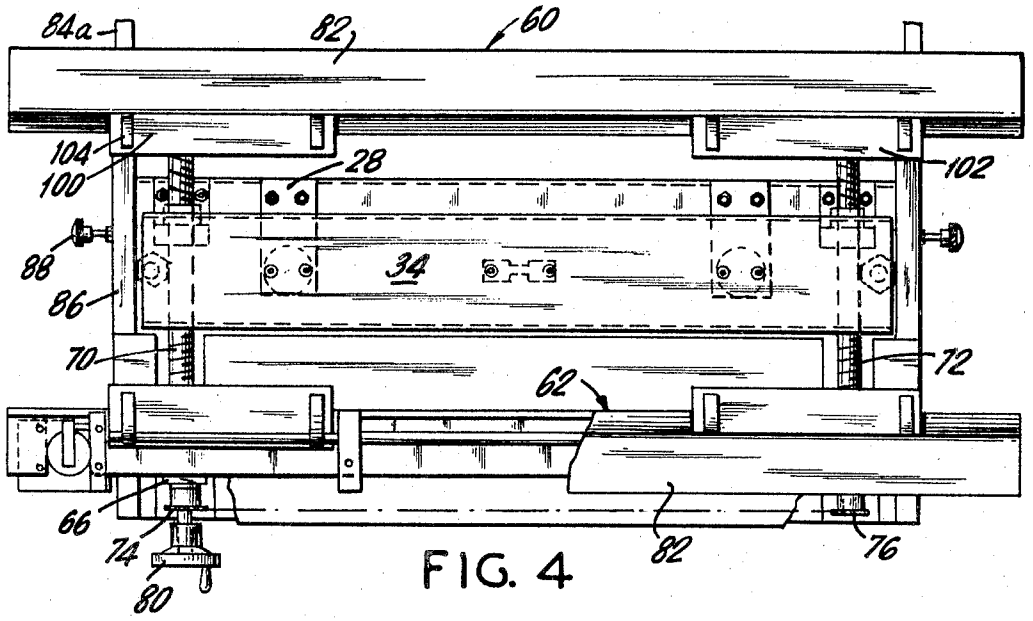


FIG. 4

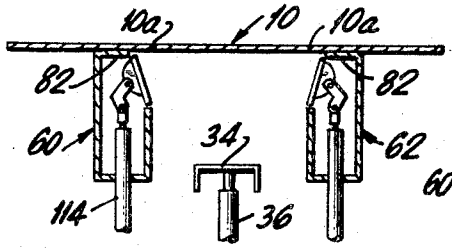


FIG.6a

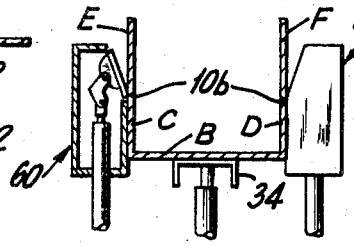


FIG.6b

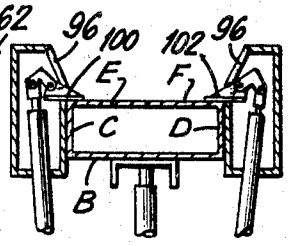


FIG.6c

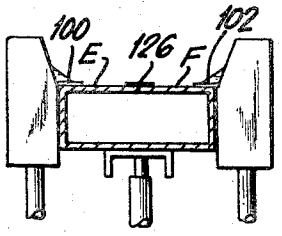


FIG.6d

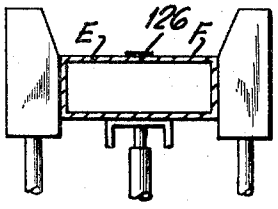


FIG.6e

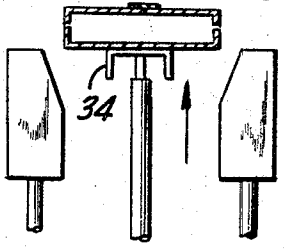


FIG.6f

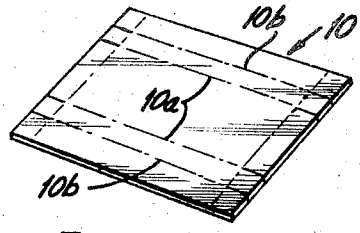


FIG. 7

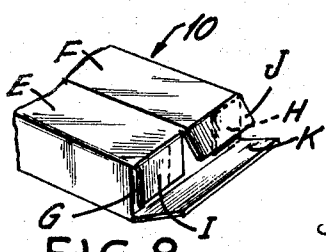


FIG. 8

INVENTORS
Harold J. Feigel
Benjamin Green

McGlew & Toren
ATTORNEYS.

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3,404,507

CONTAINER FORMING DEVICE

Harold J. Feigel, West Englewood, N.J., and Benjamin Green, Brooklyn, N.Y., assignors to Closure Corporation, Linden, N.J.

Filed Mar. 18, 1966, Ser. No. 535,566
11 Claims. (Cl. 53—29)

ABSTRACT OF THE DISCLOSURE

A device for facilitating the formation of container blanks into containers includes a base over which the containers are formed which carries spaced parallel longitudinal guide members which may be adjusted toward and away from each other. The guide members each include a substantially flat horizontal top wall for supporting the container blanks and oblique side walls for deflecting the side walls of the blanks upwardly from their associated bottom when the blank is moved downwardly between the oblique walls of the guide members. The guide members also carry movable elements which engage and fold the cover flaps to a closed position.

This invention relates in general to container-forming devices and in particular to a new and useful handling device or machine for folding and forming pre-scored containers.

The present invention is an improvement over the prior art particularly in the provision of an improved means for receiving a pre-scored sheet of corrugated paperboard. fiberboard and the like in a machine which is pre-calibrated or set for the specific size of the board received so that it may be hand-folded by depressing the container between two longitudinal guideways to effect first the forming of a container in a substantially U-shaped form. The container may be filled either before or after it is folded into a U-shaped form. After filling the machine includes means for closing the top flaps of the container. The device includes means which will hold the flaps downwardly while they are sealed closed with an adhesive strip and the like.

Accordingly, it is an object of the invention to provide an improved container-forming machine with longitudinal guide means for aligning a container above a supporting channel member so that it may be pressed downwardly between the guides onto a bottom support plate, thereby to effect infolding of the side flaps as the box is pushed past the guide members. The formed container becomes oriented above the support plate for filling purposes. The guide members include means for deflecting the top cover flaps downwardly to close the container or aid in closing the container and for holding the cover flaps in a closed position while the top is sealed by a sealing tape, for example.

A further object of the invention is to provide a device for forming containers which is simple in design, rugged in construction and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

In the drawings:

FIG. 1 is a perspective view of a box folding machine constructed in accordance with the invention;

FIG. 2 is a partial side elevational and sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a section taken along the line 3—3 of FIG. 2;

FIG. 4 is a top plan view of the device;

FIG. 5 is a section taken on the line 5—5 of FIG. 3;

FIGS. 6*a* and 6*f* are schematic partial elevational and partial sectional views indicating the steps of folding the container with the machine and removing the same after it is sealed;

FIG. 7 is a plan view of a container blank which may be advantageously employed with the machine; and

FIG. 8 is a perspective view of the end closure of the container indicated in FIG. 7.

Referring to the drawings in particular, the invention embodied therein comprises a machine for facilitating the folding of a container from a blank of a type generally designated **10** as indicated in FIG. 7. As best indicated in FIG. 1, the machine includes an enclosed mounting base generally designated **12** which is advantageously oriented adjacent the mounting base **14** for a sealing tape dispenser schematically indicated at **16**. The machine is designed to be used for filling a container and thereafter sealing the container and is therefore usually employed in the shipping rooms of operating plants. The base **12** includes side walls **15**, **16** and end walls **18** and **20**.

In accordance with the invention, one of the side walls, the side wall **16**, is provided with a supporting bracket in the form of a channel member **22** at its upper end for supporting two longitudinally spaced cylindrical guide members **24** and **26** (see FIGS. 2 and 3). The cylindrical guide members **24** and **26** are supported on plate extensions **28** which extend outwardly from the bracket **22**. The cylinder members **24** and **26** form vertical guides for guide rod members **30** and **32** which are secured at their upper ends to a channel member or bottom wall supporting plate **34**.

A centrally located cylindrical actuating member **36** is pivotally mounted on a bracket **38** which is carried on a cross frame element **40**. The cylinder member **35** is provided with a slidable piston member having a rod portion **42** which is connected at its upper end to the bottom wall supporting plate **34**. A pressure fluid such as air is admitted to selected ends of the cylinder member **36** through one or the other of the connecting lines **44** or **46** in order to move the piston rod element **42** vertically and thus control the height of the bottom wall supporting plate **34**. In the embodiment illustrated, air supplied from an inlet air connection **48** which is connected to a suitable air pressure source (not shown) is directed through a supply conduit **50** to a foot-operated valve **52** which will be opened upon the depressing of a pedal **54** to cause air to flow through the conduit **46** to effect raising of the platform **34** and which will be lowered upon an upward movement of the pedal **54** to cause the pressure air to flow through the conduit **44**. The supporting plate in the embodiment shown may be raised to lift a sealed carton for overhead removal. In some instances the plate **34** is replaced by a moving conveyor to permit longitudinal withdrawal of the sealed container. In most instances when the plate **34** is fixed it is provided with rollers (not shown) to facilitate container removal either longitudinally or transversely. A spindle **37** as shown in FIG. 2 is provided for fine adjustment of the vertical position of the plate **34** to assure alignment of the folding apparatus.

As best indicated in FIG. 3, the fluid air control system includes a filter **53**, a pressure regulator **55**, a lubricator **56** and another regulator **58**. The function of these air pressure controls, filtering and lubricating devices are well known.

A feature of the invention is the provision of longitudinal guide members designated **60** and **62** each of which includes a flat base or bottom **64** which is respectively secured to a carrier nut **66** and **68** (see FIG. 5).

The carrier nuts **66** and **68** are carried on threaded spindle members **70** and **72** which are rotatably mounted in side walls **15** and **16** adjacent respective ends of said machine base. As best indicated in FIG. 2, the threaded spindle members **70** and **72** are connected together for simultaneous rotation in the same direction by means of sprocket wheels **74** and **76** and a chain **78**. Each of the spindle members **70** and **72** is provided with a threaded portion in one rotational direction extending outwardly from one side wall to the center of the device and an oppositely threaded portion extending from the center to the opposite wall. In this manner, the guide members **60** and **62** may be moved toward or away from each other by rotation of a hand wheel **80** which is connected to the threaded spindle member **70**.

A container blank which is to be folded as shown in dotted lines and indicated by the number **10** in FIGS. 1 and 6 to 8, is oriented over the tops of the guide members **60** and **62** and for this purpose the guide members each include a flat top wall **82**. In addition, the machine is provided with a container blank aligning means comprising a side aligning frame generally designated **84** which includes bottom members **84***a*, **84***a* which are slideable in a channel member **86** which is carried at the upper end of the base **12**. A tightening screw **88** (FIG. 5) is provided for anchoring the side aligning frame **84** in an adjusted position laterally in order to accommodate the particular size of blank being used. The upper portion of the frame includes a telescopic guide arm **90** having an end plate **92** against which the edge of the container blank **10** may be aligned. A set screw **94** is provided for securing the arm **90** in an adjusted position in accordance with the length of container which is to be employed.

Each of the guide members **60** and **62** includes oblique upper sidewall portions **96** for facilitating the infolding of the container blank **10** along score lines **10***a*, **10***a*. As indicated in FIGS. 3, 6*a* and 6*b*, when an operator or the weight of the contents in the container exerts a downward pressure on the blank **10** after it is first aligned over the top walls **82**, **82** and against the end plate **92**, the bottom B will be oriented over the bottom wall supporting plate **34** and the sidewalls C and D, together with their associated cover flaps E and F, will be oriented in a substantially vertical position as indicated in FIG. 6*b*. With the flaps oriented in this position, the box or container may be filled with merchandise either from the top or through each end of the blank had not been previously loaded with merchandise.

After the container is filled, the machine and/or the operator effects the closing of the top flaps E and F with the use of top flap closing means generally designated **98** which are carried by the longitudinal guide members **60** and **62**. The top flap closure means **98** include substantially rectangular plates **100** and **102** which are located at spaced longitudinal locations on each of the guide members **60** and **62**. The plates **100** and **102** are carried by brackets **104** which are secured at spaced locations along a cross rod **106** (FIGS. 1 and 3) which connects them together for simultaneous operation. A link member **108** (FIG. 1) is connected to one end of the rod **106** and is pivotally connected to the upper end of a reciprocating piston rod **110**. The piston rod **110** is reciprocable within a fluid cylinder **114** and will be moved upwardly and downwardly in accordance with whether pressure is admitted through pressure conduits **116** and **118** for the respective cylinders of each of the guide members **60** and **62**. The conduits **116** and **120** are supplied with air under pressure through a supply line **120** which is connected to a foot-operated valve **122**. The valve is supplied with air under pressure through the conduit **124** (FIG. 2). When the pedal **126** of the valve **122** is depressed, air will be admitted through the bottom of the cylinder **114** to cause the piston to move upwardly and to cause the rectangular walls **100** and **102** to move inwardly and downwardly against the cover flaps E and F to cause the folding thereof along fold lines **10***b*. The plates will exert downward holding pressure on the cover flaps E and F, as indicated in FIG. 6*c*, until a length of sealing tape **126** is withdrawn from the tape dispenser **16** by the operator and applied over the abutting ends of the top cover flaps E and F. Thereupon the pedal **54** is actuated to restore pedal **126** and the wall plates **100** and **102** returned to their original positions, as indicated in FIG. 6*e*.

Before the sealing tape **126** is applied, as indicated in FIG. 6*d*, it is usually advantageous to fold side flap elements G and H inwardly from the side walls and to fold cover closure flaps I and J downwardly from the top walls E and F as shown in FIG. 8. A bottom outer closure flap K is then folded upwardly from the bottom wall B, as indicated in FIG. 8, and the sealing tape **126** is advantageously extended around the ends of the container and over the outer flap K.

The invention thus provides a simple means for facilitating the filling of containers and the sealing thereof which may be carried out easily by one operator. The device is especially useful where a large number of orders must be shipped in the same container, in which case the machine may be set for the size container being used and the filling operation may be accomplished in a simple manner with the use of the machine.

In the preferred arrangement, the bottom supporting plate **34** is advantageously mounted on a nut member **30** which permits the lateral adjustment thereof along with the guide members **60** and **62**. The nut member **30** is engaged with the spindle **70**, advantageously with the same directional thread as with the guide member **60**, so that it will be transposed laterally in the same amount as the guide member **60** and thus will be substantially centered between the guide members **60** and **62** for all conditions of operation. The guide members **60** and **62** also include substantially vertical inner side walls **130** and **134** for facilitating the orientation of the side flaps C and D in a substantially vertical position during filling.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A device for facilitating the forming of container blanks into containers comprising a machine base, first and second parallel longitudinal guide members mounted on said base, means mounting said guide members permitting adjustment of the spacing therebetween, said guide members each including a substantially flat horizontal top wall for supporting a container blank thereon, oblique opposed side walls for deflecting the side walls of the blank inwardly from their associated bottom when the blank is moved downwardly between said oblique upper sidewalls and substantially vertical opposite lower side walls for orienting and maintaining the side walls of the container blank vertical when the blank is pushed therebetween, holding means carried by said guide members including a member mounted for pivotal movement outwardly and downwardly from each of said guide members to engage the cover flaps of the container blank and to move them to a substantially horizontal closing position for covering the container, said member holding said flaps in such position, and means connected to said member for effecting movement thereof.

2. A device according to claim **1**, including guide carried by said base and being adjustable for aligning the edge of a container blank on the top walls of said guide members.

3. A device according to claim **1**, including a bottom supporting plate disposed between said guide members and means for raising and lowering said supporting plate for raising and lowering the container blank thereon.

4. A device according to claim 3, wherein said means for raising and lowering said supporting plate includes a fluid cylinder pivotally mounted on said base, and a piston member connected to said bottom plate, and fluid means for shifting said piston member in said cylinder for displacing said bottom supporting plate vertically.

5. A device according to claim 1, wherein said means for moving said member includes fluid operating means for shifting said member into engagement with the top flap of said container.

6. A device according to claim 1, wherein said holding member includes a plate formed as portions of said oblique sidewall of said guide members.

7. A device according to claim 1, including a guide frame having an arm slidable inwardly and outwardly from said base or finger or button for aligning the edge of a container blank over the tops of said supporting member.

8. A device according to claim 1, including a threaded member rotatably mounted on said base, said guide members including a portion threadably engaged with said threaded member and being displaceable along said threaded member when said threaded member is rotated.

9. A device according to claim 7, wherein said threaded member is rotatably mounted across said frame, said guide members extending longitudinally along said base, a hand wheel connected to said threaded member to rotate said threaded member, said threaded member having different thread portions with different rotational directions thereon engaged with each respective supporting member for moving said supporting members upon rotation toward and away from each other.

10. A method of forming a container using longitudinal guide members having opposed oblique deflecting edges and substantially vertical aligning edges for the side walls of a container blank, comprising orienting the container blank above the guide members and then pressing the container blank downwardly between the guide members to cause the infolding of the sidewalls with the top cover flaps, filling the container with the material to be shipped, deflecting the cover walls downwardly to close the container and applying a sealing tape over the deflected cover walls.

11. A method according to claim 10, wherein said supporting members include means for holding the cover flaps downwardly after the container is filled and the further step of actuating the means for holding the container flaps downwardly to hold them in place while a sealing tape is applied thereto.

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BERNARD STICKNEY, *Primary Examiner.*