March 24, 1970 R. L. GEYER 3,501,895

CONTAINER LIDDING MACHINE

Filed March 14, 1967 5 Sheets-Sheet 1

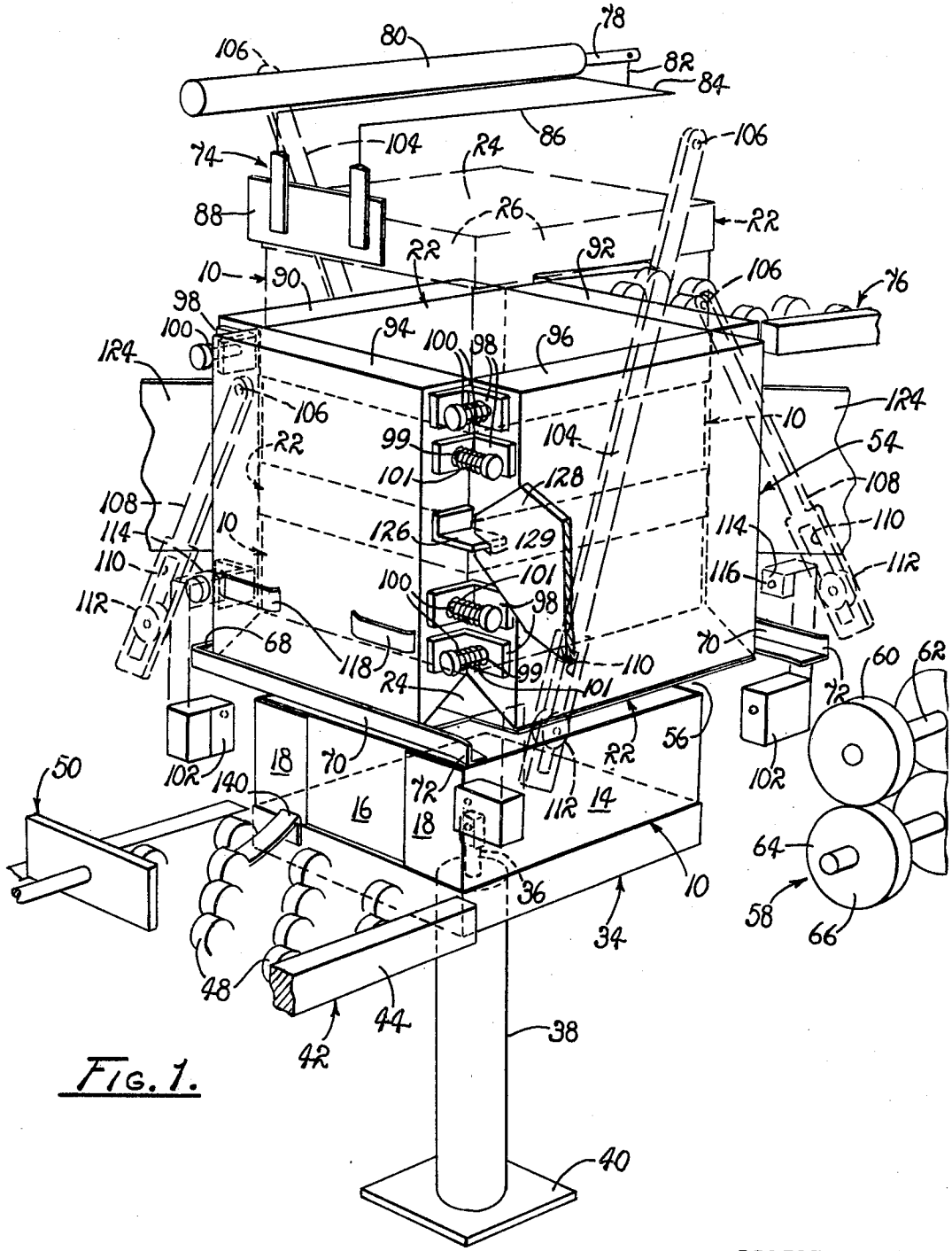


FIG. 1.

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CONTAINER LIDDING MACHINE

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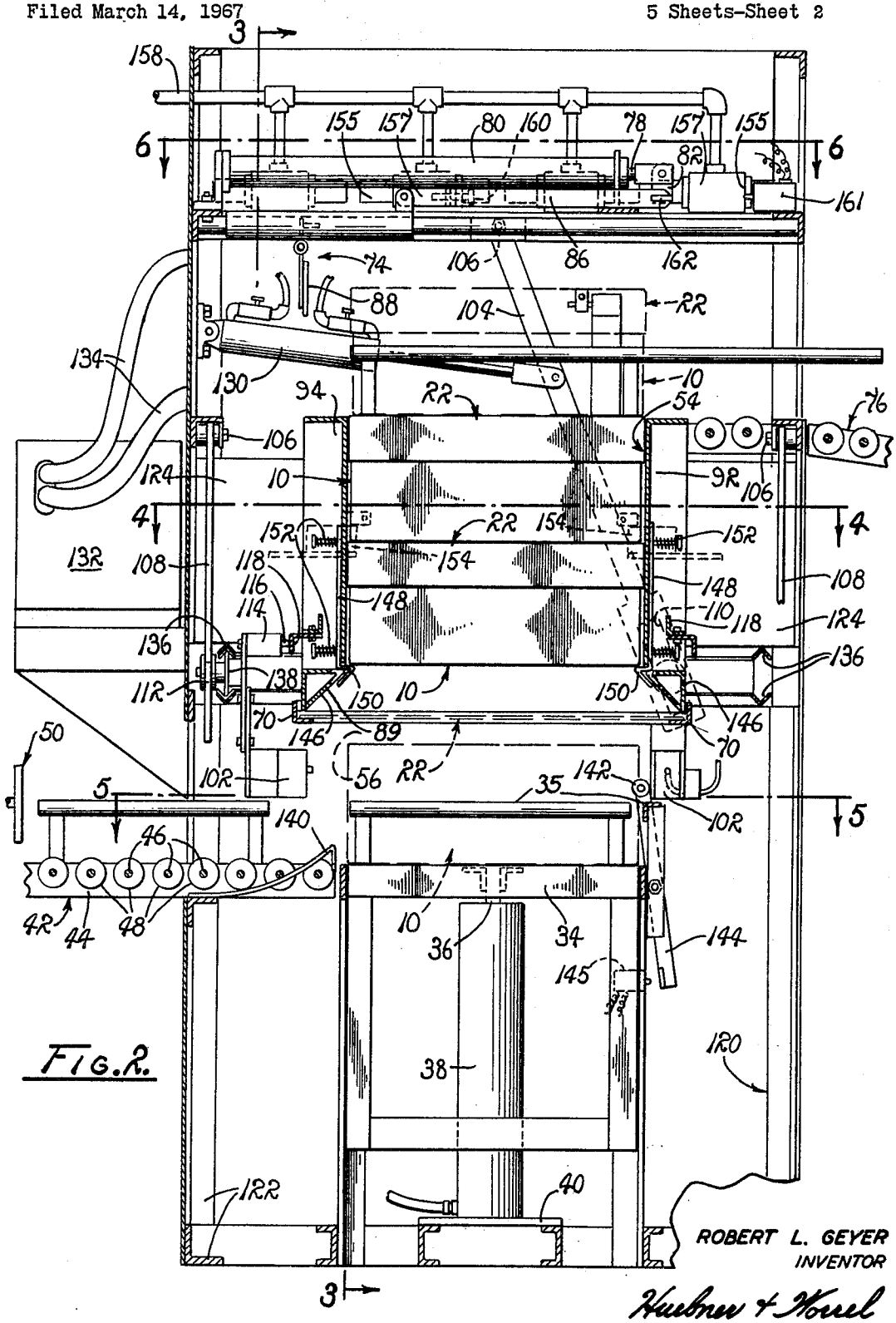


FIG. 2.

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March 24, 1970 R. L. GEYER 3,501,895

CONTAINER LIDDING MACHINE

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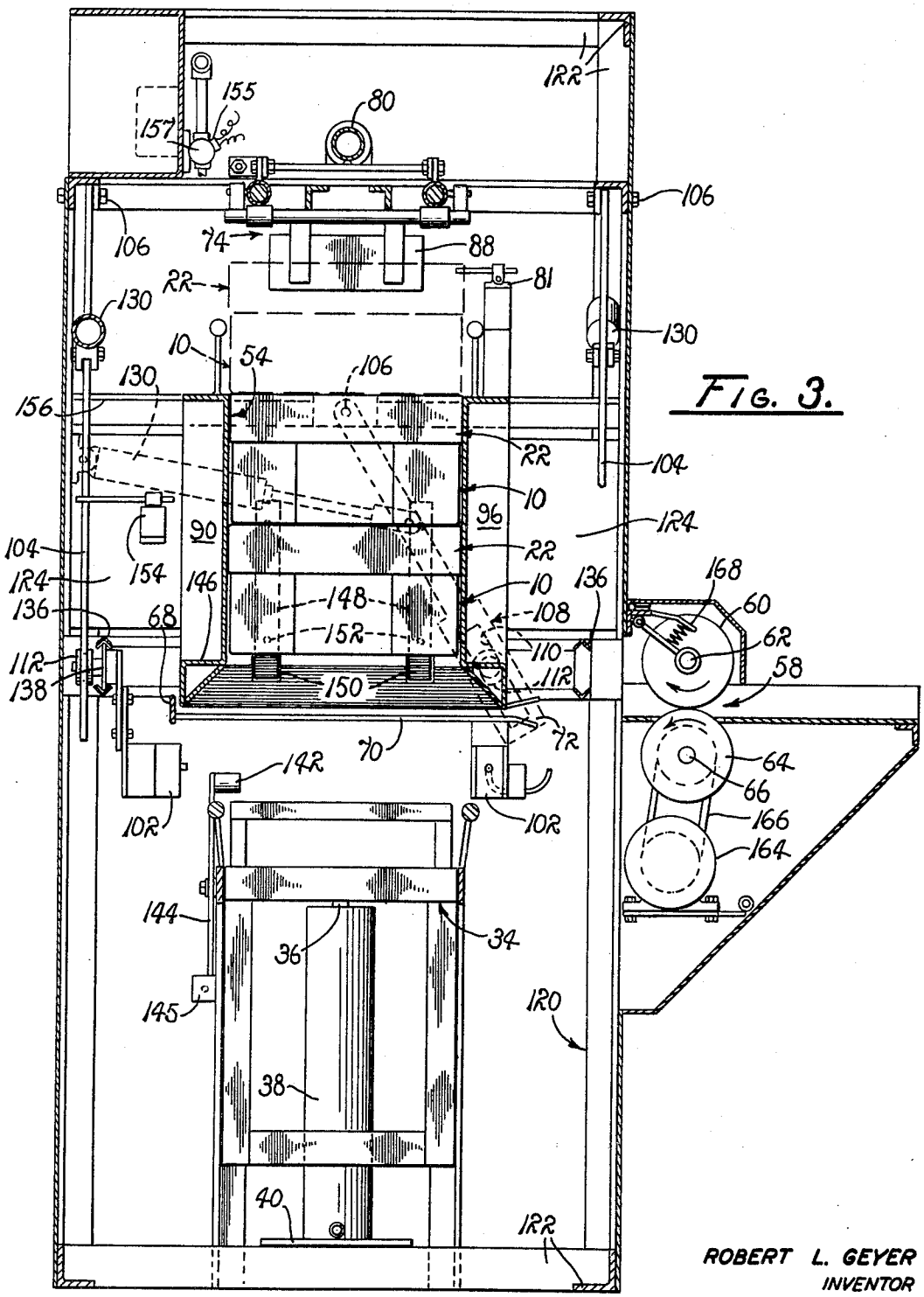


FIG. 3.

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March 24, 1970 R. L. GEYER 3,501,895

CONTAINER LIDDING MACHINE

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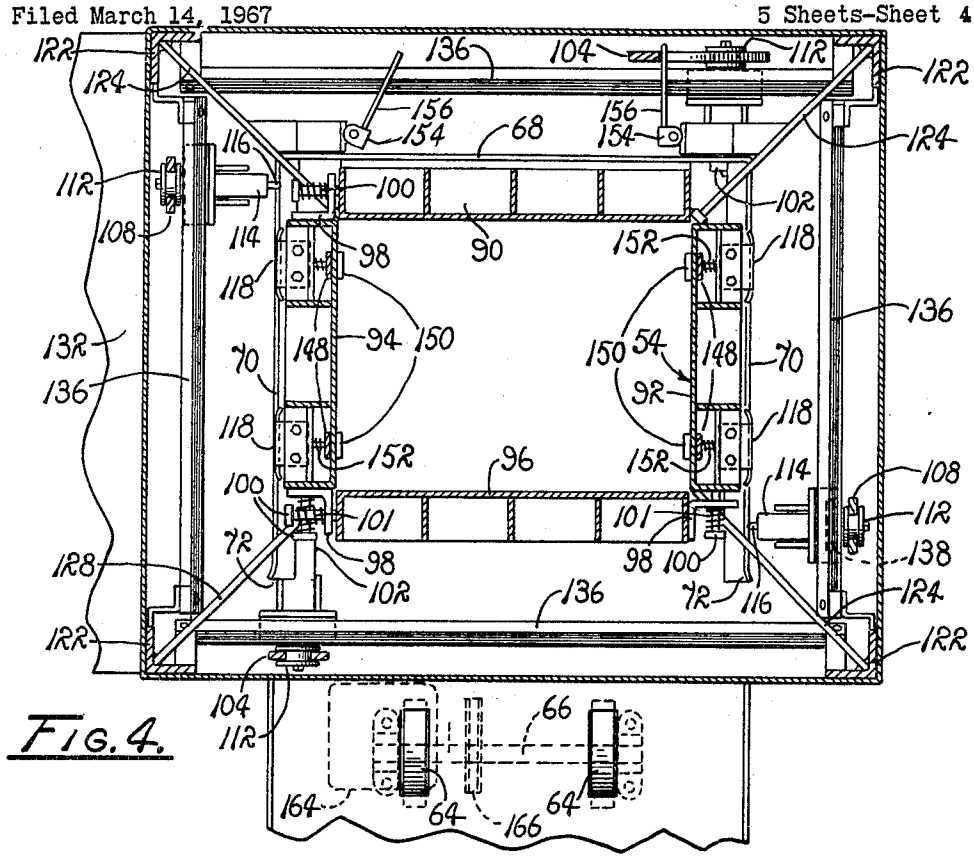


FIG. 4.

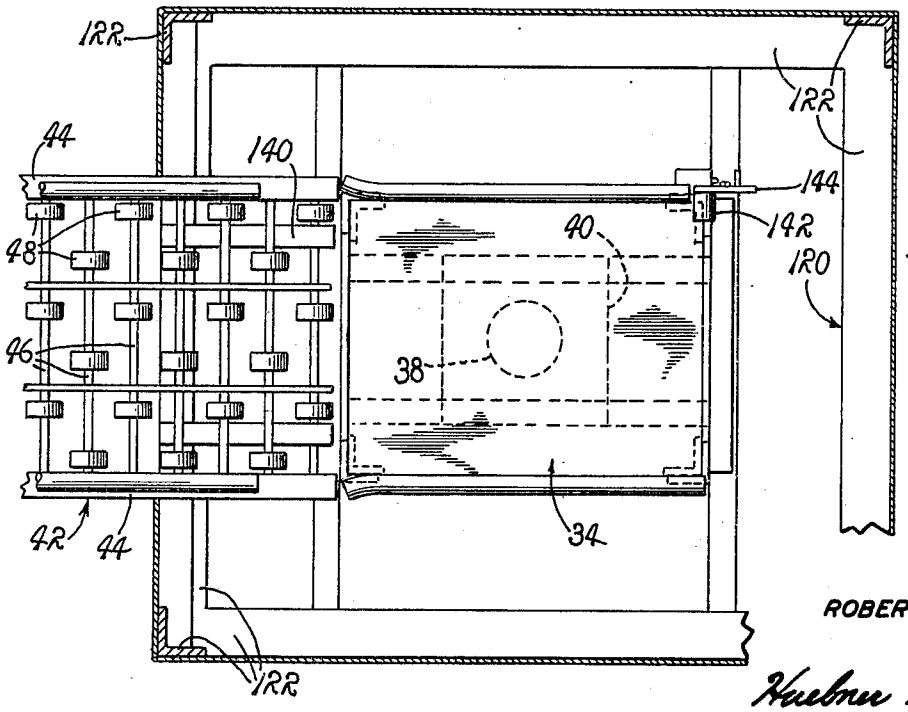


FIG. 5.

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March 24, 1970 R. L. GEYER 3,501,895

CONTAINER LIDDING MACHINE

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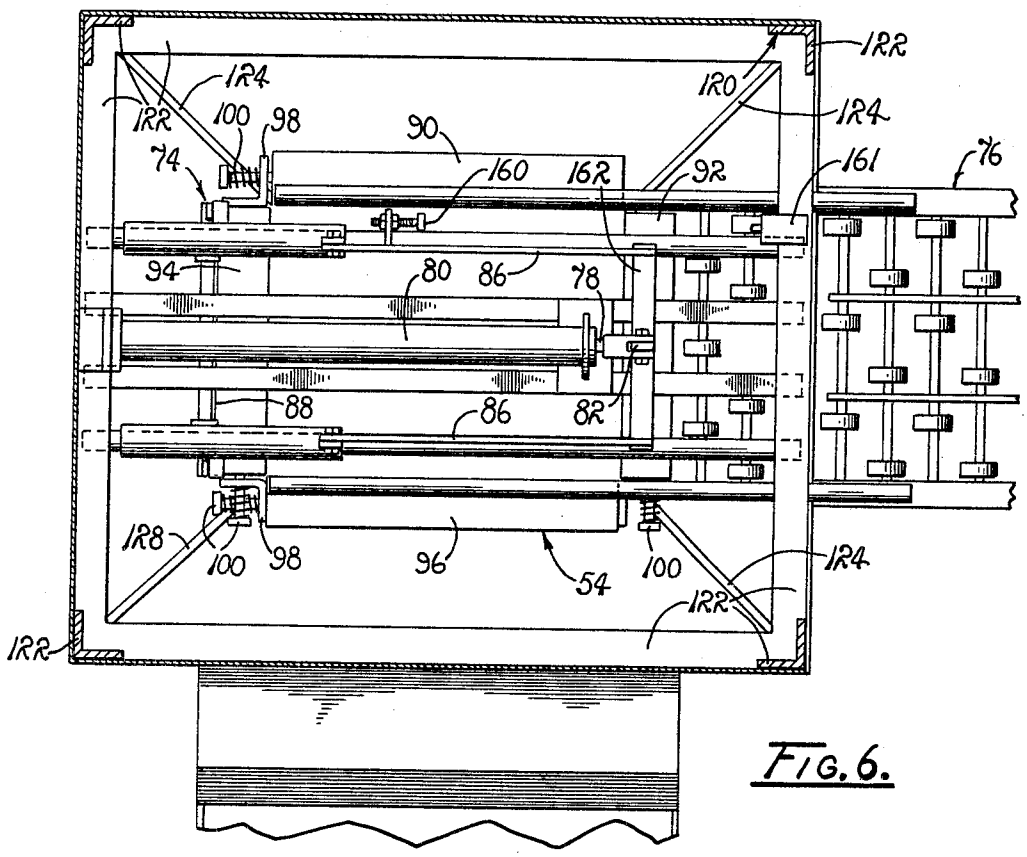


FIG. 6.

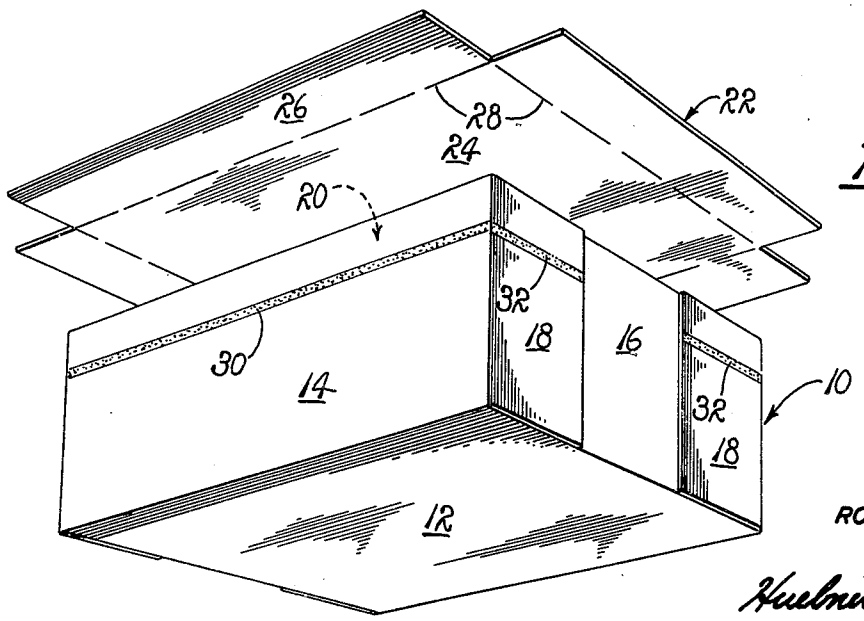


FIG. 7.

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United States Patent Office 3,501,895
Patented Mar. 24, 1970

3,501,895

CONTAINER LIDDING MACHINE

Robert L. Geyer, Merced, Calif., assignor to Foster Poultry Farms, a corporation of California

Filed Mar. 14, 1967, Ser. No. 623,108
Int. Cl. B65b 7/16, 51/02
U.S. Cl. 53—287 8 Claims

ABSTRACT OF THE DISCLOSURE

Container lidding machine for applying to and sealing lids on containers in a substantially continuous manner adapted to receive filled and open containers, position closing lids as blanks, in flattened condition, over open tops of the containers, to apply glue to the container sides, and subsequently to fold the lids in such manner as to form side folded flaps thereof and contact the flaps with their associated containers, and thereafter to hold the lids in position on the containers under compression until the glue hardens, by slidably inserting the containers in superimposing sequence into a vertical tunnel, the walls of the tunnel being adapted to permit slight inward and outward movement under adjustable compression, and upward passage therethrough of the superimposed containers after lids have been placed thereover and glue applied thereto, with the lids having portions engaged with the interior surfaces of the tunnel to insure maintaining the lids in place until the glue has set, so that upon discharge of the containers from the tunnel the lids are caused to be properly secured to the containers.

BACKGROUND OF THE INVENTION

The present invention broadly is applicable to the closing or lidding of open containers adapted for containment therein of produce or articles of any desired nature. In many industries, and especially in the food industry, there is a need for an automatically operable machine wherein a container lid can be placed over an open top of a container, and secured to the container with the lid being tightly engaged therewith and dependably secured thereto.

The present invention is especially applicable to the closing of carton-like containers containing therein freshly cleaned and eviscerated poultry, along with a subliming refrigerating medium, wherein it is desirable to close the carton in a substantially airtight manner while at the same time permitting a slight bleeding to atmosphere of pressurized gas resulting from a sublimation of the refrigerating material.

The containers to be lidded by the machine of the present invention is particularly adapted for and constitutes a substantially imperforate, moisture proof packaging and shipping container for poultry and the like, and incorporates means for creating and establishing a circulation therein of vaporized carbon dioxide generated by the sublimation of a solid carbon dioxide refrigerant material placed therein. A thus established differential in pressures within and without the container is utilized to permit a slow gradual egress of gaseous carbon dioxide to the atmosphere, to thereby minimize or prevent ingress of atmospheric air, which tends to contaminate, deteriorate, discolor, or otherwise render poultry or the like packaged in the container unsaleable, or otherwise undesirable to the purchasing public.

A container and process for packaging of articles, such as cleaned and eviscerated poultry, is disclosed in detail in my copending patent application, Ser. No. 595,531, filed Nov. 18, 1966, entitled "Container and Process for Packaging Poultry."

SUMMARY

In the mass butchering, picking, cleaning, eviscerating and marketing of fresh poultry, the prepared poultry is placed in a cardboard carton having an open top, downwardly over which a closure lid is adapted to be positioned and secured. It is of the utmost importance that the lid be tightly engaged with the box and dependably secured thereto. The machine of the present invention serves this purpose by applying glue to container sides, and thereafter folding the flaps of the closure lid into juxtaposed position against the sides of the containers, and then holding the folded flaps under compression in engagement with the container sides until the glue hardens, to provide a finalized sealed container.

In accomplishing purposes of the present invention a conveyor equipped with a container motivating apparatus delivers filled containers successively to a predetermined glue applying station, where the containers are each in turn disposed on a table mounted on a reciprocable pneumatic ram. Glue nozzles there are so disposed and operated as to apply glue in a predetermined pattern along upper edge portion of each side of the container. Four vertically disposed walls are provided and rectangularly arranged directly above this station to define a tunnel into which the filled containers slidably are fitted. Selective ones of the walls are mounted for slight inward and outward movement, and resiliently are urged inwardly by compression springs. Suitable means, being either automatically or manually operable, are provided for sliding closure lids in a flattened blank condition over the open upper end of each of the containers as it is seated on the table. The lids marginally overlap the respective containers to provide lid side flaps therefor engageable with the glue applied to the container upon downward depression thereof. The vertically disposed walls defining the tunnel have lower edges which are downwardly and outwardly flared or extended. When a lid is in proper juxtaposition to a container to which it is to be secured, the ram is extended upwardly to force the container and its associated lid upwardly into the tunnel to be tightly compressed between the tunnel walls. Upon initiation of such movement, the lower edges of the walls, which extend angularly outwardly, initiate a downward folding of the marginal edges of the lid over its respective container. The container subsequently is moved upwardly into the interior of the tunnel which, due to the constricting action of the walls, maintains the marginal edges of the lid in close contact with the sides of the container. A spring biased stop additionally is provided to prevent undesired downward movement of the lidded container under the influence of gravitational forces.

The extended ram is then retracted, with the container and its lid being maintained under frictional compression established between the walls in the tunnel and supported against lowering vertical movement therein. The ram having been retracted, is prepared to repeat its cycle of operation with a succeeding container and lid. Successive containers and lids are thereby loaded into the tunnel in vertically stacked compressive relation. The tunnel can be designed to have any desired vertical length to achieve a desired duration of compression thus to insure proper completion of the gluing action.

When the uppermost container in the tunnel reaches the upper open end thereof, it is ejected upwardly from the tunnel by the upward thrust of the next succeeding, vertically lower disposed container, which in turn is thrust upwardly by an insertion of a new container and its lid into the tunnel by the ram mechanism. The top or uppermost container, following ejection from the tunnel, is deposited by a pusher into a take-off conveyor by which the

container is transported to a suitable storage or transport mechanism.

Accordingly, it is an object of the instant invention to provide an improved machine for lidding and sealing filled containers of the type which receive a disassociated lid to be secured thereto.

It is another object to provide a new and novel machine for applying and sealing a closure lid to an open top container, utilizing side pressure means including spring pressed walls which initially serve to fold container lid closure flaps downwardly, and thereafter fold them into sealing engagement with the sides of the container and maintain them in sealing relationship until glue disposed therebetween has had time to set and harden.

Another object of the invention is to provide a machine for substantially automatically advancing filled open top containers onto vertical moving means, placing a closure lid in flattened condition over the top of the container, thereafter moving the container and lid upwardly into a four sided enclosing tunnel, which serves initially to fold downwardly marginal edges of the flattened lid against the exterior sides of the container to which glue has been applied and then move the so-lidded container upwardly through a confining tunnel with superimposed ones of the cartons maintaining a compressive force upon succeeding ones, and the spring pressed or biased walls of the tunnel holding an inward pressure, the result being a proper sealing of the lid on container. Another object is to provide a container lidding and sealing machine for sequentially receiving filled open top containers, applying glue to the container walls in a predetermined pattern, delivering a prescored lid to the container, folding the lid flaps into sealing engagement with the container walls and retaining the folded flaps in engagement with the container until the glue "sets," and then discharging the filled, lidded and sealed container therefrom.

Further advantages and objects of the present invention will be more readily apparent from the following detailed description of an embodiment thereof, when taken together with the accompanying drawings in which:

FIG. 1 is a schematic perspective view depicting certain operating components of the machine, and their association with one another;

FIG. 2 is an elevational view, partly in section, taken at right angles to the line of introduction of the containers to be lidded;

FIG. 3 is a sectional view generally taken on line 3—3 of FIG. 2;

FIG. 4 is a sectional view generally taken on line 4—4 of FIG. 2;

FIG. 5 is a sectional view generally taken on line 5—5 of FIG. 2;

FIG. 6 is a sectional view generally taken on line 6—6 of FIG. 2; and

FIG. 7 is an exploded unassembled perspective view of a container and a lid adapted to be placed thereon, and capable of being lidded and sealed by use of the present apparatus.

Referring now more specifically to the drawings, in FIG. 7 there is shown a type of container adapted for lidding and sealing with the apparatus of the present invention. The container is an open top container, generally designated **10**, which consists of a lateral bottom wall **12**, and vertically arranged side walls **14** and end walls **16**. The end walls **16** include overlying end flap portions **18** secured to the end walls **16**, by any convenient means. The container **10** also includes an open upper top **20** which is adapted for closure after produce, poultry or the like is placed therein. A lid generally designated **22**, FIG. 7, is introduced in a flattened condition, into the present machine for achieving a subsequent closure and sealing of the container. The lid has a central portion **24**, of a size commensurate with the open top **20** of the container **10**, and side flaps **26**, extending from the central portion **24**. Score lines **28** are formed between the central portion **24** and each of the side flaps **26** to facilitate a downward bending of the side flaps into the desired downward sealing engagement and arrangement with the vertical walls of the container.

Glue preferably is applied to the side walls **14** in a single strip, as shown at **30**, by appropriate means to be hereinafter described and preferably is in a continuous line therealong. Discontinuous glue strips **32** are applied on the overlying end portions **18** of end walls **16** by a skip gluing process since the overlying end portions are raised with respect to the central or main portion of the end walls **16**. These glue strips **30** and **32** are adapted for sealing engagement with the under surfaces of the side flaps **26** when the flaps have been bent or folded into downward engagement with the vertical walls of the container.

The general over-all construction of the present machine will be understood from an examination of FIG. 1 of the drawings. A table **34**, adapted to support and elevate filled containers **10**, is supported between container guide rails **35**, by means including a piston **36** operatively connected to the table adapted to be vertically displaced or extended by a hydraulic cylinder or ram mechanism **38**. The ram **38** appropriately is supported on a suitable base **40** of any desired configuration or construction. The upper surface of table **34** is flat and is adapted to be brought into alignment with the discharge end of a filled container conveyor, generally designated **42**. The conveyor **42** includes side rails **44**, which support therebetween a plurality of shafts or rods **46**, each of which mounts a plurality of rollers **48**. This conveyor mechanism can be either power driven, not shown, or arranged for a gravitationally conveying of erected and filled containers **10**. A convenient pusher mechanism, generally designated **50**, is positioned above the conveyor **42** and is adapted for engaging and pushing a container **10** from the conveyor onto the table **34**. This operation can be either automatically or manually controlled, as will be apparent to those skilled in the art.

A vertically disposed lid closure and lid sealing tunnel **54** is mounted above the table **34** in vertical alignment therewith. The tunnel **54** is vertically spaced from the table **34** to provide a slight clearance, indicated at **56**, between the tunnel and the top of the container **10** seated on the table. This spacing is to permit a lid aligning introduction of a prescored lid **22** between the top of the container **10** and the lower end of the tunnel **54**. A lid feeder, generally designated **58**, is operatively associated with the table. The feeder can be automatically or manually controlled and operated, as is found desirable. As shown in the drawings, the feeder **58** includes mated sets of upper rollers **60** mounted on shaft **62**, and lower rollers **64** mounted on shaft **66**. Preferably these rollers are continuously driven and when a container is arranged in place on the table **34** an operator causes a lid to be inserted between the sets of rollers so that it is impelled into a proper position over the container. A back stop **68** is aligned with the bite of the rollers **60**, **64** and serves to engage and properly position the impelled lid **22** in a pair of parallel side guides **70**. The guides **70** are provided between the container **10** and the tunnel **54** and operatively serve to support the lid **22** delivered thereto by the feeder **58** as the lid is engaged by the back stop **68**.

The side guides **70** thus constitute a support mechanism for a lid being inserted into the machine for placement and securement on the container. The side guides **70** also are provided with flared entrance portions, shown at **72**, which assist in guiding the lids into proper position over a container **10** to which it is to be affixed.

With the lid **22** supported between the guides **70** and an open container **10** having been received and being supported by the table **34**, the ram **38** is actuated for

forcing the container **10** "through" the lid **22** for causing the flaps **26** to engage the tunnel structure and be folded downwardly as the container is advanced into the tunnel for thus initiating a subsequent container-sealing passage therethrough.

After a container has been lidded, and the lid sealed during passage through the tunnel **70**, a laterally reciprocating ejector mechanism, generally designated **74**, FIG. 1, is utilized in order to move the container **10** onto a take-off conveyor **76**. The conveyor **76** is of any convient design and is employed to transfer the filled and lidded containers away from the tunnel **54** to a desired station and/or position for further disposition.

The ejector **74** consists generally of a reciprocating horizontally disposed and hydraulically operated ram **78** operatively associated with a hydraulic cylinder **80**. The ejector **74** is operated as to engage and eject a lidded container **10**. If desired, the ejector may be manually or electrically controlled sequentially and in a timed sequence with the operation of the machine, however, a limit switch **81** mounted on the machine and extended into the vertical path of the containers has been found to be a practical means for sensing the presence of a container in a position to be ejected. As illustrated, FIGS. 1 and 2, the ram **78** operatively is connected by a link **82** and a plate **84** to spaced arms **86**, or the like at the rearward end of which there is secured a vertically disposed ejector plate **88** adapted to be laterally displaced to engage a face of a lidded container, as the container operatively is associated therewith.

The plate **88** thus is caused to reciprocate and to eject and deliver the sealed containers **10** to the take-off conveyor **76**.

The tunnel **54** is provided with vertical walls, each including an outwardly flared and downwardly directed surface **89** so arranged as to receive and impose a lateral compressive force upon the side flaps of the lids for the containers to insure a "setting" or proper gluing thereof. to this end the tunnel **54** includes four side walls **90**, **92**, **94** and **96** relatively positioned to establish a selected cross sectional configuration, depending upon the specific shape and size of the container to be lidded. Two of the sides, designated at **90** and **92** are fixedly mounted, whereas sides **94** and **96** are resiliently mounted for displacement with respect to each other as well as the sides **90** and **92** by brackets **98** having associated therewith openings **99**, bolts **100** and helical compression springs **101**, FIG. 1.

The bolts **100** are slidably extended through openings **99** formed in the brackets **98** and are fixed at the extended ends thereof to the adjacent surfaces of the adjacent sides, with the compression springs **101** being concentrically disposed about the bolts and seated between the brackets and the bolt heads, so that the associated side, to which each of the brackets is fixed, is caused to be biased inwardly by the springs **101** acting between the bolt head of the associated bolt and the bracket **98**. As a practical matter, the openings **99**, FIG. 1, are enlarged sufficiently for accommodating the desired displacement of the adjacent side to which the bolt is secured.

The mechanisms for applying glue to the sides of the container **10** are broadly shown in FIG. 1 of the drawings, and includes traveling heads **102** which are arranged on all four sides of the container. The glue heads **102** are of a convenient construction adapted for translational movement and to spray a hot melt glue or the like along a desired portion or strip on the sides of the container **10** during the movement of the heads **102**. To achieve the movement of the glue heads **102**, they are mounted by means including a first pair of arms **104** pivotally coupled at opposite sides of the machine, by means including a pair of pivot pins **106**, and a second pair of shorter arms **108** pivotally mounted on the other two sides of the machine by another pair of pivot pins **106**. The shorter arms **108** provide suitable clearance in one translational direction for achieving ejection of a lidded and sealed container **10**, from the machine, as will be apparent from a study of FIG. 1 of the drawings. Each of the arms **104**, **108** are provided in proximity to their lower ends with slots **110**, within which are operatively associated grooved spools **112** or the like containing peripheral grooves for establishing and maintaining rolling engagement therein. Each of the spools **112** is operatively connected with a glue head **102** disposed in a driving relationship therewith. The purpose of the slots, in combination with the spools, is necessitated by the fixed pivot points of the arms **104** and **108** and the fact that while the arms move angularly relative to the adjacent container **10**, the glue heads are adapted to move rectilinearly.

On those sides of the containers **10** wherein the end walls **16** are provided with the overlying end flap portions **18**, and in order to insure the discontinuity of application of the glue strips **32**, there are provided intermediately operating glue switches **114**. Each switch **114** includes an actuating button **116** adapted for coacting with suitably mounted glue switch plates **118**. The glue switch plates are spaced toward opposite ends of the side plates **92** and **94** forming a portion of the tunnel **54**. The switches **114** are operatively mounted on the arms **108** employing any convenient means and are associated with but positioned above the glue heads **102**. Hence, the switches **114** move transversely along the surface or side of the container together with the associated glue head. When the buttons **116** contact the glue switch plates **118** they are so actuated, by depression thereof, as to activate the glue heads and thereby apply glue only to that portion of the container as might be desired for coaction with a lid, due to the specific configuration and construction of the sides of the container.

A frame **120** is supported in any desired manner and includes structural angle irons **122** or the like fixed at the corners, for rigidity and strength. Fixed sides **90** and **92** of the tunnel **54** are secured in position by means including a plurality of transverse plates **124**, welded or otherwise secured to tthe angle irons **122** and to the fixed sides **90** and **92**. A support angle iron **126**, FIG. 1, is secured to the side **94**. Mounted to extend inwardly from the frame **120** is a slotted plate **128** including a horizontally disposed open-ended slot **129** extending into receiving engagement with the support angle iron **126**. The plate **128** operatively is coupled in supporting relationship with the side **94** by receiving, for horizontal sliding displacement, the laterally extended portion of the support **126**.

Therefore, the sides **94** and **96** are vertically supported for horizontal displacement by the support **126** as it is slidingly received within the slot **129** of the plate **128**.

Each of the sets of arms **104** and **108** are operatively displaced by means including a pair of pivotally mounted double-acting ram units **130** connected thereto, FIG. 2, which can be actuated by any desirable source of energy, such as air under pressure for example, or through other suitable mechanism. The ram units are so operated as to displace the glue applying heads **102** only in a single direction during one period of movement, and when the next in-line container **10** has been positioned on the table **34** the glue heads **102** are displaced in a reverse direction so that only a single gluing pass is made by each head for each container. It is to be understood that a suitable glue container and heater **132**, of a convenient design, is appropriately fastened to the machine and includes the associated glue hoses **134** for directing hot glue to each of the gluing heads. The heads **102** are guidingly supported for rectilinear movement by pairs of vertically spaced angularly shaped guides **136** arranged in the nature of spaced track portions for receiving for reciprocal movement therebetween a glue carriage mechanism **138**, FIG. 2.

Each of the glue carriage mechanisms **138**, is formed to include a plate having vertically spaced bearing sur-

faces and is fitted in between and mated with the spaced guides in a slidable manner. The spools **112** are fixed to the carriage mechanism **138** in a manner such that the mechanism serves to support the grooved spools **112**, as they are movably mounted within the slots **110** in the arms **104** and **108**.

When a container **10** is to be inserted in the machine for lidding and sealing purposes, it is advanced over the rollers **48** and onto the table **34** by the pusher mechanism **50**. In being advanced, the container **10** passes over a spring retainer **140**, which is depressed by the container in its passage thereover. Thereafter the retainer will spring back to such a restraining position so as to restrain its container in the desired position seated on the ram actuated table **34**. When the container is moved into the appropriate position on the table, it will contact a roller or the like **142**, FIG. 2, mounted on a pivoted arm **144** and extended into the path of the filled container. The arm **144** is mounted to pivotally rotate and activate an associated electrical switch **145** mounted adjacent thereto. The switch **145** serves to sense the presence of a container and is connected, preferably in series with a manual starting switch and with a source of electrical energy and is operable to initiate a chain of events which leads to an elevation of the container **10**, which has been glued, and a lid applied thereto into the tunnel **54** for lidding and sealing purposes.

Since sidewise compressive forces against the container and lid may be insufficient to maintain the lidded container **10** in the tunnel **54**, means are provided to positively prevent downward movement or displacement of the container from the tunnel. Such means include openings formed in support braces **146** which can be in the form of channels or the like, and which are appropriately supported on the machine. Resilient arms or fingers **148**, having inwardly directed noses **150** thereon, are mounted to extend through the openings adjacent to the tunnel **54** and are spring biased inwardly by means of bolt and spring assemblies generally designated **152**. In operation, as a container passes upwardly into the tunnel the noses **150** on the arms **148** will be retracted, due to their resilient or spring biased mounting, to permit passage therebetween of the containers, and thereafter when the bottom of a container has passed thereover the noses will extend under the bottom of the container to provide a positive support therefor, and prevent gravitational forces from expelling or permitting containers from dropping below the bottom opening of the tunnel.

In addition to the aforementioned control circuit components, control means are included to specifically control movement of the glue heads **102** in one direction of movement only for each container **10**. Such means include limit switches **154** operatively connected with appropriate solenoid switches **155** connected into the gluing mechanism operating and control circuit. These switches are actuatable by pivotally mounted plates **156** fixed thereto, FIGS. 3 and 4, which also serve the purpose of establishing a reverse circuit for the glue heads when a next succeeding box is properly positioned in the apparatus.

Here again, circuits of this type are well known, therefore a detailed description of the circuit is omitted in the interest of brevity. However, it is to be understood that as the glue heads **102** are displaced, the plates **156** are alternately engaged and actuated for causing a control circuit to be completed to a ram selector control valve **157**, preparatory to reversing the direction of travel thereof, so that at the next energization of the circuit the ram **130** will serve to displace the heads **102** in reversed directions of travel. The selector valves **157** are of any suitable design and are connected with the input and output of the rams **130** so that when the selector valves are in a first position the ram is driven in a first direction and when the valve is switched to a second position, the ram operatively responds to be driven in a second direction. Such valves are well-known in the art, therefore, a detailed description thereof is omitted.

A source of air pressure, generally designated **158**, is interconnected with the individual rams **130** through the valve **157** for driving the rams **130** to thus cause the glue heads **102** to traverse across the sides or faces of a container **10** to be glued. Suitable switching means of a convenient design, not shown, are electrically connected with the limit switch **155** and serve to assist in the control of the pressurization of the source of air **158**, so that each actuation of the plate **156** is employed in the de-pressurization of the source of air **158**, which is again pressurized when the switch **145** subsequently is actuated.

Direction of travel for the ejector mechanism **74** is controlled by a head **160** adapted to operatively engage a limit switch **161**. The head **160** is mounted to be displaced by a traveling cross head **162** which couples the arms **86** of the ejector, as shown in FIGS. 2 and 6, connected with the ejector plate **88**.

The switch **161** is a microswitch which is closed through an engagement thereof with head **160** for initiating a reversing displacement of a suitable selector valve, not shown, for achieving a reversing displacement of the ram **78**.

The lid infeed mechanism **58**, consisting essentially of the rollers **60** and **64**, is actuated by an appropriately mounted motor **164** interconnected by a driving belt **166** to the lower rollers **64**. The upper rollers **60** are yieldably mounted by a spring mounting mechanism, generally designated **168**, as shown in greater detail in FIG. 3, and in conjunction with the driven rollers **64** serve as a follower mechanism acting with sufficient pressure to insure positive driving therethrough or therebetween of the lids **22**. Feeding of the lids to the bit of the rollers can be manually or automatically controlled, as found practical. Where desirable, the lid feeding operation is controlled by sensing the operation of the switch **145** as it detects the presence of a container **10** seated on the table **34** preparatory to receiving a lid thereover.

The purposes and operation of the present apparatus, effective to lid and properly seal such lids to containers will be apparent from the foregoing description, and a further detailed discussion thereof is not considered necessary herein. However, the operation of the machine is summarized as follows.

Assuming that the table **34** is seated in coplanar alignment with the conveyor **42** and that a filled but open container **10** is positioned on the conveyor and supported adjacent the table **34**, a selective displacement of the pusher **150** serves to advance the container across the supporting roller **48** onto the upper surface of the table. As the container thus is brought into the proper orientation with respect to the table **34**, and into vertical alignment with the tunnel **54**, the switch **145** is actuated in response to a pivoting displacement of the lever **144**, as the container comes to rest thereagainst as it is positioned by the guide rails **35**. In response to the actuation of the switch **145**, the motor **164** of the lid feeder **58** is actuated for causing a blank lid to be fed to the guides **70** while simultaneously therewith the rams **130** are caused to be activated through an actuation of the selector valves **157** and the pressurization control means for the source of air **158**. Activation of the rams **130** serve to cause the arms **104** and **108** to be pivoted about the pivot pins **106** for displacing the glue heads **102** and their associated control switches **114**. The heads are drivingly displaced along their respective rectilinear paths of travel adjacent the uppermost portion of the vertical walls **14** and **16** of the container seated on the table. As the buttons **116** of the switches **114** engage the glue switch plates **118**, the glue heads are activated for laterally discharging heated glue to the adjacent surfaces of the container. Since the switch plates **118** are interrupted at two opposing sides of the table **34**, the glue there applied appears to be applied as an interrupted strip, so that only the end flap portions **18** of the end walls **16** are provided with a glue strip. Completion of the glue application is sensed by the switches

154 as the arms 104 and 108 are displaced to their limits whereat the arms each engage plates 156 of the associated limit switches 154. The switches 154 cause the selector valve 157 to assume a suitable configuration for achieving a reversing direction of travel for the ram 130, in response to signals applied by the switches 154. Activation of the switches 154 therefore serves to interrupt the flow of air to the rams 130 and prepare them for reversed displacement when the next in-line filled carton is seated upon the upper surface of the table.

Upon a sensing of completion of the travel imposed upon the glue heads 102, by the switches 154, the control circuit causes the ram 36 to be operatively extended for elevating the table 34. As the table is elevated, a central portion of the lid 22 is seated over the open top of the container 10, as the container is elevated into engagement therewith. Continued elevation of the table causes the flaps 26 to engage surfaces 89 which cause the flaps to be down-folded into engagement with the glue strips 30 and 32 so that as the container is elevated into the tunnel 54, passed the spring biased stops 150, the flaps are positioned and held in place until the glue "sets" or harden during the carton's upward passage through the tunnel.

As the ram 36, and therefore the table 34, reach the upper limit of their respective upward displacement, the presence of a container 10, as it discharges from the tunnel 54, is sensed by the switch 81, whereupon the ram 36 is caused to reverse the direction of travel and the ram 78 is activated for horizontal displacement.

As the ram 78 is activated, the vertically disposed plate 88 is driven across the upper end of the tunnel 54. As the plate 88 is thus displaced, the uppermost container 10 is engaged thereby and laterally discharged onto the adjacent take-off conveyor 76. As the ram 78 reaches its extended most position, the switch 161 is actuated by an engagement therewith of the head 60, whereupon the direction of travel for the ram is reversed for effecting a retracting displacement of the plate preparatory to the advancement of another container from the upper end of the tunnel 54. The ram 36 has now retracted to its lowermost position and is prepared to receive the next in-line container 10 thereon, for causing the cycle to be repeated.

The specific circuitry employed in the machine is of any convenient design and may be varied as found desirable. Since the specific circuitry employed forms no part of the instant invention and may be varied as desired, a detailed description thereof has been omitted. However, it is to be understood that the plurality of switches 145, 154, and 81 serve as limit switches which function to sense the completion of each pase of the machine's operation and to initiate the next operative phase all in a convenient manner, well known to those skilled in the art.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred system and apparatus, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as the embrace any and all equivalent systems and apparatus.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A machine for serially lidding and sealing a plurality of open top containers comprising a tunnel including sides positioned to form a substantially vertical closure, at least one of said sides being yieldably mounted with respect to the others of said sides, means defining an outwardly flared surface extending laterally along the lower end portion of each of said sides, whereby said tunnel is provided with an outwardly flared lower end to facilitate movement of containers vertically upwardly into the tunnel, vertically movable means including a table for serially receiving containers thereon, means for inserting and positioning a flattened lid over the top of each container when said container is properly positioned in vertical alignment with said tunnel and received on said table, means operable upon a proper positioning of said container on said table for controlling operation of said lid inserting and positioning means, means including a movable gluing head positioned adjacent to each side of said table and operable in the presence of a container properly positioned on the table for applying a stripe of glue along each side of said container during a single unidirectional movement of said heads and including means for effecting a return glue applying movement and operation of said heads when a subsequent container is properly positioned on said table, operable means including a ram supporting said table, and a selectively operable fluid pressure system connected with said ram for effecting a selective vertical reciprocation of said table for thereby moving each of said containers into engagement with a flattened lid and to advance the container and the engaged lid vertically upwardly and through said tunnel, said flared lower ends of said sides being adapted to initiate a downward angular bending of the side edges of each of the flattened lids to facilitate juxtaposition thereof against the sides of a container, the dimensions of the tunnel being such as to complete folding of the side edges of the lids into intimate sealing engagement with the sides of said containers and to maintain a compressive force between the containers and the lids being moved therethrough.

2. A machine as claimed in claim 1, said vertical tunnel being adapted to movably contain a plurality of superimposed and successively injected containers with lids thereon, whereby a vertical compressive force is maintained on lids applied to succeeding ones of lidded containers inserted therein and moving therethrough to a top ejection station.

3. A machine as claimed in claim 1, at least two sides of said tunnel forming approximately one half thereof being yieldably mounted, with the other two sides being fixedly positioned, and spring controlled means connected to said yieldably mounted sides to permit yieldable movement thereof.

4. A machine as claimed in claim 1, including pivotally mounted arms substantially vertically positioned and operatively connected with each of said gluing heads, fluid operating means connected to said arms operable to pivot said arms in a single direction upon placement of each succeeding container on said table, guide tracks associated with said machine and operatively mounting said gluing heads in position on each side of said machine, said arms having rectilinearly extended openings therethrough in proximity to the lower ends of said arms, roller means operatively associated with said openings, and permitting angular pivotal movement of said arms while simultaneously restricting movement of said gluing heads along a predetermined straight path of traversal along a side of a said carton.

5. A machine as claimed in claim 4, including conveyor means for deposition of a said container onto said table, said conveyor means including a selectively operable pusher mechanism, and a spring-biased depressible lever, having a restraining nose thereon, downwardly movable upon passage of a container thereover, and subsequently being operable to assume a raised, nondepressed position, wherein said nose restrains retractive motion of a container placed upon said table.

6. A machine as claimed in claim 5, including a pivotally mounted arm at the rearward end of said table, with respect to the direction of movement thereonto of a container, said lever being pivotally mounted and adapted, upon engagement with an end thereof by a container being positioned on said table to be rotated thereby, switch means mounted in proximity to an end of the lever remote from the end contactable by a said container, said switch upon being contacted by said

lever, after rotation thereof, serving to activate an electrical circuit whereby a successive container can be placed upon said table, a lid inserted thereover, and said glue heads activated, with subsequent operation of said ram means to elevate said table and a container positioned thereon.

7. A machine as claimed in claim 6, resilient means connected to at least two opposed sides of said tunnel including angularly disposed nose portions, adapted to be resiliently retracted upon passage of a container and lid into said tunnel and thereafter to be resiliently repositioned whereby said nose portions engage the under surface of a container inserted in said tunnel to prevent gravitational discharge therefrom.

8. A machine for lidding and sealing open top containers, comprising a substantially rectangularly shaped vertical tunnel including side walls and having at least one yieldably mounted side wall, means for supporting a container and vertically moving said container upwardly into and through said tunnel, means for depositing a lid for and on the open top of a said container, means for applying glue to mating portions of said lid and the sides of said container, said side walls of said tunnel, upon vertical movement of said container and lid operatively associated therewith, applying side pressure to maintain a sealing and gluing relationship between the lid and container, said tunnel having a length sufficient to insure a proper setting time for the glue during passage of the container therethrough to securely seal the

lid with respect to the container, said means for supporting the container and vertically moving the container upwardly through said tunnel being operable to move successively upwardly a succession of containers having lids mounted thereon in compressive succession, one beneath the other, to maintain a top compressive pressure of a lid on the container, and means for removing an uppermost closed carton with lid sealed thereon ejected from the upper end of the tunnel, successively lower ones of said containers elevating said containers in said tunnels, thereby placing an uppermost one thereof in ejection position by pressure from a next succeeding vertically moving container in said tunnel.

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