July 4, 1961 J. F. FLYNN 2,990,934

MECHANISM FOR PAIRING CONTAINERS HAVING GABLED TOP ENCLOSED POURING SPOUT

Filed July 21, 1958 11 Sheets-Sheet 1

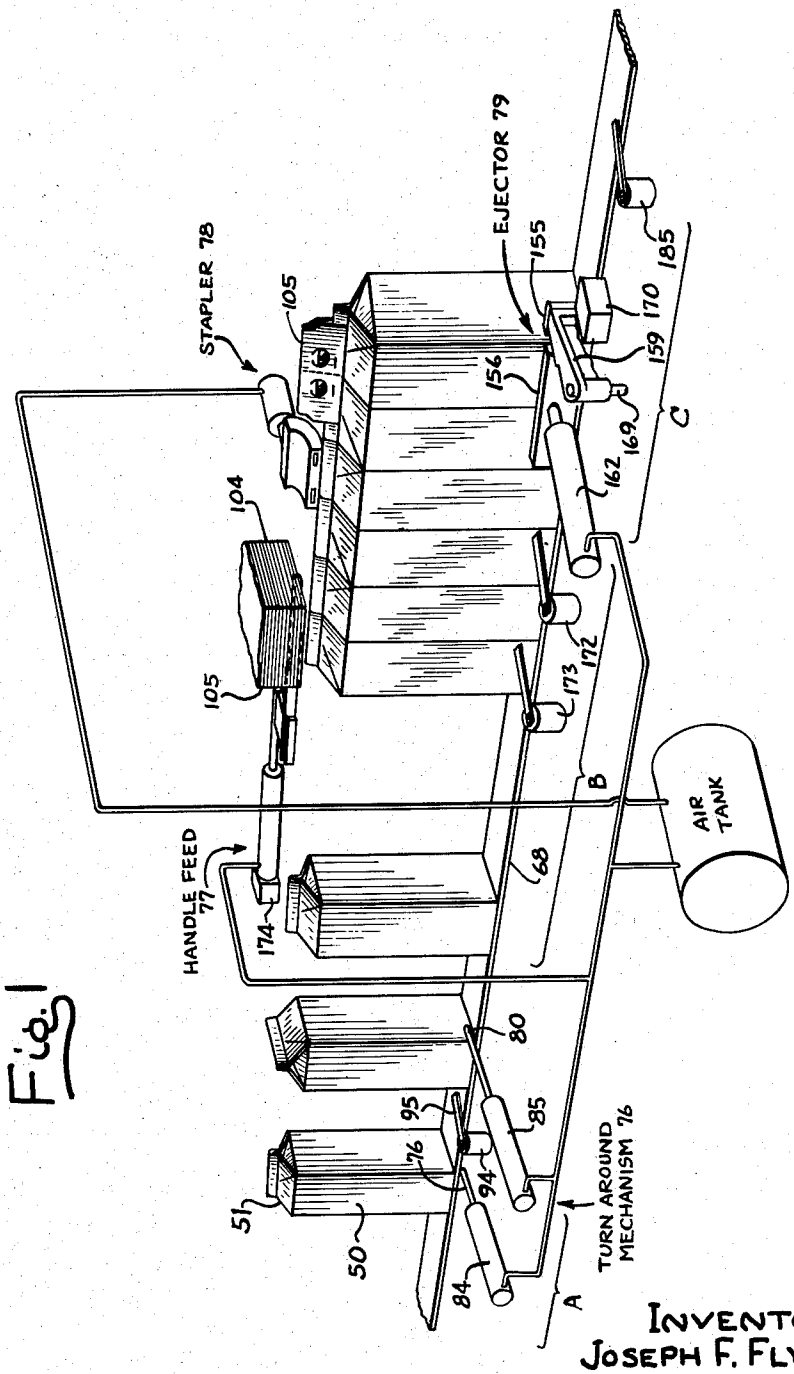


Fig. 1

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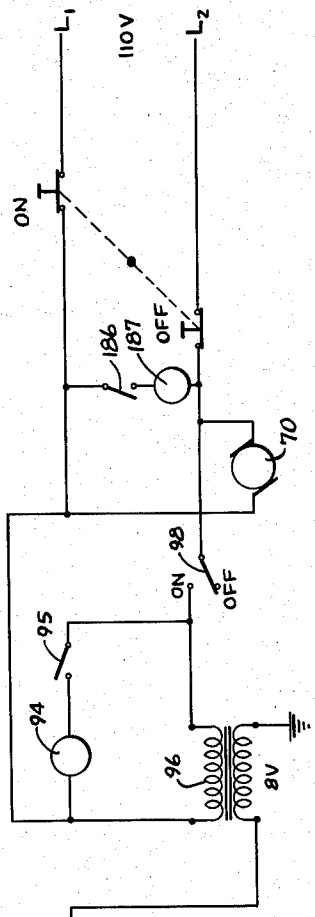


Fig. 1

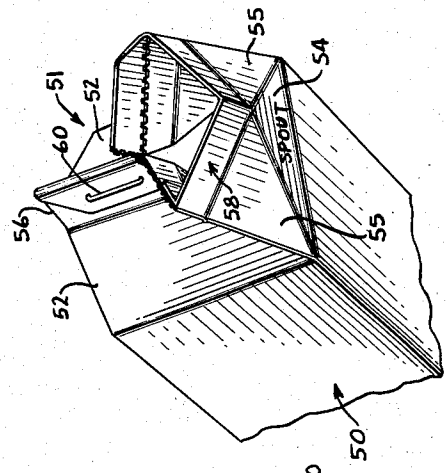


Fig. 3

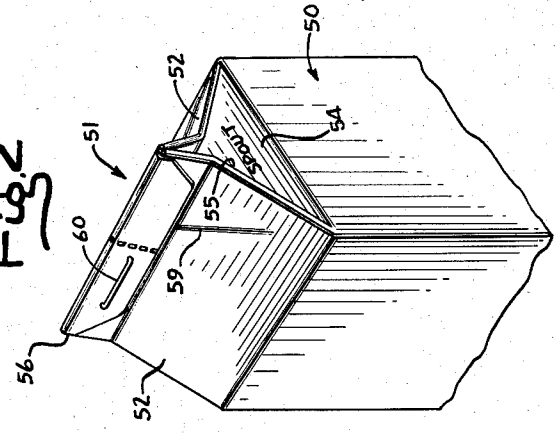


Fig. 2

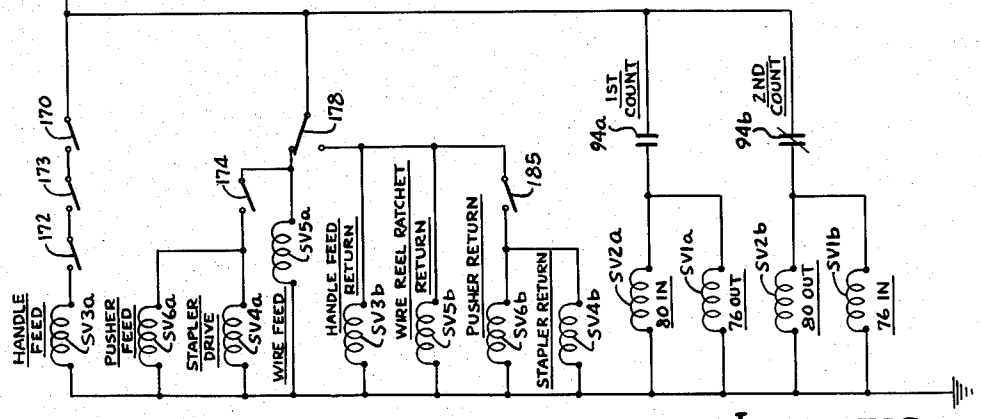


Fig. 5

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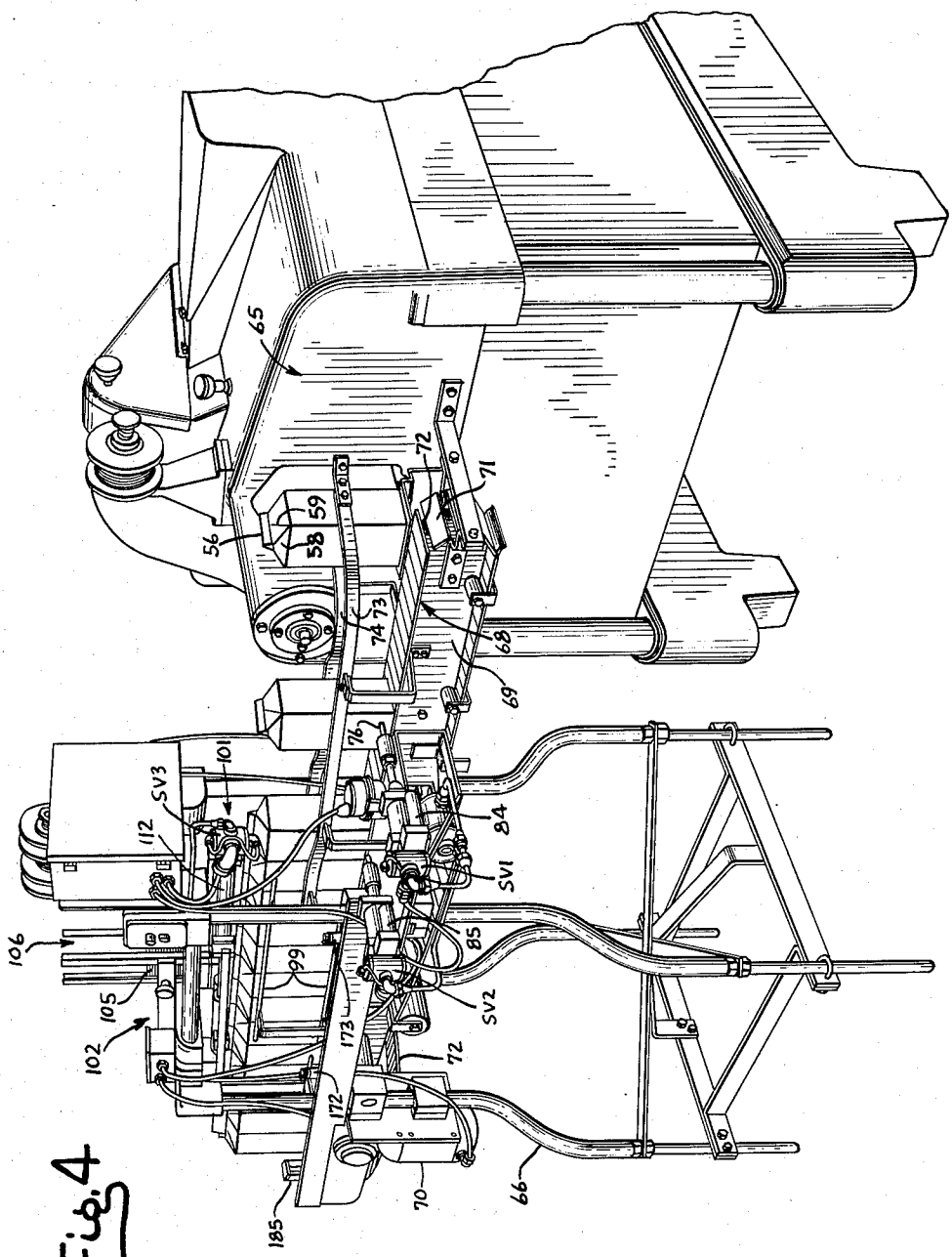


Fig. 4

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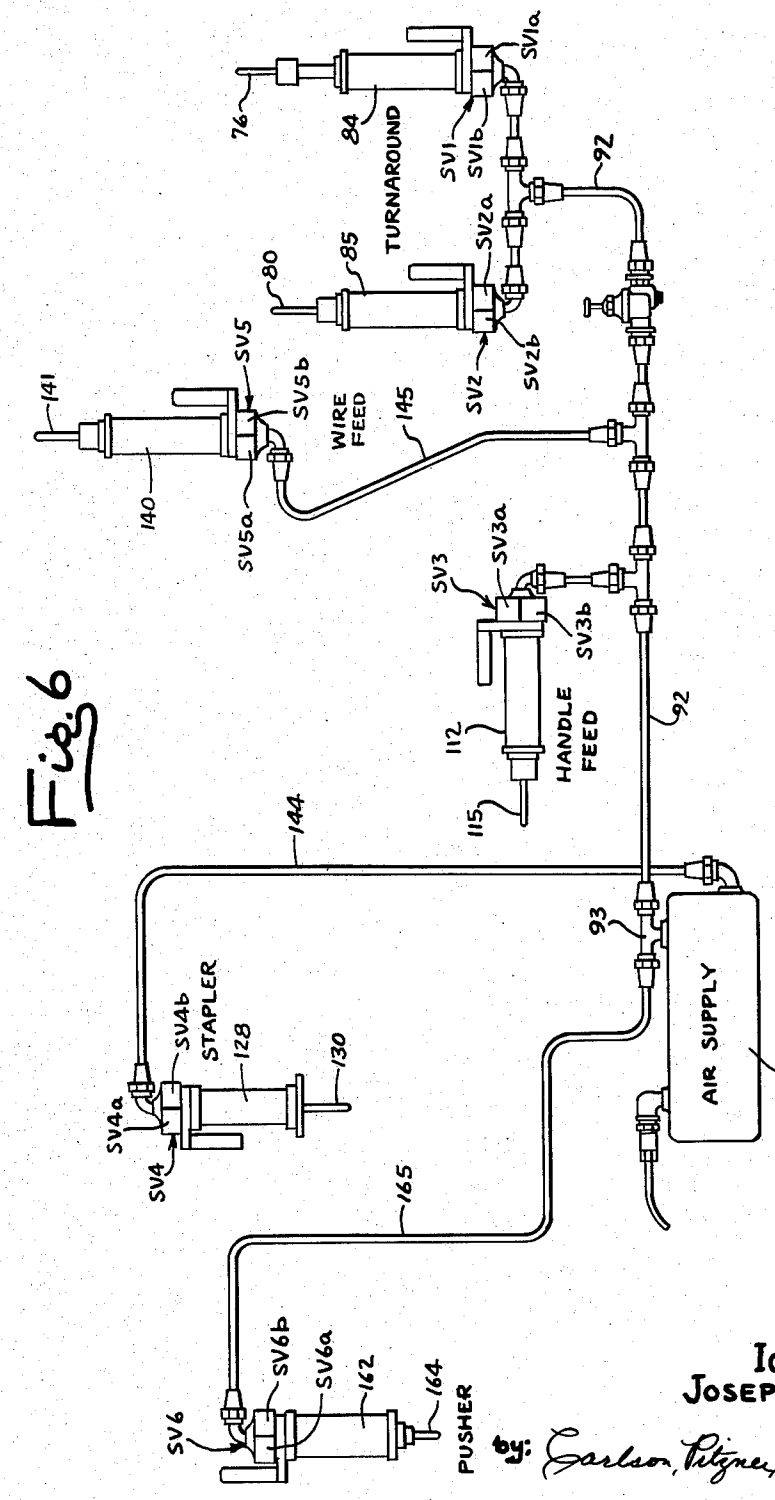


Fig. 6

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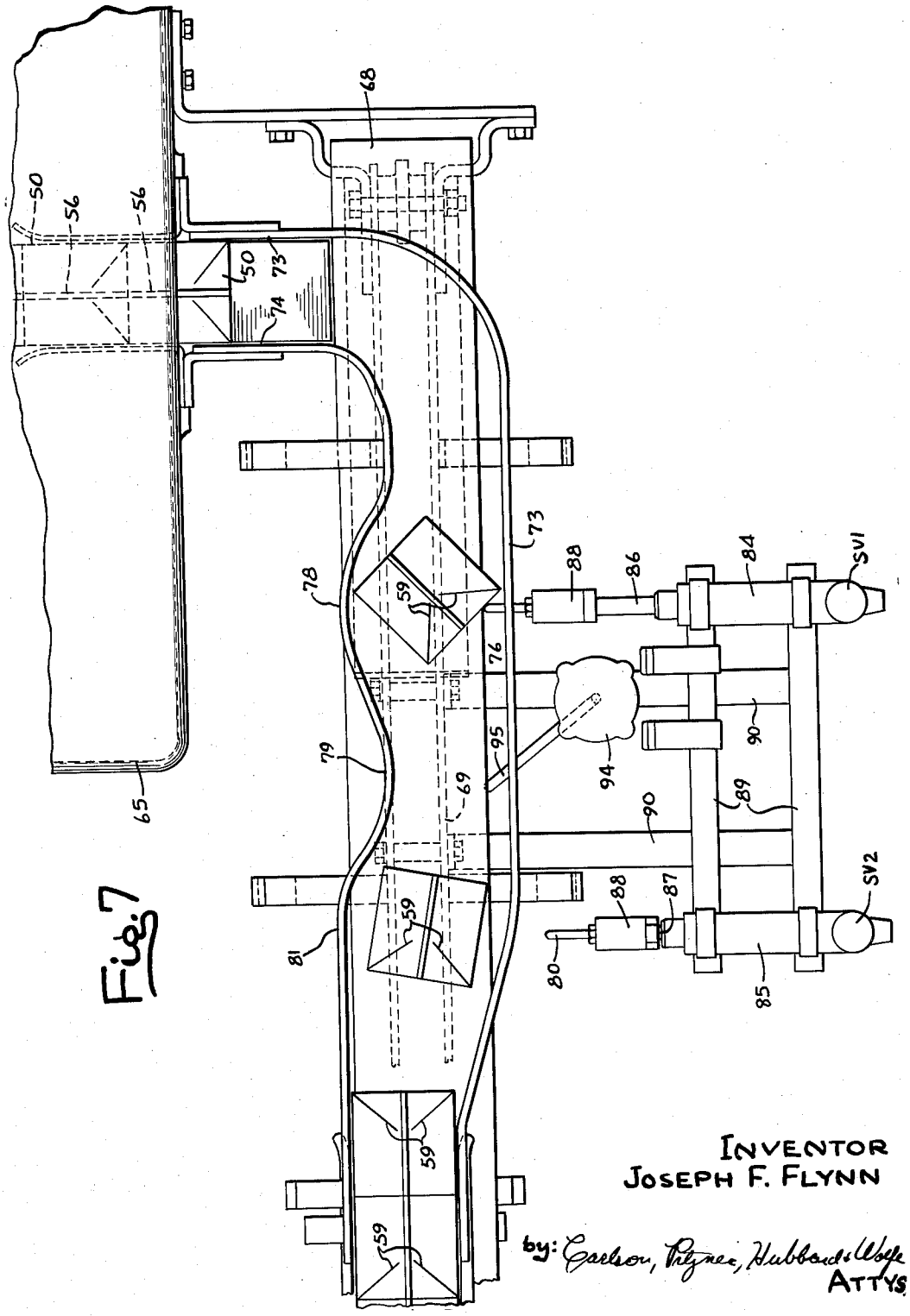


Fig. 7

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MECHANISM FOR PAIRING CONTAINERS HAVING GABLED TOP ENCLOSED POURING SPOUT

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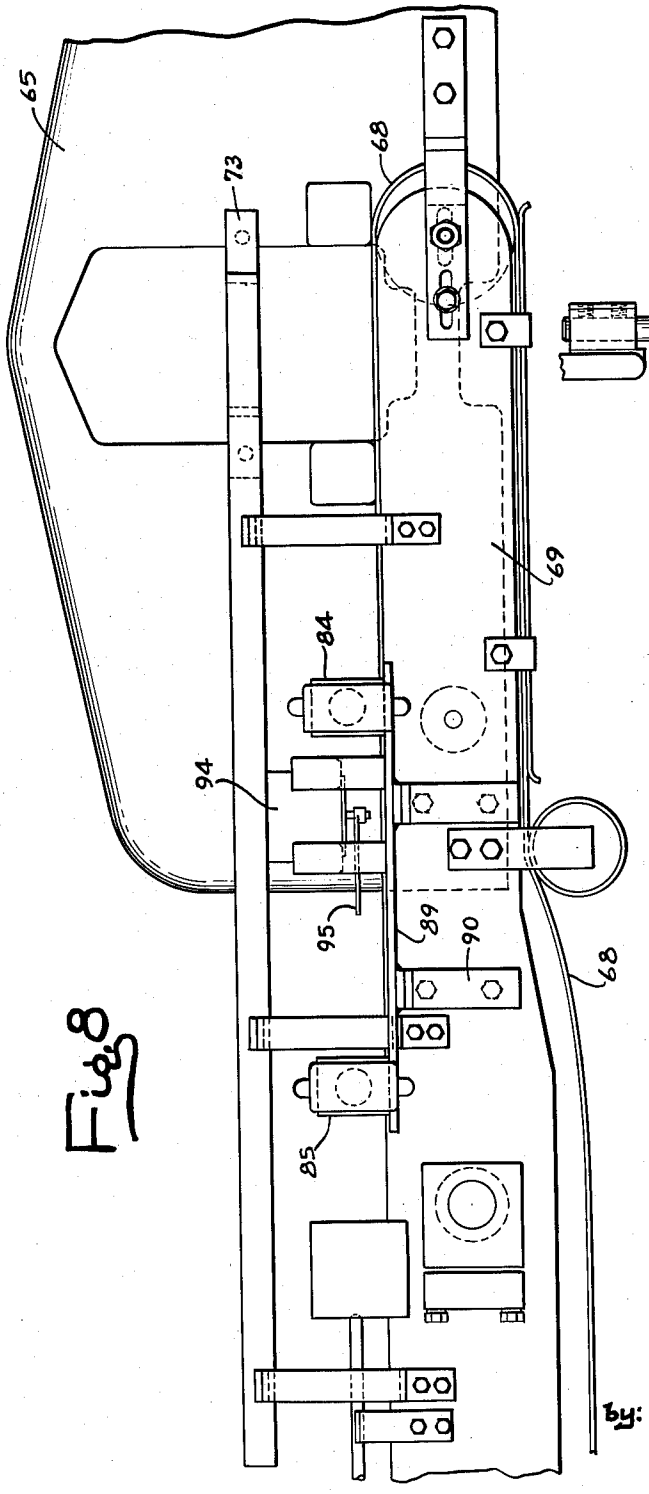


Fig. 8

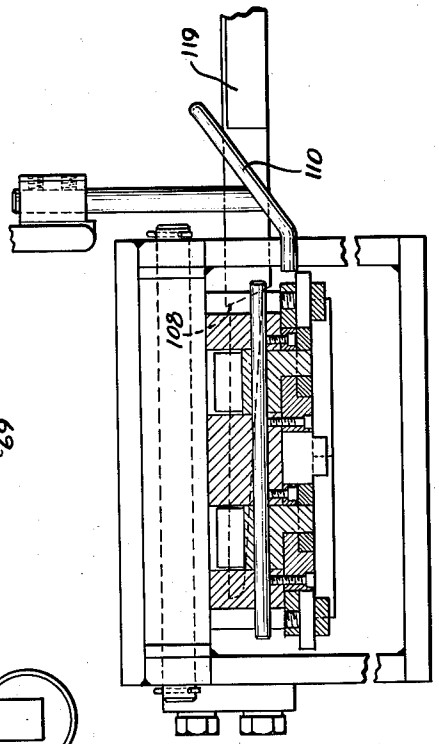


Fig. 10

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MECHANISM FOR PAIRING CONTAINERS HAVING GABLED TOP ENCLOSED POURING SPOUT

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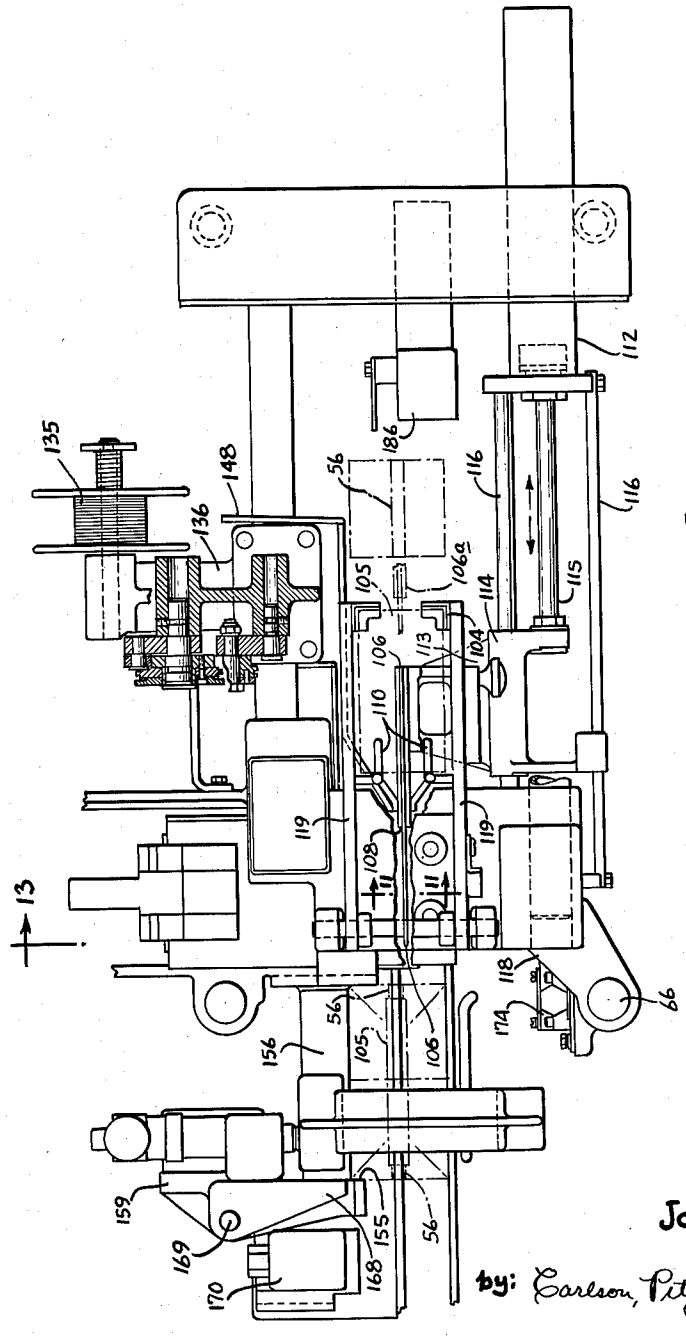


Fig. 9

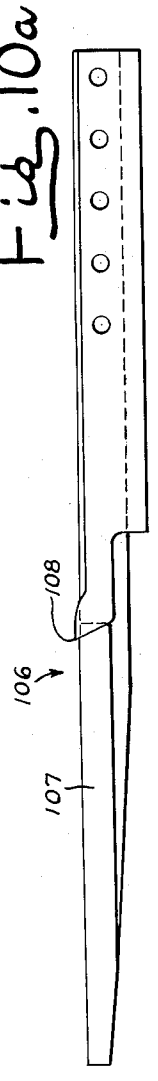


Fig. 10a

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Fig. 14

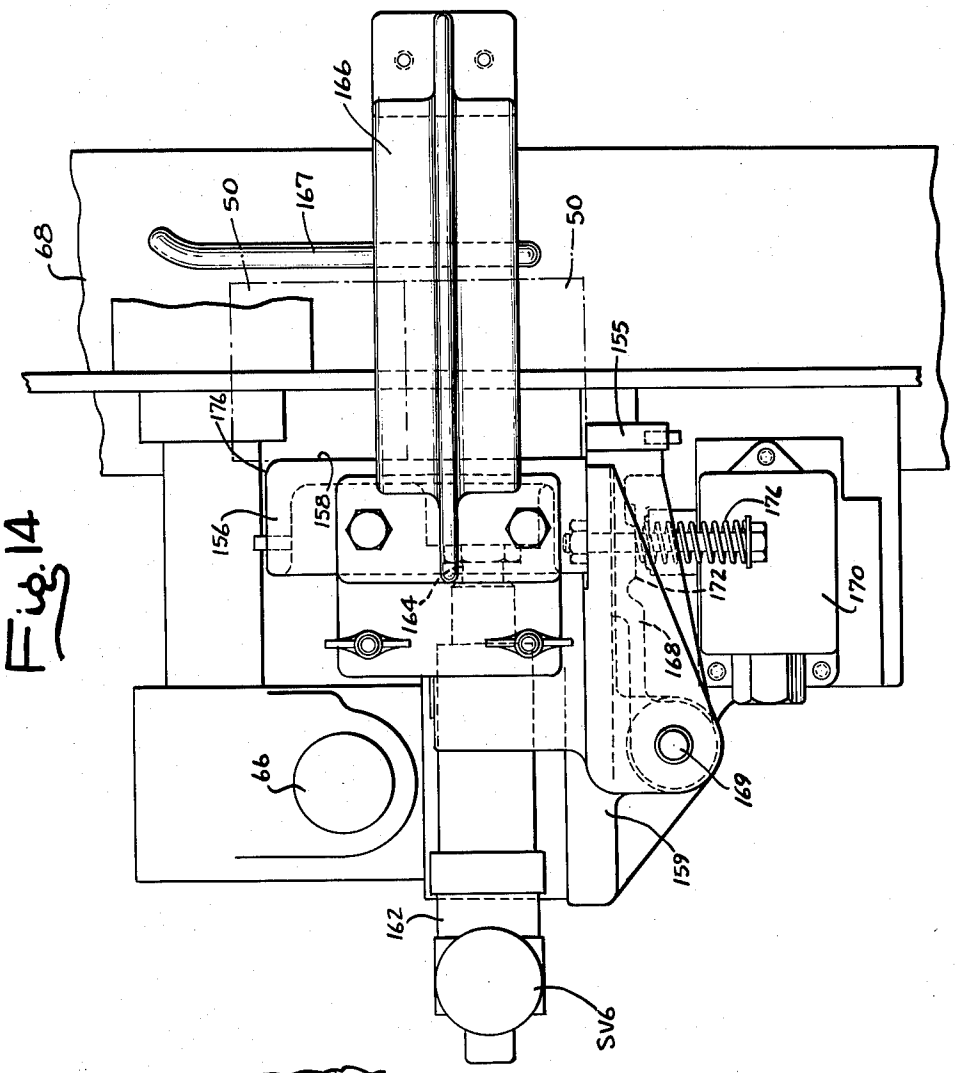
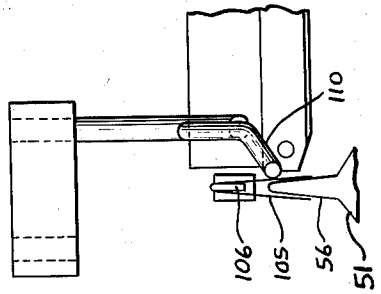


Fig. 11



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Fig. 13

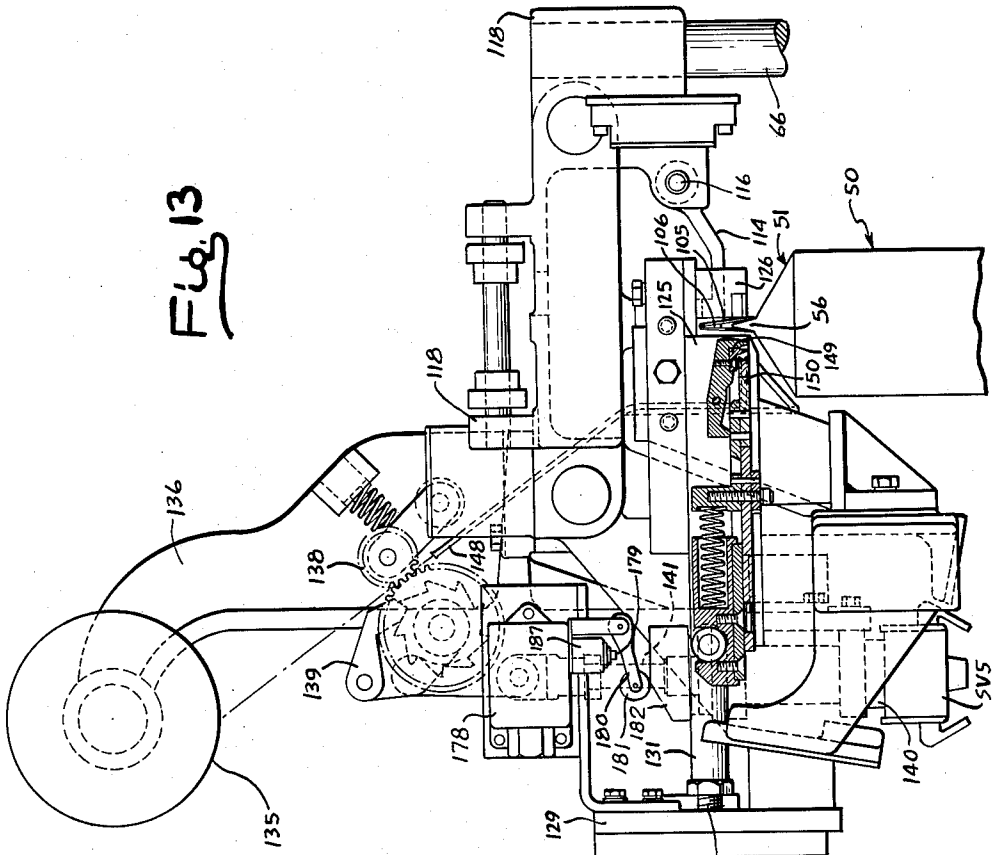
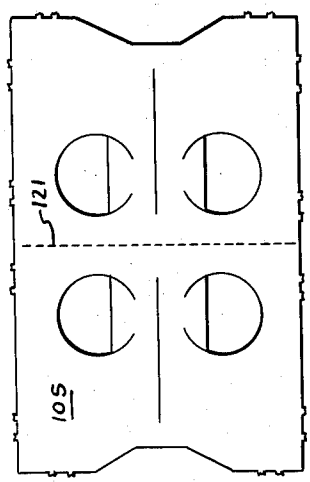


Fig. 12



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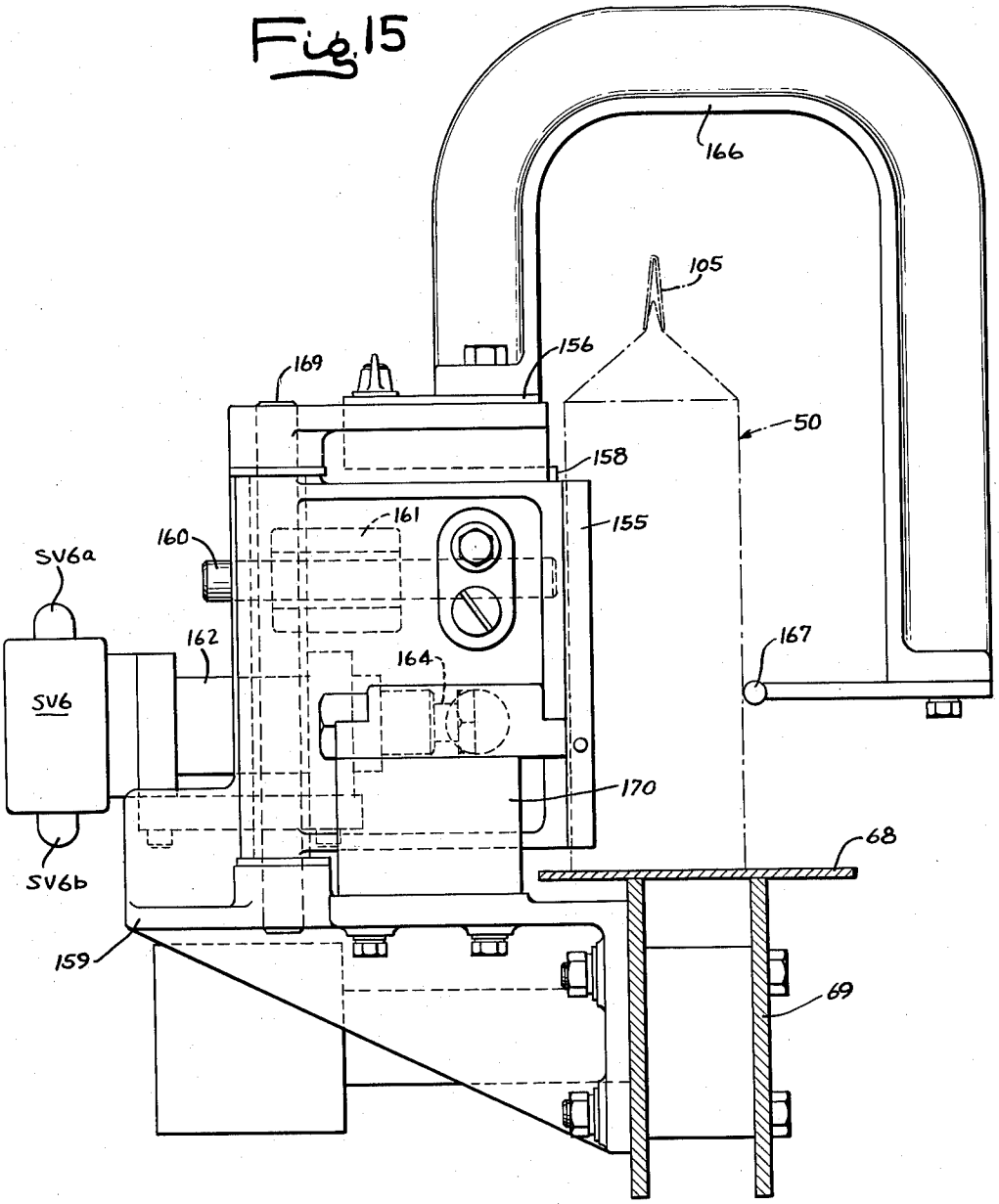
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MECHANISM FOR PAIRING CONTAINERS HAVING GABLED TOP ENCLOSED POURING SPOUT

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Fig. 15



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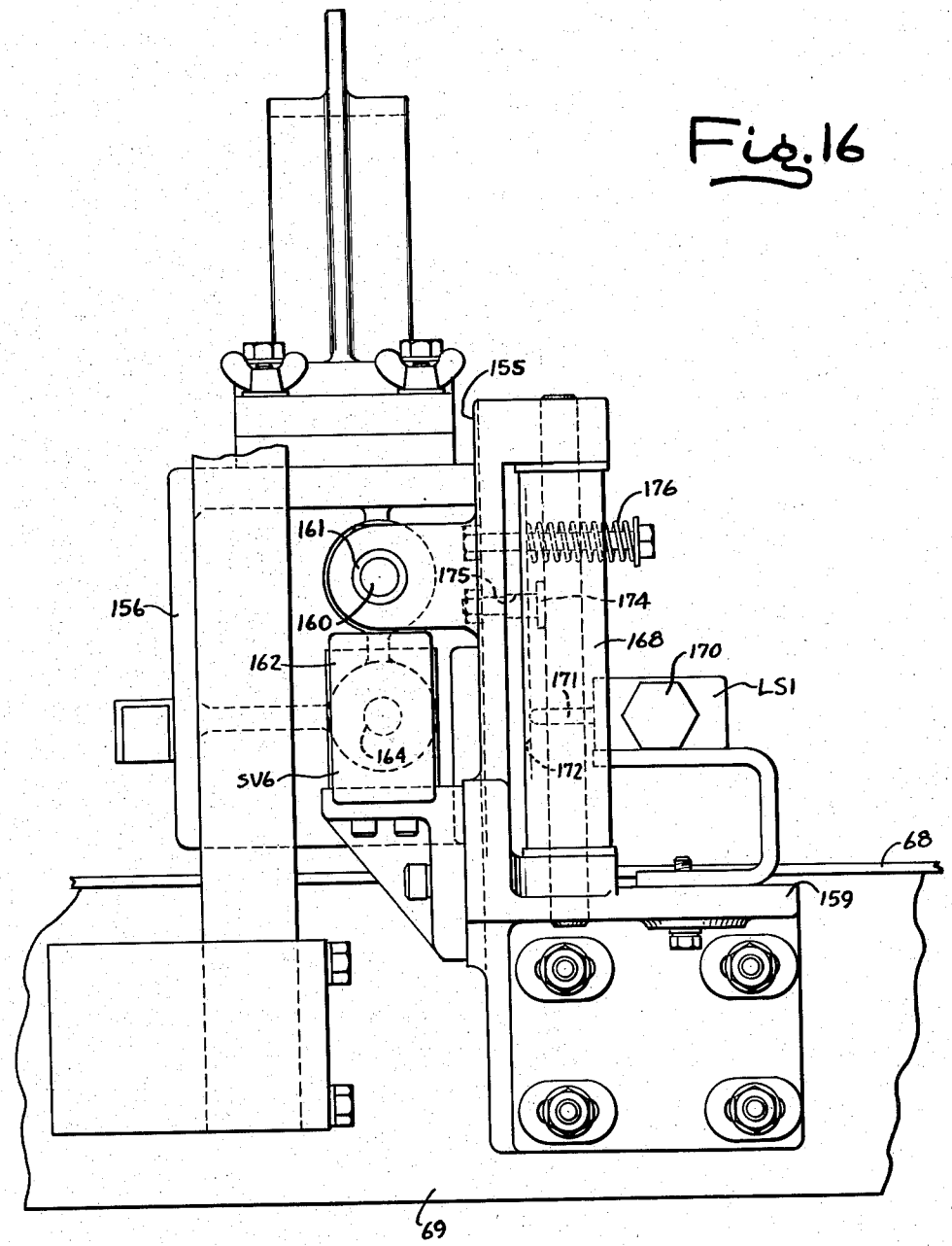
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July 4, 1961 J. F. FLYNN 2,990,934

MECHANISM FOR PAIRING CONTAINERS HAVING GABLED TOP ENCLOSED POURING SPOUT

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Fig. 16



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United States Patent Office 2,990,934 Patented July 4, 1961

2,990,934

MECHANISM FOR PAIRING CONTAINERS HAVING GABLED TOP ENCLOSED POURING SPOUT

Joseph F. Flynn, Detroit, Mich., assignor to Ex-Cell-O Corporation, Detroit, Mich., a corporation of Michigan

Filed July 21, 1958, Ser. No. 750,013
6 Claims. (Cl. 198—33)

The present invention relates to packaging machines for producing filled containers of the gabled top closure variety having enclosed within the gable top closure an extensible pouring spout. More particularly, the invention relates to a mechanism for joining filled and sealed paperboard containers of this type in pairs by attaching a handle to the gable top closure of two such containers alined back-to-back with the spouts facing outwardly.

The familiar gable topped paperboard container, now in widespread commercial use for milk and other dairy products, has an extensible pouring spout enclosed within the gabled top closure. This spout is readily accessible for use by merely folding the roof panels of the top back from one end and at the same time tearing the upstanding rib along its top fold line, and then snapping the spout forward to its extended position. The staple employed in the rib, to hold the container closed, is necessarily offset from the center of the gable top rib so as not to interfere with the spout. Previous forms of gable top style paperboard containers did not embody the extensible pouring spout but rather used a plug opening in one roof panel for dispensing the contents, and accordingly the staple was applied at the center of the top rib.

When the older type containers were paired and joined together by a handle, it was a simple matter to staple the handle directly to the upstanding rib of two adjacent containers as they emerged from the filling machine. With the advent of the extensible pouring spout type container, however, this method of attaching the handle was found to be impractical, primarily because the containers emerged from the filling machine with their spouts alined in one direction and consequently in attaching a handle to the pair the staple was driven through the spout of one of the containers. When this was done, the spout of that container could not be opened as desired and the container lost an attractive feature.

By turning alternate ones of the containers and pairing the alternated containers back-to-back with the spouts directed outwardly, the handles can be attached to the previously stapled portions of both containers of the pair without interfering with the usefulness of the spout. This turning and pairing operation has been carried out by hand and the handle attached by stapling to the previously stapled portions of both containers of the pair.

It is the primary object of the present invention to provide an improved mechanism which, in a rapid and efficient manner, reverses alternate containers of a procession of containers emerging from a filling machine, alines these containers in a column with the containers paired back-to-back the spouts facing outwardly, supplies and attaches a handle to the paired containers, and discharges the containers in pairs while reactivating the mechanism for a subsequent operation. More specifically, it is an object of the invention to provide a container pairing machine for use with gable topped containers of the extensible pouring spout variety which operates rapidly and positively to turn alternate containers through 180°, to position the containers in pairs back-to-back with their spouts facing outwardly and then to attach a handle to the back-to-back paired containers.

Another object of the present invention is to provide an apparatus of the foregoing character which performs the handle pairing and attaching operations in a minimum of space, which is simple and readily controlled, and which is easy to operate and keep clean in accordance with the sanitary conditions required to be maintained in the dairy.

A further object of the present invention is to provide a mechanism for discharging paired containers from the machine while maintaining the remaining oriented containers in position for receiving a handle.

Other objects and advantages will become apparent as the following description proceeds taken in connection with the accompanying drawings wherein:

FIGURE 1 is a schematic illustration of a container pairing machine illustrative of the present invention.

FIG. 2 is a container of the gable topped enclosed pouring spout variety for use in accordance with the present invention.

FIG. 3 is a perspective view of the container shown in FIG. 2 but with the spout extended.

FIG. 4 is a perspective view of a container orienting, pairing and handle attaching mechanism illustrative of the present invention.

FIG. 5 is an electric control circuit employed on the machine shown in FIG. 4.

FIG. 6 is a hydraulic circuit employed on the machine shown in FIG. 4.

FIG. 7 is an enlarged fragmentary plan view of the container orienting portion of the mechanism.

FIG. 8 is an elevation view of the mechanism shown in FIG. 7.

FIG. 9 is a plan view partially in section and with a portion cut away of the container pairing and handle attaching mechanism.

FIG. 10 is an enlarged fragmentary elevation view of the handle forming mechanism shown in FIG. 9.

FIG. 10*a* is an elevation view of the handle forming knife shown in FIG. 10.

FIG. 11 is an enlarged section view taken substantially in the plane of line **11**—**11** of FIG. 9.

FIG. 12 is a plan view of a handle of the type attached to a pair of containers by the illustrative mechanism.

FIG. 13 is an elevation view of a stapler mechanism taken substantially in the plane of line **13**—**13** of FIG. 9.

FIG. 14 is an enlarged plan view of an escapement and pusher mechanism.

FIG. 15 is an elevation view of the mechanism shown in FIG. 14.

FIG. 16 is an end view of the mechanism shown in FIG. 14.

While one illustrative mechanism for pairing gable topped containers and attaching a handle thereto has been shown in the drawings and will be described below in considerable detail, it should be understood that there is no intention to limit the invention to the specific form disclosed. On the contrary, the intension is to cover all modifications, alternative constructions, equivalents and uses falling within the spirit and scope of the invention as expressed in the appended claims.

Gable topped containers of the variety having an extensible pouring spout are shown in U.S. Patent 2,750,095, issued June 12, 1956 to C. R. Alden. While a brief description of these containers will suffice for present purposes, reference should be made to the Alden patent for a more detailed description of the character and structure of the containers. Such containers comprise (as shown in FIGS. 2 and 3) a rectangular tubular body portion **50** surmounted by a gable topped closure portion **51**. Forming the gable topped closure are a pair of opposed upwardly inclined roof panels **52** overlying the body **50**, a pair of inwardly inclined triangular end panels **54**, and inwardly folded triangular fold back panels **55** connecting the roof panels and triangular end panels **52** and **54**. The closure panels are surmounted by

rib panels which, in the folded and closed container, define an upstanding rib **56**. An extensible, sanitarily protected pouring spout **58** of pitcher-like form is incorporated into the top closure of the container and rendered accessible by partial disassembly of the central rib **56**. The spout itself is formed by the triangular end panels **54** and **55** and surmounting rib panels, and is opened by gripping the fold-back triangular panels **55** and pulling them outwardly to tear the rib along a perforation. At the same time, a portion of the inclined roof panels **52** is folded back along an inclined score line **59**. By reason of their inherent stiffness, the panels forming the spout cause the spout to snap outwardly as the triangular panels are bent back to a position as shown in FIG. 3.

It will be seen from FIG. 2 that the gable topped closure is held together by a staple **60** extending through the central laminar rib **56**. It will also be noted that this stable is off-set from the center of the rib so that it does not interfere with the opening of the spout. If a handle were to be attached by stapling to the spout portion of the rib, it can be easily seen that the spout could be opened only with difficulty and to do so would most likely tear the container and destroy the usefulness of the pouring spout.

The gable topped containers are filled with milk or other desired product in a machine of a known commercial type, illustrated generally at **65**, and emerge from that machine as a continuous procession of filled, closed and sealed containers. As the containers emerge from the filling machine **65** they are alined with their spouts directed forwardly and with the upstanding central laminar rib **56** extending longitudinally of the direction of movement of the procession (FIG. 4). If the containers are of the type which do not include spouts, it is a simple matter to attach a handle to pairs of containers by merely stapling the handle to the central laminar rib. The mechanism hereinafter to be described for stapling a handle can, of course, be used to advantage for this purpose. However, when the containers are of the type with extensible pouring spouts, alternate ones of the containers in the procession must be rotated through 180° so that the containers are oriented back-to-back with the spouts facing outwardly before the handles are attached.

The mechanism illustrative of the present invention for orienting the containers, pairing them and attaching a handle, as shown in FIG. 4, is organized on a frame **66** which carries a continuously moving endless belt type conveyor **68** for supporting the containers and carrying them through the various handle attaching stages. The conveyor **68** is supported on the frame in the usual manner by means of an appropriate conveyor frame **69** and is driven by an electric motor **70** or, alternatively, by a power-take-off from the filling machine **65**. The conveyor is preferably of the type formed with a plurality of narrow plates **71** fixed to a chain **72** so that a smooth, flat surface is provided at all times for supporting the containers. A further feature which the conveyor desirable possesses is a surface which is sufficiently smooth to allow the conveyor to move relative to the containers when the latter are stopped relative to the mechanism. The plates **71** are thus formed with a smooth surface without projections which might engage and damage a container.

The containers, as they emerge from the filling machine **65**, are guided onto the conveyor by appropriate guide rails **73**, **74** fixed at one end to the machine **65**. These guide rails may be positioned to lead the containers out of the machine **65** at any angle and serve to position them onto the conveyor **68** in a continuous procession with the spouts directed forwardly.

In the pairing mechanism mounted on the frame **66**, the containers first pass through station A (Fig. 1) where alternate containers are rotated 180° and thereby oriented for the subsequent handle attaching operation which takes place at a subsequent station B. At station B, there is provided a handle feed mechanism **77** and a stapler mechanism **78** including two stapler heads for attaching the handle to a pair of containers. When a handle has been attached, the containers proceed to a discharge station C where they encounter an ejector mechanism **79** which serves to discharge pairs of containers from the mechanism while retaining the following containers in position for receiving a handle. The operations at the various stations A, B and C are preferably carried out by means of a hydraulic system controlled by solenoids energized in an appropriate electric control circuit as will hereinafter be discussed in detail.

In accordance with one aspect of the present invention there is provided, at station A, a new and improved mechanism for orienting the containers by rotating alternate ones through an angle of 180°. As pointed out above, the purpose of this rotation is to enable the containers to be alined in pairs back-to-back with the spouts directed outwardly, in opposite directions from each other and directed forward and backward respectively.

As the containers, with their spouts directed forwardly, are carried by the conveyor **68** through the turning station A, alternate ones of the containers are rotated twice through angles of 90°, thereby through a total of 180°. This rotation is accomplished by inserting into the path of a container to be rotated, a pin which engages one leading corner portion of a container. In order to get past the pin the container rotates 90°.

The portion of the mechanism making up the container turning station A, is shown in FIG. 7. At this station, containers received from the outlet of the filling machine **65** are guided by the rails **73**, **74** to the first turning point where a leading corner portion of a container **50** is engaged by the first pin **76** projecting outwardly into the path of the container. This pin **76** stops the movement of the engaged corner portion of the container so that the container, being carried by the continuously moving conveyor belt **68**, is forced to rotate the pin **76** as a fulcrum. To permit this rotation the outer guid rail **74** is provided with an outwardly bent portion **78** which is sufficiently spaced from the inner guide rail **73** to receive the diagonal length of the container thus permitting the container to rotate through an angle of 90°. Further movement of the conveyor **68** carries the container around the projecting pin **76** and through a necked-down portion of the guide rails defined by an inwardly projecting guide rail portion **79**. This straightens or alines the container on the conveyor, but with the container spout facing off one side of the conveyor. Upon further movement of the partially rotated (90°) container, it engages a second pin **80** projecting into its path and, again, the container is rotated through an angle of 90°. As before, to accommodate this second rotation, the outer guide rail **74** is provided with a second outwardly bowed portion **81** spaced a sufficient distance from the inner guide rail **73** to that the container can be rotated.

In order to rotate the containers alternately so that alternate ones will pass through the mechanism without rotation, the rotating pins **76** and **80** are staggered so that when one pin projects over the conveyor for rotating a container, the other pin is retracted. This movement of the pins is accomplished by any suitable means such as, for example, by an air motor operated by compressed air under the control of suitable solenoid valves. Air motors **84**, **85** are provided for the pins **76** and **80** respectively, these motors having pistons **86**, **87** on the end of which are adapters **88** for securing the pins. The motors **84**, **85** are mounted on a bracket **89** which is securely attached by means of arms **90** to the conveyor frame **69**.

The motor cylinders **84**, **85** are supplied with air pressure from a supply tank **91** (FIG. 6) by means of a conduit **92** leading from a pressure reducing fitting **93** on the supply tank to solenoid valves SV1 and SV2 respectively on the motors **84** and **85**. These solenoid valves are operated to actuate the motors for projecting or retracting

the pins, according to the position of the containers on the conveyor, by means of a selector switch **94** having an arm **95** spring biased to extend over the conveyor **68** in the path of the containers and between the pins **76** and **80**. Each time a container strikes this arm **95**, the switch **94** associated therewith is closed thereby changing the position of contacts **94***a* and **94***b* (FIG. 5) to actuate the corresponding set of solenoid valve coils SV1*a* and SV1*b* or SV2*a* and SV2*b*. When either set of coils is energized, the corresponding solenoid valve is actuated to operate the motors **84** and **85** and reverse the positions of the pins **76** and **80**. For example, with the pin **76** projecting over the conveyor and the pin **80** withdrawn as shown in FIG. 7, contact of arm **95** by a container which has been rotated through 90° as shown in FIG. 7, will close switch **94** and thereby close contact **94***a* and open contact **94***b*. When this occurs, pin **76** will be moved out or withdrawn from over the conveyor while pin **80** will move in and project over the conveyor as a stop for rotating the container through a further 90°.

A following container, which is not to be rotated, will pass the withdrawn pin **76** and engage the switch arm **95** without being rotated. When this occurs, contact **94***a* will be opened and **94***b* will be closed thereby withdrawing pin **80** and projecting pin **76** over the conveyor. This will allow the unrotated container to pass pin **80** and continue towards the handle attaching stations with its spout directed forwardly. The next container in the procession, however, will engage pins **76** and **80** and be rotated 180°. It can thus be seen that the operation will be repeated so long as containers are in the machine, with alternate ones of the container being rotated to reverse the spouts and orient them so that containers may be paired back-to-back with the spouts facing outwardly.

Power is supplied for the switching and solenoid valve operations from an appropriate source through lines L1 and L2 (FIG. 5). So that the solenoid valves may operate at a lower voltage, a step-down transformer **96** is provided to which the solenoid valve coils and contacts are connected. In order to facilitate positive action of the contactor **94**, it is connected across the full voltage lines L1 and L2. The conveyor motor **70** may be operated across the lines with suitable on-and-off switches being provided. It is also desirable that an on-off switch **98** be provided for operating the container pairing mechanism, so that if desired both pins **76** and **80** can be retracted and containers may be passed through the mechanism without being reversed and without having a handle attached thereto.

From the reversing and orienting mechanism at station A, the containers pass in a procession to the handle attaching station B, where they are paired with their spouts directed outwardly and where a handle is attached to the paired containers. To this end the containers carried on the conveyor pass between horizontal guide rails **99** and are alined beneath the handle feed mechanism **77** and stapler mechanism **78**, with the upstanding central laminar rib **56** of the containers alined beneth these mechanisms so that an appropriate handle may be attached thereto.

For supplying the handles there is provided a magazine **104** containing a stack of handles **105**. The bottom handle blank **105** in the stack is removed and positioned above the containers to which it is to be attached by means of a feed knife **106** (FIGS. 9–11). Briefly, this knife comprises an elongated bar member having a tapered end portion **107** which is relatively thin and around which the handle can be bent (FIGS. 10 and 10*a*). Intermediate its ends the knife has a handle engaging step **108** for picking up a handle blank from the magazine. When the handle is retracted, shown in phantom at **106***a*, the stack of handles drops slightly so that the bottom handle **105** in the magazine **104** is engaged by the step **108**. As the handle knife is moved forwardly this blank is forced out of the magazine into engagement with a pair of spaced downwardly inclined guide rails **110** which serve to bend the handle downwardly over the thin tapered end portion of the knife (FIG. 11). The lower ends of the handle portion then straddle the upstanding central rib of a container. The stack of handles, at the same time, rides up on the rear portion of the knife.

In the mechanism shown in FIG. 9, an air cylinder motor **112** is provided for operating the handle feed knife **106** which is mounted, by means of a bracket **113** on a frame **114** secured to the free end of a piston **115** of the motor **112**. The frame **114** is guided on a pair of spaced rods **116** mounted on the conveyor frame **66** by means of a suitable bridge **118**. The magazine **104** is supported on the bridge **118** by means of a pair of arms **119** which also serve to support the guides **110**.

The handle feed motor **112** is air operated and accordingly is connected to the air supply conduit **92** through a solenoid control valve SV3 (FIG. 6). The solenoid valve controls the actuation of the handle feed mechanism to feed a handle when solenoid valve coil SV3*a* is energized and to return the handle feed mechanism to pick up a handle blank when solenoid valve coil SV3*b* is energized. When a handle **105** has been fed into place over a pair of properly alined containers, in the sequence hereinafter to be described, the handle is stapled to the upstanding central laminar rib or truss of the containers by the stapler mechanism **78**. The stapler applies a staple through the handle and container rib in that portion of the rib which has previously been stapled for purposes of sealing the container (see FIGS. 2 and 3). Because the containers are alined and oriented back-to-back with the spouts facing outwardly, the handle staples are attached through the portion of the rib which does not include the container spout. The containers may then later be separated along an appropriate score line **121** provided in the handle **105** and the spouts open and extended in the usual manner, as described above. It will be appreciated that any form of handle suitable for the purpose may be employed.

The stapling mechanism **78** (FIG. 13) includes two heads **125**, one for each staple and container, and, for each stapler head **125**, a clincher block **126** disposed on opposite sides of the container rib. The stapler head is driven by a suitable air motor **128** mounted on a bracket **129** supported on the bridge **118**. To this end, the stapler head **125** is connected to the piston **130** of the motor by a suitable arm **131**. The stapler is of the usual construction employed in packaging machinery of this type.

Staple wire is fed to each of the stapler heads **125** from a pair of spools **135** supported on a bracket **136** mounted on the bridge **118**. The staple wire is fed by a wheel drive **138** actuated by a ratchet mechanism **139**. The ratchet mechanism itself is operated by an air cylinder **140** connected to the ratchet by means of a piston **141**.

The stapler, requiring a larger supply of air as the operating pressure fluid, is connected directly to the reservoir **91** by means of a conduit **144** through a solenoid valve SV4. The wire feed cylinder **140** on the other hand, is connected to the lower pressure supply conduit **92** by means of a branch pipe **145** (FIG. 6) and a solenoid valve SV5. The operation of the solenoid valves SV4 and SV5 to control the actuation of the motors **128** and **140** respectively is controlled by the electrical circuit (FIG. 5), suitable solenoid coils SV4*a* and SV4*b*, and SV5*a* and SV5*b* respectively being provided for this purpose.

From the supply reels the staple wire is fed through the ratchet feed mechanism and thence through a tube **148** into the stapler head **125**. The wire projects through the head in a direction generally parallel to the container rib and is held in place by a stapler inside former **149**. When the stapler is actuated, by supplying air pressure to the motor **128**, the head slides forward forcing the container rib against the clincher block and at the same time the outside former **150**, being bifurcated, extends on

opposite sides of the inside former **149**, and bends the staple towards the container. The inside former is subsequently withdrawn and a driver (not shown) forces the formed staple through the handle and the rib against the clincher block.

In accordance with another aspect of the present invention, the handle feeding, attaching and container pair discharge cycle is uniquely arranged for rapid and positive operation to prevent the misapplication of handles to containers and to insure that the handles are uniformly spaced on the ribs and are securely attached in their proper position. In order to aline a procession of containers, with spouts properly oriented by the reversing mechanism at station A, between the guide rails **98** and beneath the handle forming and stapling mechanisms, there is provided at the discharge end of the conveyor a stop **155** extending over the conveyor and adapted to engage a leading corner portion of a container and prevent it, and necessarily the following containers, from being carried further by the conveyor. The stop **155** is spaced along the conveyor a distance away from the stapling mechanism which is somewhat more than the length of a paired unit of containers. It is thus the second pair of containers in line which is positioned beneath the stapling head and handle feed mechanism for receiving a handle. The first pair of containers positioned between the stapling station B and the discharge end of the conveyor, is in the ejector or escapement station C (FIG. 1).

For moving the leading pair of united containers away from the stop **155** so that they may continue to be carried by the conveyor, a pusher or positioner **156** is provided at the ejector station C (FIG. 14). The pusher **156** comprises a large rectangular plate having a container engaging face **158** positioned alongside of and extending parallel to the conveyor and thus to the sides of the containers **50** carried thereon. The pusher **156** is mounted for sliding movement on a bracket **159** secured to the frame **66**, and to this end, is fixed to a shaft **160** slidably guided in a bearing **161** mounted on to the bracket **159**. The pusher **156** is caused to move by means of an air motor **162** mounted on the bracket **159** beneath the guide rod **161** (FIG. 16) and having a piston rod **164** secured at its free end to the pusher **156**. In order to prevent the containers from tipping when moved transversely of the conveyor and stop **155** by the pusher **156**, the latter includes an arch **166** fixed to the pusher **156** and extending therefrom over the conveyor where it supports above the edge of the conveyor opposite the pusher, a guide rail **167**. In this manner the container is supported on both faces, and thus will not tip, when engaged by the pusher.

For controlling the application of air to the pusher motor **162** there is provided an appropriate solenoid valve SV**6** communicating with the reservoir **91** through a conduit **165**. The solenoid valve SV**6** is controlled by appropriate solenoid coils SV**6***a* and SV**6***b* in the electric circuit (FIG. 5) for determining the direction of movement of the pusher.

In accordance with another aspect of the present invention, correct timing of the handle attaching operation is accomplished by positioning at least three pairs of containers in successive alinement in stations B and C. The presence of these containers is sensed by appropriate limit switches positioned along the conveyor and by a switch on the stop **155**. Accordingly, the stop **155** is mounted on a gate **168** which is swingably mounted by means of a pin **169**, on the pusher frame **159**. On the frame **159** in back of the gate is mounted a limit switch **170** having a contact arm **171** engaged by a projecting abutment **172** on the gate. The gate itself is limited for movement by a headed stop screw **174** secured to the frame **159** and extending through an aperture **175** on the gate. As a sufficient number of containers are backed up against the stop, the continuous frictional force of the conveyor causes these containers to exert a force on the gate. This force acts against and compresses a spring **176** and thereby moves the switch arm **171** to close limit switch **170**. The presence of the desired number of containers along the conveyor in position for receiving a handle is sensed by two or more limit switches **172, 173** mounted beside the conveyor (FIG. 4) and having arms extending over the conveyor into the path of the container. When these three limit switches (**170, 172** and **173**) are closed, that is when at least three pairs of containers (six containers) are in position, the mechanism begins its handle attaching operation for attaching a handle to the second pair of containers in the line. Thus, referring to FIG. 5, when all three pairs are alined in front of the stop **155**, the gate is swung to close limit switch **170** and the handle feed solenoid coil SV3*a* is energized to actuate solenoid valve SV3 to apply air to handle feed motor **112**. The motor is then operated to move the rod **115** outwardly and cause the feed arm **106** to pick up a handle from the stack and move it through the handle guide rails to beneath the stapler and over the container ribs (FIG. 11). Upon the completion of the handle feeding operation, a further limit switch **174** is closed. This limit switch **174** is mounted on the bridge **118** for engagement by the handle feed mechanism (FIG. 9) and serves to initiate the remainder of the handle stapling cycle. When limit switch **174** is closed, the pusher feed solenoid coil SV6*a* and the staple driver coil SV4*a* are energized to actuate the respective solenoids SV**6** and SV**4** to apply pressure fluid to the corresponding motors **162** and **128** respectively. Although both solenoid valves are energized at the same time, the pusher motor **162** is designed to operate somewhat faster than the stapler motor. Accordingly, the first pair of containers in the line are moved away from the stop **155** by the action of the pusher **156** against them, and are carried away by the conveyor. This allows the next two containers in line, that is positioned directly beneath the stapler head and handle, to start to move. They move only a very short distance however (approximately ¼ inch), before they are gripped between the stapler heads and anvils, and thereby temporarily stopped. The stapler then completes its stroke and drives a staple through the handle and upstanding container ribs. Accordingly, it is important that these containers be stopped initially slightly short of their staple receiving position so that they move into the correct position for stapling when the pusher is actuated to remove the leading pair of containers.

During the time in which the staple is to be driven into the handle and the handle is attached to the two containers thereby pairing them together, this group of containers is temporarily stopped by engagement between the stapler heads and anvils and slightly short or against a lateral edge **175** of the extended pusher, depending upon the amount of movement of the pair before and after stapling.

The outward staple driving movement of the stapler actuates the handle feed and wire reel ratchet return. To this end, there is provided a switch **178** on the bracket **129** having a contact button **179** engageable by an arm **180**. The arm **180** is cammed into engagement with the contact **179** by a cam wheel **181** which rides up on a cam surface **182** fixed on the stapler head **125**. Upon a reversal of the switch **178** as the staple mechanism moves out to stapling position, solenoid valve coils SV4*a*, SV5*a* and SV6*a* are de-energized and solenoid valve coils SV3*b* and SV5*b* are energized (FIG. 5). The handle feed solenoid had previously been de-energized when the first two containers were pushed away from the stop thereby allowing switch **170** to open. The handle feed then returns to position for receiving another handle and the wire reel ratchet is cocked for feeding a further portion of wire to the staplers.

As the first pair of containers which was pushed away from the stop by the pusher moves towards the discharge end of the conveyor, it engages a discharge switch **185**

positioned alongside of the conveyor. Upon the closing of this switch the solenoid coils SV4*b* and SV6*b* are energized to return the pusher and the stapler to their retracted or out positions. When these elements are so returned the containers then in the mechanism are moved forward by the conveyor until the stop **155** is engaged. The leading pair of containers is attached together by a handle, being the pair just previously receiving a handle. As the stapler returns to its in-active or retracted position, the position of switch **178** is shifted and the wire feed solenoid SV5*a* is energized to actuate the wire feed motor **140** to feed a section of wire to the stapler heads.

When three pairs of containers are again alined in properly oriented position within the stations B and C the operation is repeated. Thus, as long as there are a sufficient number of containers present in the mechanism, handles will be attached to pairs of containers rapidly and automatically and with a minimum of attention. In the event of a misalinement of containers, for example should one container be rotated only through 90°, its rib will extend crosswise of the conveyor. In this instance, a warning switch **186** mounted above the conveyor adjacent to the handle feed mechanism, will be closed energizing a warning device **187** such as a bell, buzzer or the like (FIG. 5).

It may be helpful at this point to give a brief resume of the operation of the above described mechanism for orienting containers of the gable topped pouring spout variety in pairs with their spouts facing outwardly and attaching a handle to the upstanding gable top ribs of each pair. A procession of containers entering the handle attaching mechanism from a filling machine and having their spouts alined in one direction are oriented by reversing alternate containers thereby to reverse the position of their spouts 180°. With the present invention this is accomplished by projecting into the path of a passing container carried on a conveyor **68** a stop rod or pin **76** which engages a leading corner portion of the container and causes the container to be turned through an angle of 90° in order to pass the pin **76**. As the partially rotated container continues further on the conveyor, it contacts a switch arm **95** which closes a switch and actuates a first air motor which withdraws the pin **76** and a second air motor which inserts into the path of the container a second pin **80**. Engagement by the container with the second pin **80** again turns the container through a 90° angle thereby reversing the direction of its spout. A following container will not be turned inasmuch as it will pass the withdrawn pin **76** and engage the switch arm **95** which causes the pin **80** to be withdrawn and the pin **76** to be projected into the path of a following container.

In this manner, containers can be readily and quickly oriented with oppositely directing spouts and can then be positioned in pairs back-to-back with their spouts facing outwardly for receiving a handle joining the containers of each pair. When a group of at least three pairs of containers, that is six containers, are lined up against a stop **155** projecting over the conveyor, switches **170**, **172** and **173** are closed. This actuates a handle feed mechanism **77** which picks up a handle blank **105** from a magazine stack and folds it onto opposite sides of the upstanding container ribs of the second pair in line. As this is completed the leading pair of containers is ejected past the stop **155** by a pusher **156** and the second pair stars to move with the conveyor. Immediately, however, the containers are secured or paired together by a stapler **78** which attaches the handle to them. When the leading pair of containers, which has been pushed past the stop, reaches the end of the conveyor, a switch **185** is closed causing the pusher **156** and stapler **78** to be retracted thereby setting the stage for a further cycle of operations.

There has thus been described a mechanism for simply, rapidly and completely automatically pairing containers in back-to-back relation with their extensible pouring spouts facing outwardly and for attaching a handle securing these containers together without interfering with future operation of their spouts. While certain illustrative mechanisms have been employed for accomplishing the above purpose, it wil be apparent to those skilled in the art that equivalent structures may be employed and such equivalency will be recognized to be within the scope of the invention.

I claim as my invention:

1. In a mechanism for receiving paperboard containers, of the type having a gable topped closure with an upstanding rib surmounting the closure and an extensible pouring spout enclosed within one half portion of the gable top and rib and a staple fastener extending through the other half portion of the rib, alined in a continuous procession with the spouts of the containers facing in one direction and with the ribs extending in the direction of the procession, for reversing alternate ones of the containers in the procession and pairing the containers with the spouts of the paired containers facing away from each other, and for attaching a handle between the stapled rib portions of the paired containers, the improvement in means for reversing alternate ones of the containers which comprises, in combination, a frame, a continuously moving conveyor on said frame for receiving and carrying the procession of containers, means mounted on said frame and extensible over said conveyor in the path of containers into engagement with a leading corner of a container to stop said corner relative to the conveyor and cause the container to turn through an angle of 90° relative to the conveyor, and means engageable by each one of the containers of the procession for actuating said extending means to engage alternate ones of containers thereby to turn said alternate containers twice through 90° and reverse the direction in which the pouring spouts thereof face whereby the procession of containers can be paired with the containers of each pair having oppositely facing spouts.

2. In a mechanism for receiving paperboard containers, of the type having a gable topped closure with an upstanding rib surmounting the closure and an extensible pouring spout enclosed within one half portion of the gable top and rib and a staple fastener extending through the other half portion of the rib, alined in a continuous procession with the spouts of the containers facing in one direction and with the ribs extending in the direction of the procession, for reversing alternate ones of the containers in the procession and pairing the containers with the spouts of the paired containers facing away from each other, and for attaching a handle between the stapled rib portions of the paired containers, the improvement in means for reversing alternate ones of the containers which comprises, in combination, a frame, a continuously moving conveyor on said frame for receiving and carrying the procession of containers, a pair of spaced abutment members mounted on said frame, each member having a plunger extensible over said conveyor in the path of containers and engageable with a leading corner of a container to stop said corner relative to the conveyor and cause the container to turn through an angle of 90° relative to the conveyor, means for extending said abutment member plunger over said conveyor, and a selector switch engageable by each one of the containers of the procession to actuate said extending means for alternately extending said abutment members to engage alternate ones of containers thereby to turn said alternate containers twice through 90° and reverse the direction in which the pouring spouts thereof face whereby the procession of containers can be paired with the containers of each pair having outwardly facing spouts.

3. In a mechanism for receiving a continuous procession of paperboard containers of the type having a gable topped closure with an upstanding rib surmounting the closure, an extensible pouring spout enclosed within one half portion of the gable top and rib, and a staple fastener through the other half portion of the rib, with the spouts

of the containers alined facing in one direction and with the ribs extending in the direction of the procession, for reversing alternate ones of the containers in the procession and pairing the containers with the spouts of the paired containers facing away from each other and for attaching a handle between the staple rib portions of the paired containers, the improvement in means for reversing alternate ones of the containers which comprises, in combination, a frame, a continuously moving conveyor on said frame for receiving and carrying the procession of containers, a first abutment member mounted on said frame and extensible over said conveyor in the path of a container to engage a leading corner of the container to stop said corner relative to the conveyor and cause the container to turn through an angle of 90° relative to the conveyor, a second abutment member mounted on said frame in a position spaced from said first member and extensible over said conveyor in the path of the rotated container to rotate the same a further 90° in the same manner as the first member, means for extending and withdrawing said abutment members, and a selector switch positioned between said abutment members and engageable by the containers of the procession for actuating said extending means to extend one of said members and withdraw the other in alternate succession so that only alternate ones of the containers in the procession are engaged and turned twice through 90°, whereby the direction in which the pouring spouts of the alternate containers face is reversed and the procession of containers can be paired with the containers of each pair having oppositely facing spouts.

4. A mechanism for reversing alternate ones of a procession of a paperboard containers of the gable topped extensible pouring spout variety having an upstanding rib alined parallel to the procession comprising, in combination, a frame mounting a conveyor for supporting and carrying a continuous procession of containers, a pair of spaced abutment members mounted on the frame and alternately extensible over one edge of the conveyor in the path of a container and engageable with a leading corner portion of a container for turning the same through two successive angles of 90° as the container is moved past the members by the conveyor, means for extending and retracting said members, and means intermediate said members engageable by each one of the containers in the procession carried on said conveyor for actuating said extending and retracting means simultaneously to extend one member and to retract the other in alternate succession whereby only every other one of the containers are engaged by said abutment members and rotated through 180° and the remaining containers are passed without rotation.

5. A mehanism for reversing alternate ones of a procession of paperboard containers of the gable topped extensible pouring spout variety having an upstanding rib alined parallel to the procession comprising, in combination, a frame mounting a conveyor for supporting and carrying a continuous procession of containers, a first abutment member mounted on the frame and extensible over one edge of the conveyor in the path of one of said containers and engageable with a leading corner portion of said container for turning the same through an angle of 90° as the container is moved past the member by the conveyor, a second abutment member mounted on the frame and extensible over said one conveyor edge into the path of said container and engageable with a leading corner portion thereof for turning the same through a further 90° whereby said container is turned a total of 180°, means for extending and retracting said members, and means intermediate said members engageable by each container carried on said conveyor, said means when engaged by one container actuating said extending and retracting means simultaneously to extend one member and to retract the other and when engaged by the next following container reversing the positions of said members whereby only alternate successive containers are engaged by said abutment members and rotated through 180°.

6. A mechanism for reversing alternate ones of a procession of paperboard containers of the gable topped extensible pouring spout variety having an upstanding rib alined parallel to the procession comprising, in combination, a frame mounting a conveyor for supporting and carrying a continuous procession of containers, first means mounted on the frame for turning a container 90°, second means mounted on the frame and spaced from said first means for turning the container through a further 90° whereby said container is turned a total of 180°, and means intermediate said turning means engageable by each one of the containers in the procession carried on said conveyor for actuating said turning means alternately to engage and turn every other one of the containers 180° and allow the remaining containers to pass without rotating.

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