Feb. 3, 1959 R. H. SORGE ET AL 2,872,018

CONTAINER PAIRING MACHINE

Filed June 7, 1955 4 Sheets-Sheet 1

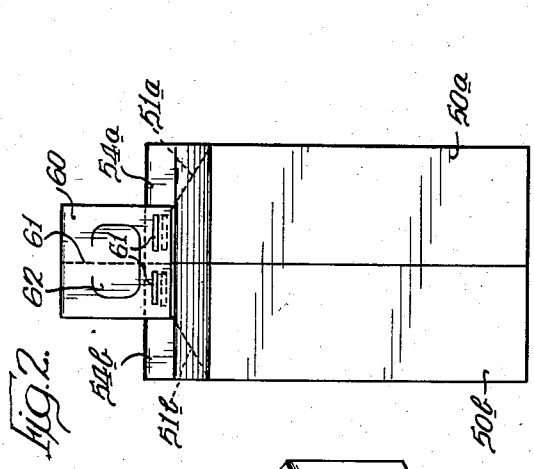


Fig. 2.

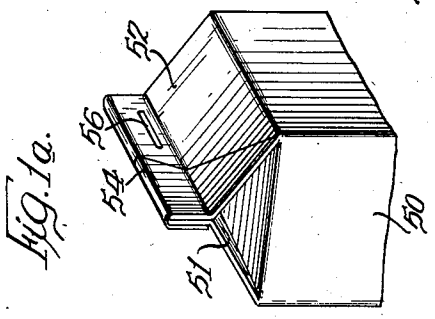


Fig. 1a.

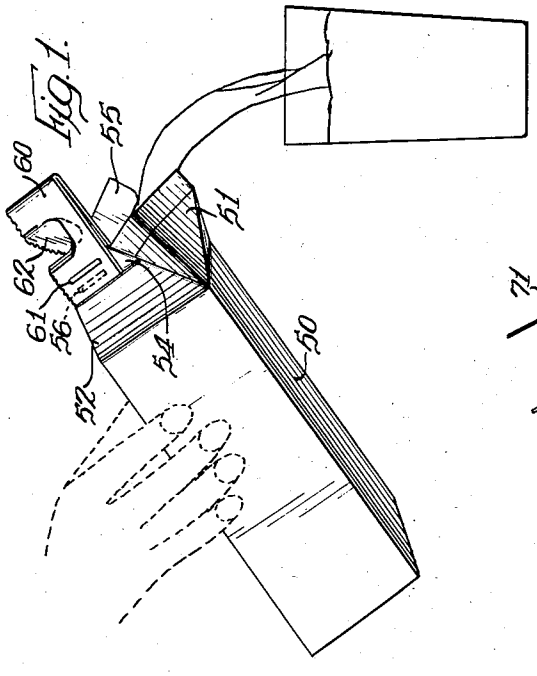


Fig. 1.

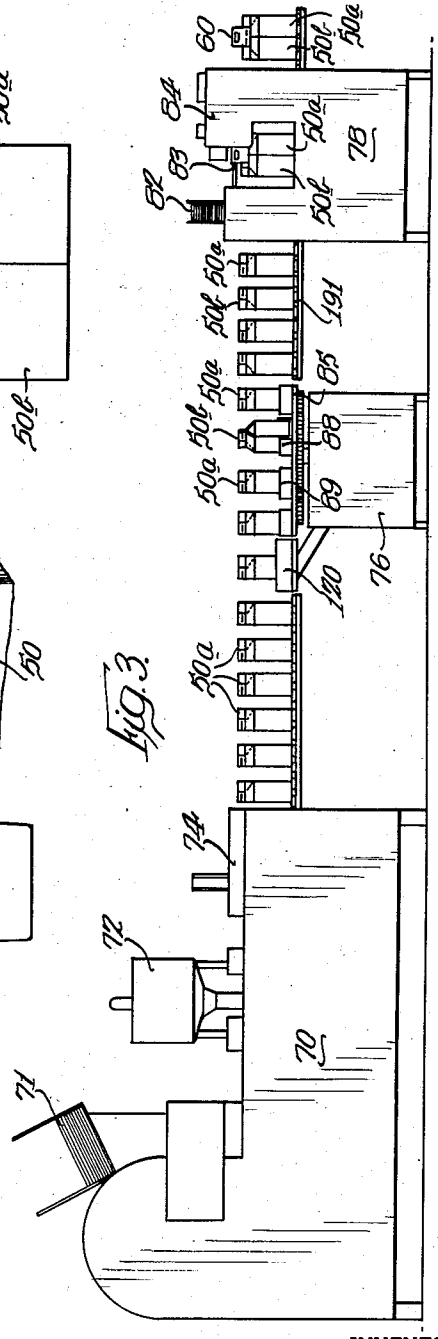


Fig. 3.

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Feb. 3, 1959 R. H. SORGE ET AL 2,872,018

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Filed June 7, 1955 4 Sheets-Sheet 2

Fig. 4.

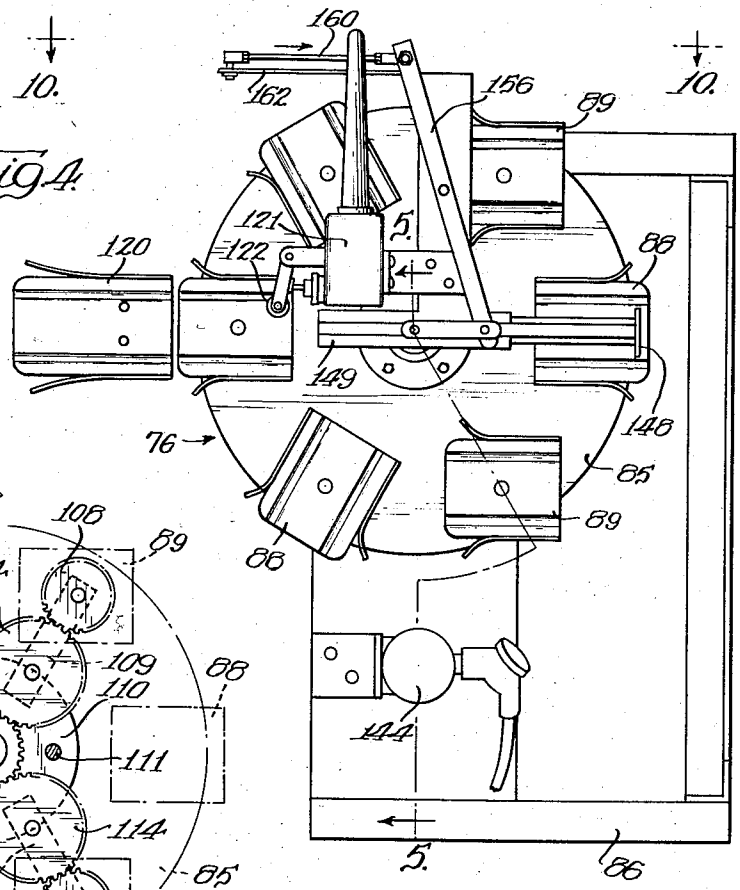


Fig. 6.

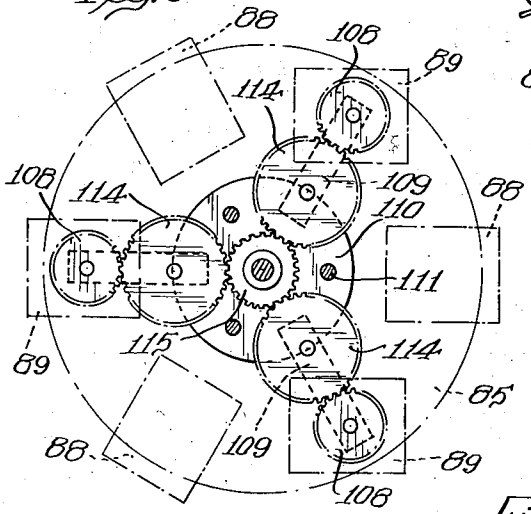
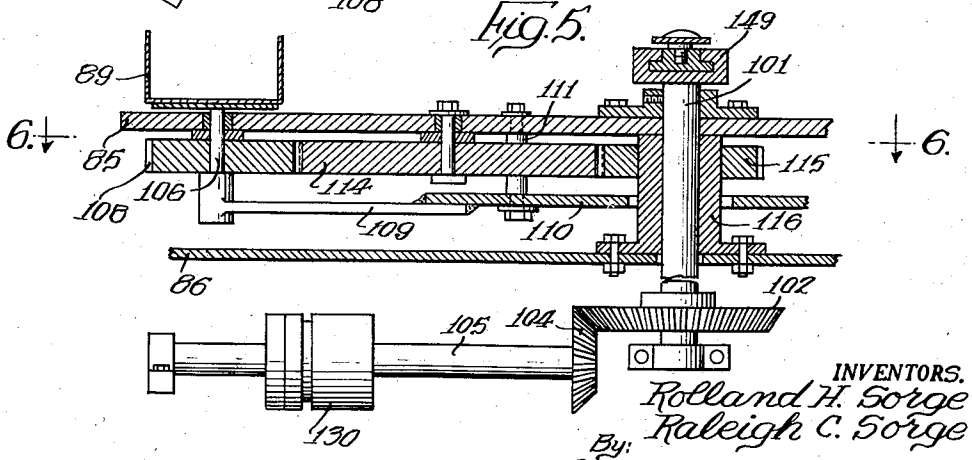


Fig. 5.



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Filed June 7, 1955 4 Sheets-Sheet 3

Fig. 7.

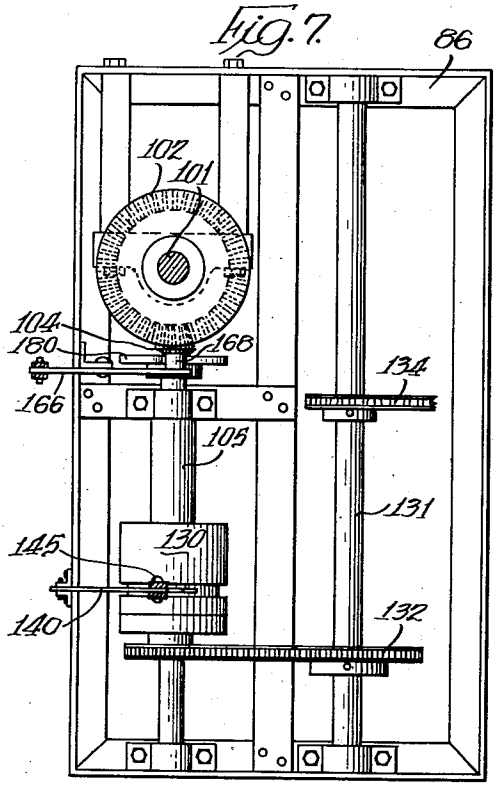


Fig. 8.

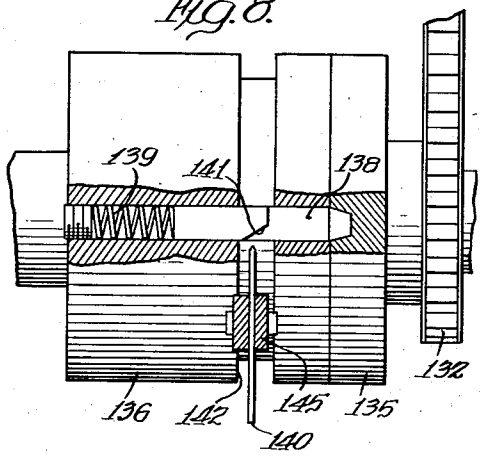
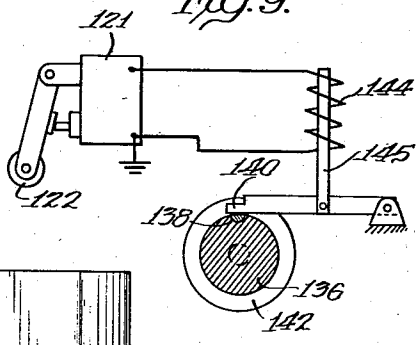


Fig. 9.



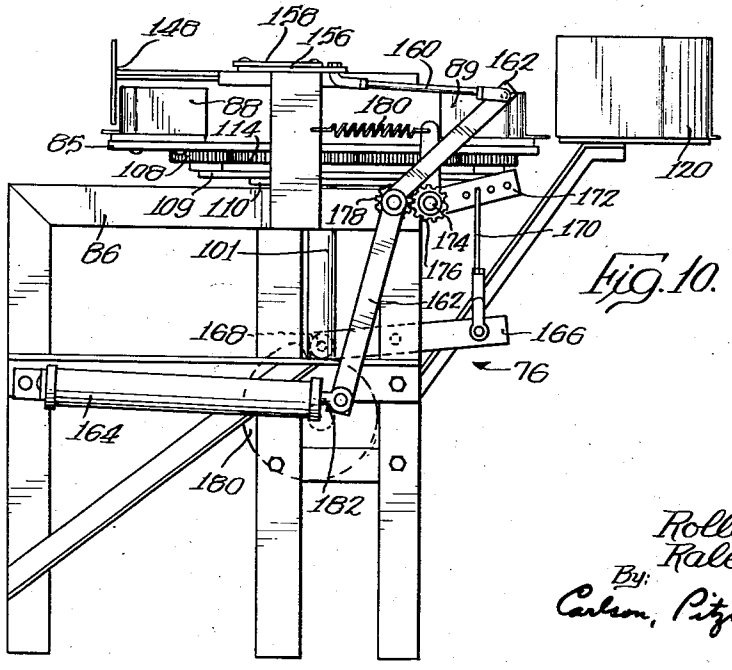


Fig. 10.

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Filed June 7, 1955 4 Sheets-Sheet 4

Fig. 11.

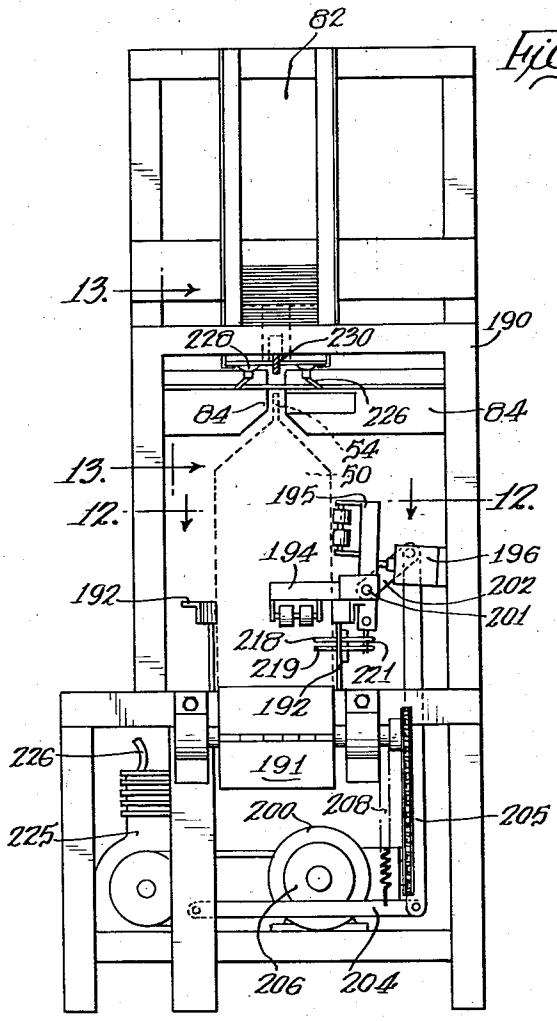


Fig. 12.

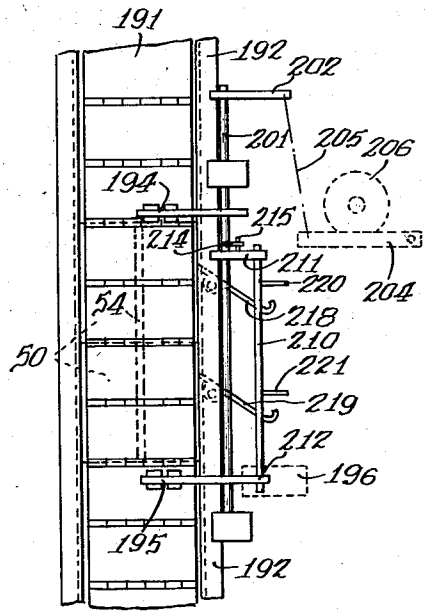
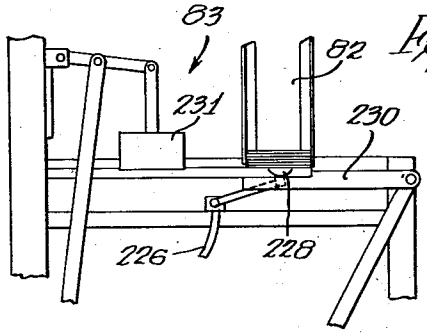


Fig. 13.



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CONTAINER PAIRING MACHINE

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Application June 7, 1955, Serial No. 513,760

2 Claims. (Cl. 198—33)

The present invention relates in general to a machine for securing a carrying device to a plurality of containers in a manner that will not interfere with the subsequent independent use of each container. More particularly, the invention relates to a machine for pairing up filled and sealed containers, such a paper milk cartons, with a common lifting and carrying handle by securing the handle to that portion of each container which is not involved in dispensing the container contents.

One type of container especially adapted for packaging in pairs with a carrying handle is the widely used gable top container known in the trade under the mark "Pure-Pak" as a container for milk and other comestibles. Each such container has a body of square or rectangular cross section and a top closure characterized by opposed pairs of roof panels and infolded panels surmounted by a top rib. The top rib is relatively stiff and provides a convenient projection on which to attach a carrying handle. Housed within the top rib is an initially collapsed pouring spout which is sealed therein when the container is filled and closed in the packaging machine. The pouring spout is situated in one longitudinal half of the top rib and can be rendered accessible by disassembling that half of the rib, the parts then being manipulated by the user to extend the spout into operative position. Containers of the foregoing type are commercially produced by means of a packaging machine which repetitively erects a caron blank, fills it with milk or other content, and seals it. These containers emerge from the packaging machine in a continuous procession with their top ribs disposed parallel to the line of travel. By the same token, the emerging containers are all situated with their pouring spout portions facing in the same direction. When a handle is to be attached to a pair of such containers as they emerge from the packaging machine, a problem is created since the fastening of a handle, by stapling or the like, to the paired containers places a staple or fastener through the collapsed pouring spout of one of the containers, thus interfering with the consumer's use of the container.

It is an object of the present invention to provide a machine for pairing gable top containers having extensible pouring spouts and for joining such paired containers together by a single carrying device in such a way as not to interfere with the pouring spout of either container.

Another object of the invention is to provide a machine of the character set forth adapted to receive from a packaging machine a procession of containers each facing in the same direction and alternately rotate them so that they may be fed to a handle attaching mechanism in a properly oriented relationship.

A further object is to provide a machine of the foregoing type and having a turretlike mechanism adapted to receive filled containers from the packaging machine, orient them 180° with respect to each other, and subsequently feed them to a handle attaching machine.

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

Figure 1 is an illustration of a spout type beverage container with the spout extended in pouring position and a portion of a carrying handle is shown attached to the carton.

Figure 1*a* is a partial perspective view of a gable top container of the type on which the machine is adapted to operate.

Figure 2 illustrates a pair of beverage containers of the gable top variety which are joined together by a handle.

Figure 3 is a diagrammatic representation of a unit for packaging a beverage in a container and subsequently attaching a handle to join pairs of containers.

Figure 4 is a plan view of the device for orienting the containers relative to each other.

Figure 5 is a section view taken on line **5—5** of Figure 4.

Figure 6 is a view taken on the line **6—6** of Figure 5 and showing the orienting receptacles in phantom.

Figure 7 is a plan view of the clutch and drive mechanism for the orienting device.

Figure 8 is an enlarged view of the cut-away view of the clutch shown in Figure 7.

Figure 9 is a schematic representation of the clutch control circuit.

Figure 10 is an elevation view of the orienting device taken on the line **10—10** of Figure 4 and showing the container ejecting mechanism.

Figure 11 is an elevation view of the handle attaching device.

Figure 12 is a partial plan view of the handle attaching device taken on line **12—12** of Figure 11.

Figure 13 is a partial elevation view of the handle blank dispensing mechanism taken on line **13—13** of Figure 11.

While the invention is susceptible of various modifications and alternative constructions, a certain illustrative embodiment has been shown in the drawings and will be described below in detail. It should be understood, however, that there is no intention to limit the invention to the specific form disclosed but, on the contrary, the intention is to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring more specifically to the drawings, there is shown in Figs. 1 and 1*a* a gable top container **50** of the type presently used, for example, in commercial dairy operations for packaging milk and other dairy products. Such containers include an extensible spout **51** which is sealed into the gable top portion **52** of the container during the packaging operation. The gable top includes a sloping roof portion surmounted by an upstanding truss or rib **54**. The spout **51** is rendered accessible by lifting a flap **55**, which forms a part of this rib. The adjacent portions of the roof panels are then bent back and manipulated until the spout **51** has been expanded to operative position as shown in Fig. 1. It can be seen that one-half of the rib must be left unfastened in order to permit the extension of the spout **51**. For this reason, containers of this type are sealed by a staple **56**, or the like, which is fastened to the rib on the portion not used for the spout.

When it is desired to attach a handle or similar carrying means to a pair of containers such as those illustrated in Figs. 1 and 1*a*, care must be used to avoid fastening the handle in such a manner as to interfere with the subseequent use of the spout **51**. For this reason, the containers to be fastened together by the handle must be so oriented that the stapled halves of the upstanding ribs **54**

are adjacent each other. There is shown in Fig. 2 a pair of cartons **50***a* and **50***b* oriented with respect to each other in the above-described manner and having a single handle **60** adjoining them and attached by staples **61** to the previously stapled portions of the ribs **54***a* and **54***b*. This construction leaves the pouring spouts **51***a* and **51***b* of the containers **50***a* and **50***b*, respectively, free for use by merely detaching the containers along the perforated line **61** of the handle **60**. A suitable finger opening **62** is provided in handle **60** for carrying the joined pair of containers.

General

The above-described containers **50** are erected, filled and sealed in an automatic packaging machine **70** illustrated in Fig. 3. This machine takes container blanks from a supply **71**, erects them and coats them with paraffin or other moisture proofing compound. The erected containers are then filled with milk or other beverage from a supply tank **72**. The filled containers then proceed to a closing and stapling device **74** from which they emerge in a continuous procession.

In order to fasten a handle to successive pairs of these containers **50***a* and **50***b*, as described above, means are provided for orienting each alternate container **50***b* through an angle of 180° with respect to the preceding container **50***a*, such movement occurring about the vertical axis of the container **50***b*. This is accomplished, as shown in Fig. 3, by conveying the cartons to an orienting mechanism **76**, such as a turntable or the like having a plurality of alternately rotatable container receptacles thereon, alternate ones of which rotate relative to the table.

From this orienting device, containers pass to the handle attaching machine **78** where the handles are attached to oriented pairs of containers, thereby joining them together.

Orienting means

The orienting mechanism **76** shown generally in Fig. 3, and in more detail in Figs. 4, 5 and 6, in this instance includes a turntable **85** mounted for rotation on frame **86** of the device **76**. In order to receive and hold the containers on this turntable, there is provided thereon a plurality of stationary receptacles **88** and an equal number of alternately spaced rotatable container receptacles **89**. The turntable is rotated by means of a shaft **101** having a spiral gear **102** at its lower end which meshes with a spiral gear **104** on the drive shaft **105**.

In order to rotate the alternate receptacles **89** during the rotation of the turntable **85**, each of these receptacles is provided with a shaft **106** extending through the turntable and having a gear **108** secured thereto. Support brackets **109** are mounted on a plate **110** which is rigidly secured to the receptacle turntable **85** by means of bolts **111**. Planetary gears **114** are secured to the underside of the turntable **85** and mesh with the receptacle gears **108**. In order to rotate the planetary gears **114**, a sun gear **115** is rigidly mounted on a sleeve **116** secured to the frame **86** and rotatably surrounding the turntable shaft **101**.

Receptacle gears **108** and the stationary sun gear are provided with the same number of teeth so that upon a given degree of rotation of the turntable **85** about the stationary gear **115**, the receptacle gears, and thus the receptacles **89**, will be rotated the same amount relative to the table, but in the opposite direction. It will thus be apparent that a container placed in a receptacle which is fixed to the rotating table **85** will be turned 180° with respect to its path of travel, while a container inserted in one of the rotatable receptacles will not be so rotated. With this arrangement, alternate containers of the above type will be rotated to a position in which the handles may be attached without interfering with the pouring spout.

The filled beverage containers, as they are ejected from the filling machine **70** (Fig. 3), are directed into a guiding platform **120** (Fig. 10) which forms a part of the orienting mechanism **76**. From this guiding platform, the containers are passed to an adjacent receptacle on the turntable upon which the container is positioned for orientation. A microswitch **121**, as shown in Fig. 4, actuates the turntable in response to the positioning of the containers therein, although it should be understood that other suitable mechanical means, such as cams and the like, may be used. A roller **122** is engaged by the container and operates the switch, which causes a clutch **130** on the drive shaft **105** to be engaged with the power shaft **131** through a chain and sprocket mechanism **132**. The power shaft is driven by means of a similar chain and sprocket **134** either directly from the packaging unit or from a separate power plant. The clutch **130** used with this orienting device is a form of an automatic pin type clutch and includes a freely rotating flywheel **135** continuously driven by the power source which is engaged with a clutch wheel **136** by means of a radially disposed axial pin **138**. This pin is mounted in the clutch wheel and is biased by a spring **139** into engagement with the rotary flywheel **135** when a dog **140** is disengaged therefrom (Figs. 7 and 8). The pin is provided with a cam surface **141** engageable by the dog **140**, and when so engaged is moved against the biasing force of the spring **139** to release the clutch wheel from the flywheel. A groove **142**, intermediate the ends of the clutch wheel **136**, provides an access to the cam surface of the pin.

The control circuit employed for actuating the clutch is illustrated diagrammatically in Fig. 9. In this circuit it can be seen that when the roller **122** is engaged by a container, the switch **121** is closed, thereby actuating a solenoid **144**. This solenoid lifts an armature **145** to which is connected the dog **140**, and thereby disengages the dog from the pin **138**. Upon the release of the dog **140**, the pin is urged forward and into engagement with the flywheel **135**. Engagement of the clutch causes one complete rotation of shaft **105** and, through the speed reduction spiral gears **102** and **104**, the table is rotated one increment. That is, the table is rotated so that a succeeding receptacle is positioned in front of the guideway. When the container is moved away from the roller **122**, switch **121** is opened thereby de-activating the solenoid **144**. This permits the dog **140** to drop into place for engagement with the pin cam surface **141**. At the completion of one revolution and at the engagement of the cam and dog, the flywheel is disengaged and continues to rotate while the clutch wheel is at rest in anticipation of the succeeding cycle.

It should be noted in the illustrative embodiment disclosed that, there being six receptacles, the ratio of the spiral gears **102** and **104** must be 6:1, so that for each complete rotation of the table **85** the clutch is rotated six times.

When the table, with the containers positioned thereon, has been rotated through 180°, an ejector **148** removes the containers from the receptacles and presents them to the handle affixing machine in properly oriented pairs. In the present embodiment, a pusher type ejector has been employed, and is reciprocably mounted in a track **149** mounted on the frame **86**. The ejector **148** is driven in timed relation with the turntable **85**.

For the purpose of operating the ejector **148** in proper synchronism with the turntable **85**, resort is had in the present instance to a cam actuated linkage assembly. The latter includes a cam **180** mounted on the drive shaft so as to be rotated one complete revolution when the clutch **130** is engaged, and is angularly positioned on the shaft to provide the proper synchronization.

This assembly also includes a suitable linkage, shown in Figs. 4 and 10, which operatively connects the cam **150** and the ejector **148**. Such linkage comprises an ejector lever **156** pivoted intermediate its ends to the frame and pivotally secured at one end to the ejector **148** by means

of a link 158. The ejector lever 156 is joined by means of a link 160 to one end of a dashpot lever 162, which is also pivoted to the frame 86 intermediate its ends.

A rocker arm 166 is pivoted to the frame 86 and includes a follower 168 operatively engaged with the cam 150. The rocker arm is operatively connected, through a link 170 and a lever 172 to a shaft 174 rotatably mounted adjacent the frame. A pair of intermeshing gears 176 and 178 on the shaft 174 and the dashpot lever 162, respectively, operatively connect the rocker arm with the ejector 148. In order to bias the cam follower against the cam a spring 180 is fixed between the frame 86 and an arm 181 secured to the shaft 174.

This ejector linkage is operated only when the clutch is engaged. When this occurs, the drive shaft 105 and the ejector cam 150 make one complete revolution, thereby acting to raise the follower 168. This action causes the rocker arm to pivot about the frame and impart a downward movement to the linkage 170 and lever 172. This movement in turn rotates the gears 176 and 178, thereby causing the dashpot lever to pivot and thereby simultaneously extend the dashpot piston 182 and retract or cock the ejector 148. As the turntable rotates, by virtue of the drive shaft rotation, a container in one of the receptacles is positioned in front of the cocked ejector. When the cam has rotated so that the follower drops, the spring acting through the linkage forces the ejector forwardly and thereby ejects the carton from the receptacle and turntable. The dashpot serves to cushion the action of the ejector arm and prevent damage to the container.

Handle attaching mechanism

The containers 50*a*, 50*b*, having been ejected from the orienting mechanism in a properly oriented position relative to each other, are directed in pairs to the handle attaching mechanism 81 as shown in Fig. 1.

The stapling head 84 of the present mechanism is of a type similar to that used for sealing the containers after they are filled with the beverage, although it is generally constructed so that more than one staple may be placed at one time. Since a single handle is to be attached to a pair of containers, means are provided for positioning such containers adjacent each other prior to the stapling operation. These means are also so located with respect to the stapling head that when the cartons are positioned thereby, they will be back to back, with the spouts outward, and the handle will be secured to the sealed portion of the container ribs. Referring more particularly to Figs. 11, 12 and 13, there is illustrated a handle attaching device, including the stapling head 84 mounted on a frame 190 which carries a conveyor 191. This conveyor passes the containers, from the orienting device 76, directly beneath the stapling head so that the upstanding ribs 54 are in a position to have the handles stapled thereto. Guide rails 192, running parallel to the conveyor 191, are provided on the frame. A system of gates and latches has been provided in order to actuate the stapler only at a time when a pair of containers is positioned beneath it. Initially, a forward gate 194 is dropped across the conveyor in a position to halt the containers under the stapler head 84. A second gate 195 drops behind the second container when it is positioned adjacent the first one and thereby closes the microswitch 196 to initiate the handle attaching operation. Upon the closing of this switch, a solenoid actuated pin type automatic clutch 200 is engaged. This clutch is a single revolution clutch similar to the one previously described and serves to actuate the handle feed mechanism and lift the gates simultaneously with the stapling of a handle to the container. As the gates are lifted, the joined containers are discharged from the machine.

The gate mechanism, shown in Figs. 11 and 12, comprises a front gate 194 rigidly secured to a shaft 201 which runs parallel with and is pivotally mounted on one of the guide rails 192. This shaft is provided with an extending lever 202 which is connected to a rocker arm 204 by a link 205. The rocker arm in turn is pivoted to the frame 190 and is rocked by a cam 206, which is rotated when the clutch 200 is engaged. A spring 208, fastened between the frame and the rocker arm, urges this arm against the cam. When the arm is against that portion of the cam having the least radius, the front gate 194 is positioned across the conveyor as shown in Fig. 11. This is the normally inactive position of the gates.

The rear gate 195 is secured to a rod 210 which is swingingly mounted on the front gate shaft 201 by means of a pair of links 211 and 212, one of which, 212, forms a part of the rear gate 195.

In order to lift the rear gate 195 from its lowered position when the shaft 201 rotates to lift the front gate, a pin or arm 214 is provided on the shaft which engages with a pin 215 projecting outwardly from one of the links 211. Means are provided to lock the rear gate 195 in its raised position until a pair of containers are disposed beneath the stapling head. Such means include a pair of levers 218 and 219 which are pivoted to the guide rail adjacent the shaft 201 and project over the conveyor 191. The position of these latches and rear gate relative to the stapling head is such that they are released when the pair of containers is in the desired position for stapling the handles thereto. When the rear gate is in the raised position, the levers engage a corresponding pair of pins 220 and 221, respectively, depending from the swinging rear gate rod 210. The rear gate is thus held in the raised position until the latches are released by the containers. When the second container engages the lever 219 nearest the rear gate 195, the forward lever 218 having been disengaged from its respective pin 220 by the first container, the rear gate drops against the second container and, when this container is adjacent the first one, the gate drops behind it, thereby closing the switch 176 and initiating the stapling operation. Rollers are provided on both the gates in order to prevent damage to the containers. At the conclusion of the handle stapling operation, the gates are lifted, as described above. The rear gate remains in its raised position by virtue of the latching means while the front gate drops across the conveyor when the cam 206 has completed its cycle.

Power is supplied to this mechanism either from the main packaging machine or from a separate power source, sufficient power being provided to drive both the clutch and cam mechanism and a vacuum pump 225. This pump is used for the handle blank feed mechanism illustrated in Fig. 13. Conduit 226 leads from the vacuum pump to a suction cup 228 adapted to remove a handle blank from the stack of handles 229 and supply it to the feed linkage 230. From the stack, the handle blank is fed by means of a suitable linkage shown generally at 230 to a forming device 231 from which it passes to the stapling heads where it is secured to the containers.

Synopsis of operation

Since the operation of each of the various mechanisms included within the machine has already been discussed in detail, a lengthy summary is unnecessary at this point. It is believed, however, that a brief review from the standpoint of overall machine operation might be helpful here. To recapitulate, containers of the gable top variety having a pouring spout formed as a part thereof are filled with the desired beverage in the filling and sealing machine 70. From this machine they flow in a continuous procession to the orienting mechanism 76. This device receives the containers and rotates alternate ones 180° with respect to the preceding container in order to position the pouring spouts in such relationship that when pairs of the containers are placed back to back, the spouts will be on the outside and the fixed portions of the top ribs of the containers will be adjacent each other. The particular device illustratively disclosed for performing this orienting operation comprises a turntable 85 having a plurality of

stationary receptacles 88 and an equal number of alternately spaced rotatable receptacles 89 for receiving the containers. As the turntable rotates, containers in fixed receptacles will be turned 180° with respect to the containers in rotatable receptacles when the containers are discharged from the turntable. These oriented containers are then conveyed to a handle attaching mechanism which, after positioning the containers in adjacent, properly oriented pairs, staples a single handle to each such pair. Following this, the joined cartons are discharged and the handle stapling machine automatically resets itself for a succeeding operation.

We claim as our invention:

1. In a container pairing machine of the character set forth, the subcombination comprising a movable support, a first pair of receptacles rigidly fixed to said support and movable bodily therewith, a second pair of receptacles movably mounted on said support and movable bodily therewith, means for positioning containers in said receptacles, means for removing the containers from said receptacles, and means for conveying the containers from said movable support.

2. In a container pairing machine of the character set forth, a container orienting mechanism comprising, in combination, a rotatable support, a first receptacle rigidly fixed to said support and movable bodily therewith, a second receptacle mounted on said rotatable support but rotatable with respect thereto, and means for imparting equal but opposite angular movement to said rotatable support and to said second receptacle.

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