May 7, 1968 R. EITZINGER 3,381,358

APPARATUS FOR ASSEMBLING LIDS AND BOTTOMS OF CONTAINERS

Filed Sept. 10, 1965 3 Sheets-Sheet 1

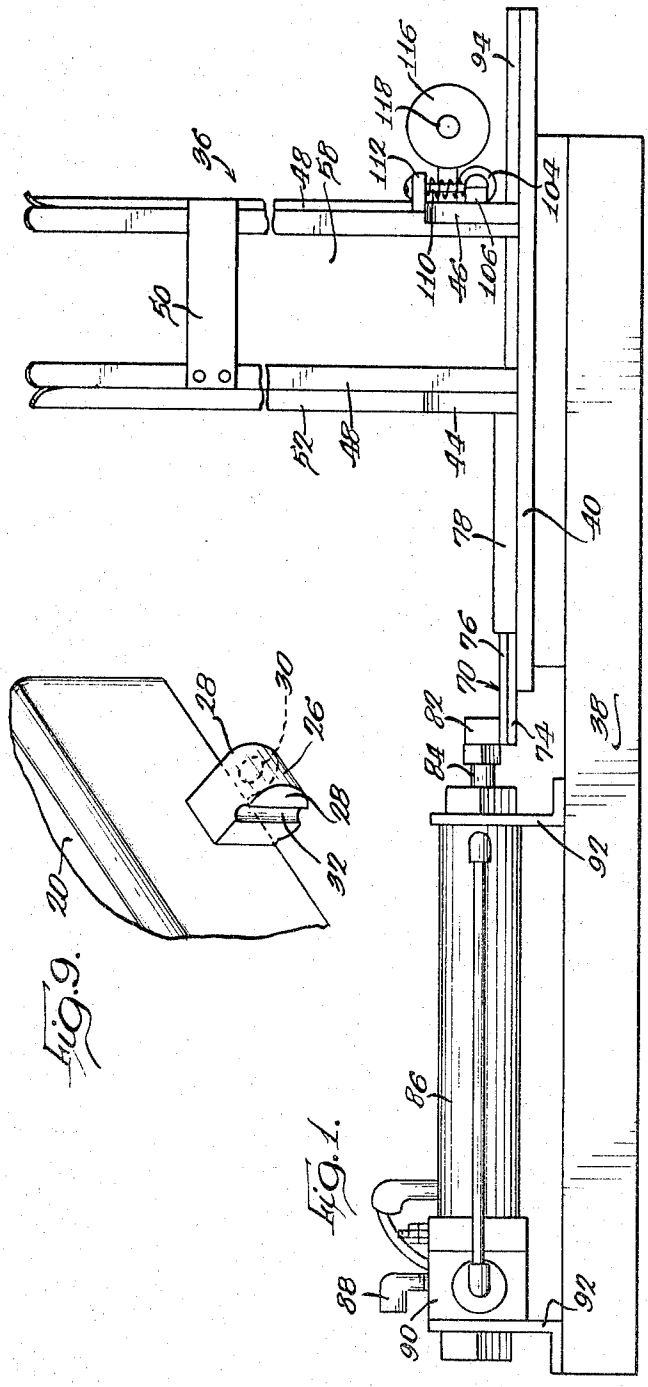


Fig. 1.

Fig. 3.

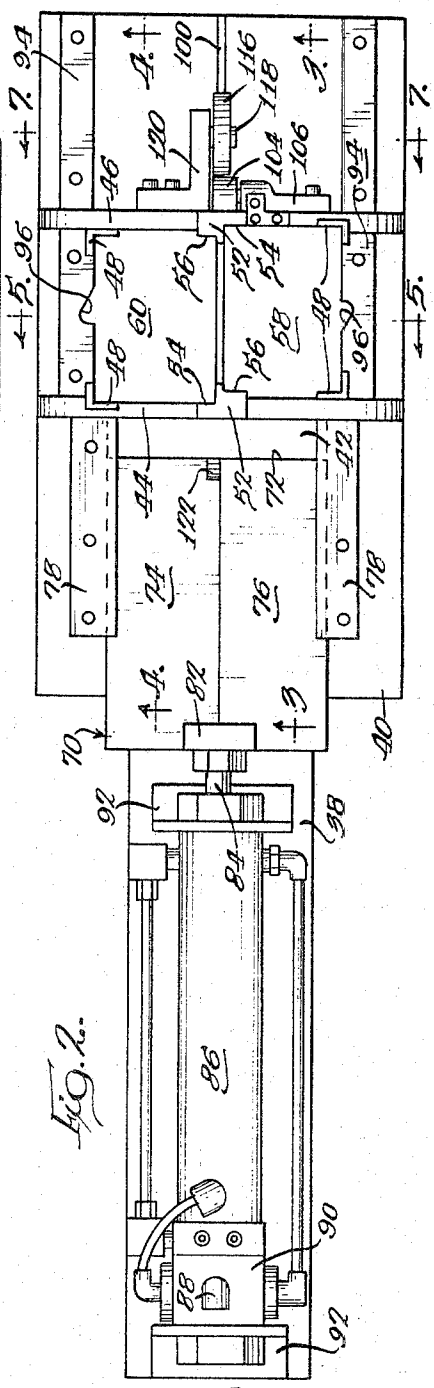


Fig. 2.

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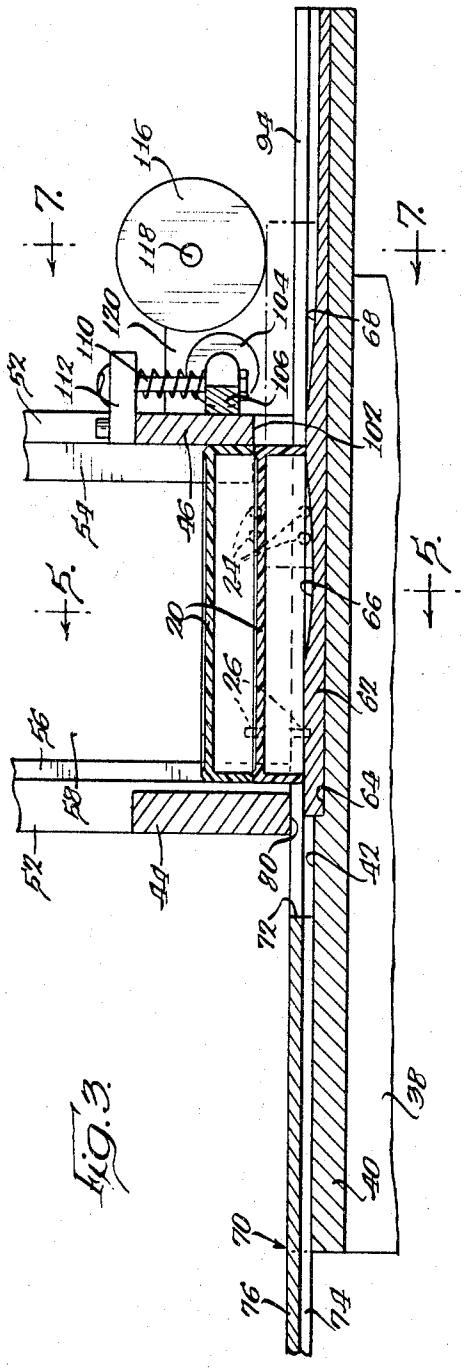


Fig. 3.

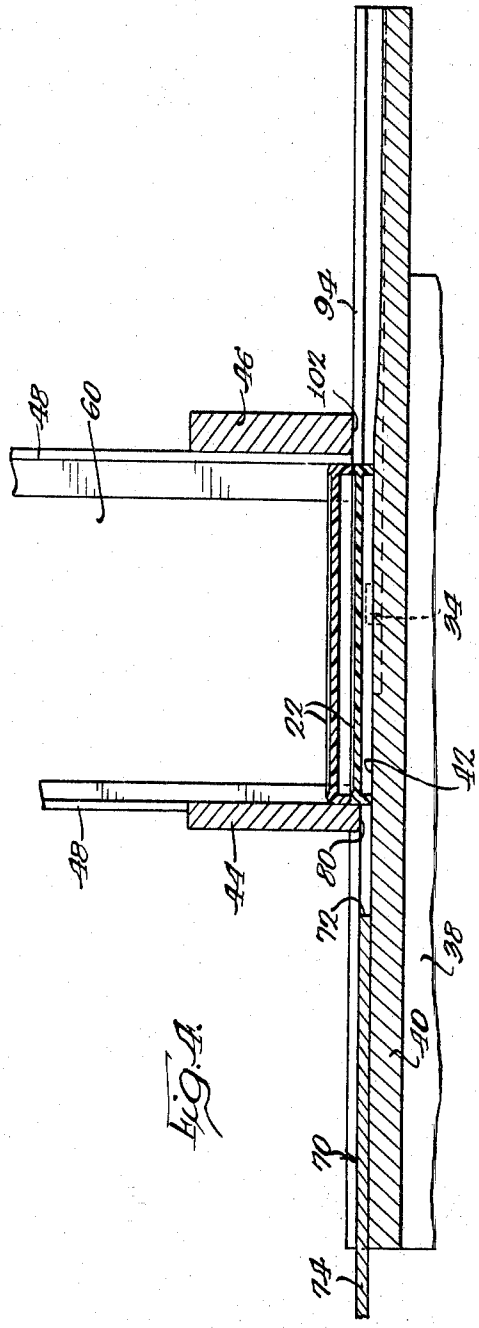


Fig. 4.

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APPARATUS FOR ASSEMBLING LIDS AND BOTTOMS OF CONTAINERS

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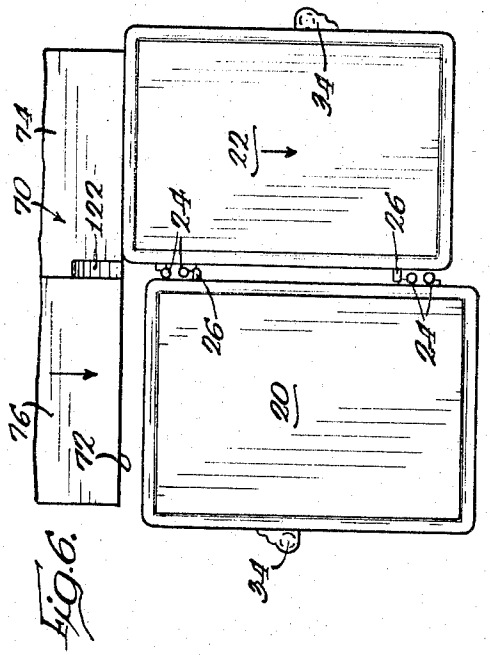


Fig. 6.

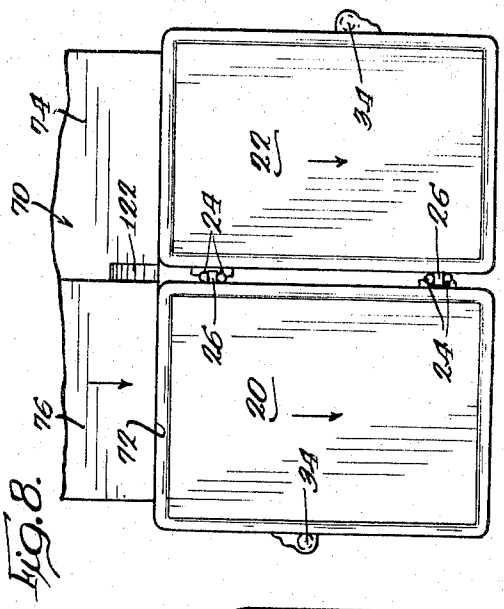


Fig. 8.

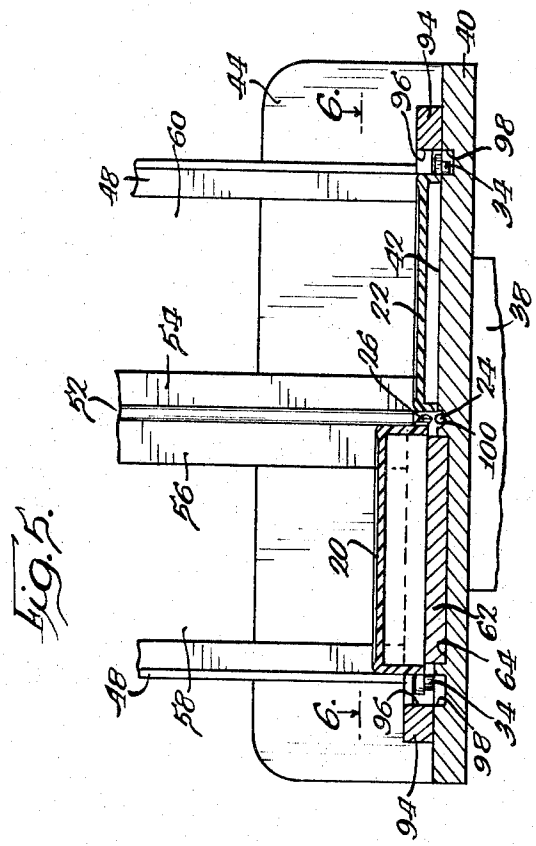


Fig. 5.

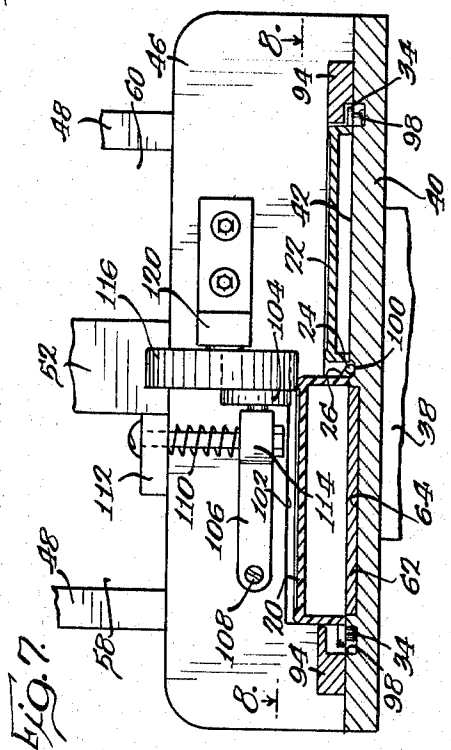


Fig. 7.

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APPARATUS FOR ASSEMBLING LIDS AND BOTTOMS OF CONTAINERS

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9 Claims. (Cl. 29—208)

ABSTRACT OF THE DISCLOSURE

The apparatus for assembling the lids to the bottoms of plastic containers, wherein the hinges consist of bulbous pintles engageable, in recesses of female hinge elements, comprises a pair of delivery chutes, one for the lids and one for the bottoms, which straddle a pair of trackway portions and from which the lids and bottoms are delivered to the trackway portion in slightly longitudinally offset relationship so that the hinge elements of the two container parts do not interfere with each other during delivery. The surfaces of the trackway portions are so contoured that the hinge elements of one container part are initially held in a horizontal plane higher than those of the other part. A reciprocating pusher advances successively and then simultaneously the two container parts first horizontally to align their hinge elements and second to push them under a bridge and onto trackway portions which permit their hinge elements to be vertically aligned and engaged. A presser roller, mounted on the bridge, presses the higher of the container parts down and onto its trackway portion and engages the hinge elements of the container lids and bottoms.

Background of the invention

This invention relates to an apparatus for assembling the lids and bottoms of plastic containers, particularly those containers wherein the lid and bottom are hinged together along one edge and the assembly can be effected by pressing the hinge elements into pivotal engagement.

Containers of the type with which the present invention is concerned are made of a slightly resilient moldable synthetic resin or plastic such as polystyrene, polyvinyl chloride, polypropylene, nylon and the like. These materials lend themselves readily to the making of inexpensive containers having lids hinged to their bottoms or bases. The hinges are simple affairs comprising a pair of spaced bulbous elements on one part adapted to be received in the recessed ends of a hinge element having a partly cylindrical portion. Because the material is somewhat resilient the parts will spring or give sufficiently to enable the hinge elements of one container part to be pressed into hinging engagement with the hinge elements of the other part. It is also customary to arrange the hinge elements with each part carrying a pair of spaced bulbous elements and a cylindrical element so that the container parts can be assembled in only one manner. Containers of the type described are more fully disclosed in Paul J. Eggers Patent No. 3,077,282, dated Feb. 12, 1963.

Heretofore, it has been customary for these container parts to be assembled manually. This is a tedious and time consuming task and while it does not take extremely high skills it, under the current economic situation, is relatively expensive. When using the apparatus of the present invention the number of persons involved in the assembly can be reduced to one-third those previously required to produce any particular assembly rate. It is more than likely that the assembly rate can be increased with increasing familiarity with the apparatus and with the use of automatic feeding equipment.

It is, therefore, a principal object of the present invention to provide a new and improved apparatus for pressably assembling the lids and bottoms of hinged plastic containers.

Another object is to provide a new and improved apparatus for pressably assembling the lids and bottoms of hinged plastic containers wherein the container parts of lids and bottoms are continuously fed to the assembly position to accommodate substantially automatic operation of the apparatus.

Another object is to provide a new and improved apparatus for pressably assembling the lids and bottoms of hinged plastic containers with the apparatus adaptable to a manufacturing line in which the container parts are molded, cooled, assembled together, filled (if that is desired), closed and packaged.

Another object is to provide a new and improved apparatus for pressably assembling the lids and bottoms of hinged plastic containers which may be adapted for the assembly of containers of various sizes.

Another object is to provide a new and improved apparatus for pressably assembling the lids and bottoms of hinged plastic containers which is simple in design, has few moving parts, is readily operated from a conventional power source, is easy to maintain and service, and is economical to manufacture.

Brief description of figures

Other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a front elevational view of the container assembling apparatus of the present invention in retracted position;

FIG. 2 is a plan view of the apparatus;

FIG. 3 is a fragmentary longitudinal sectional view on an enlarged scale through that side of the apparatus holding the container bottoms, and is taken along the line 3—3 of FIG. 2, looking in the direction of the arrows;

FIG. 4 is a fragmentary longitudinal sectional view on the scale of FIG. 3 through that side of the apparatus holding the container lids or covers, and is taken along the line 4—4 of FIG. 2, looking in the direction of the arrows;

FIG. 5 is a fragmentary transverse sectional view on the scale of FIG. 3 showing the relative positions of the container bottoms and lids before operation of the apparatus and the assembly of the bottoms and lids, and is taken along the line 5—5 of FIGS. 2 and 3, looking in the direction of the arrows;

FIG. 6 is a partly schematic illustration showing the container parts in their FIG. 5 position, and is taken along the line 6—6 of FIG. 5, looking in the direction of the arrows;

FIG. 7 is a fragmentary transverse sectional view on the scale of FIG. 3 showing the assembled positions of the container bottoms and lids after operation of the apparatus, and is taken along the line 7—7 of FIGS. 2 and 3, looking in the direction of the arrows;

FIG. 8 is a partly schematic illustration showing the container parts in their FIG. 7 and assembled position, and is taken along the line 8—8 of FIG. 7, looking in the direction of the arrows; and

FIG. 9 is an enlarged fragmentary perspective view illustrating a detail of the female hinge element.

Specific description

FIGS. 5 to 9 hereof best illustrate the containers of the type more fully disclosed in the aforementioned Patent No. 3,077,282. Each container comprises a bottom or base 20 and a lid or cover 22, and projecting male and female hinge elements molded integrally with the back wall. Each male hinge element comprises a pair of spaced

ball-like pintles 24, and the female hinge element 26 comprises an elongated body which is most clearly seen in FIG. 9. The female hinge element 26 is bounded on its opposite ends by generally plane surfaces 28, one of which has a central recess or depression 30 and the other of which is formed with a transverse slot 32 which is arranged generally parallel to the rear wall of the bottom 20 or lid 22, as the case may be. The recess 30 and the slot 32 cooperate with the bulbous pintles 24 of the male hinge element to pivot the container parts together.

It will also be noted from FIGS. 6 and 8 that each of the container parts 20, 22 bears a male hinge element and a female hinge element so that they can be assembled in only one position, thus assuring that when assembled they will close properly to form a utilitarian container.

Each of the container parts 20, 22 is formed with a catch 34 which engages with formed elements on the front wall of the opposite part to secure the parts in closed position in a known manner.

The container parts are assembled by aligning the pintles 24 to straddle the cylindrical hinge element 26 and then pressing the hinge elements toward each other in a direction parallel to the surface of the back wall so that the bulbous pintles 24 engage in the recess 30 and slide to the center of the slot 32, thus providing an operable hinge.

Machine 36 for carrying out the foregoing assembly is the subject matter of the present invention, and has a base 38 on which is mounted a plate 40 forming the bottom of a trackway 42 across which the container parts 20, 22 are moved during the assembly thereof. Straddling the trackway 42 are a pair of bridges 44 and 46 which are spaced apart a distance sufficient to accommodate the container parts 20, 22 therebetween in longitudinally staggered relationship. Upstanding from the bridges 44, 46 are four corner guides 48 of right angle configuration with the guides being secured together by straps 50 to give them stability. At about the midpoint of each of the bridges 44 and 46 there is upstanding a guide 52 which has offset reentrant guiding angles 54, 56 to cooperate with the corner angle guides 48 which are aligned therewith and are faced thereto to define a pair of chutes 58, 60 down which the container parts 20 and 22 are adapted, respetcively, to fall open side down as is most clearly seen from the positioning of the parts in FIGS. 3, 4, 5 and 7. In the apparatus as shown the operator manually feeds the container parts to the proper chute open side down with the hinge elements directed toward the other chute. They then fall by gravity to the top of the stack. (For the sake of clarity complete stacks are not shown.) Since the chutes 58 and 60 are longitudinally slightly offset, the container parts 20 and 22 will arrive at the bottom thereof in the relative positions shown in FIG. 6 wherein the hinge elements are on the adjacent container part walls but are longitudinally misaligned so that they cannot be engaged. The misalignment permits loading the chutes in an orderly fashion and without interference between the stacks.

As seen most clearly in FIGS. 3 and 5, the bottom of the chute 58 is formed by an insert plate 62 set in a wide groove 64 in the trackway plate 40. The upper surface of the plate 62 is contoured to provide a slight depression 66 and an outlet depression 68 so that at the outlet side of the machine the upper surface of the insert plate 62 is flush with the top of the trackway plate 40. The insert plate 62 provides the sliding support for the sides of the container bottom 20 and thus holds the female and male hinge elements of the container bottom in a plane above their counterparts on the container lid 22. This permits the container parts to be differentially slid to align the hinge elements so that they may be pressed into pivotal engagement.

The container parts 20 and 22 are moved through the apparatus 34 and are aligned by a pusher 70 which has a straight forward edge 72 and a low side 74 and a high side 76 which is undercut to slide over the raised insert plate 62. The pusher 70 is guided by L-shaped guide members 78 which overlie the side edges of the pusher 70 and are bolted to the track plate 40. The bridge 44 is cut out at 80 to accommodate the sliding movement of the pusher 70. At its rear end the pusher 70 has a block 82 connected to piston rod 84 of a double acting air cylinder 86 which has a nipple 88 adapted to be connected to a source of air under pressure and a conventional automatic reversing valve mechanism 90. The construction of such air cylinders is well known and understood, and no specific description will be given. The cylinder is mounted on a pair of brackets 92 upstanding from the base 38.

The container parts 20, 22 are guided through and from their chutes 58, 60 by L-shaped side guides 94 bolted to the trackway forming plates 40. These are L-shaped and similar to the guides 78 in order to accommodate the catches 34. It will be observed from FIG. 2 that each of them is cut out at 96 to permit the catches 34 to fall therepast during the gravity feed of a particular element to the assembly position.

As seen best in FIGS. 5 and 6, the track plate 40 is grooved at 98 to accommodate the catches and at 100 to accommodate the hinge elements in both unassembled and assembled conditions. Whether or not these grooves will always be necessary depends to a very large extent upon the design of the particular container being assembled.

The bridge 46 is undercut at 102 to the respective height necessary to accommodate the lids 22 and bottoms 20 as they are pushed forwardly to assembly and exit from the machine. As they move outwardly they pass below a pivoted roller 104 carried on the end of an arm 106 which is pivotally mounted at 108 to the outer or exit face of the bridge 46. The roller 104 and arm 106 are biased downwardiy or in the clockwise direction as seen in FIG. 7 by a spring 110 acting between a pair of abutments 112 carried on the bridge 46 and 114 carried on the arm 106. The roller 104 is primarily a steering roller and is intended to introduce the container bottom 20 below a presser roller 116 which is mounted on a fixed shaft 118 adjacent the outer end of an arm or bracket 120 carried on the outer face of the bridge 46. Thus, as the pusher 70 advances the lid 22 and bottom 20 of each container outwardly under the undercut 102 in the bridge 46, the roller 104 first engages the bottom 20 and tilts it downwardly to follow the recess 68, the container parts having been aligned previously by being engaged by the forward face 72 of the pusher 70. As this is accomplished the male and female hinge elements are aligned. The roller 116 lines up over the hinge area and particularly engages the bottom 20 over the rear wall so as firmly to press the hinge elements carried by the bottom 20 into pivotal engagement with the hinge elements carried by the lid 22, thus engaging the bulbous pintle elements 24 in the recess 30 and slot 32 formed in the cylindrical female hinge element 26.

As the pneumatic cylinder 86 advances the pusher 70 it will be seen from FIG. 6 that first it engages the lid portion 22 and moves its hinge elements below the bottom portion hinge elements so that the latter are aligned. In moving beneath each other, it may be that these hinge elements will temporarily engage one another. It is for this reason that the plate 62 is formed with the depression 60 to permit some leeway or shifting movement in a vertical direction between the different stacks of lids and bottoms in the chutes 58 and 60. This movement is very slight and ordinarily does not occur. However, it is desired that it be accommodated in order that there be no difficulty in the proper alignment of the bottoms and tops.

In the further advancement of the lid and bottom, the bottom is directed down the incline 68 by engagement with the roller 104. This tends to shift the stack of bottoms which also is accommodated by the recess 66. As

the bottom 20 comes under the roller 116, the leading hinge elements are pressed into engagement and then the succeeding ones. Subsequently, the completed container is then pushed outwardly and exited from the machine by later advanced assembled containers.

During the forward movement of the pusher 70 there is some danger that the leading edge 72 might engage the projecting hinge elements 24 and 26 of the lid which lies atop the lowermost lid in the stack and break them off or damage them. The pusher 70 is therefore beveled at 122 to a narrow lip at the base of the edge 72 and the depending hinge elements ride up the bevel to the upper face of the pusher.

As the pusher 70 is retracted, it slides below the stacks of bottoms and lids in the chutes 58, 60 and when completely withdrawn the stacks settle by gravity to position another bottom and lid as shown in FIGS. 5 and 6 for the subsequent assembly. Ordinarily the valve mechanism 90 of the air cylinder 86 will be set for automatic reversing and the assembly process will be repeated. With attendants replenishing the stacks of bottoms and lids in the chutes the assembly process may be continued indefinitely.

This apparatus lends itself readily to a complete manufacturing line. The molded bottoms and lids may be fed on a belt or other conveyor to the upper ends of the chutes 58 and 60 where they are entered open side down to the top of the respective stacks therein. The assembled containers may similarly be carried away from the exit or right end of the apparatus (FIGS. 1 and 2) for a subsequent operation of filling, closing and packaging.

Inasmuch as the operation of the apparatus has been explained in the description of the construction, no separate description of the function will be given.

From the foregoing description it is appreciated that the objectives which were claimed for the invention and apparatus at the outset of this specification have been attained.

While a preferred embodiment of the apparatus for assembling the lids and bottoms of plastic containers has been shown and described, it will be apparent that modifications and variations thereof may be made without departing from the underlying principles of the invention. It is therefore desired, by the following claims, to include within the scope of the invention all such variations and modifications by which substantially the results of this invention may be obtained through the use of substantially the same or equivalent means.

What is claimed as new and desired to be secured by United States Letters Patent is:

1. Apparatus for assembling lids to bottoms of plastic containers having hinged lids with hinge elements consisting of pairs of bulbous pintles engageable in recesses in female elements, comprising in combination, a base defining a trackway for the lids and bottoms, means for delivering lids and bottoms to said trackway in a first position in side by side relationship with their hinge elements longitudinally offset, said trackway being formed to support one of the pairs of lids and bottoms with their hinge elements in a horizontal plane different from that of the other part, a reciprocable pusher engageable with the container parts to move them to and through a second position and simultaneously longitudinally to align their hinge elements for engagement, and roller presser means mounted for free rotation on a fixed axis in said second position and under which that one of the aligned container parts whose hinge elements are in the higher horizontal plane is pushed cooperating with said trackway and engageable with said last mentioned container part to press said last mentioned part downwardly to cause the hinge elements of the two parts to engage.

2. Apparatus for assembling lids to bottoms of plastic containers having hinged lids with hinge elements consisting of pairs of bulbous pintles engageable in recesses in female elements, comprising in combination, a base defining a trackway for the lids and bottoms, means positioned over said trackway for supporting stacks of lids and bottoms in side by side relationship with their hinge elements longitudinally offset and from which said lids and bottoms are delivered to said trackway, said trackway being formed to support one of the parts of lids and bottoms with the hinge elements in a horizontal plane different from that of the other part, a reciprocable pusher engageable with only the lowermost container parts in the stacks of lids and bottoms to move them to and through a second position and simultaneously longitudinally to align their hinge elements for engagement, and roller presser means mounted for free rotation on a fixed axis in said second position and under which that one of the aligned container parts whose hinge elements are in the higher horizontal plane is pushed cooperating with said trackway and engageable with said last mentioned container part to press said last mentioned part downwardly to cause the hinge elements of the two parts to engage.

3. The combination set forth in claim 2, wherein said means for supporting stacks of lids and bottoms comprises a pair of bridges straddling said trackway and longitudinally spaced therealong, and a plurality of vertical guide members carried by and upstanding from said bridges, said guide members being positioned to engage the corners of the lids and covers in the stacks.

4. The combination set forth in claim 2, wherein said trackway is provided with a raised insert to support the hinge elements of the bottoms in a plane higher than that of the hinge elements of the lids.

5. The combination set forth in claim 4, wherein said raised insert portion of said trackway is formed with a transverse depression to accommodate shifting movement of the parts as they are assembled.

6. The combination set forth in claim 3, wherein said presser means comprises a bracket fixed to the outer face of one of said bridges, and a roller mounted thereon for free rotation on a fixed axis.

7. The combination set forth in claim 2, including means directing that container part whose hinge elements are in the higher horizontal plane into engagement with said presser means as the container parts are moved through the apparatus.

8. The combination set forth in claim 7, wherein said part directing means includes an inclined surface on said trackway and a freely rotatable roller spring biased toward said trackway.

9. The combination set forth in claim 2, including automatically reversible means for reciprocating said pusher.

References Cited

UNITED STATES PATENTS

2,075,795	4/1937	Babcock	156—564
2,613,861	10/1952	Goerlitz	29—211
2,624,907	1/1953	Graham	29—453
2,928,165	3/1960	Carlzen et al.	29—203
3,037,268	6/1962	Mitchell et al.	29—203

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