Nov. 4, 1969 J. W. SCULLY 3,476,022

CONTAINER FORMING MACHINE

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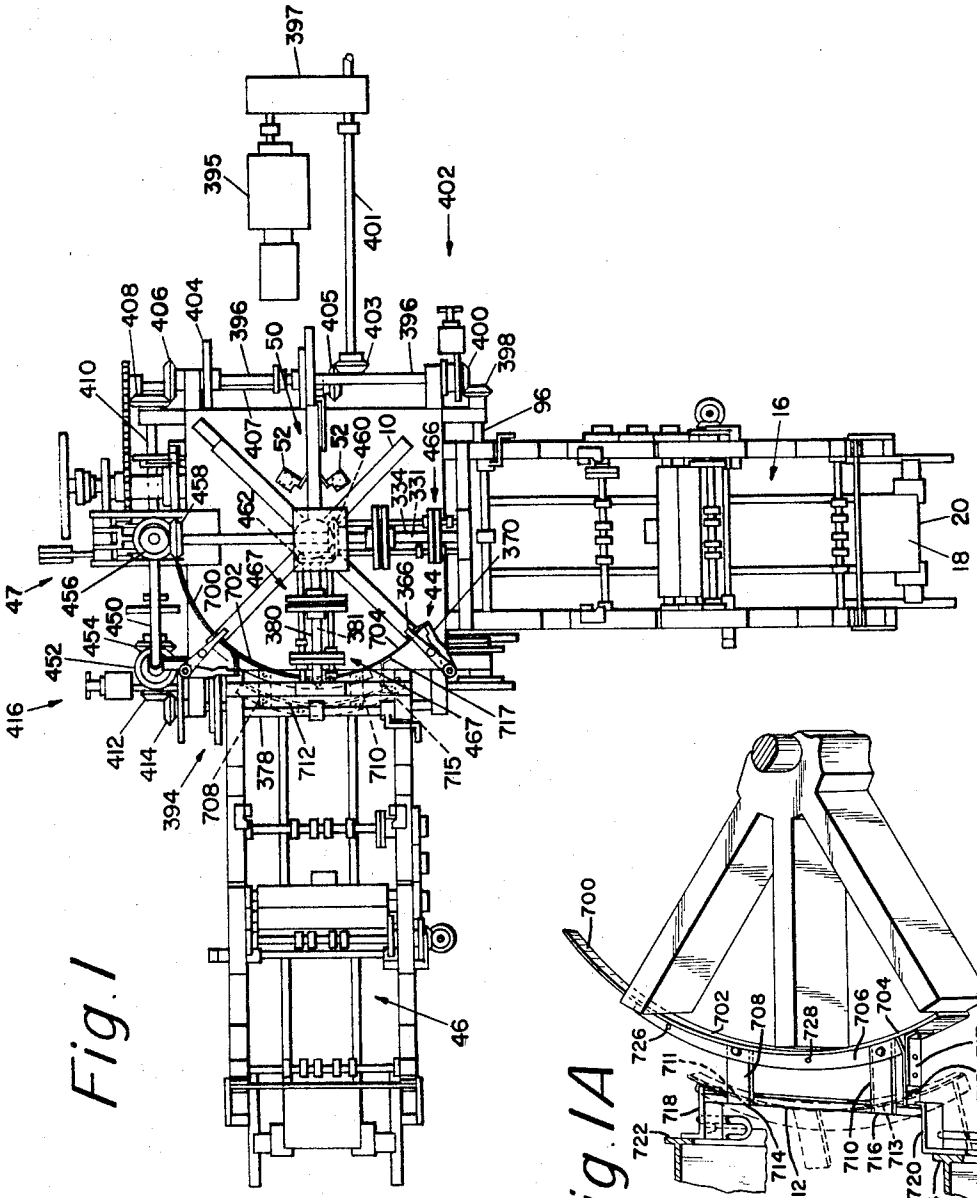


Fig. 1

Fig. 1A

INVENTOR
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BY Robert E. Cunningham

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CONTAINER FORMING MACHINE

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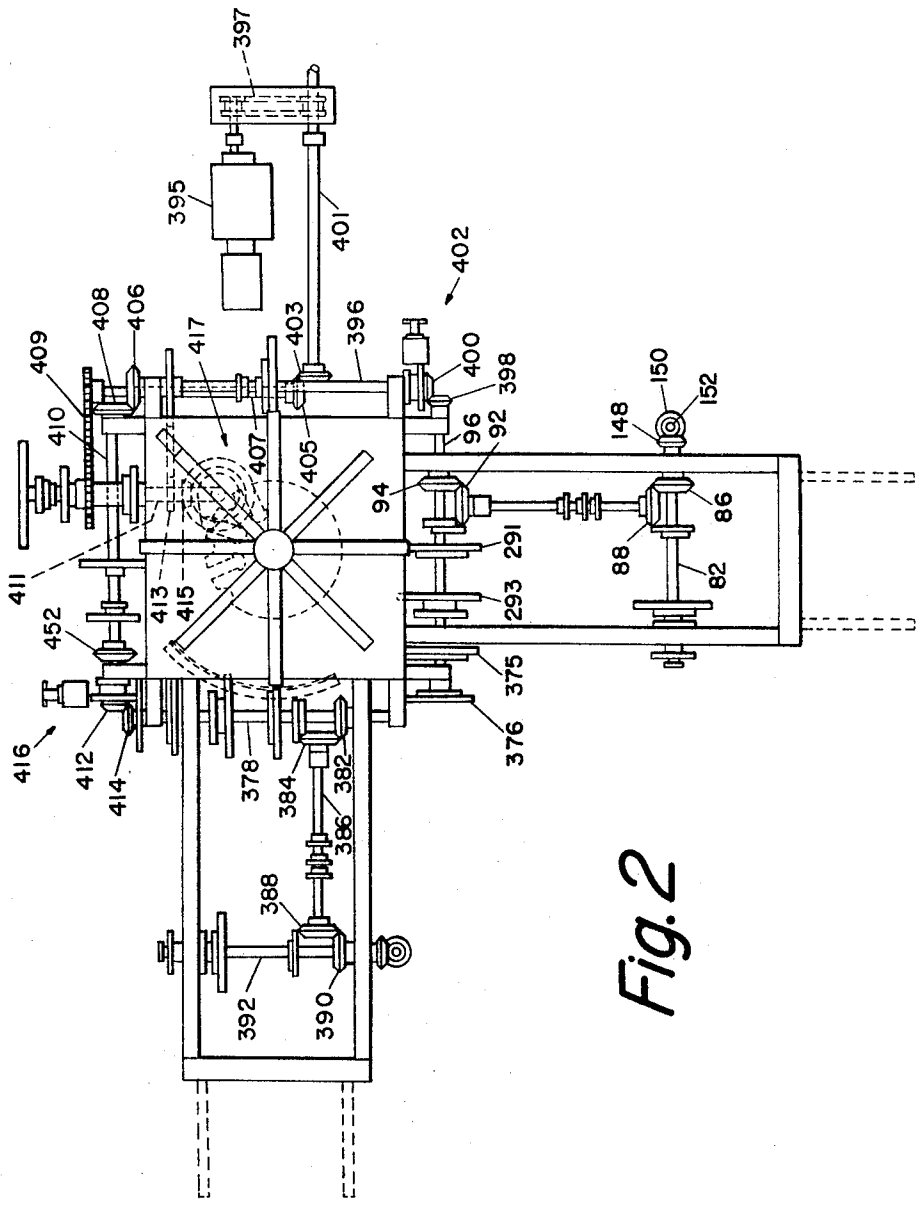


Fig. 2

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Nov. 4, 1969 J. W. SCULLY 3,476,022

CONTAINER FORMING MACHINE

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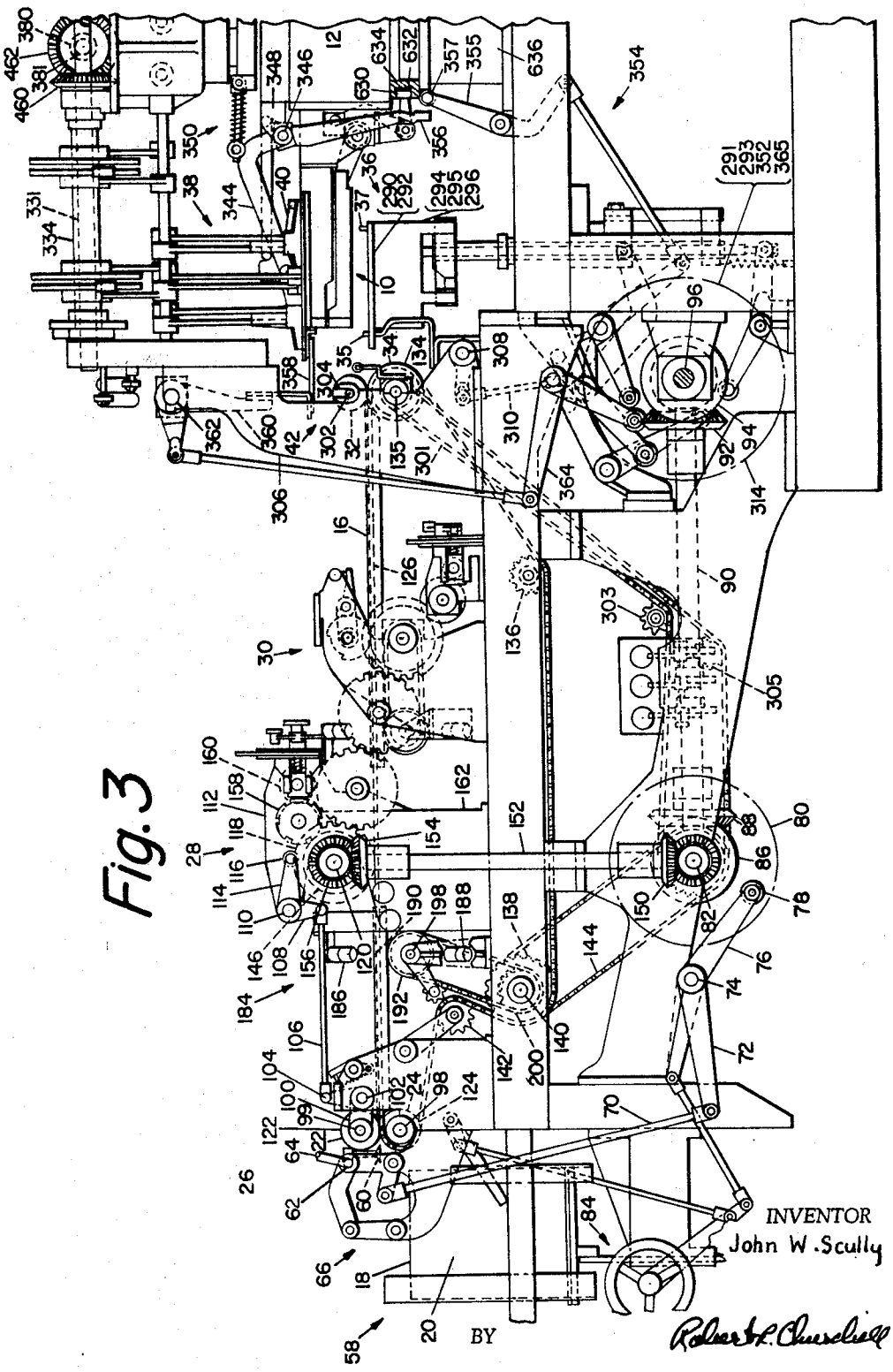


Fig. 3

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Nov. 4, 1969 J. W. SCULLY 3,476,022

CONTAINER FORMING MACHINE

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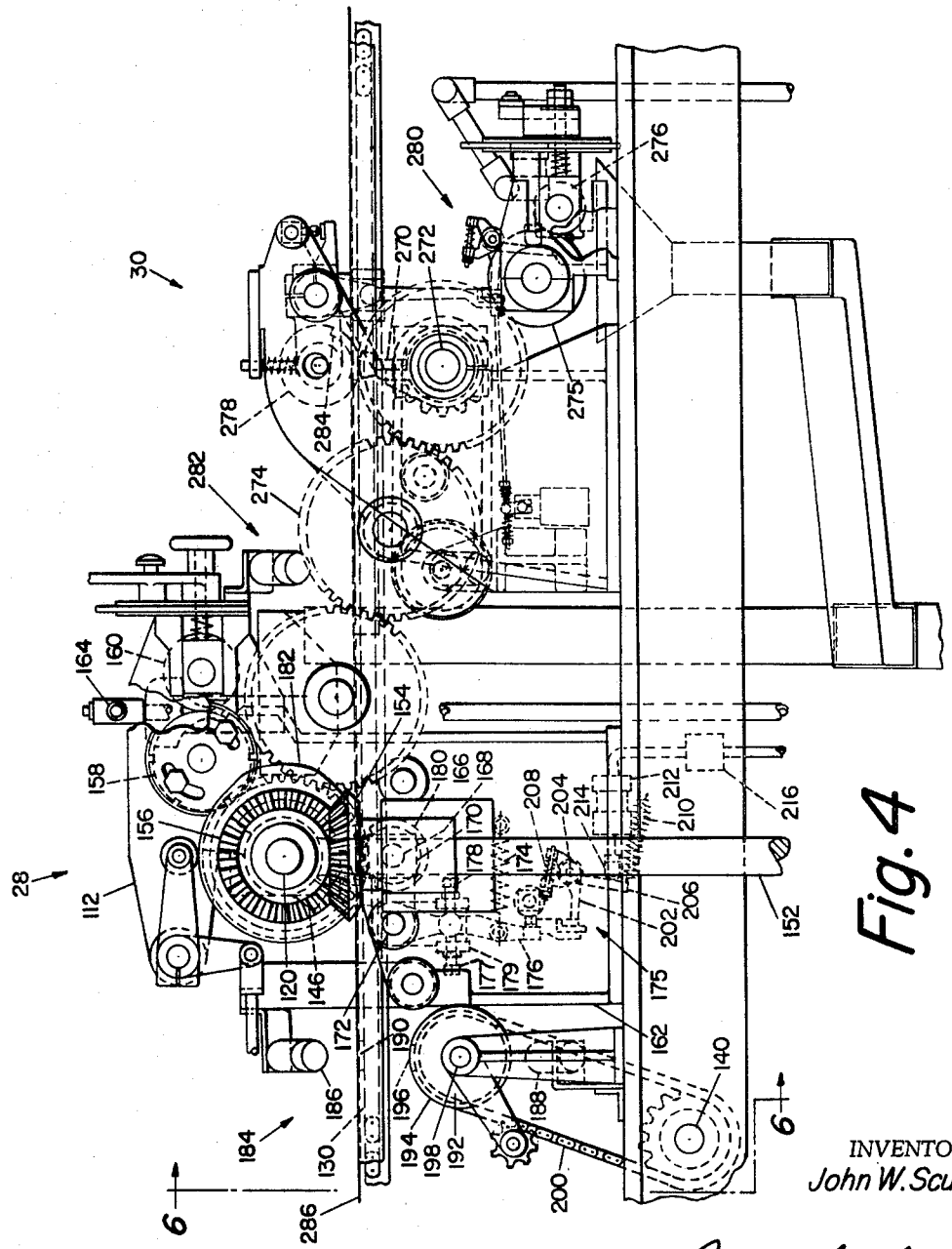


Fig. 4

INVENTOR
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CONTAINER FORMING MACHINE

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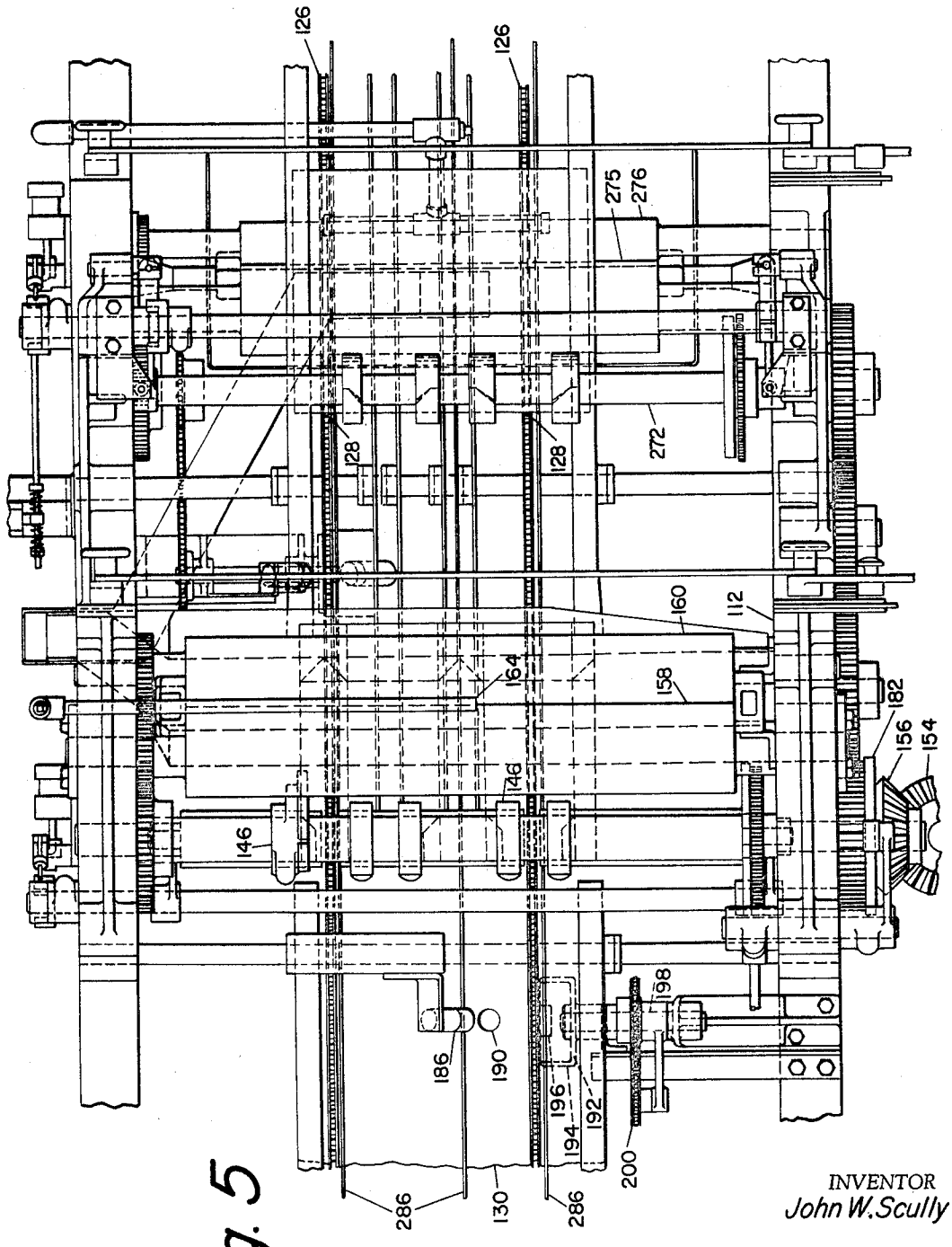


Fig. 5

INVENTOR
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CONTAINER FORMING MACHINE

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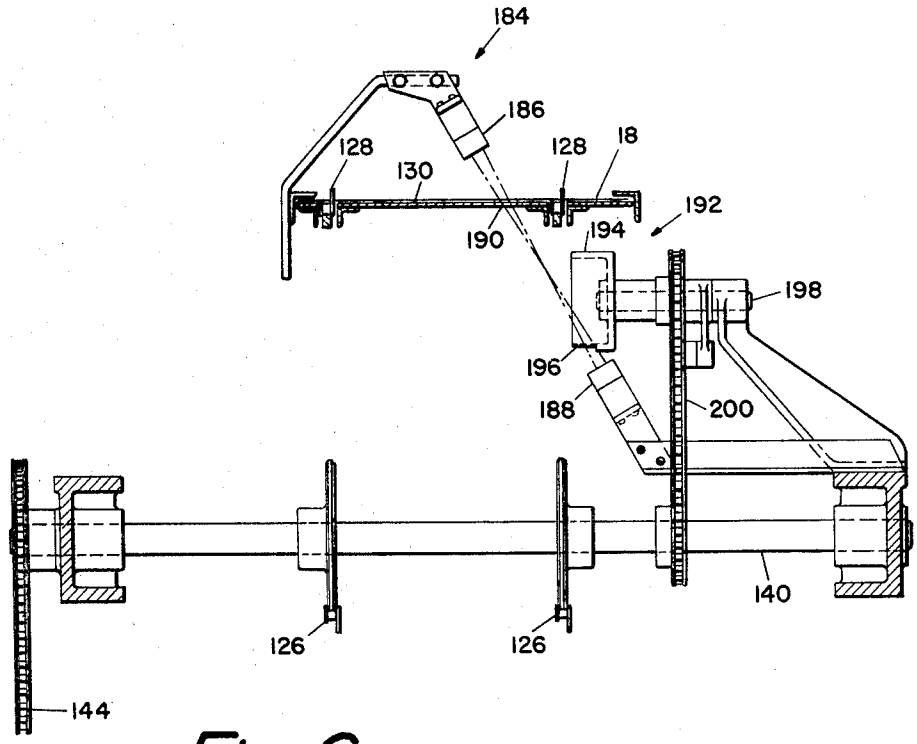


Fig. 6

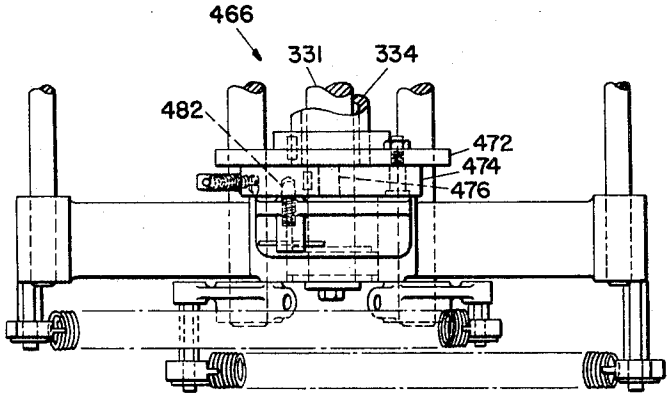


Fig. 13

INVENTOR
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CONTAINER FORMING MACHINE

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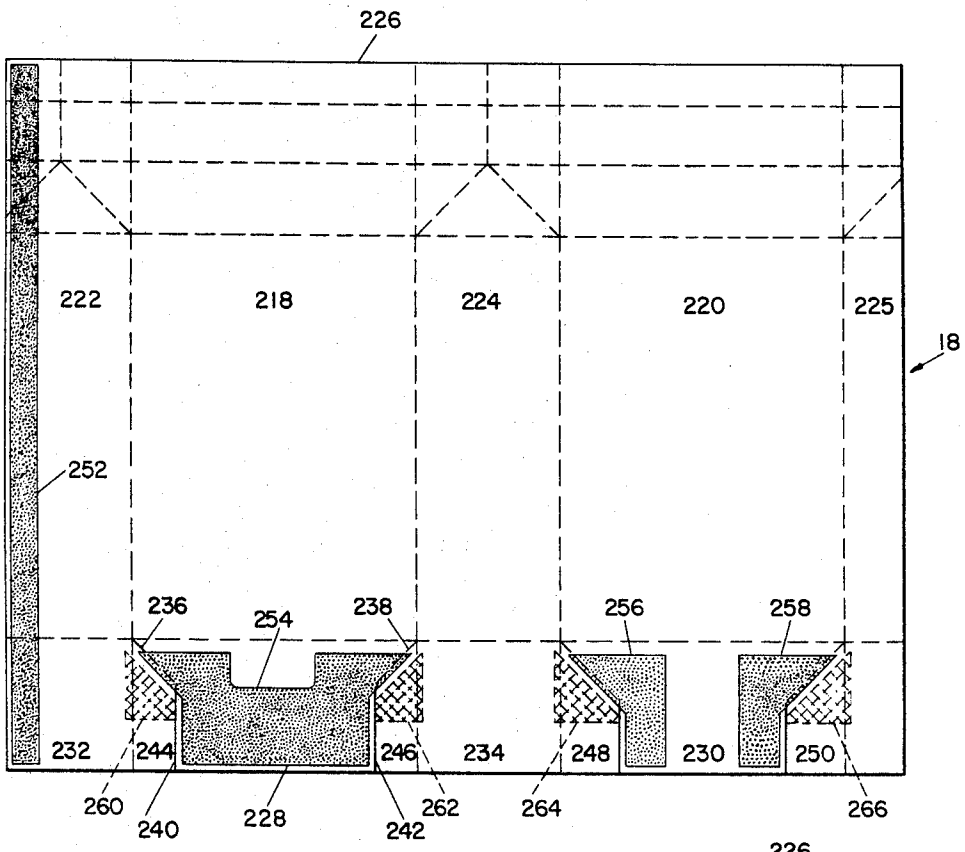


Fig. 7

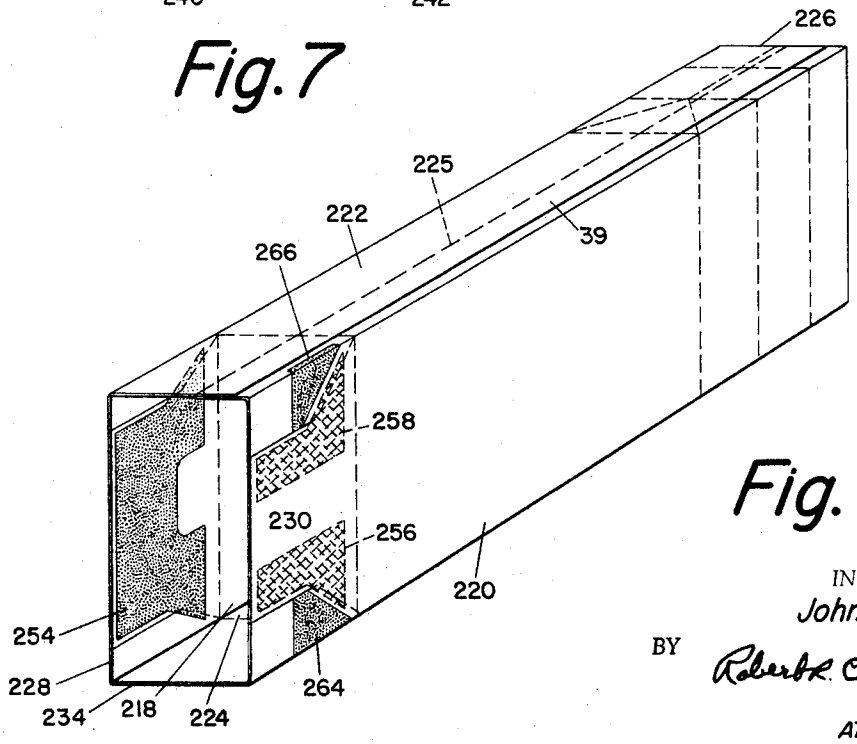


Fig. 8

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CONTAINER FORMING MACHINE

Filed May 31, 1966 19 Sheets-Sheet 8

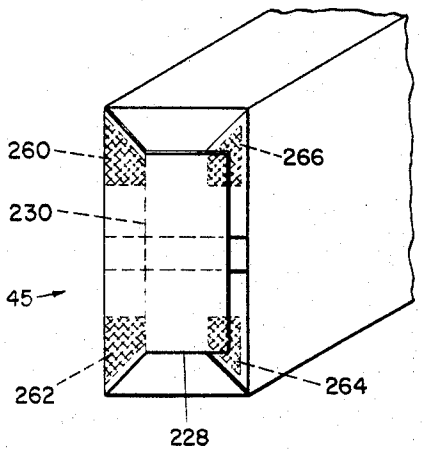


Fig. 11

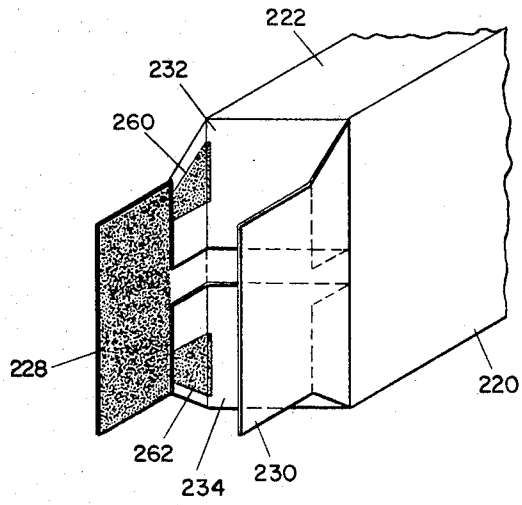


Fig. 9

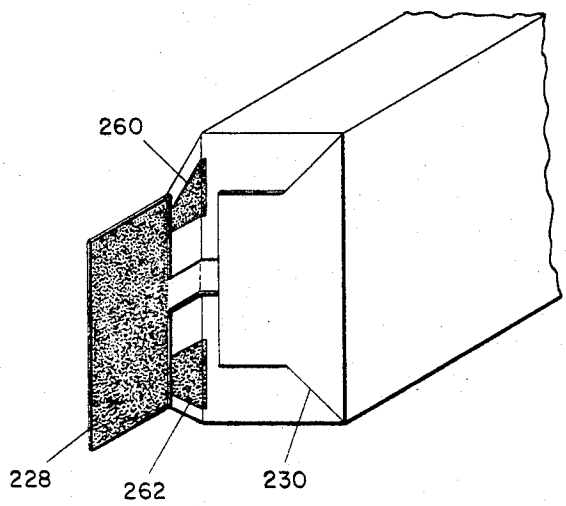


Fig. 10

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CONTAINER FORMING MACHINE

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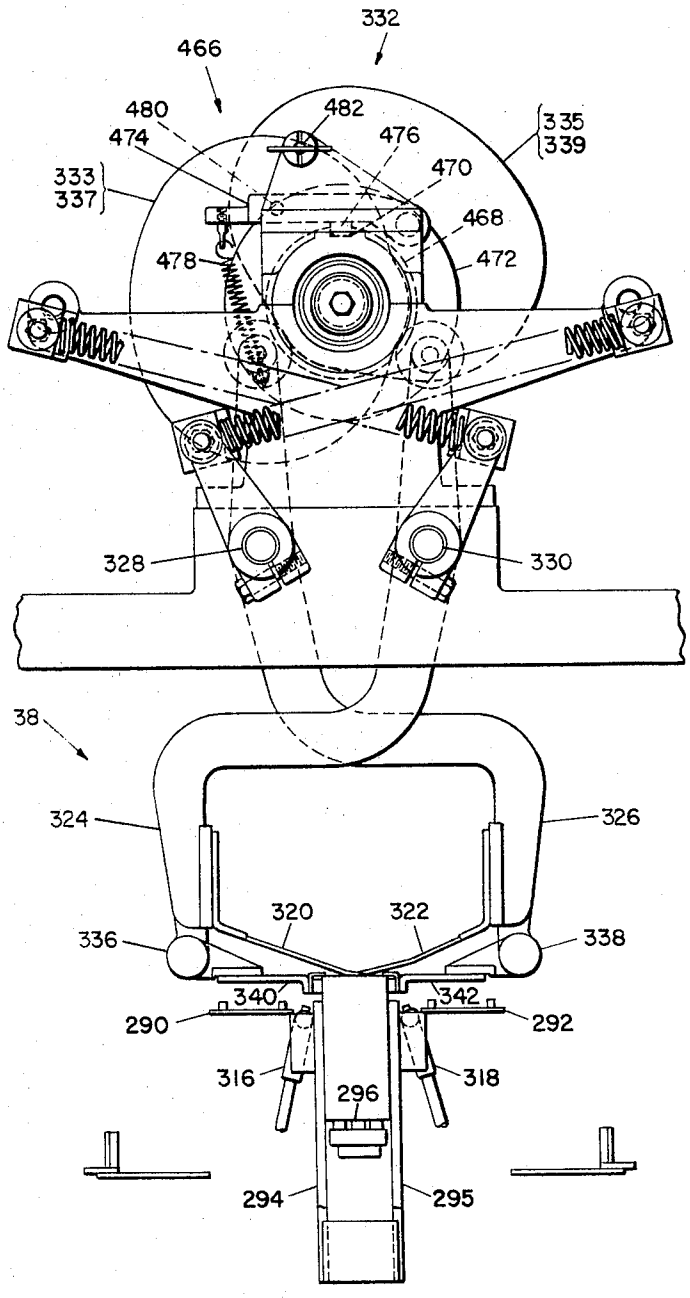


Fig. 12

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CONTAINER FORMING MACHINE

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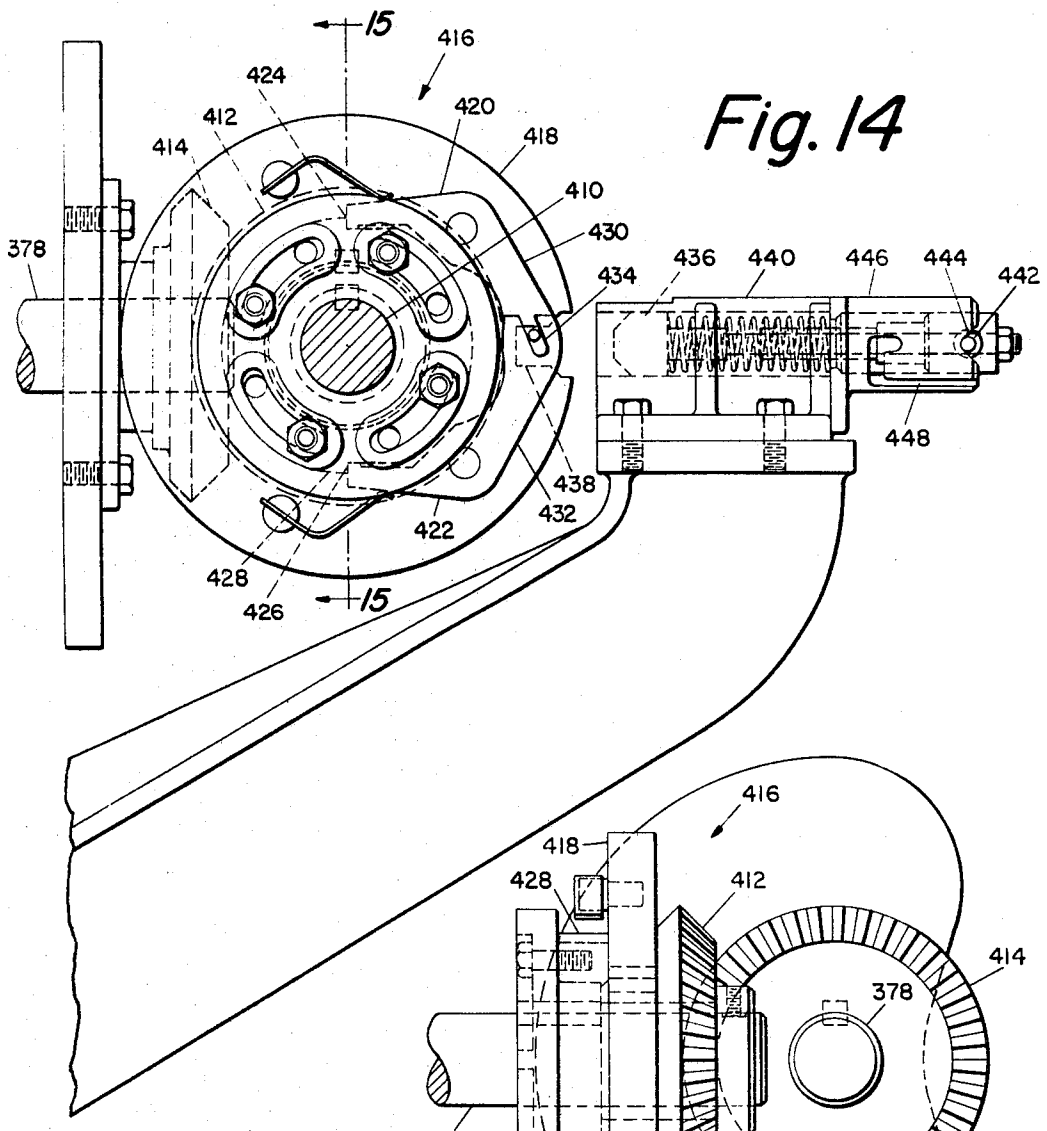


Fig. 14

Fig. 15

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CONTAINER FORMING MACHINE

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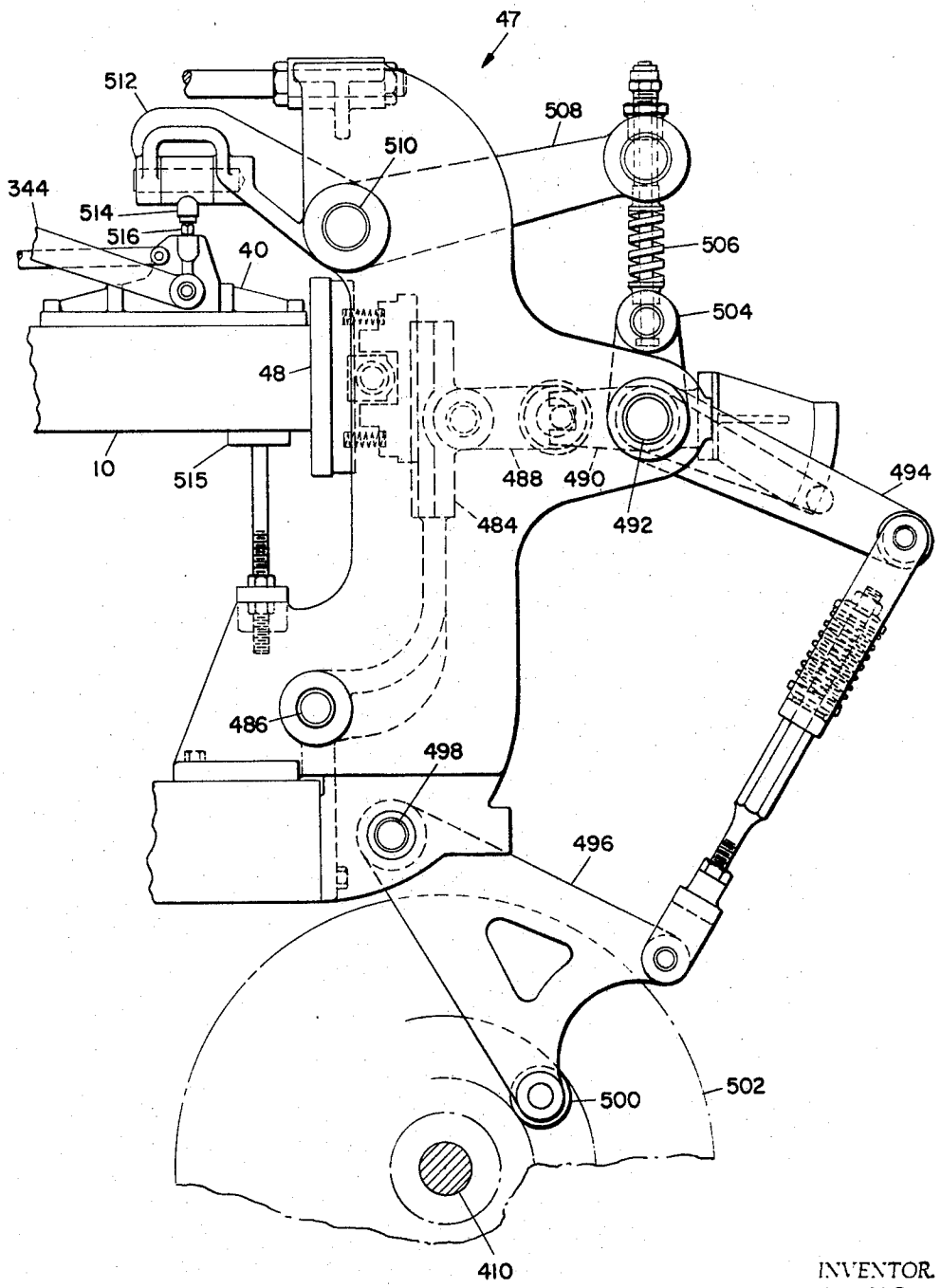


Fig. 16

INVENTOR.
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Nov. 4, 1969 J. W. SCULLY 3,476,022

CONTAINER FORMING MACHINE

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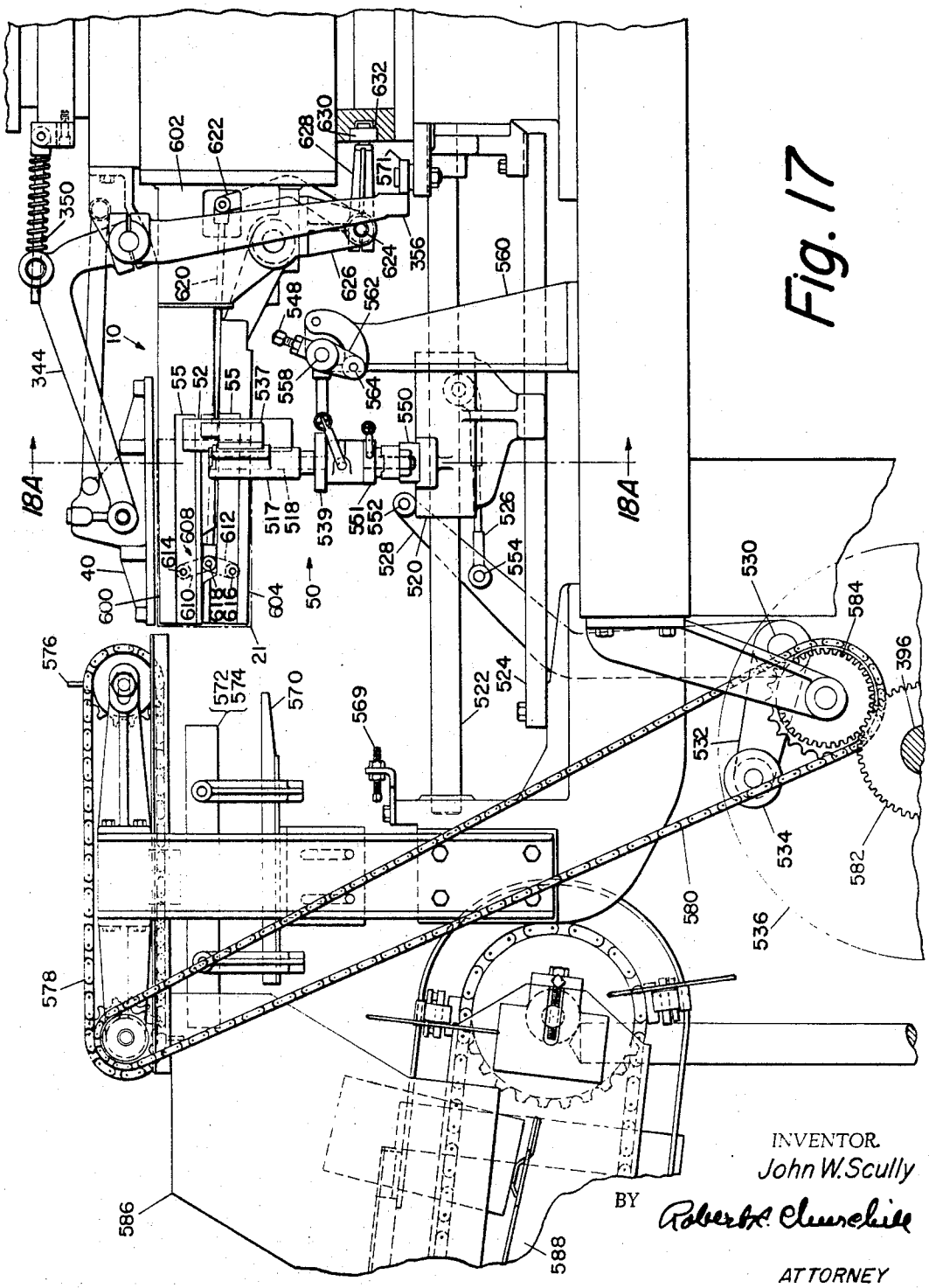


Fig. 17

INVENTOR.
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CONTAINER FORMING MACHINE

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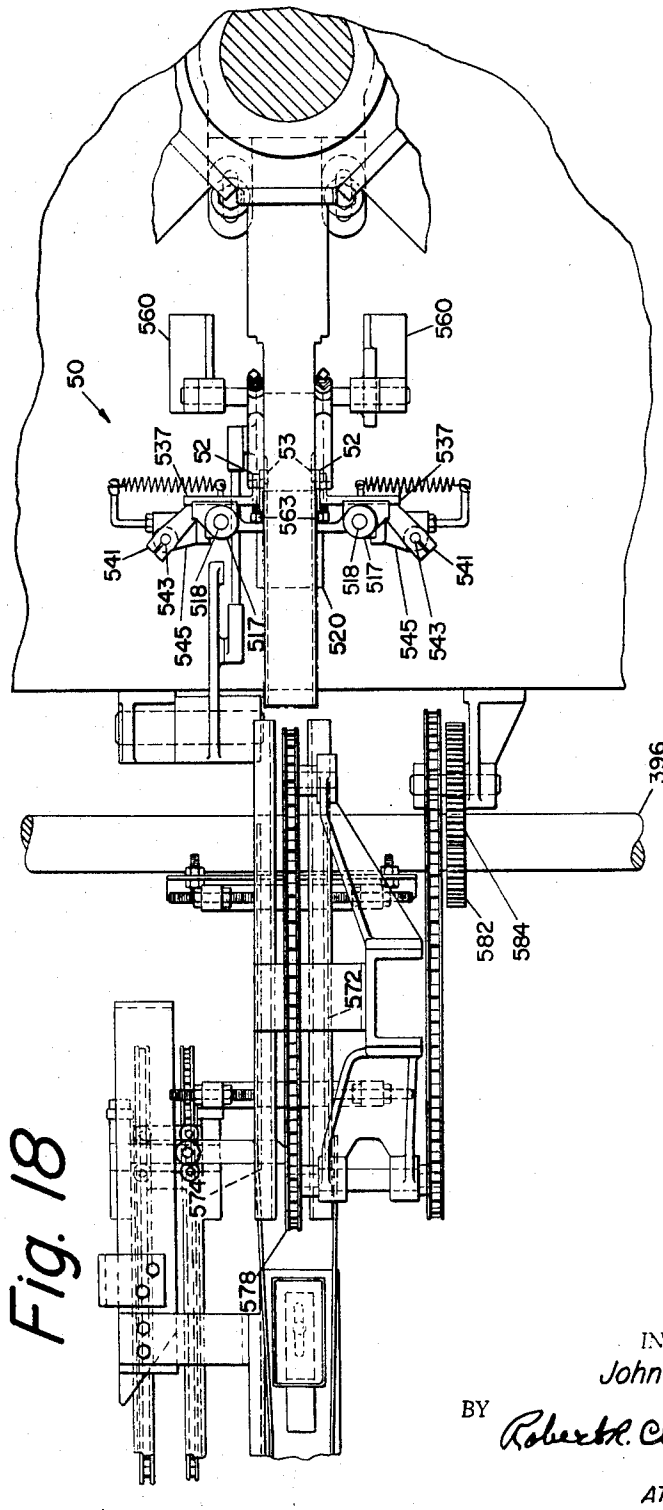


Fig. 18

INVENTOR.
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Nov. 4, 1969 J. W. SCULLY 3,476,022

CONTAINER FORMING MACHINE

Filed May 31, 1966 19 Sheets-Sheet 14

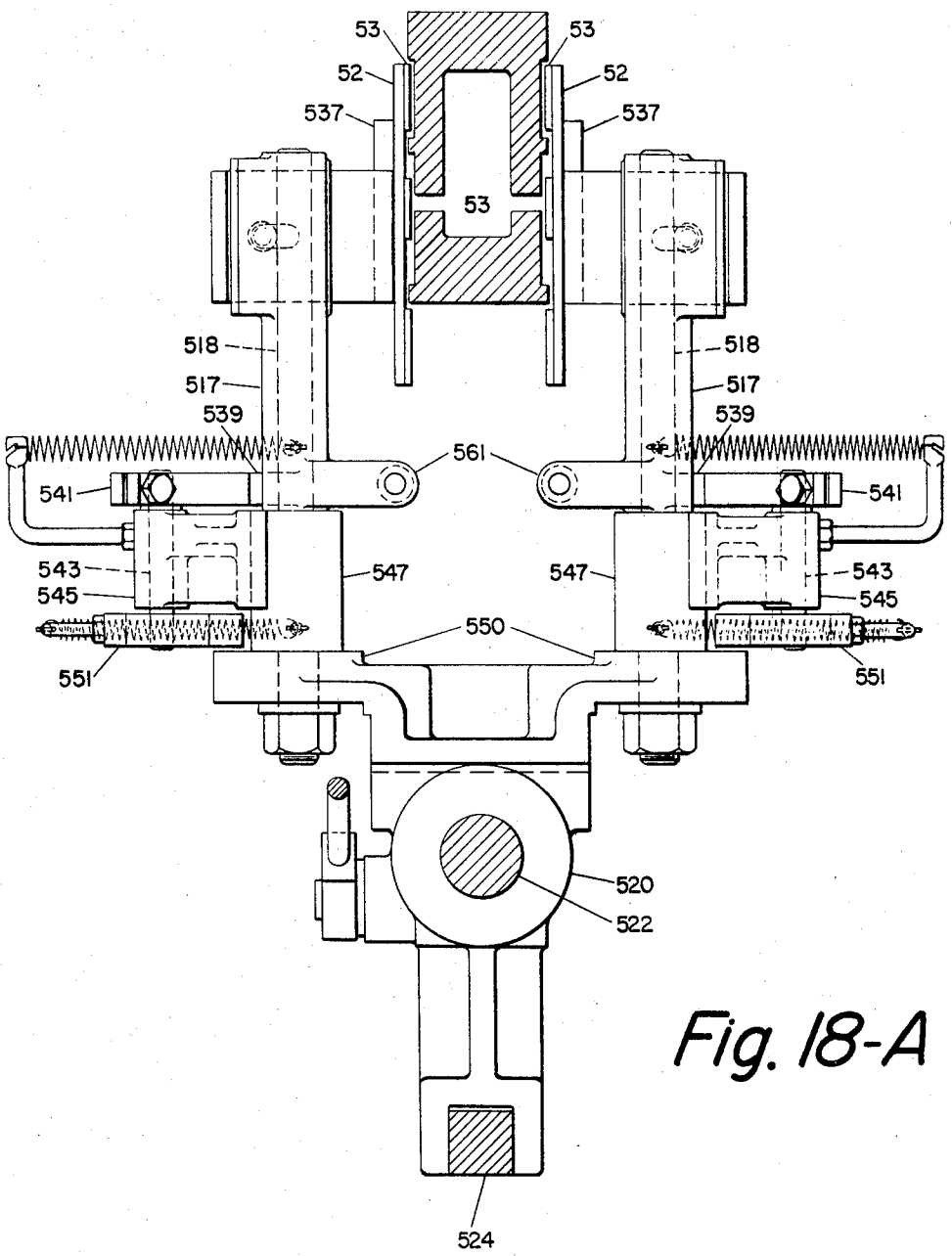


Fig. 18-A

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CONTAINER FORMING MACHINE

Filed May 31, 1966 19 Sheets-Sheet 1

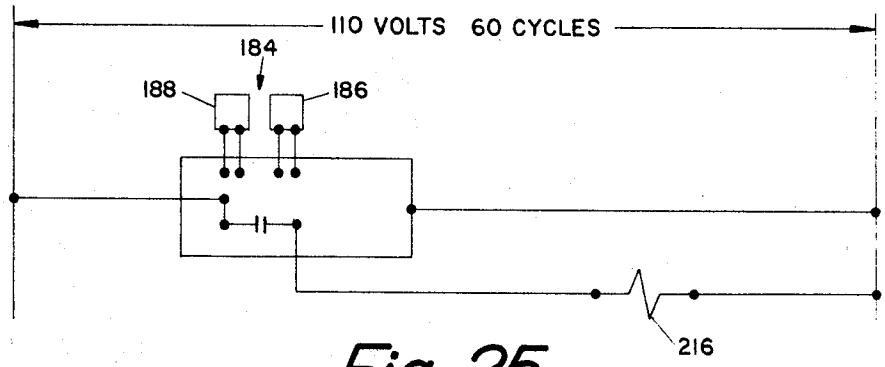


Fig. 25

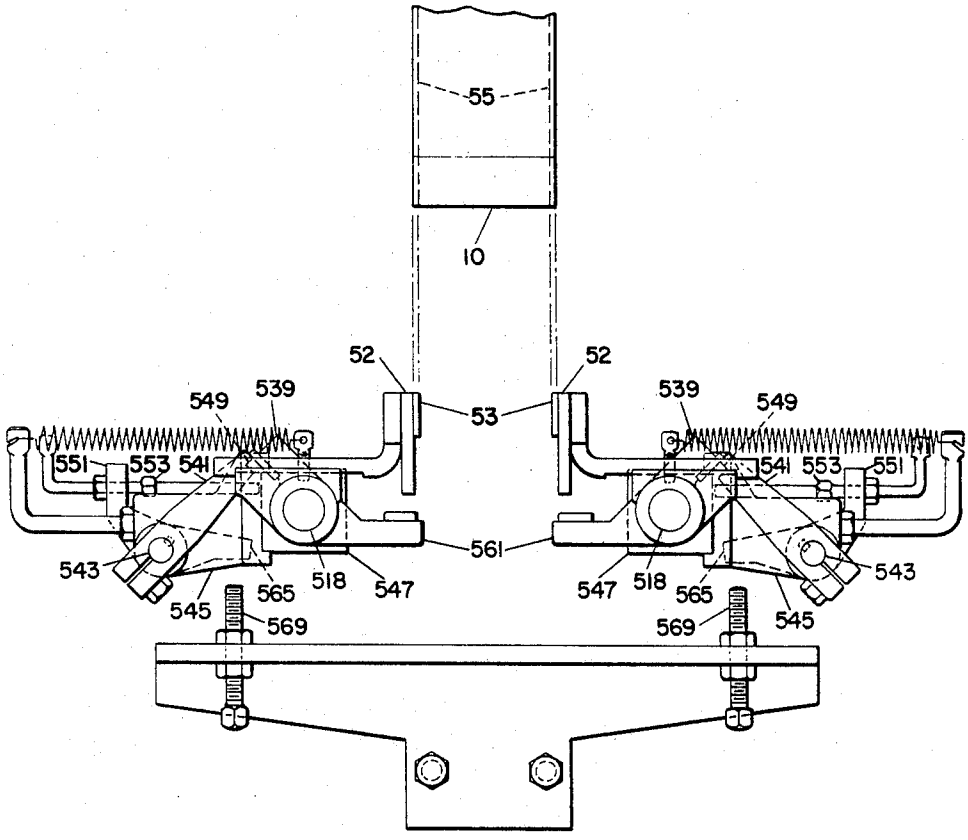


Fig. 18-B

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BY Robert R. Churchill

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CONTAINER FORMING MACHINE

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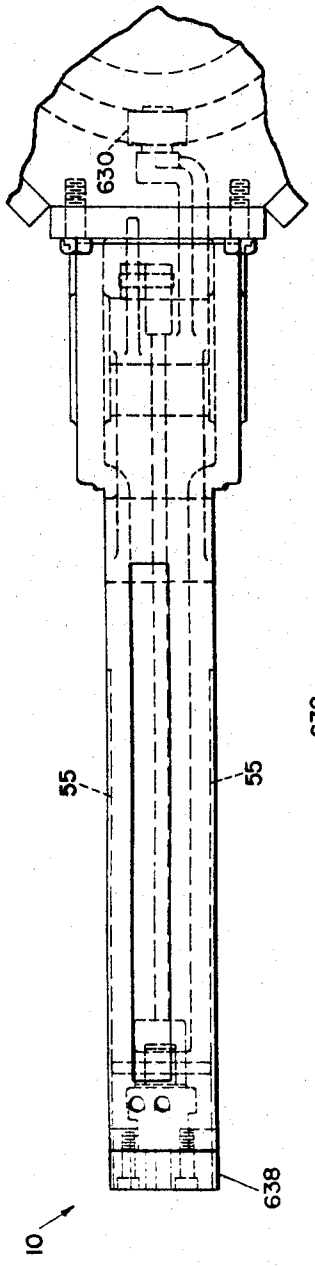


Fig. 19

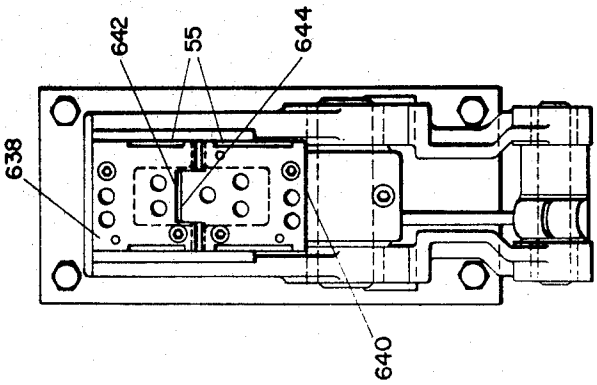


Fig. 21

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CONTAINER FORMING MACHINE

Filed May 31, 1966 19 Sheets-Sheet 17

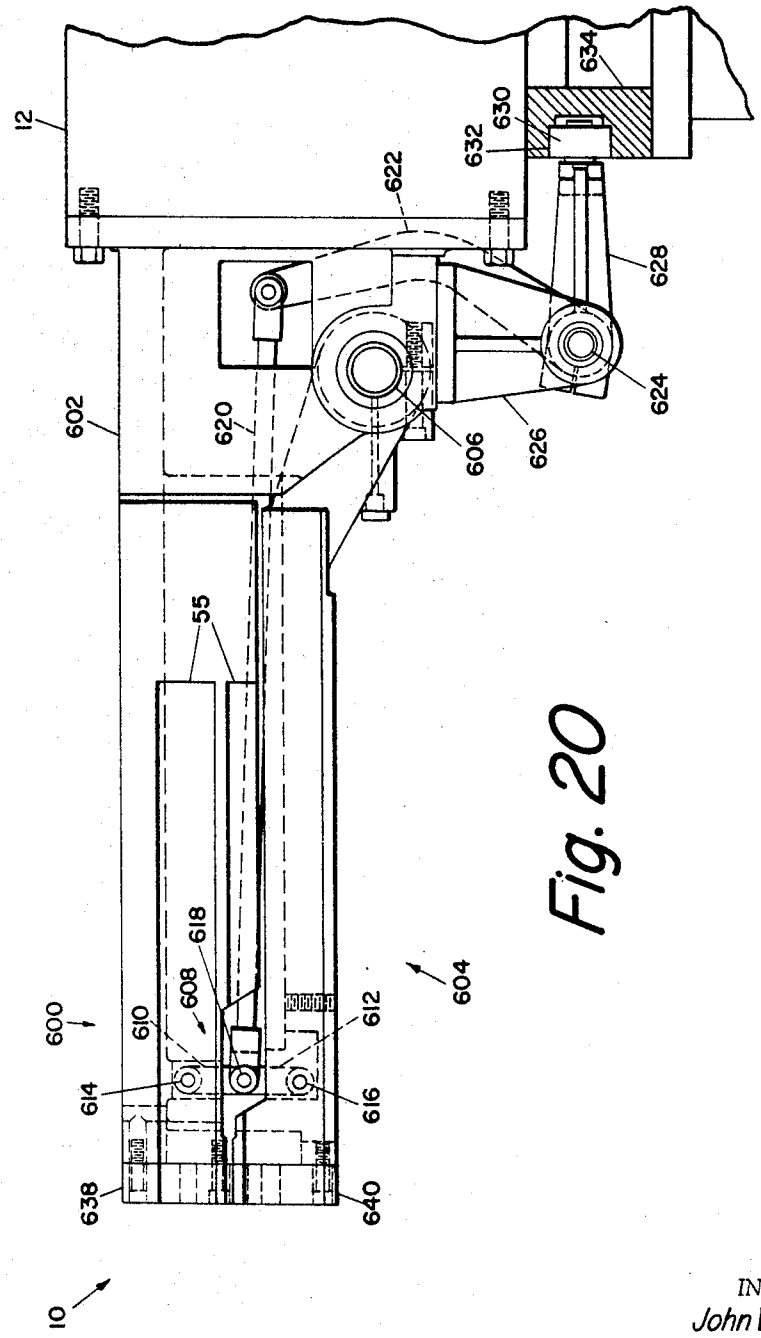


Fig. 20

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Nov. 4, 1969 J. W. SCULLY 3,476,022

CONTAINER FORMING MACHINE

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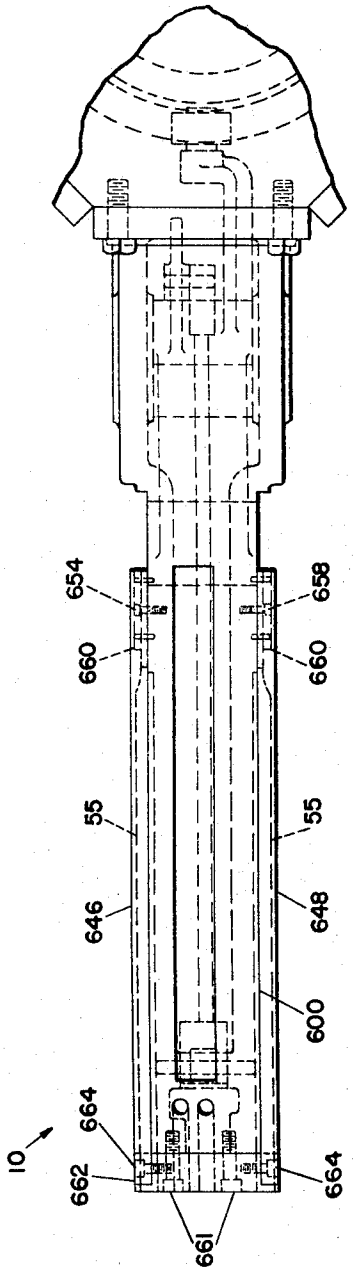


Fig. 22

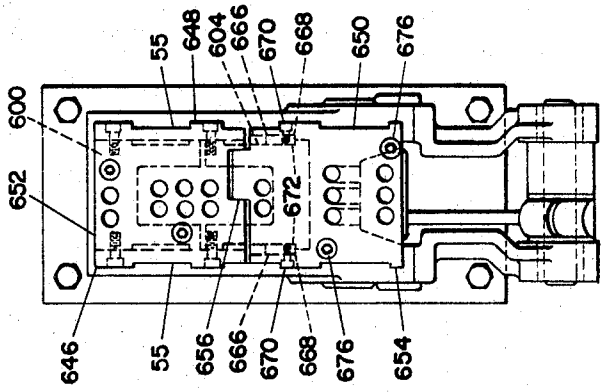


Fig. 24

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Nov. 4, 1969 J. W. SCULLY 3,476,022

CONTAINER FORMING MACHINE

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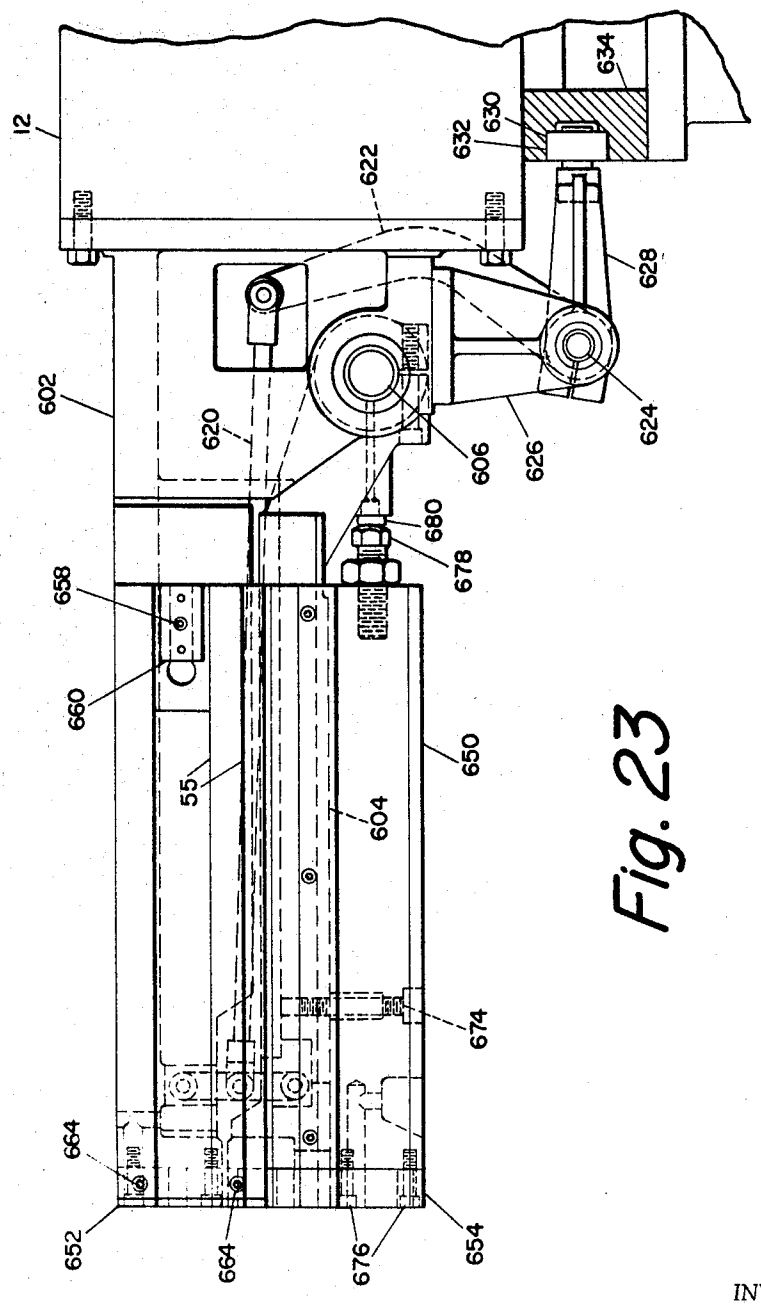


Fig. 23

INVENTOR
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BY Robert C. Churchill

ATTORNEY

United States Patent Office 3,476,022 Patented Nov. 4, 1969

3,476,022

CONTAINER FORMING MACHINE

John W. Scully, Raynham, Mass., assignor to Pneumatic Scale Corporation, Quincy, Mass., a corporation of Massachusetts

Filed May 31, 1966, Ser. No. 553,879
Int. Cl. B31b 1/28, 49/04, 1/72
U.S. Cl. 93—12 12 Claims

ABSTRACT OF THE DISCLOSURE

A container forming machine having provision for forming different sizes of containers in one machine wherein a minimum number of interchangeable parts are required to produce the different size containers.

This invention relates to a container forming machine.

The invention has for an object to provide a novel and improved container forming machine for producing containers and which is characterized by provision for producing two different sizes of containers on one machine in a novel and efficient manner.

The invention has for another object to provide a novel and improved container forming machine of the character specified wherein a minimum of interchangeability of parts is required to produce one or the other size of container.

The invention has for a further object to provide a novel and improved container forming machine of the character specified wherein novel drive means is provided having provision for interchangeably connecting the drive to the apparatus for producing one or the other size of container in a simple and efficient manner.

With these general objects in view and such others as may hereinafter appear, the invention consists in the container forming machine and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention:

FIG. 1 is a more or less diagrammatic plan view of a container forming machine embodying the present invention;

FIG. 1A is a perspective view of the guide rails shown in FIG. 1 for retaining the bottom closure in its folded condition;

FIG. 2 is a plan view of the lower portion of the machine showing the drives and the cam shafts;

FIG. 3 is a side elevation of the mechanism for feeding the blanks into operative position to be wrapped about a forming block at one station of operation;

FIG. 4 is a side elevation at a larger scale of the adhesive applying mechanisms shown in FIG. 3;

FIG. 5 is a plan view of the mechanisms shown in FIG. 4;

FIG. 6 is a cross sectional view taken on the line 6—6 of FIG. 4;

FIG. 7 is a plan view of a container forming blank;

FIGS. 8 to 11 are perspective views illustrating successive steps in the formation of a container;

FIG. 12 is a front elevation of the mechanism for folding a blank about a forming block;

FIG. 13 is a plan view of a portion of the mechanism shown in FIG. 12;

FIG. 14 is a detail view in side elevation of a disconnecting mechanism forming a part of the drives;

FIG. 15 is a cross sectional view taken on the line 15—15 of the mechanism shown in FIG. 14;

FIG. 16 is a side elevation of the mechanism for applying auxiliary pressure to the adhesively secured side seam and bottom closure of the container;

FIG. 17 is a side elevation of the stripper mechanism;

FIG. 18 is a plan view of FIG. 17;

FIG. 18A is a cross sectional view taken on the line 18A—18A of FIG. 17;

FIG. 18B is a plan view of the mechanism shown in FIG. 18A;

FIGS. 19 and 20 are views in plan and side elevation respectively of a base forming block used for producing one size of container in the present machine;

FIG. 21 is an end view of the forming block shown in FIG. 20;

FIGS. 22 and 23 are views in plan and side elevation respectively of the forming block having parts assembled therewith for use in producing a larger size of container in the present machine; and

FIG. 24 is an end view of the forming block shown in FIG. 23; and

FIG. 25 is a schematic wiring diagram of the control mechanism shown in FIGS. 4 and 6.

In general, the present invention contemplates a container forming machine for producing individual containers from prescored blanks of container forming material. The invention is herein illustrated as embodied in a container forming machine of the type having a plurality of intermittently movable horizontally disposed and radially extended forming blocks or mandrels about which the blanks of container forming material are wrapped to produce the container and, except as to such details as are hereinafter pointed out, the illustrated container forming machine may comprise any of the usual forms of such apparatus now upon the market. In the operation of such prior container forming machines, a blank of the material is wrapped about a forming block at one station of operation and adhesively secured along a longitudinal overlapping side seam to produce a tubular container having portions thereof extended beyond the end of the block. At a succeeding station of operation, the extended portions are folded over the end of the forming block in overlapping relation and adhesively secured together to provide a bottom closure. At a subsequent station of the machine, pressure is applied to the end closure to set the seal, and at a final station of operation the completed carton is stripped from the forming block and discharged onto a conveyor for delivery to a package filling and weighing machine.

Such prior container forming machines, known in the trade as a double package maker, as typified in the United States patents to John G. Vergobbi, Nos. 2,533,642 and 2,364,406, are arranged to form a lining bag about the forming block at one station of operation, and then wrap a carton blank about the lining on the block at a subsequent station of operation to form a lined carton. Such prior machines are designed to form one size of container only on one machine so that a second machine is required to produce containers of a different size.

In accordance with the present invention, provision is made for producing two different sizes of individual or unlined containers on one machine with a minimum of interchangeability of parts to produce one or the other size of container. In the illustrated container forming machine, which has eight stations, provision is made for forming one size of container at station 1 where a blank is wrapped around a forming block to form a tube with an adhesively secured side seam, the extended portions of the tube being folded and adhesively secured at station 2. Stations 3 and 4 are similar to stations 1 and 2 except that they are arranged to form a different size of container. Station 5 comprises an end pressing station which is common to both sizes; station 6 is idle; station 7 com-

prises the container removing or stripping station; and station 8 is idle.

In operation, stations 3 and 4 are idle when stations 1 and 2 are in operation, and stations 1 and 2 are idle when stations 3 and 4 are in operation, novel drive means being provided having disconnecting means for discontinuing the operation of the container forming stations for one size when the container forming stations for the other size are in operation.

The forming blocks on the present machine are of novel structure such as to provide a base block of a size to accommodate the smaller of the two sizes of containers to be produced, such base block being arranged to be built up by the assembly of additional parts to provide a forming block of a size to accommodate the larger of the two sizes to be produced.

The advantages of a machine constructed in accordance with the present invention include lower cost of one machine as compared with the cost of the two machines formerly required for producing two different sizes of containers, and less floor space occupied by the single machine for producing two different sizes of containers as compared with the floor space occupied by two machines formerly required.

Referring now to the drawings, only sufficient portions of the container forming machine have been herein illustrated and will be hereinafter described as will enable the present invention to be understood. As illustrated in FIG. 1, in general, **10** represents the forming blocks secured to a spider **12** mounted upon a central shaft **14** arranged to be intermittently rotated to present the forming blocks to successive stations in the formation of an individual unlined container. The various stations of the machine are designated **1** to **8**, and cooperating with station **1** is a conveyor **16** for advancing successive carton blanks **18** into operative relation to the forming block **10** to be wrapped thereabout. The prescored blanks **18** are transferred from a stack **20** thereof into the nip of a pair of driven feed rolls **22, 24** by suction means indicated generally a **26**, the feed rolls operating to deliver successive blanks onto the conveyer in timed relation to the operation of the machine. The carton blank being advanced on the conveyer is then provided with adhesive in selected areas on the upper face thereof by a first adhesive applying mechanism indicated generally at **28**, and is also provided with adhesive at selected areas on the underside thereof by a second adhesive applying mechanism indicated generally at **30**. The adhesively coated blank is the advanced on the conveyer into the nip of feed rolls **32, 34** which operate to rapidly advance the blank beneath the forming block **10**. In order to dispose the blank in registered position beneath the forming block, a pusher arm **35** is provided which engages the rear edge of the blank to advance the blank against stops **37**. The blank thus positioned is then wrapped about three sides of the block by mechanism including elevating means and side folding members as indicated generally at **36**. The portions of the blank extending upwardly from the sides are maintained in an upright position by air streams and are then folded over the upper face of the block in overlapping relation by folding mechanism indicated generally at **38**. At this time, a presser bar **40** carried by and movable with the forming block is caused to be rocked into engagement with the overlapping portions to provide a side seam **39** and to form a tubular structure with portions thereof extending beyond the free end of the block. A separate support **42** is movable under the extended unsealed portions of the seam to maintain these portions straight during the folding operation.

The forming block **10** is then moved to station **2** where the extended portions of the tube are folded against the bottom of the block by mechanism indicated generally at **44** to provide an end closure, the overlapping portions of the end closure being adhesively secured together.

Stations **3** and **4** are similar to stations **1** and **2** except that the blank feeding and adhesive applying conveyer indicated generally at **46** is proportioned for a different size, herein shown as for a larger size of container. In the illustrated embodiment of the invention, stations **1** and **2** are proportioned to produce a container for holding two pounds of material, and stations **3** and **4** are proportioned to produce a container for holding five pounds of material. It will be understood that the stations **3** and **4** are idle when stations **1** and **2** are in operation, each being driven from a common source, and novel disconnecting means is provided for each unit as will be hereinafter described.

At station **5** pressure is applied to the end of the forming block by mechanism indicated generally at **47** which includes a movable presser pad **48** arranged to apply substantial pressure to set the adhesively secured bottom closure. Since the presser pad **48** need only be of a size large enough to accommodate the larger of the two sizes of containers produced, it will also accommodate the smaller size container so that no interchangeability of parts is necessary at this station. Provision is also made at this station for applying auxiliary pressure to the side seam presser bar **40** to fully set the seam, such bar also being of a size such as to accommodate the side seams of both sizes of containers adapted to be produced on the machine. Station **6** is idle.

At station **7** the completed container indicated at **21** is stripped from the forming block **10** by reciprocable mechanism indicated generally at **50** and which includes stripping fingers **52** engageable with opposed edges of the open end of the container on the block and arranged to be moved outwardly to remove the container from the block. In practice, the forming block may also be connected to a source of air under pressure to assist in removing the container from the block. As herein shown, the container **21** removed from the block comes to rest on a stationary support and is arranged to be advanced and turned to an upright position to be conveyed to a succeeding machine in the packaging line as will be hereinafter more fully described. Prior to stripping the container from the block, provision is made for rocking the side seam presser bar **40** upwardly out of engagement with the container. Provision is also made for collapsing the forming block to facilitate removal of the container. Station **8** comprises an idle station.

Referring now to FIG. 3 for a more detailed description of the operating mechanisms, the stack **20** of container forming blanks **18**, which comprise flat prescored blanks, is supported in a magazine **58**, and successive uppermost blanks **18** are transferred onto the continuously moving conveyer **16** by the suction means **26** which operates to lift a blank upwardly and forwardly to present the leading edge of the blank to the feed rolls **22, 24** which feed the blank onto the conveyer. The suction transfer means **26** may be of a known type, such as illustrated and described in the United States patent to Vergobbi, No. 2,890,077, issued June 9, 1959, and includes a plurality of suction cups **60** carried by a manifold pipe **62** connected to a source of vacuum through a flexible hose **64**. The vacuum line to the suction cups **60** includes a cam operated valve, not shown, by which the vacuum may be connected and disconnected each cycle of operation. The manifold pipe **62** is carried by parallel linkage indicated generally at **66** arranged to be rocked each cycle of operation to effect transfer of a blank. The parallel linkage includes a bell crank having an arm **68** connected by a link **70** to an arm **72** keyed to a rocker shaft **74**. A cam lever **76**, also keyed to the rocker shaft, carries a roller **78** arranged to cooperate with a cam **80** fast on a cam shaft **82** as shown. The stack of blanks **20** may be kept at a constant level in the magazine by elevating mechanism indicated generally at **84** and which operates to automatically elevate the stack periodically to compensate for the blanks which have been withdrawn by the suction transfer mechanism.

As shown in FIGS. 2 and 3, the cam shaft **82** is con-

nected by miter gears 86, 88 to an intermediate shaft 90 which in turn is connected by miter gears 92, 94 to a cam shaft 96 which forms one of a series of cam shafts arranged at right angles to each other for operating the various mechanisms throughout the machine, as will hereinafter be more fully described.

The lower feed roll 24 is mounted fast on a sprocket shaft 98 forming a part of the conveyer 16. The upper feed roll 22 is carried by a shaft 99 supported between arms 100 fast on a rocker shaft 102 arranged to be rocked to present the upper roll 22 into and out of feeding engagement with the lower roll 24 each cycle of operation in timed relation to the transfer of successive container blanks 18 by the suction means 26. The arms 100 which carry the upper roll 22 are spring urged downwardly and are arranged to be rocked upwardly by connections including an am 104 fast on the rocker shaft 102 which is connected by a link 106 to an arm 108 fast on a rocker shaft 110 journaled in a bracket 112. A second arm 114 fast on the shaft 110 is provided with a cam roll 116 for cooperation with a cam 118 fast on a shaft 120. The shaft 120 forms a part of the adhesive applying mechanism 28. The upper feed roll shaft 99 is geared to rotate with the lower feed roll shaft by spur gears 122, 124 as shown.

The conveyer 16 includes a pair of laterally spaced conveyer chains 126 provided with longitudinally spaced lugs 128 arranged to engage the rear edges of the blanks, and the blanks are moved along an elongated supporting table 130 which extends between the conveyer chains 126. The upper runs of the chains 126 are supported in suitable tracks and are arranged to pass over sprockets 132 fast on the shaft 98 at the receiving end of the conveyer and over sprockets 134 fast on a shaft 135 at the delivery end of the conveyer. The lower runs of the chains pass from the sprockets 134 over idler sprockets 136, drive sprockets 138 fast on a shaft 140, and idler sprockets 142 to the sprockets 132 at the delivery end of the conveyer. The shaft 140 is arranged to be rotated by a chain and sprocket drive 144 from the cam shaft 82.

In operation, successive container blanks 18 are presented to the feed rolls 22, 24 in timed relation to the continuously moving conveyer chains 126 so that a blank is delivered to the conveyer each cycle of operation and in spaced relation to be engaged and moved along the table 130 by the chain lugs 128. The continuously advancing blank is now provided with adhesive by the adhesive applying mechanism 28 at selected areas of the blanks as indicated in FIG. 7. As herein shown, the adhesive applying mechanism 28 includes a segmental adhesive applying roll 146 fast on the shaft 120. The shaft 120 is driven from the cam shaft 82 through connections including miter gears 148, 150, the latter being fast on a vertical shaft 152, the upper end of the shaft 152 being connected to the shaft 120 by miter gears 154, 156.

The segmental applying roll 146 is provided with a coating of adhesive on the segmental portions thereof by a transfer roll 158 which cooperates with a spreader roll 160, all of the rolls being geared together and supported for rotation in a bracket 162 attached to the machine frame. Liquid adhesive is supplied from a nozzle 164 which drops the adhesive between the glue roll 158 and the spreader roll 160. Liquid adhesive is supplied to the nozzle from a supply thereof, surplus adhesive being drained back into the supply and recirculated by means of a pump not shown.

As herein shown, see FIG. 4, the segmental adhesive applying roll 146 is arranged in the path of an oncoming blank 18 to apply adhesive to selected areas of the upper face of the blank. In order to provide a sufficient pressure against the underside of the blank during the applying operation, a cam operated presser roll 166 is provided to cooperate with the applying roll 146. The presser roll 166 is mounted on a shaft 168 carried by arms 170 pivotally mounted on a shaft 172 journaled in the bracket 162. The roll 166 is urged upwardly into pressing engagement with the underside of the carton blank during the adhesive applying operation by a spring 174 connected to an arm 176 loosely mounted on the shaft 172. The loosely mounted arm 176 cooperates with opposed stop screws 177, 178 carried by an arm 179 fast on the shaft 172 to permit adjustment of the pressure of the roll 166 against the applying roll. The lower end of the arm 176 is arranged to cooperate with latching mechanism indicated generally at 175. The presser roll carrying shaft 168 is also provided with a cam roll 180 of the same diameter as the presser roll 166 and which cooperates with a cam 182 fast on the adhesive applying roll shaft 120. In operation, the presser roll 166 is held down out of operative engagement with the applying roll 146 by the cam 182 until such time in the cycle as a container blank 18 is advanced into operative position to receive the adhesive. The blank is advanced on the conveyer in timed relation to the rotation of the segmental applying roll 146, and when the blank arrives in operative relation thereto, the presser roll 166 is rocked upwardly to press the blank against the applying roll and effect application of the adhesive.

Provision is made for detecting the presence of a blank 18 on the conveyer at a point preceding the adhesive applying device 28 and for latching the presser roll 166 in its downwardly rocked inoperative position in the event that a blank is found to be absent. As herein shown, see FIGS. 4 and 6, the detecting means includes an electric eye detector indicated generally at 184, which includes a photocell 186 mounted above the conveyer 16 and a light source comprising a lamp 188 supported below the conveyer. The light beam from the lamp 188 is directed at an angle transversely of the conveyer through an opening 190 in the table 130 over which a blank 18 is arranged to pass. In operation, the presence of a blank over the opening 190 will cut off the light beam so that the photocell will not be energized and the presser roll will not be latched and, conversely, when a blank is absent, the light beam may pass through the opening to energize the photocell and cause latching of the presser roll, thus preventing application of adhesive to the presser roll when a blank is absent. In order to prevent the photocell from being energized during that period in the cycle between the passage of successive blanks being advanced on the conveyer, provision is made for cutting off the light beam during such time and for permitting the light beam to extend through the opening 190 during a portion only of the cycle at a time when a blank should be in position over the opening. This is accomplished by a timing wheel indicated generally at 192 havng a cylindrical wall 194 arranged in the path of the light beam, the wall 194 having a cutout 196 arranged to permit passage of the light beam through the opening 190. The timing wheel 192 is mounted on a shaft 198 arranged to be rotated by a chain and sprocket drive 200 from the conveyer drive shaft 140.

As illustrated in FIG. 4, the latching mechanism 175 includes a pivotally mounted latch member 202 normally positioned out of the path of the end of the arm 176. The latch member is loosely mounted on its pivot 204 and is operatively connected to an arm 206, also carried by the pivot 204, by a resilient connection indicated at 208. A spring 210 connected to the arm 206 is arranged to urge the latch member 202 out of the path of the arm 176, and the latch member is arranged to be rocked into the path of the arm 176 by an air cylinder 212 having a plunger 214 arranged to be extended when a container blank is absent. The air cylinder 212 forms a part of an air circuit connected to a regulated source of compressed air, the circuit including a normally closed solenoid valve 216. The solenoid valve also forms a part of an electrical circuit, see FIG. 25, which includes the electric eye detector 184 and which is provided with the usual relay to effect opening of the solenoid valve when

a blank is found to be absent to permit air to pass to the cylinder effecting extension of the plunger **214** and latching of the arm **176** in its inoperative position. Thus, the presser roll **166** is held down out of pressing relation to the adhesive applying roll during the cycle in which a container blank is absent. During the following cycle, if a container blank is present to cover the opening **190**, the latch will be automatically reset to its inoperative position to unlock the arm **176** and permit movement of the presser roll to press the blank into adhesive receiving engagement with the applying roll **146**.

After passing the first adhesive applying mechanism **28**, which applies adhesive to selected areas of the upper face of the blank, the blank advances to the second adhesive applying mechanism **30** arranged to apply adhesive to selected areas of the underside of the blank. The upper face of the blank corresponds to the inner face of the subsequently formed container, and the underside of the blank corresponds to the outer face of the container.

As shown in FIG. 7, the container blank indicated generally at **18** comprises a prescored blank having a body portion defined by side wall panels **218**, **220** and end wall panels **222**, **224**. A side seam panel **225** extends laterally from the side wall panel **220**. Extending from one end of the body panels and formed integrally therewith are the top closing flaps indicated generally at **226** and which are scored to provide a bellows fold top closure on a subsequent machine. Extending from the other end of the body panels and also formed integrally therewith are the bottom closing flaps comprising side flaps **228**, **230** and end flaps **232**, **234**. The side flap **228** is provided with angular score lines **236**, **238** which terminate at the upper ends of slits **240**, **242**, respectively, providing portions **244**, **246** which are integral with their adjacent end flaps **232**, **234**. The side flap **230** is similarly provided with slit portions and angular scored portions providing portions **248**, **250** formed integrally with side flap **234** and side seam panel **225**, respectively, such structure being arranged to provide a bottom closure, as illustrated in FIGS. 8 to 11, wherein the integral portions **224**, **246** and **248**, **250** are folded inwardly with their respective end wall flaps **232**, **234** to present such portions parallel to the adjacent side flaps **228**, **230** to be folded with the side flaps to complete the bottom closure.

The first adhesive applying operation provides an adhesive strip **252** along the left hand side of the blank for cooperation with the side seam panel **226**; the side flap **228** is provided with an adhesively coated area **254**; and the side flap **230** is provided with adhesively coated areas **256**, **258** as shown in FIG. 7.

As further shown in FIG. 7, the second adhesive applying operation provides substantially triangular adhesive coated areas **260**, **262** on the underside of flap portions **244**, **246** respectively; and similar adhesive coated areas **264**, **266** on the underside of flap portions **248**, **250**, respectively. As illustrated in FIG. 9, the triangular coated areas are disposed adjacent the side flaps after the end flaps are folded inwardly and serve to seal those areas of the bottom closure which would otherwise be open to leakage between the folded flaps.

The second adhesive applying mechanism **30** for applying adhesive to the underside of the closing flaps, as described, is also illustrated in FIG. 4 and comprises mechanism similar to that used for the first adhesive applying operation except that it is adapted to apply adhesive to the underside of the blank. A segmental applying roll **270** is mounted on a shaft **272** arranged to be rotated by a train of spur gears **274** from the first adhesive applying shaft **120**. Adhesive is applied onto the segmental portions of the applying roll **270** by a transfer roll **275** which cooperates with a spreader roll **276**. In this reverse embodiment of adhesive applying mechanism it will be noted that the transfer roll **275** and spreader roll **276** rotate in directions opposite to the corresponding rolls in the first adhesive applying mechanism so that it is not feasible to supply adhesive between the rolls as is done in the first mechanism. Instead, adhesive is supplied to the spreader roll **276** only which carries the adhesive around into engagement with the underside of the transfer roll **275** to be spread and transferred to the applying roll **270**.

The second adhesive applying mechanism is also provided with a pivotally mounted presser roll **278** which may be similar to the presser roll **166** except that it is mounted above the advancing blank to press the blank against the segmental applying roll **270** to apply adhesive to the underside of the blank. Similar mechanism is provided for rocking the presser roll into and out of cooperating engagement with the applying roll in timed relation to the movement of the blank, and similar latching mechanism indicated generally at **280** is provided for latching the spreader roll in its inoperative position in the event that a blank is absent at a point preceding the adhesive applying mechanism **30**. The latching mechanism **280** is actuated through mechanism similar to that previously described in connection with the first adhesive applying mechanism and which includes a second electric eye detector **282** arranged to detect the absence of a blank on the conveyer at a point preceding the second adhesive applying mechanism. The pivotal movement of the presser rolls **166** and **278** is relatively small, and in practice the presser rolls may be geared to their respective applying roll shafts **120**, **272** to maintain the rate of advance of the blank during the adhesive applying operation. It will be noted that the presser roll **278** is provided with a cutout **284** in its periphery to avoid contact with the adhesively coated areas previously applied to the upper face of the blank.

During the adhesive applying operation, some of the blanks may tend to be carried around with the segmental applying rolls, and in order to prevent such occurrence, two or more spaced stationary elongated wires **286** connected between the ends of the conveyor are disposed a short distance above the blanks to hold the blanks down during their passage through the adhesive applying mechanisms.

After passing the adhesive applying stations, the blank is advanced into the nip of the accelerating rolls **32**, **34** arranged to advance the blank at a faster rate than the advance of the blanks on the conveyor **16** to present the leading blank into a position beneath a forming block **10** to be elevated and wrapped about three sides of the block. Successive leading blanks are accelerated and advanced each cycle of operation in timed relation to the arrival of a forming block at station **1**. The blank is supported beneath the block on spaced stationary supports **290**, **292** and on reciprocable elevating and folding members **294**, **295** and **296**. After a blank leaves the nip of the advancing rolls **32**, **34**, it is engaged at its trailing edge by the rockingly mounted pusher arm **35** which serves to push the blank onto the supporting elements to present the leading edge of the blank against the stops **37** in registered position to be folded about the block. The lower accelerating rolls **34** are mounted fast on the conveyor sprocket shaft **135**, on which the sprockets **134** are loosely mounted and freely rotatable with relation to the shaft, and provision is made for driving the shaft **135** at a rate such as to effect rapid advance of the leading blank with relation to the linear speed of the conveyor chains **126**. As herein shown, the shaft **135** is driven from the cam shaft **82** by a chain and sprocket drive **301** which passes over idler sprockets **303**, **305**. The cooperating accelerating rolls **32** are mounted on a shaft **302** which is free to move axially in vertical slots **304** formed in a supporting bracket **306** whereby the rolls rest by their own weight in engagement with the lower rolls. The rockingly mounted pusher arms **35** are fast on a shaft **308** which is connected by linkage indicated generally at **310** operated by a cam **314** fast on the cam shaft **96**.

The mechanism 36 for folding the registered blank about three sides of the forming block 10 is conventional and includes cam operated linkages operated by cams 291, 293 for elevating the folding members 294, 295 and 296 to fold the blank about the underside and against opposed side walls of the block. The marginal edges of the blank extend above the upper face of the block to be folded into overlapping relation onto the upper face of the block to provide the side seam 39. In order to maintain the marginal edges of the blank in a vertical position prior to the side seam folding operation, air jets 316, 318 carried by the side folding members 294, 296, respectively, are arranged to project streams of air against the outer faces of the marginal portions of the blank as shown.

The side seam folding mechanism 38 for folding the extended marginal portions of the blank against the upper face of the block is also conventional and, as illustrated in FIGS. 3 and 12, includes a pair of rockingly mounted folding plates 320, 322 carried by arms 324, 326, respectively, which are mounted on shafts 328, 330 arranged to be rocked by cam operated means indicated generally at 332 which includes cams 333, 335 mounted on an upper cam shaft comprising a sleeve shaft 334 which is mounted to rotate with and is detachably connected to a drive shaft 331. A pair of opposed cooperating arms 336, 338 also mounted on the shafts 328, 330, respectively, are provided with angle members 340, 342 arranged to engage the adjacent corners or longitudinal upper edges of the block to hold the blank firmly against the upper edges during the folding operation. The arms 336, 338 are operated by cams 337, 339 also mounted on the sleeve shaft 334.

After the side seam folding operation is completed, the side seam presser bar 40 which is held up out of the way during the folding operation is arranged to be rocked down into engagement with the side seam. The presser bar is carried by parallel linkage indicated generally at 344 and mounted fast on a rocker shaft 346 journaled in a bracket 348 attached to the spider 12. The parallel linkage 344 is arranged to be resiliently urged into pressing engagement with the forming block 10 by spring means indicated generally at 350, and is arranged to be lifted up out of engagement with the side seam by a cam 352 fast on the cam shaft 96 and through linkage 354 including an arm 355 having a roller 357 arranged to engage the lower end of an elongated arm 356 fast on the rocker shaft 346. As will be hereinafter described, provision is made for applying auxiliary pressure against the side seam at the presser station 5.

During the side seam folding operation a rockingly mounted supporting element 358, referred to generally as a separate support 42, is arranged to be inserted within the portions of the blank extended beyond the end of the block to present the same under the overlapping portions of the side seam, as shown in FIG. 3, to prevent bowing inwardly of these portions during the side seam folding operation. The supporting element 358 is carried by an arm 360 fast on a rocker shaft 362 and is arranged to be rocked by cam operated linkage indicated generally at 364 by a cam 365 fast on the cam shaft 96.

After the folding elements are retracted, the forming block 10 is moved to station 2 where the extended portions of the blank are folded into overlapping relation against the end of the forming block by the end closure folding mechanism 44. The mechanism 44 may be conventional and includes upper and lower rockingly mounted folding plates indicated at 366 arranged to fold inwardly opposed end flap portions 232, 234 of the extended portions, as illustrated in FIG. 9, and a rockingly mounted folding plate 370 arranged to fold inwardly the side flap portion 230 as shown in FIG. 10. The folding plates are cam operated through suitable linkages and by cams 375, 376 fast on the cam shaft 96. The remaining side flap portion 228 is folded inwardly by a stationary curved rail 704 during subsequent intermittent movement of the forming block to the next station of operation.

From the description thus far it will be seen that the container forming blank 18 for one size container is transferred from a stack thereof onto a conveyor; then provided with adhesive at selected areas thereof; and is then advanced into operative position beneath a forming block 10. The blank 18 is then wrapped about the block to form a tube having a side seam 39, the tube having portions extended beyond the end of the block at station 1. At station 2 the extended portions are folded against the end of the block to provide a bottom closure 45. It will be observed that the folding operations for producing the smaller size containers at stations 1 and 2 are controlled by cams mounted on the cam shaft 96 and on the upper sleeve shaft 334.

Stations 3 and 4, arranged to produce the five-pound containers, provide similar structures for wrapping a blank about its forming block to form a tube having a side seam and for folding the extended end of the tube to provide a bottom closure, except that they are proportioned to produce the larger size containers. The container forming blanks are similarly transferred to a conveyor indicated generally at 46 and provided with adhesive by corresponding adhesive applying mechanisms as they are advanced along the conveyor whereupon successive blanks are accelerated into a position beneath a forming block at station 3 and moved into registered position to be wrapped thereabout. Stations 3 and 4 also provide similar cam operated mechanisms for folding a blank about the forming block which are controlled by corresponding cams mounted on a lower cam shaft 378 and by cams mounted on a similar upper cam shaft comprising a sleeve shaft 380, which is also mounted to rotate with and is detachably connected to a drive shaft 381. The cam shaft 378 is also connected by miter gears 382, 384 to an intermediate shaft 386 which in turn is connected by miter gears 338, 390 to an auxiliary cam shaft 392 corresponding to the cam shaft 82. The end closure folding mechanism indicated generally at 394 at station 4 is likewise similar to the corresponding mechanism 44 at station 2 and is operated by corresponding cams fast on the cam shaft 378.

Referring now to FIG. 2, showing the lower cam shafts and the driving mechanism, provision is made for disconnecting the drive to the cam shaft 378 for rendering inoperative the mechanism for producing five-pound containers at stations 3 and 4 when the machine is set up for producing two-pound containers at stations 1 and 2 and, conversely, provision is made for disconnecting the drive to the cam shaft 96 for rendering inoperative the mechanism for producing two-pound containers at stations 1 and 2 when the machine is set up for producing five-pound containers at stations 3 and 4. Provision is also made for rendering inoperative the mechanism associated with the upper sleeve shaft 334 in one instance, and for rendering inoperative the mechanism associated with the upper sleeve shaft 380 in another instance. The drives to one or the other container blank advancing conveyer 16 and 46 is also inoperative when the drive connections to their respective cam shafts 96 and 378 is rendered inoperative.

As illustrated in FIG. 2, the cam shaft 96 is connected to a drive shaft 396 by miter gears 398, 400, the latter gear forming a part of a disconnecting mechanism indicated generally at 402. The shaft 396 is continuously rotated by a motor 395 and driving connections including a chain drive 397, shaft 401 and miter gears 403, 405 to a lower shaft 407. The shaft 407 is connected by a chain drive 409 to a hand wheel shaft 411 having a pinion 413 connected by a gear train to a gear 404 fast on the drive shaft 396. The shaft 411 is also provided with a bevel gear 415 for driving the Geneva 417. The other end of the shaft 396 is connected by miter gears 406, 408 to a cam shaft 410 which in turn is connected by miter gears 412, 414 to the cam shaft 378, the gear 412 also forming a part of a disconnecting mechanism indicated generally at 416.

Each disconnecting mechanism 402, 416 is similar in structure and operation.

As shown in detail in FIGS. 14 and 15, the disconnecting drive mechanism 416 includes the miter gear 412 loosely mounted on the continuously driven shaft 410 in mesh with the miter gear 414 fast on the cam shaft 378. The miter gear 412 is formed integrally with a pawl carrier disk 418 having two opposed spring pressed pawls 420, 422 pivotally carried thereby. Each pawl is arranged to engage its respective notch 424, 426 formed in diametrically opposed portions in the periphery of a disk 428 keyed to the continuously driven shaft 410. Each pawl is provided with an extension 430, 432 which are joined at their ends by a pin and slot connection 434. The ends of the extensions 430, 432 are disposed in alignment with a spring pressed plunger 436 arranged to engage a notch 438 formed in the periphery of the pawl carrier disk 418. The plunger is slidingly supported in a bracket 440 and is held in its retracted position, as shown, by a cross pin 442 which extends through the outer end of the plunger and which is engaged in retaining recesses 444 formed in the outer end of an extension 446 of the bracket 440. When the plunger is in its retracted position, the spring pressed pawls are permitted to enter into driving engagement with their notches. The extension 446 is also provided with opposed elongated slots 448 so that by manually pulling outwardly and rotating the plunger to move the cross pin 442 out of the recesses 444 and to align the cross pin 442 with the elongated slots, the plunger is free to be spring pressed into the notch 438 of the carrier disk. When the plunger is thus released, the end of the plunger engages the ends of the extensions 430, 432 which are rocked on their pivots to remove the spring pressed pawls 420, 422 from their notches, thus disengaging the driving connections. Engagement of the plunger 436 with the notch 438 also effects locking of the disengaged driving connection in its idle position. It will be noted that the shaft 410 and its notched disk 428 continues to rotate, but since the miter gear 412 is disconnected from driving engagement with the shaft 410, the cam shaft 378 and its associated mechanisms will be idle. It will be understood that the disconnecting mechanism indicated at 402 is of similar structure so that when the corresponding spring pressed plunger is released, the shaft 396 will continue to rotate and the cam shaft 96 will be idle. It will be seen that only one of the disconnecting mechanisms 402, 416 may be in operative driving position at one time, the other being disconnected. It will also be seen that when the disconnecting mechanism 402 is disconnected, the drives to the conveyer 16 and its associated mechanisms are discontinued and, likewise, when the disconnecting mechanism 416 is disconnected, the corresponding drives to the conveyer 46 and its associated mechanisms are discontinued.

Referring now to FIGS. 1 and 3, the upper drive shafts 331, 381 on which the sleeve shafts 334, 380 are mounted are driven from the cam shaft 410 by an angularly extended shaft 450 connected at one end by bevel gears 452, 454 to the continuously rotated cam shaft 410 and connected at its other end by bevel gears 456, 458 to one end of the upper drive shaft 331. The upper drive shafts 331, 381 are arranged at right angles to each other and are connected by miter gears 460, 462 as shown. The drive shafts 331, 381 are thus rotated continuously and in order to permit operation of the cams on one sleeve shaft while the cams on the other sleeve shaft are idle, provision is made for manually disengaging one or the other sleeve shafts from its respective drive shaft. As herein shown, each drive shaft 331, 381 is operatively connected to its respective sleeve shaft 334, 380 by a disengageable driving connection indicated generally at 466, 467. As shown in detail in FIGS. 12 and 13, each driving connection 466, 467 includes a driving disk 468 having a notch 470 cut in its periphery, and a driven element comprising a carrier disk 472 which carries a latch arm 474 pivotally mounted thereon. The latch arm is provided with a projection 476 intermediate the ends thereof arranged to fit in driving engagement with the notch 470. The driving disk 468 is keyed to its respective continuously rotated shaft 331, 381, and the driven disk 472 is keyed to its respective sleeve shaft 334, 380. The outer end of the latch arm 474 is connected by a spring 478 to the carrier disk 472 to urge the projection 476 into driving engagement with its notch 470. The driving connection is disengaged by manually rocking the latch arm 474 outwardly to disengage the projection from its notch, and in order to retain the clutch arm in its outwardly rocked position, a spring pressed pin 482 is arranged to be extended into an opening 480 formed in the latch arm. In operation, when the machine is set up to produce two-pound containers, the driving connection is engaged with its sleeve shaft 334, and the corresponding driving connection is disengaged from its sleeve shaft 380. Conversely, when five-pound containers are produced, the driving connection is engaged with its sleeve shaft 380, and the corresponding driving connection is disengaged from its sleeve shaft 334.

At station 5, auxiliary pressure is applied to the side seam 39 and to the bottom closure 45 by the presser mechanism indicated at 47 when the forming block comes to rest, such mechanism being adapted to operate on either size of container being produced since the end of the five-pound forming block is the same distance from the center line of the machine as the end of the two-pound forming block, and the upper surface of one size block is arranged in the same horizontal plane as the upper surface of the other size block, as will be hereinafter more fully described. As illustrated in FIG. 16, the bottom closure presser pad 48 is resiliently mounted on the upper end of an arm 484 pivotally mounted at 486, and the arm 484 is connected by a link 488 to a toggle arm 490 pivotally mounted at 492. The toggle arm 490 forms one arm of a three-armed lever, the second arm 494 of which is connected by a yieldable link to one arm of a cam lever 496 pivotally mounted at 498. The second arm of the cam lever 496 is provided with a cam roll 500 which cooperates with a cam 502 fast on the cam shaft 410.

The third arm 504 of the three-armed lever is connected by a yieldable link 506 to one arm 508 of a two-armed lever pivotally mounted at 510. The second arm 512 of the two-armed lever carries a presser element 514 arranged to engage a stud 516 carried by the presser bar 40. Thus, in operation, substantial pressure is applied simultaneously to both the side seam 39 and the bottom closure 45 at station 5. In practice, the outer end of the block comes to rest on and adjustable support 515 arranged to counteract the auxiliary pressure applied to the top of the block by the side seam presser bar 40. It will be seen that the side seam presser bar 40 is of a length to accommodate both sizes of containers produced on the machine, and likewise the bottom closure presser pad 48 is of a size such as to accommodate both sizes of containers produced. Station 6 may be idle.

At station 7, the completed container is removed from the forming block by the stripping mechanism 50. Also, at this station provision is made for lifting the side seam presser bar 40 up a short distance out of resilient engagement with the block in order to permit removal of the container. Provision is also made for collapsing the forming block to facilitate removal of the container from the forming block.

As illustrated in FIGS. 17 and 18, the stripping mechanism 50 comprises a pair of opposed stripping fingers 52 which are mounted to rock on vertical studs 518 carried by and adjustably mounted in a reciprocable bracket 520. The bracket 520 is mounted to slide on a rod 522 and a depending portion of the bracket having a rectangular slot engages a square guide bar 524 to maintain the bracket and the stripping fingers in a vertical position. The bracket 520 is connected by a link 526 to one arm 528 of a two-armed lever pivotally mounted at 530. The second arm 532 of the

two-armed lever carries a roller 534 for cooperation with a cam 536 fast on the cam shaft 396.

The bracket 520 is reciprocated each cycle of operation when a forming block 10 comes to rest to present the stripper fingers in a position to engage the edges of the open end of the container and to then remove the container from the forming block. As herein shown, each stripping finger 52 comprises a flat plate arranged to engage opposed side walls of the forming block, each plate having projections 53 arranged to fit into grooves 55 cut in the forming block. The stripping fingers 52 are carried by angle members 537 adjustably secured to an elongated sleeve 517 rockingly mounted on the studs 518 and in order to hold the fingers in their outwardly rocked position away from operative engagement with the block during their forward or inward movement, the lower end of each sleeve 517 is provided with a latch piece 539 spring urged in an outwardly rocked position. The latch piece 539 is arranged to cooperate with a latch member 541 fast on the upper end of a vertical pin 543 mounted to rock in a bracket 545 secured to and extending from a square portion 547 of the vertical studs 518. The latch member 541 is provided with a notch 549 in which the free end of the latch piece 539 rests when the fingers are in their outwardly rocked position. The latch member 541 is spring urged in a direction to cooperate with the latch piece by a latch release member 551 fast on the lower end of the pin 543, the member 551 being connected by a spring attached to the square portion 547. The rocking movement of the latch release member 551 is limited by a stop screw 553.

The latch piece 539 is provided with a stop engaging arm 561 for cooperation with an adjustable stop 563 disposed at the end of the forward or inward stroke of the reciprocable movement of the stripping elements, and the latch release member 551 is likewise provided with a stop engaging arm 565 arranged to cooperate with an adjustable stop 569 disposed at the end of the outward or retracting stroke of the stripping elements.

In operation, during the forward stroke of the stripping elements, the fingers 52 are held in their outwardly rocked position with the latch piece 539 resting in the notch 549 of the latch member 541. When the fingers pass beyond the open edge of the container on the block and approach the end of the forward stroke, the arm 561 of the latch piece 539 engages the stop 563 to rock the latch piece out of its notch and to present the fingers into operative engagement with the side walls of the forming block with the projections 53 engaged in the grooves 55 of the block. This permits the latch member 541 to rock inwardly a short distance so that the extreme end of the latch member engages the latch piece to hold the fingers in their rocked position to strip the container from the block during the retracting stroke. Conversely, when the stripping elements approach the end of their retracting or stripping stroke the arm 565 of the latch releasing member 551 engages the stop 569 to rock the latch member 541 outwardly a short distance so as to permit the fingers to again rock outwardly in readiness for a succeeding forward stroke, the latch piece again falling into the notch 549 to maintain the fingers in their outwardly rocked position during their forward stroke. In practice, compressed air is arranged to pass through openings in the block to assist in removing the container from the block.

As herein shown, provision is made for adapting the stripping mechanism to handle both sizes of containers. The studs 518 which carry the stripping fingers 52 are adjustable laterally in slots 550 in the slide bracket 520 to accommodate the different widths of forming blocks. The stroke of the reciprocable bracket 520 is arranged to be adjusted by connecting the link 526 to an outer opening 552 in the arm 528 for the longer stroke when the larger container is being produced, and to an intermediate opening 554 for the shorter stroke when the smaller container is being produced. The inner stop means 563 may also be adjusted to accommodate the different lengths of stroke. As illustrated, two radially extended stops 563 and 548 are extended from a hub keyed to a shaft 558. The radially extended stop 548 is relatively short and is aligned with the stop engaging arm 561 when the larger container is being produced. The radially extended stop 563 is relatively long and is rotated with the shaft 558 to align the same with the stop engaging arm 561 when the smaller container is being produced. The stops 563, 548 are also adjustable laterally on the shaft 558 to accommodate the different widths of forming blocks. The shaft 558 is journaled in spaced brackets 560, and in order to hold the stops 563, 548 in their adjusted position, an arm 562 also fast on the shaft 558 is provided with a spring pressed pin 564 insertable into openings formed in one of the brackets to hold the stops in their adjusted position. It will be noted that the stops 569 at the end of the retracting or stripping stroke may be fixed in the same position longitudinally for both sizes of forming blocks and are adjustable laterally to accommodate the different widths of forming blocks.

Prior to the stripping operation, the side seam presser bar 40 is rocked upwardly a short distance out of contact with the forming block by means of a stationary roller 571 supported adjacent the stripping station and which is arranged to be engaged by the lower end of the arm 356 as the forming block approaches the stripping station. Also, the forming block 10 is partially collapsed to facilitate removal of the container at the stripping station as will be hereinafter described.

As herein shown, the container removed from the block comes to rest on a stationary support 570 between guide rails 572, 574 and is advanced by a lug 576 carried by an endless chain 578 supported above the container.

The chain 578 is provided with a plurality of spaced lugs 576 and is driven in timed relation to the machine through driving connections including a chain drive 580 connected by gears 582, 584 to the cam shaft 396 to advance successive containers stripped from the blocks 10. The containers advanced by the lugs 576 are guided over the end of the support 570 to fall closed end first between guides 586 to assume an upright position on a conveyor 588 where they are received in spaced pockets carried by the conveyor for delivering the containers in timed relation to the operation of a subsequent machine in the line such as a container filling machine.

Referring now to FIGS. 19 and 20, the forming blocks indicated generally at 10 are adapted to be changed in size for producing either a two-pound capacity container or a five-pound capacity container, the forming block for the five-pound container being constructed by assembling parts to the outer surfaces of the two-pound size forming block. Each forming block is also arranged to be collapsed at the stripping station 7 to facilitate removal of the completed container from the block.

As illustrated in FIGS. 19, 20 and 21, the forming block for producing the two-pound container comprises an upper half 600 which is formed integrally with a bracket 602 attached to the central spider 12, and a lower half 604 pivotally mounted on a shaft 606 journaled in the bracket 602 and connected to the upper half 600 by toggle linkage indicated generally at 608. The toggle linkage comprises an upper link 610 and a lower link 612 pivotally connected to the upper and lower halves respectively by pins 614, 616. The free ends of the links are connected by a toggle pin 618 which is connected by a rod 620 to an arm 622 fast on a shaft 624 journaled in a bracket 626 attached to and depending from the bracket 602. A second arm 628 fast on the shaft 624 is provided with a cam roll 630 for cooperation with a cam path 632 formed in a stationary cam 634 supported in a central bearing bracket 636 as shown in FIG. 3. In operation, the cam path 632 is arranged to hold the upper and lower toggle links 610, 612 in a substantially

vertically aligned position, as shown, in which position the upper and lower halves of the block are parallel. As shown in FIG. 21, each half of the forming block is provided with an end plate comprising an upper end plate **638** and a lower end plate **640**. The upper end plate **638** is provided with an open end rectangular slot **642** formed therein, and the lower end plate **640** is provided with a correspondingly shaped projection **644** slidingly received in the slot to maintain the upper and lower halves of the block in alignment. The container is formed about the block in this condition, and when the block approaches the stripping station 7, the cam path **632** causes inward rocking of the toggle linkage and upward pivoting of the lower half **604** of the forming block to collapse the block whereby to facilitate removal of the container from the block at the stripping station.

Referring now to FIGS. 22 and 23, the forming block for producing the five-pound capacity container may be built up by securing side plates **646**, **648** to the side walls of the upper or stationary half **600** of the forming block for producing the two-pound capacity container, and by assembling with the lower or movable half **604** of the forming block a filling piece **650**. Also, the end plates **638**, **640** are removed and replaced by end plates **652**, **654** to conform to the larger size of block, such plates being also provided with a cooperating slot and projection for maintaining the upper and lower halves in alignment as shown at **656**.

The inner ends of the side plates **646**, **648** are secured to the side wall of the upper block member **600** of the forming block by bolts **658**. Each side plate is provided with a tongue piece **660** fitted into a grooved portion of its side plate and which is provided with dowels fitted into the member **600**. The end plate **652** is secured to the upper block member **600** by bolts **661** and is also provided with dowel pins fitted into the member **600**. As herein shown, the end plate **652** is provided with recessed portions **662** along its longitudinal marginal edges to receive the outer ends of the side plates **646**, **648**, which latter are secured to the end plate by bolts **664**.

The filling piece **650** is arranged to be slidingly engaged with the lower half **604** of the block. As shown in FIG. 24, the filling piece is U-shaped to embrace the underside of the block member **604**, and each leg of the U is provided on its inner face with an elongated tongue **666**. Each tongue rests on a shouldered portion **668** of opposed legs of the U and is secured to the filling piece by bolts **670**. The laterally extended lower edges of the tongues **666** are arranged to slidingly engage shouldered portions **672** formed on the lower end of the lower block member **604**, and is secured to the block member by a central bolt **674**. The end plate **654** is secured to the filling piece **650** by bolts **676**. An adjustable stop screw **678** carried by the inner end of the filling piece **650** is arranged to engage a stop **680** carried by the bracket **602** in order to adjustably align the filling piece longitudinally with the lower block member **604** to present the outer end of the filling piece flush with the outer end of the lower block member during assembly. In practice, each forming block is provided with its individual side plates and filling piece so that the expedient of doweling the parts to fit its individual forming block assures that the parts are assembled in accurately fitting engagement to their respective upper and lower block members **600**, **604**. Also, when the machine is to be changed over from the smaller to the larger forming blocks, the provision of the dowels facilitates assembly of the parts. It will be understood that as thus assembled the upper surface of the forming block for producing the five-pound capacity container is in the same horizontal plane as the upper surface of the forming block for producing the two-pound capacity container, and that the end plates for one size forming block are in the same vertical plane as the end plates for the other size forming block. It will also be noted that the same linkage and operating means for collapsing one size of forming block at the stripping station is also used for the other size of forming block.

From the above description it will be seen that the present container forming machine is readily adapted to produce either one of two sizes of containers on the same machine with a minimum of interchangeability of parts. In practice, when it is desired to change over from production of the smaller to the larger size container, the drive connection **402** to the cam shaft **96** is disengaged, and the drive connection **416** to the cam shaft **378** is engaged; the drive connection **466** to the upper sleeve shaft **334** is disengaged, and the drive connection **467** to the upper sleeve shaft **380** is engaged; the parts **646**, **648** and **650** are assembled to the upper and lower forming block members **600**, **604**, respectively; and the end plates **638**, **640** are replaced by the end plates **652**, **654**. Also, the stripping mechanism **50** is adjusted in the manner described to accommodate the size of container being produced.

In practice, when the larger container is being produced at stations **3** and **4**, the bottom closure folded at station **4** is held in its folded position during its movement to the press station **5** by a stationary curved guide rail **700** supported from the machine frame. However, when the smaller container is being produced at stations **1** and **2**, the bottom closure folded at station **2** must be held in its folded position as it passes the now idle stations **3** and **4**. For this purpose, a removable curved guide rail **702** is provided which extends from the end of the curved guide rail **704** supported adjacent station **2**, past stations **3** and **4** to the adjacent end of the curved guide rail **700**. As herein shown, the curved guide rail **702** comprises an angle piece **706** which is supported by extensions **708**, **710** secured to an elongated bar **712** by bolts **714**, **716** which cooperate with threaded openings **711**, **713** formed in the bar. The bar **712** is attached to angle brackets **718**, **720** which in turn are secured to flanges **722**, **724** forming a part of the machine frame. In operation, when stations **3** and **4** are operating and stations **1** and **2** are idle, the two bolts **714**, **716** are removed and the entire guide unit **702** is removed and bodily moved in a generally diagonal direction to present clearance openings **726**, **728** formed in the angle piece **706** into alignment with the threaded openings **711**, **713** in the elongated bar **712** and secured thereto by bolts **714**, **716** to be supported in the dotted line position shown in FIGS. 1 and 1A out of the path of the folding mechanisms at stations **3** and **4**. The guide rail **704** is independently supported from the bar **712** by adjustably connected angle brackets **715** and **717**.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a container forming machine, in combination, a plurality of operating stations, a plurality of radially extended forming blocks intermittently movable to successive operating stations for producing containers, operating mechanisms at two of said stations including mechanism at one of said two stations arranged to wrap a blank about a forming block to produce a tube having a side seam, and mechanism at the second of said two stations arranged to fold extended portions of the tube into overlapping relation to provide a bottom closure, similar operating mechanisms at two succeeding stations adapted to produce another size container, said forming blocks having a base structure for producing one size container and an outer structure adapted for assembly with said base structure for producing the other size container, and drive means common to all of said stations including means for disconnecting the drive to the mechanisms for producing one size container when the other size is being produced,

said drive means including a plurality of lower cam shafts operatively connected together, one lower cam shaft cooperating with mechanisms at the two stations for producing one size container, a second lower cam shaft cooperating with mechanisms at the two stations for producing said other size container, said drive means further including two upper cam shafts operatively connected to said lower cam shafts, one upper cam shaft cooperating with the mechanisms for producing one size container and the second upper cam shaft cooperating with the mechanisms for producing the other size container, said disconnecting means comprising a disengageable drive unit operatively connected to each of said lower cam shafts, and a disengageable drive unit operatively connected to each of said upper cam shafts.

2. A container forming machine as defined in claim 1 wherein each of said disengageable drive units comprises a driving element and a driven element, and manually operated means for disengaging the driven element from the driving element and for locking the driven element in its disengaged position.

3. In a container forming machine, in combination, a plurality of operating stations, a plurality of radially extended forming blocks intermittently movable to successive operating stations for producing containers operating mechanisms at two of said stations including mechanism at one of said two stations arranged to wrap a blank about a forming block to provide a tube having a side seam, and mechanism at the second of said two stations arranged to fold extended portions of the tube into overlapping relation to provide a bottom closure, similar operating mechanisms at two succeeding stations adapted to produce another size container, said forming blocks having a base structure for producing one size container and an outer structure adapted for assembly with said base structure for producing the other size container, and drive means common to all of said stations including means for disconnecting the drive to the mechanisms for producing one size container when the other size is being produced, each forming block being provided with side seam presser means carried by and movable with each forming block, said side seam presser means being common to each size of forming block said operating stations including a station having auxiliary pressure applying mechanism common to both sizes of forming blocks for exerting substantial pressure to said side seam and said bottom closure, and guide rail means for retaining the bottom closure in its folded condition until it arrives at said auxiliary pressure applying station, the guide rail means for retaining the bottom closure formed at the stations for producing one size container being detachably supported to extend across the stations for producing the other size containers, said retaining means being movable to an inoperative position when said other size container is being produced.

4. In a container forming machine, in combination, a plurality of operating stations, a plurality of radially extended forming blocks intermittently movable to successive operating stations for producing containers, operating mechanisms at two of said stations including mechanism at one of said two stations arranged to wrap a blank about a forming block to provide a tube having a side seam, and mechanism at the second of said two stations arranged to fold extended portions of the tube into overlapping relation to provide a bottom closure, similar operating mechanisms at two succeeding stations adapted to produce another size container, said forming blocks having a base structure for producing one size container and an outer structure adapted for assembly with said base structure for producing the other size container, and drive means common to all of said stations including means for disconnecting the drive to the mechanisms for producing one size container when the other size is being produced, said operating stations including a station having reciprocable stripping mechanism common to both sizes of forming blocks for removing the completed containers from successive forming blocks said stripping means comprising a pair of opposed fingers engageable with opposite sides of the forming block, cam operated means for reciprocating the fingers, said opposed fingers being mounted for adjustment laterally to accommodate different widths of forming blocks, said reciprocating means being adapted for adjusting the stroke of the fingers to accommodate different lengths of containers.

5. A container forming machine as defined in claim 4 wherein the stripping fingers are pivotally mounted and arranged to assume a position out of engagement with the forming block during their inward stroke and to assume a position in operative engagement with the block during their retracting stroke, and stop means disposed at each end of the reciprocating stroke for cooperation with said fingers to change the pivotal position of the same.

6. In a container forming machine, in combination, a plurality of operating stations, a plurality of radially extended forming blocks intermittently movable to successive operating stations for producing containers, operating mechanisms at two of said stations including mechanism at one of said two stations arranged to wrap a blank about a forming block to provide a tube having a side seam, and mechanism at the second of said two stations arranged to fold external portions of the tube into overlapping relation to provide a bottom closure, similar operating mechanisms at two succeeding stations adapted to produce another size container, said forming blocks having a base structure for producing one size container and an outer structure adapted for assembly with said base structure for producing the other size container, and drive means common to all of said stations including means for disconnecting the drive to the mechanisms for producing one size container when the other size is being produced, operating stations including a station having reciprocable stripping mechanism common to both sizes of forming blocks for removing the completed containers from successive forming blocks, each forming block being mounted to permit inward collapsing movement of one wall thereof, and means including a toggle connection common to both sizes of forming blocks for effecting collapse of said one wall as the forming block approaches the stripping station to facilitate removal of the container from the block.

7. In a container forming machine, in combination, a plurality of operating stations having mechanisms at two selected stations for producing one size of container and having mechanisms at two other selected stations for producing another size of container, a plurality of forming blocks intermittently movable to successive operating stations and about which blanks are wrapped to produce containers having an adhesively secured side seam and an adhesively secured bottom closure, each forming block having a base structure for producing one size container and an outer structure adapted to be assembled with said base structure for producing said other size container, a continuously moving conveyor arranged to feed successive blanks into operative relation to be wrapped about a forming block at one of said selected stations for producing said one size container, a second continuously moving conveyor arranged to feed successive blanks into operative relation to be wrapped about a forming block at one of the selected stations for producing said other size of container, and drive means common to all of said stations including a disengageable connection for driving the mechanisms at said two selected stations, a second disengageable connection for driving the mechanisms at said two other selected stations, and means for disconnecting the drive to the conveyer and associated container forming mechanisms for producing one size container when the other size container is being produced.

8. In a container forming machine, in combination, a plurality of operating stations have mechanisms at two selected stations for producing one size of container and having mechanisms at two other selected stations for

producing another size of container, a plurality of forming blocks intermittently movable to successive operating stations and about which blanks are wrapped to produce containers having an adhesively secured side seam and an adhesively secured bottom closure, each forming block having a base structure for producing one size container and an outer structure adapted to be assembled with said base structure for producing said other size container, a continuously moving conveyer arranged to feed successive blanks into operative relation to be wrapped about a forming block at one of said selected stations for producing said one size container, a second concontinuously moving conveyor arranged to feed successive blanks into operative relation to be wrapped about a forming block at one of said selected stations for producing said other size of container, and drive means common to all of said stations including means for disconnecting the drive to the conveyer and associated container forming mechanisms for producing one size container when the other size container is being produced, each conveyer having associated therewith a first adhesive applying device for applying adhesive to selected areas of the upper face of successive blanks advanced on said conveyer, and a second adhesive applying device for applying adhesive to selected areas of the underside of said blanks, each of said adhesive applying devices including a segmental applying roll and a pressure applying roll cooperating with the segmental roll arranged to press successive blanks into adhesive receiving engagement with their respective segmental applying rolls.

9. A container forming machine as defined in claim **8** wherein elongated wires are longitudinally extended above the blanks being advanced on the conveyer whereby to avoid upward displacement of the blanks with said segmental applying roll.

10. A container forming machine as defined in claim **8** wherein said second adhesive applying device is arranged in an inverted position with relation to said first adhesive applying device.

11. A container forming machine as defined in claim **8** which includes means for detecting the absence of a blank on said conveyer, said pressure applying roll being movable into and out of operative engagement with the adhesive applying segmental roll in timed relation to the passage of a blank, and means responsive to said detecting means for holding said pressure applying roll in its inoperative position when the absence of a blank is detected.

12. A container forming machine as defined in claim **11** wherein the blanks are advanced in spaced relation on said conveyer, and wherein the detecting means comprises an electric eye and a light source whose beam is arranged to be intercepted by passage of a blank on said conveyer, and a timing drum disposed between the light source and the electric eye and having a cutout therein to permit the light beam to pass through during passage of a blank to be intercepted thereby and arranged to intercept said light beam during the time interval between passage of the trailing end of one blank and the leading end of a succeeding blank.

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