United States Patent [19]

MacInnes et al.

[11] **3,714,756**

[45] **Feb. 6, 1973**

[54] **MACHINE FOR ASSEMBLING GROUPS OF CONTAINERS**

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[73] Assignee: **Owens-Illinois, Inc.**, Toledo, Ohio

[22] Filed: **Dec. 21, 1970**

[21] Appl. No.: **100,034**

[52] **U.S. Cl.**.....**53/48**, 53/159, 53/198 R, 53/189

[51] **Int. Cl.**.....**B65b 21/00**, B65b 27/04

[58] **Field of Search**.....53/48, 159, 198 R, 389

[56] **References Cited**

UNITED STATES PATENTS

2,864,212 12/1958 Bruce.....53/48 X

3,509,684 5/1970 Hohl et al.....53/48

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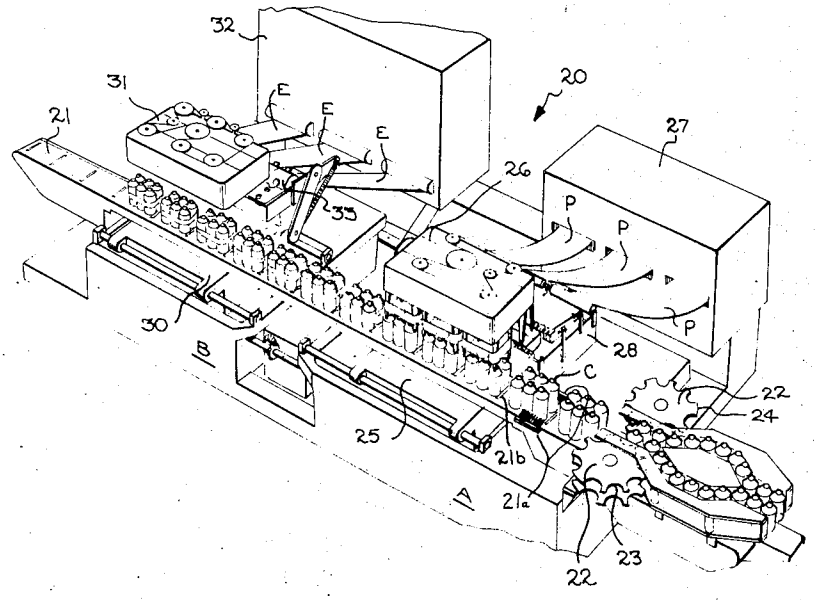
[57] **ABSTRACT**

A method and apparatus for forming packages of containers which have a body portion and a relatively smaller neck portion with abutment means adjacent the upper end of the neck portion. The containers are moved continuously in a predetermined path, segregated into groups or clusters, and an endless band is expanded, moved along in registry with each cluster and finally telescoped and released onto each cluster. At a subsequent position along the path of each cluster a carrier is moved along in registry with each cluster and forced downwardly over the ends of the containers to complete the package.

12 Claims, 25 Drawing Figures



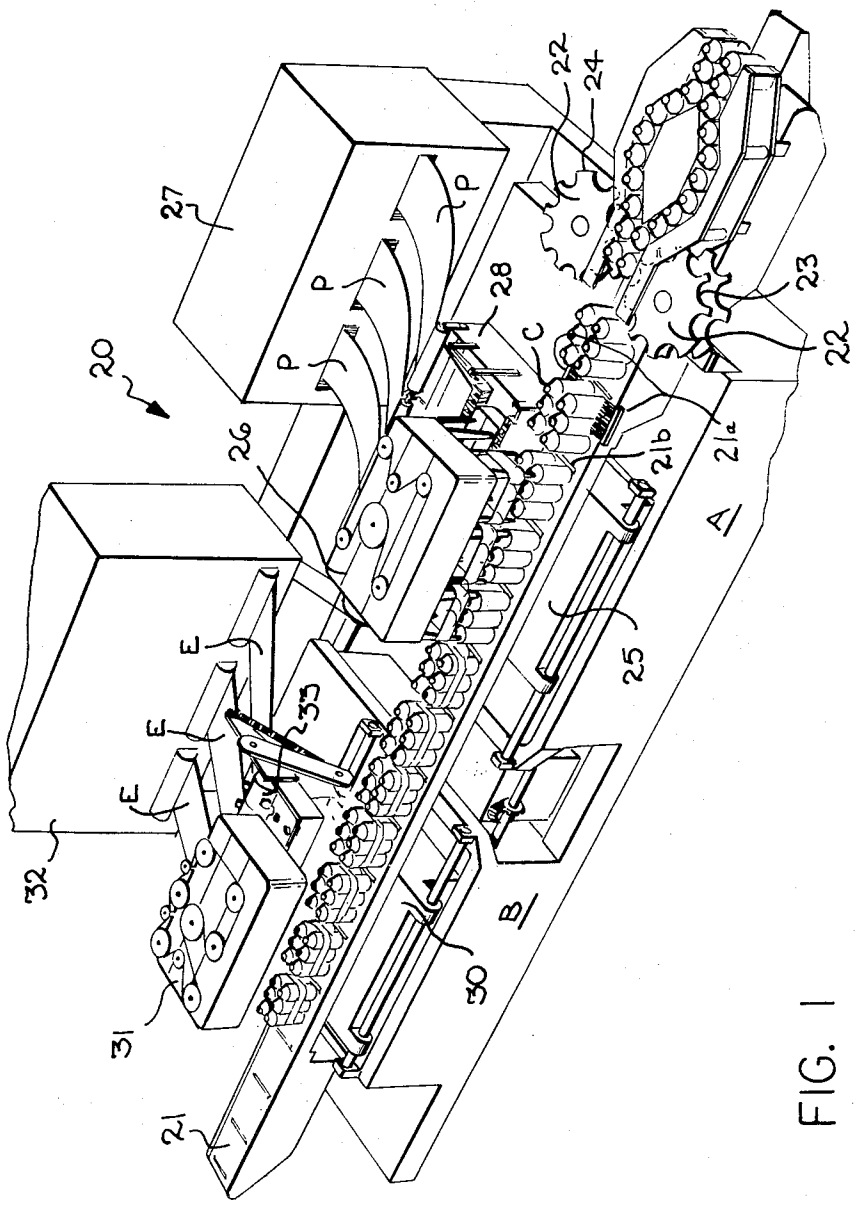


FIG. 1

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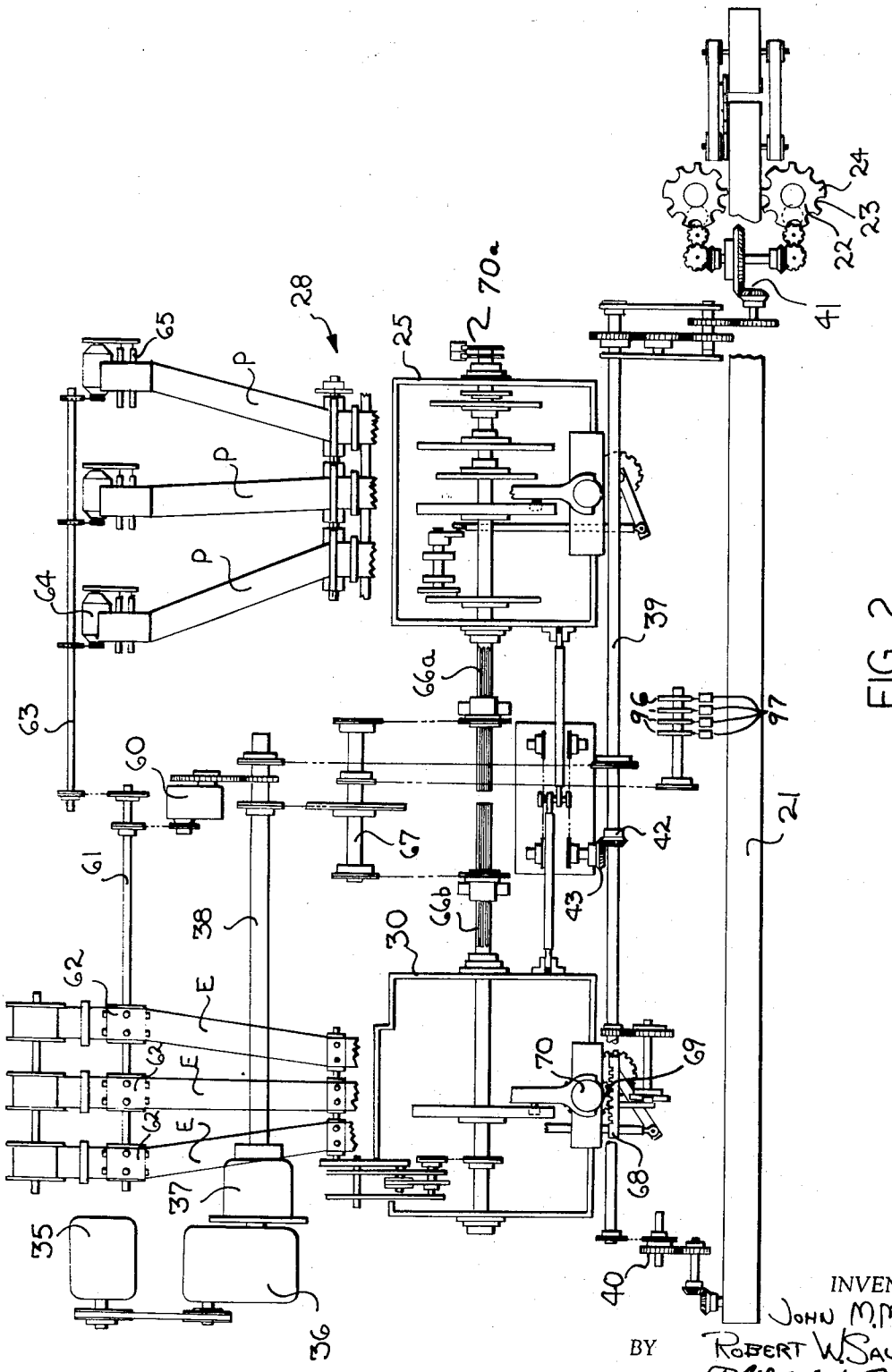

FIG. 2

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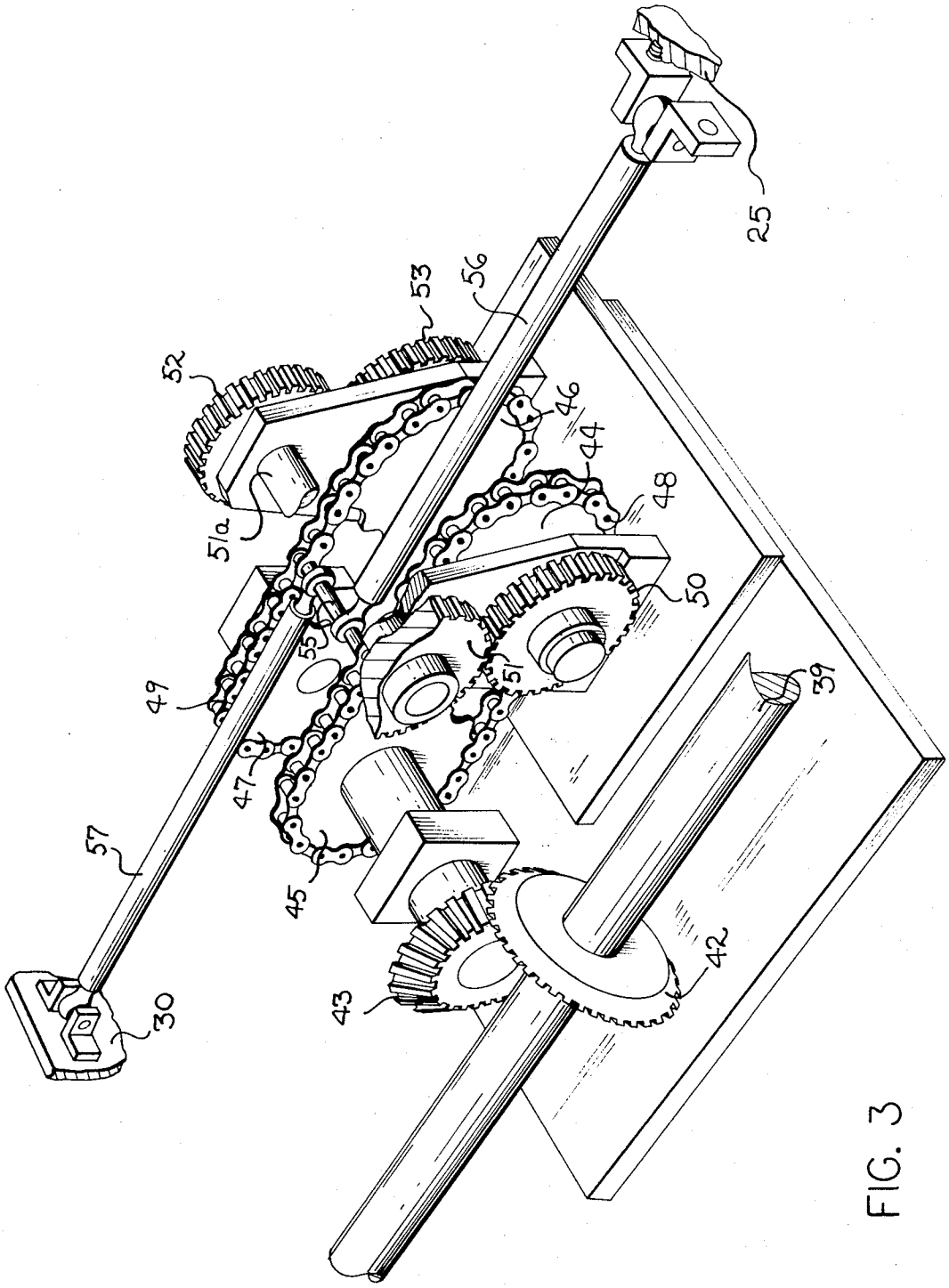

FIG. 3

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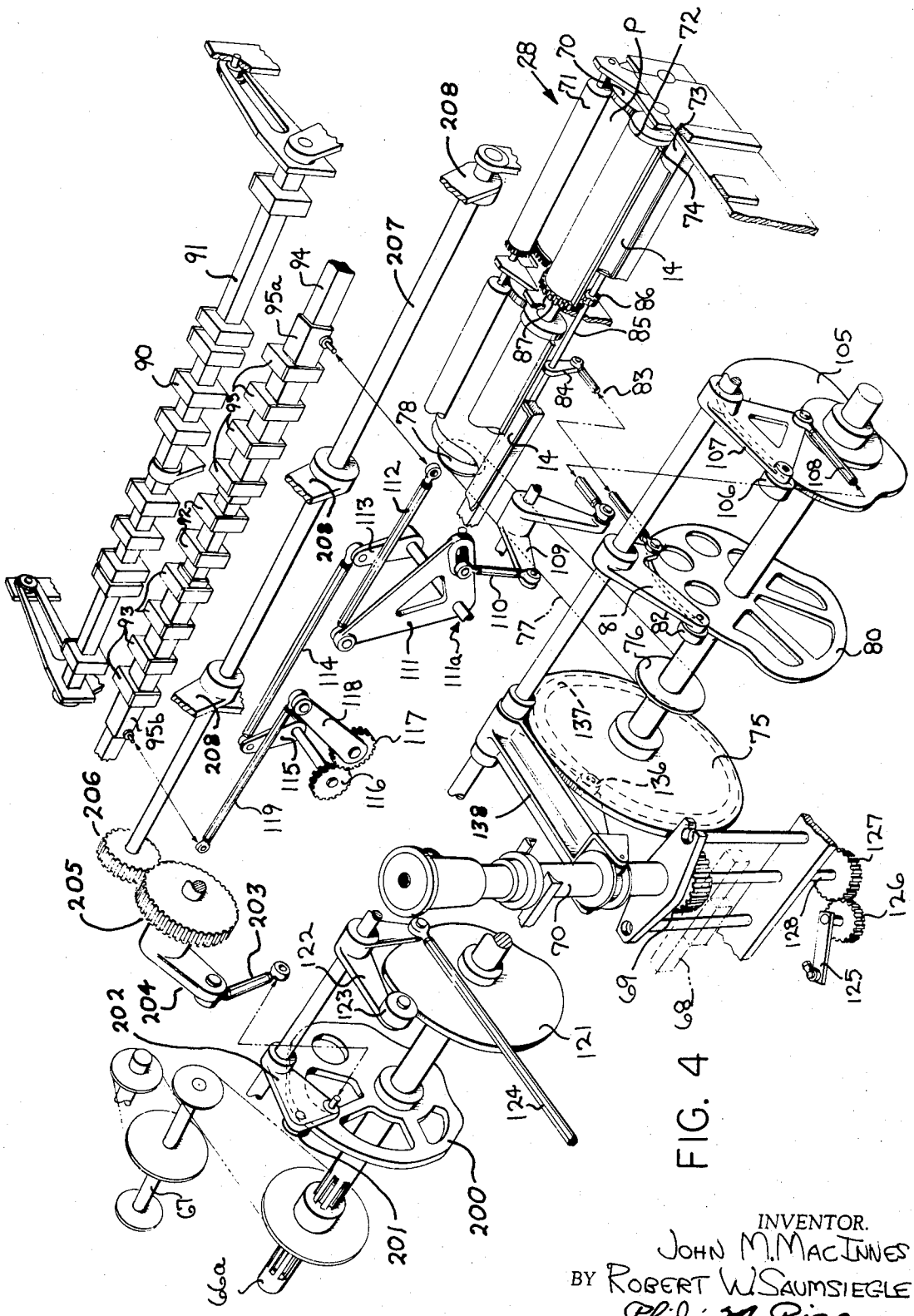

FIG. 4

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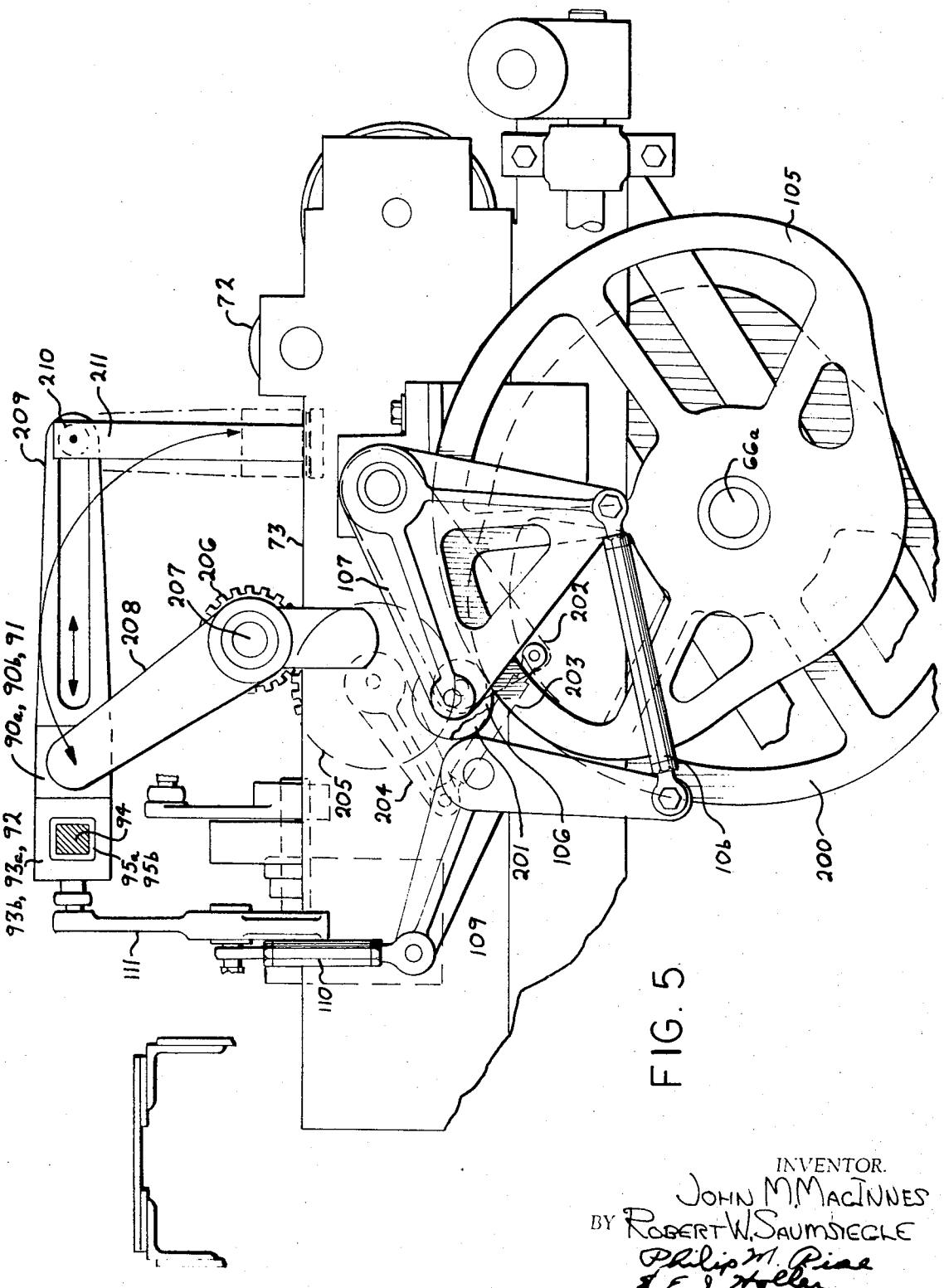

FIG. 5

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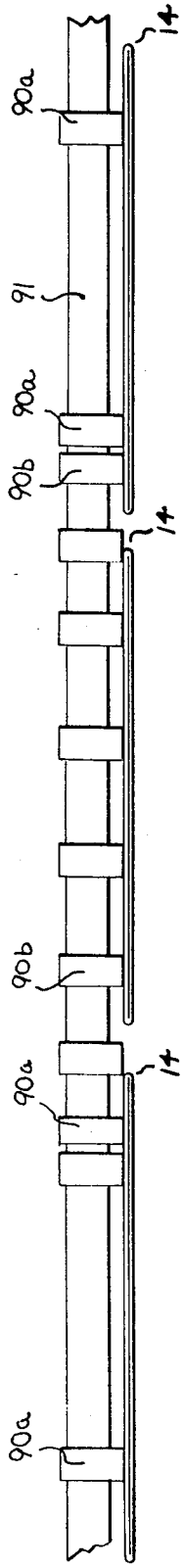

FIG. 6

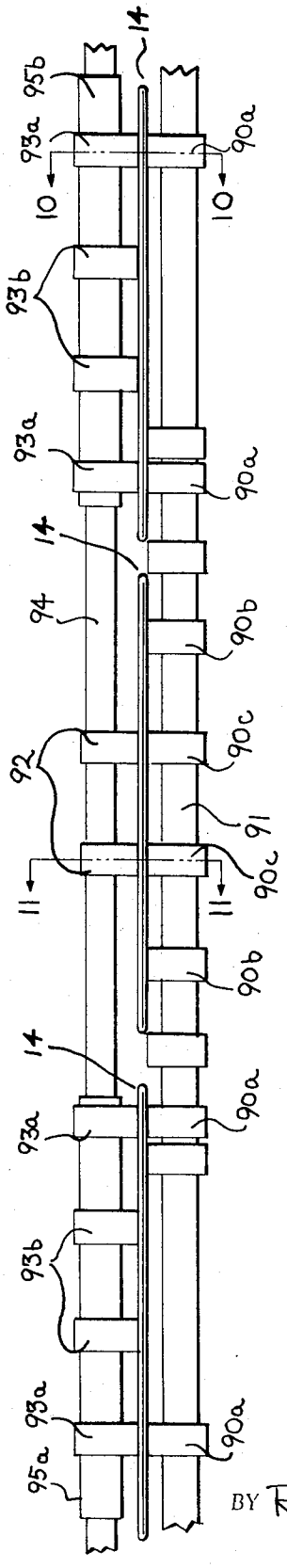

FIG. 7

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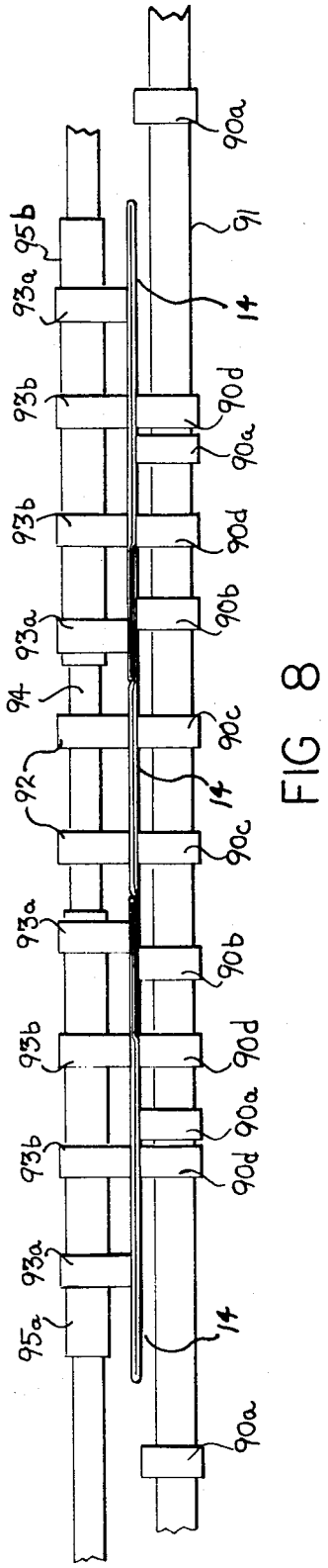

FIG 8

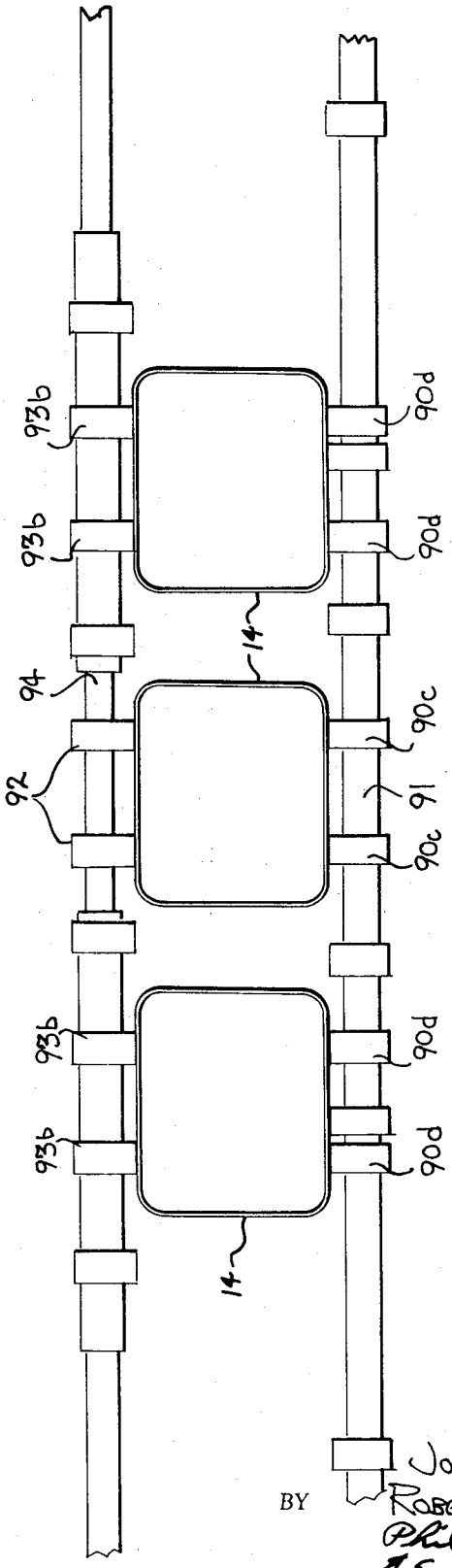

FIG 9

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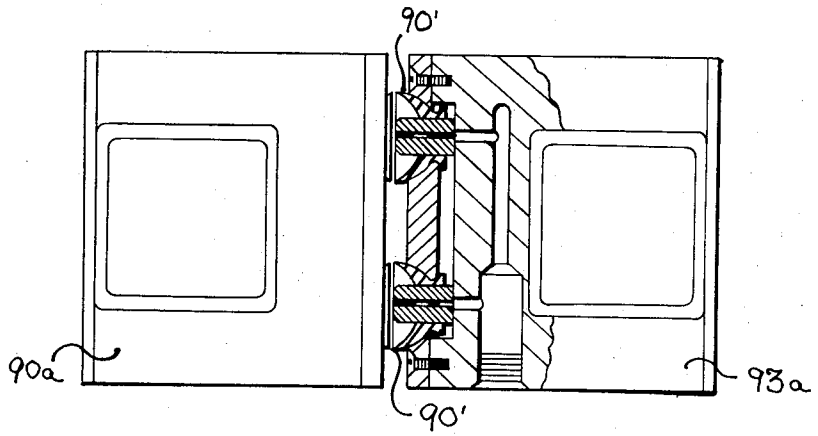

FIG. 10

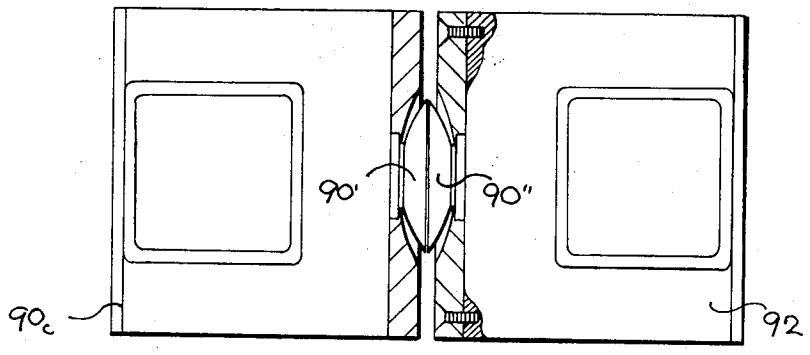

FIG. 11

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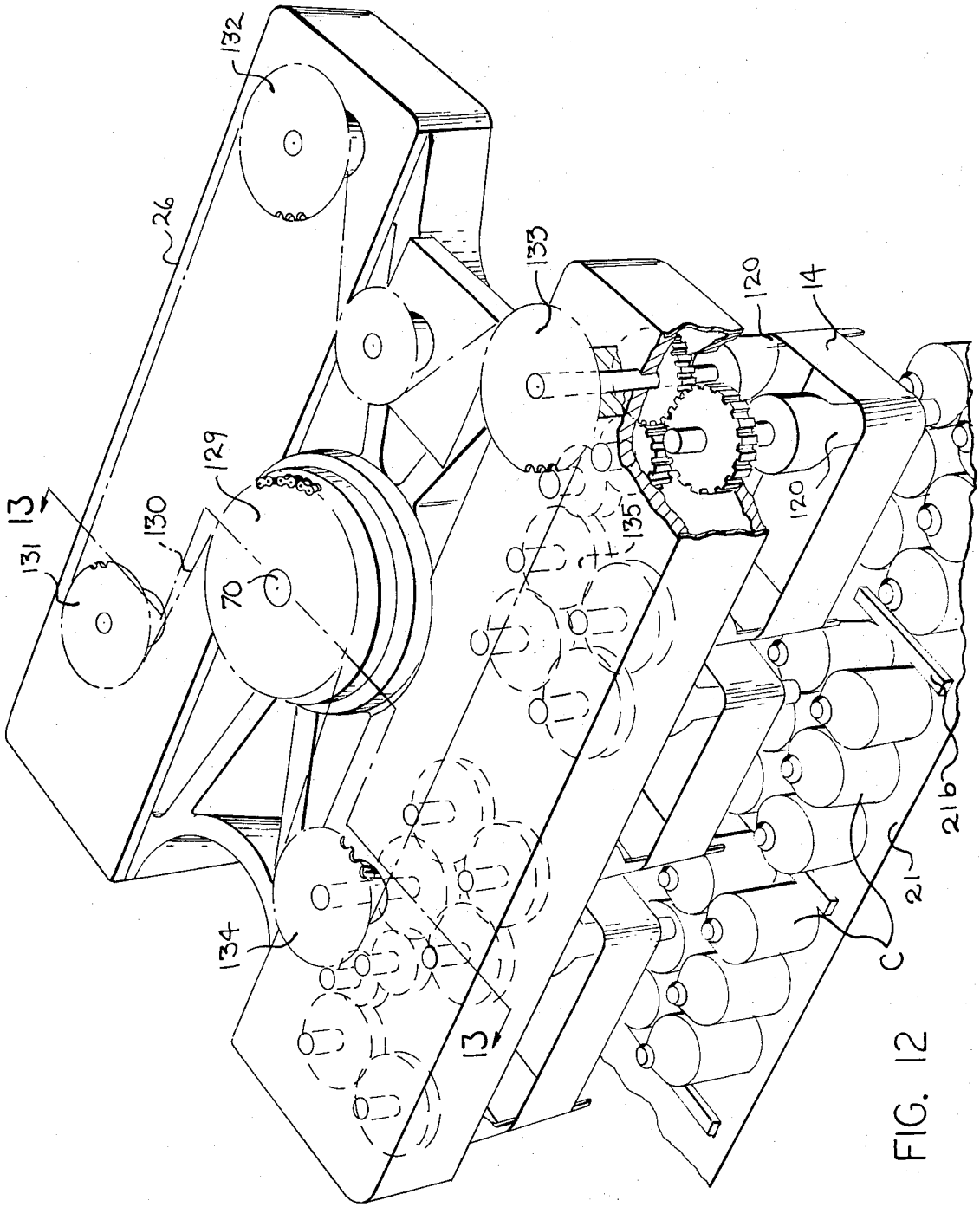

FIG. 12

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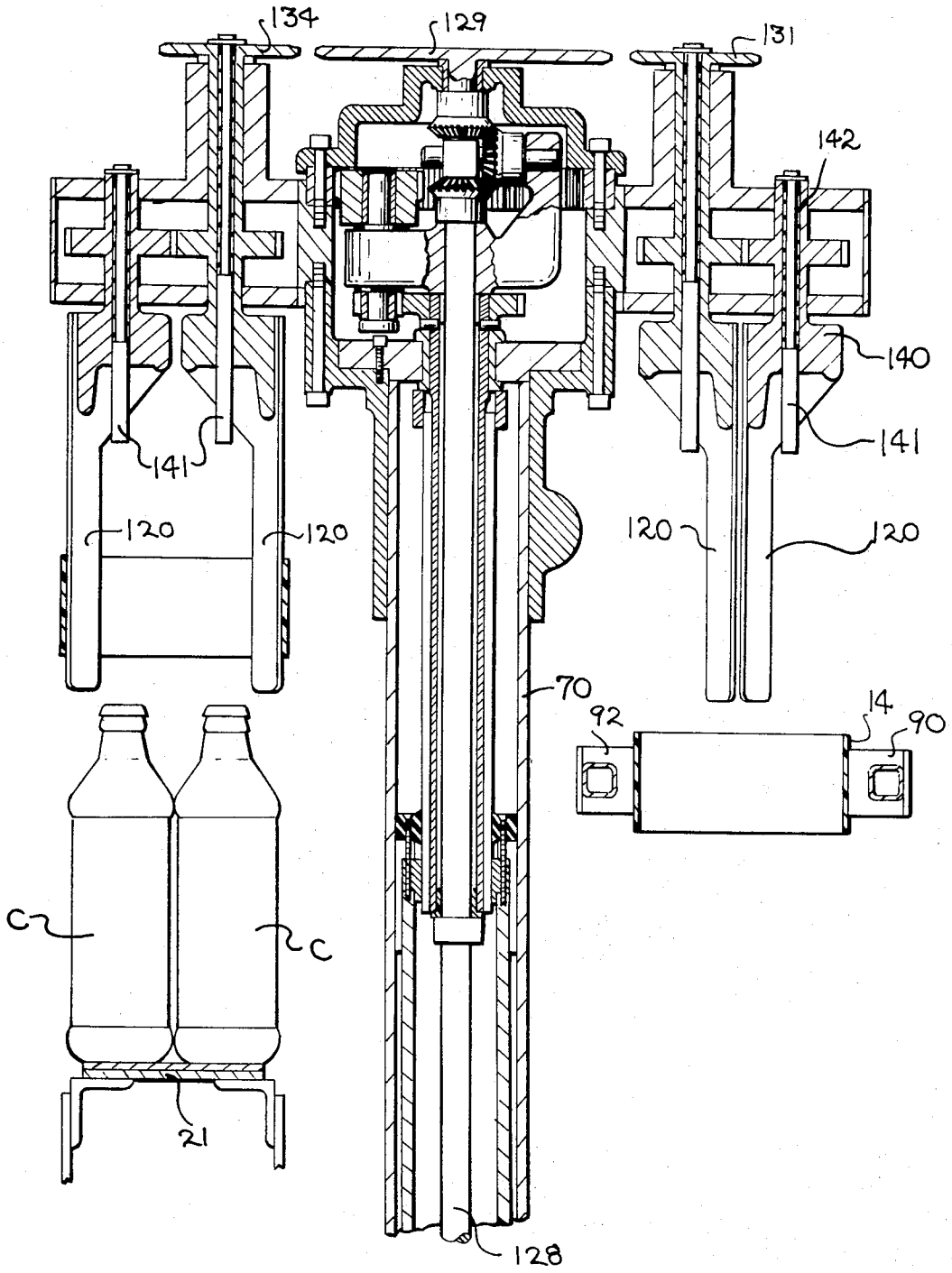

FIG. 13

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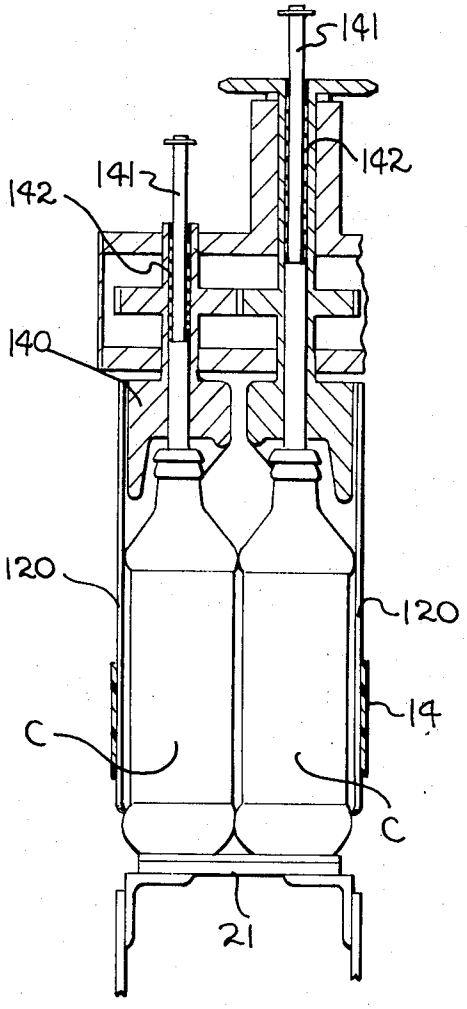

FIG. 14

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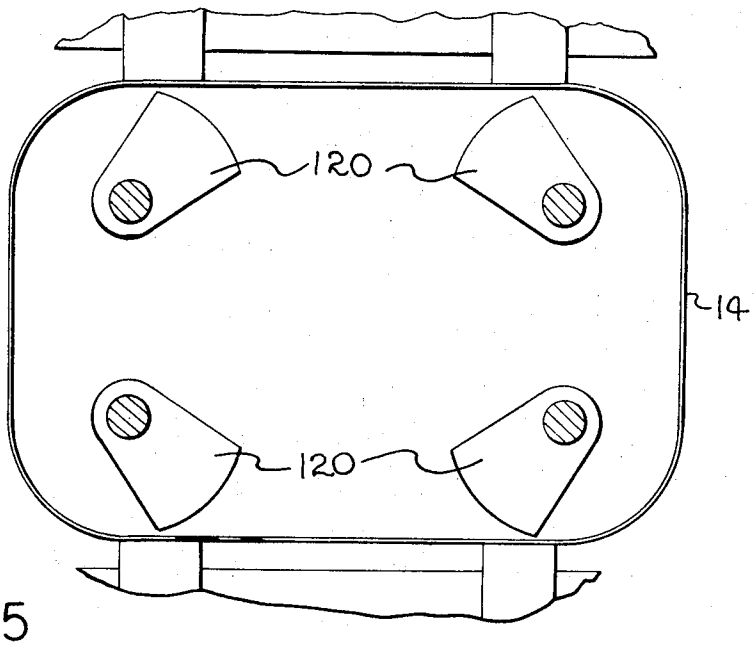

FIG. 15

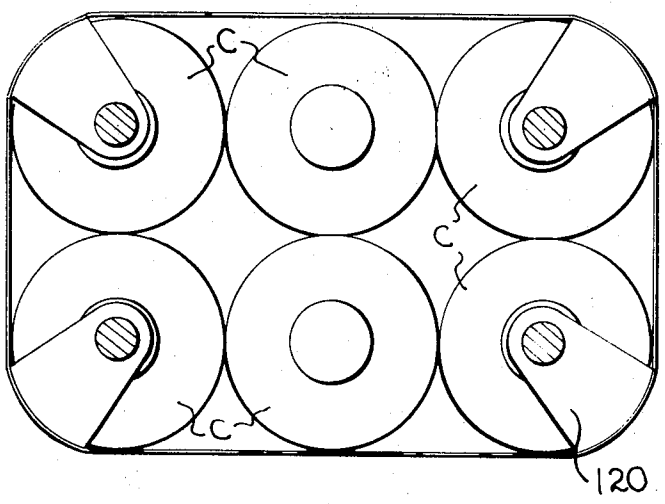

FIG. 16

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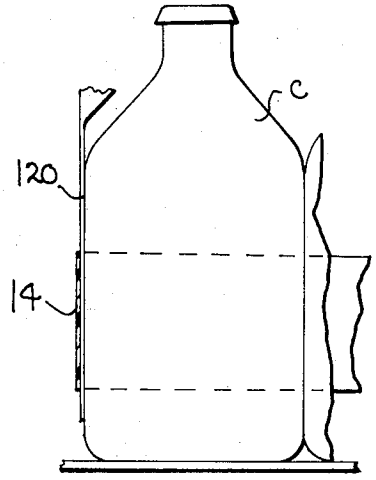

FIG. 17

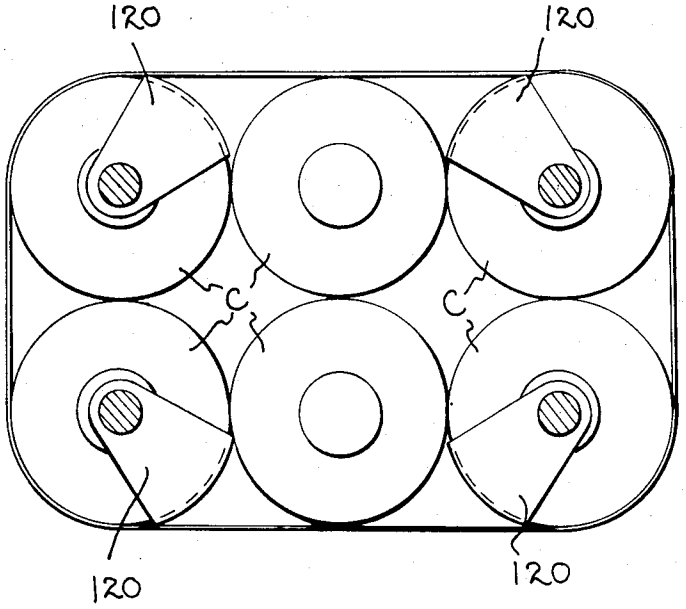

FIG. 18

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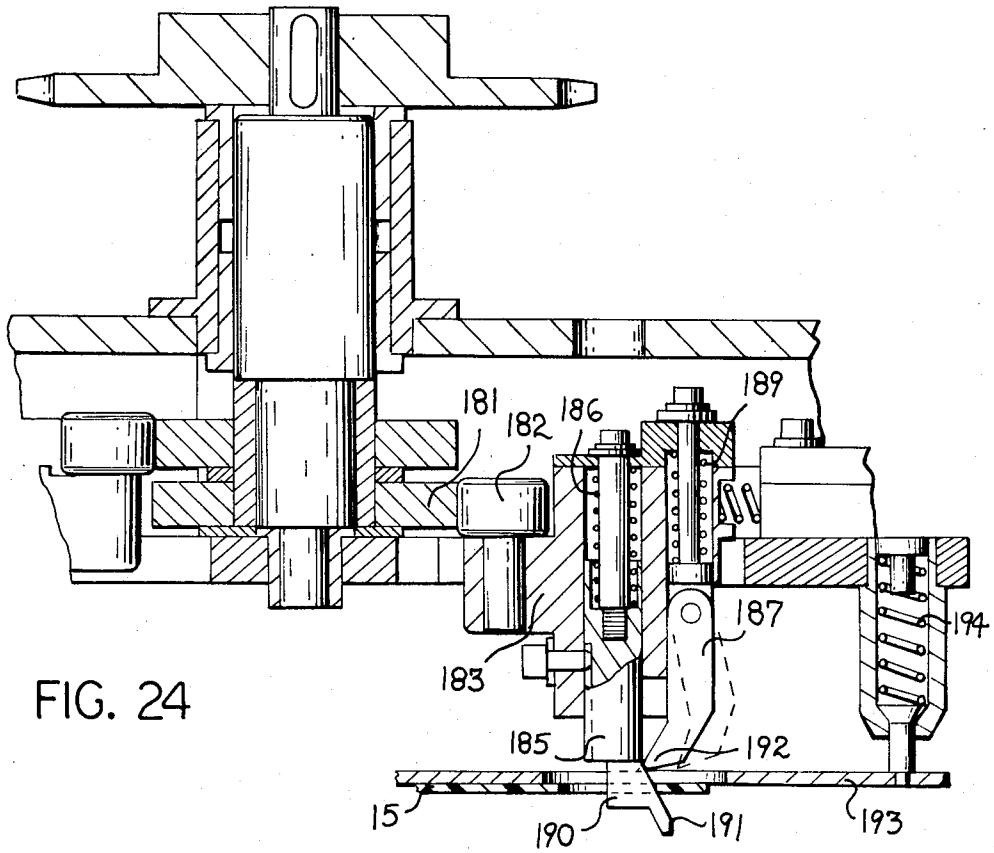

FIG. 24

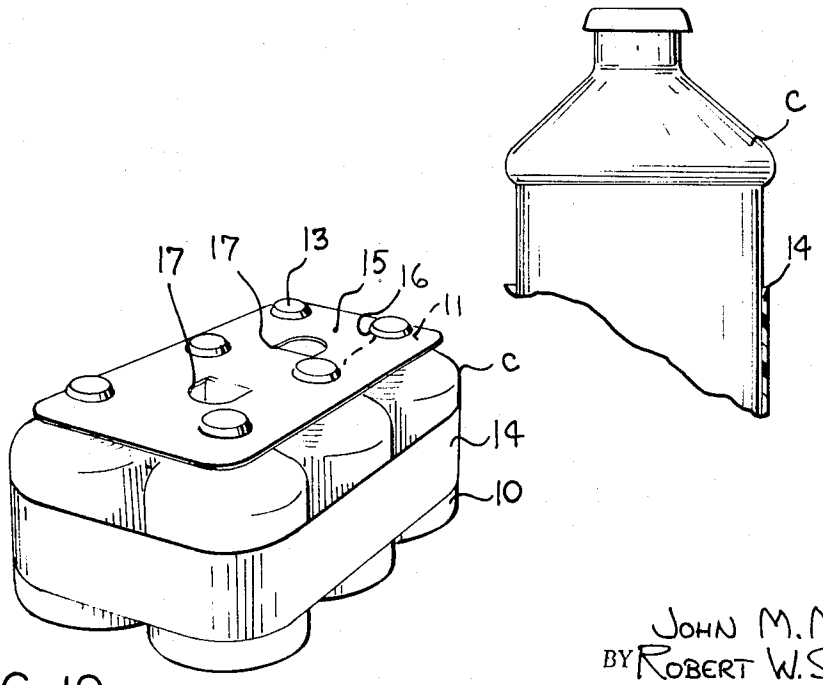

FIG. 19

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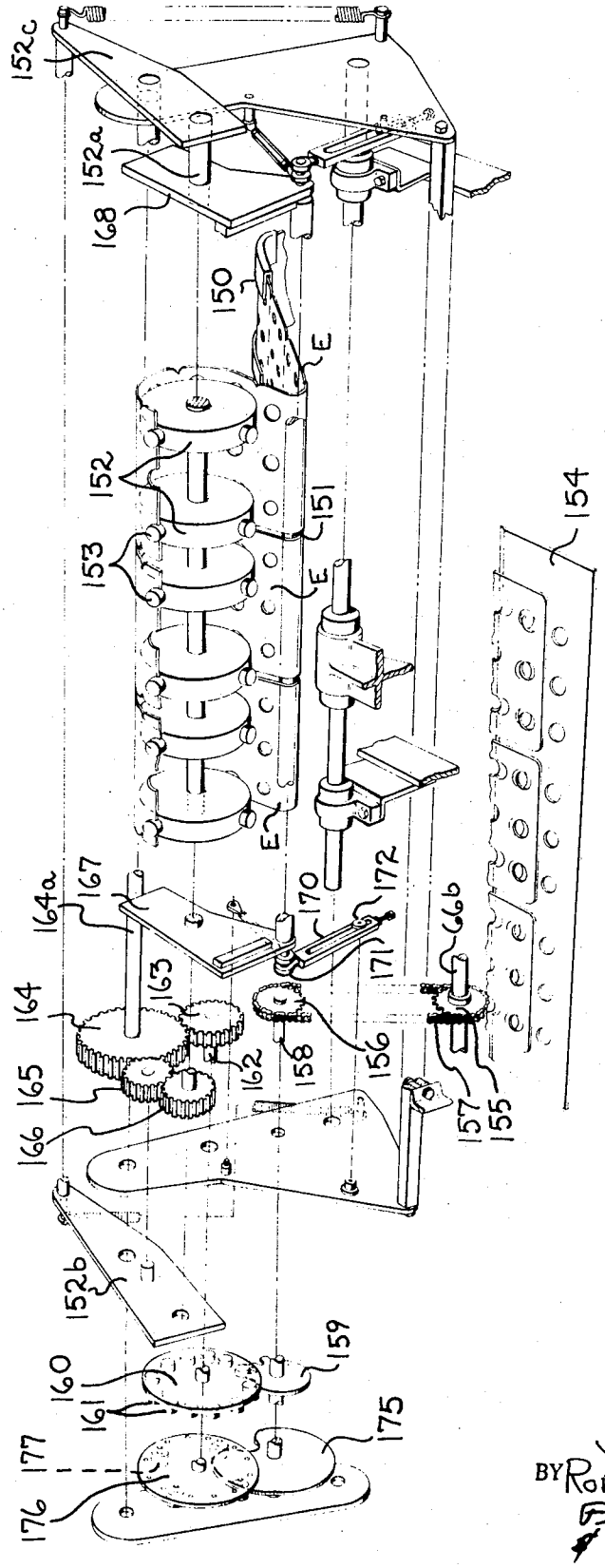

FIG. 20

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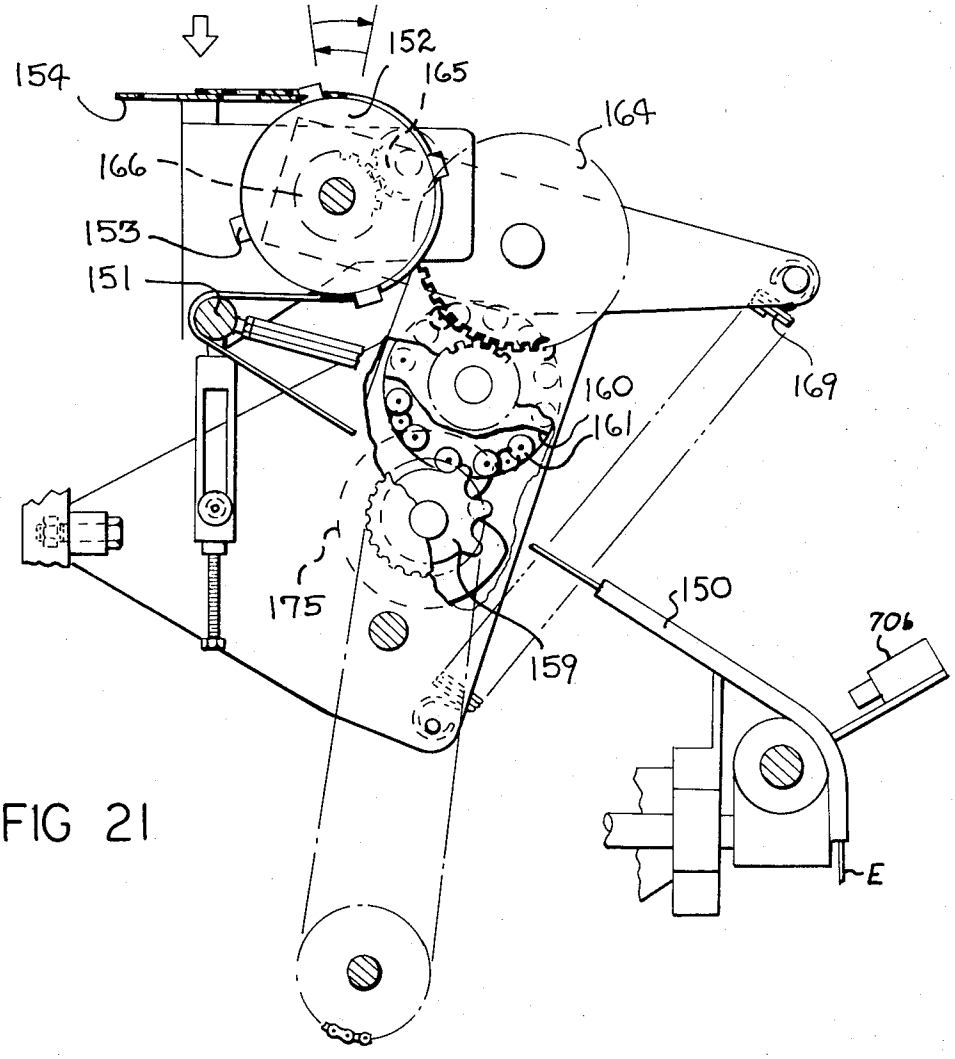

FIG 21

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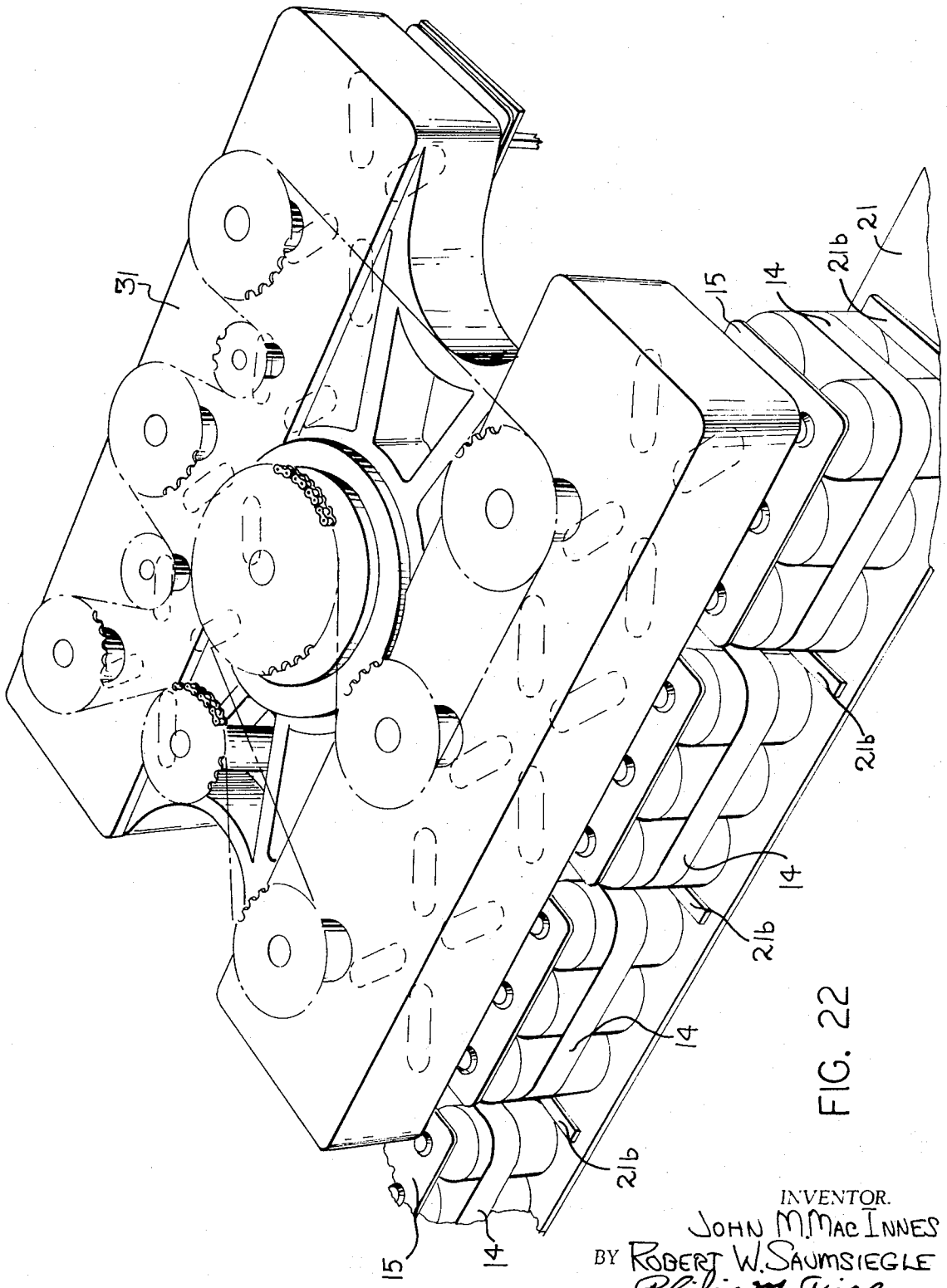

FIG. 22

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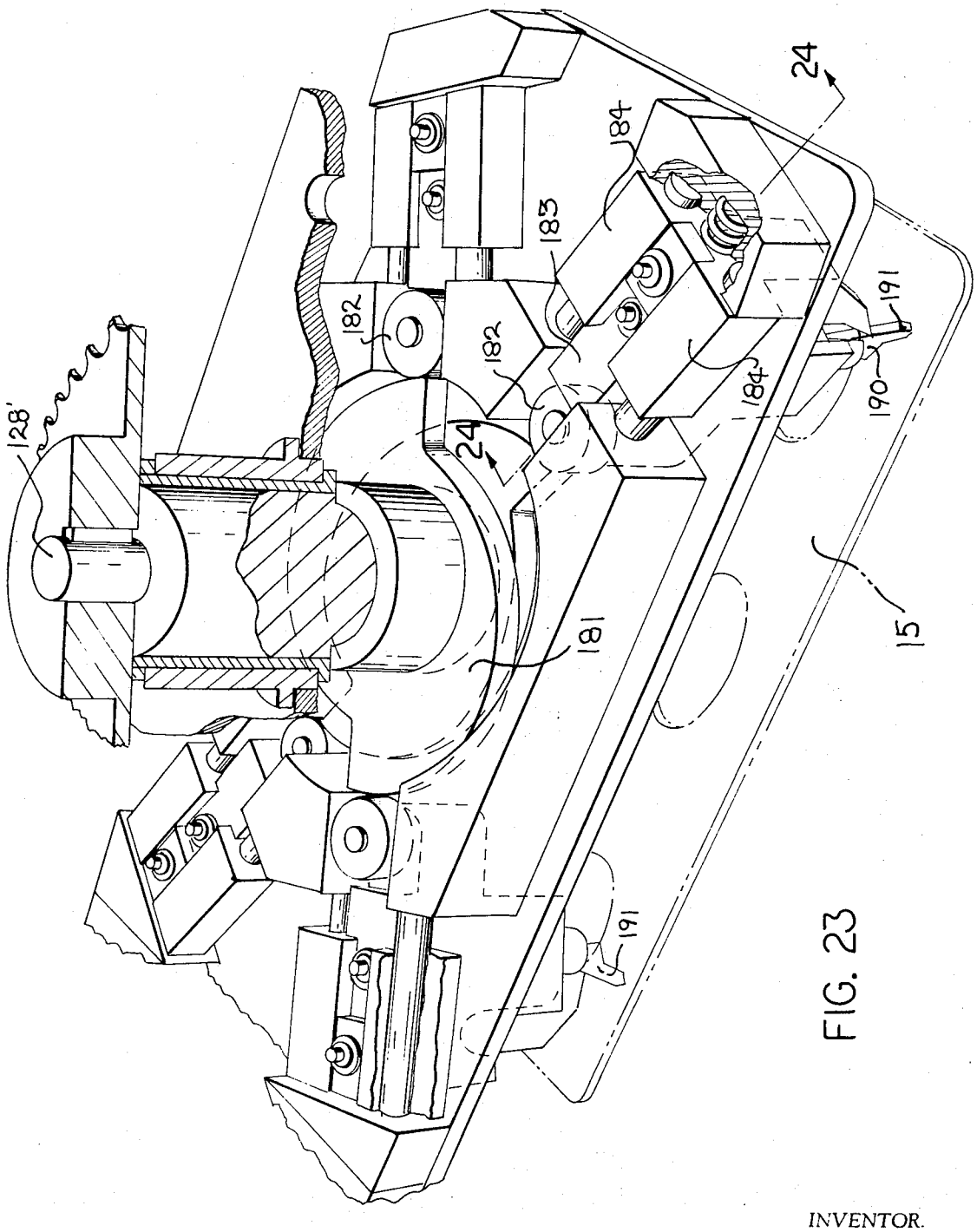

FIG. 23

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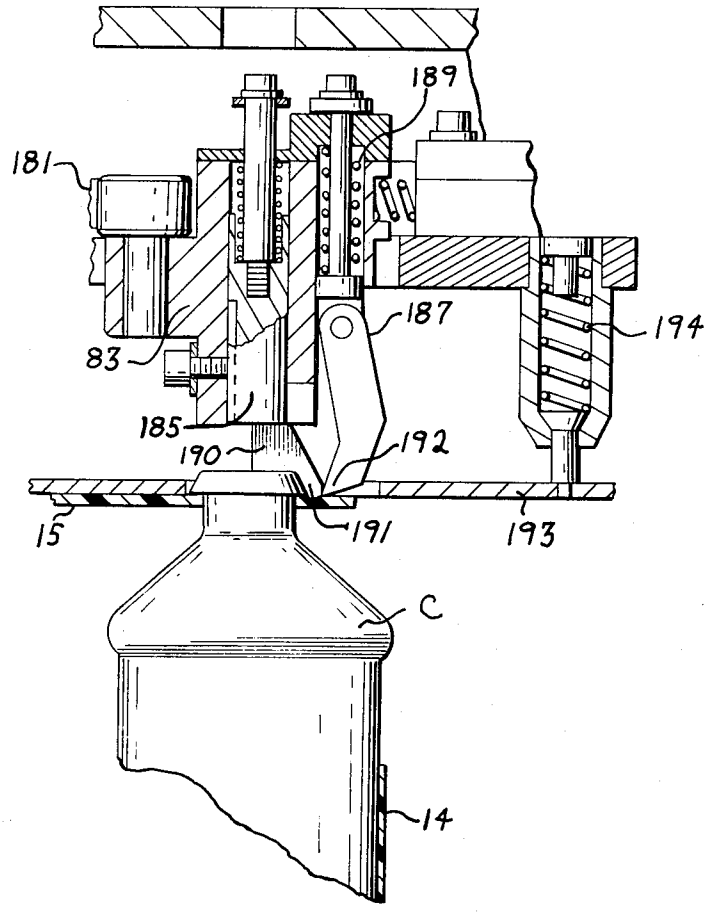

FIG. 25

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MACHINE FOR ASSEMBLING GROUPS OF CONTAINERS

This invention relates to forming packages of containers and particularly to forming packages of groups of containers, each container comprising a body portion and a relatively smaller neck portion with abutment means adjacent the upper end of the neck portion.

BACKGROUND OF THE INVENTION

In the handling of containers such as glass bottles which have a body portion and a relatively small neck portion, it is common to segregate the containers into groups and provide a carton or other type of enclosure so that each group can be handled separately both in distribution, sales and by the ultimate customer. Such enclosures have conventionally comprised paper cartons, elastic bands and carriers that are forced about the upper end of the neck portions of the containers.

Among the objects of the present invention are to provide a method and apparatus wherein endless elastic bands can be placed about groups of containers and carriers can be applied on the upper end of the containers; wherein this can be achieved quickly and efficiently at high speeds; wherein this can be achieved without interrupting the movement of the containers in a continuous path; and wherein there is a minimum of disturbance or undesirable forces placed upon the containers during handling.

SUMMARY OF THE INVENTION

The invention relates to forming packages of containers which have a body portion and a relatively smaller neck portion with abutment means adjacent the upper end of the neck portion. The containers are moved continuously in a predetermined path, segregated into groups or clusters, and an endless band is expanded, moved along in registry with each cluster and finally telescoped and released onto each cluster. At a subsequent position along the path of each cluster a carrier is moved along in registry with each cluster and forced downwardly over the ends of the containers to complete the package.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary perspective view of a machine embodying the invention;

FIG. 2 is a partly diagrammatic view of the drive system of the machine shown in FIG. 1;

FIG. 3 is a fragmentary part sectional perspective view of a portion of the drive;

FIG. 4 is a fragmentary exploded perspective view of a portion of the band feed mechanism;

FIG. 5 is a fragmentary part sectional view of a portion of the band handling mechanism;

FIGS. 6–9 are partly diagrammatic views showing the manner in which the endless bands are removed from a source and expanded into position for transfer and application to a cluster or group of containers;

FIG. 10 is a fragmentary sectional view taken along the line 10—10 in FIG. 7;

FIG. 11 is a fragmentary sectional view taken along the line 11—11 in FIG. 7;

FIG. 12 is a fragmentary perspective view of a portion of the band handling mechanism;

FIG. 13 is a fragmentary part sectional view of a portion of the band applying mechanism taken along the line 13—13 in FIG. 12;

FIG. 14 is a fragmentary sectional view similar to FIG. 13 showing the parts in a different operative position.

FIGS. 15 and 16 are partly diagrammatic views showing the manner in which an endless band is grasped for application to a group of containers;

FIG. 17 is a side elevational view showing the manner in which the band is held in position for telescoping over a container;

FIG. 18 is a partly diagrammatic plan view showing the manner in which the band is applied to a group of containers;

FIG. 19 is a perspective view showing a completed package;

FIG. 20 is a fragmentary exploded perspective view of the carrier feeding mechanism;

FIG. 21 is a fragmentary sectional view of the same;

FIG. 22 is a fragmentary perspective view of the carrier applying mechanism;

FIG. 23 is a fragmentary perspective view of the carrier applying mechanism, parts being broken away.

FIG. 24 is a fragmentary sectional view taken along the line 24—24 in FIG. 23;

FIG. 25 is a fragmentary sectional view similar to FIG. 24 showing the parts in a different operative position.

DESCRIPTION

Referring to FIG. 19, the method and apparatus disclosed herein is intended to assemble a group of containers C having a body portion 10 and a relatively smaller neck portion 11 and rib 12 and end cap 13, such as glass containers with metal caps, into a package. In accordance with the invention the package comprises an endless elastic band 14 that is telescoped over a group or cluster of containers and a carrier 15 that has openings 16 having a diameter slightly less than that of the necks so that the carrier being made of flexible plastic material can be telescoped over the necks to complete the package. The carrier is of substantially uniformly thick material and has finger engaging openings 17.

GENERAL DESCRIPTION

Referring to FIG. 1, the machine 20 embodying the invention comprises an endless conveyor 21 which carries the containers C progressively between pairs of star wheels 22. The star wheels 22 are provided with groups of pockets 23 separated by spaced portions 24 so as the star wheels rotate continuously they segregate the two rows of containers into groups or clusters, herein shown as six containers in each group or cluster. As the containers leave the star wheels they are loosely clustered. Therefore, a retarding means, such as brushes 21*a* located on each side of the conveyor drag the containers against cleats 21*b* fixed to the conveyor flights, thus resulting in a closely clustered group of bottles which are now in registered location with the band and carrier applying heads.

Each group of containers is carried along continuously by the conveyor 21 past an endless band applying area or station A during which the endless band 14 is

applied to the group and then through a carrier applying station B at which the carrier **15** is applied to the group. As will appear hereinafter, at each station A, B, the bands and carriers are applied to three groups or clusters of containers simultaneously.

At the band applying station A, a carriage **25** is reciprocated back and forth so that during a portion of its movement it carries a band applying head **26** along in register with the groups of containers and operation of the head **26** applies bands to the groups of containers. The endless bands are supplied from a source **27** that provides three flattened tubular lengths of plastic P from which the endless bands are cut and transferred by a transfer mechanism **28** to fingers on the head **26**, as presently described. The fingers apply the endless bands to the groups of containers as the groups of containers and head **26** move along in registry.

As the groups of containers with endless bands applied thereto are thereafter moved by conveyor **21** through station B, a second carriage **30** is reciprocated along the conveyor **21** to carry a carrier applying head **31** in registry with the containers as they are moved along by the conveyor **21** and thereby apply, as presently described, carriers to the groups of containers. The carriers are delivered from a source **32** in three endless bands E from which they are severed and delivered to the head **31** by a mechanism generally shown as at **33**. As the head **31** is carried by the carriage **30** in the same direction as the endless conveyor **21**, the head is manipulated to apply the carriers to the groups of containers herein shown as three groups simultaneously.

DRIVE MECHANISM

Referring to FIG. **2** which is a schematic view of the drive mechanism of the machine shown in FIG. **1**, it can be seen that the basic drive is obtained from a motor **35** which drives a speed reducer **36** through a clutch **37** to a shaft **38**. The shaft **38** is connected by a chain to a main drive shaft **39** which in turn through gearing **40** drives the endless conveyor **21**. The shaft **39** also functions through gearing **41** to operate the star wheels **22**.

The carriages **25, 30** are reciprocated by a drive from the shaft **39** through bevel gears **42, 43** and a mechanism that is more clearly shown in FIG. **3** and comprises spaced pairs of sprockets **44, 45**, and **46, 47** over which chains **48, 49** are trained. The sprockets **44, 45** are driven from the bevel gear **43** through the chain **48**. Rotation of sprocket **44** rotates gears **50, 51**. Rotation of gear **51** rotates a stub shaft **51***a* to drive gears **52** and **53**. Gear **53** in turn drives chain **49**. The endless chains **48, 49** carry a cross pin **55** to which links **56, 57** are pivoted at one end. The other end of the links **56, 57** are pivoted to the carriages **25, 30** respectively. As the chains **48, 49** are moved in an endless path, the carriages are thus reciprocated back and forth at the stations A and B.

As further shown in FIG. **2**, the shaft **38** functions through gear boxes **60** to rotate a shaft **61** on which feed rolls **62** for the carrier strip are provided. Drive from shaft **61** extends through sprockets and chains to a shaft **63** provides a drive to clutch and brakes **64** for periodically feeding portions of the tubular strips P to the feed rolls **65**. Carriages **25, 30** reciprocate along splined shafts **66***a*, **66***b* that receives a drive from a jack shaft **67** that in turn is driven from the main shaft **38**. Each carriage **25, 30** has cams thereon as presently described for providing various movements to the mechanism thereon. In addition, a rack **68** is provided adjacent each carriage **25, 30** and is adapted to be moved into and out of position for rotating a gear **69** to provide periodic rotation to a shaft **70** on the carriage for purposes presently described.

BAND FEEDING AND CUTTING MECHANISM

As shown in FIGS. **1** and **2**, the endless flattened tubular bands P are fed by the supply rollers **65** to the mechanism **28** which feeds and cuts a predetermined length to form the endless bands **14**. Referring to FIG. **4**, each of the endless bands P is fed between a drive roller **70** and a pressure roller **71** adjacent to a rotatable oscillating knife **72** that is associated with a flat table surface **73** having a cutting edge **74**. By periodically rotating the roller **70** a predetermined length of the tubular web P is fed into position on table **73**. The knife **72** is then moved to sever the predetermined length leaving it in position on the table **73** in the form of a flattened band **14**.

As further shown in FIG. **4**, drive for the drive rollers **70** is achieved by a chain drive from shaft **66***a* which includes a sprocket **76** over which an endless chain **77** is trained to a sprocket **78** on the shaft on which the drive rollers **70** are mounted. Intermittent drive of rollers **70** is achieved under the control of cams and limit switches **70***a* (FIG. **2**) which control a signal to an electric clutch and brake (not shown) in roller **70**. Where bands P are printed with advertising material and the like, a further control is achieved by a photocell **70***b* (FIG. **21**) which insures that a feed signal will continue as long as the photocell is viewing printed matter.

The oscillating knives **72** are driven by drive from a cam **80** on shaft **66***a*. The cam **80** causes oscillating movement of a crank **81** that has a cam follower **82** engaging the cam **80**. A link **83** interconnects crank **81** to a lever **84** on a shaft **85** which has pinions **86** fixed thereto for engaging a gear **87** associated with each oscillating knife **72**.

ENDLESS BAND TRANSFERRING MECHANISM

A mechanism is provided for lifting each endless band **14** from its table **73** and transferring it to a position where it can be opened for engagement by fingers of a band applying mechanism as presently described.

Referring to FIGS. **4** and **5**, vacuum heads **90** are provided on a shaft **91** which is oscillated between positions adjacent the table **73** and a vertical position. By oscillating the shaft **91** and simultaneously rotating it 90° about its axis, three bands **14** can be picked up from the position on table **73** and moved to a vertical position adjacent fixed vacuum heads **92** and movable vacuum heads **93** on a shaft **94**. The vacuum heads **93** are provided on a slide **95** slidable on the shaft **94**. The functioning of the vacuum heads to transfer and open each endless band can be more readily understood by reference to the diagrammatic views FIGS. **6–9**.

The mechanism for moving heads **90** horizontally and rotating them comprise a cam **200** fixed to the continuous revolving shaft **66***a*, with cam follower **201** engaged with said cam. The follower **201** is mounted on

arm 202. Therefore, as the cam revolves rotational movement is imparted to arm 202. The rotational movement is transmitted to levers 208 via connecting link 203, arm 204, gears 205, 206 and shaft 207. As levers 208 rotate there is imported to arm 209 a combination of horizontal and radial movement resulting in movement of heads 90 from a vertical position, when adjacent to heads 92, 93, to a horizontal position when adjacent to table 73.

Rollers 210, mounted on posts 211, are engaged in the slot of arm 209 and thus provide a combination support and pivotal guide for arm 209.

As will be seen in FIG. 9 there is required an almost pure horizontal travel of heads 90 prior to the engagement of the band applying fingers with the bands. By the mechanism previously described in combination with the properly programmed path of cam 200 the required horizontal travel of heads 90 is obtained.

Referring to FIG. 6, as vacuum heads 90*a* and 90*b* reach table 73, vacuum is applied thereto to lift three bands 14 which are in flattened condition from table 73.

Referring to FIGS. 5 and 7, shaft 91 is then swung in an arc and simultaneously rotated to bring the bands 14 to a vertical position adjacent to heads 93*a* and 92. Vacuum is then applied to heads 93*a* and vacuum is shut-off on heads 90*a*. Vacuum remains on 90*b*. End bands are now held by 93*a* and center band 90*b*. Shaft 91 moves away a short distance from shaft 94.

Referring to FIG. 8, slides 95*a* and 95*b* move toward each other until heads 93*b* align with 90*d* and heads 92 align with heads 90*c*. Shaft 91 then moves toward shaft 94 so that heads on 91 are adjacent to heads on shaft 94. Vacuum is then simultaneously shut-off on head 93*a* and head 90*b* and turned-on on heads 93*b*, 90*d*, 92 and 90*c*. The end bands are now held by head 93*b* and head 90*d*, the center band is held by heads 92 and 90*c*.

Referring to FIG. 9, shaft 91 moves away from shaft 94 to open the bands 14 into a generally rectangular configuration.

Sequencing of the vacuum supply to the various vacuum heads is accomplished by cams 96 actuating limit switches 97 (FIG. 2) which in turn energize solenoid operated sequencing valves (not shown) with vacuum heads for one or more vacuum cups 90', 90'' thereon for applying vacuum to the bands 14.

Referring to FIGS. 4 and 5, the mechanism for reciprocating the heads 93*a*, 93*b* on the shaft 94 comprises a cam 105 on shaft 66*a* which is continuously rotated. A cam follower 106 oscillates a crank 107 periodically which in turn reciprocates a link 108 and oscillates an intermediate crank 109. Crank 109 is connected by a link 110 to an oscillating crank 111 which in turn is connected by link 112 to the slide 95*a*. The slide 95*b* is operated by a shaft 111*a* fixed to crank 111. Shaft 111*a* is fixed to and operates crank arm 113, link 114, arm 115 and gears 116, 117 through arm 118 and link 119 so that the slides 95*a* and 95*b* are moved toward and away from one another as desired.

BAND APPLYING MECHANISM

Referring to FIG. 12, head 26 is provided with fingers 120 that are adapted to engage the band and expand it so that when the head is moved downwardly onto a group or cluster of containers, the band will be telescoped over the containers. By oscillating the fingers 120, the band may be permitted to contract onto the group of containers.

As shown in FIG. 12, three sets of four fingers 120 are provided on the head 26 and are adapted to engage and apply three bands simultaneously on three groups or clusters of containers. The head 26 is mounted for vertical movement on the carriage 25 and the post 70 extends vertically therethrough. As previously noted, the post 70 is adapted to be periodically rotated to rotate the head 180°. Thus with six sets of fingers 120, the head can apply bands to three groups of containers while at the same time it is picking up three more bands.

Referring to FIG. 4, a cam 121 on shaft 66*a* is engaged by a cam follower 123 to cause oscillation of a lever 122 and in turn reciprocation of a rod 124. Reciprocation of rod 124 oscillates arm 125 to oscillate gear 126. Oscillation of the gear 126 in turn oscillates the gear 127 on a shaft 128 extending through the post 70. The upper end of the post 70 is formed with a sprocket 129 over which a chain 130 is trained. The chain 130 is in turn meshed with sprockets 131, 132, 133, 134 (FIG. 12) each of which is fixed to a gear. A gear train 135 extends to each of the shafts that support the fingers 120 to oscillate the fingers.

Referring to FIG. 4, the vertical movement of the head is achieved by engagement of a cam follower 136 thereon with a cam 137 on shaft 66*a*. Cam follower 136 is fixed to arm 138 which has cam followers engaged in collar of post 70.

Referring to FIG. 13, after the endless band 14 has been opened to the position shown in FIG. 9, lowering of the head will cause the fingers 120 to enter the band. At this point the position of the fingers 120 is as shown in FIG. 15. The fingers are then rotated moved outwardly to expand and hold the band as shown in FIG. 16. Upon lifting and rotation of the head to overlying relation with the containers as shown to the left in FIG. 13, and lowering of the head, the fingers are rotated to return them to their original position as shown in FIG. 18 releasing the band and permitting it to contract about the containers.

As shown in FIGS. 13 and 14, each finger 120 is supported at its upper end by a block 140. Spring loaded plungers 141 urged downwardly by springs 142 are provided to facilitate upward movement of the fingers 120 after the band is applied. The plungers 141 tend to hold the containers against the conveyor 21.

CARRIER FEEDING AND SEVERING MECHANISM

As heretofore set forth in connection with FIGS. 1 and 2, endless webs E of carrier stock are fed to a position adjacent the carriage 30.

Referring to FIG. 20, the carriage 30 supports guides 150 that guide each endless length E of carrier stock upwardly over a shaft 151 and thereafter around feed rollers 152 that have projections 153 engaging the openings in the carrier which are to receive the necks of the containers. Periodic rotation of the feed rolls 152 transfers one carrier in each row of 3 to a table 154. The carrier is engaged as presently described when in position on the table so that is can be transferred for application to the groups of containers. When the carri-

er is so engaged, the rollers **152** are given a slight retrograde or reverse motion causing the carrier that has been delivered to the table to be severed from the remainder of the web along a weakened line previously formed in the web.

Referring to FIG. **20**, the drive for rotating the rolls **152** to feed carriers to table **154** is achieved from a sprocket **155** on cam shaft **66***b* that rotates a sprocket **156** through an endless chain **157**. Sprocket **156** is mounted on a shaft **158** on the carriage. Rotation of the shaft **158** rotates a gear sector **159** that engages a wheel **160** having pins **161** thereon so that the wheel **160** is periodically rotated producing a periodic rotation of the rolls **152** through shaft **162** and gears **163**, **164**, **165**, **166**. The table **154** is fixed to plates **167** and **168** which are journaled on shaft **152***a*. Shaft **152***a* is fixed to brackets **152***b* and **152***c*. These brackets are pivotable on shaft **164***a*. Therefore, as table **154** is forced downward plates **167**, **168** and shaft **152***a* are moved downwardly, causing brackets **152***b* and **152***c* to pivot about shaft **164***a*. Shaft **165***a* is fixed to bracket **152***b* and gear **165** is allowed to rotate on shaft **165***a*. As gear **165** is in mesh with gear **164**, the pivotable motion of bracket **152***b* causes gear **165** to rotate counterclockwise (FIG. **21**) thus causing gear **166**, shaft **152***a* and rollers **152** to rotate clockwise, or reverse of carrier feed rotation, to break the carriers from the remainder of the webs when the carriers are engaged by the applying mechanism as presently described.

During this action, gear **164** is locked, against revolving, since gear **163**, shaft **162** and wheel **176** cannot revolve as rollers **177**, fixed to wheel **176**, are engaged on the dwell side of cam **175**. When the downward force on table **154** is released, spring **169** returns **152***b* and **152***c* to original position, thus causing the resetting of rollers **152** by reverse action through gears **165** and **166**. Slotted bracket **170** engaged with link **171**, and guided over pin **172** acts as a vertical guide and positioning adjustment for plates **167** and **168**. Shaft **151** is provided as a tie bar for **167** and **168** as well as guide for carriers E to engage on rollers **152**.

The downward force on table **154** to cause the reverse rotation of rollers **152** is provided by the downward stroke of carrier applying head **31**. The pressure plate (FIG. **24**) as it moves downward initially contacts the table **154**, thus causing the carriers to be sandwiched between these two members at which time fingers **191** enter the openings of carriers E. Continuing the downward motion provides the previously mentioned downward force on table **154**.

CARRIER APPLYING HEAD

As in the case of the band applying head, the carrier applying head **31** is mounted on its respective carriage and is adapted for rotation periodically 180°. The head **31** is adapted to pick up three carriers from the table **154** while simultaneously applying three carriers on the opposite side to three groups of containers as shown in FIG. **22**. The structure for raising and lowering the head and for applying rotation to the mechanism of the head is substantially identical to that described in connection with the band applying mechanism.

Referring to FIG. **23**, the central shaft **128'** is driven in an oscillating motion in a similar fashion as in the case of the band applying mechanism. The cams **181** act upon cam followers **182** on the end of slide blocks **183** (FIGS. **23** and **24**). The slide blocks **183** are mounted for horizontal movement in blocks **184** generally diagonally outwardly with respect to a carrier. Each slide block yieldingly supports a plunger **185** that is yieldingly urged downwardly by a spring **186** and a stripper finger **187** that is yieldingly urged downwardly by a spring **189**. A carrier engaging member **190** is provided on the lower end of each plunger **185** and includes a downwardly and outwardly inclined surface **191** that is engaged by an inwardly extending projection **192** on the stripper **187**.

When carriers are provided on the table **154** and the head is lowered, the plunger **185** and particularly the carrier engaging members **190** enter the openings of the carrier **15**. The cams **181** are then operated to move the fingers **191** outwardly stretching the carrier **15** and thereby grasping the carriers **15**. Upon rotation of the head to bring the carriers **15** into overlying relationship with the group of containers and lowering of the heads, the carrier engaging members **190** seat upon the upper ends of the containers C. Further downward movement of the head causes the stripper fingers **192** to follow the inclined outer surfaces of the carrier engaging members **190** and strip the carrier from the head. A pressure plate **193** yieldingly supported by springs **194** applies a substantially uniform pressure to the upper surface of carrier **15** to assist in stripping it onto the groups of containers (FIG. **25**).

It can thus be seen there has been provided a method and apparatus for applying endless bands and carriers onto groups of containers without interrupting movement of the containers.

We claim:

1. In an apparatus for making a package of containers having a body portion and a relatively narrow neck portion with abutment means adjacent the upper end of said neck portion including a conveyor for moving containers in a predetermined path, means along the conveyor for segregating the containers into clusters, and means along said conveyor for applying a band to each said cluster, the improvement wherein said means for applying a band comprises

a first carriage along the conveyor,

means for mounting said carriage for reciprocating movement along said conveyor,

a turret on said carriage,

said turret having at least one head thereon,

means for rotating said turret periodically,

said head having means thereon for engaging and expanding an endless band,

means for moving said head into telescoping relation to a cluster as it is moved along with the conveyor,

means for moving said carriage so that the head is in registry with the cluster,

and means for releasing the band when the band is telescoped over the cluster.

2. The combination set forth in claim **1** wherein said means for moving said head comprises means for raising and lowering the turret on the carriage.

3. The combination set forth in claim **1** wherein a plurality of heads are mounted on said turret,

said heads being operable to provide a plurality of bands on a plurality of clusters simultaneously.

4. The combination set forth in claim 1 wherein each said head comprises a plurality of fingers operable to expand and stretch said band.

5. The combination set forth in claim 1 including means for feeding a flattened tube of elastic material,
means for successively severing portions of said tube to form said endless band,
means for expanding each severed band such that it is in position for engagement by said expanding and stretching means.

6. The combination set forth in claim 5 wherein said means for expanding said flattened tube comprise vacuum means operable to engage opposed sides of said flattened tube,
and means for moving said vacuum means away from one another to expand said band.

7. The combination set forth in claim 1 wherein a plurality of heads are mounted on said turret and a plurality of flattened tubes are engaged and expanded,
means for engaging said tubes prior to expansion and moving them axially toward one another to bring them into alignment with said expanding and stretching means,
means for expanding said tubes for engagement by said expanding and stretching means.

8. The combination set forth in claim 7 wherein said last-mentioned means comprises vacuum means operable for longitudinal movement relative to one another.

9. In an apparatus for making a package of containers having a body portion and a relatively narrow neck portion with abutment means adjacent the upper end of said neck portion including a conveyor for moving containers in a predetermined path, means along the conveyor for segregating the containers into clusters, and means along said conveyor for applying a band to each said cluster, the improvement wherein said means for applying a band comprises
a first carriage along the conveyor,
means for mounting said carriage for reciprocating movement along said conveyor,
a turret on said carriage,
said turret having a plurality of heads along opposed sides thereof,
means for rotating said turret periodically to bring the heads along one side or the other into overlying relation with said conveyor,
each said head having means thereon for engaging and expanding an endless band,
means for raising and lowering said turret and in turn said heads into telescoping relation to a plurality of clusters as they are moved along by the conveyor,
means for moving said carriage so that the heads are in registry with the clusters,
and means for releasing the bands when the bands are telescoped over the clusters.

10. The combination set forth in claim 9 wherein each said head comprises a plurality of fingers operable to expand and stretch said bands simultaneous with releasing bands onto bottles opposite the side at which bands are engaged and expanded.

11. The combination set forth in claim 10 including means for feeding a plurality of flattened tubes of elastic material,
means for successively severing portions of said tubes to form a plurality of said endless bands,
means for simultaneously expanding severed bands such that they are in position for engagement by said expanding and stretching means.

12. The combination set forth in claim 11 wherein said means for expanding said flattened tubes comprise vacuum means operable to engage proposed sides of said flattened tubes,
and means for moving said vacuum means away from one another to expand said bands.

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