United States Patent [19]

Heisler

[11] **3,848,394**

[45] **Nov. 19, 1974**

[54] **APPARATUS AND METHOD FOR ORIENTING AND CASE PACKING EARED CONTAINERS**

[76] Inventor: **Raymond A. Heisler,** 657 Dakota Trl., Franklin Lakes, N.J. 07417

[22] Filed: **June 26, 1973**

[21] Appl. No.: **373,752**

[52] **U.S. Cl.** ..... **53/26,** 53/29, 53/159, 53/186, 53/383, 53/387, 198/31 AC, 198/235

[51] **Int. Cl.**.... **B65b 5/08,** B65b 35/56, B65b 43/28

[58] **Field of Search** ..... 53/159, 61, 67, 26, 29, 53/186, 252, 284, 247, 383, 387; 198/24, 21 AC, 235

[56] **References Cited**

UNITED STATES PATENTS

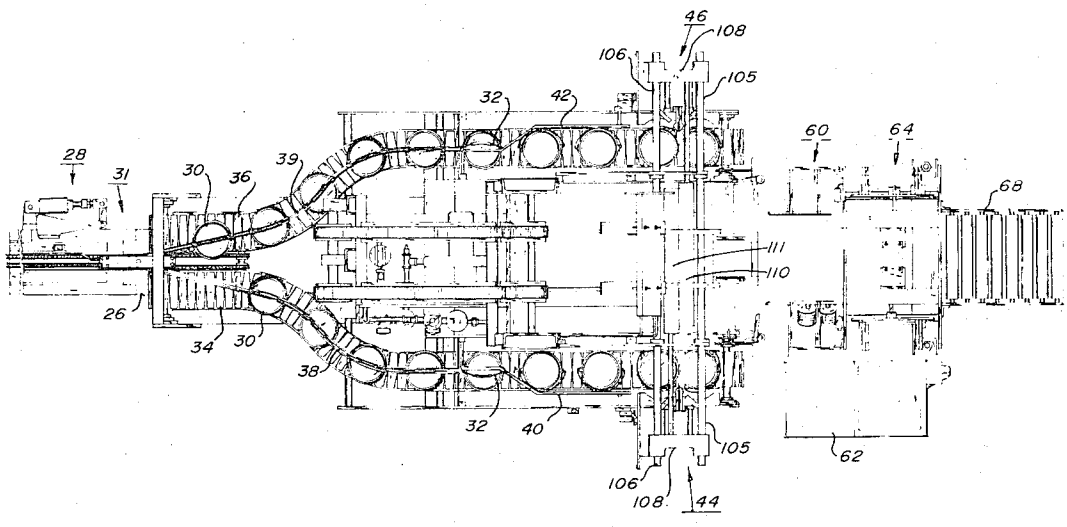
3,136,105	6/1964	Eckhoff	198/24 X
3,209,512	10/1965	Ferguson, Jr. et al.	53/159 X
3,284,985	11/1966	Roth	53/159 X
3,289,810	12/1966	Iannucci	53/61 X
3,462,912	8/1969	Anderson	53/167 X
3,740,919	6/1973	Heisler	53/159

Primary Examiner—Gil Weidenfeld
Attorney, Agent, or Firm—Ralph R. Roberts

[57] **ABSTRACT**

An apparatus and method is disclosed for receiving bailed containers in a single file array from a delivery system and to orient said containers so that they are delivered to a Y-divider for separation into two groups for single file alignment and delivery to a transfer system for moving them into the open ends of an automatically erected carton. After filling the carton with either four or two containers the carton is advanced to a closing, sealing and delivering mechanism. In this automatic mechanism the cartons for the case packing operation are placed in a delivery station from which they are advanced to an erecting station which is automatically actuated in response to the delivery of bailed containers to and through the orienting apparatus. The glued and sealed cartons may be delivered to a conveyor or pallet. The containers as they are arranged in the carton may have their bails facing into the corners of the carton or facing toward the center of the carton. Apparatus is shown where changes in the apparatus and operation permit carton delivery and feeding means to also erect small size cartons and fill these smaller size cartons with only two containers.

39 Claims, 36 Drawing Figures



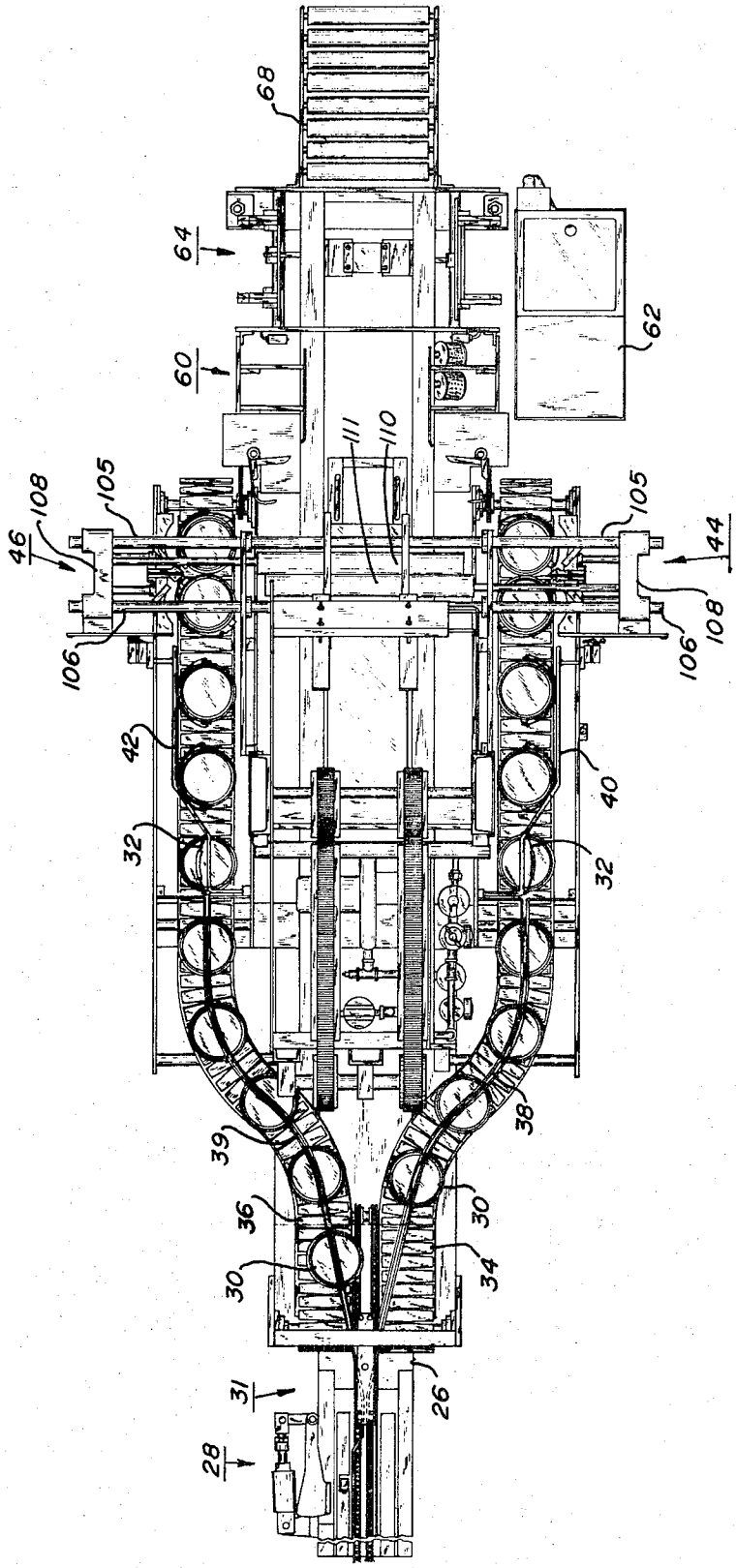


Fig. 1

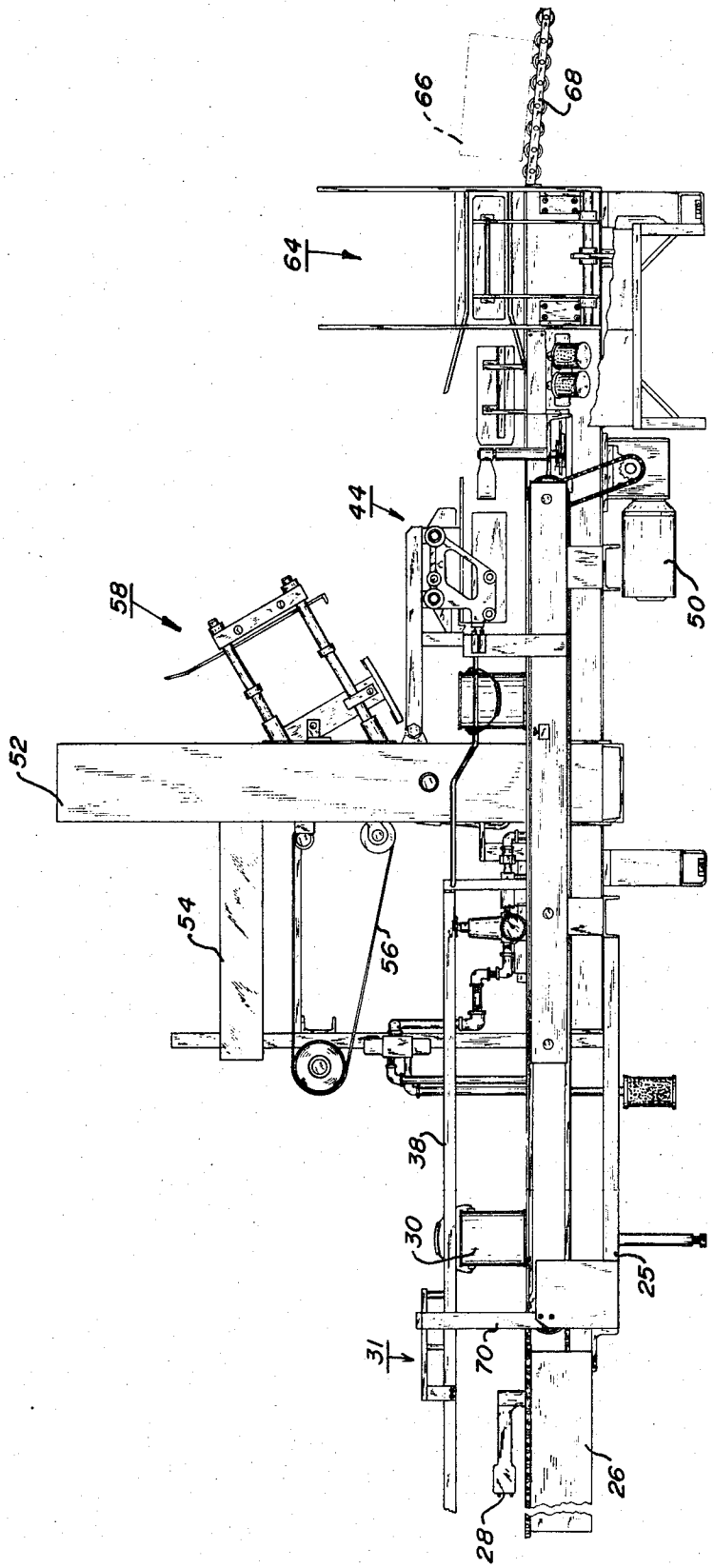


Fig. 2

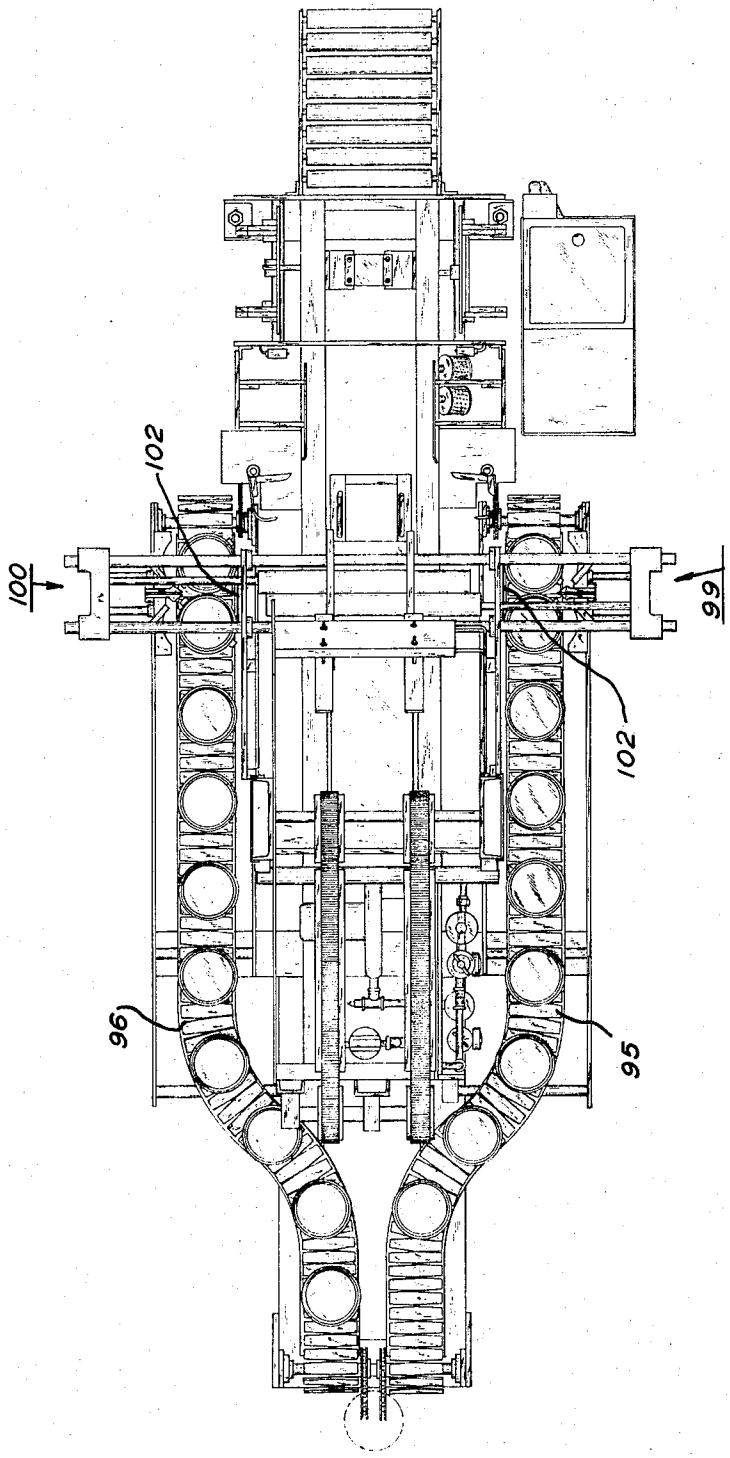


Fig - 3

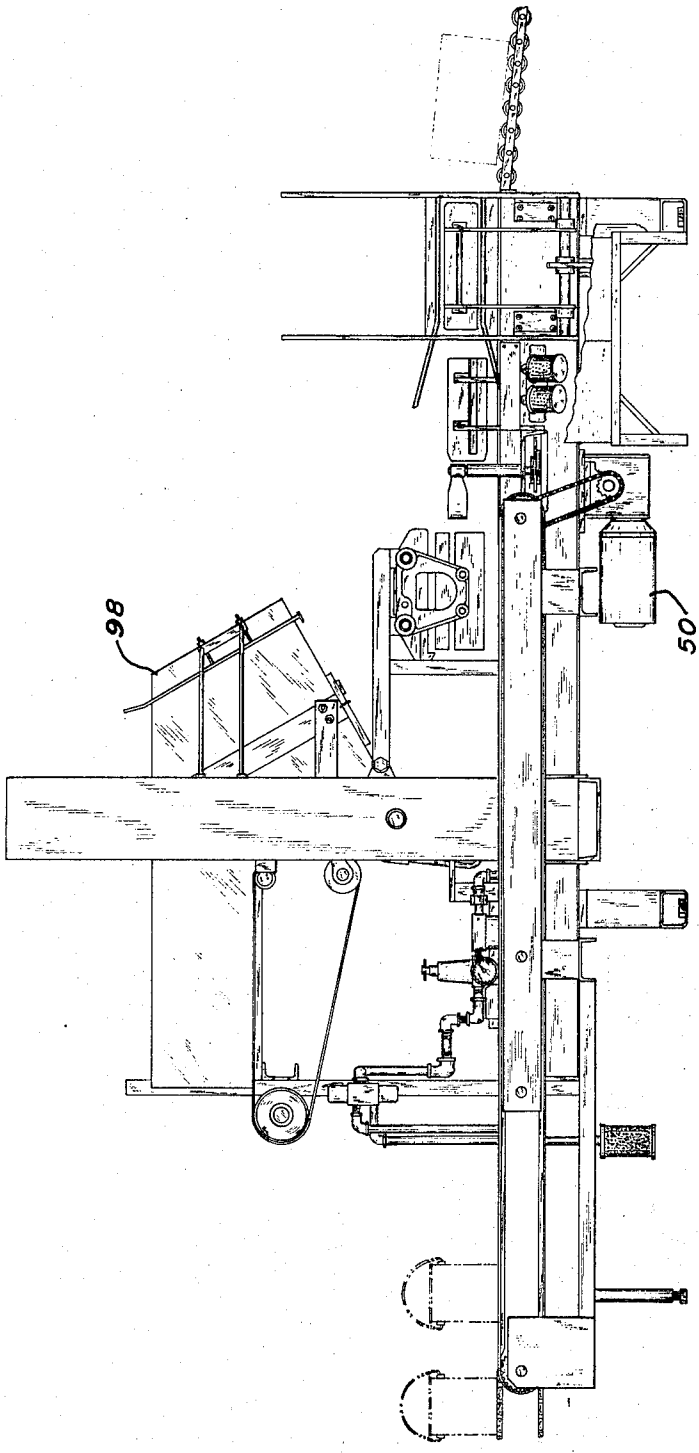


Fig. 4

Fig. 6

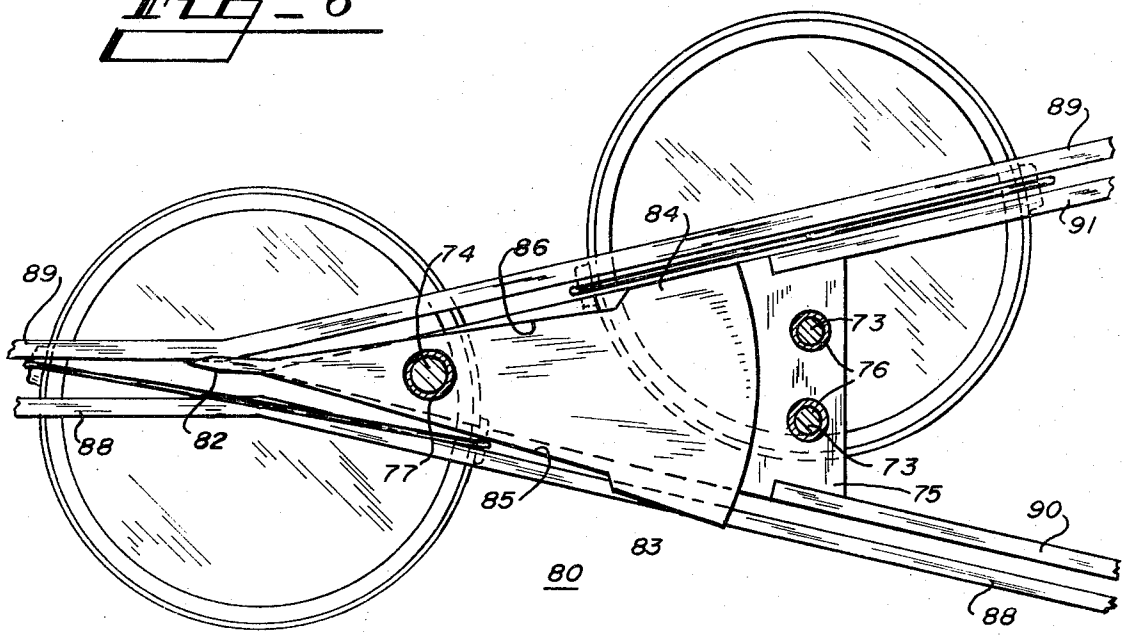
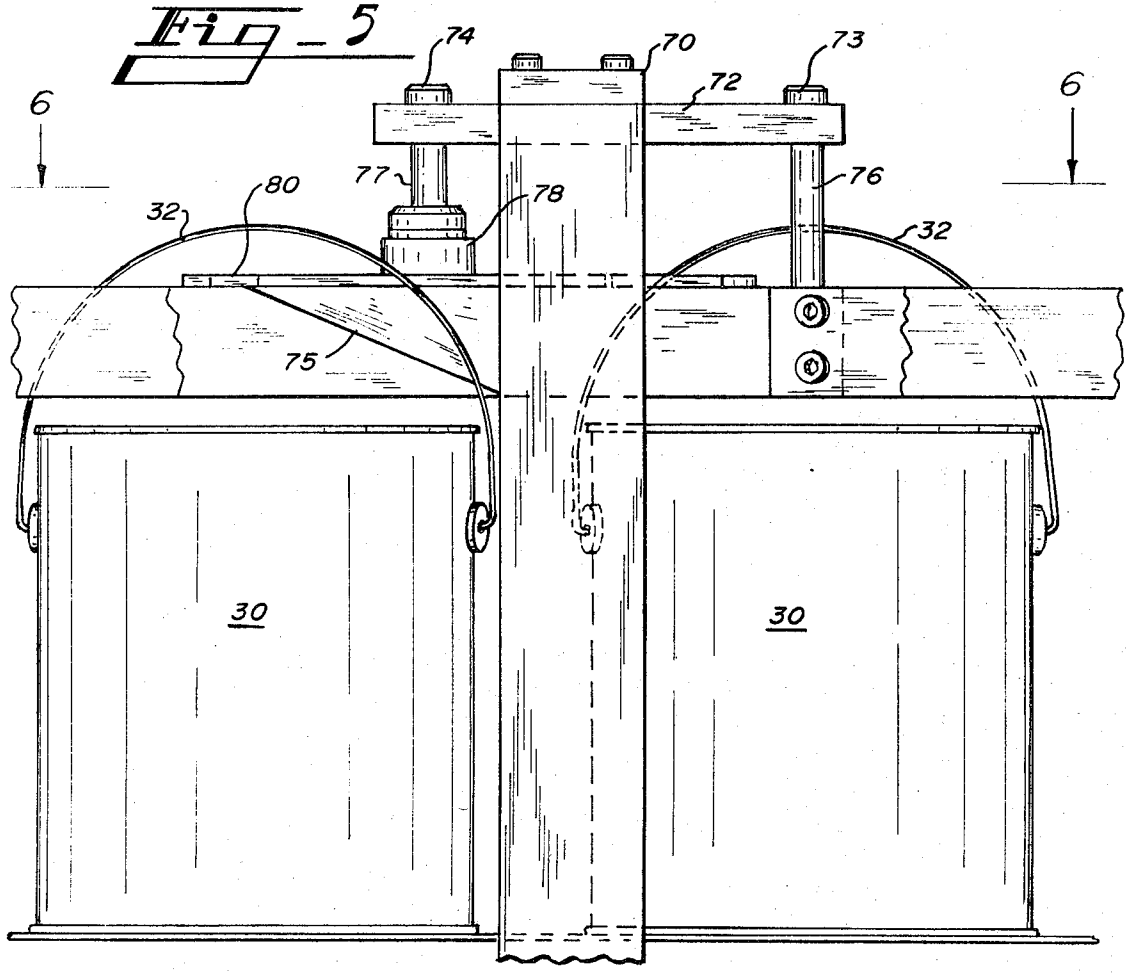

89
84
74
86
91
89
73
76
88
82
77
85
73
75
90
83
80
88

Fig. 5


74
70
73
6
72
6
77
76
80
78
32
32
75
30
30

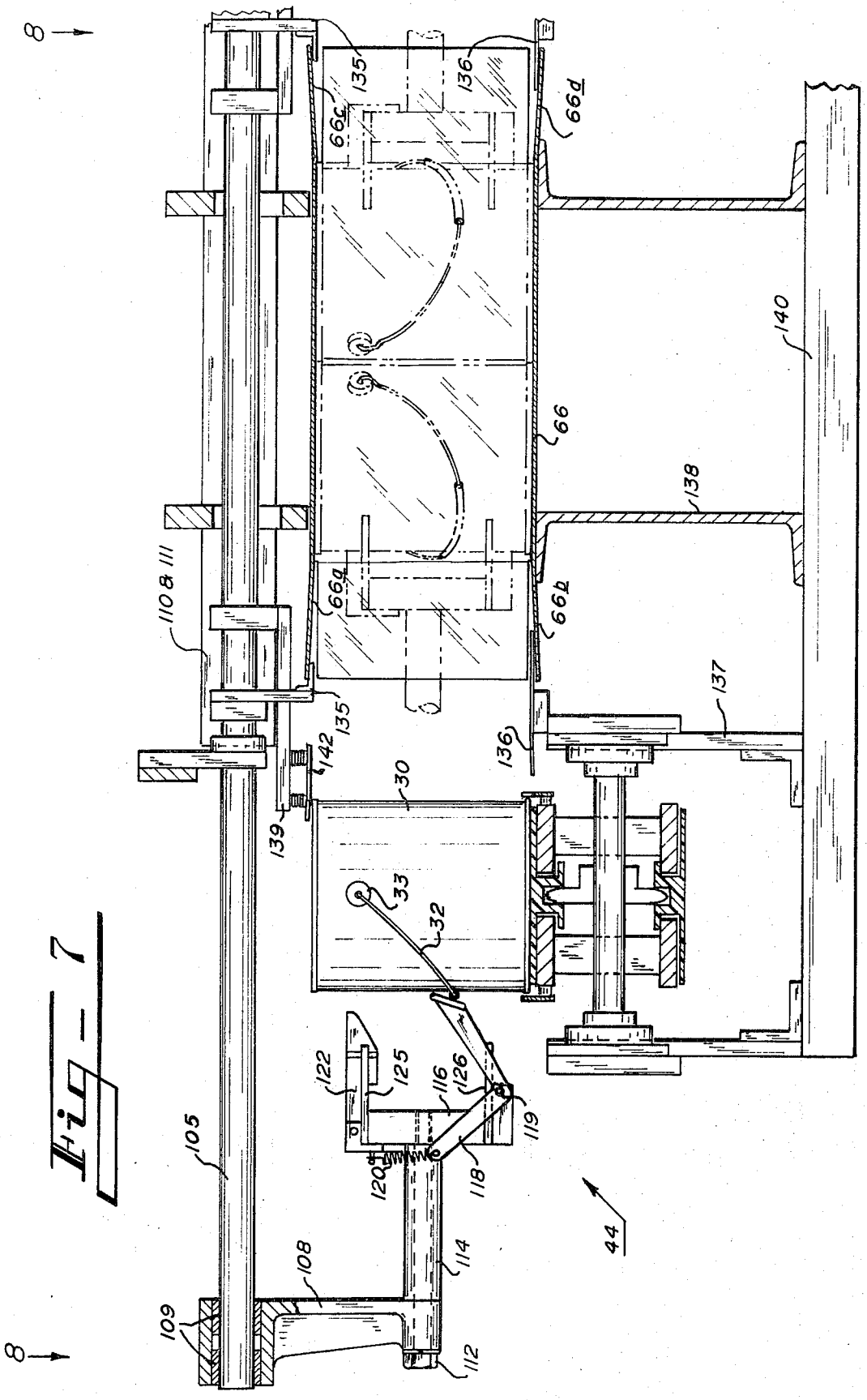

8
8
135
136
66c
66d
140
66
138
110 111
66a
66b
137
135
136
142
30
139
33
32
122
125
116
126
119
120
118
105
108
114
109
112
44

Fig - 7

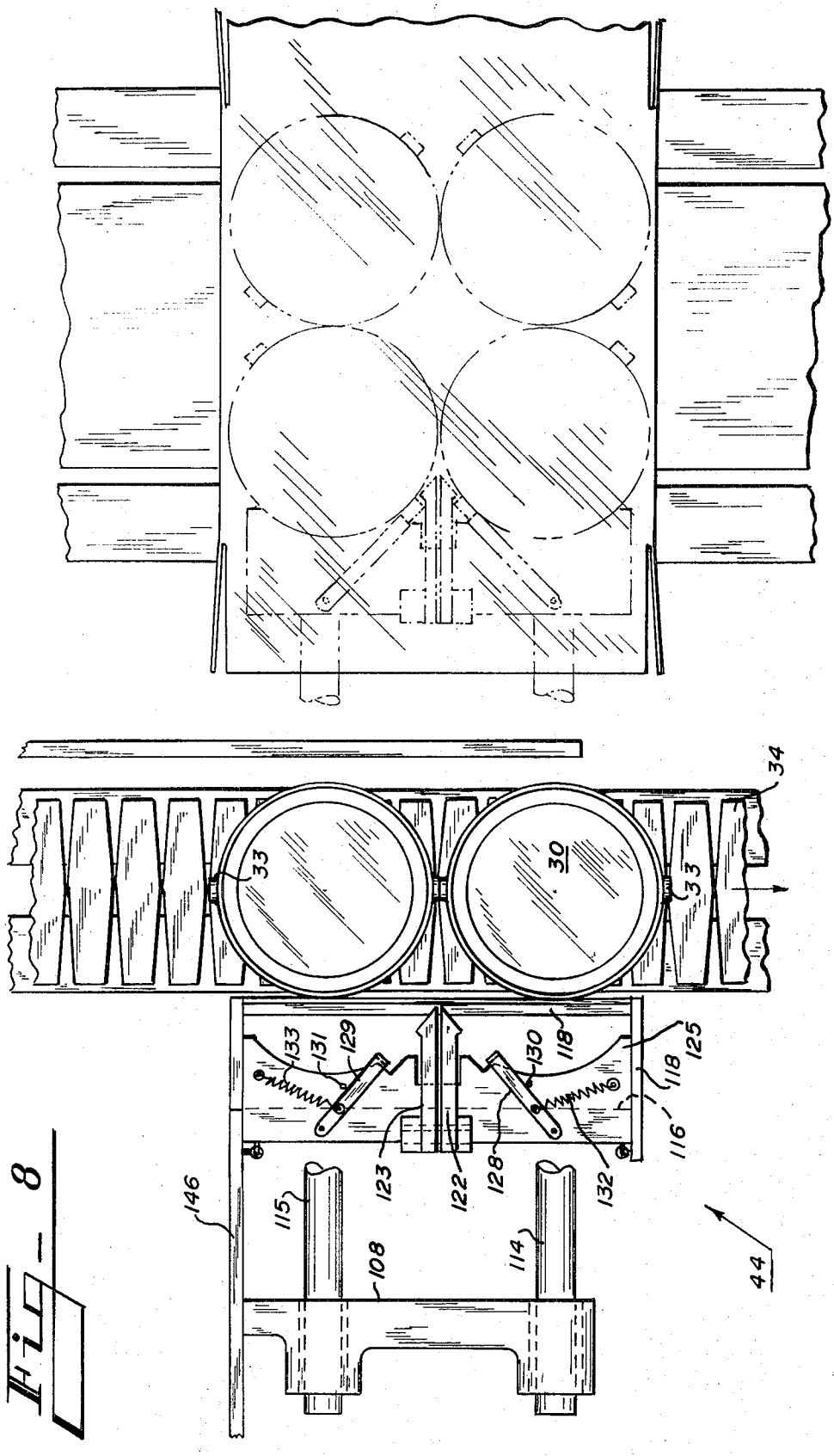

34
33
30
33
133
131
129
130
118
125
118
116
146
115
123
122
128
132
108
114
44

Fig. 8

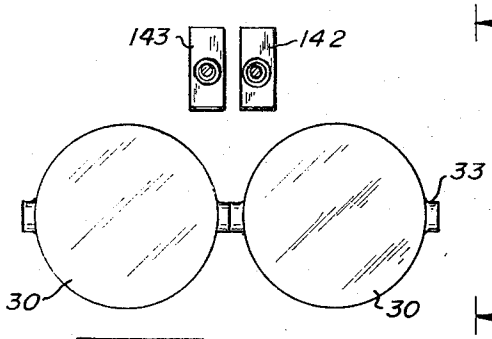


Fig_9A

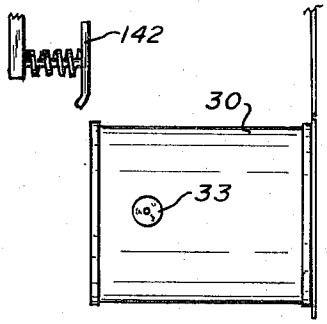


Fig_10A

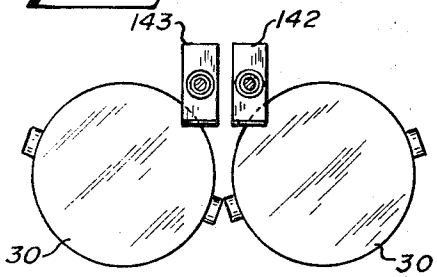


Fig_9B

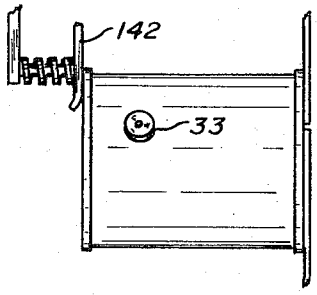


Fig_10B

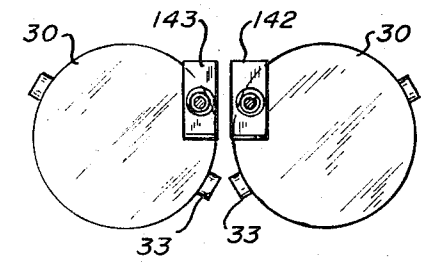


Fig_9C

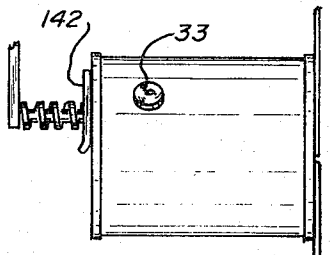


Fig_10C

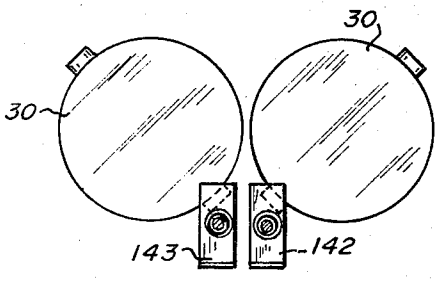


Fig_9D

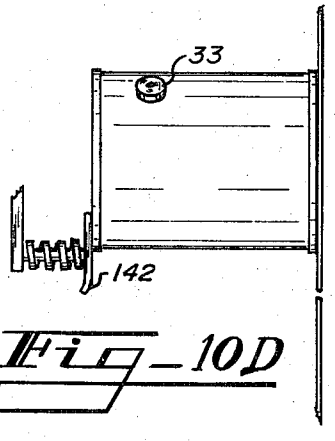


Fig_10D

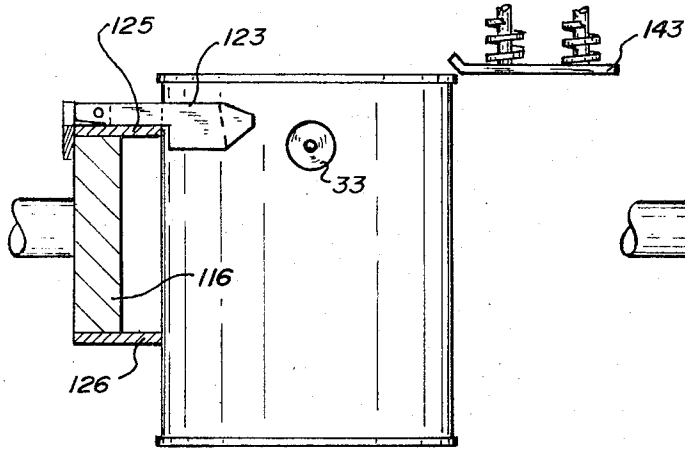


Fig_11A

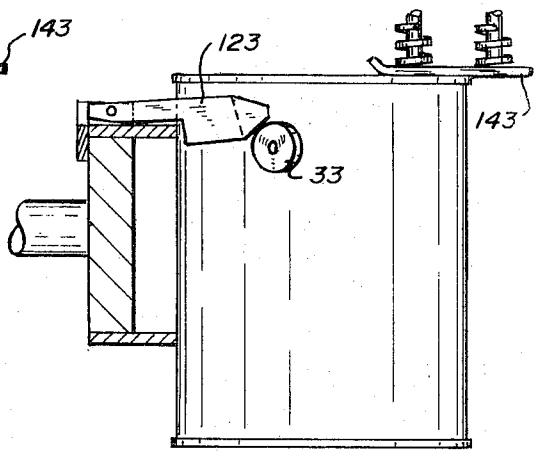


Fig_11B

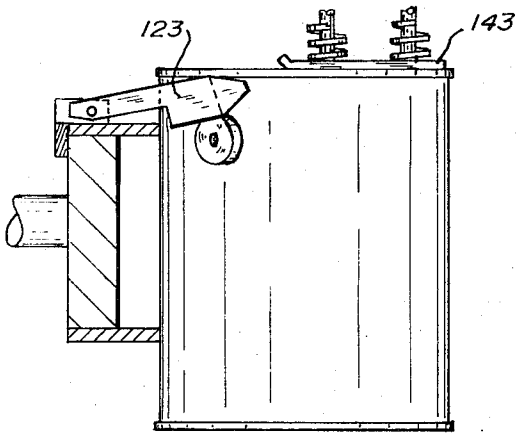


Fig_11C

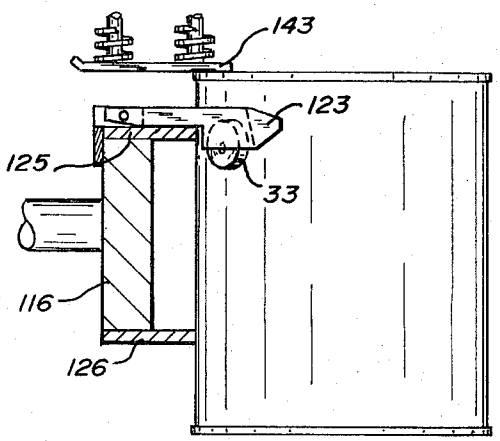


Fig_11D

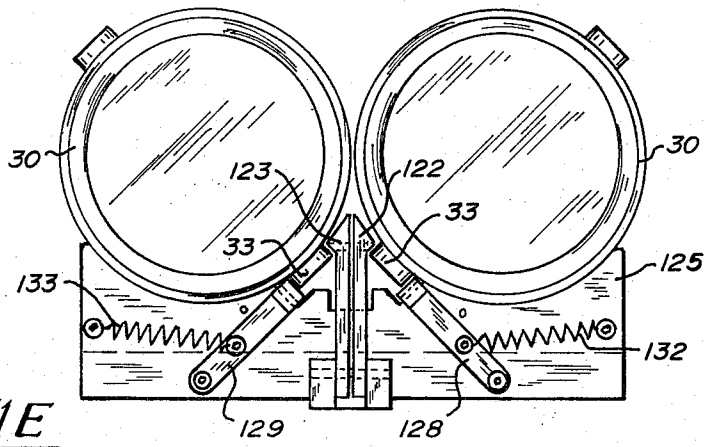


Fig_11E

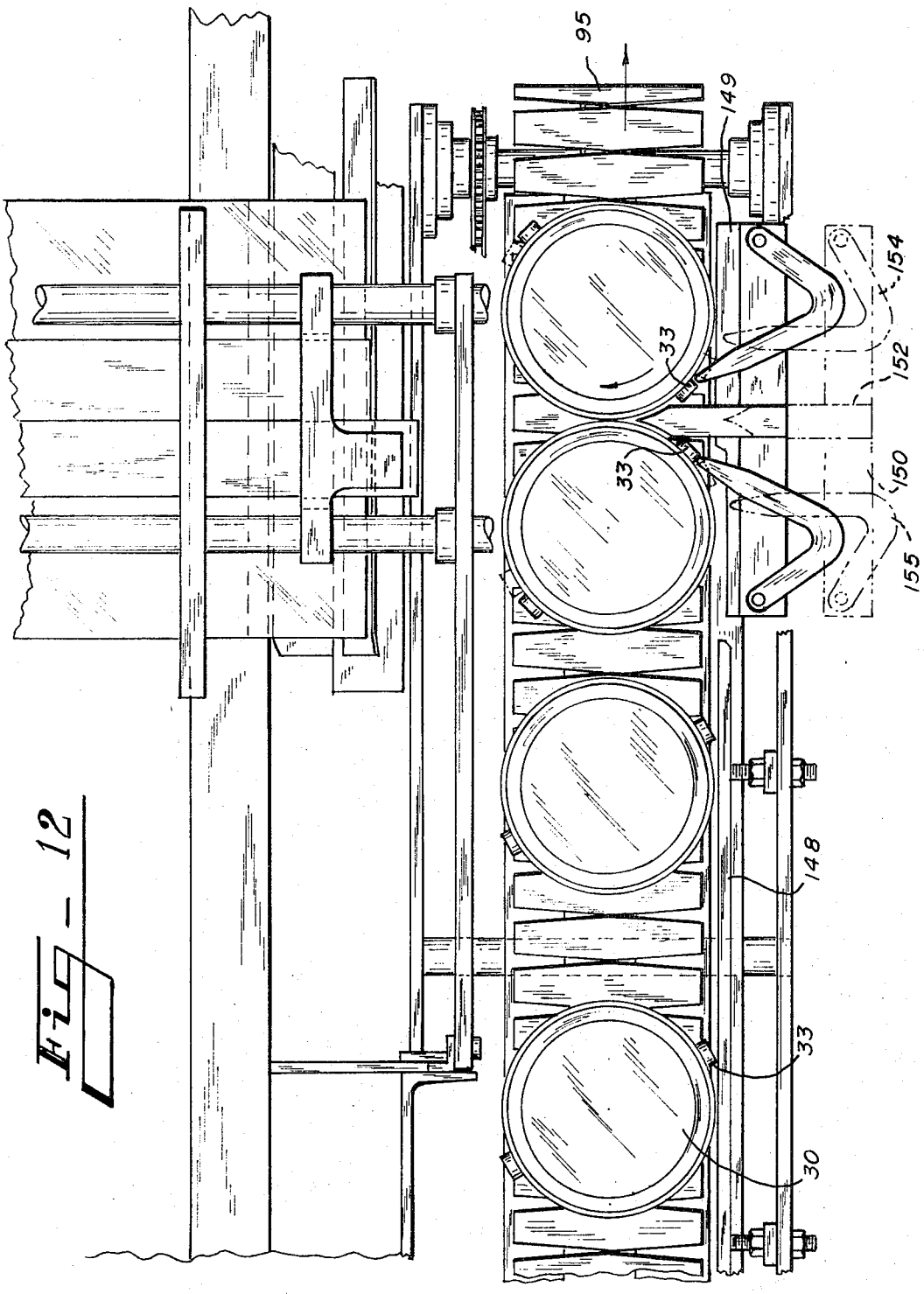


Fig - 12

52
158
160
30
Fig_13A
102
33
32
Fig_13C
158
33
32
95
160
Fig_13E
13E
13E
102
Fig_13B
13F
13F
102
Fig_13D
102
95
Fig_13F

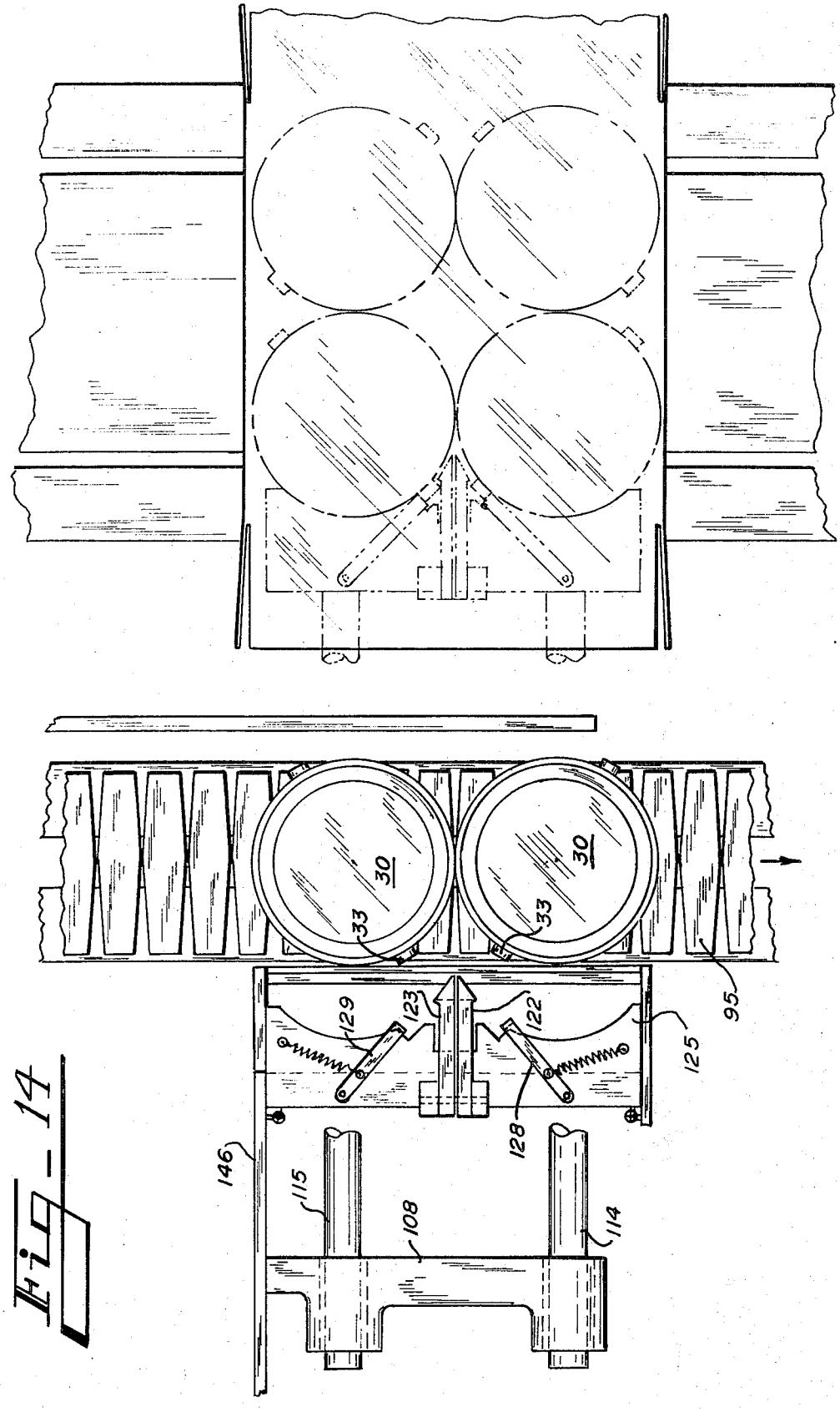


Fig - 14

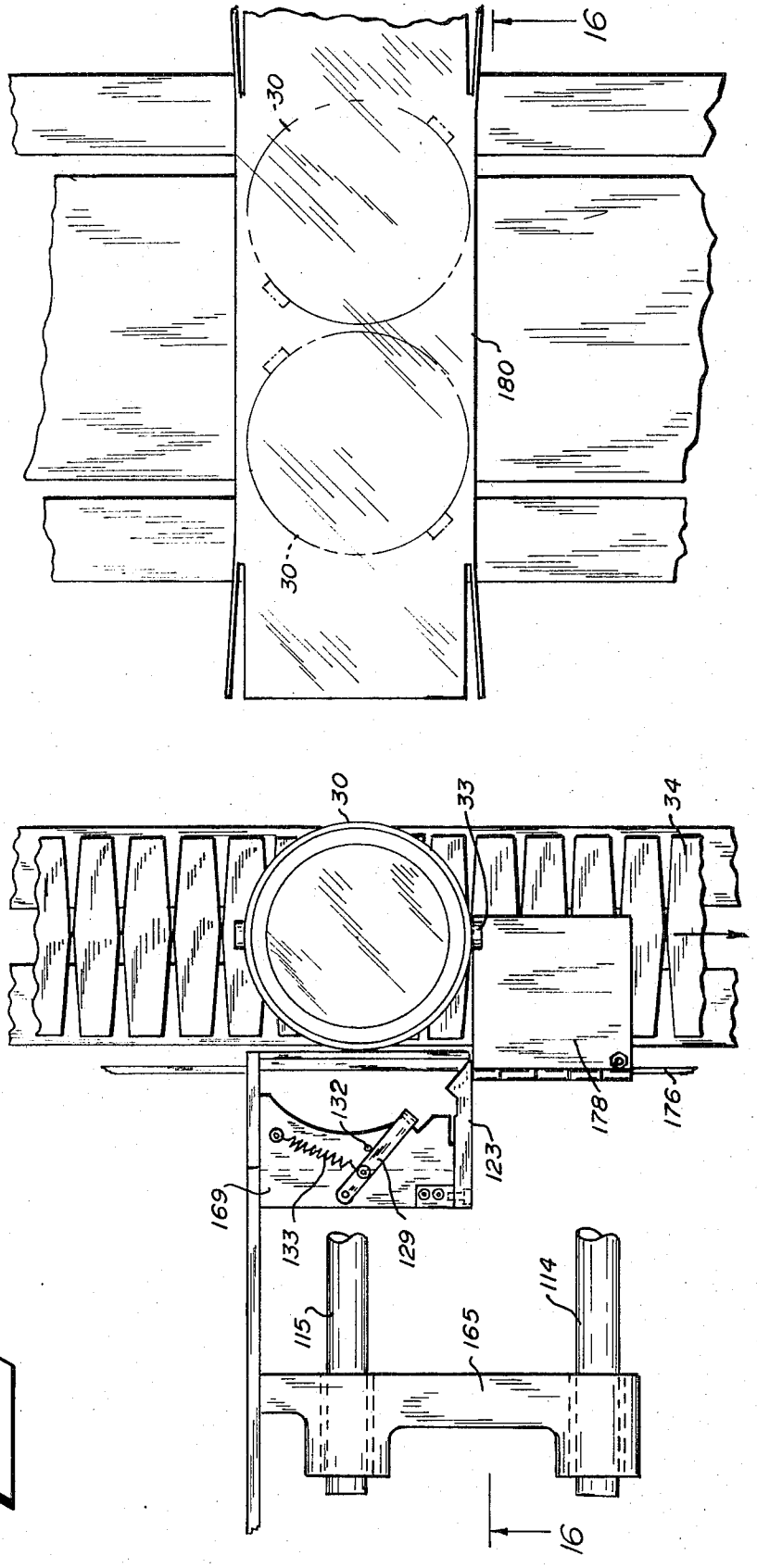


Fig. 15

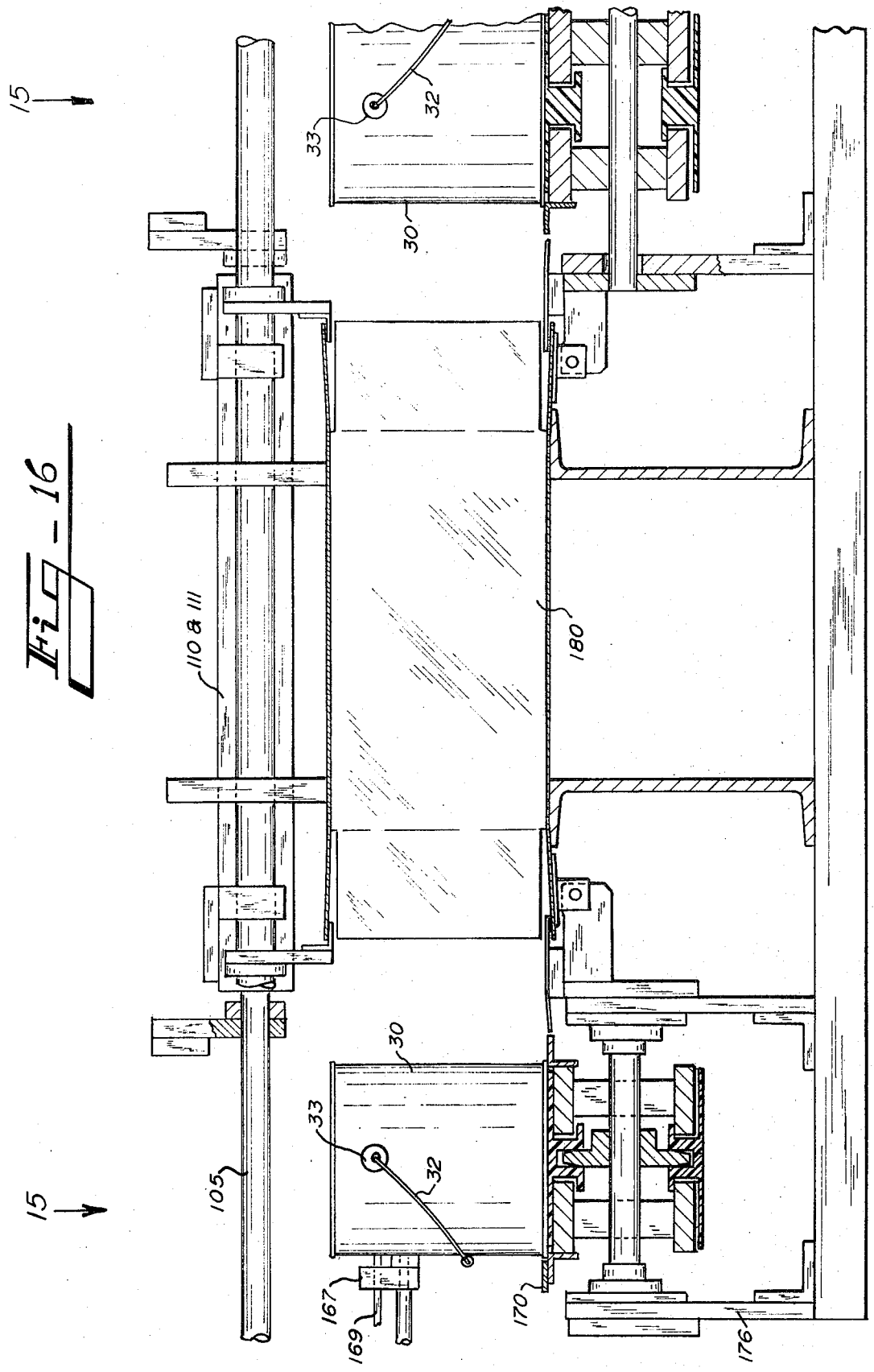


Fig - 16

Fig - 18

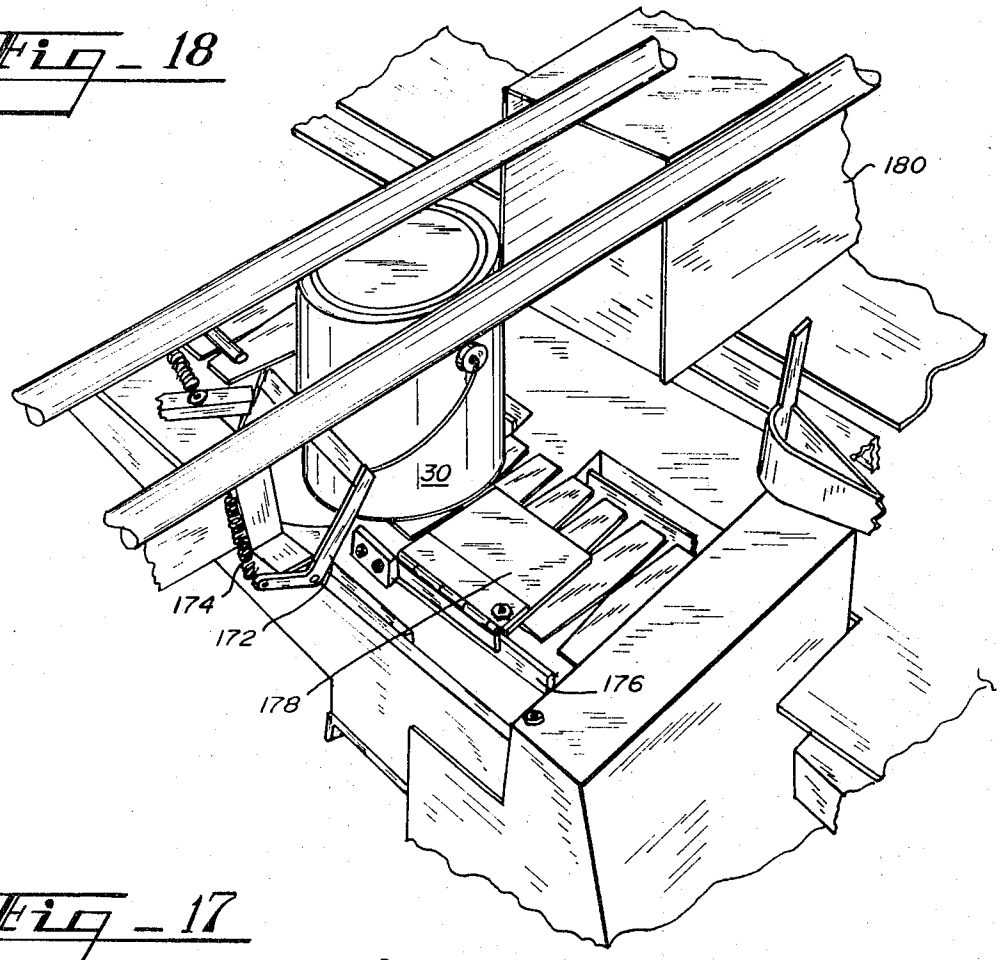
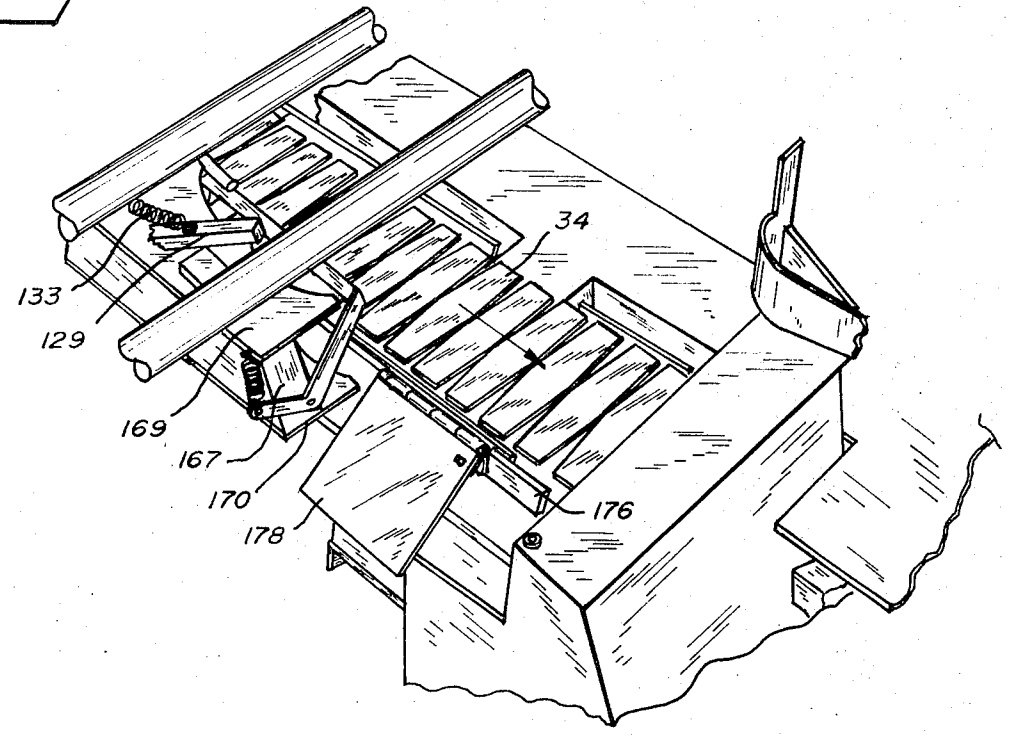


Fig - 17



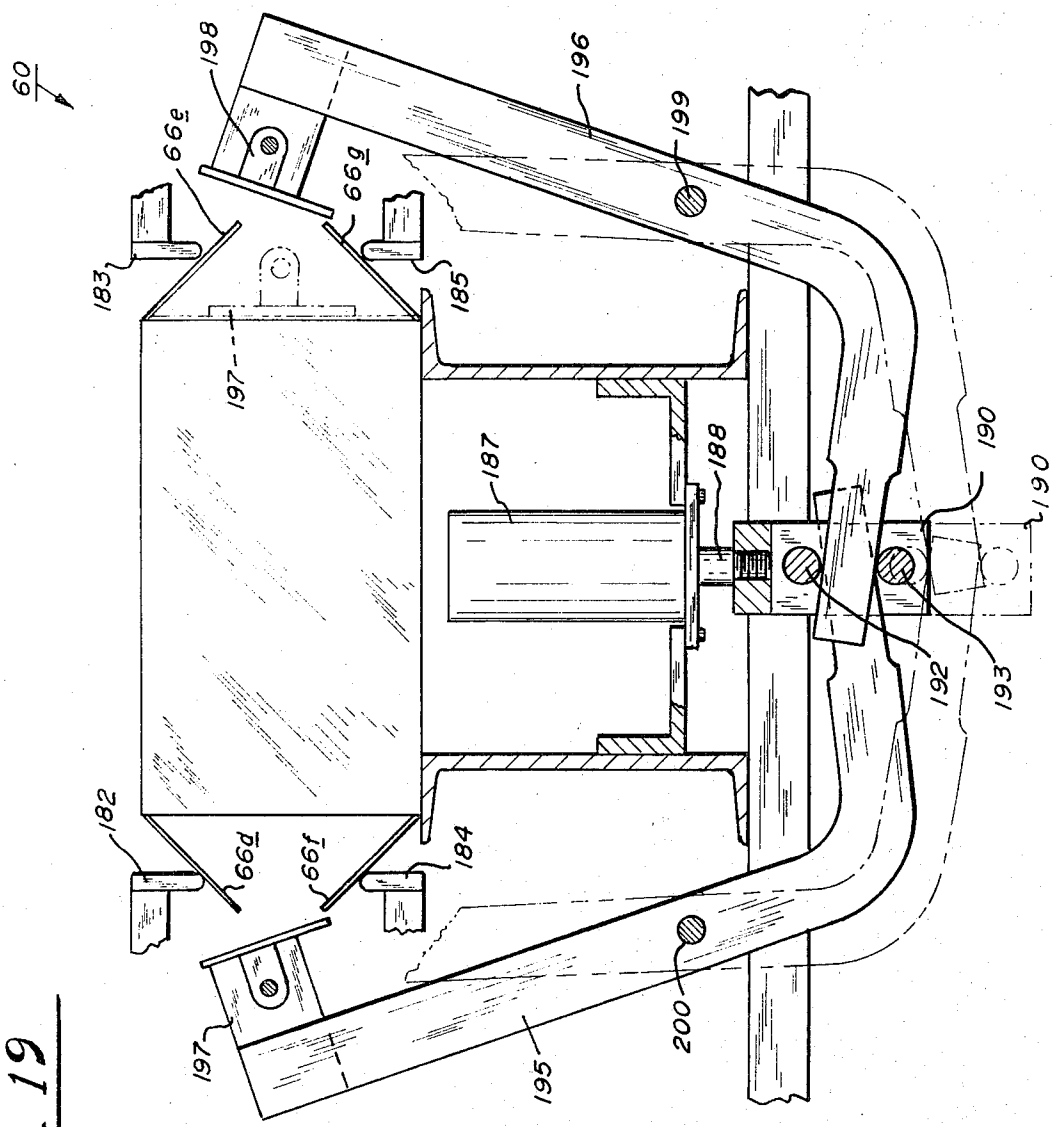

60
198
66e
66g
183
185
197
196
199
187
188
190
190
192
193
182
66d
66f
184
197
195
200

Fig - 19

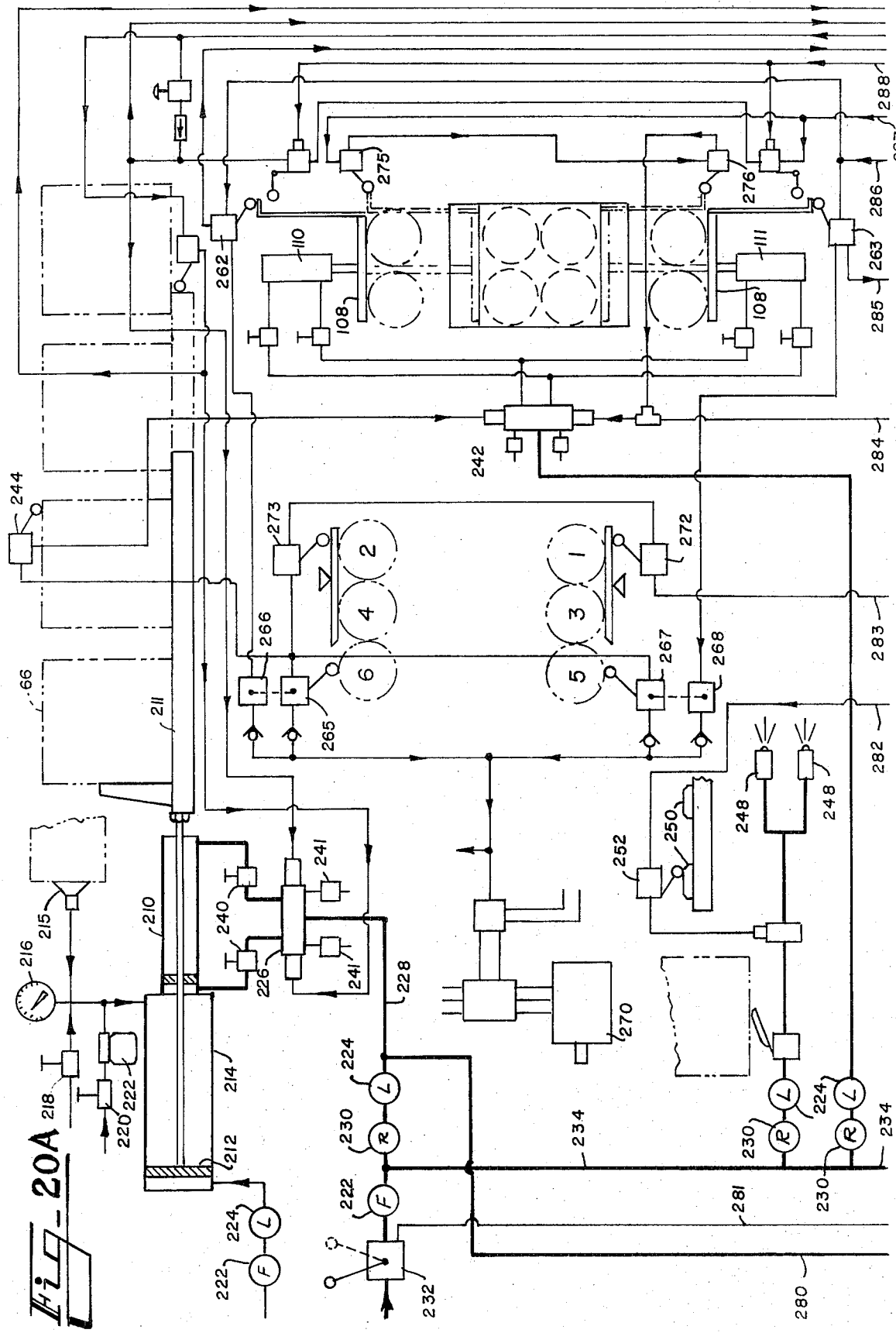

288
287
275
276
286
263
262
110
111
108
285
242
284
244
273
272
2
4
6
1
3
5
266
267
268
265
283
66
211
282
248
250
252
241
240
226
210
215
216
228
270
214
218
220
222
212
224
230
234
281
232
280

Fig. 20A

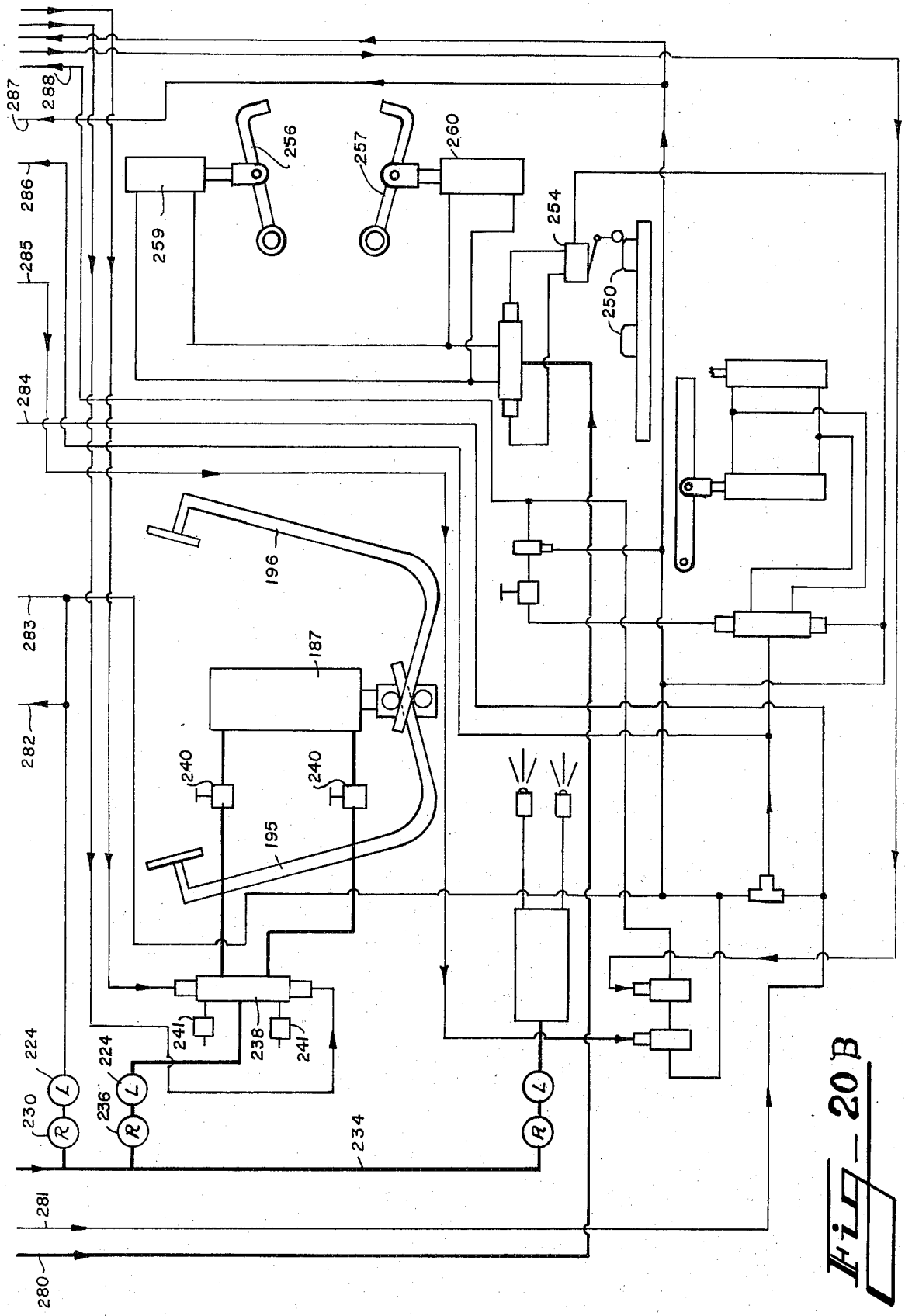

287
288
286
285
284
283
282
281
280
256
257
260
259
254
250
196
187
240
240
195
241
238
241
224
224
230
236
234
L
R
L
R
L
R

Fig. 20B

APPARATUS AND METHOD FOR ORIENTING AND CASE PACKING EARED CONTAINERS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application relates to two associated applications by the same inventor as the present application. A parent application given Ser. No. 204,892 and filed Dec. 6, 1971 is now U.S. Pat. No. 3,740,919 as issued on June 26, 1973. A divisional application and continuation-in-part of this parent application given Ser. No. 336,246 was filed on Feb. 27, 1973 now Pat. No. 3,814,000. To the extent applicable the subject matter of these referenced applications are incorporated by reference into this application.

BACKGROUND OF THE INVENTION

1. Field of the Invention

With reference to the classification of art as established in the U.S. Pat. Office the field of art to which this invention pertains is found in the general Class of "Package Making" (Class 53) and more particularly in the subclass of "automatic or trigger control" (subclass 52) and more particularly in the further subclass of "group feed triggered by completion of group" (subclass 61). Another pertinent subclass in this general class is "group forming of contents unit" (subclass 26).

2. Description of the Prior Art

In the prior art, apparatus is known wherein eared containers with attached bails are oriented and fed into erected cartons which are then sealed. The mechanism for orienting and feeding these containers is usually complex, expensive and often is capable of an operating speed which is less than that now achieved in filling lines having automatic bail-applying mechanism. An example of said bail-applying mechanism is found in my U.S. Pat. No. 3,241,578 which issued Mar. 22, 1966. This bail-applying mechanism is used on hundreds of production lines such as paint filling lines many of which, if not all, are presently operating at speeds of 75 or more containers per minute. It is desirable and necessary that case packing apparatus used with these filling lines have sustained operating capacities as great as and preferably in excess of those operating speeds.

Several recent U.S. Patents pertaining to apparatus for article positioning and case loading have been issued. Among these patents are U.S. Pat. No. 3,209,512 to Ferguson, Jr., et al which issued on Oct. 5, 1965; U.S. Pat. No. 3,284,985 to Roth which issued on Nov. 15, 1966 and also U.S. Pat. No. 3,462,912 to Anderson which issued on Aug. 26, 1969. In these and other known systems it is the intent to receive bailed eared containers and to orient these containers so that with their bails laid against the side of the containers these containers, as a grouping, may be fed into an open erected carton and with the containers in a determined oriented condition the carton is closed and sealed. Insofar as is known by the applicant the apparatus above-identified and shown in these patents as well as others which have been used in industry have not provided the reliability and speed necessary for present paint filling lines.

In the present invention and as reduced to practice, the rate for the orienting and placing the bailed containers in an erected carton is at least 10 percent greater than the 75 containers per minute now found on some of the faster paint filling lines. The present invention receives bailed containers on a conveyor leading from a bail-applying mechanism or other container advancing means. In a preferred embodiment these containers with their bails in a vertical condition are brought to an alternate feed device whereat the containers are alternately delivered by one of two accumulating conveyors to an orienting mechanism where they are oriented in a determined manner and arranged in groups of two. As oriented pairs, these containers are then fed into opposite open sides of an erected carton. After the carton has been filled with four containers the carton is advanced to a closing, sealing and delivering mechanism. The rate of operation of the mechanism of the present invention is established by the receipt of the containers from the bail-applying mechanism or other feeder lines. The bailed containers, as oriented, may be arranged in the carton with their bails facing into the four corners of the carton or if desired the bails may be facing toward the center of the carton.

In the present invention there is also disclosed adjustable apparatus whereby at one setting two containers are inserted into an appropriately formed and erected carton which is then closed and sealed. In the other setting four containers are simultaneously inserted into an erected carton which is then closed and sealed.

SUMMARY OF THE INVENTION

This invention may be summarized at least in part with reference to its objects.

It is an object of this invention to provide, and it does provide, an orienting apparatus adapted to receive bailed eared containers aligned in a determined array and to feed these containers in a single file to an apparatus wherein the containers are oriented in a desired array and arranged into two columns and as oriented pairs are discharged simultaneously into the open sides of an erected carton. The filled carton with four oriented containers is then transferred to closing, gluing and discharging operations.

It is a further object of this invention to provide, and it does provide, orienting apparatus adapted to receive bailed eared containers delivered in single file array and to reorient the containers so that they are delivered two at a time and simultaneously as oriented pairs are fed to and into opposite sides of an erected carton after which the flaps of the carton are closed and glued as and after which the carton is advanced for delivery to a conveyor or pallet. The carton erecting equipment includes a flat carton receiving station whereat a supply of cartons is stored in a substantially vertical condition and from which they are fed to a carton chute in which a supply of cartons is supported in a more or less horizontal condition. From the bottom of the chute the cartons are engaged by suction cups carried on an arm which is cycled so as to withdraw a carton from the chute and erect this same carton while delivering to a carton conveyor apparatus.

The orienting and case packing apparatus and method provided by this invention includes a receiving conveyor adapted to receive bailed containers in a single file array and with alternating diverter feed containers to and through a Y-type conveyor in equal numbers to alternate sides of a carton erecting station. On the two branches of the conveyor the containers are

brought to opposite sides of the erected carton. The bails of the containers are brought to the sides of the container and with either one or two containers arranged thereon are pushed into the opposite open ends of the erected carton. With the withdrawal of the pushers from the carton and the conveyor path subsequent containers are brought along the conveyor and in way of the just withdrawn transfer pusher for transfer of these containers into the succeeding carton.

Two means of orienting and positioning the bailed containers in the erected carton are shown. In a preferred arrangement the bailed containers are received with the bails in a substantially vertical condition and with the bails retained in a guideway above the conveyors the advancing containers are fed to a position just prior to the inserting station whereat the bails are turned to rest on the side of the container. In one embodiment whereat the pusher engages, guides and transfers two adjacent containers into one open end of the carton, the pusher engages one ear on each container to insure a positive alignment. In an alternate embodiment the bailed containers are delivered to the Y-type conveyor with the bails turned to the sides of the container. The bottom edge of the advancing container is engaged to cause rotation to the desired orientation by causing an ear of the container to be engaged by a stop rail. The filling of the carton initiates a signal means for automatically causing the filled carton to be advanced and closed while a just-erected carton is moved into place for filling with the next group of containers. Sealing and delivering of the filled cartons to a pallet or conveyor is provided by apparatus as described in my U.S. Pat. No. 3,740,919 as issued on June 26, 1973.

In addition to the above summary the following disclosure is detailed to insure adequacy and aid in understanding of the invention. This disclosure, however, is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how it may later be disguised by variations in form or additions of further improvement. For this reason there has been chosen a specific embodiment of the orienting apparatus for rotating and positioning the containers and cause packing the bailed eared containers as adopted for use with container bailing or container conveying mechanism and showing a preferred means for orienting and grouping the containers into groups of two and then with opposite pushers placing them in a carton. This specific embodiment and an alternate embodiment have been chosen for the purposes of illustration and description as shown in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** represents a plan view of the preferred embodiment of a case packing apparatus and showing in particular the sequential feeding of the containers delivered in a single file array to a Y-conveyor and by bail guiding means positioning the containers in way of a transfer pusher prior to their insertion into the opposite open ends of an erected carton;

FIG. **2** represents a side view of the apparatus of FIG. **1** and showing in particular the positioning of the carton erecting station in relation to the container inserting mechanism as well as the carton closing and delivery apparatus;

FIG. **3** represents a plan view of an alternate arrangement of case packing apparatus similar to that of FIG. **1** but with the transport means for the containers including a rotative orienting action which is independent of the bail and a container transferring apparatus which is slightly different than that used in the apparatus of FIG. **1.**

FIG. **4** represents a plan view of the alternate arrangement of the apparatus of FIG. **3**;

FIG. **5** represents in an enlarged side view a diverter used with container handling apparatus which is operated by and with the case packer of FIGS. **1** and **2,** this diverter provides for the equal division of the containers onto the two extensions of the Y-conveyor as seen in FIG. **1**;

FIG. **6** represents a plan view of the apparatus of FIG. **5,** this view being taken on the line **6—6** of FIG. **5**;

FIG. **7** represents a side view, partly fragmentary and diagrammatic of the container inserting mechanism generally shown in FIGS. **1** and **2**;

FIG. **8** represents a top or plan view of the apparatus of FIG. **7,** this view taken generally on the line **8—8** thereof and looking in the direction of the arrows;

FIGS. **9A, 9B, 9C** and **9D** represent sequential and partly diagrammatic plan views of four progressive steps showing the turning actuation imparted to two side-by-side containers as they are moved from the receiving position into the open end of a carton;

FIGS. **10A, 10B, 10C** and **10D** represent sequential diagrammatic side views taken on the lines **10—10** of FIGS. **9A, 9B, 9C** and **9D** and showing in particular the progressive actuation of the friction engagement and the ear position of the turning container as it is moved under pressure pad and from the receiving station and into the open end of the carton;

FIGS. **11A, 11B, 11C** and **11D** represent the sequential diagrammatic side views taken on the lines **11—11** of FIGS. **9A, 9B, 9C** and **9D** and showing in particular the position of the cammed ear retaining finger on and forward of the ear as the container is turned, FIG. **11E** shows the completed position;

FIG. **12** represents a plan view, partly diagrammatic of an alternate container orienting system and apparatus, this system being used with the apparatus of FIGS. **3** and **4** and with this system the containers are inserted into the open end of an erected carton by an alternate embodiment of a pusher means;

FIGS. **13A, 13B, 13C, 13D, 13E** and **13F** represent a plan view, somewhat diagrammatic of the progress of a container along the conveyor and the orienting sequence of the container by an alternate means from that of FIG. **12**;

FIG. **14** represents a plan view, partly diagrammatic of the container orienting system of FIG. **12** but with the pusher apparatus of FIGS. **7** and **8**;

FIG. **15** represents a plan view, partly diagrammatic of the container orienting system of FIGS. **1** and **2** but with an alternate pusher apparatus adapted only for inserting one container into the open end of a carton adapted to receive and retain only two containers, this view taken on the line **14—14** of FIG. **15**;

FIG. **16** represents a side view, partly diagrammatic, of the pusher arrangement of FIG. **15**;

FIG. **17** represents a fragmentary isometric view of the pusher apparatus of FIG. **15** as adapted for single containers with the stop for the container advance in open condition;

FIG. 18 represents the isometric view of FIG. 17 but with the adjustable container advance limiting stop in position for single container insertion;

FIG. 19 represents a fragmentary sectional view of the sealing mechanism by which the flaps of the filled case are pressed into position after the glue application, and

FIGS. 20A, and 20B represent a circuit diagram showing the control means for the case packer apparatus and with this circuit is shown diagrammatic representations of the apparatus functions which the circuit controls. In the following description and in the claims various details will be identified by specific names for convenience; these names, however, are intended to be generic in their application. Corresponding reference characters refer to like members throughout the several figures of the drawings.

The drawings accompanying, and forming part of, this specification disclose certain details of construction for the purpose of explanation of the broader aspects of the invention, but it should be understood that structural details may be modified and that the invention may be incorporated in other structural forms than shown.

DESCRIPTION OF THE PREFERRED EMBODIMENT AS SEEN IN FIGS. 1 AND 2

Referring now in particular to the case packer apparatus of FIGS. 1 and 2, it is to be noted that upon the left end of a frame 25 is carried the terminating end of a delivery conveyor 26 which includes a reject mechanism 28 of conventional construction. This reject device is for containers 30 which are rejected if bails are not properly applied or for other automatic inspections which cause the container to be removed from the packaging line. This reject mechanism 28 is of known construction and may be inserted at any position in the transport system as desired by the customer. The container 30, seen in FIG. 2, has been received and guided by a diverting mechanism generally indicated as 31 which engages the bails 32 of the containers and guides these containers onto one of two conveyors 34 and 36. This diverting mechanism is more fully described in conjunction with FIGS. 5 and 6. From conveyor 26 alternate containers 30 are fed by diverting mechanism 31 to either near conveyor 34 or to the far conveyor 36 as seen in FIG. 1. The alternate feed delivers every other container in an oriented fashion to one conveyor and the remaining containers to the other conveyor. This diverting mechanism 31 receives the upright bails 32 of each container and directs them to either guide rail system 38 or 39. The guided upright bails retain the container in the prescribed path which includes the S curves found in both conveyor 34 and 36 and continues to retain the container in its oriented condition as it is brought to the straight and parallel delivery section of the conveyors. After a brief trip on the straight portion of the conveyors each guide rail 38 and 39 is provided with deflectors 40 and 42 which engage the bail and cause the bail to be layed to the side of the container. Side guides on the conveyors insure that the containers are retained on the conveyor in an aligned condition as they are fed to the container inserting stations generally indicated as 44 and 46. As seen particularly in FIG. 2 a gear motor 50 and power transmission system which includes a roller chain drive provides the means to power the conveyor sections 34 and 36 by which the containers 30 are fed to alternate sides of an erected carton.

Particularly seen in FIG. 2 are uprights 52 which carry guides 54 and delivery belt 56 for advancing and retaining the folded cartons which are to be erected. These cartons are delivered to an adjustable chute generally indicated as 58 from which cartons are drawn for erection. This chute 58 is made so that cartons of various sizes may be accommodated as necessary for size variations and arrangements of containers to be packaged. A detailed description of the carton advancing and erecting mechanism is omitted from this application since this apparatus as above noted is incorporated by reference into this application and is well described in U.S. Pat. No. 3,740,919 as issued on June 26, 1973 and in the divisional application thereof as shown and described in my application Ser. No. 336,246 filed Feb. 27, 1973. This application Ser. No. 336,246 is directed in particular to automatically feeding and erecting folded cartons such as is used for bailed containers packaged by the apparatus of this invention. After the erected carton has been brought to a retained position between the inserting stations and apparatus 44 and 46 the insertion operation is begun with the arrival of the prescribed number of containers.

In this general arrangement and downstream (to the right in FIGS. 1 and 2) and subsequent to the inserting operation is the flap tucking equipment 60, the hot-melt and glue applicators 62 such as shown and described in the forementioned referenced patent and application and a final closing and sealing station 64. This end flap closing mechanism is more completely shown in FIG. 19 and is more completely described hereinafter with reference to the description of FIG. 19. After the carton has been sealed it is discharged from the apparatus. The sealed carton is indicated as 66 and is transported on a delivery conveyor 68 to palletizing or other operations.

DIVERTING MECHANISM OF FIGS. 5 AND 6

Referring now in particular to FIGS. 5 and 6 there is shown in a somewhat diagrammatic representation and enlarged detail the container diverting mechanism carried by the frame 25 of FIGS. 1 and 2. Extending upward from this is a support member 70 which has secured thereto a horizontal support plate 72. Depending from this plate are bolt members 73 and forward bolt 74. Attached to and spaced from support 72 is a triangularly-shaped guide block 75 which has tapped holes which receive the threaded ends of bolts 73 and 74. Spacers 76 on bolts 73 maintain the rear positioning of block 75 from support 72 while spacer 77 on front bolt 74 not only positions the block 75 from support 72 but also provides the vertical shaft means for a collar and bearing 78 which carries a pivoted diverter member 80. This diverter member 80 slides on block 75 so as to maintain a slight drag as it is swung within determined limits around pivot spacer 77. This pivoted diverter member 80 includes a point portion 82 and joins a tapered expanding section forming the body of the diverter. At and near the large end of this tapered or triangularly-shaped member 80 are camming extensions 83 and 84 which are of a length and extent sufficient to be actuated by a passing bail 32 of a container 30. From point 82 the member 80 is formed with a straight extent along near side surface 85 to camming extension 83 and on the opposite or far side the mem-

ber **80** is formed within a straight extent **86** which extends from point **82** to camming extension **84.**

USE AND OPERATION OF THE DIVERTER OF FIGS. 5 AND 6

In operation the infeeding or delivery conveyor **26** brings containers **30** in a single file array and with their bails **32** upright to the diverter station. Outside rails **88** and **89** retain the bails upright as the bails approach the point portion **82** which lies either to the left or to the right in the guideway in which the bail **32** is carried. As seen in FIG. **6,** the diverter point **82** is against the upper outside rail **89** whereby the bail **32** is being directed to the near conveyor **34.** As the leading wire portion of this bail moves along the tapered side **85** it slides along this surface until it engages the camming extension **83** whereby the bail moves the member **80** counterclockwise and causes point **82** to move to guide rail **88** causing the next container to be diverted to guide rail system **39** (FIG. **1**). At the time of the moving of point **82** the trailing portion of the bail **32** will have passed and will be downstream of point **82** so that the bail is completely free of any interference with the forward point **82.** This permits the container **30** to proceed on to the conveyor **34** between outside rail **88** and inner rail **90** until it reaches the straight section as above-described.

Also seen in FIG. **6** is bail **32** of a container **30** which is on conveyor **36** and is retained between outside rail **89** and inner rail **91.** This bail has already passed the diverter point **82** and as it slides by and in way of camming extension **84** it deflects the member **80** to the position as seen in FIG. **6.** The bail **32** as it engages the extending camming extension **84** causes the diverter to swing clockwise to the position as seen in FIG. **6** with the point **82** resting against the guide rail **89** with the wire passing down the side of block **75** until it reaches the inner guide rail **91** forming the inner portion of the upper guide members generally indicated as **39.** The bail **32** now between outer rail **88** and the side of block **75** will move along this lower path until the wire bail is slidably engaged between rail **88** and inner rail **90.**

ALTERNATE EMBODIMENT OF FIGS 3 AND 4

Referring next to the embodiment of FIGS. **3** and **4** there is depicted apparatus in which two conveyors are used to receive the output of two or more bail applying machines. This embodiment may also include an automatic diverter in which electrical and pneumatic means is used to feed every other container to the two conveyors. It is assumed that the containers, if they have bails, will have the bails turned to either their inside or outside at or before delivery to the conveyors. As seen in FIG. **3** the near conveyor is identified as **95** and the far conveyor as **96.** As in FIG. **2** these conveyors are moved at like speeds by a gear motor **50** seen in FIG. **4.** The carton erecting station as shown in FIG. **4** uses an angled chute **98** which is generally adapted for one size cartons and is like that in my referenced application above noted.

Containers **30** whether on conveyor **95** or **96** are caused to be rotated by an orienting system such as is shown in U.S. Pat. No. 3,241,578 as issued on Mar. 22, 1966 or by other systems whereby the bottom of the advancing container is caused to rotate to bring one of the ears of the container to a determined orientation which in this embodiment is to bring the leading container in an orientation which is substantially in the position at which the second or trailing of the two containers is to be inserted. At inserting stations **99** and **100** a rub rail **102** is provided to cause the leading or number one container to turn approximately a quarter turn to the position as seen in FIGS. **12** and **14** to be hereinafter described. The orientation turn is diagrammatically shown in FIG. **13** and will be described in detail in conjunction with that FIGURE.

In all other respects the embodiment of FIGS. **3** and **4** are like the apparatus of FIGS. **1** and **2,** above described. In particular this apparatus may be used where containers are packaged having bail ears but no attached bails.

INSERTING MECHANISM OF FIGS. 7 AND 8

Referring next to FIGS. **7** and **8** there is shown inserting apparatus which is illustrated in the apparatus of FIGS. **1** and **2.** As seen in FIG. **8** the containers **30** are transported on conveyor **34** and the ears **33** are aligned substantially with the axis of the conveyor although the bails **32** have been previously turned to the condition as seen in FIG. **7** by bail deflector **40** shown in FIG. **1.** Signal means is provided in the circuit control to count and sense the presence of two containers. At the same time, the sensing means checks the presence of an erected carton to be sure that an erected carton is in fact in place to receive the containers to be inserted by apparatus at stations **44** and **46.** Although both stations have mirror arrangements of components FIGS. **7** and **8** depict station **44** wherein a positive stop, not shown, is mounted transverse of the conveyor to insure that the leading container **30** does not move beyond a determined position. Rods **105** and **106** carry header frame **108** which by means of bushings **109** are freely slidably movable on the rods by an air cylinder **110.** A pair of bolts **112** and spacers **114** retain pusher block **116** at a determined distance from frame **108.** A pivoted bail retaining bar **118** is disposed to engage the midportion of the bail and insures that the bails of both containers lay against the sidewall of the container to which they are attached and remain thereagainst as the containers are turned and advanced into the open ends of carton **66.** Bar **118** is carried by a pair of aligned pivot pins **119** and is urged to a forward shown position by tension springs **120.**

On the upper portion of block **116** is pivotally carried a pair of pivoted, cammed ear-retaining fingers **122** and **123.** Each of these ear-retaining fingers have their front portions formed with cam ramps which are positioned to engage the ear **33** of a container and to be lifted by this ear until the ear passes by an arrow-like extending projecting portion on the retainer finger whereat the ear retaining finger drops to ear engaging position to prevent the ear from moving forwardly. The pusher block **116** also has two arcuate members **125** and **126** which for engaging and advancing a straight sided container have like arcuate cutouts sized to engage a portion of the outside container body. Carried on the top member **125** are two pivoted ear pusher arms **128** and **129.** These arms are drawn against stops **130** and **131** by springs **132** and **133.**

CONTAINER TURNING APPARATUS AS IN FIGS. 7, 8, 9 AND 10

Referring now to the container turning apparatus of FIGS. **7** through **10** it is to be noted in FIG. **7** that con-

tainer 66 has upper and lower flaps 66*a* and 66*b* retained in an open condition by a slide bracket 135 which engages and lifts upper flap 66*a*. A slide plate 136 which is carried on frame 137 engages and moves lower flap 66*b* out of the path of the incoming containers 30.

Carried on rods 105 and 106 are arms 139 and 140 to which spring mounted slide plates 142 and 143 are secured, these plates engage the top edges of the containers 30.

In like manner the opposite inserting station 46 is adapted to engage and retain upper and lower carton flaps 66*c* and 66*d* by means of an upper slide bracket 135 and a lower slide plate 136. The carton 66 is slidable on frame members 138 and 139 which members are carried on base member 140.

OPERATION OF THE TURNING, ORIENTING AND INSERTING APPARATUS OF FIGS. 7–11

It is assumed that the containers 30 have been fed to inserting station 34 or in a like manner to 36. The timed operation of the apparatus contemplates that as the second container reaches the position of FIG. 8 and FIG. 9A the arrival of the fourth container will cause air cylinders 110 and 111 to be actuated to simultaneously pull the header frames 108 toward the open ends of the carton. As seen in FIG. 1 cylinder 110 moves the frame 108 asoociated with the inserting station 46 and cylinder 111 moves the frame 108 associated with the inserting station 44. The inward movement of each frame produces a like series of events in each station so that only the events of one station will be recited.

The bail retaining bar 118 engages the bail 32 to push any bail not already tight against the side wall of the container 30 and during the rotative insertion of each container this bar retains the bail against the container. The arcuate cutout of arcuate pusher members 125 and 126 engages the side wall of the container above and below the bail. The cammed ear retaining fingers 122 and 123 enter between the containers and nearly to the ears 33. The ear pusher arms 128 and 129 are brought against the side of the containers and are slidably retained there at a determined tangent angle. The fingers 122 and 123 maintain a determined spacing of the containers as the containers are advanced into the carton.

As seen in FIGS. 7, 9 and 10 the forward or inward movement of the containers from the receiving positions of FIGS. 9A and 10A bring the inner top rims of the containers into engagement with one of the spring supported slide plates 142 and 143. As seen in FIG. 9B the forward or right-hand container 30 engages plate 142 and because of the frictional restraint on the left portion of the rim this container turns counterclockwise and as this container is advanced under the plate the container moves progressively in a smooth rotation from the initial condition of FIG. 9A to the final condition of FIG. 9D. The ear pusher arm 128 which has been in slidable contact with the side of the container engages the ear 33 when a determined degree of rotation has been achieved and limits further rotation.

In FIGS. 11A, B, C and D the cammed ear retaining finger movement is shown. From its initial position at the start of the forward motion of the pusher block 116 this retaining finger 122 engages the ear 33 and as the ear is rotated the finger is cammed up until the projecting point is passed whereupon it drops into the position of FIG. 11E. In this position and with pusher arm 128 retaining further rotative movement of the container the container is pushed into the open end of the carton 66. The container is made to be a snug fit in the carton so that unwanted shifting is eliminated. The reverse or withdrawal movement of the pusher block 116 uses a camming surface 144 on the member 122 to cause it to engage a round portion of the ear to cause the forward portion of member 122 to lift from the ear for easy withdrawal of the pusher from the carton.

During the above-described actuation of the right-hand container 30, the left-hand container is similarly turned except in a clockwise direction. The pusher arm 129 engages the side of the second or trailing container and at a determined limit of rotation engages ear 33 to limit the rotation. The slide plate 143 engages the inner top rim of the container and as the container is moved thereinunder the clockwise rotation is accomplished. The pivoted cammed ear retaining finger 123 is moved up and down by the rotative movement of ear 33 as in the first container and with the ear 33 retained in a manner as in FIG. 11E the container is pushed into the carton 66.

The carton 66 may be a slightly tight fit for two side-by-side containers but the circular sides of the containers permit a small camming action to enable forced entry to be accomplished. It is to be noted in FIG. 8 that a stop slide bar 146 is carried on header frame 108 and is disposed to engage the next following container on the conveyor 34 and prevent interference with the in-and-out movement of the container inserting apparatus.

During this same period of time the containers on the opposite conveyor 36 are being inserted in a like manner and with like apparatus by the pusher mechanism of station 46. With the exception that the apparatus is one hundred degrees out of phase the apparatus of stations 44 and 46 are to all intents and purposes identical.

The final arrangement of the containers in the cartons is seen in phantom outline in FIG. 8, the diagonal position of the ears being disposed at about 45° to the sides of the container. The forward position of the pusher for insertion of the containers is shown also in FIG. 8. The position of the bails 32 as derived by the apparatus of FIG. 1 is with the bails toward the outside corners of the carton; however, if the bails are desired to be to the inside, the turning action of the guide rail systems 38 and 39 will be to bring the bail toward the center line of the machine which is opposite that shown in FIG. 1.

ALTERNATING EMBODIMENT OF INSERTING MECHANISM OF FIG. 12

Referring next to the alternate embodiment of FIGS. 3 and 4 and the delivery of the containers by orienting means, to be more fully described in conjunction with FIG. 13, it is to be noted that containers 30 are fed along conveyors 95 and 96 and as delivered to the inserting mechanism of stations 99 and 100 the containers are oriented by an ear engaging rail to be delivered in a prescribed orientation.

As depicted, a series of containers 30 are transported on conveyor 95 and are turned to bring ears 33 against an ear stop rail 148. This stop rail in combination with a rub rail, not shown, causes the ears 33 to lay at about

30° to a line transverse of the path of the conveyor. When released from rotative motion the containers travel, as seen in FIG. 12, until the leading conveyor reaches a turning rail portion 149 which extends inwardly from a point just past the final position of the second container. This rail portion causes this forward container to be turned clockwise about a quarter revolution to the position depicted. A bridge block or head member 150 carries a can aligning finger member 152 which has its inwardly extending end contoured to a point with the contours conforming generally to the side contours of the container.

Pivotally carried on head member 150 are right- and left-hand ear engaging arms 154 and 155 which are urged by springs, not shown, to the position shown in phantom outline. They are maintained at this position by limiting stops which permit them to be swung toward each other or toward finger member 152 for a reason to be described with the operation sequence.

OPERATION OF THE INSERTING MECHANISM OF FIG. 12

The insertion of the containers 30 with the inserting mechanism is quite similar to that of FIG. 7 and 8 above in that four containers must be in place before the air cylinders which are to move the headers 150 inwardly are actuated. As the header 150 is moved toward the open end of the erected carton the finger member 152 enters between the ears 33 of the two adjacent containers. At this same time the distal end of each of the arms 154 and 155 engage the side of the container with which they are associated. As the header 150 is moved further inwardly the ear 33 of the forward container 30 is engaged by arm 154 and pushed into engagement with the forward edge of finger member 152. In a like manner the ear 33 of the second container is engaged by the end of arm 155 and is pushed into engagement with the trailing edge of finger member 152. With the ears of both containers thus retained in the desired orientation the containers are pushed into the open end of the erected carton. Withdrawal of the header member 150 to the position shown in the phantom outline permits two succeeding containers to be moved into place. Inserting station 100 operates in the same manner and at the same time with substantially identical apparatus.

ORIENTING SYSTEM OF FIG. 13

Referring next to the diagrammatic steps whown in FIGS. 13A, 13B, 13C, 13D, 13E, and 13F, it is to be noted that there is depicted an alternate ear orienting means to that shown in FIG. 12. It is assumed that instead of the ear stop rail 148 of FIG. 12 there is provided an ear stop rail 158 which is disposed on the inner side of conveyor 95. A bottom rub rail 160 is caused to engage the bottom edge of the container near a tangential side of the container. As the container is moved forwardly it also turns clockwise to bring the ear 33 against stop rail 158. At or near upright 52 both the ear stop rail and the bottom rub rail 160 are terminated and the containers with their ears generally oriented as in FIG. 12 advance forwardly to the inserting station.

As the leading container enters the depicted inserting station 99 the bottom edge tangentially engages rub rail 102 and causes the container to turn counterclockwise about one quarter turn. With the ears 33 of the two adjacent containers 30, which are to be inserted, arranged generally as in FIG. 12 insertion of the containers is accomplished as above-described.

As depicted, rub rails 160 and 102 are shown in an exaggerated condition above conveyor whereas in practice the tops of the rail are about ten-thousandths of an inch above the conveyor surface and there are ramps leading to each rail top surface.

CONTAINER INSERTING APPARATUS OF FIG. 14

Referring next to FIG. 14 there is depicted an arrangement wherein the inserting mechanism of FIGS. 1 and 2 is used with the conveyor and orienting apparatus of FIGS. 3 and 4. The containers 30 are delivered and are then oriented before transfer so that the ears 33 are in the arrangement of FIG. 14 and utilizing the inserting apparatus of FIG. 8 are inserted into the cartons. The ear retaining fingers 122 and 123 pass by the ears 33 and to a position adjacent the side walls of the containers. The pusher arms 128 and 129 engage the ears and move them in the manner of arms 154 and 155 in FIG. 12. When the ears are positioned as in the inserted condition seen in the phantom outline the transfer operation is accomplished as in the manner of FIG. 12.

INSERTING APPARATUS OF FIGS. 15, 16 17 AND 18

Referring next to the embodiment as shown in FIGS. 5, 16, 17 and 18 there is depicted an arrangement whereby the apparatus of FIGS. 1 and 2 may be used to insert one container from each of the conveyors 34 and 36 into opposite ends of an erected carton which will receive and retain only two containers. In this alternate arrangement the header frame 108 and associated members are removed and on rods 114 and 115 are slidably mounted on a frame 165. Spacers and bolts similar to bolts 112 and spacers 114 and 115, as in FIG. 7, are used to support and maintain a pusher block 167 which is shaped like the rear one-half of block 116. Arcuate members 169 and 170 are like the rear half of members 125 and 126 with the members 169 and 170 adapted to freely enter the end of an erected carton. A pivoted bail retaining bar 172 is spring biased by springs 174 and is retained on pusher block 167 in a manner similar to that of bar 118 on block 116. Carried on the top of member 169 is an ear pusher arm 129 which is urged by spring 133 against a stop 132. A pivoted cammed ear retaining finger 123 is also carried on top of arcuate member 169.

Hingedly attached to the side of the conveyor frame 176 is a stop plate 178 which, as seen in FIG. 17, may be swung out of the way of incoming containers when four containers are to be inserted into an erected carton. When only two containers are to be inserted into an erected carton 180 stop plate 178 is turned to the stop position shown in FIGS. 15 and 18.

USE AND OPERATION OF THE APPARATUS OF FIGS. 15, 16, 17 and 18

In the manner of the apparatus of FIGS. 7 and 8 the container inserting apparatus of this embodiment utilizes a counting means to ascertain that a container is on both conveyor 34 and 36 and is in way of the inserting apparatus. Cylinders 110 and 111 are actuated if an erected carton 180 is in place to receive the containers.

The pivoted bail retaining bar engages the bail to retain the bail during the insertion. A pressure pad, not shown, causes the container **30**, shown in FIG. **15**, to rotate clockwise which causes pusher arm **129** and ear retaining finger **123** to engage the rotated container at the degree of rotation as shown by the phantom container seen in FIG. **15**.

Except that the container insertion is adapted for one container per open end of the carton **180** the procedure and operation of this alternate embodiment is substantially identical to that of FIGS. **7** and **8**.

FLAP CLOSING APPARATUS OF FIG. 19

In FIG. **1** is shown a plan view of flap closing or tucking equipment generally indicated as **60**. In FIG. **19** is shown an enlarged partly diagrammatic sectional transverse view in which the filled carton **66** has had hot-melt glue from applicators **62** applied to the outside surfaces of the already closed or tucked flaps. Guides **182, 183, 184** and **185** respectively engage flaps **66***d*, **66***e*, **66***f* and **66***g* to retain them at a determined distance from the already tucked end flaps. At a signal from the circuit control pressurized air is fed to air cylinder **187** whose rod **188** moves clevis block **190** doWnwardly to the phantom position. Pins **192** and **193** carried by clevis block **190** engages the ends of pivotally mounted arms **195** and **196** so as to move pivoted pads **197** and **198** inwardly to push flaps **66***d*, **66***e*, **66***f* and **66***g* tightly against the glued flaps of the carton. Pivot pin **199** retains arm **196** while pivot pin **200** supports arm **195**. The period of time that arms **195** and **196** are moved to clamping condition is very short after which the sealed carton is moved to delivery conveyor **68**. The pneumatic actuation of the pads **197** and **198** insure that equal and sufficient pressure is applied to the flaps and that carton manufacturing tolerances or variations are accommodated satisfactorily.

CIRCUIT DIAGRAM OF FIGS. 20A AND 20B

Referring finally to the circuit diagram of FIGS. **20A** and **20B** there is shown a preferred means of the electrical and pneumatic operation of the apparatus above-described. For the carton erecting apparatus and sequence which is used with the inserting mechanism of this invention, reference is made to the diagram FIGS. **27A** and B of my U.S. Pat. No. 3,640,919 above referenced. In the present invention power piston **210** in addition to moving the reciprocated frame **211** by which the cartons are transported also moves the piston **212** in cylinder **214** to provide the vacuum for causing vacuum cups **215** to grasp the folded carton **66** or **180**. Gauge **216** indicates the developed vacuum and a ball valve **218** is provided which is adjusted to bleed the vacuum cups **215** when the mechanism is to be operated without pulling cartons from the stack in chute **58**. A needle valve **220** permits a determined amount of air to enter the cylinder **214** during the vacuum stroke. This air is filtered through filter **222** to prevent fouling the cylinder and reduce wear. On the open side of cylinder **214** a conductor **223** is provided with a filter **222** and a lubricator **224**.

An automatic valve **226** receives 60 pounds compressed air through conductor **228** which is also provided with a lubricator **224** and a pressure regulator **230** which reduces the pressurized air line pressure which may be 80 pounds or more. Sixty pounds of pressure to piston **210** in the preferred embodiment provides an ample force for moving the reciprocating frame **211** but this force is such that stalling occurs when a filled carton becomes jammed in the apparatus. A filter **222** prevents dirt, etc., from blocking ports and causing undue wear in the many control members. A three-way lever controlled valve **232** is opened and closed to permit line supplied pressurized air to be fed to the systems. A conductor **234** feeds the filtered line pressure air to a regulator **236** where the air is reduced to eighty psi and then through a lubricator **224** is fed to an automatic valve **238** which controls the responsive movement of air cylinder **187** used in the flap closing apparatus shown in FIG. **19**.

Speed control valves **240** are provided to regulate the rate of travel for both cylinders **210** and **187**. Mufflers **241** are also provided to reduce the pneumatic exhaust noise as these cylinders are cycled. The high pressure air going to valve **238** is also fed to cylinders **110** and **111** whose actuation is controlled by valve **242**. Line pressure air is fed through conductor **234** to regulator **230**, a lubricator **224** then a valve **244** which is actuated and opened by the presence of a carton **66** carried by the reciprocated frame **211**. A valve **246** senses the carton and is actuated to feed air to glue guns **248**. A cam **250** is placed in one of two positions; at the first it accommodates cartons **66** for four containers and at the other position for carton **180** for two containers. Valve **252** releases air to the glue guns. Valve **254** releases air to carton flap tuckers **256** and **257** moved by cylinders **259** and **260**. Air power for the glue gun system is fed through conductor **234** to regulator **230**, a lubricator **224** and to glue unit system **62** which may be a hot-melt glue system made by NORDSON or the like.

It is to be noted that the circuit provides means whereby the inserting stations are contemplated to be operated at such a rate of speed that only containers **1, 2, 3** and **4** are in an inserting operation sequence. With the arrival of the fourth container, air to cylinders **110** and **111** is delivered through valve **242** providing that the header frames **108** are fully back to open valves **262** and **263**. If either container **5** and/or **6** is in place valves **265, 266, 267** and/or **268** are opened. If container **5** is in place valves **267** and **268** are opened. Valve **267** when opened feeds air to the controls of conveyor motor **270** to shut the conveyor down. In like manner, if container **6** is in place to open valve **265** the motor **270** is shut down, as is power to other equipment supplying containers to the conveyors. If containers **1** and **2** are in position valves **272** and **273** are open and if either container **5** and/or **6** arrives the valves **265** and/or **267** are opened to shut down the apparatus even if the pushers **108** are not in the position to close valves **262** and **263**. Valves **275** and **276** return the cylinders **110** and **111** to their insert position at the completion of their inward strokes. This arrangement requires that the inserting mechanism complete its cycle within a prescribed period of time in pace and synchronism with the conveyor. Otherwise, if it is slower or a jam occurs the apparatus will be shut down to enable adjustment to be made and damage avoided.

For the convenience of checking and following the circuit, flow from FIG. **20A** to FIG. **20B**, the lines **280, 281, 282, 283, 284, 285, 286, 287** and **288** have been match identified on both of these FIGURES.

METHOD OF OPERATION

The above apparatus is, of course, adapted to method operation to be hereinafter claimed. The method includes receiving containers in a single file array to equally divert said containers to two conveyors and to then insert an equal number of containers substantially simultaneously into opposite open ends of an erected carton and thereafter delivering said carton to closing, gluing and sealing means after which the carton is delivered from the apparatus, said method particularly including the steps of: delivering a supply of eared containers to a receiving station; feeding the received containers to a diverting means and from there feeding these containers alternately with every other container fed to and on a first transporting conveyor disposed along one side of the apparatus and feeding alternately the other containers to and along a second transporting conveyor disposed along the other side of the apparatus; erecting and delivering an erected carton to an inserting station with the carton having both its ends retained in an open condition, each open end being adjacent a container inserting apparatus; orienting and presenting each container to an inserting station with its ears in an oriented condition; controlling by a circuit control means the receipt and presence of a required quantity of containers in place in way of each of the inserting apparatus and that an open erected carton is in its required place; upon actuation of the circuit control causing inserting apparatus associated with each transporting conveyor to be actuated and positioning on each apparatus by an ear engaging arm disposed to slidably engage the side of a container as the container is moved from the conveyor to and into the open end of a carton; engaging one side of an ear with the engaging arm so as to orient the axis of the ear at a determined angle to the side of the box; positioning an ear retaining finger so that with the ear engaging arm the finger and arm will engage and retain the ear and attached container at a determined orientation in the carton during insertion of the container into the carton, and moving the filled carton to flap folding, gluing, sealing and delivering operations.

EQUIVALENT AND POSSIBLE ALTERNATE CONSTRUCTIONS AND/OR ARRANGEMENTS

In describing and showing the best contemplated constructions and/or arrangements it is to be noted that the header members **108** and attached fixed members of the inserting apparatus may be made as a molded one-piece construction if desired. The orienting of the containers **30** with their bails **32** in the four corners of the carton may be reversed by simply turning the bails to the inside of the conveyors **34** and **36.** The S-curve conveyors **34** and **36,** shown and described, employ plate top conveyor strands but strand-type conveyors or belts can, of course, be used.

If the efficiency and high speed capability of the apparatus shown and described is not desired the feed of containers to the inserting station could be arranged to provide a determined demand supply such as six or more in surplus before the container insertion is actuated. Containers could, of course, be delivered from a plurality of sources and on the delivery conveyors be fed to the inserting stations. Glue, of course, is the preferred sealing means but an obvious equivalent would be stapling and other means may be used.

Terms such as "left", "right", "up", "down", "bottom", "top", "front", "back", "in", "out", "clockwise", "counterclockwise" and the like are applicable to the embodiments shown and described in conjunction with the drawings. These terms are merely for the purposes of description and do not necessarily apply to combinations with other apparatus in which the apparatus and method for orienting and case packing eared containers may be constructed or used.

While a particular embodiment and alternate embodiments have been shown and described it is to be understood the invention is not limited thereto since suggested and other modifications may be made within the scope of the accompanying claims and protection is sought to the broadest extent the prior art allows.

What is claimed is:

1. Apparatus for receiving containers in a single file array and to equally divert said containers to two conveyors and to then insert an equal number of containers substantially simultaneously into the opposite open ends of an erected carton and thereafter delivering said carton to closing, gluing and sealing means after which the carton is delivered from the apparatus, said apparatus including: (a) a delivery means adapted to deliver a supply of eared containers to a receiving station; (b) a diverting means at said receiving station, said diverting means adapted to alternately feed every other container to and along a first transporting conveyor disposed along one side of the apparatus and to alternately feed the other container to and along a second transporting conveyor disposed along the other side of the apparatus; (c) means for erecting and delivering an erected carton to an inserting station whereat the carton has both its ends retained in an open condition, each open end of the carton positioned adjacent a container inserting apparatus; (d) means in association with said conveyor for presenting each container to an inserting station with the ears of the container in a determined oriented condition; (e) circuit control means adapted to determine that a required quantity of containers are in place in way of each of the inserting apparatus and that an open erected carton is in its required place; (f) inserting apparatus associated with each transporting conveyor, each apparatus having an ear engaging arm disposed to slidably engage the side of a container as the container is moved from the conveyor to and into the open end of a carton, said engaging arm engaging one side of an ear to orient the axis of the ear at a determined angle to the side of the receiving carton, and an ear retaining finger associated with the ear engaging arm, said finger and arm retaining an ear of the container at a determined orientation in the carton during insertion of the container to achieve the carton filled condition, and (g) means for moving the filled carton to sealing and delivery means.

2. Apparatus for receiving and packing eared containers into cartons as in claim **1** in which the eared containers are also provided with bails and in which the orienting of the containers on the conveyor includes receiving the bailed containers with their bails disposed in a vertical manner and in which said vertical bails are retained in a guide rail system to bring the oriented containers to a determined oriented position and prior to the inserting station apparatus is provided for turning the bails to the side of the container.

3. Apparatus for receiving and packing eared containers into cartons as in claim **2** in which the turning

of the bails from their vertical condition to a side condition also insures that the containers are delivered to the inserting station with their ears substantially aligned with the axis of the conveyor.

4. Apparatus for receiving and packing eared containers into cartons as in claim **3** in which each inserting apparatus is adapted to receive and insert two adjacent containers into the side of an open carton.

5. Apparatus for receiving and packing eared containers as in claim **4** in which the inserting mechanism engages the two containers and pushes the containers toward and into the open end of the carton, and in which the apparatus includes a slide plate positioned to slidably engage the upper rim of the advancing container in such a manner as to cause the container to rotate on its axis as it is moved under and past this slide plate.

6. Apparatus for receiving and packing eared containers as in claim **5** in which there is a slide plate for each of the two containers with the slide plates arranged side-by-side and substantially equidistant from the theoretical center line between the containers.

7. Apparatus for receiving and packing eared containers as in claim **6** in which the inserting mechanism further includes a bail retaining bar disposed to engage and slidably retain the bail of each container against the side of the container during the inserting motion of the inserting mechanism.

8. Apparatus for receiving and packing eared containers as in claim **7** in which each of the inserting mechanism is for two containers and includes a pair of arcuate members each having arcuate segments disposed to engage and retain the containers in a determined side-by-side spacing and with each inserting mechanism having the ear retaining finger as a cammed ear retaining finger disposed to be lifted and to drop into ear retaining condition during the rotation of the container and in which the ear engaging arm as it engages the ear positions the axis of the ears of the container at substantially 45° to the side of the carton.

9. Apparatus for receiving and packing eared containers as in claim **8** in which the bail retaining bar is spring biased to its initial forward condition and in which the cammed ear retaining finger is pivotally retained at one end so as to be lifted by the ear movement against a cam surface and by gravity the retaining finger falls into place.

10. Apparatus for receiving and packing eared containers as in claim **9** in which the inserting apparatus includes a stop bar which is carried by the apparatus so as to impede the progress of succeeding advancing containers into the path of the inserting mechanism until the mechanism has been returned to its initial inserting condition.

11. Apparatus for receiving and packing eared containers into cartons as in claim **3** in which the cartons are adapted to receive only two containers with one container inserted into each end of an erected carton and in which each inserting apparatus is adapted to receive and insert a single container into the open end of an erected carton.

12. Apparatus for receiving and packing eared containers into cartons as in claim **11** in which the inserting mechanism engages a single container and pushes this container toward and into the open end of the carton and in which the apparatus includes a slide plate positioned to slidably engage the upper rim of the advancing container in such a manner as to cause the container to rotate on its axis as it is moved under and past this slide plate.

13. Apparatus for receiving and packing eared containers into cartons as in claim **12** in which the container inserting mechanism further includes a container retaining bar disposed to engage and slidably retain the bail of the container against the side of said container during the inserting motion of the inserting mechanism.

14. Apparatus for receiving and packing eared containers into cartons as in claim **13** in which the container inserting mechanism further includes upper and lower arcuate members each having an arcuate receiving contour disposed to engage and retain the container in a determined position in the inserting mechanism during insertion.

15. Apparatus for receiving and packing eared containers into cartons as in claim **14** in which the conveyor transporting the containers is provided with a removable stop which when in the path of the container causes the advance of the container to be impeded and in which the inserting apparatus includes a stop bar which is carried by said apparatus so as to impede the progress of succeeding advancing containers into the path of the inserting mechanism until the mechanism has been returned to its initial inserting condition.

16. Apparatus for receiving and packing eared containers into cartons as in claim **1** in which the orienting of the containers on the conveyor includes a rub rail which engages the bottom rim of the container in such a manner as to cause the container to rotate around its axis to bring an ear of the container against an ear stop rail which then engages the ear of the advancing container to retain the desired container orientation until the container reaches a determined position where this orienting apparatus is discontinued to permit the now oriented containers to proceed to the inserting station.

17. Apparatus for receiving and packing eared containers into cartons as in claim **16** in which the orienting of the containers at the inserting station further includes a second rub rail by which the leading container is caused to be turned about a quarter turn from the orientation of the second container in the series to be inserted, this orientation resulting in the ears to be engaged by the inserting mechanism being toward the center line of the inserting mechanism.

18. Apparatus for receiving and packing eared containers into cartons as in claim **17** in which the container inserting mechanism includes a fixed ear retaining finger disposed to engage the adjacent side wall of each of the containers while each ear is engaged by one of a pair of ear engaging arms which is moved from a limiting stop and against a spring bias.

19. Apparatus for receiving and packing eared containers into cartons as in claim **18** in which each inserting apparatus includes a stop bar which is carried by the apparatus so as to impede the progress of succeeding advancing containers into the path of the inserting mechanism until the inserting mechanism has been returned to its initial inserting condition.

20. Apparatus for receiving and packing eared containers as in claim **1** in which there is provided adjustment means whereby the carton delivery chute is able to receive and dispense cartons of various sizes including cartons for two as well as for four containers and in

which the conveyors are provided with selective stops whereby a first inserting apparatus is adapted to insert only one container into a carton and means is provided for removing and replacing this inserting apparatus with a second apparatus which is adapted to insert two containers into the open end of an appropriately sized carton.

21. Apparatus for receiving and packing eared containers as in claim **1** in which the circuit is provided with a detecting means which is so positioned that with one container in inserting position in an inserting station adapted for only inserting one container and said detecting means is actuated by the presence of an adjacent succeeding container, the detecting means causes a signal by which this conveyor transport system is shut down.

22. Apparatus for receiving and packing eared containers as in claim **21** in which the circuit is provided with an adjacent container detecting means at each of the opposite inserting stations.

23. Apparatus for receiving and packing eared containers as in claim **1** in which the circuit is provided with an adjacent container detecting means which is so positioned that with two containers in inserting position in an inserting station adapted for inserting two containers and said detecting means is actuated by the presence of an adjacent succeeding container the detecting means causes a signal by which the conveyor transport system is shut down.

24. Apparatus for receiving and packing eared containers as in claim **23** in which the circuit is provided with adjacent container detecting means at each of the opposite inserting stations.

25. The method of receiving containers in a single file array to equally divert said containers to two conveyors and to then insert an equal number of containers substantially simultaneously into opposite open ends of an erected carton and thereafter delivering said carton to closing, gluing and sealing means after which the carton is delivered from the apparatus, said method including the steps of: (a) delivering a supply of eared containers to a receiving station; (b) feeding the received containers to a diverting means and from there feeding these containers alternately with every other container fed to and on a first transporting conveyor disposed along one side of the apparatus and feeding alternately the other containers to and along a second transporting conveyor disposed along the other side of the apparatus; (c) erecting and delivering an erected carton to an inserting station with the carton having both its ends retained in an open condition, each open end being adjacent a container inserting apparatus; (d) orienting and presenting each container to an inserting station with its ears in an oriented condition; (e) controlling by a circuit control means the receipt and presence of a required quantity of containers in place in way of each of the inserting apparatus and that an open erected carton is in its required place; (f) upon actuation of the circuit control causing inserting apparatus associated with each transporting conveyor to be actuated and positioning on each apparatus an ear engaging arm disposed to slidably engage the side of a container as the container is moved from the conveyor to and into the open end of a carton; (g) engaging one side of an ear with the engaging arm so as to orient the axis of the ear at a determined angle to the side of the box; (h) positioning an ear retaining finger so that with the ear engaging arm the finger and arm will engage and retain the ear and attached container at a determined orientation in the carton during insertion of the container into the carton, and (i) moving the filled carton to flap folding, sealing and delivering operations.

26. The method of receiving and packing containers as in claim **25** which further includes the step of insuring that each of the containers have bails and that these bails are disposed in a vertical manner and the further step of maintaining the containers in an oriented condition on the conveyor by retaining the bails in a guide rail system as they are moved along the conveyor.

27. The method of receiving and packing containers as in claim **26** which includes the further step of turning the bails to the outer side of the conveyor and container as each container is brought on and by the conveyor to the inserting station.

28. The method of receiving and packing containers as in claim **27** which further includes feeding two containers to and past sensing means to insure that two adjacent containers are present in the inserting apparatus before initiating the inserting movement of the apparatus.

29. The method of receiving and packing containers as in claim **28** which further includes the step af arranging the containers with their ears substantially aligned with the axis of the conveyor.

30. The method of receiving and packing containers as in claim **25** which includes arranging a slide plate so as to slidably and frictionally engage the upper rim of an advancing container during its insertion movement and by frictional restraint rotating the container on its axis for about one-eighth revolution.

31. The method of receiving and packing containers as in claim **30** which includes bringing two adjacent containers to the inserting station and arranging two slide plates so that during the container inserting movement by the inserting apparatus one container turns clockwise around its axis and the other adjacent container turns counterclockwise around its axis.

32. The method of receiving and packing containers as in claim **31** which further includes the engaging and retaining of the bail against the side of the container during the insertion of the container into the carton.

33. The method of receiving and packing containers as in claim **25** which further includes providing a stop means adjacent the inserting mechanism to impede progress of the containers along the conveyor and in way of the inserting mechanism while the mechanism is in its inserting cycle.

34. The method of receiving and packing containers as in claim **25** which includes the step of providing only cartons which will receive and retain two containers with one container inserted into each open end of the carton and further arranging each opposite inserting apparatus so as to engage and retain only one container and insert that container into the erected carton.

35. The method of receiving and packing containers as in claim **25** which includes the further step of orienting the containers as they travel along each conveyor by arranging a rub rail to tangentially engage the bottom of the advancing container to cause the container to rotate around its axis and placing an ear engaging rail in way of the rotating ear to stop the rotation of the container at a determined orientation position for delivery to the inserting station.

36. The method of receiving and packing containers as in claim 35 which includes the further step of arranging an additional rub rail at an inserting station for two containers said additional rub rail causing rotation of the leading container of about one-quarter revolution.

37. The method of receiving and packing containers as in claim 36 which further includes positioning an ear retaining finger so as to engage adjacent side walls of the containers and also one side of one of the ears on each of the containers and arranging pivotally mounted ear engaging arms to engage the other sides of these ears to establish a determined orientation of the container in the carton.

38. The method of receiving and packing containers as in claim 25 which includes the further step of detecting one container in the inserting station adapted for only inserting one container and further arranging another detecting means so as to detect the presence of an adjacent succeeding container and when so detected initiating a signal to cause the conveyor transport system to be shut down.

39. The method of receiving and packing eared containers as in claim 25 which includes the further step of detecting two containers in the inserting station adapted for inserting two containers and further arranging another detecting means so as to detect the presence of an adjacent succeeding container before initiation of the inserting mechanism and when said adjacent container is detected initiating a signal to cause the conveyor transport system to be shut down.

* * * * *