Nov. 15, 1966 W. F. ROTH 3,284,985

CONTAINER ARRANGING MECHANISM

Filed June 10, 1963 3 Sheets-Sheet 1

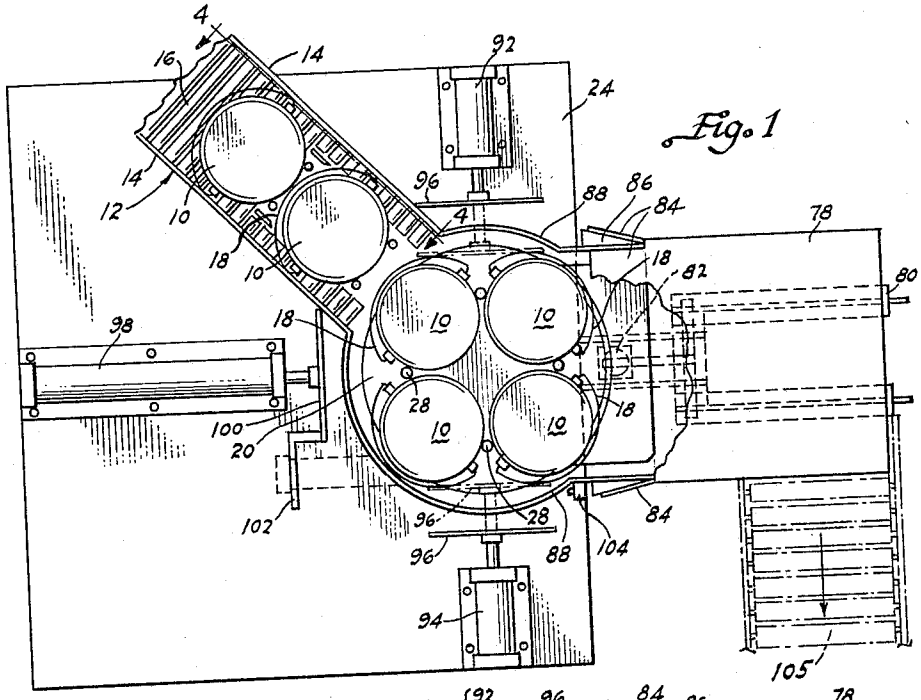


Fig. 1

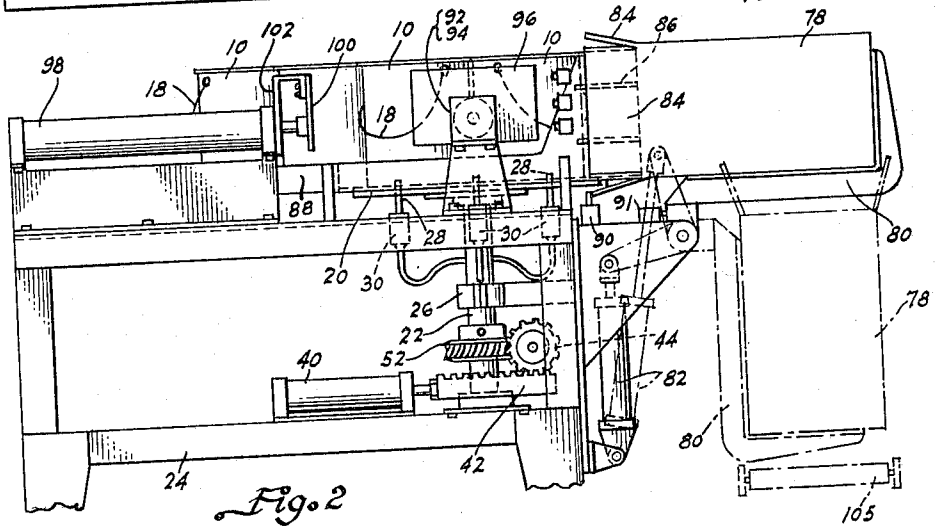


Fig. 2

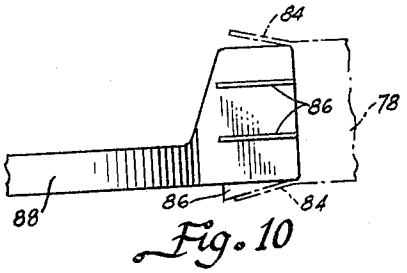


Fig. 10

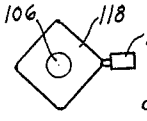


Fig. 12

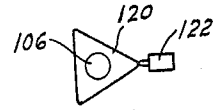


Fig. 13

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CONTAINER ARRANGING MECHANISM

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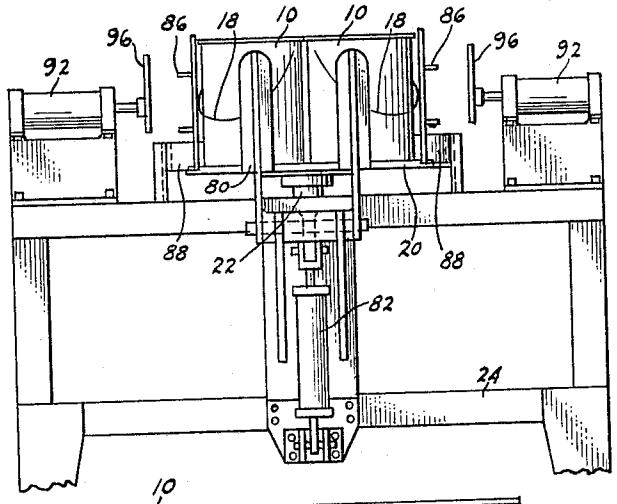


Fig. 3

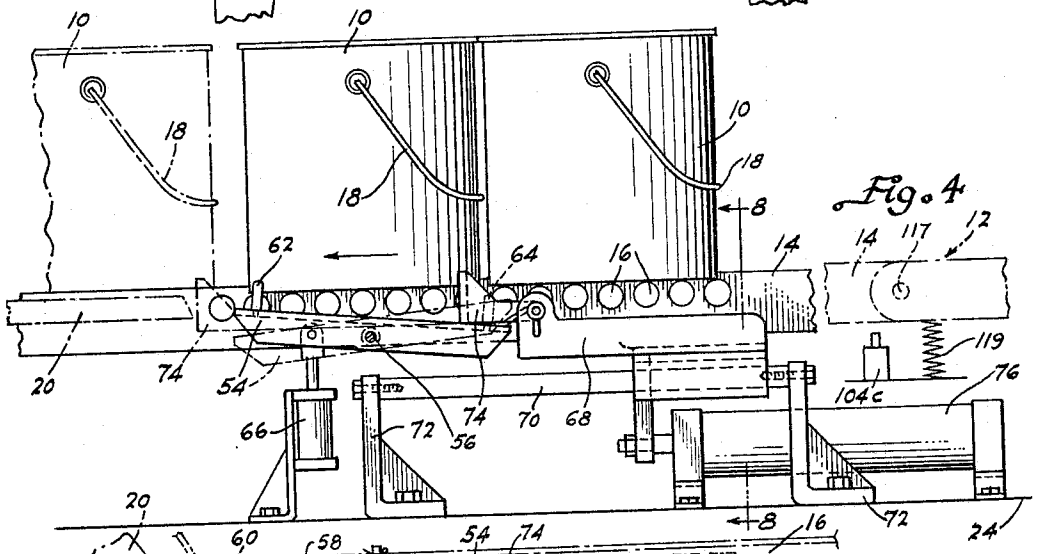


Fig. 4

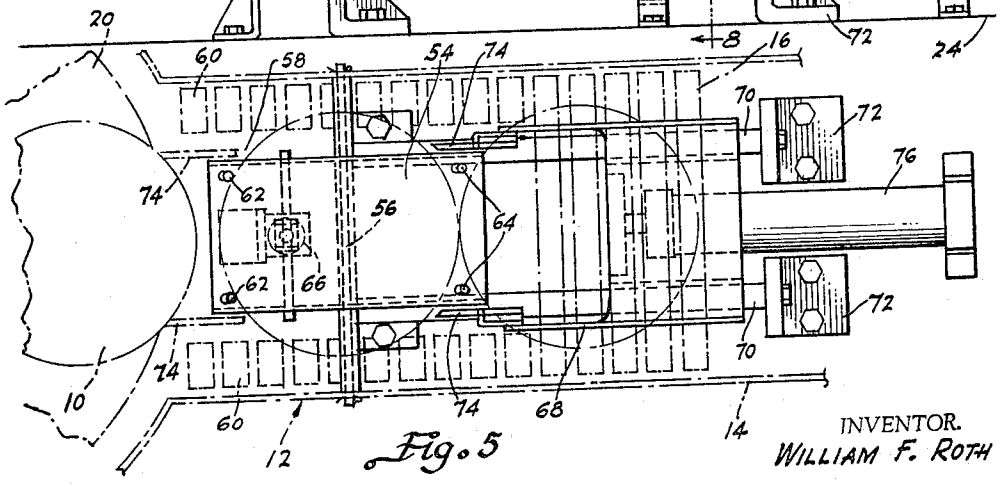


Fig. 5

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CONTAINER ARRANGING MECHANISM

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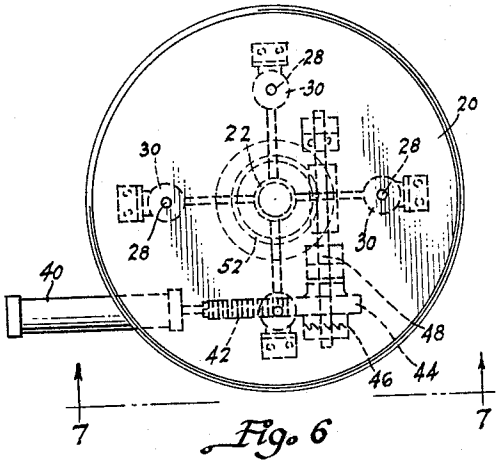


Fig. 6

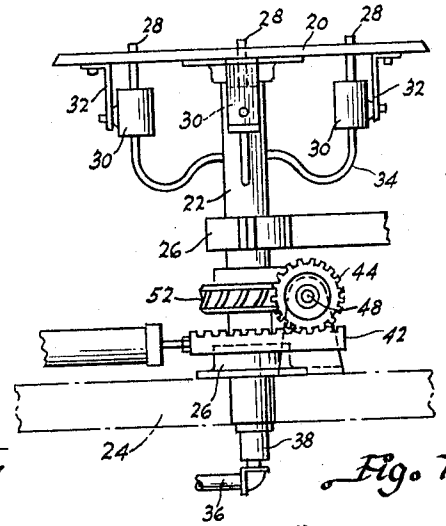


Fig. 7

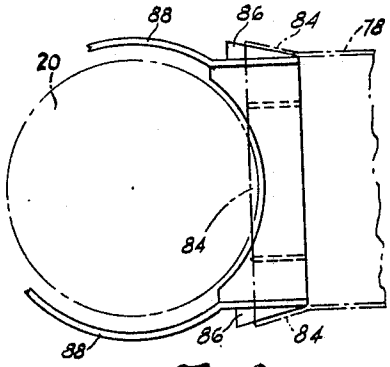


Fig. 9

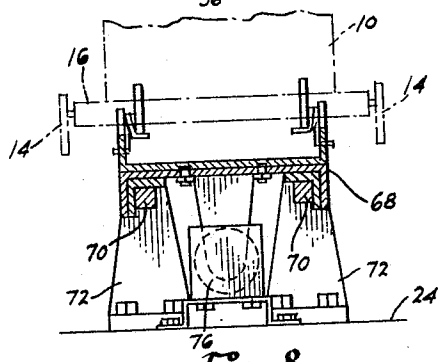


Fig. 8

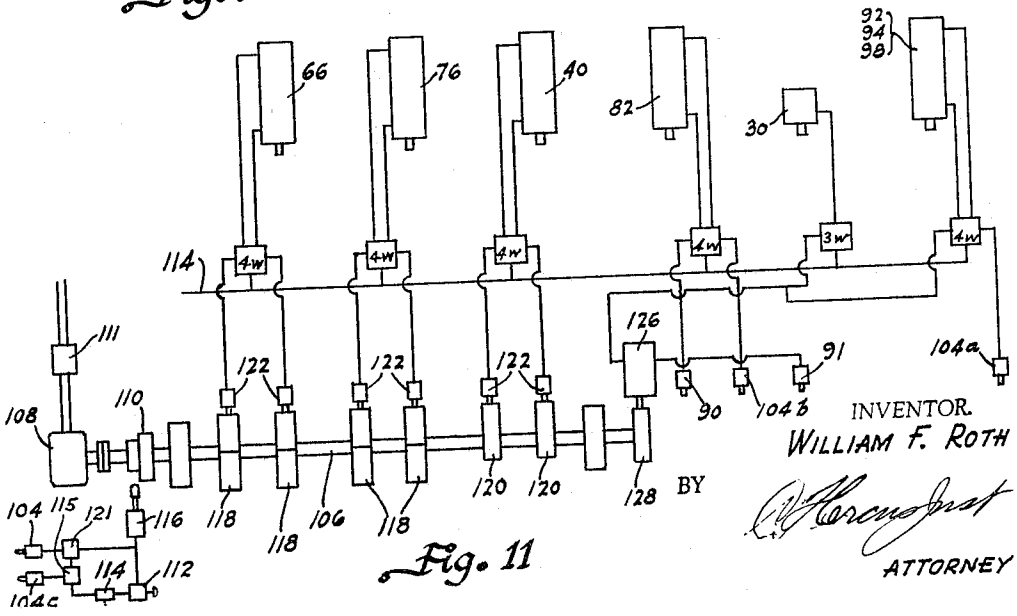


Fig. 11

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CONTAINER ARRANGING MECHANISM

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Filed June 10, 1963, Ser. No. 286,600
14 Claims. (Cl. 53—247)

This invention pertains to a container arranging mechanism and, more particularly, to such a mechanism for arranging containers having handles thereon into a cluster configuration of such containers in which the handles are disposed in certain predetermined relationship with respect to the center of the cluster.

One particular type of container to which the present invention pertains is a metallic can within which paint is merchandized and particularly the larger capacity sizes of these cans, such as a one gallon size. For many years, paint has been sold in one gallon cans, the cans having bail-type handles thereon pivotally connected at the ends thereof to opposite sides of the can near the top thereof. When not in use, the handles hang along one side of the can.

For quite a period of time, it has been conventional to package four one gallon cans in a single carton, the cans being arranged so as to somewhat resemble a four leaf clover in plan view. Until recently, such cans, when so packaged, were not provided with handles attached thereto but, rather, four handles were placed loosely in each carton containing four one gallon cans and either the user or retailer was required to mount the handles manually respectively on the cans. This was required primarily because no automatic machinery was available until very recently to place such handles, automatically, in operative position thereon upon such cans.

It now has been found that the placing of such handles upon cans, particularly gallon paint cans having paper labels thereon, presents problems when a group or cluster of such cans, such as four one gallon cans, are placed evenly in a square configuration within such carton unless the handles on each can hang down along the side thereof which is opposite to and most remote from the center of the cluster. This is due to the fact that if the cans are not placed in the carton with the handles in such outwardly disposed relationship to the center of the cluster of such cans, there is a tendency for the handles on those cans which are not so arranged to rub against the labels on adjacent cans and either blemish or damage such labels.

It is the principal purpose of the present invention to provide container arranging mechanism constructed and adapted to receive cans from a line thereof, all preferably having the handles thereon disposed in trailing relationship with respect to the advancing line of cans or containers, and arranging groups or clusters of a predetermined number of such cans or containers in uniform patterns in which the handles upon the cans are disposed outward or remote from the center of the cluster thereof. When said group or cluster of such cans or containers are so arranged, the mechanism also includes means to deliver said predetermined arrangement or configuration of cans or containers into the open face of a carton in which they are to be enclosed.

Another object of the invention is to provide relatively simple mechanism having a minimum number of elements or sub-units, all preferably fluid actuated, and operated in sequence to effect the desired arrangement or predetermined configuration of a group or cluster of such cans or containers without necessitating any manual operation other than the placing of an open faced carton into position upon the mechanism to receive one of such

clusters or groups of containers or cans when arranged in the manner described above.

A further object of the invention is to provide mechanism of the type described hereinabove which includes a collecting and arranging table mounted for rotation upon a preferably vertical axis and operable to receive, in succession, containers or cans from a delivery conveyor, whereby when the leading can upon said conveyor successively is advanced onto the table radially, and the table is rotated stepwise, through a series of segments of a complete revolution, ultimately to dispose a plurality of such containers or cans upon said table until a full charge thereof is received upon the table, additional means then are activated to push such prearranged group of cluster of containers or cans into the open face of a carton supported to receive the same.

Still another object of the invention is to provide suitable guide means for said group or cluster of containers or cans, so arranged upon said positioning table, to facilitate the operation of the pusher mechanism by which said group or cluster is moved into said carton.

Still a further object of the invention is to provide positioning means upon the collecting and arranging table to limit the movement of the individual containers or cans in a radial direction onto the table from the conveyor means, thereby controlling the shape of the group or cluster of such containers or cans being formed upon said table, said positioning means automatically being removed from engagement with said containers when the pusher mechanism is to be operated to transfer said group or cluster of containers or cans into a carton.

Still another object of the invention is to provide suitable control means for the fluid-powered actuating mechanism for the various elements and sub-units of the entire container arranging mechanism, whereby automatic control and operation of the same is effected.

Details of the foregoing objects and of the invention, as well as other objects thereof, are set forth in the following specification and illustrated in the accompanying drawings, comprising a part thereof.

In the drawings:

FIG. 1 is a top plan view of a preferred construction of container arranging mechanism embodying the principles of the present invention and illustrating a cluster of containers in position to be moved into the open face of a carton arranged to receive the same.

FIG. 2 is a side elevation of the mechanism illustrated in FIG. 1 and, in full lines adjacent the right-hand end, illustrating carton-supporting means in elevated position, while in broken lines, said supporting means is shown in depressed position in which a filled carton is arranged to be received upon a transfer conveyor.

FIG. 3 is an end elevation of the mechanism shown in FIGS. 1 and 2 as viewed from the end of the mechanism upon which the carton supporting unit is positioned.

FIG. 4 is a fragmentary side elevation, on a larger scale than utilized in FIGS. 1 through 3 and illustrating the stop and feeding pusher means located adjacent the delivery end of the feeding conveyor means for controlling the delivery of individual containers from the leading end of the conveyor means onto the collecting table, as viewed on the line 4—4 of FIG. 1.

FIG. 5 is a fragmentary plan view of the mechanism shown in FIG. 4.

FIG. 6 is a fragmentary top plan view of the collecting and arranging table, including the drive mechanism therefor, and showing the container positioning means thereon.

FIG. 7 is a fragmentary side elevation of the mechanism shown in FIG. 6 as viewed on the line 7—7 of FIG. 6.

FIG. 8 is a sectional vertical elevation of the mech-

anism shown in FIG. 4 as seen from the line 8—8 in FIG. 4.

FIG. 9 is a fragmentary plan view, somewhat diagrammatic, illustrating the relationship between the collecting and arranging table and the carton positioning means, a fragmentary portion of a carton being shown in broken lines.

FIG. 10 is a fragmentary side elevation of the mechanism shown in FIG. 9.

FIG. 11 is a diagrammatic view showing the fluid-actuated operating units for the various elements and sub-units of the entire mechanism, and the valve actuating means by which the delivery and removal of fluid to the power units is controlled.

FIGS. 12 and 13 respectively are fragmentary sectional views of two different types of cam elements employed in the valve actuating mechanism shown in FIG. 11.

Referring to the drawings and particularly FIGS. 1 and 2, an exemplary row of containers **10** are shown at the delivery end of a fragmentarily illustrated conveyor means **12** which, in the preferred embodiment of the invention, comprise opposite side frame plates **14** between which closely arranged rotatable rollers **16** are mounted. In the specific embodiment of conveyor means **12** shown herein, the rollers **16** are mounted for rotation about fixed axes but, if desired, a moving conveyor may be used, in accordance with the spirit of the present invention, for purposes of delivering containers to the arranging mechanism, to be described hereinafter.

The specifically illustrated containers **10** comprise exemplary cans which, though not restricted thereto, are paint cans of one gallon capacity each. They are of the type having bail-handles **18** pivotally connected at the ends thereof to opposite sides of the containers **10** and, further in accordance with the principles of the present invention, the handles **18** preferably hang downwardly along the trailing side of the containers as fed along the path defined by the conveyor means **12**.

As used herein, the term "container" is intended to be generic with respect to various kinds of containers made from different types of material, including glass, various types of synthetic resins, metal, and wood or the like. The invention primarily is intended to apply to the arranging of any type of containers having handles thereon which, unless the containers are arranged in predetermined relationship with respect to adjoining containers in a cluster or group thereof to be delivered to a carton for enclosure therein, will either present problems with respect to damaging adjacent containers or labels on adjacent containers, or the containers will not fit in compact manner at least within a carton or other similar enclosure unless the containers in a cluster or group thereof are disposed so that the handles thereof are in non-interferring relationship with adjacent containers or the carton to enclose the same. Hence, it is contemplated, by way of further example, that plastic or glass containers having handles protruding beyond the outline of the cylindrical walls of the containers will present obstructions with respect to adjacent containers in a cluster thereof unless said handles are arranged in predetermined relationship within the group or cluster thereof. The concept of the present invention is capable of handling containers of this type as well as the type specifically illustrated in the drawings.

Further in accordance with the concept of the present invention, relative to the preferred arranging of containers in a cluster with the handles thereof disposed in certain predetermined relationship relative to the cluster, such preferred arrangement is that in which the cluster comprising a square arrangement of four containers and the handles thereon preferably are disposed along the sides of the containers which are most remote from or opposite to the center of the cluster. However, it also

is to be understood that the selected arrangement of fou containers for a cluster thereof is not to be regarded a restrictive inasmuch as, for example, a cluster of thre containers likewise is capable of being utilized in accord ance with the principles of the present invention. Fur ther, particularly if the containers have a molded handl on each one which projects radially a limited distanc beyond the confines of the walls of the containers, it is conceivable that the handles could be arranged within the space formed in the center of the cluster, especially if said handles are sufficiently narrow that they could be disposed within said space without any serious interference with the handles on adjacent containers.

Collecting and arranging means

One of the very essential elements of the arranging system comprising the present invention is the container collecting and arranging means which, in accordance with the principles of the invention, comprises a turntable **20** which, preferably, is substantially horizontal, plate-like, and supported for rotation by a central spindle **22**, details of which are best shown in FIGS. 2, 6 and 7. The spindle **22** is supported by a frame **24**, between a pair of spaced bearings **26**.

Particularly for purposes of insuring the desired positioning of a plurality of containers **10** upon the collecting and arranging table **20** so as to form a cluster of desired shape and configuration upon said table, the latter is provided with positioning means comprising a plurality of lugs **28** which, in the operative position thereof, as best shown in FIG. 7, project slightly above the upper surface of table **20** so as to be engaged by the rims of the bottoms of the containers. As will be seen especially from FIG. 1, when four containers are to be arranged in a cluster, there are four positioning lugs **28** and the distance between adjacent pairs of said lugs preferably at least is slightly less than the diameter of the containers so as to constitute appropriate stopping means to restrict the radial positioning movement of the containers onto the table **20**.

Positioning lugs **28** preferably are movable vertically between the upper, extended position thereof shown in FIG. 7 to a retracted position in which the upper ends of the lugs are at least no higher than the upper surface of table **20**, for purposes to be described. Such movement of the lugs easily is accomplished by each of the same being controlled by a piston and cylinder fluid-actuated unit **30** supported by appropriate brackets **32**, for example, from the lower surface of table **20**. The cylinders of units **30** preferably employ air or other suitable gas which is delivered thereto through suitable conduits **34** which extend between the units **30** and spindle **22**. Such spindle at least is axially bored from the lower end thereof up to the location where the conduits **34** are connected thereto so as to direct fluid thereto from a supply line **36** and a rotor-seal **38** connects the line **36** to the hollow interior of spindle **22**. Exemplary operation of the units **30** comprises applying pressure thereto to elevate the positioning lugs **28**, while conventional retracting springs within the units will depress the lugs to retracted position when fluid pressure is released by suitable control means to be described hereinafter.

To simplify the operation of the entire container arranging mechanism comprising the present invention, a single type and source of fluid preferably is employed, such as compressed air. Accordingly, all moving sub-units and elements of the mechanism likewise are driven preferably by such type of fluid which operates appropriate driving means of various types explained in detail hereinafter. One specific example of such driving means comprises another piston and cylinder unit **40** which operates a reciprocating rack **42** meshing with gear **44**, as shown in FIGS. 6 and 7. Gear **44** operates an over-running clutch **46**, see FIG. 6, which functions as a one-way clutch to drive shaft **48** unidirectionally.

Fixed to shaft **48** is a worm **50** which meshes with worm gear **52**, as shown in FIG. 6, said worm gear being fixed to spindle **22**. Shaft **48** also is supported by suitable bearings shown in FIGS. 6 and 7.

Cylinder **40** preferably is double acting and, as will be explained in greater detail hereinafter with respect to FIG. 11, wherein said cylinder is shown diagrammatically, the piston of said cylinder is driven positively in opposite directions, the table **20** being driven intermittently and sequentially in a single direction as the piston of unit **40** is actuated successively in one direction, whereas the over-riding or one-way clutch **46** permits a reversing movement of the piston of unit **40** while table **20** remains stationary. The worm and worm gear drive of said table insures such stationary condition of the table during such reversing movement of the piston of unit **40**.

Container feeding and control

The feed of containers **10**, preferably one at a time, from the conveyor means **12** onto the arranging and positioning table **20** is effected under closely controlled conditions by mechanism best illustrated in FIGS. 4 and 5. Assuming, for example, that the filling and capping mechanism, or possibly the labeling unit discharges cans in a continuous row onto conveyor means **12**, preferably by some type of positive feed, the engagement of one container with another will serve to move a row of such containers along the roller-type, stationary frame conveyor means **12**, but, under such conditions, it is possible to momentarily halt the advance of such row of containers, without adversely affecting the mechanism in any way, especially for purposes of performing the following operation incident to loading the table **20** with a group or cluster of a predetermined number of containers arranged in a desired pattern for subsequent transfer to a carton therefor.

Utilizing the fact that the handles **18** of the containers **10** hang against the trailing sidewall surface of the containers as the row thereof advances in the direction of the arrows shown in FIGS. 4 and 5, the leading or forwardmost container **10** in the row thereof at the delivery end of container means **12** is moved radially and slidably onto table **20** while the next succeeding container is held against movement onto table **20**, at least momentarily, and for a brief additional period of time sufficient to permit the drive cylinder unit **40** to rotate table **20** for a required segment of a single revolution so as to present a space upon said table which is to receive the next succeeding container. To accomplish this, appropriate stop and pusher means are provided with respect to the delivery end of conveyor means **12**, which now will be described.

As illustrated in FIGS. 4 and 5, it will be seen that a rocking plate **54** is pivotally mounted upon a shaft **56** intermediately of the side plates **14** of conveyor means **12** and, preferably, within a space **58** provided between the inner ends of relatively short, cantilever type conveyor rolls **60** which are rotatable about relatively fixed axes. There are parallel rows of said short conveyor rolls **60** respectively adjacent and supported by the opposite side frame plates **14** at the delivery end of conveyor means **12**.

Plate **54** is provided respectively adjacent opposite ends thereof with pairs of transversely spaced, fore and aft stop pins **62** and **64**. The rocking movement of plate **54** is performed and controlled by a fluid-actuated cylinder and piston unit **66** which is of the double-acting type as is illustrated on the fluid circuit diagram shown in FIG. 11.

With reference to FIG. 4, it will be seen that the fore stop pins **62** are elevated so as to engage the rim of the bottom of the leading container shown in full lines in the exemplary row thereof upon conveyor means **12**. While the table **20** is stationary, pusher head **68**, which is slidably guided upon a pair of horizontal bars **70**, supported upon suitable brackets **72** fixed to frame **24**, pushes the leading container onto said table and, in FIG. 4, head **68** has just completed the pushing stroke to place the fragmentarily illustrated container **10**, shown at the left-hand end of FIG. 4, onto table **20** by means of trip dogs **74** on pusher head **68**. The farthest advancing position of dogs **74** is shown in broken lines in FIG. 4 adjacent table **20**.

While the fore stop pins **62** hold the leading container **10** on the delivery end of conveyor means **12** against advancing movement, the pushed head **68** will be moved by the piston of another, double-acting piston and cylinder unit **76** of the fluid-actuated type from the forward limit of its advance movement, toward the right as viewed in FIG. 4, to the retracted or starting position of the pusher head **68** shown in full lines in FIG. 4. Dogs **74** are pivotally connected to the forward end of pusher head **68** and are normally spring-pressed upwardly into the positions thereof shown in FIG. 4 but, during the retreating movement of pusher head **68** as described above, the rearward ends of dogs **74** are provided with a cam surface to enable the same to be depressed below the level of the containers **10** as the head **68** moves in retracting direction to its initial feeding position shown in full lines in FIG. 4.

From the full line position of head **68** and dogs **74** shown in FIG. 4, wherein said dogs engage the trailing edge portion of the bottom rim of the intermediate container **10**, actuation of pusher head **68** by cylinder unit **76** which will not be initiated in feeding direction until cylinder unit **66** has reversed the position of rocking plate **54** to the dotted line arrangement thereof shown in FIG. 4, wherein aft stop pins **64** will be elevated to operative position and the fore stop pins **62** have been retracted to inoperative position so as to permit the intermediate container **10**, of those shown in FIG. 4, to be moved forwardly onto turntable **20**.

When the aft stop pins **64** are elevated so as to engage the right-handmost container **10** shown in FIG. 4, it will prevent further movement of said container in feeding direction, while, due to the retraction of fore stop pins **62**, the pusher head **68** now may be moved by cylinder unit **76**, in feeding direction, to move the middle container **10** shown in FIG. 4 onto the table **20** by engagement of dogs **74** with the trailing end thereof. It will will be seen that the head **68** is channel-shaped and the side flanges thereof, which pivotally support the dogs **74** straddle the sides of rocking plate **54** so as to clear the same during the advancing movement of the dogs **74**.

At the completion of the feeding movement of head **68** and dogs **74**, the same are retracted by cylinder unit **76** incident to the rocking plate **54** being reversed in position by cylinder unit **66** to dispose the same in the full line position thereof shown in FIG. 4, whereupon the previously halted right-handmost container **10**, of those illustrated as representative of the line thereof upon conveyor means **12**, may advance into engagement with the fore stop pins **62**, at which time the pusher head **68** and dogs **74** will be restored to the full line position thereof shown in FIG. 4 so as to be arranged for the next pushing stroke after rocking plate **54** again has been moved by cylinder unit **66** to the broken line position thereof shown in FIG. 4.

The pusher head **68** will be adjusted to move each container **10**, successively, from the delivery end of conveyor means **12**, radially, onto table **20** until each container engages the suitably positioned pair of positioning lugs **28** which are best shown in FIG. 1. Following the delivery of a container onto table **20**, and while the pusher mechanism is retreating to the starting position thereof shown in FIG. 4 in full lines, table **20** is rotated through a segment of a complete revolution thereof, i.e., one-quarter of a revolution for the specific embodiment of container arrangement or cluster shown in FIG. 1, so as to dispose a clear segment of the table in position to receive the next container advanced from the conveyor means.

This procedure is repeated until a full complement of containers are arranged, in clustered configuration upon table **20**. When this occurs, the control mechanism, to be described in detail hereinafter is so arranged as to provide a dwell in the cycle which holds the fore stop pins **62** elevated for a brief period sufficient to enable the cluster of containers to be moved into the open face of carton **78** which is supported substantially horizontally by let-down arm unit **80**, the latter being pivotally supported adjacent the delivery end of the container arranging mechanism.

Movement and positioning of the unit **80** between the carton loading position shown in full lines in FIG. 2 and the let-down or discharge position thereof shown in broken lines in FIG. 2 is effected by still another fluid-actuated piston and cylinder unit **82**, preferably of the double-acting type. When unit **80** is in the lowered, dotted line position shown in FIG. 2, a carton **78** is positioned manually with one face thereof open, preferably an end face, and the closing flaps **84** for said face at least partially in open position, against suitable spreading fins **86**, see FIG. 10, which, conveniently, may be carried by curved guide rails **88** which are best shown in FIGS. 1, 2, 9 and 10, so as to spread said flaps to fully open position.

Container transfer mechanism

Initiation of the discharging operation of the container arranging mechanism comprising the present invention occurs by such aforementioned manual placement of a carton **78**, by an operator, against the spreading fins **86** at the delivery end of the mechanism. When said carton is disposed in the horizontal full line positions thereof shown in FIGS. 1 and 2 against such fins, one of the flaps **84** on said open face of the carton, such as the lowermost flaps shown in FIG. 2, engages an operating lever on a fluid control pilot valve **90** or the operating lever, for example, of an electrical relay controlling the operation of a fluid control valve. This will cause fluid unit **82** to elevate arm unit **80** to the full line position shown in FIG. 2. When so elevated, a part of arm unit **80** engages the actuating member of valve **91**, see FIG. 2, which functions to initiate the following operations.

Assuming that the cycle of operation of the entire mechanism is such that, by this time, a full complement of containers comprising a desired cluster thereof has been delivered to and arranged upon table **20**, the actuation of fluid control valve **91** by arm unit **80** will cause double acting, fluid actuated piston and cylinder units **92** and **94** to be operated to move pathway-defining guide plates **96** toward each other, past the guide rails **88**, and substantially into engagement with the walls of the cluster of containers **10** formed on table **20**, as indicated in dotted lines in FIG. 1.

Incident to such aforementioned activation of the fluid operated units **92** and **94**, an additional fluid-actuated, double-acting piston and cylinder unit **98** operates delivery pusher plate **100** to engage said arranged group or cluster of containers **10** for movement of the entire cluster into the carton **78**. Prior to such pushing movement of the cluster by plate **100** however, units **30** which control the operation of positioning lugs **28** on plate **20** are moved in directions to retract said lugs **28** so as not to obstruct such delivery or transfer of the cluster of containers **10** into the carton **78**. As is readily seen from FIGS. 1 and 2, the cylinder unit **98** is sufficiently long to permit the movement of plate **100** entirely across the full width of table **20** and to dispose the cluster of containers **10** fully into carton **78**.

Upon the completion of the delivery stroke of pusher plate **100**, an actuating member **102** thereon is positioned to engage a fluid control pilot valve **104** carried, for example, by one of the supporting means for spreading fins **86**, as shown in FIGS. 1 and 2, thereby causing fluid unit **82** to operate in a direction to permit the let-down arm unit **80** to assume the lower position thereof, shown in dotted lines in FIG. 2. This will dispose the loaded carton **78** in position to be received upon discharge conveyor **105** arranged to carry the loaded cartons successively away from the container arranging mechanism.

After the fluid unit **82** has been activated to effect such lowering of the carton **78**, the fluid unit **98** then operates in reverse direction to retract the pusher plate **100** to the starting position thereof shown in FIGS. 1 and 2. The fluid units **92** and **94** likewise are simultaneously activated in reverse direction to retract the guide plates **96** to the inoperative position thereof shown in FIG. 1. During the time such operations are occurring, the fluid units **30** also are operated to restore the positioning lugs **28** to elevated position with respect to collecting and arranging table **20**, whereupon the above described procedures are resumed by which the table **20** again is loaded with a complete complement of containers comprising the desired cluster formation thereof in which the individual containers respectively are positioned so that the handles **18** thereon are disposed along one of the sides of the containers, which is radially outermost from the center of the cluster as well as the center of the table **20**, as clearly shown particularly in FIG. 1.

Fluid circuit and control

Referring particularly to FIG. 11, wherein the fluid diagram is shown, there is schematically illustrated an exemplary master fluid control means of suitable conventional type. In the specific illustration shown in FIG. 11, said master control means is shown as comprising a cam shaft **106** driven by appropriate means such as an electric motor **108** of required speed and interconnected to the cam shaft **106** by means of a single revolution clutch **110**. To initiate action of the entire mechanism, a manually operable electric switch **111** is closed to start electric motor **108** and air valve **112** thus is operated to connect an air inlet conduit **114** to a single acting fluid-operated cylinder unit **116** which trips the clutch **110** and initiates a single operation of drive shaft **106**.

Air conduit **114**, as also shown in FIG. 11, has a branch extending to a valve **115**, operation of which is controlled by pilot valve **104***c* having a reciprocable actuating member engaged by a section of the frame of conveyor **14** which, as shown in FIG. 4, is arranged to have two short sections pivotally connected by pivot means **117** to permit limited movement downward due to the weight of containers **10** when moving thereover, against the action of exemplary spring **119** supported by a part of the frame of the machine. As long as valve **115** is open, air under pressure will be available to valve **121** which is operable to control air cylinder **116** in a manner to be described.

The air supply conduit **114** also is diagrammatically shown as a single line in FIG. 11 that is connected by suitable lateral branches to various 4-way and 3-way valves connected between the supply line and opposite ends of the various cylinders of the fluid-operated units. Valve operating members are actuated by a series of 4-point cams **118** and 3-point cams **120** on cam shaft **106**, respectively shown in profile in FIGS. 12 and 13. The various valve operating members **122** also are shown diagrammatically in FIGS. 11, 12 and 13.

As the drive shaft **106** revolves during its single operation, unit **66** is caused to reciprocate four times successively in opposite directions, thereby releasing, in succession, four of the containers **10** from the conveyor means **12**. In timed relationship with such release of the containers, pusher head **68** is reciprocated by fluid unit **76** four times successively in forward and reverse directions so as to feed said containers successively onto the turntable **20** and thereby fully load the same with the exemplary cluster of four containers. Meanwhile, the turntable **20** is successively rotated for segments of a complete revolution three times by the fluid unit **40** which reciprocates in opposite directions successively to drive

the table during said segments of revolutions and then reverse the movement of the rack **42** by means of the overrunning clutch **46** while the table is stationary, thereby completely loading the table **20** with a complete complement or charge of a desired configuration or cluster of containers.

After the turntable **20** has thus been completely charged with containers, the single revolution clutch **110** disconnects motor **108** from the drive shaft **106**. Meanwhile however, the open end of a carton **78** has been placed in operative relation with the spreading fins **86** and thereby engages pilot valve **90** which actuates fluid unit **82** in a direction to elevate let-down arm unit **80** to hold the carton while the transfer mechanism functions.

When the let-down arm **80** is elevated to the full line position thereof shown in FIG. 2, a portion of the supporting arm thereof engages the actuating member of pilot valve **91**. A three-way valve **126**, shown in FIG. 11, is in series with valve **91** and is placed in operative position by means of a cam **128** driven by cam shaft **106**, but only at the completion of the singe revolution thereof, which then causes all of the fluid units **92**, **94** and **98** to operate respectively to bring the guide plates **96** into operative position adjacent opposite sides of the cluster on table **20**, while the pusher plate **100** is moved in cluster-transferring or pushing direction by fluid unit **98**. If a carton engages pilot valve **90** before table **20** is fully loaded, the let-down arm **80** will be elevated to support the carton but cam **128** has to complete its cycle and operate valve **126** before plunger **98** can operate. Simultaneously wtih actuation of units **92**, **94** and **98**, the plurality of fluid units **30** which operate the positioning lugs **28** on table **20** are moved in a direction to retract said lugs just prior to the pusher plate **100** engaging the cluster of containers **10**.

As the pusher plate **100** completes its transferring movement to completely push the entire cluster of prepositioned containers into the carton **78**, preferably through an open end thereof, actuating member **102** on pusher plate **100** engages fluid control pilot valve **104** which activates fluid unit **82** in a direction to cause the let-down arm unit **80** to be lowered, with a loaded carton or case thereon, onto discharge conveyor **105** which carries said carton away from the mechanism.

When the actuating member **102** is moved toward the carton, it also engages additional pilot valves **104***a* and **104***b*, respectively to shift the 4-way valve controlling cylinders **92**, **94** and **98** to retract the guide plates **96** and pusher plate **100**, and actuate the 4-way valve controlling cylinder **82** so as to cause it to lower the let-down arm **80**. These operations are caused to occur slightly before pilot valve **104** is actuated.

When pilot valve **104** also is actuated, it opens valve **121** to cause fluid to operate cylinder **116** and engage clutch **110**, thereby initiating another revolution of shaft **106**, which operates the stop and pusher mechanism that controls movement of the containers on conveyor means **12**, as well as the drive means for turntable **20** which is operated as aforesaid until another complete charge of containers is disposed thereon in preparation for charging of the same into the open end of another carton, thereby automatically repeating the cycle as long as containers continue to move along conveyor **10** and actuate pilot valve **104***c*.

As an alternative arrangement concerning the positioning of pins **28** relative to table **20** within the spirit of the invention, it is contemplated that the table **20** may be raised and lowered relative to pins **28** which are stationarily mounted relative to spindle **22**, for example, for purposes of clearing the top of table **20** of obstructions to enable pusher plate **100** to move a charge of containers from the table **20** into a carton. Fluid operated means similar to the cylinder **30**, for example, could be utilized, by using bracket arms, not shown, fixed to spindle **22** and extending upward to support pins **28** and fixed pistons, while cylinders **30**, when fixed to table **20**, could be used to move the table upward and downward.

While the invention has been described and illustrated in its several preferred embodiments, it should be understood that the invention is not to be limited to the precise details herein illustrated and described since the same may be carried out in other ways falling within the scope of the invention as claimed.

I claim:

1. Mechanism to arrange a group of containers in a predetermined relationship for feeding the same to an open face of a carton, said mechanism comprising conveyor means to move containers having bail-type handles hanging along one side thereof successively along a path, container collecting and arranging means mounted for rotation and operable to receive containers from said conveyor and arrange sequentially a predetermined number of successive containers in a cluster with the hanging handles thereon extending along one side of each container in a direction out of contact with adjacent containers in said cluster, and separate transfer means operable to engage said arranged cluster of containers and move the same from said collecting and arranging means into an open face of a carton to dispose the cluster within said carton in said arranged condition and thereby prevent the handle on any container from contacting an adjacent container while stored or transported in said carton.

2. The container arranging mechanism set forth in claim **1** further characterized by said collecting and arranging means comprising a table mounted for rotation about a substantially vertical axis, and said mechanism also including means engageable with said table and operable to drive the same intermittently for similar fractions of a revolution about the axis thereof.

3. Mechanism to arrange a group of containers in a predetermined relationship for feeding the same to an open face of a carton, said mechanism comprising conveyor means to move containers having handles extending along the trailing side thereof successively along a path, a rotatable collecting table operable to receive containers in sequence from said conveyor means, means to drive said table sequentially about its axis for fractions of a revolution to receive a cluster of said containers thereon with the handles thereon extending in directions out of contact with other containers in the cluster, and transfer means operable to engage said arranged cluster of containers and move the same from said collecting table into an open face of a carton to dispose the cluster within said carton in said arranged condition and thereby prevent the handle on any container from contacting an adjacent container while stored or transported in said carton.

4. The container arranging mechanism set forth in claim **3** further including positioning means carried by said table and operable uniformly to limit the extent to which each container is moved onto said table, thereby to control the shape of the cluster of containers.

5. The container arranging mechanism set forth in claim **3** further including positioning means movably positioned upon said table and projecting upwardly therefrom, said positioning means being arranged upon said table so as to be engaged by containers and similarly restrict the movement of successive containers onto said table and thereby determine the pattern of the cluster of containers formed thereon, and means interconnected to said positioning means and operable to retract the same to disengage said cluster of containers and thereby condition said table to permit the transfer means to move said cluster of containers from said table into a carton.

6. Mechanism to arrange a group of containers in a predetermined relationship for feeding the same to an open face of a carton, said mechanism comprising con-

veyor means to move containers having handles extending along the trailing side thereof successively along a path, a rotatable table operable to receive containers in sequence from said conveyor means, means to drive said table sequentially about its axis for fractions of a revolution to receive a cluster of said containers thereon with the handles thereon extending in directions out of contact with other containers in the cluster, stop means operable relative to said conveyor means to engage the advancing line thereof to stop such feed while said table is rotating, and transfer means operable to engage said arranged cluster of containers and move the same from said rotatable table into an open face of a carton to dispose the cluster within said carton in said arranged condition and thereby prevent the handle on any container from contacting an adjacent container while stored or transported in said carton.

7. The container arranging mechanism set forth in claim 6 further characterized by said stop means being positioned relative to the delivery end of said conveyor means to engage the container next to the leading container on said means, and a feeding pusher operable relative to said conveyor means and arranged to engage said leading container and push the same onto said table.

8. Mechanism to arrange a group of containers in a predetermined relationship for feeding the same to an open face of a carton, said mechanism comprising conveyor means to move containers having handles extending along the trailing side thereof successively along a path, a rotatable table operable to receive containers in sequence from said conveyor means, means to drive said table sequentially about its axis for fractions of a revolution to receive a cluster of said containers thereon with the handles thereon extending in directions out of contact with other containers in the cluster, means to stop delivery of said containers to said table when a cluster of a predetermined number are positioned thereon, side guide means movable relative to opposite sides of said table to define an exit path for said cluster of containers, and pusher means positioned adjacent one end of said exit path and operable to engage said arranged cluster of containers and move the same from said rotatable table into an open face of a carton to dispose the cluster within said carton in said arranged condition and thereby prevent the handle on any container from contacting an adjacent container while stored or transported in said carton.

9. The container arranging mechanism set forth in

claim 8 further including positioning means on said table engageable by containers fed to said table and operable uniformly to limit the movement of containers onto said table from said conveyor means, thereby to control the pattern of the clusters of containers formed upon said table, and means operable to move said positioning means out of engagement with said containers to permit said pusher means to move clusters of containers from said table into a carton positioned to receive the same.

10. The container arranging mechanism set forth in claim 9 further including drive means interconnected to said table and operable to drive the same sequentially and uni-directionally for uniform segments of a revolution corresponding to the fraction of a cluster represented by each container.

11. The container arranging mechanism set forth in claim 10 further including stop means operable relative to said conveyor means to engage a container in the advancing line thereof on said conveyor means and stop such advance thereof while said table is being rotated through one of said segments of a revolution thereof.

12. The container arranging mechanism set forth in claim 11 further including a feeding pusher operable to engage the leading container upon said conveyor means and move the same onto said table radially into engagement with the positioning means upon said table after the advance of containers upon said conveyor means has been stopped.

13. The container arranging mechanism set forth in claim 12 further including fluid operated units interconnected to the movable elements of said mechanism and operable to actuate the same as set forth.

14. The container arranging mechanism set forth in claim 13 further including a fluid control system interconnected to and operable to actuate all of said fluid operated units and to actuate the same in sequence.

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