

[54] **CLOSURE HANDLING AND
ORIENTING APPARATUS**

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[73] Assignee: **Pneumatic Scale Corporation**, Quincy, Mass.
[22] Filed: **June 23, 1971**
[21] Appl. No.: **155,751**

[52] U.S. Cl. **198/33 AA**
[51] Int. Cl. **B65g 47/24**
[58] Field of Search **198/33 AA; 221/167**

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Attorney—Robert T. Gammons

[57] **ABSTRACT**

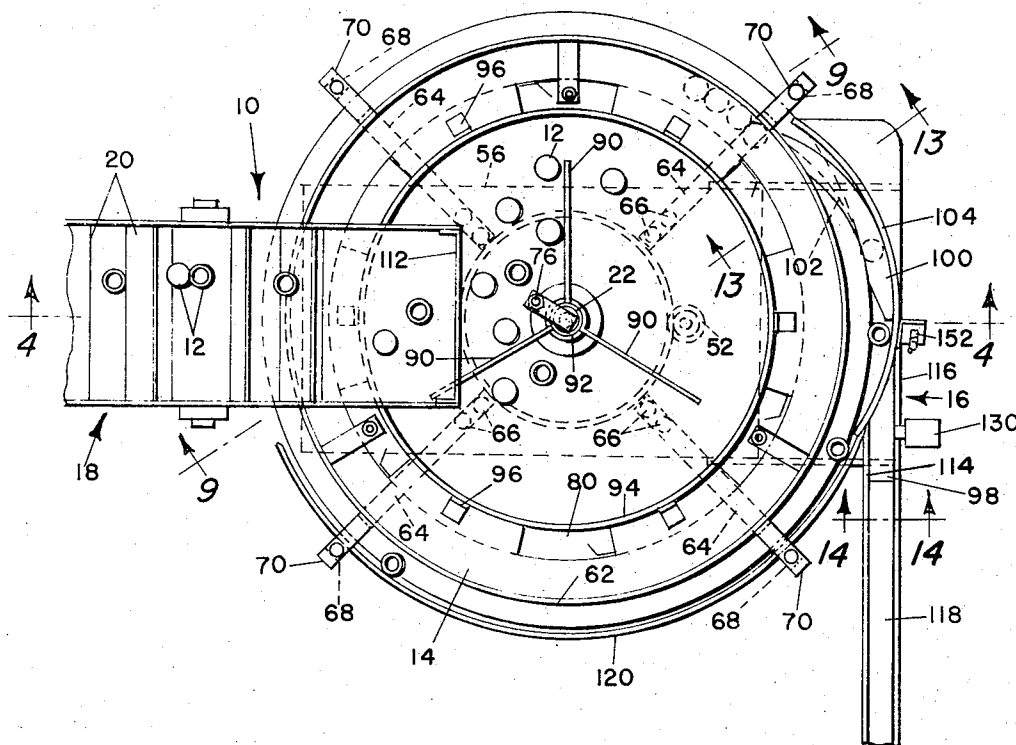
Apparatus particularly adapted for handling spherical closures having a flat portion at its open end wherein the randomly arranged closures are first manipulated to cause them to assume an oriented open end down position on a rotary disk whereupon the closures are aligned and discharged from the disk into a delivery chute. Provision is also made for preventing entrance into the chute of those closures in the line which inadvertently assume an open end up position and for rejecting such closures to be returned to the disk.

[56] **References Cited**

UNITED STATES PATENTS

19 Claims, 23 Drawing Figures

3,277,998 10/1966 Medoff 198/33 AA



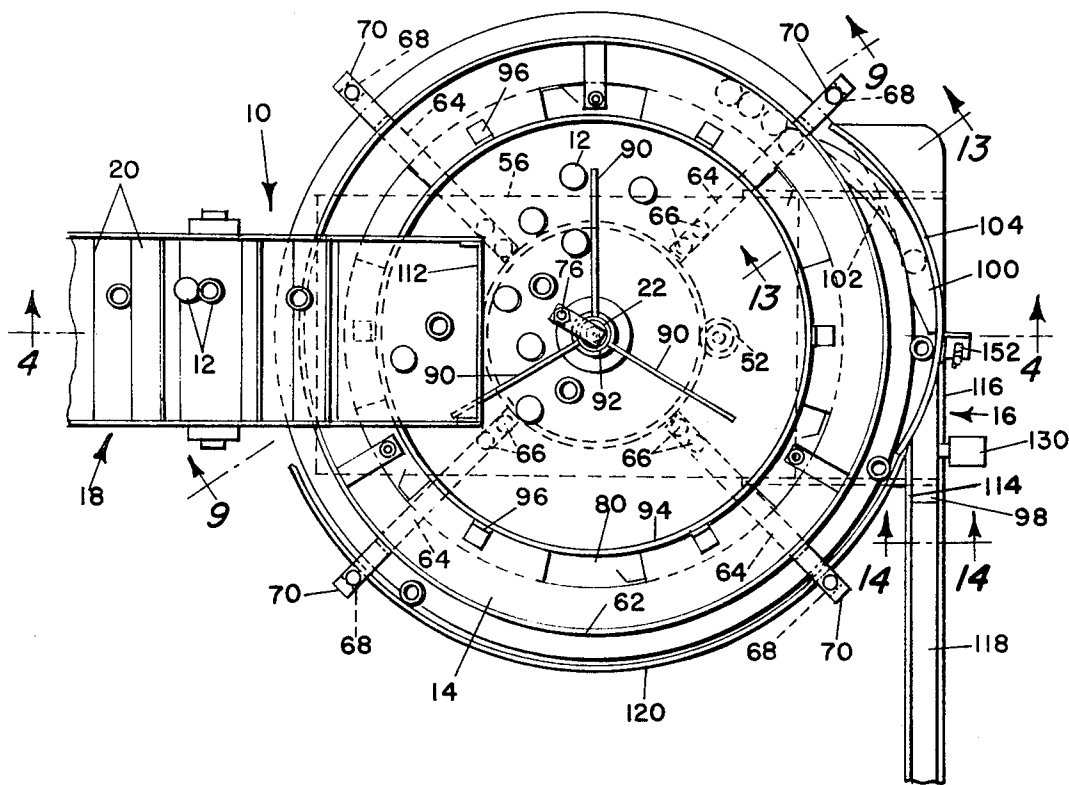


Fig. 1

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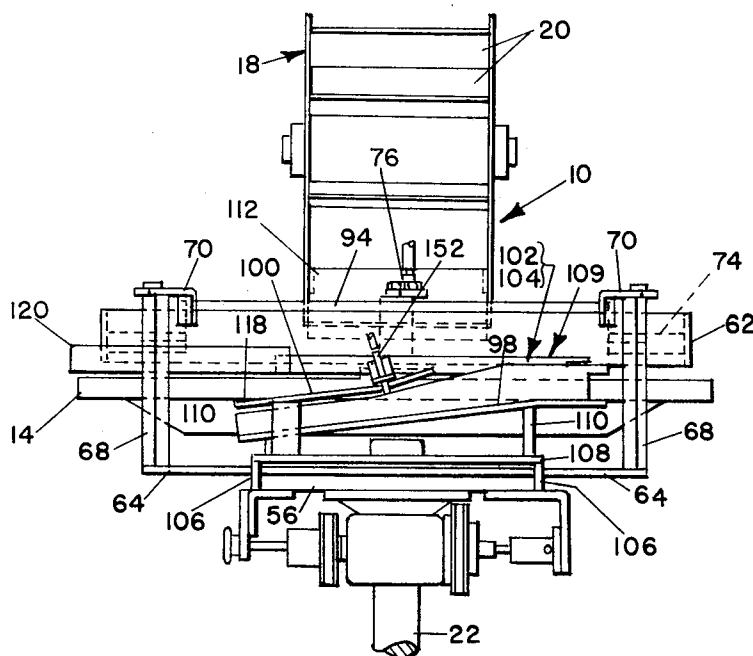


Fig. 2

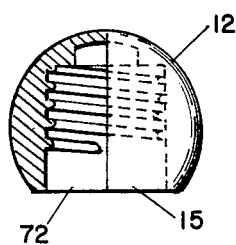


Fig. 3

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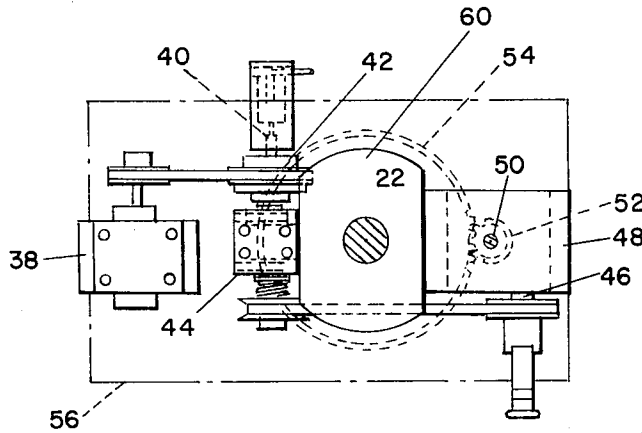


Fig. 4

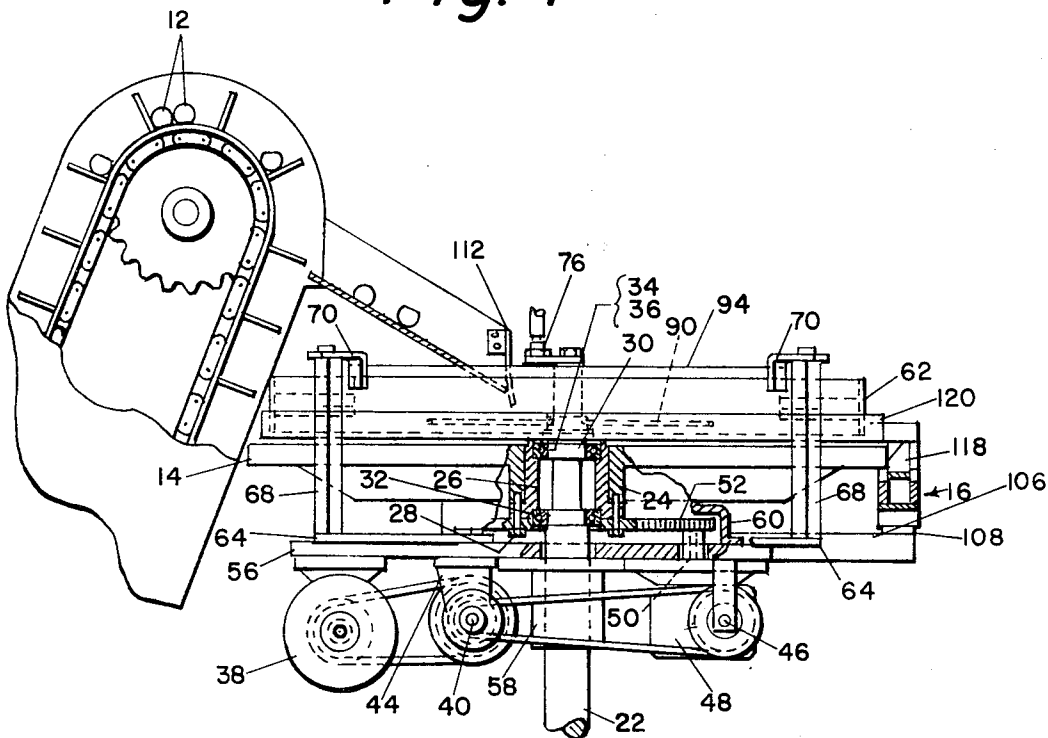


Fig. 5

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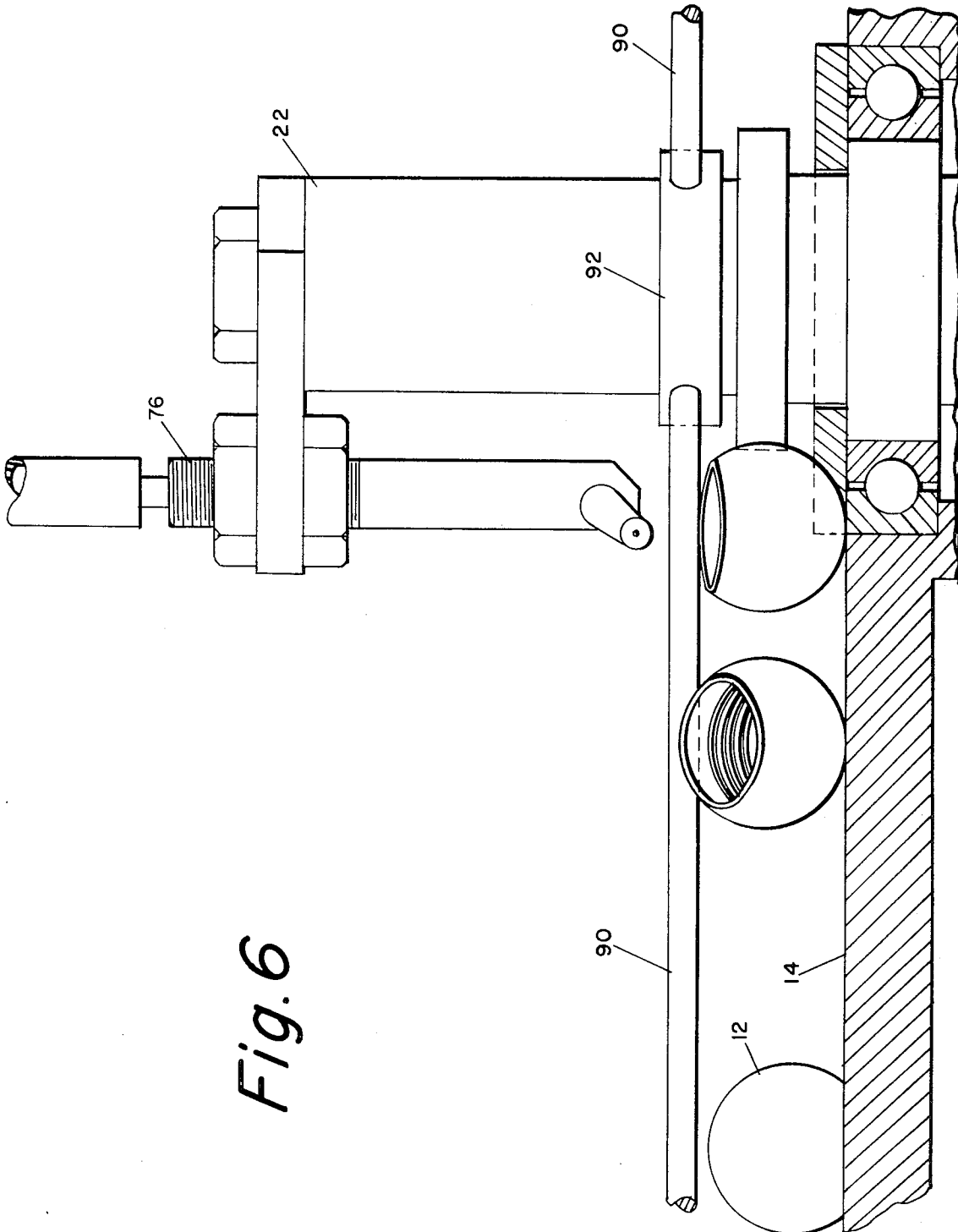


Fig. 7

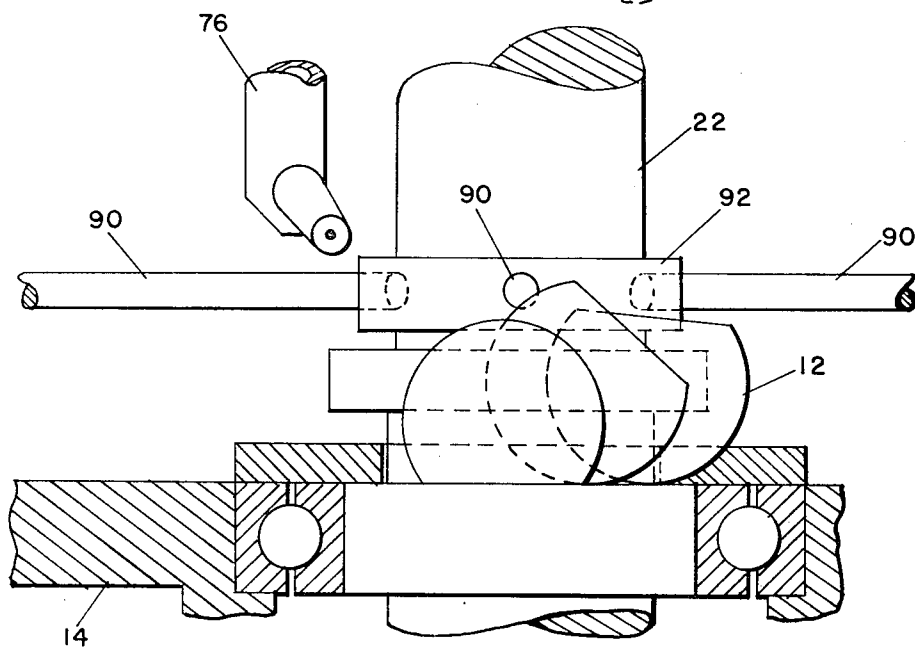
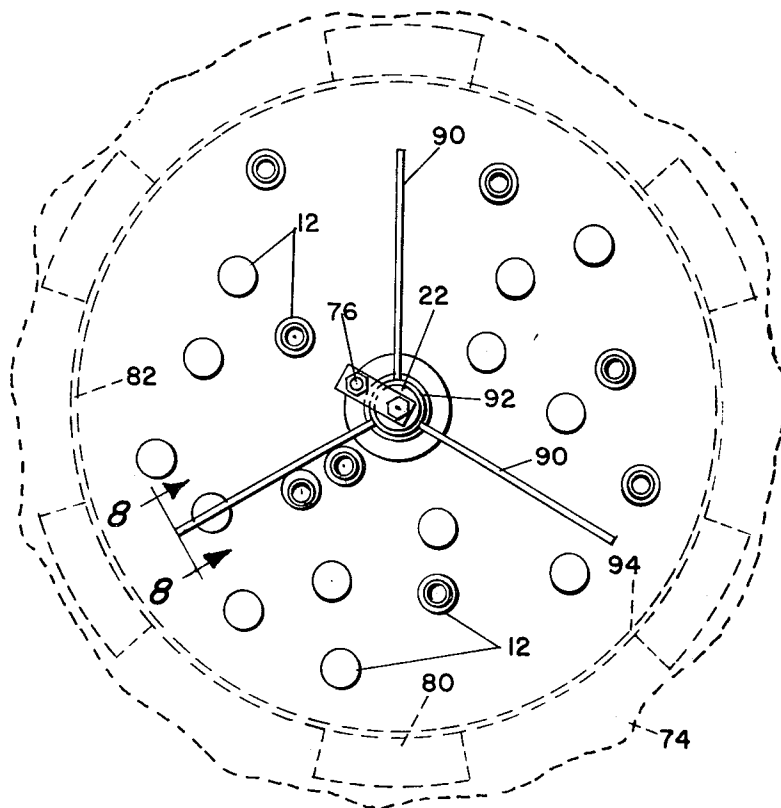


Fig. 8

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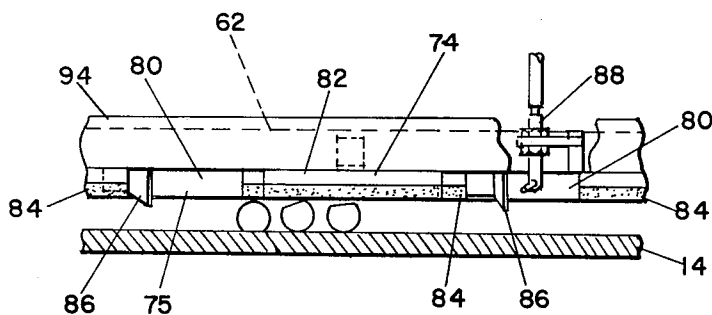


Fig. 9

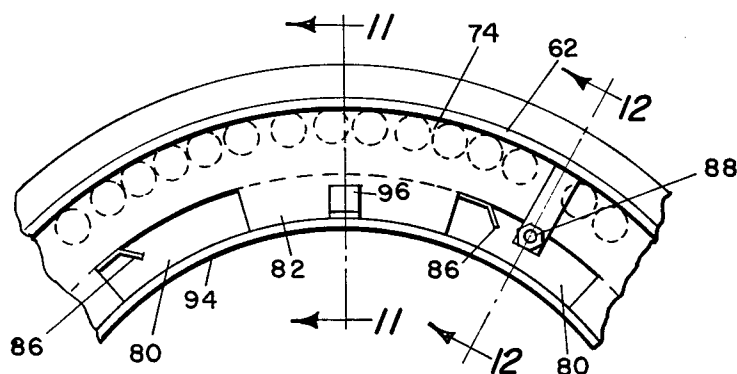
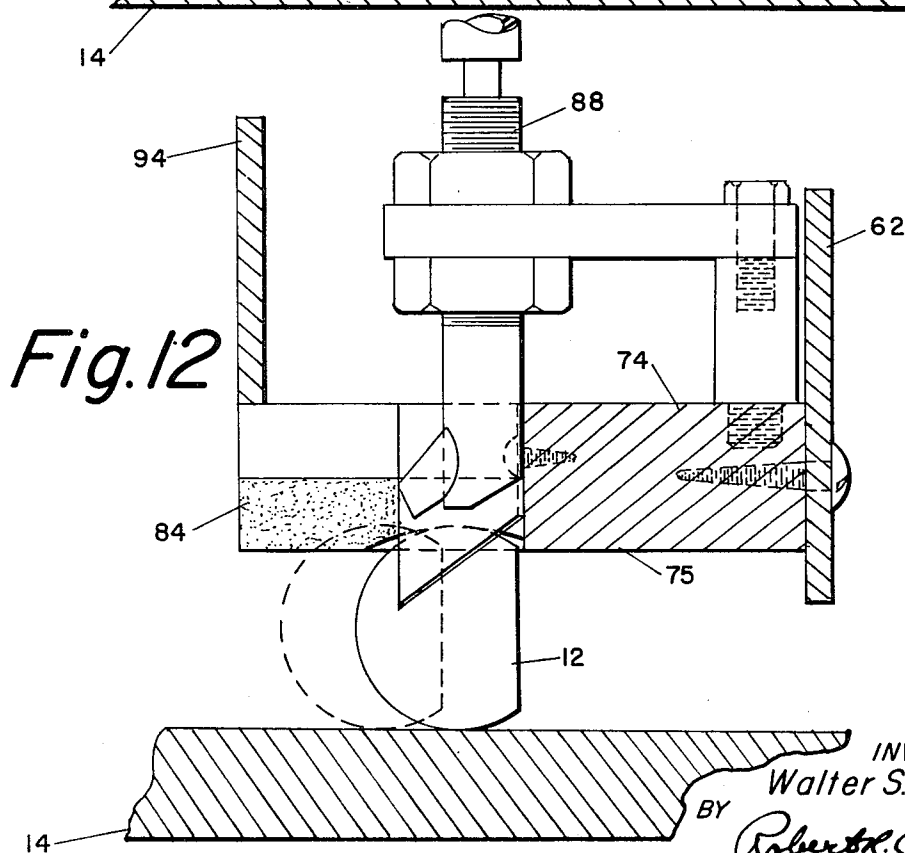
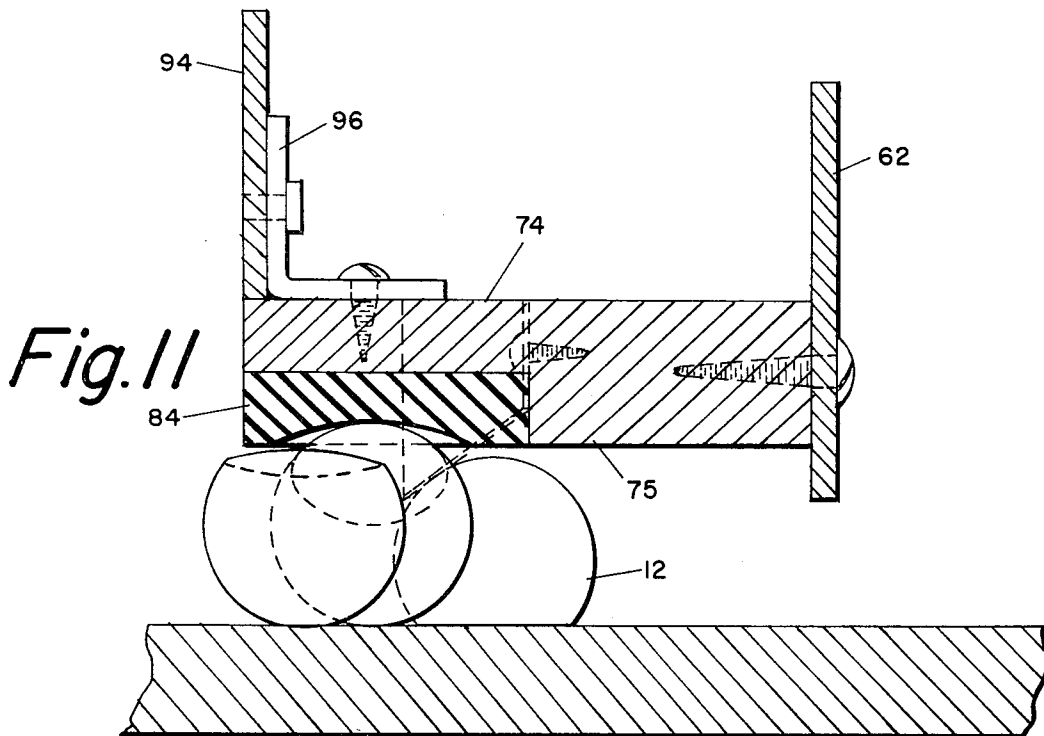


Fig. 10

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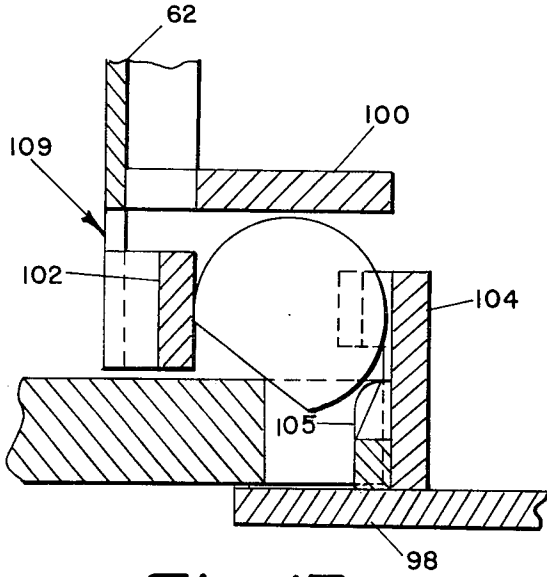


Fig. 13

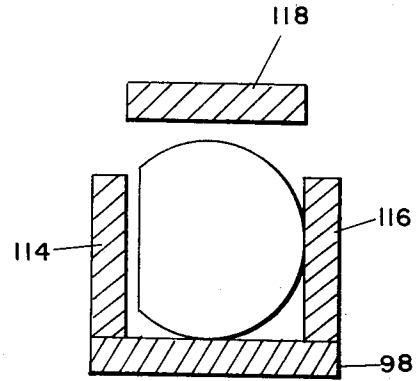


Fig. 14

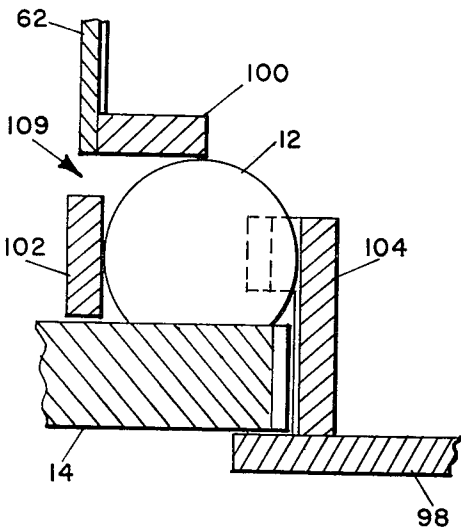


Fig. 15

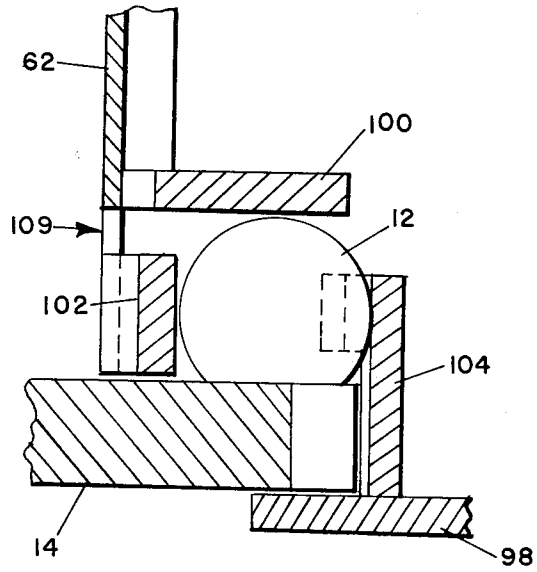


Fig. 16

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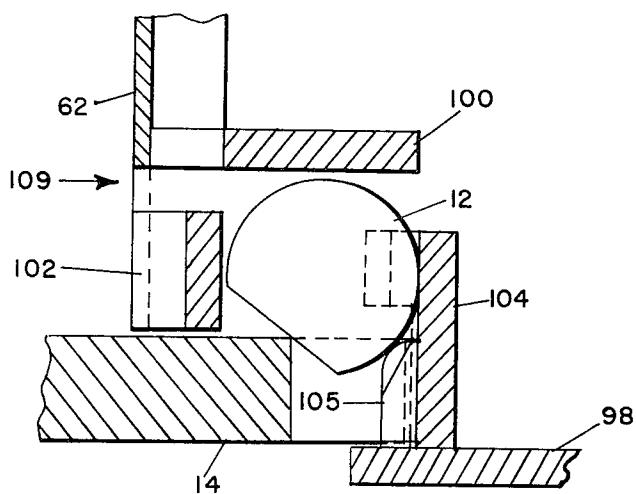


Fig. 17

Fig. 18

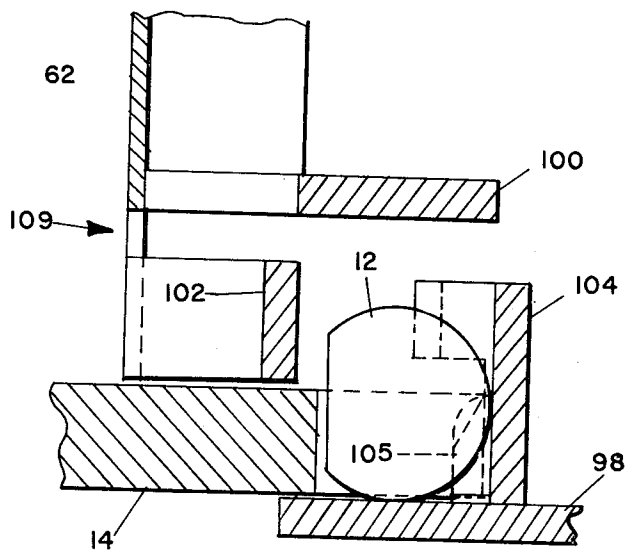
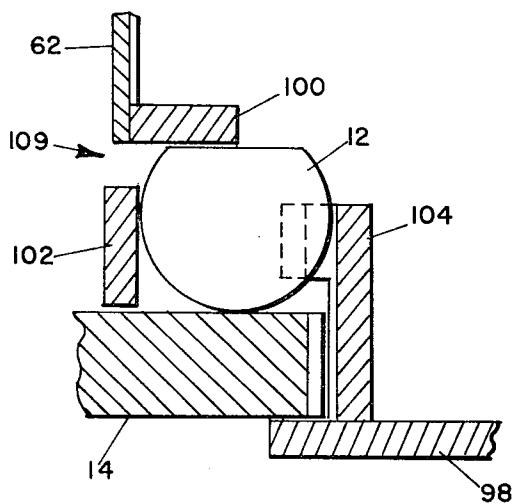


Fig. 19



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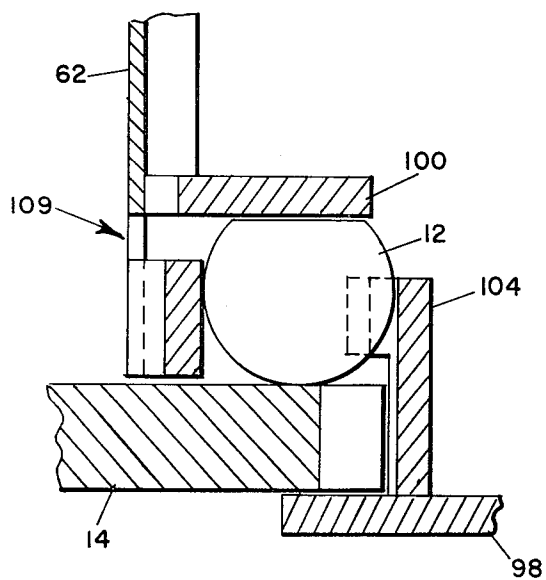


Fig. 20

Fig. 21

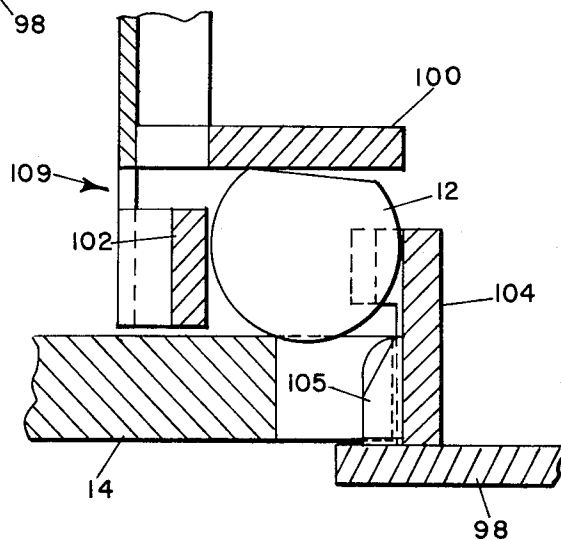
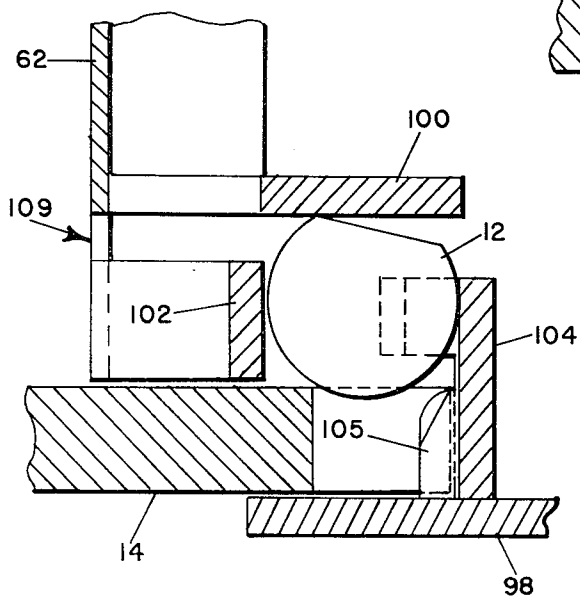


Fig. 22



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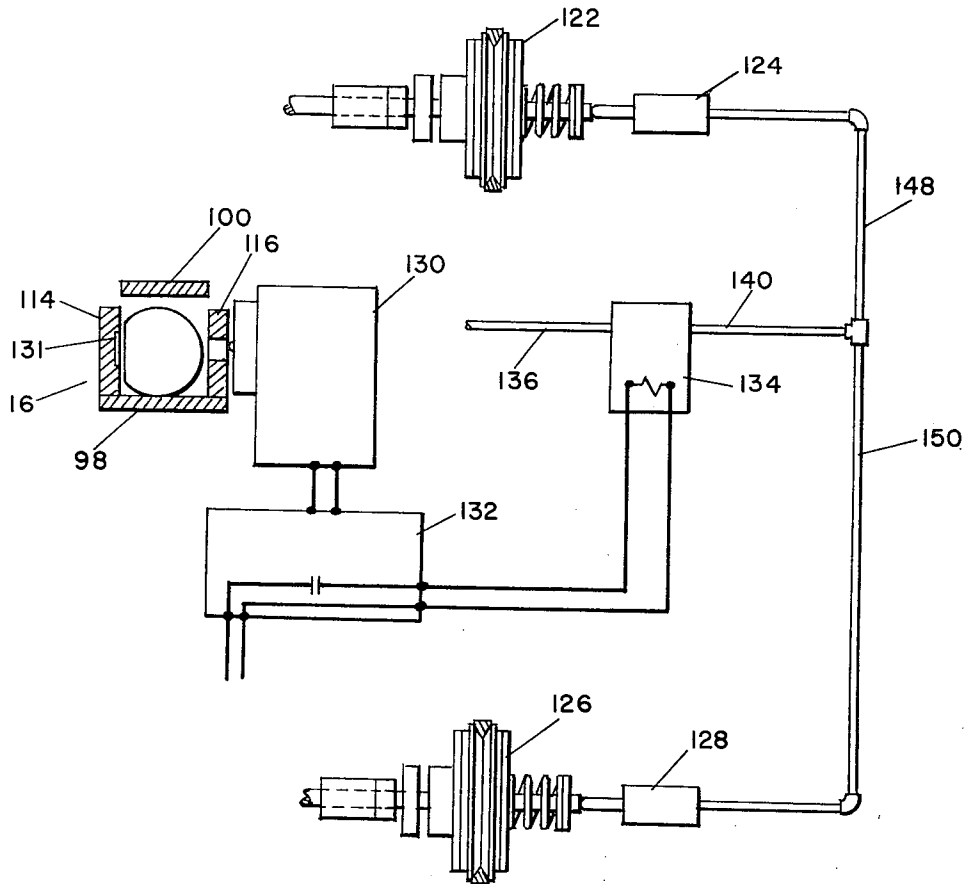


Fig. 23

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CLOSURE HANDLING AND ORIENTING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The apparatus of the type herein illustrated is principally employed in the bottle filling industry wherein the filled bottles are provided with closures. The closure handling apparatus is adapted to sort and align randomly arranged closures which are then deposited into a feed chute in an oriented condition, successive closures being withdrawn from the feed chute for application to the filled bottles.

2. DESCRIPTION OF THE PRIOR ART

Prior closure handling and orienting apparatus adapted to handle randomly arranged closures is illustrated and described in the U.S. Pat. No. 2,715,978, assigned to the present assignee. Such prior apparatus is arranged to handle cylindrical closures which are guided onto an orienting disk adapted to support those closures assuming a predetermined oriented position thereon, and to deposit such closures into a supply chute from which successive closures are withdrawn to be applied to bottles. Any closures assuming a position other than such predetermined oriented position are rejected from the orienting disk. Such prior closure handling apparatus is not particularly adapted to handle spherical closures having a flat face on one side nor is it adapted to handle the closures at a relatively high rate of speed.

SUMMARY OF THE INVENTION

In general, the present invention contemplates novel closure handling apparatus particularly adapted for handling spherical closures, each having a flat face on one end, comprising the open end, and in which provision is made for first orienting randomly arranged closures with the flat ends down on a rotary disk and for then aligning the oriented closures end to end in a circular path to be discharged substantially tangentially from the disk into a delivery chute. Provision is also made for diverting and rejecting such closures as are inadvertently advanced toward the chute in an upside down or flat end up position. Provision is further made for controlling the operation of the orienting apparatus in response to detection of a surplus of closures in the delivery chute.

Accordingly, the invention has for an object to provide novel and improved closure handling apparatus particularly adapted for orienting in a rapid and efficient manner spherical closures having flat portions at their open ends.

The invention has for another object to provide novel and improved apparatus of the character specified having provision for orienting the spherical closures to stand upright on their flattened ends while being moved in a rotary path and for depositing the oriented closures into a delivery chute.

The invention has for a further object to provide novel and improved closure handling and orienting apparatus of the character specified having provision for aligning the oriented closures in a circular path to be transferred to a delivery chute and wherein provision is made for diverting upside down closures from entering said chute.

With these general objects in view and such others as may hereinafter appear, the invention consists in the closure handling and orienting apparatus for spherical closures, each having a flat on one side, and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings illustrating the preferred embodiment of the invention:

FIG. 1 is a plan view of closure handling and orienting apparatus embodying the present invention;

FIG. 2 is a side elevation of the apparatus shown in FIG. 1;

FIG. 3 is a detail view partly in cross section of a closure of the type handled by the present apparatus;

FIG. 4 is a side elevation partly in cross section as seen from the line 4—4 of FIG. 1 showing a portion of the drives;

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

FIG. 6 is a detail view in side elevation of a radially arranged means for orienting a majority of the randomly arranged closures deposited on a rotary disk;

FIG. 7 is a plan view detail of the orienting means shown in FIG. 6;

FIG. 8 is a cross sectional view taken on the line 8—8 of FIG. 7;

FIG. 9 is a detail view in side elevation of a circumferentially arranged orienting structure as seen from the line 9—9 of FIG. 1;

FIG. 10 is a plan view detail of the orienting means shown in FIG. 9;

FIG. 11 is a cross sectional detail view taken on the line 11—11 of FIG. 10;

FIG. 12 is a cross sectional detail view taken on the line 12—12 of FIG. 10;

FIG. 13 is a cross sectional detail view taken on the line 13—13 of FIG. 1 showing the guides for transferring the oriented closures into a delivery chute;

FIG. 14 is a cross sectional detail view taken on the line 14—14 of FIG. 1 showing a different portion of the transfer guides;

FIGS. 15 to 18 are cross sectional views diagrammatically illustrating the transfer of an oriented closure from the disk to the supply chute;

FIGS. 19—22 are similar views illustrating how a non-oriented closure is caused to remain on the disk; and

FIG. 23 is an elementary wiring diagram of the control means including an air circuit embodying solenoid operated air valves.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings and particularly to FIGS. 1 and 2, the closure handling and orienting apparatus therein illustrated comprises in general: a guide chute 10 from which randomly arranged closures 12 are delivered; a rotary carrier disk 14 which is mounted to rotate in a horizontal plane and which is arranged to receive the randomly arranged closures 12; and a supply chute 16 arranged to receive oriented closures from the disk, and from which successive closures are withdrawn for application to containers.

The randomly arranged spherical closures 12 having flat portions 15 at their open ends, see FIG. 3, are delivered to the apparatus in controlled amounts by an upright elevating conveyor 18 which is provided with a plurality of equally spaced flights 20. The outer run of the conveyor is arranged to cooperate with a bulk supply hopper associated therewith, not shown, to pick up the closures on the flights 20 as the outer run passes through the bulk supply hopper. In operation, when the closures are carried over the upper end of the conveyor, they fall off the flights 20 and are guided by the chute 10 onto the rotary carrier disk 14. The upright elevating conveyor 18 may comprise the conveyor illustrated and described in the U.S. Pat. to Sterling, No. 3,079,042, to which reference may be made for a more detailed description thereof.

As herein illustrated, the rotary carrier disk 14 is supported for rotation about a central stationary post 22 suitably supported in the machine frame. A depending hub 24 of the disk is provided with a sleeve 26 secured to the hub 24 by bolts 28. The sleeve 26 is provided with ball bearings 30, 32, the lower bearing 32 resting on a shouldered portion of the central post 22. A lock washer 34 and nut 36 threadedly carried by the post 22 engage the upper ball bearing 30 as shown.

The carrier disk 14 is arranged to be rotated through connections from a motor 38 belted to one end of a drive shaft 40 having a normally engaged clutch 42 associated therewith. The shaft 40 is journaled in a bracket 44, and the other end of the clutch shaft is belted to the input shaft 46 of a speed reducing unit 48. The output shaft 50 of the speed reducing unit is provided with a pinion 52 which is in mesh with a gear 54 connected to the lower end of the sleeve 26 by the bolts 28. The motor 38, bracket 44 and speed reducing unit 48 are attached to the underside of a mounting plate 56 supported on the post 22 by a flanged hub 58. A casing 60 mounted on top of the plate 56 encloses the gearing. In operation, the disk 14 is arranged to be rotated in a clockwise direction at a relatively slow speed in the neighborhood of 50 R.P.M., arranged to be varied as required.

As herein shown, a circular stationary guard rail 62 is supported above the horizontal rotary disk 14. The rail 62 is supported from the mounting plate 56 by four equally spaced radially extending bars 64 bolted to the plate 56. Each radial bar carries an upright bar 68 at its outer end and the upper end of each upright bar carries an angle member 70 to which the guard rail 62 is bolted. In practice, the guard rail serves to retain the closures on the disk, and provides a guide to form a circular row of oriented closures to be deposited in the chute 16. As illustrated in FIG. 3, the screw closure 12 handled by the present apparatus comprises a spherical closure having a flat 15 at its open end, the opening 72 being threaded for application to a container. It will thus be seen that the height or distance from the flat to the top of the sphere is less than the width or diameter thereof. This difference in dimensions is taken advantage of to effect sorting and orientation of the closures with their flattened open ends down, provision being further made for rejecting those closures which assume an upside down position, that is, with their flattened ends up.

In accordance with the present invention, the means for sorting the open end down closures from those resting on their spherical surfaces and for effecting orientation of the latter to cause them to assume an open end down position includes an annular member 74 supported by and extended inwardly from the inner face of the guard rail 62. The lower face 75 of the annular member 74 is parallel to the upper face of the carrier disk 14 and is spaced therefrom a distance such as to provide a clearance of about 1/16 inch for an oriented closure to enter thereunder, as illustrated in FIG. 11, while preventing entrance thereunder of those closures resting on a spherical portion thereof. The guard rail 62 may be adjusted vertically relative to the angle members 70 to provide the desired clearance. Thus, in operation, all of the randomly arranged closures 12 deposited on the rotary carrier disk 14 which happen by chance to land on their flattened ends will be free to move under the annular member 74 by centrifugal action to form a circular row thereof aligned against the inner face of the guard rail 62. In the event that the rotation of the carrier disk 14 is too slow to create a centrifugal action, one or more air jets 76 may be provided to assist movement of the closures radially outwardly.

Provision is made for orienting those closures 12 on the disk 14 which fall on their spherical surfaces by causing them to roll until they rest on their flattened portions to assume an upright position. As illustrated in FIGS. 9, 10 and 11, the inner periphery of the annular member 74 is provided with a plurality of equally spaced cutouts 80 leaving curved segments 82 extending between the cutouts 80. Each segment 82 is recessed on its underside to receive a resilient layer 84 of sponge rubber, neoprene, or the like. The resilient layer 84 extends the width of each segment 82 and is adhesively or otherwise secured to each cutout. The undersurface of the resilient layer 84 is flush with the underside of the outer rigid portion of the annular member.

In operation, since the height or diameter of the spherical portion of the closure 14 is greater than the height of an upright closure, it will be seen that when a non-oriented closure is moved outwardly on the disk 14, it will engage under the resilient layer 84 of one of the segments to cause it to roll between the surface of the disk and the resilient layer until it assumes an upright position whereupon it is clear of the resilient layer and is free to move outwardly under the rigid portion of the annular member and against the wall 62 into alignment with other oriented closures arranged in a circular path.

In practice, it sometimes happens that an unoriented closure may roll between the carrier disk 14 and the resilient layer 84 of a segment 82 without ever assuming a position where it will stand upright on its flattened portion. When this occurs, the closure will roll out from under its segment 82 into a cutout portion 80. At this point, a leaf spring 86 is positioned such as to engage and guide the unoriented closures back onto the inner portion of the rotary disk where they are subjected to jostling and rolling contact with other closures tending to cause them to assume an oriented position. Those closures urged outwardly which initially enter the cutout portions 80 will pass under the rigid portion of the

annular member 74 if they are oriented with their flatted side down, those resting on a spherical surface being unable to enter thereunder. Such unoriented closures are urged inwardly at spaced points around the disk 14 by air jets 88 carried by the annular member 74 and supported adjacent alternate cutout portions 80 as shown.

In practice, the randomly arranged closures deposited on the disk may fall either with their flatted open ends up so as to rest on a spherical portion, or may land on their flatted surfaces. In any event, provision is made for effecting preliminary conditioning of the closures to cause the majority thereof to assume an oriented position with their open and flatted ends down prior to being moved under the annular sorting and orienting member 74. As herein shown, see FIGS. 6, 7 and 8, a plurality of radially extended rods 90, herein shown as three rods, are carried by a collar 92 secured to the upper end of the central supporting post 22. The height of the rods from the surface of the disk to the underside of the rods is such as to provide about 1/16 inch clearance above a closure resting on its flatted side. Thus, the oriented closures are free to pass under the rods and outwardly under the annular member 74 as described. However, those closures which assume a position resting on their spherical surfaces cannot pass under the rods and will be caused to roll when carried by the disk 14 into engagement with the rods 90 by rotation of the carrier disk. This rolling or spinning movement will cease when the closure is rolled onto its flatted side whereby to effect orientation of a majority of the closures deposited on the disk to permit them to pass under the annular member 74 and against the circular wall 62 preparatory to transfer from the rotary disk to the supply chute 16. In operation, the randomly arranged closures supplied by the elevating conveyor 18 flow down the chute 10 by gravity to land on the disk 14. In order to prevent the closures from bouncing or from being otherwise displaced from the disk 14, an inner circular guard ring or wall 94 is provided. The ring 94 is supported by angle members 96 secured to the inner marginal edge of the annular member 74. In practice, the closures are preferably deposited at the center of the disk and in order to reduce the impact of the free flowing closures from the chute 10 onto the disk, the discharge end of the chute may be provided with a flexible and resilient baffle plate 112 against which the closures strike before falling onto the disk.

As illustrated in FIGS. 1 and 2, the supply chute 16 includes a bottom rail 98, top rail 100 and side rails 102, 104 supported from the mounting plate 56, which latter is provided with longitudinally extended side bars 106 secured to opposite sides of the plate. A tie bar 108 connects the outer ends of the side bars. Upright members 110 which are attached to the tie bar 108 serve to support the upper end of the chute. In practice, the closures pass between the side rails 102, 104 and through an opening 109 in the guard rail 62 to enter the chute 16.

In operation, as shown in FIGS. 15 to 18, the oriented closures being moved in a circular path along the inside of the rail 62 are guided between the side rails 102, 104 and the top rail 100 outwardly toward the edge of the rotary disk 14. Each upright closure is confined between the disk 14 and the rails 100, 102,

104 until it reaches a point where it overhangs the edge of the disk to an extent such as to cause it to become overbalanced whereupon the closure tips sideways, as shown in FIG. 17, rocking and sliding on its flatted surface with its spherical surface against the side rail 104 until it drops down on edge by gravity between the disk 14 and the outer side rail 104 to land sideways on the bottom rail 98, see FIG. 18. A shelf portion 105 on the inside of the side rail 104 is provided to support the closure during its rocking movement until it reaches the bottom rail as shown. It will be observed that the inner and outer rails 102, 104 gradually curve outwardly until sufficient space is provided between the edge of the disk and the outer rail 104 for the closure to fall therebetween on its side, that is, with its axis in a horizontal position, and thereafter the rails 102, 104 gradually curve inwardly while the oriented closures released from the disk are guided between side rails 114, 116, bottom rail 98 and top rail 118 as illustrated.

Referring again to FIGS. 11 and 12, it will be seen that it is possible for an upside down open end up closure to pass under the annular member 74, particularly if it is supported in such position by adjacent open end down closures passing thereunder. In operation, such upside down closures amount to only 3 or 4 percent of the total number of closures deposited on the disk 14, and such open end up closures follow along with the open end down closures between the side guides 102, 104 and top rail 100. However, when the upside down closure with its flatted side up arrives at the point where an oriented closure would pass through between the marginal edge of the disk and the outer rail 104, the flatted upper end will engage the underside of the top rail 100 and thereby prevent rocking and overbalancing thereof. As a result, the upside down closure will remain on the edge of the disk and will be diverted from the entrance to the chute by the rails 102, 104 which curve inwardly as described. The upside down closures thus rejected are carried along the marginal edge of the disk between the rail 62 and an outer rail 120 until they reach a point where the outer rail is discontinued whereupon the closure will fall off the edge of the disk to be guided back to the supply where it may be received on one of the flights 20 of the upright conveyor 18 to be returned to the disk 14.

Provision is made for controlling the operation of the apparatus by discontinuing rotation of the carrier disk 14 and simultaneously discontinuing operation of the upright supply conveyor 18 when the supply of oriented closures exceeds the demand therefor as indicated by an accumulation of closures in the chute up to and beyond a predetermined point in the chute. As diagrammatically illustrated in FIG. 23, the drive to the upright conveyor 18 includes a clutch 122 which is normally held in its engaged position by an air cylinder 124, and the drive to the carrier disk 14 includes a clutch 126 which is normally held in its engaged position by an air cylinder 128.

As further shown in FIG. 23, the control means includes a retroreflective photoelectric unit 130 arranged to scan successive closures passing into the chute 16. The photoelectric unit 130 cooperates with a reflective spot 131 on the inside surface of the side rail 114 and is operatively connected to a relay 132. The relay is also connected to a normally open solenoid air valve 134.

An air line 136 leading from a regulated source of compressed air is connected to the inlet side of the valve 134. The outlet side of the valve is connected to a line 140 which in turn is connected by lines 148, 150 to the air cylinders 124, 128 associated with the clutches 122, 126 respectively.

In operation, successive oriented closures which enter the chute 16 are arranged to be rapidly advanced along the chute by an air jet 152 until they engage the endmost closure in the line. In the event that a surplus of closures is provided, that is, if the supply exceeds the demand, the closures will back up and accumulate to a point beyond the photoelectric unit 130 so as to cut off the light beam to the reflective spot 131 for a predetermined length of time. When this occurs, the normally open solenoid valve 134 is caused to be closed to cut off the air through lines 140, 148, 150 leading to the cylinders 124, 128, respectively, thus permitting disengagement of the clutches 122, 126 to discontinue operation of the elevator conveyor 18 and the rotary carrier disk 14. It will be understood that normally only a slight delay in supplying closures to the chute is sufficient to reduce the number of closures in the chute during continued withdrawal of closures therefrom whereupon the solenoid air valve 134 will return to its normally open condition to effect engagement of the clutches and to resume feeding of the closures into the chute.

It will be further understood that although the photoelectric unit 130 is activated by cutting off the reflection from the spot 131, the relay 132 may be adjusted so as to permit passage of successive individual spaced closures through the chute without activating the relay. It will also be understood that in the illustrated embodiment of the invention, the oriented closures in the circular path on the disk 14 pass into the chute in a continuous line. For this reason, the air jet 152 is provided to effect separation of successive closures as they enter the chute. Thus, the relay will not be activated until the line in the chute backs up to a point where the reflection from the spot 131 is cut off for a time longer than the passing of an individual closure.

From the above description it will be seen that the present closure handling apparatus is particularly adapted for handling spherical closures having a flat surface on one side in a rapid and efficient manner and which provides novel and efficient means for orienting the closures.

While the oriented closures assume an on edge or sidewise position, that is, with their axes in a horizontal position in the chute, it will be understood that by twisting or otherwise fashioning the chute, the closures may be caused to assume any desired position when they reach the discharge end of the chute for application to a container.

Having thus described the invention, what is claimed is:

1. Article handling and orienting apparatus adapted to handle spherical articles having a flat portion at one end, in combination, a rotary disk upon which randomly arranged articles are deposited to be urged radially outward, a circular retaining wall cooperating with said disk and against which oriented articles resting on their flat surfaces are urged to provide a circular row, a stationary annular member disposed above the mar-

ginal edge of said rotary disk providing clearance to permit passage thereunder of oriented articles resting on their flat surfaces, and means associated with said annular member for effecting orientation of those articles resting on their spherical surfaces.

2. Closure handling and orienting apparatus adapted to handle spherical closures open at one end and having a flat portion at its open end, in combination, a rotary disk upon which randomly arranged closures are deposited to be urged radially outward, a circular retaining wall cooperating with said disk and against which oriented closures resting on their flat surfaces are urged to provide a circular row, a stationary annular member disposed above the marginal portion of said disk and spaced therefrom to permit passage thereunder of oriented closures resting on their flat surfaces, the underside of said annular member having resilient portions engageable with those closures resting on their spherical surfaces to cause them to roll until they rest on their flat surfaces.

3. Apparatus as defined in claim 2 wherein the closures are urged outwardly by centrifugal force, and air jets arranged to assist in effecting said outward movement.

4. Closure handling and orienting apparatus as defined in claim 2 which includes means for preorienting a majority of the closures deposited on the disk adapted to effect rolling of those closures resting on their spherical surfaces to cause them to rest on their flat surfaces.

5. Closure handling and orienting apparatus as defined in claim 2 which includes means for preorienting a majority of the closures deposited on the disk, said preorienting means comprising radially extended stationary rods from the center of said disk providing vertical clearance for closures resting on their flat surfaces and effecting rolling of those closures resting on their spherical surfaces.

6. Closure handling and orienting apparatus as defined in claim 2 wherein said annular member is provided with cutout areas at the inner periphery thereof leaving spaced segmental portions, said segmental portions having the resilient material on the underside thereof.

7. Closure handling and orienting apparatus as defined in claim 6 wherein provision is made in said cutout areas for diverting toward the center of the disk those closures which fail to assume an oriented position before coming out from under a segmental portion.

8. Closure handling and orienting apparatus as defined in claim 6 which includes air jets directed to return toward the center of the disk those closures disposed in selected of said cutout areas.

9. Closure handling and orienting apparatus adapted to handle spherical closures open at one end and having a flat portion at its open end, in combination, a rotary disk upon which randomly arranged closures are deposited to be urged radially outward, a circular retaining wall cooperating with said disk and against which oriented closures resting on their flat surfaces are urged to provide a circular row, a stationary annular member disposed above the marginal portion of said disk and spaced therefrom to permit passage thereunder of oriented closures resting on their flat surfaces, the underside of said annular member having

resilient portions engageable with those closures resting on their spherical surfaces to cause them to roll until they rest on their flat surfaces, and means for preorienting a majority of the closures deposited on the disk comprising radially extended stationary rods from the center of said disk providing clearance for oriented closures and effecting rolling of those closures resting on their spherical surfaces.

10. Closure handling and orienting apparatus adapted to handle spherical closures open at one end and having a flat portion at its open end, in combination, a rotary disk upon which randomly arranged closures are deposited to be urged radially outward, a circular retaining wall cooperating with said disk and against which oriented closures resting on their flat surfaces are urged to provide a circular row, means for orienting those closures resting on their spherical surfaces, a feed chute, means for transferring oriented closures from said circular row into said feed chute, and means for diverting from said row those closures having their flat sides up.

11. Apparatus as defined in claim 10 which includes a bulk supply of closures, and means for returning the diverted closures to said bulk supply.

12. Apparatus for handling spherical closures having a flat on one side comprising, in combination, a bulk supply of closures, a carrier disk mounted to rotate in a horizontal plane and onto which randomly arranged closures are deposited from said supply, a retaining wall cooperating with said disk and against which upright closures with their flat ends up or down are aligned to provide a circular row, a stationary annular orienting member disposed above and cooperating with said disk arranged to bar entrance thereunder those closures assuming an upright position with their flat ends down, a feed chute, means for transferring from said circular row into said feed chute those closures having their flat ends down, and means for diverting from said circular row those closures having their flat ends up to be returned to said bulk supply.

13. Apparatus as defined in claim 12 which includes means for feeding closures from said bulk supply onto said disk, means for driving said feeding means, means for rotating said carrier disk, and control means responsive to an accumulation of closures beyond a predetermined point in the chute for discontinuing operation of said feeding mean and said disk.

14. Apparatus as defined in claim 13 herein the closures are transferred to the chute in a continuous line and wherein the control means includes a photoelectric detecting unit and a relay in circuit therewith arranged

to permit individual closures to pass said predetermined point without activating said unit, and an air jet operative to rapidly advance successive foremost closures in the continuous line to cause rapid passage of individual closures by said photoelectric unit during normal operation.

15. Apparatus for handling spherical articles having a flat at one end comprising, in combination, a rotary carrier disk upon which randomly arranged articles are deposited, a circular retaining wall cooperating with said disk, said articles being moved radially outward toward said wall during rotation of the disk, means disposed in the path of said outwardly moving articles for barring movement to said wall of those articles resting on their spherical surfaces while permitting passage of oriented articles resting on their flat ends to provide a circular row of articles against said wall, a supply chute, and means for transferring oriented articles from said circular row to said supply chute.

16. Apparatus as defined in claim 15 which includes means for preventing entrance into said chute of those articles which inadvertently assume a flat end up position in said circular row.

17. Apparatus as defined in claim 16 wherein the means in the path of the articles comprises an annular member disposed above the disk, the underside of said member comprising a resilient material arranged to effect rolling and orientation of those articles resting on their spherical surfaces.

18. Closure handling and orienting apparatus adapted to handle spherical closures open at one end and having a flat portion at its open end, in combination, a rotary disk upon which randomly arranged closures are deposited to be urged radially outward, a circular retaining wall cooperating with said disk and against which oriented closures resting on their flat surfaces are urged to provide a circular row, and stationary means cooperating with said rotary disk adapted to effect rotation of those closures resting on their spherical surfaces to cause them to rest on their flat surfaces.

19. Apparatus for handling spherical articles having a flat at one end comprising in combination, a rotary carrier disk upon which randomly arranged articles are deposited, a circular retaining wall cooperating with said disk, said articles being moved radially outward toward said wall during rotation of the disk, and stationary means cooperating with said rotary disk and engageable with the tops of the articles resting on their spherical surfaces to cause them to roll until they rest on their flat surfaces.

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