May 14, 1946. J. HOHL ET AL 2,400,419

CAP ARRANGING DEVICE

Filed April 18, 1944 5 Sheets-Sheet 1

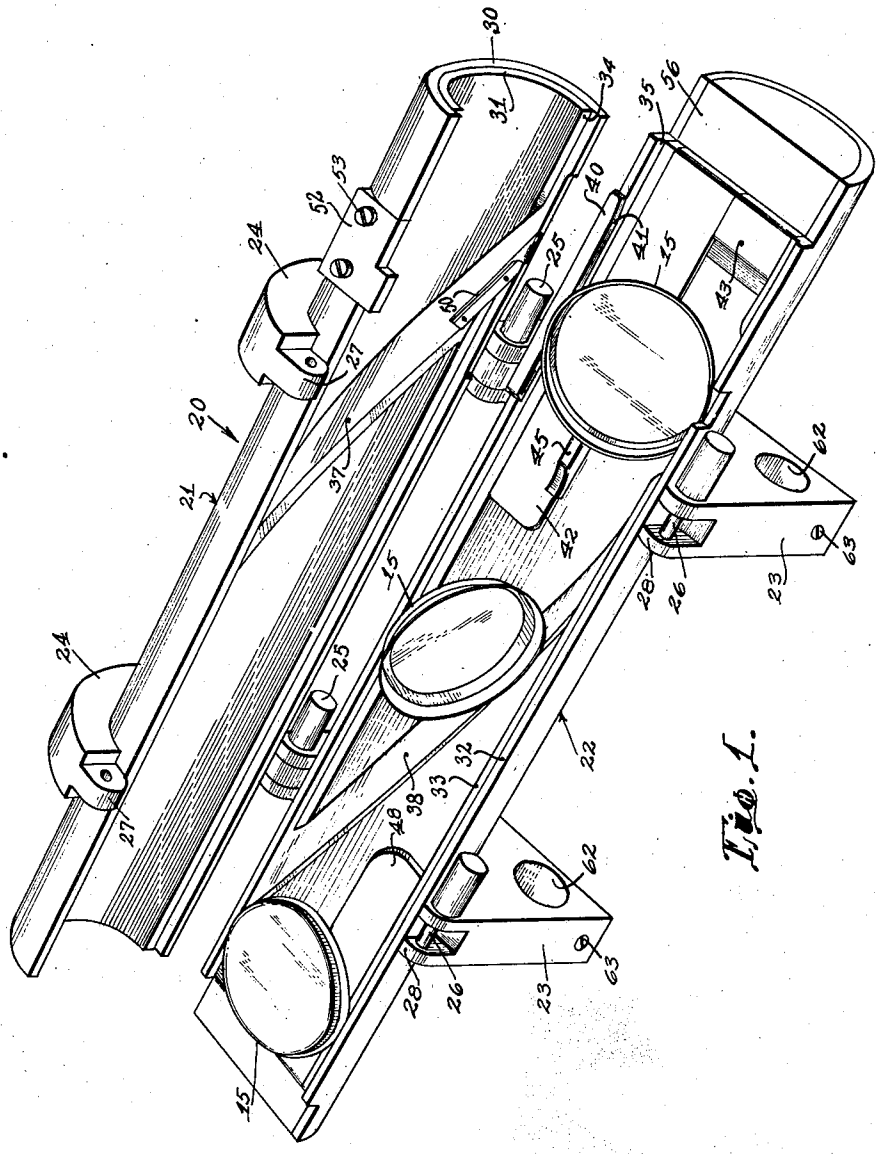


Fig. 1.

Inventors
JOHN HOHL
LEON KLATT

By Rule and Hoge,

Attorneys

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CAP ARRANGING DEVICE

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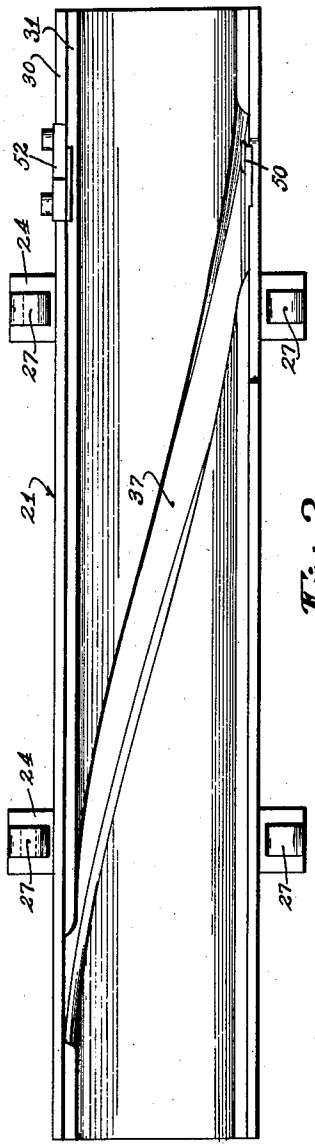


Fig. 2.

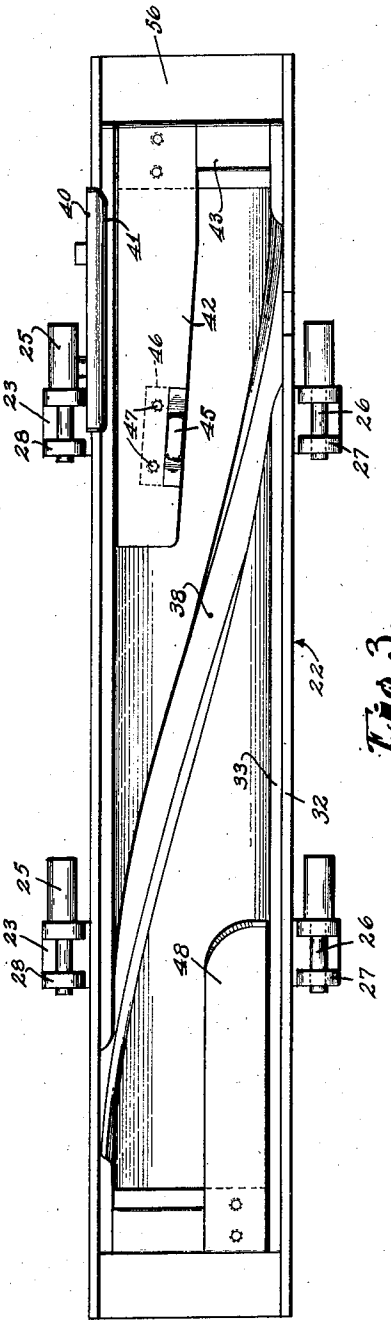


Fig. 3.

Inventors
JOHN HOHL
LEON KLATT

By Rule and Hoge,
Attorneys

May 14, 1946. J. HOHL ET AL 2,400,419

CAP ARRANGING DEVICE

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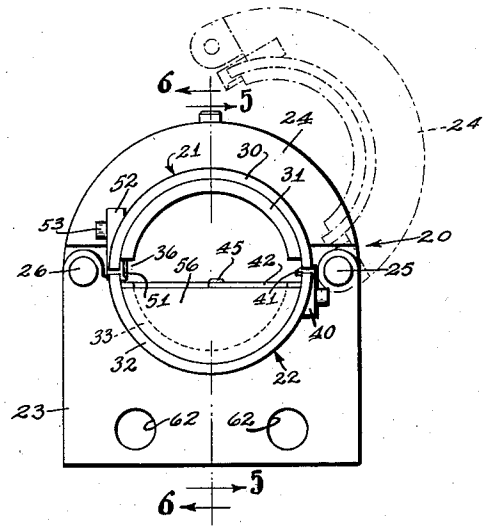


Fig. 4.

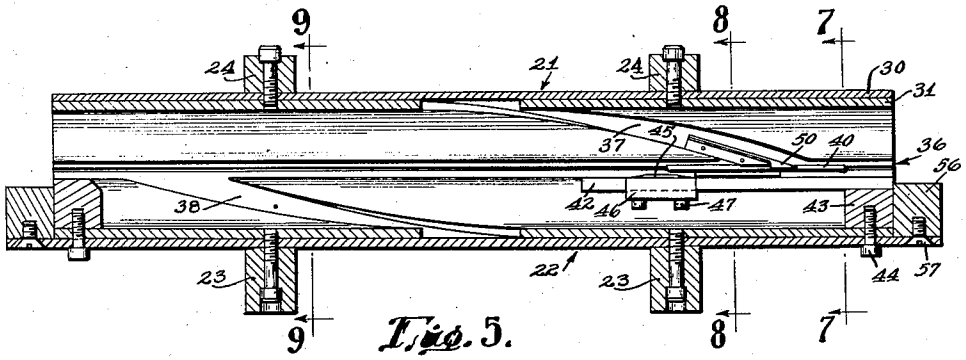


Fig. 5.

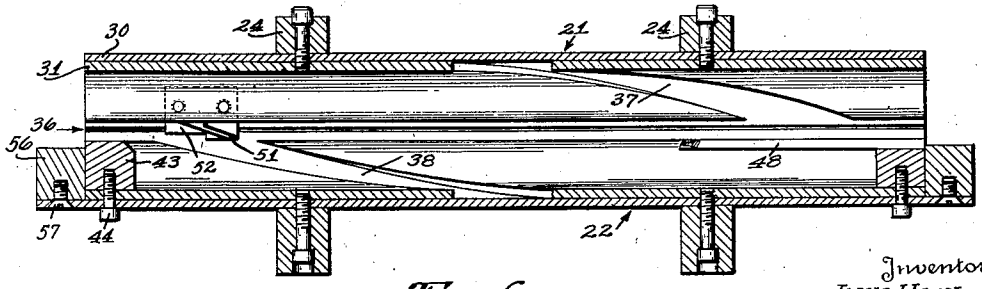


Fig. 6.

Inventors
JOHN HOHL
LEON KLATT

By Rule and Hoge.

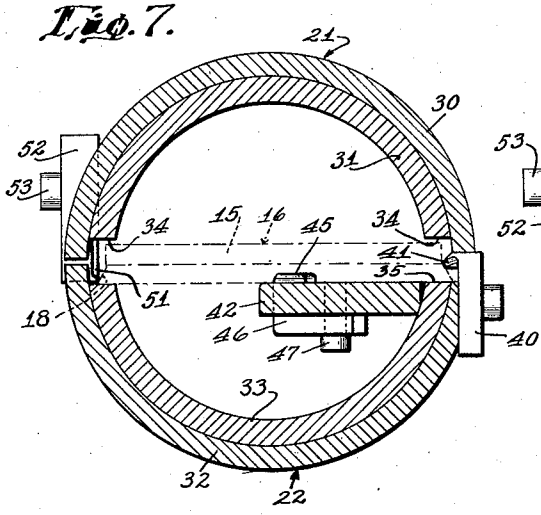
Attorneys

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CAP ARRANGING DEVICE

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Fig. 7.



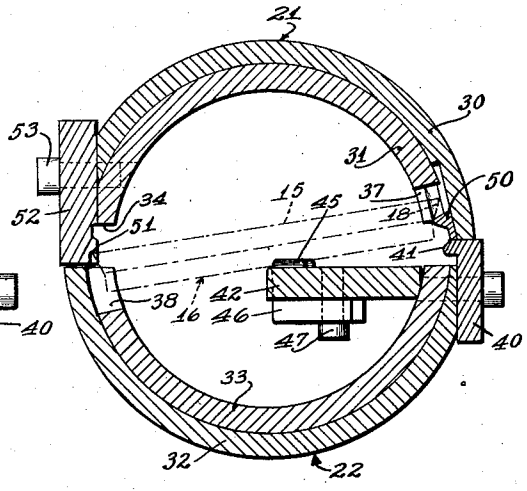


Fig. 8.

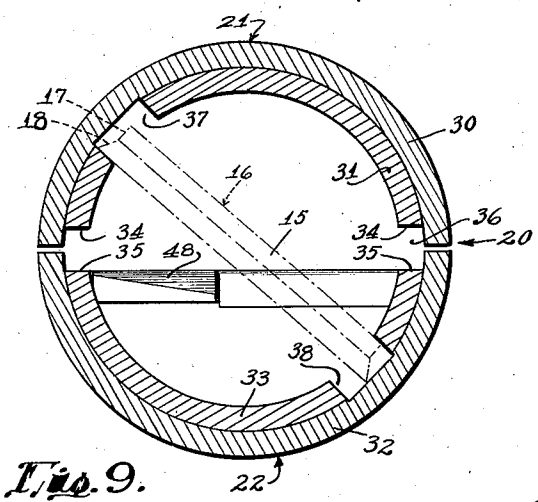


Fig. 9.

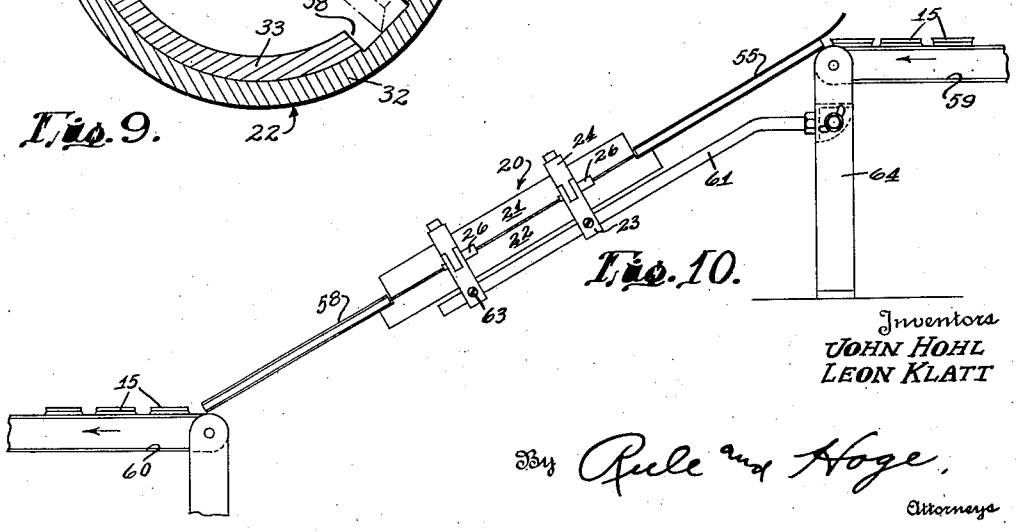


Fig. 10.

Inventors
JOHN HOHL
LEON KLATT

By Rule and Hoge,
Attorneys

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CAP ARRANGING DEVICE

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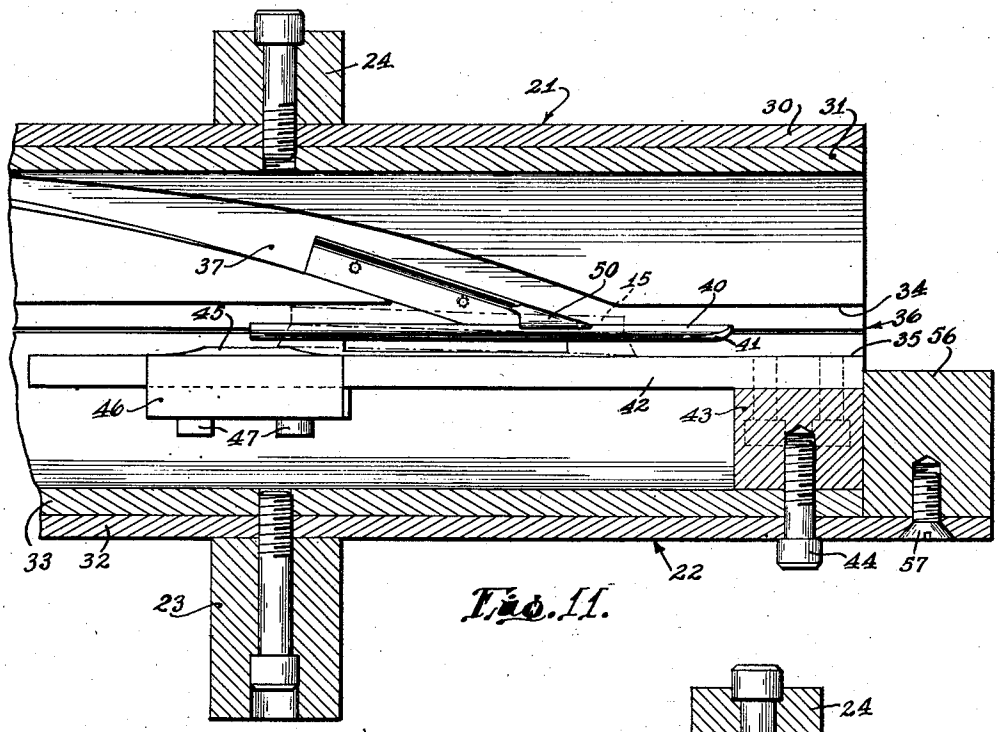


Fig. 11.

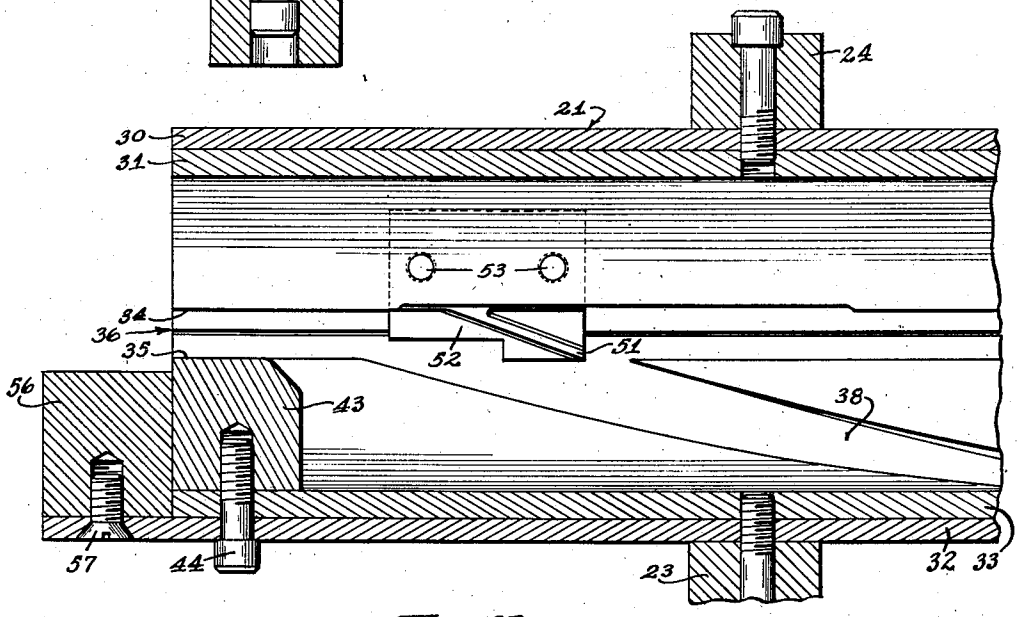


Fig. 12.

Inventors
JOHN HOHL
LEON KLATT

By Rule and Hoge,

Attorneys

Patented May 14, 1946 2,400,419

UNITED STATES PATENT OFFICE

2,400,419

CAP ARRANGING DEVICE

John Hohl and Leon Klatt, Toledo, Ohio, assignors to Owens-Illinois Glass Company, a corporation of Ohio

Application April 18, 1944, Serial No. 531,661

15 Claims. (Cl. 193—43)

Our invention relates to apparatus for sorting and arranging bottle caps or other articles while the articles are being transferred from one position to another.

An object of our invention is to provide a device by means of which articles which are being transferred in a continuous row or stream from one position to another with the articles presented promiscuously, some right side up and others upside down, are rearranged and those that are wrong side up are turned over, thereby presenting all of the articles right side up.

A further object of the invention is to provide a device of the character indicated which is free from moving parts and operable to sort and arrange the articles, reinverting those that are wrong side up while the articles are being carried therethrough by gravity.

Other objects of the invention will appear hereinafter.

Referring to the accompanying drawings:

Fig. 1 is a perspective view of a device embodying our invention, said device being shown in open position.

Fig. 2 is a plan view of the upper section of the device, looking at the inner side thereof.

Fig. 3 is a plan view of the lower section of said device.

Fig. 4 is an end elevation of the device.

Fig. 5 is a longitudinal section as indicated by the section line on Fig. 4, looking in the direction of the arrows 5—5.

Fig. 6 is a similar view looking in the direction of the arrows 6—6 on Fig. 4.

Figs. 7, 8, and 9 are cross sections on a larger scale at the lines 7—7, 8—8 and 9—9 respectively, on Fig. 5.

Fig. 10 is a diagrammatical elevational view showing the device assembled with means for conveying the articles to and from the device.

Fig. 11 is a fragmentary longitudinal sectional elevation of the receiving end portion of the device on a comparatively large scale.

Fig. 12 is a similar view of the discharging end of the device.

The apparatus as herein illustrated is particularly adapted for handling bottle caps 15 but may readily be adapted for use with other articles. The cap 15 as herein shown, comprises a top portion 16 (Figs. 7, 8, and 9) substantially in the form of a flat circular disk, and a marginal depending skirt 17, the lower portion 18 of which is downwardly and outwardly flared so that the rim or lower peripheral edge of the cap is of substantially larger diameter than the top 16.

The device 20 through which the caps are carried and by which the inverted caps are reinverted, comprises a hollow, cylindrical body or tube which is split lengthwise along its horizontal diameter to provide an upper section 21 and a lower section 22. The sections are hinged together by hinges comprising hinge members 23 or blocks fixed to the lower section 22 and hinge members 24 or straps secured to the upper section 21, the hinge members being connected by hinge pins 25. The sections 21 and 22 are held closed during operation by locking pins 26 which extend through aligned openings in lugs 27 and 28 formed on the upper and lower hinge members respectively.

The upper section 21 comprises an outer shell 30 and an inner shell 31. The lower section 22 in like manner comprises an outer shell 32 and an inner shell 33. The longitudinal edges 34 of the inner shell 31 are spaced apart from the opposite edges 35 of the shell 33 to provide straight longitudinal grooves or guideways 36 extending from one end to the other of the cylinder. The caps which are right side up as they enter the cylinder, are guided along these guideways as hereinafter described. The inner shell section 31 has a portion cut away to form a spiral groove or track 37 extending from a point near the intake end of the cylinder to a point near the discharge end. A corresponding groove or track 38 is provided in the lower shell 33 diametrically opposite the groove 37. The caps which enter the cylinder wrong side up are directed into the spiral grooves as hereinafter set forth and are rotated through an angle of 180° during their passage through the cylinder, so that they are discharged right side up.

Attached to the lower section 22 near the intake end thereof is a separator shoe 40 which is formed on its inner face with a longitudinal rib 41 which lies within the recess 36 and extends lengthwise thereof intermediate the upper and lower edges of said recess. When a cap enters the cylinder right side up as shown in broken lines in Fig. 7, the margin 18 of the cap passes beneath the guiding rib 41. As the rib 41 extends across the entrance to the spiral track 37, the cap is confined to the straight track as it advances along the cylinder.

A carrier plate 42 is attached to the lower section 22 of the cylinder at the intake end thereof and extends forwardly in a position to form a support for the caps which enter the cylinder right side up and support them as they are carried across the entrance to the spiral tracks. The

plate 42 (see Fig. 11) is formed with a head 43 attached by a bolt or bolts 44 to the cylinder section 22. A lifter 45 in the form of a short rib is mounted on the forward end of the plate 42. This rib as shown, is formed on a block 46 attached by bolts 47 to the plate 42. This lifter serves to lift the forward edge of the cap and guide it onto the straight track.

A carrier plate 48 is mounted on the lower section 22 adjacent the discharge end thereof in position to provide a support for the caps and positively prevent them from being tilted as they pass over the intersection of the spiral track.

A pick-up track 50 (Figs. 1, 8, and 11) is mounted on the upper section 21 of the cylinder in position to engage the margins of caps which enter the cylinder upside down and deflects them into the spiral track 37. The lower or receiving end of the track 50 is about on a level with and close to the upper surface of the rib 40, so that the margin of a cap advancing along the upper surface of the rib 40 is deflected upwardly by the pick-up track 50 and thus guided into the spiral track 37.

Diametrically opposite the track 50 is another deflector 51 in the form of a rib on a plate 52 attached as by means of bolts 53 to the cylinder. The deflector rib 51 (see Fig. 12) extends in a downwardly and forwardly inclined direction along the entrance of the lower spiral track and is positioned and arranged to engage above the margin of the inverted cap, thereby directing it downwardly into the lower spiral track 38 as the opposite margin is lifted and guided by the deflector 50 into the upper spiral track. Each cap which enters the cylinder upside down, as it is guided into and along the spiral tracks, is rotated about an axis through 180°, thus bringing the cap to a position right side up as it is discharged from the cylinder. This axis of inverting movement coincides with a diameter of the cap which extends in the direction of its travel. In other words, the axis of inverting movement substantially coincides with the longitudinal axis of the cylinder so that the cap during its inverting movement always remains parallel with said axis. In this manner interlocking of the caps or interference of the caps as they pass through the cylinder is prevented.

The cylinder is mounted in an inclined position, as shown in Fig. 10, and forms a chute so that the caps are carried therethrough by gravity. The caps are fed to the cylinder through an inclined chute 55, the lower end of which rests on a supporting block 56 attached with a screw 57 to the intake end of the cylinder section 22 which for this purpose is extended beyond the end of the upper section. The caps are discharged from the cylinder to a chute 58 which is connected to the cylinder in the same manner as the chute 55. The caps are fed to the chute 55 by an endless conveyor 59 and are delivered by the chute 58 to a conveyor 60. The cylinder is mounted on supporting rods 61 which extend through openings 62 in the lower hinge blocks. Clamping screws 63 secure the cylinder in position on the rods. The rods 61 are mounted on standards 64 and are angularly adjustable for adjusting the inclination of the cylinder 20. The hinge construction of the cylinder permits ready access to the interior thereof for clearing it if it should become clogged or whenever access to the interior is desirable. The method of mounting the cylinder on the supporting rods 61 (Fig. 10) permits it to be quickly removed and replaced with another designed for handling caps or articles of a different diameter or shape.

Modifications may be resorted to within the spirit and scope of our invention.

We claim:

1. Apparatus for arranging articles delivered thereto, comprising a chute through which the articles are directed, said chute constructed to provide a pair of straight parallel tracks positioned and arranged to engage diametrically opposite marginal portions of the articles, and a pair of spiral tracks having a common axis coinciding with the center line between and parallel with said straight tracks, said spiral tracks being positioned and arranged to engage opposite marginal portions of the articles, and means for selectively directing the articles to said straight and parallel tracks in accordance with the position of each article upon entering said chute.

2. Apparatus for arranging similar articles comprising a tubular body through which the articles are directed, said body having a cylindrical interior surface, straight tracks extending lengthwise along said surface through the interior of said body from one end thereof to the other, spiral tracks extending along said surface through the interior of said body, and means for selectively directing the articles to said straight tracks and spiral tracks respectively in accordance with the position of each article as it enters said body.

3. Apparatus for arranging caps or like articles comprising a hollow cylinder through which the articles are directed, said cylinder having a cylindrical interior surface and being formed with a pair of interior straight guideways extending lengthwise along said surface at diametrically opposite sides thereof, a pair of spiral guideways extending lengthwise along said surface, each said spiral guideway terminating at one end in one of said straight guideways and at its other end in the other of said straight guideways, and means for selectively directing the articles to the respective pairs of guideways in accordance with the position of each article as it enters the cylinder.

4. Apparatus for arranging caps or like articles comprising a hollow cylinder having a cylindrical interior surface extending throughout the length of the cylinder and formed with a pair of interior straight guideways extending along said surface and through the cylinder at diametrically opposite sides thereof, a pair of spiral guideways extending along said surface, each said spiral guideway terminating at one end in one of said straight guideways and at its other end in the other of said straight guideways, means by which articles delivered one side up to said cylinder are guided into and along said straight guideways, and means by which like articles which are delivered with the opposite side up to the cylinder are deflected and guided into and along said spiral guideways.

5. Apparatus for handling circular articles, said apparatus comprising a tubular body open at its ends, means providing straight grooves forming guideways extending lengthwise through the said body, said grooves being arranged diametrically opposite each other, means providing a pair of diametrically opposite spiral grooves extending lengthwise through the interior of said body, each said spiral groove merging at its opposite ends into said straight grooves respectively, a separator shoe extending along a said straight groove adjacent the intake end of the said body in position to guide certain of said articles along the straight grooves, and a switch device extending along a said spiral groove in position to deflect

other of said articles from the straight grooves into the spiral grooves.

6. Apparatus for arranging caps comprising flat circular tops and marginal skirts having rims of larger diameters than tops of the caps, which apparatus comprises a tubular cylindrical body formed with diametrically opposite straight grooves in the inner wall surface thereof and extending lengthwise through the said body and diametrically opposite spiral grooves in said wall surface and extending lengthwise of said body, said spiral grooves merging into the straight grooves, and a separator shoe extending along one of said straight grooves adjacent the intake end of the cylinder in position to overlie the margin of a cap entering the cylinder right side up and guide the cap along said straight grooves, said shoe being positioned to extend beneath the margin of a cap entering the cylinder upside down, and means for deflecting said last mentioned cap into the spiral grooves.

7. Apparatus for arranging caps comprising flat circular tops and marginal skirts having rims of larger diameters than tops of the caps, which apparatus comprises a tubular cylindrical body formed with diametrically opposite straight grooves in the inner wall surface thereof and extending lengthwise through the said body and diametrically opposite spiral grooves in said wall surface and extending lengthwise of said body, said spiral grooves merging into the straight grooves, and a separator shoe extending along one of said straight grooves adjacent the intake end of the cylinder in position to overlie the margin of a cap entering the cylinder right side up and guide the cap along said straight grooves, said shoe being positioned to extend beneath the margin of a cap entering the cylinder upside down, and deflecting means extending along a said spiral groove in position to deflect the articles entering the cylinder upside down, into the spiral grooves and causing the articles as they advance along the spiral grooves to be rotated to a right side up position.

8. Apparatus for arranging caps comprising flat circular tops and marginal skirts having rims of larger diameters than tops of the caps, which apparatus comprises a tubular cylindrical body formed with diametrically opposite straight grooves in the inner wall surface thereof and extending lengthwise through the said body and diametrically opposite spiral grooves in said wall surface and extending lengthwise of said body, a carrier plate extending inwardly from the intake end of the cylinder in position to provide a support for a cap entering the cylinder and moving along said straight grooves, and a separator shoe extending along a said straight groove in position to overlie the margin of the cap and hold the latter in position on said carrier plate.

9. Apparatus for arranging caps comprising flat circular tops and marginal skirts having rims of larger diameters than tops of the caps, which apparatus comprises a tubular cylindrical body formed with diametrically opposite straight grooves in the inner wall surface thereof and extending lengthwise through the said body and diametrically opposite spiral grooves in said wall surface and extending lengthwise of said body, a carrier plate extending inwardly from the intake end of the cylinder in position to provide a support for a cap entering the cylinder and moving along said straight grooves, a separator shoe extending along a said straight groove in position to overlie the margin of the cap and hold the latter in position on said carrier plate, and a second supporting plate adjacent to the discharge end of the cylinder in position to support and guide the cap moving along the straight tracks.

10. Apparatus for arranging caps comprising flat circular tops and marginal skirts having rims of larger diameters than tops of the caps, which apparatus comprises a tubular cylindrical body formed with diametrically opposite straight grooves in the inner wall surface thereof and extending lengthwise through the said body and diametrically opposite spiral grooves in said wall surface and extending lengthwise of said body, a carrier plate extending inwardly from the intake end of the cylinder in position to provide a support for a cap entering the cylinder and moving along said straight grooves, a separator shoe extending along a said straight groove in position to overlie the margin of the cap and hold the latter in position on said carrier plate, and a lifter device attached to said plate in position to engage the margin of the cap as it advances for lifting and guiding it along the straight track.

11. Apparatus for arranging bottle caps and other articles comprising a tubular cylinder through which the caps are guided, said cylinder having a cylindrical interior surface, straight and spiral tracks extending side by side along said surface lengthwise through said cylinder, means for mounting the cylinder in an inclined position, a chute connected to the upper end of the cylinder for feeding and guiding the caps into the cylinder, and means by which the caps are selectively directed to the respective tracks in accordance with the position of the caps as they enter the cylinder.

12. Apparatus for arranging bottle caps and other articles comprising a tubular cylinder through which the caps are guided, said cylinder having a cylindrical interior surface, straight and spiral tracks extending side by side along said surface lengthwise through said cylinder, said cylinter being split longitudinally to provide upper and lower sections, hinges connecting said sections, and means by which the caps are selectively directed to the respective tracks in accordance with the position of the caps as they enter the cylinder.

13. An apparatus for arranging similar articles delivered thereto promiscuously with some of the articles facing in one direction and some in the opposite direction, said apparatus comprising a body having a cylindrical passageway extending therethrough, said passageway being circular in cross section, pairs of tracks extending along the wall of said passageway, the tracks of each pair being at diametrically opposite positions, said tracks being divergent along the said wall in directions lengthwise of the wall to cause a relative rotation of articles moving along the respective pairs of paths, such that articles moving along one pair of tracks are inverted relative to those moving along the other pair of tracks during their passage through said passageway, means for directing the articles into the said passageway, and means for selectively directing the articles to the respective pairs of tracks in accordance with the position of each article as it enters the passageway.

14. An article arranging device for arranging similar articles presented thereto with some facing in one direction and some in the opposite direction, said device having a cylindrical channel through which the articles are directed, said channel being circular in cross section, pairs of

tracks extending lengthwise along the cylindrical wall surface of the channel, the tracks of each pair being diametrically opposite each other, said tracks being divergent along said wall surface in directions lengthwise of the channel, to cause relative rotation of articles traversing the respective pairs of tracks, said rotation being about the longitudinal center line of said channel, and means for selectively directing the articles to the respective pairs of tracks in accordance with the direction in which each article faces as it is presented to said device.

15. Apparatus for transferring circular articles from one position to another along a predetermined path, means for guiding the articles and maintaining a diameter of each article substantially in line with and coinciding with the center line of said path during the passage of the article between said positions, said guiding means comprising separate tracks, and means for selectively directing the articles to said tracks, said tracks being divergent in directions lengthwise of said center line to cause the relative rotation of the articles guided thereby about their said diameters as axes.

JOHN HOHL.
LEON KLATT.