June 5, 1956 S. T. DAY 2,748,914

ARTICLE ORIENTING MEANS

Filed Jan. 14, 1954 2 Sheets-Sheet 1

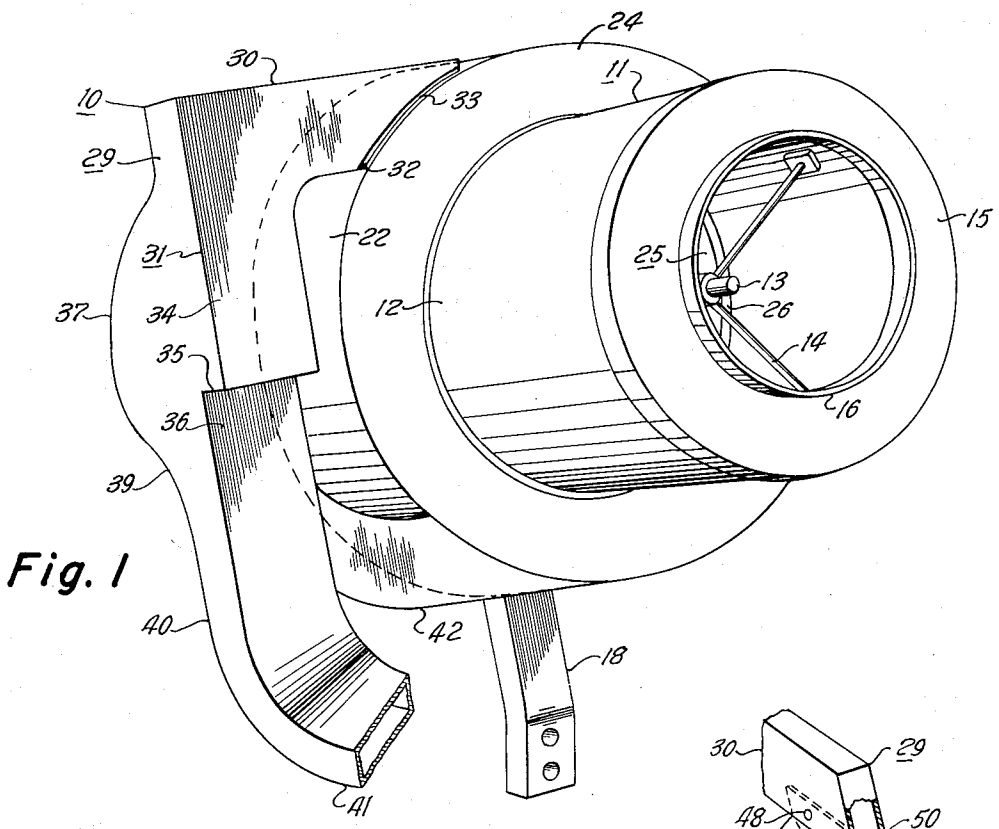


Fig. 1

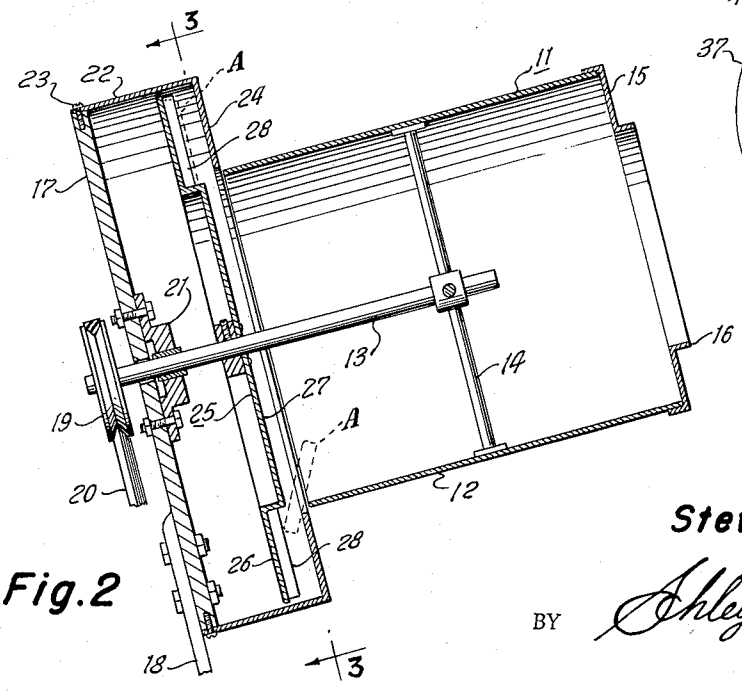


Fig. 2

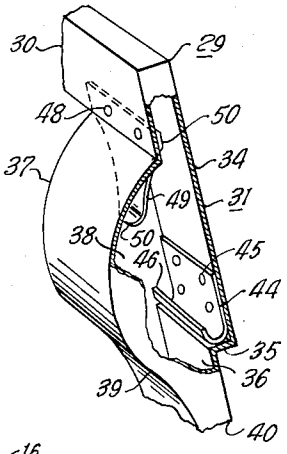


Fig. 7

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ARTICLE ORIENTING MEANS

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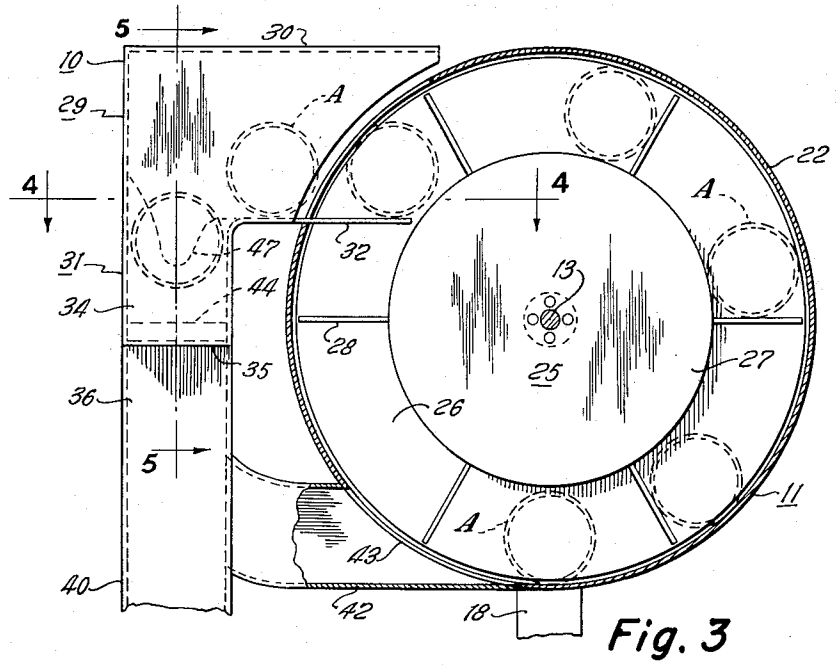


Fig. 3

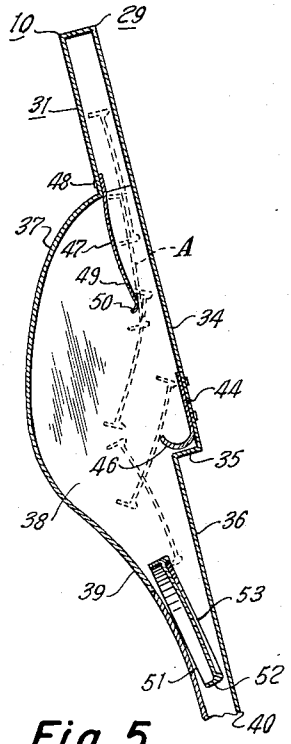


Fig. 5

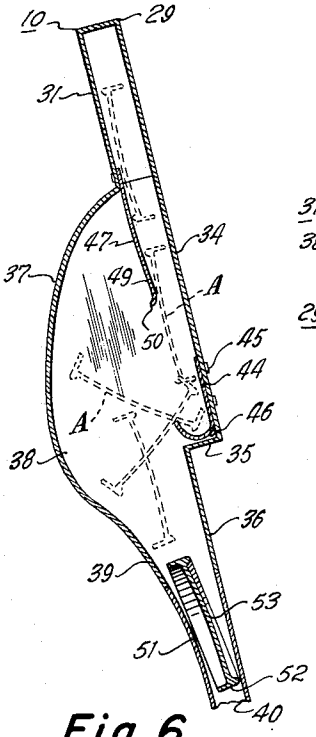


Fig. 6

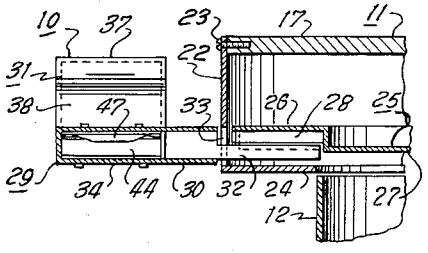


Fig. 4

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ARTICLE ORIENTING MEANS

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Application January 14, 1954, Serial No. 403,972

17 Claims. (Cl. 193—43)

This invention relates to new and useful improvements in orienting means and more particularly to means for orienting articles having marginal flanges.

One object of the invention is to provide improved means for orienting articles having marginal flanges or walls, such as container caps, whereby the articles may be rapidly fed to a point of use without the necessity of prearranging the same.

An important object of the invention is to provide improved orienting means of such construction as to receive flanged articles in heterogeneous arrangement and to deliver the same individually and successively in an oriented manner irrespective of whether the flanges are unidirectional or project from both sides of the bodies of the articles.

A particular object of the invention is to provide an improved orienter having coacting stationary means for orienting flanged articles whereby the orienter is of relatively simple, inexpensive construction and does not involve any moving parts.

Another object of the invention is to provide an improved orienter for flanged articles which is of the inclined chute type and which has a pair of spaced coacting elements arranged to bypass correctly oriented articles and to invert or orient oppositely disposed articles regardless of whether the flanges project from only one or both sides of the bodies of the articles.

Still another object of the invention is to provide an improved orienter, of the character described, wherein the coacting elements are spaced in accordance with the diameter or width of the articles to permit an article to clear one of said elements when the article is momentarily supported by the other element, one of said elements being disposed above the other for directing misoriented articles into contact with said other element for correctly orienting such articles.

A further object of the invention is to provide an improved orienter having novel hopper means of simplified construction for receiving a plurality of flanged articles and individually and successively feeding the same to orienting means of the character described.

A construction designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, wherein an example of the invention is shown, and wherein:

Fig. 1 is a perspective view of orienting means and a hopper constructed in accordance with the invention,

Fig. 2 is a transverse, vertical, sectional view of the hopper,

Fig. 3 is a vertical, sectional view, taken on the line 3—3 of Fig. 2, showing the relation of the orienting means and hopper,

Fig. 4 is a horizontal, cross-sectional view, taken on the line 4—4 of Fig. 3,

Fig. 5 is a transverse, vertical, sectional view of the orienting means taken substantially on the line 5—5 of Fig. 3, showing the bypassing of correctly oriented articles,

Fig. 6 is a view, similar to Fig. 5, showing the inverting of misoriented articles, and

Fig. 7 is a perspective view, partly in section, of the orienting means and showing the relation of its coacting elements.

In the drawings, the numeral 10 designates an orienter embodying the principles of the invention and having a hopper 11 associated therewith for feeding flanged articles, such as caps, thereto in heterogeneous arrangement. As shown most clearly in Fig. 2, the hopper 11 includes an open-ended cylindrical drum or sleeve 12 mounted on the upper end of an inclined axial shaft 13 by means of a suitable spider 14 and extending outwardly from the shaft. An annular flanged plate or end wall 15 overlies the outer end of the drum 12 and has outwardly flanged, coaxial opening or inner periphery 16 of relatively large diameter, whereby flanged articles to be oriented may be readily placed in said drum and retained therein. The lower end of the shaft 13 extends through a circular base or plate 17, which is rigidly mounted by means of a suitable support 18, and carries a drive pulley 19 for receiving a belt 20 to impart rotation to said shaft and the drum relative to the base. A suitable bearing 21 is mounted on the base 17 and has the shaft journaled therein. The base is spaced from the inner or lower open end of the drum 12 and has an annular, peripheral cover or rim 22 fastened thereto, such as by screws 23, in surrounding relation and extending coaxially between said base and drum. A radial flange 24, having an internal diameter slightly greater than the external diameter of the drum, extends inwardly from the outer end of the rim 22 in closely spaced, encircling relation to said drum.

The rim and its flange 24 coact with the base 17 to provide a housing for a circular plate 25 fixed on the shaft 13 so as to be rotatable with and provide a bottom for the drum. In order to be closely contiguous to the rim 22, the diameter of the plate 25 is substantially equal to the diameter of the base. As will be apparent, the spacing between the plate and the adjacent open end of the drum as well as the inner periphery of the flange 24 varies in accordance with the thickness of the articles to be oriented. Preferably, the peripheral portion of the plate 25 is offset toward the base to provide an annular, radial flange 26 spaced from the housing flange a greater distance than the upset medial portion 27 of said plate which is substantially of the same diameter as the drum and forms the bottom thereof. As shown in Fig. 2, the spacing between the medial portion of the plate and the inner end of the drum is insufficient to permit an article A, shown in broken lines, to pass therebetween except when the article is at an angle to said plate between parallel and perpendicular relation thereto. As a result, an article supported by the flange 26 is retained by the upset medial portion 27 of the plate 25 and cannot fall into the drum and said flange coacts with the rim 22 and its flange 24 as well as the medial portion of the plate to provide a track encircling the drum. A plurality of widely-spaced fins or ribs 28 extend radially from the medial portion of the plate for carrying articles along the track around the drum.

Figs. 3 and 4 illustrate the movement or feeding of the articles A from the hopper to the orienter, which is shown in the form of a right angular chute or housing 29 having an upper horizontal or transverse leg 30 and a depending or upright leg 31. The housing is substantially rectangular in cross-section and of dimensions sufficient to accommodate the passage of a single article at a time in edgewise or flangewise relation. The horizontal

leg 30 has its free end conforming to the curvature of the rim 22 and is provided with a lower side wall or guide bar 32 projecting through a slot 33 in said rim adjacent its flange 24 for coacting with the ribs 28 to direct articles from the hopper to the orienter. As shown most clearly in Fig. 4, the guide bar 32 overlies the track in spaced relation and is of such height as to clear the ribs and stop rotative movement of the articles revolved by the track. Since the articles cannot clear the guide bar, said articles are directed through the slot 33 into the transverse leg 30 of the orienter and each article is pushed therealong until it falls into the upright leg 31. Although the orienter and hopper are inclined in the same general direction, rearwardly and downwardly, it is noted that the article may be fed directly to said orienter in any suitable manner and/or by any suitable means.

The upright leg 31 of the orienter housing 29 includes an angular front wall 34 having a rearwardly offset shoulder 35 and lower portion 36. Below the transverse leg 30, the rear wall of the upright leg has an outwardly bowed or distended portion 37 which is spaced from the front wall 34 a distance appreciably greater than the thickness of the articles A so as to provide a chamber or cavity 38 of sufficient amplitude to accommodate the greatest dimension, width or diameter, of said articles. The distended wall portion 37 extends below the shoulder 35 and has its lower extremity 39 converging or tapering inwardly toward the lower front wall portion 36 into substantially parallel relation. A suitable discharge chute 40, rectangular in cross-section, depends from the lower end of the upright leg, as shown by the numeral 41, may have a forwardly curved lower end portion (Fig. 1). If desired, a return chute 42 may extend transversely from the upper portion of the discharge chute 40 to the lower portion of the hopper. A slot 43 is formed in the lower portion of the rim 22 adjacent its flange 24 (Fig. 3) to establish communication between the return chute 42 and track whereby excess articles may be returned to said track from the discharge chute to prevent clogging of the orienter.

For inverting or orienting the misoriented articles, an inverting or hook element 44 is carried by the front wall 34 of the upright leg 31 of the housing 29 immediately above the rearwardly offset shoulder 35 (Figs. 5–7) and may be supported or form a part of said shoulder. Although subject to variation, the hook element 44 is shown in the form of an upright plate underlying the front wall in contiguous, parallel relation and suitably attached thereto, such as by rivets 45. A rearwardly and upwardly curved flange or lip 46 is formed on the lower edge portion of the plate (Fig. 7) and, preferably, is swung on an arc of constant radius of sufficient amplitude and relative shallowness so as to receive the edge or flange of an article without confining the article. It is noted that the hook element is substantially in alinement with the upper portion of the housing leg 31 as well as with the outer end portion of the transverse leg 30.

At the juncture of the housing legs, a guide element or plate 47 is secured by rivets 48, or other suitable means, in overlying relation to the rear housing wall so as to depend into the chamber 38 in spaced relation to the front wall 34. Preferably, the guide element 47 is formed of relatively thin, flexible metal or other material and is arched or bowed rearwardly, whereby its lower end converges toward the front wall and is spaced therefrom a distance less than its upper end and slightly less than the thickness of the articles. A flexible finger or tongue 49, of a width less than the diameter of the articles, is provided by tapering or reducing the lower end portion of the guide element and is adapted to bear against the articles so as to urge and maintain the same in engagement with the front wall. Of course, the exact contour and shape of the guide element is not critical so long as said element performs the above function and directs misoriented articles into contact with the lip 46 of the hook element. If desired, the extremity of the tongue 49 may be bent rearwardly upon itself as shown by the numeral 50. It is noted that the guide element is substantially in alinement with the outer edge of the lip, although rearward thereof in a vertical plane. The spacing between the hook and guide elements is in accordance with the diameter of the articles and is sufficient to permit an article to clear one of said elements when the article is supported momentarily by the other element.

Since the orienter is disposed at a rearward inclination, a correctly oriented article is momentarily suspended by the guide element 47 by engagement of the tongue 49 with the upper margin of the article (Fig. 5) whereby the lower margin of said article swings outwardly or rearwardly away from the front wall 34 so as to clear the hook element 44. This rearward swinging of the article is permitted by the size of the chamber 38 and is due to the flange of the article projecting primarily from one of its sides. As soon as the lower margin of the article moves below the tongue, said margin is unconfined and said article pivots clockwise toward a vertical plane about the fulcrum provided by said tongue and the upper margin of said article. Upon disengagement from the tongue, the article strikes the bowed rear wall portion 37 and slides along the lower rear wall portion 39 into the discharge chute 40. As a result, the orienter has no effect upon articles which are correctly oriented other than to maintain the same in such relationship.

As shown in Fig. 6, a misoriented article is held in engagement with the front wall due to the tongue bearing against the relatively flat top or outer side of the article. The tongue has sufficient flexibility or resiliency to maintain this relationship without retarding downward travel of the article, said tongue flexing rearwardly to permit passage of said article. Due to its confinement by the tongue, the article slides along the front wall and its lower margin is directed into the lip 46 of the hook element. Since the front wall is inclined, the article pivots counterclockwise and falls into the chamber 38 in inverted or correctly oriented relation. From the chamber, the article slides down the lower rear wall portion 39 into the discharge chute 40.

The orienter may be employed for unscrambling or orienting various articles having coaxial, marginal flanges or walls, such as caps, lids, cups, cans and other closures, containers, retainers or receptacles. Primarily, the orienter is adapted for use with caps for cartons of the type indicated by the numeral 51 (Figs. 5 and 6) and having its flange 52 projecting above and below or on each side of an intermediate closure member or disk 53. Of course, the disk or a portion thereof must be closer to one edge of the flange than the other and may be flush with one of said flanges, it being noted that caps or other articles having dual projecting flanges are most difficult to orient. In addition to the versatility of the orienter, its simplicity of construction and the absence of moving parts make said orienter most economical, efficacious and rapid in operation without requiring any appreciable adjustment or maintenance. Although primarily designed for orienting circular or cylindrical articles, it is noted that many polygonal articles are capable of being oriented in substantially the same manner by the means described hereinbefore. It is pointed out that the construction of the hopper 11 is subject to variation and that other means may be utilized for feeding articles to the housing of the orienter. Also, the transverse leg of the orienter housing is not essential since the articles may be fed to the upper end or any side of the upright leg.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. Means for orienting relatively flat articles having axial flanges including walls defining a passage for flanged articles in seriatim, coacting means mounted in spaced relation on the walls in the passage for inverting misoriented articles and bypassing correctly oriented articles, the first of the coacting means momentarily supporting a correctly oriented article to permit pivoting of such article and its clearance of the second coacting means, said first coacting means confining a misoriented article in engagement with one of the walls and directing such article into contact with said second coacting means, the latter being stationary and momentarily supporting such article by its axial flange to permit reverse pivoting thereof and its clearance of said first means whereby the misoriented article is correctly oriented.

2. An orienter for relatively flat articles having axial flanges including walls defining a passage for flanged articles in seriatim, guide means on one of the walls for confining a misoriented article in engagement with an opposite wall, and inverting means on the opposite wall receiving the misoriented article from the guide means and momentarily supporting such article by its flange to permit pivoting and correct orientation of such article, said guide means momentarily supporting a correctly oriented article by its flange to permit reverse pivoting of such article away from said opposite wall and inverting means.

3. An orienter as set forth in claim 2 wherein the inverting means is spaced from the guide means in accordance with the width of the articles.

4. An orienter as set forth in claim 2 wherein the walls define a gravity chute, the guide means being disposed above the inverting means.

5. An orienter as set forth in claim 4 wherein the guide and inverting means are spaced apart in accordance with the width of the articles.

6. An orienter for relatively flat articles having axial marginal flanges including an inclined chute, coacting orienting means in the chute and including guide and inverting means in opposed vertically spaced relation to each other, the guide means momentarily supporting a correctly oriented article by its flange to permit pivoting of such article and its clearance of the inverting means, said guide means confining and directing a misoriented article into engagement with said inverting means, the latter momentarily supporting such article to permit pivoting thereof in a direction opposite to the pivoting of the correctly oriented article whereby the misoriented article is correctly oriented.

7. An orienter as set forth in claim 6 wherein the guide means is spaced above the inverting means in accordance with the width of the articles.

8. An orienter as set forth in claim 6 wherein the chute is enlarged opposite the inverting means to accommodate pivoting of the misoriented article.

9. An orienter for relatively flat articles having axial marginal flanges including a gravity chute having walls,

an inverting element on one of the walls of the chute for momentarily supporting a misoriented article by its lower flange portion to permit pivoting and orientation of such article, a guide element on an opposite wall above the inverting element for confining and directing the misoriented article into contact with said inverting element, the guide element momentarily suspending a correctly oriented article by its upper flange portion to permit pivoting of such article in a direction opposite to the pivoting of the misoriented article and its clearance of said inverting element.

10. An orienter as set forth in claim 9 wherein the chute has upper and lower inclined walls, the guide element being carried by the lower inclined wall and the inverting element by the upper inclined wall.

11. An orienter as set forth in claim 10 wherein the lower inclined wall is distended below the guide element to provide a chamber for accommodating pivotal orientation of misoriented articles.

12. An orienter as set forth in claim 9 wherein the guide element is flexible and coacts with the chute wall carrying the inverting element.

13. An orienter for relatively flat articles having axial marginal flanges including a gravity chute having walls, guide means adjacent one of the walls of the chute for confining a misoriented article in engagement with the opposite wall, inverting means adjacent said opposite wall and below the guide means for receiving the misoriented article therefrom and momentarily supporting such article by its lower flange portion to permit correct pivotal orientation of such article, said guide means momentarily suspending a correctly oriented article by its upper flange portion to permit pivoting of such article away from the inverting means and said opposite wall.

14. An orienter as set forth in claim 13 wherein the guide means includes a flexible element, the inverting means including a hook element.

15. An orienter as set forth in claim 13 wherein the chute has upper and lower inclined walls, the guide means being adjacent the lower inclined wall and the inverting means adjacent the upper inclined wall.

16. An orienter as set forth in claim 15 wherein the lower inclined wall is distended below the guide means to provide a chamber for accommodating pivotal orientation of misoriented articles.

17. An orienter as set forth in claim 13 wherein the wall adjacent the guide means is bowed outwardly below said means to provide a chamber for accommodating pivotal orientation of misoriented articles.

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