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Randrup

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[54] **UNSCRAMBLER**

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[52] **U.S. Cl.**.....**198/33 AA,** 198/33 AD

[51] **Int. Cl.**.....**B65g 47/24**

[58] **Field of Search** .....198/33 AA, 127, 33 AD; 221/171

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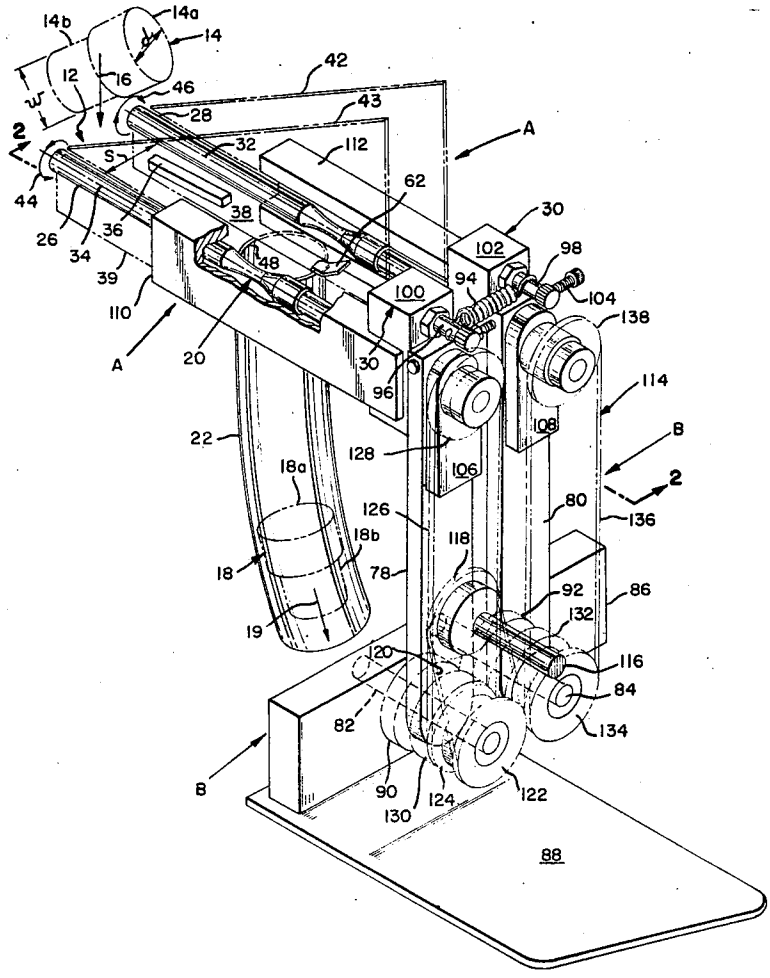
[57] **ABSTRACT**

A sorting device or unscrambler comprising a pair of elongate parallel rod members positioned and held at a slope downward from the input station thereof to a delivery station. The spacing of the rods is such that work objects, for example corks or the like which are characterized by a head portion of slightly greater weight and diameter than the remainder thereof, are received at the input station end of the rods and advanced therealong head first to the delivery station. At the latter station, by virtue of a widened out portion formed between the rods, the work objects are dropped one-by-one in desired predetermined orientation for subsequent processing. At least one of the rods is rotated by a source of rotational power coupled thereto so that each of the aforementioned work objects placed upon the sloping rods is caused to advance therealong by the coaction of rod movement and attendant slippage thereupon by the work object.

7 Claims, 4 Drawing Figures



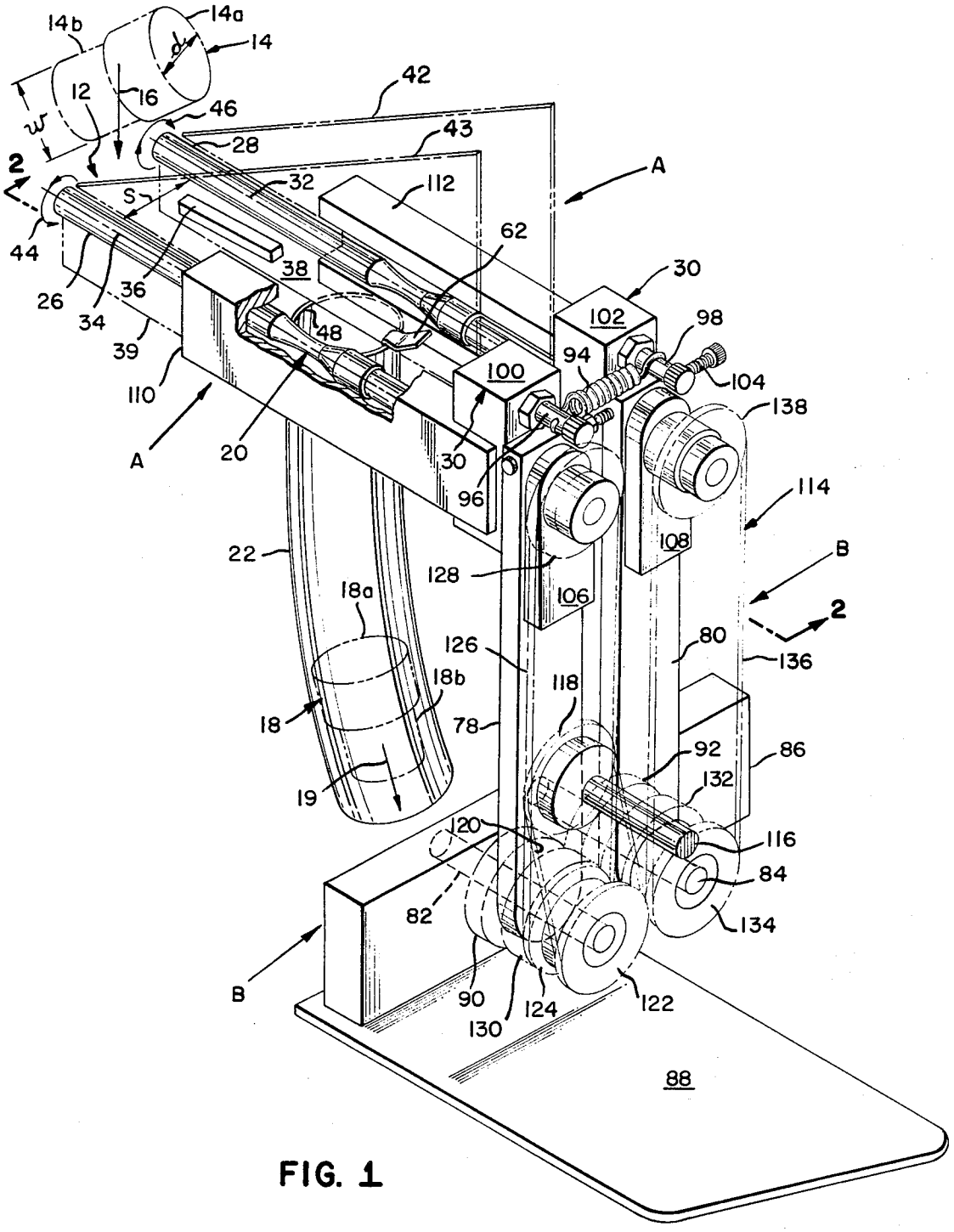


FIG. 1

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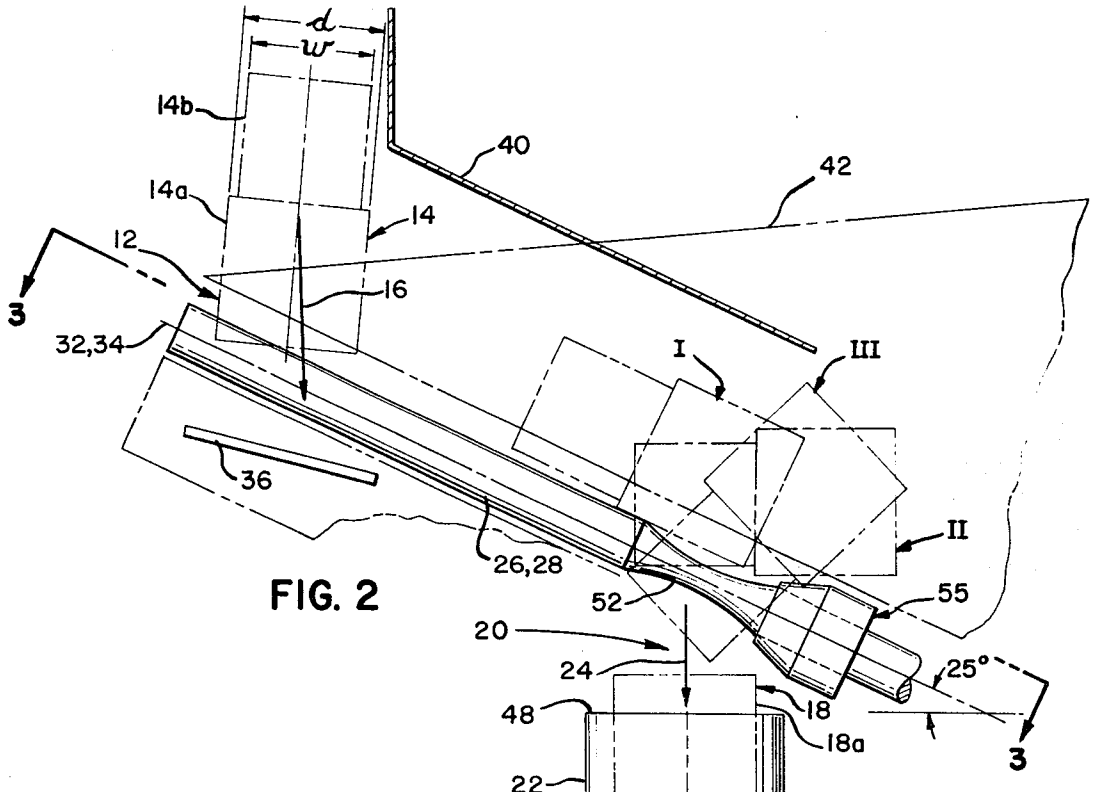

FIG. 2

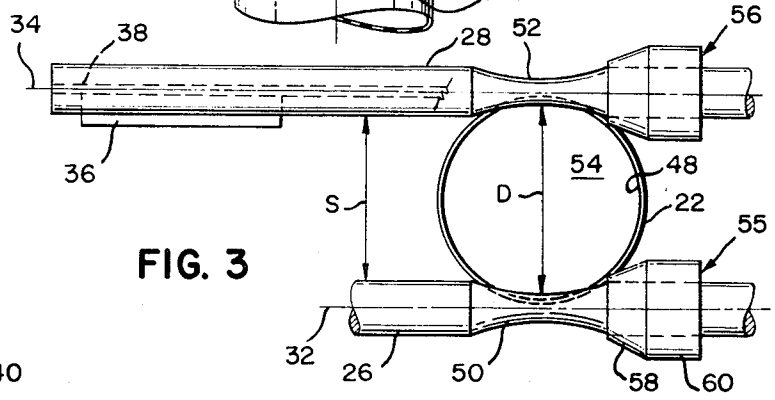

FIG. 3

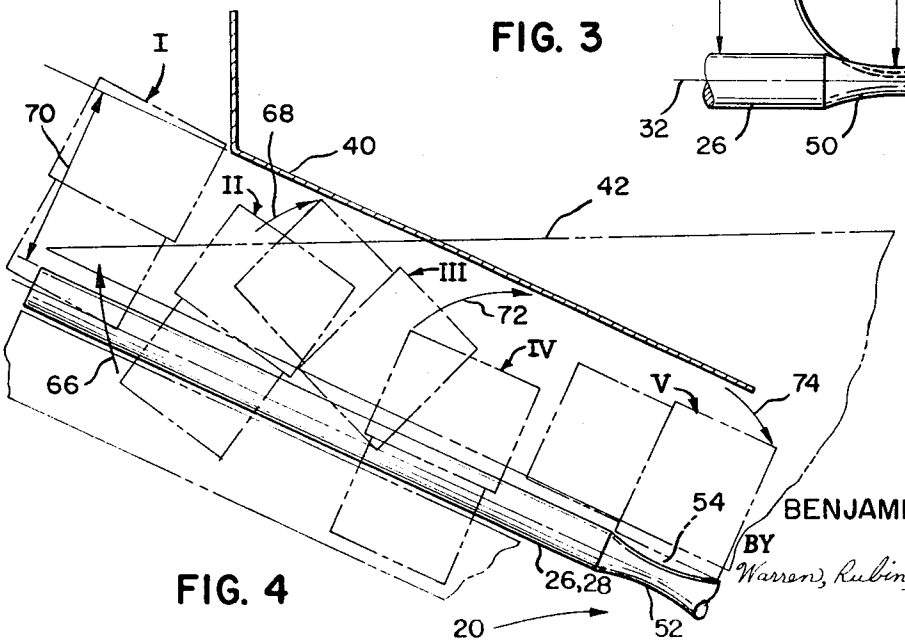

FIG. 4

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UNSCRAMBLER

This invention relates to sorting devices and more particularly to devices of such character known as "unscramblers" which also establish a specific orientation of relatively small work objects, such as corks and the like used in the bottling of certain types of beverages, for example champagne.

With champagne bottling as an example of one application of my invention——it is by no means to be assumed therefore that this is a limitation of my invention——a brief description of that process and the type of corks used therein will be of assistance to one of ordinary skill in the art to understand several aspects and advantages of my invention, particularly when compared to prior known devices used to achieve somewhat the same results as my invention.

Champagne and other sparkling wines, both natural and artificially carbonated, are normally put up and sold in bottles capped by a cork, or sometimes, nowadays a plastic closure. The natural cork is still preferred by the vintners producing champagne and other sparkling wines by the so-called "older, classic method," as well as by many others who utilize lesser methods. Unlike the relatively uniform diameter cylindrical cork commonly employed to cap bottles of still wine, champagne corks when in place are characterized by a round knob-like protrusion at the top of the bottle held in place by a wire hood or strap. Such cork structure originates with a cork having a head portion of substantially circular cross-section whose diameter is greater than that of the remainder of the cork, which head portion is also somewhat heavier than the remainder of the cork of reduced diameter. Examples of such corks may be seen in phantom outline at FIG. 2 of the second sheet of drawings accompanying this specification.

In placing corks, or other kinds of stoppers or closures, of the above-described type into champagne bottles, especially where the process although classical still uses at least that degree of automation wherein the bottle closures or corks are inserted into the bottles by machine instead of by hand and mallot, it is required that the corks be received seriatim from a source thereof in random orientation and then, one-by-one, be placed in a predetermined orientation, usually with the small end of the cork facing down, at a delivery station or zone. Thereafter, the work objects (corks) may be systematically and mechanically inserted into bottles that have been filled with beverage.

In accordance with the prior art with which I am familiar, the aforementioned selection from a random source, rearrangement to a predetermined position, and advancement of corks to a delivery zone for further working, i.e., unscrambling, may be accomplished manually or by various types of mechanical unscramblers. One with which I am familiar drops the corks between a pair of pins whose separation is just wide enough to pass the cork therebetween by means of an advancing roller if the cork is small side down. Otherwise, a plunger, moving at the same speed as the roller, pushes the cork; and it topples, small side down, to the delivery zone. However, this device, and others like it tend to jam and occasionally permit a cork to be delivered large side down. Should a cork be delivered to the automatic corker in the wrong position, e.g., with the head end headed toward the bottle ending, and then forcibly thrust into the bottle, cork will be wasted; and sometimes the bottle is broken at and around the neck thereof. In any event cork wastage alone is costly (champagne corks, for example, cost around $.06 each) and I have seen as many as several hundred corks spoiled during an average bottling season of but a few months. Besides considerable production time is also lost, especially if the bottle is broken thus adding to the labor of clean-up and maintenance.

Thus it is an object of the present invention to provide a work object unscrambler which may receive corks or the like of the type described above, seriatim and in random orientation from a source thereof, and deliver such corks one-by-one in a predetermined orientation.

It is also an object of the present invention to provide a work object unscrambler that is highly reliable in respect of delivery of such objects in a desired predetermined orientation and at a relatively high rate of delivery.

A feature and advantage of the present invention is that due to the increased reliability of orienting and delivering corks or work objects to a work station for subsequent processing, the spoilage of the corks, which would occur if the work objects were not properly delivered, is greatly reduced if not nearly eliminated altogether, with attendant significant savings in cork or other work object costs.

A further feature and advantage of my invention is that due to its relatively high efficiency and rate of operation the amount of spoilage, for example in the champagne bottling process, is reduced to a minimum; and the rate at which bottles may be capped and delivered is maintained at a relatively high level of production.

It is also an object of the present invention to provide an unscrambler device that is compact in its physical make-up, relatively simple in mechanical arrangement, and hence generally economic to fabricate and maintain.

These and further objects, features and advantages will become apparent to one of ordinary skill of the art upon a reading of the specification which follows with reference to the accompanying drawings wherein the same characters of reference designate the same or similar elements in each of the several figures.

Turning now to the drawings, FIG. 1 is an overall perspective view of the unscrambler device embracing my invention except that a portion thereof hereafter referred to as a bridge baffle plate, which occupies a portion of the space over the top of the device, is removed so as not to obscure certain other relevant details therebelow;

FIG. 2 is a partial sectional elevation taken along line 2—2 of FIG. 1, except that bridge baffle plate 40 is restored to view;

FIG. 3 is a partial plan view taken along line 3—3 of FIG. 2; and

FIG. 4 is a portion of the sectional view of FIG. 3 repeated primarily to show a succession of positions of a work object received and advanced therealong and not shown in FIG. 2, FIG. 4 thus providing a more lucid disclosure and associated description of the function of my invention in connection with such work object positions.

My invention may be understood by referring to the accompanying drawings, particularly FIG. 1, wherein I illustrate my unscrambler device. It should be appreciated that the assembly illustrated occupies a position in an overall line of equipment (not shown) utilized in the production of bottled champagne; and, in the particular portion thereof shown, work objects——in this case corks to be inserted into the type of champagne bottles——are delivered one by one from a source thereof (not shown) and dropped in random orientation to the region or zone 12 of the device, which may also be referred to hereinafter as an input station, and one such cork or work object 14 being thus dropped in the direction of arrow 16 is shown. A second cork 18 is seen being exited in the direction of arrow 19 just below delivery station 20, specifically through conduit 22, the latter work object having also been oriented to the desired predetermined position shown, i.e., with the larger diameter head portion 18^a being uppermost or above the remainder or smaller diameter portion 18^b. Thus oriented, the cork may be subsequently maneuvered to eventual insertion into a bottle of beverage in a manner and by means of mechanical expedients known to those of ordinary skill in the art and hence not shown in the drawing nor further described herein.

The mechanism of my invention whereby the foregoing desired result is achieved is illustrated at section A of FIG. 1, while the support therefore and basic power movement is embraced at section B. Because of its more fundamental relevance to my invention, and to make the reading of this specification and appreciation of the invention herein more lucid, attention is directed first to section A of FIG. 1, and auxiliary FIGS. 2 and 3.

As noted above, corks or other work objects of the shape and character first described in the introductory remarks to this specification, are dropped one by one from a source thereof to the input station at 12. At this point the work objects encounter a pair of elongate bars 26, 28 which prevent further drop of the object. This is so because bars 26, 28 are supported and carried by guide assembly 30 (further described below) in parallel alignment at a distance S from each other, S being just slightly smaller than head diameter *d* of the work object, yet greater than any width dimension of the remainder of the object, in this case diameter *w* of the lower portion of the cork.

Immediately upon being caught at the input station between bars 26, 28, an object such as cork 14 tends to tumble so that head portion 14^a faces toward delivery station 20. This is so no matter in what position the cork first lands on bars 26, 28, for several reasons embraced by the structure of my invention. First, guide assembly 30 is so constructed that bars 26, 28 are supported with their longitudinal axes 32, 34 sloped downwardly from input station 12 to delivery station 20 (FIG. 2); and, in the embodiment shown I prefer the angle of slope with the horizontal to be in the neighborhood of not less than about 25°. Thus, should a cork land on rods 26, 28 in a position anywhere from substantially vertical, to nearly on its side, and due to the somewhat heavier head portion than the remainder thereof, the cork naturally tends to tumble with the head portion pointing downslope, i.e., toward delivery station 20.

Second, should a cork drop in a nearly vertical orientation between bars 26, 28 with the smaller diameter portion depending therebetween, plate 36 secured to lower wall section 38 will contact the depending portion as the cork advances along the bars, as will be explained, and thus tips the cork to the desired intermediate position exemplified by object position I (FIG. 2).

Third, should a cork happen to drop head portion down upon bars 26, 28,(a position not shown in the drawings but readily imagined), and tend to hang on in that position——a condition that could eventually lead to the cork being undesirably delivered "upside-down" at the delivery station——such is rectified by the interdiction of bridge baffle 40(FIGS.2,4) secured to upper wall section 42. That is should a cork in such undesirable position proceed to advance in the general direction of delivery station 20, contact of the upwardly extending portion of the cork with baffle 40 will cause the piece to be toppled over to object position I.

Advancement of work objects along bars 26, 28 is achieved by continuous agitation of the work object thereon, and this is the result of coaction of the shape and slope positions of the rods, and rotational movement of the rods about their respective central longitudinal axes. In this connection I prefer that the rods be fabricated of round steel stock. Rotational movement is accomplished by means of rotational power transmitted to the rods by known mechanical expedients, which appear in the B section of the assembly of my invention explained in somewhat greater detail hereinafter. More specifically I prefer to constantly rotate rods 26, 28 in the counter rotating directions indicated by arrows 44, 46 (FIG. 1). By such constant rod movement, and because the rods are sloped, constant slippage between rods and corks is induced; and, thus the corks advance, that is slip, from the input station at 12 toward upper terminus 48 of delivery conduit 22. In this connection I prefer to rotate both rods 26 and 28, although positive results could be obtained by rotating only one of the two; and I prefer to counter rotate the rods in the direction of the arrows 44, 46 so as not to "pinch" the corks, a condition which could hinder if not block movement thereof altogether along the rods.

Finally, the work objects——corks in the case shown in the drawings——are unfailingly oriented and exited in the position of cork 18 (FIGS. 1 and 2) by virtue of the rod structure of my invention best understood by reference mainly to FIGS. 2 and 3, although the elements may be seen at FIG. 1 as well. More specifically rods 26, 28 are gradually reduced in diameter along confronting rod segments 50,52 to form a more or less "hour glass" profile immediately above upper terminus 48 of delivery conduit 22. Such rod diameter reduction establishes opening 54 having diameter D between the rods wherein diameter D is larger than diameter *d* of the cork head portion. Thus a cork or work piece, if positioned at opening 54 with the head thereof in vertical alignment with the remainder of the cork, will drop through opening 54 and be exited at delivery station 20 passing through terminus 48 and conduit 22 in the desired predetermined work piece orientation referred to hereinabove. Such positioning is achieved in accordance with the present invention by deflectors 54, 56 associated, respectively, with rods 26, 28.

Each of deflectors 55, 56 are comprised of the same elements, so that only deflector 55 is described herein, it being understood that the same description applies to deflector 56. More specifically deflector 55 provides frusto-conical surface 58 which is formed at one face of cylinder 60 secured to rod 26. As a cork exemplified by the one shown at position I (FIG. 2) advances on rods 26, 28 toward the general region of delivery station 20, the piece crosses over opening 54 unable to pass therethrough, since the size of the cork head on its side is too large to pass through opening 54. Immediately thereafter, however, as shown by the cork at position II, one side of the head end of the cork encounters frusto-conical surface 58 of deflector 56. Such engagement with the sloped surfaces of the deflectors causes the cork to be lifted through the position indicated by cork position II to that of position III, and thence further until the work object is maneuvered to the aforementioned predetermined position and thus caused to pass through opening 54 as explained above.

It should be noted that while deflectors 55, 56 may be formed integrally with shafts 26, 28, I prefer that these elements be separately fabricated and provided with through bores for slidable placement on the shafts. The deflectors may then be secured in place by means of set screws or the like; but by employing such separate assembly, some adjustment may be achieved in the placement thereof upon the shaft, so that somewhat different size corks or other work objects may be handled.

In the event that a cork should "hang up" in the vicinity of opening 54, and refuse for some reason such as size irregularity or the like not to pass through opening 54, end shield 62 (FIG. 1) is provided. That is, as succeeding corks advance along rods 26, 28 to the vicinity of opening 54, and come into contact with the cork that is unable to proceed, such contact by successive work objects will push the recalcitrant member up over the sloping face of shield 62 to thereafter be manually recycled or rejected altogether, should the cause of its delay be an irregularity of sufficient magnitude to require such rejection.

While the foregoing describes certain essential structural elements of my invention, attention is redirected to FIGS. 2 and 4 particularly to explain further that feature of my invention which prevents excess tumbling of corks or other work objects as they proceed along rods 26, 28 that could result in a chance occurrence of the object plunging undesirably head first through opening 54. Such undesired occurrence is prevented by bridge baffle plate 40. As was described above, bridge baffle 40 assures toppling of a cork which initially strikes head first on rods 26,28. In FIG. 4 I show a similar cork or work object which at position I therein is dropping with the smaller width portion of the cork headed downward between rods 26, 28. At position II the work piece has further advanced downwardly between the rods, but now can go no further because of contact between the enlarged head portion of the cork and rods 26, 28.

As is sometimes the case, corks moving somewhat faster due to additional drop as above described, and for other reasons, may tend to bounce or tumble, with the lower portion thereof advancing upward in the direction of arrow 66. This could result in the cork eventually going through position III and thence head first in undesired fashion through opening 54. This is prevented by the guidance imposed by bridge baffle plate 40. That is plate 40 is in the form of an elongate plate secured by conventional means such as weldment or bolting to side shield 42, and located so as to form a surface parallel to rods 26, 28 at normal distance 70 therefrom less than the length of the smaller width portion of the work piece plus that portion of the head about which the entire cork would have to pivot when supported between the elongate rods to continue tumbling or bouncing in the direction of arrow 68. At the same time normal distance 70 is selected to be greater than the distance occupied by the head portion of the piece when the latter is supported between rods 26, 28 and pivoted (by the action of the weight of the head, slope of rods, and movement therealong as explained hereinabove) from upright position IV in the direction or arrows 72 and 74 to position V, wherein the head portion rests upon its side facing toward the delivery station zone at 20. Thus by virtue of that portion of the structure of my invention as just described, I achieve the highly desirable result that a work piece or cork, once placed for advancement along and between rods 26, 28, is constrained from bouncing or tumbling undesirably head first into opening 54.

In this connection also it should be noted that upper wall section or side shield 42, and its opposite hand counterpart 43, secured by conventional means, respectively, to cantilever channels 110, 112, act to prevent undisciplined side bouncing of the work pieces or corks; and thus these shields also serve to prevent corks from going astray.

A further significant benefit which my invention derives from the action of bridge baffle plate 40 is that it enables my unscrambler to reliably process work pieces whose head portions, while more or less cylindrical in the broadest sense, are also rounded off at the top, or even bullet shaped —— a common configuration of plastic stoppers now sometimes employed by certain beverage manufacturers. Such pieces have what may also be described as "mushroom" shaped heads, and when introduced into an unscrambler of the type embracing my invention tend to bounce and roll even more so than the cork variety having relatively uniform cylindrical head portions. However, for the reasons explained above in connection with the structure shown in FIGS. 2 and 4, and further described herein, even pieces with such "mushroom" shaped heads could be oriented and delivered at delivery station 20 in upright position. That is, as such a work piece lands on rods 26, 28 at input station 12, and particularly if it lands head first and commences to tumble about, as soon as it advances along the rods to the region beneath the bridge baffle plate, tumbling is constrained except for pivotal movement about the head itself to a head-first position; or the piece will remain supported between the rods with its smaller diameter portion depending downwardly. And the latter position of course if maintained, as it will be, until dropping through opening 54 achieves the orientation objective of the present invention.

Related to the foregoing is that the use of bridge baffle plate 40 makes it possible to even eliminate entirely plate 36. Indeed, in some cases this is advantageous because plate 36 sometimes tilts the corks and in rare

cases this may cause clogging or slow down of the corks' progress through the unscrambler. As will be recalled, the purpose of plate **36** is to cause the corks to tumble in those instances when the smaller diameter portion initially depends between the rods. This is also the case when a cork commences advancement along the rods in a fast bounce or tumble which, unless inhibited as by the action of plate **36**, may result in the undesirable head-first egress of the cork through opening **54**. However, as explained hereinabove, bridge baffle **40** also prevents the latter type of undesirable tumbling; and hence when used, as I prefer to do, positively assures the function of plate **36**. Conversely, of course, the use of plate **36** also, more or less, acts to some degree as a substitute for bridge plate **40**; but I prefer the embodiment of my invention employing the bridge plate.

Also, particularly in connection with the handling of plastic bottle closures, I have found it advantageous to modify the configuration of elongate rods **26,28**. More specifically, I then provide such rods with helical threads (not shown in the FIGURES) of more or less Acme shape and preferably of a pitch such that an individual plastic closure may be embraced between the rods and within adjacent helical thread walls on each rod. In such case the distance between the root diameters of the two rods corresponds to just slightly more than the small diameter of the plastic closure, i.e., the small part to be inserted in the bottle; and the interval between the Acme, or other type thread, lands on opposite rods is made substantially less than the small diameter of the closure. In this manner I achieve positive control over the orientation and delivery of plastic closures; and indeed, due to the positive driving effect of the threaded rods, the rods need not be sloped as in the case in the earlier described embodiment of my invention. In addition, I may, indeed prefer, rotate the rods in a direction opposite to arrows **44, 46**. In this way, I tend to force the small ends of the plastic closures downwardly between helically conformed rods, thus reinforcing the positive action of my invention in this alternative embodiment thereof.

The mounting of the rods of my invention, and the manner of their rotation, may be understood by referring to FIG. **1**, particularly the B section thereof and guide assembly **30**. Each of guide assemblies **30** comprise vertical support members **78, 80** which at their base are pivotally supported on fixed pins **82, 84**; and these in turn are fixedly secured by conventional means to base block **86** and motor platform **88**. Vertical supports **78, 80** are each free to rotate except that mating gears **90, 92** are respectively affixed to each support. Moreover, the upper ends of the support are constrained from separation by tension spring **94**, opposite ends of which are secured to pins **96, 98**; and these in turn are attached to blocks **100, 102**. While the action of spring **94** tends to pull the upper ends of supports **78,80** together, adjusting screw **104** acts to the contrary. That is screw **104** threadedly engages vertical support **80** through the appropriate threaded bore therethrough and bares its free end against vertical support **100**. Thus by threadedly engaging or disengaging the adjusting screw through its bore, and up against the edge of support **100**, the interval therebetween may be varied, although spring **94** retains the supports in firm position. Since the lower end of supports **78,80** are ganged together by relatively fixed gears **90, 92**, the amount of movement by each support as the adjusting screw is turned in or out remains relatively constant in respect to each other, and substantially symmetrical with respect to the vertical centerline therebetween (not shown).

Each of rods **26, 28** are separately journalled at one end thereof in blocks **100** and **102**, respectively, including a portion of such journalling in the upper ends of supports **78, 80** including spacer bosses **106, 108**. In addition there are provided cantilever channels **110, 112** which shield the rods and at the same time provide support for upper shields **42, 43**; and lower shields **38, 39**. In this manner each of the rods are separately carried by their respective vertical support members; and cantilever therefrom to section A of the device previously described in greater detail.

Rotation of rods **26, 28** is accomplished by means of drive assembly **114** comprising a gear motor or other source of rotational power (not shown) coupled to drive shaft **116** at the place where the shaft is shown interrupted on the drawing. Shaft **116** is provided at one end thereof with drive sprocket **118** which in turn drives chain **120**, the latter being coupled to sprocket **122** which rides freely on shaft **82**. Sprocket **122** in turn is fixedly secured to sprocket **124** which drivably engages chain **126**, the latter being endlessly linked about sprocket **128**. Sprocket **128** is secured to shaft **26** at the portion thereof protruding through vertical support **78** and spacer boss **106** so as to powerably rotate the shaft when the source of rotational power is turned on at shaft **116**.

It is also to be noted that rod **28** is driven in a manner and by mechanical components similar to those described above in connection with rod **26**. More specifically, gear **130** is fixedly secured to sprocket **124** so that as the latter rotates so does the former. In turn gear **130** engages its mate **132** freely rotatably mounted on shaft **84** which thus causes counter rotation of sprocket **134** to which gear **132** is fixedly secured. In turn chain **136** coupled to sprocket **134** drives sprocket **138** secured to rod **28**. As indicated earlier, it is preferred to power the afore-described assembly so that rods **26, 28** counter rotate in the direction of circular arrows **44, 46**; and especially in the case of cork work objects, the rotation is such that when viewed from the sprocket end of the drive, rod **26** turns in a counter clockwise direction and rod **28** in a clockwise direction.

It should be noted that by virtue of the type of chain drive assembly above described, my invention embodies the useful feature that the interval between rods **26, 28** may be varied relatively easily by merely turning adjusting screw **104** so that it separates vertical supports **78, 80** to a greater or lesser amount. Moreover such adjustment may be made without altering the drive chain assembly itself and even during actual operation, so that should the generally uniform size of work pieces or corks be changed during operation, the distance between rods **26, 28** may be changed by the operator to achieve optimum operating results.

I have explained my invention and various embodiments thereof by way of the foregoing disclosure and accompanying drawings to which it refers. It should

also be noted, however, that my invention also embraces a novel method for processing work objects of generally uniform shape, such as corks for bottling certain beverages and the like, such objects being characterized by a head portion of greater weight than the remainder of the object, and wherein a plurality of said objects provide a randomly oriented source thereof. One example of the practice of my new and useful method may be appreciated by a study of the processing of work objects as illustrated at FIGS. 2 and 4 in the accompanying drawing, and certain of the specifications hereinabove referrable to those FIGURES.

More specifically the process of my invention may be summarized by the following steps:

1. placing work objects, from a randomly oriented source of such objects, seriatim and in random orientation at an input station;
2. advancing each one of the work objects in a downward direction along a zone of travel from the input station to a delivery station; and, during such advancing, agitating the work object so as to cause the heavier head portion thereof to tumble in a direction away from the input station and toward a delivery station, so that the head portion of the work object faces the delivery station;
3. engaging the head portion of each work object when the latter is in the vicinity of the delivery station; and elevating the head portion to a predetermined position in vertical alignment above the remainder of the work object; and
4. When each of the work objects is maneuvered to the position of vertical alignment as set forth in the aforementioned step of engaging and elevating, releasing each of the work objects so that the latter may be subsequently processed after having been delivered one-by-one in said predetermined position, so that such objects may be subsequently processed.

I claim:

1. In the handling of work objects of generally uniform shape such as corks for bottling certain beverages and the like, such objects each being characterized by a head portion of substantially circular cross-section having a diameter greater than any width dimension of the remainder of said object, said head portion also being of greater weight than the remainder of said object, and a plurality of said objects comprising a source thereof, a device for receiving said work objects seriatim and in random orientation from said source at an input station, and exiting said objects one-by-one in predetermined orientation at a delivery station, comprising in combination;

a pair of elongate rods;

guide means for supporting said rods in parallel alignment at a distance apart from each other less than the head diameter of said object and greater than any width dimension of the remainder thereof, wherein one proximate pair of said rod ends thus supported correspond to said input station and the opposite ends proximate said delivery station, said rods each shaped to form a reduced section thereof proximate said delivery station defining an opening between said rods to pass a work object therethrough when the object is advanced to said opening and positioned to said predetermined orientation, and said guide means supporting said rods with the longitudinal axes thereof sloped downwardly from said input to said delivery station, so that each of said objects is supportably carried by said rods after placement thereon and movably advanced toward said delivery station;

driving means coupled to at least one of said rods to rotate the latter about its central longitudinal axis causing continuous agitation of a work object thereon and advancement of such object from said input station to said delivery station; and

deflector means secured to each of said rods at the end proximate said reduced section thereof, said deflector means to engage the head portion of a work object advanced thereto and cause such work object to be positioned to said predetermined orientation.

2. The device in accordance with claim 1 wherein the opening between said rods is formed by a continuum of reduced diameter section associated with each of said rods and confronting each other, each last said continuum of sections defining a transverse arcuate or "-hour glass" profile on said rods, and wherein the interval between confronting surfaces of said profiles is greater than the diameter of the head object or said work object or cork.

3. The device in accordance with claim 1 wherein said work object is further characterized as comprising in addition to said one portion a second portion coaxial thereto and also having a generally circular cross section, and said predetermined oriented position occurs when said one portion is in vertical alignment above said second portion, and wherein further said deflector means comprises:

a frusto-conical surface formed concentrically about the central longitudinal axis of the rod upon which it is carried and located to face said opening.

4. The device in accordance with claim 1 and wherein further a plate and means for securing same in position below at least one of said rods proximate to said input station and at a vertical distance therefrom at least less than the length of the smaller width portion of said work object, said plate width formed so as to contact at least a portion of a work object being advanced along said rods if the smaller width portion depends therebetween, and thus cause the work object to be tumbled so that the head portion thereof faces downwardly along said rods toward said delivery station.

5. The device in accordance with claim 1 and wherein further a bridge baffle and means for securing same in position above at least one of said rods proximate to said input station and at a vertical distance therefrom at least less than the length of the smaller width portion of said work object, said bridge baffle width formed so as to contact at least a portion of a work object being advanced along said rods if the smaller width portion of the object is disposed vertically upward from said head portion, and thus cause the work piece to be tumbled so that the head portion thereof faces downwardly along said rods toward said delivery station.

6. The device in accordance with claim 1 and wherein further a bridge baffle plate and means for securing same in position above at least one of said rods proximate to said input station, said baffle plate located in a plane substantially parallel to said elongate rods and having one transverse edge thereof proximate to said input station and the other to said delivery station, the normal distance from said elongate rods to said baffle plate being less than the distance required to pivotally rotate said work piece with the head portion thereof supported between said rods and the smaller width portion in movement thereabout, and greater than the distance occupied by the head portion of said piece when the latter is supported between said rods and pivoted from an upright position to the position wherein the head portion rests upon its side facing toward said delivery station, so that tumbling by said work piece once advanced along and between said rods is constrained to the latter recited movement.

7. A method for processing work objects of generally uniform shape, such as corks for bottling certain beverages and the like, such objects each being characterized by a head portion of greater weight than the remainder of said object, and wherein a plurality of said objects provide a randomly oriented source thereof, said method comprising the steps of:

placing said work objects seriatim and in random orientation at an input station;

advancing each of said work objects in a downward direction along a zone of travel from the input station to a delivery station; and, during said step of advancing, agitating the work object causing the latter to tumble so that the head portion thereof faces away from the input station and toward the delivery station;

engaging the head portion of each said work object when the latter is in the vicinity of the delivery station; and elevating said head portion to a predetermined position in vertical alignment above the remainder of the work object; and,

when each of said work objects is maneuvered to the position of vertical alignment as set forth in said step of engaging and elevating, releasing each of said work objects so that the latter may be subsequently processed after having been delivered one-by-one in said predetermined position.

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