

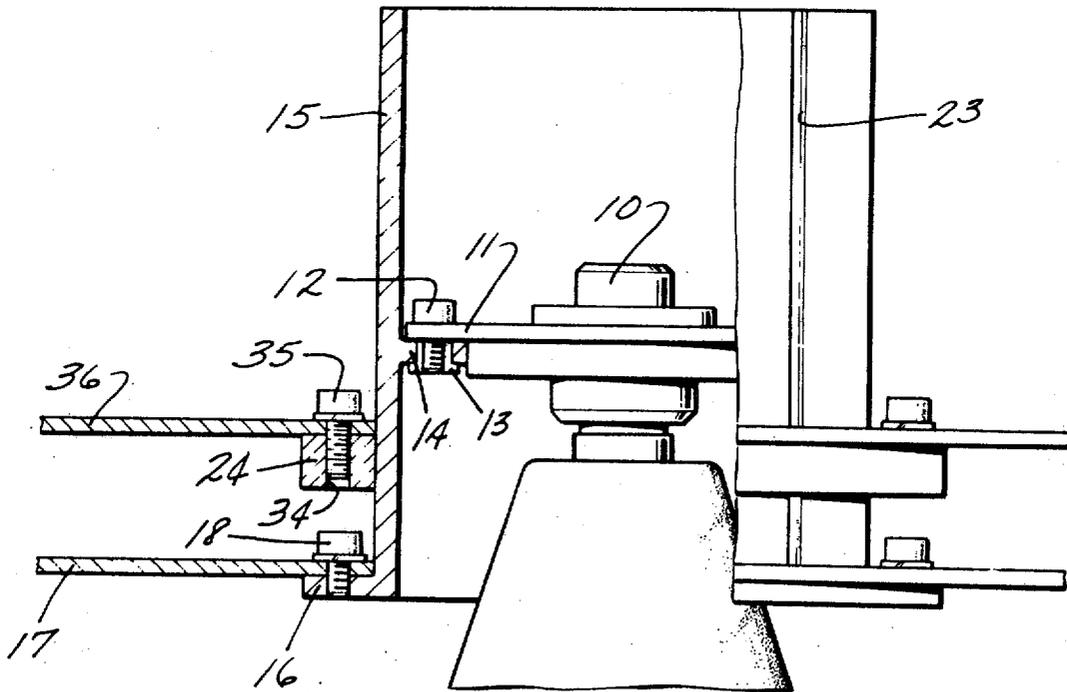
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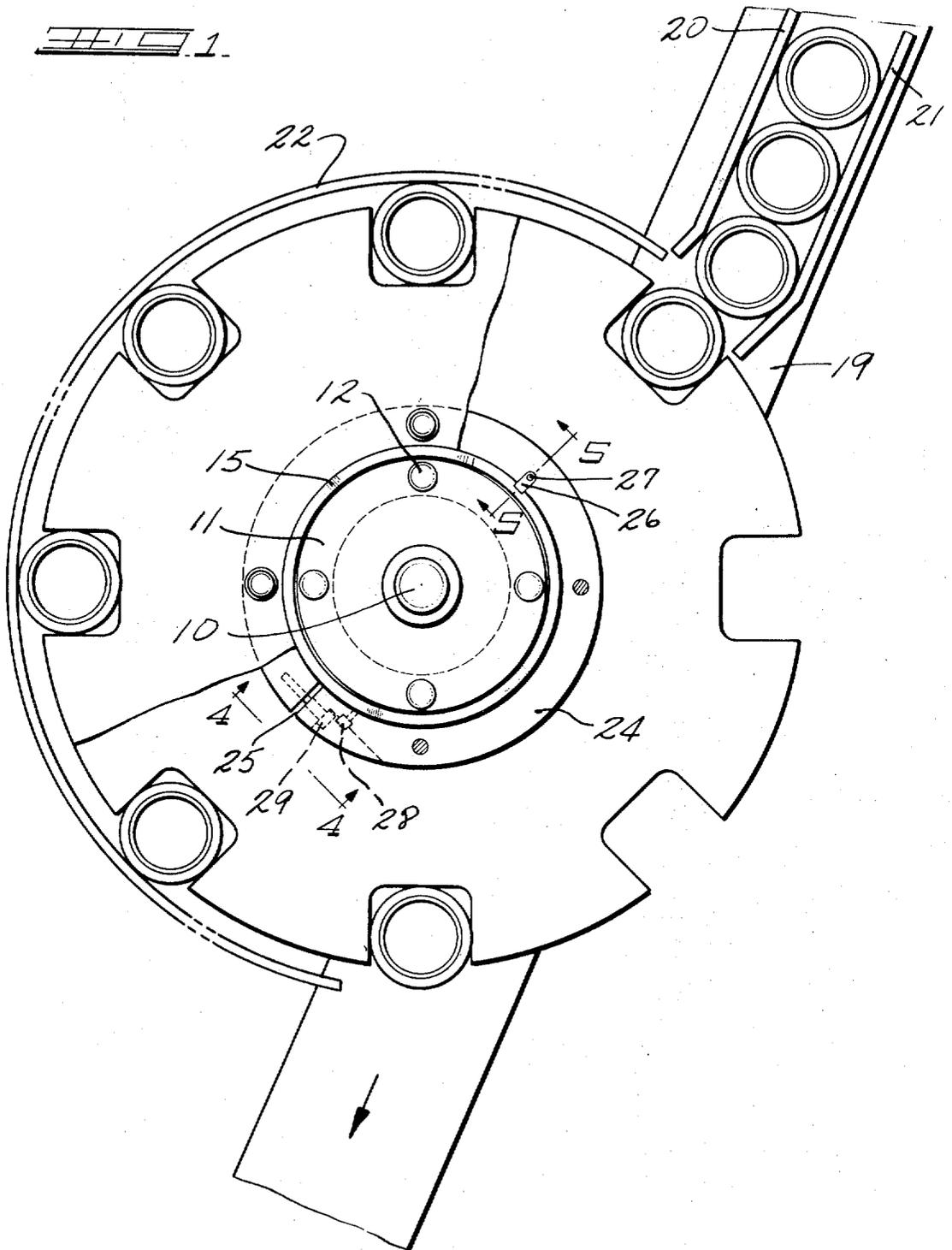
[56] **References Cited**  
**UNITED STATES PATENTS**  
 2,512,199 6/1950 Dawson, Jr. .... 141/152 X  
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[54] **CONTAINER-HANDLING APPARATUS**  
 10 Claims, 6 Drawing Figs.

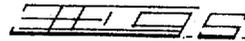
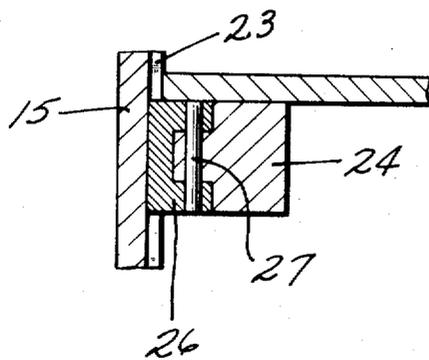
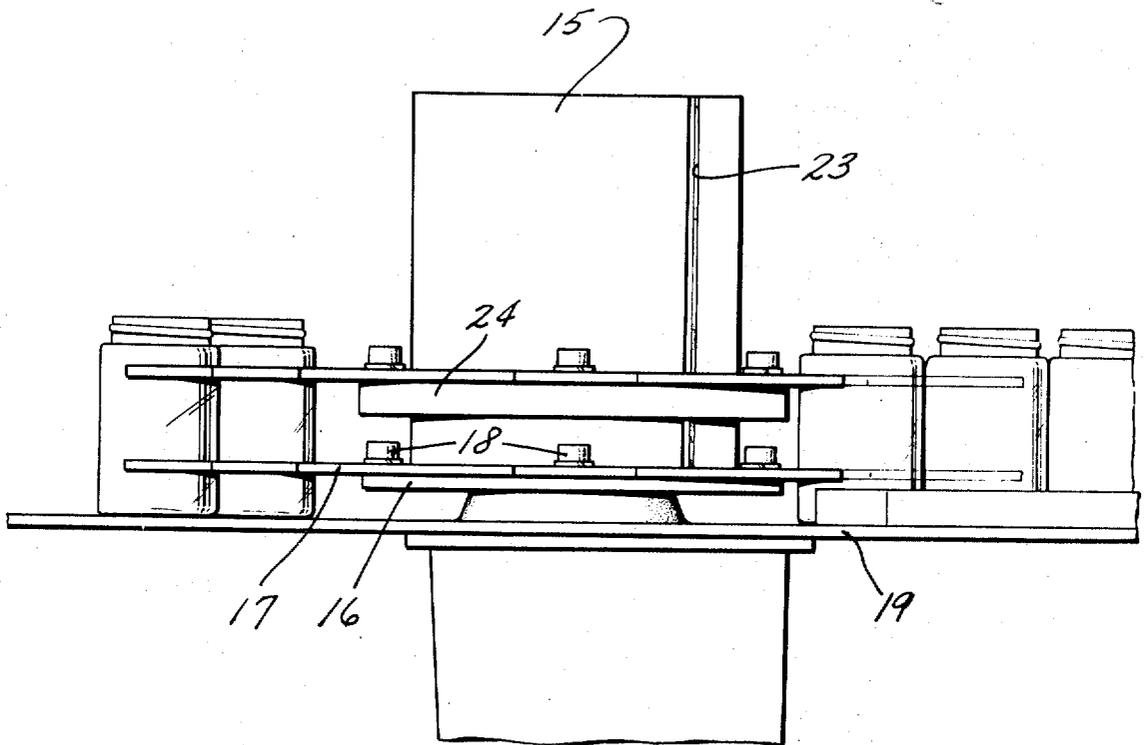
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 141/152  
 [51] Int. Cl. .... **B65g 29/00**  
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 177, 145, 146, 147, 209; 198/117

**ABSTRACT:** Indexing mechanism for multiple-station, glass-ware inspection machines in which two or more pocketed star wheels are used. The mounting of the plural star wheels, which are selected as to size of pockets depending on the height and width of the ware being inspected, is simplified by the use of a universal hub to which the lower star wheel is fixed. Additional star wheels are mounted on the hub at adjustable heights by the use of split, clamping rings that are keyed to the hub to maintain vertical orientation of the pockets of all star wheels.

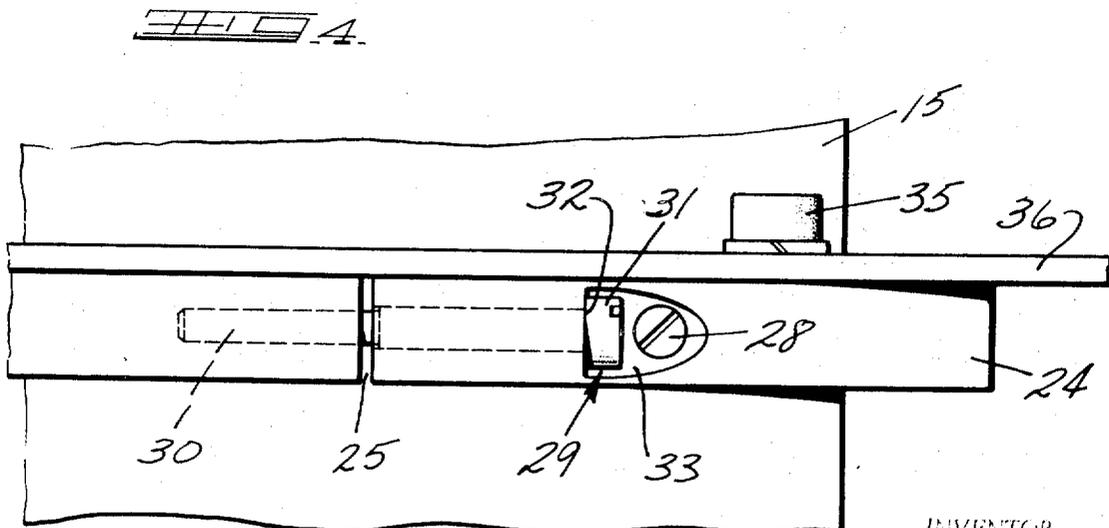
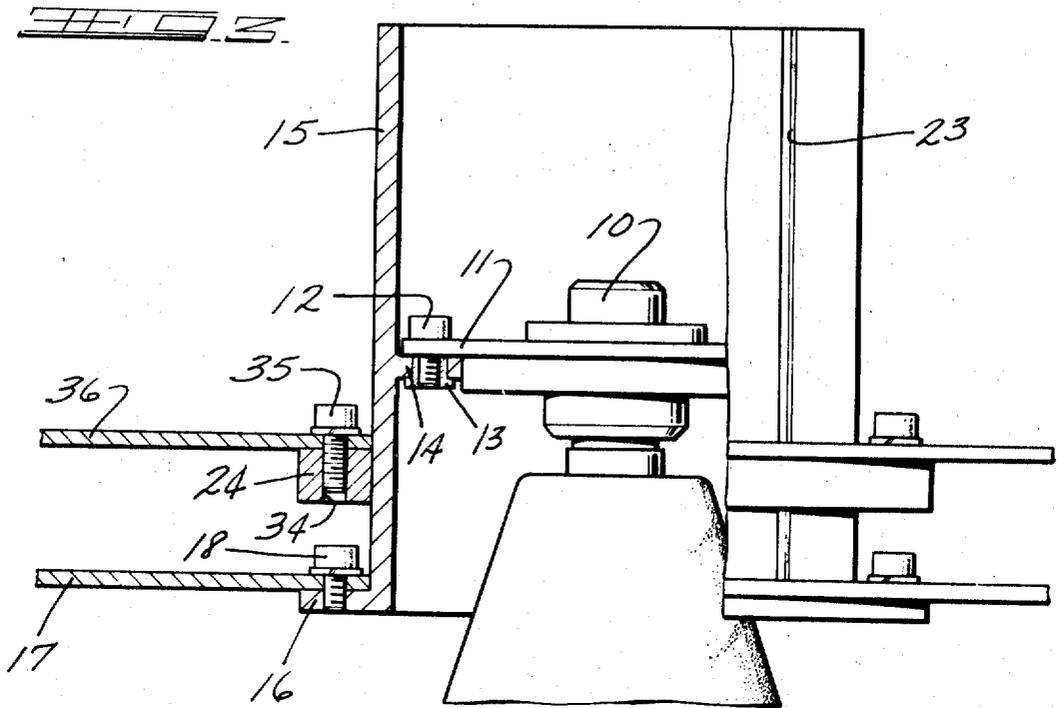




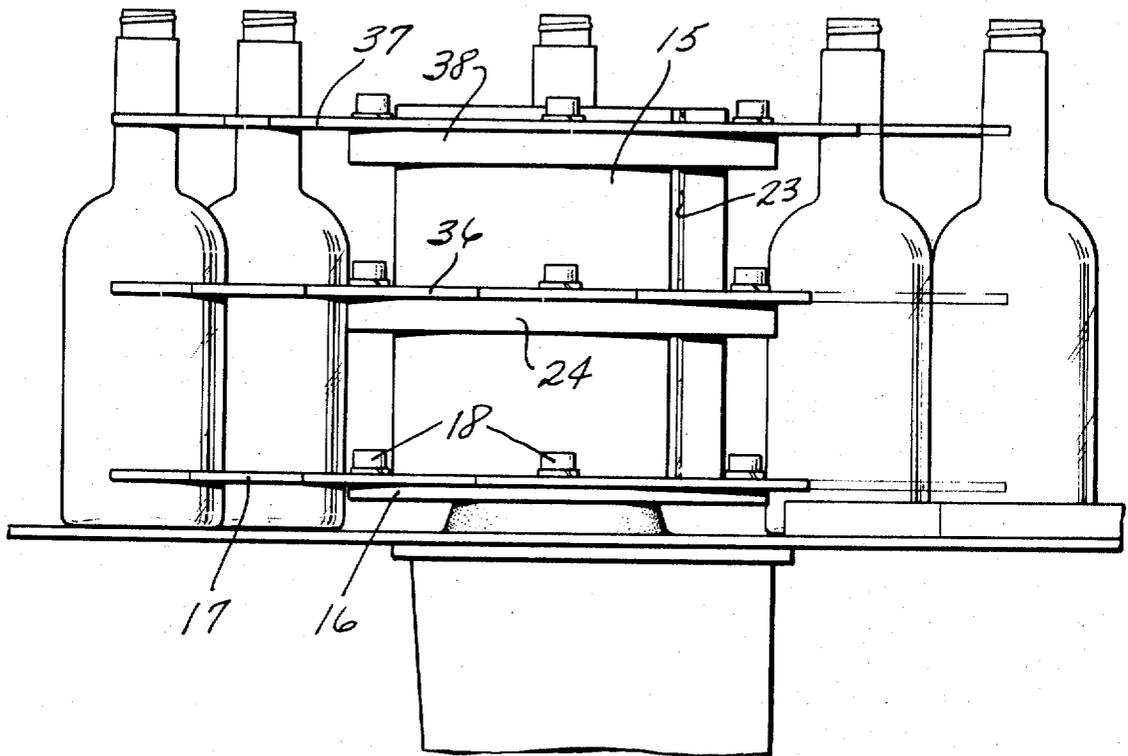
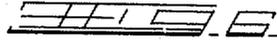
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## CONTAINER-HANDLING APPARATUS

## BACKGROUND OF THE INVENTION

It has been the practice in the past when necessary to adapt a gauging and inspection machine to inspect tall ware such as olive jars or beverage bottles, to add additional star wheels to provide the necessary stability during indexing of the ware between inspection stations or positions. This addition was accomplished by using spacer rings or posts which had to be selected from a necessary inventory of a large number, and then assembled before being mounted on the drive shaft of the machine. Orientation of the plural star wheels had to be maintained during assembly and mounting, thus requiring substantial time and attention to detail resulting in periods of "downtime" during changeover. If initial selection were not properly made, then the process had to be repeated with the result that a substantial quantity of ware would have to be accumulated, usually by hand, and inspected later, thus disrupting the orderly flow of ware from the forming machines to the warehouse. Due to the fact that glassware of many differing sizes, both as to height and diameter, is produced and inspected, a substantial inventory of spacers or posts was necessary for each machine.

The present invention overcomes many of the difficulties attendant to setting up the inspection machine for handling various-size ware by the use of a single hub and star wheel mounting arrangement in which fewer parts are needed and changeovers may be made in a relatively short time.

## SUMMARY OF THE INVENTION

Bottle-indexing apparatus in which a vertical, cylindrical hub is provided to which a plurality of pocketed star wheels may be adjustably attached. The arrangement of the hub with the keyway and the use of split rings with keys for mounting the star wheels provides an easy, quick adjustment arrangement for changing the height of the star wheels relative to the hub to accommodate bottles or containers of different heights, with adjustments and changes of star wheels always being effected with precision, obviating any alignment problems.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of the star wheel mounting apparatus of the invention with the top star wheel broken away;

FIG. 2 is a side elevational view of the apparatus of FIG. 1;

FIG. 3 is a vertical, part sectional, and part elevational view of the hub and star wheel mounting of the invention;

FIG. 4 is a detailed side view, on an enlarged scale, taken at line 4-4 of FIG. 1;

FIG. 5 is a cross-sectional view, on an enlarged scale, taken at line 5-5 of FIG. 1; and

FIG. 6 is a side elevational view, similar to FIG. 2, illustrating the modification of the invention to adapt it to handle tall containers.

With particular reference to FIGS. 1-3, the following detailed description of the apparatus of the invention is made.

Indexing drive mechanism (not shown) is connected to the central shaft 10, it being understood that the drive mechanism for the shaft 10 is essentially the same as that disclosed in U.S. Pat. No. 3,313,409 issued Apr. 11, 1967.

Essentially, the drive consists of an indexing-type rotation of the shaft 10. The shaft 10, at its upper end, carries a mounting plate 11. The plate 11 is provided with four mounting holes through which threaded bolts 12 extend and engage with threaded bushing 13 carried by an inwardly extending, annular flange 14 of a generally cylindrical mounting hub 15.

The hub 15 has an outwardly extending flange 16 adjacent its lower end to which a lower, pocketed star wheel 17 is attached by means of threaded bolts 18. The star wheel 17 (as best shown in FIG. 2), when attached to the hub 15, lies in a horizontal plane, above a bottle-supporting conveyor 19 which is moving in the direction of the arrow shown thereon in

FIG. 1. It can readily be seen that the conveyor 19 moves the containers, in series, between a pair of guide rails 20 and 21 into the pocket of the star wheel when the pocket is positioned opposite the leading container in a row of containers approaching the star wheel.

As is the case in the bottle inspection apparatus, the bottles or containers are indexed by movement of the star wheel in a counterclockwise direction, as viewed from above, in succession to the four positions at the left side of FIG. 1, wherein the bottles may be inspected for various defects, similar to those being inspected in the above-referred-to U.S. Pat. No. 3,313,409. The bottles are supported during the index movement from inspection station to inspection station by a table having an upper surface essentially at the same height as the height of the conveyor 19. Bottles are held within the pockets during the indexing movement by a semicircumferential guide rail 22.

As can best be seen when viewing FIG. 2, the lower star wheel 17 engages the bottles at a point below the center of mass of the bottle or container. Depending upon the size of the containers being inspected, and in particular the height of the containers, one or more additional star wheels are necessary to properly steady the bottles during their indexing movement from station to station and when being rotated in station for inspection purposes. With this in mind, the hub 15 serves as the mounting means for additional star wheels, for example, one additional star wheel as specifically illustrated in FIG. 2 and two additional star wheels as specifically illustrated in FIG. 6.

The hub 15 is provided with a vertical keyway 23. The keyway 23 provides a locating and positioning means to assure the proper alignment and orientation of all additional star wheels which are to be mounted on the hub. The additional star wheels are mounted to the hub 23 by means of a split ring 24, having its split opening 25 located diametrically opposite from a key 26 which is adapted to ride in the keyway 23. The key 26, as specifically shown in FIG. 5, is mounted to the ring 24 by a vertical retaining pin 27.

As will readily be appreciated, the split ring 24, prior to mounting, has an internal diameter slightly larger than the external diameter of the hub 15 so that the ring may be easily telescoped over the hub 15. Clamping of the ring 24 to the hub is accomplished by turning a tensioning screw 29. As clearly shown in FIG. 4, the tensioning screw 29 has a threaded end 30 which is threaded into one end of the ring 24 with its head 31 being seated against the vertical face 32 of a cutout portion 33 of the ring 24. Turning of the head 31 of the screw 29, moves the ends of the ring together to tend to close the split opening 25 and effectively, circumferentially clamp the ring 24 to the hub 15.

A screw 28, with its head extending outwardly into the path of the head 31 of the screw 29, provides an arrangement whereby the turning of the screw 29 to loosen the ring 24 on the hub 15, to make adjustments, will come into contact with the head of the screw 28 and provide a slight amount of opening force with respect to the ring 24 so that the ring, if it is still relatively tight with respect to the hub 15, will slightly open up the opening 25 to permit easy moving of the ring 24 relative to the hub.

The ring 24 is provided with four precisely located threaded openings 34 within which bolts 35 are threaded with a second star wheel 36 clamped between the bolthead and the ring 24. It can readily be seen that upon loosening of the screw 29 and setscrew 28, the ring 24 may be raised or lowered relative to the hub to accommodate the apparatus to the handling of bottles of varying or differing heights. Furthermore, replacement of the star wheels may be easily accomplished merely by removing the bolts 35 and 18 and substituting star wheels having pockets of different dimensions so as to accommodate ware of differing diameters.

As particularly illustrated in FIG. 6, a third star wheel 37 may be mounted to the hub by means of a split ring 38 in a substantially identical manner as disclosed with respect to the

mounting of star wheel 36. Thus it can readily be seen that an easy, economical and quick change arrangement is provided for adjusting the heights of the star wheels relative to each other so as to provide apparatus best able to handle ware through the inspection stations of the inspection machine. Furthermore, when it is necessary to adapt the inspection machine for the inspecting of ware of a totally different diameter, the present arrangement now permits easy removal and replacement of star wheels without the use of spacers as specifically shown in FIG. 2 of the above-referred-to U.S. Pat. No. 3,313,409.

By reason of the fact that the key 26 which is carried by the ring is positioned at the diametrically opposed, point of the ring 24 relative to the opening 25, clamping of the ring to the hub will in no way change the vertical orientation of the pockets of the added star wheels with respect to the lower star wheel which is fixed to the flange on the hub 15. The location of the mounting holes in all star wheels is the same so that when they are fixed to the rings 24 and 38 or to the flange 16, they are always in the same relative orientation with respect to each other. No problem with respect to vertical alignment is encountered.

I claim:

1. Indexing apparatus for moving glass containers in series through a plurality of inspection positions arranged in a semicircle, comprising a cylindrical hub positioned with its axis vertical, drive means connected to the interior of said hub for rotating said hub about its axis, an annular ledge extending outwardly from the lower edge of said hub, a first, pocketed star wheel mounted on said annular ledge in predetermined, circumferential orientation, split ring means telescopically received on said hub, means carried by said ring for circumferentially clamping said ring to said hub, alignment means interconnecting said ring and hub, a second pocketed star wheel, means mounting said second star wheel on said ring, the mounting of the star wheels to the hub being such that the pockets are maintained in precise, vertical alignment.

2. The apparatus of claim 1, wherein said alignment means comprises a vertical keyway formed in the exterior of said hub

and key means mounted on said ring means and engageable in said keyway on said hub.

3. The apparatus of claim 1, further including a third star wheel, second split ring means telescopically received on said hub and means mounting said third star wheel on said ring.

4. The apparatus of claim 3, including alignment means interconnecting said second ring and said hub.

5. The apparatus of claim 4, wherein said alignment means comprises a vertical keyway formed in the exterior of said hub and key means mounted on said ring means and engageable in said keyway on said hub.

6. The apparatus of claim 2, wherein said key means is located diametrically opposite from the split in said ring.

7. Bottle engaging and indexing apparatus comprising, a vertical, cylindrical hub, means connected to said hub for rotating said hub about its vertical axis, an annular flange extending outwardly adjacent the lower end of said hub, a first horizontal star wheel mounted on said flange, a radially split, annular ring having an inside diameter greater than the outside diameter of said hub, adjustable means extending between the split ends of said ring for adjusting the gap in said ring, an inwardly extending key mounted on said ring diametrically opposite the gap therein, a vertical keyway formed in said hub within which said key is adapted to ride, a second horizontal star wheel, means mounting said star wheel on said ring, and setscrew means carried by said ring and engageable with said hub for retaining said ring at adjusted height prior to final circumferential engagement of said ring to said hub by operation of said adjustable means extending between the ends of said split ring.

8. The apparatus of claim 7, further including a third star wheel, second split ring means telescopically received on said hub and means mounting said third star wheel on said ring.

9. The apparatus of claim 8, including alignment means interconnecting said second ring and said hub.

10. The apparatus of claim 9, wherein said alignment means comprises a vertical keyway formed in the exterior of said hub and key means mounted on said ring means and engageable in said keyway on said hub.

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