

[54] BOTTLE UNSCRAMBLING AND ERECTING APPARATUS	2,585,674	2/1952	Owen.....	198/248
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[75] Inventors: Arthur G. Pugh, Vancouver; Fernand G. Fortier, Coquitlam; Alfred B. Patrick, Burnaby, all of Canada	3,339,702	9/1967	Novak et al. ....	198/248
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198/127

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

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198/253, 287, 285, 236, 244, 245, 247, 267,  
198/278, 29, 30, 254, 255, 268, 282,  
198/263, 274, 127

[56] References Cited

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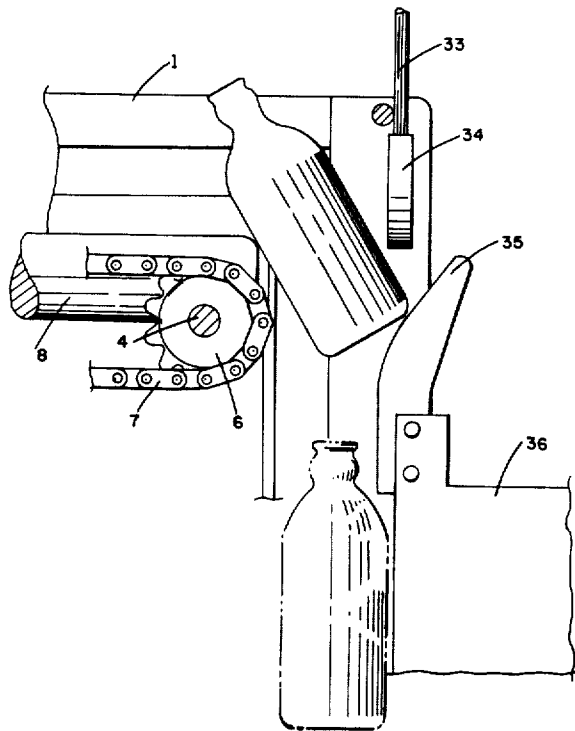
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[57] ABSTRACT

The invention relates to bottle unscrambling apparatus i.e. apparatus which will bring about erection of bottles from a horizontal plane to a vertical plane and preferably during their travel from the point of their uncasing to the usual sterilizer, such erection being achieved at one end of a conveying table either by combined fixed bottle support and guide members which guide the bottles, in an erected condition into bottle stalls, or by pivotal support members which achieves the same effect.

6 Claims, 8 Drawing Figures



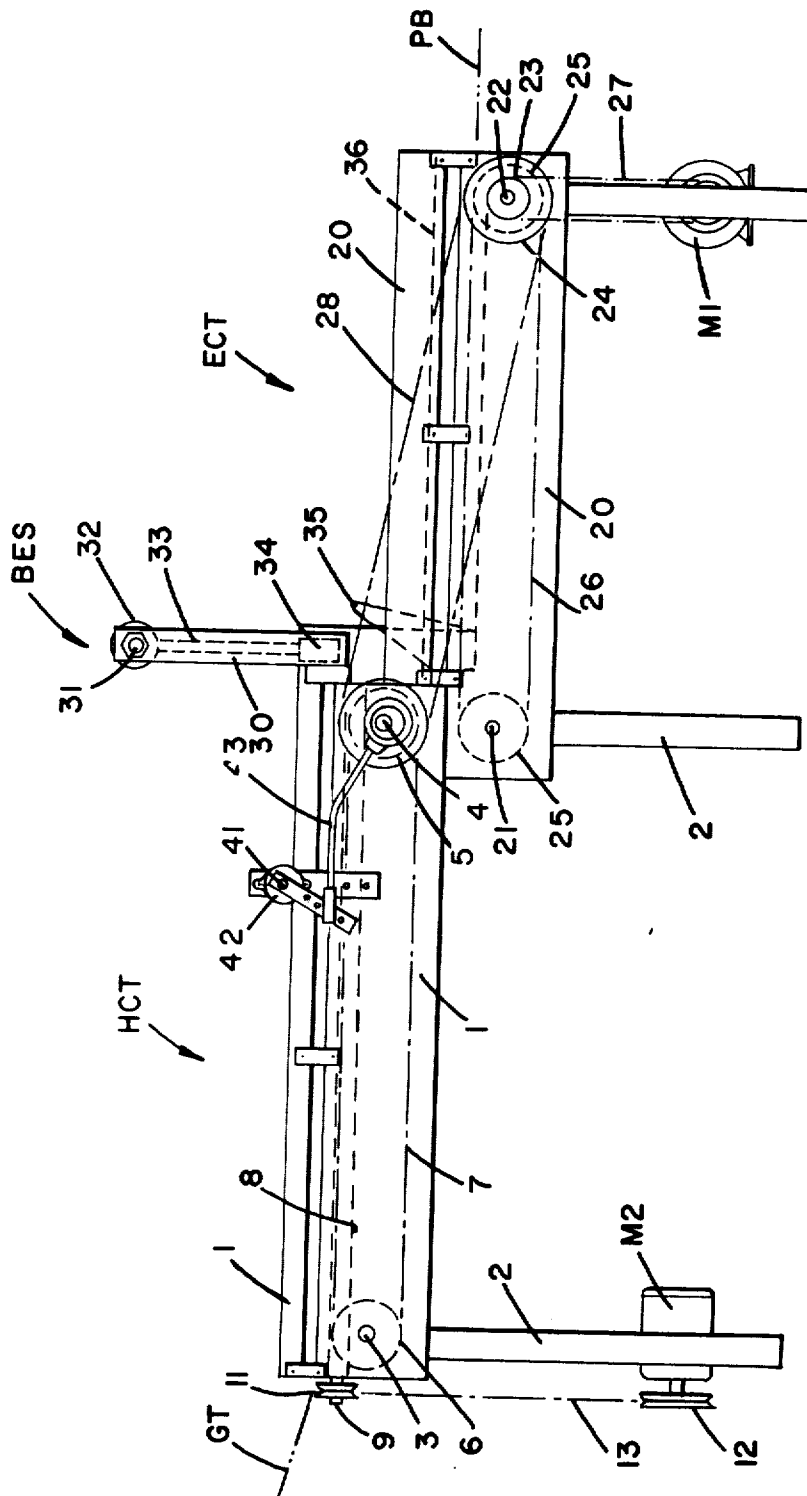


FIG. 1

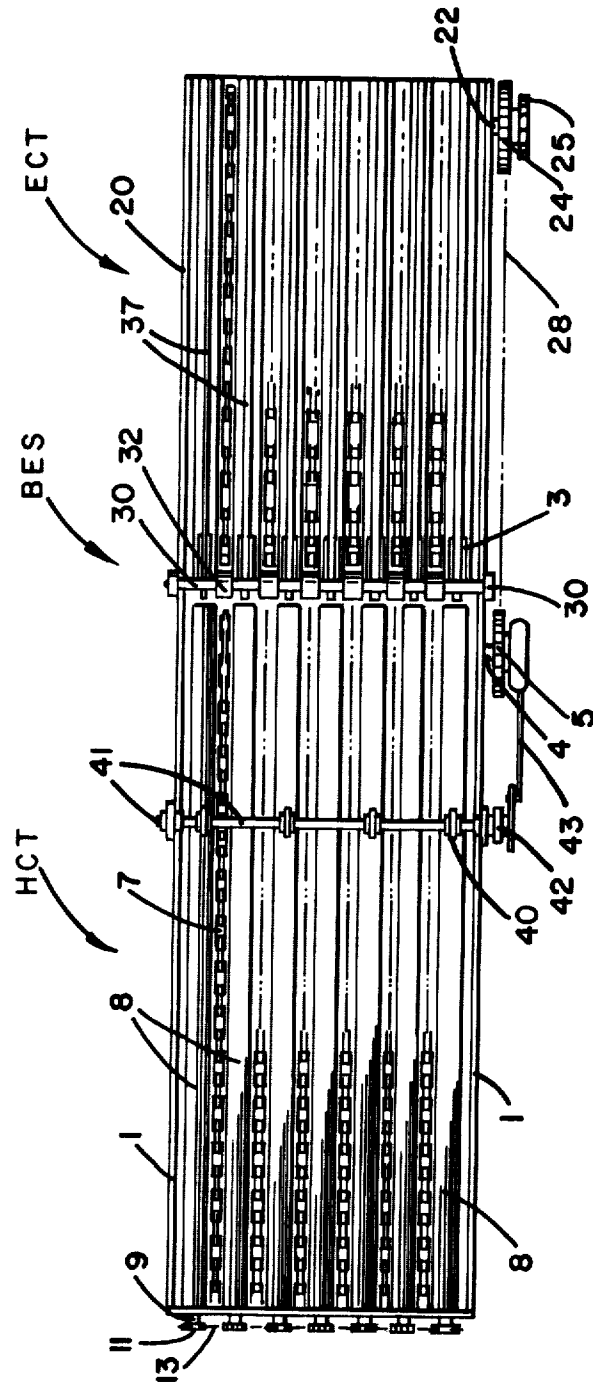


FIG. 2

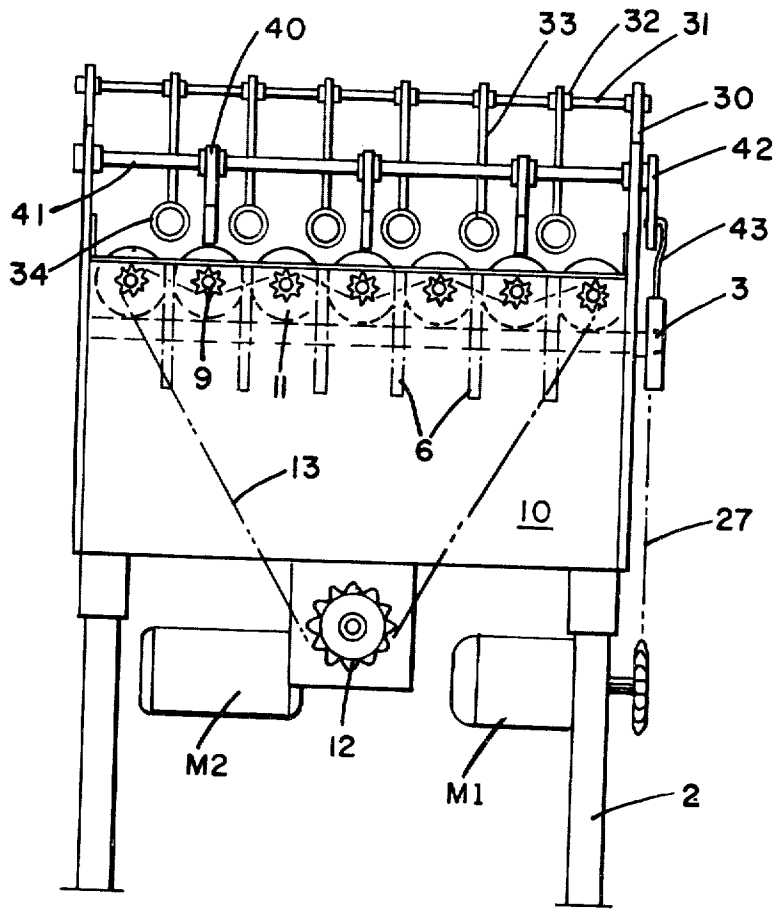


FIG. 3

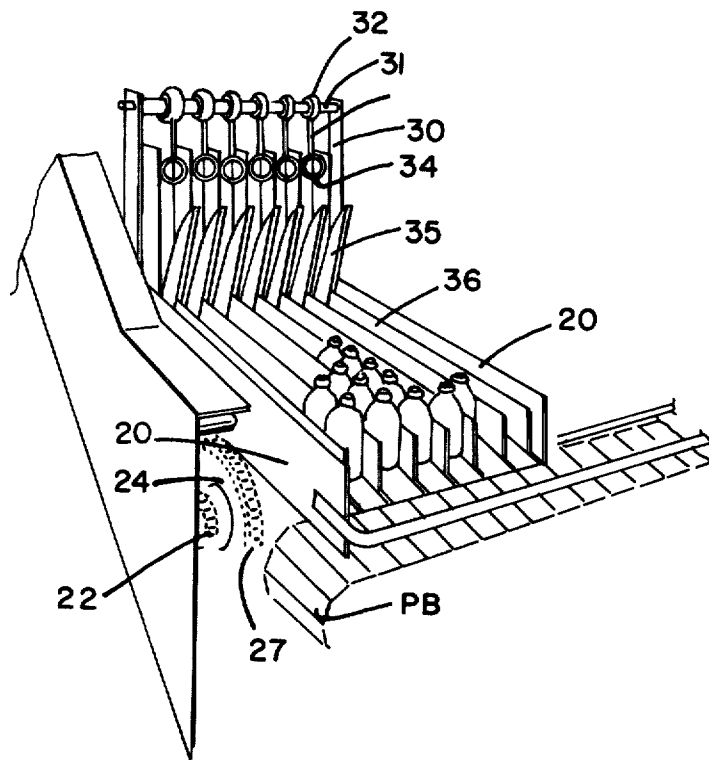


FIG. 4

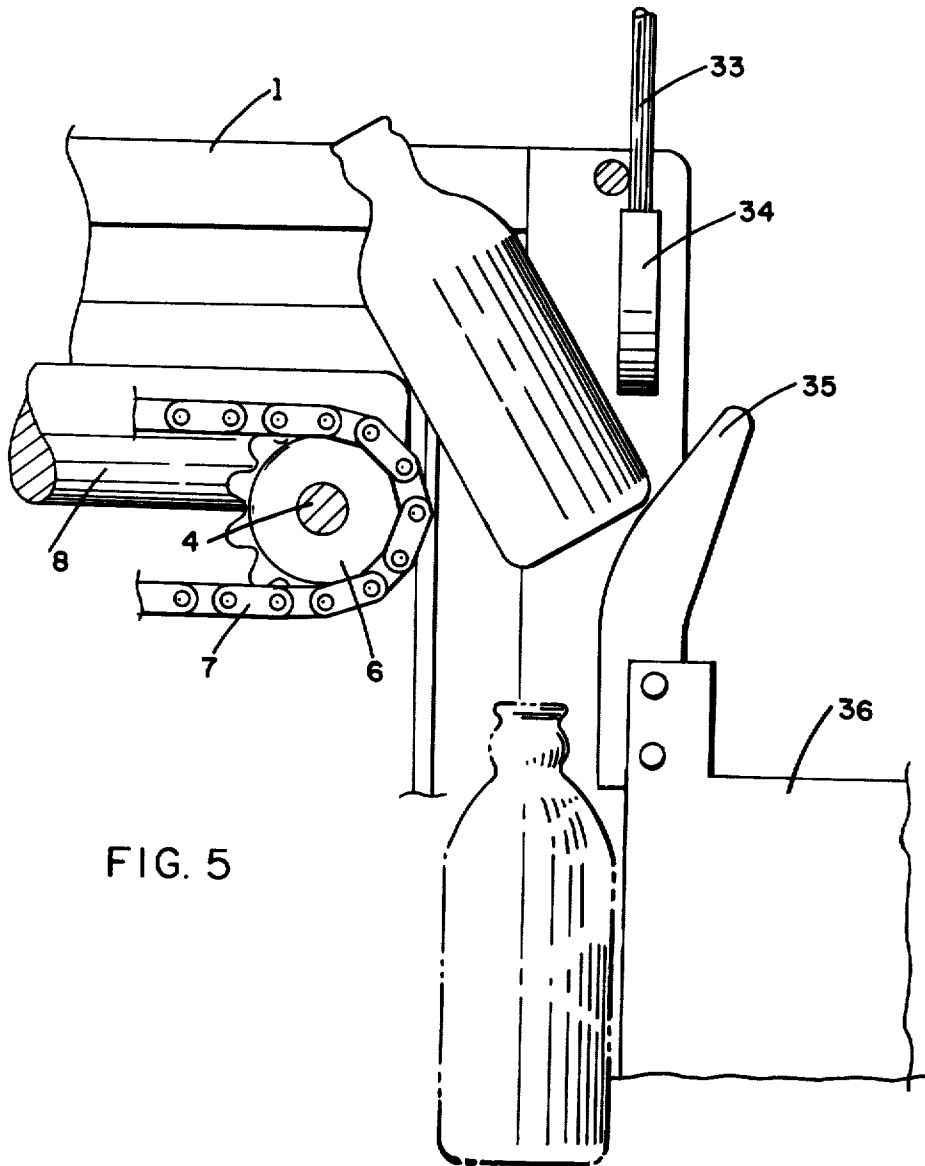


FIG. 5

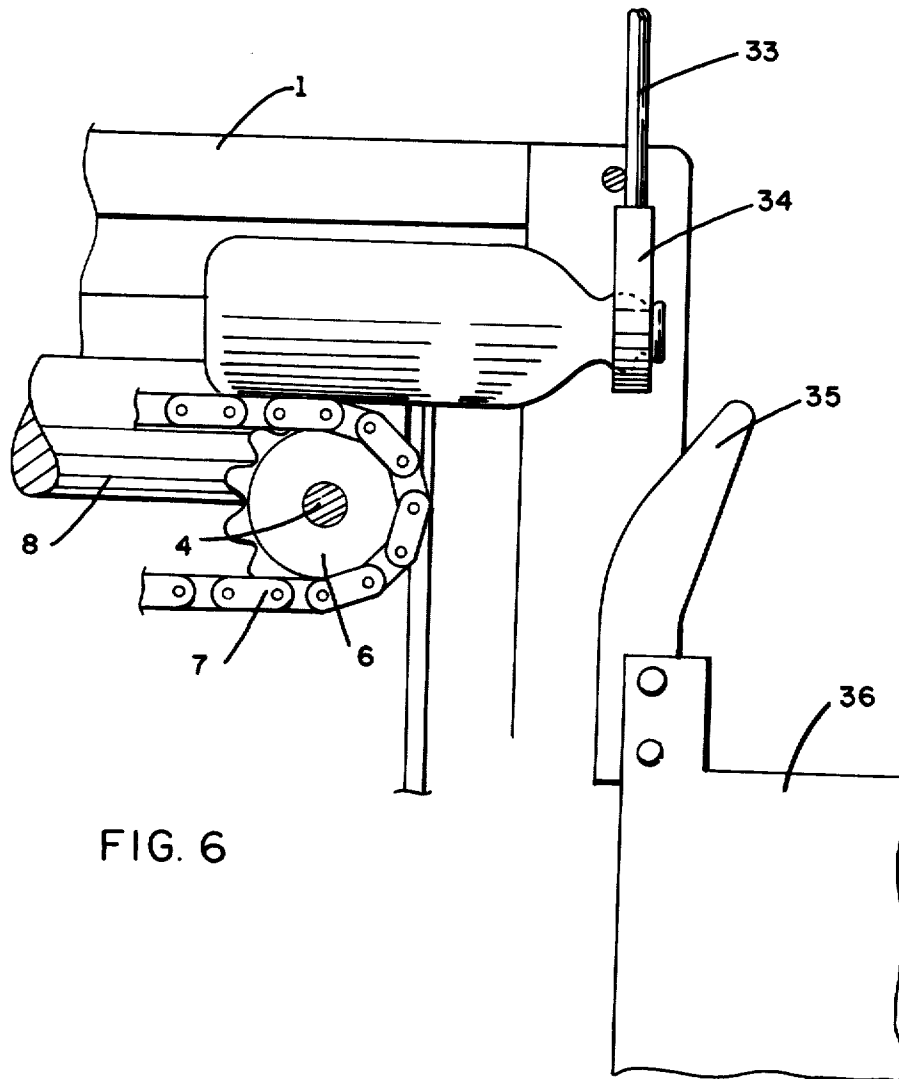


FIG. 6

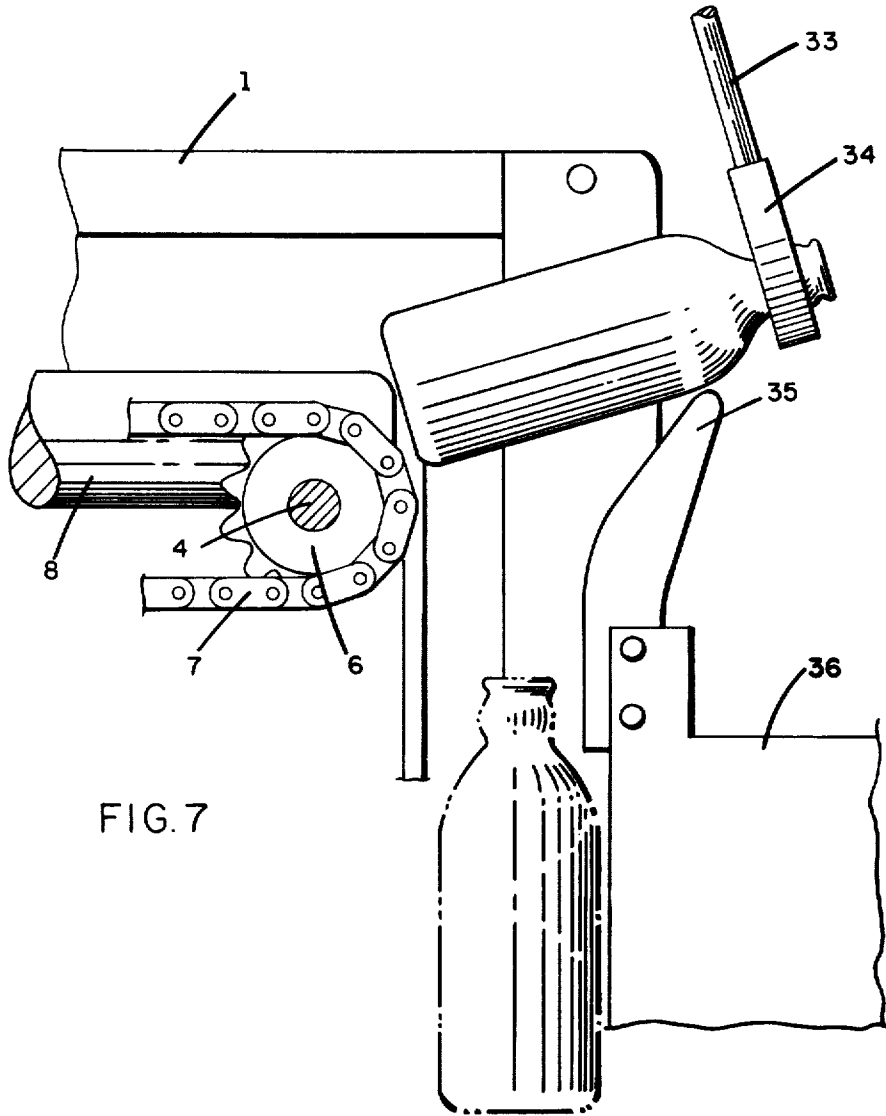


FIG. 7

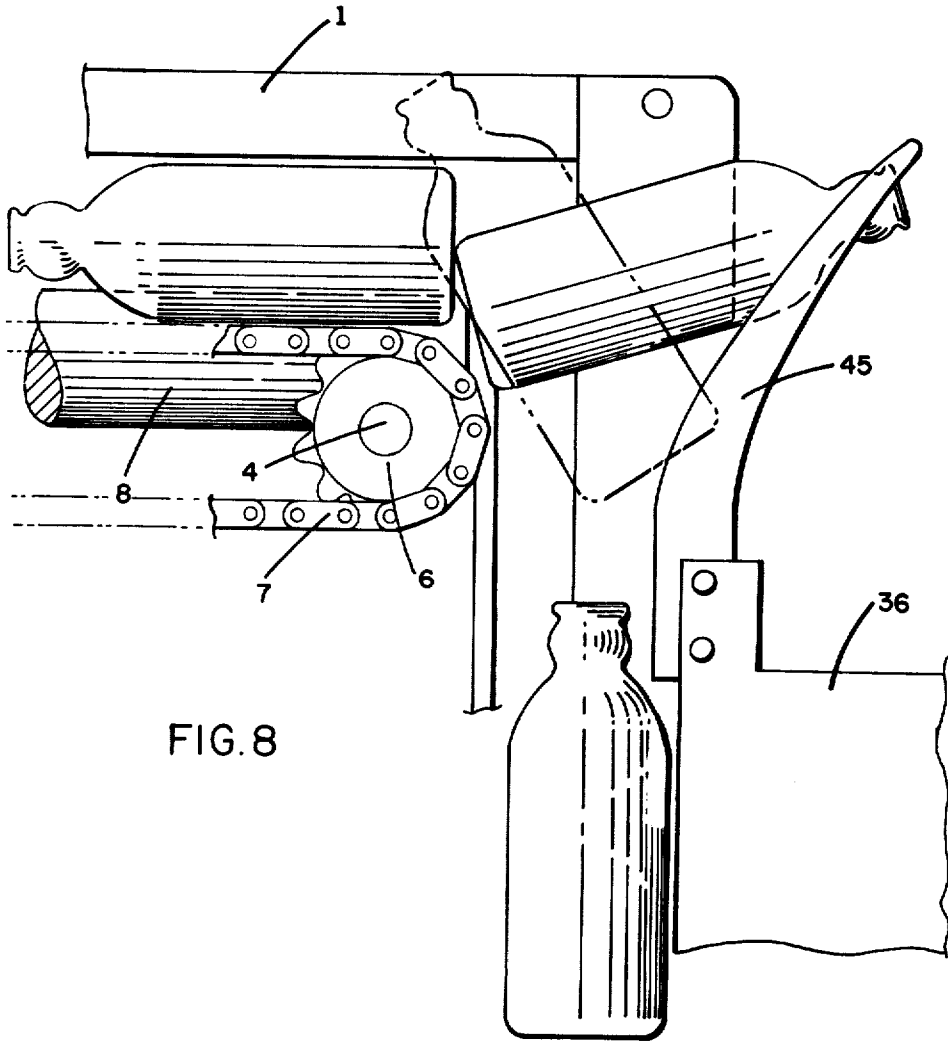


FIG. 8

## BOTTLE UNSCRAMBLING AND ERECTING APPARATUS

This invention relates to bottle unscrambling apparatus.

When empty bottles are returned to a beverage manufacturer, they must be uncased from their containers and then passed through a sterilizer before re-use. When the empty bottles have been uncased and deposited on to a moving conveyor belt leading to the sterilizer, many of them are, often as not, found to be lying on their sides and labour must be employed to maintain watch and to stand such bottles vertically prior to their arrival at the sterilizer.

Thus it is the object of the present invention to overcome this difficulty by providing apparatus which will automatically unscramble uncased bottles and ensure that they will all be in an upright position when they are transferred to the conveyor leading to the sterilizer.

The invention is illustrated by way of example and diagrammatically in the accompanying drawings in which:

FIG. 1 is a front elevation of the bottle unscrambling apparatus;

FIG. 2 is a plan of FIG. 1;

FIG. 3 is an end elevation of the apparatus;

FIG. 4 is a further end elevation but taken from the opposite end to that shown in FIG. 3;

FIGS. 5-7 are detail views of part of the mechanism of FIG. 1, and

FIG. 8 is a diagrammatic illustration of an alternative form of mechanism.

Empty beverage bottles are usually returned to the manufacturers in cardboard cartons or what are termed in the art as "pop carriers". The cartons and bottles pass through an uncasing machine which separates the empty bottles from their carriers.

Referring to the drawings, the apparatus forming the present invention includes a non-vertical or horizontal bottle conveying table indicated generally at HCT, a bottle erecting station BES and an erect bottle conveying table indicated generally at ECT. The apparatus forming the present invention may also include a vibrating grid table, such as that indicated generally at GT in FIG. 1 leading from the uncasing machine (not shown) to the table HCT and along which the empty bottles pass whilst all tramp material is being removed.

The non-vertical bottle or first conveying table HCT includes pairs of upper and lower side-plates 1 carried by pedestal legs 2, the plates supporting a pair of cross-shafts 3,4, the latter having a main drive sprocket 5 mounted on one end thereof. Both the cross-shafts 3 and 4 serve as the mounting for a plurality of sprockets 6 around which chain-conveyors 7 extend. Extending parallel with the drives 7, but each being intermediate thereof, is a plurality of rollers 8, each mounted on a shaft 9 projecting through a forward cross-plate 10 and having a sub-drive sprocket 11 mounted thereon. The rollers 8 extend substantially throughout the length of the table HCT.

A motor M2, via a drive sprocket 12 and a chain drive 13, drives the sprockets 11 and it will be seen from FIG. 3 that the chain is arranged so as to drive each sprocket 11 in an opposite direction to that of its neighbour.

Table ECT is located in advance of the forward end of table HCT and slightly below the latter. Table ECT

includes pairs of upper and lower side plates 20 and cross-shafts 21, 22 one end of the latter serving as the mounting for a pair of drive sprockets 23, 24. Cross-shafts 21, 22 also serve as the mountings for a plurality of subdrive sprockets 25 around which a plurality of spaced chain-conveyors 26 pass. A motor M1, via a chain drive 27 and sprocket 23, imparts motive power to shaft 22 and, via a chain drive 28 and sprocket 5, shaft 4.

The bottle erecting station BES includes a pair of vertical straps 30 secured at their lower ends to the terminal ends of the side plates 1. The upper ends of the straps 30 serve as the mounting for a cross-shaft 31 carrying a plurality of bushings 32 from each of which depends a spindle 33, the lower end of each of which is provided with a collar 34 for supporting the necks of non-vertical bottles as will be described hereinafter.

Located at the bottle erecting station BES is a plurality of angulated fingers 35 each of which is secured to an associated guide plate 36 extending substantially throughout the length of the erect bottle conveying table ECT. The proximal end of each guide plate 36 has a vertical wall portion 37 and each space between an adjacent pair of such portions 37 defines a stall for an erect bottle.

The distal end of the conveying table ECT terminates adjacent a plate belt PB.

The operation of the apparatus is such that after the empty bottles have been uncased from the returned pop carrier or carton, they then pass down the vibrating grid table GT where said bottles are separated from any tramp material which may have been in the cartons. At this stage, the empty bottles will be lying on their sides as they pass on to the non-vertical bottle or first conveying table HCT. Due to the counter-rotating rollers 8, the non-vertical bottles will be urged on to the chain conveyors 7 which will transport them, either neck first or bottom first, in defined and separate longitudinal paths of travel to the terminal end of table HCT where the bottle erecting station BES is located.

As table HCT is slightly above table ECT, the non-vertical bottles must, of necessity, fall by gravity from the terminal end of the former into the bottle stalls. However, it is essential that the empty bottles enter the bottle stalls in an erect condition, so that they can then be conveyed in this condition to the sterilizer (not shown) via table ECT and plate belt PB.

For those bottles which travel along table HCT bottom-first, erection thereof is quite easily accomplished when the said bottles fall from the terminal end of table HCT under gravity and, in so doing, strike the fingers 35 (as is shown in FIG. 5) which thereby achieve the purpose of reducing the speed of fall of the bottles and which also guide the bottles into the bottle stalls and on to the chain-conveyors 26 of table ECT. It will be appreciated that just prior to their free fall, the bottoms of the bottles contact the support collars 34 and pivot them out of the path of travel of said bottles.

For those bottles which travel along table HCT neck-first, erection of such bottles is just as easily accomplished by the neck of each bottle passing into an associated collar 34 at the bottle erection station BES (and as is shown in FIG. 6), continued forward movement of the bottle enabling the shoulders thereon to contact the said collar causing the latter, its spindle 33 and bushing 32 to pivot about cross-shaft 31 in a direction away from the terminal end of table HCT with the collar 34

still supporting the neck of the bottle — as is shown in FIG. 7. Continued forward movement of such a bottle will occur until the centre of gravity of the bottle passes beyond the terminal edge of table HCT whereupon the bottle will fall, bottom first, from said table into its stall while, in so doing, striking the fingers 35 which again serve the dual purpose of bottle guides as well as a means of breaking the fall of the bottle and reducing the speed of said fall.

The chain conveyors 26 of table ECT then convey the erected bottles from the bottle stalls to the terminal end of said table where they can, if desired, be transferred on to the plate belt PB for transportation to the bottle sterilizer. Alternatively, the plate belt PB can be dispensed with entirely with the erect bottles passing direct to the sterilizer.

Although the rollers 8 are shown as being substantially the same length as table HCT, it will be appreciated that each said roller can be formed in two parts so that a group of distal rollers and a group of proximal rollers is provided with the speed of rotation of one such group being different to the remaining group, such an arrangement possessing the advantage that the non-vertical bottles will not bunch together.

Moreover, and if desired, auxiliary conveying means may also be provided operating in conjunction with table HCT, such means taking the form of rotating fingers 40 which gently brush the sides of non-vertical bottles and assist their passage along the said table. The fingers 40 are fast on a cross-shaft 41 which is rotated, via gear 42 and drive 43, from shaft 4.

Furthermore although chain conveyors have been described and illustrated, it is within the scope of the invention to use belt conveyors, plate belts or any other similar conveying means.

If desired, the pivotal support means shown in FIGS. 1-7 can be replaced by the fixed bottle support and guide means 45 shown in FIG. 8. In the lastmentioned Figure, such means 45 are located at the bottle erecting station and are spaced slightly from the terminal end of the table HCT, whilst extending upwardly from the bottle stalls and then being angulated away and upwardly from said terminal end. The means 45 in this arrangement serve to support non-vertical bottles which are pushed, neck-first, to the terminal end of table HCT by the next succeeding bottle and then up said means until such bottles fall back downwardly and into the stalls bottom-first being guided thereinto by the lower part of said bottle support and guide means 45.

It will be appreciated that those bottles which are presented to the terminal end of table HCT bottom-first, will merely be pushed off said end by the next succeeding bottle and will land, in an erect condition, in the bottle stalls. In other words, such bottles will not proceed up the means 45.

We claim:

1. Apparatus for unscrambling and erecting a plural-

ity of non-vertical bottles comprising:

an elongated conveying table which receives the scrambled, non-vertical bottles at one end thereof and transports said bottles in defined and separate paths of travel along the longitudinal axis thereof to the opposite terminal end thereof, said conveyor table having transporting means including a plurality of counter rotating rollers rotatable about axes parallel to the longitudinal axis of the conveyor table, and a plurality of chain drives extending parallel to the longitudinal axis of the conveyor table, with each counter-rotating roller being separated from its neighbor by a chain drive, and with both said rollers and said chain drives extending substantially throughout the length of the conveyor table, and including drive means for driving said chains and the counter rotating rollers;

a bottle erecting station located adjacent the terminal end of said conveyor table and including a plurality of bottle stalls at a lower level than said terminal end;

pivotal support means located at said station and struck by the bottoms of non-vertical bottles presented bottom-first to said terminal end and which support means are thereby pivoted out of the path of travel of such bottles; and

guide means at said station struck by the bottoms of such bottles falling from said terminal end and which thereby guide such bottles, in an erect condition, into said bottle stalls;

said pivotal means also serving to support the necks of non-vertical bottles presented neck-first to said terminal end until said last-mentioned bottles fall from said terminal end, bottoms-first, thereby striking said guide means and being directed, in an erect condition, into said bottle stalls.

2. Apparatus according to claim 1 wherein separate drive means are provided for the counter rotating rollers and the chain drives.

3. Apparatus according to claim 2 wherein each roller is made of a plurality of parts, and includes separate drive means to vary the speed of rotation thereof to aid in unscrambling of bottles.

4. Apparatus according to claim 1 wherein said pivotal means includes a plurality of depending and pivoted support collars each located at the terminal end of an associated said path of travel.

5. Apparatus according to claim 4 wherein the portions of said guide means initially struck by said falling bottles are located beyond said terminal end with the remaining portions of said guide means extending into said bottle stalls.

6. Apparatus according to claim 5 including a second conveyor table with second means for transporting erect bottles from said stalls.

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