

[54] **APPARATUS FOR WRAPPING BOTTLE NECKS**

3,116,193 12/1963 Ehlenbeck 156/487

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[57] **ABSTRACT**

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Apparatus for wrapping bottle necks, preferably with foil wrappers. The apparatus includes wrapper applying mechanism and following treatment apparatus to shape and conform the wrapper to the bottle neck and crown. The treatment apparatus includes a series of pressing and smoothing tools which are arranged on a serpentine path and conveyor means for advancing the bottles on said serpentine path past said tools. The wrapper shaping and conforming tools are desirably arranged on circular arcs and the conveyor desirably comprises star wheels which convey the bottles on said arcs for engagement with said shaping and conforming tools.

[30] **Foreign Application Priority Data**

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[52] U.S. Cl. **156/487, 156/477, 156/481, 53/128**

[51] Int. Cl. **B65b 61/24, B65c 3/18**

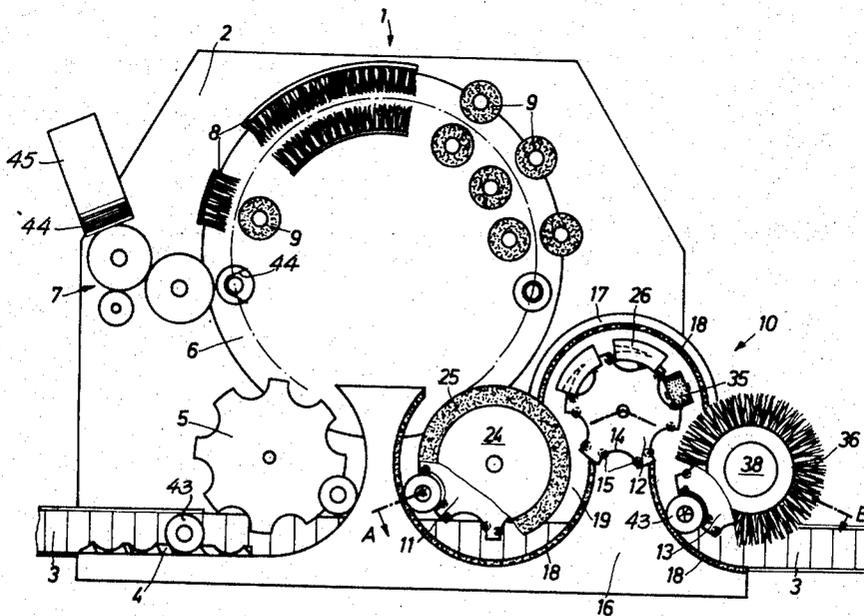
[58] Field of Search **53/128, 137; 156/477, 481, 487, 488**

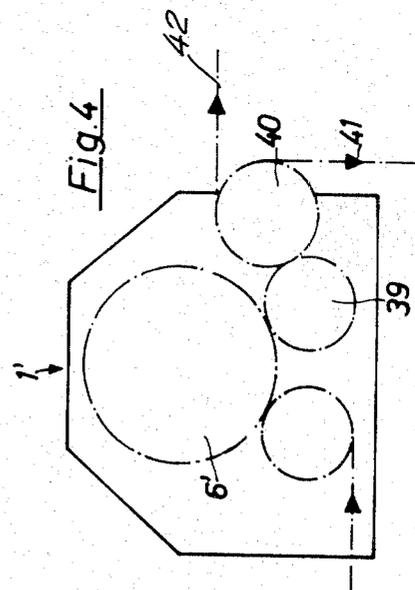
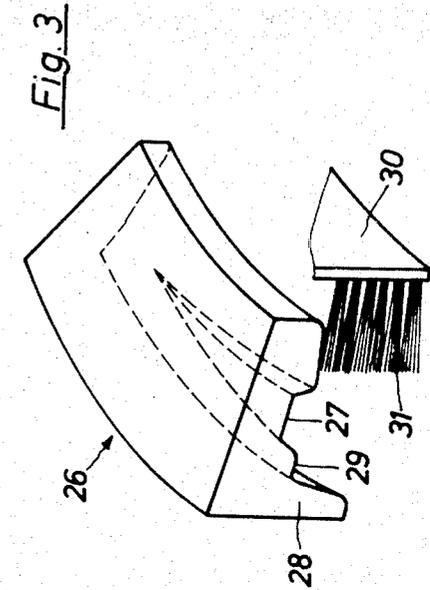
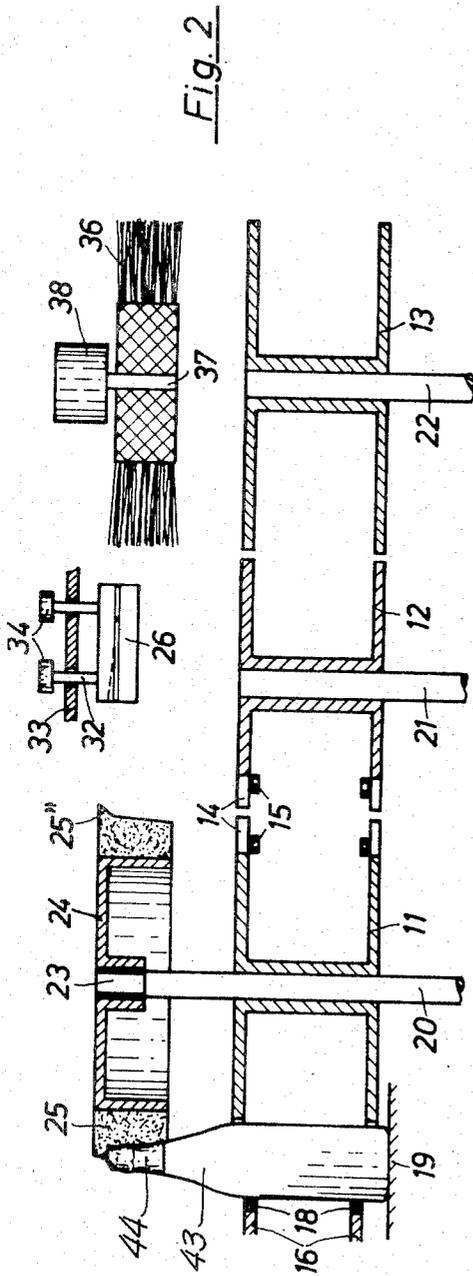
[56] **References Cited**

UNITED STATES PATENTS

3,567,551 3/1971 Dullinger 156/391

11 Claims, 5 Drawing Figures





APPARATUS FOR WRAPPING BOTTLE NECKS

CROSS REFERENCE TO RELATED APPLICATIONS

Cross reference is made to my U. S. Pat. No. 3,567,551 granted Mar. 2, 1971, on my United States application Ser. No. 836,285 filed June 25, 1969, the same being copending with my German application Ser. No. P 20 55 834.3 filed Nov. 13, 1970, the priority of which is herein claimed.

BACKGROUND OF THE INVENTION

My U. S. Pat. No. 3,567,551 aforesaid shows a foil wrapping machine especially designed to wrap the necks of bottles with glued metal foil, and also with labels, as the bottles are processed through the machine. After the foil wrappers are applied to the bottle necks, they are shaped and conformed thereto by pressing and smoothing apparatus which is typically disposed on an elongated rectilinear path which incorporates costly apparatus and occupies considerable space in the factory.

SUMMARY OF THE INVENTION

An important object of the present invention is to simplify, consolidate, compact and reduce the cost of apparatus for shaping and conforming wrappers to the necks of bottles. In particular, it is an object of the invention to reduce the length and space occupied by the wrapper treatment apparatus. This objective is achieved in the apparatus of the present invention by disposing the treatment apparatus on a serpentine path which consolidates the pressing and smoothing apparatus in a compact, space-saving arrangement. Accordingly, the space occupied by the apparatus and its distance from the machine frame is greatly reduced, although the length of the treatment path is not actually diminished.

In preferred embodiments, the treatment path comprises a series of circular arcs or arcuate sections, one of which follows the other in series.

Moreover, in lieu of the use of chain conveyors, as shown in my prior U. S. Pat. No. 3,567,551, the conveyor mechanism of the present invention desirably is greatly simplified by using successive star wheels which are arranged in series and which are synchronously driven. The bottles are rotated on their own axes by disposing rails with yieldable bottle engaging surfaces along the serpentine path. The star wheels are provided with bottle receiving pockets with anti-friction bottle supports, thus to cause the bottles to twirl on their own axes as the star wheels urge the bottles against and along the padded rails.

Each star wheel is further provided with tool apparatus to shape and conform the wrappers against the bottle neck and crown as the bottles are conveyed along the arcuate path and while the bottles are twirling. One such shaping tool comprises a disk-like pressing-on rotor, the periphery of which is padded to be yieldable. The disk rotates on an axis substantially at the center of the arc of the curved rail. The rotation of the bottles which are in contact with the padded rotor will cause the disk to rotate also and hence press the wrappers snugly against the bottle necks and smooth the wrappers into folds thereabout. The padded rotor can also be arranged slightly offset or eccentrically to the center

of the circular arc for varying pressure effects upon the wrapper.

Another of the shaping tools desirably comprises an iron which presses the wrapper down on the top of the bottle and which has a groove which embraces the bottle crown, thus to shape, fold and smooth the wrapper over the top of the crown cap or stopper.

This shaping tool may be followed by a rotor brush in the next arch which further smooths and shapes the wrapper to the bottle.

Other objects, features and advantages of the invention will appear from the following disclosure.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic plan view of apparatus embodying the invention.

FIG. 2 is a fragmentary cross section taken along the line A—B of FIG. 1.

FIG. 3 is a perspective view of smoothing rail or iron, in association with a brush, all curved on the serpentine path along which the bottles are conveyed.

FIG. 4 is a schematic view illustrating a modified embodiment.

FIG. 5 is a fragmentary view similar to a portion of FIG. 1, but illustrating an eccentrically mounted padded rotor.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structure. The scope of the invention is defined in the claims appended hereto.

The machine 1 has a housing 2 within which drive and control units are contained. The bottles 43 are fed to the machine on a conveyor plate chain 3. On entering the star wheel 5, the bottles are spaced by the in-feed worm 4. Star wheel 5 conveys the bottles onto the rotating bottle table 6. Apparatus 7 feeds discrete wrappers 44 from a magazine 45 for application to the bottle necks. Wrappers 44 typically comprise a glued metal foil wrapper, as shown in my U. S. Pat. No. 3,567,551, aforesaid.

The wrappers 44 are initially applied to the bottle necks as described in my prior patent aforesaid with the aid of a series of stationary curved brushes 8, sponge rollers 9 and the like. However, the metal foil wrappers 44 cannot be applied completely to the bottle necks and crowns by the apparatus associated with the table 6. Further treatment is required outside of the bottle table. This treatment occurs at the treatment station 10 where the foil wrapper 44 is shaped and tightly pressed and smoothed onto the bottle neck and crown.

Treatment station 10 provides a compact serpentine path about three sets of staggered bottle advancing or conveying star wheels 11, 12, 13 which are connected in series and driven in synchronism by conventional apparatus not shown. The respective star wheels 11, 12, 13 comprise paired upper and lower disks having peripheral pockets 14 in which body portions of the bottles 43 are received. Each pocket 14 is desirably provided with rollers 15 which provide an anti-friction bearing in which the respective bottles may twirl or rotate on their own axes with minimum frictional resistance. The rollers 15 could be replaced by other anti-

friction apparatus, or the star wheel disks could be made of a low friction substance.

About each star wheel 11, 12, 13 is disposed a stationary guide which is curved arcuately about star wheel concentrically with the axis of rotation of the respective shafts 20, 21, 22 of the star wheels 11, 13, 12. The guides are formed of plates 16, 17 provided with an edge padding 18 of resilient yieldable material and against which the star wheel presses the bottles to produce sufficient friction between the bottle and pad to cause the bottle to twirl or rotate about its own axis as the star wheels turn.

The first star wheel 11 has eight pockets 14 and receives the bottles 43 from the conveying table 6 and transfers the bottles to the intermediate star wheel 12, which has six pockets 14. Star wheel 12 transfers the bottles to a third star wheel 13 which is provided with eight pockets from whence the bottles are finally conveyed to the plate conveyor 3.

Accordingly, the bottles 43 stand upright either on the chain plate conveyor 3 or on a stationary apron 19 over which the respective star wheels advance the bottles from one wheel to the next.

The star wheel shafts 20, 21, 22 are driven by gear or chain and sprocket drive mechanism within the housing 2, the movement of one star wheel being synchronized with the next.

The brushes 8 and rollers 9 on the table 6 pre-shape the wrappers 44 quite closely to the bottle necks, but the wrappers are not completely shaped and are not smoothed and pressed well enough to the neck and crown of the bottle. A series of shaping and conforming tools are associated with each of the star wheels 11, 12, 13. The first star wheel 11 is provided with a sponge rubber rotor pad 25 which is mounted on a wheel 24 having a hub which may rotate on the upper end of the shaft 20 for star wheel 11. The pad 25 is desirably shaped with a sloped shoulder 25' which overlies the crown of the bottle, as shown in FIG. 2. Rotor 24 is freely rotatable on shaft 20. Accordingly, as the bottles twirl on their own axes and have their necks pressed against the rotor pad 25, the pad 25 will rotate on its own axis so that there is substantial pressing and smoothing contact between the pad 25 and the wrapper 44. Accordingly, the foil wrapper is tightly pressed against the bottle neck and crown to closely shape and conform the wrapper 44 to the bottle neck and crown and also adhere the glue on the inside of the wrapper tightly against the bottle.

The next star wheel 12 is provided with a series of arcuately extending smoothing rails or irons 26 which have arcuately shaped grooves or arched pockets 27 on their undersides. Pockets 27 have relatively deep entrance portions and run out near the ends of the rails. A rib 28 formed on the outer periphery of the rails 26 guides the bottle with respect to the rail. Rails 26 function similar to the rails or irons of my prior patent aforesaid, but are arcuately shaped to align on the serpentine path aforesaid. Upwardly projecting portions of the foil wrapper are pressed intimately against the crown cap or stopper of the bottle by the weight of the rails 26 which are suspended on the rods 32 having weighted heads 34. The rods are vertically movable with respect to the support 33 which is fixed above the star wheel 12. Accordingly, the rails 26 are continually raised and lowered under gravity bias as the rotating bottles pass therebeneath.

Support 33 also desirably supports a pad roller 35 which presses the wrapper down on the crown of the bottles, beyond the last of the smoothing rails 26. Roller 35 could also be replaced by a smoothing rail 26 with a flat undersurface which does not have the groove 27.

The last star wheel 13 is provided with a brush rotor tool 36 which is arranged either concentrically or eccentrically with respect to shaft 22. Brush 36 is mounted on a shaft 37 which has a motor 38 which drives the brush 36 at a speed different from the speed of the bottles, whereupon the brush 36 will further smooth and press the wrappers against the bottle necks and crowns.

The stationary guides 16, 17 can be replaced with endless belts with padded surfaces which may also be driven to give the bottles additional gyrations.

FIG. 4 shows another embodiment in which the treatment path, while still serpentine, is somewhat shorter from that shown in FIG. 1. In this embodiment only two star wheels 39, 40 follow the bottle table 6' of labeling machine 1'. The bottles can be discharged from the machine either in the same direction as they are fed thereto, along the path of arrow 42, or they can be discharged at right angles to the infeed path, along the path of arrow 41. This arrangement is particularly advantageous in the event that the foil wrapper has been folded tightly against the neck of the bottle within the machine, so that treatment afforded by the pad rotor 25 can be omitted.

FIG. 5 shows another embodiment in which the rotor pad 25' of wheel 24' is disposed offset from the axis of shaft 20 of the star wheel 11, thus to vary the pressure of the pad 25' against the wrapper as the bottles traverse the path defined by the arcuate rail pad 18.

I claim:

1. In apparatus for wrapping bottle necks, which apparatus includes wrapper applying apparatus for applying the wrapper to the bottle neck and following treatment apparatus to shape the wrapper against the bottle neck, the improvement in which said treatment apparatus comprises a series of pressing and smoothing tools arranged on a serpentine path and conveyor means for advancing the bottles on said serpentine path past said tools, said serpentine path comprising a plurality of circular arcs along which said tools are disposed, said conveyor means comprising a plurality of star wheels arranged in series, said star wheels having their axes of rotation substantially at the centers of said circular arcs.

2. The apparatus of claim 1 in which said arcs comprise yieldable friction surfaces against which the star wheels press the bottles to cause the bottles to turn as they are advanced by the star wheels.

3. The apparatus of claim 2 in which said treatment apparatus further comprises for one of said star wheels a disk-like, pressing-on rotor having a yieldable periphery, means supporting said rotor for rotation within one of the circular arcs, the periphery of said rotor contacting the bottle necks, said rotor being rotated on its axis by rotation of the bottles as they are turned on their own axes.

4. The apparatus of claim 3 in which the means supporting the rotor has an axis of rotation eccentric to the center of said circular arc.

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5. The apparatus according to claim 3 in which said rotor has a periphery which overhangs the crown of the bottle.

6. In apparatus for wrapping bottle necks, which apparatus includes wrapper applying apparatus for applying the wrapper to the bottle neck and following treatment apparatus to shape the wrapper against the bottle neck, the improvement in which said treatment apparatus comprises a series of pressing and smoothing tools arranged on a serpentine path and conveyor means for advancing the bottles on said serpentine path past said tools, one of said tools comprising a rotary brush the periphery of which engages the bottle neck, and support means for the brush on which it is arranged concentrically to a circular arc in said serpentine path.

7. Apparatus for pressing a foil wrapper against a bottle neck and comprising a star wheel, an arcuate rail about the periphery of the star wheel, said rail having a yieldable surface against which the star wheel presses bottles conveyed thereby, whereupon to twirl the bottles on their own axes, a pressing rotor having a turning axis within the arc of said rail and having a peripheral resilient surface disposed for engagement by the necks of said bottles, whereby said rotor presses the wrapper against the bottle necks as the bottles twirl and also turn the rotor on its axis.

8. The apparatus of claim 7 in which the axis of rota-

tion of the pressing rotor is concentric to the axis of rotation of the star wheel.

9. The apparatus of claim 7 in which the axis of rotation of the pressing rotor is eccentric to the axis of rotation of the star wheel.

10. In apparatus for wrapping bottle necks, which apparatus includes wrapper applying apparatus for applying the wrapper to the bottle neck and following treatment apparatus to shape the wrapper against the bottle neck, the improvement in which said treatment apparatus comprises a star wheel, a yieldable friction surface disposed in an arc about the star wheel whereby the star wheel advances the bottle along said arc and presses the bottle against said yieldable friction surface to cause the bottles to turn about their own axes as they are advanced by the star wheel, and pressing and smoothing apparatus disposed on an arc adjacent the bottle neck to press the wrapper against the bottle necks as the bottles turn on their own axes and advance along said arc.

11. The apparatus of claim 10 in combination with a pressing rotor within said arc and on which said pressing and smoothing apparatus is mounted for pressing the wrapper against the bottle necks as the bottles turn on their own axes.

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