Nov. 26, 1963 A. W. WELLER 3,111,798

DISPENSING FITMENT APPLYING MACHINE

Filed June 2, 1959 3 Sheets-Sheet 1

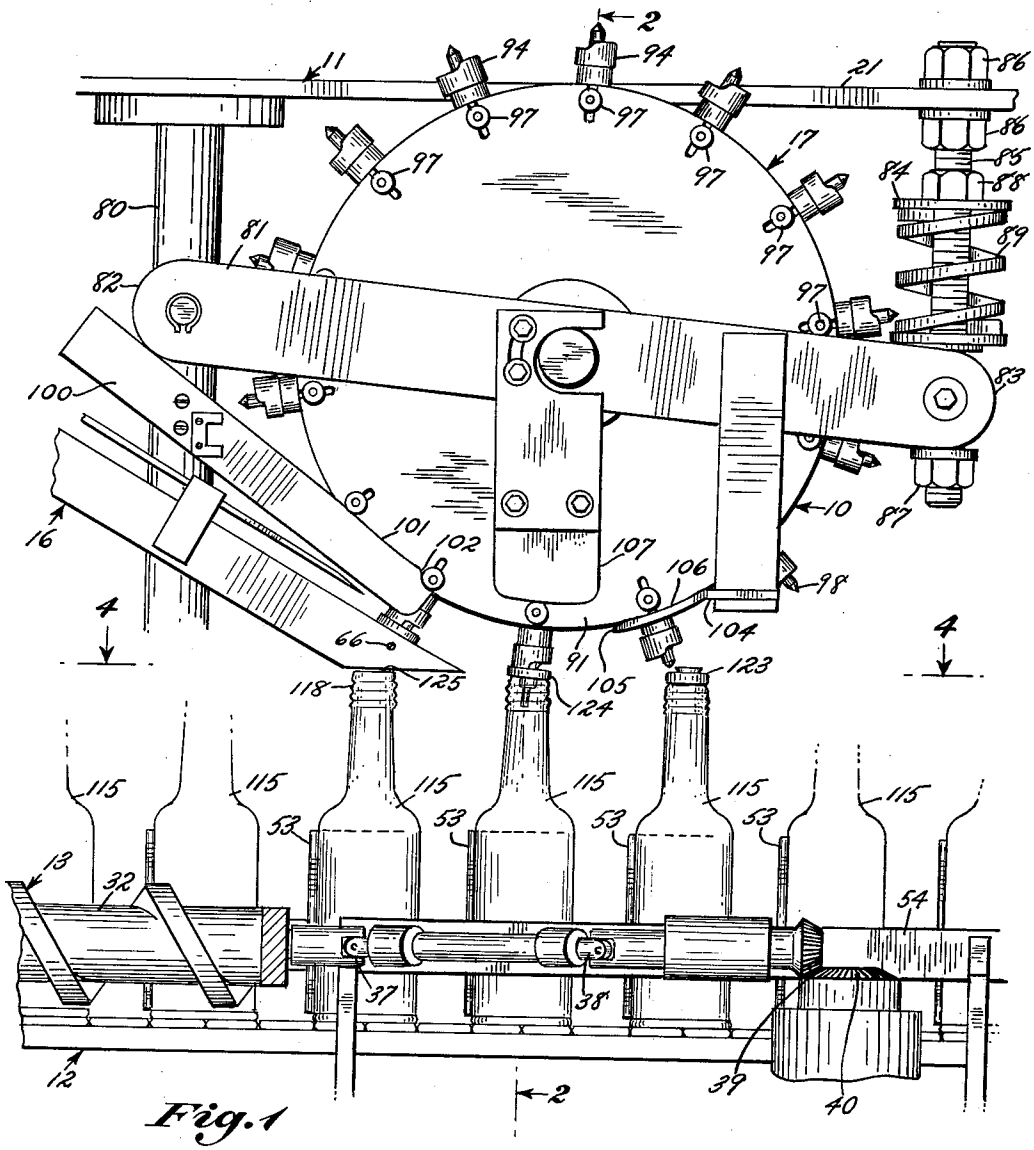


Fig. 1

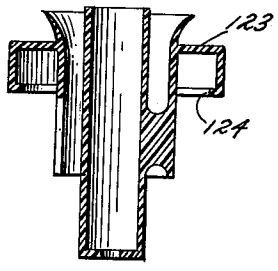


Fig. 3

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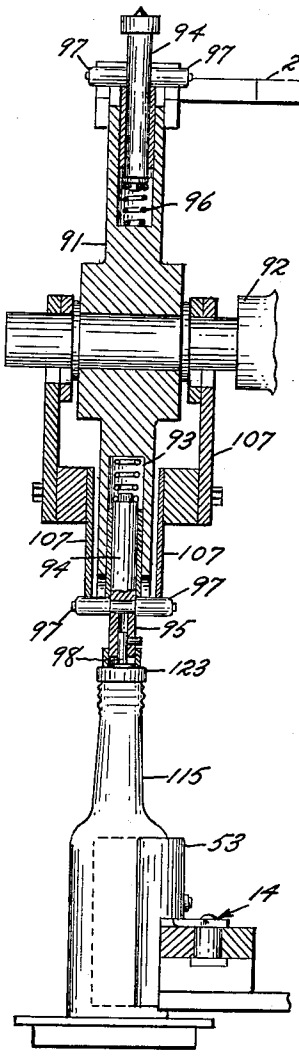


Fig. 2

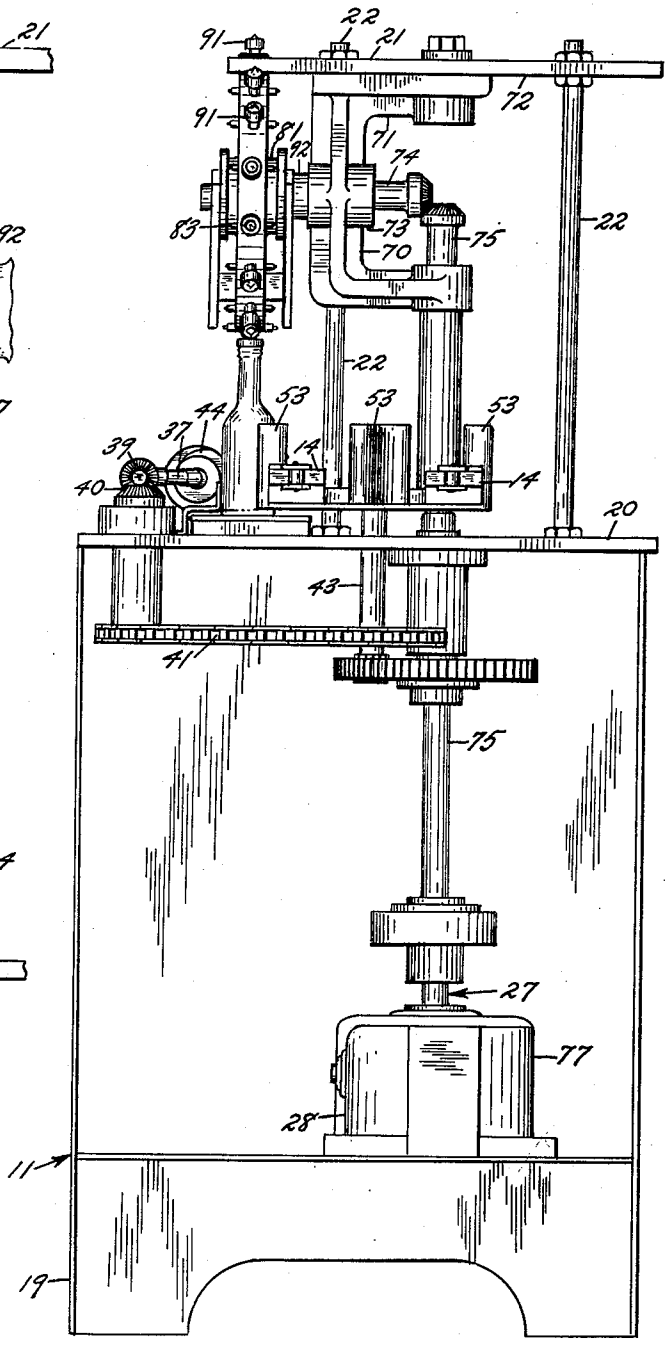


Fig. 5

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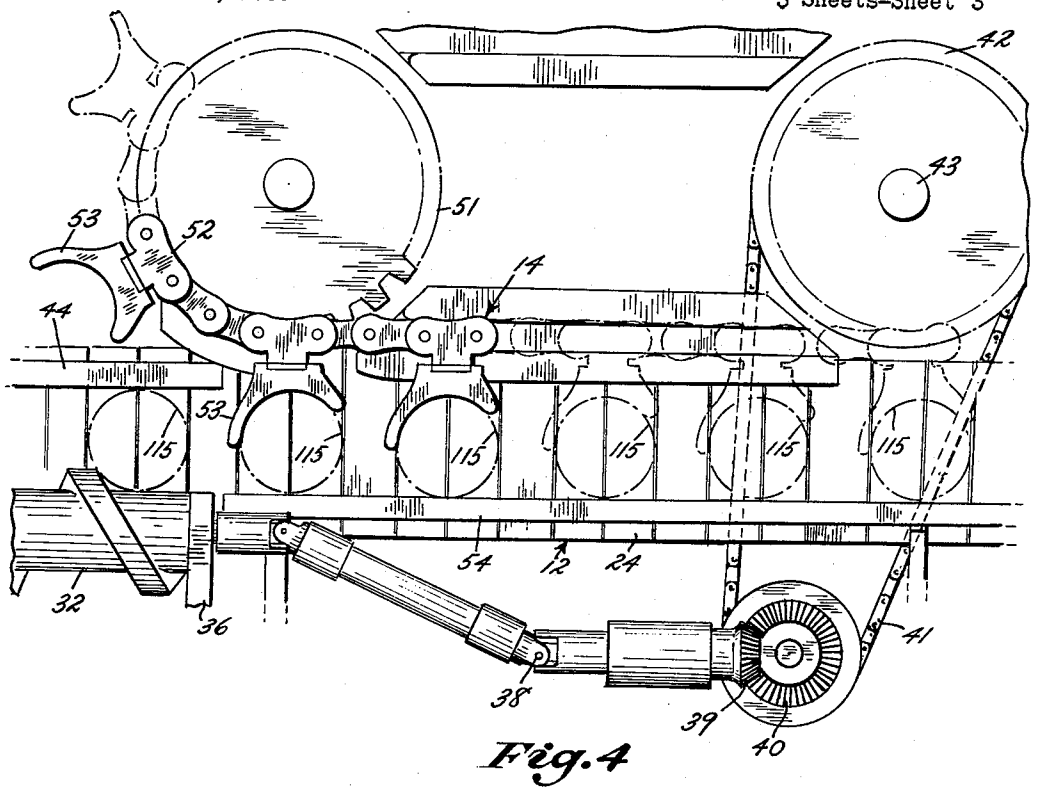


Fig. 4

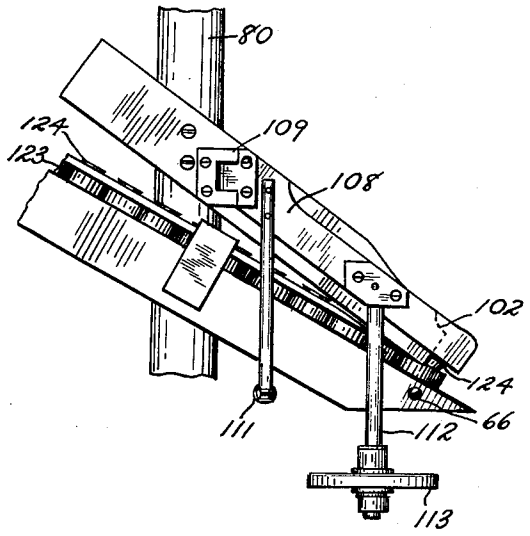


Fig. 6

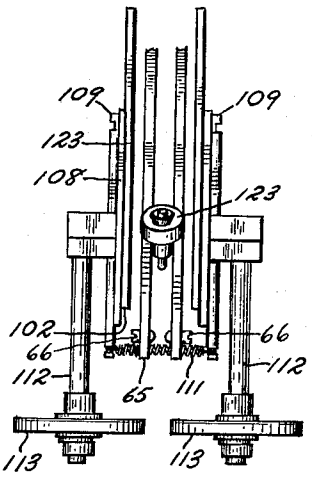


Fig. 7

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3,111,798

DISPENSING FITMENT APPLYING MACHINE

Arthur W. Weller, Brooklyn, N.Y., assignor to Resina Automatic Machinery Co., Inc., Brooklyn, N.Y., a corporation of New York

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9 Claims. (Cl. 53—306)

This invention relates generally to the field of cap or fitment applying apparatuses, and more particularly to an improved device particularly adapted for use in applying dispensing or pouring type fitments of the type disclosed in U.S. Patent No. 2,411,435 entitled Liquid Dispensing Device, granted November 19, 1946, to S. Kirschenbaum.

Existing prior art devices have not been found suitable for applying relatively delicate fitments of this type, owing to the relatively thin wall sections employed in the construction of the device. Where the fitment is made of soft inert materials such as polyethylene, care must be taken to avoid damaging the flared pouring spout, or the centrally disposed tube. Thus, capping devices having a rolling action which are known and widely used in the art are completely unsuitable for the reason that the aforementioned parts will be deformed or otherwise damaged as the same pass beneath the pressure roller of such cap applying machines.

It is therefore among the principal objects of the present invention to provide an improved applying device specifically adapted for the placement of dispensing fitments of the type described which will accurately and completely seat a fitment within a bottleneck without misshaping or other damage to such fitments.

Another object of the invention lies in the provision of a fitment applying machine of the class described which may operate at a speed comparable with that of existing cap applying machinery, and thus have wide commercial application for use in conjunction with the packaging of a variety of liquids.

Another object of the invention lies in the provision of an improved fitment placing device in which the moving parts thereof may be of relatively simple nature, thus assuring a relatively long useful life, with a minimum of adjustment or servicing.

Still another object of the invention lies in the provision of a fitment placing machine which may be substantially automatic in operation, and require but a minimum of attendance on the part of an operator.

A further object of the invention lies in the provision of improved fitment applying structure, possessed of the above advantages, and in which the cost of fabrication may be of a reasonable order, thereby permitting consequent wide sale, distribution and use.

A feature of the invention lies in the provision of means whereby the fitments are stretched slightly as they are engaged upon the neck of a container, thereby simulating to a degree the rolling action of existing capping devices without danger of damage to the fitment, as the same is being applied.

These objects and features, as well as other incidental ends and advantages, will more fully appear in the progress of the following disclosure, and be pointed out in the appended claims.

In the drawings, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIGURE 1 is a fragmentary side elevational view of an embodiment of the invention, with certain parts removed for the purpose of clarity.

FIGURE 2 is a fragmentary vertical sectional view as seen from the plane 2—2 in FIGURE 1.

FIGURE 3 is an enlarged sectional view of a fitment

of the type employed in conjunction with the present embodiment.

FIGURE 4 is a plan view showing container advancement means comprising a part of the embodiment.

FIGURE 5 is an end view in elevation of the embodiment showing in particular the frame element thereof.

FIGURE 6 is an enlarged fragmentary side view of the fitment gating means.

FIGURE 7 is a fragmentary end view of the gating means.

In accordance with the invention, the device, generally indicated by reference character 10, comprises broadly: a frame element 11, container conveying means 12, container timing and spacing means 13, container engaging means 14, fitment supply means 16 and fitment applying means 17.

The frame element 11 is best seen in FIGURE 5 on the drawings, and may be of any well known construction. The element 11 includes a base 19, a lower frame floor 20, an upper frame floor 21 and means 22 for adjusting the relative distance between the floors 20 and 21.

The container spacing means 13 serves to introduce and maintain a uniform interval between successive containers, and includes a horizontally mounted worm member 32 having a trailing end. The worm member is supported on bearing members one of which is shown at 36 and driven through universal joints 37 and 38, pinnion 39 and gear 40. Power is transmitted through a timing chain 41 and pulley 42 from a vertical shaft 43. A guide rail 44 is mounted in parallel relation with respect to the axis of the worm 32, and spaced a distance to permit each convolution of the worm to engage a single container, as best seen in FIGURE 1 on the drawings.

The container engaging means 14 is also driven from the shaft 43 through a driving sprocket 42. The sprocket 42 and an idler sprocket 51 support a sprocket chain 52 having a plurality of equally spaced container engaging members 53 mounted thereon. Containers are guided by the cooperation of the members 53 with a guide rail 54, in such manner that although the space interval between containers is greater when the same are being advanced by the container engaging means 14 as compared with the container spacing means 13, the timed relation is maintained.

The fitment supply means 16 is preferably in the form of a chute, the lower end 65 of which is provided with resilient gating means 66, the action of which will more fully appear at a point later in the disclosure.

The fitment applying means 17, see FIG. 1, serves the broad function of removing an individual cap from the gating means 66, see FIGS. 6 and 7, and placing it upon a container neck as the same moves therebeneath. The means 17 includes a C-shaped frame 70 (see FIGURE 5), the upper leg 71 of which is secured to the undersurface 72 of the upper frame floor 21. A horizontal bearing 73 supports a shaft 74 driven from the main shaft 75 by the electric motor 28 and reduction means 77. Supported from a vertically disposed bracket 80 are a pair of pivotally mounted generally horizontally disposed arms 81. The first ends 82 thereof are secured to the bracket 80 by pintles permitting angular movement, while the second ends 83 thereof are supported by a tensioning element 84 which permits limited arcuate movement. The element 84 includes a threaded bolt member 85 having upper anchoring nuts 86 engageable with the floor 21, a lower positioning nut 87, a tensioning nut 88 and a tension spring 89 of relatively high modulus.

The fitment applying wheel 91 is supported by the bearing 73 and shaft 84 and is driven through the shaft 74. Arranged about the periphery of the wheel 91 are a plurality of equally spaced bores 93 generally radially arranged with respect to the axis of rotation of the wheel 91. Dis-

posed within the bores 93 are a plurality of resilient fitment applying units 94, which are substantially similar. Each includes a cylindrical main body member 95 which is urged outwardly by a coil spring 96, the spring 96 performing a cam follower function. A pair of cam engaging members 97 are transversely arranged with respect to the axis of the body member 94, the same being preferably of a roller bearing type. The fitment engaging member 98, see FIGS. 1 and 2, as shown in the drawings is specifically adapted for use with the fitment shown in FIGURE 3, and it will be understood by those skilled in the art, to which the invention relates, that the configuration of the same may be readily changed where fitment of other configurations are being applied. If desired, the members 98 may be made in such manner as to be readily changed with others upon the outer end of the body member 95.

Extending at an angle with respect to the vertical brackets 80, are a pair of first cam supporting members 100, each having a first cam surface 101 and a second cam surface 102. On the opposite side of the axis of rotation of the wheel 91 is a second pair of cam supporting members 104 having first and second cam surfaces 105 and 106. Disposed between the cam surfaces 101—102 and 105—106 are a pair of third cam members 107 which engage the cam engaging members 97 of the individual units 94 during the period in which the fitments are being pressed into position with respect to individual containers.

Referring to FIGURES 6 and 7 on the drawings, there may be seen a pair of holding cam members 108 having hinged mounting means 109 thereon. The cam members 108 substantially duplicate the cam surfaces 101 and when in engaged position with the cam engaging members 97 prevent the same from engaging the second cam surfaces 102. Resilient means 111 joins the cam members 108 to maintain them normally in engaged position alongside the cam members 100. Each of the cam members 108 is provided with a vertically arranged shaft 112, having a roller 113 positioned within the path of containers or bottles moving through the container engaging means 14.

The operation of the device will be apparent from a consideration of the several views. Bottles generally indicated by reference character 115 are conveyed by the container conveying means 12 to a point where the same are engaged by the container spacing means 13. With rotation of the worm 32, the bottles are advanced to a point where they are engaged by the container engaging means 14 which advances the same at a rate corresponding to the passage of the individual fitment applying units 94. The fitment supply means 16 continuously positions individual fitments 123 within the gating means 66 in a position to be contacted by the fitment engaging members 98. Where no bottle 115 is in fitment receiving position, the holding cam members 108 lie parallel to the cam members 100, so that rotation of the wheel 91 will not result in radially outward movement of successive units 94 when they reach the position opposite the cam surfaces 102.

On the presence of one or more containers 115, the rollers 113 are contacted resulting in the spreading apart of the holding members 108, whereby the cam surfaces 102 permit the unit 94 to project into the gating means 66 to engage fitments 123 disposed therein. With subsequent movement of the container engaging means 14 and the fitment applying wheel 91, the fitment is inserted into the neck 118 of the container 115. As best seen in FIGURE 1, the cam engaging members 97 then engage the cams 107 which exert a positive force accurately securing the fitment within the neck in the bottle. This movement is accompanied by an upward movement of the unit 94 in a direction toward the axis of rotation of the wheel 91, which will result in the unit 94 exerting a slight dragging motion upon the fitment. As the fitment engages the opening in the container 115 in such manner

that the leading edge 124 of the fitment 123 contacts the upper edge 125 of the neck portion 118 before the remaining parts of the fitment, this receiving action of the unit 94 will result in a motion equivalent to a rolling motion. It is to be observed that this motion takes place because of the fact that the shortening of effective radius of rotation results in a corresponding shortening of the peripheral path of motion of the unit, and not due to any loss of synchronism between the wheel 91 and the container engaging means 14. With further movement of the wheel 91, the cam engaging members 97 are contacted by the surfaces 105 and 106 of the cam supporting member 104, resulting in withdrawing the units 94 from contact with the now seated fitment 123.

It may thus be seen that there has been invented novel and highly useful improvements in fitment applying machines, in which means for accurately seating fitments into the necks of open containers is provided which will in no way damage or misshape such relatively delicate fitments.

Also provided is an accurate and relatively simple container timing and spacing means which controls movement of successive container to synchronize with movement of reciprocating container fitment applying units in such manner that no fitments will be placed in the event there are no containers in fitment receiving position. Owing to the relative simplicity of the inventive structure, the device may be operated at a relatively high speed, comparable with existing prior art capping machines.

It is to be understood that it is not considered that the invention lies within the precise details of structure shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention relates.

What is claimed is:

1. In a fitment applying apparatus, the improvement comprising: a fitment applying wheel having an axis of rotation substantially horizontally disposed, means for driving said wheel in a predetermined angular direction; said wheel having a fitment applying unit thereon arranged for radial reciprocation within said wheel, and having cam follower means thereon; fitment supply means including a component for successively positioning oriented fitments to a position for engagement by said fitment applying unit; means for advancing a series of open containers in predetermined timed and spaced sequence beneath said wheel to correspond to angular movement of said reciprocating fitment unit; cam means engaging said cam follower means for moving said reciprocating unit radially outwardly to pick up a fitment disposed in said fitment supply means and move the same outwardly of said supply means, whereby angular movement of said wheel in connection with said container advancing means may serve to place and seat individual fitments upon a container disposed in fitment receiving position.

2. In a fitment applying apparatus, the improvement comprising: a fitment applying wheel having an axis of rotation substantially horizontally disposed, means for driving said wheel in a predetermined angular direction; said wheel having a fitment applying unit thereon arranged for radial reciprocation within said wheel, and having cam follower means thereon; fitment supply means including a component for successively positioning oriented fitments to a position for engagement by said fitment applying unit; means for advancing a series of open containers in predetermined timed and spaced sequence beneath said wheel to correspond to angular movement of said reciprocating fitment unit; cam means engaging said cam follower means for moving said reciprocating unit radially outwardly to pick up a fitment disposed in said fitment supply means and move the same outwardly of said supply means, whereby angular movement of said wheel in connection with said container advancing means may serve to place and seat individual fitments upon a container disposed in fitment receiving position; and means

for rendering said cam means inoperative during such period as there is no container in fitment receiving position.

3. A container fitment applying device comprising: a fitment applying wheel mounted for rotation about a substantially horizontally disposed axis, a plurality of fitment applying units arranged for substantially radial reciprocation upon the periphery of said wheel and having cam follower means thereon, resilient means associated with each of said fitment applying units serving to urge the same radially outwardly; fitment supply means having gating means associated therewith disposed within the path of said fitment applying units; cam means for resiliently extending said fitment applying units in succession into engagement with successive fitments disposed within said gating means; and means for advancing successive containers in spaced and timed relation beneath said wheel, whereby said fitments may be seated upon said containers.

4. A container fitment applying device comprising: a fitment applying wheel mounted for rotation about a substanitally horizontally disposed axis, a plurality of fitment applying units arranged for substantially radial reciprocation upon the periphery of said wheel and having cam follower means thereon, resilient means associated with each of said fitment applying units serving to urge the same radially outwardly; fitment supply means having gating means associated therewith disposed within the path of said fitment applying units; first cam means for resilient extending said fitment applying units in succession into engagement with successive fitments disposed within said gating means; means for advancing successive containers in spaced and timed relation beneath said wheel, and second cam means for moving said units radially outwardly adjacent said containers, whereby said fitments may be transferred from said gating means and seated upon said containers.

5. A container fitment applying device comprising: a fitment applying wheel mounted for rotation about a substantially horizontally disposed axis, a plurality of fitment applying units arranged for substantially radial reciprocation upon the periphery of said wheel and having cam follower means thereon, resilient means associated with each of said fitment applying units serving to urge the same radially outwardly; fitment supply means having gating means associated therewith disposed within the path of said fitment applying units; first cam means for resiliently extending said fitment applying units in succession into engagement with successive fitments disposed within said gating means; means for advancing successive containers in spaced and timed relation beneath said wheel, and second cam means for moving said units radially outwardly adjacent said containers, whereby said fitments may be transferred from said gating means and seated upon said containers; and third cam means for positively retracting said fitment applying units after the seating of said fitments upon said containers.

6. A container fitment applying device comprising: a fitment applying wheel mounted for rotation about a substantially horizontally disposed axis, a plurality of fitment applying units arranged for substantially radial reciprocation upon the periphery of said wheel and having cam follower means thereon, resilient means associated with each of said fitment applying units serving to urge the same radially outwardly; fitment supply means having gating means associated therewith disposed within the path of said fitment applying units; cam means for resiliently extending said fitment applying units in succession into engagement with successive fitments disposed within said gating means; and means for advancing successive containers in spaced and timed relation beneath said wheel, whereby said fitments may be seated upon said containers; and means for rendering said cam means inoperative when there is no container in fitment receiving position.

7. A container fitment applying device comprising: a fitment applying wheel mounted for rotation about a substantially horizontally disposed axis, a plurality of fitment applying units arranged for substantially radial reciprocation upon the periphery of said wheel and having cam follower means thereon, resilient means associated with each of said fitment applying units serving to urge the same radially outwardly; fitment supply means having gating means associated therewith disposed within the path of said fitment applying units; first cam means for resiliently extending said fitment applying units in succession into engagement with successive fitments disposed within said gating means; means for advancing successive containers in spaced and time relation beneath said wheel, and second cam means for moving said units radially outwardly adjacent said containers, whereby said fitments may be transferred from said gating means and seated upon said containers; and third cam means rendering said first cam means inoperative when there is no container in fitment receiving position.

8. A container fitment applying device comprising: a fitment applying wheel mounted for rotation about a substantially horizontally disposed axis, a plurality of fitment applying units arranged for substantially radial reciprocation upon the periphery of said wheel and having cam follower means thereon, resilient means associated with each of said fitment applying units serving to urge the same radially outwardly; fitment supply means having gating means associated therewith disposed within the path of said fitment applying units; first cam means for resiliently extending said fitment applying units in succession into engagement with successive fitments disposed within said gating means; means for advancing said successive containers in spaced and timed relation beneath said wheel, second cam means for moving said units radially outwardly adjacent said containers, whereby said fitments may be transferred from said gating means and seated upon said containers; third cam means for positively retracting said fitment applying units after the seating of said fitment upon said containers; and fourth cam means for rendering said first cam means inoperative when there is no container in fitment receiving position.

9. A container fitment applying device comprising: a fitment applying wheel mounted for rotation about a substantially horizontally disposed axis and capable of limited resilient flexing in a vertical plane, a plurality of fitment applying units arranged for substantially radial reciprocation upon the periphery of said wheel and having cam follower means thereon, resilient means associated with each of said fitment applying units serving to urge the same radially outwardly; fitment supply means having gating means associated therewith disposed within the path of said fitment applying units; cam means for resilently extending said fitment applying units in succession into engagement with successive fitments disposed within said gating means; and means for advancing successive containers in spaced and timed relation beneath said wheel, whereby said fitments may be seated upon said containers.

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