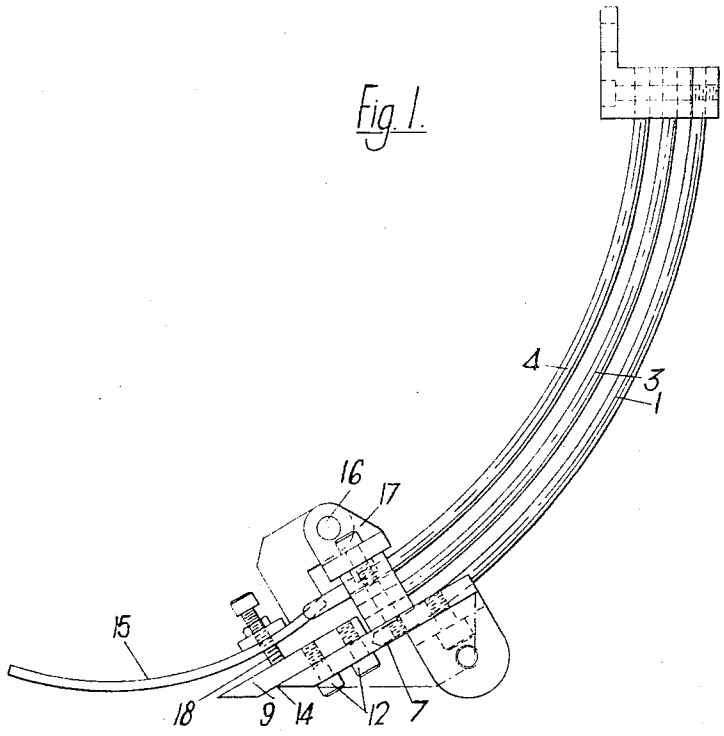
Jan. 23, 1968 W. H. WYARD 3,364,653

APPARATUS FOR FEEDING CAPS TO CONTAINERS

Filed May 4, 1966 3 Sheets-Sheet 1

Fig. 1.



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APPARATUS FOR FEEDING CAPS TO CONTAINERS

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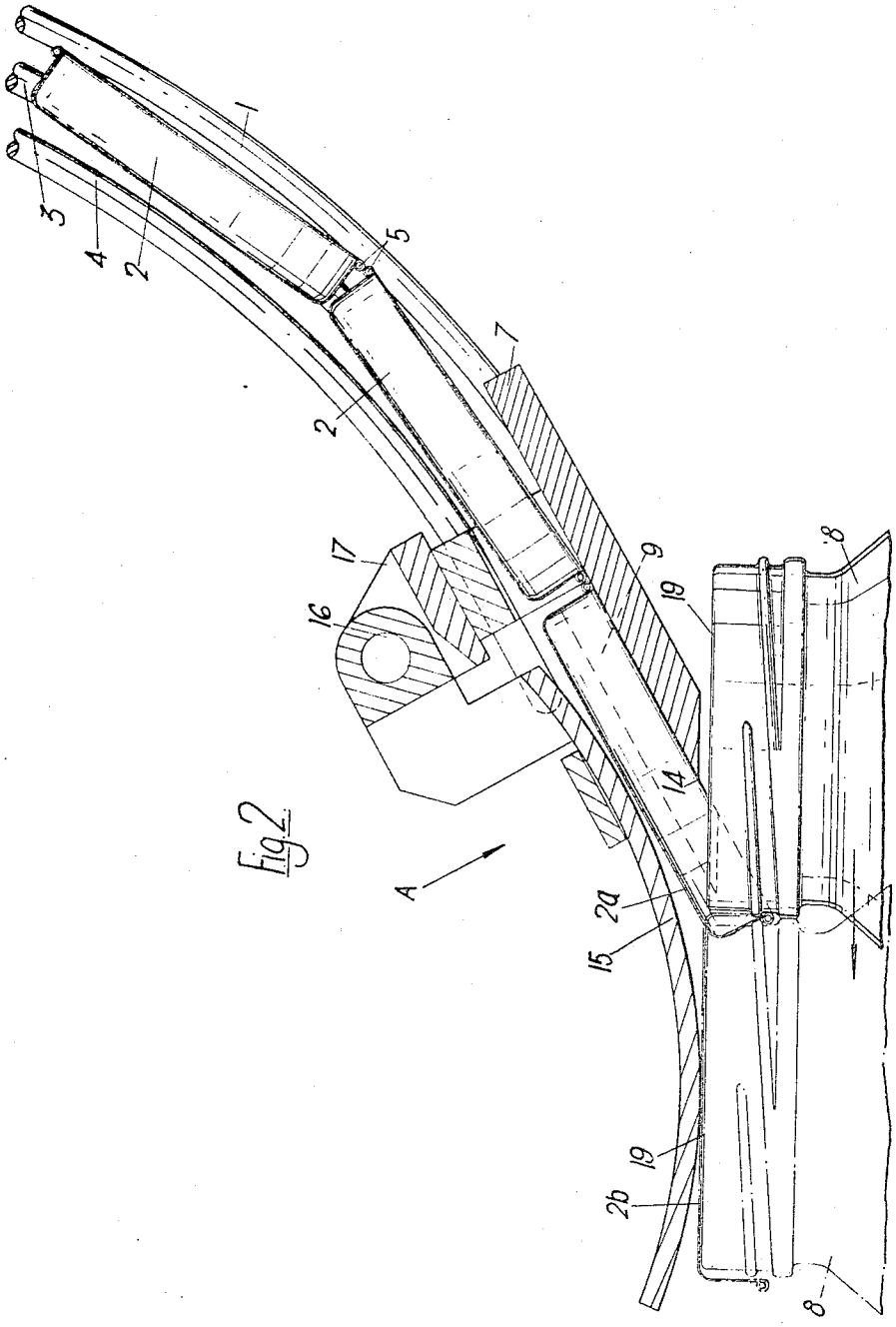


Fig 2

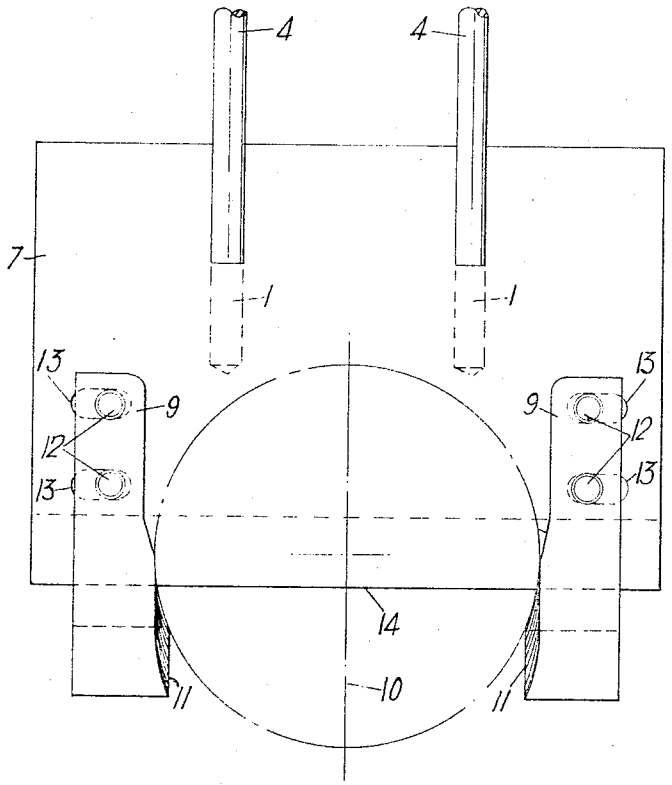
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APPARATUS FOR FEEDING CAPS TO CONTAINERS

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Fig. 3



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APPARATUS FOR FEEDING CAPS TO CONTAINERS

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1 Claim. (Cl. 53—315)

ABSTRACT OF THE DISCLOSURE

A closure cap feeding means having a downwardly and forwardly inclined feedway terminating in a floor plate with cap arresting and positioning guides thereon, and a cap-retaining shoe overlying and extending beyond the plate and guides for cooperation with the guides in placing caps properly on containers being moved along a horizontal path past the delivery end of the plate.

This invention relates to apparatus for feeding caps to containers and in particular to apparatus of the kind in which caps are gravity fed in succession down a chute with the rims of the caps supported by downwardly inclined guides spaced apart along the path of the caps, each cap in turn being arrested at the lower ends of the guides with a portion thereof extending into a second path along which containers are moved in succession whereby the cap is removed from the chute by engagement of the interior sides of the cap by the neck of a container moving along said second path and is disposed about said neck as the cap is withdrawn from the chute. Such apparatus will be referred to below as "apparatus of the kind described."

Heretofore, apparatus of the kind described has usually incorporated springs which assist in controlling the leading cap during application thereof to a container and in controlling the next succeeding cap as the latter is moved into position for application to a container. These springs have often been found to be unsatisfactory for long runs because they are subject to corrosion and become unserviceable. It is a main object of the present invention to provide apparatus of the kind described which gives good control of the caps, operates effectively, and uses no springs.

According to the invention there is provided apparatus of the kind described wherein the guides are mounted on a support plate over which the caps move towards the guides and a cap-retaining shoe is freely pivoted above the guides at a position in advance of the guides, the cap-retaining shoe when in the position thereof closest to the plate being spaced from the plate by a distance greater than the height of a cap and the guides being formed to lift and direct the top of a cap against the underside of the shoe so that the cap is held between the shoe and guides until movement thereof by a container causes movement of the shoe about the pivot therefor away from the guides thereby permitting the cap to be drawn between the shoe and guides and under control thereof.

In a preferred embodiment of the invention the guides are equi-spaced on opposite sides of the median line of the path of the caps and include cap guide portions each formed as a segment of a circle forming the path of the cap as it is moved from the chute by a container said portions being arranged to lift and direct the top of the cap against the shoe. The guides may be supported by said plate for adjustment towards and away from each other and the segmental portions of the guide rails extend beyond the edge of the plate nearest the path of the containers. The cap-retaining member may be in part

located above the guides and in part disposed over said second path to press a cap against the mouth rim of a container passing therebelow.

In order that the invention may be clearly understood one embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a side elevation of apparatus according to the invention,

FIG. 2 is a section illustrating the mode of operation of the apparatus, and

FIG. 3 is a view looking in the direction of arrow A, FIG. 2, with some parts omitted for clarity.

Referring to the drawings, the apparatus comprises a downwardly and forwardly directed chute or cap guideway which includes a pair of downwardly inclined bottom guide members **1** spaced apart along the path of caps **2**, FIG. 2, which move gravitationally in succession down the guide members **1**. Side guide members **3** and top guide members **4** co-operate with the members **1** to form the chute or guideway and the rims **5** at the peripheries of the caps rest on the bottom guide members **1**. The upper ends of the guide members **1**, **3** and **4** are connected to suitable cap conveyor means not shown. The lower ends of the guide members **1** terminate in and deliver onto a flat plate **7** providing a flood at the delivery end of the guideway the lower edge of which, as shown in FIG. 2, is located above a horizontal second path along which containers **8**, for example glass jars, are moved to receive caps **2** from the chute prior to the containers being moved, together with the caps, to mechanism arranged to secure the caps to the containers. Stationary guide rails **9** are equi-spaced on opposite sides of the medium **10**, FIG. 3, of the path of the caps and each guide rail **9** includes facing cap guide portions **11** each formed as a segment of a circle forming the path of a cap as it is moved from the chute by a container as described below. The guide rails **9** are adjustable towards and away from each other, being secured to the flat plate **7** by screws **12** which pass through slots **13** in the flat plate. The segmental cap guide portions **11** of the guide rails **9** extend beyond the terminal edge **14** of the plate **7** nearest the path of the containers **8**.

A cap-retaining shoe **15**, of arcuate form, is freely pivoted at **16** to brackets **17** mounted on the flat plate **7**. The pivot **16** for the shoe **15** is located at a position in advance of the guides **9**, and the shoe when in the position thereof closest to the plate **7** is spaced from the plate **7** by screws **18**, FIG. 1, by a distance which is slightly greater than the height of a cap. The cap-retaining shoe **15** in part is located above the guide rails **9**, and is spaced therefrom by a distance sufficient to permit movement of a cap as described below, and in part is disposed over the second path along which the containers **8** are moved and is arranged to control caps as they slide into place on the mouth rims **19**, FIG. 2, of the containers. The segmental guide portions **11** are arranged to lift or direct the top of the cap upwardly against the underside of the shoe **15**.

The operation of the apparatus is as follows: The caps **2**, FIG. 2, move gravitationally down the guide members **1** over the flat plate **7** until the leading cap is arrested at the position indicated in broken lines in FIG. 3 and is held, as described below, between the segmental cap guide portions **11** and the cap-retaining shoe **15**. In this position the leading portion of the cap extends into the path of the containers **8** and as a container **8** is moved along the path the initial engagement of the container with the interior of the cap as illustrated at **2a**, FIG. 2, draws the cap between the cap guide portions **11** and the cap-retaining shoe **15** thus raising the shoe **15**. The weight of succeed-

ing caps tends to force the cap arrested as indicated in FIG. 3 slightly further than the position at which it is held by the cap guide portions **11** so that when the cap is in the position indicated in FIG. 3 the front edge thereof is lifted by said portions **11** thus bringing the cap into contact with the retaining shoe which accordingly assists in holding the cap stationary until the neck of the container completes the lifting action and effects withdrawal of the cap. Forward movement of the cap is constrained by the segmental portions **11** and shoe **15** until the angle at which the cap is held is substantially reduced, when the weight of the shoe **15** alone retains the cap until the trailing edge of the cap drops off the edge **14** of the plate **7**. As the cap is withdrawn from the chute it drops over the neck of the container and the weight of the shoe **15** on the top of the cap ensures that the cap is properly applied to the container as illustrated at **2***b*, FIG. 2. It is to be understood that when a capped container is in the position shown at **2***b* the next cap **2***a* has only reached the position at which it is arrested between the guide portions **11** and shoe **15** and that the positions of the containers as shown in FIG. 2 is only for convenience to afford economy of space on the drawing. As the cap **2***a* is withdrawn from the chute the next succeeding cap follows it gravitationally until it, in turn, is arrested and held between the guide portions **11** and shoe **15**.

It will be understood that the radii of the segmental guides portions **11** and cap-retaining shoe **15** will vary according to the size of cap to be fed and that the space beween the guide rails **9** will also be selected according to the size of the caps.

I claim:

1. Cap feeding means for feeding closure caps having generally cylindriform peripheries in a first downwardly and forwardly extending path onto containers being conveyed along a horizontal second path, said cap feeding means including a downwardly and forwardly extending cap guideway terminating in a floor plate whereupon is mounted a pair of laterally spaced cap arresting and positioning guides, a cap-retaining shoe freely pivoted above said plate and curving downwardly and forwardly opposite a lower delivery end of said plate and then downwardly, forwardly and upwardly beyond said delivery end, stop

means limiting downward swinging of the shoe to place it when in position closest to said plate spaced from the plate by a distance slightly greater than the height of closure caps being fed, said guides being shaped and placed to engage at sides of a cap periphery and arrest gravitational movement of each downward-fed cap in the guideway with the leading cap opposite the shoe at its closest proximity to the floor plate and lift said leading cap against the underside of said shoe so that it is held between the shoe and guides until movement thereof by contact of an oncoming container brings about movement of the shoe about its pivot away from the guides thereby permitting the cap to be drawn between the shoe and guides and under the control thereof, said guides being equi-spaced on opposite sides of the median line of the path of the caps and include cap guide portions each formed as a part circle defining a path along which each cap is moved from the shoe by a container, the part circle portions having leading upwardly curved surfaces arranged to lift the leading edge of each cap against the underside of said shoe, said guides being adjustable for relative linear movement toward each other on said plate, said part circle guide portions of said guides extending beyond the lower delivery end portion of the plate, and said cap-retaining shoe extending along said second path beyond the delivery end of the floor plate and the guides and lying at its lower level in a position for pressing each oncoming container carried cap into closing position on the container carrying the same.

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