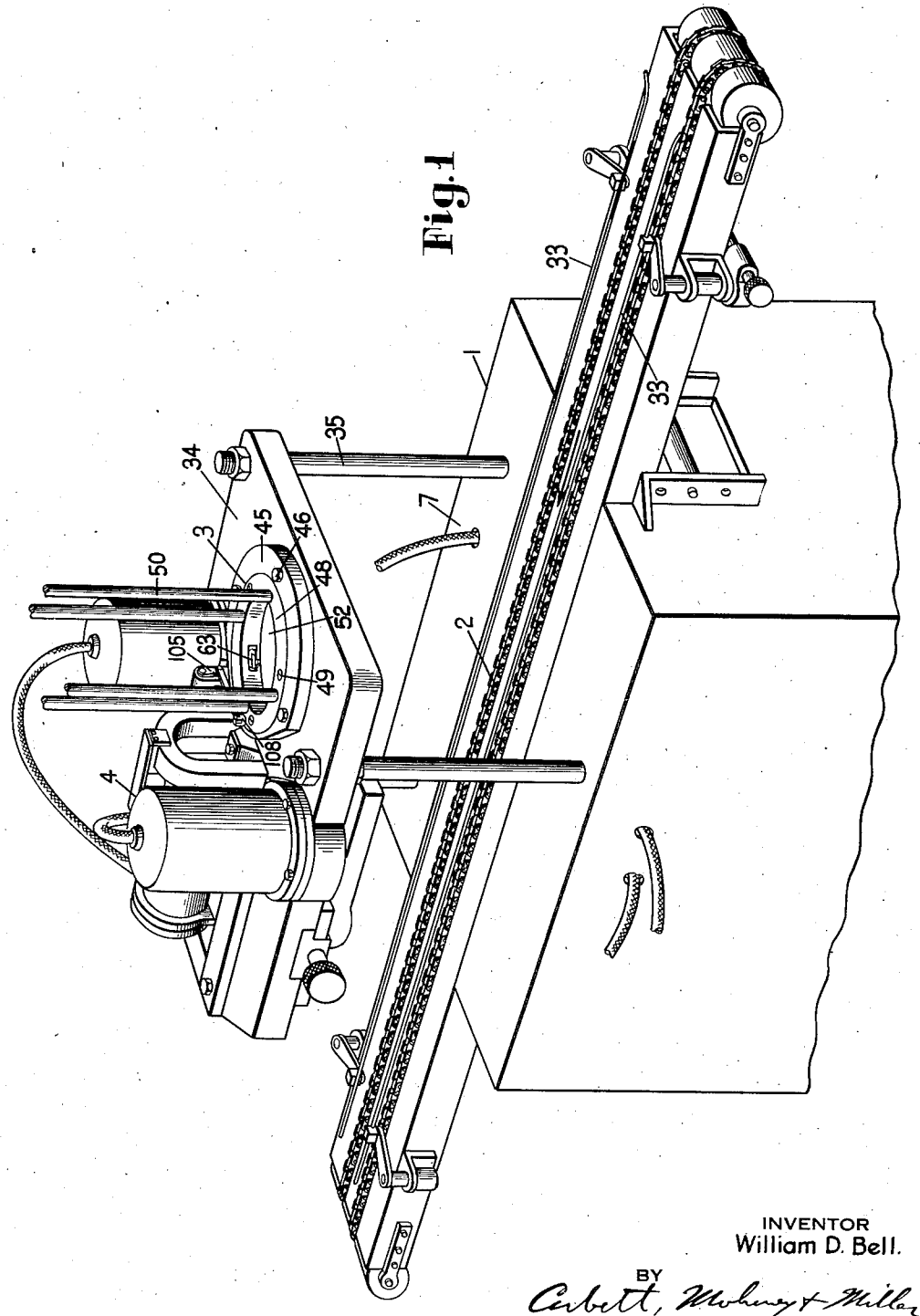
July 4, 1944. W. D. BELL 2,352,764

CAP-FEEDING APPARATUS

Original Filed Jan. 17, 1940 4 Sheets-Sheet 1

Fig. 1



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CAP-FEEDING APPARATUS

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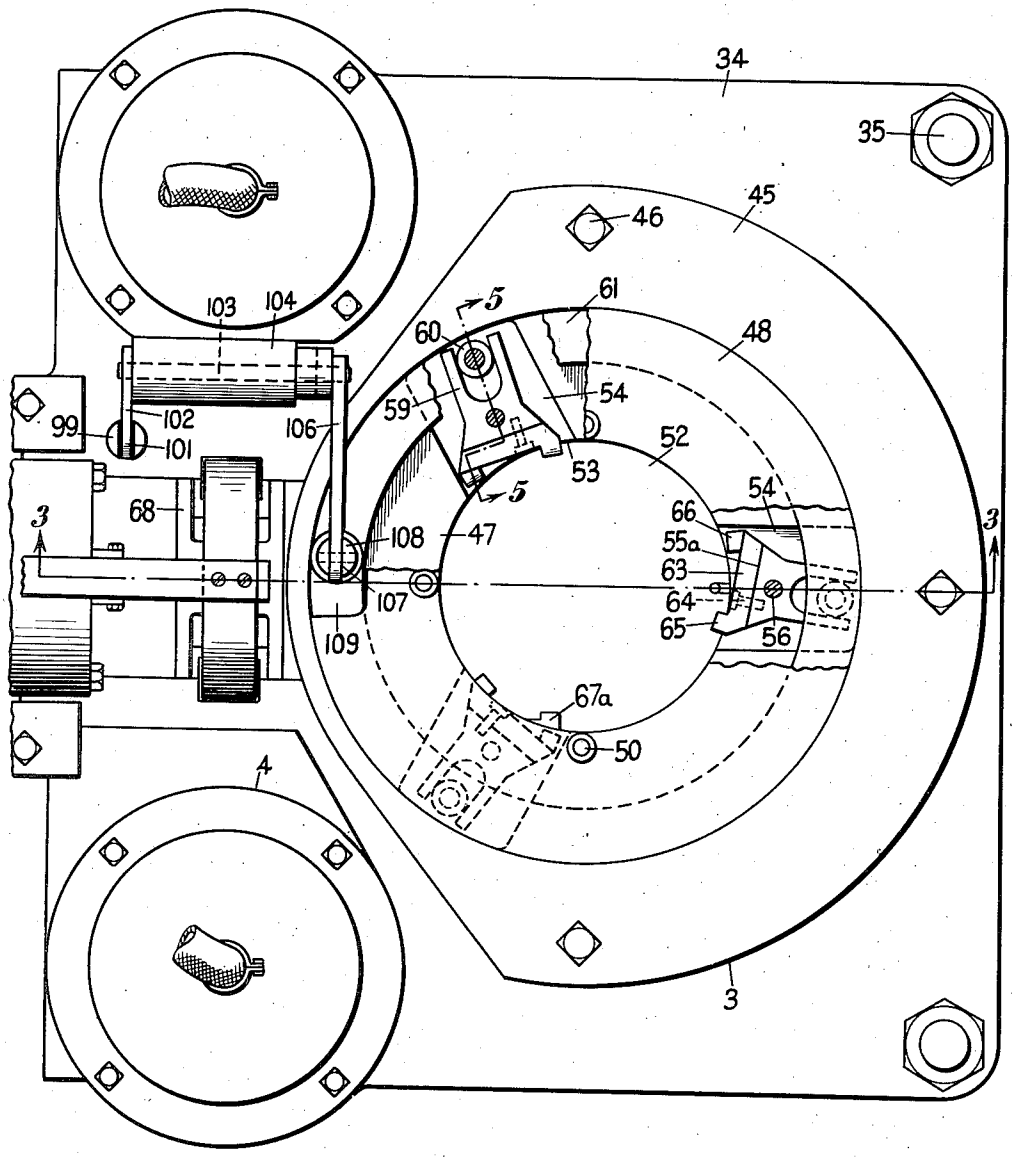


Fig. 2

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CAP-FEEDING APPARATUS

Original Filed Jan. 17, 1940 4 Sheets-Sheet 3

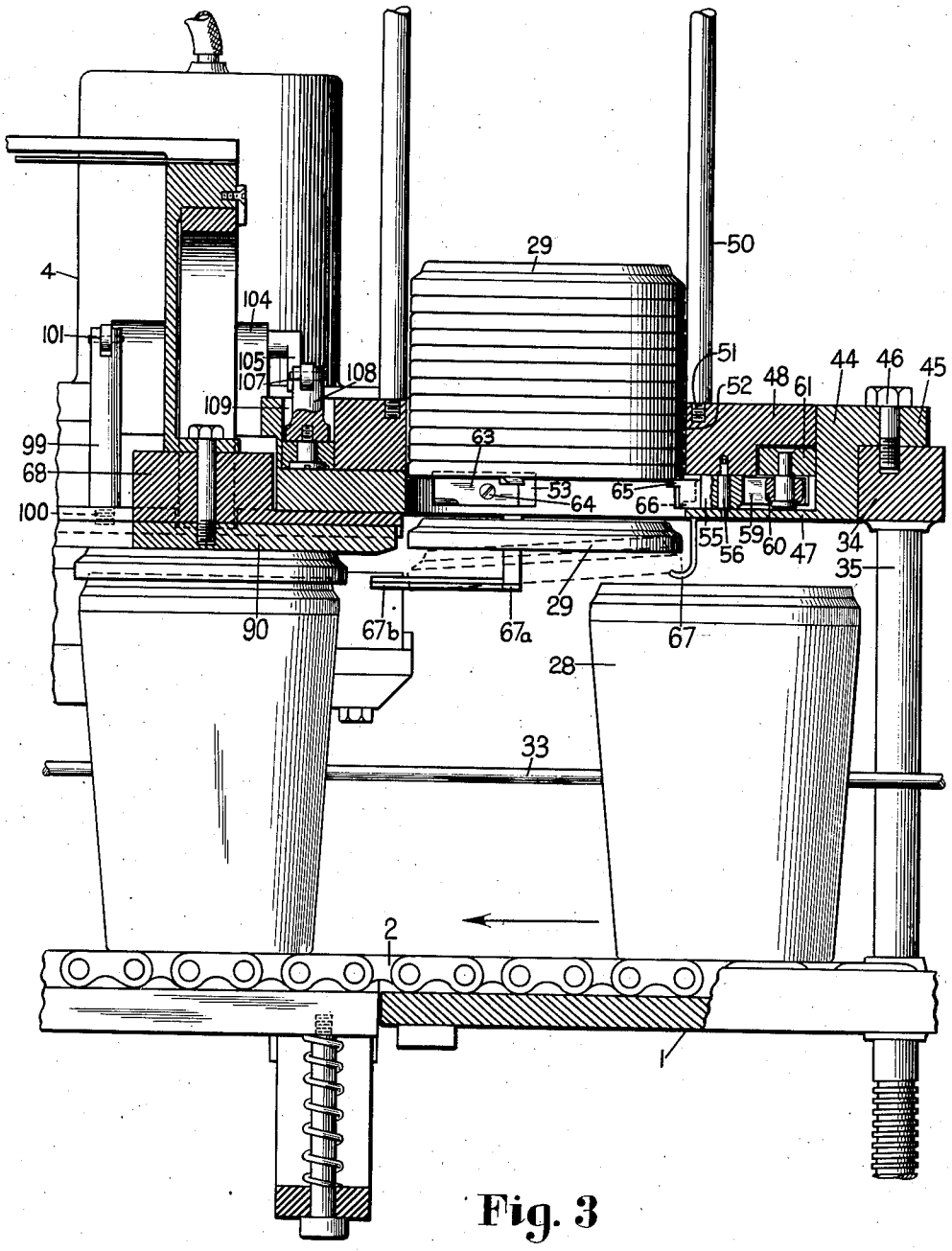


Fig. 3

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CAP-FEEDING APPARATUS

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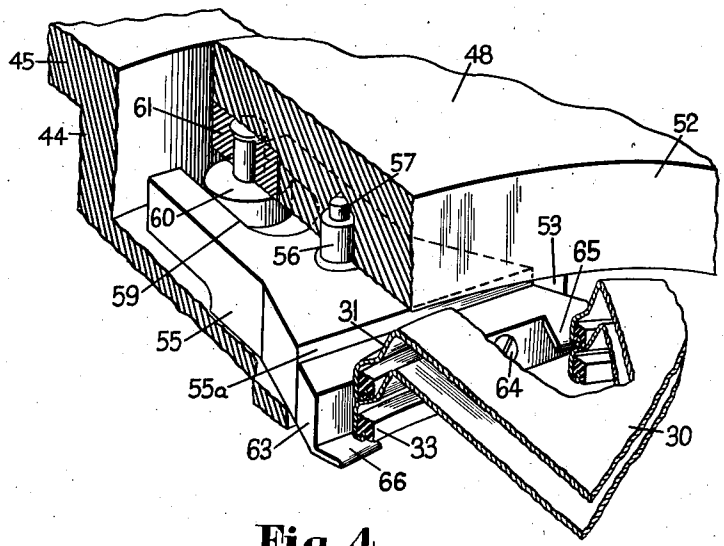


Fig. 4

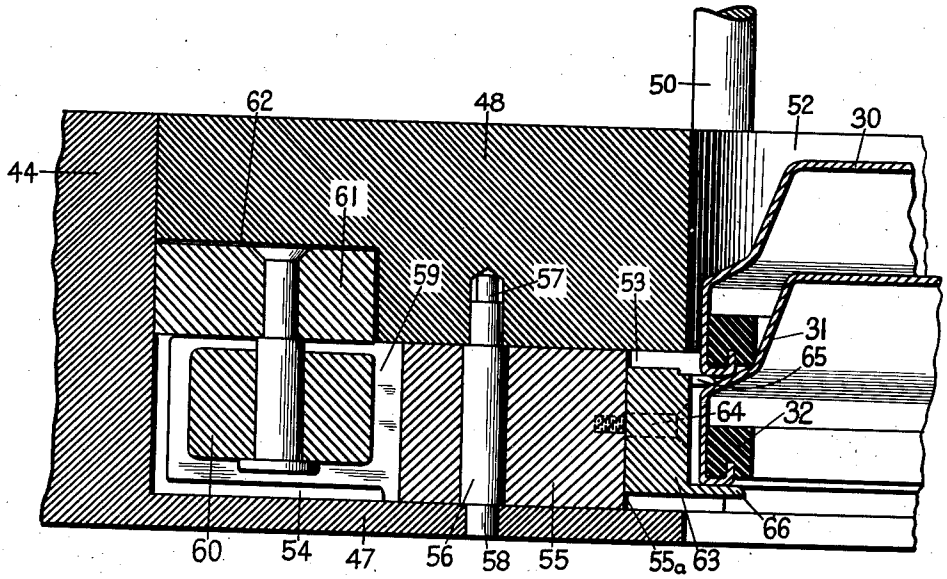


Fig. 5

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UNITED STATES PATENT OFFICE

2,352,764

CAP-FEEDING APPARATUS

William D. Bell, Columbus, Ohio, assignor to Anchor Hocking Glass Corporation, Lancaster, Ohio, a corporation of Delaware

Original application January 17, 1940, Serial No. 314,299. Divided and this application May 19, 1941, Serial No. 394,065

4 Claims. (Cl. 226—88.1)

My invention relates to cap-feeding apparatus. It has to do, more particularly, with apparatus for feeding caps from a source of supply and applying them to containers, such as food containers and including jars, bottles, cans, et cetera, preparatory to sealing them on said containers.

One of the objects of my invention is to provide a simple and effective apparatus for feeding caps from a source of supply into position to be engaged by the upper ends of containers to be sealed thereby which are moved along by a conveyer.

Another object of my invention is to provide apparatus which will automatically release caps from a cap reservoir and feed them into position to be engaged by the top of the containers without any manual intervention by the operator.

Another object of my invention is to provide a cap-feeding and applying unit of such a nature that the cap can be withdrawn therefrom by a container on a moving conveyer without danger of upsetting the container.

Another object of my invention is to provide a cap-feeding apparatus of such a nature that the cap which is fed into position to be engaged by a container will not drop from the cap-feeding mechanism until it is positively withdrawn by the approaching container.

Another object of my invention is to provide a cap-feeding unit having a magazine for a vertically disposed stack of caps and which is of such a nature that the lowermost cap will be separated from the stack while the stack is supported in position.

In its preferred form, my invention contemplates the provision of a simple apparatus for feeding caps from a source of supply and applying them to containers such as jars, bottles, cans et cetera. The apparatus is preferably employed with a continuously moving conveyer upon which the filled containers are placed indiscriminately. Means is preferably provided in association with the conveyer for centering and maintaining the containers centered on said conveyer. The containers are first moved by the conveyer to my cap-feeding and applying unit where caps or other closures are loosely positioned on the upper ends of the containers. The containers may then be moved to a sealing unit such as is described in my parent application, Serial No. 314,299. It will, of course, be understood that any suitable sealing unit may be used in conjunction with my cap-feeding apparatus. The sealing head and my cap-feeding and applying unit are preferably separately disposed directly adjacent each other. My cap-feeding and applying unit is preferably connected to the sealing head so that each time the sealing head is actuated, a cap is fed from my cap-feeding unit into position to be engaged by the next container in the conveyer. It is not, however, necessary to operate the cap-feeding and applying unit by the sealing head.

Various other objects and advantages will be apparent from the following description.

This application is a division of my co-pending application Serial No. 314,299, filed January 17, 1940, and directed to Apparatus for sealing containers.

The preferred embodiment of my invention is illustrated in the accompanying drawings, wherein similar characters of reference designate corresponding parts and wherein:

Figure 1 is a perspective view of my cap-feeding and applying apparatus showing it associated with a sealing machine.

Figure 2 is a plan view, partly broken away, of my cap-feeding apparatus and its actuating means.

Figure 3 is a vertical sectional view taken substantially on line 3—3 of Figure 2.

Figure 4 is a detail, partly in perspective and partly in vertical section, of a portion of my cap-feeding unit.

Figure 5 is a detail in vertical section of a portion of the cap-feeding unit taken substantially on line 5—5 of Figure 2.

With reference to the drawings, I have illustrated a machine of the type disclosed in my co-pending application Serial No. 314,299. This machine comprises generally a table 1 supporting a horizontal conveyer unit 2 on its upper end (Figure 1), a cap-feeding and applying unit 3, and a sealing head unit 4.

The conveyer unit 2 is described in detail in said co-pending application. As disclosed in said application, the conveyer unit 2 is driven continuously.

As described in said application, the containers 28 are placed indiscriminately on the conveyer and are moved in the direction of the arrows (Figures 1 and 3) by the conveyer. My invention is not limited to any particular type of container and cooperating cap but for illustrative purposes I have shown in Figure 3 a tumbler adapted to receive the cap 29 on its upper end. This cap preferably embodies a substantially disk-like portion 30 (Figures 3, 4 and 5) which has a depending annular skirt 31 which carries an annular gasket 32 therewithin. When the cap is

forced downwardly onto the upper end of the container, the frictional contact of the gasket with the upper end of the container will aid in maintaining the cap in position and will seal the cap on the container.

In order to center the containers transversely of the conveyer and to maintain them centered, I provide a pair of longitudinally extending guide rails **33**, as disclosed in my co-pending application. These guide rails are supported on opposite sides of the conveyer in such a manner that they may be adjusted towards and away from each other. Thus, these guide rails will center the containers on the conveyer, as they are moved between the rails, and will maintain them centered on the conveyer during the time they are moved along by the conveyer.

After the containers are positioned on the conveyer, they are carried to my cap-feeding and applying unit **3**. This unit is of such a type that it will apply a cap loosely to the upper end of the container. After the container passes the unit **3**, it proceeds to the sealing head unit **4** in the manner described in my co-pending application.

The unit **3** is preferably disposed directly adjacent the sealing head unit **4**. They are both supported by a horizontally disposed plate **34**. The plate **34** is supported at a point spaced above the table **7** by means of a plurality of vertically disposed posts **35**. These posts may be in any suitable number. These posts extend downwardly through the top plate **7** of the table **1** on opposite sides of the conveyer. The posts may be adjusted vertically in the manner described in my co-pending application to vary the height of units **3** and **4** above the conveyer.

My cap-feeding and applying unit proper comprises an annular member **44** (Figure 3) which fits in an opening formed in the plate **34**. This member is provided with a peripheral flange **45** which rests on the top of plate **34** and which may be bolted thereto by means of bolts **46**. On its lower edge, the member **44** is provided with an inwardly projecting shelf-like portion **47**. The member **44** has its lower surface substantially flush with the lower surface of the plate **34**. The member **44** receives an annular collar **48** which may be slipped thereinto and which will rest on the portion **47** thereof. This member is held in position by means of screws **49** (Figure 1). The member **48** carries four upstanding posts **50**. Each of these posts is provided with a reduced threaded lower end **51** (Figure 3) which is adapted to be screwed into a cooperating threaded opening formed in the member **48**. The posts **50** are disposed adjacent the central opening **52** formed within the collar **48**. This opening is of such a size as to permit the caps to drop therethrough. A stack of nested caps is adapted to be disposed within the posts **50**.

For controlling the movement of the caps through the opening **52**, formed within member **48**, I provide the following structure. At suitable circumferentially spaced intervals, the collar **48** is provided with apertures or notches **53**, formed in the bottom portion thereof. These apertures extend inwardly entirely through the collar **48**, as indicated in Figure 5. The inner end of each aperture communicates with a chamber **54** formed in the annular member **44** in alignment therewith. In each chamber formed by an aperture **53** and a cooperating chamber **54**, an escapement member **55** is disposed. Each of the members **55** is pivotally mounted, as indicated in Figures 2 and 5. A pivot pin **56** is carried by each member **55** intermediate the inner and outer ends thereof. The upper end of the pivot pin **56** is rotatably carried by the member **48**, as at **57**, while the lower end of the pivot pin is rotatably carried by the portion **47** of the member **44**, as at **58**.

The inner end of each member **55** is provided with a bifurcated portion **59**. Each of these portions **59** has a roller **60** disposed therebetween (Figures 2, 3, 4 and 5). These rollers **60** are carried at properly circumferentially spaced intervals by ring **61**. The ring **61** is disposed in an annular space **62** formed within the collar **48** at the lower and inner edge thereof. The ring **61** is free to rotate slightly or oscillate relative to the member **48**. When the ring is rotated, all of the members **55** are swung about their pivot points **56**. Each of the members **55** has a flat outer end **55***a* (Figures 4 and 5). A member **63** is disposed in abutting relationship to this surface. This member **63** is pivoted to the member **55** by a pivot pin **64**. Each member **63** is provided with an outwardly projecting upper knife-like finger **65** and lower knife-like finger **66**.

Normally the members **55** will be in such a position that the lower finger **66** will project outwardly beyond the wall of the opening **52**. Consequently, the lowermost cap of the stack will rest on these fingers **66** and will be prevented from dropping through the opening **52**. At this time the fingers **65** will not project into the opening **52**. However, when the ring **61** is rotated in the proper direction, it causes the members **55** to pivot in such a manner that the fingers **66** will be withdrawn inwardly from the opening **52** and the fingers **65** will be swung outwardly into the opening. This will permit the lowermost cap to drop while the cap next above will be engaged by the finger **65** and will be prevented from dropping. As soon as the ring is rotated to its original position, the fingers **65** will again be withdrawn from the opening **52** allowing the stack of caps to drop onto the fingers **66**, which will again be projected into the opening **52**. Thus, rotation of the ring **61** will permit one of the caps to drop from the opening **52**. The members **63** are free to move slightly about the pivots **64** to prevent jamming of the feeding device. The movement is limited, as indicated in Figure 5, by the member **48** disposed thereabove and the portion **47** of member **44** disposed therebelow. Thus, it will be apparent that the caps will be fed one by one from the opening **52**. The cap released from the stack will drop downwardly and will be received by the hook **67**, depending from the portion **47** of member **44** and disposed (Figure 3) adjacent and behind the opening **52**, and a pair of fingers **67***a* which are formed on guide members **67***b*. The hook **67** and the members **67***a* cooperate to support the cap in a downwardly inclined position, as indicated in Figure 3, so that as a container is moved beneath the cap by the conveyer, the upper edge of the container will engage the forward portion of the skirt of the cap and will pull it off the hook **67** and members **67***a* allowing it to drop into position on the flanges of members **67***b*. As disclosed in my co-pending application, the members **67***b* are disposed in parallel relationship and extend longitudinally of the path of movement of the container. They are spaced apart a distance slightly less than the diameter of the cap. However, the upper end of the container will still project slightly above the horizontal flanges of these members.

Thus, the upper end of the container will move the cap along members 67b until it moves off such members, at which time it will be beneath the plate 99 of the sealing head unit 4.

As disclosed in the parent application, in order to actuate the cap-feeding and applying unit 3 each time the sealing head of the sealing head unit 4 is actuated, I preferably provide means for connecting the vertically movable plate 68 of the unit 4 to the rotatable ring 61 (Figure 3) of unit 3. For this purpose the plate 68 is provided with an upstanding post 99 which has its lower end threaded into an opening in the upper surface of the plate 68, as at 100 (Figure 3). This post has its upper end pivotally connected, as at 101, to a crank arm 102 which is keyed to one end of the shaft 103 (Figure 2) which is rotatably mounted in a suitable bearing 104 carried by the upper surface of the stationary plate 34. The opposite end of this shaft has keyed thereto a crank arm 105 (Figure 3) which has its lower end pivotally connected to a link 106 (Figure 2). This link has its opposite end pivotally connected as at 107 to the upstanding member 108 (Figure 3) which has its lower end attached to the ring 61. A slot 109 (Figure 2) is provided in the collar 48 to permit movement of the member 108 so that it will rotate the ring 61. It will be apparent that when the plate 68 is moved downwardly, the ring 61 will be rotated in one direction and when it is moved upwardly, the ring will be rotated in the opposite direction. Thus, each time the sealing head is actuated, the cap-feeding device will be actuated to release a cap from the stack.

From the preceding description, the operation of my cap-feeding apparatus will be well understood. The containers will be placed indiscriminately on the conveyer which will move them between the guides 33 so that they will be in proper alignment with the units 3 and 4. The containers will then be moved along and as they pass beneath the unit 3, each container will withdraw a cap from the supports 67 and 67a, as previously described. The container with the cap loosely applied thereto will then be moved beneath the sealing head unit 4 and will be sealed in the manner described in the parent application.

One of the advantages of my invention is that a very simple and effective apparatus for feeding caps from the source of supply into position to be engaged by the upper ends of containers preparatory to sealing is provided. This apparatus will automatically release the lowermost cap from the cap reservoir, without any manual intervention, while at the same time support the stack of caps thereabove. The cap may be withdrawn from my cap-feeding apparatus by a container without upsetting said container. Another advantage of my invention is that the cap which is being fed into position to be engaged by a container will not drop from the cap-feeding mechanism until it is positively withdrawn by the approaching container.

Many other advantages will be apparent from the above description and from the following claims.

Having thus described my invention, what I claim is:

1. A cap-feeding unit comprising a magazine adapted to receive a vertical stack of caps, means for feeding the caps one by one from the lower end of said stack, said means comprising an annular member through which the caps are adapted to drop, a plurality of pivoted escapement members associated with said annular member, each of said escapement members embodying a main portion pivoted for swinging movement in a horizontal plane, each of said main portions carrying on its outer end a member pivoted thereto for movement in a vertical plane which is substantially tangential to the periphery of said annular member, said last-named pivoted member carrying at one end a horizontal finger disposed adjacent the upper edge thereof, and at the other end a horizontal finger disposed adjacent the lower edge thereof, said escapement members being normally positioned so that the lower fingers support the lowermost cap of the stack, and means for swinging the main portions of said escapement members about their pivots so that the lower fingers will move out of engagement with the lower cap and the upper fingers will move into engagement with the cap next above.

2. A cap-feeding unit comprising a magazine adapted to receive a vertical stack of caps, means for feeding the caps one by one from the lower end of said stack, said means comprising an annular member through which the caps are adapted to drop, a plurality of pivoted escapement members associated with said annular member, each of said escapement members embodying a main portion pivoted for swinging movement in a horizontal plane, each of said main portions carrying on its outer end a member pivoted thereto for movement in a vertical plane which is substantially tangential to the periphery of said annular member, said last-named pivoted member carrying at one end a horizontal finger disposed adjacent the upper edge thereof, and at the other end a horizontal finger disposed adjacent the lower edge thereof, stop means for limiting pivotal movement of said last-named member, said escapement members being normally positioned so that the lower fingers support the lowermost cap of the stack, and means for swinging the main portions of said escapement members about their pivots so that the lower fingers will move out of engagement with the lower cap and the upper fingers will move into engagement with the cap next above.

3. A cap-feeding unit comprising a magazine adapted to receive a vertical stack of caps, means for feeding the caps one by one from the lower end of said stack, said means including a member having an opening through which the caps are adapted to drop, a plurality of pivoted escapement members associated with said opening, each of said escapement members embodying the main portion pivoted for swinging movement in a horizontal plane, each of said main portions carrying on its outer end a member pivoted thereto for movement in a vertical plane which is substantially tangential with the periphery of the caps, said last-named member carrying on opposite sides of the pivot point thereof upper and lower horizontal fingers spaced apart vertically a distance corresponding substantially to the thickness of each cap at the edge thereof, said escapement members being normally positioned so that the lower fingers support the lowermost cap of the stack and means for swinging the main portion of said escapement members about their pivots so that the lower fingers will move out of engagement with the lower cap and the upper fingers will move into engagement with the cap next above.

4. A cap-feeding unit comprising a magazine adapted to receive a vertical stack of caps, means for feeding the caps one by one from the lower end of said stack, said means including a collar member having an opening through which the caps are adapted to drop, a plurality of pivoted escapement members associated with said opening, each of said escapement members embodying a main portion pivoted for swinging movement in a horizontal plane, each of said main portions carrying on its outer end a member pivoted thereto for movement in a vertical plane which is substantially tangential to the periphery of the collar member, said last-named pivoted member carrying on opposite sides of the pivot point thereof upper and lower horizontal fingers spaced apart vertically a distance corresponding substantially to the thickness of each cap at the edge thereof, stop means for limiting pivotal movement of said last-named member, said escapement members being normally positioned so that the lower fingers support the lowermost cap of the stack and means for swinging the main portions of said escapement members about their pivots so that the lower fingers will move out of engagement with the lower cap and the upper fingers will move into engagement with the cap next above.

WILLIAM D. BELL.