Dec. 11, 1956 G. L. N. MEYER 2,773,522

RESILIENT BOTTLE GRIPPER FOR FILLING MACHINE

Filed March 15, 1954 3 Sheets-Sheet 1

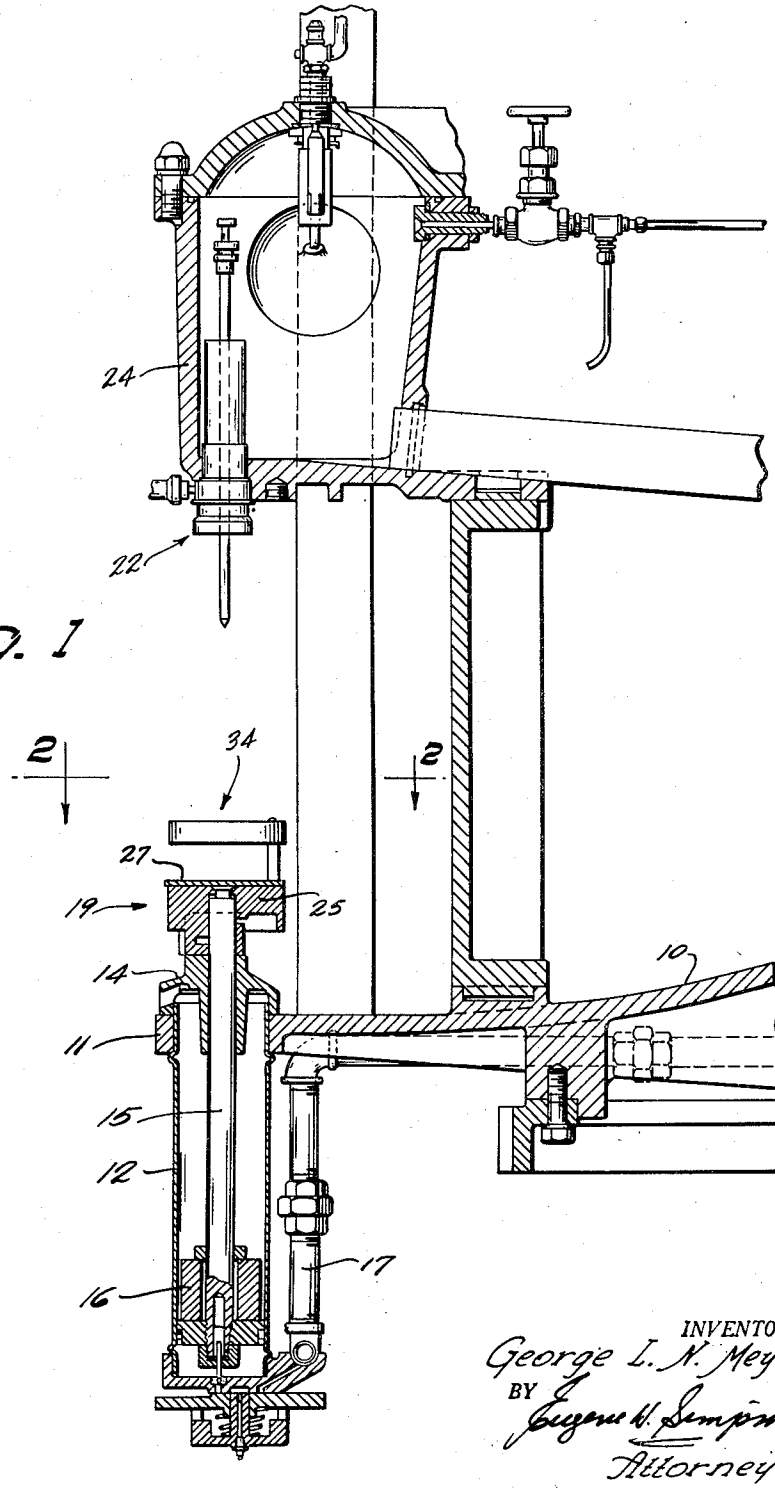


Fig. 1

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Filed March 15, 1954 3 Sheets-Sheet 2

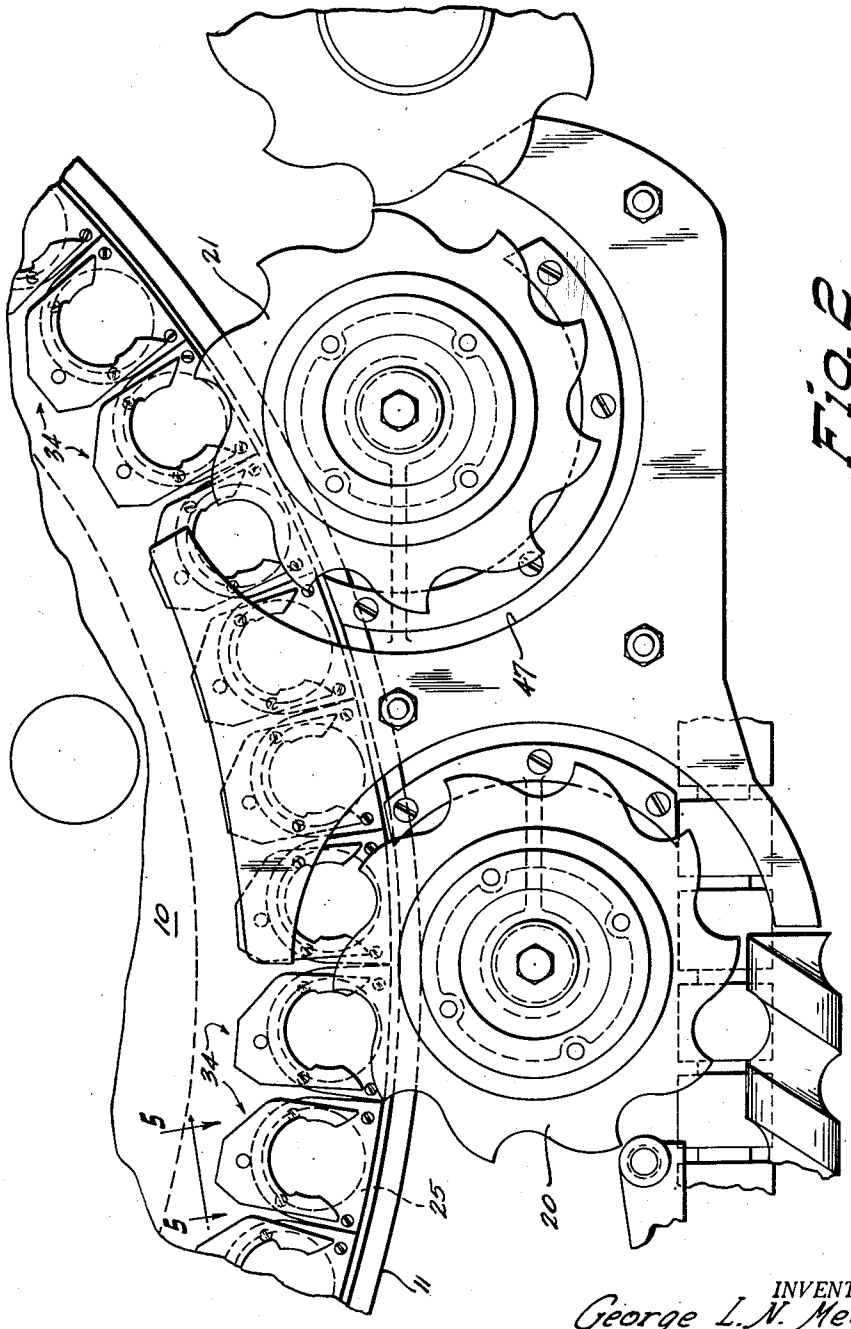


Fig. 2

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RESILIENT BOTTLE GRIPPER FOR FILLING MACHINE

Filed March 15, 1954 3 Sheets-Sheet 3

Fig. 3

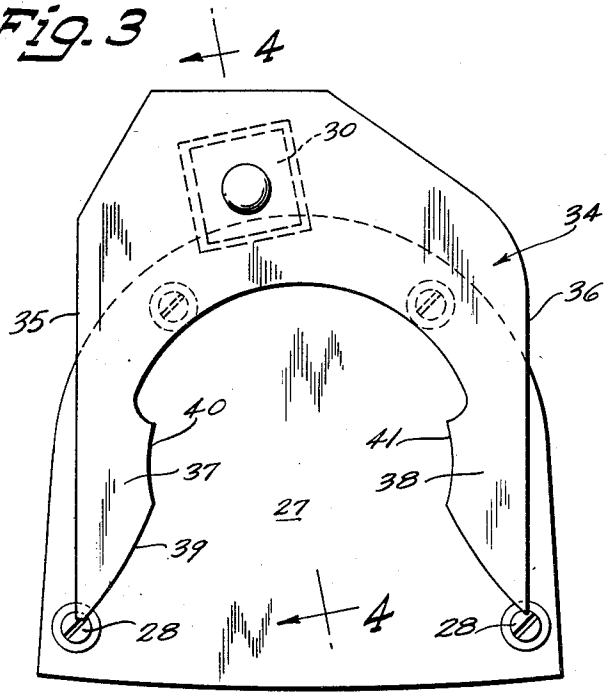


Fig. 4

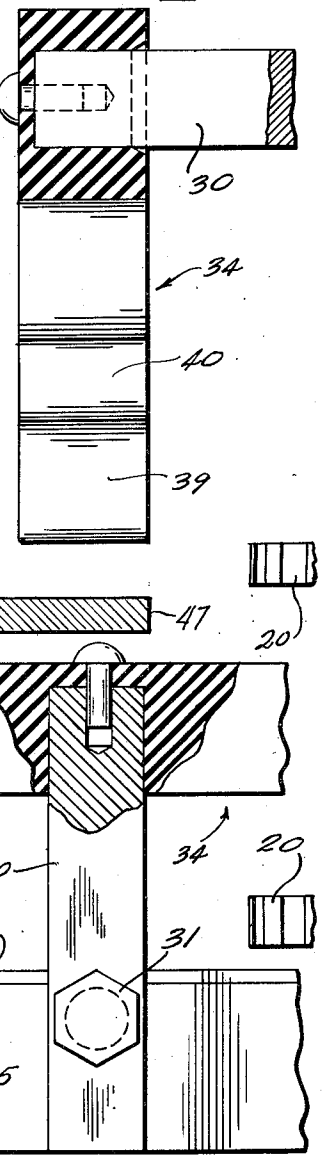


Fig. 6

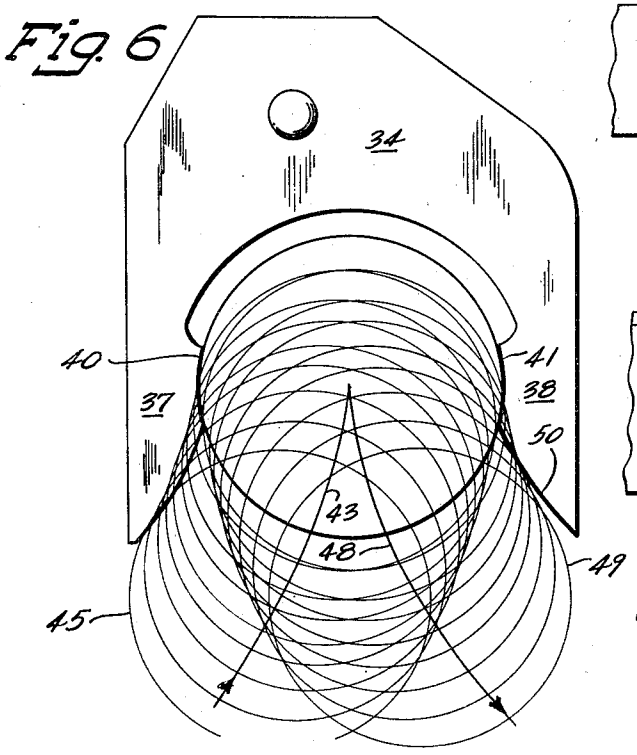


Fig. 5

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2,773,522

RESILIENT BOTTLE GRIPPER FOR FILLING MACHINE

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Application March 15, 1954, Serial No. 416,190
7 Claims. (Cl. 141—165)

This invention relates to bottle filling machines and more particularly to a bottle gripper to receive the bottles as they move onto the stirrup and center and retain the bottles under the filling head during filling.

Modern bottle filling machines ordinarily contain a constantly rotating filler bowl. The containers to be filled are moved by a star wheel onto stirrups at a loading station. The stirrups raise the bottles into filling position during the rotation of the bowl. After filling, the bottles are lowered from filling position by the stirrups and are removed from the stirrups by a discharge cam and a star wheel.

The stirrups on the filling machines heretofore made, usually have spaced metallic pins which project above the surface of the stirrups and serve to center the bottles directly under the filler valves.

It has been found, however, that as the bottles pass around the star wheel they have a tendency to spin on their axes, the spinning in turn causing some misaligning of the bottles on the stirrups.

It has been found also that when the machine is started or stopped the inertia of the bottles, if they are not clamped in filling position, tends to jar those bottles out of position, causing the bottles so misalined to jam against the vent tube and bend it, or so jars the bottles out of position that they are out of time with the discharge star and may be broken between the discharge star and the discharge cam.

It is an object of the present invention to provide a bottle gripper for a bottle filling machine, or the like, which will position the bottles properly under the filler head.

Another object is to provide a bottle gripper for a bottle filling machine, or the like, which will prevent the spin of the bottles as they enter or are discharged from the machine.

Another object of the invention is to provide a bottle gripper for a bottle filling machine, or the like, which will insure the bottles reaching the discharge station on the machine in proper position to be engaged by the discharge star wheel.

A further object of the invention is to provide a bottle gripper for a bottle filling machine, or the like, which will hold the bottles positively against the effects of centrifugal force.

A still further object is to provide a bottle gripper for a bottle filling machine, or the like, which will retain the bottles securely against the inertia of starting or stopping.

A still further object is to provide a bottle gripper for a bottle filling machine, or the like, which will retain the bottles accurately during raising thereof into filling position.

A still further object of the invention is to provide a bottle gripper for a bottle filling machine, or the like, which will deliver the bottles accurately to the discharge star wheel.

A still further object is to provide a bottle gripper for a bottle filling machine, or the like, which will reduce bottle breakage.

A still further object is to provide a bottle gripper for a bottle filling machine, or the like, which will reduce damage to the machine due to misalignment of bottles.

Still further objects of the invention will become apparent upon considering the following specification, which, when taken in conjunction with the accompanying drawings, illustrates a preferred form of the invention.

In the drawings:

Fig. 1 is a vertical cross-section through the filler bowl and stirrup of a bottle filling machine, showing the improved bottle gripper in position on the stirrup;

Fig. 2 is a plan view, taken on the line 2—2 of Fig. 1, looking in the direction of the arrows, and including the infeed and discharge star wheels;

Fig. 3 is an enlarged top plan view of the improved bottle gripper, shown in Figs. 1 and 2, in place on a stirrup;

Fig. 4 is a cross-section through the bottle gripper shown in Fig. 3, and is a section taken on the line 4—4 of Fig. 3;

Fig. 5 is a rear view of the stirrup shown in Fig. 3, showing the mounting of the bottle gripper post and the position of the star wheels; and

Fig. 6 is a plan view of the bottle gripper, shown in Fig. 3, showing the locus of the center of the containers relative to the stirrups on which they are about to be delivered.

Referring to the drawings and particularly to Figs. 1 and 2, the bottle filling machine comprises a standard (not shown) which carries a rotatable base plate **10**, extending from its central axis (not shown) to an outer circular periphery **11**.

The plate **10** has a series of apertures spaced about its periphery which receive lifting cylinders **12**. Each cylinder **12** has a head or cover **14** which receives and guides a piston rod **15**. The piston rod **15** is actuated pneumatically by a piston **16** through an air supply pipe **17**. The piston **15** carries a lifting stirrup, generally designated **19**, which raises the bottle into engagement with a filler valve **22**.

Bottles or other containers are moved onto the stirrups by an intake star wheel **20** prior to the beginning of the filling operation and are removed from the filling machine at the conclusion of the filling operation by a discharge star wheel **21**. The filler valves **22** are mounted in a filler bowl **24**, one valve being mounted directly above each of the stirrups **19** so that when the bottles are raised to the filler valves **22** they are centered with respect to the valves and the valves may then be opened to fill bottles with beverage in a manner well known in the art.

The stirrup **19** is shown in detail in Figs. 3 and 4. Referring then to Figs. 1 to 4, inclusive, the stirrups **19** comprise substantially horse shoe-shaped castings **25** secured to the piston rods **15** through clamps formed integrally on the castings **25**. The tops of the castings **25** are provided with cover plates **27** which are polished or smoothed on top to receive the bottles. The cover plates **27** are secured to the castings **25** by means of countersunk machine screws **28**.

A square post **30** is secured to the rear of each stirrup **19** by a screw **31** (Fig. 5), the post extending above the top of the plate **27** to form a support for a flexible bottle gripper, generally designated **34**. The bottle gripper **34** is provided with a square recess extending upwardly through the bottom surface to a point adjacent the upper surface and with a continuing circular aperture connecting the upper end of the recess with the upper surface of the bottle gripper. The square recess is received snugly over the top of the post **30**, the post thus supporting the bottle gripper **34** securely in spaced parallel relation above the plate **27**. A headed pin **35** is secured in the top of the post **30** and extends through the circular aperture leading to the square recess in the bottle gripper to retain the gripper in position on the post.

The gripper 34 is adapted to grip the bottle at approximately the center of gravity in order to minimize the possibility of misalignment of the bottles.

Since each of the bottle grippers on the machine are identical in shape and in operation only one will be described.

The bottle gripper 34 is formed from a slab of flexible material such as rubber and has substantially parallel sides 35 and 36 projecting over the top of the stirrup 19. The parallel sides 35 and 36 form the exteriors of a pair of fingers 37—38. The finger 37 has a curved intake surface 39 adapted to contact the bottle as it is moved onto the stirrup by the star wheel 20, the contact of the bottle with the surface 39 stopping the rotation of the bottle and steadying it. Further movement of the bottle onto the stirrup bends the finger 37 forwardly and permits the bottle to pass between the fingers 37 and 38 to be gripped between a circular surface 40 on the finger 37 and a corresponding circular surface 41 on the finger 38. Thus the bottle is placed accurately in position on the stirrup 19 by the star wheel 20 and is held securely and accurately in position between the surfaces 40 and 41 on the bottle gripper 34.

The path of the center of the bottle with respect to the stirrup is shown by the curve 43, Fig. 6, and the outlines of the bottle as it advances onto the machine along the path 43 is shown by the circles 45. It will therefore be seen from Fig. 6 that as the bottle moves onto the machine the finger 37 must move to the left, as seen in Fig. 6, in order that the bottle advance fully onto the stirrup. The contact of the bottle with the surface 39 of the finger 37 both stops bottle spin and steadies the bottle as the star wheel positions it under the filler valve 22.

The surfaces 40 and 41 retain the bottle in position on the stirrup as the stirrup revolves about the center of the machine and as the bottle is being filled.

At the discharge station the bottle engages a cam 47 and is engaged by the discharge star 21. As the bottle advances on the machine the discharge star 21 and the cam 47 force the bottle outwardly off the stirrup and onto the star. The path of the center of the bottle with respect to the stirrup as it is being moved off the stirrup is shown by the curve 48, in Fig. 6, and the outlines of the bottle are shown by a series of circles 49.

As the bottle moves outwardly from the stirrup the finger 38 flexes to the right permitting the bottle to leave the circular gripping portions 40—41 and to contact a discharge surface 50. The discharge surface 50 retains the bottle firmly in contact with the surface of the discharge star, steadies the bottle and prevents it from spinning.

While the bottle filling machine herein described refers only to bottles, it will be understood that it applies equally to other forms of containers such as tin cans, etc., and the word "bottles" as used herein is to be so interpreted.

It is obvious that the bottle gripper described hereinabove stops bottle spin effectively, steadies the bottle, prevents the bottle from being misaligned due to inertia of starting and stopping the machine and will position the bottle accurately for filling.

It will be realized that the above description is merely a preferred embodiment of the invention and that various changes in size, shape and arrangement of parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

That which is claimed as new and is desired to be secured by United States Letters Patent is:

1. A bottle filling machine, having a plurality of stirrups adapted to raise the bottles into engagement with filler valves for filling and a star wheel adapted to move the bottles on to the stirrups, a bottle gripper on each of said stirrups, said bottle gripper comprising a resilient member

adapted to engage a bottle in gripping engagement and center the same below a filler valve.

2. A bottle filling machine, including a plurality of stirrups adapted to raise the bottles into engagement with filler valves for filling and a star wheel adapted to move bottles onto successive stirrups, a bottle gripper supported on each stirrup in spaced parallel relation thereto, said bottle gripper including a pair of substantially parallel resilient fingers adapted to resiliently engage a bottle as it is placed on a stirrup by the star wheel and center the bottle under a filler valve.

3. A bottle filling machine, including a plurality of stirrups adapted to raise the bottles into engagement with filler valves for filling and a star wheel adapted to move the bottles onto successive stirrups, a bottle gripper on each of said stirrups comprising a pair of resilient fingers extending parallel to and spaced from the top of the stirrup, means on said fingers to resiliently grip and center a bottle under a filler valve, and a post secured to said stirrup to support the fingers thereabove.

4. A bottle filling machine including a plurality of stirrups adapted to raise bottles into engagement with filler valves for filling and a star wheel adapted to move the bottles onto successive stirrups, a bottle gripper supported from and above each stirrup in spaced parallel relation thereto, said bottle gripper comprising a pair of substantially parallel resilient fingers adapted to engage a bottle resiliently and center the same under a filler valve, and means on the outer ends of the bottle gripper to engage the bottle as it is moved onto the stirrup by the star wheel to stop the spin thereof.

5. A bottle filling machine, including a plurality of stirrups adapted to raise bottles into engagement with filler valves for filling, a first star wheel adapted to move the bottles onto successive stirrups and a second star wheel adapted to move the filled bottles off said stirrups, a bottle gripper supported on each stirrup in spaced parallel relation thereto, said bottle gripper including a pair of substantially parallel resilient fingers adapted to engage a bottle resiliently as it is placed on the stirrup by the first named star wheel and center the same under a filler valve, and means contacting said bottle, as the bottle is moved off the stirrup by the second named star wheel, to prevent spinning of the bottle.

6. A bottle filling machine, including a plurality of stirrups adapted to raise bottles into engagement with filler valves for filling and a star wheel adapted to move the bottles onto successive stirrups, a bottle gripper carried by each stirrup, said bottle gripper being parallel to the top of said stirrup and spaced thereabove at a point substantially equal to the height of the center of gravity of the bottle to be filled, and a plurality of resilient fingers formed on said bottle gripper to engage a bottle resiliently as it is placed on the stirrup by the star wheel and center the same under a filler valve.

7. A bottle filling machine, including a plurality of stirrups adapted to raise the bottles into engagement with filler valves for filling and a star wheel adapted to move bottles onto successive stirrups, a bottle gripper supported on each stirrup in spaced parallel relation thereto, said gripper including a pair of substantially parallel resilient fingers adapted to grip a bottle resiliently therebetween in a position under the filler valve, and means on one of the fingers operable by an entering bottle to deflect the finger and permit the movement of the bottle into the said position.

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