

Feb. 25, 1936.

G. L. N. MEYER

2,031,663

BOTTLE CENTERING MEANS

Filed July 16, 1934

2 Sheets-Sheet 1

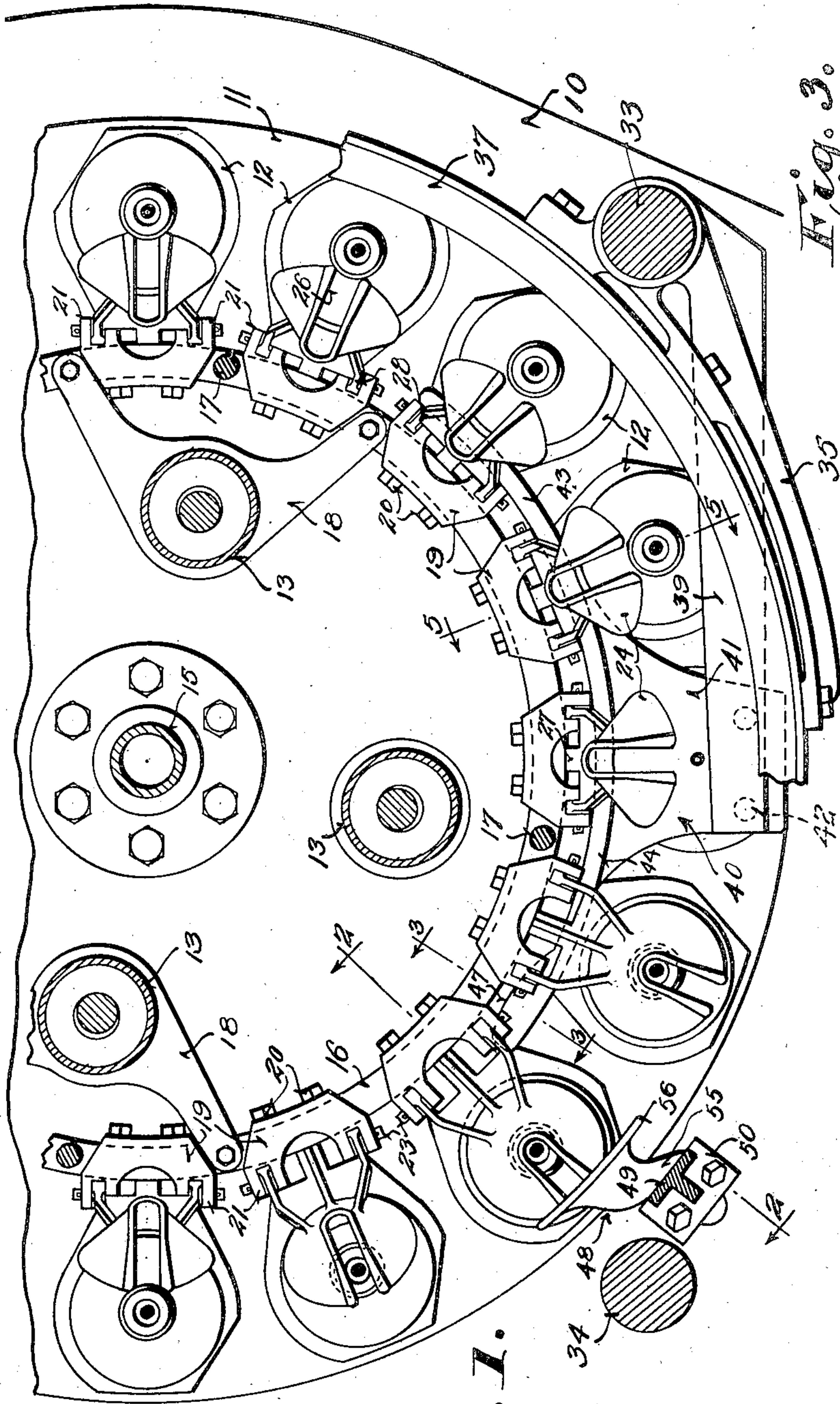


Fig. 1.

Fig. 3.

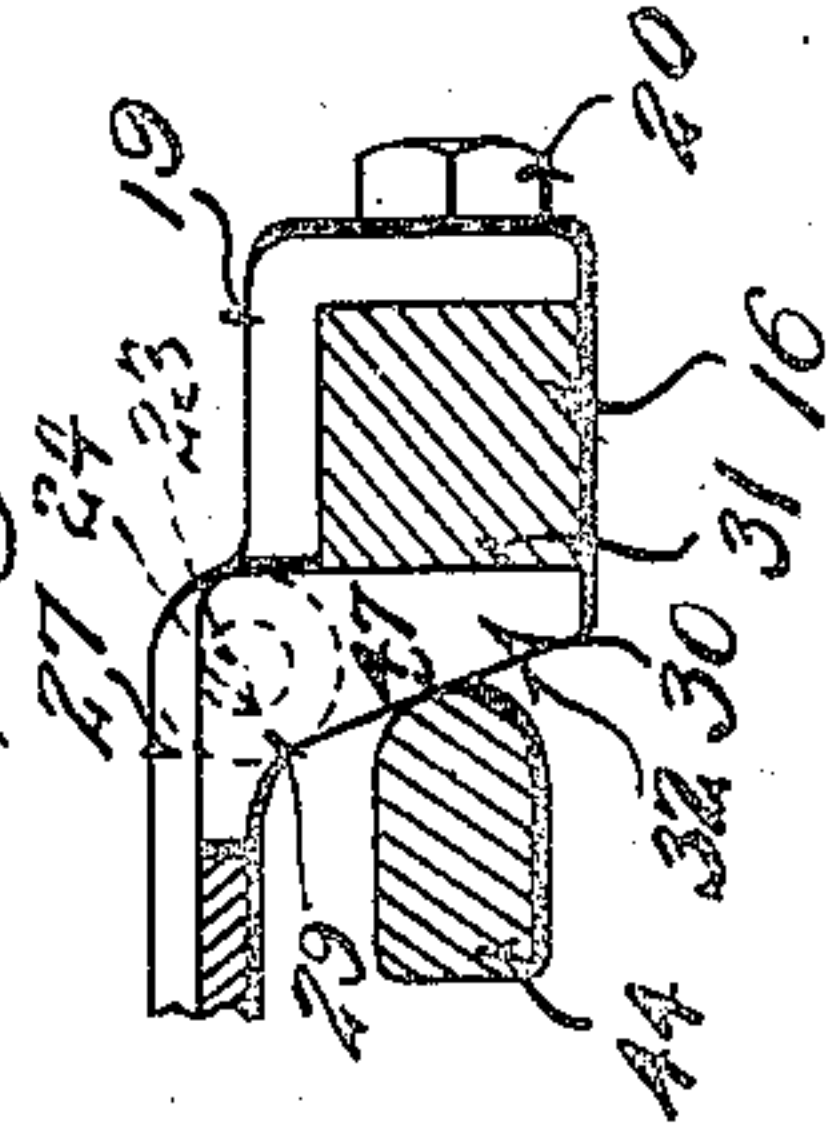
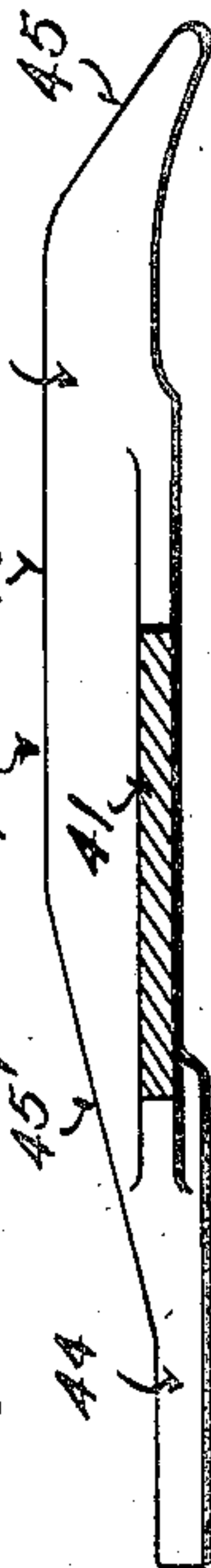


Fig. 4.



INVENTOR
GEORGE L. N. MEYER.
BY
C. B. Goring
ATTORNEY

Feb. 25, 1936.

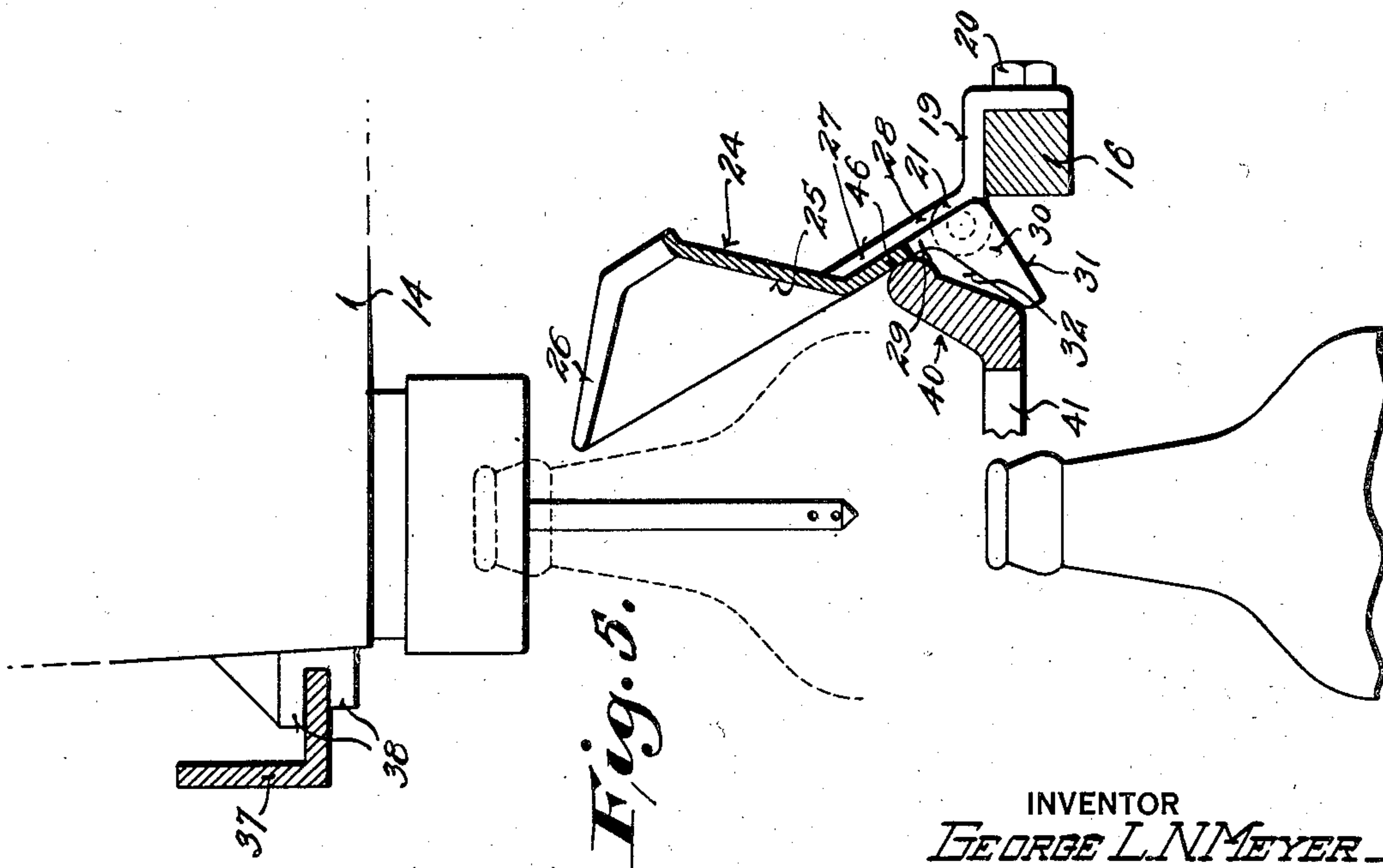
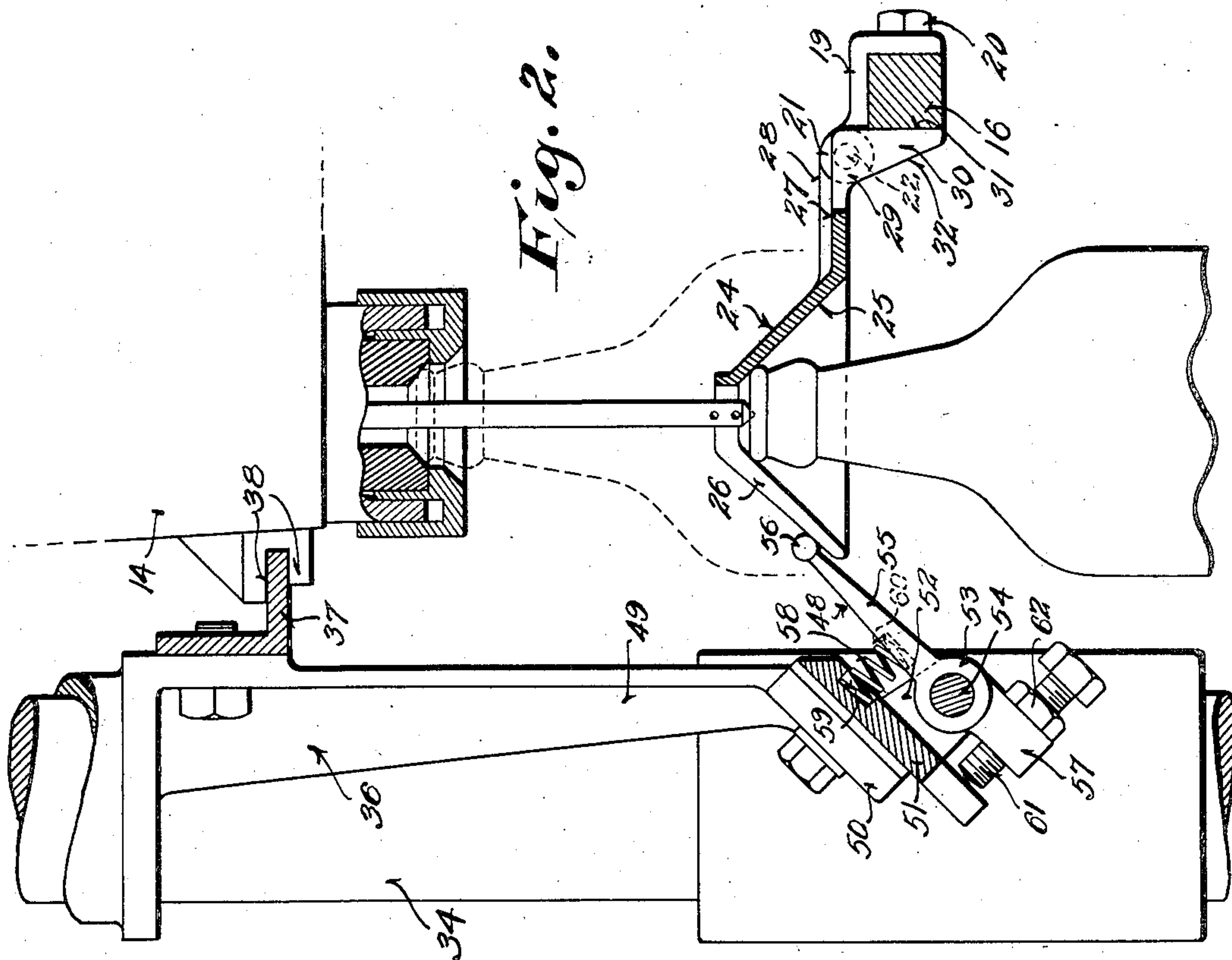
G. L. N. MEYER

2,031,663

BOTTLE CENTERING MEANS

Filed July 16, 1934

2 Sheets-Sheet 2



INVENTOR
GEORGE L. N. MEYER
BY *Erwin B. Eising*
ATTORNEY

UNITED STATES PATENT OFFICE

2,031,663

BOTTLE CENTERING MEANS

George L. N. Meyer, Milwaukee, Wis.

Application July 16, 1934, Serial No. 735,382

11 Claims. (Cl. 226—129)

This invention relates to bottle filling machines and more particularly to bottle centering means therefor.

The bottle filling machines on which the present invention is particularly well adapted for use are those of the counter-pressure type which generally comprise a rotatable table having a plurality of vertically reciprocable bottle receiving stirrups adapted to successively raise each of a progression of bottles received from an infeed star wheel into filling position with respect to filler valves carried by a filling bowl adjustably mounted above the table and rotatable therewith as a unit. In this type of machine the filler valves are provided with depending tubes receivable into the mouth of the bottles and serve as filler and/or vent and displacement tubes dependent upon the instant design. After the filling operation is completed the stirrups are lowered and the bottles removed therefrom by the operation of an outfeed starwheel.

A bottle centering means is utilized on machines of the above mentioned type and the necessity for such means is particularly urgent where small mouthed bottles are to be filled. The purpose of the bottle centering means is to insure proper alignment of the mouth of the bottle and filling or venting tube to prevent fouling when the bottle is raised into filling position.

Two general types of centering means have been prevalently used to accomplish this desired alignment between the mouth of the bottle and tube. One type comprises a hollow conical bell slidably mounted on the filling tube and the other comprises a slotted hollow conical bell formed at the extremity of a lever arm. It will be noted, in both of these types, that the centering bells are motivated solely by gravity. By reason of this fact, certain inherent defects are manifest in each of these types of centering devices.

Where the centering bell is slidably mounted on the filling tube, a serious problem in design is met. Some means must be provided to retain the bell on the filling tube and the customary expedient is the provision of a collar or shoulder at the lower end of the tube. The diameter of this collar must, of course, be of such size as to be readily insertable into the mouth of the bottle. By reason of this condition, the diameter of the tube is such that both its displacement and orifice are severely limited. A further objection lies in the fact that the lower edge of the centering bell is disposed a considerable distance below the lower end of the tube. The clearance between the lower edge of the centering bell and the stir-

rup must be great enough to accommodate the customary variation in the height of bottles found in the general run of filling. With this arrangement, there is considerable lost motion in the initial movement of the stirrup, prior to the actual centering operation which is effected by contact of the crown ring of the bottle with the inner conical surface of the centering bell. Where this type of centering means is utilized, the force of gravity is the sole motivating power for the bell and hence when the resistance between the crown ring of the bottle and the inner surface of the bell is increased by chipping or other defect of the crown ring, the weight of the centering bell is frequently insufficient to overcome the additional friction of the bottle. As a result, the bottle may not be properly centered and fouling of the tube may also occur in the presence of this condition.

In the instance where a slotted centering bell, mounted on a fulcrumed lever arm, is used, the difficulty encountered lies primarily in the operation and position of the bell. Here again it is common practice to have the lower edge of the bell in a plane considerably below the mouth of the tube. As a result lost motion is again found in raising the bottle prior to effect centering of the same. After the bottle raises to its extreme uppermost position, in sealing contact with the filler valve, the bell lies in constant contact with the outer surface of the bottle. This contact between the bell and bottle remains throughout the filling and the lowering of the bottle. During the lowering operation, the centering bell may engage the crown ring of the bottle and retain the bottle in suspended position on the filler tube which may result in breakage of the bottle or damage to the filler tube. The difficulty just referred to is most common in instances where the length of the lever arm is relatively short. Unfortunately, it is necessary in many instances to provide a short lever arm in order to obtain the desired relationship between operating elements.

The primary object of the present invention is to eliminate the difficulties above mentioned, particularly with reference to the last named type of centering means, wherein a centering element is formed on a pivoted lever.

Another object of the present invention is the provision of an improved bottle centering means wherein the lost motion of the bottle upon admission to the machine is reduced to a minimum.

A further object resides in the provision of an

improved means, wherein the motion of the centering means is positively controlled.

A further object lies in the provision of an improved means for releasably retaining the bottle centering means in contact with the bottle until the same is properly centered with respect to the filling tube.

Another object resides in the provision of an improved bottle centering means wherein the bottle engaging element is adapted to be positively elevated to admit a bottle therebeneath, to be positively lowered over the mouth of the bottle into proper position to effect the centering of the bottle, to resiliently resist upward movement until the centering operation is completed and to move out of contact with the bottle before the bottle is withdrawn from the machine subsequent to the completion of the filling operation.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawings:—

Fig. 1 is a fragmentary top plan view of a portion of a bottle filling machine, showing the improved bottle centering means and associated operating elements, constructed in accordance with the teachings of the present invention.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1 showing a bottle properly centered (in full lines); the dotted line shown indicating the ultimate position of the bottle in sealing contact with the valve during the subsequent filling operation.

Fig. 3 is a detailed sectional view taken on the line 3—3 of Fig. 1 showing a means for positively lowering the centering bell over the mouth of the bottle.

Fig. 4 is a side view of the cam element utilized to effect the positive raising and lowering of the bottle centering means.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 1 showing the positive means for retaining the centering bell out of engagement with the bottle as the same is lowered to the position shown in full lines.

In the embodiment of the present invention chosen for illustrative purposes, a fragmentary portion of the bottle filling machine is shown. This filling machine is of a well known type previously referred to and described.

The machine comprises a body portion 10 having a rotatable table 11 mounted thereon and adapted to be driven in any suitable manner. A plurality of stirrups 12 are guided for vertical reciprocation with respect to table 11. The means for effecting movement of the stirrups together with means for releasably retaining them in their raised position may be of any well-known type. A plurality of columns 13 project upwardly from the table and serve as supporting means for a filler bowl 14. A central column 15 serves as a source of liquid supply for the bowl 14 which is mounted for vertical adjustment on the columns 13 and 15.

A ring 16 is suspended beneath the bowl 14 by means of tie-rods 17. A plurality of brackets 18 fixedly mounted on the columns 13 and anchored to the ring 16 in any suitable manner serve to prevent angular movement of the ring 16 with respect to the bowl 14. A plurality of bell receiving brackets 19 are mounted in spaced relationship about the circumference of the ring 16 and retained thereon by the application of suitable anchoring means such as bolts 20. Each bracket 19 is provided with a pair of outwardly extending

bifurcated portions 21 provided with horizontally disposed apertures 22 adapted to receive pivot pins 23 on which centering bells 24 are rockably mounted. The centering bells 24 are of conical form and are provided with a tapered inner wall 25 adapted to engage the crown ring of a bottle. A slot 26 suitably positioned interrupts the continuity of the cone to provide an aperture through which the valve stem may pass as the bell is raised or lowered. The centering bell is provided with an inwardly projecting arm 27 preferably formed integral with the bell. The arm 27 is provided with a pair of spaced lugs 28 and intermediate portion 29 which terminates in a downwardly extending finger 30. The lugs 28 are adapted to be received between the bifurcated portions 21 of the brackets 19 and are also provided with apertures adapted to receive the pivot pins 23. The finger 30 is provided with a face 31 adapted to contact with the outer surface of the ring 16 to serve as a means for limiting the downward movement of the bell so that the lower edge of the same will lie in a substantially horizontal plane when the face 31 contacts the ring 16. The outer surface of the depending finger 30 is also provided with a face 32 for a purpose to be hereinafter more specifically described.

A pair of stationary columns 33 and 34 extend upwardly from the base 10 and lie adjacent the bowl 14. Suitable means in the form of brackets 35 and 36 are adapted to be retained in proper position on columns 33 and 34 respectively. These brackets serve as spaced supports for a ring 37 which surrounds the bowl 14 and is receivable between a plurality of spaced lugs 38 (one of which is shown) suitably attached to the bowl 14. The bracket 35 is provided with an arm 39 which extends in a horizontal plane beneath the ring 37 and approximately in the plane of the ring 16. This arm serves as a mounting means for a cam member 40.

The cam member 40 comprises a bracket portion 41 adapted to be suitably secured to the arm 39 by means of cap screws 42. The general contour of the inner portion of the cam member 40 is arcuate in shape and is formed by curved arms 43 and 44 which extend outwardly in opposite directions from the bracket portion 41. The arm 43 is provided with an inclined cam surface 45 adapted to engage the lower surface of the arm 27 formed on the bell 24 to rock the bell upwardly as it travels in a clockwise direction of the cam. A horizontal portion 46 is formed by an upwardly turned flange formed on the inner extremity of the bracket 41. This portion 46 merges with the surface 45 to form a continuous path on which the arm 27 rides as it passes over the cam member.

The arm 44 is provided with a cam surface 45' which provides a descending portion on which the centering bell rides as it continues its movement along the cam. A lobe 47 is formed adjacent the extremity of arm 44 and extends inwardly toward and in the plane of the ring 16. The clearance between the lobe 47 and the outer surface of the ring 16 is such as to permit the finger 30 to freely pass therethrough. This lobe 47 is adapted to contact with the face 32 formed on the finger 30 to cause the bell to be rocked downwardly until the face 31 of the finger lies in contact with the outer surface of the ring 16. The application of the above described means for positively controlling the movement of the bottle centering bell virtually eliminates the possibility

of fouling and has resulted in the production of a machine of greatly increased efficiency.

The operation of the bottle centering means may be further facilitated by the provision of a yieldable member 48 for releasably resisting the upward movement of the centering bell 24 against the pressure of the rising bottle during the bottle centering operation. In the present instance, the means provided for accomplishing this end comprises a depending arm 49 formed on the bracket 36 and having a foot 50 in a plane approximately the plane of the ring 16. The foot is preferably directed in an angular position with respect to the arm 49. A plate 51 suitably secured to the foot 50 is provided with a pair of downwardly extending spaced lugs 52 which provide suitable means for pivotally mounting a yieldable member 48.

The member 48 comprises a body portion 53 through which a pivot pin 54 may be passed in order to journal the member 48 in the lugs 52. The body portion 53 is provided with a forwardly extending portion 55 which terminates in a bar 56 which lies in a substantially horizontal plane. A rearwardly extending portion 57 is also formed on the body portion 53. A coil spring 58 located between the pivot pin 54 and the bar 56 is retained within suitable sockets 59 and 60 formed respectively in the plate 51 and forwardly extending portion 55 of the yieldable member 48. This coil spring serves to normally urge the bar 56 downwardly. A suitable set screw 61 provided with a locknut 62 passes through the portion 57 of the yieldable member and abuts the plate 51 to form an adjustable means for limiting the downward movement of the bar 56 under the action of the coil spring 58. The bar 56 is positioned so as to lie in the path traversed by the centering bells 24 and is adapted to contact the outer surface of each bell as the same passes therebeneath. The bottle which is admitted onto the stirrup prior to contact of the bell with the bar 56 is raised while the bar is contacting the bell. By reason of this condition, the bar 56 forms a yieldable means for resisting the upward movement of the bell against the pressure exerted by the bottle during the raising of the stirrup. The coil spring 58 has sufficient strength to resist the upward movement of the bell 24 under the pressure of the rising bottle until the mouth of the bottle has been properly centered by the sliding contact of the crown ring with the smooth conical surface 25 of the bell. The centering operation is completed prior to the time that the bottle reaches the point of elevation at which the tube of the filling valve enters the mouth of the bottle.

The operation of the bottle centering means provides a simple and effective means for insuring proper centering of the bottles as they are directed upwardly by movement of the stirrups into sealing contact with the filler valves carried by the bowl 14. The filler valves are preferably constructed and operated in accordance with the teachings and in the manner described in applicant's co-pending application Serial 674,405 filed June 5, 1933. The bottles are fed onto the stirrups 12 in the usual manner, as by an infeed starwheel and upon rotation of the table 11 each bottle is positioned beneath a bell 24 which is directly above the bottle at that instant. As the table continues to rotate, the centering bell is rocked downwardly by contact between face 32 on finger 30 and lobe 47 on the arm 44 and the bell rides under the bar 56 which pro-

vides a yieldable means for resisting a rocking movement of the bell 24 as the bottle is raised under action of the stirrup. As the bottle continues its upward movement after being properly centered, the bell 24 will rock on the pivot pin 23 and raise the bar 56 a sufficient distance to break contact between the bar and lower edge of the valve. After this contact is broken the bell 24 will be free to swing upwardly as the bottle continues its upward movement into sealing contact with the filler valve. This sealing contact remains until the filling operation has been completed during the movement of the bottles with the rotating table. After the bottles have been filled, the continued rotation of the table presents them to a position where the surface 45 on the arm 43 contacts with the lower surface of the arm 27. Contact between these two surfaces effects a raising of the bell to a position where it is out of contact with the bottle. During continued rotation of the table 11 the stirrups 12 are lowered in any suitable manner and the bottles are presented in a lowered position at a discharge station where they are removed in any suitable manner such as by the operation of an outfeed starwheel. The centering bell 24 is retained in its raised position during this operation and it rides along the surface 46. Continued rotation of the bell with respect to the cam causes the particular centering bell just referred to, to ride on the descending surface 45' of the arm 44. As the bell reaches the position directly above the infeed, the lobe 47 formed on the arm 44 again contacts the face 32 of the finger 30 to again effect a positive rocking action of the bell 24 to again place the centering bell in proper position to effect the centering of another bottle.

While the foregoing description has been directed primarily to the action and operation of a single bell throughout a complete cycle of machine operation, it will be clearly understood that each of a succession of bells function in the identical manner.

From the foregoing description of an illustrative embodiment of the present invention it will readily be understood that a simple and effective bottle centering means has been provided, whereby the centering bell is positively controlled in its lowering and raising movements. The positive means for controlling the lowering of the centering bell is of considerable importance by reason of the fact that the bottles may be moved with more certainty into proper relationship with the depending stem of the filler valve prior to the upward movement of the bottles. The provision of a yieldable means for retaining the centering bell against upward movement during the initial raising of the bottle provides additional insurance of satisfactory operation. The resistance to upward movement of the bottle between resilient members is at all times sufficient to overcome any frictional resistance with the inner wall 25 of the bell 24 and the crown ring of the bottle even though the resistance of the bottle may be increased by reason of an irregular surface which may have resulted from chipping. The positive raising of the bell after the completion of the filling operation is also of importance insofar as it insures successful, uninterrupted operation of the machine, by eliminating the possibility of bottles hanging on the centering bell during the descent of the bottle to a position from which it may be removed from the machine. The particular yieldable means which contact with the bottle centering bell dur-

ing the initial raising of the bottle to filling position also serves to control the opening operation of the filler valve. This additional function of the yieldable member is more fully described and claimed in applicant's co-pending application Serial #674,405 filed June 5, 1933.

It will be noted from the foregoing that the centering bells are normally in a partially elevated position when the bottles are introduced beneath them. By reason of this condition it is apparent that when the bell reaches its normal horizontal position the distance of the bottle from the tube is reduced to an amount which virtually eliminates lost motion of the bottle prior to the effective centering of the same. The reduction of this lost motion of the bottle materially increases the speed and efficiency of the machine and this improved result is made possible by the improved means for positively controlling the raising and lowering movement of the centering bell.

While the invention has been described in considerable detail in the foregoing specification, it is understood that various changes may be made in its embodiment without departing from or sacrificing any of the advantages hereinafter claimed.

I claim:

1. A bottle centering device for bottle filling machines comprising, a movable bottle centering element, positive means for imparting a downward movement to said element, and means for yieldably resisting the upward movement of said element.

2. A bottle centering device for bottle filling machines comprising, a bottle centering element, a pivotal mounting for said element, positive means for imparting a downward movement to said element, and yieldable means for resisting the upward movement of said element.

3. A bottle centering device for bottle filling machines comprising, a movable bottle centering element, a pivotal mounting for said element and means for yieldably retaining said element in bottle centering position.

4. A bottle centering device for bottle filling machines comprising, a movable bottle centering element, cam means for lowering said element, and yieldable means for resisting the upward movement of said element.

5. A bottle centering device for bottle filling machines comprising, a bottle engaging element having a cam engaging surface thereon, a pivotal mounting for said element, a cam for contact with the cam engaging surface on said element to positively lower said element into bottle centering position, and yieldable means for resisting the upward movement of said element.

6. A bottle centering device for bottle filling machines comprising, a hollow conical bottle centering element having a cam engaging surface thereon, a pivotal mounting for said element, a cam for contact with the cam engaging surface to lower said element into bottle centering position, and yieldable means for resisting the upward movement of said element.

7. A bottle centering device for bottle filling machines comprising, a hollow slotted bottle centering bell having a cam engaging surface thereon, a cam for contact with the cam engaging surface on said bell to positively lower the bell into bottle centering position, and means for yieldably resisting the upward movement of said bell.

8. A bottle centering device for bottle filling machines comprising, a hollow slotted conical bottle centering bell having a cam engaging surface thereon, a cam for contact with the cam engaging surface on said bell to lower the same into bottle centering position, yieldable means for resisting the upward movement of said bell, and means on said cam for raising said bell out of contact with said bottle.

9. A bottle centering device for bottle filling machines comprising, a centering bell having a cam engaging surface thereon, a pivotal mounting for said bell, a cam for contact with the cam engaging surface of said bell to lower the same into bottle centering position, yieldable means for resisting the upward movement of said bell, and means on said cam for contact with said bell to raise the same out of contact with said bottle.

10. A bottle centering device for bottle filling machines comprising, a rotatable element, a slotted bell having a cam engaging surface thereon, means for pivotally mounting said bell on said rotatable element, a stationary cam for contact with the cam engaging surface of said bell to lower the same into bottle centering position, and yieldable means for resisting the upward movement of said bell.

11. A bottle centering device for bottle filling machines comprising, a bottle centering element having a cam engaging surface thereon, a rotatable element, means for pivotally mounting said bottle centering element on said rotatable element, a stationary cam for contact with said cam engaging surface on said bottle centering element to lower the same into bottle centering position, yieldable means for resisting the upward movement of said bottle centering element, and means on said cam for engaging said bottle centering element to raise the same out of contact with the bottle.

GEORGE L. N. MEYER.