H. M. SMITH.

FILLING MACHINE.

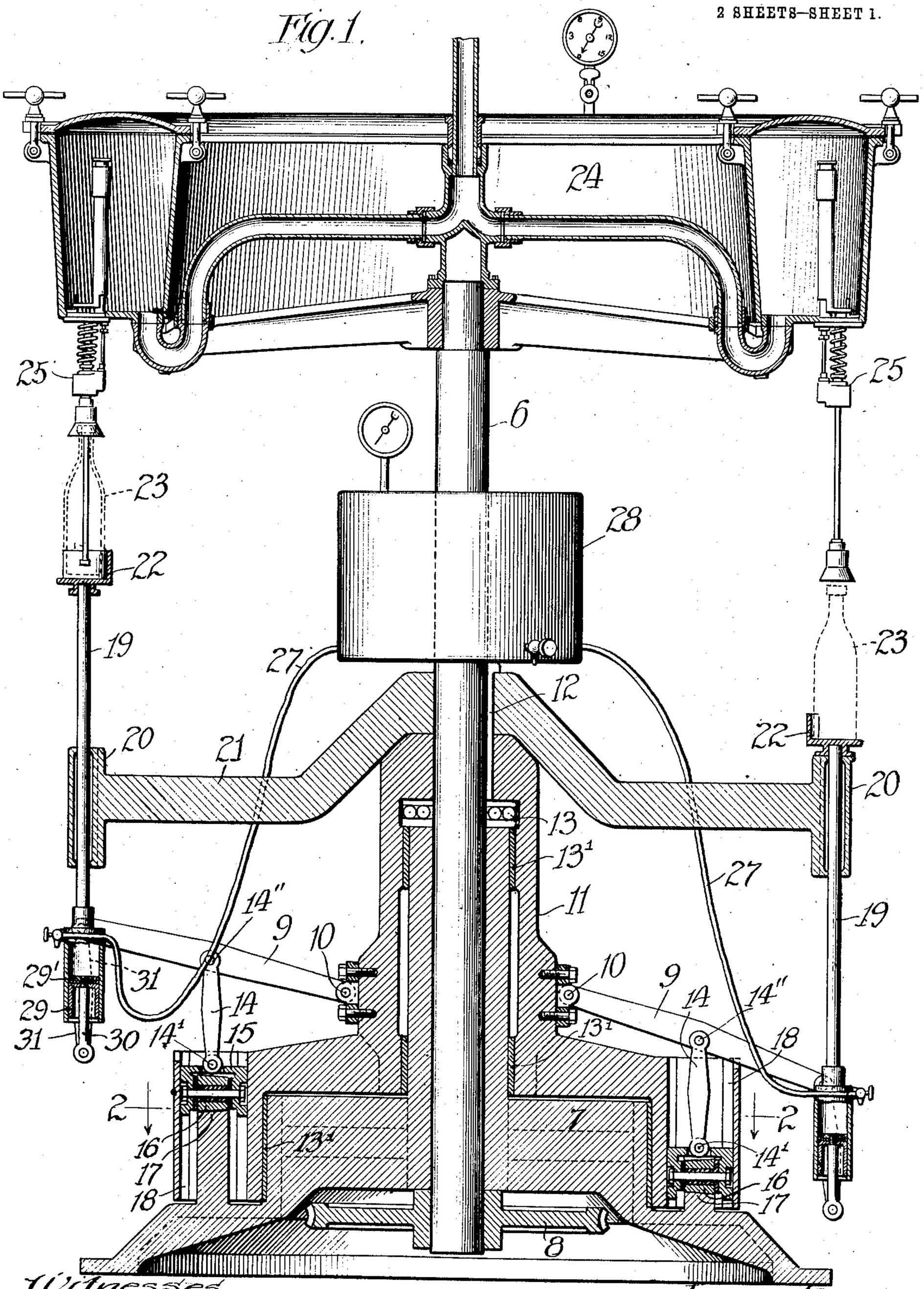
APPLICATION FILED MAR. 23, 1908.

980,445.

Patented Jan. 3, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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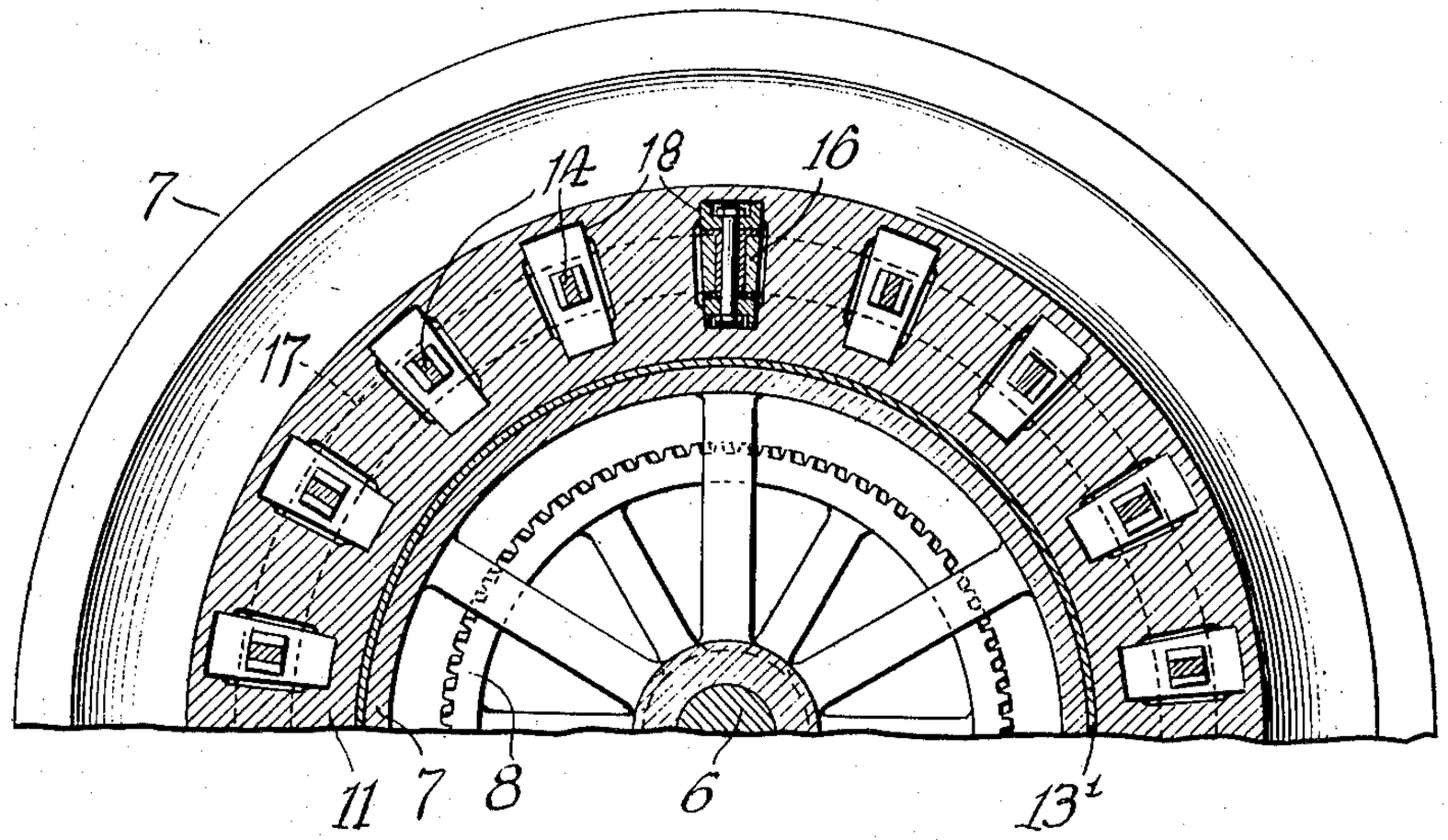
2 SHEETS—SHEET 2.

Fig. 2.



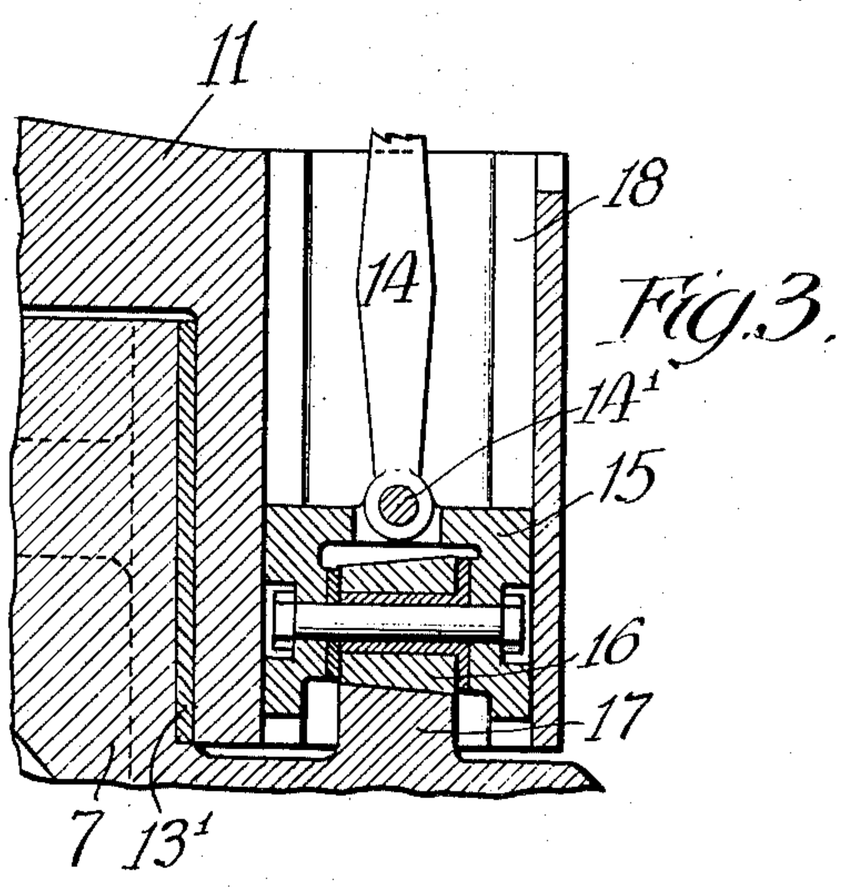


Fig. 3.

Fig. 4.

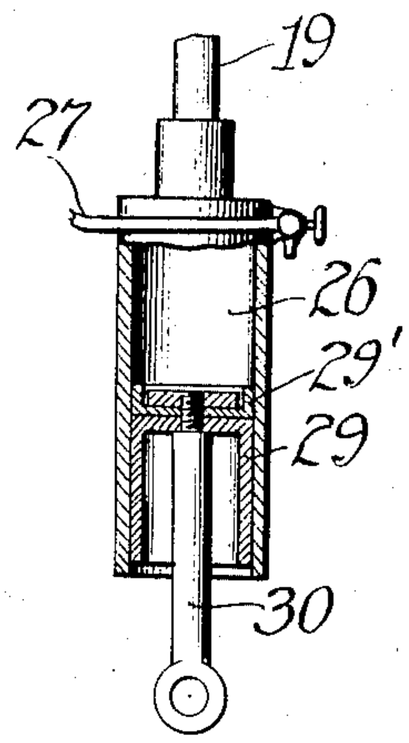
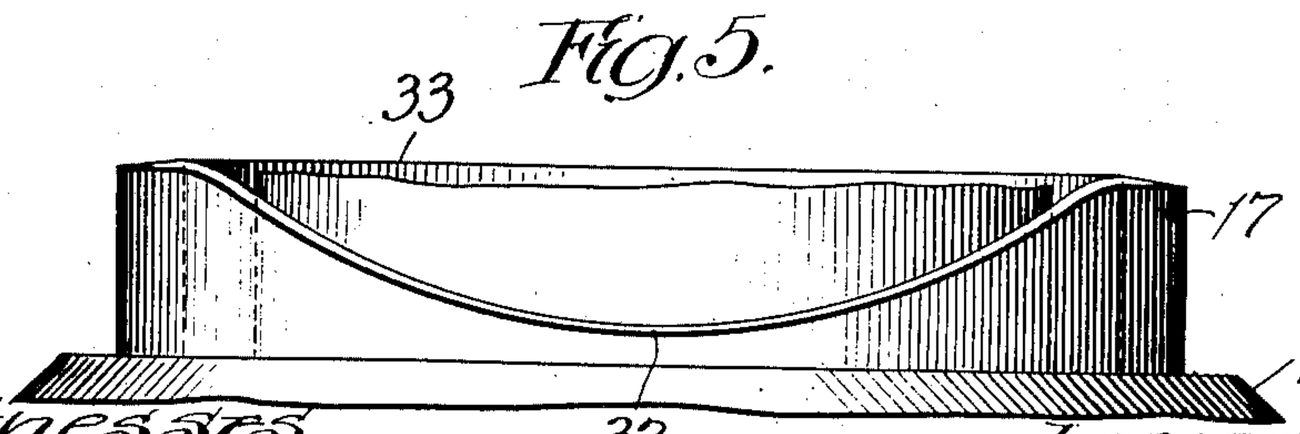


Fig. 5.



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UNITED STATES PATENT OFFICE.

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FILLING-MACHINE.

980,445. Specification of Letters Patent. Patented Jan. 3, 1911.

Application filed March 23, 1908. Serial No. 422,715.

To all whom it may concern:

Be it known that I, HORACE M. SMITH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Filling-Machines, of which the following is a specification.

This invention relates to improvements in filling machines of the rotary type and more particularly to the means for moving the bottles or other receptacles to and from filling position.

The invention is adapted to machines for filling still and charged liquids, and semi-liquids such as catsup and the like, but it is especially important in connection with the filling of charged or carbonated liquids, such as beer and soda water.

One of the objects of the invention is to move the receptacles to and from filling position by a cam lift mechanism constructed and arranged to reduce wear on the parts to a minimum, to avoid lateral strains, and to obtain a high efficiency.

Another object of the invention which is especially important in filling charged liquids is to provide an even and regular movement for the receptacles to and from filling position and especially after they have been filled and thus prevent agitation of the liquid in the receptacles which would tend to liberate the contained gases and produce foaming.

In the accompanying drawings I have illustrated the invention as embodied in a beer filling machine and referring thereto—

Figure 1 is a sectional elevation of the machine. Fig. 2 is a sectional view on the line 2—2 of Fig. 1. Fig. 3 is an enlarged detail sectional view. Fig. 4 is an enlarged detail sectional view showing the air chamber in one of the bottle lifts. Fig. 5 is a detail view of the cam in elevation.

Referring to the drawings, 6 is a vertical shaft mounted to revolve in a stationary base 7 and provided at its lower end with a gear 8 which is driven in any suitable manner. A plurality of lift levers 9 are pivotally mounted at their inner ends at 10 to a support 11 which is made fast to revolve with the shaft 6 by a key 12. This support has a ball bearing 13 on the base 7 at the top thereof and bronze bushings 13′ are preferably arranged on the base where the support engages therewith. The levers 9 project outward radially from the support. Each lift lever is connected by a link 14 to a cross head 15 and a roller 16 is journaled in the cross head and arranged to travel on a circular cam track 17 rigid with the base 7. The cross head 15 travels in a guideway 18 in the support 11 and this guideway may be formed, as shown in Fig. 2, to engage the ends only of the cross head so as to reduce the frictional engaging surface of the cross head with the guideway, but at the same time the cross head is guided to travel evenly and smoothly in a vertical direction.

The link 14 is pivotally connected at its lower end 14′ to the cross head and at its upper end 14″ to the lift lever 9 at or about its middle. The outer end of the lift lever 9 is connected to a stem 19 which operates vertically in a guide 20 on a guide plate 21 which is locked to the shaft 6 by the key 12. A rest 22 is mounted on the upper end of the stem 19 to receive the bottle 23. A liquid tank 24 is mounted on the shaft 6 to revolve therewith and a filling mechanism 25 is suspended from the liquid tank opposite each bottle rest. As the filling mechanism forms no part of the present invention it will not be necessary to describe the same in detail, except to say that it is operated by engagement of the bottle therewith.

The lift lever 9 may be connected to the stem 19 in any suitable manner to impart to the stem an up and down movement but as the cam will move the lever positively and constantly in the same arc I prefer to embody in the lift mechanism some means whereby said mechanism will be automatically adjusted to variations in the heights of bottles and likewise to provide against accident in event that the bottle is not properly centered in filling position. As one way of accomplishing this automatic adjustment of the lift mechanism I provide an air chamber 26 at the lower end of the stem 19 (Fig. 4) and connect this chamber by a flexible tube 27 to an air reservoir 28 mounted on the vertical shaft 6 to revolve therewith (Fig. 1). A piston 29 carrying a cup leather 29′ is arranged to operate in the air chamber 26 and is carried by a piston rod 30 which is connected at its lower end by a pivot link 31 to the outer end of the lift lever 9. The air tube 27 is connected to a three-way cock on the chamber 26 and the latter is constructed in any suitable manner to provide

a communication from the air tube to the chamber or to cut off the air tube from the chamber and open the chamber to the atmosphere.

The machine can be made of any suitable size and in practice the bottles are placed on the bottle rests while they are in lowered position as indicated at the right of Fig. 1. The rotary movement of the machine is continuous and as the lift mechanism travels up from the low part 32 to the high part 33 of the cam (Fig. 5) the bottle will be forced against the filling mechanism to operate the same in a familiar manner. By the time the lift mechanism begins to travel by gravity from the high part to the low part of the cam the bottle will have been filled and when the lift mechanism reaches the low part of the cam the bottle will be in position for removal from the machine. The lift levers are operated positively by the cam and always swing in the same arc. The power is applied to these levers in the most efficient manner in a machine of this character for securing an even and regular movement without shocks or jars. The cross head traveling in the guideways prevents the cam from imparting a lateral or torsional strain on the lift mechanism. The air chamber provides for an automatic regulation of the upward movement of the bottle which may become necessary by reason of inequalities in the height of bottles or because the bottle has not been properly centered in filling position. The machine can be adapted to fill bottles of a certain standard height but in practice it is found that there is more or less variation in the height of bottles and as the movement of the cam lift is in a fixed arc it becomes necessary to provide this adjustment in order to accommodate bottles which vary in height without setting the machine initially to work with what may be considered to be probably the shortest bottle that may be used. When a somewhat longer bottle than the average is moved to filling position the air piston will rise in the air chamber to enable the lift lever to swing in its arc without materially or appreciably increasing the pressure of the bottle against the filling mechanism. The air chamber is always in communication with the air reservoir and the pressure is equal in both. While the rising of the piston in the air chamber will somewhat increase the pressure this will not be appreciable because in any event the increase would not be very much and it is distributed through the air reservoir and in all of the other chambers. If the bottle should be moved to filling position and then found to have a chipped lip which would permit the escape of beer during the filling operation the three-way cock can be turned to close the air tube and exhaust the air in the chamber to the atmosphere, thus allowing the bottle rest to carry the bottle down sufficiently to close the filling mechanism.

What I claim and desire to secure by Letters Patent is:

1. In a bottle filling machine, the combination of a rotatable upright shaft, a support rotating with the shaft, a plurality of levers pivotally mounted on the support and extending therefrom radially of the shaft, a bottle rest operated by each lever, a stationary continuous circular cam track around the shaft, and means engaging said cam track and flexibly connected to said lever between its ends and above the track to actuate said lever.

2. In a bottle filling machine, the combination of a rotatable upright shaft, a support rotating with the shaft, a lever pivotally mounted on the support and extending therefrom radially of the shaft, a bottle rest operated by said lever, a stationary continuous circular cam track around the shaft, and means for actuating said lever comprising a roller to travel on the cam track, a cross head in which said roller is journaled, and a link flexibly connected to said cross head and to said lever between its ends.

3. In a bottle filling machine, the combination of a rotatable upright shaft, a support rotating with the shaft, a lever pivotally mounted on the support and extending therefrom radially of the shaft, a bottle rest operated by said lever, a stationary cam track around the shaft, and means for actuating said lever comprising a guideway, a cross head movable in said guideway, a roller journaled in said cross head to travel on said cam track, and a link connecting the cross head to the lever.

4. In a bottle filling machine, the combination of a rotatable upright shaft, a support rotating with the shaft, a lever pivotally mounted on the support and extending therefrom radially of the shaft, a bottle rest operated by said lever, a stationary cam track around the shaft, and means for actuating said lever comprising a guideway on both sides of the cam track, a cross head movable in said guideway, a roller journaled in said cross head to travel on said cam track, and a substantially upright link pivotally connected to the cross head and to the lever between its ends.

5. In a bottle filling machine, the combination of a base, a stationary circular cam track on said base, an upright rotatable shaft mounted in said base, a support mounted on the base to rotate with said shaft and having a circular channel for the cam track, a guideway in the support on both sides of said cam track, a lever pivotally mounted on the support and extending therefrom radially of the shaft, a bottle rest operated by said lever, a cross head movable in said

guideway, a roller journaled in said cross head to travel on said cam track, and a link flexibly connecting the cross head to the lever.

6. In a rotary bottle filling machine, the combination of a liquid tank, a plurality of filling devices depending from the tank, a plurality of bottle rests opposite the filling devices, a stem for each bottle rest, a cylinder secured to each stem, a piston disposed within said cylinder, cam lift mechanism for actuating said piston, and means for maintaining a column of air in said cylinder to provide a yielding cushion between the cylinder and piston, whereby to permit variable movement of the bottle rest.

7. In a rotary bottle filling machine, the combination of a liquid tank, a plurality of filling devices depending from the tank, a plurality of bottle rests opposite the filling devices, a stem for each bottle rest, an air cylinder at the bottom of the stem, an air reservoir connected to said cylinder, a piston in said cylinder, a piston rod carrying said piston and projecting downward through the cylinder, a lift lever pivotally connected to the piston, and means for actuating said lever.

8. In a bottle filling machine, the combination of a base, a stationary circular cam track on said base, a rotatable upright shaft mounted in said base, a support mounted on the base to rotate with said shaft and having a channel for the cam track, a plurality of guideways radially disposed around said support adjacent to the cam track, a plurality of levers pivotally mounted on the support and extending therefrom radially of the shaft across said guideways, a bottle rest operated by each lever, a cross head movable in each guideway, a roller journaled in each cross head to travel on said cam track, and a plurality of upright links flexibly connecting the cross head to the lever.

9. In a rotary bottle filling machine, the combination of a liquid tank, a plurality of filling devices depending from the tank, a plurality of bottle rests opposite the filling devices, a stem for each bottle rest, a cylinder secured to each stem, a piston disposed within said cylinder, cam lift mechanism for actuating said piston, comprising a circular cam and a lever mounted to be oscillated by said cam, and means for maintaining a column of air in said cylinder to provide a yielding cushion between the cylinder and piston, whereby to permit variable movement of the bottle rest relatively to the piston.

10. In a bottle filling machine, the combination of a rotatable upright shaft, a support rotating with the shaft, a lever pivotally mounted on the support and extending therefrom radially of the shaft, a bottle rest operated by said lever, a stationary cam track having its cam surface disposed concentrically with said shaft, and means including a cross head, a roller journaled therein to travel on said cam, and a link connecting the cross head and lever, for actuating said lever to operate said bottle rest.

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Witnesses:
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