April 28, 1942. J. KANTOR 2,281,540

BEVERAGE MIXING MACHINE

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Fig. 4.

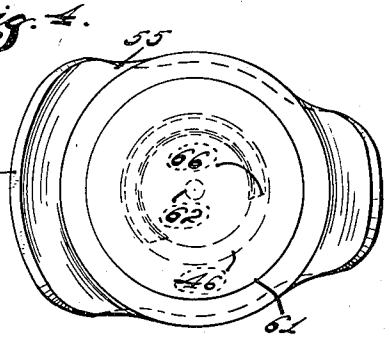
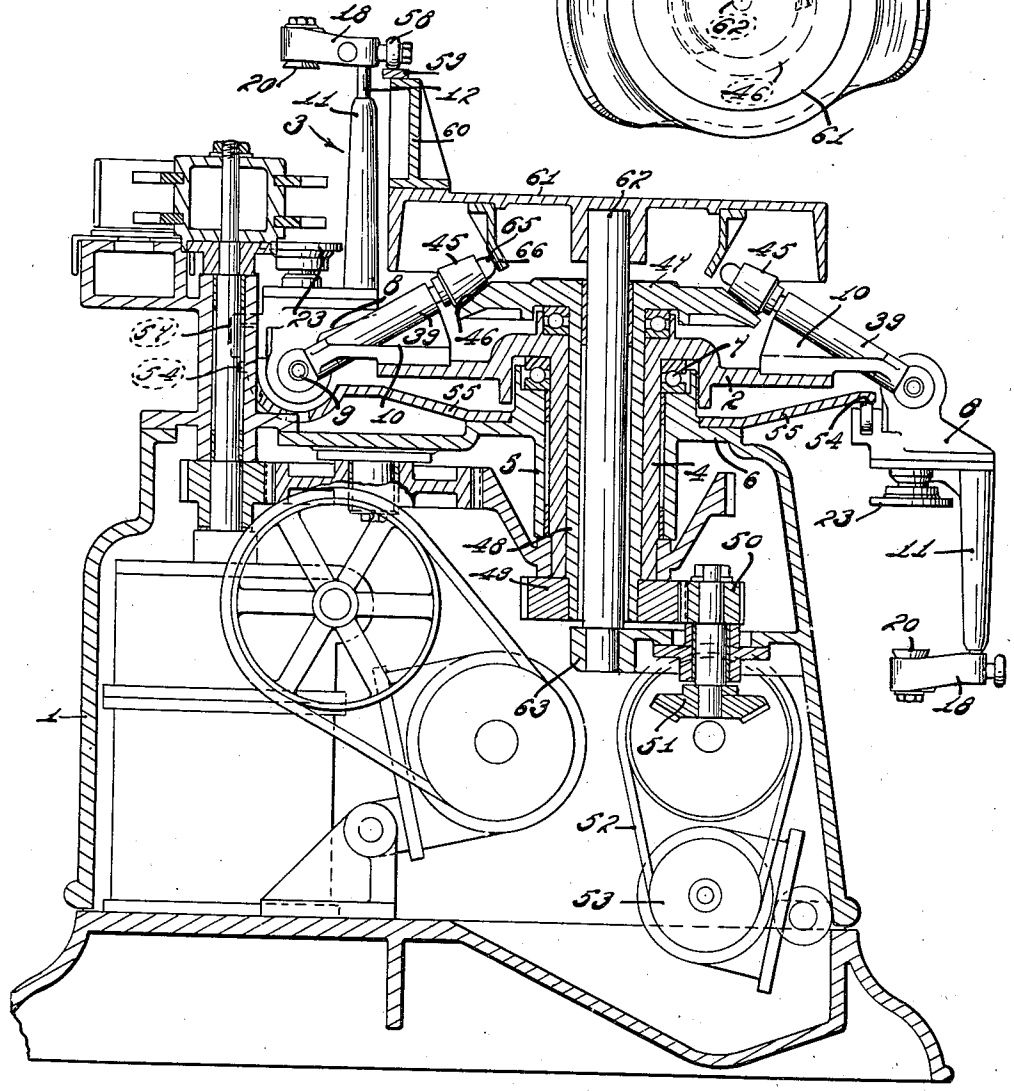


Fig. 1.



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Fig. 3.

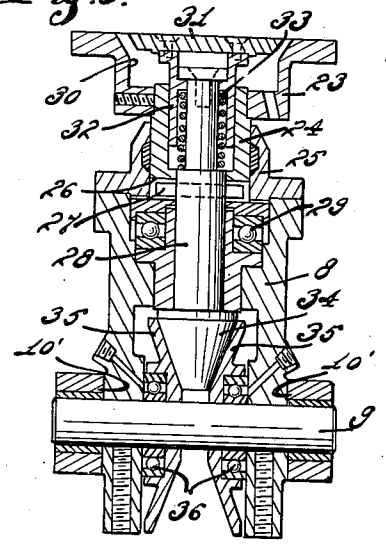
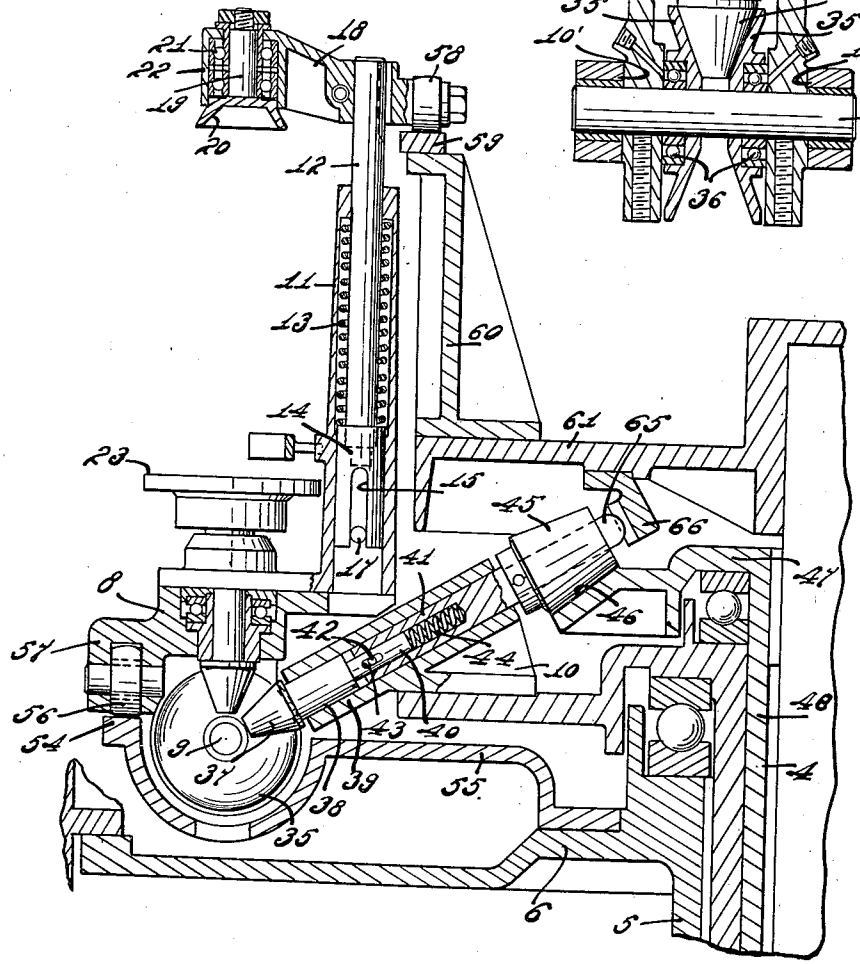


Fig. 2.



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UNITED STATES PATENT OFFICE

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BEVERAGE MIXING MACHINE

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25 Claims. (Cl. 259—54)

My invention relates to mixing apparatus and, more particularly, apparatus for mixing in the container carbonated beverages of the type comprising a flavoring syrup and carbonated water.

In depositing in the container, beverages of the above type, it is the usual custom to deposit in the container a predetermined quantity of the flavoring syrup first and to flow into the container above this syrup, until the container is filled, the carbonated water. As a result, after the container has been filled, there is in the container a lower stratum of syrup and an upper stratum of water. It is the object of the present invention to so manipulate the container after it has been filled, that the syrup and water become thoroughly mixed and to so manipulate the container that the almost imperceptible film of syrup which is known to have a tendency to cling to the side walls of the container as a result of merely agitating the container for the purpose of mixing the contents, is eliminated.

More specifically, it is one of the objects of my invention to provide an apparatus which will spin the container, while filled with the carbonated beverage, on its longitudinal axis and to provide means which may oscillate the container for the purpose of agitating the liquid contained therein.

It is a further object of my invention to provide an apparatus wherein the spinning of the container and the oscillating of the container may be carried out simultaneously.

For the purpose of disclosing my invention, I have illustrated in the accompanying drawings an apparatus embodying the invention, in which:

Fig. 1 is a longitudinal sectional view of the machine embodying my invention;

Fig. 2 is an enlarged detail section of a bottle support for my machine, together with a means for spinning the bottle or container thereon;

Fig. 3 is an enlarged detail section of the bottom table and its mounting of a supporting mechanism; and

Fig. 4 is a developed view of the cam for causing an oscillation of the supporting member and the cam for controlling the operation of the spinning mechanism.

Referring now to the structure disclosed, I provide a base casing 1 on which the various parts of the apparatus are adapted to be mounted and on this base 1, I mount a rotatable table 2 adapted to carry a plurality of bottle supporting elements 3. The table 2 is provided with a central sleeve 4 mounted within a bearing sleeve 5 extending downwardly from the top 6 of the base 1 and the table is supported upon a suitable ball bearing 7 interposed between it and the top 6. Each of the container supports 3, of which there are a plurality, comprises a base 8 supported to oscillate on a shaft 9 extending between a pair of bifurcated arms 10' projecting from a bracket 10 mounted upon the upper face of the table 2. This base 8 has extending vertically therefrom a hollow standard 11 in which is supported a vertical post 12 biased in a downward direction by a coiled spring 13 arranged within the standard surrounding the post 12 and interposed between the top of the standard 11 and an enlarged portion 14 of the post 12. This enlarged portion at its lower end is provided with a vertical slot 15 in which extends a pin 17 passing through the lower portion of the standard 11. Through the medium of the pin and slot, the post 12 is held against rotative movement in the standard and, at the same time, is permitted of a vertical movement therein. The upper end of the post 12 carries an outwardly extending arm 18 through which passes a rotatable shaft 19 provided on its lower end with a clamping bell 20 adapted to engage and clamp upon the top of a container to be held in the support. Suitable thrust bearings 21 are provided in a housing 22 at the end of the arm 18 and surrounding the shaft 19. A table 23 supports the container beneath the clamping member 20 and this table is rotatably mounted upon the base 8. To this end the table 23 is fixed on a sleeve 24 rotating in a bearing 25 on the base 8 and the sleeve 24 at its lower end is transversely grooved as at 26 to receive a cross pin 27 on a driving shaft 28 rotatably mounted within the base 8, the table and driving shaft being supported upon a ball bearing 29. The table 23 is preferably recessed in its center, as at 30, to receive a supplemental table 31 mounted upon a downwardly extending sleeve 32 extending into the sleeve 24 and biased in its raised position by a coiled spring 33. Therefore, the bottle supporting table portion 31, after the bottle has been received thereon and the clamping member 20 lowered on the top of the bottle will give and the bottle will drop into the recess 30 so that danger of the bottle slipping off as the bottle support is agitated is materially prevented.

For rotating the table 23 on its vertical axis, the shaft 28, at its lower end, is provided with a cone pinion 34 adapted to fit between and frictionally engage a pair of cone discs 35 rotatably mounted upon the shaft 9, suitable bearings 36 being provided for the discs. These discs 35 in

turn are driven by a cone pinion 37, fitting between the same and extending at an angle to the pinion 34. This pinion is mounted upon the end of a shaft 38 having a bearing in a bearing sleeve 39 in turn mounted upon the bracket 10. The upper or outer end of this shaft 38 is reduced as at 40 and fits within a driving shaft 41 having a driving connection with the shaft 41 through the medium of a pin 42 on the shaft which extends through a longitudinal slot 43 on the end 40 of the shaft 38. Due to this construction, a relative axial movement between the shafts 39 and the shaft 41 is permitted, the shaft 41 being biased in its outermost position through the medium of the coiled spring 44. The outer end of the shaft 41 is provided with a cone pinion 45 adapted to be forced into frictional engagement with a cone disc 46 which, as it rotates, will in turn rotate the pinion 45, thus driving the pinion 37 and in turn through the above instrumentalities, spinning the table 23 at a relatively high rate of speed. To obtain the relatively high driving speed for the table 23, the cone driving gear 46 is supported on a rotating disc 47 carried by a sleeve 48 extending through the sleeve 4 and having at its lower end a driving gear 49 meshing with the driving pinion 50 in turn driven by suitable driving gearing 51 operated by a belt drive 52 from a suitable driving motor or other source of power 53.

From the above, it will be observed that so long as the pinion 45 is in contact with the cone drive 46, the table 23 will be spun on its longitudinal axis irrespective of the position which said table may assume. At the same time, the table 23, and in fact, the entire bottle supporting mechanism, may tilt on the shaft 9, to move or tilt the container from a substantially vertical upright position to a substantially vertical inverted position. To attain this tilting or oscillating movement of the bottle support 3, I provide a cam member 54 carried at the outer extremity of a support 55 stationarily mounted. A roller 56 carried in a foot 57 on the base 8 rides on this cam 54 and due to the contour of the cam, controls the oscillating movement of the container support on its shaft 9. This cam is so developed that during the feeding of the containers to the support 3 and the removal of the containers from the support 3, the support will be maintained in its upright position with the table 23 disposed horizontally. Also, during the in- and out-feed of the bottles to the support 3, the arm 18 is maintained in a raised position through the medium of a roller 58 which rides on a cam 59 carried on a support 60 extending from a stationary base member 61. This base member is mounted upon a post 62 extending through the sleeves 4 and 48 and supported at its lower end in a bracket 63. The cam 59 maintains the clamping member 20 in a raised position for a short travel of the rotating table 2 during the infeed of the container. When the container is properly positioned upon the table 23, the roller 58 riding off the cam 59 will permit the clamping head 20 to drop down and engage the top of the bottle, firmly clamping the bottle in position. Shortly after this clamping takes place, the roller 56 riding on the cam 54, due to the development of the cam, will permit the bottle support 3 to tilt outwardly or radially until it is tilted to a position wherein the bottle is wholly inverted. During this initial tilting of the support and container, the spinning mechanism of the table 23 is inactive, due to the fact that the end 65 of the shaft 41 is in contact with a stationary cam 66 which forces the shaft inwardly. This disengages the driving cone 45 from the cone 46. This cam 66 is so developed that the cone pinion 45 will remain out of contact with the cone gear or disc 46 during the initial tilting of the container and until the container has moved to approximately upright position as a result of the contact of the roller 56 with the cam 54. The cam 54 causes the support to move to its upright position and then again dip to an inverted position and then move to an upright position from which point it will remain in its upright position for delivery purposes. From the point where the container assumes upright position, during its second inverted position and until it is again moved to its upright position, the driving shaft 41 will be operatively engaged with the cone disc 46 and the bottle or container will be spun at an extremely high rate of speed. When the support and container has been moved to the final upright position, the end 65 of the shaft 41 will again engage a cam 66 to disengage the cone pinion 45 from the disc 46. This stops the spinning action of the container while the same is being removed from the table 23. At the same time that the container moves to a delivery position, the roller 58 will again engage the cam 59, thereby raising the arm 18 and unclamping the container.

It is to observed that in the operation of the apparatus heretofore described, the container is fed into the support in an upright position. As the support travels in its orbit, the support and container will be tilted until the container is in an inverted position, after which the support and container will be raised until the container is again in an upright position. During this initial tilting movement, the container is not spun or rotated on its own axis. After the support has been moved to upright the container, the spinning action commences whereby the container is spun on its own axis at a relatively high rate of speed, approximately from 1100 R. P. M. to 1500 R. P. M. During this spinning movement of the container, the container is again inverted and brought to an upright position. Having been finally brought to its second upright position, the spinning action is discontinued and the bottle is removed from the support by a suitable outfeed star. As a result of initially inverting the container without spinning, the bottom stratum of syrup in the container tends to flow toward the top of the container and by the time the container has moved to its upright position, the syrup is fairly evenly distributed throughout the water content of the bottle. After this even distribution of the syrup has taken place, the continuous spinning and oscillation of the container thoroughly mixes the contents of the container and, at the same time, the formation of a film of syrup on the surface of the container is prevented. Furthermore, this spinning of the container prevents the undue formation of foam which would otherwise result from the agitation of the contents of the container due to its oscillating movement. Therefore, when the container is delivered from the mixing apparatus, the contents of the container are thoroughly mixed, there is no adhering film of syrup to the side walls of the container, and the contents of the container are in practically foamless condition.

I claim as my invention:

1. In a machine for mixing the contents of a container, in combination, a member moving in

a fixed path of travel, means on said member for supporting a container and journaled on said member for oscillating movement thereon in a plane substantially transverse to the plane of movement of the member, means for imparting an oscillating movement to said member while moving in said path of travel, and means for positively rotating said container supporting means on an axis coincident with the longitudinal axis of the container supported thereby while said supporting means is oscillating and while traveling in said path.

2. In a beverage mixer, the combination with means for moving a filled container in a fixed path of travel, means for swinging said container in a vertical plane during said movement, and means for positively rotating the container on its own axis while said container is swinging in a vertical plane and while it is travelling in said fixed path of travel.

3. In a beverage mixing machine, the combination with a means for revolving a filled container in an orbit, means for swinging the container in a vertical plane during its movement in said orbit, and means for positively rotating the container on its own axis while said first mentioned means is swinging the container in a vertical plane and while the container is moving in said orbit.

4. In a beverage mixer, the combination with means for moving a filled container in a fixed path, means for alternately tilting and uprighting said container during said movement, and means for positively revolving said container on its own axis while it is being tilted and uprighted and during its movement in said path of travel.

5. In a beverage mixing machine, the combination with means for revolving a filled container in an orbit, means for tilting and uprighting said container while revolving in said orbit, and means for positively rotating said container on its own axis while being tilted and uprighted and while traveling in said orbit.

6. In a machine for mixing beverages, the combination with means for moving a filled container in a fixed path of travel, means for imparting to said container during its travel, a series of tilting and uprighting movements, and means for positively revolving said container on its own axis throughout a portion of said tilting and uprighting movements.

7. In a beverage mixing machine, the combination with means for moving a container in a fixed path of travel, means for alternately tilting and uprighting said container while moving in said path, means for positively and continuously rotating said container on its own axis while it is being tilted and uprighted, and means for rendering said rotating means inoperative during the initial tilting movement of the container.

8. In an apparatus for mixing the contents of a container, the combination with a member for moving in a fixed path, of means on said member for supporting a container and journalled in said member for oscillating movement thereon in a plane substantially transverse to the plane of movement of said member, and means for positively rotating said supporting means on an axis coincident with the axis of the bottle while said oscillating movement takes place and during its movement in said path.

9. In an apparatus for mixing the contents of a container, the combination with a rotary member, of means on said member for supporting a container and journalled on said member for oscillating movement in a plane substantially radial with respect to the plane of rotation of said member, means for supporting a filled container on said supporting element to rotate with its axis coincident with the axis of said member, means for oscillating said supporting member, and means for positively rotating said supporting member on its axis while the oscillation thereof is taking place and during its movement with said rotary member.

10. In a beverage mixing machine, the combination with a traveling member, of a container support journalled on said member to oscillate in a plane transverse to its path of travel, means for supporting a container on said support to rotate on its longitudinal axis, means for oscillating said support during its path of travel, and means for positively rotating the container on said longitudinal axis on said support while its oscillations take place and during its movement with said traveling member.

11. In a beverage mixing machine, the combination with a rotary member, of means for supporting a container on said rotary member journalled to oscillate in a plane radial to said rotary member, said supporting means including container-holding means rotatable on an axis coincident with the longitudinal axis of the container, means for initially oscillating the container supporting means to invert the container and to subsequently alternately upright and invert the container, and means for positively rotating said supporting means on said axis while said subsequent alternate uprighting and inverting movements take place.

12. In a machine for mixing the contents of a container, in combination, a member having a fixed path of travel, means on said member for supporting a container journaled on said member for oscillating movement thereon in a plane substantially transverse to the plane of movement of the member, and means driven independently of the movement of said member in its path of travel and of the oscillating movement of the support for positively rotating said supporting means on the longitudinal axis of the container supported thereby while said oscillating movement takes place.

13. In a beverage mixer, the combination with means for moving a filled container in a fixed path of travel, means for swinging said container in a vertical plane, and means independent of the means for moving the container in its path of travel and of the swinging movement of the container for positively rotating the container on its own axis while said swinging movement is in effect.

14. In a beverage mixing machine, the combination with means for revolving a filled container in an orbit, means for swinging the container in a vertical plane during its movement in said orbit, and means independent of the means revolving the container and of the swinging movement thereof for positively rotating the container on its own axis while said swinging movement is in effect.

15. In a beverage mixer, the combination with means for moving a filled container in a fixed path, means for alternately tilting and uprighting said container during said movement, and means independent of the means for moving the filled container in its fixed path and of its tilting and uprighting movement for positively revolving said container on its own axis while said tilting and uprighting movements take place.

16. In a beverage mixing machine, the combi-

nation with means for revolving a filled container in an orbit, of means for tilting and uprighting said container while revolving in said orbit, and means independent of said revolving means and of the tilting and uprighting movement of the container for positively rotating said container on its own axis while said tilting and uprighting movement is being effected.

17. In a beverage mixing machine, the combination with a traveling member, of a container support journaled on said member to oscillate in a plane transverse to its path of travel, means for moving said traveling member in its path of travel, means for supporting a container on said support to rotate on its own axis, means for oscillating said support during its path of travel, and means independent of means for moving said member in its path of travel and of said tilting and uprighting means for positively rotating the container on said support on said axis while it is being oscillated.

18. In a beverage mixing machine, the combination with a rotary member, of means for supporting a container on said rotary member journalled to oscillate in a plane radial to said rotary member, said supporting means including a container holding means rotatable on an axis coincident with the longitudinal axis of the container, a second rotary member driven independent of said first-mentioned rotary member, driving means driven by said second rotary member, and means for drivingly connecting said driving means with said container holding means for rotating said container holding means irrespective of the oscillating movement of said holding means.

19. In a beverage mixing machine, the combination with a rotary member, of means for supporting the container on said rotary member journalled to oscillate in a plane radial to said rotary member, said supporting means including container holding means rotatable on an axis coincident with the longitudinal axis of said container, a shaft for driving said container holding means, a second shaft mounted transversely of the axis of said first-mentioned shaft, a driven gear on said first-mentioned shaft, a driving gear on said second-mentioned shaft driving said first-mentioned gear, and means for driving said second-mentioned gear.

20. In a beverage mixing machine, the combination with a rotary member, of means for supporting a container on said rotary member journalled to oscillate in a plane radial to said rotary member, said supporting means including container holding means rotatable on an axis coincident with the longitudinal axis of the container and a driving shaft coaxial with the axis of the container, a second driving shaft extending transversely of the axis of said first-mentioned shaft, a driving connection between said shafts, and means for driving said second-mentioned shaft.

21. In a beverage mixing machine, the combination with a rotary member, of means for supporting a container on said rotary member journalled to oscillate in a plane radial of said rotary member, said supporting means including container holding means rotatable on an axis coincident with the longitudinal axis of said container, means oscillating the container supporting means, said container supporting means including a driving shaft coincident with the axis of the container, a shaft extending transversely of said first-mentioned shaft, a driving gear mounted on said transversely extending shaft, a driven gear mounted on the container supporting means shaft and engaging said first-mentioned driving gear, a driving shaft, a gear mounted on said driving shaft meshing with said first mentioned gear, and means for driving said last-mentioned shaft.

22. In a beverage mixer, in combination, a member moving in a fixed path of travel, means on said member for supporting a container and journalled on said member for oscillating movement thereon in a plane substantially transverse to the plane of movement of said member, means for imparting an oscillating movement to said member while moving in said path of travel, means for positively rotating said container supporting member on an axis coincident with the longitudinal axis of the container supported thereby while said oscillating movement is being effected and while traveling in said path, driving means for said rotating means, and means for disconnecting said driving means from said rotating means during a portion of the travel of said supporting means in its path.

23. In a beverage mixing machine, the combination with a rotary member of means for supporting a container on said member, journalled to oscillate in a plane radial to said rotary member, said supporting means including a container holding means rotatable on an axis coincident with the longitudinal axis of the container, a second rotary member driven independently of said first-mentioned rotary member, driving means driven by said second rotary member, means for drivingly connecting said driving means with said container holding means for rotating said container holding means irrespective of the oscillating movement of said holding means, and means for drivingly disconnecting said driving means from said holding means.

24. The combination with a rotating head of a support for a container journalled on said head to tilt and upright in a plane radial to said head and including a supporting table rotatable on an axis coincident with the longitudinal axis of the container, an axial driving shaft for said table, a driving member for said shaft rotating on an axis coincident with the journal of said support, and means for driving said member during the rotation of said head and while said support is tilting and uprighting.

25. The combination with a rotating head of a support for a container journalled on said head to tilt and upright in a plane radial to said head and including a supporting table rotatable on an axis coincident with the longitudinal axis of the container, an axial driving shaft for said table, a driving member for said shaft rotating on an axis coincident with the journal of said support, means for driving said member during the rotation of said head and while the support is tilting and uprighting, and means for drivingly disconnecting said means from said driving member.

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