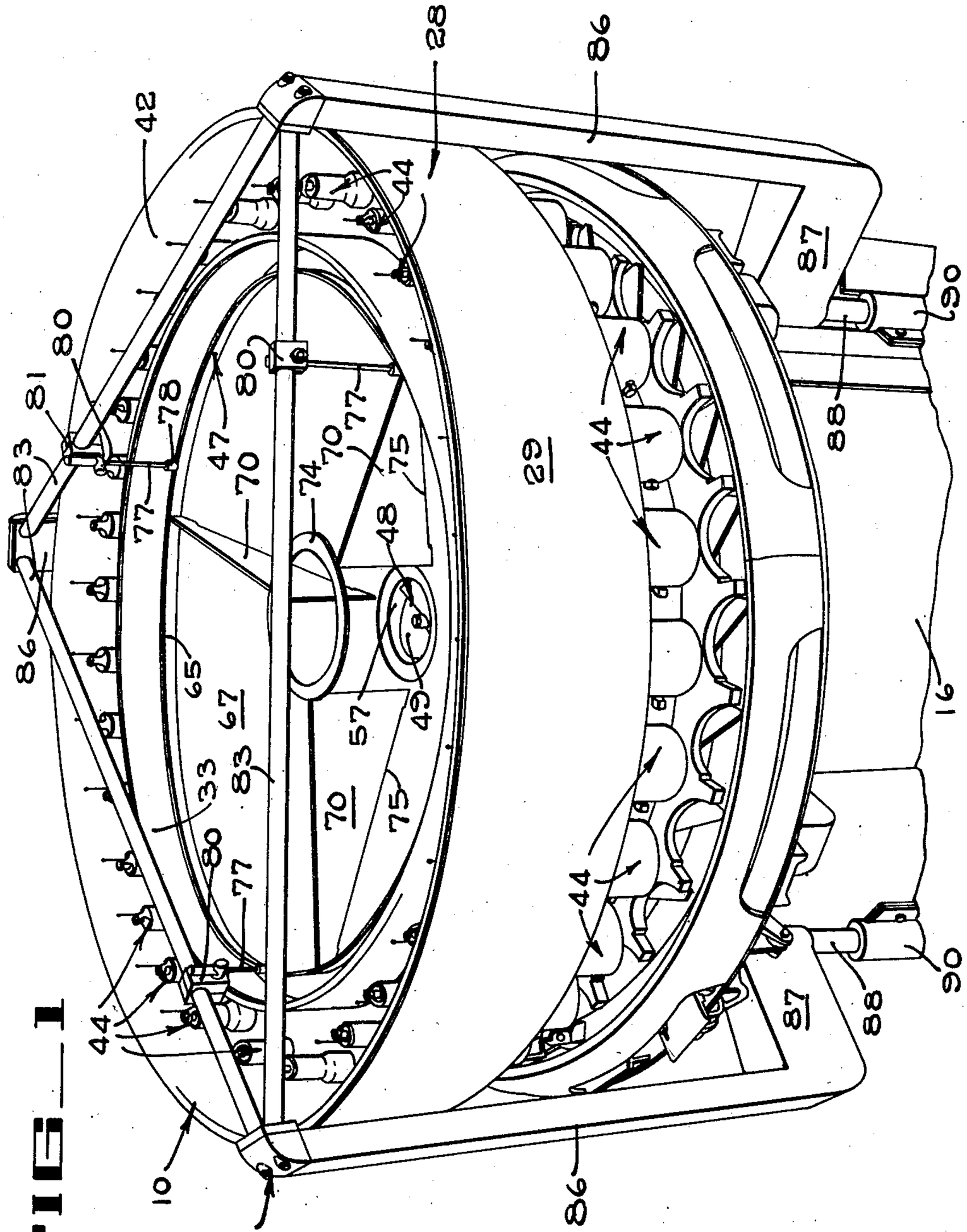
June 7, 1955 R. K. GALLOWAY 2,710,024

TANK CONSTRUCTION FOR A FILLING MACHINE

Filed Dec. 1, 1952 4 Sheets-Sheet 1



FIG—1

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TANK CONSTRUCTION FOR A FILLING MACHINE

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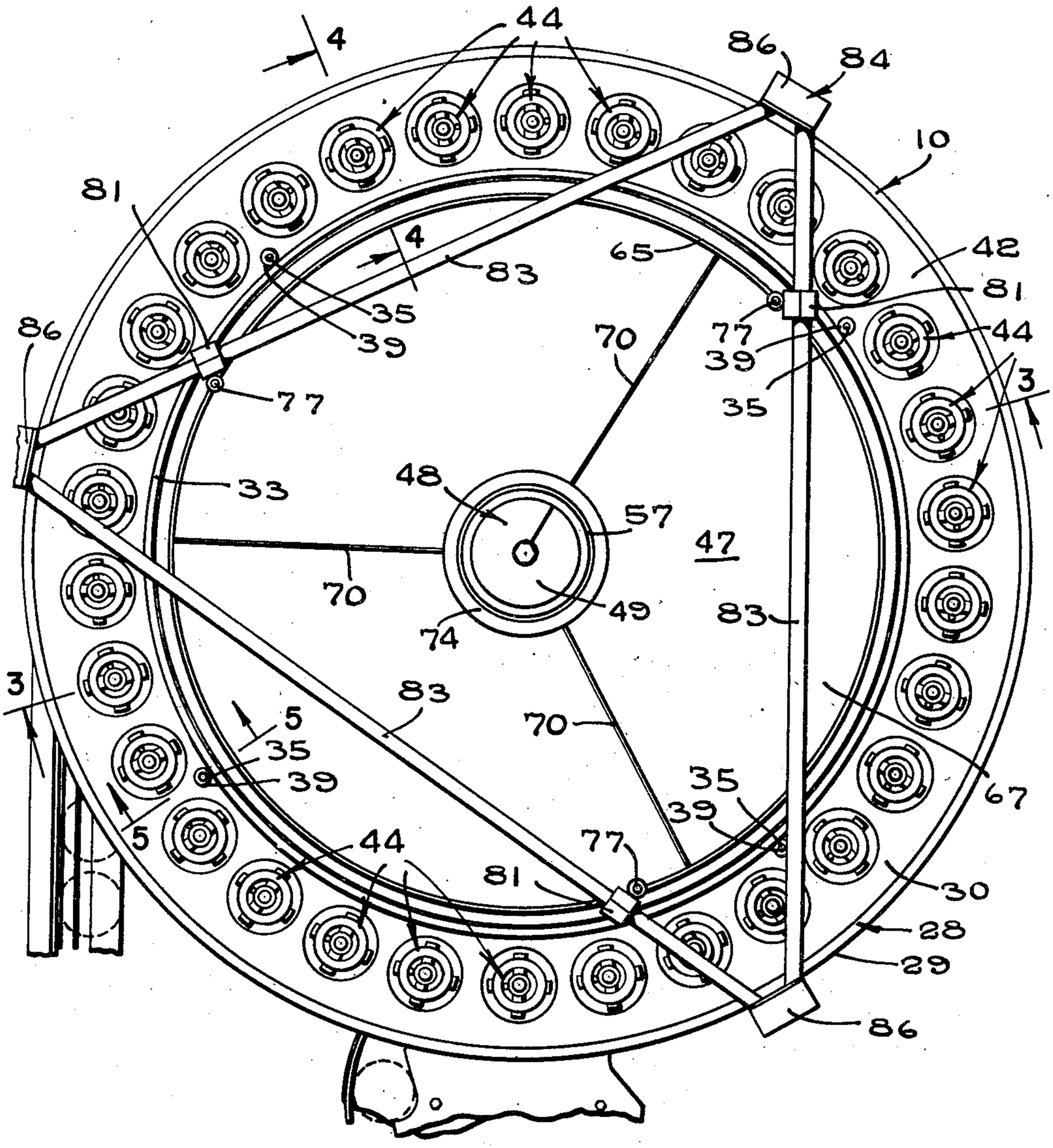
FIG_2



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TANK CONSTRUCTION FOR A FILLING MACHINE

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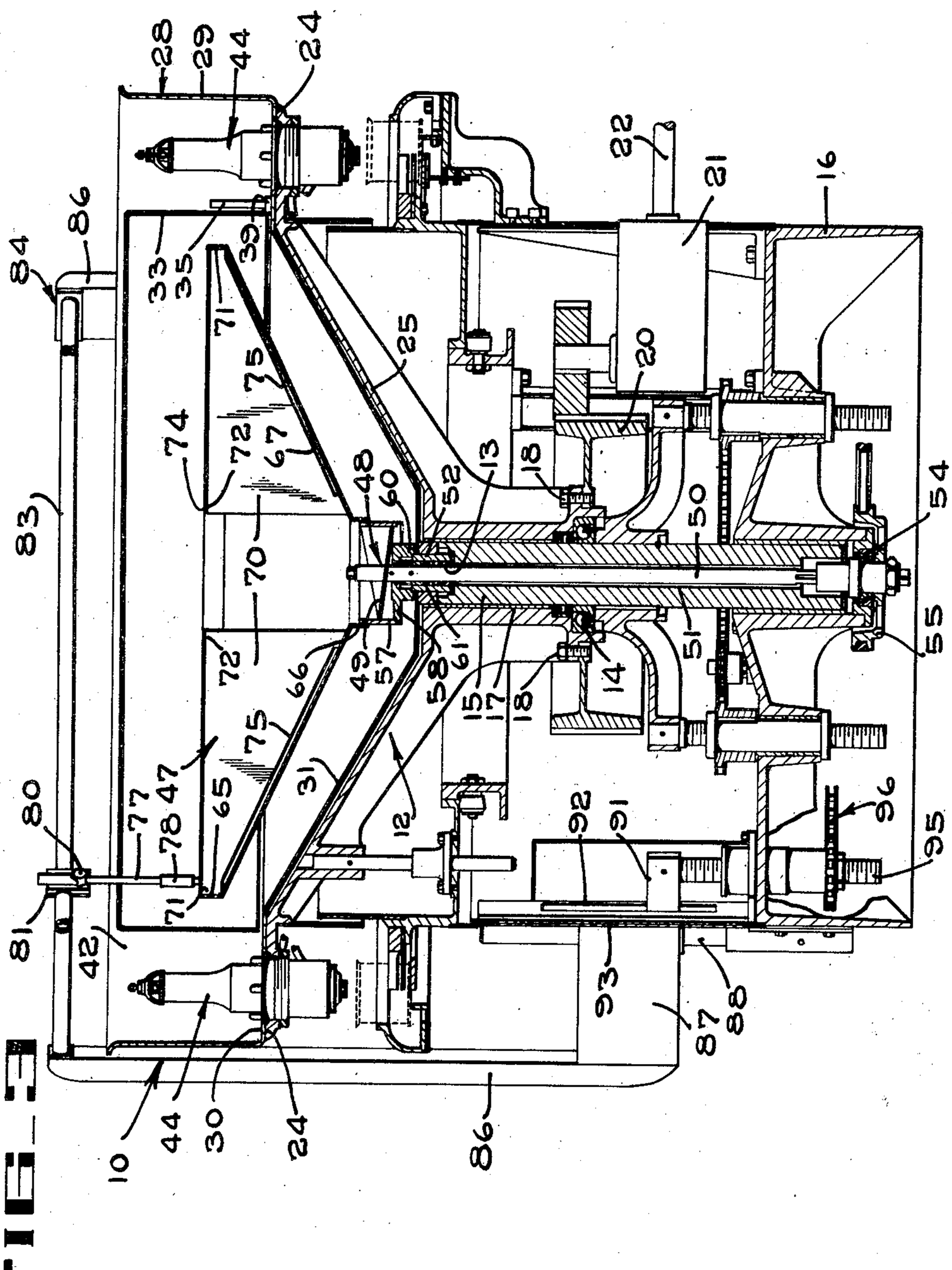

FIG. 3

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TANK CONSTRUCTION FOR A FILLING MACHINE

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FIG_4

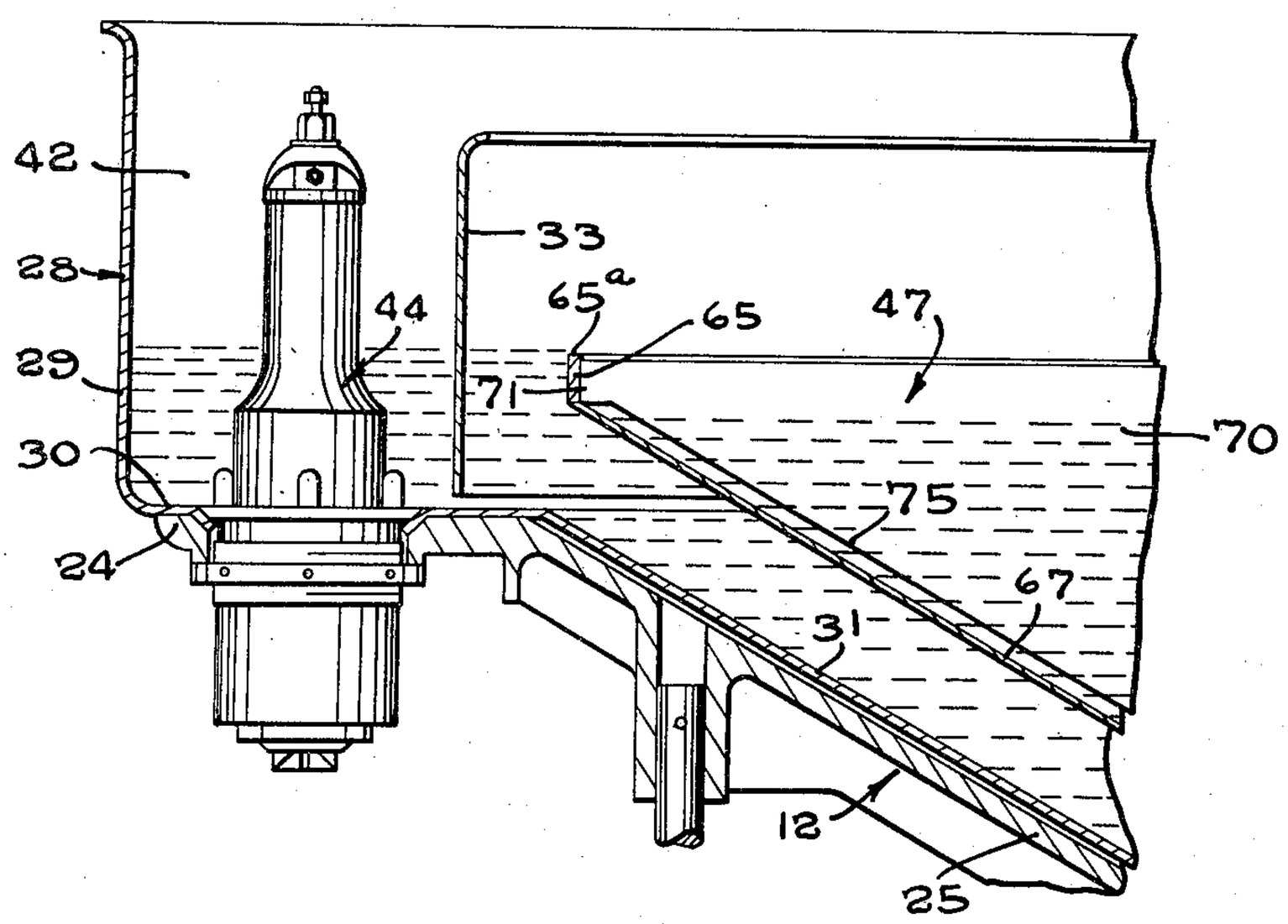
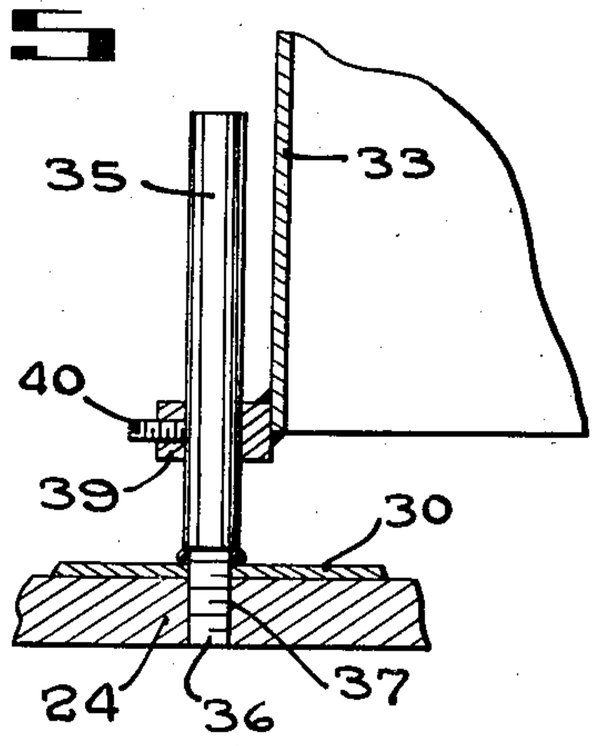


FIG_5



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TANK CONSTRUCTION FOR A FILLING MACHINE

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Application December 1, 1952, Serial No. 323,408

16 Claims. (Cl. 137—563)

This invention appertains to improvements in machines for filling containers with liquid. More particularly this invention relates to an improved liquid supply tank in which a liquid is temporarily stored in the filling machine before it is delivered in measured quantities to individual containers.

In the food canning industry, machines for filling containers are used wherein the liquid to be dispensed is maintained at a predetermined level in an annular valve chamber defined between the wall of an outer rotatable cylindrical tank and the wall of a concentric, stationary inner tank. The inner tank provides a supply from which liquid is pumped to maintain the advantageous liquid level in the outer tank. With such machines, it has been found that a considerable amount of turbulence is caused in the annular valve chamber due to the frictional drag of the wall of the stationary inner tank on the liquid in the rotating outer tank, whereby the accuracy of the metering valves is seriously impaired.

It is an object of the present invention to provide a tank construction for a rotary filling machine in which turbulence of the liquid in the tank is substantially eliminated.

Another object is to provide means for breaking up foam formation in the tank.

A further object is to provide an efficient means of transferring liquid from a stationary supply tank to a rotatable liquid-dispensing tank without causing bobbing and waving of the liquid level in the tank receiving the liquid.

Another object of this invention is the provision of tank construction having an outer rotating tank and an inner stationary tank wherein the frictional drag of the wall of the stationary inner tank on the liquid in the outer tank is eliminated.

Other and further objects and advantages of the present invention will become apparent from the following detailed description taken in connection with the acompanying drawings.

Fig. 1 is a fragmentary perspective of a filling machine having a tank constructed in accordance with the teaching of the present invention.

Fig. 2 is a plan view of the machine of Fig. 1.

Fig. 3 is a vertical section taken along line 3—3 of Fig. 2.

Fig. 4 is a fragmentary vertical section taken along line 4—4 of Fig. 2.

Fig. 5 is a fragmentary vertical section taken along line 5—5 of Fig. 2.

In Figs. 1, 2 and 3 the reference numeral 10 indicates generally a rotary filling machine in which a turret 12 is rotatably mounted by a bushing 13 (Fig. 3) and a bearing assembly 14 on a stationary support 15 extending upwardly from a rigid base structure 16. The turret 12 has a hub 17 secured by a plurality of capscrews 18 to the flange of a gear 20 which is driven by a suitable power transmission 21 from a power driven shaft 22. The turret 12 has an outer annular flat supporting platform 24 connected to the hub 17 by a generally conical, rigid, drive-transmitting section 25. Supported on the turret 12 for rotation therewith is an outer tank 28 formed of a continuous, rigid, sheet metal member including an upright cylindrical wall 29, a tank bottom 30, and a turret liner portion 31. A cylindrical baffle 33 is supported in upright position in spaced relation above the tank bottom 30 by a plurality of studs 35, Fig. 5, that have lower ends 36 threaded into tapped openings 37 in the tank bottom 30 and the supporting platform 24 of the turret 12. Collars 39, welded to the lower edge of the baffle 33, are disposed around the studs 35 to which they are adjustably secured by a capscrew 40.

The space between the wall 29 of the outer tank 28 and the cylindrical baffle 33 defines an annular trough 42 (Fig. 3) in which a plurality of liquid metering and filling valves 44 are operatively disposed. Filling valves suitable for such an installation are specifically disclosed and claimed in my co-pending application Serial No. 323,406 entitled "Filling Valve" filed Dec. 1, 1952. Liquid is drawn from an inner supply tank 47 and delivered to the annular trough 42 by a power driven pump 48. The pump 48 consists of a helical vane 49 keyed to a shaft 50 that extends upwardly through a bore 51 in the support post 15 and is rotatably journaled therein by bushings 52. At its lower end the shaft 50 is journaled in a bearing assembly 54 and carries a pulley 55 through which the pump shaft is rotated. The helical vane 49 rotates in a cylindrical housing 57 which is closed at its lower end by an apertured disc 58. The disc 58 is keyed to the turret 12 for rotation therewith in any suitable manner, as by means of interengaging drive rings 60 and 61. It will be understood that the helical vanes rotate in the direction opposite to the direction of rotation of the pump housing 57.

The inner tank 47 is generally conical in configuration and comprises an upper, large diameter rigid ring 65 and a lower, small diameter rigid ring 66 connected by a funnel shaped, heavy sheet metal wall 67 which is secured, as by welding, to both rings 65 and 66. Three generally triangularly shaped vanes 70, Figs. 1, 2 and 3 are mounted in upright position in the tank 47 to reduce swirling of the liquid in the tank. The vanes 70 are equally spaced from each other and extend radially in the tank. Each vane has an outer edge 71 welded to the inner surface of the large upper ring 65, a bottom, radially inward edge 72 welded to the upper surface of the tank base, and an inner, upper edge 73 welded to the lower surface of a flatring 74. The lower, slanted edge of each vane 70 has a cut-out portion 75 to permit the flow of liquid under the vane.

The inner tank 47 is suspended above the turret 12 by three spaced rods 77 each of which is secured by a quick action connection 78, of any well known type, to the upper edge of the large ring 65 of the inner tank. At its upper end each rod is adjustably secured by a clamping member 80 (Fig. 3) to a split block 81 that is disposed around one of three tubular braces 83 of an overhead supporting frame 84. Each split block 81 is clamped on the associated tubular brace 83 by the same clamping member 80 that secures the rod 77 to the block. The three braces are secured, in any suitable manner, as by set screws not shown, to upright posts 86 which have lower laterally extending arms 87 slidably journaled in rods 88 (Fig. 3) secured to support blocks 90 of the machine base 16. An inner extension 91 of each lateral arm 87 projects through an elongated slot 92 in the casing 93 of the machine and rests on the upper end of a jacking screw 95, of well known design, which may be adjustably rotated through a power driven sprocket and chain drive 96 connected to an elec-

tric motor (not shown). By means of the three jacking screw units, the inner tank 47 may be raised for convenient removal or cleaning or for adjusting the level of liquid in the annular trough 42, which level corresponds to the level of the upper edge 65*a* of the inner tank wall 65, as will appear presently.

The pump 48 extends into the tank 47 to form a central outlet therefrom. Liquid is delivered to the inner tank from a source of liquid supply and is preferably introduced into the tank over the pump to fill the tank to the desired level. In maintaining this level a common float valve, not shown, may be used. The pump 48 continuously withdraws the liquid, forces it downwardly through openings in the apertured disc 58 of the pump housing, then angularly upwardly along the inclined wall 31 of the outer tank, under the cylindrical baffle 33 and into the annular trough 42. The narrow space under the baffle 33 is sufficient to permit free passage of the liquid into the annular trough 42 without impeding the flow therein. It further regulates this flow so as to reduce or dampen any tendency to surge within the trough. As best seen in Fig. 4, the liquid in the annular trough 42 and in the outer tank inside the baffle 33 will rise to the level of the upper edge 65*a* of the inner tank 47. When this level is attained, the excess liquid spills over the upper edge 65*a* of the inner tank and is returned to the suction side of the pump. It is to be particularly noted that, in spilling over the edge of the tank, the excess liquid cuts into and tends to dissipate and disperse the foam that forms in the inner tank. Further, the cylindrical baffle 33 prevents the entrance of the foam into the annular trough 42 in which the valves 44 are positioned. Thus, the removal or adjustment of the valves during the operation is greatly facilitated due to the absence of foam therearound.

From the foregoing description, it will be seen that the new cylindrical baffle 33 defines an outer annular rotating trough in which the liquid therein is completely separated from frictional contact with the inner stationary tank 47 and thus turbulence in the trough due to the relative rotation of the inner and outer tanks is substantially eliminated. The novel baffle also provides a restricted adjustable inlet through which the liquid may be smoothly directed into the annular trough without creating further turbulence.

It will be understood that modifications and variations may be made without departing from the scope of the present invention.

Having thus described my invention what I claim as new and desire to protect by Letters Patent is:

1. In combination, a rotatable turret, a tank carried by said turret and having a flat bottom wall, a cylindrical outer sidewall, and an upright cylindrical inner wall disposed concentrically with said outer sidewall and spaced inwardly therefrom, said inner wall having an opening in a lower portion thereof defining a liquid inlet passage and means for supplying liquid to said tank through said inlet passage.

2. In combination, a rotatable trough having upright sidewalls, means including an opening in the lower portion of one wall of said trough defining a restricted annular inlet passage for said trough, means for varying the effective area of said opening, and means for pumping liquid into said trough through said inlet passage.

3. In combination, a rotatable turret, an annular trough carried by said turret and having upright sidewalls, means including an opening in a wall of said trough for supplying liquid to said trough in a lower portion thereof, and means cooperating with said wall opening for maintaining a uniform liquid level in said trough.

4. In combination, a rotatable tank, a stationary liquid supply receptacle inside said tank, and means for partitioning an outer annular portion of said tank from the wall of said inner supply receptacle, said partitioning means being adjustably mounted in said tank and having a lower edge spaced above the bottom of said tank to define an inlet passage for said annular portion.

5. In combination, a rotatable annular trough having upright sidewalls and a substantially flat apertured bottom wall, a plurality of valves disposed in the apertures in said bottom wall, one of said side walls being spaced above said bottom wall to define a restricted annular passage into said trough, means for adjusting the position of said one side wall relative to said bottom wall to vary the effective area of said passage, and means for directing liquid through said annular passage into said trough.

6. In combination, a rotatable tank having a flat apertured bottom wall, a stationary liquid supply receptacle inside said tank and having walls spaced inwardly from the sidewalls of said tank, valves disposed in the apertures in said bottom wall, means for partitioning the portion of said tank in which said valves are disposed from the wall of said inner supply receptacle, said partitioning means being disposed in spaced relation above the bottom wall to provide an inlet passage, and means for adjusting the position of said partitioning means relative to said bottom wall to vary the effective area of said inlet passage.

7. In combination, a rotatably mounted annular trough, a reservoir disposed radially inwardly of said annular trough and having an upstanding outer wall cooperating with the inner wall of said trough to define a chamber, means including an opening in the lower portion of the inner wall of said trough providing a passage communicating said chamber with said trough, means for pumping liquid from said reservoir to said trough and to said chamber in quantities sufficient to flow liquid over the outer wall of said reservoir for returning to said reservoir, and means for adjusting the elevation of the top edge of said outer wall.

8. In combination, a base, a turret rotatably mounted on said base, an outer tank carried on said turret, said tank having an upright cylindrical side wall and a bottom wall with an outer flat annular portion and a generally conical downwardly and inwardly extending portion integrally formed with said annular portion, an upright cylindrical baffle supported in spaced relation above said annular bottom wall and disposed concentrically with said side wall and spaced inwardly therefrom, an inner tank suspended centrally in said outer tank, and means for pumping liquid from said inner tank, and forcing it upwardly along said conical wall surface under said baffle and into the annular trough defined between the side wall of the outer tank and the cylindrical baffle.

9. In combination, a base, a turret rotatably mounted on said base, an outer tank mounted on said turret for rotation therewith and including an outer upright cylindrical sidewall and an annular flat apertured bottom wall, an upright cylindrical baffle disposed in said outer tank generally concentric with said sidewall, and means for adjustably supporting said baffle from said bottom wall including a plurality of collars secured to said baffle and studs mounted in said bottom wall and extending upwardly therefrom through said collars, and means for adjustably securing each stud to a collar.

10. In combination, a base, a turret rotatably mounted on said base, a tank mounted on said turret for rotation therewith including an outer upright cylindrical sidewall, an annular flat apertured bottom wall, and a generally conical tank liner extending downwardly and radially inwardly from said annular bottom wall, a cylindrical baffle disposed in said tank concentric with said sidewall and secured in upright position near the juncture of said bottom wall and said liner and in spaced relation thereabove, a stationary liquid reservoir disposed in said tank, said reservoir having an upright sidewall, means for pumping liquid from said reservoir, upwardly along said liner, under said baffle and into the annular space between the outer sidewall of said tank and said baffle and into the annular space between the baffle and said upright sidewall of said reservoir, said pumping means having a

capacity to maintain said two spaces at a level corresponding to the upper edge of said reservoir sidewall and means for adjusting the level of said reservoir sidewall.

11. In combination in a filling machine, a housing, a turret rotatably mounted in said housing, an annular trough carried by said turret, an open top reservoir disposed inside the ring defined by said annular trough and having an upright sidewall with an upper overflow edge, means including the upper edge of said sidewall and an opening in said trough for maintaining the liquid in said trough at a predetermined level, means for varying the elevation of said upper edge including an overhead support structure, means for suspending said reservoir from said structure, rods connected to said structure and extending downwardly along the outside of said housing, jacking screws mounted in said housing, means connecting each rod to one of said jacking screws, and power means for rotating said jacking screws.

12. In a tank construction, a base, a turret rotatably mounted on said base, an outer tank mounted on said turret for rotation therewith and including an outer upright cylindrical sidewall and an annular flat apertured bottom wall, an upright cylindrical baffle disposed in said outer tank generally concentric with said sidewall, and means for adjustably supporting said baffle from said bottom wall.

13. A tank construction comprising a rotatable tank having an upright sidewall and a bottom wall, an open top reservoir mounted in said tank substantially centrally thereof with the upper edge of the sidewall of said reservoir disposed below the upper edge of the sidewall of said tank, a cylindrical baffle supported between the sidewall of said reservoir and the sidewall of said tank with the upper edge of said baffle extending to a level higher than the upper edge of the sidewall of said reservoir and with the lower edge of said baffle spaced above the bottom wall of the tank, and means for pumping liquid from said reservoir under said baffle and into the space between the sidewall of the tank and said baffle and for pumping liquid into the space between said baffle and the sidewall of said

reservoir in sufficient quantities to cause liquid to overflow into said reservoir.

14. In a tank construction, an outer tank having an upstanding sidewall, an inner open-top reservoir for liquid mounted in said outer tank, the liquid in said reservoir being subject to foam accumulations which tend to overflow from said reservoir, and a baffle disposed between said reservoir and the sidewall of said outer tank and being of a height to prevent foam overflowing from said open-top reservoir from entering the space between said baffle and the sidewall of said outer tank.

15. In a tank construction, an outer tank having an upstanding sidewall and a bottom wall, an open-top reservoir for liquid mounted in said outer tank, the liquid in said reservoir being subject to foam accumulations which tend to overflow from said reservoir, a baffle disposed between said reservoir and the sidewall of said outer tank to define a trough and being of a height to prevent foam overflowing from said reservoir from entering the space between said baffle and the sidewall of said outer tank, the lower edge of said baffle being spaced from said bottom wall to provide a liquid flow passage, and means for pumping liquid from said reservoir to said trough through said passage.

16. A tank construction comprising a rotatable tank, an upright baffle disposed in said tank in spaced relation to the wall of the tank to define a trough, an open-top reservoir disposed centrally in said tank for storing liquid subject to foam accumulations, and means for pumping liquid from said reservoir to said trough and for directing a portion of said liquid into the open top of said reservoir and into the foam accumulated on the surface of the liquid in said reservoir.

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