June 10, 1952 E. H. L. JOHANNES 2,600,299

TRAP TANK

Original Filed Feb. 11, 1947

FIG. 1.

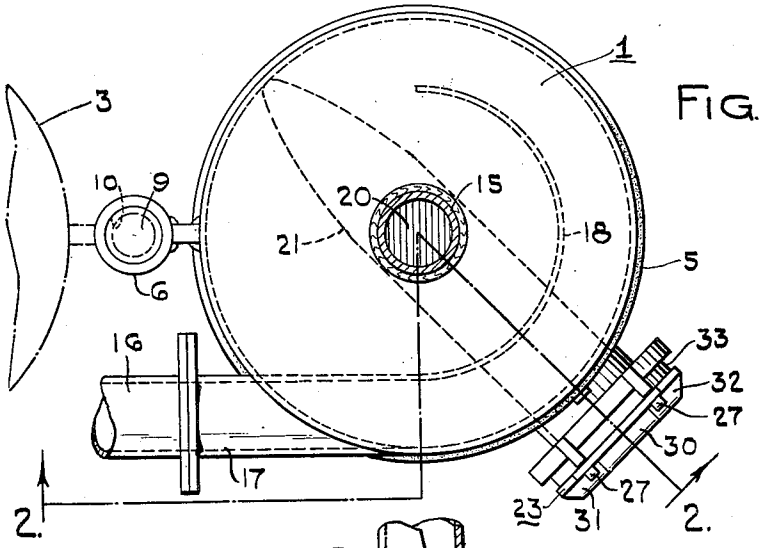


FIG. 2.

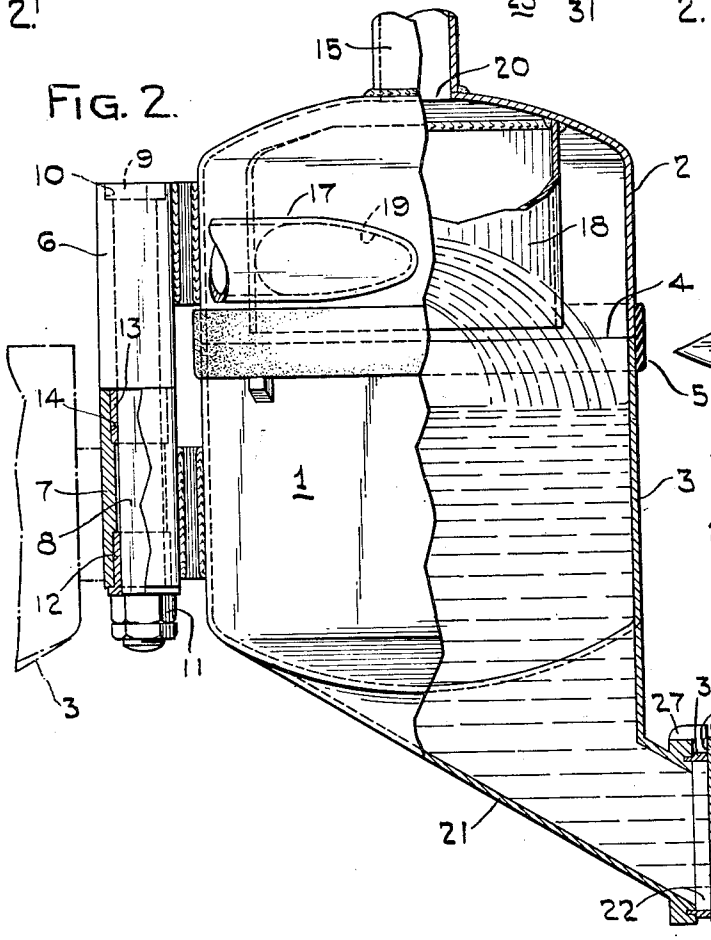
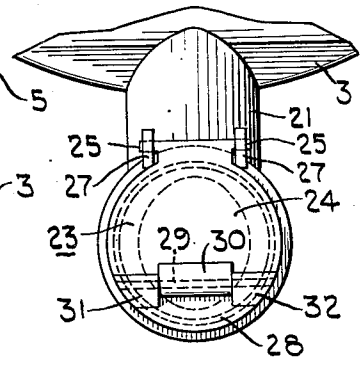


FIG. 3.



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TRAP TANK

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Original application February 11, 1947, Serial No. 727,801, now Patent No. 2,511,637, dated June 13, 1950. Divided and this application October 6, 1949, Serial No. 119,856

1 Claim. (Cl. 137—205)

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This invention relates to suction pumps of the type disclosed in my copending application Serial No. 727,801, filed February 11, 1947, now Patent No. 2,511,637, issued June 13, 1950 (of which the present application is a division), and a principal object of the invention is to provide a generally improved trap tank, forming a unitary functional part of such pump apparatus as a whole and specially designed to function efficiently in the pumping of soups and like flowable substances either with or without a solids content.

A more specific object is to provide a trap tank of novel form and mounting, affording ready access to the interior for inspection, cleaning, and sterilization.

Another important object is to provide a novel discharge port valving or closure device, having improved structural and functional characteristics as hereinafter more fully set forth.

In the attached drawings:

Fig. 1 is a top plan view of a trap tank made in accordance with the invention;

Fig. 2 is a sectional elevational view on the line 2—2 of Fig. 1; and

Fig. 3 is a fragmentary front elevational view showing details of the discharge port valving device.

With reference to the drawings, the trap tank designated generally by the reference numeral 1, comprises upper and lower sections 2 and 3 respectively, said sections being generally cylindrical in form and having confronting edges which, when in registry, form a transverse joint 4 in which the said edges fit closely together. In operation, the joint is effectively sealed by a band 5 of rubber, preferably synthetic, which encircles the tank as shown in Fig. 2.

The upper section 2 of the tank has secured to the outside thereof a sleeve 6, and a corresponding sleeve 7 is attached to the lower section 3. These sleeves are arranged on the respective tank sections so that when the said sections are brought together in normal position as illustrated in Fig. 2, the said sleeves will be in alignment with each other with the lower end of the sleeve 6 abutting the upper end of the sleeve 7. A bolt 8 extends through the two sleeves with the head 9 of the bolt seated in a countersunk recess 10 at the upper end of the sleeve 6, and the lower projecting end of the bolt receives a nut 11 which when tightened, secures the sleeves 6 and 7 together in their aligned relation. A flanged liner 12 fitted into a counterbore in the lower end of the sleeve 7, forms a seat for the nut

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11 and this, together with a second liner 13 in a counterbored recess 14 in the upper end of the sleeve 7, journals this sleeve on the bolt 8 and provides for swinging the lower section 3 of the tank, after the sealing band 5 has been displaced from the joint 4, about the bolt 8 as a pintle into a position clear of the top section 2 for inspection and cleaning of the tank interior. In the present instance, the tank is suspended from a pipe 15, the lower end of which is secured by welding to the top section 2 of the tank.

Entering the side of the upper section 2 of the tank, is a duct 16, the inner flanged end 17 of which is integral with and in substantially tangential position with respect to the tank section 2 so that the duct will discharge into the tank in a tangential direction. Interiorly the section 2 of the tank is provided with a depending baffle 18 which forms, with the side wall of said section, a channel for reception of said tangential discharge. The baffle 18 functions in obvious manner to effectively separate the port 19 of the tank which communicates with the duct 16, from the port 20 at the inner end of the pipe 15. As arranged, the baffle 18 extends downwardly approximately to the lower edge of the tank section 2. The baffle, in conjunction with the tangentially directed inflow duct 17, serves also to guide the stream of fluid material discharging into the tank into a descending spiral path, thus preventing abrupt drop of the material to the bottom of the tank. This is of particular importance in the handling of soups having solid particles or garnish in that the device prevents possible damage to the garnish when it impinges upon the tank bottom.

The bottom section 3 of the tank terminates at its lower end in a downwardly directed cylindrical spout 21, the port 22 at the lower end of this spout lying in a vertical plane and being normally covered by a valve or closure 23. The closure 23 consists of an upper section 24 which has at its upper end transversely projecting trunnion elements 25 which rest freely in slotted openings 26 in brackets 27 on the nozzle. The section 24 terminates short of the bottom of the port 22, and a lower section 28 is provided which is hinged to the upper section 24 of the valve and which, with the said upper section, covers the entire port. The elements 25 have sufficient play in the openings 26 to permit the closure 23 to adjust itself readily and accurately to the opening 22.

The manner in which the lower section 28 of the closure is hinged to the lower edge portion of the upper section 24 is best illustrated in Figs.

2 and 3. As shown in the first of these figures, the upper edge of the section 28 closely abuts the lower edge of the upper section 24 when the valve occupies the normal closed position. The hinge pin 29 which holds the two sections together extends through hinge sockets 30, 31 and 32 on the outside of said sections, the socket 30 being centrally arranged and being carried by the upper section 24, and the sections 31 and 32 being on the lower section and being located one at each side of and contiguous to the ends of the socket 30 so as to provide in effect a continuous socket extending across the full width of the closure plate. The sockets are also arranged so as to directly overlie the joint between the two valve sections so that when the joint is closed, as in Figs. 2 and 3, the sockets help to seal the joint. The suspension of the valve, including the position of the slots 26 is such that, hanging freely as described above and as shown in Fig. 2, the inner plane face of the closure 23 will lie flatly against the outer edge of a cylindrical sleeve 33 which projects from the lower end of the nozzle 21 and defines the port 22.

In operation, suction is applied to the tank by way of the pipe 15 and port 20 so as to draw the soup or other liquid to be transferred into the tank through the duct 16 and port 19 which are connected to a source of said liquid. When suction is thus applied to the tank, the closure 23 will lie against the outer end of the sleeve 33 and will function as a check valve to effectively seal the port 22. When the suction is relieved, however, the closure 23 will immediately open under the pressure of the fluid contents of the tank and will permit said contents to flow freely by gravity from the discharge port 22. As the tank empties and the volume and weight of the liquid against the closure 23 progressively decreases, the upper section 24 will reseat while the lower section 28 of the closure will remain open under the reduced pressure and will exert a minimum restraint to the free passage of the residual fluid from the tank.

It sometimes happens that when, after completion of the gravity discharge phase described above, the suction is reapplied to the tank, a particle or particles of the solids content of the soup will be caught between the edge of the sleeve 33 and the lower part of the closure 23 and will, by preventing full seating of the closure, permit air to enter the tank through the discharge port 22 and thereby prevent formation in the tank of the required degree of vacuum.

It will be noted that the articulated construction of the closure will, under these conditions, permit the upper and major portion of the closure to close tightly so that the air-admitting gap will be confined entirely to the lower section 28 and will thereby be reduced to a point where the force of the suction acting on the section 28 will be sufficiently great to draw this section also to its seat by crushing and disintegrating the said interfering solid particle or particles. This is a primary function of the articulated closure structure.

I claim:

In apparatus for transferring soup or the like, a cylindrical trap tank having a discharge port arranged so that the tank may empty by gravity, means for evacuating the tank including an exhaust port in said tank, a suction intake duct connected to the tank, and a baffle in the interior of the tank spaced from and substantially paralleling the cylindrical wall of the latter and separating the said exhaust port from the suction intake port, said intake duct where it joins the tank being substantially tangential to the cylindrical wall of the latter and communicating with the space between said wall and the baffle.

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