

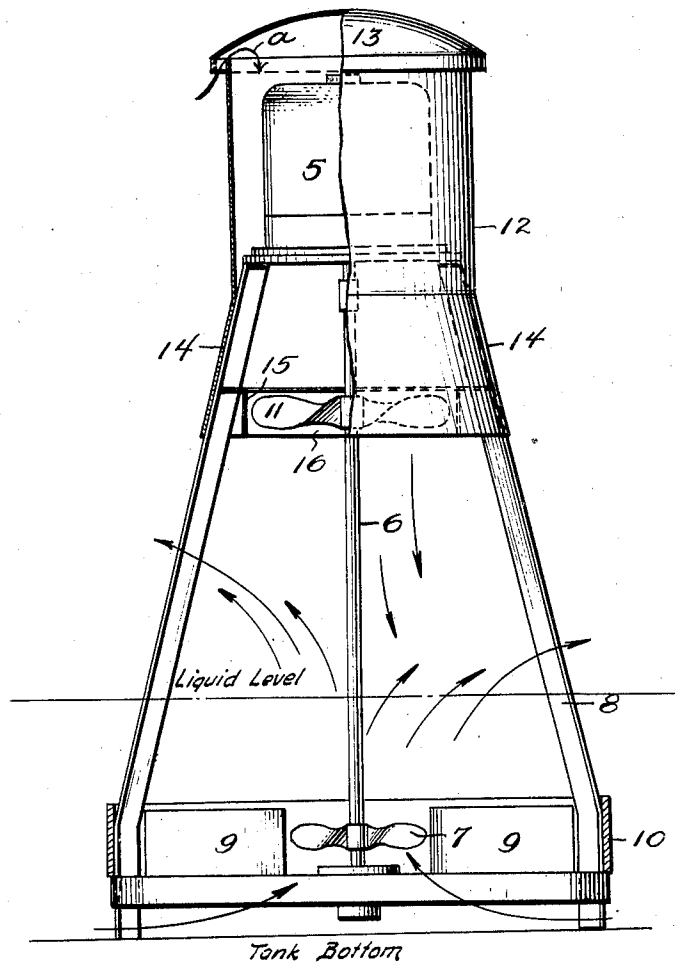
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MEANS FOR TREATING LIQUIDS AND GASES

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MEANS FOR TREATING LIQUIDS AND GASES

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4 Claims. (Cl. 261-93)

This invention relates to means for agitating, aerating, mixing and, or, purifying liquids and gases. The device of the present invention provides a mechanism similar to that in the patent to Jones, et al., No. 1,765,338, issued June 17, 1930. The Jones patent aforesaid discloses a supporting frame adapted to be set in a tank of liquid, such as water, for example, said frame supporting a motor, the vertical shaft of which carries a propeller which lies beneath the surface of the water and, in conjunction with baffle plates, acts to force the water violently upwardly in the form of an inverted cone, at the same time breaking the liquid up into spray, fine drops or a thin water sheet which, in descending, entrain air. In addition, the violent action beats the air into the liquid. As this action is repeated the surface tension is broken again and again and the same liquid is exposed to the air many times.

My improvement not only retains all of the advantages of the structure of the Jones patent, but contemplates the provision of an additional air forcing means, so disposed with relation to the ebullient cone of water that a kinetic column of air may be forcibly directed into the heart of the cone to carry off released impure gases as fast as they are released by the constant breaking of the surface tension of the liquid.

The figure shown in the accompanying drawing is a view partly in side elevation and partly in section.

In the drawing, 5 designates any suitable type of motor, preferably electric, though any suitable prime mover may be employed. This motor imparts rotation to a vertical shaft 6 carrying a liquid propelling blade 7. The motor is supported upon a suitable frame 8 and this frame carries baffle plates 9, the function of which plates is to prevent the propeller 7 from setting up a mere whirlpool action of the water. I may, if desired, provide a band 10 around the lower portion of the frame 8 so that the liquid in the tank as it flows to the propeller 7 is caused to flow in from the lowest portion of the tank. The liquid is discharged at high velocity by the propeller, upwardly.

It is frequently just as desirable to get rid of any undesirable odors or gases entrained in the water or other liquid, as it is to get air or other gases into the water and the present invention differs principally from the Jones patent aforesaid in providing an air or other gas propelling fan or propeller 11 upon the shaft 6 at a point above the liquid level in the tank, not shown, in which the structure is placed. A hood 12 surrounds

the motor and lies in spaced relation thereto. This hood comprises a cap 13 which is enough larger in diameter than the hood to provide air inlet openings for air along the path indicated by the arrow *a*. An apron 14 constitutes a continuation of hood 12 and I may, if desired, provide a band 15 to more nearly dimension the outlet passage 16 of the air to the size of the blade 11. With the motor in operation and with the fan 11 revolving at high speed, air will be drawn into the hood 12 and discharged forcibly against the upwardly boiling cone of water discharged by propeller 9. This forcible discharge of the air against the water takes place at a time when the surface tension of the water is being broken continuously and consequently entrained gases of an undesirable nature may be most easily driven off.

While I have spoken principally of the aeration and purification of water and while it is a fact that apparatus of this character has for its principal use the purification and aeration of large bodies of water, such, for example, as the drinking water supplies of cities, the present invention is by no means limited to the aeration of water but, upon the contrary, is of utility in gas and liquid contact apparatus and systems of many different kinds. There are many chemical processes in which the greatest efficiency is obtained by continuously maintaining intimate contact between a body of gas, upon one hand, and a body of liquid upon the other hand, and the apparatus of the present invention is applicable in many of these relations. When the fan 11 is arranged to force air or gas down upon the liquid to be agitated it creates a current of air or gas which radiates from the center constituted by shaft 6. However, the fan 11 may be arranged to pull air or gas from the liquid being agitated, thus creating a current of air or gas toward the center of the machine. In the former case the air may be utilized to drive off undesirable tastes and odors due to the entrained gases in the liquid, which gases are being released and driven out by agitation. In the latter case, i. e., where gases and liquids are being mixed as, for example, for the purpose of obtaining a desired chemical reaction, the fan will maintain a continuous supply of gas to the agitated liquid. Since the fan 11 and propeller 7 are mounted upon a common shaft 6 they will be driven in a determined relation to each other to thereby bring about a uniformity of result. It should be noted that the incoming air passes over the motor. This tends to cool the motor and permits the use of motors which, be-

cause of small size, would otherwise be overloaded or overheated.

5 It is to be understood that the invention is not limited to the precise construction set forth but that it includes within its purview whatever changes fairly come within either the terms or the spirit of the appended claims.

Having described my invention, what I claim is:

10 1. In combination, a vertically disposed frame comprising a plurality of spaced uprights, a vertically disposed motor and shaft supported by said frame, a hood enclosing said motor and the upper portion of the frame, said hood comprising a cap spaced from the remainder of the hood
15 to leave an air inlet opening through which air may be drawn into the hood and past the motor, an upwardly acting fluid propeller upon the lower portion of the shaft and a downwardly acting fan upon the shaft at a point above the lower edge
20 of the hood.

2. A structure as recited in claim 1 in combination with baffle plates for preventing the setting up of eddy currents by the liquid propeller.

25 3. In combination, a supporting frame, a substantially vertical shaft therein, a propeller upon the lower portion of said shaft, discharging up-

wardly, means for rotating the propeller and shaft and a ring carried by the frame and surrounding the propeller in the lateral plane thereof, said ring being spaced above the bottom of the frame to cause liquid flowing to said propeller to be drawn from a point beneath said ring, and a
5 downwardly acting fan upon the upper portion of said shaft.

4. A machine for purifying and aerating liquids, comprising a propeller located below the surface of the liquid, means for rotating said propeller, baffles disposed around the propeller to aid in preventing the setting-up of a whirlpool action of the water by the propeller and to thereby cause substantially the entire energy delivered by
10 the propeller to be utilized in forcing a truncated cone of the liquid upwardly and materially above the normal liquid level, and to thereby continually break the surface tension of said liquid, and an air propelling means, located at such a height
15 above the top of the cone of liquid as not to be contacted by said liquid, acting to set up a downwardly moving current of air and to continuously impinge the same upon the surface of the liquid during the breaking of the surface tension
20 thereof.

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