Dec. 14, 1926. 1,611,080

O. ROTHENBERG

APPARATUS FOR EJECTING ATOMIZED LIQUIDS

Filed August 9, 1926 2 Sheets-Sheet 1

Fig. 5.

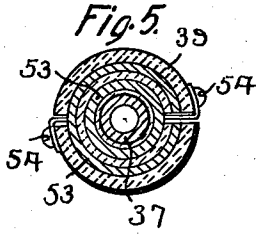


Fig. 1.

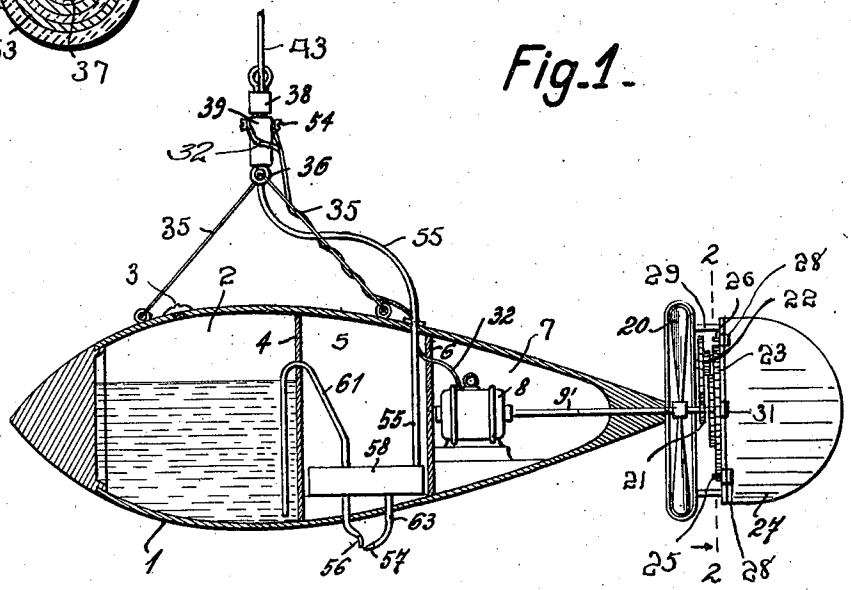
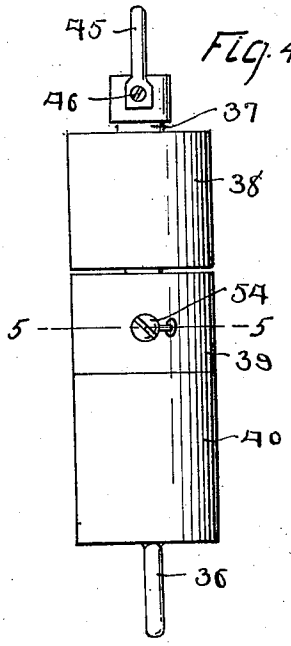


Fig. 4.



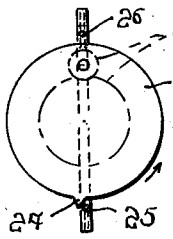


Fig. 2.

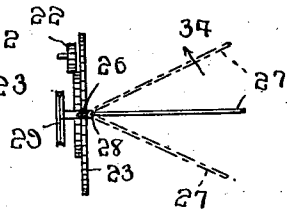


Fig. 3.

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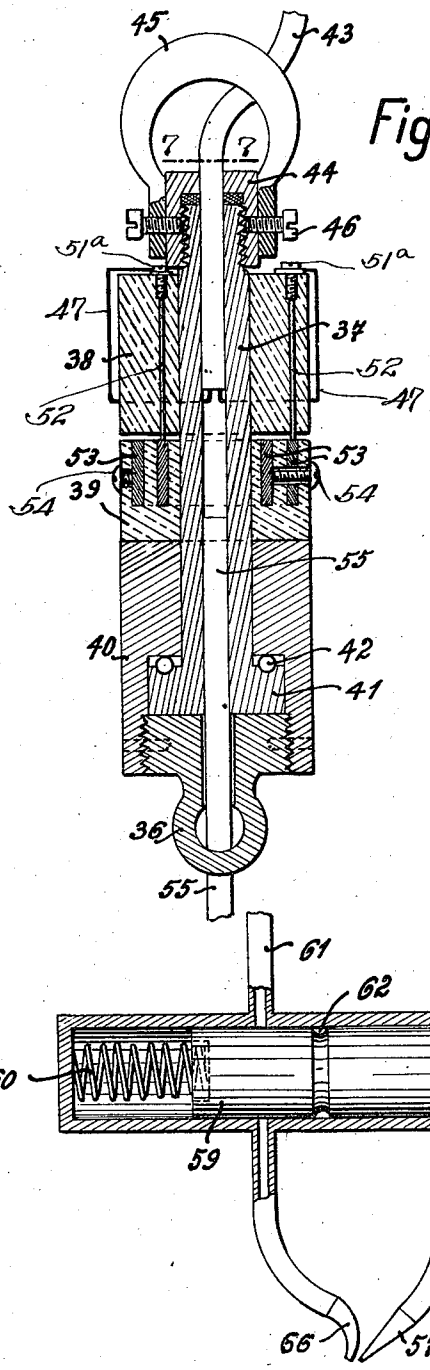


Fig.6.

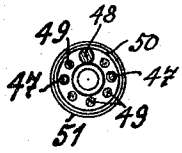


Fig.7.

Fig.8.

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UNITED STATES PATENT OFFICE.

OSKAR ROTHENBERG, OF BERLIN, GERMANY.

APPARATUS FOR EJECTING ATOMIZED LIQUIDS.

Application filed August 9, 1926, Serial No. 128,237, and in Germany March 2, 1925.

My invention relates to an apparatus for ejecting atomized liquids, particularly perfumes, and it is an object of my invention to provide an apparatus which will thoroughly distribute such atomized liquids in the ambient air.

To this end, I provide the apparatus—which may be suspended from a ceiling or the like—with means by which it is moved through the air.

It is another object of my invention to admix a gas or a gas mixture to the ejected atomized liquid, and, if desired, I may supply such gas or mixture under pressure and utilize its kinetic energy for atomizing and ejecting the liquid.

To this end, I provide a cord-like flexible tube, preferably combined with the cable or cables from which the apparatus is suspended, and I supply gas under pressure through such tube.

Preferably, the gas admixed is oxygen as by this the air is renewed and its vitiation is counteracted.

The object of my apparatus is first and foremost that of distributing atomized perfumes, to which oxygen or any other gas may be admixed as mentioned, this gas being under pressure if desired, in the air of rooms in which there are many persons, theaters, restaurants, etc. It is well known that in such rooms the air is gradually but uniformly vitiated.

In reducing my invention to practice, I enclose the liquid to be atomized—which will be referred to as "the perfume" but obviously may be any other liquid—in a tank in which or on which an engine, for instance, a motor, may be arranged for moving the apparatus through the ambient air. A motor is preferred because its current supply cables may readily be combined with the cables on which the apparatus is suspended, and do not interfere with its motion through the air.

In a preferred embodiment of my invention, the body of the apparatus is shaped like a torpedo or a bomb and encloses a liquid tank, a motor actuating the means for moving the apparatus through the ambient air.

A propeller may be provided for imparting motion to the body and an automatically controlled rudder may be arranged on the body for moving the body through the air on a comparatively irregular path so as to distribute the ejected perfume.

By ejecting oxygen from the apparatus as described its effect is much improved for the oxygen not only makes up for the oxygen consumed by the persons in the room but also, if under high pressure, reduces the temperature very considerably so that the development of heat in a room in which there are many persons, is efficiently counteracted.

The means for supplying oxygen must stand the high pressure of that gas without interfering with the motion of the body through the air. Oxygen is supplied through a flexible tube which is preferably inserted in the cable for supplying current to the motor. A rubber tube is inserted between the strands of the cable. The strands of the cable and a steel suspension wire are distributed around the tube. Strands of hemp or other material may be inserted in the spaces between the strands and the steel wire. A tape is wound around the combined cable and tube on the outside and held by strong thread. In this manner a unit is obtained which contains all parts required for the operation of the apparatus and possesses ample strength for supporting the body.

Means must be provided for permitting the body to turn to all sides notwithstanding the oxygen tube connected to the body at one end. To this end, a specially designed bearing is provided. The bearing comprises a hollow shaft the inside diameter of which is equal to the outside diameter of the flexible tube unit. One end of the unit is secured in one end of the shaft and the other end of the tube is secured in the other end of the shaft. The tube ends are inserted gas tight in the shaft but do not abut within its bore. Even if the two ends are not in very intimate contact with the wall of the bore this does not bring about leakage as the surfaces in contact are very long.

Two cylinders of insulating material are seated on the hollow shaft. The upper cylinder is secured on the shaft and the cable strands from the tube unit are inserted in the cylinder and project from its lower face. The lower cylinder is adapted to rotate about the hollow shaft and slip rings for the ends of the cable strands are inserted in the upper face of this rotary cylinder.

The upper end of the tube unit is inserted in a threaded end of the hollow shaft and held by a cap nut. A strong eye is secured to the upper end of the hollow shaft.

In order to atomize and eject the perfume by the jet of oxygen, a tube for the perfume is provided which opens at the bottom of the body in close vicinity to the end of the oxygen tube. The stream of oxygen which issues from the oxygen tube at high velocity atomizes the perfume from the perfume tube. However, to prevent continuous flowing out of the perfume from the tube after the supply of oxygen has been arrested, means must be provided for closing the perfume tube to prevent leakage of perfume after the oxygen supply has been shut off. The means are operated automatically under the influence of the oxygen pressure. The oxygen tube is connected to one end of a cylinder in which a piston is reciprocating against the action of a spring which tends to hold the piston in such a position that the perfume tube is closed. The pressure of the oxygen forces the piston back against the action of its spring and causes the perfume tube to be opened.

In the drawings, apparatus embodying my invention is illustrated by way of example.

Fig. 1 is a longitudinal sectional view of the apparatus.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a detail plan view illustrating the rudder and the means for operating it.

Fig. 4 is an elevation of a part of the suspending means for the main body.

Fig. 5 is a transverse section on the line 5—5 of Fig. 4.

Fig. 6 is a longitudinal section of Fig. 4.

Fig. 7 is a transverse section through the suspending cable on the line 7—7 of Fig. 6.

Fig. 8 is a detail section of the control valve forming part of the apparatus.

Referring now to the drawings, 1 is the hollow body of the apparatus which resembles a bomb or torpedo, 2 is the perfume chamber of the body, 3 is a filling plug for the chamber, 4 is a transverse partition at the rear end of the chamber 2, 6 is a partition at the rear of the partition 4 and providing an intermediate chamber 5, and 7 is a motor chamber at the tail end of the body 1, 8 is a motor in the chamber 7, 9′ is a rearward extension of the motor shaft which projects from the tail end of the body 1, 20 is a propeller on the outer end of the shaft 9′, 21 is a pinion on the shaft 9′ at the rear of the propeller 20, 22 is a reduction gear connected with the pinion, 23 is a disc operatively connected with the reduction gear, 24 is a dog on the disc and 25 and 26 are pins on the trunnions 28, 28 of a rudder 27 which is carried on a cage 29 surrounding the propeller 20. 31 is a bearing for the shaft of the disc 23 in the cage 29. The dog 24 alternately engages the pins 25 and 26 of the trunnions 28.

Rotation of the motor 8 causes the propeller 20 to rotate and to exert a forward thrust on the body 1. At the same time, the disc 23 is rotated by its reduction gear 21, 22 and, at each half rotation—which, due to the considerable ratio of the reduction gear, is performed in a comparatively long time,—at first, as indicated in Figs. 2 and 3, the dog 24 strikes the lower pin 25 of the rudder 27 and causes the rudder to swivel in the direction of the arrow 34, Fig. 3. As soon as the dog 24 strikes the upper pin 26 of the rudder the rudder is swung out in opposite direction and the body now turns to the left under the combined action of the propeller and the rudder 27. In this manner the body 1 is caused to move continuously along varying curves and distributes the perfume over a large area.

35 is a sling of strong steel wire by which the body 1 is suspended from an eye 36 of a bearing 38, 39, 40 which connects the strands of the current supply cable and a flexible tube 43, 55 for supplying oxygen to the body, with the latter.

Referring now to Figs. 4 to 6, a hollow shaft 37 is inserted in two insulating cylinders 38 and 39. 40 is a metal cylinder secured to the insulator 39 and on which the eye 36 is formed or secured. 41 is a flange at the lower end of the shaft 37 and 42 is a ball bearing on the upper face of the flange on which the metal cylinder 40 is carried. 43 is the upper end of a flexible oxygen tube and cable unit which is tightly fitted into the bore of the hollow shaft 37 and is held by a cap nut 44. An eye or hook 45 is secured to the cap nut by trunnions 46 and a sling 35 passed through an eye 36 supports the body 1.

Fig. 7 shows the section of the tube and cable unit. 47 are the strands of the cable which are distributed about the tube, 48 is a steel wire absorbing the greater part of the load on the cable, 49 are cords of hemp or the like which may be inserted between the strands 47 and the wire 48. 51 is a wrapper of tape surrounding the unit and 50 is a layer of strong thread wound about the tape. The unit is slung in the eye 45 and thus supports the apparatus.

The strands 47 are conducted out of the tube unit and to binding posts 51^a on the upper face of the insulator 38 as shown in Fig. 6. Strands 52 are inserted in the insulator 38 and extend downwards to concentric slip rings 53 in the insulator 39. 54 are binding posts on the outside of the insulator 39, to which are connected cables 32 along the sling 35. The lower end of the oxygen pipe 55 is fitted tightly into the bore of the hollow shaft 37.

Referring now to Fig. 8, 58 is a cylinder arranged in a suitable position in the body 1, 61 is a pipe supplying perfume to the cyl-

inder at a point intermediate its ends, 59 is a piston having a circumferential groove 62 and adapted to reciprocate in the cylinder against the action of a spring 60, 57 is an oxygen nozzle connected to the cylinder at a point swept by the piston, and 66 is the corresponding perfume nozzle. The latter nozzle is diametrically opposite the tube 61. Oxygen enters the cylinder through the tube 55 at its right-hand end, forcing back the piston and causing the groove 62 in the piston to register with the perfume pipe 61 and the perfume nozzle 66 and uncovering the passage through the nozzle 57. Perfume now flows from the nozzle 66 and is atomized by the jet of oxygen from the nozzle 57.

In the position illustrated the piston blocks both nozzles 66 and 57 and prevents leakage of perfume from the nozzle 66.

It will be understood that in this manner oxygen under high pressure is supplied to the body 1 without interfering with its motions as the lower end 39, 40 of the bearing is perfectly free to turn on the hollow shaft 37 with the body and the sling 35 and the tube 55.

I claim:

1. An apparatus for ejecting atomized liquids comprising a body defining a liquid chamber, an atomizing ejector adapted to eject liquid from said chamber, means for imparting motion to said body, cord-like means for suspending said body from a support, said suspending means permitting universal movement of said body under the influence of the motion imparting means.

2. Apparatus for ejecting atomized liquids comprising a body refining a liquid chamber suspending means for said body, an atomizing ejector adapted to eject liquid from said chamber, a motor, a propeller mounted on said body and operatively connected to said motor, a rudder trunnioned to said body, and means operatively connected with said motor for alternately rocking said rudder in opposite directions.

3. Apparatus for ejecting atomized liquids comprising a body defining a liquid chamber, suspending means for said body, an atomizing ejector adapted to eject liquid from said chamber, a motor, a propeller mounted on said body and operatively connected to said motor, a rudder trunnioned to said body, a plate carried on said body and adapted to be rotated by said motor, and a dog on said plate adapted to engage alternately the trunnions of said rudder so as to rock it in opposite directions.

4. Apparatus for ejecting atomized liquids comprising a body defining a liquid chamber, means for suspending said body, an atomizing ejector adapted to eject liquid from said body and arranged on said body, a motor, a current supplying cable for said motor, and a tube for supplying gas under pressure to said ejector, said cable and said tube being both combined with said suspending means, and means operatively connected with said motor for imparting motion to said body.

5. Apparatus for ejecting atomized liquids comprising a body defining a liquid chamber, means for suspending said body, an atomizing ejector adapted to eject liquid from said chamber and arranged in said body, a motor, a current supplying cable for said motor, and a tube for supplying gas under pressure to said ejector, said cable and said tube being both combined with said suspending means, so that said tube constitutes the core of said cable and said suspending means, a tape wound about said cable and suspending means on the outside, thread wound about said tape, and means operatively connected with said motor for imparting motion to said body.

6. Apparatus for ejecting atomized liquids comprising a body defining a liquid chamber, means for suspending said body, an atomizing ejector adapted to eject liquid from said chamber, a hollow shaft secured to said means, a gas tube for supplying gas to said ejector inserted in one end of said shaft, a gas tube connected to said ejector and inserted in the other end of said shaft, a motor in said body, a current supplying cable for said motor, an insulating block secured on said hollow shaft and supporting binding posts for said cable, a rotary insulating block also secured on said hollow shaft and provided with slip rings for the ends of the cable in said first-named insulating block and connected with binding posts, cables connecting said last-named binding posts with said motor, and means operatively connected with said motor for imparting motion to said body.

In testimony whereof, I have signed my name to this specification.

OSKAR ROTHENBERG.