July 10, 1962 R. DILIONE 3,042,981

ATOMIZER

Filed June 23, 1959

FIG.1.

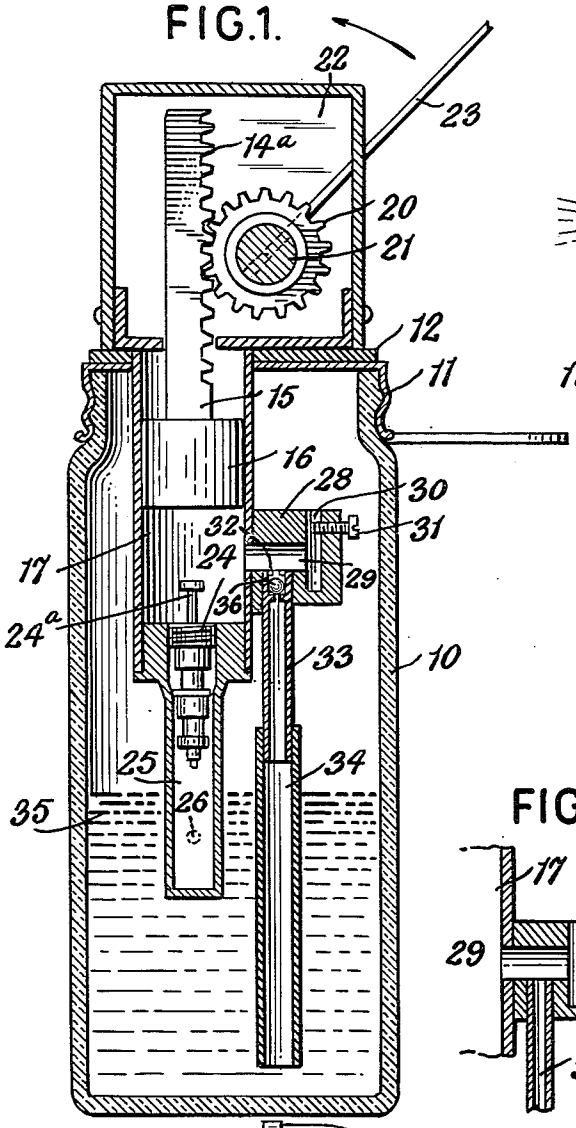


FIG.2.

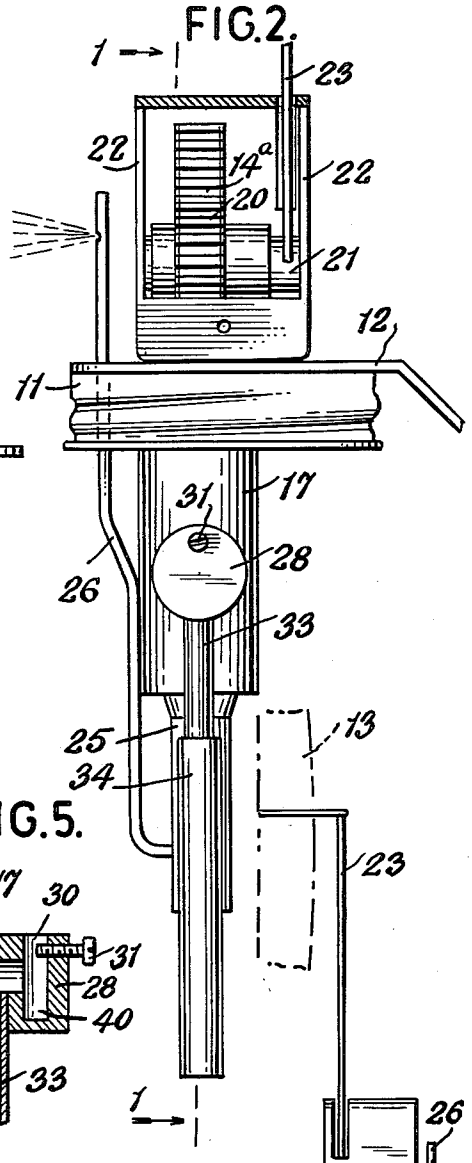


FIG.5.

FIG.3.

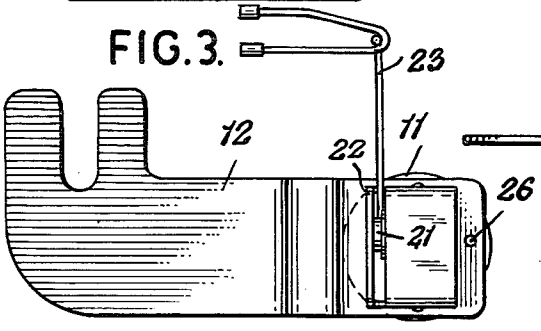


FIG.4.

INVENTOR.
ROCCO DILIONE
BY Erwin G. Yaeger
Attorney

United States Patent Office 3,042,981 Patented July 10, 1962

3,042,981

ATOMIZER

Rocco Dilione, 4410 NE. 16th Ave., Fort Lauderdale, Fla.

Filed June 23, 1959, Ser. No. 822,393
3 Claims. (Cl. 21—77)

This invention relates to deodorizing and disinfecting devices and more particularly to such devices used in connection with toilet seats and doors which are adapted to be operated whenever the seat is lowered or whenever the door is closed.

Disinfecting and deodorizing devices for use in toilets which operate by lowering the toilet seat cover or closing the door are not new in the art. While there exists a great need for such a device, none however seem to be available commercially which give satisfactory service or which atomize the liquid disinfectant and deodorizing material into the room to purify the surrounding air.

This invention has as an object to provide an improved device dapted to be automatically operated by the swinging of a movable member which will deodorize and disinfect the air in the room.

It is a further object of my invention to provide a device of the kind described which shall be simple in construction, certain in its operation, durable, and not liable to get out of order.

It is a still further object of my invention to provide a deodorizing and disinfecting device arranged to be operated by the movement of the toilet seat cover or a door whereby a liquid can be atomized into the air in an efficient manner so as to provide the deodorization and disinfection thereof.

Other objects and advantages of my invention will be apparent as it is better understood from the following description, which when considered in connection with the accompanying drawings illustrates a preferred embodiment thereof.

The foregoing objects are accomplished by placing the following described elements in combination: a reservoir containing a liquid; a piston cylinder positioned therein and fitted with a piston and piston rod slidably mounted therein and adapted to be reciprocated by the swinging of a movable member; an air-liquid mixing chamber which connects into said piston cylinder postioned so that the top thereof is below the bottom of the piston when the piston is fully raised; a liquid intake, one end of which is submerged into the liquid, the other end connected into the air-liquid mixing chamber, said liquid intake having means for maintaining the liquid in the liquid intake at all times; an air intake connecting into said air-liquid mixing chamber and having means for regulating the quantity of air to be admitted into the air-liquid mixing chamber on each stroke of the piston; an expansion chamber connected to the piston cylinder through a sealed spring-loaded valve, the stem thereof being so positioned that when the piston is substantially in its most compressed position the piston is in contact with the valve stem which spontaneously opens the valve, permitting the release of the compressed air-liquid mixture from the piston cylinder and when out of contact with the valve stem the valve is closed so as to seal off the high pressure cylinder from the piston cylinder; and, means through which the compressed air-liquid mixture is discharged from the expansion chamber and atomized into the surrounding atmosphere.

The accompanying drawings illustrate a preferred embodiment of my invention.

FIG. 1 is a vertical sectional view through the device, the view being taken substantially on the line 1—1 of FIG. 2, looking in the direction of the arrows;

FIG. 2 is a view at right angles to that of FIG. 1, with a portion shown in section; and with the fluid holder omitted;

FIG. 3 is a top plan view, on a reduced scale of the device;

FIG. 4 is a front elevational view of the structure of FIG. 3, and

FIG. 5 is a detail view, showing a modified construction in which the check valve is eliminated.

Referring to FIGURE 1 of the drawings, my improved device will be seen to comprise a glass liquid reservoir **10**, which may contain the deodorizing and disinfecting material **35** to be used for purifying the surrounding atmosphere. The liquid reservoir is provided with a screw cap **11** which may be screwed on to the top of the liquid reservoir **10**. Fastened to the upper side of the screw cap **11** of the reservoir **10** is a support plate **12** (FIG. 3), which plate is provided with the necessary appurtenances for fastening to a toilet seat cover **13** (FIG. 4) of the seat assembly. The screw cover **11** and plate **12** each have a hole through the center of sufficient size to permit a piston rod **15** to pass therethrough, yet fitting tightly enough to maintain alignment of the piston rod **15** in a vertical position.

A piston of the pump type **16** is positioned in a cylinder **17** within which the piston is reciprocated. The piston fits tightly, but slidably, against the piston cylinder walls. The piston rod **15** moves up or down in the piston cylinder **17** by means of a rack **14***a* cut into the upper end of the piston rod **15**, the teeth of said rack engaging in a pinion gear **20**. The pinion gear **20** is mounted on a shaft **21**, which shaft is supported by two shaft supports **22** (FIG. 2) one on either side of the pinion gear **20**, which supports are mounted on plate **12**. The shaft **21** is rotated by means of a crank **23** which is fastened to the toilet seat cover **13** (FIG. 4) of the seat assembly, so that when the toilet seat cover is lowered the piston travels in a downward direction and when the toilet seat cover is raised the piston travels in an upward direction.

Positioned at the bottom of the piston cylinder **17** and fastened thereto through a valve arrangement **24** is an expansion chamber **25**. The valve **24** is so arranged that the valve stem **24***a* thereof is normally in a closed position and opens only when the stem **24***a* of the valve **24** is in contact with the bottom of the piston **16**. Connected to the bottom of the expansion chamber **25** is a discharge line **26** (FIG. 2) which extends through the screw cap **11** and discharges into the atmosphere.

Fastened into the wall of the piston cylinder **17** is a block **28**. Drilled into the block **28** is an air-liquid mixing chamber **29**, one end of which opens into the piston cylinder **17**. Air is admitted into the air-liquid mixing chamber **29** through air inlet **30**, the amount of air being controlled by means of air regulator screw **31**.

The deodorizing and disinfecting liquid **35** contained in the liquid reservoir **10** is admitted into the air-liquid mixing chamber **29** through an opening **32**, into which is fitted a metal sleeve **33**, and attached to the sleeve at one end is a section of tubing **34**, the other end of which tubing extends at all times into the deodorizing and disinfecting liquid **35**. In order to feed a uniform amount of deodorizing and disinfecting liquid **35** into the piston cylinder **17** on each stroke of the piston a check valve in the form of a metal ball **36** is placed on top of the metal sleeve **33**, so that when the piston cylinder **17** is at substantially atmospheric pressure the ball is seated on the rim of the metal sleeve **33** and thus at all times liquid is maintained in the tubing **34** and the metal sleeve **33**. When the pressure in the piston cylinder **17** is less than atmospheric pressure and the piston is raised to a position just above the inlet of the air-liquid mixing chamber, the suction so created raises the metal ball **36** off its seat and sucks liquid and air into the air-liquid mixing chamber **29**, which liquid is then admitted into the piston cylinder **17**, thus plac-

ing the piston cylinder 17 under substantially atmospheric pressure.

FIGURE 5 shows an alternate means for regulating the amount of liquid being admitted into the air-liquid chamber on each stroke of the piston. Liquid 35 is sucked up the tube 33 into the air-liquid mixing chamber 29, the amount entering the air-liquid mixing chamber depending upon the height of the liquid 35 in the reservoir 10, the excess amount thereof flowing into the overflow reservoir 40.

My invention operates in the following manner. The deodorizing and disinfecting liquid 35 to be used is placed in the reservoir 10, the liquid level of which is substantially above the bottom of the liquid intake 34. This may be done by either removing the cover 11 from the reservoir 10 or by admitting liquid through an opening in the cover 11. The crank 23 of my device is then fastened to the toilet seat cover 13 of the seat assembly or to a swinging door in such a manner that as the door closes or the seat cover 13 is lowered the piston 16 moves in a downward direction and as the seat cover 13 is raised or the door is opened the piston 16 moves in an upward direction. Some slight adjustment may be necessary in placing the crank so that the piston 16 is completely depressed at the time the seat cover 13 is fully lowered or the door is closed, but such an adjustment will be readily apparent to those skilled in the art. As the crank 23 moves radially it turns the shaft 21 so that the piston is raised, thus creating a vacuum in the piston cylinder 17 until the bottom of the piston is opposite the air-liquid intake 29, at which time the suction raises the ball float 36 off its seat and admits liquid 35 into the air-liquid mixing chamber 29. Simultaneously air is sucked into the air-liquid mixing chamber 29 through the air intake line 30.

Once the piston 16 has been raised above the bottom of the air-liquid mixing chamber 29 the pressure in the piston cylinder 17. returns to substantially atmospheric pressure by the admission of the air-liquid mixture. The amount of liquid 35 entering the piston chamber 17 is controlled through the ball 36, so that on each stroke of the piston a constant amount of the liquid 35 will be admitted into the air-liquid mixing chamber 29. Prior to the incorporation of the check valve arrangement in the liquid intake 33 it was impossible to accurately control the amount of liquid 35 being admitted into the piston cylinder 17. With the toilet seat cover 13 fully raised or the door open, the pressure of the air-liquid mixture in the piston cylinder 17 will be the same as that of the surrounding atmosphere. With the beginning of the lowering of the seat cover 13 or the closing of the door the crank 23 which is securely fastened to the shaft 21 causes the shaft to rotate, which in turn lowers the piston 16 through the gear arrangement 21 shown. As the piston 16 is lowered it compresses the air-liquid mixture in the piston cylinder 17 until the bottom of the piston 16 comes in contact with the stem 24*a* of the spring-loaded valve 24. Pressures in the piston cylinder 17 up to four pounds per square inch gauge have been developed in the cylinder just prior to the opening of the valve 24. As the piston 16 continues rapidly in its downward movement and presses against the valve stem 24*a* the valve 24 opens and the compressed air-liquid mixture is then spontaneously released into the expansion chamber 25, which material then escapes through the discharge line 26 into the surrounding atmosphere, deodorizing and disinfecting the same.

It is to be understood that my invention is capable of various modifications and I do not desire to be limited to the exact construction shown and developed.

I claim as my invention:

1. A deodorizing device comprising in combination a reservoir containing a liquid deodorant; a piston cylinder fitted with a piston and piston rod adapted to be reciprocated in the piston cylinder by the swinging of a hinged movable member; an air-liquid mixing chamber which connects into said piston cylinder; a liquid intake, one end of which is submerged into the said deodorizing liquid, the other end of which connects into the air-liquid mixing chamber; an air intake connecting into said air-liquid mixing chamber; and an expansion chamber, one end of which exhausts to the atmosphere and the other end of which is connected to the piston cylinder through a sealed mechanism, the seal normally being maintained, except at the point of maximum compression of the air-liquid mixture.

2. A deodorizing device comprising in combination a reservoir containing a liquid deodorant; a piston cylinder fitted with a piston and piston rod adapted to be reciprocated in said piston cylinder by the swinging of a hinged movable member; an air-liquid mixing chamber which connects into said piston cylinder so that the inlet thereof is below the bottom of the piston when the piston is fully extended at one end of its stroke; a liquid intake, one end of which is submerged into the deodorizing liquid, the other end of which connects into the air-liquid mixing chamber, said liquid intake having means for maintaining liquid deodorant therein at all times; an air intake connecting into said air-liquid mixing chamber having means for regulating the quantity of air to be admitted into said air-liquid mixing chamber; and an expansion chamber, one end of which exhausts to the atmosphere, the other end of which is connected to the piston cylinder through a sealed valve arrangement, the seal normally being maintained except at the point of maximum compression of the air-liquid mixture.

3. A disinfecting device comprising in combination a reservoir containing a liquid disinfectant; a piston cylinder fitted with a piston and piston rod adapted to be reciprocated in the piston cylinder through the swinging of a hinged movable member; an air-liquid mixing chamber which connects into said piston cylinder, positioned so that the inlet thereof is below the bottom of the piston when the piston is fully extended at one end of its stroke; an air-liquid mixing chamber which connects into said piston cylinder; a liquid intake, one end of which is submerged into the said disinfectant, the other end of which connects into the air-liquid mixing chamber, said liquid intake having positioned therein a liquid overflow reservoir; an air intake connecting into said air-liquid mixing chamber and having means for regulating the quantity of air to be admitted into said air mixing chamber; and an expansion chamber, one end of which exhausts to the atmosphere, the other end of which is connected to the piston cylinder through a sealed valve having a valve stem which protrudes into said piston cylinder, the seal normally being maintained and broken only when the piston comes into contact with the valve stem.

References Cited in the file of this patent

UNITED STATES PATENTS

1,149,343	Coleman	June 21, 1915
1,403,140	Wiggins	Jan. 10, 1922
2,534,465	Marini	Dec. 19, 1950

FOREIGN PATENTS

198,181	Canada	Mar. 16, 1920