June 26, 1951 R. R. TRAVIS 2,558,469

DEODORIZER

Filed July 8, 1946

FIG. 1.

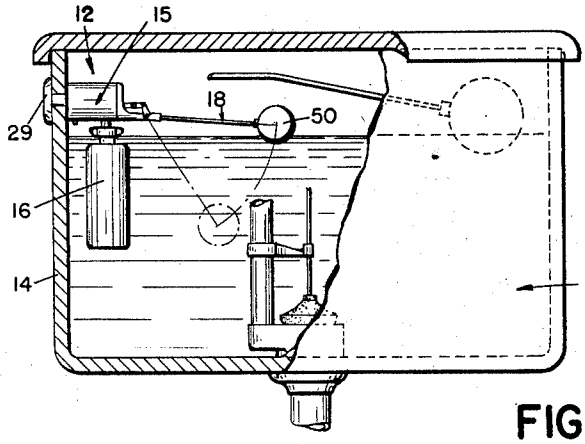


FIG. 6.

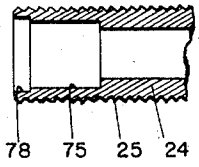


FIG. 2.

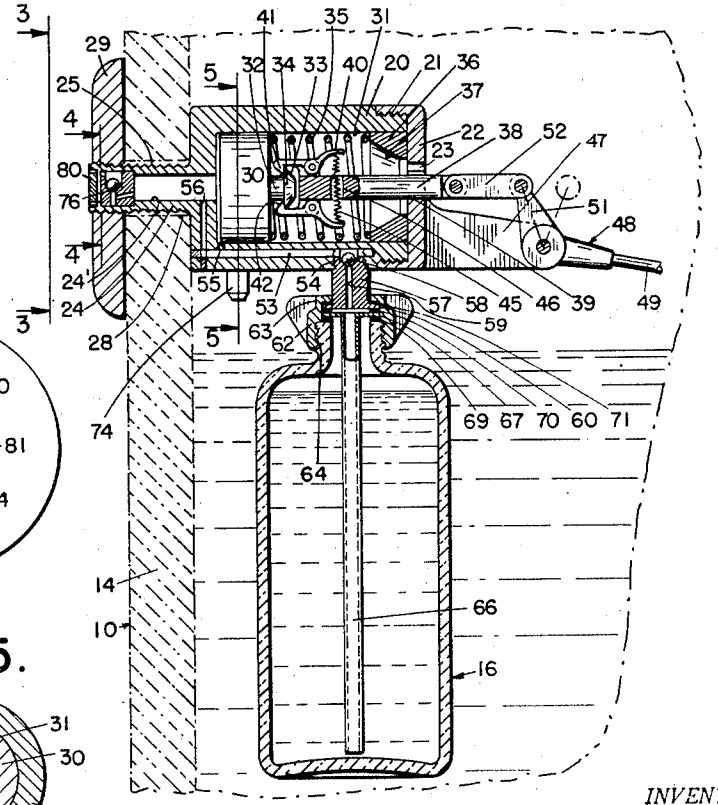


FIG. 4.

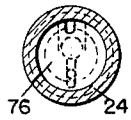


FIG. 3.

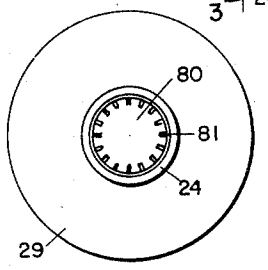
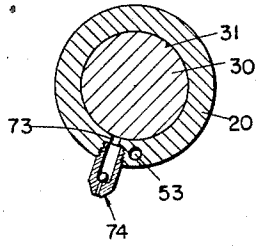


FIG. 5.



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DEODORIZER

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3 Claims. (Cl. 4—228)

1

This invention relates generally to atomizers and particularly to atomizing devices for use mounted in the tank of the ordinary toilet for projecting a spray of disinfectant or deodorant into the air periodically.

I am aware that atomizers have been used in connection with toilets for the purpose of spraying a quantity of deodorant or disinfectant into the air at the time the toilet is flushed. Various means have been used for actuating these devices but so far as I am aware the devices heretofore used have had several disadvantages.

One disadvantage common to several devices is the fact that they are dependant upon the force exerted by the rise or fall of the level of the water in the tank. In the operation of such atomizing devices it is not always possible to secure a strong enough force of air to obtain the desired degree of atomization. Other devices are cumbersome and difficult to mount out of sight, as within the tank. In some cases devices have been mounted exteriorly of the tank, but these are objectionable both from the standpoint of appearance and the fact that they are usually manipulated by a person either directly or by manipulation of the lever or pull chain used for flushing the toilet.

It is a primary object of this invention to provide novel means particularly adapted for mounting in the tank of the ordinary toilet for spraying a desired quantity of deodorant or disinfectant into the room at the time the toilet is flushed. In this connection, it is a particular object to provide a device which is actuated by the lowering of the liquid level in the tank but is not dependent upon the water in the tank for supplying the force to operate the atomizer device.

It is a further object of the invention to provide a device of the type indicated which gives a positive, quick spraying action independently of the rate of rise or fall of the water in the tank of the toilet.

It is also an object to provide a device which may be regulated to vary the relative proportions of air or liquid deodorant or disinfectant in the spray.

It is a particular object of the invention to provide a device of the type indicated which may be readily mounted in the ordinary type of tank of a toilet and which, when mounted therein, will spray into the room in a desired direction.

It is also an object to provide an atomizing device which is inherently suitable for use in

2

various installations and is not limited to the particular use for which it is illustrated and described herein.

These and other objects will appear from the following description and the drawing. Referring to the drawing, which is for illustrative purposes only:

Fig. 1 is an elevational view of the tank of a toilet broken away to show a part thereof in section and to show a device embodying the invention mounted therein;

Fig. 2 is an enlarged sectional view of the device shown in Fig. 1;

Fig. 3 is an end elevation on line 3—3 of Fig. 2;

Fig. 4 is a cross section on line 4—4 of Fig. 2;

Fig. 5 is a cross section on line 5—5 of Fig. 2; and

Fig. 6 is an enlarged fragmentary longitudinal section of the outer end of the device.

More particularly describing the invention, reference numeral 10 generally indicates the tank of a toilet. The device of the invention is generally indicated by numeral 12 and is shown mounted within the tank supported by and extending through the end wall 14 of the tank. The atomizing device includes an atomizing mechanism 15, a container 16 for holding a supply of deodorant or disinfectant or other suitable liquid, and a float operating mechanism generally indicated by numeral 18.

Referring particularly to Figs. 2–6 for a more detailed description of the device, the atomizing mechanism 15 consists of a housing made up, in the form of the invention shown, of a cylindrical member 20 which is threaded at 21 to receive an end closure or cap 22 which is correspondingly threaded and which is apertured at 23. The member 20 has an elongated tubular extension or nipple 24 which is provided with external screw threads 25.

In installing the device in the tank, a suitable hole 28 is provided in the wall 14 of the tank and the nipple 24 passed therethrough, leaving a portion thereof projecting externally of the tank. A retaining plate 29 adapted to thread on the nipple is screwed thereon to the position in which it is shown in the drawing and the parts are then held securely mounted in place.

A piston 30 is positioned in bore 31 of the member 20. This piston is provided with a headed projection 32 having a tapered surface 33 and an annular shoulder 34. A spring 35 is provided for yieldably holding the piston in the position in which it is shown in Fig. 2. The

outer end of this spring abuts against a ring 36 which is provided with a tapered frusto-conical cam face 37 for a purpose which will be described later.

In order to operate the piston, a stem 38 is slidably mounted in a bore 39 in the cap 22 and is provided at its inner end with a pair of pivotally mounted fingers 40. The arms have hooked projections 41 at their inner ends shaped to engage the inner side or shoulder 34 of the headed projection 32 of the piston. Preferably the inner ends of the projections 41 on the fingers are tapered, as indicated by the numeral 42, in order to provide a cam surface which will engage the tapered surface 33 on the head of the stud of the piston so that the projections may be expanded over into the position in which they are shown in the drawing. The outer or rear ends of the fingers diverge relatively to each other and are yieldably held apart by means of a compression spring 45 which, in the form shown, passes through an opening 46 in the stem.

The inner end of the member 20 is provided with an arm 47 on which is pivotally mounted a bell crank lever 48 having a long arm 49 carrying a float 50 at its outer end. The short arm 51 is pivotally connected to a link 52 which in turn is pivotally connected to the stem 38.

The housing 20 is provided with a liquid passageway 53 which leads from a threaded bore 54 to a port 55 at the inner end of bore 31 and to a second port 56 communicating with the passageway 24' through the nipple 24. The portion of the passageway 53 between ports 55 and 56 is in reality a suction passageway during the forward motion of the piston, as will be explained later.

Mounted in the threaded bore 54 is a fitting 57 to which is attached the container 16 adapted to hold a quantity of liquid to be sprayed. The fitting 57 contains a ball check valve of ordinary construction indicated at 58 which controls the passageway 59 extending through the fitting. This valve permits flow of fluid in a direction from the container to the inside of the housing 20, but prevents return flow.

In the form of the invention shown, the fitting 57 is provided with a flange 60 so that a coupling element 62 having a flanged upper end 63 may be mounted thereon. The coupling element 62 is internally threaded at 64 to screw onto the upper end of the container 16, as shown. A suction tube 66 extending to the bottom of the container is provided and this tube has a flange 67 at its upper end so that the same may be secured and held in place by the coupling element 62 when the same is screwed onto the container. Suitable gaskets 69, 70 and 71 are provided between the parts to effect a seal.

The housing 20 is also provided with an air inlet passage 73 which is internally threaded to accommodate a check valve generally indicated by numeral 74. It is to be noted that the passageway 73 is located farther from the inner end of the bore 31 than the liquid inlet port 55 so that in the operation of the device air is not immediately drawn into the cylinder, as will be explained later.

At its outer end the nipple 24 is provided with a counterbore 75 in which is mounted a check valve 76. Outwardly of the bore 75 is a second counterbore 78 which is adapted to accommodate an atomizing disc 80 which may be secured in the bore by a press fit. The atomizing disc 80 is provided with a plurality of longitudinal grooves 81 at its periphery, as shown in Fig. 3.

In the operation of the device, assuming the parts are in the position in which they are shown in the drawing, upon the toilet being flushed the water level in the tank drops, thereby permitting the float 50 to fall, as indicated by the broken line position thereof in Fig. 1. In this connection it is to be pointed out that the float should preferably be weighted so that it will just barely float in water in order to insure sufficient weight thereof to operate the piston against the force of the spring 35. One way of accomplishing this is to partially fill the float with water.

As the float drops the piston 30 is pulled from the position in which it is shown in Fig. 2 toward the opposite end of the bore 31 through the lever and linkage system heretofore described. During its movement the piston creates a partial vacuum behind it, the effect of which is to immediately draw in a quantity of liquid through the passageway 53 and port 55 from the container. After the piston has moved a sufficient distance to uncover the air inlet opening 73, air is drawn in during the remainder of the stroke of the piston. The position of the air inlet thus determines the amount of liquid that will be drawn into the cylinder and the location of the air inlet may be varied in different models of the device to accomplish the desired results with the materials being used.

When the piston and its associated operating mechanism has moved sufficiently far to the right, the outer ends of the fingers 40 strike the cam surface 37 of the ring 36 and through the interaction of the parts, the outer ends of the fingers are forced inwardly, causing the opposite ends of the projections 41 thereon to become disengaged from the headed projection of the piston. When this occurs, the energy stored in the compressed spring 35 immediately, quickly and forcibly returns the piston to its original position, as shown in Fig. 2. During the return or forward stroke of the piston, the air in the housing, and also any entrapped liquid, is forced out through the nipple 24 and the check valve 76 and through the passages 81 in the plate 80, the mixture being atomized by passage through the restricted passages 81 in the disc. The expelled air passing through the nipple creates a suction at the port 56 so that liquid is drawn through the port into the air stream. This construction causes removal of liquid from the bottom of the cylinder, insuring that the liquid deodorant or disinfectant drawn into the cylinder on the suction stroke of the piston is expelled on the return stroke. During the forward stroke of the piston the check valve 74 prevents escape of the mixture through the air inlet 73, while the check valve 58 located in the fitting 57 prevents escape of the mixture into the container 16. During the intake stroke of the piston, the check valve 76, of course, prevents air being drawn in through the nipple 24.

Although the invention has been shown and described with reference to a particular type of installation, it is contemplated that various changes and modifications may be made not only in the installation but in the details of construction of the atomizing device itself, and it is intended to cover such changes and modifications as come within the spirit of the claims.

I claim:

1. In an atomizing device, a cylinder having an inlet and an outlet, a piston in said cylinder, said piston having a headed projection at the end thereof farthest removed from said outlet, com-

pression spring means between said piston and the end of said cylinder farthest removed from said outlet, an elongated member slidably mounted in said mentioned end of said cylinder for movement longitudinally of said cylinder, a spring urged catch on the inner end of said elongated member adapted to releasably engage the headed projection on said piston, and cooperating cam surfaces for releasing said catch from said piston at a predetermined point of travel of said piston away from said outlet, one of said surfaces extending radially inward from the wall of the cylinder and another of said surfaces being on said catch.

2. In an atomizing device for use as described, a housing having a cylindrical chamber therein, having a fluid inlet and a fluid outlet, a piston in said cylinder, a compression spring urging said piston toward said outlet, piston actuating means including a stem extending through an end of said housing for releasable attachment to said piston whereby said piston may be moved against said spring, means for automatically disengaging said piston actuating means from said piston when said piston has moved a predetermined distance under the influence of said actuating means including interengaging means on said stem and said housing, and means for operably moving said piston actuating means including a weighted float lever operatively associated with said stem adapted to be supported by water in a toilet tank.

3. In an atomizing device, a housing providing

a cylindrical bore and an outlet passage of less diameter than said bore and extending from one end of said bore, said housing having a liquid inlet passage terminating in an inlet port at the lower periphery of said bore adjacent the end communicating with said outlet passage and having a suction passage leading from said inlet port to a suction port located in said outlet passage, a piston in said bore, and means for operating said piston.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
24,363	Hartzler	July 26, 1859
708,897	Meals	Sept. 9, 1902
726,069	Josse	Apr. 21, 1903
1,300,014	Ranson et al.	Apr. 8, 1919
1,342,338	Main	June 1, 1920
1,489,452	Napolis et al.	Apr. 8, 1924
1,976,903	Tear	Oct. 16, 1934
2,067,601	Dobkin	Jan. 12, 1937
2,217,191	Thernell	Aug. 16, 1938
2,269,901	Bletcher et al.	Jan. 13, 1942

FOREIGN PATENTS

Number	Country	Date
159,716	Great Britain	Mar. 10, 1921
683,523	Germany	Oct. 19, 1939