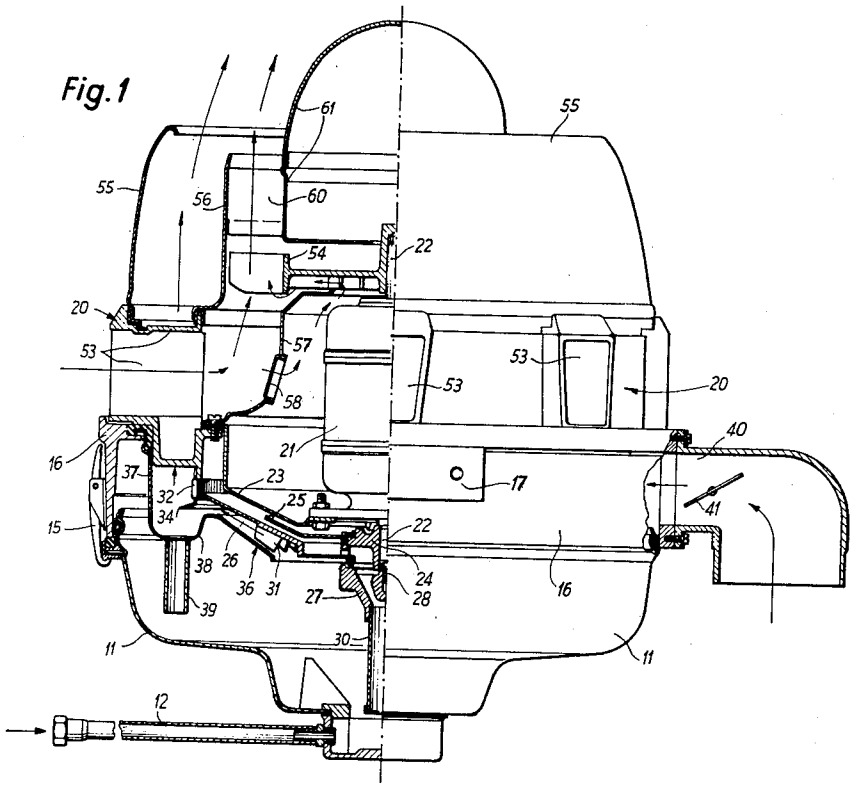
July 17, 1962 K. FLURY 3,044,752

LIQUID ATOMIZER

Filed April 1, 1959 3 Sheets-Sheet 1

Fig.1



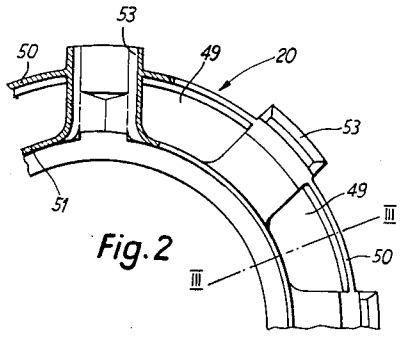
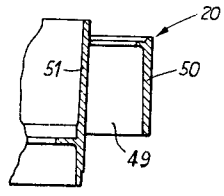


Fig.2

Fig.3



Inventor
Karl Flury

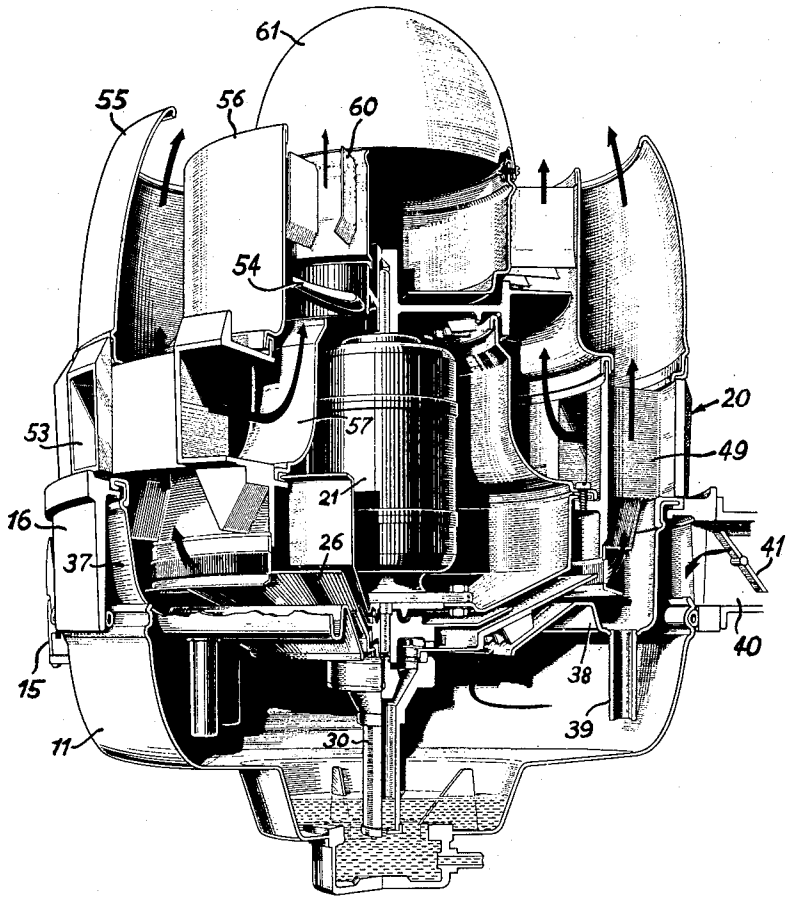
By
Watson, Cole, Grindle & Watson
Attys.

July 17, 1962 K. FLURY 3,044,752

LIQUID ATOMIZER

Filed April 1, 1959 3 Sheets-Sheet 2

Fig. 4



Inventor
Karl Flury

By
Watson, Cole, Grindle & Watson
Attys.

July 17, 1962 K. FLURY 3,044,752

LIQUID ATOMIZER

Filed April 1, 1959 3 Sheets-Sheet 3

Fig. 5

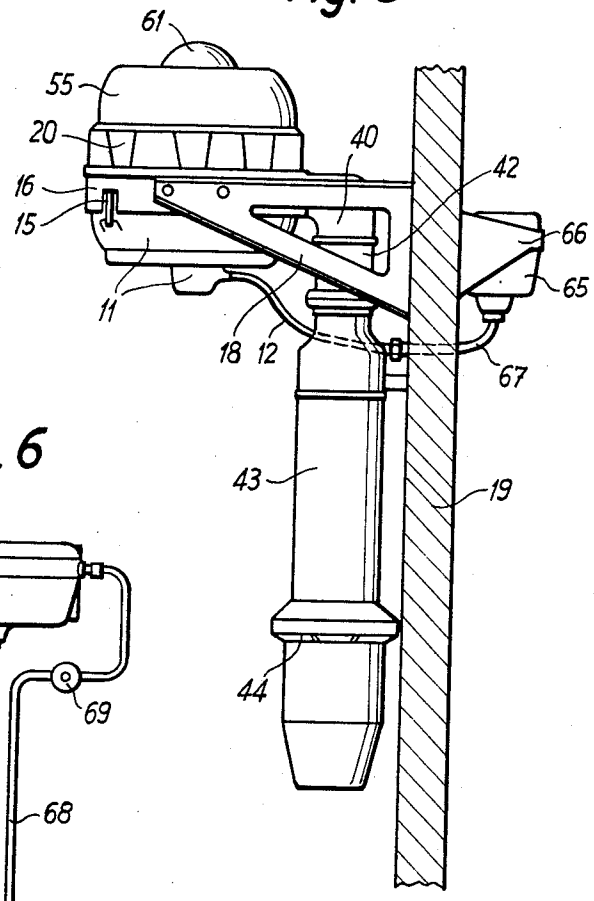
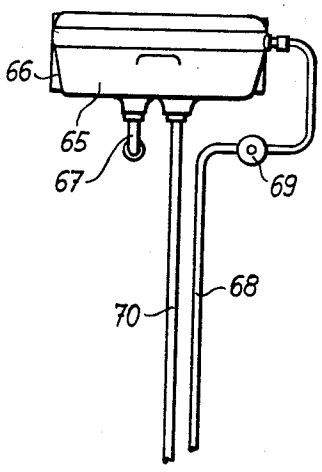


Fig. 6



Inventor
Karl Flury
By
Watson, Cole, Grindle & Watson
Attys.

United States Patent Office

3,044,752

Patented July 17, 1962

3,044,752

LIQUID ATOMIZER

Karl Flury, Adliswil, Zurich, Switzerland, assignor to Defensor AG., Zurich, Switzerland

Filed Apr. 1, 1959, Ser. No. 803,395
Claims priority, application Switzerland Apr. 12, 1958
2 Claims. (Cl. 261—29)

The present invention relates to a liquid atomizer having motor-driven rotary members arranged within a casing for throwing out a liquid by means of at least one centrifugal disk against a ported atomizer rim and for producing a primary and a secondary air stream, the primary one entering the lower part of the casing sweeps past the atomizer rim to carry along the mist droplets formed there, the secondary one entering direct the upper part of the casing to be subsequently mixed with the mist-containing primary air stream.

In prior art liquid atomizers of the type, mixing of the mist-containing primary air with the secondary air takes place within the upper casing part, whereupon the two air streams together with the mist are thrown out through an outlet at the top of the atomizer casing. This design is objectionable insofar as dust particles brought into the atomizer with the secondary air are moistened by the mist within the atomizer casing and may then form a solid crust on certain parts of the atomizer. This incrustation may in part be very difficultly removed and may also appreciably affect the functioning of the atomizer.

The object of the present invention is to obviate this drawback. In accordance with the invention this aim is achieved in that, in the upper part of the casing, two completely separate annular ducts are coaxially disposed within each other, the outer duct thereof adapted for guiding the mist-containing air stream and the inner duct for guiding the secondary air stream, and that for admitting the secondary air stream at least one duct leads substantially radially through the outer annular duct into the inner annular duct containing a fan or blower connected to the same electric motor which also serves for driving the rotary members.

Further features of the invention will appear from the following description and claims, taken in conjunction with the accompanying drawing, wherein there is shown purely by way of example one form of embodiment incorporating the invention.

FIG. 1 shows the liquid atomizer partly in side view and partly in vertical section;

FIG. 2 represents a component part of the atomizer casing, partly in top view and partly in horizontal section;

FIG. 3 shows a vertical section taken on the line III—III of FIG. 2;

FIG. 4 is a perspective view of the atomizer partly cut away along different axial planes;

FIG. 5 illustrates on a smaller scale, how the atomizer may be attached to a wall and be associated with an air filter and a liquid control apparatus;

FIG. 6 is a view as seen from the right-side in FIG. 4.

Referring to said annexed drawing, the liquid atomizer shown comprises a container **11** designed as a basin for taking the liquid to be atomized. Said container is provided with a flexible tubing **12** for the steady supply of liquid. By means of lever clamps **15**—only one of which being visible in FIG. 1—the container **11** is removably suspended on an annular casing **16** comprising two diametrically opposite bearing places **17** which, according to FIG. 4 are each connected to a support **18** capable, for instance, of being fixed on a wall **19**. The container **11** and casing part **16** together constitute the lower part of the atomizer casing.

The casing part **16** has a further annular casing part **20** loosely mounted thereon. An electric driving motor

21 with vertical shaft **22** is fixed to a carrier ring **23** situated within the casing part **20**. The lower portion of the motor shaft **22** carries a hub **24** of a centrifugal disk **25**. A further centrifugal disk **26** is clamped between the hub **24** and a holding member **27** which is detachably screwed on a threaded portion **28** of the motor shaft **22** and carries a riser extending into the container **11** for the liquid to be atomized. The underside of the centrifugal disk **26** has blades **31** for producing a primary air stream, further referred to as description proceeds. At some distance from the periphery of the centrifugal disks **25, 26** there is an atomizer rim **32** provided with passages for the liquid thrown off the disks **25, 26**. Said atomizer rim is attached to the casing part **20** and includes an outturned flange **34** beneath said passages.

The casing part **16** has arranged thereon a ring **36** which grips below the centrifugal disks **25, 26** and forms a baffle wall for the air stream induced by the blades **31**. Further, outside the atomizer rim **32**, the ring **36** forms a baffle wall **37** for intercepting any liquid drops thrown out through the passages of the atomizer rim as well as a collecting trough **38** for the condensate. From said collecting trough at least one drain pipe **39** leads back to the container **11**.

Furthermore, the casing part **16** is provided with an intake **40** for the said primary air stream. The intake **40** includes a throttle flap **41** which is operable from outside and adapted for regulating the primary air stream and hence also the amount of liquid being atomized. According to FIG. 4 the intake **40** is connected through a pipe **42** to an air filter **43** having air intakes **44** and being for instance also attached to the wall **19**. The filter **43** may also be located at any other suitable place, if necessary outside the room to be humidified and be connected through lengthy piping to the intake **40** of the primay air stream.

As may be gathered from FIGS. 1–4, the casing part **20** is of special design. For guiding the primary air stream containing the produced fluid mist, it comprises an outer circumferential wall **50** and an inner circumferential wall **51** (FIGS. 2 and 3) spaced therefrom, between which the primary air stream flows upwards. In addition, the casing part **20** comprises a plurality of intake ducts **53** which are spaced from each other at regular distances apart along the periphery of the casing, extend radially and protrude through the two walls **50** and **51**. The intake ducts **53** serve for admitting a secondary air stream which is directed therethrough inside the inner wall **51** and induced by a blower **54** mounted on top of the motor shaft **22**. Consequently, for the primary air stream in the casing part **20** only passages **49** are provided between radially running ducts **53** neighboring each other, as distinctly shown in FIG. 2.

The casing part **20** carries two jackets **55, 56** coaxially disposed within each other, one of which being closely mounted on the wall **50**, and the other on the wall **51**. Both jackets **55, 56** are individually removable without resorting to tools. The blower **54** is housed within the inner jacket **56**. Moreover, for conveniently guiding the secondary air stream, the casing part **20** has attached to it a ring **57** which surrounds the motor **21** in spaced relation and comprises preferably at least one passage **58**. The blower **54** is designed and arranged so as to be capable of delivering upwards a part of the secondary air stream through the passage **58** and then upwards past the motor **21**. The casing part **20** and outer jacket **55** together form the upper part of the atomizer casing.

By means of webs **60**, the jacket **56** has arranged in it a hood **61** which covers the central portion of the blower **54**.

In the described atomizer, the primary air stream containing the fluid mist and the secondary dry air stream

are entirely separated from each other by the atomizer casing. For this purpose, in the upper part of the atomizer casing, there are provided two annular ducts disposed within each other. The outer annular duct adapted for guiding the primary air stream is defined to the outside by the wall **50** of the casing part **20** and by the jacket **55**. Said wall **50** and the jacket **56** together form the limitation of the annular duct for the primary air stream to the inside and at the same time the limitation of the annular duct for the secondary air stream to the outside. The motor **21** is entirely located within the annular duct for the secondary air stream which contains no mist.

At the side of the wall **19** away from the atomizer, according to FIGS. 5 and 6, there is arranged a liquid control apparatus **65** mounted on a bracket **66**. A drain pipe of said apparatus passes through the wall **19** and is detachably connected to the flexible tubing **12**. A piping **68** having a shut-off member **69** therein is joined to a system of pressure water supply and serves for feeding water to the control apparatus **65**. The latter includes, in a manner known per se, a float for automatically regulating the inflow so that the liquid in the control apparatus will invariably stand at the same level. The liquid level in container **11** of the atomizer coincides with that in the control apparatus **65**. As a measure of precaution, the apparatus **65** is additively provided with an overflow having connected to it a drain pipe **70**.

The aforedescribed liquid atomizer involves quite a number of advantages. Due to the fact that the mist-containing primary air stream and the secondary dry air stream are conducted entirely separate through the atomizer and mixed only after leaving the openings at the top of the atomizer casing, it will securely be avoided that any dust particles carried along with the unfiltered secondary air are moistened in the atomizer and cling thereto. In this way the hazard of dirtying the atomizer is largely minimized. Another advantage of the air conduct mentioned results in that the electric motor **21** is not surrounded by a moist air stream, but only by the dry secondary air stream. In this way, possible damages caused to the motor by moisture, corrosion and insulation defects are practically avoided. In addition, the possibility exists to utilize the secondary dry air stream for cooling the motor, as shown in FIG. 1.

A further advantage of the described atomizer is seen in the easy dismountability of all component parts which, occasionally, must be subject to cleaning. For disassembling, no tools whatever are needed. The liquid container **11** is also removable without further parts of the atomizer having to be lifted or taken off. The throttle flap **41** permits in the simplest way of efficiently regulating the output of the atomizer since, on closing the flap, the primary air stream decreases and less liquid mist will then be blown out upwards from the casing.

It is understood that the foregoing description is given merely by way of illustration and that variations may be made therein without departing from the scope of my invention.

What I claim is:

1. Apparatus for atomizing liquids and discharging the same in the form of an aerosol mist, comprising an outer casing divided into a lower part having at least one air inlet opening and an upper part having a discharge opening, a housing disposed within said upper part of the casing and spaced therefrom, said housing having at its top an air escape opening, the space between said housing and said upper part of the casing being divided by means of an annular jacket into completely separate annular ducts coaxially disposed one in the other, passages provided between said lower part of the casing and the outer one of said annular ducts, a plurality of air intake ducts provided radially through the outer one to the inner one of said annular ducts and to said housing, a motor disposed within said housing and having driving means for moving a primary air stream through said passages and the outer one of said annular ducts from said air inlet opening to said discharge opening, driving means for moving a secondary air stream through the inner one of said annular ducts from said radial intake ducts to said discharge opening, driving means for moving a tertiary air stream through said housing from said radial intake ducts to said air escape opening, said secondary air stream having a quantity per time unit at least as large as said primary air stream, and atomizer means for introducing fluid particles to said primary air stream to form a mist therein, all of said means for moving said primary, said secondary and said tertiary air streams being disposed so that the air to be moved is dry to the exclusion of mist.

2. Apparatus according to claim 1, in which said intake ducts are evenly distributed along the circumference of the casing and spaced from each other to leave passages therebetween for said primary and mist-containing air stream, said radially running intake ducts and said passages therebetween being formed on an annular constituent of the upper casing part, said constituent supporting said housing with said motor and said atomizer means and said means for moving the air stream, said jacket and a portion of the upper part of the outer casing being disposed on said constituent of the upper casing part, a further annular constituent of the lower casing part being provided with said air inlet opening and being mounted on a stationary support, a basin containing a liquid to be atomized being removably suspended at the underside of said other annular constituent of the lower casing part, and said annular constituent of the upper casing part being loosely placed on said other annular constituent of the lower casing part.

References Cited in the file of this patent

UNITED STATES PATENTS

916,146	Gosline	Mar. 23, 1909
2,874,797	Flury	Feb. 24, 1959

FOREIGN PATENTS

809,677	France	Mar. 8, 1937
856,676	France	Aug. 1, 1940