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3,605,385

ATOMIZER FOR LIQUIDS

Filed Sept. 29, 1969

2 Sheets-Sheet 1

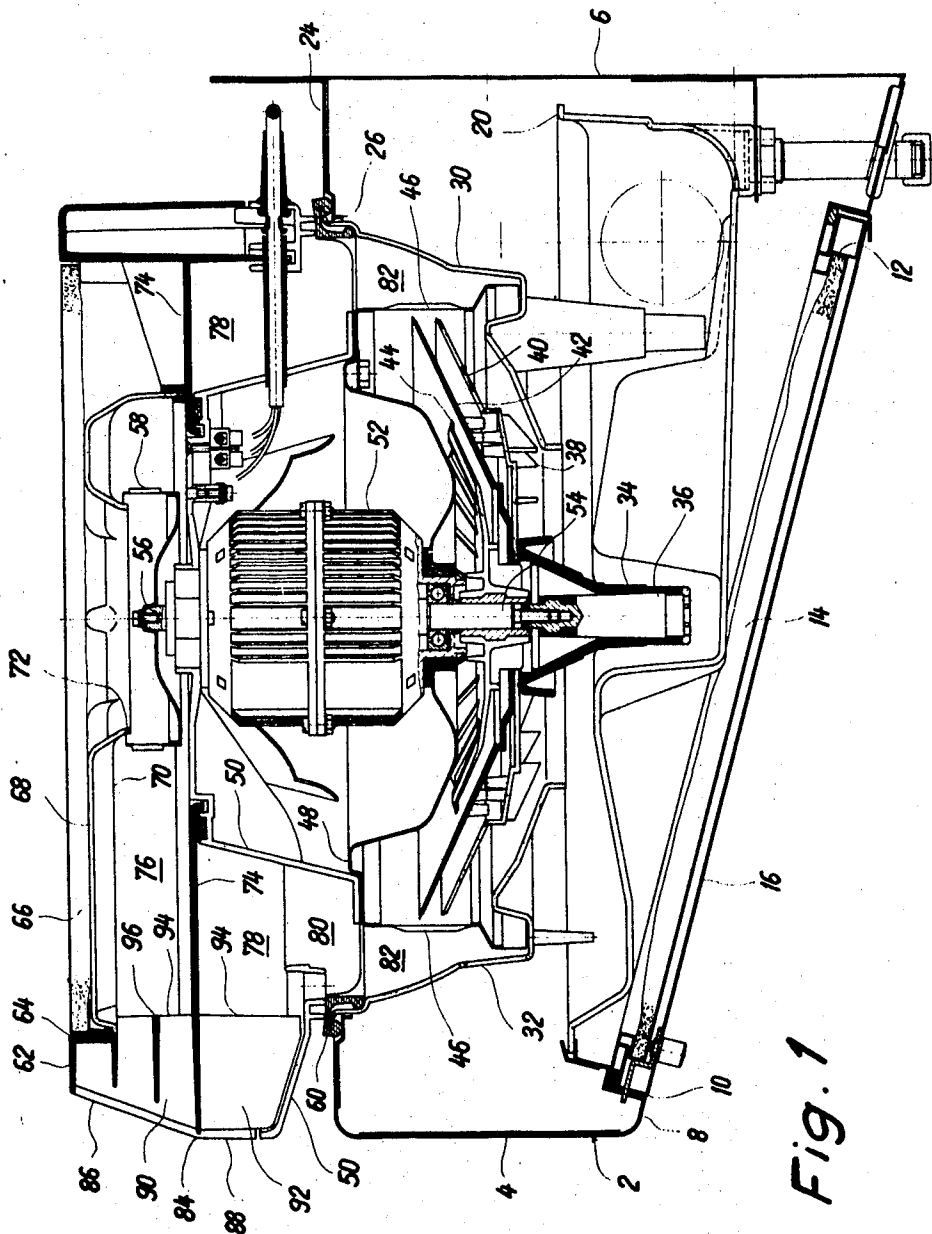


Fig. 1

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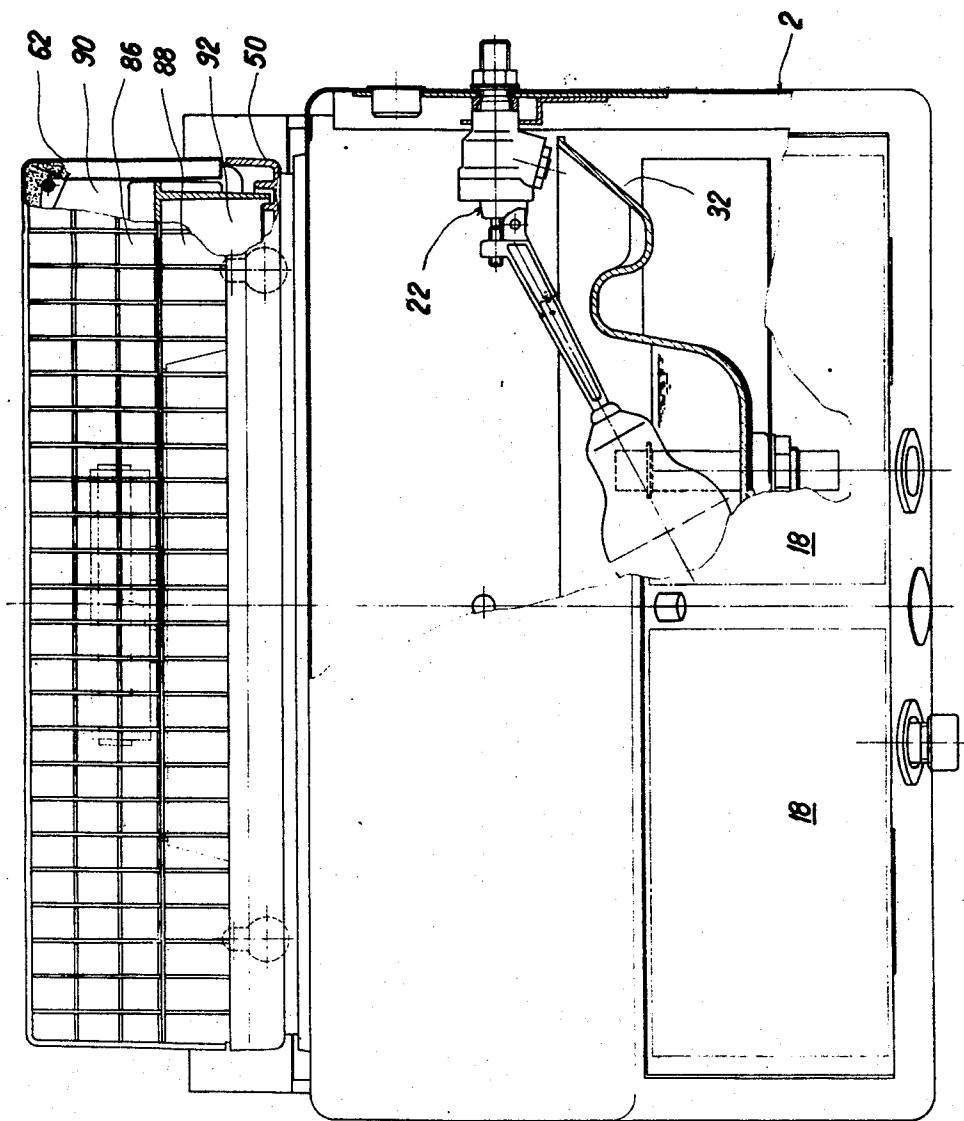


Fig. 2

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ATOMIZER FOR LIQUIDS

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6 Claims

ABSTRACT OF THE DISCLOSURE

A novel atomizer for liquids is disclosed, the atomizer being of the type wherein a separate primary and secondary air stream is provided, the secondary air stream being utilized as a transportation air stream so as to aid the primary air flow containing the atomized liquid or mist. Both the primary and secondary air streams are discharged into the room approximately horizontally, with the secondary air stream being discharged at a level above the primary air stream. In this fashion, the secondary air stream further functions as a means to protect the ceiling of the room against spray and mist contained in the primary air stream.

BACKGROUND OF THE INVENTION

The instant invention generally relates to atomizers and particularly concerns an atomizer for liquids, such atomizer being of the type wherein a separate primary and secondary air stream is generated.

Atomizers for liquids of the general type in which both a primary and a secondary air stream is produced and guided through the apparatus completely separate from one another are known to the art. This construction affords the advantage that dust particles which may have been suctioned into the atomizer apparatus with the non-filtered secondary air, remain relatively dry and do not tend to exhibit crust formations. In this manner, the operational readiness of the apparatus is maintained even if cleaning of the apparatus is only occasionally performed, which cleaning, however can be easily effected. In atomizers for liquids of this general type known to the prior-art, the primary air stream as well as the secondary air stream emerge upwardly from the apparatus into the room. As a result, the secondary air stream which is primarily provided to assist the transportation and mixing of the primary air stream in which the mist is contained, must be guided and channeled through the atomizer apparatus so as to be properly accelerated. Additionally, discharge of the air stream in an upward direction necessitates that the apparatus be placed a sufficient distance from the ceiling of the room in which it is disposed so as to prevent spraying the ceiling with mist. Placing the apparatus in such a manner oftentimes is disadvantageous and limits its environment of use.

SUMMARY OF THE INVENTION

Accordingly, a need exists in the art for an atomizer of the general type wherein both a primary and a secondary air stream is provided, which apparatus, however, eliminates the disadvantages and operational limitations associated with prior-art devices as discussed. It is the primary object of the instant invention to provide such an improved apparatus.

This object as well as other objects which will become apparent as the description proceeds, are implemented by the novel invention apparatus which proceeds from the discovery and realization that the secondary air stream which is utilized as a transportation air stream so as to aid the primary air flow and the mixing of the same

as set forth above, can also be utilized as a protective means functioning to screen the ceiling of the room in which the atomizer is placed against spray by the mist contained in the primary air stream. To achieve this result, both the primary and the secondary air streams are discharged into the room approximately horizontally, with the secondary air stream being discharged into the room physically above the primary air stream.

Structurally speaking, the novel atomizer for liquids which incorporates this concept comprises a housing in which a water tank, a rotating atomizer means disposed above the water tank, two blowers, and inlet and outlet openings for both the primary and secondary air flows are provided. The novel apparatus is further characterized by the features that the air inlet opening for the secondary air stream is disposed on the top side of the housing and contains an air filter, the blower for the secondary air stream being defined by a radial blower. Furthermore, in the preferred inventive construction, the outlet opening for the primary air stream is disposed beneath the outlet opening for the secondary air stream in the side of the atomizer housing.

By virtue of the novel construction wherein the secondary air blower comprises a radial blower and wherein the air inlet for the secondary air stream is disposed on the top side of the housing, a very simple and quiet guidance of the air is obtained, this simple and quiet guidance itself constituting a major advantage over prior-art constructions. Filtering of the secondary air stream in the manner contemplated by the instant invention not only protects the atomizer apparatus against dirt, but further prevents dirt from accumulating on the ceiling under which flows the secondary air stream, this stream gradually mixing with the primary air stream contained in the most.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention itself will be better understood and features and advantages thereof other than those already described will become apparent from the following detailed description of a preferred inventive embodiment, such description making reference to the appended sheets of drawings, wherein:

FIG. 1 depicts a sectional elevational view of the novel atomizer for liquids constructed in accordance with the instant invention; and,

FIG. 2 depicts the novel atomizer for liquids in a side elevational view, with portions thereof broken away for illustrative clarity.

DETAILED DESCRIPTION OF A PREFERRED INVENTIVE EMBODIMENT

Now, by referring to the drawings and particularly to FIG. 1 thereof, it will be noted that reference numeral 2 serves to identify the lower portion of a housing which is constructed to have an approximately square configuration. The bottom 8 of the housing portion slants downwardly relative to the horizontal and runs from a forward wall 4 towards a rearward wall 6. Bottom 8 is provided with a square recess 10 into which a primary air filter 14 is inserted and held by frame 12. A cover plate 16 also disposed in frame 12 is provided with perforated partitions or holes 18 (FIG. 2) which form inlet openings for the primary air flow.

The lower portion 2 of the housing contains, in its interior, a liquid storage tank 20 which is coupled to a nonillustrated feed line for transporting the liquid to the atomizer. A float unit or device 22 as depicted in FIG. 2 is secured to the rear wall of the housing portion and cooperates with the liquid tank 20, the float unit serving to control the intake of liquids into the tank in known manner. The uppermost area 24 of the lower housing por-

tion 2 is provided with a circular opening 26 in which an atomizer unit of known construction is inserted, such unit generally being designated by reference numeral 30. The atomizer unit will be seen to comprise a ring jacket 32 supported on the lower portion 2 of the housing, a suction extension member 34, a suction pump 36, a blower disc 40 provided with blades 38, a centrifugal disc 42, a guide disc 44, and a stationary atomizer ring 46.

The atomizer ring 46 is supported on a motor support plate 48 which, together with a housing member 50, surrounds an electric motor 52. Electric motor 52 is vertically disposed and, on its downwardly extending shaft end 54, carries discs 40, 42 and 44 and further operates suction pump 36. On the upwardly extending shaft end 56 of the electric motor 52, a radial blower 58 is disposed, such blower being located above the housing member 50. Housing member 50 which supports the motor 52 and the atomizer ring 46 is itself supported by means of an annular flange or sealing ring 60 which surrounds the upper end of the ring jacket. Housing member 50 is therein rotatable about a vertical axis relative to the lower portion 2 of the housing.

A cover member 62 is disposed upon the housing member 50 and has a configuration corresponding to the rectangular configuration of housing member 50. A rectangular-shaped opening 64 is provided in the upper portion of the cover member 62 and contains a filter plate 66 supported on ribs 68 of an inlet member 70. Inlet member 70 defines a ring-shaped opening 72 coaxially disposed to the radial blower 58 immediately above the same. A separating wall 74 is provided and serves to separate the secondary air chamber 76 from the primary air chamber 78, which primary air chamber is, in turn, connected to a mixing chamber 82 between atomizer ring 46 and ring jacket 32 via a ring-shaped opening 80 in the underside of the housing member 50. The front side 84 of the upper portion of the housing formed by members 50 and 62 defines ribbed grid-containing outlet openings 86 and 88 connected to the secondary and primary air chambers 76 and 78, respectively, via blow-out chutes 90 and 92. Blow-out chutes 90 and 92 are provided with vertical guide blades 94 with chute 90 being additionally provided with a horizontal guide member 96.

During operation of the novel atomizer as above discussed, liquids to be atomized such as water, for example, is suctioned-in from the liquid storage tank 20 by suction pump 36 and is conveyed to discs 40 and 42 which serve to throw the water against the atomizer ring. At the same time, primary air is suctioned-in at the atomizer disc by blades 38 which form the primary air blower, this primary air entering through opening 18 and being purified and filtered as same passes through primary air filter 14. The primary air flows about the water tank 20 and is suctioned into ring jacket 32 whereupon such air is conveyed beneath the discs 40 and 42 into the mixing chamber 82 after passing through the atomizer ring. The purified primary air now mixes with the mist or vapor formed by the atomizer ring 46, such mixing taking place in the mixing chamber 82, and the primary air then passes through opening 80 into primary air chamber 78 in the upper portions 50 and 62 of the housing. The air is deflected in primary air chamber 78 towards the blowout chute 92 with the air flow being directed through the guide blades 94. Thereupon, the primary air emerges from the liquid atomizer through outlet opening 88.

The secondary air is taken or suctioned into the atomizer through opening 64 and filter plate 66, respectively, disposed in the cover member 62, the suction action being effected by the radial blower 58 which, together with the primary air blower 38, the pump 36 and the rotatable atomizer discs, is driven by the electric motor 52. The purified or filtered secondary air now flows between the filter plate 66 and the inlet member 70 toward opening 72 and is then transported into the secondary air chamber

76 by the radial blower 58. The secondary air stream leaves the atomizer via the blow-out chute 90 and outlet opening 86 during the course of which such secondary air is likewise directed through guide members 94 and 96.

From the foregoing, it will be appreciated that the exit or discharge of both the primary air as well as the secondary air takes place in an approximately horizontal direction depending upon the location of the novel atomizer, with the secondary air flow having a comparatively greater speed and forceably carrying along the primary air flow carrying the mist. This air flow also accelerates, of course, untreated air which preferably flows upwardly from below when the atomizer is disposed in the vicinity of the ceiling of the room. The secondary air flow serves to screen the ceiling against the possibility of moisture from the primary air flow depositing thereon in the sense that the secondary air flow functions as a horizontal air curtain. As should further be appreciated, and if so desired, the air flow from the atomizer could also be discharged upwardly therefrom at a slight angle from the horizontal.

Since the upper portions 50 and 62 of the housing are disposed in a rotatable manner upon the lower portion 2, the discharge air streams can be directed into the room in any desired direction throughout an enclosed angle of approximately 90° relative to the rear wall 6 of the atomizer, which wall would be secured to a respective room wall. Additionally, cover member 62 can be removed from the atomizer simply by lifting the same from housing member 50. In a similar fashion, the upper portions 50 and 62 of the housing together with the atomizer unit 30 can be lifted out of the housing lower portion 2 thereby significantly simplifying cleaning and maintenance operations of the atomizer.

As should now be apparent, the object initially set forth at the outset to this specification, has been successfully achieved. Accordingly,

What is claimed is:

1. A liquid atomizer comprising: housing means; a liquid tank, a rotating atomizer means disposed above said liquid tank, and a primary and secondary blower means, all disposed within said housing means; inlet and outlet openings disposed in said housing means for both primary air flow and secondary air flow, said secondary air inlet opening being disposed on the top side of said housing means, said primary and secondary air outlets being disposed in the side of said housing means with said primary air outlet opening being disposed below said secondary air outlet opening; air filter means provided for said secondary air inlet opening; and wherein said housing comprises a rotatable upper portion and a stationary lower portion, said upper portion surrounding said secondary blower means and containing said outlet openings for both said primary and said secondary air in a side wall thereof.

2. A liquid atomizer comprising: housing means; a liquid tank, a rotating atomizer means disposed above said liquid tank, and a primary and secondary blower means, all disposed within said housing means, said secondary blower means comprising a radial blower; inlet and outlet openings disposed in said housing means for both primary air flow and secondary air flow, said secondary air inlet opening being disposed on the top side of said housing means, said primary and secondary air outlets being disposed in the side of said housing means with said primary air outlet opening being disposed below said secondary air outlet opening; and air filter means provided for said secondary air inlet opening; and wherein said housing means comprises a rotatable upper portion and a stationary lower portion, said upper portion surrounding said radial blower and containing said outlet openings for both said primary and said secondary air in a side wall thereof.

3. An atomizer as defined in claim 2, wherein said upper portion of said housing means contains a ring-

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shaped primary air chamber, a connecting opening means for said primary air chamber extending over the circumference thereof; and blow-out chute means coupled between said connecting opening and said outlet opening for said primary air.

4. An atomizer as defined in claim 3, wherein said blow-out chute means comprises guide members and wherein said primary air outlet opening is formed by a ribbed grid.

5. An atomizer as defined in claim 2, further including electric drive motor means having an upper and lower shaft end disposed in said housing means; atomizer disc means and suction pump means disposed in said lower portion of said housing means; said radial blower means being disposed on said upper end of the shaft of said electric drive motor means; and wherein said lower end of the shaft of said electric drive motor means is operatively coupled to said primary air blower, said atomizer disc means, and said suction pump means.

6. An atomizer as defined in claim 2, wherein said stationary lower portion of said housing means and said rotatable upper portion of said housing means together form a unitary structure.

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References Cited

UNITED STATES PATENTS

1,072,031	9/1913	Rankine et al.	261—91
1,564,949	12/1925	Cramer	55—230X
1,626,667	5/1927	Cramer et al.	261—91
2,079,574	5/1937	Lea	261—91
2,554,868	5/1951	Mills	261—30X
3,342,466	9/1967	Flury	261—91
3,365,862	1/1968	Flury	261—30X

FOREIGN PATENTS

213,417	9/1956	Australia	261—91
771,990	4/1957	Great Britain	239—214.21
638,168	5/1928	France	261—91
1,125,623	3/1962	Germany	261—91
366,948	3/1963	Switzerland	261—91

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