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HUMIDIFICATION SPRAY DEVICE

Filed June 22, 1935

2 Sheets-Sheet 1

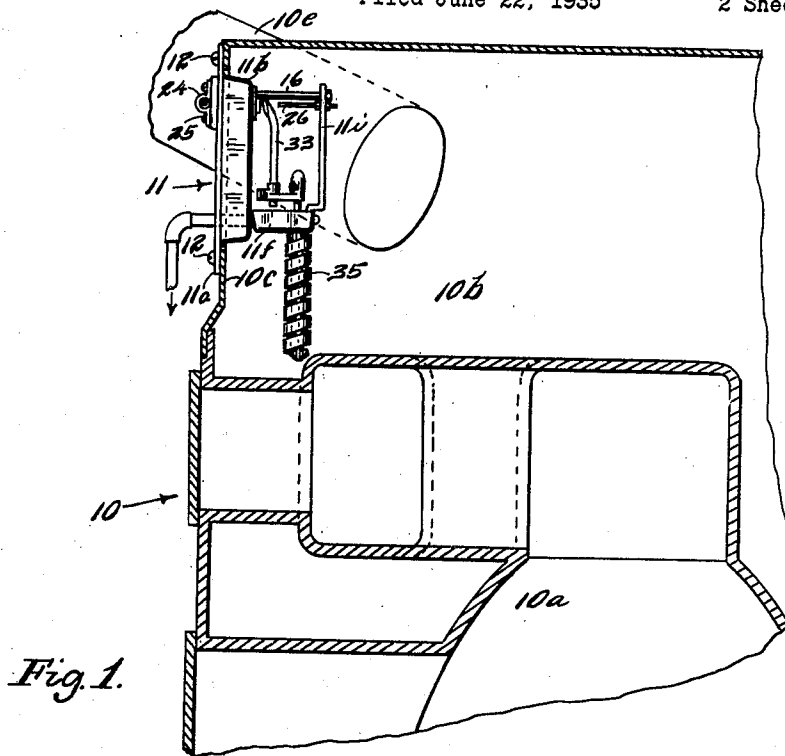


Fig. 1.

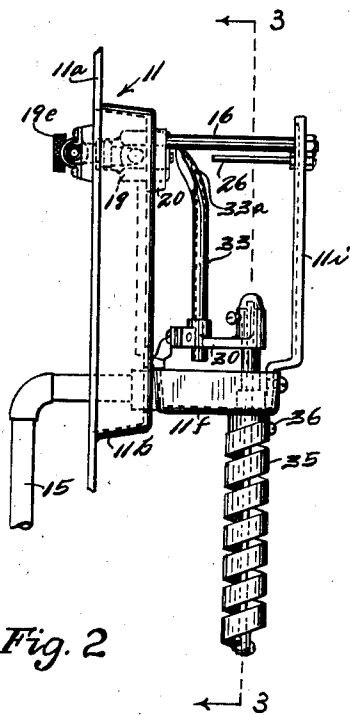


Fig. 2.

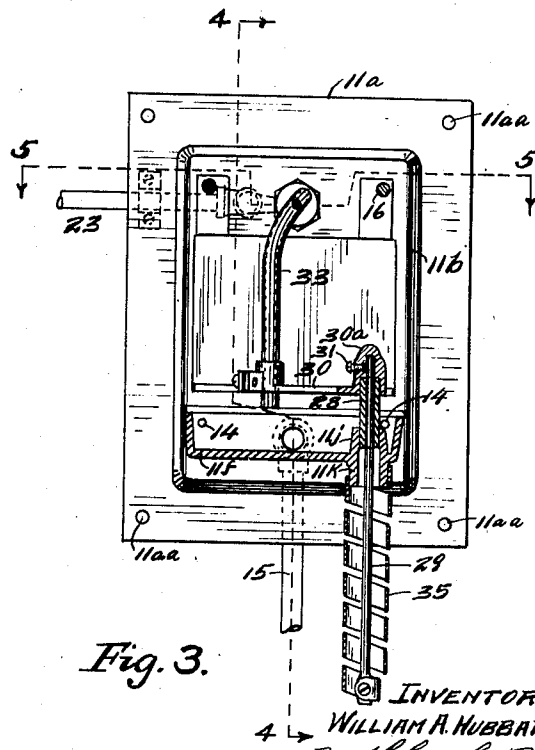


Fig. 3.

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2 Sheets-Sheet 2

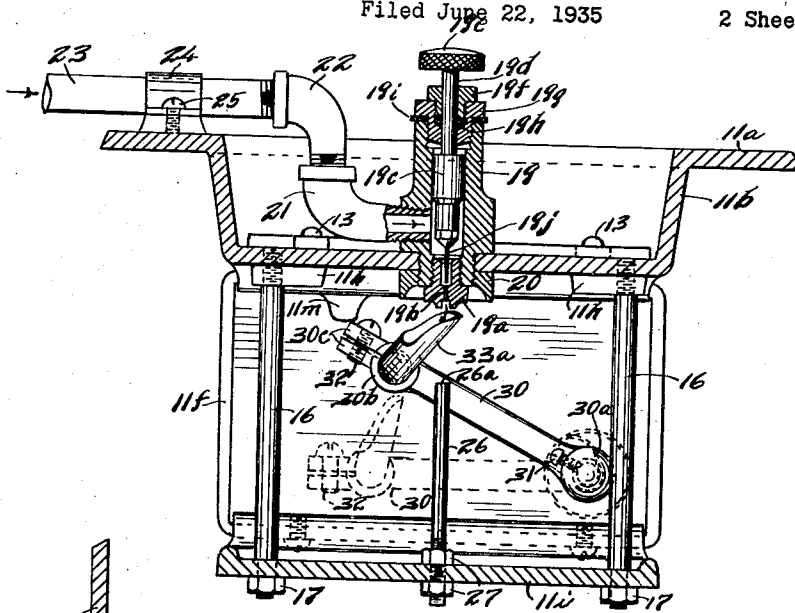


Fig. 5.

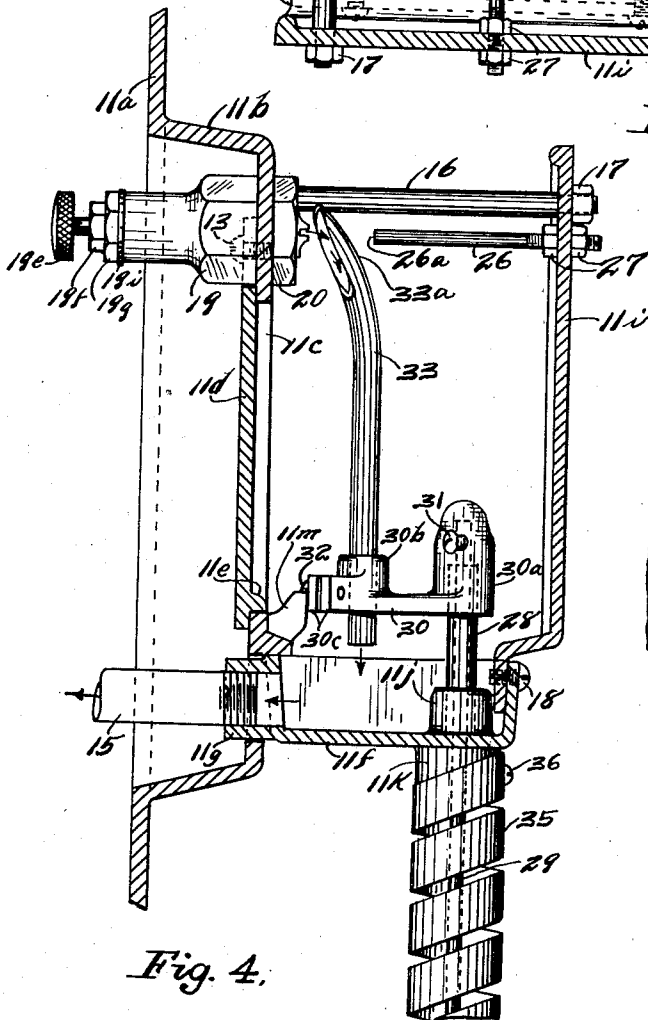


Fig. 4.

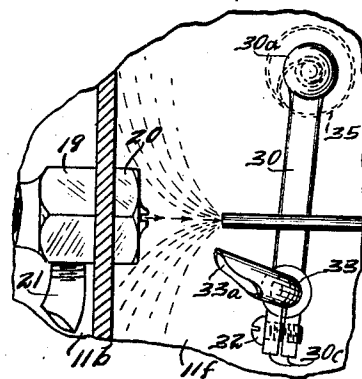


Fig. 6.

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HUMIDIFICATION SPRAY DEVICE

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6 Claims. (Cl. 126—113)

This invention relates to a device adapted to be used for humidification and particularly to such a device adapted to be used in a chamber which is heated at times, such as the air chamber in a furnace.

Humidification is now obtained in many places heated by a furnace, by supplying liquid in the form of a spray or otherwise to the interior of said furnace and usually the chamber through which heated air passes to the rooms to be heated.

It is an object of this invention to provide a simple and inexpensive device for supplying liquid for humidification to a chamber, comprising means for projecting a jet of liquid into said chamber and means preferably automatically controlled for rendering said jet operative or inoperative for humidification purposes.

It is another object of this invention to provide a device comprising a nozzle for projecting a jet of liquid into a chamber to be heated, means for directing said jet to a drain when said chamber is not heated and means for rendering said last mentioned means inoperative when said chamber is heated so that the liquid of said jet can be used for humidification.

It is a further object of the invention to provide a device comprising means for projecting a jet of liquid into a chamber, means having a surface of very small area and disposed substantially perpendicular to said jet against which said jet is projected to atomize said liquid together with provision for receiving said jet and directing the same to a drain so that the liquid is not atomized.

It is still another object of the invention to provide a device comprising means for projecting a jet of liquid into a chamber together with means for intercepting said jet and directing the liquid thereof to a drain and thermostatically controlling the operation of said last mentioned means.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings, in which like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a view in vertical section through a portion of a furnace showing the application of the invention thereto;

Fig. 2 is a view in side elevation of the device of this invention;

Fig. 3 is a view in vertical section taken on line 3—3 of Fig. 2 as indicated by the arrows;

Fig. 4 is a vertical section taken on line 4—4 of Fig. 3 as indicated by the arrows;

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 3 as indicated by the arrows; and

Fig. 6 is a partial horizontal section similar to Fig. 5 showing the parts in different positions.

Referring to the drawings, a portion of a furnace 10 is shown, which furnace is of the well known hot air type. The upper portion 10a of the fire pot or chamber and the chamber 10b at the top of the furnace from which air passes to the rooms to be heated are shown. The air reaching chamber 10b passes around the heated chamber 10a and the air is conducted to the rooms from chamber 10b through a plurality of conduits 10c, one of which is shown. The device of the invention is shown in side elevation in Fig. 1 and comprises a frame or casing 11 having a plate 11a arranged as shown to be secured to the furnace wall 10c in any suitable manner as by the screws 12 extending through holes 11aa in plate 11a. The plate 11a has a recessed portion 11b adapted to extend into the furnace, the same having a rear wall with an opening 11c therein. This opening is closed by a plate 11d having a flange 11e adapted to rest on said rear wall at the bottom of said opening and said plate 11d is held in place by a plurality of screws 13 extending through lugs on plate 11d into said rear wall. A pan 11f extends inwardly from the rear wall of portion 11b and has a cylindrical spout 11g extending through an opening in said wall, said pan being secured to said wall by a pair of screws 14. The spout 11g is interiorly threaded to receive a drain pipe 15 extending forwardly from pan 11f and then extending downwardly in front of plate 11a as shown in Figs. 1 and 2. The rear wall of portion 11b has lugs 11h projecting inwardly, into which are threaded the studs 16 extending horizontally inwardly and having reduced threaded portions at their other ends which extend through apertures in a plate 11i, which plate abuts the shoulders formed by said reduced portions on stud 16 and said reduced portions have thereon the nuts 17 holding plate 11i in place. Plate 11i at its bottom has an offset portion extending along the inner rear side of pan 11f and secured thereto by the headed screws 18.

A nozzle member 19 is threaded into the upper portion of the rear wall of portion 11b and held therein by the nut 20 threaded thereon. Nozzle 19 has a discharge head 19a threaded into its inner portion, the same having a very small discharge aperture 19b. Said nozzle has a cylindrical bore extending outwardly from member 55

19a in which is slidable a plunger 19c having a handle rod 19d equipped at its outer end with a knob 19e having a cylindrical knurled periphery. Rod 19d is slidable in a packing nut 19f threaded into a packing gland 19g, in turn threaded into the body of nozzle 19 and adapted to receive packing 19h engaged by member 19f. A gasket washer 19i is shown between member 19g and the outer end of the nozzle body. Plunger 19c has a reduced inner end in which is secured a very small rod or needle member 19j adapted to move through the aperture 19b. The body of nozzle 19 has a threaded opening in one side thereof in which is secured a curved nipple 21 receiving another curved nipple 22 to which is secured a water supply pipe 23 held by a bracket 24 to plate 11a by the screws 25, said plate having a projecting boss or lug into which said screws are threaded. A rod 26 is secured in plate 11i, the same extending through said plate and having a threaded portion receiving nuts 27 thereon at each side of said plate. Rod 26 has a plane end surface 26a of quite small area which is substantially perpendicular to the axis of rod 26 and rod 26 is coaxial with aperture 19b and nozzle 19. Pan 11f has a boss 11j therein and a tube or bushing 28 is secured in said boss and extends upwardly therefrom. A shaft 29 is journaled in bushing 28 and extends thereabove and has secured to its upper end the apertured end 30a of an arm 30, the same being secured to shaft 29 by the set screw 31. Portion 30a rests on the top of tube 28 and is oscillatable thereon with shaft 29. Arm 30 has a boss 30b adjacent its other end, the same being split and having projecting portions 30c receiving a clamping screw 32. Boss 30b is bored and has clamped therein by the screw 32 a tube or conduit 33 which extends upwardly and has an open lower end disposed over pan 11f. The upper end of tube 33 is curved toward nozzle 19 and has a portion cut away at the side thereof so that the tube is open and the upper curved portion thereof 33a forms a deflector. Shaft 29 extends below pan 11f and has secured to its lower end by a screw 34, one end of a helical strip 35 which will be made of thermostatic bimetallic construction. The upper end of member 35 is secured to a boss 11k by a screw 36, which boss extends downwardly from the bottom of pan 11f concentric with boss 11j. The member 35 in addition to being a thermostatic member acts as a spring and normally holds arm 30 in position with its end against a stop lug 11m formed on the rear side of portion 11b. Arm 30 can be adjusted on shaft 29 so that the same will be moved at different temperatures.

In operation, water will be supplied through pipe 23 and this pipe will be connected to some source of water, such as the city mains or the piped water supply in use. Water is constantly supplied to pipe 23 and there is no necessity for a regulating valve for said pipe. Water is thus projected by nozzle 19 through aperture 19b inwardly into the chamber in which the device is disposed. As stated tube 33 normally occupies the position shown in Figs. 4 and 5 and the jet of liquid projected by nozzle 19 is deflected by the curved deflector 33a of tube 33 and the liquid of the jet is directed downwardly into tube 33 and delivered into pan 11f from whence it passes through pipe 15 to a suitable drain. The elongated side opening in tube 33 is provided to prevent any whistling effect. The liquid passes noiselessly into tube 33 and into pan 11f. When

the furnace or other chamber is heated and the temperature rises to a certain point thermostat 35 operates to turn shaft 29 and this swings arm 30 in a counter-clockwise direction so that tube 33 and its deflector 33a are moved out of the path of the jet projected from nozzle 19 as shown in Fig. 6 or in dotted lines in Fig. 5. The jet from nozzle 19 is then directed forcibly against the surface 26a of rod 26 and the liquid is broken up into a very fine mist or spray. This mist is taken up by the heated air which is passing through the chamber, the air is properly humidified and is then carried to the rooms to be heated. Should any liquid drop from rod 26 it will be caught in the pan 11f and pass out the drain pipe 15. The thermostat 35 will, of course, be set to operate at a desired temperature which will vary with the furnace or device in which the invention is used. In the old type of furnace the temperature in the hot air chamber varied from 200 to 350 degrees F., but in the later type of furnace where air is circulated in the furnace jacket by a blower the temperature usually varies from 125 to 250 degrees F. Water cannot be effectively sprayed into a cold chamber for humidification purposes and it is desirable and efficient to not spray the water into the chamber unless the temperature of the furnace is sufficient to take up the liquid or vapor. When the temperature is low there is usually no necessity for liquid to be supplied to the air. The nozzle 19 can be occasionally cleared of any sediment or accumulation in the discharge passage 19b by pushing in the rod 19d by means of knob 19e which will project needle 19j through said aperture.

From the above description it is seen that applicant has provided a simple and efficient device which will effectively supply liquid for humidification to a heated chamber and will be automatically controlled. The device can be easily applied to a furnace or other wall and plate 11a will be made to fit against the wall whether it be curved or plane. It has been a practice with many such devices to have a magnetically controlled valve on the water supply pipe which is operated by a thermostat. This equipment is expensive and is dispensed within the present device. Water is continually supplied to applicant's nozzle 19 and the amount of water not used is so small that the cost is negligible. Access can be had to the inside of portion 11b by removal of the cover plate 11d. The parts are all of simple construction and easily accessible for removal if necessary. The device is easily installed and after being installed operates without attention. The device has been amply demonstrated in actual practice and found to be very successful and efficient. The device also operates noiselessly when the jet from nozzle 19 strikes surface 26a to atomize the liquid. It is obvious that applicant's apparatus above disclosed may be used with liquids other than water.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which generally stated, consists in a device capable of carrying out the objects above set forth in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. A humidifying device of the class described having in combination, a nozzle for projecting a fine jet of aqueous liquid, an abutment against which said jet may strike to atomize said liquid,

a drain means, a deflecting means for directing said jet into said drain means movable into operative position between said nozzle and abutment and into inoperative position out of alinement with said jet and abutment.

2. A humidifying device of the class described having in combination, means for projecting aqueous liquid in a fine jet into a chamber, a member against which said liquid impacts for atomizing said liquid, a deflector positioned in the path of said jet to deflect the same to a drain, said deflector being movable out of the path of said jet and thermostatic means for moving said deflector out of the path of said liquid.

3. A humidifying device of the class described having in combination, a chamber, means for heating said chamber, a nozzle for projecting aqueous liquid in a fine jet into said chamber, a member against which said liquid is projected for atomizing the same, a drain means, means movable between said nozzle and member and into and out of the path of said jet for intercepting and receiving said jet and directing the same to said drain means and automatically acting means for moving said last mentioned means.

4. A humidifying device of the class described having in combination, a nozzle for projecting aqueous liquid in the form of a fine jet, a member having a surface disposed substantially perpendicular to said jet against which the same is projected to atomize the liquid of said jet, a drain, means comprising a deflector for intercepting said jet and receiving the liquid thereof and directing the same to said drain, a shaft upon which said means is mounted so that said means is swingable about the axis of said shaft to and from a position between said nozzle and member, a thermostatic means connected to said shaft for turning the same and moving said means out of the path of said jet.

5. A device of the class described having in combination, a casing comprising a plate adapted

to be mounted on the wall of a furnace, a drain pan carried at one side of said plate, a drain pipe leading from said pan, a nozzle mounted in said plate above said pan constructed to project aqueous liquid in the form of a jet away from said plate, a shaft journaled in said casing, a tube mounted on said shaft having an open upper end adapted to move into the path of said aqueous liquid to receive the same, said tube leading to said drain pan, means for oscillating said shaft to move the upper end of said tube out of the path of said liquid and a member against which said jet strikes to atomize said liquid when said tube is moved out of the path of said jet.

6. A device of the class described having in combination, a chamber, means for heating said chamber, said chamber having a wall with an opening therethrough, a casing adapted to project through said opening and having a plate adapted to engage the outer side of said wall about said opening, means for securing said plate to said wall, a drain pan secured to said casing and disposed within said chamber, a nozzle carried by said casing for projecting water in a fine jet into said chamber, a shaft journaled for oscillation adjacent said drain pan, an arm secured to said shaft, a vertically disposed tube carried by said arm having an elongated opening at its upper end, said tube being curved at its upper end so that said opening is on its concave side and said opening being disposed in the path of said jet so that said tube receives the liquid thereof and directs the same into said drain pan, a thermostatic member fixedly secured at one end and secured at its other end to said shaft for oscillating said shaft and swinging said tube to move its upper end out of the line of said jet and a member having a surface disposed perpendicular to said jet against which said jet impinges when said tube is moved out of the path thereof.

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