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2,825,602

HUMIDIFYING HEAD

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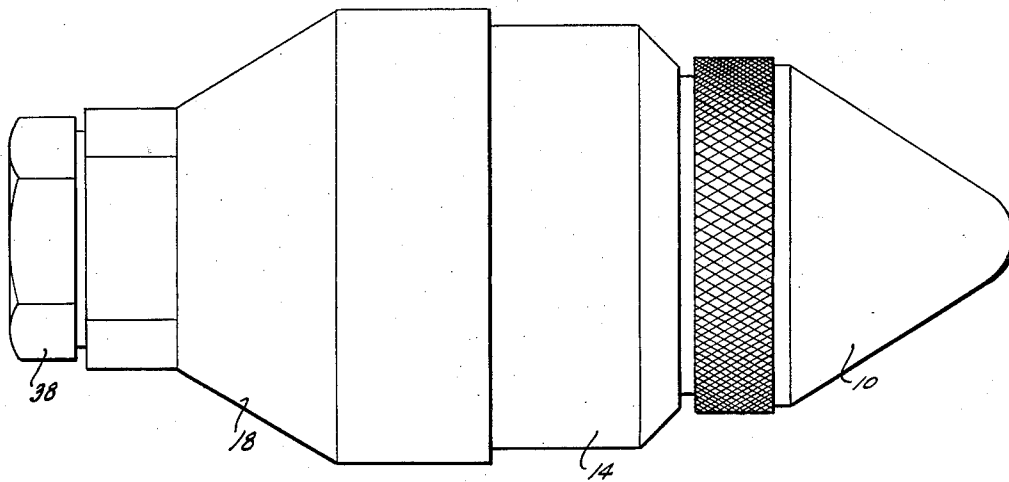


Fig. 1

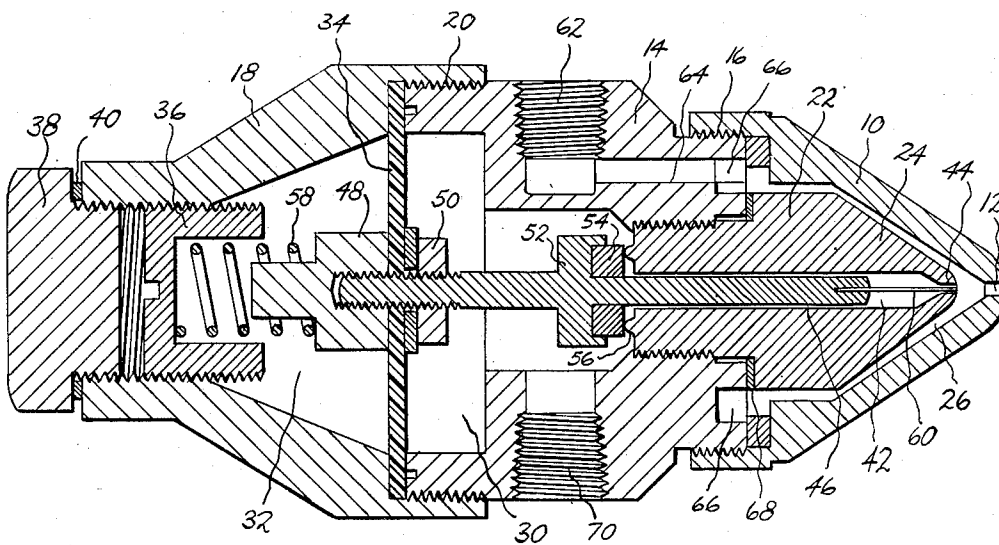


Fig. 2

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2,825,602

HUMIDIFYING HEAD

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1 Claim. (Cl. 299—59)

This invention relates to a humidifying head to which air and water are supplied to be discharged as vapor or fine mist to maintain a humid atmosphere in a room or enclosure in which a high degree of humidity is necessary or desirable. The invention is embodied in a head which is similar in some respects to that shown in U. S. Patent No. 2,260,987, granted to D'Arcy and Rabbitt on October 28, 1941, but includes important improvements. A relatively simple and inexpensive diaphragm is used instead of the bellows shown in the patent, and the arrangement of chambers and passages within the head is such that even if the diaphragm wears out or otherwise develops a leak, no dripping from the head results. Complete prevention of dripping is highly important as sizable drops of water can cause considerable damage in textile mills where humidifiers are customarily used.

On the drawing—

Figure 1 is an elevational view of a humidifying head embodying the invention; and

Figure 2 is a longitudinal section of the same.

The humidifier shown on the drawing comprises a body having a shape somewhat like a projectile with a conical nose. As shown the body consists chiefly of three members, namely, a hollow conical nose member 10 having a small axial discharge vent 12 at its apex, a somewhat cylindrical mid member 14 to an end of which the nose member is screw-threaded at 16, and a rear member 18 screw-threaded at 20 to the rear end of the mid member 14. An inner member 22 is screwed into the forward end of the mid member 14. The forward portion 24 of this inner member is conical and is nested in but spaced from the hollow nose 10, forming therewith a chamber 26 in the shape of a hollow cone opening into the discharge vent 12. The mid-member 14 encloses a central chamber 30 the forward end of which is substantially closed by the inner member 22. The rear member 18 encloses a rear chamber 32 which is separated from the central chamber 30 by a flexible diaphragm 34 arranged transverse to the axis of the head. The rear end of the rear member 18 is closed by an inner cup element 36 which is in screw-threaded engagement with the member 18 so as to be adjustable forward or rearward. Behind the element 36 is a screw-threaded plug 38 which with a washer 40 seals the rear end of the member 18.

The forward inner member 22 has an axial passage 42 the forward end 44 of which is constricted to a greatly reduced diameter to form a small discharge vent aligned with the slightly larger vent 12. A longitudinally movable stem 46 is loosely slidable in the passage 42. This stem extends across the central chamber 30 and is secured to the center of the diaphragm 34 by any suitable means such as a block 48 on the rear side of the diaphragm and a nut 50 on the forward side. At an intermediate point of the stem 46 is a valve element 52 which with a washer 54 bears on a valve seat 56 on the rear end of the inner member 22 so as to seal the passage 42 when the stem is moved to its forward position. The stem is constantly pressed forward by a spring 58 which

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is compressed between the cup element 36 and the block 48. The pressure of the spring 58 against the stem can be regulated by adjusting the cup element 36 forward or rearward. The forward end of the stem 46 carries an axial pin 60 which extends through the vent 44 to the orifice thereof when the stem is in its forward position as shown in Figure 2. The pin 60 fits loosely in the vent 44 and is retracted completely therefrom when the stem is fully retracted by pressure on the diaphragm 34.

A lateral air inlet 62 is provided in the wall of the mid member 14 to which a pipe (not shown) may be attached to supply air to the head. The inlet 62 is connected by a suitable passage 64 and an annular passage 66 to the conical chamber 26 whence the air flows out through the discharge vent 12. A washer 68 in the joint between the inner member 22 and the mid member 14 prevents leakage of air into the central chamber 30.

A second lateral inlet 70 is provided in the wall of the mid member 14. This inlet opens into the central chamber 30 and is designed to conduct water from a suitable supply into the central chamber.

In operating the humidifying head, the air is turned on first, then the water. A certain amount of water pressure determined by the adjustment of the spring 58 must be built up in the central chamber 30 to open the valve 52. The water then flows through the passage 42, is atomized as it passes through the vent 44 and is vaporized as it is swept through the vent 12 by the stream of air which is being discharged therethrough. To shut down the head, the water is turned off first; then the air. When the water pressure in the central chamber 30 drops, the spring 58 pushes the stem forward to seat the valve 52. Thus there is no residual dribbling through the vent 44. If in the operation of the head any solid matter should plug the vent 44, the water supply can be turned off briefly so that the pin 61 will be pushed through the vent 44 to dislodge the material blocking the vent.

It may be noted that the rear chamber 32 is sealed, so that even if a leak should develop in the diaphragm 34, the water entering the rear chamber could not escape to drip from the head but would soon equalize the fluid pressure on both sides of the diaphragm, with the result that the spring 58 would shut off the flow through the discharge passage 42. This is an important practical feature as humidifying heads of this type are often mounted above machinery which might be seriously damaged if water should drip from the head after a failure of the mechanism within.

Suitable materials are employed in the several parts of the head. The metal parts are preferably of brass or bronze; the washers are of rubber or an equivalent; and the diaphragm is of rubber with or without a reinforcing layer of nylon textile fabric or the like.

I claim:

A humidifying head comprising a body having a hollow conical nose with a discharge vent in the apex thereof, an inner conical member nested in and spaced from said hollow nose to form a conical chamber communicating with said discharge vent, said inner member having an axial passage therethrough aligned with said discharge vent, the forward end portion of said axial passage being of reduced diameter, said body also enclosing central and rear chambers and having an internally threaded tubular rear end portion, a flexible diaphragm mounted in said body to separate said central chamber from said rear chamber, an axial stem secured to the center of said diaphragm and extending forward therefrom into said axial passage, a valve member mounted on said stem and movable therewith forward and rearward to close off said passage from said central chamber and to connect said passage and central chamber, a pin mounted on the forward end of said stem to project through the reduced

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forward portion of said passage when the stem is in its forward position and to be clear of said reduced portion of the passage when the stem is retracted to its rearward position, a spring in said rear chamber pressing said stem forward, a cup-shaped element screw threaded in the rear end portion of said body for adjustable support of said spring, said spring having its rear end seated in said element, and a plug screw threaded into said rear end portion of said body behind said element to seal said rear

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end portion, said body having a lateral inlet communicating only with said conical chamber and a second inlet communicating with said central chamber.

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