

March 15, 1927.

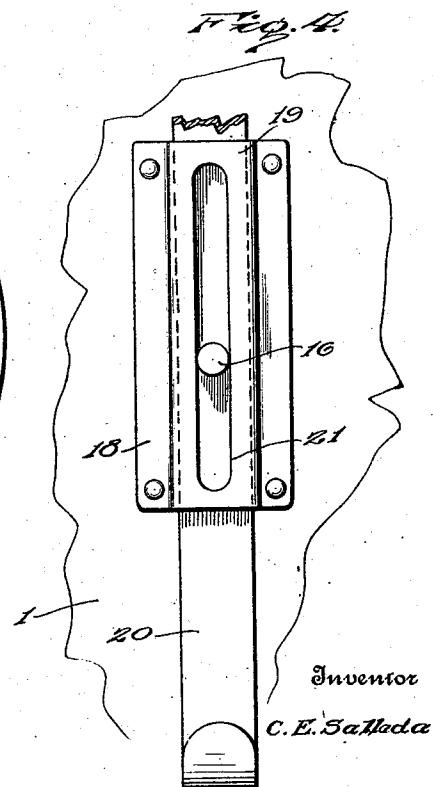
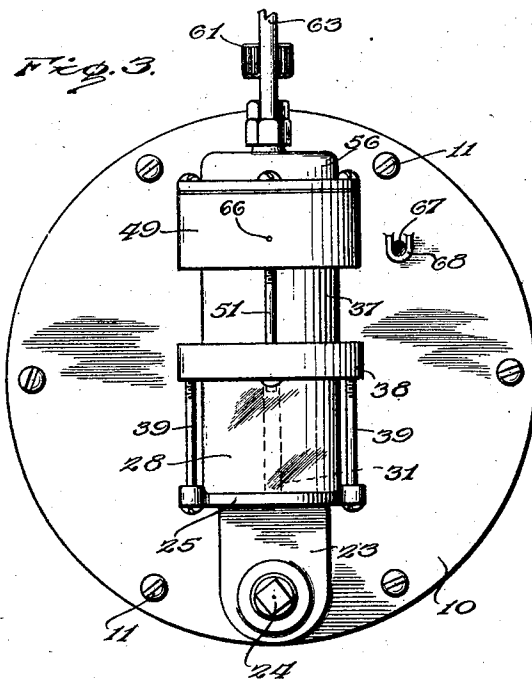
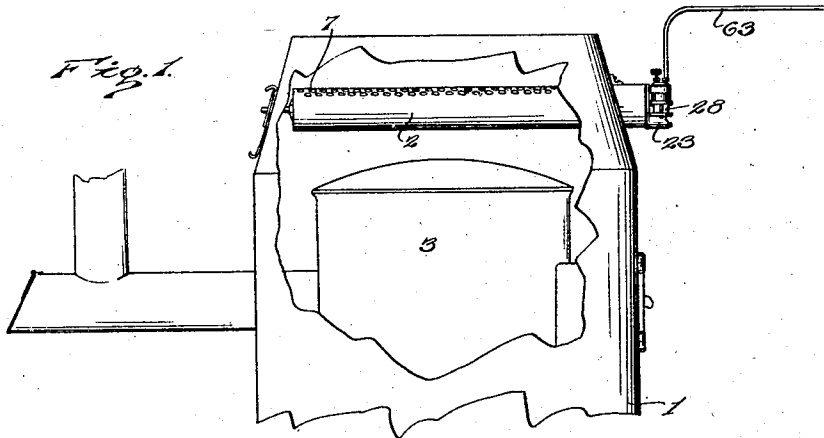
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1,621,436

AIR MOISTENER

Filed April 29, 1926

2 Sheets-Sheet 1



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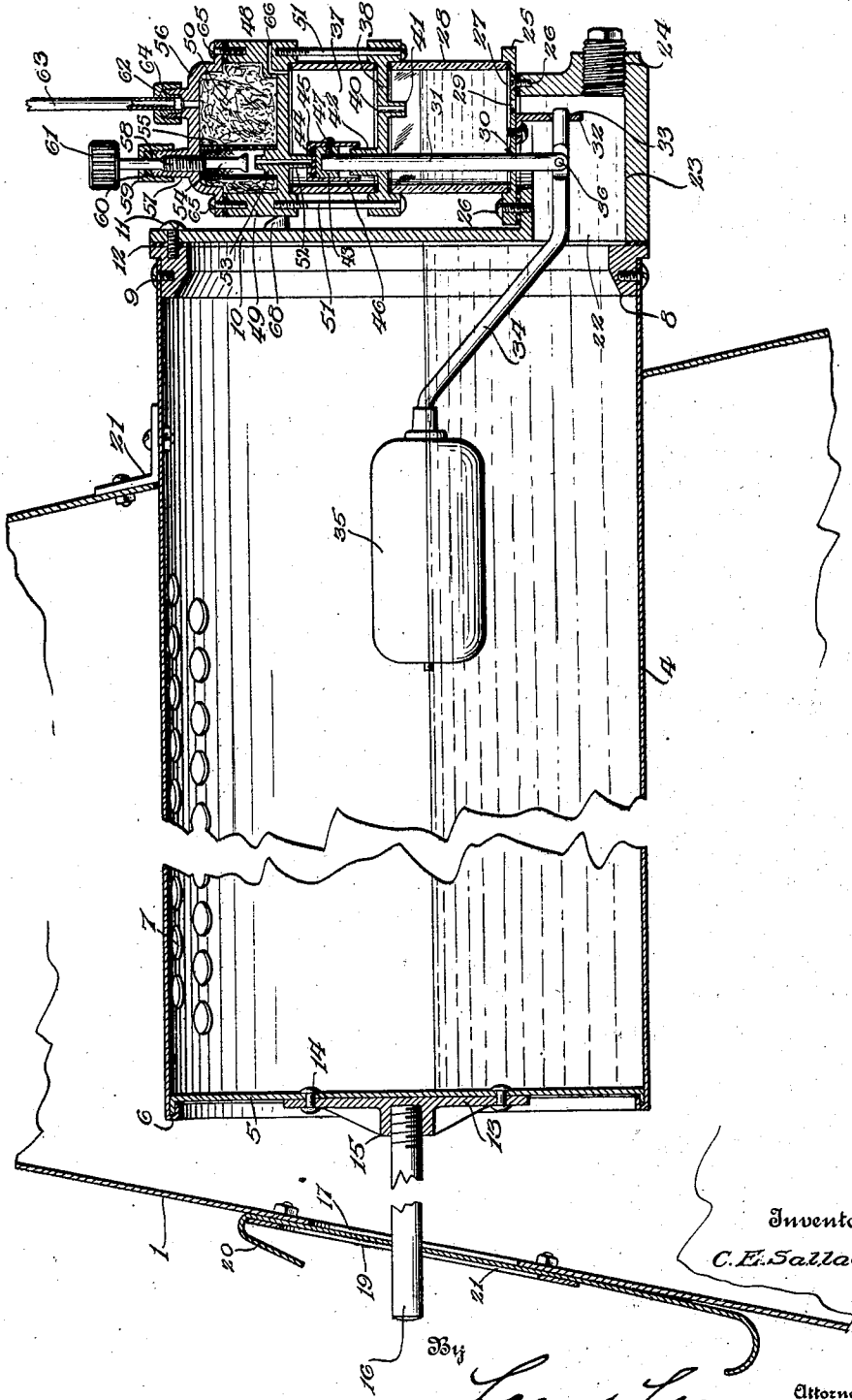
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UNITED STATES PATENT OFFICE.

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AIR MOISTENER.

Application filed April 29, 1926. Serial No. 105,567.

This invention relates to air moisteners or humidifiers and has for its object the provision of a simple and efficient mechanism whereby the hot air passing from a hot-air furnace into the rooms of a building will be caused to contain a percentage of moisture. It is well known that the hot air circulated through a building from a hot-air furnace is dry and tends to loosen the joints in furniture and in the woodwork of the building so that cracks open and drafts are created through the building and the furniture is rendered useless or so damaged that frequent repairs are necessary. Various devices have been heretofore proposed for imparting a moisture content to the air passing from the furnace through the heating flues but all such devices have been objectionable as they were costly to produce and install and were uncertain in their operation. The present invention provides a light device which may be easily applied to a furnace in operative position and which will need no attention through a long period of use when once properly installed and adjusted. The invention is illustrated in the accompanying drawings and will be hereinafter fully set forth.

In the drawings:

Figure 1 is a side elevation, partly broken away, of a portion of a hot-air furnace having my improved device installed therein;

Fig. 2 is an enlarged longitudinal section through the air-moistening device;

Fig. 3 is an end elevation of the device;

Fig. 4 is an enlarged detail of the means employed for supporting the inner end of the device and adjusting it to a level position.

The furnace 1 may be of any approved design, the air-moistening device of the present invention, indicated as an entirety by the reference numeral 2, being mounted in the outer shell of the furnace above the fire-box 3 of the same.

In carrying out the present invention, I provide a container 4 which may be a casting but is preferably of copper or other sheet metal which is quickly heated and is not apt to corrode. This container may be of any desired dimensions and the seam produced by rolling a blank into cylindrical form may be closed in any convenient man-

ner. The back end of the container is closed by a head plate 5 which is illustrated in Fig. 2 as being connected with the shell or wall of the container through an interlocking joint 6, and in order that this joint may be water-tight the parts are preferably brazed after the flanges have been fitted together. In the top of the container are a plurality of openings 7 through which the vapor arising from the water fed into the container may escape, and it will be understood, of course, that, while I have illustrated a number of openings extending in longitudinal series, the escape for the vapor may be in the form of a longitudinal slot. As shown clearly in Fig. 2, the container is inserted through the wall of the furnace and disposed therein so that one end will project beyond the furnace shell, this projecting end being fitted around a collar or ring 8 which is preferably of brass or aluminum so that it will withstand the effects of moisture and will not impart excessive weight to the apparatus. The end of the container is secured around this collar or ring by cap screws 9 inserted through the container shell into the ring, as shown, and may then be brazed or soldered so that a water-tight joint will be effected. This outer end of the container is closed by a head plate 10 secured to the ring or collar 8 by cap screws 11 and having a gasket 12 interposed between their opposed faces so as to attain a water-tight joint. The head plate 10 carries the regulating valve and water supply controlling elements, as will be hereinafter fully described. Secured to the back plate 5 is a plate or flange 13 which is preferably fastened in place by rivets 14, the inner heads of the rivets being brazed or soldered so that leakage around the same cannot occur. On the plate 13 is formed a threaded socket or boss 15 into which is screwed one end of a supporting rod 16 which projects outwardly through a slot 17 provided therefor in the shell of the furnace. Secured upon the outer side of the furnace shell at the sides of the slot 17 is a keeper and guide plate 18 which has its central portion offset to provide a vertical channel, as indicated at 19, whereby a supporting strip 20 inserted through the channel will be held close against the furnace shell and extend

over the slot 17 to cover the same. This supporting strip 20 is preferably a sheet metal tape or ribbon provided with an opening to receive the end of the rod or arm 16 and fit closely about the latter so that the arm and the inner end of the container 4 will be supported at such height as may be determined by the adjustment of the tape. The channel 19 is constructed with a vertical slot 21 through which the free end of the rod or arm 16 projects, as will be understood upon reference to Figs. 2 and 4. The parts having been assembled as described, the ribbon or supporting strip 20 is moved vertically through the channel 19 of the plate 18 until the container 4 is level, and the upper end of the strip is then bent over the upper end of the anchor plate 18, as clearly shown in Fig. 2, thereby maintaining the container 4 in its level position. This manner of supporting the inner end of the container is advantageous inasmuch as it is very simple and permits the container to be easily and quickly brought into a true level position, thereby tending to prevent overflow and permitting the use of a container of large capacity. This particular means for supporting the inner end of the container is especially desirable when applying the device to old furnaces which may have settled unevenly inasmuch as the container can be brought into a true level position notwithstanding the uneven mounting of the furnace. The outer end of the container is secured firmly to the furnace shell by a clip or bracket 21 which is bolted or otherwise secured to the furnace shell and to the top of the container, as clearly shown in Fig. 2. The exact manner of securing the clip is immaterial but if sheet metal screws be employed such screws will cut their way through the metal of the container and thereby firmly engage the same so that loosening or withdrawal will be prevented.

The ring 8 and the head plate 10 will preferably be castings of brass or other non-corrodible metal in order that the necessary rigidity and durability will be attained. The head plate is formed with an opening 22 through its lower portion, and upon the outer face of the head plate around said opening is formed a trough or U-shaped chamber 23 closed at its outer end but open at its top, and through the outer wall or closed end of the trough is fitted a drain plug 24 whereby the container may be drained when the furnace is shut down for the summer or cleaning or repairing may be necessary. Resting upon the trough 23 so as to cover the open top thereof is a bottom plate 25 which is secured to the trough by screws 26, as shown in Fig. 2. This bottom plate 25 has its upper surface recessed to provide a seat 27 for a cylinder 28 of glass or the like which constitutes a sight tube and packing is, of course, provided between the lower end edge of the sight tube and the bottom plate and also between the bottom plate and the trough so that water-tight joints will be attained. The bottom plate 25 is also provided with an opening 29 for the flow of water into the trough and with an opening 30 which constitutes a guide for a plunger rod 31 presently more particularly referred to. A bracket 32 is secured to the under side of the plate 25 between the openings 29 and 30 and in the depending portion of this bracket is formed a flared opening 33 which receives the outer end of a float rod 34 extending longitudinally of the trough 23 and into the container 4 to carry a float 35. This float 35 may be of any approved style and is preferably a rear elongated body of circular cross section. The opening 33 in the supporting bracket 32 is of sufficient diameter to permit free movement of the float rod and accommodate the angular relation of the same to the plunger rod 31 so that bending of the plunger rod or binding of the same in the guides through which it works will be avoided. It will be understood that the lower end of the plunger rod 31 is pivoted to the float rod, as shown at 36, and the plunger rod rises through the opening 30 and passes into a valve chamber 37 over the sight tube 28. It will be understood that the plunger rod and the float rod are connected as the parts are assembled. After the sight tube or cylinder 28 is in place, a central plate 38 is fitted over the upper end of the sight tube, packing being interposed between the said plate and the upper edge of the tube 28, as will be understood. This plate 38 is connected with the bottom plate 25 by long bolts 39 inserted through and engaged in the marginal portions of the respective plates so that, when these bolts are turned home, the plates 25 and 38 will be firmly clamped together and to the sight tube 28. The plate 38 has a drip opening 40 formed therethrough and preferably a nipple or drip nozzle 41 is formed on the under side of the plate around the said opening. The plate 38 is provided on its upper side with a boss or cylindrical guide 42 for the plunger rod and a guide opening is formed through the plate in axial alignment with the bore of the said guide. Secured upon the upper end of the plunger rod 31 is a plunger head or governor valve 43 having a gasket 44 resting on its upper end and held thereto by inturned flanges 45 formed at the upper end of a sleeve 46 which fits snugly around the plunger head or valve body 43 and depends below the same to fit around the guide 42 and constitute a water shed whereby the water will be prevented from dripping into the opening around the plunger rod. The guide

sleeve 46 is secured to the head or valve body 43 by a screw 47 which may also be utilized as the means for securing the head upon the plunger rod. Covering the upper end of the governor valve chamber 37 which may be provided by a tube or cylinder of brass or aluminum, as shown, is a plate 48 having a circular wall 49 rising from its upper side. This plate 48 with its wall 49 constitutes a filtering chamber which is packed with any filtering material 50, such as sponge, charcoal, or other well known filtering media. The filtering chamber is secured upon the tube or cylinder 37 by bolts 51 engaged in the marginal portions of the members 38 and 48, as will be understood. On the under side of the plate 48 is a nipple 52 which is aligned axially with the plunger rod 31 and extends downwardly to such a point that when the plunger rod is raised the packing 44 will be held close against the said nipple to cut off the flow therethrough. The bore of this nipple extends through the plate 48 and also through a boss or nipple 53 formed on the upper side of the plate, the upper extremity of the said nipple forming a seat for a regulating valve 54. Fitted snugly about the boss 53 is a strainer 55 which may conveniently be a tube of brass netting and of such length that when fitted about the boss it will be held between the plate 48 and a cap 56 secured to and upon the upper edges of the wall 49. Formed upon the cap 56 in axial alinement with the boss 53 is a guide tube 57 having a threaded bore to be engaged by the threaded stem 58 of the regulating valve 54. A gland 59 is provided to hold packing 60 around the valve stem and a milled head 61 is provided on the upper end of the stem to facilitate the adjustment of the valve. It will be readily understood that by rotating the head 61 and the valve stem the valve 54 will be set closer to or farther from the valve seat provided by the upper end of the boss 53 and, consequently, the space through which water may flow to the outlet will be more or less restricted. The cap 56 is also provided with a nipple 62 in which the end of the supply pipe 63 is secured by a coupling 64 of a well known slip joint type. The pipe 63 is connected with the main water supply pipe of the building and it is, of course, equipped at any convenient point with a cut-off valve whereby the inflow of water may be adjusted or cut-off entirely as when the furnace is shut down for hot weather or repairs or cleaning may be necessary.

As shown and before stated, the container 4 is located in the top of the furnace over the fire-box so that it is exposed to the heat generated in the furnace. Consequently, the water flowing into the container will be evaporated, the vapor escaping through the openings 7 and passing out through the hot-

air flues. Assuming the container 4 to be free of water, the float 35 will, of course, be at the bottom thereof and the plunger 31 will be lowered so that the lower end of the sleeve 46 will rest upon the intermediate plate 38, and water admitted to the device may flow through the nipples 53 and 52 into the regulating chamber 37 and thence pass through the drip 40, the sight tube and the opening 29 into the trough 23. The water will accumulate in the trough until it reaches a level which will permit it to flow through the ring 8, after which it will flow into and accumulate in the container 4 until the float 35 has been raised to such a point that the governor valve will seat against the drip nipple 52 and cut-off the further flow. The rate of flow of the water will, of course, be determined by setting the valve 54 and may be observed through the sight tube 28 so that a very exact adjustment may be effected. The inflowing water will be filtered by the filtering element 50 and further cleaned by flowing through the cylindrical screen 55 so that the water eventually passing through the device and into the container will be free of impurities and the accumulation of deposits in the container will be avoided.

By employing a complete cylindrical container instead of a semi-cylindrical or trough-like member, the capacity of said body is increased and the liability of overflow through a lessening of the fire and consequently diminishing evaporation will be minimized. The device may be easily installed by one workman and may be just as easily adjusted so as to permit a rate of inflow of water commensurate with the desired evaporation. The device may be made in any size according to the dimensions of the furnace in which it is to be installed and as the greater portion is of sheet metal it will be very light and, consequently, will not require heavy securing elements to maintain it in position in the furnace. The device is entirely automatic in its operation after being installed and adjusted inasmuch as the inflow of water will be cut-off when the rate of evaporation falls and will be instantly resumed when the rate of evaporation rises. In this device, there are no packing boxes connected with any of the working parts to cause the same to bind or stick and thereby detract from the efficiency of the device. Should it become necessary to renew the filtering agent, the screws 65 which secure the cap 56 upon the body of the filtering chamber are withdrawn, whereupon the cap may be lifted and swung about the water supply tube 63 without requiring dismantling of the entire device, the filtering agent and the screen being thus rendered accessible so that they may be simply lifted from the filtering chamber and renewed or cleaned.

After the new filtering agent is placed in position, the cap is returned to place and secured by the screws 65 as before. If, through long-continued use, the packing 44 should be worn, the bolts 51 may be withdrawn, whereupon the entire upper section of the device may be lifted slightly and swung about the water supply pipe 63 thereby exposing the governor valve. The body 37 may then be lifted from its place giving access to the screw 47, the removal of which will permit the guiding and water-shedding sleeve 46 to be withdrawn. New packing may then be easily placed upon the head or valve 43 and the parts restored to their normal positions by reverse operations. It may be necessary after several years' use to clean deposits from the container 4. By removing the screws 11, the plate 10 and all the parts associated therewith may be swung to one side without disconnecting the water pipe so that a scraper may then be inserted into the container and manipulated to withdraw the deposits. If the bracket or clip 21 be removed, the container may be rotated about its connection with the supporting arm 16 so as to be entirely withdrawn and subjected to a more thorough cleaning.

To avoid trapping of air within the governor chamber 37, a vent 66 is formed through the bottom and side of the filter body, and to take care of possible overflow which might occur through failure to cut off the inflow of water when the furnace has been shut down, I provide an opening 67 through an upper portion of the plate 10 and on the outer face of the said plate around the said opening form a small spout 68. In the event that such overflow should occur, the water will be directed by the spout 68 onto the cellar floor and will eventually reach the cellar drain, the arrangement directing the water away from the shell of the furnace so that rusting of the furnace under these conditions will be avoided.

Having thus described the invention, I claim:

1. An air-moistening device comprising a container for water, a head plate secured over the outer end of the container and having an opening through its lower portion communicating with the container, a trough formed on the head plate around the opening therethrough, a float rod supported at its front end within the trough and extending into the container, a valve casing mounted upon the top of the trough, means for connecting the upper end of the valve casing with a source of water supply, and a governor valve mounted within the casing and connected with the float rod to control the flow of water through the casing.

2. An air-moistening device comprising a water container, a head plate covering the outer end of the container and having a

trough on its outer side at its lower end communicating with the interior of the container, a valve casing resting on said trough and communicating therewith, a bracket on the lower end of the valve casing depending into the trough, a float rod having its outer end supported in said bracket for free movement and its other end extending into the container, a plunger carried by the float rod and extending upwardly therefrom within the valve casing, and a governor valve on said plunger rod controlling the flow through the valve casing.

3. An air-moistener comprising a container for water, a valve casing carried by the outer end of the container and in communication at its lower end with the container, said casing comprising a lower sight chamber and an upper valve chamber, means for connecting the valve chamber with a source of water supply, a plunger rod passing through the sight chamber of the valve casing and having its upper end within the valve chamber thereof, a valve carried by the upper end of the plunger rod and controlling the flow through the valve casing, and a float-controlled rod supported within the container and having the lower end of the plunger rod pivoted thereto.

4. An air moistener comprising a container for water, a valve casing mounted upon the outer end of said container and comprising a lower sight chamber in communication with the container, an intermediate valve chamber and an upper filtering chamber, means for connecting the filtering chamber with a source of water supply, a regulating valve within the filtering chamber controlling the communication between the same and the valve chamber, a governor valve within the valve chamber to cut off or permit flow from the filtering chamber to the valve chamber, float-controlled means for operating said governor valve supported below and extending upwardly through the sight chamber, and a drip port establishing communication between the valve chamber and the sight chamber.

5. An air moistener comprising a container for water, a valve casing carried by one end of the container and having communication at its lower end with the container, said casing comprising a lower sight chamber, an intermediate valve chamber and an upper filtering chamber, a drip port establishing communication between the valve chamber and the sight chamber, a boss on the bottom of the filtering chamber, a nipple depending from the top of the valve chamber aligned with the said boss, there being a bore extending axially through said nipple and said boss, a plunger extending through the sight chamber and having its upper end disposed within the valve chamber, a valve carried by the upper end of the plunger

adapted to fit against and close the lower end of the said nipple, float-controlled means within the container for operating said plunger, a screen fitted about the said boss and extending from the bottom to the top of the filtering chamber, a filtering medium within said chamber around the screen, a connection with the top of the filtering chamber for the inflow of water, and a valve mounted in the top of the filtering chamber and movable toward and from the boss therein within the screen. 10

In testimony whereof I affix my signature.

CLARENCE E. SALLADA. [L. S.]