

April 26, 1960

R. P. REDNER
HUMIDIFIER STRUCTURE

2,934,058

Filed April 1, 1957

3 Sheets-Sheet 1

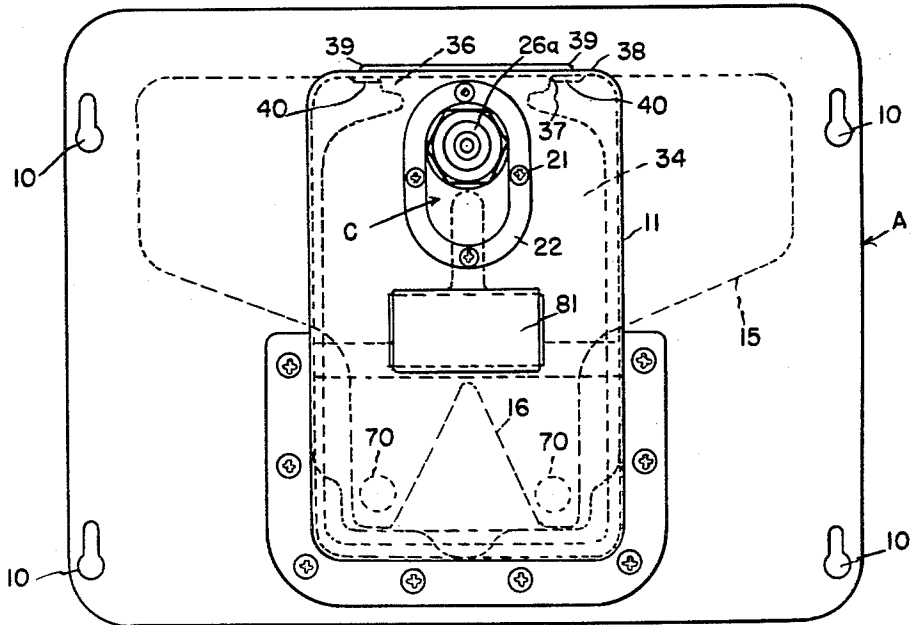


FIG. 2.

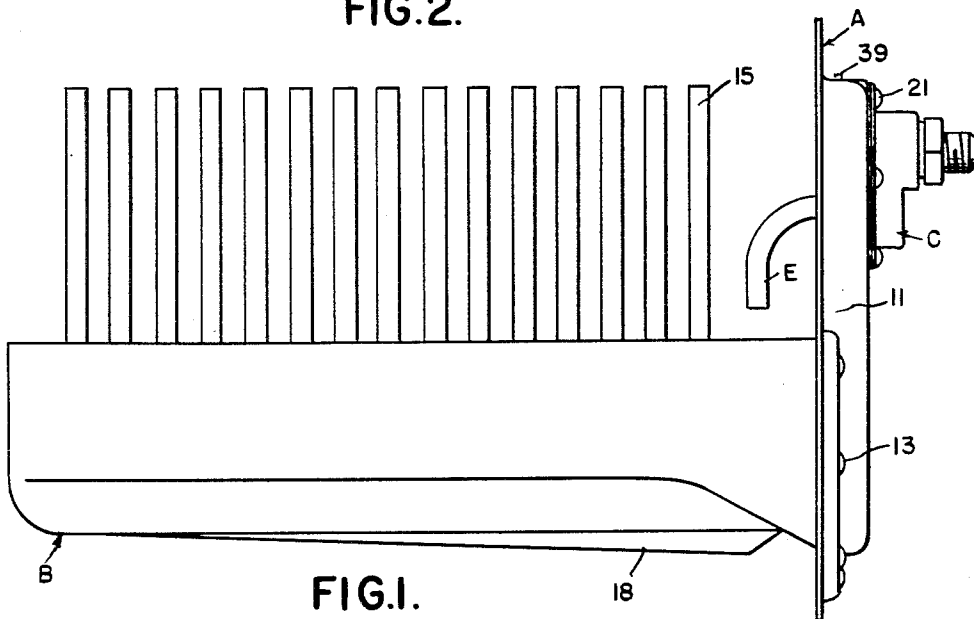


FIG. 1.

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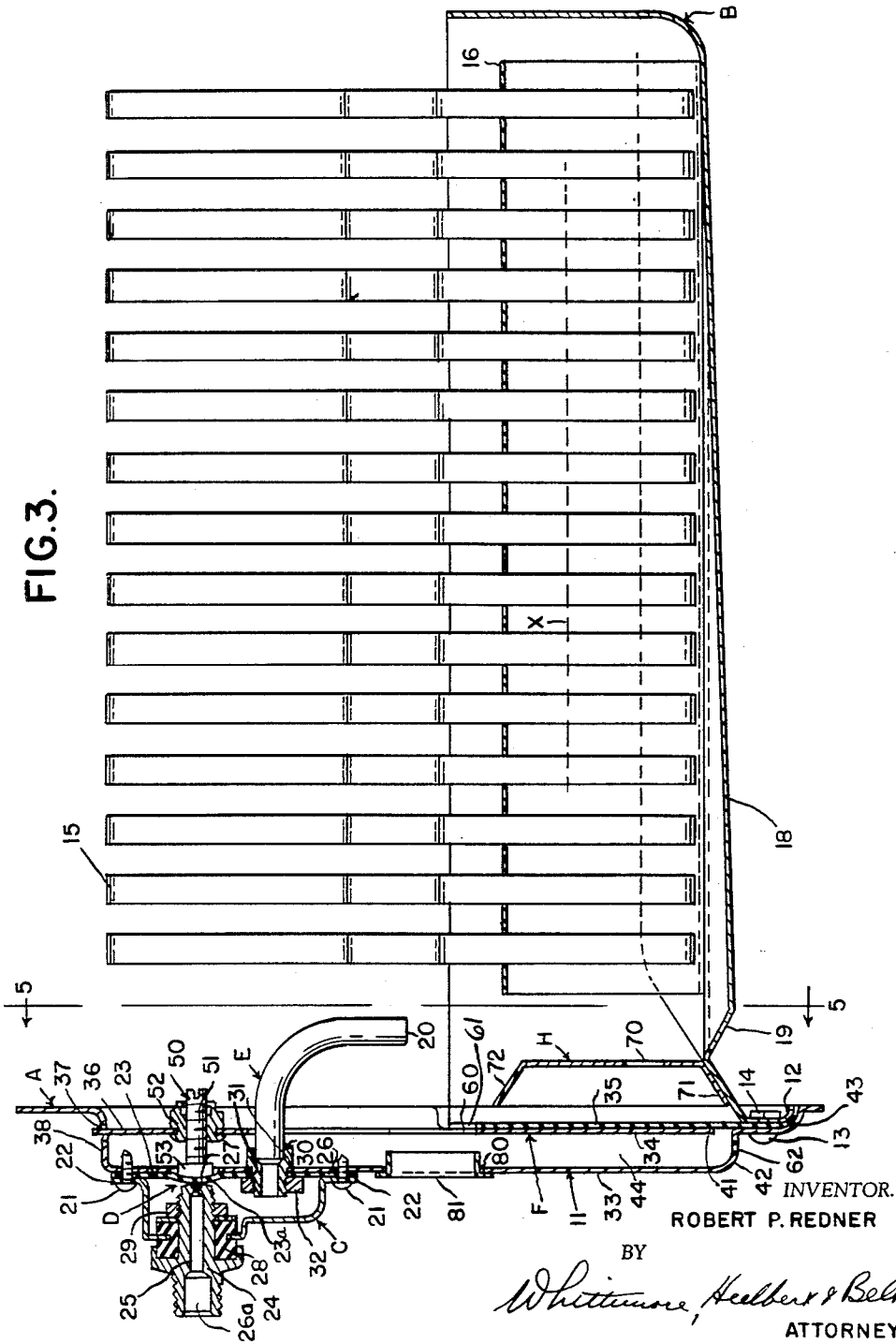
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FIG. 3.



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3 Sheets-Sheet 3

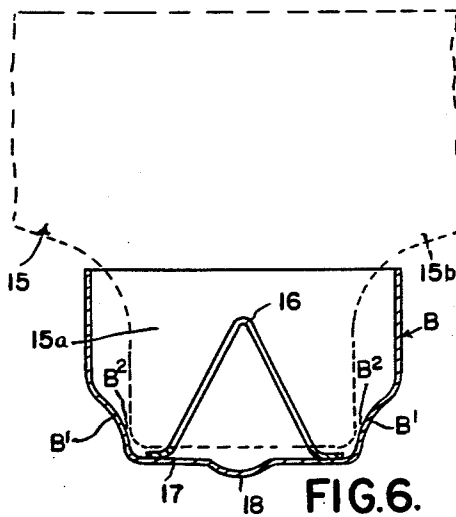
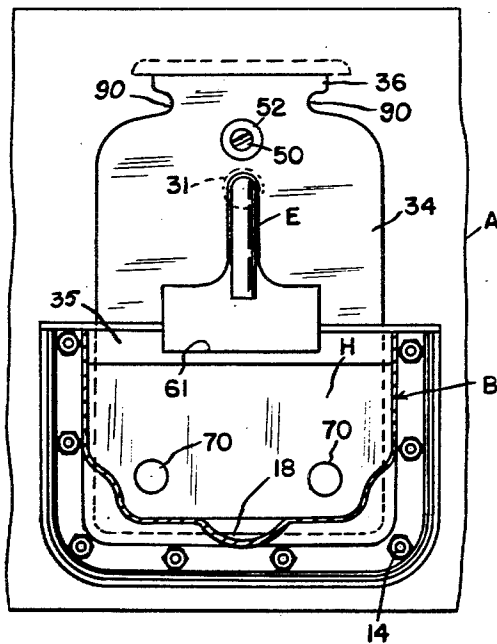
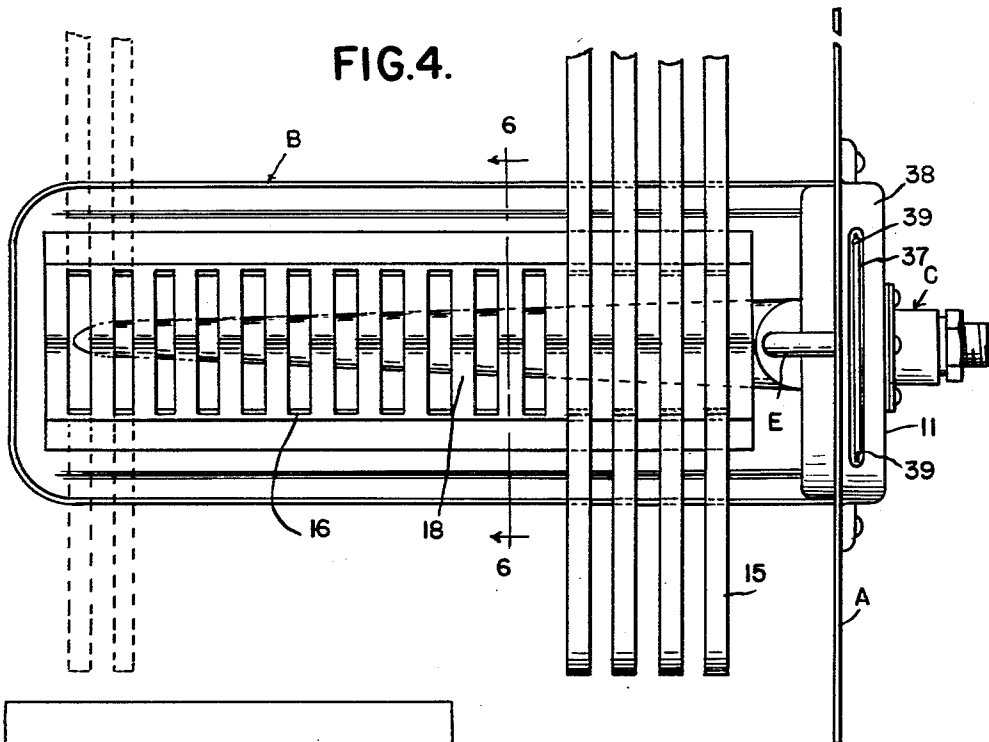


FIG. 5.

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2,934,058

HUMIDIFIER STRUCTURE

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Application April 1, 1957, Serial No. 649,940

12 Claims. (Cl. 126—113)

This invention relates generally to humidifier structures and refers more particularly to an automatically refillable structure adapted to be easily installed as a unit within a warm air furnace.

One of the essential objects of the invention is to provide a humidifier structure of the type mentioned having an upright face plate readily attachable to a wall of a plenum chamber or main warm air duct leading from a plenum chamber of a warm air furnace and constituting a common support for the remainder of the structure.

Another object is to provide a humidifier structure wherein a portion of the face plate mentioned is embossed outwardly to provide an inwardly opening enclosure and support for an efficient actuator for a valve adapted to regulate or meter the supply of water from a suitable source to the structure.

Another object is to provide a humidifier structure wherein the valve mentioned preferably includes two elements, one constituting the valve proper and having a movable portion, and the other constituting a fitting having a longitudinally extending passage provided at its outer end with a socket in which suitable tubing leading from a suitable source of water is connected, and provided at its inner end with a water discharge orifice of predetermined diameter constituting a seat for the movable portion of the valve proper.

Another object is to provide a humidifier structure wherein the valve proper under the control of the actuator mentioned and the water discharge orifice constituting a seat for the valve proper are upon the outer side of the embossed portion of the face plate and are completely enclosed within a housing or shell that is adapted, due to atmospheric pressure at the mouth of the drip tube, to contain a sufficient quantity of water to envelop the movable portion of the valve and its seat, whereby evaporation of water and the resulting accumulation of residue around the valve is effectively prevented.

Another object is to provide a humidifier structure wherein the actuator aforesaid is responsive to the static force or pressure of water in an open top evaporator pan structure.

Another object is to provide a humidifier structure wherein an operating connection between the actuator and the movable portion of the valve proper includes an element capable of being adjusted so that the regulating or metering action of the valve may be varied as desired.

Another object is to provide a humidifier structure wherein the valve proper and the enclosing shell have common attaching means for mounting the same upon the outer side of the embossed portion of the face plate.

Another object is to provide a humidifier structure wherein the fitting aforesaid of the valve is preferably secured in a grommet of sound deadening material anchored within an opening in the shell, whereby the grommet will absorb and thereby eliminate "water hammer-

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ing" and associated objectionable noises normally occurring when the movable portion of the valve proper opens and closes the discharge orifice.

Another object is to provide a humidifier structure wherein the valve actuator cooperates with the embossed portion of the face plate to form an overflow chamber for water rising above a predetermined level in the pan structure.

Another object is to provide a humidifier structure wherein the valve actuator preferably includes two elements, one being a plate of rigid material having its upper end suspended by laterally projecting ears thereof within substantially V-shaped depressions in the top of the embossed portion of the face plate and having its lower end terminating short of the bottom of said embossed portion so that said actuator plate may swing like a pendulum, and the other being a sheet of flexible material secured in surface to surface relation to the lower end portion of said actuator plate and having marginal portions respectively projecting laterally beyond opposite side edges and downwardly below the lower end of said actuator plate and secured to the pan structure and to the face plate below and beyond opposite sides of the embossed portions thereof, whereby said sheet of flexible material serves first as an actuating diaphragm for the actuator plate, secondly as a watertight seal between the actuator plate and face plate to preclude water in the pan structure entering the overflow chamber during normal operation of the structure i.e. when the water in the evaporator pan structure is below a predetermined level, thirdly to retain the actuator plate against undesired upward and/or lateral movements, and fourthly as a sealing gasket between the evaporator pan structure and the face plate to prevent leakage of water from the pan structure onto the parts of the furnace.

Another object is to provide a humidifier structure wherein the evaporator pan structure and the flexible sheet of the valve actuator have common attaching means for mounting the same upon the face plate.

Another object is to provide a humidifier structure wherein the open top evaporator pan structure is adapted to receive water from a drip tube projecting inwardly and downwardly from a tubular insert or sleeve extending through a wall of the valve enclosure, and is adapted to contain a predetermined number of spaced upright evaporator plates and a suitable supporting rack therefor.

Another object is to provide a humidifier structure wherein the bottom of the open top pan structure is provided longitudinally thereof throughout substantially its entire length with a depression or trough that tapers from front to rear both in width and depth to enable water in the pan structure to flow to all of the upright evaporator plates in said pan structure.

Another object is to provide a humidifier structure wherein the forward end of the trough just mentioned is below and substantially in vertical alignment with the outlet of the drip tube and is inclined downwardly and rearwardly to direct rearwardly in the pan structure the water received from the drip tube to thereby (1) prevent splashing of water out of the pan structure, and (2) to reduce the noise of water splashing into the pan structure at the start of the structure.

Another object is to provide a humidifier structure wherein the valve actuator has at a predetermined height relative to the bottom of the evaporator pan structure an opening through which water in the pan structure rising above such height will pass safely into the overflow chamber and thus will not overflow the edges of the pan structure onto parts of the furnace.

Another object is to provide a humidifier structure

wherein the lower end or bottom of the overflow chamber is provided with a drain opening to which any suitable drain tubing may be connected to carry off the overflow to any desired point for disposal purposes.

Another object is to provide a humidifier structure wherein the evaporator pan structure is provided adjacent its forward end below the overflow opening in the valve actuator with an upstanding baffle having at a predetermined height relative to the bottom of the pan structure one or more openings through which water in the pan structure may flow to bear against the flexible sheet of the valve actuator to operate the latter.

Another object is to provide a humidifier structure wherein the openings in said baffle are at such a height relative to the normal level of water in the pan structure that sediment will collect on the bottom of the pan structure and surface scum of water in the pan structure will be retained in the pan structure in rear of the baffle.

Another object is to provide a humidifier structure wherein the location of the baffle relative to the valve actuator is such that the baffle will protect the flexible sheet of the valve actuator against puncture or damage when a service man removes by tools (not shown) scale, scum, sediment and the like from the interior of the evaporator pan structure.

Another object is to provide a humidifier structure wherein the embossed portion of the face plate is provided with a normally closed opening through which a person may inspect the condition of the evaporator plates and the level of water in the pan structure.

Another object is to provide a humidifier structure that is simple and compact in construction, economical to manufacture, efficient in operation, light in weight, easily installed, and trouble free while in use.

Other objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings wherein:

Figure 1 is a side elevational view of a humidifier structure embodying my invention;

Figure 2 is a front elevation thereof;

Figure 3 is an enlarged longitudinal vertical sectional view through the structure shown in Figures 1 and 2;

Figure 4 is a top plan view of the humidifier structure, with parts broken away;

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 3; and

Figure 6 is a sectional view taken substantially on the line 6—6 of Figure 4.

Referring now to the drawings, A is the upright face plate, B is the open top evaporator pan structure, C is the housing or shell, D is the valve, E is the drip tube, F is the valve actuator, and H is the upstanding baffle of a humidifier structure embodying my invention.

As shown, the face plate A constitutes a common support for the remainder of the structure and is provided adjacent the four corners thereof with openings 10 through which suitable fastening elements (not shown) may be inserted for attaching the face plate to a wall of a plenum chamber or to a wall of a main warm air duct leading from a plenum chamber of a warm air furnace. Preferably a portion 11 of the face plate is embossed or offset outwardly to provide an inwardly opening enclosure and support for the valve actuator F.

The evaporator pan structure B is fastened to the inner side of the face plate A, preferably adjacent the lower end thereof, and projects inwardly therefrom. As shown, the pan structure B has an open outer end in rear of the valve actuator F and is provided at such open end below and upon opposite sides of the embossed portion 11 with a laterally projecting marginal flange 12 that is secured to the face plate A by suitable fasteners such as the bolts 13 and nuts 14. In the present instance, the pan structure B is adapted to receive water from the drip tube E and is adapted to contain a predetermined

number of spaced upright evaporator plates 15 and a supporting rack 16 therefor. Preferably, the bottom 17 of the pan structure is provided longitudinally thereof throughout substantially its entire length with a depression or trough 18 that tapers from front to rear both in width and depth to enable water in the pan structure to flow to all of the upright evaporator plates 15 in said pan structure. Also, the forward end portion 19 of the trough is below and substantially in vertical alignment with the outlet 20 of the drip tube E and is inclined downwardly and rearwardly to direct rearwardly in the pan structure the water received from the drip tube E to thereby (1) prevent splashing of water out of the pan structure, and (2) to reduce the noise of water splashing into the pan structure at the start of the humidifier structure. Opposite sides of the evaporator pan structure B are preferably provided longitudinally thereof with inwardly curved offset portions B' providing shoulders B² that are spaced relatively close to opposite upright side edges of the reduced or narrow lower end portions 15a of the evaporator plates 15 and serve to center the evaporator plates 15 in the pan structure so that the upper wider portions 15b of said plates will not come in contact with the upper edges of the pan structure. Hence there is no objectionable contact between the upper wider portions 15b of the evaporator plates 15 and the edges of the pan structure that might cause water from the wider portions 15b of the evaporator plates to run down the outside of the pan structure.

The housing or shell C is upon the outer side of the face plate A, preferably upon the outer side and adjacent the upper end of the embossed portion 11 thereof, and cooperates with said embossed portion to form a chamber. Any suitable fasteners such as the screws 21 may be employed to secure a marginal flange 22 of the shell to said embossed portion 11.

The valve D is within and adjacent the upper end of the housing or shell C and preferably comprises two elements 23 and 24 respectively.

In the present instance, the valve element 23 is a sheet or diaphragm of flexible material having a movable portion or valve proper 23a, and having marginal portions 26 secured by the screws 21 to the marginal flange 22 of the shell and to the embossed portion 11 of the face plate. Thus the screws 21 constitute a common attachment means for both the diaphragm 23 and the shell C. The other valve element 24 is a fitting having a longitudinally extending passage 25, and provided at its outer end with an exteriorly threaded nipple 26a attachable to an end of suitable tubing (not shown) leading from a suitable source of water. Such valve element or fitting 24 is also provided at its inner end with a water discharge orifice 27 of predetermined diameter constituting a seat for the movable portion 23a or valve proper of the diaphragm. As shown, the fitting 24 extends through a grommet 28 of sound deadening material anchored within an opening in the outer wall of the shell C and is held in place by a nut 29 upon the inner side of said grommet. Thus the grommet 28 will eliminate "water hammering" and associated objectionable noises normally occurring when the movable portion or valve proper 23a of the diaphragm opens and closes the discharge orifice 27.

A tubular insert or sleeve 30 extends through the diaphragm 23 and embossed portion 11 at the lower end of the valve enclosure or shell C and carries the drip tube E. Preferably the insert 30 has a shoulder 31 engaging the inner side of the embossed portion 11 and is threadedly engaged and held in place by a nut 32 upon the outer side of the diaphragm 23. One end of the drip tube E is anchored in the inner end of the insert 30. Preferably such drip tube extends inwardly and downwardly toward but terminates short of the evaporator pan structure B.

The valve actuator F is responsive to the static force or pressure of water in the evaporator pan structure B and controls the action of the valve D, especially the movable portion 23a of the diaphragm 23. Preferably this actuator F is substantially parallel to the front wall 33 of the embossed portion 11 of the face plate and comprises two laminated elements 34 and 35 respectively. In the present instance, the element 34 is an upright elongated plate of rigid material such as metal having a reduced upper end portion 36 extending upwardly through an opening 37 in the top 38 of the embossed portion 11 of the face plate and provided above said opening 37 with laterally projecting ears 39 engaging spaced aligned substantially V-shaped depressions 40 in the top 38 of the embossed portion 11 of the face plate. The lower end 41 of the plate 34 terminates short of the bottom 42 of the embossed portion 11 so that said plate 34 is suspended by said ears 39 from said depressions 40 and may swing therefrom like a pendulum. The other element 35 of the valve actuator F is an upright sheet-like diaphragm of resilient material having the center portion thereof secured in surface to surface relation to the lower end portion of the actuator plate 34 and having marginal portions 43 projecting laterally beyond opposite side edges and downwardly below the lower end of said actuator plate 34. Preferably, a suitable cement (not shown) is used to secure the center portion of the diaphragm 35 in surface to surface relation to the lower end portion of the actuator plate 34. However, any suitable securing means could be employed. In fact, the diaphragm 35 could be fused to the plate 34, if desired. Such marginal portions 43 are located between and are secured by the fasteners 13—14 to the face plate A and the lateral flange 12 of the evaporator pan structure below and at opposite sides of the embossed portion 11 of the face plate. Thus the valve actuator F spans and cooperates with the embossed portion 11 of the face plate to form an overflow chamber 44 for water rising above a predetermined level in the pan structure B, and the fasteners 13—14 constitute a common attaching means for both the pan structure B and the flexible sheet 35 of the valve actuator. Also, the marginal portions 43 cooperate with the face plate A and the lateral flange 12 of the evaporator pan structure to form a watertight seal.

The operating connection between the valve actuator F and the valve D includes a screw 50 capable of being adjusted so that the regulating or metering action of the valve D may be varied as desired. As shown, the screw 50 has a stem 51 extending through and threadedly engaging a nut 52 anchored within an opening in the actuator plate 34, and has a head 53 within an opening in the offset portion 11 of the face plate and bearing against the inner side of the movable portion 23a of the diaphragm 23 at a point substantially in horizontal alignment with the discharge orifice 27 of the fitting 24.

Normally the level of water in the pan structure B is approximately at the line X in Figure 3. However, provision has been made in the upright elongated plate 34 and in the upright diaphragm 35 at a predetermined height relative to the bottom of the pan structure to permit water in the pan structure rising above said height to pass safely into the overflow chamber 44, without overflowing the upper edges of the pan structure onto parts of the furnace. As shown, the plate 34 is provided with an opening 60, and the diaphragm 35 is provided with a cut-out notch 61. The opening 60 extends downwardly below the upper edges of the pan structure and extends upwardly to receive the drip tube E. The cut-out notch 61 is in the upper edge of the diaphragm 35 and is in registration with the lower end of the opening 60. The lower end 42 of the embossed portion 11, constituting the bottom of the overflow chamber 44, is provided with a drain opening 62 to which any suitable drain tubing (not shown) may be connected to carry off the overflow to any desired point for disposal purposes.

The baffle H is adjacent the forward end of the evaporator pan structure B, preferably in spaced substantially parallel relation to the valve actuator F and has at a predetermined height relative to the bottom of the pan structure one or more openings 70 through which water in the pan structure may flow freely to bear against the flexible sheet 35 of the valve actuator F to operate the latter. Preferably the lower end 71 of the baffle is rigidly secured to the bottom of the pan structure B, and the upper end 72 of said baffle is below the overflow opening 60 and cut-out notch 61 respectively in the valve actuator plate 34 and the diaphragm 35. Actually the openings 70 in the baffle H are at such a height relative to the normal level X of water in the pan structure B that sediment will collect on the bottom of the pan structure, and surface scum of water in the pan structure will be retained in the pan structure in rear of the baffle. Moreover, the location of the baffle H relative to the valve actuator F is such that the baffle H will protect the flexible sheet or diaphragm 35 of the valve actuator against puncture or damage when a service man removes by tools (not shown) scale, scum, sediment and the like from the interior of the pan B.

To enable a person to inspect the condition of the evaporator plates 15 and the level of the water in the pan structure B, the embossed portion 11 of the face plate is provided in horizontal alignment with the opening 60 in the plate 34 with a sight opening 80 that is normally closed by a removable closure or cover 81.

In use, water from a suitable source such as a cold water pipe of a regular water pressure system may be conducted by suitable tubing (not shown) to the passage 25 in the fitting 24. One end of such tubing would be secured within the socket 26 of the fitting. When the installation of the humidifier structure is completed in the plenum chamber or main warm air duct leading from a plenum chamber of a warm air furnace, there is no water in the evaporator pan structure B and hence there is no water pressure on the lower end of the valve actuator F. Accordingly, when water is initially supplied from the regular water pressure system to the fitting 24, such water may flow freely through the discharge orifice 27 past the diaphragm 23 into the shell C and thence through the drip tube E to the pan structure B. In this connection, the water from the drip tube E will initially drop onto the inclined portion 19 of the trough 18 in the pan structure B and will be directed rearwardly of the pan structure. Hence splashing of water out of the pan structure will be prevented, and the noise of water splashing in the pan structure will be reduced.

When the water level in the pan structure B rises to the opening 70 in the baffle H, then water in the pan structure will flow through said openings 70 into engagement with the flexible sheet 35 of the valve actuator F. When the water level in the pan structure B reaches the line X then the static pressure of water on the diaphragm 35 is sufficient to swing the lower end of the actuator plate 34 forwardly to thereby cause the screw 50 to press the movable portion 23a of the diaphragm 23 against the orifice 27 to close the same and thereby shut off the supply of water from the fitting 24 to the pan structure B. In this connection, the action of the valve actuator F is dependent upon the volume and/or static pressure of water in the pan structure B. However, as the pan structure B is installed within a warm air chamber or duct of a furnace (not shown) there is a tendency for the water in the pan structure to evaporate and thus additional water will be required from time to time in the pan structure. Therefore, as the water level in the pan structure B is lowered by evaporation, the static pressure of water against the diaphragm 35 is correspondingly less. Accordingly, the lower end of the actuator plate 34 is correspondingly relieved of pressure. This will cause the pressure exerted by the screw 50 against the movable portion 23a of the diaphragm 23 to be cor-

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respondingly relieved, so that water from the fitting 24 may again flow through the orifice 27 into the shell C and thence through the drip tube E into the pan structure B. Thus it will be appreciated that the static pressure of the water in the pan structure B operates the diaphragm 35 and plate 34 of the actuator F to cause the diaphragm 23 to control the opening and closing of the orifice 27 in the fitting 24. Moreover, it will be appreciated that the valve D is upon the outer side of the face plate A and is within a complete enclosure C that is adapted, due to atmospheric pressure at the mouth of the drip tube E, to contain a sufficient quantity of water to envelop the movable portion 23a of the valve D and the seat 27 therefor. Hence evaporation of such water in the enclosure and the resulting accumulation of residue around the valve is effectively prevented.

The trough 18 in the bottom of the pan structure B enables the water from the tube E to flow lengthwise of the pan structure beneath the evaporator plates 15 and thereby flow to all of said plates in the pan structure. The overflow opening 60 in plate 34 and cut-out notch 61 in diaphragm 35 of the actuator F provide a safety factor by permitting water to overflow from the pan structure B through said cut-out notch 61 and opening 60 into the overflow chamber 44 and thence through the drain opening 62 to the drain tubing (not shown). Thus water will not overflow the edges of the pan structure B onto portions of the warm air furnace.

Inasmuch as the diaphragm 35 has its center portion secured to the actuator plate 34 and has its marginal portions 43 secured to the face plate A, the portions of the diaphragm intermediate said center portion and said secured marginal portions serve (1) as a watertight seal between the actuator plate 34 and the face plate A and (2) as an operator for the actuator plate 34. The marginal portions 43 of the diaphragm serve as a sealing gasket between the marginal flange 12 of the evaporator pan structure B and the face plate to prevent leakage from the pan structure onto the parts of the furnace. The actuator plate 34 is also held against undesired upward and/or lateral movements by the connections 13-14 between the diaphragm 35, face plate A and flanges 12 of the pan structure B.

When assembling the valve actuator F with the face plate A of the humidifier structure, the valve actuator is tilted so that one ear 39 of the plate 34 may be inserted upwardly through the opening 37 in the top 38 of the embossed portion 11 of the face plate. While in such tilted position the plate 34 is then moved upwardly in the opening 37 until the other ear 39 passes upwardly through said opening 37. Then both ears 39 may be moved downwardly into the depressions 40. In this connection, the plate 34 is provided adjacent the reduced upper end 36 thereof with slots 90 for clearance purposes to permit the tilting action aforesaid. After the valve actuator has been assembled as described with the face plate A, the latter and the diaphragm 35 of the valve actuator are secured to the flange 12 of the pan structure B by means of the bolts 13 and nuts 14.

What I claim as my invention is:

1. A humidifier structure comprising an upright plate, an evaporator pan structure for water having a bottom, side walls, an end wall, and an open end opening toward and secured to said plate, an upright diaphragm closing the open end of said pan structure and responsive to the static force of water in said pan structure, said diaphragm having marginal portions between and secured to portions respectively of said pan structure and said plate, a portion of said plate being offset in spaced parallel relation to said diaphragm and cooperating with said diaphragm to provide an overflow chamber, said diaphragm being provided at a predetermined height relative to the bottom of said pan structure with a cut-out through which water in the pan structure rising above such height may pass into said overflow chamber, and means movable in

said offset portion and actuatable by said diaphragm to control the supply of water to said pan structure.

2. A humidifier structure comprising an upright plate, an evaporator pan structure for water having a bottom, side walls, an end wall, and an open end opening toward and secured to said plate, and means for regulating the supply of water to said pan structure, including a movable valve element, an actuator having two laminated parts, one being an upright flexible diaphragm closing the open end of said pan structure and responsive to the static force of water in said pan structure, said diaphragm having marginal portions between and secured to portions respectively of said pan structure and said plate, a portion of said plate being offset outwardly relative to said diaphragm to provide an inwardly opening enclosure, the other of said laminated parts being an upright rigid member movable within and suspended from a portion of said enclosure, said suspended member being actuatable by said diaphragm, and means movable within said enclosure and actuatable by said suspended member for operating said movable valve element.

3. A humidifier structure having an upright face plate attachable to a wall of a warm air furnace and provided with an outwardly projecting embossed portion forming an inwardly opening enclosure, an evaporator pan structure for water upon the inner side of said face plate opposite said enclosure and having a bottom, side walls, an end wall, and an open end opening toward said face plate, said pan structure having at said open end a marginal flange secured to said face plate, and means for regulating the supply of water to said pan structure including a movable valve element, an upright flexible diaphragm substantially parallel to a portion of said enclosure, said diaphragm closing the open end of said pan structure and being responsive to the static force of water in said pan structure, a member movable within and suspended from a portion of said enclosure, said suspended member being actuatable by said diaphragm, and an element movable within said enclosure and actuatable by said suspended member for operating said movable valve element, said diaphragm having marginal portions between and secured to portions respectively of said face plate and said marginal flange to form a watertight seal, said diaphragm cooperating with said enclosure to provide an overflow chamber, and said diaphragm being provided at a predetermined height relative to the bottom of said pan structure with a cut-out through which water in the pan structure rising above such height may pass into said overflow chamber.

4. A humidifier structure having an upright face plate attachable to a wall of a warm air furnace and provided with an outwardly projecting embossed portion forming an inwardly opening enclosure, an evaporator pan structure for water upon one side of said face plate opposite said enclosure and having a bottom, side walls, an end wall, and an open end opening toward said face plate, said pan structure having at said open end a marginal flange secured to said face plate, and means for regulating the supply of water to said pan structure including a movable valve element, an upright, diaphragm substantially parallel to a portion of said enclosure, said diaphragm closing the open end of said pan structure and being responsive to the static force of water in said pan structure, an upright member movable within and suspended from a portion of said enclosure, said suspended member being actuatable by said diaphragm, and an element movable within said enclosure and actuatable by said suspended member for operating said movable valve element, said diaphragm having marginal portions between and secured to portions respectively of said face plate and said marginal flange to form a watertight seal.

5. A humidifier structure having an upright face plate attachable to a wall of a warm air furnace and provided with an outwardly projecting embossed portion forming an inwardly opening enclosure, an evaporator pan structure

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for water upon one side of said face plate opposite said enclosure and having a bottom, side walls, an end wall, and an open end opening toward said face plate and provided with a marginal flange, and means for regulating the supply of water to said pan structure including a movable valve element, an upright diaphragm substantially parallel to a portion of said enclosure, said diaphragm closing the open end of said pan structure and being responsive to the static force of water in said pan structure, an upright member movable within and suspended from a portion of said enclosure, said suspended member being actuable by said diaphragm, and an element movable within said enclosure and actuable by said suspended member for operating said movable valve element, said diaphragm having marginal portions between portions respectively of said face plate and the marginal flange of said pan structure to form a watertight seal, and a common means for attaching the marginal flange of said pan structure and the marginal portions of said diaphragm to said face plate.

6. In a humidifier structure, an evaporator pan structure for water having a bottom, side walls, an end wall, and an open end, and overflow chamber for water at the open end of said pan structure and having an inlet for water rising above a predetermined level in said pan structure, one wall of said chamber being an upright face plate attachable to a wall of a warm air furnace, a second wall of said chamber extending across and closing the open end of said pan structure, said second wall being an upright diaphragm responsive to the static force of water in said pan structure, said diaphragm having marginal portions between and secured to portions respectively of said pan structure and said face plate and cooperating therewith to provide a watertight seal, means for regulating the supply of water to said pan structure, including a movable valve element, and means actuable by said diaphragm for controlling the action of said valve element, and an upstanding baffle in said pan structure at the open end thereof in spaced relation to said diaphragm and having at a predetermined height relative to the bottom of said pan structure one or more openings through which water in said pan structure may flow into engagement with said diaphragm.

7. In a humidifier structure, an evaporator pan structure for water having a bottom, side walls, an end wall, and an open end, an overflow chamber for water at the open end of said pan structure and having an inlet for water rising above a predetermined level in said pan structure, one wall of said chamber being an upright plate, a second wall of said chamber extending across and closing the open end of said pan structure, said second wall being an upright diaphragm responsive to the static force of water in said pan structure, said diaphragm having marginal portions between and secured to portions respectively of said pan structure and said face plate and cooperating therewith to provide a watertight seal, means actuable by said diaphragm to control the supply of water to said pan structure, and an upstanding baffle in said pan structure at the open end thereof in space relation to said diaphragm and having at a predetermined height relative to the bottom of said pan structure an opening through which water in said pan structure may flow into engagement with said diaphragm, said opening in said baffle being also at a predetermined height relative to the normal level of water in said pan structure whereby sediment will be retained by said baffle in said pan structure and surface scum of water in said pan structure will be retained in said pan structure in rear of said baffle.

8. A humidifier structure having an upright plate provided with an outwardly projecting embossed portion forming an inwardly opening enclosure, an evaporator pan structure for water upon one side of said plate opposite said enclosure and having a bottom, side walls, an end wall, and an open end opening toward and secured

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to said plate, and means for regulating the supply of water to said pan structure including a movable valve element, a two part actuator, one part of said actuator being an upright diaphragm substantially parallel to a portion of said enclosure said diaphragm closing the open end of said pan structure and being responsive to the static pressure of water in said pan structure, said diaphragm having marginal portions between and secured to portions respectively of said pan structure and said plate and cooperating therewith to provide a watertight seal, the other part of said actuator being an upright member movable within and suspended from a portion of said enclosure, said suspended member being actuable by said diaphragm, and an element movable within said enclosure and actuable by said suspended member for operating said movable valve element.

9. A humidifier structure comprising an upright face plate attachable to a wall of a warm air furnace and provided with an outwardly projecting embossed portion forming an inwardly opening enclosure, an evaporator pan structure for water upon the inner side of said face plate opposite said enclosure and having a bottom, side walls, an end wall, and an open end opening toward and secured to said face plate, and means for regulating the supply of water to said pan structure, including a movable valve element, an actuator having two connected parts, one being an upright diaphragm substantially parallel to a portion of said enclosure, said diaphragm being secured to and closing the open end of said pan structure and being responsive to the static force of water in said pan structure, the other of said connected parts being an upright plate movable within and suspended from a portion of said enclosure, said suspended plate being actuable by said diaphragm, and an element movable within said enclosure and actuable by said suspended plate for operating said movable valve element, said suspended plate and said face plate being provided with horizontally aligned openings through which a person may inspect the interior of said pan structure.

10. A humidifier structure comprising an upright face plate provided with an outwardly projecting embossed portion forming an inwardly opening enclosure, an evaporator pan structure for water upon the inner side of said face plate opposite said enclosure and having a bottom, side walls, an end wall, and an open end opening toward and secured to said face plate, a housing cooperating with said face plate to form a chamber for water, a drip tube projecting from said chamber over and terminating above said pan structure, means for regulating the supply of water to said chamber, including a valve element movable in said chamber, means for controlling the action of said valve element, including an upright flexible diaphragm substantially parallel to a portion of said enclosure, said diaphragm being secured to and closing the open end of said pan structure and being responsive to the static force of water in said pan structure, and means within said enclosure and connected to said diaphragm for moving said valve element.

11. A humidifier structure comprising an upright face plate provided with an outwardly projecting embossed portion forming an inwardly opening enclosure, an evaporator pan structure for water upon the inner side of said face plate opposite said enclosure and having a bottom, side walls, an end wall, and an open end opening toward and secured to said face plate, a housing cooperating with said face plate to form a chamber for water, means for conducting water from said chamber to said pan structure, means for regulating the supply of water to said chamber, including a valve element movable in said chamber, and means for controlling the action of said valve element, including flexible means opposite said enclosure and secured to and closing the open end of said pan structure, said flexible means being responsive to the static force of water in said pan structure, a member within said enclosure and movable relative thereto, said

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movable member being actuatable by said flexible means, and an element within said enclosure and adjustably connected to said movable member, said adjustably connected element being operatively associated with said valve element.

12. In a humidifier structure, an upright face plate attachable to a wall of a warm air furnace and provided with an outwardly projecting embossed portion forming an inwardly opening enclosure, an evaporator pan structure for water upon the inner side of said face plate opposite said enclosure and having a bottom, side walls, an end wall, and an open end opening toward and secured to said face plate, means for regulating the supply of water to said pan structure including a movable valve element, an upright diaphragm opposite said enclosure and closing the open end of said pan structure, said diaphragm being responsive to the static force of water in said pan structure, an upright member movable within and suspended from a portion of said enclosure, said suspended member being actuatable by said diaphragm, and an element movable within said enclosure and actuatable by said suspended member for operating said movable valve element, said diaphragm having marginal portions between and secured to portions respectively of said face plate and said pan structure, and an upright baffle within said pan structure upon the inner side of and spaced from said upright diaphragm, said baffle having at

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a predetermined height relative to the bottom of said pan structure one or more openings through which water in said pan structure may flow freely to engage said diaphragm while permitting sediment to collect upon the bottom of said pan structure, said baffle being spaced sufficiently close to said diaphragm to effectively protect said diaphragm against accidental damage while sediment is removed from said pan structure.

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