

Dec. 25, 1934.

L. M. PERSONS

1,985,689

HUMIDIFIER

Filed March 6, 1931

2 Sheets-Sheet 1

Fig. 1.

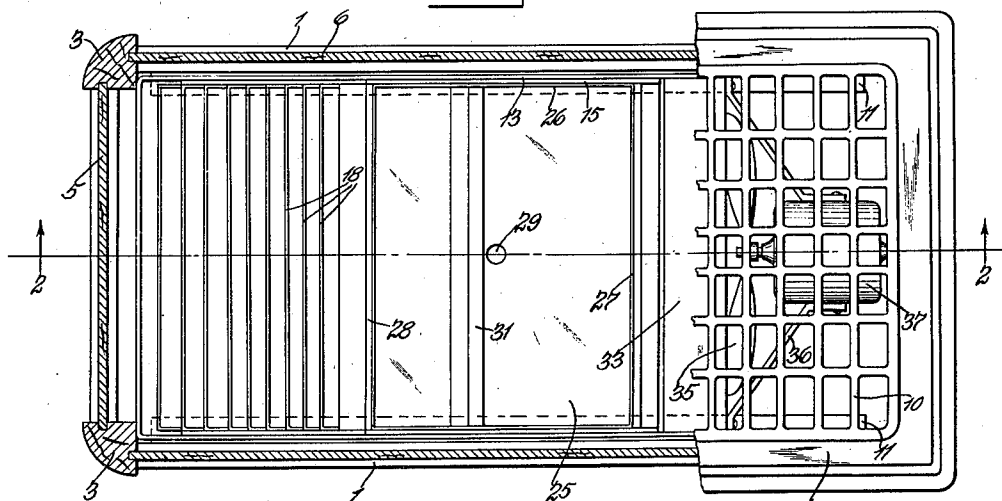
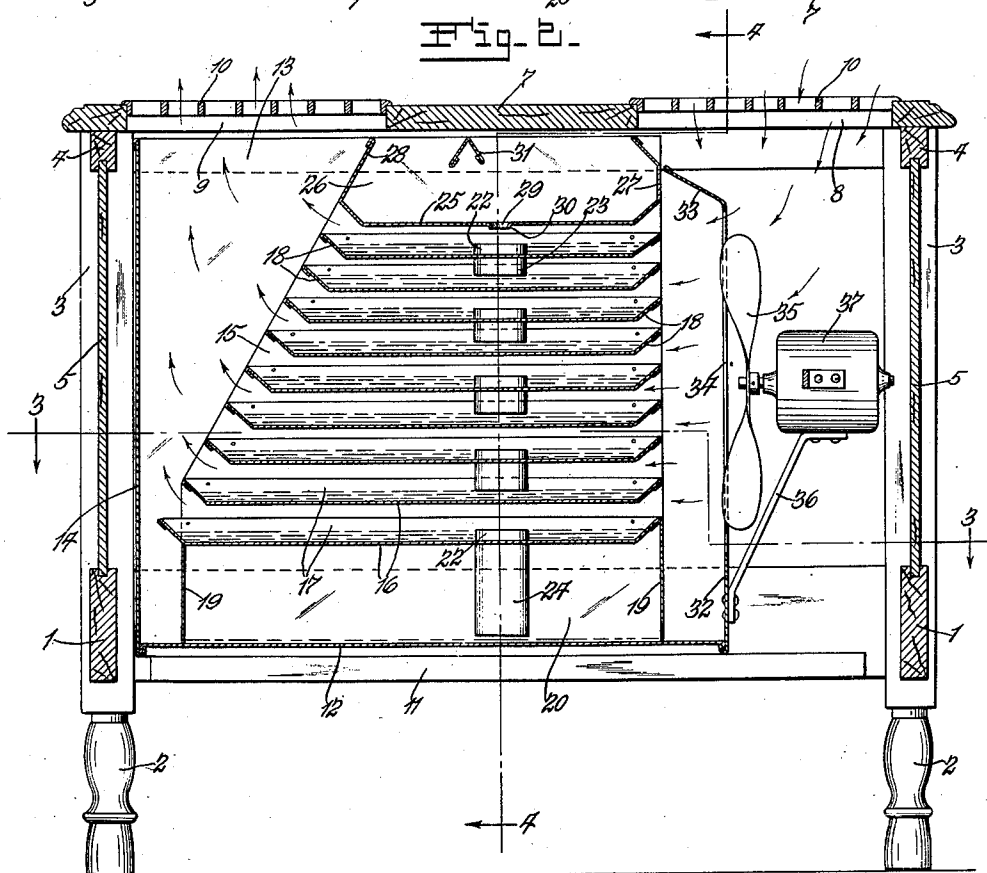


Fig. 2.



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2 Sheets-Sheet 2

Fig-3-

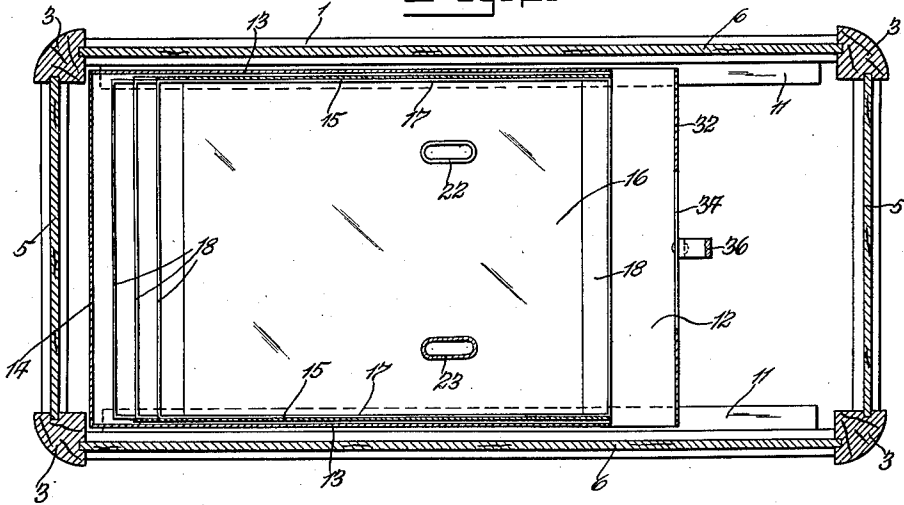


Fig-4-

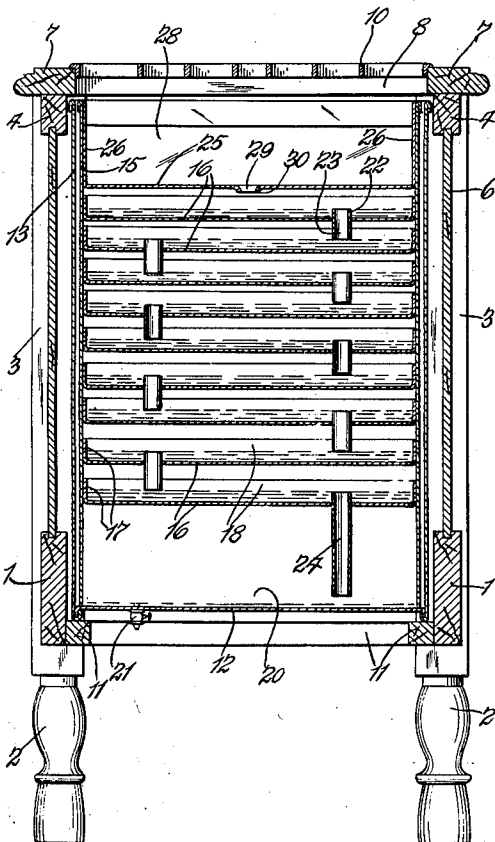
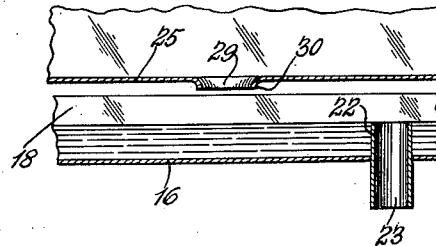


Fig. 5.



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UNITED STATES PATENT OFFICE

1,985,689

HUMIDIFIER

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corporation of Missouri

Application March 6, 1931, Serial No. 520,521

13 Claims. (Cl. 261—30)

This invention relates to humidifiers; and has special reference to humidifiers for humidifying the air so as to improve the condition of the air.

Objects of the invention are to provide an improved humidifier embodied and supported in an appropriately designed cabinet having openings to permit the air to pass into and from the cabinet so as to be properly conditioned as to humidity; a series of water-containing trays mounted in the cabinet, so that the air that circulates through the cabinet becomes humidified by passing in contact with or adjacent to the water; a blower enclosed within the cabinet for effecting the circulation of the air; and means for controlling and directing the passage of the air through the cabinet so that the air will be properly humidified during such passage.

Another object of the invention is to provide an improved ornamental portable humidifier embodying essential portions of the construction herein disclosed so as to operate in a satisfactory manner to obtain the desired results.

Other objects of the invention will appear from the following description, reference being made to the accompanying drawings, in which—

Fig. 1 is a view partly in horizontal section and partly in plan looking down upon and into the cabinet;

Fig. 2 is a vertical longitudinal sectional view of the humidifier approximately on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal sectional view approximately on the line 3—3 of Fig. 2.

Fig. 4 is a vertical sectional view approximately on the line 4—4 of Fig. 2.

Fig. 5 is an enlarged detail sectional view showing the water distributing devices.

My improved cabinet comprises a lower frame 1 mounted on ornamental supporting legs 2 formed at or secured to the lower ends of the vertical cabinet corner members 3. An upper frame structure 4 is attached to the upper ends of the cabinet corner members 3. End walls 5 and side walls 6 extend between the corner members 3 and from the lower frame 1 to the upper frame 4. The top 7 of the cabinet has near one end an air inlet opening 8 and near the opposite end an air outlet opening 9. Each of the openings 8 and 9 is equipped with a grid device 10 through the openings in which the air may freely pass, as clearly indicated in Fig. 2 of the drawings.

The lower frame 1 of the cabinet supports inside ledges 11 upon which the humidifying devices are removably supported. To permit removal and replacement of the humidifying devices, the top 7 of the cabinet is removable so as to open the top of the cabinet through which the humidifying devices may be inserted or withdrawn, as desired. Upon the ledges 11 an en-

closure having one end and the top thereof open rests. This enclosure may be made of sheet metal, or other appropriate material, and comprises a bottom wall 12, two side walls 13 rising from the side edges of the bottom wall 12 and an end wall 14 rising from one end of the bottom wall 12 to the height of the side walls 13 and having its side edges united with the adjacent ends of said side walls 13. The end wall 14 is below the outlet opening 9 and the opposite end of this enclosure, which is open, is relatively a considerable distance from the opposite end of the cabinet and below the inner portion of the inlet opening 8.

A pair of supporting side walls 15 are located between the side walls 13 and adjacent thereto respectively. These inner side walls 15 support the water trays, each of which comprises a bottom wall 16, vertical side walls 17 secured to and supported by the walls 15 and upwardly diverging end walls 18. These water trays may be of graduated lengths having their ends that are toward the air inlet opening 8 in vertical alignment and having their opposite ends below the outlet opening 9 and arranged in an inclined plane. In this arrangement, each water tray has its end that is below the outlet opening 9 extended beyond the next adjacent upper water tray so as to facilitate the movement and passage of the air upwardly as soon as the air passes from between the water trays. The ends of the lower water tray are connected with the bottom 12 by vertical walls 19, thus forming a lower receptacle adapted to receive and contain water and from which the water may be withdrawn through a drain valve 21 (Fig. 4) that may be opened to remove water from said receptacle 20 and closed to retain water therein. An oval tube or pipe section opens through the bottom wall 16 of each water tray and has a portion 22 extending above the bottom wall and a portion 23 extending below the bottom wall of the tray to which it is attached. The portions 22 terminate below the planes of the side and end walls of the respective trays and the portions 23 extend downwardly below the planes of the side and end walls of the next lower trays and approximately to the horizontal plane of the upper end of the upper portion 22 of the next lower pipe or tube section. By this arrangement, water is discharged downwardly through the respective trays and is maintained at equal depth in the respective trays, because when the water in any tray rises above the upper end 22 of the discharge pipe or tube, it will overflow into the next lower tray and so on. The lower ends 23 of the respective pipes or tubes contact with the water in the next lower trays respectively and, accordingly, do not support drops of water that might be carried away by the air moving through the cabinet. On the con-

trary, the air merely contacts with the surface of the water and is thereby appropriately and satisfactorily humidified without carrying any water of condensation. The lower end 24 of the drain pipe or tube that extends through the bottom wall 16 of the lowest water tray is considerably longer than the lower ends 23 of the remaining pipes or tubes in order to extend downwardly to a point near the bottom wall 12.

A filler tray is mounted above the series of water trays and comprises a bottom wall 25, side walls 26 extending to the upper edges of the side walls 15 and appropriately formed end walls 27 and 28 connecting the side walls 26 and forming baffles. The wall 27 is adjacent to the air inlet opening 8 and prevents the air from passing above the filler tray. The wall 28 is below the air outlet opening 9 and serves to cause the air to pass upwardly through said outlet opening. The bottom wall 25 has therethrough an opening 29 surrounded by a downwardly extended flange 30, which prevents the water from spreading over the under side of the bottom wall 25 when water is discharged through said opening 29 to fill or replenish the water. An approximately inverted V-shaped element 31 is attached to the side walls 26 of the filler tray and is intended to be used when water is poured into the filler tray to prevent splashing. By pouring the water onto the member 31, the stream of water is thereby split and retarded and is discharged into the filler tray without splashing. When it is desired to fill or replenish the water trays, the top of the cabinet may be removed to permit the water to be poured onto the member 31 as described and, after the filler trays have been refilled or replenished, the top of the cabinet may be replaced.

An end wall 32 rises from the end of the bottom wall 12 that is below the air inlet opening 8 and has its upper end 33 deflected and extended toward the end wall 27 of the filler tray (Fig. 2). This wall 32 has therethrough an air inlet opening 34 in or adjacent to which a blower device or machine 35 is located. This blower machine or device 35 is mounted on a support 36 attached to the end wall 32 and is removable from and replaceable in the cabinet with the remaining humidifying structure as a unit. The blower machine or device 35 may include an electric motor 37 equipped with the usual electric circuit connections whereby said motor may be optionally operated.

When the device is to be used, a sufficient amount of water is maintained in the water trays. The motor 37 is set in operation, thereby operating the blower device 35, thus drawing air through the air inlet opening 8 and driving the air between the water trays and across the upper surface of the water in said trays, so that the air becomes satisfactorily humidified. The humidified air is deflected upwardly and outwardly through the opening 9. The device is mounted in an appropriate ornamental cabinet, which is readily portable so that it may be easily moved from place to place.

It is now clear that my invention obtains all of its intended objects in a highly efficient and satisfactory manner and that it may be varied within the scope of equivalent limits without departure from the nature and principle thereof. I claim:

1. A humidifier comprising a cabinet having an air inlet passage through the top near one end and an air outlet passage through the top near the opposite end, a vertical series of vertically

spaced water trays in said cabinet, means for limiting the depth of water in said trays, a wall below said inlet opening having an opening opposite the adjacent ends of said water trays, and a blower mounted below said inlet opening adjacent said opening through said wall for drawing air through said inlet opening and driving said air between said trays and from said cabinet through said outlet opening.

2. A humidifier comprising a cabinet having an air inlet passage through the top near one end and an air outlet passage through the top near the opposite end, a vertical series of vertically spaced water trays in said cabinet, means for limiting the depth of water in said trays, a wall below said inlet opening having an opening opposite the adjacent ends of said water trays, a blower mounted below said inlet opening adjacent said opening through said wall for drawing air through said inlet opening and driving said air between said trays and from said cabinet through said outlet opening, and a support in said cabinet removably supporting said trays and said blower.

3. A humidifier comprising a cabinet, a top wall for said cabinet having an inlet opening near one end and an outlet opening near the opposite end, a vertical series of vertically spaced water trays in said cabinet below the space between said openings, means in connection with said trays for limiting the depth of water in said trays and for discharging water downwardly into and through the trays successively, a filler tray above the upper tray of said series having a discharge opening through the bottom thereof, and a water spreader in said filler tray for spreading and retarding the water poured into said tray.

4. A humidifier comprising a cabinet, a top wall for said cabinet having an inlet opening near one end and an outlet opening near the opposite end, a vertical series of vertically spaced water trays in said cabinet below the space between said openings, means in connection with said trays for limiting the depth of water in said trays and for discharging water downwardly into and through the trays successively, a filler tray above the upper tray of said series having a discharge opening through the bottom thereof, a water spreader in said filler tray for spreading and retarding the water poured into said tray, and a baffle wall opposite the end of said filler tray below said inlet opening substantially preventing passage of air above said filler tray from said inlet opening to said outlet opening.

5. A humidifier comprising a cabinet, a top wall for said cabinet having an inlet opening near one end and an outlet opening near the opposite end, a vertical series of vertically spaced water trays in said cabinet below the space between said openings, means in connection with said trays for limiting the depth of water in said trays and for discharging water downwardly into and through the trays successively, a filler tray above the upper tray of said series having a discharge opening through the bottom thereof, a water spreader in said filler tray for spreading and retarding the water poured into said tray, a baffle wall opposite the end of said filler tray below said inlet opening substantially preventing passage of air above said filler tray from said inlet opening to said outlet opening, an additional baffle wall below said inlet opening and having an air passage opposite said trays, and a blower supported in said cabinet opposite said air passage

for drawing air through said inlet opening and forcing said air between said trays and from the cabinet through said outlet opening.

6. A humidifier comprising a cabinet having an inlet opening through one end of the top wall thereof and an outlet opening through the opposite end of the top wall thereof and having an intermediate portion between said openings, a vertical series of vertically spaced water trays in said cabinet below said intermediate portion of said top wall having their ends approximately vertically aligned below said inlet opening and having their opposite ends terminating in a plane inclining upwardly toward the plane of said vertical ends, a filler tray above the upper water tray having an opening therethrough for discharging water into said upper water tray, baffle walls at the ends of said filler tray substantially preventing the passage of air from said inlet opening above said filler tray to said outlet opening, a baffle wall opposite the ends of said trays below said inlet opening and having an air passage opposite the ends of said trays, and a blower supported in said cabinet opposite said air passage for drawing air into said cabinet through said inlet opening and driving said air through said passage and between said trays and from the cabinet through said outlet opening.

7. A humidifier comprising a cabinet having an inlet opening through one end of the top wall thereof and an outlet opening through the opposite end of the top wall thereof and having an intermediate portion between said openings, a vertical series of vertically spaced water trays in said cabinet below said intermediate portion of said top wall having their ends approximately vertically aligned below said inlet opening and having their opposite ends terminating in a plane inclining upwardly toward the plane of said vertical ends, a filler tray above the upper water tray having an opening therethrough for discharging water into said upper water tray, baffle walls at the ends of said filler tray substantially preventing the passage of air from said inlet opening above said filler tray to said outlet opening, a baffle wall opposite the ends of said trays below said inlet opening and having an air passage opposite the ends of said trays, a blower supported in said cabinet opposite said air passage for drawing air into said cabinet through said inlet opening and driving said air through said passage and between said trays and from the cabinet through said outlet opening, a receptacle below said trays for receiving excess water, means for discharging excess water into said receptacle, and means for withdrawing water from said receptacle.

8. A humidifier comprising a cabinet, a top wall for said cabinet having an air inlet opening near one end and an air outlet opening near the opposite end, an enclosure in said cabinet having an open end adjacent said air inlet opening and having an open top below said air outlet opening, a vertical series of vertically spaced water trays in said enclosure, a device for discharging water into the upper water tray with means for preventing the passage of air over said device from said inlet opening to said outlet opening, and a blower supported in said cabinet below said air inlet opening for drawing air through said air inlet opening and forcing air between said trays and from the cabinet through said outlet opening.

9. A humidifier comprising a cabinet having an air inlet opening near one end of the top and an air outlet opening near the opposite end, and a

vertical series of vertically spaced water trays of graduated lengths and of respectively decreasing length from the lowest tray to the upper tray supported in said cabinet and having their ends below said inlet opening approximately in vertical alignment and their opposite ends below said outlet opening in a plane inclining upwardly toward the vertical plane of the first named ends of said trays.

10. A humidifier comprising a cabinet having an air inlet opening near one end of the top and an air outlet opening near the opposite end, a vertical series of vertically spaced water trays of graduated lengths and of respectively decreasing length from the lowest tray to the upper tray supported in said cabinet and having their ends below said inlet opening approximately in vertical alignment and their opposite ends below said outlet opening in a plane inclining upwardly toward the vertical plane of the first named ends of said trays, and a blower supported in said cabinet below said inlet opening for drawing air through said inlet opening and forcing air between said trays and from the cabinet through said outlet opening.

11. A humidifier comprising a cabinet having an air inlet opening near one end of the top and an air outlet opening near the opposite end, a vertical series of vertically spaced water trays of graduated lengths and of respectively decreasing length from the lowest tray to the upper tray supported in said cabinet and having their ends below said inlet opening approximately in vertical alignment and their opposite ends below said outlet opening in a plane inclining upwardly toward the vertical plane of the first named ends of said trays, a blower supported in said cabinet below said inlet opening for drawing air through said inlet opening and forcing air between said trays and from the cabinet through said outlet opening, and means for discharging water successively from the upper tray to the respective lower trays and preventing the moving air from entraining drops of water.

12. A humidifier comprising a cabinet having an air inlet opening near one end of the top and an air outlet opening near the opposite end, a vertical series of vertically spaced water trays of graduated lengths and of respectively decreasing length from the lowest tray to the upper tray supported in said cabinet and having their ends below said inlet opening approximately in vertical alignment and their opposite ends below said outlet opening in a plane inclining upwardly toward the vertical plane of the first named ends of said trays, a blower supported in said cabinet below said inlet opening for drawing air through said inlet opening and forcing air between said trays and from the cabinet through said outlet opening, means for discharging water successively from the upper tray to the respective lower trays and preventing the moving air from entraining drops of water, and baffle walls substantially preventing the passage of air through said cabinet other than between said trays.

13. In a humidifier having a vertical series of vertically spaced water trays, and means to direct a current of air between the trays, a vertical tubular member on each of the trays except the lowest one extending through the bottom of such tray and terminating above the bottom thereof to limit the depth of water therein and terminating below the level of water in the succeeding tray.

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