Sept. 19, 1933. P. MOHLER 1,927,593

AIR CONDITIONER

Filed Dec. 16, 1930

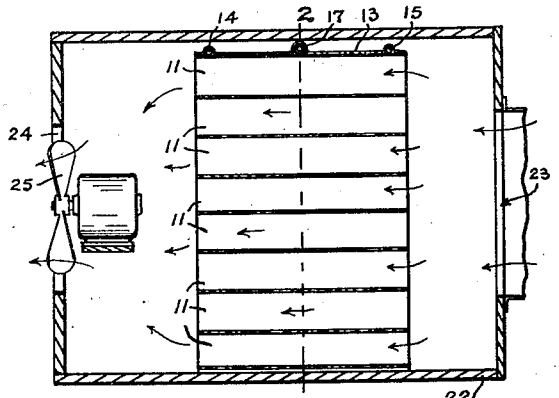


Fig. 1

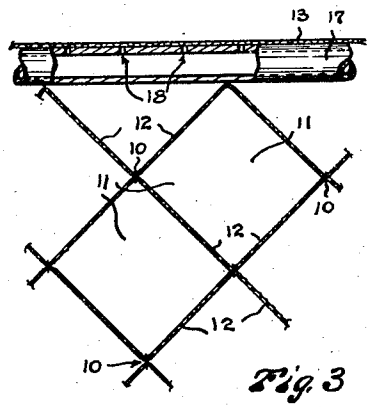


Fig. 3

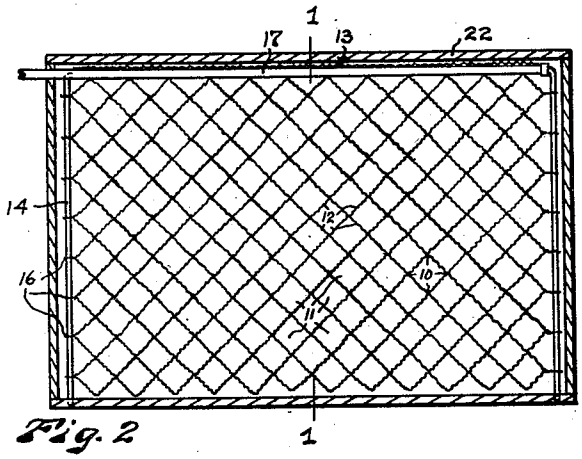


Fig. 2

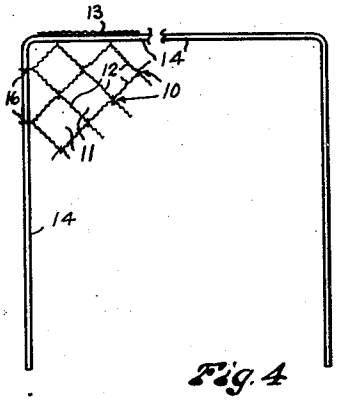


Fig. 4

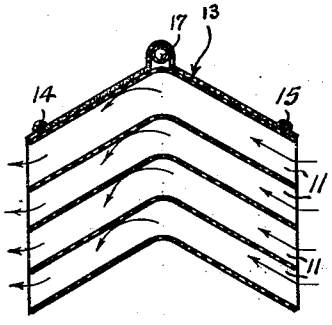


Fig. 5

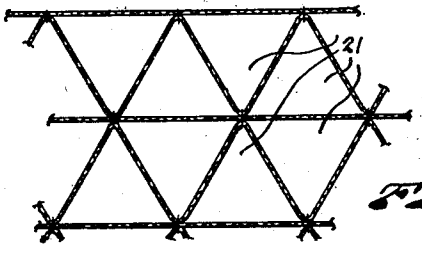


Fig. 6



Fig. 7

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AIR CONDITIONER

Paul Mohler, Seattle, Wash.

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Serial No. 502,687

10 Claims. (Cl. 261—103)

My invention relates to air conditioners and the general object of my invention is to provide a simple and efficient air conditioner which may be used to impart a desired temperature and humidity to air and to clean said air of dust, smoke and solid matter.

Another primary object of my invention is to provide an air conditioner embodying a conditioner member of flexible water absorbent material made into a shape which I have termed honey comb, to afford a plurality of contiguous side by side parallel passageways through which air may pass, said passageways being of suitable cross sectional shape to cause the air to take up a whirling or spiraling motion as it passes therethrough thus promoting contact of all of the air with the walls of the passageways and more efficiently cleaning, humidifying and tempering said air.

Another primary object of the invention is to provide an air conditioner member of flexible absorbent material which is capable of being bent or distorted out of its normal shape to thereby provide passageways which are not straight, whereby the direction of movement of the air will be changed within said passageways and whereby said air will be directed against the walls of the passageways to better clean and humidify and temper the same.

Another primary object of the invention is to provide novel and efficient means for producing an even distribution of water throughout the walls of the air conditioner member.

Other and more specific objects of the invention will be apparent from the following description taken in connection with the accompanying drawing.

In the drawing Figure 1 is a view in vertical section of an air conditioner constructed in accordance with my invention.

Fig. 2 is cross section of the same, taken through the air conditioner member substantially on broken line 2—2 of Fig. 1.

Fig. 3 is a detached view on a larger scale of a fragment of the air conditioner member.

Fig. 4 is a detached view of a frame member which may be used for supporting my air conditioner member.

Fig. 5 is a sectional view showing my conditioner member supported in a distorted position to afford air passageways which are bent or distorted from a straight line.

Fig. 6 is a fragmentary cross section of a conditioner member in which the passageways are of triangular shape.

Fig. 7 is a fragmentary cross sectional view showing an adaptation of an open trough for supplying water.

Like reference numerals designate like parts throughout the several views.

My air conditioner member as disclosed in Figs. 1 to 5 is constructed of flexible absorbent material sewed or otherwise fastened together at the locations 10 to form a plurality of substantially rectangular or diamond shaped air passageways 11 enclosed by inclined walls 12. I have herein termed this conditioner member a honey comb construction because of its similarity to a honey comb. By the term honey comb I mean any cellular construction in which the passageways are contiguous and unobstructed from end to end and are separated from each other only by their own walls and, as seen in elevation or cross section present the appearance of a multiplicity of cells arranged in close formation. This honey comb construction differentiates from a construction in which a plurality of parallel plates or plane surfaces are used to form long narrow passageways. By using the honey comb construction in which the internal cross sectional dimensions of the air passageways are somewhere near equal in all directions I am able to obtain a spiraling or rotary movement of the air as it is drawn through said passageways, and this, I find, is a distinguishing characteristic of the honey comb construction and one which greatly increases the cleaning and humidifying and tempering efficiency of the conditioner. In contrast to this, I find that when the air is passed between adjacent flat surfaces, through relatively long narrow spaces, this spiraling of the air will not occur and the efficiency will not be so great and it will require more power to move a given amount of air. I contemplate making my conditioner unit of any desired flexible, absorbent material and I find that linen cloth of the variety commonly used for toweling is one material which is satisfactory for this purpose.

In making my air conditioner member I preferably sew a piece of material 13 across the top of the cell structure and may support the said conditioner member, preferably in a horizontal position, by two or more frame pieces 14 and 15 of inverted U shape, which are passed underneath the piece of material 13 and rest on suitable supporting means. The conditioner member may hang loosely, or it may be secured to the frame pieces, at its ends, as indicated at 16.

Water for keeping the conditioner member moistened is supplied through a pipe 17 which

extends across the top of the conditioner member underneath the absorbent strip 13. This pipe has a plurality of perforations 18 in its upper side. The strip 13 of flexible absorbent material rests on the pipe 17 and extends over the perforations 18 and helps, by absorption, to promote an even discharge of water from the perforations and to transmit this water to the walls 12 of the conditioner, to which said strip 13 is secured. Without this absorbent material 13 on the pipe 17 I find that it is very difficult to obtain an even distribution of the relatively small amount of water needed by the conditioner member, due to the fact that the water will not discharge evenly from the perforations 18 if they are left unobstructed, regardless of the direction in which they are turned. When the absorbent material 13 is placed over said perforations 18 the pipe 17 does not need to be exactly horizontal to obtain an even discharge of water and smaller perforations may be used. As an alternative in place of the perforated pipe 17, I may use an open trough 20, see Fig. 7, with the absorbent member 13 extending over the top of said open trough and dipping into the water. This is less satisfactory than the perforated pipe because it does not afford so efficient a means for regulating the amount of water supplied to the conditioner member.

All of the walls of the conditioner member shown in Figs. 1 to 5 are downwardly inclined so that gravity will help to promote the downward flow and absorption of moisture in these walls. In the triangular cell structure shown at 21 in Fig. 6 one of the walls of each passageway may be horizontal, but at least two of the walls of each passageway will be downwardly inclined.

The conditioner member may be placed in any passageway or conduit through which air is drawn, as for instance, it may be placed in a receptable 22 which has an air inlet 23 on one side of the conditioner member and an air outlet 24 on the other side of the conditioner member. A fan 25 may be positioned in the outlet 24 to induce or draw air through the air conditioner member and to drive said air to any desired location. I find that a better and more efficient spiraling of the air within the passageways 11 is obtained by drawing the air through said passageways than can be obtained by pressure methods. This spiraling air comes in contact with the moistened walls of the passageways and is efficiently tempered and humidified. Any solid matter, dust or dirt in this spiraling air will have a tendency to move outwardly, due to centrifugal force, and will be caught and held within the passageways. This conditioner may thus be used for cleaning air without moistening the conditioner member. The corners, in both the rectangular and triangular type of passageway, afford a place where the air may eddy and consequently more dirt and dust is deposited in these corners. These corners also tend to hold more moisture than other portions of the walls.

It will be noted that substantially the entire surface of the cloth is utilized in my conditioner member and that the air is passed over the surface of the cloth but is not passed through said cloth, and that the conditioner member is readily removable for cleaning.

In Fig. 5 I have shown the air conditioner member distorted in shape by using the pipe 17 as one support and elevating said pipe 17 a substantial distance above the horizontal top portions of the frame members 14 and 15. When this is done the two portions of each passageway 11 on opposite sides of the pipe 17 will be inclined relative to each other and the air, entering through one portion of the passageway will have its direction changed and will be directed against the walls of the other portion of the passageway thus increasing the cleaning efficiency of the conditioner member. Obviously more than one bend may be provided in each passageway and the sharpness of the bends may be great or little, as desired.

My conditioner may be used in warm weather for cooling and humidifying air, or it may be used in colder weather in connection with a heating plant for cleaning and humidifying air. It may also be used for de-odorizing and for various other purposes.

The method of operation of my air conditioner is believed to be clearly set forth in the foregoing description.

The foregoing description and accompanying drawing clearly discloses a preferred embodiment of my invention but it will be understood that this disclosure is merely illustrative and that such changes in the invention may be made as are fairly within the scope and spirit of the following claims.

I claim:

1. In an air conditioner, a conditioner member of flexible absorbent material and of honey comb construction affording a plurality of air passageways of substantially square cross section disposed with their walls at an incline of substantially forty-five degrees relative to the horizontal means for supplying water to the top of said conditioner unit whereby gravity and capillary attraction will tend to cause said water to travel down said inclined walls of said passageways to maintain said walls in moistened condition and means for passing air which is to be conditioned through said passageways.

2. In an air conditioner, a conditioner member of flexible absorbent material and of honey comb construction affording a plurality of passageways, therethrough, means for passing air through said passageways, a water container above said conditioner member, said container being open on the top whereby water may escape and flexible absorbent material resting upon said water container and connected with said conditioner.

3. In an air conditioner; a conditioner member of flexible absorbent material and of honey comb construction affording a plurality of passageways therethrough, means for passing air through said passageways, a water supply pipe at the upper portion of said conditioner member, said water supply pipe having upwardly directed water discharge openings therein and flexible absorbent material extending over said discharge openings and connected with said conditioner member.

4. In an air conditioner, a conditioner member composed of strips of flexible absorbent cloth secured together at intervals to form a honey comb construction affording a plurality of substantially horizontal air passageways, an auxiliary strip of cloth secured to the top of said conditioner member, a substantially horizontal water supply pipe extending across the top of said conditioner member underneath said auxiliary top strip of cloth, said pipe having upwardly directed perforations over which said cloth extends, and means for drawing air through said passageways.

5. In an air conditioner, a honey comb conditioner member formed of flexible absorbent material affording a plurality of contiguous air passageways which are unobstructed from end to end and are separated from each other by relatively thin absorbent walls, said passageways being of substantially square cross section and substantially uniform cross sectional area, said walls being inclined relative to the horizontal to promote a gravity distribution of moisture; means supplying water to the upper portion of said conditioner member, and air circulating means connected with one end of said conditioner member.

6. In an air conditioner, a cell like conditioner member of flexible absorbent material of honey comb construction affording a plurality of contiguous passageways therethrough, which are unobstructed from end to end and are separated from each other only by relatively thin flexible absorbent walls, said passageways being of substantially square cross section and the walls of said passageways being inclined relative to the horizontal to promote a gravity circulation of moisture, means for supplying water to the upper portion of said conditioner member, and means for drawing air through the passageways of said conditioner member.

7. In an air conditioner, a conditioner member composed of strips of flexible absorbent cloth secured together at intervals to form a honey comb construction affording a plurality of contiguous unobstructed air passageways of substantially square cross section through which air may pass longitudinally without penetrating said cloth, water supply means positioned to deliver water on the upper portion of said conditioner member and frame means supporting said conditioner member.

8. In an air conditioner, a conditioner member of flexible absorbent material and of honey comb construction affording a plurality of contiguous unobstructed air passageways of substantially square cross section, the walls of said passageways being inclined at substantially forty-five degrees relative to the horizontal, water supply means positioned to deliver water at the upper portion of said conditioner member whereby the walls of said passageways may be maintained in a moistened condition, and suction means connected with one end of said conditioner member whereby air will be drawn through said passageways.

9. In an air conditioner, a conditioner member of absorbent material and of honey comb construction affording a plurality of air passageways of substantially square cross section extending therethrough, the walls of said passageways being positioned in planes inclined relative to the horizontal, different longitudinal portions of said air passageways being inclined relative to each other, whereby the direction of movement of air will be changed in said passageways and said air will be brought into contact with the walls of said passageways, water supply means positioned to deliver water to the upper portion of said conditioner member, and means for producing a circulation of air through said passageways.

10. In an air conditioner, a conditioner member of flexible absorbent material and of honey comb construction affording a plurality of contiguous unobstructed air passageways therethrough, frame means supporting the end portions of said conditioner member and other frame means positioned above said end supporting frame means and between the two ends of said conditioner member and supporting the medial portion of said conditioner member in relatively elevated position whereby said passageways will be inclined downwardly in both directions from a location substantially midway between the two ends thereof, and water supply means positioned to deliver water at the apex of said conditioner member.

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