July 22, 1952 L. B. SUMMERHILL 2,604,311

FILTER MAT FOR EVAPORATIVE COOLERS

Filed June 19, 1950

Fig. 1

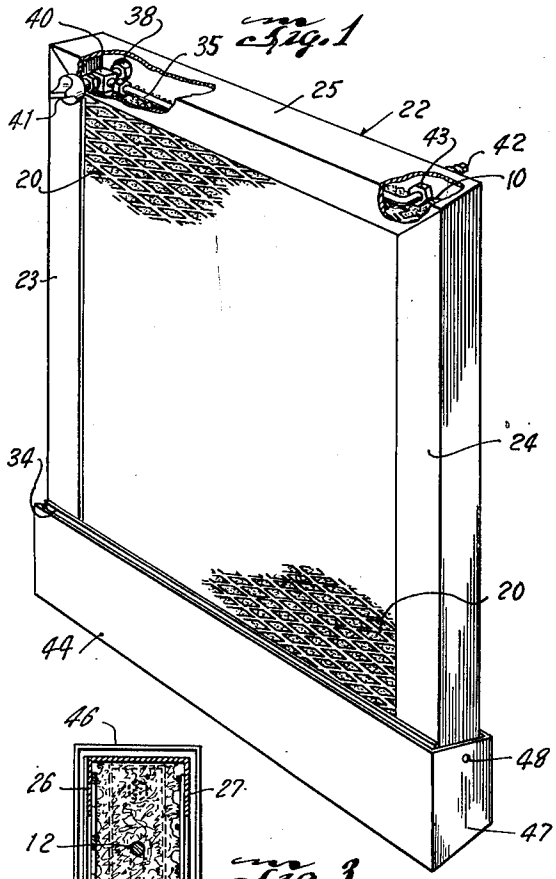


Fig. 2

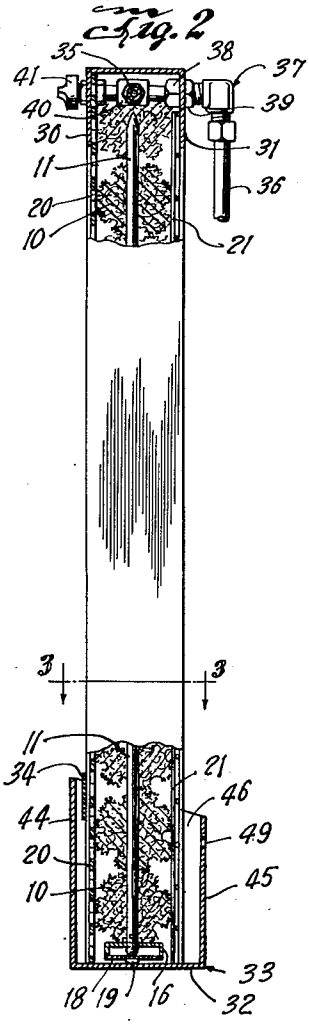


Fig. 3

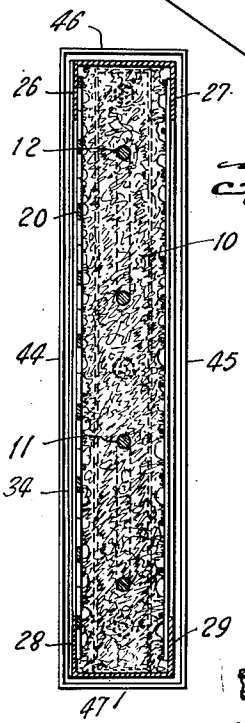
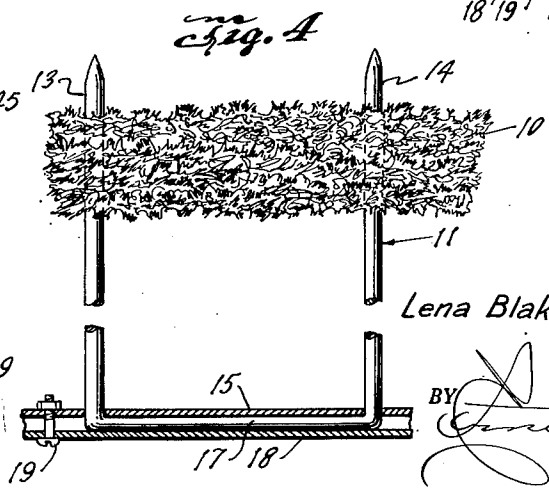


Fig. 4



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Patented July 22, 1952

2,604,311

UNITED STATES PATENT OFFICE

2,604,311

FILTER MAT FOR EVAPORATIVE COOLERS

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Application June 19, 1950, Serial No. 168,946

2 Claims. (Cl. 261—97)

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This invention relates to evaporative coolers and more particularly to such coolers having moistened filter mats through which passes the air to be cooled.

Evaporative coolers usually comprise a mat of moistened filter material through which passes the air which is to be cooled. The material of which the mat is composed is generally of a fibrous nature having a very large surface area which the air contacts in its passage through the mat. Since the surface of the fibrous material is moistened, evaporation of the water takes place at these surfaces as the air travels through the mat. It is important that all air passing through the mat come into contact with the surfaces of the fibrous material since air passing through any gaps in the mat will not be cooled. Furthermore, the air in contacting the moistened surfaces of the mat deposits most of the dust and other foreign material with which it is laden on the moistened surfaces of the mat and is in this manner filtered or cleansed in its passage through the mat. It is therefore desirable that the material of which the mat is made resist sagging even when moistened, that it provide a large surface area which can be moistened, that the fibrous material itself provide uniform interstices through which the air may pass, and that the means for mounting the mat facilitate the removal for cleaning of the mat and also its installation after cleaning.

Accordingly, it is an object of my invention to provide a new and improved evaporative cooler.

It is another object of my invention to provide a new and improved evaporative cooler having a mat of fibrous material.

It is another object of my invention to provide a new and improved evaporative cooler which is easily disassembled for cleaning.

It is another object of my invention to provide a new and improved mat for evaporative coolers.

It is still another object of my invention to provide a new and improved mat for evaporative coolers which is composed of luffa cores.

Briefly stated, my new and improved evaporative cooler is provided with a mat of the cores of luffa plants, a genus of tropical climbing herbs. Luffa cores have heretofore been employed mainly as sponges but I have discovered that they are ideally suited for use in mats for evaporative coolers since they do not sag when moistened, have interstices of more or less uniform size, and can be readily cleaned with soap and water when laden with dirt and reused again and again. According to my invention the luffa cores are impaled on substantially U-shaped rods to form the mat. The mat is then inserted in a flat rectangular frame which is provided with foraminous sides and with a perforated tube through which water is supplied to moisten the mat. The lower ends of the frame and the mat rest in a trough secured to a window. The mat

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and the frame can be easily removed from the trough and the mat can be easily removed and replaced in the frame to facilitate cleaning of the mat.

For a better understanding of my invention reference may be had to following description taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

In the drawing:

Figure 1 is a perspective view, with some parts broken away, of the evaporative cooler of my invention;

Figure 2 is a side view of the device shown in Figure 1 with some parts shown in section;

Figure 3 is a sectional view taken along line 3—3 of Figure 2; and

Figure 4 is a fragmentary view showing the manner of impaling the luffa cores to form a mat and the manner in which the impaling rods are held in position.

Referring now to the drawing, the mat is formed of luffa cores which are impaled on substantially U-shaped supporting members 11 and 12. The parallel members 13 and 14 of each supporting member 11 and 12 pass through suitable apertures in the web 15 of a channel member 16 and the connecting member 17 lies in the channel of the channel member 16. A strap 18 is detachably secured to channel member 16 by means of bolts 19 and maintains the supporting members 13 and 14 attached to channel member 16.

In practice, the luffa cores of the mat 19 are pressed into close relationship with no intervening spaces therebetween but in order to clearly show the shapes of these cores in transverse section, they are spaced apart in Figure 2.

One side of mat 10 abuts a foraminous cover 20 which may be formed of expanded metal while its opposite side abuts a foraminous cover 21 which may be formed of crossed wires.

The mat 10 and covers 20 and 21 are mounted in a substantially U-shaped frame 22 having parallel members 23 and 24 and a connecting member 25. Members 23, 24 and 25 are channel shaped and have parallel sides 26 and 27, 28 and 29, and 30 and 31, respectively, between which are disposed the outermost edges of three sides of mat 10 and covers 20 and 21. The edges of the fourth side of mat 10 and covers 20 and 21, rest on the bottom 32 of a trough 33. The sides 26 and 28 of parallel members 23 and 24 are connected near their lower ends by a bracing member 34 which may be rigidly secured to sides 26 and 28 by welding or by any other suitable means.

Secured to connecting member 25 and extending parallel to and between its sides 30 and 31 is a perforated tube 35.

One end of tube 35 is connected to a water supply tube 36 through a suitable fitting assembly 37 and is rigidly secured to side 31 of con-

necting member 25 by means of nuts 38 and 39 threaded on tube 35. A needle valve indicated generally by the numeral 40 having a handle 41 is provided to control the rate of flow of water into perforated tube 35. The other end of tube 35 is closed by a plug 42 and is similarly secured to side 31 by means of nuts 43, one of which can be seen in Figure 1. Perforated tube 35 extends above mat 10 and, when supplied with water through supply tube 36, it drips water on mat 10. The rate of flow of water onto mat 10 can be regulated by manipulation of handle 41 of needle valve 40.

Trough 33 has a pair of elongated sides 44 and 45, one of which, the side 44 is higher than the other. Each of the end walls 46 and 47 are provided adjacent their upper edges with an aperture 48, one of which can be seen in Figure 1. The apertures 48 are adapted to receive screws, not shown, which are employed to fasten trough 33 in a window. The lower side 45 is provided with an aperture 49 adjacent its upper edge through which the overflow, if any, of water collecting in trough 33 may escape. Should aperture 49 become clogged for any reason, the overflow would take place over the upper edge of lower side 45 precluding flow of water over the higher side 44 into the room into which the window opens.

The air may be drawn through mat 10 by natural drafts or by means of a fan, not shown.

The method of assembly of mat 10 and its installation in a window is very simple and easy. Supporting members 11 and 12 are secured to channel member 16 by bolting strap 18 to channel member 16. Luffa cores are then impaled on the supporting members 11 and 12 until a mat 10 is formed of approximately the proper dimensions. The covers 20 and 21 are then placed on opposite sides of mat 10 and mat 10 and covers 20 and 21 are slid between the sides 26 and 27, and 28 and 29 of members 23 and 24 respectively, until the upper edges of cover member 20 and 21 and mat 10 slide between the sides 30 and 31 of member 25. This assembly is placed in trough 33, secured in a window, with the lower edges of covers 20 and 21 and the bolts 19 resting on the bottom 32 of trough 33. The sash of the window is then lowered to rest on connecting member 25. If desired, the slits or apertures between members 23 and 24 and the sides of the window can be closed by any suitable means, such as stuffing, to prevent the flow of air into the room between members 23 and 24 and the sides of the window. The water supply tube 36 is then connected to perforated tube 35 and the handle 41, which is in the room, is manipulated to provide the proper rate of flow upon mat 10. It will be apparent that the luffa cores which compose the mat 10 can be easily removed, by employing the converse of the process just described, when they become dirty. The luffa cores can be easily washed in soap and water and again assembled into the mat 10. In this manner their useful life is prolonged and costly replacement of mat 10 each time it becomes dirty is made unnecessary.

The cover 20 is made of expanded material since it faces into the room and presents a better appearance than the intercrossed wires of cover 21.

The window mats, sometimes referred to as "flats," used dry in the winter, will filter out practically all the dust, and can be washed as soon as any noticable accumulation of dust is

trapped. With the house free from dust of incoming air, general health conditions are improved and the damage from dust to furnishings is reduced to a minimum.

Another outstanding advantage of using these "flats," or filtering and cooling mats, is the fact that windows can be left fully opened without danger of water damage in a heavy rainstorm. The householder can go to work in the morning, leaving all windows open which are equipped with these luffa "flats" and come to freshly aired quarters.

While I have shown and described a preferred embodiment of my invention it will be obvious that various changes and modifications can be made without departing from my invention and I, therefore, aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of my invention.

What is claimed is:

1. In an air filter mat, the combination comprising channel members defining the sides and top of an inverted U-shaped frame, a bracing member affixed to and extending from one to the other of said sides adjacent their lower ends, a water trough receiving the lower ends of said sides and to which the latter are secured, an inverted channel member disposed in and coextensive with the bottom of said trough, a plurality of U-shaped supporting members whose bight portions underlie the web of said inverted channel member and whose legs extend upwardly in parallelism with said frame sides through apertures in said web, said legs terminating in pointed ends spaced from the top of said frame, means coextensive with and secured to said inverted channel member and bearing against the bight portions of said supporting members to hold the same in relation to said inverted channel member, a series of luffa plant cores impaled on the legs of said supporting members in juxtaposition, a foraminous cover on each side of said frame and means in the top of said frame for distributing water on said luffa plant cores to be received in said trough.

2. In an air filter mat, the combination comprising channel members defining the sides and top of an inverted U-shaped frame, a water trough receiving the lower ends of said sides and to which the latter are secured, a plurality of U-shaped supporting members whose lower portions are disposed in said trough and whose leg portions extend upwardly in said frame and which terminate in pointed ends, a series of luffa plant cores impaled on the legs of said supporting members in juxtaposition, a foraminous cover on each side of said frame and means in the top of said frame for distributing water on said luffa plant cores to be received in said trough.

LENA BLAKE SUMMERHILL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
381,707	Libbey	Apr. 24, 1888
2,137,905	Church et al.	Nov. 22, 1938
2,160,003	Slayter et al.	May 30, 1939
2,182,501	Quave et al.	Dec. 5, 1939
2,404,479	Essick	July 23, 1946
2,408,158	Belsher	Sept. 24, 1946