Nov. 21, 1950 H. S. MULHOLLEN 2,530,535

AIR HUMIDIFIER AND FILTER

Filed Sept. 25, 1948

Fig. 1.

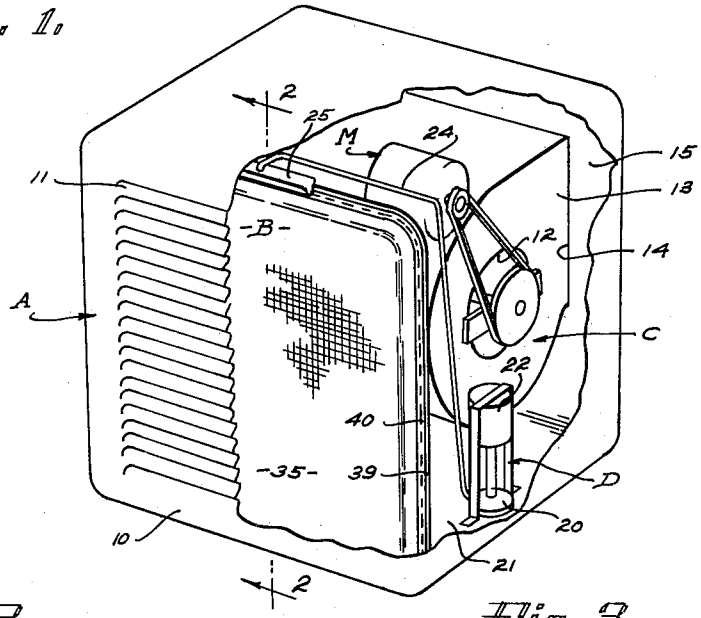


Fig. 2.

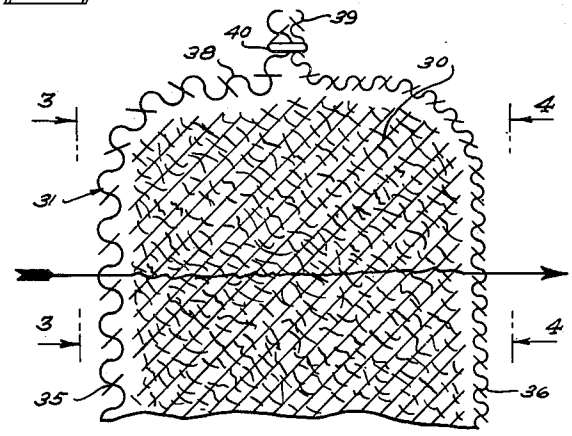


Fig. 3.

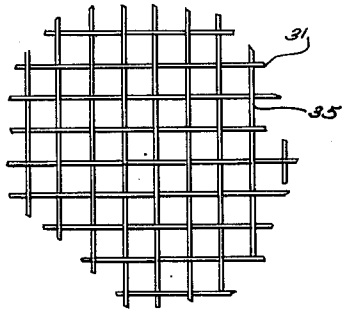
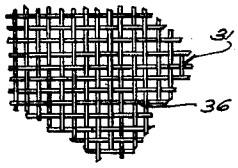
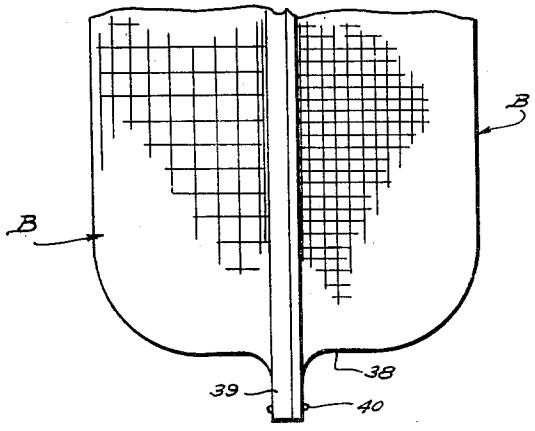


Fig. 4.





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AIR HUMIDIFIER AND FILTER

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2 Claims. (Cl. 183—10)

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This invention is concerned with a pack for handling air in a ventilating or cooling system, and it is an object of the invention to provide a simple, practical, improved pack for passing air and acting either to merely clean the air or to clean and facilitate cooling of the air by evaporation of water applied to the pack.

Ventilating and cooling systems commonly include fans or blowers serving to circulate air and it is common to provide packs or cells through which the air must be circulated either to merely clean the air or to clean and also cool the air by reason of the evaporation of water. Packs of the character referred to may with ordinary construction be made reasonably effective or efficient in the removal of dust or large air-borne bodies or particles, even including objects such as bees, large flies, etc. In practice, however, packs such as are ordinarily used, are made with front and back porous cover sheets which confine a loose body of material and these sheets are of like character. When the cover sheets are made fine enough to check the passage of insects the front sheet quickly builds up a body of dust and the efficiency of the whole pack is materially lowered. Where water is applied to the packs to evaporate and thus cause the desired cooling effect, considerable difficulty is experienced with the usual pack construction, since the moist condition of the pack is attractive to or conducive to the breeding of mosquitoes and consequently, if the cover sheets of such packs are made coarse enough so they do not clog too fast then mosquitoes become bothersome.

It is a general object of this invention to provide a pack of the general character referred to which is of such form and construction as to efficiently pass air, effectively trap or catch dust or like foreign matter borne by the air, and which effectively checks the passage of particles or objects such as are not checked by an ordinary pack, for example, insects, and particularly gnats, flies and mosquitoes.

A further object of the invention is to provide a pack of the general character referred to which has the action hereinabove set forth without requiring parts, elements, or devices in addition to those ordinarily employed in packs of the general class referred to. The pack of the present invention involves merely a filler which may be a body of excelsior or the like, and a retaining envelope or holder which supports the filler.

A further object of this invention is to provide a pack of the general character referred to which is such that it can be adapted to an ordinary

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ventilating or cooling system of the character referred to and which is easily manufactured making it economical and commercially practical.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of my invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a perspective view of a simple, typical type of evaporative cooler embodying a pack provided by the present invention, parts being broken away to show the details of construction. Fig. 2 is an enlarged edge view of the pack in which the lower portion of the pack is shown in elevation while the upper portion is shown in section, the section being taken in the general direction indicated by line 2—2 on Fig. 1. Fig. 3 is a view showing a portion of the front sheet of the envelope of the pack taken in the general direction indicated by line 3—3 on Fig. 2, and Fig. 4 is a view showing a portion of the rear sheet of the pack, being a view taken in the direction indicated by line 4—4 on Fig. 2.

The pack provided by the present invention is useful, generally, in ventilating or cooling systems or in apparatus incorporated in such systems. However, since it is particularly practical as applied to evaporative coolers it is illustrated in such a cooler and will be described as applied to such a construction, it being understood that modifications or variations of the invention may occur in the course of applying it to other situations.

The particular apparatus illustrated in the drawings is an evaporative cooler involving a box-like case A supporting a pack B embodying the present invention and carrying a blower C and a liquid circulator D. One wall 10 of the case A will be referred to as the front wall of the case and it is provided with a plurality of louvers 11 admitting air into the case. The pack B provided by the present invention is located in the case immediately behind the front wall 10 and it may be mounted in any suitable manner so that it intercepts all of the air admitted into the case through the louver openings 11.

The blower C is located in the case A rearward of the pack B and has air inlet openings 12 receiving air after it has passed through the pack B and it has an outlet duct 13 connected into a discharge opening 14 in the rear wall 15 of the case. It is to be understood that the blower C may include suitable propelling or driving means such as a motor M and it may be of any

suitable type and may be mounted in the case in any suitable manner.

The liquid circulating means D may be any suitable structure serving to supply water to the pack B so that it evaporates therefrom as air is drawn through the pack. The necessary water may be supplied from a water line connected to the structure or, as illustrated, a pump 20 may be mounted to receive water caught by the bottom 21 of the case A and a motor 22 may drive the pump so that the water received by the pump is delivered through a supply pipe 24 to a distributing trough 25 located above the pack. The trough is so located and constructed as to distribute the water over the pack in a manner to effectively wet the entire pack.

The pack provided by the present invention includes, primarily, a body or filler 30 of suitable material and an envelope or holder 31 carrying the body 30.

The body 30 may, in practice, be a pad or mass of any suitable material that will serve to pass air and if it is to be used in an evaporative cooler it is preferably a material that will properly handle water so that it evaporates in a manner to create the desired cooling effect. For purpose of example, the body 30 will be referred to as a body of excelsior, or the like, it being understood that the excelsior may be made from any desired material or materials, may be of various forms or coarseness and may be packed or compressed to any desired degree, all as circumstances may require.

The envelope or holder 31 for the body 30 is characterized by front and rear sheets 35 and 36, respectively, which are at opposite sides of the body 20 and confine the body, holding it in the desired form or shape. In the particular case illustrated the pack B is a flat structure substantially rectangular in shape and in such case the sheets 35 and 36 are flat sheets parallel with each other and spaced apart far enough to accommodate the filler or body 30. The sheets 35 and 36 may be held or secured in the desired relationship through any suitable means or construction, it being preferred that they be joined to the edges or marginal portions of the pack and, in practice, it is advantageous to provide the edge portions of the sheets 35 and 36 with inwardly turned portions 38 provided where they meet with flanges 39 which may be secured together by suitable fasteners 40. The fasteners may be clips, stitching, or other structure serving to effectively join the flanges 39.

In accordance with the present invention the sheets 35 and 36 are porous sheets serving to effectively pass the desired flow of air while being strong enough to suitably support or confine the filler 30. It will be apparent that the sheets 35 and 36 may be advantageously formed of cloth made of any suitable material and having any suitable weave or mesh. Since structures of the character under consideration are perishable and must be replaced from time to time it is preferred that the sheets 35 and 36 be formed of fabric, as for instance, a cotton fabric, and that the weave be a simple type of mesh such as is employed in netting or meshes employed in curtaining, cheese cloth, mosquito netting, etc.

It is a feature of the present invention that the sheets 35 and 36 be differentiated by the fact that the front sheet 35 is of what I will refer to as a coarse or open mesh, while the back sheet 36 is of fine or close mesh. In referring to the front sheet 35 as being of coarse mesh I mean that it is so open or porous as to freely admit air to be handled by the pack and may even pass foreign matter, including dust, and any ordinary air borne objects including insects such as flies, gnats, mosquitoes, etc. By making the front sheet 35 of coarse mesh it does not become clogged but freely passes all air borne material.

The air passed by the coarse or porous front sheet 35 must find its way through the body or pad of excelsior immediately behind the front sheet and the body 30, being of the character above described, effectively traps or catches most ordinary particles, as for instance, dust, any large insects, etc. It is significant to observe, however, that the excelsior 30, being a rather thick pad, as distinguished from a thin sheet, does not catch or accumulate foreign matter at any one zone or spot, but rather, the caught material becomes distributed throughout the pad and consequently, the effective life of the pad is not materially impaired, even though the pad may catch and hold a substantial amount of material.

The back or rear sheet 36, which is very fine or closely meshed as compared to the front sheet 35, is open or loose enough to effectively pass the desired air, yet at the same time it is so fine or closely meshed as to positively check or prevent the passage of material or objects such as most insects, and particularly the undesirable insects such as flies, gnats, mosquitoes, etc. In employing the term insects I mean to include any bodies, objects or materials such as are subject to being passed by ordinary packs of the type referred to and which are undesirable, and in referring to the front sheet of the pack as being coarse, I mean that it is of such large or loose mesh as to freely pass air and have little or no filtering or checking effect upon the material desired to be checked by the pack. In referring to the rear sheet 36 of the envelope as fine, or close meshed, I mean to define a sheet which freely passes air but at the same time is effective in checking the passage of bugs and insects, and particularly insects such as flies, gnats, mosquitoes, beetles, etc.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. A pad for an evaporative cooler in which a case carries an air circulator and a water distributor including, a single flat body of excelsior for vertical disposition in the case where it receives water at its upper edge and conditions air passing through it from one of its sides to the other, and an envelope of porous moisture-retaining fabric confining the body and including a sheet at one side of the body for passage of air into the body and a sheet at the other side of the body for exhaust of air from the body, the sheets being joined together at the edges of the body, the last mentioned sheet being of substantially finer mesh than the first mentioned sheet to check the passage of airborne matter and insects from the pad.

2. A pad for an evaporative cooler in which a case carries an air circulator and a water distributor including, a single flat body of excelsior for vertical mounting in the case to receive water at its upper edge and to condition air passing

through it from one of its sides to the other, a porous sheet of coarse mesh cotton fabric at the air receiving side of the body confining the excelsior, and a porous sheet of coarse mesh cotton fabric at the opposite side of the body of substantially finer mesh than the first mentioned sheet and confining the excelsior and checking the passage from the pad of airborne matter and insects.

HAROLD S. MULHOLLEN.

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