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EVAPORATIVE COOLER PAD CONSTRUCTION

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Fig. 1

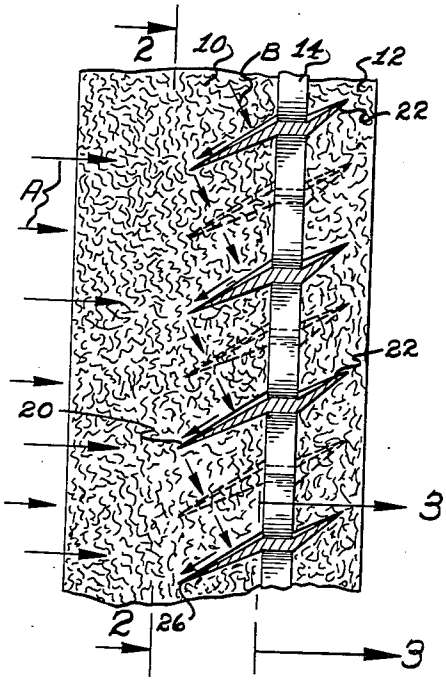
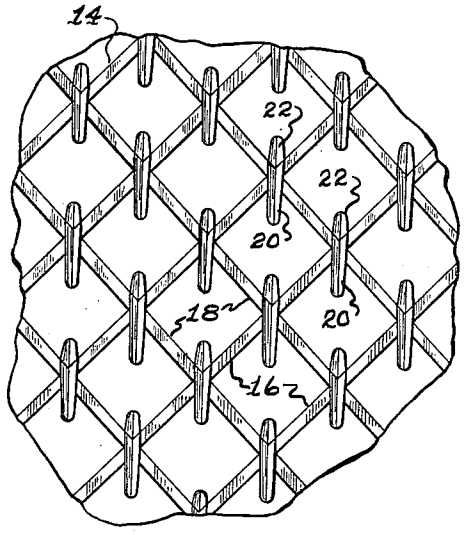


Fig. 2



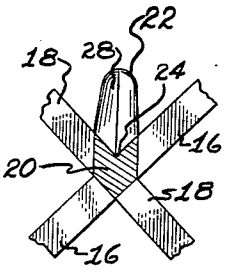


Fig. 3

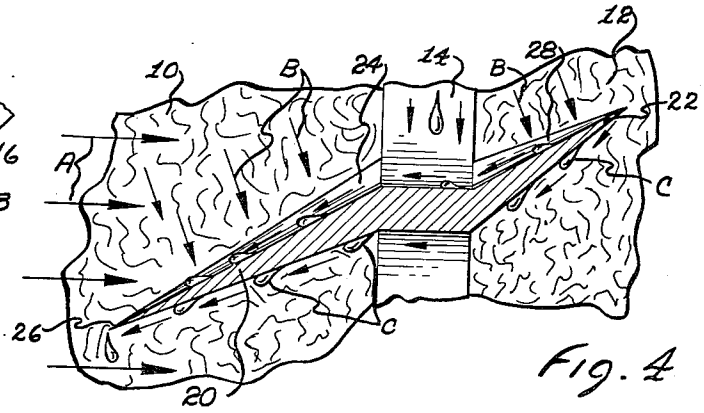


Fig. 4

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EVAPORATIVE COOLER PAD CONSTRUCTION

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This invention relates to an evaporative cooler pad construction and more particularly to an evaporative cooler pad construction wherein a separator is interposed between evaporative cooler pad layers for the purpose of controlling the water flow through the pad construction and the prevention of undesirable wetting of one of the pad layers.

In the construction of conventional evaporative cooler pads a layer of wood excelsior is backed by a contiguous layer of glass fibers which are coated with materials such as heavy viscous oil. When these pad layers are in a contiguous relationship to each other and air is forced therethrough while water drains vertically through the pad the flow of air carries water from the layer of excelsior into the layer of glass fibers and tends to wash the protective coating from the glass fibers. When the coating is washed away from the fibers the dust catching utility of the glass fiber layer is reduced. When the coating is thus removed from the glass fibers dust may pass from the excelsior pad through the glass fiber pad during initial operation of the evaporative cooler before the pad structure is wet.

Another difficulty with conventional evaporative cooler pad structures is that water introduced at the upper portions of the pads tends to establish certain flow paths which cause the concentration of water flow in some areas of the pad and cause other areas of the pad to become relatively dry. This condition is due in part to air flow through the pad transversely of the flow of water which is induced by gravity. Such flow of air tends to force the water toward one side of the pad whereupon the water collects in an area adjacent one side of the pad or may collect in an adjacent layer of glass fibers of the pad.

Accordingly, it is an object of the present invention to provide an evaporative cooler pad construction wherein a foraminous separator is interposed between adjacent layers of an evaporative pad in order to provide more efficient water flow through the pad and to prevent undue flow of water from the excelsior layer of the pad into a glass fiber layer adjacent thereto.

Another object of the invention is to provide an evaporative cooler pad construction wherein a separator is provided with inclined fingers which return water to an evaporative cooler pad in an up stream direction relative to air flowing therethrough thereby increasing the efficiency of the pad.

Another object of the invention is to provide an evaporative cooler pad construction wherein a separator is provided with inclined fingers projecting into a cooler pad on an incline to thereby prevent the flow of water from separating into concentrated paths through the pad whereby efficient uniform wetting of the pad is maintained.

Another object of the invention is to provide a cooler pad construction wherein a separator drains water away from a fiber glass layer of the pad and returns it to an excelsior layer of the pad thereby minimizing the tendency of the water to remove the dust collecting coating normally contained on the fiber glass layer of the pad.

Another object of the invention is to provide a cooler pad construction wherein a foraminous separator is disposed between adjacent layers of an evaporative cooler pad and wherein said separator is provided with inclined fingers directed upwardly in one of said layers at one side of said separator and fingers are directed from the opposite side of said separator downwardly into the other pad whereby water readily flows on the inclined fingers from one pad to the other pad.

Another object of the invention is to provide an evaporative cooler pad construction wherein a separator member is provided with fingers extending on an incline from opposite sides thereof and wherein these fingers are connected with the separator at the juncture of downwardly converging structures which outline openings through the separator whereby water which is transferred from fingers at one side of the separator pass downwardly through the juncture of the converging structure of the separator to the downwardly inclined fingers at the opposite side of the separator.

Further objects and advantages of the invention may be apparent from the following specification, appended claims and accompanying drawings in which:

FIG. 1 is a fragmentary, vertical, sectional view of an evaporative cooler pad constructure in accordance with the present invention, and showing a separator between adjacent evaporative cooler pad layers.

FIG. 2 is a fragmentary, side elevational view of the cooler pad separator taken from the line 2—2 of FIG. 1 and omitting the evaporative cooler pads as shown in FIG. 1.

FIG. 3 is an enlarged fragmentary sectional view taken from the line 3—3 of FIG. 1 showing details of the separator and inclined fingers and omitting a disclosure of the evaporative cooler pads as shown in FIG. 1; and

FIG. 4 is an enlarged fragmentary, sectional view taken on the same plane as that shown in FIG. 1 but illustrating the flow of water relative to the fingers of the separator and within the evaporative cooler pads.

As shown in FIG. 1 the evaporative cooler pad construction of the present invention includes a first pad layer **10** and a second pad layer **12** and a separator **14** disposed between the pad layers. The first pad layer **10** is preferably made of wood excelsior or other equivalent material while the second pad layer **12** is made of glass fibers or other equivalent material. These fibers in the pad layer **12** are fine filamentary elements disposed close together so that they may collect dusts, insects or other material which might pass through the more open structure of the excelsior pad **10**. The filament structures of the pad layer **12** are coated with a heavy viscous oil so that dust will be collected by the pad layer **12** when the cooler is operated for ventilation purposes without water in the pad layer **10**.

In normal operation of the evaporative cooler pad construction shown in FIG. 1 of the drawings air passes through the pad construction as indicated by the arrows A while water is introduced into the pad layer **10** at the upper extremity thereof and tends to gravitate downwardly through the pad layer **10**. As the water travels downwardly through the pad layer **10** the air flow in a substantially horizontal direction causes the water to move toward the separator or foraminous means **14** as indicated by arrows B. The separator **14** may be made of any suitable material as desired however the particular construction shown herein as an example of the invention is preferably made of plastic by an injection molding process. This separator **14** is constructed in the form of a grid wherein a plurality of bar portions **16** intersect other bar portions **18** at right angles to each other and these grid structures are so arranged that the bar portions **14** and **18** converge downwardly to the intersecting portions thereby providing openings bounded by downwardly diverging and converging bar portions as shown best in FIG. 2 of the drawings. At the junctures of the downwardly converging bars or at the intersections thereof are fingers **20** which are integral at said

juncture with the separator and which project downwardly and on an incline into the pad layer **10**.

Similar fingers **22** project on an incline upwardly into the pad layer **12** from the opposite side of the separator **14** and these fingers **22** are integral with the separator **14** at common junctures with the fingers **20**. It will be seen that the fingers **22** are disposed on an incline in the pad layer **12** and are directed downwardly toward the separator **14** and that the fingers **20** extend downwardly on an incline from the opposite side of the separator **14** into the pad layer **10** so that water may be conveyed from the interior of the pad layer **12** downwardly and inwardly of the pad layer **12** toward the direction from air flows as indicated by the arrows A.

Since the fingers are arranged in staggered relationship as shown in FIG. 2 of the drawings and are relatively close together they establish very closely related flow pads for the water thereby providing the uniform distribution of the water in the pad and also provide for the return of the water from the separator **14** to an inner portion of the pad layer **10** at the ends of the fingers **20** all as will be hereinafter described in detail in connection with the disclosure of FIG. 4 of the drawings.

As shown in FIG. 4 of the drawings each finger **20** extends downwardly and inwardly of the pad layer **10** on an incline and water which drains downwardly through the pad as indicated by the arrows B contacts the upper trough shaped surface **24** of each finger **20** and passes downwardly to the end **26** of each finger **20** whereupon the water passes from the end thereof into the middle portion of the pad layer **10** and again tends to gravitate downwardly therethrough. Since the water moves on an angle as indicated by the arrow B the next successively lower finger **20** receives the water at an intermediate portion thereof and conducts it to the end **26** of the respective finger. In this fashion water is continually returned from the rear of the pad layer **10** to the interior thereof. Concurrently any small amount of water which passes through the separator **14** toward the pad layer **12** is collected on the fingers **22** at their upper trough portions **28** which carry the water downwardly to a position intermediate the converging bars **16** and **18** which coincide with the trough portion **24** of each of the respective fingers **20**. Thus, the water may travel from the extremity of each finger **22** to the lower end **26** of each finger **20**. Additionally, drops of water C will travel down the lower surfaces of the fingers **22** and **20** to the end **26** of each finger **20**.

Water which drips from the lower surface of each juncture of the bar **16** and **18** will be caught in the next lower juncture and will be carried off by the respective finger **20** to its lower extremity **26** and thereby returned to the middle portion of the pad layer **10**.

The drainback function of the separator **14** prevents an excessive amount of water from washing the filaments of the pads **12** and thereby protects the pad **12** so that the water does not wash a substantial amount of the coating material from the filaments of the pad layer **12**.

It will be appreciated by those skilled in the art that the separator also serves to maintain a uniform wetting of the pad **10** throughout its vertical area due to the fact that the closely distributed fingers **20** in their staggered relationship to each other completely break up concentrated flow paths of water in the pad and distribute the water evenly throughout the entire pad area. Furthermore, the back flow function obtained by the fingers **20** recirculates the water backwardly from the rear side of the pad into the middle portion of the pad thereby requiring less initial flow of the water to supply the upper portion of the pad.

It will be obvious to those skilled in the art that various modifications of the invention may be resorted to in a manner limited only by a just interpretation of the following claims.

I claim:

1. In an evaporative cooler pad construction the combination of: first and second pad layers; and a forminous separator therebetween; water distributor fingers carried by and projecting from said separator and into both of said pad layers.

2. In an evaporative cooler pad construction the combination of: first and second pad layers disposed to receive a stream of air laterally therethrough in a direction from said first pad layer to said second pad layer; a foraminous separator between said pad layers; first water distributor fingers on said separator inclined downwardly therefrom and projecting into said first pad layer and second water distributor fingers projecting upwardly from said separator on an incline into said second pad layer.

3. In an evaporative cooler pad construction the combination of: first and second pad layers disposed to receive a stream of air laterally therethrough in a direction from said first pad layer to said second pad layer; a foraminous separator between said pad layers; first water distributor fingers on said separator inclined downwardly therefrom and projecting into said first pad layer; and second water distributor fingers projecting upwardly from said separator on an incline into said second pad layer, said separator having upper sections of downwardly diverging bars and integral lower sections of downwardly converging bars forming openings between the upper and lower sections, said fingers connected to said separator at the junctures of said downwardly diverging and downwardly converging bars.

4. In an evaporative cooler pad construction the combination of: first and second pad layers disposed to receive a stream of air laterally therethrough in a direction from said first pad layer to said second pad layer; a foraminous separator between said pad layers; first water distributor fingers on said separator inclined downwardly therefrom and projecting into said first pad layer; and second water distributor fingers projecting upwardly from said separator on an incline into said second pad layer, said separator having upper sections of downwardly diverging bars and integral lower sections of downwardly converging bars forming openings between the upper and lower sections, said fingers connected to said separator at the junctures of said downwardly diverging and downwardly converging bars, said fingers trough shaped.

5. In an evaporative cooler pad construction the combination of: an evaporative cooler pad having an air inlet side and an air outlet side; a foraminous means contiguous thereto; inclined fingers carried by and projecting from said foraminous means into said pad and downwardly therein toward said air inlet side; and structure of said foraminous means comprising integral junctures of downwardly diverging and downwardly converging portions, said fingers disposed at said junctures to receive water which drains downwardly on said downwardly converging portions and water which drains downwardly through said pad.

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