Nov. 2, 1943. W. S. GUTHRIE 2,333,374

EVAPORATIVE AIR COOLER AND WINDOW SUPPORT

Filed Sept. 9, 1941 2 Sheets-Sheet 1

Fig. 1

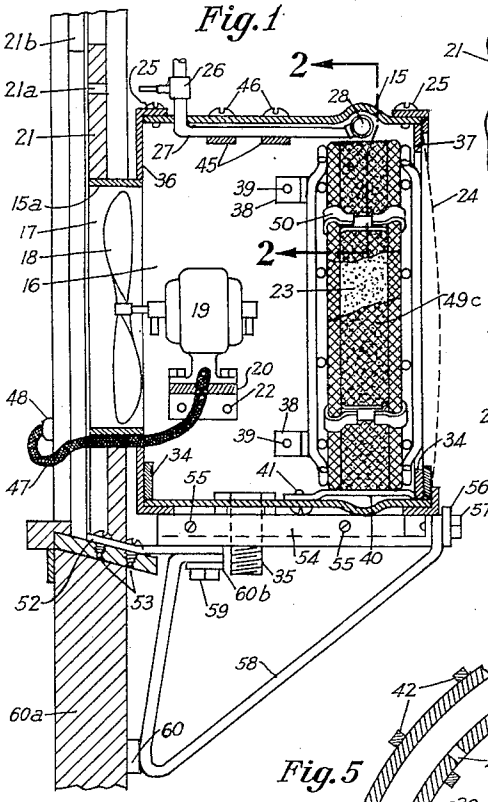


Fig. 2

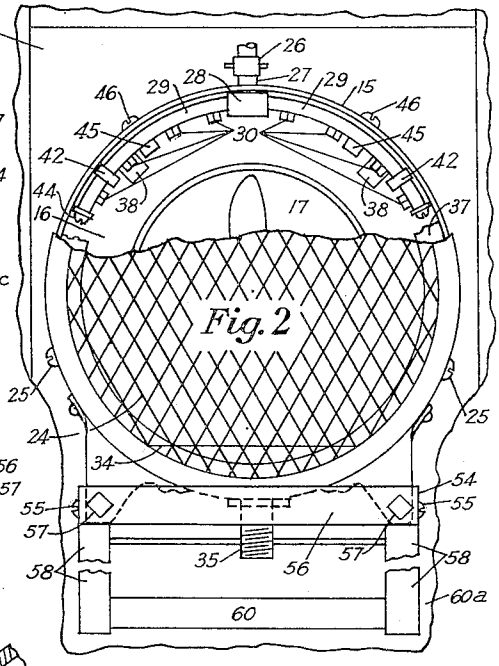


Fig. 5

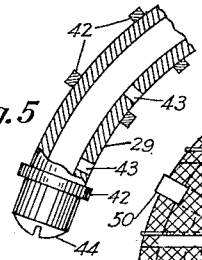


Fig. 4

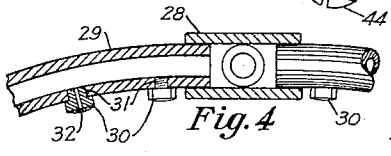


Fig. 3

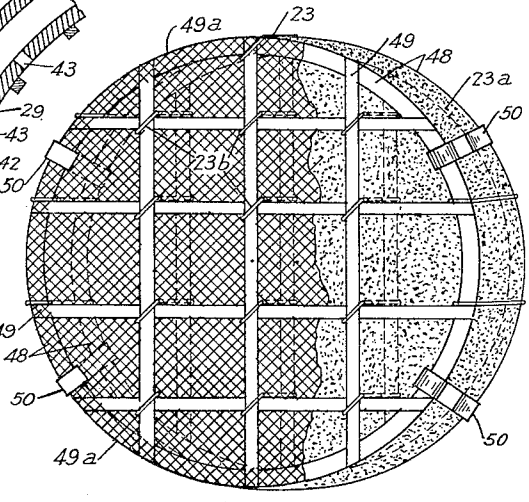


Fig. 6

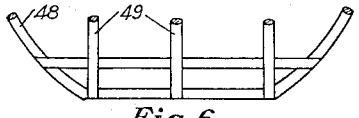


Fig. 7

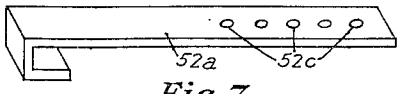
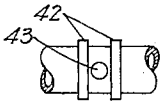


Fig. 5A



INVENTOR.

William S. Guthrie

Nov. 2, 1943. W. S. GUTHRIE 2,333,374

EVAPORATIVE AIR COOLER AND WINDOW SUPPORT

Filed Sept. 9, 1941 2 Sheets-Sheet 2

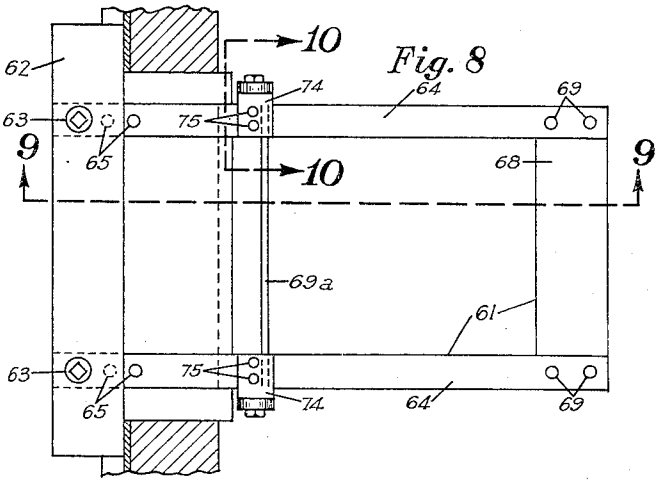


Fig. 8

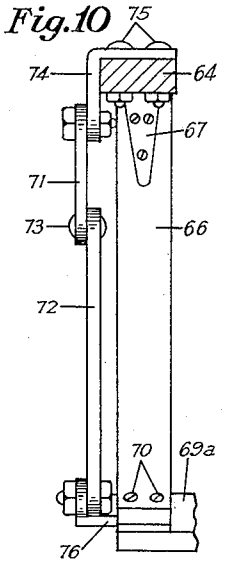


Fig. 10

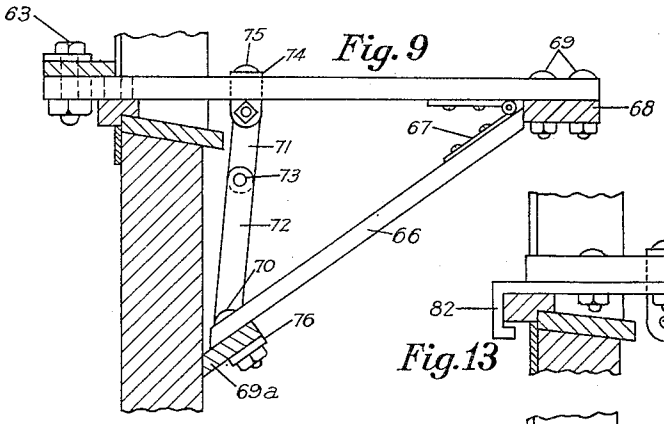


Fig. 9

Fig. 13

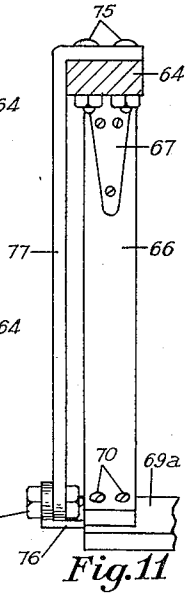


Fig. 11

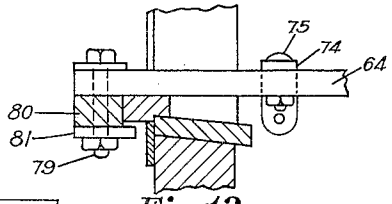


Fig. 12

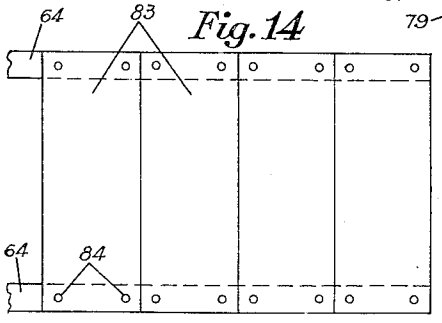


Fig. 14

INVENTOR.

William S. Guthrie

Patented Nov. 2, 1943

2,333,374

UNITED STATES PATENT OFFICE

2,333,374

EVAPORATIVE AIR COOLER AND WINDOW SUPPORT

William S. Guthrie, Los Angeles, Calif.

Application September 9, 1941, Serial No. 410,191

5 Claims. (Cl. 261—97)

This invention relates to evaporative air coolers and window scaffolds for supporting the coolers on the outside of windows.

One object of the invention is to provide an evaporative air cooler with an efficient moisture pad assembly which may be easily assembled into the cooler and removed therefrom, and which may be manufactured at a low cost.

Another object of the invention is to eliminate the expense entailed by the usual necessity of frequently replacing the cheesecloth type of pad, because the pad as heretofore made and used would become sour and cause the air flowing through the same to be intolerable.

The drains in some types of coolers do not permit all of the water in the sump to drain off. I have provided simple means for supporting the pad above the normal water level when the cooler is not being used. This permits the pad to dry out between uses, and results in prolonging the life of the pad as will be apparent, and thereby prevents such frequent replacements of the pad.

Another object of the invention is to provide an air cooler of the class specified with a water distribution system that will more efficiently distribute the water to a moisture pad of any form, as well as the round form herein illustrated, than has heretofore been provided.

A further object of the invention is to provide a complete cooler and scaffold support assembly that may be installed from the interior of a window without disfiguring the exterior wall of the building with nails, bolts and the like.

My improved cooler and scaffold support assembly is adapted to be installed from the interior of a window that may be high above the ground at a nominal cost, if any.

Other objects and advantages of my invention will be apparent with reference to the following specification and accompanying drawings, in which:

Fig. 1 is a side elevational view of my evaporative air cooler and scaffold support anchored to a window frame installed for use, the cooler being shown in detail.

Fig. 2 is an outer end elevational view of my installed cooler and scaffold support assembly, the upper portion of the cooler is shown in detail with the moisture pad removed. The intermediate portion of the scaffold bracket 53 being cut away.

Fig. 3 is an enlarged view of the moisture pad assembly, with the cheesecloth removed from the periphery and a portion of the side thereof.

Fig. 4 is an enlarged detail view of the central portion of the water distribution tubes.

Fig. 5 is a detail view of a portion of a modified form of distributor tube.

Fig. 5—A is a plan view of a section of horizontal form of distributor tube.

Fig. 6 is a view of the moisture pad wire frame in modified form, the upper portion of which is broken away.

Fig. 7 shows a modified form of the scaffold anchoring plate.

Fig. 8 is a top view of a modified form of scaffold support which is anchored to the interior of the window frame above the sill. Fig. 9 is a sectional view on the line 9—9 of Fig. 8. Fig. 10 is a sectional view on the line 10—10 of Fig. 8. Fig. 11 is a view similar to Fig. 10 which shows a modified form of brace. Fig. 12 is a view of the inner portion of the scaffold similar to that shown in Fig. 9, which shows the scaffold anchored to the interior of the window sill. Fig. 13 shows a modified form of window sill anchorage. Fig. 14 is a top view of the scaffold provided with floor boards, the inner portion being removed.

Referring by numerals to the accompanying drawings and particularly to the construction illustrated in Figs. 1 to 4 inclusive, 15 designates the body of my improved cooler, which is provided with an air chamber 16. A tubular formed section 15a may be welded or otherwise secured to the front panel 36 of the body 15. The said section 15a forms an air outlet 17 for the air chamber in which a blower or fan 18 is preferably positioned to exhaust moistened air through the outlet 6.

The fan 18 is connected to a motor 19 which is adapted to rotate the fan to cause it to exhaust air from the air chamber 16. The motor 19 is supported by a bracket or member 20 which is secured to the body of the cooler by screws or bolts 22. The bracket or cross member 20 may extend across the air chamber so that it may be secured to the body on both sides thereof.

The tubular outlet 17 is preferably made just large enough to clear the blades of the fan 18 to avoid the possibility of air entering the air chamber through the same. My specially designed moisture pad assembly 23 is positioned in the body 15 and forms the outer end wall of the air chamber 16. The outer extremity of the body may be provided with a freely opened grilled air inlet panel 24, which has an angular formed flange provided with apertures in the periphery thereof to adapt the same to be secured to the body by screws 25.

A water control valve 26 is adapted to supply water from a source of water supply to my specially designed water distributing system through the pipe 27, which pipe is connected to the T fitting 28. This fitting may be constructed with metal or rubber or any other suitable material. Two distributor pipes or tubes 29 are connected to the T fitting so that the water supply may flow to both of them from the supply pipe 27.

A series of removable fittings 30 are secured

to the distributor tubes 29 by means of screw threads 31, as shown in Fig. 4. These removable fittings are preferably positioned adjacent to the upper edge of the pad 23 and are provided with orifices or jets 32 through which water flows from the tubes 29 and discharges at predetermined points into the upper portion of the moisture pad assembly 23 preferably at or adjacent to the lateral center thereof. The water thus flows directly into the excelsior filler of the moisture pad to thoroughly moisten the excelsior. When the blower or fan 18 is in operation air from the outside atmosphere will be induced to enter the air inlet and be moistened as it flows through the wet filler of the pad and into the air chamber 16. This moist air is discharged through the outlet 17 into the interior of the building. The air thus moistened is reduced considerably in temperature, and therefore reduces the temperature of the room into which it is discharged. All other windows in the room should be closed to prevent any air entering the room other than that discharged from the cooler. It is desired to have some outlet such as a window, door or transom open sufficiently to permit the warm air in the room to pass out.

The window opening around the tubular section 15*a* of the cooler is paneled up as shown at 21 to prevent air entering the room at this point. The panel 21 may be made of ply wood or wall board as desired.

The lower portion of the cooler body 15 has a metal plate or baffle 34 positioned adjacent to the inner and outer ends thereof. These baffles may be welded or otherwise secured to the bottom of the body 15 in water tight fashion to provide a sump to hold the water flowing through the moisture pad until it can be drained out by the pipe fitting 35 which is secured to the bottom of the cooler body in the usual manner. This fitting is adapted to be connected to a drain pipe or hose to carry the water away from the cooler.

The window panel 21 is apertured to 21*a* to provide means to operate the valve 26 with a slotted key. The front or forward end panel 36 of the body has a flange and means for securing it to the body similar to that previously described relative to the grilled outer end panel 24.

A baffle ring 37 may be interposed between the flanged rim of the grilled outer end and the moisture pad assembly 23 to prevent unmoistened air to flow into the air chamber 16 around the periphery of the said pad assembly. A series of angle irons 38 may be secured to the wall of the body by screws 39 to support the forward portion of the moisture pad assembly 23 and prevent any additional forward movement thereof.

When the lower portion of the pad assembly 23 is made of a rounded formation as illustrated, it may be desirable to provide a support for holding the same above the water level in a sump, which as illustrated is at the top of the drain pipe fitting 35. One or more angle plates or bars 40 would provide such a support. These bars may be secured to the lower portion of the body 15 by means of screws 41.

The moisture pad will dry out more quickly when it is held above the water level as described, and this is an important feature of the invention because this tends to prevent the deterioration of the excelsior and other materials employed in forming the pad. This feature of the invention may also be accomplished by the formation of the lower portion of the supporting frames with a horizontal section at the bottom thereof, similar to that shown in Fig. 6. Suitable angle bars similar to the supporting bar 40 may be provided to support this form of frame construction when desired. Thus it will be seen that I have provided means to prevent the moisture pad deteriorating, which will increase the life of the pad, and which will also prevent unpleasant odors in the air from the cooler for a considerably longer period of time than has been the case heretofore especially with the round or barrel type of body construction. It is believed that when the moisture pad is made and supported as suggested by the present invention, the said pad may never become sour to cause such unpleasant odors.

Fig. 5 shows a section of a distributor tube having the jet orifices drilled in the walls thereof similar to that which is being manufactured at the present time. When the water valve is only partially opened the water issuing from these jets will creep along the exterior of the tube, which is very undesirable. I have improved this type of tube by installing a friction tight band or disc 42 on the tube just below each of the jets 43. These bands or discs 42 stop the creeping of the water, and causes the water to drip off the lower portion of the bands. The water as thus distributed to the excelsior is very efficient. These bands 42 may be made of rubber or any other suitable material. This improved type of tube may be employed in place of the removable jet type before described. The latter type may be preferable for the reason of adjusting the opening for each individual jet. Screw plugs 44 may be employed to close the outer ends of the distributor tubes.

These tubes and the water supply tube 27 are secured in position by metal clips 45 secured to the upper portion of the body by screws 46. A band 42 preferably of rubber formation may be employed as shown in Fig. 2 to prevent the outer ends of the distributor tubes from vibrating against the body walls and possibly causing a rattle.

The motor 19 is connected to a source of energy in the usual manner, the wires 47 being connected to the motor and a light socket or service outlet 48.

My improved moisture pad assembly 23 has two reasonably heavy wire frames 48 (clearly shown in Fig. 3) to which vertical and horizontal wires 49 are preferable welded to form a part of the frames. A mesh wire or cheesecloth screen 49*a* is secured to one side of each of the frames, preferably by sewing or cementing it to the periphery thereof when the cheesecloth is employed for the screen material, so as to form two units. When mesh wire is employed for the screen, it may be sewed to the frame or secured thereto by wires or otherwise so as to form the units.

Excelsior 23*a* or other suitable porous filler material is placed between the two said units with the screened sides thereof next to the filler material. When excelsior is employed, as illustrated, it is preferably evenly placed between the two units. Four spacer clips 50, preferably made of metal, are employed to fasten the two units together with the excelsior between the same. These spacer clips are adapted to hold the two units apart at a predetermined distance, which permits wires or cords 23*b* to pass transversely through the excelsior and be tied securely to the framework of each of said units.

These tie wires or cords are adapted to hold the excelsior in place. A strip of cheesecloth may be covered over the periphery of the pad

assembly to protect the excelsior when desired. This cheesecloth strip 49c as shown in Fig. 1 may be sewed or cemented to the framework of the pad and thereby avoid having a wide cemented seam in the lateral center of the periphery of the excelsior to interfere with the distribution of the water, like has heretofore been done.

Thus it will be seen that I have provided a sturdy efficient moisture pad assembly that is not easily damaged in handling.

My improved cooler and window support assembly has two detachable supporting plates or arms 52. These plates are secured to the side rails 54 with bolts at 59. These supporting plates are anchored to the window sill with two screws 53 at the inner ends of each of the plates. The angular side rails 54 extend outwardly to the outer end of the cooler body 15. The vertical portion of these side rails provide a suitable wall to which the cooler may be secured with screws or bolts 55. A cross iron bar 56 provides an outer wall to limit the outward movement of the cooler. This bar may be riveted or otherwise secured at 57 to the outer ends of the side rails 54, thereby joining the outer portion of the scaffold.

Two angular braces or brackets 58 provide a brace for each side of the scaffold. The outer ends of these braces may be interposed between the ends of the cross bar 56 and side rail 54 so as to be secured to the latter by the rivets or bolts 57.

The upper inner ends of the braces 58 are secured to the side rails by the bolts 59. A cross plate 60 is welded or otherwise secured to the lower portion of the braces 58 which join the lower portion of the braces and provides a suitable means for engaging the building wall 60a without danger of damaging the wall.

A cross plate 60b may be employed to join the inner ends of the side rails 54. This plate may be apertured to be secured by the bolts 59. Plates similar to the plate 52a as shown in Fig. 7 may be substituted for the plates 52 when it is desired to anchor the scaffold to the inside of the window sill. The hook shaped end of the plate 52a is adapted to hook over the sill. A series of apertures 52c provides means to adjust the scaffold to the proper position. The above described scaffold is preferably constructed of metal.

The scaffold 61 as shown in Figs. 8, 9 and 10, is principally constructed of wood. This scaffold is adapted to be anchored to the inside of the window casing by means of a cross rail 62 secured by the bolts 63 to the inner end portion of the supporting rails 64. A series of apertures 65 may be provided in the inner portion of the supporting rails 64 for adjusting the scaffold to the window. The swinging brackets 66 are joined to the outer end portion of the supporting rails by relatively small hinges 67 to provide a folding bracket.

A cross rail 68 is bolted at 69 to the outer ends of the supporting rails 64, and thereby secures the latter in the proper position. This cross rail also provides a strong stop for the folding bracket to engage when the latter is opened to the fullest extent. A cross rail 69a is bolted at 70 to the lower ends of the two folding brackets 66, which secures the brackets in the proper position and provides a suitable means for engaging the wall of a building without damaging the wall. This feature is similar to that previously described.

The downward movement of the folding brackets 66 and the cross rail 69a is limited by the metal links 71 and 72, which are provided on each side of the scaffold. These links are pivotally connected at 73. The upper links 71 are pivotally connected to the brackets 74 that are secured to each of the supporting rails 64 by the bolts 75. The lower ends of the links 72 are pivotally connected to the brackets 76 which are secured by the bolts 70 to the lower ends of the folding brackets 66.

This folding type of scaffold is desirable to use on a window where the opening thereof is too small to permit the scaffold to pass through the same when the scaffold is in the open position. This scaffold may be provided with angle iron braces 77 (Fig. 11) in place of the links 71 and 72 where a folding scaffold is not needed. The lower ends of the braces 77 are connected to the similar brackets 76 by the bolts 78. The upper ends of these braces are secured to the supporting rails by the similar bolts 75.

Fig. 12 shows the inner ends of the supporting rails 64 bolted at 79 to the top of a shorter cross rail 80, which is anchored to the interior of the window sill. Plates 81 secured by the bolts 79 are adapted to prevent the upward movement of the inner end portion of the scaffold supporting device as before described. The window sill type of anchoring means is desirable to employ with the scaffolds when they are to be used on casement windows which open inwardly.

Fig. 13 shows the inner ends of the supporting rails 64 provided with angle iron hooks 82 which also adapts the same to be anchored to the sill of the window frame.

Fig. 14 shows the supporting rails 64 provided with a board floor. The boards 83 may be secured to the rails 64 by nails or bolts 84 or otherwise as may be desired. These boards may be of a longer length than the width of the rails 64 when desired.

The scaffold support shown in Figs. 1 and 2 is adapted to be anchored to the interior of the window sill as well as to the exterior thereof. When anchored to the exterior portion as illustrated, the inside sash of the window 21b may be lowered to its normally closed position in stormy weather, by removing the electric wires 47 from the wall connection 48 and placing the wires in the tubular passageway 17. The plate 52a shown in Fig. 7 may be substituted for the plate 52 to provide a more secure support for the heavier weight of the larger coolers when desired.

Thus it will be seen that each type of my window scaffold support is adapted to be anchored to the frame of a window in a simple manner and without the necessity of attaching the same to the exterior walls of the building, or requiring the use of any overhead supports of any kind.

While the body of the evaporative air cooler as shown and described is of the simple tubular or barrel type, it will be understood that one or more of the new features disclosed and claimed in the appended claims hereof, may be employed to advantage in any form of cooler body construction, including the rectangular and square shapes.

Means similar to that disclosed herein to prevent the creeping of the water on the distributor tube would doubtless increase the efficiency of the water distribution system of other such cooling devises as as they are being constructed at the present time. A band or disc 42 may be positioned on the horizontal type of distributor tube on both sides of each of the water supply jets adjacent to the jets as illustrated in Fig. 5A, which

would prevent the water creeping in any direction on the tube and thereby assure the proper distribution of the water supply when the water control valve is not in the wide open position; such coolers would not have to be perfectly level to have reasonably efficient distribution of the water supply.

From the above description it will be seen that supporting means is provided to secure the water distributor tube in position, so that the water discharges into the porous filler of the pad at points between the sides thereof, and additional means extending outwardly from the surface of the tube is adapted to prevent the water creeping along the exterior of the tube between the water discharge orifices, and which construction comprises a valuable feature of my invention.

It will also be understood that any form of this class of cooling device may employ two or more of the said moisture pad assemblies through which the air flows to the air chamber from the sides of the body of the cooler as well as the more simple type as shown in the drawings hereof, and which employs only one of the moisture pad assemblies.

A simple exhaust fan is employed to discharge the air from the air chamber of the cooler employed to illustrate the invention, and while this type of blower may be desired in the construction of small coolers, it will be understood that the squirrel cage type of blower may be employed to exhaust the air from the said air chamber when desired, in fact any form of blower, belt driven or otherwise may be so employed. The construction of the body would possibly have to be of a nature as will accommodate the various blowers.

The wire frames employed to form the moisture pad assembly as illustrated herein has a series of vertical and horizontal wires **49**, and while the latter wires are desirable, to employ when the said screen portion of the pad is made of light mesh wire or cheesecloth, it will be understood that these wires **49** may not be necessary when heavier mesh wire is employed for the screen portion of the pad, provided the heavier mesh wire employed does not sag when it is secured to the surface of the frame, whether it is round shaped or formed in any other shape; and provided the heavier mesh wire so employed is sufficiently heavy to permit the same to be sewed or tied to secure the excelsior without compressing the latter sufficiently to interfere with the air flowing freely through the same.

When two or more of the excelsior pad assemblies are employed in forming the cooler, it may be more efficient to provide an individual water supply valve to control the flow of the water to the distributor tube over each of the excelsior pad assemblies independently of each other; however a single water supply valve may be employed to supply the water to the distributor tubes over the several excelsior pads when the distributor tubes are all sufficiently level to assure that the water will flow to each alike, when said valve is only partially open.

My evaporative air coolers may be positioned on the roof of a building or in a well ventilated attic, or basement or in any portion of the building desired, as well as in any place outside of the building. The cool air therefrom may then be supplied to any portion of the building by means of a cool air conduit attached to the outlet air passageway **17** of the cooler. The delivery of the cool air may then be made in a manner similar to that usually employed to deliver the warm air from a furnace.

The drawings hereof may show the mesh of the cheesecloth and other parts somewhat out of proportion, but it is believed that the drawings show the detailed construction sufficiently clear when considered in view of the foregoing specification, to enable any one skilled in the art to which it appertains, to make and use the invention.

It will be understood that changes in the size, form and construction of the various parts of my improved evaporative air cooler and window support may be made and substituted for those herein shown and described without departing from the spirit of the invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. An evaporative air cooler having a body with an air chamber therein, an air inlet for the air chamber, a porous moisture pad vertically positioned in said air inlet, a water distributor tube having a series of predetermined spaced orifices adapted to discharge water into the porous filler of said moisture pad at points between the sides thereof, means for supporting said distributor tube, and additional means extending outwardly from the surface of said distributor tube adapted to prevent water creeping along the exterior thereof between said orifices.

2. In an evaporative air cooler of the class specified having a casing, a water distribution system including a distributor tube provided with a series of orifices adapted to discharge water therein at predetermined points, means for supporting said tube, and additional means elevated from the surface of said distributor tube adapted to prevent water creeping along the exterior thereof between said orifices.

3. An evaporative air cooler having a body with an air chamber therein, an air inlet for said air chamber, a porous moisture pad vertically positioned in said air inlet, a water distributor tube having a series of predetermined spaced orifices positioned in close proximity to the upper edge of said pad, said orifices adapted to discharge water into the porous filler of said moisture pad, said orifices being embodied in fittings connected to and projecting outwardly from said distributor tube, and supporting means for the latter.

4. In an evaporative air cooler having a body with a moisture pad assembly therein comprising two supporting frames, a screen attached to one side of each of said frames so that each thereof forms a screened unit, a porous filler material interposed between the screened sides of said units, a series of metallic spacer clips connected transversely to each of said units adapted to secure the latter at a predetermined distance apart, and means extending transversely of said assembly and connected to both of said units to support said filler material and prevent sagging thereof.

5. An air cooler and window support assembly including in combination, a scaffold extending outwardly from a window frame, an air cooler supported by said scaffold, said air cooler adapted to discharge air inwardly through an opening in the window frame, said scaffold substantially supported by the sill portion of the window frame and being adapted to be secured in position by angular anchoring means freely engaging the inner side of the window frame at the lower portion thereof, substantially as described.

WILLIAM S. GUTHRIE.