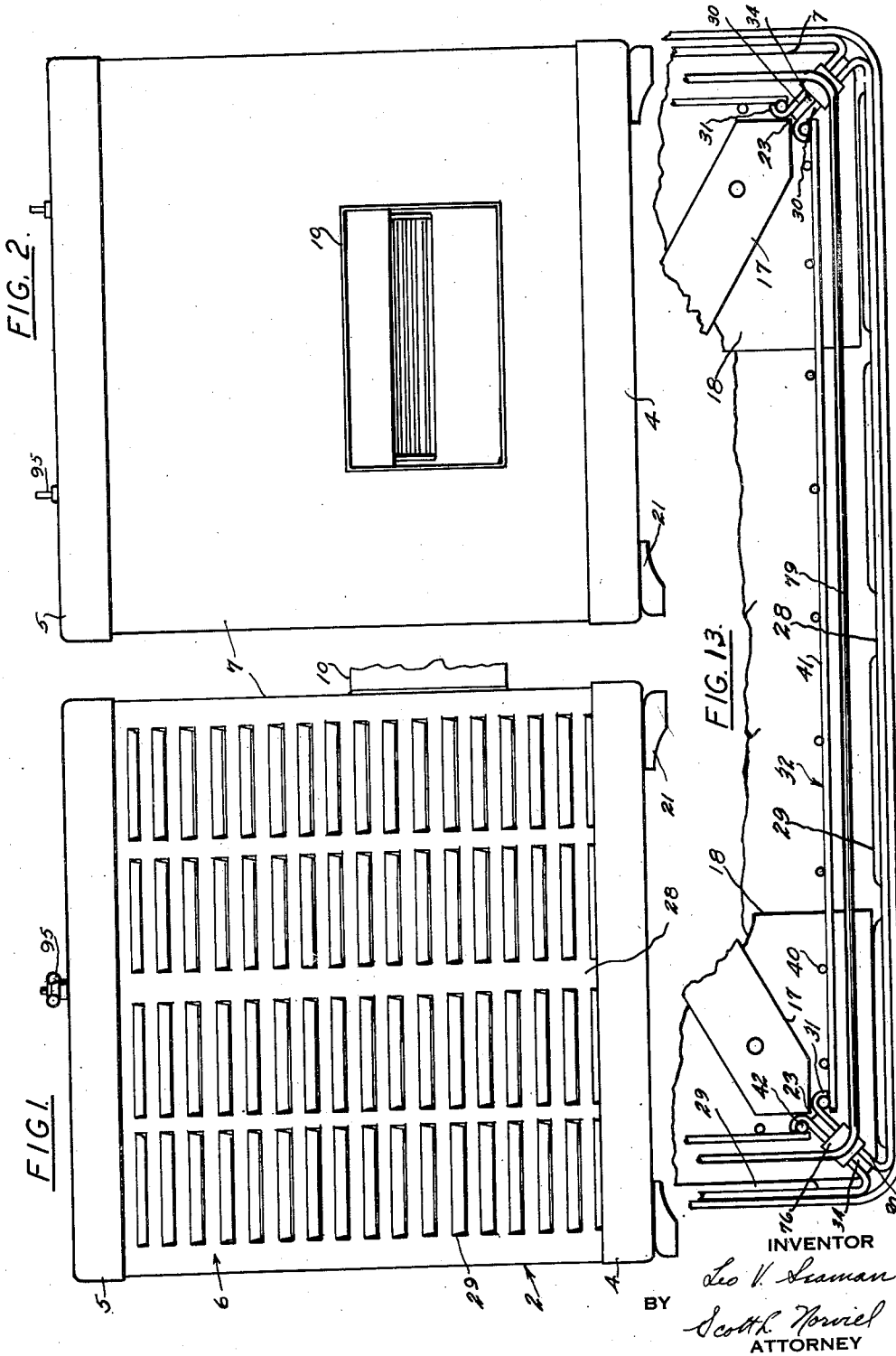


March 5, 1946.

L. V. SEAMAN
EVAPORATIVE COOLER
Filed Oct. 16, 1943

2,396,024

4 Sheets-Sheet 1



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FIG. 3

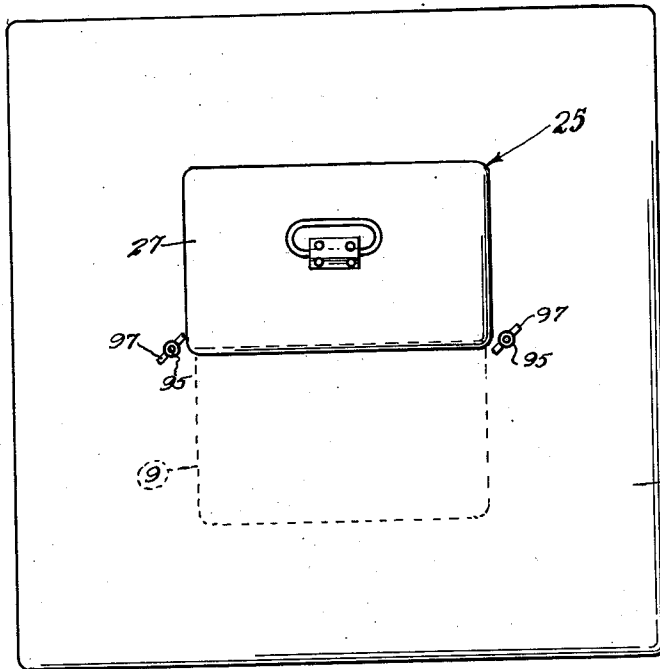


FIG. 10

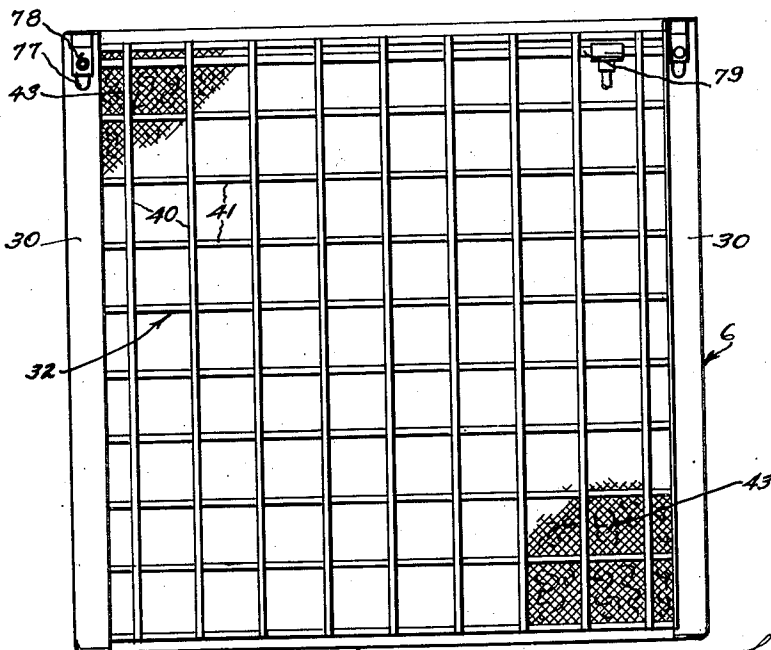
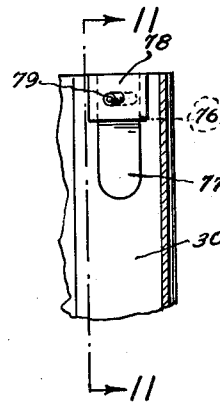


FIG. 11

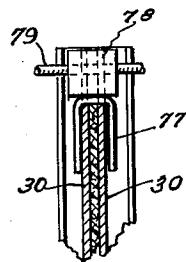


FIG. 12

28

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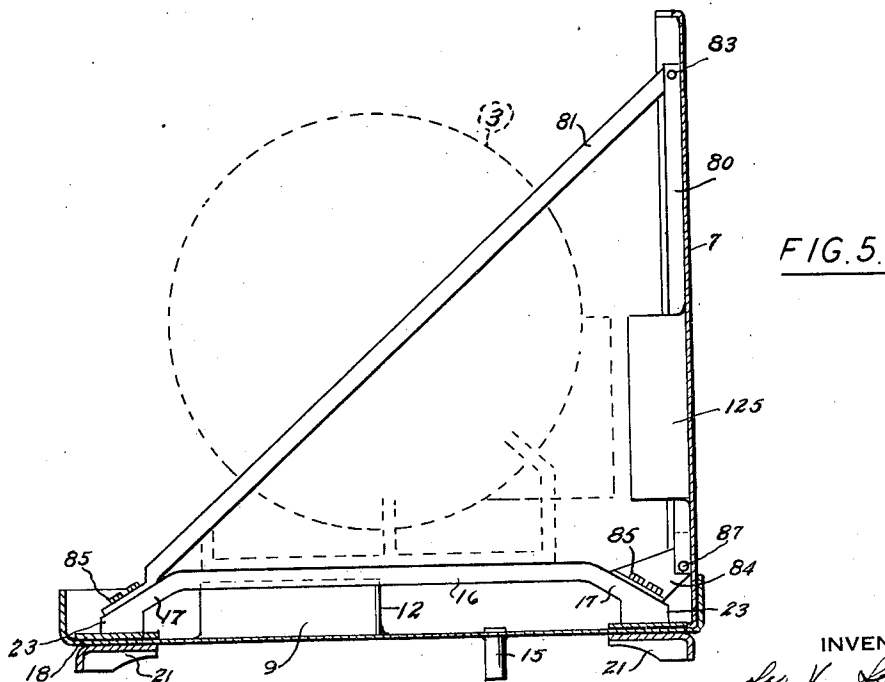
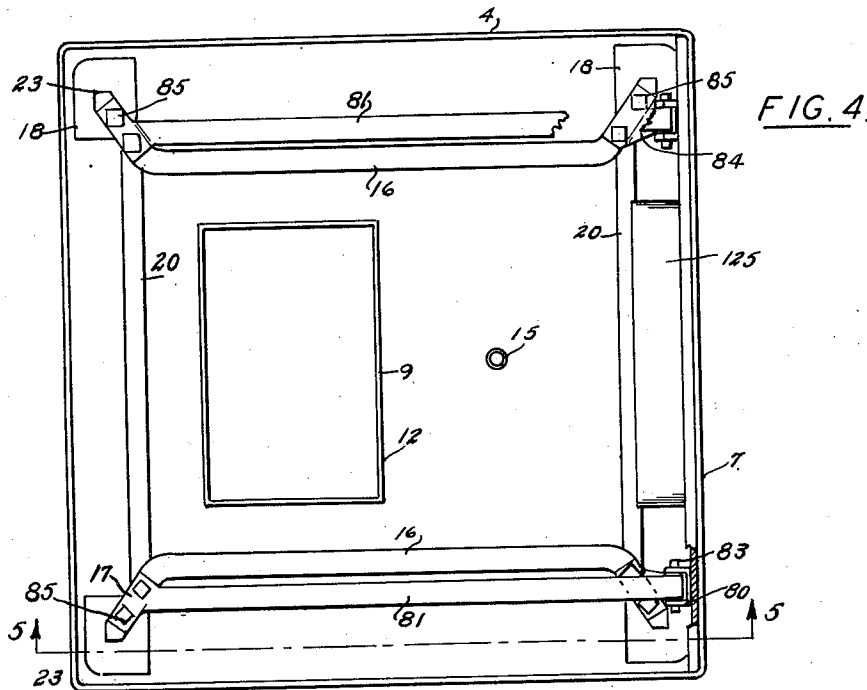
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EVAPORATIVE COOLER

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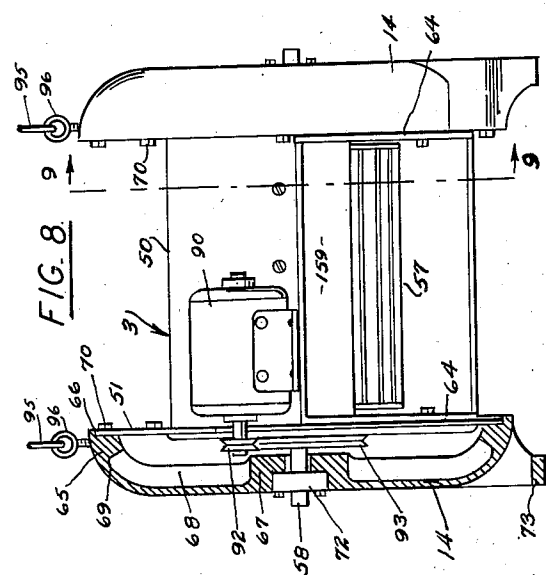


FIG. 8.

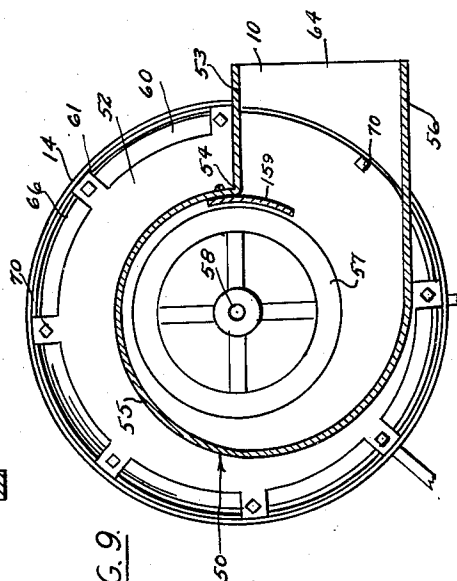


FIG. 9.

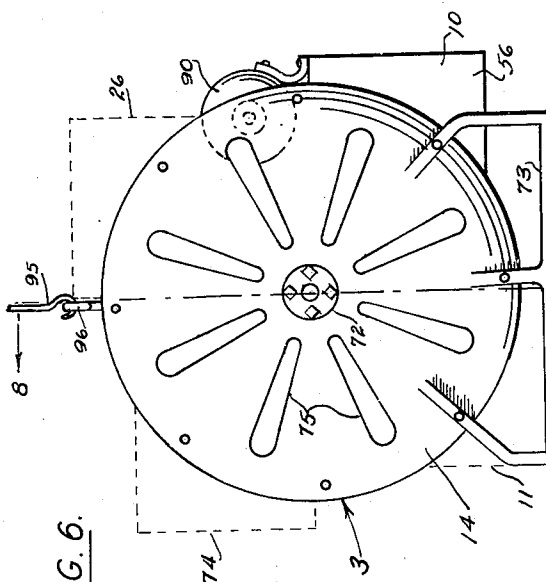


FIG. 6.

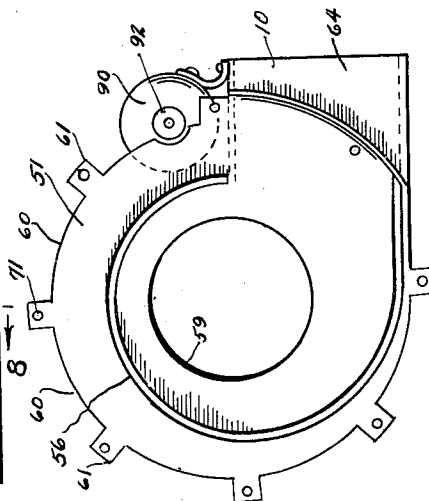


FIG. 7.

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2,396,024

EVAPORATIVE COOLER

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Application October 16, 1943, Serial No. 506,620

8 Claims. (Cl. 261—30)

This invention pertains to evaporative coolers of the type usually used in dry climates in the southwestern part of the United States, and has for its object:

First: A provision of evaporative cooler wherein the several parts of the case are interchangeable, and of simple construction, enabling them to be knocked down for packing and shipping and to be assembled without cutting or fitting and without the use of special tools.

Second: The construction of an easily assemblable cooler of the type indicated, having interchangeable parts and an inside positioned blower element adapted to rotate so that the outlet or discharge vent may be directed toward either the bottom, top, right or left hand sides of the case whereby the cooler may be adapted to various installation mountings, buildings or the like which may require differently positioned connections to ducts or registers.

Third: The provision of an evaporative cooler having an interior frame and bracing structure in combination with the outer case and a variable directive blower support, including an interior supporting frame adapted to carry the weight of the blower and its motor, this support being of symmetrical structure to accommodate the entire cooler structure to various installations.

Fourth: The combination of an evaporative cooler blower support and directive panel whereby the blower case may be moved to direct the outlet vent in various desired directions, and the support at the same time acting as a panel to divide air currents prior to their entering the blower so that pressures may be evenly distributed over the area of evaporative pads, and

Fifth: To provide a case structure including a base and top elements in combination with interchangeable evaporative pad panels whereby the structure is readily adapted to the formation of cases having four, six, eight or multiple sides in order to increase the evaporative pad area.

I attain the foregoing object by means of the structure and arrangements of parts shown in the accompanying drawings in which,

Figure 1 is a side elevation of one form of an evaporative cooler including my improvements;

Figure 2 is a front view thereof;

Figure 3 is a top view thereof;

Figure 4 is a plan view of the cooler bottom and blower supporting the frame structure;

Figure 5 is a sectional elevation of the base and discharge panel taken on line 5—5, Figure 4;

Figure 6 is a side elevation of the blower showing the combination blower support and baffle;

Figure 7 is a side elevation of the blower case;

Figure 8 is a front elevation of the blower case and its supports, with the left blower support and baffle shell shown in section substantially along line 8—8, Figure 6;

Figure 9 is a section of the blower case taken on line 9—9, Figure 8;

Figure 10 is a fragmentary elevation of the upper corners of adjoining pad panels showing interlocking means to the water pipe support;

Figure 11 is a section of the structure shown in Figure 10 taken on line 11—11, Figure 10;

Figure 12 is an elevation of a pad panel viewed from the interior case; and

Figure 13 is a plan view of a pad panel with fragments of adjacent side panels showing corner construction, and drawn to a somewhat enlarged scale.

Referring to the drawings, 2 indicates the case generally; a blower 3 is positioned in this case, supported on a frame structure 14; which also acts as a pressure equalizing baffle.

The case parts are principally made from pressed sheet metal and include a bottom 4, a top 5, interchangeable pad panels 6 forming three sides, and an interchangeable vent panel 7 forming the fourth side. In the frame, here shown, the bottom 4 is square with its edges pressed upward to form a basinlike structure.

The top 5 is made of the same material as the bottom and has the same shape and dimensions. The edges are similarly pressed down. The top and bottom close over the top and bottom portions of the pad and vent panels respectively, holding them in place, and these six parts form the enclosure termed the case.

The pad panels consist of a central plate portion 28 in which downwardly and inwardly opening louvres 29 are formed. The side edges of the plate are folded inwardly at 30 to attain an angle of 45° relative to the face of the plate. The inner edge of this vertical fold is then rounded and curved inwardly to form a retaining lip 31 to receive the edges of the inner pad-retaining screen 32. The adjacent folded edges of the pad panels are shaped and positioned so that they fit against each other when in position within the top and bottom members. Felt padding 34 may be interposed between the adjoining faces of these angular edges to aid in securing an air-tight joint between the several panels. The same corner and edge construction is provided along the edges of the vent panel 7.

In the bottom 4 a vent 9 is formed by punching out a rectangular hole and welding a collar

12 around its edges to extend into the basinlike closure of the bottom. This vent is positioned to register with the discharge vent 10 of the blower when it is directed downward. An overflow or drain tube 15 is provided elsewhere in the bottom as shown. A collared vent 25 is similarly provided in the top and it also is positioned to register with the blower vent 10 when the blower is rotated to discharge upward. A similar vent 125 is formed in panel 7.

It will be noted that the blower is positioned so that the upper edge of its discharge vent 10 is in a plane with its rotor shaft and this, in turn, is centrally located within the case; the vents in the top and bottom are, therefore, symmetrical as to a plane passing vertically through them and the axis of the rotor shaft. This construction makes it possible to form the top and bottom on identical dies and to punch the openings for all vents in the same mechanism.

A lid or vent cover 27, having a depending lip, is fitted into the top vent when it is not used. A similar cover may be fitted from the inside into the bottom vent when it is not in use, or into the side vent in the vent panel when either the top or bottom vents are used in a particular installation and the panel 7 is retained.

Within the bottom 4 and forming a part of it is a spider base composed of side rails 16 having legs 17 at their ends extending angularly downward and outward and terminating in feet 18 positioned to rest in the corners of the bottom. These rails are spaced to fit and receive the bottoms of baffle supports 14 of the blower and are held in position transversely by cross bars 20.

It will be noted that the rails are pressed from metal to form channel-shaped bars and that the legs 17, where they adjoin the feet 18, are shaped to provide square raised corners 23. These corners form retention means for the adjoining inner edges of the panels to space and retain them in position when the case is assembled. On the outside of the base there are feet 21 at the four corners. These are spot welded in place at the same time that the spider base feet 18 are similarly attached.

In the foregoing structure, the parts, after welding, as stated, are galvanized to secure a finished non-corrosive surface and close the seams between the adjacent parts.

Inner pad-retaining screens 32 are provided for each of the pad panels. These are composed of a number of vertically extending round metal bars 40, spot welded to a desired number of horizontal bars 41 to form a cross bar or grill structure. At the sides of this structure large and vertical bars 42 are provided and these are positioned to fit into and be retained by the retaining lips 31 of the edge folds of the panel.

Pads 43 are prepared in a flat form from wood excelsior, shavings, or the like. They are placed between the inside of the plate portion of the pad panels and the retaining screens 32. It is sometimes desirable to enclose the evaporative pad material in a flat sack of lightly woven material, such as cheese cloth or the like; when this is done, the removal of contaminated pads is facilitated.

The blower 3 is made with the spiral case member 50 held between the two flanged end members 51 and 52. This spiral member is shaped from one piece of sheet metal, starting with the flat portion 53 which forms the top of the blower vent 10. It is bent up at 54, forming a fold, and then curved to form a spiral section 55 ending in

the flattened portion 56 which forms the bottom of the vent 10.

The end pieces 51 and 52 are right and left counterparts. Each has a spiral groove 56 adapted to receive the edges of the middle case part 50 to aid in maintaining it in proper shape. The spiral is proportioned to have the proper volume increase relative to the size of the squirrel cage rotor 57. The shaft 58 of the rotor is centered in the intake holes 59 cut in the center of each end piece. A throat piece 159 is inserted as shown to more completely enclose the rotor.

The perimeters of each end piece are arcuately notched at 60 leaving tabs 61 for attachment to the supporting baffles 14 at equidistant peripheral distances. The lower edge of each end portion extends tangentially to adjoin the lower flattened portion 56 of the mid case part 50, and at the center a radial extension joins the edges of the flattened portion 53. These extensions form sides 64 to box in the vent 10. The three main members constituting this blower case or housing are preferably made of sheet metal, spot welded along the contacting edges, and then dip galvanized. The throat piece 159 is made removable and is held in place with screws.

The combination supports and baffles 14 are preferably cast of light metal alloy. As viewed from the outside, they are convex shells having flattened middle portions. An annular groove 66 is formed around the inner face of the rim 65. A bearing boss 67 is formed in the center of the inner face. Strengthening ribs 68 radiate from this boss to lugs 69 formed just inside the rim. These lugs are spaced and positioned to register with tabs 61 of the blower case. Each lug is drilled and threaded to receive machine screws extending outward thru holes 71 in tabs 61. Screw holes are drilled thru side panels 64 to match the holes in lugs positioned adjacent these members. The rotor shaft 58 is journaled in bushings 72 set in bosses 67. At the lower edges of these supporting baffles feet 73 are cast integral with the shell. These have flat bottoms adapted to rest on and be secured to the rails 16 of the spider base by bolts or other fastening means.

It will be noted that the centers of the supporting baffles and the blower housing ends are concentric. As a result of this structure, the blower housing can be rotated relative to the supporting baffles, by merely removing screws 70 and rotating it until the tabs 61 again align with the lugs 69, and then re-inserting these screws. In this manner, the blower vent may be directed to the right as shown in Fig. 6 or downward, upward or toward the left side as indicated by the dotted lines 11, 26, and 74, respectively.

Air drawn in thru the intake holes in the blower enters between the supporting baffles and the blower case sides thru the arcuate vents formed by the notches 60. In order to equalize intake or suction draft currents radial slots forming additional vents 75 are cut into each baffle shell between the radial strengthening ribs 68. These are sized so that the intake or suction draft is equalized over the whole area of each of the pad panels. In this way coursing is prevented and dry spots on the pads eliminated. The case is assembled by setting the three pad panels and one vent panel into the bottom 4. The angular side plates 30 of each of these panels adjoin and are retained in place in the bottom between its outer rim and the spider frame feet corners 23.

Notches 76 are cut in the top of the adjoining side plates 30 to receive clips 77 which bind them

together at the top. Above these clips are rubber water pipe pads 78, moulded with grooves to fit over the edges of notches 76, and pierced to accommodate the corner bends of the water spray pipe 79. This pipe extends along the top of the pads in their panels. This pipe is of usual construction, being of ample size to deliver water uniformly thru holes pierced thru its under side along those portions over the top edges of the pads.

In setting up the cooler it is understood that if the structure on which it is used or to which it is to be attached is a side wall with a low vent delivery the vent panel is attached as shown and three pad panels are used. The spider frame carries the weight of the blower and motor and lug screws extend thru upright frame stanchions 80 into the side wall. However, where installation is made on a roof where it is vented downward then four pad panels are used. The water supply pipe is extended accordingly.

It will be noted that when the cooler is attached to a side wall the vent panel is used next to the wall and the weight of the entire blower is supported by the inner frame as shown particularly in Figs. 4 and 5.

This frame includes vertical channel steel stanchions 80 attached to the inner face of the vent panel, stretcher braces 81 held in place by pins 83, and compression pieces 84, at the bottom. These are attached to the nearest rail legs 17 by screws 85. The outer ends of braces 81 are similarly attached to the outer rail legs. Holes to receive the screws 85 in the brace and compression pieces are matched with threaded holes in the legs 17 so that these parts are interchangeable to affect a right or left position of the panel 7, so that where installation requires a high discharge vent, the vent panel is inverted, reversed and placed on the lefthand side.

Where the installation calls for top or bottom vent delivery and four pad panels are used, obviously the use of the stanchions, and brace members 81 and 84 is unnecessary. If, in such an installation, only three pads are used, a lid similar to 27 may be used to fill the vent collar in the pad panel.

After installation of the case base and assembly of the side panels, the blower is installed and adjusted to the desired vent direction, an airtight fabric or a metal collar may be used to join the blower vent to the vent collar in the case part desired. The motor 90 is then attached and connected to drive the rotor 57 by means of a belt over pulley wheels 92 and 93. The water supply pipe 79 is connected to a water supply main and flow regulated in any desired manner. The case top is then placed over the side panel tops and clamped down by hook screws 95 which engage eyes 96 on the baffle supports, and are held tight on the case top by wing nuts 97 on the upper face of the top.

From the foregoing it will be seen that I have provided an evaporative cooler structure which may be both easily and cheaply manufactured in quantities; further, the parts are so related that they are interchangeable, and reversible, so that various installations may be made without cutting or dressing the parts to the particular job. Heretofore installations have been "tailor made" to fit the necessities of each job, and the position of the blower and the means of support and attachment had to be specially designed and fabricated. I realize that to those familiar with the art, various changes, modifications and substitu-

tions of parts may be suggested, all of which might well remain within the spirit of the invention, therefore, I wish to be limited only to the following claims:

I claim:

1. An evaporative air cooler comprising in combination a casing having interchangeable evaporating panels and a vent panel and a blower, said blower having a discharge outlet, a blower supporting frame within the casing and means for adjustably mounting the blower within the supporting frame to direct the outlet of the blower in accordance with the selected position of the vent panel of the casing said means including spaced inwardly facing convex supporting shells having a plurality of perforations forming vents and an annular positioned channel on their inner opposite faces, together with a blower casing having end plates removably attached within the annular positioning channel of said supporting shells.

2. An evaporative air cooler casing consisting of a series of interchangeable panels, the side edges of each panel being inwardly directed to abut with the edge portions of the adjacent panels, said inwardly directed edges having retaining lips formed thereon, a grille member spaced inwardly from the face of the air panels and held in said spaced relation by the retaining lips on the side edges of the panels, and an evaporative pad member arranged in the space between the panel and the grille member, the inwardly directed edges having a cut out portion at the top, and a perforated pipe arranged over the evaporative pad members and having its corner bends positioned within the cut out portion in the inwardly directed edges.

3. An evaporative air cooler casing consisting of a series of interchangeable panels, the side edges of each panel being inwardly directed to abut with the edge portions of the adjacent panels, said inwardly directed edges having retaining lips formed thereon, a grille member spaced inwardly from the face of the air panels and held in said spaced relation by the retaining lips on the side edges of the panels, and an evaporative pad member arranged in the space between the panel and the grille member, the inwardly directed edges having a cut out portion along its upper edge, a pipe support arranged within the cut out portion and a perforated pipe bent to overlie the evaporative pad member and having its corner bends positioned on the pipe support.

4. An evaporative cooler comprising a series of evaporating pad panels, top and bottom covers therefor, a blower structure consisting of spaced supporting frames and a casing supported therebetween, said frames and said casing provided with a plurality of vents proportioned to equalize the air suction drawn by said blower through the surrounding pad panels.

5. An evaporative cooler comprising a series of evaporating pad panels, top and bottom covers therefor, a blower, spaced supports for the blower, and a blower casing supported between said spaced supports, said supports and said blower casing having a plurality of vents proportioned to equalize the air suction drawn by said blower through the surrounding evaporating pad panels.

6. An evaporative cooler comprising a series of evaporating pad panels, top and bottom covers therefor, a blower having a casing provided with flanged end plates, supports for said blower consisting of convex oppositely facing shells, in-

cluding and attached to said casing end plates said shells having a plurality of vents proportioned to equalize air suction drawn by said blower through the surrounding pad panels.

7. An evaporative cooler having an outer case composed of a series of interchangeable evaporating pad panels and top and bottom covers therefor, and a vent panel, a blower having a discharge outlet and a case including flanged end plates, supports for said blower including means to adjust the position of the blower to align the discharge outlet thereof with the selected position of the vent panel of said casing, consisting of oppositely positioned convex shell supports embracing said blower casing and attached to the annular edges of said blower end plates, and said shells having a plurality of vents proportioned to equalize air suction drawn by said blower through the pad panels of said outer case.

8. An evaporative cooler having an outer case composed of a series of interchangeable evaporating pad panels, top and bottom covers therefor, and a vent panel, a blower having a case provided with substantially circular end plates, supports for said blower having means to adjust the position of the blower to align the discharge outlet thereof with the selected position of the vent panel of said casing consisting of oppositely positioned convex supporting shells having annular grooves formed on their inner faces adapted to receive the end plates of said blower cases, and attached thereto, said blower casing end plates and said shells having a plurality of vents proportioned to equalize the air suction drawn by said blower through the pad panels of said outer case.

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