Oct. 14, 1947. A. S. FEINBERG 2,428,842

WATER ELEVATING AND DISTRIBUTING SYSTEM

Filed Feb. 4, 1946 2 Sheets-Sheet 1

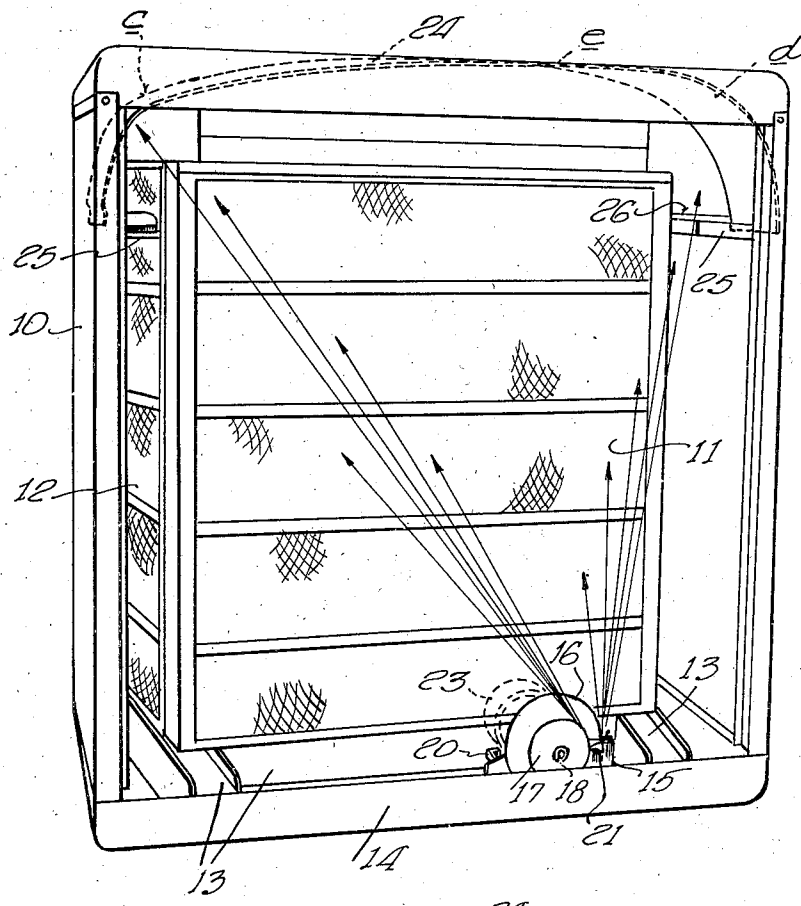


FIG. 1

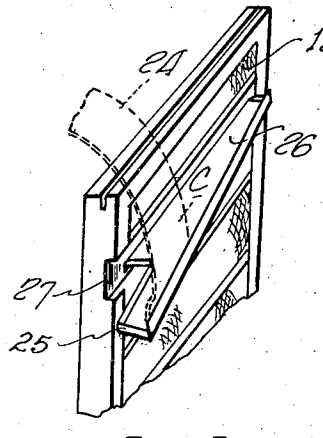


FIG. 3

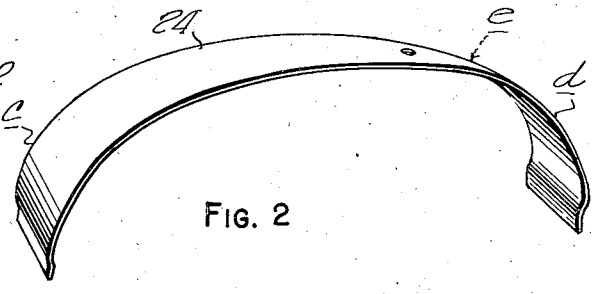


FIG. 2

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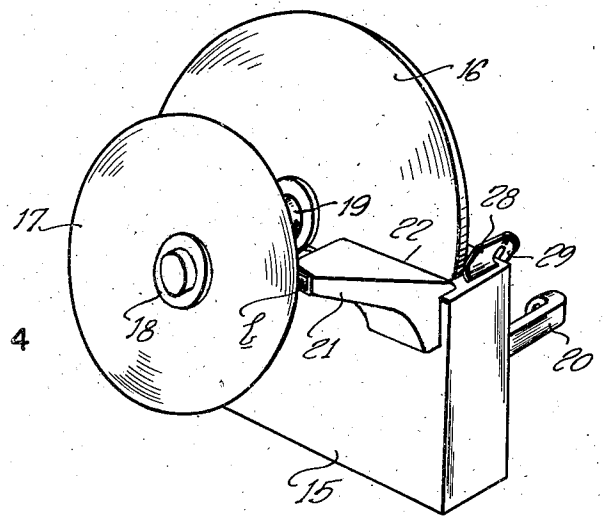


FIG. 4

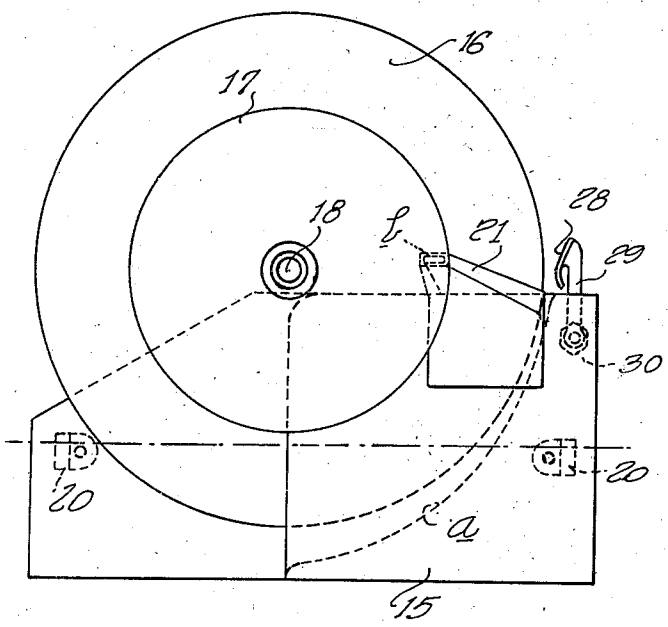


FIG. 5

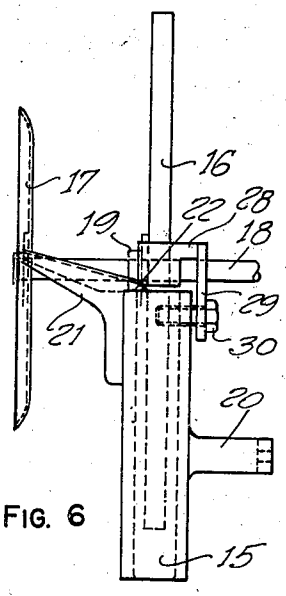


FIG. 6

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WATER ELEVATING AND DISTRIBUTING SYSTEM

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10 Claims. (Cl. 261—36)

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This invention relates to evaporative air cooling apparatus and more particularly to water elevating and distributing means for evaporative coolers of the multi-filter type.

The principal object of the invention is to provide improved means for delivering water in substantially equal volume to each of a plurality of angularly related filter mats in an evaporative cooler such as described in U. S. Letters Patents Nos. 2,296,155 and Re. 22,675 wherein side mats converge rearwardly towards a rear mat disposed transverse to the stream of air caused to pass therethrough by means of a blower situated between the side mats. To avoid the conventional but impractical method of elevating water by pump action and distributing the same by means of troughs located along the upper edges of the filter mats, the present invention provides a water elevating unit disposed in the water basin of the cooling apparatus which consists of two discs of different diameters, one being partially submerged in the water of the basin to elevate and transfer water to the other. By virtue of the high speed of rotation of these discs, water is discharged tangentially off the perimeter of the discs upwardly, the direction of thrust from the larger of the discs being predetermined and controlled by an adjustable baffle adjacent its periphery while the discharge from the companion disc is controlled by causing water collected off the face of the larger disc to impinge the confronting face of the said companion disc at a predetermined point thereon.

Another object of the invention is to provide an arcuated water collecting and distributing plate disposed above the filter mat assembly against which water thrown upwardly by the discs impinges at preselected points. To complete the assembly, the invention further provides water sheds or baffles alongside the side mats into the rear ends of which water is discharged from the collecting plate for distribution onto the said side mats to saturate the same.

With the foregoing objects as paramount, the invention has further reference to certain features of accomplishment which will become apparent as the description proceeds, taken in connection with the accompanying drawing wherein:

Figure 1 is a rear perspective view of an evaporative cooling apparatus showing the water elevating and distributing assembly installed.

Figure 2 is a detail perspective view of the arcuated collecting and distributing plate per se.

Figure 3 is a fragmentary perspective view of

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one of the side mats, showing a water shed and the relationship therewith of the collecting and distributing plate, the latter being fragmentarily shown in dotted lines.

Figure 4 is a perspective view of the water elevating unit.

Figure 5 is a side elevational view thereof on enlarged scale, and

Figure 6 is a rear elevational view of the water elevating unit.

Continuing with a more detailed description of the drawings, reference is primarily made to Figures 1 to 3 wherein numeral 10 denotes a cabinet of conventional design and also conventional are the air filter mats 11 and 12. The mat 11 is disposed at the rear and the side mats 12 are disposed at relative angles and converge rearwardly, thus defining between their outer surfaces and the side walls of the cabinet substantially triangular spaces serving as moisture collecting chambers. The mat assembly is mounted removably on skids 13.

As stated, it is the intent of the invention to provide for equal distribution of water on the mats 11 and 12 from a single point without the aid of a pump and distributing troughs usually situated above the mats or along their upper edges. Due to the necessity in many cases for mounting the cooling unit outdoors, it is impossible to obviate collection of foreign matter in the water of the basin 14 and this foreign matter not only causes frequent fouling of the pump but if elevated with water delivered by the pump, such foreign matter collects on the mats and in the case of animal and vegetable matter decaying thereof gives rise to unpleasant odors difficult to remove.

As will become apparent presently, the invention provides a single unit for elevating and distributing water to all of the mats simultaneously and the very minimum of foreign matter reaches the mats by virtue of the fact that gravity will cause the heavier of the particles of solid matter to precipitate out of the streams of water as they are projected upwardly to be transported in part to the side mats and caused to enter the rear mat under influence of the blower.

Accordingly, the water elevating unit consists of a base 15, the rear portion of which is formed with a narrow cavity having a curved bottom *a* (Fig. 5). A portion of the base extends forwardly and is disposed rearwardly of a disc 16 which may, for identification purposes, be referred to hereinafter as the major disc while a smaller disc 17, mounted on the same axis 18, will be re-

ferred to as the minor disc. It is to be noted in Figure 5 that the perimeter of the major disc conforms nearly to the contour of the bottom *a* of the cavity in the base into which part of the major disc extends. The shaft 18 of the two discs is journaled in bearings 19 mounted or formed on the top of the base element 15.

The base 15 is provided with supporting arms 20 which are bolted or otherwise secured to the skid 13 supporting the rear mat 11 and by which the said base is mounted.

Mounted on one side of the base 15 is a stripping tube 21 whose end nearest the major disc 16 is of greater width than the discharge or nozzle end *b* which is in juxtaposed relation to the confronting face of the minor disc 17 and spaced inwardly from the perimeter thereof. Moreover, it is pointed out that the tube 21 is disposed at an angle to the plane of the face of disc 17 for the purpose to become apparent presently.

The stripping tube 21 has a lip 22 overreaching the edge of the cavity in the base in which the major disc 16 operates and this lip is in near contiguity with the face of said disc 16 and parallel therewith.

The base 15 is but partially submerged in the water of the basin 14 to a depth insufficient to permit the minor disc 17 to enter the water. The water level at its peak is suggested by the dotted line crossing Figure 5 and is shown to be below the minor disc 17 but the disc 16 is shown as being partially submerged.

A motor 23 (Fig. 1) adequately sealed against moisture is disposed inwardly of the rear mat 11 and drives shaft 18 at a high rate of speed, causing the discs 16 and 17 to revolve at the same speed. Water is elevated by the disc 16 by surface tension and is stripped off by the lip 22 of tube 21 and caused thereby to be projected through the tube 21 onto the face of the rapidly revolving disc 17. The water is discharged tangentially off the disc 17, taking the path substantially as shown by arrows in Figure 1 or towards the upper left hand corner of the cabinet 10 and in impinging the downwardly curved portion *c* of a collecting and distributing plate 24, the water follows the curve of the plate and falls upon the extended end 25 (Fig. 3) of a shed or baffle 26.

As shown in Figure 3, the sheds 26 which are identical in construction and position on each side of the cabinet, occupy the triangular moisture collecting chambers between the side pads 12 and side walls of the cabinet. The sheds are slightly inclined towards the rear of the cabinet as well as laterally towards the side mats 12 and their inner or discharge edges lie in recesses 27 (Fig. 3) in the outer surfaces of the mats. Hence, the water delivered onto the ends of these sheds by the collecting plate 24 will flow at once towards the forward end of the shed and off the discharge edge thereof throughout its length to enter the adjacent mat and maintain saturation thereof.

Simultaneous with the foregoing function a separate discharge of water is made off the perimeter of the major disc 16 which takes the course shown by the arrows to the right in Figure 1, i. e., upwardly towards and against the downwardly curved end *d* of the collecting plate 24, to be discharged thereby onto the extended end 25 of the opposite shed 26 and similarly distributed along the outer surface of the companion side pad near its top, as shown.

It is to be particularly observed that the curvature of the collecting plate 24 does not represent a true centered arc but instead is distorted to

dispose the portion *e* having the deepest curve nearer the right of the rear mat. The object in so doing is to insure that water in adequate quantities will be transferred by surface tension and gravity along the gradually sloping undersurface of the plate 24 to the downwardly curved end c and onto the water shed 26. It is less difficult to adequately supply the shed 26 to the right of the cabinet, hence the arrangement described. Obviously, there will be a radial discharge from both discs 16 and 17 throughout the effective radius but the greater discharge will be as described and shown, i. e., towards the upper corners of the cabinet.

While not shown, it is understood that a conventional blower is disposed between the side mats 12 and forwardly of the rear mat 11 to cause air to be drawn through the mats and to discharge the same at the front of the cabinet into a room or enclosure. Suction of the blower will constrain water thrown upwardly by the discs to enter the rear mat 11, saturating the same and also into the moisture collecting chambers at each side of the cabinet where the water will, in part, be influenced to enter the side mats supplementing that precipitated by the sheds 26, as described.

In order to control the direction of discharge as well as the quantity of water thrown by disc 16, a baffle 28, consisting of a small, curved plate, so identified, is mounted adjacent the point of the greatest discharge of disc 16 and is supported adjustably by an arm 29, attached by means of screw 30 to the base mounting 15. It is apparent that this baffle 28 may be moved towards and away from the periphery of the disc 16 to respectively decrease and increase the quantity of water discharged thereby as well as to change slightly the direction of discharge. It is further apparent that the confined space in which the disc 16 is constrained to operate, combined with the curved bottom *a* of the cavity, limits the width of the discharge, the said curved bottom *a* being especially effective to establish a head of water which remains constant so long as the level in the basin is constant.

Manifestly, the construction as shown and described is capable of some modification and such modification as may be construed to fall within the scope and meaning of the appended claims is also considered to be within the spirit and intent of the invention.

What is claimed is:

1. In an evaporative cooler having a rear and juxtapositioned side filter mats at relative angles, a water elevating and distributing assembly including a base supporting parallel discs of different diameters operating at the same speed, the larger of said discs being partially submerged in the water of the basin of said cooler, means establishing a head of water in said base, means for stripping water from one face of said larger disc and projecting the same onto the confronting face of the companion disc for upward discharge at an angle to the peripheral discharge of said larger disc and arcuate means against which the discharge of said discs impinge at separate points for collecting and distributing water for delivery onto said side mats simultaneously.

2. In an evaporative cooler having angularly related filter mats, a water basin, a pair of discs of unequal diameters rotatably mounted so that the larger of said discs only is partly submerged in the water of said basin, means for stripping water elevated by said larger disc from a side

thereof and for projecting a stream onto the confronting face of the companion disc for tangential discharge at an angle to that of said larger disc and arcuate means against which said water is projected from said discs for delivery to selected ones of said mats.

3. A water elevating and distributing assembly for evaporative coolers equipped with rear and angularly related side mats and a water basin, water sheds whose delivery edges are in contiguity with the outer surfaces of said side mats, an arcuate water collecting and distributing plate whose ends overlie the ends of said sheds, a pair of discs of unequal diameter rotatable at the same speed, the largest of which is partially submerged in the water of said basin, means for stripping water from the face said latter disc and projecting the same onto the confronting face of the companion disc for discharge simultaneously with that of said large disc but in different upward directions to impinge said collecting and distributing plate at different points for discharge at opposite ends thereof.

4. A water elevating and distributing assembly for the mats of an evaporative cooler, a water basin, complementary discs of different diameters, the largest of which is partially submerged in the water of said basin, means for collecting water off the face of said latter disc for discharge onto the confronting face of the companion disc for upward discharge at an angle to the peripheral and simultaneous discharge of said larger disc, means against which the discharge of said discs impinge at separate points for delivery in opposite directions to selected mats of said cooler and means for rotating said discs.

5. A water elevating device including a water basin, a base having a narrow cavity, a disc rotatable in said cavity and partially submerged in the water of said basin, a smaller disc above the level of said water and mounted on the shaft of said first disc, a stripping tube having a lip at one end for collecting water from the upgoing face of said first disc for delivery through said

tube onto the confronting face of said companion disc for upward peripheral discharge simultaneous with but in a different direction than the peripheral discharge of said first disc.

6. The structure set forth in claim 5, further defined in that adjustable means is provided at the discharge point of the largest of the discs for varying the volume and direction of said discharge.

7. Apparatus for elevating water from basin comprising parallel discs adapted to rotate at the same speed but of different diameters, the largest of the discs being partially submerged in the water of said basin and means intermediate said discs for collecting water from the face of the largest and transferring the same to the confronting face of the smallest disc for discharge tangentially and simultaneously but in a different direction from the tangential discharge of said largest disc.

8. A water elevating apparatus for an evaporative cooler equipped with rear and side mats and a water basin, a pair of discs of different diameters operable at the same speed, one of which is partially submerged in the water of said basin, means intermediate said discs for transferring water from the face of the largest to the face of the smallest of said discs of simultaneous peripheral discharge, and means in line of said discharge for receiving a part of said discharge at different points and for delivering the same in opposite directions for reception by said side mats.

9. The structure set forth in claim 8, further defined in that the water receiving and delivering means consists of an arcuated plate whose downwardly curved ends are in juxtapositioned relation to the side mats of the cooler.

10. The structure set forth in claim 8, further defined in that means individual to each side mat is provided, on which is deposited the water from the receiving and delivering means for distribution along the tops of the side mats.

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