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R. N. BROOKINS
LIQUID DISTRIBUTOR

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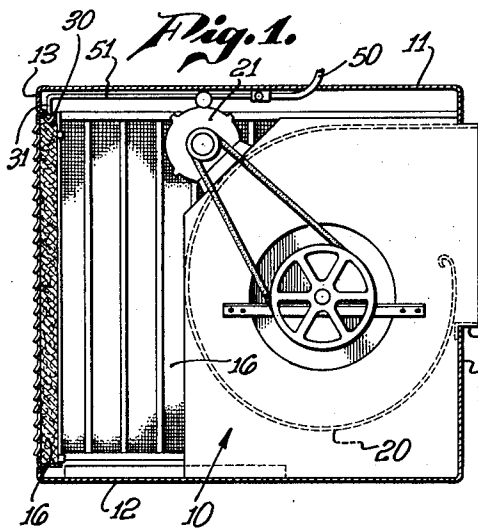
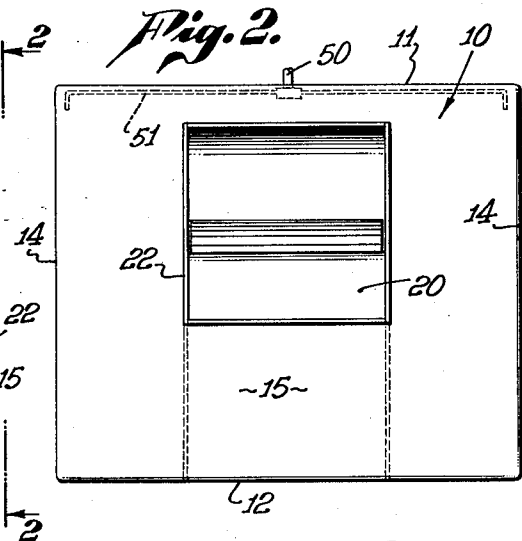
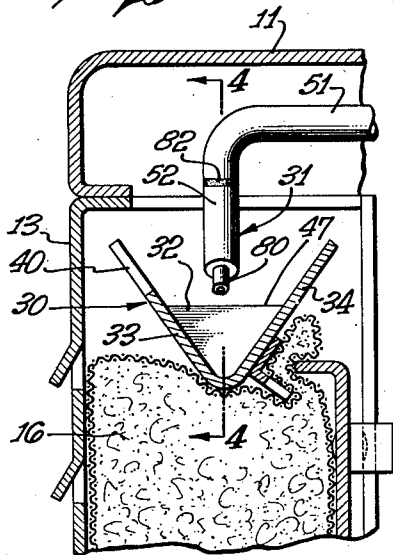
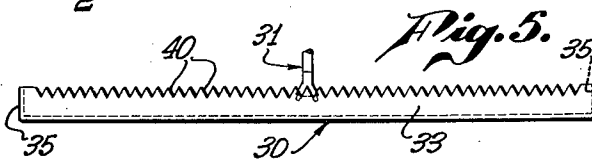
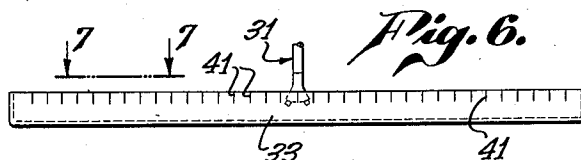
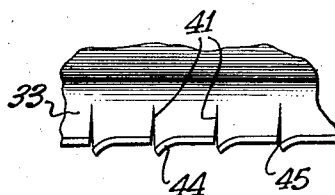
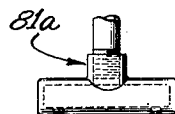
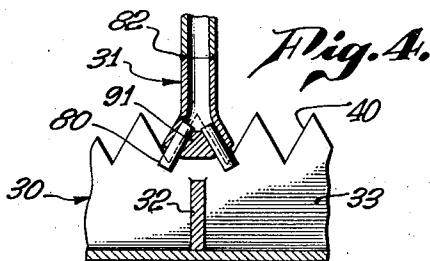


Fig. 3.



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LIQUID DISTRIBUTOR

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1 Claim. (Cl. 299—1)

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This invention has to do with a construction for coolers and has particular reference to a construction suitable for use in evaporative coolers. It is a general object of the present invention to provide a simplified improved and inexpensive means for distributing water to a pack or cell such as is used in an evaporative cooler.

Evaporative coolers or cooler elements such as are used, generally, in air conditioning, commonly involve a pack or cell of excelsior or like material to which water is applied, so that a stream of air circulated by a fan or blower may contact the water to create evaporation and consequently, a cooling action. In practice for effective cooling the water must be distributed over or throughout the pack with reasonable uniformity and to this end various arrangements have been proposed and employed. Accurate distribution is particularly important when a non-circulating system is used.

In practice, one means frequently employed for water distribution includes a tube arranged over the cell, which tube is provided with numerous small spaced discharge openings designed to discharge water at various points along the length of the tube and thus effect substantially uniform distribution along the top of the cell. The difficulty encountered with this type of distribution is that foreign matter present in the water, or corrosion or other such factors, result in the small openings becoming clogged or restricted, to the end that after a short period of use the distribution is no longer uniform and may even become almost completely cut off.

Another form of construction that is commonly employed involves a trough arranged over the cell which trough has an overflow edge and, in some cases, the overflow edge is notched or provided with spaced overflow openings. This type of device works satisfactorily only when the trough is mounted in a true horizontal position and is maintained in that position. In practice evaporative coolers are seldom installed by experts able to initially arrange the troughs in a true horizontal position, to effect uniform overflow throughout their lengths, and even if they are initially installed in the proper position there are many cases where they will not remain in that position. In time the supports or the coolers themselves may sag or become distorted, with the result that it is usually not long before this type of device is delivering practically all of the water at one end of the cell, without delivering any appreciable amount, if any, water to the other end of the cell.

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It is a general object of my present invention to provide a simple, effective, and inexpensive trough type distributor for a cell such as the cell of an evaporative cooler which overcomes, to a large degree, or practically, the difficulty inherent in trough type distributors heretofore employed.

It is another object of my invention to provide a trough type distributor for an evaporator cell which effects substantially uniform distribution over the top of a cell so long as the trough is arranged in a substantially horizontal position. The structure that I have provided is such that it will work satisfactorily or to give a substantially uniform distribution over a cell so long as it is reasonably near a horizontal position. The device is preferably mounted initially in a horizontal position and is such that it will continue to operate satisfactorily even though it may later become somewhat out of line or out of the horizontal position due to settling or distortion from conditions which commonly cause such devices to become out of line.

Another important object of my present invention is to provide a distributor of the general character referred to which eliminates entirely complicated valves, openings, or distributing devices such as have been heretofore proposed to overcome the problem that I have above pointed out. The device of the present invention adds little to the cost of the ordinary distributing trough and yet greatly improves the effectiveness of such structure.

Another object of this invention is to provide a device of the general character referred to involving an exceedingly simple nozzle which effectively divides the stream delivered to the trough.

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

Fig. 1 is a side view of a typical evaporative cooler employing the present invention, with parts broken away to show in section and to show the general location of a cell and the trough that I have provided for distributing water over the cell. Fig. 2 is a view of the structure shown in Fig. 1 taken substantially as indicated by line 2—2 on Fig. 1. Fig. 3 is an enlarged detailed transverse sectional view of the upper end portion of the cell, showing the distributing trough of the present invention as it is located over the cell. Fig. 4 is a detailed transverse sectional view

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of the middle portion of the trough being a sectional view taken as indicated by line 4—4 on Fig. 3. Fig. 5 is a side view of the trough and nozzle of the present invention showing a form of trough wherein the discharge edge is notched to form spaced individual overflow openings. Fig. 6 is a view similar to Fig. 5 showing a somewhat different form of notching. Fig. 7 is an enlarged view taken as indicated by line 7—7 on Fig. 6, and Fig. 8 is a view showing another form of the distributing nozzle.

The structure provided by my present invention is particularly useful as applied to an ordinary or conventional type of evaporative cooler, such as is used in air conditioning. For the purpose of disclosing a typical situation in which my invention can be used to advantage I have disclosed in the drawings a typical or common form of evaporative cooler of the type wherein there is one or more cells of excelsior or the like, over which water is distributed and wherein air is circulated through the cell or cells to create evaporation and consequently a cooling action.

The particular cooler illustrated in the drawings involves, generally, a box-like body 10 having a top 11, a bottom 12, what may be termed a front 13, sides 14, and a rear 15. The device illustrated has evaporator packs or cells 16 occupying the front 13 and the sides 14, each of the cells being mounted as a unit in the manner common to structures of this character. Each cell is a flat rectangular body of excelsior, or the like, forming a pad through which air can be circulated and designed to be moistened so that the air circulated through it contacts water so that the water is evaporated. The particular cooler illustrated involves a blower 20 within the body driven by a motor 21 and arranged to draw air into the body through the several cells and to discharge it out through a discharge or delivery duct 22 provided at the rear 15 of the body. The construction involves means at each evaporator cell 16 for distributing water over the cell.

My present invention is concerned with the means for distributing water to a cell 16, or the like, and it involves, generally, a trough 30, a nozzle 31, and a partition 32 in the trough at the nozzle.

The trough 30 may be any suitable device designed to allow water to overflow along its length to fall upon the cell 16 so that the water is distributed along the length of the cell. In the preferred form the trough is a simple V-shaped structure formed of sheet metal to be V-shaped in cross section, so that it has upwardly and outwardly divergent side walls 33 and 34. The V-shaped trough thus formed by the side walls is closed at each end by an end wall 35.

The top edge of one or both of the walls may be flat or straight and such as to form an overflow edge. However, I prefer to provide spaced overflow openings along one of the sides. In the preferred form of the invention one side only of the trough has overflow openings, for instance as shown in the drawings, the side 33 of the trough has a plurality of spaced overflow openings formed in it from one end of the trough to the other.

In the form of the invention shown in Figs. 4 and 5 of the drawings the overflow openings are formed or established by providing V-shaped notches 40 in the upper edge of the side 33, whereas in the form of the invention shown in Figs. 6 and 7 of the drawings the overflow openings are formed by making cuts 41 in the upper

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edge portion of side 33 and deflecting the material at one side of each cut to form lips 44 which leave openings 45 through which water can flow.

The structure thus far described forms or establishes an elongate trough which, if arranged in a truly horizontal position will uniformly distribute water along its length but which, if tipped slightly, so that one end is lower than the other, will act to deliver a substantially greater volume of water to the low end.

In accordance with my present invention I provide a partition 32 across the trough formed by the divergent sides 33 and 34 which partition is preferably located at the middle of the trough or halfway between the two ends 35, and is secured in the trough to divide it into two entirely separate compartments or sections. In the preferred construction the partition 32 is a simple sheet metal part soldered or otherwise secured in place to extend across the trough and to project upwardly so that it presents an upper edge 47.

In the device illustrated a water supply line 50 extends into the body and a distributing line 51 extends to each trough that may be involved in the unit. In the particular case illustrated the distributing line 51 extends to a point immediately above the partition 32 and there it is turned to face or discharge downwardly. The downwardly turned or facing discharge end of the distributing line may be termed a nozzle 52.

In accordance with the broader aspects of my invention I may provide any suitable sort of nozzle or nozzle construction. However, I prefer to form the nozzle 31 by fixing two small tubes or tips 80 in the discharge end of the nozzle body 91. The tips have openings through them to deliver streams of the proper size and they are disposed to discharge into the two trough sections so that the water supplied to the nozzle is equally divided between the two sections. In practice when a recirculating system is used I may wish to remove the restrictions set up by the nozzle so there is sufficient volume of water to flood the trough. To allow for quick simple removal of the nozzle I may provide a weakened point or break joint at 82 so the nozzle can be readily broken off without resort to tools or wrenches such as are required to operate threaded pipe joints or the like. I use the term "break joint" to define a joint between parts enabling them to be separated easily and quickly by breaking or fracturing the joint or the material at the joint as distinguished from the usual fittings or joints commonly used in pipe lines and which almost always require operation by a wrench or the like. The usual joint is slow to manipulate and may be so located, as within a structure such as I have illustrated, that it is very difficult if not impossible to operate. My break joint can be released or broken by mere application of pressure deflecting one part sidewise relative to the other. In Fig. 8 I show a nozzle 81^a that can be renewed when it is to be removed.

By dividing the supply of water the two sections of the trough are individually supplied with water and each acts as an individual distributing trough so that even though the entire unit or trough is tipped so that one end is lower than the other, still there will be an effective distribution of water along the top of the cell 16 because the lower end portions of the two sections of the trough will, of necessity, be spaced a substantial distance apart.

In employing the construction of the present

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invention it is preferred to install the unit so that the trough 30 is in a true horizontal position, and consequently there will be a uniform distribution of water through the overflow openings in the side of the trough from one end of the trough to the other. However, should there be a slight lack of alignment no particular harm will result as the two sections of the trough will serve to divide the supply of water as above described. Further, if the trough becomes misaligned after installation no serious harm will result as the two sections individually supplied as above described will effect substantial uniform distribution over the cell.

From the foregoing description it will be apparent how I have, by my invention and through a very simple and inexpensive arrangement, provided for practical distribution of water over a cell under ordinary operating conditions and even though the distributing trough as a whole is not at all times in a truly horizontal position. With the construction that I have provided it is necessary only to provide the nozzle, which is very simple, and to add the partition 32 which is an exceedingly simple inexpensive part, easily applied to the trough.

I have, in describing my invention, referred to a single partition applied to the trough 30 and a single nozzle 52 cooperating with the partition. It will be understood that if the trough 30 is of a length making it necessary or advantageous to divide into more than two sections, in accordance with the principle that I have taught, then any desired number of partitions and corresponding nozzles can be employed. In practice, in an ordinary air conditioning unit or air cooler, I have found it practical to provide a single partition and nozzle such as I have described above.

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Having described only typical preferred forms and applications 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 claim.

Having described my invention, I claim:

A trough of the character described having a wall with a plurality of longitudinally spaced portions divided from and angularly related to the upper edge of the wall to have adjacent opposed lip portions diverging upwardly and laterally of the wall to form V-shaped overflow openings.

RICHARD N. BROOKINS.

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