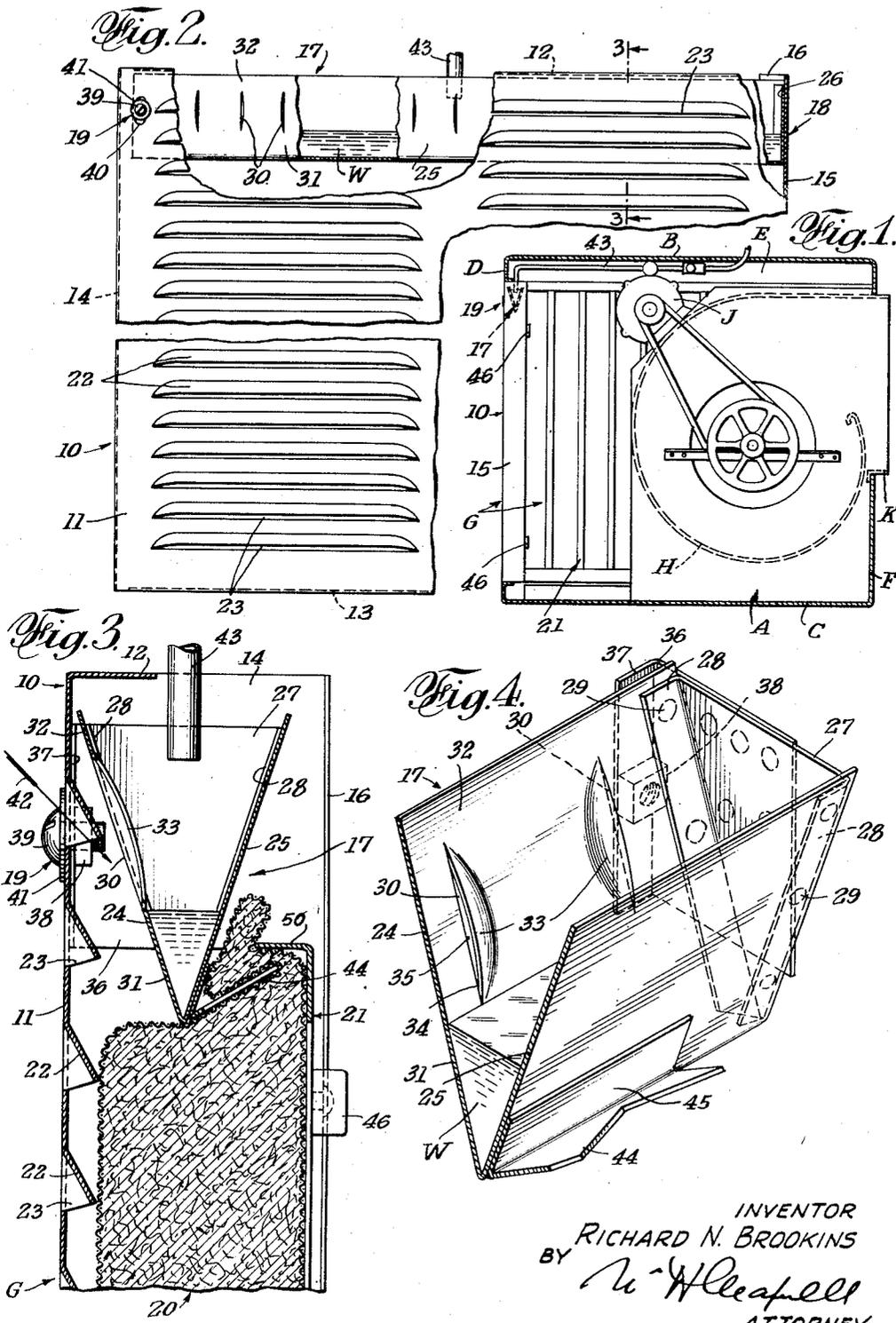


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## EVAPORATIVE COOLER

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8 Claims. (Cl. 299—58)

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This invention relates to evaporative coolers. It is a general object of the present invention to provide a simple, improved and practical construction for a cooler wherein water is distributed to an evaporative cell of the type commonly used in evaporative coolers.

Cooler devices, and more particularly evaporative coolers such as are generally used for air conditioning purposes, commonly incorporate a wetted cooler pack having a cell of material such as excelsior, or the like, and a stream of air is directed through or over the cell to cause evaporation. The air cooled by the evaporation provides an air conditioning and cooling medium for homes, factories, etc. In practice, for effective cooling of the air, the water must be distributed over or throughout the cell with reasonable uniformity. One type of cooler of the character mentioned includes a trough arranged over the cell, said trough having an overflow edge from which the water overflows. Unless such trough is truly horizontal so that the overflow is uniformly distributed over the cell, inefficient operation results. Such prior devices may be initially installed to give efficient operation, and thereafter become tilted because of sag or distortion of the cooler or its supports resulting in one end of the cell receiving an excess of water while the other end receives little, if any, water.

The evaporative cooler of the present invention is an improvement of my invention as disclosed in my patent No. 2,522,600 granted September 19, 1950.

Another object of my invention is to provide a simple, inexpensive evaporative cooler incorporating improved means for obtaining uniform distribution of water to the evaporator cell of said cooler.

Another object of my invention is to provide a trough type evaporative cooler of improved, efficient design for overcoming the inherent faults of trough-type coolers of prior constructions and which produces efficient air cooling and conditioning.

Another object of my invention is to provide an evaporative cooler of the type referred to embodying a simple effective and easily operated means for adjusting the operative position of the water distributing trough for obtaining efficient operation of the cooler.

Another object of my invention is to provide an evaporative cooler embodying a novel and efficient water distributing trough of simple and inexpensive construction and affording control of its operative position after installation of the cooler.

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A further object of the invention is to provide a trough type evaporative cooler in which the water overflow portions of the trough are visible from the outside of the cooler so that the overflow of the trough can be viewed to determine whether the trough needs adjustment to obtain uniform water distribution to the cell of the cooler.

A still further object of my invention is to provide simple, easily operated and novel means for leveling the overflow trough of an evaporator cooler of the type referred to, after said cooler has been installed.

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

Fig. 1 is a side sectional view of an evaporative cooler employing the present invention;

Fig. 2 is a broken front view of the evaporative cooler pack of Fig. 1, embodying my invention;

Fig. 3 is an enlarged cross-sectional view of the upper portion of the cooler pack as taken on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged detailed broken perspective view of one end of the water distributing trough of my invention.

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 shown a 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 cause evaporation and, consequently, a cooling action.

The particular cooler illustrated in the drawing involves, generally, a box-like body A having a top B, a bottom C, what may be termed a front D, sides E, and a rear or back F. The device illustrated has evaporator packs G occupying the front D and the sides E, each of the packs G being mounted as a unit in the manner common to structures of this character. Each pack is a rectangular unit including a cell through which air can be circulated and which holds water so that the circulating air contacts the water to evaporate it. The particular cooler shown involves a blower H within the body A driven by a motor J and arranged to draw air into the body through the several packs G and

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to discharge it out through a discharge or delivery duct K provided at the rear F of the body A. The construction involves means at each evaporator pack G for distributing water over the pack.

The particular cooler pack G which I have illustrated may be said to comprise, generally, a rectangular frame-like housing 10 having a louvred front wall 11 flush with the body walls at which the pack is arranged. The housing has top and bottom inwardly projecting stiffening flanges 12 and 13, respectively, and at its vertical edges it has side walls 14 and 15 with stiffening flanges 16.

A water receiving and distributing trough 17 is arranged longitudinally along and within the top of the housing 10. The trough is mounted or supported by means 18 at one end of the trough and by adjusting means 19 at the other end. An evaporator cell 20 is carried by the trough 17 and is disposed within the housing 10 to receive water from the trough 17 and to pass air admitted from the louvred front wall 11. A closure frame or the like 21 is provided at the back of the housing 10 to confine the cell 20 within said housing.

The housing 10 is preferably formed of sheet metal, the various walls and flanges being integrally formed to provide a substantially rigid element capable of fully resisting distortion in the plane of the front wall 11 and suitable for embodiment in coolers as above indicated. The louvres 22 are formed in the front wall 11 by providing horizontal slits in said wall and then pressing or bending the wall in or rearwardly just above each slit to provide a plurality of spaced longitudinally disposed air passage 23. In the case shown the air passages are arranged in two vertical tiers or banks. Said louvres formed as I have provided serve to stiffen the front wall 11 and, consequently, the housing 10.

The trough 17 is a device designed to allow water to overflow along its length to fall upon the cell or cells 20. In the form illustrated, the trough is a simple device formed of sheet metal to have a main part or body which is V-shaped in cross section so that it has upwardly and outwardly divergent side walls 24 and 25. The ends of the body are closed by closure walls 26 and 27. The latter walls are each formed with inwardly directed flanges 28 engaged with the trough walls 24 and 25 and preferably spot welded thereto, as at 29, whereby the trough 17 is not only made rigid but is suitable for holding a quantity of water without accidental spilling or leaking.

Spaced overflow openings are provided in one of the side walls of the trough. For reasons later apparent, I provide said openings in the side wall 24 which is directed toward the front wall 11 of the housing 10. The openings which I provide are in the form of slits 30 extending vertically or substantially so through the intermediate longitudinal portion of said wall 24. The vertical extent of the slits 30 is such as to provide an unslitted lower longitudinal wall portion 31 and an unslitted upper longitudinal wall portion 32. To provide water passages I flare or deform, one wall portion 31 adjacent each slit, so that it projects inwardly forming a passage of small water-passing capacity at its lower end 34 and progressively increasing in capacity as it advances upwardly toward the middle of the slit at 35. The offset wall portions 33

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also serve to stiffen the trough wall 24 and consequently the entire trough 17.

It will be evident that the trough 17 can hold a quantity of water as indicated at W, to the level of the lower ends 34 of the slits 30 without spillage or leakage. As the water level rises in the trough, water will seep through the narrow lower end portions 34 of the passages to fall upon the cell 20. Since the water passages are in a horizontal series in the wall of the trough it is evident that unless the lower ends of the passages are substantially horizontal, the passages at one end of the trough will drip more water than those at the other end. If the misalignment is great enough the passages at one end will pass a substantial amount of water while those at the other end will not pass any water. Accordingly, I provide simple and effective mounting means for the trough 17 so that the lower ends 34 of the slits 30 or water passages can be leveled off or adjusted to obtain uniform water distribution by adjusting the horizontal disposition of the trough.

The trough that I have shown and described is the subject of my copending application No. 7,371 filed February 10, 1948.

The means 18 for mounting one end of the trough 17 preferably serves to rigidly secure that end of the trough so that it remains stationary or in a fixed position while the other end of the trough is adjusted. In a simple form of construction the means 18 may involve merely a spot weld connection or the like between the side wall 15 of the housing 10 and the end wall 26 of the trough thus making one end of the trough fixed while the other end is free. Mounted in this manner, the trough extends in the manner of a cantilever arm at the rear of the front wall 11 and toward the opposite side wall 14.

The means 19 is provided for adjustably securing the free end of the trough 17 to the housing 10. The means 19, which is illustrated, comprises a bracket 36 welded or otherwise suitably secured to the trough wall 27. The bracket has a flange 37 arranged along the inner surface of the front wall 11 of the housing. I provide a nut 38, or the like, welded to the flange 37 and disposed to receive a screw 39 passing through an elongated opening 40 in said wall 11. A washer 41 is engaged between the screw head and said wall 11. It will be apparent that after installation of the cooler, the trough 17 can be leveled and locked in the desired adjusted position by the above described means 19. In a case where a construction such as I have just described is provided at each end of the trough, either end of the trough may be the end shifted to effect adjustment while the other end is left alone or fixed as though welded or otherwise rigidly secured.

It will be noted that the structure which I provide permits viewing of the slits 30 or water passages of the trough at all times through the topmost louvre slits 23, as indicated by the arrow 42 of Fig. 2. It is, therefore, a simple matter to watch the water overflow or drip from the trough as the trough leveling operation is performed.

The cooler is provided with a suitable water supply which is shown as involving a pipe 43, the flow through which can be controlled. I can obtain a desired rate of overflow from the trough by watching the same through said upper louvre slits 23 and by adjusting the flow through the pipe 43.

The cell 20 comprises a flat, substantially rectangular body of excelsior, or the like, forming a

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pad through which air can be circulated and which can be moistened so that air circulated through it contacts the water delivered to the pad from the trough 17. Evaporation of the water takes place to cool the air circulating through the cell. The excelsior cell may be supported in the path of air flow as by suspending the same upon a horizontal angularly disposed serrated ledge or holder 44 which I provide on the trough. The holder 44 has a folded part or flange 45 spot welded to the wall 25 of the trough 17. By hooking the cell over the serrated edge of the holder 44, as shown in Fig. 2, and by providing the closure frame 21 at the rear of the pack with a flange 50 overlying the holder to clamp the cell thereto, the cell is firmly held in desired water-receiving and air-passing position. The frame 21 is removably held as by latches 46 engaged with the flanges 16 of the housing.

From the foregoing description it will be apparent that I have provided an extremely simple and inexpensive evaporative cooler; that I have provided for practical and efficient uniform water distribution to the cell of the pack of said cooler, even though the cooler as a whole may not be in a true horizontal position; that the distributing trough can be quickly and easily adjusted to function in a proper manner; that visual means are afforded to enable suitable control of the quantity of water being supplied; etc.

Having described only a typical preferred form and application 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 claims:

Having described my invention, I claim:

1. An evaporative cooler including, a housing having a front wall defining the front of the cooler and having an opening therein, an elongate water distributing trough in the housing, means fixing one end of said trough to a stationary part of the housing, and means supporting the trough at a point remote from said end thereof and operable to vary the angular position of said trough with relation to said housing comprising a member attached to the trough and engaged through the opening in the front wall of said housing to be accessible at the exterior of the housing.

2. An evaporative cooler including a housing having a front wall with an opening and defining the front of the cooler and spaced sides adjoining and extending rearwardly from the front wall, an elongate water distributing trough behind the front and between the sides of the housing, means fixing one end of the trough to one side of said housing, and means for adjusting the position of said trough with relation to said housing including a releasable clamp member engaged through the opening in the front wall of said housing with a part operable from the exterior of the housing and a part engaging the trough at a point spaced a substantial distance from said end.

3. An evaporative cooler including, a housing having a front wall defining the front of the cooler and side walls projecting rearwardly from the front wall, an elongate water distributing trough arranged to the rear of the front wall and extending between the side walls of the housing, means permanently fixing one end of the trough to one side wall so one end portion

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of the trough is permanently held against vertical movement in the housing, and means adjustably connecting the other end portion of the trough to the front wall adjacent the other side wall, said means operating to adjust the said other end of the trough vertically.

4. An evaporative cooler including, a housing having a front wall with an opening and defining the front of the cooler and side walls projecting rearwardly from the front wall, an elongate water distributing trough arranged to the rear of the front wall and extending between the side walls of the housing, means permanently fixing one end of the trough to one side wall so one end portion of the trough is permanently held against vertical movement in the housing, and means adjustably connecting the other end portion of the trough to the front wall adjacent the other side wall, said latter means including a horizontally disposed screw extending transversely of the trough and engaged through the opening in said front wall and a nut carried by the trough and receiving the screw.

5. An evaporative cooler including, a housing having a front wall with a vertical slot and defining the front of the cooler and side walls projecting rearwardly from the front wall, an elongate water distributing trough arranged to the rear of the front wall and extending between the side walls of the housing, means permanently fixing one end of the trough to one side wall so one end portion of the trough is permanently held against vertical movement in the housing, and means adjustably connecting the trough to the front wall adjacent the other side wall for adjusting the position of said trough with relation to said housing, said latter means including a clamp screw extending transversely of the trough and engaged through the vertical slot in said front wall and a nut carried by the trough and receiving the screw.

6. An evaporative cooler including, an exterior housing having a front wall with louver openings therein, a water distributing trough in the upper portion of the housing and extending parallel with the front wall and having a longitudinal series of normally discharging overflow openings immediately behind said wall, pad means in the lower portion of said housing receiving said overflow water, and means for adjusting the position of the trough with respect to the housing; said trough openings being visible through one of the louver openings to facilitate adjustment.

7. An evaporative cooler including, an exterior housing having a front wall with louver openings therein, a water distributing trough in the upper portion of the housing and extending parallel with the front wall and having a longitudinal series of normally discharging overflow openings immediately behind said wall, pad means in the lower portion of said housing receiving said overflow water, and means for adjusting the position of the trough with respect to the housing; said trough openings being visible through one of the louver openings to facilitate adjustment; said adjusting means including a member attached to the trough and engaging the front wall of said housing and accessible from the exterior of said housing.

8. An evaporative cooler including, a housing comprising a plurality of walls, louvers in one of said walls, an opening in one of said walls, an elongate water distributing trough having overflow openings in said housing, pad means in said

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housing below said trough receiving overflow water therefrom, means anchoring one end of said trough to said housing, and means supporting the trough at a point remote from said one end thereof and operable to vary the angular position of said trough with relation to said housing for levelling same comprising a member attached to the trough and housing in register with said opening to be accessible at the exterior of said housing.

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