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UNIT LIQUID COOLER

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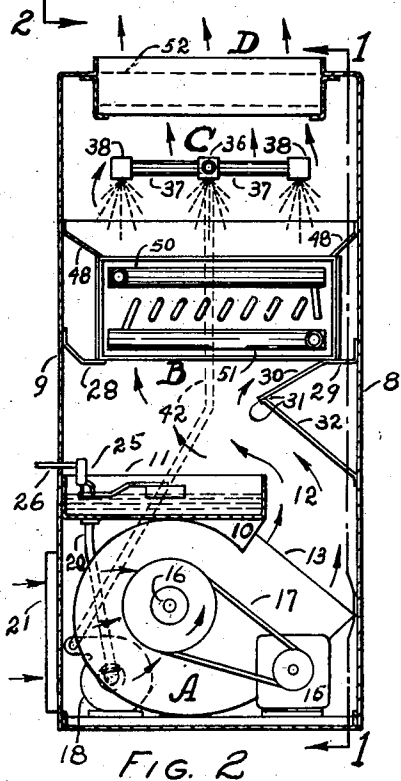
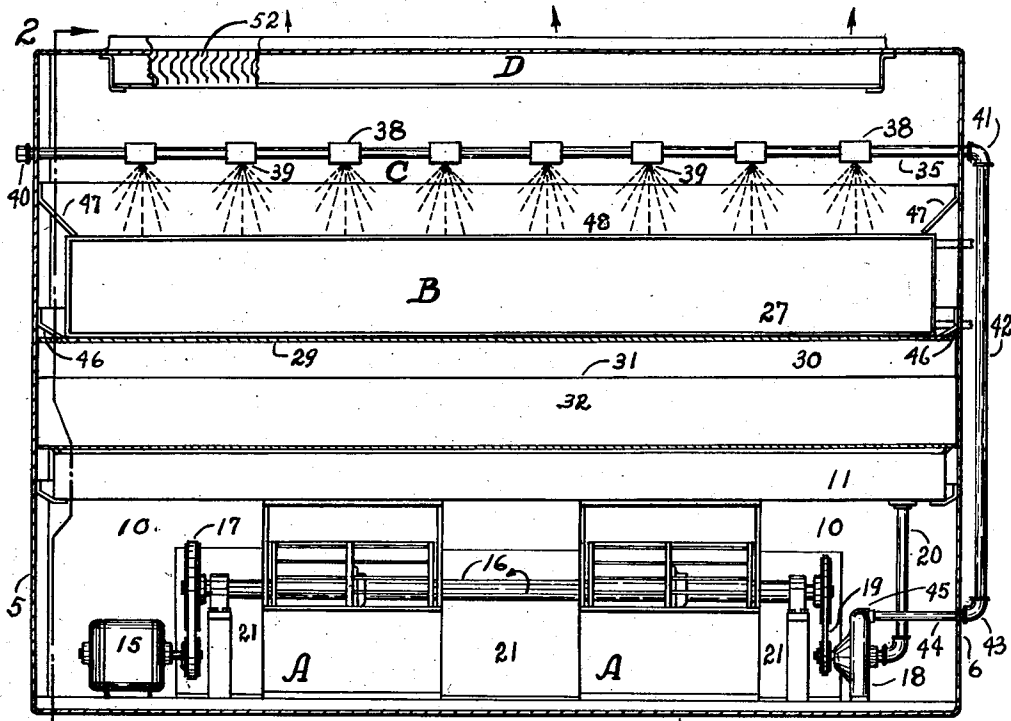


FIG. 1

FIG. 2

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UNIT LIQUID COOLER

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pany, a corporation of Wisconsin

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6 Claims. (Cl. 62-156)

The present invention relates to means for cooling a liquid being circulated through a conventional finned core and having a spray of water which moves downwardly between the fins and tubes of the core while a blast of air is being moved upwardly between the tubes and fins and in contact with the spray of water whereby the liquid in the tubes of the core is cooled by the spray of water and by the evaporative effect of the water while in contact with the air.

An object of the present invention is to provide a vertically positioned cabinet inclosure having a blower fan at the bottom and adjacent the air inlet and means for trapping the moisture left in the air after leaving the spray and for trapping the drippings below the core.

Another object of the present invention is to provide convenient means for supplying a constant level of water in the drip pan and a pump which is driven from the fan shaft and adapted to recirculate and spray the water over the core.

A further object of the present invention is to provide a design which can be made at low cost, is simple and will operate efficiently.

To these and other useful ends my invention consists of parts, combinations of parts, or their equivalents, and mode of operation, as hereinafter set forth and claimed and shown in the accompanying drawing in which:

Fig. 1 is a front plan view of our improved liquid cooling device taken on line 1-1 of Figure 2.

Fig. 2 is an end elevation of the device illustrated in Figure 1 and taken on line 2-2 of Figure 1.

As thus illustrated, we provide a cabinet having end walls or panels 5 and 6, a bottom panel 7 and front and rear panels 8 and 9.

We provide a fan chamber 10 formed by means of a drip pan 11. This drip pan is adapted to occupy all of the space between panels 5, 6, 8 and 9 except an air passageway 12.

We position one or more blower fans which are in their entirety designated by reference character A and locate them in chamber 10 as clearly illustrated in the figures. The blower fan is provided with an outlet 13 registering with air passageway 12.

We provide a motor 15 which is operatively connected to the fan shaft 16 by means of a suitable pulley and V belt or belts 17. The motor is adapted to turn the fan rotor as indicated by curvilinear arrows.

We preferably position a centrifugal liquid pump 18 in the other end of the fan chamber

and operatively connect this motor to the fan shaft by suitable pulleys and a V belt 19. Pump 18 is operatively connected on its suction side to trough 11 by means of a pipe 20.

An air inlet 21 is provided in panel 9 as illustrated in the figures. This inlet may be grilled or provide a suitable connection for an air duct leading from the exterior of the building.

A quantity of moisture is carried through the system by the passing air. We provide a float controlled valve 25 having a water inlet pipe 26 thus any water discharged from the cabinet will be replaced by this valve so there will always be an abundant supply of water for pump 18.

We position a finned core which in its entirety is designated by reference character B a distance above trough 11. This core is designated in its entirety by reference character B and may be made in any conventional form, the preferred form being a number of coils of tubes and a multiplicity of closely spaced fins through which the tubes extend, the entire assembly being surrounded by a suitable housing inclosure 27 and supported preferably by panels 8 and 9 through brackets 28 and 29, bracket 29 extending preferably for the entire length of the cabinet thus to provide an air lock on the rear side of the core. Bracket 29 is provided with a downwardly and inwardly projecting plate 30 which terminates as at 31 thus to catch any drippings that may fall from the core and direct them into pan 11.

We provide a plate 32, this plate and member 30 extending preferably for the entire length of the cabinet thus to form an air directing means and permit the air passing from duct 12 to spread and pass through the entire surface of core B. The direction of the air passage through the device is clearly indicated by arrows in Figure 2.

We provide a number of integrally connected spraying heads which are in their entirety designated by reference character C comprising a main tube 35 having spaced and centrally positioned spraying heads 36 each being adapted to receive transverse pipes 37 on the ends of which are positioned spraying heads 38 each head having a small orifice at its bottom as at 39 whereby when a sufficient water pressure is maintained, the water will be sprayed over unit B as illustrated by dotted lines in the figures.

Pipe 35 is provided with a cap 40 at one end and an elbow 41 at the other end having a pipe 42 which forms a connection to pump 18 through an elbow 43 and pipe 44 which is screw threaded into pump 18 as at 45. Thus when the fans

are operating, pump 18 will act to move water from pan 11 into the heads 36 and 38 which will in turn spray the water over unit B as already explained.

5 Core B is supported in the housing at its ends preferably by means of brackets 46—46. These brackets extend preferably from panel 8 to panel 9 thus to form air locks at the end of unit B. Drip guards 47 and 48 are provided so as to prevent the spray from passing over the edges of
10 unit B. It will be understood that guards 47 and 48 may act as the air seals in which case brackets 46 and 28 may be made short so as to act as supports only. Unit B is provided with
15 an inlet header 50 and an outlet header 51 having suitable inlet and outlet pipe connections as illustrated.

We provide an eliminator which, in its entirety, is designated by reference character D. This
20 eliminator may be made in any desired form but preferably consists of a multiplicity of transverse plates 52 having means for catching the liquid moisture carried past the spray by the air.

It will be seen that the fans, fan motor, pump
25 and belts will be within a dry air compartment; that a constant water spray will be furnished as long as the fans are in operation; that air will be conveniently and efficiently conducted from the exterior through the core, the water spray
30 and the eliminators; that the device is compact, simple and efficient and that provisions are made whereby as nearly as possible, all solid moisture is trapped before the air escapes from the unit and is conducted to the pan and is used over
35 and over.

Clearly many minor detail changes may be made in our structure as illustrated without departing from the spirit and scope of the present invention as recited in the appended claims.

40 Having thus shown and described our invention, we claim:

1. A device of the class described, comprising a cabinet, a bottom chamber in said cabinet formed by means of a water pan and leaving
45 an air passageway at one side thereof, a blower fan having a motor and a water pump operatively connected thereto positioned in said bottom chamber, the blower fan being arranged to discharge air into said air passageway, an air
50 inlet to said bottom chamber, an intermediate chamber formed by a liquid cooling core which occupies the major part of the cabinet in cross

section and having thereunder a drip plate which is spaced from and extends over said air passageway and being arranged to convey drippings from said cooling core to said pan, a top chamber having an eliminator in its outlet and having
5 therein means for spraying water over said core.

2. A structure as recited in claim 1 including; supporting brackets for said core, drain plates positioned above said core and being arranged to prevent water spray from passing around the
10 edges of said core.

3. A structure as recited in claim 1 including; drain plates positioned above said core and being arranged to prevent water spray and air from passing around the edges of the core. 15

4. A structure as recited in claim 1 including; an air guide plate positioned below said drip plate forming a brace connection between the free edge thereof and the adjacent panel of said cabinet near said air passageway. 20

5. A structure as recited in claim 1 including; said pump having a suction connection to said pan and an outlet connection to said water spraying means. 25

6. A device of the class described, comprising
25 in combination, a cabinet, a bottom chamber in said cabinet formed by means of a water pan but leaving an air passageway at one side thereof, a blower fan positioned in said bottom chamber and having a motor and a water pump operatively connected thereto, said blower fan being
30 arranged to discharge air into said air passageway, an air inlet in said bottom chamber, an intermediate chamber formed by a liquid cooling core which occupies the major part of the cabinet in cross section and having thereunder a
35 drip plate which is spaced from and extends over said air passageway and being arranged to catch and convey some of the drippings from said cooling core to said pan, an air guide plate secured to the free end of said drip plate and extending outwardly and downwardly and contacting the wall of said cabinet near the outside
40 edge of said air passageway, a top chamber having an air outlet and an eliminator therein, means in said top chamber for spraying water over said liquid cooling core, said pump having an inlet connection from said pan and an outlet connection to said water spraying means. 45

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