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AIR COOLING APPARATUS

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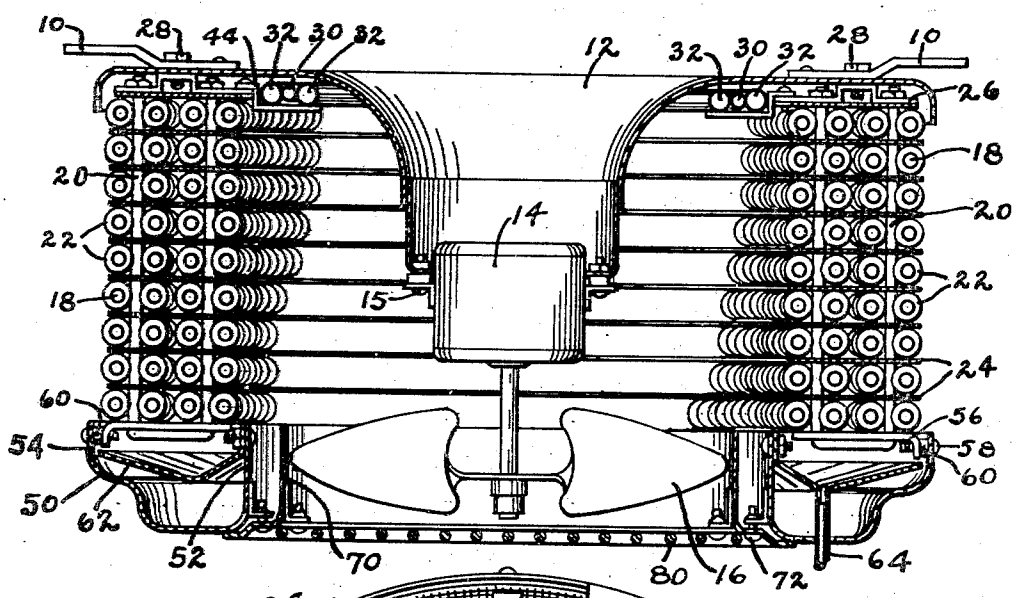


FIG. 1

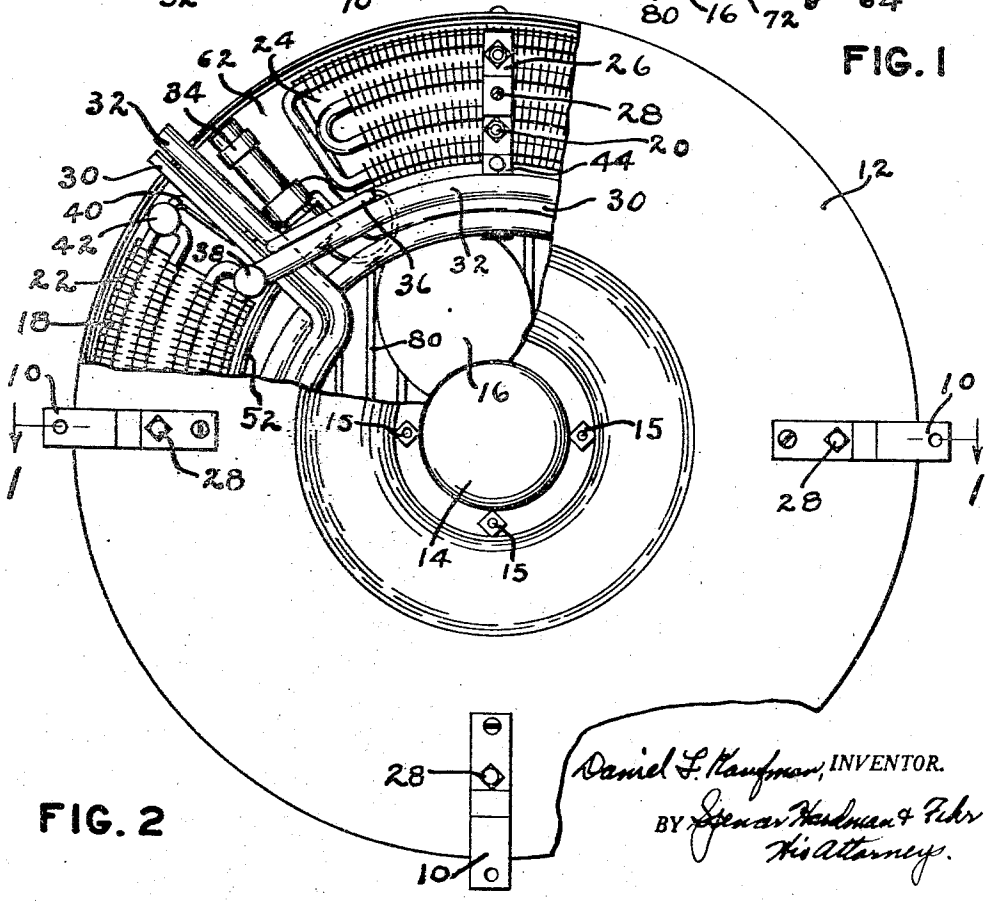


FIG. 2

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AIR COOLING APPARATUS

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3 Claims. (Cl. 62—140)

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This invention relates to refrigerating apparatus and more particularly to an improved circular evaporator unit.

It is an object of this invention to provide a low cost circular evaporator unit in which the colder portions of the unit are effectively insulated from the outer casing.

It is another object of this invention to provide a forced air cooling unit wherein the colder portions of the outer casing of the unit are shielded from the relatively warm incoming air.

Still another object is to provide an evaporator unit in which the fan and fan motor may be removed or repaired without dismantling the rest of the mechanism.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a vertical, sectional view taken substantially on line 1—1 of Fig. 2; and

Fig. 2 is a top view with parts broken away.

In many air conditioning and refrigerating installations it is desirable to mount a refrigerant evaporator adjacent the ceiling of the space to be cooled and to provide forced air circulation over the coils of the evaporator. One of the problems involved in thus mounting the evaporator directly within the conditioned space is that of preventing condensation on the evaporator housing. Many arrangements have been used with varying degrees of success for preventing the formation of condensate on the housing but these have been complicated and expensive. The drawing shows an inexpensive construction which accomplishes the desired results in a very practical manner.

Referring now to Fig. 1 of the drawing wherein I have shown a preferred embodiment of my invention, reference numeral 10 designates a plurality of mounting brackets which are used for attaching the cooling unit to the ceiling or other supporting structure (not shown). Reference numeral 12 designates a circular top plate or housing member which may be riveted or otherwise secured to the mounting brackets 10. A motor 14 is removably supported from the central portion of the top plate 12 by means of the bolts 15 and is used for operating the fan 16. The fan 16 is arranged to pull air upwardly into the unit. The bottom of the plate 12 presents a curved surface which serves to direct the air radially outwardly through the evaporator 18.

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The evaporator 18 is arranged in a semicircle as indicated in the drawing and is held in place by a plurality of removable U-shaped bolts 20 which are secured to the mounting brackets 26 which in turn are removably secured to the mounting brackets 10 by means of screws 28. As indicated in Fig. 1 of the drawing, the evaporator comprises a plurality of semicircular pipes having fins 22 which facilitate the transfer of heat from the air to the refrigerant flowing through the pipes. A plurality of horizontally arranged spacers 24 are provided between adjacent layers of pipe so as to hold the vertically disposed layers of pipe properly spaced.

Liquid refrigerant is supplied to the evaporator 18 through the liquid line 30 which is arranged in direct contact with the return or suction line 32 throughout an appreciable distance as indicated in the drawing. The lines 30 and 32 are arranged in circular formation adjacent the top plate 12 and are held in place by the brackets 44 which are secured to the brackets 26 as shown. The liquid refrigerant is fed into the evaporator through a conventional thermostatic expansion valve 34 which is arranged in the space between the ends of the semicircular evaporator 18 as indicated in Fig. 2. The expansion valve 34 is provided with a conventional thermostat bulb 36 which helps to control the flow of refrigerant through the expansion valve 34. The bulb 36 is arranged adjacent the suction line 32 at the point where it is connected to the evaporator head 38. The refrigerant leaves the expansion valve 34 through the line 40 which leads to the evaporator header 42.

A stamped sheet metal circular bottom plate or housing member 50 has been provided which has upturned inner and outer edges 52 and 54 respectively whereby a circular shaped channel is formed directly beneath the evaporator 18. A plurality of mounting brackets 56 carried by the U-shaped bolts or mounting members 20 serve as supports for the housing member 50. The housing 50 is removably secured to the brackets 56 by means of the bolts 58 which are preferably of a low heat conducting or insulating material. Insulating means 60 have been provided as shown in Fig. 1 for thermally insulating the housing from the evaporator 18. A circular condensate collecting pan 62 has been provided for collecting the condensate dripping from the evaporator 18. This condensate pan is bolted to the inner upturned edge 52 of the bottom plate or housing member 50. Reference numeral 64 designates the condensate drain pipe.

A circular fan shroud 70 is removably secured to the bottom plate 50 by means of screws 72. It will be noted that the fan shroud 70 serves to direct the relatively warm inrushing air directly onto the evaporator 18 without the air flowing in thermal exchange relationship with the upturned inner edge portion 52 of the bottom plate 50. This arrangement helps to prevent the condensation of moisture from the inrushing air onto the bottom plate 50. An air grill or fan guard 80 is removably carried by the fan shroud 70.

By virtue of the above described arrangement it is apparent that the fan 16 and/or the fan motor 14 may be removed for repair or replacement purposes without removing the bottom plate 50 and without removing the evaporator 18 from its mounting. It is also apparent that the bottom housing and associated parts of the unit are thermally insulated from the relatively cold evaporator and that the relatively warm incoming air does not flow in direct thermal exchange with any of the colder portions of the unit prior to its contact with the evaporator proper.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In a heat exchange unit, bracket means for suspendingly supporting said unit, a top plate secured to said bracket means, circular air cooling coils, means for suspending said coils from said bracket means, fan means for circulating air to be conditioned in thermal exchange with said cooling coils, a circular substantially U-shaped in cross-section bottom housing, insulating means for securing the upper edge portion of one leg of said housing to said coil suspending means, a circular drip tray disposed within said housing, means for securing said drip tray to the upper edge portion of one of the legs of said housing so as to support the tray in spaced relationship to the other leg of said housing and to the bottom wall thereof, and a collar-like member surrounding said fan means and extending substantially throughout the height of the inner leg of said housing in spaced relation thereto for shielding the same from incoming air circulated by said fan means.

2. In a heat exchange unit, bracket means for suspendingly supporting said unit, a top plate secured to said bracket means, circular air cooling coils, means for suspending said coils from said bracket means, a circular bottom housing having upturned inner and outer edges, insulating means for securing the upturned outer edge of said housing to said coil suspending means, a motor having a fan operatively connected thereto for circulating air to be conditioned in thermal exchange with said cooling coils, said motor being detachably mounted on said top plate, a shroud surrounding said fan and being secured to the upturned inner edge of said housing in spaced relation thereto for shielding the same from incoming air circulated by said fan, grill means secured to said shroud, and said grill means being removable from said shroud to permit detachment of said motor from said top plate and removal of said motor and said fan downwardly of said unit through the opening of said shroud.

3. In a heat exchange unit, bracket means for suspendingly supporting said unit, a top plate secured to said bracket means, circular air cooling coils, means for suspending said coils from said bracket means, a motor having a fan operatively connected thereto for circulating air to be conditioned in thermal exchange with said cooling coils, said motor being detachably mounted on said top plate, a circular substantially U-shaped in cross-section bottom housing, insulating means for securing the upper edge portion of the outer leg of said housing to said coil suspending means, a circular substantially V-shaped in cross-section drip tray within said housing, means for securing an edge portion of said drip tray to the upper edge portion of the inner leg of said housing so as to support the tray in spaced relationship to the outer leg of said housing and to the bottom wall thereof, a collar-like member surrounding said fan extending substantially throughout the height of said inner leg of said housing in spaced relation thereto for shielding the same from incoming air circulated by said fan, grill means below said fan and secured to said collar-like member, and said grill means being removable from said collar-like member to permit detachment of said motor from said top plate and removal of the same along with said fan downwardly of said unit through said collar-like member.

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