

Sept. 12, 1950

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2,521,841

AIR COOLING BY EVAPORIZATION OF WATER

Filed Oct. 15, 1945

3 Sheets-Sheet 1

Fig. 1

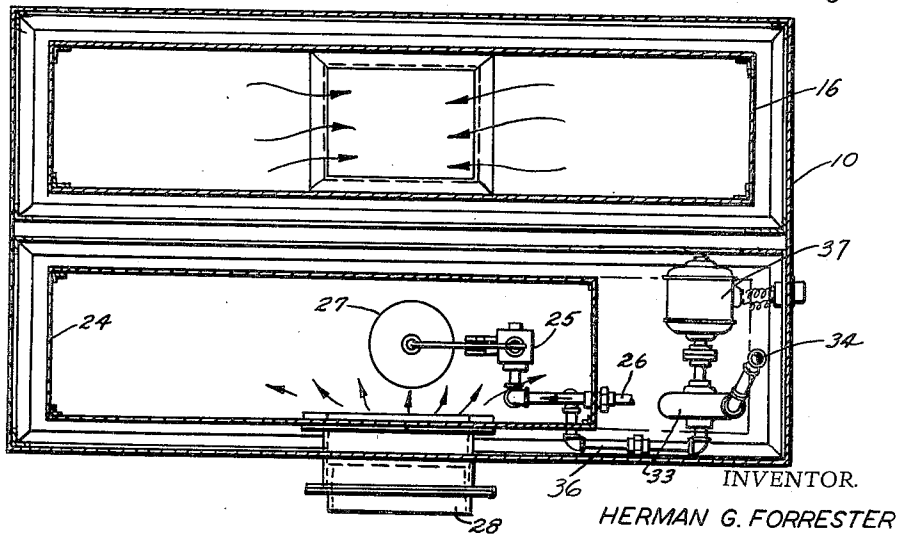
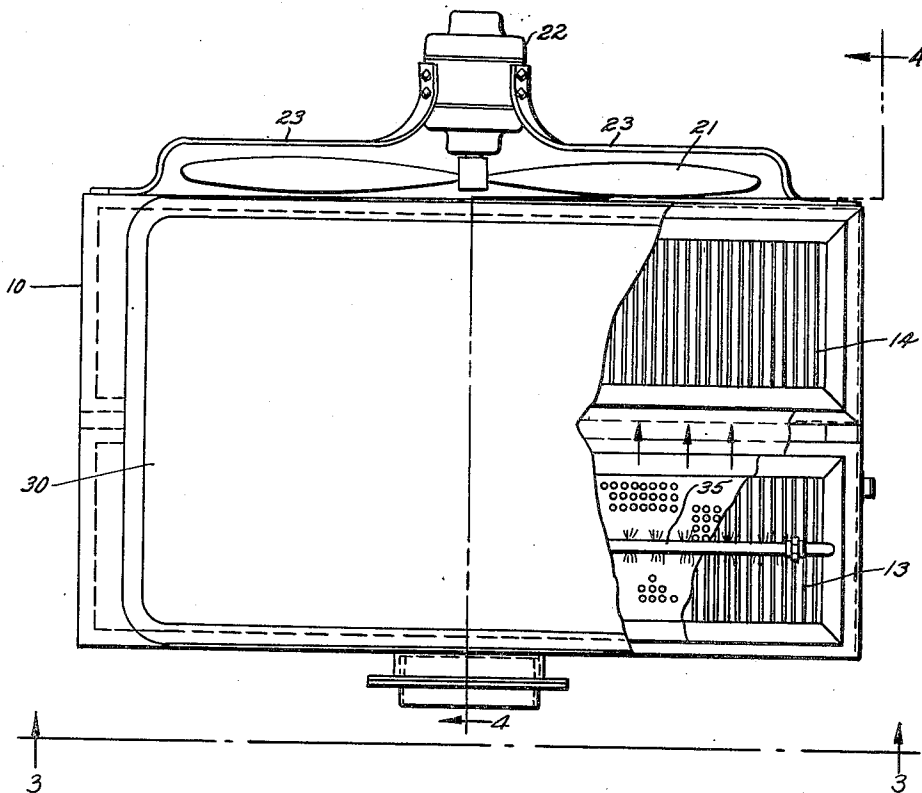


Fig. 2

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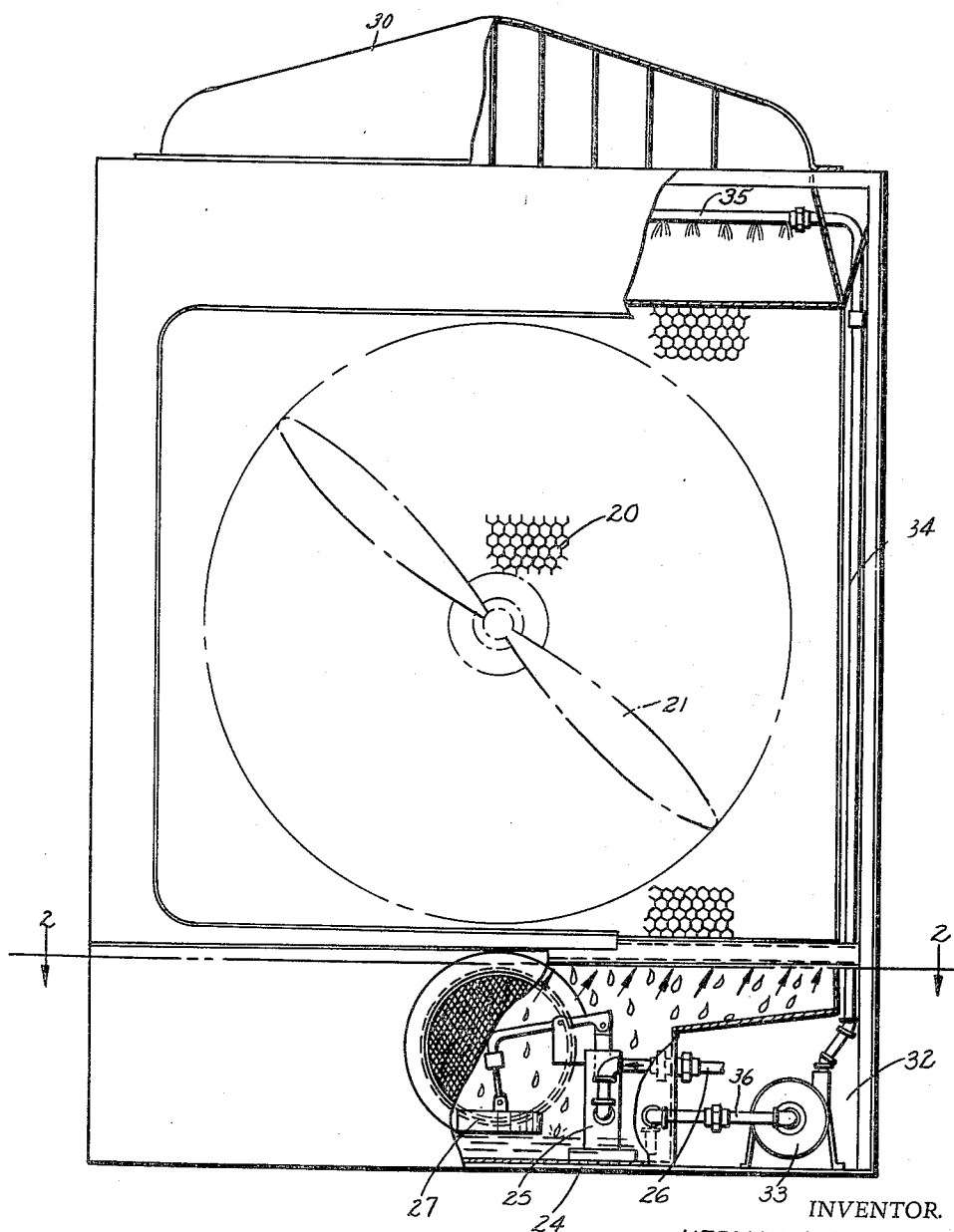
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Fig. 3



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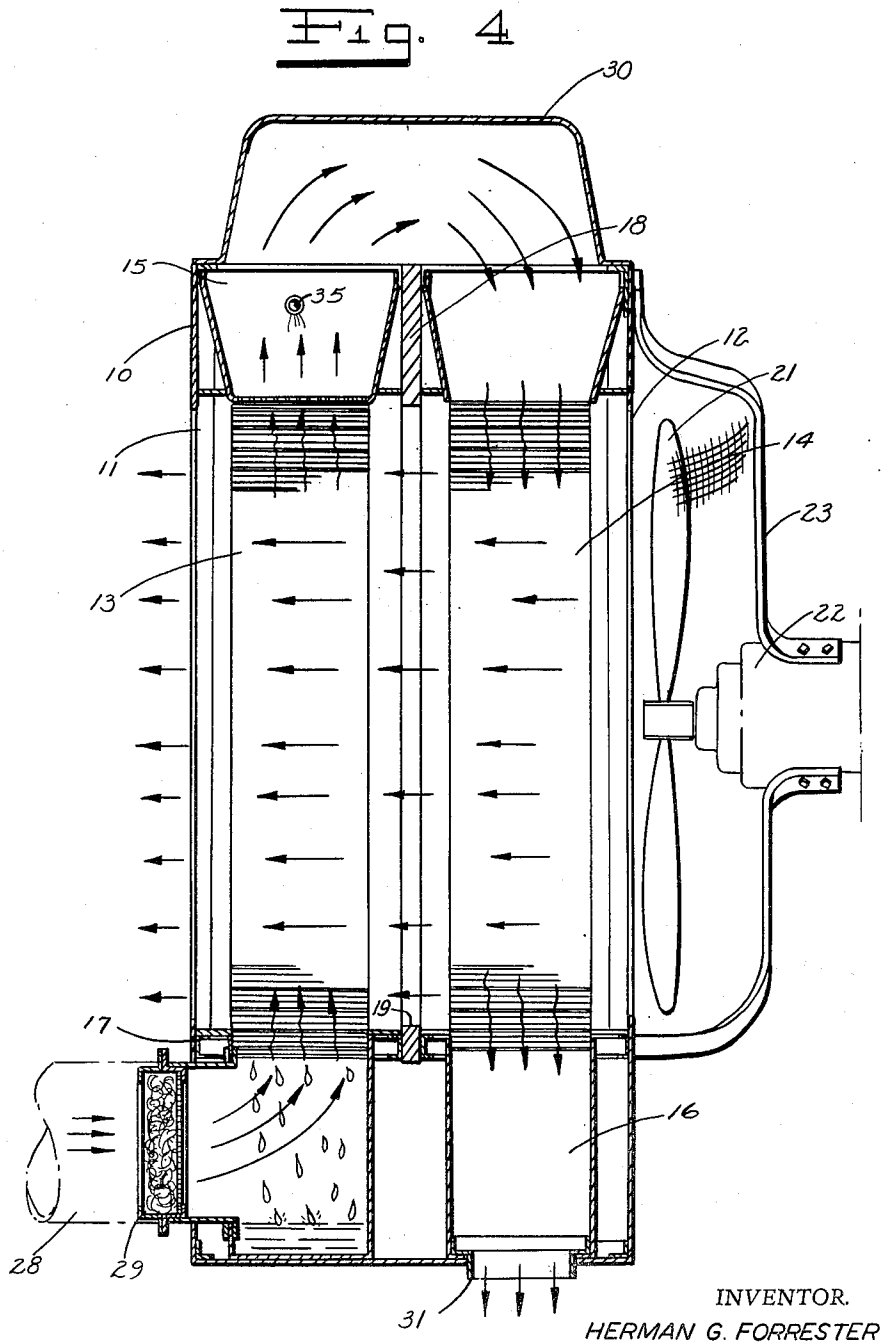
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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AIR COOLING BY EVAPORIZATION OF WATER

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2 Claims. (Cl. 62—139)

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The invention relates to an air conditioning apparatus and more especially to an air cooling machine.

The primary object of the invention is the provision of a machine of this character, wherein the outside atmosphere within an enclosure can be cooled by a heat exchange unit of novel construction and unique in the assembly thereof, the cooling being had by air and water circulation and evaporation of the latter and the cooled air diffused by force draft.

Another object of the invention is the provision of a machine of this character, wherein its construction permits the use thereof within a home, office or other enclosure, for the conditioning of the air therein.

A further object of the invention is the provision of a machine of this character, which is automatic in the working thereof, simple in construction, most efficient in operation, strong, durable, does not require cleaning, thereby avoids dismantling of the parts of the same for such purpose and inexpensive to manufacture and install.

With these and other objects in view the invention consists in the features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings, which show the preferred embodiment of the invention, and pointed out in the claims hereunto appended.

In the accompanying drawings—

Figure 1 is a plan view of the machine constructed in accordance with the invention.

Figure 2 is a sectional view taken on the line 2—2 of Figure 3 looking in the direction of the arrows.

Figure 3 is an elevation, partly broken away, and looking in the direction of the arrows following the line 3—3 of Figure 1.

Figure 4 is a sectional view taken approximately on the line 4—4 of Figure 1 looking in the direction of the arrows.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

Referring to the drawings in detail, the machine constituting the present invention, comprises an outer cage-like shell or casing 10 having registering open window frames 11 and 12, respectively, fore and aft thereof, confronted by spaced upstanding front and rear honey-combed radiator-like heat exchange units 13 and 14, respectively, each having top and bottom headers 15 and 16, and such units are fixed within the shell or casing 10 which houses the same by

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brackets 17, while between the said units is an open center separator 18. The open center 19 of this separator 18 registers with the open window frames 11 and 12 for the exposure of the honey-combed cores 20 of the units 13 and 14 to a bladed fan wheel 21, aft thereto and this wheel is a part of an electric fan motor unit 22 supported by brackets 23 for the carrying thereof by the shell or casing 10.

The bottom header 16 of the unit 14 creates a water evaporating pan 24, for a water supply through a valved inlet 25 from a water feed pipe 26, the valve for the inlet being float controlled at 27 to regulate the quantity of water delivered to such pan 24, and opening into this header 16 is an outside air inlet conduit 28, provided with a filter 29 next to the point of communication of the conduit with the said header 16.

Both top headers 15 of the units 13 and 14 open upwardly into a dome 30 to the shell or casing 10 at the top thereof, while the bottom header 16 of the unit 14 has communication with an outlet flue or conduit 31 at the bottom of the shell or casing 10, these conduits 28 and 31 being for the circulation of air through the units. The conduit 31 may be connected to any conventional type of suction fan, which forms no part of the present device, for withdrawing air from unit 14 which in turn causes air to flow into conduit 28.

Within a space 32 in the bottom area of the shell or casing 10 is a water pump 33, which has a lift pipe 34 extending upwardly between one end of the unit 13 and the said shell or casing, and has coupling with a horizontally disposed sprayer nozzle 35 overlying the said unit 13 for the spraying of water onto the latter, the said pump 33 being provided with an inlet water pipe 36 which depends within the pan 24 and this pump is operated from an electric motor 37 which is also located in the space 32, so that water is collected from the pan and supplied by the pump to the nozzle 35, as best seen in Figure 3 of the drawings.

The machine depends on rapid evaporation of water trickling down through the honey-combed core of the unit 13, caused by air passing upward through the same cells, resulting in a reduction in temperature within the heat exchange units 13 and 14 cooling the same. Air forced by the fan 21 through these heat exchange units is cooled by passing it through both units 13 and 14 under force by the fan wheel 21 exteriorly of the cores of the units. The water, not evaporated or carried out through the header 16 by the air entering through inlet conduit 28, falls into the pan

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24, where the remaining quantity of water therein is pumped back to the nozzle 35 for the spraying thereof onto the unit 13 and this operation is continued and repeated during the working of the machine for air conditioning purposes, as will be apparent.

What is claimed is:

1. A machine of the kind described, comprising a windowed housing, a plurality of parallelly-arranged, side-by-side, honey-combed radiator-like heat exchange units confronting the windows in said housing, means supplying air through said units lengthwise thereof, means above one of said units for spraying the same at the top thereof and for trickling water therethrough, means underneath the said one unit trapping the water sprayed thereupon, means supplying additional water to the trapping means, a forced air supply passing air transversely through both said units, means for regulating the additional water supply, a filter within the first named means, a separator between the units and having an open center registering with the windows in the housing, a dome on the housing for directing air flowing lengthwise from one unit into the other unit, and top headers on the units opening into the dome, one of said headers enclosing the spraying means and the other of said headers placing said dome in communication with said other unit.

2. A self-contained air cooling unit comprising a casing having main air inlet and outlet openings in alignment, a pair of parallelly-arranged honeycomb radiator-like devices arranged side-by-side in said casing between and in alignment with said openings, a sump in said casing beneath the first of said devices, a source of water supply entering said casing and communicating with said sump, means for controlling the level of the water in said sump fed thereto from said source, a header having nozzles and secured to said casing above said first of said devices, pump

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means for forcing water from said sump to said header whereby the water discharged from said nozzles flows downwardly through the interstices of said first device back to sump, a secondary air inlet adjacent said sump providing a source of air flowing upwardly through the interstices of said first device and in a direction opposite to the flow of water to effect evaporation of a portion of the same to create a cooling result in said device, means above said devices directing the air from said first device toward said second device for causing the air to flow therethrough oppositely to that in said first device, a secondary air outlet underneath said second device for discharging air therefrom, a fan means mounted adjacent said main inlet opening for forcing ambient air through said devices and main openings and in a direction substantially normal to the direction of flow through the interstices of the devices of the water and the air from the secondary inlet whereby a temperature differential in the ambient air is created between the main inlet and main outlet openings of the casing.

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