June 24, 1941. B. J. COMPTON 2,246,506

AIR CONDITIONER

Filed Sept. 28, 1938 2 Sheets-Sheet 1

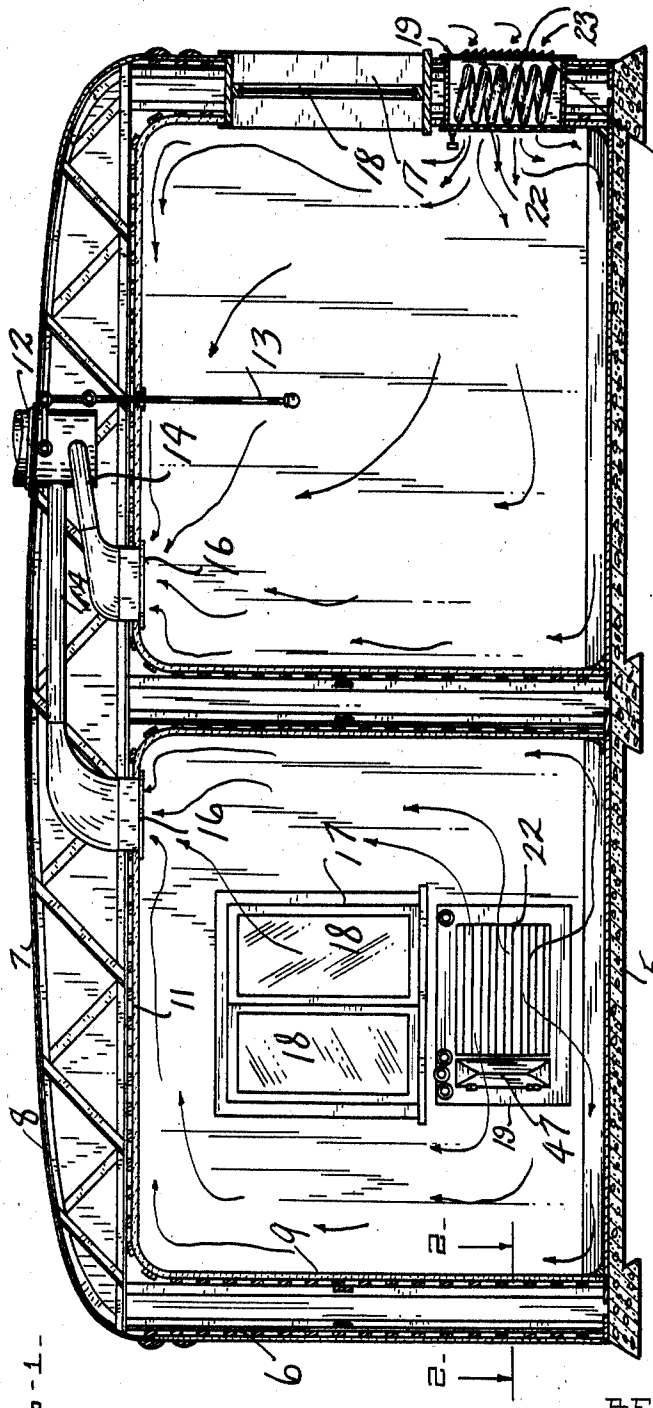


FIG-1-

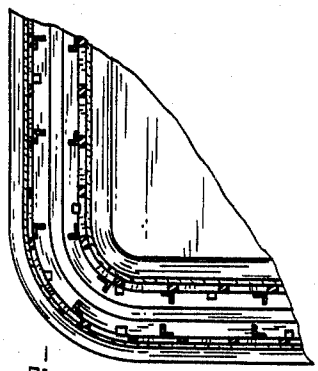


FIG-2-

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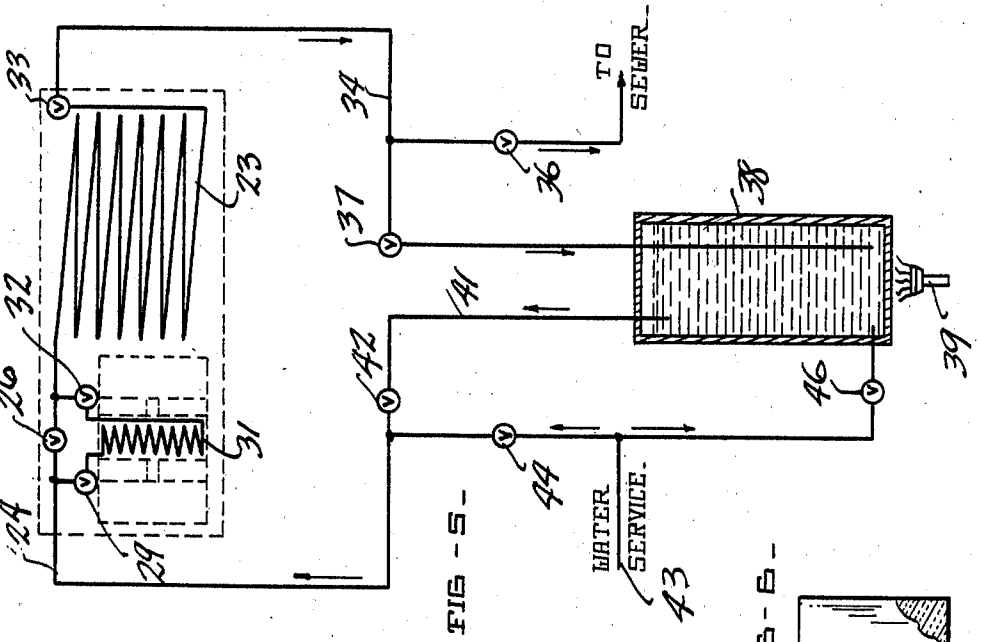


FIG - 5 -

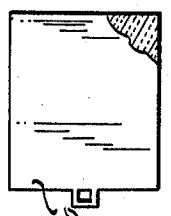


FIG - 6 -

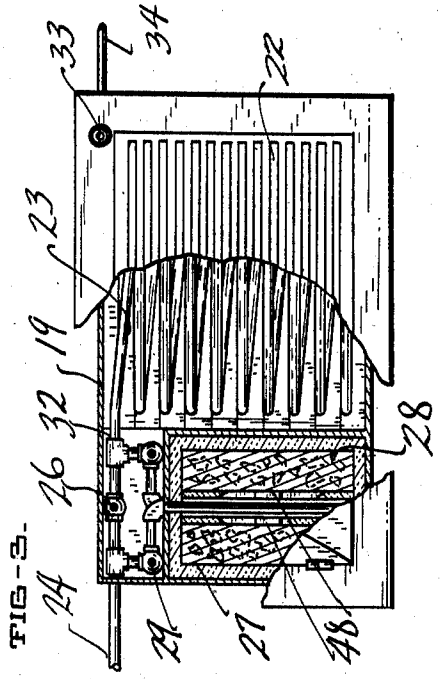


FIG - 3 -

FIG - 4 -

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UNITED STATES PATENT OFFICE

2,246,506

AIR CONDITIONER

Beaulard J. Compton, Oildale, Calif., assignor of fourteen per cent to Herman M. Price, San Francisco, Calif., fourteen per cent to Serg Besoyan, Delano, Calif., and fifteen per cent to Ross B. Walker, two and one-half per cent to Leland S. Hooper, and two and one-half per cent to Albert Diel, all of Bakersfield, Calif.

Application September 28, 1938, Serial No. 232,209

5 Claims. (Cl. 62—141)

This invention relates to improvements in air conditioning apparatus.

The principal object of this invention is to produce an air conditioning apparatus wherein the operation thereof may be controlled in an efficient manner and whereby economical heating and cooling may be effected, as desired.

A further object of the invention is to produce a device of this character which may be applied to any number of the rooms of a house and which is uniquely adapted to permit the temperature of any one of the rooms to be individually regulated to suit the occupant.

A still further object is to produce a device of this character which is economical to install and simple to operate.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a cross sectional view of a building constructed in accordance with my invention;

Fig. 2 is a cross sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a front elevation of one of the heating and cooling units, having a portion thereof broken away;

Fig. 4 is a top plan view of Fig. 1;

Fig. 5 is a schematic arrangement of the water circulating system; and

Fig. 6 is a side elevation of one of the insulating plates used in the cooling compartment.

The average metal building consists of a wall made of relatively thin material; and, consequently, the outside weather conditions materially affect the temperature of the inside of the building. It is, therefore, difficult to heat such a building in winter or to cool the same in summer.

Applicant has, therefore, devised a building wherein steel walls are used, the outer wall serving to enclose inner walls or individual rooms, thus providing an air space between the outer wall and the inner wall. By circulating air within the rooms from an outside source and tempering this air to the desired degree of temperature, applicant has produced a structure which is both economical and comfortable. Applicant has further found that by coving all the corners of the building, a much more efficient circulation of air therein takes place.

In the accompanying drawings wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates any kind of floor surface, such as a concrete floor, upon which the frame of the building is placed. At 6 I have shown an outer wall which extends entirely around the four sides of the building, which outer wall is joined by a roof 7, supported by any desired form of girder construction, as shown at 8. It is, of course, obvious that the usual door and window openings are constructed wherever necessary.

Within this structure and supported upon the floor 5 is an inner shell 9 extending around the four sides of a room, which inner shell is spaced from the outer wall 6. This inner shell is provided with a ceiling 11 which completes the room enclosure.

It will be noted that all corners of the building are curved which materially assists in air circulation by eliminating dead spots, common where square corners are used.

Figure 1 illustrates a stack 12 which extends through the roof 7 and which has a damper therein manually controlled by a pull rod 13. This stack is connected by flues 14 to grills 16 positioned in the ceiling of each room. This arrangement provides means for exhausting air from the various rooms. It is, of course, obvious that an exhaust fan may be located in the stack 12. At 17 I have shown a window frame extending through the inner and outer walls of the room and provided with the customary window pane 18. Beneath the window is located the temperature control chamber 19 which is provided with an outside louver 21 and an inside grill 22. Therefore air may pass from the outside through the louver and through the chamber, thence through the grill, and into the room. During the passing of the air through the chamber, it must pass over a coil 23 positioned in the chamber, which coil is connected to a water supply 24. A valve 26 is so located that when the valve is closed the water must by-pass thereabout and through a cooling unit. The cooling unit, as best illustrated in Figures 3 and 4, consists of an insulated chamber 27 in which a refrigerant 28 is packed. This refrigerant may be carbon dioxide, or any other suitable cold producing medium. The water is by-passed through a valve 29 into a cooling coil 31, thence through a valve 32 and the coil 23. As shown in Fig. 5, the coil 23 empties through the valve 33, through a pipe 34, through a valve 36 to any discharge point, as, for instance, the sewer; or the pipe 34 may discharge through a valve 37 into a storage tank 38, which may be heated by a burner 39 or by any other

convenient means. The top of the storage tank is connected by a pipe 41 through a valve 42 to the pipe 24.

The water main is shown at 43, and this in turn connects to the pipe 24, through a valve 44, and through a valve 46 to the bottom of the storage tank 38.

A door 47 provided in one side of the chamber 27 gives access to the cooling chamber so that the insulating plates 48 may be arranged at the opposite sides of the coil 31 to separate the coil from the refrigerant contained therein. While two plates 48 are here illustrated, one at each side of the coil, it is to be understood that any number of the plates may be used; the greater number of the plates used, the less effect the refrigerant will have on the liquid passing through the coil and the warmer the temperature of the liquid flowing trough the coil will be. By removing all of the insulating plates, the full effect of the refrigerant may be utilized, and by progressively inserting the plates between the coil and the refrigerant, the temperature of the liquid in the coil may be accurately controlled.

It will thus be seen that when valves 26, 33, 37 and 42 are open and valves 29, 32, 36, 46 and 44 are closed, a closed heating system will be obtained. If the burner 39 is employed to heat the water as it flows through the tank 38, hot water will flow through the pipes 41 and 24 through the coil 23 and from the coil through the pipe 34 back to the heating tank. The valve 46 may be opened to supply additional water to the system to compensate for natural losses, as by evaperation, and the like. Any air passing through the louvers 21 and the grill 22 will be heated so as to circulate warm air into the room. Refrigerant may be packed into the chamber 27 to cool the water flowing through the coil 31 and the effect of the refrigerant upon the water to cool the same may be accurately controlled by judicious insertion and removal of the insulating plates 48. A cooling effect may be obtained from the present arrangement without the use of a refrigerant by merely permitting unheated water from the water supply main 43 to flow through the coil 23 and by causing the air from outside the room to be passed thereover and into the room.

An open system cooling unit of the above-mentioned type may be obtained by opening valves 44, 29, 32, 33 and 36 and closing valves 26, 37, 42 and 46 to cause the water to flow from the water main 43 through the pipe 24 to the coil 31, from the coil 31 to the coil 23, and from the coil 23, through the pipe 34 to the outlet. Refrigerant may or may not be used at the discretion of the operator and, if the refrigerant is used, the plates 48 may be employed to regulate the temperature of the water circulated through the coil 23. It will thus be noted that any desired temperature may be quickly available to the occupant of the room.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that various changes relative to the material, size, shape and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. An air conditioning unit comprising a heat exchanger, a housing, a cooling coil contained by the housing and connected to the heat exchanger, pipe means connected to the heat exchanger and coil to permit a liquid to be continuously passed therethrough, the said housing being substantially larger than the said coil, whereby a cooling medium may be packed around the coil to reduce the temperature of the liquid flowing therethrough, and a plurality of removable plate elements arranged within the housing, said plate elements separating the coil from the cooling medium and being inserted in or removed from the housing to regulate the freezing effect of the cooling medium upon the liquid within the said coil.

2. In an air conditioning unit of the type including a coil through which a freezable liquid is passed, means to regulate the temperature of the liquid within the coil comprising a housing having a thermally insulated compartment receiving the coil, the said compartment being substantially larger than the coil whereby a cooling medium may be packed around the coil, and a plurality of thermally insulating plate elements removably contained within the compartment to separate the coil from the cooling medium, said plate elements being individually inserted in or removed from the compartment to regulate the freezing effect of the cooling medium upon the liquid within the coil.

3. In an air conditioning unit of the type including a coil through which a freezable liquid is passed, means to regulate the temperature of the liquid within the coil comprising a housing having a thermally insulated compartment receiving the coil, cooling means within the compartment in close proximity to the coil, and a plurality of thermally insulating plate elements removably contained within the compartment to separate the coil from the cooling means, said plate elements being individually inserted in or removed from the compartment to regulate the freezing effect of the cooling means upon the liquid within the coil.

4. An air conditioning unit having in combination, a heat exchanger, a coil, means for circulating a liquid first through the coil and then through the heat exchanger, a housing having a ventilated compartment accommodating the heat exchanger and a thermally insulated compartment accommodating the coil, said last compartment being larger than the coil whereby a cooling medium may be introduced therein and packed around the coil, and thermally insulating laminae separating the coil from the cooling medium, each of the lamina being separately removable from the compartment to regulate the freezing effect of the cooling medium upon the liquid within the coil and to, consequently, regulate the heat absorbing capacity of the said heat exchanger.

5. In an air conditioning unit including a heat exchanger and pipe means connected with the heat exchanger for circulating a liquid therethrough, a coil connected to the pipe means to by-pass the liquid before it passes through the heat exchanger, a housing having a thermally insulated compartment receiving the coil, the said compartment being substantially larger than the coil whereby a cooling medium may be packed around the coil, and thermally insulating laminae separating the coil from the cooling medium, each of the lamina being separately removable from the compartment to regulate the freezing effect of the cooling medium upon the liquid within the coil and to consequently regulate the heat absorbing capacity of the said heat exchanger.

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