Oct. 25, 1932. H. D. BETZ 1,884,534

PORTABLE AIR CONDITIONING DEVICE

Filed Oct. 13, 1927

Fig. 1.

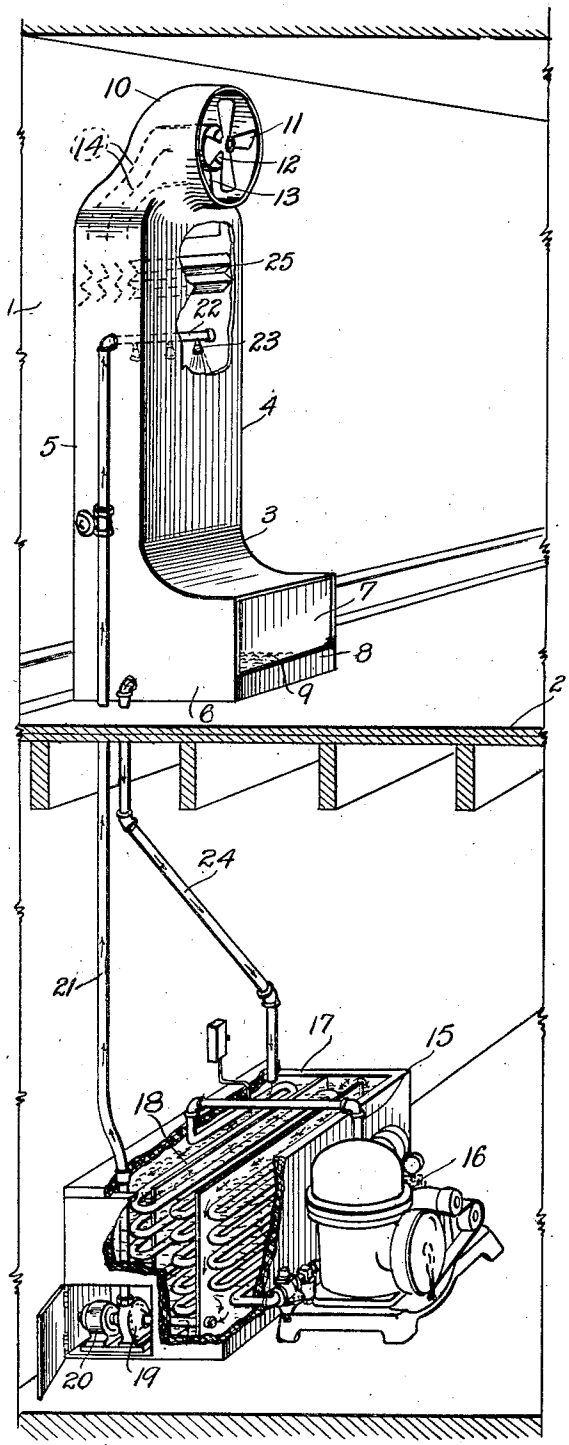


Fig. 2.

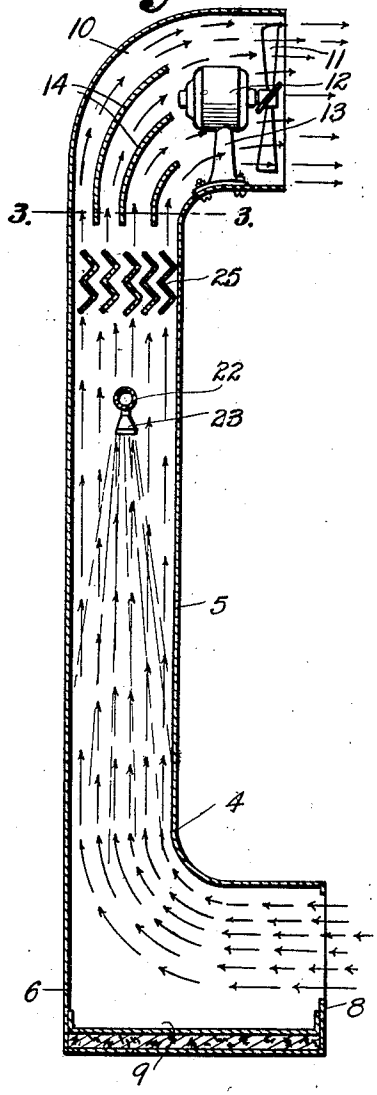
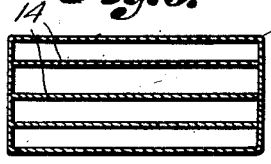


Fig. 3.



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UNITED STATES PATENT OFFICE

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PORTABLE AIR-CONDITIONING DEVICE

Application filed October 13, 1927. Serial No. 225,972.

My invention relates to air condition methods and apparatus, and more particularly to devices of that character adapted for recirculating, washing and cooling air.

An air conditioning process of the indicated type ordinarily provides for drawing air through ducts for a considerable distance to a housing located adjacent the refrigerating apparatus, refrigerating, washing, dehumidifying and otherwise treating air, and conducting the treated air back to the place of use.

One of the objects of my invention is to treat the air in or adjacent its place of use, and conduct conditioning elements to the air to be treated.

Another object of my invention is to provide an individual and independent unit for conditioning the air of a relatively small space such as an office or room in a dwelling, for recirculating the air of such space and conditioning it during the process of recirculation, and for economy, efficiency and attractiveness of structural elements of such a unit.

Further objects of the invention are the provision of a portable air-conditioning unit that may be installed in a room for temporary use and later removed, or that may be permanently installed either in the room or in the walls, and the arrangement of refrigerating and similar devices suitably for enabling such a unit to function.

In accomplishing these and other objects of the invention I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawing, wherein:

Fig. 1 is a perspective view of air conditioning apparatus combining a portable unit embodying my invention, and arranged for serving a room spaced from the refrigeration plant.

Fig. 2 is a vertical central section of the portable unit.

Fig. 3 is a cross section of the unit housing on the line 3—3, Fig. 2, illustrating baffle elements for equalizing the cross section of an air current induced by a fan in the housing.

Referring more in detail to the drawing:

1 designates a side wall and 2 the floor of a room, the air of which is to be treated by my unit, generally designated 3. The unit comprises a housing 4 having a vertical body portion 5 preferably positioned for convenient installation against the room wall; or which may be set inside the wall for permanent installation, a base portion 6 extending outwardly from the body portion and having a front port or air inlet 7 and provided with a stop wall 8 closing part of the opening to produce a catch basin 9.

The housing is further provided with a head portion 10 comprising a cowl-like outlet member preferably extending in the same direction as the base and outwardly into the room, in which a fan 11 actuated by a motor 12 is positioned, supported by a bracket 13 fixed to a wall of the cowl or head portion of the housing. The fan is designed to draw air from the room through the port 7 of the base portion through the body and outwardly through the cowl and discharge it into the room adjacent the ceiling and preferably toward an opposite wall for deflection and distribution throughout the room.

Arcuate baffle elements 14 extending transversely from wall to wall of the housing as illustrated in Fig. 3, are provided to distribute equally to all vertical sections of the cowl outlet the air which may be induced by the fan to flow from the housing.

Located remotely from the conditioning element, namely the unit 3, and for example in the basement of the house, apartment, or other building in which the device is used or elsewhere, is refrigerating apparatus, generally designated 15 and illustrated as a unit 16 of well known construction including a compressor, condenser, motor and accessories, together with a storage tank 17 in which are coils 18 containing the refrigerant to be energized, circulated and actuated by the unit 16, the tank containing water to be cooled by the coils; and a pump 19 actuated by a motor 20, which pumps cooled water from the storage tank through a pipe 21.

The pipe 21 is led, as necessary or desired,

to the conditioning unit 3 and introduced into the housing through a transverse discharge pipe 22 provided with depending nozzles 23 whereby the pump may discharge the cooled water through the spray nozzles, a valve being provided, for example in the conduit portion 21 adjacent the unit for controlling delivery of water through the discharge pipe. A drain pipe 24 is connected with the catch basin 7 for conducting water from the housing back to the storage tank. Eliminator plates 25 of zigzag form are provided in the housing above the refrigerant-discharging spray nozzles, to prevent mist from being drawn through the housing by the fan, by intercepting and holding the particles of moisture carried by the air current.

Adjustable louvers may be installed in the cowl outside the fan, and other well known ventilating devices may be added as mechanical skill or knowledge of the art may suggest. The base is preferably insulated.

The structure having been provided as described and the parts assembled, the fan is set in motion and draws air from the room adjacent the floor through the housing, the refrigerating apparatus supplying cooled water under pressure which is sprayed into the housing, the air drawn through the housing being washed and cooled by the spray. The washed air passing on encounters the eliminators by which excess moisture carried by the air current is trapped so that relatively dry air passes onward through the housing and is distributed by the baffles for discharge into the room, the excess moisture dropping from the eliminator plates to the catch basin.

The air of a room thus recirculated is not only washed and cooled and provided in a moving stream, but is dehumidified by reason of the lowering of the temperature of the air received, whereby part of the moisture content of the air is condensed, the products of condensation, together with the mist produced by the spray nozzles, being detained and removed from the air current by the eliminators.

A plurality of the housing elements or conditioning units may be installed in various rooms and all may be served by a single assembly of water refigerating apparatus including a pump for pumping a cooled liquid to the several units.

It is obvious that while the disclosed method of refrigeration and air conditioning provides preferably for locating a conditioning unit in a room spaced from the refrigerating apparatus, and a plurality of units in a plurality of rooms served by one or more pieces of refrigerating apparatus, a plurality of the units may be arranged in a single room or enclosure for cooperation in conditioning the air supplied to the enclosure; and air inlets may be positioned as desired either for withdrawal of air from the enclosure at points adjacent the housing, or at other desired locations.

The device may be used in winter, for washing, purifying, humidifying or otherwise treating the air of a room, the refrigerating element being dispensed with, and the eliminators being modified or omitted as desired.

It is obvious that chemicals are among the means that may be utilized with the disclosed apparatus and method for conditioning the air of a room.

What I claim and desire to secure by Letters Patent is:

1. An air conditioning device consisting of an elongated upright casing having laterally directed openings at the top and bottom of said casing, means in the upper part of the casing for directing a spray of liquid downwardly, said means being adapted to be connected to a source of water under pressure, a fan in the casing for drawing air therethrough, and means below the lower opening for collecting and leading off the water falling from said spray.

2. An air conditioning device including an elongated upright casing having a laterally directed air inlet opening at the bottom of said casing, a fan in the casing for drawing a column of air therethrough, means in the upper part of the casing for directing a spray of liquid into the column of air moved by the fan, said means being adapted to be connected to a source of water under pressure, and means below the air inlet opening for collecting and leading off the water falling from said spray.

3. In apparatus of the character described, in combination with a water tank, a refrigeration plant for cooling the water in said tank, a conduit leading from said tank, and a pump for moving water under pressure from the tank through the conduit, a unit for cooling, washing and circulating air located remotely above said tank and comprising a vertical casing having a vertically spaced air inlet and outlet openings, means for inducing flow of a current of air through the casing, means for directing a spray of water into said current of air, and means for collecting and leading off water falling from said spray, returns for connecting said leading off means with the tank, and valved means for connecting said spray-directing means with said conduit, whereby delivery of water from the tank to the spray-directing means may be controlled independently of the quantity of water delivered from said pump.

4. Apparatus of the character described including a water tank, means for cooling water in the tank, a unit including a vertical casing having air inlet and outlet openings and located remotely above said tank, a motor driven rotary fan mounted in the outlet opening to form an integral part of the unit, means including a discharge pipe terminat-

ing within said casing for conducting water from said tank to the casing, means connected with said discharge pipe for directing a spray of water within the casing, and means for collecting and leading off water falling from the spray, a return conduit connected with said leading off means for gravity movement of said collected water back to the tank, and a pump having an inlet from the tank and an outlet to said discharge pipe.

In testimony whereof I affix my signature.

HARRY D. BETZ.