

March 31, 1953

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2,633,070

AIR CONDITIONING APPARATUS

Filed March 26, 1951

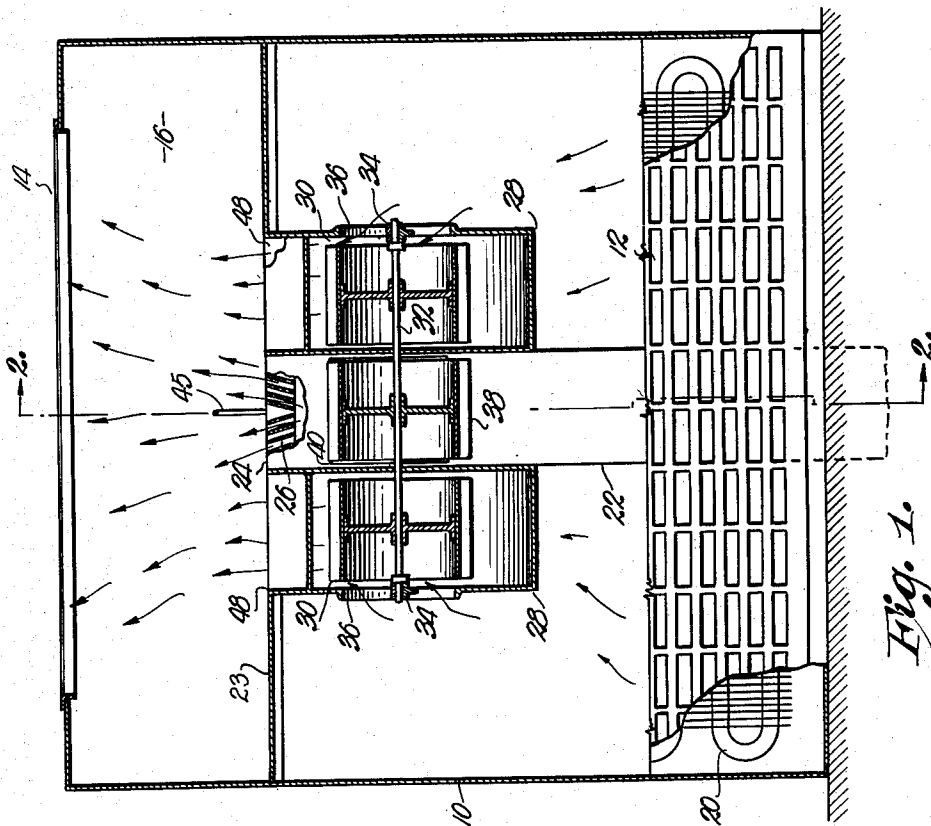


Fig. 1.

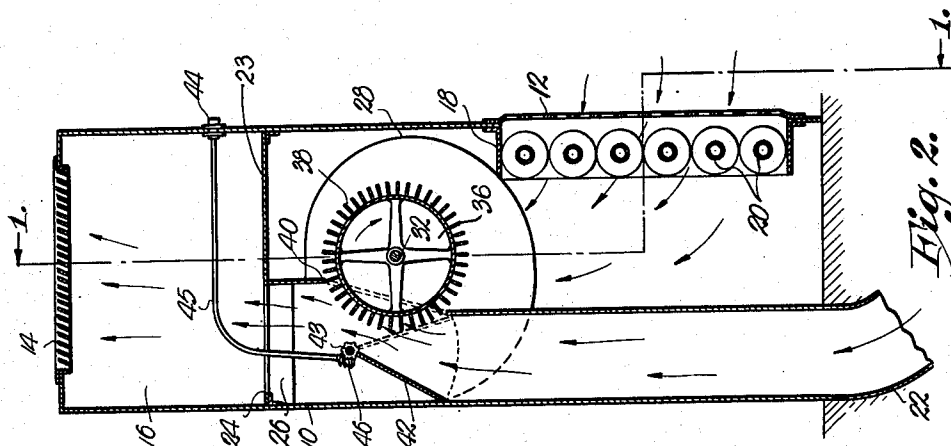


Fig. 2.

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2,633,070

AIR CONDITIONING APPARATUS

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Application March 26, 1951, Serial No. 217,653

1 Claim. (Cl. 98—38)

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The present invention relates to air conditioning equipment, and the primary object in view is to devise an improved form of air conditioning unit utilizing a novel arrangement or assembly of air re-circulating means, and actuating means therefor.

Accordingly the invention aims to provide a novel type of room air-conditioning unit having as an outstanding feature the utilization of the primary air supply thereto as the driving or actuating means for maintaining the air mixing and recirculating function involved in the operation of the unit.

For the accomplishment of this purpose, the invention consists in providing an air conditioning unit equipped with a combination air recirculating and driving assembly, adapted to be directly actuated by the force of the primary air supply entering the unit.

It is further sought to provide an improved construction of this character in which the same is adapted for not only economical and efficient operation, but also includes simple and convenient regulating means for the proper control of the operation of the unit.

As a practical form of embodiment of the proposed improved construction, the same can be readily incorporated in a small cabinet form of unit having the conventional air-conditioning means and an air-mixing space and including a primary air-supply passage—by introducing a combination drive and fan assembly in proper intermediate relation to said air-conditioning means and the mixing chamber, as well as in operative relation to the movement of the incoming air through said passage, for thereby actuating said drive and fan assembly—as required for its normal operation.

With the foregoing general objects in view, the invention will now be described by reference to the accompanying drawing illustrating one practical and efficient form of construction which I have found suitable for embodiment of the aforesaid improvements, after which those features and combinations deemed to be novel and patentable will be particularly set forth in the appended claim.

In the said drawing—

Figure 1 is a front elevation, illustrative of one form of construction embodying the present invention, said view representing a section taken on the line 1—1 of Figure 2; and

Figure 2 is a vertical sectional view of the same, representing a section taken on the line 2—2 of Figure 1.

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Referring now to the accompanying drawing in detail, the example of construction shown therein comprises a cabinet type of room air-conditioning unit in the form of a casing or housing 10 designed to be supported in upright position and provided with a front intake grill opening 12 at its bottom portion for receiving the recirculated air supply, and also with an outlet grill opening 14 for the discharge of the outgoing, treated and mixed air from the air mixing chamber 16, constituting the top portion of the unit.

In an open supporting frame 18 inside the front lower portion of the unit is mounted a conventional set of heating and cooling coils 20 in the path of the incoming air, entering the grill opening 12 for recirculation.

At the rear of the unit, and extending upward from the bottom and substantially midway between the ends thereof, is a duct 22 providing passage for the flow of the primary air supply—under suitable operating pressure, and communicating at its upper end with the bottom of the air mixing chamber 16 by way of a discharge outlet opening 24 in the bottom wall 23 of the chamber 16, which opening is preferably fitted with sets of oppositely inclined baffle elements 26—as illustrated in Figure 1.

Adjacent to the upper portion of the primary air supply duct 22, and on opposite sides thereof, are located a pair of drum-shaped housing members 28 of somewhat eccentric form and designed to enclose a pair of blower-type fans 30 for air-recirculating action—these fans being secured to a horizontal shaft 32, the ends of which are journaled in bearings 34 located centrally of air-intake openings 36 provided in the outer walls of said housing members 28—as represented in Figure 1. On the central portion of the said shaft 32, and between said housing members 28, is mounted a third fan 38, for turbine action in driving said shaft, for which purpose the said fan 38 projects through an opening 40 in the adjacent wall of the duct 22, and hence into the path of movement of the primary air flow—as shown in Figure 2. Within said duct 22 and directly to the rear of the said opening 40, is suspended a conventional form of damper plate 42, which is supported by means of a suitable pivot 43 for swinging movement (as represented by dotted lines in Figure 2) for regulation of the degree or proportion of the primary air flow utilized for operation of said turbine or driver fan 38; and such regulation is represented as adapted to be controlled by means of a knob 44 at the front

of the unit, for operation of a flexible shaft connection 45 to a worm and gear assembly 46 associated with the pivoted end of the damper member 42.

The housings 28 are also provided with discharge outlets 48, for the discharge of the recirculated air into the bottom of the mixing chamber 16, which outlets may likewise be fitted with suitable grill work or inclined baffle structure, as in the case of the discharge opening 24 for the primary air flow.

In the operation of the improved type of air conditioning assembly as above described, it will be apparent that as the flow of primary air takes place, under the pressure of the primary air supply, and follows its course through the duct passage 22, a portion of that primary air current is intercepted by the turbine fan member 38 and thereby utilized for driving said fan in turbine fashion and in turn actuating the shaft 32 and the other two fans 30 for the carrying out of the air recirculating operation—the recirculated air supply being drawn in through the intake openings 36 of the fan housings, and thence discharged through the outlets 48 into the mixing chamber 16, in an obvious manner. For obtaining any desired regulating effect of the said fan and recirculating operation, it is only necessary to adjust the knob 44 to the required extent, for varying the operative position of the damper plate and correspondingly controlling the rate of the turbine driving action of the fan assembly. Of course it is also evident that such regulation may be carried out by use of a conventional form of thermostatic control, if desired.

Thus an extremely simple and compact form of construction is provided for carrying out the primary objects of my invention, as regards reducing the essential structural features thereof to a minimum by eliminating all complications arising from the use of any of the common or usual motor-driven types of driving means, and simply deriving the necessary driving action from the energy of the primary air supply pressure, with the resultant economy characterizing the improved and simplified structural unit and its operation as above described.

The improved form of unit is moreover obvious-

ly adapted for any types of installation and operations for which such character of apparatus is generally used, including of course seasonal changes in operation and the corresponding variations as to the air-conditioning treatment.

While I have herein illustrated and described what I now regard as one efficient and preferred form of embodiment of the aforesaid novel and essential features of the invention, I desire to be understood as expressly reserving the right to make such changes or modifications as may fairly be deemed to fall within the spirit and scope of my invention as defined by the appended claim.

What I claim is:

An air conditioning unit comprising a housing structure providing a lower air conditioning space and an upper air mixing chamber, air conditioning means within said lower space, air recirculating means comprising spaced housing chambers intermediate said air conditioning means and said air mixing chamber, said housing chambers being both positioned in receiving relation to said lower air conditioning space and in discharge relation to said air mixing chamber, a shaft carrying rotary fan elements within said housing chambers and also a turbine driving element in the space between said chambers, and means for conducting a flow of primary air under pressure in driving relation to said turbine element and thereafter discharging said flow of primary air into said upper air mixing chamber.

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