

May 11, 1943.

R. E. HOLMES

2,319,062

AIR CONDITIONING APPARATUS

Filed Aug. 3, 1940

2 Sheets-Sheet 1

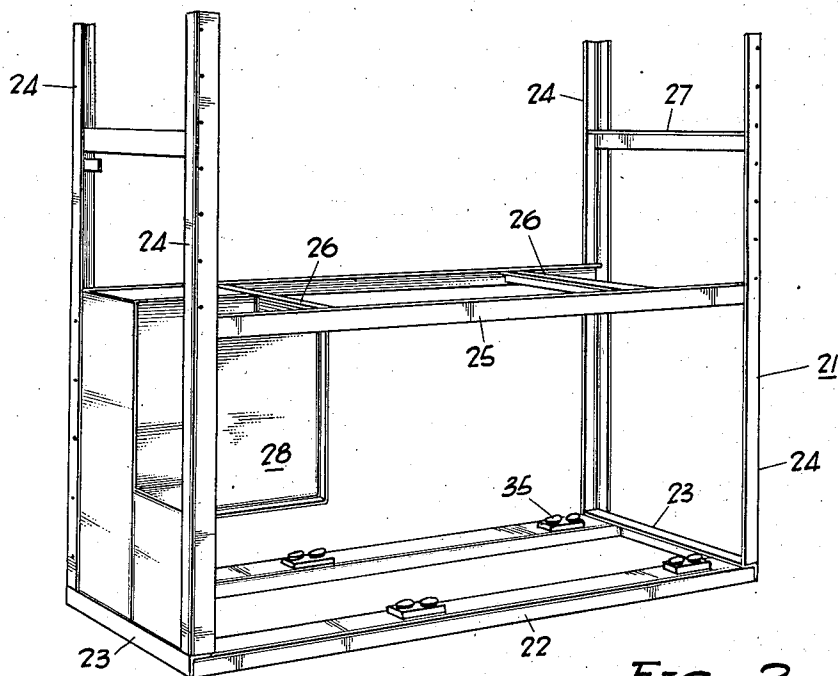


FIG. 2.

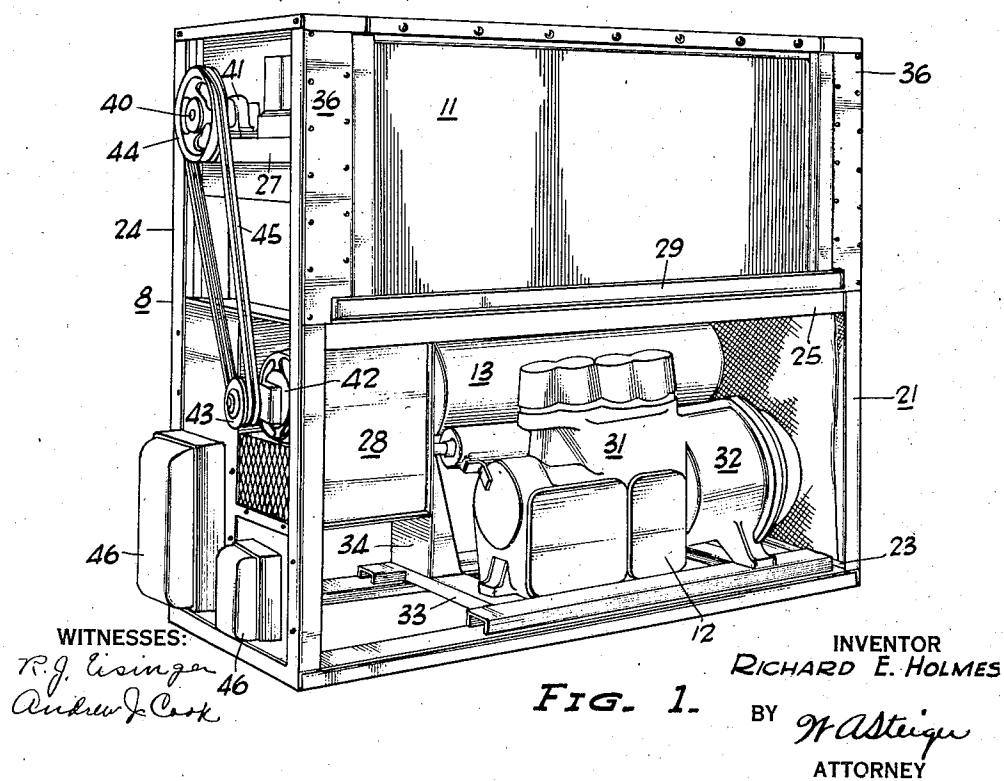


FIG. 1.

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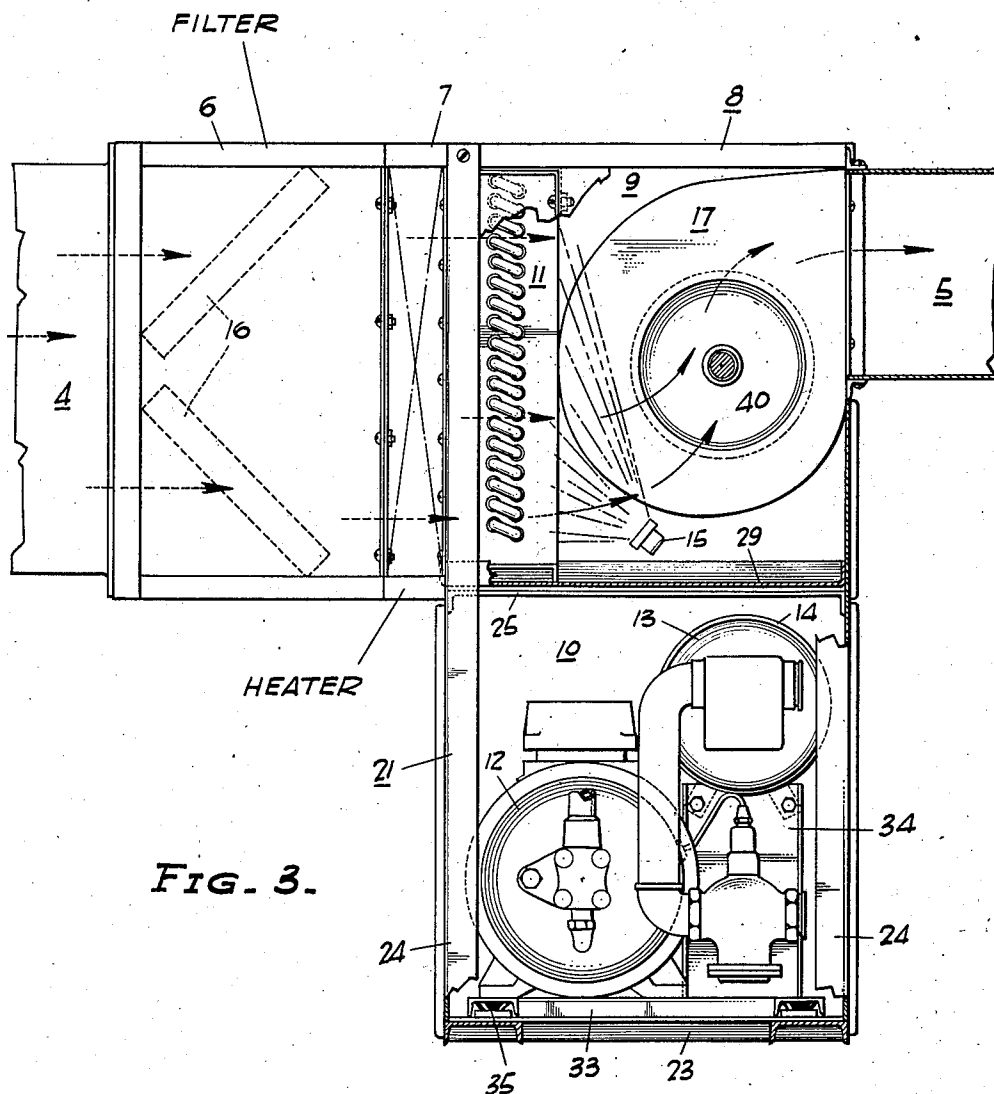
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2 Sheets-Sheet 2



WITNESSES:

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2,319,062

AIR CONDITIONING APPARATUS

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Pennsylvania

Application August 3, 1940, Serial No. 350,812

4 Claims. (Cl. 62-129)

My invention relates to air conditioning apparatus, more particularly to apparatus for a central system, that is, an air conditioning system in which the air is conditioned by apparatus disposed outside of the enclosure and then conveyed through ducts to the enclosure.

An object of my invention is to provide an air conditioning unit including a complete refrigerating system, in order that the refrigerating system may be assembled, charged and tested at the factory.

A further object is to provide an air conditioning unit having an improved arrangement of parts.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a perspective view of my improved air conditioning unit;

Fig. 2 is a perspective view of the frame thereof; and,

Fig. 3 is an end elevation of the air conditioning apparatus.

Referring first to Fig. 3, I show air conditioning apparatus incorporating my invention and including a filter section 6, a heating section 7, and an air conditioning unit 8. A return duct 4 is connected to the inlet side of the filter section 6 and conveys air to be conditioned, either return air or outdoor air, or a mixture of both. The unit 8 includes an upper or air conditioning compartment 9 and a lower or machine compartment 10. The unit 8 contains a complete refrigerating system which comprises an evaporator 11 disposed in the air conditioning compartment 9, a motor-compressor unit 12 and a condenser 13 disposed in the machine compartment 10, and an expansion valve or device which may be located in any suitable available space. Spray nozzles may be provided in the compartment 9, as shown at 15, for humidifying the air in the winter. A blower or blowers 17 are provided in the compartment 9 and effect flow of air from the return duct 4 through the filter section 6, the heating section 7, and the compartment 9, and discharge the conditioned air into a supply duct 5, which may be connected directly to the blower outlet or outlets.

The filter section 6 is bolted to the heating section 7, and the latter is in turn bolted to the unit 8, so that the unit 8 carries both of the sections 6 and 7. The use of the heating section 7 is optional, and the bolting connections are

such that, when the heating section 7 is not employed, the filter section 6 may be bolted directly to the unit 8 and supported thereby.

The filter section 6 comprises filters 16 of any suitable type, such as those of the viscous impingement type. It is preferably provided with any suitable known arrangement affording ready access to the filters, so that they may be readily replaced. The heating section 7 is provided with any suitable heating coil or other heating element therein.

Referring now in greater detail to the unit 8, it comprises a frame 21 shown in Fig. 2. This frame comprises longitudinal channel iron members 22 and transverse angle iron members 23 disposed at the bottom of the frame and forming a base therefor, four angle iron members 24 disposed at the four corners and forming corner posts, longitudinal angle iron members 25 extending longitudinally between the corner posts intermediate the top and bottom of the unit, transverse angle iron members 26 extending between the members 25 as shown in Fig. 2, and transverse angle iron members 27 extending between the corner posts as shown in Fig. 2. Suitable sheet metal members provide a compartment 28 for the blower motor, this compartment being disposed within the machine compartment but being separate therefrom.

A drain pan 29 rests on the angle iron members 25 and 26 and forms a division between the air conditioning compartment and the machine compartment. The motor-compressor unit 12 is of the enclosed type and comprises a reciprocating compressor 31 and a motor 32 directly connected to the compressor for driving the same. The motor-compressor unit is mounted on a mounting cradle 33 and is disposed at the bottom of the machine compartment along one side thereof. The condenser 13 comprises a cylindrical casing or shell 14 disposed horizontally in the upper portion of the machine compartment and adjacent the side opposite from the motor-compressor unit. As will be noted from Fig. 3, with this arrangement, the motor-compressor unit and the condenser are readily accommodated in the machine compartment and are readily accessible; even though the sum of their individual widths is greater than the width of the machine compartment 10 and the sum of their individual heights is greater than the height of the machine compartment. The condenser 13 is also supported on the cradle 33, being mounted thereon by means of bracket members 34. The cradle 33 is mounted on the

channel members 22 of the frame through rubber mountings 35. Accordingly, the motor-compressor unit and the condenser are resiliently mounted as a unit.

The evaporator 11 is mounted vertically within the evaporator compartment along one longitudinal vertical side as shown in Figs. 1 and 3. The evaporator 11 is set in the drain pan 28, the bottom of the frame enveloping the evaporator resting directly on the drain pan. The flanges of the enveloping frame at the ends of the evaporator are bolted to the adjacent corner posts 24 by means of sheet metal plates 36.

The rotors for the several blowers 17 are mounted on a common shaft 40 extending throughout the length of the compartment 9 and journaled in bearings 41 mounted on the angle iron members 27. A motor 42 disposed in the motor compartment 28 drives the blower shaft 40 through pulleys 43 and 44 and a belt 45.

Suitable panels close the otherwise open sides of the compartments 9 and 10 and are preferably detachably connected so that they may be readily removed to provide access to the compartments. The electrical control elements, including the starters and switches, are preferably enclosed in boxes 46 on the exterior of the unit 8, in order that they may be readily accessible. Also, a suitable cover or guard is preferably provided over the pulleys 43 and 44 and the belt 45.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. A self-contained air cooling unit comprising a frame having corner posts and horizontal members connecting the corner posts at the bottom thereof and also intermediate the top and the bottom, panel members attached to said frame and forming a cooling compartment in the upper portion thereof, an evaporator disposed vertically in one vertical side of said compartment, a fan disposed in said cooling compartment between said evaporator and the opposite side of the compartment, a filter casing section having an inlet and an outlet and having means for retaining a filter or filters therein in the path of the air flowing from the inlet to the outlet, said filter casing section being separate from said unit, means for detachably connecting said filter section to said unit with the outlet disposed toward said evaporator and thereby supporting said filter section on said unit, whereby said fan effects flow of air horizontally from said filter section and through said evaporator, and a compressor and a condenser supported on said frame below said cooling compartment and connected in refrigerant flow relation to said evaporator.

2. A self-contained refrigerating unit for an air conditioning system comprising a chassis or casing structure having upper and lower compartments, said upper compartment having an air inlet, a fan in said upper compartment, an

evaporator disposed in said upper compartment in the path of the air stream flowing from said air inlet to the inlet of said fan, a filter casing section separate from but detachably connected to and carried by said casing structure in registry with said air inlet, and adapted for connection to an air duct, a filter in said filter casing section, a condenser and an enclosed motor-compressor unit mounted in said lower compartment, an expansion device carried by said casing structure, said evaporator, motor-compressor unit and condenser being connected in a complete refrigerant circuit mounted on said casing structure whereby the refrigerating system may be shipped as a complete and fully charged self-contained unit.

3. A self-contained refrigerating unit for an air conditioning system comprising a frame structure having an air conditioning compartment in the upper portion thereof, an evaporator disposed in said compartment vertically across one side thereof, a fan in said compartment for effecting induced flow of air into said compartment through said evaporator, a compressor, a condenser and a fan motor mounted on said frame structure below said compartment, drive means connecting said fan and said fan motor, a filter casing section detachably connected to said one side of said upper compartment in registry with said evaporator and thereby supporting said filter casing section on said unit, a filter element in said filter casing section, the latter having an air inlet formed for connection to an air duct, and said compartment having an outlet adapted for connection to an air duct.

4. A self-contained air cooling unit comprising a frame having corner posts and horizontal members connecting the corner posts to form a rigid unitary structure, the unit being provided with a cooling compartment in the upper portion of said frame, said cooling compartment being of substantially the same width as said frame, an evaporator disposed in a vertical plane in said cooling compartment in one vertical side thereof, panels attached to said frame for closing the remaining sides of said cooling compartment, two of said horizontal members being connected to the corner posts at the ends of the cooling compartment and having fan shaft bearings mounted thereon, a centrifugal fan in said cooling compartment between said evaporator and the opposite side of said cooling compartment, said fan being disposed with its shaft extending horizontally parallel to said evaporator and to said other side, said fan shaft extending the full length of the cooling compartment with one end projecting beyond the panel at one end of the cooling compartment and being journaled in said bearings, a fan motor mounted on said frame beneath said cooling compartment with its shaft disposed horizontally parallel to the fan shaft and with one end projecting beyond said panel, pulleys on the projecting ends of said shafts and a belt connecting said pulleys, and a compressor and a condenser supported on said frame directly below and substantially within the horizontal bounds of said cooling compartment and connected in refrigerant flow relation to said evaporator.

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