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2,580,535

AIR-CONDITIONING APPARATUS

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FIG. 1.

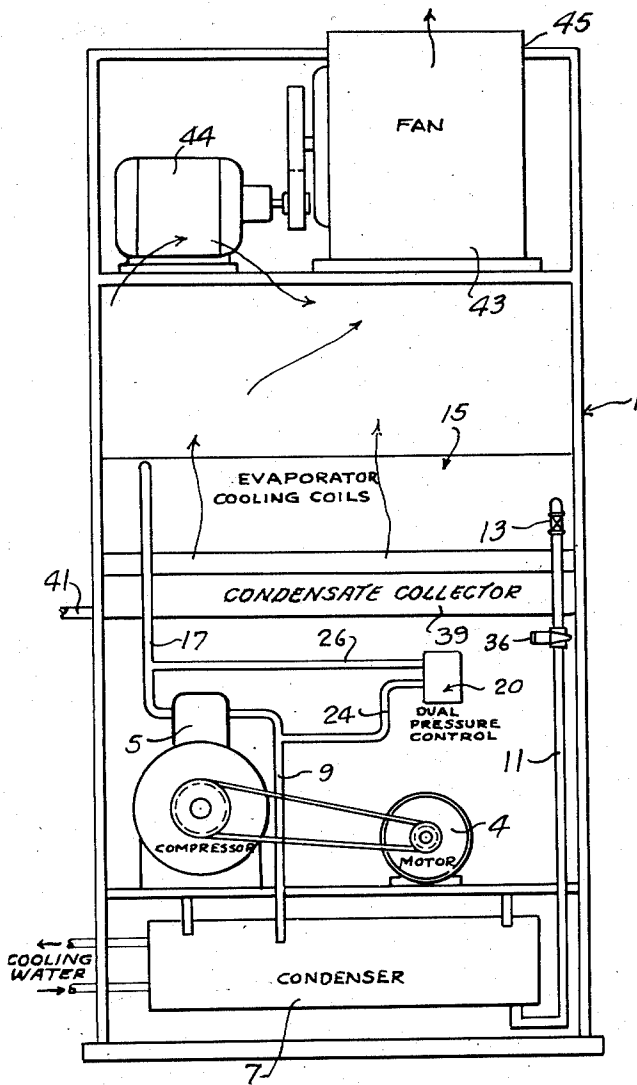
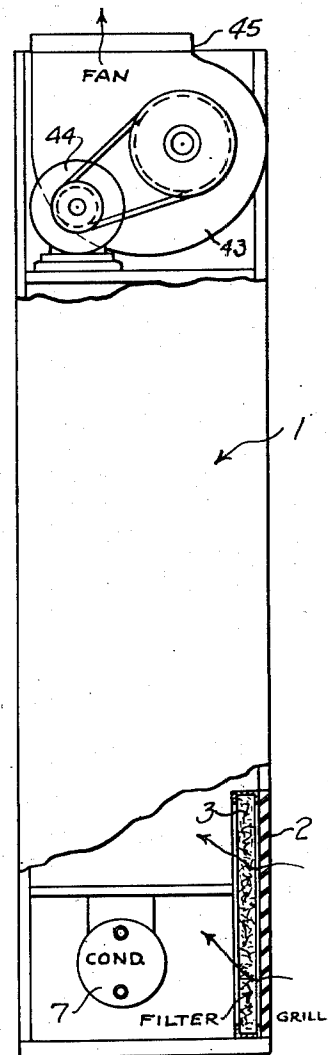


FIG. 2.



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AIR-CONDITIONING APPARATUS

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4 Claims. (Cl. 62-140)

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This invention relates to air conditioning apparatus of the type that circulates and recirculates large quantities of room air through a unit which controls temperature and humidity of the air.

It is an object of this invention to provide air conditioning apparatus in which a maximum of efficiency is possible in the utilization of filter area, compensating for heat losses in the equipment itself, isolating noises made by moving parts, maximum utilization of cooling coil capacity, and the like. This and other objects are accomplished by a particular arrangement of the elements in the cabinet in relation to air flow through the cabinet.

In the drawings:

Fig. 1 is a front view of the apparatus with the front panel removed and

Fig. 2 is a side view of the apparatus with parts broken away and in section.

The apparatus comprises an enclosed cabinet 1 in which are disposed the various elements necessary for the effective functioning of an air conditioning unit. At or near one end of the cabinet is an air entrance passage in which is provided a grill 2 and an air filter 3.

An electric motor 4 is connected to drive a compressor pump 5 which exhausts high temperature, high pressure gas into a condenser 7.

As can be seen from the drawings, condenser 7, motor 4, and compressor 5 are all disposed near the entrance passage. In this way they are in a position where the incoming air sweeps over them and keeps them cool. Compressor 5 pumps hot gas to the condenser through pipe or line 9 and liquid goes from condenser 7 to the evaporator through liquid line 11. An expansion valve 13 is provided in liquid line 11. From expansion valve 13, liquid and gas at low temperature and low pressure pass into the evaporator cooling coils indicated generally at 15. Low pressure gas is pumped out of the evaporator back into the compressor through line 17.

No attempt is made in this case to show the automatic controls for the apparatus. These controls are shown and claimed in my copending application Serial No. 15,073, filed March 16, 1948, patented March 6, 1951, Number 2,544,592. However, those portions of the control mechanism which are directly connected in the refrigeration circuit are shown here, bearing the same reference numerals as they bear in the above identified copending application.

One of the above referred to control elements is the dual pressure control indicated generally

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at 20. As is explained in my copending application, dual pressure control 20 is connected to shut down the unit when the refrigerant pressure on the low side falls below a predetermined minimum and when the pressure on the high side exceeds a predetermined maximum. To that end, pressure control 20 is shown connected to the high side of the refrigerant circuit by means of line 24 which is shown here as being piped into line 9, although, of course, the line 24 may be piped into any convenient part of the high side. Pressure control 20 is piped into the low pressure side of the refrigeration circuit by means of line 26 being connected to line 17.

A valve is shown diagrammatically at 36 in line 11. Valve 36 is a solenoid operated valve which opens or closes the line 11 depending upon whether the solenoid is energized or de-energized as is explained in the above identified copending application.

A condensed moisture, or condensate, collector 39 is shown disposed between the compressor 5 and the evaporator 15. Collector 39 may be any of a number of satisfactory types. As will be understood by those skilled in the art, the air loses moisture in passing through the evaporator cooling coils and this moisture is collected in the condensate collector and is removed through a drain 41.

Air is drawn through the apparatus by means of a fan or blower 43 which is connected to be driven by a motor 44. Fan 43 exhausts air through an opening 45 in or near the upper end of cabinet 1. As can be seen from the drawings, opening 45 in the cabinet is at the opposite end from the entrance passage.

Operation

In operation, air enters one end of the elongated enclosure or cabinet 1 through an entrance passage provided by grill 2 and filter 3. The incoming air sweeps over the condenser 7, the compressor 5, and its associated drive motor 4, cooling those elements and raising the air temperature. The air then passes through the condensate collector 39 and through the evaporator 15, giving up heat to the evaporator cooling coils. The moisture which condenses out of the air because of the cooling, collects in collector 39 and is removed through drain 41. The air is then pumped out through opening 45 in the upper end of cabinet 1 by means of fan 43 driven by motor 44.

I claim:

1. In combination, an elongated enclosure, a

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passage for air into the enclosure near one end, an exit passage for air near the opposite end, an externally cooled liquid receiver mounted in the enclosure near the first-named air passage, a compressor-pump mounted adjacent said liquid receiver and between it and the exit passage, a source of motive power connected to drive the pump, a means to collect and remove condensed moisture, said means being mounted in the enclosure between the compressor and the exit passage, a cooling coil mounted in the enclosure between said means and the exit passage, an air pump mounted in the enclosure and positioned to draw air into the enclosure by way of the first named passage and to pump said air out through the exit passage to provide an air stream flowing through the enclosure, means to drive the air pump, and liquid conduits connecting the compressor, the receiver, the cooling coil, and the compressor again in the order named, all the heat producing elements of the refrigeration system being located in the air stream ahead of the cooling coil.

2. In combination: an elongated enclosure; a passage for air into the enclosure, and an exit passage for air from the enclosure, the air passages being near opposite ends of the enclosure; a compressor-pump, an externally cooled liquid receiver, means to collect and remove condensed moisture, a cooling coil, and an air pump mounted in the enclosure between the two air passages and positioned to draw air into the enclosure through the first named passage and discharge air out of the enclosure through the exit passage; and liquid conduits connecting the compressor, the receiver, the cooling coil, and the compressor in the order named, all the heat producing elements of the refrigeration system being located in the air stream ahead of the cooling coil.

3. In air conditioning apparatus, an elongated enclosure, a passage for air into the enclosure

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near one end, a passage for air to leave the enclosure near the opposite end, an externally cooled condenser mounted in the enclosure near the first-named air passage, a compressor mounted adjacent the condenser and between it and the second-named air passage, a source of motive power connected to drive the compressor, means to collect and remove condensed moisture, said means being mounted in the enclosure between the compressor and the second-named air passage, a cooling coil mounted in the enclosure between the said means and the second-named passage, an air pump in the enclosure and positioned to draw air into the enclosure by way of the first named passage and to pump said air out through the second-named passage to provide an air stream flowing through the enclosure, means to drive the air pump, and liquid conduits connecting the compressor, the condenser, the cooling coil, and the compressor again in the order named, all the heat producing elements of the refrigeration system being located in the air stream ahead of the cooling coil.

4. The invention of claim 3, and an air filter adjacent one of the air passages.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,119,011	Grosvenor	Dec. 1, 1914
2,116,873	Williams	May 10, 1938
2,155,831	Hull	Apr. 25, 1939
2,209,431	Tull	July 30, 1940
2,220,594	Young	Nov. 5, 1940
2,265,272	Ditzler	Dec. 9, 1941
2,369,511	Winkler	Feb. 13, 1945