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**REFRIGERATING APPARATUS**

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3 Claims. (Cl. 62-180)

This invention relates to refrigerating apparatus and more particularly to air conditioning.

This application is a division of my copending application Serial Number 849,979, filed October 30, 1959.

It is an object of this invention to provide air conditioning with automatic temperature regulation of both the refrigerating system and the fan speed.

This object is attained in the form shown in the drawings in which a stage thermostat is employed to provide an arrangement wherein under high temperatures the cooling system and the fan operate at high speeds while at lower temperatures the fan speed is reduced automatically and at a still lower temperature the operation of the cooling system is discontinued. The selector switch also provides selective high and low fan speeds without operation of the refrigerating system.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein preferred embodiments of the present invention are clearly shown.

In the drawings:

FIGURE 1 is a diagrammatic view of a reverse cycle refrigerating system embodying one form of my invention; and

FIGURE 2 is a control system applicable to the refrigerating system shown in FIGURE 1 providing change of fan speeds through a stage type thermostat in conjunction with the control of the refrigerating system.

Referring now to the drawings and more particularly to FIGURE 1, there is shown a room or enclosure 20 to be conditioned, indicated by dot and dash outlines. Within the room 20 is an indoor coil 22 provided with a fan 24 driven by an electric motor 26 for circulating air from the room into heat transfer relationship with the indoor coil 22 and then returning the air to the room. The refrigerating system includes a pump or compressor 32 driven by an electric motor 34 which draws evaporated refrigerant through the suction conduit 36 and discharges the compressed refrigerant through the discharge conduit 38. Both of these conduits 36 and 38 connect to the electromagnetically operated reversing valve 40 actuated to the heating position by the energization of a solenoid 42. The reversing valve 40 has a conduit connection 44 with the indoor coil 22 and a second conduit connection 46 with the outdoor coil 48 which is located in some location wherein outdoor air may circulate in heat transfer relation with it either by natural convection or forced air. A second conduit 52 connects the indoor coil 22 with a restrictor 54 which in turn is connected by a conduit 56 to the outdoor coil 48. A selector switch 62 is also conveniently located in the room for selecting either high or low fan operation without operation of the refrigeration system or heating or cooling with high or low speed fan operation. A room thermostat 654 is also provided in the inflowing air stream to the fan 24.

In FIGURE 2, there is shown a control system which in one position of the selector switch provides a thermostatic control in which at low room temperatures the fan motor operates at low speeds while at higher room temperatures the fan operates at higher speeds, both accom-

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panied by normal operation of the refrigerating system. The supply conductor 620 connects with the switch blades 622, 624 and 626 of the manual selector switch 628. The selector switch 628 has an off position in which the entire circuit is deenergized. A contact 630 is engaged by the switch blade 622 in the first operative position connecting through the conductor 632 to the fan motor 26 which is provided with a centrifugal starting switch 634 for controlling the energization of the phase winding 636. Switch 634 may be replaced with a capacitor for operation as a permanent capacitor type motor. The fan motor 26 is protected by a thermal motor protector 638 connecting to the conductor 640 in turn connecting to the return supply conductor 642. The switch blade 624 in the second operative position connects with a contact 644 connected by the conductor 646 to the reactor 80 with the fan motor 26 to provide slow speed operation of the fan. The switch blades 622, 624 and 626 are connected together by the linkage 648. In the third operative position, the switch blade 622 connects to a contact 650 connected to the switch blade 652 of the stage type, double throw, double pole room thermostatic switch 654. The switch blade 652 is provided with a snap action spring 656 and, under cool room conditions, connects with the contact 658 which connects through the reactor 80 to operate the fan motor 26 and the fan 24 at a slow speed. At the same time, the switch blade 626 engages a switch contact 660 connecting through the conductor 662 with the switch blade 664. The switch blade 664 normally is in engagement with the dead contact 666 under cool room conditions so that the compressor motor 34 will not be in operation. As the room 20 warms up, the switch 664 will be moved upwardly into contact with the contact 668 connecting through the conductor 670 with the compressor motor 34. The compressor 34 may have a voltage controlled relay 672 for controlling the energization of the phase winding 674. Since the solenoid 42 is not energized, the valve 40 is in the normal refrigeration position. The fan motor 26 is caused to operate at a slow speed since the switch blade 652 will at first remain in engagement with the contact 658 connecting through the conductor 646 and the reactor 80 to the fan motor 26. As the room temperature increases, the switch blade 652 will be moved into engagement with the upper contact 676 connecting through the conductor 632 with the fan motor 26. This will provide maximum cooling through full speed operation of the fan motor 26 and normal operation of the compressor motor 34. This will provide very desirable comfort conditions under room temperatures requiring cooling.

While the embodiments of the present invention as herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. An air conditioner for cooling an enclosure including a refrigerating system having indoor and outdoor heat transfer units, a fan and motor for circulating air into heat transfer with said indoor unit and discharging the air into said enclosure, said refrigerating system including a compressor and a motor for driving the compressor, a stage type double throw, double pole room thermostat switch responsive to temperatures within said enclosure, means including first and second electrical conductors connected to said fan motor and the alternate contacts of one of the poles of said stage type switch for operating said fan and motor at slow and high speeds, means connecting the one contact of the other pole of said stage type switch to said compressor motor, said stage type switch including means for energizing only the conductor and fan for slow speed at a low temperature and said conductor and fan for slow speed together with the com-

pressor motor at higher temperatures and for energizing said conductor and fan for high speed together with the compressor motor at still higher temperatures.

2. An air conditioner for cooling an enclosure including a refrigerating system having indoor and outdoor heat transfer units, a fan and motor for circulating air into heat transfer with said indoor unit and discharging the air into said enclosure, said refrigerating system including a compressor and a motor for driving the compressor, a stage type double throw, double pole room thermostat switch responsive to temperatures within said enclosure, means including first and second electrical conductors connected to said fan motor and the alternate contacts of one of the poles of said stage type switch for operating said fan and motor at slow and high speeds, said stage type switch having high and low temperature contacts for each pole, said second conductor for high fan speed being connected to the high temperature contact for one pole, said first conductor for low fan speed being connected to the low temperature contact for said one pole. 20

3. An air conditioner for cooling an enclosure including a refrigerating system having indoor and outdoor heat transfer units, a fan and motor for circulating air into heat transfer with said indoor unit and discharging the air into said enclosure, said refrigerating system in-

cluding a compressor and a motor for driving the compressor, a stage type double throw, double pole room thermostat switch responsive to temperatures within said enclosure, each of said double throw portions of said switch including opposed high and low temperature contacts, said switch comprising means for operating the first double throw portion from its low temperature contact to its high temperature contact in response to an increase in temperature in a low temperature range and for operating the second double throw portion from its low temperature contact to its high temperature contact in response to an increase in temperature above said low temperature range, means including first and second conductors connected to said fan motor and respectively to the low and high temperature contacts of said second double throw portion for operating said fan and motor at slow and high speeds, and means connecting the high temperature contact of said first double throw portion to said compressor motor.

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