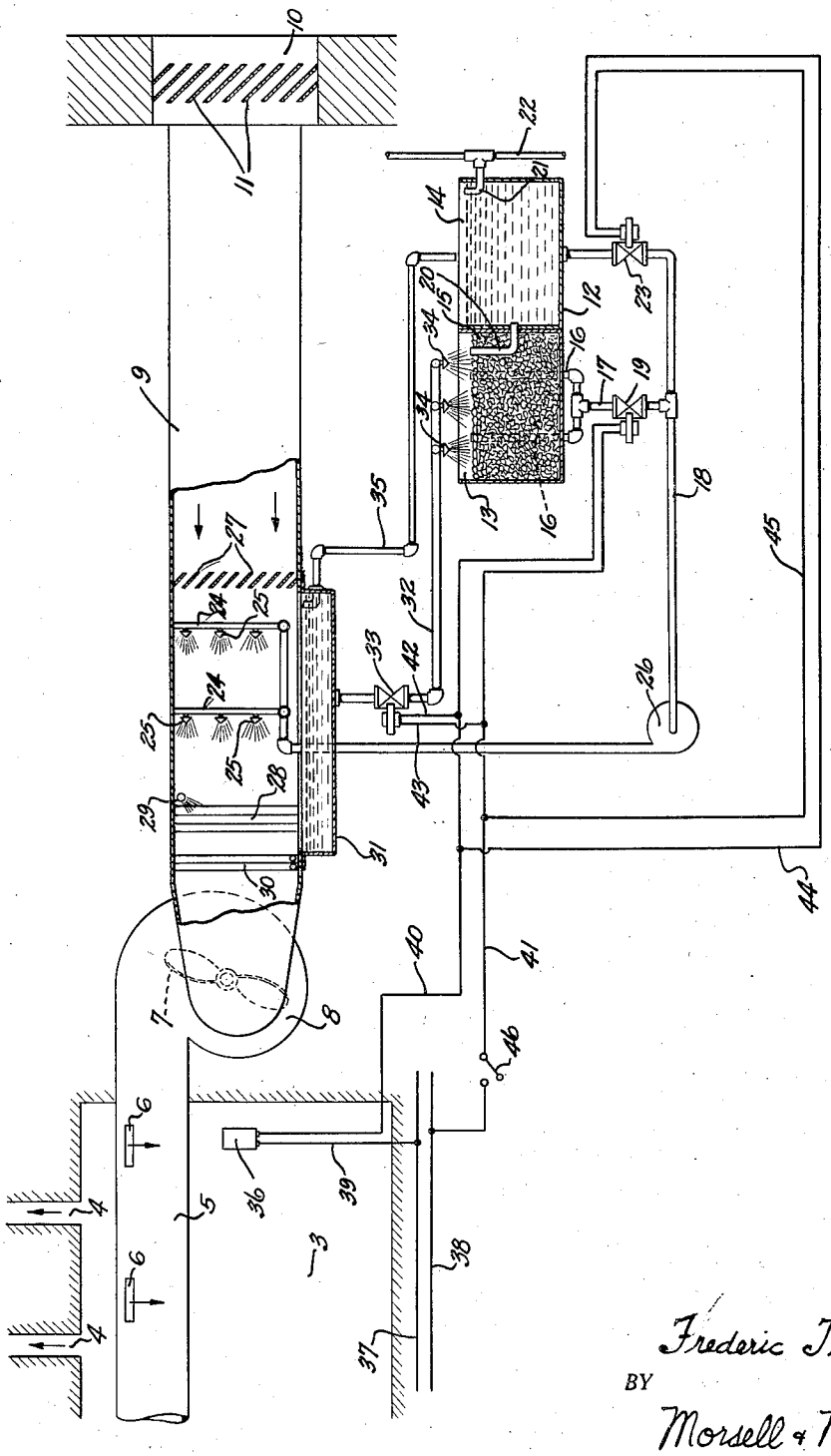
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COOLING SYSTEM

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COOLING SYSTEM

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The present invention relates in general to improvements in the art of conditioning the air in spaces such as rooms, and relates more specifically to an improved cooling system especially adapted to control the atmospheric conditions within relatively small enclosures.

An object of the invention is to provide an improved cooling system which is simple and compact in construction, and which is also highly efficient in operation.

In the art of space cooling, it is frequently desirable to provide for the periodic conditioning of the atmosphere within relatively small rooms, and it is moreover extremely desirable to effect such air conditioning at minimum cost. Most apparatuses for this purpose now resort to mechanical refrigeration means such as circulating a refrigerant to cool the introduced air, which arrangement requires an expensive installation and the upkeep is expensive, and the expense, therefore, prohibits its use for the cooling of relatively small rooms for short periods of time. The present invention overcomes this objection by the provision of a cooling system wherein commercial ice is employed as the cooling medium rendering the system inexpensive in operation, especially suitable for the cooling of relatively small rooms.

A further object of the invention is to provide a cooling system for rooms especially suited for operation for short time periods, and susceptible of automatic control so that when the room reaches the desired minimum temperature, the system can be continued in operation economically so as to save the cooling medium.

These and other objects will be apparent from the following detailed description.

A clear conception of an embodiment of the invention and of the mode of constructing and of operating apparatuses built in accordance therewith, may be had by referring to the drawing accompanying and forming a part of this specification wherein the figure illustrates a schematic view of the apparatus.

Referring now more particularly to the drawing it will appear that the numeral 3 indicates a chamber to be cooled, and said chamber is provided with vent openings 4 and is entered by an elongated blower conduit or pipe 5 having discharge openings 6 therein. Within an enlarged outer end portion 8 of said blower conduit 5 is a fan 7. The fan chamber 8 is entered by the end portion of an air conduit 9 which extends from an opening 10 in the wall of the building. Said opening 10 is controlled by louvers 11.

Installed within the building in any suitable place and remote from the chamber or room 3 is an open tank 12 which is divided by a central vertical partition 15 into an ice reservoir 13 and a water reservoir 14. The ice reservoir 13 is adapted to contain ice, preferably in crushed form, and extending upwardly into the reservoir 13, through the bottom thereof, are a pair of discharge pipes 16. The portions of said pipes within the reservoir are perforated and the perforated portions are screened. The outer ends of said pipes connect with a branch pipe 17 which enters an elongated main pipe 18. Within the branch pipe 17 is a solenoid operated direct acting water valve 19. An overflow pipe 20 extends from an upper portion of the reservoir 13 through the partition 15 into the water reservoir 14 to discharge into said reservoir 14 overflow or excess water occasioned by the melting of ice in the reservoir 13. The reservoir 14 is also provided with an overflow pipe 21 which extends outwardly of the tank and connects with a discharge or overflow drain pipe 22. The end of the main pipe 18 enters the bottom portion of the reservoir 14 and communicates with the interior thereof. Flow from said reservoir 14 through the pipe 18 is controlled by a solenoid operated reverse acting water valve 23.

The main pipe 18 extends into the forward end portion of the air conduit 9 and branching therefrom, within said conduit, are a pair of spaced spray pipes 24 carrying spray nozzles 25. A water pump 26 in an intermediate portion of said main pipe line 18 is adapted to draw water from either the reservoir 13 or the reservoir 14 and to force said water through the spray pipes 24 and nozzles to spray air passing through the air conduit 9, whereby the air is cleansed and cooled. Inwardly of the spray pipes, within said air

conduit, there is another set of louvers 27 through which the air passes, and on the other side of the spray pipes, after being sprayed, the air passes through an eliminator 28 on which is directed a washing spray 29, and also over heating coils 30, which may heat the air somewhat, if necessary, and remove excess moisture from the air.

The air duct 9, below the spray pipes 24, is formed with an enlarged opening below which is supported a tank 31. Extending from an opening in the bottom of the tank is a water discharge pipe 32 in which there is located, adjacent the tank, a solenoid controlled direct acting water valve 33. Said discharge pipe 32 extends over the open upper portion of the ice reservoir 13 of the tank 12, and is provided with spray nozzles 34 directed so as to spray water into said reservoir 13. There is also extended outwardly of the tank 31 an overflow pipe 35 which extends to and terminates above the reservoir 14 of the tank 12 so as to discharge overflow water from the tank 31 into the reservoir 14.

A thermostat 36 is located within the chamber 3, and said thermostat, as well as the electrically operated valves 19, 23 and 33, is included in an electrical circuit. A suitable arrangement for the electric circuit is shown diagrammatically in the drawing, and it will be evident that the wires of a main electric power line, extending from any suitable source of supply, are indicated by the numerals 37 and 38. A wire 39 may extend from wire 37 to one terminal of the thermostat 36 and extending from the other terminal of the thermostat is a wire 40 leading to one terminal of the valve 19. A circuit wire 41 extends from the other main supply wire 39 and connects with the other terminal of the valve 19. A circuit to the valve 33 is established by wires 42 and 43 which are tapped in on wires 40 and 41 respectively, and a circuit to valve 23 is established by wires 44 and 45 which are also tapped in on wires 40 and 41 respectively.

The operation of the improved cooling apparatus is as follows: The thermostat 36 in the chamber to be cooled is set for the desired temperature and a switch 46 in the electric circuit is closed. The reservoir 13 of the tank 12 is, of course, filled with ice, preferably in crushed form. Initially, valve 19 is open, as is valve 33, while valve 23 is closed. Water formed within reservoir 13 by the melting of the ice will pass through the screened pipes 16 and through the pipe 17 and valve 19 into the main pipe 18. The pump 26 in said main pipe, which is of conventional form and driven by any suitable means, will force the water of the melting ice through the discharge nozzles in a duct 9. Air is being driven through said duct from the atmosphere by the fan 7 and which is also of conventional form and driven by any suitable means. Obviously the cold water discharged will cool the incoming air which is then subjected to the washing spray 29, the eliminator 28, and the heating coils 30. The air is then introduced into the chamber 3 and will lower the temperature therein. Water sprayed through the nozzles 25 will be caught in the tank 31, and as long as the valve 33 is open, said relatively cold water will be returned by the pipe 32 and sprayed into the ice reservoir 13 and the cycle will continue until the chamber 3 has been cooled to the predetermined minimum temperature. Upon attainment of the predetermined minimum temperature, the thermostat 36 will operate to influence the circuits to all of the solenoid controlled valves so that valves 19 and 33 will close, while valve 23 will open. The result of this reversal of the valves will be that water from the melting ice will first flow into reservoir 14 through the overflow pipe 20, and then through pipe 18 to be sprayed in the duct 9. As the valve 33 is closed, the sprayed water will collect in the tank 31 and will upon reaching a proper level, be discharged through pipe 35 and directly back to the water reservoir 14. Obviously, when this is taking place, the water spraying the air is somewhat warmer than the sprayed water in the first instance, as it does not come directly from the ice, and the air introduced into the chamber 3 will be somewhat warmer. When the temperature rises in said chamber to the predetermined maximum temperature, said thermostat 36 will again operate to influence the valves to resume the original relationship so that the cooling fluid will again come directly from the ice reservoir.

It will thus be seen that the chamber 3 can be automatically maintained in a properly cooled condition with fresh clean and cooled air, and the air is cooled by a very simple and inexpensive arrangement. From time to time the cooling fluid will be taken from the water reservoir 14 and this will result in a material saving of ice, and there will not be a constant drain thereon. The apparatus is especially suited for the cooling of rooms and chambers where the cooling period is not too prolonged, as for instance for funeral parlors and the like. The improved cooling apparatus is furthermore simple and economical, and is well adapted for the purposes set forth.

What is claimed as the invention is:

1. In combination, an air duct communicating with a chamber, a spray for delivering liquid into said duct to condition gas passing therethrough to the chamber, an ice reservoir, a water reservoir, means for conducting liquid from either reservoir to the spray for discharge into the air duct, and means for selectively returning the sprayed liquid to either reservoir.

2. In combination, an air duct communicating with a chamber, a spray for delivering liquid into said duct to condition gas

passing therethrough to the chamber, an ice reservoir, a water reservoir, an overflow connection between the ice reservoir and the water reservoir, a pipe for conducting liquid to the spray for discharge into the air duct, said pipe being communicable with both reservoirs, valve means controlling flow from said reservoirs to the pipe, and means for selectively returning the sprayed liquid to either reservoir.

3. In combination, an air duct communicating with a chamber, a spray for delivering liquid into said duct to condition gas passing therethrough to the chamber, an ice reservoir, a water reservoir, an overflow connection between the ice reservoir and the water reservoir, a pipe for conducting liquid to the spray for discharge into the air duct, said pipe being communicable with both reservoirs, valves controlling discharge from both reservoirs to said pipe, a tank for collecting the sprayed liquid, means for returning the collected liquid in the tank to either reservoir, valve means controlling the return of liquid to the desired reservoir, and a thermostat within the chamber and electrically connected with all of the valves to operate the same.

4. In combination, a duct, a spray for delivering liquid into said duct to condition gas passing therethrough, an ice storage reservoir, a water accumulating reservoir, an overflow connection for conducting excess liquid from said ice storage reservoir to said water accumulating reservoir, means for conducting liquid to said spray for discharge into said duct, valves for interchangeably delivering liquid from said reservoirs to said conducting means, and means for selectively returning sprayed liquid from said duct to either of said reservoirs.

5. In combination, a duct, spray means for delivering liquid into said duct to condition gas passing therethrough, an ice storage reservoir, a water accumulating reservoir, valve means for controlling interchangeable delivery of liquid from said reservoirs to said spray means, and means for selectively returning sprayed liquid from said duct to either of said reservoirs.

In testimony whereof, I affix my signature.

FREDERIC T. GOES.