

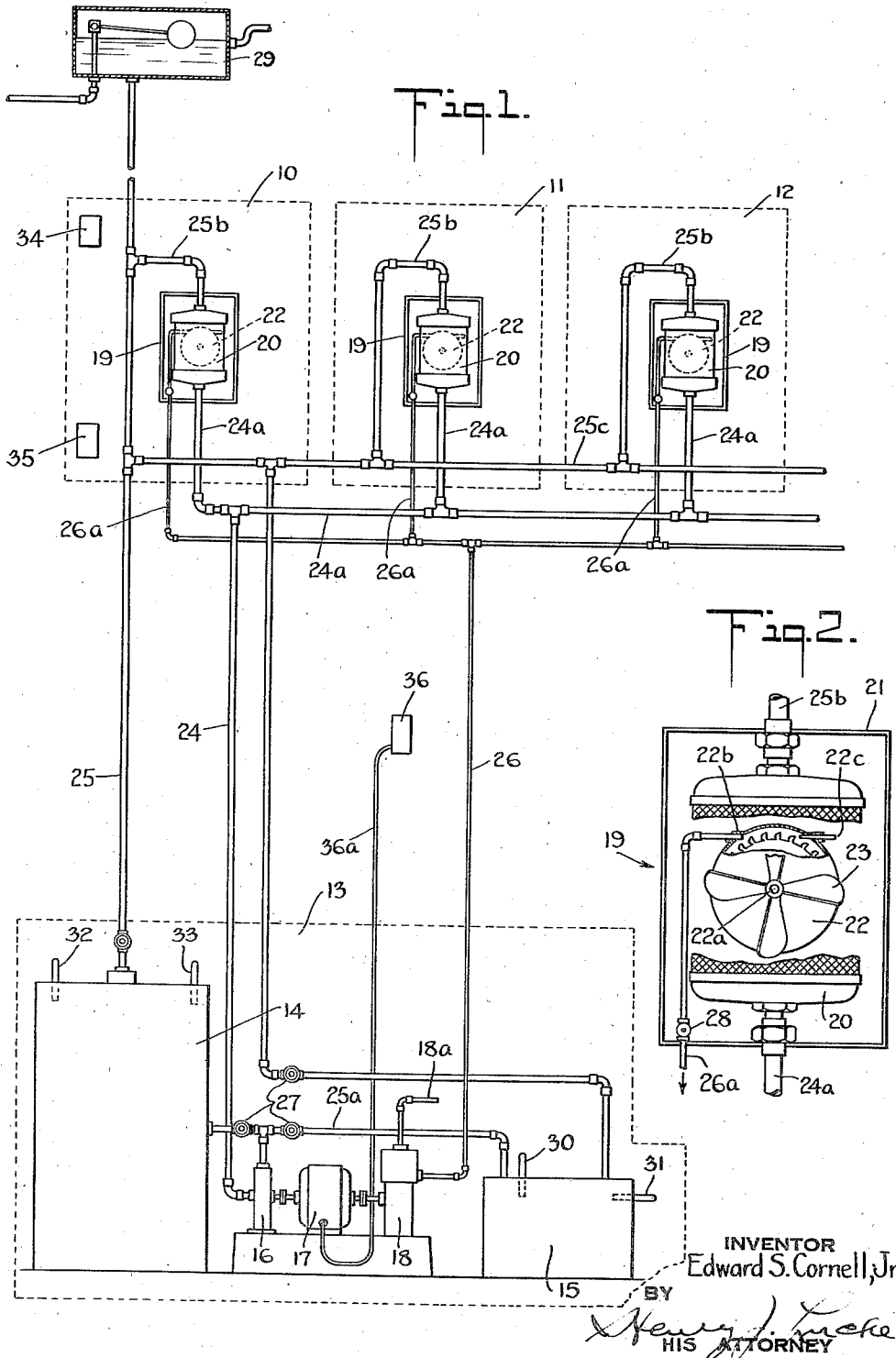
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THERMAL SYSTEM

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THERMAL SYSTEM

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The invention relates to an improved thermal system.

A characteristic of the invention is the employment of individual thermal units for the respective rooms or other enclosures of a house or other structure, for heating, or alternatively for cooling, the air of the respective rooms or other enclosures to effect a range of temperature as may be desired by the occupants of the respective rooms or other enclosures, such thermal treatment of the air of such individual rooms or other enclosures being accomplished by the withdrawal of decrements of vitiated air therefrom. Cooperative with the withdrawal of vitiated air, suitable means are provided for the supply to the respective rooms or other enclosures of fresh air, i. e., outer atmospheric air, preferably conditioned as to moisture content, removal of dust or other foreign matter, elimination of outside noises, etc.

A further characteristic of the invention resides in the employment of central heating means, or alternatively central cooling means, means for positively circulating the thermal medium from such central thermal means, alternatively, to suitable instrumentalities serving the respective rooms or other enclosures, such central supply of the thermal medium and its circulation being responsive to suitable thermostatic means. Preferably, the thermal treatment of the air of the individual rooms or other enclosures, is effected by the assembly of a heater unit suitably connected by piping with the central heating means, or alternatively with the central cooling means, with which each thermal unit is associated, an air motor and fan or equivalent, operated and directly controlled by the air motor, each air motor being operated under subatmospheric pressure conditions, the outtakes of the respective air motors being suitably connected by piping to a common air exhauster, whereby during the stage of operation of the air exhauster, the respective air motors are operated, withdrawing air, i. e., vitiated air, from the respective rooms or other enclosures, directly operating the respective associated fans, and thereby directly circulating the air of the respective rooms or other enclosures, the fresh air, supplied as above indicated, serving to maintain the desired air conditioned status for the individual rooms or other enclosures, the motor-fan enforced air circulation effecting the distribution of the supplied fresh air.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawing, in which

Fig. 1 is a schematic diagram typifying a representative embodiment of the invention; and

Fig. 2 is a detail front elevation, on an enlarged scale, of a preferred assembly of thermal unit and therewith associated subatmospheric air motor and fan.

Referring to the drawing, the arrangement shown in Fig. 1 is typical of a system for heating or alternately cooling the rooms or other enclosures of a building or other structure, pursuant to the principle of the present invention. At 10, 11 and 12 are indicated such rooms or other enclosures. The invention, as generally stated hereinabove, includes common thermal means, i. e., a boiler, or alternatively a refrigerating or other cooling means, which group of instrumentalities are advantageously assembled in the basement or the like, indicated at 13.

At 14 is indicated any suitable type of boiler for heating the thermal medium; preferably, the thermal medium is water. At 15 is indicated suitable refrigerating means for reducing the temperature of the thermal medium within predetermined limits, which may be controlled by suitable thermostatic devices, commonly known as aquastats. At 16 is indicated a circulator which is advantageously operated by an electric motor indicated at 17. At 18 is indicated suitable subatmospheric pressure creating means such as an air exhauster. Desirably, the electric motor 17 serves to jointly operate the circulator 16 and the air exhauster 18, thereby dually controlling the operation and non-operation jointly of the circulator 16 and air exhauster 18.

In each such room or other enclosure 10, 11, 12, etc., is one or more heater unit-air motor-fan assemblies, each such assembly being indicated 19 in the drawing. Preferably, as shown in the drawing and particularly in Fig. 2, each heater unit 20 is of the reticulated type, disposed in a casing 21 to locate its reticulated portion in close proximity to the front opening of the casing and in symmetrical relation with the lateral and top and bottom sides of the casing, the air motor indicated at 22 and its fan 23, the latter preferably directly mounted upon the air motor shaft 22a, being jointly mounted within the casing 21, rearwardly of the heater unit 20, the casing 21 being substantially closed at its lateral, top and bottom sides and at its rear, suitable perforations being provided for the entry of the piping serving the headers of the heater unit and the piping leading from the outtake 22b of the air motor to the air exhauster 18.

Piping serving to lead the thermal medium

from such boiler 14 or refrigerating means 15, is indicated at 24, such piping including sub-piping 24a, respectively connected to the intake headers of the respective thermal units 20 in the respective rooms or other enclosures 10, 11, 12, etc. The piping for the return of the thermal unit to the boiler, or alternatively to the refrigerating means is indicated at 25, which includes sub-piping 25a leading directly to the refrigerating means 15. The individual piping leading from the outtake headers of the respective thermal units 20 are designated 25b. Preferably, the sub-piping 24a are arranged in multiple relation to one another, in which arrangement the same are connected with the main piping 24 through suitable manifold-piping 24b; correspondingly, the outtake sub-piping 25b may be connected in multiple relation to one another and to the outtake piping 25, which may include manifold-sub-piping 25c.

The piping connecting the air exhauster 18 with the respective subatmospheric air motors 22, is designated 26. Preferably, such piping is connected in multiple with the outtakes 22b of the respective air motors 22, as by the indicated sub-piping 26a. The piping leading from the discharge of the air exhauster 18 is designated 18a and may discharge as may be preferred and desired; preferably the combined withdrawn vitiated air is discharged into the outer atmosphere. The intake of each air motor is indicated at 22c, and as appears from the drawing the intake 22c of any air motor serving the respective rooms or other enclosures, communicates with the air of the said rooms or other enclosures whereby during the stage of operation of the air exhauster 18 decrements of the vitiated air of such rooms or other enclosure is exhausted from the same into the outer atmosphere. Suitable valves or other devices are provided for the operative connection of the boiler 14 with the stated piping 24, 25, or in the alternative, for the operative connection of the refrigerating means 15; valves for such purposes are indicated at 27.

Means for controlling the operation of the individual air motors is indicated at 28, see Fig. 2, which may be of the manually or thermostatically operated type to regulate the subatmospheric pressure effective upon such air motor.

By setting any valve 28, thereby controlling the operation of its air motor 22 to full or partial operative status, the associated fan 23 is correspondingly actuated causing the air of the room or other enclosure served by such thermal unit-air motor-fan assembly to be circulated and subjected to thermal treatment through the thermal unit, to suit the desires of the occupant or occupants of such room or other enclosure. Upon shutting off such valve 28 to its closed position, the air motor and fan are brought to rest, thus bringing about the condition of non-thermal treatment of the air of such room or other enclosure, and independently of the heated or cold status of the thermal medium. The valve 28 may be set manually or automatically controlled by suitable thermostatic means, indicated at 34 for the room 10.

At 29 is indicated a pressure equalizing supply tank for the thermal system, which, as indicated in the drawing, is of the float valve type, insuring the maintenance of the level of the thermal medium within the system within a predetermined range of level.

At 32, 33 are indicated maximal and minimal aquastats for controlling the range of maximum

and minimum temperatures of cooling, effected by the refrigerating means 15. At 32, 33 are indicated maximal and minimal aquastats for controlling the range of maximum and minimum temperatures of heating, effected by the boiler 14.

Cooperative with the thermal treatment of the air of the respective rooms or other enclosures and simultaneous therewith the withdrawal of vitiated air therefrom, suitable means are provided for the inflow of fresh air into the respective rooms or other enclosures. Such fresh air supply means is indicated at 35, with respect to the room 10. Preferably, such air supply means effects the removal of dust and humidification and dehumidification, etc. of the outer atmospheric air, to supply decrements of fresh air to provide a predetermined range of moisture content, and other desired conditioned air status for the respective rooms or other enclosures.

At 36 is diagrammatically a thermostat serving to control the simultaneous operation and simultaneous non-operation of the thermal medium circulating means, i. e. circulator 16 and the subatmospheric pressure creating means, i. e., air exhauster 18, as by electrical connection indicated at 36a with their common driving means, i. e., the electric motor 17.

Whereas I have described my invention by reference to specific forms thereof it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim:

1. The combination with a plurality of rooms, of thermal devices located in such rooms, central thermal means, piping interconnecting said central thermal means with said thermal devices respectively for the supply of a suitable thermal medium, means controlling the circulation and non-circulation of the thermal medium supplied by said central thermal means through said piping to said thermal devices, air motor and fan means associated with said thermal devices respectively, each of said air motors being operated under subatmospheric pressure, the intake of said air motors respectively communicating with the air of the room served by the associated thermal device, means common to the air motors for creating subatmospheric pressure, piping interconnecting the outtakes of said air motors with said common means, thermostatic means responsive to predetermined maximum and predetermined minimum temperatures of any of said rooms, and means associated with said thermostatic means controlling the operation and non-operation of said thermal medium circulation and non-circulation means respectively simultaneously with the operation and non-operation of said subatmospheric pressure creating means, whereby during the stage of operation of the respective thermal unit—air motor—fan means in the individual rooms the air of such rooms is circulated and vitiated portions thereof are withdrawn therefrom.

2. The combination with a plurality of rooms, of thermal devices located in such rooms, central thermal means, piping interconnecting said central thermal means with said thermal devices respectively for the supply of a suitable thermal medium, means controlling the circulation and non-circulation of the thermal medium supplied by said central thermal means through said piping to said thermal devices, air motor and fan means associated with said thermal devices respectively, each of said air motors being operated

under subatmospheric pressure, the intake of said air motors respectively communicating with the air of the room served by the associated thermal device, means common to the air motors for creating subatmospheric pressure, piping interconnecting the outtakes of said air motors with said common means, means individual to the respective rooms for the supply of fresh air, whereby the supplied fresh air is distributed therein by the circulation of the air thereof by its served thermal unit—air motor—fan means, thermostatic means responsive to predetermined maximum and predetermined minimum temperatures of any of said rooms, and means associated with said thermostatic means controlling the operation and non-operation of said thermal medium circulation and non-circulation means respectively simultaneously with the operation and non-operation of said subatmospheric pressure creating means, whereby during the stage of operation of the respective thermal unit—air motor—fan means in the individual rooms the air of such rooms is circulated and vitiated portions thereof are withdrawn therefrom, and concomitantly therewith fresh air supplied thereto and distributed therein.

3. The combination with a plurality of rooms, of thermal devices located in such rooms, central thermal means, piping interconnecting said central thermal means with said thermal devices respectively for the supply of a suitable thermal medium, means controlling the circulation and non-circulation of the thermal medium supplied by said central thermal means through said piping to said thermal devices, air motor and fan means associated with said thermal devices respectively, each of said air motors being operated under subatmospheric pressure, the intake of said air motors respectively communicating with the air of the room served by the associated thermal device, means individual to the respective air motor—fan means for controlling the rate of operation of the same, means common to the air motors for creating subatmospheric pressure, piping interconnecting the outtakes of said air motors with said common means, thermostatic means responsive to predetermined maximum and predetermined minimum temperatures of any of said rooms, and means associated with said thermostatic means controlling the operation and non-operation of said thermal medium circulation and non-circulation means respectively simultaneously with the operation and non-operation of said subatmospheric pressure creating means, whereby during the stage of operation of the respective thermal unit—air motor—fan means in the individual rooms the air of such rooms is circulated and vitiated portions thereof are withdrawn therefrom, and concomitantly therewith fresh air supplied thereto and distributed therein.

tion and non-operation of said thermal medium circulation and non-circulation means respectively simultaneously with the operation and non-operation of said subatmospheric pressure creating means, whereby during the stage of operation of the respective thermal unit—air motor—fan means in the individual rooms the air of such rooms is circulated and vitiated portions thereof are withdrawn therefrom.

4. The combination with a plurality of rooms, of thermal devices located in such rooms, central thermal means, piping interconnecting said central thermal means with said thermal devices respectively for the supply of a suitable thermal medium, means controlling the circulation and non-circulation of the thermal medium supplied by said central thermal means through said piping to said thermal devices, air motor and fan means associated with said thermal devices respectively, each of said air motors being operated under subatmospheric pressure, the intake of said air motors respectively communicating with the air of the room served by the associated thermal device, means individual to the respective air motor—fan means for controlling the rate of operation of the same, means common to the air motors for creating subatmospheric pressure, piping interconnecting the outtakes of said air motors with said common means, means individual to the respective rooms for the supply of fresh air, whereby the supplied fresh air is distributed therein by the circulation of the air thereof by its served thermal unit—air motor—fan means, thermostatic means responsive to predetermined maximum and predetermined minimum temperatures of any of said rooms, and means associated with said thermostatic means controlling the operation and non-operation of said thermal medium circulation and non-circulation means respectively simultaneously with the operation and non-operation of said subatmospheric pressure creating means, whereby during the stage of operation of the respective thermal unit—air motor—fan means in the individual rooms the air of such rooms is circulated and vitiated portions thereof are withdrawn therefrom, and concomitantly therewith fresh air supplied thereto and distributed therein.

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