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AIR CONDITIONING SYSTEM

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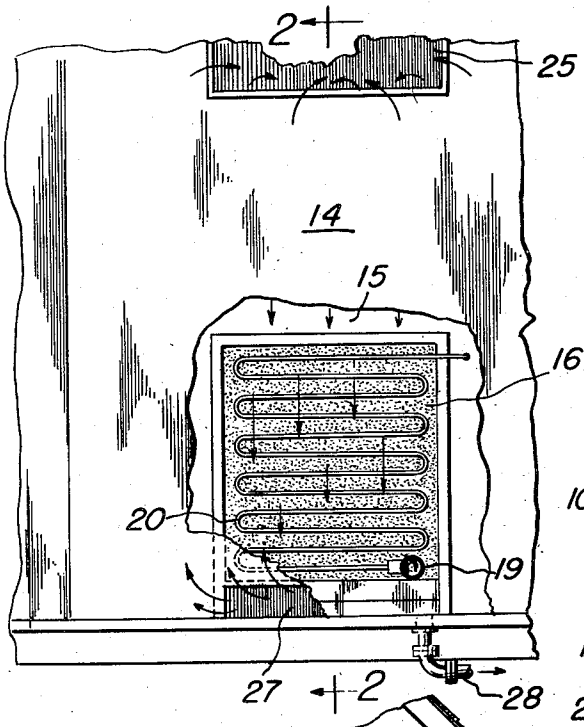


FIG. 1

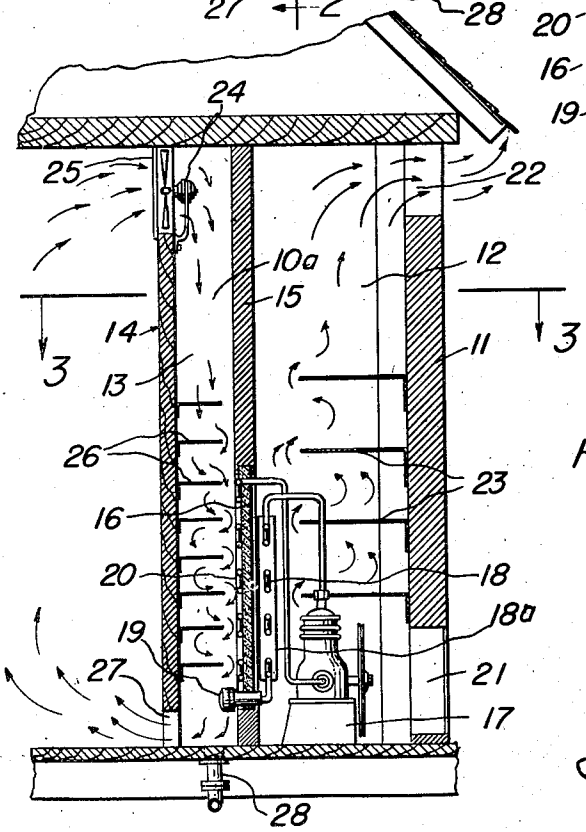


FIG. 2

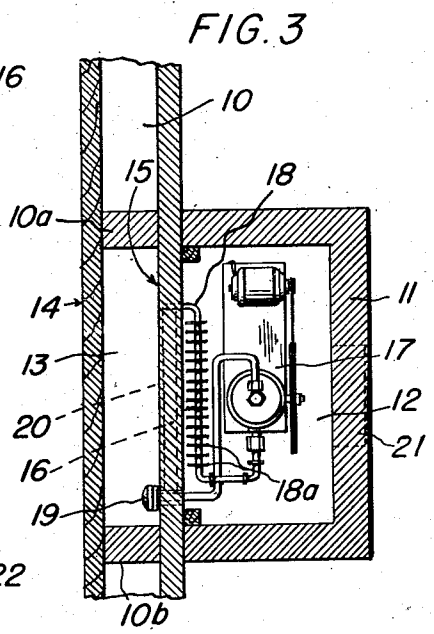


FIG. 3

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AIR CONDITIONING SYSTEM

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2 Claims. (Cl. 62—140)

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This invention relates to air conditioning systems which provide for both cooling and dehumidification of the air.

In my U. S. Letters Patent No. 2,336,456 there is disclosed dehumidifying apparatus utilizing a pervious, porous wall between a flow of air to be dehumidified and a flow of heated air, a cooling coil being disposed at that surface of the pervious, porous wall against which the air to be dehumidified impinges. Thus, the fugacity of the moisture-laden air is lowered and the latent heat of vaporization absorbed by the cooling coil. Moisture condenses upon the pervious, porous wall, is passed through the pores to the heated air stream, and is carried away thereby.

In the present system substantially the same dehumidifying principle is employed, but in combination with a refrigeration system for supplying both the cooling coil with a cooling medium and the opposite face of the pervious, porous wall with warmth. The resulting structural combination provides very effective air conditioning at minimum cost.

Accordingly, an object of the invention is to provide an effective air conditioning system which may be installed and operated at minimum costs.

Another object is to achieve both cooling and dehumidification of air by means where regeneration of the dehumidifying agency is automatic.

A further object is to utilize, in an air conditioning system, both the cooling effect and the heat produced by a refrigerating mechanism, such heat being that which is normally wasted.

Additional objects and features of the invention will be apparent from the following detailed description of the preferred specific embodiment of the system illustrated in the accompanying drawing.

In the drawing:

Fig. 1 is an inside elevation of a portion of the wall of a building with which the system of the invention is incorporated, part of the inside wall surfacing being broken out to illustrate otherwise hidden elements of the system;

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1; and

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 2.

Referring now to the drawing: As illustrated, the system is installed within an exterior wall of a building, a bay portion 11, Fig. 3, being annexed to the normal wall structure to house the

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refrigerating mechanism of the system and to provide a flow channel 12 for heated air.

A flow channel 13 for air to be conditioned is defined within the wall 10 of the building between adjacent studs 10*a* and 10*b* thereof and the interior wall facing 14. Between the flow channels 12 and 13 there is disposed a partition 15 which embodies a slab 16 of pervious, porous material. This slab 16 is advantageously the calcium hydrosilicate or calcium hydroaluminate material known by the trade-mark "Microporite," as manufactured pursuant to the disclosure of U. S. Patent No. 1,932,971 issued October 31, 1933 to Huttemann et al. entitled Method of making light weight block, or the similar specially treated dehydrating material disclosed in my U. S. Patent No. 2,005,401 issued September 9, 1941 and entitled Dehydrating material.

One face of the slab 16 is exposed to the flow channel 12, while the opposite face thereof is exposed to the flow channel 13. Thus, it might be said that the respective flow channels are arranged back-to-back with the slab 16 partitioning the two.

The refrigerating mechanism comprises the usual compressor 17 and piping 18 which carries the hot compressed refrigerant to the expansion valve 19, from which the cooling or refrigerating coil 20, here shown of serpentine formation, extends.

The piping 18 carrying the hot compressed refrigerant, as well as the compressor itself, are disposed in the flow channel 12 at the lower part thereof, the piping 18 advantageously bearing fins 18*a* for the purpose of more easily giving up the heat to exterior air which enters flow channel 12 through lower opening 21 and leaves through upper opening 22. The piping 18 is preferably located adjacent the face of the pervious, porous slab 16, and baffles 23 are preferably provided interiorly of the flow channel 12 for diverting the inflowing air against the face of slab 16. Thus, the air flowing into flow channel 12 from the outside is heated as it enters and impinges against the exterior surface of the pervious porous slab 16 in heated, moisture-receptive condition.

The serpentine refrigerating coil 20 is positioned closely against the interior face of the pervious, porous slab 16, and may even be partially embedded therein. A fan 24 serves to draw the air to be conditioned into the flow channel 13 through upper register opening 25, such air passing downwardly over the cooling coils 20 and the interior face of pervious, porous slab

16, contact with such cooling coil and slab face being facilitated by means of baffles 26. In its contact with the cooling coils and interior face of the pervious, porous slab 16, the air to be conditioned will lose moisture to the slab because of its lowered fugacity and loss of heat of vaporization, and will at the same time be cooled to a suitable conditioned temperature. Such air passes back into the space from which it came by means of the lower, exit register 27. Any drip of condensed moisture from the cooling coils 20 will be disposed of by the drain 28.

Accordingly, it is seen that both the cooling effect and the heat generated by the refrigerating device are effectively utilized for conditioning the air, which makes for great efficiency of operation.

While the refrigerating mechanism as a whole, with the exception of the cooling portions thereof, is here illustrated as disposed within the flow channel 12, it is within the province of the invention to dispose the compressor per se elsewhere, utilizing only the finned piping 18 to heat the air flowing through said flow channel 12.

Whereas this invention is here illustrated and described with respect to a preferred specific embodiment thereof it should be understood that various changes may be made therein and various other embodiments may be constructed on the basis of the teachings hereof by those skilled in the art without departing from the novel inventive concepts defined by the following claims.

I claim:

1. An air-conditioning system, comprising structure defining two air-flow channels, one for air to be conditioned and one for heated air; a moisture-pervious, porous wall dividing the two channels, one from the other; refrigerating mechanism disposed within the said channel for heated air and arranged to impart its normally waste heat to air flowing into and through said channel, the cooling coil of said refrigerating mechanism being disposed within the said air-conditioning channel, at and extending along the exposed face of said porous wall; means for circulating interior air to be conditioned through the said air conditioning channel; entrance and exit orifices for exterior air at opposite ends of the said heated air channel, and baffles provided inwardly of both flow channels to direct the air flowing therethrough against the respective opposite faces of the moisture-pervious wall.

2. An air-conditioning system, comprising structure defining two air-flow channels, one for air to be conditioned and one for heated air; a moisture-pervious, porous wall dividing the two channels, one from the other; refrigerating mechanism disposed within the said channel for heated air and arranged to impart its normally waste heat to air flowing into and through said channel, the cooling coil of said refrigerating mechanism being disposed within the said air-conditioning channel, at and extending along the exposed face of said porous wall; means for circulating interior air to be conditioned through the said air conditioning channel; and entrance and exit orifices for exterior air at opposite ends of the said heated air channel, wherein the system is built into the framework of an exterior wall of a building.

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