Dec. 24, 1940. G. E. KERSHAW 2,226,061

BUILDING CONSTRUCTION

Filed Dec. 4, 1939 2 Sheets-Sheet 1

Fig. 1.

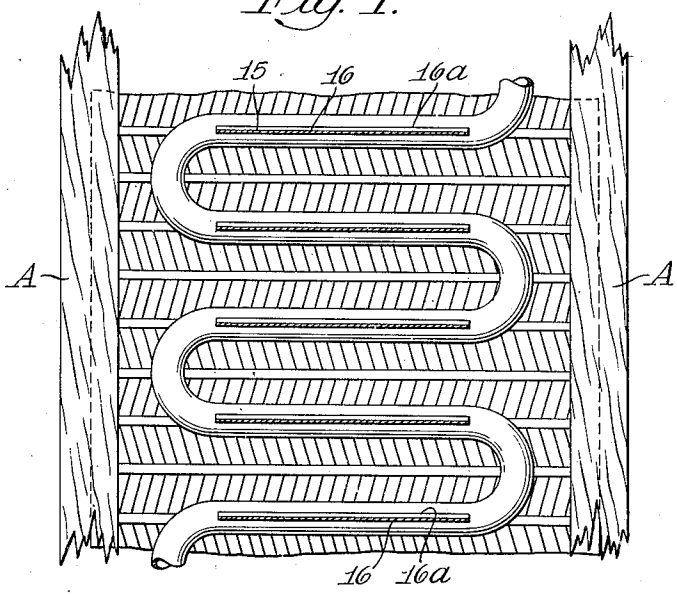


Fig. 4.

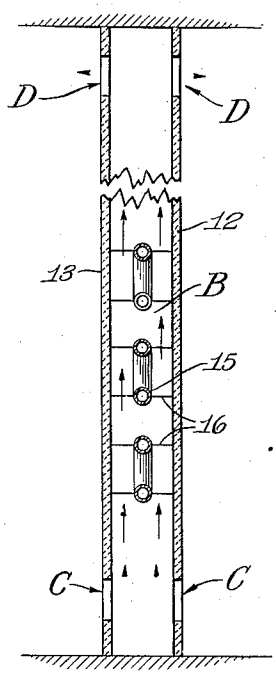


Fig. 2.

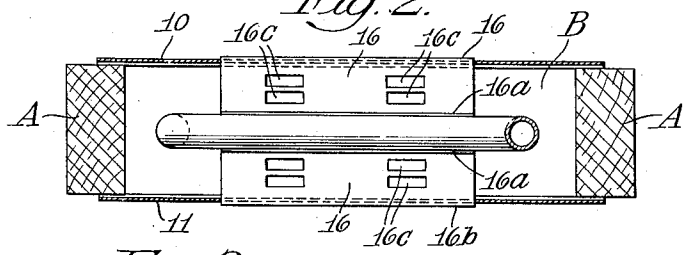


Fig. 3.

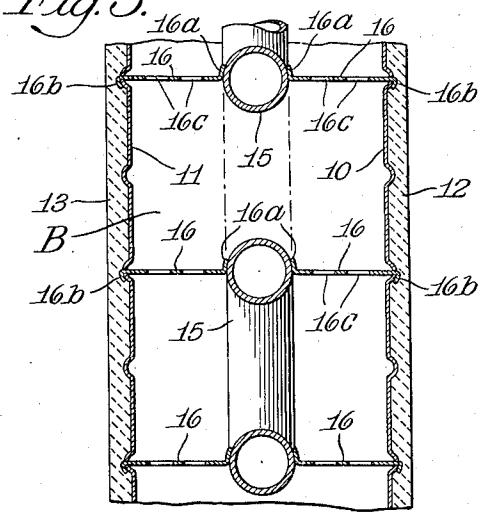
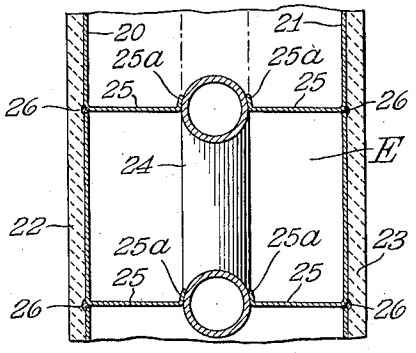


Fig. 5.



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Fig. 6.

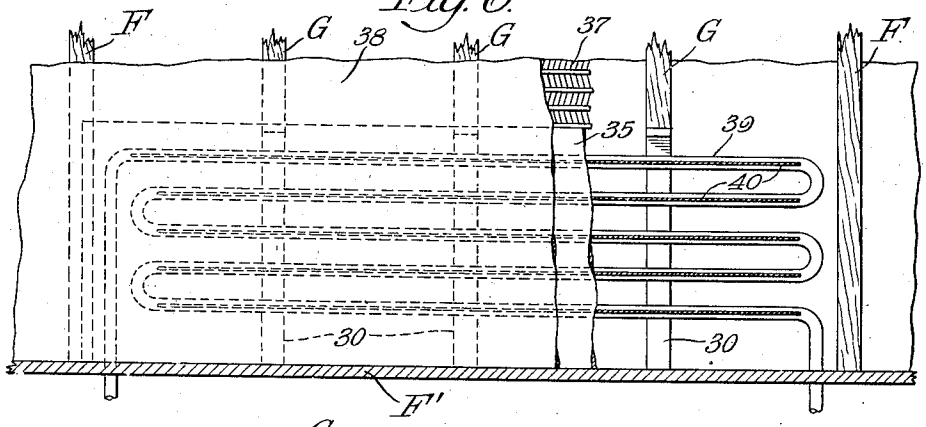


Fig. 7.

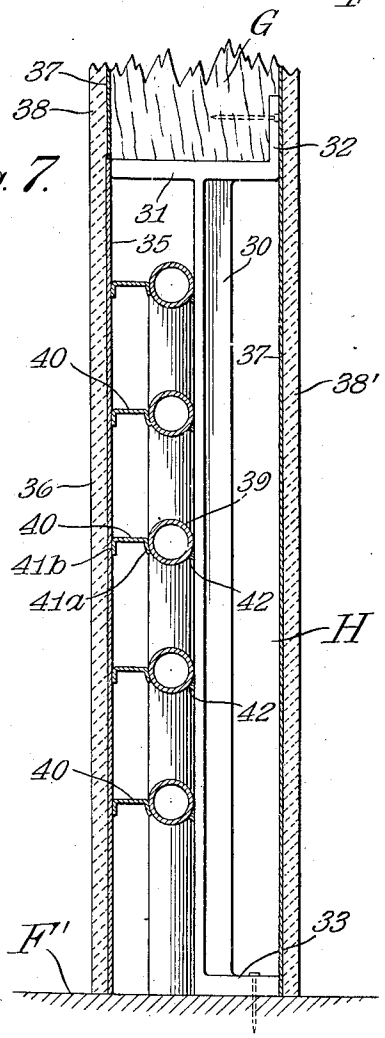
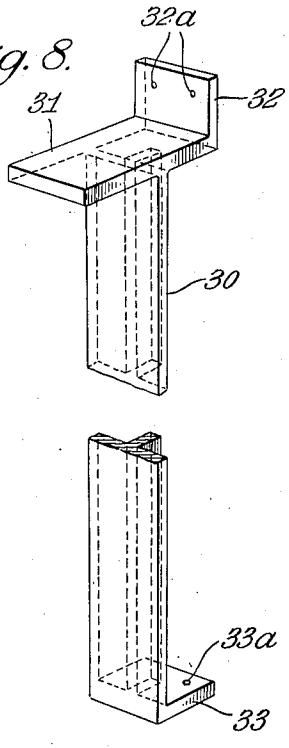


Fig. 8.



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UNITED STATES PATENT OFFICE

2,226,061

BUILDING CONSTRUCTION

George E. Kershaw, New York, N. Y.

Application December 4, 1939, Serial No. 307,534

5 Claims. (Cl. 237—1)

This invention relates to improvements in building construction and especially is concerned with a new and improved type of building construction wherein means are provided for heating or, upon occasion, cooling rooms within the building.

The ordinary means of heating and cooling rooms within a building comprises unsightly heat exchangers commonly called radiators wherein fluid of a preselected thermal content is circulated. This means is unsatisfactory, however, since the appearance of a room is seriously and deleteriously effected by the presence of ugly, clumsy and bulky radiators. Moreover radiators being substantially nonportable hinder use of portions of wall and floor space which otherwise could be utilized to advantage.

It is an object of the present invention to provide a novel heat exchange unit which can be incorporated within partitions of a building for the purpose of heating or cooling the rooms thereto adjoining.

Another object of this invention is to provide a novel type of partition construction whereby the provision of a void within a partition is facilitated in which a heat exchange unit can be mounted.

Among the important advantages of the novel building construction according to the present invention are the simplicity and ruggedness of construction of the preferred embodiment of the invention which permit manufacture under conditions of mass production and which minimize necessity for and cost of repair.

A feature of the novel partition construction according to this invention is that the mounting for the heat exchanger is intrinsically flexible to a degree such that expansion and contraction of parts of the heat exchanger do not impair the strength of the partition nor otherwise deleteriously affect neighboring portions of the structure.

Other objects, advantages and features of the new and improved building construction according to the present invention will be apparent to those skilled in this art during the course of the following description.

Regarded in certain of its broader aspects, the novel building construction according to this invention comprises a partition having a void therein across which extends a foraminous thermoconductive sheet behind which is located, within the void, a sinuosity of tubing wherein fluid of preselected heat content can be circulated.

In order to facilitate a fuller and more complete understanding of the present invention a specific embodiment thereof herein illustrated will be hereinafter described, it being clearly understood, however, that the illustrated embodiment, although presently preferred, is provided solely by way of example of the practice of this invention and not by way of limitation thereof except insofar as the invention is recited in the subjoined claims.

Referring then to the drawings,

Figure 1 is substantially a front elevational view of a portion of a partition embodying features of the present invention, one of the sides of the partition being broken away for clearness of illustration,

Fig. 2 is a horizontal sectional view of Fig. 1 illustrating details of mounting of the sinuosity,

Fig. 3 is a vertical sectional view of a portion of the structure shown in Fig. 1 illustrating details of the construction,

Fig. 4 is substantially a vertical sectional view of a partition constructed in accordance with the teachings of this invention,

Fig. 5 is a view similar to Fig. 3 of another embodiment of the present invention showing same in vertical sectional view to expose internal construction,

Fig. 6 is substantially a front elevational view of another embodiment of this invention with parts being broken away for clearness of illustration,

Fig. 7 is essentially a vertical sectional view of a portion of the structure illustrated in Fig. 6, and

Fig. 8 is a perspective view partially broken away of one of the supporting studs.

Referring now particularly to Figs. 1 to 4 inclusive wherein the first illustrated and presently preferred embodiment of this invention is illustrated, it will be noted that upright studs A extend in spaced parallelism and carry attached to the sides thereof foraminous sheets 10 and 11 which are coated on their outer surfaces by essentially continuous layers 12 and 13 respectively of surfacing material such as plaster and the like. It is of course to be understood that the foraminous sheets are disposed in essential parallelism with respect to each other and define therebetween an enclosed void B. The coatings 12 and 13 adhere to the foraminous sheets by reason of application of the coatings in unset form to the sheets whereby portions of the coating composition key themselves to the interstices of the subjacent sheets.

A sinuosity 15 extending substantially in a single plane is disposed within the void defined by the studs A and the spaced foraminous sheets 10 and 11, being spaced with respect to each and being supported by means hereinafter to be de-

scribed. The sinuosity is formed of tubing wherein fluid of a preselected heat content can be circulated and in the presently preferred embodiment of this invention is formed with copper tubing which is both easy to fabricate into the desired shapes and also possesses high heat transfer coefficient although other tubing such as ordinary iron piping may be substituted if conditions warrant.

Fins 16 extending essentially perpendicularly with respect to the sinuosity 15 and united thereto by welding along upturned edge portions 16a are bent at the opposite edge portions 16b to engage with openings in the foraminous sheets 10 and 11 substantially as shown in Figs. 2 and 3. It is preferred that the edge portions 16b of the fins 16 be spot welded or otherwise firmly attached to the foraminous sheets 10 and 11 and that the fins be formed of thermo-conductive material whereby heat can be conducted through the fins to and from the sinuosity 15. The fins 16, in the preferred embodiment of this invention, are easily bent, being weakened by openings 16c formed therein, whereby expansion and contraction of the sinuosity due to variations in the thermal content will be substantially without effect upon the partitions 10 and 11.

Referring now especially to Fig. 4 it will be seen that, in the therein illustrated partition embodying features of the present invention, openings C are provided at the bottoms of the sides of the partition and openings D are provided in the tops of the partition sides whereby air can circulate freely through the openings C upwardly through the void B and outwardly through the openings D. It will be evident of course that the coils 15 within the void B will serve either to heat or to abstract heat from air circulating through the void. It also will be apparent from the foregoing that heat will be conducted by the fins from or to, as the case may be, the foraminous sheets 10 and 11 which, in the preferred embodiment of the invention, are formed of thermo-conductive material whereby the surfaces 12 and 13 of the partition acquires a thermal content depending upon the thermal content of the sinuosity 15. In this manner the rooms adjoining the partition are heated by convection, conduction and radiation assuring maximum utilization of the thermal content of fluid circulated within the sinuosity.

The embodiment of the present invention illustrated in Fig. 5 differs from the first described embodiment of the present invention in the means whereby the supporting fins attached to the sinuosity are connected to the foraminous sides of the partition. It will be seen that in this embodiment of the present invention foraminous sheets 20 and 21 extending in essentially parallel relationship are provided on their outer surfaces with coatings 22 and 23 respectively and that a sinuosity 24 positioned in the void E between the foraminous sheets is supported by fins 25, formed by punching out parts of the sheets, spot welded or otherwise attached at end portions 25a thereof to the sinuosity, the opposite ends of the punched out parts being attached by welding, soldering or other means to knuckles formed in adjoining parts of the foraminous sheets as indicated by the reference character 26.

Referring now especially to Figs. 6 to 8 inclusive wherein the so-called panel type of unit is illustrated, it will be seen that uprights extending from the floor F' upwardly are disposed in essentially spaced parallelism with respect to each other and that between the uprights F other uprights G are provided resting upon studs 30. The studs 30, one of which is illustrated in Fig. 8, each comprise an upright portion T-shaped in cross-sectional outline having a bracket top 31 provided with upturned end 32 and fastening holes 32a. The lower end of the stud is bent to provide a base portion 33 which also is provided with fastening holes 33a.

In this embodiment of the present invention foraminous thermally conductive sheets 37 and 37' are attached to the studs or uprights F and G hereinabove described to define therebetween a void H. A panel of thermally conductive material 35 causes the void near the base of the partition substantially as shown and both sides of the partition are coated with surfacing material 36, 38 and 38' whereby a finished appearance is provided. A sinuosity 39 positioned between the studs 30 and the panel 35 is supported by fins 40 which are welded or otherwise attached to the sinuosity and to the plate at 41a and 41b respectively whereby a firm but flexible support is provided adapted to permit expansion and contraction of the sinuosity resulting from variation in the thermal content thereof. Soldering, welding or other appropriate means of connection 42 serves to hold the sinuosity against the upright studs 30, it of course being noted that the expansion of the sinuosity will in turn be reflected in expansion of the stud and similarly with contraction of the sinuosity whereby impairment of the union between studs and sinuosity will not be caused by thermal expansion and contraction. In this embodiment of the present invention the plate 35 functions substantially as a source of radiant energy serving further to facilitate heating of adjoining rooms in addition to the heating provided by convection and conduction from the heat exchanger as hereinabove described.

It is to be understood that this invention is capable of extended application and is not confined to the precise illustrated forms nor described construction and, therefore, such changes and modifications may be made therein, for instance the use of the units in floors instead of upright partitions, as do not affect the spirit of the invention nor exceed the scope of the appended claims.

Having thus described the present invention, what it is desired to secure by Letters Patent is:

1. In a building, a partition having a void therein, a foraminous thermo-conductive sheet across the void; a sinuosity of tubing wherein fluid of preselected heat content can be circulated; and thermo-conducting means for supporting the sinuosity within the void in a manner permitting expansion and contraction comprising easily bending fins connecting the sinuosity and the sheet.

2. In a building, a partition comprising spaced essentially parallel foraminous sheets of thermo-conductive material defining a void therebetween, a sinuosity of tubing between the sheets for the circulation of a thermo fluid, and flexible thermo-conducting fins connected to the tubing and the sheets of thermo-conductive material.

3. In a building, a partition comprising spaced essentially parallel foraminous sheets of thermo-conductive material defining a void therebetween, a wall surfacing material on the outer face of said sheets, a sinuosity of tubing between the sheets for the circulation of a thermo fluid, and flexible thermo-conducting fins connected to the tubing and the sheets of thermo-conductive material.

4. In a building, a partition comprising spaced

essentially parallel foraminous sheets of thermo-conductive material defining a void therebetween, a sinuosity of tubes within the void and spaced from the sheets for the circulation of the thermo fluid, and flexible thermo-conducting fins connected to opposite sides of the tubing and having their outer ends connected to the sheets of the thermo-conductive material.

5. In a building, a partition comprising spaced essentially parallel foraminous sheets of thermo-conductive material defining a void therebetween, a wall surfacing material on the outer face of said sheets, a sinuosity of tubing between the sheets and spaced therefrom for the circulation of a thermo fluid, and flexible thermo-conducting fins welded to the outer faces of the tubing and extending outwardly with their free ends entering openings in the thermo-conducting sheets.

GEORGE E. KERSHAW.