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BUILDING CONSTRUCTION

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This invention relates to building constructions, and particularly to constructions which will have high flame resistance and heat insulating properties.

One object of this invention is to provide an improved and inexpensive wall board construction of any type, having relatively high heat insulating properties through increased heat reflection of the wall board.

It is also important to increase the flame resistance of wall board in order to gain the approval of fire underwriters in many cities, and another object of this invention is to provide an improved wall board which will have a relatively high flame resistance, without a material lessening of the heat insulating properties of the board, and which will be relatively simple and inexpensive.

A further object of the invention is to provide an improved wall board which will have relatively high heat insulation and resistance to flame.

Another object of the invention is to provide an improved wall construction, which will have relatively good heat insulating properties and flame resistance, and which will be relatively simple and inexpensive.

Various other objects and advantages will be apparent from the following description of several embodiments of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawing:

Fig. 1 is a sectional plan through a side wall of a building constructed in accordance with this invention;

Fig. 2 is an edge elevation of a portion of a sheet of one type of wall board constructed in accordance with this invention;

Fig. 3 is an edge elevation of a portion of a sheet of another type of wall board also constructed in accordance with this invention and illustrating still another embodiment thereof;

Fig. 4 is an edge elevation of a portion of a sheet of still another type of wall board also constructed in accordance with the invention.

Referring now particularly to Fig. 1 of the drawing, the illustrated example of a wall constructed in accordance with this invention includes a frame formed of a plurality of studs or elements 10, having spaces between the same. Any suitable siding 11 may be applied to the studs or elements 10 to provide the outside face of the wall, and the inner face of the wall is provided by applying to the studs or elements 10, sheets 12 of wall board constructed in a manner which will be explained presently in accordance with this invention. The sheets 12 of the improved wall board extend between studs 10 and slightly overrun the faces of the studs, with adjacent edges of the sheets of wall board approximately abutting one another edge to edge along the faces of the studs 10.

The sheets of wall board are secured to the studs 10 in any suitable manner such as by nails, and the cracks between the abutting or adjacent edges of the sheets 12 are concealed by suitable panel strips 13 which are attached to the studs 10 so as to run along and overlap with the abutting edge portions of the sheets 12. This not only conceals the edges of the sheets 12, but also aids in confining the sheets to the studs. The panel strips 13 may be secured to the studs in any suitable manner such as by nails or screws 14, which pass through the strips into the studs. The sheets 12 of wall board may be of any of the usual types of wall board prepared or treated in accordance with this invention in a manner which will now be explained.

Referring to Fig. 2 of the drawing, the sheet 12 of wall board there shown includes a plate-like body 15 of open pore fibrous insulating wall board. To one face of such a body 15 of wall board I apply a layer 16 of good heat reflecting material such as thin metal foil, for example, aluminum foil, or aluminum paint, and the opposite face of the body 15 is treated in a manner to increase its flame resistance, by impregnating or coating it with a material 17 which is flame resistant. Among the materials which may be used for increasing the flame resistance may be mentioned ammonium phosphate, particularly the mono-ammonium phosphate, silicate of soda, chlorinated diphenyl resin, ammonium chloride, and other similar substances.

The resistance to fire or flame may also be increased by mixing with the silicate of soda, the chlorinated diphenyl resin, or any other flame resisting coating which acts as a binder, a quantity of micaceous material such as ground mica or other similar, finely divided mineral material, the mica being particularly useful for this purpose. Examples of other finely divided, flame resisting minerals which may be used, are asbestos tailings, serpentine tailings, amphibole, vermiculite, andalusite, sillimanite, and actinolite. If the coating material is of the binder type, the mineral particles may be applied either by mixing with the binder and then applying the mixture to the board as a coating, or the binder may be first applied to the wall board and then the mineral

particles blown or forced against the freshly applied or unhardened binder.

While the panel strips 13 protect the edges of the sheets 12 from flames, the flame resistance may be somewhat increased by also treating the edges of the sheets with one of these fire proofing or fire resisting agents, as at 12a. When wall board of the type shown in Fig. 2, is applied to the studs 10, as shown in Fig. 1, the face with the metal foil or coating 16 should be on the inside, so as to face the outside siding 11, thus placing the flame resisting surface 17 on the room side.

Referring now to Fig. 3, the improved sheet 12 of wall board is of the type employing a filler 18 of either gypsum or laminated pulp board such as newsprint pulp, and having paper liners 19 and 20 cemented to opposite faces thereof. A heat reflecting finish or layer 21, similar to the finish 16, may be applied over one of the liners such as the liner 19. The other liner 20 may be treated in any suitable manner to increase its flame resistance or it may have incorporated therein a quantity of mineral fibers such as of rock wool or asbestos, such fibers being preferably included with the paper fibers in the beaters at the time the paper liners are formed, or asbestos paper may be used as the liner and secured to the filler 18 by a suitable adhesive.

Referring next to Fig. 4, the sheet of wall board there illustrated includes a body 22 of any standard wall board construction having applied to both faces thereof a coating 23 of silicate of soda or chlorinated diphenyl, this coating having incorporated therein ground mica or micaceous material or other finely divided mineral material which is flame resisting. The ground mica is relatively inexpensive, and is very satisfactory for this purpose because it readily reflects heat, increases the toughness and electrical resistance of the film, and is easily mixed with the silicate of soda or diphenyl. The mica will not cause crystallization of the silicate of soda when mixed therewith, which is an important consideration. In place of the ground mica I may advantageously employ exfoliated vermiculite which has been ground to the desired degree of fineness.

The mica or exfoliated vermiculite which is mixed with the silicate of soda, is preferably of at least 200 mesh fineness and, by way of example, I have found it advantageous to combine twenty parts, by weight, of the mica or vermiculite with eighty parts of the silicate of soda of 42° Baumé. This mixture produces a translucent, intensely hard, fire-resisting film. As much as 30% to 40% by weight of ground mica or vermiculite may also be employed, and while that percentage of the mica makes the mixture thick enough to apply with a putty knife, it can be reduced with water sufficiently to be applied by roller coating or any other means. The mica remains in suspension and does not settle out materially when used in various dilutions or proportions.

I have found that a hardened surface of silicate of soda, alone or with mica or vermiculite, can be polished, and when so polished it becomes a good reflector of radiant heat, and hence such a coating of silicate of soda and mica, particularly when polished, may be used in place of the aluminum foil or aluminum paint as a heat insulation in any of the examples illustrated.

In Fig. 4 one of the coated faces of the sheet of wall board is polished to give it good heat reflecting properties, and that polished face is disposed on the inside of the wall construction in the same position that the face coated with aluminum foil is placed when the board is attached to the studs.

The strips 13 which cover the cracks between abutting edges of the sheets, may be of any fire resisting or fire proof material. They may be formed of sheet metal, such as of shallow channel shape, which, with the open face of the channel facing the board, is very satisfactory for this purpose, or the strips may be made of pressed asbestos board, of pressed strips of a synthetic resin, such as of phenol-aldehyde condensation products, or of synthetic board which contains a high percentage of fire proof filler, such as asbestos, mica, vermiculite, or amphibole, bound together with a synthetic resin. I may also employ fibrous strips such as of wood or wall board which have been impregnated or coated with a fire resisting material in the same manner that a face of the wall board has been treated with a flame resisting material.

It will be understood that various changes in the details, materials and proportions of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention, as expressed in the appended claims.

I claim as my invention:

1. In a flame resisting building construction, a wall board having on a surface thereof a coating of a mixture of silicate of soda and ground mica.

2. A flame resisting building construction comprising a sheet of wall board carrying a surface coating of silicate of soda having intermixed therewith approximately 20% by weight, of a micaceous substance having a fineness of at least approximately 200 mesh.

3. A flame resisting building construction comprising a sheet of fibrous wall board having on one face thereof a coating with a good heat reflecting finish and on the opposite face thereof an applied coating providing a flame resisting finish and containing ground mica.

4. In a flame resisting building construction, a sheet of fibrous wall board having upon one face thereof a layer of metal foil and upon its opposite face a coating providing a flame resisting surface and containing a finely divided, non-metallic material.

5. In a flame resisting building construction, a sheet of wall board having a coating providing a good heat reflecting surface upon one face thereof, and a flame resisting surface layer of silicate of soda and a non-metallic mineral in finely divided form upon the other face thereof.

6. A flame resisting building construction comprising a frame, wall board secured against said frame and having upon its face facing the frame a good heat reflecting surface and upon its other face a flame resisting surface layer containing a non-metallic mineral in finely divided form.

7. A flame resisting building construction comprising a skeleton frame formed of connected frame elements, a plurality of sheets of wall board secured to one face of said frame, with the sheets approximately abutting edge to edge against a common face of a frame element, and fire resisting strips secured to said frame elements and overlapping the abutting edges of said board to confine the sheets to said frame elements, the inner face of each sheet of board having a good heat reflecting layer and having upon its outer face a good flame resisting surface layer.

8. A flame resisting building construction comprising a skeleton frame formed of connected frame elements, a plurality of sheets of wall board secured to one face of said frame, with the sheets approximately abutting edge to edge against a common face of a frame element, the inner face of each sheet of all board having a coating of a bright, heat reflecting metal, and its outer face having a good flame resisting layer containing a non-metallic mineral in finely divided form, and flame resisting strips overlapping adjacent edges of said sheets and secured to said frame elements for confining the sheets to the frame elements and for covering and protecting the edges of said sheets.

9. A flame resisting building construction comprising a skeleton frame formed of connected frame elements, a plurality of sheets of wall board secured to one face of said frame, with the sheets approximately abutting edge to edge against a common face of a frame element, each sheet of wall board having upon its inner face a bright heat reflecting surface, and having upon its outer face a good flame resisting surface layer containing a finely divided mineral, and panelling strips secured to said frame elements and overlapping the outer faces of the abutting edges of said wall board, for confining the sheets to said frame elements, said strips having their exposed faces of fire resisting material.

10. A building construction comprising a sheet of wall board having upon a face thereof a hardened layer of a non-metallic coating material and polished upon the exposed face thereof.

11. In a building construction, a sheet of wall board having upon one face thereof a hardened, non-metallic, flame resisting coating having good heat reflecting properties and upon its other face having a flame resisting surface layer.

12. A building construction comprising a frame including spaced frame elements, wall board secured against said frame and bridging the space between said elements, and means for securing said wall board to said elements, said board having upon its inner face a non-metallic, hardened coating with good heat reflecting properties.

13. A building construction comprising a frame including spaced frame elements, wall board secured against said frame and bridging the space between said elements, and means for securing said wall board to said elements, said board having upon its inner face a non-metallic, hardened coating with good heat reflecting properties, and having upon its outer face a flame resisting surface.

14. A building construction comprising a frame including spaced frame elements, wall board secured against said frame and bridging the space between said elements, and means for securing said wall board to said elements, the inner face of said board having a hardened, non-metallic, mineral, flame resisting coating, polished to increase its heat reflection.

15. A building construction comprising a frame including spaced frame elements, wall board secured against said frame and bridging the space between said elements, and means for securing said wall board to said elements, the inner face of said board having a hardened, non-metallic, mineral, flame resisting liquid coating material, said coating being polished to increase the heat reflection of the layer, the outer surface of said board having a flame resistant surface.

16. In a flame resisting building construction, a sheet of wall board having upon one face thereof a coating of a metal foil, and upon its opposite face a coating of a mixture of silicate of soda and ground mica.

17. In a flame resisting building construction, a sheet of wall board having upon one face thereof a coating of a good heat reflecting finish and upon its opposite face a coating of silicate of soda in which a quantity of ground mica has been incorporated.

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