March 25, 1952 H. H. CRAFTON 2,590,687

BUILDING STRUCTURE

Filed June 23, 1948 2 SHEETS—SHEET 1

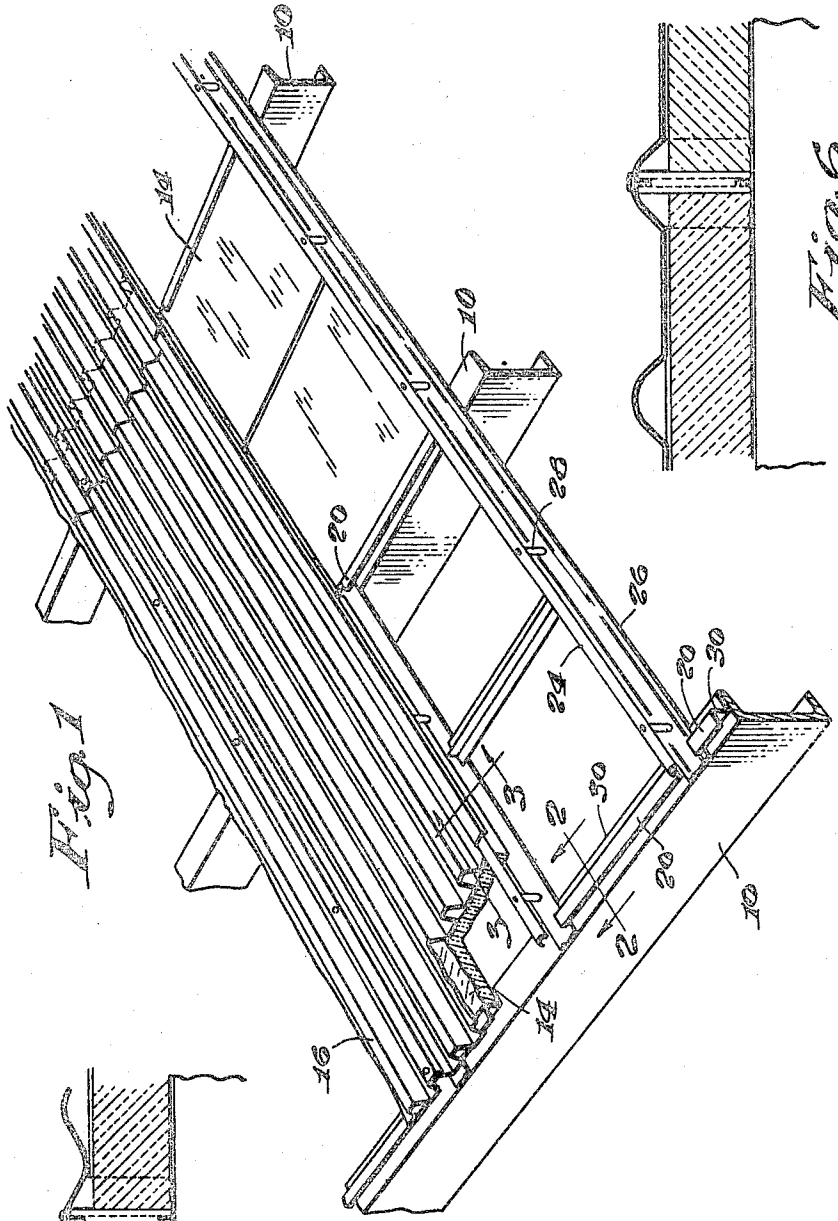



Fig. 1



Fig. 6

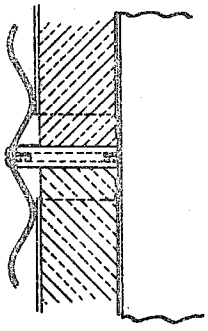


Fig. 5

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BUILDING STRUCTURE

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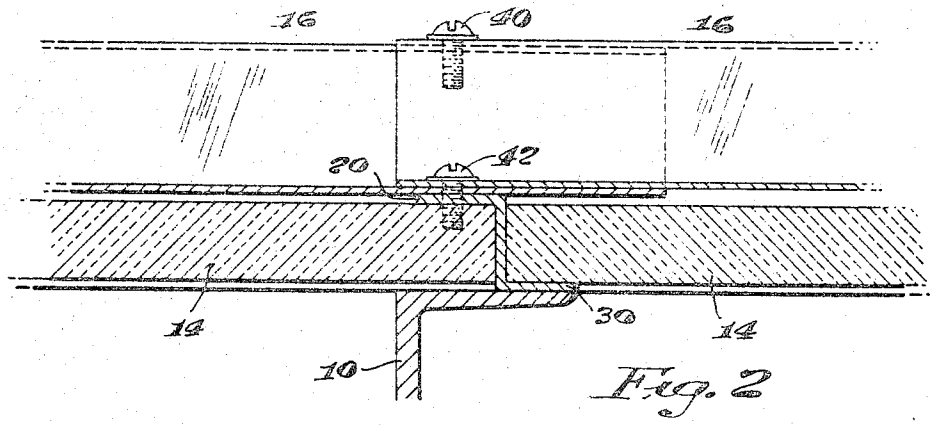



Fig. 2

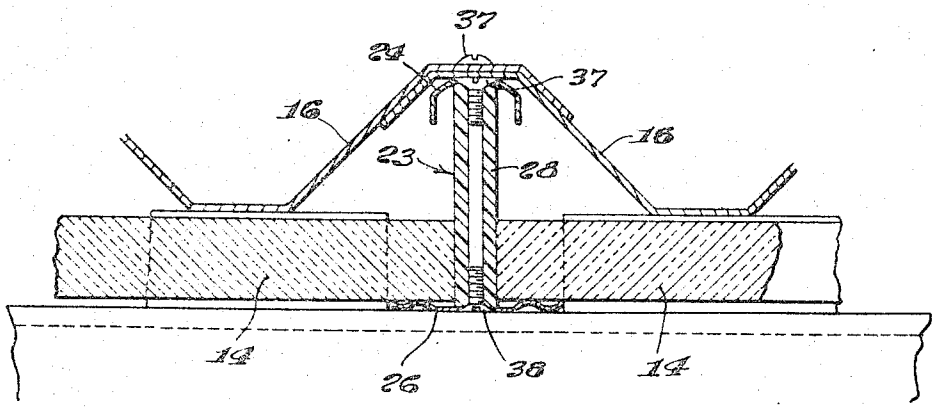



Fig. 3

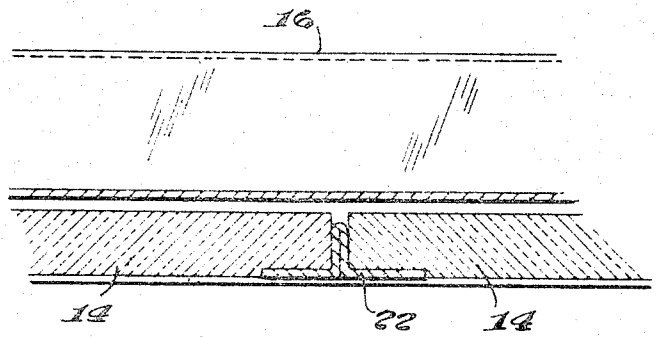



Fig. 4

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2,590,687

# UNITED STATES PATENT OFFICE

2,590,687

## BUILDING STRUCTURE

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Application June 23, 1948, Serial No. 34,669

5 Claims. (Cl. 189—34)

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This invention relates to a building structure and more particularly to a roofing and siding structure.

The object of the invention is to provide a novel and improved roofing and siding structure which affords highly efficient insulation against heat and cold and which may be economically manufactured and erected with more facility and at less expense than prior comparable structures of which I am aware.

With this general object in view, and such others as may hereinafter appear, the invention consists in the building structure and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a perspective illustrating a portion of a roof structure embodying the invention; Fig. 2 is a detail taken on the line 2—2 of Fig. 1; Fig. 3 is a cross-sectional detail taken on the line 3—3 of Fig. 1; Fig. 4 is a detail of the intermediate support; and Figs. 5 and 6 are sectional details illustrating corrugated and Mansard types of corrugated sheets forming a part of modified forms of the building structure, as will be described.

In general, the present invention contemplates a building structure embodying corrugated sheet members and underlying preformed insulating sheets, both being operatively supported in a metal framework of special design which enables the erection of both the insulating members and the overlying and spaced corrugated members from the top or the exterior of the roof or siding of the building to the end that necessity for scaffolding and the like may be avoided during the erection of the structure. The resulting insulated construction provides a speedily erected, dry, and light-weight insulated structure which is not affected by freezing weather, and when erected the interior insulating panels provide a neat appearing interior which can be easily painted by spraying or otherwise with any desired color. The air space between the insulating panels and the exterior corrugated sheets enhances the insulating effect and further provides ventilation between these parts.

Referring now to the drawings, the invention has been illustrated in Fig. 1 as embodied in a roofing structure wherein 10 represents the purlins upon which the present improved insulated assembly is erected. The present assembly comprises a special metal framework erected upon the purlins in such a manner as to accommodate

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and support preformed insulating panels 14 and superposed corrugated roofing or siding members 16 so as to transmit the roof or siding load through the framework independently of the insulating panels to the purlins or other metal framework upon which the special supporting framework is erected.

In the preferred embodiment of the invention the corrugated roofing or siding members 16 may comprise any of the load supporting preformed roofing or siding members now upon the market such as corrugated sheet metal, corrugated asbestos-cement sheets, and corrugated protected metal sheets such as are illustrated in the patent to Robertson No. 1,277,755. These commercial roofing or siding sheets 16 are of sufficient length to span one or two purlins and usually are made in standard widths, and accordingly a special supporting framework is first erected upon the purlins, or upon the supporting framework forming the sides of the building, comprising Z-shaped metal bars 20 of a width slightly less than the width of the roofing or siding sheets 16 employed and which are welded or otherwise secured upon the upper flange of the roof purlins or upon the corresponding elements in the side wall frame of the building. In some instances, particularly where the purlin spacing is long, it may be desirable to provide an intermediate support at a point between the adjacent purlins such as an inverted T-shaped metal member 22. The sides of the special framework are formed by specially designed supporting members 23 comprising an upper member 24 and a lower member 26 separated by fiber or other insulating spaced members 28 so as to enable the insulating panels 14 to be dropped into place to be supported at their ends upon the lower flanges 30 of the Z-bars 20 and upon one of the flanges of the intermediate inverted T-shaped support 22 if such be provided. In those instances where the purlin spacing permits, the ends of the insulating panels 14 may be supported at one end on a lower flange 30 of a Z-bar 20 and at their second ends upon the upper flanges of the purlins themselves. The sides of the insulating panels are supported upon the lower members 26 of adjacent supporting members 23 as shown. The preformed weatherproofing roofing or siding members herein shown as comprising corrugated metal members 16 are supported at their sides upon the upper member 24 of the supporting members 23 of the framework. The marginal corrugations of the corrugated roofing or siding members are lapped over upon one another, both being supported

upon the upper member 24 of the supporting members 23 of the framework. The spacing between the upper and lower members 24, 26 is such as to provide an air space between the under surface of the corrugated roofing or siding members and the insulation. The end laps of the corrugated members are preferably made so as to be disposed over the purlins or equivalent cross members of the framework of the side of the building.

As shown in Fig. 3, the insulating members 28 may comprise insulating tubes such as hard fiber tubes, and the upper and lower supporting members 24, 26 may be secured thereto by screws 37, 38 as shown. The corrugated roofing or siding members in their overlapping relation may be fastened together by the usual screws 40 along the side laps thereof. The overlapping ends of the sheets may be secured by additional screws 42 screwed into the upper flange of the Z-bars 20.

It will be observed that the above described construction provides complete insulation against the transmission of heat or cold by conduction so that the formation of condensation upon the under-surfaces of the supports 26 is reduced to a minimum. In addition, the described construction provides a dry lightweight insulated roofing or siding structure, which may be erected without scaffolding and in a speedy and economical manner in which preformed insulating sheets of commercially available materials, such as glass or metal wool insulation may be used thus providing an incombustible structure. After the roofing or siding has been erected the insulation provides a neat appearing interior surface which can be easily spray painted with any color desired, and the character of the insulation may be such as to provide the structure with acoustical properties.

Another feature of the present invention is that the air space between the insulating sheets and the corrugations of the roofing or siding material provides ventilation, reducing to a minimum any condensation and contributing to the life of the structure. The entire structure may be erected from the exterior of the building, and this feature contributes to the economy with which the structure may be erected.

While the preferred embodiment of the invention has been herein illustrated and described it will be understood that the invention may be embodied in other forms within the scope of the following claims.

I claim:

1. In a building structure, a plurality of load supporting members disposed in parallel and spaced relation, a plurality of preformed corrugated weather-proofing sheets disposed in side and end overlapping relation, a plurality of preformed insulation sheets disposed beneath the corrugated sheets and forming in effect a substantially continuous insulating layer spaced from said sheets, and a supporting framework mounted upon said spaced load supporting members provided with portions supporting said corrugated sheets transmitting any load applied to said corrugated sheets directly to said load supporting members independently of said preformed insulating sheets, said framework comprising a plurality of Z-shaped bars mounted upon and extending lengthwise of said load supporting members and supporting the ends of the insulating sheets on the lower flanges thereof, and a plurality of side supporting members mounted upon and extending in spaced relation at right angles to said load supporting members supporting the sides of the insulating sheets.



2. In a building structure, a plurality of load supporting members disposed in parallel and spaced relation, a plurality of preformed corrugated weather-proofing sheets disposed in side and end overlapping relation, a plurality of preformed insulating sheets disposed beneath the corrugated sheets and forming in effect a substantially continuous insulated layer below said sheets and a supporting framework supporting both said corrugated weather-proofing sheets and said insulating sheets, said framework comprising Z-shaped bars mounted upon and extending lengthwise of the load supporting members supporting ends of the insulating sheets on the lower flanges thereof, side supporting members mounted upon and extending in spaced relation at right angles to said load supporting members and upon which the sides of the insulating sheets are supported, said framework having additional members disposed above and thermally insulated from said side supporting members and upon which the corrugated sheets are supported.

3. In a building structure, a plurality of load supporting members disposed in parallel and spaced relation, a plurality of preformed corrugated weather-proofing sheets disposed in side and end overlapping relation, a plurality of preformed insulating sheets disposed beneath the corrugated sheets and forming in effect a substantially continuous insulated layer below said sheets and a supporting framework supporting both said corrugated weatherproofing sheets and said insulating sheets, said framework comprising Z-shaped bars mounted upon and extending lengthwise of the load supporting members supporting ends of the insulating sheets on the lower flanges thereof, side supporting members mounted upon and extending in spaced relation at right angles to said load supporting members and upon which the sides of the insulating sheets are supported, said framework having curved upper members shaped to fit the corrugation of said weather-proofing sheets and a plurality of spaced supporting members disposed between the upper and lower members of the framework directly transmitting any load applied to the outer surface of the corrugated sheets to said lower members and thence to said load supporting members.

4. In a building structure, a plurality of load supporting members disposed in parallel and spaced relation, a plurality of preformed corrugated weatherproofing sheets disposed in side and end overlapping relation, a plurality of preformed insulating sheets disposed beneath the corrugated sheets and forming in effect a substantially continuous insulated layer below said sheets and a supporting framework supporting both said corrugated weatherproofing sheets and said insulating sheets, said framework comprising Z-shaped bars mounted upon and extending lengthwise of the load supporting members supporting ends of the insulating sheets on the lower flanges thereof, side supporting members mounted upon and extending in spaced relation at right angles to said load supporting members and upon which the sides of the insulating sheets are supported, said framework having curved upper members shaped to fit the corrugation of said weatherproofing sheets and a plurality of spaced supporting members disposed between the upper and lower members of the framework directly transmitting any load from the corrugated sheets to said lower members and thence to said load

supporting members, and means accessible from the exterior of the building for securing said corrugated sheets to said framework.

5. In a building structure, a plurality of load supporting members disposed in parallel and spaced relation, a plurality of preformed corrugated weatherproofing sheets disposed in side and end overlapping relation, a plurality of preformed insulating sheets disposed beneath the corrugated sheets and forming in effect a substantially continuous insulated layer below said sheets and a supporting framework supporting both said corrugated weatherproofing sheets and said insulating sheets, said framework comprising Z-shaped bars mounted upon and extending lengthwise of the load supporting members supporting ends of the insulating sheets on the lower flanges thereof, side supporting members mounted upon and extending in spaced relation at right angles to said load supporting members and upon which the sides of the insulating sheets are supported, said framework having curved upper members shaped to fit the corrugation of said weatherproofing sheets and a plurality of spaced supporting members disposed between the upper and lower members of the framework directly



transmitting any load from the corrugated sheets to said lower members and thence to said load supporting members, fastening means for securing said corrugated sheets to the upper flange of said Z-bars said means being accessible from the exterior of the building, and fastening devices accessible from the exterior of the building for securing the overlapping sides of the corrugated sheets together.

HENRY H. CRAFTON.


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