

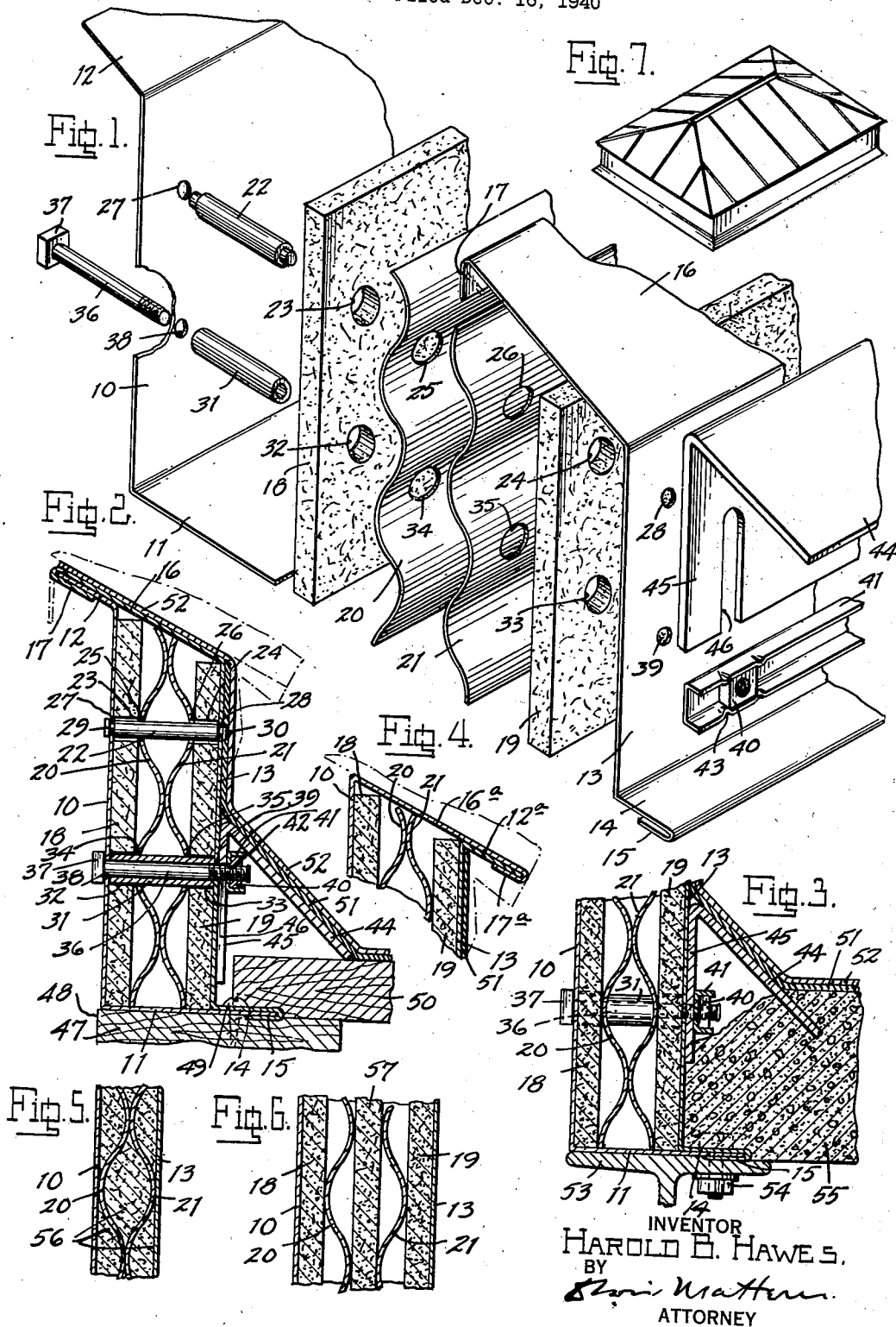
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STRUCTURAL CURB OR WALL

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STRUCTURAL CURB OR WALL

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9 Claims. (Cl. 108—1)

The present invention relates to an improvement in structural curbs or walls for skylights, ventilators, and the like, particularly of the type adapted for use upon roofs or decks of buildings, although the invention may find other uses, as for instance, as a curbing or other wall structure intended for incorporation at any point in a building where the considerations of strength, lightness, heat insulation and water tightness are important.

It is an object of the invention to provide a curb or wall structure constructed mainly of sheet metal, which will lend itself to convenient and economical fabrication, will be light in weight, so that it can be transported, handled and installed with facility, and will have great structural strength both from the standpoint of load support and side stresses. To this end it is proposed to provide structural reinforcing and supporting members, within the space between the outer and inner walls of the curb or wall structure, preferably in the form of cooperative corrugated metal sheets having their corrugations so arranged with respect to the walls and to each other as to provide a trussed load supporting structure, and further to provide transverse tie means between the inner and outer walls, which in cooperation with the reinforcing truss means renders the structure extremely resistant to side strains, and to twisting strains that may result from the combination of load and side strains. These are important considerations when it is considered that the curb or wall constitutes a structural part of the roof or other structure in which it is incorporated, so that it must form an adequate support for the adjacent structure of the roof or other structure, and must also support the substantial weight of a skylight, ventilator or the like in exposed position above the roof where it is subjected to the effects of high wind, snow weight and the like.

A further object is to provide a curb or wall structure in which heat insulating means may be conveniently incorporated, either in the form of composition slabs or loose insulating material, and further to provide a structure which will permit of the incorporation of any desired degree of heat insulation by providing a greater or less number of heat insulation slabs or providing such slabs of different thicknesses.

A further object is to provide a curb or wall structure which may be formed of different thicknesses without affecting its structural load supporting and side strain resisting characteristics.

A still further object is to provide a curb or wall structure which lends itself to use with different types of roof constructions of varying thicknesses, and further to provide vertically adjustable cant strip means for the purpose of supporting and connecting water-proofing flashing, the vertical adjustability of such cant strip means permitting various thicknesses of roof structures to be built after installation of the curb or wall structure. It is further proposed to provide such cant strip means in the form of an ease providing a space beneath it and at the outer side of the curb or wall structure which will permit the roof to extend beneath the cant strip into proximity to the wall structure, thus permitting the edge of the roof structure to constitute a supporting buttress at the outer side of the curb or wall structure to effectually support and anchor it against side strains. In the case of a wooden roof the vertically adjustable cant strip may be brought into contact with the roof after it is completed, while in the case of a poured concrete roof structure the adjustable cant strip may either be brought into contact with it after it is poured, or it may have its lower projecting end portion imbedded in the concrete, thus providing a rigid interlocking connection between the curb and the roof.

With the above and other objects in view, embodiments of the invention are shown in the accompanying drawing, and these embodiments will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

In the drawing—

Fig. 1 is a perspective view showing the various parts of the curb or roof structure, according to the exemplary illustrated embodiment of the invention, in expanded relation.

Fig. 2 is a vertical sectional view of the curb or wall structure incorporated in a roof structure of wood type, the supported skylight or ventilator, or the like, being shown in dot-and-dash lines.

Fig. 3 is a fragmentary vertical sectional view showing the curb or wall structures incorporated in a roof structure of steel and concrete type.

Fig. 4 is a fragmentary perspective view of the upper end of the curb or wall structure, according to the invention, of modified type, in which the skylight or ventilator attaching flange projects outwardly.

Fig. 5 is a fragmentary vertical sectional view of a modified form of curb or wall structure.

according to the invention, in which loose heat insulating material is incorporated.

Fig. 6 is a similar view showing another modified form of curb or wall structure, according to the invention, in which an intermediate heat insulating composition slab is disposed centrally between two corrugated truss members.

Fig. 7 is a perspective view showing a skylight structure supported upon the curb or wall structure, according to the invention.

Similar reference characters indicate corresponding parts throughout the several figures of the drawing.

Referring to the drawing and more particularly to Figs. 1 and 2 thereof, the curb or wall according to the exemplary embodiment of the invention illustrated therein, comprises an inner sheet metal vertically disposed wall or shell member 10, provided at its lower end with an outwardly extending horizontally disposed base portion 11 bent therefrom, and provided at its upper end with an inwardly extending upwardly inclined flange portion 12 bent therefrom, and a vertically disposed outer wall portion or shell 13 disposed in spaced parallel relation to the inner wall portion 10, provided at its lower end with an outwardly extending horizontally disposed base portion 14, overlying the outwardly disposed marginal portion of the base portion 11, and bent about its edge and secured thereto by a marginal lip portion 15 bent upon the under-side of the base portion 11. At its upper end the outer wall portion is provided with an inwardly extending upwardly inclined top wall portion 16 extending across the space between the inner and outer walls and overlying the flange portion 12 of the inner wall 10, and being secured thereto by a marginal lip portion 17 bent about the edge of the flange portion 12 against its under-side.

Within the space between the inner and outer walls there are provided heat insulating slabs 18 and 19 formed of suitable heat insulating composition, the slab 18 being in contact with the inner wall 10 and the slab 19 being in contact with the outer wall 13, and being pressed and retained in this contacting relation by means of a pair of corrugated sheet metal structural truss members 20 and 21, the corrugations running horizontally and being arranged in opposed relation whereby the inwardly curved corrugations of the two members contact each other while the outwardly curved corrugations contact the insulating slabs. These parts are secured in rigidly connected relation by means of shouldered spacer studs or rods 22 loosely engaged through holes 23 and 24 in the respective insulating slabs and holes 25 and 26 in the truss members, the reduced ends of these studs being engaged in holes 27 and 28 in the inner and outer walls and being rigidly riveted thereto by heading over the ends of the studs, as at 29 and 30. These studs are provided at suitable intervals and are preferably provided in the upper portion of the curb or wall, the lower portion of the curb or wall being provided with a different type of fastening, which in addition to securing the walls in rigid separated relation also serves to secure the vertically adjustable cant strip, hereinafter more fully referred to. These fastening means, which are also provided at suitable intervals, each consists of a spacer bushing 31 disposed between the inner and outer walls in abutting relation with the inner surfaces thereof and engaged through holes 32 and 33 in the

insulating slabs and holes 34 and 35 in the truss members, a bolt 36, headed at its inner end, as at 37, being engaged through this spacer bushing and through holes 38 and 39 in the inner and outer walls corresponding in diameter substantially to the bore of the spacer bushing. The head 37 of the bolt is disposed at the inner side of the curb or wall, while the threaded end projects outwardly from the outer wall 13 where it is engaged with a nut 40 rigidly secured within a clamping channel strip 41 extending longitudinally of the curb or wall and provided at suitable intervals with the nuts 40 to correspond to the positions of the fastening means, these nuts being secured between the flanges of the channel member in relation with holes 42 registering with the holes of the nuts by crimping or swedging the flanges at the sides of the nuts, as at 43.

The vertically adjustable cant strip, which is secured to the outer wall 13, consists of a downwardly and outwardly inclined cant portion 44 and a vertically disposed downwardly extending fastening portion 45, provided at suitable intervals with vertical slots 46 open at their lower ends, the vertical portion 45 being engaged between the outer wall 13 and the clamping strip 41 with the slots 46 engaged by the bolts 36. By loosening the bolts 36 the cant strip may be attached and secured in any desired position of vertical adjustment, after the curb or wall is installed, or at any time during the construction of the roof, depending upon the particular type of roof, and as will hereinafter more fully appear.

In assembling the parts of the curb or wall structure, according to the invention, the spacer studs 22 and the spacer bushings 21 are first engaged through the holes in the insulating slabs 18 and 19 and in the corrugated truss members 20 and 21, and thereupon the inner and outer walls are connected by engaging the reduced shouldered ends of the studs 22 in the holes 27 and 28 in the inner and outer walls, the ends of the studs being then headed over at 29 and 30 to secure the parts together. The bolts 36 are then engaged through the holes 38 and 39 of the inner and outer walls and through the spacer bushing 31, and are screwed into tight relation with the nuts 40 carried by the channel clamping bar 41, which may be tightened up against the outer wall, without the cant strip 44 in place, for the purpose of shipment and installation, the cant strip being later applied by loosening the clamping strip 41. The assembly is completed by bending over the marginal lip 17 upon the underside of the flange 12.

The curb or wall is installed in the case of a wooden type roof or other structure, as shown in Fig. 2, by mounting it upon the upper surface of the frame beam 47, with the inner wall 10 flush with the vertical inner surface 48 of the beam 47, and which constitutes the opening in the roof or other structure for the skylight, ventilator, or the like, the curb or wall being thereupon secured by screws 49, engaged through the flange formed by the base portion 14 of the front wall and the underlying base portion 11 of the rear wall, and screwed into the beam 47. In this relation and before mounting of the cant strip the wall constitutes a form or abutment for the roof structure, which is in the form of planks 50 supported upon the frame beam 44, the planks having their edges preferably carried over the base portion 14 and brought into close substantially contiguous relation with the vertical surface of

the outer wall. This is made possible by the removability and adjustability of the cant strip 44. The result is a better and more conveniently constructed roof structure which may be of any desired thickness without interfering with the curb or wall structure, or necessitating that the curb or wall be raised to correspond with an increase in the thickness of the roof, and such as is the case with other types of curb structures which are mounted directly upon the upper surface of the roof. Upon completion of the roof the cant strip 44 is installed, and because of its vertical adjustability its lower edge may be brought into direct and firm contact with the surface of the roof, being thereupon secured in place by tightening the bolts 36 from the inside, this being made possible by the fact that the bolt heads 37 are exposed at the inside. The flashing sheet 51 and covering sheet 52, which constitute the water-proofing roof surface, are carried over the cant strip and the upper portion of the outer wall and may thereupon be secured by carrying the covering sheet over the upper wall 16 where it is secured in any suitable manner, as for instance by the application of tar or other adhesive. The skylight, ventilator, or other superimposed structure is secured upon the curb or wall in any suitable manner. For instance attaching screws or bolts may be engaged through the inwardly extending flange 12.

In Fig. 3 I have illustrated the invention as incorporated in a roof structure of steel and concrete type. In this case the structural steel frame member 53 of the building, in the form of a channel or T-beam surrounding the skylight or ventilator opening of the roof, has the curb and wall structure mounted thereon, and secured thereto by bolts 54 extended through the outwardly projecting base flange of the curb or wall, the inner wall 10 being flush with the inner edge of the beam. The curb or wall in this case constitutes a form for the poured concrete roof structure 55. Prior to the pouring of the concrete the cant strip 44 may be vertically adjusted and secured at a point where the lower edge of the inclined portion 44 will be below the upper surface of the concrete, the concrete thus imbedding the lower marginal portion of the cant strip so that it is interlockingly anchored to the roof. It will be understood that if desired the concrete roof may be poured before connecting the cant strip in which case its lower edge is brought into contact with the roof surface in the same manner as shown in Fig. 2.

In Fig. 4 I have illustrated a modified form of the invention in which the flanged structure of the curb or roof, for securing the superimposed skylight, ventilator, or the like, projects outwardly in downwardly inclined relation from the outer wall 13. In this case there is provided at the upper end of the wall 13 a downwardly and outwardly inclined flange 12^a bent therefrom, and there is provided at the upper end of the inner wall 10 a downwardly and outwardly inclined top wall portion 16^a bent therefrom, which spans the space between the inner and outer walls and extends over the flange 12^a, to which it is secured by means of a marginal lip portion 17^a bent about the edge of the flange 12^a and against the under-side thereof.

In Fig. 5 I have illustrated a modified form of the invention in which the heat insulating means consists of loose fibrous or powdered insulation material 56 filling the spaces between the inner and outer walls and the truss members, the

outwardly curved corrugations of the truss members 20 and 21 in this form of the invention being engaged directly with the inner and outer walls 10 and 13.

In Fig. 6 I have illustrated another modified form of the invention substantially like that shown in Fig. 2, except that an additional heat insulating slab 57 is interposed between the two structural truss members 20 and 21. Obvious other modifications may consist in providing an insulating slab between the two truss members and dispensing with the slabs 18 and 19, or either one of these slabs may be incorporated while dispensing with the other. Another modification may consist in combining the heat insulating slabs with the loose insulating material, and this may be done by providing the loose material either between the two truss members while the slab material is provided between the truss members and the inner and outer walls, or reversing this arrangement and providing the slab 57 between the two truss members and providing the loose material between the truss members and the inner and outer walls.

I have illustrated and described preferred and satisfactory embodiments of the invention, but it will be understood that changes may be made therein, within the spirit and scope thereof, as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a building structure, a roof comprising a supporting part, a structural curb or wall comprising a hollow wall section having spaced side wall members and a bottom wall portion integral with one of said side wall members extending across said wall section and projecting beyond said other side wall member and engaged with said supporting part, said other side wall member having an integral flange portion contacting the projecting portion of said bottom wall portion and secured thereto, fastening means extending through said flange portion securing said wall section to said supporting part, a reinforcing corrugated strut member disposed between said side wall members, and transverse fastening means connected between said side wall members and extending through said strut member.

2. In a building structure, a roof comprising a supporting part, a structure curb or wall comprising a hollow wall section having spaced side wall members supported upon said supporting part, and an inclined top wall portion integral with one of said side wall members extending across said wall section and projecting beyond said other side wall member, said other side wall member having an integral flange portion contacting the projecting portion of said inclined top wall section and secured thereto, a reinforcing corrugated strut member disposed between said side wall members and transverse fastening means connected between said side wall members and extending through said strut member.

3. In a building structure, a roof comprising a supporting part structural curb or wall comprising a wall section having side wall members supported upon said supporting part, and a downwardly inclined cant strip secured to one of said side wall members, the lower end of said cant strip terminating at a point in a plane above the plane of the lower end of the wall section whereby an eave is provided beneath said cant strip to permit the roof structure to extend beneath said

cant strip in lateral line with the lower end portion of said wall section.

4. In a building structure, a roof comprising a supporting part, a structural curb or wall comprising a wall section having side wall members supported upon said supporting part, a cant strip member comprising a downwardly inclined cant strip portion and a fastening portion, and connection means between said fastening portion and one of said side wall members permitting vertical adjustment of said cant strip.

5. In a building structure, a roof comprising a supporting part, a structural curb or wall comprising a wall section supported upon said supporting part, a cant strip member disposed upon one side of said wall section, and slot and bolt connection means between said cant strip member and said wall section permitting relative vertical adjustment of said cant strip member.

6. In a building structure, a roof comprising a supporting part structural curb or wall comprising a wall section having spaced side wall members, transverse bolt means connected between said side wall members, and a cant strip member secured to one of said side wall members by said bolt means.

7. In a building structure, a roof comprising a supporting part, a structural curb or wall comprising a wall section having spaced side wall members, transverse bolt means connected between said side wall members, and a cant strip member comprising a downwardly inclined cant strip portion and a vertically disposed fastening portion having a vertical slot therein, said slot

being engaged by said bolt means to secure said cant strip means to said wall section and permit vertical adjustment thereof.

8. In a building structure, a roof comprising a supporting beam structure and a roof deck supported upon said beam structure and terminating in spaced relation to one edge of said beam structure, a structural curb or wall comprising a hollow wall section having spaced side wall members and mounted upon said beam structure with its lower hollow wall section in lateral alignment with the edge of said roof deck, and cant strip means carried by the side of said wall adjacent said roof deck, said roof deck extending beneath said cant strip in proximity to said wall and being engaged by said cant strip.

9. In a building structure, a roof comprising a supporting beam structure and a roof deck supported upon said beam structure and terminating in spaced relation to one edge of said beam structure, a structural curb or wall comprising a hollow wall section having spaced side wall members and mounted upon said beam structure with its lower hollow wall section in lateral alignment with the edge of said roof deck, cant strip means carried by the side of said wall adjacent said roof deck, said roof deck extending beneath said cant strip in proximity to said wall and being engaged by said cant strip, and adjustable fastening means securing said cant strip to said wall adapted to permit removal and vertical adjustability thereof.

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