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L. LANE

GLAZING SYSTEM

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Fig. 1,

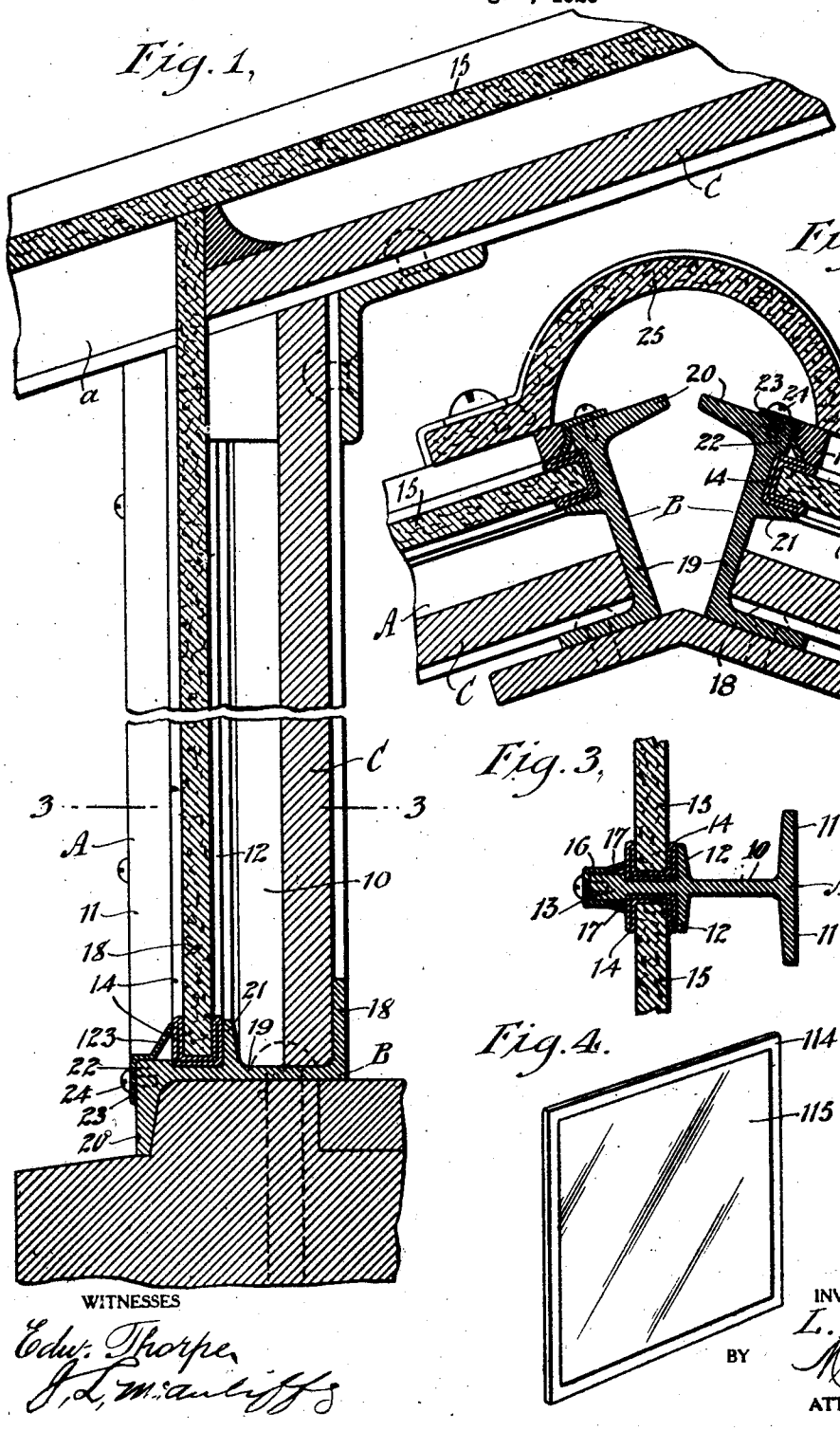


Fig. 2,

Fig. 3,

Fig. 4.

WITNESSES

Edw. Thorpe.

J. L. McCullough

INVENTOR

L. Lane

BY

Munn & Co

ATTORNEYS

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UNITED STATES PATENT OFFICE.

LOUIS LANE, OF HABANA, CUBA.

GLAZING SYSTEM.

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My invention relates to the construction of building walls and roofs and movable sections thereof as employed in that class of buildings known as the steel skeleton type and especially such walls and roofs wherein the principal covering materials employed consist of flat sheets of glass, asbestos and the like. My invention consists in the use of certain novel forms and sections of material and in certain new and useful improvements in the methods of assembling and supporting the covering sheets in the same to produce a cheaper and better construction for such skeleton type buildings than at present used in their construction.

Such buildings are of wide demand for industrial and housing purposes, bunk houses, camp and country residences, garages, warehouses, etc. especially in tropical and semi-tropical climates where they are preferably covered with some heat-retardant coverings such as sheets of asbestos cement, etc.

The severe wind storms of such tropical and semi-tropical regions require that such skeleton buildings be of great rigidity although of light construction and that the covering materials be secured in place in an almost hermetic manner.

The usually employed form of corrugated sheets of asbestos etc. has been found to be very unsatisfactory owing to the difficulties of supporting and securing such sheets in place as well as the relative high cost of corrugated sheets and one of the objects of my invention is to provide a cheap, more economical, more practical and more weather-tight method applicable to such sheets in a flat form.

To secure the objects of my invention I use such flat sheets in place of corrugated sheets and thus save the extra cost and weight of the corrugated material as well as securing a greatly improved weathering while at the same time providing for an interchangeability of said coverings with flat glass sheets to secure day-lighting where desired. To secure the objects of my invention I employ a novel vertical supporting joint member between the adjacent edges of the sheets having substantially the form shown and described below. In order to procure absolute weather-tightness of a permanent character, I employ an elastic puttyless housing of the sheet edges consisting preferably of a strip formed of an elastic fibrous body saturated with an elastic adhesive to envelop the sheet edges; and a joint covering strip of metal of channel form of a minimum width and of novel form in cross section whereby the use of the wide batten effect now in use is done away with, and a more secure and more pleasing appearance is attained with less cost for material.

By the glazing method of construction as here used is intended to be meant the method whereby the sheets of glass, etc. used are emplaced and secured within rabbets preformed in their supporting bars and weather-sealed therein by the use of putty or equivalent plastic cementing materials, and where no holes are made through the edges of the sheets themselves.

Putty glazed construction is at present generally employed in such coverings of walls and roofs in steel skeleton and similar buildings, as for instance in the so-called "windo-walls" construction: in continuous sash sides of monitors and 'saw-tooth" roofs: in green houses, etc.

Recent extensive experience has demonstrated that this form of glazing construction wherein the sealing means employed is putty, and in which the supporting bars are metal; has serious defects as to durability; arising from the rapid excessive hardening of the putty, with consequent loss of strength and elasticity; which causes its cracking up and falling out, especially when it is exposed outside to the weather. This defect becomes an especially serious one when such putty glazing constructions is used in tropical and semi-tropical climates because of the stronger sunlight and the higher temperatures of such climates.

As a result of this hardening and loss of "yield" of the cementing putty there results excessive breaking of the glass, etc. (and other sheets) in such steel structures through the expansion and contraction of the steel frame members and a rapid rusting out of the supporting metal bars through penetration of water into the cracked-up putty.

In structures of the above type it is an indispensable requisite that where glass and similar brittle materials are employed, the glazing joints should retain their elastic yield to expansion strains and preserve their

weather-tight seal unbroken in all climates; and an important object of my invention is to secure this through the use of an improved form of puttyless glazing therefor.

My invention is characterized by a puttyless type of glazing construction for such wall and roof coverings wherein the weather-sealing of the joints is accomplished by the use of a semi-plastic cementing material having a fibrous body instead of putty; said fibrous body being impregnated with a hydrocarbon mastic preferably of an asphaltic nature combined with said body at the fusing temperature of the mastic to produce the said semi-plastic sealing material I employ.

A further object of my invention is to provide in my said improved puttyless method better means whereby the use of sheets of other more or less brittle materials than glass, especially sheets of asbestos and the like that are foil-metal protected as described in my application Serial Number 696,851 may be easily used interchangeably with glass sheets for such roofing and siding covering purposes and in a cheaper and better way than can be done with any of the glazing methods now in use.

To attain the stated objects of my invention I employ solid metal supporting joint and frame bars of an improved shape in cross section whereby a more efficient use of the fibre strength of the metal material to resist transverse strains is secured as well as a better location and arrangement of the pre-formed rabbets in the said bars and a shape affording better attachment means for securing the bars together and into the structure. I further employ my improved continuous joint sealing element preferably of felted or woven elastic fibrous material such as wool or asbestos the same being impregnated at fusion with a suitable natural mineral water-proofing adhesive substance of a fusing point above 200° F. in order to secure lasting flexibility and durability of said element.

A further feature in the said fibrous body semiplastic sealing strip is its use in a two-ply form about the sheet edge by doubling it upon itself at all points in such a manner that when it is applied about the sheet edge it produces a fold at both edges thus producing a neater exposure with greatly increased imperviousness and yielding qualities.

My invention is characterized also by a holding and protecting metal capping joint bar having an improved cross sectional shape of a minimum width to secure the least possible exposure of metal on the outside all as more fully described and claimed below.

Reference is to be had to the accompanying drawings forming a part of this specification, it being understood that the drawings are merely illustrative of one example of the invention.

Figure 1 is a vertical section of a side wall and roof embodying my invention;

Figure 2 is a view of the ridge portion of the roof with features of my invention;

Figure 3 is a detail in horizontal section on the line 3—3, Figure 1;

Figure 4 is a perspective view of one of the sheets or panels employed in the roof or wall and held by my improved glazing means.

In carrying out my invention in accordance with the illustrated example, instrumentalities are employed described in the following:

A supporting vertical joint bar designated generally by the letter A has a stem or web portion 10, an inner flange portion 11, a pair of symmetrically located seating flanges 12—12 located opposite each other at the sides of the web and extending laterally outward from the web 10, said seating flanges being located or positioned intermediate the flange portion 11 and the opposite or outer edge of the web 10. The vertical supporting joint bar A further includes a large rectangular bulb portion or head 13 at said outer edge of the web 10, the distance from said bulb edge 13 of the bar A to the faces of the seating flanges 12—12 being sufficient to accommodate the thickness of the sheet such as 15, and accommodate also the sealing strip 14 when applied about the edge of sheet 15 at the joint, thus providing a recess webward from the side of the bulb member or head 13 of bar A, to accommodate a thickness of the said sealing strip 14 between the edge of sheet 15 and the web 10 of bar A.

The holding strip 16 of channel form is adapted to seat in close contact against and about the bulb edge or head 13 of bar A and said strip 16 has its opposite inner flange edges 17 set outwardly at an angle to the plane of the side flanges of the channel strip 16, whereby to secure a line contact or engagement adjacent the exposed edge of and in close sealing contact with the surface of the sealing strip 14. The described angular deflection of the terminal edges 17 of the channel strip 16 serves to constitute an adjustable means for securing the strip 16 to the outside bulb or head 13.

The above description applies to the vertical bar 12 and the sheet 15 of asbestos, glass, or the like. It is to be understood in this connection that an advantage of my invention is that glass, asbestos, or sheets of other material may be employed interchangeably. In Figure 4 is a glass panel or sheet 115 having a permanent sealing edging 114 formed preferably after the manner of the sealing edging 14 or in accordance with

the seal disclosed in my mentioned application. For said sealing edges 14 I use advantageously a strip of asbestos, wool, felt, or the like, the same being saturated in a fused solution of a natural mineral asphaltum of high adhesive properties and having a fusing point of at least 220° F. Wool fibers treated hot with an asphalt base adhesive fusing at 220° F. as an impregnation effects a combination of the adhesive with the natural waxes and oils of the wool to produce a very ductile and elastic semi-plastic substance having sufficient strength, "yield", adhesiveness, and durability to constitute a very material improvement over putty compounds and the described arrangement retains the weatherproofness of the joint in all climates, thus eliminating the serious objections with the use of common putty glazings as now commonly employed in metal buildings.

Bars *a* corresponding in cross section with the described vertical bars A are employed in the roof, and at the sides and top and bottom of the structure to frame the sections of the side walls or roof and at the ridge of the roof, bars B are employed embodying features of the bars A, *a*. Said frame bars B have an inner attaching flange 18, a web portion 19 and an outer flange portion 20, thus forming a substantially Z-shaped cross section. Each bar B is provided with a seating rabbet flange 21 extending laterally inwardly from the web 19 on the opposite side of the web from that on which the outer flange 18 is formed. Said seating flange 21 is located intermediate between the said flanges 18 and 20 of the bar. The bar B is further formed with an enlargement 22 extending outward from the web 19 and at the side thereof opposite that on which the flange 20 is formed and adjacent to said flange 20, that is to say, at the back of said flange. The enlargement 22 corresponds in projection and size to one side of the bulb head 13 of the joint bar A with which it mates. A joint-sealing strip or element such as 14 or 114 is accommodated between the seating flange 21 and the shoulder formed by the enlargement 22. A joint bar 23 is provided on bar B as a covering and holding element for the joint sealing element 14 or 114. Said covering and joint bar 23 is fastened in any suitable manner to bar B as by screws 24. One leg or edge portion 123 of bar 23 is offset inwardly at an angle to the general plane of said leg to engage the sealing strips such as 14 and 114 at a distance from the enlargement 22 of web 19 and constitutes a means to adjustably engage the sealing strip 14 or 114. The roof ridge has a covering element 25 arched in cross section as shown in Figure 2 covering the adjacent ends of the pitch roof and the adjacent bars B at the ridge.

The channeled edge sealing element 14 or 114 is formed from a single piece of material and it is so folded upon itself as to give the element a two-ply character with the terminal edges adjacent to each other and at all events remote from the folding lines of the plies at the edges of the side flanges of the channel.

As plainly shown in Figures 1 and 2, the sheet material 15 is at the outer side of the wall structure and usually said sheet material is spaced from a plaster board C or other wall material.

I would state in conclusion that while the illustrated example constitutes a practical embodiment of my invention, I do not limit myself strictly to the exact details herein illustrated, since, manifestly, the same can be considerably varied without departure from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. An improved metal joint supporting bar for flat sheets of the class described, comprising a solid metal section having a web portion disposed at right angles to the plane of the supported sheets and between their edges, opposite basal flanges at the inner edge of the web of the bar for secondary sheet support and attachment, a pair of direct lateral sheet seating flanges extending at right angles either side from the web of the bar and integral therewith, said flanges being of a lesser width than the basal flanges, a groove formed in each side of the web adjacent to the said flanges and outwardly therefrom of sufficient depth to receive a strip of sealing material between the edge of the supported sheet and the bottom of the groove, said groove terminating outwardly a distance inward from the outer edge of the bar, the outer thicker edge portion of the bar being rectangular in cross section with its sides parallel to the plane of the web, of a minimum metal thickness between the sheet edges necessary to receive the attaching screws of the cover strip to the joint.

2. An improved form of joint supporting bar for flat sheets of the class described, comprising a solid metal section having a web portion disposed at right angles to the plane of the supported sheets and between their edges, opposite basal flanges at the inner edge of the web of the bar for secondary sheet support and attachment; a pair of direct lateral sheet seating flanges extending at right angles either side from the web of the bar and integral therewith, said flanges being of a lesser width than the basal flanges, each side of the web having a groove adjacent to the said flanges and outwardly therefrom of sufficient depth to receive a strip of sealing material between the edge of the supported sheet and the bottom of

the groove, said groove terminating outwardly a distance inward from the outer edge of the bar, the outer thicker edge of the bar being rectangular in cross section with sides parallel to the plane of the web of a minimum metal thickness between the sheet edges to receive the attaching screws of the cover strip to the joint, sheets supported on said outer flanges and having an angle-shaped strip of adhesive sealing material between the said seating flanges and the sheets and in between the edge of the said sheets and the bottom of the grooves adjacent to the seating flanges to provide a seat and edge sealing of the sheets to the joint bar.

3. An improved form of joint supporting bar for flat sheets of the class described, comprising a solid metal section having a web portion disposed at right angles to the plane of the supported sheets and between their edges, opposite basal flanges at the inner edge of the web of the bar for secondary sheet support and attachment a pair of direct lateral sheet seating flanges extending at right angles either side from the web of the bar and integral therewith, said flanges being of a lesser width than the basal flanges, each side of the web being formed with a groove, said grooves being adjacent to the said flanges and outwardly therefrom of sufficient depth to receive a strip of sealing material between the edge of the supported sheets and the bottom of the groove, each groove terminating outwardly a distance inward from the outer edge of the bar, the outer thicker edge of the bar being rectangular in cross section with sides parallel to the plane of the web and with only a minimum metal thickness between the sheet edges to receive the attaching screws of the cover strip to the joint, sheets supported on said outer flanges and having an angle-shaped strip of adhesive sealing material between the seating flanges and the sheets and in between the edge of the said sheets and the bottom of the groove adjacent to the bar flanges to provide a seat and edge sealing of the sheets to the joint bar, an adhesive sealing cover strip applied directly on the top edges of the jointed sheets and extending in close contact with the bar top continuously from sheet edge to sheet edge.

4. An improved form joint supporting bar for flat sheets of the class described comprising a solid metal section having a web portion disposed at right angles to the plane of the supported sheets and between their edges opposite basal flanges at the inner edge of the web of the bar for secondary sheets support and attachment, a pair of direct lateral extended sheet seating flanges at right angles either side from the web of the bar and integral therewith, said flanges being of a lesser width than the basal flanges, each side of the web being formed adjacent to the said flanges and outwardly therefrom with a groove of sufficient depth to receive a strip of sealing material between the edge of the supported sheets and the bottom of the groove, said groove terminating outwardly a distance inward from the outer edge of the bar, the outer thicker edge of the bar being rectangular in cross section with sides parallel to the plane of the web and having a minimum metal thickness only between the sheet edges to receive the attaching screws of the cover strip to the joint, sheets supported on said outer seat flanges and having an angle-shaped strip of adhesive sealing material between the seating flanges and the sheets and in between the edge of the said sheets and the bottom of the groove adjacent to the bar flanges to provide a seat and edge sealing of the sheets to the joint bar, an adhesive sealing cover strip applied directly on the top edges of the jointed sheets and extending in close contact with the bar top continuously from sheet edge to sheet edge, with a metal cap bar strip in combination with said angle sealing strip under and at the edges of the sheets, an over cover sealing strip from sheet to sheet, and adjustable means to attach said metal cap bar to the rectangular edge of the joint supporting bar with the sides thereof in compressive contact with the over cover sealing strip, and the edges of the said cap bar entering into the said over cover sealing strip.

LOUIS LANE.