

Oct. 1, 1929.

L. BURGESS

1,729,818

TRANSPARENT STRUCTURE AND COMPONENT PARTS THEREOF

Filed July 15, 1927

3 Sheets-Sheet 1

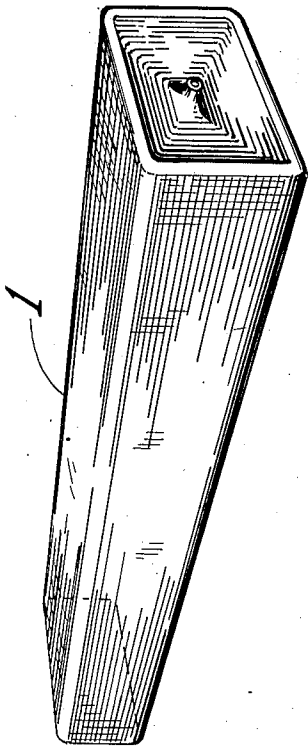


FIG-1

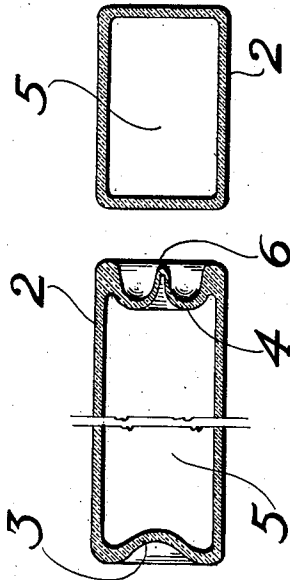


FIG-2

FIG-3

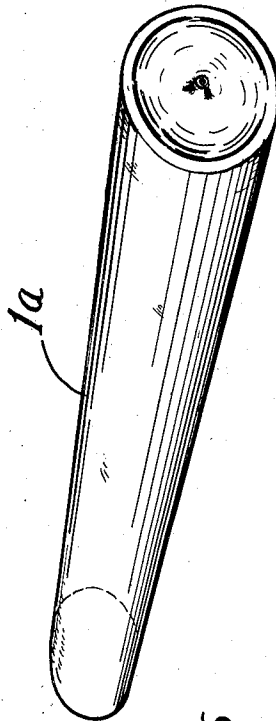


FIG-4

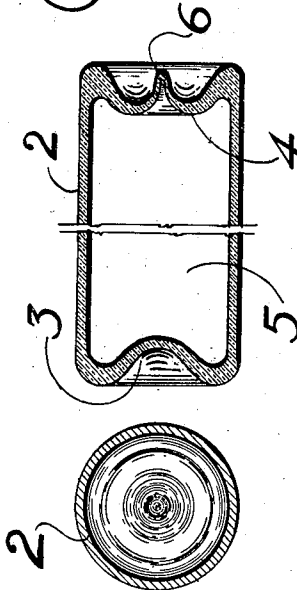


FIG-5

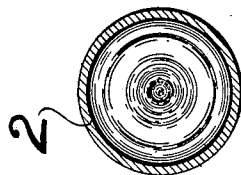


FIG-6

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TRANSPARENT STRUCTURE AND COMPONENT PARTS THEREOF

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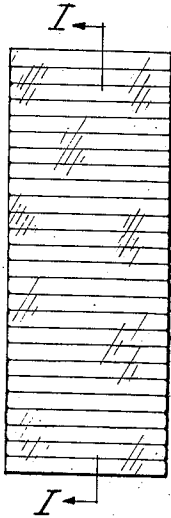


FIG. 7



FIG. 8



FIG. 9



FIG. 10

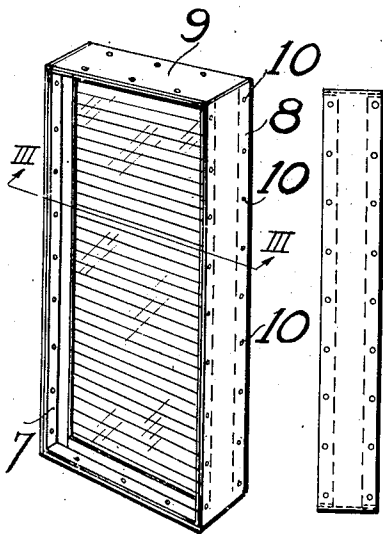


FIG.-11 FIG.-12

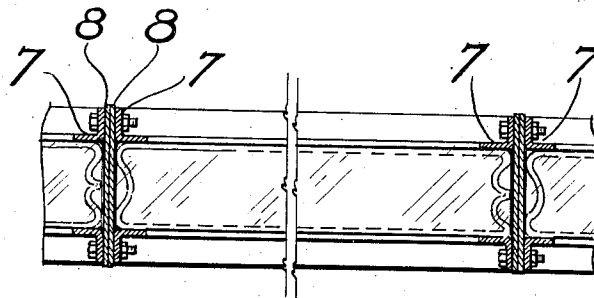


FIG. 13

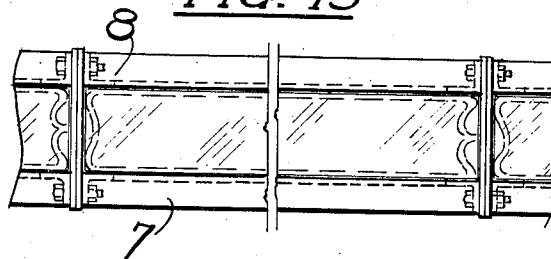


FIG.-14

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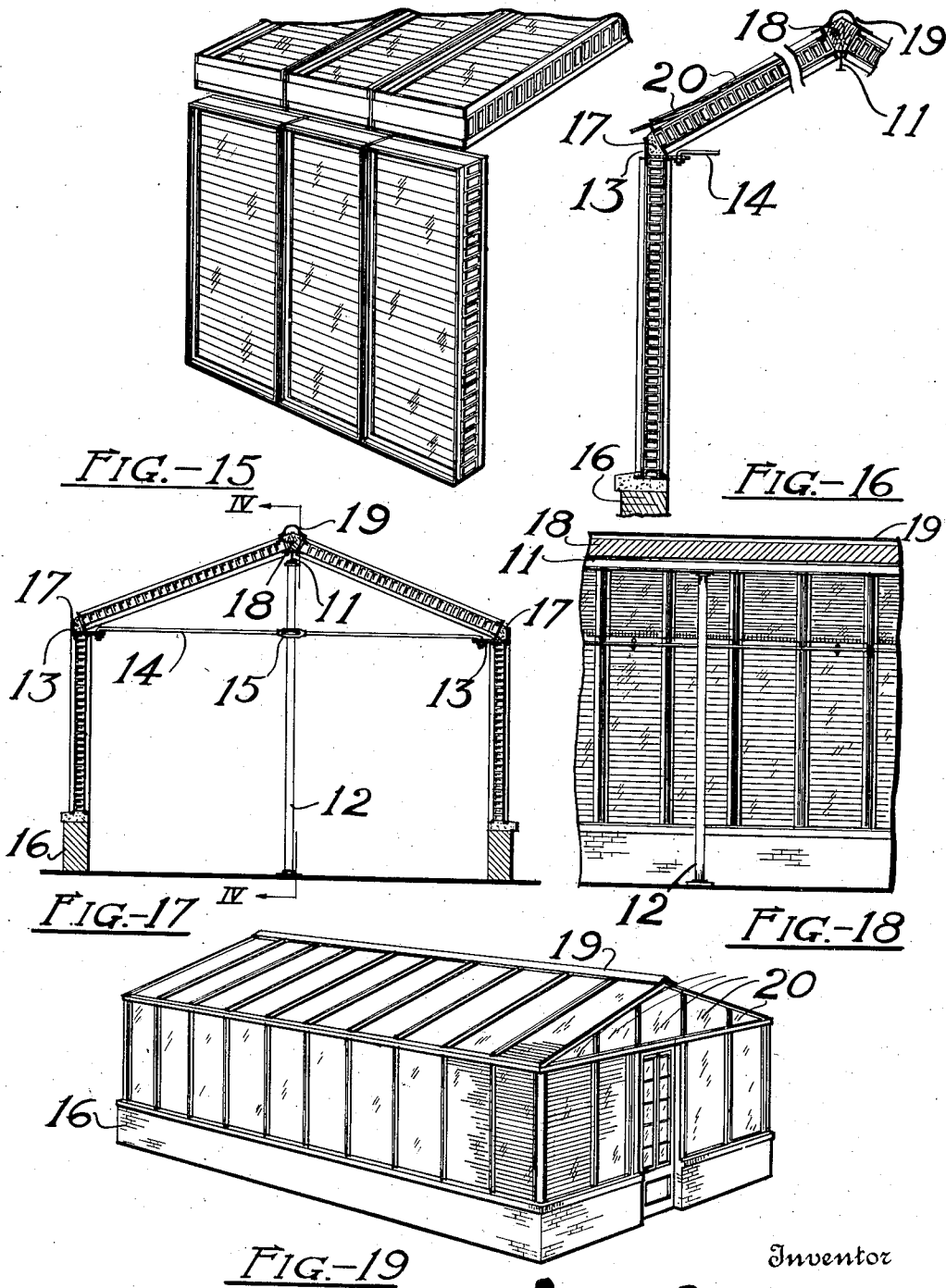
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TRANSPARENT STRUCTURE AND COMPONENT PARTS THEREOF

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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TRANSPARENT STRUCTURE AND COMPONENT PARTS THEREOF

Application filed July 15, 1927. Serial No. 205,893.

This invention relates to transparent structures, such as solariums and greenhouses, and to component parts thereof. This invention has for its object a form of construction for structures or extensions involving large transparent surfaces whereby temperatures either above or below the outside temperature may be more easily maintained therein.

I accomplish this object by the form of construction illustrated in the drawings in which:

Fig. 1 is a perspective view of a unit employed in constructing transparent surfaces.

Fig. 2 is a longitudinal cross section showing the ends of the same. Fig. 3 is a transverse central cross section of the same.

Fig. 4 is a perspective view of an alternative form of unit. Fig. 5 is a longitudinal cross section showing the ends of the same. Fig. 6 is a transverse central cross section of the same.

Fig. 7 is a front elevation of a number of the units shown in Figs. 1, 2 and 3 as assembled and Fig. 8 is a longitudinal cross section of the same thru the line I—I.

Fig. 9 is a front elevation of a number of units shown in Figs. 4, 5 and 6 assembled and Fig. 10 is a longitudinal cross section thru the line II—II.

Fig. 11 is a perspective view of an assembly of units as shown in Figs. 7, 8, 9 and 10 in combination with means for maintaining same in position to form a panel. Fig. 12 is a side elevation of same. Fig. 13 is a cross section of Fig. 11 thru the line III—III. Fig. 14 is an end view of Fig. 11. Figs. 13 and 14 show in addition the manner of attachment of such panels to contiguous ones.

Fig. 15 is a perspective view of panels assembled to form part of a wall and roof. Fig. 16 is a cross sectional view with part omitted of a structure comprising such panels showing construction details. Fig. 17 is a complete cross sectional view of the same. Fig. 18 is a side elevation of part of Fig. 17 thru the line IV—IV and Fig. 19 is a perspective view of the structure as a whole.

Referring specifically to Fig. 1 the transparent unit of low thermal conductivity 1 is made of transparent material such as glass.

Colored glass having light filtering properties may be used in case it is desired to selectively limit transmitted light and special glass or other transparent material in case it is desired to extend the transmitted radiation into the ultra-violet or infra-red. Referring specifically to Fig. 2 the unit 1 is provided with wall 2 and preferably, concave ends 3 and 4 whereby it is better enabled to resist external stresses. The interior of such unit contains a vacuum 5.

Preferably the major part of the volume bounded by the outer surfaces of same is vacuum, subject to the limitation that the walls must be sufficiently strong to resist circumferential pressure of the atmosphere and stresses incidental to use. Any vacuum will be partly effective but for best results the absolute pressure in the unit should be less than 10 mm. and preferably less than 1 mm. of mercury.

Figs. 4, 5 and 6 represent corresponding views of an alternative form 1A corresponding numerals denoting corresponding parts.

These units may be made either by the manipulation of tubing etc. as by glass blowing or by blowing fluid or semi-fluid glass into moulds as at present practiced or by any other suitable method. An extension tube is preferably affixed or made as an integral part of the unit to be utilized for evacuation thereof and thereafter to be permanently sealed as by fusion to form the tip 6.

A great number of variations of form may be employed without departing from my invention, thus such units may be of any polygonal, oval or even irregular cross section. They should preferably be of a form such that they may be conveniently assembled to form an extensive surface as illustrated in vertical plan in Figs. 7 and 9 and cross sectionally in Figs. 8 and 10. Such units may be made close fitting, or interlocking, surfaces in contact may be made serrated, or the joints between contiguous units may be sealed with any transparent or semi-transparent cementing material such as for instance clear varnish, nitrocellulose or bakelite, alternatively a gasket of rubber or other material may be employed.

Although I may lay these units and particularly the form shown in Figs. 1, 2 and 3 contiguously to form an entire wall my preferred method is to assemble same with suitable retaining means to form panels, which retaining means is preferably so constructed that the external load will be carried thereby when panels are contiguously joined to form a structure, thereby relieving the units of strain and permitting thinner walls therein to form an aggregate surface of extremely low thermal conductivity and excellent transparency to light.

The retaining means illustrated in Fig. 11 comprises angle iron frames 7, sides 8 and ends 9. These sides and ends may be of any material of strength and low thermal conductivity although I prefer wood or asbestos wood. Holes 10 are preferably provided at the margins so that panels may be bolted together or otherwise secured in contiguous relationship to form part of a wall and/or roof, the details of such connection being shown in Figs. 13 and 14. Fig. 13 is a cross section and Fig. 14 an end view with 9 removed of a panel as secured to contiguous ones.

Panels assembled in this manner are shown in perspective in Fig. 15. As shown cross sectionally in Figs. 17 and 18 the roof is vertically supported by ridge beam 11 carried on columns such as 12. The walls are secured against horizontal thrust resulting from the weight of the roof by angle iron 13, torsion rods such as 14 and turnbuckles such as 15 or any other suitable means.

The panels may be carried on a foundation of cement or brickwork such as 16. Wood or other filling material may be interposed at joints between wall and roof sections 17 and between roof sections 18. A crown piece 19 is preferably provided. An additional roof sheathing or shingling 20 of transparent material such as plates of glass may be provided to facilitate shedding of rain or snow, as illustrated cross sectionally in Fig. 16.

A complete structure is shown in perspective in Fig. 19. Sections such as 20 and the door shown may comprise the units hereinbefore described (specially shaped where necessary) or may be of ordinary construction and section 20 is preferably made openable for ventilation purposes.

The use of such structures is substantially identical with that of transparent structures now available except that less fuel or other available energy is required for maintaining desired temperatures therein under adverse weather conditions. Suitable heating equipment will of course be included in case temperatures above those external to the structure are desired and suitable cooling equipment in case temperatures below are desired.

The specific views shown are in illustration and not in limitation. Various alternatives

may be made within the scope of the appended claims in which it is my intention to claim broadly all novelty inherent in the invention.

I claim:

1. A transparent surface of low thermal conductivity comprising transparent tubular bodies of transparent material, the major part of the volume bounded by the outer surfaces of which bodies is vacuum, the said bodies being laid with their major axes substantially parallel each to the other and to the plane of the said transparent surface.

2. A transparent surface of low thermal conductivity comprising tubular bodies of transparent material, the major part of the volume bounded by the outer surfaces of which bodies is vacuum, the said bodies being laid with their major axes substantially parallel and coincident with the plane of the said transparent surface and sealing means at the line of contact between the said bodies.

3. An article of manufacture comprising a group of bodies of transparent material, the major part of the volume bounded by the outer surfaces of which bodies is vacuum, the said bodies being of substantially equal length, laid with their ends substantially flush and their major axes coincident with the plane of the extensive surface so formed, and means marginally embracing said group of bodies and adapted to retain same in fixed relationship to form a panel.

4. An article of manufacture comprising a group of bodies of transparent material, the major part of the volume bounded by the outer surfaces of which bodies is vacuum, the said bodies being of substantially equal length, laid with their ends substantially flush and their major axes coincident with the plane of the extensive surface so formed, means marginally embracing said group of bodies and adapted to retain same in fixed relationship to form a panel, and means whereby the said panel may be joined to similar panels to form structural surfaces.

5. An article of manufacture comprising a group of bodies of transparent material, the major part of the volume bounded by the outer surfaces of which bodies is vacuum, the said bodies being of substantially equal length, laid with their ends substantially flush and their major axes coincident with the plane of the extensive surface so formed, means marginally embracing said group of bodies and adapted to retain same in fixed relationship to form a panel, and means whereby the said panel may be joined to similar panels to form structural surfaces, the said marginally embracing and retaining means being adapted to carry the external load when such panels are contiguously joined to form a structural surface, thereby relieving the bodies of strain and permitting relatively thin walls therein.

6. An article of manufacture according to claim 3 in which the said bodies are of tubular form.

7. An article of manufacture according to claim 4 in which the said bodies are of tubular form.

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