UTILITY MODEL PATENT

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Title

Light-Transmitting Enclosing Structure

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Owners:

Leonid Oleksandrovych Lazebnikov, Kyiv, UA

Inna Davydivna Lazebnikova, Kyiv, UA

Ihor Vasylovych Shchedrin, Kyiv, UA

Legal Representative:

Meissner & Meissner Law Firm, Berlin, Germany

Main Claim

The light-transmitting enclosing structure, which includes insulating glass with hermetically sealed glass panes, features an internal stiff reinforcement profile and a spacer frame. The innovation is characterized by the addition of an external reinforcing U-profile in the form of a GFRP (glass-fiber-reinforced plastic) pultrusion profile.

Description

This utility model belongs to the field of construction materials and specifically concerns high-strength transparent enclosures used in industrial and civil construction, such as facade or window structures, ceiling and floor openings, and architectural components requiring transparent spatial elements.

The construction overcomes limitations of existing transparent panels that require external frames made of materials like aluminum, which diminish thermal insulation due to high thermal conductivity. This model introduces a design where GFRP pultruded profiles are bonded directly to the insulating glass using high-adhesion adhesives, allowing frame-free mounting while enhancing strength and insulation.

The structure features both internal and external reinforcement profiles, with multiple profile geometry options such as rectangular, oval, or U-shaped cross-sections. The adhesive bonding ensures climate stability, durability, and suitability for wide-scale industrial and civil applications.

Manufacturing steps involve: (1) assembling glass panels with primary sealing; (2) integrating the internal reinforcement profile using press-fit techniques with pre-applied adhesives; (3) mounting the external U-profile similarly. Gaps are minimized to 1.5–3 mm to ensure precision and eliminate air leaks.

Claims

1. A light-transmitting enclosing structure comprising insulating glass, hermetically sealed with an internal stiffening profile and a spacer frame, additionally equipped with an external reinforcing U-profile made from a GFRP pultrusion profile.

2. The structure of claim 1, wherein metallic or non-metallic plate-shaped fasteners are mechanically fixed at the edges.

3. The structure of claim 1, wherein metallic or non-metallic angle-shaped fasteners are fixed at the edges.

4. The structure of claim 1, wherein angle-shaped fasteners are installed on the inner and/or outer reinforcement profiles.

5. The structure of claim 1, wherein the internal reinforcement profile is rectangular.

6. The structure of claim 1, wherein the internal reinforcement profile is square-tubed.

7. The structure of claim 1, wherein the internal reinforcement profile is oval.

8. The structure of claim 1, wherein the internal reinforcement profile is U-shaped.

9. The structure of claim 1, wherein both internal and external reinforcement profiles are present.

10. The structure of claim 1, wherein a pultruded strip is mechanically attached to the internal reinforcement.

11. The structure of claim 1, wherein the insulating glass is single-layered and includes integrated reinforcement.

12. The structure of claim 1, wherein the insulating glass is double-layered with embedded reinforcing profiles and strips.