Jan. 3, 1933. J. H. OLD 1,893,101

SHIELD FOR SKYLIGHT, FLOOR LIGHT, AND VAULT LIGHT STRUCTURES

Filed July 22, 1930

Fig. 1.

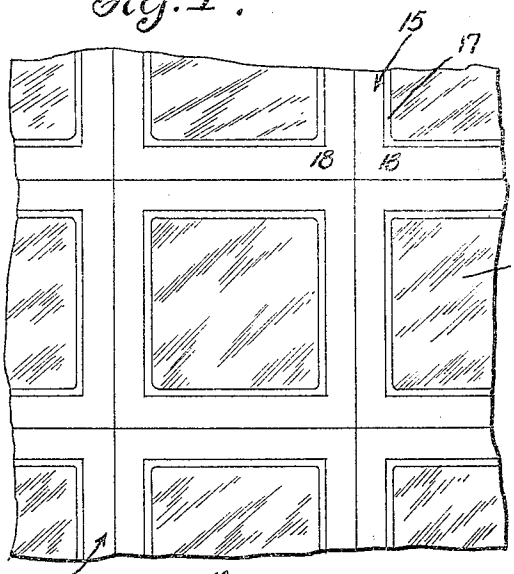


Fig. 3.

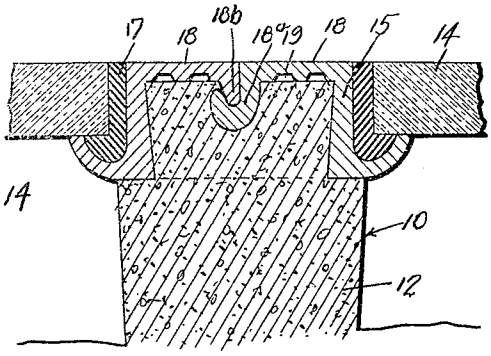
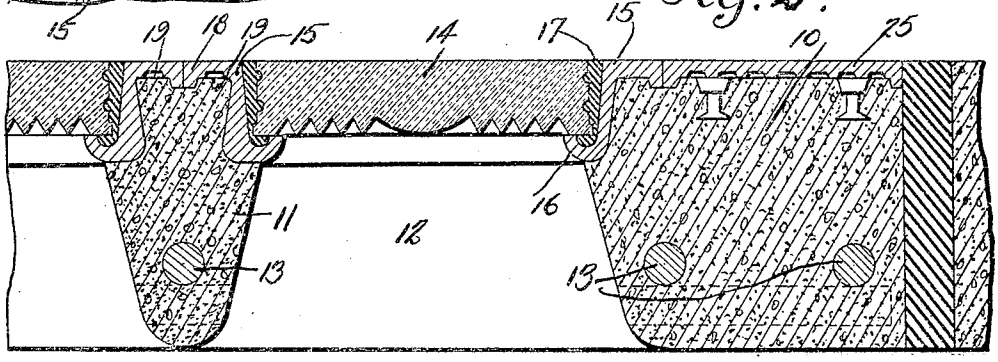


Fig. 2.



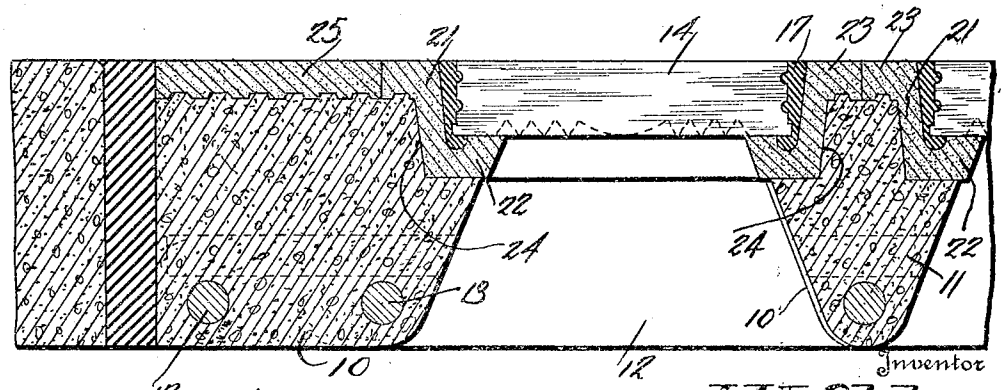


Fig. 4.

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UNITED STATES PATENT OFFICE

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SHIELD FOR SKYLIGHT, FLOOR LIGHT AND VAULT LIGHT STRUCTURES

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This invention relates to skylights, floor light or vault light construction and particularly to such structures formed of concrete and having lenses or thick glass panes set therein. It is the common practice today to support these lenses in what may be termed a concrete frame formed to provide intersecting beams, rafters, or rails defining square or circular openings having seating flanges and to set into the concrete wall bounding each opening a shield having the form of the opening and having inwardly extending flanges upon which the glass, prism, lens or pane rests, there preferably being an intermediate seal between the edge of the glass and the metallic shield.

Heretofore, the surface of the concrete between the shields has been exposed and has had to be finished with a particular finishing surface of concrete after the prisms or lenses have been put in place and this concrete is very liable to wear, to deterioration under weather and to cracking so that after a relatively short time, the concrete between the metallic shields would wear down or disintegrate so that the surface of the concrete would be below the upper edges of the shields and tend to hold water and then if the concrete had previously cracked, this water would be liable to seep into the crack, become frozen and tend to still further disintegrate the concrete.

This objection is a very vital one as it renders the upper surface of the vault light structure or floor light structure irregular and where this structure is used as a skylight structure, there is a tendency to collect water.

The general object of the present invention, therefore, is to avoid this objectionable feature by forming the shield with outwardly extending flanges at the upper edges of the shield, these flanges extending over and covering the upper face of the concrete beam or rafter so as to form an exposed all-metal wearing surface or an exposed earthenware surface or rubber surface where the shield is formed of earthenware or rubber composition.

A further object is to so form the shield elements that they will have interlocking engagement with the concrete beam or rafter.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawing, wherein:—

Figure 1 is a fragmentary top plan view of a vault light, floor light or skylight construction, constructed in accordance with my invention;

Figure 2 is an enlarged vertical sectional view through the construction shown in Figure 1;

Figure 3 is a like view to Figure 2 but showing the modified method of constructing the lens supporting frames or shields;

Figure 4 is a like view to Figure 2 but showing an earthenware or other composition lens supporting frame or shield constructed in accordance with my invention;

Referring to the drawing, 10 designates generally a concrete frame comprising the longitudinally and transversely extending supporting elements 11 and 12. This concrete is preferably reinforced by reinforcing rods 13 or in any other suitable manner. Disposed within the openings defined by the concrete frame, which openings are shown as rectangular, are the glass lenses or panes 14. Disposed upon the concrete beams and embedded therein are the metallic shields designated generally 15 which are square in plan, where the panes or lenses are square, each of these metallic frames being formed with the inwardly extending, upwardly curved gutters or flanges 16, the edge of each flange curving up beneath and preferably bearing against the under face of the pane so that the pane or lens seats upon this upper edge of the gutter or flange 16. Disposed between the edge of the glass pane and the face of the shield 15 is a filling 17 of suitable composition which acts as a cushion and also as a waterproof filling. Preferably the edges of the pane are ground under a grinding wheel so that this ground surface will have proper engagement with this sealing compound 17.

Sealing compounds have been used around the lenses of these structures and, therefore, this forms no part of my invention.

My invention consists in forming each of the shields 15 with an outwardly extending flange 18 so that when the two shields are placed upon the bottom 11, these two shields will overlap the upper face of the beam and meet so that the upper face of the beam will be entirely protected by the flanges 18 of adjacent shields. Preferably these flanges are so formed as to have interlocking engagement with the concrete 11. To this end, as illustrated in Figure 2, the inwardly extending flanges may be formed with indentations 19, projections or any other suitable means whereby the concrete may be interlocked with the shields or, as shown in Figure 2 the inner faces of the vertical portions of the shields are inwardly inclined so as to provide a back draft on the confronting faces of the shield as at 20 to thus anchor the shield to the concrete. In Figure 3, I illustrate the flange 18 of one of the shields as having a downwardly extending upwardly curved portion 18^a while the flange of the confronting shield has a downwardly extending rib 18^b which fits within the recurved flange 18^a and interlocks therewith, thus interlocking the two shields with each other and closing the joint between the two shields.

While I have heretofore referred to these shields as being made of metal, I do not wish to be limited to this as the shields might be formed of fire clay, rubber, or any other non-corrosive composition. Two such shields are illustrated in Figure 4 wherein the shields are designated 21, each shield being formed with the upwardly turned gutter 22 upon which the lens rests.

Each shield is formed with the outwardly extending flange 23, the flanges on adjacent shields abutting against each other as indicated. These shields are formed as illustrated with the outwardly projecting bosses 24 for the purpose of interlocking them to the concrete beam 11.

It is to be understood that while the concrete of the beams is still soft, the shields are forced into place or embedded so that the shields will form an integral part of the structure. By putting the shields in place while the concrete is still soft and forcing the shields down, the concrete may be forced to flow around the undercut portion or "draft" 20 and around the lugs 24 and interlock with the shield. Of course, at the outer margin of the frame 10, a protective plate of metal or earthenware or rubber composition will be used having lugs embedded in the concrete so that this outer margin of concrete will be fully protected. This is indicated at 25.

As before remarked, the lenses may be of any desired form, either many-sided or round and, of course, the figure described by the shields will conform to the shape of the pane or lens of glass. Thus the exterior outline of the shield may be rectangular, and interior outline of the shield circular. My construction provides either for an all metal wearing surface level with the upper faces of the lenses or for an earthenware, rubber or other composition wearing face which is level with the glass or lenses. Such a construction as this prevents deterioration of the upper face of the concrete either by wear or weather and provides a non-corrosive surface which prevents the inlet of water to the concrete and prevents disintegration or deterioration of the concrete.

As a consequence, the pavement, skylight or other structure will last much longer and keep its condition better than where there is no protective covering or surface over the upper face of the concrete.

Preferably standard wire glass units will be used in this structure, though, of course, I do not wish to be limited to this. The shields if of metal are galvanized and rust resisting and the sealing compound is preferably of tar and sulphur.

It is to be particularly noted that the outer surface of the flange 16 comes against the glass pane 14 and that no concrete touches this pane or is spread over the outer margin of the flange 16. Thus there is no chance in erecting this structure of films of concrete being accidentally spread upon the under surface of the glass pane, which films are very difficult to remove. In my construction, the metallic lens supporting frame being formed of non-corrodible metal or of earthenware or other composition, there is no chance of its corroding even where exposed.

While I have illustrated certain details of construction and arrangements of parts, I do not wish to be limited to these exact details as defined in the appended claims, as obviously many minor changes might be made in the form without departing from the spirit of the invention.

I claim:—

1. In a structure of the character described, a concrete frame defining adjacent rectangular openings, lens supporting frames one for each of said openings, each frame constituting a shield and embedded in the corresponding opening, the lens supporting frame being formed by a substantially vertical web having adjacent its lower end an inwardly extending lens supporting flange and at its upper end having an outwardly extending flange, the outwardly extending flanges of adjacent frames extending over, abutting against each other and completely covering the upper face of the concrete frame to thereby form a protective wearing and tread surface therefor.

2. In a structure of the character described, a concrete frame defining adjacent rectangular openings, lens supporting frames, one for each of said openings, each frame constituting a shield, and embedded in the correspond-

ing opening, the lens supporting frame being formed by a substantially vertical web having adjacent its lower end an inwardly extending lens supporting flange and at its upper end having an outwardly extending flange, the outwardly extending flanges of adjacent frames extending over, abutting against each other and completely covering the upper face of the concrete frame to thereby form a protective wearing and tread surface therefor, the outwardly extending flange of one frame being formed at its margin with a downwardly and outwardly curved flange, the outer edge of the corresponding flange on the adjacent frame having a downwardly extending portion fitting within the outwardly curved flange of the first named frame.

3. In a structure of the character described, a concrete frame defining adjacent rectangular openings, and rectangular lens supporting frames constituting shields and set into said openings, each of said lens supporting frames being formed by vertical webs having lens supporting portions and each vertical web having an outwardly extending flange at its upper end, the outwardly extending flanges of adjacent lens supporting frames extending entirely over the upper face of the concrete frame and abutting each other, and lenses supported within said lens supporting frames and having their upper faces flush with the upper faces of said outwardly projecting flanges on the frames.

4. In a structure of the character described, a concrete frame defining adjacent openings, a lens supporting frame of non-corrosive material constituting a lens shield and embedded in said openings, each of the lens supporting frames being formed by a substantially vertical web having at its lower end inwardly extending lens supporting means and at its upper end having an outwardly extending flange, the outwardly extending flanges of adjacent frames extending entirely over the upper face of the concrete frame between said lenses and abutting against each other to thus form a protective and tread surface for said concrete frame, the lenses resting upon said lens supporting means and having their upper surfaces flush with the upper surfaces of said outwardly projecting flanges, and sealing material disposed between the edges of the lenses and the adjacent surfaces of the frames.

5. In a structure of the character described, a concrete frame defining adjacent openings, a lens supporting frame of non-corrosive material and constituting a shield disposed within said openings, each of said lens supporting frames having at its lower edge an inwardly and upwardly extending gutter-shaped flange and each lens supporting frame at its upper edge being formed with an outwardly extending flange, the outwardly extending flanges of adjacent lens supporting frames abutting against each other and extending entirely over the concrete frame to form a protective and tread surface for the same, lenses disposed upon said gutter-shaped flanges and having their upper surfaces flush with the upper surfaces of the outwardly projecting flanges and sealing material disposed within the gutter shaped flanges and between the edges of the lenses and the adjacent faces of the lens supporting frames.

6. A structure of the character described, including a concrete supporting frame, having lens receiving openings, lenses disposed in said openings, and protective elements of non-corrosive material disposed over and anchored to the upper face of the concrete supporting frame the elements having edge contact and extending entirely over the upper face of the concrete supporting frame to provide a tread and protective surface therefor.

7. In a structure of the character described, a concrete frame defining a plurality of openings, a plurality of metallic frames, each constituting a lens holder and shield, each lens holder having an upright portion formed with an inwardly projecting lens supporting flange at its lower edge and having at its upper edge an outwardly projecting substantially horizontal flange, the spaces between the confronting faces of the lens supporting frames being less in width than the greatest width of the concrete frame, said supporting frame being embedded in the concrete frame and the concrete of the frame filling the spaces between the upright portions of the lens supporting frames, the horizontal flanges of the lens supporting frames abutting each other and entirely covering the upper face of the concrete supporting frame.

8. In a structure of the character described, a concrete frame defining a plurality of openings, a plurality of metallic frames, each constituting a lens holder and shield, each lens holder having an upright portion formed with an inwardly projecting lens supporting flange at its lower edge and having at its upper edge an outwardly projecting substantially horizontal flange, the spaces between the confronting faces of the lens supporting frames being less in width than the greatest width of the concrete frame, said supporting frames being embedded in the concrete frame and the concrete of the frame filling the spaces between the upright portions of the lens supporting frames, the horizontal flanges of the lens supporting frames abutting each other and entirely covering the upper face of the concrete supporting frame, the outer face of the upright portion of each lens supporting frame extending outward and downward into the concrete whereby to anchor the frame in the concrete frame.

9. In a structure of the character described,

a concrete frame defining a plurality of openings, a plurality of metallic frames, each constituting a lens holder and shield, each lens holder having an upright portion formed with an inwardly projecting lens supporting flange at its lower edge and having at its upper edge an outwardly projecting substantially horizontal flange, the spaces between the confronting faces of the lens supporting frames being less in width than the greatest width of the concrete frame, said supporting frame being embedded in the concrete frame and the concrete of the frame filling the spaces between the upright portions of the lens supporting frames, the horizontal flanges of the lens supporting frames abutting each other and entirely covering the upper face of the concrete supporting frame, the outer face of the upright portion of each lens supporting frame extending outward and downward into the concrete whereby to anchor the frame in the concrete frame, the inner faces of the upright portion of each lens supporting frame being inclined downward and inward, lenses disposed within said lens supporting frame and resting upon the lower flanges thereof, and a filling of initially plastic material disposed between each of said lenses and the upright portion of the corresponding frame.

10. A structure of the character described, including a concrete supporting structure having lens openings, lenses disposed in said openings, and protective elements disposed over and anchored to the upper face of the concrete, said elements having contact with each other and extending entirely over and protecting the upper face of the concrete supporting structure and providing a tread therefor.

In testimony whereof I affix my signature.

JAMES H. OLD.