Nov. 14, 1933. W. N. THURN 1,935,583

REENFORCED VITREOUS PANEL AND METHOD OF MAKING THE SAME

Filed Jan. 27, 1930

Fig. 1.

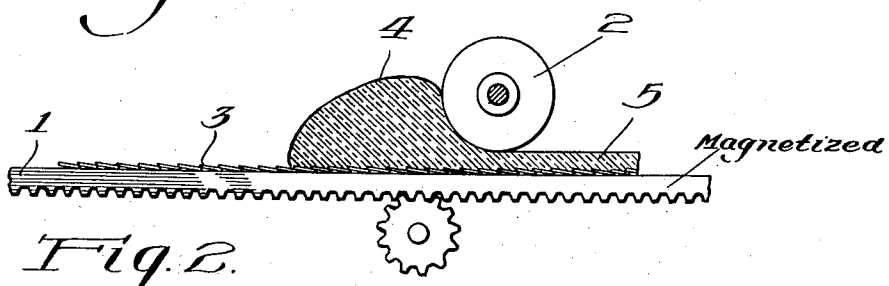


Fig. 2.

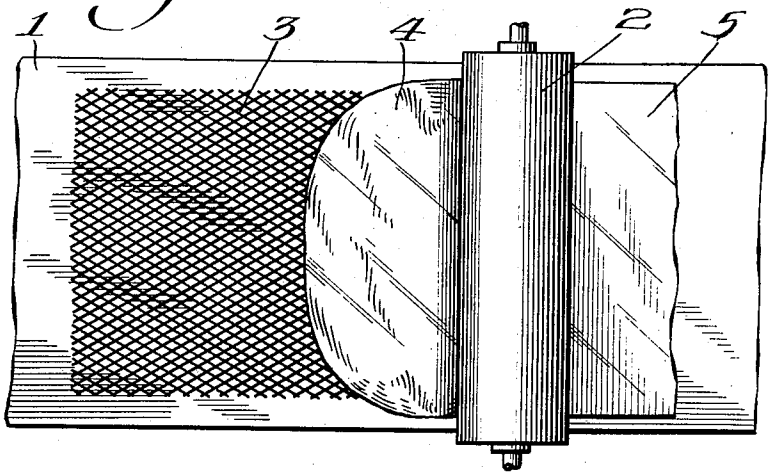


Fig. 3.

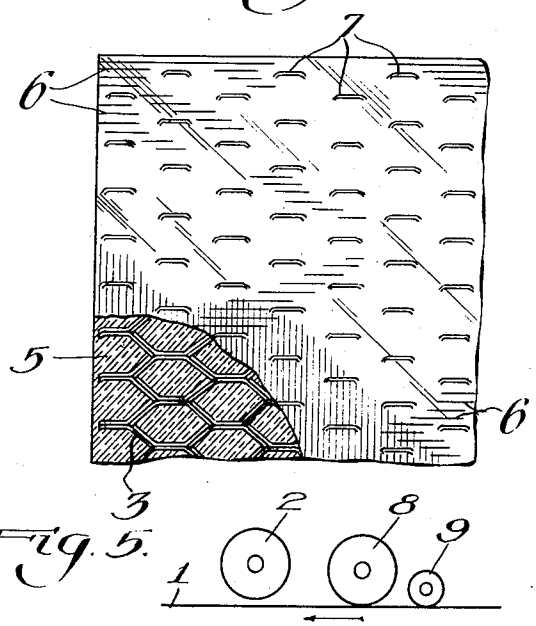


Fig. 4.

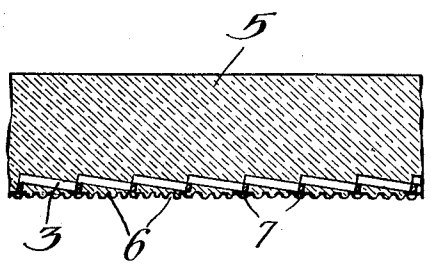


Fig. 5.

Inventor:
Walter N. Thurn

By Wm. F. Freudenreich.

Atty.

Patented Nov. 14, 1933

1,935,583

UNITED STATES PATENT OFFICE

1,935,583

REENFORCED VITREOUS PANEL AND METHOD OF MAKING THE SAME

Walter N. Thurn, Chicago, Ill., assignor to The Vitrolite Company, a corporation of West Virginia

Application January 27, 1930. Serial No. 423,694

15 Claims. (Cl. 49—86)

The present invention relates particularly to panels, slabs or other large bodies of vitreous material, or what may be termed opaque structural glass, and their manufacture. Elements of this kind are made by casting a molten batch containing, in addition to silica which forms the main constituent of glass, various ingredients to render the product opaque and cause it to have any desired color. The molten batch is deposited upon a casting table and rolled out into a sheet; or, the casting table may be the bottom of a mold, so that the final shape is given by forcing a plunger-like top member downwardly upon the mass in the mold.

Where the molten vitreous material is rolled it is difficult to secure a flat fire-finished face on a large sheet or panel, as there is always more or less tendency toward distortion and unevenness. Furthermore, panels of this kind break more easily than is desirable when subjected to blows or to distorting stresses while in use; this objectionable characteristic having militated against the employment of this material in certain fields as, for example, interiors and exteriors for buildings.

Viewed in its several aspects, the present invention may be said to have for its object to overcome the objections above enumerated.

In carrying out my invention I form the opaque vitreous panel in the usual way, casting it, however, upon a comparatively stiff metal reenforcing structure, preferably, a sheet of expanded metal of a shape similar to the well known forms of expanded metal lath. The reenforcing structure is thus embedded in the under side of the panel, close to and parallel with the under face. The reenforcing structure contains sufficient mass so that the effect of the same and the underlying casting table is to cool what may be termed the bottom layer of the panel and cause it quickly to congeal. Consequently, when the sheet or panel is removed from the casting table to the annealing ovens, the bottom of the panel has hardened sufficiently to form a firm foundation for the overlying softer vitreous body and consequently the top of the panel will retain its original flat condition. Thereafter, if a panel is broken in use, the parts will be held together by the reenforcing structure.

A further advantage of my improved process is that the placing of the reenforcing fabric close to one face of the panel makes it possible to provide satisfactory means for anchoring a panel securely to a wall without interfering with the best recognized practice of making panels and without depreciation of the quality of the panels.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawing, wherein:—

Figures 1 and 2 are respectively a side view and a top view of a fragment of a casting table, illustrating more or less diagrammatically the carrying out of my improved method; Fig. 3 is a rear view of a fragment of a completed panel, a portion being shown in section; Fig. 4 is a section through the panel at right angles to one of the broad faces, only a fragment of the panel being shown; and Fig. 5 is a diagrammatic illustration of a modified arrangement of rolls cooperating with the casting table.

Referring to the drawing, 1 represents an ordinary casting table and 2 a roll under which the table is adapted to be moved in the process of rolling out a molten mass to form a sheet or slab.

In accordance with my invention, I lay on the table a sheet of metal reenforcing material 3 before depositing the molten mass 4. I have found that the best results are obtained by employing a comparatively stiff reenforcing sheet having considerable mass as, for example, expanded metal of the expanded metal lath type of comparatively small mesh. In the arrangement shown, the reenforcing structure is metal expanded to form diamond mesh the broad faces of whose strands lie at an acute angle to the plane of the sheet.

When the table with the overlying reenforcing sheet is moved toward the right in Figs. 1 and 2, the molten vitreous material is flattened out and pressed through the interstices in the reenforcing material, producing a flat slab or panel 5 having the reenforcing fabric embedded in the bottom thereof.

In practice the top faces of the casting tables are not smooth but are provided with numerous, closely-spaced, tiny ridges extending from one end to the other. In effect, therefore, the molten vitreous material is pressed below the plane of the under side of the expanded metal, as it is caused to fill the valleys between the ridges; resulting in completely embedding the expanded metal within the body of the panel but close to and at a definite distance from a flat plane touching the small ridges on the back or under face of

the panel. These ridges are indicated at 6, but they have been partly omitted from Fig. 3 for the purpose of permitting the effect of the expanded metal on the back or under face of the panel to be more clearly seen. The strands, as will be apparent from Fig. 4, are inclined lengthwise to the plane of the sheet, so that some portions of the strands come closer to the surface of the sheet than do others. This results, where the ordinary standard casting table is used, in little depressions 7 in the back or under face of the sheet, along the near portions of the strands, because the molten material has not been able to flow into the little valleys in the table at these points to a greater depth than will serve to cover the strands.

The casting table may be magnetized so as to insure that the expanded metal will be held down in a flat condition, although I have found that good results without employing a magnetized table can be obtained.

Furthermore, the reenforcing fabric may be made of rustless iron or other non-rusting material that will be strong enough and not deteriorate under the heat to which it is subjected and that has the proper coefficient of expansion. It is necessary that the reenforcing fabric be clean. It is not in all cases essential that the fabric be heated before being placed on the table, although it may be heated to a high enough temperature to burn off any oil or grease, and to pre-expand the fabric before it is placed on the table.

Thick panels are usually rolled in several layers. In such cases, in addition to the reenforcing near an outer face of the panel there may be other reenforcing sheets placed between the layers. In some cases, where built-up panels are required to have both faces polished, they may be reenforced by simply placing the reenforcing fabric between the layers.

My improved panels are not only free from distortion, but they are very strong and adapted for uses that have not heretofore been open to this type of material. A very important feature is the facility with which the panels may be anchored successfully to the face of a wall, through the reenforcing material; thus making possible the use of vitreous opal panels for facing the outside walls of tall buildings as well as other high walls. Specific means for so anchoring panels are claimed in another application, however.

In Fig. 5 there is shown a modified arrangement of rolls for rolling out the panels. In addition to the roll 2 there is another roll 8 placed in advance thereof. The molten batch is poured upon the table between these rolls which have a squeezing effect on the same before flattening it upon the table; thereby working out gas bubbles that might otherwise produce defects in the finished product. There may also be a third roll, as indicated at 9, ahead of the roll 8. This third roll is adapted to rest on the fabric near the point where it engages the molten vitreous material, so as to aid in causing the fabric to lie flat on the table. The reenforcing fabric being laid on the table to the right of the roll 9, the table is moved toward the left, under the rolls, and the molten vitreous material is poured between the rolls 2 and 8 at the proper time to position the advance end of the reenforcing fabric at the desired point with respect to the advance end of the sheet or panel.

While I have illustrated and described with particularity only the best form of my invention now known to me I do not desire to be limited to the details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of my invention constituting the appended claims.

I claim:—

1. The method of making a cast reenforced vitreous panel, which consists in laying directly on top of a casting table a sheet of expanded metal, and casting a panel of vitreous material upon the top of said expanded metal.

2. The method of making a cast reenforced vitreous panel, which consists in heating a sheet of expanded metal, laying the sheet directly on the top of a casting table and, while the sheet is still hot but much cooler than the molten vitreous material, casting a panel of vitreous material upon said sheet.

3. The method of producing a cast vitreous panel having an undistorted fire-finished face, which consists in casting a panel of vitreous material upon a comparatively stiff sheet of expanded metal.

4. The method of producing a cast vitreous panel having an undistorted fire-finished face, which consists in casting a panel of vitreous material upon a comparatively stiff sheet of expanded metal composed of bonded strands whose wide faces make an acute angle with the plane of the sheet.

5. The method of producing a cast vitreous panel having an undistorted fire-finished face, which consists in laying directly on top of a casting table a comparatively stiff flat sheet of expanded metal the broad faces of whose strands form an acute angle with the plane of the sheet, and then casting a panel of vitreous material upon said sheet.

6. The method of producing a reenforced cast vitreous panel having an undistorted fire-finished face, which consists in casting a panel of vitreous material upon a comparatively stiff sheet of expanded metal sufficiently massive and cool enough to cause the adjacent lower portions of the molten mass, while lying on the casting table, to congeal quickly relatively to the upper part of the mass.

7. The method of producing a reenforced vitreous panel which consists in laying on a magnetized casting table a metal fabric of magnetic material and, while the fabric is held down on the table, casting thereon a panel of vitreous material.

8. A cast vitreous panel having a comparatively stiff flat sheet of expanded metal embedded therein and lying close to and parallel with the face of the panel that lay upon the casting table during the casting process.

9. A cast vitreous panel having embedded therein and positioned close and parallel to the face that lay upon the casting table during the casting operation, a flat, comparatively stiff sheet of expanded metal and broad faces of whose strands make an acute angle with said face.

10. An opaque vitreous panel having a comparatively stiff expanded metal sheet embedded in the body thereof and lying near and parallel to one face of the panel.

11. The method of producing a reenforced panel of opaque vitreous material which consists in laying a comparatively stiff sheet of expanded metal directly upon a flat rigid base member, covering the sheet with molten opal vitreous ma-

terial, and rolling the molten vitreous material into the interstices in the sheet.

12. The method of producing a reenforced cast vitreous panel having an undistorted fire-finished face, which consists in laying directly on top of a flat casting table, a comparatively stiff sheet of expanded metal sufficiently massive and cool enough to cause the adjacent portions of a molten mass of opaque structural glass material to congeal quickly relatively to the upper part of the molten mass, pouring upon the table a mass of molten structural glass material and rolling the molten material into a sheet or panel having the expanded metal embedded in the body thereof.

13. A cast and rolled opaque structural glass panel having embedded therein near the face of the panel that lay upon the casting table during the casting operation and remote from the opposite face a comparatively stiff sheet of expanded metal.

14. A cast and rolled opaque structural glass panel having embedded therein near the face of the panel that lay upon the casting table during the casting operation and remote from the opposite face a comparatively stiff sheet of expanded metal of the diamond mesh type.

15. A cast and rolled opaque structural glass panel flat on the side that lay upon the casting table during the casting operation, and a comparatively stiff sheet of expanded metal embedded in said panel near the aforesaid side and remote from the opposite side.

WALTER N. THURN.