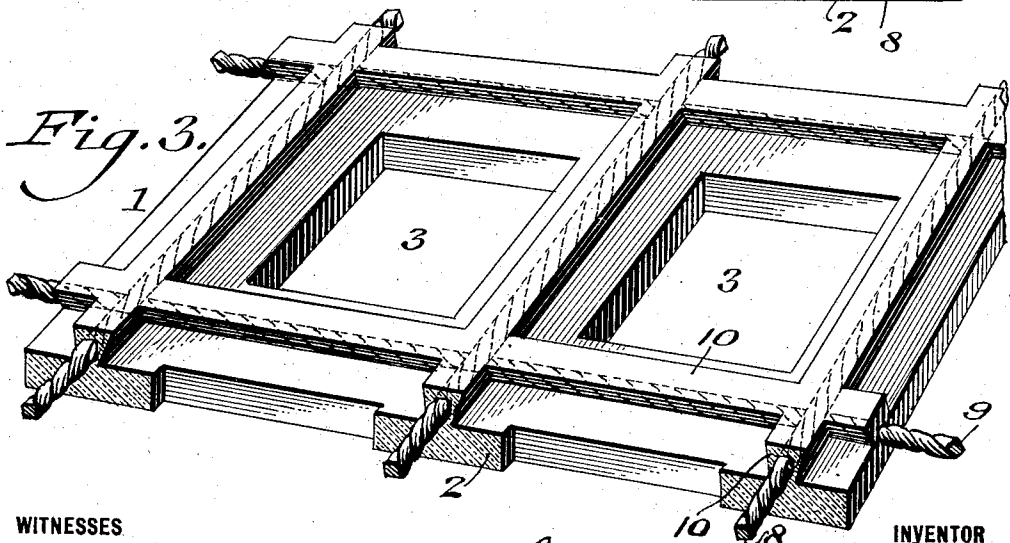
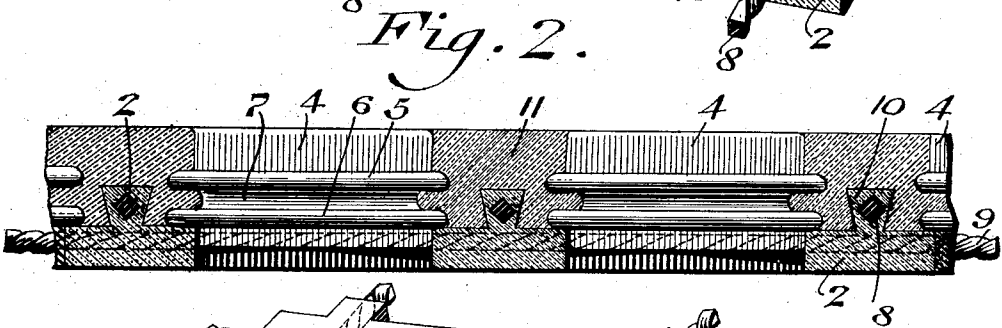
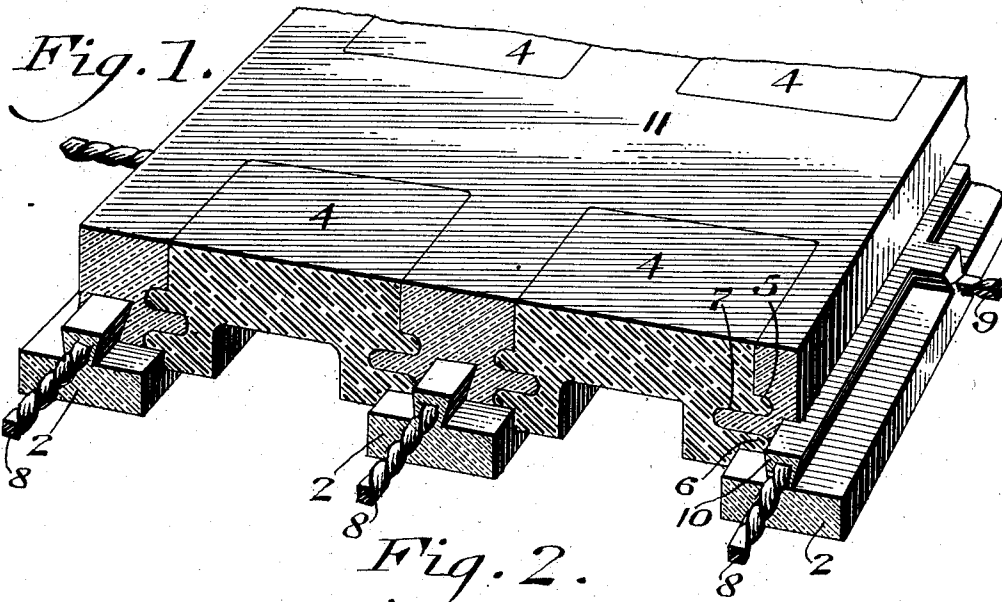


L. W. MULFORD.
 CONCRETE SKYLIGHT, VAULT LIGHT, AND FLOOR LIGHT.
 APPLICATION FILED JUNE 3, 1911.

1,021,548.

Patented Mar. 26, 1912.

3 SHEETS—SHEET 1.



WITNESSES

P. F. Nagle.
L. Quaville.

INVENTOR

Logan Willard Mulford

BY

Hedersheim Jacobson

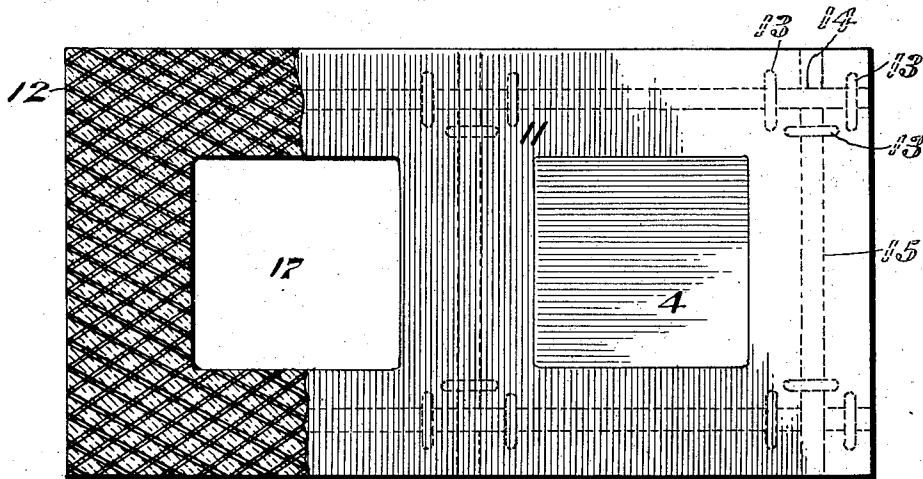
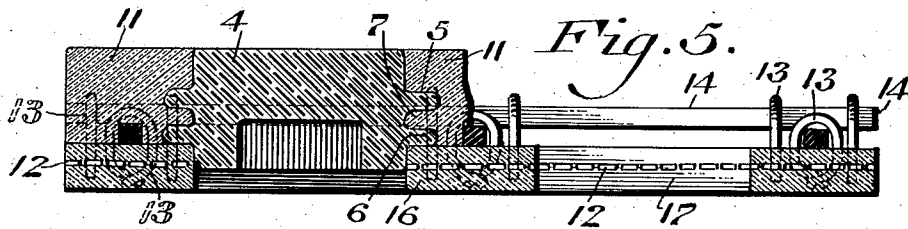
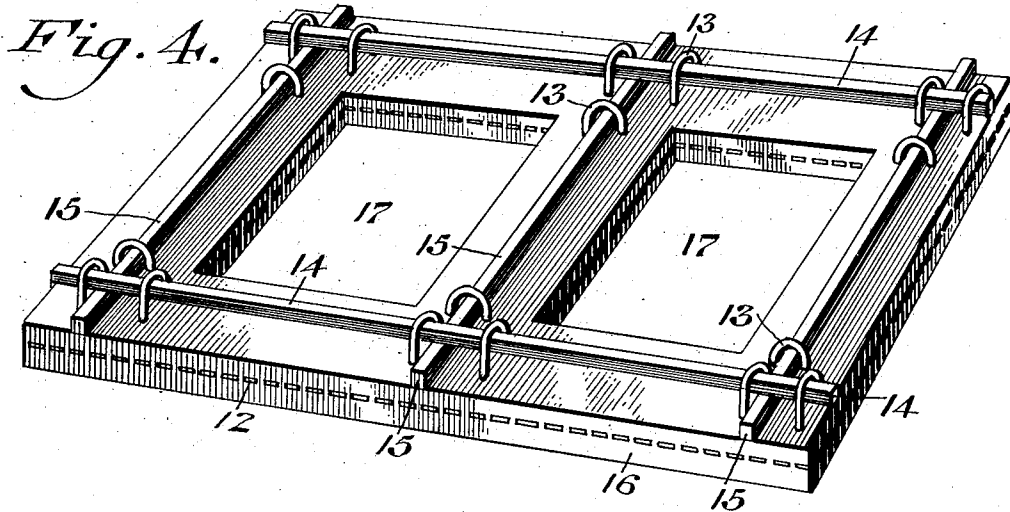
ATTORNEYS

L. W. MULFORD.
CONCRETE SKYLIGHT, VAULT LIGHT, AND FLOOR LIGHT.
APPLICATION FILED JUNE 3, 1911.

1,021,548.

Patented Mar. 26, 1912.

3 SHEETS—SHEET 2.



WITNESSES

D. F. Nagle.
L. Douville.

Fig. 6.

BY

Logan Willard Mulford
Mederstein & Gaitanakis

INVENTOR

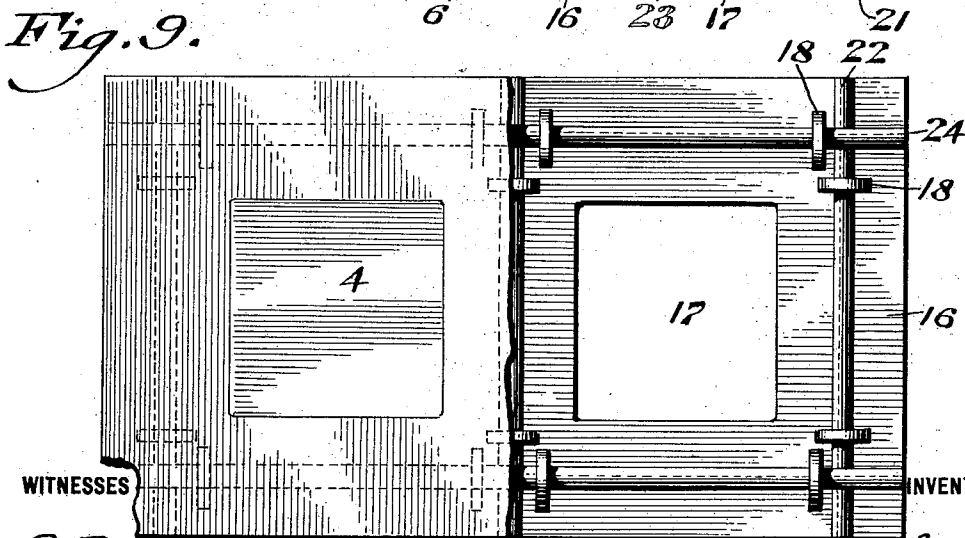
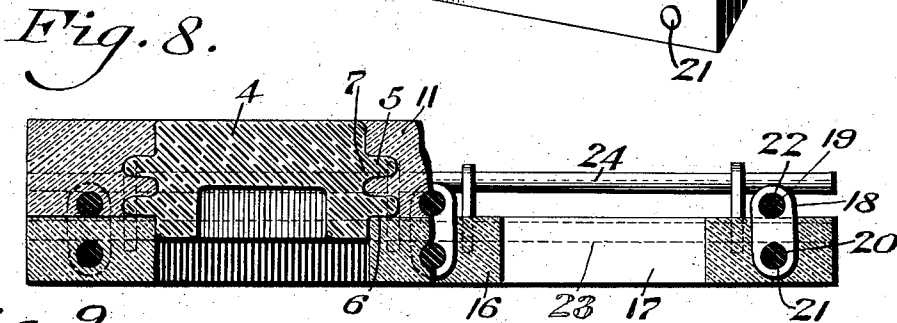
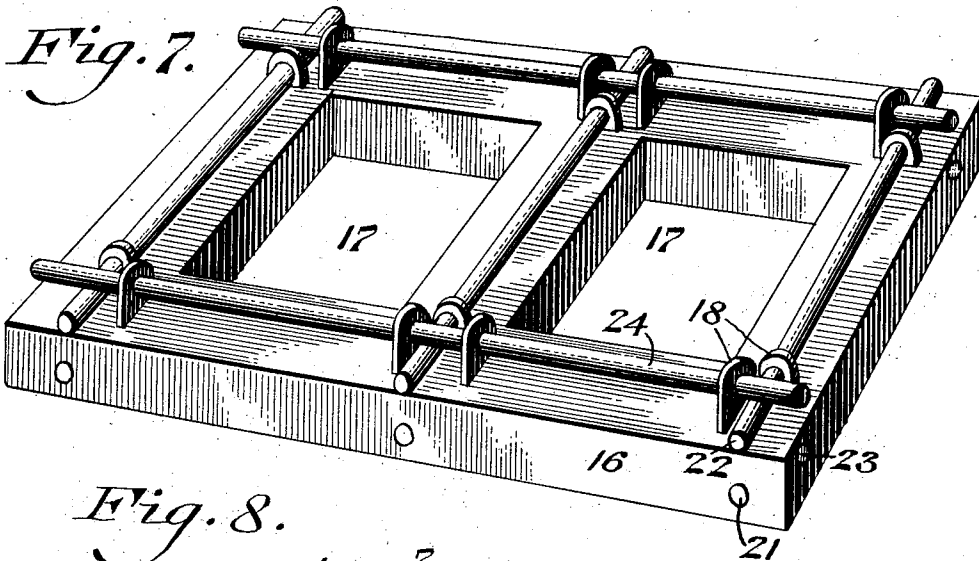
ATTORNEYS

L. W. MULFORD.
 CONCRETE SKYLIGHT, VAULT LIGHT, AND FLOOR LIGHT.
 APPLICATION FILED JUNE 3, 1911.

1,021,548.

Patented Mar. 26, 1912.

3 SHEETS—SHEET 3.



WITNESSES

INVENTOR

P. F. Nagle.
E. J. Conville.

BY *Logan Willard Mulford.*
Kiedersheim Garbantes.
 ATTORNEYS

UNITED STATES PATENT OFFICE.

LOGAN WILLARD MULFORD, OF NARBERTH, PENNSYLVANIA.

CONCRETE SKYLIGHT, VAULT-LIGHT, AND FLOOR-LIGHT.

1,021,548.

Specification of Letters Patent.

Patented Mar. 26, 1912.

Application filed June 3, 1911. Serial No. 631,084.

To all whom it may concern:

Be it known that I, LOGAN WILLARD MULFORD, a citizen of the United States, residing at Narberth, in the county of Montgomery, State of Pennsylvania, have invented a new and useful Concrete Skylight, Vault-Light, and Floor-Light, of which the following is a specification.

In devices of this character, as heretofore manufactured, it has been impracticable, owing to the cost of transportation from the factory to the place of usage, and also from the great liability to breakage in transit, and further the impossibility of making a first class installation at the building, to substantially complete the construction before shipping and where long hauls are necessary the cost of transportation has rendered such methods commercially impracticable.

The object of my present invention is to devise a novel sky light, vault light and floor light whereby the construction may be partially or substantially completed at the factory and then shipped to its destination, at which place it may be readily placed in position by unskilled labor, the parts being constructed in such a manner that the elements thereof are not in danger of being moved out of alinement with consequent detriment to the finished construction, and my novel method also provides a construction in which the top finish and the watertight finishing work can be done at the building, thus accomplishing the same purpose as when the entire work of construction is done at the building, and at the same time greatly reducing the cost of construction.

My invention in its broad and generic scope consists of a novel construction wherein a concrete slab having tile or lens receiving openings is built up, after which such slab is shipped to its destination and located in position, then the openings are covered by the lenses or tiles, and then the construction is completed by pouring on the concrete in such a manner as to embed the tiles and secure them in proper position.

My invention further consists of a novel sky light, vault light and floor light construction which may be partly finished at the factory and then completed at a desired place of construction with a large reduction in the cost of construction.

It further consists of a novel sky light, vault light and floor light construction

wherein novel means are provided for bonding the new concrete with that which has set.

It further consists of a novel reinforced concrete construction provided with openings adapted to receive the lenses or tiles and with means for causing a bond between the binding material used to complete the construction and embed the lenses and the preformed binding material.

It further consists of a novel sky light, vault light and floor light construction wherein the lenses or tiles are wholly supported by the binding material which secures them in position thereby eliminating in a large measure the breakage of the lenses or tiles.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

For the purpose of illustrating my invention, I have shown in the accompanying drawings preferred embodiments thereof which have been found in practice to give satisfactory and advantageous results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a perspective view of a portion of a sky light, vault light and floor light construction embodied in my invention. Fig. 2 represents a sectional elevation of Fig. 1. Fig. 3 represents a perspective view showing the construction as manufactured at the factory and ready for shipment. Fig. 4 represents a perspective view of another embodiment of my invention showing the same as ready for shipment. Fig. 5 represents a sectional elevation of Fig. 4 but showing in addition a lens in place and the binding material in coöperative relation with respect thereto. Fig. 6 represents a plan view of the finished construction partly broken away to show more clearly one type of metal reinforcement. Fig. 7 represents a perspective view of another embodiment of my invention. Fig. 8 represents a sectional elevation of Fig. 7 but showing in addition a tile in position and the binding material in coöperative relation with respect thereto. Fig. 9 represents a plan view of Fig. 8.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, my invention in its broad and generic scope and in its simplest form consists of a concrete slab, having tile receiving openings, which is adapted to be located in position and after the tiles have been placed in their proper positions above the openings, a second layer of concrete is formed thereon which embeds the tiles and finishes the construction, and in order that my construction may be more clearly understood I have shown herein certain embodiments thereof which may be advantageously employed in practice.

In all of the embodiments of my invention herein illustrated, I have shown a construction which is preferably completed at the factory to such an extent that it is adapted to receive the lenses or tiles, and provided with bonding elements adapted to receive rods or bars of any desired contour so that after the partly completed construction is received at its destination, the rods or bars may be assembled with respect to the bonding elements, the lenses placed in position and embedded in the binding material which unites with the bonding elements, so that the binding material which is preformed, will be united in a reliable and stable manner with the binding material which embeds the lenses and secures them in position.

Referring first to the embodiment seen in Figs. 1 to 3 inclusive, 1, as indicated in Fig. 3, designates the construction as completed ready for shipment, and wherein a foundation or layer of binding material 2 of any desired nature is employed, which in the present instance, forms a layer of substantially uniform thickness and is provided with openings 3 therethrough adapted to receive the lenses or tiles 4 which may be of any desired character and which, in the present instance, are illustrated as provided with the laterally extending flanges 5 and 6 between which is located a laterally extending groove 7 which extends into the body portion of the tile in order to provide a space adapted to be filled with binding material. 8 designates rods or bars which may have any desired contour and are preferably arranged parallel with respect to each other, it being noted that rods or bars 9 extending at right angles to the bars 8 are employed in order to reinforce the concrete. These rods or bars 8 or 9 may be round or deformed, that is, they may have either a round contour or any other desired contour may be given thereto and still be within the scope of my invention. The rods or bars 8 and 9 respectively are arranged in any desired manner, in the present instance in different horizontal planes, the rods 9, in the present instance, being located in the

layer 2, while the rod 8 is located in a plane thereabove, and these members 8 and 9 are embedded in the same binding material as that which forms the layer 2 in order to form dovetail projections 10 which intersect each other, as will be best apparent from Fig. 3.

It will of course be understood that in the process of manufacture the members 8 and 9 are supported in a suitable form or mold so that when the binding material is placed therein a construction such as is seen in Fig. 3 will be formed, in which the layer 2 and dovetail members 10 are simultaneously produced.

After the construction has been completed to the extent indicated in Fig. 3, the same is ready for shipment to the desired destination. After being located in its proper position the lenses or tiles 4 are placed in position above the openings 3 so that the rib 6 will surround the walls of such opening, after which the binding material 11 is placed in position so as to embed the tiles and interlock with the ribs 5 and 6 and the groove 7 therebetween and also interlock with the dovetail members 10 so that when the parts are in assembled position the binding material 11 will be united in a positive manner with respect to the binding material 2 and the members 10.

In the embodiment seen in Figs. 4 to 6 inclusive, I have shown the metal reinforcements as consisting of any desired number of layers of apertured or expanded metal 12 through which passes bonding elements 13, which, in the present instance, are shown as having their ends secured together and embedded in the concrete although, as will be apparent, the ends of the bonding elements 13 may extend above the layer of preformed concrete. In this embodiment the bonding elements 13 extend throughout the construction thereby adapting the same to receive the rods 14 and 15 which in this embodiment, I have illustrated as being of rectangular contour. The construction, comprising the concrete base 16 having the tile receiving apertures 17 therein and the bonding elements 13, may be shipped from the factory either with or without the rods 14 and 15 in assembled relation with respect thereto. The tile 4 is constructed in a similar manner to that already described with reference to Figs. 1 to 3 inclusive and is secured in position by means of the binding material 11 in a similar manner, it being seen that the binding material embeds the bonding elements 13 and the rods 14 and 15 so that a bond or tie is formed between the old concrete or binding material and the new concrete or binding material.

In the embodiment seen in Figs. 7 to 9 inclusive, I have shown a construction wherein a different type of bonding elements

is employed and in this embodiment the bonding elements consist of strips 18 preferably metallic and provided with apertures 19 and 20, the apertures 20 being adapted to receive the rods 21 which in this instance are embedded in the lower concrete layer 16 while the upper ends of the members 18 are adapted to receive rods 22, it being understood that similar binding elements 18 are employed through which are adapted to pass the rods 23 which are embedded in the preformed concrete and rods 24 which latter are adapted to be embedded in the concrete which is used to embed the tiles and form a bond with the bonding elements 18 and the rods 22 and 24. It will be readily apparent from Fig. 8 that the binding material interlocks with the tile in a similar manner to that already described with reference to other figures of the drawings.

It will now be apparent that in carrying out my novel construction I first form a concrete slab having tile receiving openings therein and such construction is then located in position, the tiles are located in place and then concrete is poured on the concrete slab so as to embed the tiles. In some cases it is advantageous instead of simply forming a concrete slab to form a reinforced concrete slab, it being understood that the reinforcements may be of any desired nature and such reinforced concrete slab having tile receiving openings therein may be located in position and then completed, as hereinbefore described, by placing the tiles in position and embedding them in another layer of concrete.

In many cases arising in practice it is advantageous to provide a concrete slab or a reinforced concrete slab having the tile receiving openings therein with bonding elements of any desired nature, so that after the tiles are placed in position and the second layer of concrete is formed a positive bond or tie will be produced between the preformed concrete construction and the concrete which embeds the tiles.

In many cases arising in practice it is advantageous to reinforce not only the first layer of concrete but also the second layer of concrete and in such case I preferably interlock with or secure to the bonding elements in any desired manner the reinforcements of the second layer of concrete.

It will be apparent to those skilled in the art that when concrete or similar binding material is applied to a preformed concrete slab, as shown in the various embodiments of my invention that a union of the preformed and subsequent formed slabs, is effected on a neutral axis, the tension stress being exerted on the preformed or lower slab and the compression stress on the upper slab, the ingredients of the slabs uniting as a homogeneous mass after the operation is

completed, so that an intimate union between the upper and lower layers of concrete is effected, without the use of bonding elements although in practice I prefer to employ such bonding devices.

In so far as I am aware, I am the first in the art to form a concrete slab having tile receiving openings so that the same may be shipped from the factory and wherein the construction is completed by locating such concrete slab in its proper place, placing the tiles thereon and then pouring on concrete to embed the tiles and secure them in position and it is to be understood that my claims to such features are to be interpreted with corresponding scope.

It will now be evident to those skilled in this art that I have devised a construction which may be partially or substantially completed at the factory so that the openings for the tile will be properly aligned and a reinforced concrete slab produced which may be placed in position by unskilled labor. The tiles may then be placed in position and it is simply necessary to pour in the concrete which unites with the bonding elements, as herein described, so that a firm bond or tie between the old concrete and the new concrete or other binding material is produced. In devices of this character, as heretofore constructed, it has been necessary to send a skilled workman from the factory to assemble the devices, but when devices are employed constructed in accordance with my novel invention, the same may be readily assembled by unskilled labor with consequent economy in the cost of construction.

It will now be apparent that I have devised a novel and useful concrete skylight, vault light and floor light which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described a preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. As a new article of manufacture, a sky light, vault light or floor light construction, consisting of a reinforced concrete slab having lens receiving openings therein, and provided with bonding elements extending beyond an outer face of said slab.

2. As a new article of manufacture, a sky light, vault light or floor light construction, consisting of a reinforced concrete slab having lens receiving openings therein, and provided with bonding elements extending be-

yond an outer face of the slab, and a second layer of reinforcing devices connected to said bonding elements.

3. As a new article of manufacture, a sky
5 light, vault light or floor light construction, consisting of a reinforced concrete slab having lens receiving openings therein, lenses covering the lens receiving openings and a layer of concrete surrounding said lenses.

10 4. As a new article of manufacture, a sky light, vault light or floor light construction consisting of a reinforced concrete slab, having lens receiving openings therein, bonding
15 elements extending beyond an outer face of said slab, lenses covering said lens receiving openings and a layer of concrete surrounding said lenses and embedding said bonding elements.

5. As a new article of manufacture, a sky
20 light, vault light or floor light construction,

comprising a reinforced concrete slab, having lens receiving openings therein, bonding elements extending beyond an outer face of the slab, a second layer of reinforcing devices connected with said bonding elements, 25 lenses covering said lens receiving openings, and a layer of binding material surrounding said lenses and embedding said bonding elements and second layer of reinforcing devices. 30

6. As a new article of manufacture a sky-light, vault light or floor light construction consisting of a reinforced concrete slab having lens receiving openings therein and a second concrete slab united to said former 35 slab.

LOGAN WILLARD MULFORD.

Witnesses:

E. HAYWARD FAIRBANKS,
H. S. FAIRBANKS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."