June 17, 1952 H. W. ASHMAN 2,601,082

CONCRETE AND SHUTTERING FLOOR STRUCTURE

Filed April 25, 1946 2 SHEETS—SHEET 1

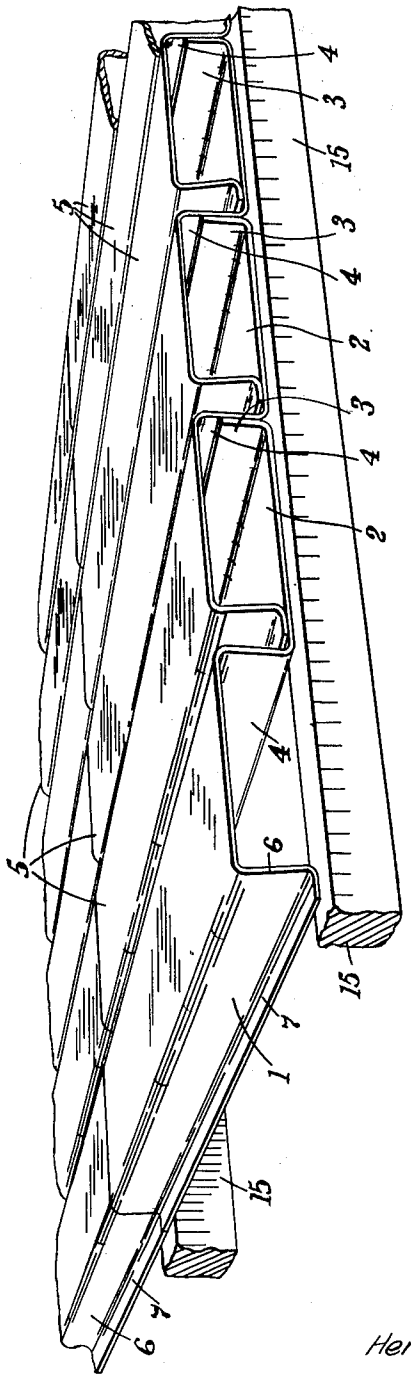


Fig. 1.

Inventor
Herbert William Ashman
By
Thos. E. Scofield
Attorney

June 17, 1952 H. W. ASHMAN 2,601,082

CONCRETE AND SHUTTERING FLOOR STRUCTURE

Filed April 25, 1946 2 SHEETS—SHEET 2

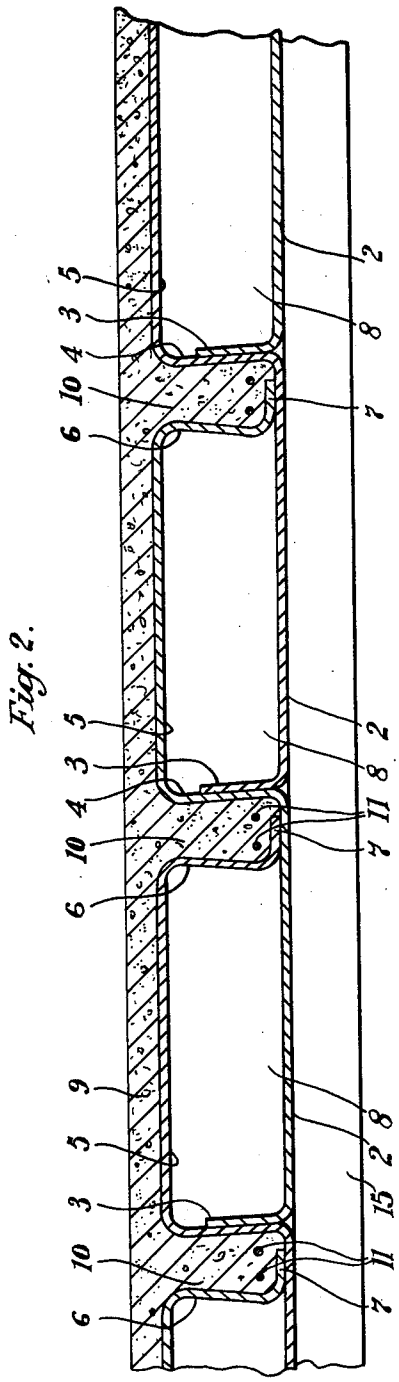


Fig. 2.

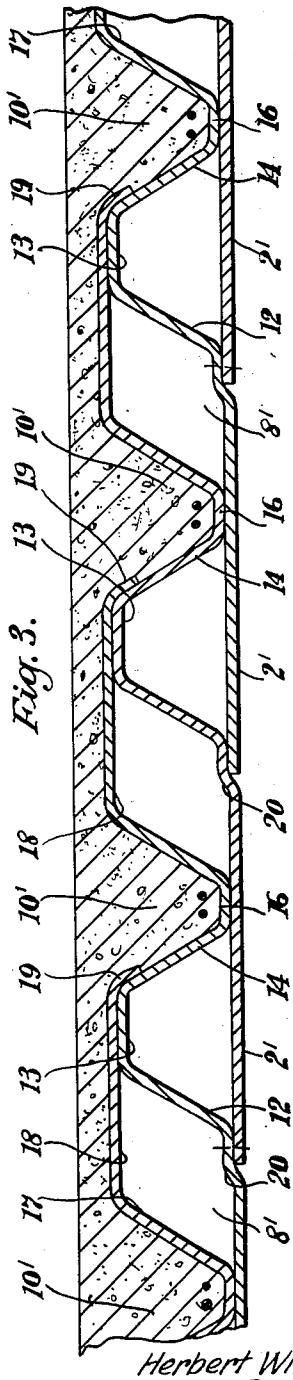


Fig. 3.

Inventor
Herbert William Ashman
By
Thos. E. Scofield.
Attorney

Patented June 17, 1952

2,601,082

UNITED STATES PATENT OFFICE

2,601,082

CONCRETE AND SHUTTERING FLOOR STRUCTURE

Herbert William Ashman, Hale, England, assignor to Keasbey & Mattison Company, Ambler, Pa., a corporation of Pennsylvania

Application April 25, 1946, Serial No. 664,896
In Great Britain May 14, 1945

2 Claims. (Cl. 72—66)

1

This invention relates to shuttering and to moulded units for use in forming such shuttering.

In forming flat or inclined concrete floors and roofs, one method in use is to provide shuttering which remains permanently in position after the concrete has set for the purpose of providing both open-topped channels which receive some of the concrete and thus form stiffening joists or ribs, and air cavities which provide thermal insulation. In addition the shuttering is used to form a substantially flat surface on the underside and so to constitute the ceiling of the room below. This shuttering is composed of rows of units, which may be made from asbestos-cement or similar preformed sheet material, and some existing units are so shaped that the channels are formed by the assembly of two units side by side in a row, the units and channels in each row being aligned with those in the other rows. However the existing units cannot easily be moulded from flat sheets.

One object of this invention is to provide improved forms of unit which can be moulded from flat sheets.

Another object is to provide improved shuttering for the purpose set forth above.

In principal, I use moulded units having flat parts extending from parts formed with one or more inverted troughs, the units being assembled together in rows so that in successive units in a row the flat part of each extends beneath an inverted trough in the next to form a cavity, the successive flat parts present a substantially continuous flat undersurface and the channels are formed between the upper surfaces of inverted-trough walls. The two inverted-trough walls forming the sides of a channel may be made in a single unit, or each channel may be formed between the outer end wall of one inverted trough and the inner end wall of an inverted trough of the next unit. In either case the units individually enclose no cavities, these cavities being formed by the overlapping of adjacent units.

The invention will be more readily understood by reference to the accompanying drawings, which show two forms of shuttering composed of moulded units according to the invention and in which:

Figure 1 is a fragmentary view of one kind of shuttering before the pouring of the concrete;

Figure 2 is a vertical cross-section through the shuttering after the pouring of the concrete; and

Figure 3 is a similar cross-section through shuttering formed from modified units.

2

Referring first to Figure 1, the shuttering is formed from rows of identical units 1 moulded from asbestos-cement sheets and put in position on joists 15. Each unit is about twice as long as it is wide, and in length it is just equal to the distance between the center lines of adjacent joists. The units are laid side by side to form a row spanning the space between adjacent joists, as shown in Figure 1, and as many rows are laid as are required to form the desired roof or floor.

As is more clearly shown in Figure 2, each unit 1 consists of a flat part 2 formed with an inclined bent-up lip 3 and merging into a narrower inverted trough part formed by a substantially vertical wall 4, a flat crest 5 and a second substantially vertical wall 6 which in turn merges into a horizontal lip 7. The units are laid with the inverted trough part of each unit overlapping the flat part of the next and the lip 3 of each unit lying flat against the inner wall 4 of the next unit. The wall 6 is of less depth than the wall 4 by the thickness of the material and the under surface of the lip 7 lies in the same plane as the upper surface of the flat part 2, so the lip 7 of each unit rests firmly on the flat part of the next. It will be seen that a series of cavities 8 is formed in the shuttering. Further, the spaces between the walls 4 and 6 of adjacent units form open-topped channels narrower at their tops than their bottoms as the walls 4 and 6 which bound them are inclined for this purpose.

When the shuttering has been put in position concrete is poured over the flat crests 5 and into the channels to form a flat covering 9 with stiffening joists or ribs 10, in which reinforcement 11 may be embedded in the usual way. These ribs 10 serve to key the units in position so that they need no permanent support and except at the ends of the roof the joists 1 on which the units are laid may be temporary. The shuttering, as will be seen from the drawing, presents a substantially flat and continuous undersurface.

Referring now to Figure 3, the modified units used have inverted trough parts which are wider than the flat parts 2', each inverted trough part comprising an inclined wall 12, a flat crest 13 and an inclined wall 14, these walls defining one inverted trough. The wall 14 forms one wall of a channel having a base 16 which merges into the second wall 17 of the channel, so that the channel is formed in a single unit instead of by the juxtaposition of two units as in Figure 1. The wall 17 merges into a flat top 18 of a second inverted trough part, the second wall of which is

formed by a lip 19 which engages over the inverted trough (bounded by the walls 12, 13 and 14) in the adjacent unit. It will be appreciated that the lip 19 could be extended downwards further or could be omitted altogether, but it is advantageous to provide it since it both helps in the location of each unit relatively to the next and by providing an overhanging edge keys with the concrete ribs 10' formed in the channels.

To make the undersurface of the shuttering substantially flat and continuous a step 20, equal in depth to the thickness of the material, is provided between each flat part 2' and wall 12.

In the construction shown in Figure 3 the crest 18 of the second inverted trough is wider than the crest 13 of the first inverted trough and also lies in a plane higher by the thickness of the material, so that this crest 18 both forms the top of a cavity 8' and is supported by the next crest 13. This presents the advantage that the unsupported width of the crest 18 is less than that of the corresponding crest 5 in the construction shown in Figure 2 with the result that any heavy load or impact to which a unit may be subjected before the concrete is put in place is resisted better.

I claim:

1. In a joist supported shuttering assembly having a continuous flat undersurface forming a ceiling resting on said joists and having in its upper surface spaced parallel troughs for receiving a cementitious material, the combination comprising a plurality of identical asbestos-cement sheets arranged on said joists in serial overlapping relation, said sheets having flat coplanar portions disposed edge to edge to form the continuous ceiling, each sheet further having an upwardly arched portion extending from one edge of the flat portion of that sheet over the flat portion of the next sheet and merging into a trough portion which in turn has a flange extending horizontally from its free edge and resting on the upwardly arched portion of the next sheet, said flange forming a flat web connecting adjacent troughs, one wall of said upwardly arched portion being spaced substantially equidistant from the confronting walls of adjacent troughs and forming a reinforcing member underlying and supporting said web intermediate its edges.

2. In a joist supported shuttering assembly having a continuous flat undersurface forming a ceiling resting on said joists and having in its upper surface spaced parallel troughs for receiving a cementitious material, the combination comprising a plurality of identical asbestos cement sheets arranged on said joists in serial overlapping relation, said sheets having flat coplanar portions disposed edge to edge to form the continuous ceiling, each sheet further having a corrugated portion extending from one edge of that sheet over the flat portion of the next sheet and of substantially equal width therewith, said corrugated portion comprising a flat crested arch and a flat bottom trough contiguous therewith, one wall of said arch extending diagonally upward from the flat portion of the sheet and the other wall of said arch being a common wall for said arch and trough, the bottom of said trough being parallel to the plane of said flat portion and displaced upwardly therefrom by the thickness of said material, and a flange extending horizontally from the free edge of said trough and resting on the flat crest of the arch of the next sheet, said flange terminating at the common wall and provided with a downturned lip engaging said wall thereby forming a flat web between adjacent troughs, the other wall of said arch being spaced substantially equidistant from the confronting walls of adjacent troughs and forming a diagonal reinforcing member underlying and supporting said web intermediate its edges.

HERBERT WILLIAM ASHMAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,109,785	Reier	Sept. 8, 1914
1,508,871	Bloedow	Sept. 16, 1924
1,679,947	Sanborn	Aug. 7, 1928
1,872,984	Land	Aug. 23, 1932
1,986,999	Burgess	Jan. 8, 1935
2,065,920	Clark	Dec. 29, 1936
2,131,652	Young	Sept. 27, 1938
2,180,504	Bradfield et al.	Nov. 21, 1939
2,424,080	Engstrom	July 15, 1947

FOREIGN PATENTS

Number	Country	Date
5,876	Great Britain	1904
747,397	France	1933
498,590	Great Britain	Jan. 11, 1939