

Aug. 23, 1932.

G. E. LAND

1,872,984

BUILDING CONSTRUCTION

Filed March 21, 1928

2 Sheets-Sheet 1

Fig. 1.

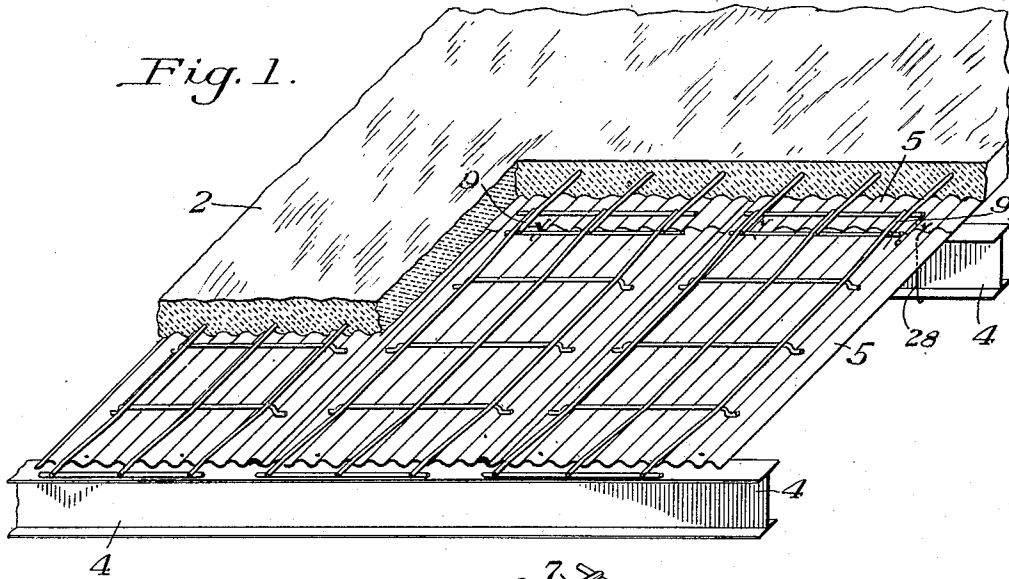


Fig. 4.

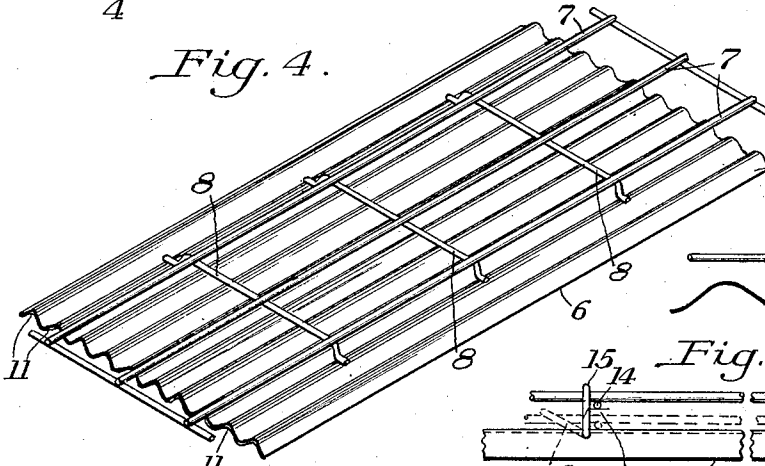


Fig. 5.

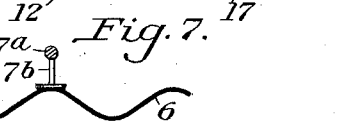
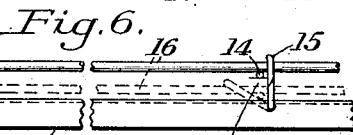
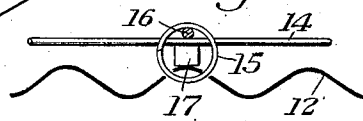


Fig. 8.

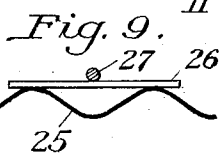
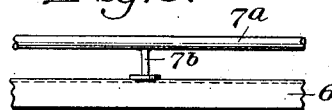


Fig. 10.

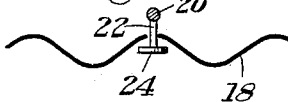
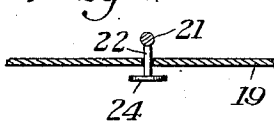


Fig. 11.



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Aug. 23, 1932.

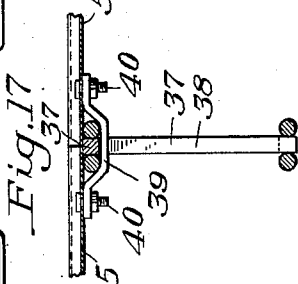
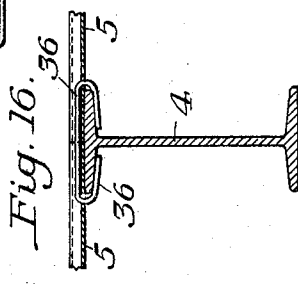
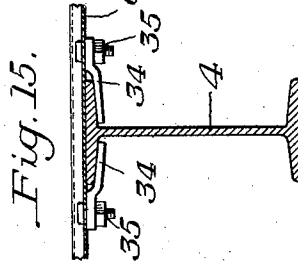
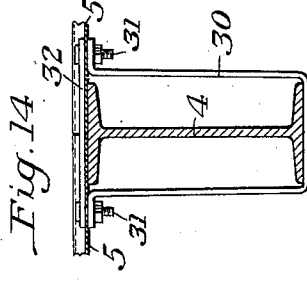
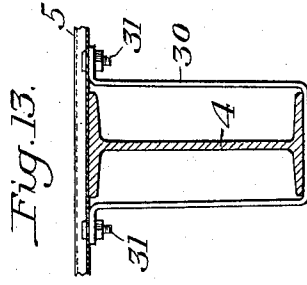
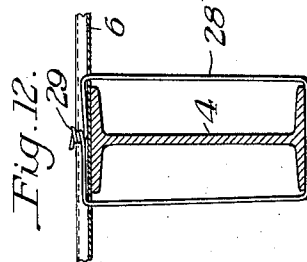
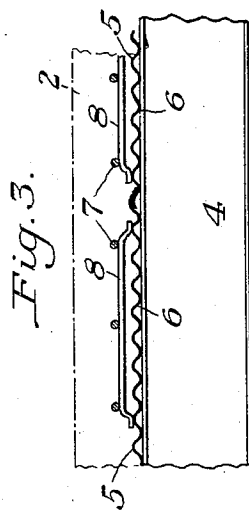
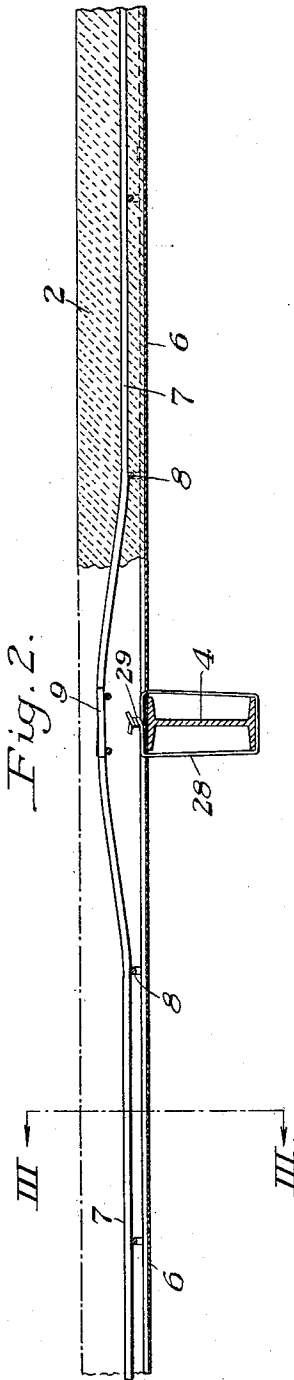
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BUILDING CONSTRUCTION

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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BUILDING CONSTRUCTION

Application filed March 21, 1928. Serial No. 263,306.

My invention relates to building construction and particularly to preassembled bases constituting a combined form and reinforcement for plastic materials for use on horizontal and semi-horizontal planes such as floors and roofs.

In forming slabs for use in buildings and other shapes utilizing a plastic material which is poured in a form and then permitted to harden, it is customary practice to prepare a temporary form of wood or other material, which is removed from the slab after the plastic material has hardened. One example of the foregoing is the pouring of concrete floors for buildings.

The waste of material incident to the erection, shoring and tearing down of such forms is considerable and the labor involved constitutes an appreciable item of expense in the cost of such a structure. The use of wooden forms particularly involves a fire hazard during construction.

Another practice is the use of different types of metal lath having stiffening crimps or corrugations formed therein. Such metal lath has openings therein and is disadvantageous as it permits the plastic material to drop down onto the floor or other structure beneath. The metal lath is of insufficient strength to carry heavy loads of wet concrete over wide spans and necessitates the use of separately handled reinforcing means for sustaining the wet plastic material.

Another practice is to utilize metal or other sheet material for such forms and permit the sheet material to remain in place after the plastic material has hardened or set. The use of these sheet materials in lieu of wooden forms has the advantage of providing a finished ceiling in certain classes of work. The presence of the sheet material at the base of the formed structure, generally termed a slab, prevents deterioration and crumbling of the material from the bottom thereof.

Such constructions have heretofore necessitated the separate placing of the sheet material or forms and reinforcing means, such as rods, bars, or metallic fabric at the site of the construction. The placing of the reinforcement and the sheet material has required that

each be carefully positioned after being transported to their place of use, which in many cases is many stories in the air, where the handling of loose pieces of material is costly, dangerous and troublesome.

Where paper-backed fabric has been used as the combined form and reinforcing means, it has been necessary to provide additional strength to the backing, and special fasteners in the end walls of the building, because the product must be stretched very taut and fastened securely in place while taut. The stretching of any reinforcing means or form from the walls of the building, particularly the end walls, requires additional strength of the walls. Even when applied in such manner, the paper-backed fabric will belly or sag between supports thereby requiring an excess of plastic material and the reinforcement will not be in its proper position in the slab.

I provide a base for plastic material which constitutes a combined form and reinforcement for the plastic material. In providing the base, sheet material is preassembled with reinforcing means such as tension rods at a factory or a field shop and is transported as a unit to the place of use. The base is laid directly upon the supporting beams of the structure where it is to be used and secured thereto. The tensioning or reinforcing rods are then in overlapping relation to transmit continuous longitudinal strains through the formed slab with the sheets of material in engagement along their edges. The form is then ready for the reception of wet plastic material without the necessity of placing reinforcing means over the sheet material as has heretofore been necessary.

In the accompanying drawings illustrating certain preferred embodiments of my invention,

Figure 1 is a perspective view of a fragment of a horizontal building slab embodying my invention;

Figure 2 is a broken longitudinal view of a portion thereof;

Figure 3 is a sectional view taken along the section line III—III of Figure 2;

Figure 4 is a perspective view of a com-

bined form and reinforcement for the slab;

Figures 5 and 6 are fragmentary transverse and longitudinal views, respectively, of a modified form of my invention;

Figures 7 and 8 are similar views of a further modification of the invention;

Figures 9, 10 and 11 are fragmentary transverse views of other forms of the invention; and

Figures 12 to 17, inclusive, illustrate different methods and devices for securing the base to the supporting beams.

Referring to Figures 1 to 3, a horizontally extending slab 2 constituting a portion of a building is supported by beams 4 and a plurality of bases 5 for plastic material. The bases 5 serve both as forms for supporting the wet plastic material and as a reinforcement therefor after it has hardened. The lengths of the bases 5 are such that they span at least the space between a pair of beams 4.

The slab 2 may be supported either in substantially a horizontal plane or slightly tilted as it may be used in a floor or in a roof. The slab 2 is representative of any form of plastic material that may be applied to the base 5, such as concrete, plaster, stucco, gypsum and other like materials. The wet material may be applied to the base 5 while in a plastic state by pouring, spreading, spraying, troweling or the like. The beams 4 are illustrative of supporting beams, either wooden or metallic, joists, girders, purlins, rafters and the like, as the invention is applicable to many different types of building construction.

Referring particularly to Figures 3 and 4, each base 5 is constituted by a metal backing sheet 6 above which reinforcing rods or bars 7 are attached by transversely extending supports 8. The reinforcing rods or bars 7 are spaced from the metal backing sheet 6 a distance corresponding to the thickness of the finished slab 2. In general, the rods or bars 7 should be disposed near the bottom of the slab between beams and curved upwardly to near the top of the slab above each beam 4 in order that they shall conform substantially to the lines of tension, rather than compression, existing in the hardened slab.

For providing continuity in the tensioning rods 7 they are made to overhang the ends of the sheets 6 a sufficient distance to overlap, as at 9, in Figures 1 and 2. The rods 7 are left free from the sheet 6 for a distance from the ends in order that they may be bent upwardly the proper distance to occupy the positions conforming to the lines of tension in the slab 2.

The rods 7 are preferably welded to the supports 8 and the latter in turn are preferably welded to the sheets 6 where the latter are of metal, although it is to be understood

that they may be held in engagement in any other manner.

The backing sheets 6 are preferably continuous to prevent wet plastic material from falling onto floors or other structures beneath the slab 2 while it is hardening, and may be either used in a flat condition or provided with strengthening corrugations, although metal laths, or nonmetallic sheet material such as paper-backing, suitable for carrying predetermined loads of wet plastic material may be employed if desired. The particular type of sheet material used in each case depends upon the weight of the plastic material to be supported per unit of area, the distance between supports, and other engineering considerations. In any case, however, the reinforcing rods or bars 7 are secured to the sheet material before the base is placed upon the supporting beams.

Other forms of reinforcing means such as wire fabric, either welded or woven, metal lath and the like may be substituted for the rods or bars 7, if desired.

One form of attaching reinforcing means to backings is shown and described in my co-pending application Serial No. 193,451 filed May 23, 1927.

The lower surface of the backing 6 is left plain or may be provided with a paper or other surfacing 11 for the attachment of finishing plaster or the like.

The bases 5 are placed as a pre-assembled unit upon the beams 4 and span the distance therebetween. The edges of adjacent bases 5 are placed in overlapping position while the ends may overlap or form a butt joint as desired, although I prefer to use a butt joint. By using a sufficiently strong backing the bases 5 support the wet slab without the aid of other forms or shoring. By eliminating the use of supporting forms and shoring, and by preventing the dropping of wet material onto lower floors or other structures, it is possible for workmen to carry on building operations below a freshly poured slab rather than have to wait several days for the removal of the shoring as has heretofore been necessary. The elimination of wooden forms and shoring also reduces the fire hazard in the construction of such a building.

For economy of space in shipping, the backing may be secured to the reinforcing means in a collapsible manner. By providing a flexible connection between the rods 7 and backing 6, the presence of the backing does not impair the efficiency of the rods 7 by interfering with longitudinal adjustments thereof. Referring to Figures 5 and 6, the backing 12 is secured to the reinforcing fabric 14 by a series of loops 15. The loops 15 pass through openings in the backing 12 and over the strands 16 of the fabric 14. When it is desired to ship the bases the fabric 14 is placed into engagement with the backing 12

and the loops 15 turn as shown in dotted lines in Figure 6 sufficiently to reduce the over-all height of the bases materially. When such a base is used small chairs or blocks 17 are inserted between the backing 12 and the strands 16 for spacing the latter from the backing.

Referring to Figures 7 and 8, the backing 6 may be secured to rods, fabric or bars 7a by studs 7b. The heads of the studs rest directly upon the upper surface of the backing 6. If the backing is corrugated the studs are placed on the tops of the corrugation. The shanks of the studs 7b are secured to the rods 7a by welding. This form of the invention is applicable where transverse tie rods or bars, such as the transverse extending supports 8, shown in Figure 4, may be dispensed with.

In Figure 9 I have shown a corrugated backing 25 with a supporting bar 26 secured directly to the top of the corrugations rather than being spaced therefrom as shown in Figure 3. Reinforcing or tensioning rods 27 are secured to the outer surface of the supporting bar 26. In determining whether a structure such as shown in Figure 3 or a structure such as shown in Figure 9 is desirable, the length of the span, the thickness of the slab and other engineering requirements must be considered.

Referring to Figures 10 and 11, backings 18 and 19 are secured to strands 20 and 21, respectively, by small nails or rivets 22 that extend through openings in the backing and terminate in heads 24. During shipment the backing and fabric are collapsed for economy of space. One embodiment of this construction is shown and described in my co-pending application Serial No. 193,451, filed May 23, 1927.

For securing the base 5 to the beams 4, I have shown several forms of fastening means. In Figures 1, 2 and 12 a wire 28 is passed through openings in the backing on opposite sides of a beam 4 and the ends thereof twisted together in a knot 29. This form of securing means is suitable for connecting the ends of adjacent bases 5 as it prevents them from moving laterally of the beams.

In Figure 13 I have shown a strap 30 secured by bolts 31 to a backing 6 and extending around a beam 4. This form of fastening device is adapted primarily for use at intermediate points along a base 5.

In Figure 14 I have shown a strap 30 and bolts 31 co-operating with a strap 32 extending across a beam 4 above the bases 5. This form of clamping means is particularly well adapted for use at the ends of the bases as the strap 32 firmly holds the ends in close abutting relation and against the top of the beam 4.

In Figure 15 the backing sheets 6 are secured to the beam 4 by lugs 34 extending under the flanges of the beam and secured

to the backing by bolts 35. This form of invention is primarily adapted for use intermediate the ends of the base 5.

In Figure 16 there is shown a rod or wire 36 that is passed through openings in the bases 5 and crimped against the under edges of the flanges of the beam 4. This form of invention may be used either at the ends of or intermediate a base 5.

In Figure 17 I have shown a built-up beam 37 having openings 38 therein through which a strap 39 extends. The strap 39 is secured by bolts 40 to the bases 5 on opposite sides of the beam 37.

While I have shown and described certain present preferred embodiments of the invention, it is to be understood that the invention may be otherwise practiced and embodied without departing from the scope of the appended claim.

I claim:

As a new article of manufacture, a pre-assembled base for employment in the production of cementitious building slabs, said base comprising a rigid metallic sheet for receiving, supporting and strengthening the cementitious material, transverse members secured rigidly to said base in spaced relation therewith, and longitudinal reinforcing members rigidly secured to said transverse members and extending at one end beyond the end of said base, whereby the longitudinal reinforcing members of one base will overlap those of a base placed adjacent thereto, said base transverse and longitudinal members constituting a unitary structure adapted to be transported and applied as such.

In testimony whereof I have hereunto set my hand.

GEORGE E. LAND.