May 26, 1936. E. W. MARTEN 2,042,113

WALL AND FLOOR CONSTRUCTION

Filed Aug. 24, 1935 2 Sheets-Sheet 1

Fig. 1.

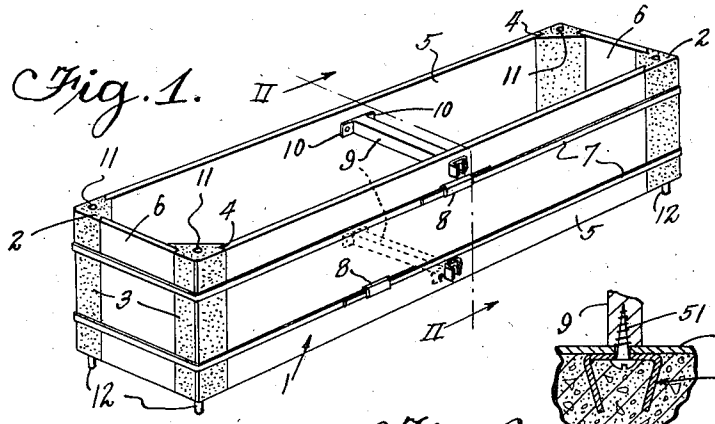


Fig. 2.

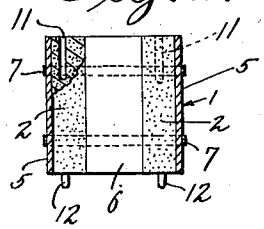
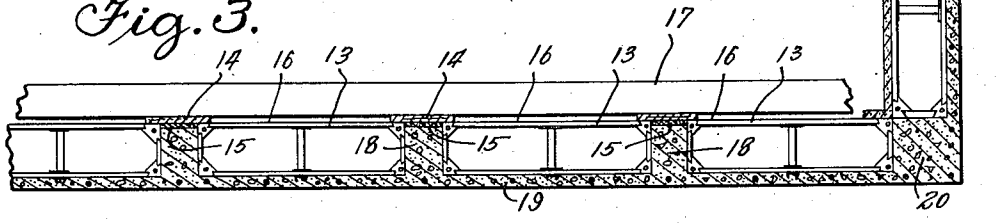


Fig. 6.

Fig. 3.



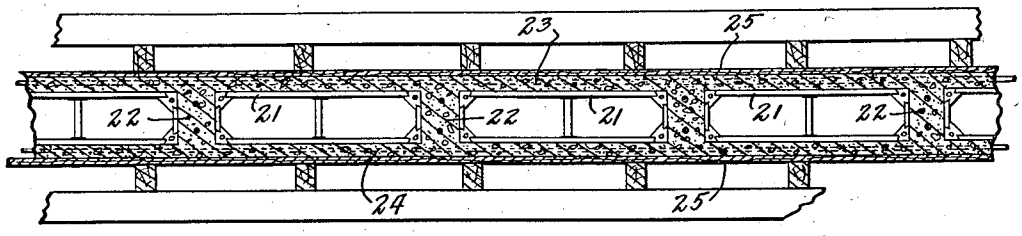
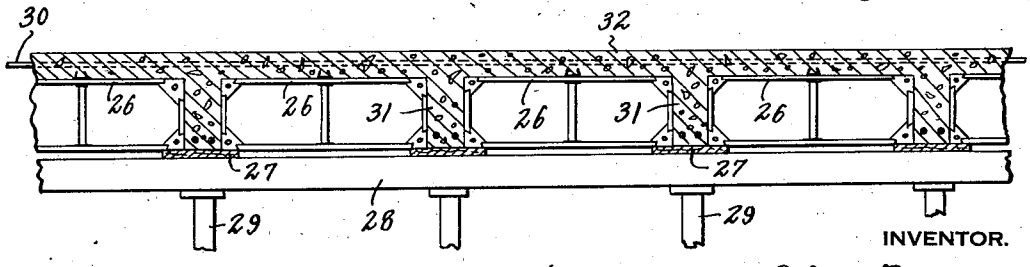


Fig. 4.

Fig. 5.



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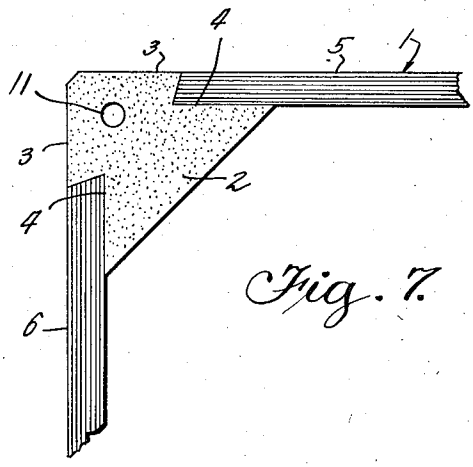


Fig. 7.

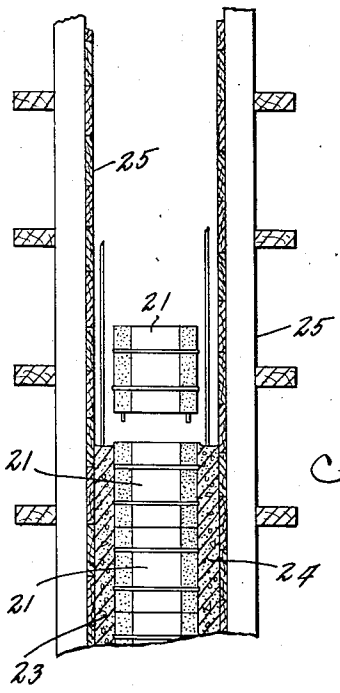
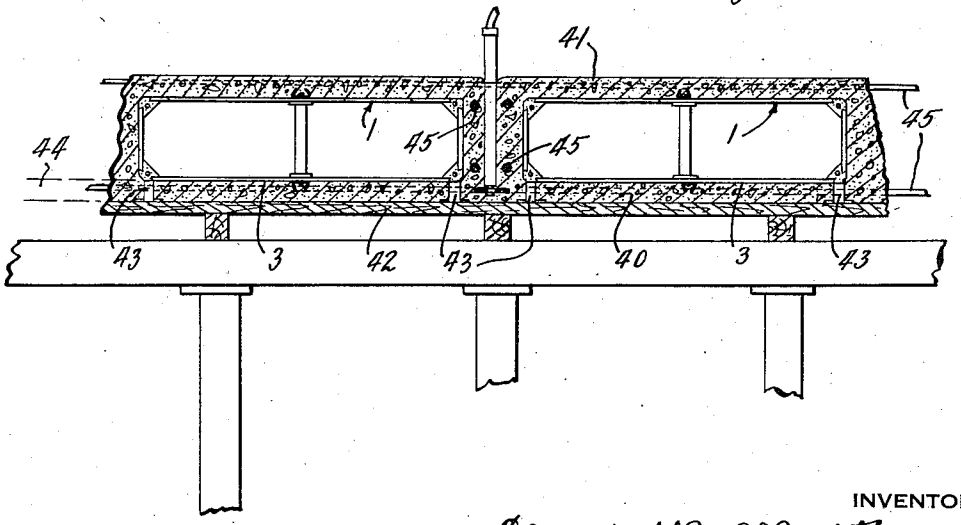


Fig. 8.

Fig. 9.



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UNITED STATES PATENT OFFICE

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WALL AND FLOOR CONSTRUCTION

Elmer W. Marten, Los Angeles, Calif.

Application August 24, 1935, Serial No. 37,695

11 Claims. (Cl. 72—47)

This invention relates to wall and floor construction, and particularly to such constructions when made of concrete or other material capable of being used to form monolithic structures.

The invention particularly concerns the construction of a unit to be used as a core and which is intended to be constructed of relatively inexpensive material, the idea being that the core constructed of the core units will be permitted to remain in the wall or floor.

The principal object of the invention is to provide a core unit of simple construction which can be readily constructed without the use of ordinary fastening devices and which can readily be made of any dimensions adapted to any particular construction or requirement.

A further object of the invention is to provide a core unit of simple construction which can readily be set up to form walls with inner and outer webs of concrete or other plastic material and in which the outer webs of the wall are connected by the molded material to form columns; also to provide a core unit which can readily be set up to enable a wall to be formed consisting of an outside slab or web with integral or monolithic columns on the inner side of the web or wall face.

A further object of the invention is to provide a simple floor construction composed of cores formed of units set up and left in the floor, said cores cooperating to enable a floor slab to be readily formed of a molded material with beams extending horizontally under the same.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combinations of parts to be described hereinafter, all of which contribute to produce an efficient wall and floor construction.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawings:

Figure 1 is a perspective of a unit constructed in accordance with my invention.

Figure 2 is a vertical section taken on the line 2—2 of Figure 1 and broken away so as to show a portion of one of the corner posts in section.

Figure 3 is a horizontal section through a wall constructed by employing cores embodying my invention. This view illustrates a wall of light type including an outer web or slab for the wall but without an inside slab of the molded material.

Figure 4 is a view similar to Figure 3 but illustrating a wall constructed by using my cores and illustrating a heavier construction of wall in which there is an inside wall slab and an outside wall slab connected by monolithic columns.

Figure 5 is a vertical section through a floor constructed of a molded material and in which my cores are employed for enabling beams to be formed in the floor under the floor slab.

Figure 6 is an enlarged fragmental sectional view illustrating a retaining clip embodied in my invention.

Figure 7 is an enlarged fragmental illustration of a corner construction of a mold embodying my invention.

Figure 8 is a view illustrating one method of constructing a wall utilizing the method embodied in my invention.

Figure 9 is a vertical sectional view through a floor construction illustrating a further modification of the method embodying my invention of the formation of a slab floor of H beam section.

In forming walls or floors of concrete it is the usual practice to set up temporary forms entailing considerable carpenter work. This cost of setting up forms, including the core forms, involves a considerable expense in erecting concrete structures. A considerable amount of expense in constructing concrete walls in the usual manner results from the necessity for taking down and removing the material out of which the forms have been constructed. In accordance with my invention, I provide a core unit which can be readily constructed of inexpensive material, and these units are so constructed that they can be readily connected together to form a complete core for a wall or floor. They are of light material and readily handled, and are so inexpensive that they can economically be left in place in the completed structure.

The cores are preferably constructed of a core unit 1 which is preferably constructed as illustrated in Figure 1 and which embodies a plurality of corners or corner members 2 of substantially triangular cross-section with outer side faces 3 which are provided with longitudinal rabbet grooves 4. These rabbet grooves are preferably undercut at a slight angle. This angle is important in the preferred form of my invention, in which form the corners 2 are formed of gypsum or similar readily molded material which is light and which can readily be cut, for example, by means of a saw. But I prefer to mold the undercut grooves in the posts to reduce their cost.

The unit includes side panels 5 and end panels 6 which panels are preferably formed of a ma-

terial such as plaster board. In forming the unit the edges of the panels are cut on an angle to enable them to fit into the rabbet grooves 4 and the panels are all put in position in the rabbet grooves as indicated in Figure 1 and then the entire structure is secured rigidly into box form by means of binders 7, said binders consisting of metal straps, the ends of which are overlapped under tension and secured together by a suitable tie 8. In this way the panels are secured and keyed to the corners without individual fastening means for each panel. The binders or bands 7 are preferably applied to the corners 2 in such manner as to form or, at a shoulder, to hold the bands in position against slippage.

In order to prevent the side panels 5 from buckling when facing material is applied thereto and likewise to form reinforced forms to provide the rigidity required for the application of such facing materials, I provide a plurality of transverse spreaders 9 located between these panels at such points as may be required. These spreaders may be formed of hollow material of substantially square section with two opposite walls cut and bent laterally to form feet 10 which may be riveted, screwed or otherwise secured to the said panels.

The units may be of any desired height to suit the requirements of the job or structure that is being formed and where the wall section may be made of sufficient thickness to permit pouring of the plastic material the core units may be mounted one upon the other to provide a continuous core and in order to align the cores as they are stacked one upon the other dowel holes 11 are formed in the ends of the corner members and dowel pins 12 are inserted in these adjacent holes 11 to hold the cores in position for lateral movement. While this method of operation is possible, where the hole section is of sufficient width transversely to permit the pouring of the plastic material of concrete, I prefer to employ the method of construction as hereinafter set forth and as is illustrated particularly in Figure 8. As my core units and method of operation are most applicable for light construction work where the transverse thickness of the cement section on the sides of the cores need not exceed 3 or 4 inches and in such case it would be impossible to pour through any such distance as 8 or 9 feet, as would be required to form in one operation a wall of story height.

In accordance with this modification of Figure 8, I prefer to position the cores 1 in a horizontal row to form one section of the wall to such height as will permit the effective pouring or positioning of the concrete to form the beams 18 between the ends of the cores 1 or the beams 22 between the ends of the cores 1 dependent upon the formation of the wall being constructed. After the wall is thus poured or formed to the height of the core, a second layer of cores is lowered into position between the forms so that the dowel pins 12 passing into the adjacent holes 11 in the corners of the cores align the cores in position, then a second section of the wall is poured and this process is continued until a complete wall is built.

In Figure 3, I illustrate a wall structure which is produced by forming continuous upwardly extending cores 13 which are disposed with their ends apart, the spaces between the ends of the cores at the inner side of the wall being covered by a retaining panel, slab, or board 14. If desired, just inside of the boards 14 a panel 15, or stringer, of plaster board may be put in position, the outer face of which is flush with the outer face 16 of the adjacent cores. This is done for a purpose which will appear hereinafter. This side of the wall is to be the inside. The panels 15 are held temporarily in place by wiring them, or temporarily fastening them to the adjacent ends of the cores. The boards 14 may be secured temporarily to 2 x 4 stringers, such as the stringer 17, or may be secured in position in any manner well understood in the art.

After the complete form has been erected in this way, molded material such as concrete is placed on the outer side of the form. This molded material may be flowed into the spaces between the ends of the cores to form monolithic columns 18 integral with the outer web or slab 19 to form the outer face of the concrete well. The cores 13 are left in place and their inner faces 16, being flush with the panels or in-set strips 15, enable plaster to be plastered on the interior of the wall without making it possible to discern where the columns are located. Figure 3 illustrates the manner in which the cores are located so as to produce a corner 20 in the wall.

In Figure 4, I illustrate a wall constructed in accordance with my invention, in which the cores 21 are set up and temporarily secured in an end to end arrangement and disposed apart at their ends so as to form spaces to receive concrete columns 22 which are integral with slabs 23 and 24 that form the outer webs or slabs of the complete wall. In forming this wall I employ temporary outside forms 25 which are taken down after the wall has been poured.

In Figure 5, I illustrate a floor embodying my invention and constructed by employing my cores 26 as floor pans. These cores are formed of core units laid side by side and the cores are spaced apart as indicated. The cores are all supported on retaining strips or boards 27 supported on stringers 28 which are themselves supported on studs 29. If desired, horizontal reinforcing rods 30 can be run in the spaces between the ends of the cores. When the concrete is applied over the cores, it extends down into the spaces between the ends of the cores to form beams 31 which are monolithic with the floor slab 32 of the construction.

By reason of the fact that the outer faces 3 of the corners are flush with the outer faces of the panels that form the unit, it will be evident that whenever a retaining strip or board such as the boards 27 and 14 are employed, the result is that a continuous flush face is formed on the outer side of the wall or floor that is formed in this way. In one case it produces a continuous flush face for applying plaster on the inner side of the wall, and in the case of the floor construction, a continuous flush face is formed on the underside to receive plaster to form the ceiling.

In the modification of my invention illustrated in Figure 9, I have illustrated a method of forming a floor slab of concrete using my cores 1 for the formation of an H section floor slab to provide a continuous sealing web 40 on the under surface of the floor and a complete floor web 41 upon the upper section. The method which I employ in forming this floor slab is similar to that illustrated in Figure 5, except that in this modification a complete form of boards 42 is formed first and feet members 43 are applied in spaced positions to the side 5 of the cores 1

to hold the cores 1 up off from the form section 42 to leave a space 44 between the cores and the form 42. The required or desired reinforcing members 45 are positioned within the spaces around the cores and held in position by any desired means common in the art.

The concrete is then poured between the ends of the cores 1 and vibrated into position by any suitable or desirable means now commonly employed in the art so that the concrete runs under the cores 1, along the form 42 to form a continuous slab of concrete for the sealing of the floor below. Concrete is continued to be poured then until the connecting webs and the floor slabs above are completely cast. This manner of casting a floor in an H section slab has many advantages in that it enables the engineering of the floor structure to take care of all negative stresses required for the formation of a correctly engineered structural floor of the required rigidity and strength not heretofore possible where merely a T section floor has been formed.

The fact that my cores 1 are of lightweight, relatively inexpensive construction and are of such material as permits their remaining positioned in the floor section as cast, makes it possible for me to carry out this method of forming a floor slab which has not been heretofore possible when using other forms of construction.

In Figure 6 I have illustrated a clip 50 which is secured by means of a screw 51 to the spreader 9 so that when the clip 50 is imbedded in the concrete which is poured around the mold 1, the spreader 9 is keyed directly to the molded construction.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and I do not wish to be limited in the practice of the invention, nor in the claims, to the particular embodiment set forth.

What I claim is:

1. In a concrete construction, a core unit comprising corner members, side panels and end panels, the said corner members having rabbet grooves in their side faces receiving the edges of the panels, and means for securing the corner members and panels together.

2. In a concrete construction, a core unit comprising end sections including corner members, side panels, the corner members having undercut rabbet grooves on their outer faces receiving the edges of the panels, and means for securing the panels to the end sections.

3. In a concrete wall construction, a core unit comprising corner members, side panels and end panels, the said corner members having rabbet grooves on their outer faces receiving the edges of the panels, and binders extending around the corners and over the outer sides of the panels for securing the same to form a rigid box-form structure.

4. In a concrete wall construction, a core unit consisting of four corner members having longitudinal rabbet grooves, side panels and end panels with their edges received in the rabbet grooves, and binders consisting of metal straps passing around the outer sides of the corner members with the ends of the straps connected together while the straps are under tension, said binders operating to hold the parts together to form a rigid structure.

5. In a concrete wall construction, a core unit consisting of four corner members having longitudinal rabbet grooves, side panels and end panels with their edges received in the rabbet grooves, binders consisting of metal straps passing around the outer sides of the corner members with the ends of the straps connected together while the straps are under tension, said binders operating to hold the parts together to form a rigid structure, and transverse spreaders secured between the side panels.

6. In a concrete construction, a core unit having four corner members formed of a relatively soft material capable of being readily severed, said corner members having rabbet grooves in their edges, panels having their edges received in the said rabbet grooves, said panels being composed of a material that can be readily severed, and binders in tension enveloping the corner members and the panels to secure the same and form a rigid box-form structure.

7. In a concrete wall construction, a core unit having four corner members of gypsum, said corner members having longitudinally extending undercut rabbet grooves, panels having their edges received in the said rabbet grooves, binders in tension enveloping the panels and the corners and securing the same in a rigid box-form structure.

8. In a concrete construction, a core unit having four corner members with longitudinally extending undercut rabbet grooves, side panels and end panels having their edges received in the rabbet grooves, binders in tension passing around the corner members and over the outer sides of the panels for securing the same to form a rigid box-form structure, said corner members having dowel sockets at one end and having dowels at the other end enabling the units to be connected together to form a continuous core.

9. In a wall construction, a plurality of cores placed end to end, said cores being of box-form and having corners with panels connecting the said corners and secured thereto, each core consisting of a plurality of core units, said posts having dowel sockets at one end and having dowels at the other end enabling the units to be stacked together to form the cores, said cores being capable of cooperating with retaining side forms to enable concrete to be retained by the side forms to form inside and outside slabs with monolith connections connecting the inner and outer slabs of the concrete through the spaces between the ends of said cores.

10. A concrete wall construction comprising a plurality of cores disposed end to end, said cores composed of box-form units, each unit having corners with panels connecting the same and with enveloping binders under tension securing the panels to the corners, said units having dowel sockets in the ends of the posts on one unit and dowel pins on the adjacent unit received in the dowel sockets, intercostal panels held in alignment with the panels on the inner side of the wall, and concrete placed on the outer sides of the cores and extending into the spaces between the cores to form columns.

11. A core for use in the formation of plastic composition structural units comprising corner members, panels connecting the corner members, straps surrounding the panels and corner members to hold the corner members and panels in unit structure, spreaders between the opposed panels for preventing inward collapse of the panels under pressure, and securing clips secured to the spreaders and extending from the exterior surface thereof to become embedded in the plastic composition.

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