March 1, 1932. W. T. OTTO 1,847,891

BUILDING CONSTRUCTION

Filed Sept. 29, 1928

FIG 1

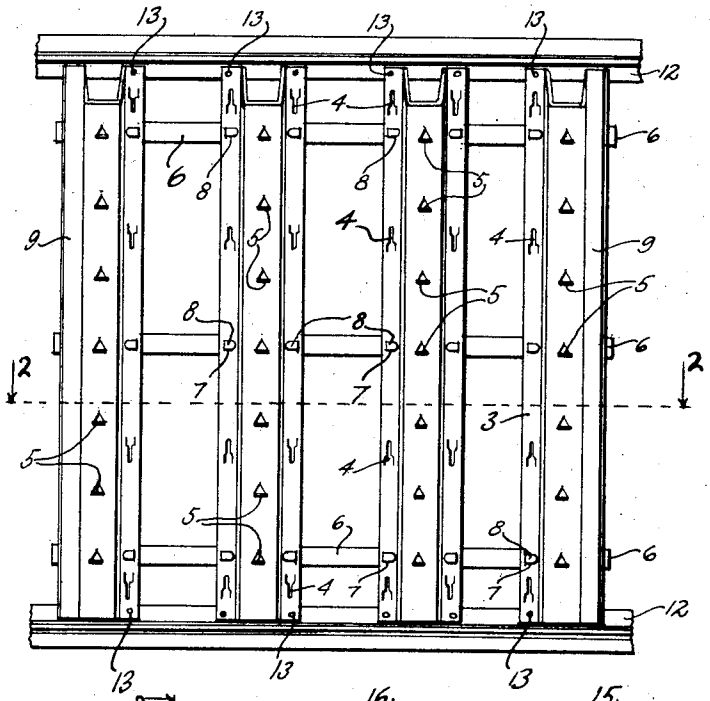


FIG 2

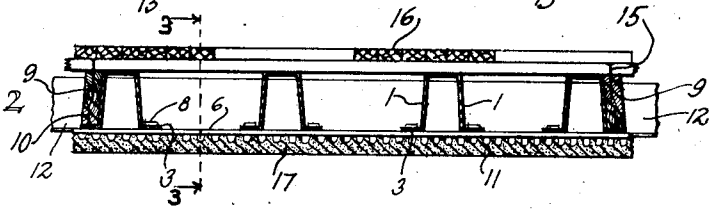


FIG 3

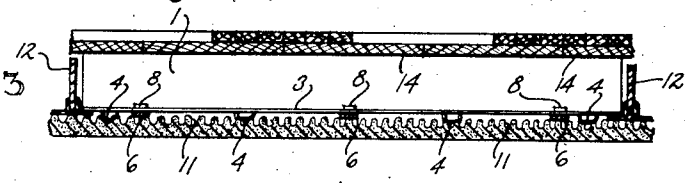
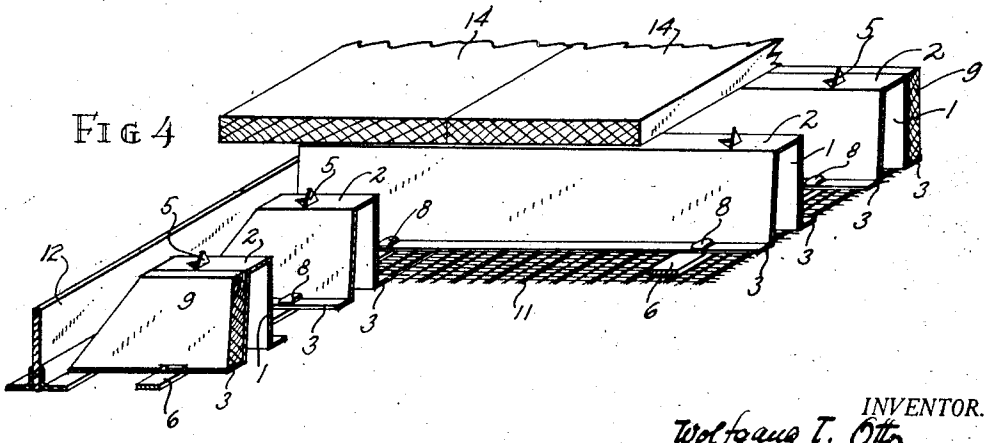


FIG 4



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Patented Mar. 1, 1932 1,847,891

UNITED STATES PATENT OFFICE

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BUILDING CONSTRUCTION

Application filed September 29, 1928. Serial No. 309,135.

The present invention relates to an improvement in building construction. One object thereof has been to provide a floor-ceiling unit which can be used advantageously in houses and other relatively lighter buildings of fireproof or semi-fireproof character. A further object of my invention has been to provide a structural assembly adapted for use in a wide variety of types or styles of architecture and which can be economically produced in large quantities. The intended results are achieved in part by conformations which combine strength with maximum lightness or economy of material, by standardization of sizes, and by simplification of labor operations involved in assembly, preferably on the site of the structure.

A preferred embodiment of my invention is illustrated in the drawings accompanying the present specification and in which

Figure 1 represents a plan view of a floor-ceiling unit in position on spaced trusses or beams, the floor boards and ceiling plaster being omitted;

Figure 2, a section on the line 2—2 of Figure 1 with floor boards and ceiling plaster indicated;

Figure 3, a section on the line 3—3 of Figure 2; and

Figure 4, a fragmentary view in perspective of a portion of a floor-ceiling unit, parts thereof being shown in section.

As indicated in the drawings, a structure embodying my invention includes as its principal feature a building element or joist consisting of spaced webs 1 which are preferably disposed at a slight angle with respect to each other and which may be connected at their upper edges by a top plate 2. A flange 3 extends at an angle from the lower edge of web 1. In practice, this building element will be constructed of a single piece of light weight sheet metal formed to the desired shape by any suitable or well known method. The flange 3 will preferably be provided with means whereby a sheet of metal lath may be secured thereto. In the illustrated embodiment of my invention, I have shown tongues 4 punched out of the metal of the flange and adapted to extend through the openings in a sheet of metal lath, wire mesh, or similar ceiling reinforcing element and to be bent back upwardly around a portion of such element so that the same is securely engaged and supported by the tongue. Each building element is also provided with means for holding rough flooring in operative position, said means being shown more clearly in Figure 4 as a prong 5. This may be struck up out of any suitable portion of the element but is shown in the drawings as forming a part of the top plate 2.

Building elements as hereinabove described are secured together and assembled on the job to form what may be conveniently called a floor-ceiling unit. For this purpose, a group of four elements, for example, is held together as a unitary structure by means of tie members 6, each of which is fastened to the component elements by any suitable means. In the illustrated construction, the flanges 3 are provided with slots or openings 7 positioned and adapted to receive tongues 8 which are struck up from the metal of the tie members 6. In order to insure a more secure connection with the wooden flooring a wooden strip 9 is secured to each of the outer webs of the floor-ceiling unit by any suitable means such for example as by nails 10 driven through the underlying flange 3. A sheet of metal lath, expanded metal, wire lath or similar material 11 is retained in operative position with respect to the unit by means of the tongues 4 or other suitable fastening interposed between the flanges 3 and the metal lath 11.

The structure thus far described forms a complete unit adapted to be put in place and secured on beams or trusses 12 by means of screws 13 or other suitable fastening means. Under ordinary conditions it is contemplated that a sufficiently rigid connection can be made by employing screws at the four places indicated in Figure 1, although the ends of each flange will preferably be punched to receive screws. The rough flooring 14, supported on the tops of said units, is retained against lateral movement by the prongs 5 which penetrate said flooring when the latter is hammered down against said prongs and

is further secured to the floor-ceiling units by means of nails 15 driven into the wooden members 9. With these operations completed, the structure is ready to receive the finished flooring 16 and the ceiling plaster 17.

As indicated more clearly in Figure 4, the webs 1 may be cut away at one or both ends in such a way that their lower edges will extend beyond their upper edges. This cutting away of the web affords a suitable space through which to lead pipes, conduits and the like so that little or no cutting of the elements will be necessary at the place of assembly.

An advantage derived from the above described construction is that the elements can be made in any predetermined suitable uniform length. For house construction and the like where floor loads are relatively light, the metallic members or elements may be made in four-foot lengths preformed and stamped at the mill. Where the webs 1 are slightly inclined with respect to each other, they can be shipped in nested relation, thus effecting a substantial economy in transportation cost. The tie members 6 are preferably made of relatively light bar material and also present no problem of transportation. The spacing of the component parts of any given unit will be determined somewhat by the intended use of the building. Ordinarily, the spacing will be such as to form a four-foot square unit which lends itself to the construction of rooms of sizes in multiples of four feet. It will be apparent that the operation of assembling the units hereinabove described may be quickly and effectively accomplished by relatively unskilled workmen, it being necessary only to connect the tie members 6 with the flanges 3, nail on the wooden strips 9 and secure the sheet of metal lath to the flanges 3 by means of the tongues 4. The unit is then ready to be secured in permanent position as by the screws 13, thus involving only a relatively simple and rapid mechanical operation. It is contemplated that advantages and benefits other than those hereinabove specifically referred to will be experienced in connection with the use of my invention.

I claim as my invention:

1. A floor-ceiling construction unit comprising a plurality of separate metal joists each having a top, divergent webs and longitudinal flanges, a plurality of spaced tie members extending across and engaging under portions of said flanges, means for securing said tie members to said flanges to form a composite frame, a sheet of metal lath secured in suspended engagement with said flanges, and floor board engaging prongs projecting from said tops to retain an overlying floor structure against lateral displacement.

2. A floor-ceiling construction comprising in combination spaced beams each having a web and a flange, a composite floor-ceiling unit supported on said beam flanges between said beams and having top floor supporting surfaces exposed above the top level of said beams, each of said units comprising a U-shaped joist provided with upwardly extending floor engaging prongs, divergent webs and longitudinal flanges, transversely disposed spaced tie members having portions interlocking with said longitudinal flanges, a sheet of metal lath secured to said longitudinal flanges, and flooring supported on said joist tops and in engagement with said prongs.

3. A floor-ceiling construction unit comprising a plurality of metal joists each having a top, divergent webs and longitudinal flanges, a plurality of spaced transverse tie members extending across and engaging under portions of said joists, means for securing said tie members to said joists to form a composite frame, a metal ceiling element secured in suspended engagement with said joists, and floor board engaging means projecting from the tops of said joists to retain an overlying floor structure against lateral displacement.

4. A floor-ceiling construction comprising in combination spaced beams each provided with a flange, a composite floor-ceiling unit supported on said flanges between said beams and having top floor supporting surfaces exposed about the top level of the beams, each of said units comprising a U-shaped joist provided with upwardly extending floor engaging prongs and longitudinal flanges, transversely arranged spaced tie members having portions interlocking with said joists, a metal ceiling element secured to the flanges of said joists, and flooring supported on the tops of the joists and in engagement with said prongs.

In testimony whereof, I have signed my name to this specification this 28th day of September, 1928.

WOLFGANG T. OTTO.