April 13, 1943. J. E. BRONNER 2,316,668

WALL UNIT ASSEMBLY

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Fig. 1.

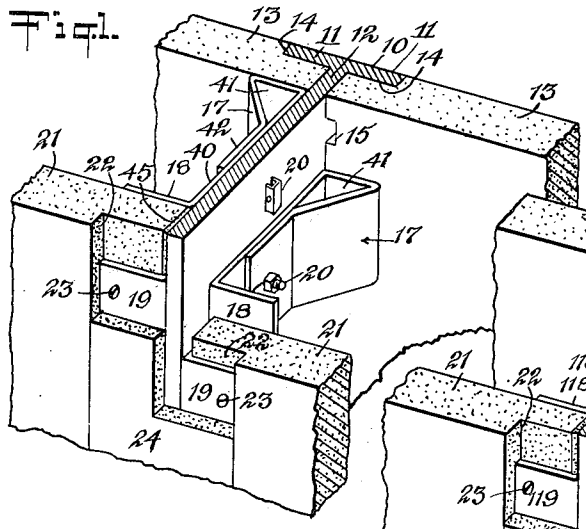


Fig. 2.

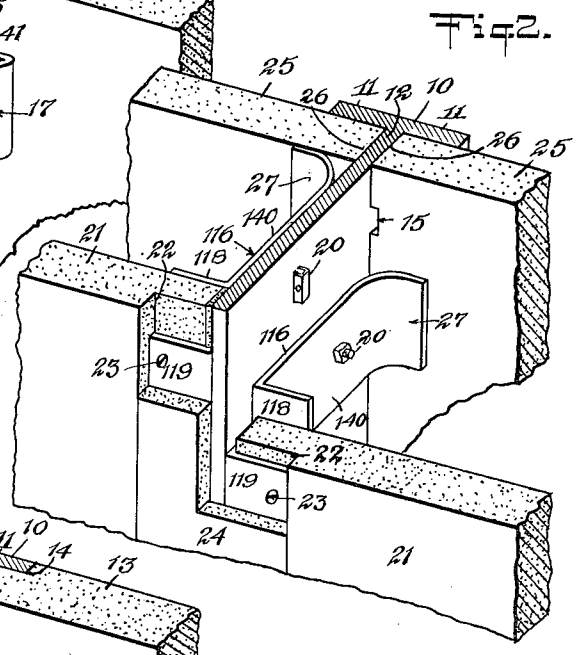


Fig. 3.

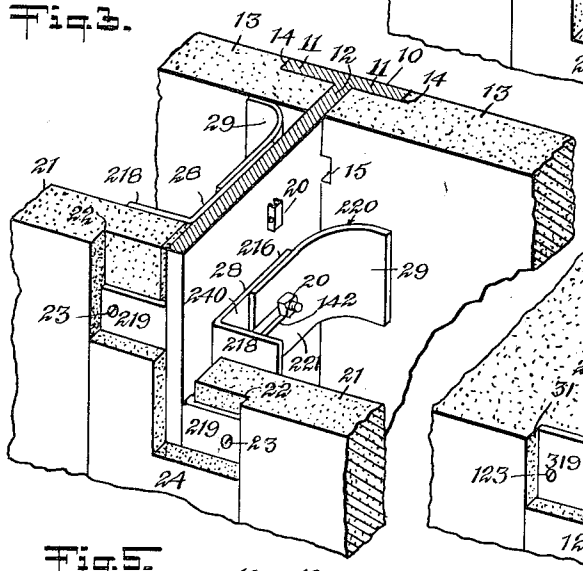


Fig. 4.

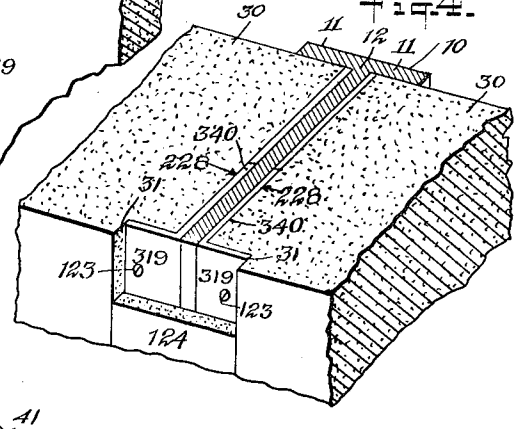
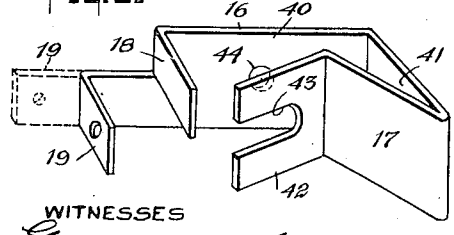


Fig. 5.



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WALL UNIT ASSEMBLY

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Application July 1, 1940, Serial No. 343,365

6 Claims. (Cl. 72—46)

This invention relates to building construction and more particularly to a wall unit assembly of the type wherein its elemental parts are standardized and pre-fabricated from composition and steel materials. The primary purpose of this invention is to facilitate the quick assembly of these wall units, the result of which will be an economically and rapidly erected fire-resisting building. Furthermore, if the necessity arises, this type of constructed building may be quickly dismantled, transported and again erected at another location.

This may be done by utilizing standard materials now in national use, pre-cast, and/or prefabricated to the desired dimensions and sections at some suitable place, and then delivered to the building site and there quickly assembled and rapidly erected into building units, with few ordinary tools and workmen. This type of construction lends itself readily to the use of pre-cast and pre-fabricated non-combustible materials thereby making mass production possible, thus keeping the building costs at a minimum.

This invention serves a four-fold purpose: (1) It eliminates the use of wood, a rapidly diminishing material which may be utilized for other and more essential purposes. (2) It utilizes non-combustible materials of unlimited resources. (3) It makes possible mass production. (4) Its cost may be well within reach of those with very moderate means, thus solving a problem long sought by national planners.

More particularly this invention relates to the wall construction of such buildings utilizing double walls with a uniform air space and involving such members as the flanged uprights and associated parts. However, such structural members may be used in other relations about the building such as beams, joists, braces, rafters and the like.

An object of this invention is to economically and expeditiously construct a building which may be rendered proof against fire, termites and rodents, insulated against heat, cold and moisture, non-deteriorating, maintenance-free and constructed at comparatively low cost and at the same time be adaptable to any style of architecture and yet impose no restrictions on its size or style and allow for later additions with a minimum of expense.

Another object of this invention is to provide a structure wherein the entire steel skeleton frame may be erected into a sturdy and rigid assembly before the application of walls or other appurtenances.

Another object of this invention is to provide in this structure a free-standing, non-weight-bearing curtain type of wall construction.

A further object of this invention is to eliminate the settlement or strain of walls caused by stresses imposed when incorporated into a building. The steel skeleton frame carries the superimposed loads, thus eliminating wall cracks and other damage due to settlement.

In carrying out this invention, the outer and inner wall panels which consist of cementitious non-combustible materials are pre-cast into desired dimensions; the sizes, width, length and thickness of each panel are not too great for convenient handling and erection. The flanged uprights and combination wall spacer and wall retainer are preferably of metal, either rolled or drawn and pre-fabricated and/or pre-formed to the required dimensions.

The overall thickness of the double wall is limited only by the depth of the web of the flanged upright. The exterior and interior wall panels are of suitable thickness to withstand the normal abuse ordinarily applicable to such building walls. The air space is kept uniform by the combination wall spacer and wall retainer.

The economical construction of this invention is further facilitated by finishing one face of each of the exterior and interior wall panels during the casting process, so that no additional exterior wall finish is required, unless it is desired to apply a paint finish. The interior wall is finished sufficiently smooth to receive the desired paint finish, except for the narrow vertical joint between the inner wall panels which may be brought to a smooth finish with cementitious materials similar to the pre-cast panels. No lathing or plastering is necessary on the interior walls.

Since all building sections will be pre-cast and prefabricated at a suitable central plant, no forms or molds are necessary during the erection of the structure. Upon delivery of the various sections to the building site they are assembled, and their erection into place ultimately forms the finished structure which is then ready for occupancy.

Further advantages of this invention will be apparent from the following specification and appended claims in connection with the accompanying drawing which shows several embodiments of this invention.

Figure 1 is a perspective horizontal section of the wall unit assembly referred to, showing one vertical flanged upright and associated parts which comprise the double wall assembly.

Fig. 2 is a similar view to Fig. 1, except that it shows another form of wall brace.

Fig. 3 is another view similar to Fig. 1, except that it shows still another method of applying wall spacer and wall brace.

Fig. 4 is a perspective, horizontal section of the wall assembly which comprise the single wall assembly.

Fig. 5 is a detail view of the combination wall spacer, wall brace, wall retainer and wall keeper shown in Fig. 1.

Referring now more particularly to Fig. 1 it will be apparent that one embodiment of the invention consists of an assembly including an upright 10, T-shape in cross-section, providing a flange 11 on a web 12. The web 12 is disposed between the ends of outside wall panels 13, each of which is rabbeted as at 14. The flanges 11 are disposed in said rabbets respectively. Use is made of a required number of devices 16, each of which serves as a spacer, brace, retainer and keeper in conjunction with the upright 10, outside panels 13 and inside panels 21. The panels 21 are arranged in spaced parallel relation to the panels 13 and the web 12 is disposed between the ends of said panels 21 in contact therewith. Each panel 21 is rabbeted as at 22. The outside panels 13 are put in place before the devices 16 and then the inside panels.

Each of the devices 16 is cut, bent and formed from a single piece of sheet metal, such as steel, to provide a portion 40, 41, 17, 42, 18 and 19 respectively. The portion 40 serves as a spacing means. One end of the portion 41 is integral with one end of the portion 40, one end of the portion 17 is integral with the other end of the portion 41 disposed at an acute angle with respect thereto, and the other end of the portion 17 is integral with one end of a portion 42 disposed to lie against portion 40 and which has a slot 43 therein. The portions 41, 17 and 42 serve as a brace as well as a pressure exerting means or clamp in conjunction with a panel 13 engaged thereby and the flange 11 engaging said particular panel. The portion 41 is preformed to an angle of 105° with respect to the portion 40 in order to exert pressure on the related panel 13 when the device 16 is secured in place. This is accomplished by the use of a toggle-bolt 20 which extends through a hole in the web 12, a hole 44 in the portion 40 and the slot 43. The bolt 20 not only holds the device 16 in place but also holds the portion 42 against the portion 40 with the portion 41 bearing on the panel 13. The portion 18 is preformed to a ninety-degree angle with respect to the portion 40, whereas the portion 19 is normally in the plane of the portion 40 as shown in dotted lines in Fig. 5. A panel 21 is set in place and is engaged on the outside by the portion 18 and the portion 19 is then bent to a ninety-degree angle with respect to the portion 40 as shown in full lines in Fig. 5 in engagement with the inside of the panel 21 in its rabbet 22. A screw 22 extending through the portion 19 and driven into the panel firmly holds the inner end of the device 16. The portion 40 is disposed between the ends of the panels 21 and a grout 45 is filled in the space between the panel end and the web 12.

The wall panels 13 and 21 are of the desired thickness and preferably, though not necessarily, several inches thick. The panels 13 and 21 are pre-cast cementitious non-combustible materials of the desired proportions for convenient handling and erection. Each outside panel has notches 15 therein to by-pass the nuts of the toggle bolts 20 when heavy outside wall panels are used. When light weight outside panels are used the notches may be omitted because such panels may be readily joggled into position.

The uprights 10 are preferably of metal, either rolled or drawn, and pre-fabricated and/or preformed to meet requirements. This is also true regarding the devices 16. The uprights 10 are spaced as required, ordinarily several feet for instance, and are firmly secured at the base and the top. Cross-bars may be used in conjunction with the uprights if and where required.

The required number of devices 16 are arranged on opposite sides of webs 12 at intervals in staggered relation. This enables the outside and inside wall panels of one bay to be detached independently of the adjoining panels. As shown, the inside panels 21 are rabbeted, as at 22, to a depth which enables the use of a filler 24 of the same material as the panels 21, and this filler is applied after the assembly of the parts has been effected. Thus the inside surface of the wall formed by the panels 21 will be brought to a smooth finish to receive the desired paint or other suitable coating to give the desired decorative effect. This is accomplished without the use of lathing or plastering.

In Fig. 2 there is shown a modified form of spacer, brace, retainer and keeper, the same being designated 116. This form of device is cut, bent and formed from a single piece of metal to provide a portion 140 which serves as a spacing means, an arcuate end portion 27 in continuation of the portion 140, and portions 118 and 119. The device 116 is analogous to the device 16 and in this respect the portion 27 has the same function as the portion 41, and the portions 118 and 119 have the functions of the portions 18 and 19 respectively of the device 16 shown in Figs. 1 and 5. The required number of devices 116 are employed as hereinabove described regarding the device 16 and accomplish the same result when assembled and secured in place.

In Fig. 3 there is shown a further modified form of spacer, brace, retainer and keeper, the same being designated 216. This type of device 216 is somewhat similar to the type of device 116, the difference being that the device 216 is of two parts, a part 28 having a portion 240 and integral portions 218 and 219, and a second part 220 consisting of a straight portion 221 and an arcuate portion 29 in continuation of the portion 221. The portion 221 has a slot 142 therein. The device 216 being made up of parts 28 and 220 is adjustable as to length. The part 28 is preferably spot-welded or otherwise secured to the web 12 and the part 220 is secured by a toggle-bolt 20 extending through the web 12, the portion 240 and through the slot 142. By virtue of the portion 29, the device 216 will exert spring pressure on the related outside panel 13. It is understood that the portions 218 and 219 serve to firmly hold the related inside panel 21.

As shown in Fig. 4, a single unit utilizes the flanges 11 and web 12 of an upright 10, and retainers 228 of L-shape providing portions 340 and and 319 respectively. The portions 340 are welded to the web 12 and the portions 319 are secured to the panels 30 respectively by screws 123. The panels 30 are rabbeted as at 31 to receive the portions 319 and a filler 124 is applied to cover the portions 319 and to finish the interior wall sufficiently smooth as hereinabove described for the purposes mentioned.

I claim:

1. A building wall assembly having in combination outside wall panels, inside wall panels spaced from said outside panels, an upright having a web and flanges on opposite sides respectively of said web, said web being disposed between adjacent ends of the outside panels and between adjacent ends of the inside panels, said flanges engaging said outside panels respectively, devices arranged on opposite sides of said web between the outside and inside panels, each of said devices having means engaged with said outside and inside panels on its side of the web to cooperate with said upright to hold said panels in place when the devices are secured to said web, and means securing said devices to said web.

2. A building wall assembly as set forth in claim 1, wherein said first means is resilient and exerts a spring pressure on the related outside panel.

3. A building wall assembly as set forth in claim 1, wherein said first means engages the inside panel on opposite sides thereof at its end.

4. A building wall assembly as set forth in claim 1, wherein said first means exerts a spring pressure on the outside panel end and engages the inside panel on opposite sides thereof at its end.

5. A building wall assembly as set forth in claim 1, wherein said securing means consists of toggle-bolts, there being one for each device.

6. A building wall assembly as set forth in claim 1, wherein said devices are arranged in staggered relation with respect to each other.

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