March 23, 1937. F. M. VENZIE 2,074,442

BUILDING STRUCTURE

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Fig. 1.

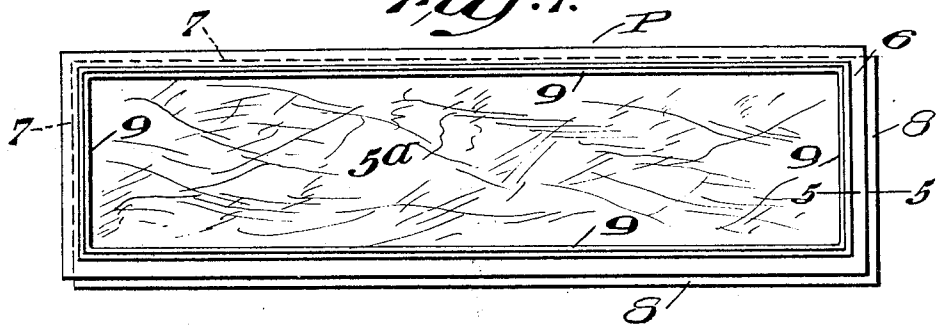


Fig. 2.

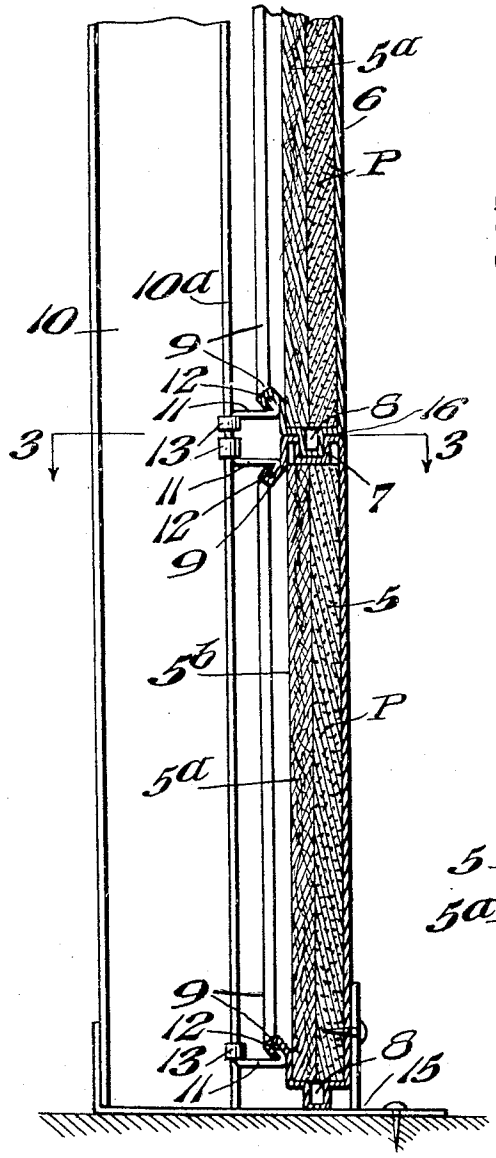


Fig. 3.

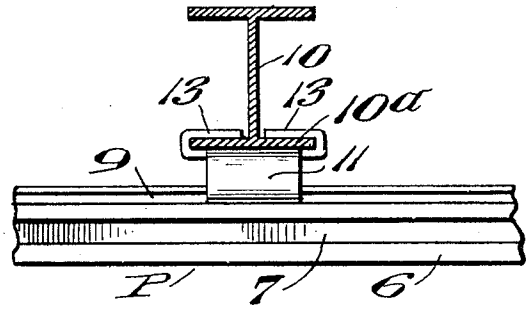


Fig. 4.

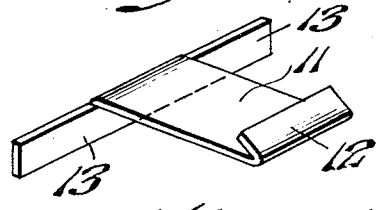
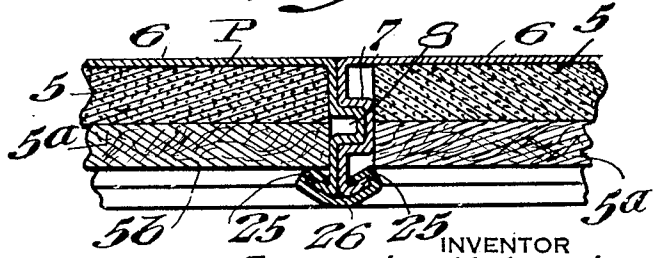


Fig. 5.



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Fig. 6.

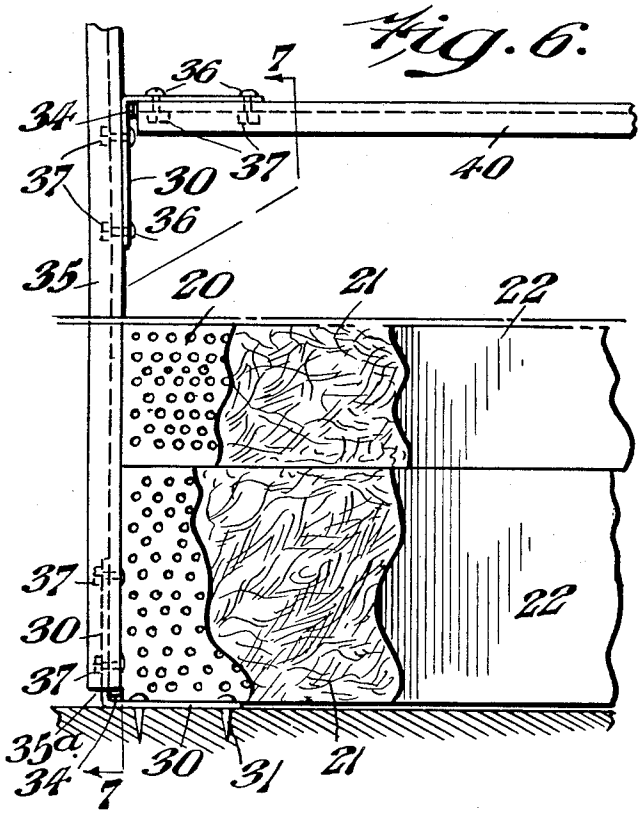
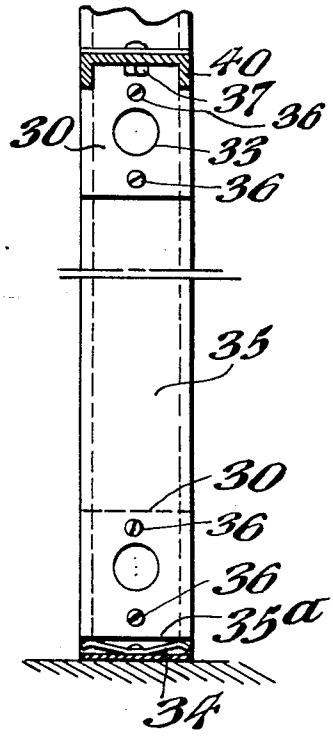


Fig. 7.



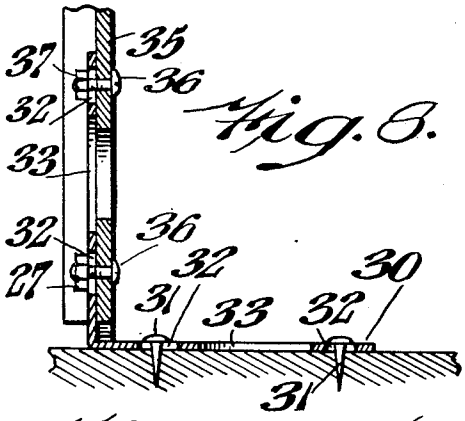


Fig. 8.

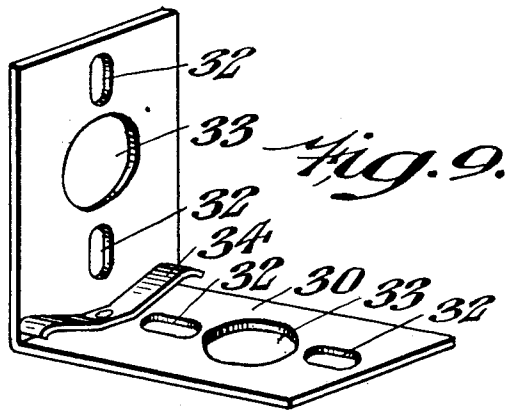


Fig. 9.

Fig. 11.

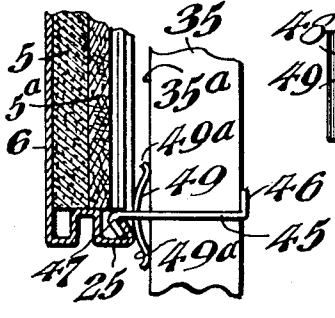


Fig. 12.

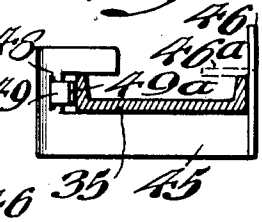


Fig. 10.



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UNITED STATES PATENT OFFICE

2,074,442

BUILDING STRUCTURE

Frederick M. Venzie, Philadelphia, Pa., assignor to National Gypsum Company, Buffalo, N. Y., a corporation of Delaware

Application February 1, 1933, Serial No. 654,688

17 Claims. (Cl. 72—46)

My invention relates to building structures, more particularly to the walls (using "walls" in the generic sense to include both ceiling and side walls) thereof, and comprises a novel panel, means for fastening the same to supporting members, and supporting framework.

In building structures as heretofore known it has been common practice to affix wall panels of various types to metal risers. A defect common to most walls made in this fashion is that the affixing means extend through the joints between adjacent panels, and such means carried a lip or other element which extended above and marred what would otherwise be the plane surface formed by the panels. When such clips were not used no satisfactory means were provided for, at the same time, making a suitable joint and supporting the panels so as to have a smooth wall surface which would be and remain free of cracks.

The present invention comprises a wall structure in which the wall is formed of a plurality of panels each with a metallic face and edges, two of the edges being tongued and the other two grooved so that a substantially one-piece wall can be formed from the panels and a finish coating applied directly to the metallic surface. Such structure necessitates the use of novel means for attaching the panels to their supporting means, and such attaching means are of the gist of my invention.

A wall so constructed has a tendency of its own accord to lie in a single plane, as contrasted with walls made from the usual materials which require a finish coat of plaster to bring the surface into a single plane, as it is well known that metal studding and cross members as normally used do not present an attaching surface which defines a plane due to various irregularities in the method of erection and somewhat, perhaps, to the material used. My invention further contemplates the provision of means for supporting the panels which, while supporting them in a predetermined plane, is automatically adjustable to compensate for irregularities.

A function of this construction is that, by it, not only will differences in dimensions be compensated for but the solidity of structures as heretofore built is broken up so that the structure provides means for taking care of expansion and contraction of the studding and wall surfacing material which expansion and contraction may be at different rates.

Another object of my invention is to provide a novel wall structure made of a plurality of separate panels so joined and held in position that the panels will present a surface to which may be applied a thin decorative coating such as wall paper or paint thereby eliminating the necessity for a finish coat of plaster or the like.

A further object of my invention is to provide a wall structure having a metallic face to which may be applied a thin decorative coating.

Another object of my invention is to provide a wall structure in which panels may be attached to the supporting elements in such a manner that the clips used for joining the panels to the supporting means do not extend between the edges of adjacent panels and hence do not protrude beyond the face surface of the wall.

Yet another object of my invention is to provide a novel wall in which the wall surfacing material is arranged so that when assembled it will lie in a predetermined plane and the means for supporting such structure is so constructed that while offering a firm support for the surface it will not draw the units making up the wall surface out of their normal plane.

A more specific object of my invention is to eliminate the need for a finish coating of plaster or other material over the wall panels.

Another specific object of my invention is to provide a combination of panels and clips so arranged that no portion of the clip extends into the joints between adjacent panels.

A further object of my invention is to provide a novel construction unit having a continuous metal surface, interlocking edges, and a substantially rigid body.

Another object is to provide a novel clip for connecting a construction unit to a support.

Yet another specific object of my invention is to provide a novel resilient clip for attaching a construction unit to a support.

Still a further object of my invention is to provide a novel angle iron for connecting studding to a floor or studding to lateral members.

Other objects and advantages of my invention will be apparent from the following specification, claims, and from the drawings illustrating one embodiment of my invention, in which:

Fig. 1 is a vertical elevation of the inner face of a panel;

Fig. 2 is a vertical sectional view through a portion of a wall showing a plurality of panels in mounted position;

Fig. 3 is a horizontal sectional view taken upon the line 3—3 of Fig. 2;

Fig. 4 is a perspective view showing one of my clips in detail;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 1;

Fig. 6 is a vertical elevation with portions cut away, illustrating a modified form of my invention;

Fig. 7 is a vertical sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 is a detailed view in vertical section of a novel angle iron used in anchoring a studding to a basal support;

Fig. 9 is a detailed perspective view of the angle iron as shown in Fig. 8;

Fig. 10 is a sectional view of a modified form of construction unit;

Fig. 11 is a side elevation of a modified form of clip for anchoring the construction panel or unit to studding; and

Fig. 12 is a plan view of the clip shown in Fig. 11, showing the clip attached to a section of channel iron.

The wall comprising my invention is formed of a plurality of panels P, such as indicated in Fig. 1, which may be of any desired and suitable shape, preferably as here indicated of greater length than width, each comprising an inner structure or filler of plaster board, wall board, or other suitable material, indicated at 5, such as is commonly used in forming wall structures, and a felt backing 5a having a metallic covering or pan 6 which may be of tin, sheet iron, or other similar fire resisting material. The covering 6 extends over one face and four edges of the plaster board 5 and over the edges of the felt 5a, and is shaped on two of the edges as indicated at 7 to form a groove, and on the other two edges as indicated at 8 to form a tongue. The metal extending beyond each of the edges is carried slightly over the margin of the inner face 5b of the felt 5a and is bent upon itself to form a socket as indicated at 9.

From the foregoing description it will be obvious that I provide panels which may be so positioned that the tongues of one panel may extend into the grooves on two adjacent panels, and the structure thus formed of a plurality of these panels will have upon its inner surface 5b a plurality of projecting sockets 9 which may receive and carry a clip. The dimensions and the material beneath the metal may be varied as well as the use to which my panel may be put; and with various forms of fillers the invention may be used for ceiling and floor construction as well as for side walls.

I have illustrated in Figs. 6 and 10 another type of panel construction which may be used in which a pan 20 is perforated and which otherwise may be similar to the pan 6. Immediately against the pan is located a layer of building felt 21 which in turn is backed by a layer of cardboard or other material 22. In this embodiment, as in the first described embodiment of my invention the finish coat may be applied directly to the pan, but in the embodiment herein illustrated the openings through the pan offer superior sound deadening qualities, as the perforated pan does not afford a continuous sound reflecting surface such as is present in the panel P.

In order to attach the panels to supporting members, herein indicated as metal I-beams 10 functioning as risers, I provide a clip 11 having a hook 12 on one end adapted to fit within the socket 9 on the panel. The clip carries at the end opposite to the end upon which the hook is formed a strap 13 which may be clinched around the flange 10a of the I-beam as clearly indicated in Fig. 3. If risers of shapes different from that of I-beams are used the strap 13 may be varied to conform thereto.

Instead of the socket 9 illustrated in Figs. 1 to 3 of the drawings I may provide a socket 25 illustrated in Fig. 5 in which the metal of the pan after forming the tongue or groove as the case may be is turned inwardly toward the pan. The clip 11 may be used to connect a pan having the socket 25 to a supporting member as readily as it connects the pans having the socket 9 by simply reversing the position of the clip upon the studding. In conjunction with the socket 25 a clip 26 may be used for tying together marginal edges of the pans where there is no studding to support the type of clip shown in Fig. 4. This type of socket may be used in place of that shown in Fig. 2 or may be used on two edges of a panel and the socket indicated at 9 used upon the other two edges.

In assembling the wall structure a panel may be mounted on any suitable base, herein indicated as a conventional bottom plate 15; a clip attached to socket 9 at the top and one to the bottom of the panel and clinched around the flange 10a of the riser. Thereafter another course of panels may be erected and clips applied. Obviously in some circumstances it may be found that the clip at the bottom of each panel may be eliminated and the one at the top only used, thus providing a means by which the panels may be readily erected from the interior of the room. This advantage is secured primarily because of my provision of the tongue and groove structure on the panels by which the panels are formed into a unit structure.

After the panels are erected the slight space indicated at 16 occurring at the joint between the edges of adjacent panels may be filled with any suitable substance such as putty, caulking compound, or the like, all of which are well known to those skilled in the art, the tongues 8 acting as a base against which the filler may be applied. Thereafter a surface coating of paint, paper, or any suitable finish coating may be applied directly to the metallic surface of the wall.

Where in the course of construction because of the size, or for other reasons, it is found undesirable to fixedly position the studding; where problems of expansion and contraction arise; or where it is desired to impart superior sound deadening qualities to the room the panels may be erected as illustrated in Figs. 6, 7, 8, etc. In this construction an angle piece 30 is suitably positioned on the floor or other basal support and held in position by nails or other positioning media 31. The angle is formed with a plurality of slots 32 through opposite faces of the angle and is provided with openings 33 through which conduits may pass. Immediately adjacent the inner corner of the angle is positioned a leaf spring 34 as illustrated in Fig. 9.

The angle being positioned on the floor, suitable studding, herein illustrated as a channel member, is connected by bolts 36 and nuts 37 to the angle piece with the lower end 35a of channel 35 resting on the spring 34. The nuts are not tightened sufficiently on the bolts 36 to preclude movement of the bolts in the slots 32 and thus the studding is held vertically in position and allowed vertical play as may be required on the spring 34. The studding may thus contract or expand in accordance with temperature con-

ditions as required. Similarly cross members 48 may be mounted on the studding 35 with the same angle iron, the end of the cross member 48 abutting at opposite ends of the spring 34, as is clearly illustrated in Fig. 6.

The panels may be attached to the channels 35 with the clip 11 illustrated in Fig. 4 or the clip illustrated in Figs. 11 and 12 may be used to connect the panel either to the studding illustrated in Fig. 6 or to the type illustrated in Fig. 2. The clip 45, illustrated in Figs. 11 and 12, in plan view is substantially L-shaped with an extension 46 at the upper end of the L, the bottom of the L being formed as shown in Fig. 11 with a hook-shaped portion 47 adapted to fit in the socket 25 of the panel. A slit 48 adjacent the hook 47 carries a leaf spring 49 the ends 49a of which are adapted to bear against one face 35a of the studding 35. The end 46 of the clip 45 may be bent as indicated in dotted lines 46a to form a clamp around the channel member and it will be obvious that the clip may be moved transversely across the channel without shifting position lengthwise of the same by reason of the provision of the spring and thus the hook will always be maintained in contact with the socket on the panel and variations in position of the studding may be compensated for. Obviously a clamp may be used on transverse members as well as on what is technically known as studding and Figs. 11 and 12 may as well be illustrative of the application of the clip to a transverse member as of the application thereof to a vertical member.

While I have referred to walls throughout the specification, my invention is equally applicable to ceilings and to partition walls as well as to division walls, and the term as herein used is to be so construed.

Various modifications may be made in the above described embodiment of my invention without departing from the spirit and scope thereof as set forth in the following claims.

I claim as my invention:

1. A building structure comprising a plurality of tongued and grooved panels having a tongue on one panel fitting a groove on an adjacent panel; supporting means; and clips holding said panels to said supporting means, said clips being entirely on the support side of said panels.

2. A wall structure comprising a plurality of metal surfaced tongued and grooved panels having the tongues on one panel fitting the grooves of adjacent panels, risers, means for resiliently supporting said risers, and means for resiliently connecting said panels to said risers.

3. A building structure comprising a plurality of tongued and grooved panels having the tongues on one panel fitting the grooves of adjacent panels, risers, and means for resiliently connecting said panels to said risers.

4. A building structure comprising a plurality of tongued and grooved panels having the tongues on one panel fitting the grooves of adjacent panels, risers, means for resiliently supporting said risers, and means for connecting said panels to said risers.

5. A wall structure comprising risers, a plurality of panels, each panel having on two edges a tongue and on two edges a groove, the tongues on each panel fitting into the grooves of adjacent panels, a socket on the inner side of each panel, and means fitting said socket for attaching said panels to said risers.

6. A wall structure comprising supporting means; a plurality of panels, each panel comprising a filler and a shell having on two edges a tongue and on two edges a groove, the tongues on each shell fitting into the grooves of adjacent shells, a socket on the inner side of each shell; and means adapted to fit each socket for attaching said panels to said supporting means.

7. A wall structure comprising risers; a plurality of panels, each panel having on two edges a metallic tongue and on two edges a metallic groove, the tongues on each panel fitting into the grooves of adjacent panels; a metallic socket on the inner side of each panel; and a clip adapted to fit each socket for attaching said panels to said risers.

8. A wall structure comprising a plurality of risers; a plurality of panels, each panel comprising a plaster board filling and a metallic shell shaped to provide a face covering one side and four edges of said filling, two edges being shaped to form a tongue, two edges to form a groove all at right angles to said face, and on the side adjacent the edges and parallel to the face being shaped to provide a socket; a clip shaped on one end to fit said socket and on the other to pass around one of said risers and comprising resilient means for holding said panels in place; and means for filling the cracks between the edges of adjacent panels.

9. A building construction comprising a plurality of risers; a plurality of panels, each panel comprising a filling and a metallic shell shaped to provide a face covering one side and four edges of said filling, two edges being shaped to form a tongue, two edges to form a groove, all at right angles to said face, and on the side adjacent the edges and parallel to the face being shaped to provide a socket; and a clip, shaped on one end to fit said socket and on the other to pass around said risers for holding said panels in place.

10. A wall structure comprising a plurality of risers; a plurality of panels, each panel comprising a filling and a perforated metallic shell shaped to provide a face covering one side and four edges of said filling, and on the side adjacent the edges and parallel to the face being shaped to provide a socket; and a clip, shaped on one end to fit said socket and on the other to pass around said risers for holding said panels in place.

11. A building construction comprising supporting means; a plurality of panels, each panel comprising a filling and a metallic shell shaped to provide a face covering one side and four edges of said filling, and on the side adjacent the edges and parallel to the face being shaped to provide a socket; and a clip, shaped on one end to fit detachably said socket, and on the other for connection to said supporting means.

12. A building construction comprising supporting means; a plurality of panels; a socket on the inner side of each panel; and a clip adapted to fit each socket for attaching said panels to said supporting means.

13. A wall structure comprising a plurality of tongued and grooved panels having the tongues on one panel fitting the grooves of adjacent panels; risers; means for resiliently mounting said risers; and means for resiliently connecting said panels to said risers, said connecting means lying entirely behind said panels.

14. A building structure comprising a plurality of tongued and grooved panels having the tongues on one panel fitting the grooves of adja-

cent panels; supporting means; and means for resiliently connecting said panels to said supporting means, said connecting means lying entirely behind said panels.

15. A building construction comprising a plurality of tongued and grooved panels having the tongues on one panel fitting the grooves on adjacent panels, whereby the faces of adjacent panels lie in a common plane; a support for said panels; means for connecting said panels to said support; and means for preventing displacement of the tongues from the grooves.

16. A building construction comprising supporting means; a plurality of panels each having four edges; a socket on the inner side of each panel, said socket having its opening facing toward the nearest edge of the panel; and a clip adapted to fit each socket for attaching said panels to said supporting means.

17. A building construction comprising supporting means; a plurality of panels each having four edges; a socket on the inner side of each panel, said socket having its opening facing away from the edge of the panel closest thereto; and a clip adapted to fit each socket for attaching said panels to said supporting means.

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