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PANEL MOUNTING ASSEMBLY

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Fig. 1.

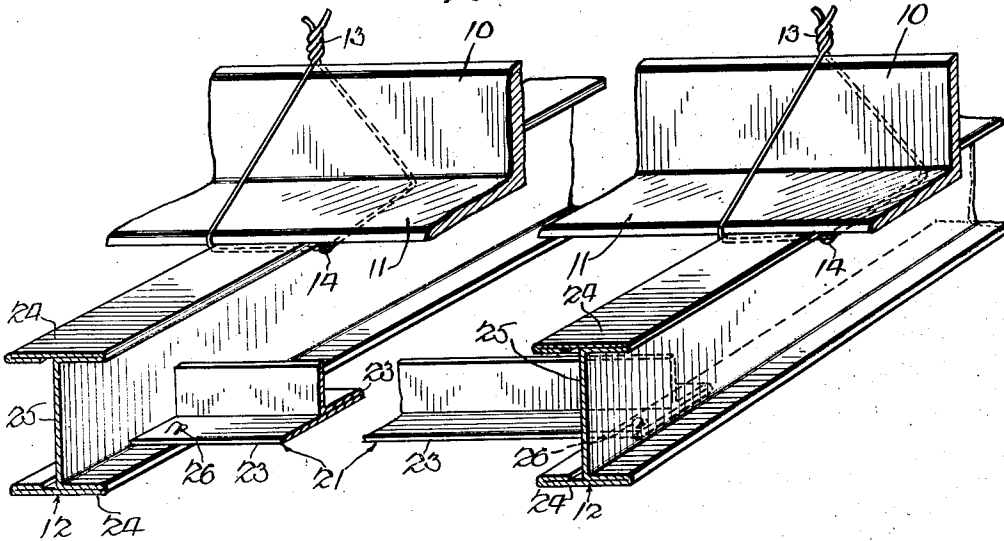


Fig. 2.

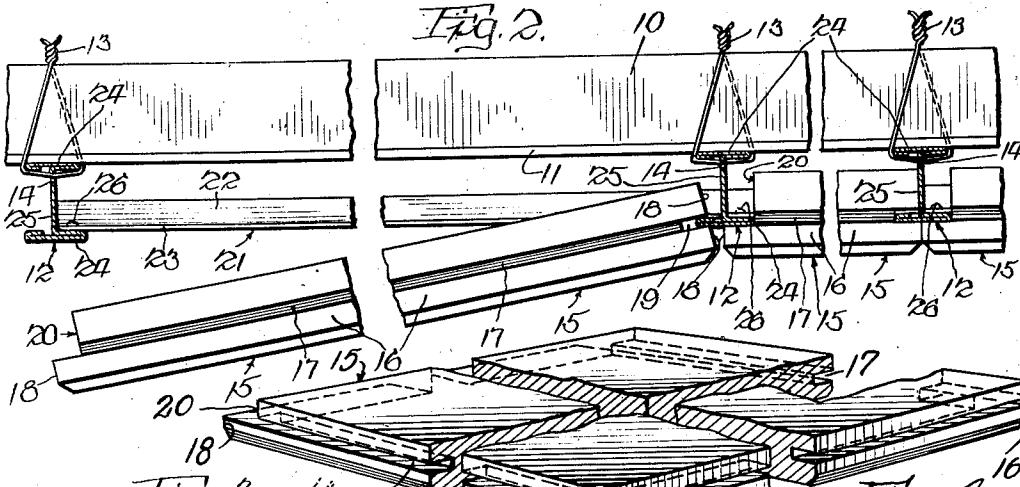


Fig. 3.

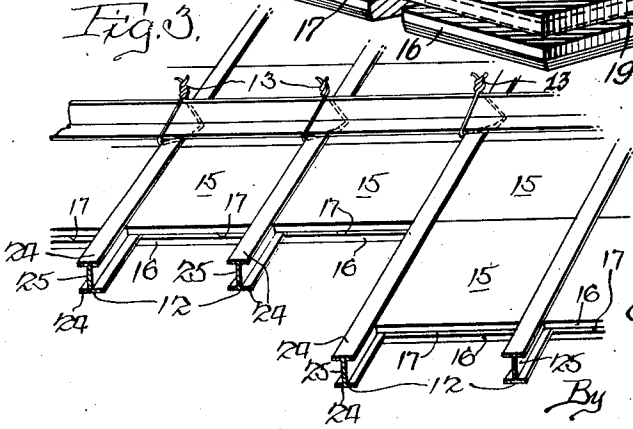


Fig. 4.

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UNITED STATES PATENT OFFICE

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PANEL MOUNTING ASSEMBLY

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8 Claims. (Cl. 72-68)

This invention relates to a structural assembly which may be employed in the erection of room ceilings and walls and wherein the assembly thereof is appropriately attached to already existing structure.

The invention is in the combination of rail members, spline members and panel units and the co-relation and co-action thereof serving to accomplish the desired results.

A particular object of the invention is the provision of a wall or ceiling surface made up of an assemblage of unit panels, erected so as not to allow breathing at the joints between units but the erection of which is simple and rapid.

The invention pertains especially to a structural assembly comprising unit panels with grooves in certain edges and rabbets on other edges which units engage and are suspended by a system of flanged supporting rails and splines.

Other objects of the invention are the provision of a structural wall or ceiling assembly constructed from parts of standard size and form, that is decorative and durable, that may be fireproof, may comprise an acoustical corrective, or may depending on the character of the panel unit employed serve in any desired form or combination of forms of structural utility.

Heretofore in the art of construction of wall and ceiling assemblies comprising a plurality of unit panels the panels have been secured by bolts, screws or nails passing through the panels and securing them to the substructure or have been secured by integral clips or attached clips and in some cases have been supported on flanged members or secured between runners. Previous results have not in all cases been satisfactory in that the fastening members are left exposed to view or are covered by batten strips or other overlaid member. The worst previous general defect has been that in most all such constructions the joints between units were not fully closed which condition allows breathing.

The invention in its preferred embodiment comprises rail members which are mounted on a substructure in any convenient manner. The rail members comprise an outstanding web portion having at its outer end oppositely disposed flanges formed at right angles to the web.

Cooperating with the rail member and supported between contiguous rail members there are applied the panel units.

Each panel unit is usually a square or rectangular piece of wall forming material and may be of fiber insulation board or of other material of sufficient thickness, say from about $\frac{1}{2}$ " to 2" thick,

having the characteristics desired for the finished wall structure.

Each panel unit is provided along three of its edges with a narrow slot or kerf about midway of its thickness and extending inwardly about $\frac{3}{8}$ ". The fourth edge of each unit is rabbeted from the back to provide a ledge approximating the outer or front face of the slot.

The third member involved is a spline which may be merely a flat member of the thickness of the slots and of a width slightly under twice the depth of a slot, or which is preferably of T-shape inverted in use so that the head of the T serves as two oppositely disposed flanges. These spline members are of the length being the distance between webs of adjacent rail members.

To erect a wall surface of the three members, just above described, rail members are mounted, in spaced parallel relation, and firmly secured to some substructure. The center spacing of the rails is the width of the panel units which are to be mounted.

The next step is to engage a slot of a panel unit (making sure that this slot is the one opposite the rabbet) with a flange of a rail and engage the face of the step, formed by the rabbet, against the outer or lower face of the opposing flange of the adjoining rail. It will be noted that thus far the panel unit is supported at only one edge.

The next step is the placing of a spline which is positioned with its flat face supported behind or above the opposing flanges of adjacent rails and is engaged for approximately half its width in an edge slot of a panel unit. For the first unit a second spline is applied to support its fourth edge. After the first unit each succeeding unit in a row is engaged with a rail flange and a spline already in place and the erection is completed as described for installation of the first unit of a row.

It will be seen that the construction described provides a tight wall without open joints and that not only are the joints closed but they stay closed since the width of a spline is approximately the total of the depth of the two slots in which it is engaged and thus it can not slip entirely or substantially entirely into one slot and leave an open joint between panel units.

An important feature of this construction is that the panel units are very firmly anchored in place due to the fact that the ends of the splines engage the back or inner faces of the rail flanges thus drawing the individual panel units firmly into contact with the lower or outer faces of the rail flange while at the same time

causing firm contact between the splines and inner or back projections forming the back face of the slots of the panel into which the splines are inserted. In erecting a row of units between adjacent rails it is advisable to reverse each panel unit so that the edge slots and rabbets alternately for each succeeding unit engage opposed flanges.

The preferred embodiment of the invention is illustrated in the accompanying drawing wherein—

Figure 1 is a bird's eye perspective of a portion of the suspension system.

Figure 2 is an elevation of a portion of an installation.

Figure 3 is a perspective of a portion of an installation of units.

Figure 4 is a bird's eye perspective on a somewhat enlarged scale showing an individual panel unit in detail.

In the several figures of the drawing like reference numerals refer to like parts.

The system as illustrated is erected on a base comprising angles 10 having a horizontal portion 11 against which rail members 12 are secured by securing means 13. As shown securing means 13 comprise wire ties which pass through holes 14 in rails 12. In the illustration the base members are shown as angles 10 but it will of course be understood that any other appropriate form may be used, such as a channel member, and that such base whether angle, channel or other member is appropriately attached by means not shown to the basic structure of the building in which installed. Instead of wire ties the securing means 13 may be bolts, formed clips, rivets, or other appropriate fastening means.

Rail members 12 are secured to the angles 10 as above described, or if appropriate in the construction involved are secured directly to the basic structure to which they may be secured by wiring or with clips, bolts, rivets, or the like, as desired.

The rail members 12 are preferably of H shape as illustrated and comprise a vertical portion 25 with upper and lower parallel flanges oppositely disposed with respect to the center line of the vertical portion 25 and indicated at 24.

The members 12 are of course spaced on centers corresponding to the width of the panel units to be erected thereon which center to center dimensions may conveniently be 24".

The panel units which are installed on rail members 12 may be of substantially any sheet formed material having appreciable thickness and particularly this system herein illustrated has been developed for use in the installation of acoustical or sound absorbing materials comprising specially manufactured fiber board which for the purpose ordinarily has a thickness of about 1 1/4" but which of course may be either thicker or thinner so long as there is provided sufficient thickness for the special fabricating operations which will be subsequently described. In accordance with the dimension above stated for the center to center dimension of the rail members the panel units will have a width of 24" and may be of such length as is desirable or convenient for handling and preferably for a length ordinarily of 12" or 24".

The panel units which are indicated at 15 are especially fabricated for use in this system as follows. The two edges of the panel unit 15 indicated as 16—16, being those edges of the unit

which when erected are perpendicular to the rail members 12, are provided with kerfs or slots 17 which in general are formed approximately halfway through the thickness of the material and which slots have a depth approximately 1/2 the width of a spline member 21 which will be subsequently herein described. The other two edges of panel unit 15 being those edges indicated as 18—18 are provided respectively at one edge with a kerf or slot 19 which is similar to kerf 17 in an edge 16, the kerf 19 matching with the respective kerfs 17. The other edge 18 of the unit is preferably provided with a rabbet cut out from the back side of the unit which cutout is indicated at 20. The face of the flange or outwardly extending portion of the cutout 20, it will be noted, is the same distance from the face of the panel unit 15 as is the corresponding face of slots 17 and 19 and this face of the cutout registers with slots 17. The depth of cutout 20, measured inwardly from the outer edge 18 of the unit, is the same as the depth of slot 19 and it is to be understood that in fact the rabbet or cutout 20 corresponds in every way with the slot 19 except that the entire back portion of the unit which is behind slot 19 is in the case of the other end of the unit removed to form the rabbet or cutout 20, or otherwise stated, there is provided only a single flange extending outwardly from one face of the panel unit as compared to the other edges of the panel unit, which each is provided with outwardly extending flanges extending from the opposite faces of the unit and spaced from one another to provide a slot or kerf between each of such pairs of outwardly extending flanges.

While unit 15 is shown and described as having edges 18—18, slot 19, and rabbet 20, respectively, it is to be understood that though in the preferred construction it may for certain conditions of erection be preferable that either both ends be rabbeted to correspond to the rabbet indicated at 20 or for both ends to be slotted as indicated at slot 19. In the case where both ends of the unit 15 are rabbeted, the entire support of the unit depends upon spline members 21 and on the other hand, if both edges 18 are provided with slots 19, then it will be necessary, in erecting the units, to either sufficiently spring the rail members 12 to allow the insertion of the units 15 or to be temporarily secured to at least every other rail 12, to be finally secured after the units 15 have been inserted between the respective pairs of rails 12.

In connection with this construction there are provided spline members 21 which as illustrated are T-shaped members 21 having an upright or vertical portion 22 and oppositely extending flanges 23. These splines may be furnished in convenient long lengths to be cut up on the job or probably more satisfactorily they can be furnished in lengths to fit between rail members 12 which in the particular case described, that units 15 having a width of 24", will require a spline 21 of 23 3/8" being the width between the center lines of adjacent rail members 12 less a slight allowance for the thickness of the rail members.

The splines as illustrated are of T-shape with the vertical portion 22 provided particularly for the added stiffness which it affords or as will be well understood the splines 21 may be merely flat strip metal stock if sufficient stiffness is provided by such flat stock or if more stiffness is desired than can be obtained by the T-shaped spline illus-

trated the spline may comprise an H-section by providing at the top of the vertical portion 22 further outwardly extending flanges 23. Flanges 23 of spline member 21 extend outwardly from the vertical portion of the member for a distance which is approximately that of the depth of the slots 17 provided in the unit members 15 preferably the width of each flange from the center line of member 21 being just slightly less than the depth of slots 17.

In the erection of an installation involving the construction described herein the operations are substantially as follows: A spline 21 is inserted between two of the H rail members 12 with the oppositely extending flanges 23 of the spline resting its ends on an oppositely disposed lower flange 24 of rail members 12. A panel unit 15 is then inserted between rail flanges 24 by first entering slot 19 on one of the flanges 24 whereupon the outwardly extending face of the flange formed by rabbet 20 may be brought up against the lower face of the other outwardly extending flange 24 as is illustrated in the drawing. When the panel unit 15 has been brought into the position just described the spline 21 will be engaged in one of the slots 17 of the unit whereupon the unit will be supported in place held firmly against the lower faces of the flanges 24 of the rail members.

The next step will be the insertion of a second spline 21 between rail members 12 and the engagement of a flange 23 in the other slot 17 of the panel unit 15 whereupon a second panel unit 15 may be inserted between the rail members 12 and then slid along sufficiently for one of its slots 17 to engage the unengaged flange 23 of the second spline and to a snug contact with the previously erected panel unit 15. The sequence of operations just described will then be followed until the full length of the space provided has been filled. The description of the erection of the units has of course been given for but one width or row of panel units and it is to be understood that other and contiguous widths will be erected in the same manner.

It will be seen that in accordance with the above described construction there is provided a system of erection and the elements therefor which is simple, which may be readily and easily installed, is flexible, and yet is a system of construction which when completed provides a rigid and substantially unitary surface.

Several very advantageous features of the above construction are that in case a panel unit 15 should be marred or injured after the surface has been erected it is relatively easy to remove such unit and replace it, in which case it is only necessary to start at the end of a line of units and remove one in a manner the reverse of the installation thereof, whereupon succeeding units may be likewise removed until the injured unit is reached whereupon it may be replaced and the previously removed units reinstalled without injury to any of the structure or components thereof. Further, while it is substantially immaterial as to which way units 15 are installed, i. e., whether the flange faces formed by rabbet 23 shall all be directed toward one of the rail members 12 there is an advantage in turning the units end for end alternately so that the flange end of each succeeding unit is applied alternately to the opposing rail member flanges 24 since, when this is done, the whole structure is slightly strengthened as is readily apparent.

A further advantageous element of the con-

struction which has not been above described but which preferably is embodied therein is the provision of means whereby the cross member splines 21 are anchored on flanges 24 against transverse movement, which anchoring may be accomplished in any convenient manner but which for the purpose of illustration hereof is indicated as a perforating operation whereby, if a spline 21 is inserted in its proper place, a flange 23 thereof and a flange 24 on which the spline rests are slit so that an anchoring tongue is turned up out of flange 24 into a cooperating opening in flange 23 to anchor spline 21 against transverse movement with respect to the rail members 12.

At 26 there is indicated the anchoring tongues turned up in the respective flanges as has just been described, which operation of punching and turning up of the tongues may be readily accomplished, for example, by the use of a small punch having a diagonally formed face so that the metal is not punched out but instead is merely cut and turned upwards to form the anchoring tongues.

This feature of anchoring the spline members 21 to the rail members 12 is advisable and desirable particularly if the panel units 15 are composed of material having the property of a relatively large degree of expansion and contraction with changes of atmospheric conditions, as for example, it is particularly advisable when the panel units are composed of the ordinary fiber insulation board, in which case it is possible that upon shrinkage of the units it may happen, due to paint bridging the joints between adjacent units, or to some other cause, that all of the openings having a plurality of units, maybe 4, 5, 6 or 8, due to contraction, may be cumulative and occur at one joint whereby the opening thereof may be sufficient to withdraw flange 23 of a spline 21 from a cooperating slot 17, whereupon it is possible that a unit 15 may drop out. With the splines 21 anchored to rail members 12 as has been described, the effect of expansion or contraction of each unit is localized between adjacent anchored splines and the difficulty described, i. e., that arising from cumulative shrinkage, cannot cause any difficulty.

Whereas there has been above described in detail the preferred embodiment of the invention disclosed in the drawing accompanying this application, I claim:

1. A surface forming structure comprising rail members mounted in spaced parallel relation in combination with panel form units, the rail members having oppositely disposed outwardly extending lower flanges and the panel unit having kerfs in three of its side edges and an outwardly extending flange at its fourth side edge, the panel mounted on the rail members with one edge kerf engaging a rail flange and the opposite edge flange contacting a flange of a contiguous rail and a spline member engaging in a side kerf of the panel unit and having its ends supported upon the rail flanges.

2. A panelled surface structure comprising spaced rails, outwardly extending flanges on the rails, panels mounted on the rails, the panels flanged all around with the flanges on two opposite side edges extending from one face and the flanges on the other opposite side edges extending from the other face, a panel mounted on the rails with two of its flanges engaging the rail flanges and supported in place by means of spline members engaging the remaining flanges of a

unit and having their ends overlying the rail flanges over that side opposite the side thereof engaged by the panel flanges.

3. The method of installation of a panelled construction comprising panels each having at opposite edges projecting flanges and at its other opposite edges also having projecting flanges, the panels with such pairs of projecting flanges facing oppositely, mounted on flanged rail members with the faces of one pair of flanges of a panel against one side of the rail flanges and are secured in place by the placement of retaining splines inserted under the face of the other pair of panel flanges and over that side of the rail flange not contacted by the panel flanges.

4. The combination of mounted rail members and panel units, the panel units having pairs of opposite flanges and the pairs of flanges facing in opposite directions, the rail members also having flanges, the panels mounted with a pair of flanges resting against the rail flanges and supported by spline members which at their ends engage the rail flanges on the sides thereof not engaged by the panel flanges and intermediately engage the face of the panel flanges not engaging the rail flanges, the splines secured at their ends with respect to the rail flanges.

5. A panelled construction comprising spaced flanged mounted rail members, having mounted thereon panels of yielding fiber board, the panels having at contiguous edges flanges facing in opposite directions and substantially totaling the thickness of the panel, the panel mounted with

an opposed pair of its flanges against a face of the flanges of the rail members and sustained by strip suspending means supported on the opposite side of the rail flanges and extending across the faces of the otherwise unsupported flanges of the panel.

6. The construction claimed in claim 5 wherein the strip suspending means and rails are provided with cooperating means restraining said members against relative movement in the direction parallel with the rails.

7. A panelled construction comprising spaced supporting rails with panels mounted thereon, the panels having kerfs in three of its edges and a projecting flange on a 4th edge, the supporting rails each having an inwardly projecting flange, the flange of one rail engaging a kerf of a panel, splines engaging the other kerfs of the panel and at their opposite ends supported on the flanges of the rails, the projecting flange of the panel projecting under the flange of an adjacent rail.

8. In a panelled construction, panels having flanges at the edges thereof, the flanges of each pair of opposite edges oppositely disposed with respect to the faces of a panel, the panels mounted on spaced flanged mounting members with the flanges of a pair of edges of a panel overlapping the outer faces of a flange of each of a pair of mounting members, cross splines overlapping the inner faces of a flange of each of the pair of mounting members, and supporting the other pair of flanges of a panel.

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