

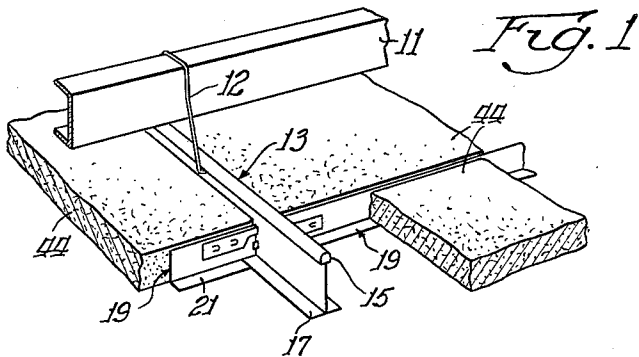
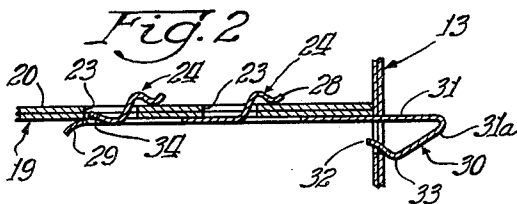
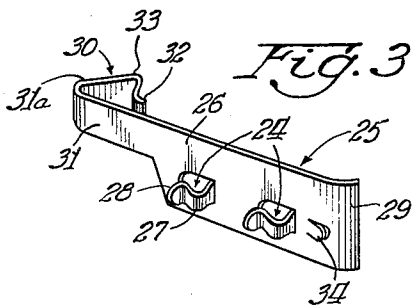
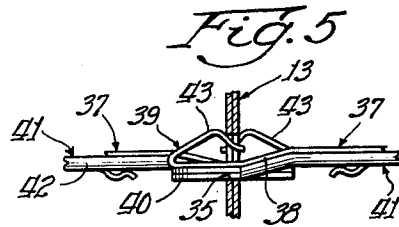
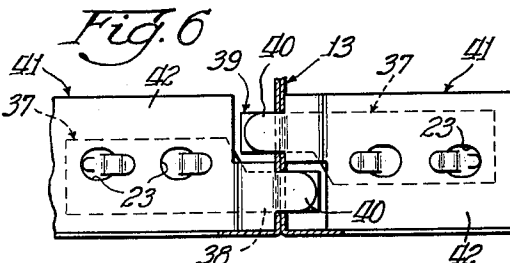
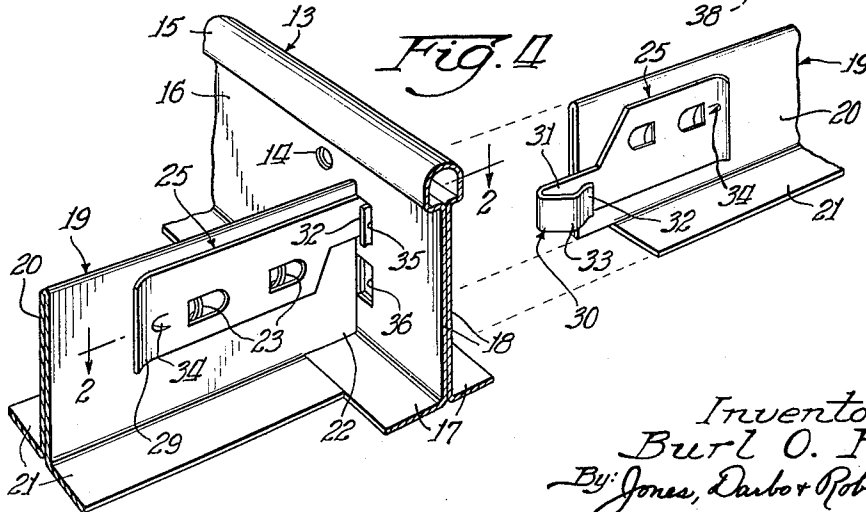
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CEILING CONSTRUCTION MEANS

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CEILING CONSTRUCTION MEANS

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This invention relates to ceiling construction means, more particularly for use in acoustic corrective ceilings.

The invention provides improved support means for the acoustic tile, the total under surfaces of which comprise a substantial part of the exposed surface of the ceiling and which are formed of a porous or cellular material that dissipates the sound by the friction the material offers to the sound waves that enter or penetrate the material.

Importantly, the invention provides a first support, a second support transverse to the first support, a hole in the first support, means carried by the second support for entering said hole, and interlocking means carried by the first mentioned means for engaging the first support.

More particularly, the invention relates to improved means for interconnecting supporting transverse tile supports on longitudinal tile supports, said means desirably including a detachable clip on the transverse support having a spring nose that enters a hole in the longitudinal support, clips and holes on aligned supports being vertically staggered whereby two transverse supports may be aligned on opposite sides of the longitudinal support. The clips are releasable from the transverse supports to permit interchange from one side to the other of the latter for purposes of accommodation to ceiling constructions.

In a further aspect of the invention, the clip nose is reinforced by a rigid lug integral with the transverse support member that enters the hole jointly with the nose.

The foregoing and other objects and advantages of the invention will be apparent from the following description, taken together with the accompanying drawings, showing illustrative embodiments thereof, and in which drawings:

FIGURE 1 is a general fragmentary perspective view of a ceiling construction having the present invention associated therewith;

FIGURE 2 is a horizontal section through a transverse support member and a longitudinal support member, associated by means of the clip of the present invention;

FIGURE 3 is a perspective separated view of the detachable spring steel clip;

FIGURE 4 is an enlarged perspective view of parts shown in FIG. 1 showing one metal transverse support interconnected with the metal longitudinal support and the other transverse support in separated relation preliminary to association;

FIGURE 5 is a fragmentary horizontal sectional view showing a longitudinal support member and two modified transverse support members associated therewith; and

FIGURE 6 is an elevational view of the structure of FIG. 5.

Referring in detail to the illustrative constructions shown in the drawings, and describing first FIGS. 1 to 4, the numeral 11 indicates a sub-ceiling beam from which is suspended, by means such as wires 12, a plurality of parallel runners such as the longitudinal tile supports 13, only one of the latter however being here shown. The wires 12 may conveniently engage holes such as 14 in the longitudinal supports 13. The latter are shown in the form of I-beams having a top rail 15 that contacts the beam 11, a laminated vertical web 16 and lateral co-planar horizontal flanges 17 on opposite sides of the member. The laminated web 16 is here shown formed by superposedly folded laminations 18. For support by the longitudinal support members 13 are other runners or transverse tile support members 19. Transverse support members 19

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also have a laminated web 20 and lateral co-planar horizontal flanges 21. The flanges are normal to the webs in each case.

In accordance with the present invention, web 20 extends beyond flanges 21 so that it can rest on one of the flanges 17 of the longitudinal support members 13, as best seen in FIGS. 1 and 4, as at 22, while the flanges 21 are brought into co-planar abutting relation with the flanges 17, for a purpose presently explained. The transverse member 19, in its web 20, has a perforation, in this case two perforations 23 to receive spring tongues 24 of an interlocking clip 25, shown in separated relation in FIG. 3. The perforations 23 are spaced to receive the tongues 24. One of the interlocking clips 25 is carried at each end of each of the transverse support members 19, in vertically relatively staggered positions as later explained, only one end, however, being here shown.

The interlocking clip 25 has a plate part 26, from which are here shown struck out, to the same side thereof in this instance, two of the spring tongues 24, one to enter each of the perforations 23 in the transverse support member. Each spring tongue 24 is shaped to have a reverse bent end 27, that is again reversely bent to have an outwardly flaring free end 28. When the plate 26 is lapped to the web 20 and the tongues 24 entered into the perforations 23 when the plate 26 may be slid forwardly with respect to the web 20, the edge of the perforations cooperating with the outwardly flaring free ends 28 to cam the tongue away from the plate 26 sufficiently to permit the edge of a perforation 23 to be received between the plate 26 and the tongue, the tongue at the same time being yieldingly stressed so that its resilient reaction grips the edge of the perforation 23 between it and the plate 26, thus holding the clip securely to the transverse supporting member until it be desired to intentionally separate the two whereupon the clip may be slid rearwardly of the web 20 to free the tongue from the edge of the perforation 23 and then to remove the tongues through the perforations.

The tail end of the plate 26 is shown flared as at 29 to facilitate thumb engagement with the clip for application or release of the latter to or from the support member, as may be desired.

On the same side of the plate 26 of the clip as the tail end 29 and at the forward end of the clip is a spring nose 30 that is laterally reversely bent from a vertically reduced section or head 31 of the plate 26. The spring nose 30 includes an oblique part 31a laterally outwardly flaring and a reverse bent termination 32, providing a hump 33 therebetween.

When the clip is secured to the transverse support member, head 31 of the clip and with it nose 30 extends beyond the forward end 22 of the transverse member 19. Head 31 is reduced in vertical height and offset toward one of the edges of the clip for a purpose presently described. When the clip is so secured to the end of the transverse member, a spring 34 detent, also shown struck out from plate 26, engages the rear side of one of the perforations 23 to enhance the engagement of the parts to prevent accidental removal while permitting intentional removal when desired. Detent 34 provides a shoulder on the clip plate facing oppositely from the spring tongue 24. Tail end 29 of the clip may be used as a lever to spring detent 34 out of perforation 23 when it is desired to slide the clip rearwardly for removal. Clips 25 may be applied on opposite ends of the transverse member by reversing the clip with respect to the offset head 31 as shown for lefts and rights in FIG. 4.

In web 16 of longitudinal support member 13 is a pair of vertically aligned openings 35 and 36, in this instance rectangular. When the clip 25 is associated with the transverse support member 19 as shown at the left-hand

side of FIG. 4 the vertically dimensionally reduced head 31 of the clip enters one of the openings 35, 36, in this instance the upper opening 35. At the same time, with respect to the other transverse support member 19 at the right-hand side of FIG. 4, the clip 25 is vertically reversed and its head 31 is offset downwardly from that at the left-hand side of FIG. 4. Thus the clip at the right-hand side enters the lower opening 36 in the web 16. At this time, both webs 20 abut web 16 on opposite sides thereof.

When two transverse support members 19 are associated with the longitudinal member 13, and the noses 30 pushed through the holes 35 and 36, the nose is compressed by the cam action between the incline 31a of the nose and the edge of the hole until the hump 33 of the nose is pushed through the hole, whereupon the nose expands until its free termination 32 engages the edge of the hole with the latter between the transverse member and the hump 33, thus resiliently but detachably interlocking the transverse member with the longitudinal member. At this time the flanges 21 of the transverse members abut and are co-planar with the flanges 17 of the longitudinal member. When it is desired to remove a transverse member from the longitudinal member, sufficient force may be applied to spring the nose again inwardly to press the hump 33 past the edge of the hole in the web 16.

In this instance, the holes 35 and 36 being of rectangular shape to accommodate the interlocking noses 30 of the clips, are vertically aligned in the web 16 so that noses 30 of oppositely aligned transverse members may enter the holes 35 and 36, one as at the left-hand side of FIG. 4 in the upper hole 35 and the other as at the right-hand side of FIG. 4 at the lower hole 36. Since the interlocking clips 25 are on the same side of the web 20 of each transverse member 19, thereby permitting vertical alternation of the noses 30 on oppositely aligned transverse members, the holes 35 and 36 are to one side of the web 20 of the aligned transverse members. This has the effect of aligning the webs 20 themselves on a common center line transversely of the longitudinal support member 13, thereby providing a symmetrical construction.

Turning now to the modification shown in FIGS. 5 and 6, the clip 37 is generally similar to the clip 25 but has a lateral offset 38 therein in its head portion 39 to conform to the offset lug 40 that is formed on and integral with the end of the transverse member 41 as a continuation of the laminated web 42 of the latter. As will be seen in FIGS. 5 and 6, the lug 40 backs up the nose 43 of the holding clip 37 and enters the hole 35 or 36, as the case may be, with the lug 40 thus reinforcing the nose.

It will be understood that opposite ends of an individual transverse support member 19 or 41 may be formed with their interlocking noses vertically staggered as here shown. The perforations 23 are aligned midway between the holes 35 and 36 to facilitate the upside down reversal of the spring steel clips 25 as illustrated for lefts and rights in FIG. 4.

In the case of either construction, the sound absorptive tile or acoustic panels 44 are laid on the flanges 17 and 21 of the longitudinal support members and the transverse support members, as shown in FIG. 1, the support members being spaced a suitable distance apart to accommodate the dimensions of the tile, thus providing an efficient and visually attractive sub-ceiling for a room. The flanges 17 and 21 conceal the breaks between the panels 44 and add to the ornamental appearance from beneath. The underfaces of the flanges 17 and 21 may be painted for this purpose.

Tile 44, as is well known, may be formed of more or less loosely compacted fibers of vegetable material, for example.

See also my copending application Serial No. 853,734 filed November 18, 1959 on "Ceiling Construction Means," (Case 2).

Such changes may be made as fall within the scope of the appended claims without departing from the invention.

What is here claimed is:

1. In ceiling construction means, a flanged longitudinal support member having a web normal to the flange, a flanged transverse support member having a web normal to its flange, the web of the transverse member projecting beyond its flange whereby the flange of the transverse support member may be disposed co-planar with the flange of the longitudinal member, with the web of the transverse member resting on the flange of the longitudinal member, a hole in the web of the longitudinal member adjacent the web of the transverse member, and an interlocking clip readily detachably carried by the transverse member having a spring nose entering the hole in the longitudinal member and providing a detachable interlocking connection therewith.

2. The structure of claim 1 wherein the web of the transverse member has a perforation and the clip has a spring tongue securing the latter to the transverse member web but providing detachability therefrom.

3. The structure of claim 2 wherein the clip carries a detent also entering the perforation to provide a shoulder oppositely facing from the spring tongue.

4. A clip for use in ceiling construction of the class described, comprising a plate part, a head extension of the plate part in the plane thereof reduced in the dimension of the width of the plate, a spring tongue struck from the plate having a reverse bent termination spaced from the plate, and a reverse bent spring nose at the end of the head extension having a reverse bent free termination providing a hump therein.

5. The structure of claim 4 wherein the plate part has a tail bent away from the plate in the opposite direction from the spring tongue and in the same direction as the spring nose.

6. The structure of claim 4 wherein the plate has a spring detent struck therefrom in the same direction as the spring tongue providing an oppositely facing shoulder on the plate.

7. The structure of claim 4 wherein there are a pair of the spring tongues.

8. Ceiling construction means, comprising a longitudinal support member having a web and a pair of flanges normal thereto, a pair of transverse support members each also having a web and a pair of flanges normal thereto, the webs of the transverse members extending beyond their flanges, a pair of vertically aligned holes in the web of the longitudinal member, the transverse members being transversely aligned with their webs co-planar on opposite sides of the web of the longitudinal member and abutting the web of the longitudinal member with readily detachable interlocking spring members carried by the webs of the transverse members entering said holes respectively.

9. The structure of claim 8 wherein the interlocking members are on the same side of the webs of the transverse members, whereby the webs of the latter are aligned transversely to one side of the holes.

10. The structure of claim 8 wherein the webs of the transverse members have vertically staggered integral lug extensions that enter the holes in the web of the longitudinal member respectively with the locking member.

11. A ceiling construction means comprising in combination: a longitudinal support member having a bottom flange and a vertical web, said web having two rectangular openings therein, said openings being vertically aligned one above the other and spaced predetermined distances from said flange; a pair of transverse support members, each transverse member having a bottom flange and a vertical web, said web of said transverse member having two holes therethrough in horizontal alignment adjacent one end thereof, said holes being spaced from the flange of the transverse member a distance such that when the flanges of the transverse and the longitudinal members are in horizontal alignment the elevation of said holes is

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midway between the elevations of said openings; and a pair of connecting clips, each of said clips having a plate adopted to lie against the web of a transverse member and with a vertical dimension smaller than the height of the web, said plate having two horizontally aligned spring tongues positioned to enter said two holes, releasably engage said web and align the plate with respect to the transverse member, a head projecting from one end of the plate and vertically offset from the line of the tongues a distance equal to said difference in elevation between said holes and one of said openings, and web engaging means on said head; whereby one of said clips may be connected in one sense to an end of a transverse member and the engaging means of the head inserted from one side of the longitudinal member into the opening at the corresponding elevation in the longitudinal member with the engaging means connecting the clip and the longitudinal member, and the other clip connected to an end of the second transverse member in the opposite sense and the engaging means of the head inserted in the longitudinal member with the engaging means connecting the clip and the longitudinal member.

12. In a ceiling construction comprising a longitudinal support member and transverse support members positioned parallel to each other and at opposite sides of the longitudinal member, with all of said members having coplanar flanges and vertical webs extending upwardly from said flanges, the improvement comprising: the web

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of the longitudinal member having a pair of vertically aligned openings therein, said openings being positioned between the webs of the transverse members; the web of the transverse members including an engageable conformation means at the end thereof adjacent the longitudinal member, said engageable conformation means being centered in elevation with respect to the elevation of said two openings; and two clips detachably connecting the two transverse members respectively with the longitudinal member, each of said clips having means releasably engaging said engageable conformation means of the respective transverse member, each clip having a vertically offset head, the head of one clip being offset downwardly and entering the lower of said two openings, the head of the other clip being offset upwardly and engaging the upper of the two openings, each head having releasable engaging means thereon to engage the web of the longitudinal member.

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