April 27, 1954 M. R. PRICE 2,676,679

JOINT CONSTRUCTION

Filed June 26, 1948

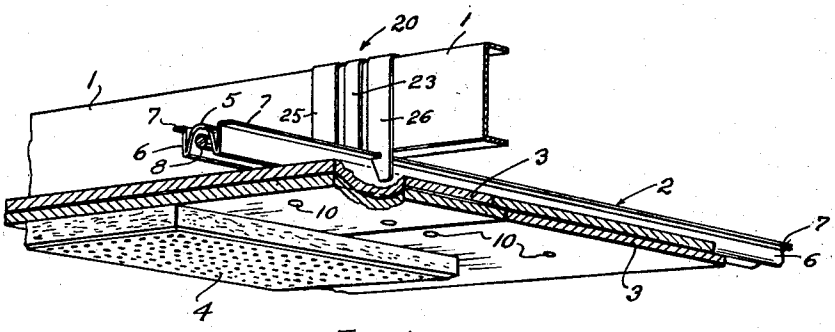


FIG-1

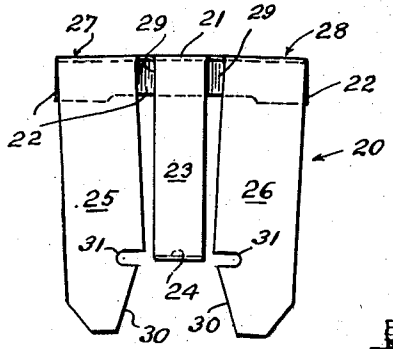


FIG-2

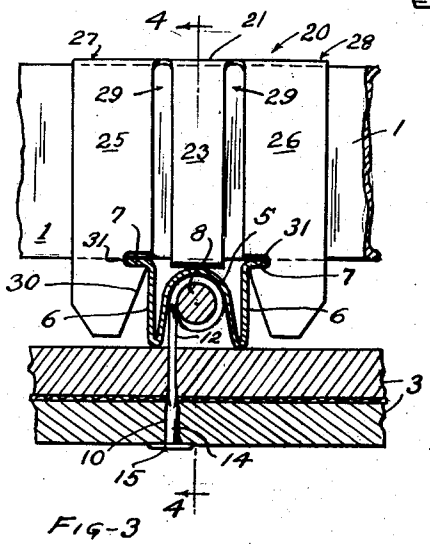


FIG-3

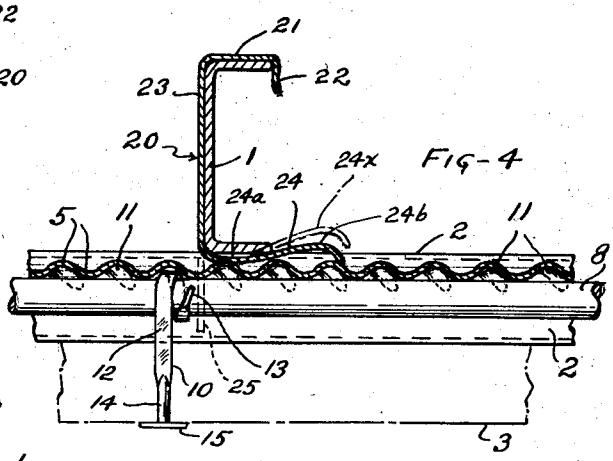


FIG-4

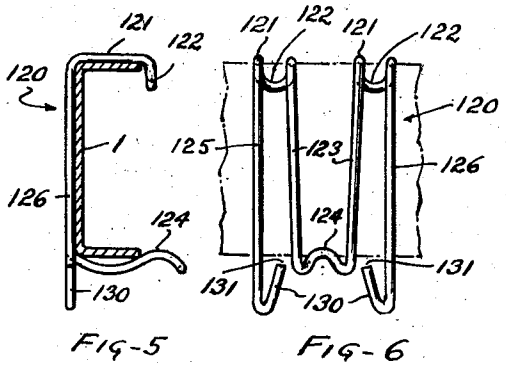


FIG-5

FIG-6

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JOINT CONSTRUCTION

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3 Claims. (Cl. 189—35)

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The invention relates primarily to a simple and effective means for securing an elongated structural building element to another or similar element, as in crossing relationship, thereby indicating the principal object.

Further objects include provision of an improved suspended ceiling or composite wall construction on the order of that shown in my Patent 2,160,794, May 30, 1939; a spring clip for securing nailing ground strips to building members, and an improved nailing ground construction of the type shown in said patent.

Other objects will become apparent from the following description of the illustrative forms shown in the drawing, wherein:

Fig. 1 is a reduced scale perspective view of part of a suspended ceiling construction and acoustical treatment embodying the invention;

Fig. 2 is a full scale front view of one form of spring clip hereof;

Fig. 3 is a similar view of the clip when operating to secure a nailing channel to a carrying member, both shown;

Fig. 4 is a sectional view of the carrying member, clip and nailing channel, as indicated on Fig. 3;

Fig. 5 is a side view of the clip in a form thereof adapted to be made from wire stock (shown in mounted position); and

Fig. 6 is a front view according to Fig. 5 with the carrier member shown diagrammatically.

Fig. 1 illustrates a portion of a carrying member 1 of typical form, being one of a plurality of sheet metal channels such as may be supported from a roof structure or the like, not shown, as by lugs, brackets or wires. The acoustical treatment illustrated includes nailing ground channels 2 (one shown) to which paneling such as laminated screw-holding board assemblies 3 may be attached as shown for example in my Patent 2,242,834, May 20, 1941. Acoustical tile are adapted to be fastened to the paneling, a portion of one such tile being shown at 4.

Members on the order of the nailing ground channels 2 are customarily secured to carrying members such as 1 by wire tie devices, usually twisted tightly together at their ends. Another method is to weld the members together. Many forms of metal clips have been devised for the purpose but without displacing to any great extent the older but timestaking method of wiring the members together. Welding demands special expensive equipment and skill. The present method aims to provide a quickly operable, rattle and vibration proof clip-on system not requiring

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special instruction or skill or auxiliary equipment or tools at the work site, thus indicating a further object.

The nailing ground channels 2, as shown, are inverted hemi-cylindrical troughs 5, Figs. 3 and 4, with generally parallel outer side walls 6 and contiguous, oppositely disposed, supporting flanges 7. Suitably attached to or carried by the channels or troughs 5 (see Patent 2,160,794) are rods 8. The panel elements 3 are secured against the open sides of the channels by nails 10 which are clinched about the rods 8 as illustrated particularly in Figs. 3 and 4.

An improvement hereof in the nailing channels comprises making the channels with transverse oblique or helical flutes formed by transverse grooves 11 in the channel walls which insure that the points of the nails, as driven into the channels, will be disaligned from the shanks so as to curl about the rods 8 in helical form as shown in Fig. 4.

The nails 10 have flat shank portions 12, Fig. 4, relatively thin cylindrical penetrating "point" portions 13 and thickened cylindrical shank portions 14 adjacent suitable heads 15.

The claimed subject matter hereof, as illustrated by Figs. 1 through 4, is embodied in spring clips 20 (one shown), each of which is made as a single piece stamping of relatively light gage spring metal stock. The clip will be described and claimed, for convenience only, in its illustrated position or as connecting two structural members each of which extends horizontally. Obviously the clip can be mounted in any conceivable position depending upon the direction of extent of the members (e. g. channels 1 and 2 representative of already known construction) connected by the clip.

The main supporting body of the clip 20 includes the substantially imperforate and rectangular upper panel portion 21 and short depending flange 22 thereof. A central leg 23 depends from the panel 21 on the side thereof opposite the flange 22, and the lower end portion 24 of the leg is formed as a double or compound curved spring tongue or clasp extending generally parallel to the top panel 21. The curved portions of the tongue 24 are indicated 24*a* and 24*b*; and the normal or unstrained shape or position of the spring tongue is as illustrated diagrammatically at 24*x*, Fig. 4. The parts or portions of the clip thus far described form a generally C-shaped spring clasp approximately complementary to the carrying member 1; and it may be here noted that the shapes and proportions of said parts of

the spring clasp may vary considerably in accordance with the cross sectional shape of the carrying members to be accommodated. The hook, for example, formed as shown by the portions 21, 22 and 23 has especially to be shaped according to the cross sectional contour of the portion of the carrying member engaged thereby. The clip will fit I-beam type and hollow rectangular box type carrying members without modification except as to size.

At opposite sides of the vertical portion of the leg 23 and in the principal plane thereof are a pair of operatively identical latch arms 25 and 26 adapted for snap-holding engagement with respective flanges 7 of the nailing ground members 2. The normal or unstrained relationship or position of the arms 25 and 26 is according to Fig. 2, their latching or operating relationship to each other and the nailing ground flanges being illustrated in Fig. 3.

The latch arms 25 and 26 are preferably yieldably maintained in their normal somewhat converging relationship (Fig. 2) by slightly bowed or relatively arched formations of the supporting panel 21 as at 27 and 28; and, since the sheared-out slots 29 which define the inner or relatively adjacent edges of the latch arms may be extended upwardly far enough to intersect the panel 21 (particular form illustrated), the arms can be swung apart in their own planes solely by slight deflection of the panel portions 27 and 28. Upwardly converging portions 30 of said inner edges of the arms are positioned for camming engagement by the flanges 7 of the nailing ground members 2; and horizontal notches or throats 31 at the upper limits of the camming edge portions 30 receive and strongly retain said flanges 7 in spring strained engagement with the outer edges thereof. The notches 31 are so located as freely to receive the flanges 7 when the member 2 is pressed against the lower flange of the carrying member 1; and such upward pressing requires a deflection of one of the bowed portions 24*a* or 24*b* (Fig. 4) of the spring tongue 24 in engagement with the top surface of the associated channel 5, as evident by comparison of Figs. 3 and 4. Thus, after the flanges 7 are seated in their latching notches 31 of the various clips, the tongues 24 continue to press downwardly on the nailing ground members centrally between the engaged flanges 7 thereof to make the construction rattle and vibration proof.

If the member to be supported by the clip 20 has coplanar flanges extending oppositely toward instead of away from each other, then obviously the cam surfaces 30 and notches 31 would be placed on the relatively outward edges of the latch arms instead of their near edges.

If desired, the leg 23, which is vertically rigid with the top panel 21 of the clip as provision against movement in the principal plane of its vertical portion, may be made wide enough at its bottom end to engage the inner surfaces of the side walls 6 of the nailing ground members as a key, further to stabilize the construction without interference with the free swinging motion of the latch arms 25 and 26 as necessary in order to snap-lock the nailing ground channels to the carrying members 1.

In mounting the clips and nailing ground channels, the upper panel and flange 21, 22 of each clip is hooked over the upper flange of the associated carrying member 1 and the lower clasping portion (tongue 24) is then sprung over the lower flange, that operation being facilitated by the curved spring portion 24*b* which due to the length of the tongue is deflected the necessary distance without causing localized bending strain at any part of the supporting leg 23.

In latching the nailing ground members 2 to a series of clips, the recommended procedure is for the workman to grasp the first clip and member 2 in one hand, pressing downwardly on the top panel 21 as with the index finger of that hand in order to maintain the latching notches 31 in flange-receiving position; and then first hooking one flange 7 into its latching notch 31 (both hands now holding the nailing ground and locally turning it about its axis as required), and finally pressing the other flange 7 upwardly into latched position by swinging the member 2 about the already notch-engaged flange as a fulcrum. The remaining clips can be similarly engaged since the nailing ground illustrated is capable of being locally twisted the necessary amount where not already fully anchored by a clip 20.

When the nailing ground or other secured members are of such stiff construction that they cannot be locally twisted, then only one of the clips of the series would be attached as described (by turning the ground member about its axis to engage one notch 31 and then rotating the member to engage the other notch); and the rest of the clips would be engaged by the nailing ground member merely by a straight upward motion on part of said member while successively holding the clip panels 21 tightly against the top flange of the carrying member.

It is contemplated that the necessary spring effect on part of the latching arms 25 and 26 can be secured other than by the swinging of the arms edgewise about supporting spring portions 27 and 28 of the clips. That may be accomplished by substituting for the camming edges 30 and notches 31 upwardly converging spring lips (not illustrated) so directed (as at right angles to the principal planes of the arms) that the lips may serve as spring latching elements and guiding cams to receive the nailing ground flanges. Such a construction when made of sheet spring stock necessarily lacks the compactness and resiliency of the illustrated arrangement described above.

The clips may be made of uniform section wire stock as shown by Figs. 5 and 6 at 120 and have very much the same operating and mounting characteristics as described in connection with Figs. 1–4, but at considerably greater expense for equivalent strength and stability. Fig. 5 shows a central loop of the wire stock 124 formed to provide the lower spring clasp (comparable to tongue 24), vertical stretches 123 (corresponding to the depending leg 23), hook-forming loop portions 121 and 122 for engagement with the top flange portion of the carrying member of the form shown, and vertical spring arms 125 and 126 which carry upwardly converging free end portions 130 the top ends 131 of which provide latching shoulders comparable to those afforded by the lower edges of the notches 31. Operation of the wire-formed clips is believed obvious from the description previously given in connection with the preferred form.

Terms upwardly, horizontally, etc., when used in the claims are for convenience of definition, not as limitations.

I claim:

1. In building constructions: a horizontally extending structural member, having at its top side two substantially horizontal flanges extending in opposite directions from the member; a trans-

versely positioned horizontally extending carrier channel disposed with its web vertical and its flanges horizontal; a resilient metal clip comprising a channel-shaped body wih a hooked top portion embracing the top portion of the carrier channel and, therebelow, a relatively longer bottom portion in spring-clasping frictional engagement with the bottom of the carrier channel while the top portion of the clip is hooked over the top of the carrier channel, said body having, at respective sides of the common vertical plane of the hooking and clasping portions thereof and close to the carrier member, two arms depending from the top portion of the body in spring latching engagement with the horizontal flanges of the first mentioned structural member, said arms, at their lower ends, beyond the bottom of the carrier member, having upwardly converging camming surfaces facing toward each other and terminating upwardly at generally horizontal latching shoulders in retaining engagement with the horizontal flanges of the first described structural member.

2. The invention according to claim 1 wherein the bottom, spring-clasping portion of the clip has a cantilever spring portion extending beyond the lower flange of the carrier channel transversely thereof into yielding abutment with the first mentioned structural member so that the horizontal flanges of that member are maintained forcibly to contact with the latching shoulders of the clip arms.

3. In building constructions: a horizontally extending structural member, having at its top side two substantially horizontal flanges extending in opposite directions from the member; a transversely positioned horizontally extending carrier channel disposed with its web vertical and its flanges horizontal; a one piece resilient sheet metal clip comprising an upright body the

upper end of which is approximately of inverted U-shape closely embracing the top portion of the carrier member on three sides, one leg of the inverted U being extended downwardly close to and alongside the carrier channel in the form of two side-by-side elongated latching arms spaced apart from each other in the principal vertical plane of the sheet metal of which the arms are formed, the lower ends of the arms extending beyond the lower limits of the carrier member, the lower ends of the latching arms, beyond the bottom of the carrier member, having upwardly converging camming edge surfaces facing toward each other and terminating upwardly at generally horizontal latching shoulders in retaining engagement with the horizontal flanges of the first described structural member, the horizontal portion of the top of the clip providing the necessary spring force to enable the arms to act as spring latches without requiring any flexure of the arms themselves.

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