March 7, 1967 J. W. SCHNELLER 3,307,315

STRUCTURAL CONNECTOR CLIP

Filed Nov. 13, 1963

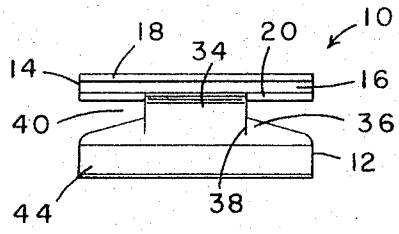


Fig. 1

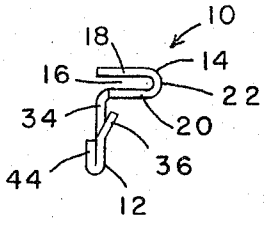


Fig. 2

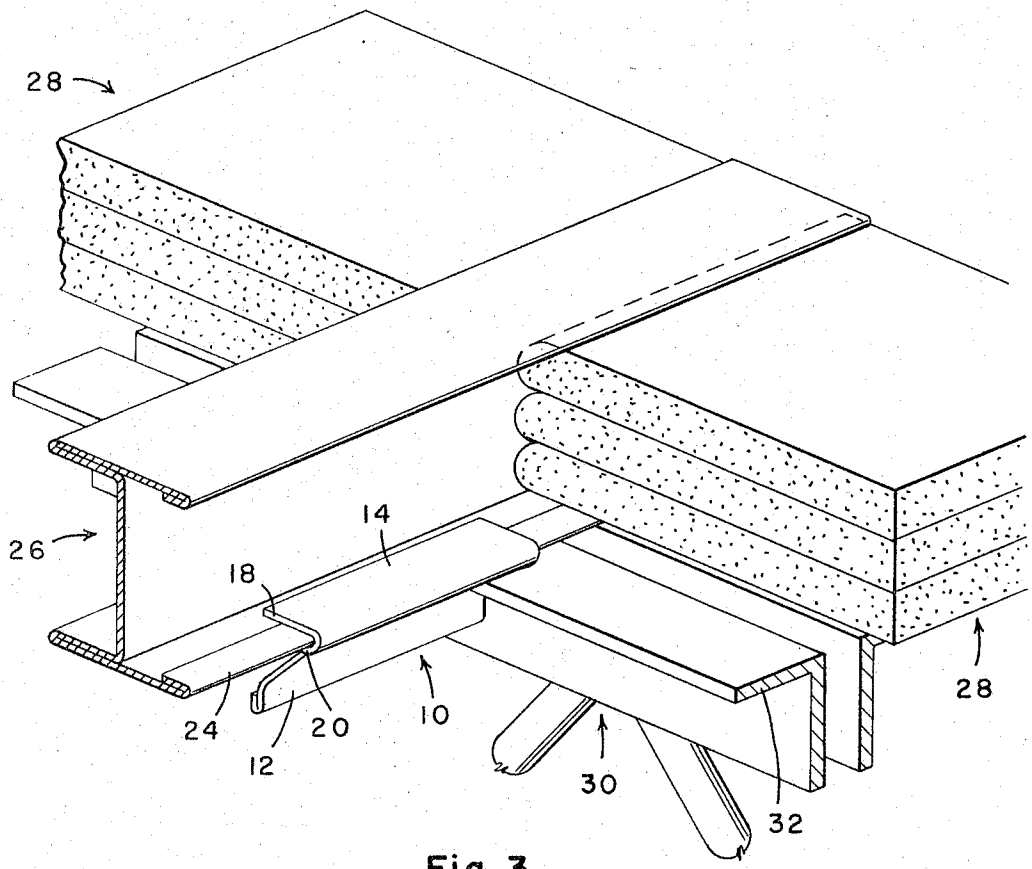


Fig. 3

INVENTOR.
Joseph W. Schneller
BY
Robert F. Hause
ATTORNEY

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STRUCTURAL CONNECTOR CLIP

Joseph W. Schneller, Williamsville, N.Y., assignor to National Gypsum Company, Buffalo, N.Y., a corporation of Delaware

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This invention relates to a means for connecting two adjacent structural flanged members and is particularly directed to a metal clip adapted to be applied to the respective flanges, channels or beams.

A typical example of the environment of the present invention would be spaced parallel metal framing members for supporting a roof deck, such as of 1½ inch roof boards, or of form boards covered with a poured gypsum deck, such framing members including along the top edge an outwardly directed, accessible flange, and disposed thereover, generally perpendicularly, a plurality of spaced parallel H-channels, or equivalent metal members, with flanges directed horizontally and outwardly for receiving roof planks. Although the roof immobility and weight generally retain the H-channels, or their equivalent, in place against the framing members, some degree of mechanical attachment at each junction of framing member and H-channel is desired to prevent possible wind lifting, expansion or contraction movement, etc.

Although many means for attachment are available, such as wire tying, welding, rivets and screws, a rapid, economical means adaptable to variations in job conditions, in flange dimensions and in accessibility was sought.

It is an object of the present invention to provide means as hereabove sought.

It is a particular object of the invention to provide an economical clip for substantially instantaneous affixing together of overlapping, perpendicular, flanged structural members.

It is a further object to provide such a clip which is suitable to normal variations in relationships of the structural members to be adjoined.

It is a still further object to provide an improved interlocked structure of relatively low cost and firm, permanent quality.

These and other objects of the invention will become readily apparent from the following specification and the drawings in which:

FIG. 1 is a front view of a flange joining clip embodying the present invention.

FIG. 2 is an end view of the clip of FIG. 1.

FIG. 3 is an isometric view of the clip of FIG. 1, shown affixed to and locking together a pair of adjacent, perpendicularly disposed flanged structural framing members.

Referring to the drawings, a flange joining clip **10** is shown, formed from a single piece of relatively inflexible sheet metal, preferably about 0.06 inch thick electrogalvanized steel.

Clip **10** includes primarily a generally flat, slightly elongate vertical lower body portion **12** and an elongate, horizontally disposed, open, reverse-bend upper body portion **14**, forming an elongate horizontal slot **16** therethroughout. Upper body portion **14** includes an upper sheet **18** and a lower sheet **20** adjoined at a bend **22** and forming therebetween the slot **16**. The slot **16** opening width is made such that it will fit on and loosely around the flange **24** of the structural framing member **26**, as shown in FIG. 3.

In the structure of FIG. 3, framing member **26** is a 1½ inch H-channel, with flanges **24** disposed horizontally, and 1½ inch roof boards **28** mounted between the flanges **24**. It will be understood that a plurality of parallel framing members **26** will be similarly disposed, at all the parallel edges of roof boards **28**. The flanges **24** have a thickness of 0.040 to 0.060 inch and the slot **16** is preferably an opening of 0.075 inch, as an example of preferred proportions.

The framing members **26** are supported by main roof framing members **30**, a plurality of which are disposed all in perpendicular relation to, and immediately under, the framing members **26**. The main framing members **30** include upper flanges **32**.

Immediately underneath the lower sheet **20** of the clip upper body portion **14**, the upper body portion **14** adjoins the vertical lower body portion **12** throughout a central segment **34** of the lower body portion **12**, said lower body portion being substantially equal and below said upper body portion. At each of the two opposed ends of the lower body portion **12**, a short, triangular lip **36** is formed in the lower body portion **12** by the removal of a triangular segment of the sheet metal along the junction of the upper portion **14** and lower portion **12**, and by a vertical slit **38** extending downwardly along the innermost edge of lip **36**.

Each of the two lips **36** are bent, about 45° out of the plane of the lower body portion **12**, in a direction toward the extent of upper body portion **14**, whereby a slot **40** of progressively decreasing width is formed between each lip **36** and the lower sheet **20** of the upper body portion **14**. The lips **36** are bent along a generally horizontal fold spaced downward y from the lower sheet **20**.

Referring to the structure of FIG. 3, the clip **10**, affixed by upper body portion **14** to the lower flange **24** of framing member **26**, is also affixed to the upper flange **32** of the main framing member **30**, the latter affixing being by the disposition of the flange **32** within one of the slits **40**. By reason of the lips **36** being angled at about 45°, free to be forced to a greater angle, the clip **10** can be very tightly engaged with the flange **32** by driving the clip onto the flange, as with a hammer. The relatively heavy gauge, small lip **36** is not easily bent to a greater angle and in being forced against the bottom face of flange **32**, the lip both bends slightly and bites into the metal of flange **32**, resulting in a very tight grasping and holding.

At the same time that the clip is being forced, as by hammering, into engagement with flange **32**, the clip upper body portion **14** is being moved along the flange **24**, around which it is disposed. When placement of the clip is final, and the roof boards **28** are disposed in place, it will be seen that the combined elements co-operate and assist each other, maintaining the fixed engagement of the clip with the two respective flanges.

The lower body portion **12** includes the above mentioned central segment **34**, whereat it adjoins the upper body portion **14**, and the two bent lips **36**. In addition, lower body portion **12** includes sufficient additional area of sheet metal below the lips **36** and central segment **34** to provide substantially inflexibility throughout, with the single exception of the bendable lips **36**, which are, although by no means flexible, in a form as to be free to bend to a slightly greater angle as the clip is being applied to flange **32**. In the preferred form shown, the bottom half of the lower body portion **12** is made of a double thickness by the bent-over edge strip **44**.

Having completed a detailed disclosure of the preferred embodiments of my invention so that those skilled in the art may practice the same, I contemplate that variations may be made without departing from the essence of the invention or the scope of the appended claims.

I claim:

1. A formed sheet metal clip for affixedly holding the bottom flange of a metal channel for roof boards to the

top flange of an adjacent perpendicularly disposed metal framing member, said clip comprising essentially a single piece of relatively inflexible formed sheet metal having an upper body portion and a lower body portion, said upper body portion being an elongate, horizontally disposed, open, reverse-bend channel, forming therein a narrow deep slot, said lower body portion being a generally vertically disposed section having an extent substantially equal and below said upper body portion, said lower body portion being adjoined to said upper body portion along a central segment and being disjoined from said upper body portion at each of the two ends of said clip, a slot of progressively decreasing width extending inwardly from each clip end between said upper body portion and said lower body portion, whereby said upper body slot may engage a metal channel bottom flange, and one of said progressively decreasing width slots may engage a perpendicularly disposed metal framing member top flange.

2. A clip as defined in claim **1** wherein said lower body portion includes a bent lip adjacent and below each said progressively decreasing width slot, said lip being bent acutely out of the general plane of said lower body portion.

3. A clip as defined in claim **2** wherein said lips are bent acutely out of the general plane of said lower body portion in a direction toward the general disposition of said upper body portion.

4. A clip as defined in claim **2** wherein said bent lips are of generally triangular shape formed by the progressively decreasing width slot, a generally horizontal fold and a generally vertical slit in the lower body portion adjacent the said central segment.

5. A clip as defined in claim **1** wherein said lower body portion includes a bottom edge portion of bent-over double thickness.

6. A roof deck comprising a metal channel having a bottom horizontal flange for supporting roof boards and, perpendicularly disposed immediately there below, a metal framing member for a horizontal top flange, said bottom flange being affixed held to said top flange by a formed sheet metal clip, said clip comprising essentially a single

piece of relatively inflexible formed sheet metal having an upper body portion and a lower body portion, said upper body portion being an elongate, horizontally disposed, open, reverse-bend channel, forming therein a narrow deep slot, said lower body portion being a generally vertically disposed section having an extent substantially equal and below said upper body portion, said lower body portion being adjoined to said upper body portion along a central segment and being disjoined from said upper body portion at each of the two ends of said clip, a slot of progressively decreasing width extending inwardly from each clip end between said upper body portion and said lower body portion, whereby said upper body slot may engage a metal channel bottom flange, and one of said progressively decreasing width slots may engage a perpendicularly disposed metal framing member top flange.

7. A roof deck as defined in claim **6** wherein the said clip lower body portion includes a bent lip adjacent and below each said progressively decreasing width slot, said lip being bent acutely out of the general plane of said lower body portion.

8. A roof deck as defined in claim **7** wherein the said clip lower portion lips are bent acutely out of the general plane of said lower body portion in a direction toward the general disposition of said upper body portion.

9. A roof deck as defined in claim **7** wherein said clip lower body portion bent lips are of generally triangular shape formed by the progressively decreasing width slot, a generally horizontal fold and a generally vertical slit in the lower body portion adjacent the said central segment.

10. A roof deck as defined in claim **6** wherein said clip lower body portion includes a bottom edge portion of bent-over double thickness.

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HARRISON R. MOSELEY, *Primary Examiner.*

A. I. BREIER, *Assistant Examiner.*