

[54] FASTENING SYSTEM

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[51] Int. Cl. .... E04b 1/40

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52/483, 484, 486, 488, 489, 493, 498, 509,  
588, 698, 714, 760; 287/189.35

[56]

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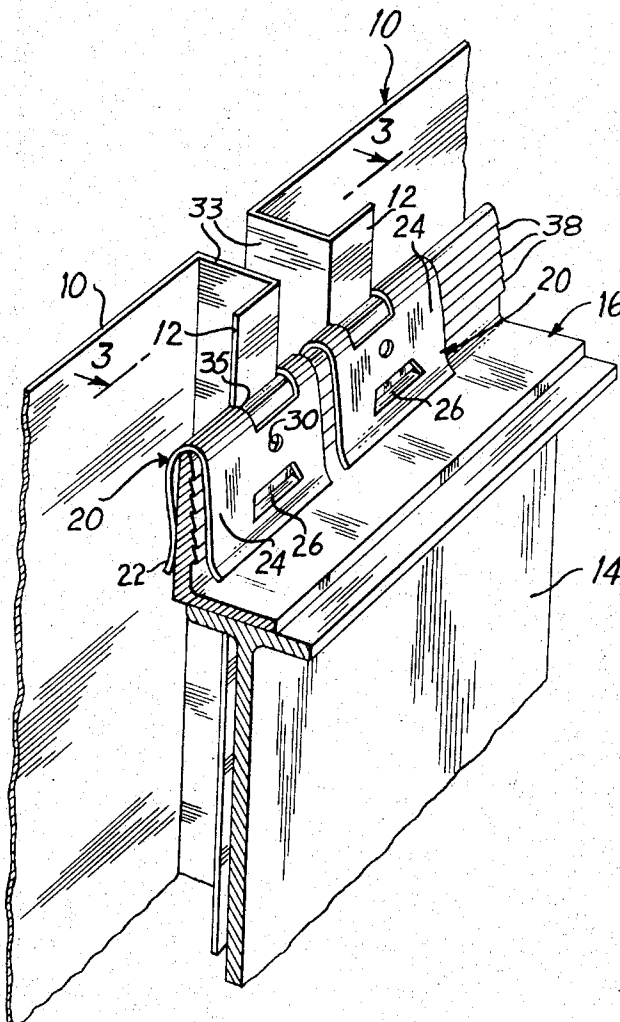
Attorney, Agent, or Firm—Brumbaugh, Graves, Donohue & Raymond

[57]

ABSTRACT

A fastening system for use in securing elongated panels having mounting flanges to mounting members comprises a support member carried on the mounting member and having a portion engaging a portion of each panel member flange in face-to-face relation. A generally U-shape clip clamps each panel member flange and the support member portion between its legs. The panel member flange extends through a slot in one leg of the clip. The other leg of the clip has a lug protruding into the space between the legs that is captured under a projection on the back of the support member.

8 Claims, 5 Drawing Figures



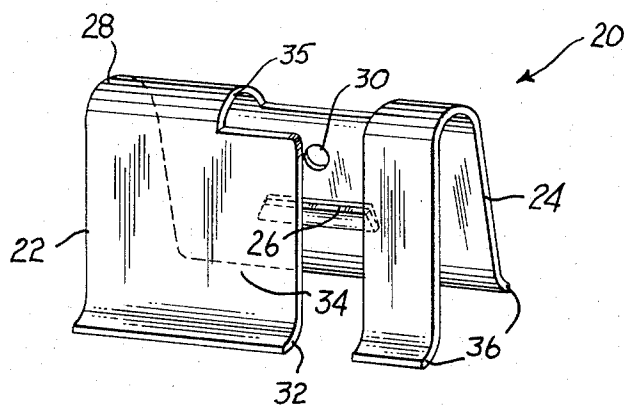


FIG. 1

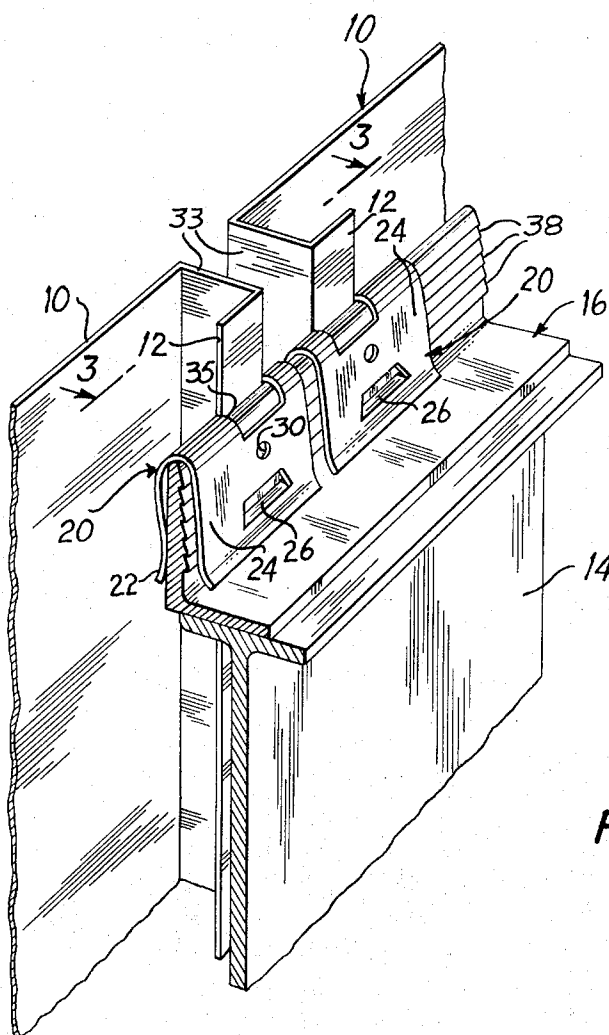


FIG. 2

FIG. 5

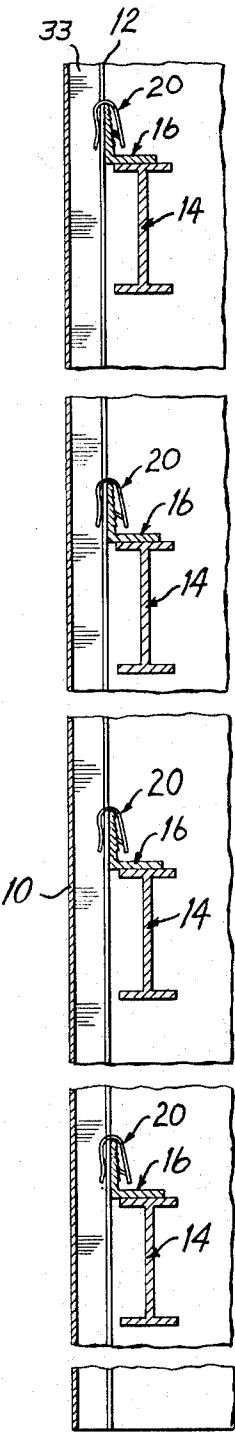


FIG. 3

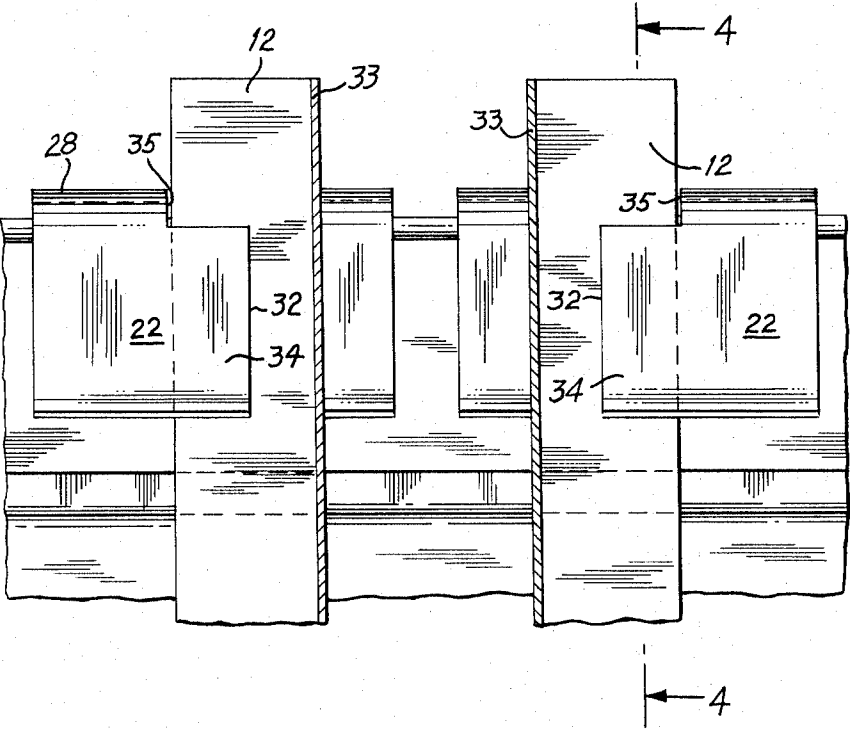
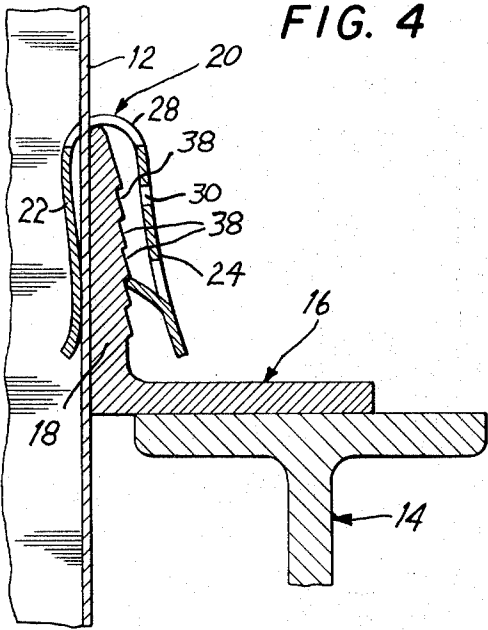


FIG. 4



## FASTENING SYSTEM

## BACKGROUND OF THE INVENTION

This invention relates to a fastening system for attaching a sheet of material to a support, the system being particularly useful in mounting building facings.

Lightweight metal building facings are widely used not only in new building construction, but also in building renovations, as sunshades, visual screens, and decorations. Such facings are generally secured to a building by bolting, riveting or welding them to an appropriate angle or bracket projecting from the side of the building. Although conventional fasteners provide, of course, adequate strength, they are not well-suited to accommodating differentials in thermal expansion and contraction. Moreover, bolts, rivets, welds and similar conventional fasteners require time-consuming (and therefore expensive) individual field operations at each connection. In the case of bolts and rivets, predrilling of holes in the members to be joined can present problems in the field when the holes are not exactly aligned. Field drilling, though more certain to avoid tolerance problems, is expensive and time consuming.

## SUMMARY OF THE INVENTION

The present invention provides a fastening system for mounting sheets of material, such as building facings, which is quickly and easily installed and allows for relative thermal contraction and expansion since it functions by clamping the members to each other. The fastening system includes a support member that is arranged to be appropriately mounted on a building and has a face portion engaging a portion of a panel member mounting flange in face-to-face relation. A clip of resilient material clamps the panel mounting flange to the support member. The clip is generally U-shaped in cross-section and receives the panel mounting flange and the face portion of the support member between its legs. An inwardly located leg of the clip has a lug which protrudes into the space between the legs and is disposed longitudinally along the clip for engaging the support member. The support member has projections that extend longitudinally and are shaped to capture the lug when the clip is in place.

The outwardly located leg of the clip has a slot through which a stand-off flange of the panel member leads away from the support members. The slot extends vertically along the height of the leg and laterally across part of the curved portion between the legs of the clip, the width of the slot being greater along the curved portion of the clip than along the height of the leg, thereby to define in the slotted leg a flap that engages the panel member flange. The resilience of the clip generates a clamping force that holds the panel mounting flange tightly against the support member against loads (e.g., wind loads) perpendicular to the panel face. Nonetheless, the fastener system of the invention permits relative thermal expansion and contraction of the panel and the support member in both the lengthwise and lateral direction by affording relative slippage.

## DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, reference may be made to the following description of an exemplary embodiment, taken in conjunction with the figures of the accompanying drawings in which:

FIG. 1 is a pictorial view of a clip taken from the panel side of an installation;

FIG. 2 is a pictorial view showing two adjoining building facing panels secured to a support member by a clip;

FIG. 3 is a frontal view of the assembly of FIG. 2 taken along the line 3—3 of FIG. 2;

FIG. 4 is a sectional view of the assembly of FIG. 3 taken along the line 4—4 of FIG. 3; and

FIG. 5 is a sectional view of a long vertical panel secured to support members at four different levels.

## DESCRIPTION OF AN EMBODIMENT

A fastening system used in a building facing system, or the like, in which elongated panel members 10 having mounting flanges 12 are secured to mounting members 14 includes a support member 16 that is carried on the mounting member 14 and that has a portion 18 engaging a portion of the panel member flange 12 in face-to-face relation. A clip 20 of resilient material clamps the panel flange 12 to the support member 16, the clip 20 being generally U-shaped in cross-section and receiving the panel member mounting flange 12 and the support member portion 18 between its legs 22 and 24. the clip 20 may be made of any appropriate resilient material, for example, stainless spring steel, and may be blanked with the appropriate slot and hole, as hereinafter described, before it is formed into a U.

As shown in FIG. 1, the inwardly located leg 24 of the clip 20 has a lug 26 protruding obliquely to the inner face of the leg 24 and into the space between the legs 22 and 24. The lug 26 is inclined generally toward the curved base portion 28 of the U and is disposed longitudinally along the clip 20 for engaging the support member 16. The lug 26, as herein shown, is punched from the material of the clip 20, but it is within the scope of the invention to have the lug 26 formed by other methods. For example, the lug 26 might be formed as a hook at the lower end of the leg 24. The inner leg 24 is further provided with a hole 30 located centrally on the leg between the curved base 28 and the lug 26. The hole 30 affords a means of hanging the clips from a workman's belt so that they may be carried conveniently from location to location and also provides a prepared opening for a bolt to provide additional support for the panel 10, as hereinafter described.

The second or outwardly located leg 22 of the clip 20 has a slot 32 through which a stand-off flange 33 of the panel member 10 extends away from the support members 16. The slot 32 is formed vertically along the height of the leg 22 and laterally across an adjoining portion of the curved part 28 of the clip. The width of the slot 32 is greater along the curved part 28 than along the height of the leg 22 thus to define in the part of the slot in the curved part 28 of the clip a lateral offset portion 35. The form of the slot thus defines in the leg 22 a flap 34 that engages the panel member flange 12. As is hereinafter further described, the offset part of the slot 32 may extend in either the lefthand or righthand direction along the base 28, depending upon whether the clip 20 is to be used with the right or left flange 12 of a panel 10. Both of the inner and outer legs 24 and 22 curve away from each other at their free ends 36, conveniently to permit receiving the support member 16 between the legs 22 and 24 upon installation. In this regard, the clip is initially formed with its legs relatively close together so that they are spread

apart upon installation to establish an inward resilient force that clamps the panel mounting flange against the support member.

The support member 16 is generally L-shaped in cross-section, and although it may be a short piece located only at adjacent edges of panels 10, it is in a building facing system preferably a long member mounted on the building structure, for example on a beam 14. To insure that it will positively retain the lug 26 of the clip 20, the support member 16 has projections 38 that extend longitudinally along the rear face of the upright flange and are shaped to capture the lug 26 when the clip 20 is mounted on the support member 16 (see FIG. 4).

As shown in FIG. 2, each mounting flange 12 of the facing panel 10 is received between the legs 22 and 24 of the clip 20 and is clamped against the upright portion 18 of the support member 16 in face-to-face relation. The mounting flange 12 extends through the offset portion 35 of the slot in the curved portion 28 of the clip 20. The stand-off flange 33 of the panel extends away from the support member 16 through the vertical portion of the slot 32 formed in the leg 22. The flap 34 defined in the leg 22 by the slot 32 clamps the mounting flange 12 against the upright portion 18 of the support member 16.

The resilience of the clip 20 holds the mounting flange 12 tightly against the support member 16 retaining the facing panel 10 in generally fixed relation to the support member 16. Thus, the clip 20 secures the panel 10 to the support member 16, but as there are no bolts or similar fixed fasteners (except as described below), the panel 10 may contract or expand in response to temperature changes. For example, in a building fitted with facing panels, the building structure often is of concrete or brick and is shaded by the building facing. Therefore, the structure will expand in response to the heat of the sun to a much lesser extent than metal facing panels, particularly in the vertical direction, that are exposed to the sun. By fitting the panels with the fastening system of the present invention, the panels will be free to expand independently of the building structure, eliminating strain on the fasteners and preventing unsightly and structurally damaging buckling of the panels.

To install the fastening system of the invention, the flange 12 on a panel 10 is first received into the slot 32 of a clip 20 with the clip located above the top edge of the support member. Due to the L-shaped configuration presented by the stand-off and mounting flanges of the panel and the corresponding offset configuration of a slot 32, this must be done by orienting the clip at an angle to the mounting flange 12, moving the clip laterally to position the flap 34 behind the flange 12, and then rotating the clip 20 to bring the legs 22 and 24 into planes generally parallel with that of the flange 12. By dimensioning the offset 35 of the slot 32 to closely fit the lateral dimension of the flange 12, the clip 20 will not only retain the panel 10 against the support member 16 but will also restrain its side-to-side movement along the support member 16 independent of the clip 20. By locating the slot 32 at a uniform position relative to the end and by locating the flange at a uniform position relative to the lateral edge of the panel member 10, positioning the clips 20 which secure two adjacent panel members 10 to the mounting member 14 in end-

to-end contact with each other will insure a predetermined spacing between the panel members 10.

With the flange 12 engaged by the clip 20 just above the upright portion 18 of the support member 16, the clip is then moved down into locked position on the support member. Several projections 38 (three are shown) are provided on the support member 16 to facilitate attachment of the clip 20 to the support member 16; the two upper most projections 38 permit the clip 20 to be driven home more easily by using a series of hammer blows to successively engage each projection 38, the first blow driving the clip 20 down to engage the lug 26 with the uppermost projection 38, the second blow engaging the lug 26 with the second projection 38 and the third driving it home. The additional projections 38 also provide a safety feature when the clip is being installed in that if the lug 26 slips off a lower projection when being driven it will not pop off.

A typical installation of a large building facing panel 10 using the fastening system of the invention is shown in FIG. 5. An exemplary building facing is composed of vertical panels placed close to each other laterally and extending vertically over three stories. The panels are secured to support members 16 on the beams of each story by clips 20. To provide additional security against vertical slipping of the panel 10, both legs of a clip 20, its associated support member 16, and the flange 12 are field (or shop) drilled at any support level (using the hole 30 as a guide hole for field drilling) and a bolt installed. Bolting only at one level is preferred, since slippage in purely clamped joints will allow for thermal expansion and contraction.

It should be clear from the foregoing and from the drawings that both right and left handed clips are required.

The above-described embodiment is merely exemplary and those skilled in the art may make many variations and modifications without departing from the spirit and scope of the invention. All such modifications and variations are intended to be included within the scope of the invention as defined in the appended claims.

I claim:

1. In a building facing system or the like in which elongated panel members having mounting flanges at the ends of stand-off flanges are secured to mounting members, the improvement of a fastening system for securing each panel member to a mounting member comprising a support member carried on said mounting member and having a portion engaging a portion of the panel member mounting flange in face-to-face relation, and a clip of resilient material clamping the panel member mounting flange to said support member portion, the clip being generally U-shaped in cross-section and receiving the panel member flange and said support member portion between legs thereof and having a slot in one leg through which the panel member stand-off flange extends away from the support member, and the other leg and the support member having coacting means thereon for retaining the clip on the support member.

2. A fastening system according to claim 1, wherein the slot is formed along the height of said one leg of the clip and along a curved portion of the clip extending between and connecting the legs, the width of the slot being greater along the curved portion of the clip than

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along the height of the leg thereby to define in said leg a flap that engages said panel member mounting flange.

3. A fastening system according to claim 2, wherein each panel member stand-off flange and the mounting flange at the end thereof together have an L-shaped transverse cross-section and wherein the greater width of the slot along the curved portion of the clip is arranged to provide an offset in the slot corresponding to the L-shaped cross-section of the flanges.

4. A fastening system according to claim 1, wherein the coating means includes a lug protruding into the space between the legs of the clip and disposed generally longitudinally along the clip, and at least one projection on the support member engaging the leg when the clip is mounted on the support member.

5. A fastening system according to claim 4, wherein

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the support member has a plurality of projections.

6. A fastening system according to claim 4, wherein the lug is cut from the material of said other leg.

7. A fastening system according to claim 1, wherein the free ends of the legs of the clip are curved outwardly away from each other to facilitate receiving said support member between the legs.

8. A fastening system according to claim 1, wherein the slot is located in said one leg and the panel member stand-off flange is located relative to said panel member such that when two adjacent panel members are secured to mounting members by two immediately adjacent clips, positioning the clips in end-to-end contact with each other ensures a predetermined spacing between the panel members.

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