METAL CONSTRUCTION CONNECTORS

Inventor: George Shahnazarian, Burnaby (CA)

Correspondence Address:
LONG AND CAMERON
SUITE 1401 - 1166 ALBERNI STREET
VANCOUVER, BC V6E 3Z3 (CA)

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A building construction connector has a horizontal seat portion, a pair of vertical side walls extending vertically upwardly from opposite sides of the seat portion, and forming a U-shaped recess therewith, an adhesive attachment on the seat portion, and a readily removable protective cover on the adhesive attachment.

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ABSTRACT
METAL CONSTRUCTION CONNECTORS

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to metal construction connectors, e.g., hangers for supporting joists, rafters or the like from a header or support beam or other types of connector, e.g. connectors intended to be embedded in concrete for supporting posts or columns and connectors for connecting beams to the tops of posts supporting the beams, and is useful for connecting both wooden and steel building construction components.

[0003] 2. Description of the Related Art

[0004] Conventional construction hangers and other connectors have a U-shaped portion formed by a pair of parallel side walls spaced apart for receiving a building component, e.g. joist, column or beam, between them, with a seat portion extending between the lower ends of the side walls for supporting the underside of the building component. In one type of hanger, the side walls are formed in one piece with rear flanges, which extend at right angles to the side walls in opposite directions and which, at their upper ends, may be provided with top support flanges. In use the rear flanges are in face-to-face contact with one side of the beam, the top support flanges, when provided, rest on the top of the beam to which a joist is being connected. The side wall, the rear flanges and the top support flanges may be provided with nail holes, through which nails are driven into the joist and the beam for securing the hanger to the joist and the beam.

[0005] In U.S. Pat. No. 3,601,428 issued Aug. 24, 1971 to Simpson Company, there is shown a joist hanger in which the side walls and the rear flanges are formed with integral prongs which can be driven by hammer blows into the joist and the beam in order to eliminate or reduce the number of nails required to fasten the hanger.

[0006] U.S. Pat. No. 4,929,725, issued May 1, 1990 to Charles E. Gore, discloses a hanger having side walls which are formed with projections on the inwardly facing surfaces of the side walls for gripping the joist as the joist is lowered into the hanger.

[0007] U.S. Pat. No. 5,564,248, issued Oct. 15, 1996 to Gerald Callies, discloses a hanger in which each of the side walls is provided with a holddown tab for engaging the joist and thereby preventing the joist from being displaced upwardly during nailing of the hanger to the joist.

[0008] It is, however, a disadvantage of these prior art hangers that, after installation, there is often sufficient looseness between the hanger, the joist and the support beam to allow relative movement between them which will result in squeaks caused by rubbing between the wood of the joist and the metal of the hanger.

[0009] Also, a disadvantage of the provision of tabs or prongs in the side walls for engagement with the joist is that they may, in practice, interfere with proper and correct seating of the joist into the hanger during installation. For example, if the length of the joist is incorrect, it may be difficult or even impossible to remove the incorrect joist or to adjust the position of the joist once it has been inserted into the hanger. Also, there is a risk that the hanger and/or the joist may be damaged by the insertion of the joist.

BRIEF SUMMARY OF THE INVENTION

[0010] It is accordingly an object of the present invention to provide a novel and improved hanger which, in use, is secured by adhesive to its joist, rafter or the like so as to prevent relative movement between.

[0011] According to the present invention, there is provided a sheet metal hanger comprising a pair of vertical side walls extending vertically upwardly from opposite sides of a seat portion, and a pair of vertical flanges extending in opposite lateral directions from the side walls. An adhesive is provided in the seat portion and is provided with a protective cover sheet.

[0012] In use, when ajoist, rafter or the like is to be inserted into the hanger, the protective cover is removed from the adhesive attachment and the joist, rafter or the like is then pressed downwardly between the vertical side walls onto the adhesive attachment on the seat portion.

[0013] In a preferred embodiment of the invention, the adhesive attachment is a foam or fiber material provided on opposite sides with adhesive coatings, and may also be provided not only on the seat portion but also e.g. on rear surfaces of rear flanges extending in opposite directions from the vertical flanges and on top support flanges extending at right angles to the rear flanges, for adhering the rear flanges and the top support flanges to the support beam or header.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The present invention will be more readily understood from the following description of preferred embodiments thereof given, by way of example, with reference to the accompanying drawings, in which:

[0015] FIG. 1 shows a view in perspective of a sheet metal construction hanger according to a first embodiment of the present invention;

[0016] FIG. 2 shows a view in perspective of the hanger of FIG. 1 installed on part of a support beam;

[0017] FIG. 3 shows a view in perspective of the hanger and support beam of FIG. 2, with an end portion of ajoist inserted into the hanger;

[0018] FIG. 4 shows a view taken in vertical cross-section through the hanger of FIGS. 1 to 3;

[0019] FIG. 5 shows a broken-away view taken in cross-section, and at right angles to the plane of FIG. 4, through the hangers of FIGS. 1 to 3;

[0020] FIG. 6 shows a broken-away view in cross-section, corresponding to that of FIG. 5, but illustrating a modified adhesive attachment arrangement;

[0021] FIG. 7 shows a view in perspective of a modification of the hanger of FIGS. 1 through 6;

[0022] FIGS. 8 and 9 show views corresponding to those of FIGS. 2 and 3 but with the hanger of FIG. 7 substituted; and
FIG. 10 shows a plan view of the hanger of FIG. 7; FIG. 11 shows a view in perspective of a modified hanger embodying the present invention; FIG. 12 shows a broken-away view taken in section along the line 12-12 of FIG. 11; FIG. 13 shows a view in perspective of a connector according to another embodiment of the present invention; FIG. 14 shows a broken away view in cross-section taken along the line 14-14 of FIG. 13; FIG. 15 shows a view in perspective of the connector of FIG. 13 embedded in a concrete foundation and supporting a post; FIG. 16 shows a view in perspective of a connector according to a further embodiment of the present invention; FIG. 17 show a broken-away view taken in cross-section along the line 17-17 of FIG. 16; FIG. 18 shows a view in perspective of the connector of FIG. 16 connecting a beam to the top of a post; FIG. 19 shows a view in perspective of a modification of the hanger of FIG. 1; and FIG. 20 shows a view taken in section along the line 20-20 of FIG. 19.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1, there is shown a sheet metal construction hanger indicated generally by reference numeral 10 which has a U-shaped seat portion 14 formed by a pair of parallel, spaced vertical side walls 12 and a flat horizontal seat portion 14 extending at right angles to the side walls 12 between the side walls 12 at the bottom of the U-shaped portion.

Vertical rear flanges 16 extend at right angles to the side walls 12 in opposite directions from respective ones of the side walls 12 and are coplanar.

At the top of the hanger 10, coplanar top support flanges 18 extend horizontally at right angles from the tops of the rear flanges 16 and project rearwardly of the hanger 10.

Referring now to FIGS. 4 and 5, the seat portion 14 has an upper surface 20 on which there is provided a attachment 22 of adhesive foam material. In this embodiment, the adhesive attachment 22 is spaced inwardly of the hanger 10 from the opposite side walls 12.

A readily removable protective cover sheet in the form of a tear-off strip 24 of plastic material is provided on top of the adhesive attachment 22 to protect the adhesive attachment 22 from dust and other contamination prior to use of the hanger 10. This tear-off strip 24 is also spaced inwardly from the side walls 12 to facilitate removal of the tear-off strip from the adhesive attachment 22.

FIG. 6 shows an alternative arrangement in which, instead of the single adhesive attachment 22, the upper surface 20 of the seat portion 14 is provided with two separate adhesive foam material attachments 22a, with respective tear-off strips 22b, which extend to the respective side walls 12 but are spaced apart from one another by a gap 26.

Referring now to FIG. 4, it will be seen that the rear flanges 16 have rear faces on each of which there is provided an adhesive attachment 28 provided with a readily removable protective cover sheet in the form of a plastic tear-off strip 30, and the underside of each top support flange 18 is provided with an adhesive attachment 32 covered by a protective cover sheet in the form of a plastic tear-off strip 34.

When the hanger 10 is being installed, the tear-off strips 30 and 34 are firstly removed and the hanger is then pressed onto and thereby secured to a header in the form of a support beam, a portion of which is indicated generally by reference numeral 36 in FIG. 2 and 3. By this means, the adhesive attachments 28 are adhered to a side face 38 of the header and the adhesive attachments 32 are adhered to a top surface 40 of the header 36.

The tear-off strip 24 is then removed to expose the adhesive attachment 22 on the seat portion 14, and an end portion 42 of a joist, rafter or the like is lowered into the hanger, between the side walls 12, onto the adhesive attachment 22, which then adhesively bonds the end portion 42 to the seat portion 14 of the hanger 10.

FIGS. 7 through 10 illustrate a modified form of construction hanger and, for convenience, parts shown in FIGS. 7 through 10 are identified by reference numerals corresponding to those used in FIGS. 1 to 6 but increased by 100.

In FIG. 7, there is shown a sheet metal construction hanger indicated generally by reference numeral 110 which has a U-shaped portion formed by parallel vertical spaced side walls 112 and a seat portion 114 extending horizontally between the side walls 112 at the bottom of the header 110.

Coplanar rear flanges 116 extend in opposite directions from respective ones of the side walls 112, but the hanger 110 does not have top support flanges such as the flanges 18 of FIGS. 1 to 6.

The side walls 112 are formed with nail holes 144 and the rear flanges 116 are formed with nail holes 146.

The seat portion 114 has an upper surface 120 provided with two adhesive foam material attachments 122a, which are each covered by a readily removable protective cover sheet in the form of a tear-off strip 122b of plastic material. In an arrangement corresponding to that of FIG. 6, the adhesive attachments 122a and the tear-off strips 122b are spaced apart from one another by a gap 126.

The rear flanges 116 are provided with adhesive foam material attachments 128 and protective tear-off strips 130.

The hanger 110 is installed, as illustrated FIGS. 8 and 9, by firstly removing the tear-off strips 130 from the adhesive attachments 128 at the rear surfaces of the rear flanges 116 and then pressing these adhesive attachments 128 against a side surface 138 of a header portion 136 in order, thereby, to temporarily secure the header 110 to the side surface 138.
Nails are then driven through the nail holes 146 in the rear flanges 116 in order to more securely fix the hanger 110 to the header portion 136. In the next step, the tear-off strips 122b are removed from the adhesive attachments 122a and an end portion 142 of a joist, rafter or the like is lowered into the hanger 110 unto the adhesive attachments 122a.

Nails are then driven through the nail holes 144 in the side walls 112 to secure the connector 110 to the end portion 142.

Each of the above described embodiments of the present invention has the advantage that the adhesive attachment bonding the hanger to the header and the joist or the like prevents relative movement between these metal and wood members and, thereby, eliminates the squeaking which, in prior art hanger assemblies in which the steel and wood parts make direct contact with one another, occurs upon relative movement of these parts, e.g. when a person walks across an overlying floor.

FIG. 11 shows a view in perspective of a sheet metal hanger indicated generally by reference numeral 200 having a U-shaped seat portion formed by parallel vertical side walls of flanges 202 and a flat horizontal seat portion 204 extending at right angles to the side walls 202 between the side walls 202.

Vertical mutually aligned rear flanges 206 extend at right angles to the side walls 202 towards one another from respective ones of the side walls 202.

The hanger 200 is provided with an adhesive attachment 208 on the seat portion 204 and a readily removable protective covering in the form of a tear-off strip 210 on the adhesive attachment 208.

Also, a further adhesive attachment 212, provided with readily removable protective coverings, in the form of tear-off strips, of which one is shown in FIG. 12 and indicated by reference numeral 214, is provided on rear surfaces 216 of the flanges 206.

In use, the tear-off 210 and 214 are removed and the adhesive attachment 208 and 212 serves to adhere the hanger 200 to a joist or other beam (not shown) inserted into the U-shaped recess of the hanger 200 and a support beam of the like (not shown) to which the flanges 206 of the hanger 200 are adhered.

FIG. 13 shows a view in perspective of a further connector, indicated generally by reference numeral 300 according to a further embodiment of the present invention. The hanger 300 has a U-shaped seat portion formed by parallel vertical side walls or flanges 302 and a flat horizontal seat portion 304 extending at right angles to the side walls 302 between the side walls 302.

An intermediate plate 306 extends between the flanges 302 substantially midway along the lengths of the flanges 302, so as to form therewith an upwardly-open U-shaped recess, and the flanges 302 are formed with nail holes 308 above the intermediate plate 306.

An adhesive attachment 310 is provided on the upper surface of the intermediate plate 306, as shown in FIG. 14, and is covered by a readily removable protective covering in the form of a tear-off strip 312.

In use, the lower half of the connector, up to the intermediate plate 306, is embedded in a concrete foundation 314, as shown in FIG. 15, and the lower end of a post 316 is inserted into the U-shaped recess formed by the plate 306 and the flanges 302. Nails (not shown) can then be driven through the nail holes 308 to more securely connect the post 316 to the foundation 314.

FIG. 16 shows yet another connector, indicated generally by reference numeral 400, embodying the present invention. The connector 400 has a pair of parallel vertical side walls 402 each formed along a lower edge with a flange 404. The flanges 404 extend towards one another from the side walls 402 and are attached by bonding to a seat portion 406.

The seat portion 406 is an intermediate portion, extending between parallel vertical side walls 408, of an inverted U-shaped portion of the connector 400, and is provided with an adhesive attachment 410 provided with a readily removable protective covering in the form of a tear-off strip 412.

The side walls 402 are formed with nail holes 414 and the side walls 408 are formed with nail holes 416.

When the hanger 400 is in use, the tear-off strip 412 is removed and the hanger 400 is then employed to temporarily secure a beam 418 on top of a post 420, as shown in FIG. 18 until nails (not shown) are driven through the nail holes 414 into the beam 418 and through the nail holes 416 into the post 420.

The hanger shown in FIGS. 19 and 20 and indicated generally by reference numeral 500 has a U-shaped seat portion formed by a pair of parallel, spaced vertical side walls or flanges 512 and a flat horizontal seat portion 514 extending at right angles to the side walls 512 between the side walls 512 at the bottom of the U-shaped portion. Vertical rear flanges 516 extend at right angles to the side walls 512 towards one another from respective ones of the side walls 512 and are coplanar. At the top of the hanger 500, coplanar top support flanges 518 extend horizontally at right angles from the tops of the rear flanges 516 and project rearwardly of the hanger 510.

As can be seen from FIG. 20, adhesive attachments 522, 523 and 524, provided with protective coverings in the form of tear-off strips 526, are provided on the undersurface 528 of the seat portion 514, rear surfaces 560 of the flanges 516 and undersurfaces 530 of the top support flanges 518.

As will be apparent to those skilled in the art, various modifications may be made within the scope of the appended claims. For example, while the adhesive attachments in the above-described embodiments of the present invention comprise an adhesive tape sold by the Bonding Systems Division of 3M Corporation of St. Paul, Minn. as Double-Coated Urethane Foam Tape 4052, which has a double-coated adhesive substance on opposite sides of an intermediate attachment of foam material, other suitable adhesives may alternatively be employed.

1. A building construction connector, comprising a horizontal seat portion and a pair of vertical side walls extending vertically upwardly from opposite sides of said seat portion,
said connector including an adhesive attachment on said seat portion and a readily removable protective cover on the adhesive attachment.

2. A building construction connector as claimed in claim 1, wherein said adhesive attachment is provided on a strip-shaped area of said seat portion, said strip-shaped area being parallel to and spaced from said side walls, and said protective cover comprising a plastic material sheet covering said adhesive attachment over said strip-shaped area and extending laterally beyond opposite sides of said strip-shaped area towards said side walls.

3. A construction connector as claimed in claim 1, wherein said adhesive attachment comprises a double coating of an adhesive substance on opposite side of a foam material.

4. A building construction hanger, comprising sheet metal bent to form a flat rectangular seat portion, a pair of flat rectangular parallel side walls extending upwardly from opposite sides of said seat portion at right angles to said seat portion to form therewith a U-shaped recess and mutually aligned flanges extending at right angles to said side walls, said hanger further comprising an adhesive attachment within said U-shaped recess on said seat portion and a readily removable protective covering on said adhesive attachment.

5. A building construction connector as claimed in claim 1, including a pair of top support flanges extending rearwardly from and at right angles to said mutually aligned flanges at the top of said sheet metal hanger, and further adhesive attachment on rear sides of said mutually aligned flanges and readily removable protective coverings on said further adhesive attachment.

6. A building construction connector as claimed in claim 4, wherein said adhesive attachment comprises a double coating of an adhesive substance on opposite side of a foam material.

7. A building construction connector as claimed in claim 5, wherein said further adhesive attachment comprises double coatings of an adhesive substance on opposite sides of foam material.

8. A building construction hanger as claimed in claim 7, wherein said rear flanges have rear surfaces beneath said top support flanges and wherein further adhesive attachment is provided on said rear surfaces and on undersides of said top support flanges, with further readily removable protective covers on said further adhesive attachment.