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INSULATED CURTAIN WALL ASSEMBLY

Filed May 11, 1962

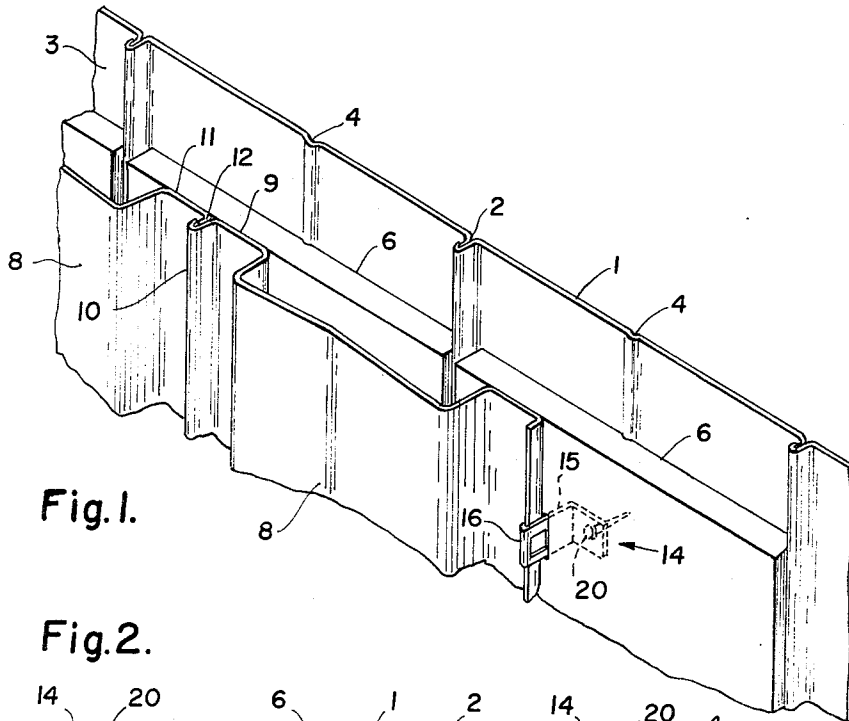


Fig. 1.

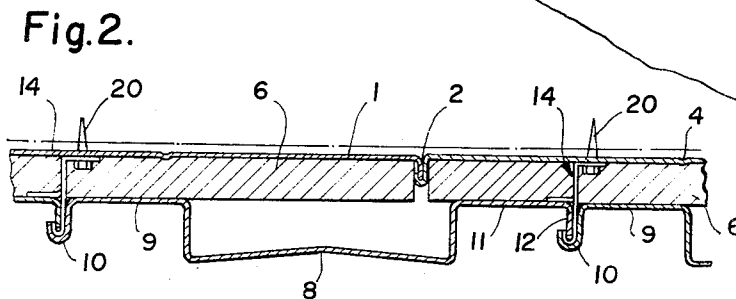


Fig. 2.

Fig. 3.

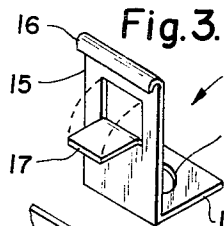


Fig. 4.

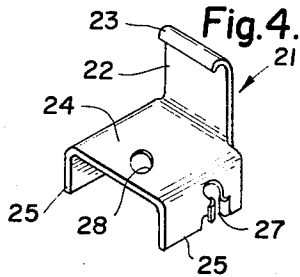


Fig. 5.

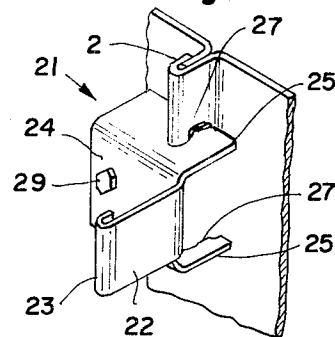
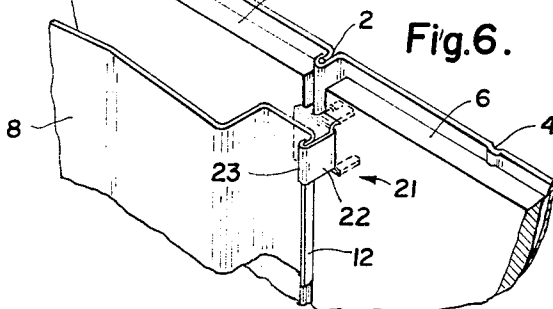


Fig. 6.



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INSULATED CURTAIN WALL ASSEMBLY
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This invention relates to an exterior wall construction, such as an insulated wall of vertically extending, interlocked metal panels, and, more particularly, relates to a unitary fastening means for holding the component parts of the wall together. This invention constitutes an improvement over that shown in my prior Patent No. 2,989,157, issued June 20, 1961.

An outstanding disadvantage in assembling the parts of an insulated metal panel wall of conventional construction is that they require a plurality of various types of fastening means for holding the wall parts together, such as sub-girts which are welded to the metal panels or to the building itself, and, in addition, screws, welded joints and other fastening means, which considerably increase the time for erection of the wall, as well as increasing the cost of erection.

An object of my invention is to provide an insulated metal panel wall construction or assembly, sometimes referred to as a curtain wall, which is devoid of the above named disadvantages and which requires no welding or additional fastening parts, such as sub-girts.

A more specific object of the invention is to provide a novel fastening means in the form of a unitary clip for holding together all of the component parts of an insulated metal panel wall, such as the back panel, the insulation and the exterior metal panel so that the single clip will provide numerous fastening functions, namely to fasten the metal back panel to the structural building frame, to hold the insulation in place and prevent its vertical displacement, to fasten and hold the exterior panels in place, to space the exterior panels from the backing panels, and to provide a support on which to lay the various exterior panels, as well as to provide a concealed fastening means which does not mar the beauty of the finished wall, also to provide a clip which is simpler in construction and less expensive and more flexible in use than that shown in my prior patent.

Other objects and advantages will become more apparent from a study of the following description taken with the accompanying drawing wherein:

FIG. 1 is a perspective view showing an insulated metal panel exterior wall construction wherein the exterior panel on the right hand side is removed to more clearly show the fastening means embodying the principles of the present invention;

FIG. 2 is a horizontal, cross-sectional view of the panel shown in FIG. 1;

FIG. 3 is an enlarged, perspective view of the novel fastening clip shown in FIGS. 1 and 2 and embodying the principles of the present invention;

FIG. 4 is a perspective view of a modification of the clip shown in FIG. 3;

FIG. 5 is a perspective view of a portion of a wall assembly including the clip shown in FIG. 4; and

FIG. 6 is a perspective view showing an insulated metal panel exterior wall construction partly assembled and embodying the fastening clip shown in FIGS. 4 and 5.

Referring more particularly to FIGS. 1 and 2 of the drawing, numeral 1 denotes an interior back panel of metal, such as 18 or 20 gauge galvanized steel or aluminum, having a relatively flat surface and having a perpendicular side flange 2 on one side and a reversely bent perpendicular flange 3 on the other side which

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may be interlocked, as shown. If desired, the interlocked joints may be caulked. Vertical reinforcing ribs 4 may be provided to add additional rigidity, if desired. The interlocked side flanges may be rigidly fastened together by die clinching, such as by button punches 5 at vertical intervals of about 3 or 4 feet.

Bats of insulation 6, such as those of glass fibers, rock wool, etc., are closely fitted between the side flanges of the back panel 1 and are preferably made slightly wider than the distance between the flanges so as to form a tight fit whereby the bats may be at least temporarily held in place solely by friction of the back panel.

Exterior panels 8 are provided which have any desired contour for enhancing the architectural beauty. Panels 8 are each provided, at one side, with an outwardly extending flange 11 terminating in side flange 12, and at the other side, with a reversibly bent, outwardly extending flange 10 so that adjoining flanges 10, 12 may be interlocked, as shown. Such interlocked flanges may be die clinched at 13 at 3 or 4 foot intervals for providing lateral continuity and strength. Panels 8 may be made of galvanized steel, embossed or plain finished aluminum, aluminized stainless steel, plastic or any other suitable material.

An important feature of the present invention resides in the specific construction of clip 14, which is shown in more detail in FIG. 3. The clip 14 is preferably of metal and is provided with a flange 15 which has a reversely bent portion 16 which is adapted to serve as a clamp or stop against the edge of the side flange 12 of the exterior panel 8, as shown more clearly in FIG. 1. Flange 15 is punched out centrally to provide an integral tab 17 which is adapted to serve as a support for flange 11 of wall panel 8 and as a spacing element for the outside and inside panels, as shown more clearly in FIG. 2, to maintain a minimum spacing and thereby prevent crushing of the insulating bat 6 as might occur otherwise when abnormally tightening fastening screws through the outside panels. A hole is provided in flange 18 which is at right angles to flange 15 so as to enable passing therethrough of a screw, such as a self-tapping screw, which is adapted to screw directly into the structural frame of the building, such as a girt portion thereof, which is located along the line shown in the dot and dash outline in FIG. 2.

A unique feature of the present invention resides in the fact that the clip 14 is the only fastening means required for holding all of the parts of the wall assembly together as well as for fastening the assembly of the girt or other structural part of the building steel frame.

In operation, in order to assemble the wall parts the first backing panel 1 erected, shown on the left hand side, is fastened by self-tapping screws or the like to the structural frame of the building, this being the only additional fastening means required, inasmuch as subsequent panels are held to the first backing panel, merely by die clinching the interlocked side flanges 2, 3 that is to say, the second, third, fourth backing panel etc. will require no fastening means for fastening them to the structural steel building. After the various backing panels have been assembled, the insulating bats 6 are put in place and sandwiched tightly between the side flanges 2, 3 of the backing panels and are temporarily held thereto solely by friction. The interlocked side flanges may be caulked if desired. The reversibly bent part 16 of the clip will hold the side flange 12 in place and the self-tapping screw 20 is passed through hole 19 and screwed into the structural frame of the building. The clip extensions 18 will extend through a hole pierced through insulating bat 6. A plurality of vertically spaced

clips are fastened to each outside panel before the next adjoining panel is erected. After one panel 8 is fastened by clips 14, and die clinched at 13 along vertical intervals, another panel is interlocked therewith and additional clips are fastened at vertical intervals along the opposite side which will be concealed by the subsequently placed outer panel.

Thus, for any of the intermediate panels, it will be seen that the sole fastening means for holding the various parts together and for holding the assembly to the structural steel frame is the clip itself, no other fastening means being required.

Alternatively, tab 17 may be struck out from the opposite side of flange 15, 180° from the position shown, or part of the tab 17 may be struck out as shown and another part, 180° away.

FIGS. 4, 5 and 6 show a modification of clip 14 identified as clip 21 which is similar in construction and operation as clip 14 shown in my prior patent. However, an improvement has been made therein whereby the clip may be selectively installed in the manner described in my prior patent or in a different manner, namely, by frictionally clamping cut out portions 27 thereof, terminating in outstruck flanges which provide spring fingers which frictionally clamp onto side flange 2, as shown in FIG. 5. Clip 21 has a vertical flange 22 comparable to flange 15 terminating in a bent part 23, similar to part 6, and has an integral seat-like portion 24 terminating in side wings or extensions 25, similar to extensions 18 of my prior patent, adapted to pierce through the insulation, whereby after a bolt 29 is extended through hole 28 and secured to the girt, shown in dash and dot outline, the head of bolt 29 will serve as a stop and support for flanges 9 and 11 of panels 8. Instead of using clamps 21 as described above and in my prior patent, they may, instead, be clipped onto flanges 2, as shown in FIG. 5, at spaced intervals along the length of flange 2. A bolt 29 is then extended through hole 28 and threads into the supporting girt of the building. When bolt 29 is screwed tightly, reversely bent part 23 will firmly hold flange 12 in place, similar to flange 16 of clamp 14. If desired, bolt 29 and hole 28 may be omitted and complete reliance made on the spring clipping of cut out portions 27. However, back panels 1 must be first welded or screwed onto the building girt or frame since bolt 29 is not relied upon for this purpose.

If desired, a tab similar to 17 may be struck out of flange 22, either from the left or right of flange 22 as

viewed in FIG. 4, or a portion from the left and another portion on the right.

Thus it will be seen that I have provided an efficient exterior wall assembly, such as an insulated curtain wall comprising metal backing panels, insulation bats and metal exterior panels, all of which parts are held together and fastened to the structural building frame solely by means of inexpensive clips of such construction as to afford numerous fastening and spacing functions, therefore taking the place of a variety and multiplicity of fastening means required for the same purposes in conventional outside metal panel wall constructions.

While I have illustrated and described several embodiments of my invention, it will be understood that these are by way of illustration only, and that various changes and modifications may be made within the contemplation of my invention and within the scope of the following claims.

I claim:

1. In a wall construction comprising a plurality of back panels having interlocking side flanges, bats of insulation extending between said side flanges, a plurality of outer panels having interlocking side flanges, in combination, a plurality of clips, each having a reversely bent flange portion directly clamping a side flange of one of said outer panels, an integral ledge portion at right angles to said flange portion and integral extensions at right angles thereto piercing said bats of insulation, said side extensions being notched out with outstruck flanges to form spring tabs snugly embracing and detachably secured to the side flanges of said back panel.

2. A wall construction as recited in claim 1 together with a bolt extending through a hole in said ledge portion and through a back panel and onto a frame portion of a building, said clips constituting means fastening together the back panels, outside panels and insulating bats.

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