June 2, 1970 T. B. JOHNSON 3,514,915

SHEET METAL WALL PANEL WITH COMPRESSIBLE EDGE SEAL

Filed Sept. 3, 1968 2 Sheets-Sheet 1

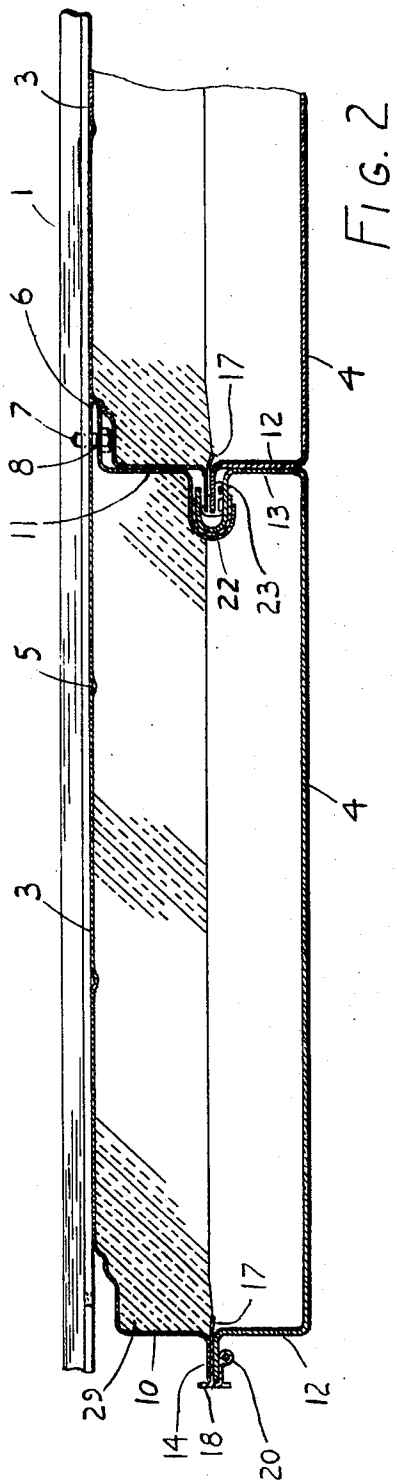


FIG. 2

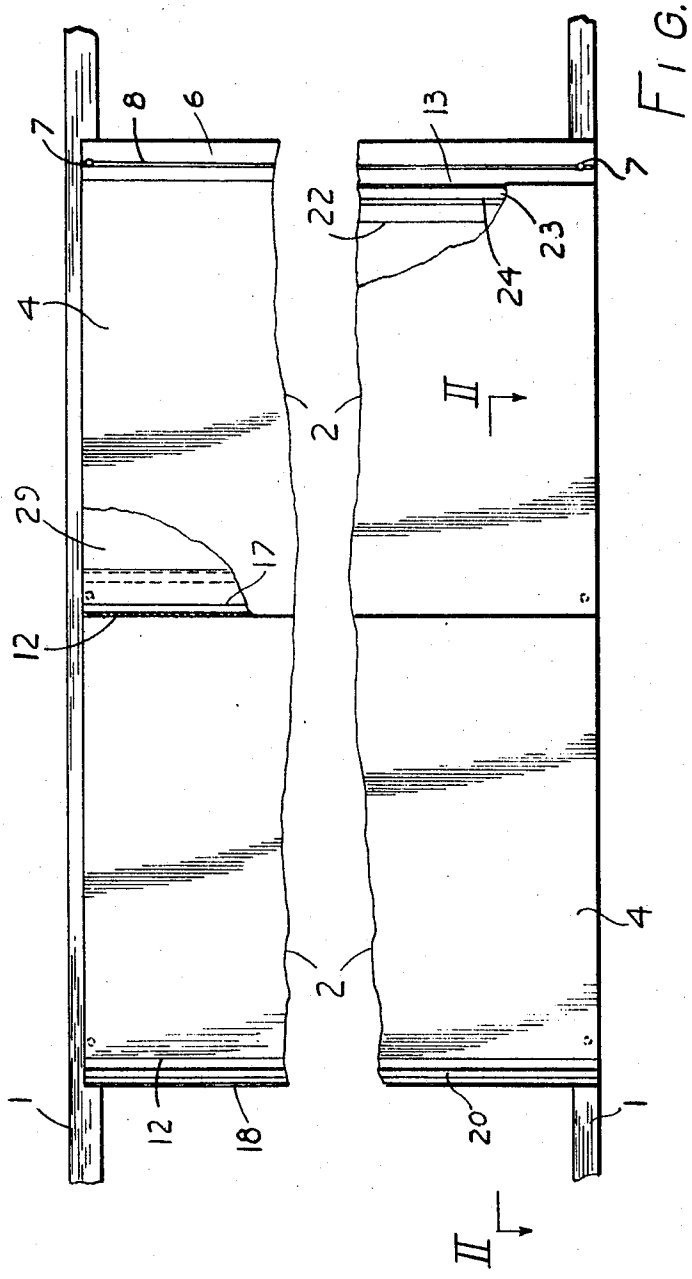


FIG. 1

INVENTOR.
THOMAS B. JOHNSON
BY
Brown, Critchlow, Flick & Peckham.
ATTORNEYS.

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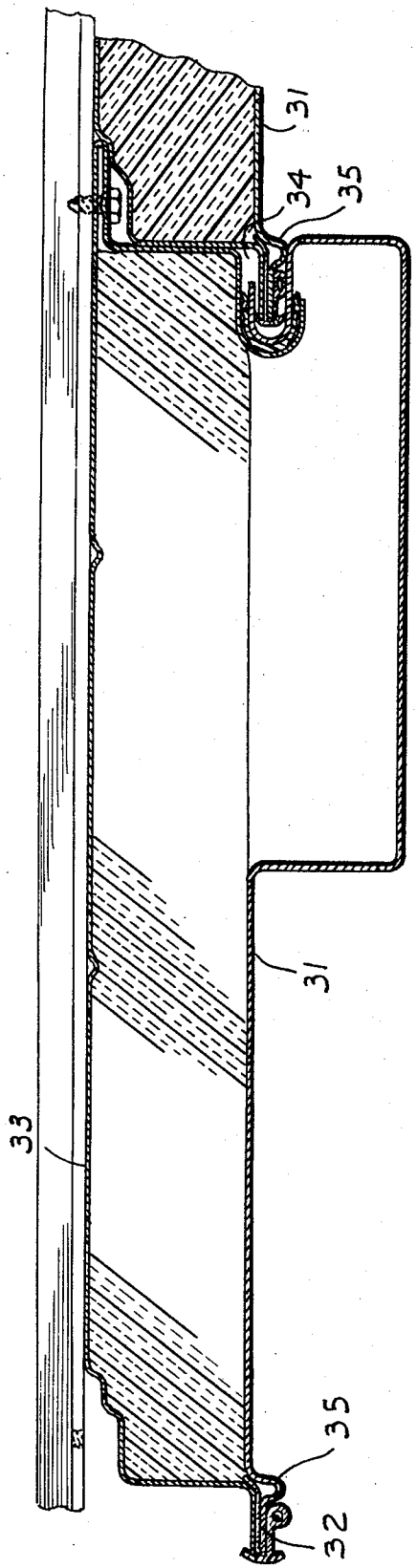


FIG. 6

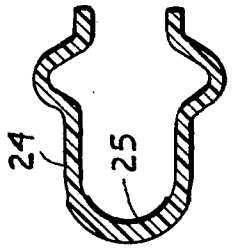


FIG. 5

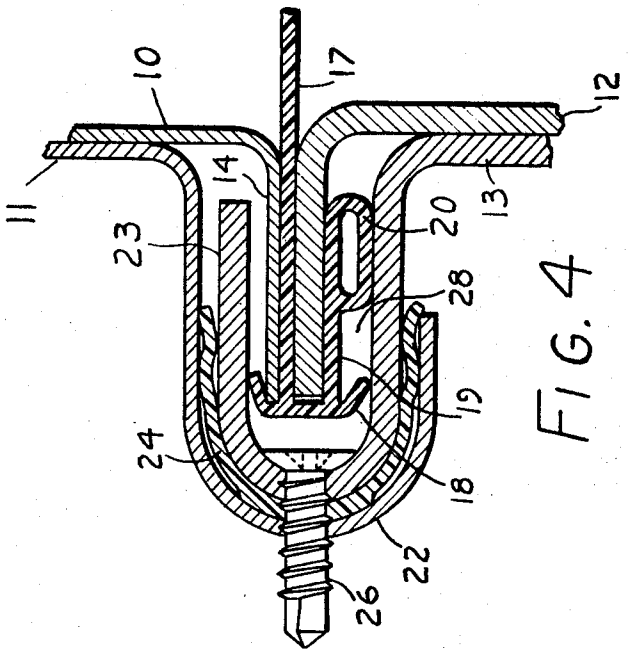


FIG. 4

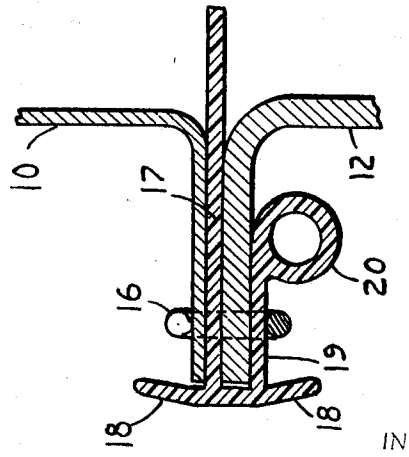


FIG. 3

INVENTOR.
THOMAS B. JOHNSON
BY
Brown, Critchlow, Flick & Peckham.
ATTORNEYS.

United States Patent Office 3,514,915 Patented June 2, 1970

3,514,915

SHEET METAL WALL PANEL WITH COMPRESSIBLE EDGE SEAL

Thomas B. Johnson, Ambridge, Pa., assignor to Plasteel Products Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

Filed Sept. 3, 1968, Ser. No. 756,894
Int. Cl. E04b 1/38, 1/74
U.S. Cl. 52—393 5 Claims

ABSTRACT OF THE DISCLOSURE

A sheet metal wall panel member has inner and outer walls and side joint walls. One of the side walls has a laterally projecting tongue extending lengthwise of it, with a gasket secured to the tongue and provided with a compressible bead extending along one side of it. The other side wall is provided with a recess extending lengthwise thereof for receiving the tongue and gasket of an adjoining wall panel. When the tongue and gasket are inserted in the recess of an adjoining panel the bead is compressed.

A common way of forming the walls of buildings is to attach vertical sheet metal facing sheets or panels to the outside of horizontal girts and also to attach sheet metal liner sheets to the inside of the girts. This requires clips and screws which are difficult to install in many cases because of lack of working space. Two installation procedures also are required; one for the facing sheets and one for the liner sheets. The insulation for such walls arrives at the building site separate from the metal sheets and then has to be installed as a separate operation. Furthermore, it is not unusual for the insulation to be damaged or stolen while awaiting installation, thereby materially increasing the building costs. Another objection to the present system of erecting such walls is that it requires a considerable amount of expensive labor at the building site, which often is a source of trouble and inefficiency.

It is among the objects of this invention to provide a wall panel which can be completely formed, including insulation, at the factory, which is simple and easy to install with merely screws applied from the outside, which requires relatively little field labor for installing it, which goes up quickly, which is strong and can be made in long lengths, which greatly minimizes conduction of heat and cold between its inner and outer walls, which can be made of dissimilar metals without danger of electrolysis, and which when combined with other like panels provides joints between them that are substantially impervious to air and humidity.

The invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a fragmentary outside view of a building wall formed from my panels;

FIG. 2 is an enlarged cross section taken on the line II—II of FIG. 1;

FIGS. 3 and 4 are still larger views in horizontal section of the tongues and recesses of the panels;

FIG. 5 is an enlarged cross section of one of the gaskets before being put in place; and

FIG. 6 is a view similar to FIG. 2 of a modification.

Referring to FIGS. 1 and 2 of the drawings, the framework of a building wall includes vertical members of columns (not shown) between which there are horizontal girts **1**. With the wall panels disclosed herein, these girts can be located a considerable distance apart because the panels are stiff. In fact, the girts can be as much as twenty feet apart. Secured to these girts are a plurality of vertical panels **2** that are placed side by side to form a wall of any desired width. Each panel includes a rigid hollow sheet

metal member that has inner and outer walls **3** and **4** connected by side walls at the joints between the panels. The inner wall may be formed with vertically extending corrugations **5** that help to stiffen the wall. The outer wall **4** may be flat, ribbed, fluted or some other shape which will give the building a pleasing appearance.

The inner wall **3** extends laterally away from the adjoining side wall and then is turned back on itself and integrally connected with the side wall. This laterally projecting portion forms a double thickness fastening strip **6** that extends lengthwise (top to bottom) of the panel. Fasteners, such as screws **7**, are driven through the strip and holes in the girts for fastening the panel to them. To make sure that the screws will not be placed too close to the edge of the fastening strip, it is provided with a longitudinally extending indicating line which may be formed by indenting it to produce a shallow groove **8** extending from top to bottom of the strip. The holes for the screws then are drilled at this groove.

At the opposite side of the panel its inner wall if offset outwardly toward the outer wall as shown in FIG. 2, in order to provide space for the fastener strip **6** and the heads of the screw fasteners of an adjoining panel overlapped by the first panel. Preferably, the offset is stepped, with the deepest part of the offset receiving the fastener heads and the shallow part of the offset receiving the edge portion of the adjoining fastener strip, substantially in engagement therewith. This overlap also permits some variation in the amount of overlap without opening the joint, thereby taking care of tolerances.

Another feature of this invention is that the hollow panel can be made from two individually and easily formed sheet metal elements having different shapes. The inner or liner element is roughly in the shape of a channel having a web **3** and parallel side flanges **10** and **11**. The outer or facing element shown in the drawings likewise is roughly channel shape, with side flanges **12** and **13**. These two elements are joined together at the side walls of the panel, which are formed by the four flanges. To permit the two elements to be joined and also to provide their side walls with tongues and grooves so that adjoining panels can be interconnected, the marginal portion of flange **10** is turned outwardly at right angles as shown in FIGS. 2 and 3 to form one side of a tongue **14** that extends lengthwise of the panel. The other side of the tongue is formed by the marginal portion of the corresponding flange **12** of the facing element.

The two sides of the tongue are secured together by any suitable means, such as by wire staples **16** driven through them and clenched by a stapling machine. However, the two sides of the tongue are not in face to face contact with each other, but are separated by part of a flexible gasket preferably extruded from a vinyl plastic. This separating portion of the gasket is a flat strip **17** that is integral at its outer edge with a strip that projects laterally in opposite directions from the tongue to form flexible lips **18**. Extending from the outer lip back across the tongue is another strip portion **19** of the gasket that terminates in a compressible bead **20** spaced from the adjoining side wall of the panel. Although the bead could be solid, it is preferred to make it hollow so that it will offer less resistance to compression. Furthermore, the resistance can be controlled by the size of the central opening through the bead.

The marginal portion of the other flange **11** of the liner element is turned inwardly and then curved forward and outwardly again to form a hook portion **22** extending the length of the panel. Nesting with this hooked portion is a similar hook portion **23** formed along the edge of the adjacent flange **13** of the facing element. It is preferred that this second hook portion fit inside the other hook

portion, but the two are spaced apart by a U-shape gasket **24**, preferably extruded vinyl plastic, that extends the length of the panel. The assembly is shown best in FIG. 4. Before the gasket is fitted over the hook portion **23** of the facing element, a butyl type tacky adhesive **25** is applied to the inside of the base of the gasket as shown in FIG. 5. It will be seen that the sides of the gasket preferably normally are provided with reverse bends that are flattened when the gasket is compressed between the two hook portions of the panel elements. This will insure that the gasket will seal the space between the two hooks. This nesting of the hook portions connects this side of the two elements together, but to make an even more secure connection self-drilling screws **26** can be run through the bases of the two hooks to positively fasten them together and to draw them up tight.

In constructing a wall, the left-hand panel **2** in FIG. 1 is attached to the girts **1** by screws **7** passing through its fastening strip **6** as previously mentioned. The tongue **14** of the next panel then is inserted in the recess **28** formed in the first panel by the interconnected hook portions **22** and **23**. As the tongue is pushed into the recess, the lips **18** of its gasket are bent backwardly and gasket bead **20** is compressed or flattened. The pressure of the bead against the front wall of the recess holds the second panel back against the girts while its fastening strip is secured to them by screws in the same manner as the first panel. This operation is repeated panel by panel until the wall has been covered.

Since each facing element is separated from the liner element in the same panel by hook gasket **24** and strip **17** of the tongue gasket, there is no metal to metal contact between the two elements except through the staples and screws **26**, and that is so negligible that it can be disregarded. As a result, the two elements of the panel are thermally insulated from each other so that heat and cold cannot be conducted by one directly to the other. Also, the separating gaskets prevent electrolysis between the two elements when they are made from different metals, such as stainless steel and aluminum. When the sheet metal elements from which a panel is made have different coefficients of expansion, only three or four screws **26** are used and they are located about midway between the ends of the panel so as not to interfere with the greater expansion of one of the elements. The same thing can be true of staples **16**, but it probably is not so important with them because they probably can give enough to allow for relative expansion of the two parts of the tongue. Due to the tongue gaskets and their engagement with the walls of recesses **28**, there can be substantially no air or moisture penetration through the joints between the side walls of the panels.

These panels are made completely at the factory, so that all that remains to be done at the building site is to fasten them in place with screws through their strips **6** and to insert the tongues in the recesses to interconnect the panels. The panels even can be insulated at the factory by placing insulation **29** inside one or both of the sheet metal panel elements before they are assembled. Therefore, the insulation already is in place when the panels are received at the building site and does not have to be separately stored or handled.

In the modification shown in FIG. 6, the outer wall of the panel is stepped to provide offset areas. One portion **31** of the wall adjacent the tongue **32** is disposed between the inner wall **33** of the panel and the plane of the outer side of its side recess **34**. It is therefore connected to the tongue by an integral reversely bent portion forming a longitudinal rib **35** that extends forward. The purpose of this vertical rib is to close the gap between the tongue and the front side of a recess **34** in which the tongue and rib are inserted.

I claim:

1. A wall panel adapted to be assembled with like panels to form a wall, comprising a rigid hollow sheet metal member having inner and outer walls and side joint walls, said hollow member being formed from a facing element and from a channel-like liner element having a web and parallel side flanges, the marginal portion of one of said side flanges being turned outwardly at a right angle to form one side of a tongue that extends lengthwise along said member, the marginal portion of the other flange being turned inwardly and then curved toward said outer wall and then extending outwardly to form a hook portion, said facing element having at one side a flange with a hook portion nesting with said first-mentioned hook portion and forming therewith a tongue-receiving recess extending lengthwise of said hollow member, the opposite side of the facing element having a laterally projecting marginal portion parallel to said one side of the tongue and forming the other side of the tongue, the tongue being perpendicular to said one flange and adapted to project into a recess in the side joint wall of an adjoining panel, a first gasket strip clamped between the two parallel sides of the tongue, a second gasket strip extending along the outer surface of said other side of the tongue, a third gasket strip extending along the free edge of the tongue and integral with the outer edges of the first and second strips, and a compressible bead extending along said second gasket strip and having a thickness such that it will be compressed by the side of the recess in the side joint wall of an adjoining panel when inserted therein with the liner element webs disposed in a common plane.

2. A wall panel according to claim **1**, in which said third gasket strip is provided with flexible lips extending lengthwise thereof and projecting from the opposite sides of the tongue far enough to be engaged and bent by the sides of the recess in the adjoining panel when inserted therein.

3. A wall panel according to claim **1**, including a gasket separating said hook portions and extending lengthwise of the panel.

4. A wall panel according to claim **1**, including a gasket U-shape in cross section separating said hook portions and extending lengthwise of the panel, and screws extending through said hook portions and the gasket between them for compressing the gasket.

5. A wall panel according to claim **1**, in which said third gasket strip is provided with flexible lips extending lengthwise thereof and projecting from the opposite sides of the tongue far enough to be engaged and bent by the sides of the recess in the adjoining panel when inserted therein, and said panel including a gasket that is U-shape in cross section separating said hook portions and compressed between them.

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HENRY C. SUTHERLAND, Primary Examiner

U.S. Cl. X.R.

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