Jan. 31, 1961 H. A. FROMSON 2,969,589

METHOD OF MAKING A PANEL STRUCTURE

Filed Dec. 20, 1956

Fig. 1.

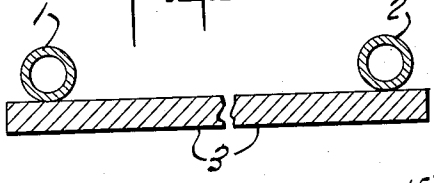


Fig. 2.

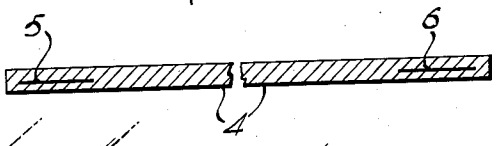


Fig. 3.

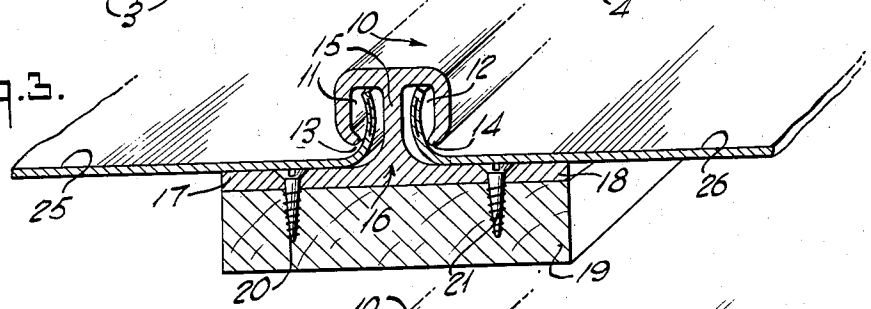


Fig. 4.

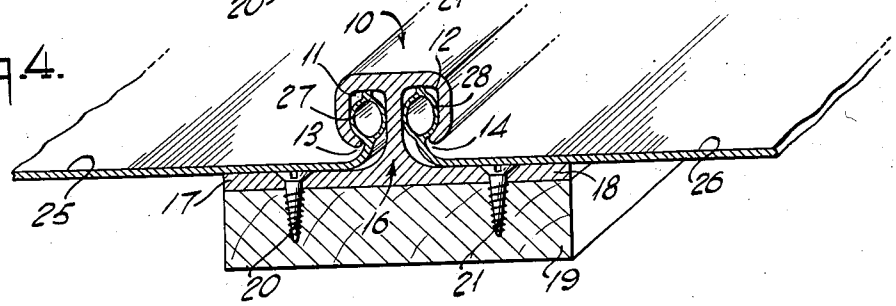


Fig. 5.

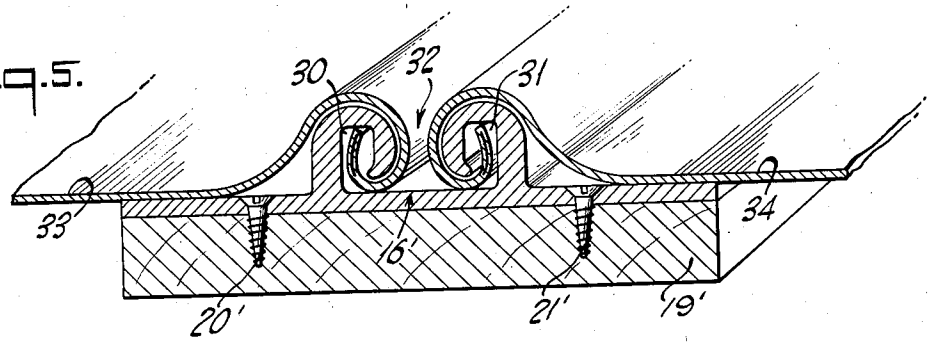
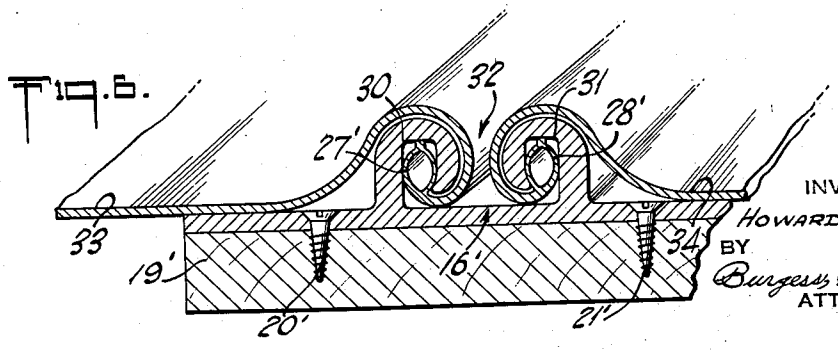


Fig. 6.



INVENTOR
HOWARD A. FROMSON
BY
Burgess, Dyany & Hicks
ATTORNEYS

United States Patent Office 2,969,589 Patented Jan. 31, 1961

2,969,589

METHOD OF MAKING A PANEL STRUCTURE

Howard A. Fromson, Weston, Conn., assignor to Calumet & Hecla Inc., a corporation of Michigan

Filed Dec. 20, 1956, Ser. No. 629,560
3 Claims. (Cl. 29—421)

This invention relates primarily to the method of making a construction of roofing or siding from metal sheets or panels and its object is to provide a structure in which the panels, while securely held, are not pierced in the customary fashion by nails, screws or the like and in which a watertight and also more sightly assembly can be achieved.

It has been proposed heretofore to roll metal slabs or pieces into sheets of required thickness and in such a way as to form, within the sheet, what is in effect a slit running lengthwise of the sheet, which slit can be opened at one end and expanded, as by pneumatic or hydraulic pressure, to form a tubular enlargement. Integral web and tube structures of this nature have found wide use in various heat exchanger applications.

As will presently appear, the present invention makes use of a form of integral sheet and tube structure of the above general character.

In the accompanying drawings:

Fig. 1 is a schematic cross section of a piece of metal and two metal tubes ready for rolling to produce, by one method, a sheet or panel suitable for the needs of the present invention;

Fig. 2 is a schematic section of the Fig. 1 elements after rolling;

Fig. 3 is a cross sectioned perspective view of one form of the invention in one stage of construction;

Fig. 4 is a similar view of the Fig. 3 components in a later stage of construction; and

Figs. 5 and 6 are views corresponding to those of Figs. 3 and 4 but showing a modified form.

In the Fig. 1 method of making an integral sheet and tube structure two metal tubes **1, 2** are treated to prevent their inner surfaces from bonding when the tubes are rolled flat. Such treatment may consist, for example, in coating the interior with any of various known resist materials. The treated tubes are placed on a slab or piece of metal **3** adjacent its edges and the components are then rolled to whatever final thickness is desired. The tubes are literally rolled into and bonded to the base **3** and the result is a sheet **4** (Fig. 2) having internal unbonded surfaces **5, 6** where the portions of the original tube walls abut one another. As will be understood, various metals may be used provided only that they are such as to bond when rolled.

There are other methods of making sheets, such as **4** and, as is well known, the tube sections may be expanded or inflated by applying hydraulic or pneumatic pressure to the ends of the slits **5, 6**. The expanded sections thus form tubular enlargements running the length of the edge portions of the sheet.

The present invention makes use of an elongated channel or anchor member, preferably an extrusion or rolled section, incorporating at least one open-sided cavity having an entrance disposed longitudinally of the member; and a sheet or panel of the type shown in Fig. 2 is secured to the anchor member by inserting a tube-section edge of the sheet through the entrance into the cavity and then inflating it so as to interlock the sheet and member. Preferably, the cavity has a restricted entrance, that is, of lesser cross section than that of the inflated tube section.

In the construction illustrated in Figs. 3 and 4, the anchor or channel member **10** is shown incorporating two separate cavities **11, 12** each having its own restricted entrance **13, 14**. The center wall **15** projects from a base **16** which has mounting side portions **17, 18** extending laterally beyond the double cavity structure. These side portions may be secured to an appropriate support **19** (as by screws **20, 21**) which may be a vertical stud or a roof beam or the like.

As illustrated in Fig. 3, the slit-incorporating edge portions of sheets **25, 26** are inserted in the respective cavities and then, as in Fig. 4, the tube sections of the edge portions are expanded. As will be understood, the cavities are appropriately dimensioned so that the enlarged tubes **27, 28** engage the cavity walls.

It will be recognized that an extremely tight joint or seam between adjacent panels can thus be secured without any nail or like holes in the panels themselves; and, of course, if it is dsired to make a completely water-tight seam without reliance wholly on the engagement of the tube walls with the cavity walls, the sheet edges or the cavities themselves may be smeared with any suitable mastic or sealing compound just before assembly.

In the modification shown in Figs. 5 and 6, the open-sided cavities **30, 31** of the anchor member have a common, centrally located, top entrance **32** through which the edge portions of sheets **33, 34** are inserted (Fig. 5) and then inflated (Fig. 6) as described above. The primed reference characters indicate the elements corresponding to those of Figs. 3 and 4, as will be self-evident.

The foregoing will serve to illustrate the principles of the invention which, of course, are susceptible of embodiment in numerous forms to meet the exigencies of particular cases.

The following is claimed.

1. The method of permanently securing an edge of a metal panel to an anchor member with a weather-tight seal which comprises: forming an elongated anchor member with a longitudinal cavity therein, said cavity having a continuous restricted entrance extending lengthwise along one side thereof; inserting through said entrance and into said cavity a flat edge portion of a metal sheet incorporating, in said flat edge portion, an inflatable tube section extending lengthwise along said edge from one end to the other end thereof; and inflating the said tube section within the cavity to a diameter larger than the restricted entrance to the cavity by introducing fluid under pressure into the tube section.

2. The method of joining an edge of a sheet metal panel to an anchoring member wherein the anchoring member has a longitudinally extending cavity therein with a continuous restricted entrance communicating with and extending lengthwise of the cavity and the edge of the metal panel incorporates therein an inflatable tube section extending lengthwise along said edge from one end to the other end thereof, which comprises: inserting the flat edge of the metal panel through the restricted entrance in the anchoring member until the inflatable tube section incorporated in the edge of the strip lies within the cavity in the anchoring member; and then inflating the said tube section to a dimension larger than the restricted entrance to the cavity whereby the edge of the panel is permanently joined to the anchoring member.

3. The method of interlocking metal panels in contiguous relation to each other which comprises: forming an elongated connecting member with parallel cavities extending longitudinally thereof, said cavities having

oppositely disposed restricted entrances extending lengthwise along spaced sides thereof; inserting through each of the respective entrances and into each of the respective cavities a flat edge portion of a metal sheet incorporating, in said flat edge portion, an inflatable tube section extending lengthwise along said edge from one end to the other end thereof; and inflating each tube section within its cavity to a dimension larger than the restricted entrance to the cavity.

References Cited in the file of this patent

UNITED STATES PATENTS

1,723,659	Rosenquist	Aug. 6, 1929
2,066,255	Dempsey	Dec. 29, 1936
2,093,092	McElhany et al.	Sept. 14, 1937
2,359,629	Dexter et al.	Oct. 3, 1944
2,367,206	Davis	Jan. 16, 1945
2,502,493	Trussell	Apr. 4, 1950
2,551,751	MacDougall	May 8, 1951
2,590,588	Wallace et al.	Mar. 25, 1952
2,759,247	Grenell et al.	Aug. 21, 1956
2,761,536	Bradley	Sept. 4, 1956
2,822,194	Fentress	Feb. 4, 1958
2,863,185	Riedi	Dec. 9, 1958
2,870,881	Rogge	Jan. 27, 1959