Sept. 29, 1964 T. B. JOHNSON 3,150,465

CONSTRUCTION SHEETS

Filed April 4, 1961

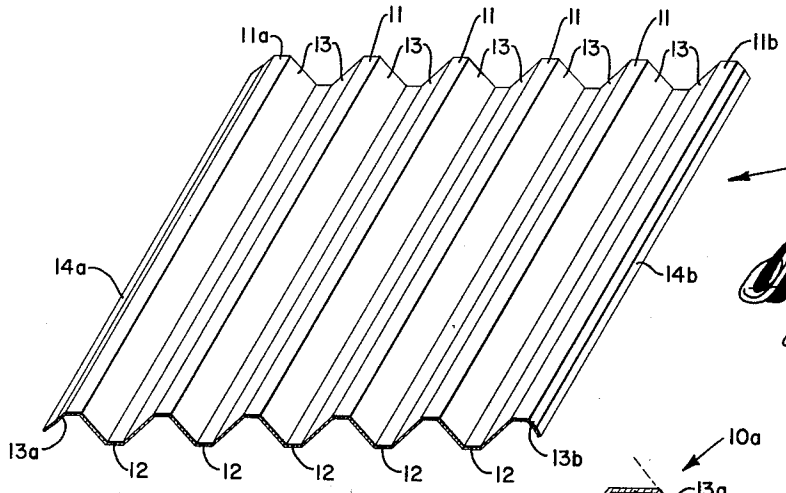


Fig. 1

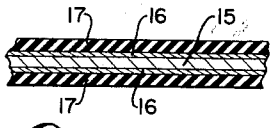


Fig. 2

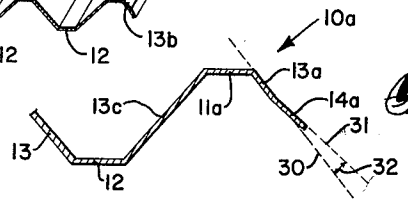


Fig. 5

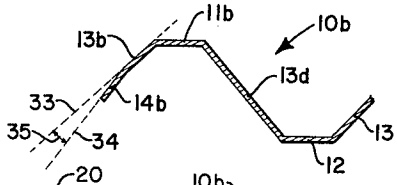


Fig. 6

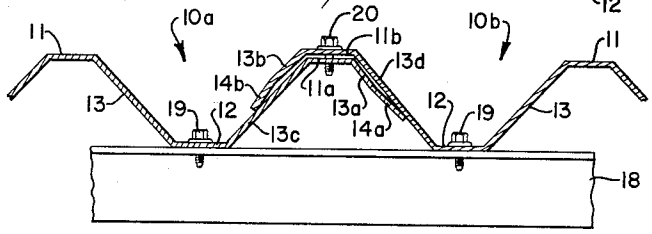


Fig. 3

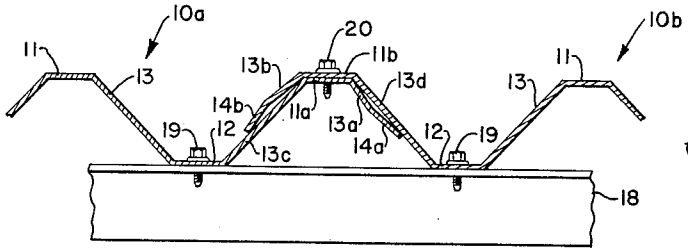


Fig. 4

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CONSTRUCTION SHEETS

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1 Claim. (Cl. 50—236)

This invention relates to building construction sheets of the type known in the industry as V-beam corrugation sheets. More particularly such sheets are fabricated from materials identified as protected metals, i.e., a metal sheet, usually carbon steel, coated with a thick, tough surface of bituminous or plastic material.

Such protected metal sheets are more fully described in U.S. Patents 1,366,999, 1,418,348, 1,432,512, 1,536,549, 1,812,732, 1,862,332, 1,863,147, 1,863,186, 1,864,971, 1,936,228, 1,973,193, 1,982,243, 2,068,975, 2,244,352, 2,286,120, 2,392,272, 2,440,626, 2,472,963, 2,631,641, 2,668,781, 2,764,808.

The protected metal sheets with which this invention is concerned are normally secured to the sides and roofs of buildings to serve as weather-proof sheathing for the buildings. Such materials are provided in various profiles, one of which is the so-called V-beam corrugation. The V-beam corrugation is illustrated and described in U.S. Patents 1,936,228 and 1,982,243, for example. The V-beam corrugation sheets are assembled onto a building structure with the corrugations in generally parallel alignment by overlapping the lateral corrugations of adjacent sheets. A self-tapping threaded fastener is driven through the ridges of overlapped lateral corrugations to secure adjacent sheets. Heretofore this side lapping assembly has presented three problems:

(1) Weather-proof characteristics;
(2) External appearance; and
(3) Internal appearance.

The weather-proof characteristics of the side lap can be satisfactory if suitable sealants are provided between the two adjacent overlapped sheets. However, it is preferable to avoid the use of sealant compositions. The external and internal appearance of the side lap usually is satisfactory so long as the sheets of protected metal are fabricated from flat sheets of steel. The more modern production techniques involve fabrication of the protected metal sheets from coiled ribbons of steel. It is a characteristic of coiled steel ribbon that the lateral edges exhibit some waviness when the steel ribbon is is uncoiled and flattened.

The waviness of the metal edges is visually apparent in both the external and internal appearance of existing side laps. The waviness, moreover, interferes with the provision of satisfactory weather-proofing characteristics in the protected metal corrugated sheets where sealant compounds are not utilized.

The object of the present invention is to provide a corrugated protected metal sheet having V-beam corrugations which will have a uniform, pleasing internal and external appearance and will have suitable weathering characteristics.

According to the present invention this object is accomplished by providing along each lateral edge of a V-beam corrugated protected metal sheet an additional flange. These additional flanges are to be known as a "hug edge" and a "hugged edge." The additional flange is provided along the lateral downwardly inclined surfaces of the V-beam corrugated protected metal sheet. The hugged edge is outwardly directed while the hug edge is inwardly directed. When the lateral corrugations of two adjacent V-beam corrugated protected metal sheets are overlapped, the hug edge of the external sheet forms a weather resistant bond with a sloping surface of the internal sheet; the hugged edge of the internal sheet forms a weather resistant bond with a sloping surface of the external sheet. The weather resistance bonds present a pleasing visual appearance to both the internal and external surfaces of the side lap.

For a clear understanding of the present invention, its objects and advantages, reference should be had to the accompanying drawings in which:

FIGURE 1 is a perspective illustration of a protected metal sheet in V-beam corrugated configuration according to the present invention;

FIGURE 2 is a cross-section illustration showing a preferred form of protected metal sheeting;

FIGURE 3 is a cross-section illustration of two adjacent protected metal sheets of V-beam corrugated configuration in a partly assembled relation;

FIGURE 4 is a cross-section illustration, similar to that of FIGURE 3, showing two side-by-side protected metal building sheets of V-beam corrugated configuration in completely assembled relation according to the present invention; and

FIGURES 5 and 6 are fragmentary cross-section illustrations showing lateral corrugation details.

Referring to FIGURE 1 there is illustrated a corrugated protected metal sheet **10** having a V-beam corrugation which includes flat top walls **11** and flat bottom walls **12** spaced apart by inclined side walls **13**. The flat top walls **11** and flat bottom walls **12** are generally parallel to each other. It will be observed that the protected metal sheet **10** terminates at each end along a downwardly inclined sidewall **13** and **13*b***, each of which joins one of the lateral flat top walls **11**. One of the downwardly inclined lateral side walls **13*a*** terminates in an outwardly bent flange portion **14*a***; the other downwardly inclined lateral side wall **13*b*** terminates in an inwardly directed terminal flange portion **14*b***. The terminal flange portions **14*a***, **14*b*** serve as a "hugged edge" and a "hug edge," respectively.

The protected metal sheeting from which the present V-beam corrugated sheets are fabricated is illustrated in a preferred embodiment in FIGURE 2 wherein a sheet of metal, usually carbon steel, is identified by the numeral **15**. Secured to each surface of the metal sheet **15** is a sheet of asbestos felt **16** preferably bonded to the metal sheet **15** by means of a protective metal coating such as zinc which is applied in a molten condition as taught, for example, in U.S. Patents 2,631,641 and 2,764,808. Secured over the outer surfaces of the asbestos felt **16** is a tough, weather resistant coating **17** which may comprise bituminous materials such as various asphalts, or suitable plastic materials such as unsaturated polyester resins copolymerized with styrene as taught in U.S. Patent 2,472,963 or copolymerized with other vinyl materials as taught in U.S. Patent 2,731,375. The outer coating **17** also may comprise oil modified, styrenated alkyd resin as taught in co-pending application Serial No. 677,147, filed August 8, 1957 and assigned to the assignee of the present invention. Preferably the outer coating **17** will have a thickness on each side of the metal sheet of at least 0.015 inch. The metal sheet **15** normally is comprised of carbon steel having a thickness from **24** gauge through **14** gauge. The precise composition of the protected metal sheet forms no part of the present invention.

Referring once more to FIGURE 1, the flat bottom walls **12** have the same width. The flat top walls **11** have the same width with the exception of the one lateral top wall **11*a***. The outer width of the top wall **11*a*** corresponds to the width of the inner side of the other top walls **11**. Reduction of the width of the one outer top wall **11*a*** permits the overlapping of the present construction sheets.

Referring to FIGURES 3 and 4, there are illustrated two of the present construction sheets **10***a* and **10***b* assembled in outer relation upon a building structure having a sub-girt **18**. It will be observed that the two construction sheets **10***a*, **10***b* are secured to the sub-girt **18** by means of screws **19** which extend through the flat bottom walls **12**. The flat top wall **11***b* overlaps the flat top wall **11***a* and a suitable screw **20** is provided through aligned drilled holes in the two top walls **11***b*, **11***a*. The lateral corrugation of the sheet **10***a* comprises an inclined side wall **13***c*, a reduced width top wall **11***a* and a downwardly inclined side wall **13***a*, which terminates in a flange portion **14***a* which is outwardly bent with respect to the sheet **10***a*. The sheet **10***b* has a lateral corrugation which comprises an inclined side wall **13***d*, a flat top wall **11***b* and a downwardly inclined side wall **13***b* which terminates in a flange portion **14***b* which is inwardly bent with respect to the sheet **10***b*.

As shown in FIGURE 3, the screw **20** extends through both of the top walls **11***b*, **11***a*. Prior to being drawn tight, the screw **20** permits the tip of the terminal flange portion **14***b* to make contact with the outer surface of the inclined side wall **13***c* and the tip of the terminal flange portion **14***a* to make contact with the inner surface of the inclined side wall **13***d* before the outer surface of the reduced width top wall **11***a* and the inner surface of the top wall **11***b* are drawn into engagement. When the screw **20** is drawn tight, as shown in FIGURE 4, the two construction panels **10***a*, **10***b* are provided with a weather tight side lap seam which has a pleasing external and internal visual appearance. By tightening the screw **20**, the top walls **11***b* and **11***a* are brought into engagement along their inner and outer surfaces respectively. The inclined side wall **13***b* and flange end portion **14***b* are resiliently urged into engagement with the outer surface of the inclined side wall **13***c*. By virtue of the presence of the terminal flange portion **14***b*, only its extreme edge is in actual contact with the outer surface of the inclined side wall **13***c* The provision of the terminal flange portion **14***b* eliminates any waviness along the edge of the construction sheet **10***b* which may have resulted from the rolled steel ribbon from which the construction sheet **10***b* was fabricated.

Similarly when the screw **20** is tightened, the inclined side wall **13***a* and flanged end portion **14***a* are resiliently urged toward contact with the inclined side wall **13***d*. The provision of terminal flange portion **14***a* permits actual contact with the inclined side wall **13***d* only along its inner surface with the extreme edge of the lateral flange portion **14***a*. Again the provision of the lateral flange portion **14***a* eliminates any waviness which may have been inherent in the coiled steel ribbon from which the construction sheet **10***a* was fabricated.

It is essential in the fabrication of building sheets according to this invention that the terminal flange portions **14***a*, **14***b* have a sufficient angle with respect to the inclined side walls **13***a*, **13***b*, respectively so that a suitable weathertight bond is secured. Nevertheless the aforesaid angle may not be too great or the construction sheets will be marred and damaged by penetration of the flanged edge portions **14***a*, **14***b* into the inclined side walls **13***c*, **13***d*.

The preferred configurations for the flanged edge portions **14***a*, **14***b* are set forth in FIGURES 5 and 6 respectively.

As shown in FIGURE 5, the lateral edge portion of a construction sheet **10***a* bears the same numerals as FIGURES 3 and 4.

As shown in FIGURE 5, the numeral **30** indicates an extension of a center line drawn through the inclined side wall **13***a* The numeral **31** indicates a center line drawn through the terminal flange portion **14***a*.

An angle **32** between the center lines **30**, **31** preferably is in range of 4–18°.

As shown in FIGURE 6, the numeral **13** represents a center line extension of the inclined side wall **13***b*. The numeral **34** indicates a center line extension of the terminal flange portion **14***b*. An angle **35** between the lines **33**, **34** preferably is in the range of 4–18°.

According to the provisions of the patent statutes, I have explained the principle, preferred embodiment and mode of operation of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

In a joint for connecting a pair of facing sheets in overlapping relation, the combination of first and second adjacent corrugated sheets each having in its body portion substantially V-beam corrugations of substantial depth provided with substantially straight interior side walls and with substantially flat top and bottom horizontal walls, the lateral corrugation of said first sheet being overlapped with the lateral corrugation of said second sheet, each of said sheets terminating along the adjacent side edges thereof in a downwardly inclined exterior side wall, the downwardly inclined exterior side wall of said first sheet having a terminal portion inwardly bent toward said body portion as a hug edge, the downwardly inclined exterior side wall of said second sheet having a terminal portion outwardly bent away from said body portion as a hugged edge, all of said interior side walls being inclined at substantially the same angle with respect to said top and bottom horizontal walls, there being substantially no waviness along said hug edge and said hugged edge, the overlapping lateral corrugations of said first and second sheets being secured together at and with the top flat horizontal walls thereof in overlying surface contact whereby the hug edge of said first sheet is urged into resilient contact with the outer face of an inclined interior side wall of said second sheet and the hugged edge of said second sheet is urged into resilient contact with the inner face of an inclined interior side wall of said first sheet.

References Cited in the file of this patent

UNITED STATES PATENTS

2,910,151 Millstine ---------- Oct. 27, 1959

FOREIGN PATENTS

73,795 Netherlands ---------- Dec. 15, 1953