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1,914,876 6/1933 Workman..... 52/522
 2,565,610 8/1951 Kinghorn..... 52/522

OTHER REFERENCES

Architectural Record March 1949, page 169 copy in 52-529

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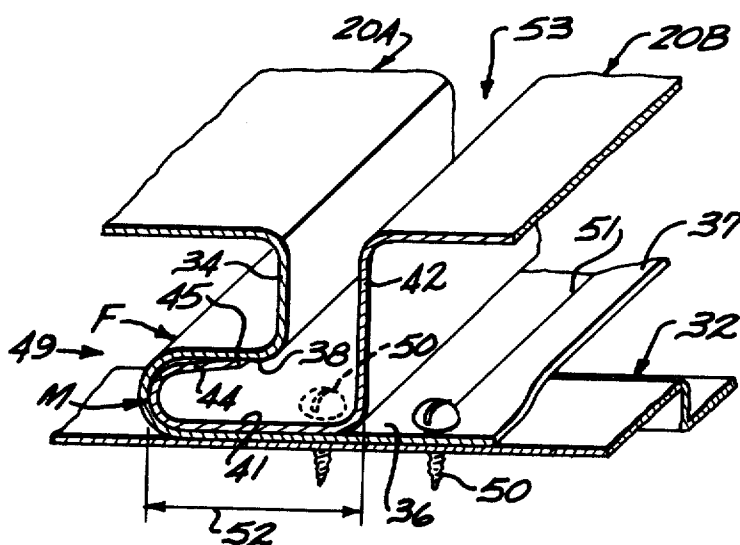
[54] BUILDING WALL PANEL AND SIDE JOINTS THEREFOR

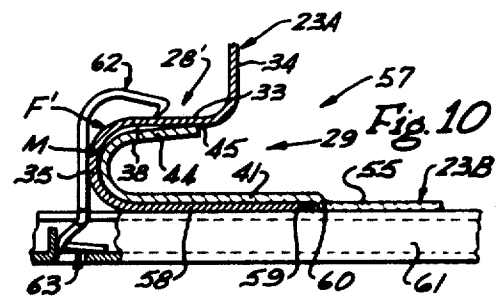
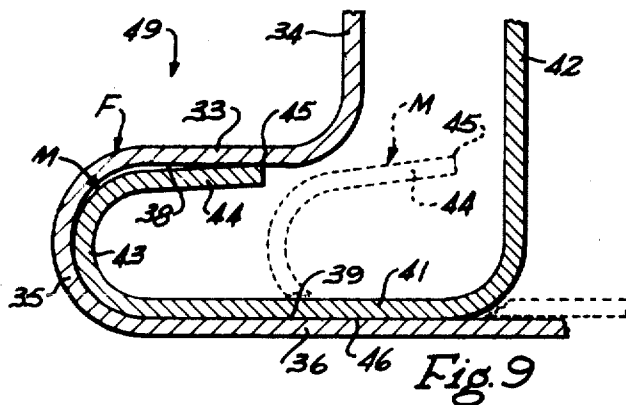
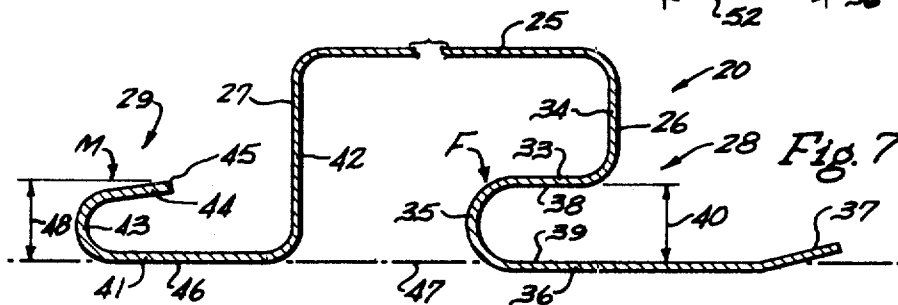
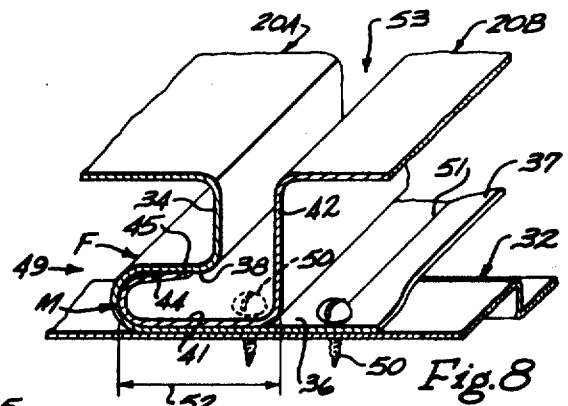
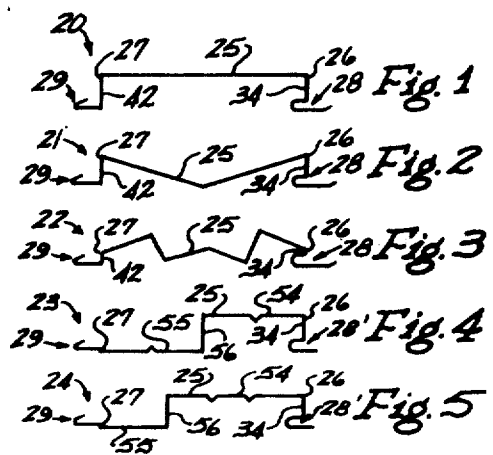
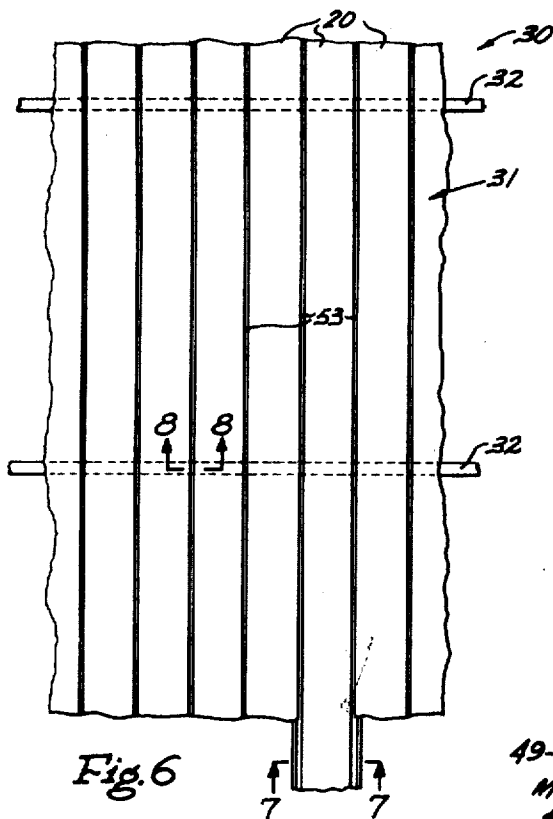
6 Claims, 10 Drawing Figs.

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E04c 2/46, E04d 3/362
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542, 529, 519, 530, 531, 539, 588, 520, 521, 492,
522, 543, 544, 545; 287/189.36, 189.36 D

[56] **References Cited**
UNITED STATES PATENTS
 1,984,607 12/1934 Twickler 287/189.36

ABSTRACT: A building wall panel having improved marginal connecting means on opposite panel sides, providing an improved side joint between adjacent ones of the building wall panel. One marginal connecting means comprises a channel-like female lip presenting opposed inner surfaces. The other marginal connecting means comprises a male lip including a reverse turned flange presenting a free edge. When the male and female lips are interengaged, the free edge of the reverse turned flange is resiliently urged into line contact along substantially its entire length with one of the opposed inner surfaces thereby to provide a gasket-free, essentially weathertight joint.





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BUILDING WALL PANEL AND SIDE JOINTS THEREFOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to building wall panels of the type adapted to be erected in side-by-side interengaged relation to form a metal sheath of a wall structure, and more particularly to improved marginal connecting means for such panels and improved side joints provided thereby.

2. Description of the Prior Art

Building wall panels are available in a wide variety of profiles for use as facing sheets of a wall structure. Typical profiles of such building wall panels are illustrated in U.S. Pat. Nos. 3,415,367 and 3,420,029. A typical wall structure incorporating such building wall panels is described and illustrated in U.S. Pat. No. 3,300,934.

Such building wall panels include a central pan having marginal connecting means, such as a male lip and a female lip, formed along the opposite longitudinal sides of the central pan. The male lip comprises a flange of a single metal thickness, extending outwardly away from the central pan. The female lip extends inboard of the central pan toward the male lip and has a generally channel-shaped configuration.

When such building wall panels are erected, the male lip of one panel is received within the female lip of an adjacent panel to form a joint therebetween. To provide a weathertight seal at the joint, the female lip may be provided with a bead of caulking material which is penetrated by the male lip of the adjacent panel. The bead of caulking material may be applied at the factory or in the field. Alternatively, a generally U-shaped gasket may be fitted over the male lip. The gasket extends the entire length of the male lip. The gasketed male lip is introduced into the female lip of the adjacent panel to seal the joint.

In either instance, difficulty is encountered when introducing the male lip of one panel into the female lip of the previously erected panel. For example, where caulking material is provided in the female lip, the caulking material resists the introduction of the male lip. Where the U-shaped gasket is provided on the male lip, the gasket resists introduction of the male lip.

SUMMARY OF THE INVENTION

The principal objects of this invention are to provide a building wall panel having improved marginal connecting means and to provide an improved side joint between adjacent ones of the building wall panels.

A further object of this invention is to provide a side joint comprising interengaged male and female lips wherein the configuration of the male lip and the female lip is such that the male lip resists being pulled out of the female lip when the joint is subjected to negative wind loading.

Another object of this invention is to provide marginal connecting means which improve the stiffness of the entire side joint.

Still another object of this invention is to provide a side joint between adjacent panels which is gasket-free and essentially weathertight.

In accordance with the present invention, one of the marginal connecting means comprises a male lip extending laterally outwardly of the central pan of the panel. The male lip includes an out-turned longitudinal strip, a bight, and a reverse turned flange extending inwardly over the out-turned longitudinal strip free edge which is spaced apart from the out-turned longitudinal strip.

The other marginal connecting means comprises a female lip extending laterally inwardly toward the male lip. The female lip includes an intumed longitudinal flange, a bight, and a reverse turned strip spaced apart from the intumed longitudinal flange. The reverse turned strip and the intumed longitudinal flange present spaced apart opposed inner surfaces, there being a gradual transition between the inner surface of the bight and each of the opposed inner surfaces.

Prior to inserting the male lip into the female lip, the distance between the free edge of the reverse turned flange and a face of the intumed longitudinal strip which is remote from the free edge, is greater than the distance between the opposed inner surfaces of the female lip. When the male lip is inserted into the female lip, the reverse turned flange is deflected whereby the free edge of the reverse turned flange is resiliently urged into line contact along substantially its entire length with one of the opposed surfaces at a location thereon which is remote from the juncture of the other of the opposed inner surfaces and the inner surface of the bight of the female lip. A gasket-free, essentially weathertight joint is thus provided.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1-5 are end views schematically illustrating the profiles of typical building wall panels provided with the improved marginal connecting means of this invention;

FIG. 6 is an elevation view of a wall structure incorporating the building wall panel of FIG. 1;

FIG. 7 is a fragmentary cross-sectional view, on an enlarged scale, taken along the line 7-7 of FIG. 6;

FIG. 8 is an isometric cross-sectional view taken along the line 8-8 of FIG. 6;

FIG. 9 is a fragmentary cross-sectional view illustrating, on an enlarged scale, the interengagement of the male and female lips of this invention; and

FIG. 10 is a cross-sectional view illustrating the interengagement of the present male and female lips provided on the building wall panels illustrated in FIGS. 4 and 5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1-5 inclusive, illustrate the profiles of typical building wall panels 20, 21, 22, 23 and 24, respectively. Each of the panels 20-24 includes a central pan 25 and opposite longitudinal panel sides 26, 27. The panels 20, 21 and 22 of FIGS. 1-3, each are provided with first marginal connecting means 28 along the longitudinal panel side 26 and the second marginal connecting means 29 along the opposite longitudinal panel side 27. The panels 23 and 24 of FIGS. 4 and 5, each are provided with first marginal connecting means 28' along the longitudinal panel side 26 and second marginal connecting means 29 along the opposite longitudinal panel side 27.

FIG. 6 presents a wall structure 30 wherein only an outer metal sheath 31 and support means, such as subgirts 32, are illustrated. For the purpose of illustration, the outer metal sheath 31 of FIG. 6 comprises a plurality of the building wall panels 20 of FIG. 1, erected in side-by-side interconnected relation and secured to the subgirts 32. Alternatively, the outer metal sheath 31 may comprise a plurality of any one of the building wall panels 21, 22, 23, 24 or combinations thereof.

Referring to FIG. 7, the first marginal connecting means 28 comprises a female lip F extending laterally inwardly toward the second marginal connecting means 29. The connecting means 28 includes an intumed longitudinal flange 33 adjoining a sidewall 34 provided at the panel side 26, a reverse turned strip 36 extending laterally outwardly beyond the sidewall 34 and terminating in an upturned strip portion 37, and a bight 35 having an arcuate configuration and connecting the intumed longitudinal flange 33 to the reverse turned strip 36. The intumed longitudinal flange 33 and the reverse turned strip 36 present opposed inner surfaces 38, 39 which are spaced apart at a selected distance indicated by the dimension line 40. Moreover, there is a gradual transition between the inner surface of the bight 35 and each of the opposed inner surfaces 38, 39.

The second marginal connecting means 29 comprises a male lip M extending laterally outwardly of the central pan 25. The male lip M includes an out-turned longitudinal strip adjoining a sidewall 42; a bight 43 adjoining the out-turned longitudinal strip 41; and a reverse turned flange 44 adjoining the bight 43 and terminating in a free edge 45. Note that the free

edge 45 corresponds to the termination of the reverse turned flange 44. The reverse turned flange 44 is inclined relative to the out-turned longitudinal strip 41 and preferably diverges from the bight 43 outwardly away from the out-turned longitudinal strip 41. The out-turned longitudinal strip 41 presents an outer face 46 which is remote from the free edge 45. The outer face 46 and the inner surface 39 of the female lip F lie in a common plane indicated by the dash dot line 47.

The spacing or distance between the free edge 45 of the reverse turned flange 44 and the outer face 46 of the out-turned longitudinal strip 41 is indicated by the dimension line 48. The spacing 48 is greater than the spacing 40 between the opposed inner surfaces 38, 39 of the female lip F.

FIGS. 8 and 9 illustrate a joint 49 between adjacent building wall panels 20A, 20B.

Referring to FIG. 8, it will be seen that the building wall panel 20A is erected with the reverse turned strip 36 engaged with the subgirt 32 and secured thereto by fastener 50. The fastener 50 may be applied along the bend line 51, that is, at the intersection of the reverse turned strip 36 and the up-turned strip portion 37.

The male lip M of the adjacent building wall panel 20B is then introduced into the female lip F of the building wall panel 20A to form the joint 49. The overall arrangement of the joint 49 is such that the free edge 45 of the reverse turned flange 44 is urged into line contact along substantially its entire length with the inner surface 38 of the female lip F, whereby a gasket-free essentially weathertight joint is created. Note also that the free edge 45 engages the inner surface 38 at a location which is remote from the juncture of the inner surface 38 and the inner surface of the bight 35 of the female lip F.

The male lip M has an overall width indicated by the dimension line 52. The width 52 of the male lip M may be such that the sidewall 42 of the building wall panel 20B is spaced apart from the sidewall 34 of the building wall panel 20A to provide a recess or groove 53 (see also FIG. 6). Alternatively, the width 52 of the male lip M may, instead, be such that the sidewall 34 of the building wall panel 20A abuts the sidewall 42 of the building wall panel 20B.

Where the recess 53 is provided, the fastener 50 may, instead, be placed within the recess 53 as shown in dotted outline of FIG. 8. In this instance, the fastener 50 will extend through the out-turned longitudinal strip 41 of the male lip M and the reverse turned strip 36 of the female lip F into threaded engagement with the subgirt 32.

The joint 49 is illustrated on an enlarged scale in FIG. 9. A position of the male lip M prior to entering the female lip F, is shown in dotted outline to demonstrate that the free edge 45 of the reverse turned flange 44 normally is disposed above the plane of the inner surface 38 of the inturned longitudinal flange 33. As the male lip M enters the female lip F, the reverse turned flange 44 is deflected toward the out-turned longitudinal strip 41. When the male lip M is seated within the female lip F, as shown in full lines, the reverse turned flange 44 is spaced apart from both of the opposed inner surfaces 38, 39 and is engaged with the inner surfaces 38 solely along the free edge 45 thereof. Moreover, the out-turned longitudinal strip 41 is in surface engagement with the inner surface 39 of the reverse turned strip 36. The reverse turned flange 44 being deflected from its normal position, urges the free edge 45 into line contact along substantially its entire length with the inner surface 38. A gasket-free, essentially weathertight joint is provided by this structure. It will be appreciated that the free edge 45 being urged into line contact with the inner surface 38, resists movement of the male lip M out of the female lip F. Accordingly, the joint 49 has improved pull out strength which is important especially under negative wind loading conditions. It will also be appreciated that the configuration of the male lip M and its interengagement with the female lip F improve the stiffness of the entire joint 49.

Referring again to FIGS. 4 and 5, it will be seen that the central pan 25 of the building wall panels 23, 24 comprise an outer pan segment 54, an inner pan segment 55 and a connecting web 56.

FIG. 10 illustrates a joint 57 which is typical of a joint between a pair of the building wall panels 23 of FIG. 4 or a pair of the building wall panels 24 of FIG. 5. Corresponding numerals will be employed to identify corresponding parts heretofor described.

In this embodiment, the first marginal connecting means 28' includes an inturned longitudinal flange 33, a bight 35 and a reverse turned strip 58 terminating in a strip edge 59. The reverse turned strip 58 extends laterally beyond the sidewall 34 of the building wall panel 23A.

In this embodiment, the out-turned longitudinal strip 41 of the male lip M is offset from the inner pan segment 55 by one metal thickness, whereby the inner pan segment 55 presents a shoulder 60 in opposition to the strip edge 59.

The building wall panel 23A is erected with the reverse turned strip 58 thereof engaging a channel-shaped subgirt 61. The female lip F' is received beneath a clip member 62 having a clip end 63 connected to the subgirt 61. Thereafter, the male lip M of the building wall panel 23B is introduced into the female lip F' with the free edge 45 of the reverse turned flange 44 urged into line contact along substantially its entire length with the inner surface 38 of the inturned longitudinal flange 33. The joint 57 comprises a gasket-free, essentially weathertight joint.

Although not limited thereto, the present joint is particularly effective when the building wall panels are formed from material known as protected metal sheathing. Such protected metal sheathing is described and illustrated in U.S. Pat. No. 3,274,679. Such protected metal sheathing includes a tough weather-resistant outer coating. The resiliently urged free edge 45 of the male lip M when introduced into the female lip F, will penetrate at least in part, the outer coating presented by the inner surface 38 of the female lip F. The resulting joint is gasket-free and essentially weathertight.

I claim:

1. In a building wall panel comprising a central pan having opposite longitudinal sides and marginal connecting means along the said opposite longitudinal sides, the improvement in said marginal connecting means comprising:

one of said marginal connecting means comprising a male lip extending laterally outwardly of said central pan and including an out-turned longitudinal strip, a bight, and a reverse turned flange extending inwardly over said out-turned longitudinal strip and terminating in a free edge spaced apart from said out-turned longitudinal strip; and the other of said marginal connecting means comprising a female lip including an inturned longitudinal flange extending toward said male lip, a bight, and a reverse turned strip spaced apart from said inturned longitudinal flange, said reverse turned strip extending beyond the longitudinal side of said panel and terminating in an upturned strip portion, said inturned longitudinal flange and said reverse turned strip presenting spaced apart opposed inner surfaces, there being a gradual transition between the inner surface of said bight and each of said opposed inner surfaces;

the lower face of said out-turned longitudinal strip of said male lip and the upper face of said reverse turned strip of said female lip lying in a common plane;

the said panel being adapted to be assembled with others of said panel with the male lip of one panel disposed within the female lip of an adjacent panel and with the free edge of the reverse turned flange disposed in line contact along substantially its entire length with said inner surface of said inturned longitudinal flange and at a location thereon which is remote from the juncture of said inner surface of said inturned longitudinal flange and the inner surface of said bight of said female lip.

2. In a joint between a pair of building panels, wherein one building panel includes a central pan having a first marginal connecting means along a longitudinal edge thereof, and the other building panel includes a central pan having a second marginal connecting means along a longitudinal edge thereof, said second marginal connecting means being engaged with

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said first marginal connecting means, the improvement in said joint comprising:

said first marginal connecting means comprising a female lip extending laterally away from said other building panel and including an inturned longitudinal flange, a bight, and a reverse turned strip spaced apart from said inturned longitudinal flange, said inturned longitudinal flange and said reverse turned strip presenting opposed inner surfaces; and

said second marginal connecting means comprising a male lip extending laterally of the longitudinal edge of said other building panel into said female lip, said male lip including an out-turned longitudinal strip engaging said inner surface of said reverse turned strip, a bight, and a reverse turned flange terminating in a free edge engaged along substantially its entire length with said inner surface of said inturned longitudinal flange at a location thereon which is remote from the juncture of said inner surface of said inturned longitudinal flange and the inner surface of the bight of said first marginal connecting means;

said out-turned longitudinal strip of said male lip being essentially parallel with said reverse turned strip of said female lip;

the spacing between said free edge of said reverse turned flange and an outer face of said out-turned longitudinal

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strip normally being greater than the spacing between said opposed inner surfaces, whereby said reverse turned flange is deflected on entering said female lip and said free edge is resiliently urged into penetrating engagement with said inner surface of said inturned longitudinal flange.

3. The improvement defined in claim 2 wherein said reverse turned flange is spaced apart from both of said opposed inner surfaces and is engaged with said inner surface of said inturned longitudinal flange solely along said free edge.

4. The improvement defined in claim 2 including support means engaging said reverse turned strip for supporting said building wall panels; and fastening means for securing at least said female lip to said support means.

5. The improvement defined in claim 4 wherein said fastening means comprises a fastener extending through said reverse turned strip of said female lip into said support means.

6. The improvement defined in claim 4 wherein said fastening means comprises a fastener extending through said out-turned longitudinal strip of said male lip and said reverse turned strip of said female lip into said support means, whereby both said male lip and said female lip are secured to said support means.

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