Aug. 28, 1951 C. M. KINGHORN 2,565,610

JOINT FOR INTERLOCKING WALL AND ROOF COVERING STRIPS

Filed Aug. 20, 1948

3 Sheets-Sheet 1

Fig. 1.

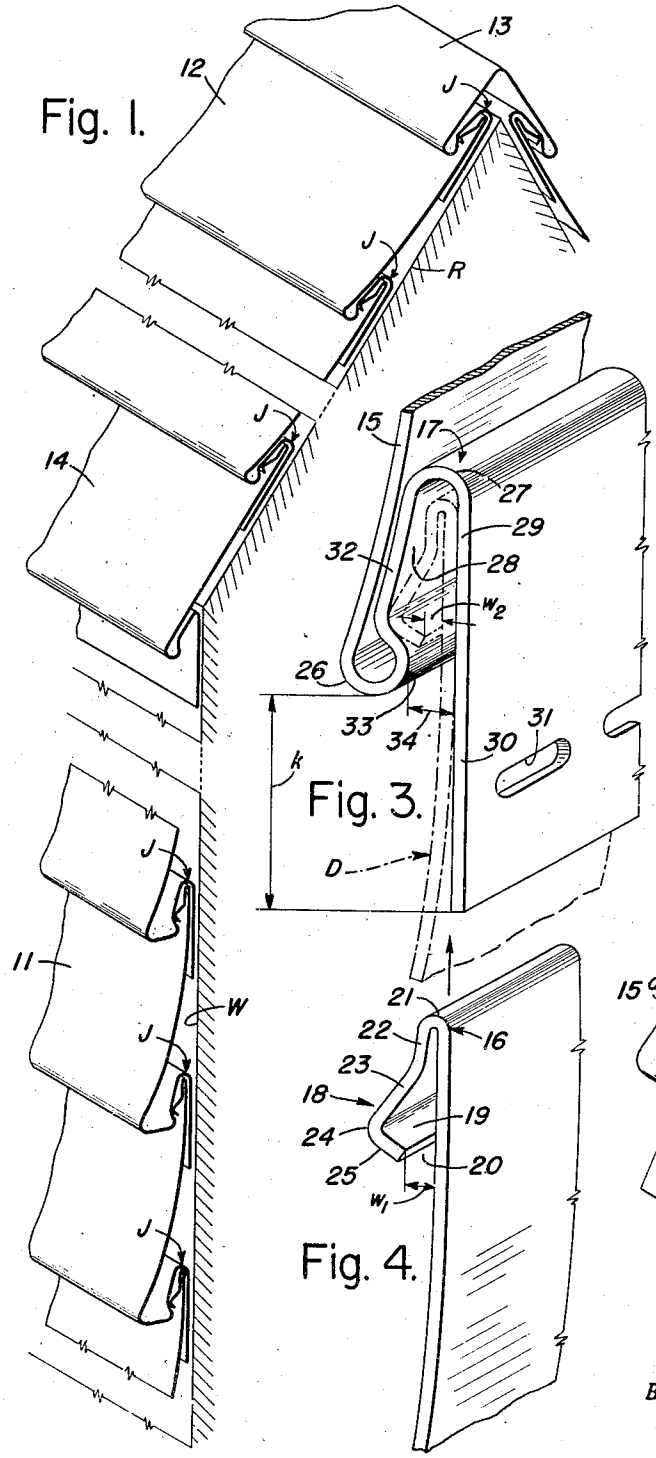


Fig. 2.

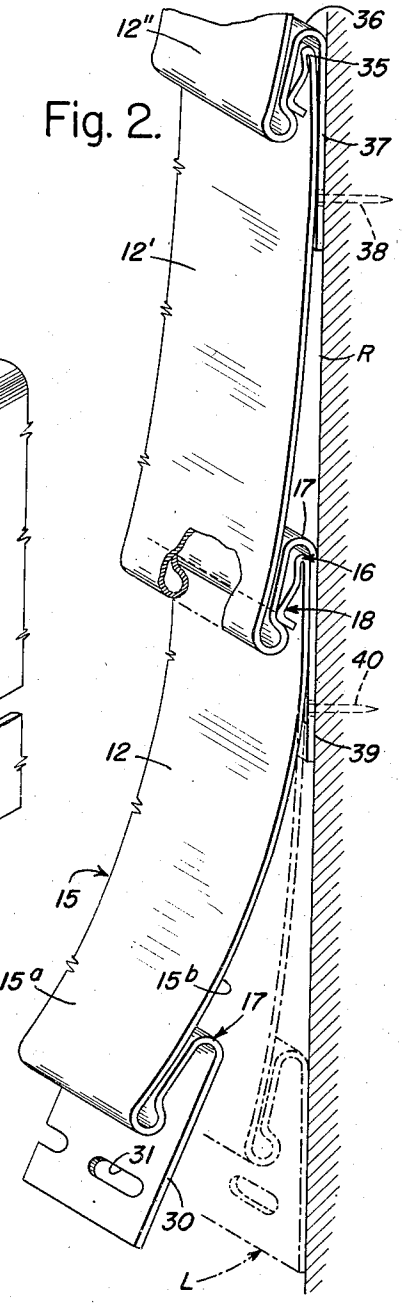


Fig. 3.

Fig. 4.

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3 Sheets-Sheet 2

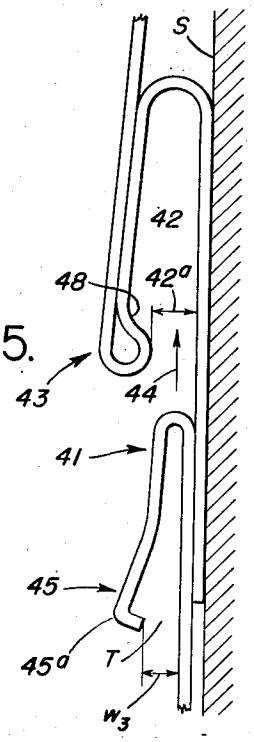


Fig. 5.

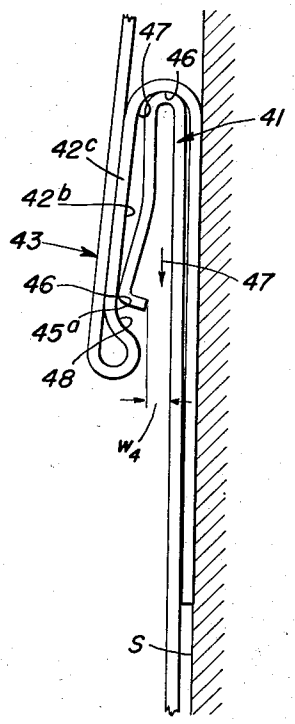


Fig. 6.

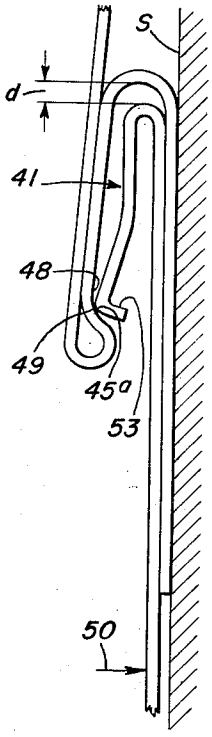


Fig. 7.

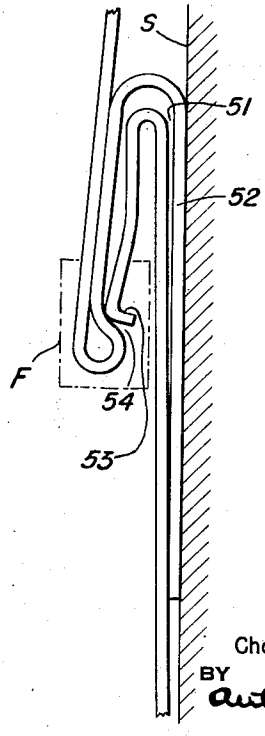


Fig. 8.

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JOINT FOR INTERLOCKING WALL AND ROOF COVERING STRIPS

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3 Sheets-Sheet 3

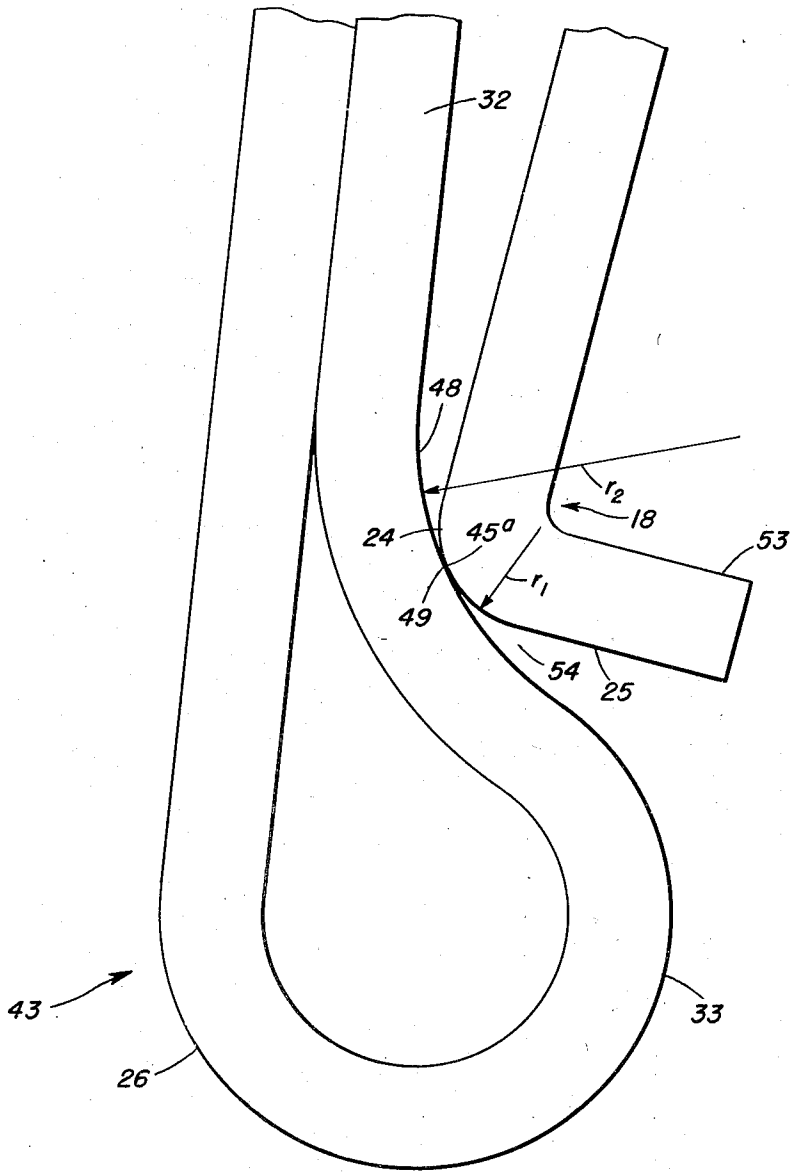


Fig. 9.

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Patented Aug. 28, 1951

2,565,610

UNITED STATES PATENT OFFICE

2,565,610

JOINT FOR INTERLOCKING WALL AND ROOF COVERING STRIPS

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Application August 20, 1948, Serial No. 45,354

6 Claims. (Cl. 108—13)

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This invention relates to sheet-metal wall-covering composed of strips that interlock edgewise for use in covering wall or roof structures.

More particularly this invention relates to improved interlocking means for such strips or units the profile of which is usually formed by rolling.

This improvement may be incorporated in strips for outside roofing or wall-covering an example of which is shown and described in my patent application Serial No. 720,811, filed January 8, 1947, now Patent No. 2,477,987 dated August 2, 1949. That specification discloses a sheet metal strip comprising a longitudinal transversely curved body portion and two parallel longitudinal marginal portions formed and adapted to interlock with adjacent similar strips. The lower edge of such a strip has an inverted groove which terminates in a wall-contacting skirt offset from the body portion towards the wall and adapted to be fixed thereto as by nails. This groove is formed by what may be generally described as an S-shape or double bend the second or terminal bend of which merges with the skirt. When assembling such strips or units to form the wall-covering the upper edge or tongue portion of such a strip enters the groove of a similar strip already emplaced and fastened above and has contact with the outer leg or side portion of the groove. Indeed pressure insures this face-to-face contact due to a tensioning imposed upon this strip when the lower edge or skirt thereof is also fastened upon the wall structure and the transverse curvature of the strip is thereby flattened or resiliently deformed with the convex side thereof facing the wall structure.

When a wall-covering of this kind is used on the exterior of a wall structure or of a roof structure it is exposed to the weather, and there is a tendency for moisture to pass or creep contrary to gravity between and past these contact faces of the joint as a result of capillary action between the contact faces so that moisture may reach the wall structure behind the metal covering.

Therefore it is an object of this invention to improve on such an interlocking joint to the end of minimizing or discouraging such capillary action. Another object of this invention is to arrest and divert any moisture accumulating at and reaching the exposed underside of the joint, so that moisture will be caused to drip downwardly away from the joint and particularly away from the aforementioned contact faces.

Still another object is to devise a thus improved interlocking joint that lends itself not only to embodiment in planar wall- and roof-

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covering strips but also in ridge strips, cornice strips, valley strips, and so on.

The major concept of this invention provides a type of pressure-contact between the weather exposed faces of the joint whereby capillary action is minimized or discouraged and the passage of moisture is blocked or whereby any moisture accumulating and tending to gain passage past the aforementioned contacting faces is diverted from these faces.

According to one feature, in the tongue-and-groove connection of the strips the tongue portion has an outwardly overhanging and outwardly bulging flange or lip. This lip is resiliently depressible and when confined in the groove portion of a superjacent strip is thereby depressed and exerts a corresponding pressure upon the line of contact between the lip and the adjoining face of the groove. Furthermore when the strip is tensioned by nailing down its skirt at the lower edge, a corresponding reaction pressure additionally bears down upon the line of contact intensifying and assuring the sealing effect by the contacting faces.

According to another feature the inverted groove is formed with a constriction at its mouth by reason of its outer side portion being roll-formed with an inward rounded bulge or protrusion or longitudinal ridge bead-shaped in cross-sectional profile, past which constriction the bulging overhang or lip must be pushed or forced when joining the strips, while the lip must yield resiliently to get past this constriction. After the tongue has thus been snapped into the groove it may be retracted sufficiently to cause the bulge or rounded apex of the lip to engage or abut or nestle into the concavity that forms the transition between the constricting ridge and the outer side portion of the groove, the radius of the apex being smaller than that of the companion concavity.

The best embodiment now known to me has been chosen for the purpose of illustration and that embodiment will be described precisely without attempt to refer to modifications or equivalents which, however, can be used while still coming within the ambit of this invention. The embodiment chosen for use exemplification is illustrated in the accompanying drawings in which.

Fig. 1 is a partial isometric view of a roof and wall structure in which this invention has been incorporated.

Fig. 2 is an enlarged partial isometric view of the wall structure shown in Fig. 1.

Fig. 3 is a further enlarged partial isometric detail view of the longitudinal groove portion of a strip showing in dotted lines the longitudinal tongue portion of a subjacent strip interlocked with the groove portion.

Fig. 4 is a similar partial isometric view of the tongue portion of an adjoining strip prior to its being advanced to the interlocked position shown in dotted lines in Fig. 3.

Figs. 5, 6, 7, and 8 are cross-sectional detail views of the interlocking portions of a pair of strips, illustrating a series of phases in the process of joining the strips.

Fig. 9 is a greatly enlarged detail view of the cline contact sealing portion of the joint.

In the drawings Fig. 1 shows the invention embodied in the vertical siding as well as in the sloped roofing applied to the wall structure W and to the roof structure R respectively of a house frame structure thus diagrammatically indicated. That is, Fig. 1 shows the strips 11 assembled or emplaced to interlock with one another upon the wall structure W to constitute the siding, and strips 12 assembled or emplaced in interlocking fashion upon the roof structure R to constitute the roofing. The siding strips 11 are shaped to simulate clapboard, while the roofing strips 12 are shaped to more or less simulate roof shingles. Fig. 1 also shows the invention embodied in a top ridge strip or briefly termed ridge strip 13. The lowermost or bottom strip of the roofing constitutes what is herein called an eave strip 14.

The improved tongue-and-groove joints of this invention whereby the strips, that is the siding strips 11 as well as the roofing strips 12 interlock, are indicated in Fig. 1 by the general designation J.

The joint J is more clearly shown in the enlarged portion of the roofing in Fig. 2, while the mode of assembling and emplacing the strips and features involved in such assembly and emplacing appear from the further enlarged detail Figs. 3 and 4 as well as in the Figs. 5 to 9.

For the purpose of this invention it will suffice to describe the roofing strips 12 and the interlocking thereof.

A roofing strip 12 (referring now particularly to its untensioned condition in Fig. 2) comprises a body portion 15 formed with a top edge or tongue portion 16, and also formed with a bottom edge or grooved portion 17. The body portion 15 of the strip is transversely curved to present a concave side 15^a and a convex side 15^b. The tongue portion 16 comprises an overhanging flange or lip 18 at the concave side of the body portion 15, which lip (see Fig. 4) constitutes, generally speaking, an outward bulge or horizontally running ridge defining within it a space 19 open downwardly through a constriction or throat 20, this lip being resiliently depressible towards the body portion 15. The lip 18 is formed by a bend 21 and more in detail is herein shown to comprise a substantially vertical upper portion 22, an outwardly and downwardly inclined intermediate portion 23 which through a bend or rounded apex 24 terminates in an inwardly and downwardly inclined flange 25 hereinafter also termed a drip flange for reasons which will appear further below.

The groove portion 17 is formed by an S-shaped or double bend of the sheet metal of which the profile of this strip is formed by rolling. This double bend comprises a first bend 26 and a second bend 27, the latter bend forming an inverted groove 28 running horizontally at the convex side

of the body portion 15. The inner side or inner wall portion 29 of the groove 28 extends downwardly a distance k beyond the bend 26 thus merging with or terminating in a flange or skirt 30 provided with horizontal elongated nail holes 31. The outer side or outer wall portion 32 of the inverted groove 28 has at the lower end thereof a horizontally running inward bulge or rounded ridge 33 to form with the opposite side of the groove an entrance constriction or throat 34. The ridge 33 in fact merges with the first bend 26 forming therewith what may be called in cross-section a hollow bead-shaped profile.

Fig. 2 shows the still untensioned strip 12 to have its tongue portion 16 already interlocked with the groove portion 17 of a superjacent already fastened and emplaced and hence tensioned strip 12', the tensioned strip 12' otherwise being structurally similar to the as yet untensioned strip 12. The superjacent strip 12' is emplaced and fastened upon the roof structure R by reason of its tongue portion 35 interlocking with the groove portion 36 of the next higher strip 12'' which has its bottom flange or skirt 37 fastened to the roof structure R as by nails 38. Similarly the skirt 39 of the strip 12' is fastened to the roof structure R as by means of nails 40, and similarly the skirt 30 of the as yet untensioned strip 12 may be nailed down and fastened to the roof structure R as is indicated by the dot-and-dash line condition L of that strip. Fig. 2 shows clearly how in its untensioned condition the strip 12 curls or curves away from the roof structure R and how after fastening of its skirt 30 the curvature of its body portion 15 has become flattened as a result of the tensioning and fastening.

Referring to Figs. 3 and 4 and in particular to Figs. 5, 6, 7, and 8, there now will be described successive characteristic phases of the process of inserting the upper or tongue portion of a strip into the lower or groove portion of a superjacent companion strip to effect an interlocking connection in a moisture-repelling or moisture-blocking fashion.

Fig. 3 shows the lower or groove-forming portion of an emplaced strip, that is a strip similar to emplaced strip 12' of Fig. 2, while Fig. 4 shows the upper or tongue portion of a similar although untensioned strip, that is a strip similar to strip 12 of Fig. 2. Viewing Figs. 3 and 4 together the tongue portion 16 of Fig. 4 is about to be joined and interlocked with the groove portion 17 of Fig. 3, the interlocked condition of the Fig. 4 tongue portion being indicated in dot-and-dash line D in Fig. 3. Accordingly, the throat 20 in Fig. 4 because of the as yet unbiased condition of the lip 18 has a greater width w_1 than the width w_2 which that throat assumes when the lip has reached its Fig. 3 (dot-and-dash) biased condition.

The progressive phases of interlocking the strips are illustrated in Figs. 5, 6, 7, and 8.

In Fig. 5 the upper or tongue portion 41 of a strip is about to enter the groove 42 of a lower or groove portion 43 of a companion strip, that condition being indicated by an arrow 44, since the companion strip is shown to have already been emplaced upon wall or roof structure S. The tongue portion 41 because of the unbiased condition of the lip 45 thereof presents a throat of the width w_3.

In Fig. 6 the tongue portion 41 is shown to have been thrust upwardly into interlocking engagement with the groove portion 43 as far as it

will go, that is the tongue portion has been thrust upwardly to where the top end or bend 46 of the tongue portion touches the bottom 47 of the inverted groove 42. Consequently in passing from the Fig. 5 to the Fig. 6 position the tongue portion 41 must have its lip 45 depressed sufficiently to allow the apex 45a thereof to slip past the entrance constriction 42a of groove 42 to reach the Fig. 6 position where the apex 45a of the lip exerts pressure along a horizontal line of contact 46 upon the inner face 42b of the outer side portion 42c of the groove 42. The magnitude of this line-contact pressure is expressed by the fact that the throat T formed by the lip 45 is being diminished to the width w_4 due to the resilient depression of lip 45 when confined within the groove 42.

From the upwardly thrust limit position in Fig. 6 the inserted tongue portion 41 is then retracted slightly to the Fig. 7 position, this retraction being indicated by an arrow 47, that is the tongue portion is retracted downwardly sufficiently, namely a distance *d*, to cause (see enlarged detail Fig. 9) the apex 45a of lip 45 to engage the inside concavity 48 formed just above the entrance constriction of the inverted groove 42, so that a final pressure contact line 49 will now be firmly established by the tangential engagement of the apex 45a with the concavity 48, the radius r_1 of apex 45a being significantly smaller than the radius r_2 of the concavity 48. While being held in the Fig. 7 position the lower or subjacent strip of which tongue portion 41 is a part, is then tensioned and its emplacement on the roof structure S completed by having its lower edge portion or skirt (not shown) nailed down upon the structure S, the deformation or transverse bending of the strip to produce that tensioning being indicated by a transverse horizontal arrow 50 in Fig. 7. Such tensioning of the strip tends to press the tongue portion 41 outwardly, that is away from the structure S, as is indicated by the clearance 51 between the tongue portion 41 and the inner side portion 52 of inverted groove 42. Such tensioning which results from the emplacing and fastening of the strip imposes a corresponding additional sealing pressure upon the contact line 49 enhancing its moisture-sealing character.

In this final Fig. 8 position (see also Fig. 9) the inwardly and downwardly sloping drip flange 53 flares away from the convexity 48 formed just above the entrance constriction 42a of the inverted groove, so that between that convexity and the drip flange there is formed an upwardly and outwardly pointed or wedge-shaped space presenting a moisture-barring gap 54. As a result of the Fig. 8 condition of the interlocking parts the joint acquires a moisture-barring character not only because of the pressure contact exerted along the horizontal contact line 49 but also because of the moisture-diverting effect of the drip flange 53. That is to say, the capillary moisture-attracting effect or tendency of the contacting faces is reduced to a minimum by concentrating the sealing-pressure between the weather-exposed contact faces in a contact line, while simultaneously discouraging or diverting moisture collecting at the entrance constriction 42a of the groove 42 by means of the drip flange 53 which functions to direct collected moisture away from the contact line.

The dot-and-dash line frame F in Fig. 8 surrounds the line contact seal portion of the joint that is shown greatly enlarged in Fig. 9.

What I claim is:

1. As an article of manufacture a metal clapboard adapted to be emplaced by attachment to a frame structure in tongue-and-groove relationship with similar clapboards to constitute a wall covering, said clapboard having its lower edge portion formed with a substantially S-shaped double bend to form an inverted groove having as its inner wall portion a downwardly extending terminal flange adapted to be fastened to the frame structure, the upper edge of the clapboard comprising an outwardly overhanging downwardly extending horizontally running lip formed with an inwardly bent lower terminal portion, said lip with said edge portion constituting a horizontally running resiliently depressible ridge, said upper edge so dimensioned as to engage in the inverted groove of an associated superjacent clapboard in a manner whereby said ridge has pressure-engagement with the outer wall of the groove.

2. An article of manufacture according to claim 1, in which the S-shaped bend is formed with a bulge constituting an entrance restriction of the groove.

3. An article of manufacture according to claim 1, in which said overhanging lip comprises a substantially vertical upper portion, a downwardly and outwardly inclined intermediate portion and a substantially inwardly inclined terminal portion, said intermediate and said terminal portions constituting said ridge.

4. A clapboard wall covering of springy metal clapboards interlocked edge wise in tongue and groove relationship with the upper margin of each forming the tongue portion and the lower margin formed with an inverted groove portion terminating in a wall-contacting skirt, characterized in that the tongue portion includes a depending laterally overhanging lip terminating in an inwardly directed flange and provided with an outwardly reaching resiliently depressible linear ridge for interlocking pressure-engagement by line contact with the outer wall of the groove of an interlocked superjacent clapboard.

5. Wall covering according to claim 4, in which the groove portion is substantially S-shape in cross-section and is formed with a bulge constituting an entrance constriction for the groove.

6. Wall covering according to claim 5, in which the bulge on the S-shape provides a concavity upward of the bulge, and in which the tongue portion is sufficiently retractable when in the groove to allow the ridge to have tangential pressure-contact with the concavity of the bulge while the terminal flange of the lip diverges from the bulge.

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The following references are of record in the file of this patent:

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