June 29, 1954 H. W. HOLMSTROM ET AL 2,682,236

CONSTRUCTION UNIT

Filed Aug. 16, 1951 3 Sheets-Sheet 1

Fig. 1.

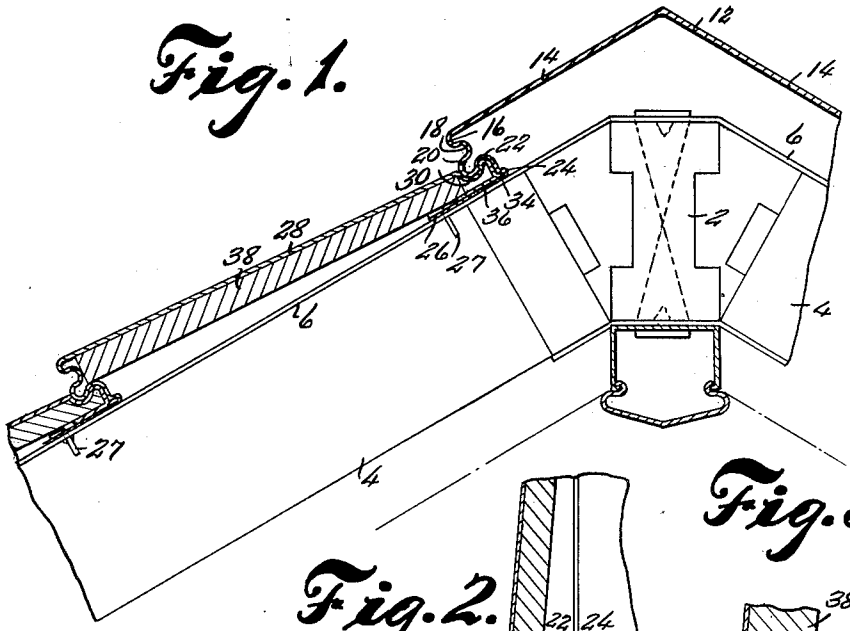


Fig. 3.

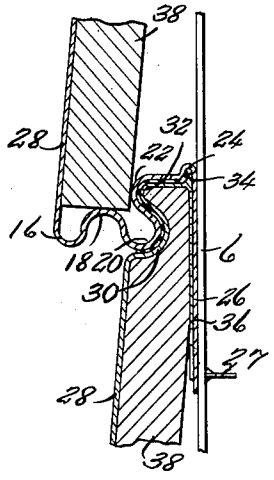


Fig. 2.

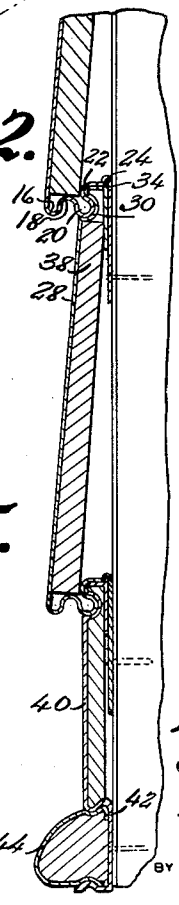


Fig. 4.

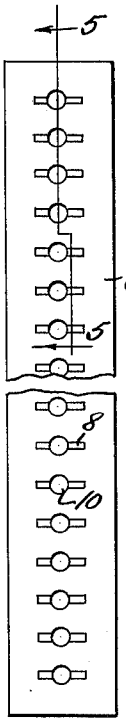


Fig. 5.



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CONSTRUCTION UNIT

Filed Aug. 16, 1951 3 Sheets-Sheet 2

Fig. 6.

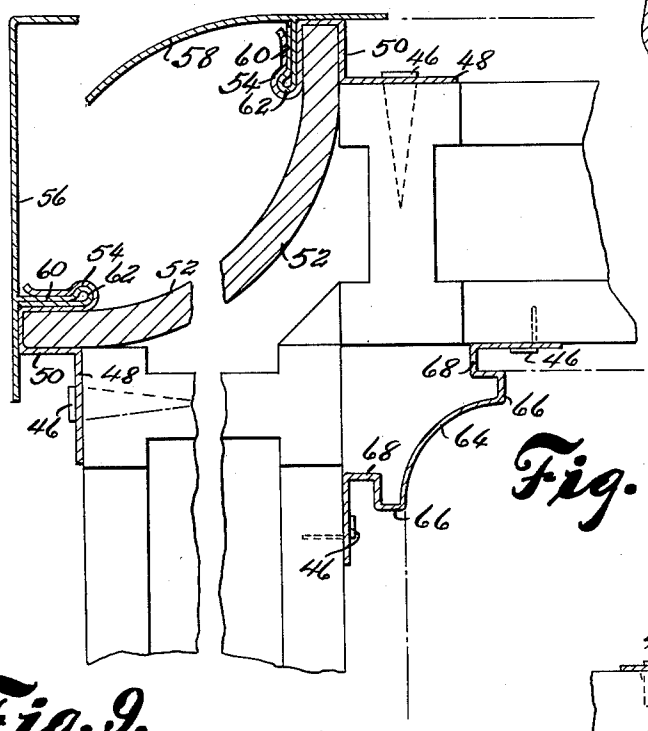


Fig. 7.

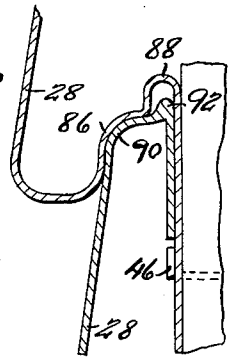


Fig. 10.

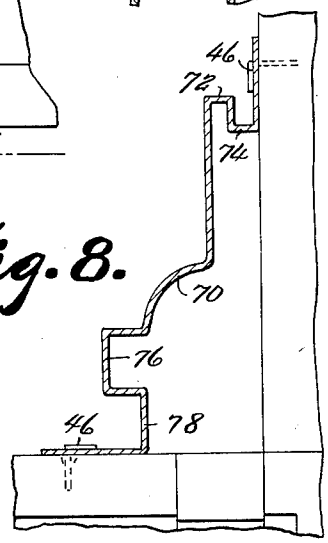


Fig. 8.

Fig. 9.

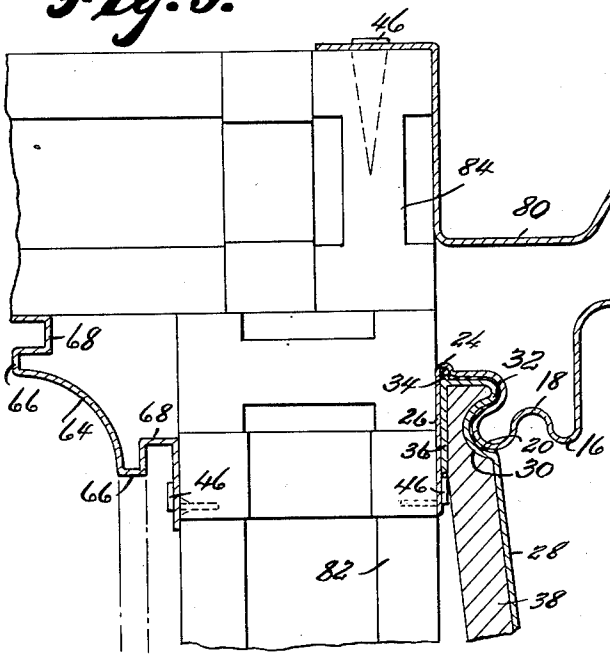
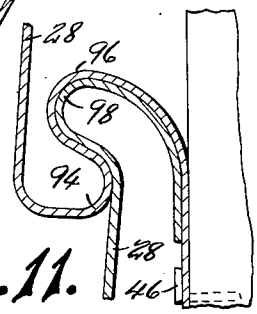


Fig. 11.



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CONSTRUCTION UNIT

Filed Aug. 16, 1951 3 Sheets-Sheet 3

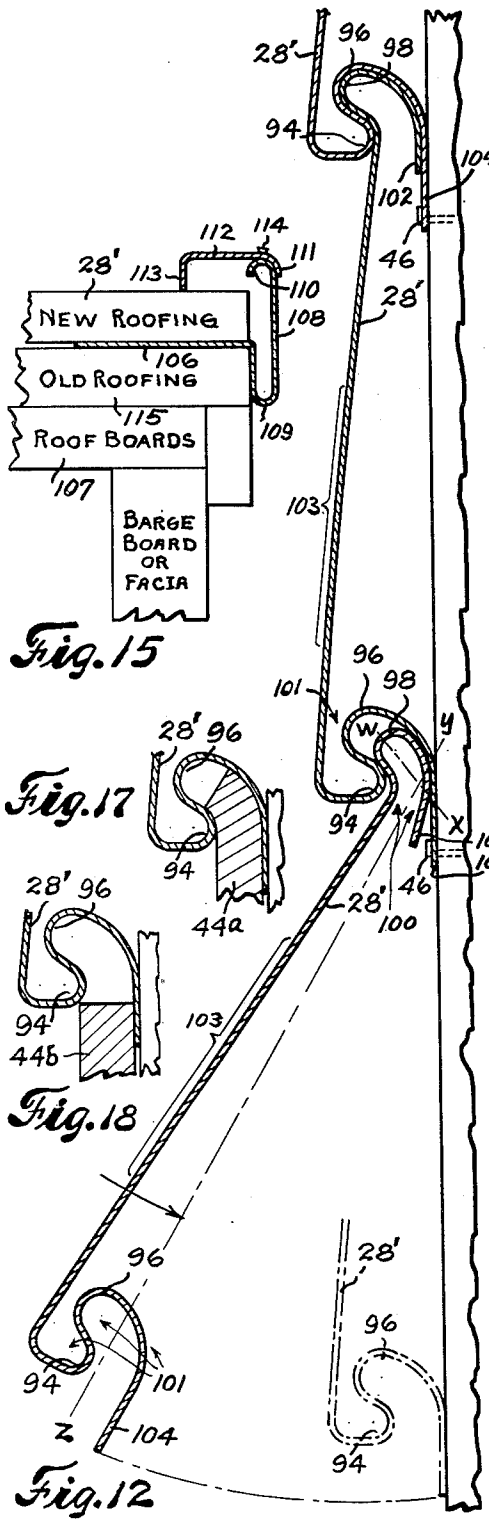


Fig. 15

Fig. 17

Fig. 18

Fig. 12

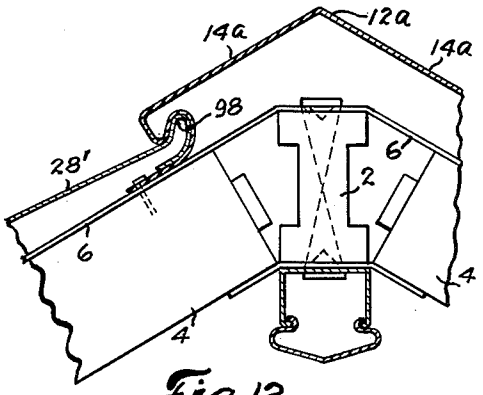


Fig. 13

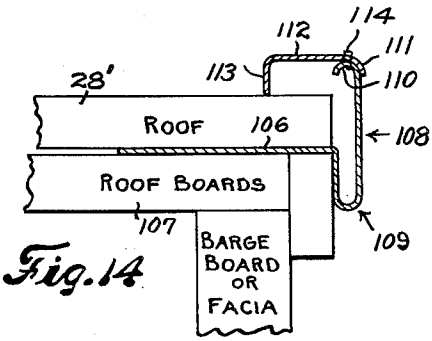


Fig. 14

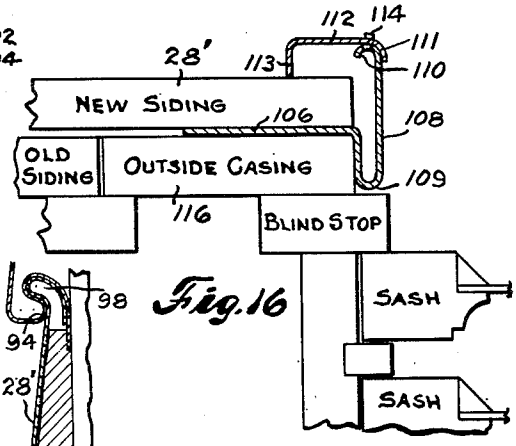


Fig. 16

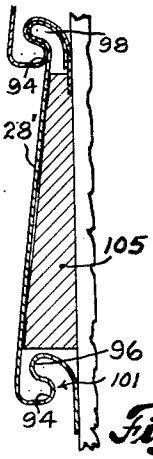


Fig. 19

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Patented June 29, 1954

2,682,236

UNITED STATES PATENT OFFICE

2,682,236

CONSTRUCTION UNIT

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Application August 16, 1951, Serial No. 242,054

11 Claims. (Cl. 108—17)

1

Our invention relates to a construction unit.

More particularly, our invention relates to a construction unit especially adapted for use in forming a roof or siding of a building. However, it is suitable for use in wall construction.

This application is a continuation-in-part of our application bearing Serial Number 764,868 filed July 30, 1947, now abandoned.

In using relatively thin and narrow metal sheets for roofing or siding, great difficulty arises in making weather tight joints. The invention must provide for expansion and contraction of the units when assembled due to exposure to the heat of the sun and the cold weather during the different seasons of the year. The securing of the units to the base, whether this be of wood or steel frame, all presents difficulties. The expansion and contraction works enlargement of the holes in the unit through which the nails or securing means pass, thereby permitting leaking in rainy weather unless provision is made to cover the same. Therefore, the forming of the joints must be characterized by affording protection against leaking and by being strong to resist strong winds.

The joints must be such that the parts of one unit must reinforce and assist the parts of the adjacent unit to remain securely anchored. This particular cooperation of the units in reinforcing each other to prevent unintentional removal as by a wind storm is most important. The holding force arising from the configuration or form of the edge portions must be such as to require a force to deform the configuration to release the parts of the joint of which force, the direction must be other than normal or right angles to the frame to which the units are secured. All this is more fully set forth hereinafter.

Moreover the installed units under the expansion due to the heat of the sun should all have the deformation of their faces more in the same direction. Clearly, if the faces of some of the units were actuated into a convex form and others into a concave form such would provide a very objectionable appearance to the structure on which they were secured. Difficulties incident to such expansion must be overcome.

Strength at the joints must also be such as to support a scaffolding or planking temporarily applied over the units of our invention, for example, in climbing over the roof in reaching a chimney for repair or other repairing.

Moreover, great difficulty arises in providing a unit such that the configuration employed to form the joints is of simple character and such as

2

to permit of a high degree of uniformity since the parts of different units must be caused to register with those of other units.

The primary purpose of our invention is to overcome all of these various difficulties set forth above as well as others inherent in the problem, and to provide a construction unit which is relatively simple of construction, economical to manufacture, and efficient.

Briefly stated, and therefore incompletely, our invention comprises a construction unit which has a first edge portion, i. e., the upper edge as the unit is normally applied, which is bent upon itself to form a projection having a spring-like construction, said projection corresponding to the upturned toe of a crow bar, so that in installing the unit this projection can be inserted into a recess of a second edge, i. e., the lower edge as the unit is normally applied, of the installed unit immediately above and the second or lower edge of the unit then forced down through an arc lik the crow bar handle in moving the said edge to anchoring position against the frame base. Such movement causes the first edge portion to become seated in forming a joint to secure the unit in place. Thereby, the outer face of the unit is placed under a tension as it assumes a slight convex form when the bottom edge is secured and anchored by fastening means to the frame work. The spring action of the projection contributes to a tight, strong joint as the bottom edge is secured to the frame.

For definiteness and clearness of description and illustration, our invention will be described as applied to roofing and siding and this, as is normal, where the units extend horizontally.

The above-mentioned general objects of our invention, together with others inherent in the same, are attained by the device illustrated in the following drawings, the same being preferred exemplary forms of embodiment of our invention, throughout which drawings like reference numerals indicate like parts:

Figure 1 is a vertical sectional view through the roof of a building showing the roofing panels of our invention;

Fig. 2 is a vertical sectional view of the panels as siding;

Fig. 3 is an enlarged detail view of the panels showing the securing and sealing structure;

Fig. 4 is a front view of the wedge receiving frame;

Fig. 5 is a sectional view at line 5—5 of Fig. 4;

Fig. 6 is a horizontal sectional view showing the application of a squared outside corner panel;

Fig. 7 is a similar view showing a rounded outside corner panel;

Fig. 8 is a sectional view showing an ornamental inside corner panel;

Fig. 9 is a sectional view showing the application of guttering;

Fig. 10 is a sectional view of a modified securing structure;

Fig 11 is a sectional view of a further modified form;

Fig. 12 is an enlarged view showing one unit embodying our invention installed and a second unit in the act of being applied;

Fig. 13 is a view in cross-section through the ridge of a roof and the installation of the first unit embodying our invention next to the ridge or peak cap;

Fig. 14 is a view in cross-section of the closure member applied to the ends of the units forming the roof;

Fig. 15 is a view of the construction when the units are installed on an old roofing;

Fig. 16 is a view in cross-section of the construction at a window opening;

Fig. 17 is a view of a modified form of the construction at the bottom of the siding employing a molding partially extending into the recess of the bottom unit;

Fig. 18 is a view of a further modified form of the bottom of the siding employing a plain flat rectangular finishing board; and

Fig. 19 is a view in cross-section of the construction unit provided with a supporting board.

Referring now to the drawings wherein we have illustrated the forms of our invention, we have shown a building structure having a ridge pole **2** carrying rafters **4** and secured by the metal strips **6**. These strips are slotted at **8** and formed with central circular openings **10**. The peak above the ridge pole is enclosed by cap **12** having downwardly inclined walls **14** each of which at its lower edge portion curves in at **16** to form grooves **18** and then in a compound curve is fashioned into the rounded ribs **20** and the adjoining groove **22**.

From this latter groove the cap is pressed or otherwise formed into a recess **24** connecting with the flat flange **26** which is slotted to receive the wedge **27** disclosed in Patent Number 2,154,570 or the wedge disclosed in Patent Number 2,508,066.

When the cap has been thus affixed the roofing and siding panels or units are positioned each consisting of the flat panel or unit **28** having an upper surface grooved at **30** to receive the rib **20** and ribbed at **32** to fit into the recess **22** and also ribbed at **34** to fit into the recess **24**. The flat flange **36** lies against the flange **26** but is not secured thereto. The lower edge of the panel is identical to the edge formation of the cap and thus starting at the top each panel is successively applied by first engaging its first or upper edge portion **100**, Fig. 12, to the unit above and then securing its lower edge portion **101** to the strips **6**. The interlocking ribbed and recessed portions of the panels are preferably covered with a sealing mastic compound, and, if desired, the panel structure may include an insulating board **38** suitably adhered to the panel.

As one form or method of applying the lowermost siding panel **40**, it may be provided with a spring flange **42** to receive a preformed molding **44** to give a finished appearance to the panelling. Or any suitable molding or finishing strip **44***a* may be secured over the bottom edge as shown

in Fig. 17. For a more simple construction a simple rectangular finishing strip or base board **44***b* could be used as shown in Fig. 18.

In Figs. 6 and 7 we have shown the framing to which are secured by wedges **46**, clips **48** having rectangular channels **50** to receive insulation board **52**, and the spring flanges **54** receive and retain the square corner piece **56** or the round corner piece **58** which are provided with integral flanges **60** having ribs **62** engaging therewith. An inside corner plate **64** is bent into a reverse U-shape forming tongue **66** and groove **68** into which groove plaster is keyed when applied to the wall.

Fig. 8 shows a floor molding **70** having the upper reversed U-shaped formation forming tongue **72** and groove **74** to receive and retain the wall plaster while the lower U-formation effects a rib **76** and recess **78** into which recess the flooring is secured.

Fig. 9 illustrates the manner of securing the eaves trough **80** to the studding **82** and floor joists **84** by wedges **46**, and the lower edge of the trough is identical to the described structure of the panels to receive and seal the uppermost panel of a wall where the form shown in Fig. 3 is employed.

Figs. 10 and 11 show modified forms of the locking structure for the panels and in Fig. 10 the lower end of the panel is recessed at **86** and **88** to receive the upper rounded top edge **90** of the lower panel, the nose **92** occupying only a portion of the latter recess which, if desired, may be filled with a mastic or sealing compound.

Fig. 11 shows a further modified and preferred form of locking structure where the second or lower edge portion **101** of the panel sheet or construction unit is bent substantially at right angles to and oppositely with respect to the outer face of the unit into a nose or rounded projection **94** and a recess **96** forming a configuration similar to that of the first or upper edge portion of the next lower panel which has an angularly disposed rounded projection **98** snugly fitting into the recess and when the lower edge portion **101** is pressed toward the wall, retained and anchored in locked position. The ridge peak cap **12***a* has inclined walls **14***a*, each of which has its lower edge portion provided with a configuration and form corresponding to the lower edge portion **101** of construction unit of the preferred form of Fig. 11.

This preferred form will now be described in more detail:

Referring particularly to Fig. 12 where two complete units A and B are illustrated, the construction unit as to edge portion **100** is bent upon itself to form a rounded projection **93** with the walls of the unit in spaced relation, thereby providing a projection, the axis WX of which is angularly disposed and upwardly projecting as respects the axis YZ of the construction unit.

The flange **102** of the first edge portion **100** is preferably angularly disposed to the plane of the face of the sheet, thereby providing a spring action when the first edge portion or bottom edge **101** of the sheet is forced back against the wall face in being positioned and secured to the face of the wall, thereby placing the outer face **103** of the unit under tension or into a slightly convex form.

The second or bottom edge portion **101** is turned substantially at right angles to the plane of the face of the unit, or is normally disposed thereto, and then continues in a configuration conforming

to that of the upper edge 100 to form a recess 96 into which the upper edge 100 in the form of projection 98 of the next succeeding unit may enter and the walls of the two be in registration.

It will be noted that this lower edge portion 101 extends beneath the lower portion of the face 103 of the unit and extends beyond the face 103, that is, beyond the portion of the face 103 which is bent at right angles, to provide a securing flange 104 to receive securing means, either nails or other fastening means 46, such as that provided in our Patent Number 2,154,579 granted April 18, 1939, and Patent Number 2,508,066 granted May 16, 1950. Thus, the securing means as 46 is covered and protected against exposure to the weather.

The ends of the construction units 28' are shown provided with a closure in Fig. 14 where new construction is involved. This closure comprises a strip 106 with a portion extending below roof boards 107 in order to provide for rain beating against the outer face 108 of strip 106 to drip off of the bent portion 109. The upper part of strip 106 has a bent portion 110 registering with a corresponding registering bent portion 111 of strip 112 which has a right angle flange 113 to make contact and ride upon portions of the construction units. These strips 106 and 112 will extend from the ridge pole to the eaves troughs and from the eaves troughs to the foundation. Strip or cap 112 is secured to strip 106 by means of fastening means 114 preferably of wedge form. The flange 113 may slide back and forth due to expansion upon the units 28'. This arrangement will leave a small V-shaped opening above the upper portion of each construction unit. This will provide for an indirect circulation of air.

Fig. 15 is a view for closing the end of the construction units 28', in all respects like that shown in Fig. 14, only in this case the construction involves application of the construction unit of our invention to old roofing 115.

In Fig. 16 the same construction of closure means as disclosed in Figs. 14 and 15 is shown as applied to the construction about a window opening where the strip 106 is held against the outside casing 116.

If desired, the construction unit of our invention may be placed over a supporting board 105 with or without mastic or other securing means whatsoever. If mastic or other securing means is employed then preferably the same is applied only along the upper and lower edges—see Fig. 19. Thus the central portion is free to absorb expansion forces by arching as heretofore set forth, and the supporting board functions also to dampen noise incident to the use of metal in construction units. The form of the joints also functions, by reason of its spring action, to lessen such noise. The construction of the joints of our invention is such as to cause the parts of one construction unit to reinforce and assist the parts of the adjacent unit to remain securely anchored, and thereby prevent removal in case of a severe wind storm. The force necessary for the removal of the unit of our invention is not that at right angles to the roof or wall. In order to remove or unjoint the construction unit the force must be directed substantially parallel to the face and this simultaneously with the swinging up of the lower edge portion. In other words, it must be the reverse of the movement of the parts in installing. Thus is evident the firm anchoring provided by the joints of our invention. Any force directed at right angles to the face 103 of the construction unit of our invention operates to augment the locking action of the joints and make the parts cooperate with the joint-forming parts of the adjacent units in resisting dislodgement. This is brought out clearly by referring to Fig. 12. Any outward movement of the face 103 of the construction unit causes it to bind tightly upon the projection portion 94 of the upper adjacent unit and such force tends to make the lower edge bind tightly upon the projection portion 98 of the next lower unit. Since the flange 104 is anchored to the wall at the joint by securing means it is manifest now great must be the magnitude of force to unseat the installed units, the securing means in conjunction with the joint parts all cooperating to make the same fast. Fig. 12 illustrates the construction when no supporting board is employed.

Mode of operation

Referring to Fig. 12 where two complete units A and B are illustrated, it will be noted that the upper unit A is secured in position. We will now describe the securing of such a unit in position. The lower unit B is shown in Fig. 12 in the act of being applied. The projection 98 of unit B is slipped under the nose 94 of the unit A and then force is applied to the lower portion of unit B and it is forced down, i, e., back to the wall in the direction of the arrow. In so doing, there is a prying action against the portion 90 of unit A and the angular disposition of the projection 98 of the upper edge 100 forms a spring which causes the projection 98 to fit snugly within the recess 96. As the prying action proceeds in forcing the lower edge portion into position against the wall, an outwardly bowing tension is imposed upon the face 103 of unit B. When the securing flange 104 of unit B is forced against the wall, it is secured by a nail or other securing means 46. Thus, it will be noted that the face of the unit is under an outwardly directed tension and any heating of the sun which becomes sufficient to cause expansion will cause the face 103 to uniformly extend outwardly rather than inwardly towards the roof or side of the building, thereby making the whole construction of the roof or siding of a uniform character in appearance and in reflecting light. In this way the expansion and contraction of the metal is provided for in large measure. The construction unit initially may be formed with a slight convex face if desired, thereby augmenting such convex or arching form. Such arching greatly strengthens the unit and functions to prevent deformation as well as otherwise. Also, there is the further provision for absorbing expansion forces made by the bending at right angles of the lower edge portion in forming the nose or rounded projection 94 so that if extreme heat is applied the sheet may not only arch as to its face but it may extend downwardly.

The registering of the projection 98 on the upper edge of the construction unit with the recess 96 forms a reinforced joint structure of exceedingly great strength even though the metal of the unit itself is of relatively very thin and flexible material. By our invention the metal is provided in four-fold form at the joint and provides for a support for any ladder or any structure that may be placed over the roof in seeking to reach a chimney or other like structure, or for any repair that may be involved.

Particularly be it noted that the structural unit of our invention is applied from the ridge-

pole downwardly to the eaves, directly contrary to the shingle laying, or other roofing or siding methods of common practice.

The material forming the construction unit of our invention may be of any suitable material. Presently aluminum is preferred of the metals.

From the above it will be seen that our invention is applicable to new structures and to old structures and provides an efficient construction unit with exceptional advantages.

We claim:

1. A roof-siding construction unit comprising a relatively narrow strip having an inner and outer face and first longitudinal edge portion bent cross sectionally considered in spaced relation upon itself forming a rounded projection upwardly angularly disposed with respect to the outer face of the unit, the said first edge portion being bent beneath and extending rectilinearly beyond said projection; and a second edge portion longitudinally paralleling said first edge portion bent substantially at right angles to and oppositely with respect to the general plane of the outer face of the unit in forming a projection beneath and continuing in a curve beneath the inner face which matches the configuration of said first edge portion with the second edge portion extending beyond the face of the unit in forming a securing anchoring means.

2. A roof-siding construction unit comprising a relatively narrow strip having a first longitudinal edge portion bent cross sectionally considered in spaced relation upon itself forming a rounded projection angularly disposed with respect to and extending above the outer face of the unit, said first edge portion being bent beneath and extending rectilinearly beyond said projection; and a second edge portion paralleling said first edge portion bent substantially at right angles to and oppositely with respect to the outer face of the unit in forming a projection beneath and continuing in a curve beneath the inner face in a configuration conforming to that of the first edge portion with the second edge portion extending beyond the face of the unit in forming a securing anchoring means.

3. A roof-siding construction unit comprising a relatively narrow strip having a first longitudinal edge portion bent cross sectionally considered in spaced relation upon itself forming a rounded projection angularly disposed with respect to and extending above the outer face of the unit, said first edge portion being bent beneath and extending rectilinearly beyond said projection in forming a spring portion; and a second edge portion paralleling said first edge portion bent substantially at right angles to and oppositely with respect to the outer face of the unit in forming a projection beneath and continuing in a curve beneath the inner face in a configuration conforming to that of the first edge portion with the second edge portion extending beyond the face of the unit in forming a securing anchoring means.

4. A roof-siding construction unit comprising a relatively narrow strip having a first longitudinal edge portion bent cross sectionally considered in spaced relation upon itself forming a rounded projection angularly disposed with respect to and extending above the outer face of the unit, said first edge portion being bent beneath and extending rectilinearly beyond said projection in a generally diverging direction with respect to the face in forming a spring portion; and a second edge portion paralleling said first edge portion bent substantially at right angles to and oppositely with respect to the outer face of the unit in forming a projection beneath and continuing in a curve beneath the inner face in a configuration conforming to that of the first edge portion with the second edge portion extending beyond the face of the unit in forming a securing anchoring means.

5. A roof-siding construction unit comprising a relatively narrow strip having a first longitudinal edge portion bent cross sectionally considered in spaced relation upon itself forming a rounded projection angularly disposed with respect to and extending above the outer face of convex form of the unit, said first edge portion being bent beneath and extending rectilinearly beyond said projection; and a second edge portion paralleling said first edge portion bent substantially at right angles to and oppositely with respect to the outer convex face of the unit in forming a projection beneath and continuing in a curve beneath the inner face in a configuration conforming to that of the first edge portion with the second edge portion extending beyond the face of the unit in forming a securing anchoring means which anchoring means imparts a convex form to the face of the unit.

6. A roof-siding construction unit comprising a relatively narrow strip having a first longitudinal edge portion bent cross sectionally considered in spaced relation upon itself forming a rounded projection angularly disposed with respect to and extending above the outer face of a convex form of the unit, said first edge portion being bent beneath and extending rectilinearly beyond said projection in forming a spring portion; and a second edge portion paralleling said first edge portion bent substantially at right angles to and oppositely with respect to the outer convex face of the unit and forming a projection beneath and continuing in a curve beneath the inner face in a configuration conforming to that of the first edge portion with the second edge portion extending beyond the face of the unit in forming a securing anchoring means which anchoring means imparts a convex form to the face of the unit.

7. In a building construction, a plurality of panels interlocked together, each of said panels being provided with a groove on its upper front face, a first rib arranged on the upper frontal corner of said panel, a first flat flange extending downwardly from the lower rear side of the panel and being arranged substantially parallel to the panel and spaced therefrom, a second rib at the lower rear corner of said panel, spaced from said flange and providing a recess therebetween, said recess adapted to receive the first-named rib on said upper frontal corner of a lower panel and said second rib adapted to seat in said first-mentioned groove.

8. A roofing-siding construction unit comprising an elongated sheet of resilient material having an upper and lower edge and outer and inner faces, said sheet along the upper longitudinal edge thereof terminating in an upwardly, as respects the outer face, and outwardly rounded nose portion having the terminal edge thereof downwardly and rearwardly turned to form a resilient bearing seat, the lower longitudinal edge of said sheet being turned upon itself in spaced relation to form a recess complemental to said nose portion and having the terminal edge thereof rearwardly and downwardly turned to form an attachment flange.

9. A roofing-siding construction unit compris-

ing an elongated sheet of resilient material having an upper and lower edge and outer and inner faces, said sheet along the upper longitudinal edge thereof terminating in an upwardly, as respects the outer face, rounded nose portion having its walls in spaced relation and having the terminal edge thereof downwardly and rearwardly turned to form a resilient bearing seat, the lower longitudinal edge of said sheet being turned upon itself in spaced relation to form a recess complemental to said nose portion and having the terminal edge thereof rearwardly and downwardly turned to form an attachment flange.

10. A roofing-siding construction unit comprising an elongated sheet of resilient material having an upper and lower edge and outer and inner faces, said sheet along the upper longitudinal edge thereof terminating in an upwardly, as respects the outer face, and outwardly rounded nose portion having the terminal edge thereof downwardly and rearwardly turned to form a resilient bearing seat, the lower longitudinal edge of said sheet being normal away from the outer face and turned upon itself in spaced relation to form a recess complemental to said nose portion and having the terminal edge thereof rearwardly and downwardly turned to form an attachment flange.

11. A structure comprising a plurality of interlocked panels having upper and lower edge portions and outer and inner faces, each of said panels having its upper edge portion bent in forming a spaced apart walled projection extending upwardly as respects the outer face with the rearward wall extending backwardly beneath said projection towards said lower edge portion in forming a resilient bearing to said projection; and said lower edge portion bent in forming a recess beneath said inner face of like close fitting configuration to said projection of the upper edge portion and attached to said panel by a portion extending substantially at right angles to said outer face, in which recess is received the projection of the adjacent lower panel whereby in assembled form the outer face is placed under tension.

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