United States Patent

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[54] **SHEET METAL ROOFING/SIDING SYSTEM WITH SEPARABLE FASTENER**

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[52] **U.S. Cl.** **52/545**, 52/546, 52/551

[51] **Int. Cl.** **E04d 1/34**

[58] **Field of Search**.....52/520, 521, 543, 545, 551, 52/552, 544, 546, 547, 549, 550

[56] **References Cited**

UNITED STATES PATENTS

362,246	5/1887	Brown, Jr.	52/521
2,126,676	8/1938	Thomas	52/545
2,245,785	6/1941	Jentzer, Jr.	52/544
953,217	3/1910	Moffett	52/520
2,182,523	12/1939	Markowski	52/547
3,418,777	12/1968	Gillis	52/514
3,380,214	4/1968	Stevens	52/551
695,523	3/1902	Williams	52/520

FOREIGN PATENTS OR APPLICATIONS

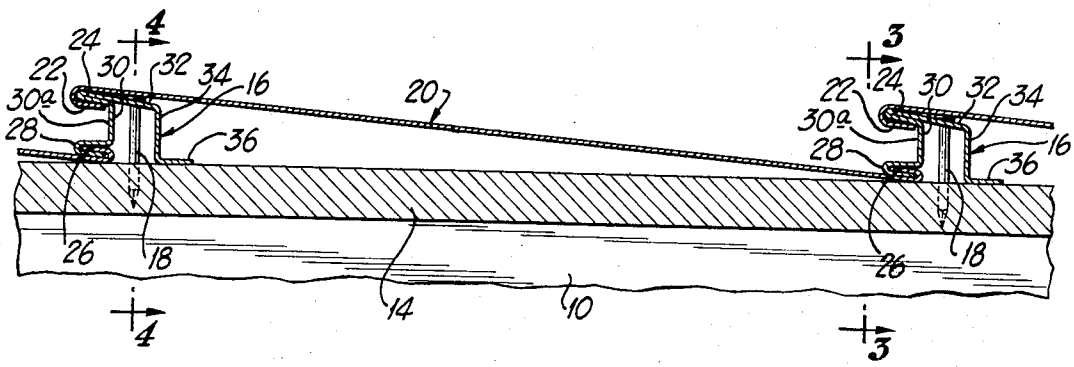
77,985	1/1949	Czechoslovakia	52/520
8,907	1/1886	Great Britain	52/520

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[57] **ABSTRACT**

A sheet metal roofing/siding system for application on the sheathing substrate of a building wall or roof structure comprising an elongated joint strip secured to said structure in combination with a pair of elongated panel members interlocked with the joint strip to form a watertight cover. The elongated joint strips are secured to the sheathing substrate of the building structure in parallel, spaced apart configuration and the panel members are interlocked with the joint strips along upper and lower marginal edges to provide a lap siding type appearance which is watertight and easy to install and apply.

5 Claims, 5 Drawing Figures



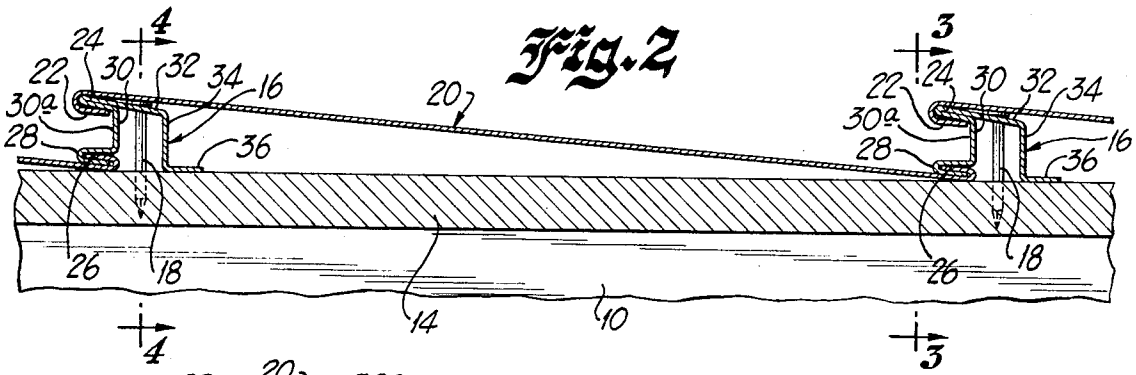


Fig. 2

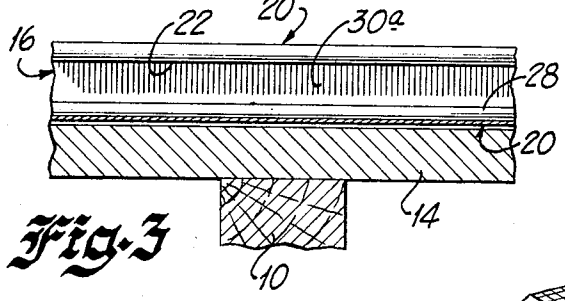


Fig. 3

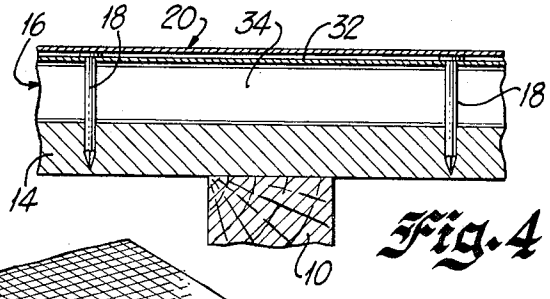


Fig. 4

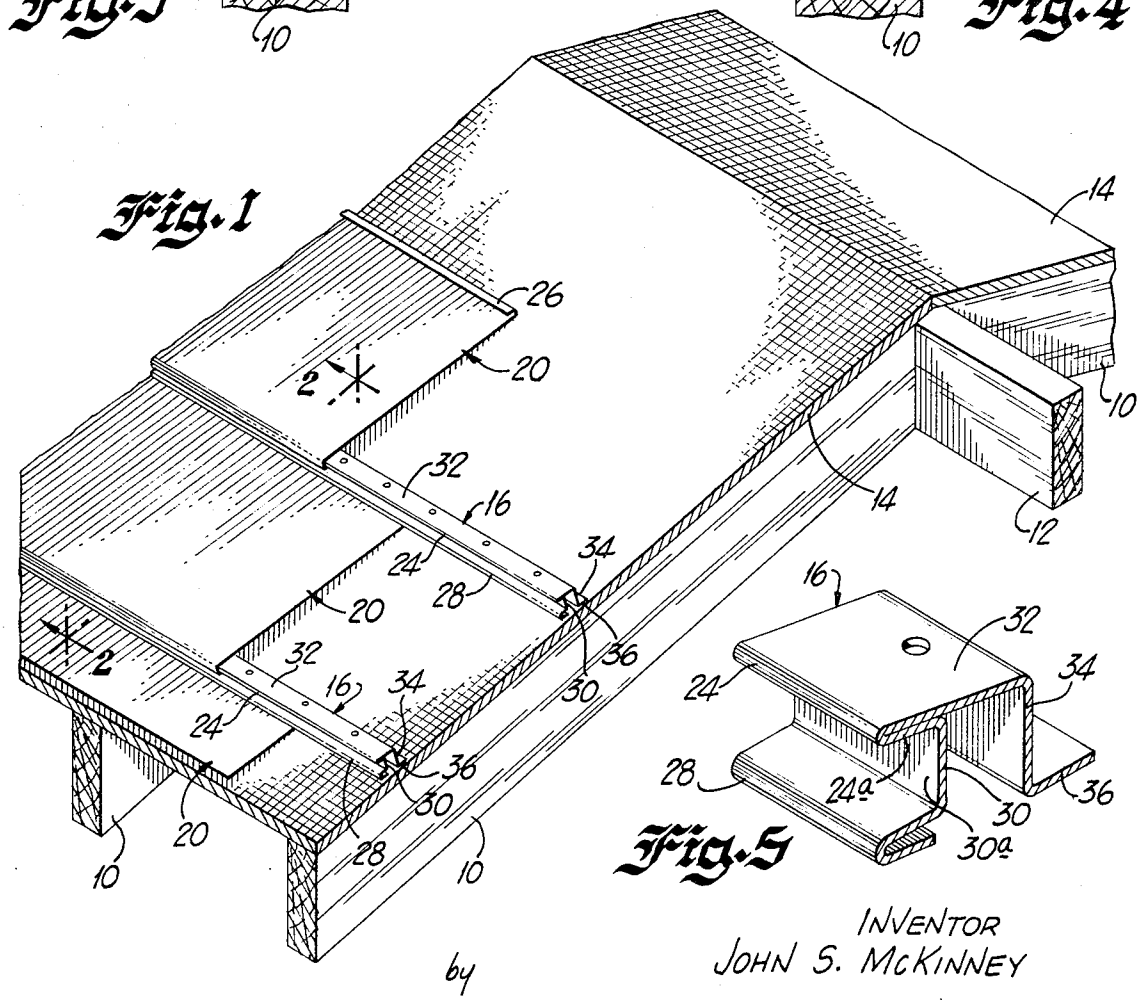


Fig. 1

Fig. 5

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SHEET METAL ROOFING/SIDING SYSTEM WITH SEPARABLE FASTENER

The present invention is directed toward a new and improved sheet metal roofing/siding system for application on the sheathing substrate of an external wall or roof building structure, and the like. In the past, aluminum and other sheet metal roofing has required the use of standing seams or V bends in order to provide a means for a watertight closure seal. These standing seams of prior sheet metal roof applications are generally not acceptable to residential buyers from the standpoint of appearance, although such systems have been widely used in industrial structures. Some attempts have been made to provide sheet metal roofing which imitates wood in appearance, and in the past these have met with definite limitations of application because of the additional requirements for using plastic film or asphalt waterproofing membranes in order to have positive assurance of a watertight construction. Because of the problem of water leakage encountered with prior aluminum or sheet metal shingle panels for roofing and the like, many codes and building practices have limited the use of such shingle panels to roof pitches in excess of 4 in 12. In addition, conventional aluminum siding, as widely used, has not been acceptable as a roofing system because of the water leakage problems.

It is thus desirable and an object of the present invention to provide an aluminum or other sheet metal roofing/siding system which is closely oriented in appearance to conventional wood or other widely used roofing/siding materials including, for example, shakes, wood shingles, or lap siding.

Another object of the present invention is to provide an aluminum or other sheet metal roofing/siding system which provides a watertight seal suitable for use on low pitch roofs without requiring the use of additional waterproofing membranes of asphaltic materials or plastic films.

Yet another object of the present invention is to provide an aluminum or sheet metal roofing system which eliminates the requirement for standing seams or V bends as provided in presently available roof systems for insuring a positive seal against water leakage.

Still another object of the present invention is to provide an aluminum or sheet metal roofing system and which is not limited only to roof pitches above 4 in 12.

Another object of the present invention is to provide a new and improved roofing/siding system of the character described wherein panels of relatively long length are employed, thus eliminating a high percentage of the side laps which would otherwise be required in an ordinary short length metal shingle system.

Another object of the present application is to provide a new and improved sheet metal roofing/siding system of the character described which employs an elongated joint strip which is positively interlocked with the opposite edges of elongated panel strips and provides a neat appearing, easy to install system that is watertight and does not require the use of plastic film or asphaltic membranes thereunder for waterproofing the system.

A further object of the present invention is to provide a new and improved sheet metal roofing/siding system wherein interlocking watertight joints are

established between elongated joint strips and panels connected therewith, which joints can accommodate contraction and expansion as the ambient temperature changes.

The foregoing and other objects and advantages of the present invention are accomplished in an illustrated embodiment thereof comprising a new and improved sheet metal roofing/siding system for application on the sheeting substrate of a building roof or wall structure. The roofing/siding system comprises an elongated joint strip which is adapted to be independently secured to the substrate of the building with fasteners and elongated sheet metal panels interlockable along opposite edges with the joint strip. The panels include marginal edge portions along opposite longitudinal edges which are bent or folded in opposite directions inwardly and outwardly with respect to the outer exposed surface of the panels for interlocking engagement with the joint strip. The joint strip is channel shaped generally and includes a pair of legs extending transversely outward of the building structure substrate. The lower surface of the lower leg is exposed to the weather and includes an interlocking structure along its lower edge of U-shaped cross section for interlocking engagement with the outwardly folded marginal edge portion along the upper edge of a panel. The lower leg joins an upper flange portion along its upper edge which extends transversely and downwardly of the exposed surface of the leg for interlocking engagement with the inwardly folded marginal edge portion along the lower edge of a panel. The system is easy to install and provides a watertight seal or lock between the panels and joint strip without the requirement for an under-laying film of plastic material or a membrane of asphaltic material, as previously required. Moreover, long sheets of paneling may be utilized, thus eliminating a high percentage of side laps which are resent in prior sheet metal roofing shingle systems.

For a better understanding of the invention, reference should be had to the following detailed description and claims taken in conjunction with the drawings, in which:

FIG. 1 illustrates a typical roof structure having installed thereon an aluminum roofing/siding system in accordance with the features of the present invention;

FIG. 2 is a fragmentary, vertical cross-sectional view taken substantially along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary cross-sectional view taken substantially along line 3—3 of FIG. 2 illustrating the underside of the joint strip and the lower edge of an interlocking panel section;

FIG. 4 is a fragmentary, cross-sectional view taken substantially along line 4—4 of FIG. 2 illustrating how the joing strip is secured in place on the structure; and

FIG. 5 is a fragmentary, perspective view illustrating a short segment of a joint strip of the roofing/siding system constructed in accordance with the features of the present invention.

Referring now more particularly to the drawings, in FIG. 1 is illustrated a sloping roof structure for a building or the like employing a plurality of spaced-apart rafters 10 which abut with a ridge member 12 at their upper ends. The slope or pitch of the rafters may be less than 4 in 12 because of the watertight construction of the roofing/siding system of the present invention, and

the pitch or slope may be as low as 1 in 12 without water leakage problems. Sheathing board, such as insulating sheathing or plywood 14, is applied to the rafters 10 and ridge 12 in a conventional manner and, in accordance with the present invention, it is not necessary or a requirement to apply a separate water seal, such as a polyethylene film, polyvinyl chloride film, or asphaltic paper on the sheathing substrate beneath the roofing system in order to insure a watertight seal.

In accordance with the features of the present invention, a new and improved roofing/siding system comprises a plurality of elongated joint strips referred to generally by the reference numeral 16, which strips are secured to the roof sheathing 14 in parallel, spaced-apart, horizontal rows by means of conventional roofing nails 18, or other suitable fasteners. The joint strips 16 are interlocked with elongated roofing/siding panels 20, which are formed of aluminum or other sheet metal. The panels are dimensioned to convenient lengths and widths, for example, 8 inches wide by 12 feet long, and are formed with folded-over, marginal, interlocking edge portions 22 and 26 along the lower and upper longitudinal edges. The interlocking edge portion 22 of each panel is adapted to engage in a watertight, interlocked relation with a flange portion 24 on the joint strip 16, as shown in FIG. 2. The marginal edge portion 22, along the lower edge of the panels 20, is folded inwardly with respect to the outer surface of the panel toward the sheathing substrate 14 on which the roofing/siding system is installed and the exposed, outer surface of the panels thus presents a smooth outer face for better appearance and water shedding. Along the upper edge of the panels 20, a marginal edge portion 26 is adapted for interlocking, watertight engagement with a U-shaped interlocking structure 28, formed along the lower edge of the lower leg of the joint strips 16. The marginal edge portion 26 along the upper edge of the panels 20 is similar to the edge portion 22 along the lower edge of the panels, except that the portion 26 is folded outwardly away from the sheathing substrate 14. It will thus be seen from FIG. 2 that the roofing/siding panels 20 are interlocked with the joint strips 16 along the entire length thereof along both upper and lower edges to provide a watertight sealing relation which does not require an additional waterproof film or membrane over the sheathing structure 14 beneath the roofing/siding system, as previously required.

The joint strips 16 are formed, as best shown in FIG. 5, in a generally U-shaped or channel-type cross section including a lower leg 30 having a downwardly facing, exposed outer surface 30*a*. Along the lower edge of the lower leg 30, the U-shaped, interlocking flange structure 28 is provided for interlocking engagement with the marginal edge portion 26 along the upper edge of the roofing/siding panels 20. Along the upper edge of the lower leg 30 of the joint strips, the flange 24 is formed and this flange comprises an under or lower portion 24*a* and a folded-over, upper bight portion 32 having spaced-apart holes therein for receiving the nails 18 or other fasteners utilized for holding the joint strip 16 in place. The bight portion 32 joins the upper leg 34 of the joint strip which is substrateably parallel with the lower leg 30, and along its lower edge the leg 34 is provided with a right-angle base flange 36 which is adapted to bear against the surface of the sheathing substrate 14, as best shown in FIG. 2.

In applying the roofing/siding system of the present invention, a first joint strip 16 is secured in place along the lower edge of the roof or wall structure on the sheathing substrate 14 by means of nails 18 or other suitable fasteners. A first roofing/siding panel 20 is then slipped into place with the lower U-shaped marginal interlocking edge portion 22 thereof engaging the downwardly extending flange portion 24 of the joint strip. Once interlocking engagement is established, the panel 22 is urged upwardly to provide a good watertight seal between the lower marginal edge portion 22 and the flange 24. A second joint strip 16 is then moved into place with its lower, U-shaped, interlocking flange portion 28 engaged in interlocked relation with the upper marginal edge portion 26 on the upper edge of the panel 20. Once engagement is established, the joint strip 16 is urged upwardly to insure interlocking engagement between the panel and the first and second joint strips. Nails or other fasteners 18 are applied to hold the second joint strip in place on the sheathing substrate, and the process is continued until the building roof or wall structure is covered.

In the event the roofing/siding application is accomplished in warm weather, the exposed width of surface on the outer face of the roofing/siding panels 20 may be reduced slightly below a maximum during the installation of the panel in order to accommodate future contraction of the panels when freezing and colder weather is encountered later on. However, because the lower leg 30 of the joint strip is not nailed to the building structure, it can flex relative to the bight portion 32, and the lower interlocking structure 28 moves up and down as expansion and contraction occur. The interlocking seal is thus maintained continuously along both the upper and lower edges of each panel regardless of the ambient temperature conditions and the resultant expansion and contraction. Moreover, the nail heads are completely hidden from view, and strong mechanical attachment of the roofing/siding system to the building structure is provided to resist wind and weather.

The roofing/siding system of the present invention may be easily and rapidly installed with minimum labor and is neat in appearance. In addition, the joint strip 16 provides a convenient and strong support for interlocking together pairs of adjacent siding/roofing panels 20, and the interlocking arrangement provides a watertight joint between the joint strips and the panels so that prior limitations or installations for low pitch roofs can be reduced. Moreover, requirements for waterproof films or membranes under the roofing system may be eliminated, and expansion and contraction problems are accommodated without incurring leakage problems. The roofing/siding panels 20 are lapped over slightly at the ends when joined end-to end, but because of the relatively long length of the panels the number of end laps is greatly reduced, thus eliminating the possibility of leakage occurring around end laps.

While there has been illustrated and described a single embodiment of the present invention, it will be appreciated that numerous changes and modifications will occur to those skilled in the art, and it is intended in the appended claims to cover all those changes and

modifications which fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A sheet metal roofing and siding system for application on the sheathing substrate of a building structure comprising an elongated continuous joint strip adapted to be secured to said substrate and at least one elongated sheet metal panel interlockable with said joint strip, said panel including marginal edge portions folded in opposite directions, one edge portion extending downwardly and inwardly and an outer edge portion extending upwardly and inwardly to define reverse bends for interlocking engagement with said joint strip, said joint strip including a leg extending transversely outward of said substrate and having an exteriorly exposed surface, said leg including structure along the lower edge defining a channel opening in a first direction for interlocking engagement with the upwardly and inwardly folded marginal edge portion along one edge of a panel, said leg including an upper flange along an upper edge extending transversely and outwardly thereof for interlocking engagement with the folded marginal edge portion along an edge of an adjacent panel.

2. The system of claim 1, including a pair of said joint strips in spaced parallel relation, one of said panels interlocked along its lower inwardly folded marginal edge portion with the upper flange of a lower one of said joint strips, the upper inwardly folded marginal edge portion of said one panel interlocked with the channel along the lower edge of the leg of the upper one of said joint strips.

3. The system of claim 1 wherein said joint strip is of generally channel-shaped cross section and includes a second leg spaced from said first mentioned leg by a bight portion.

4. The system of claim 3 wherein said second leg includes a flange along the lower edge transverse thereof for bearing against the substrate on which said joint strip is mounted.

5. The system of claim 1 wherein said flange and said channel along the lower edge of said leg are parallel and project outwardly of said exteriorly exposed surface of said leg.

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