Jan. 13, 1970 K. GOBEL 3,488,902

ROOFING SHEET-ANCHORING APPARATUS

Filed May 1, 1968 2 Sheets-Sheet 1

Fig. 1.

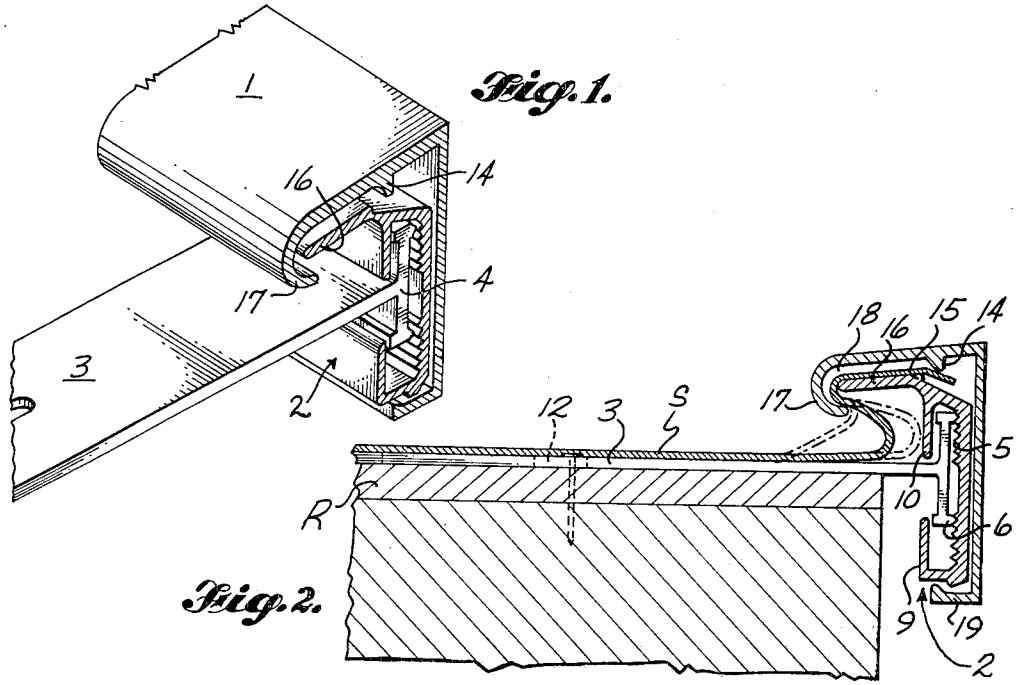

Fig. 2.

Fig. 3.

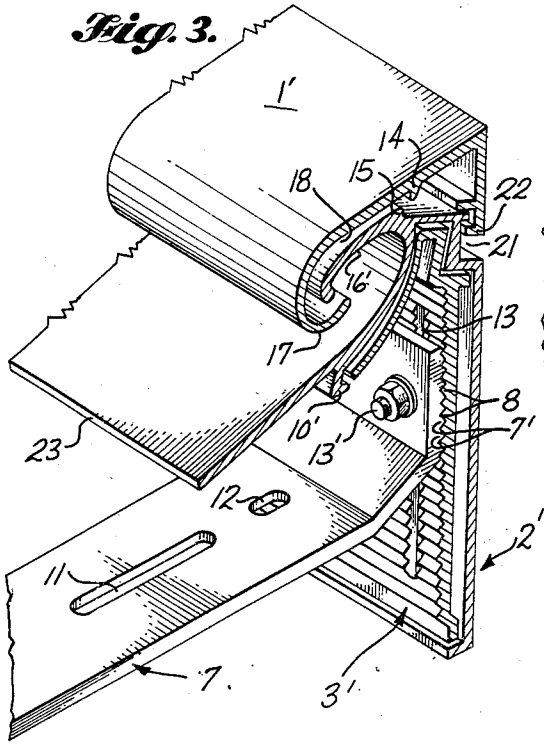

Fig. 4.

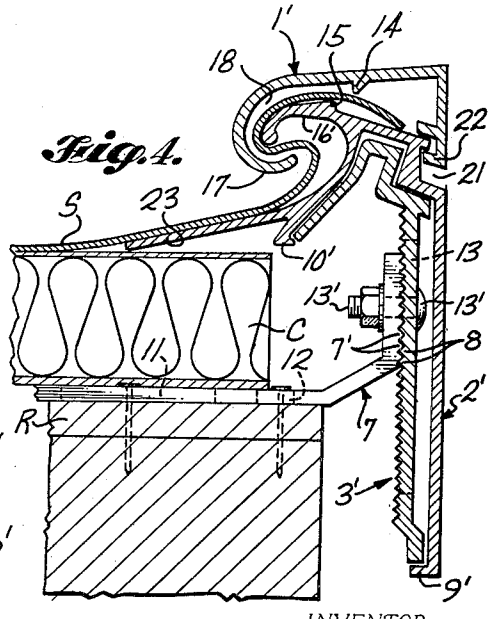

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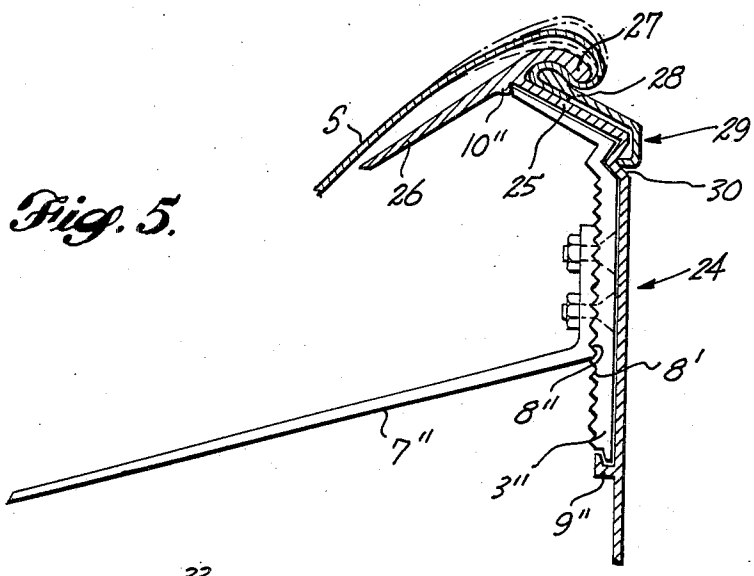
Fig. 5.



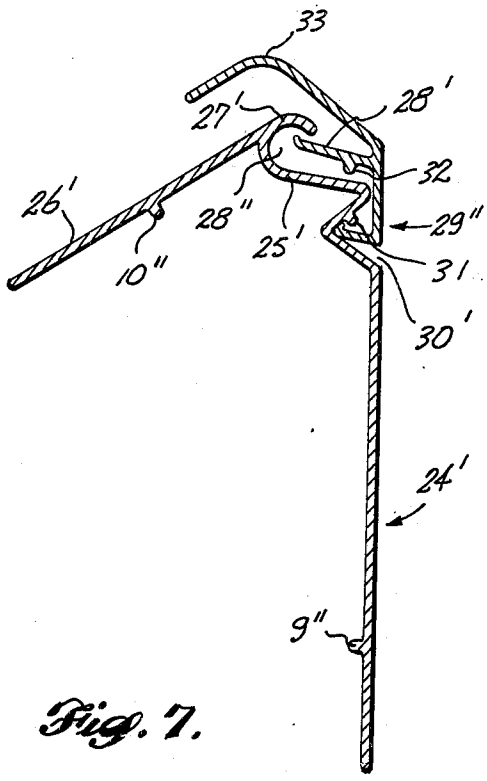


Fig. 7.

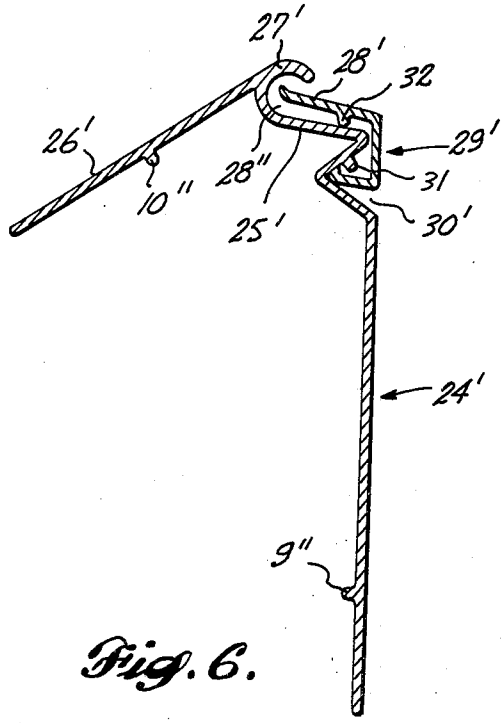


Fig. 6.

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ROOFING SHEET-ANCHORING APPARATUS

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Continuation-in-part of applications Ser. No. 397,184, Sept. 17, 1964, and Ser. No. 602,067, Dec. 15, 1966.
This application May 1, 1968, Ser. No. 725,866
Claims priority, application Germany, Dec. 6, 1963, G 39,338; Jan. 11, 1966, G 45,678
Int. Cl. E04b 7/00; E04d 13/00, 13/14
U.S. Cl. 52—94 12 Claims

ABSTRACT OF THE DISCLOSURE

A holder attached to roof sheathing secures an inner section and a complemental outer section. The inner and outer sections provide a space between them for receiving the edge of a roofing sheet formed into a reverse bend which includes first and second folds. The reverse bend may be upstanding above the general upper surface of the sheet and its first fold is inserted between a tongue and groove formed by the complemental sections which extend inwardly from the roof edge. The second fold of the bend is unrestrained, to be varied in size corresponding to the expansion or contraction of the sheet in response to temperature changes. Alternatively the marginal portion of the roofing sheet is supported a substantial distance above the roof and the return bend extends downwardly toward the roof with the first fold clamped between the tongue and groove portions of the complemental sections. The reverse bend of the roofing sheet edge and the portions of the complemental sections enclosing the roof edge prevent entry of water and wind between the roofing sheet edge and the roof sheathing.

This application is a continuation-in-part of the application of my U.S. Patent 3,381,425, for Protective Covering for Roof Edges, and my application Ser. No. 602,067, filed Dec. 15, 1966, now Patent No. 3,444,658, for Roof Sheet Anchoring Apparatus.

It has been a problem to attach roofing sheets satisfactorily and to protect roof edges adequately from penetration of moisture between the roofing sheets and the underlying roof sheathing, which moisture would cause deterioration of the sheathing. Therefore, it is a principal object to provide sheet-anchoring apparatus which will securely attach roofing sheets to the roof edges and prevent access of moisture to the space between such roofing sheets and the sheathing.

An additional problem associated with conventional application of roofing sheets by nailing them to sheathing is the tendency of the sheet edges to be moved relative to the sheathing caused by alternate contraction and expansion of the sheet material in response to temperature changes. Such relative movement pulls the sheet-holding nails out of the sheathing. Consequently, it is an important object to provide sheet-anchoring apparatus which permits movement of one sheet edge in response to such temperature changes with a minimum of force being exerted on the opposite sheet edge which may be joined to another sheet and nailed to the sheathing in overlapping relationship in conventional manner. It is a further object to provide sheet-anchoring apparatus which can be installed quickly and easily.

An additional important object is to provide such apparatus which covers and protects the roof edge to prevent weathering and especially to prevent wind from entering between and exerting a force to separate the roofing sheets from the sheathing.

FIGURE 1 is a top perspective of sheet-anchoring apparatus of the present invention and FIGURE 2 is a vertical section through the apparatus as installed on a roof

FIGURE 3 is a top perspective of a modified form of the sheet-anchoring apparatus and FIGURE 4 is a vertical section through the apparatus installed on a roof.

FIGURE 5 is a vertical section through a different form of the sheet-anchoring apparatus and FIGURES 6 and 7 are vertical sections through complemental inner and outer sections of somewhat different forms than that shown in FIGURE 5.

In the form of the sheet-anchoring apparatus shown in FIGURES 1 and 2, an outer section **1** complementally fits over an inner section **2** and is snapped onto and held by such inner section. The inner section has a supporting portion which slidably receives in its cavity the head **4** of the T-shaped holder **3** which can be fastened to roof sheathing R by nails or screws extending through slots **12**. Teeth **5** in the supporting portion cavity of section **2** mesh with teeth **6** on opposite edge portions of head **4** for selectively adjusting the elevation of the inner section **2** corresponding to different structural characteristics of a roof edge.

The form of attaching apparatus shown in FIGURE 1 is especially suitable for roofs having relatively short horizontal extents so that inner section **2** can be slid conveniently longitudinally onto holder head **4** and held in constant elevational position by engagement of teeth **6** on opposite edge portions of the cross flanges **4** with selected teeth **5** on the adjacent inner surface of section **2**. Such teeth are kept in mesh by engagement of the backing flanges **9** and **10** with the side of head **4** opposite the teeth **6**. Outer section **1** also is installed by sliding it lengthwise parallel to the roof edge with its lower arm **19** engaged beneath the lower edge of section **2**.

In the form shown in FIGURE 3, the fingers **9'** and **10'** snap over the edges of holder **3'**. The holder is secured by nuts and bolts to an angle bracket **7** secured to roof sheathing R by screws extending through slots **11** and **12**. Holder **3'** can be adjusted vertically relative to bracket **7** by selective engagement on teeth **7'** on the outer face of the upright flange of such bracket and teeth **8** on the adjacent face of the holder **3'**. A slot **13** is provided in holder **3'** to receive the bolt **13'**. The upper section **1'** snaps over the lower section and projection **22** on the lower edge of its upright supporting portion is received in rabbet **21** of section **2'**.

The cantilever arms **17** of sections **1** and **1'** in FIGURES 1 and 3 are return bent to form grooves into which extend the cantilever flat tongue **16** or **16'** of section **2** or **2'**, respectively, such free ends being spaced apart to form a slot **18** for receiving the edge of a roof sheet therebetween. The margin of such roof sheet S is formed as an upstanding reverse bend, the first fold of which is received in slot **18** and extends over opposite sides of the tongue. The free margin of arm **17** forming one side of the groove is a flange extending into the second fold of the return bend. The edge of the sheet is bent slightly downward and is held between staggered projections or ribs **14** and **15** on sections **1** and **2**, respectively.

Sufficient space is provided adjacent to the opening to slot **18** to accommodate the second fold of the reverse bend and to permit its flexure to compensate for contraction or expansion of sheet S in a direction perpendicular to the reverse bend, as indicated in broken lines in FIGURE 2, in response to temperature changes. The sheet can also contract or expand without restraint longitudinally of the sheet-anchoring apparatus by sliding of the reverse bend lengthwise of the anchoring elements.

The holder **3''** and bracket **7''** shown in FIGURE 5 are similar to the holder and bracket shown in FIGURES 3 and 4. The holder extends in contiguous engagement

ith lower anchoring section 24 between fingers 9'' and
)'' on the lower section. Such fingers snap over oppo-
:e ends of holder 3'' to hold section 24 in place. Section
t includes a substantially vertical supporting portion
ıd an upwardly and inwardly inclined portion 25 sup-
›rted by the holder. A cantilever arm 26 extends in-
ardly and downwardly toward the roof from inclined
›rtion 25 so that the adjacent ends of the portion 25 and
m 26 form a peak. From such peak a cantilever flange
extends upward and outward, its free end projecting
ward the roof edge. The lower section inclined portion
5 and cantilever flange 27 form a return bend groove
to which extends the upper cantilever arm 28 of upper
ction 29 which cantilever arm forms a flat tongue
:tending into the groove. The lower end of the upright
ıpporting portion of upper section 29 has an inwardly
›jecting flange which snaps into a rabbet 30 in the up-
ght supporting portion of lower section 24. The shapes
ıd proportions of the lower section rabbet and of the
›per section flange are such that when these elements
:e fitted together the upright portions of the upper and
›wer sections are disposed in substantially coplanar
:lationship one above the other, as shown in FIGURES
, 6 and 7.

The substantially flat margin of roofing sheet S extends
›wardly over and is supported on cantilever arm 26,
ıd further extends over the second cantilever arm 27,
ıe roofing sheet edge portion being folded to form a
›verse bend. The outer side of the first, lower, fold of
ıe reverse bend is received in the groove formed by re-
ırn bend 25, 27 and is clamped in such return bend
roove by tongue 28 of upper section 29. The second
›ld of the roofing sheet reverse bend extends normally
›osely around flange 27, as shown by the solid lines
f FIGURE 5. Such reverse bend upper fold can, there-
›re, flex as indicated in broken lines, in response to ex-
ansion or contraction of the roofing sheet due to at-
ıospheric changes and such flexure reduces the strain
n the opposite margin of the roofing sheet.

The lower section 24' shown in FIGURES 6 and 7 is
imilar to that shown in FIGURE 5. In this instance,
owever, the finger 10'' is located closer to the free end
f arm 26' and the peak formed between arm 26' and
ıe lower section inclined portion 25' is spaced outwardly
rom finger 10'' and, consequently, is spaced outwardly
rom the end of a holder 3'' engaged with such finger.
he holder is complementally formed to extend between
ngers 9'' and 10''.

The upper cantilever tongue 28' of upper section 29'
xtends into the groove of return bend 25', 27', but the
lot 28'' between arm 28' and return bend 25', 27' is
vider than the thickness of a roofing sheet so that both
he first and second folds of the roofing sheet reverse
end can flex in response to expansion and contraction
f the roofing sheet. Lower section inclined portion 25'
s crimped to form rabbet 30'. A rib 31 in rabbet 30'
s engageable by the hook-shaped lower end of the sup-
›orting portion of upper section 29'. A rib 32 on the
›wer side of tongue 28' bears on the upper side of the
rimped portion 25' of the lower section.

The upper section 29'' of FIGURE 7 is similar to the
he upper section 29' shown in FIGURE 6 except that
ı ridged cap 33 extends upwardly and inwardly from the
›ot of upper section cantilever arm 28'. Such cap fur-
her deters access of rainwater and wind to the reverse
›ent edge of the roofing sheet.

As shown in FIGURES 5, 6 and 7, the cross section
›f the section or strip 24 or 24' has both a vertical ex-
ent and a horizontal extent a plurality of times as great
ıs the corresponding vertical extent and horizontal ex-
ent, respectively, of the cross section of the section or
ıtrip 29 or 29'.

Tests have shown that use of sheet-anchoring apparatus
›f the present invention prevents joint separation be-

tween roof sheets due to temperature variations. Rainwater or other moisture which collects on roof sheet S cannot penetrate between the roof sheathing R and sheet S because of the reverse bend in the sheet margin when the anchoring apparatus of FIGURE 2 or FIGURE 4 is used. If, during a heavy rain, water should be forced upward, over and around the bend, it will flow between sections 1 and 2 and run out, with section 2 protectively encasing the roof edge. Similarly, if water is driven into the lower fold of the roofing sheet reverse bend shown in FIGURE 5, such water would simply run out between sections 24 and 29, so that water cannot be forced under the roofing sheet.

In FIGURE 3, the upper edge of the lower section 2' is provided with a flange 23 inclined downwardly to its edge for supporting the margin of sheet S. Such strip may extend downward to and rest on a layer of cork C or other insulating material underlying the roofing sheet as shown in FIGURE 4 and simultaneously tends to prevent the lower end of section 2' from tilting out of engagement with holder 3'.

I claim:

1. Sheet-anchoring apparatus for a roof edge comprising a first strip having a supporting portion extending along the roof edge and a generally flat tongue projecting inwardly from said supporting portion, a roofing sheet having a substantially flat portion, a first fold spaced from said substantially flat portion, folded around the edge of said tongue and extending over opposite sides of said tongue and a second fold extending upward from said first fold, joining said first fold and said substantially flat portion and forming with said first fold a reverse bend portion along the margin of said substantially flat portion, and a second strip having a flange above and overlapping said first strip tongue, extending within said second roofing sheet fold and forming one side of a channel defined by said second strip, said channel receiving therein said first strip tongue and said first roofing sheet fold.

2. The sheet-anchoring apparatus defined in claim 1, in which the supporting portion of the first strip is generally flat and disposed in an upright plane from which the tongue projects inwardly.

3. The sheet-anchoring apparatus defined in claim 2, in which the second strip has a generally flat supporting portion disposed in an upright plane generally parallel to the supporting portion of the first strip.

4. The sheet-anchoring apparatus defined in claim 3, in which the supporting portion of the second strip is disposed substantially coplanar with the supporting portion of the first strip.

5. The sheet-anchoring apparatus defined in claim 3, in which the supporting portion of the first strip has an inwardly-directed flange on its lower edge and the supporting portion of the second strip has a groove parallel to and receiving said second strip supporting portion flange.

6. The sheet-anchoring apparatus defined in claim 5, in which a portion of the second strip below the tongue of the first strip has a rib projecting downwardly toward the first strip supporting portion lower edge flange.

7. The sheet-anchoring apparatus defined in claim 6, in which the first strip supporting portion lower edge flange has an edge hook engageable with the first strip rib.

8. The sheet-anchoring apparatus defined in claim 1, in which the first strip is supported by the second strip.

9. The sheet-anchoring apparatus defined in claim 1, in which the second strip includes a portion inclined downwardly away from the roof edge for underlying a roofing sheet in supporting engagement therewith.

10. The sheet-anchoring apparatus defined in claim 1, in which the second strip includes a portion inclined downwardly in a direction away from the channel of the second strip for underlying a roofing sheet in supporting engagement therewith.

11. The sheet-anchoring apparatus defined in claim 1, in which the tongue portion of the first strip has a longitudinal rib projecting downward therefrom and the second strip includes a portion underlying said rib for engagement with a portion of the roofing sheet between the first strip and the second strip.

12. The sheet-anchoring apparatus defined in claim 1, in which the second strip cross scection has both a vertical extent and a horizontal extent a plurality of times as great as the corresponding vertical extent and horizontal extent, respectively, of the cross section of the first strip.

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ALFRED C. PERHAM, Primary Examiner

U.S. Cl. X.R.

52—60, 573