April 19, 1938. A. H. TASHJIAN 2,114,362

SYSTEM OF ROOF CONSTRUCTION

Filed Dec. 21, 1935 2 Sheets-Sheet 1

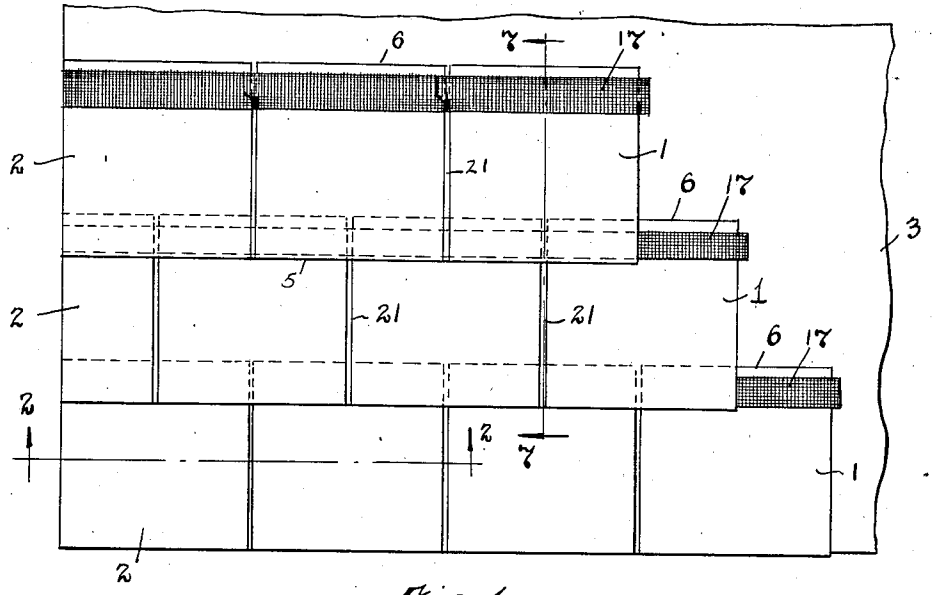


Fig. 1

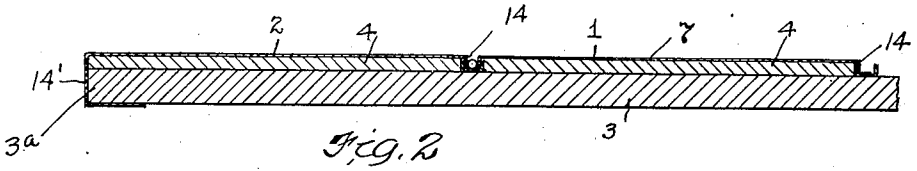


Fig. 2

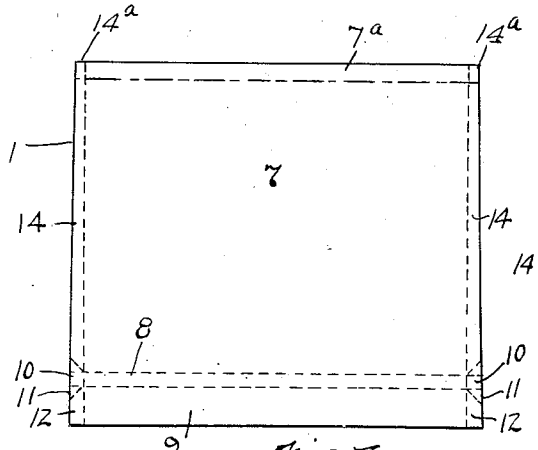


Fig. 3.

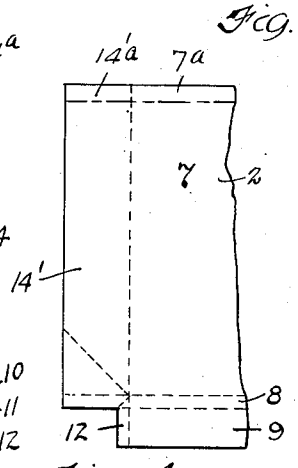
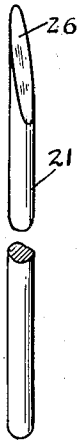


Fig. 4.

Fig. 6



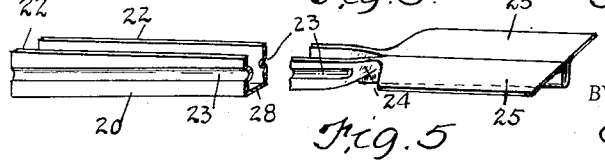


Fig. 5

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SYSTEM OF ROOF CONSTRUCTION

Filed Dec. 21, 1935 2 Sheets-Sheet 2

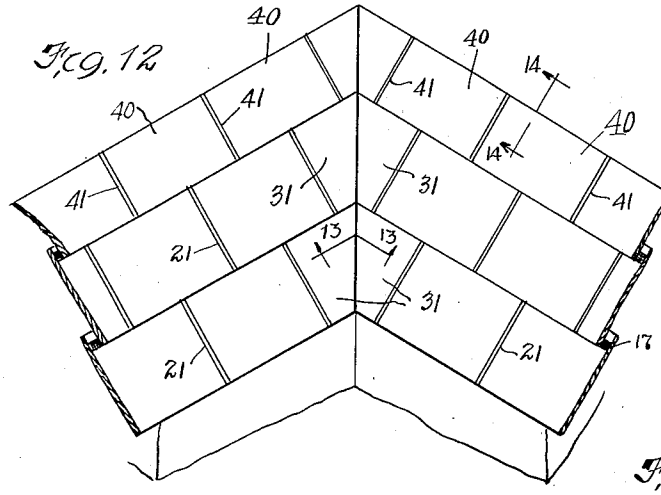


Fig. 12

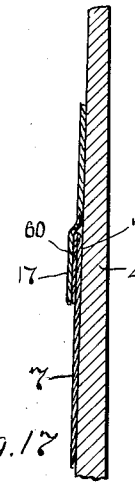


Fig. 17

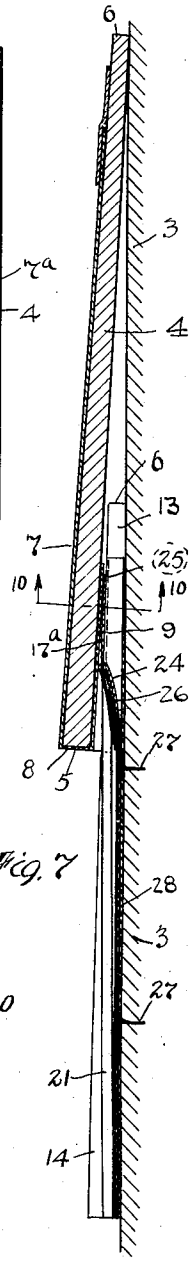


Fig. 7

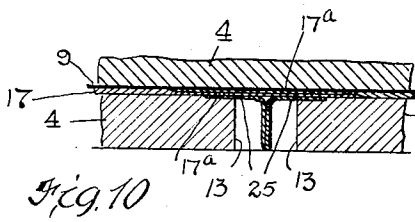


Fig. 10

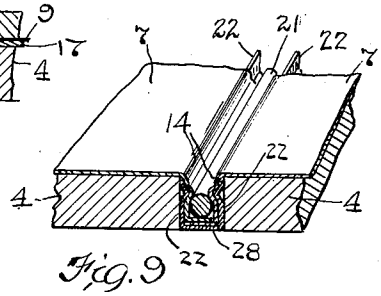


Fig. 9

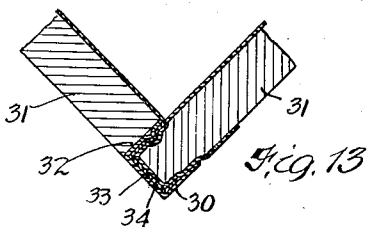


Fig. 13

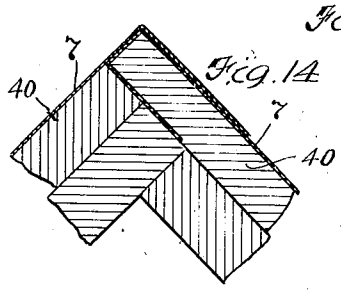


Fig. 14

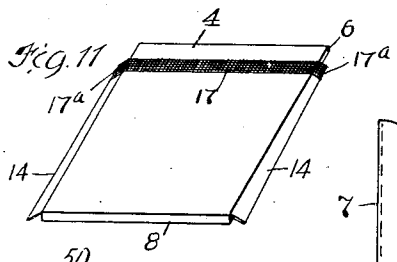


Fig. 11

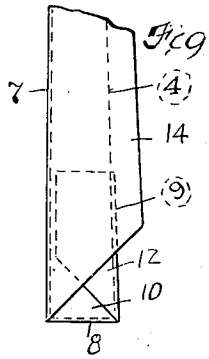


Fig. 8

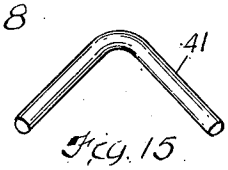


Fig. 15

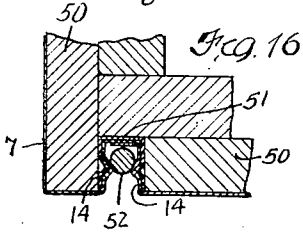


Fig. 16

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Patented Apr. 19, 1938

2,114,362

UNITED STATES PATENT OFFICE

2,114,362

SYSTEM OF ROOF CONSTRUCTION

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Application December 21, 1935, Serial No. 55,501

8 Claims. (Cl. 108—8)

This invention relates, as indicated, to a novel system of roof construction but has reference more particularly to a roof construction embodying metal encased shingles.

Although the encasing of conventional shingles of various materials with metal has been previously proposed, the area of metal employed for the casing of such shingles has necessarily been so great as to preclude the economies which a shingle of this character is intended to effect. In this connection it may be noted that the area of a conventional shingle is approximately 2.2 times its exposed area, and that since the lower or unexposed surface of such a shingle must necessarily be as impervious to moisture as its exposed surface, the total area of metal required to encase such a shingle is in excess of four times the exposed area of the shingle. For this reason, metal encased shingles, as heretofore manufactured, have not been regarded as practical from a commercial standpoint.

Moreover, the casing in every instance was employed solely as a protective coating for the shingle and was not designed to serve any other useful purpose, or improve weaknesses of conventional shingle construction.

The primary object of the present invention is to provide a water-tight shingle construction for sloping roofs, by a novel means of sealed interlocks between adjacent shingles in a course, and sealed joints between successive courses, and sealed construction of valleys, hips, ridges and end flashings.

A further object of the invention is to provide a novel metal encased shingle in which the area of metal used for the casing is reduced to a minimum and in which the casing is designed to co-operate with suitable locking elements for rigidly securing the shingles in position on a roof, siding or the like, in a water-tight sealed jointing.

Another object of the invention is to provide a shingle and securing means therefor of such a character as to permit the laying of the shingles in courses from the eaves up or from the ridge down.

Another object of the invention is to provide a roof construction from which the individual shingles which have been damaged may be easily and quickly removed and replaced by other shingles without removing any adjacent shingle or shingles.

A further object of the invention is to provide metal encased shingles, the casings of which are designed to serve as flashings at gable ends, or at parapets, thereby dispensing with the need for separate metal flashings which are required in conventional shingle construction.

A still further object of the invention is to provide a metal encased shingle of standard form, but of such construction as to enable special forms of shingles to be cut or made therefrom for special forms of construction, as for example, for valleys and hips of roofs of varying pitches, and ridges, thereby eliminating the need for expensive valley flashings, and separate hip and ridge rolls.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the annexed drawings and the following description setting forth in detail certain structure embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a fragmentary plan view of a roof comprising metal encased shingles made in accordance with the invention; Fig. 2 is a cross-sectional view, taken on the line 2—2 of Fig. 1; Fig. 3 is a development of the metal casing of one of the standard shingles; Fig. 4 is a development of a portion of the metal casing of one of the end or gable shingles; Fig. 5 is a perspective view of one of the shingle side-flange-receiving channels; Fig. 6 is a perspective view of one of the locking elements; Fig. 7 is a cross-sectional view, taken on the line 7—7 of Fig. 1; Fig. 8 is a fragmentary side view of the exposed end of a shingle; Fig. 9 is a fragmentary sectional and perspective view, showing the manner in which adjacent shingles are locked to the stationary channel; Fig. 10 is a cross-sectional view, taken on the line 10—10 of Fig. 7; Fig. 11 is a perspective view of one of the standard shingles; Fig. 12 is a fragmentary plan view of a valley, showing shingles of modified contour which are employed in the construction of such valley; Fig. 13 is a cross-sectional view, taken on the line 13—13 of Fig. 12; Fig. 14 is a sectional view of a typical ridge construction; Fig. 15 is a fragmentary elevation of a locking bar used for ridge shingles; Fig 16 is a fragmentary sectional view of a typical hip construction; and Fig. 17 is a fragmentary longitudinal cross-sectional view of a modified form of shingle.

Referring more particularly to Figs. 1 to 11 of the drawings, there is disclosed a roof embodying shingles 1, hereinafter designated as standard

shingles, and shingles 2, hereinafter designated as end or gable shingles, these shingles, as shown in Fig. 1, being laid on the roof boards 3 in courses in the usual manner.

Each of the shingles 1 comprises a base or core 4, which is preferably tapered from its front edge 5 to its rear edge 6, and consists of a suitable material having heat insulating properties, such, for example, as fiber board, composition board and the like. This shingle is partially encased in a casing or covering of sheet metal of a corrosion-resistant character, such for example as copper, lead, zinc, etc. In practice it is preferred to employ comparatively thin, soft, sheet metal, of a thickness which may be easily forced into side interlocking channels without prior forming and which may be cut to any desired contour by means of an ordinary pair of shears, thereby facilitating the cutting of special shingles in the field as will be presently described.

In forming the casing, a blank cut to the desired contour is provided, as shown in Fig. 3, and is bent along the dotted lines, as indicated, to provide a facing 7 for the upper surface of the base 4 of the shingle, a downwardly extending flange 8 for covering the front edge 5 of the base, a rebent flange 9 for covering a relatively small portion of the lower surface of the base 4 adjacent the front edge thereof and additional areas 10, 11 and 12 for covering portions of the side edges 13 of the base. The facing 7 and flanges 14 are provided at their rear portions with areas 7*a* and 14*a*, respectively, which are indicated by the dot and dash lines and serve a purpose which will be presently described. The tapering side flanges 14 are sufficiently wide to not only cover the side edges 13 of the base, but to provide an excess for covering the web of the locking channels, as will be presently described.

The casing is preferably secured to the base or core of the shingle as by stapling the terminal edges of flange 9 to the back face of the base or core and cementing the facing 7 (with the exception of the area 7*a*) and flange 8 to the upper surface and front edge of the base, the remaining portions of the casing being unattached to the base.

Overlying the areas 7*a* and 14*a* of facing 7 and flanges 14, there is provided a strip 17 of adhesive waterproof fabric, approximately double the width of these areas and of a length equal to the width of the casing face 7 plus the width of the areas 14*a* of the flanges 14, the portions of this strip which extend beyond the side edges 13 of the shingle being designated 17*a*. The strip 17, by virtue of its adhesive nature, is cemented to the upper surface of the area 7*a* and to that portion of the base immediately to the rear of this area. The function of the strip 17 will be presently described.

It will be particularly noted that the flanges 14 and areas 14*a* of the casing are not in any way secured to the side edges 13 of the base, but in effect provide pliable flaps, which, as will be presently described, are employed for the locking of adjacent shingles to the stationary channels and roof construction, without necessitating nailing of the shingles to the roof construction.

The end shingles 2 are made in precisely the same manner as the regular shingles, with the exception that the side flanges designated 14' and areas 14'*a* are considerably wider than the flanges 14 and area 14*a* so as to provide flaps for covering the ends 3*a* of the roof boards 3, as shown in Fig. 2. If desired, the flaps 14' and 14'*a* may be extended, as shown in Fig. 2, to provide rebent portions to engage the lower surface of the roof end. The flap 14' and 14'*a* will, of course, be nailed or otherwise secured to the edges or underside of the roof boards, or may be turned up and flashed in the parapet, the flaps in either case eliminating the need for separate flashings at the ends of the roof construction.

For the purpose of securing the shingles to the roof boards without nailing them directly to such roof boards, there are provided locking elements, such as the channel 20 in Fig. 5 and the rod 21 in Fig. 6.

The channel 20 is preferably made of resilient copper, or other corrosion-resistant metal, and of a length approximately equal to the length of the shingles. The flanges 22 of the channel are tapered from front to rear to correspond with the taper and thickness of the shingles and are provided with inwardly disposed longitudinally extending beads 23. The walls of the rear end of the channel are pressed together to provide an inclined end stop 24 and a pair of flat horizontally extending flanges 25 beyond this end stop, these flanges being of a width appreciably greater than the distance between the flanges 22.

Prior to the laying of the first course of shingles, the channels 20 are secured to the roof boards 3 at shingle-width spacings, as by driving a nail or two nails 27 through the webs 28 of the channels into the roof boards.

A course of shingles is then laid between the channels 20, and the flanges 14 of the casings of adjacent shingles are forced into the channels by means of the locking rods 21, the rods forcing these flanges into tight-fitting conformity with the walls of the channels, as clearly shown in Figs. 7 and 9. At the same time, the forward portions of the areas 14*a* and the portions of areas 17*a* of the strips 17, which overlie these portions of the areas 14*a*, are forced into the grooves of the channels and against the stops 24 by the tapered ends 26 of the rods 21, with the result that the sides of adjacent shingles are effectively locked to the channels in a water-tight sealed grip. Portions of the areas 14*a* and 17*a* of the casing and strips, respectively, which extend beyond the inclined end stop 24 of the channel, will overlie the flanges 25 of the channel and be disposed in the general plane of the upper surfaces of the shingles, as clearly shown in Fig. 10. These areas will therefore function as a water-tight seal between successive courses of shingles in the areas about the rear ends of the channels. The flanges 25, as will be noted in Fig. 10, overlie the marginal portions of the upper surfaces of the bases 4 of the shingles and effectively preclude the passage of moisture into the spaces between the edges 13 of the shingles at these points.

The rod 21 is locked into position in the channel by the beads 23 thereof, as shown in Figs. 7 and 9. In this way the casing flanges are tightly locked to the channels, an efficient water-tight sealed joint is thus provided between adjacent shingles, and the shingles are held down rigidly along both sides for the entire length thereof.

If the shingles are laid in courses from the eaves upward, the channels for the second course of shingles are secured to the roof board in staggered arrangement with the first course of channels, the forward ends of the channels overlapping the rear portion of the upper surfaces of the shingles, as clearly shown in Figs. 1 and 7.

The shingles of the second course are then secured to their channels in the same manner as the first course of shingles. The front nail 27, which secures each channel to the roof, is driven through the webs of the channel at a point immediately to the rear of the rear edge 6 of the underlying shingle, so that the channel securing nails are in no case driven through the shingles.

It will be noted that the forward edges of the shingles of each course are so laid that their flanges 9 overlie, and, by virtue of the adhesive nature of the strips 17, adhere to the adhesive strips 17 of the course below. Since the adhesive strips 17 are cemented to the upper surfaces of the areas 7a and 14a and also to the flanges 9 of the overlying casings, a water-tight seal or barrier is provided between overlapping courses of shingles. The adhesive strip 17 may be cemented to the casings in the course of manufacture of the shingles or may be applied to the shingles in the field, or in lieu of such strips, thick strips of emulsified asphalt or the like may be used.

It will be noted that the shingles of each course overlap the shingles of the adjacent courses to the minimum extent required for bearing and that the area of the casing of each shingle is reduced to a minimum, which is but slightly in excess of the exposed area of the shingle when in position on the roof.

It will be further noted that the shingles 1 are not secured as by nailing to each other or to the roof boards, and that a damaged or otherwise defective shingle may therefore be pulled out and replaced by simply removing the two adjacent locking rods 21 without disturbing other shingles.

The advantages of the present construction which may be noted are the use of a minimum amount of casing metal for each shingle with resultant economies in manufacturing cost, water-tight sealed interlock between adjacent shingles in a course and sealed jointing between successive courses, the securing of adjacent shingles to the roof boards by means consisting of portions of the casing and of locking means extending substantially the entire length of the shingle, thereby holding the front ends of shingles firmly and securely down, and the ability, by virtue of the manner in which the shingles are secured to the roof boards, of laying the shingles in courses from the eaves up or ridge down, as may be desired. In laying the shingles in courses from the ridge down, the channels for the first or uppermost course of shingles are secured to the roof board in such a manner that their forward ends are spaced from the roof boards sufficiently to receive thereunder the rear portions of the next or subjacent course of shingles. The channels for the second course are secured to the roof board in a similar manner, etc.

In forming a valley, a modified valley channel 30, as shown in Fig. 13, is nailed in position at the valley corner, with the channel flanges parallel with one surface of the valley. The channel 30 is similar to the channels 20, except that the groove therein is of tapering width to receive the side edges of a shingle and the back stop which corresponds with the end stop 24 is at the rear end of the channel, the channel having no flanges such as the flanges 25 of the channel 20. Shingles 31 of modified area, as shown in Figs. 11 and 12, are then formed, such shingles being preferably formed from standard shingles 1. The field man will take these shingles 1, strip the casing from the cores as far back as necessary, saw or cut the core to the form shown in Fig. 12, recover the base with the casing and cut away portions of the casing to form extending flaps, as shown in Fig. 13. He will lay one valley shingle with its side edge closely abutting the free flange 32 of valley channel 30, and with its flap 33 disposed over the flange 32 and across the web 34 of the channel. He will then force the other valley shingle into the groove of the valley channel, forcing the flap of the adjacent shingle into a firm water-tight grip with the valley channel, as clearly shown in Fig. 13. In this manner water-tight closed valleys for roofs of varying pitches may be constructed without requiring expensive valley flashings.

In forming a ridge, modified ridge shingles 40 are provided, as shown in Fig. 12. These shingles are preferably formed from standard shingles 1. The field man will take these shingles 1, strip the casing from the cores as far down as necessary, and saw off the rear ends of the cores to leave shingles of the desired length. He will then lay the shingles in the manner shown in Figs. 12 and 14, extending the casing 7 of one ridge shingle over and across the upper surface of the opposite ridge shingle. The flaps 14 of these ridge shingles will then be forced into suitable locking channels by means of bent locking rods 41, as shown in Figs. 12 and 15. The locking channels for these ridge shingles will be made by sawing off the rear ends of channels 20 to correspond with the ridge shingle lengths.

In forming a hip, the field man will use standard shingles, and modify the same so as to enable them to be used in a hip construction, such as shown in Fig. 16. The adjacent hip shingles 50 are laid in an overlapping manner, as shown, and the modified flaps of such shingles are locked to channels 51, as by means of locking rods 52, these channels and rods being similar in all respects to the channels 20 and rods 21. The hip channel may be staggered from one face of the hip to the other in successive courses.

In Fig. 17 is disclosed a shingle in which a modified form of connection between the casing of the shingle and the fabric strip 17 is utilized. In this case, the casing 7 is provided with an integral flap or flange 60 which overlies the areas 7a and 14a, of the casing and the strip 17 is cemented to the flap and to the upper surface of the base 4 rearwardly of the flap.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the construction herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. A shingle comprising a base and a casing of sheet metal, said casing extending beyond the upper edge of the base to provide integral ridge covering means for a roof.

2. A shingle comprising a base and a casing of sheet metal having portions covering and enclosing the lower edge of the base and a portion extending beyond the upper edge of the base to provide ridge covering means for a roof.

3. A valley construction for a roof, comprising a channel at one side of the valley, a shingle having a base and a pliable casing, the marginal edge of said casing being disposed in said channel, and a second shingle at the other side of the valley having its edge disposed in said channel whereby to lock said marginal edge of said first shingle to said channel.

4. In a roof construction, locking means for adjacent shingles, consisting of a resilient metal channel independent of either of said adjacent shingles, said channel being closed adjacent one end thereof, and a locking member in said channel forming a water-tight seal between two adjacent shingles.

5. A valley construction for a roof, comprising adjoining shingles in V-relation, each having a base and a casing of sheet metal, the casings of each shingle having integral flexible marginal portions along their adjoining sides, and a resilient channel at the junction between said shingles, one of said shingles locking the marginal portion of the other shingle to said channel.

6. A ridge construction for a roof, comprising adjoining shingles in inverted V-relation, each having a base and a casing of sheet metal, the casing of one of said shingles extending over the upper end of the other shingle to provide a ridge covering.

7. In a roof construction, spaced shingles having flexible marginal flaps, a channel member disposed in the space between said shingles and having laterally extending flanges at its rear end substantially flush with the upper surfaces of said shingles, portions of said flaps extending into said channels in overlapping relation and portions overlying said flanges in overlapping relation, and a locking element disposed in said channel and overlying said first-named overlapped flap portions.

8. In a roof construction, spaced shingles having flexible marginal flaps, a channel member disposed in the space between said shingles, said channel being closed adjacent its rear end, portions of said flaps extending into said channels in overlapping relation, and a locking element disposed in said channel and overlying said overlapped flap portions.

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