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METAL SHINGLE CONSTRUCTION WITH REENTRANT JOINT

Filed Aug. 15, 1966

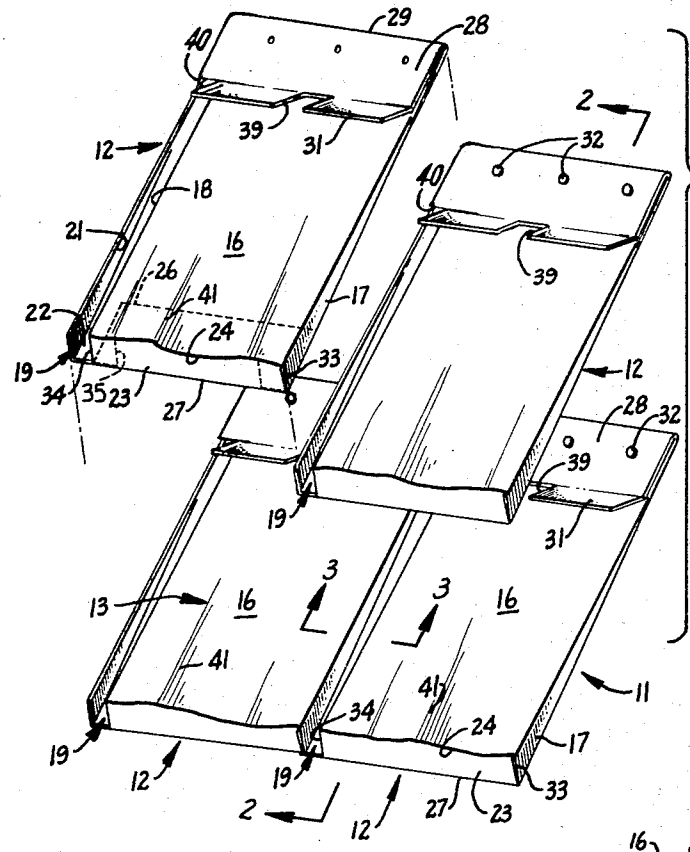


FIG. 1.

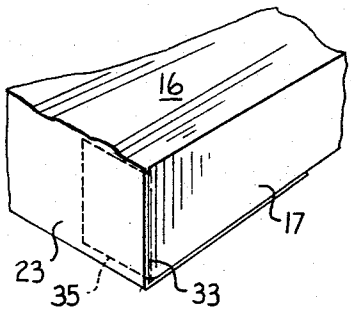


FIG. 5.

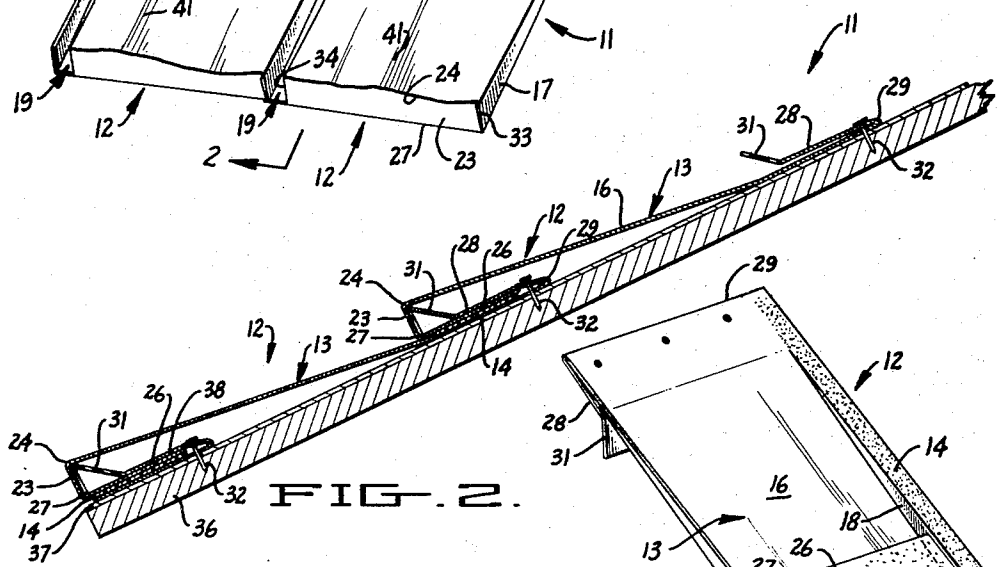


FIG. 2.

FIG. 4.

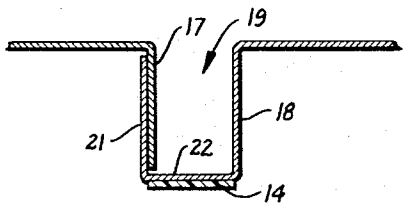


FIG. 3.

INVENTOR.
CLIFFORD C. MERRILL
BY
Gardner & Zimmerman
ATTORNEYS

United States Patent Office

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METAL SHINGLE CONSTRUCTION WITH REENTRANT JOINT

Clifford C. Merrill, Santa Rosa, Calif., assignor to Carl E. Strombeck, Loleta, Calif.

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10 Claims. (Cl. 52—420)

ABSTRACT OF THE DISCLOSURE

A shingle construction is described in which the shingles are formed of sheet metal to simulate the appearance of Hollywood shake shingles. Each shingle has a rectangular body section from which depend triangular shaped side walls and a rectangular lower end edge to simulate a wedge-shaped shingle having a thick end. One of the triangular wedge-shaped side walls has a channel integrally attached thereto with a side wall adapted to fit inside of an adjacent shingle to simulate a groove between shingles similar to that which appears when shake shingles are conventionally attached to a roof. The lower end edge of the shingle has integral therewith a section which extends inward of the shingle therefrom to form a holding strip for lower adjacent shingles and the upper edge of the body section has a metal connecting strip integral therewith for interlocking with the holding strip of an upper adjacent shingle. The upper metal connecting strip includes a portion which extends toward the lower end edge of the main body section in substantially spaced parallel relation with the upper surface of the main body section to define a slot between such portion and the body section therebeneath adapted to receive a holding strip of an adjacent upper shingle. The parallel portion of the connecting strip terminates in a portion which extends angularly upward from the body section in the direction of the lower end edge thereof and registering nail holes are provided through the parallel portion and the body section therebeneath to permit passage of a nail to secure the shingle to a roof sheathing and force said connecting strip towards the body section to provide a tight and rigid grip on a holding strip therebetween of an adjacent upper shingle.

This application is a continuation-in-part of my prior copending application Ser. No. 341,302 filed Jan. 30, 1964 for Metal Shingle Construction, which has now been abandoned. The present invention relates to improvements in a metal shingle construction, and more particularly to a metal shingle construction containing simulated shingles formed of sheet metal which present the appearance of Hollywood shakes.

It is known to make roofing and siding out of sheet metal and it has been particularly useful to make such materials from aluminum. However, in the aluminum roof structures heretofore suggested, a number of disadvantages were encountered, particularly in the appearance thereof. However, the aluminum building materials have certain advantages over wood materials particularly insofar as maintenance is concerned, and the present invention is directed to providing a roof structure incorporating the advantages of both types of material as well as other advantages which will become apparent hereinafter.

In particular, roofs which are known as Hollywood shake roofs have been extremely popular from the standpoint of appearance and it is proposed to provide shingles made from aluminum which have the appearance of these large Hollywood shakes. However, it will be appreciated that other highly attractive roofing forms may be provided utilizing the principles of the present invention, if desired.

Another important consideration in the construction of roofs resides in the cost thereof, and this cost includes the price of material and the price of installation. While large shingles are important in reducing the installation price, they tend to become rather expensive, particularly when made from wood. However, rather large shingles having the appearance of large shakes are comparatively inexpensive when constructed according to the invention and yet provide reduced installation cost. This cost saving is achieved by forming single sheets into large box-like structures by suitable folding so that shingles having the appearance of large pieces of wood are obtained with a minimum of material and weight.

In addition, the construction according to the invention provides means for sealing the unit so as to overcome one of the problems heretofore encountered in the metal construction art. With this sealing, it is possible to retain the conventional system used for fastening wooden shingles, but with the added advantage of good firm fastening without added brackets or the like.

Accordingly, it is a primary object of the present invention to provide a roofing structure containing shingles which are each made from a single sheet of metal material such as aluminum which is light in weight and easy to install and yet has the appearance of wooden shingles.

Another object of the invention is to provide a roof of the character described which has the advantage of being fireproof and which requires a minimum of maintenance.

A further object of the invention is to provide a roof of the character described which is weather proof and which does not undergo the usual warpage encountered with wooden roofs.

A still further object is to provide a roof of the character described which may be applied over an already existing roof, or which may be applied to a new roof, if desired.

Still another object of the invention is to provide a roof construction of the character described which is equipped with improved sealing means so as to provide improved water proofing and allow a roof of a shingle-like appearance to be applied on a lower pitch than heretofore practical.

Further objects and advantages of the invention will be apparent as the specification progresses, and the new and useful features of the metal shingle construction will be fully defined in the claims attached hereto.

The preferred form of the invention is illustrated in the accompanying drawings, forming part of this description, in which:

FIGURE 1 is an exploded view illustrating the manner in which a group of shingles constructed according to a preferred form of the invention fit together when placed on a roof.

FIGURE 2 is a cross-sectional view of shingles as they appear on a roof including the substructures thereof, substantially as seen in the plane of line 2—2 of FIGURE 1.

FIGURE 3 is a cross-sectional view illustrating a lateral joint between shingles and showing the appearance as seen substantially in the plane of line 3—3 of FIGURE 1; and

FIGURE 4 is a perspective bottom view of one of the shingles shown in FIGURES 1 through 3.

FIGURE 5 is a perspective, enlarged partial view of the shingles of FIGURE 1 depicting the construction at a lower corner thereof.

While only the preferred form of the invention is shown, it should be understood that various changes or modifications may be made within the scope of the claims attached hereto without departing from the spirit of the invention.

Referring to the drawings in greater detail, there is

shown a roof structure **11** comprising shingles **12** which are preferably formed from a single metal sheet **13** and have a mastic **14** undercoated on the bottom thereof to provide automatic sealing as the shingles are applied.

The metal sheet **13** of each shingle contains a substantially rectangular body section **16** and various other sections integrally connected to the rectangular body section along each one of the four sides thereof and folded with respect thereto. At each side of the rectangular body section there is a wedge-shaped side having its point near the upper end of the body section and having its short dimension substantially perpendicular to the lower edge thereof. One side of the shingle **17** consists entirely of one of these wedge-shaped sides, and the other side **18** is part of a channel section **19** having a U-shaped cross section.

This channel section **19** contains the wedge-shaped side **18** and a substantially parallel wedge-shaped side **21** held in spaced parallel relation by a substantially rectangular floor section **22** (see FIGURE 3). As best seen in FIGURE 1 this U-shaped channel is present between shingles after assembly to give the impression of spacing between shingles as is found in Hollywood shake roofs. In order to complete the simulated thickness of the shingle, there is a lower edge or side **23** of substantially rectangular shape which is integrally connected with the rectangular body section **16** through fold line **24**.

This lower edge or front wall also carries a section of metal sheet or holding strip **26** which is also substantially rectangular and integrally connected to the lower edge **23** at fold line **27**. This holding strip is utilized to hold down the lower end of the shingle by cooperation with a gripping strip at the upper end of the lower course or row of shingles. In turn, the shingles provide these gripping strips for the next higher course. In order to achieve this function, the rectangular body section **16** has a metal gripping or connecting strip **28** along the upper edge thereof and formed for gripping the holding strip **26** on the next shingle.

In its broad form, the connecting strip **28** could be applied separately but in the preferred form of the invention, this connecting strip is integrally formed with the metal sheet by folding back a section from the rectangular body section **16** at fold line **29**. In this way, only one part is needed for each shingle and the need for brackets is positively avoided. As shown, the connecting strip **28** extends the full width of the body section, including over the channel **19**. Because of this, the reentrant fold **19** acts as a stop for any rain or other water which might flow up the channel **19** or the exterior surfaces of the shingle. As best seen in FIGURE 2, the connecting strip **23** contains an angularly upwardly bent section **31** which is adapted to fit between the lower edge **23** and rectangular section **16** at fold **24**.

With this construction, it is seen that the shingles of one course fit into tight engagement with the shingles of the next lower course so that the nails **32** or other fastening means applied to the lower course serve to hold both the top of one row of shingles and the bottom of another row of shingles. As best seen in FIGURE 2, the inner surface of the connecting strip **28** cooperates with a section of front face **16** to grip the holding strip **26** in sandwiched fashion and provide an especially tight grip. Although the drawing shows the unit somewhat spread and the nails **32** slightly raised, it will be appreciated that the thicknesses are exaggerated for the sake of illustration, and that in actual practice no substantial movement will occur as this fit is made.

It is also seen that the mastic **14** is brought into place to provide an absolute seal between strips so that water cannot be blown by the wind up on the roof under the shingles. Such water movement has been a very serious problem in the past, but with the present invention it is solved in a comparatively simple manner due to the provision of the mastic and the extension of the strip **28** for the full width of the shingle. It should also be noted that the nails or fastening means **32** will be held in a sheltered position with respect to weather. As best seen in FIGURE 3, the mastic **14** also provides lateral seal between shingles.

When the shingle is formed simply by folding the sheets, it will be appreciated that cracks will exist along the front face of the shingle particularly at **33** and **34**. FIGURE 5, the side edges **17** and **18** have inwardly bent tabs **35** at their lower ends which extend behind the rectangular lower edge sides **23**. It has been found that these tabs will prevent rain water or the like from flowing upward beneath the shingle, but will allow any condensation or water already beneath the shingle to flow out through the cracks **33** and **34**. It is to be noted that alternatively, these tabs could be a part of the lower edge **23** and extend upward along the inside surfaces of the side edges. However, in such a construction, rain water is more likely to be forced upward along the tabs to beneath the shingle. For this reason, the arrangement shown in the drawings is preferred. This tab sealing means has the advantage of being inexpensively provided as a part of the metal blank when it is cut to form the shingle, and yet provide a very effective seal.

In operation, the shingles may be applied over a standard roof sheathing **36** which has a building paper vapor barrier **37** fastened thereover in the conventional manner. A beginning strip **38** which is similar in construction to the connecting strip **28** is nailed in place and the shingles are applied thereover to put the first course of shingles along the lower edge of the roof. As these shingles are applied, their channel sections are fit in side-by-side relation as shown in FIGURE 3, and they are nailed in the upper portion thereof through nail holes which are preferably already provided in the shingles. Then the next course is fit on by sliding the connecting strips thereof underneath the holding strips **28** of the first course and construction continued until the entire roof is finished.

It will be appreciated that certain auxiliary structures may be needed to cover ridge lines, and simple sheets or other hardware may be utilized for this purpose. Preferably, these sheets will also contain suitable sealing mastic. In this connection, another advantage of the present invention resides in the use of relatively thin sheet material which can be easily cut with shears suitable for cutting sheeting, so that fabrication is also facilitated where peculiar shapes are required.

It will be appreciated that the shingles could be placed in regular courses and tiers with the U-shaped grooves being in registry on adjacent tiers, if desired. To permit such an arrangement, the bent section **31** is cut away over the channel section to provide a recess **40** for the reception of the channel section of the shingle in the next higher tier. It is important to note, however, that the remaining portion of the strip **28** is not removed so that it will act as a stop to any water forced up the channel by wind or the like. It is preferred to arrange the shingles in a staggered construction as shown in FIGURE 1 in order to achieve the desired shake appearance. A recess or U-shaped cutaway **39** is centrally located in the bent section **31** and is adapted to receive and properly center a U-shaped channel of the next course when the shingles as applied in this configuration. Other variations in design may be provided as will be apparent to those skilled in the art.

As indicated above, the sheeting is preferably aluminum and it may be anodized or otherwise treated to give a permanent color in a wood shade or be painted a wood color as desired. In addition, the facing of the sheet may be easily stipled and provided with grooves **41** to give the appearance of shakes of wood.

The mastic may be any mastic known in the building trade such as bitumen or asphalt or other plastic materials which are suitable for holding floors or keeping roofing

materials together. Such compositions are readily available and well-known in the building trades.

From the foregoing description, it is seen that I have provided an improved metal roofing structure which is similar in appearance to known attractive wood structures and which may be formed to simulate a Hollywood shake, yet which is simple and inexpensive to construct and absolute reliable in use. In addition, the structure is light in weight and easily installed.

What is claimed is:

1. A metal shingle comprising a metal sheet having a generally rectangular body section and sections integrally connected with and substantially perpendicularly disposed therefrom to provide a pair of substantially wedge-shaped sides having their pointed ends at the upper end of the shingle and a substantially rectangular lower end edge whereby a wedge-shaped shingle having a thick end is simulated, one of said wedge-shaped sides having a channel integrally attached thereto having a side wall adapted to fit inside of an adjacent shingle to simulate a groove between shingles similar to that which appears when shake shingles are conventionally attached, a section of the metal shingle integral with said lower edge and extending inward therefrom to form a holding strip, a metal connecting strip integral with said sheet and having a first portion and a second portion, said first portion extending towards the lower end edge of the main body portion in substantially spaced parallel relation with the upper surface of the main body portion and terminating in the second portion extending angularly upward from said main body portion in the direction of said lower end edge thereof and sealing means carried on the shingle in position to seal the joint to be formed between the holding strip and the connecting strip.

2. A metal shingle comprising a metal sheet having a generally rectangular body section and sections integrally connected with and substantially perpendicularly disposed therefrom to provide a pair of substantially wedge-shaped sides having their pointed ends at the upper end of the shingle and a substantially rectangular lower end edge whereby a wedge-shaped shingle having a thick end is simulated, one of said wedge-shaped sides having a channel integrally attached thereto having a side wall adapted to fit inside of an adjacent shingle to simulate a groove between shingles similar to that which appears when shake shingles are conventionally attached, a section of the metal shingle integral with said lower edge and extending inward therefrom to form a holding strip, a metal connecting strip integral with said sheet and having a first portion and a second portion, with the first portion extending towards the lower end edge of the main body portion in substantially spaced parallel relationship with the upper surface of said main body portion and terminating in the second portion extending angularly upward from said main body portion in the direction of said lower end edge thereof, the second portion terminating at a free edge which is above said first portion a distance substantially equal to the height of said rectangular lower end edge and mastic sealing means carried on the inner surface of said shingle for sealing the joints formed with adjacent shingles and providing a completely water-proof roofing.

3. A metal shingle formed from a single sheet of metal and constructed to simulate a Hollywood shake shingle comprising, a metal sheet having a generally rectangular body section defined by fold lines in the metal in said sheet, an elongated triangular shaped side wall at one side of and at right angles to said main body section with the point of the triangle terminating at the upper end of said body section and the short side of the triangle perpendicular to the lower edge of said main body section, a channel-shaped section on the other side of said body portion having an elongated rectangular strip and a pair of upstanding triangular side walls similar in size and shape to said triangular side wall on the other side of said body section, said channel section being integral with said main body and folded therefrom, a generally rectangular front wall having its long dimensions corresponding to the short dimension at the lower edge of said main body section and having its short dimension of the same length and generally corresponding to the short dimension of said triangular side walls, a section of the metal shingle integral with said lower edge and extending inwards therefrom to form a holding strip, a metal connecting strip integral with said sheet and having a first portion and a second portion, with the first portion extending towards the lower end edge of the main body portion in substantially spaced parallel relationship with the upper surface of said main body portion and terminating in the second portion extending angularly upward from said main body portion in the direction of said lower end edge thereof, the second portion terminating at a free edge which is above said first portion a distance substantially equal to said short dimension of said rectangular front wall and sealing means carried on the shingle in position to seal the joint to be formed between the holding strip and the connecting strip.

4. A metal shingle formed from a single sheet of metal and constructed to simulate a Hollywood shake shingle comprising, a metal sheet having a generally rectangular body section defined by fold lines in the metal in said sheet, an elongated triangular shaped side wall at one side of and at right angles to said main body section with the point of the triangle terminating at the upper end of said body section and the short side of the triangle perpendicular to the lower edge of said main body section, a channel-shaped section on the other side of said body portion having an elongated rectangular strip and a pair of upstanding triangular side walls similar in size and shape to said triangular side wall on the other side of said body section, said channel section being integral with said main body and folded therefrom, a generally rectangular front wall having its long dimensions corresponding to the short dimension at the lower edge of said main body section and having its short dimensions of the same length and generally corresponding to the short dimension of said triangular side walls, a section of the metal shingle integral with said lower edge and extending inwards therefrom to form a holding strip, a metal connecting strip integral with said sheet and having a first portion and a second portion, with the first portion extending towards the lower end edge of the main body portion in substantially spaced parallel relationship with the upper surface of said main body portion and terminating in the second portion extending angularly upward from said main body portion in the direction of said lower end edge thereof, the second portion terminating at a free edge which is above said first portion a distance substantially equal to said short dimension of said rectangular front wall, said second portion also having a U-shaped cutaway centrally located and sized to fit a U-shaped channel section of another similar metal shingle and mastic sealing means carried on the lower portion of said channel section and said holding strip to provide water-proofed shields laterally between adjacent shingles and longitudinally between adjacent tiers of shingles.

5. A metal shingle comprising a metal sheet having a generally rectangular main body portion and sections integrally connected to and substantially perpendicularly disposed therefrom to provide a pair of substantially wedge-shaped sides having their pointed ends at the upper end of the shingle and a substantially rectangular lower end edge whereby a wedge-shaped shingle having a thick end is simulated, one of said wedge-shaped sides having a channel integrally attached thereto and having a side wall adapted to fit inside of an adjacent shingle to simulate a groove between shingles similar to that which appears when shake shingles are conventionally attached, a section of the metal shingle being integral with said lower edge and extending inwards therefrom to form a holding

strip, a metal connecting strip integral with said sheet and having a first portion and a second portion, with the first portion extending toward the lower end edge of the main body portion in substantially spaced parallel relationship with the upper surface of said main body portion and terminating in the second portion extending angularly upwardly from said main body portion in the direction of said lower end edge thereof, the second portion terminating at a free edge which is above said first portion a distance substantially equal to the height of said rectangular lower end edge.

6. The metal shingle defined in claim **5**, in which said second portion also has a U-shaped cutaway centrally located and sized to fit a U-shaped channel section of another similar metal shingle.

7. A metal shingle comprising a metal sheet having a generally rectangular body section, a generally rectangular section integrally connected with and substantially perpendicularly disposed from the lower end of said body section to provide a substantially rectangular lower end edge whereby a wedge-shaped shingle having a thick end is simulated, a section integrally connected with each side edge of said body section forming means for interlocking said shingle to similarly shaped adjacent shingles, a generally U-shaped channel section integral with said body section and extending downward therefrom parallel to a side edge thereof to simulate a groove between shingles similar to that which appears when shake shingles are conventionally attached, a section integral with said lower end edge and extending inwards therefrom to form a holding strip, a metal connecting strip integral with said sheet at the upper edge of said body section and including a portion extending angularly upward from the body section in the direction of said lower end edge thereof, said angularly extending portion having a recess adapted to receive the channel section of another similar shingle having a holding strip adapted to be interlocked with said metal connecting strip, and wherein said metal connecting strip includes a portion extending towards the lower end edge of the main body section in substantially spaced parallel relation with the upper surface of the body section and defining a slot between said portion and the body section therebeneath adapted to receive a holding strip of an adjacent upper shingle, said parallel portion terminating in said portion which extends angularly upward, the parallel portion and the body section therebeneath being provided with registering nail holes for the passage of a nail or the like to secure said shingle to a roof sheathing, and said slot extending to adjacent said registering nail holes whereby said nail or the like forces said connecting strip toward said body section to provide a tight and rigid grip on a holding strip therebetween of an adjacent upper shingle.

8. The metal shingle of claim **7** wherein said parallel portion of said connecting strip extends over the upper end of said channel section.

9. A metal shingle comprising a metal sheet having a generally rectangular body section, a generally rectangular section integrally connected with and substantially perpendicularly disposed from the lower end of said body section to provide a substantially rectangular lower end edge whereby a wedge-shaped shingle having a thick end is simulated, a section integrally connected with each side edge of said body section forming means for interlocking said shingle to similarly shaped adjacent shingles, a section integral with said lower end edge and extending inwards therefrom to form a holding strip, a metal connecting strip integral with said sheet at the upper edge of said body section and extending back over said body section in spaced relationship thereto and defining a slot between said strip and the body section therebeneath adapted to receive a holding strip of an adjacent upper shingle, said connecting strip and the body section therebeneath being provided with registering holes for the passage of a nail or the like to secure said shingle to a roof sheathing, said slot extending to adjacent said registering nail hole whereby said nail or the like forces said connecting strip towards said body section to provide a tight and rigid grip on a holding strip therebetween of an adjacent upper shingle.

10. The metal shingle of claim **9** wherein said metal connecting strip includes a portion extending towards the lower end edge of the main body section in substantially spaced parallel relation with the upper surface of the main body section and terminates in a portion which extends angularly upward from the body section in the direction of said lower end edge thereof, and said registering holes extend through said parallel portion and the body section therebeneath.

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FRANK L. ABBOTT, *Primary Examiner.*

ALFRED C. PERHAM, *Examiner.*