June 9, 1936. J. H. WAHL ET AL 2,043,271

ROOF STRUCTURE AND MATERIAL

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Fig. 1.

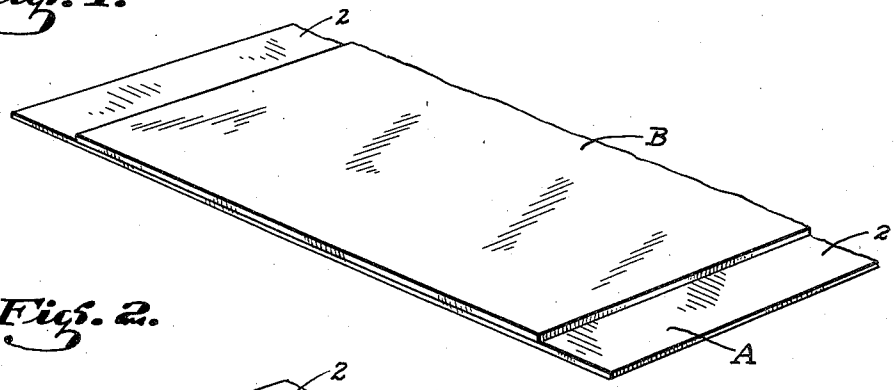


Fig. 2.

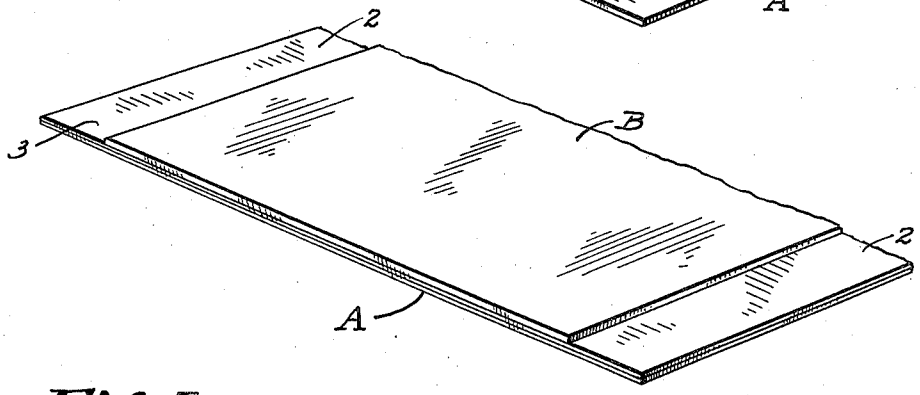
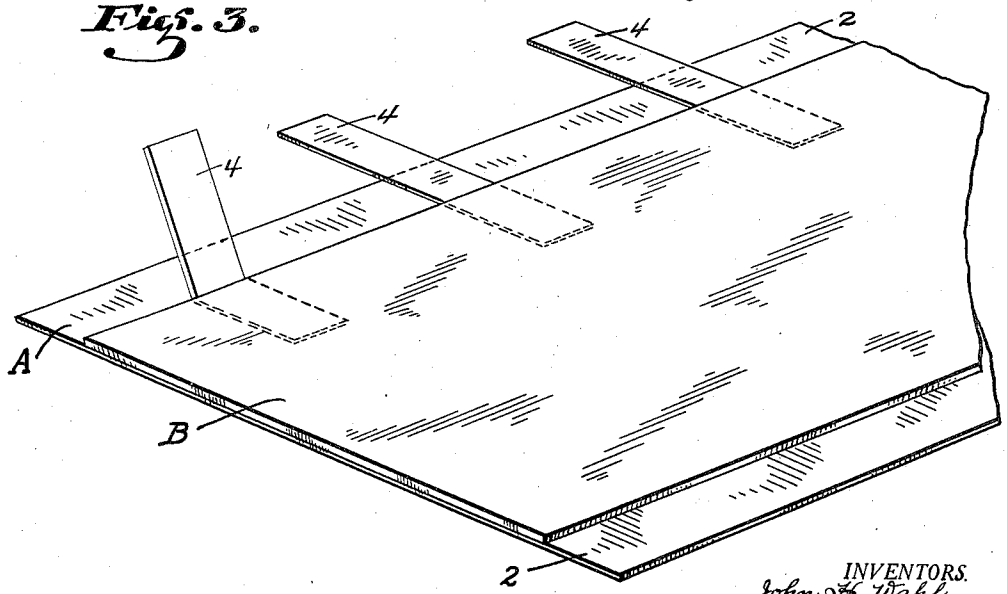


Fig. 3.



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Fig. 4.

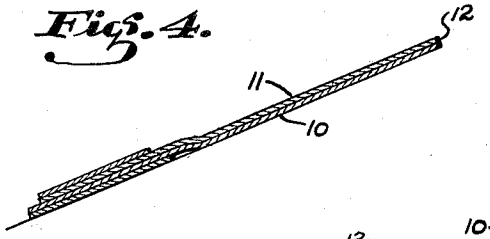


Fig. 6.

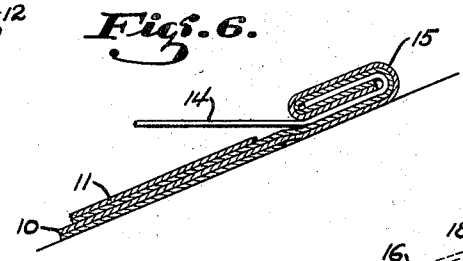


Fig. 5.

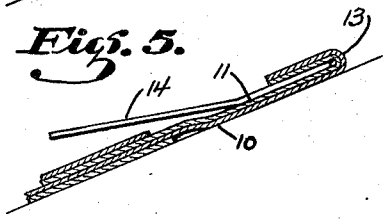


Fig. 7.

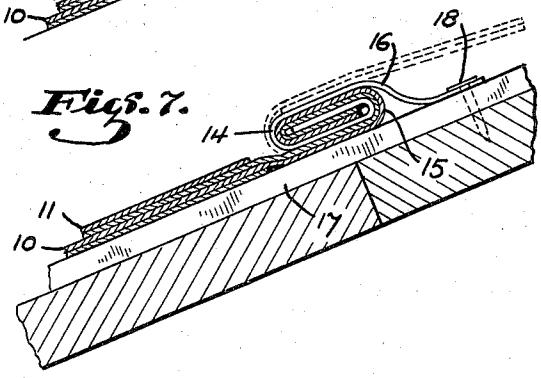


Fig. 8.

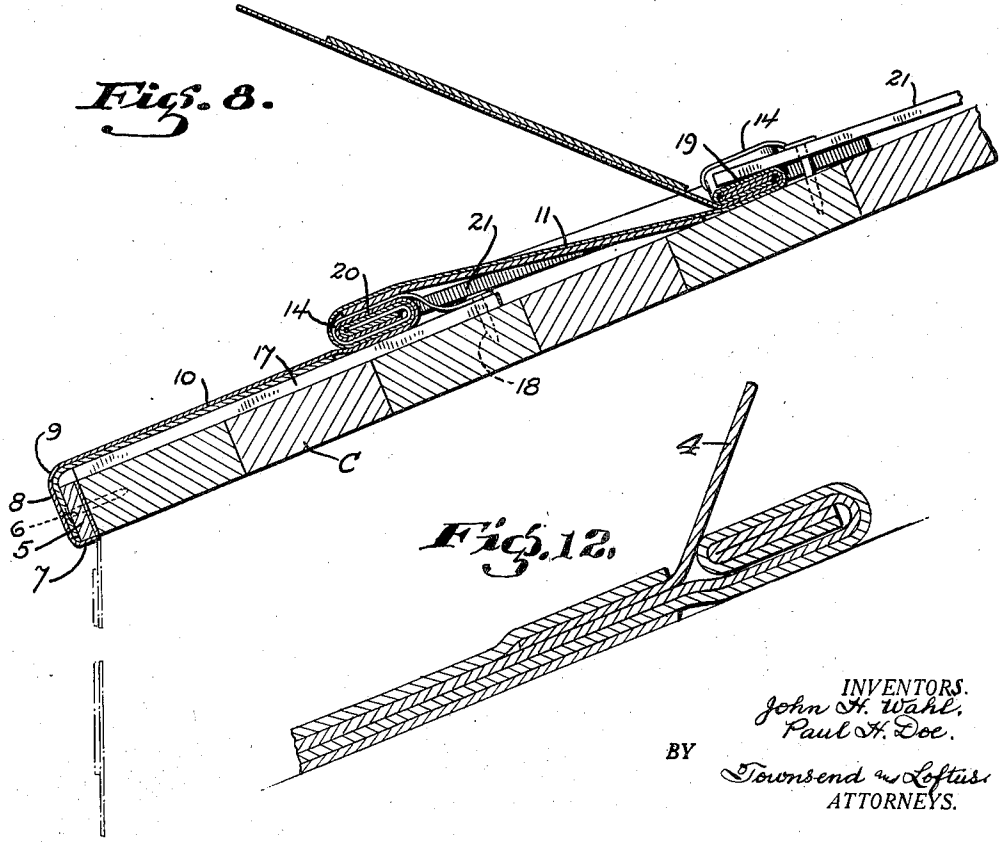


Fig. 12.

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Fig. 9.

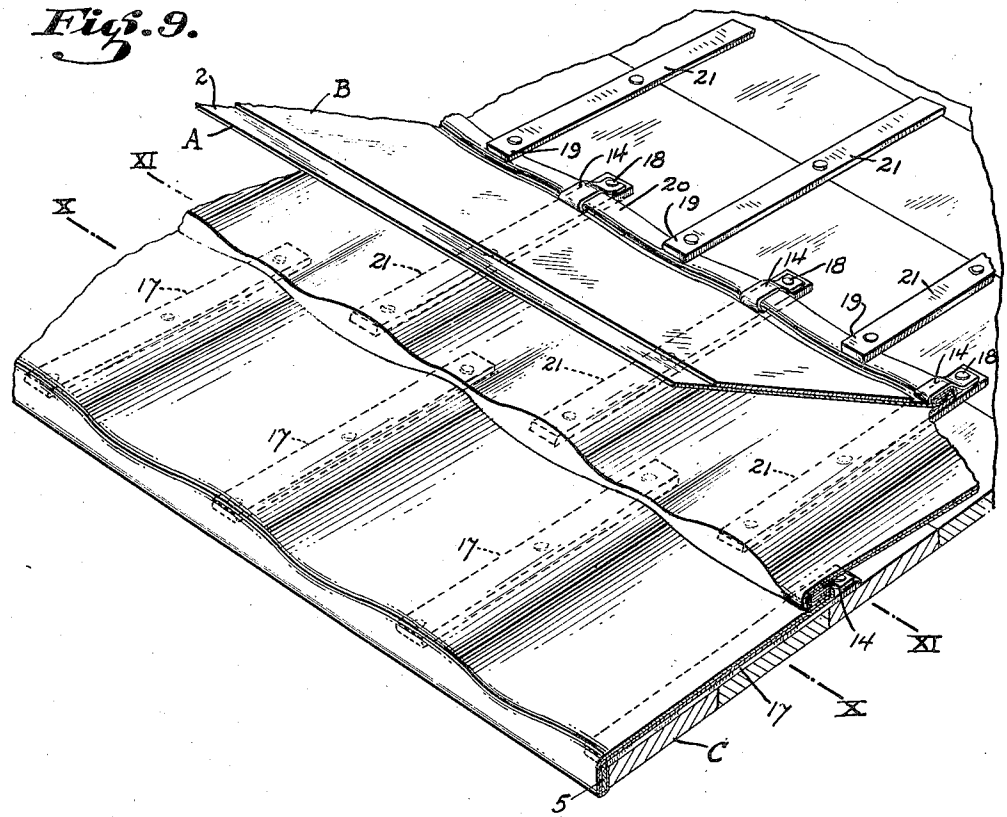


Fig. 10.

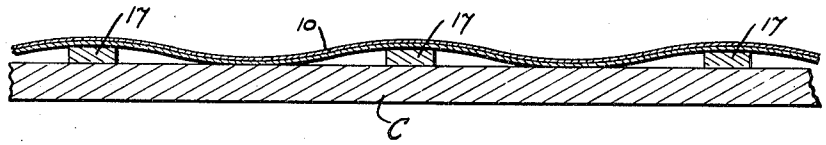
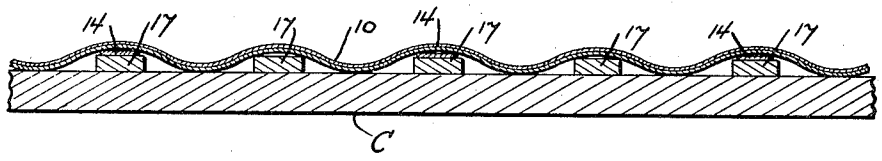


Fig. 11.



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2,043,271

ROOF STRUCTURE AND MATERIAL

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Application April 17, 1934, Serial No. 720,932

6 Claims. (Cl. 108—13)

This invention relates to a roofing material and method of applying the same, and especially to a sheet metal covering for roofs or walls of buildings and similar structures.

Of all the roofing materials known and in use copper is probably the most desirable due to its long life. Roofs covered with copper are, however, expensive as fairly heavy large sheets are used. Such sheets must be carefully interlocked and soldered and allowance must be made for expansion and contraction due to the comparatively high coefficient of expansion of copper.

The cost of copper depends upon the size and gauge or weight of sheets employed, hence if a small or narrow sheet of light weight material can be employed expense can be reduced to a point where a copper covered roof can be laid in competition with other roofing materials.

The object of the present invention is to generally improve and simplify the construction of copper covered roofs; to provide a method of application which permits the use of narrow, light gauge or weight strips of copper; to provide a method of application which takes care of both lateral and longitudinal expansion of each strip; to provide copper strips lined on one side with a reinforcing and sound deadening material; to provide a method of applying the copper strips which produces a raised ornamental effect; and further, to provide a roof covering material of the character described which can be applied or laid at a minimum of labor cost.

The roofing material and the method of applying the same to a roof is shown by way of illustration in the accompanying drawings, in which—

Fig. 1 is a perspective view of a portion of a roofing strip showing one manner of applying a reinforcing material.

Fig. 2 is a similar view showing another method of applying two sections of reinforcing material.

Fig. 3 is a perspective view showing the manner of applying the lug strips.

Figs. 4, 5, 6 and 7 are diagrammatic views showing the successive steps employed in interlocking or connecting the longitudinal edges of two roofing strips.

Fig. 8 is an enlarged cross section of a portion of a roof.

Fig. 9 is a perspective view of a portion of a roof showing the manner in which the roofing strips are laid and waved longitudinally and laterally.

Fig. 10 is a longitudinal section taken on line X—X of Fig. 9.

Fig. 11 is a longitudinal section taken on line XI—XI of Fig. 9.

Fig. 12 is an enlarged cross section of a portion of the roof illustrating in association with a joint the arrangement of the lug strip shown in Fig. 3.

Referring to the drawings in detail, particularly Figs. 1 to 3, A indicates a strip of copper. The strip is narrow and long and is obtainable in lengths of twenty-five, fifty, or more feet as required. The width of the strip may vary but in actual practice a strip approximately fifteen inches wide has proven very satisfactory. The thickness or gauge of the strip also varies but the material actually used is very thin, running from four thousandths of an inch up to eight thousandths of an inch, or better.

Secured to one face of the copper strip is a reinforcing material which serves two other functions, to wit, that of insulation and sound deadening. This material is indicated at B. It is of the same length as the metal roofing strip but it is narrower so as to leave two bare strip surfaces, such as indicated at 2—2, one on each side of the reinforcing strip. The reinforcing strip may be constructed of felt, padding material, paper, or the like and it is mounted and secured to the face of the copper or metal roofing strip by any suitable adhesive such as asphalt, etc.

The simplest form of the material is shown in Fig. 1. Another form is shown in Fig. 2. In this instance the same copper metal roofing strip is employed but to one face thereof is applied a sheet of reinforcing material such as indicated at 3. This strip is of the same length and width as the metal roofing strip and as such covers one face thereof from side to side and end to end. This reinforcing strip may be made of paper, cloth, or any other similar fibrous material and it is attached to the face of the metal roofing strip by any suitable adhesive. When the reinforcing strip is secured to the metal strip by asphalt as above explained, the asphalt forms on the reinforcing strip a coating of water-proofing material which impregnates the fibrous material of the reinforcing strip to a greater or less degree. After this is applied the reinforcing strip B is applied. As previously stated, by using the two reinforcing strips as shown in Fig. 2, thinner copper may be employed. The strip 3 serves two functions, first that of reinforcing the thin copper or other metal employed, and also that of a backing in the joint formed by folding the edges together when two adjacent sheets are interlocked.

In Fig. 3 another form of the metal roofing strip is shown. It is identical to that illustrated

in Fig. 1 with the exception that lug strips, such as indicated at 4, have been applied. The strips extend in under the reinforcing strip B and are secured by being soldered, sweated, welded, or the like. The strips 4 are placed at right angles to the longitudinal axis of the metal roofing strip so as to extend over one side edge thereof. They are placed at spaced intervals and their function will hereinafter be described.

It has previously been stated that copper is an ideal material for roof covering but it has heretofore been expensive due to the large heavy sheets required, and also because of the allowance for expansion and contraction, and so on. In the present instance large sheets are dispensed with entirely as the material is obtained in narrow strips approximately fifteen inches wide and in lengths as long as required. The thickness of the copper is also reduced to a minimum as in actual practice copper material between four and eight thousandths of an inch has proven exceedingly satisfactory. Even though such thin material is employed allowance must be made for both longitudinal and lateral expansion and contraction and the manner in which this is accomplished will be hereinafter described.

In describing the laying of this roofing material, reference will be made to Figs. 4 to 11, inclusive. In Fig. 8, C indicates the boards with which the roof frame or joists are covered. Such a covering is essential as something must be provided into which securing nails can be driven. With the roof covered with boards, such as shown at C, the application of the metal roofing strips is accomplished as follows: A strip is first hung from the edge of the roof and a wooden lath 5 is applied and secured by brads or nails 6. The roofing strip is then bent around the lower edge of the slat as shown at 7 and upwardly over the same, as indicated at 8, and then over the corner 9 of the roof and is then laid out flat as shown at 10. A second strip of copper, indicated at 11, is then laid on top of the strip 10 with their upper edges parallel as indicated at 12. The two sections of copper are then folded back on themselves to form a hook such as shown at 13 in Fig. 5. Lug strips 14 are then placed at spaced intervals, as shown in Fig. 5, and the two sections of metal are then bent once more upon themselves as shown at 15 in Fig. 6. This serves two functions, first that of thoroughly securing the adjacent edges of the two sheets with relation to each other by doubly interlocking them, and secondly that of securing the ends of the lug strips 14. The lug strips are then bent over the folded material, as shown at 16 in Fig. 7 and they are then nailed to wooden slats 17, thus securing the joint or folded portion of the two sheets with relation to the roof and doing so without driving any nails through the roofing material itself. This is important as it is not desirable to puncture the roofing material in any way whatsoever.

Before the first sheet is laid flat on the roof, as indicated at 10 in Fig. 8, a series of wooden slats are nailed to the boards C as shown at 17 in Fig. 9. These wooden slats are of a length slightly greater than the width of each roofing strip when laid so as to project in under the next adjacent strip, and also permit the free ends to receive the lug strips 14 and the nails 18 driven therethrough. These wooden slats are tacked to the roof at regular spaced intervals and they serve several functions; first that of forming a longitudinal series of waves in each strip; secondly that of receiving and securing the lug strips 14; and third that of acting as intermediate clamps as shown at 19 in Fig. 9. When the first roofing strip has been laid flat on the roof, as indicated at 10 in Fig. 8, and the second adjacent strip has been laid on top thereof and folded to form the interlock between the adjacent edges of the two strips, as shown in Figs. 4 to 7, inclusive, it will be noted that the interlocked or folded edge shown at 20 will overlie the wooden slats 17. The wooden slats, indicated at 21, are then applied at points intermediate the slats 17 and with their lower ends overlying the folded edge 20. The folded edge thus passes over and under the successive wooden slats and a wave-like formation is formed not only in the body of each strip but also in the folding joint connecting the two strips. The slats at the same time function to rigidly secure the roofing material to the roof boards or sheathing C without in any way puncturing the roofing material. The final result when a series of strips are laid is clearly shown in the two completed strips, see Fig. 9; that is, each strip forms an undulating surface in which the waves extend longitudinally of each strip, the waves being formed both in the body and in the interlocked portion. This longitudinal wave formation takes care of expansion and contraction due to temperature changes, that is, contraction and expansion longitudinally of the sheet. The expansion and contraction laterally of each sheet or strip is, of course, small compared to the longitudinal expansion or contraction but it should nevertheless be taken care of and it is taken care of by the interlocked joints formed by bending the metal upon itself, as clearly shown in Figs. 7 and 8, the bends forming a certain slackness in the material which is then adapted to take care of lateral expansion and contraction.

The longitudinal wave formation of the material is clearly shown not only in Fig. 9 but also in the longitudinal sections, see Figs. 10 and 11. It should further be noted that the wave formations become staggered as each strip is laid, thus producing a raised ornamental effect which is highly desirable as copper material otherwise has a tendency to appear too flat. By employing the reinforcing, indicated at B, comparatively thin metal may be employed, insulation is improved and sound deadening is insured. That is, metal roofs have a tendency to rattle in windy weather but such rattling is entirely overcome by the lining and reinforcing material employed. This material aids in insulating against heat and further insulation against heat is obtained by the air spaces formed by the waving of the material both longitudinally and laterally. The lug strips employed may be permanently attached to the strip material, as shown in Fig. 3, or it may be inserted during the folding of the material as described in conjunction with Figs. 4 to 7. Either method is efficient, and both insure a rigid fastening between the roofing material and the boards or sheathing C.

An important feature of this invention is the provision of the reinforcing strip B. First of all it functions as a reinforcing member, secondly as a sound deadening member, and third as insulation. The importance of making the reinforcing strip narrower than the metal roofing strip is that it leaves a bare uncovered strip surface, such as shown at 2—2, on each side, these

bare surfaces being employed when folding the metal edges upon each other as shown in Figs. 4 to 7. If the reinforcing material extended the complete width of the roofing sheet the folded interlocking edges would become rather heavy and clumsy, but if it is desired to increase the raised effect formed in the surface of the roof the reinforcing material may be extended the entire width.

While copper material has been specified, it is obvious that any other metal such as aluminum, etc., may be employed, and while other features have been more or less specifically described, we wish it understood that various changes may be resorted to within the scope of the appended claims. Similarly, that the materials and finish of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:—

1. A roof covering composed of a plurality of narrow metal strips running longitudinally of the roof, the adjacent edges of the strips being folded to join and interlock them, a plurality of spaced slats disposed under each strip at right angles thereto to form a waved surface longitudinally of each strip, said slats being longer than the width of the strips to extend beyond and to underlie the folded portion of the adjoining edges of the strips, means securing said slats to the roof, a second series of slats secured to the roof and staggered with relation to the first-named slats, said second named slats having their lower ends overlying the folded portion of the adjacent strips and underlying the adjacent strips.

2. A roof covering composed of long narrow sheet metal strips joined along their longitudinal edges, a plurality of spaced slats disposed in row formation under each strip and disposed at right angles to the longitudinal axis of the strips, the ends of the slats under one strip overlying the joined portion of an adjacent strip and clamping the joined portion against the roof, and the ends of the slats under said adjacent strip underlying said joined portion, and causing the joined edges to form a series of raised and depressed wave formations.

3. A roofing material comprising a long narrow strip of thin metal and a backing of reinforcing and sound deadening material secured to one face of the strip but being narrower than the strip to leave a longitudinally extending bare strip surface on each side of the backing, and a plurality of spaced metal lug strips secured to the metal strip between the backing and the metal strip and having a free portion extending beyond the said backing.

4. A roofing material comprising a long narrow strip of thin metal and a backing of reinforcing and sound deadening material secured to one face of the strip but being narrower than the strip to leave a longitudinally extending bare strip surface on each side of the backing, and a plurality of lug strips secured to the metal roof strip and carried by the same and having a free portion extending outward from the marginal edge of the backing.

5. A roof covering composed of a plurality of metal strips running longitudinally of the roof, the adjacent edges of the strips being folded to join and interlock them, and a plurality of spaced slats disposed under each metal strip at an angle thereto to form the metal strips including the folded joint portions thereof into a series of waves or curves to localize the effect of expansion and contraction and prevent rupture of the sheet metal, said slats being longer than the width of the metal strips when assembled to extend beyond and to underlie the folded portions of the adjoining edges of the strips.

6. Roofing material consisting of a unitary structure and comprising a long narrow strip of thin metal, a reinforcing strip of fibrous material of the same width and length as the metal roofing strip having an adhesive water-proofing coating thereon and secured by the same to and entirely covering one face of said metal strip, and a backing of reinforcing sound deadening material secured to the reinforcing strip and being narrower than the same to leave marginal watertight packing portions of the reinforcing strip uncovered throughout the entire length of the metal strip.

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