

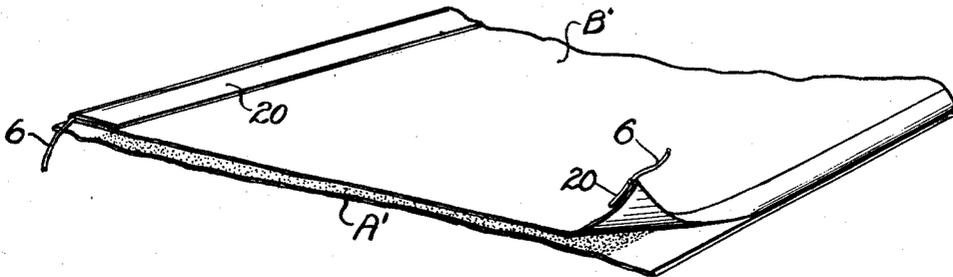
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METAL SHEATHED ROOF

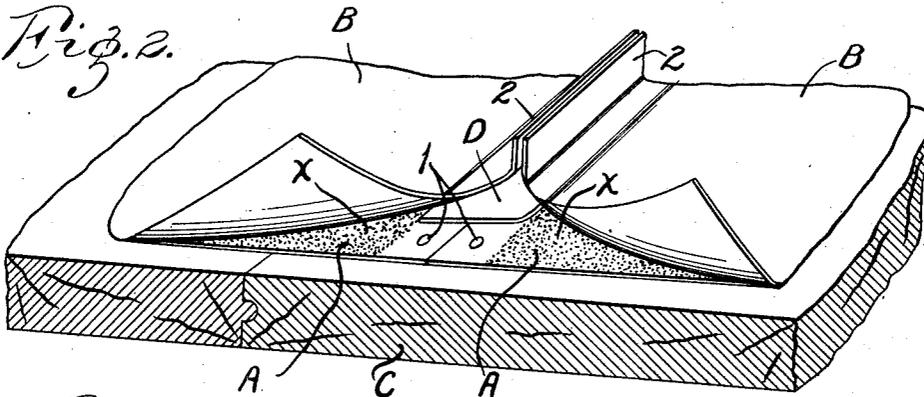
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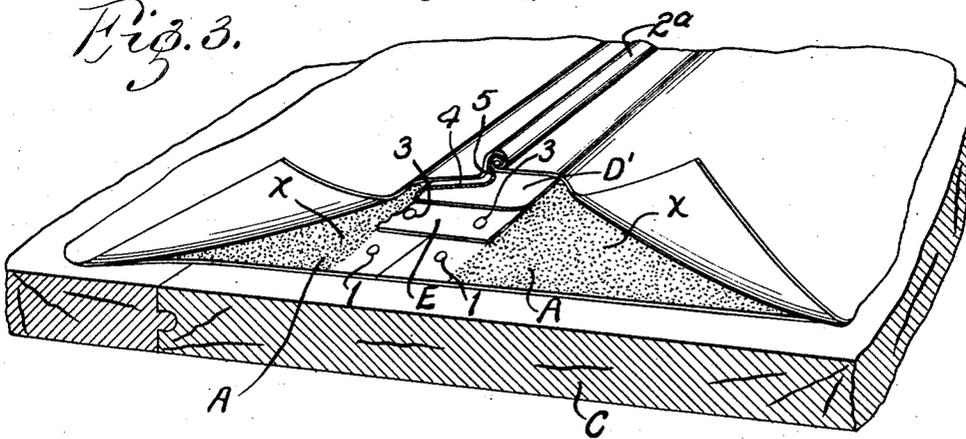
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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## METAL SHEATHED ROOF

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This invention relates to roofs of the type that are composed principally of sheet material, such as felt, paper or the like, that is saturated, impregnated and coated with a substance, such as asphalt, that will render said sheet material water-proof.

One object of the present invention is to overcome the necessity of using a relatively great number of superimposed layers of sheet material in roofs of the general type mentioned, in instances where it is desired to produce a roof that is capable of successfully withstanding the elements for a period of many years.

Another object is to provide a roof, which in addition to having the desirable features and characteristics of a roof made up of numerous superimposed layers of water-proof sheet material, is weather-proof, fire-resistant, resistant to radiant heat and lightning-protective.

Another object is to provide a roof that comprises a perishable water-proofed material, and a protective sheathing for said material, which, in addition to being capable of reflecting actinic rays, will also protect said material from oxygen, moisture, excessive heat and extreme temperature changes.

Another object is to provide a roof that comprises a metal foil top sheathing, and a plastic cushion or supporting base for said sheathing that will protect the underside of said sheathing from moisture and also prevent said sheathing from being injured by roof distortions.

Another object is to provide a roof having the desirable characteristics above mentioned, that can be installed or erected quickly and with unskilled labor.

And still another object is to provide a roofing strip or sheet of novel construction, that is easy to apply or install.

In constructing roofs of the type that are composed of felt or other suitable flexible sheet material saturated, impregnated and

coated with asphalt or a similar substance that will make the sheet material water-proof, it is the general custom to employ a number of superimposed layers of sheet material arranged so that the joints between the adjacent sheets or strips of one layer are widely overlapped by the sheets or strips of the superimposed layer, in instances where it is desired to produce a roof that will successfully withstand the elements for a period of many years. The reason for this is that asphalt and similar bituminous substances used in the manufacture of sheet roofing, are easily affected by the elements, particularly actinic rays and oxygen. After the superimposed layers of sheet material have been applied to the supporting structure of the roof to form the body portion of the roof, a top covering or protecting surface is usually applied, which top covering or protecting surface may consist of asphalt covered with gravel, or a top layer of sheet material coated with fine slate particles, heavy asphalt or various other substances that will impart a durable finish and attractive appearance to the top layer of the roof.

The roof that forms the subject-matter of my present application for patent is distinguished from conventional roofs of the general type mentioned, in that it is composed of a body portion which may be constructed in various ways, and a top portion or protective sheathing made up of sheets or strips of metal foil combined in such a way as to produce a substantially continuous or unbroken metallic top covering for the body portion that is non-corrosive, lightning-protective, and free from cracks or joints through which the elements can penetrate. Due to the fact that the metallic protective sheathing adequately protects the body portion of the roof from actinic rays, oxygen, moisture, excessive heat and extreme temperature changes, it is highly practicable to

form said body portion from a single layer of water-proofed sheets or strips that are either butted together or slightly overlapped. The sheets or strips of flexible material constituting the body portion of the roof may be applied in any preferred manner to the supporting structure of the roof, and the metallic protective sheathing thereafter applied to said body portion, or the impregnated sheets or strips used to form the body portion may be combined at the factory with the sheets or strips of foil used to form the protective sheathing, so as to form a composite roofing strip or sheet that can be installed as a single unit. In such a roof, the body portion serves as a plastic cushion or supporting base for the metal foil top sheathing, that protects the underside of said sheathing from moisture and also prevents said sheathing from being injured by roof distortions.

Figure 1 of the drawing is a perspective view, illustrating my improved roofing strip.

Figure 2 is a perspective view, illustrating a roof constructed in accordance with my invention; and

Figure 3 is a perspective view, illustrating my improved roof equipped with anchoring devices for securing the metallic sheathing to the supporting structure of the roof.

In the accompanying drawing which illustrates my invention, A in Figure 2 designates the body portion of the roof, and B designates the metallic cap sheet, top covering or protective sheathing for said body portion. The body portion A can be constructed in various ways without departing from the spirit of my invention, but is preferably formed from one or more layers of sheet material that has some flexibility or resiliency, such as felt, paper or the like, saturated, impregnated and coated with asphalt or any other substance that will render it water-proof, or substantially so. Said sheet material is preferably installed by laying it upon the supporting structure C of the roof and securing it to said supporting structure in any preferred or suitable way, as, for example, by an adhesive or by fastening devices. If the supporting structure C is made of wood or similar material, the portion A of the roof is secured to same by nails or similar fastening devices 1 that are driven through the sheet material A into the supporting structure C. Due to the fact that the metallic sheathing B protects the body portion A from the elements, particularly light and oxygen, it is practicable to lay the strips or sheets constituting said body portion so that the adjacent edges are butted together or slightly overlapped. After attaching the sheets or strips A to the supporting structure of the roof, joint protectors D are laid over the cracks or joints between said sheets so as to close said

joints and also protect the means or medium used to secure the sheets A to the supporting structure C, said joint protectors D preferably consisting of strips of felt, metal foil or other suitable material that is held in place by an adhesive applied either in a cold or heated condition.

The metallic cap sheet or protective sheathing of the roof is made up of strips B of metal foil that are arranged in parallel relationship and subjected to a rolling operation that smoothes out said strips and causes them to lie flat and free from wrinkles. Prior to laying the metal foil B on the body portion A of the roof, hot asphalt or some other suitable adhesive  $x$  is spread over said body portion so as to cause the metal foil to be securely attached to said body portion and combined with same in such a way that there will be no voids or air pockets between said foil and body portion. While various kinds of metal foil may be used to constitute the protective sheathing of the roof, it is preferable to form said sheathing from strips of aluminum foil, as such material is not seriously affected by exposure to the elements; it is of high reflectivity and low emissivity; it is a good conductor of electricity; and it is capable of being easily lock-seamed so as to produce gas and liquid-tight joints between adjacent strips.

If the protective sheathing of the roof is formed from strips of metal foil that are applied after the body portion A of the roof has been attached to the supporting structure C, the preferred procedure is to bend up the longitudinal edge portions of the sheathing strips B, so as to produce upstanding flanges 2 thereon, as shown in Figure 2, and thereafter curl, fold or interlock the flanges 2 of adjacent strips and flatten down said interlocked flanges so as to produce locked seams or double locked seams 2<sup>a</sup> between the strips, as shown in Figure 3. It is immaterial what procedure or means is used to produce locked seams between the adjacent sheathing strips of foil B, but one advantage of the roof herein illustrated and described is that the metallic sheathing strips may be lock-seamed or mechanically connected together to produce gas and liquid-tight joints between the same by means of a tool or machine that is moved longitudinally of the sheathing strips so as to progressively deform and interlock the flanges 2 of adjacent strips.

In instances where it is not desired to spread a coating of asphalt or other suitable adhesive over the body portion A of the roof before applying the metallic sheathing strips B, or in instances where it is desired to have the metallic sheathing B mechanically connected to the supporting structure C of the roof, as well as being secured by an

adhesive  $\alpha$  to the body portion, anchoring devices E, formed preferably from metal foil, are arranged over the joints or cracks between the strips A and attached by fastening devices 3 to the supporting structure of the roof before applying the sheathing strips B. Said anchoring devices E may each consist of a strip of metal bent to form a base portion through which the fastening devices 3 pass, as shown in Figure 3, a horizontally-disposed portion 4 attached to one edge of said base portion, and lapping over the same, and an upstanding flange or tab 5 on said portion 4 that is adapted to be arranged between the upstanding flanges 2 on two adjacent sheathing strips B in the operation of laying said sheathing strips on the body portion A of the roof. In the operation of lock-seaming or joining the sheathing strips B together, the upstanding flanges or tabs 5 on the anchoring devices E are interlocked with the co-acting flanges 2 of the sheathing strips during the operation of curling, bending or deforming said flanges 2, so as to produce the locked seams 2<sup>a</sup> shown in Figure 3. When anchoring devices E are employed it is preferable to arrange protecting elements D' of felt, foil or other suitable material, on the base portions of the anchoring devices, so as to cover the fastening devices 3, and thus eliminate the possibility of moisture finding its way into the holes produced in the body portion of the roof by the fastening devices used to secure the anchoring devices to the supporting structure. If desired, a suitable adhesive may be spread over the top face of the base portion of each anchoring device before installing the protecting element D'.

On roofs of uneven surface or on roofs where people are liable to walk, it may be desirable to form the body portion A of the roof from a plurality of superimposed layers of felt or other suitable sheet material, treated to render it water-proof or substantially so, which superimposed layers may either be nailed in position or laid in hot asphalt and arranged so that the sheets or strips constituting one layer are butted together or only slightly overlapped. If desired, the body portion of the roof may comprise layers of coated felt or other suitable material arranged so as to protect the underside of the body portion of the roof against absorption of moisture.

In conventional roofs of this general design the body portion of the roof is often composed of from five to seven layers of saturated felt and asphalt between the layers, and the sheets or strips of the layers arranged so that said strips are overlapped as much as twenty-five inches. With a roof of the construction herein described, however, a body portion formed from a single layer of felt or similar material, lapped only

one inch, will give greater protection than a body portion formed from five to seven layers of felt or the like, and moreover, will be fire-resistant and lightning-protective, and will reduce the temperature of the roof as much as 30° F. when exposed to radiant heat. Furthermore, when the protective sheathing B of the roof is constructed from polished metal foil, the roof will increase the illumination in the rooms of adjoining buildings, due to the high reflectivity of the cap sheet of the roof. If it is desired to produce what is commonly referred to as an "insulated" roof, a water-proof base layer is attached to the supporting structure C of the roof, so as to protect the underside of the insulating material from moisture, a layer of insulating material is then laid upon said base layer, a layer of impregnated felt or similar material is then installed on the insulating layer, so as to form a pliable base for the foil top sheathing and also protect the underside of same from moisture, and a metallic protective sheathing formed from strips or sheets of metal foil B, as previously described, is then applied to the layer of impregnated felt, so as to prevent disintegration of the water-proofing compounds with which said felt is impregnated.

Figure 1 illustrates a composite roofing material that is particularly adapted for use in producing a roof of the construction above described. Said roofing material is of novel construction, in that it comprises a body portion formed from a strip or sheet A' of felt or other sheet material saturated, impregnated and coated with a water-proofing substance, and a protective sheathing B' formed from metal foil that is permanently combined with said body portion before said body portion is applied to the supporting structure of the roof. In manufacturing or producing such a roofing sheet or strip, a strip of metal foil B' provided with folded or doubled portions 20 at its longitudinal side edges, is secured by an adhesive to a strip or sheet A' of saturated felt or other suitable material, in such a way that the side edge portions of the strip of foil B' are not secured or attached to the side edge portions of the felt A', thereby permitting the foil to be turned back sufficiently, as shown in Figure 1, to permit fastening devices 1 to be driven through the side edge portions of the felt A' to secure the same to the supporting structure of the roof. Said metallic protective sheathing B' is applied to the felt A' at the factory where the material is prepared for the market, thereby producing a composite roofing strip composed of a body portion of felt or similar material permanently combined with a metallic protective sheathing that is adapted to be joined by locked seams to the protective sheathings of similar roofing strips.

If desired, strands 6 of any suitable material can be arranged under the folded or doubled over side edge portions 20 of the metallic protective sheathing B' of each composite strip, so as to enable said folded or doubled portions to be bent upwardly to form the flanges 2, simply by pulling the strands 6 in a direction to raise or lift the folded or turned over edge portions 20 of the protective sheathing. A composite roofing strip or sheet of the construction above described can be installed quickly and easily by unskilled labor, and it is a decided improvement on conventional sheet roofing material, in that it comprises as an integral part thereof a metallic cap piece or sheathing that affords adequate protection for that portion of the material that is apt to deteriorate rapidly when subjected to light and oxygen. It is, of course, immaterial what type or kind of sheet material is used to form the body portion A' of a composite roofing strip or sheet of the kind just described, and in instances where the material is to be used to form a so-called "insulated" roof, the composite strip or sheet may comprise a layer of insulating material combined in any preferred manner with the material that constitutes the body portion.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A roof comprising a body portion formed from pieces of flexible sheet material treated to render it water-proof, arranged with the edges of adjacent pieces in abutting relationship, fastening devices that pass through the edge portions of the said pieces for securing them to the supporting structure, joint covers arranged in overlapping relationship with the edge portions of adjacent pieces so as to cover the joints between the same and also cover the heads of said fastening devices, and a top protective sheathing formed from pieces of metal foil joined together by locked seams and secured by an adhesive to said body portion.

2. A roof, comprising a body portion formed from pieces of non-metallic, flexible sheet material treated to render said material water-proof, fastening devices driven through the edge portions of said pieces to secure them in position, anchoring devices attached to the supporting structure of the roof and arranged over said fastening devices and over the joints between said pieces, a protective sheathing for said body portion formed from pieces of metal foil, and co-acting flanges on said pieces of foil and on said anchoring devices, that are bent, curled or deformed so as to produce locked seams.

3. A composite roofing material formed from a piece of non-metallic sheet material, and a metallic protective sheathing of foil secured by an adhesive to said sheet material

and provided at one side edge with a doubled or folded portion, that overlaps said non-metallic material, the top layer of said folded portion being adapted to be lock-seamed to a similar portion of an adjacent piece of composite roofing material.

4. A roofing material of the kind described in claim 3, provided with means for facilitating bending upwardly the doubled or folded portion of the protective sheathing.

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