July 19, 1927. 1,636,388

T. ROBINSON

PROTECTED METAL ROOFING

Filed May 6, 1926

Fig. 1.

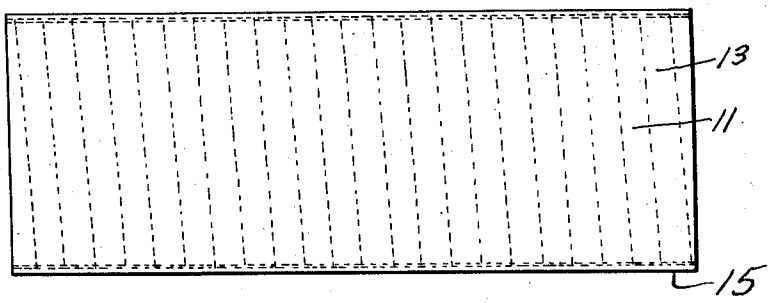


Fig. 2.

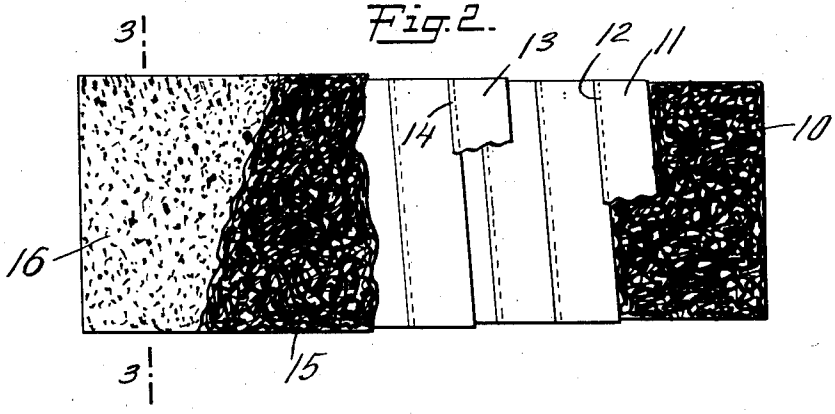


Fig. 3.

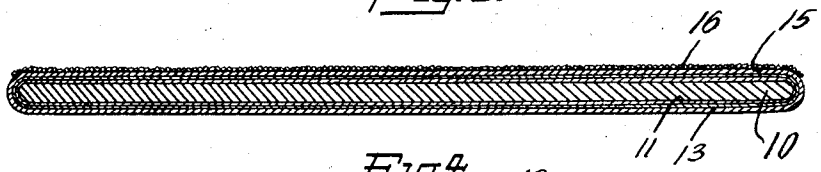


Fig. 4.

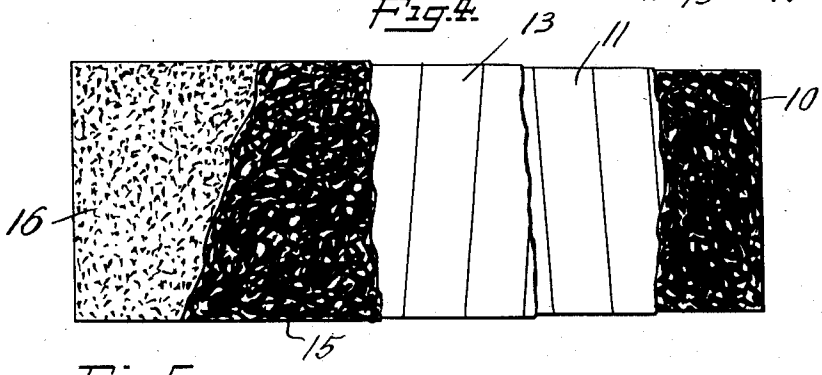


Fig. 5.



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UNITED STATES PATENT OFFICE.

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PROTECTED METAL ROOFING.

Application filed May 6, 1926. Serial No. 107,041.

This invention relates to prepared building materials suitable especially for the roofs and walls of buildings, and the invention is more particularly concerned with the provision of a building material which possesses all the advantages of rigidity and strength of metallic materials, but is of greater durability and improved appearance.

Metallic roofing and siding material is now commonly used in buildings for industrial and other purposes, where an inexpensive construction is desired and the material is usually in the form of iron sheets which may be either plain or corrugated. These sheets are of a relatively heavy gauge and in one common form are oblong in shape and from six to eight feet long and approximately three feet in width. These sheets are laid on the roof in the usual way, and ordinarily the metal employed is galvanized so that corrosion will be resisted. Such treatment, however, is only temporarily effective, and in a short time the metal rusts, the corrosion proceeding rapidly where the atmosphere contains acid fumes. The life of such material is consequently limited and the material, which, when newly laid, does not have a particularly attractive appearance, becomes especially unsightly after rusting begins.

The object of the present invention is to provide a building material of improved appearance and long life which may be made in any form desired, at a low cost and at a high rate of output. The material is preferably made in the form of a sheet of the usual size and its weight is not substantially different from that of plain metal sheets, although it is considerably thicker.

The new material includes a core of a non-metallic substance, and may be in the form of a hardened plastic mass or of a sheet of flexible fibrous material. A bituminous mastic including an asphaltic compound is suitable or the core may be of a heavy sheet material, such as paper, and preferably a paper impregnated with a water-proofing substance. The plastic type of core is preferably produced by a continuous process and, as rapidly as it is formed, it is encased within a layer of metal. This may be done by forming the core by an extrusion operation, and then wrapping the core with a strip of metal laid about the core helically in a plurality of convolutions so as to form a substantially continuous metallic layer. Over this metallic layer, which extends from end to end of the core, is wrapped a protective jacket which may take the form of a strip of flexible fibrous material wrapped over the metal layer in a series of convolutions. Over the layer of fibrous material is applied a sealing jacket, preferably in the form of a waterproof plastic substance, such as asphalt capable of withstanding solar heat. If desired, the sealing layer may be covered with a surfacing material, such as mineral products, of the type of sand, crushed slate, and the like. This surfacing material may best be applied to the surface of the sealing layer while the latter is still tacky, being partially submerged therein by the action of pressure.

For a better understanding of the invention, reference may be had to the accompanying drawing, in which

Fig. 1 is a face view of a strip of the new material, but with the surfacing layer absent,

Fig. 2 is a similar view, with portions of the overlying layers broken away,

Fig. 3 is a sectional view on the line 3—3 of Fig. 2,

Fig. 4 is a view similar to Fig. 2, but showing the jacketing strips in a different arrangement, and

Fig. 5 is a view similar to Fig. 3, showing a corrugated material.

Referring now to the drawings, the new roofing material includes a core 10, which is here shown as relatively flat, although the shape of the core will be dependent on the kind of product which is to be made. This core may be of any suitable material of an insulating character, and if made of a plastic substance it may be produced by an extrusion operation which is inexpensive and simple. The plastic substance should be one which will harden on setting, such, for instance, as a bituminous substance, and if desired, may contain a filler, such as crushed mineral matter. Instead of using the mastic, a suitable grade of a fibrous material, such as paper, may be employed, and for this purpose it is preferable to use paper which has been rendered waterproof by the use of asphalt.

Enclosing this core is a jacket of metal 11 which may be conveniently applied in the form of a metallic strip, preferably of a light gauge steel wound about the core helically and with the convolutions partially overlapping, as indicated at 12, so that the

core is encased in a substantially continuous metallic layer. This metallic layer provides a reinforcement for the finished product, and gives it the necessary strength and rigidity. The overlapping edges of the convolutions provide a double thickness of metal, which act as stiffening ribs, and which are inclined at opposite angles on the opposite faces of the core, as will readily be apparent from a consideration of the manner in which the metal is applied. By wrapping the metal in this manner, both longitudinal edges of the core are protected against injury. Encasing the metal is the jacket layer 13, which protects the metal from the weather. I prefer to use for this purpose a heavy paper rendered waterproof by impregnation with a substance, such as asphalt. The strip of fibrous material is continuous from end to end of the core, and is wrapped about the core helically as shown, the convolutions partially overlapping as indicated at 14. If desired, and as shown in Fig. 4, the strip of metal 11 may be wound in one direction helically around the core, aid the strip of fibrous material 13 wound with the opposite lay. When the strip of fibrous material is wound as shown in Fig. 2, the convolutions of the outer layer should break joint with the convolutions of the metal.

Applied over the jacketing layer of paper is a sealing layer 15 of a suitable waterproof composition. Asphaltic material is satisfactory for the purpose, and the asphalt used should be one which has a melting point sufficient to withstand solar heat.

Applied over the surface of the sealing layer, is a layer 16 of material for wear purposes. This may be any of the usual substances, such as sand, crushed slate, and the like, used in this way. This wear surface not only protects the base against injury, but in addition, it improves the appearance of the material.

In the manufacture of the new material I prefer to employ a process similar to that illustrated and described in my co-pending application, Ser. No. 101,877, filed April 14, 1926. In this application there is shown a process and apparatus by which a core is continuously formed of a plastic material by an extrusion operation. This material is forced from the extrusion orifices, which are arranged to produce a tube of the plastic compound, around which is wrapped the metallic strip. Over this is laid the strip of the fibrous material, and the tubular core, with these jacketing layers applied, passes from the extrusion device and is led through rolls which collapse the core, consolidating it into a single layer. The convolutions of the metal strip are similarly flattened and the pressure applied is sufficient to give the bends in the metal at the edges of the core a permanent set. Passing from the shaping rolls, the jacketed core is led through a coating device, by which the layer of asphaltic material is applied, after which the granular surface is laid. Preferably, the granular material is applied over the surface of the asphalt while the latter is still tacky, and is partially embedded therein to be held by the asphalt when the latter cools and sets.

The material illustrated in Figs. 1 and 3 is of a flat cross-section and after it is produced by a continuous operation in the form of a flat sheet of indefinite length, this sheet is cut into lengths suitable for ordinary building purposes. Such sheets are commonly of approximately three feet in width and six to eight feet long. If desired, however, a corrugated product, such as that illustrated in Fig. 5, may be produced, this product being made in the same way as the flat material but being passed through corrugating rolls in the course of manufacture. The corrugations will preferably extend lengthwise of the sheet.

The new material is primarily adapted for industrial building purposes, and may be laid in the usual way on the building structural members. The material is much superior to ordinary sheet iron commonly used heretofore for this same purpose, because while it includes a metallic jacket which gives the product the desired strength and rigidity, the metal is entirely concealed and protected so that corrosion is prevented. At the same time, the metal is encased and in turn encases insulating material, so that heat cannot be transmitted through the new product with rapidity. The use of the sealing layer protects the two jacket layers and in turn affords a means for applying the granular wear material which enhances the appearance of the product. The new material may be considered as a protected metal product, although it is superior to the protected metal building elements heretofore manufactured, because the metal is employed in the form of a strip of relatively light weight. The metal layer, which is of generally tubular form, is protected on both faces and also on its interior against rusting. The use of the metal in the form of a helically laid strip having overlapping edges, permits the use of much lighter gauge material without sacrificing the strength and stiffness of the final product.

I claim:

1. A prepared material for roofing and other similar purposes which comprises a non-metallic core, a layer of metal encasing the core and a waterproof jacket over the metallic layer.

2. A prepared material for roofing and other similar purposes, which comprises a relatively flat non-metallic core, a substantially continuous layer of metal encasing the

core, and a waterproof jacket including fibrous material encasing the metallic layer.

3. A prepared material for roofing and other similar purposes, which comprises a non-metallic core, a strip of metal laid about the core in a plurality of convolutions and forming a substantially continuous metallic layer, and a waterproof jacket encasing the metallic layer with the core inside it.

4. A prepared material for roofing and other similar purposes, which comprises a non-metallic core, a strip of metal wound around the core helically in successive partially overlapping convolutions to form a substantially continuous metallic layer, and a waterproof jacket encasing the metallic layer with the core inside it.

5. A prepared material for roofing and other similar purposes, which comprises a non-metallic core of insulating material, a strip of metal wound about the core from one end to the other in overlapping convolutions, and a strip of waterproof flexible fibrous material laid over the metal to form a substantially continuous jacket.

6. A prepared material for roofing and other similar purposes, which comprises a non-metallic core of plastic material, a strip of metal wound about the core in a plurality of convolutions, and a waterproof jacket encasing the metal layer.

7. A prepared material for roofing and other similar purposes, which comprises a relatively flat core of plastic material, a strip of metal wound helically about the core to form a substantially continuous layer of metal, a strip of flexible fibrous material wound over the metal, and a sealing layer of waterproof material applied over the fibrous strip.

8. A prepared material for roofing and other similar purposes, which comprises a relatively flat core of plastic material containing a bituminous substance, a substantially continuous metal layer encasing the core, a strip of flexible fibrous material wound over the metal and a sealing layer of waterproof material applied over the fibrous strip.

9. A prepared material for roofing and other similar purposes, which comprises a core of asphaltic material, a strip of thin metal wrapped about the core to form a substantially continuous metallic layer, a strip of flexible fibrous material wrapped about the core over the metal, and a layer of bituminous material applied over the fibrous layer and forming a waterproof seal.

10. A product for building and other purposes, which comprises a sheet of considerable extent formed of a relatively flat core of non-metallic material, a metallic strip wrapped about the core helically from one end to the other and forming a substantially continuous metallic layer, and a waterproof layer forming a protective jacket for the metal and core.

11. A prepared material for roofing and other similar purposes, which comprises a non-metallic core, a layer of metal encasing the core, a waterproof jacket encasing the metallic layer, and granular wear material covering one surface of the waterproof jacket.

In testimony whereof I affix my signature.

THOMAS ROBINSON.