May 26, 1931. T. RC 3INSON 1,807,435

ROOFING ELEMENT

Filed June 14 1929

Fig. 1.

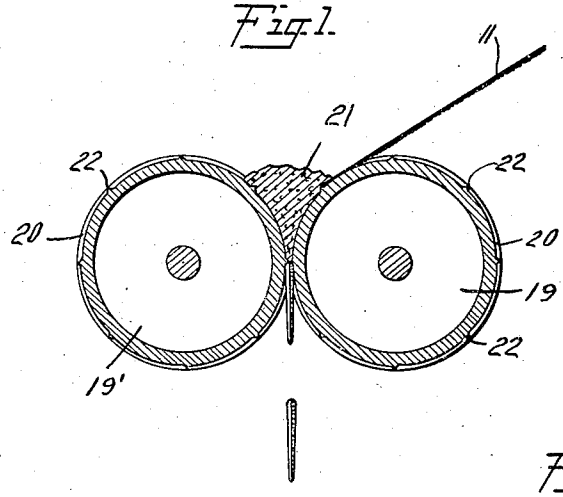


Fig. 6.

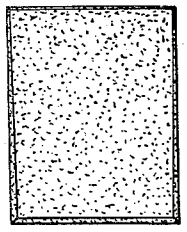


Fig. 2.

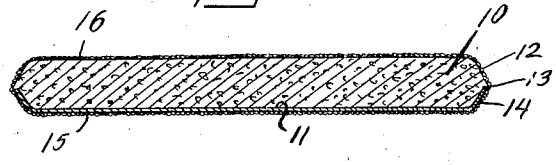


Fig. 3.

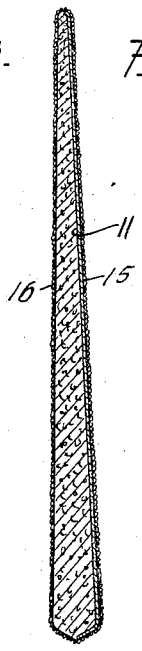


Fig. 4.

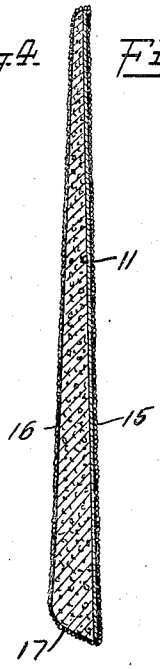


Fig. 5.

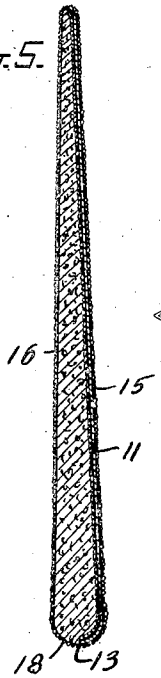
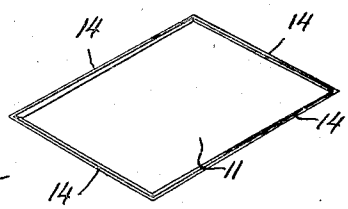


Fig. 7.



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UNITED STATES PATENT OFFICE

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ROOFING ELEMENT

Application filed June 14, 1929. Serial No. 370,974.

This invention relates to roofing elements and is concerned more particularly with a roofing element which consists of a body of hardened plastic material, and a facing sheet applied to one face of the body to strengthen and re-inforce the body and protect its edges. This new product has the advantage of having a longer life and offering greater resistance to fire than wooden shingles and it may be made in different shapes and thicknesses. In particular it may be made tapered and with a thick butt so that it has a more attractive appearance when laid than so-called "prepared" roofings which are relatively thin and ordinarily of uniform thickness from end to end.

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

Fig. 1 is an end view of the apparatus which may be used in making the new product;

Fig. 2 is a sectional view of one form of the product;

Figs. 3, 4, and 5 are sectional views of different types of the product;

Fig. 6 is a plan view of one form of the product; and

Fig. 7 is a perspective view of one form of the facing sheet.

While the new product may be made in various shapes and sizes, for convenience it is illustrated in the form of an individual shingle. This shingle comprises a body 10 of hardened plastic material, made up of an aggregate and a binder. The aggregate may consist of ground cork, cinders, sand, crushed slate, and other finely divided materials of that type, preferably mixed with unfelted fibre, such as asbestos or the like. For some purposes, the fibrous material may be used alone and without mixture with the finely divided solid materials. This aggregate is bound together by a suitable binding medium, preferably of the bituminous type, asphalt of a suitable melting point being satisfactory for the purpose. The plastic mass is made by mixing the solid and fibrous material with the heated asphalt, a relatively large proportion of the aggregate being employed so that the mass is relatively stiff.

On one face of the body is a protective facing in the form of a fibrous sheet 11. The sheet material is preferably wool or asbestos felt impregnated with a waterproofing compound, such as asphalt, although coarse paper and the like may also be used.

All of the shingles illustrated are of tapering thickness, although it is to be understood that the new product may also be made with a uniform thickness from end to end. The tapered shingle is preferred since by that construction the shingle may have a butt end which is relatively thick and at the same time may be readily laid with others in the usual overlapping courses. The body of the new shingle is of plate-like form with its greatest area substantially in a plane which may lie midway between the two faces. In that form, the faces of the plate incline toward each other, as indicated at 12, to meet in the plane 13 which passes centrally through the body.

The facing sheet 11 covers one of the faces of the body and its margins may be shaped so as to lie out of the major plane of the sheet and thus cover such portions of the edges of the body, indicated at 14, as lie at one side of the central plane thereof. Preferably in this form of the shingle, the sheet has portions along at least a pair of opposite edges which extend out of the plane of the sheet, and in the construction shown in Figs. 2, 3, 5, and 7, all four edges of the sheet are bent out of the plane so that the sheet is dish-shaped (Fig. 7) and the body lies in its concavity. With this construction, the edges 14 of the sheet re-inforce the shingle at the edges thereof since the sheet edges lie at an angle to the plane of the element, thus protecting the body against injury and preventing distortion thereof.

In the finished product, the facing sheet is saturated and coated with asphalt and provided with the usual grit surfacing indicated at 15. The grit may be crushed slate or other materials commonly used as surfacings in the roofing art. The face of the body not protected by the sheet is also covered with sur-

facing material, indicated at 16, the particles of this surfacing being partially embedded in the body so as to be bound thereto.

In the construction illustrated in Fig. 4, the sheet 11 lies flat and the end and side edges of the body are inclined toward the sheet so as to give the body the proper tapering thickness and appearance at the edges 17. In this form, the sheet is provided with surfacing 15 and the body is similarly provided with surfacing 16. In the construction shown in Fig. 5, the edges of the body meet in a central plane 13 to merge together at that plane with a smooth curve indicated at 18. The central plane is thus somewhat less clearly defined by the edges than is the case with the construction shown in Fig. 3, for example. Also, in the construction shown in Fig. 5, the sheet 11 is coated and surfaced with grit on both faces. This double surfacing of the sheet is useful in some instances in that it simplifies the handling of the sheet in the manufacture of the product and also produces a slightly better bond between the sheet and the body, the projecting portions of the particles on the inner face of the sheet extending into the body and serving to interlock the sheet and body. A sheet with surfacing on both faces may be employed in any form of shingle made in accordance with this invention.

In the manufacture of the new product, the apparatus conventionally illustrated in Fig. 1 may be employed. The sheet 11 is drawn from a supply and impregnated, coated, and given a grit surfacing by the usual processes. The sheet is then led between a pair of molding drums 19, 19′. These drums have cavities 20 in their surfaces, pairs of cavities registering as the drums rotate to define a space corresponding to the shape and size of the shingle to be produced. In the space above the drums is maintained a supply 21 of the plastic material which is to form the body and as the drums rotate the registering cavities mold the plastic material to the proper form of individual elements and at the same time the sheet material is drawn between the drums and pressed into one mold cavity so as to conform to the surface of the plastic mass being molded. The drums are formed with cutting or scoring edges 22 between adjacent cavities so that during their operation a succession of individual elements is delivered therefrom, the units either being wholly severed or else separated by lines of scoring so that they can be readily broken apart. Following the formation of the elements in the manner described, a layer of surfacing is applied to the exposed facing of the body. This may be done by blowing the surfacing material against the plastic surface by an air blast, or a sheet of paper on which the grit has been affixed by a soluble adhesive, such as sodium silicate, may be led around the drum 19′ in a manner similar to that employed in connection with the facing sheet 11. The paper has grit on that surface which comes in contact with the plastic mass and in the formation of the products by the operation of the drums the grit on the paper is embedded on the face of the body of each element. After the elements are completed, they are dipped in water, causing the adhesive material to dissolve, after which the paper may be removed, while the grit remains partially embedded in the surface of the elements.

A third process which may be used for applying grit to the face of the body involves coating the faces of the mold cavities of the drum 19′ with a soluble adhesive, such as sodium silicate, and blowing grit against the coated surface. The grit becomes embedded in the plastic body material during the formation of the shingles so as to cover all surfaces of the body not protected by the facing sheet.

The shingles are laid on the roof in overlapping courses in the ordinary manner with the facing sheet forming the bottom of each shingle. The sheet strengthens the shingle, protecting it against injury during handling and laying, and when the sheet is formed so that its edges are upturned additional strength is imparted to the shingle by reason of the inclination of these edges of the sheet to the plane of the shingle. The asphalt used in the body is of a high melt point so that there is no tendency for the body to become softened and distorted upon exposure to the sun.

The new product is much superior to ordinary prepared roofings now in common use, since it may be made with a relatively thick butt end. The product is highly resistant to fire and but little felt is used in its manufacture, the facing sheet being much thinner than felts ordinarily used for roofing purposes. In felt roofings as now made, the main body of each shingle consists of impregnated and coated felt and the thickness of the felt substantially determines the thickness of the finished product, so that heavy felts are required for the production of shingles of the best quality. The felt constitutes one of the greatest items of expense in the manufacture of prepared roofings and is also probably the chief point of weakness, since the decays and disintegrates, which action is accompanied by warping of the shingles, particularly at the exposed ends. Also, such shingles are so thin that their exposed ends are readily lifted by the wind. In the present product the major portion of the shingle consists of hardened plastic material which is not subject to distortion. While felt is employed, it is of relatively light weight and is used as a re-inforcement instead of constitut-

ing the main body of the material. The new shingle may be made with any desired butt thickness and it is substantially stiffer than ordinary felt roofings. The entire shingle is grit surfaced and by using grits of different colors, a final product of any desired appearance may be produced.

What I claim is:

1. A roofing element which comprises a body of hardened plastic material softening under the action of heat and a sheet of fibrous material covering one face only of the body, the sheet having its edges turned toward the body to provide a concavity in which the body lies, said body having an exposed portion projecting beyond the concavity of the sheet.

2. A roofing element which comprises a body of hardened plastic material softening under the action of heat and a sheet of fibrous material on one face only of the body and covering part of the edges thereof, the sheet being generally concave and said body having an exposed portion lying beyond the edges of said sheet.

3. A roofing element which comprises a body of hardened plastic material softening under the action of heat of tapering thickness from end to end and a sheet of fibrous material on one face only of the body, at least a pair of opposite edges of the sheet extending out of the plane of the main part of the sheet and partially overlying the edges of the body and said body having an exposed portion projecting beyond the edges of said sheet.

4. A roofing element which comprises a body of hardened plastic material softening under the action of heat of tapering thickness from end to end and a sheet of fibrous material on one face only of the body, the major portion of the sheet lying substantially in a plane with the edges of the sheet extending out of the plane to provide a concavity in which the body lies, said body having an exposed portion extending beyond said concavity.

5. A roofing element which comprises a sheet of fibrous material having its edges raised to make the sheet dish-shaped, and a body of hardened plastic material softening under the action of heat resting on the concave face of the sheet, said sheet covering one face only of said body and the latter having a portion projecting beyond the edges of said sheet.

6. A roofing element which comprises a body of hardened plastic material softening under the action of heat having a tapering thickness from one end to the other with the extreme defining margins of the body lying substantially in a central plane, and a sheet of fibrous material over one face only of the body and covering such portions of the edges thereof as lie at one side of said central plane, said body having an exposed face lying at the other side of said central plane.

7. A tapered roofing element which comprises a body of hardened plastic material softening under the action of heat, a layer of surfacing material on one face of the body, the particles of said surfacing material being partially embedded in the body, and a sheet of fibrous material covering the other face only of said body and having its edges extending toward the body and covering portions of the edges of said body, said portions extending through the full length of said edges but only a portion of the width thereof.

8. A roofing element comprising a body made up of fibrous material and a binder softening under the action of heat, and a sheet of impregnated fibrous material covering one face only of the body, the edges of said sheet extending along the edges of the body and covering a portion thereof of less width than the thickness of the body.

In testimony whereof I affix my signature.

THOMAS ROBINSON.