

Feb. 20, 1940.

F. G. EICHHORN

2,190,654

ROOFING

Original Filed March 8, 1937

Fig. 1

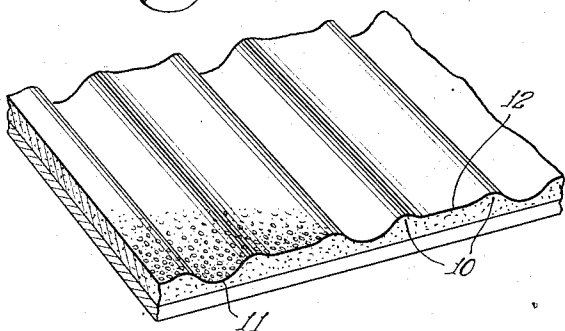


Fig. 2

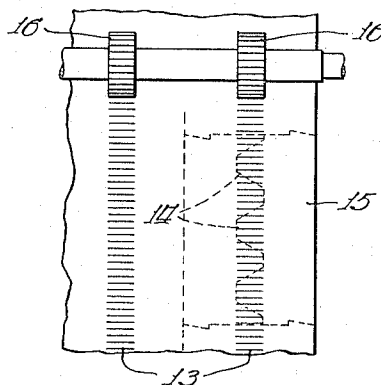


Fig. 3

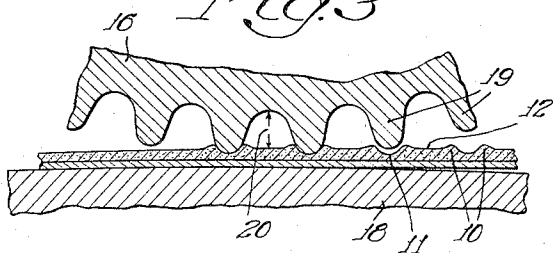


Fig. 4

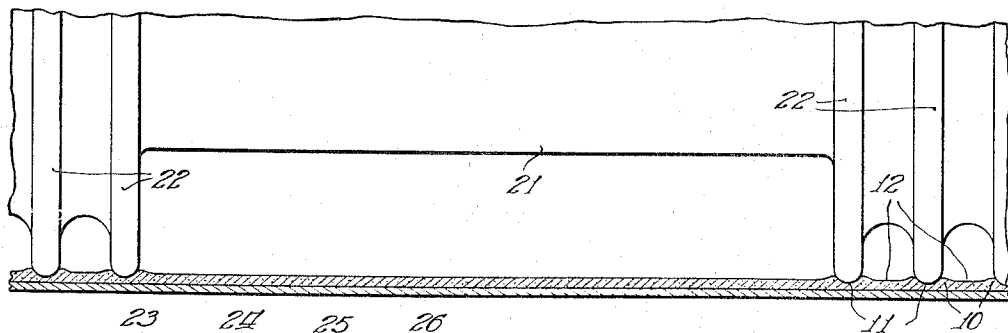
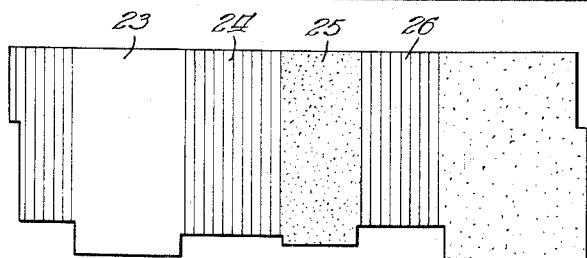


Fig. 5



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UNITED STATES PATENT OFFICE

2,190,654

ROOFING

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Original application March 8, 1937, Serial No.
129,587. Divided and this application April
29, 1938, Serial No. 205,029

5 Claims. (Cl. 108—7)

This invention relates to prepared roofing and among other objects aims to provide roofing having grooves in its upper surface.

The invention may be readily understood by reference to the forms of roofing embodying the invention and illustrated in the accompanying drawing.

In said drawing:

Fig. 1 is a perspective view of a portion of the grooved roofing on an enlarged scale;

Fig. 2 is a plan view of a sheet of roofing grooved in predetermined regions with reference to the shingle units to be cut therefrom, and showing in diagrammatic form a portion of the apparatus for forming such grooves;

Fig. 3 is a transverse section illustrating the roofing in the process of formation of transversely extending grooves and the apparatus for forming such grooves;

Fig. 4 is a transverse section through a sheet of roofing illustrating the formation of longitudinally extending grooves and a portion of the apparatus for forming such grooves; and

Fig. 5 is a plan view of a roofing unit having alternate grooved and plain bands extending longitudinally thereof and formed by an apparatus similar to that illustrated in Fig. 4.

One common form of prepared roofing comprises a base sheet of so-called roofing felt saturated with a waterproofing compound and coated with a layer of high melting point asphalt and having an upper surfacing of granular mineral material, such as crushed slate, embedded or partly submerged in the asphalt coating. Such roofing may be applied either in sheet form (usually called roll roofing) or as shingle units of various designs and shapes cut from the sheet roofing and laid in overlapping courses to form a shingled surface. The shingle units or other form of roofing may advantageously be superficially provided with grooves extending down or longitudinally of the roof. Among other advantages, the grooves prevent leakage by resisting the travel or rain transversely of the roof under the action of wind and otherwise prevent the development of extensive or large cracks in and through the asphalt coating of the roofing, prevent blisters in the roofing or limit them to small areas, relieve monotony of appearance, and assist in blending contrasting color effects produced by the use of differently colored mineral surfacing material.

Efforts to produce grooved roofing of this character have not been completely successful. For example, the roofing made according to Lehon

Patent No. 1,518,988 initially comprised narrow valleys or grooves separated by ridges having convex upper surfaces. However, experience proved that owing to the pressure upon the relatively soft ridges when the roofing was stacked in bundles or rolled in rolls after manufacture, the ridges were flattened (spreading laterally) and the grooves were reduced to relatively inconspicuous, shallow, V-shaped notches, which, besides being only partly effective for their intended purposes, were so sharp as to promote the development of cracks clear through the roofing. To avoid the development of cracks, it is important that the grooves remain relatively wide and have no sharp corners. While corrugated or embossed felt which permitted application and retension of an apparently thicker coating of asphalt (as shown for example in Lehon Patent No. 1,441,861) made possible the initial formation of deeper grooves, the ridges between the grooves were, nevertheless, flattened, as above described, consequently reducing the grooves to the same relatively inconspicuous sharp notches as in the plain felt roofing.

The illustrative roofing herein disclosed embodies an improved groove and ridge contour which is not distorted under pressure imposed thereon in bundles and rolls, but retains its original and effective contour, even if a thicker than standard coating or embossed felt be used. However, under the present method of manufacture, grooves of effective depth may be formed in standard roofing made with plain felt and having the standard thickness of coating material. According to the present invention, the roofing is embossed while the coating is still relatively soft in such a way as to cause the coating and surfacing material, displaced upon the formation of the grooves, to flow upwardly adjacent the sides of the grooves (instead of laterally), thereby giving the ridges between the grooves a slightly concave, instead of a convex, contour. The improved contour is illustrated in Figs. 1, 3 and 4 wherein the marginal ribs formed by the material displaced in forming the grooves, project above the surface of the ridge and serve as two supporting points for each ridge (instead of one as formerly) when the roofing is stacked in bundles or rolled in rolls. It should be understood that the pressure in the bundles or rolls is not necessarily concentrated on the ribs alone—they simply insure a wider distribution of pressure than heretofore and reduce the unit pressure sufficiently to pre-

vent flattening of the ridge and narrowing of the grooves. The upwardly extruded ribs adjacent the grooves also serve to increase the depth of the grooves without involving an increase in the thickness of the asphalt and mineral coating of the roofing, and the ribs give the ridges 12 concave upper surfaces which constitute secondary grooves, which function for purposes above ascribed to the main grooves, besides improving the appearance of the roofing. It is thus possible to provide apparently deep and prominent grooves in roofing having no more than standard thickness of asphalt coating, thereby eliminating the problem of distortion which is present when there is an unbalanced condition on the opposite faces of the roofing produced for example by a coating on one place of greater than standard thickness.

The grooves are formed in the roofing sheet either transversely or longitudinally, depending upon the manner in which the shingle units are made from the roofing. In most shingle units certain advantages accrue from cutting the units longitudinally of the sheet, and it is necessary, therefore, to form the grooves transversely of the sheet. This is illustrated in Fig. 2 for a special type of unit wherein the grooves are confined to regions 13 so located as to fall in a predetermined region of the shingle unit. For example, the grooved regions may embrace only the tab portions of the shingle units or, as here illustrated, the lower half of the hexagon tabs 14 of so-called hexagon shingle strips 15. It is possible by this method to provide reversible shingles, one transverse region of which is grooved and the balance is not, making it possible to use the shingles either with the grooved portion or plain portion exposed. For the ordinary types of shingle units the roll teeth are continuous and form grooves extending clear across the sheet.

The grooves are formed in this instance by rolls 16 whose width and position are determined by the location and extent of the desired grooved regions on the sheet. A roll of this character is shown on a larger scale in Fig. 3. At an earlier stage in the formation of the roofing the hot asphalt coating has been applied and the colored granular mineral surfacing material has been embedded or partly submerged in said coating. The sheet is then caused to traverse a series of cooling rolls but reaches the grooving roll while the coating material is still relatively soft. As here shown, the grooving roll engages the sheet as it passes over one of the conventional cooling rolls 18 by which it is supported against the pressure of the grooving roll. The latter is provided with a series of longitudinally extending, spaced, relatively blunt grooving teeth 19 whose depth is substantially greater than the depth of the grooves to be formed in the roofing. The teeth are spaced and shape so that as they enter the coating material they displace it upwardly to form the ribs 10 adjacent each of the grooves, instead of displacing it laterally toward the center of the ridge 12. In the present instance, the teeth are spaced about $\frac{5}{8}$ " and have a rounded contour on a $\frac{1}{8}$ " radius, making the teeth about $\frac{1}{4}$ " in width. The tooth spacing should be sufficiently great to leave a ridge 12 of such width that its intermediate portion resists displacement, thereby confining the displacement of the coating material to the margins of the ridge and resulting in the aforesaid ribs 10 which give the upper surface of the ridge the so-called concave

contour, constituting in effect a secondary groove. Besides giving the main grooves 11 a greater effective depth, the ribs 10 serve to distribute pressures (exerted while the roofing is in bundles or rolls) sufficiently to preserve the desired contour of the grooves or ridges, and particularly to prevent such flattening of the ridges as would tend to narrow down and obliterate the grooves.

It is important also that the teeth be of such depth as to allow a space 20 between the roofing and the base of the teeth in which the aforesaid displacement may take place without restriction and to prevent any molding or forming action on the roofing by the contour of the roll at the base of the teeth.

Preferably the roll teeth are slightly skewed relatively to the direction of travel of the roofing in order to effect a progressive engagement of the teeth across the sheet. This is particularly important where the sheet is entirely grooved transversely or wide regions thereof are thus grooved. Such progressive engagement of the teeth with the roofing distributes the resistance to the travel of the sheet caused by the embedding of the teeth therein (see Fig. 3), and particularly avoids the gouging of the roofing coating which might occur if the entire length of a tooth simultaneously entered the roofing. The teeth may be skewed as aforesaid in a variety of ways, for example, by skewing the axis of the roll slightly with reference to the direction of travel of the teeth or by skewing the teeth slightly on the roll itself relative to the axis of the roll. The skewing is, however, very slight, being in this instance only about $\frac{1}{8}$ " across a 72" sheet. When laid in the roof, the amount of skewing of the grooves and ridges is so slight that it cannot be detected. The skewing need be only enough to effect a progressive entrance of the teeth into the sheet to avoid the aforesaid gouging.

Preferably the diameter of the roll 16 is made great enough so that a plurality of teeth will be engaged with the sheet at all times. Fig. 3 shows teeth thus engaged. This arrangement materially assists in the desired upward displacement of the coating material along the margins of the ridges by confining it between a pair of teeth during formation and thereby preventing lateral displacement of the coating.

Fig. 4 illustrates the formation of grooves longitudinally of the sheet. The grooving means comprises a roll 21 having a fluted contour formed by a series of teeth 22 whose spacing depth and contour may be generally the same as that illustrated in Fig. 3. Skewing of the roll axis is not necessary since the teeth, by reason of their circular shape, themselves effect a progressive engagement with the sheet. No gouging of the sheet can occur. The grooving teeth may extend continuously across the roll or may be confined to predetermined regions as here illustrated, thereby forming roofing having zones of grooves which in the transversely cut roofing units appear in the units as alternate bands of grooves extending up and down the unit and interrupted by plain or ungrooved regions. These alternate grooved and ungrooved regions may be employed for their decorative effect.

A shingle of this character is illustrated in Fig. 5. It is formed by cutting transversely a sheet having zones of longitudinally extending grooves. The units may be laid in the roof either with the plain edge or the notched or irregular edge exposed and preferably with the grooved

bands on one course of shingles staggered relatively to those of the adjacent course, thereby providing pleasing contrasts. Additional variation may be secured by surfacing each of the plain and grooved zones 23, 24, 25, 26, etc., with granular surfacing material of contrasting colors.

While the aforesaid grooves and ridges have been illustrated as straight and parallel, it should be understood that they may be formed irregular and with non-parallel relationship simply by appropriate design of the embossing or grooving roll. When extending downwardly or longitudinally of the roof, they will nevertheless function to prevent transverse travel of the rain water and otherwise in the same manner as the straight and parallel grooves.

This application is a division of my copending application, Serial No. 129,587.

Obviously the invention is not limited to the details of the illustrative units above described, since these may be variously modified. Moreover, it is not indispensable that all features of the invention be used conjointly since various features may be used to advantage in different combinations and sub-combinations.

Having described my invention, I claim:

1. Prepared roofing or the like comprising in combination an asphalt coated sheet having surfacing material partly embedded in said coating and having a series of closely adjacent grooves impressed in the coating material, said grooves being of such substantial depth as to extend almost through the coating and being separated by plain strips of a width greater than the grooves each having marginal ridges rising above the surface of the sheet adjacent the grooves to give said strips in effect a concave surface for distributing pressure on the unit and thereby preventing obliteration of said grooves.

2. Prepared roofing or the like comprising in combination an asphalt coated sheet having surfacing material partly embedded in said coating and having a series of grooves impressed in the coating material and extending in the same general direction on the sheet, said grooves being of a depth substantially equivalent to the thickness of said coating and being relatively closely adjacent to give the appearance of a corrugated surface, the strips between said grooves having a width greater than the grooves and having marginal ridges rising above the surface of the material and adapted to assist in distributing pressure on the sheet to prevent obliteration of said grooves.

3. As an article of manufacture prepared roofing or the like comprising in combination an elongated sheet of roofing felt of indefinite length having an asphalt coating and granular surfacing material embedded therein, said sheet having alternate plain and grooved areas extending longitudinally of the sheet, the grooves in said grooved areas extending transversely of the sheet and being relatively close together but separated by ridges of a width greater than the width of the grooves to give the grooved areas a corrugated appearance.

4. A shingle strip or the like comprising in combination a base sheet coated with asphalt and having granular surfacing material embedded therein, the depth of said strip corresponding to that of a shingle and its width corresponding to the combined widths of a plurality of shingles, said strip having alternate plain and grooved shingle areas each extending from the upper to the lower edge of the strip, the grooves in said grooved areas having relatively broad rounded bottoms and extending vertically of the unit and being relatively close together to give the grooved areas a corrugated appearance.

5. Material of the character described comprising in combination a sheet having a relatively soft asphalt coating surfaced with comminuted mineral material partly embedded therein, the coated surface of said sheet being formed with a series of closely adjacent substantially deep grooves separated by ridges of a width greater than the grooves which give the material a corduroy effect, said ridges having marginal ribs projecting above the plane of the surface of the sheet, said ribs cooperating to distribute pressure over said ridges to prevent substantial narrowing of said grooves by lateral spreading of said ridges.

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