

June 4, 1963

G. A. FASOLD ET AL
GROOVED ROOFING

3,091,898

Filed Dec. 21, 1956

2 Sheets-Sheet 1

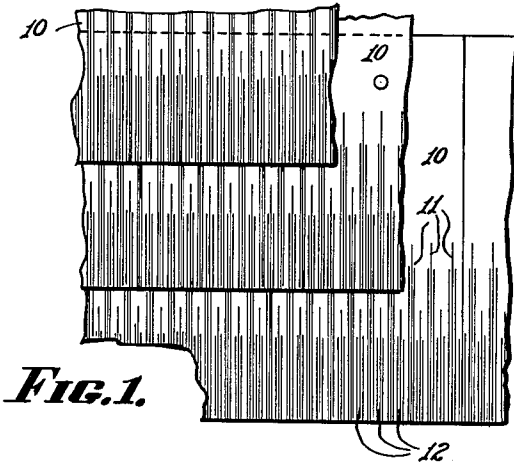


FIG. 1.

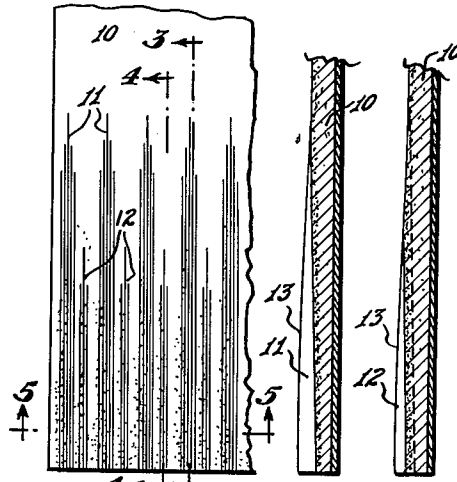


FIG. 2.

FIG. 3. FIG. 4.

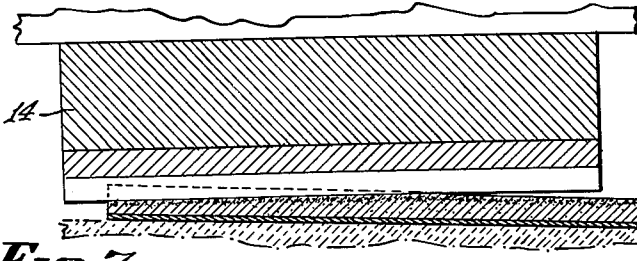
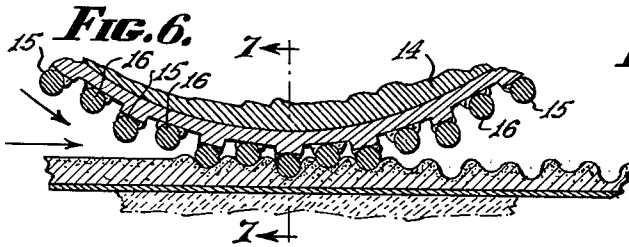


FIG. 7.

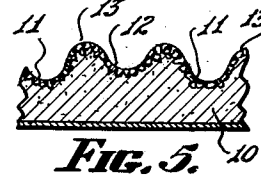


FIG. 5.

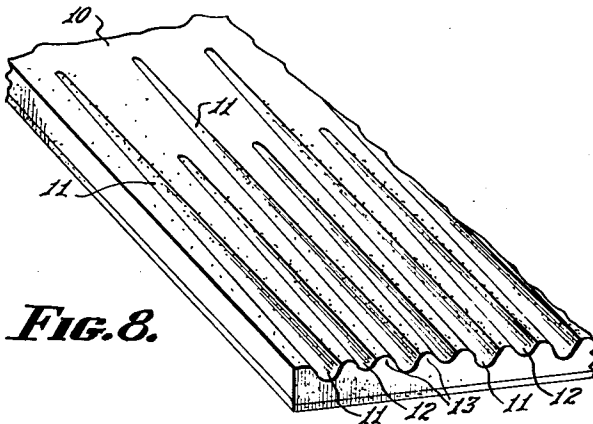


FIG. 8.

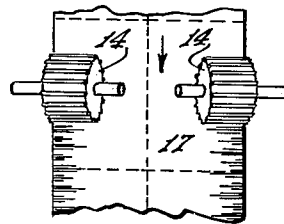


FIG. 9.

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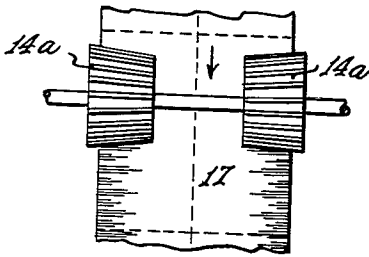


FIG. 10.

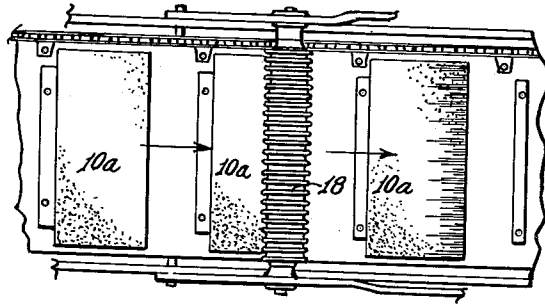


FIG. 11.

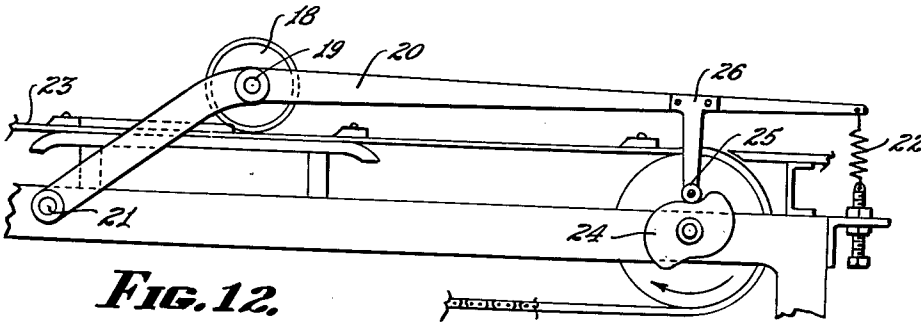


FIG. 12.

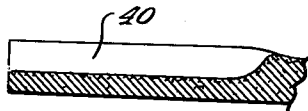


FIG. 16.

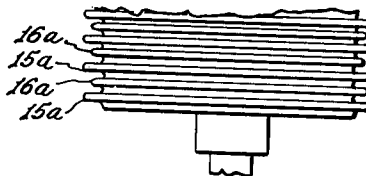


FIG. 13.

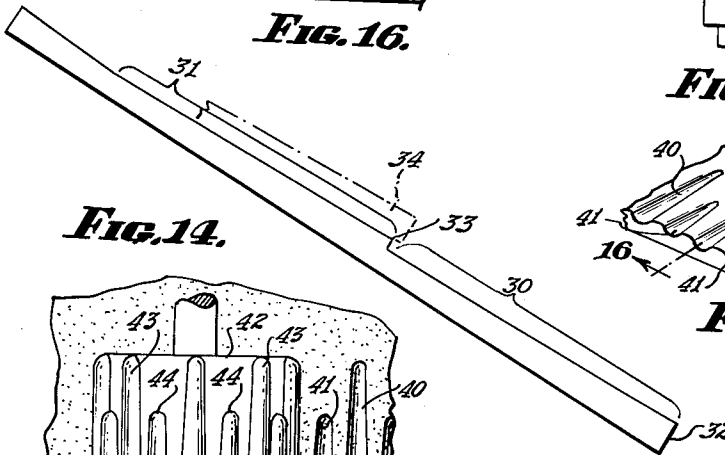


FIG. 14.

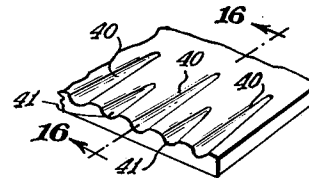


FIG. 15.

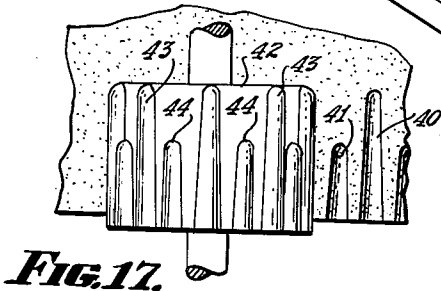


FIG. 17.

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GROOVED ROOFING

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5 Claims. (Cl. 50-261)

This invention relates to grooved roofing and method of grooving same and to novel grooving rolls which may be used for the purpose. The roofing is what is known as prepared roofing, generally comprising a base sheet of roofing felt saturated with a water-proofing compound and coated with a layer of high melting point asphalt and having upper or weather surfacing of granular mineral material such as, for example, crushed slate partly embedded in the asphalt coating. Such prepared roofing may be made in the form of sheets in which case it is known as "roll roofing" or it may be in the form of strip shingles or individual shingles.

In the past it has been found advantageous to provide the roofing sheet in the form of roll roofing, shingles or strip shingles, with superficial grooves extending down the roof when the roofing is laid. Such grooves help to prevent leakage by resisting transverse travel of rain under the influence of wind and they assist at preventing the development of cracks while also preventing blisters. In addition to this they have an aesthetic effect in that they give somewhat of a sparkle to an otherwise uninteresting looking roof.

In the Eichhorn patents, No. 2,190,654 and No. 2,199,660, a particular form of such roofing is taught as well as method and apparatus for producing it. According to the teachings of these patents, the roofing is grooved by means of grooving rollers having grooving teeth spaced apart a sufficient distance that instead of a lateral flow of displaced asphalt material, there is achieved an upward flow adjacent the grooves so that in the final roofing there are a series of spaced grooves having marginal elevated ridges separated by slight concavities.

It is an object of the present invention to improve upon the roofing produced according to the Eichhorn patents and to provide an effectively thicker roofing without use of additional material. Additionally, it is an object of the invention to provide a roofing material which, because of its effectively greater thickness, will have enhanced property not only from the utilitarian standpoint but from the appearance standpoint.

These and other objects of the invention which will be described in greater detail hereinafter or which will be apparent to one skilled in the art upon reading these specifications are accomplished by that construction and arrangement of parts and by that method of which we shall now disclose exemplary embodiments.

Reference is made to the drawings forming a part hereof and in which:

FIGURE 1 is a fragmentary view of three courses of shingles according to the present invention laid upon a roof.

FIGURE 2 is a fragmentary view of one such shingle on an enlarged scale.

FIGURE 3 is a cross-sectional view of the same taken on the line 3-3 of FIGURE 2.

FIGURE 4 is a cross-sectional view taken on the line 4-4 of FIGURE 2.

FIGURE 5 is a fragmentary cross-sectional view taken on the line 5-5 of FIGURE 2.

FIGURE 6 is a fragmentary cross-sectional view of one form of grooving roll in the process of forming grooves in a piece of prepared roofing.

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FIGURE 7 is a cross-sectional view taken on the line 7-7 of FIGURE 6.

FIGURE 8 is a fragmentary perspective view of a shingle produced according to FIGURES 6 and 7.

FIGURE 9 is a semi-diagrammatic plan view showing how the operation of FIGURES 6 and 7 may be carried out.

FIGURE 10 is a view similar to FIGURE 9 showing a modification.

FIGURE 11 is a fragmentary plan view showing a different type of grooving roll.

FIGURE 12 is an elevational view showing the mechanism for moving the grooving roll of FIGURE 11.

FIGURE 13 is a fragmentary plan view of the grooving roll of FIGURE 11 on an enlarged scale.

FIGURE 14 is a diagrammatic elevational view of a double grooved shingle.

FIGURE 15 is a fragmentary perspective view of a shingle having a modified grooving.

FIGURE 16 is an enlarged cross-sectional view taken on the line 16-16 of FIGURE 15; and

FIGURE 17 is a plan view showing how the grooving of FIGURES 15 and 16 may be produced.

Briefly, in the practice of our invention we provide a shingle with a series of grooves as taught in the Eichhorn patents mentioned above, but we enhance the effects thereof by impressing intermediate the primary grooves a series of secondary grooves. We have found that by impressing secondary grooves of lesser depth between the primary groove of the Eichhorn patents, we can enhance the upward flow effect of the asphalt adjacent the primary grooves so that the ridges adjacent the primary grooves are increased in height.

Referring now in more detail to the drawings, we have shown in FIGURE 1 three courses of shingles 10 having tapered grooves. The primary grooves are indicated at 11 and the secondary grooves are indicated at 12. Preferably these grooves will be tapered so as to be of increasing depth in the direction of the shingle butts. It should be understood that throughout the specification where reference is made to shingles, the term is to be considered as inclusive of strip shingles. By reference to FIGURE 3, it will be seen that the grooves 11 increase in depth toward the bottom of the figure and from FIGURE 4 it will be clear that the grooves 12 likewise increase in depth toward the bottom of the figure. It will also be apparent that the grooves 12 at any given cross-section are of lesser depth than the grooves 11 and therefore are shorter than the grooves 11. Adjacent each groove 11 is a ridge 13 (FIGURE 5) which is of increased height because of the impression of the grooves 12 between adjacent grooves 11.

The grooves may be formed in several ways. In FIGURES 6 and 7, we have shown one form of grooving roller 14 having grooving teeth 15 for producing the primary grooves and intermediate grooving teeth 16 for producing the secondary grooves. Preferably these grooving teeth will have a semi-cylindrical grooving surface and all the teeth 15 will be at the same distance from the axis of the roller 14 and all the teeth 16 will be at an equal distance less than the distance of the teeth 15. In this instance the grooves will be formed transversely of the direction of travel of the roofing material. The taper of the grooves may be achieved by producing the grooving roller 14 with a tilted axis as best seen in FIGURE 7. It will of course be understood that the means for adjusting the degree of tilt are within the skill of the mechanic and does not constitute a part of the present invention.

In FIGURE 9 we have shown how a double operation can be formed by the use of two grooving rollers 14

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with tilted axes operating on opposite edges of a web 17 which may later be cut into individual shingles or into shingle strips as is well known in the art. The rollers 14 are of course tilted in opposite directions.

In FIGURE 10 we have illustrated how, instead of substantially cylindrical rollers 14 mounted on tilted axes, we can use conical grooving rollers 14a mounted upon an axis which is parallel to the web 17. The effect, or end result, in FIGURE 10 is the same as in FIGURE 9.

Instead of providing grooving rolls analogous to gears which provide grooves in a direction transverse to the direction of movement of the material being operated upon, we may provide rollers such as that indicated at 18 in FIGURE 11 which is in the nature of a corrugating roller. This device will form grooves running in the direction of travel of the web being operated upon. A fragment of such a roller is shown in FIGURE 13 and again it will be provided with alternate grooving elements 15a and intermediate grooving elements 16a. Again the diameter of the grooving elements 16a will be less than the diameter of the grooving elements 15a, so that the same type of grooves are produced.

If it is desired to produce tapered grooves or grooves having varying depth, means must be provided to movably mount the grooving roller and to provide means for moving the mounting of the grooving roller to vary the depth of the grooving. Such an arrangement is shown more or less diagrammatically in FIGURE 12. The roller 18 is shown as being mounted at 19 upon a lever 20 which is pivoted to the machine frame at 21. An adjustable spring means may be provided at 22 to urge the roll 18 against the traveling web 23 with the required grooving pressure. A cam 24 actuates a follower 25 secured to the lever 20 by means of a bracket 26 and is driven in timed relation to the movement of the web 23 by means not shown. The cam 24 of course is given the necessary configuration to produce a gradual indentation during travel of the required distance by the web and then to lift the grooving roller clear of the web for the required distance before the next impression. From a consideration of FIGURE 11, it will be clear that the shingles are traveling broadside rather than lengthwise and while we have shown individual shingles 10a being operated upon, it will be clear that they could be in the form of a continuous web which is later slit by means well understood.

From FIGURE 14 it will be clear that double grooving may be provided. FIGURE 14 is somewhat diagrammatic and represents an edge view of a shingle having grooving indicated by the bracket 30 formed by any of the means described above and having a second row of grooves, also formed as described above, the grooves being of increasing depth toward the right. The result of this treatment is that the effective height of the shingle butt at 32 is enhanced and that at the point 33 the effective height is again enhanced. Thus, when the next course of shingles indicated in broken lines at 34 is laid, there is a duplication of the thickening effect so that with the enhanced shadow effect the shingles have a much greater apparent thickness.

In FIGURES 15 to 17 inclusive we have shown a modification wherein tapered grooving of constant depth is provided. Here the grooves 40 and the intermediate grooves 41 are tapered in width only, but not in depth, as clearly appears from FIGURE 16. Such grooving may be produced by a gear type roll 42, having tapered teeth 43 and 44 as shown in FIGURE 17. This type of grooving may be found advantageous with shingles having a thin asphaltic layer, and it gives to such shingles much of the effect which can be achieved with thicker shingles by means of grooves which taper in depth. It will be understood that with the relatively thick shingles it may be desirable to provide grooves which taper in depth as well as in width.

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We find that a shingle according to the present invention not only has a better appearance but provides better drainage, ventilation and insulation. In actual practice, an original shingle caliper .234 inch when treated according to the present invention had a caliper at the butt edge of .312 inch, so that the effective thickness of the shingle was increased .068 inch or approximately 29%. It will be observed of course that the substantial 30% increase in thickness of a shingle is achieved without the addition of any material over and above that which was on the flat shingle.

It will be understood that various modifications may be made without departing from the spirit of the invention and we therefore do not intend to limit ourselves except as set forth in the claims which follow.

Having now fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A roof covering comprising similar asphalt shingle elements laid in overlapping courses to provide multiple layer coverage with the lower portion of each of said elements exposed and the upper portion covered by the next overlying element, each of said shingle elements being provided with a plurality of spaced primary grooves of substantial depth impressed in the coating of said shingle and with secondary grooves of lesser depth intermediate said primary grooves, both said primary and secondary grooves being progressively tapered and of greater width and depth toward and normal to the lower edge of the shingle, the deeper and wider grooves formed at the butt edge of one course of shingles being immediately adjacent the narrower and shallower grooves of the shingles of the next underlying course.

2. An asphalt roofing shingle element adapted to be laid with other similar elements in overlapping courses to provide multiple layer coverage for the roof, each of said shingle elements having an exposed lower portion and a covered upper portion as laid, said element being provided with a plurality of spaced primary grooves of substantial depth impressed in the coating of said shingle and with secondary grooves of lesser depth intermediate said primary grooves, both said primary and secondary grooves being progressively tapered so as to be of greater width and depth toward the lower edge of said shingle element, and the effective thickness of the lower exposed portion of the element being substantially increased by the upward displacement of the coating adjacent the margins of the primary grooves.

3. An asphalt roofing shingle element adapted to be laid with other similar elements in overlapping courses to provide multiple layer coverage of the roof, each of said shingle elements having an exposed lower portion and a covered upper portion as laid, said element being provided with a plurality of spaced primary grooves of substantial depth impressed in the coating of said shingle and with secondary grooves of lesser depth intermediate said primary grooves, both said primary and secondary grooves being tapered progressively and being of greater depth toward and normal to the lower edge of said shingle element, the upward displacement of the coating adjacent the margins of the primary grooves substantially increasing the effective thickness of the lower exposed portion of the element.

4. An asphalt roofing shingle element adapted to be laid with other similar elements in overlapping courses to provide multiple layer coverage of the roof, each of said shingle elements having an exposed lower portion and a covered upper portion as laid, said element being provided with a plurality of spaced primary grooves of substantial depth impressed in the coating of said shingle and with secondary grooves of lesser depth intermediate said primary grooves, both said primary and secondary grooves being tapered progressively and being of greater width toward and normal to the lower edge of said shingle element, the upward displacement of the coating ad-

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jacent the margins of the primary grooves substantially increasing the effective thickness of the lower exposed portion of the element.

5. An asphalt strip shingle element of substantially rectangular shape having tab defining slots cut upwardly from the lower edge of said strip, said strip shingle being adapted to be laid with other similar shingle elements in overlapping courses to provide multiple layer coverage of the roof, each of said shingle elements having a lower exposed portion and a covered upper portion as laid, said shingle element being provided with a plurality of spaced primary grooves of substantial depth impressed in the coating of said shingle and with secondary grooves of lesser depth intermediate said primary grooves, both said primary and secondary grooves being progressively tapered so as to be of greater width

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and depth toward the lower tab edge of said shingle element, the deeper and wider grooves formed at the lower tab edge of one course of shingles being immediately adjacent the narrower and shallower grooves at the top edge of the exposed tabs of the next underlying course of shingles and the effective thickness of the shingle tabs being substantially increased.

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