

June 2, 1931.

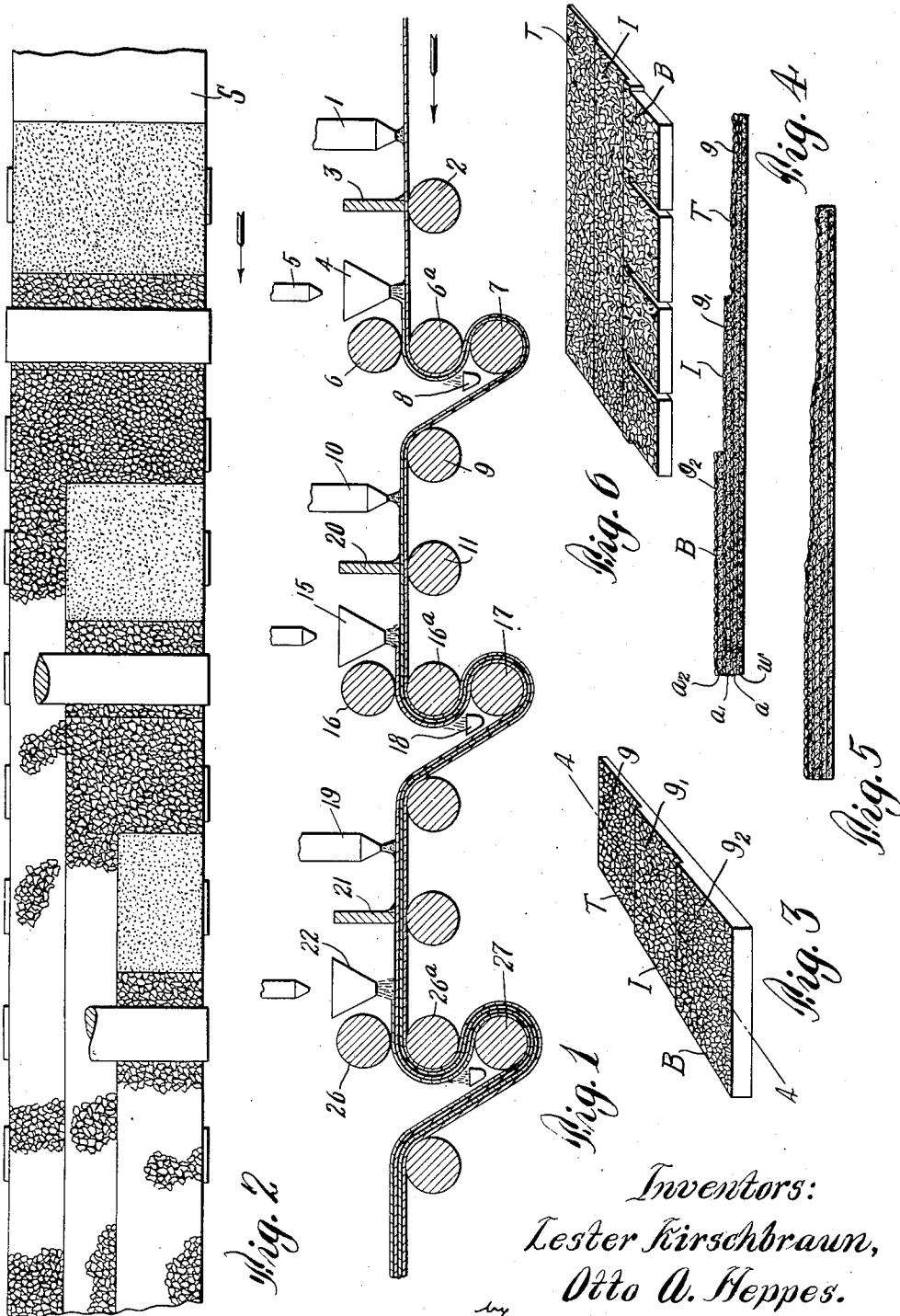
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1,807,918

ROOFING SHINGLE AND METHOD OF MAKING SAME

Original Filed Aug. 7, 1925

2 Sheets-Sheet 1



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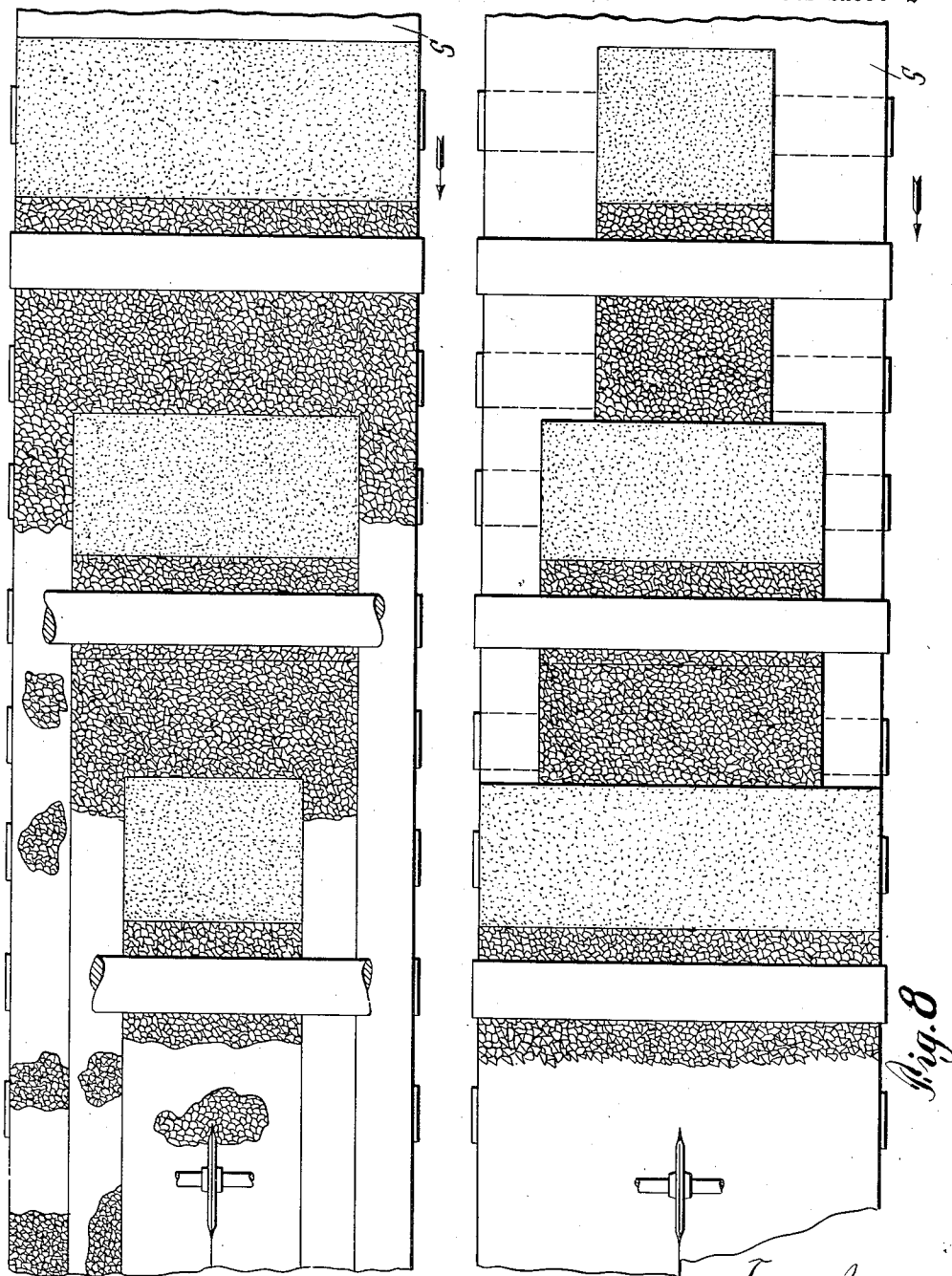


Fig. 7

Fig. 8

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UNITED STATES PATENT OFFICE

LESTER KIRSCHBRAUN, OF LEONIA, NEW JERSEY, AND OTTO A. HEPPE, OF LA GRANGE, ILLINOIS, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE PATENT AND LICENSING CORPORATION, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

ROOFING SHINGLE AND METHOD OF MAKING SAME

Original application filed August 7, 1925, Serial No. 48,840. Divided and this application filed November 20, 1928. Serial No. 320,682.

This application is a division of our co-pending application Serial No. 48,840, filed August 7, 1925, for roofing shingle and method of producing same. The invention relates to asphalt shingles adapted to be laid with others of similar construction in overlapping courses and serving as protecting or covering elements for the roof or side wall of a building.

Such shingles usually comprise a fibrous base or foundation, saturated with asphalt or equivalent waterproofing material, coated on one or both faces with an adhesive surface or bed layer of asphalt in which is partially embedded on its outer or exposed surface a surface layer of crushed slate, stone, granite, or like material, having ornamental, wear resisting and fireproofing characteristics.

Since such shingles are of thin construction, they present a monotonous or "flat" appearance when laid on a roof surface in overlapping courses. Moreover, because of the inherent flexibility of such shingles, they are sometimes subject to curling, and their butt ends are liable to be raised by the wind, and allow rain to beat in under them so that the appearance and the waterproofing qualities of the roof covering are impaired. Hence, the primary object of the present invention, generally stated, is to provide an asphalt or prepared shingle of a thick butt end construction, which will impart an appearance of substantial solidity or thickness to a roof or other exposed surface when laid, and which will not be raised by the action of the elements. A further object is to provide a method for the production of such shingles in an economical and efficient manner.

Briefly stated, the shingle of the present invention is of a stepped or variable thickness construction, the butt end portion as laid being of the greatest thickness, and the upper end portion of least thickness. There may be portions intermediate the thicker and thinner portions of one or more intermediate thicknesses, and these portions of varied thickness may either be sharply defined or stepped, or they may merge more or less gradually one into another. In any event, however, the lower or butt portion is of a thicker

construction than the upper portion of the shingle, and is provided with an adhesive bed coating comprising a plurality of strata of asphalt between which are sandwiched and in which are embedded a layer or layers of crushed slate or equivalent mineral grit. The strata of asphalt and the layer or layers of grit are firmly united or bonded to form an integral coating, and there is a surface layer of grit partially embedded in the asphalt stratum immediately thereunder. In a shingle where there are portions of intermediate thickness, these portions are provided with bed coatings comprising fewer asphalt strata and fewer layers of grit therebetween than the butt portion, but this bed coating is also surfaced with a layer of grit. The upper portion of the shingle, however, is coated with only a single stratum of asphalt in which is partially embedded the surface layer of crushed slate. The entire surface of the shingle is thus formed of a partially embedded layer of grit or crushed mineral material.

The novel shingle may be produced by coating a sheet of asphalt-saturated fibrous material, such as is usually employed in the manufacture of roofings, with a layer of asphalt, then partially embedding a layer of mineral grit in the asphalt coating and applying a plurality of asphalt coatings along successively narrower portions or longitudinal zones on one side of the sheet, and partially embedding layers of mineral grit between the successive coatings and after the last coatings, thereby producing a sheet construction the thickness of which is variable or stepped along its width, or a narrow stripe of asphalt may first be applied and grit partially embedded therein, followed by applications of asphalt and grit in wider stripes, or zones, the final coating of asphalt, with its surface layer of grit, covering the entire surface of the sheet. When such a sheet is cut transversely of its length, shingles embodying the present invention are produced.

The invention may best be understood from the following more detailed description thereof, when considered in conjunction with the accompanying drawings, in which,—

Figure 1 represents in sectional view, dia-

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grammatically and conventionally, a portion of the apparatus by means of which the shingle may be produced.

Figure 2 represents a plan view of the same.

Figure 3 illustrates a shingle embodying the present invention.

Figure 4 represents a section on the line 4—4 of Figure 3.

Figure 5 represents in section a shingle constituting another embodiment of our invention.

Figure 6 represents a strip shingle embodying the invention.

Figure 7 is a plan view of apparatus for applying to a sheet successively narrower central bands of coating and grit.

Figure 8 is a plan view of apparatus for applying to a sheet successively wider bands of coating and grit, the final band extending to the edges of the sheet.

Referring to the drawings, in the diagrammatic illustration shown in Figures 1 and 2, a sheet of material S, of indeterminate length, is represented as undergoing a treatment in accordance with the present invention in the course of its travel from right to left, as viewed in the drawing. The sheet material may consist of the "felt" or equivalent fibrous material usually employed in the manufacture of roofing, saturated or impregnated by a previous treatment with asphalt or other suitable waterproofing agent.

In the practice of the present invention, the sheet S, in its horizontal travel or propulsion produced by suitable means (not shown), is shown as being first coated over its entire surface with asphalt in which there is partially embedded a surfacing layer of grit. To this end, the sheet S is subjected on its upper face to a stream of semi-fluid (preferably molten) asphalt delivered thereonto from a coating nozzle 1 located directly thereabove. The asphalt coated sheet passes from the coating nozzle over a guide roll 2, above which and acting on the coated sheet is a scraper or doctor 3 (which may, if desired, be a roll), which acts to distribute the semi-fluid asphalt evenly over the sheet and to remove any surplus asphalt from the sheet in its passage thereby.

The asphalt-coated sheet is then surfaced with a layer of crushed slate or other equivalent grit, while the asphalt is still in its semi-plastic state. For this purpose, there is provided a hopper or grit distributor 4, suitably supplied with grit in regulated and controlled quantity from a grit feed conduit 5 thereabove, which is arranged to distribute grit evenly and uniformly throughout the width of the sheet. The grit surfaced sheet is then passed successively through a pair of press rolls 6, 6a and under a guide roll 7 located below the lower roll 6a. The press

rolls partially force or embed the slate into the asphalt and in the downward passage of the sheet from the lower press roll 6a to the guide roll 7 any non-adherent or excess and unembedded grit falls from the sheet into a trough or receptacle 8. Thus far we have described a method of coating and surfacing fibrous material, all of which is well known in the art.

According to the present invention, however, provision is made for further increasing the thickness of the sheet material in longitudinal zones thereof. This is done by applying further coatings of asphalt on the sheet along successively narrower portions or longitudinal zones and partially embedding grit in each asphalt coating. To this end, the grit surfaced sheet passes from the guide roll 7 over a guide roll 9, again assuming a horizontal travel, and is now subjected to another asphalt coating operation along a narrower side portion or longitudinal zone, after which slate is partially embedded in the asphalt-coated portion. For this purpose, the coated sheet passes successively under a coating nozzle 10, arranged to deliver semi-fluid asphalt on the desired width, thence over a guide roll 11, above which a doctor or scraper 20 of suitable form is positioned in a manner to distribute the asphalt uniformly thereon along a longitudinal zone and to remove any excess asphalt therefrom. The partially coated sheet is then subjected to a surfacing operation, by delivering grit thereonto on its freshly asphalt-coated portion from a hopper 15. The grit is partially embedded as previously, by passage of the sheet through a second pair of press rolls 16, 16a, and provision is made to remove excess grit, as previously, by a downward passage of the sheet about the press roll 16a to a guide roll 17, the excess or unembedded grit dropping into a trough 18. The sheet now consists of thicker and thinner side portions, and may be cut transversely of its length into shingles, the thicker portion serving as the butt portion and being sufficiently thick and rigid to resist the action of the elements and to impart a substantial appearance to the roof.

It may, however, be desirable to still further increase the thickness of a still narrower side portion of the sheet which is to form the butt portion of the shingles, and in such cases this butt portion of the sheet may be subjected to another thickening operation. In such cases the sheet passes from the guide rolls 17 successively under a coating nozzle 19, which is arranged to distribute asphalt over the desired width of sheet, thence by a scraper 21, and under a grit distributor 22, which is positioned to surface the last coated portion with grit. The grit is partially embedded in the asphalt coating by a pair of press rolls 26, 26a, and the thickened sheet

passes under a guide roll 27, after which, if desired, it may be cut, or if further thickening of a side portion is desired, it may be subjected to further thickening operations.

5 The sheet is cut transversely of its length into shingles of the desired length by transverse cutters or any other suitable cutting mechanism, the resulting shingles presenting an appearance as illustrated by an embodiment shown in Figure 3. The shingle is of "stepped" or varying thickness, and comprises a waterproof fibrous base or foundation W, coated with a plurality of superposed asphalt strata a, a_1, a_2 , each respectively having mineral grit g, g_1, g_2 , embedded therein, said strata being progressively shorter and all extending from the butt end of the shingle. The upper portion T thus has only one stratum a , and surfacing g , of grit, and is thinner than the lower or butt portion B, and there is an intermediate portion I having one less coating of asphalt and one less surfacing than the butt portion. As a matter of fact, there may be a plurality of intermediate portions, so that a very gradual stepped reduction in thickness from the butt to the upper end of the shingle may be had. In any case, however, the butt portion is of sufficient thickness to be rigid and to impart a substantial appearance to the roof.

While we have described a process in which only one surface of the shingle is subjected to a plurality of coating and "gritting" operations, it will be understood that both surfaces of the shingle may be so treated. Moreover, different colored grits may be embedded in the successive coating operations, and similarly the size of the grit material and its composition or quality may be varied. For example, the lowermost grit surfacing may be of very fine and cheap grit, whereas the uppermost or exposed surface may be coarse and more expensive grit granules. Or the upper portion of the shingle may not be surfaced with grit, whereas the lower portion may be provided with a plurality of surfacings.

While we have described a construction in which the lower portion of the shingle is thicker than the upper or unexposed portion, thereby allowing for the saving of asphalt and grit, it is, of course, possible to provide a construction where the entire shingle is of uniform thickness and is provided with a plurality of strata of asphalt between which are the layers of grit.

By the shingle construction described herein, we may produce shingles of thick construction, which are more economically manufactured than shingles which are thickened by the employment of a thick fibrous foundation, or which are mainly thickened by the use of a thick asphalt coating. That is, in the thickened shingle of the present invention, we have substituted the use of grit as a thick-

ening constituent, in place of asphalt or fibrous material. Moreover, in so doing we have been primarily concerned with the thickening of the butt or exposed portion, since it is this portion which imparts to the roof its waterproofing characteristics and its appearance.

It is evident that, with a sheet that is wider than the length of the shingles to be cut therefrom, the narrowest zone of asphalt and grit may be located in the central portion of the sheet, as shown in Figure 7, and the sheet then slit longitudinally along its longitudinal median line to form strips from which shingles embodying the present invention may be cut. As previously indicated, instead of first applying layers of asphalt and grit over the entire surface of the sheet, and then applying thereon successively narrower layers of asphalt with grit therein, the operation may be reversed. That is, we may apply the narrowest layers first, and then apply successively wider layers, until the final layer of asphalt with the grit partially embedded therein covers the entire surface of the sheet. This is illustrated in Figure 8. In some aspects, this is a preferable mode of operation, since a more gradual taper is produced, as the overlapping layers tend to smooth themselves at the "steps", or shoulders, at the edges of the several coatings.

In addition to the individual shingles hereinbefore described, strip-shingles or other equivalent roofing elements may be produced in the practice of the invention, as illustrated for example in Figure 6, such strip shingles being provided with cut-outs, notches, or recesses in their lower portion which define a plurality of individual shingle-simulating tabs.

Having thus described an embodiment of this invention, it should be evident to those skilled in the art that it is capable of various changes and modifications which lie within its spirit and the scope of the appended claims.

We claim:

1. In the manufacture of asphalt roofing elements, a process which comprises applying a continuous layer of bituminous coating to a face of a sheet of waterproof fibrous material, said layer extending over the entire widthwise extent of said sheet, embedding grit in said coating, applying a second continuous layer of bituminous coating over said embedded grit, said second layer of coating being narrower than the width of the sheet and having the longitudinal borders thereof spaced inwardly from the marginal edges of the sheet, embedding grit in said second layer of coating, slitting the sheet longitudinally through said second coating layer and severing shingle elements from the sections formed by the slitting.

2. In the manufacture of asphalt roofing

elements, a process which comprises applying a continuous layer of bituminous coating to a face of a sheet of waterproof fibrous material, said layer extending over the entire
 5 widthwise extent of said sheet, embedding grit in said coating, applying a second continuous layer of bituminous coating over said embedded grit, said second layer of coating being narrower than the width of the sheet
 10 and having the longitudinal borders thereof spaced inwardly from the marginal edges of the sheet, embedding grit in said second layer of coating, slitting the sheet longitudinally along the median line of said second coating
 15 layer and severing shingle elements from the sections formed by the slitting.

3. In the manufacture of asphalt roofing elements, a process which comprises applying a continuous layer of bituminous coating to
 20 a face of a sheet of waterproof fibrous material, said layer extending over the entire widthwise extent of the sheet, embedding grit in said coating, applying a second continuous layer of bituminous coating in the
 25 form of a central longitudinal band narrower than the sheet, embedding grit in said second layer of coating, slitting the sheet longitudinally along its median line, and severing shingle elements from the strips formed by
 30 said slitting.

4. In the manufacture of asphalt roofing elements, a process which comprises applying a continuous layer of bituminous coating to a
 face of a sheet of waterproof fibrous material,
 35 said layer extending over the entire widthwise extent of the sheet, embedding grit in said layer, applying a plurality of additional superposed layers of bituminous coating in successively narrower bands, each of said
 40 bands having its median line coincident with the median line of the sheet, embedding grit in each said layer before applying the next layer, slitting the sheet along its median line, and severing individual elements from the
 45 strips formed by the slitting.

5. In the manufacture of asphalt roofing elements, a process which comprises applying to an elongated sheet of roofing felt a
 plurality of superposed bands of asphalt, one
 50 of said bands being wider than another of said bands, all said bands having their median line approximately coinciding with that of the sheet, slitting the coated sheet along its
 median line, and cutting the sections thus
 55 formed into individual roofing units.

6. In the manufacture of asphalt roofing elements, a process which comprises applying to an elongated sheet of roofing felt a plu-
 60 rality of superposed bands of asphalt of different widths, each band having its median line approximately coinciding with that of the sheet, partially embedding a layer of grit in each band while the asphalt thereon is
 65 sticky, slitting the coated sheet along its me-

dian line, and cutting the sections thus formed into individual roofing units.

7. In the manufacture of asphalt roofing elements, a process which comprises applying to an elongated sheet of roofing felt a plu-
 70 rality of superposed bands of asphalt, partially embedding a layer of grit in at least one of said bands while the asphalt thereon is sticky, one of said bands being wider than
 75 another of said bands, all of said bands having their median lines approximately coinciding with that of the sheet, slitting the coated sheet along its median line, and cutting the sections thus formed into individual
 80 units.

In testimony whereof we have affixed our signatures.

LESTER KIRSCHBRAUN.
 OTTO A. HEPPE.

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