

March 7, 1939.

C. R. MacDONALD

2,150,004

SHINGLE ELEMENT

Original Filed March 13, 1926 2 Sheets-Sheet 1

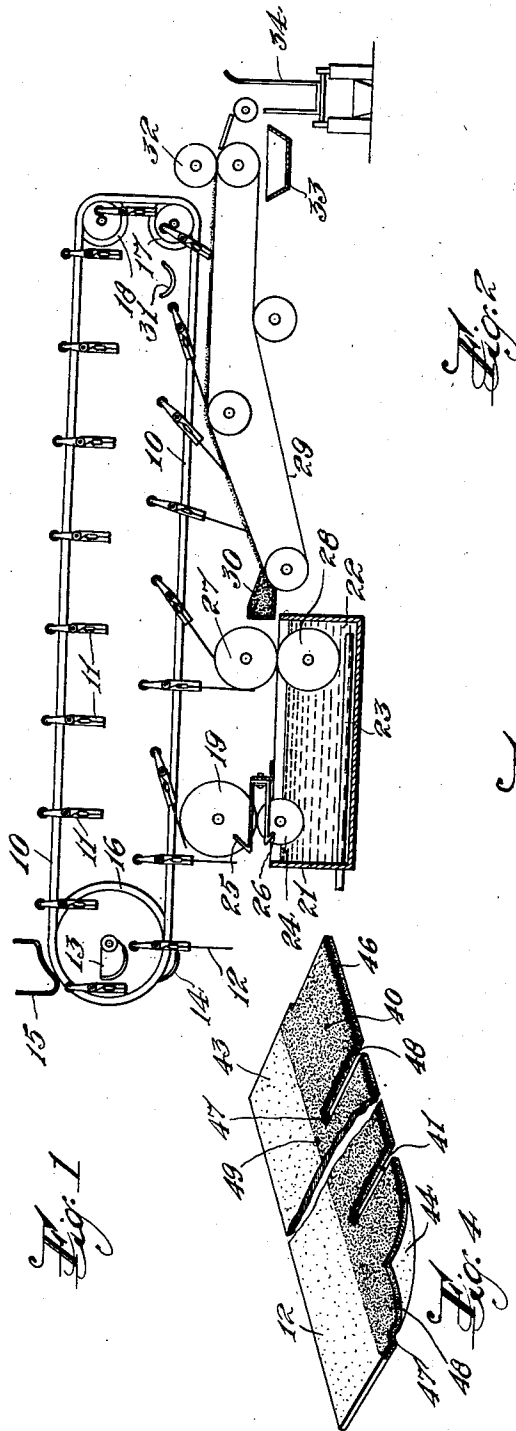


Fig. 1

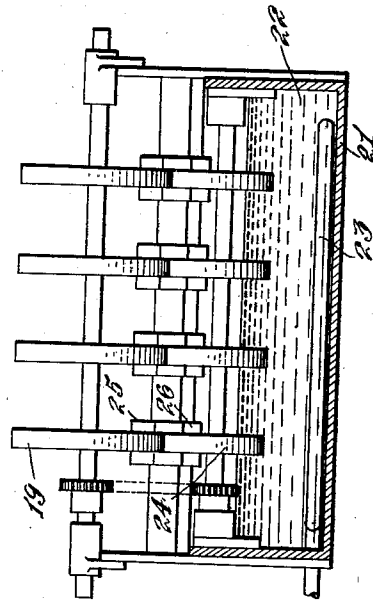


Fig. 2

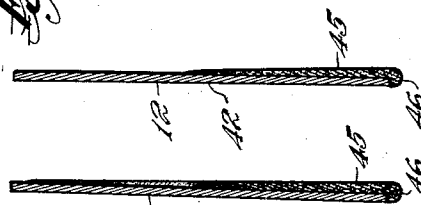


Fig. 3

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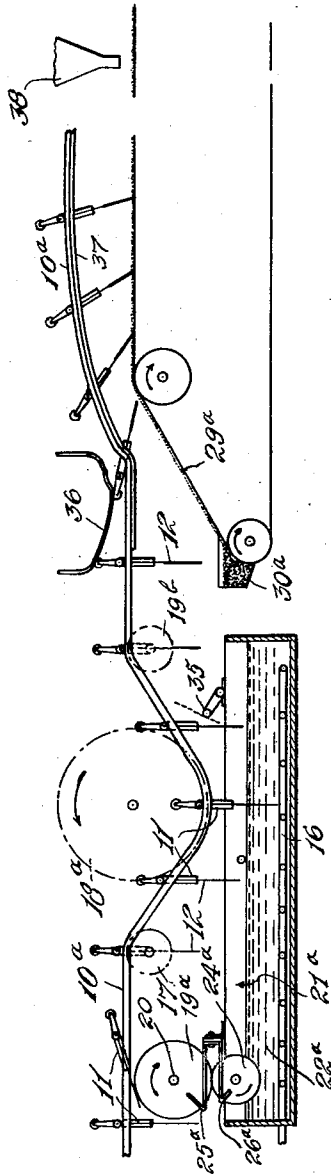


Fig. 3

Fig. 6

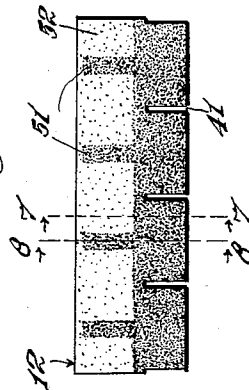


Fig. 7

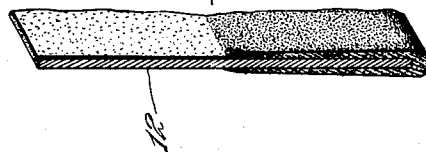
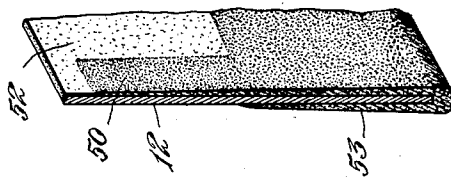


Fig. 8



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2,150,004

SHINGLE ELEMENT

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ton, Mass., a corporation of Massachusetts

Original application March 13, 1926, Serial No.
94,377. Divided and this application October
21, 1931, Serial No. 570,110

4 Claims. (Cl. 108—8)

This application is a division of my co-pend-
ing application Serial No. 94,377, filed March 13,
1926.

The invention relates generally to roofing ele-
ments, and particularly to those which comprise
a fibrous foundation made resistant to water,
wear and weather by the application thereto of
suitable waterproofing and wear-resisting sub-
stances.

Ordinarily a bibulous felt produced on paper-
making machinery from a furnish comprising
rags, cellulosic material, hair, wool or asbestos
or the like, is employed as the foundation and the
sheet is saturated with asphalt while the latter
is in a liquid condition, usually when molten.
The saturated sheet is ordinarily coated on one or
both faces with asphalt, usually a relatively high
melting point blown asphalt, and is surfaced on
one or both faces with a mineral material, such
as crushed slate, sand, fine pebbles or the like.
The sheet of saturated, coated and surfaced felt,
is then cut into individual roofing units, such as
individual shingles or strip shingles, so called, of
various sizes and designs. Because of the fact
that the finished sheet is ordinarily flat and rela-
tively thin, a roof covered with such roofing units
presents a thin relatively unsubstantial appear-
ance. An additional disadvantage flows from the
cutting of the finished sheet since the fibers and
the asphalt are exposed at the cut edges to the
action of the elements, thereby causing a more
rapid disintegration of the unit.

One of the objects of my invention is to pro-
vide shingles or shingle strips of the character
described so constructed as to afford optimum
resistance to deterioration by the weather.

Another object of my invention is to provide
roofing elements which are artistic and attrac-
tive.

Further objects and advantages will be mani-
fest to one skilled in the art from the following
description in conjunction with the accompany-
ing drawings in which:

Figure 1 indicates diagrammatically in side
elevation, apparatus for producing elements in
accordance with my invention;

Figure 2 is an end view on a larger scale of a
portion of the apparatus shown in Figure 1;

Figure 3 indicates diagrammatically, in side
elevation, a view of a modified form of apparatus
for producing elements according to my inven-
tion;

Figure 4 is a perspective view showing one form
of the improved shingle strip, with one of its
corners turned up to show the underside thereof;

Figure 5 is a vertical cross-sectional view of
the element illustrated in Figure 4;

Figure 6 is a plan view of the upper face of a
modified shingle strip embodying my invention;

Figure 7 is a vertical cross-sectional and per-
spective view of the element illustrated in Figure
6 as produced by the apparatus shown in Figure
3, taken on the line 7—7 of Figure 6;

Figure 8 is a similar view taken on the line 8—8
of Figure 6; and

Figure 9 is a vertical cross-sectional view of
the element illustrated in Figure 6 taken on the
line 8—8, when made by the apparatus shown in
Figure 1.

It may be again stated that the roofing ele-
ments forming the subject matter of this inven-
tion are first formed in any suitable sizes and
shapes by any suitable machinery. While for
most purposes, I propose to treat those elements
which have been cut from a sheet of saturated,
coated and mineral-surfaced fibrous material,
nevertheless, the elements may be cut from an
unsaturated sheet, or one which has been sat-
urated, and, if desired, coated.

As will be explained, the elements to be treated
are successively and automatically subjected to a
coating operation, and then to a surfacing opera-
tion, and finally discharged in a finished condi-
tion.

In Figure 1, is illustrated an apparatus for pro-
ducing elements of the type illustrated in Fig-
ures 6 and 9. The numeral 10 indicates a pair
of endless conveyors, preferably in the form of
chains, to which may be attached suitable clamp-
ing devices 11 at regular intervals adapted to
seize each individual roofing unit and carry it
through the successive steps of the process. The
form of strip shingle for which the apparatus
as illustrated is more particularly designed to
handle is that shown in Figures 6 and 9, that is,
a strip shingle of generally rectangular shape
having slots extending upwardly from the butt
edge to form shingle simulating tabs; but it is
to be understood that the same apparatus may be
used as it is or with slight alterations to treat
roofing units of other shapes.

Strip shingles may be supplied successively to
the clamps 11 by suitable apparatus such as is
shown in my co-pending application Serial No.
94,377, hereinbefore referred to, or by hand, or
in any other desired way.

The clamps 11 may be successively opened as
by suitable cams 13 and 14 to receive strip shin-
gles to be treated. In order to prevent the clamps
11 from catching on or interfering with the cam

13 as they pass it, a cam 15 may be provided to tilt the jaws out of the way. The cams 13 and 14 interact with portions of the clamps to open the same for a brief period and then allow them to close. Suitable springs (not shown) may be provided connecting the jaws of each clamp to hold them normally closed and to draw the jaws together with sufficient force to grip and support a strip shingle which may be positioned between them. The conveyors 10 may be carried by a suitable number of sprocket wheels such as shown at 16, 17 and 18, any or all of these sprocket wheels being driven as desired. The strip shingles 12 after being supplied to and gripped by the clamps 11 are carried hanging from the clamps 11 by the conveyors 10 to a coating device. This, as shown in Figure 1, may include a series of striping wheels 19, if stripes such as are indicated at 51 in Figure 6 are desired. As shown, the striping wheels 19 are mounted over a suitable tank 21 containing the liquid coating material 22 which may be molten asphalt of relatively high melting point or any other desirable or suitable liquid. In order to keep the coating material in liquid form, it may be necessary to keep it hot. To this end, suitable heating means such for example as steam pipes 23 may be provided. The striping wheels 19 may dip directly into the pool of coating material 22 or as shown in Figure 1, may receive on their peripheries, films of coating material which are raised from the tank by feed wheels 24. In order to prevent the formation of congealed masses of material on the sides of the wheels 19 and 24, suitable scrapers 25, 26 may be provided. The effect of these scrapers is to confine the coating material to the peripheral areas of the wheels 19 and 24, and thus insure uniform width and definition of the stripes on the strip shingles. In order to coat the butt portions as well as the cut edges of the strip shingles 12 as shown in Figures 6 and 9, a suitable coating roll 27 is mounted in the path of the advancing strip shingles, the roll 27 being at such an elevation that as the shingles are successively drawn over the peripheral surface thereof, the butt portions only of the shingles come into contact with the surface of the roll. The roll 27 may dip into the pool 22 or may be continuously supplied with a film of coating material on its surface as by a feed roll 28. The rolls 19, 24, 27 and 28 are all preferably driven by any convenient means in either direction as desired, so that films of coating material are constantly raised from the pool 22 and presented to the advancing strip shingles. The strip shingles 12 as they are carried past the roll 27 come in contact with the surface of the roll and receive therefrom coating material which covers the butt portion of one face thereof and also the butt and other cut edges as shown in Figures 6 and 9. I prefer usually to drive the roll 27 in a counter-clockwise direction so that the film of coating carried by the roll is transferred to the shingles with a wiping action which insures a thorough application of an ample quantity of coating material to the portion of the shingle presented to the roll and to the butt edges. Each strip shingle when thus coated is carried along to a conveyor belt 29 upon which is deposited from a suitable supply 30 a layer of loose granules of crushed slate, brick, tile, or other comminuted matter suitable for surfacing a roofing element. The belt 29 is preferably driven so that the upper stretch thereof goes in substantially the same direction as the lower

stretch of the shingle supporting conveyors 10, the linear speed of the belt 29 being preferably a little less than the speed of the conveyors 10. Thus when the butt edge of each strip shingle comes in contact with the grit-covered stretch of the belt 29, the head portion of the shingle advances beyond and thus rocks the shingle on its butt edge while it is in contact with the grit. At a suitable point in the progress of the shingle, a cam 31 is provided to separate the jaws of the clamps 11 and thus release successively the shingles held thereby. The shingles thereupon fall flat on the grit-covered stretch of the belt 29 and are carried along in contact therewith between suitable press rolls 32 which are journaled in such a way as to be pressed together resiliently in order to permit the passage of the thickened portion of the shingle between them without the exertion of undue pressure thereon. Suitable cooling means (not shown) may be provided to chill the coating material after the shingles have passed through the press rolls. Loose grit on the belt 29 which is not taken up by the strip shingles, may be recovered as by a suitable receptacle 33. The finished shingles may be deposited in a suitable conveyor 34 and collected in packages for shipment.

If it is desired to produce shingles or shingle strips of the type illustrated in Figures 4 and 5, the striping wheels 19 may be omitted from the apparatus shown in Figure 1. By omitting the wheels 19, the blanks are coated only on the forward face of the butt portion and the cut edges by means of the coating roll 27.

In order to produce the modified form of shingle strip shown in cross-section in Figures 7 and 8, the pre-cut blanks will be treated by means of the apparatus shown in Figure 3. The elements, held by the spaced clamping devices pivotally mounted on the conveyors 10^a, are brought into contact with the stripe coating rolls 19^a, which may be supported by a suitable shaft 20 over the container 21^a, from which the coating material 22^a is supplied to the rolls by feed rolls 24^a. The shaft 20 is preferably connected to a power shaft by suitable gearing so as to drive the coating rolls 19^a with a peripheral speed equal to the linear speed of the conveyors 10^a. The feed rolls 24^a may also be driven by any desired means, such as sprocket wheels and a chain.

In order to prevent coating material from congealing on the sides of the rolls 19^a and thus increasing the virtual widths of these rolls in a manner to deposit stripes of excessive or irregular width, suitable scrapers 25^a, 26^a may be provided for the sides of the rolls 19^a and 24^a respectively, to confine the coating material to the peripheral surface of these rolls. The rolls 19^a are positioned at such an elevation that their peripheries will contact the strip 12 at suitable points near the top thereof. The progress of the strip will draw it over the rolls 19^a from which it will receive on its forward face stripes of coating material which will be of the same width as that of the rolls. In advance of the rolls 19^a the conveyors 10^a are preferably led over sprocket wheels 17^a, 18^a, which are so disposed as to lower the clamps 11, with the roofing units they carry, as they pass over the receptacle 21^a. The guiding sprocket wheels are so arranged that each shingle strip will be dipped to a desired depth in the coating fluid, and will thereupon be removed from the coating fluid by leading the conveyors over the sprocket wheels 19^b, both the dipping and the removal taking place while the shingle strip is

maintained in a substantially vertical position. The entire surface of the submerged portion of the strip will be completely covered with the coating compound, including all the edges of the cut-outs. During its removal and subsequently while the strip is in a vertical position, it is obvious that the coating will tend to flow and drain toward the bottom edge of the strip, thus assuming a tapered form with maximum thickness at the butt edge of the strip. A wiping device, which is preferably in the form of a steam pipe 35, may be positioned so as to engage each strip at its butt edge, and thus to remove the drippings of coating material therefrom. In order to be adjustable for strips of differing height, the pipe 35 may be pivotally mounted so as to be raised or lowered at will. From the dipping vat, the shingle strip is carried to a suitable conveyor 29^a which may comprise an endless belt arranged to receive comminuted surfacing material on its surface from a suitable hopper 30^a and to be led by guide rolls so as to engage the butt edge of the successive shingle strips as they are carried from the coating vat. Any desired surfacing material, such as crushed slate, grit, powdered mica or chalk electrically conducting granules or powder (desirable when the strip is to be electroplated), cork, sawdust, or other equivalents, may be supplied to the belt 29^a from the hopper 30^a. For brevity, this material will be hereinafter referred to generically as "grit", it being understood that any desired comminuted material may be included in the term. Before contacting with the grit-covered belt 29^a, each strip is preferably tilted backwardly by means of a suitably shaped cam 36 so as to project the butt edge forwardly just before it comes in contact with the grit-covered belt. The relative speeds of the conveyors 10^a and the belt 29^a are so regulated that the upper portion of the shingle will be carried along faster than the lower portion. In this way, the head portion of the backwardly tilting shingle will overtake the forwardly extending butt portion so that the backward tilt will change to a forward tilt while the edge remains in contact with the grit on the belt. After the butt edge of the strip has contacted with the grit covered belt 29^a and the clamps have passed beyond the cam 36, the conveyors 10^a carrying the clamps 11 are curved to proceed upwardly on an arc, the direction of motion being governed as by a guide track 37 which may be of such shape that the clamps may straighten the strips 12 to a vertical position with their butt ends at all times in contact with the grit on the belt, and then may swing the strip forwardly. As a result, the butt edge of each strip is simultaneously rounded off and surfaced with the grit or other surfacing material on the belt 29^a. When the strip, as it travels along, has been tilted forwardly to a sufficient degree, tripping means engage and open the clamps, holding them so that the strips are allowed to fall forwardly on the grit-covered belt 29^a in the same manner as described in connection with Figure 1. This brings the entire forward face of the strips in contact with the grit on the belt, with the result that sufficient grit sticks to the coated portion of the forward face to surface the coating. The shingle strips may then be carried by a conveyor beneath a hopper 38 which is adapted to spray granular material on the upper surface of the strips. The strips pass between suitable compression rolls to firmly embed the granular ma-

terial in the coated portion of the strips and the strips are finally collected in a suitable receptacle.

Referring to Figures 4 and 5, the numeral 12 indicates generally a shingle strip of substantially rectangular configuration having tabs 40 spaced by narrow cut-outs 41. The numeral 42 indicates a pre-cut blank which has been saturated and coated with waterproofing material, such as asphalt on one or both faces thereof and surfaced with granular material such as crushed slate or the like. Preferably only the upper surface 43 of the pre-cut blank is surfaced with wear resisting material and the lower face 44 is surfaced with powdered talc or mica. The secondary layer of asphalt or other waterproofing material 45 which is applied by means of the coating roll 27, covers the entire upper face of the butt portion of the strip together with the edges 46, 47 and 48 of the tabs and cut-outs. The secondary coating preferably tapers so that it is thickest at the butt edge and thinnest at its upper extremity 49. The upper extremity of the secondary coating layer is substantially parallel with the butt edge and occurs a short distance above the inner edges 47 of the cut-outs as clearly shown in Figure 5. The secondary coating over the butt face is continuous and integral with the coating on the cut edges. The areas covered by the secondary coating are surfaced with granular material of any desirable size and color.

The shingle strip illustrated in Figures 6 and 9 differs from that shown in Figures 4 and 5 in that tongues 51 extend along the body portion 52 of the strip substantially midway between the cut-outs 41. These tongues constitute the stripes of waterproofing material applied by the striping wheels 19 and are surfaced with granular material when the thus coated strips are brought into contact with the grit on the belt 29. When these strips are laid on a roof in a series of staggered overlapping courses, the tongues 51 will underlie the cut-outs of superjacent strips and thus additionally protect these areas from the ravages of the weather.

In the modification shown in cross-section in Figures 7 and 8, the strip has a thick tapered secondary coating covering both the upper and lower faces of the butt of the strip as well as the cut edges thereof. The secondary coating on the upper butt surface is continuous and integral with the coating on the cut edges and also with the coating on the lower butt surface as clearly shown in Figures 7 and 8. The strip will have tongues 51 substantially like those described in conjunction with Figures 6 and 9. The surfacing on the secondary coating may be of any desired mesh and color. If desired, the surfacing on the secondary coating covering the underface of the butt portion may be of finer mesh than that on the upper butt face, the exposed cut edges and the tongues.

I claim as my invention:

1. A shingle element comprising a blank, cut from a sheet of felted fibrous material saturated and coated with waterproofing substance, and an additional layer of waterproofing substance forming a continuous coating over substantially only the exposed portion of the upper face and the exposed butt and side edges and the bottom portion of said shingle element being free from the additional layer of waterproofing substance and from coarse mineral grit whereby the coating or saturation of the shingle has a tendency to exude from the bottom thereof and thereby cause the shingle to stick to the underneath surface.

2. An element in accordance with claim 1 having tongues of waterproofing substance extending in continuity with and upwardly from the upper extremity of said continuous coating, intermediate the lateral edges of said element.

3. A shingle element comprising a blank, cut from a sheet of felted fibrous material saturated and coated with waterproofing substance, a secondary layer of waterproof coating material covering substantially only the exposed portion of the upper face and edges of said element, and tongues of coating material extending upwardly from the upper extremity of said secondary layer intermediate the lateral edges of said element, and comminuted material surfacing said tongue and secondary layer the bottom portion of said shingle element being free of said secondary layer of waterproof coating material and said comminuted material whereby to permit the coating or saturant of the shingle element to exude from

the bottom of said shingle and stick to the underneath surface.

4. A thick butt shingle composed of a saturated fibrous foundation, waterproof coating material completely covering the face of said foundation, granular material partially embedded in said coating material and substantially completely covering the face of said foundation, a layer of coating material extending from the forward edge of said element and substantially completely covering the granular material on the lower portion of the face only of said element to be exposed to the weather, said layer of coating material being extended about the forward and side edges of the element but not upon the back of the element, thus sealing the cut edges of the element, and additional granular material partially embedded in the said layer of coating material.

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