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W. H. CADY

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METHOD AND APPARATUS FOR TREATING SHINGLES OR SHINGLE STRIPS

Filed March 17, 1932

3 Sheets-Sheet 1

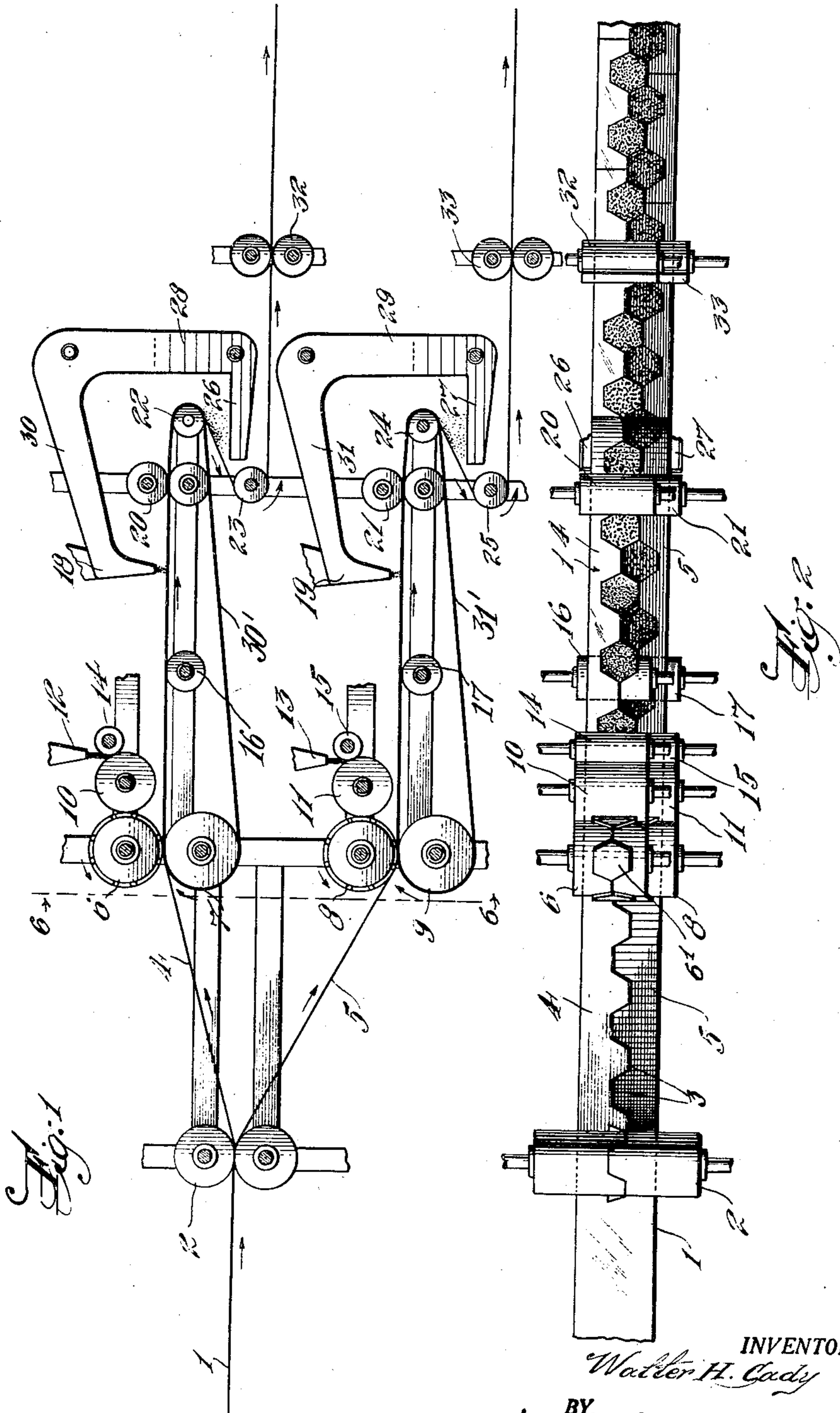


Fig. 1

Fig. 2

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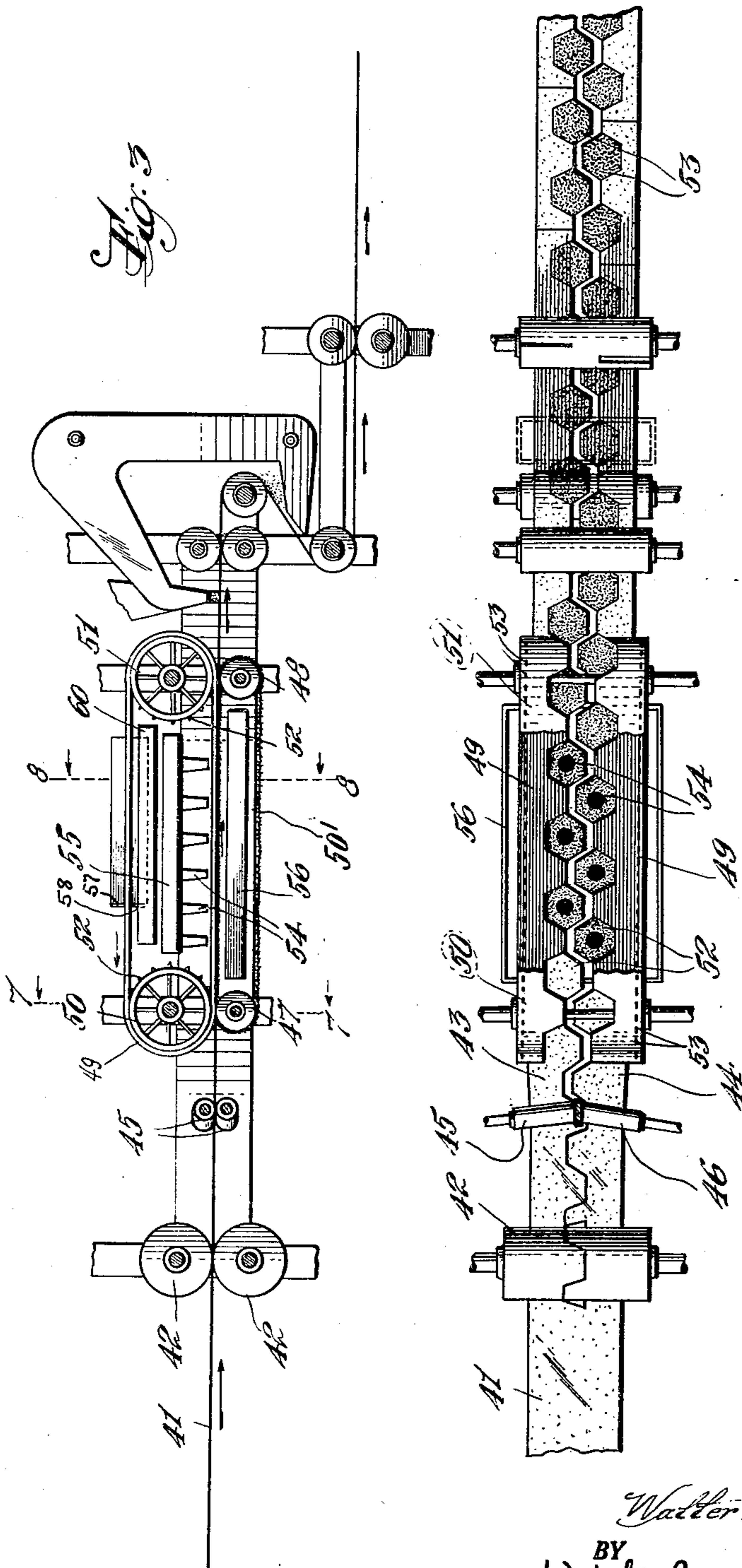
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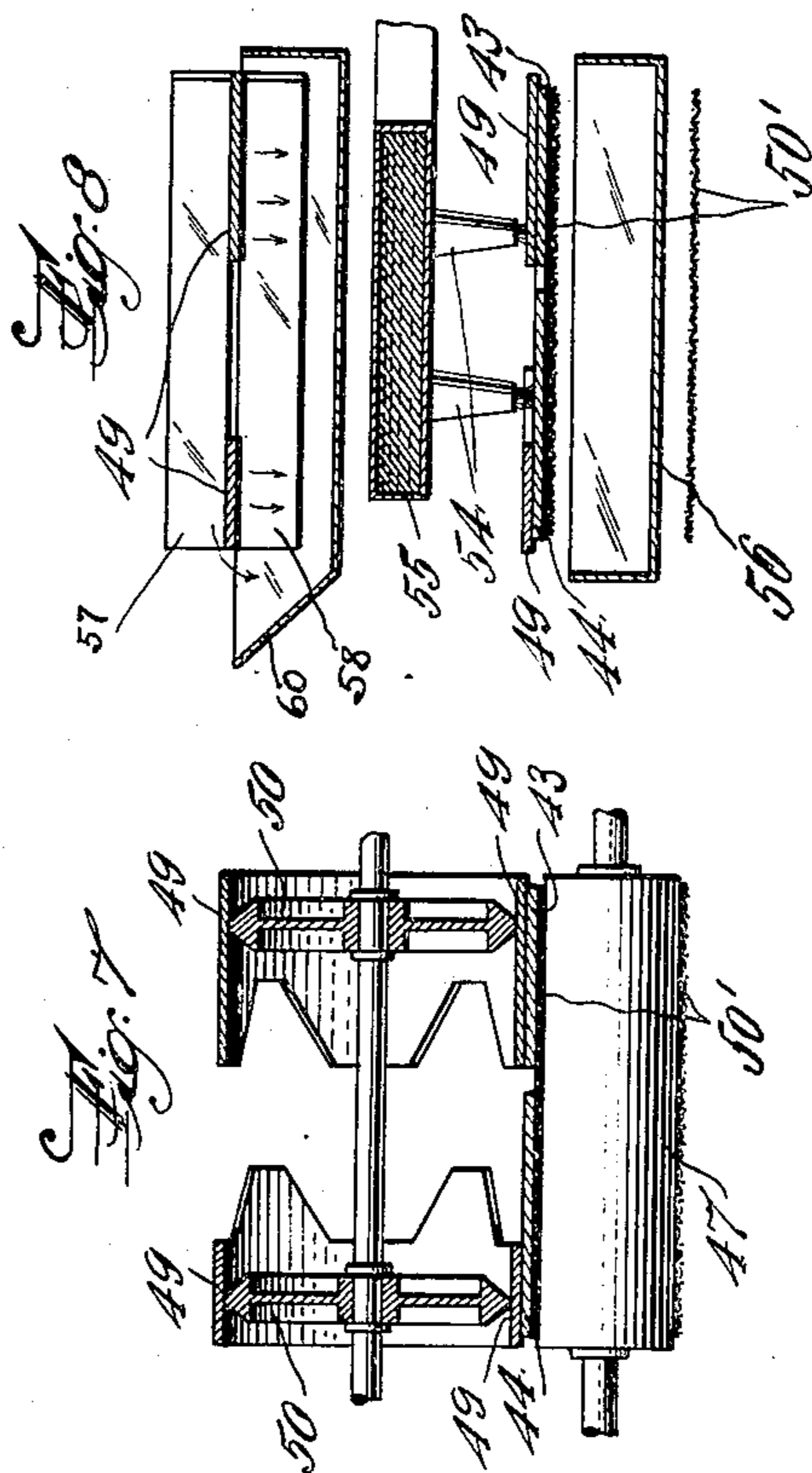
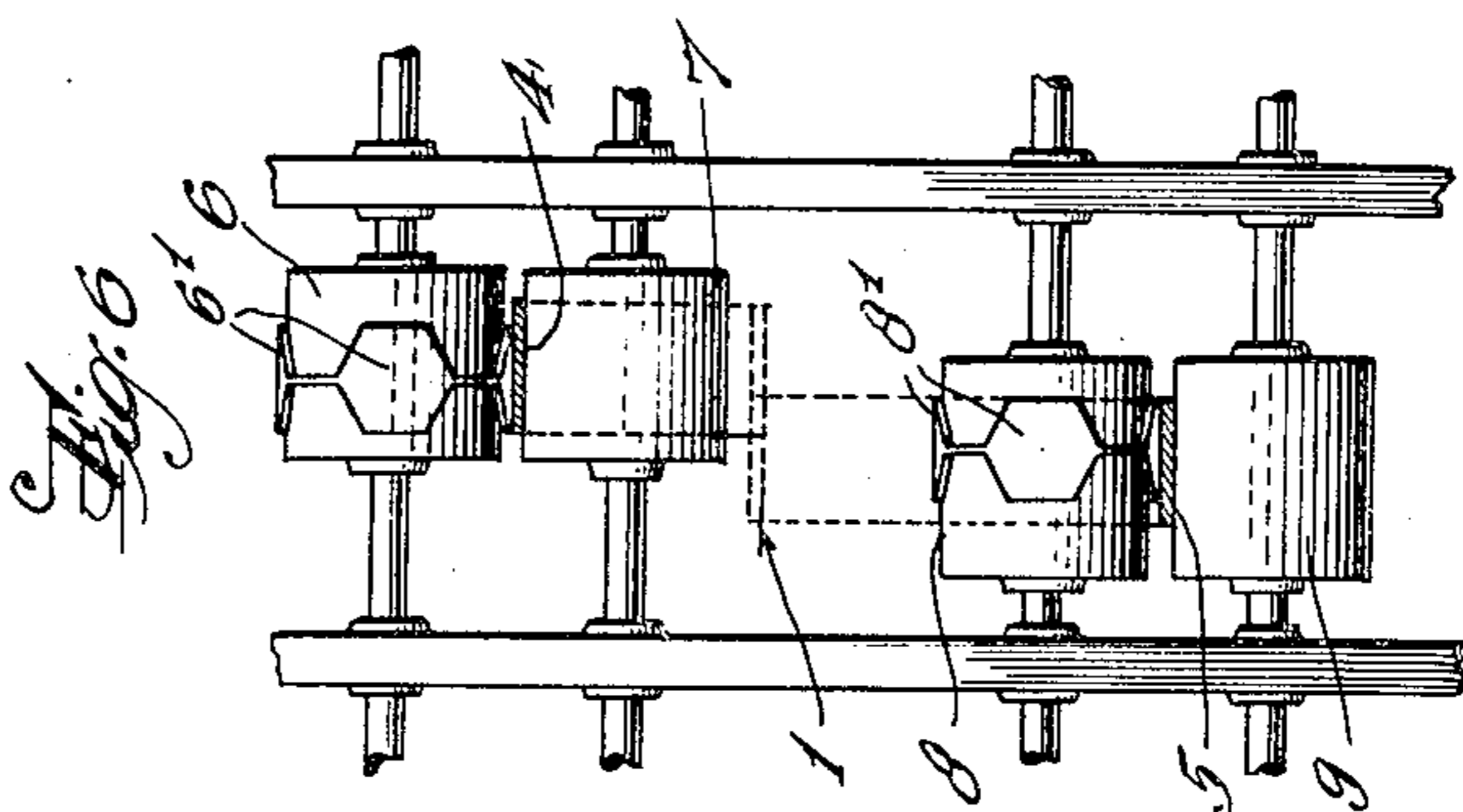
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METHOD AND APPARATUS FOR TREATING SHINGLES OR SHINGLE STRIPS

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18 Claims. (Cl. 91—14)

This invention relates to fabricated building material and has particular reference to a method and apparatus for treating asphaltic roofing material in such manner as to produce shingles, shingle strips or split sheet roofing, having sealed edges and thick butts.

In the manufacture of "asphalt" shingles, a sheet of felted fibrous material is saturated with a waterproofing substance such as low melting point asphalt, then coated with a film of waterproofing substance of higher melting point and surfaced with comminuted wear-resisting material such as crushed slate or slag. The sheet is then severed into elements of the desired size and shape. Elements so prepared have several objectionable features. The portions which are exposed when laid on a roof have a thin, unsubstantial appearance. Furthermore, fibers are exposed along the cut edges which absorb moisture in wet weather causing the shingles to swell and crack, thus reducing the waterproof quality of the roof as a whole and shortening the life of the individual elements.

These objections may be obviated by thickening the exposed portion of the shingle and sealing the exposed edges with waterproofing substances. Various methods have heretofore been proposed for accomplishing this in accordance with which either substantially the entire strip, or that portion only of the strip which is exposed when laid in place, is coated. Although these methods are more or less satisfactory for coating substantially the entire shingle of any shape, or for coating only the exposed portions of the shingles or strips having substantially rectangular shaped butts, they are not suitable for coating the exposed portions only of shingles or strips in which portions of the body of the strip are exposed in complementary relation with the tabs, as for example in the case of roofing elements which form a hexagon pattern when laid on a roof. When elements of this nature are treated according to prior methods, it is necessary to coat substantial areas which are not exposed in order to coat those portions of the shingle which are exposed when the shingles are laid in place.

The invention herein described has for its object the provision of a method of and apparatus for thickening the butts and coating the exposed face portions and edges of the shingles, shingle strips or split sheet roofing in which portions of the body of the strip are to be exposed in complementary relation with the tabs, without the necessity of coating those portions of the shingle

which are not to be exposed when laid in place on a roof.

A better understanding of my invention will be obtained from the following description in conjunction with the accompanying drawings of which:

Figure 1 is a diagrammatic side elevational view of one form of apparatus embodying my invention.

Figure 2 is a plan view of the apparatus shown in Figure 1, with some parts of the apparatus removed.

Figure 3 is a diagrammatic side elevational view of another form of apparatus embodying my invention.

Figure 4 is a plan view of the apparatus shown in Figure 3, with some parts of the apparatus removed.

Figure 5 is a perspective view of a sheet of roofing material showing the effects of the several steps in the process practiced in the use of the apparatus illustrated in Figure 1.

Figure 6 is an elevation of a part of the apparatus shown in Figure 1, indicated by the line 6—6.

Figure 7 is a view partly in cross-section taken on the line 7—7 of Figure 3.

Figure 8 is a cross-sectional view taken on the line 8—8 of Figure 3.

Referring to Figures 1, 2, 5 and 6, the numeral 1 indicates a sheet of felted fibrous material which has been saturated and coated with asphalt and surfaced with comminuted wear-resistant material. The sheet may be saturated only or may be saturated and coated without being surfaced with grit, in which case, it is preferably dusted with mica or talc to prevent it from sticking to the apparatus. The sheet passes between slitting rolls 2 and is slit longitudinally along a line forming the butt portion of the shingles or shingle strips to be subsequently severed from the sheet. In the drawings, the sheet is shown as slit along a zig-zag line 3 to form two continuous complementary strips 4 and 5 with semi-hexagonal shaped tabs, but the sheet may be slit to form tabs of any other desirable shape or configuration. Moreover, a wider sheet may be used and a greater number of strips slit from the sheet. After leaving the slitting rolls 2, the strips 4 and 5 are separated vertically, the upper strip passing between rolls 6 and 7, and the lower strip passing between rolls 8 and 9. The rolls 6 and 8 have suitably embossed surface areas 6' and 8' respectively for applying the coating to substantially only those portions of the upper face of

each strip which will be exposed when the strip is subsequently severed into appropriate lengths or elements and the strips or elements laid on a roof or other structure in overlapping courses. The rolls 6 and 8 are timed to rotate at a peripheral speed equal to the lineal speed of the strips 4 and 5. The rolls 7 and 9 act as supporting rolls for the strips 4 and 5 respectively during the coating operation. The rolls 6 and 8 have coating material fed to their embossed design surfaces by means of the smooth surfaced feed rolls 10 and 11 to which waterproofing material is fed from spouts 12 and 13 respectively. Rolls 14 and 15 are provided to spread the coating evenly over the surface of the feed rolls. From the coating rolls, the strip 4 is carried by a suitable endless conveyor 30' to a suitable hopper 18 through which comminuted material, such as crushed slate or slag, is dropped onto coated design areas of the strip. The strip then passes between suitable press rolls 20 to embed the grit firmly in the coating on the design areas, and over suitable idle rolls 22 and 23, where the strip is caused to travel with the surfaced face downward in order to allow excess grit to fall therefrom into a receptacle 26 from whence the comminuted material is conveyed by a suitable conveyor 28 to a chute 30 which returns the excess comminuted material to the hopper 18. The strip then passes between suitable severing rolls 32 where it is severed into shingles or strips of suitable length. In like manner, the strip 5, after being coated on suitable areas by the embossed portions 8' of the coating roll 8, is carried by a suitable endless conveyor 31' to a hopper 19 from which comminuted material is showered thereon. This material is pressed into the coated areas by rolls 21 after which the strip passes over idle rolls 24 and 25 to discharge excess grit into a receptacle 27 from which it is returned by a conveyor 29 and a chute 31 to the hopper 19. Severing rolls 33 then cut the strip into pieces of desired length.

A similar result can be accomplished by means of the apparatus shown in Figures 3, 4, 7 and 8. According to this embodiment of the invention, a sheet 41 of felted fibrous material which may have been subjected to preliminary treatment in the manner hereinbefore described, is fed between slitting rolls 42 which slit the sheet into strips 43 and 44. From the slitting rolls the strips pass between draw rolls 45 and 46 which are mounted to meet end to end at the mid-line of the sheet, with axes at an angle to each other, so that a slight lateral separation of the strips results. After being separated, the strips are caused to resume their normal direction of travel and are passed between a horizontal stretch of a conveyor belt 50' which may be made of open mesh woven wire and a pair of endless stencil sheets 49 made of metal, fabric or other suitable material. The belt 50' travels around supporting rolls 47 and 48. The sheets 49 travel around wheels 50 and 51 which may have lugs 52 spaced around the periphery thereof and adapted to mesh with slots or perforations 53 along the margins of the sheets to keep them properly aligned. The sheets 49 are designed and arranged to expose only those areas of the strips 43 and 44 which are to be coated. The lower faces of the sheets 49 are in contact with the upper faces of the strips 43 and 44 and the sheets are timed to travel at the same speed as the strips. A series of nozzles 54 connected at spaced intervals to a header 55 are arranged to spray waterproofing material on those portions

of the strips 43 and 44 which are exposed beneath the sheets 49. A catch basin 56 is placed beneath the strips 43 and 44 to collect any excess waterproofing substance. Suitable doctor blades 57 and 58 are placed in contact with both surfaces of the upper portion of the sheets 49 in order to remove any coating material which adheres thereto. A suitable catch basin 60 may be provided beneath the upper portions of the stencil sheets to collect the coating material scraped therefrom. After being coated the strips are surfaced and severed into elements in substantially the same manner described in connection with Figures 1 and 2.

The apparatus shown in Figures 1, 2 and 6 is especially adapted for coating with molten asphalt, while that shown in Figures 3, 4, 7 and 8 is particularly adapted for the use of asphalt emulsions as a coating material. However, it is to be understood that molten asphalt or asphalt in the form of emulsion can be used with either apparatus. Furthermore, instead of separating the strips vertically and coating with an embossed design roll, the strips may be separated laterally as shown in Figure 4 and coated by means of a roll having embossed areas corresponding to the combined areas of the strips, which are to be coated. Likewise, the strips may be separated vertically as shown in Figure 1 and coated by means of a spray and stencil sheet as shown in Figures 3 and 4.

Instead of carrying out the coating operation in a continuous manner, the operation may be an intermittent one in which the strip after being slit from a sheet of roofing material may be passed, either vertically or horizontally behind a suitable template or stencil and the movement of the strip momentarily interrupted while the exposed portions are sprayed with waterproofing material. Furthermore, individual shingle strips may be treated by suspending them in a vertical position, placing a suitable template or stencil in front of the strip and causing the shingle strip and the template to move together across the path of a spraying device.

Where it is desirable to coat both surfaces of the strip, a coating operation similar to that applied to the upper surface may be simultaneously applied to the lower surface of the strip.

Roofing material treated in accordance with my invention is preferably coated with only a thin coating of waterproofing material varying from about .010" to .017" in thickness on the upper surface and from .003" to .005" in thickness on the lower surface. The upper surface is covered with fine mesh slate or other wear-resisting material varying in fineness from such as will pass a screen of 28 mesh to such as will be retained on a screen of 100 mesh. The lower surface is preferably dusted with talc or mica. The second coating applied to the exposed portions of the strips after being severed from the sheet may range from .015" to .030" in thickness and the comminuted surfacing material may vary from such as will pass a screen of 8 mesh to that which will be retained on a screen of 35 mesh. Thus the coating and surfacing are so distributed that the greatest amount covers those areas which are exposed and require substantial protection while the portions of the elements which are covered when laid in courses carry only a small amount of coating and surfacing material. By so distributing the coating and surfacing material, the total amount required for a given amount of roofing material is substantially the

same as that heretofore required to produce strips which were neither thick-butted nor edge-sealed thereby eliminating the objectionable features of such elements without materially adding to the cost of production.

I claim:—

1. Apparatus of the character described, comprising means for slitting longitudinally into strips a sheet of roofing material longitudinally along a line defining alternating complementary tabs and recesses on the slit margin of each said strip, means for separating said strips, a coating roll having spaced embossed areas thereon of substantially the size and shape of the areas of the finished unit to be exposed to the weather, means for applying asphalt to said embossed areas only, means for feeding one of said strips in synchronized contact with said roll whereby the embossed areas on the roll register with the tabs on the strip, and means for surfacing the coated areas with granular material.

2. Apparatus of the character described, comprising means for slitting longitudinally into strips a sheet of roofing material along a line defining alternating complementary tabs and recesses on the slit margin of each said strip, means for separating said strips, a coating roll having spaced embossed areas thereon of substantially the size and shape of the areas of the finished units to be exposed to the weather, and means for progressively applying coating material to the embossed areas only of said roll.

3. A continuous method of producing roofing elements, which comprises forming from a sheet of roofing material of indeterminate length a plurality of locally coated longitudinal strips such that each said strip has a non-straight edge forming a series of alternate tabs and recesses of similar size and shape and areas of adhesive coating covering but substantially restricted to the weather face of each tab and an area contiguous and similar in shape and dimensions thereto whereby the upper boundaries of the coated areas are symmetrical with the boundaries of the tabs, surfacing the locally coated areas with granular material, and cutting each said strip into roofing elements.

4. A continuous method of producing roofing elements, which comprises forming from a sheet of roofing material of indeterminate length a plurality of locally coated longitudinal strips such that each said strip has along one edge thereof of series of alternate tabs and recesses and an adhesive coating of waterproofing material covering but substantially limited to the weather face of said tabs and an area contiguous to each said tab face and forming a mirror image thereof whereby the upper boundaries of the coated areas are symmetrical with the boundaries of the tabs, surfacing said coated areas with granular material, and cutting each strip into roofing elements.

5. A continuous method of producing roofing elements, which comprises forming from a sheet of roofing material of indeterminate length a plurality of locally coated longitudinal strips, each strip having along an edge thereof a series of semi-hexagonal tabs spaced by similar semi-hexagonal recesses and areas of adhesive waterproofing material covering but substantially restricted to hexagonal areas bounded by the edges of the tabs and upper boundaries symmetrical with said edges, surfacing said areas with granular material, and cutting said strips into roofing elements.

6. In a machine for making strip shingles, means for feeding longitudinally a strip of roofing having semi-hexagonal tabs along one edge thereof, means for applying adhesive coating material locally to hexagonal areas on one face of the advancing strip, each said hexagonal area being twice the area of a tab and inclusive thereof, and means for surfacing the coated areas with granular material.

7. A continuous method for producing roofing elements having alternate complementary tabs and recesses along the weather edge thereof and adapted to be laid on a roof with said tabs and recesses vertically aligned respectively with recesses and tabs of the next adjacent courses above and below, said process comprising longitudinally slitting into strips a sheet of flexible roofing material of indeterminate length along a non-straight line forming an edge of each said strip with a series of alternate complementary tabs and recesses, applying a film of waterproof coating to cover substantially only those portions and edges of the strips which will be exposed when elements severed therefrom are applied to a roof as described, surfacing the coated areas with wear-resisting material, and severing the strips into elements.

8. Apparatus of the class described, comprising means for slitting a sheet of roofing into strips each having along the cut edge thereof alternating complementary tabs and recesses, means operating progressively on said strips along the length thereof for covering successive hexagonal areas thereof with waterproof coating restricted to said tabs and areas contiguous and similar thereto, and means for feeding said sheet and strip.

9. Apparatus of the class described, comprising means for slitting a sheet of roofing into strips, each having along the cut edge thereof alternating complementary tabs and recesses, a coating roll for each said strip having hexagonal embossed areas thereon adapted to coat localized areas of the corresponding strip comprising the tabs and areas similar and contiguous thereto, means for feeding coating material substantially only to the embossed surfaces of said rolls for transfer to said strips, and means for feeding the several said strips to their respective rolls.

10. In a continuous process for making strip shingles having semi-hexagonal tabs, the steps of feeding longitudinally a strip of roofing material having semi-hexagonal tabs along an edge thereof, applying adhesive coating locally to successive tabs and areas contiguous with respect thereto so as to form a series of hexagonal coated areas, and applying granular surfacing material to said coated areas.

11. In a machine for making strip shingles, means for feeding longitudinally a strip of roofing material having semi-hexagonal tabs along one edge thereof, a stencil having similar semi-hexagonal tabs along an edge thereof, and means for feeding said stencil with and upon said sheet so as to expose only hexagonal areas of the sheet along said edge thereof.

12. Apparatus of the character described, comprising a slitting device adapted to slit a sheet of roofing material into strips having semi-hexagonal tabs and recesses, a stencil having a design adapted to expose hexagonal areas of said sheet when arranged thereover, means for feeding said strips in spaced relation beneath said stencil, means for advancing said stencil in predetermined relation to said strips so as to

expose hexagonal areas thereon, and means for applying coating to said areas exposed beneath the stencil.

13. Apparatus of the character described, comprising means for slitting a sheet of roofing into strips each having along the cut edge thereof alternating complementary semi-hexagonal tabs and recesses, means operating progressively on said strips along the length thereof for covering successive hexagonal areas thereof with waterproof coating restricted to said tabs and areas contiguous and similar thereto, said operating means including a stencil overlying a portion of said strips so as to expose only said tabs and contiguous areas, and means for feeding said strips and stencil.

14. Apparatus of the character described, comprising means for slitting a sheet of roofing material into strips each having along the cut edge thereof alternating complementary semi-hexagonal tabs and recesses, means operating progressively on said strips along the length thereof for covering successive hexagonal areas thereof with waterproof coating restricted to said tabs and areas contiguous and similar thereto, and means for feeding said strips, said operating means including a stencil overlying and traveling with said strips so as to expose only said hexagonal areas, and means for depositing on said exposed areas a film of waterproofing material.

15. A continuous method of producing roofing elements, which comprises cutting a sheet of roofing material of indeterminate length into strips each having along one edge thereof alternate tabs and recesses of similar size and shape, feeding said strips with stencils thereon so arranged as to expose only said tabs and areas of similar size and shape contiguous thereto, applying waterproof coating material to the area thus

exposed, surfacing the coated areas with granular material, and cutting each said strip into roofing elements.

16. A continuous method of making roofing elements, which comprises forming from a sheet of roofing material of indeterminate length a plurality of strips each having along one edge thereof a series of semi-hexagonal tabs spaced by recesses of similar size and shape, feeding said strips with overlying stencil means exposing only horizontal areas of said strips, half of each said hexagonal area being a face of one of said tabs, covering the exposed areas with waterproof coating material, surfacing the coated areas with granular material, and cutting the strips into roofing elements.

17. A continuous method of producing roofing elements, which comprises cutting a sheet of roofing material of indeterminate length into strips each having along an edge thereof alternate tabs and recesses of similar size and shape, imprinting on said strips successive areas of coating material limited to said tabs and areas of similar size and shape contiguous thereto, surfacing the imprinted areas with granular material, and cutting each said strip into roofing elements.

18. A continuous method of making roofing elements, which comprises forming from a sheet of roofing material of indeterminate length a plurality of strips each having along one edge thereof a series of semi-hexagonal tabs spaced by recesses of similar size and shape, imprinting liquid waterproofing material on successive hexagonal areas of each said strip, each said area including a face of one of said tabs, surfacing said areas with granular material, and cutting each strip into roofing elements.

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