Aug. 14, 1934. F. C. OVERBURY 1,970,431

METHOD AND APPARATUS FOR MAKING SHINGLE ELEMENTS

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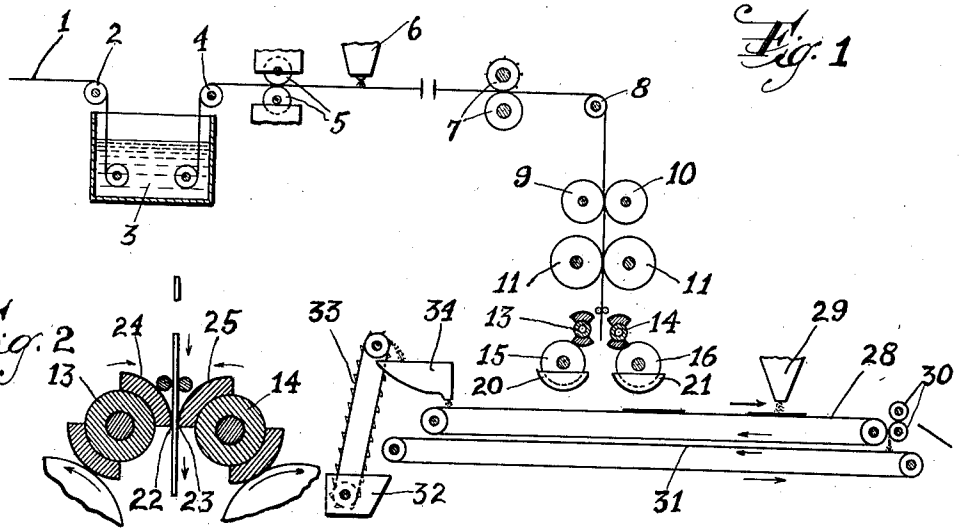

Fig. 1

Fig. 2

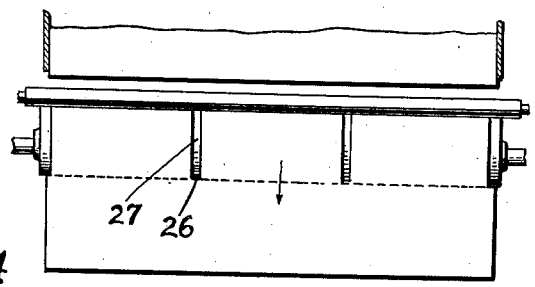

Fig. 4

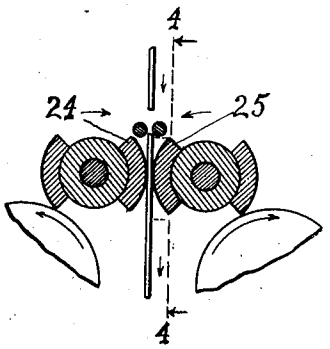

Fig. 3

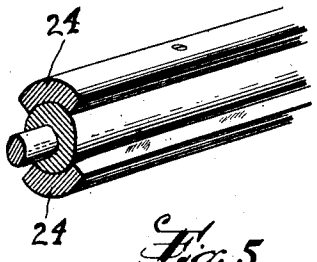

Fig. 5

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METHOD AND APPARATUS FOR MAKING SHINGLE ELEMENTS

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Application November 27, 1931, Serial No. 577,442

9 Claims. (Cl. 91—14)

This invention relates to a method of and apparatus for manufacturing shingle elements, particularly those comprising a base of fibrous material made resistant to water, wear and weather by the application of suitable water-proofing and wear-resisting substances.

In the manufacture of asphalt shingles it is customary to produce a sheet of bibulous felt, made from rags, cellulosic material, hair, wool, asbestos or the like, on a paper machine and saturate the sheet with asphalt while in a molten condition. The saturated sheet is coated with high melting point blown asphalt and surfaced on one or both sides with crushed slate, slag or the like material. The finished sheet is then cut into individual shingles or strips.

Shingles or strips so produced have several objectionable features. They are flat and thin and hence are unattractive and appear to be unsubstantial. Moreover, the felt fibres are exposed along the cut edges and absorb moisture during wet or damp weather causing the element to swell with resultant cracking of the coating and disintegration of the entire shingle.

One of the objects of this invention is to provide a method of and apparatus for sealing the edges and thickening the butt portions of shingle elements which have been made in the manner described.

Another object of my invention is to provide a continuous method and apparatus for feeding elements directly from the roofing machine to a device for sealing the edges and thickening the butts.

A still further object of my invention is to provide a method and apparatus for applying wear-resistant material to the elements after the coating material has been applied to the butts and edges thereof.

Further objects and advantages attending my invention will be manifest from the following description in conjunction with the accompanying drawing of which,

Figure 1 is a diagrammatic view in side elevation, showing an arrangement of apparatus conforming to my invention;

Figure 2 is a view partly diagrammatic and partly in cross-section of the apparatus for thickening the butts and sealing the edges of the strips;

Figure 3 is a view similar to Figure 2 showing an advanced stage in the process of applying coating to the butt portion of an element.

Figure 4 is an elevational view taken along line 4—4 of Figure 3, looking in the direction of the arrows;

Figure 5 is a perspective view of one of the cam coating rolls.

Referring to the drawing, the numeral 1 indicates a sheet of felted fibrous material fed from a suitable roll (not shown) over guide roll 2 into a saturating tank 3 where it is saturated with asphalt in the usual manner. From the saturating tank the sheet passes over guide roll 4 and between coating rolls 5 where it is coated on one or both surfaces with blown asphalt of high melting point. Preferably the coating on the upper face of the sheet, which is to form the exposed face of the finished element, is applied in a thickness of say from 0.012 to 0.020'' while that on the opposite face is of a thickness say from 0.003 to 0.006''. From the coating rolls the sheet passes under a hopper 6 which discharges crushed slate or other granular material onto the upper face of the sheet. This granular material is preferably of relatively fine mesh, say from such as will pass a screen of 30 mesh to such as will be retained on a screen of 100 mesh.

The sheet is then passed around the usual press drums (not shown) to cause the granular material to be firmly affixed to the coating, talc or mica being applied to the coating on the under face of the sheet as it passes around the press drum, in the customary manner. If it is desired to produce shingle strips of the square butt variety, having a plurality of tabs spaced by narrow cut-outs, the sheet may then be passed through a slotting device 7, for forming rows of slots in the sheet. The slotted sheet passes over a guide roll 8 and between rolls 9 and 10, carrying suitable knives for severing the sheet transversely along lines coinciding with the ends of said slots, thus completing the severance of the strips from the sheet. The sheet is preferably severed transversely at the upper or rear end of the slots for a purpose which will be hereinafter explained. From the cutting rolls 9 and 10 the severed elements pass between draw rolls 11. These draw rolls are spaced at such a distance from the cutting rolls 9 and 10 that at the instant the upper edge of the strip leaves the nip of the cutting rolls, the lower edge thereof is caught by the nip between the rolls 11. The rolls 11 serve to feed the strips between guide rolls 12 to the cam coating rolls 13 and 14, which are arranged to receive a film of asphalt or similar coating material from "pick up" or feed rolls 15, 16 respectively, which revolve in pans 20 and 21 containing a supply of the molten asphalt. Instead of acting as sever-

ing rolls, the rolls 9 and 10 may perforate the sheet along spaced transverse lines and the sheet be separated into strips along the lines of perforation by the tension exerted by the draw rolls 11.

The draw rolls 11 preferably revolve at such a rate that their peripheral speed is greater than the peripheral speed of the rolls 9 and 10, thereby spacing the strips from each other by a small distance before they are fed between the cam coating rolls 13 and 14. By so spacing the elements, the coating of the upper edge of each element is insured. The cam rolls are preferably spaced at such a distance from the draw rolls 11 that at the instant the uppermost edge of the advancing strip leaves the nip of the rolls 11, the strip is engaged on its opposite faces by the leading ends 22, 23 of the cam surfaces 24, 25 along a line a short distance in advance of the inner ends 26 of the cut-outs 27 formed in the strip. The rolls 13 and 14 preferably revolve at such a rate that the peripheral speed of the cam surfaces is the same as that of the draw rolls 14.

Referring more particularly to Figures 2 and 3, it will be seen that as the strip is engaged in the nip between the cam surfaces at the points 22 and 23, it is caused to continue its motion downward and at the same time the coating carried by each of the cam surfaces is transferred onto the confronting face of the shingle strip. The cam surfaces 24 and 25 are of an arcuate length equal to or slightly greater than the width of the portion of the strip desired to be coated, and preferably of an axial length slightly greater than the length of the strip. As the strip continues on its downward path, a well of coating material is built up between the cam surfaces 24 and 25 and the confronting surfaces of the strip, due to the slight squeezing action of the cam surfaces against these faces of the strip. As the upper edge of the strip arrives at the nip between the cam surfaces, this well of coating material is forced over the upper edge and effectively coats and seals it. During the contact between the cam surfaces and the confronting faces of the strip, the coating material is forced around the edges of the slots which have been previously cut in the strips and thereby coats and seals these edges. As the rear or uppermost edge of the strip passes beyond the nip between the revolving cam surfaces 24 and 25, the strip falls freely onto a travelling belt 28 having a layer of grit thereon. The strips will all fall in one direction on the belt by virtue of the horizontal motion imparted to the lower edge of the strip by the belt, while the upper edge is substantially motionless. The belt 28 carrying the coated elements passes beneath a hopper 29 which feeds crushed slate or other gritty material onto the upper surface of the elements. The elements are then fed between press rolls 30 which firmly embed the grit in the coating. From the press rolls 30 the elements are conveyed to any suitable cooling zone and thence to a suitable place of packing or bundling.

The cam rolls 13 and 14 may be of any suitable size and have any desirable number of cam surfaces thereon. The cam surfaces are preferably provided, as shown in Figure 5, by removably securing arcuate plates of suitable size at properly spaced intervals to the surface of a cylindrical drum or roll. The drum may, if desired, be hollow to permit circulating steam or other temperature regulating medium therethrough. The plates are spaced from each other so that the arcuate distance from the edge of one plate to the adjacent edge of the adjacent plate is equal to the width of the portion of the strip which it is not desired to coat, plus the gap or space between the successive strips as they are fed to the cam rolls.

It is apparent that if it is desired to coat only one surface of the butt portion of the element, coating material may be omitted from one or the other of the supply pans 20, 21, thus leaving the corresponding cam coating roll to assist in the feeding of the strip without acting to coat the corresponding face of the element.

In place of cam rolls, circular rolls can be used which may be caused to revolve at a peripheral speed equal to that of the draw rolls 11 and which are caused to rock intermittently by means of a cam mechanism so that they remain in contact with the surfaces of each element for a period of time sufficient only to coat the butt portion and edges thereof.

Instead of severing strips from the sheet in such a manner that the butt portion is at the upper end of the strip as the latter is fed to the coating rolls, the strips may be severed so that the butt portion is lowermost. In some respects, it is more advantageous to feed the elements to the coating rolls butt edge downward since as the elements leave the nip of the coating rolls 13 and 14 they will fall upon the grit conveying belt 28 so that the coated butt edge will strike the grit and be effectively surfaced.

The surplus grit which is carried to the end of the conveyor belt 28 falls onto a second conveyor belt 31 travelling in a direction opposite to the belt 28 and discharging the excess grit into a storage bin 32 from whence it is picked up by bucket conveyor 33 and fed to a bin 34 which again feeds the grit onto the belt 28.

If preferred, the initial steps of saturating, coating and surfacing may be performed as a separate operation and the material thus prepared may be wound into rolls which may be used as a source of supply of the material to be fed to the slotting and severing devices, and then to the draw rolls and cam coaters in the same manner as heretofore described. Moreover, units which have previously been severed may be automatically fed from a magazine to the cam coating rolls in timed relation therewith. This latter method permits of greater flexibility in operation since the feeding of the units can conveniently be timed as desired, whereas when units are fed directly from the roofing machine, the intermittent coating operation of the successive units must proceed with substantially the same rapidity as that with which the elements are produced. Furthermore, where the units are fed from a magazine and it is desired to coat only one surface of the butt portion, this may readily be accomplished by feeding two units simultaneously back to back between the coating rolls.

It will be understood that by varying the design of the cam coating rolls to conform to various shaped shingles, other types of shingles and shingle strips such as those with hexagonal exposed designs can be produced in the same manner.

To facilitate further the accurate feeding of the strips between the cam coating rolls, the latter may be formed with spaced metal strips or bands extending circumferentially of the rolls intermediate the cam surfaces and connected thereto so as to lie in substantially the same peripheral plane with the latter. These strips or bands are preferably secured at spaced intervals corresponding

to the distance between the tab-defining slots or cut-outs in the shingle strips being treated but are located in staggered relation with reference to the position of the cut-outs as the strips pass between the rolls. These facing bands would then aid in holding the shingle strips properly aligned during their passage between the cam surfaces of the coating rolls, and would serve also to apply tongues of coating material extending into the upper part of the shingle strips intermediate the cut-outs. These additional tongues would underlie the cut-outs of a superadjacent strip when laid, thus affording additional protection at these areas.

It will be apparent that by modifying the design of the cam coating rolls, shingle strips may also be treated for recoating them while they are fed in a direction longitudinally of their butt edges, instead of at right angles thereto.

I claim as my invention:

1. The process of manufacturing shingle strips comprising saturating and coating a sheet of felted fibrous material with a waterproofing substance, surfacing the sheet with wear-resisting material, cutting slots in said sheet at spaced intervals, severing the sheet along lines co-incident with the ends of said slots to form strips, continuously feeding the severed strips in succession directly to a coating zone whereby to coat substantially only the butt portions and the exposed edges of said strips, dropping said strips onto a bed of surfacing material whereby to surface the portions of the strips which have been coated.

2. The method of producing shingle elements which comprises saturating and coating a sheet of felted fibrous material with a waterproofing substance, severing the sheet into units, continuously feeding the severed units in succession directly to a coating device whereby to coat substantially only the butt portion and exposed edges of said units with waterproofing substance and surfacing said coated butt portion and exposed edges with wear-resisting material.

3. A method for thickening the butts and coating the edges of shingle strips comprising feeding precut strips successively to an intermittent coating device, operating in timed relation with the feed of said strips, coating substantially only the butt portions and the exposed edges of said strips and surfacing the thus coated portions and edges with wear-resisting material.

4. In the manufacture of shingle elements the step of feeding precut elements in a vertical direction between a pair of co-acting cam surfaces supplied with a film of waterproof coating material whereby to coat substantially only the butt portion and the exposed edges of said elements with the waterproofing material.

5. In the manufacture of shingle elements the step of feeding precut elements in a vertical direction between a pair of co-acting cam surfaces supplied with a film of waterproof coating material whereby to coat substantially only the butt portion and the exposed edges of said elements with the waterproofing material, and allowing the elements to drop, with the butt edge foremost, onto a moving bed of comminuted material.

6. In the method of producing shingle elements the steps consisting in severing elements from a sheet of roofing material, continuously feeding the severed elements without substantially altering their plane of disposition directly to a coating zone to coat a portion only of both faces of said element, and surfacing the coated areas with comminuted material.

7. Apparatus of the character described comprising means for saturating and coating a sheet of fibrous material with waterproofing substance, means for surfacing said sheet with granular material, means for cutting slots in said sheet and severing the sheet into units, an intermittent coating means, and means for feeding said units in succession directly from said severing means to said coating means.

8. Apparatus of the character described comprising means for severing a sheet of roofing material into strips, intermittent means for coating said strips, and means for feeding strips in succession directly from said severing means to said coating means.

9. A method for recoating prepared shingle units comprising feeding precut units successively to an intermittent coating device operating in timed relation with the feed of said units, coating substantially only predetermined portions of said units and surfacing the thus coated portions with a wear-resisting material.

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