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PROCESS AND APPARATUS FOR MANUFACTURING DESIGN ROOFING

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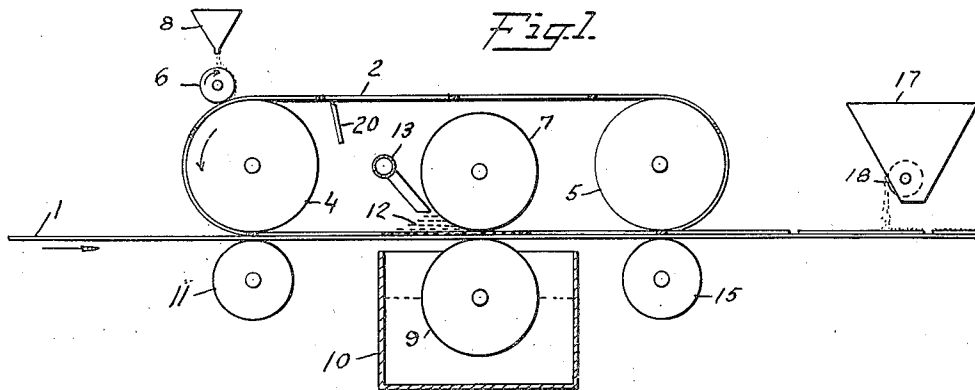
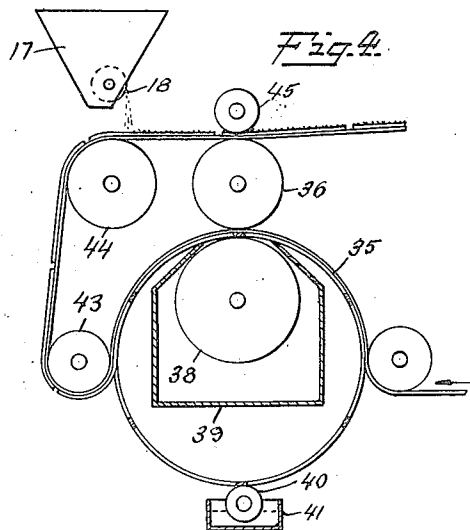
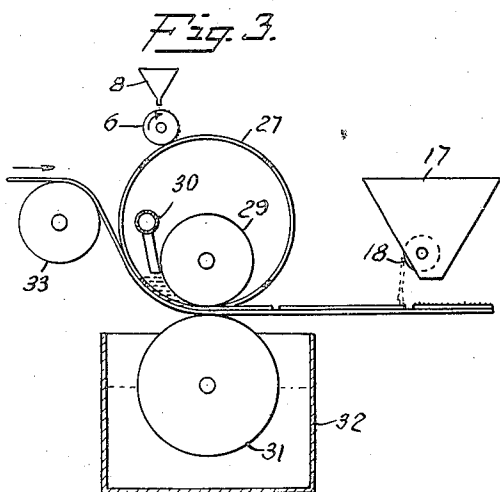
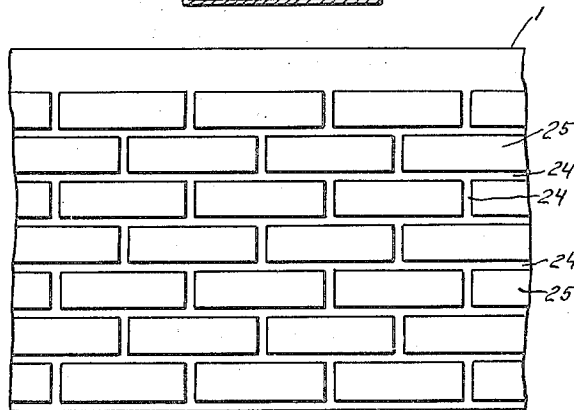


Fig. 2.



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PROCESS AND APPARATUS FOR MANUFACTURING DESIGN ROOFING

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8 Claims. (Cl. 91—18)

This invention relates to roofing and more particularly to the production of roofing or siding having the exposed face formed with a desired pattern or design.

One of the objects of this invention is to provide a novel method and means for applying bituminous coating material to either plain saturated felt or mineral-surfaced sheet roofing in the form of a pattern or design.

Another object of the invention is to provide an improved apparatus and process for applying a design or pattern of bituminous material to mineral-surfaced roll roofing or shingles and thereafter surfacing the bituminous design with comminuted mineral material of a contrasting color.

Another object of the invention is to provide a method and apparatus for applying a design to a sheet of roofing material in which viscous or plastic bituminous material or bituminous mastic is forced through a stencil onto the roofing by means of suitable pressure rolls.

Prior to this invention it was common practice in the roofing industry to apply ornamental designs or patterns to saturated felt or mineral-surfaced roll roofing material by contacting the roofing base with a suitable printing roll, rotating in a bath of coating material.

In the process of the present invention, positive pressure is employed for forcing the coating material through the stencil onto the sheet of roofing. This method permits the use of relatively viscous coating material so that a fairly thick layer can be applied to the roofing and sharply defined designs produced.

For a better understanding of the invention, reference should be made to the accompanying drawing wherein is shown by way of illustration the preferred method of carrying out the invention.

In the drawing,

Fig. 1 is a diagrammatic sketch showing a preferred arrangement of the apparatus;

Fig. 2 shows one type of design roofing which may be produced by this invention;

Fig. 3 is a sketch showing a modified arrangement of the apparatus; and

Fig. 4 is a sketch showing another modification in the arrangement of the apparatus.

As shown in Fig. 1, a sheet of saturated roofing felt 1 is fed from a suitable source of supply and contacted with an endless perforated belt 2 which may be of steel or other flexible durable material. The belt passes around spaced rollers 4 and 5 driven at a suitable speed through any

suitable drive (not shown). Between the spaced rollers is a rotating coating roll 7 which abuts tangentially against the upper face of the endless belt passing thereunder. Vertically beneath coating roll 7 and disposed on the opposite side of the endless belt is a similar coating roll 9 which revolves in a suitable coating pan 10 adapted to contain bituminous coating material.

Before being brought into contact with the saturated felt, the belt is first given an application of anti-stick solution, such as a solution of soap and water. This solution may be applied by means of a suitable application roll 6, the surface of which is wetted with anti-stick solution fed from supply tank 8. The anti-stick solution prevents the belt from sticking to the coating material or coated felt sheet, insures the production of a clear cut design or pattern, and permits the ready separation of the stencil or pattern belt from the coated sheet.

After the felt sheet 1 is contacted with the revolving perforated belt 2 they pass together horizontally over roll 11, adapted to keep the belt and the roofing in close contact, and then travel between the pair of rotating coating rolls 7 and 9. Just before they pass between the coating rolls, coating material 12 is fed onto the upper face of the perforated endless belt by means of feed pipe 13. As the coating material, perforated belt, and the sheet of saturated felt in contact therewith pass between the coating rolls, the top coating roll 7 pressing against the bottom coating roll 9 forces the coating material through the perforations in the belt onto the upper surface of the sheet of felt. Simultaneously, the bottom coating roll, revolving in the bath of bituminous coating material, deposits a film of coating on the lower surface of the felt sheet. Thus, the entire under face of the sheet is coated with waterproofing material, such as asphalt, and the upper face has a coating of plastic waterproofing material such as asphalt simultaneously applied thereto in a desired pattern or design.

The resultant coated sheet, after passing roll 15, disposed beneath roller 5, is stripped from the rotating endless belt. The coating material which was forced through the perforated felt remains on the felt sheet and forms a design or pattern the exact configuration of which depends upon the perforations or open spaces in the belt. The coated felt sheet is then given a surfacing of comminuted mineral material which adheres to the cementitious coated portions and not to the non-cementitious uncoated portions. This surfacing may be applied by passing the sheet under

a grit hopper 17 from which a stream of grit particles such as crushed stone, slate, or other mineral granules may be fed onto the sheet by means of a distribution roll 18. A seal-back coating of some suitable material such as powdered soapstone, mica flakes, etc. may then be applied to the under surface of the sheet. The surfaced sheet may then be passed through suitable pressure rolls which partially embed the grit particles in the coating and cause them to firmly adhere thereto.

During the return of the endless perforated belt from roller 5 back to roller 4, the inside face of the belt is contacted with a scraper 20. This scraper removes from the belt any coating material which may be adhering thereto and thus cleans and prepares the belt for the next coating operation. As hereinabove pointed out the belt is provided with a film of anti-stick solution from tank 8 before being brought into contact with the saturated felt.

If it is desired to produce a double-coating product, a sheet of mineral-surfaced roofing (as for example felt saturated with asphalt, coated on both sides with asphalt surfaced on one side with mineral granules and having mica applied to the other side) may be used in place of the saturated felt as described above. Operating with mineral-surfaced felt it is unnecessary to coat the under side and consequently the coating material is drained from coating pan 10, the bottom coating roll 9 acting as a pressure roll and cooperating with roll 7 to cause the application of the coating in sharply defined patterns. After the coating operation has been performed, comminuted mineral material contrasting in color with the grit surfacing of the base may be applied to the base from the hopper 17. This comminuted mineral material will adhere only to the cementitious coated portions of the base and will form a design against the contrasting background.

It is obvious that the above described procedures make it possible to form roof roofing having a wide variety of designs or patterns. The exact design obtained depends entirely upon the type of perforated belt used. For instance, if the belt were composed of a series of parallel metal bands connected together by perpendicular metal bands, there would be formed sheet roofing having the appearance of courses of bricks, as shown in Fig. 2. The depressed narrow horizontal and vertical strips 24 correspond to the solid portions of the belt. The rectangular brick-shaped areas 25, defined by strips 24, correspond to the open portions or perforations in the belt.

As shown in Fig. 3, a hollow rotating cylindrical stencil 27, the walls of which are cut out to permit the passage of coating material therethrough in the form of a suitable design, may be used instead of the endless perforated belt of Fig. 1. Eccentrically disposed within the perforated cylinder or stencil is a top coating roll 29. Supply pipe 30 feeds coating material into the interior of the stencil on one side of coating roll 29. A bottom coating roll 31 is placed vertically below the top coating roll in such a manner that a small clearance is provided between the outer surface of the stencil and the surface of the bottom coating roll. The lower coating roll is adapted to rotate in a bath of coating material contained in coating pan 32.

In carrying out the process with this modified apparatus, saturated roofing felt is first passed over roll 33 and contacted with the outer surface

of the rotating perforated cylinder or stencil 27. The perforated cylinder may previously be given an application of soap solution or other anti-stick preparation in any suitable manner, as for example by means of application roll 6 and supply tank 8. As the cylinder 27 and coating rolls 29 and 31 rotate, coating material from supply pipe 30 will be squeezed through the cut-out portions in the wall of the cylinder and be deposited on the upper side of the sheet of saturated felt. Simultaneously, the bottom coating roll 31, rotating in pan 32, will apply a thin film of coating material to the lower side of the felt sheet. After passing between the rolls, the coated felt sheet is stripped from the perforated cylinder and is given a surface coating of granular material fed from grit hopper 18 by means of distribution roll 17 and a seal-back coating of soapstone or some similar material applied in any desired manner.

This modified process may be used to produce a design on granular surfaced roll roofing. In such a case, as pointed out previously, it is preferable to omit the coating pan 32, or drain it of its contents, and use the lower roll 31 merely as a pressure roll against which the stencil 27 and upper roll 29 may bear.

Another modification in the process and arrangement of the apparatus is shown in Fig. 4. In this case, a hollow perforated cylinder or stencil 35 is disposed vertically beneath a pressure roll 36. Inside the hollow cylinder or stencil is a coating roll 38 rotating in a pan 39 of coating material. The top of the coating roll bears against the inside surface of the rotating perforated cylinder. As the coating roll rotates within the coating pan it picks up a layer of coating material and forces it through the interstices of the perforated cylinder onto the sheet roofing passing thereover. The perforated cylinder may first be given an application of anti-stick solution from roll 40 rotating in supply tank 41 to prevent the coating material and roofing from sticking thereto. The coated sheet is directed over rolls 43 and 44 and passes beneath grit hopper 17 and distribution roll 18 which feed a supply of grit onto the sheet. The surfaced sheet may then be passed between pressure rolls 36 and 45 which partly embed the grit in the coating material and cause the grit to firmly adhere thereto. Since only one side of the sheet roofing is coated in this process, the method is particularly adapted for use in applying a design to mineral-surfaced roofing rather than to plain saturated felt.

The present invention makes it possible to use coating material in a relatively viscous condition. This is because the coating material is actually forced through the interstices of the endless belt by the positive action of the oppositely-disposed pressure or coating rolls. Asphalt of a melting point from 85° C. to 120° C., and preferably about 105° C. may be applied at a temperature of from 150° C. to 235° C. and give good results. Bituminous compositions or mastics containing considerable quantities of inert materials, such as asbestos, wood flour, etc., may also be employed as the coating materials.

Since certain changes in carrying out the above process and in the constructions set forth may be made without departing from the scope of this invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. The process of applying viscous coating ma- 75

terial in a predetermined three-dimensional design in relief constituted of raised portions of substantial height and depressed portions of substantial depth to a sheet of roofing material which comprises contacting a stencil with the sheet, supplying the viscous coating material to the side of the stencil remote from the sheet and applying pressure to opposite sides of the sheet and stencil, thereby pressing the viscous coating material through the stencil onto the sheet to fill the stencil to form said raised and depressed portions, said raised portions projecting a substantial distance from the surface of said sheet, and retaining the stencil in contact with said sheet until the coating material has partially hardened.

2. In a process of making ornamental roofing, the steps comprising stenciling under pressure raised areas of heat liquefied bituminous material of substantial thickness onto a flat roofing base of sufficient strength to remain substantially undeformed during said stenciling operation, the portions of said roofing base between said areas remaining uncovered by said coating material, applying to the sheet so produced granular surfacing material and partially embedding said surfacing material in the bituminous coating material, whereby the surfacing material adheres to the raised areas only.

3. The process of forming ornamental design roofing of embossed appearance which comprises coating one entire face of a sheet, simultaneously pressing a liquid coating agent through a stencil of substantial thickness onto the opposite face of the sheet to form said design of embossed appearance constituted of raised portions of substantial height and depressed portions of substantial depth, the difference in height between said raised portions and depressed portions being substantially equal to the thickness of the stencil, and subsequently partially embedding granular surfacing material in the coating material of said raised portions.

4. The process of applying high melting point bituminous coating material at relatively high temperatures such that the coating material is liquefied, to sheet roofing in a predetermined relief design by passing the coating through a stencil which comprises superimposing the stencil on the sheet, supplying the heat liquefied coating material to the stencil and applying pressure to the stencil, sheet and the coating material to force the coating material into and to fill the interstices therein, retaining the stencil in contact with said coating material forced therethrough until it has partially hardened and simultaneously applying coating material and pressure to the opposite side of the sheet.

5. The process of applying viscous liquid coating material at relatively high temperatures in a predetermined relief design constituted of raised portions of substantial height and depressed portions of substantial depth to a sheet of mineral surfaced roofing by passing the coating through

a stencil of substantial thickness onto the sheet, which comprises applying a film of anti-stick to the stencil, superimposing the sheet roofing on the treated stencil, supplying coating material to the side of the stencil opposite to the sheet and forcing it therethrough onto the sheet in sufficient quantity to fill the interstices of the stencil, simultaneously applying pressure to the opposite side of the sheet, retaining the stencil and sheet in contact until the coating material has partially hardened, removing the sheet from contact with the stencil, applying grit to the freshly coated raised portions, and partially embedding the grit in said raised portions.

6. In apparatus for applying coating material in a design constituted of raised portions of substantial height and depressed portions of substantial depth to a sheet of roofing material, a stencil of substantial thickness, and coating rolls disposed on opposite sides of said stencil and arranged to receive the sheet therebetween, a source of coating material arranged to supply such material to the side of the stencil remote from said roofing sheet in advance of said coating rolls, said coating rolls cooperating to exert pressure on the stencil and the sheet and to force the coating material through the stencil onto the sheet, said stencil being constructed of durable material capable of withstanding the stresses imposed by the application of said coating material.

7. In apparatus for applying plastic waterproofing material in a predetermined design of embossed appearance constituted of raised portions of substantial height and depressed portions of substantial depth to a sheet of roofing material, the combination comprising spaced rollers, an endless perforated metallic belt of substantial thickness adapted to rotate about said rollers, an upper coating roll disposed between said rollers and adapted to abut against the face of said perforated belt, a lower coating roll disposed on the opposite side of the perforated belt vertically beneath the upper coating roll and means for applying coating material onto said stencil, said coating rolls cooperating to apply pressure to said sheet and stencil and to force the coating material through the interstices of the stencil onto the sheet.

8. In an apparatus for applying coating material in a design of embossed appearance to a sheet of flexible roofing base, a rotating cylindrical stencil of substantial thickness, a rotating coating roll located within said stencil, means for supplying coating material to the interior of said cylindrical stencil and a second coating roll disposed on the opposite side of the stencil vertically beneath the first coating roll, the second coating roll being adapted to rotate in a pan of coating material, said coating rolls cooperating to receive therebetween and to exert pressure on the stencil and sheet.

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