June 15, 1965 H. M. RAPP 3,189,498

ROOFING METHOD

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FIG. 1

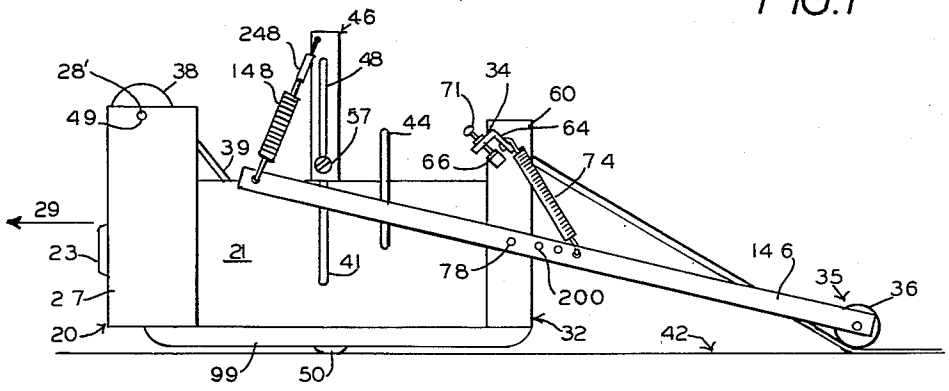
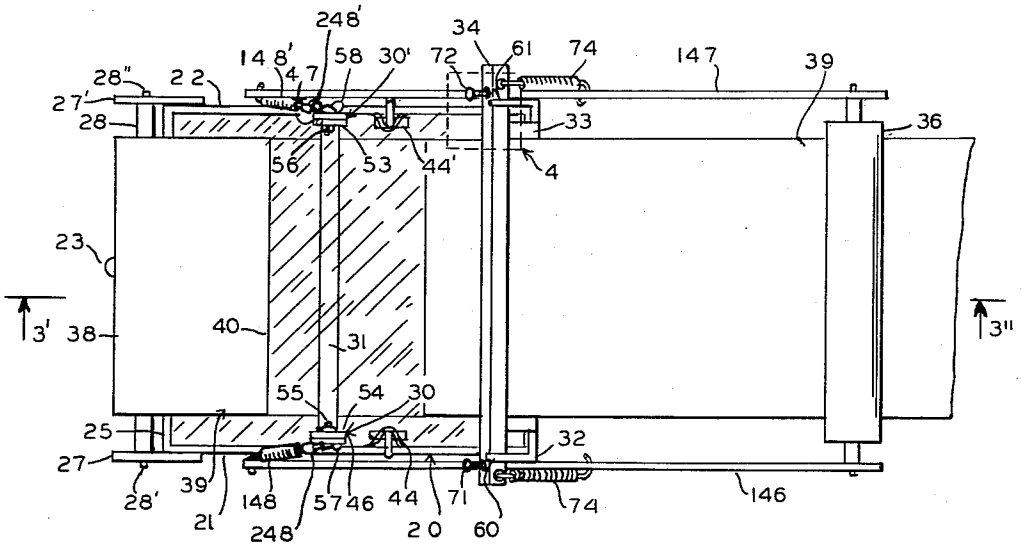


FIG. 2



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FIG. 3

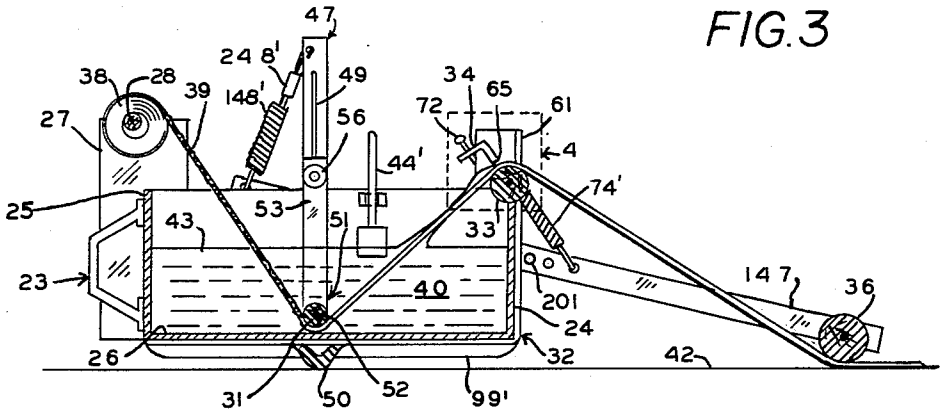


FIG. 4

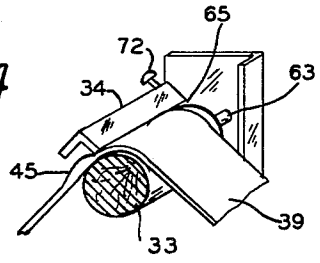
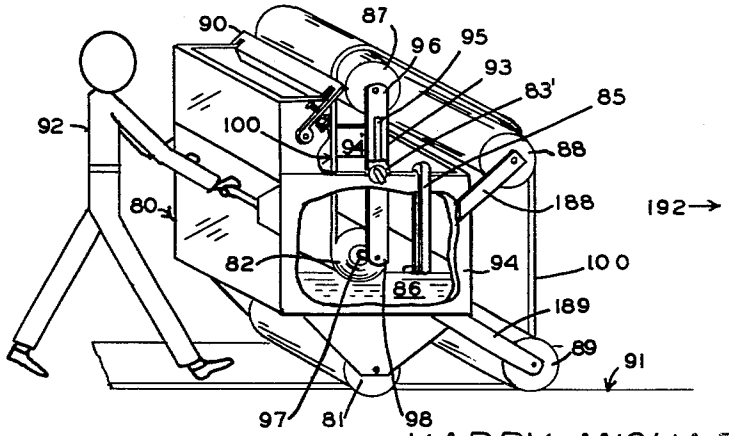


FIG. 5



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United States Patent Office 3,189,498 Patented June 15, 1965

3,189,498

ROOFING METHOD

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Original application Jan. 30, 1961, Ser. No. 85,805, now Patent No. 3,148,104, dated Sept. 8, 1964. Divided and this application Feb. 6, 1962, Ser. No. 171,482
4 Claims. (Cl. 156—71)

This invention relates to a method for applying roofing materials. This is a division of my co-pending United States patent application, Serial No. 85,805, filed January 30, 1961, now U.S. Patent No. 3,148,104.

One object of this invention is to provide a method of increased efficiency for preparing and applying roofing materials.

Another object is to provide a method for reducing the time requirements for application of roofing seams to a roof.

This invention comprises novel functions and cooperations thereof as well as novel combinations and structures of parts as will more fully appear in the course of following description, of which description the drawings attached hereto form a part.

In these drawings wherein like reference characters designate like parts in the several figures,

FIGURE 1 is a side view of the preferred embodiment of apparatus of this invention;

FIGURE 2 is a top view of the device of FIGURE 1.

FIGURE 3 is a sectional view of the device of FIGURE 2 taken along the section indicated by 3'–3" of FIGURE 2;

FIGURE 4 is an enlarged perspective view of the zone 4 indicated within area shown by the dotted lines of FIGURES 2 and 3;

FIGURE 5 is a perspective view, partly broken away, of an alternative embodiment of this invention for large capacity application.

Generally, this invention provides for automatically conveniently, evenly, efficiently and rapidly applying to both sides of a glass webbing a sufficient amount of roofing tar to make such webbing firmly adhere to the roof therebelow. Additionally, the method automatically provides for a thorough and even application of such amount of material through the interstitial area of such webbing by such roofing material. This is done, generally, by forcing the tar or asphalt material to pass through the webbing first from one direction and then through the webbing in the other direction with removal of excess tar or asphalt. This application and removal is done evenly over the entire area of the webbing. Following such proper application of the asphalt adhesive material to the webbing the webbing so treated with such adhesive and carrying it is automatically and evenly pressed onto the roof to which it is to be applied. The preceding application of the asphalt material to the webbing and the application of the thus treated webbing to the roof are accomplished automatically on the movement of the webbing and the material to impregnate such tape across the zone or seam to which such webbing or tape is to be applied.

The process of this invention comprises automatically and continuously impregnating roofing webbing with roofing tar and applying such webbing to a roof. The webbing is passed as a flat sheet through a volume of tar whereby such roofing tar may thoroughly contact one or both surfaces of said webbing. Pressure is then applied to one side of the tape by a surface of a relatively narrow cylindrical roller at an angle to the plane of said tape and the webbing tape is drawn against such surface so that such angled surface pressures the tarring material against the webbing. This action also forces tar into the interstices of said webbing; in as much as there is tar in the interstices as well as on the surface of the tape such tape has a greater affinity for holding tar on either surface of such webbing than would be the case where the interstices were not so filled. This method also fills the interstices of the webbing all along the width of said webbing in an even manner. The thus impregnated webbing may preferably be again moved through tar whereupon such tarring material adheres to both surfaces of said webbing. A straight-edge scraper is applied above the level of said tar to one surface of said thus treated webbing and exerts a compressive force along its edge parallel to and close to a straight line in the surface of a second narrow cylindrical roller; the second roller provides a surface at an angle to said webbing which forces tar through the webbing in a direction opposite to that effected by the first roller. The scraper on the other side of said webbing from the roller cooperates with said roller to limit the width of tarry material carried along on the top surface of said webbing. The webbing tape is thoroughly and evenly impregnated with roofing material automatically and the amount of such material is predetermined and controlled. The thus impregnated and tar-bearing tape is brought into contact with a roofing surface to which such tape is to be applied while a predetermined pressure is applied to such tape whereby to controllably and evenly press the impregnated tape into contact with the surface with which said tape is to be attached. These consecutive steps occur concurrently for increments of webbing that are continuously and consecutively laid on the roof and while the supply of such webbing is continuously moved over the area which is to be covered by the thus-impregnated webbing.

Generally, one preferred embodiment of an apparatus for effecting this invention, as in FIGURES 1–4, comprises a container 20, which container is composed of one side wall 21, another side wall, 22, parallel therewith, a front wall 24 at right angles to said side walls and a rear wall 25 parallel to wall 24. These walls, with the floor 26, form a container. Walls 21 and 22, respectively, are attached to and support vertical rear roller supports 27 and 27' which support the rear roller axle 28 parallel to plane of floor 26 and wall 24. Walls 21 and 22 also, respectively, support the middle roller supports 30 and 30' on which middle roller 31 is adjustably supported in a plane parallel to wall 24. The box also supports and is strengthened by the front roller supports 32 and 32' on which front roller 33 is supported parallel to plane of floor 26 and wall 24. These front roller supports also form an adjustable support for scraper blade 34 which is aligned parallel to the surface of roller 33. U-frame 35 extends forward to the box 20 and supports an advance roller 36. Wall 25 supports handle 23.

In operation of this device a roll of conventional glass or cotton webbing, 38, as of about 20 squares to the linear inch is supported on the axle 28 and the apparatus of FIGURE 1 is continuously moved in direction shown by arrow 29. The sheet of webbing, 39, passes downward through the volume of asphalt 40 in container 20 from the first roller 28 to the bottom of the middle roller 31. Thereafter the sheet of webbing continuously passes over the front roller 33 and below the scraper 34 and out to and below the advance roller 36 which advance roller presses the impregnated webbing against the roof surface 42 to which surface such webbing is applied. The volume of asphalt primer or roof coating container in the box reaches the level 43, which level is indicated on the outside of the container by sensor 44. The middle roller 31 forces asphalt material downward through at least the top portion of the interstices of the webbing in contact therewith. On further passage of the webbing

upward through the volume 40 towards the upper surface of the front roller, 33, asphalt adherent to the webbing sheet is carried upward from level 43 on the bottom surface of the webbing. The angle of rise of the sheet is sufficiently steep to drain away much of the tar from the webbing. Contact with the roller, 33, evenly forces asphalt on the bottom of the sheet upwardly through at least the bottom portion of the interstices of the webbing, and also, such asphalt is evenly distributed over the bottom surface of the glass webbing. Scraper blade 34 is in line with a radius of the roller 33 and forces the webbing and the tar carried thereby to pass through a narrow slit. This controls the amount of material carried on the top of the webbing material as well as effecting the above described impregnation and distribution. Blade 34 maintains a reservoir or "pileup" 45 of such asphalt to provide a uniform layer of asphalt on top of the webbing and to provide for evening spreading of the asphalt across the width of the top surface of webbing passing between the roller 33 and such scraper 34.

The thus-impregnated webbing is continuously brought into contact with the roof 42 by the downward forcing action of the advance roller 36. The roller 36 is held by the arms 146 and 147 of the frame 35. Such arms, in turn, are each pivoted and supported about a stub axle or bolt in the front roller support 32 and 32', the center line of such axles being co-axial and parallel to roller 33 and roller 36. Arms 146 and 147 are urged downwardly by springs 148 and 148', respectively, which springs are each attached to an adjacent portion of the middle roller support 30 or 30'.

Each rear roller support as 27 and 27' is a plate in which is provided a bearing surface as 49 on which is supported a heavy wooden dowel axle 28. This is about 15 inches long and 1 inch in diameter in the preferred embodiment and is sufficiently sturdy to support six inch diameter 12 inches long roll of glass webbing, 38. Stub axles 28' and 28'' project from this dowel: the plates 27 and 27' are mounted with sufficient flexibility to permit replacement of the webbing roll rapidly and conveniently. The internal annular surface of this roll of webbing is about 2 inches diameter, hence substantially larger than the support therefor and accordingly the roll may freely rotate about said axle.

The middle roller support comprises two sturdy parallel arms 46 and 47 each provided with a central slot, 48 and 49 respectively. These slots in turn support a U-frame 51, which U-frame supports the roller 31. The U-frame comprises a central shaft 52 supported by upwardly extending sturdy parallel arms 53 and 54: each such arm is provided near its top with a bolt 55 and 56, respectively, which fits into the slot as 48 and 49, respectively and such bolts are each provided with a wingnut, as 57 and 58 respectively, thereby the roller 31 may be readily moved upwardly and downwardly in the container 20 in a plane defined by the slots 48 and 49 for control of level of the roller and for insertion of refills of new tape with convenience and rapidity.

The front roller supports 32 and 32' each comprise one steel angle 60 and 61 at each of the front corners of container 20. Near the top of each angle a bearing 62 and 63 respectively isprovided for roller 33 which roller is in the preferred embodiment a wooden shaft of about 1½ inch diameter and 15 inch length. The angles 60 and 61 are each provided with a slot 64 and 65 respectively at an angle of approximately 45 degrees to the vertical and, more generally, at an acut angle to the plane of the webbing 39 which extends from the bottom of the middle roller 31 to the top of the front roller 33. This slot is adequately wide for the scraper blade 34 to ride therein. The front roller supports 60 and 61 are each provided with laterally extending lugs 66 and 67, respectively, against which the scraper is adjustably positioned. This adjustable positioning is effected by screws 71 and 72 with locknuts which provide for adjustments of the distance of spacing of the bottom of the scraper from the most adjacent surface of the front roller 33. The scraper is thus controllably movable back and forth in the slots 64 and 65 in the front roller supports 32 and 33. Springs 74 and 74' are provided to hold the scraper toward the surface of the front roller, and permit release of the scraper for insertion of refills of webbing tape.

In the preferred embodiment the arms 147 and 146 of the frame 36 are made of ⅛" x 1" steel bars and are 16 inches long from the center of the advance roller 36 to the pivot as 78 therefor on the support 32 or 32'. The front roller is 1½ inches in diameter and 14 inches wide for 12 inch webbing and 40 inches wide for 36 inch roll of webbing. The sidewall 22 would be 14 inches wide and 6 inches high, the whole made of No. 10 gauge galvanized sheet with angles 60 and 60' of ⅛" x 1" x 1" steel and ⅛ inch thick steel plate for the rear roller supports 27 and 27'. The middle roller 31 is readily movable to any desired height by the thumscrews 57 and 58 as desired in order to keep such middle roll at an appropriate height relative to the level of the asphalt 40 in container 20, as indicated by sensors 44 and 44', for proper impregnation of the webbing with the asphalt 40.

In operation adequate tension is kept on spring 148 and 148' to provide firm adherence of the asphalt impregnated webbing to the roof.

In operation when the temperature is about 80 degrees F. the bottom of the middle roller 31 is preferably kept at 1 inch below the surface 43; at 90 degrees F., 2 inches below the surface; at 110 degrees F. at 2½ inches below the surface.

When the weather is colder the roller 31 is adjusted by the thumbscrew as 57, 58 above described so that said roller is barely beneath the surface of the asphalt material. The tension of the springs 148 and 148' are adjusted for advance roller 36 so that contact of the impregnated webbing is not lost with the roof surface 42 once contact is made between said impregnated webbing and said roof surface. In operation sufficient of the asphalt roofing material is added to provide that the middle roller 31 is kept below the surface of the material in the container preferably as above given, dependent upon the temperature. The roller at the rear 28 and the front roller 33 turn freely as well as does the middle roller 31. In operation the axes of rollers 28, 31, 33, and 36 are maintained parallel to each other although the height of roller 31 varies and roller 36 may be rotated about the axis between the pivots (as 78) for arms 146 and 147. Adjustments for tension of springs 148 and 148' are provided by adjustable lengtheners 248 and 248'.

According to this invention it is very easy to controllably and rapidly and evenly put about 3 gallons of asphalt per square (each 10 feet by 10 feet measure) of the roofing covered. The position of the scraper 34 relative to roller 33 may be regulated to give 4 to 5 gallons of tar per square if the roof is dry. It is to be noted that the device of this invention forces the material into the glass webbing from both sides. Accordingly, the webbing is well and evenly saturated therewith before it contacts the roof. Further, the use of the advance roller as above described avoids wrinkling of the webbing. The absolute amount of force on the advance roller 36 depends on the roofing material used; when there are thinner or penetrating oils in the asphalt material then the force required would be less. If the roofing material has asbestos fiber therein, the application pressure is necessarily greater. It is to be noted that the small number of roofing parts applied hereto and the very light weight of the entire apparatus permit it to be readily handled even on small roofs. Further the force of transportation of the box over the area to be covered supplies the force required to impregnate and apply the material.

While the device hereinabove described may be supported by hand it has a wedge 50 therebelow for purposes

of moving it over the surface of the roof to which the impregnated webbing material is applied. A set of wheels may be substituted for the wedge 50.

The rollers as 36 may be grooved or smooth. In the preferred embodiment the roller supports 27, and 27' are made of ⅛ inch steel as are the middle roller supports 30 and 30'. Angles 60 and 61 are 1 inch L's made of ⅛ inch steel. Additionally, a lower frame 99, also made of 1 inch L's under each side member as 22 and 21 support the container on skid or slide 50. Supports 27, 30 and 61 are bolted to and so reinforce walls of the container 20. These supports are welded to the bottom frame, as 99 and 99', on each side of the container. The above described device is adapted for the application of 12 inch wide rolls of webbing; in such use rollers 28, 31, 33 and 36 are 14 to 15 inches wide: for a 36 inch wide roll of webbing these rollers would be 40 inches wide and the bottom of the container and the front and the rear walls would also be 40 inches wide. The device of FIGURES 1 to 4 would otherwise be unchanged for use of such wider rolls. Box 20 is 4 inches wider than its contained rollers.

The advantage of the use of this apparatus and method is demonstrated by that in normal operations it requires some 7 men 6 hours working by normal hand application to lay 18 seams each 75 feet long, while 7 men working 18 hours can lay 180 seams each 75 feet long and additionally 10 seams of 190 feet length using the apparatus of FIGURE 1. All these seams were 4 inches wide. Accordingly, hand operations provides some 1350 feet of seams laid in 42 man hours or 32 feet per man hour, while use of the device of this invention provides some 15,450 feet of seams for 126 man hours or a total of 116 feet per man hour using the device of this operation compared with the usual manual attempts and procedures of affecting cold mopping operations on the roof.

Another apparatus within the scope of this invention and using some of the process thereof is shown in FIGURE 5. The device of the FIGURE 5 provides for rollers and utilization of the weight of the material being applied as a force to urge the impregnated tape and into contact with the roof.

This device comprises a container 80 supported on a roller 81. A roll of webbing 82 to be dispensed is supported on an axle 97 which is supported in the same manner as axle 28 above described on a vertically adjustable mounting 83'. This container is provided with a sensor float 85 whereby to measure the depth of the webbing material 82 in the contained volume of asphalt 86 relative to the height of roll 82. The mounting 83' keeps the bottom peripheral surface of the roll of webbing 82 in contact with the tar 86. A scraper 90 operates with respect thereto in somewhat the same manner as scraper 34 above described with relation to the roller 33. Container 80 is 40" wide, 20" long and high.

The edge of scraper blade 90 is parallel to axis of roller 87 and controllably positioned with respect thereto; scraper blade 90 is at an acute angle to the plane of the sheet of webbing, 100, to control the thickness of asphalt carried by the webbing as well as improve the penetration of asphalt on the left side (as seen in FIGURE 5) of the webbing into the interstices of the webbing. The tar adheres to the webbing material which passes over rollers 87—supported by mounting 83—and rollers 88 and 89 (which latter are supported by U-frames 188 and 189, which are firmly positioned on container 80) and then below the roller 81. The asphalt roofing is thus applied only to one surface of the roll 84. According to this device, the weight of the container 80, and its contents serves to apply the impregnated webbing material to the roof 91 while the operator 92 moves this apparatus over the roof in the direction of the arrow 192.

In the apparatus of FIGURE 5 the support 83 comprises a pair of slotted vertical arms 93 and 93' fixed to the sides, as 94 and 94', of the rectangular container 80. Each of the vertical supports as 93 has a bearing support as 96, for an upper roller 87. A roll of roofing webbing 82 is loosely supported on a rod 97, which rod is rotatably supported at its ends on upwardly extended rigid arms 98 and 99. (In the preferred embodiment arms 98 and 99 as well as arms 93 and 93' would be 1½ inch wide ⅛ inch thick steel bars.) Arms 98 and 99 are attached by screws and wingnuts as 99 to the slot 95 and 95' in the arms 93 and 93' to keep the webbing roll 82 at the proper level with respect to the asphalt roofing material 86 in container as above described with respect to roller 31.

It is within the scope of this invention that the webbing application assembly of FIGURE 5 be used in combination with the impregnation apparatus of FIGURES 1–4 when heavy volumes of tar are to be moved and wide tapes applied by providing frames as 188 and 189 and rollers as 88, 89 and 91 in place of the U-frame 35 on container 20.

Also, the above descriptions have been for application to a flat roof; for application to a sloped roof, the wheels or rollers under the frame 99 may be adjusted to compensate for such slope to keep the contents of the container 20 level and the arms 46 and 47 appropriately lengthened as provided for by additional pivot holes 200 and 201 so that the roller 36 lies flat against the roof surface to which the impregnated webbing is to be applied. The embodiment of FIGURE 5 may also be used on sloping roofs by adjusting the supports for the bottom roller 81 so that the contents of the container 80 are maintained level while the bottom roller 81 maintains even contact with the sloped surface to which the impregnated webbing is to be applied.

It will accordingly be seen that this invention provides a process which simplifies and reduces the cost of the procedues usually involved in applying cold mop roof material this is in addition to the cleanliness of the finished operations. Cold mopping according to the process and device above described is a convenience to do-it-yourself-mechanics as well as for industrial users who are interested in the economy of the labor as well as of material resultant from use of the process of this invention.

Though I have shown and described certain embodiments of my invention, I do not wish to be limited thereto, but desire to include in the scope of my invention the constructions, combinations and arrangements substantially as set forth in the appended claims.

I claim:

1. A method of automatically impregnating roofing webbing and applying same to a roof surface in a predetermined path comprising the steps of drawing a sheet of said webbing through a body of liquid tar in a container therefor and thereafter drawing one side of said sheet of webbing against a first firm surface at an acute angle to said sheet of webbing, thereby pressing the liquid tar into the interstices of said webbing and forcing tar through the webbing in a first direction, and thereafter passing the other side of said sheet of webbing material against a second firm surface above the level of the liquid tar at an acute angle to the plane of said webbing and forcing tar through the webbing in a direction opposite to said first direction while a third firm scraping surface parallel to said second firm surface is in proximity to the first side of said sheet of webbing and continuously downwardly applying a portion of the weight of said body of tar to the upper surface of said thus impregnated sheet of webbing downwardly in contact with the roof surface while moving said body of liquid in said predetermined path.

2. Process as in claim 1 including the step of increasing and decreasing the depth in the body of liquid below the top thereof at which depth the sheet of webbing is drawn against the first firm surface and the tar forced through the webbing as the temperature of the liquid tar increases and decreases respectively.

3. A method of automatically and continuously impregnating roofing webbing and applying same to a roof surface in a predetermined path comprising the steps of

continuously drawing a sheet of said webbing through a body of liquid tar in a container therefor and thereafter drawing one side of said webbing in contact with a first surface at an acute angle to a first side of said webbing thereby pressing the liquid tar downwardly into the interstices of said webbing and forcing tar through the webbing in a first direction, adjusting the height of the tar above said surface at the level of said contact between one and 2½ inches during a temperature range of 80 to 100 degrees Fahrenheit and thereafter continuously passing said webbing through and out of the tarry material and thereafter passing the other side of said webbing material against a second firm surface above the level of the liquid tar at an acute angle to the plane of said webbing and forcing tar through the webbing in a direction opposite to said first direction while a third firm scraping surface parallel to the second surface along a line of contact of said webbing and said second surface is in contact with the other side of said sheet of webbing, followed by continuously applying a portion of the weight of said body of tar to the top of the thus-impregnated sheet of webbing to urge said thus impregnated sheet of webbing downward into

contact with the roof surface while drawing said body of liquid in said predetermined path.

4. Process as in claim 3 wherein the entire weight of the body of liquid tar is applied downwardly to the top of the impregnated sheet of webbing to urge said sheet of webbing into contact with the roof surface.

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