METHOD OF APPLYING GRANULES TO SIMULATE A MASONRY PATTERN

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This invention relates to a new method for use in the manufacture of insulating siding, wherein there are provided mortar simulating lines and it has to do specifically with a method for depositing or applying a contrasting material in proper quantity and in the correct placement to provide the desired mortar simulating lines between the surface elements of such product.

Insulating sidings are manufactured by the general procedure of saturating the surfaces of a suitable sheet of fiber insulating board with asphalt and with subsequent application to a surface of suitable granular material to simulate the type of surfacing desired—as, for example, to simulate brick, stone, or the like. In the usual procedure of manufacture, after the basic surface granules have been applied to a soft asphalt coating on the face of the base sheet, the such coated sheet is passed under a branding roll on which there is an upper and lower pattern of the desired mortar simulating lines, and where the mortar lines are to appear the such branding roll presses the granules into and submerges them in the asphalt coating on which they have been applied. The result of this general procedure of manufacture, it will be evident, produces a sheet on the face of which there are face elements of adhered granules and between which there are mortar simulating lines which are black due to the fact, as before stated, that the granules on these portions of the face have been pressed into and submerged in the asphalt coating so that what is seen at the mortar lines is the black color of the asphalt coating. It is desirable, to obtain an actual simulation of brick work, stone work, or the like, that there be applied in the mortar line pattern colored granules to simulate a mortar line appearance of real brick work, stone work, or the like, and the apparatus hereof has been developed for the purpose of applying to the mortar line pattern the desired material of a contrasting color to simulate actual mortar lines between the individual face elements, simulating brick, stone, or the like.

In the normal process of production of insulating sidings, it is necessary that the base sheets be processed be run in one position only; that is, they pass through the manufacturing process in a horizontal position with the same face up at all times, and which is necessary due to the fact that the surfacing granules are applied to and adhered in a rather heavy coating of hot asphalt, with the result that this surface must be kept upwards at all times during the processing as it is in a quite plastic condition and it would slide or be displaced if any attempt were made to invert the sheet for processing with the treated surface turned downwardly.

Various devices have been tried for applying contrasting material to the mortar line simulating pattern in manufacturing this type of product. For example, one manner in which such has been applied is by the application of a layer of the contrasting material over the entire upper surface of the sheet with subsequent operations for sucking off, as by vacuum, the excess material which does not adhere in the mortar joint simulating lines, or by blowing off the excess, or by a combination of suction and blowing to remove the excess. Such procedure is not satisfactory in that there are always sufficient voids or openings or exuded adhesive here and there between granules of the element simulating faces, so that some of the contrasting material adheres to the adhesive layer at such points within the area of the individual unit simulating surfaces, and the product consequently has a somewhat speckled effect. Efforts have also been made to apply the mortar simulating material only in the mortar joint lines with subsequent pressing, as by a roll with a suitable pattern on the surface, but it has been found that the contrasting material deposited in the mortar joint lines flows over the edges of the mortar line recess, or is somehow forced over the edges in the pressing operation, with the result that some of these contrasting granules are adhered in the overall pattern of granules with a very disfiguring effect.

It is a particular object of this invention to provide an apparatus which will accurately deposit contrasting mortar line simulating material within the confines of the mortar line recess, and which will provide for securing such material in the mortar line recess without deposit of such material on the background field, so that there is no chance that any such contrasting material may be adhered within the background field and thus the marring or disfiguring effect resulting therefrom will be avoided. Also it is an object hereof to provide such an apparatus which can be used in a continuous process of production of the product, the operation of which is simple and the apparatus itself is what might be termed "foolproof." In the accompanying drawings, wherein the inventions hereof are disclosed,

Figure 1 is a side elevation of the apparatus;
Figure 2 is a top plan view;
Figure 3 is a vertical sectional view of the transfer roll and associated parts of Figure 2;
Figure 4 is a sectional view taken on the line 4—4 of Figure 3;
Figure 5 is an enlarged detail section of a portion of the transfer roll and associated parts;
Figure 6 is an enlarged detail view showing a part of the transfer roll surface; and
Figure 7 is a detail view on a still larger scale than Figure 5 and showing in section a portion of the transfer roll and associated parts.

The apparatus hereof is particularly for use in a continuous line production process for the production of insulating siding which is provided with a contrasting mortar line pattern.

Insulating siding generally comprises a sheet of fiber insulating board one-half inch thick and about 12" x 48" as the base or core thereof. It is to be understood, of course, that the size of the base sheet may vary with different manufacturers, but it is generally of sizes of or about as stated. In the manufacture of the product the base sheet is submerged or otherwise surface-saturated with asphalt to a limited depth, and then an asphalt coating is applied to one surface, the upper surface in the process of manufacture. Suitable granular material is then applied to the adhesive asphalt surface coating and suitably embedded or adhered to the asphalt coating, with any excess or unadhered particles removed generally while passing under suction nozzles. The sheet so prepared with an overall background or surface of adhered granules is then passed under a suitable branding roll on the surface of which there is provided the desired configuration or pattern, to press the surfacing granules into or submerge such granules in the adhesive coating along the lines corresponding to the pattern provided on what is usually termed the "branding" roll.

It is usual that insulating siding is provided either
with a brick pattern or a stone work pattern, that is, a simulation of brick work or stone work, according to the particular pattern which has been adopted by the particular manufacturer. When the background surfacing is submerged in the adhesive coating as by spraying, as has been referred to, the unit then displays a surface which comprises a simulation of brick work or stone work or other desired simulation in which the individual units or unit elements or faces thereof are simulations of a structural material separated by simulated mortar lines which are black, similar along these lines, as has been described, the asphalt coating has been brought to the surface by the branding operation.

Since a black mortar line between bricks or stone or the like is not a normal color for the mortar joint between such units or elements, it is desired to apply a colored mortar line simulating material between the individual elements or units, as, for example, white or slightly buff colored granules applied along these mortar line joints and adhered therein by the asphalt which is there exposed, as has been described. The device hereof has been developed especially for the purpose of depositing and securing in the mortar line recesses between individual elements or units suitably colored material, usually in granular form, so as to simulate mortar line joints of suitable and usual color between the individual units or elements.

For the purpose of applying the contrastingly colored mortar line material in the process of continuous production of the fiber insulating siding units, there is provided the apparatus disclosed in detail in the drawings, wherein such apparatus is assembled to a suitable supporting structure in which there is a base rail 11, a top rail 12, spacer members 13 and a roll supporting construction designated generally by numeral 14. The specific construction of this supporting framework is relatively immaterial and is merely referred to for the purpose of providing a complete description and understanding of the apparatus.

On upper rail 12 there is suitably mounted a conveyor for conveying units which have been surface-saturated and coated and to which the granule background surface has been applied and branded. The conveyor for conveying the units through the apparatus hereof comprises the conveyor chains 16, the outer ends of which run over suitable chain driving sprockets 17 mounted on conveyor drive shaft 18, which in turn is suitably journaled to the upper rail member 12 and is driven by spur gear or equivalent, 19. Mounted on conveyor chains 16 there are provided cross members 20 which are adapted to receive and carry through the apparatus hereof.

For the purpose of applying a suitable material of the desired color in the mortar line depressions in the faces of the insulating siding units 22, the mortar line depressions being shown in 23, there is provided the apparatus as will now be described.

On a suitable supporting frame 14 there is journaled a roll 25 which is mounted in journals or bearings 26. These bearings 26 are journaled to annular members 27 and 28, respectively, secured to the opposite end faces 29 of roll or cylinder 25. A pipe line member 32 extends through the annular members 27 and 28, and roll 25 is in effect journaled on such pipe member 32 and in bearings 26, the purpose of which construction will subsequently become apparent.

Roll 25 is a closed roll or drum member comprising the circumferential shell and end members 29 so that such shell and members are applied to the interior thereof, as will be hereinafter described. A hopper 33 is associated with the roll 25, being suitably supported by supports such as 34 mounted to the heretofore described framework of the apparatus.

Hopper 33 comprises an inclined wall which extends transect the width of the apparatus together with side members 38 which embrace the cylinder end 29 to form an open-sided V-like trough, one side of which is closed or completed by roll 25 which is embraced by the hopper side members 34. At the bottom of the inclined transverse wall of the hopper there may be provided a flexible seal 35 which is suitably secured to the inclined wall as member and seals against the surface of roll 25. Positioned across the hopper near the top there may be provided an adjustable gate 36 secured in adjusted position by a locking member 37.

The face of the roll 25 is provided with a suitable brick pattern, stone pattern, or the like, as may be desired, and between the individual units thereof is recessed, as at 40, which recesses correspond to the mortar lines in the product being produced. The recesses 40, it will be apparent, extend only partly into the shell or face of the roll, and in the base of such recesses there are provided small openings 41 which may be small drilled holes or other equivalent which will provide for communication between the such recesses 40 and the interior of roll 25. Pipe 32 hereinafter referred to, and which extends through the annular roll journal members 27, is provided with openings 42, whereby a via the side members or the like connected to pipe 32 may exert a vacuum or suction on the interior of roll 25 which, of course, communicates through openings 42 to the roll shell, and as a consequence exerts a suction or vacuum effect in recesses 40.

Pipe member 32, adjacent its outer end, is provided with a suitable plug, such as 43, so that the purpose as referred to may be applied to the interior of roll 25. Also within roll 25 and mounted on pipe 32 there are provided partition members 44 which are secured to the pipe member in any suitable manner, as by brazing, or the like, or by any mechanical equivalent thereof. At their outer ends these partition members 44 are provided with suitable sealing means, such as the strips 45, which are mounted to members 44 and which provide a seal between members 44 and the interior surface of roll shell 25. These partition members are spaced one positioned substantially on the center vertical line through the axis of roll 25 and the other angularly spaced therefrom to contact the interior surface of roll 25 at a point approximately at the level of the lower end of hopper member 33, the angle between such partition members 44 being in the specific illustration approximately 80°. The purpose of these partition members 44 is to seal off a portion of the interior of roll 25 from the effect of the suction or vacuum exerted through pipe 32 and the openings therein 41, so that atmospheric pressure may be maintained in the portion of the interior roll which is encompassed between the surface thereof and the partition members 44.

It is to be noted that the openings or holes in the pipe member 32 are so positioned that none of them open from the pipe into the space encompassed between the partition members 44, and thus it would be evident that the interior of the roll 25 will be subjected to suction or vacuum throughout the major portion of the volume thereof except for the space encompassed between the partition members 44 from which such vacuum or suction is sealed by partition members 44 and sealing members 45, and wherein due to communication of the portion with the atmosphere through openings 41 such portion of the interior of the cylinder will be subjected to atmospheric pressure.

Mounted above roll 25 in suitable bearings there is a brush 47 which is mounted substantially at the point where roll 25 emerges from the hopper member, which brush roll is mounted on shaft 48 on which there is provided a driving sprocket 49 which in turn is driven by sprocket 51 mounted on one of the annular members secured to a cylinder end 29. It is to be understood that the specific drive is immaterial, and that any other equivalent drive may be employed to suitably drive this brush roll which serves to brush any excess granules from the surface of cylinder member 25 as it emerges from the hopper 33, as will be hereinafter more fully referred to.
For driving the apparatus there is provided a suitable source of power operating at the desired speed, and such may, for example, comprise motors 55 and speed reducer 56. Shaft 57, which is suitably mounted in the frame members 13, is driven from speed reducer 56, and mounted on this shaft 57 there is provided a sprocket 58 which drives chain 59 in turn mounted on sprocket 60 which drives the main roll 25. Sprocket 60 is mounted on the annular member 28 which is mounted to roll 25, and there is also mounted to such annular member 28 a second sprocket 51 which drives chain 50 trained over brush roll sprocket 49. Also mounted on shaft 57 there is provided a gear 63 which meshes with gear 19 which, as hereforeto described, drives the conveyor chains 16.

Suitable vacuum or suction may be applied to the interior of roll 25 through pipe 32 by connected pipe 65 which will extend to and connect to a suitable source of suction or vacuum.

In the operation of the apparatus prepared blanks, which have been previously surface-saturated, and surface-coated, and to the upper surface of which the desired background granules have been applied but with the adhesive surface coating exposed at the mortar line pattern 23, as by appropriately submerging the background granules along such mortar line joint lines 23, are placed on conveyor chains 16 whereupon, with the machine operating, the cross members 20 properly position the prepared blanks on the chains to carry them through the apparatus in registration with the rotation of roll member 25.

It will be readily understood that roll member 25 has a circumference somewhat in excess of the length of the individual units 22, such being equal to the length of a unit 22 plus the distance that such units are spanned over conveyor 16 in accordance with the positioning of cross members 20 thereon. This spacing between the units 22 on the conveyor is the arcuate distance encompassed between the partition members 44 which are positioned within roll 25. As a consequence of the fact that the entire device is driven from a single power source through suitable gearing, chains and sprockets, the unit 22 will be carried through under roll 25 in register therewith to register the recessed pattern 40 provided in the surface of the roll, which pattern 40 is the same as the pattern of the mortar line recesses 23 provided in the face of the unit 22.

Suitable contrasting granular or particulate material is supplied to hopper 33, and as roll 25 is rotated, the recessed surface pattern 40 thereof will be filled with such contrasting material and will be retained in the pattern recesses 40 due to the suction existing within roll 25 and exerted thereon through the small openings 41 which communicate from the interior of roll 25 and the base or bottom of the pattern recesses 40. As the roll 25 rotates, any excess of the contrasting granular material on the surface of the roll or protruding at the recesses 40 above the surface of the roll will be brushed off by the rotating brush 47, so that as any particular recess 40 passes the brush, the recess will be just full of the contrasting granular material. Due to the fact that the suction continues to be exerted through openings 41 as roll 25 rotates, the contrasting material in the recesses 40 will be held therein until the recessed portion reaches the position at substantially the vertical, passing through the centerline of the roll, that is, until any such particular point reaches the forward edges of the seal members 45 in the vertical partition member 44. At such point the suction from the interior of the roll is cut off by the seal members 45 and such suction no longer being effective to retain the contrasting material in the groove 40 at such position, the contrasting material will be deposited in the registering mortar line groove 23 in the face of unit 22 since, as above stated, the mortar line pattern of recesses 40 in roll 25 are the same as or a reproduction of the pattern of mortar line recesses 23 in a unit, and since the movement of the roll and unit is synchronized, the contrasting granular material will be deposited from the pattern on the roll surface into the mortar line pattern on the surface of the unit. The mortar line depressions 23 having adhesive therein, as previously described, that is the material of the adhesive coating which had been applied to the surface of the unit 22, it results that the contrasting material which is deposited from the roll 25 in such mortar line pattern 23 on the unit will be adhered to the contrasting mortar line pattern 23, and unit 22 will be provided with the desired contrasting mortar line pattern.

It may be desired to positively propel granules as they are discharged or released against or into the mortar joint lines 23 just as or immediately subsequent to their discharge or release from grooves 40 of roll 25. To accomplish such purpose there accordingly may be provided a third partition member 44a positioned within the roll 25 and secure to and extending substantially outwardly radially from pipe member 32 and which may, at its outer end, be provided with a sealing strip 45 similar to those provided in the outer ends of partitions 44, as hereforeto described.

For supplying air under pressure to the narrow space just preceding, in the direction of rotation, the partition 44 which extends substantially vertically downward, and defining between such partition 44 and the above-referred to partition 44a a pipe or pipe member 52 is positioned within suction pipe member 32, which pressure pipe 52 is preferably welded or otherwise sealed to the interior surface of pipe 32 as by continuous bead welds 54 or the like. With the construction just described it is evident that holes or passages 53 may be drilled through walls of pipes 32 and 52 to provide communication between the interior of pipe 52 and the space encompassed between partition members 44 and 44a, above-referred to, whereby with air under pressure in pipe 52 the space between the partitions will be subjected to such positive air pressure. In connection with the foregoing, it should be realized that in the rotation of roll 25 just as any point in the circumference thereof reaches the seal of the substantially vertical partition 44, the suction is cut off from the groove 40 at such point, and that as such point passes the seal 45 the groove 40 then at that point will be subjected to positive air pressure due to air under pressure flowing through the small openings or holes 41 provided at that point, and that consequently granules at such point will be positively deposited in grooves 40 under the effect of such positive air pressure. It is, of course, understood that pipe member 52 will at some point outside of roll 25 pass through the wall of pipe 32 and may be connected to any suitable source of air under pressure.

Although not previously mentioned, it should be readily apparent that the partition 44 which is spaced from the substantially vertically, downwardly extending partition 44a need not necessarily be positioned at about 80° therefrom, as shown in Figure 3, but, if desired, such second partition 44 may be spaced up to substantially 180° therefrom, or anywhere up to the position of brush roll 47, in connection with which, of course, suction ports 42 in pipe 32 must be appropriately relocated.

What I claim is:

1. The method of applying contrasting granules in a pattern to board-form sheet material and comprising the steps; supplying such granules to a surface in the desired pattern, temporarily securing the granules to such surface by application of suction thereto by way of openings extending through such surface, bringing such pattern of granules into depositing relation to the board-form sheet to which they are to be applied and discontinuing the suction effect whereby the granules are released and deposited in the desired pattern on the board-form sheet.

2. The method of transferring contrasting discrete particles from a heterogeneous supply and depositing them in a predetermined pattern and comprising the steps; supply-
ing such particles to and filling a predetermined pattern of grooves, applying suction in such grooves and retaining the particles therein, successively transferring succeeding increments thereof to succeeding preplanned points for deposit thereof, beginning at a predetermined point, progressively discontinuing the suction applied to the grooves and thereby release the granules for deposit in successive increments from the grooves.

3. The method of transferring solid particles from a heterogeneous supply thereof and depositing solid particles, from said supply thereof, on a material in a predetermined pattern and comprising the steps: bringing into contact with solid particles of said heterogeneous supply thereof a surface porous to air in a predetermined pattern but otherwise air-impervious, securing solid particles from said supply to a face of said surface by the effect of a partial vacuum applied at the other face of said surface, while maintaining such partial vacuum and retaining to a face of said surface the pattern of solid particles, moving said surface from association with the supply of solid particles to depositing position, with the face to which the solid particles are retained lowermost, and while so positioned discontinuing the effect of the partial vacuum aforesaid and receiving the consequently released pattern of solid particles on a surface of a material in said predetermined pattern of solid particles.

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