July 3, 1951 C. G. MUENCH 2,559,543

APPARATUS FOR THE MANUFACTURE OF BRICK SIDING

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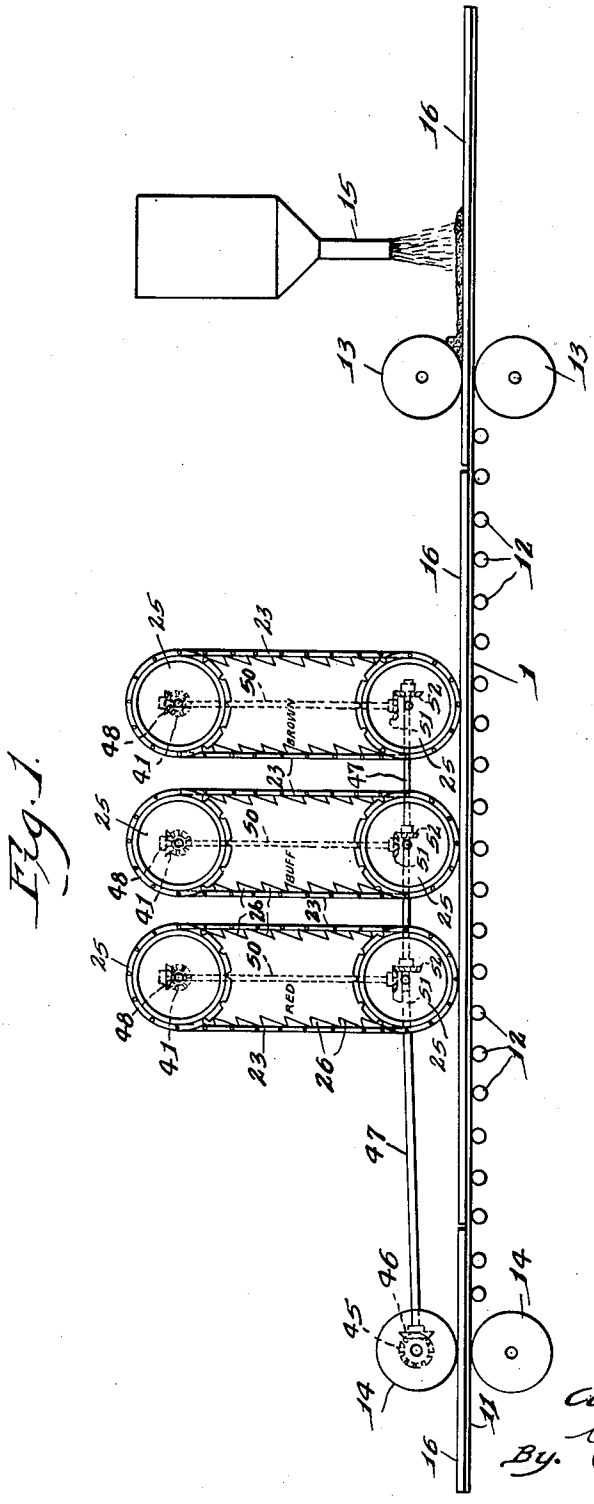


Fig. 1.

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Fig. 4

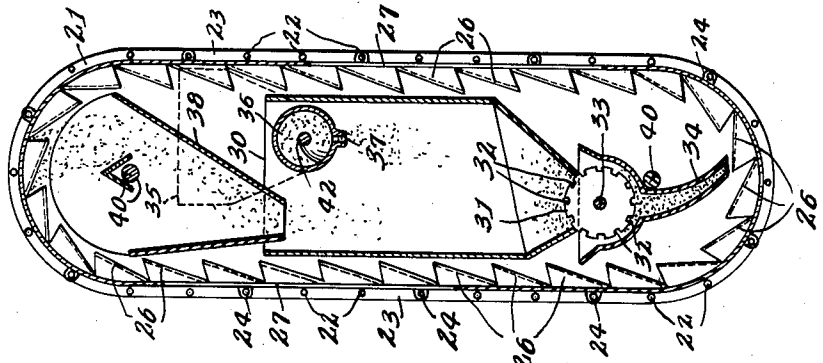


Fig. 3.

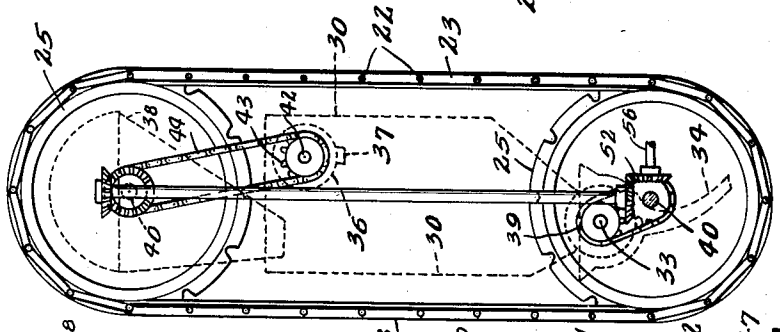
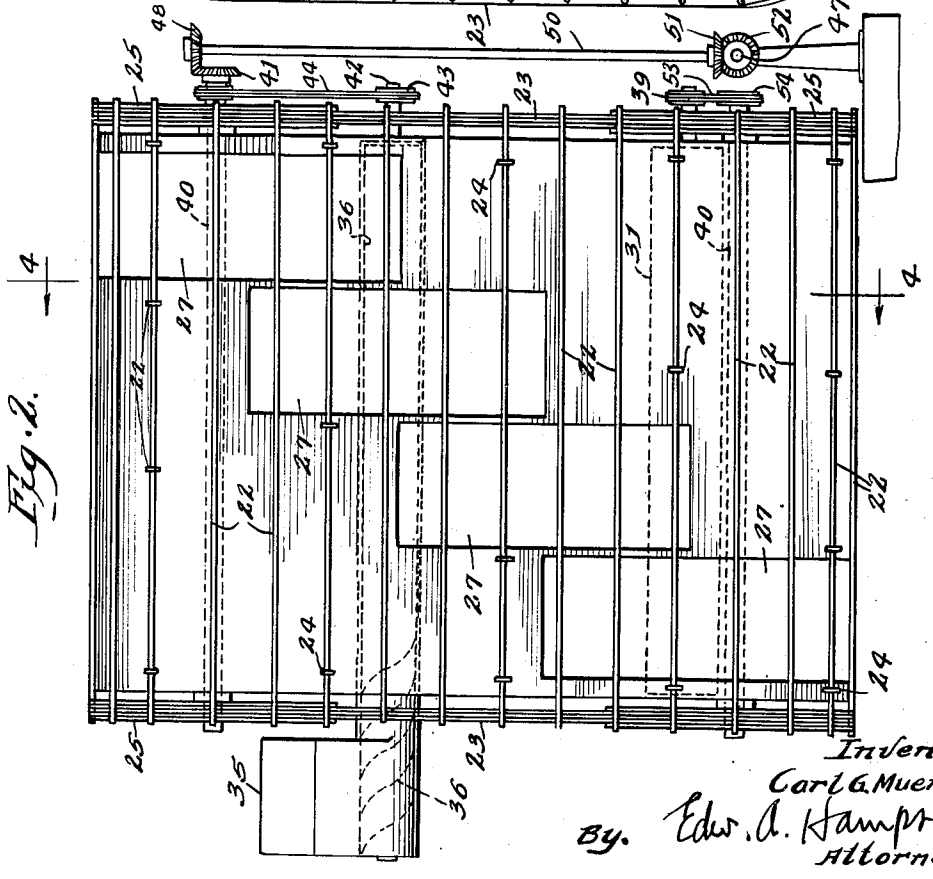


Fig. 2.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR THE MANUFACTURE OF BRICK SIDING

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7 Claims. (Cl. 91—43)

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This invention is with reference to an apparatus for the manufacturing of insulating brick siding specifically. The apparatus, as shown and will be described particularly, when used in connection with the manufacture of insulating brick siding, is applicable to the manufacture of other products which comprise a base sheet to which is applied an adhered coating or layer of particulate material, which may be powdery, granular, or finely fibrous.

Described most broadly, the apparatus comprises a device for continuously supplying a substantially uniform falling stream of the coating or surfacing particles, which stream, when it falls on the surface of a sheet of material being conveyed along a path, substantially perpendicular to the falling stream, the surface of the base sheet having first been coated with an adhesive, deposits the falling material on a selected portion of the sheet being conveyed, and with the such stream from time to time intercepted and returned to the supply whereby, under the control of the apparatus, the granular or other surfacing material is applied as a coating to selected portions of the base sheet.

To provide for the application of a variegated patterned coating in connection with the foregoing, there are here shown and described duplicate unit devices, one for each color or shade of the surfacing material which is to be applied to make up the desired variegated pattern.

The inventions hereof will be described particularly in connection with the manufacture of an insulating brick siding unit which is of dimensions of about 9 inches by 48 inches, and to which there is applied a brick simulating pattern, so that the product is in effect a brick panel four bricks wide and six bricks in length. Since it is desired to apply a variegated pattern of surfacing so that the finished unit will simulate variegated brick work, there are provided a plurality of devices so that there is one for applying each of the colors, shades, or blends of surfacing material which are applied in providing the desired simulation.

It is particularly the object of this invention to provide an apparatus for applying different surfacings to specifically different portions of a panel-form base member in order that the finished product may have the appearance of a variegated pattern of brick or the like. It is further an object to provide such an apparatus which may be used to produce a product such as just previously referred to, but in addition comprising such an apparatus as may be used to achieve the effect of a variegated pattern generally as the surfacing of a panel-form base.

It is also an object of this invention to provide a method of application of the variegated pattern surfacing, as above referred to, and in particular to provide such a method wherein the application

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of the surfacing is uniform and accurately positions the surfacing material.

Other objects, such as the provision of an apparatus of the type described, which is simple in construction, relatively cheap and simple in operation, are also provided. Still other and further objects of the invention will be apparent to those skilled in the art upon consideration of the specification and appended claims in detail, in particular when taken into consideration with the drawings accompanying the specification.

In the accompanying drawings, Figure 1 is a diagrammatic view of the apparatus;

Figure 2 is a front elevation of one of the granular-applying elements of the apparatus;

Figure 3 is a side elevation of the element shown in Figure 2, and

Figure 4 is a section of the element shown in Figure 2 taken on section line 4—4.

In the accompanying drawings it is to be understood that the entire showing is, to a considerable extent, diagrammatic. That is, an effort has been made to simply illustrate the constructions involved so that those skilled in the art may readily understand the apparatus and its construction, and that in aid of simplicity, only such features are illustrated as are required for an understanding of the invention by one skilled in the art.

In Figure 1 there is illustrated a device for producing insulated brick siding or other generally similar products. There is provided a horizontal conveyor of suitable type which is identified by the numeral 11, and which is shown as supported on suitably mounted rolls 12. There are provided a pair of asphalt coating rolls 13, one positioned above conveyor 11 and the other positioned below conveyor 11. Also there is shown a pair of embedding rolls 14—14 of which likewise one is positioned above and one below the conveyor. To the rear of the asphalt coating rolls 13 there is provided any suitable supply for fluid asphalt, such as that indicated by the numeral 15, from which fluid asphalt may be discharged upon the surface of a sheet of fiber insulation board or the like being conveyed on conveyor 11. On conveyor 11 there are shown parts of fiber insulation board panels 16 to which are to be applied the variegated patterned surfacing. Over the conveyor and beyond the coating rolls 13, there are mounted a plurality of identical granule-applying units, each designated by the numeral 20. Each of these units 20 extends across the width of the sheet to be surfaced, and there may be provided one or more of such units depending on the number of different surfacing materials which are to be applied to the panels. As illustrated, there are shown three of the granule-applying units 20 which, for example, may be considered as provided for applying, respectively, brown, buff and red granules, whereby the finished panels have a

variegated pattern of brown, buff and red surface portions.

Since each of the granule-applying units 20 is the same, there will be described in detail the construction of but one of such units. A unit 20, most briefly described, comprises an endless belt trained over sprockets at the top and bottom and provided with a pattern of openings or cutouts in the belt which are of predetermined size, shape and placement, so that they will position the surfacing granules of the units on predetermined areas of a panel 16 as it passes under the unit 20 due to advancement of conveyor 11.

Each unit includes belt 21 which may be composed of rubber or a suitable rubber composition, and preferably with a fabric or like reinforcement not itself actually trained over the sprockets above referred to, but as is seen in the drawings, the endless belt 20 carries rods 22, the ends of which comprise the pins of sprocket chains 23 or are otherwise suitably secured to sprocket chains 23. The rods 22 may be secured to belt 21 by eyes or the like suitably formed integrally with belt 21, or equivalent members of rubber, metal or other material suitably secured as by rivets or the like to belt 21. Such eye means or the like, mounting rods 22 to belt 20, are designated in the drawings by the numeral 24. The carrying rods 22 being secured to the belt 21, and in turn carried by sprocket chains 23, it will be obvious, as the sprocket chains advance by rotation of sprockets 25—25 over which chains 23 are trained, that correspondingly belt 21 will be operated.

Belt 21 interiorly is provided with pockets which extent across the width of the belt, the such pockets being formed by lips or the like 26, which numeral will also be used in referring to the pockets formed by such lips. These lips 26, being mounted in the interior surface of belt 21 and positioned angularly with respect to the interior surface of the belt, provide pockets in which material may lodge to thus be conveyed by operation of belt 21. These lips 26, forming the pockets, may be comprised of rubber or the like integrally with the structure of the belt, or they may comprise sheet metal, suitably laminated synthetic resin products or the like, in which case it will be understood that if such lips are not formed integrally with belt 21, that they are suitably secured thereto by riveting, by adhesives, or in such manner as may be desired by the designer. The manner of attachment of lips 26 to form the conveying pockets is immaterial, so far as the principles of the invention here are concerned, and it will be understood that the mode of attachment is purely a matter of engineering design.

For the purpose of description hereof, it will be assumed that endless belt 21 is of the same length as a brick siding panel unit which is to be manufactured. It will further be assumed that such panel unit will be four courses wide by six bricks in length. If one granular-applying unit 20 is to provide in the pattern of a panel unit three brick facings of the particular color, then the belt 21 will be provided with three cutouts, each positioned in the course in which the deposit of the colored granules is to be made, and so positioned lengthwise of the belt that the granules will be deposited in the proper position lengthwise of the panel unit. In the illustration of the drawing, belt 21 is illustrated as provided with three cutouts 27, each of which is substantially the width of a brick face and the length of a brick face. As shown, the cutouts 27 are provided for applying the particular color to brick face elements in the three center courses of the panel unit with each displaced one brick length in advance lengthwise of the panel unit. It will be understood, of course, that the particular positioning of the cutouts 27, as has just been described, is merely with respect to the particular showing of the drawings, and that these cutouts will be arranged so as to provide for application of the desired pattern on the panel unit.

Positioned interiorly of the vertical runs of belt 21 there is provided a hopper 30 which may be suitably mounted. Hopper 30 is provided at its bottom with a suitable discharge opening extending across the width of the hopper and in which discharge opening there is mounted a feeder wheel 31 which is an elongated cylinder having suitably spaced, longitudinal flutes or recesses 32 provided in its face. Feeder wheel 31 is mounted on shaft 33 which may be provided with suitable sprocket gear or the like as, for example, 39, whereby feeder wheel 31 may be driven at a suitable speed for feeding granules. Granules which are fed at a uniform rate by the operation of feeder wheel 31 discharge into an elongated funnel member or the like which extends across the width of the apparatus, which funnel member terminates at its lower end in a relatively narrow spout portion 34 which is positioned to discharge granules into pockets 26 of belt 21.

For feeding granules to the hopper 30 there is provided an exterior hopper 35 from which extends a screw feed and housing, generally designated at 36, which housing within hopper 30 is provided at its lower portion with an opening or slot 37 from which granules fed from the feed hopper 35 may be fed to and discharged into hopper 30.

Above hopper 30 there is provided a funnel-like member 38 positioned to receive granules discharged from pockets 26 as they approach the upper portion of their travel and to funnel such granules back into hopper 30. The function and construction of this funnel 38 will not be further described except to say that it extends across the width of the device, and its construction is not important except that it must provide for receiving granules discharged from pockets 26 and for discharging these granules back into hopper 30.

The shaft 40 of one of sprockets 25 may extend outwardly and carry mounted thereon a gear or other suitable drive means 41, and likewise shaft sprocket 54 driving sprocket 39 on shaft 33 through chain 53. The patterned belts may be driven from a driven embedding roll 14 by means of shaft and bevel gear drive system 45, 46, 47, 52, 51, 50, 48 and 41. The granule conveyor may be driven from upper shaft 40 by means of sprockets on the shafts and chain 44. Coating rollers 13—13, embedding rollers 14—14 are driven by suitable drive means, and the various drives therefrom are designed so that the various parts of the device will function at the proper relative speeds, as, for example, conveyor 11 and belt 21 are synchronized so as to travel at the same speeds, and the other drive means will be driven at speeds suitable to provide for a suitable supply of granules from granule hopper 35 to hopper 30, and to provide the required uniform discharge from hopper 30 to spout 34.

From the foregoing description the mode of operation of the apparatus should be clearly apparent to one skilled in the art, but, however, a brief summary of the operation of the device will

be given. The panels 16 are advanced by conveyor 11 under the granule-applying units 20. The belts 21 properly synchronize with respect to the panel 16, passing thereunder and operating at the same lineal speed, deposit through suitable openings or cutouts 27 colored granules on the surface of the panel according to a predetermined pattern which is determined by the positioning of the cutouts 27 in the belt 21. Each of these cutouts is, of course, the size of the dimensions of a brick face, sc that when the granules are deposited through a cutout on the surface of panel 16, such deposit will simulate a brick face. It is to be understood, of course, that the panels 16, as they are being fed toward the granule-applying units 20, are first coated with a layer of asphalt or other suitable adhesive in which the granules are deposited, and that after the granules are deposited they pass under means for suitably embedding the granules in the adhesive, as, for example, by embedding rolls 14.

Each of the granule-applying units 20 applies granules to a predetermined number of areas corresponding to the brick face areas which make up the panel unit 16. In order that there may be applied to the panels 16 brick simulating faces of different colors, there are provided a plurality of granule-applying units 20 closely spaced one from the other in the direction of travel of a panel unit 16. Each of the belts 21 of these units 20 will be provided with suitable cutouts 27 to deposit granules on the various areas as desired, and it will be understood that the aggregate of such deposits are so predetermined that the entire face of a panel unit is covered as it passes under the plurality of granule-applying units 20.

Each unit 20 has a suitable feed for supplying granules to its individual hopper 30 positioned between the runs of endless belt 21. This granule supply is so designed that the granules are supplied to hopper 30 at substantially the rate at which the granules are deposited on the panel unit 16, so that a substantially uniform supply of granules is maintained in hopper 30.

At the bottom of hopper 30 there is provided a feeder cylinder or wheel 31 with flutes or recesses 32 into which the granules drop as the member rotates. Member 31 is rotated at a speed such that the granules are fed from hopper 30 to spout 34 at the rate at which the granules are to be deposited through cutout 27 as such passes under the lower end of spout 34. During that part of the rotation of endless belt 21, where the imperforate portion of belt 21 is under the lower end of spout 34, the granules which are being discharged therefrom at a constant rate merely fall upon the interior face of belt 21, and as the belt travels the lips 26 provide lifting pockets which carry such granules upwardly to substantially the top of the travel of the belt to discharge such granules into funnel 38, which returns these granules to hopper 30.

From the foregoing description it is believed obvious that substantially any variegated pattern of colors can be deposited on the surface of panels 16, merely depending on the positioning of the various openings or cutouts 27 in the several endless belts 21. Of course, if it is desired to deposit only two colors of granules on a panel, then only two of the granule-applying units will be utilized. Or, if it is desired to deposit four, five or six different colors or blends, then, of course, there will be provided four, five or six granule-applying units 20 as may be required for the purpose. It is furthermore to be understood that the width

and length of endless belts 21 shall be varied in accordance with the size of the panel which is to be surfaced, and that the size of the various cutouts 27 will be of dimensions of the deposits which are to be made, and that the apparatus is in no way limited as to the size or design of the deposit to be made. For example, if it is desired to manufacture a brick siding panel which includes the simulation of an end face of a brick, then the cutout for applying granules therefor will be of dimensions or substantially the dimensions of a brick end face. Or, if it is desired that the individual deposits be in the form of squares, then the cutouts will accordingly be square, etc. The specific structure of the apparatus, that is, the mechanical details of the structure, is not of the essence of the invention hereof, since, as previously referred to, the drawings and the disclosure are made with the idea of simplifying such, so far as possible, and the mechanical design of any specific such apparatus will, of course, depend entirely upon the engineer designing the device. For driving gears there may be substituted chains and sprockets or belts and pulleys, etc.

For driving the endless belts and feeders, the shaft of an embedding roll 14 may be provided with a bevel gear 45 meshing with gear 46 of vertical shaft 47. Shaft 47 appropriately carries bevel gears 48 and 49 which drive, respectively, gears 43 and 41 on the feeder and belt drive shafts, respectively.

The apparatus described is that for applying the desired colored granules on the surface of a panel, and it will be understood by those skilled in the art that subsequent to the device herein illustrated and described, mortar joint simulating lines will be impressed in the surface so as to submerge the granules at brick face area junctures, so that the finished product will simulate a panel of brick faces. This provision of the mortar simulating joint lines being common to the manufacturer of brick siding units, and well known to those skilled in the art, it is thought to suffice that mention be made of such operation as the operation for completing the product subsequent to the deposit of the granules upon the surface of the base sheet. No particular description of the base sheet has been given, and this, of course, will be in accordance with the desires of the designer so that it may or may not be provided with shiplap edges or the like, and may or may not be presealed with an asphalt coating or the like, and in general will be in accordance with the whims or desires of the designer as he conceives the requirements of the market for such features of the product.

The invention has been particularly described with respect to the manufacture of insulating brick siding, but it is to be understood that the principles of the inventions hereof may be applied to the manufacture of other products of a more or less similar character, felt base roofing and siding and the like, and that fundamentally the apparatus is suitable for applying to a sheet surface a predetermined, definite pattern composed of areas of applied material having a difference in character in adjacent areas of application. The surfacing materials deposited need not necessarily be granules, such as are ordinarily used on asphalt base roofing or insulating brick siding, but they may vary from a powdered material to granules substantially such as those usually used on asphalt base roofings, or they may be finely fibrous or of plate-like structure.

A generally similar but specifically different product which may be readily made on the apparatus is stone patterned siding. The surface of such product represents a pattern of stone faces of various sizes and of different shapes, and may be of a variegated color pattern. The apparatus hereof is particularly adapted for producing such a product since, if the belts are operated at the same lineal speed as the speed of forward travel of the unit being processed, the cut-outs in the belt comprise a stencil pattern assuring accurate configuration and placements of the various applied stone faces.

A particular advantage of the apparatus is that it is most flexible. In the first place, a series of the belt units for applying a plurality of different colored granules takes up only a short space lengthwise of the machine, as the vertical runs can be positioned quite closely, it being necessary to provide but a relatively narrow space, between the runs of a belt, sufficient to accommodate a narrow granule hopper and associated feeder wheel. The successive belts may be so positioned that they substantially touch, spaced only sufficiently that contiguous vertical runs do not interfere, one with the other.

It is to be understood that the belts may comprise any suitable flexible material, and that the elevating pockets shown and described are merely illustrative, that is, they may be of any desired form or material so long as they provide means for returning excess surfacing material to the individual hopper.

The various belts need not be of the same length nor run at the same speed. One of the belts, for example, may be of twice the length of another, with, for the application of a unit of the pattern being applied, the long belt dimensions at twice the lineal speed of that of the short belt, unless the pattern applied by the short belt is duplicated on a unit, in which case the speeds will be the same. In the first instance, however, it will be understood that the cut-outs in the short belt are to be but half the length longitudinally of the belt, relative the length of cut-outs of the long belt. In any case it will be understood that the lineal belt speed is to be synchronized with the sheet to which the surfacing is being applied. In this case "synchronized" is used in the sense that the lineal speed of a belt and length of cut-out therein shall be such that the effective granule discharge time interval shall be equal to the time interval of lineal travel of the sheet required for applying the particular pattern element. A specific example is, if the belt is operated at one-third the lineal speed of the sheet to which the pattern is being applied, then a belt cut-out will be substantially one-third of the length of the pattern element applied through such cut-out.

It will, of course, be understood that the general remarks just above are merely representative of special conditions, and that in general accord therewith, one skilled in the art may incorporate in a device, built in accordance with the teachings hereof, such variations in design as are obvious and follow the basic structure as disclosed.

To sum up the inventions hereof, such consist in the provision of an apparatus and a method for applying a particulate material to pre-selected areas of a base sheet, and wherein such coating materials in definite adjacent areas may be of differing character.

The inventions hereof having been described in full detail, I claim:

1. Apparatus of the type described, comprising in combination, means carrying sheet material in a substantially horizontal plane, an endless elevating belt conveyor mounted thereover, means mounting the endless conveyor to vertically spaced wheel means, selected portions of the endless belt conveyor cut out, means synchronizing the peripheral speed of the belt with the lineal rate of movement of the sheet material, means directing a falling stream of particulate material to the inner surface of the lower run of the endless belt and particle elevating means mounted interiorly to the elevating belt conveyor.

2. The apparatus described in claim 1 wherein the means mounting the endless belt to the spaced wheel means comprises a plurality of spaced rod members secured to the endless belt and extending outwardly beyond its edges.

3. The apparatus described in claim 1 wherein the elevating means are mounted to the interior face of the belt of the endless elevating belt conveyor, substantially uniformly spaced and extending across the interior face thereof, are angularly inclined from the inner face of the belt and provide elevating pockets between contiguous faces of the belt and the elevating means.

4. The apparatus described in claim 1 provided within the endless elevating conveyor belt with a hopper, a slot provided in the bottom wall of the hopper and a metering device mounted to said slot and discharging material from the hopper uniformly and at a measured rate.

5. The apparatus described in claim 1 provided within the endless elevating belt with a hopper, and below the hopper a discharge chute terminating in close proximity of the inner generated belt periphery, the hopper having a slot in the bottom wall and a metering device mounted to said slot and discharging to the discharge chute.

6. The apparatus described in claim 1 and comprising a plurality of such endless elevating belt conveyors closely positioned along the panel conveying means, each such endless belt provided with cut-outs therein, each cut-out in a relatively different area of the belt in which it occurs when compared with the cut-outs in the other belts.

7. Apparatus of the type described, comprising in combination, means conveying panel form units in a substantially horizontal plane, an endless elevating belt conveyor mounted thereover, means mounting the endless conveyor to vertically spaced wheel means, means maintaining the speeds of the panel conveying means and endless elevating belt conveyor in synchronization, selected portions of the endless belt conveyor cut out, means continuously directing a falling stream of particulate material to the inner surface of the lower run of the endless elevating belt and means comprising pockets on the interior face of the endless elevating belt.

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