

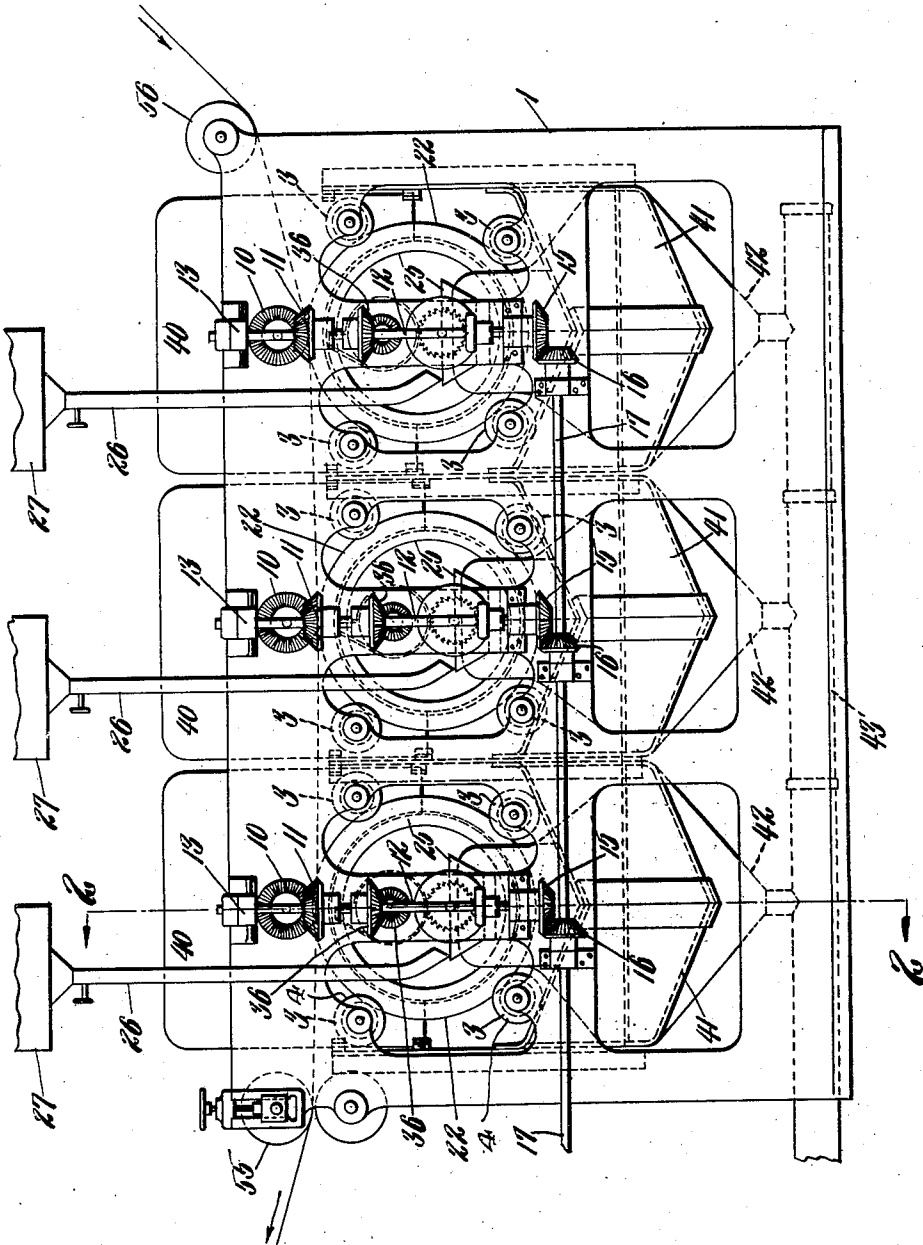
June 17, 1930.

R. T. JOHNSTON  
MACHINE FOR COATING

1,764,080

Filed March 20, 1923

5 Sheets-Sheet 1



*Fig. 1.*

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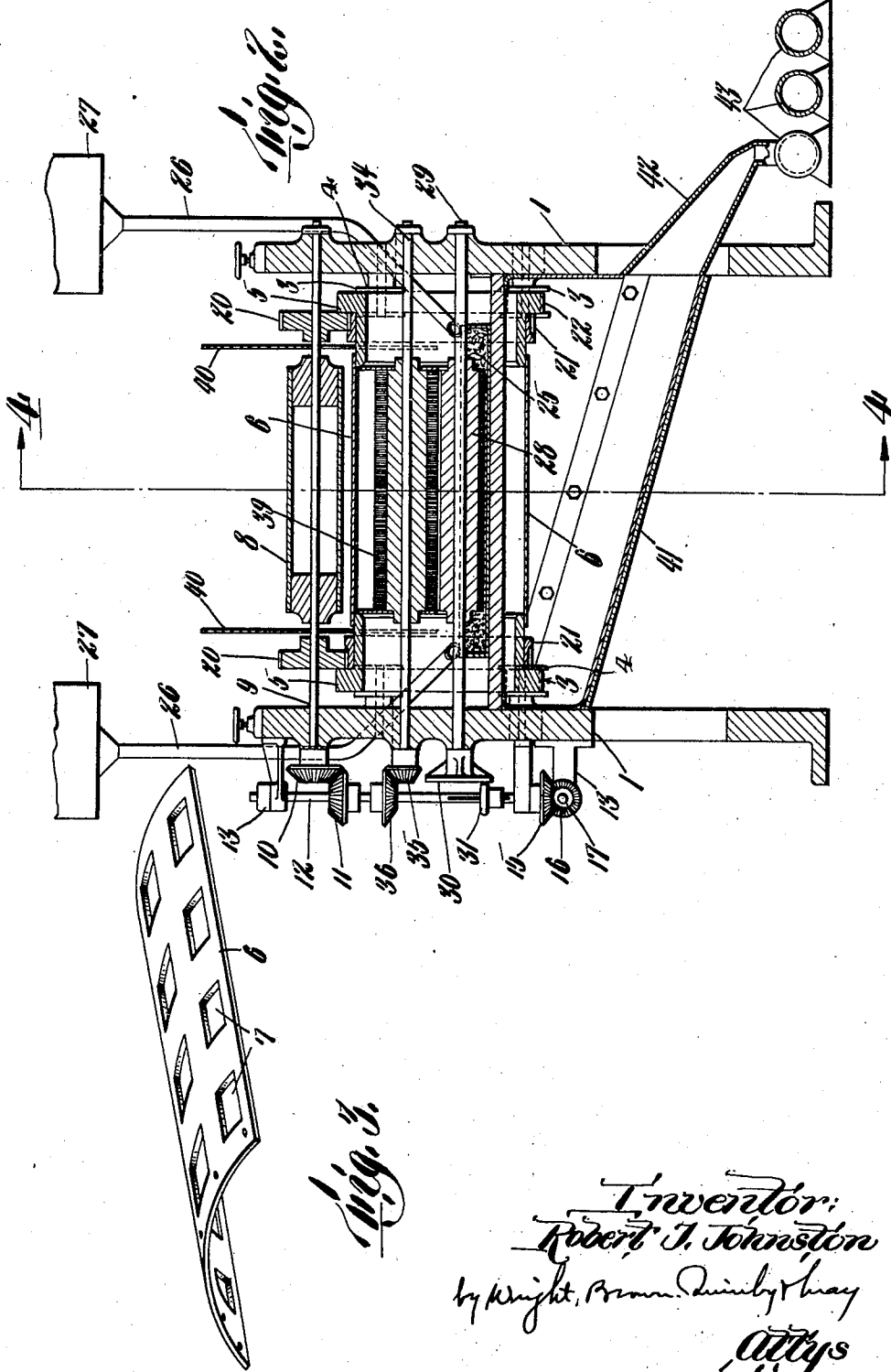
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5 Sheets-Sheet 3

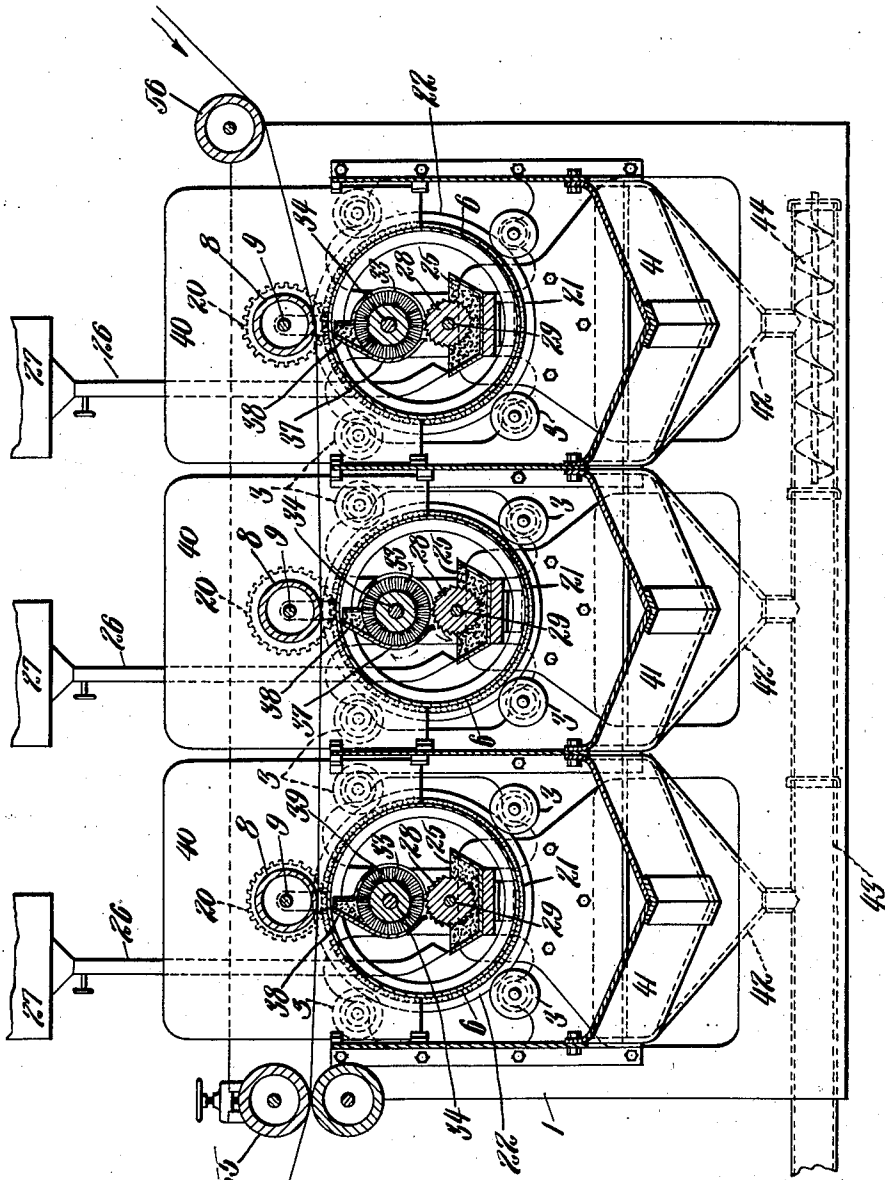


Fig. 4.

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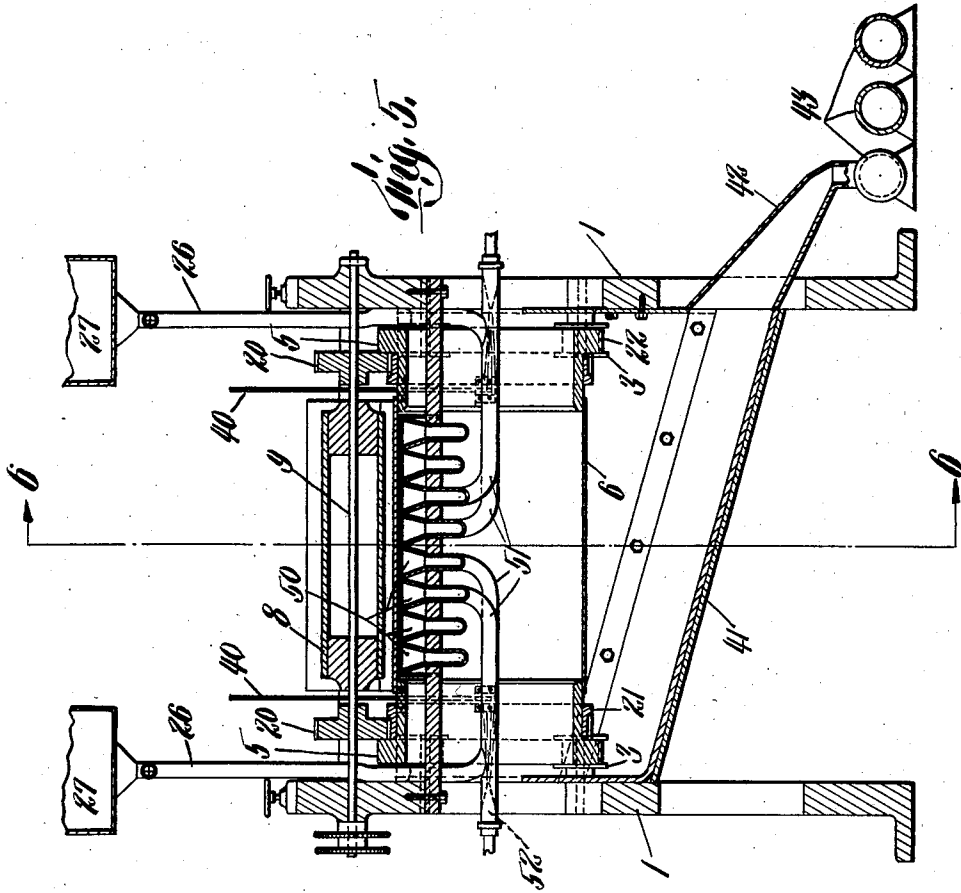
June 17, 1930.

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1,764,080

Filed March 20, 1923

5 Sheets-Sheet 4



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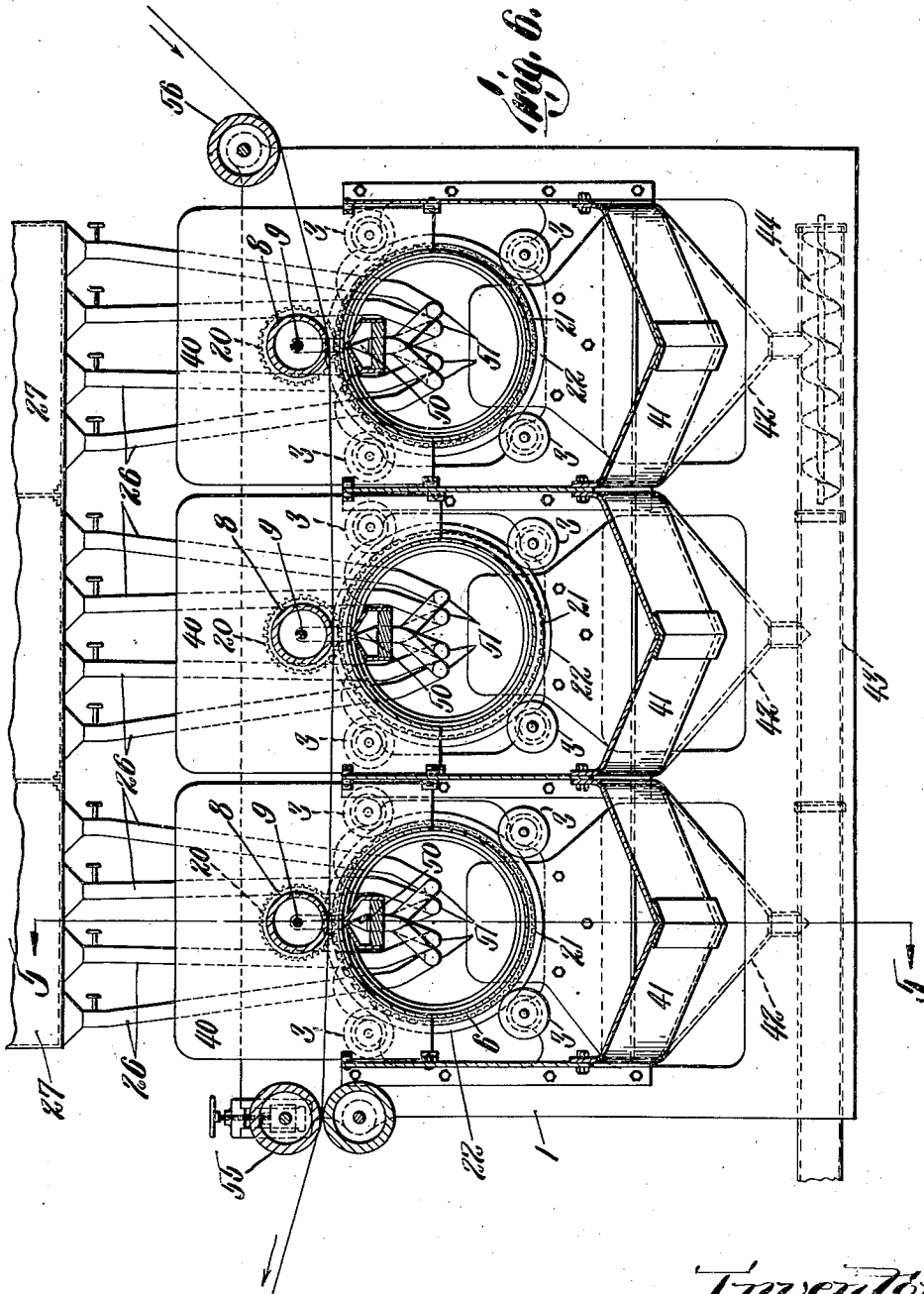
June 17, 1930.

R. T. JOHNSTON  
MACHINE FOR COATING

1,764,080

Filed March 20, 1923

5 Sheets-Sheet 5



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# UNITED STATES PATENT OFFICE

ROBERT T. JOHNSTON, OF NEW BRUNSWICK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE PATENT AND LICENSING CORPORATION, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

## MACHINE FOR COATING

Application filed March 20, 1923. Serial No. 626,438.

This invention relates to a method and machine for coating having been designed more particularly for coating tacky sheet material with granular material and, if desired, according to a predetermined pattern in one or more colors. While not restricted to such use, the machine has been designed primarily for the purpose of applying ground slate or other suitable surfacing to sheet roofing material during its process of manufacture, the material being afterwards cut up into shingles if desired or used in extended lengths. As usually constructed such roofing comprises a fibrous base, such as rag felt, impregnated and coated with material such as asphalt, the granular surfacing being applied to one face of the sheet while the coating asphalt is still warm and tacky.

According to the present invention sheet material is held in elevated position and the surfacing material thrown up against its lower face. By throwing the coating up in this manner a uniform deposit of the granular material is effected on the exposed area of the sheet which may be defined by a stencil so as to produce the desired pattern. Suitable properly related stencils for the successive application of granular material of various colors may be employed in case more than one color is desired so that a pattern in the colors may be effected.

For a more complete understanding of this invention, together with further objects and advantageous details and combinations of parts, reference may be had to the accompanying drawings in which

Figure 1 is a side elevation of a machine designed to carry out the method of the invention.

Figure 2 is a vertical section on line 2—2 of Figure 1.

Figure 3 is a perspective of one form of stencil.

Figure 4 is a vertical section on line 4—4 of Figure 2.

Figure 5 is a view similar to Figure 2 but showing a modification.

Figure 6 is a vertical section on line 6—6 of Figure 5.

Referring to these drawings, 1 indicates a

pair of spaced side frames on which is supported the operative portions of the mechanism. On the adjacent faces of these frames are journaled opposed series of rollers 3, as shown four such rollers being employed for each side frame for each coating-applying unit, as shown in the drawings three such units being employed, each arranged to coat with a material of one color. These rollers may have their ends adjacent their respective side frames 1 flanged so as to retain thereon with capability of rotation about an axis centrally of each series of rollers, a ring 5. Opposite rings 5 are adapted to be connected together by a series of stencil plates 6, one of which is shown detached in Figure 3, the stencil plates and the rings together forming drums with openings in their peripheries formed by the openings 7 of the stencil plates. These drums form one member of a pair of feed rolls for the sheet material, the other member being formed by a roll 8 fixed to a shaft 9 journaled in suitable bearings in opposite side frames immediately above the drum.

The rolls 8 are arranged to be power driven, for this purpose one end of each shaft 9 having fixed thereto a beveled gear 10 with which meshes a similar gear 11 on a vertical shaft 12 journaled in brackets 13 extending outwardly from one of the side frames 1. The lower end of the shaft 12 as shown carries a beveled gear 15 with which meshes a bevel pinion 16 on a horizontal drive shaft 17 which may be driven from any suitable source of power (not shown). The drums are also designed to be driven positively to cooperate with the rolls 8 and to present the openings 7 of the stencil plates successively adjacent the lower surface of the sheet material so that the stencil moves with the sheet material which is superposed thereon. For this purpose the shaft 9 has fixed thereto gears 20 which mesh with gear rings 21 made fast to the rings 5, the rings 5 as shown being provided with flanged extremities 22 against which the gear rings 21 engage and which ride closely adjacent the flanges 4 of the supporting rollers 3. Positioned within the drums are the mecha-

nisms for throwing the granular material against the lower face of the sheet material through the openings in the stencil plates. Various means for effecting this may be employed, one means for the purpose being shown in Figures 1, 2, and 4 and a different means in Figures 5 and 6.

The means shown in Figures 1, 2, and 4 comprises a trough 25 extending longitudinally within each rotating drum and supported in stationary position therein, this trough being designed to receive a supply of the granular material as through one or more chutes 26 extending from a source of supply 27. Dipping within the material in the trough 25 is shown a toothed roller 28 which is fixed to a shaft 29 journaled in the side frames 1 and designed to be rotated at any suitable speed as by means of a friction wheel 30 fixed to the shaft 29 with which cooperates a friction pulley 31 adjustable lengthwise of the shaft 12 and keyed to rotate therewith. The granular material is picked up by the teeth of the roll 28 and is presented to a revolving brush 33, this brush being fixed to a shaft 34 also journaled in the side frames 1 in parallel relation to the shaft 29 and driven by a beveled pinion 35 with which meshes a beveled gear 36 also fixed to the shaft 12. The brush 33 rotates within a casing 37 which partially encloses the same and has an upwardly directed chute or spout 38. The material removed by the brush from the toothed roll 28 is caught between the bristles 39 of the brush and the casing 37 until the portion 38 is reached, whereupon the bristles of the brush exert a snapping action on the granular material to project it in a column through the nozzle 38 and against the inner face of the drum, whereupon the granular material passes through the openings of the drum and impinges on the lower face of the sheet material where some adheres, due to the tacky condition of the sheet.

As shown baffle plates 40 may be employed at each end of each of the drums so that any granular material not finding its way into contact with the sheet material may be prevented from reaching the driving gears or other mechanism of the machine and may fall down and be caught in an inclined trough 41 positioned beneath each drum and leading through a spout 42 to a closed conduit 43. Within each conduit 43 may be positioned a conveyor such as the screw conveyor shown at 44 by which the excess granular material which finds its way into the conduit may be carried back into its respective source of supply 27 to be used over. By suitably relating the stencils of the various drums in angular relation the portions of the sheet to be coated by the granular material thrown thereagainst through any of the stencils may be regulated so as to

produce the desired surface pattern on the sheet, it being intended that the various drums should be employed in connection with surfacing of different colors. While only one form of stencil has been indicated in Figure 3, it is evident that any shape and size of openings may be made therein in accordance with the desired pattern to be formed on the sheet material.

Another form of mechanism for throwing the coating material against the lower face of the sheet comprises, as shown in Figure 5, a series of upwardly directed nozzles or jets 50 within each drum through which the coating material may be blown as by an air current. These jets as shown extend practically continuously throughout the length of each drum and are supplied with the coating material through blast pipes 51 into which air under pressure is introduced as through a nozzle 52. The granular material may be led to the blast pipes from the sources of supply 27 by gravity into position where it will be caught by the air emerging from the nozzle 52 and be carried through the blast pipes and discharged substantially uniformly throughout the length of the stencil and the drum in a column impinging against the lower face of the stencil and passing through the openings therein into contact with the sheet material. While as described granular material is preferably employed to be thrown up against the lower face of sheet material while in a tacky condition, it is evident that the same principle might be employed if the sheet were not tacky, but the coating material were of such a nature as to stick thereto, such for example as in the nature of a paint which might be thrown up either by an air jet or mechanical projection against the material to be coated. It is also evident that a powdered material might be employed in place of the granular material if desired, the term "granular material" being used in a generic sense in this application to cover not only grains such as crushed slate or sand, but also powdered talc or mica.

As shown the sheet material after passing over all the stencils of the series passes between a pair of pressure rollers 55 which act to compress the coated material into the surface of the sheet so as to insure a proper bond therebetween. It may be noted that as shown the sheet material is led to the first coating mechanism of the series beneath a guide roll 56 positioned above the adjacent upper feed roll 8, that the central upper feed roll 8 is slightly lower than the first and third upper rolls 8 and that the nip of the pressure rolls 55 is positioned above the lower edge of the last feed roll 8. By this means the rapidly moving sheet may be held under proper tension against these feed rolls so as to prevent whipping. It also permits,

if desired, a slight space between the stencils and the sheet material so that the coating as deposited thereon will not be sharply defined along its edges to effect a slight blending of the colors where they meet whereby any slight offsetting of the stencils relative to each other will not be noticeable.

Having thus described certain embodiments of this invention, it should be evident to those skilled in the art that many changes or modifications might be made therein without departing from its spirit or scope as defined by the appended claims.

I claim:

1. A machine of the class described, comprising a sheet feeding mechanism comprising a roller and a drum beneath said roller between which the sheet material passes, said drum having peripheral openings, means in said drum for projecting a column of coating material toward the axis of the roll with sufficient velocity to impinge on the inner surface of the drum and on the areas of the sheet exposed by the openings of the drum in the line of motion of the projected material and means for reclaiming the coated material not deposited on the sheet.

2. A machine of the class described comprising sheet feeding means including feed rollers above the sheet, drums beneath certain of said feed rollers, said drums having peripheral openings therethrough, and means within each drum for projecting comminuted coating material toward the axis of the corresponding roller and against the portions of the sheet registering in passing with said openings in the drum.

3. A machine of the class described comprising spaced side frames, a series of spaced rolls journaled on the inner face of said frames, the series on said frames being oppositely disposed, rings rotatably supported by said rolls, stencil plates fixed at their ends to said rings and forming therewith a hollow drum, means to feed a sheet comprising a roll extending in parallel relation to and above said drum, means to rotate said feed roll and drum at equal peripheral speeds, and means for projecting a column of coating material against the inner faces of the stencil plates to pass through the openings therein and impinge on the sheet.

4. A machine of the class described comprising spaced side frames, a series of spaced rolls journaled on the inner face of said frames, the series on said frames being oppositely disposed, rings rotatably supported by said rolls, stencil plates fixed at their ends to said rings and forming therewith a hollow drum, means for feeding a sheet comprising a roll extending in parallel relation to and above said drum, means to rotate said feed roll and drum at equal peripheral speeds, means for projecting a column of

coating material against the inner faces of the stencil plates to pass through the openings therein and impinge on the sheet, a container for coating material, means within the drum for projecting a column of coating material from said container against the inner faces of the stencil plates to pass through the openings therein and impinge on the sheet, a trough to receive coating material not adhering to said sheet, and means for returning material from said trough to said container.

5. A machine of the class described comprising means for supporting and moving a plurality of stencils and a sheet of tacky material in superposed spaced relation thereto, and means for blowing granular material of different colors against the lower face of the stencils to impinge on the sheet material through the openings of said stencils.

6. A machine of the class described comprising a plurality of feed rolls against which the upper face of sheet material may travel, a plurality of stencil plates having openings and movable with the velocity of the sheet adjacent the under face thereof one of which stencil plates is located opposite each of certain of said rolls, and means for projecting coating material of different colors against said stencil plates to impinge on the sheet material through the stencil openings opposite to its respective roll.

7. A machine of the class described comprising a plurality of feed rolls, means for holding the upper face of sheet material against said rolls, said rolls being so disposed as to impart a tension thereto to prevent whipping of the material as it passes thereunder, a stencil plate beneath each roll movable at the velocity of said material, and means for projecting granular material through the openings of said stencil plates into contact with the lower face of the material.

8. In a machine of the class described, a plurality of spaced stencils having apertures therethrough, means for supporting a sheet above and in close proximity to said stencil but out of contact therewith, and means for separately projecting surfacing material of different colors through said apertures provided by said spaced stencil plates against said sheet.

9. In a machine of the class described, a plurality of spaced stencils having apertures therethrough, means for supporting a sheet above and in close proximity to said stencil but out of contact therewith, means for advancing the sheet and the stencil at equal speeds, and means for separately projecting surfacing material of different colors through said apertures against said sheet.

10. In a machine of the class described, a hollow drum having a cylindrical wall, said wall having openings therein to form a



stencil, means for supporting a sheet above and nearly tangent to said cylindrical stencil but out of contact therewith, and means extending within the drum for projecting surfacing material through said openings and against said sheet.

11. In a machine of the class described, a horizontally disposed hollow drum having a cylindrical wall apertured to form a stencil, means for rotating said drum with a predetermined peripheral speed, means for advancing a sheet having one face covered with a tacky substance horizontally over said drum in a direction perpendicular to that of the axis of the drum and at a speed equal to said peripheral speed, the tacky face being toward the drum, means for guiding said sheet close to the upper portion of said drum but out of contact therewith, and means for projecting a substantially vertical column of comminuted surfacing material upwardly against the portions of the sheet registering with the apertures.

In testimony whereof I have affixed my signature.

ROBERT T. JOHNSTON.

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