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[54] GROOVED ROD COATER

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[52] **U.S. Cl.** **118/414**

[51] **Int. Cl.** **B05c 3/18**

[58] **Field of Search** ..... 118/414, 119, DIG. 10

[56] **References Cited**

UNITED STATES PATENTS

2,066,780	1/1937	Holt	118/414 X
3,196,784	7/1965	Kraft	118/414 X
2,100,587	11/1937	Chalker	118/DIG. 10

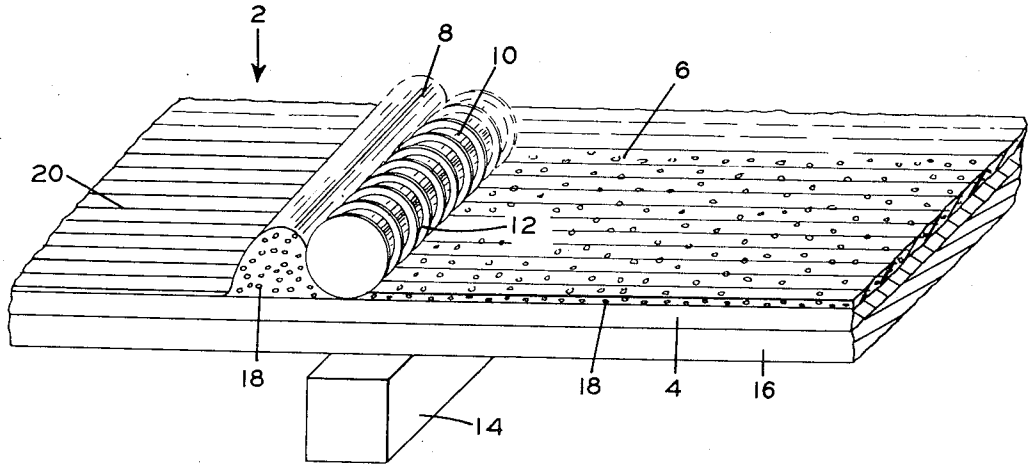
Primary Examiner—John P. McIntosh

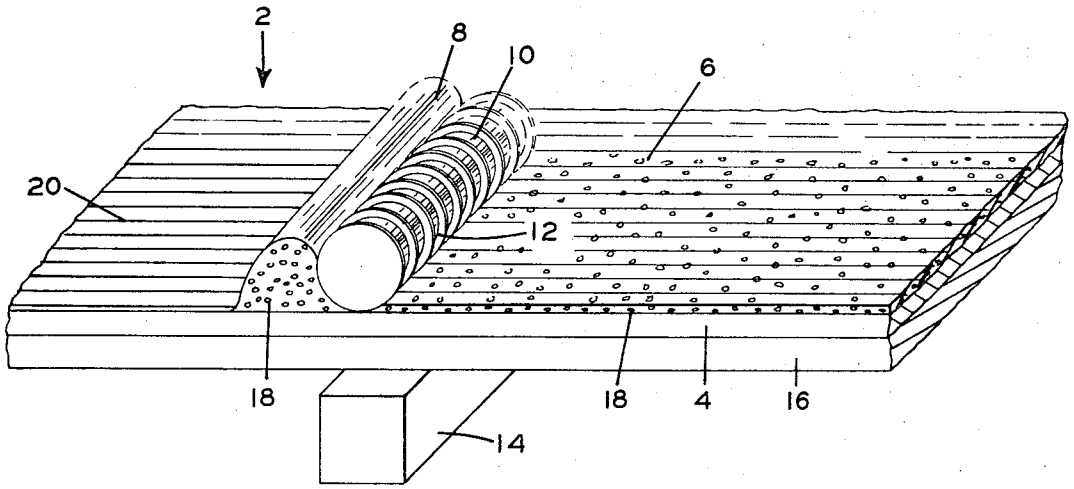
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[57] **ABSTRACT**

A coating apparatus is provided for placing a uniform coating of particulate-containing material. A grooved rod is held against the sheet to be coated by action of a magnet on the back side of the sheet to be coated. The grooves in the rod permit the controlled application of a coating containing particles.

3 Claims, 1 Drawing Figure





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GROOVED ROD COATER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention is directed to a coater and, more particularly, to a grooved rod coater for application of a coating containing particles.

2. Description of the Prior Art

Screen printing apparatus are available wherein a magnetic squeegee is used to force the ink material through the screen of the printer as shown in U.S. Pat. No. 3,196,784. On the underside of the material to be printed there is positioned a magnetic source. Over top of the material to be printed is placed a pattern screen. A metal rod is placed over top of the screen and is used to force the ink down through the screen to print the pattern. The magnetic source under the article to be printed attracts the metal rod and holds it against the screen and assists in its movement and its uniform application against the screen.

A grooved doctor blade has been utilized for coating apparatus as shown in U.S. Pat. No. 3,304,910. Here, magnetic action holds the grooved doctor blade in position and the doctor blade wipes the coating to the desired thickness after the coating has been applied by a conventional roll coater.

Conventional coaters such as forward roll, reverse roll and blade coaters can be used to apply coatings having high viscosity and solid content with small particles. However, in comparison to their high equipment costs, the grooved rod coater can achieve the same results in an inexpensive and much more compact manner. In addition, the grooved rod rotates in contact with the moving substrate, and coatings having large particles, strands or fibers can be applied uniformly to the substrates with no adverse effects on the coating operation. Also, the grooved rod coater is independent of line speed and width, which are distinct advantages over many of the conventional coaters which are power driven.

SUMMARY OF THE INVENTION

The coating apparatus herein revolves around a grooved rod coater which is a steel rod that has cut in its peripheral surface a screw thread configuration. The spiral effect of the screw threads extends across the length of the rod, and the pattern provides a series of high and low areas. The high areas of the rod engage the material to be coated while the low areas are spaced therefrom and contain a substantial quantity of coating material and provide an area into which particles within the coating material may pass without damage to the particles and without the particles being built up behind the coater. When fibers are used, the spiral groove is replaced by a series of unconnected grooves.

Underneath of the article to be coated there is an electromagnet source which acts upon the grooved rod to hold it in position relative to the material to be coated. The rod is held by the magnetic force with a steady pressure against the material to be coated so that the uniform coat is applied.

BRIEF DESCRIPTION OF THE DRAWING

The drawing is an isometric view in section of the invention herein.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The coating apparatus **2** herein is used to provide the uniform coating to a sheet **4**. This sheet could be any type of material. A flat plastic sheet, a scrim, a porous plastic sheet, a fiber material, or even paper could be utilized. Onto the sheet **4** there is provided a coating **6** which is formed from some liquid type material **8** which is supplied behind the coating roller **10** and is spread across the sheet **4** to a uniform thickness by the coating roller **10**. The liquid being applied could be any conventional coating material. It could be a thermoplastic and/or thermosetting coating material including the metering of mechanically or chemically blown foams. In one embodiment used, the apparatus was employed to provide a coating of 6 to 10 mils of a liquid plastisol. The coating material usually has solid particles or fillers within the coating. These fillers could include pigments, glass beads, or metallic particles which would be applied for the purpose of providing some type of special decorative effects. It is also possible that glass strands or fibers could be incorporated within the coating layer or plastisol layer during the coating operation to provide a reinforcing effect. The groove configuration **12** of the coating rod **10** is the feature that permits the particles of the plastisol coating to pass under the roll coater or permits the strands to be incorporated within the plastisol coating. The groove can be either V-shaped or substantially square. In one embodiment, an 8 mil coating of plastisol was applied to a backing sheet using a ½ inch diameter rod with **20** spiral turns to the inch with a depth of 0.040 inch between the high point and low point of the V-shaped grooves. The grooves in the rod coater could be in a spiral pattern or a series of unconnected rings.

The rod **10** is held in place due to the magnetic action of the electromagnet **14** positioned below the conveyor table **16** across which the backing sheet **4** passes. The rod **10** is steel and it is thus attracted by the electromagnetic force. Depending upon the force of the magnetic field, the rod will press against the backing sheet **4** with varying degrees of force. The magnetic force holds the rod in position, but still permits the rod to rotate due to movement of the sheet **4**. The rod is held uniformly against the sheet and therefore will not bow in the center to provide a thicker coating in the center relative to its two ends. Actually, the electromagnetic force is provided by the magnet extending across the full length of the table just as the rod extends across the full length of the table surface **16** resulting in a constant force per inch across the coater. The tips or high areas of the grooves are held tightly against moving substrates, therefore forming a constant nip. The thickness of the coating can be controlled by the configuration of the grooves machined into the rod. The open areas above the tips of the grooves are the areas through which the particles of the coating material pass or the fiber strands may be placed to allow them to be contained within the layer **6** applied to the sheet. As shown in the Figure, the coating material contains particles. The particles, being shown by reference numeral **18**, are both in the reservoir behind the coating roller and within the applied coating. The strands **20** are also shown. The strands were passed between the grooved areas of the coater **10**. The coater thus holds the strands in a parallel relationship while they are being placed within the coating **6**.

What is claimed is:

1. A coating apparatus which comprises a flat surface conveyor table, on one surface of the conveyor table there is positioned a means for developing magnetic force, on the opposite side of the table there is placed a material for receiving a coating, a freely rotatable grooved rod is placed on top of the material for receiving the coating and the magnetic attraction of the magnetic generating means under the table attracts the grooved rod to hold it against the surface of the material to be coated and the rod rotates due to movement of the material, said grooved rod having a plurality of raised and lowered areas wherein the raised areas only are always in contact with the surface to be coated and

the lowered areas provide a spacing between the grooved rod and the material to be coated, said configuration of the lowered areas controlling the thickness of the coating.

2. The apparatus of claim 1 wherein the space between the grooved rod and the material to be coated functionsas a means for the passage of particles in the coating material.

3. The apparatus of claim 1 wherein the space between the material to be coated and the grooved rod functions as a passageway means for strands of fibrous material.

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