United States Patent

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[33] **Germany**
[31] **P 19 12 773.2**

[54] **APPARATUS FOR THE SPOT APPLICATION OF ADHESIVES TO CONTINUOUS SHEET MATERIAL**
6 Claims, 3 Drawing Figs.

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[51] **Int. Cl.** **B05c 3/00**
[50] **Field of Search** ..... 118/406, 301, 312, 308, 24, 25; 101/123, 126, 119, 382 MV; 107/1.6

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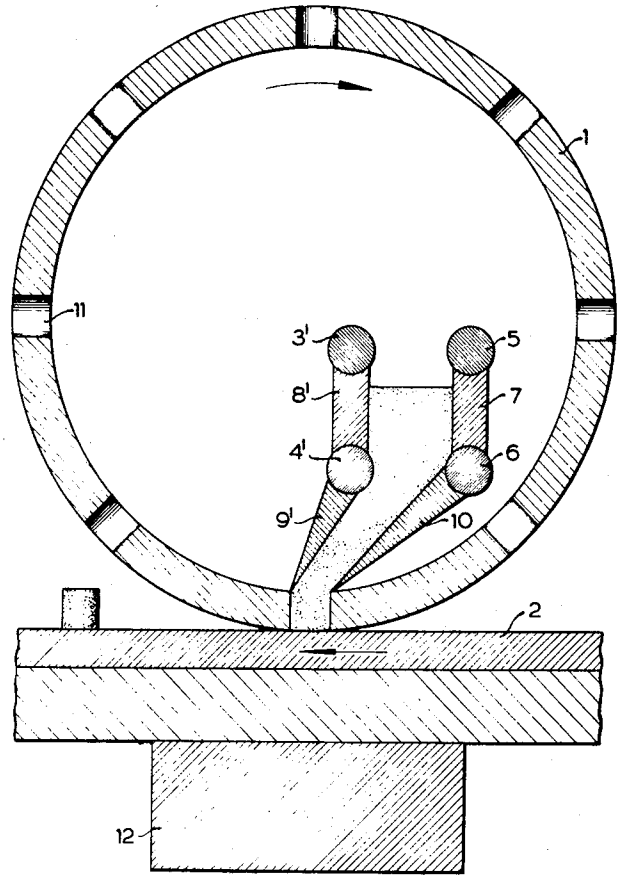
ABSTRACT: Apparatus for spot printing a powder onto a substrate including a perforated hollow roller; means for rotating the roller relative to a textile or other substrate; and hopper means within the hollow roller for holding the powder which hopper means mouth is about equal to the diameter of the perforations in the roller and registers with the perforations only when the perforations are adjacent the substrate.



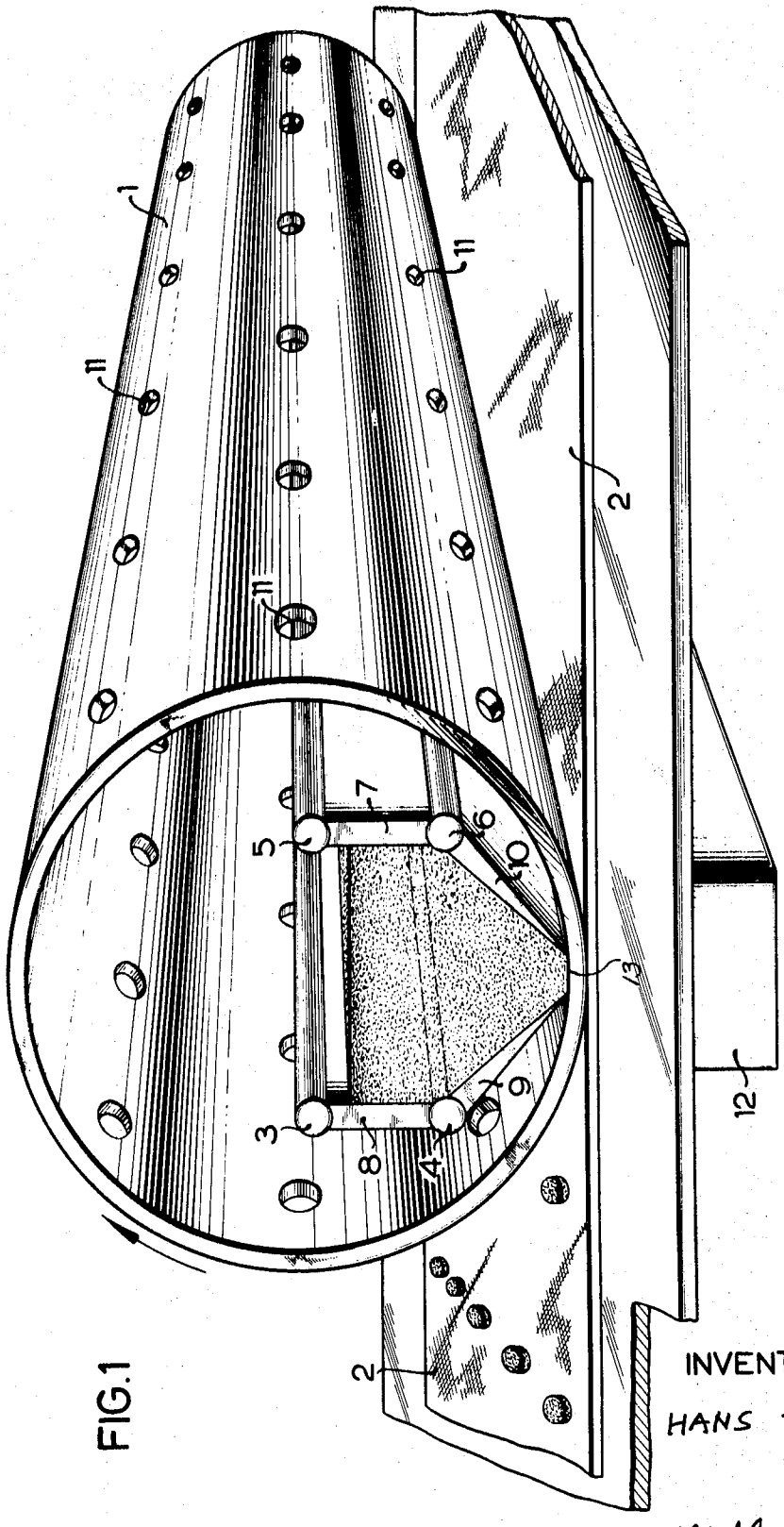


FIG.1

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FIG. 2

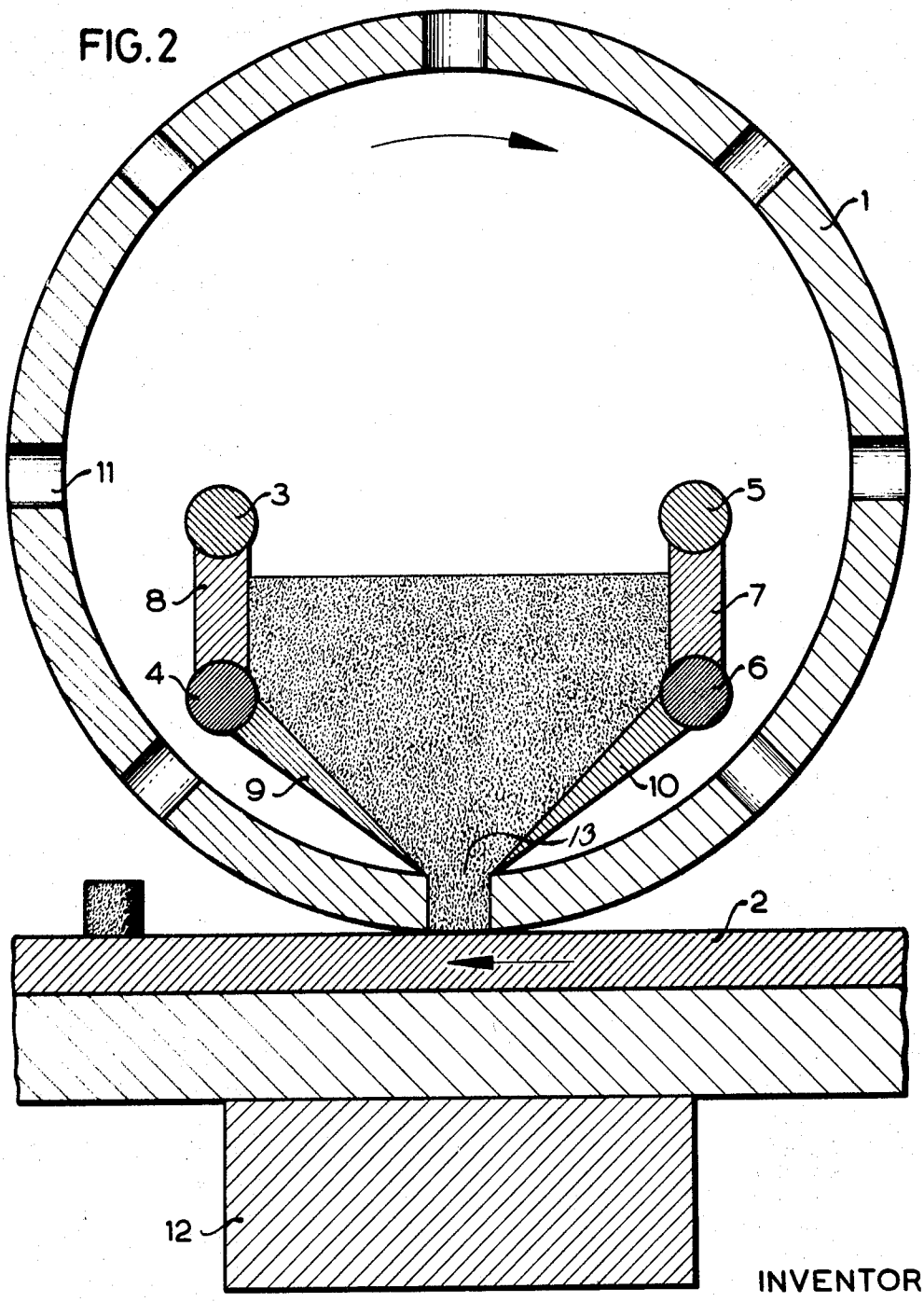

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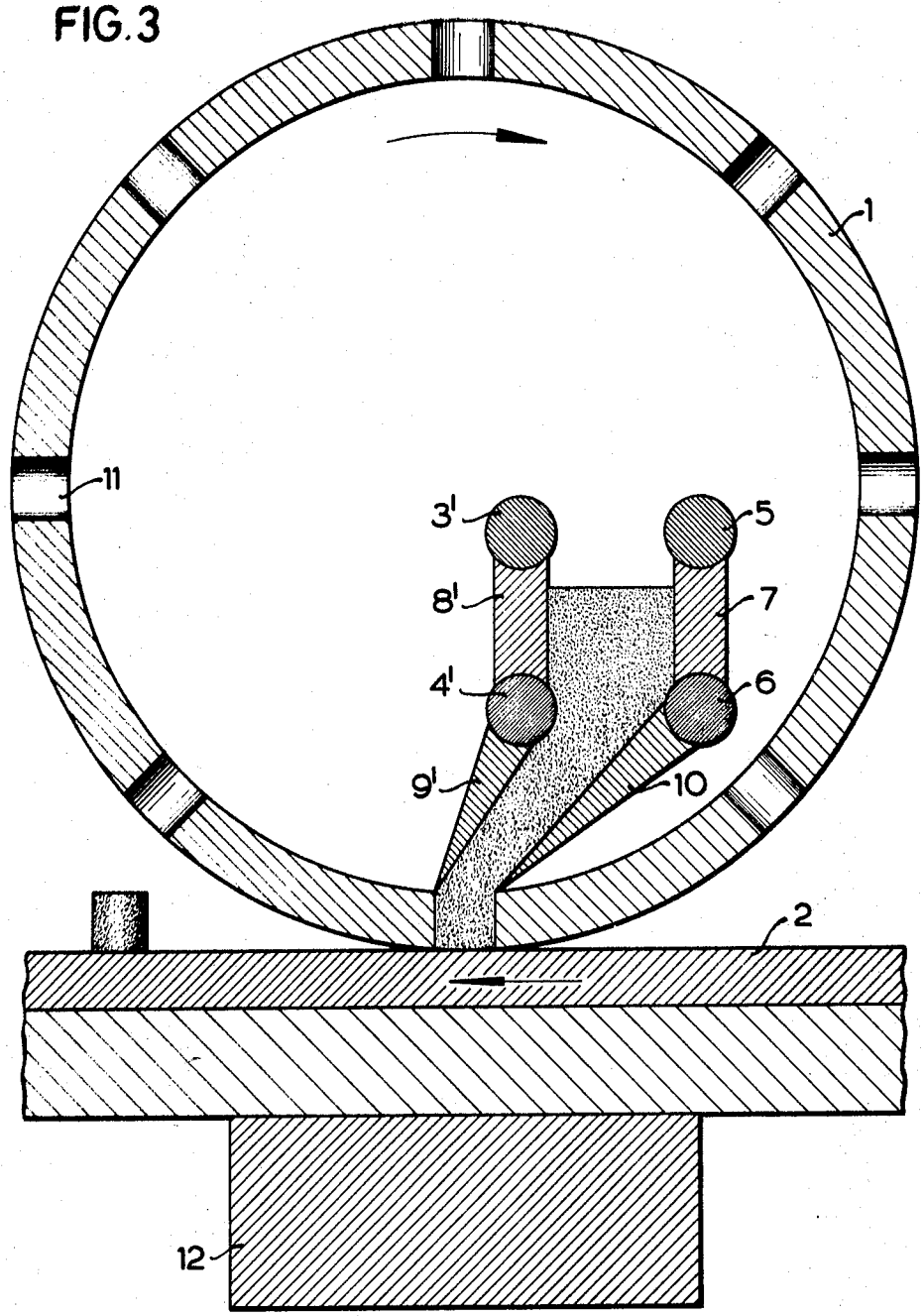
FIG. 3



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APPARATUS FOR THE SPOT APPLICATION OF ADHESIVES TO CONTINUOUS SHEET MATERIAL

It is in the prior art to imprint polyvinyl chloride or other plastic compositions in paste form onto continuous sheets of textiles or other materials, see Green U.S. Pat. No. 1,248,006. Carpets, particularly, have been provided with spots of polyvinyl chloride to prevent slipping, and padding and stiffening materials for clothing are often imprinted with thermoplastic paste compositions for ultimate adhesive use. After the paste spots dry, they remain on the material in a very uniform pattern in the form of dots of thermoplastic binding agent. A padding or lining material of this kind needs only to be laid on the surface of material that is to be padded or stiffened, with the dotted side facing it, and then the two materials can be bonded together by simple ironing, thereby eliminating the tedious sewing that was formerly required.

In many cases, it is desirable to apply to a continuous sheet material, not a paste, but a dry powder in the form of uniformly distributed dots. It can be seen that dry powder cannot be accurately imprinted in predefined dot areas by means of the conventional roller printing or rotary printing machines. These are suitable only for handling viscous pastes.

It is an object of this invention to provide an apparatus to be described hereinbelow, whereby dry powder can be applied to a continuous sheet material, in the form of small, discrete spots distributed in a predetermined pattern over its surface.

Other and additional objects will become apparent from a consideration of this entire specification including the drawing and claims hereof.

This invention will be described with relation to the drawing, in which:

FIG. I is a diagrammatic perspective view, with parts broken away of the apparatus of the invention.

FIG. II is a sectional elevation through the apparatus of the invention.

FIG. III is similar to FIG. II showing another embodiment of the invention.

Referring now to the drawing, the apparatus of this invention comprises a perforated cylinder **1**, which rolls over a continuous sheet of material **2**. On the interior of the cylinder **1** there is located a hopper type of structure made up of four rods **3**, **4**, **5** and **6** which extend from one end of the cylinder to the other. The rods **3** and **4** and **5** and **6** have disposed therebetween stiff plates **8** and **7**, respectively. Two additional plates **9** and **10** extend from rods **4** and **6**, respectively, toward each other so as to form an elongated mouth **13**. These plates **9** and **10** each contact the inside wall of the perforated cylinder and are arranged such that the mouth **13** between plates **9** and **10** corresponds approximately to the diameter of a hole **11** in the perforated cylinder. The plates **9** and **10** may be pivotally attached to the rods **4** and **6** to make the mouth size adjustable.

If the hopper means is filled with powder, the powder can then emerge from a hole **11** only when the hole (perforation) is directly over the continuous sheet **2**. In other words, the distance between the hole and the sheet is substantially zero at the moment in which the powder passes through the hole and lands on the sheet. In this manner, sharply defined dots are formed, each containing substantially the same quantity of powder.

If the dry powder were deposited from a perforated cylinder without the hopper structure according to the invention therein, powder would fall from those holes of the cylinder which were downwardly disposed as the cylinder rolled over the sheet material. The powder would fall from the hole even when the hole has covered only one-sixteenth to one-eighth of a turn, i.e., when the distance between the hole and the sheet amounts to from a few millimeters to a few centimeters, depending on the diameter of the cylinder and the amount of powder therein. This continued trickling of powder, however, causes such to feather out to such a degree that the deposit will be in a series of streaks rather than in precisely defined dots as desired.

The edges of plates **9** and **10** must bear against the inside of the cylinder **1** with sufficient force to prevent powder from escaping beyond the edges of plates **9** and **10**, and eventually falling from holes **11** in the cylinder as the cylinder continues to roll, thus again causing smearing.

This can be accomplished in a very simple manner by arranging a magnet **12** underneath plates **9** and **10** and utilizing ferromagnetic material for these plates.

The equipment, therefore, is substantially stationary, except for the rotating cylinder **1**. A magnet **12** is disposed directly beneath the tabletop. In operation, a sheet **2**, disposed on a rubber belt, coming from the right in FIGS. **1** and **2**, passes underneath the cylinder **1**. This rubber belt urges the sheet **2** against the cylinder **1**. If this sheet **2** is then pulled to the left, the perforated cylinder is rotated in a clockwise direction. During this rotation, the hopper system **3** to **10** inside of the cylinder precisely spans each successive hole, and precisely meters a sharply defined pile of powder onto the sheet **2** corresponding to each hole.

It has been found that this invention works quite well in practice and that excellently precise deposition of material is accomplished. It has been found however that occasionally one of the plates **9** presses against the rotating cylinder **1** to an extent sufficient to be partially pressed into an aperture **11**. Continued rotation of the cylinder **1** has caused plate **9** to break. A preferred embodiment of this invention is shown in FIG. **3** wherein the feeding hopper and its associated plates and rods **3'**, **4'**, **5**, **6**, **7**, **8'**, **9'** and **10** is canted away from the direction of rotation so that there is an acute angle of attack between both the plates **9'** and **10** and the inside wall of the rotating cylinder. This effectively prevents catching the plate **9** on the inside of an aperture and breaking the plate **9**.

In the manufacture of iron-on stiffening materials with the aid of the above-described apparatus, the sheet containing dots is passed into a hot air chamber located as near as possible to the point of emergence of the sheet from the cylinder. This hot air chamber softens the thermoplastic powder so as to form precisely defined dots which are anchored firmly to the sheet material **2**.

What is claimed is:

1. In an apparatus for applying discontinuous dots of dry powder material in a predetermined pattern onto a substantially continuous substrate, which apparatus comprises perforated hollow roller means movable with respect to said substrate whereby to sequentially juxtapose said perforations to said substrate and to permit material in said hollow roller to pass through said perforations onto said substrate; the improvement, whereby permitting said material in dry powder form to be applied as discreet dots through said perforations, which comprises ferromagnetic hopper means with respect to said apparatus, and magnet means disposed proximate to said substrate and said hopper means on the side of said substrate directed away from said hopper which hopper means has mouth means directed toward said substrate and in contact with the inside wall of said roller, which hopper means is canted in the upstream direction and which mouth means comprises two arms both of which are canted upstream of the leading edge of a perforation in registry therewith whereby said powder material is maintained substantially only in said hopper means and passes through only those perforations in said roller means juxtaposed to said substrate and wherein both of said mouth arms form an acute angle with the trailing surface of said roller.

2. The improved apparatus claimed in claim **1**, wherein the mouth of said hopper means is adjustable in width and substantially corresponds to the diameter of said perforations

3. The improved apparatus claimed in claim **1**, wherein said hopper means is elongated and substantially coextensive in length to said roller width.

4. The improved apparatus claimed in claim **2**, wherein said hopper means arms are pivotally connected to the remainder of said hopper.

5. The improved apparatus claimed in claim 1 including support means for said substrate and wherein said substrate is a textile fabric.

6. The improved apparatus claimed in claim 1, wherein said hollow roller is substantially stationarily disposed and axially rotatable, wherein the upper portion of said hopper means is composed of two rods extending parallel to the axis of said cylinder and said hopper means has two lower rods extending parallel to the axis of said cylinder, which rods are joined together by substantially rigid plates, and which lower rods are pivotally connected to two moveable rods which extend therefrom and terminate, at the end thereof opposite to the end pivotally connected to said lower rods, in said mouth.