

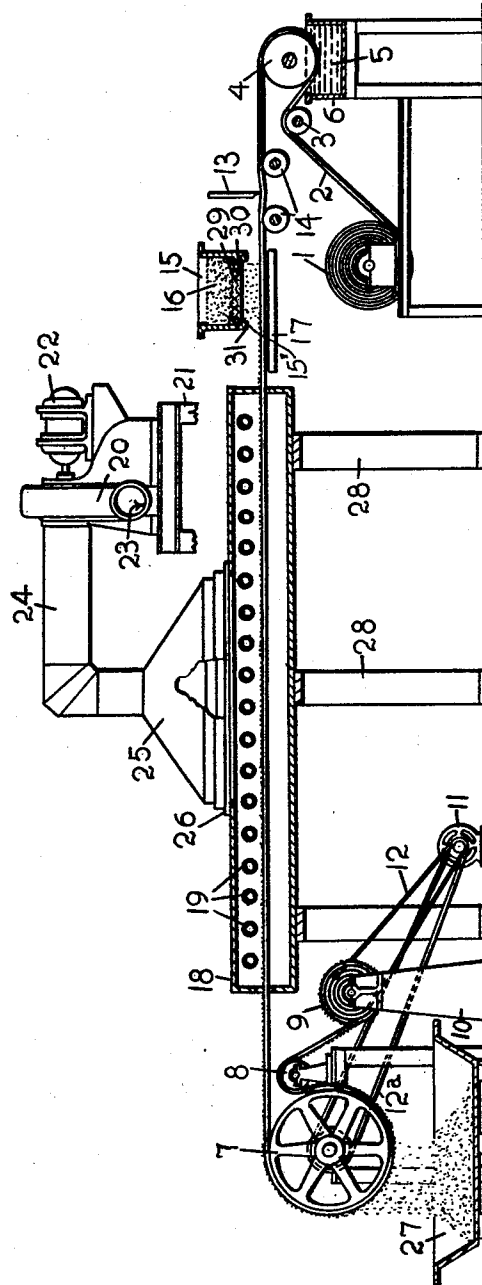
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MACHINE FOR CONTINUOUSLY APPLYING GLASS SPHERES OR PARTICLES TO FLAT SURFACES

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MACHINE FOR CONTINUOUSLY APPLYING
GLASS SPHERES OR PARTICLES TO FLAT
SURFACES

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3 Claims. (Cl. 91-18)

This invention relates to the application of glass beads, prisms, rods or finely ground glass to flat surfaces, and more particularly to an improved process for the application of particles of this character to a continuously moving strip of fabric or paper base covered with an improved adhesive.

This application is a division of our application Serial No. 494,392, filed November 8, 1930.

In the usual practice of applying glass beads to coated fabrics for ornamenting costumes, slipper material, and for moving picture screens, it has usually been the practice to apply the beads by scattering them over a surface which has been freshly japanned or varnished. After drying the excess beads are brushed or shaken off, and the beaded surface of the finished product results from the beads which remain anchored. This method usually requires a number of hours for completion because of the time required for the adhesive to dry and consequently the application of beading is intermittent rather than continuous with an accompanying variation in the uniformity of the finished product.

This invention has as an object an improved method for applying glass beads or similar particles to flat surfaces. Another object is to provide an improved process for the continuous application of glass beads or similar particles to a continuously moving strip of sheet material. Another object resides in an improved process for applying glass beads or similar particles to sheet material which will result in a product having improved optical properties. Another object is an improved process for applying glass beads or similar particles to base material covered with an improved adhesive which results in a better anchorage of the particles on the base material. Another object is an improved process for applying glass beads or similar particles to base material in the form of a pattern or design. A still further object resides in the mechanism utilized to carry out our improved process.

These objects are accomplished by the following preferred mode of procedure described in connection with the single figure in the drawing which is the side view of the mechanism suitable for carrying out the invention.

The numeral 1 designates the roll of material, such as paper or fabric, to which the glass beads or particles are to be applied. The base material 2 passes over a roller 3 which, together with the roller 4 around which the material passes, serves as a guiding means to direct the material into the adhesive 5 contained in the receptacle 6. After

the sheet material 2 passes over the roller 4, it moves in a substantially horizontal plane around a pull roll 7 and over a roller 8 to the windout roll 9, journaled in the support 10. The rolls 7 and 9 are driven by a motor 11 through a belt 12 as shown, and it is by this means that the sheet material 2 is unrolled from the roll 1 and drawn through the mechanism which results in the application of the glass beads or particles to the material. After the sheet material 2 has been dipped into the adhesive 5, by passing around the roller 4, the adhesive is spread and evenly distributed over the material by means of a scraping or doctor knife 13, supported by any suitable means (not shown). The doctor knife 13 bears against the material 2 between two rollers 14. The coated material then passes beneath the receptacle 15 containing the glass beads or particles 16 which fall onto the material 2, through screens, in a regulated manner hereinafter described.

A shelf or ledge 17 is placed under the material 2 at the place of the application of the particles in order to prevent the material from sagging. The material, with its coating of glass particles, then passes through a drying chamber 18, carried by supports 28 and heated by steam coil 19. The drying chamber is ventilated by means of a fan contained within the housing 20, which is supported by a base 21. The fan, driven by a motor 22, draws air from the openings at each end of the machine through which the material passes, through the funnel-like portion 25 to the conduit 24, and finally through the fan outlet 23. As the particle covered material passes around the pullwheel 7, the excess particles are deposited in the pan 27.

The receptacle for the particles 16 has a screen bottom 29, the mesh of which is just sufficient to allow the particles to pass through. The screen 29 slides on a second screen 30 of substantially the same mesh as the screen 29. The necessary relative motion between the screens 29 and 30 required to permit the passage of particles 16 through the two screens may be obtained in any desired manner.

In the present embodiment of the invention we have illustrated the screen 30 as the stationary screen having suitable supporting means (not shown). The receptacle 15 is provided with flanges 15' which straddle the frame pieces 31 of the screen 30 and permit the receptacle 15 to be reciprocated over the screen 30.

This screen combination above described may be referred to as a "sieve-valve". The deposi-

tion of the particles in the manner permitted by this valve contributes materially to the success of the process.

In the case of a number of substances, such as cotton flock or finely ground cork, a single screen is sufficient to support the material when stationary, yet when shaken will permit it to freely pass through. However, the density of glass is such that beads or finely ground particles will pass through a single screen even when stationary, unless the screen is of such fine mesh that the particles cannot be made to pass through even when vigorously shaken. By employing two screens of the proper mesh, however, this can be controlled since the interstices of the screens are blocked except when one of the screens moves over the other. This motion may either be reciprocating or rotary, and the necessary movement of one screen relative to the other may be effected manually, or the movable screen may be connected to the mechanism for driving the sheet material so as to regulate the quantity of the particles deposited with respect to the length of the material 2 which passes in a given time underneath receptacle 15. By this means it has been found that a uniform distribution of beads can be applied continuously to a moving base material. It will be understood, however, that either screen may be the movable one, thus the receptacle may be held stationary and the bottom screen 30 moved in its plane relative to the screen 29.

Several advantages flow from the method of applying the glass particles as above described. In this connection the application of adhesive by the combined use of the dipping roll 4 and the doctor knife 13 is especially advantageous. We have found that the application of the adhesive by the use of a knife alone results in scratches which are very undesirable and furthermore, the adhesive so applied does not give satisfactory anchorage.

The use of the dipping roll alone results in the desired anchorage, but due to a very slight unevenness of flow the frequent anchorage of more than one thickness of beads produces a very undesirable optical effect, which is especially disadvantageous when the product is used as a moving picture screen. By the combination of dipping roll and doctor knife herein disclosed, these disadvantages are overcome and a product having the desired optical properties with the beads firmly anchored is produced in a continuous operation.

The type of adhesive found to give best results in connection with the present process may be described as a cellulose nitrate composition containing a suitable solvent softener. The practical operating limits of this formulation and the preferred composition are as follows:

	Operating range	Preferred
	Per cent	Per cent
Cellulose nitrate.....	6-12	8
Ethyl acetate.....	40-70	64
Butyl acetate.....	10-30	20
Tricresyl phosphate.....	6-12	8

By a slight modification of the procedure already described the anchorage of beads in a definite pattern or design on only a portion of the base material may be accomplished. For this purpose the base material is embossed in the desired pattern and then passed under a "sharp" doctor knife. In this way the adhesive com-

position is applied only to the depressed portion of the design, with the result that the beads when applied are anchored only in this pattern. Similar results may also be obtained by spraying the adhesive composition through a stencil of the desired pattern. The practical operation limits and the preferred formula for a spraying composition suitable for this purpose are as follows:

	Operating range	Preferred
	Per cent	Per cent
Cellulose nitrate.....	6-12	8
Ethyl acetate.....	20-40	25
Ethyl alcohol.....	10-20	14
Butyl acetate.....	30-50	35
Butyl alcohol.....	10-20	10
Tricresyl phosphate.....	6-12	8

The objects of this invention may also be successfully accomplished by using other types of adhesives, as for instance cellulose nitrate lacquers employing other solvent softeners than tricresyl phosphate, such as dibutyl tartrate, acetyl laurins, dibutyl phthalate, butyl lactate, etc. The use of a cellulose nitrate lacquer is likewise not essential as dispersions of other cellulosic derivatives, such as cellulose acetate may also be employed.

By the process described glass beads and particles may be applied to a base material consisting of coated fabric of various weights and colors. Among these may be specifically mentioned base material having various decorative designs and printed patterns as well as material prepared from coating compositions containing metallic bronze and aluminum pigments.

The finished material resulting from this process is characterized by an anchorage of the glass beads, or particles, which by direct comparison, has been found superior to that of beaded material now on the market. In addition to this is the high degree of optical uniformity resulting from the even application of the adhesive and deposition of the beads. In addition to the realization of a product of improved quality, a further advantage, which results from our method of continuous operation, is the greatly increased rate of production, as compared with the methods commonly employed in the manufacture of beaded surfaces.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that we do not limit ourselves to the specific embodiments thereof except as defined in the appended claims.

We claim:

1. In a mechanism for making a fabric having a top coating of glass particles, means for moving an adhesive-coated fabric sheet in a substantially horizontal plane, and a receptacle comprising a pair of superposed horizontally positioned wire mesh screens arranged for relative sliding movement of the surfaces of one screen over the other, said receptacle being positioned to deposit the glass particles passing through the screens on to the adhesive surface of the fabric, the mesh of said screens being such as to prevent passage of the glass particles when the interstices of the screens are in overlapping position and to permit such passage when the interstices of the screens are caused to coincide by sliding the screens relatively to each other.

2. In a mechanism for applying glass particles to a continuously moving strip of sheet material, a power driven windout roll, a receptacle for con-

taining adhesive, guide means positioned to direct the sheet material from its source of supply into contact with the adhesive therein, means including relatively movable closely adjacent
5 screens arranged to deposit the glass particles onto the surface of the applied adhesive, a drying chamber into which the sheet material passes after deposition of the glass particles, and a pull roll over which the sheet material passes to cause
10 the excess particles to fall from the material before the material passes to the windout roll.

3. In a mechanism for applying glass particles to a continuously moving strip of sheet material, a power driven windout roll, a receptacle for con-
15 taining adhesive, guide means positioned to direct the sheet material from its source of supply into contact with the adhesive therein, a doctor knife bearing against said material to distribute the adhesive, means arranged to deposit the

glass particles onto the surface of the applied adhesive, a drying chamber into which the sheet material passes after deposition of the glass particles, said means for depositing the particles consisting of a pair of closely adjacent superposed
5 screens through which the particles are deposited onto the sheet material, the mesh of each of said screens being of such size as to permit passage of the particles onto the sheet material upon alignment of the mesh of the screens but prevent
10 their passage when the mesh of the screens are not aligned, one of said screens being movable in the plane thereof relative to the other screen to cause uniform deposition of the particles by
15 alternate alignment and non-alignment of the mesh of the screens.

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