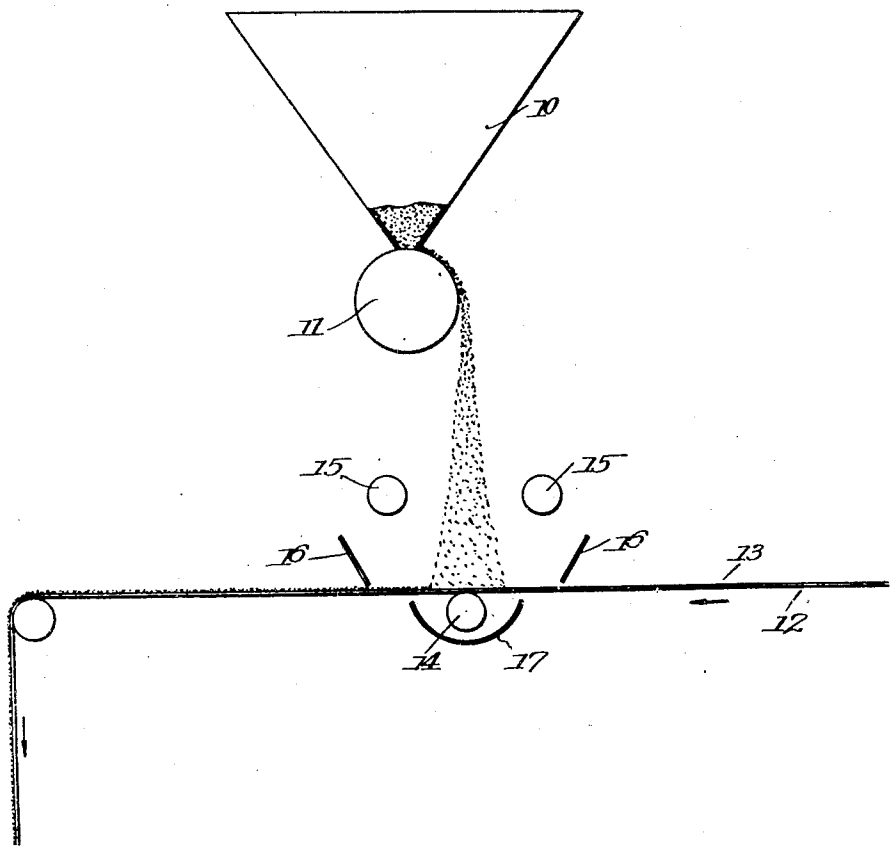
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MANUFACTURE OF ABRASIVE ARTICLES

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MANUFACTURE OF ABRASIVE ARTICLES

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5 Claims. (Cl. 91—18)

My invention relates to the manufacture of abrasive articles and particularly flexible abrasive material such as sand paper wherein the abrasive particles are applied to the adhesive surface of a backing or carrier.

The primary object of the invention is to produce a sand paper having optimum cutting efficiency, and wherein the particles are uniformly dispersed, oriented and stratified upon the surface of the backing.

It is a further object of the invention to control the positions of the particles upon the carrier by means of an electrical field which will embrace the sand column adjacent to and about its point of contact with the carrier.

In accordance with the present invention wherein the positions of the sand particles is very definitely controlled, I am enabled to obtain (*a*) a uniform dispersion to produce a level sand distribution having the maximum number of cutting points, (*b*) an orientation of the particles such that the longest axes and sharpest edges produce maximum cutting effect, and (*c*) a stratification or classification whereby the coarser fractions are positioned in the top plane where they produce maximum abrading effect.

The invention is applicable to the manufacture of both "closed coated" and "open coated" sand paper.

In the drawing, the single figure is a diagrammatic view of the invention.

In carrying out the invention, I employ a hopper 10, in which are disposed the abrasive particles. A feed roller or gate 11 is disposed at the mouth of the hopper, so that the particles may be fed in controlled amounts gravitationally.

The particles will comprise the usual mixture, namely of "under grade", "control grade" and "above grade", in which the "control grade" usually predominates.

A carrier or backing 12 of paper, cloth, or laminated structure of the two is arranged to be continuously moved in a position over suitable supporting rollers 18 to receive the sand particles fed from the hopper. This backing or carrier has its surface coated with a suitable adhesive as at 13 and travels in the direction indicated by the arrows. Disposed below the carrier 13 is an electrode 14, which will be suitably charged from a source of high potential. The electrode will preferably carry a negative charge and will comprise a bar, cylinder or other desired form of element, preferably of the length to extend across the transverse dimension of the web 12.

On the other side of the carrier, there is placed a pair of opposed grounded terminals 15.

At this point, it should be understood that the terminals 15 may be charged and the terminal 14 grounded. I may also use a pair of charged terminals 15 and a pair of grounded terminals 14 or vice versa.

In lieu of these expedients, I may also employ reversely charged terminals wherein the electrode or electrodes below the web will be charged negatively and the electrode or electrodes above the web are charged positively, from a suitable source of high potential, or vice versa.

Referring to the drawing, the terminals 15 are preferably disposed out of the normal gravitational path of the sand column and at a suitable distance, depending upon the voltage employed, from the electrode 14 as to produce a thoroughly satisfactory electrical field. The electrode or ground 14 is preferably placed in close proximity to the under surface of the backing as shown, but the spacing of the various terminals or electrodes with respect to each other and to the carrier may be varied in accordance with the product being made, the strength of the field and the nature of the particles.

In the embodiment shown, the intensity of the electrical field will be greatest at and about the point where the lines of force created between the terminals 15 and the electrode 14 converge, namely at and about the sand column where it contacts with the web.

By employing such a construction the particles are attracted to the backing by the electrode 14, at the same time acquiring a charge which causes them to be mutually repellent and hence shower or fan out.

By reason of the electrical field created in any of the several ways described, the control of the deposition of the particles upon the web is very efficiently cared for.

Thus the intensity of the field is greatest at and about the point of contact of the sand column with the web and I am enabled to obtain (*a*) a uniform dispersion to produce a level sand distribution having a maximum number of cutting points, (*b*) an orientation such that the particles are positioned with their longest axes and sharpest edges producing a maximum cutting effect, and (*c*) a stratification or classification whereby the coarser fractions are disposed in the top plane where they produce an optimum abrading result.

It will be understood that with the feed of the particles regulated from the hopper by means of

the gate 11 to accord with the character of sand paper it is desired to produce, that the particles will be propelled by gravity to a point adjacent the continuously moving backing above the electrode 14 and between the terminals 15, reaching the paper or web at the point of conversion of the lines of force created by the electrodes or terminals and which is the point of greatest electrical intensity. Thus a field is produced at and about the sand column which creates the repellent action of the particles and causes them to fan-out in a definite manner, depending upon the strength of the field which may be regulated to alter the effect.

I have illustrated in the drawing two shields 16 disposed adjacent the backing and which extend across the transverse area thereof. These shields in some cases are useful to confine the particles in the event there is an undue fanning-out or showering and are preferably made of insulated material or suitably insulated. I also place beneath the electrode 14 a shield 17 of insulated material and the respective shields cooperate in addition to confining the particles, to enhance the intensity of the electrical field produced through the medium of the several electrodes or terminals. These shields, of course, may be omitted but I find them very satisfactory for both functions recited.

While I have referred herein to sand as the abrasive medium, it will be understood that other abrasives of a particle nature are operable in accordance with this invention.

The electrodes, as stated, may be arranged in various ways and their spacing with respect to each other and to the backing, may be varied at will in accordance with the character of the coating desired, the strength of the field and the particular article which is being made.

It will be understood that the invention enables a very careful and accurate control to the end that a uniform dispersion, orientation and stratification are obtained and an article having optimum abrading efficiency is formed.

What I claim is:

1. In an apparatus of the class described comprising a feeding means for abrasive particles, means for supporting a carrier having an adhesive surface to be coated with said particles below said feeding means, and means for forming an electrical field comprising terminals on one side of the carrier between which the particles pass in their path to the carrier and a terminal of opposite polarity on the other side of the carrier disposed substantially intermediate the said first mentioned terminals, whereby to narrow and intensify the field at the point of disposition of the particles upon the carrier.

2. An apparatus of the class described comprising a gravity feeding means for abrasive particles, means for supporting a backing having an adhesive surface to be coated with said particles, an electrode disposed in close proximity beneath the backing when the latter is supported on said means, and a pair of spaced terminals disposed on the other side of the backing and creating with said electrode a substantially V-shaped electrical field embracing the abrasive column at and about its point of contact with the carrier.

3. An apparatus of the class described comprising a feeding means for abrasive particles, means for supporting and continuously moving a carrier having an adhesive surface to be coated with said particles, a terminal disposed in close proximity beneath said carrier when supported on said means, and a pair of spaced terminals disposed above said carrier between which the particles are adapted to pass in their path to the carrier, the respective terminals creating a substantially V-shaped electrical field having its greatest intensity at and about the point of contact of the abrasive column with the carrier.

4. An apparatus of the class described comprising a feeding means for abrasive particles, means for supporting and continuously moving a carrier having an adhesive surface to be coated with said particles, a terminal disposed in close proximity beneath said carrier when supported on said means, and a pair of spaced terminals disposed above said carrier between which the particles are adapted to pass in their path to the carrier, the respective terminals creating a substantially V-shaped electrical field having its greatest intensity at and about the point of contact of the abrasive column with the carrier, and shields of insulated material disposed adjacent the carrier and about the electrode beneath the carrier.

5. In an apparatus of the class described comprising a feeding means for abrasive particles, means for supporting a carrier having an adhesive surface to be coated with said particles, and means for forming an electrical field comprising terminals of opposite polarity on opposite sides of the carrier, said terminals cooperating to narrow and intensify the field and converge the same at the point of disposition of the particles upon the carrier.

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