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J. H. CARPENTER
ELECTROSTATIC SEPARATOR

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Fig. 1.

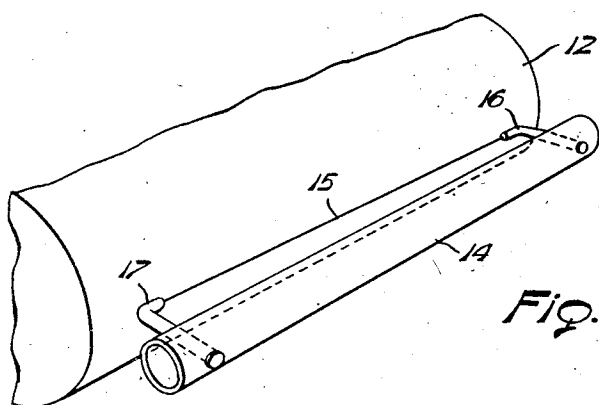
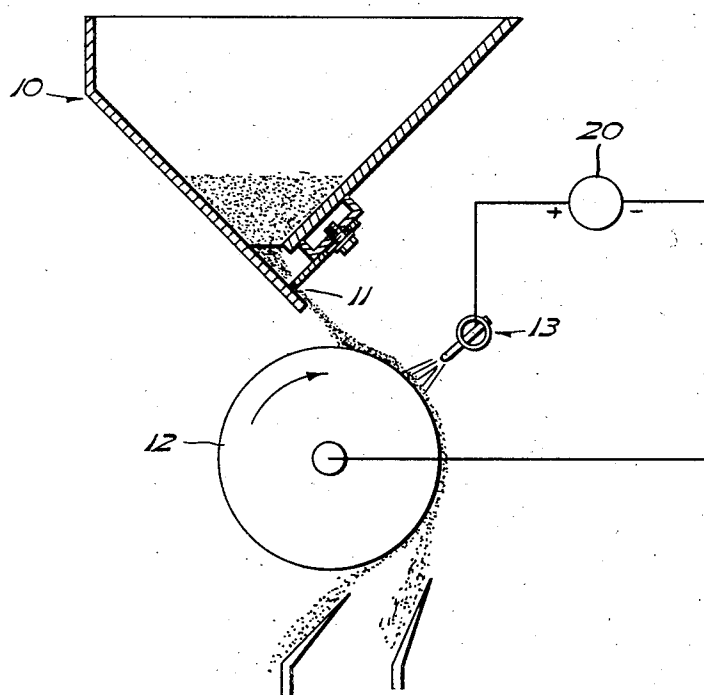


Fig. 2.

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ELECTROSTATIC SEPARATOR

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3 Claims. (Cl. 209—127)

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The present invention relates to the electrostatic separation of materials and more particularly to the provision of an improved discharging electrode for employment with conventional electrostatic separating machines.

Heretofore, advantage has been taken of the difference in dielectric capacity of materials to effect a separation of those materials. In general, the finely divided material to be separated was passed over a so-called separating electrode which was generally cylindrical and capable of rotation. The separating electrode was connected to one side of an electrostatic generator, while the other side of the generator was connected to a charging electrode adjacent to but spaced from the separating rotatable electrode or drum. The charging electrode consisted in general of a series of points or a comb from which points a silent discharge could more readily be effected between the discharging and separating electrodes.

It is an object of the present invention to provide a more efficient discharging electrode for electrostatic separating devices. It is also an object of the invention to provide an electrostatic separating device which is more efficient in separating materials of different dielectric capacities than devices provided heretofore.

It is also an object of the invention, therefore, to increase the capacity of existing electrostatic separating devices by providing more efficient discharging electrodes therefor.

In the drawing, Fig. 1 is a diagrammatic showing in section of an electrostatic separating device of the present invention, while Fig. 2 is a greatly enlarged showing of the improved discharge electrode.

In accordance with the procedure of the present invention, the material to be electrostatically separated is placed in the feed hopper 10 and discharged therefrom through a suitable feed orifice or slot 11 on to the surface of the separating drum or electrode 12. This electrode is generally of conducting material such as metal and is rotated at any desired speed by suitable rotating means not shown. Separating electrode 12 is connected electrically by any conventional means to one side of an electrostatic generator 20.

The improved discharging electrode 13 of the present invention is spaced from separating electrode 12 and is electrically connected to the other side of the electrostatic generator 20.

The discharging electrode 13 comprises an electrically conducting element 14 of a diameter

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very greatly in excess of the diameter of an electrically conducting wire 15 which is spaced therefrom and which is directed toward separating electrode 12. The element 14 as shown in the drawing consists of a metallic tubular member as, for instance, a metal pipe of about $\frac{1}{2}$ inch in diameter although the diameter may vary considerably above or below this figure; the main point being that it should greatly exceed the diameter of wire 15.

Companion connecting arms 16 and 17 are attached mechanically and electrically adjacent the ends of tubular member 14 and conducting wire 15 is stretched therebetween in conducting relationship. The arms 16 and 17 are of conducting material and have conducting contact with the ends of wire 15 and with tubular member 14. As shown in the drawing the filamentary wire 15 is held taut between the inwardly bent tips of the arms 16, 17 in spaced relationship to the surface of the base support 14 and substantially parallel to the rotatable electrode 12.

When the improved discharge electrode 13 is directed toward separating electrode 12 as shown in Fig. 1, greatly improved separating action is obtained, separations being 50 to 75% more effective on a given material than when the conventional wires or combs of prior separating devices are employed. That is to say, a given degree of separation can be obtained with fewer passes over the rolls than required heretofore. Or corollary thereto, a given machine when employing the improved discharging electrode of the present invention can handle a considerably greater quantity of material in a given time than was possible heretofore.

It will be understood that the essence of the invention is the provision of a tube or rod, the diameter of which is greatly in excess of the diameter of the discharging electrode wire with which it is associated. The actual diameter of these elements have little direct effect upon the separating process. Thus, at the ratio of 20 to 1, the efficiency begins to fall off and one would not get all the benefit of the invention when operating with ratio greatly below this. Excellent operating results are obtained with a wire 0.010 inch and a tube of 0.700 inch: in general, the higher the ratio the better.

What is claimed is:

1. An electrostatic separator comprising the combination of a rotatable electrode, and a co-operating spaced electrode, the latter including an elongated electrically conducting support member, electrically conducting arms extending

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outwardly from said support member toward said rotatable electrode, said arms being spaced apart from one another, and a conducting wire mounted upon said arms, said wire being spaced in discharge-supporting relation to said support member, the diameter of said support member being at least about twenty times greater than the diameter of said wire.

2. An electrostatic separator electrode consisting of conducting material and comprising the combination of a rotatable electrode and a co-operating stationary electrode, the latter consisting of an elongated substantially cylindrical base which is oriented substantially parallel to said rotatable electrode, arms mounted in said base in spaced relation and extending outwardly therefrom and a conducting filamentary wire mounted upon the tips of said arms and being held in taut position substantially parallel to the surface of said rotatable electrode, said base having a diameter of about 20 to 70 times greater than the diameter of said wire.

3. An electrostatic separator comprising the combination of a rotatable electrode, and a co-

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operating electrode consisting of an elongated metal support member, electrically conducting arms extending outwardly therefrom and being spaced apart from one another and a conducting wire, having a diameter of about .01 inch, held in taut relation by said arms in a position toward said rotatable electrode and in substantially parallel spaced relation to the surface of said support, said support being about 20 to 70 times greater in diameter than said wire, said wire being positioned normally between said support and said rotatable electrode.

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