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Aug. 27, 1929. W. S. BUTTLES 1,726,340

METHOD OF AND APPARATUS FOR COATING FINELY DIVIDED PARTICLES

Filed Jan. 22, 1925

Fig. 1.

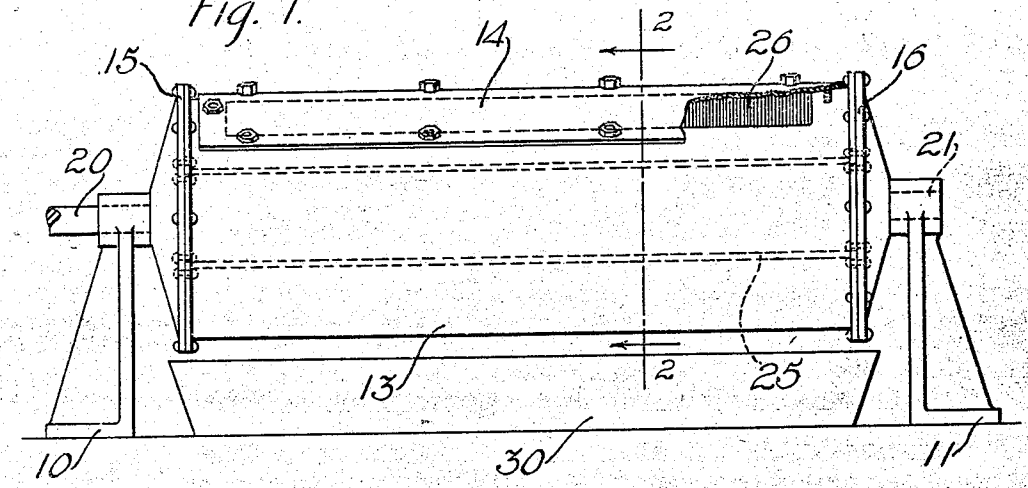


Fig. 2.

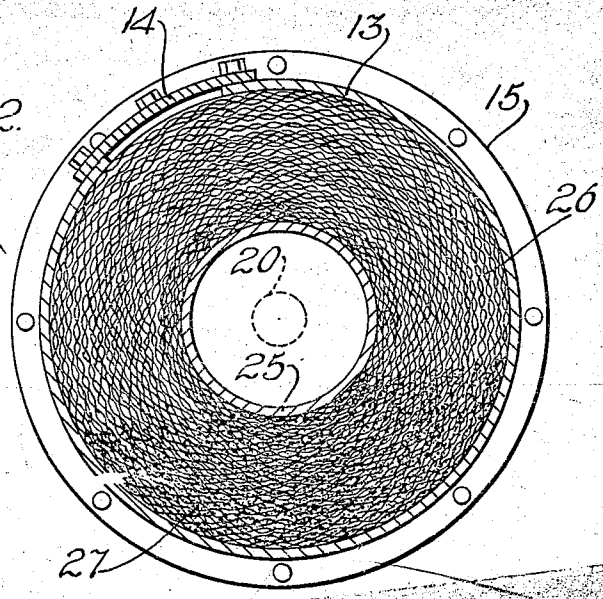
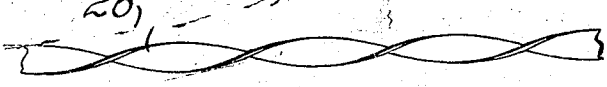


Fig. 3.



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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR COATING FINELY-DIVIDED PARTICLES.

Application filed January 22, 1925. Serial No. 3,915.

This invention relates to methods of and apparatus for coating finely divided particles, and has for its primary object, the provision of improved methods of and apparatus for this purpose, which are simple, inexpensive and effective in operation.

In the embodiment illustrated herein, the apparatus is especially designed for coating magnetic particles with zinc for use in the manufacture of magnetic cores used in loading coils in accordance with Patent No. 1,292,206, issued January 21, 1919 to John C. Woodruff.

According to the main features of the present invention a relative movement is caused between finely divided particles, such as particles of magnetic material, and relatively fixed surfaces of a coating material, such as zinc, the particles becoming coated with zinc removed by abrasion from the fixed surfaces thereof.

The invention will be more fully understood from the following description and the accompanying drawings showing an apparatus embodying the invention and by which the method may be practiced, and in which

Fig. 1 is a front elevation of a drum, partly cut away to show the wound ribbon contained therein;

Fig. 2 is a section along the line 2—2 of Fig. 1 showing the ribbon and the finely divided particles between the convolutions thereof, and

Fig. 3 is an enlarged elevation of a portion of the twisted ribbon used in forming the winding.

It is believed that the method will be clearly understood from a description of the apparatus by which it may be practiced. Although specific reference will be made to zinc as the coating material, it is apparent that other materials, such as aluminum or lead mentioned in the above identified Woodruff patent, may be used as well.

Referring now to the drawings in which like numerals are employed to designate similar parts throughout the several views, brackets 10 and 11 support the ends of a drum, which drum consists of a cylindrical member or casing 13, a removable cover 14, end plates 15 and 16, and integral with the end plates, trunnions 20 and 21, respectively, the trunnion 20 being extended to form a shaft leading to a source of power (not shown) by means of which the drum may be rotated. Within the drum a tube 25, secured by suitable bolts to the end plates 15 and 16, supports a zinc tape or ribbon 26, preliminarily twisted and then wound therearound in a plurality of layers. The spiralled zinc ribbon as shown in the drawing substantially fills the cylinder 13 but provides space for particles 27 of finely divided material between the successive convolutions thereof.

When it is desired to coat the finely divided particles the cover 14 is removed from the drum, the particles deposited therein and the shaft 20 and the drum carried thereby is caused to rotate. As the drum rotates, the particles 27 are tumbled within the drum and caused to fall in serpentine or tortuous paths in contact with the surfaces of the twisted ribbon of zinc 26. The engagement between the particles and the zinc surfaces removes a portion of the zinc from the ribbon by abrasion and coats the particles thoroughly with the removed zinc. The zinc ribbons are preferably in a soft or annealed condition when placed within the drum, but hard or semi-annealed zinc may also be employed, depending upon the characteristics desired. When the drum has been rotated for a sufficient length of time to cause a thorough coating of the particles it is stopped, the door 14 removed and the drum turned so that the opening covered by the door is over a receptacle 30 to receive the coated particles.

The method as brought out in the description of the apparatus consists in removing portions of zinc from surfaces thereof by abrasion caused by the relative movement of finely divided magnetic material and relatively large surfaces of metallic zinc, the zinc surfaces being held in relatively fixed positions or moved in a predetermined manner. However, it is apparent that the method may be practiced by the use of other than the particular apparatus described herein. One advantage of the method and apparatus forming the present invention is that a relatively large surface of zinc is exposed to the action of the particles, and in addition thereto a large relative movement takes place between the two materials. Furthermore, since the surfaces of the coating material are fixed relatively to the drum, there is no necessity

of sifting the particles after they have been coated and the possibility of fine particles of metallic zinc remaining with the finely divided magnetic material is minimized.

What is claimed is:

1. A method of coating a finely divided particle of a hard material with a softer material, which consists in causing the particle to traverse a serpentine path in engagement with surfaces of the coating material.

2. A method of coating finely divided particles of a magnetic material with a non-magnetic material, which consists in depositing portions of the coating material upon the particles by causing engagement over a serpentine path between the materials during a relative movement between the particles and surfaces of the coating material.

3. In an apparatus for coating finely divided particles with material, a movable container, and means for securing strips of coating material thereto to present relatively fixed surfaces to the particles during the movement of the container.

4. In an apparatus for coating finely divided particles with material, a rotatable drum for tumbling the particles, and means for securing a ribbon of the coating material therein to rotate therewith, said ribbon presenting a plurality of surfaces for contacting with the particles during the tumbling operation.

5. In an apparatus for coating finely divided particles with material, a rotatable drum for tumbling the particles, and means for securing a twisted ribbon of the coating material therein to rotate therewith, said ribbon being wound in a plurality of layers of helical convolutions to guide the particles in serpentine paths in contact with surfaces of the ribbon during the tumbling operation.

6. A method of coating finely divided particles of a material with a softer material, which consists in arranging a strip of the softer material in a spiral form, and causing the finely divided particles to impinge upon the spiral strip and to traverse a serpentine path in frictional contact therewith.

7. A method of coating finely divided particles of a material with a softer material, which consists in preliminarily twisting an elongated strip of the softer material, arranging the twisted strip in the form of a plurality of concentric helices, and causing the particles to impinge upon the several convolutions of the strip and to traverse a tortuous path in fractional contact therewith.

In witness whereof, I hereunto subscribe my name this 7th day of January, A D. 1925.

WILLIAM STEVENS BUTTLES.