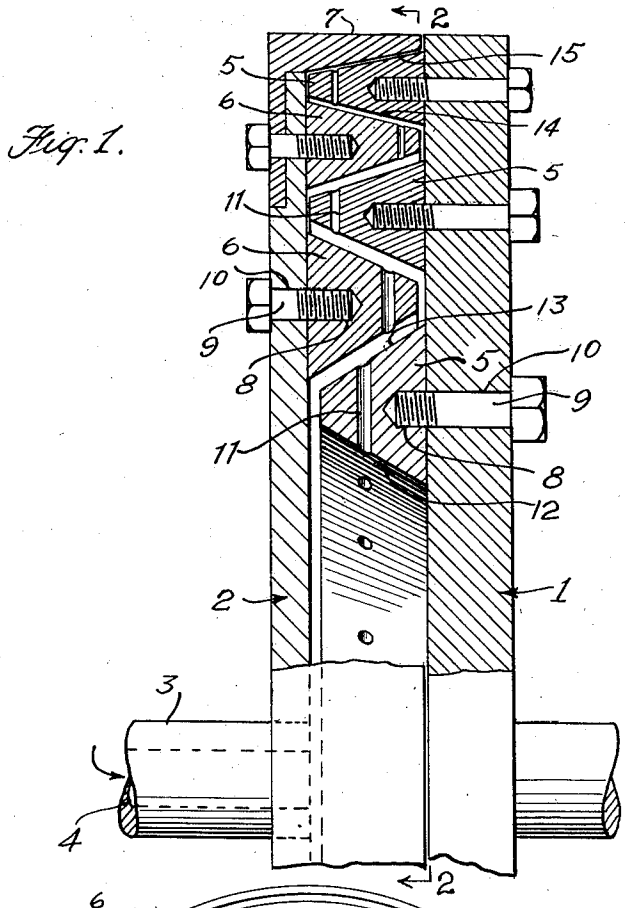
April 21, 1931. B. CUNNIFF ET AL 1,801,849

ROTOR FOR DISINTEGRATING MACHINES

Filed Oct. 29, 1927

Fig. 1.



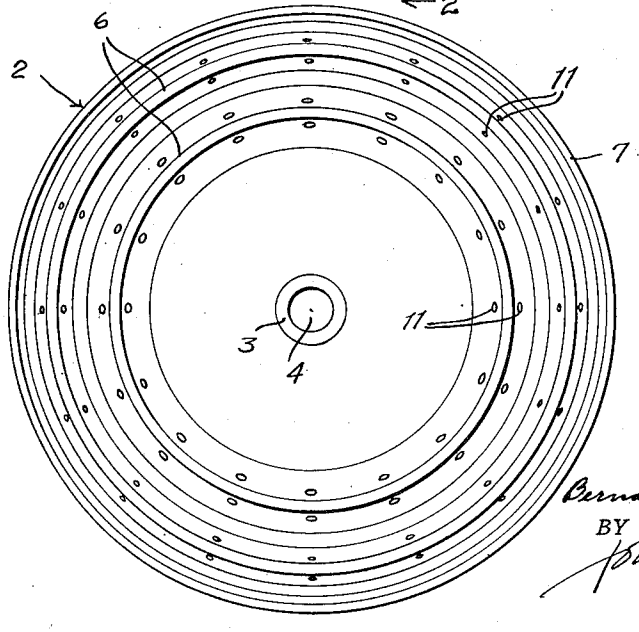


Fig. 2.

INVENTORS
Bernard Cunniff and
Nixon Lee
BY
John W. Thompson
their ATTORNEY

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UNITED STATES PATENT OFFICE

BERNARD CUNNIFF, OF NEW YORK, AND NIXON LEE, OF FOREST HILLS, NEW YORK, ASSIGNORS TO COLLOIDAL EQUIPMENT CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

ROTOR FOR DISINTEGRATING MACHINES

Application filed October 29, 1927. Serial No. 229,701.

The present invention relates to an improvement in rotors for disintegrating machines of a type commonly known as colloidal mills. As used herein, the term "rotor" is intended to include either of the inter-engaging or co-operating disintegrating members of a so-called colloidal mill whether both rotate or one remains stationary while the other rotates.

Experience with colloidal mills has indicated that the process of disintegration of a solid treated therein is largely a function of pressure, duration of treatment, and speed and clearance of the rotors. In general, for a given rotor speed, a solid will be reduced to finer particles or more thoroughly dispersed in a medium where the time of effective passage through the mill is extended or passage of the material retarded. In one type of mill this retardation has been effected in part by reducing the area of the outlet from the space between the rotors without considering the intermediate rotor clearance. In operation, the factors of rotor speed and clearance are such that an unduly large proportion of the disintegration is effected only after the material arrives at or adjacent to the constricted outlet. It is an object of the present invention to provide a rotor construction in which disintegration will take place progressively with the advance of the solid through the machine so that, during the final stage of treatment, the intensified disintegrating forces there exerted will operate on particles already greatly reduced in size.

A further object has been to simplify and reduce the cost of colloidal mill equipment and its operation by providing rotors with interchangeable disintegrating parts having different characteristics to accommodate a wide variety of solids. For example, some solids are more abrasive than others and therefore require disintegrating surfaces of relatively more resistant metal. Also, in some cases an undesirable chemical re-action takes place unless disintegration is effected by rotors of relatively inert metal or material.

One form of rotor embodying our invention is illustrated in the drawings accompanying the present specification and in which

Figure 1 is a fragmentary view partly in radial section, and

Figure 2, a view on the line 2—2 of Figure 1.

Referring to the drawings, a rotor having a base 1 is mounted to co-operate with a rotor having a base 2 mounted on a shaft 3 which is provided with a feed passageway 4. It is contemplated that both of said rotors may be made to rotate by any suitable means or one rotor may be stationary while the other is rotated relatively thereto and that material may be fed to the chamber between said rotors through said conduit 4 or by other suitable means. Base 1 is provided with a plurality of detachable rings 5 and base 2 with a flange 7 and with a plurality of detachable rings 6 positioned opposite the spaces between said rings 5. Each of the rings 5 and 6 is provided with suitable means for removable attachment to its respective base, each having for this purpose threaded recesses as 8 adapted to receive bolts 9 which pass through holes 10 in the bases. Some or all of the rings may be provided with radially disposed passageways 11 which afford additional surfaces for effectively changing the direction of movement of material being treated and increasing the amount of shearing action of the machine on the solid.

It will be noted that the lateral surfaces 12 and 13 of the innermost ring 5 are disposed at a greater angle to the normal face of base 1 than the surfaces 14 and 15 respectively, of the outermost ring 5 mounted on said base. It is contemplated that this relation shall vary progressively from the innermost ring to the outermost ring, whatever the number of rings employed. Similar gradation of the angular relation of the lateral surfaces of the rings 6 is provided for. As shown in the drawings, the space between the innermost rings 5 and 6 is greater than the space between the outermost rings 5 and 6 or between the flange 7 and the outermost ring 5, said spaces being proportioned to provide an outlet passage of substantially uniform effective discharge area or capacity between the rotors. In other

words, as the effective length of the discharge opening increases toward the periphery, the width thereof is diminished in a compensating degree.

In operation, it is contemplated that material to be treated will be introduced between the bases 1 and 2 and moved outwardly through the disintegrating zone, which is coextensive with the channel provided between the several rings, by centrifugal force, applied pressure, or both. In a construction such as that illustrated in the drawings, the particles of the material being treated will encounter increasingly more abrupt changes of direction as they move outwardly toward the discharge opening between flange 7 and the outer edge of the base 1. Also, the width of the channel or space between the rotors progressively diminishes, thus subjecting the particles to constantly increasing rate of displacement in a progressively diminishing space.

It is contemplated that in treating some kinds of materials such as those which are of an abrasive character, the rings will become worn, thus necessitating replacement. By removing the screws of the bolts 9 holding any given ring, such ring can be removed and a similar or different one inserted in its place.

In one embodiment of our invention, as illustrated in Figure 1 for example, the lateral surfaces 12 and 13 of innermost ring 5 are disposed at approximately an angle of 31 degrees to the normal face of base 1. The lateral inner surface 14 of the outermost ring 5 is disposed at an angle of 13 degrees thereto while the outer surface thereof has a pitch of 11 degrees. The inner lateral surface of the intermediate ring 5 has a pitch of 23 degrees and the outer surface a pitch of 17 degrees. On base 2 the inner face of flange 7 has a pitch of 11 degrees to conform to the pitch of the outer lateral face 15 of the outermost ring 5. Similarly, the outer lateral surface of each ring has approximately the same pitch as the inner lateral surface of the next adjacent ring on the opposite base.

While the specific construction hereinabove described has been found to produce satisfactory results in the reduction of some solids, it is contemplated that different pitches or gradations of pitches and different interrotor spacing and gradations thereof may be effectively employed. Accordingly, the rotor rings are made removable and replaceable by other rings having various pitch and spacing characteristics.

We claim as our invention:

1. A rotor for a disintegrator comprising a base and a plurality of annular projections each having lateral faces and passageways passing through said projections and intersecting said lateral faces, said passageways being of progressively diminishing cross sectional area from the innermost projection toward the outermost projection.

2. A rotor for a disintegrator comprising a base and a plurality of annular projections each having lateral faces and passageways passing through said projections and intersecting said lateral faces, said passageways being arranged in the respective projections at progressively increasing distances from said base, the passageways in the innermost projection being positioned nearest said base.

3. A disintegrator comprising a pair of rotors each having an annular projection provided with passageways extending therethrough, the position of the passageways of one rotor being offset with respect to the position of the passageways of the other rotor.

In testimony whereof, we have signed our names to this specification this 27th day of October, 1927.

BARNARD CUNNIFF.
NIXON LEE.