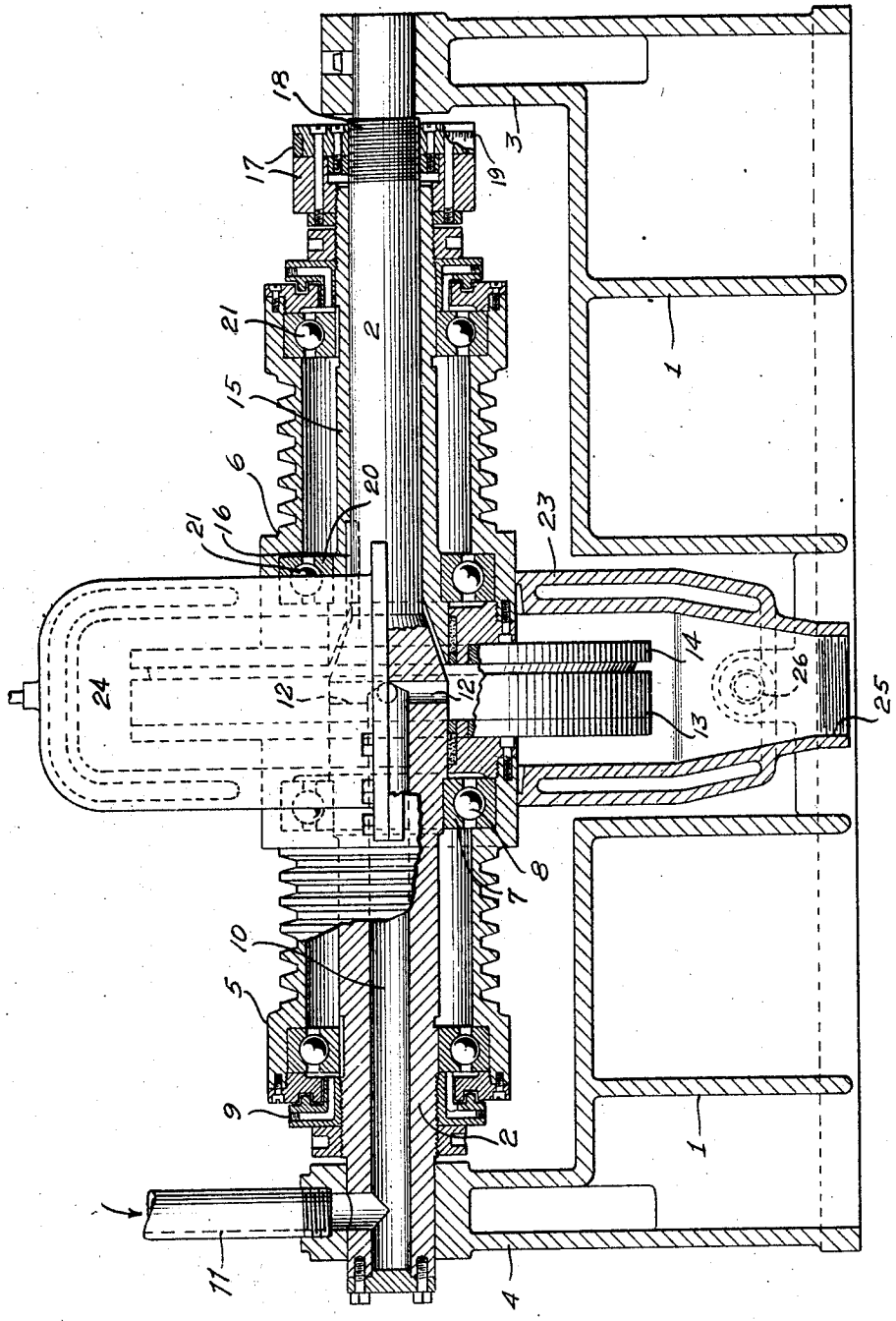
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B. CUNNIFF ET AL

DISINTEGRATING MACHINE

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BY

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DISINTEGRATING MACHINE.

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The present invention relates to an improvement in disintegrating machines more particularly of the type known as colloid mills and intended to be used for the very fine grinding of solids. One object thereof has been to provide a machine which will in a measure avoid the defects and insufficiencies of known devices intended for a similar purpose. Various homogenizers, disintegrators, deflocculators and the like have been devised for purposes suggested by their several names and, so far as they have been utilized in the production of emulsions, a fair degree of successful operation has been secured. However, where the ultra fine grinding of solids has been attempted, many difficulties have been encountered and devices ordinarily effective in the production of emulsions have not been commercially successful in the reduction of solids. One reason has been that such machines have had inadequate means for effectively adjusting and maintaining accurate alignment of and suitable clearance between their active disintegrated members commonly called rotors. In these devices disintegration is commonly effected by passing a solid between two rotors or between a rotor and a stator. In any case, it is desirable to provide means for adjusting the clearance between the disintegrating members inasmuch uniformity of the product and the degree of fineness to which a given solid is reduced depends in large measure on the rotor speed and maintaining a predetermined clearance between the rotors.

This invention is particularly applicable to disintegrating machines or colloid mills in which the rotors are intended to operate at very high speeds such for example as 3000 R. P. M. or more. Heretofore some difficulty has been experienced in maintaining alignment and effective lubrication at high rotor speeds and over commercially practicable operating periods. Accordingly, it has been a further object of our invention to improve the construction of disintegrating machines in such a way as to provide for adequate and effective lubrication of the moving parts and to maintain alignment by mounting rotors and other rapidly moving parts on a single rigid shaft, thus avoiding axial displacement between said rotors during operation of the machine.

One embodiment of our invention is illustrated in the drawing accompanying the present specification, the single figure of which is a view partly in front elevation and partly in longitudinal vertical section. As indicated therein, a base 1 supports a fixed shaft 2, the ends of which are mounted in spaced brackets 3 and 4 forming part of the base 1. Hubs 5 and 6 are mounted on the shaft 2, the former being spaced therefrom by means of ball races 7 and friction bearings 8 to form an annular chamber between the interior surface of said hub and a portion of the outer surface of the shaft 2. Oil or other suitable lubricant is supplied to said annular chamber through a duct 9. A feed channel 10 extends longitudinally through a portion of the shaft 2 and is provided at its outer end with an inlet opening 11. The inner end of said channel opens into radially arranged passageways 12 which in turn communicate with the space between a pair of opposed rotors 13 and 14 secured respectively to the opposed or inner ends of said hubs 5 and 6.

Suitable means are provided for permitting effective adjustment of the clearance between said rotors 13 and 14, including a bushing 15 slidable longitudinally on a portion of shaft 2, said bushing being prevented from rotating with the hub by means of a key or spline 16, and being threaded to engage a nut 17, another portion of which is threaded to co-operate with a threaded end portion 18 of the shaft 2. Thus, by rotating the nut 17 on shaft 2, the bushing 15 is moved longitudinally in the desired direction. The nut 17 is provided with a series of markings 19 calibrated to indicate the extent of endwise movement of the bushing 15 in any desired standard of linear measurement, as millimeters or thousandths of an inch.

The hub 6 is mounted upon and moves longitudinally with the bushing 15 and is spaced therefrom by means of ball races 20 and anti-friction bearings 21, thus forming an annular chamber between the inner wall of said hub and a portion of the outer wall of said bushing 15. A duct 22 is provided for the purpose of admitting oil or other lubricant to said chamber.

The rotors 13 and 14 and the opposed inner end portions of the hubs 5 and 6 are enclosed in a suitable casing or housing. As indicated in the drawing, such a housing is shown

as preferably in two parts, a lower part 23 and a removable upper part 24, said parts having co-operating flanges provided with bolt holes and being held together by bolts or other suitable means. The lower portion of the casing 23 is provided with a discharge opening 25. It is contemplated that both upper and lower portions of the casing will contain hollow chambers to accommodate either heating or cooling mediums such as steam, cold water and the like, said mediums being admitted therein through a suitable inlet opening as 26 and discharged through an outlet not shown.

From the foregoing description and the drawing therein referred to it will be apparent that our improved disintegrating machine presents a novel combination of rugged strength and sensitiveness to precise adjustment. It is capable of operating continuously at high speeds over periods of time corresponding generally to a working day or such other time as the character of the grinding operation or of the material being treated requires. The rotors and their hubs are conveniently adjusted to provide any predetermined spacing between the rotors and, when once set the adjustment and clearance remain unchanged during operation at high speed. The spacing of the hubs from the shaft forms a chamber in which an ample supply of lubricant is readily available to the bearings.

To repair, clean or inspect interior portions of our machine, it is only necessary to remove the upper half of the casing, release the ends of the shaft and lift the shaft and rotors from their operative positions. The rotors are then readily removed from the shaft if it is desirable to replace them or any of their parts.

We claim as our invention:

1. A disintegrating machine comprising a base, a fixed shaft mounted therein, a pair of hubs rotatably mounted in spaced relation on said shaft, rotors mounted at the opposed ends of said hubs, and driving means for effecting relative rotation between said rotors.

2. A disintegrating machine comprising a base, a fixed shaft mounted therein, a pair of hubs rotatably mounted in spaced relation on said shaft, anti-friction spacing means interposed between said hubs and the shaft to form an annular lubricant holding chamber, rotors mounted at the opposed ends of said hubs, and driving means for effecting relative rotation between said rotors.

3. A disintegrating machine comprising a base, a fixed shaft mounted therein, a pair of hubs rotatably mounted in spaced relation on said shaft, rotors mounted at the opposed ends of said hubs, and driving means for effecting relative rotation between said rotors, said shaft having a longitudinal feed channel provided with an inlet opening beyond the outer end of a hub and a discharge opening between the opposed ends of said hubs.

4. A disintegrating machine comprising a base, a fixed shaft mounted therein, a casing, a pair of hubs rotatably mounted in spaced relation on said shaft and with their opposed ends inside said casing, rotors mounted at the opposed ends of said hubs, and driving means for effecting relative rotation between said rotors.

5. A disintegrating machine comprising a base, a fixed shaft mounted therein, a pair of hubs, a bushing mounted for longitudinal sliding movement between a portion of said shaft and one of said hubs, said hub being rotatably mounted on said bushing and movable longitudinally therewith and the other hub being spaced therefrom and rotatably mounted on said shaft, rotors mounted at the opposed ends of said hubs, and driving means for effecting relative rotation between said rotors.

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

BERNARD CUNNIFF.
NIXON LEE.