

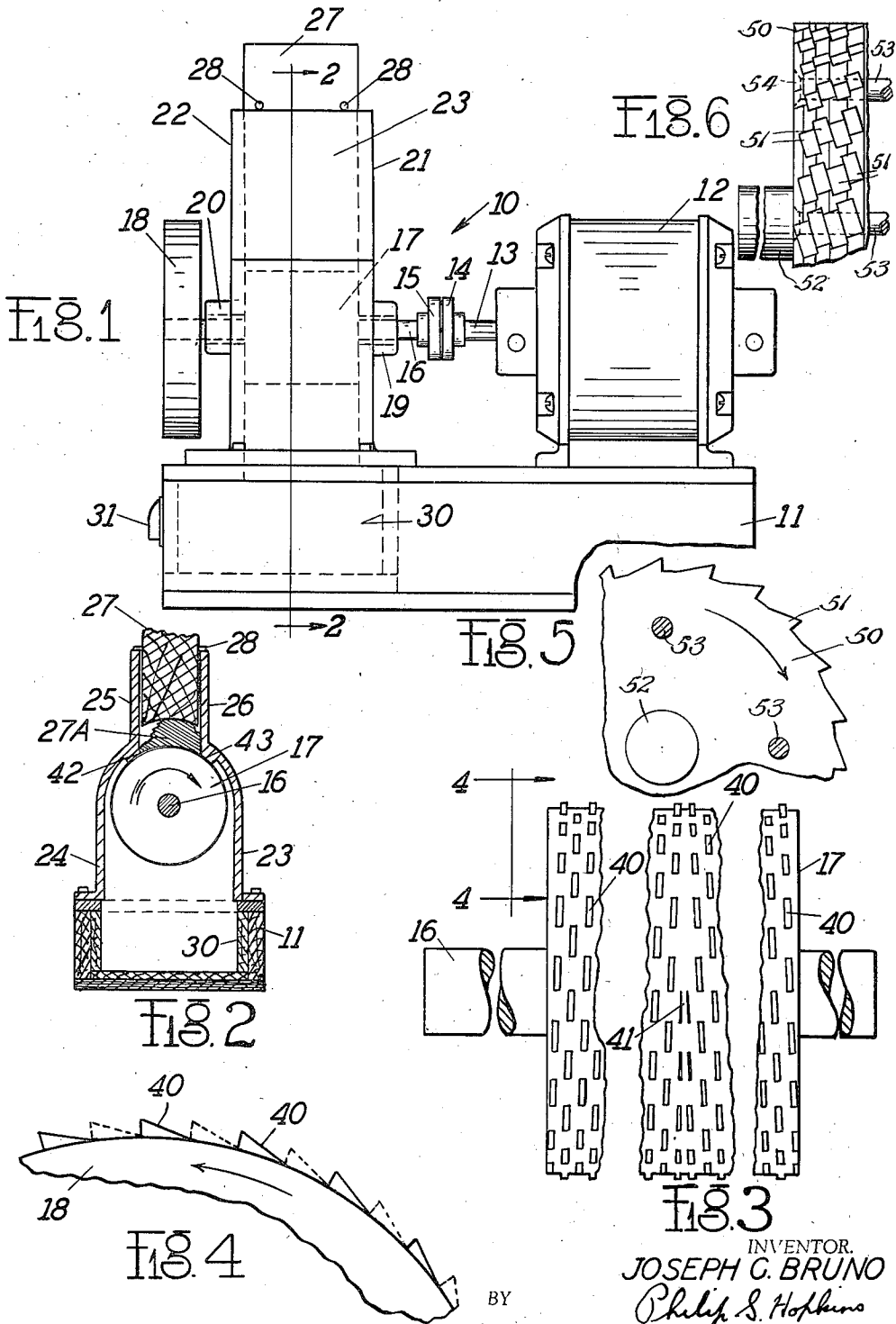
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GRATING ROTOR

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GRATING ROTOR

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This invention relates to abrasive machines adapted for pulverizing or powdering solids and more particularly to a rotor for such machines.

A primary object of this invention is the provision of a rotor provided with teeth, the teeth themselves being so arranged as constantly to guide the abraded material toward the center of the rotor and away from its edges, consequently providing an abrading surface resulting in the production of an improved grated product.

A still further object is the provision of a rotor adapted to accomplish the guiding of the pulverized material toward the center thereof requiring a comparative minimum of machine operations in its construction.

An additional object is the provision of such a device wherein the guide means for the pulverized material are contained in the alignment of the teeth themselves thus avoiding the necessity of any other shaping of the rotor or stationary mechanism of the device, beyond the proper positioning of the teeth.

An additional object of this invention is the provision of a rotor having teeth so positioned with respect to said rotor and to the solid which the rotation of the rotor is adapted to pulverize as to impact said solid at an angle of varying degree in order to provide a shearing or slicing action in conjunction with the abrading process as well as a direct impact against the surface to be abraded.

In the embodiment of the invention hereinafter described and shown in the accompanying drawing the rotor is described in connection with a grater utilized for the purpose of powdering or pulverizing hard cheese as it is particularly adapted for this purpose. It will be understood, however, that it may be equally well adapted to any analogous purpose requiring the pulverization of a solid and may vary in size and/or configuration depending upon the use to which it is put.

Additional objects reside in the provision of means whereby any tooth or series of teeth, as for example, a row in axial alignment with the rotor body may be readily replaced with a minimum of time and effort.

The invention accordingly consists in the combinations of elements, arrangements of parts and features of construction all as will be more fully pointed out hereinafter and disclosed in the accompanying drawing wherein:

Figure 1 discloses one form of mechanism incorporating the rotor of this invention,

Figure 2 is a sectional view taken substantially along the line 2—2 of Figure 1,

Figure 3 is an enlarged side elevational view of the rotor of the instant invention, certain parts thereof being broken away,

Figure 4 is an enlarged sectional view taken along the line 4—4 of Figure 3 as viewed from the left,

Figure 5 is a fragmentary end elevational view of a modified form of rotor embodying this inventive concept,

Figure 6 is a fragmentary plan view of the form of rotor shown in Figure 5.

Similar reference characters refer to similar parts throughout the several views of the drawing.

Having reference now to Figure 1 there is disclosed one illustrative mechanism embodying this invention taking the form of a grater for hard cheese, generally indicated at 10. Grater 10 is comprised of a base 11 on which is mounted a motor 12 of any suitable type provided with a drive shaft 13 and disk 14. Disk 14 is positioned for interengagement with a disk 15 mounted on a shaft 16 which carries a cylindrical rotor, to be more fully described hereinafter. Shaft 16 projects completely through rotor 17 and has mounted on its opposite end a counterbalance 18. Shaft 16 is journaled in bearings 19 and 20 which may comprise portions of the side walls 21 and 22 of a housing provided also with end walls 23 and 24 (see Figure 2). The housing is provided with upwardly extending portions 25 and 26, defining an aperture in which is positioned a hard cheese 27A or similar article which it is desired to pulverize. Cheese 27A is held in position as by follower 27 of wood or other desired material adjacent rotor 17, follower 27 being supported in the aperture as by means of pins 28, passed therethrough at desired positions. The housing comprised of the side and end walls is secured to base 11 and is open at its lower end, as best shown in Figure 2, to permit the pulverized material to drop into a drawer or receptacle 30 which may be withdrawn when filled as by means of handle 31 and the contents thereof stored in any desired manner. Suitable switch and clutch means (not shown) are provided to energize motor 12 and similarly to cause the engagement and disengagement of disks 14 and 15 as desired.

From the foregoing it should now be understood that the operation of the device is as follows: A cheese 27A or other material to be powdered is inserted into the aperture in the

upper section of the housing and follower 27 placed thereon and motor 12 started. Actuation of the clutch then causes rotor 17 to revolve at any suitable predetermined speed, speedily pulverizing the material adjacent thereto. If desired it will be understood that mechanical means, of any desired type, may be utilized to impart the requisite pressure to follower 27. The powdered cheese then falls into drawer 30 until such time as the rotor is stopped whereupon the drawer may be readily removed and the powdered material utilized for any desired purpose.

Having reference now particularly to Figure 3 it will be seen that rotor 17 is provided with a plurality of teeth 40. The teeth are cut in such manner that their cutting faces are toward the direction of rotation of rotor 17 as indicated by the arrow of Figure 4 and are arranged in two oppositely disposed helices converging toward the center of rotor 17 and eventually meeting as indicated at 41. The pitch of each helix is so arranged that as each tooth engages the solid, in this case cheese 27a, it strikes the same at an angle sufficiently small to insure a relative shearing action as between the tooth and the face of the solid, and at the same time sufficiently large to guide the abraded material away from the edges of the rotor. The pair of converging helices serve constantly to prevent any finely abraded material edging its way toward the edges of rotor 17 and into the space between the end thereof and the end wall of the housing. When the abraded particle, which is held adjacent the bulk of cheese 27a by a pair of shoulders 42 and 43 adjacent rotor 17 and providing only minute clearance therefor, is reduced to a size less than the height of the teeth, so that it may drop into the interstices therebetween to be carried by the rotation of rotor 17 beyond shoulder 43 it falls, by gravity, into drawer 30. Thus only completely abraded particles are permitted to pass into the storage receptacle. Due to the shearing action hereinbefore mentioned, it will be seen that each tooth shaves only a minute quantity of substance from the bulk, as of the cheese 27 in passing thereby, and consequently an evenly powdered abraded substance results.

It will further be seen that rotor 17 may be readily manufactured since the previously mentioned helices may be readily cut in any desired manner as illustratively, by supporting rotor 17 with its axis in a vertical plane and cutting transverse grooves therein and subsequently cutting the teeth from the remaining material. In order to avoid undue packing of the abraded material it has been found advantageous in practice to remove alternate teeth of alternate rows (see Figure 4) wherein the teeth so removed are indicated in dotted lines. By this action a smooth, even, unvarying performance of the rotor is assured and the possibility of clogging or packing due to an excess of powdered material is avoided.

Figures 5 and 6 disclose a modified form of rotor comprised of a plurality of plates 50, each having teeth 51 therein and mounted on a central shaft 52. Plates 50 are held in related as-

sembly in any desired manner as by tie rods 53 having heads engaging suitable recesses in the end plates thereof. The apertures positioned to accommodate tie rods 53 are so positioned in each of plates 50 as to provide a spiral or helix of teeth in a manner similar to that disclosed in connection with Figure 3. The teeth 51 correspondingly may be bent to overlie adjacent plates 50 in such manner as to provide relatively complete guiding and shearing helices in accordance with this invention. In this connection it will be seen that in the event a tooth or plurality of teeth is damaged it is only necessary to remove the plate on which the particular tooth is mounted, repair the tooth and replace the plate in the rotor or substitute a new plate therefor.

Now from the foregoing it will be seen that there are herein provided several devices accomplishing all the objects of this invention and others including many advantages of great practical utility.

Thus while in the foregoing the rotor has been particularly described as useful in a machine or device for abrading or grinding cheese it is to be understood that it may have a wide variety of uses, as for example pulverizing coal, powdering sugar or any of a vast variety of uses for which an abrasive rotor is desired. It will further be understood that the form and the size of the rotor may be widely varied so long as the underlying inventive concept hereinbefore set forth and hereinafter claimed is retained.

As many embodiments may be made of this inventive concept and as many modifications may be made in the embodiments herein described and shown in the accompanying drawing it should be understood that all matter hereinbefore set forth or shown is to be interpreted merely as illustrative and not in a limiting sense.

I claim as my invention:

1. In a rotor for grating machines, a plurality of circular plates having teeth on the peripheral edges thereof, means retaining said plates in related assembly to form a cylinder, said teeth being bent in such a manner as to overlie adjacent plates with respect to the plane of each of said plates and spaced with respect to adjacent teeth of adjacent plates to form a plurality of oppositely disposed helices beginning at the ends of said rotor and converging toward a midpoint thereof to guide the grated material toward said midpoint.

2. In a rotor for grating machines, a plurality of circular plates having teeth on the peripheral edges thereof, means retaining said plates in related assembly to form a cylinder, said teeth being bent obliquely with respect to the plane of rotation of each of said plates to overlie an adjacent plate and spaced with respect to adjacent teeth of adjacent plates to form a plurality of oppositely disposed helices beginning at the ends of said rotor and converging toward a midpoint thereof to guide the grated material toward said midpoint.

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