No. 782,293. PATENTED FEB. 14, 1905.

A. A. WARNER.

GRINDING DISK FOR COFFEE MILLS.

APPLICATION FILED NOV. 10, 1904.

Fig. 1.

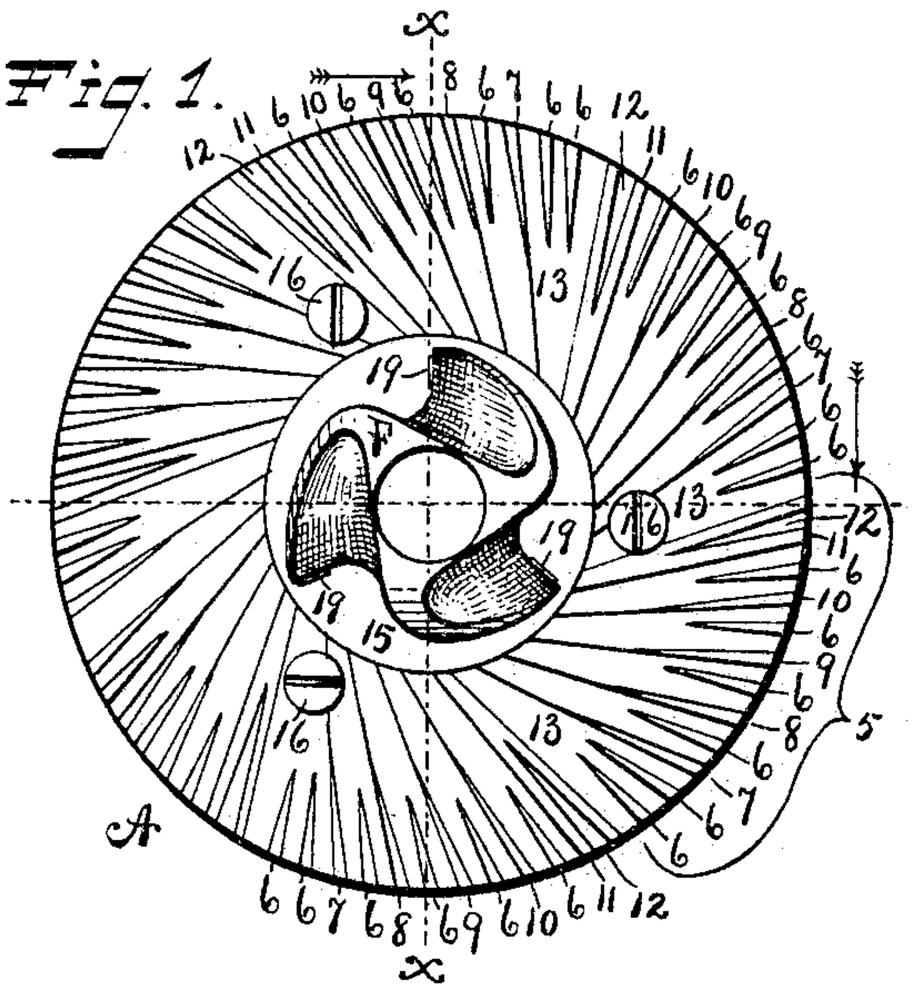


Fig. 2.

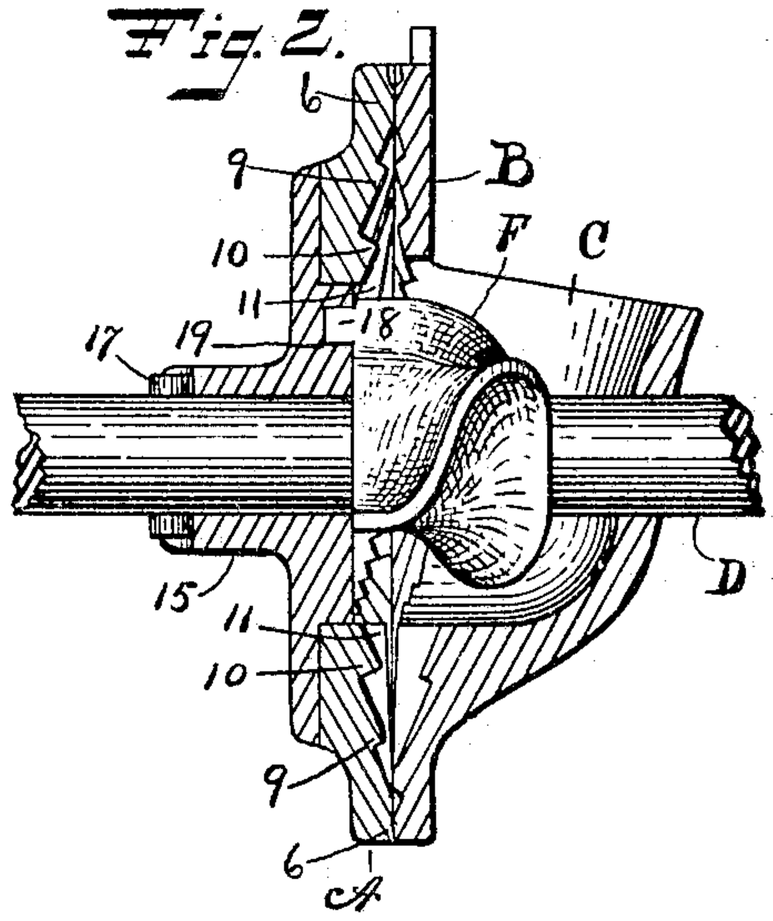


Fig. 3.

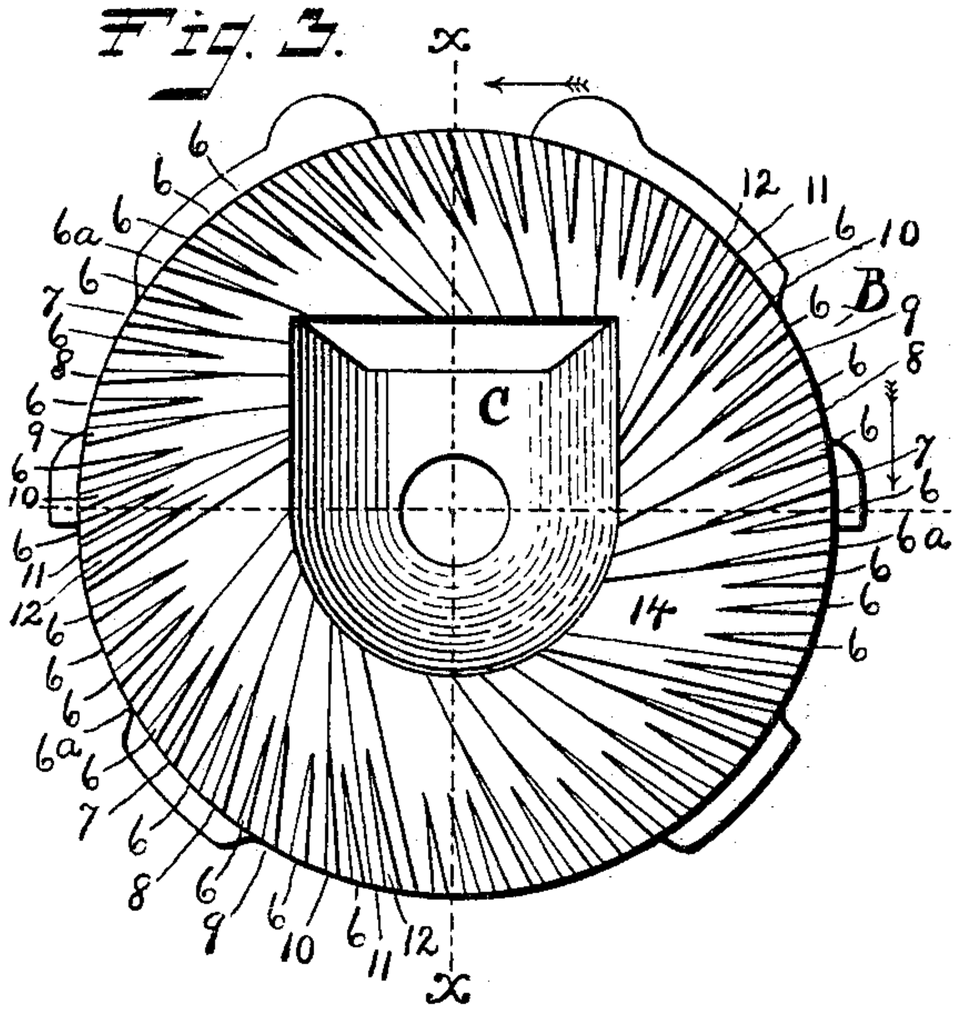
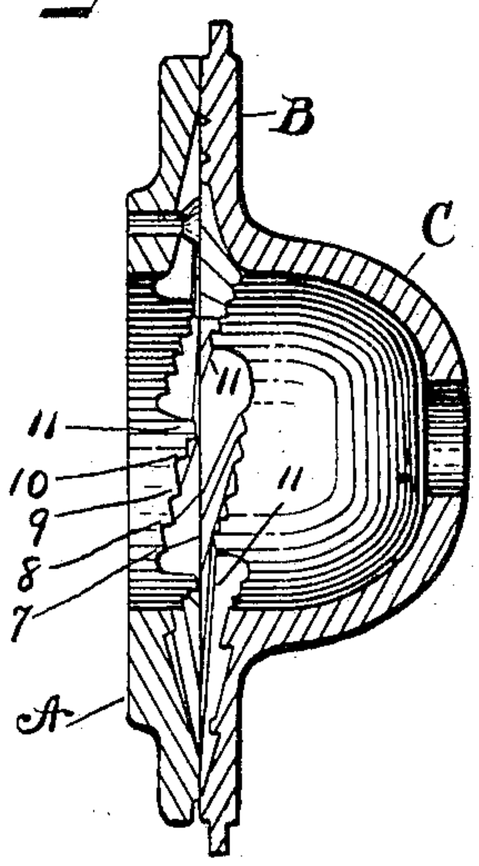


Fig. 4.



Witnesses.

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No. 782,293. Patented February 14, 1905.

UNITED STATES PATENT OFFICE.

ALONZO A. WARNER, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO LANDERS, FRARY AND CLARK, OF NEW BRITAIN, CONNECTICUT, A CORPORATION.

GRINDING-DISK FOR COFFEE-MILLS.

SPECIFICATION forming part of Letters Patent No. 782,293, dated February 14, 1905.

Application filed November 10, 1904. Serial No. 232,096.

To all whom it may concern:

Be it known that I, ALONZO A. WARNER, a citizen of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Grinding-Disks for Coffee-Mills, of which the following is a specification.

My invention relates to improvements in grinding-disks for coffee and spice mills; and the main object of my improvements is efficiency in operation, particularly with reference to rapid grinding.

In the accompanying drawings, Figure 1 is a face view of the moving disk, together with a combined forcer and crusher attached to the said disk. Fig. 2 is a sectional view of the two disks on the line *x x* of Figs. 1 and 3, together with a side elevation of the combined forcer and crusher and a portion of the shaft which carries the moving disk. Fig. 3 is a face view of the fixed or stationary disk, and Fig. 4 is a horizontal section of the two disks on the line *y y* of Figs. 1 and 3.

A designates the moving disk, and B the fixed disk, the latter having formed integral therewith a partial hopper C, through the wall of which one end of the driving-shaft D for the moving disk A extends. The fixed disk and the shaft carrying the driving-disk may be supported in any ordinary manner. The novelty of this invention resides solely in the parts of the mill above named and illustrated in the drawings. The teeth or dressing of the two disks is substantially the same in its general character, but differs somewhat in detail, as hereinafter described. The highest points of both disks are substantially in one level or plane near their outer edges, so as to have substantially an annular bearing-contact with each other for some distance from their outer edge and then gradually slant away from each other as the toothed surface is followed toward the center the disks. The fine teeth at the outer edge, which form this annular bearing-contact, are all approximately of the same height or depth, while the coarse teeth in each set are of a gradually-decreasing height or depth, and one tooth in each set has a broad and substantially flat top at its inner end, with its outer end divided into two finer teeth.

In the moving disk A the bracket 5 in Fig. 1 indicates the several teeth of one set. These are composed of six short teeth 6, four long teeth 7 8 9 10, and one long tooth 11, which is divided into two members at its outer end by the groove 12. The first two of the short teeth 6 are opposite a blank space 13 at their inner ends, while the other short teeth 6 alternate with the respective long teeth 7 8 9 10 11 and run into the face that slants backwardly from the front edge of each long tooth. That the tops of the long teeth slant backwardly from their front edge after the fashion of ratchet-teeth is best shown in Fig. 4. The long tooth 11 has this backward slant only in a very slight degree. Its top face is broad and at the inner end stands up boldly above the teeth on either side thereof. Its divided outer end has its top in the plane of the disk, and its inner end is dressed off at a slight angle with reference to its length, so as to slant slightly away from the companion disk. Each of the other long teeth vary in the angle of the tops of their inner and outer ends, so as to form a series of steps of gradually-higher teeth from the first long tooth 7 to the last one, 11, as best shown in Fig. 4. The fixed disk B has the same short teeth 6, but more in number and somewhat differently arranged, and it has one or more long teeth in each set, the first one of which I will designate as 6ª and the others 7, 8, 9, 10, and 11, as in the moving disk. There are three of the short teeth 6 opposite the blank space 14, the other short teeth alternating with the long ones, as in the moving disk A. With the exception of the central opening opposite the partial hopper and the difference before specified the construction of the fixed disk is the same as that of the moving disk.

The moving disk A is provided with a hub 15, which may be a separate piece from the main part of the disk and the two pieces secured together by the screws 16. A pin or suitable driver 17 on the main shaft may en-

gage the hub 15 of the moving disk, as shown in Fig. 2, for driving the said disk with the shaft D. In the central part of the moving disk or its hub there is a combined crusher and forcer F, that projects into the lower part of the partial hopper, as shown in Fig. 2. It is formed with three wings 18, that extend longitudinally of the shaft D in substantially a straight line for a short distance until they pass the inner ends of the teeth on the fixed disk, and then the blades are curved into a spiral, so as to form a screw forcer to force the material being ground from the bottom of the hopper toward the space between the toothed portions of the two disks. This combined crusher and forcer should have a driving connection with the moving disk, and this is accomplished by providing the hub 15 of the moving disk with mortises or recesses 19, while the wings 18 are provided with projections 20 for being engaged by the said recesses, so as to drive the combined crusher and forcer with the moving disk. By reference to Fig. 3 it will be seen that the upper part of the opening in the fixed disk that opens into the hopper is rectangular. The combined crusher and forcer revolves within this opening and acts to crush or crack the grains of coffee, spice, or other material being ground between the wings of the said crusher and the surrounding wall of the hopper. The material also enters the spaces between the two disks and is crushed or ground finer as it works out through the outer edge. The broad top face that extends across the long tooth 11 of each set of teeth gives that tooth great strength and force. This is the last tooth in each set or group, and as it quite closely approaches the like teeth on the fixed disk it catches all the material left by the other teeth in each set and reduces the material sufficiently to let it pass outwardly in between the finer teeth at the edge of the disks, where it is reduced to the desired fineness. This construction causes the material to be reduced very rapidly.

I claim as my invention—

1. The herein-described mill-disk having an annular bearing-contact surface at its outer edge and the several sets of teeth composed of a plurality of short teeth near the edge of the disk outside of a blank space, alternating long and short teeth with the long teeth of a gradually-increasing height and a long tooth at the end of each set having a broad top face at its inner end and standing above the tops of the inner ends of the other long teeth.

2. The herein-described mill-disk having a series of long and short teeth arranged in sets, the highest and last tooth having a broad and substantially flat top with a groove at its outer end to divide the said top at the said outer end while its inner end is undivided.

ALONZO A. WARNER.

Witnesses:

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