

D. MALONEY.
GRINDING PLATES.
APPLICATION FILED FEB. 24, 1920.

1,369,685.

Patented Feb. 22, 1921.

2 SHEETS—SHEET 1.

FIG 1

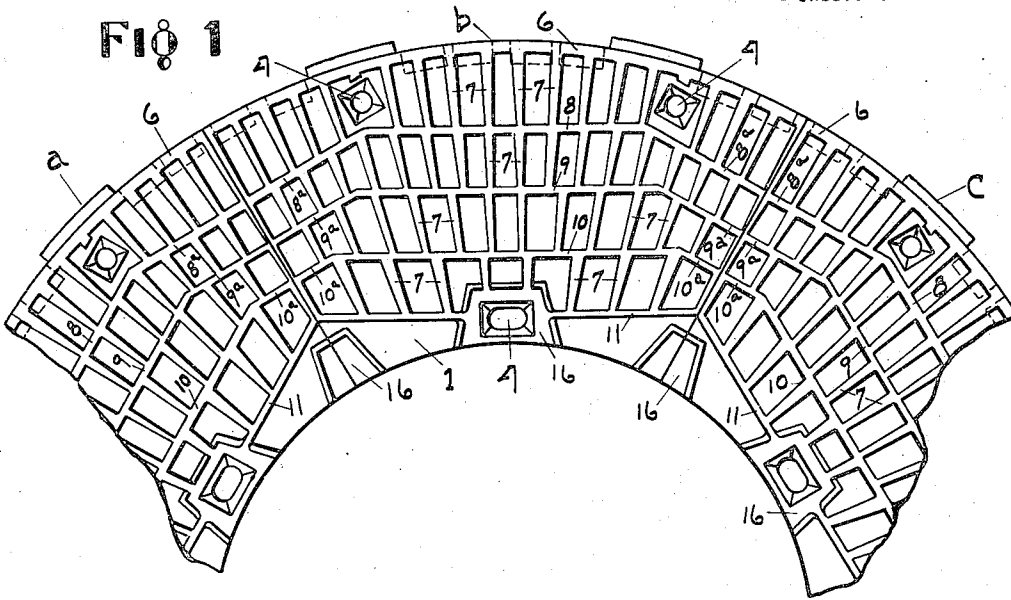
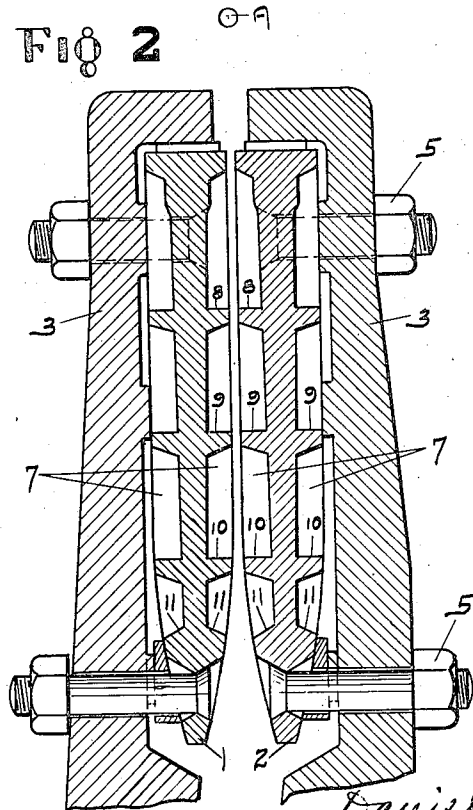


FIG 2



Inventor

Witnesses

Chas. J. Mch

By

Daniel Maloney

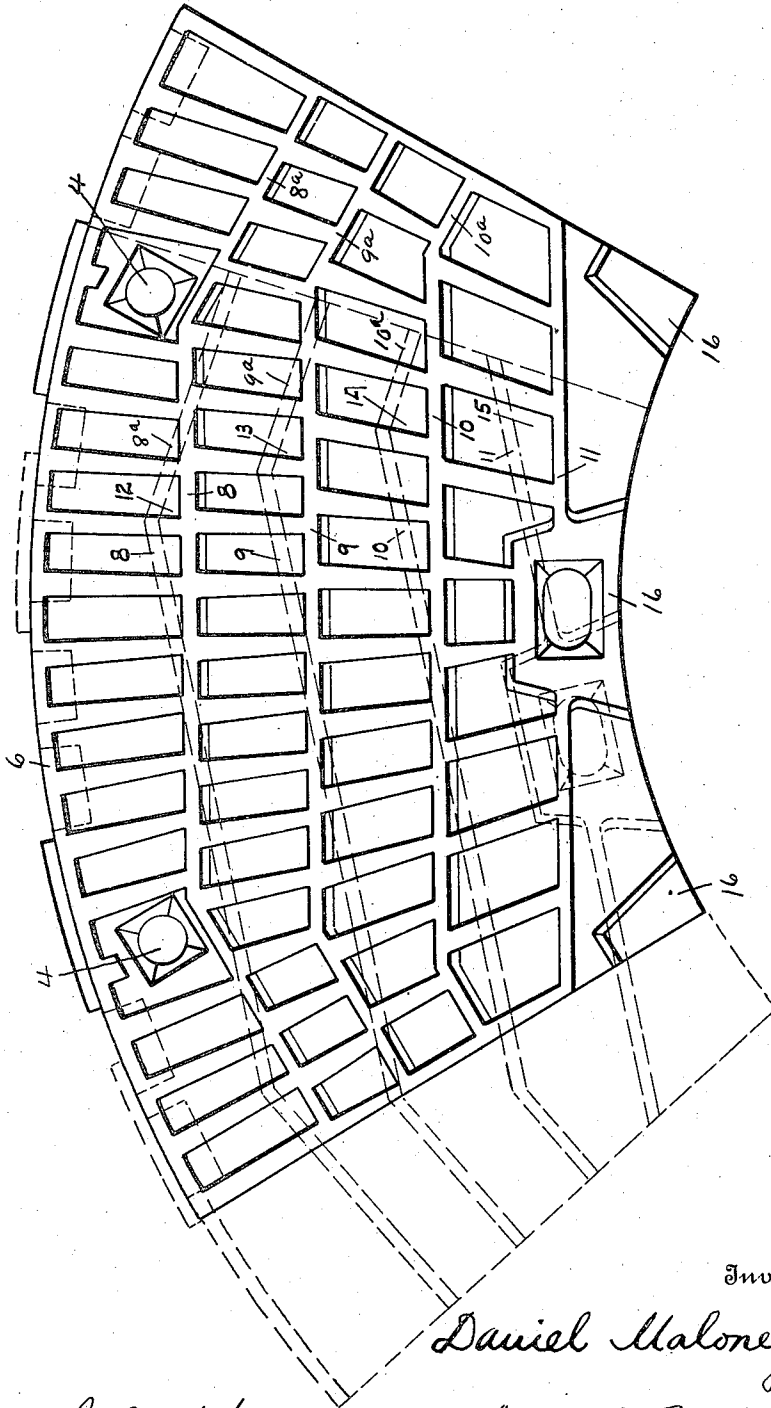
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2 SHEETS—SHEET 2.

FIG 3



Witness

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UNITED STATES PATENT OFFICE.

DANIEL MALONEY, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE BAUER BROTHERS COMPANY, OF SPRINGFIELD, OHIO, A CORPORATION OF OHIO.

GRINDING-PLATES.

1,369,685.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, DANIEL MALONEY, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Grinding-Plates, of which the following is a specification.

My invention relates to grinding plates and more particularly to grinding plates for use in mills employing opposing plates rotating in opposite directions although they may be used when one of the plates is held stationary.

In this class of mills the material to be ground is fed through a central opening and discharges at the periphery of the plates.

The object of my invention is to control the travel of the material being ground so as to more evenly distribute the wear over the entire grinding surface of the plates and at the same time give a more efficient service both as to the quality and quantity of the product.

Figure 1 is a plan view of a portion of a plate embodying my improvements.

Fig. 2 is a vertical section of two opposing plates and the heads upon which they are mounted.

Fig. 3 is a side view of one sector of one of the plates with the chordal ribs of one of the opposing plates shown in dotted lines.

Referring to the drawings, 1 and 2 represent two opposing grinding plates as a whole, which are removably secured to heads 3 in the usual way. Each plate is divided into sectors, an entire sector *b* and two adjacent partial sectors *a* and *c* being shown in Fig. 2. Each sector is provided with bolt openings 4 to receive the bolts 5 which secure the same to its head.

Carrying out my invention I provide each sector with a peripheral circular rib 6, a series of long rib portions 8, 9, 10 and 11 formed as chords of concentric circles which have their centers at the axis A of the plate, and a series of short connecting rib portions 8^a, 9^a and 10^a which unite with corresponding rib portions on adjacent sectors to also form chords of the same circles. The rib portions 8, 9, 10 and 11 are arranged parallel with each other and are of different lengths, the rib 11 extending entirely across the plate sector while the other rib portions gradually shorten in length out-

wardly. The short rib portions 8^a, 9^a and 10^a are also arranged parallel with each other and increase in length outwardly. The rib portions 8, 9, 10 and 11 are of such proportionate length and distance apart that the greatest distance between the outer side of any one rib portion and the axis of the plate will be less than the least distance between the inner side of the next outer rib portion of the opposing plate and the axis of its plate, this likewise being true with respect to the rib portions 8 and the peripheral ribs 6 of the respective plates, and, as will be apparent, is true of the shorter rib portions. As a specific example of this, for instance, the distance between the outer side of each rib portion 10 at the respective ends thereof and the axis of the plate is less than the distance between the inner side of each rib portion 9 midway its length and the axis of the plate. This arrangement allows for more or less clearance between any one of the ribs and the next succeeding outer rib on the opposing plate, or, in other words, prevents those ribs from overlapping each other as the plates are revolved, resulting in an improved action which more evenly distributes the material and reduces the wear on the plates.

As before stated the long rib portions 8, 9 and 11 are of different lengths, and it will be seen that the short rib portions are arranged at an angle to the long portions. As the opposing plates revolve, this results in opposing or corresponding ribs forming pockets as represented at 12, 13, 14 and 15 of varying sizes, gradually decreasing outwardly. These pockets will be triangular in form, the different lengths of the rib portions resulting in varying triangular pockets whose maximum sizes decrease toward the outer periphery of the plate, thereby resulting in pockets which will proportionately vary in size in a decreasing manner as the material is reduced and thrown outwardly so that a finer grinding action will be had, and further, that each succeeding set of ribs from the innermost one to the outer one, will perform its proportionate amount of work, causing the wear to be more evenly distributed throughout the entire surface of the plate.

In the particular arrangement shown in the drawings the portions of the outer series of chordal ribs are of substantially the

same length as is also true of the innermost series of chordal ribs, but the rib portions of each series of intermediate chordal ribs vary in length, each series of alternate rib sections being of the same length.

Referring to Fig. 2, it will be seen that the outer faces of the grinding ribs 9, 9^a, 10, 10^a and 11, as well as the adjacent radial ribs 7 are formed on curved lines which are farthest removed from each other between the ribs 11 and gradually approach each other to a point between the ribs 8, 8^a and 9, 9^a, thence continuing on straight lines to the outer periphery of the plates. This results in a wide open throat at the point of supply which gradually decreases as the material is reduced to a point where it will be of uniform width for a substantial distance along the outer surface of the plates.

While the longitudinal centers of each of the radial ribs 7 are on a true radial line, yet it will be noticed that the side walls of each radial rib diverge outwardly so that the rib gradually increases in width outwardly. By this arrangement the heavier part of the radial ribs is located at the point where the greatest wear occurs.

Each side of each plate has corresponding ribs, as shown in Fig. 2, so that when the plate becomes worn it can be reversed to present a fresh surface, thereby doubling the usefulness thereof.

Arranged about the inner periphery of each plate is a series of projecting breakers 16 having sides which converge toward the periphery of the plate. These breakers serve to break up the larger pieces of material and their converging or beveled sides have a feeding action which aids in forcing the material toward the peripheries of the plates.

Having thus described my invention, I claim:—

1. A pair of grinding plates, each plate having a series of ribs shaped to extend on lines to form chords of concentric circles, the chordal sections being proportioned and arranged to give a clearance between the ribs of one plate and the next outer ribs of the opposing plate, the corresponding ribs of the respective plates forming pockets of diminished size toward the outer periphery of the plates.

2. A pair of grinding plates, each plate having a series of corresponding ribs, one or more of said ribs extending on a line shaped to form chords of a circle with alternate chords of the same length and of dif-

ferent lengths than the other chords, so that such rib of one plate will coact with the corresponding rib of the other plate to form triangular shaped pockets.

3. A pair of grinding plates, each plate having corresponding ribs, the ribs of each plate increasing in length toward the periphery of the plate, each rib being extended on a line so shaped as to form chords of a circle, alternating chords of one or more of said ribs being of the same length and of different lengths than the other chords, so that such rib or ribs will coact with the corresponding rib or ribs of the other plate to form triangular shaped pockets.

4. A pair of grinding plates, each plate having a series of ribs corresponding with ribs on the opposing plate, each rib extending on a line forming chords of a concentric circle, the chords forming some of said ribs being of the same length, and the chords forming the other ribs varying in length with alternate chords of the same length.

5. In an annular grinding plate, a peripheral rib, a plurality of radial ribs and a series of ribs parallel with each other forming chords of concentric circles having their centers at the axis of the plate, the respective ends of each of the outer chordal ribs having a less radius than said peripheral rib.

6. In an annular grinding plate, a peripheral rib, a plurality of radial ribs and a series of ribs parallel with each other forming chords of concentric circles having their centers at the axis of the plate, the respective ends of each of the inner chordal ribs having a less radius than a point on the inner surface of the next outer rib midway of its length.

7. In an annular grinding plate, a peripheral rib, a plurality of radial ribs and a series of ribs parallel with each other forming chords of concentric circles having their centers at the axis of the plate, the respective ends of the outer chordal ribs having a less radius than said peripheral rib and the respective ends of each of the other chordal ribs having a less radius than a point on the inner surface of the next outer rib midway of its length.

In testimony whereof, I have hereunto set my hand this 19th day of February 1920.

DANIEL MALONEY.

Witnesses:

PERCY NORTON,
CHAS. I. WELCH.