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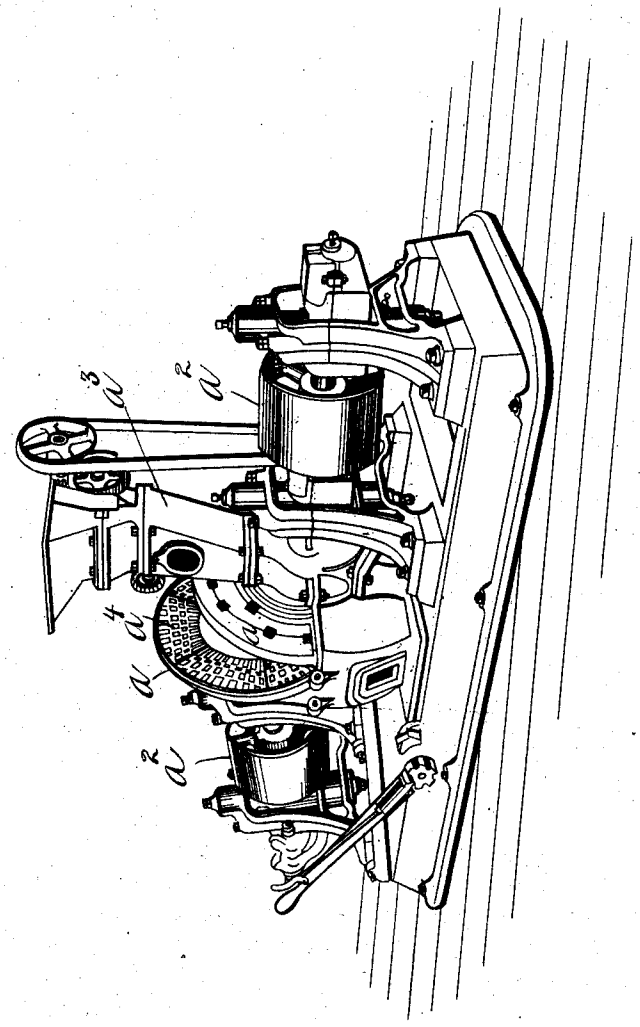
ATTRITION MILL PLATE.

APPLICATION FILED FEB. 27, 1908.

905,492. Patented Dec. 1, 1908.

4 SHEETS—SHEET 1.

Fig. 1



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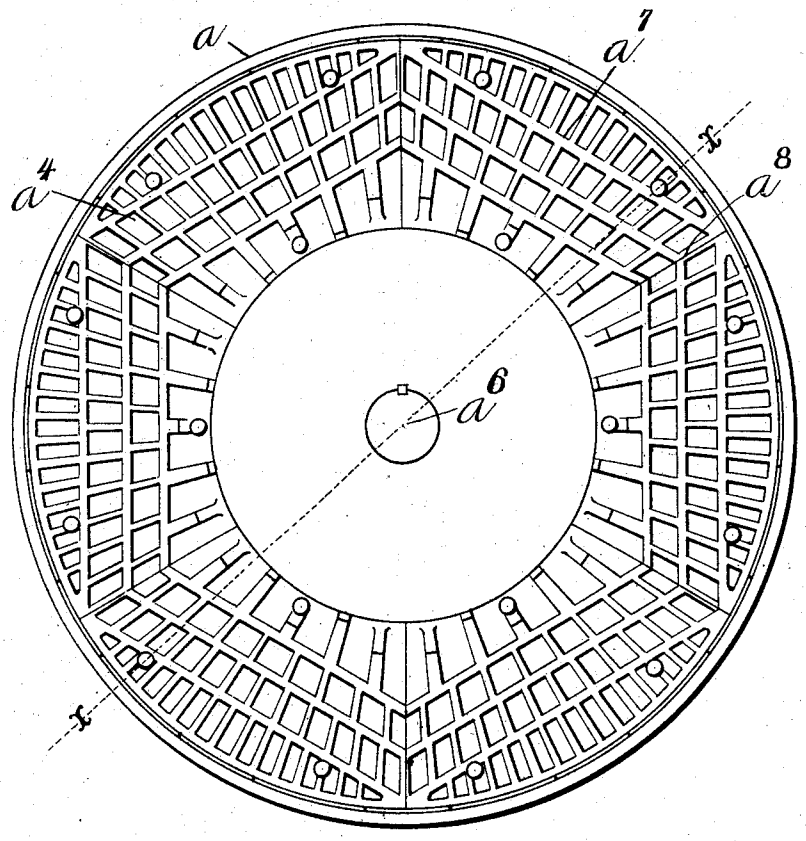
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4 SHEETS—SHEET 2.

Fig. 2



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4 SHEETS—SHEET 3.

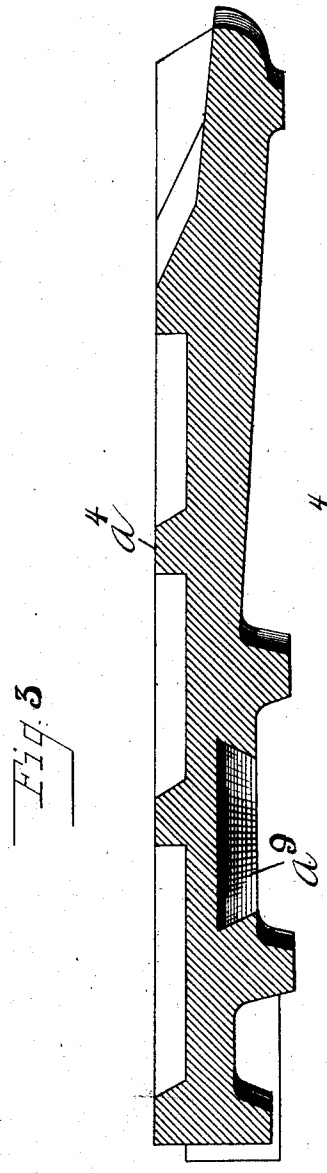


Fig. 5

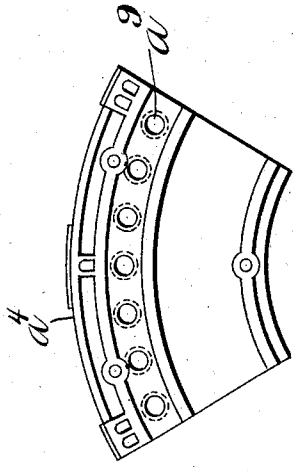


Fig. 4

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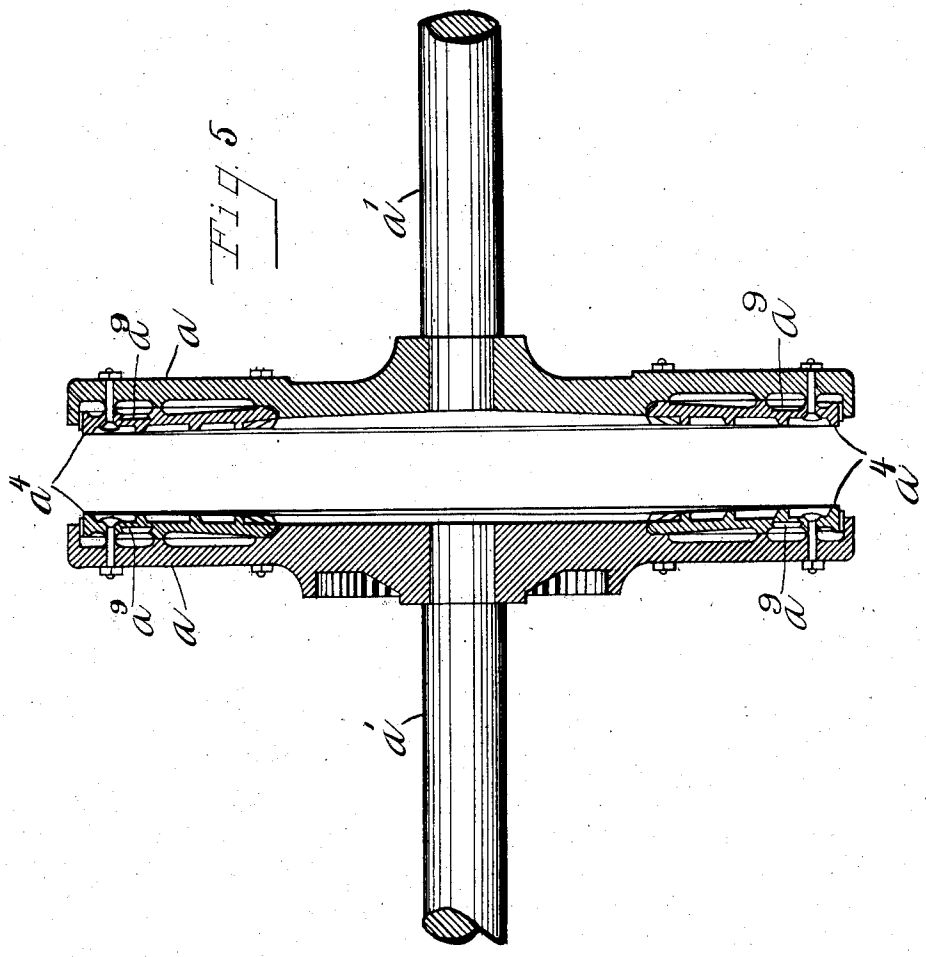
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4 SHEETS—SHEET 4.

Fig. 5



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UNITED STATES PATENT OFFICE.

LOUIS E. BAUER, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE FOOS MANUFACTURING COMPANY, OF SPRINGFIELD, OHIO, A CORPORATION OF OHIO.

ATTRITION-MILL PLATE.

No. 905,492. Specification of Letters Patent. Patented Dec. 1, 1908.

Application filed February 27, 1908. Serial No. 418,000.

To all whom it may concern:

Be it known that I, LOUIS E. BAUER, 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 Attrition-Mill Plates, of which the following is a specification.

My improvement relates to grinding plates and particularly to removable grinding plates for grinding machines or attrition mills where a plurality of plates are employed, one plate revolving in the opposite direction from its opposing plate.

My object is to so construct the plates that there will be the maximum of efficiency and the minimum of wear.

In the drawings Figure 1 is the perspective view of the grinding machine showing one of the grinding plates partly elevated. Fig. 2 is a plan view of a head and plates. Fig. 3 is a sectional view of one of the plates. Fig. 4 is a detail view of the rear portion of the plate. Fig. 5 is a sectional view of the associated heads and grinding plates.

Like letters of reference indicate like parts throughout the several views.

The grinding plates are annular in shape and preferably divided into sections along radial lines.

The head is indicated by a and the heads are formed on shafts a^1 (see Figs. 1 and 5) and pulleys, a^2 are power driven and the parts are so arranged that by means of said pulleys the heads a are rotated reversely.

A chute a^3 is so arranged that the material to be ground is fed into the space between the two heads a a.

As shown in Fig. 5 the grinding plates a^4 are bolted or in any usual way secured to the outer portions of the heads a a.

Referring now to Fig. 2 showing the plates secured within the head it will be remembered that I have formed, by means of radial and circumferential ribs, a series of pockets, which pockets are commonly used in grinding or attrition plates to permit the material to flow therein. But my improvement is such that there is an improved shearing action by reason of the associated relation of the ribs and by the improved construction the wear on the ribs is greatly reduced.

It will be apparent that there are inscribed within the circumference of the grinding head a plurality of polygons and the respective sides of each polygon have pre-determined relations to the associated sides of the next succeeding hexagon. Each side of the polygon represents a chord which subtends an arc of a circle drawn from the center a^6 of the grinding head. The outer chords subtend the arcs on the outer circumference of the grinding head. Having pre-determined the location of the outer chords by dividing the registering head into sectors, I then determine the altitude of the triangle formed by the chord and two radii by the arc subtended by that chord. This altitude determines the length of the radius for the next succeeding circle and taking a radius of that length and dividing the circle into equal sectors and drawing the chords for the arcs of each sector I then locate the ribs of the next succeeding inner polygon. In the same way I determine the altitude of the triangle formed by the two radii and the chord which constitutes one of the sides of this next succeeding polygon. Taking that altitude as the radius for the next succeeding circle I then divide that circle into equal sectors, as before, and locate the inner ribs or sides of the innermost polygon. It will be apparent that having pre-determined the relation of the various chords so that the outer chord constitutes the tangent to the arc of the circle subtended by the next succeeding chord, there will be only one point in the entire length of the outer chord that will be intersected by the arc subtended by the inner chord, and consequently when the corresponding associated grinding head revolves in an opposite direction (being understood that these heads and plates are exact duplicates) there will be only one point on each outer chord or rib that will be intersected by a point on the next succeeding chord of its opposing head. For that reason the wear on any one of these circumferential ribs will be minimum.

Applying the principle to one of the plates shown on the head in Fig. 2 we will take a point on the outer rib marked a^7. This point is substantially at the center of the chord, and the line drawn from a^6 to a^7 will constitute the altitude of the triangle formed by the two radii and that chord. Taking this altitude as the radius for the next succeeding part subtended by the next succeeding chord, the distance from the point a^8 to the center of the circle a^6 will be the same as the

distance from a^7 to a^6. Consequently when the two heads are rotating reversely the point a^8 on one head will approach the point a^7 on the opposing head and at some time during the revolution of the two heads the point a^8 will intersect the point a^7, but no other points other than the extremities of the next succeeding inner chord will ever intersect the outer chord. Moreover, there will be an improved shearing action by reason of the pockets at the extremities of an inner chord of one head approaching the pockets near the center of the next succeeding outer chord for the opposing head. For the same reason the pockets near the extremities of the innermost chord will approach the pockets near the center of the next succeeding chord, and by that I mean the pockets near the extremities of the chord of the opposing grinding head will approach and receive from the pockets near the center of the next succeeding rib or chord on the opposite head.

In Fig. 4 I have shown perforations a^9 for counter-balancing the grinding plates and it is to be remembered that these plates are formed in sections as shown in Fig. 4, but when placed upon the grinding head these sections constitute part of the sectors of the circle and the circumferential ribs formed on the plates coincide one with the other so as to form hexagons as shown clearly in Fig. 1.

Having described my invention, I claim as follows:—

1. In an annular grinding plate, a plurality of outer ribs forming chords for the outer circumference, and a series of inner ribs parallel with the outer ribs, which inner ribs subtend arcs each having a radius equal to the altitude of a triangle whose base is one of the outer ribs and whose apex is the center of the said plate, substantially as specified.

2. The combination of a grinding plate, a plurality of outer and inner circumferentially-extending ribs forming chords, a series of radially-extending ribs, and pockets formed by said circumferential and radial ribs, the outer circumferential ribs being substantially tangent to the arcs subtended by the inner circumferential ribs, substantially as and for the purpose specified.

3. In a grinding machine, the combination of opposing grinding plates, means for rotating said opposing plates reversely, a series of pockets formed in said plates, a plurality of circumferentially-extending ribs forming chords and a plurality of radially-extending ribs, said ribs constituting the sides of said pockets, a plurality of hexagons formed by circumferentially-extending ribs, one hexagon being inscribed within the other and the sides of the outer hexagon being substantially tangent to the arcs subtended by the sides of the next succeeding inner hexagon, substantially as specified.

In testimony whereof, I have hereunto set my hand this 15th day of February, 1908.

LOUIS E. BAUER.

Witnesses:
CHAS. I. WELCH,
ALVA YAKE.