

S. L. FRASER & A. E. JACOBSON.
GRINDING PLATE FOR ATTRITION MILLS.
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975,848.

Patented Nov. 15, 1910.

Fig. 1.

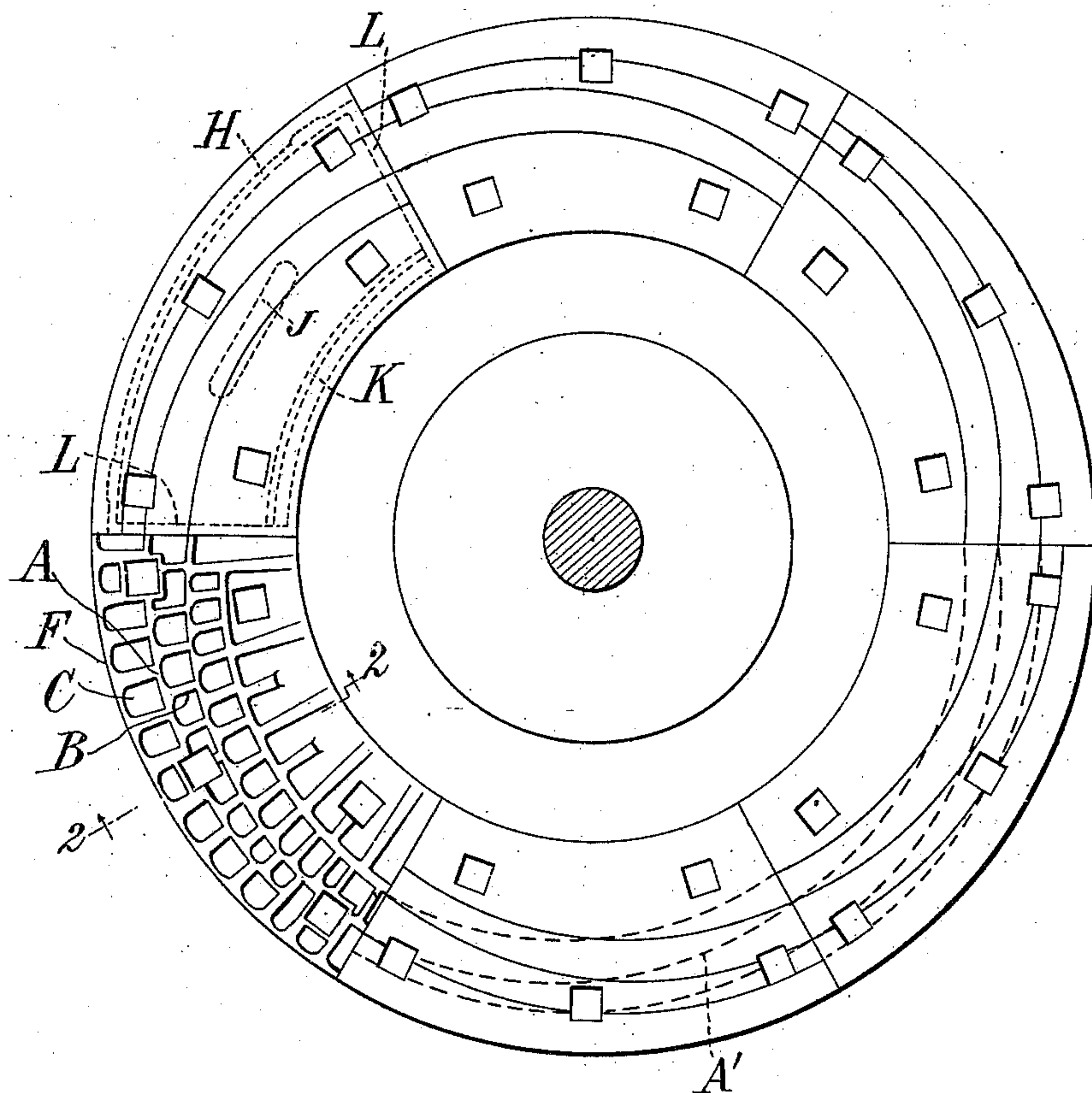


Fig. 2.

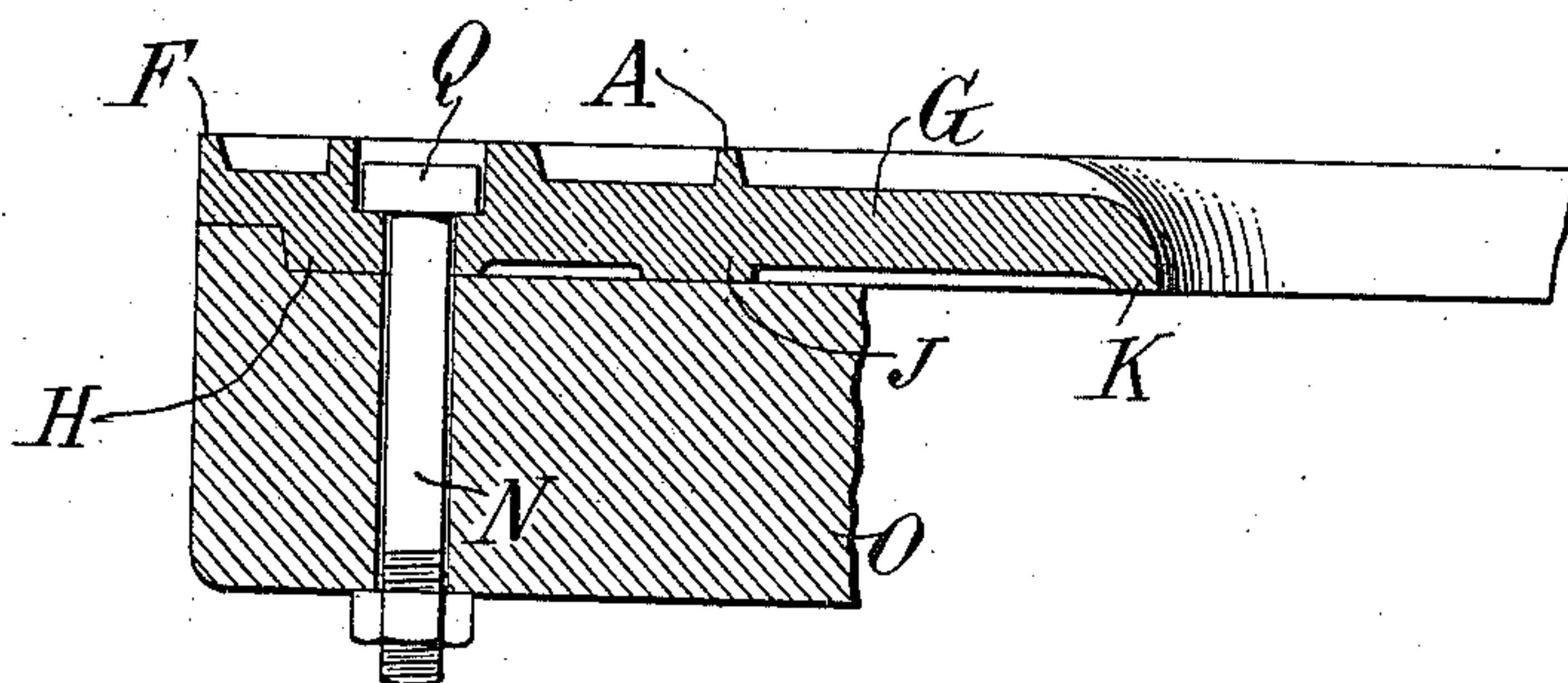
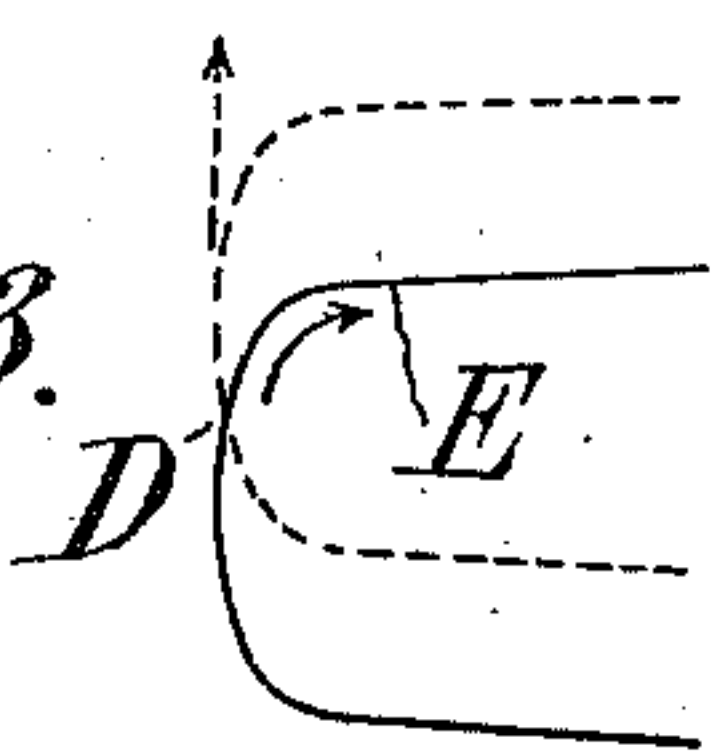


Fig. 3.



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UNITED STATES PATENT OFFICE.

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GRINDING-PLATE FOR ATTRITION-MILLS.

975,848.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, SPENCER L. FRASER and AXEL E. JACOBSON, both citizens of the United States, and residents of Minneapolis, in the county of Hennepin and State of Minnesota, have jointly invented certain new and useful Improvements in Grinding-Plates for Attrition-Mills, of which the following is a specification.

This invention aims to provide improvements in the grinding plates of attrition mills, such for example as are used in the cotton seed oil industry; the invention, however, being adapted for use in mills working upon various materials.

The improvements are designed to give to the grinding plates a large capacity and an equal wear, to cause them to grind in a superior manner, and to be interchangeable, so that the same plate may be used at either side.

There are other advantages referred to in detail hereinafter.

The accompanying drawings illustrate a plate embodying the invention.

Figure 1 is a face elevation of the same partly complete and partly diagrammatic to illustrate the principle more clearly; Fig. 2 is a radial section on the line 2—2 of Fig. 1; Fig. 3 is a diagram.

Referring to the embodiment of the invention illustrated, the grinding face of the plate is provided with radial and transverse ribs, and the latter are not truly circular but extend at a small angle relatively to circles described about the center of the plate, the lines of these transverse ribs being approximately or substantially spirals A extending half way around the plate; that is to say having their beginning, of largest radius, diametrically opposite their ending, of smallest radius. There are six of these half revolution spirals, so that a radius at any point is intersected by three; the plate is divided into six separate sections each of which contains the first sextant of one spiral and the last sextant of another, so that each of the six sections of the plate is identical, and when arranged end to end and fastened upon the end of a shaft in the usual or any suitable way, they constitute the complete attrition plate. The fact that these longitudinal ribs extend at an angle relatively to a true circle, causes a crossing of such ribs of one plate with the similar ribs of another identical plate facing it, as indi-

cated by the dotted lines A', so that when one of these plates is rotated relatively to the other they have a gradual shearing effect upon the material between them, which increases the quality of the grinding and the capacity of the mill. The inclination of these longitudinal ribs relatively to a circle is preferably slight to produce a very gradual cut compared with the rate of revolution, and it may be made greater approaching the instantaneous cut which takes place along the radial edges of the other ribs hereinafter referred to.

Between the longitudinal ribs are radial ribs B forming numerous pockets C carrying the material to be ground. The outer ends of these pockets are rounded at the corners so as to produce, when the two plates move over each other, a shifting of the shearing point from the outer edge of the pocket to the radial edge in a gradual manner. Fig. 3 shows for example how the point of contact of the shearing edges shifts gradually from D to E as the pocket whose outline is shown in dotted lines passes over the pocket shown in full lines of the opposite plate.

The ribs are tapered toward their outer faces, the taper being especially pronounced upon the inner sides of the transverse ribs as shown in Fig. 2, including the circular rib F which extends around the outer edge of the plate and the spiral ribs A. Such ribs wear uniformly. The tendency to wear more rapidly at one point is counteracted by the increasing area of its face due to the taper of the ribs.

Actual experience has demonstrated that, with ribs arranged and tapered as described and the corners of the pockets rounded, the plates wear equally in every part so as to have a long life, and effect in a better grinding and a larger capacity than those of the old type.

An important feature of improvement is the bolt-head holes which are countersunk square, so that they receive the head of a bolt and prevent it from turning, while a nut is fastened on its other end to hold it in engagement with the head. This enables one man to also easily and quickly change the plates when necessary.

The base G is comparatively thin, and is provided with stiffening ribs H, J and K on its under face. The location of these ribs for one section of the plate is indicated

in Fig. 1 in dotted lines, the same figure showing ribs L at the ends of the section. The depressed spaces between the ribs are provided with round holes for the shank of the bolt N, so that the square head of the latter lies only within the plate proper, and the completed structure has practically a countersink extending through the base G of the plate. Or the countersink might be of less depth at the points where it is convenient to provide ribs surrounding the head of the bolt. The backing is indicated at O in Fig. 2.

We claim as our invention:—

1. A grinding plate for attrition mills having on its face ribs which are spiral continuously in one direction around the face of the plate, and radial ribs between said spiral ribs.

2. A grinding plate for attrition mills having on its face ribs which are spiral continuously in one direction around the face of the plate, and radial ribs between said spiral ribs which divide the face of the plate into a series of pockets, the corners of said pockets being rounded, and said ribs being tapered toward their outer faces so as to cause an increased surface to be exposed as the ribs wear.

In witness whereof, we have hereunto signed our names in the presence of two subscribing witnesses.

SPENCER L. FRASER.
AXEL E. JACOBSON.

Witnesses:

PERCY C. LONG,
OSCAR E. MOBERG.