

(No Model.)

A. B. PAUL.
ORE GRINDING MILL.

No. 315,825.

Patented Apr. 14, 1885.

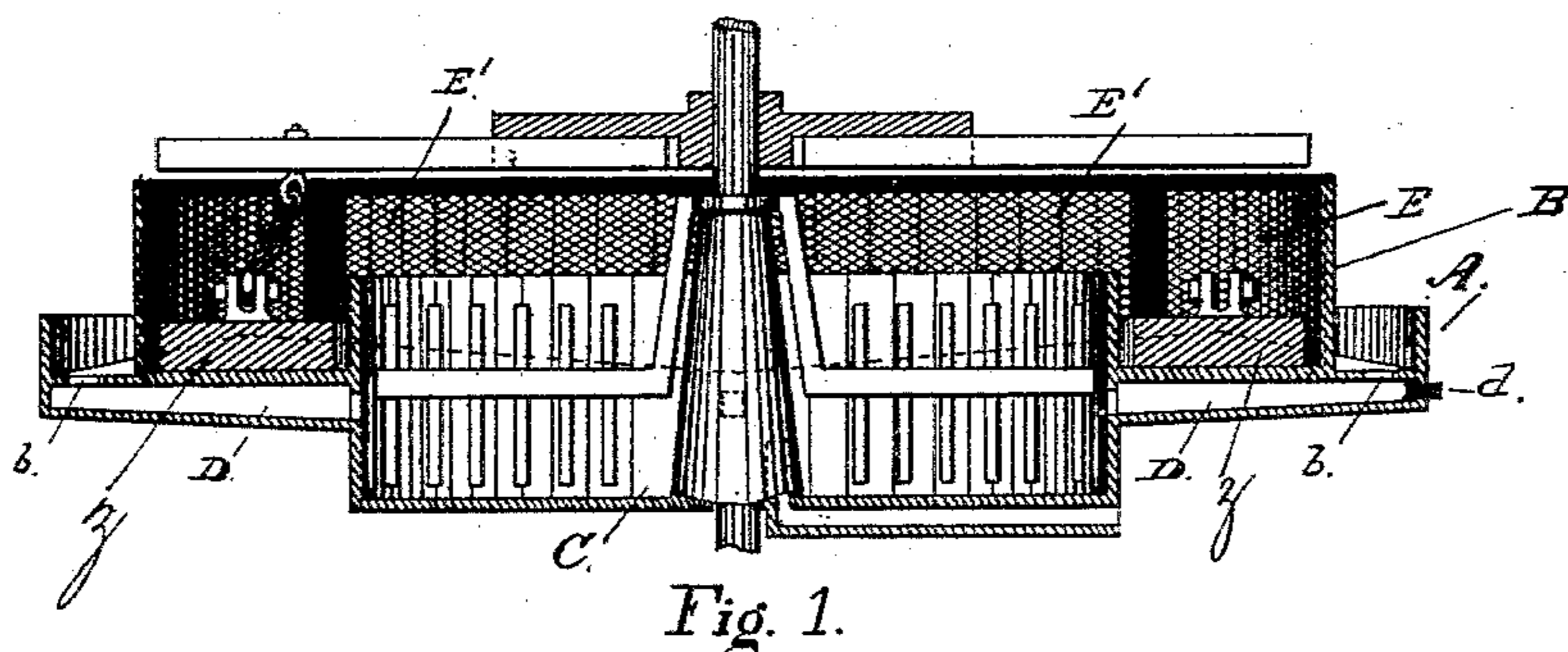


Fig. 1.

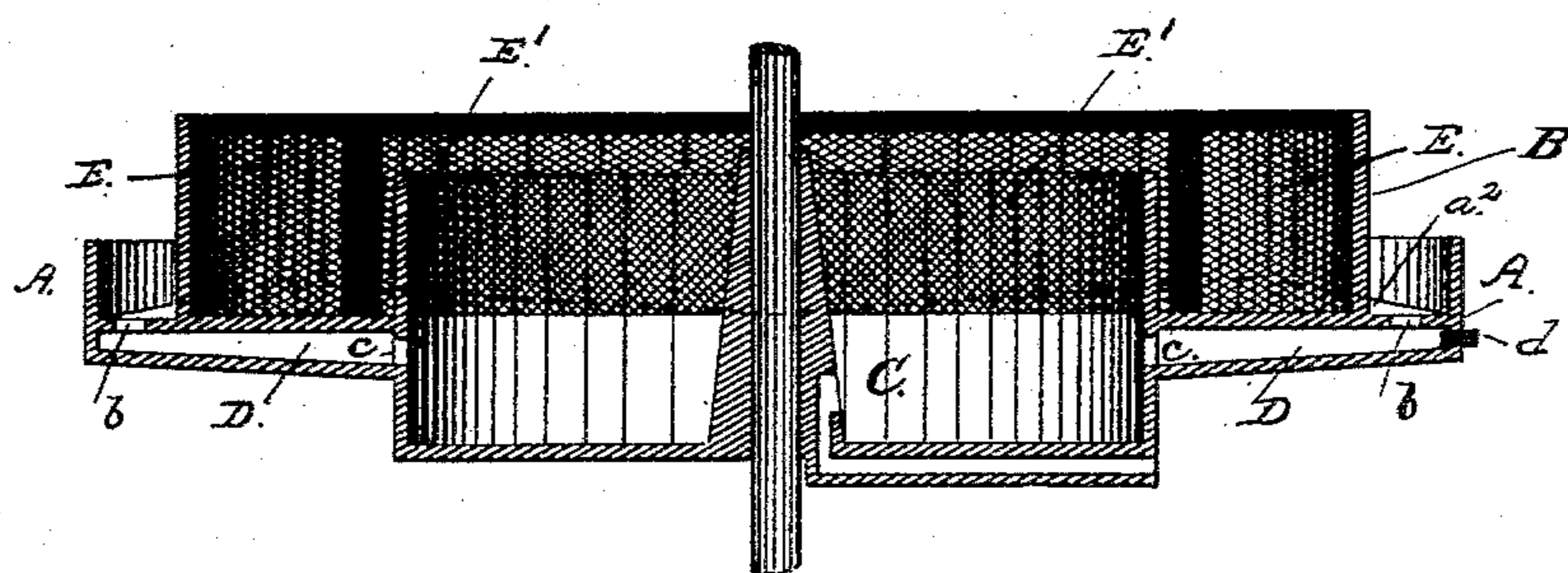


Fig. 2.

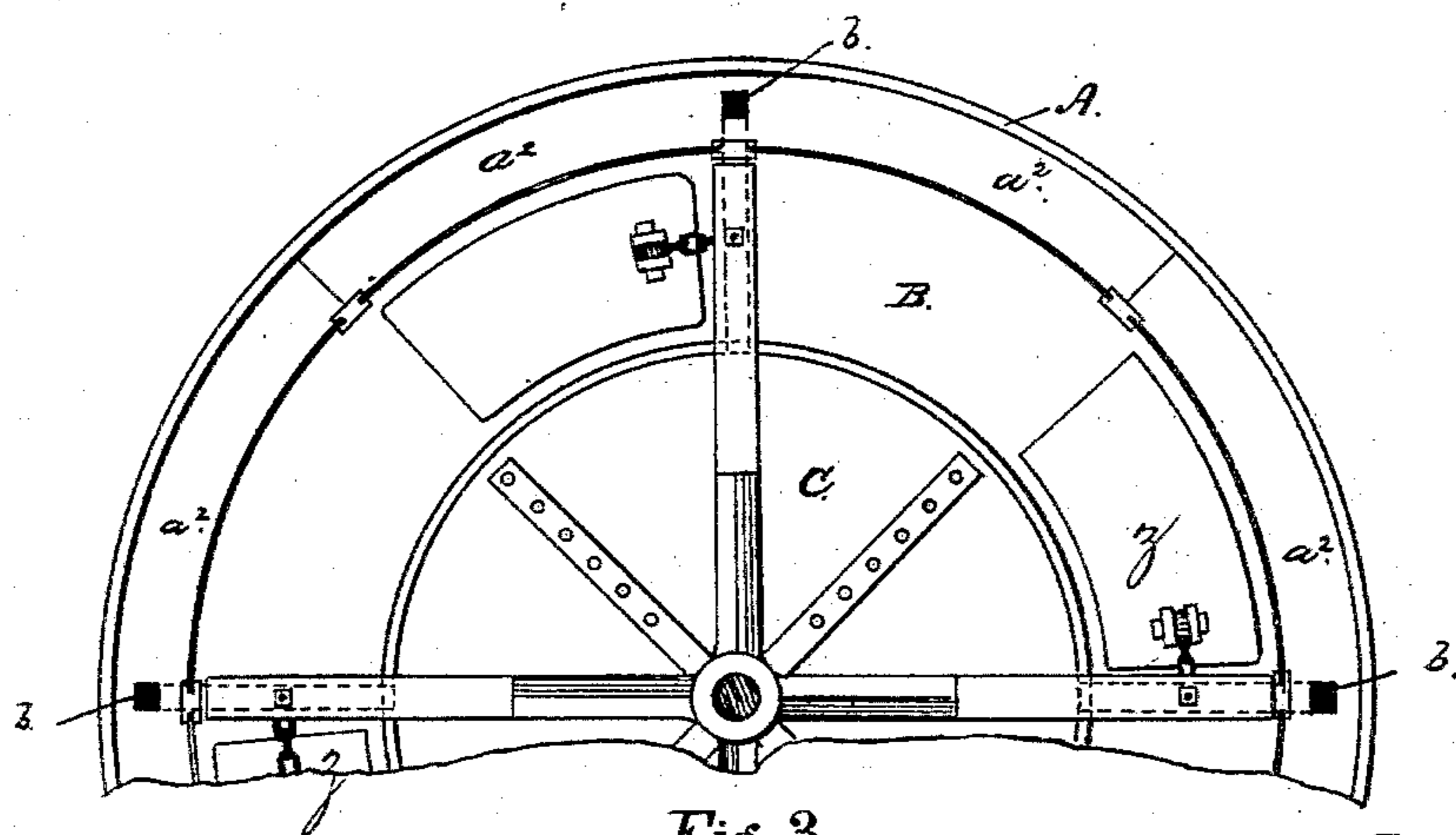


Fig. 3.

Witnesses:

Geo. A. Dickson. ---

F. M. Lowrey. ---

Inventor:

Almarin B. Paul,

By his Atty., Edward S. Osborn

UNITED STATES PATENT OFFICE.

ALMARIN B. PAUL, OF SAN FRANCISCO, CALIFORNIA.

ORE-GRINDING MILL.

SPECIFICATION forming part of Letters Patent No. 315,825, dated April 14, 1885.

Application filed December 7, 1883. (No model.)

To all whom it may concern:

Be it known that I, ALMARIN B. PAUL, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Ore-Grinding Mills, of which the following is a specification.

My invention has reference to ore-grinding mills or machines of the character known as "arrastras." A grinding-mill of this kind was patented to me in the United States on the 21st day of September, 1880, No. 232,364.

In the mill as constructed according to said patent provision was made for grinding the ore, and then treating it by means of rotary drags or mullers operated as in arrastras, and afterward subjecting it to a settling operation in a central compartment, the two separate annular compartments surrounding and discharging into the central compartment by overflow. My present invention differs from that mill in the fact that the outer grinding-compartment is dispensed with, and the ore-pulp is introduced and treated directly in the compartment where the drags are located, and which, for convenience, I will denominate the "arrastra-compartment," and in place of the outer grinding-compartment of said patent an annular trough or conductor is employed to catch the matter discharged from the arrastra-compartment through the screens, and to direct and discharge it into the central settling-compartment, suitable connecting tubes or channels being employed to convey the matter from the annular trough which surrounds the arrastra-chamber to the settler, which is inside of and lower than the arrastra-compartment.

The following description fully explains the nature of my improvements and the manner in which I construct and use them, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a vertical section through the center of the several compartments, with the screens applied between the annular receiving-trough and the arrastra-compartment. Fig. 2 is a similar view, with a set of screens applied between the arrastra-compartment and the central settling-chamber. Fig. 3 is a plan

or top view of the mill, about one-half of which is broken away in this figure to economize space.

In these views the necessary supporting frame-work and the mechanism for driving the working-shaft have been omitted.

A is the annular trough surrounding the arrastra-compartment B, and having an inclined self-discharging bottom, in which are segmental outlet-apertures *b b* at intervals apart, connecting with the central chamber, C, through tubular passages D, which run from the annular trough A under the bed of the arrastra-compartment B, and converge to the center, toward which they have a slight inclination. These passages are cast upon the bottom of the arrastra-compartment and against the circular body of the central compartment, through which the apertures *c* are made. The bottoms of these passages have a slight inclination toward the apertures *c*, and the outer ends are closed by plugs *d*, which are removable to afford opportunity for clearing out the passages.

The bottom of the annular trough A is formed of inclined plates *a' a'*, either plain or silver-plated, and laid in sections that give a double inclination from a point midway between every two apertures down to the apertures in both directions in such manner that the trough is divided into sections composed of double-inclined segments having an outlet situated at the bottom of each section.

The outer wall of the arrastra-compartment has curved screens *E E*, set over openings, for the purpose of affording a continuous discharge of reduced matter from the arrastra-compartment into the annular trough outside. Similar screening-surfaces, *E'*, can be set into the circular inner wall or partition that forms the rim of the arrastra-compartment, in order to facilitate the discharge of the finest particles therefrom, and to afford a direct escape into the settler through the inner rim or partition.

The bottom of the central compartment, C, in the mill is considerably below the level of the annular trough A, in order to afford complete and uninterrupted discharge from the latter into the settler-compartment, and the separating-wall between the settler and the

arrastra-compartments will terminate at about the level of the bed of the arrastra-compartment if the screens E' are employed; but without these screens it will be carried up above the bed to a point high enough to confine the ore matter while it is undergoing treatment by the drags z.

Arrastras of this kind can be made of any diameter from five to twenty-five feet, although a medium size—say about eight or nine feet—is perhaps the most advantageous for general use.

The matter to be treated is introduced into the arrastra chamber or compartment B, and as soon as sufficiently reduced is thrown out through the screens in one or the other direction, and brought immediately or mediately into the central settler-chamber, where separation and precipitation of the metallic particles are effected.

Having thus described my invention, what I desire to claim and secure by Letters Patent is—

1. In an ore-mill, the combination, with the arrastra-compartment B, of screens in the outer walls thereof, an annular receiving and discharging trough, A, surrounding compartment B, and having outlets and conductors to receive and lead away the matter discharged through the screens, and the settling-compartment, substantially as set forth.

2. The combination, with the arrastra-compartment having screens, of the annular

trough A, provided with outlets and conductors, and having its bottom formed of inclined plates, and the settler-compartment, as set forth.

3. In an ore-mill of the arrastra kind, the combination, with the arrastra-compartment, screens in the outer wall thereof, and an annular receiving-trough, of a central settling-compartment having its bottom on a lower level than and provided with connections with said annular receiving-trough, consisting of suitable conductors that run under the bed of the arrastra-compartment.

4. The combination of the settling-compartment, the arrastra-compartment, and the receiving-trough having discharge-apertures and conductors that pass beneath the arrastra-compartment and discharge into the central compartment below the level of the arrastra-compartment, substantially as herein described.

5. The combination of the central settling-compartment, the arrastra-compartment, and the outer annular receiving-trough having outlet-apertures, and the bottom of inclined surfaces, and the inclined conducting-passages that pass under the arrastra-compartment and converge to and terminate at openings in the sides of the settler, as set forth.

ALMARIN B. PAUL.

Witnesses:

F. M. DOWNEY,

GEO. S. HOFFLEFINGER.