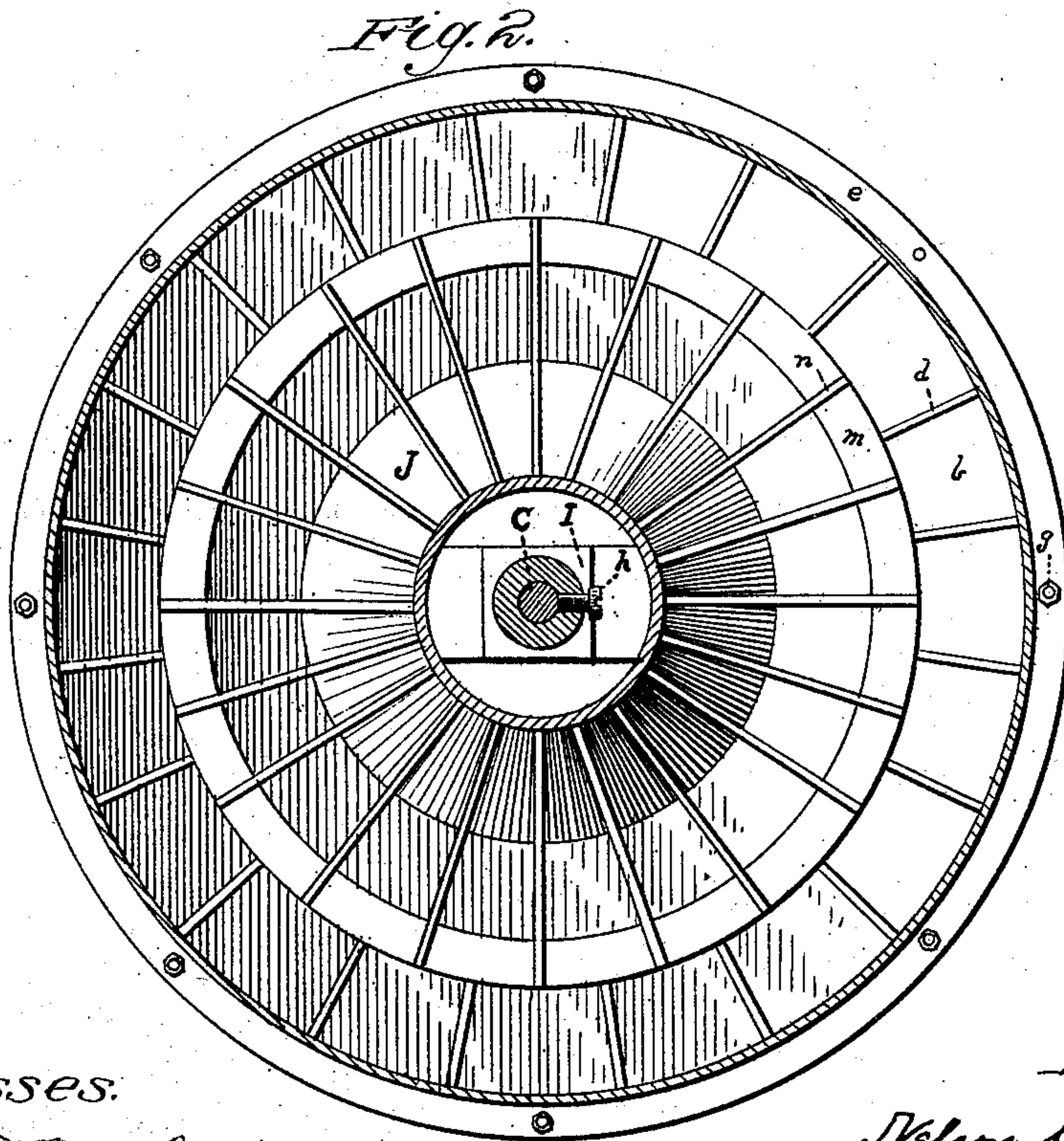
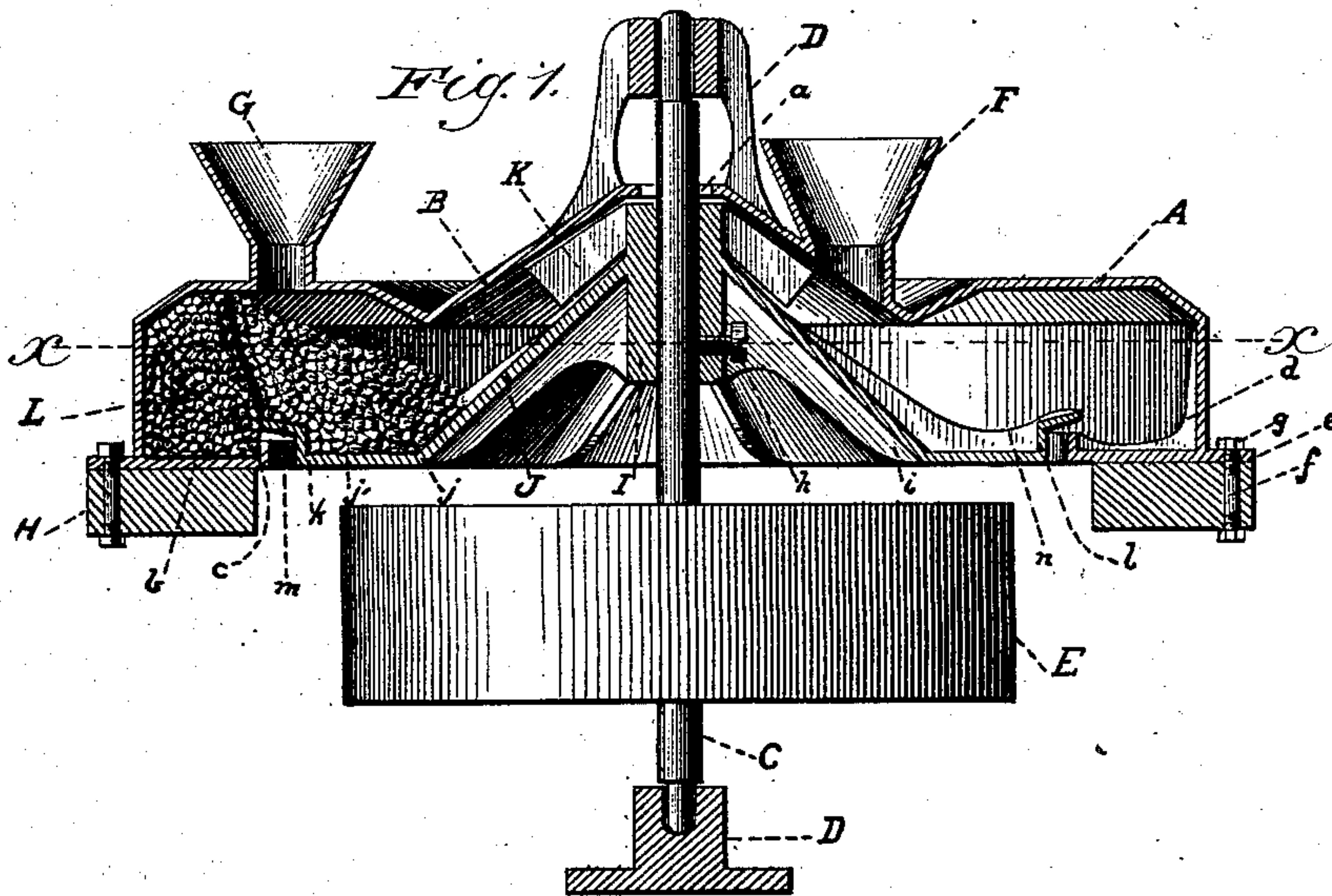


(No Model.)

N. CLEMENT.  
ORE REDUCING APPARATUS.

No. 291,294.

Patented Jan. 1, 1884.



Witnesses:

Will R. Quokando.

Louis Volting.

Inventor

Nelson Clement

By Wm. H. Lotz  
per M. J. Clapett

Atty



# UNITED STATES PATENT OFFICE.

NELSON CLEMENT, OF CHICAGO, ILLINOIS.

## ORE-REDUCING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 291,294, dated January 1, 1884.

Application filed July 24, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, NELSON CLEMENT, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Ore-Reducing Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain improvements in ore-reducing apparatus. The objects in view are to lessen the wear upon the apparatus, and to more thoroughly and perfectly reduce the ore.

The invention consists, in a mill or apparatus for reducing ore by attrition, of the novel construction hereinafter described and claimed.

Reference will be made to the accompanying drawings, which form part of this specification, and in which—

Figure 1 is a vertical section of the apparatus, and Fig. 2 a sectional plan view of same on line *xx* of Fig. 1.

Like letters refer to corresponding parts in both views.

A represents the main and stationary casing of the apparatus. This casing is of any desired size and is formed of any suitable material. It is circular in form and provided at the bottom with a circular opening, the object of which will be explained. Upon its upper face it is formed in the shape of a cone, B, said cone being provided at its upper end with an opening, through which a shaft, C, is passed, as shown. Shaft C has bearing at its lower end in a seat, D, and at its upper end in a bracket, D', formed upon the upper end of cone B. Keyed to this shaft at the point shown is a pulley, E, for imparting motion thereto.

Upon the inclined face of cone B there is formed a funnel-shaped spout, F, which opens into the interior of casing A, and into and through which the ore to be reduced is fed. A similar funnel-shaped spout is formed upon the upper face of casing A, and upon the opposite side of cone B to that occupied by spout F. This spout G also opens into casing A, and through it is forced the ore when reduced.

Upon the inner edge of the base or bottom

of casing A there is formed a vertical flange, *c*, and extending from said flange to the outer wall of said casing are a series of ribs, *d*. The base-plate *b* of casing A extends a short distance beyond the wall of the same, and forms a horizontal flange, *e*, through which are passed bolts *f*, for securing said casing to any suitable support, H, said bolts being held in place by nuts *g*.

Keyed to shaft C, by means of screw *h*, is a sleeve or hub, I, upon which is cast a cone-shaped casing, J, which is hollow and is provided on its lower side with projections *i*, which add to its strength. At the point *j* cone J is bent to form the horizontal flange *j'*, and at *k* is bent at right angle to form vertical flange *l*, said last-named flange being also bent nearly at a right angle to form inclined flange *m*.

Cast upon the upper side of cone J, and extending from about the top of said cone to the outer edge of inclined flange *m*, are a series of ribs, *n*, as shown.

Cast upon sleeve or hub I, and at points above the upper edge of cone J, are a series of wings or arms, K, which, upon the revolution of shaft C and sleeve I, serve as fans to force the reduced ore through spout G. The inclined flange *m* of cone J overlaps the vertical flange *c* of base *b*.

The operation of the apparatus is as follows: Motion is imparted to shaft C through pulley E, any suitable power being applied thereto. As this shaft revolves it carries with it sleeve I and the cone and fans cast therewith. Ore in its unreduced state is then fed through spout F and falls upon cone J, and is thrown by centrifugal force into the space formed by the base *b* of stationary casing A. This operation continues until there is formed upon said base a solid wall of ore, as at L, Fig. 1. The ore is continued to be fed through spout F, and the wall L having been formed, said ore remains upon the revolving cone J, but, by centrifugal force, is thrown against the solid wall of ore referred to, and is gradually reduced by the attrition of the two masses. The ore thus reduced to a powdered form is blown out by fans K through spout G. The ribs *d* and *n*, described as formed upon base *b* and cone J, respectively, serve to hold the two



bodies of ore more firmly in place and prevent any sliding of the same. By this operation the ore upon revolving cone J is more liable to be reduced than that upon base *b*; but as the last-named body is gradually reduced it is renewed by ore from that on cone J, a continuous solid wall of ore being thus kept on base *b*.

In case any ore should escape between flanges *e* and *m*, there may be any suitable receptacle placed thereunder to catch the same; and, further, should the circulation of air, caused by the revolution of fans K, be insufficient to force the reduced ore through spout G, said spout may be lengthened and provided with an exhaust or suction fan.

Having thus described my invention, what I claim as new therein, and that for which I desire to secure Letters Patent, is—

1. The combination, with stationary casing A, provided with an inlet-spout, F, and ribs *d*, of shaft C, and cone J, provided with ribs *m*, the parts constructed to bring two bodies of ore in contact and reduce the same by attrition, as described and shown.

2. The stationary casing A, provided with inlet-spout F, outlet-spout G, and ribs *d*, in combination with revolving cone J, provided with ribs *m*, and the fans K, as described and shown.

In testimony whereof I affix my signature in presence of two witnesses.

NELSON CLEMENT.

Witnesses:

M. J. CLAGETT,

R. G. SCHMID.