

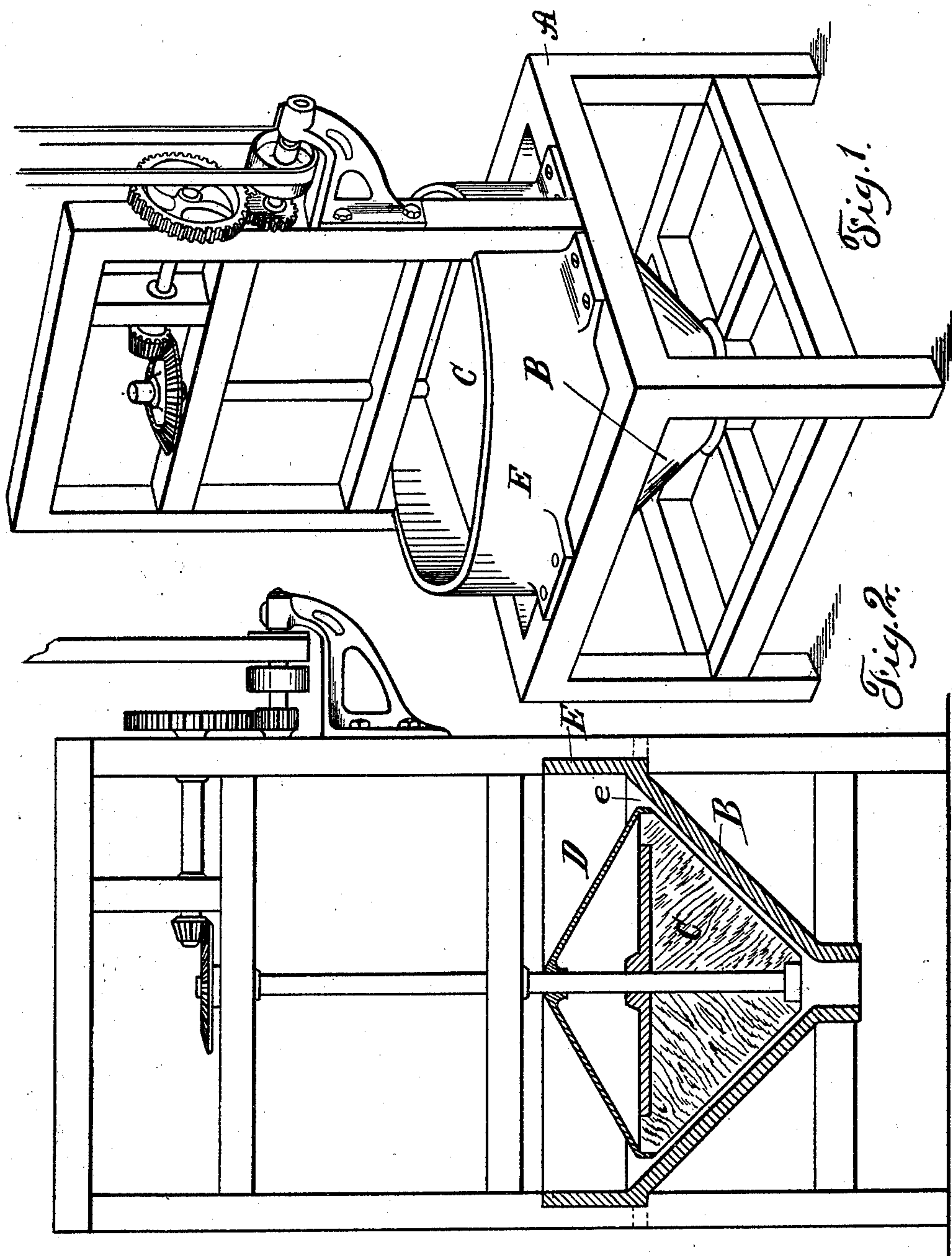
(No Model.)

M. BALMES.

MACHINE FOR GRINDING GANGUE CONTAINING CORUNDUM.

No. 509,789.

Patented Nov. 28, 1893.



WITNESSES  
*J. Clough.*  
*J. B. Bruckford*

INVENTOR  
*Michael Balmes*  
*by Parker & Burton*  
Attorneys.



# UNITED STATES PATENT OFFICE.

MICHAEL BALMES, OF DETROIT, MICHIGAN.

## MACHINE FOR GRINDING GANGUE CONTAINING CORUNDUM.

SPECIFICATION forming part of Letters Patent No. 509,789, dated November 28, 1893.

Application filed January 19, 1893. Serial No. 458,893. (No model.)

*To all whom it may concern:*

Be it known that I, MICHAEL BALMES, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Machines for Grinding the Gangue in which Corundum is Embedded; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to machines for separating and purifying corundum, and has for its object an improved milling or grinding machine, in which the material found in corundum in the mine can be ground up finely and prepared for subsequent treatment, by which the foreign particles may be separated from the particles of corundum, by either wet or dry process as may be desired. The corundum particles while very hard, are quite fragile, and are easily crushed, splintered and broken, if subjected to hard grinding or milling rolls, while the foreign matter or gangue is usually soft and easily friable, and can be reduced to powder without destroying or breaking down the corundum particles beyond the size desired for their subsequent use by employing my invention; and my invention consists primarily in a grinding mill, in which the grinding shall be effected between a hard and a comparatively soft surface, the soft surface however being hard enough to crush the softer material.

My invention is embodied in the mechanism shown in the accompanying drawings, in which—

Figure 1, shows the mill in perspective. Fig. 2, shows it in cross section.

A, indicates the framework, and B, indicates a metallic hopper or concave, within which revolves, a grinding wheel or roll C; in the form shown the concave is in the form of a conical hopper, and the grinding wheel in the form of a cone. The hopper B, is made of hard and durable material as metal, and the grinding wheel C, is made of softer material preferably of wood set with the grain per-

pendicular to the faces of the concave B, so that the ends of the grain form the holding surface within which the hard particles of corundum will partially embed themselves without being crushed, while the particles of softer material will be crushed between the wooden grinding wheel C, and the hard metallic concave B. The grinding operation is aided by the small particles of corundum which become temporarily embedded in the wooden blocks that form the grinding roll C; these small particles of material are caught and carried around with the wheel and serve to cut and grind the softer material that they come in contact with in their travel.

D indicates a conical cover which serves to guide material placed in the hopper into the opening c.

E, indicates the retaining walls of the hopper in which the material is placed.

Motion is given to the grinding roll C, from any convenient source of power through suitable gearing.

It is evident that the form of the grinding mill may be varied without departing from the spirit of my invention, which consists in the employment of a soft moving roller or wheel acting in conjunction with a hard concave serving through its peculiar quality of allowing particles of corundum to become temporarily embedded in it, to utilize these particles of corundum as a cutting and grinding medium by which the softer gangue is reduced to powder.

What I claim is—

In a machine for reducing the gangue accompanying corundum, the combination with a concave of hard material, of a rotating grinding wheel, composed of blocks of wood set with the grain perpendicular to the surface of the concave and adapted to temporarily hold the hard particles of corundum, substantially as and for the purpose specified.

In testimony whereof I sign this specification in the presence of two witnesses.

MICHAEL BALMES.

Witnesses:

CHARLES F. BURTON,  
EFFIE I. CROFT.