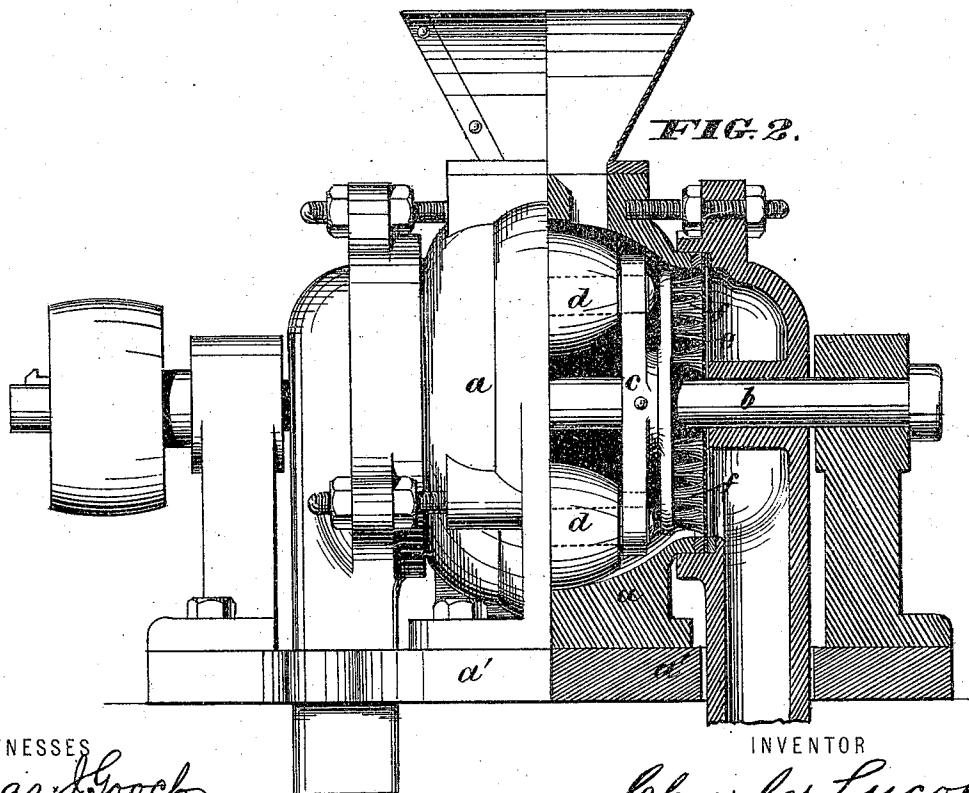
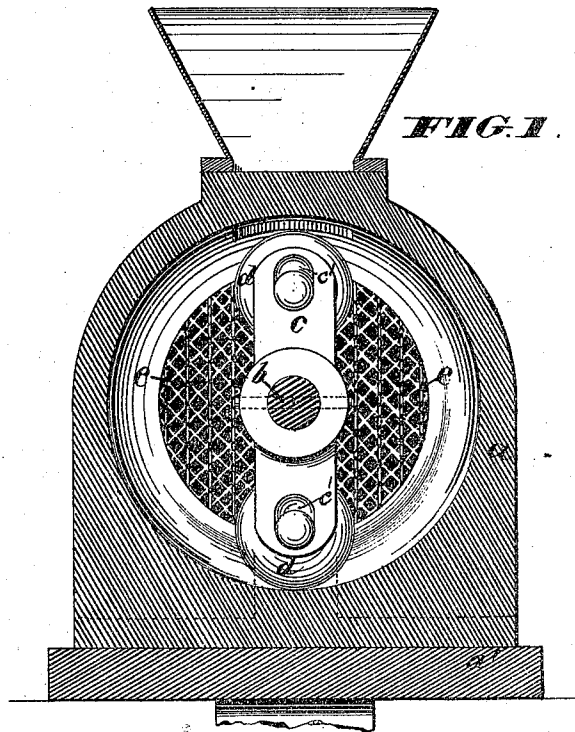


C. LUCOP.

MACHINERY FOR GRINDING AND PULVERIZING GRAIN, ORES, &c.

No. 173,411.

Patented Feb. 15, 1876.



WITNESSES
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UNITED STATES PATENT OFFICE.

CHARLES LUCOP, OF SOUTHWARK, ASSIGNOR OF ONE-HALF HIS RIGHT TO
NATHAN GOLD KIMBERLEY, OF LONDON, ENGLAND.

IMPROVEMENT IN MACHINERY FOR GRINDING AND PULVERIZING GRAIN, ORES, &c.

Specification forming part of Letters Patent No. **173,411**, dated February 15, 1876; application filed
November 11, 1875

To all whom it may concern:

Be it known that I, CHARLES LUCOP, of Southwark, in the county of Surrey, England, have invented certain new and useful Improvements in Machinery for Grinding and Pulverizing Seed, Grain, Ores, and other substances, of which the following is a specification:

This invention relates to new or improved machinery for grinding, crushing, pulverizing, and reducing to powder various vegetable, mineral, or animal substances, such as seed, grain, ores, lime, cement, black-lead, plaster, colors, baryta, sulphur, glass, or other substances, which, according to my invention, is accomplished by means of centrifugal force.

Machinery arranged and combined in accordance with my invention may be constructed as shown in the accompanying drawings, in which—

Figure 1 is a transverse section. Fig. 2 is a front elevation, partly in longitudinal section.

The machine is constructed with a circular metal or other casing, *a a*, of a flat, elliptical, or other form; or it may be of a long flat-sided, oblong, or other suitable form. This casing *a* is fixed firmly on a bed-plate, *a' a'*, or other secure foundation. A shaft, *b*, passes through the center, and has keyed upon it arms *c c*, to act upon a ball, sphere, or roller, of metal or other material, or a series of them, and when the shaft *b* revolves at, say, three hundred revolutions, more or less, per minute, the balls *d* or other bodies are carried round by the arms *c c*, and by the centrifugal action they fly off from the centers and run on the interior periphery of the casing *a*, and thus, by cen-

trifugal force, crush, grind, and pulverize the substances they come in contact with. The sides of the casing may be perforated or formed as open wire sieves *e e* of the required fineness stretched over openings, and regulated by suitable means. A series of brushes, *f f*, attached to, and revolving with, the central shaft *b*, may be arranged to pass over the inner surface of the sieves *e e*, and thereby brush the material under treatment through as it is pulverized.

If desired, rotary motion may be given to the casing in an opposite direction to the arms. For some purposes, when it is desired to reduce the substance treated to a granular state only, I prevent the balls, spheres, or rollers *d* from acting upon the inner circumference of the casing *a* by inserting bearings or packing within the outer ends of the slots *c' c'* of the arms *c c*, in order to regulate the distance to which the rollers are allowed to travel toward the inner periphery of the casing *a*.

Having thus described the nature of my invention, and the manner of performing or carrying the same into practice, what I claim as new, and desire to secure by Letters Patent, is—

The machine constructed, substantially as described, with a central shaft, *b*, arms *c c*, and balls or roller *d*, carried by slots *c' c'* in the said arms, to permit of free centrifugal action of the balls or rollers, substantially as set forth.

CHARLES LUCOP.

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