No. 646,204. Patented Mar. 27, 1900.

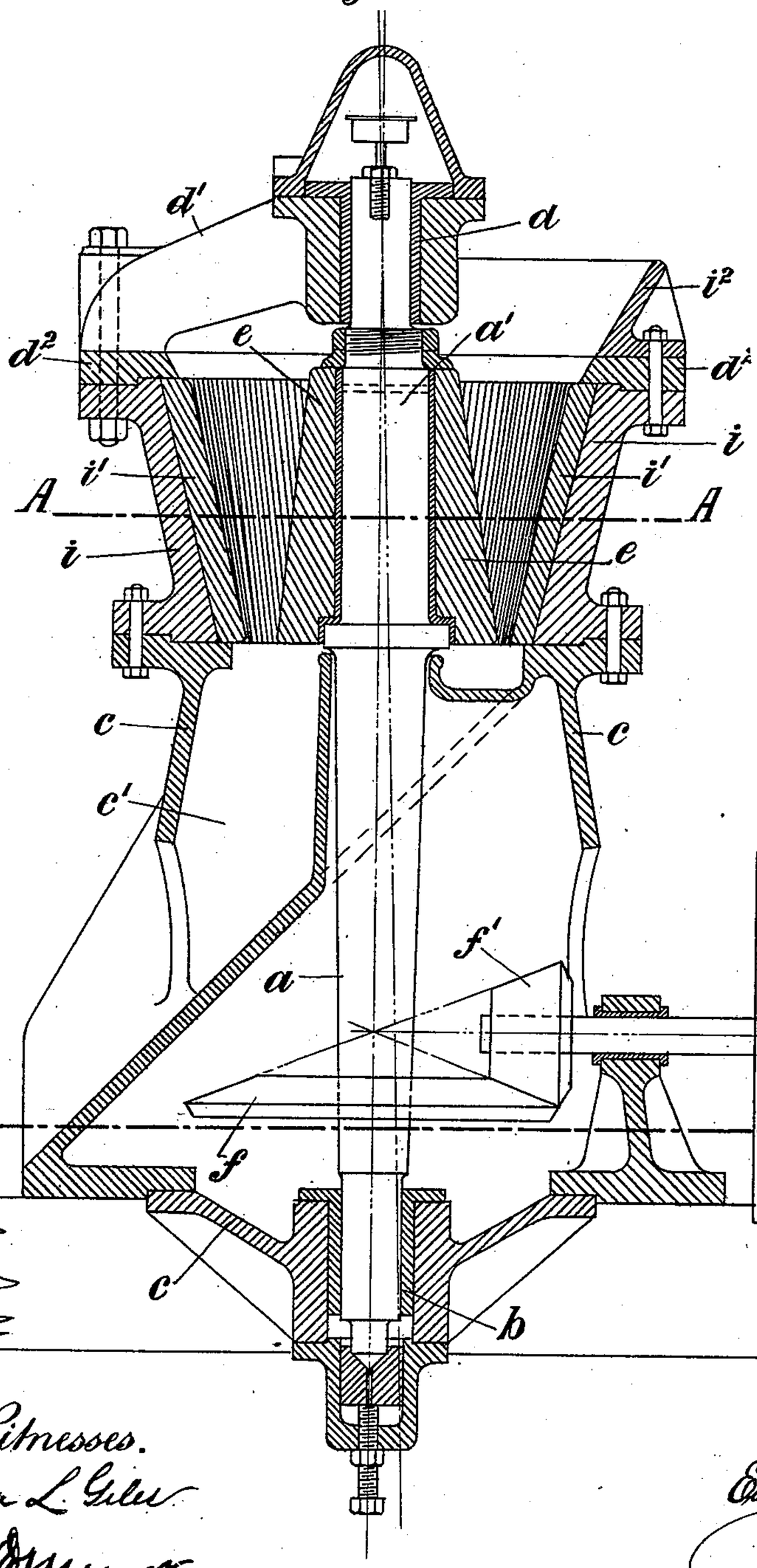
E. COMERFORD.

ORE OR ROCK BREAKING MACHINE.

(Application filed Apr. 29, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses.
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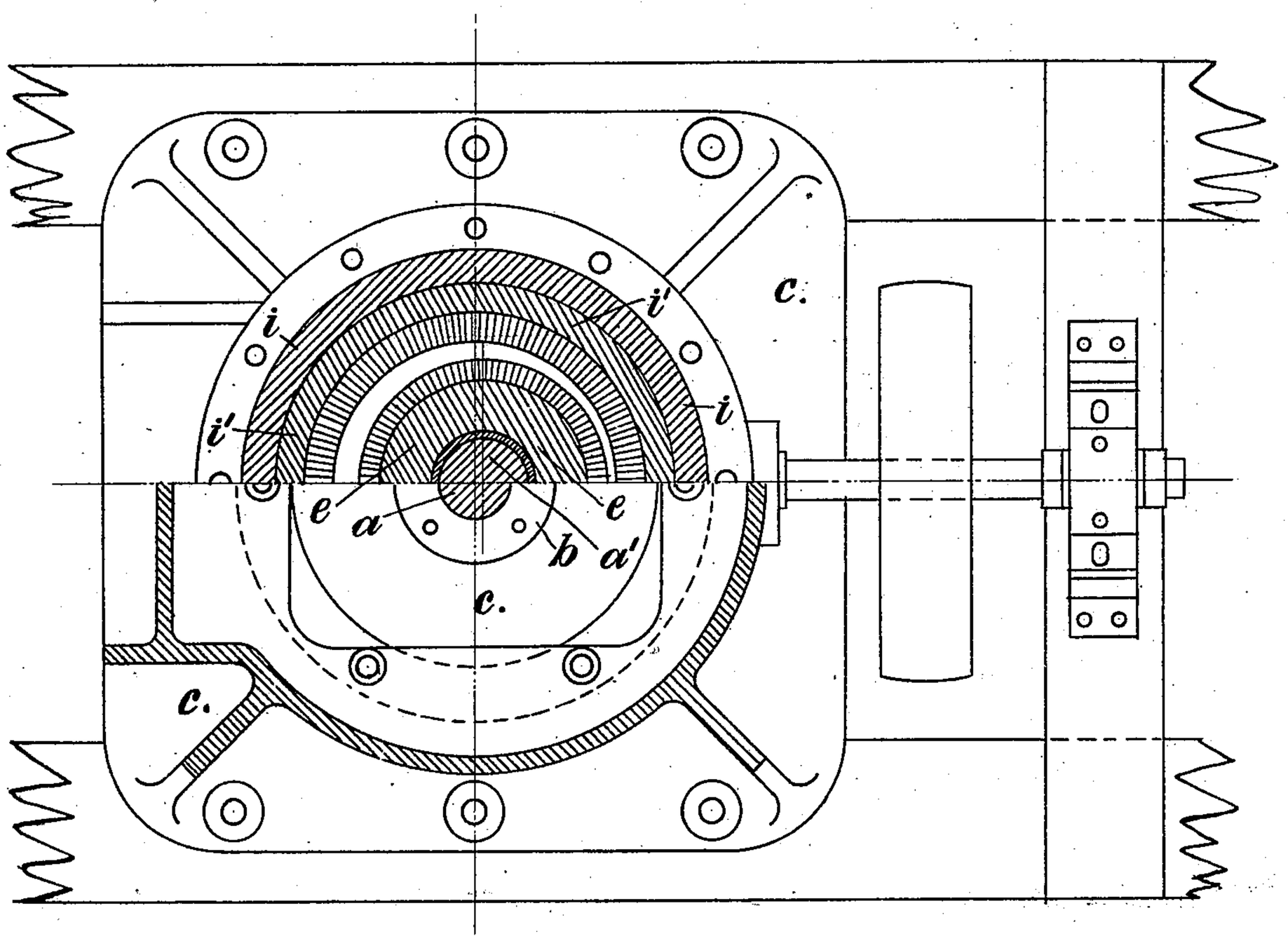
Fig. 2.



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UNITED STATES PATENT OFFICE.

EDWARD COMERFORD, OF LIVERPOOL, ENGLAND.

ORE OR ROCK BREAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 646,204, dated March 27, 1900.

Application filed April 29, 1899. Serial No. 714,972. (No model.)

To all whom it may concern:

Be it known that I, EDWARD COMERFORD, a subject of the Queen of England, and a resident of Liverpool, England, have invented certain new and useful Improvements in Ore or Rock Breaking Machines, of which the following is a specification.

This invention has reference to machinery for breaking rock, ore, or the like of the type in which a rotating barrel is mounted on a vertical shaft which revolves, the barrel being disposed within a stationary outer hopper or case and the revolving and stationary parts being respectively coned or tapered inward and outward from below.

According to this invention in a machine of this type the vertical shaft of the machine is supported in bearings above and below and centrally or practically centrally with—that is, on the same axis as—the axis of the outer casing or body, while a revolving crushing-barrel is carried eccentrically on this shaft and in the outer stationary case or body, and also the axis of this crushing-barrel is disposed at an inclination to the axis of the shaft.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section illustrating the machine; and Fig. 2 is a plan in section taken half at the line A A and half at the line B B, Fig. 1.

Referring now to the drawings, *a* is the vertical shaft, *e* is the crushing-barrel on this shaft, and *i* is the outer case or body. The body *i* is coned and has an inner lining *i'* with an internally ribbed or roughened surface, while the rotating barrel *e* is also coned, as described, in the opposite direction and has a ribbed or roughened outer surface, and the material to be crushed is introduced into the eccentric funnel-shaped space between the roughened surfaces of *i* and *e*.

The shaft *a* is mounted by a footstep-bearing *b* below, supported in the frame *c* of the machine, and in an upper bearing *d* above the crushing-barrel *e*, which is supported from the hopper i^2 of, and fastened to, the upper edge of the body *i* by three radial arms (one of which is seen and marked *d'*) and a ring d^2, cast in one piece and fitting in between the fastening-flange of the hopper i^2 and the case *i*. This flange holds by an inwardly-projecting ledge (as shown) the liner *i'* in position in *i* by resting on its upper ledge.

The shaft *a* passes through the crushing-barrel *e* and carries it loosely upon it, and at this part it is provided with a cylindrical portion *a*, the axis of which is eccentric to the bearing-axes of the shaft *a*, and also its axis is disposed at an inclination as well as eccentric to the axis of *a*, and the degree of eccentricity of *e* to the axis of *a* is greater at the lower end or base than at the upper end. The crushing-barrel *e* being itself circular in cross-section and its exterior surface concentric with the axis of the hole or bore in which the shaft portion *a'* lies, the eccentricity of the outer surface of *e* is of course due to the eccentricity of the portion *a'*. However, it is to be understood that the construction by which the eccentricity of the outer surface of *e* is obtained is not restricted to that just described and shown.

On the lower part of the shaft *a* there is a driving bevel-gear wheel *f*, and meshing with it is another bevel-pinion *f'* on a shaft *g*, which is driven by belt or other suitable gearing.

It will be seen from this description that as regards this type of machine, the shaft *a* is truly concentric with the general axis of the machine and is mounted in simple bearings below and above, and thereby the bearings, mountings, and mode of operating the shafts, such as are usually employed in this type of machine, and their costliness, intricacy, and difficulty of repair and upkeep are obviated, while as regards effect, the result and action due to this eccentric and inclined disposition of the crushing-barrel, as described, is equivalent to that of the other machines both in its mode of action on the material and results.

With regard to the base *c* of the machine this is generally of the usual type, and the action is similar to that of the ordinary machine—namely, the rock, ore, or other matter to be crushed is introduced above by way of the hopper i^2 into the larger eccentric annulus between the liner *i'* and the barrel *e*, and it is discharged through the smaller eccentric annulus between the lower edges of these two parts into the discharge-trough *c'* below.

What is claimed in respect of the herein-described invention is—

In a rock, ore, or analogous breaking ma-

chine, the outer conical body having its axis vertical, an inner loosely-mounted crushing-barrel *e*, and a vertical operating-shaft *a*, having its bearing-axes at the upper and lower ends concentric with the axis of the body, and having an eccentric portion *a'* on which the said crushing-barrel *e* is mounted and free to revolve, with its axis inclined outward from the upper end toward the lower end, whereby the eccentricity of the lower part of said barrel-bearing portion *a'*, is greater than the eccentricity of the upper part, substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

EDWARD COMERFORD.

Witnesses:
JOHN H. WALKER,
JNO. W. BROWN.