

(No Model.)

C. FORSTER.
GRINDING MILL.

No. 250,432.

Patented Dec. 6, 1881.

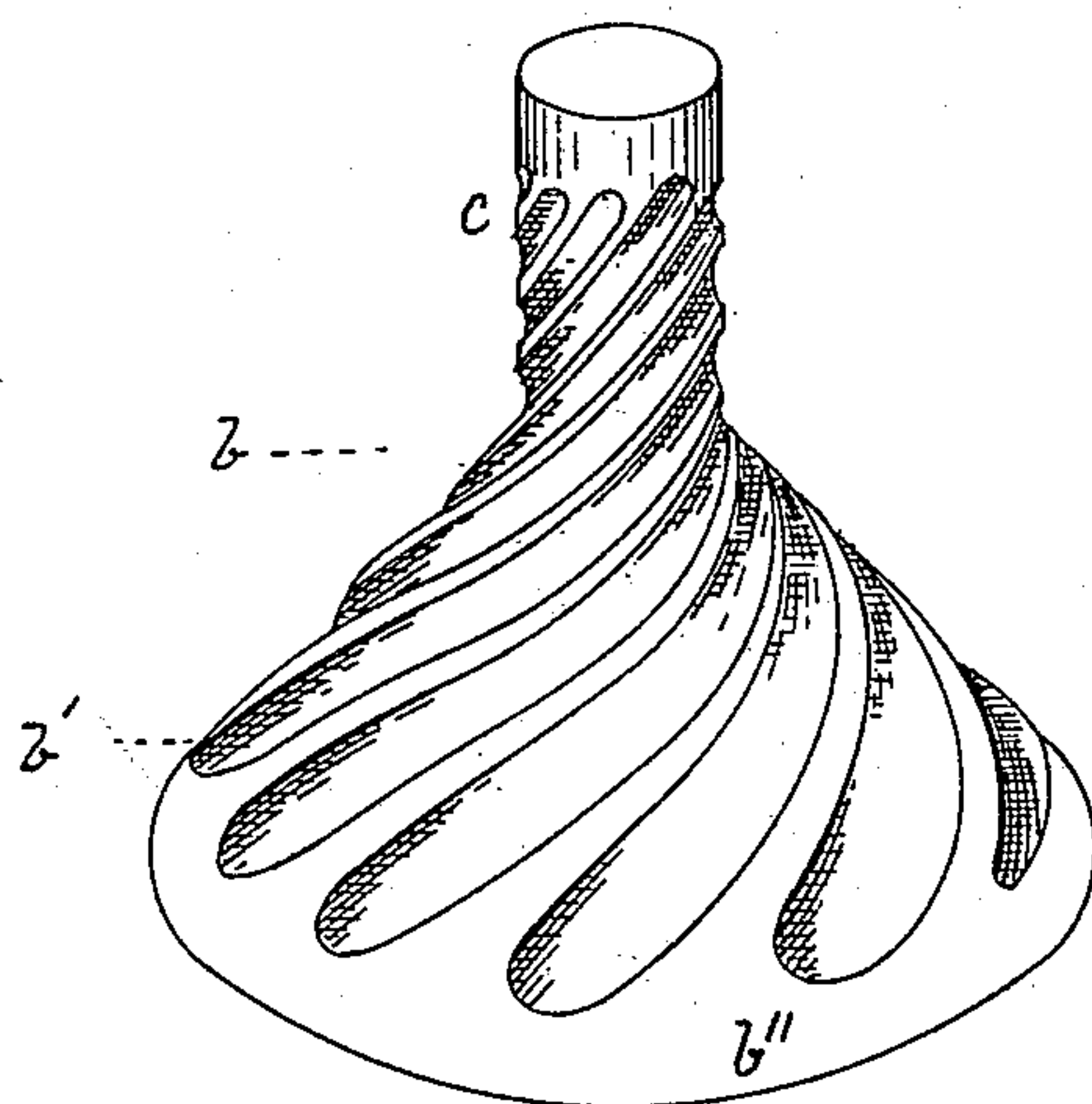
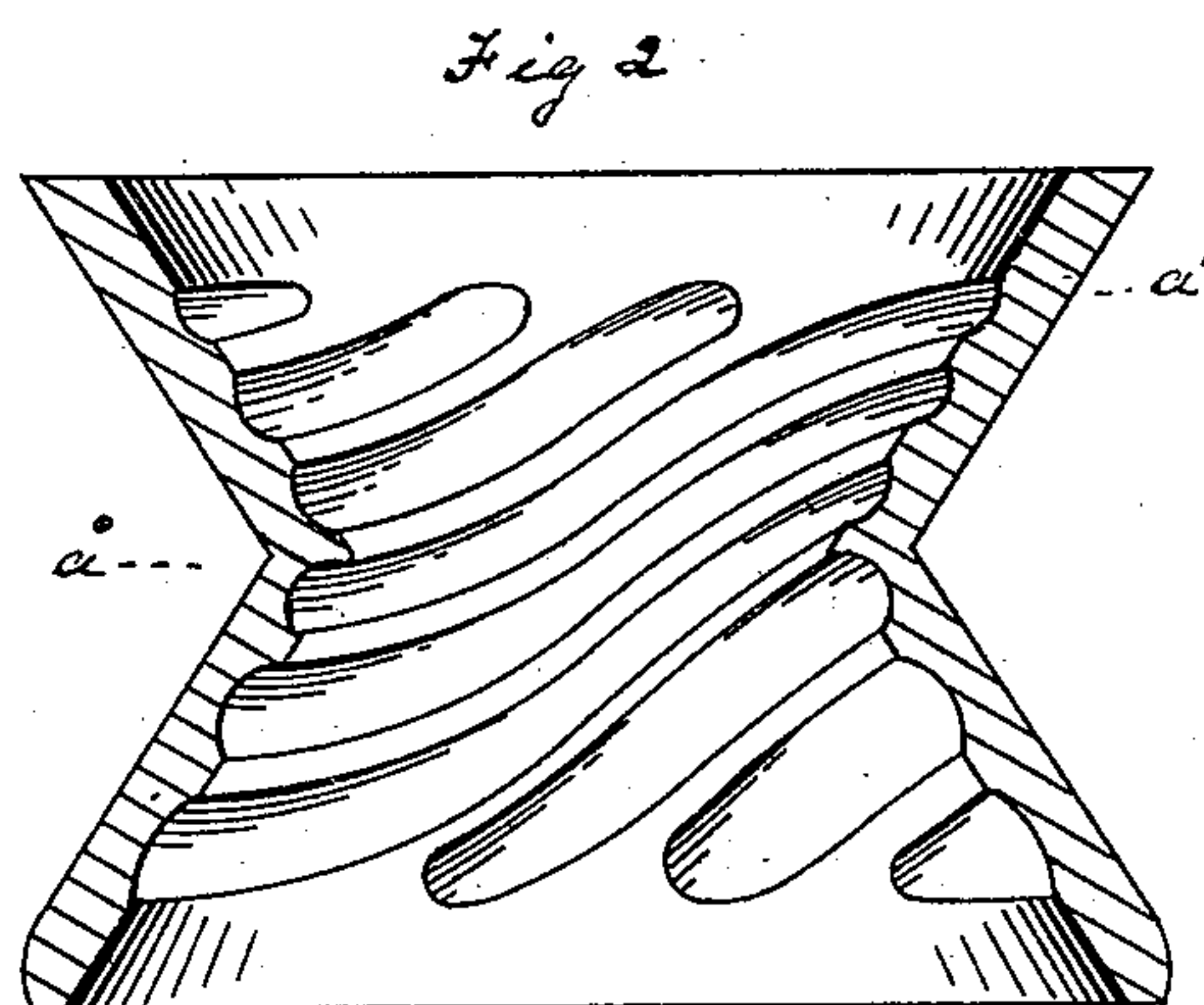
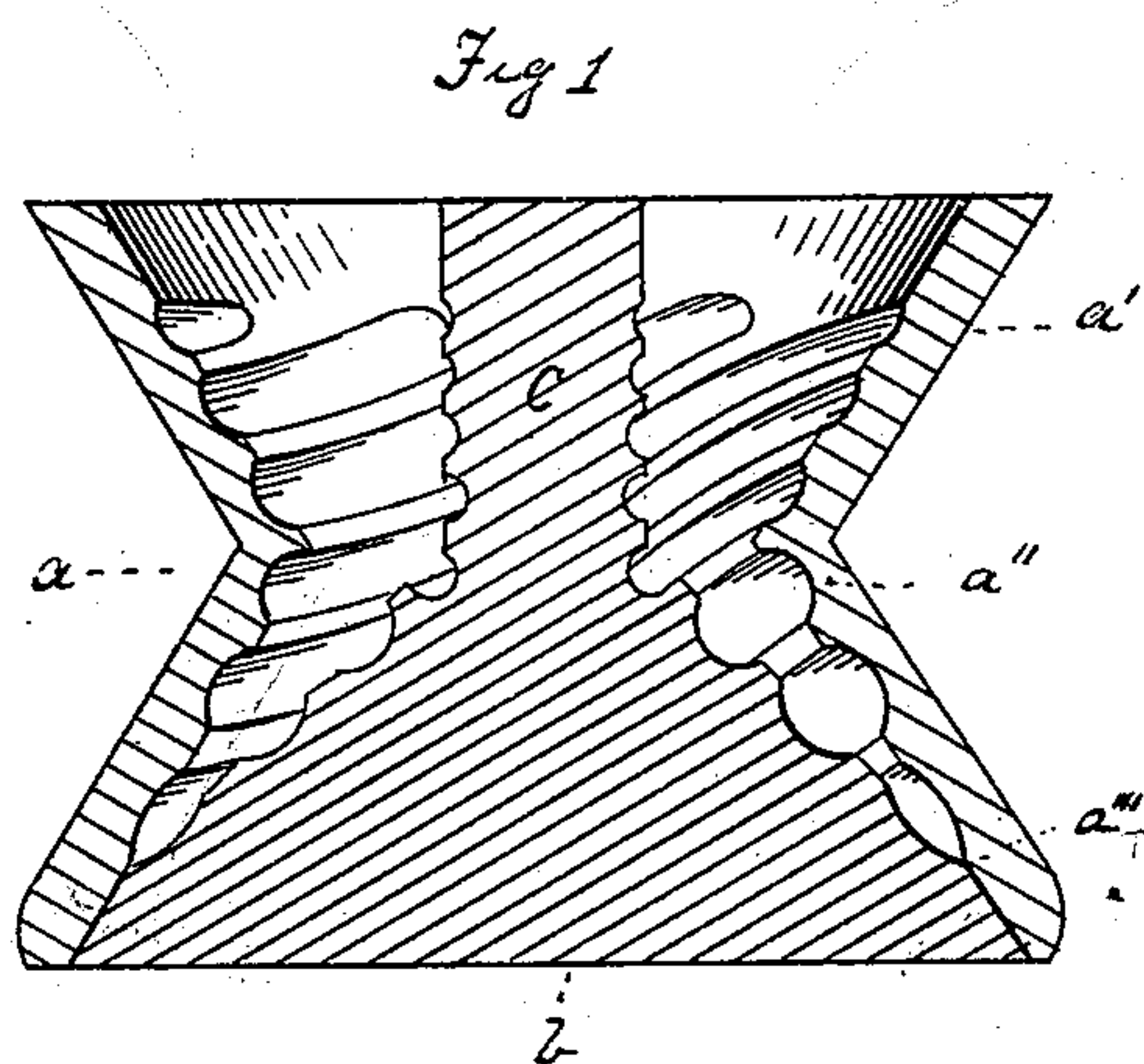


Fig. 3.

Witnesses—

J. H. Smith
Lo. C. Fidler.

Inventor—

Charles Forster
by his attorneys
Ratwell & Co.

UNITED STATES PATENT OFFICE.

CHARLES FORSTER, OF PITTSBURG, PENNSYLVANIA.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 250,432, dated December 6, 1881.

Application filed September 21, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FORSTER, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Grinding-Mills; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to an improvement in grinding-mills for grinding lime, quartz, chalk, and like substances; and it consists of a mill having an inner cone over which is an outer shell, the grinding-surfaces of which are provided with grooves extending spirally downward and gradually decreasing in depth from the top and increasing in width to within a short distance of the base. Between these grooves are ridges or lands having a flat surface. At the base of the shell and cone the surfaces are quite smooth and touch each other. At or about the point where the grooves end the surfaces separate from each other at an acute angle upward, so as to gradually increase the distance apart between the shell and the cone.

Heretofore grinding-mills for lime, chalk, &c., have been provided with grooves or teeth extending to a point near the base of the cone and shell. From this point to the base the surfaces were provided with diamond-shaped teeth, which served to pulverize and deliver the substance ground. When, however, these teeth became worn the mill would not deliver the ground lime and became useless. In my mill the crushed lime or other substance is carried down the spiral grooves, is forced between the smooth surfaces at the base, and is thence delivered in a pulverized condition.

I will now describe my invention, so that others skilled in the art may manufacture and use the same, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional view, showing the shell and grinding-cone of my improved mill. Fig. 2 is a sectional view of the shell. Fig. 3 is an elevation of the grinding-cone.

Like letters of reference indicate like parts in each.

In the drawings, *a* represents the outer shell, the lower portion of which is shaped in the form of a frustum of a cone, at the top of

which the shell widens, so as to form the hopper *a'*. From the point *a'* on the inner surface of the shell grooves *a''* extend spirally down along the surface to the point *a'''*. From the point *a'''* to the base of the shell the surface is perfectly smooth. Inside of the shell *a* is a grinding-cone, *b*, upon the surface of which are grooves *b'*, similar to the grooves *a''* on the surface of the shell *a*, excepting that they extend spirally downward in the opposite direction to the grooves on the shell. From the point where the grooves end on the cone *b* to the base of the cone is a smooth surface, *b''*. The surface of the lands or spaces between the grooves is smooth. From the upper portion of the cone *b* extends a cylinder, *c*, to a point on a level with the top of the hopper *a'*. The grooves *b'*, which extend down the cone *b*, start from the top of this cylinder, which may be formed in one piece with the cone. The cone *b* is suitably mounted, so as to turn in the shell *a*, the plain surfaces of the shell and cone at their base touching each other. From this point, however, the grinding-surfaces of the cone and shell separate from each other at an acute angle, increasing the distance apart to the point where the hopper of the shell flares outward.

The operation is as follows: The lime, chalk, or other substance to be ground is placed in the hopper of the mill, the cone revolving. The lime or other substance is broken by the spaces between the grooves, and is carried down the grooves and is delivered between the smooth surfaces at the base of the mill in a finely-ground condition, where it is pulverized and discharged from the mill.

The advantages of my invention are that the lime, &c., is more thoroughly ground than could be done with the mills now in use, and my mill will last much longer than other mills, as it has no teeth to become dull and wear away, thereby decreasing the efficiency of the mill until it becomes worthless.

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

1. The combination, in a grinding-mill, of an outer shell and an inner cone, the grinding-surfaces of which are provided with grooves extending spirally to a point near the base of

the same, the grooves on the cone extending in an opposite direction to the grooves on the shell, and arranged so as to leave lands or spaces having a smooth surface situated between said grooves, the lower portion of the grinding-surfaces of the cone and shell being smooth, substantially as and for the purpose specified.

2. The combination, in a grinding-mill, of an outer shell and an inner cone, the grinding-surfaces of which are provided with grooves extending spirally to a point near the base of the same, the grooves on the cone extending in an opposite direction to the grooves on the shell, said grooves being arranged to leave lands or spaces having a smooth surface situated between said grooves, the lower portion of the grinding-surfaces of the cone and shell being smooth, and the grinding-surfaces of the cone and shell separating from each other at

an acute angle from the bottom of the grooves, substantially as and for the purposes described.

3. In a grinding-mill, the combination of the outer shell, the upper portion of which is formed in the shape of a hopper, and a portion of the inner surface of the shell being provided with grooves extending spirally thereon, and an inner cone, from the upper portion of which a cylinder extends to the top of the hopper, the surface of the cylinder and a portion of the surface of the cone being provided with spiral grooves, the lower portion of the grinding-surfaces of the shell and cone being smooth, substantially as and for the purposes specified.

In testimony whereof I have hereunto set my hand.

CHARLES FORSTER.

Witnesses:

JAMES K. BAKEWELL,
L. C. FITLER.