

R. D. GRANGER.
Grinding Mill.

No. 19 559.

Patented March 9, 1858.

Fig. 1.

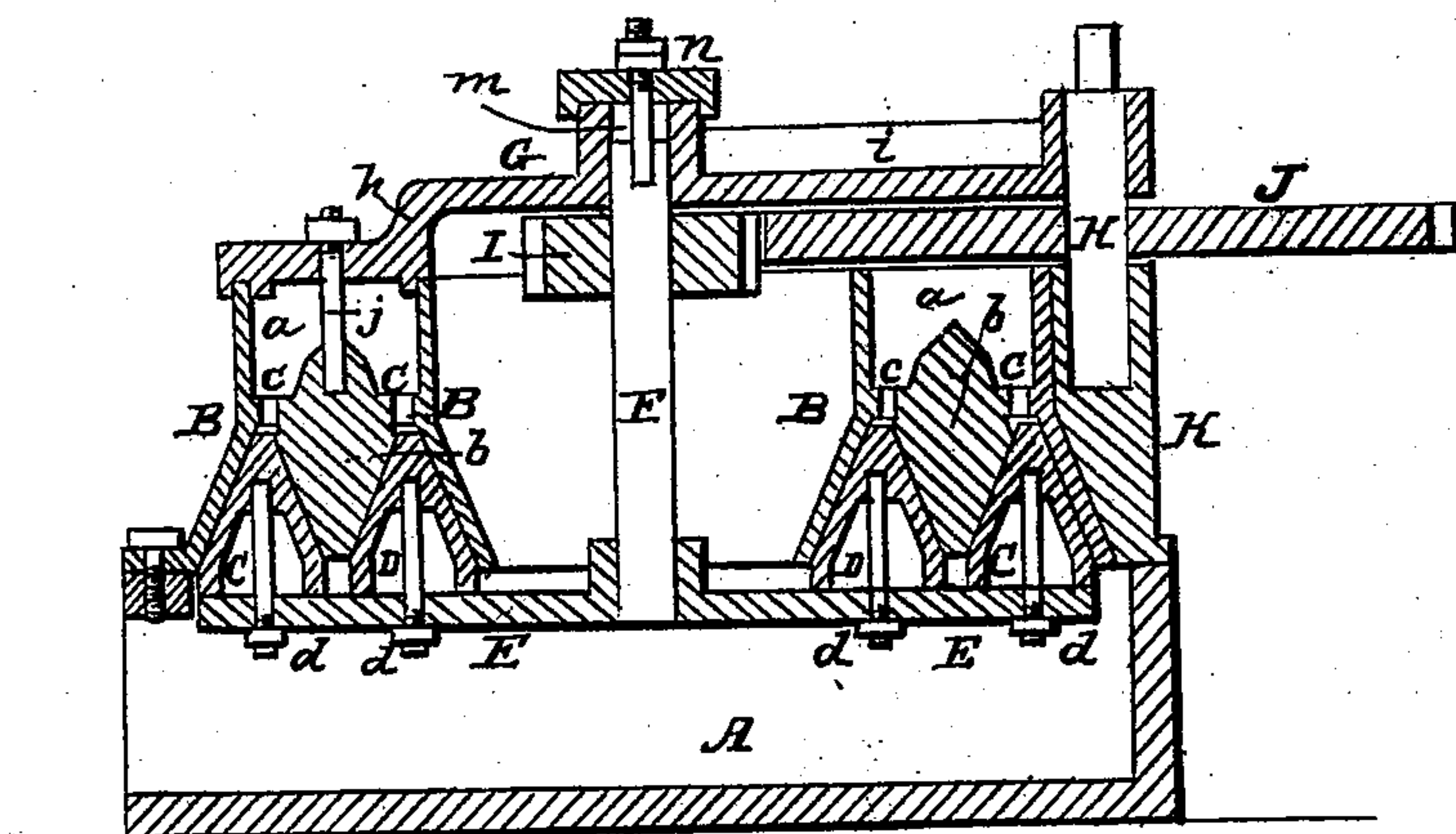
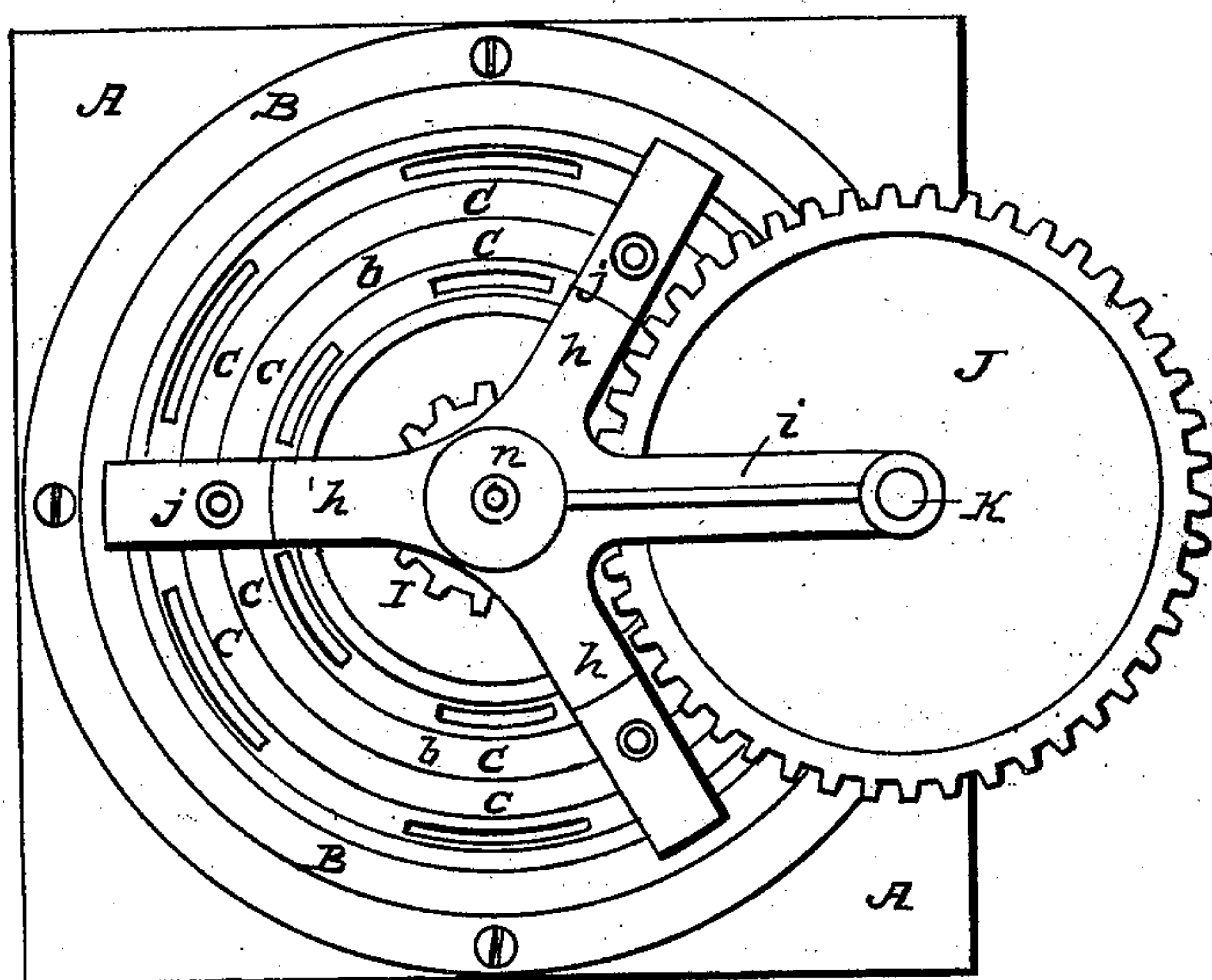


Fig. 2.



UNITED STATES PATENT OFFICE.

R. D. GRANGER, OF PHILADELPHIA, PENNSYLVANIA.

GRINDING-MILL.

Specification of Letters Patent No. 19,559, dated March 9, 1858.

To all whom it may concern:

Be it known that I, RENSSELEAR D. GRANGER, of the city of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Mills; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention relates to improvements in mills having a number of annular grinding cones, and my improvements consist in a mode of admitting the grain or other material to the separate grinding surfaces, whereby the proper amount may be distributed to each, and in a novel arrangement of gearing fully described hereafter, by the adoption of which, the mill may be driven either by the ordinary lever, to which a horse is hitched or by a belt.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawing, which forms a part of this specification; Figure 1 is a sectional view of my improved grinding mill. Fig. 2 a ground plan of the same.

A is the box for receiving the ground materials. To the top of this box is secured the annular shell B, the upper portion *a* of which forms the hopper for receiving the materials to be ground. The lower portion is divided by the intermediate piece *b* into two annular, angular recesses, both sides of each recess having cutting and grinding teeth similar to those of ordinary mills. The upper portion of the shell or hopper is divided from the lower or grinding portion, by the intermediate piece *b* and a partition on each side of the same, through which are a series of openings *c c* for the passage of the material to be ground.

Adapted to the outer angular, grinding recess of the shell is the annular bur C, and to the inner recess of the shell, the inner annular bur D, both burs being secured by bolts *d d* to the cross bar E, and the latter being secured to the vertical spindle F, the upper end of which turns in the central hub of the bridgetree G. The latter has four arms, three of them (lettered *h*) being secured to the hopper by means of bolts *j*, which are attached to the intermediate piece

b. The fourth arm *i* projects horizontally and terminates in a hub, in which turns the upper end of the driving shaft H, the lower end turning in a projection *k*, which is attached to or forms a part of the shell B. The shaft F is furnished at the top with a bolt *m*, which passes through a washer *n* on the central hub of the bridgetree, the end of the bolt being furnished with nuts, by turning which in one direction or the other the grinding surfaces of the burs may be brought nearer to or removed farther from those of the shell. A pinion I on the shaft F gears into the wheel J on the driving shaft H, the cogs of the pinion being broader than those of the wheel, in order that both may remain in gear when the shaft and the burs are raised or lowered by the nuts of the bolt *m*.

It will be observed, that the intermediate piece *b* is carried upward into the hopper, so as to provide the latter into two smaller hoppers, one for the outer and the other for the inner grinding portion of the mill. It should be understood that the teeth in the upper grinding surface of the shell and burs are coarser than those in the lower portion of the same, and that the general disposition of the teeth is varied according to the nature of the material to be operated upon.

The burs being set in motion, by turning the shaft H, the grain or other substance will drop through the orifices *c c*, and, being acted upon by the grinding surfaces of the shell and burs, will be reduced to the required consistency, and be dropped into the box A. As the outer bur moves over more space, in the same time, than the inner bur, and has consequently more duty to perform, the orifices *c c* of the former must be larger or more frequent than those of the latter; and as each set of orifices has its own hopper, there is no fear of the grain crowding more into one set of orifices than the other.

In grinding mills of a large size, in which other than manual power is required, great difficulty has been found in readily adapting them to be driven at pleasure by either a belt or the ordinary lever, to which a horse is hitched. This change cannot be affected without a great loss of time, and without removing and adding complicated machinery.

By the peculiar arrangement of the gear wheels I and J, and their situation as regards the bridgetree, I am enabled to effect this change in a moment; for should horse-

power be required to drive the mill, one end of a lever is attached to the top of the driving shaft H and a horse hitched to the other end, in which case, the horse will move in a track eccentric with the shell and burs, instead of concentric with them as in other mills. Should it be desirable to drive the mill by means of a belt, the lever is removed and a pulley attached to the top of the shaft. The use of a large driving wheel, gearing into a smaller one on the bur, as applied to mills to be driven by horsepower, presents the further advantage over the ordinary mills, in which the lever is attached directly to the bur, of allowing the use of a much increased length of lever, without diminishing the speed of the bur, and consequently allowing a much greater diameter of track for the horse to traverse, the advantage of which is well known.

Without laying any exclusive claim to the employment of two more grinding cones, and without confining myself to any par-

ticular number of such cones, I claim and desire to secure by Letters Patent:

1. So constructing grinding mills having any convenient number of annular concentric, grinding cones, that each cone shall have its own hopper, communicating with the general hopper, and its own set of feed openings, substantially as herein set forth and for the purpose specified.

2. The combination of the bridgetree G, as secured to the shell B; the bur shaft F with its pinion I; and the shaft H with its wheel J, when each is arranged in relation to the other, substantially as herein set forth and for the purpose specified.

In testimony whereof, I have signed my name to this specification before two subscribing witnesses.

RENSSELEAR D. GRANGER.

Witnesses:

HENRY HOWSON,
HENRY ODIORNE.