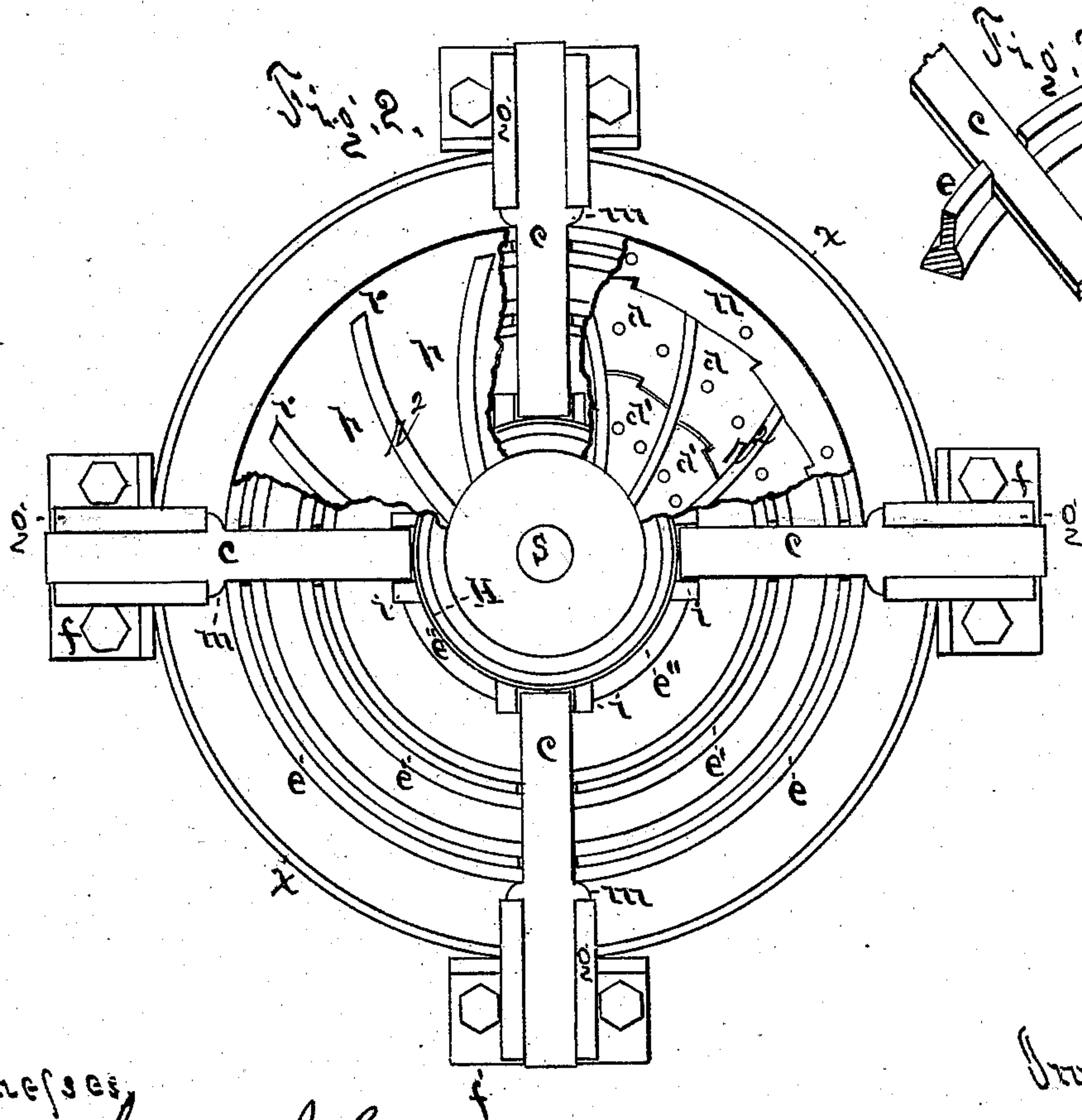
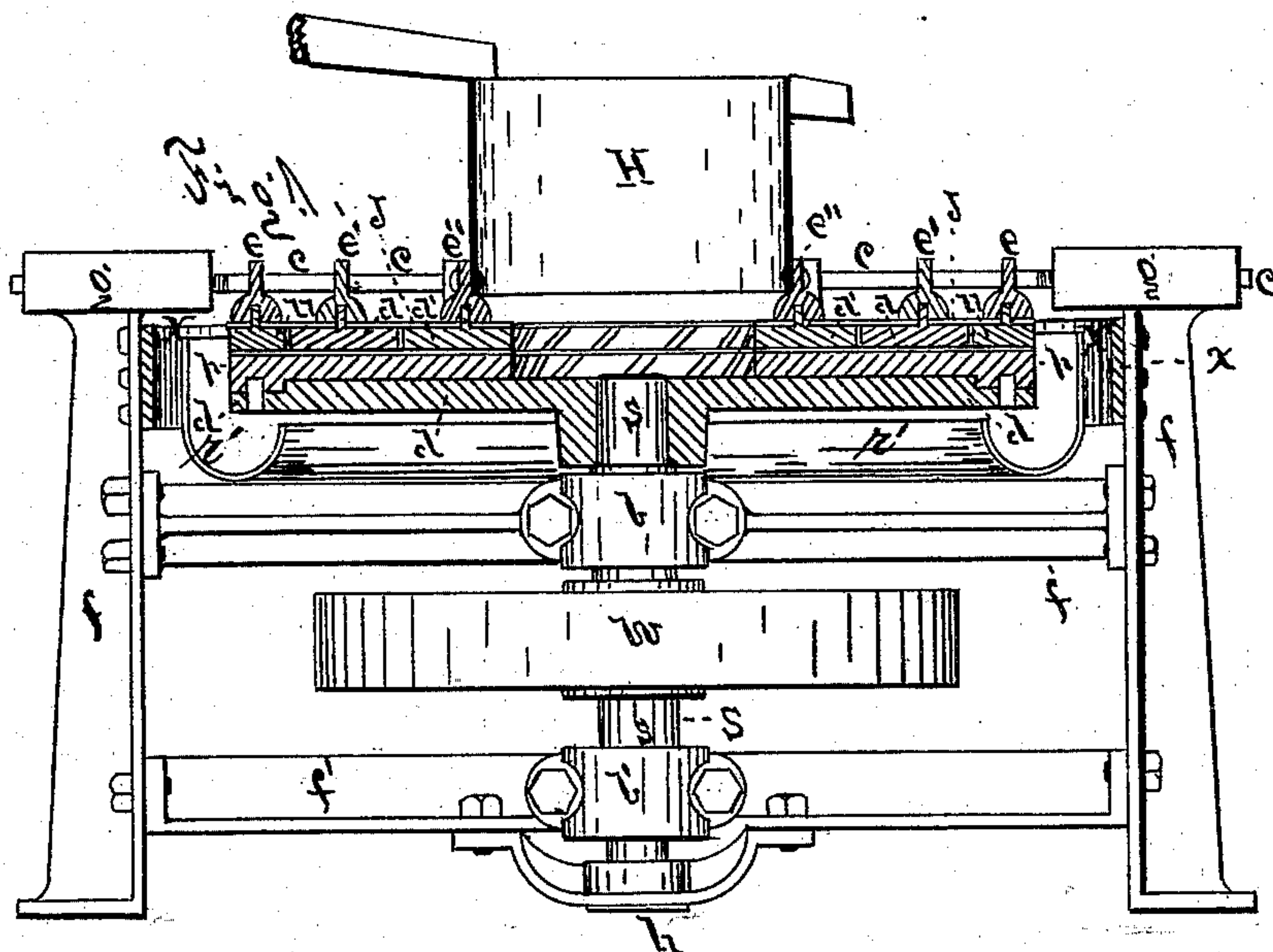


G. JOHNSTON.  
Ore Grinding Mill.

No. 237,288.

Patented Feb. 1, 1881.



Witnesses,

James J. Carter  
Oliver P. Buckley

Inventor,

George Johnston  
per Atty.  
A. S. Waterhouse,



# UNITED STATES PATENT OFFICE.

GEORGE JOHNSTON, OF SACRAMENTO, CALIFORNIA.

## ORE-GRINDING MILL.

SPECIFICATION forming part of Letters Patent No. 237,288, dated February 1, 1881.

Application filed December 11, 1879.

*To all whom it may concern:*

Be it known that I, GEORGE JOHNSTON, of the city of Sacramento, in the county of Sacramento and State of California, have invented certain new and useful Improvements in Ore-Grinding Mills; and I do hereby declare that the following is a full, clear, and exact description thereof, sufficient to enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawings, with reference-letters marked thereon, in which—

Figure 1 is a vertical section, partly in side view, of my improved ore-mill. Fig. 2 is a plan view thereof, with the flexible or rubber material between the rings and the grinding-shoes broken away, exposing the grooves or furrows between the shoes; and Fig. 3 is a detailed perspective view of the same.

This invention has relation to improvements in ore-grinding mills; and it consists of the construction, combination, and arrangement of parts, substantially as hereinafter more fully set forth and claimed.

In the accompanying drawings, *x* indicates a circular case bolted to suitable uprights, *f*, and having around its lower edge a similar bottom or trough, *r'*, to receive and permit of the carrying off of the ground ore. Secured upon a shaft, *S*, having a driving-pulley, *w*, and supported in the boxes *b b'* of the cross-pieces *f' f'* of the uprights *f*, and in the step *h* of the lower cross-piece, is a disk, *d*, upon which is secured a second disk, *p*, having a series of curved slots or furrows, *r<sup>2</sup>*, radiating from a central opening and terminating at *r*, a short distance inward from the periphery or circumference of the disk. These furrows, in cross-section, extend obliquely through the disk. This constitutes the lower revolving grinding-surface or burr.

The upper grinding-surface consists of the ring *n* and the two inner series of grinding-shoes, *d d'*, with their under or grinding faces indented by a series of curved grooves or furrows radiating from a central orifice or open-

ing and terminating at the ring *n*. The shoes and ring are adapted, as seen in Fig. 2, to interlock at their meeting curved edges to secure them in position with relation to each other. They are secured to a flexible or elastic disk, *J*, which prevents the upward passage of the material from the shoes. Upon the flexible disk *J* are fastened a number of concentric rings, *e e' e<sup>2</sup>*, one being disposed around the central opening, the outer one placed around the edge of the periphery, and the other arranged between those just referred to, as seen in Figs. 1 and 2. *c c* are radial bars or levers let into slots in the upper edges, and arranged transversely of the rings *e e'*, with their inner ends entering sockets *i* on the ring *e<sup>2</sup>*, while their outer ends rest in slots *g* in the upper ends of the uprights *f*. Lateral projections *m* are formed upon the outer ends of the bars or levers *c c*, fitting against the uprights *f*, the object of which is to retain the bars or levers in position, as against endwise movement. The aforesaid arrangement of parts permits, while holding the upper grinding-surface from revolving, the shoes and ring thereof, as reduced by wear, to adjust themselves so as to rest always upon the lower grinding-surface or upon the material being ground between them.

*H* is the hopper, suitably mounted in position upon the ring *e<sup>2</sup>*, and adapted to feed the ore or material to the center of the machine, to be ground, as aforesaid, between the grinding-surfaces above described.

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

In a grinding-mill, the combination of the flexible disk *J*, the self-adjusting non-rotating notched rings *e e' e<sup>2</sup>*, radial bars *c c*, the grinding-shoes *d d'*, and ring *n*, substantially as and for the purpose set forth.

GEORGE JOHNSTON.

Witnesses:

JAMES J. CARTER,  
ELISON V. BUCKLEY.