

T. WALKER & J. J. EMBREY.

APPARATUS FOR DRYING AND ROASTING ORES.

No. 177,303.

Patented May 9, 1876.

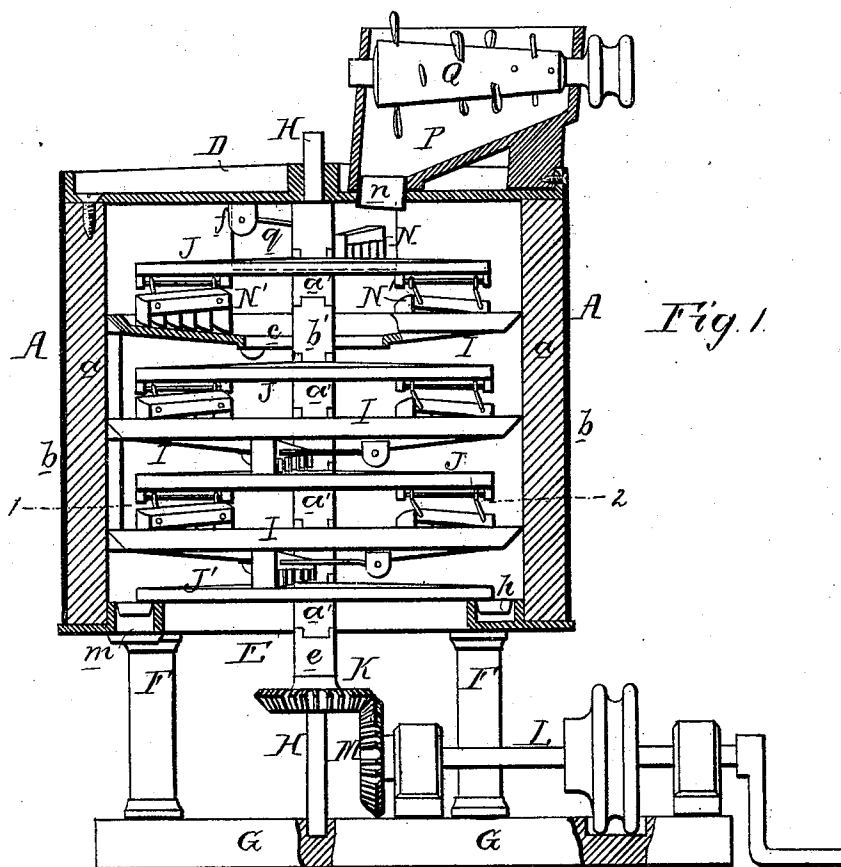


Fig. 1.

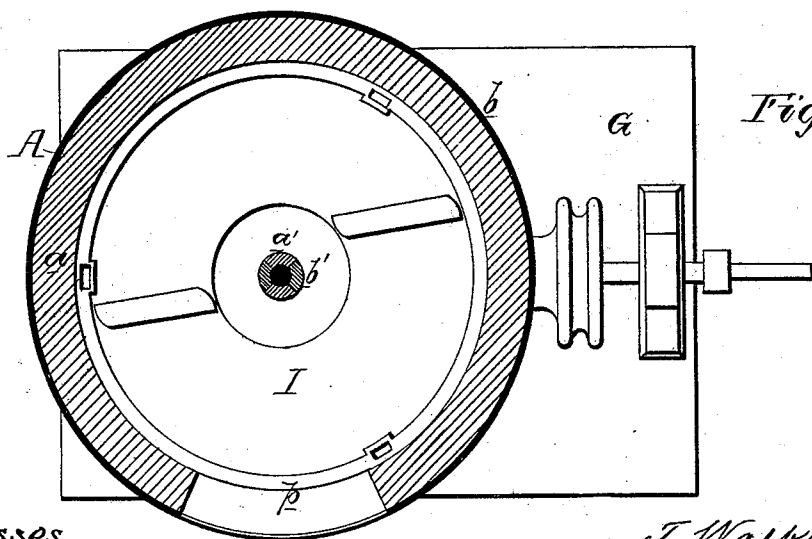


Fig. 2.

Witnesses,
J. L. Shidmore.
W. E. Chaffee

T. Walker
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By their attys.
Howson & Son

UNITED STATES PATENT OFFICE

THOMAS WALKER, OF PHILADELPHIA, PA., AND JUDSON J. EMBREY, OF FAUQUIER COUNTY, VA., ASSIGNORS TO THEMSELVES, JOSEPH W. BANCROFT, AND S. HENRY SAFFORD, OF PHILADELPHIA, PA.

IMPROVEMENT IN APPARATUS FOR DRYING AND ROASTING ORES.

Specification forming part of Letters Patent No. **177,303**, dated May 9, 1876; application filed August 27, 1875.

To all whom it may concern:

Be it known that we, THOMAS WALKER, of Philadelphia, Pennsylvania, and JUDSON J. EMBREY, of Fauquier county, Virginia, have invented certain Improvements in Apparatus for Roasting and Drying Ores, of which the following is a specification:

The main object of our invention is to thoroughly roast or dry pulverized ores with rapidity; and this object we attain in the manner which we will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1 is a vertical section of the exterior casing of our ore roasting or drying machine; and Fig. 2 a sectional plan on the line 1 2.

A is a hollow cylinder, consisting of a lining, *a*, of fire-brick, or other refractory material, contained within a shell, *b*, of plate-iron, or the lining may be otherwise bound, so as to render the structure substantial and permanent. The cylinder has a cover, D, and rests on an annular plate, E, supported on columns F secured to a suitable base, G. A central shaft, H, passes through the cylinder, and has its upper bearing in the cover D and lower bearing in the base G. Within the cylinder, and extending entirely across the same, are a number of circular stationary plates, I, arranged at equal distances apart, these plates alternating with disks J, which do not extend to the interior of the cylinder, the disks having central clutch-like hubs *a'*, adapted to the shaft H, and the hub of one disk being connected to the hubs of the disks above and below by sleeves *b'*, which embrace the shaft and pass through openings *c* in the plates I. The lowest disk J' of the series is arranged to revolve as closely to the annular plate E as possible without being in absolute contact therewith, and the hub *a* of this disk is either clutched to a fixed collar, *c*, on the shaft H, or has clutch-like projections adapted to recesses in the hub of the bevel-wheel K, which is driven from a shaft, L, through the intervention of the bevel-wheel M.

The clutch-like hubs of the several disks and the connecting-sleeves form a continuous

tube driven from the wheel K, and the several disks J are driven from the said wheel through the medium of this tube; hence the central shaft H is subjected to no torsional strain, its sole purpose being to maintain the disks in their proper lateral positions concentric with the cylinder. I prefer to make the upper surface of each disk slightly convex or inclined downward from its center to the outer edge. On the uppermost disk are rakes N, each having arms hinged to lugs *f* on the under side of the cover D, these rakes having a tendency to move the pulverized ore to the edge of the disk, whence it falls onto the flanged plate I below. This plate we prefer to make slightly concave or inclined from the edge downward toward the central opening *c*.

Rakes N', similar to those above, are hinged to the under side of the disks, and, bearing on the plate, tend to move the pulverized ore inward toward the central opening *c*, whence it falls onto the second disk J, and the ore, by the movement of the disks and action of the rakes, is made to pursue this zigzag course until it reaches the lowest disk, from which it is raked into an annular channel, *h*, in the plate E, and is directed by vanes on the disk from this channel to the outlet-opening *m*. The pulverized ore is introduced into the cylinder through an opening, *n*, in a hopper, P, at the top of the cylinder A, the hopper being provided with a rotating shaft, Q, inclined arms on which agitate the ore, and direct the same to the said openings *n*. Heated products of combustion from an adjacent furnace are introduced into the cylinder at *p*, and passing upward in a zigzag course meet and are brought into intimate contact with the pulverized ore as it descends through the same course, the products of combustion finally escaping through the outlet *q*, and the ore, thoroughly roasted, escaping at the outlet *m*.

We claim as our invention—

1. An ore roasting or drying apparatus, in which a cylinder, A, having inlets and outlets for the admission and discharge of products of combustion and pulverized ore, is combined with stationary plates I, having central open-

ings *c*, revolving disks *J*, and rakes *N*, substantially in the manner and for the purpose herein set forth.

2. The combination of the revolving disks *J*, stationary plates *I*, and intervening rakes *N*, having arms hinged to the disks, as specified.

3. The combination of the disks *J*, their clutch-like hubs *a'*, sleeves *b'*, and the collar *e* of the hub of the driving-wheel, with the central shaft *H*.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

THOMAS WALKER.
JUDSON J. EMBREY.

Witnesses:

HERBERT HOWSON,
HARRY SMITH.