

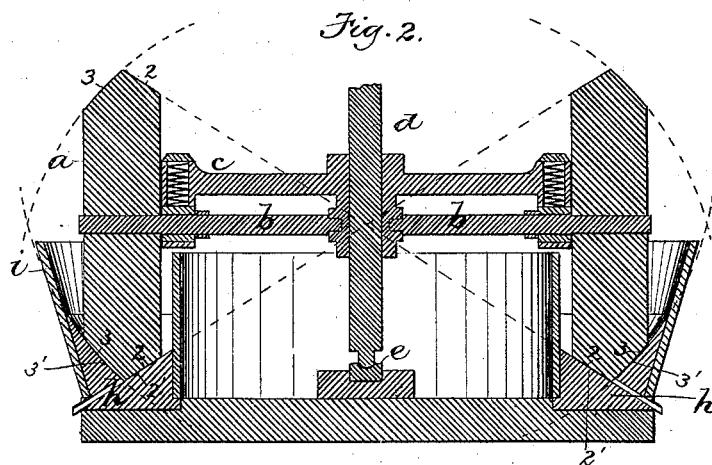
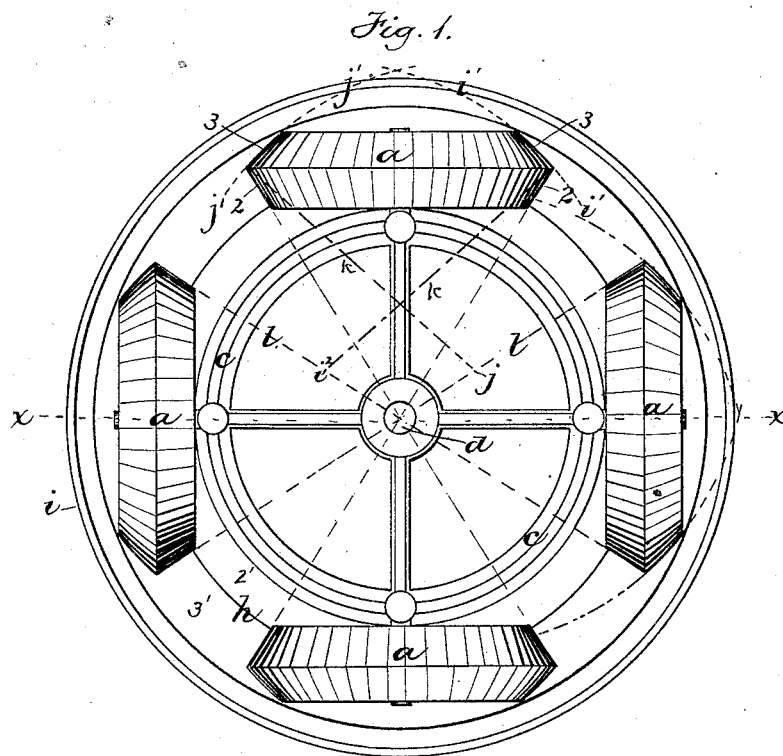
(No Model.)

J. C. WISWELL.

ORE CRUSHER.

No. 307,513.

Patented Nov. 4, 1884.



Witnesses.

H. Brown.
A. L. White

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UNITED STATES PATENT OFFICE.

JACOB C. WISWELL, OF MEDFORD, MASSACHUSETTS.

ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 307,513, dated November 4, 1884.

Application filed May 28, 1884. (No model.)

To all whom it may concern:

Be it known that I, JACOB CHARLES WISWELL, of Medford, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Ore-Crushers, of which the following is a specification.

This invention relates to that class of ore-crushing mills in which a series of rollers are employed and a fixed circular bed on which said rollers are adapted to travel. An example of this class of mills is shown in Letters Patent of the United States No. 296,096, granted to me April 1, 1884.

My present invention consists wholly in the improvements in the form of the peripheries of the rollers, and of the corresponding portion of the circular bed, hereinafter described, whereby the meeting-point of the outer faces of the rollers with the bed is enabled to extend entirely across said faces, and the rollers are enabled to travel easily and with the minimum of friction upon the portions of the bed supporting their outer faces, as I will now proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a plan view of a series of rollers and their supporting-bed embodying my improvements. Fig. 2 represents a section on line *x x*, Fig. 1.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a a a a* represent the series of crushing-rollers, which are in this instance four in number, and are mounted on radial axles *b*, which are journaled in a frame, *c*, substantially as shown in my above-named patent, said frame being affixed horizontally to a vertical shaft, *d*, which is supported at its lower end by a step, *e*, and is rotated by power suitably applied to its upper end. The periphery of each roller is composed of two inclined or beveled faces, 2 3, which are arranged to give said periphery a pyramidal form in its transverse section. The inner face, 2, of each roller is a conic frustum, of which the apex is the intersection of the axial line of the vertical shaft *d* and of the axial line of the axles of the rollers, as shown in dotted lines in Fig. 1. Owing to this form, the periphery of the inner face of the roller adapts itself naturally to the correspondingly-formed bed,

hereinafter described, and traverses the latter with ease, free from slip and lost motion, which reduces the friction to the minimum. The outer face, 3, of each roller in any portion of its transverse section presents an arc of a circle having a radius of the same length as the radius of the circle formed by the outer margin of the supporting-bed *h*, on which the rollers travel, the opposite arcs being struck from separate centers.

In forming the outer face, 3, of each roller the following rules must be followed: First, the diameter of the roller at the apex of its periphery must be about equal to the radius of the circle formed by the outer margin of the supporting-bed; secondly, the distance of the apex of the periphery of the roller from the center of the shaft *d* having been determined, the centers *i' j'* of the arcs *i' i'* and *j' j'*, which the cross-section of the outer face, 3, of the roller presents, are located by finding the points where lines *k k*, of the same length as the radius above mentioned, drawn from the apex of the periphery of the roller, intersect lines *l l*, drawn from the peripheries of the two adjacent rollers to the center of the shaft *d*. The circular supporting bed or trough *h* has two faces, 2' 3', which are so formed that the cross-section of the bed presents the exact converse of the cross-section of each roller, as shown in Fig. 2, the line of contact of each roller with the bed extending entirely across both faces of the roller, as shown.

The above-described form of the inner faces of the rollers and of the supporting-bed is fully set forth in my former patent, the novelty now presented being the form of the outer faces, 3, of the rollers and of the faces 3' of the bed. I have found by practical experience that the described form of the faces 3 and 3' enables the rollers to run freely and naturally in a circular direction, the outer face of each roller crushing equally with the inner faces, because of their extended bearing on the bed. The rollers rotate and travel without greater friction between the outer faces, 3 and 3', than between the faces 2 and 2', and therefore without torsional or binding strain upon their axles. Heretofore in mills of this class the outer faces of the rollers have generally been cone-frustums, presenting straight sur-

faces in cross-section, like the inner faces. If
said faces fitted snugly to the outer faces of
the trough, an abrasive action would ensue be-
tween the two, as stated in my former patent,
5 the friction attending the movement of the
outer faces of the rollers being greater than
that attending the movement of the inner
faces; hence the outer faces of the rollers had
to be slightly separated from the correspond-
10 ing face of the bed. This objection and the
necessity of such separation is entirely over-
come by the present improvement, which ef-
fects a considerable saving in motive power,
and largely increases the capacity of the mill
15 for work, in consequence of the increased area
of crushing-surface and the facility which the
described peculiarities of form of rollers and
bed afford in aiding the discharge of the pul-
verized ore from the screen. Said ore is
20 thrown upward and outward by centrifugal
force of the revolving rollers, and escapes
through a screen or screens in the curb *i*, sur-
rounding the bed or trough, as described in
my former patent. Suitable openings are
25 formed at the bottom of the bed or trough to
permit the drawing off of the amalgam and
materials used in cleaning the trough.

It is obvious that one roll may be employed
instead of a series without departing from the
spirit of my invention. 30

I claim—

A crushing-roller adapted to travel in a cir-
cular path, and having the inner crushing-face,
2, which is a cone-frustum having its apex in
the center of the circular path in which the 35
rolls travel, and the outer crushing-face, 3,
which presents in cross-section the arc of a cir-
cle having the described radius, the opposite
arcs having different radial centers, combined
with the bed or trough formed to present in 40
cross-section the exact converse of the cross-
section of the roller, whereby an extended
bearing between the roller and bed is afforded,
and the roller is enabled to travel easily and
with the minimum of friction, as set forth. 45

In testimony whereof I have signed my name
to this specification, in the presence of two sub-
scribing witnesses, this 17th day of May, 1884.

JACOB C. WISWELL.

Witnesses:

C. F. BROWN,
A. L. WHITE.