(No Model.)

W. H. H. BOWERS.

CRUSHING ROLL.

No. 294,361. Patented Mar. 4, 1884.

Fig. 1.

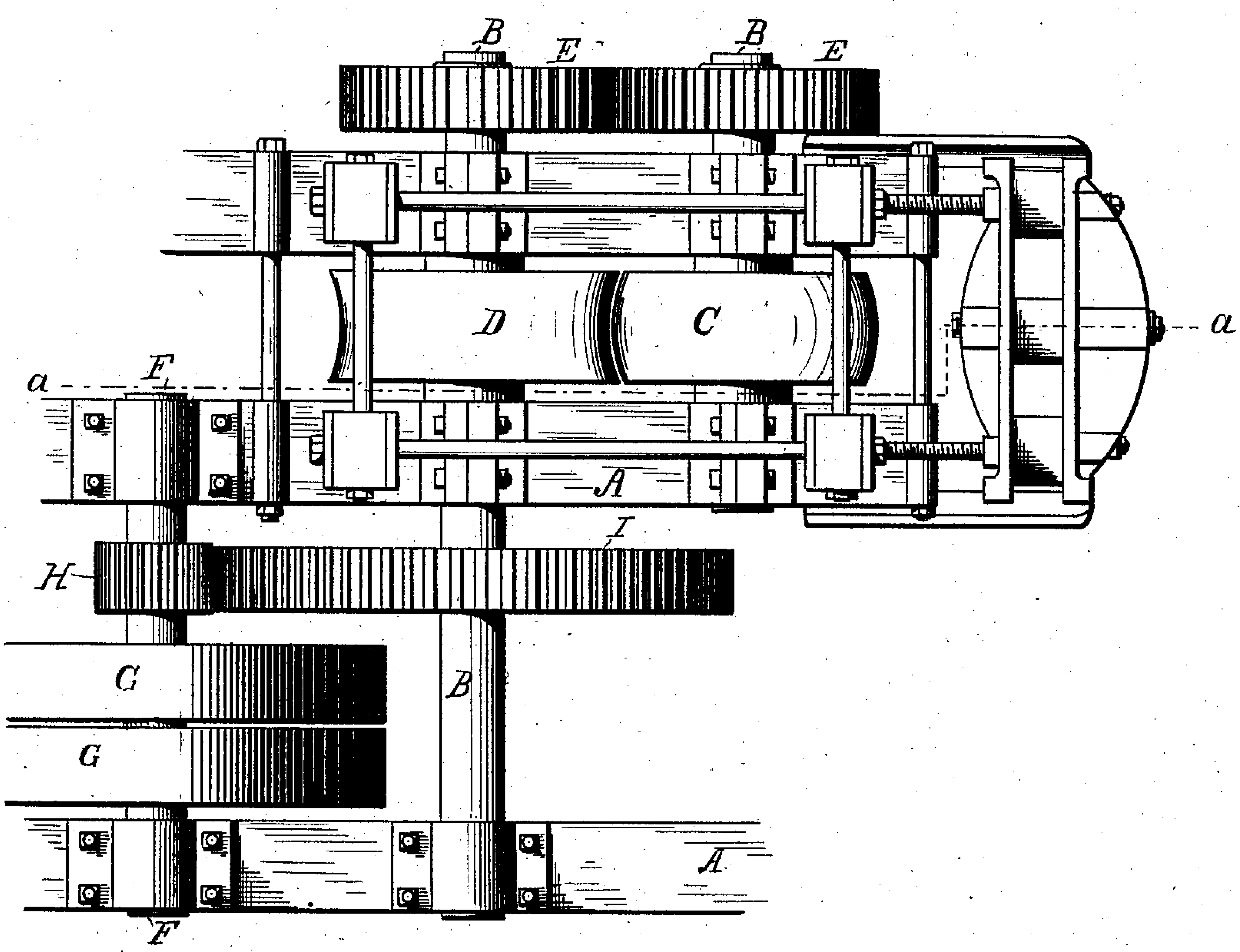
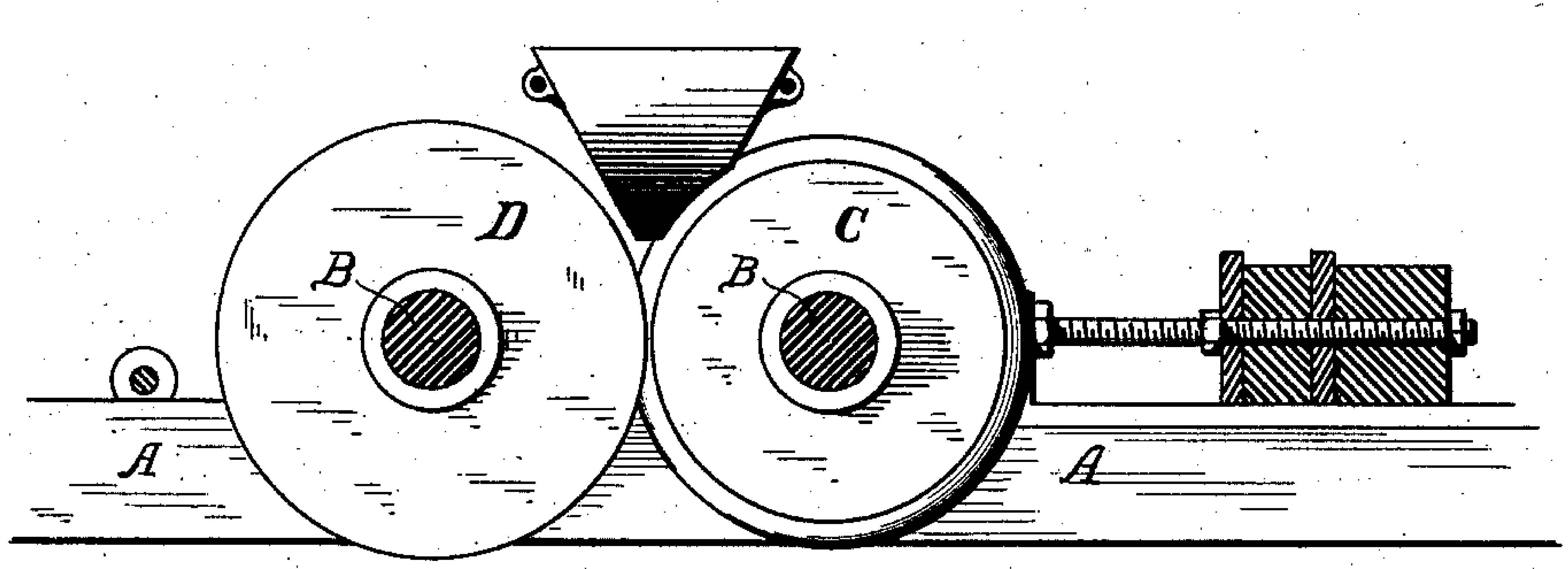


Fig. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM H. H. BOWERS, OF SALT LAKE CITY, UTAH TERRITORY, ASSIGNOR OF ONE-HALF TO STEPHEN P. M. TASKER, OF PHILADELPHIA, PA.

CRUSHING-ROLL.

SPECIFICATION forming part of Letters Patent No. 294,361, dated March 4, 1884.

Application filed July 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. H. BOWERS, of Salt Lake City, Utah Territory, have invented an Improvement in Crushing-Rolls, of which the following is a specification.

My invention relates to what are known, technically, as "Cornish rolls," which are used for crushing ores and other hard substances.

As heretofore constructed, Cornish rolls have consisted either of two straight-faced metal rollers set upon horizontal shafts erected face to face and caused to revolve in opposite directions toward each other, or else have consisted of two double-conical rolls similarly mounted and driven, each of which rolls consists of two truncated cones united as to one roll base to base, and as to the other roll in the plane of the truncations; or, again, have consisted of two rolls, one of which is convex and the other of which is correspondingly concave, but of which the diameters at their respective central portions have been different.

Material to be crushed is fed from above between the rolls, is crushed between their approaching opposing peripheral faces, and discharged below in a state of subdivision from between said rolls. These rolls have been sustained in any suitable housing, and usually been driven by toothed spur-wheels, substantially in the manner represented in the drawings.

Incident to the employment of the above-mentioned straight-faced Cornish rolls has been the disadvantage that they have worn out as to the central or median portions of their peripheral faces more quickly than as to the edge portions, with the result that both of the rolls have become concave, and have therefore become worthless, because incapable of adjustment for fine crushing.

Incident to the employment of the above-mentioned double-conical rolls has been the disadvantage that they have worn out more quickly as to their extremities and as to their central portions than as to the portions intermediate between the centers and the extremities, while incident to the rolls above mentioned, of which one is convex and the other concave, has been the disadvantage that they have worn out more quickly as to the central or median portions than as to the other portions of their acting peripheral faces.

I have discovered that by making one of the rolls convex as to its peripheral face and the other correspondingly concave as to its peripheral face, and by making the proportions of the rolls such that their diameters on central vertical planes are the same, the wear of the acting peripheral faces of the rolls will be even throughout the entire extent of said faces—a result due to the fact that the edge portions of the acting face of the concave roll, being of greater circumferential extent than the correspondingly opposite edge portions of the acting face of the convex roll, travel faster than the same portions of the convex roll, and therefore occasion a rubbing or rolling action upon the material happening to be between the edge portions of the peripheral faces of the rolls sufficient to occasion the wearing away of said portions equally and to the same extent as the central portions of the two rolls, which central portions, traveling at the same rates of speed, do not rub but merely crush the material, and are worn away by the action of crushing only as opposed to the action of rubbing or rolling.

In the accompanying drawings, which represent an apparatus conveniently embodying my improvements, Figure 1 is a top plan view, and Fig. 2 a vertical sectional side elevational detail taken on a vertical plane projected on the dotted line *a a* of Fig. 1.

A represents a housing of any convenient construction, upon which are suitably journaled the shafts B B of my improved rolls, of which the convex roll is designated by the letter C, and the concave by the letter D.

E are toothed spur-wheels rigidly affixed upon the extremities of the shafts, and engaged with each other so as to occasion an opposite rotation of the shafts and rolls.

F is a driving-shaft equipped with pulleys G, and with a driving-pinion, H, which is engaged with a driving spur-wheel, I, upon the shaft of the concave roll. Motion imparted to the driving-shaft occasions the rotation of the roll-shafts through the instrumentality of the pinion and spur-wheels described.

In the drawings I have represented but one

convex and one concave roll. I desire, however, to state that I contemplate the employment of two or of a series of rolls side by side upon the same shaft, and set to face a corresponding number of correspondingly oppositely-curved rolls upon the opposite shaft, the arrangement being one of convenience merely, to increase the effective capacity of the machine without in any wise altering its principle of operation.

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

As an improvement in crushing-rolls, the combination, substantially as and for the purposes described, of two oppositely-placed or opposing rolls, one of which is convex as to its peripheral or acting face, and the other of which is correspondingly concave as to its peripheral or acting face, and both of which are isodiametric as to the central portions of their acting faces and travel at the same rate of speed, and means for occasioning the reverse rotation of the said two rolls.

In testimony whereof I have hereunto signed my name this 16th day of May, A. D. 1883.

WILLIAM H. H. BOWERS.

In presence of—
J. BONSALL TAYLOR,
JOHN JOLLEY, Jr.