

(No Model.)

2 Sheets—Sheet 1.

P. H. ADAMS, Jr. & O. T. X. ADAMS.
APPARATUS FOR USE IN DECOMPOSING METALLIC SALTS AND
DESULPHURIZING ORES.

No. 399,115

Patented Mar. 5, 1889.

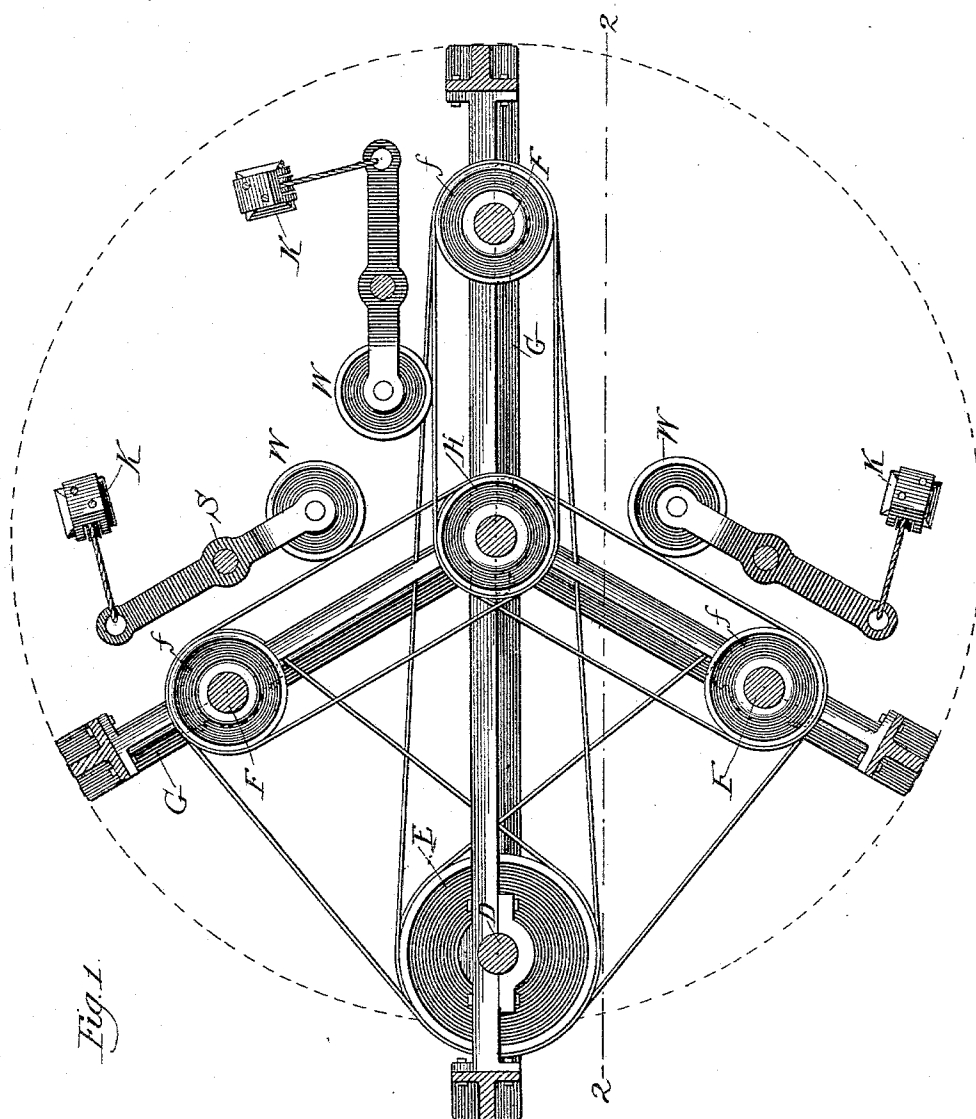


Fig. 1.

Witnesses:

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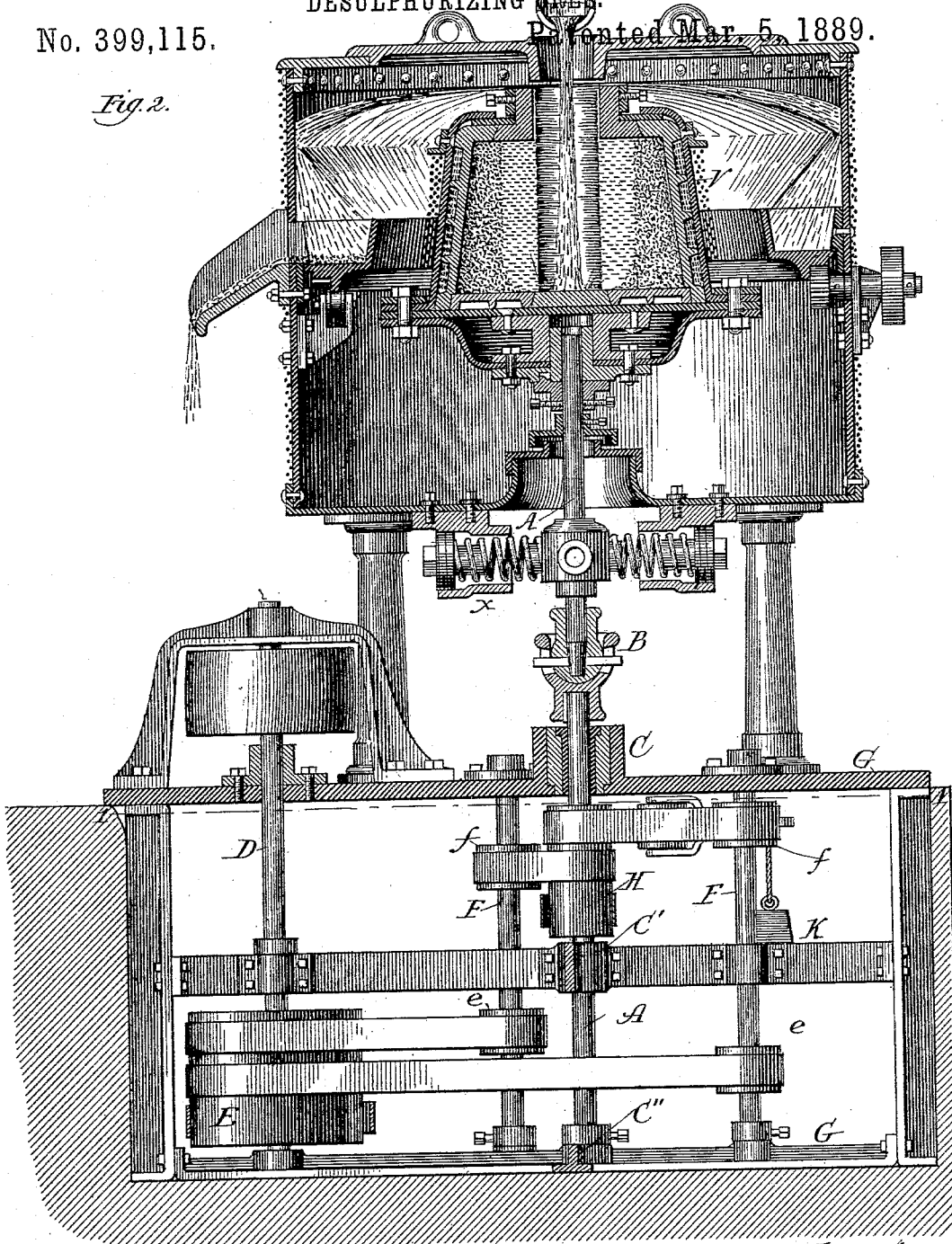
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Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR USE IN DECOMPOSING METALLIC SALTS AND DESULPHURIZING ORES.

SPECIFICATION forming part of Letters Patent No. 399,115, dated March 5, 1889.

Application filed December 10, 1888. Serial No. 293,192. (No model.)

To all whom it may concern:

Be it known that we, PHINEAS H. ADAMS, JR., and ORSEMAS T. X. ADAMS, citizens of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Apparatus for Use in Decomposing Metallic Salts and Desulphurizing Ores, of which the following is a specification.

The object of our invention is to improve an apparatus for mechanically decomposing chemical compounds, metallic salts, and desulphurizing ores or their resulting material, when the substances treated are in a molten condition, by the action of centrifugal force; and our invention has more particular reference to the running-gear portions employed on such apparatus and the means for driving the same.

In the drawings, Figure 1 is a vertical section of the apparatus with the lower portion taken in line 2 2 of Fig. 2, showing most of the running-gear in elevation; and Fig. 2 is a plan view taken in the line 1 1 of Fig. 1.

In making our improved apparatus for decomposing chemical compounds, metallic salts, or salts of metal, and desulphurizing ores, we make a receiving-vessel, V, adapted to receive the substance to be treated when in a molten condition. This receiving-vessel is mounted and rests upon an actuating-shaft, A, to which it is fixed or keyed in such a way that by the rotation of the shaft the receiving-vessel will be revolved. The receiving-vessel may be made in such way as will secure the required strength and reduce the conduction of heat from the interior to the exterior. It may be surrounded by a curbing and have a removable bottom to facilitate the removal of the material not thrown off at the top by the action of centrifugal force; and in other respects it may be made as will be calculated to subserve the end in view and permit of its being rotated at a high rate of speed for the separation of particles of different degrees of density in the matter treated. All of these parts and the details of their construction, as they do not form the subject-matter of our present claims, need not be more fully described, as they will be sufficiently understood from an inspection of the drawings.

The actuating-shaft A, which serves to rotate the receiving-vessel, is preferably provided with a joint or coupling, B, to enable its upper portion to have a sufficient lateral play to accommodate it to the vibration of the receiving-vessel when rotating at a high speed. The lower portion of the actuating-shaft passes down through journal-boxes C C' and preferably enters a step, C'', which serves to support the shaft and its superimposed load, and to maintain its lower end in its proper vertical position; but as to this means of supporting the shaft we desire to say that it may be varied at pleasure or wholly different means employed in its place.

As to the journal-boxes C C', we desire to say that changes and modifications may be made in their arrangement, their number, and the general details of their construction. The actuating-shaft which we prefer to make, as above described, is composed of two parts—a flexible or laterally-vibratable upper portion and a rigidly journaled lower portion. To assist in supporting the flexible upper portion of the shaft in its proper vertical position a laterally-yieldable journal or box, X, may be employed, as shown in Fig. 1.

To rotate the actuating-shaft with its superimposed load, we employ what we term a "power-shaft," D, which is connected with the power of the works and caused to rotate. This power-shaft is provided with a pulley or belt surface, E, which rotates with it, and which is connected by belts with pulleys or belt surfaces *e* on counter-shafts F; or, if desired, it may be connected directly with the actuating-shaft and the belts connecting it with the counter-shafts dispensed with, or it may be connected with but one of the counter-shafts and so rotate the actuating-shaft. These counter-shafts are preferably three in number and preferably occupy a vertical position supported in journals in a suitable framework, G. They are intended to be also each provided with a pulley or belt surface, *f*, and to be located in such relations to the actuating-shaft as that the strain caused by the belts connecting their pulleys or belt surfaces *f* with the pulleys or belt surfaces H on the actuating-shaft shall largely counteract or balance the lateral strain produced by each

other. By this means we are able to rotate the actuating-shaft with its superimposed load without the great strain to one side which is produced by the tension of a belt drawing in but one direction, as in the ordinary way, and which would greatly impair the operativeness or practical character of an apparatus subjected to the great strain caused by the rotation of the actuating-shaft, under a very heavy load and at a very great speed. As shown in Fig. 2, these counter-shafts are located at what would form the apexes of an equiangular triangle, although we do not desire to limit ourselves to this location nor to this number of counter-shafts and connecting-belts, as it is obvious that a different number can be employed and different locations adopted, and yet secure the counteracting or balancing desired. For instance, very beneficial results could be secured where but two shafts on opposite sides of the actuating-shaft are employed, and the power shaft, in addition to affording means for rotating the actuating-shaft, may also perform the functions of a counter-shaft. In this way the lateral friction between the actuating-shaft and the journal-boxes supporting it in a vertical position is reduced or obviated, so that extreme or injurious lateral friction is avoided.

In Fig. 2 we have shown adjustable belt supports or tighteners, preferably pivoted, with one end provided with wheels W bearing against the belts, and the other end connected to weights K by a cord or other means, so as to bring the wheels against the belts with sufficient pressure to secure the proper tension. These belt-tighteners are separate from each other and severally act on the respective belts so that any particular belt may have its tension regulated to increase or decrease its drawing lateral strain on the actuating-shaft by increasing or decreasing the weights, and thereby enable the tension of the several belts to be so equalized as to hold the actuating-shaft in that position which will secure the least amount of lateral friction between it and the journal-boxes intended to maintain it in a vertical position.

In the claims we shall, for convenience, speak of counter-shafts; but in the use of

these words in the plural number we mean to include any arrangement that employs one or more counter-shafts, or, in other words, any arrangements in which there are belts connecting the actuating-shaft with other shafts, including the power-shaft as one, and drawing against the actuating-shaft from different directions. And when we speak in the claims of belts we mean to include cables, sprocket-chains, or similar means for transmitting power from one shaft to another.

What we regard as new, and desire to secure by Letters Patent, is—

1. In an apparatus for decomposing metallic salts or salts of metals and desulphurizing ores when in a molten state, the combination of a revoluble receiving-vessel adapted to receive molten material to be treated, a revoluble actuating-shaft carrying said vessel and its superimposed load and rotating them as it revolves, one or more counter-shafts with belts drawing against the actuating-shaft from different lateral directions and maintaining it in a vertical position while carrying and rotating the receiving-vessel and its superimposed load, and means for rotating one or more of said shafts, whereby all are rotated, substantially as described.

2. In an apparatus for decomposing metallic salts or salts of metals and desulphurizing ores when in a molten state, the combination of a revoluble receiving-vessel adapted to receive molten material to be treated, a revoluble actuating-shaft carrying said vessel and its superimposed load and rotating them as it revolves, one or more counter-shafts, with belts drawing against the actuating-shaft from different lateral directions and maintaining it in a vertical position while carrying and rotating the receiving-vessel and its superimposed load, means for severally tightening and maintaining the tension of the connecting-belts, and means for rotating one or more of said shafts, whereby all are rotated, substantially as described.

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