

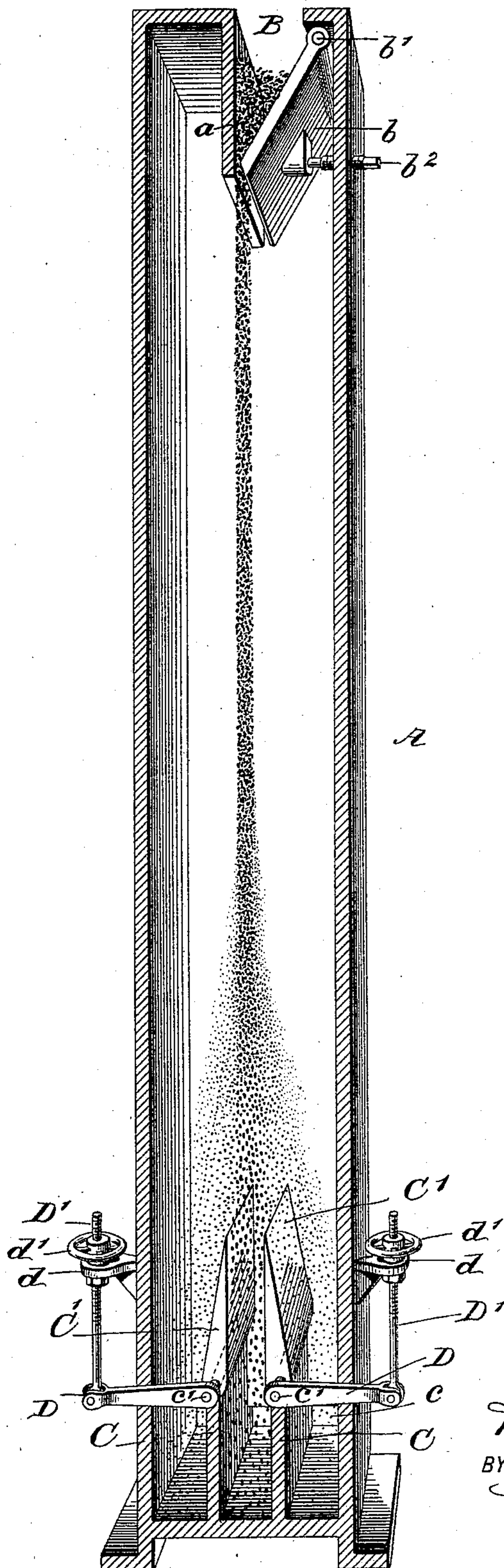
(No Model.)

D. BRENNAN, Jr.

METHOD OF GRADING ORES OR SIMILAR MATERIALS.

No. 529,587.

Patented Nov. 20, 1894.



WITNESSES:

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DANIEL BRENNAN, JR., OF BAYONNE, NEW JERSEY.

METHOD OF GRADING ORES OR SIMILAR MATERIALS.

SPECIFICATION forming part of Letters Patent No. 529,587, dated November 20, 1894.

Application filed November 3, 1893. Serial No. 489,896. (No model.)

To all whom it may concern:

Be it known that I, DANIEL BRENNAN, Jr., of Bayonne, in the county of Hudson and State of New Jersey, have invented a new and Improved Method of Grading Ores or Similar Materials, of which the following is a full, clear, and exact description.

The invention is designed mainly to classify ores comminuted so finely as to be extremely difficult and expensive to classify by screens, it being well known that below a certain fineness screens are impracticable on any large commercial scale.

In grading comminuted ores, sand and similar material in accordance with my invention, the material is fed in the form of a close, continuously falling stream, into a chamber containing a fluid, such as air or water, and the force of gravity is utilized, as hereinafter particularly explained, in effecting a separation of the finer and lighter particles from the coarser and heavier ones, the conditions to be observed for success being the initial compactness and volume of the stream, the density of the fluid medium, the extent of fall of the material, and the expansion permitted the stream or column of material before dividing or arresting the same. The stream being initially of the proper volume and compactness, as it falls through the fluid, a continuous re-arrangement of the particles will take place, the stream tending to become disintegrated, and as the stream progresses an outward whirling or curling movement will be induced at the exterior of the column and the expansion of the latter becomes more marked, until a point is reached where the particles range themselves with the lightest and finest at the exterior of the now pronouncedly widened column, and increasingly coarser and heavier toward the initial line of fall. At this point I divide the column of material, by separating the outer particles from those nearer the initial line of fall, while continuing the feed, and if desired I may also effect any desired practical subdivisions.

Reference is to be had to the accompanying drawing forming part of this specification, in which is shown in perspective, the pre-

ferred apparatus for carrying out my invention, the front wall or side being omitted to show the interior.

The case A, is preferably rectangular and of a height to allow the material considerable of a fall, the fluid medium being air. At the top of the case A a hopper B, is provided, the delivery orifice or opening of which is at about the center of the case, and is narrow but elongated, to feed a narrow stream extending substantially across the full width of the case in one direction. The particular form of the orifice will, however, vary in practice. One wall or side a of the hopper is fixed, while the other wall or side b is hinged as at b' , and is adapted to be adjusted toward and from the opposite fixed wall by means of a screw rod b^2 .

At the bottom of the apparatus, fixed vertical partitions C, C, are provided forming a central pocket and two side pockets, each of which is provided with an outlet as at c , which may be closed in any suitable manner to permit outlet of the material as desired without causing any considerable movement or currents of the fluid within the case. On the top of each of the partitions C, is a movable partition C' , which is mounted on a rock shaft c' , and these rock shafts extend through and beyond the front side of the case, and outside of the case the shafts receive arms D, to the opposite ends of which there are pivoted the threaded rods D' , which extend upwardly through slots in the brackets d on the case, and receive, above the brackets, the hand wheels d' , the arrangement being such that by turning the hand wheels the movable partitions C' , may be adjusted toward and from each other, and also independently of each other. By this means the entrance to the central pocket may be made to align with the center of the stream, should the line of fall shift slightly by the settling of a floor or building. The adjustment of the partitions toward and from each other, regulates the degree of fineness of the material falling in the outer pockets, by excluding or including more or less of the coarser particles nearer the center of the column as desired.

The fluid in the case should be substantially inert for the best results, that is, it should have no movement other than that induced by the falling material, or that would affect the widening of the column and the arrangement of the continuously falling particles, so that by dividing the falling column, the separation of the fines may be effected.

The apparatus shown, while it is the preferred form, is not absolutely essential to the carrying out of my improved method, and may be modified, it being only essential that the stream be permitted to progress undivided, under the influence of gravity, a sufficient distance, and permitted to disintegrate and expand or widen while falling, and before being divided or arrested, until the particles arrange themselves increasingly coarser and heavier from the outside toward the center or initial line of fall or practically so, whereby a proper vertical division of the column will cut off the required fines from the coarser and heavier particles. Some fines may be held among the coarser particles until the movement induced becomes too weak to detach and deflect them to the outside, and a second operation will then be necessary if it is desired to recover them, but with a

proper fall and a proper adjustment of the partitions the particles will, to a practical degree, arrange themselves increasingly larger from the outside toward the center, and enable a good practical separation to be effected.

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

The herein described method of grading comminuted ores and similar materials, consisting in causing the material to fall, in response to gravity, in a stream of unscattered particles, in a fluid medium, while maintaining the medium undisturbed except as movement thereof is induced by the particles responding to the force of gravity, permitting the stream to thus progress downward, unobstructed, and to expand until a self grading of the stream is effected and the particles range themselves to a practical degree, increasingly coarser from the exterior toward the line of initial vertical fall, and then separating the expanded stream into grades by dividing the same, substantially as described.

DANIEL BRENNAN, JR.

Witnesses:

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