

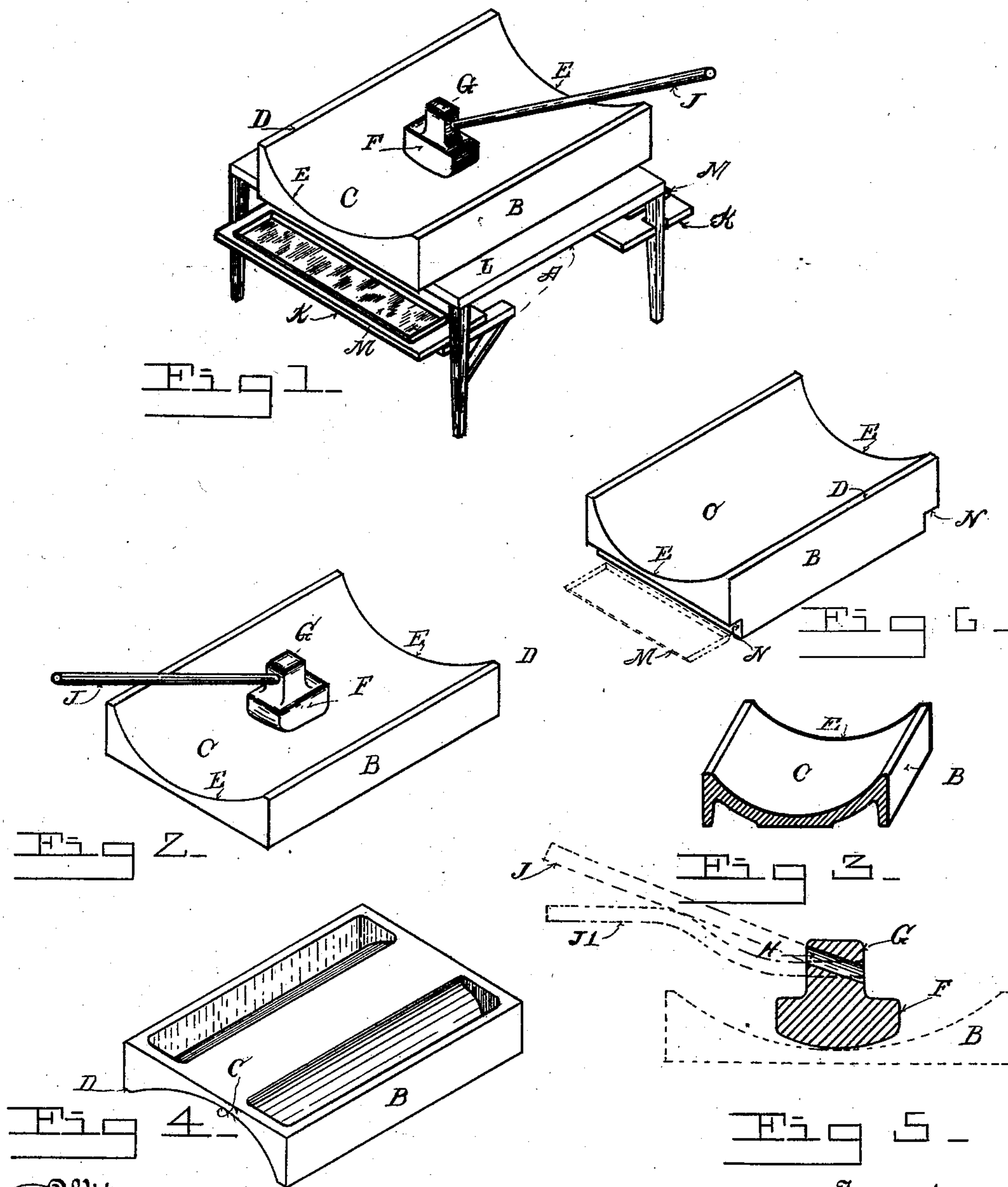
(No Model.)

J. A. McCLURG.

SAMPLE GRINDING AND PULVERIZING APPARATUS.

No. 603,405.

Patented May 3, 1898.



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SAMPLE GRINDING AND PULVERIZING APPARATUS.

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To all whom it may concern:

Be it known that I, JAMES A. MCCLURG, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Sample Grinding and Pulverizing Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in sample grinding and pulverizing apparatus for the use of assayers, chemists and metallurgists, druggists, and others for pulverizing and grinding samples of mineral-bearing rock and analogous substances, whereby they are reduced to a comminuted or pulverulent state for the purpose of assaying or analyzing their composition or for mixture with other ingredients; and the objects of my invention are, first, to provide a pulverizing and grinding device in which samples can be pulverized in much less time than with the devices in common use; second, to provide a sample-pulverizing device in which the material under treatment constantly feeds while being pulverized toward a common center, which keeps the coarser part of the material constantly in the plane of action; third, to provide a simple and durable sample-pulverizing device having a large operative surface and of such a form that the operator can accomplish more work with less labor than with the devices in common use. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of my improved sample-pulverizing device mounted on a table especially adapted for it; Fig. 2, a perspective view of the pulverizing device, showing the muller arranged at right angles to the position shown in Fig. 1; Fig. 3, a cross-section of the mortar-plate of Fig. 2; Fig. 4, a bottom perspective view of the mortar-plate; Fig. 5, a cross-section of the muller; and Fig. 6, a perspective view of the mortar-plate, showing a slight modification in construction.

Similar letters of reference refer to similar parts throughout the several views.

Referring to Fig. 1, A designates a bench

or table of suitable strength to support the mortar-plate B. In the present state of the art this mortar-plate consists of a simple flat cast-iron plate with a narrow raised marginal edge at its side. It is of approximately an inch in thickness by approximately twenty-three inches wide by twenty-four inches long. My improved mortar-plate comprises an iron mortar-plate B of substantially the same dimensions, with a concaved operative surface C of several inches in depth, which extends throughout its width to within a very narrow marginal edge D at its sides. This surface is finished by suitable machinery perfectly smooth. Both of its ends E are preferably left open. Its bottom side is preferably hollowed out at the sides to save material and to lighten it, as shown in Fig. 4 and in the cross-section Fig. 3. The ends and sides are, however, preferably integral from the bottom and top surfaces of the plate.

F designates a muller. It comprises a rectangular-shaped block of iron, provided with a projecting head G, in which is formed a handle-eye H, which is placed at an oblique angle and provided with a straight handle J. This handle is arranged at this angle to prevent the operator striking his hand against the edges of the mortar-plate. A straight handle-eye can be formed through the head G, if preferred, and a curved handle J' used substantially as shown in dotted lines in Fig. 5. The face of the muller is convexed or curved, with preferably a curve of shorter radius than the curved surface of the mortar-plate, as shown in Fig. 3, and it is also finished smooth. The bottom sides and ends are also rounded, the object being to form a clearance-space under the ends and sides, and particularly under the ends, when the muller is resting in the mortar-plate, which will allow the muller to ride over the material being pulverized when it is reciprocated up and down the curved surface of the mortar-plate by the operator. The table A is made a trifle shorter, or as short as the mortar-plate, in order to allow the ends of the mortar-plate to extend over it at each end a short distance.

A shelf K extends across each end of the table below its top L from leg to leg, as shown. This shelf may be secured in any convenient manner to the table's legs, or, if desired, they may be arranged to slide under the table on suitable supports when not in use. These

shelves are made wide enough to support a small pan M under each end of the mortar-plate, in which the samples, or any desired portion of them, may be deposited by simply pushing the comminuted material over the edges of the mortar-plate. Some operators might prefer to rest the mortar-plate upon a long work-bench and dispense with the table. In Fig. 6 I illustrate a mortar-plate adapted for bench use. In this view the mortar-plate is provided with a stepped recess N at each end, which allows the pans, when the mortar-plate is resting on a long bench, to be placed under the delivery edges of the mortar-plate. When the mortar-plate is placed on a bench, the bench, or that portion of it where the mortar-plate rests and for an ample space adjacent to each end, should be lowered to bring the mortar-plate at a practical operating height, as the common height of work-benches is too high.

My improved sample-pulverizing apparatus is operated as follows: A sample of ore or other material is placed along the center of the mortar-plate. The operator then takes the muller by the handle and occasionally may first proceed to beat the sample and break it up into smaller pieces. He next proceeds to grind it by moving the muller reciprocally up and down the curved sides and surface of the mortar-plate. The material gravitates constantly to the center of the mortar-plate under the agitation of manipulation, and is consequently more quickly pulverized than if scattered over considerable surface, and as the ends of the muller are curved upward the material rolls under it as it is passed over it instead of being pushed ahead of it. The operator can also exert considerable additional pressure on the muller by placing one hand on its head and bearing down on the muller as it is reciprocated, thus grinding, pulverizing, and scouring the material until it is reduced to a pulverulent mass, when it is pushed or brushed over the ends of the mortar-plate into the pans. The muller can be used lengthwise of the mortar-plate, if desired, as shown in Fig. 1; but the best results will be obtained by reciprocating it with the curve of the surface. These curved surfaces assist the operator in moving the muller, inasmuch as when the muller is moved down from one of the sides its weight assists the operator and allows him to more easily acquire a quick enough movement to carry the muller up the opposite side with but little energy on his part.

My invention is simple and durable and will save time and labor in reducing samples of coarse material to a pulverized state, and its surface will wear more evenly than the form in common use.

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

1. The combination in a sample grinding and pulverizing apparatus of a mortar-plate having a transverse, concaved grinding-sur-

face with open terminal ends; a receding stepped recess at each end at its bottom edge adapted to form an overhanging lip at the delivery ends of said mortar-plate, with a muller comprising a block-shaped member having its bottom curved with a curve of slightly less radius than the transverse curve of the mortar-plate and having all its bottom edges rounded, a handle-eye in said muller and a curved handle in said eye curved to extend upward from said eye above the sides of said mortar-plate and then curved to extend outward beyond said mortar-plate in a plane substantially parallel and horizontal to the horizontal plane of said muller, substantially as described.

2. The combination in a sample grinding and pulverizing apparatus of a mortar-plate having a transverse concaved grinding-surface and open ends flush with its grinding-surface at the terminal ends of its length and having its ends at the terminus of its length project beyond the bottom of said mortar-plate and arranged to form a recess under said ends high enough to allow the side of a pan to be placed therein, a muller comprising a block-shaped member having a curved bottom adapted to the curve of the transverse curve of the grinding-surface of said mortar-plate and having its bottom sides and end edges rounded, a centrally-located, vertically-projecting member on the top of said muller, a handle-eye in said projection and a curved handle in said eye extending above and beyond the borders of said mortar-plate, with a supporting table or bench shorter than the length of said mortar-plate, a shelf supported between the legs of said table or bench at the ends of its length and under the ends of the length of said mortar-plate, and pans on said shelves under the overhanging ends of said mortar-plate, substantially as described.

3. The combination in a sample grinding and pulverizing apparatus for assayers and chemists of a rectangular-shaped mortar-plate having a transversely-concaved grinding-surface and having both of the terminal ends of its length open, with a muller comprising a rectangular block-shaped member having a curved bottom surface curved to operatively engage the grinding-surface of said mortar-plate and having its bottom side and end edges rounded and adapted to be manually reciprocated up and down said transverse-curved surface of said mortar-plate, a handle-eye in said muller and a curved handle extending a short distance beyond the mortar-plate and curved from said eye to diverge upward over the transverse-curved sides of said mortar-plate and then extending substantially parallel to the plane of the curved base of said muller, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES A. MCCLURG.

Witnesses:

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