S. F. BARTOL & J. M. LEUZARDER.

DIES AND SHOES FOR QUARTZ MILLS.

No. 183,362. Patented Oct. 17, 1876.

Fig. 1.

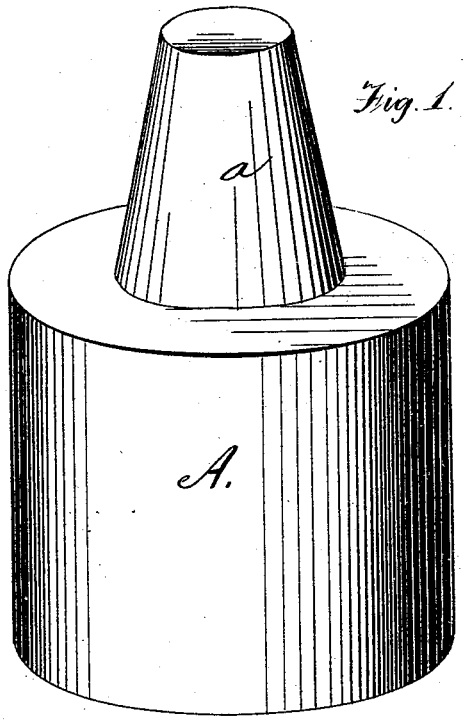
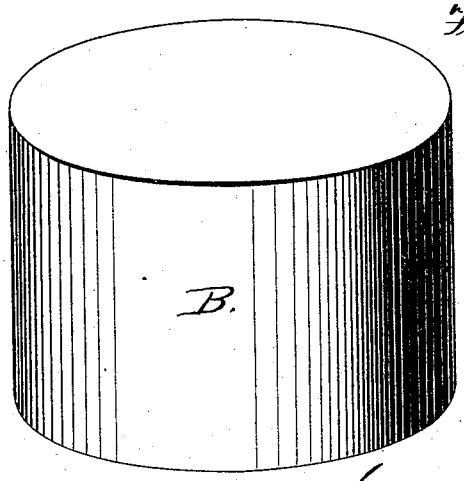


Fig. 2.



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UNITED STATES PATENT OFFICE.

SAMUEL F. BARTOL AND JULES M. LEUZARDER, OF BOSTON, MASS.

IMPROVEMENT IN DIES AND SHOES FOR QUARTZ-MILLS.

Specification forming part of Letters Patent No. **183,362**, dated October 17, 1876; application filed October 2, 1876.

To all whom it may concern:

Be it known that we, SAMUEL F. BARTOL and JULES M. LEUZARDER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Dies and Shoes for Quartz-Mills; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings forming part of this specification.

Our invention relates to mills for crushing quartz; and consists in improved dies and shoes for the same, the peculiar nature of which improvement will be fully and clearly set forth hereinafter.

It is well known that the dies and shoes in quartz-mills are subject to such jarring and crushing action, by reason of the heavy blows necessary to crush the stone placed between them, that they require to be made of material possessing in one combination the greatest possible hardness and tenacity. This is necessary in order to have unyielding surfaces without that liability to fracture inherent in most hard substances.

Hitherto these dies and shoes have been made either of cast-iron with chilled surfaces or of steel—chiefly of the chilled cast-iron. The average life of those made of cast-iron with the chilled surfaces, by reason of great jar and wear when in action, is about thirty days; but, as the places where the dies and shoes are used are remote from railroads, and from the foundries where such articles are cast, the expense of transportation often forms the largest element of their cost, and the articles, when worn out at the mines, are useless and valueless for any purpose; nor has the evil been remedied by a substitution of cast-steel, the greater durability of the steel dies and shoes not paying the greater cost of the material.

A better and cheaper material for this special purpose we have found in the "bug" or "shot" iron, which is obtained from the ashes or cinders that come from a cupola-furnace. This material, as we have found by experiment, may be readily cast into the proper shapes, and the dies and shoes so made possess the combined qualities of hardness and durability in a greater degree than the cast-steel, while, by reason of the fact that the material has heretofore been considered almost worthless, except for the purpose of weights, the improved dies and shoes of this material can be made cheaper than the cast-iron.

The material may be separated from the foreign matters with which it is mixed by processes now known, and may be cast into the shapes required by the ordinary methods of casting. The extreme hardness and tenacity are inherent in the iron itself, and there is no need of further hardening, and, as the articles are fit for use when taken from the mold, this inherent hardness is not objectionable, as in articles which need finishing after casting. The hardness and tenacity of this material are uniform through the whole mass, it differing in this respect from chilled iron, in which the hardness is greatest at the surface and diminishes below it.

The material used in our improved dies and shoes appears to derive the qualities which render it valuable for this purpose from the cooling and chilling which it receives while in a finely-divided condition.

The iron may be intentionally made by a similar process for the express purpose, and have the same qualities; but ordinarily the waste iron is abundant and cheaper.

In the drawings, the shoe is represented at A, with a shank, *a*, for the attachment of the boss. The die is represented at B, and may, as usual, be round or square, and fixed in place in any of the well known ways.

The lifting apparatus, being of ordinary construction, need not be described here.

These shoes can also be applied to amalgamating-pans.

We claim as our invention—

A shoe and corresponding die (one or both) for quartz-crushing mills and amalgamating-pans, composed of the waste or bug iron from the ashes from a cupola-furnace, or from similar source, as set forth.

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