A. BUCHANAN.

QUARTZ CRUSHER.

No. 45,222. Patented Nov. 29, 1864.

Fig. 1.

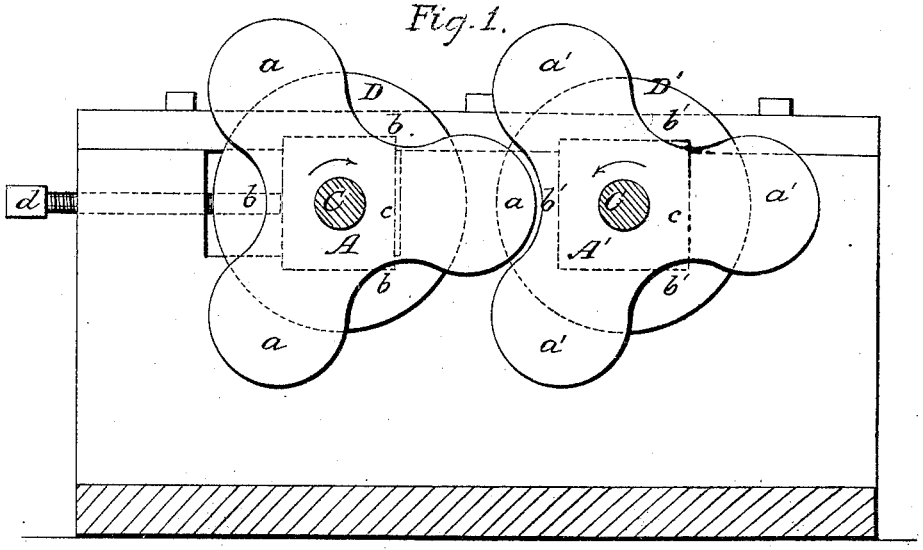
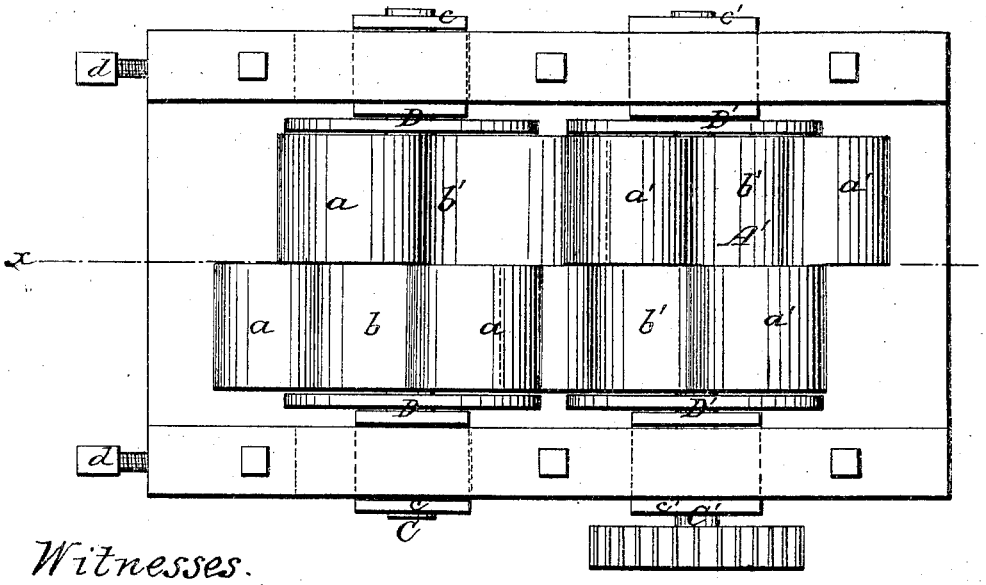


Fig. 2



Witnesses.

L. P. Hale.

Geo. W. Reed.

Inventor.

Andrew Buchanan.

UNITED STATES PATENT OFFICE.

ANDREW BUCHANAN, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN QUARTZ-CRUSHERS.

Specification forming part of Letters Patent No. **45,222**, dated November 29, 1864; antedated November 26, 1864.

To all whom it may concern:

Be it known that I, ANDREW BUCHANAN, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Apparatus for Crushing Quartz, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of my invention taken in the plane indicated by the line *x x*, Fig. 2. Fig. 2 is a plan or top view of the same.

Similar letters of reference indicate corresponding parts.

This invention consists in the employment or use of two crushing-wheels, each provided with a series of cogs and intervening cavities, and placed in such relation to each other that they mesh into each other like cog-wheels and that a rotary motion imparted to one of said wheels is transmitted to the other without the use of gear-wheels in such a manner that quartz or any other substance thrown between said crushing-wheels is gradually drawn in and crushed between the cogs of one and the cavities of the other, and furthmore by the difference in the velocity of the crushing-surface of the cogs and that of the cavities in passing each other a grinding effect is produced which facilitates the crushing operation in a great measure. Said crushing-wheels are provided with projecting side flanges to prevent the substance to be crushed and that already crushed from getting between the journals and journal-boxes.

A A′ represent two crushing-wheels, which are made of cast-iron or other suitable material in the best possible manner. If cast, their surfaces ought to be chilled to render them as hard as possible. These wheels are provided with cogs *a a′* and intervening cavities *b b′* and they are secured to axles C C′ in such relation to each other that the cogs of one mesh into the cavities of the other in the manner of cog-wheels. The cogs and corresponding cavities may be rounded, as shown in the drawings, or one or both may be provided with flat or with projecting portions, according to the nature of the substance to be crushed.

For quartz the form of the cogs and cavities shown in the drawings will be preferable to any other.

The number of cogs in each wheel may be varied according to the size of the wheels and according to the nature of the substance to be crushed, and if the wheels are made with three cogs only, as shown in the drawings, two wheels may be placed side by side on the same shaft, or each wheel may be cast solid, so as to represent two distinct wheels, each of which has it cogs in line with the cavities of the other, and vice versa.

The axles C C′ have their bearings in suitable journal-boxes, *c c′*, in the frame B, and the boxes of the axle C are made adjustable by means of set-screws *d*, or in any other convenient manner, so that the distance between the crushing-surfaces of the two wheels can be regulated at pleasure. If desired, suitable springs, of india-rubber or other material, may be interposed between the point of the screws and the movable boxes *c*, so that the wheel A is made yielding and injury to the working parts of the apparatus is prevented in case a piece of iron or other similar hard material should accidentally get between the crushing-surfaces.

The quartz or other material to be crushed is fed to the wheels A A′ by means of a hopper or in any other suitable manner, and, as the wheels revolve, said substance is gradually drawn in between the crushing-surfaces, and by the difference in the velocity of the points or outer surfaces of the cogs and the inner surfaces of the cavities a grinding effect is produced which facilitates to a considerable extent the operation of crushing.

The sides of the crushing-wheels are protected by flanges D D′, which project above the cavities *b b′* in said wheels and prevent the material to be crushed or already crushed from dropping on the journals and getting between the bearings of the axles. These side flanges may be made to overlap each other if it should be desirable.

This apparatus is particularly intended for the purpose of crushing quartz, but it can be

used for crushing any other material or substance, such as plaster-paris, stones, coal, linseed, and so forth. It is very simple in its construction, and when properly made it will work for any length of time without getting out of order.

I claim as new and desire to secure by Letters Patent—

1. As an improvement in quartz-crushing machines, the crushing-wheels A A′, provided with cogs *a a′* and intervening cavities *b b′*, and arranged in relation to each other like cog-wheels, substantially as and for the purpose herein shown and described.

2. The application of the side flanges, D D′, to the crushing-wheels A A′, substantially as and for the purpose set forth.

ANDREW BUCHANAN.

Witnesses:
W. HAUFF,
J. P. HALL.