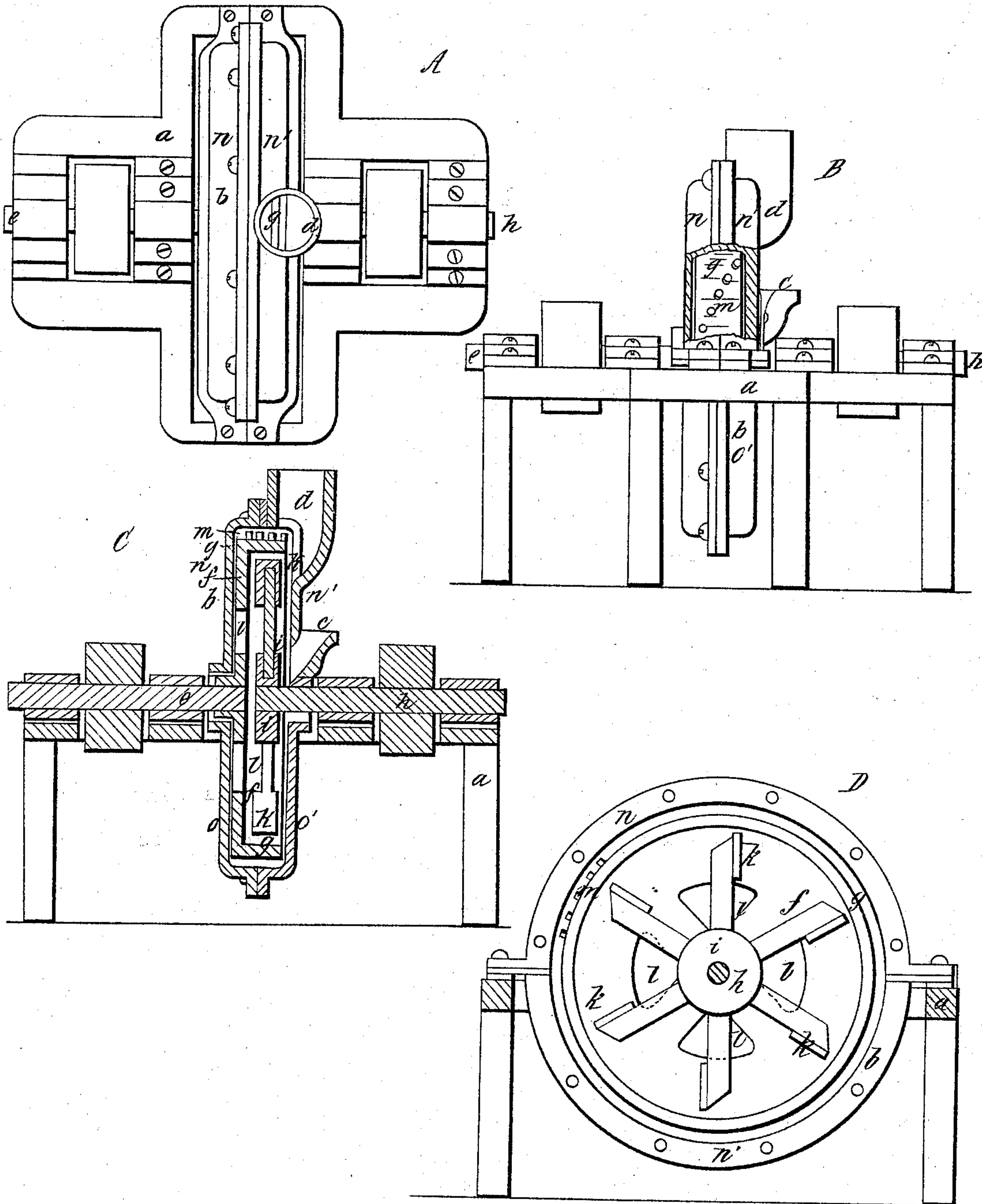


H. A. BREED.

Ore Mill.

No. 54,497.

Patented May 8, 1866.



Witnesses:

M. W. Frothingham
J. B. Hedder

Inventor:

H. A. Breed
by his attys
Crossby & Gould

UNITED STATES PATENT OFFICE.

HENRY A. BREED, OF LYMAN, MASSACHUSETTS.

IMPROVEMENT IN QUARTZ PULVERIZING.

Specification forming part of Letters Patent No. 54,497, dated May 8, 1866.

To all whom it may concern:

Be it known that I, HENRY A. BREED, of Lynn, in the county of Essex and State of Massachusetts, have invented an Improved Pulverizing-Machine; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

This invention relates to that class of crushing or pulverizing mills in which a series of rotating hammers are used to throw the material against the surface of a wheel driven in the opposite direction, the material being reduced to powder by percussion or impact against the said wheel. A machine having such an arrangement of parts was patented by C. H. Griffin, No. 45,213, which patent has been assigned to me. In said machine the hammers consist of a series of spokes or arms projecting radially from a hub, and having striking-faces at or near their outer ends, and the wheel against which the hammers hurl the material consists of a disk having a flange at its periphery, the inner surface of which constitutes the impact-surface. This surface in said machine is armed with teeth or corrugations; but in the machine herein to be described said surface is smooth, experience having proved that such teeth are unnecessary and objectionable. In such Griffin machine great trouble arises from the material clogging between the periphery of the wheel and the inner surface of the casing, and between the outer surface of the disk and the adjacent side of the casing or shell, and my present improvements relate, principally, to obviating the defective construction causing this clogging.

My invention consists, therefore, in constructing the rotary disk with a series of openings near its center, through which any material getting between the disk and casing will be drawn by the blast produced through the rapid rotation of the hammers; also, in fixing upon the outer surface of the disk-flange or crushing-wheel a series of teeth or clearers, so arranged as to drive the material lodging between the flange and casing back to the open side of the wheel and to the action of the hammers.

The drawings show at A a plan, at B an end view, and at C a central cross-section, and D is a sectional view, representing the rotary

hammers and crushing-wheel in side elevation, one side of the entire casing or shell being removed.

a denotes a frame supporting a stationary case or circular box or shell, *b*, which has a mouth or opening, *c*, near its center, through which the material to be crushed is fed into the machine, and a discharge-pipe, *d*, through which the powdered material is drawn by the blast produced by the rotation of the hammers.

On one side of the frame a shaft, *e*, is mounted in suitable bearings, said shaft projecting through the adjacent side of the shell *b* and carrying a disk, *f*, at the periphery of which is a flange, *g*, the disk *f* rotating in a plane parallel to and in juxtaposition with the inner face of one side of the shell *b*, and the flange projecting at right angles from the disk and nearly to the opposite side of the shell, as seen at C. The other side of the frame supports in suitable bearings a rotary shaft, *h*, the inner end of which extends through the adjacent side of the shell and carries a series of radial arms projecting from a hub, *i*, and provided at their outer ends with hammers *k*, the path of rotation of the hammers being in the plane of rotation of the flange *g*.

The shaft *e* and its disk *f* being driven in one direction and the shaft *h* and its hammer *k* in the opposite one, and the ore or other material to be pulverized being fed through the mouth *c*, the hammers *k* in their rotation strike or catch the material and hurl it violently against the surface of the flange or impact-wheel *g*, the operation soon reducing the material to powder, in which state it is discharged through the pipe *d* by the blast produced by the arms *k*, the opening *c* permitting influx of air to keep up the blast.

The disk *f* is provided with openings *l* near its center, as seen at C and D, and the material penetrating the space between the adjacent surfaces of the disk and shell is drawn by the blast through these openings, and escapes through the pipe *d*.

On the outer surface of the wheel or flange *g* is a series of pins or teeth, *m*, arranged on an incline across the peripheral face of the wheel, as seen at B, where the shell is shown as broken away to show the arrangement of the pins or clearers. These teeth extend nearly to the inner surface of the shell, and any material which lodges between the pe-

riphery of the wheel and the surface of the shell will be dislodged by these clearers and thrown toward the open face of the wheel, where it will be again brought under the action of the hammers, or if in a powdered condition will be drawn through the pipe *d*. By this construction the wheel is prevented from clogging the openings through the disk, and the operation of the teeth keeping its surfaces adjacent to the surfaces of the casing freed from accumulation of material, and keeping the parts from unduly heating through attrition upon such material.

By inspection of the drawings it will be observed that each side plate of the case or shell *b* is formed in two parts, *n* and *o*, or *n'* and *o'*, the two parts *n n'* constituting the upper half and the two parts *o o'* the lower half of the case, and each two parts *n n'* and *o o'* being bolted together. By this arrangement either part *n* or *n'* may be removed from the frame

without disturbance of any other part of the machine, or the parts *n* and *n'* (constituting the upper half of the box) may be removed as one piece. This allows access to the working parts while they are in motion, enabling the action of the rotating hammers and wheel to be inspected, whereas when one whole side has to be removed one-half of the mill must necessarily be taken to pieces, as will be readily understood.

I claim—

1. The construction of the rotating disk *f* with the openings *l*, in the manner and for the purpose substantially as described.

2. The teeth or clearers *m* upon the periphery of the wheel *g*, operating substantially as set forth.

HENRY A. BREED.

Witnesses:

F. GOULD,

S. B. KIDDER.