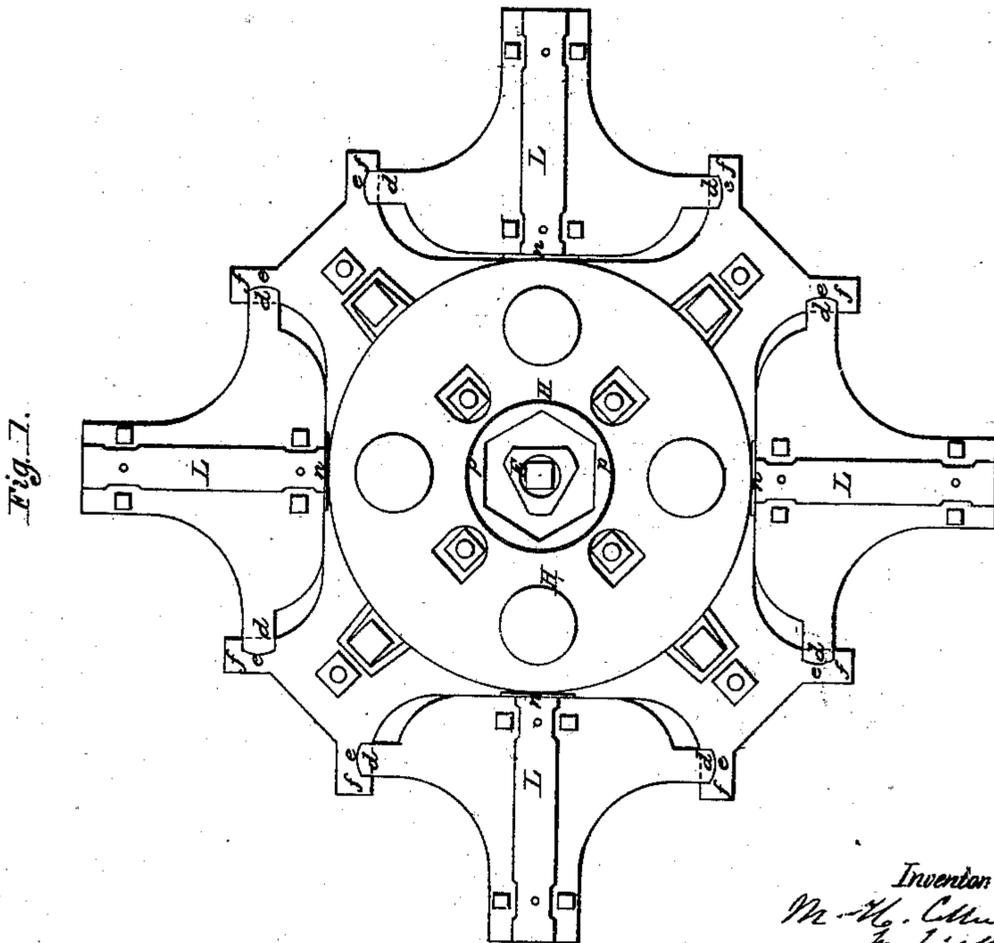
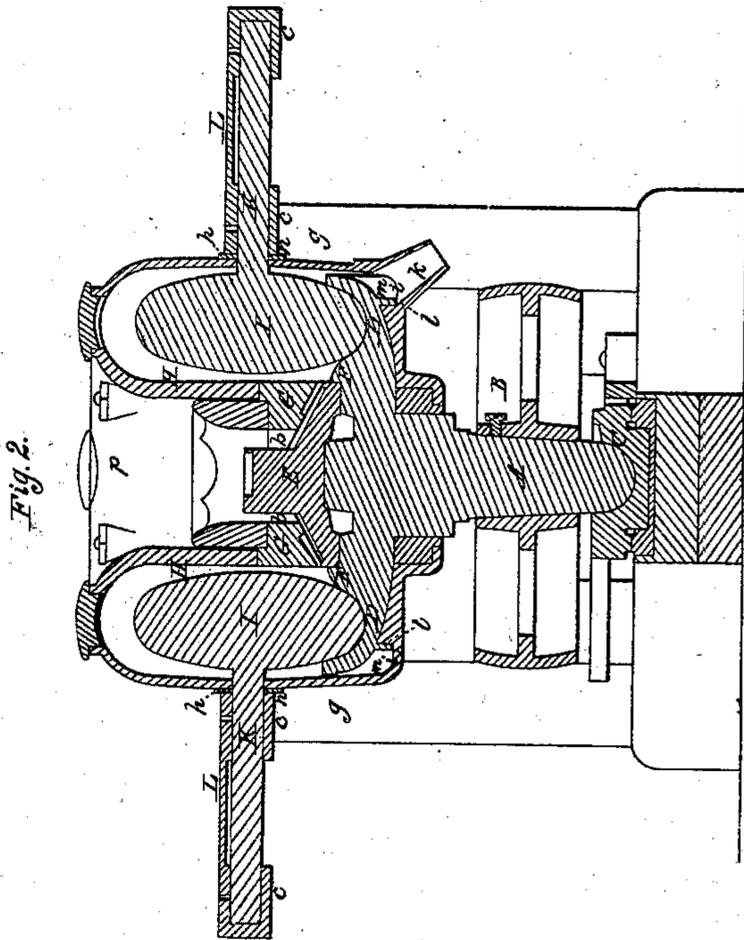
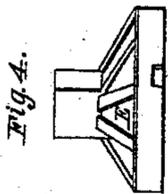
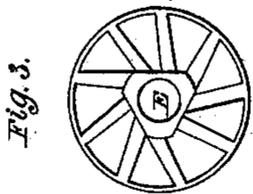
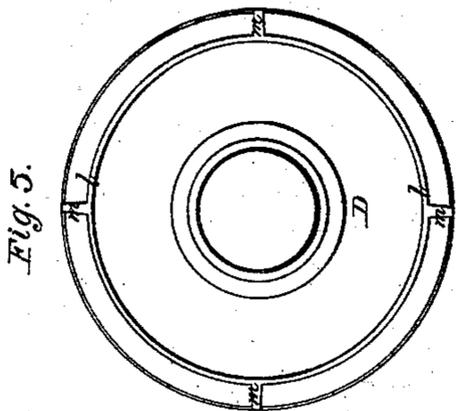


M. H. COLLINS.
GRINDING MILL.

No 43,096.

Patented June 14. 1864.



Witnesses:
Frederick Curtis.
Geo. A. Rogers.

Inventor
M. H. Collins
by his attorney
H. W. Ledy

UNITED STATES PATENT OFFICE.

MICHAEL HENRY COLLINS, OF CHELSEA, MASSACHUSETTS.

IMPROVEMENT IN QUARTZ-CRUSHERS.

Specification forming part of Letters Patent No. 43,096, dated June 14, 1864.

To all whom it may concern:

Be it known that I, MICHAEL HENRY COLLINS, a resident of Chelsea, in the county of Suffolk and State of Massachusetts, have invented an Improved Mill for Grinding or Pulverizing Substances; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 denotes a top view, and Fig. 2 a transverse and vertical section, of it.

The nature of my invention is a combination and arrangement of a perforated stationary receiving-breaker, a rotary breaker, a rotary annular trough, and one or more pulverizing-wheels applied to one or more rock-shafts arranged with respect to the mill-case as hereinafter explained.

In Fig. 2 of these drawings, A denotes a vertical shaft, furnished with a driving-pulley, B, and supported within a step or cup, C, which may be provided with mechanism for elevating it and the shaft, so as to adjust the rotary breaker vertically with reference to the stationary breaker, to be hereinafter described. There is fastened to this shaft an annular trough, D, from which there arises a conical grinder or breaker, E, which, to fix it to the trough, may rest in a cylindrical socket or recess, F, formed concentrically within the trough, and provided with tenons or projections to extend up into the breaker, so as to clutch it and cause it to revolve with the trough when the latter may be in rotation. The breaker is represented in top view in Fig. 3 and in side elevation in Fig. 4, and extends up into a stationary or fellow grinder or breaker, G, which is a hollow cone provided with teeth or ribs on its inner surface, and having an eye or passage, b, through which the substances to be ground or broken are to enter the machine or mill. This stationary breaker is held in place by a metallic case, H, which surrounds the rotary trough and breaker and opens at top by a mouth, p, directly into the stationary breaker. The said case H also covers four or any other suitable number of upright wheels, I I, from the center of each of which a shaft, K, projects outwardly and is supported by bearings, c c, carried by a rocker frame or shaft, L, which is arranged outside of the case and has two journals, d d, that rest in bearings e e, made in arms f f, which serve to support the

case H on the tops of the posts g g. Each wheel-shaft goes through an opening, h, made in the case and elongated vertically sufficiently to allow the proper vertical play or movement of the wheel in the trough. Furthermore, the lower part of the case H is made with an annular trough, i, out of which and through the side of the case a passage leads. From the bottom surface of the rotary trough an annular lip, l, and a series of wings, m m, extend, the same being shown more particularly in Fig. 5, which is an under side view of the rotary trough. These wings and lip project into the trough i. The lip l is to prevent dust from passing out of the trough i and inwardly toward the shaft A, and so as to be discharged into its step.

In the operation of the machine a material to be crushed and pulverized enters the mouth of the case and passes directly between the stationary and rotary breakers, the rotary trough and breaker being supposed to be in revolution. As the material may descend between the breakers, it will be crushed by their joint action upon it, and will be discharged into the rotary trough, wherein it will be subjected to the pulverizing action of such trough and its rotary wheels. These wheels, by the arrangement of their shafts and their application to rock-shafts, as described, will be put in revolution by the trough, and will roll upon and reduce or comminute the matters in such trough, these matters, when pulverized sufficiently, being discharged from the trough by centrifugal force and over its extreme edge and into the auxiliary or stationary annular trough i, through and out of which they will be driven by the action of the series of wings m m, and finally be discharged from the case through its opening k. Each of the shafts of the wheels is provided with a broad annular flange, n, which goes around it and against the opening h and serves to prevent the discharge of dust through the opening and upon or into the bearings of the shaft.

By the application of the wheel-shaft, to rocker-shafts and the arrangement of the latter and the supporting-bearings of the wheel-shafts entirely outside of the case H, the bearings, and journals of the shafts will be better protected from the dust produced in grinding than when inside of the case.

I am aware that a rotary trough and a series of wheels disposed vertically therein and hav-

ing their axles arranged in radial directions and extending toward the axis of the trough have long been in common use. I am also aware that a rotary breaker and a surrounding stationary fellow breaker or crusher have before been combined and used with mill-stones or grinding-surfaces. I am also aware of the mechanism and devices described and claimed in the United States Patents Nos. 12,054 and 19,670. Consequently I do not claim such as my invention; but

What I do claim in my improved crushing and pulverizing mill, in which the rotary trough, wheels, and breakers or crushers are arranged together and within a case, H, as above described, is—

1. The arrangement of each of the pulverizing-wheel shafts K and its rocker frame or shaft L and their journals and bearings relatively to the said case H, in manner substantially as explained, the said shaft K, under such ar-

rangment, being made to project out of the case H, and to have its journals and bearings and its rocker frame or shaft L and the journals and bearings thereof disposed outside of the case, substantially as specified.

2. The arrangement of the shafts K L and their journals and bearings relatively to each other as described, when disposed with respect to the case H and the pulverizing wheels arranged therein substantially in manner as specified, the said shafts K and L, under this latter arrangement, having their axes at right angles to one another.

3. The rotary grinding-trough, as made with the lip *l*, arranged with respect to its wings *m m*, and the receiving trough *i*, disposed below the rotary trough.

M. H. COLLINS.

Witnesses:

R. H. EDDY,
F. P. HALE, Jr.