

(No Model.)

T. L. STURTEVANT.

ATTRITION MILL.

No. 346,513.

Patented Aug. 3, 1886.

Fig. 1.

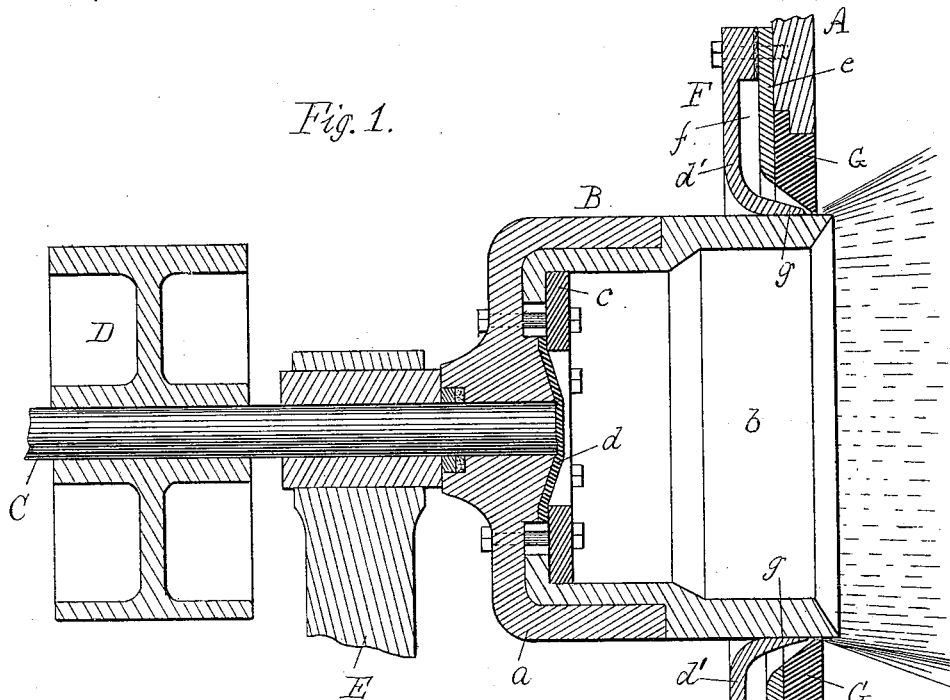


Fig. 2.

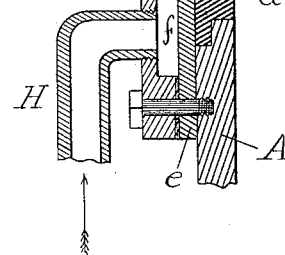
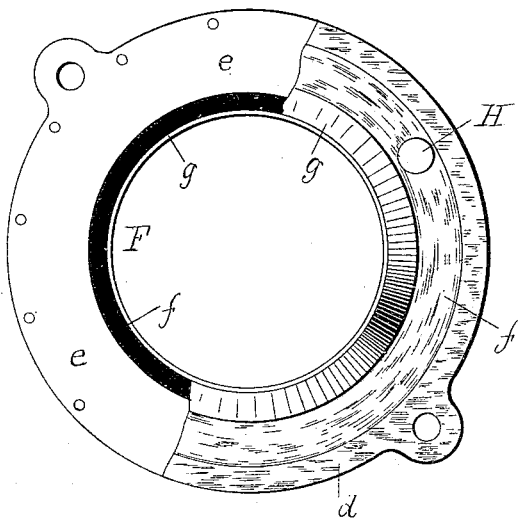


Fig. 3.

Witnesses.

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ATTRITION-MILL.

SPECIFICATION forming part of Letters Patent No. 346,513, dated August 3, 1886.

Application filed March 6, 1886. Serial No. 194,230. (No model.)

To all whom it may concern:

Be it known that I, THOMAS L. STURTEVANT, a citizen of the United States, residing at Framingham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Attrition-Mills; and I do hereby 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 letters or figures of reference marked thereon, which form a part of this specification.

This invention pertains to grinding or attrition mills, more especially to that class of machines in which two oppositely-disposed heads containing the material are rotated in contrary directions, whereby the particles or masses comprising the substances in process of reduction are brought into frictional contact and collision with each other, and thus finely pulverized.

The said invention further relates to "wet mills," so termed; and it consists in disposing about the rotary head or heads an annular liquid-chamber, constructed as hereinafter described, and exteriorly secured to the mill-casing. This chamber is formed with a V-shaped or other contracted delivery-orifice angularly disposed with respect to the periphery of the rotary head, through which orifice the liquid is supplied to the mill. This chamber is filled with liquid under pressure, and a continuous fine spray is thrown within the mill, to prevent the particles of material in process of disintegration from adhering together and forming a pasty mass, which would materially interfere with and prevent the efficient operation of the mill. Moreover, the inward flow of the liquid serves as a packing, and nearly prevents all escape about the head of the material contained within the machine. A current of air under pressure may be substituted for the liquid with equally good results when the mill is employed in dry grinding, as is often the case.

The drawings represent, in Figure 1, a central vertical longitudinal section of a water or air supply and packing device attached to a portion of a mill of the class before premised, and embodying my invention. Fig. 2 is a

plan of the air or liquid chamber with a portion of its top removed, showing the interior of said chamber; and Fig. 3 is a detail sectional view of a part of said chamber.

In attrition-mills, more particularly that class which embodies the invention shown in Letters Patent No. 255,550, and issued to me on the 28th day of March, 1882, especially when they are employed in "wet grinding," it is very necessary to supply a proper and continuous flow of liquid within the casing of the mill, to enable the fine particles to readily flow away and be removed. Furthermore, in such mills it is equally requisite that the space between the mill-casing and the exterior of the rotary head or heads should be maintained tight, to prevent expulsion of substances from the mill during active employment.

The application of a device embodying my invention I have shown in the drawings, wherein is represented the casing and rotary head of a mill of the class above premised, such casing to be attached to and mounted upon a suitable standard. (Not shown.) This casing A is laterally bored to admit of the partial introduction of the rotary head B, while the other head (not shown) is oppositely disposed. Furthermore, this head B is rigidly attached to the shaft C, suitably mounted in the standard E (the other standard not being shown) and driven by the pulley D.

The rotary head B is composed of a hollow circular head, *a*, within which is fitted a bushing or ring, *b*, composed of some hard metallic substance, secured to the back of the head by the clamping-plate *c*, which is held in place by bolts or otherwise. Since a part of the material in process of reduction is contained within the bushing *b*, I find it necessary to protect the end of the shaft C, and therefore have inclosed it beneath a cap or plate, *d*, which is maintained in position upon the shaft and rigidly secured thereto by the plate or ring *e*, before mentioned.

In the employment of this mill for wet grinding I find it necessary, as usual, to maintain a tight joint between the mill-casing and the exterior periphery of the rotary head, and have therefore inclosed the head or heads B by an annular liquid-chamber, F. This chamber F is composed of the disks *d'* *e*, which are suitably packed and united, leaving an annu-

lar space, *f*, between them. This annular air or liquid chamber *F* is bolted to the mill-casing *A*, and in connection with the annular collar *G*, hereinafter described, serves not only as a packing, but as a device for introducing a continuous supply of liquid within the mill. The space *f* aforesaid terminates near the periphery of the head *B* in a V-shaped orifice or passage formed by the annular inwardly-projecting lip or flange *g* on the disk *d'*, (see Fig. 3,) said lip being inclined on its upper side, in connection with the oppositely-beveled face of collar *G* and disk *e*. Said collar is set into the casing *A* and firmly held thereby. The V-shaped orifice is obliquely disposed with respect to the exterior of the rotary head, against which it discharges near the inner edge thereof. At *H*, I have shown the water-supply pipe, which is affixed to the chamber *F*, and thence leads to some suitable water-supply under pressure.

From the construction and arrangement of the parts above described it is evident that the space *f* is maintained constantly full, while the conformation of the gradually-contracting delivery portion thereof is most favorable to the entrance of the liquid within the mill; and while the liquid impinges with the greatest force upon the head, it cannot enter the mill in excessive quantities. Moreover, since the narrow vent is circumferentially disposed about the head, and the supply of liquid or air is directed with much force inwardly, it is evident that the joint is closed by a thin film or packing of either water or air, whichever may be used, and the fine dust is prevented from coming out about the head by the inward current, which opposes any tendency of the material within the mill to escape exteriorly.

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

1. In a grinding-mill, the combination, with the mill-casing and a rotary head, of an annular chamber surrounding the latter and provided with an unobstructed delivery-orifice, through which water or air may be discharged into the mill around the said head, substantially as set forth.

2. In combination with the mill-casing and a rotary head, a stationary annular chamber surrounding said head and provided with a delivery-orifice, through which water or air may be discharged into the mill about the said head, and a pipe leading from the source of supply to said chamber, substantially as set forth.

3. In a grinding-mill, the combination of a mill-casing and a rotary head with an annular chamber surrounding the same and provided with a V-shaped annular delivery-orifice which is obliquely disposed and in close proximity to the periphery of said head, substantially as set forth.

4. In a grinding-mill, the combination of a mill-casing and a rotary head with flat disk *e*, collar *G*, having an inner beveled face, and disk *d'*, having a flange, *g*, which presents an inclined face to said beveled face of said collar, the said disks inclosing a space, *f*, and forming an annular air or water chamber surrounding said head and provided with a V-shaped orifice, substantially as set forth.

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

THOMAS L. STURTEVANT.

Witnesses:

H. E. LODGE,
F. CURTIS.