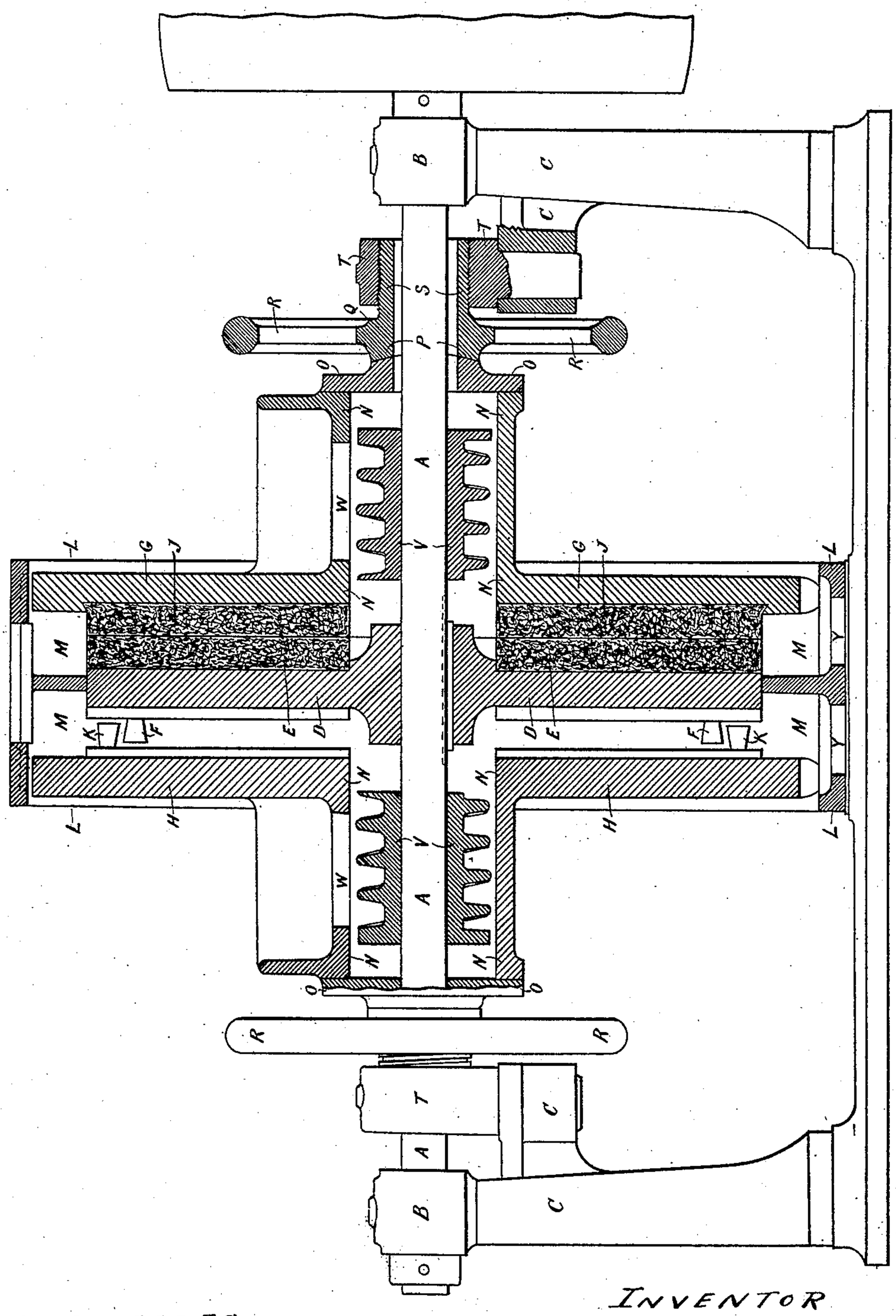
No. 883,872. PATENTED APR. 7, 1908.

J. J. FRASER.

GRINDING OR CRUSHING MILL.

APPLICATION FILED MAY 31, 1906.



WITNESSES

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JAMES JOHNSTONE FRASER, OF LEITH, SCOTLAND.

GRINDING OR CRUSHING MILL.

No. 883,872. Specification of Letters Patent. Patented April 7, 1908.

Application filed May 31, 1906. Serial No. 319,635.

To all whom it may concern:

Be it known that I, JAMES JOHNSTONE FRASER, a subject of the King of Great Britain and Ireland, and a resident of Leith, in the county of Mid-Lothian, Scotland, (whose postal address is 49 Dalmeny street, Leith, Scotland,) have invented certain new and useful Improvements in or Relating to Grinding or Crushing Mills, (for which I have obtained a British patent, No. 17,200, dated August 25, 1905,) of which the following is a description.

My said invention has for its object to improve and simplify the construction and action of grinding or crushing mills.

In carrying out my invention there is mounted on a shaft, carried in suitable bearings in the framing of the mill, a disk which is keyed to and rotates with the shaft. To one face of this disk there is applied any well known kind of grinding composition, while to the other face of the disk there is secured by screwing or otherwise a number of studs or projections which according to my invention are of a dovetailed-like formation. Two non-rotating disks are as usual arranged, one on each side of, and adapted to work against each face of the rotating disk. The grinding face of one of the non-rotating disks has applied to it any well known grinding composition to work against the corresponding face of the rotating disk while the grinding face of the other non-rotating disk has a number of dovetailed-like studs or projections fitted to it, to work against the corresponding face of the rotating disk. If preferred, the working face or faces of each disk may be provided with a grinding composition. Means are provided for adjusting the non-rotating disks, and also for feeding the material to be ground to the grinding surfaces of the disks. If desired only one non-rotating disk may be used.

In order that my said invention and the manner of performing the same may be properly understood I hereunto append a sheet of explanatory drawings showing a sectional elevation of a grinding or crushing mill as made according to my invention.

As shown in the drawing, the shaft, A, carried in suitable bearings, B, in the framing, C, of the mill, has mounted on it a disk, D, said disk being keyed to and rotating with the shaft. To one face of the disk, D, there is applied any well known grinding composition, E, while to the other face of the disk a number of studs or projections, F, of a dovetailed-like formation, are secured by screwing or otherwise. Two non-rotating disks, G, H, are arranged one opposite to each face of the rotating disk, D, and to the face of one of the non-rotating disks, G, there is applied a grinding composition, J, while to the face of the other non-rotating disk, H, there are secured a number of studs or projections, K, of a dovetailed-like formation. Any convenient number of rows of those studs or projections, F, and K, may be used, the studs in one row being preferably arranged at intermediate points to the studs in the next row. The rotating and non-rotating disks, D, G, and H, are inclosed within a casing, L, and two annular passages or spaces, M, are formed within the casing to receive the ground material after it has passed between the grinding faces of the disks.

The non-rotating disks, G, and H, have each an elongated tubular hub or extension, N, and bearing against the outer end there is a ring or collar, O, of a convex form to fit a corresponding concave recess, P, in the hub, Q, of the handwheel, R. The hub, Q, of the handwheel, R, has an extension, S, formed on it, said extension being externally screwed to work in an internally screwed collar or ring, T, encircling the shaft, A, and carried in the framing, C, of the mill. By means of the handwheels, R, the non-rotating disks, G, and H, can be adjusted relative to the rotating disk, D. If desired only one non-rotating disk may be used.

A screw feeding device, V, mounted on and rotating with the shaft, A, is arranged within the hub or tubular extension, N, of each non-rotating disk, G, and H.

The dovetailed-like studs or projections, F, and K, instead of being used as grinding surfaces, may be utilized to secure to the face of the disks any well known grinding composition.

In operation the action of the mill is as follows:—The material to be ground is fed from any suitable hopper (not shown) and passes down through one or other of the openings, W, to the screw feeding device, V, which propels it towards the disks, D, G, and H. As the material is now rotating at a comparatively high speed, it is by centrifugal force driven towards and between the grinding surfaces of the disks. After the material has passed between the disks it escapes into one or other of the annular passages, M, and is

discharged through one of the openings, Y, in the bottom of the casing, L. When bones and such like material is to be ground, it is first passed between what might be termed the preparatory grinding surfaces, consisting of the studs or projections, F, and K, and afterwards finally ground between the grinding surfaces, E and J.

What I claim is:—

A grinding mill comprising a rotary shaft uprights for supporting the same, a rotary disk mounted on said shaft and having a grinding surface on one side and dove tailed projections on the other side, a non-rotating disk on each side of the rotary disk, one of said non-rotating disks having a grinding surface adapted to engage with the grinding surface on the rotary disk and the other disk having dove tailed projections thereon adapted to engage with the projections on the rotary disk, said non-rotating disks having hollow hubs, a casing surrounding the peripheries of said disks, said casing having outlets therefrom and two annular passages therein, one passage receiving the material passing from the projections and the other passage the material from the grinding surfaces, means for feeding the material through the hollow hubs of the non-rotating disks and means for moving said non-rotating disks towards and from the rotary disk.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JAMES JOHNSTONE FRASER.

Witnesses:

ROBERT LINKEASER,

GEORGE PATTERSON.