No. 679,775.

Patented Aug. 6, 1901.

C. W. PANK.

GRINDING MILL.

(Application filed Feb. 9, 1900.)

(No Model.)

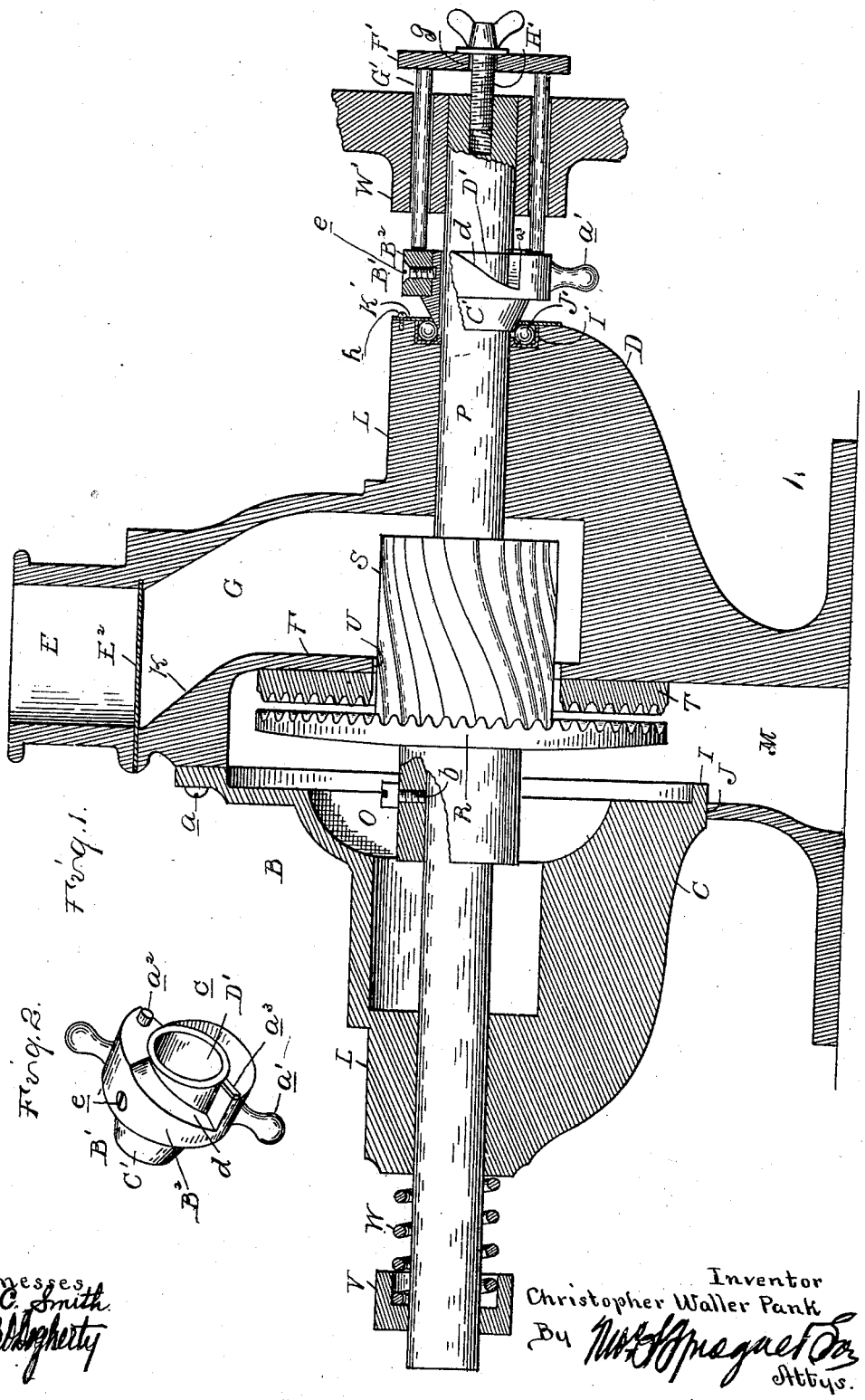

Fig. 1.

Fig. 2.

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UNITED STATES PATENT OFFICE.

CHRISTOPHER WALLER PANK, OF CHICAGO, ILLINOIS.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 679,775, dated August 6, 1901.

Application filed February 9, 1900. Serial No. 4,643. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER WALLER PANK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates generally to grinding-machines, and has particular reference to a grinding-mill especially designed for grinding or pulverizing coffee.

The invention consists in the peculiar construction, arrangement, and combination of the various parts, as shown in the drawings, in which—

Figure 1 is a vertical central section through the body of my improved grinding-machine, and Fig. 2 is a perspective view of the combined adjusting and thrust collar.

In the drawings thus briefly described I have shown only the body of the mill, the grinding-chamber being formed by the casing B, constructed, preferably, in two parts or sections C and D. The latter section terminates at its top in a neck E, on which the usual hopper may be placed.

E^2 is the usual cut-off, and G is a feed-passage leading from the hopper to the grinding mechanism, hereinafter described.

The section C of the casing is provided at its lower end with a flange I, which rests when the parts are assembled upon the shoulder J, formed upon the section D, and its upper end is secured to an enlarged portion K upon the partition F by means of bolts or screws *a*.

L L′ are tubular bearings, formed one upon each casing-section and arranged in alinement, and M is a discharge-passage for the ground material, extending from the grinding-chamber O within the casing through the bottom, said passage usually discharging into a pan or box. (Not shown.)

The main driving-shaft P of the mill is journaled for rotary movement in the journal-bearings L L′ and projects at each end beyond the mill-casing. The shaft is also endwise adjustable in the bearings. Secured to this shaft, within said casing, by a set-screw *b* is the movable grinding-disk R and the feed-worm S, the latter being at the bottom of the feed-passage G.

T designates a stationary grinding-plate secured in any suitable manner to the section D, and U is an annular feed-opening around the feed-worm.

Upon the end of the shaft projecting beyond the bearing L is fixedly secured a collar V, and W is a coil-spring arranged intermediate this collar and the bearing referred to and acting normally to move the shaft endwise in a direction which will separate the grinders. Upon the opposite end of the shaft is fixed the hub W′ of a drive-wheel, by means of which the shaft is turned. Loosely sleeved upon the shaft intermediate the bearing L and the hub is a combined adjusting and thrust collar B′. The combined adjusting and thrust collar it will be observed is not only for the purpose of adjusting the shaft longitudinally, but acts also as a bearing for the right-hand end of the shaft and serves to center the same in the bearing-opening in the casing L, and thereby centers the grinding-disk R. The collar is a bearing collar or ring, as well as an adjusting-collar. This collar I show as formed of two parts, the collar proper, B^2, having cam-faces *c* and *c* formed in its outer face, as shown in Fig. 2, and the cone section or bearing comprising the conical head C′ projecting from the other side, the cone being secured to the collar by a tubular shank or bushing D′, projecting inside the collar. *e* is a set-screw which holds the parts in engagement. As a result of this peculiar formation of the collar I am enabled to readily remove the portion of said collar that becomes worn for the purposes of repair or to replace the same without the necessity of providing an entirely new device for the mill; also, by arranging the collar-sections one over another, as set forth, a more solid and compact structure is provided, which occupies a minimum amount of space upon the shaft. Thus I economize in material and add to the appearance of the mill.

The construction of the adjusting device for the disks comprises a cross bar or head F′, laterally-projecting members in the form of parallel rods G′, extending through apertures formed in the hub into contact with the

outer face of the collar proper, as shown, and a thumb-screw H′, projecting through an aperture *g* in the cross-piece and having a threaded engagement with the shaft, as indicated.

In the end of the bearing L′, immediately adjacent to the collar, I form a ball-race I′, in which is located a series of balls J′.

K′ is an annular retaining-plate for the balls, secured by screws *h* to the bearing.

It will be obvious from the above description of the grinding mechanism that the cone is held constantly in frictional contact or engagement with the ball-bearings by the spring W, whereby a ball thrust-bearing is provided for the shaft, which allows the mill to be easily operated.

In operation the material to be ground is fed within the hopper and is received upon the worm, which feeds it to the grinding mechanism. The grinding is effected in the usual manner, and the ground or pulverized material is discharged through the passage M into a suitable receptacle. When it is desired to cleanse the grinding mechanism, the operator turns the collar B^2 by means of the handles *a′* until the laterally-projecting pins of the adjusting device engage the cam-faces. Through the action of the coil-spring W the shaft is drawn laterally through the collar and its cone and through the mill, and the grinding-disks are separated a sufficient distance from each other to permit of the clogged material or foreign articles to drop through the mill into the receptacle. Upon movement of the collar in the opposite direction the pins are forced into engagement with the side of the collar opposite the cone, and the collar is caused to rotate with the shaft through the agency of a lug or pin a^2 and shoulders a^3, formed upon the outer side of the collar, against which the pins strike. The mill is then in readiness for grinding, and the degree of fineness or coarseness of the ground material is regulated by the thumb-screw, forming a part of the adjustable mechanism.

What I claim as my invention is—

1. In a grinding-mill, the combination with the body, grinding instrumentalities, shaft, and the drive-wheel secured to the shaft, of a ball-bearing in the body for and extending about the shaft, a cone loosely sleeved upon said shaft and projecting into engagement with the ball-bearing, a collar mounted upon the cone and detachably secured thereto, and means coöperating with said collar and acting normally to hold the cone in engagement with the ball-bearing.

2. In a grinding-machine, the combination of a casing, a rotatable shaft supported by said casing and movable axially, a spring acting to move said shaft axially, a roller-bearing in the casing surrounding said shaft, a bearing and adjusting cone loose on said shaft and having a reduced shank, a collar detachably secured to said shank and having a cam-face, and a device secured to said shaft and engaging said cam-face, substantially as and for the purpose set forth.

3. In a grinding-machine, the combination with a shaft, and a bearing part, of means for adjusting the shaft axially comprising a bearing-ring having a reduced shank, an annular cam-ring sleeved on said reduced shank and detachably secured to the bearing-ring, and antifriction-bearing devices between said ring and said bearing part and a part coöperating with said cam-ring, substantially as described.

4. In a grinding-mill, the combination of a casing, a rotatable shaft, a ball-bearing for the shaft, a bearing and adjusting cone loose on the shaft and capable of being shifted thereon rotatably and longitudinally for the purpose described, and means acting to maintain said cone in contact with said ball-bearing, substantially as described.

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

CHRISTOPHER WALLER PANK.

Witnesses:
W. F. NORMAN,
EDWARD REITER.