

(No Model.)

H. C. MECKE.
CRUSHING MILL.

No. 580,115.

Patented Apr. 6, 1897.

Fig. 1.

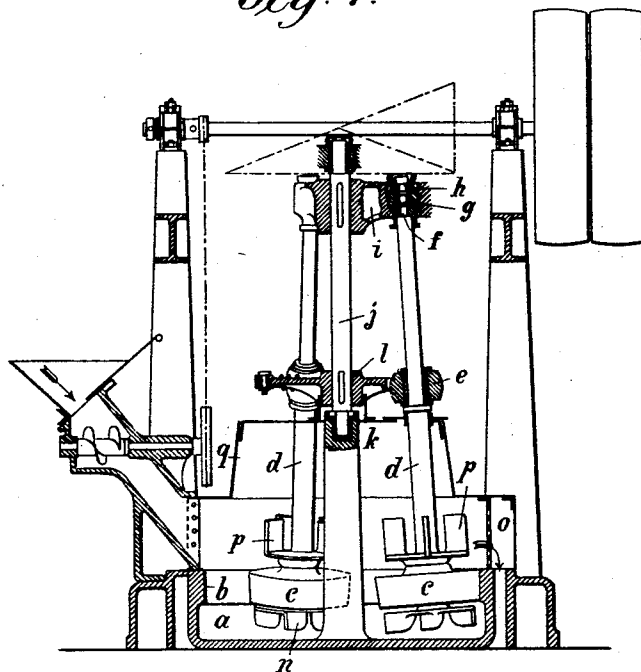
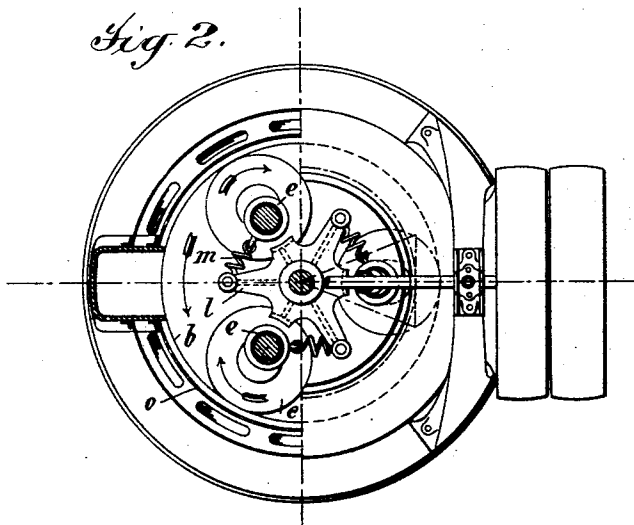


Fig. 2.



Attest:

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UNITED STATES PATENT OFFICE.

HEINRICH CHRISTIAN MECKE, OF HAMBURG, GERMANY.

CRUSHING-MILL.

SPECIFICATION forming part of Letters Patent No. 580,115, dated April 6, 1897.

Application filed February 6, 1896. Serial No. 578,227. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH CHRISTIAN MECKE, a citizen of the city of Bremen, residing at Hamburg, in the Empire of Germany, have invented a new and useful Crushing-Mill, of which the following is a specification.

This invention relates to that class of grinding-mills in which ores, &c., are crushed or pulverized between a grinding-ring and grinding-rollers revolving within the ring and held in contact therewith, while revolving, by centrifugal force.

The invention relates particularly to means for suspending the roller-shafts from the driving-shaft, so as to provide for freedom of movement in all directions with the least possible friction, and also to means for so connecting the roller-shafts to the driving-shaft as to regulate within proper limits the extent of oscillation tangentially with relation to the circle described by the roller-shafts at their points of suspension.

In the drawings, Figure 1 is a vertical section, and Fig. 2 a plan view, of my improved mill.

Referring to said drawings, *a* is the grinding-chamber, in which is situated the grinding-ring *b*. Arranged to rotate upon the latter by friction are two or more grinding-rollers *c*, which are rigidly connected to shafts *d*, that pass through loose bearings *e*, and at their upper ends are formed into journals *f*, provided with collars, so as to rotatively suspend the shafts *d* in bearings *g*. The bearings *g* are ball-shaped and rest in spherical or cup-shaped sockets or bearings *h*, provided in the cross-piece of frame *i*, which is mounted upon the central spindle *j* of the grinding-mill. The step-bearing *k* of the grinding-spindle is so arranged as to afford ready access thereto. Above it the driver *l* is secured to the spindle. An elastic or yielding connection between the loose bearing *e* and the driver is formed by a spring *m*, which drags the shaft *d* when the spindle rotates in the direction indicated by the arrow in Fig. 2, thus permitting just the proper amount of tangential oscillation of the grinding shafts and rollers. Stirring arms, blades, or wings *n*, arranged underneath the rollers, move or sweep the material to be ground between the grinding-path *b* and the rollers *c*, where it is

crushed and ground to the condition of flour or powder. Above the annular path a sieve or sifting-frame *o* is arranged, which, while retaining the coarser particles of the ground material, allows the finer particles to pass through its meshes and be discharged from the machine. Propelling-blades *p* are provided to drive or throw the ground material toward the sifting-frame. Above the sifting-frame *o* the grinding-chamber is closed in by means of a casing *q*.

By the employment of the ball-and-socket joints for the roller-shafts each roller can swing in all directions, including tangential oscillation, and, by arranging a driver on the grinding-spindle preceding or following the roller-shaft and yieldingly connected with it by a loose sleeve or bearing on the shaft and an elastic intermediate link, as a spring, the extent of tangential oscillation of the rollers is regulated within proper limits.

The ball-and-socket joint for the purposes of the present invention is preferably constructed in such a manner that when the shaft of the roller revolves round its axis the said joint does not work and wear, the shaft being not immovably connected with the ball-pivot, but the upper end of the shaft forming a gudgeon, by means of which the shaft rotates within the spherical pivot, so that the ball-and-socket joint merely serves to allow the pendulum-like motion of the grinding-roller.

What I claim is—

1. In a crushing-mill the combination with a cross-piece secured to the vertical grinding-spindle, of a plurality of grinding-rollers suspended in ball-and-socket joints from the cross-piece and a driver secured to the grinding-spindle and yieldingly connected with each roller-shaft so as to limit the tangential oscillation of said rollers, substantially as described.

2. In a crushing-mill the combination with a cross-piece secured to the vertical grinding-spindle, of a plurality of grinding-rollers suspended in ball-and-socket joints from the cross-piece and a driver secured to the grinding-spindle and connected with bearings on the roller-shaft beneath its point of suspension by means of springs, substantially as described.

3. In a crushing-mill the combination with

a cross-piece secured to the vertical grinding-spindle, of a plurality of grinding-rollers suspended in ball-and-socket joints on the cross-piece, the roller-shafts having gudgeons at
5 their upper ends by means of which they are rotatably suspended in the ball-pivots, and means for limiting the tangential oscillation of said rollers, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HEINRICH CHRISTIAN MECKE.

Witnesses:

GUSTAF AXMER,
E. HH. MUMMANHOFF.