C. L. PETRIKIN & C. R. DIMM.

SEALING RING FOR GRINDING MILLS.

APPLICATION FILED MAR. 25, 1910.

972,470. Patented Oct. 11, 1910.

Fig. 1.

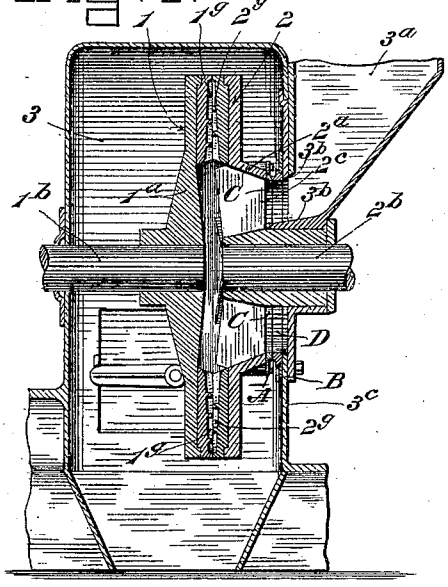


Fig. 2.

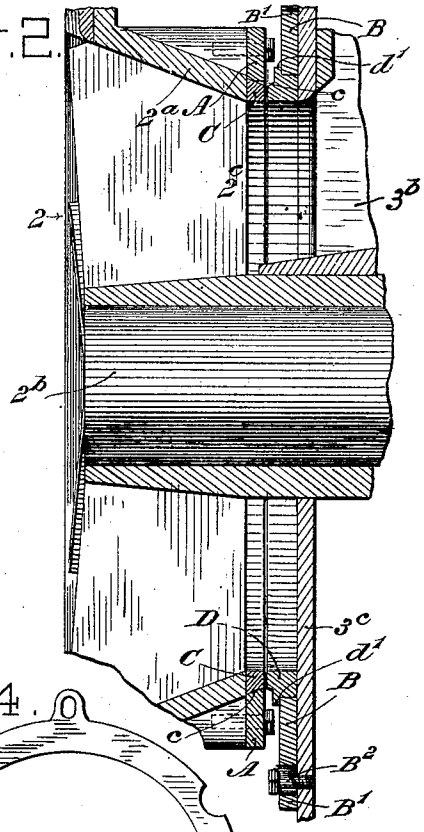


Fig. 3.

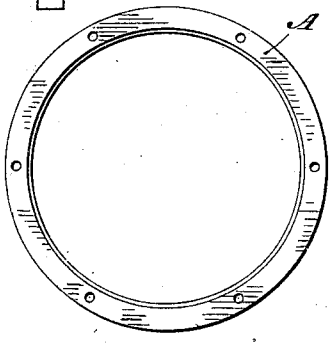


Fig. 4.

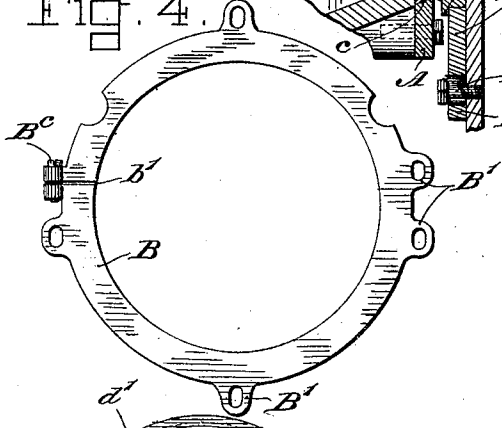


Fig. 5.

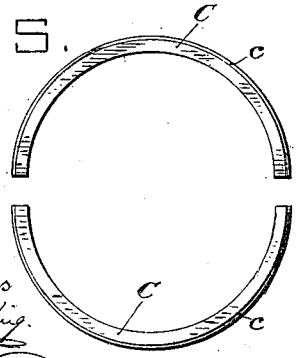
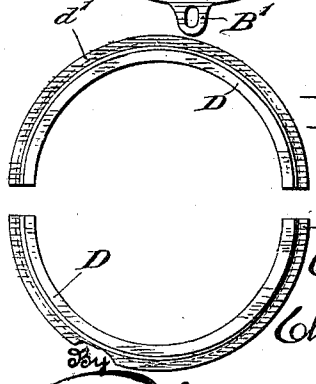


Fig. 6.



Witnesses

Harry King.

James B. Mansfield.

Inventors.

Charles L. Petrikin and Chandos R. Dimm

By Alexander & Dowell Attorneys

UNITED STATES PATENT OFFICE.

CHARLES L. PETRIKIN AND CHANDOS ROY DIMM, OF MUNCY, PENNSYLVANIA, ASSIGNORS TO ROBINSON MANUFACTURING COMPANY, OF MUNCY, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

SEALING-RING FOR GRINDING-MILLS.

972,470. Specification of Letters Patent. Patented Oct. 11, 1910.

Application filed March 25, 1910. Serial No. 551,602.

To all whom it may concern:

Be it known that we, CHARLES L. PETRIKIN and CHANDOS ROY DIMM, citizens of the United States, and both residing at Muncy, Lycoming county, State of Pennsylvania, have invented certain new and useful Improvements in Sealing-Rings for Grinding-Mills; and we hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention relates to attrition or grinding mills, of that class in which the grinding is performed between two disks arranged in a vertical plane, one or both of which disks may be rotated so that the material fed axially therebetween is discharged by centrifugal action at the peripheries thereof after being ground. In such mills the stock or grain to be ground is usually fed by gravity from a hopper through a suitable spout into the central space between the two disks. The grinding surfaces of the disks are also usually formed of hardened steel plates removably attached to so called "runner-heads", and the runner-head next the feed spout is provided with openings which are adapted to register with the spout and permit the material fed from the hopper to pass into the central cavity or chamber between the disks, and the centrifugal force throws the stock to be ground out between the grinding disks.

To prevent unground stock mixing with the ground product, it is necessary to have a close joint at the junction of the lower terminal of the spout and the opening (called the eye) through the runner-head. Heretofore it has been usually customary to employ a rim or collar, cast onto and a part of the runner-head proper, and revolving in close proximity to a concentric stationary rim or collar on the spout; but this construction has been found very objectionable, as the collar or rim on the runner-head will wear out, before other parts of the head, thereby shortening the usefulness of the head and rendering repairs quite costly.

Manufacturers of such grinding mills now commonly provide for renewing the parts that form the joint between the spout and runner-head; usually by employing a collar bolted to the runner-head and having a neck extending into a ring, called a seal ring, that is stationary and secured to the spout. There are several objections to this construction; one is that there is considerable friction caused by the stock packing around the neck, sometimes to such an extent that the friction causes the stock to take fire; another is that if the disks become the least bit out of alinement the revolving neck is thrown in contact with the seal ring and one or both of them is cut or worn away, very rapidly destroying the joint and allowing the stock to leak through; still another objection is that when the neck becomes worn it is necessary to take the runner-head out of its bearings to put a new neck in place, which necessitates a long delay in use of the mill, and a great deal of work.

The object of our invention is to avoid all the aforesaid objections to the present known connections between the runner-head of a grinding mill and the feed spout; and our invention consists in providing a revolving sealing ring mounted upon the runner-head, and a stationary sealing ring mounted upon or around the mouth of the spout; which sealing rings are made adjustable, so that—(after the disks are put in perfect alinement and their grinding faces are exactly parallel)—the retainer rings can be adjusted so close together endwise that no material or stock can pass between said rings although their opposed ends need not impinge nor have any wearing contact with each other; by this construction an unobstructed passage is left for the stock between the spout and runner-head; there is no place for lodgment or collection of stock in the joint; and consequently all the stock flowing from the hopper spout will pass to the runner-head and between the disks.

The main advantages of our invention are that it is simple and inexpensive; the sealing rings can be readily put in place or removed or adjusted; they can be inserted or removed without removing the runner-head in very little time; and if either ring wears or breaks it can be easily and cheaply and quickly replaced.

In the accompanying drawings we have illustrated a practical embodiment of the invention as applied to an attrition or grinding mill of the type shown in the patent to Robinson #805,933 of November 28, 1905,

but the invention is not restricted to use in any particular construction of mill.

In said drawings—Figure 1 is a sectional elevation of part of a disk action grinding mill provided with sealing rings constructed and arranged in accordance with our invention. Fig. 2 is an enlarged vertical section of the sealing rings and their retainers. Figs. 3 and 5 are detail views of the inner, or rotating, sealing ring and its retainer, separated. Figs. 4 and 6 are detail views of the outer, or stationary, sealing ring and its retainer, separated.

In the drawings, 1 and 2 designate opposite grinding disks, composed of annular grinding plates 1^g, 2^g, respectively mounted upon runner-heads 1^a, 2^a, which heads are keyed to shafts 1^b, 2^b, suitably journaled in bearings on the frame of the machine; and which may be rotated in opposite directions by any suitable means, (not shown) for example such as are shown and described in the patent to Robinson aforesaid. The said grinding disks are inclosed in a casing 3, and the runner-head 2^a is provided with an "eye" or opening 2^e through which the stock is fed into the space between the runner-heads from a spout 3^b leading to a hopper 3^a. The aforesaid parts may be constructed substantially as shown and described in said patent to Robinson, or in any other suitable manner, so that in operation the material fed from the hopper 3^a passes to and between the runner-heads 1^a, 2^a, and after being ground between the disks 1 and 2 is discharged at the peripheries thereof by centrifugal action into casing 3. In order to prevent the stock packing or collecting between the rotating runner-head 2^a and the stationary discharge spout 3^b, we employ opposed parallel sealing-rings C and D, the former of which is attached to the runner-head 2^a and the latter to the wall of the casing around the mouth of the spout 3^b and surrounding the shaft 2^b. The rotary sealing ring C is secured to the runner-head 2^a by an annular retainer A which is bolted to the outer end of the runner-head 2^a; and the stationary sealing-ring D is secured to the casing by means of a stationary retaining ring B bolted to the casing as shown.

The sealing ring C is preferably beveled on its outer edge, as shown at *c*, the bevel sloping toward the ring D; and the inner surface of the retainer A is beveled to correspond with the bevel of the ring C, so that when the retainer A is placed over and around the ring C (as indicated in Figs. 1 and 2) the ring C will be held in place within the ring A and firmly secured to the runner-head 2^a. Preferably ring C is made in two or more sections (Fig. 5) so that in case of undue wear or breakage of any section of such ring the damaged section can be removed and replaced without having to renew the whole ring; and without having to remove the runner-head or take down the mill,—as would have to be done if the ring C was made solid.

The outer sealing ring D is preferably of the same internal diameter as the sealing ring C; and is also preferably made in sections (Fig. 6). Ring D is adapted to fit closely within an annular retainer B, which is provided with slotted lugs B′ on its outer edge for the passage of bolts B^2 that fasten it to the wall 3^c of the casing. The retainer B is preferably split at one side as shown at *b′* and the ends of the ring, at the split, are united by a bolt or screw, as indicated at B^c, so that after the ring D has been properly adjusted in position, it can be securely held therein by contracting the retainer B around it. The ring D may be provided with an annular flange *d′* abutting against the outer face of the retainer B as shown, said flange preventing outward movement of the ring D in retainer B.

The sealing ring C is secured to the end of the runner-head 2^a by means of the retainer A, as shown, and after the disks 1 and 2 have been adjusted so that their grinding surfaces are exactly parallel with each other,—ring C is adjusted, in said retainer, so that its outer edge will be exactly parallel with the plane of the grinding surfaces of disk 2. The sealing ring D, which is first placed loosely in the retainer B, should then be pressed inward, by any suitable means, until its inner end is in close contact with the outer end of the sealing ring C; then ring D is rigidly clamped in this position by tightening the screw B^c in the retainer B. The object in making the rings C and D in such a form that they can be set endwise parallel with each other, is that even when the disks have been trued and adjusted for operation there is small chance that the disks will be exactly parallel with the feed spout or retainer B; and it is therefore necessary to have some simple arrangement for then adjusting the sealing rings C and D until their ends are exactly parallel and then firmly securing the rings in such position.

After the ring D has been set up against the ring C the grinding disks can be slightly separated by turning the usual adjusting screw (not shown) until the adjacent ends of the rings C, D, are say about one-thirty-second of an inch apart, at all points, (as indicated in Fig. 2). The rings might be fixed this distance apart at the outset by inserting a piece of paper or sheet tin between the ends of the rings before the sealing ring D is clamped in the retainer B, but we prefer to first set the ring D close against the ring C, after the disks have been properly alined, and then slightly separate the sealing rings by backing the runner-heads 1^a and 2^a away from the ring D, by the usual regulat-

ing means. When thus adjusted there is absolutely no friction between the sealing rings, and no danger of friction from accumulation of stock at or between the ends of the ring, as is the case when the neck extends into a collar, and the disks may become considerably out of true axial alinement before there can be any leakage between the rings or any injurious frictional contact therebetween. A great practical advantage is the ease with which the rings can be renewed when worn out, as they can be changed in about one-tenth the time usually required to renew other connections.

If the disks should become so much out of alinement as to cause the rings to contact and wear on their ends until the stock can leak therebetween, the leak can be stopped by merely properly turning the usual adjusting screw at the end of the disk shaft.

Having described our invention what we claim is:

1. In a grinding mill, the combination of a runner-head and feed spout; with a pair of sealing rings interposed between and respectively connected with the runner-head and the feed spout, said rings having their meeting ends directly opposed and closely adjacent to prevent escape of stock between the rings when passing from the feed spout to the runner-head.

2. In a grinding mill, the combination of a runner-head and a feed spout; with a sectional sealing ring removably attached to the outer end of the runner-head and rotating therewith; and a second sectional sealing ring in substantially axial alinement with the first sealing ring, and means for removably securing the second ring around the opening in the feed spout with its inner end closely adjacent the outer end of the first ring.

3. In a grinding mill, the combination of a runner-head, an annular retainer secured to the outer end of the runner-head, and a sectional sealing ring secured within the said retainer; with a feed spout, an annular retainer secured around the end of such spout adjacent the runner-head, and a second sectional sealing ring fitted within the said annular retainer with its inner end directly opposed to the outer end of the first ring and closely adjacent thereto.

4. In a grinding mill, the combination of a runner-head, a retainer secured to the outer end of the runner-head and beveled on its inner periphery, and a sealing ring beveled on its outer periphery and secured within the said annulus; with a feed spout, and a second sealing ring secured around the discharge end of the spout; said sealing rings being adjusted so that their opposed ends are closely adjacent to prevent escape of stock passing from the spout to the runner-head.

5. In a grinding mill, the combination of a runner-head, an annulus secured to the outer end of the runner-head and beveled on its inner periphery, and a sealing ring secured within the said annulus; with a split retainer secured around the discharge end of the spout, means for clamping the split retainer, and a sealing ring fitted within the said split retainer and having its inner end closely adjacent the outer end of the first ring.

6. In a grinding mill, the combination of a runner-head, a retainer secured to the outer end of the runner-head and beveled on its inner periphery, and a sealing ring beveled on its outer periphery and secured within the said annulus; with a feed spout, an annular split retainer secured around the discharge end of the spout, and a sealing ring fitted within the split retainer and said sealing rings being adjusted so that their opposed ends are closely adjacent and parallel to prevent escape of stock passing from the spout to the runner-head.

7. In a grinding mill, the combination of a runner-head, an annulus secured to the outer end of the runner-head and beveled on its inner periphery, and a sectional sealing ring beveled on its outer periphery and secured within the said annulus; with a split retainer secured around the discharge end of the spout, means for clamping the split retainer, and a sealing ring fitted within the said split retainer and having its inner end closely adjacent the outer end of the first ring.

In testimony that we claim the foregoing as our own, we affix our signatures in presence of two witnesses.

CHARLES L. PETRIKIN.
CHANDOS ROY DIMM.

In presence of—
H. L. BERGER,
ROBT. K. REEDER.