No. 705,749. Patented July 29, 1902.

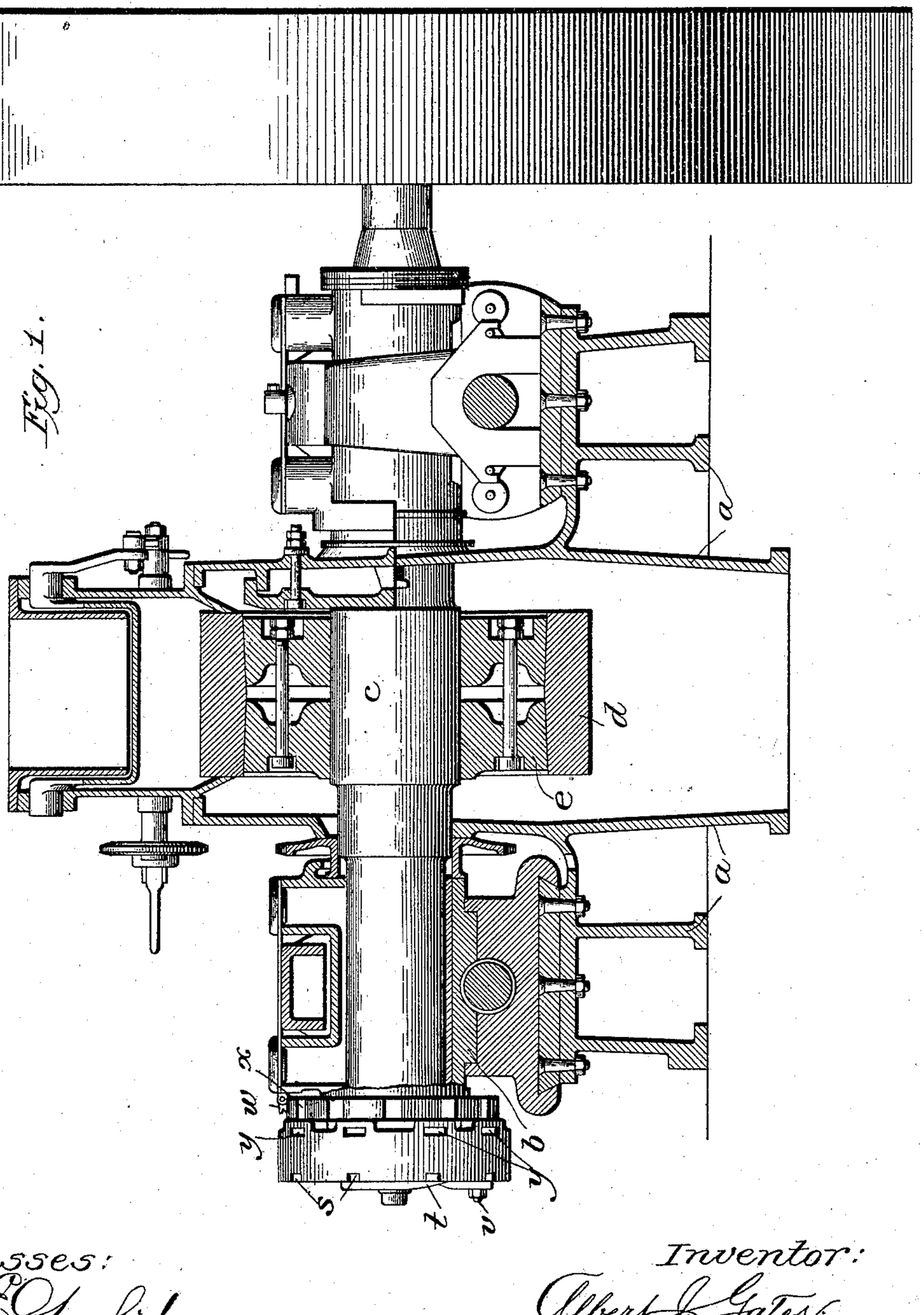
A. J. GATES.

CORNISH ROLL.

(Application filed July 29, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses:
Chas. E. Gaylord.
John Enders Jr.

Inventor:
Albert J. Gates;
By Thomas F. Sheridan,
Att'y.

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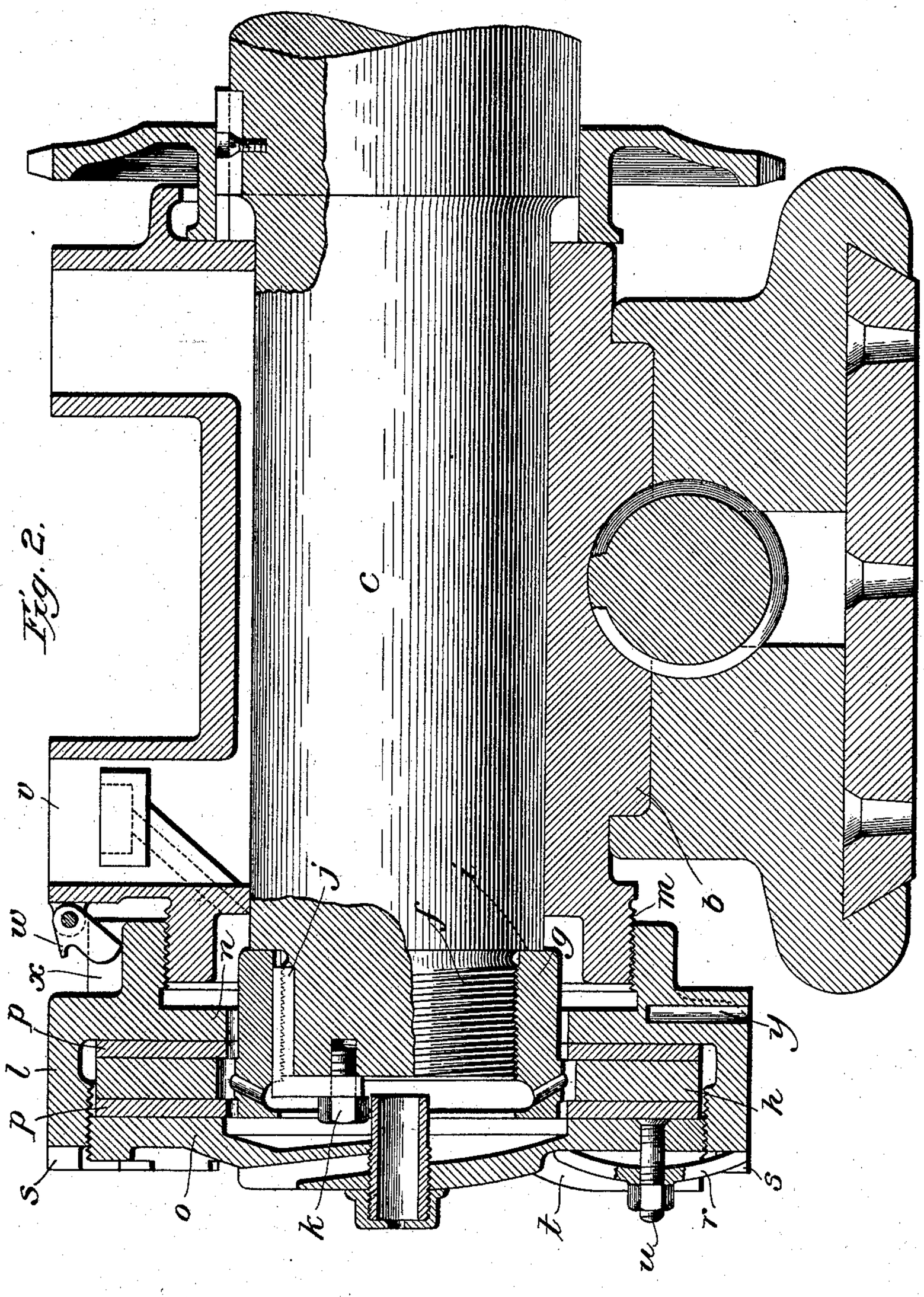

Fig. 2.

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UNITED STATES PATENT OFFICE.

ALBERT J. GATES, OF CHICAGO, ILLINOIS, ASSIGNOR TO ALLIS-CHALMERS COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

CORNISH ROLL.

SPECIFICATION forming part of Letters Patent No. 705,749, dated July 29, 1902.

Application filed July 29, 1901. Serial No. 70,050. (No model.)

To all whom it may concern:

Be it known that I, ALBERT J. GATES, 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 Cornish Rolls, of which the following is a specification.

This invention relates to that class of rolls which are known as "Cornish" rolls, used for the purpose of grinding or reducing ores and similar materials to a condition of great fineness; and it has particular relation to the means for adjusting one or both of the rolls with relation to each other, all of which will more fully hereinafter appear.

The object of the invention is to provide Cornish rolls with simple, economical, and efficient means by which one or both of the shafts that carry the rolls may be adjusted longitudinally; and the invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of one of the roll-shafts of a Cornish roll constructed in accordance with these improvements; and Fig. 2 an enlarged longitudinal sectional elevation of one end of one of the roll-bearing shafts, showing the adjusting mechanism.

In the art to which this invention relates it is well known that the roll-centers are surfaced with shells or tires of some hard material calculated to resist great wear, but that after a certain period of usage these crushing-surfaces become grooved and the efficiency of the mechanism thereby greatly impaired, as well as the life of the shell or tire greatly lessened, all of which will be appreciated by those skilled in the art.

To restore the efficiency of the machine, it is necessary to grind or turn the shells so that the faces of the two rolls shall be smooth and parallel with one another, or to arrange one roll-shaft so that it may be adjusted laterally to the other, or to arrange both shafts so that they may be adjusted laterally to each other, thus allowing of bringing the ridges in one of the rolls opposite the grooves in the other roll, thereby causing the ridges to wear down and straightening the face of the rolls with one another.

It is evident that the oftener the rolls are adjusted with reference to one another the less liability there is of the shells grooving, and as this character of machine is largely used in operations where they run practically continuously it is essential that the means for adjusting be such that the operation can take place while the machine is in motion.

In illustrating and describing this invention I have only illustrated and described that which I consider to be new, taken in connection with so much as is old as will properly disclose the invention to others and enable those skilled in the art to practice the same, leaving out of consideration other and well-known parts, which if shown and described in unnecessary detail would only tend to prolixity, confusion, and ambiguity.

In constructing a crushing-roll in accordance with these improvements a frame portion *a* of the desired size, shape, and strength to hold the parts in position is provided and which can be made in one or more parts, as may seem desirable. Mounted in suitable bearing-blocks *b*, in turn adjustably mounted in this frame portion, is a pair of roll-shafts *c*, carrying the crushing-rolls composed of the shells *d* and the centers *e*, which are secured to the shaft C in the usual well-known manner. The lateral thrust imparted to the shaft by the pressure on the material being crushed by the ridges and grooves necessitates that the adjusting mechanism be of such character as to withstand this heavy pressure with the development of the least possible amount of frictional resistance, and therefore in order to accomplish the results above enumerated in the manner suggested the end of one or both of the roll-shafts that does not carry the driving pulley or gear is screw-threaded, as at *f*, and mounted upon this screw-threaded end, as shown particularly in Fig. 2, is a thrust-collar *g*, having a radially-extending flange portion *h*. This thrust-collar, as above suggested and as can be readily seen from an examination of the drawings, has its internal bore screw-threaded to engage with the screw-threads on the end of the roll-shaft and is so constructed and arranged that its inner end abuts against a shoulder *i* on the roll-shaft. To prevent this thrust-collar from turning,

or, in other words, to lock it securely in the desired position, a gib-key *j* is provided and driven into a slot, formed half-way in each of the threaded portions of the roll-shaft and thrust-collar, so that after both such parts are placed in engaging position and the gib-key driven in independent rotation of such parts is rendered impossible. To lock this gib-key in position, a cap-screw *k* is provided and inserted through a perforation in the head of the key, so as to have a threaded engagement with that particular end of the shaft, as shown in Fig. 2.

To provide means for taking the thrust of the thrust-collar, and thereby hold the roll-shaft and other parts in position, a ring-nut *l* is provided of the relative size and shape shown in Fig. 2, the inner end of which is screw-threaded, so as to engage with a threaded portion *m* on the bearing-box. This ring-nut has an inwardly-projecting annular shoulder or flange *n*, extending inwardly to about the diameter of the hub *g* of the thrust-collar, so as to furnish a wearing-surface against which the inward thrust is taken. To take up the thrust in the opposite direction, the outer end of the ring-nut is bored and threaded of a diameter larger than the diameter of the flange on the thrust-collar, so that such collar may be placed in or removed from position at any time without disturbing the entire ring-nut, and a plate-nut *o* is provided and inserted in the threaded opening thereof. (See Fig. 2.)

In order to provide for minimizing the frictional resistance and secure minimum wear of the parts, a pair of wearing-rings *p* is provided of a diameter substantially equal to that of the flange on the thrust-collar, one of which is placed between one face of the thrust-collar flange *h* and the inwardly-extending inner flange *n* of the ring-nut and the other between the outside face of the flange *h* of the thrust-collar and the plate-nut *o*. The advantages of such a construction and arrangement will be readily appreciated by those skilled in the art, first, because it provides the minimum frictional resistance and wearing of the parts, and, second, because it permits the rotation of the ring-nut upon its threaded bearing *m* on the shaft-journal box, thereby permitting the moving or adjusting of the thrust-collar with its roll-shaft longitudinally without disturbing any of the other parts.

It is highly desirable that some means be provided to lock the plate-nut *o* in its position, and to accomplish this result a plate-nut latch *r* is provided, having one end engaging with one of a series of slots or grooves *s* in the ring-nut and the other end engaging with a slot or groove *t* in the plate-nut *o*, as shown particularly in Fig. 1, while a stud or bolt *u* serves to lock and keep the parts in such engagement until it is desired to change the relative position. It will be understood that the latch may be placed in engagement with any one of these grooves *s*, so that the plate-nut may be locked in one of a number of different positions, and thereby obtain the desired amount of play between the thrust-collar and the wearing-rings.

It will be seen that when the parts described are locked in the position shown in Fig. 1 by turning the ring-nut *l* by using a lever in the recesses therein the thrust-collar, with its roll-shaft, is moved longitudinally inwardly or outwardly. It becomes desirable, therefore, to lock the ring-nut *l* in its desired position. To accomplish this result, the journal-box, or, more properly speaking, the walls of the oil-well *v*, which form a portion of said journal-box, is provided with a dog *w*, arranged to engage with one of a series of grooves or slots *x* in the exterior periphery of the ring-nut *l*, so that it can be locked in any desired position and retain the desired adjustment of the roll-shaft.

I claim—

1. In a Cornish roll, the combination of a shaft, a thrust-collar secured thereto at or near one end thereof, a ring-nut in engagement with the journal-box of the shaft and means for holding the thrust-collar rotatably in engagement with the ring-nut to take up the thrust thereof, whereby as such ring-nut is rotated and moved inwardly and outwardly the thrust-collar is likewise moved, carrying with it the shaft and roll, substantially as described.

2. In a Cornish roll, the combination of a roll-shaft, a thrust-collar engaged therewith, a ring-nut surrounding the thrust-collar and having screw-threaded engagement with the frame of the machine, means for locking and holding the thrust-collar in rotatable engagement with the ring-nut used to sustain the thrust thereof, and means for locking and holding the ring-nut in desired engagement with the frame, substantially as described.

3. In a Cornish roll, the combination of a roll-shaft, a thrust-collar in engagement with one end thereof and provided with an annular flange, a ring-nut in threaded engagement with the frame of the machine and surrounding the thrust-collar, and a plate-nut in engagement with the other end of the ring-nut and forming in connection therewith a closure that holds the thrust-collar rotatably in position, substantially as described.

4. In a Cornish roll, the combination of a roll-shaft, a thrust-collar provided with an annular flange in engagement with one end of such roll-shaft, a ring-nut having one end in threaded engagement with the frame of the machine and upon which it is rotated and adjusted, a plate-nut adjustably mounted in engagement with the other end of the ring-nut for confining and forming a closure for the thrust-collar, means for holding the plate-nut in adjusted position, and wearing-rings interposed between the plate and ring-nuts and the flange of the thrust-collar, substantially as described.

5. In a Cornish roll the combination of a roll-shaft, a thrust-collar provided with an annular flange in engagement with one end of such roll-shaft, a ring-nut surrounding the thrust-collar having one end in threaded engagement with the frame of the machine and upon which it is rotated and adjusted, a plate-nut adjustably mounted in engagement with the other end of the ring-nut for confining and forming a closure for the thrust-collar to confine it therein and sustain the thrust thereof, means for holding the plate-nut in adjusted position, wearing-rings interposed between the plate and flange of ring-nut and the flange of the thrust-collar, and means for locking the ring-nut in adjusted engagement with the frame, substantially as described.

6. In a Cornish roll, the combination of a roll-shaft, a thrust-collar provided with an annular flange in threaded engagement with one end thereof, a gib-key engaging a slot formed by and in the threaded portions of the roll-shaft and thrust-collar for holding such parts in the desired position, a ring-nut surrounding the thrust-collar having one end in threaded engagement with the frame of the machine for the adjustment thereof, a plate-nut in threaded engagement with the other end of the ring-nut to complete the closure for and confine the thrust-ring, means for holding the plate-nut in adjustable engagement with the ring-nut, means for holding the ring-nut in adjustable engagement with the frame, a wearing-ring interposed between the ring-nut and the annular flange of the thrust-collar, and a wearing-ring interposed between the plate-nut and the annular flange of the thrust-collar, substantially as described.

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