

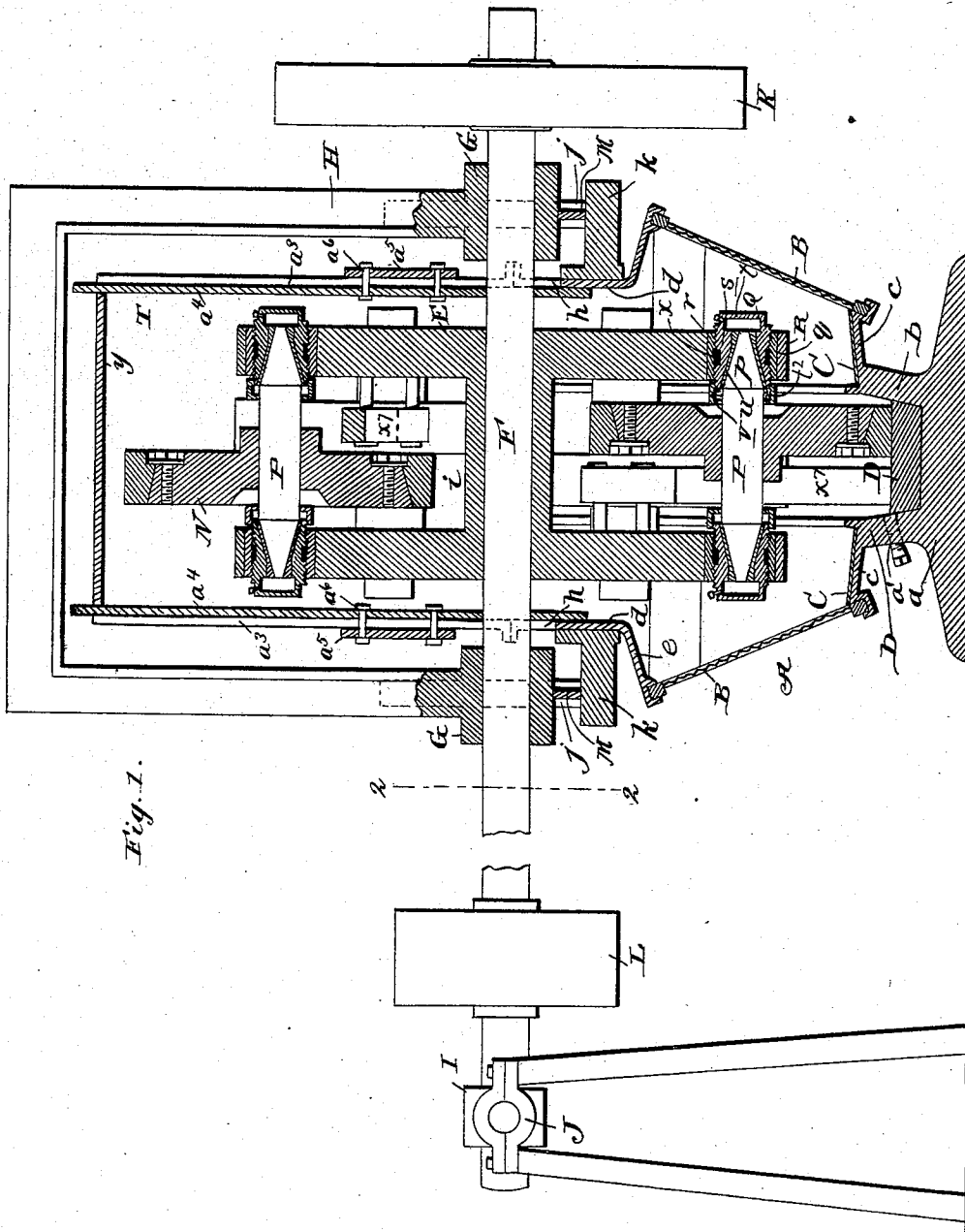
(No Model.)

3 Sheets—Sheet 1.

P. McKELLAR.
MACHINE FOR PULVERIZING ROCK, &c.

No. 536,225.

Patented Mar. 26, 1895.



Witnesses:

C. H. Fiedler

H. H. Matthews.

Inventor

J. McKellar

By

By James J. Sheehy

Attorney

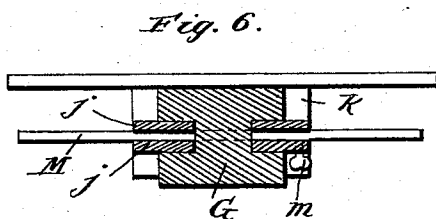
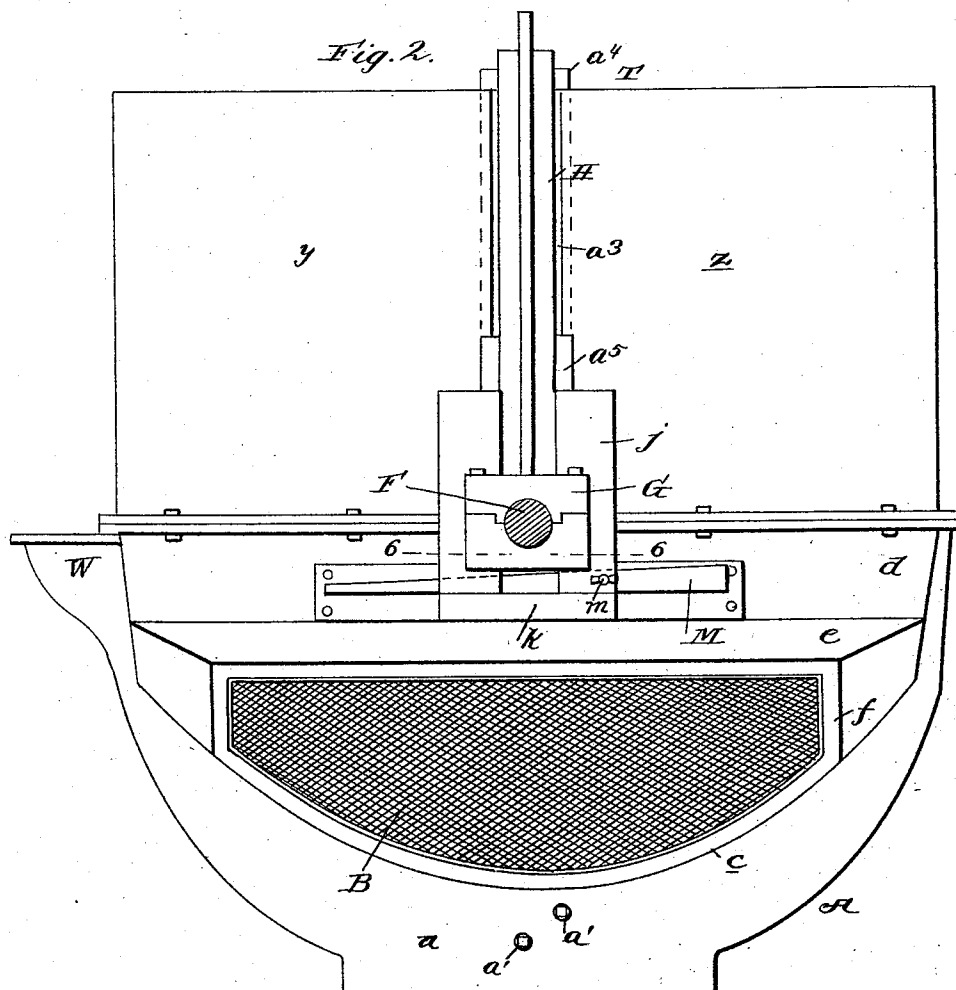
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3 Sheets—Sheet 2.

P. McKELLAR.
MACHINE FOR PULVERIZING ROCK, &c.

No. 536,225.

Patented Mar. 26, 1895.



Witnesses:
C. Raeder
R. F. Matthews

Inventor
J. McKellar
By James J. Shuckey
Attorney

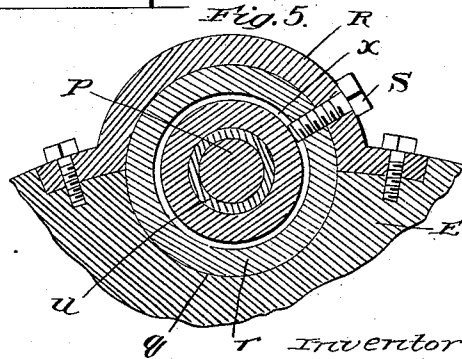
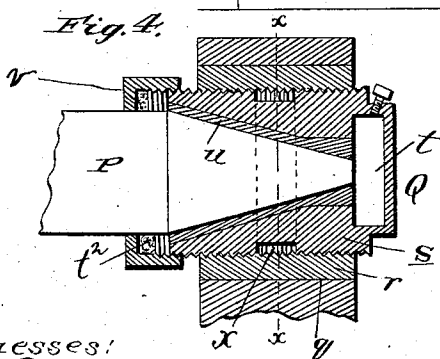
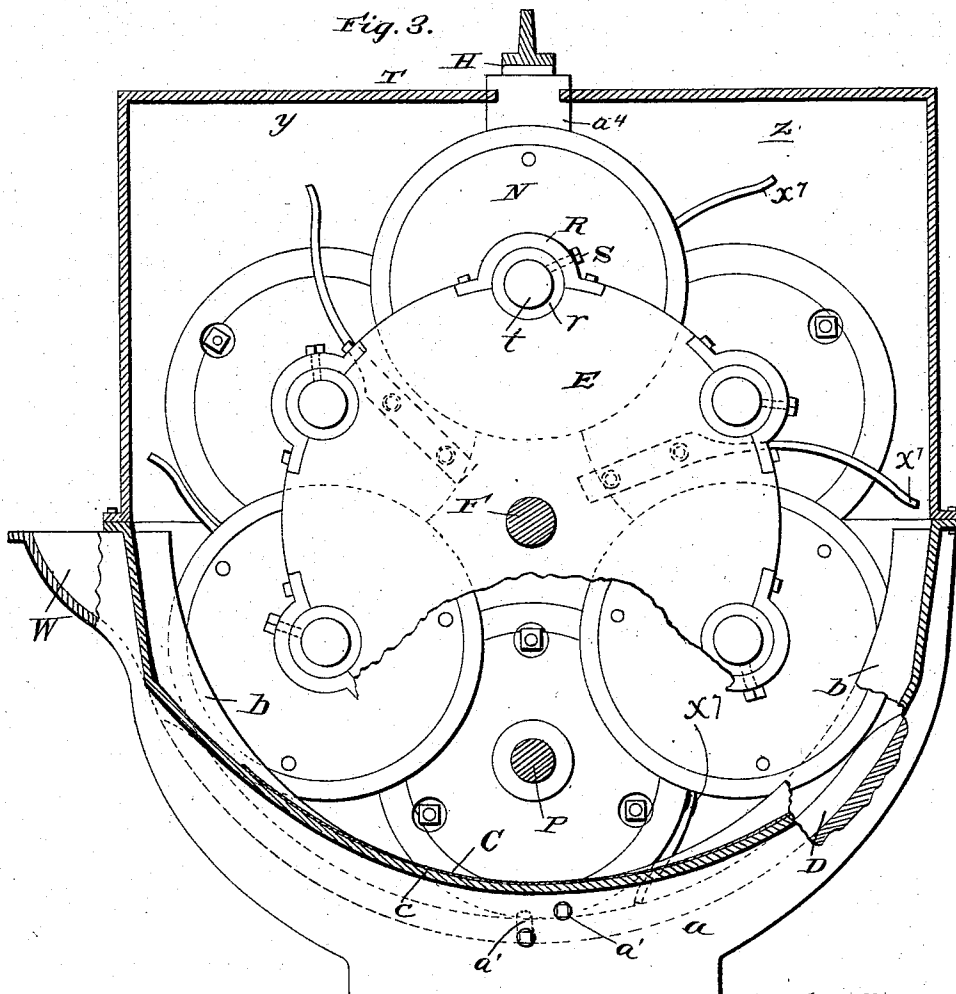
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3 Sheets—Sheet 3.

P. McKELLAR.
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Witnesses:
C. H. Raeder
N. F. Matthews.

Inventor
P. McKellar
By James J. Shuey
Attorney

UNITED STATES PATENT OFFICE.

PETER MCKELLAR, OF FORT WILLIAM, CANADA.

MACHINE FOR PULVERIZING ROCK, &c.

SPECIFICATION forming part of Letters Patent No. 536,225, dated March 26, 1895.

Application filed November 13, 1894. Serial No. 528,679. (No model.)

To all whom it may concern:

Be it known that I, PETER MCKELLAR, a citizen of Canada, residing at Fort William, in the district of Thunder Bay and Province of Ontario, Canada, have invented certain new and useful Improvements in Machines for Pulverizing Rock, &c.; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machines for pulverizing rock, ore, and the like, and it is designed more particularly as an improvement upon the machine disclosed in my Letters Patent No. 526,788, which embodies such a construction that in operation the full weight of the impact rolls and the wheel carrying the same is imposed upon the rock or ore so as to facilitate the crushing of the same.

One of the objects of my present invention is to provide a rock or ore pulverizing machine in which the weight of the impact rolls and the wheel carrying the same is utilized to effect the crushing of the ore or rock, and in which it is consequently duly necessary to rotate the said wheel at a speed sufficient to cause the minute particles of rock or ore to "float."

Another object of the invention is to provide an ore or rock crushing machine which may be used to advantage in crushing ore containing gold, and still another object is to provide means whereby grit and fine particles of ore will be prevented from getting into the bearings of the shafts of the impact rolls, and accelerating the wear thereof, and means whereby wear of the said shafts may be readily taken up.

Other objects and advantages of the invention will be fully understood from the following description and claims when taken in connection with the annexed drawings, in which—

Figure 1, is a transverse section of my improved machine with parts in elevation. Fig. 2, is a section taken in the plane indicated by the line 2, 2, of Fig. 1. Fig. 3, is a vertical, longitudinal section of the machine with parts in elevation. Fig. 4, is an enlarged,

diametrical section of one of the journal boxes of one impact roll shaft. Fig. 5, is a transverse section taken in the plane indicated by the line *x, x*, of Fig. 4, and Fig. 6, is a horizontal section taken in the plane indicated by the line 6, 6, of Fig. 2.

In the said drawings, similar letters designate corresponding parts in all of the several views, referring to which—

A, indicates the mortar of my improved machine. This mortar is preferably of a general semi-circular form, as illustrated, and it comprises, by preference the curvilinear bottom *a*, having the parallel ridges *b*, which are of an even height throughout their length and are provided for an intermediate portion of their length with the lateral flanges *c*, and the side walls *d*, which rise from the ridges *b*, and are provided with the horizontal and vertical flanges *e, f*, designed to serve in conjunction with the flanges *c*, to form openings for the reception of the screens B, which are formed in the flanges *c, d, e*, as illustrated. The flanges *c*, while they extend laterally along the ridges *b*, are of a less curvature than said ridges to afford greater screening capacity; and they are provided with copper plates C, which are desirable for obvious reasons when the machine is used for crushing gold and silver bearing ore, but which may be and preferably are omitted when the pulverizer is used for crushing other ores and rock.

The mortar A, is provided in the channel formed by the ridges *b*, with a shoe D, of hardened metal designed to prevent wear of its bottom, and said mortar is also provided in its side walls with notches *h*, the purpose of which will be presently described.

E, indicates the wheel which carries the impact rolls and is designed to be rotated in the mortar A. This wheel E, may be cast in one piece, and has a peripheral recess *i*, to receive the impact rolls, and it is fixed upon a shaft F, as better illustrated in Fig. 1. The said shaft F, is journaled in suitable bearing-blocks G, at the ends of a yoke H, and the said bearing blocks are arranged to slide between the guides *j*, which rise from lugs *k*, on the outside of the mortar walls *d*, whereby it will be seen that the full weight of the wheel E, and the impact rolls and other parts con-

nected therewith will be imposed upon the ore or rock in the bottom of the mortar to facilitate the crushing thereof, and the wheel E, will also be enabled to accommodate itself to the amount of ore or rock in the mortars; the notches *h*, in the mortar walls *d*, serving to permit a limited movement of the shaft F. Scrapers *X*⁷, are fastened to wheel E, as shown, and are adapted to level the material in advance of the impact rolls.

In order to render the rotation of the wheel E, more regular and even, I extend the shaft F, on opposite sides of the mortar and journal it at one end in a bearing box I, which is swiveled in suitable bearings J, and provide it at its opposite end or other suitable point with a balance wheel as K. Thus it will be seen that as the shaft is rotated through the medium of a belt taking around the belt pulley L, the wheel E, will be evenly rotated without interfering with the imposition of the entire weight thereof upon the rock or ore which is a desideratum. When the weight of the wheel E, and its appurtenances are thus imposed upon the rock or ore, the crushing is done entirely by the weight with the little extra force gained by the velocity to rotate said wheel at a speed sufficient to make the finer particles of ore or those which are small enough to pass through the screens B, "float."

It is desirable in some cases to limit the downward movement of the wheel E, so that when in its lowermost position it will rest at a certain distance above the mortar bottom, and I therefore provide the wedges M, better illustrated in Figs. 1, and 2. These wedges M, take through openings in the guides *j*, at points above the lugs *k*, and they are designed to be adjusted for the purpose stated, and are also designed to be adjustably fixed through the medium of the set screws *m*, which take through the guides *j*, as better shown in Fig. 6.

N, indicates the impact rolls which are, by preference, of a similar construction to those disclosed in my Letters Patent, and are similarly arranged so as to enable them to balance each other and the wheel. The said impact rolls are fixed upon shafts P, and these shafts which have conical or tapered ends *p*, are journaled in bearing boxes Q, which are secured by removable caps R, in seats *q*, formed at equi-distant points in the periphery of the wheel E.

The journal or bearing boxes Q, are of a peculiar and advantageous construction and they respectively comprise the outer shell *r*, which is interiorly threaded, the body *s*, which is exteriorly threaded to engage the threads of the shell and is provided at its outer end with a receptacle *t*, for lubricant or packing, the bushing *u*, preferably of brass, which is designed to be readily removed when worn and be replaced by a new one, and the guard cap *v*, which is preferably of right-angle form in cross-section and is interiorly threaded as shown, so as to enable it to engage the body

s, and press the packing in space *t*, against the shaft, and effectually exclude grit and the like from the box and thereby prolong the usefulness of the same.

The outer shell *r*, of the bearing boxes Q, is fixed against movement by the screw S, which takes through the cap R and the shell or casing *r*, and into a peripheral groove *x*, in the body *s*, and consequently prevents undue lengthwise movement of said body. By this construction it will be seen that the body *s*, may be readily adjusted lengthwise to take up any wear.

A journal box or bearing such as described, is particularly adapted for rock or ore pulverizing machines inasmuch as the grit and fine particles of ore are effectually excluded and for the further reason that all wear may be readily taken up and the parts most subjected to frictional wear may be readily removed and be replaced by new ones without the employment of skilled labor.

In order to prevent the finer particles of ore from flying out of the machine in operation, I provide the cover or hood T, better illustrated in Figs. 1, and 3. This cover or hood T, is formed in two sections *y*, *z*, and these sections are detachably connected by bolts or the like, to the mortar walls *d*, whereby it will be seen that either one or both may be readily removed when it is desired to gain access to the interior of the machine for repairs or for any other purpose.

For the purpose of facilitating cleaning of the mortar A, I provide the normally plugged apertures *a'*, in one of the ridges *b*, adjacent to the bottom of the mortar. These apertures when open permit of the contents of the mortar to flow out and consequently it will be seen that the mortar may be readily cleaned.

As better shown in Figs. 1, and 3, of the drawings, the contiguous vertical edges of the hood sections *y*, *z*, rest apart so as to form vertical play spaces *a*³, for the shaft F. These spaces are in alignment with the notches *h*, in the side walls of the mortar; and in order to prevent the pulverized ore from flying out of such spaces *h*, *a*³, I provide the vertical plates *a*⁴, which rest on the inside of the side walls of the mortar and hood and receive the shaft F, and the plates *a*⁵, which rest on the outside of the hood walls and are connected with the plates *a*⁴, by bolts *a*⁶, as shown. The plates *a*⁴, extend through the top *y*, of the hood T, as shown and move with the shaft F, and they are therefore adapted to effectually prevent the ore from being thrown out of the mortar and hood.

The general operation of my improved machine is similar to that of the machine disclosed in my aforesaid Letters Patent; the ore being fed in at the mouth W, and passing out, when pulverized, through the screens B.

I have in some respects specifically described the construction and relative arrangement of the parts of my improved machine in

order to impart a full and clear understanding of the same, but I do not desire to be understood as confining myself to such specific construction and arrangement of parts as such changes or modifications may be made in practice as fairly fall within the scope of my invention.

Having described my invention, what I claim is—

1. In a machine for pulverizing ore, rock, and the like, the combination of a mortar or receptacle having vertical guides at its opposite sides, vertically-movable bearings arranged in said guides, a bearing I, mounted in suitable bearings and located at one side of the mortar or receptacle, a shaft journaled in the vertically-movable bearings and in the bearing I, and having a fly or balance wheel on the opposite sides of the mortar with respect to the bearing I, and a wheel fixed on the shaft and arranged to turn in the mortar or receptacle, substantially as specified.

2. The combination of a shaft having its end tapered, an interiorly threaded shell r , a suitable support for said shell r a body having exterior threads to engage those of the shell and adapted to receive the tapered end of the shaft, and a ring v , mounted on the shaft and having interior threads adapted to engage the threads of the body, substantially as and for the purpose set forth.

3. In a machine for pulverizing ore or rock, the combination of the wheel having notches in its periphery, a shaft having its ends tapered and carrying an impact roll, the journal boxes or bearings arranged in the peripheral notches of the wheel and respectively comprising an interiorly threaded shell r , an exteriorly threaded body s , engaging the shell r , and adapted to receive the tapered end of the shaft, and the ring v , surrounding the shaft and having interior threads adapted to engage the threads of the body s , and means for fix-

ing the shells r , with respect to the wheel, substantially as and for the purpose set forth.

4. In a machine for pulverizing ore or rock, the combination of the wheel having notches in its periphery, a shaft having its ends tapered and carrying an impact roll, the journal boxes or bearings arranged in the peripheral notches of the wheel and respectively comprising an interiorly threaded shell r , the exteriorly threaded body s , engaging the shell r , and adapted to receive the tapered end of the shaft and having the lubricant or packing receptacle at its outer end, and the ring v , surrounding the shaft and having interior threads adapted to engage the threads of the body s , for tightening packing in space t , the caps R , secured to the wheel and arranged over the journal bearings or boxes and screws taking through said caps and the shells r , of the boxes, substantially as and for the purpose specified.

5. In a machine for pulverizing ore and rock, the combination of a mortar having notches h , in its side walls, a hood arranged on the mortar and having vertical play spaces a^3 , in alignment with the notches h , the wheel arranged in the mortar and having its shaft extending through the notches h , and journaled in vertically movable bearings, the vertically-movable plates a^4 , arranged on the inner sides of the mortar and hood walls and receiving the shaft of the wheel, and the plates a^5 , arranged on the outside of the hood walls and connected and adapted to move with the plates a^4 , substantially as and for the purpose set forth.

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

PETER MCKELLAR.

Witnesses:

E. A. CARPENTER,
E. A. MORTON.