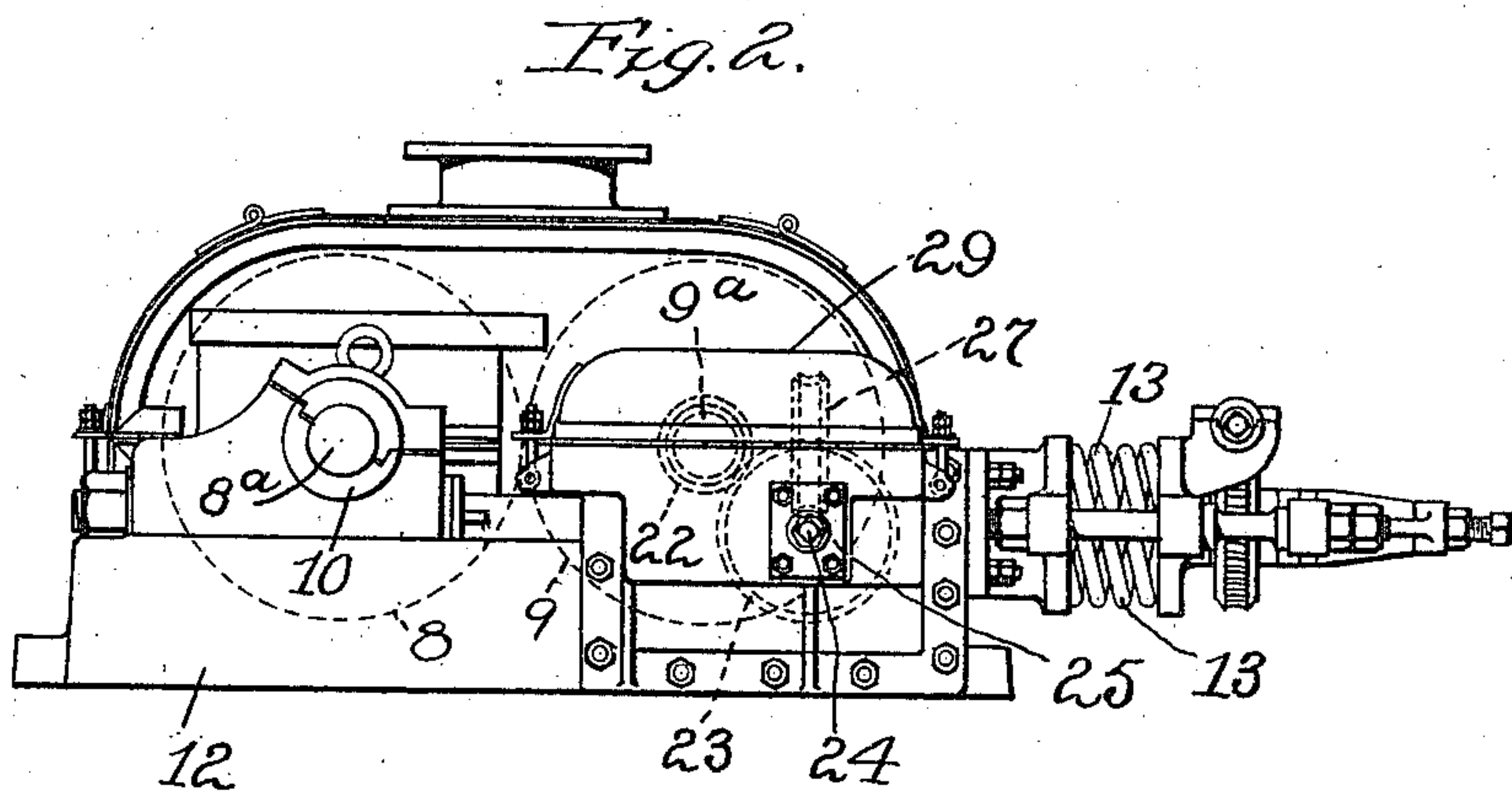
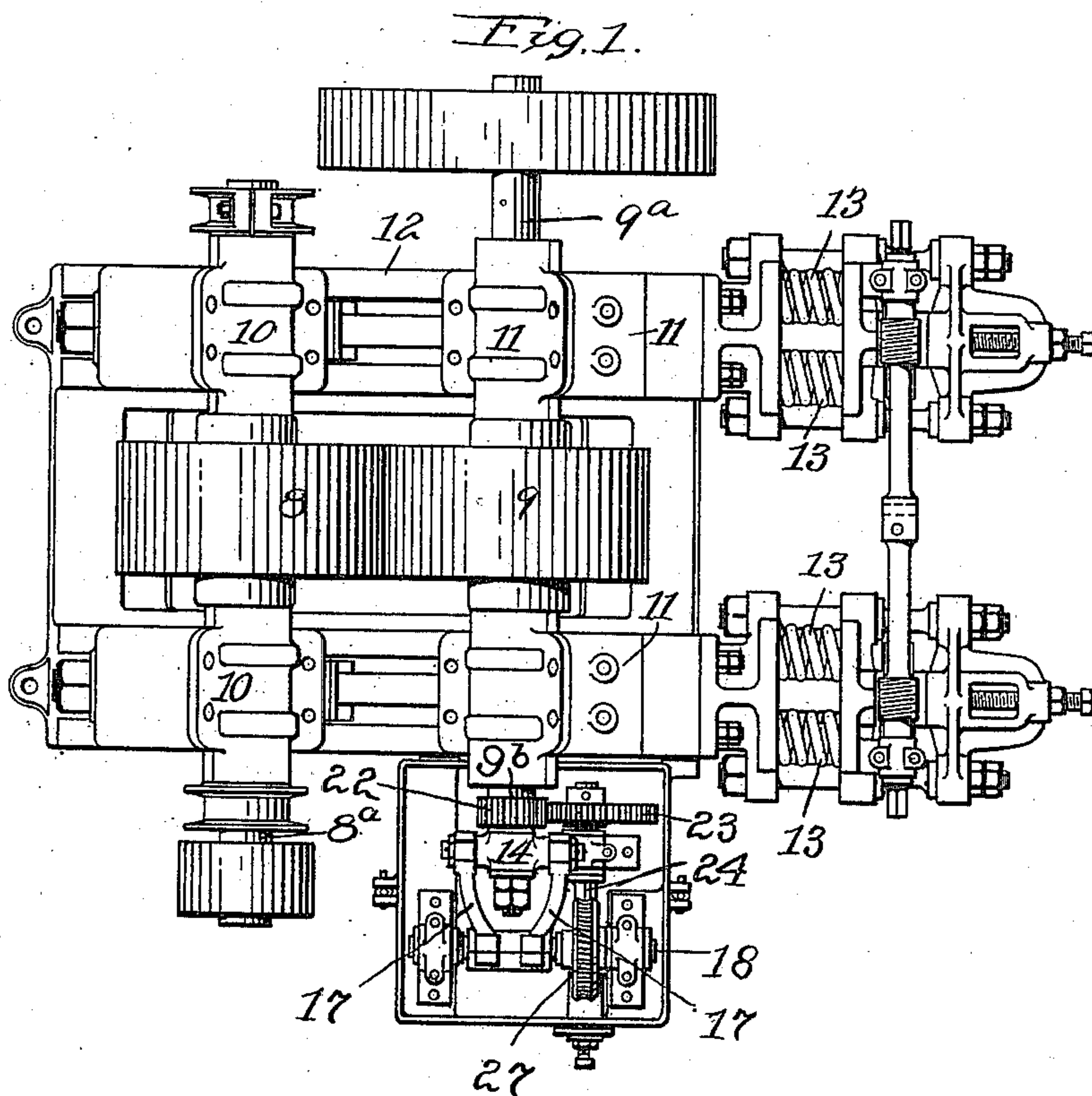


P. E. VAN SAUN.
 ROLLER CRUSHING MILL.
 APPLICATION FILED MAR. 3, 1910.

964,070.

Patented July 12, 1910.

2 SHEETS—SHEET 1.



Witnesses:

J. W. Hopkins
 R. Peterson.

Inventor:

P. Edwin Van Saun,

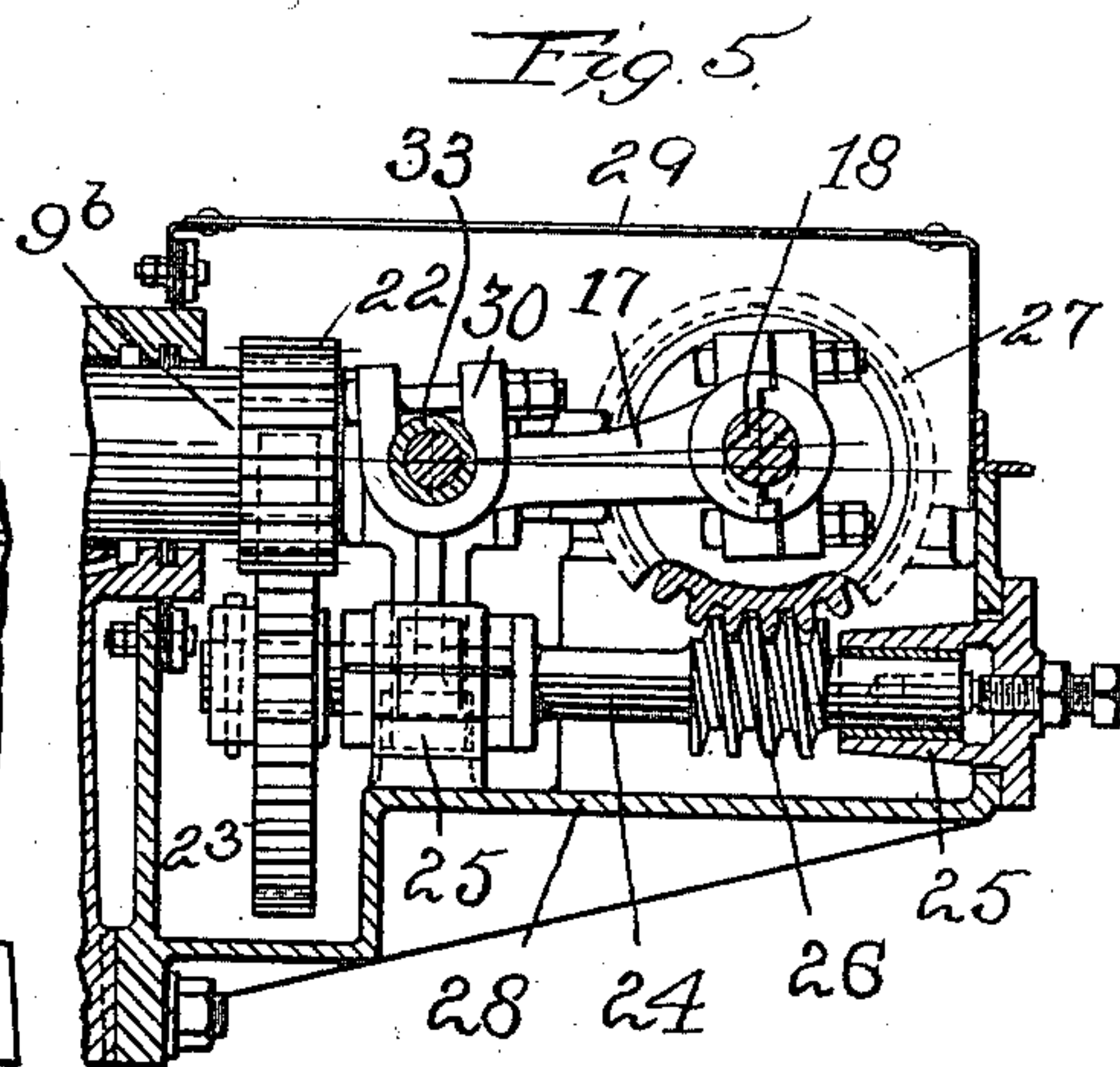
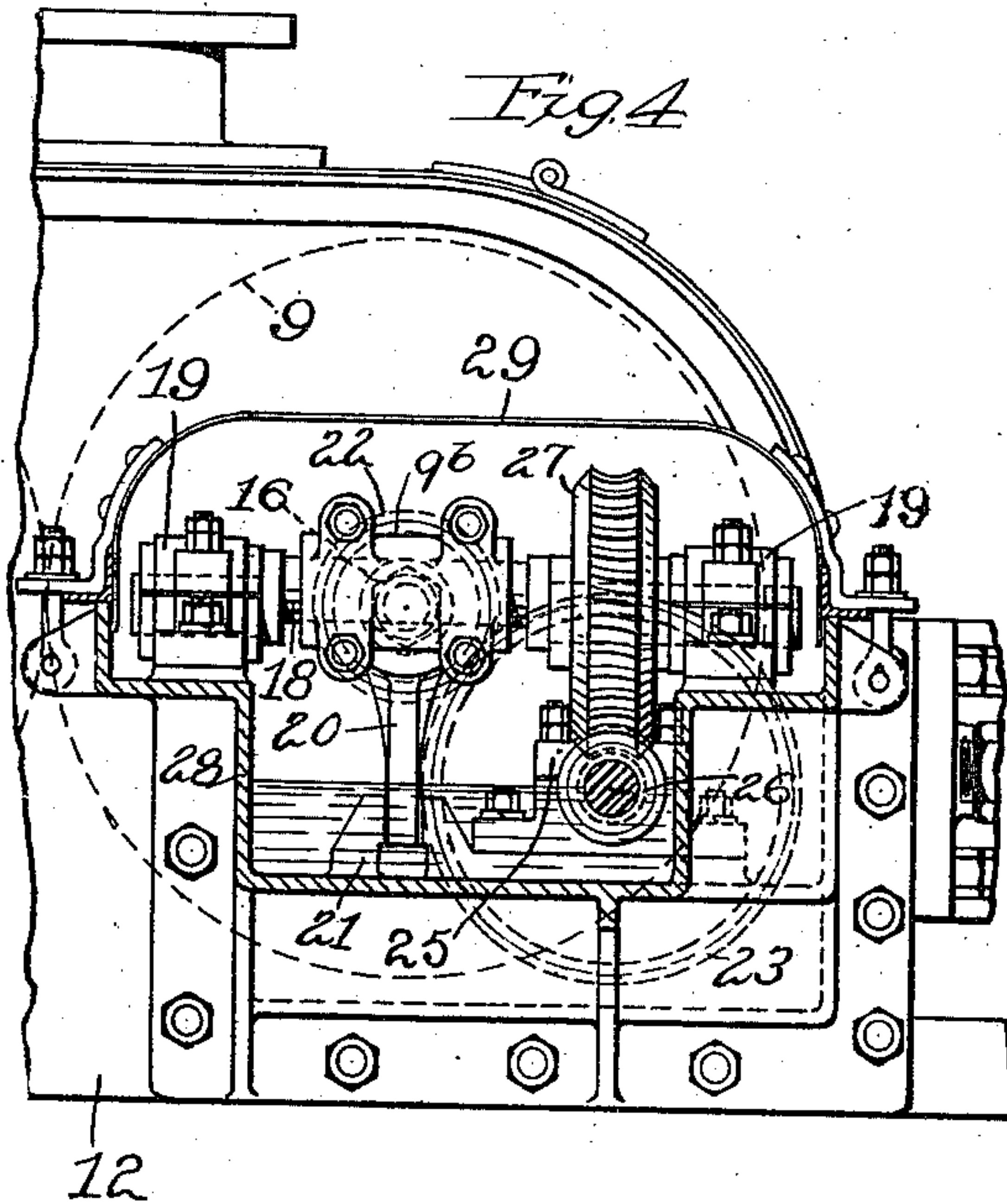
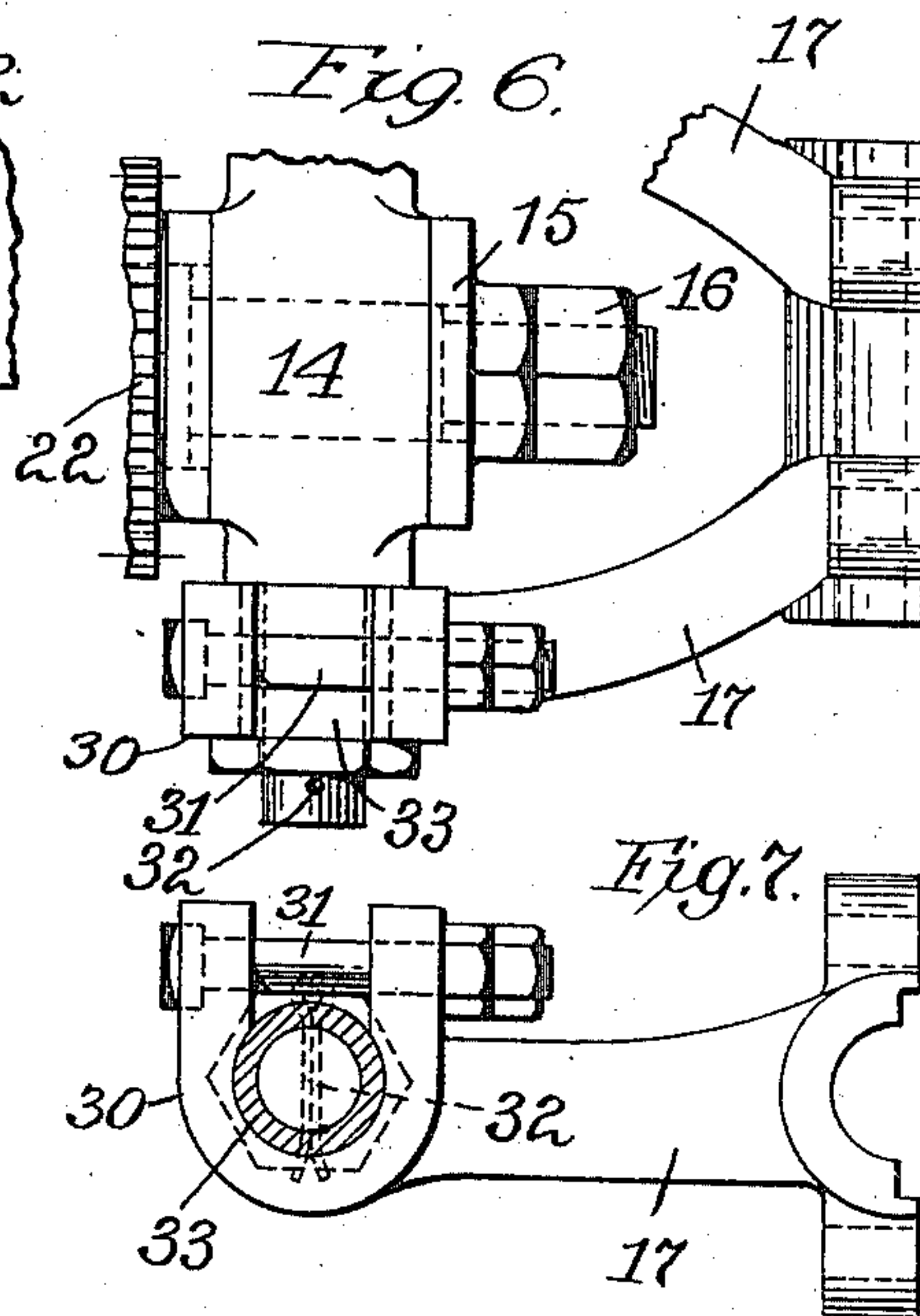
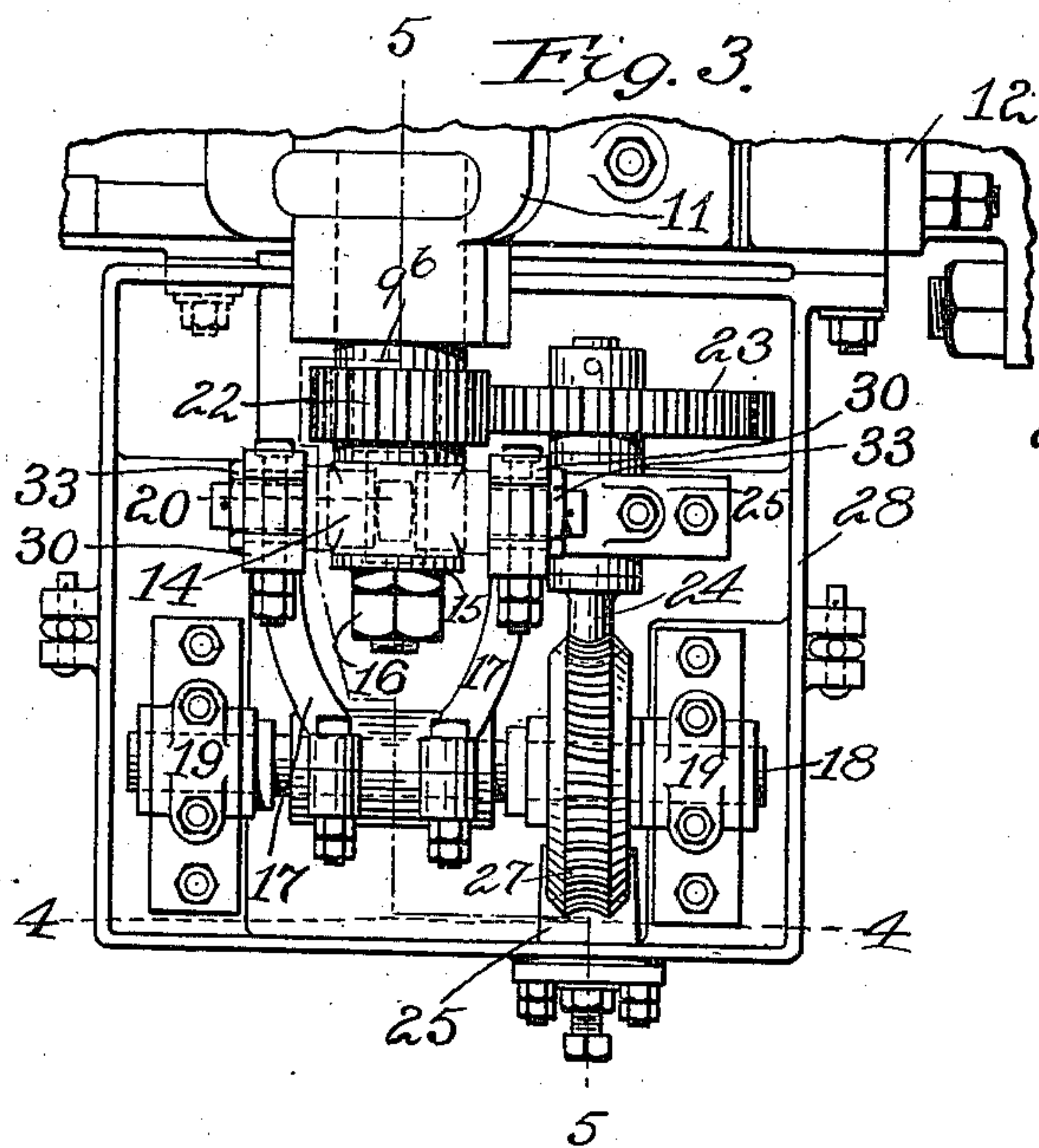
By *Middleton Donaldson*,
 attorney.

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2 SHEETS—SHEET 2.



Witnesses:
 J. W. Hopkins.
 R. Peterson.

Inventor:
 P. Edwin Van Saun,
 By *Spur Middleton Donaldson* Attorney.

UNITED STATES PATENT OFFICE.

PETER EDWIN VAN SAUN, OF NEW YORK, N. Y.

ROLLER CRUSHING-MILL.

964,070.

Specification of Letters Patent.

Patented July 12, 1910.

Application filed March 3, 1910. Serial No. 547,115.

To all whom it may concern:

Be it known that I, PETER EDWIN VAN SAUN, a citizen of the United States, residing at New York city, New York, have invented certain new and useful Improvements in Roller Crushing-Mills, of which the following is a specification.

My present invention relates to improvements in roller crushing mills, and comprises the novel features of construction and arrangement and combination of parts hereinafter described and particularly set forth in the appended claims.

An embodiment of my invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a plan view of a mill; Fig. 2 is a side elevation; Fig. 3 is an enlarged plan view of the mechanism for producing the endwise movement of the roll; Fig. 4 is a section on line 4—4 of Fig. 3; Fig. 5 is a section on line 5—5 of Fig. 3; Fig. 6 is an enlarged sectional detail illustrating the connection between the pitman and the yoke; and Fig. 7 is a detail view taken at right angles to Fig. 6.

Referring by reference characters to these drawings, the numerals 8 and 9 represent the crushing rolls of a mill which are mounted on shafts 8^a and 9^a journaled in suitable bearings 10 and 11 in the frame 12, these parts being constructed in the ordinary or any desired manner, and the bearings or journals 10 of one of the roll shafts being arranged to slide toward and from the other and being placed under the tension of springs 13 capable of adjustment by mechanism and in the manner so well understood by those skilled in the art as to necessitate no further specific description thereof herein. It has been found in practice that these crushing rolls are very satisfactory in operation, while the surfaces of the rolls or tires are true, but there is a great tendency of all rolls of this description to wear into corrugations or channels extending around the periphery, which seriously impairs the efficiency of the rolls. I have discovered that if a slight axial movement is imparted to one of the rolls, this objection will be overcome, and it is the mechanism for producing this axial movement which forms the subject of the present application. To this end I so journal the shaft of one of the rolls, as, for instance, the shaft 9^a, as to make it capable of longitudinal movement within its

bearings. The shaft is projected beyond one of its bearings, as indicated at 9^b, and on the projecting portion and preferably near the end is journaled a yoke 14, this yoke being mounted so as to permit the rotary movement of the shaft but to prevent the yoke being moved longitudinally on the shaft. To accomplish this the yoke is preferably mounted on a reduced portion of the shaft, and held on by flanged nut 15 and lock nut 16, and the ends of the yoke are connected by suitable mechanism such as pitmen 17 to a crank or cam shaft 18 journaled in suitable bearings 19 and arranged transversely of or at right angles to the roll and shaft, and preferably in line therewith. It will thus be seen that rotation of the transverse shaft will, through the pitmen and yoke connection, produce axial or endwise movement of the roll shaft and corresponding movement of the roll carried thereby. In order to prevent the yoke from turning with the shaft, it is provided with a projecting part such as an arm 20, which slidably engages with a stationary guide 21, as shown clearly in Fig. 4.

A very convenient manner of rotating the transverse shaft 18 is to effect this through suitable intermediate mechanism directly from the roll shaft itself, and in order to do this efficiently and economically, I provide fast on the roll shaft a gear 22 which meshes with a gear 23 fast on a worm shaft 24, which is journaled in suitable bearings 25. One of the gears 22 and 23 is made wider than the other by an amount equal to the length of axial or longitudinal movement which is imparted to the roll, so as to permit the full area of the teeth of the other gear to always be in mesh therewith. The worm shaft 24 which is, of course, parallel to the roll shaft, is provided with a worm 26 which meshes with a worm wheel 27 on transverse shaft 18, so that the motion of the roll shaft will, through the gearing described, impart a very slow reciprocating motion to the roll shaft.

In these roller crushing mills, the parts are subjected to great strain, and hence a great deal of power is required, and consequently much friction, unless the parts are kept thoroughly lubricated. My arrangement of the parts for effecting these motions enables me to have them run in an oil bath, as all of the operating parts are compactly arranged within a small space, and therefore

can be located within oil chambers 28 as clearly shown in Figs. 3, 4 and 5, which chambers may support the bearings for the several shafts, and be bolted or otherwise secured directly to the main frame of the roll. A suitable cover 29 serves to exclude all dust and pulverized ore or other material from the oil chambers. In order that the roll and its shaft may be readily removed without requiring also the removal of the mechanism for effecting the longitudinal movement, I provide the pitmen with upwardly turned open bearing recesses 30 which receive bushings 33 in which the ends of the yoke are journaled, these bushings being clamped in place by cross bolts 31 and provided with cotters 32 to avoid possibility of dislodgment. Hence when the roll is to be removed, it is only necessary to remove the bolts 31 and cotters 32, after which, on removing the bushings 33, the pitmen may be readily disconnected from the arms of the yoke.

Having thus described my invention what I claim is:—

1. In a roller crushing mill, a roll having a shaft slidably journaled in suitable bearings, a crosshead having rotatable connection with the shaft, a pitman connected to said crosshead, a second shaft for operating said pitman, and positive operating means for said second shaft geared to the end of said shaft which is engaged by the pitman substantially as described.

2. In a roller crushing mill, a roll having a shaft slidably mounted in suitable bearings, a cross head having a rotatable connection with the shaft, a pitman connected to said cross head, a second shaft arranged at right angles to the shaft of the roll and having an eccentric part operatively connected to said pitman, and positive gearing between the shaft of the roll and said second shaft for driving the latter, substantially as described.

3. In a roller crushing mill, a roll having a shaft slidably mounted in suitable bearings, a cross head having a rotatable connection with the shaft, a pitman connected to said cross head, a second shaft arranged at right angles to the shaft of the roll and having an eccentric part operatively connected to said pitman, and gearing between the shaft of the roll and said second shaft

for driving the latter, and an oil containing casing inclosing the end of the roll shaft and said operating parts, substantially as described.

4. In a roller crushing mill, a roll having a shaft slidably mounted in suitable bearings, a cross head having a rotatable connection with said shaft, a pair of pitmen connected to said cross head on opposite sides of said roll shaft, a transverse shaft having offset or eccentric portions connected to said pitmen, and gearing between the roll shaft and transverse shaft for operating the latter from the former, substantially as described.

5. In a roller crushing mill, a roll having a shaft slidably journaled in suitable bearings, a cross head in which the roll shaft is journaled, pitmen connected to opposite ends of the cross head, a part projecting from the cross head, a guide parallel with the roll shaft with which said part engages to prevent tipping of the cross head, and a means for operating said pitmen, substantially as described.

6. In a roller crushing mill, a roll having a shaft slidably mounted in suitable bearings, a cross head on the shaft having bearing members projecting from opposite sides, a transverse shaft having eccentric portions, pitmen connected to said eccentric portions and having upwardly opening bearing recesses to receive said bearing members, and removable bushings closing said open parts of the bearing recesses, substantially as described.

7. In a roller crushing mill, a roll having a shaft slidably mounted in suitable bearings, a cross head journaled on the shaft, a gear fast on said shaft, a counter shaft having a gear meshing with the gear on the roll shaft, one of said gears being of greater thickness than the other, a shaft arranged at right angles to said roll shaft and counter shaft, worm gearing connecting said counter shaft and transverse shaft, and pitmen connecting said transverse shaft and cross head, substantially as described.

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

P. EDWIN VAN SAUN.

Witnesses:

F. W. HOPKINS,
R. PETERSON.