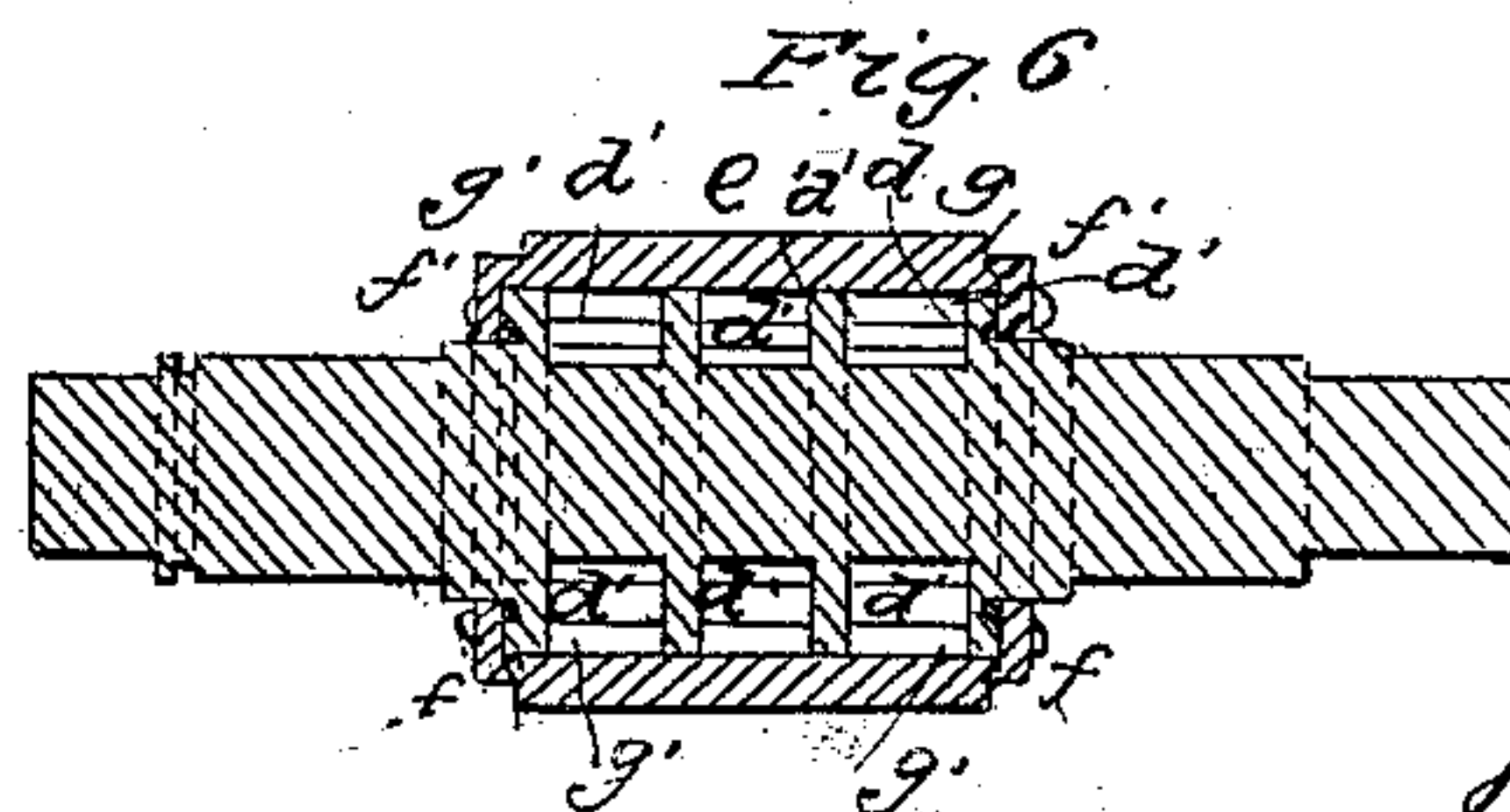
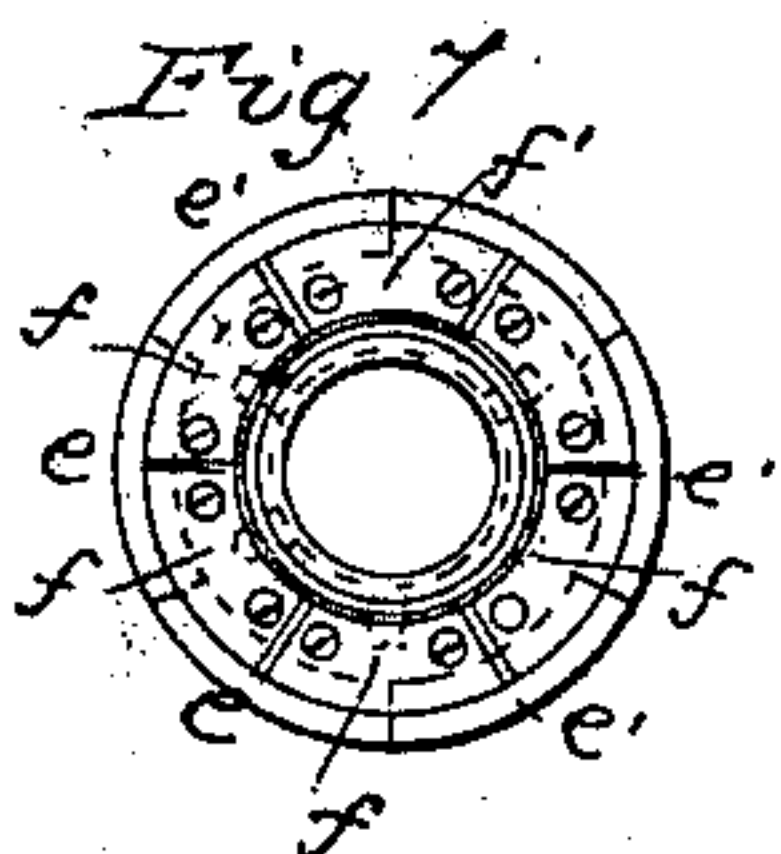
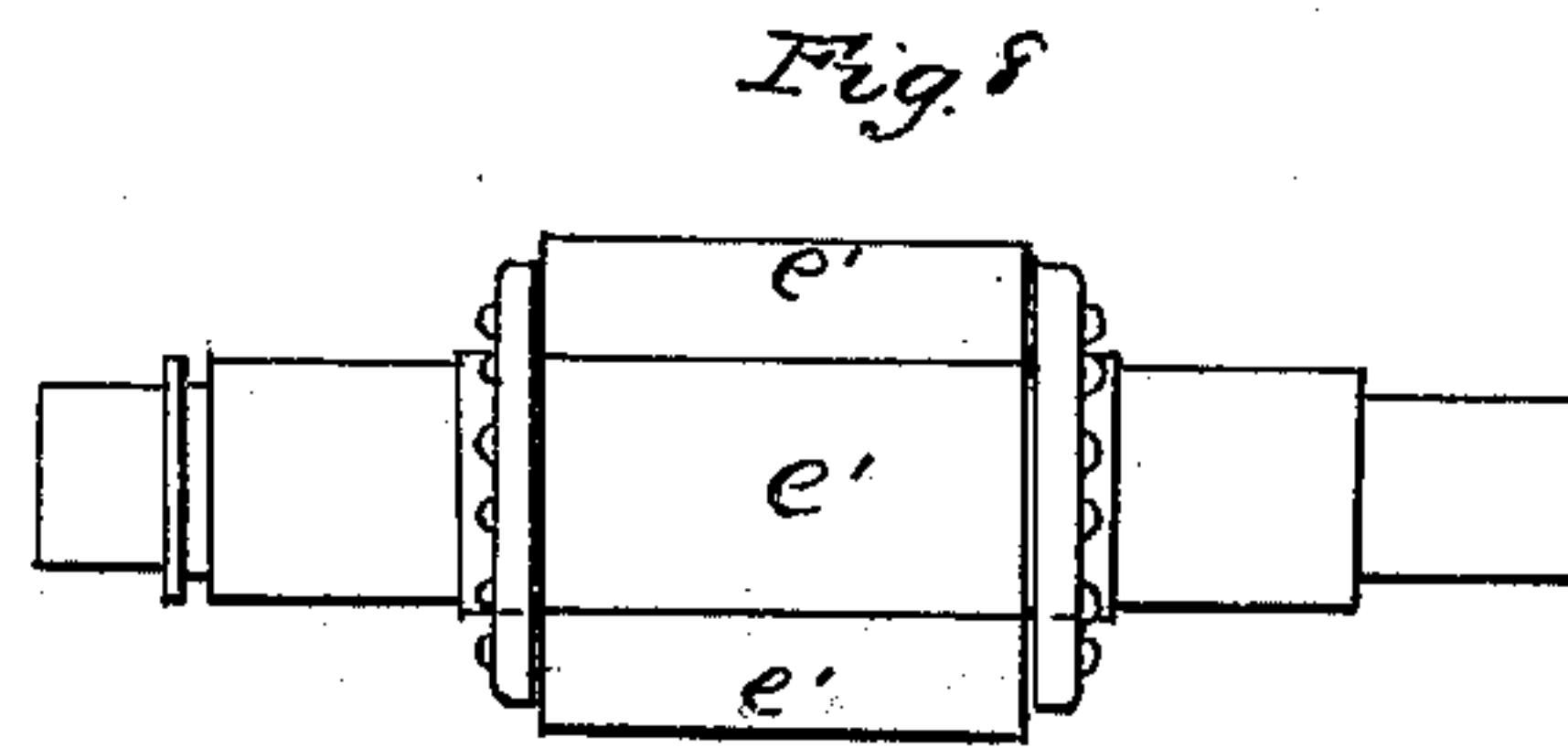
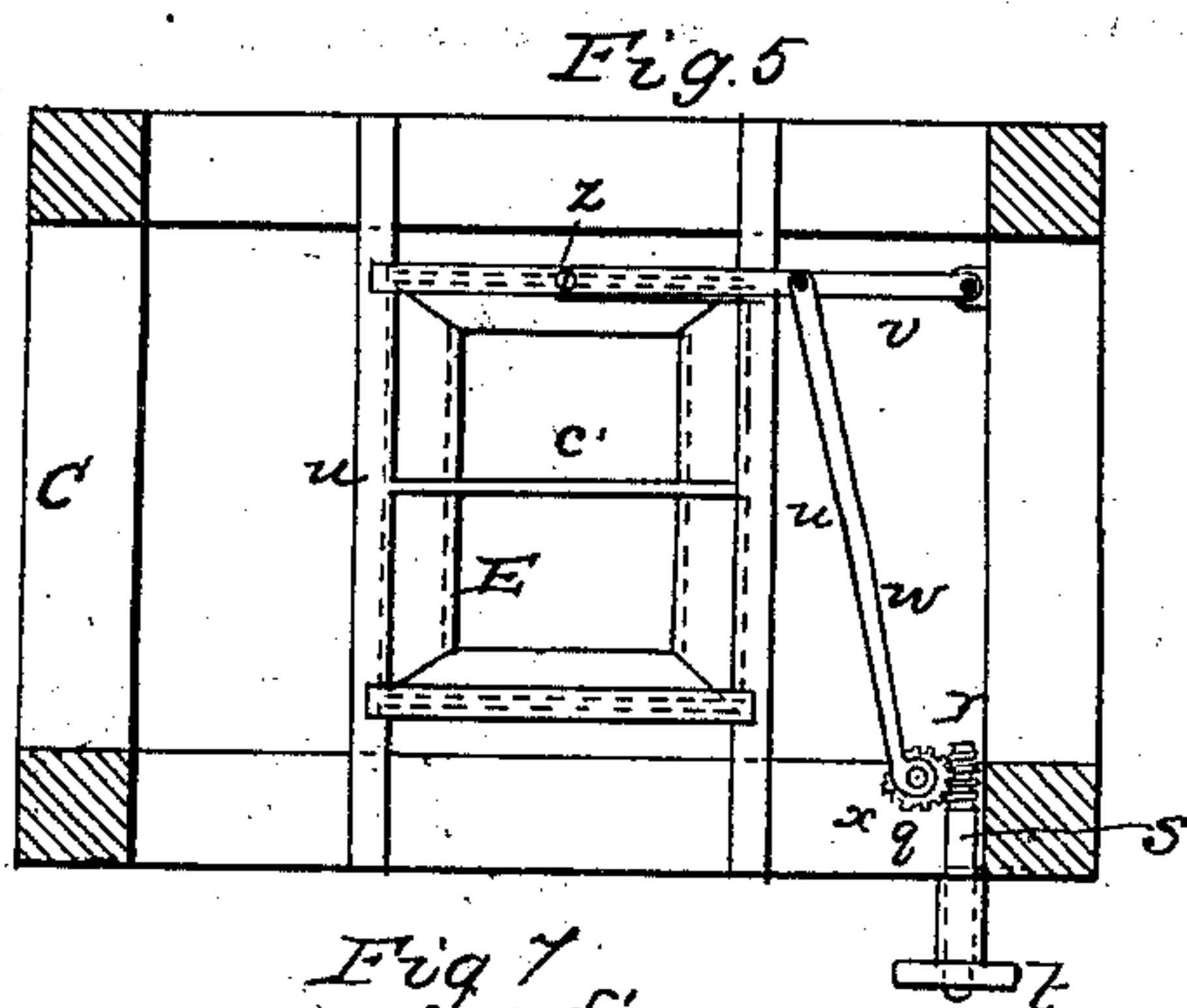
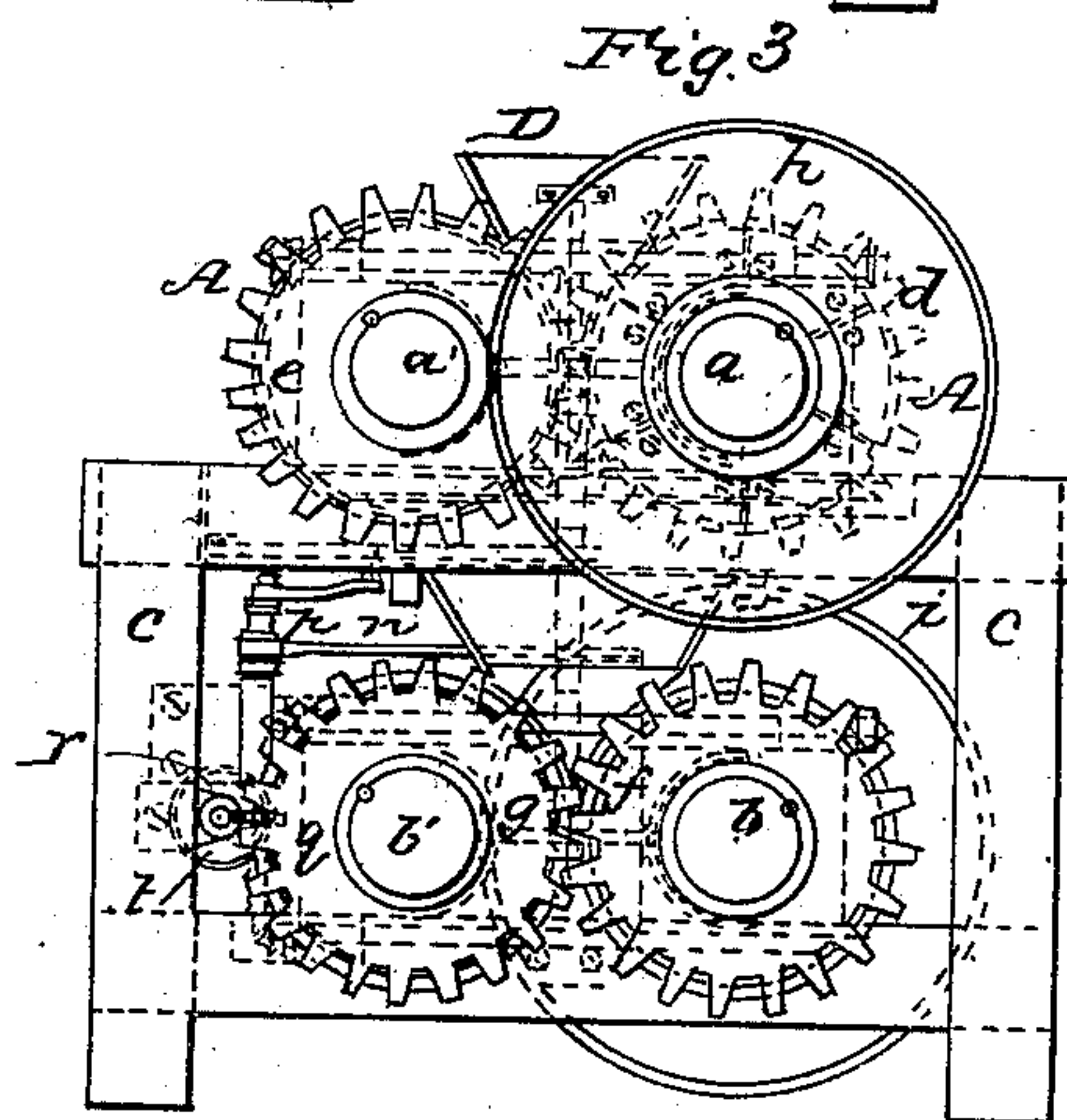
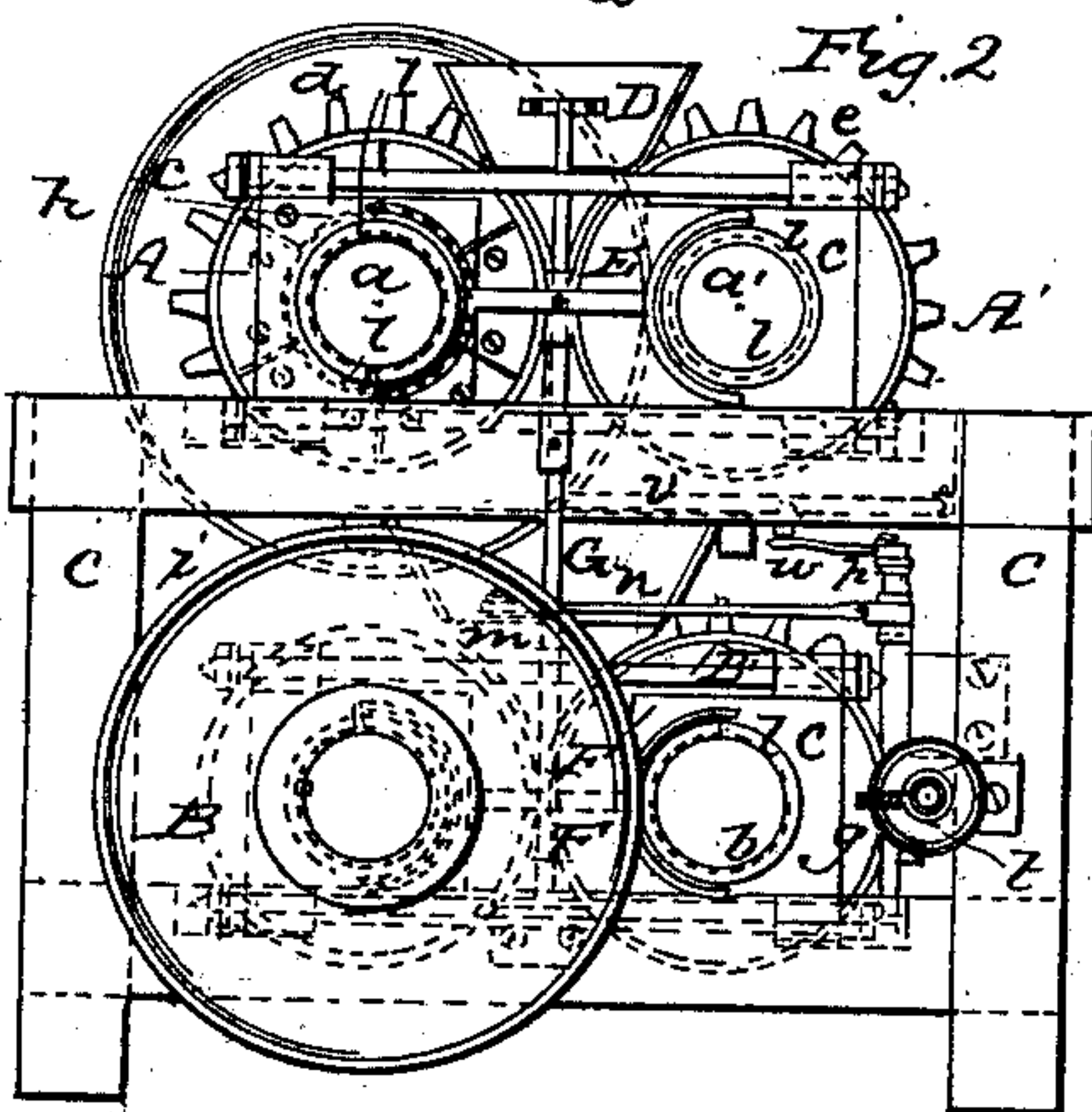
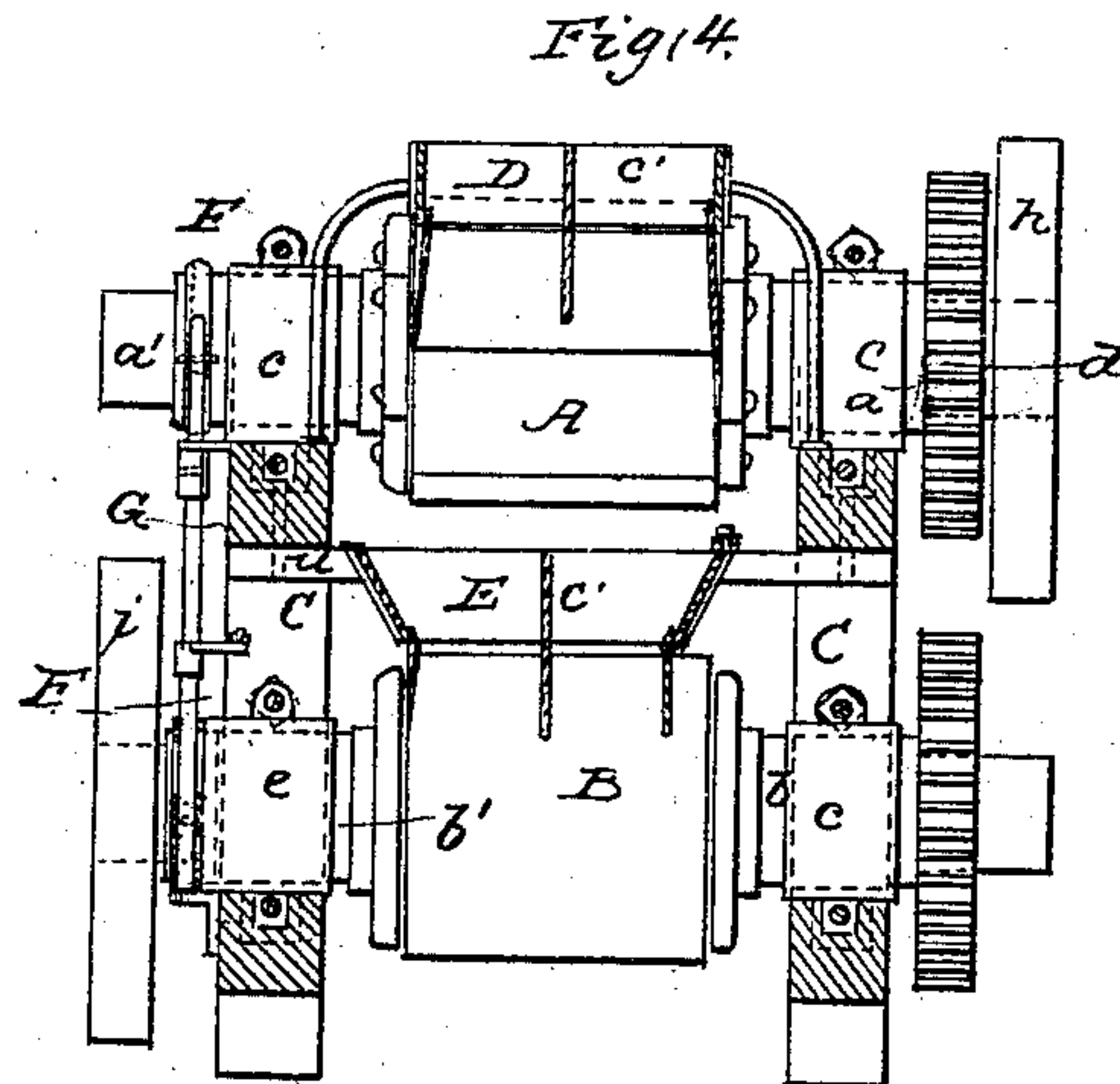
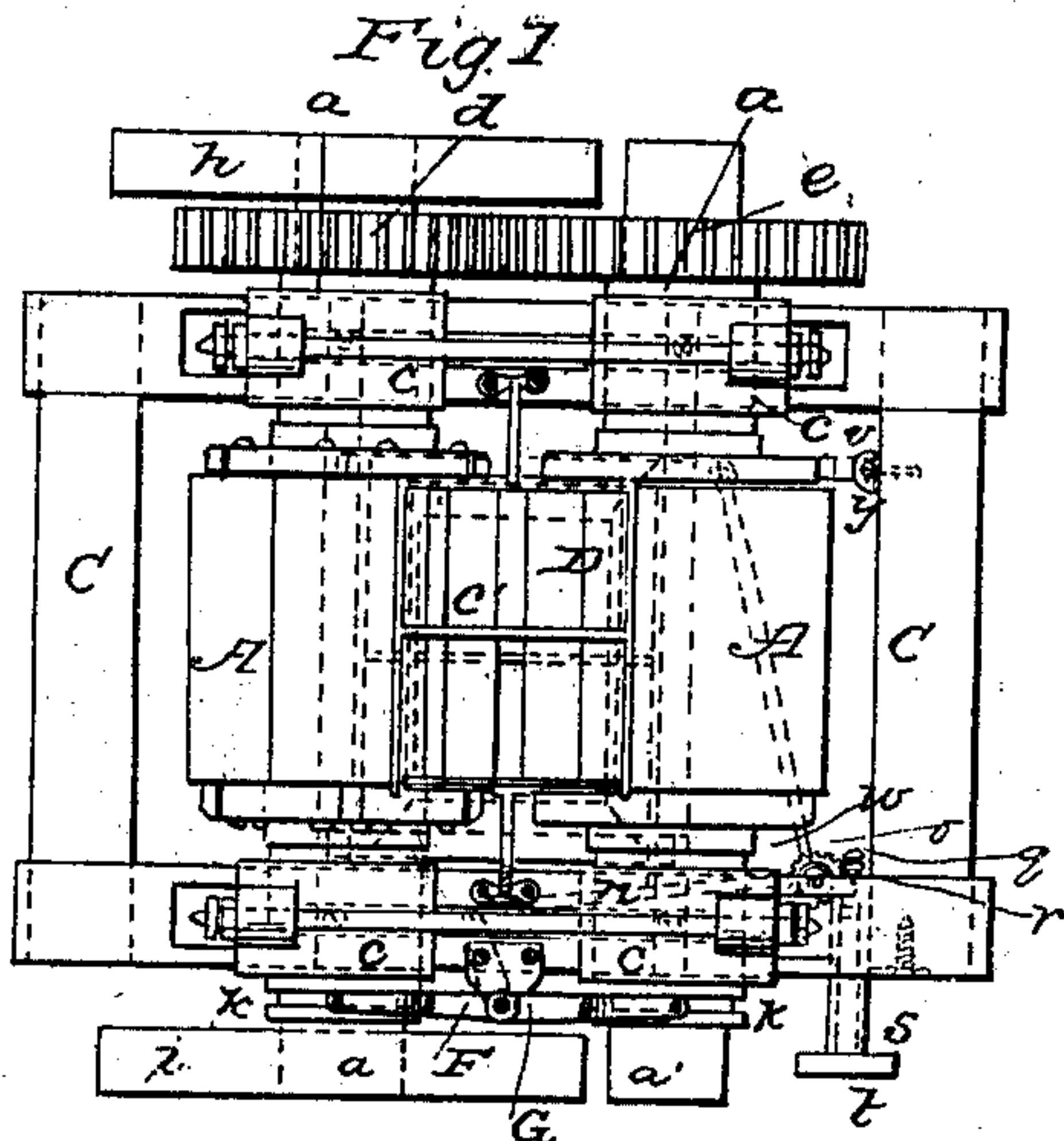


PARROTT & BORDMAN.

Ore Crusher.

No. 61,019.

Patented Jan. 8, 1867.



WITNESSES

General at Kper
Geo. H. Andrews

INVENTORS

Thos. R. R. R.
Jas J. C. C.

United States Patent Office.

WILLIAM P. PARROTT AND JOHN J. BORDMAN, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 61,019, dated January 8, 1867.

IMPROVEMENT IN ORE CRUSHERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL PERSONS TO WHOM THESE PRESENTS SHALL COME:

Be it known that we, WILLIAM P. PARROTT and JOHN J. BORDMAN, of Boston, in the county of Suffolk, and State of Massachusetts, have invented an improved Machine for Crushing and Pulverizing Ores, or various other substances; and we do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view.

Figures 2 and 3 are end elevations; and

Figure 4 is a longitudinal section of it.

Figure 5 is a horizontal section of it taken so as to exhibit the inferior or lower hopper, and its operative mechanism, to be hereinafter described.

Figure 6 is a longitudinal section.

Figure 7, an end view; and

Figure 8 a side elevation of one of the crushing rollers of the machine.

It is intended for each of the rollers to be constructed like that exhibited in the three figures last mentioned, although the drawings may not so represent them; that is to say, each roller is to be composed of a series of peripheral segments or parts, a body and devices or mechanism for fastening such peripheral parts to the body, the same being to enable such parts to be renewed, or renewed and replaced with respect to the body, as occasion may require.

The machine as shown in the figures has two sets or pairs of crushing rollers, A A', B B', the journals of whose shafts, *a a'*, *b b'*, are supported in suitable boxes *c c c c*, &c., upheld by a strong frame, C. One pair of these rollers is arranged directly over the other, there being a hopper, D or E, disposed above and between the rollers of each set or pair. One of the shafts of each pair of rollers is provided with a driving-pulley, *h* or *i*, and the rollers of each pair are coupled by means of two gears, *d e* or *f g*, fixed on their shafts. One of the gears of each set should have one tooth less than the number of those of its fellow-gear, in order that the two gears may be revolved at variable or different speeds. Furthermore, these rollers have mechanism for imparting to each of them a reciprocating longitudinal motion, the object of such motion being to prevent the peripheries of the rollers from being worn in grooves while the rollers may be in operation. The mechanism causes one roller of the pair to traverse in one, and the other to move in the opposite direction, at one and the same time; the hopper of such rollers during such movements of them being stationary, or instead of the rollers being so moved they may be stationary, except in being revolved on their respective axes, and their hopper may have a reciprocating rectilinear motion parallel to the axes of rollers. Each of these means of preventing the rollers from being unevenly worn while in operation is exhibited in the drawings, and may be described as follows: Each roller-shaft, where projecting beyond its supporting box at one side of the frame, is provided with a groove, *k*, (see fig. 1,) formed in and around it, such groove being for reception of two cylindrical studs *l l*, (see fig. 2,) projecting from the extremities of the fork of a bifurcated lever, F, which, at its middle, is fixed to and on a vertical shaft, G, supported in suitable bearings. A crank-arm, *m*, extending from the upright shaft G, is jointed to one extremity of a rod, *n*, which at its other end encompasses an eccentric *o* fixed on another vertical shaft *p*, provided with a worm gear, *q*, to engage with a screw, *r*, carried by a horizontal shaft, *s*. Rotary motion is to be given to the said shaft by an endless belt to go around a pulley, *t*, fixed on the shaft. By such means the endwise movements of the two rollers of each pair may be attained while they may be in revolution. But in case it may be preferable to impart to the pair of rollers rotary motions only, their hopper may be supported on parallel ways *u u*, so as to be movable thereon endwise, that is, crosswise of the machine, its reciprocating movement being effected by means of a lever, *v*, a connecting-rod, *w*, and a crank, *x*, the latter being fixed to the top of the upright shaft *p*, the whole being arranged as represented in the drawings. The connecting-rod should be jointed to both the crank and the levers. The latter should be supported, at or near one of its ends, on a stationary pin or fulcrum, *y*, its other end being furcated and made to span a pin, *z*, extended upward from the hopper. While the shaft *p* may be in revolution, the hopper will be moved first in one and next in the opposite direction. For the purpose of keeping the charge of each hopper evenly distributed therein, we construct such hopper with one or more partitions *c'* extended across it transversely, in order to divide into

two or more separate chambers or receptacles for holding the ore or material to be crushed. Were it not for this construction of the hopper, or its division into cells opening downward, the material or ore, when within it, and the machine is in operation, would be likely to be piled more at one end than at the other of the hopper. The body part of each roller is shown at $d' d' d' d'$, in fig. 6, it being surrounded by the series $e' e' e' e'$ of peripheral segments or sections, which are held in place on the body by two series of annular clasps $f' f'$, formed and applied to the body and fastened to it by screws, substantially in manner as represented in figs. 6, 7, and 8. Besides the above-mentioned devices for fixing the peripheral segments to the body of the roller, I provide each of such segments with two or more studs or tenons $g' g'$, (see fig. 6,) to extend from it and enter corresponding mortises made in the body of the roller, the purpose of such tenons and mortises being to prevent the segment from being revolved on the said body. By means of the appliances for holding the peripheral segments to the body of the roller, such segments may be readily removed from the body, or, in case it may be desirable, either of them may be removed at any time without disturbance of the remainder. In operating with this machine, the upper hopper is to be charged with the ore or material to be reduced. The upper rollers will crush and grind this charge between them, and deliver it into the lower hopper from which it will pass into the bite of, or between, the lower rollers, and by them will be still further ground and reduced.

We make no claim to one or more sets of rollers with machinery for revolving them at like speeds in order that they may be employed for crushing and pulverizing a metallic ore, or other material.

What we claim as our invention, or improvements with reference thereto, is as follows:

We claim the mode hereinbefore described of making either or each of such crushing rollers of a series of peripheral segments or sections e' , a body, $d' d' d' d'$, and clamp rings $f' f'$, formed and applied together, substantially as specified.

We also claim the mechanism as described for imparting reciprocating endwise movements to the rollers of either or each pair of crushing rollers as described.

We also claim the combination of a movable hopper, a pair of crushing rollers, and mechanism for moving the hopper laterally in reference to such rollers, in manner as set forth, while they may be in revolution, as specified.

We also claim the construction of each hopper, viz, with two or more receiving and discharging apartments arranged in it substantially as and for the purpose specified.

WM. P. PARROTT,
JNO. J. BORDMAN.

Witnesses:

R. H. EDDY,
F. P. HALE, Jr.