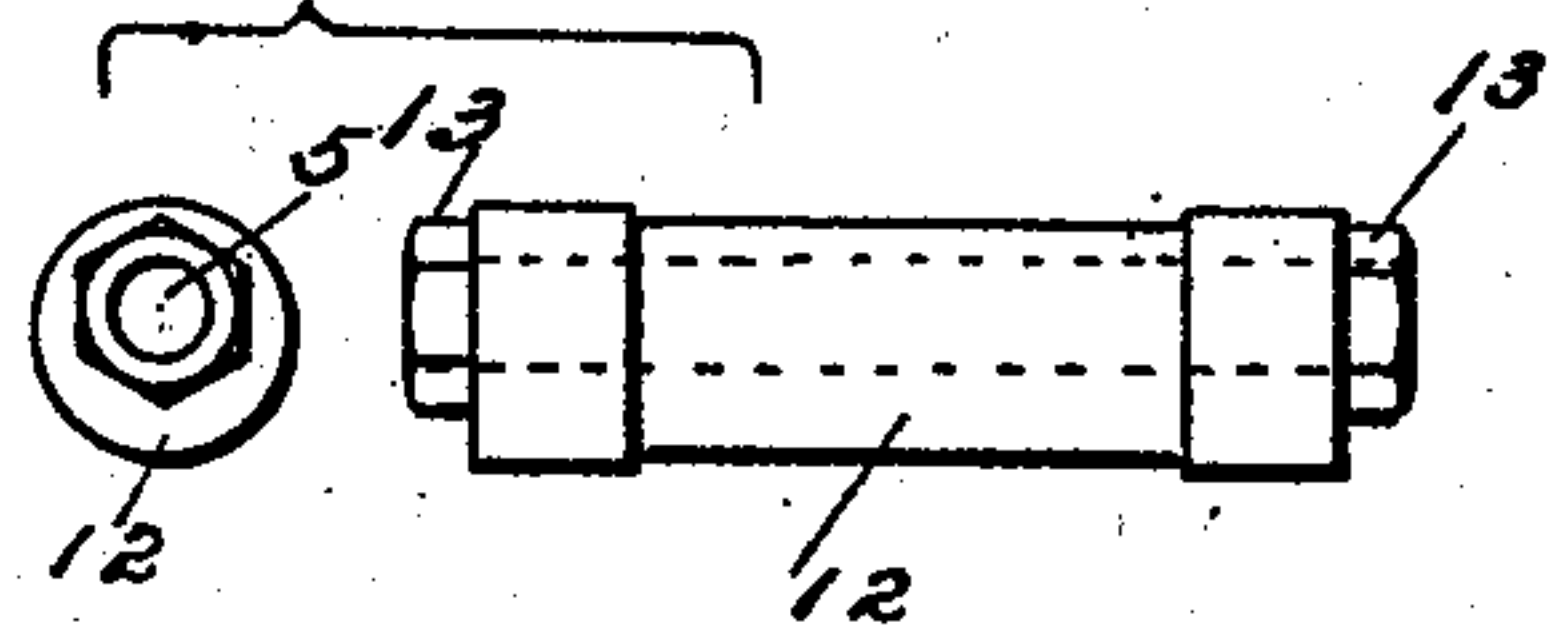
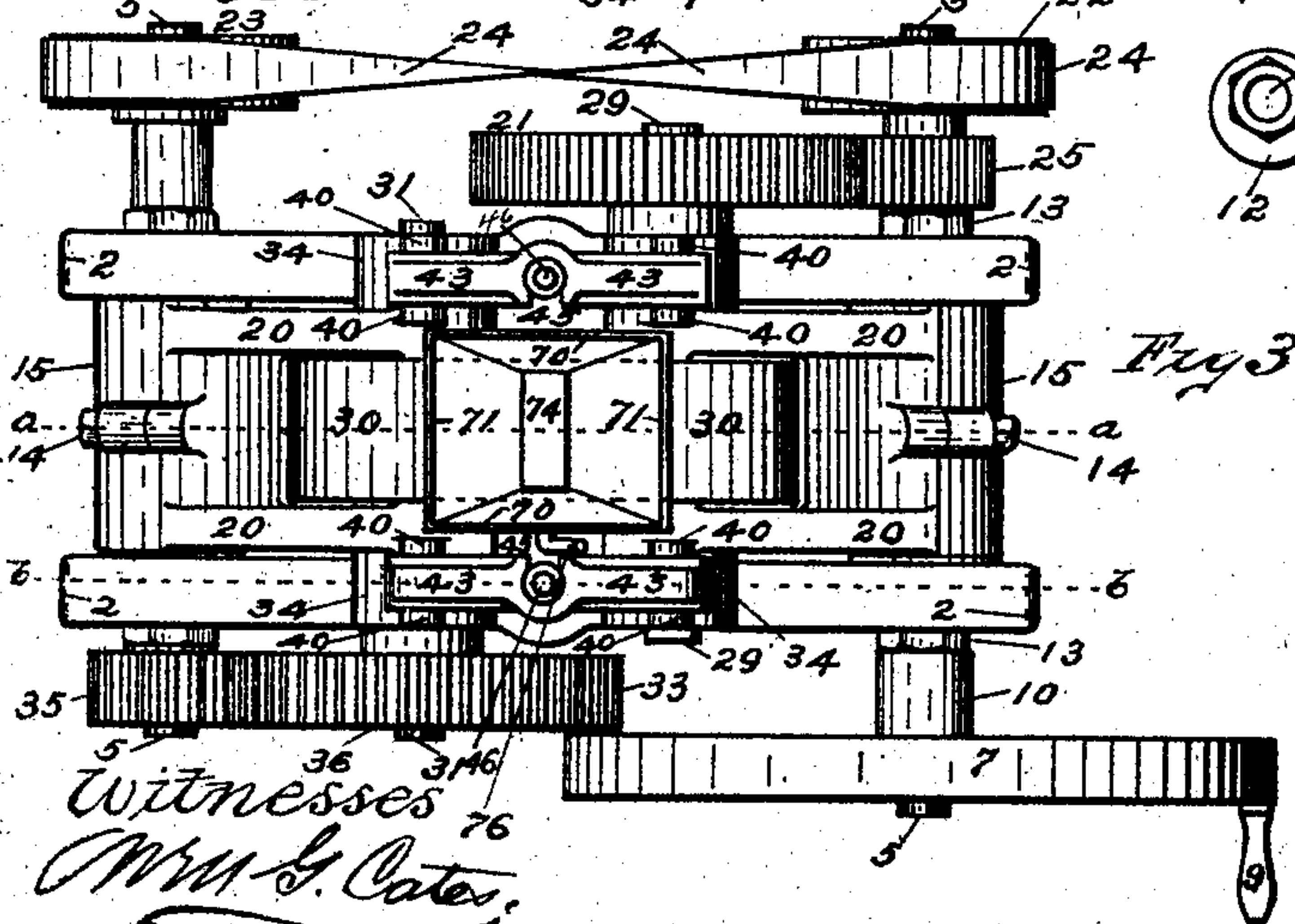
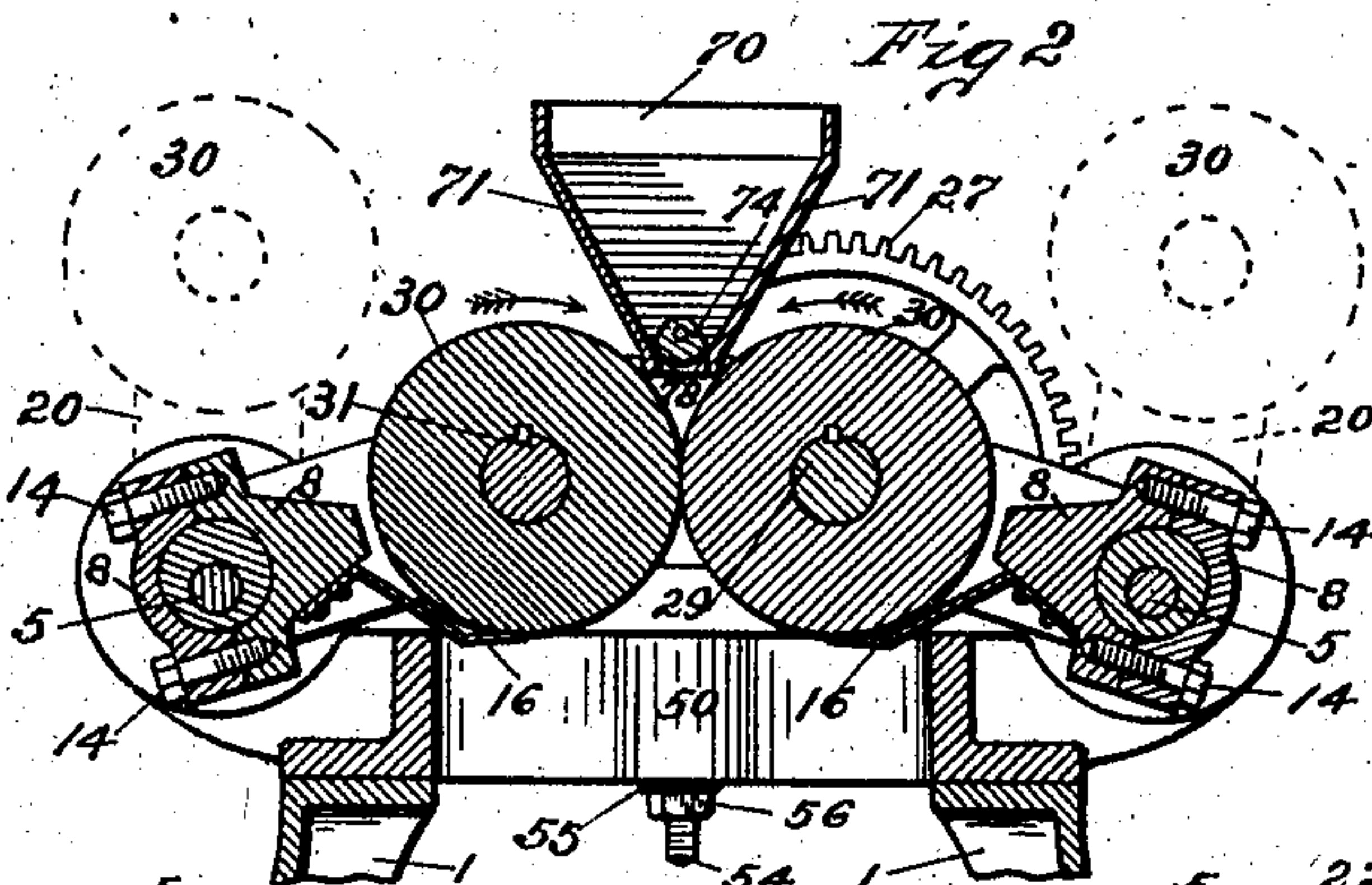
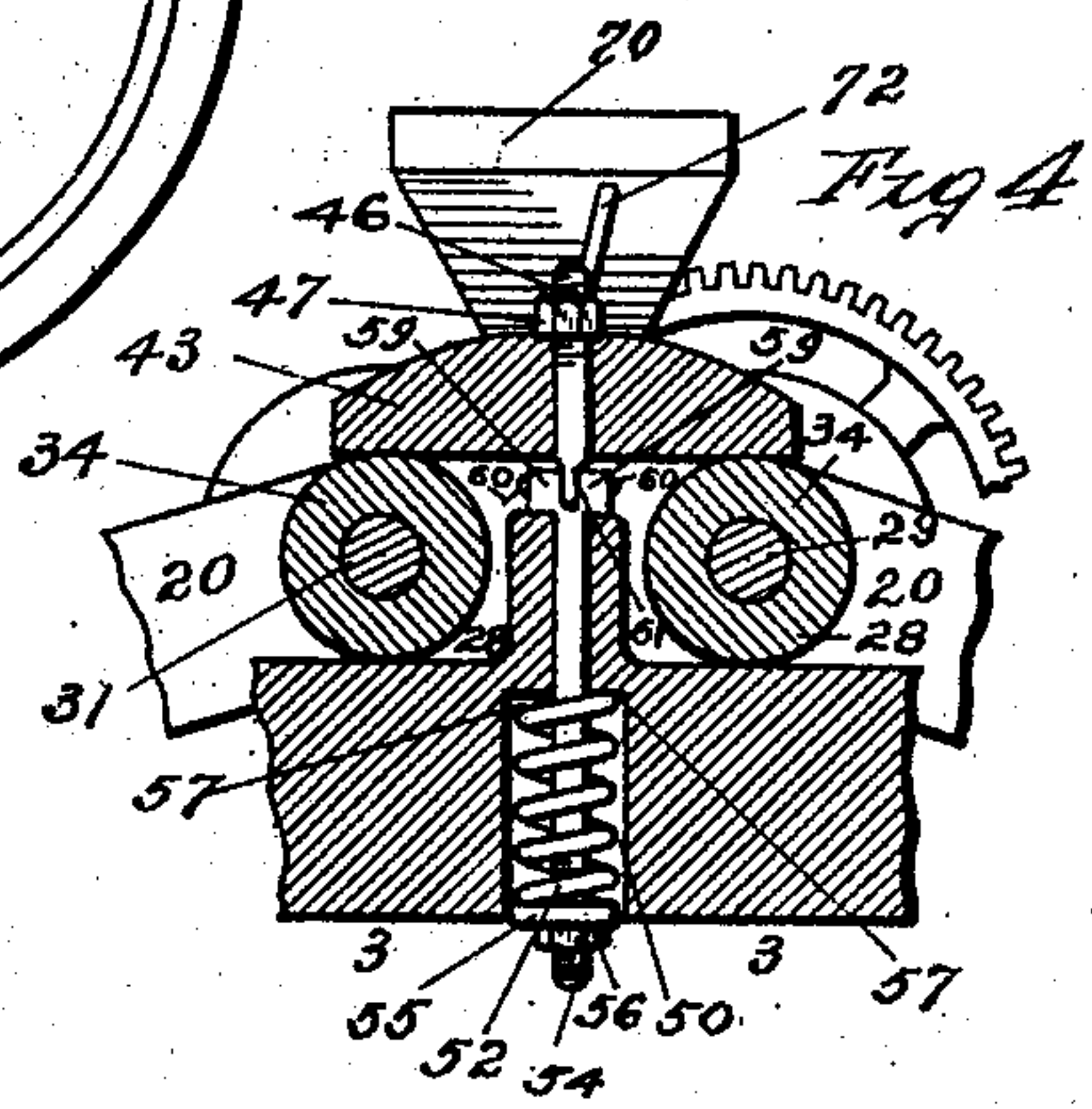
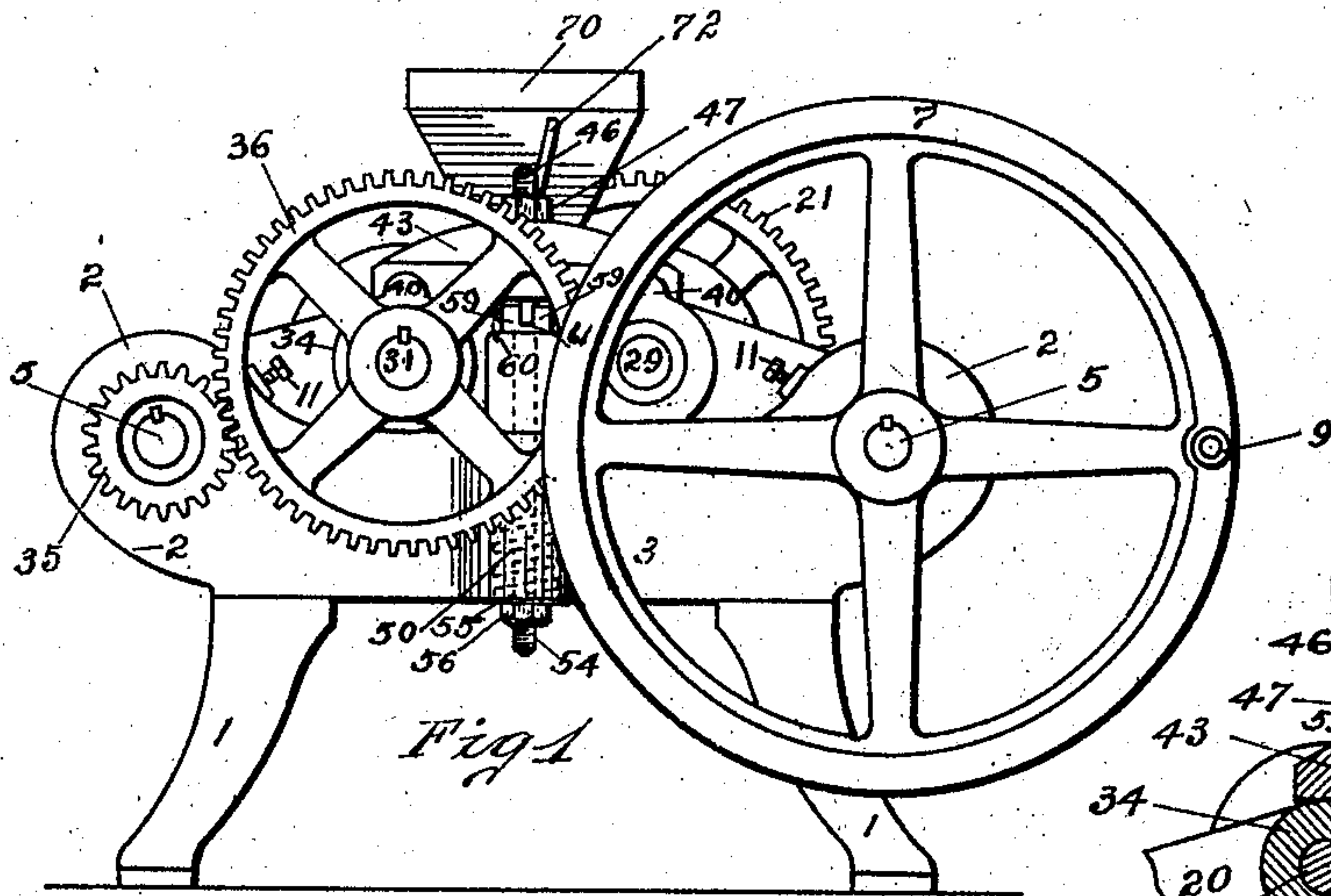


No. 815,332.

PATENTED MAR. 20, 1906.

A. C. CALKINS.
CRUSHING ROLLS.

APPLICATION FILED AUG. 26, 1902.



Witnesses
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ALBERT C. CALKINS, OF LOS ANGELES, CALIFORNIA.

CRUSHING-ROLLS.

No. 815,332.

Specification of Letters Patent.

Patented March 20, 1906.

Application filed August 26, 1902, Serial No. 121,139.

To all whom it may concern:

Be it known that I, ALBERT C. CALKINS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented and discovered a new and useful Improvement in Crushing-Rolls; and I do hereby 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.

This invention relates to improvements in crushing-rolls for ores, minerals, and like hard substances; and the objects of my improvement are, first, to provide means for pivoting the rolls in the same horizontal plane; second, to afford facilities for retaining the rolls in the same horizontal plane and parallel with each other during the crushing operation; third, to obviate lateral and torsional strain upon different portions of the rolls; fourth, to retain the rolls parallel to each other and in horizontal alinement with each other during the operation of crushing; fifth, to accommodate the passage of infrangible substances between the rolls; sixth, to prevent grooving and mutilating the surfaces of the rolls by fragments of unyielding material, and, seventh, to make provisions for bringing together the contact-surfaces of the rolls after the passage therebetween of portions of metallic or other infrangible substances. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a view in elevation of one side of the machine. Fig. 2 is a longitudinal sectional view of the machine on the line *a a* of Fig. 3. Fig. 3 is a top plan view of the machine. Fig. 4 is a longitudinal sectional view on the line *b b* of Fig. 3, parts of the frame and of the yokes broken away; and Fig. 5 shows end and side views, respectively, of one of the eccentric sleeves.

The reference-numerals 1 1 refer to the supports for the bed-plate 3 of the machine. Through the upturned ends 2 2 at each end of the bed-plate 3 the shafts 5 5 extend across the bed-plate 3, and each projects slightly on either side thereof. At one end of the bed-plate one of the shafts 5 5 carries thereon a hand-wheel 7, provided with a hub 10, and a handle 9, the latter projecting from the outer face thereof, by means of which handle 9 the crushing-rolls are operated. Preferably, how-

ever, the crushing-rolls may be operated by a belt running over the periphery of the wheel 7 to a driving-shaft carrying a pulley thereon. (Not shown upon the drawings.)

The two shafts 5 5 are each in like manner secured within the upturned ends 2 2, which are made integral with the bed-plate 3 of the machine, and a description of the manner in which one of the shafts 5 5 is secured in one of the two upturned ends 2 2, made integral with the bed-plate 3, will in like manner serve as descriptive of the construction by which the other shaft 5 in the opposite end of the machine is secured therein. Each of the shafts are provided with hexagonal portions 13 13, and has secured thereon a cylindrical sleeve 12, having bearings 15, (hereinafter referred to,) preferably made parts of the yokes 20 20. Each of the said bearings 15 15 of the yokes 20 20 and the cylindrical sleeves 12 12 are each alike constructed, and the description of the particular construction thereof at one end of the machine serves alike for both constructions. The yokes 20 20 are identical in construction at each end of the machine, as well as the crushing-rolls 30 30, carried in the free ends of the yokes 20 20, each of which yokes is pivoted upon the eccentric sleeves 12 12 at each end of the machine.

The shafts 5 5 in each end of the machine are surrounded by the cylindrical sleeves 12 12, which are secured within the two-part bearing-boxes 8 8, said two-part bearing-boxes 8 8 being secured together by means of screw-bolts 14, and to the inwardly-projecting portions of the journal-boxes 8 8, by means of screws or other suitable devices, the scrapers 16 16 are fastened and by means of which ground and triturated material adhering to the rolls 30 30 is readily removed therefrom.

As shown in dotted line upon Fig. 2 of the drawings, it will readily appear that the yokes 20 20 can easily be swung into a vertical position.

The shafts 29 and 31, journaled in the free ends of the yokes 20 20, revolve in bearings in the hubs or bosses 34 34 at the free ends of the yokes 20 20.

Upon one end of the shaft 29 a large gear 21 is secured, which meshes with a smaller gear 25 on the end of the shaft 5, which revolves within its eccentric sleeve 12 when the hand-wheel 7, having the hub 10 made a part thereof, is revolved by means of the handle 9,

secured thereto. The revolution of the said wheel 7 causes the shaft 5 to revolve within its eccentric sleeve 12 within the bearing-box 8 and carries with it the gear 25, which causes the shaft 29 to revolve, and with the last-mentioned shaft 29 one of the crushing-rolls 30, secured thereon, also revolves. The revolution of the last-mentioned shaft 5, having secured on the end thereof the band-pulley 22 and connected with the band-pulley 23 on the end of the other shaft 5 at the opposite end of the machine, is also caused to revolve. The last-mentioned shaft 5 has upon the opposite end thereof the gear 35, which meshes with a larger gear 36, carries upon the end of the shaft 31, and has thereon a crushing-roll 30. The revolution of the band-pulley 23 by means of the cross-belt 24 causes the gear 35 to revolve and with it the gear 36 and one of the crushing-rolls 30, secured on the shaft 31.

The two crushing-rolls 30 30 are made of the same material and are secured on their respective shafts 29 and 31 in like manner. These two crushing-rolls are of the same size; but the two pulleys 22 and 23 are slightly different in diameter in order that the crushing-rolls 30 30 revolve with slightly-different rates of speed. The different rates of speed by which the said two rolls 30 30 are caused to revolve is for the purpose of preventing the crushed and disintegrated material from becoming caked upon said rolls.

Upon the tops of each of the hubs 34 34 of each of the yokes are a pair of lugs 40 40, and between each pair of said lugs 40 40 one end of the equalizing-bar 43 rests. The said equalizing-bar 43 has at or about the central portion thereof a slot 45, in which slot a screw-threaded bolt 46, having thereon a clamping-nut 47, by means of which the equalizing-bar is clamped between the pairs of lugs 40 40 upon a hub 34 of each yoke. The said equalizing-bar, with the clamping-nut 47 and by means of the slot contained in said equalizing-bar, is readily removed from the hubs 34 34, so that the yokes, with their integrally-made hubs, can readily be swung upon their pivots, the eccentric sleeves to the position shown in dotted line upon Fig. 2 of the drawings.

Within recesses 50 50 in the bed-plate 3 I secure the springs 52 52, coiled upon rods 54 54, secured in said housings, and upon the lower end of the screw-threaded rods 54 54 I secure plates 55 55, and to the under side of said plates 55 55 upon the end of rods 54 54 I fasten a screw-threaded nut 56. By means of the screw-threaded nut 56 and plate 55 the tension of the spring 52 may be increased or diminished. The upper portion of each of the springs 52 52 rests against offsets 57 57, made within the housings 50 50 of the bed-plate 3. The upper portion of each of the screw-threaded bolts 54 is provided with a T

portion 59, having a longitudinal perforation therein, through which a pivot-pin 60 passes. In the central and upper portion of the T portion 59 I provide a slot 61, in which slot the lower portion of the screw-threaded bolt 46 enters and is pivotally secured in said slot by means of the pivot-pin 60.

To the frame 33 I secure, by means of screws or other suitable devices, the end portions 70 70 of the hopper, and to said end portions of the hopper 70 70 I secure in any suitable manner the side portions 71 71. The said end portions of the hopper and side portions thereof converge to about the center of the frame of the machine. The side portions 71 71, if further extended, would converge over the point of contact of the crushing-rolls 30 30. In the opening 78 between the converging ends of the side portions 71 71 of the hopper I pivotally secure upon the rod 72, journaled in the end portion 70 70 of the hopper, the prismatic-shaped cut-off 74. One end of the rod 72 projects through one end of the hopper 70 70 and has a crank projection 76, by means of which the prismatic-shaped cut-off is revolved within the opening 78 in the bottom of the hopper, which is in a vertical line above the point of contact of the two crushing-rolls 30 30.

The advantages of my improved machine are manifest and obvious. The crushing-rolls 30 30 are keyed or otherwise fastened upon the shafts 29 and 31 and revolve in the hubs or bosses 34 34 of the free ends of the yokes 20 20. Substances capable of being crushed which pass between the rolls cause no lateral and torsional strain upon the different portions of the rolls. The faces of the rolls at all times during the crushing operation remain parallel. Other advantages of my improved machine are readily apparent. Provision is made by means of the springs for the occasional passage of metallic and infrangible substances between the crushing-rolls. By the elevation of the free ends of the yoke carrying the crushing-rolls 30 30, journaled in the bosses or hubs 34 34, made integral therewith, infrangible substances are permitted to pass between the rolls. The said yokes at their free ends are elevated against the action of the spiral springs 52 52. The spiral springs 52 52 ordinarily exert sufficient downward pressure through the rods and equalizing-bars 43 43 to crush and disintegrate ores, minerals, and like substances. By this construction also the crushing-rolls are prevented from being grooved and otherwise mutilated.

The operation of this invention will be readily understood from the foregoing description when taken in connection with the drawings.

It is obvious that many variations and changes in the details of construction and arrangement of my invention would read-

ily suggest themselves to persons skilled in the art and still be within the spirit and scope of my invention.

I do not desire to confine this invention to the specific construction, combination, and arrangements of parts herein shown and described, and the right is reserved to make all changes in and modifications of the same as come within the spirit of this invention; but I do desire to secure as my invention all features of construction and equivalents thereof that come within the scope of my improvement as herein shown and described and illustrated upon the drawings appended hereto.

Having described my invention, what I do claim, and desire to secure by Letters Patent, is—

1. In ore-crushing machines, yokes provided with bearings in the ends of the frame, the crushing-rolls journaled in the open ends of said yokes, scrapers secured to the bearings, the equalizing-bars resting upon roll ends of the yokes, and tension devices attached to said frame and removably secured to the said bars, whereby an equal elevation of the rolls is maintained during the operation of crushing.

2. In ore-crushing machines, a frame, yokes having bearings and pivoted in the ends of the frame, a crushing-roll journaled in the

open end of each of said yokes, equalizing-bars provided with slots therein, and spring tension devices attached to said frame and removably fastened to each of said bars.

3. In ore-crushing machines, a frame, a driving-shaft, a driven shaft, means for revolving the shafts, a bearing in opposite ends of the frame for the driving-shafts, an eccentric sleeve secured on each of the driving-shafts, a yoke provided with a bearing upon each of the sleeves, each of the yokes having a crushing-roll in the open end thereof, equalizing-bars upon the roll ends of the yokes, and spring tension devices for retaining the crushing-rolls at an equal elevation relative to the frame.

4. In ore-crushing machines, horizontally-disposed yokes provided with bearings in the ends of the frame, the crushing-rolls journaled in the free ends of the said yokes, equalizing-bars resting upon the roll end of the yokes and tension devices attached to said frame and secured to the said bars, whereby desired tension is attained.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT C. CALKINS.

Witnesses:

C. W. HOLLISTER,
I. B. MARLIN.