

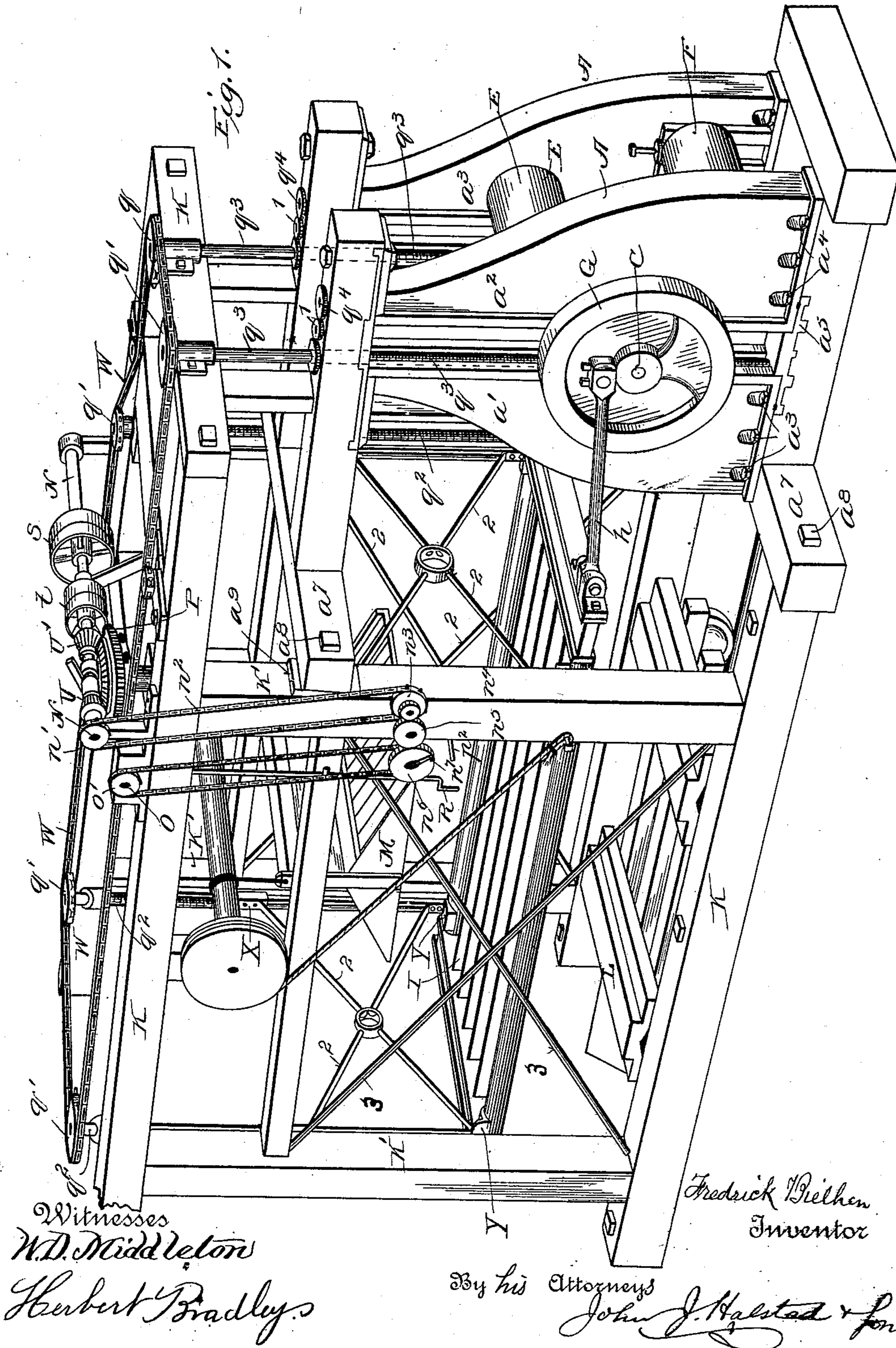
(No Model.)

7 Sheets—Sheet 1.

F. BIELHEN.
STONE SAWING MACHINE.

No. 568,731.

Patented Oct. 6, 1896.



(No Model.)

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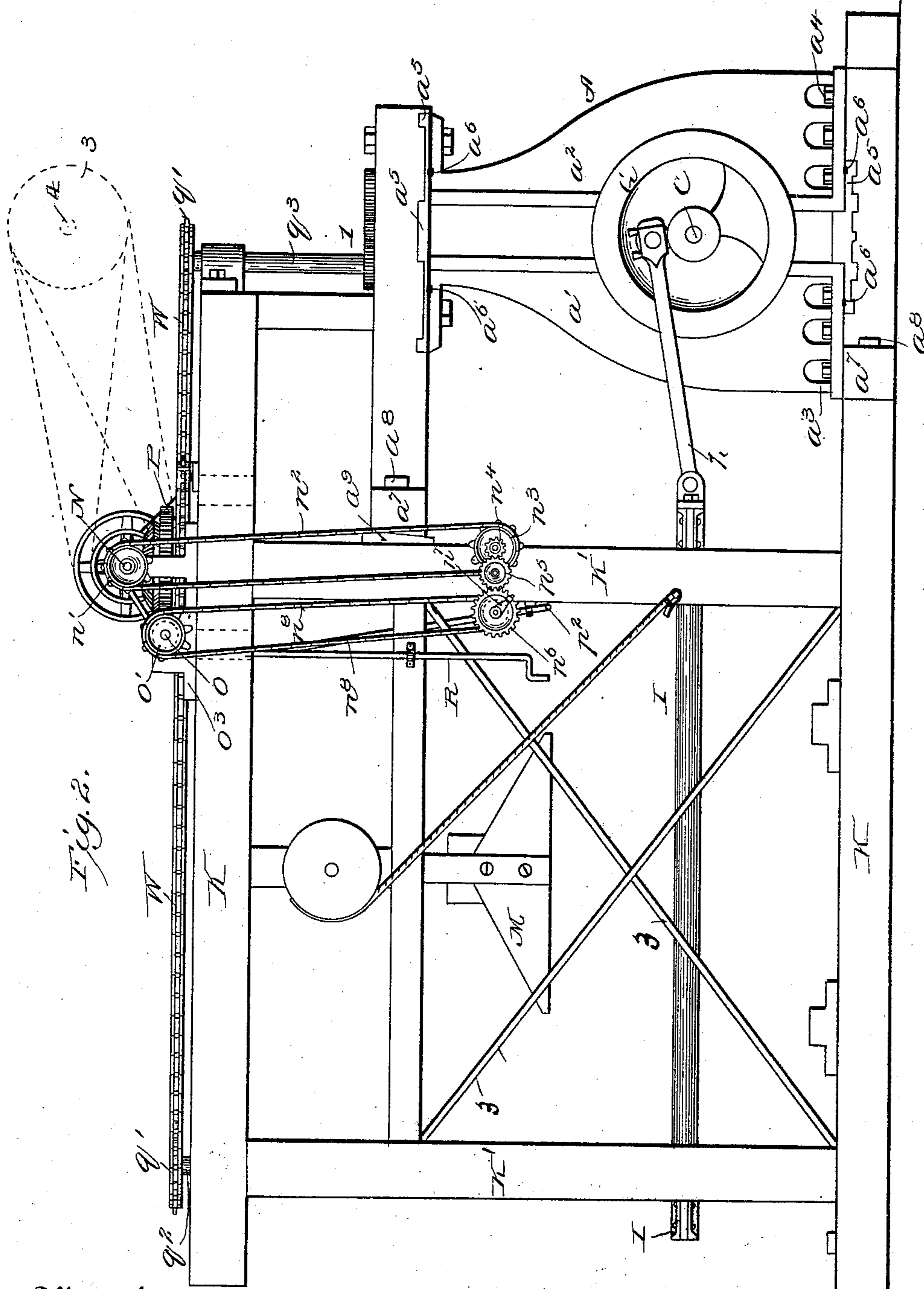


Fig. 2.

Witnesses
H.D. Middleton
Herbert Bradley

Fredrick Dieken, Inventor

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John J. Halsted & Son.

(No Model.)

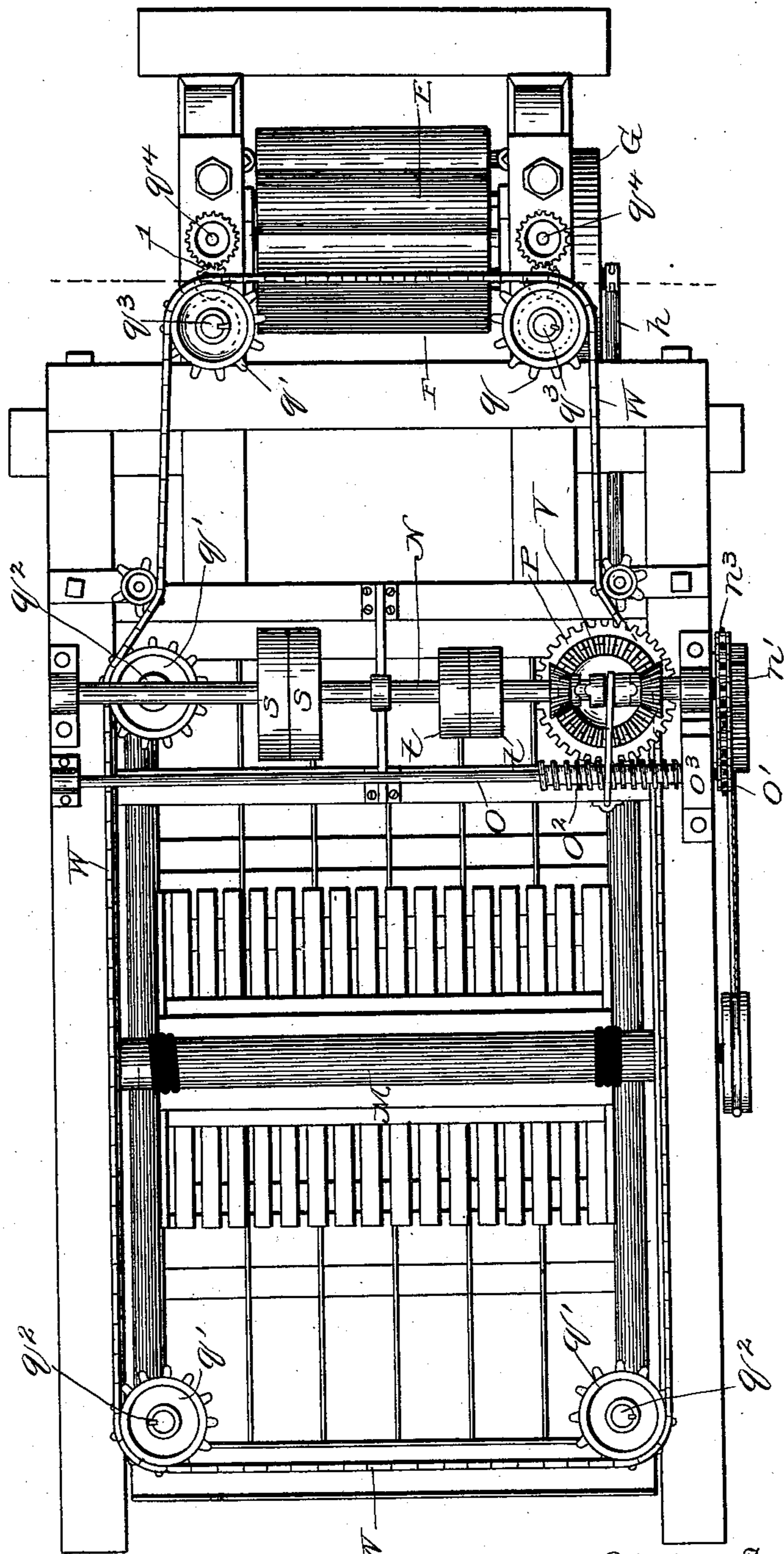
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Fig. 3.



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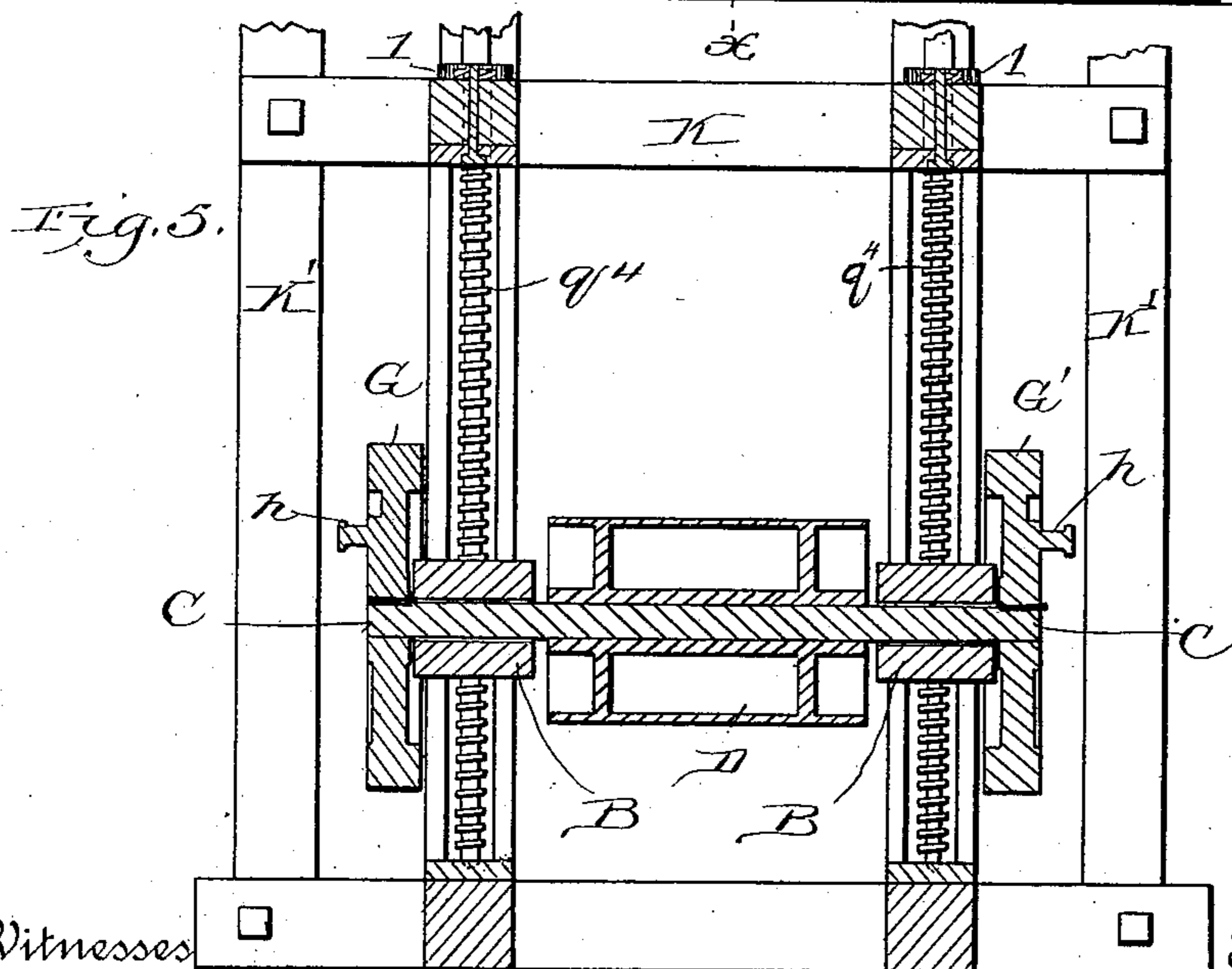
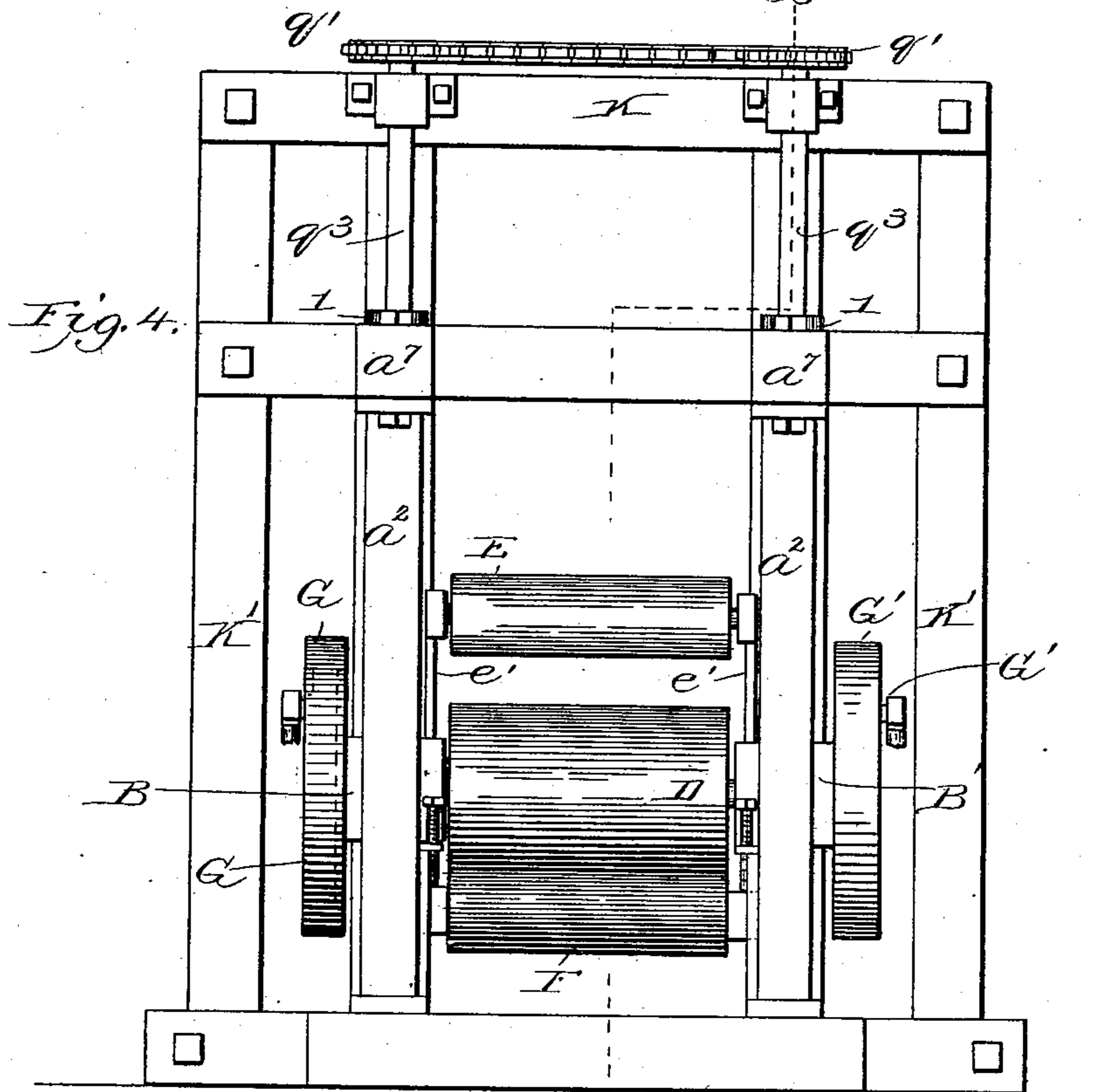
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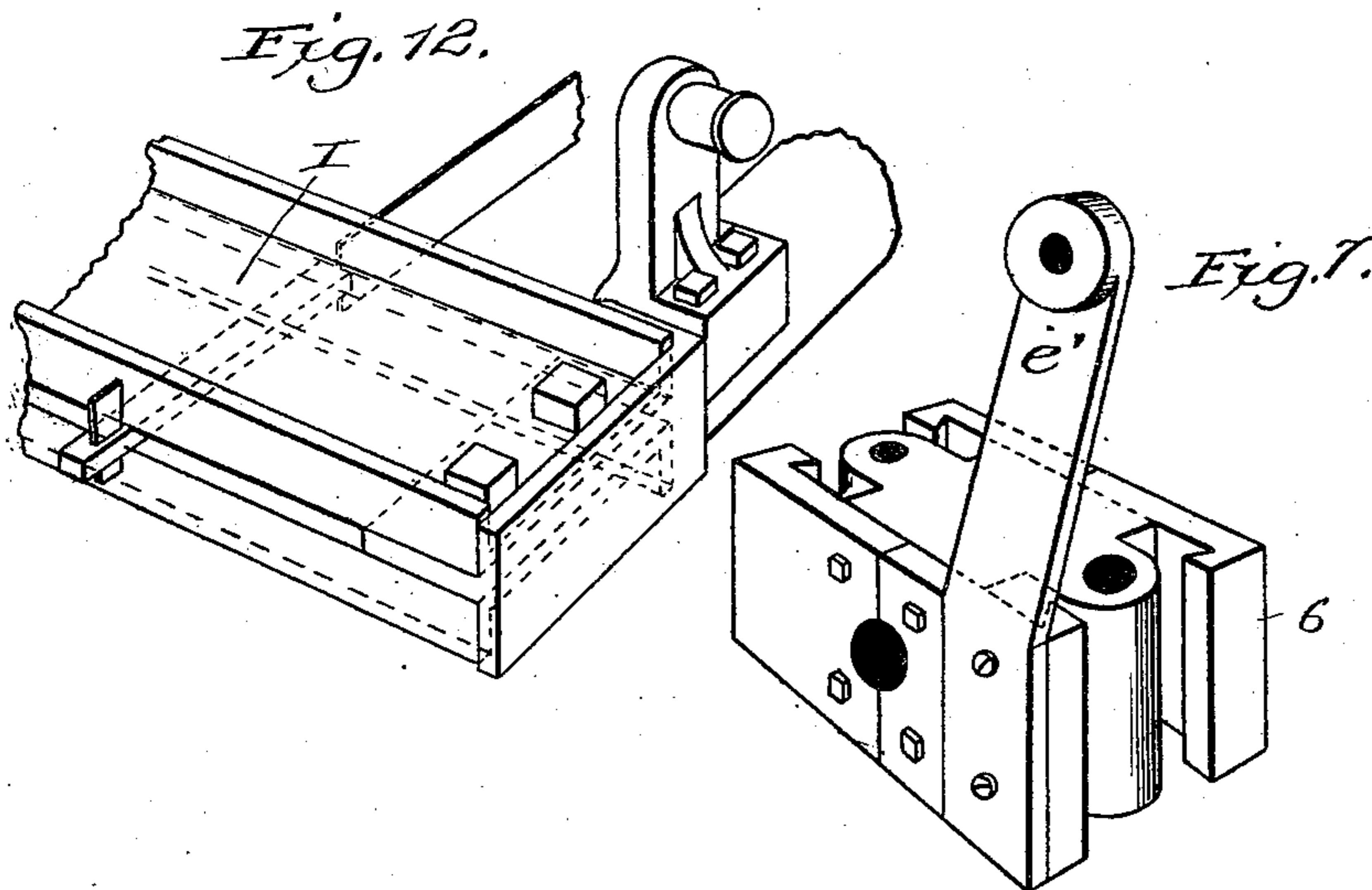
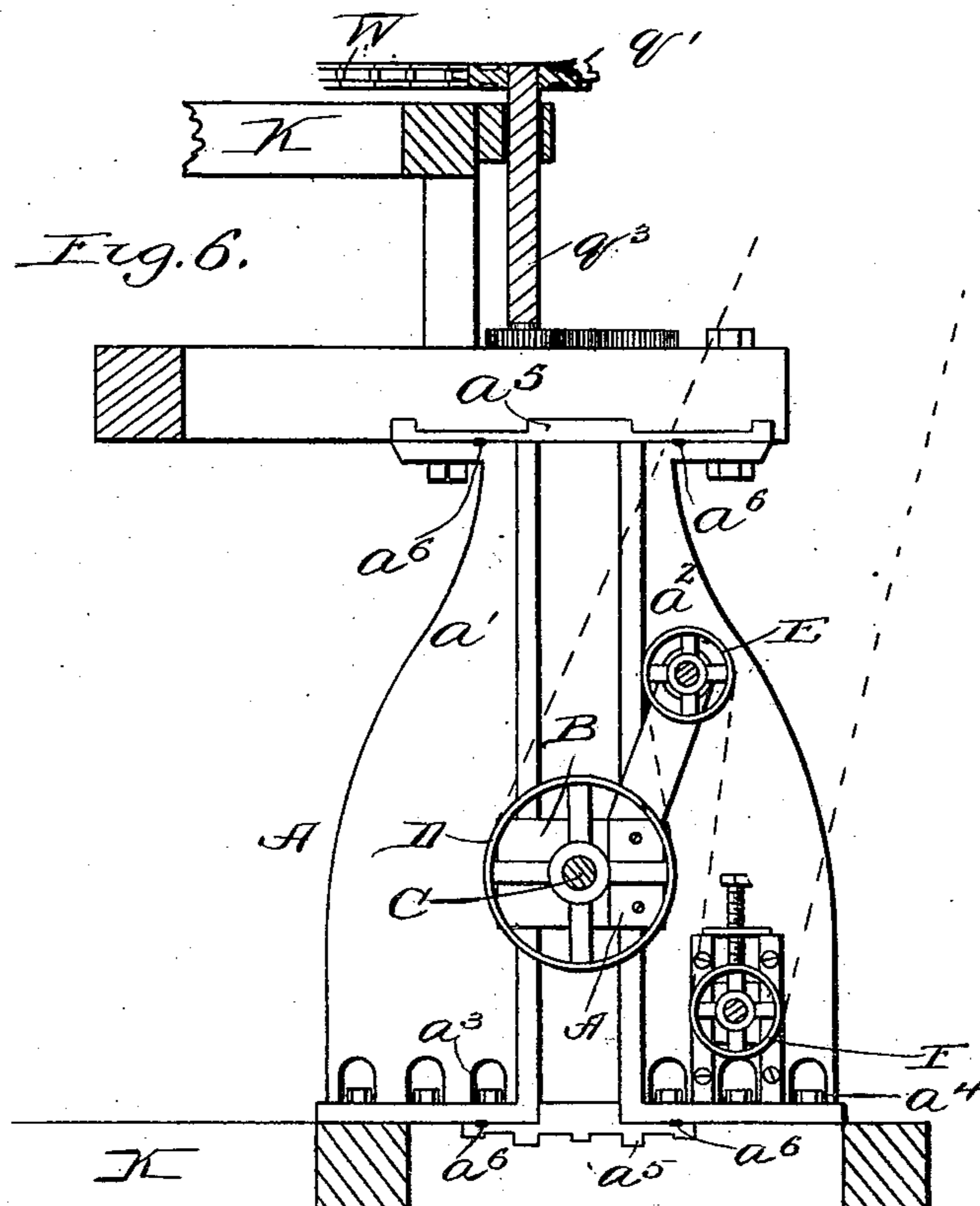
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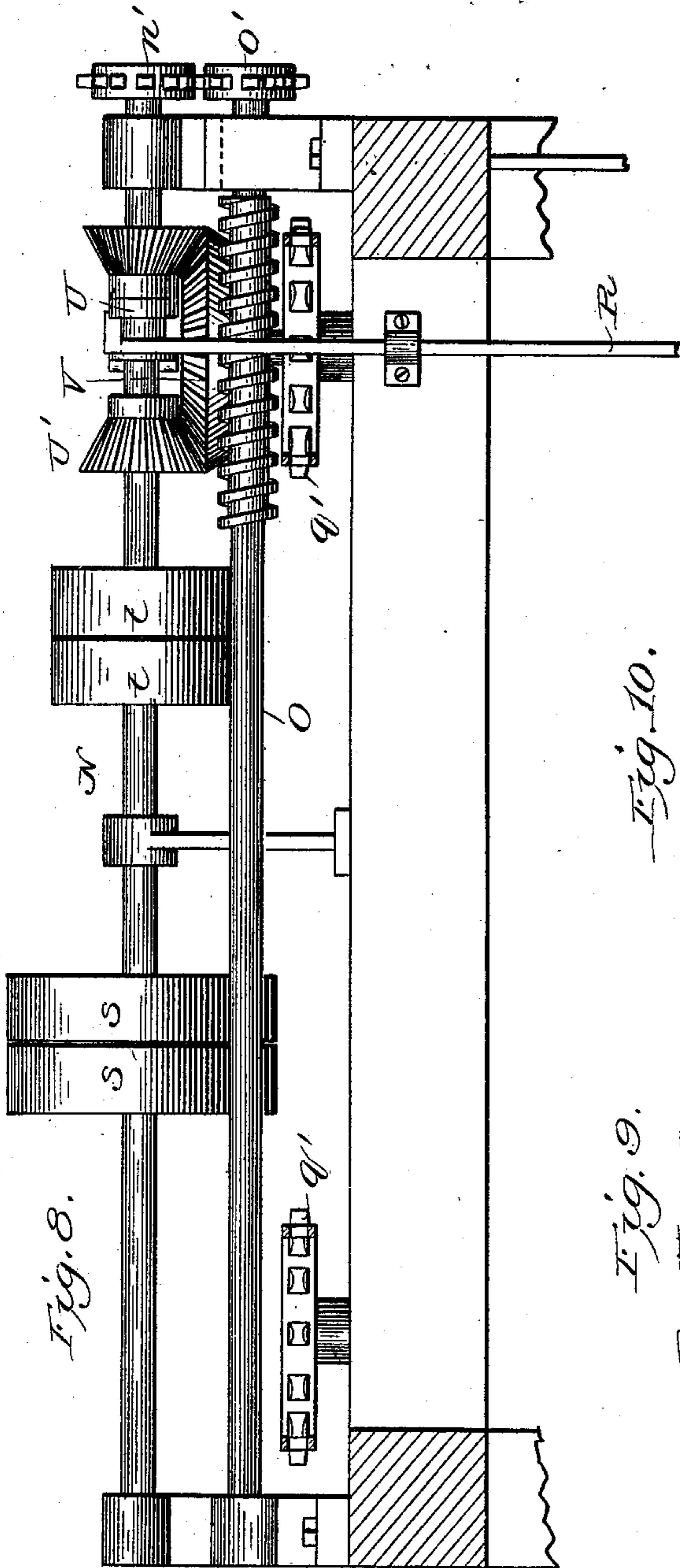


Fig. 8.

Fig. 10.

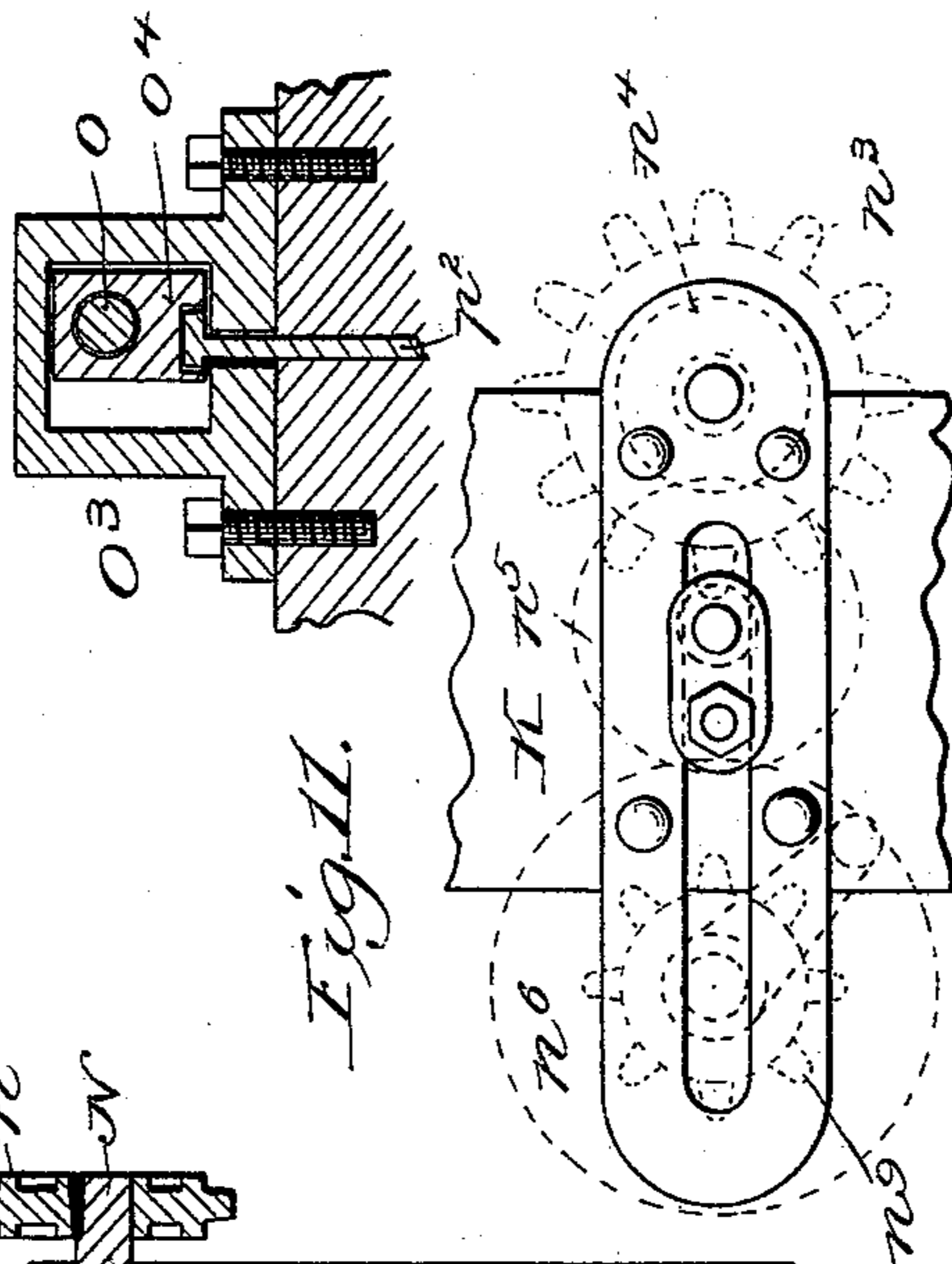
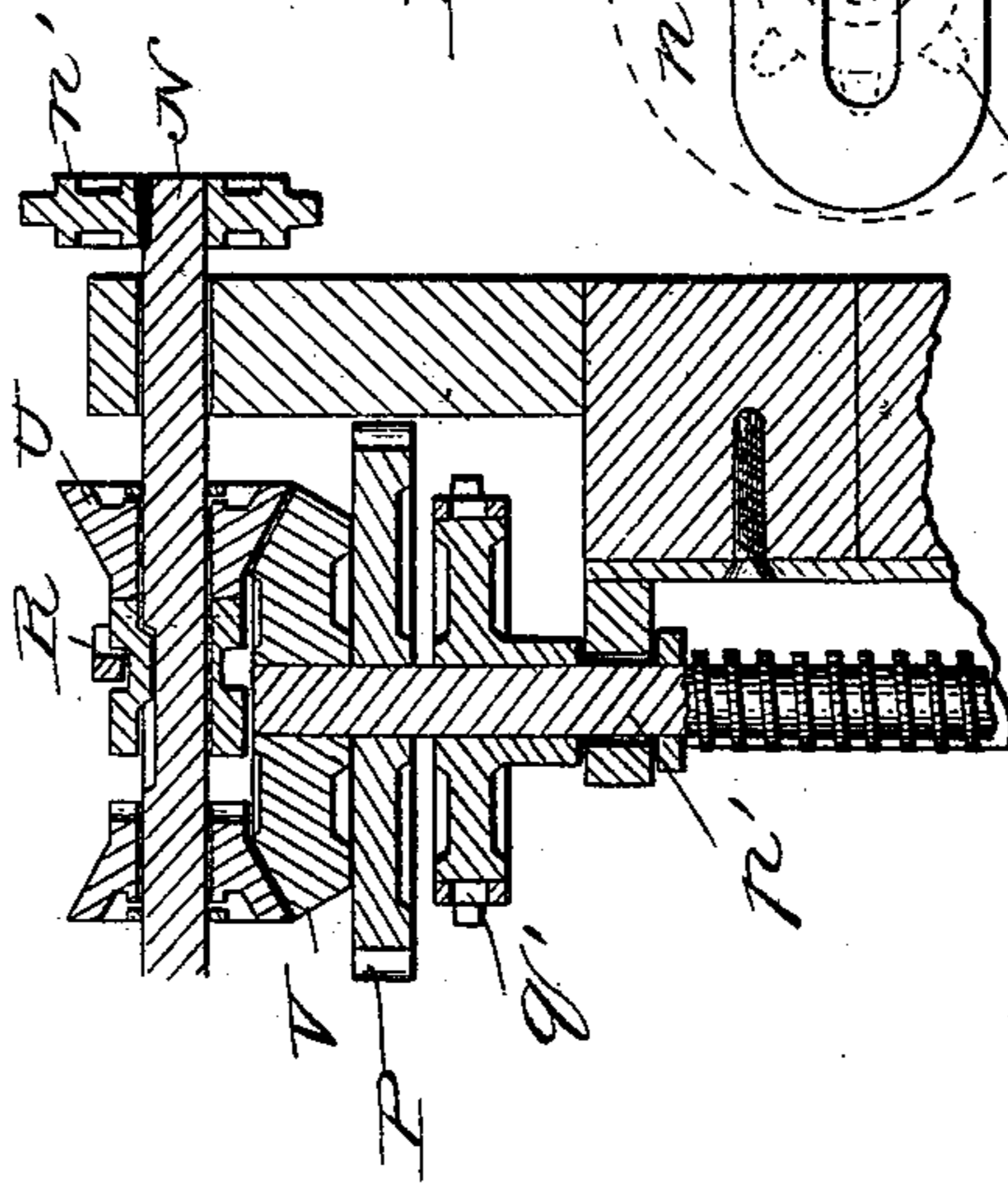


Fig. 11.

Fig. 9.



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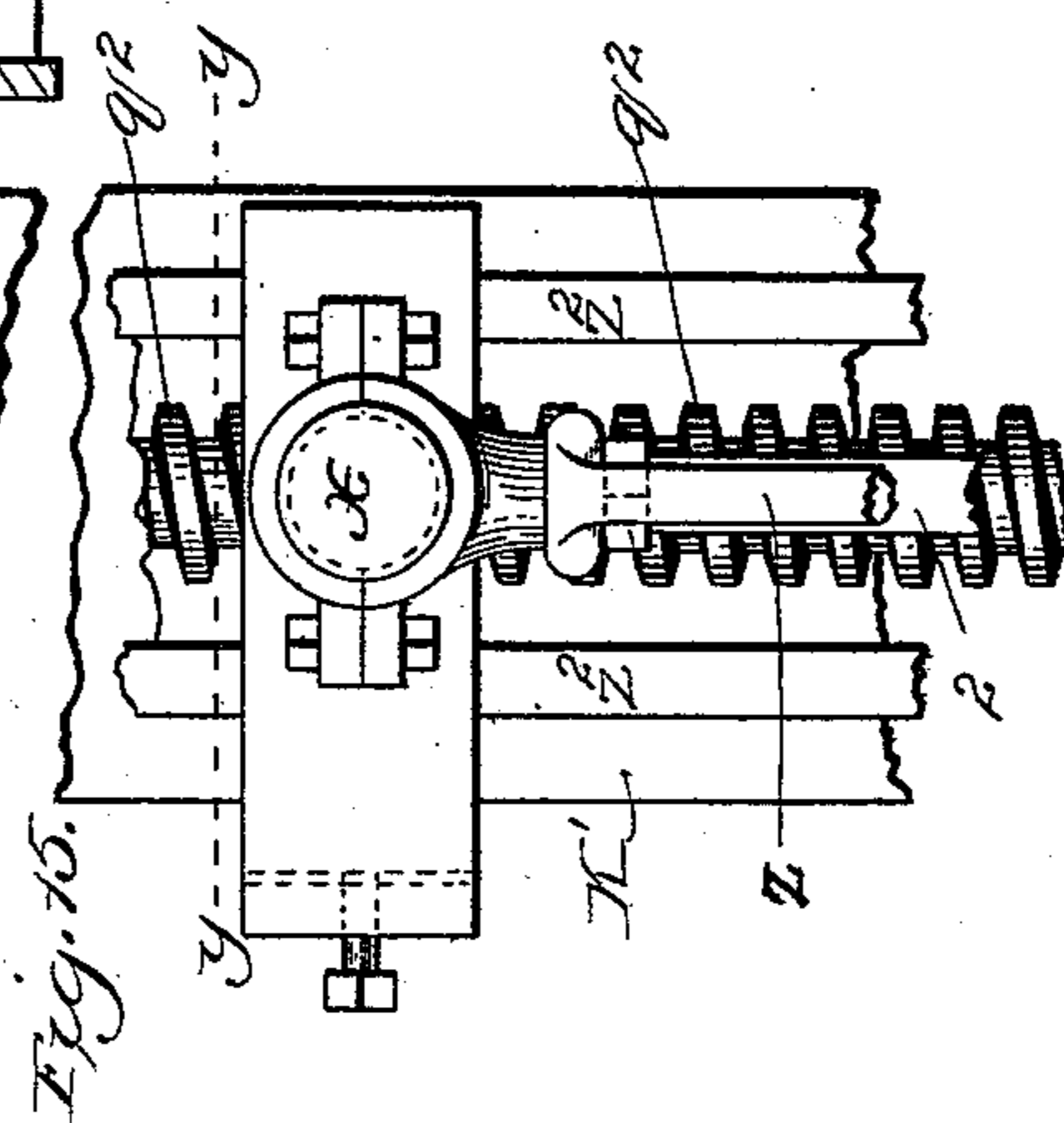
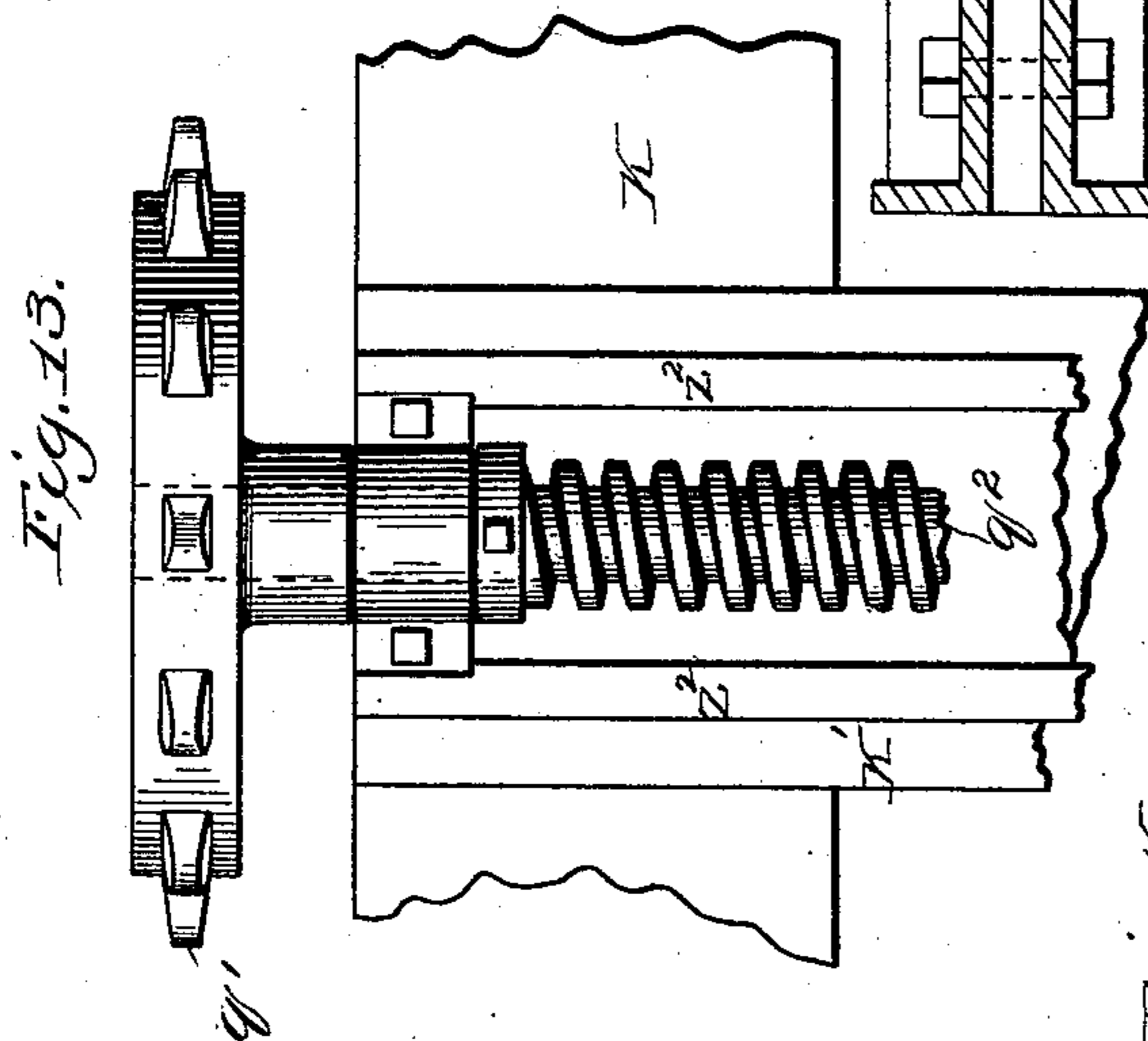
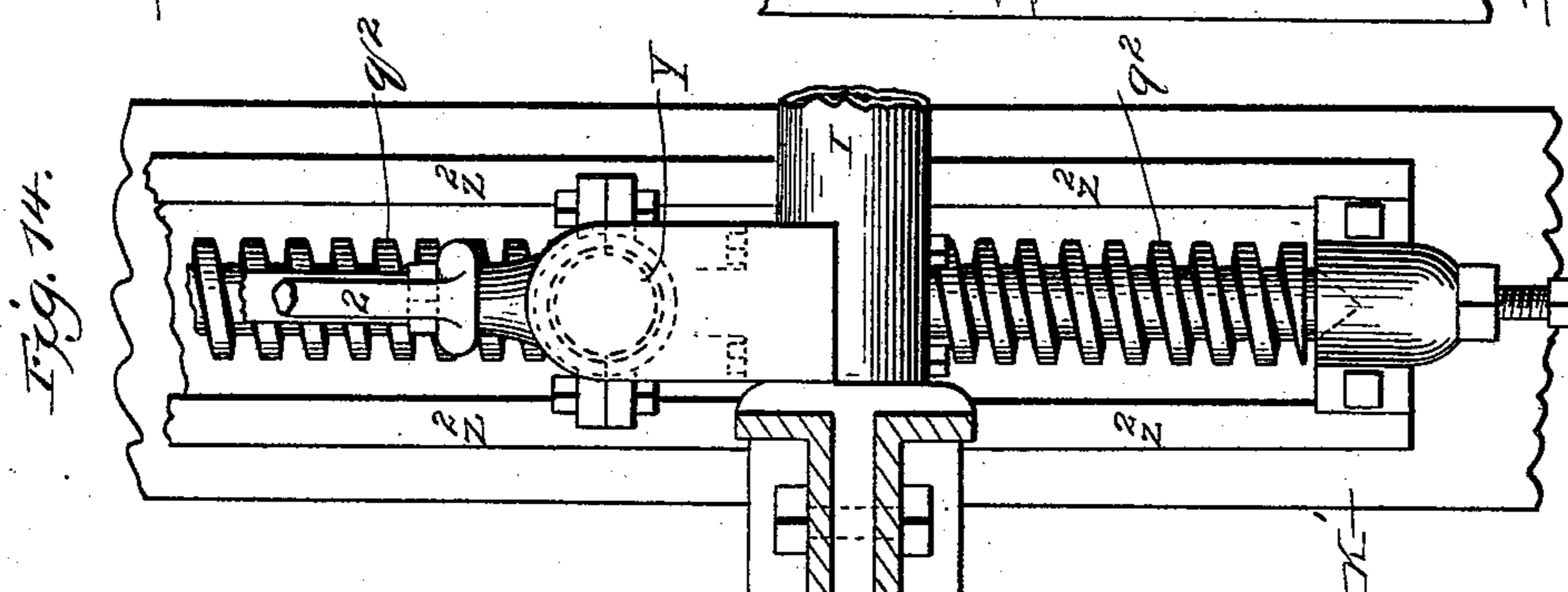
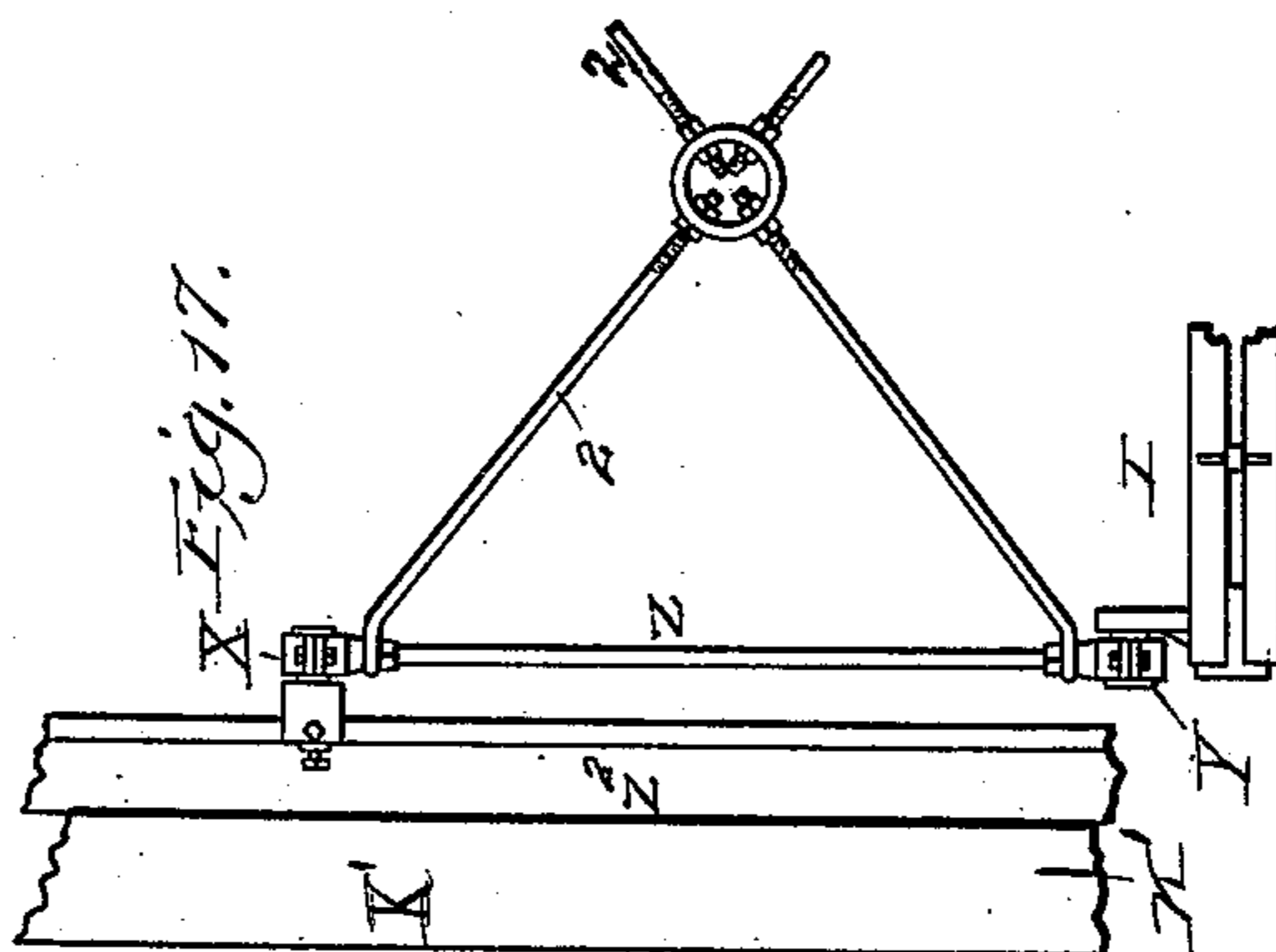
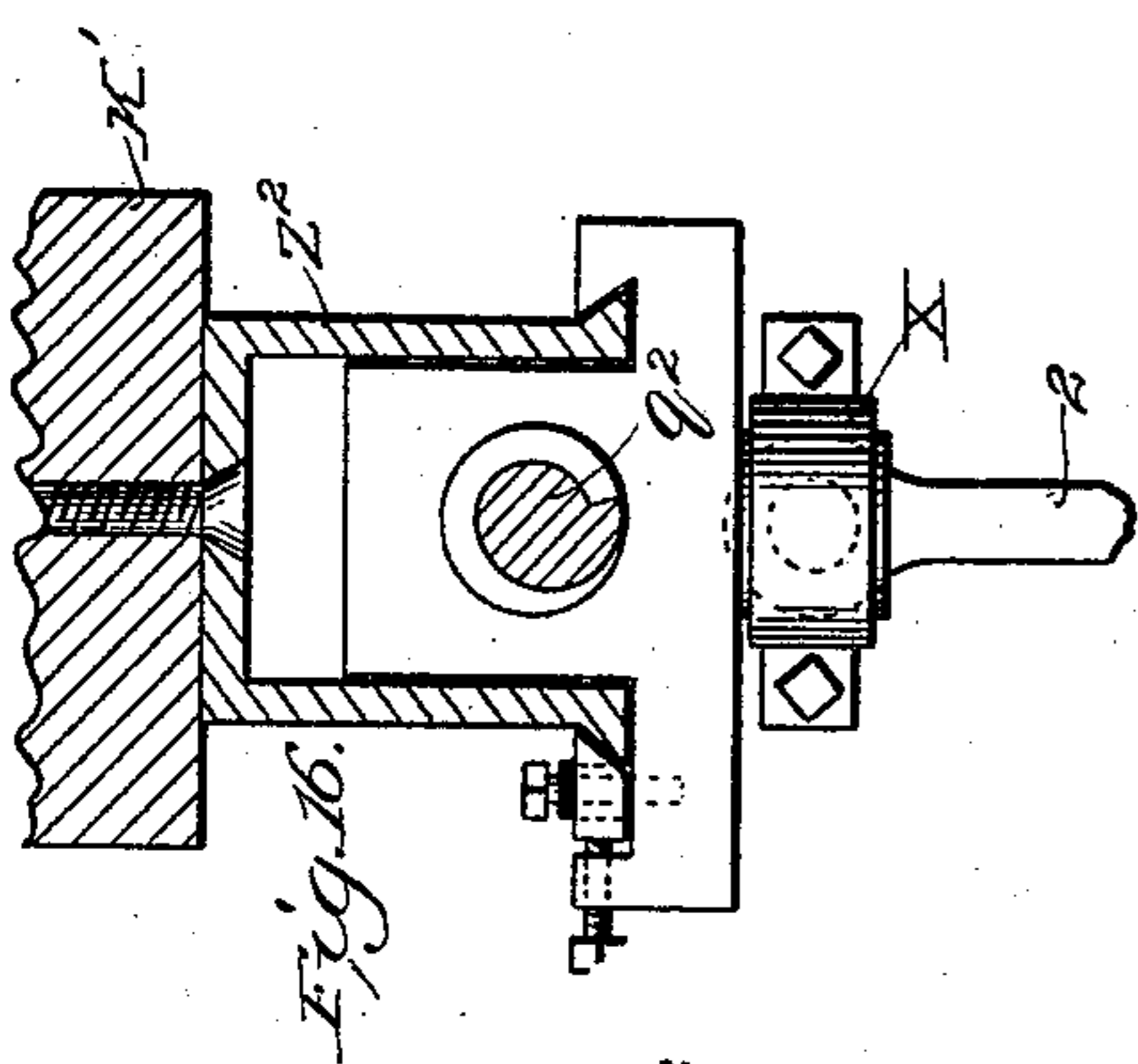
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UNITED STATES PATENT OFFICE.

FREDRICK BIELHEN, OF ST. JOSEPH, MISSOURI.

STONE-SAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 568,731, dated October 6, 1896.

Application filed April 30, 1895. Serial No. 547,665. (No model.)

To all whom it may concern:

Be it known that I, FREDRICK BIELHEN, a citizen of the United States, and a resident of St. Joseph, in the county of Buchanan and State of Missouri, have invented certain new and useful Improvements in Stone-Sawing Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention has for its object a high-speed machine, capable of rapid sawing of stone with a gang of saws, and having great firmness, strength, and durability; also the holding of the sash-frame securely in its correct position without lateral motion while swinging only back and forth in a true path or line.

By my construction I also do away with slides and with guides, rub-irons, (or boards,) and consequent frictions and adjustments; and by means of my continuous and positive chain-feed, as hereinafter described, I not only dispense with any ratchet-feed, (which usually feeds once to every five or seven strokes of the saws,) but I give the saws at each stroke the same to cut. I also avoid any friction-feed, which is a continuous annoyance because of continual slipping, my construction insuring a steady, uniform feed, feeding an equal portion at each stroke, and which is of great importance in rapid sawing.

Other important advantages are also obtained by my invention, such as improved means for raising and lowering the crank-shaft, keeping the belt under the same tension during such raising or lowering, an improved structure of the driving-frame, &c., all as will hereinafter appear.

In the accompanying drawings, which illustrate a form of machine embodying my improvements, Figure 1 is a perspective view showing the general construction, some of the details being shown in other and larger views; Fig. 2, a side elevation showing the line-shaft; Fig. 3, a plan; Fig. 4, a front view; Fig. 5, a cross-section through the crank-shaft, boxes, frame, columns, &c., at

the front of the machine; Fig. 6, a longitudinal section of part of the same; Fig. 7, a detail, enlarged, of the bearing for the crank-shaft and pulley-shaft; Fig. 8, a detail, enlarged, being a rear view of the bevel-gears and their shaft and of the worm-shaft, worm-wheel, and adjacent parts; Fig. 9, a longitudinal central section, enlarged, through these bevel-gears and shaft, worm-wheel and its shaft, worm gear or screw, and sprocket-wheels; Fig. 10, a detail, enlarged, showing a cross-section of the end of the worm-screw and its box; Fig. 11, an enlarged detail showing cog-wheels and sprocket in dotted lines; Fig. 12, a detail in perspective showing the mode of attaching the saw-blade and gang sides; Fig. 13, a detail, enlarged, in elevation, of the upper part of screw and sprocket; Fig. 14, arm attachment, lower one; Fig. 15, vibratory arm, upper connection, enlarged; Fig. 16, a section on the line $y y$ of Fig. 15; Fig. 17, a back view of the upper or vibratory connection.

Referring more particularly to Figs. 1, 2, and 6, A is an iron driving-frame in which are the sliding boxes B B' and a raising and lowering main driving or crank shaft C, supported in said boxes. The dotted lines in Fig. 6 indicate a portion of an endless belt running from any convenient prime-motor shaft to the main driving-pulley D on said main shaft, thence over a take-up pulley E, supported by arms e' on boxes b , and thence to and over an adjustable pulley F, the object of the take-up being to keep the belt under tension when the crank-shaft is raised or lowered. G G' are the cranks, one at each end of shaft, and h the crank-rods or pitmen connecting the cranks to the saw-sash I.

The frames or crank-shaft columns A are composed, at each side of the machine, of massive castings $a' a^2$, securely bolted at the bottom with large bolts, as shown at $a^3 a^4$, through a wood sill-plate and down through the foundation. Under and on top of these columns, securely fastened or bolted, are large cast-iron plates a^5 . Between these plates and the columns are keys a^6 , for the purpose of keeping the columns equal distances apart and in the proper position. At the top and bottom of these columnar castings $a' a^2$ the

wooden frame extends to the main saw-frame K K', as shown at a^7 , and is there securely bolted with large bolts, as shown at a^8 .

If desired, wedges a^9 (see Fig. 1) may be provided for properly adjusting the connections of the driving-frame with the main saw-frame.

The reciprocating saw-sash is shown at I.

L indicates a truck or carriage for the stone to be sawed; M, a distributor for delivering sand and water to the stone during the sawing, and having provision for lowering, raising, or adjusting the same.

A cross-shaft N, on top of the saw-frame K and driven from a long drum 3 (see Fig. 2) on any overhead shaft 4, has at its end a sprocket-wheel n' , and a chain n^2 connects the same by a sprocket-wheel n^3 with the feeding devices. This shaft has no endwise motion, for this would interfere with the proper action of the sprocket n' and bevel-pinions U' and U', hereinafter mentioned. Wheels n^5 and n^6 I make removable, say by stud or any well-known means, to increase or diminish the feed for different kinds of stone. The wheel n^3 also is fastened to and carries a small removable pinion n^4 , gearing with a larger intermediate gear n^5 on the frame, and which engages with a still larger gear n^6 , which is provided with a small bolt or nut n^7 , having a lever-handle, as shown in Fig. 1, and a chain n^8 extends from sprocket n^9 on n^6 (see Fig. 11) to another sprocket-wheel, O', on the shaft O, provided with a worm o^2 . By these means motion is transmitted to the sprocket-wheel n^3 and thence to the worm-shaft O. The shaft N being the driving-shaft of the machine, and the sprocket-wheel n' being keyed fast to this shaft, the gear-wheels n' and n^3 being connected by the belt n^2 , and n^3 and n^4 being fastened together, as above stated, n^4 , n^5 , and n^6 constitute a train of gears. When the driving-shaft N revolves, (it being driven, as heretofore stated, by a belt from the line-shaft pulley or drum 3,) it drives all the above. This shaft O is made to engage or disengage the worm-wheel P on a feed-screw p' . When feeding for sawing, a slow feed is used. The worm o^2 is then engaged and turns the wheels q' , which are severally secured to one end of the vertical raising and lowering screws q^2 , and which are four in all, namely, one at each of the four corners of the main saw-frame, as shown, and four others, q^3 and q^4 , located in the crank-shaft columns. The screws q^3 impart motion to the screws q^4 by means of the intermediate gears l .

The worm-shaft O o^2 is moved in and out of gear by means of the shifter p^2 , (shown in Figs. 1, 2, and 3,) and in Fig. 10 is shown the adjustable bearing-block o^4 , which permits one end of this shaft to be shifted for this purpose.

To obtain a fast or slow feed, as may be needed, I use different-sized gears in place of n^4 , n^5 , or n^6 , and which thus admit of nine

change-gears. For instance, to change the feed in the ratio of two to four I take off n^4 and substitute a large gear, and this will increase the speed of all the other gears, and consequently will feed the machine down faster.

The pinion n^4 , for the purpose of ready removal, may have a thumb-bolt or nut like that shown at n^7 . These thumb-bolts serve to hold the gears in place. The gears n^3 n^4 n^5 n^6 are all supported on a bracket, (see Fig. 11,) and which is itself fastened to one of the upright timbers K, and it is made slotted, as also shown in Fig. 11, to enable the different changeable gears to be put in as required.

To give the saw-sash a rapid up-and-down movement, an independent feed mechanism is provided, as shown in the plan view, Fig. 3.

Upon the cross-shaft N are tight and loose pulleys s, driven by a belt from an overhead drum 3, and also the smaller tight and loose pulleys t t' , driven from the same drum by a cross-belt, (see Fig. 2,) and the tight pulley t , revolves this cross-shaft and is used to raise and lower the saws quickly to and from their work. The worm is thrown back by means of its shifter p^2 , and the clutch U, which slides upon a feather, is thrown into contact with the bevel-pinion V by means of the clutch-shifter R and is thrown to the right when the saw-sash is required to be raised from the work and to the left when lowering it to work.

The bevel-pinions U' U' are loose upon shaft N and engage with the large bevel-gear V, which is secured to the worm-wheel P.

Below the wheel P (see Fig 9) and attached to one of the sprocket-wheels q' is an endless chain W, which passes more or less around and engages all the sprocket-wheels q' on the vertical screws, as before mentioned, located upon the main corners of the main saw-frame and also similarly passes around and engages the sprocket-wheels q' , attached to the vertical screws on the crank-shaft columns A, which serve to raise and lower the crank-shaft simultaneously with the saw-sash and thereby keeping the power in line. The saw-sash is strongly braced with diagonal braces 2 2 and the main frame with diagonal side braces 3 3. These, together with the massive frames, large bolts, and the adjusting-wedges above named, serve to keep the structure firm, rigid, and true to its work. One of the upper cross-heads is shown in Fig. 1 at X and the lower ones at Y. (See, also, the enlarged detail Figs. 14, 15, 16, and 17, and in which K' indicates vertical posts of the main saw-frame, Z the pendulum vibratory hanger, and Z² one of the housings for the raising and lowering screws q^2 .)

The tight and loose pulleys employed to drive shaft N are two sets—namely, S S, representing, say, twenty-four tight and loose ones used for feeding the machine down, and t t' , representing eighteen tight and loose pulleys to run the cross-shaft faster to raise and

lower the saws or working parts from and to the stone. Two different belts run from these pulleys to the line-shaft above.

I claim—

5 1. The iron driving frames or columns composed of massive castings, the top and bottom plates and keys, and top and bottom timbers bolted to the same and to the main saw-frame, combined with the main driving-shaft and
10 its rising and falling blocks supporting said shaft, and means for raising and lowering the same, substantially as and for the purposes set forth.

2. In combination with the iron driving-
15 frame columns, and with their top and bottom timbers, and their plates and keys, and with the main shaft and its boxes adapted to be raised and lowered in said columns, the main frame firmly bolted to such driving-frame,
20 the saw-sash in the main frame, its pitman connected to a crank on the main shaft in the iron driving-frame, and the described means for raising and lowering equally and simultaneously the main shaft and the saw-sash to
25 preserve their proper relative alinements, all substantially as set forth.

3. In a stone-sawing machine, the combination with the iron driving-frame connected

to the wooden saw-frame substantially as set forth, of the described feed devices, consist- 30
ing of the non-shifting cross-shaft N, its sprocket-wheel n' , and chain n^2 , sprocket n^3 , pinion n^4 , gears n^5 , n^6 , each removable and changeable for varying the feed, chain n^8 , sprocket n^9 , sprocket o' , adjustable worm- 35
shaft O, o^2 , worm-wheel P, and its feed-screw p' , and the described system of vertical screws, their sprocket-wheels and endless chain engaging therewith.

4. In combination, the non-reciprocating 40
cross-shaft N, its clutch U and gears U', the feed-screw p' , worm-wheel P, worm-shaft O, o^2 , adapted at one end to be swung into and out of engagement with wheel P, and a shifter p^2 , for effecting such engagement and disen- 45
gagement.

5. In combination, the iron columnar cast-
ings a' , a^2 , the wooden sills beneath and the wooden frame above the same, and the plates a^5 , a^5 , and their keys a^6 , a^6 , all substantially 50
as and for the purposes set forth.

FREDRICK BIELHEN.

Witnesses:

KERR. M. MITCHELL,
ERNEST L. SMITH.