

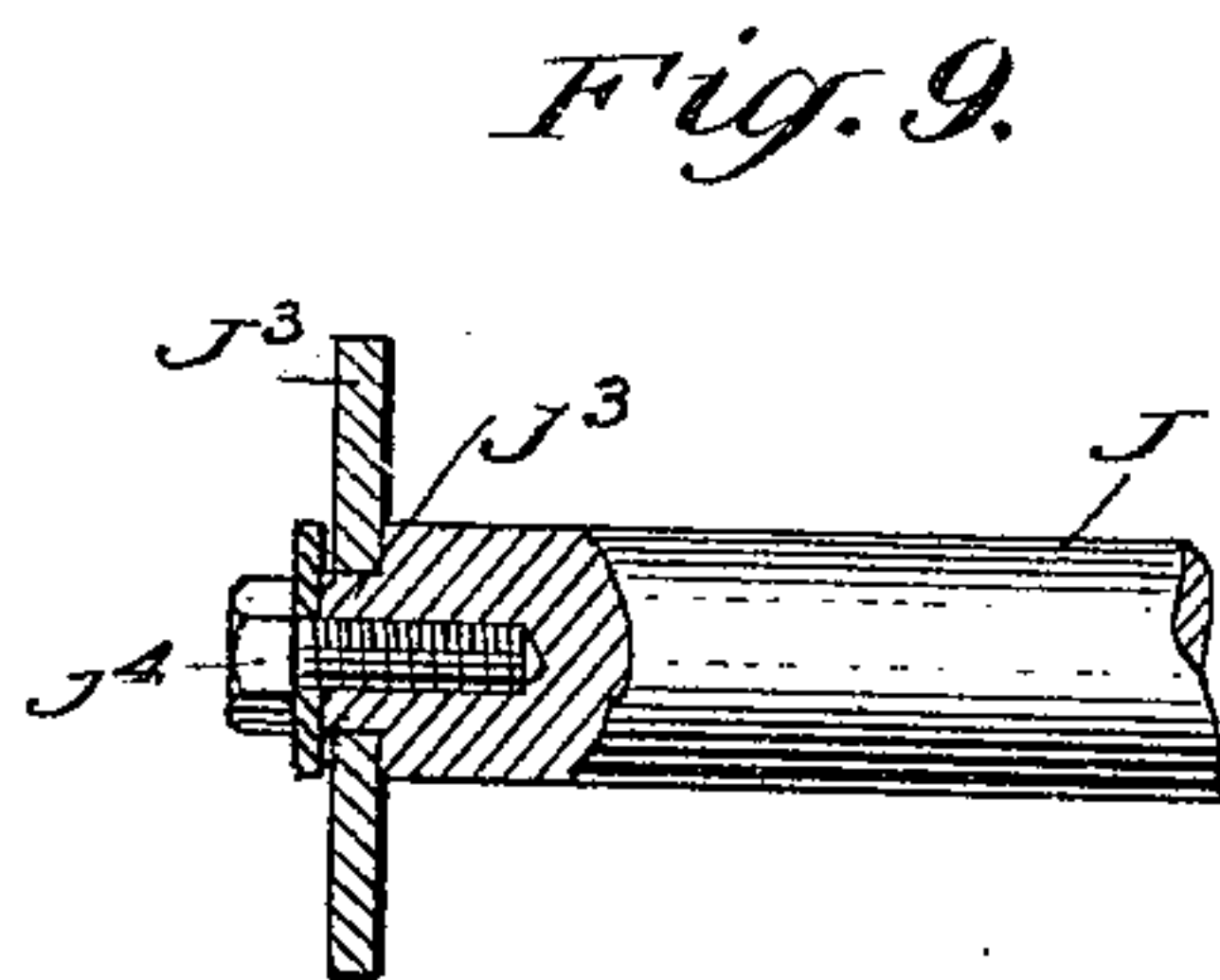
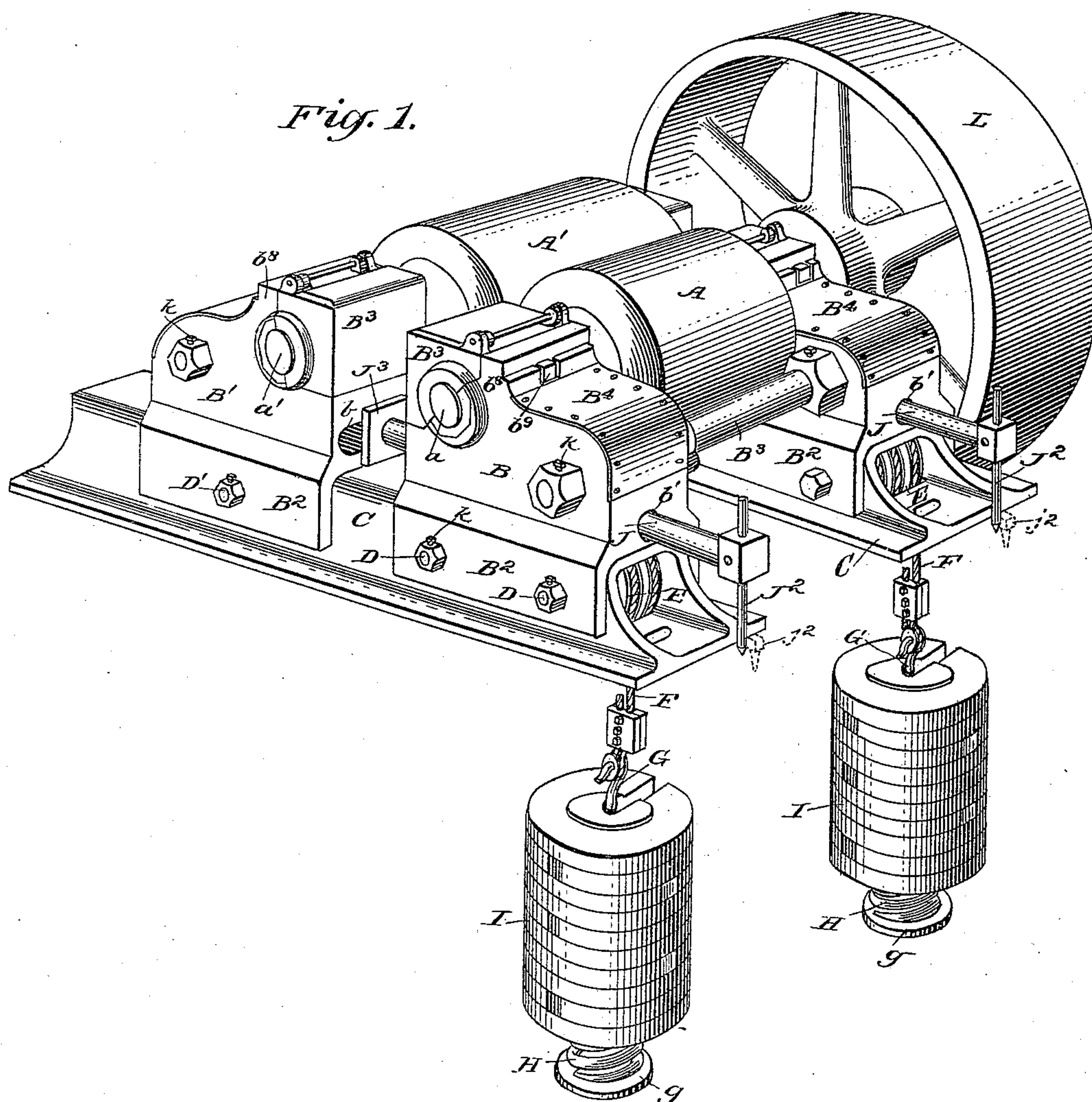
(No Model.)

4 Sheets—Sheet 1.

D. BRENNAN, Jr.
CRUSHING ROLLS.

No. 442,764.

Patented Dec. 16. 1890.



WITNESSES:

J. A. Griswold.
to Sedgewick

INVENTOR:

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ATTORNEYS

(No Model.)

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Fig. 2.

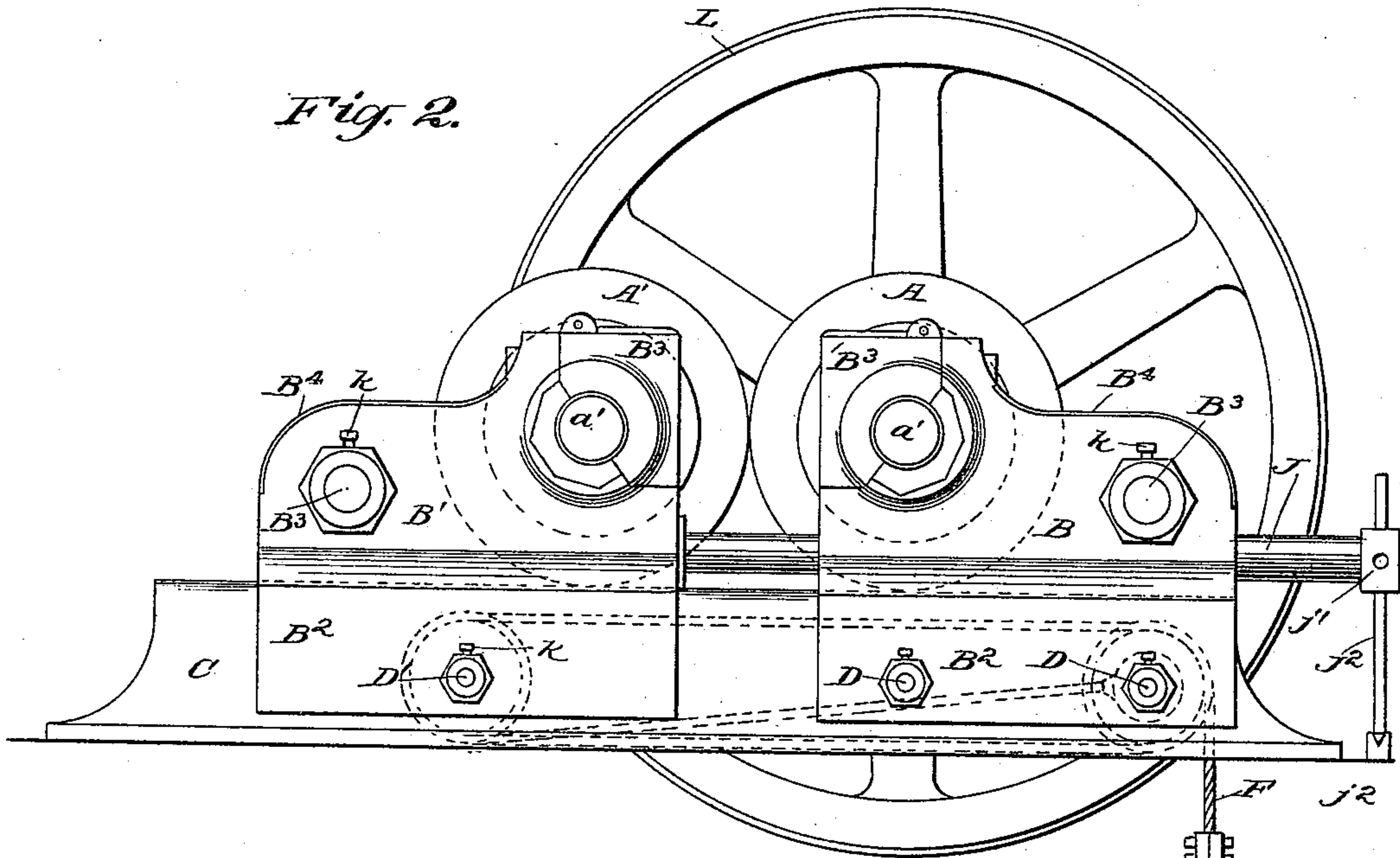
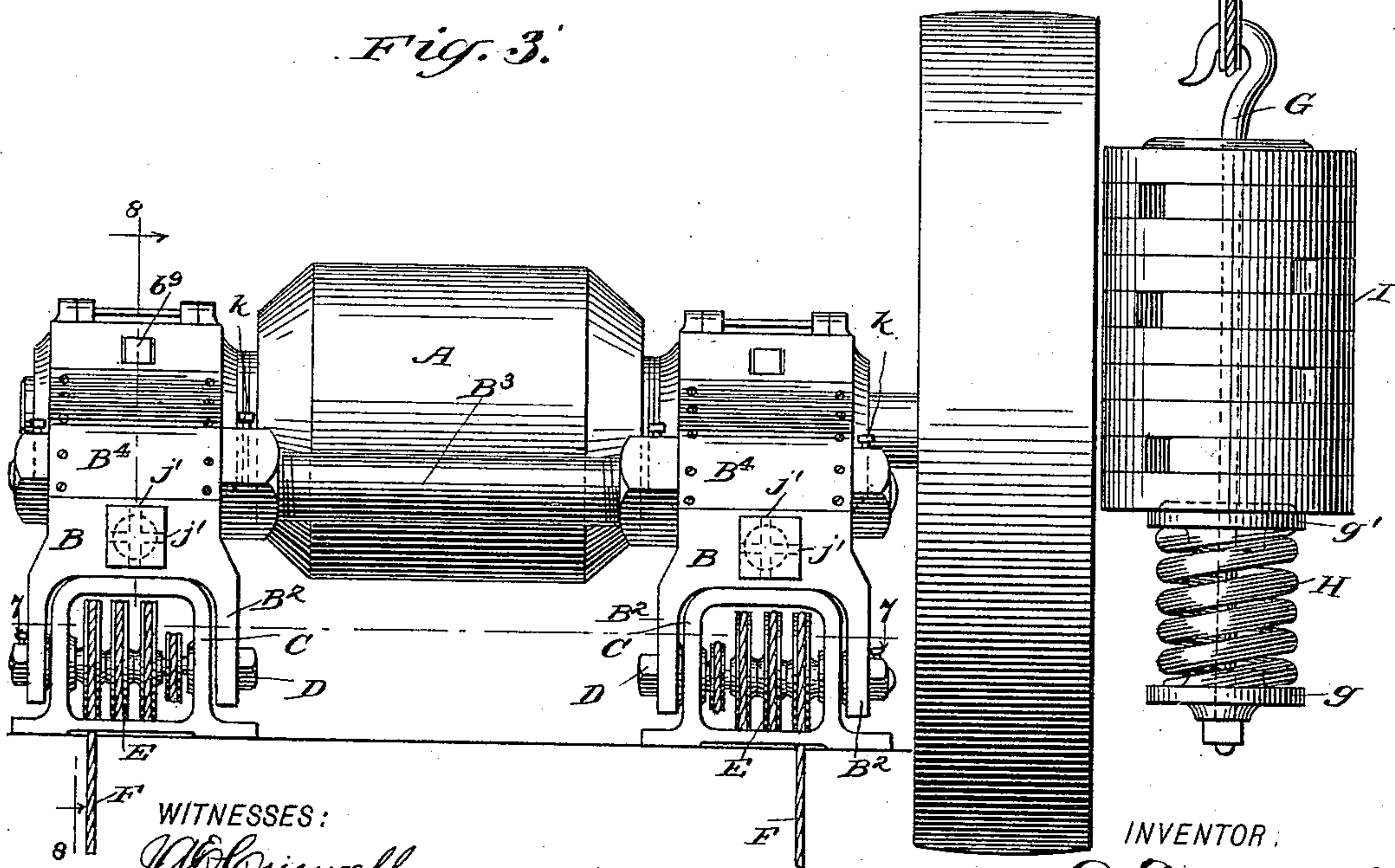


Fig. 3.



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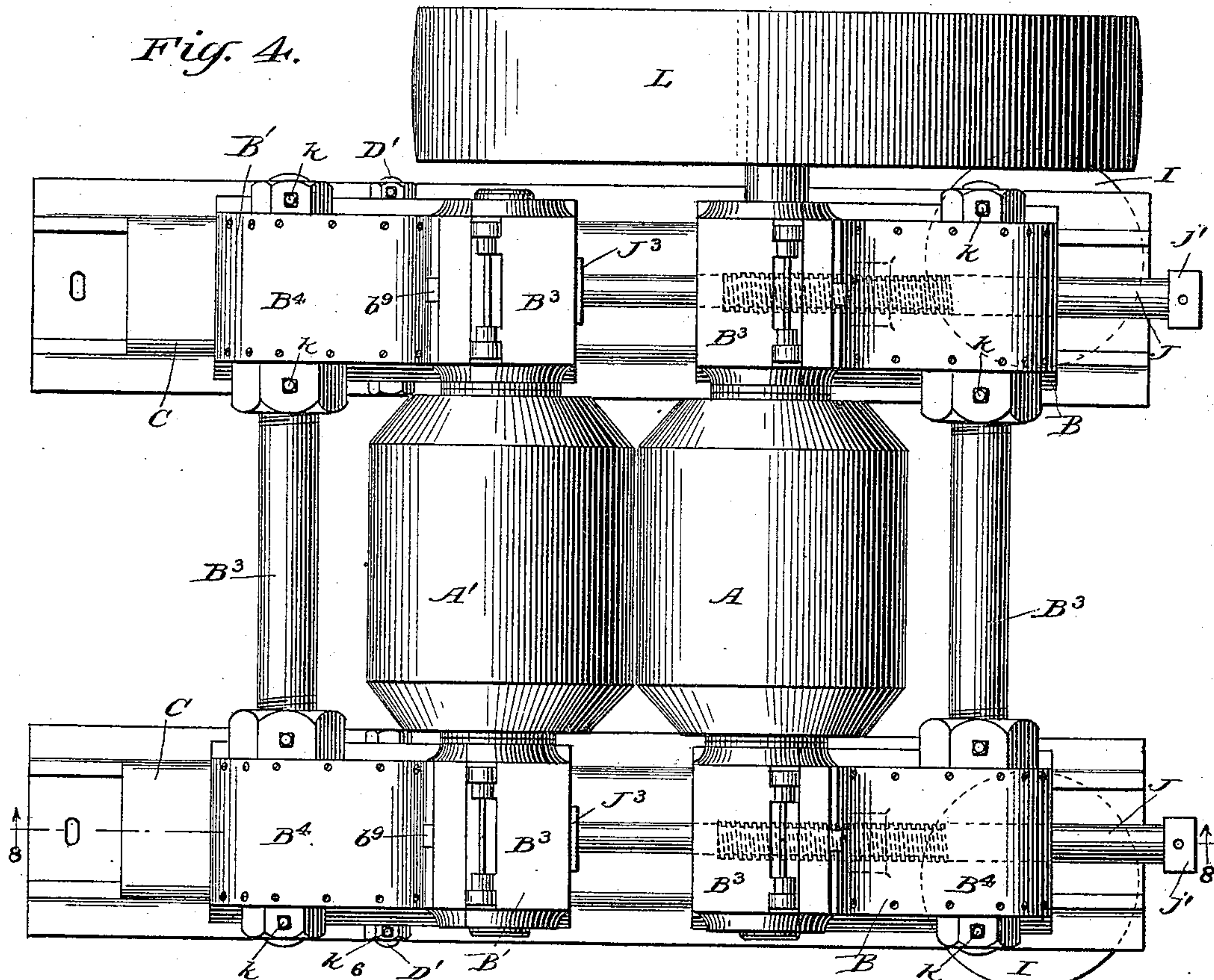


Fig. 5.

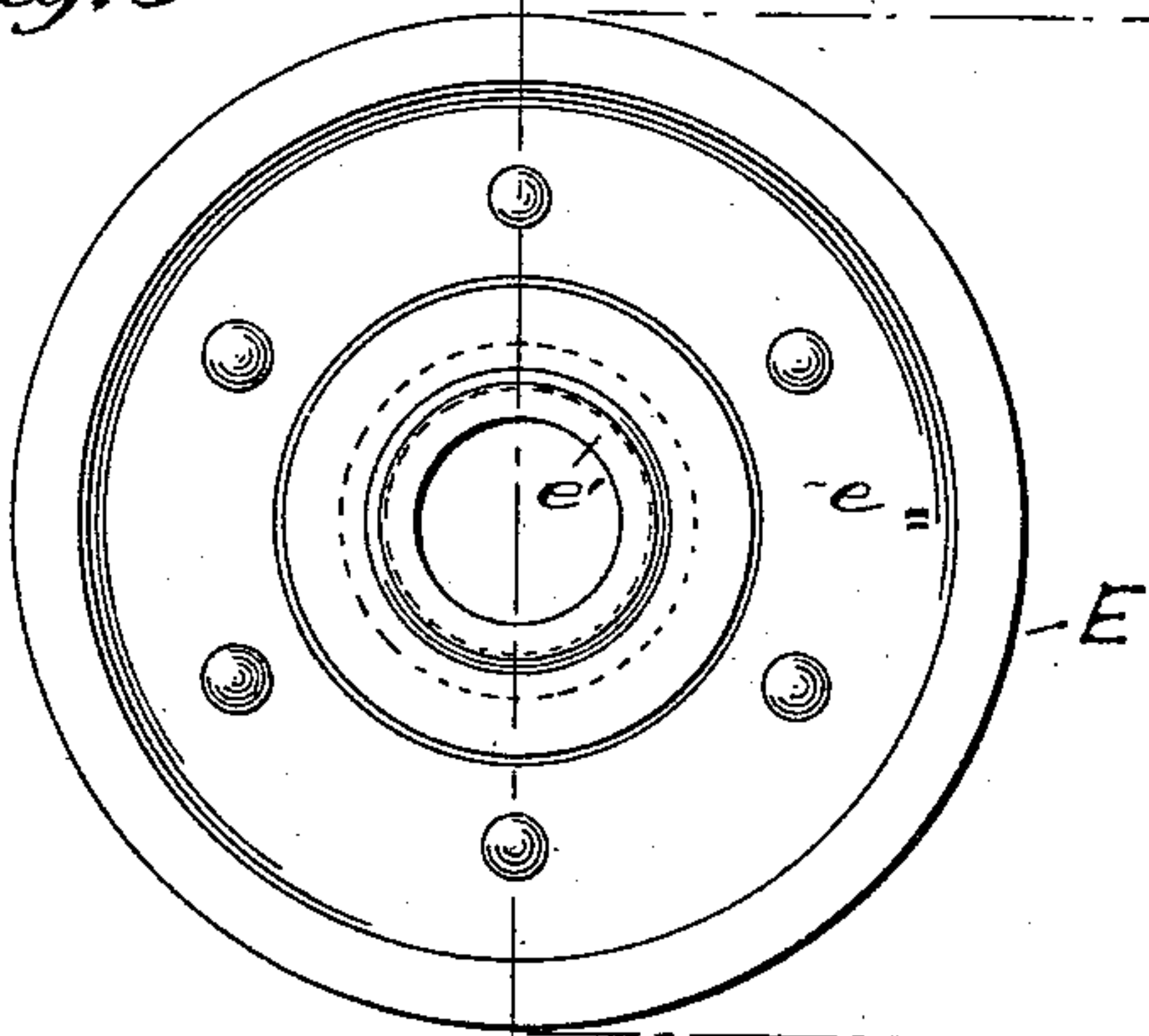
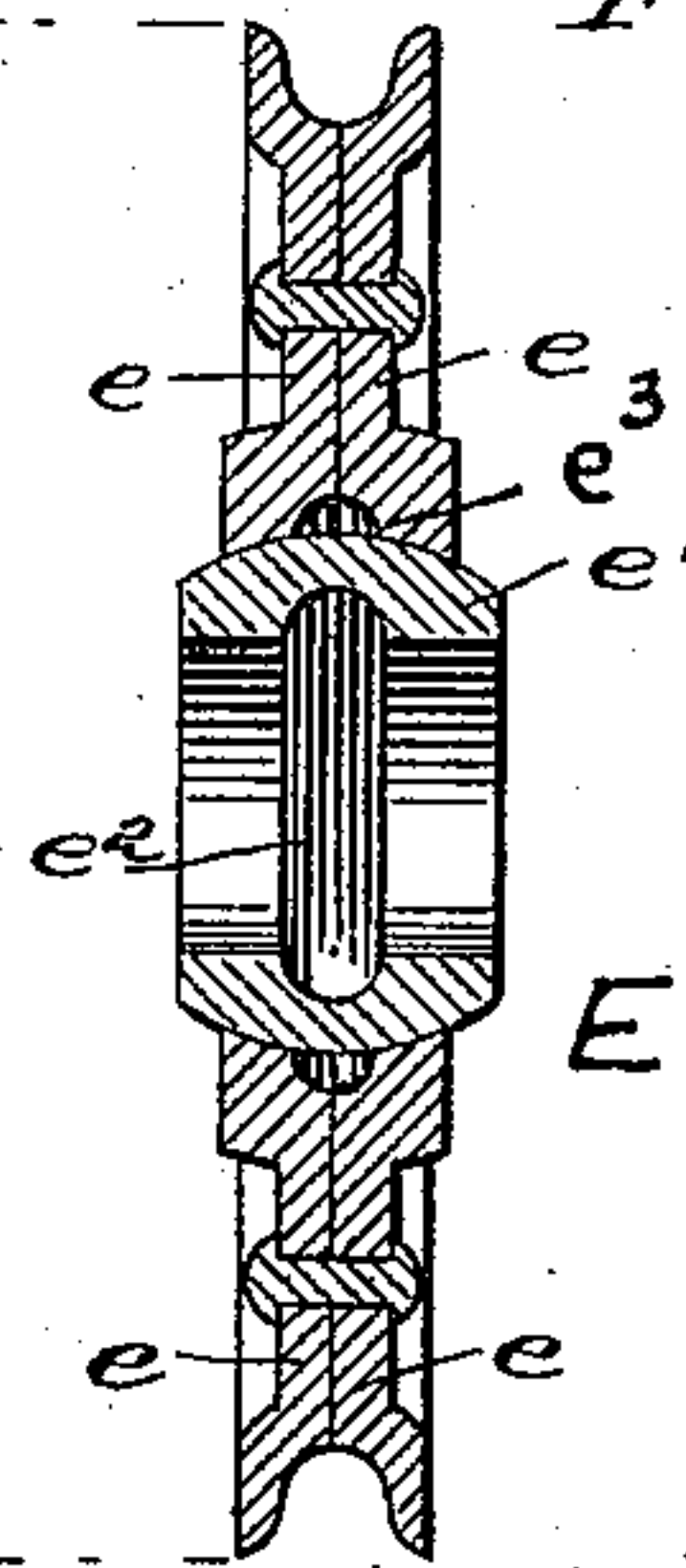


Fig. 6.



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UNITED STATES PATENT OFFICE.

DANIEL BRENNAN, JR., OF BAYONNE, NEW JERSEY.

CRUSHING-ROLLS.

SPECIFICATION forming part of Letters Patent No. 442,764, dated December 16, 1890.

Application filed April 10, 1890. Serial No. 347,337. (No model.)

To all whom it may concern:

Be it known that I, DANIEL BRENNAN, Jr., of Bayonne, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Crushing-Rolls, of which the following is a full, clear, and exact description.

The invention relates to that class of crushing-rolls in which the pressure is regulated in accordance with the material to be acted upon, and in which provision is made for allowing the rolls to yield and pass any foreign matter or material that they may be unable to crush, thus preventing injury to the machinery.

The object of my invention is to improve crushing-rolls of this character in their several features with a view of promoting economy, increasing the efficiency of the rolls, and rendering their action more reliable.

With a view of giving a full understanding of the present improvements, it is explained that in machinery of this class—in crushing iron ores, for instance—many tons pressure is exerted on the rolls to keep them to their work, and it will be readily understood that in operation the rolls will be given a vibratory or jarring movement by reason of the high yielding pressure and the resistance of the material being treated. Thus when weighted levers are employed, they and their appurtenances have communicated to them the vibratory movement of the rolls and pillow-blocks, and it is very evident that the vibrations thus imparted to the weighted lever will affect the constancy of its pressure, and thus impair its efficiency. A further objection to the weighted lever is that should any matter that the rolls are unable to crush accidentally enter between the latter—as, for instance, a drill-point or other piece of manufactured iron—the rate of speed of the rolls is such as to feed in the said bar before the resistance of the same to the rolls can overcome the inertia of the weighted lever to allow the movable roll to yield, and damage to the machinery is therefore liable to result. When springs are employed alone to effect the pressure, their action is not sufficiently constant to be reliable, as their tension varies from many causes.

To the end therefore of overcoming the above and other practical difficulties, my invention consists in the novel construction

hereinafter described, and defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents in perspective a pair of crushing-rolls and their appurtenances to which my improvements have been applied. Fig. 2 is a side elevation thereof. Fig. 3 is a front elevation, the handle-bar of the adjustable stop being omitted to give a clear view of the tackle. Fig. 4 is a plan view. Fig. 5 is a side view of one of the improved sheaves forming a feature of my invention. Fig. 6 is a vertical sectional elevation of such sheave, the view being taken on the line 6 6, Fig. 5. Fig. 7 is a sectional plan view, the section being taken on the line 7 7 of Fig. 3. Fig. 8 is a longitudinal sectional elevation on line 8 8 of Fig. 4, looking in the direction of the arrows shown in connection with said Fig. 4; and Fig. 9 is a detail view of the head of the adjustable stop.

The crushing-rolls A A' have their trunnions *a a'* journaled, respectively, in the fixed pillow-blocks B and the movable pillow-blocks B'.

The pillow-blocks are mounted on hollow beds C, and are formed with side flanges B² B³, which straddle said beds C, and by means of which the said pillow-blocks are held to their beds through the medium of bolts D D D', one of which bolts D and the bolt D' are made to serve as the pins on which the sheaves E E' of the tackle are mounted, the said sheaves being arranged within the hollow beds C, whereby they are protected from dirt and injury. Each pair of pillow-blocks are united by transverse bolts B³.

A wire rope or other suitable rope, band, or chain F is rove through the two sets of sheaves E E', one end of the rope being secured to a suitable fixed support—as, for instance, to the fixed pin D of the stationary sheaves E, as shown—and the fall or free end of the rope carries a rod G. On the lower end of the rod G a plate *g* is held and forms a seat for a spring H, the upper end of which abuts against a plate *g'*, that is free to move vertically on the rod G in response to the tension of the spring and the pressure of the remov-

able weights I, by means of which weights I pressure is exerted on the movable crushing-roll A' through the spring H and rope or like connection F.

5 The pin D' of each set of movable sheaves E' moves in longitudinal slots c, formed in the sides of the hollow beds C, (see Fig. 8,) and the said pin D' being fixedly held to the pillow-block B', the weights I will tend to
10 maintain the roll A' of said movable pillow-blocks up to its work in connection with the relatively-fixed roll A.

In order to limit the movement of the roll A' toward the stationary roll A in accordance with the degree of fineness to which the material being operated upon is to be reduced, I provide adjustable stops J. Each stop J extends longitudinally of the fixed pillow-blocks through a passage b, formed in the inner side
20 of said blocks, through an aperture or opening b' in the front of the blocks, and through a suitable guide-opening formed in an intermediate vertical lug or projection b². Adjacent to the projection b² at the inner side thereof the bottom of the pillow-block B is formed with a recess or opening b³, which accommodates and holds in place a nut J', through which the threaded portion j of the adjustable stop J passes, whereby when the
30 said stop is turned by means of the handle-bar J² or by a wrench the inner end of the said stop is projected the desired extent beyond the inner face of the fixed pillow-block to limit the forward movement of the movable pillow-block. The handle-bar J² is fitted in
35 one of the intersecting apertures j', formed in the outer end of the stop J, and may be moved in said aperture to enable the bar to clear a suitable stop j² in turning the stop J. The stop j² may consist of any suitable block, bolt, or other device fixed in such position as
40 to cause it to engage the handle-bar J² to prevent the latter from accidentally turning.

The inner end of the stop J is provided with a squared head J³, as shown most clearly in
45 Figs. 1 and 9, the head being fitted on the reduced end j³ of the stop and held in place by a bolt or screw j⁴, which is secured axially in the end of the stop J. The heads J³ rest
50 on the tops of the beds, whereby the said heads will be prevented from turning with the stops while being free to respond to the longitudinal movements of the latter. The stop J is also required to be adjustable to
55 adapt it to the gradual decrease of the diameter of the rolls by the abrasion of the material operated upon.

The pillow-blocks are all formed in the main of corresponding construction with a
60 view to promoting economy in their manufacture. The movable pillow-blocks have each, therefore, an opening b corresponding to the openings b in the stationary blocks, and in the former said openings are directly in
65 line with the stops J. As the stops are of less diameter than the openings, the thrust of the movable blocks is received by the heads

J³ of the stops, by reason of which the effect of the shock is more or less spent on the head, and the strain on the stop-bar and its threads
70 is therefore less than if the thrust were received directly by the bar J. The heads J³, it will be observed, are formed of comparatively thin metal.

The bearings of the several pillow-blocks
75 are formed alike, and each consists of the semicircular bearings or half-boxes b⁴, provided with the caps B³. The bearing-surface b⁴ consists of any suitable lining of Babbitt or composition metal. The bottom of each
80 cap B³ is seated on the projecting ledge b⁵ of the pillow-block, and is secured to the latter by screws b⁶, the shanks whereof pass through oblong slots b⁷, formed in the bottom of the cap. The upper end of the cap B³ is bolted
85 to the vertically-extending upper end b⁸ of the blocks by a horizontal bolt b⁹, which passes through a bolt-hole b¹⁰ in the cap. The boxes are, however, of ordinary form in the main. The caps B³ are filled with waste and sup-
90 plied with oil through the hinged cover, the upturned lower ends b¹¹ of the caps serving to hold a supply of oil.

The sheet-metal housing or covering B⁴ of the pillow-blocks excludes dirt and dust from
95 the interior.

In the bottoms of the movable pillow-blocks a short vertical pipe b¹² is fitted, which communicates with an orifice b¹³, which leads to the joint between the cap and journal-box,
100 whereby the contacting surfaces of the movable blocks and their beds will be lubricated by waste oil from said journal-box.

Referring particularly to Figs. 5 and 6, the sheaves of the tackle are formed of the two
105 members e e, which are bolted or riveted together on a transversely-rounded hub e', in the eye of which is formed a depression e² for receiving a lubricant, a similar depression or recess e³ being formed in the body portion.
110 Any other suitable provision may be made for lubricating the sheave. The sheaves by this construction are permitted to cant side-
115 wise on their rounded hubs, and are therefore enabled to accommodate themselves to the lines of strain of the rope of the tackle, as will readily be understood, whereby the sheaves will be relieved of much lateral strain. Owing to the great strain exerted by the weights this form of sheave, it is evident, is
120 specially adapted for its purpose.

In practice sufficient clearance is allowed between the flanges of the movable pillow-blocks and the sides of the hollow beds to allow the yielding roll to swing sufficiently
125 out of line with the stationary roll in response to uneven feeding of the material or uneven wear on the rolls.

The above-described machine affords a steady and uniform pressure for the rolls
130 owing to the indirect application of the pressure, and, in addition, should a drill-point, piece of steel, or other like unyielding article or material enter between the rolls the ten-

sion of the spring-cushion of the weights will be overcome to a sufficient extent to cause the spring to yield and allow the rolls to separate and pass the said drill-point or other matter, whereas without the intervention of the spring-cushion the separation of the rolls might not occur quickly enough to avoid damage, as the unyielding matter would overcome the spring when it could not immediately overcome the inertia of the weights.

The drawings show a drive-pulley L for imparting motion to the stationary roll A, the movable roll receiving its motion from the material. Any other suitable driving-gear may be employed.

The particular arrangement shown is merely to illustrate the invention in the preferred form, and, described in its simplest form, it may be said to consist in applying the pressure to the yielding roll through the medium of a rope, chain, or the like connected with the said roll, led over a pulley or guide, and carrying weights at its free end or fall.

I prefer the construction shown, as a lighter or more flexible chain or rope can be used and less weight is needed; but the number of sheaves, strength of rope, and amount of weight may be varied, as desired, as will readily be understood by mechanics.

The housing of the sheaves within the hollow beds of the pillow-blocks I find a very desirable feature in practice.

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

1. The combination, with crushing-rolls and with the pillow-blocks of the yielding roll, of pulleys carried thereby, and ropes passing over said pulleys and provided with weights, substantially as described.

2. The combination, with crushing-rolls, of a tackle, one set of the sheaves of which is movable with the movable crushing-roll, weights arranged in connection with the tackle, and a spring-cushion for said weights, substantially as described.

3. In crushing-rolls, the combination, with the movable rolls, of a tackle connected with the yielding roll and comprising sheaves mov-

able obliquely to their hubs, a rope rove through said sheaves, a spring-seat arranged for connection with the free end of said rope, and weights seated on said seat, substantially as described.

4. The combination, in crushing-rolls and with the pillow-blocks of the yielding pressure-roll, a hollow supporting-bed therefor, and a means for exerting pressure on said roll, of a rope for transmitting the pressure to the roll, said rope extending from the pillow-block through the hollow bed to the pressure mechanism, substantially as described.

5. The combination, in crushing-rolls and with the pillow-blocks of the yielding pressure-roll and the hollow bed therefor, of a rope for transmitting pressure to the said roll and fixed and movable sets of sheaves arranged within the hollow bed and over which sheaves said rope passes, substantially as described.

6. The combination, in crushing-rolls and with the pillow-blocks of the yielding roll, of weights for exerting pressure on said roll, a spring forming a seat for said weights, and a rope transmitting the pressure of the weights, substantially as described.

7. The combination, with crushing-rolls of the character described, of stops for the yielding roll, consisting of screw-rods having at their inner ends loosely-fitted heads against which the pillow-blocks of the yielding roll contact, said heads being held to the rods for longitudinal movement therewith, but held against rotary movement, substantially as described.

8. The combination, with crushing-rolls of the character described, of stops consisting of screw-rods that pass through the pillow-blocks of the stationary roll and disposed in the direction of the pillow-blocks of the yielding roll and formed with heads that rest on the bed of the rolls and support the inner free ends of the rods, substantially as described.

DANIEL BRENNAN, JR.

Witnesses:

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