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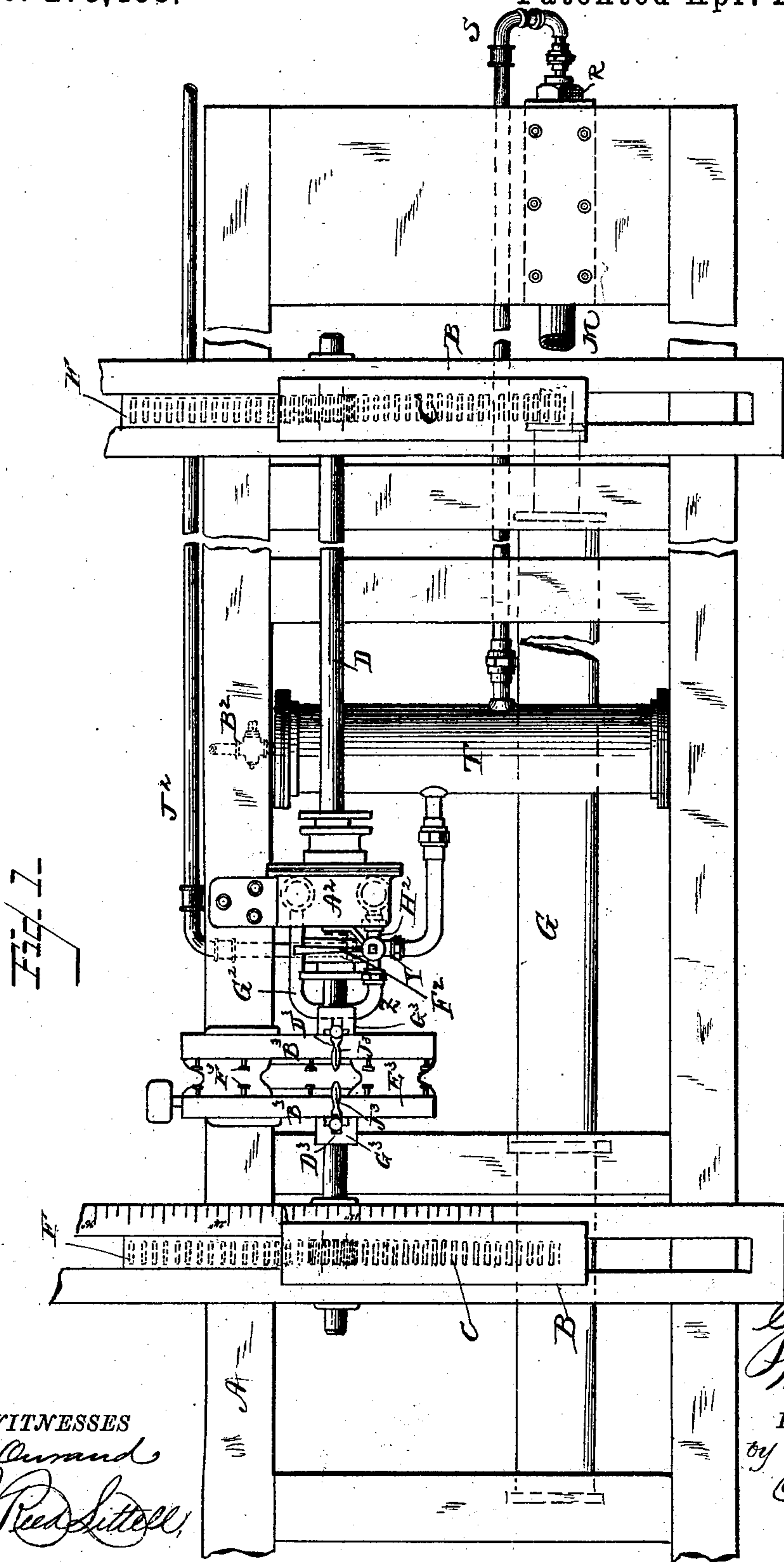
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G. CLARK & W. J. TAYLOR.

STEAM SET WORKS FOR SAW MILLS.

No. 275,468.

Patented Apr. 10, 1883.



WITNESSES
F. L. Curran
J. Reed Little

George Clark
W. J. Taylor,
INVENTORS
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(No Model.)

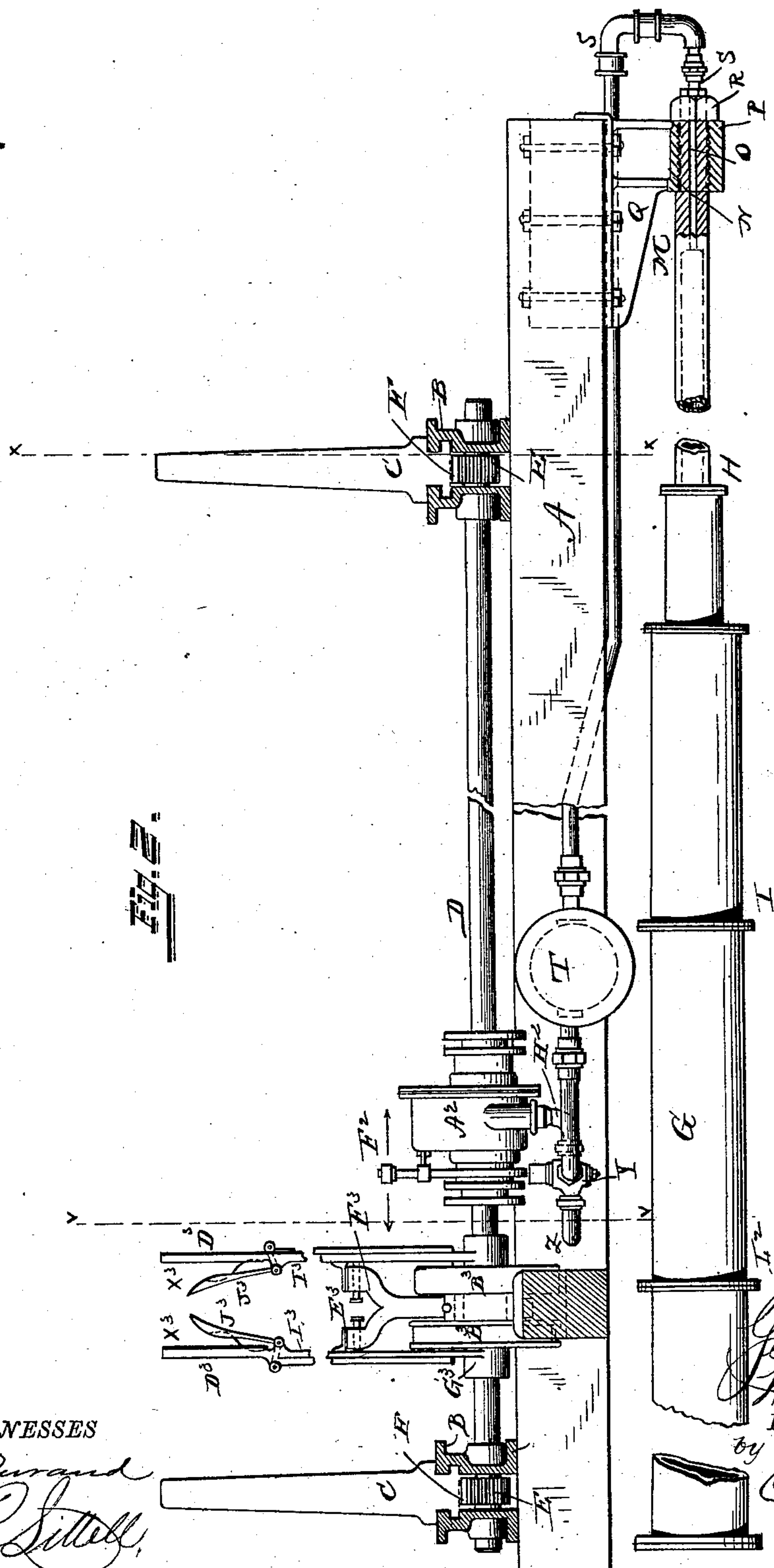
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(No Model.)

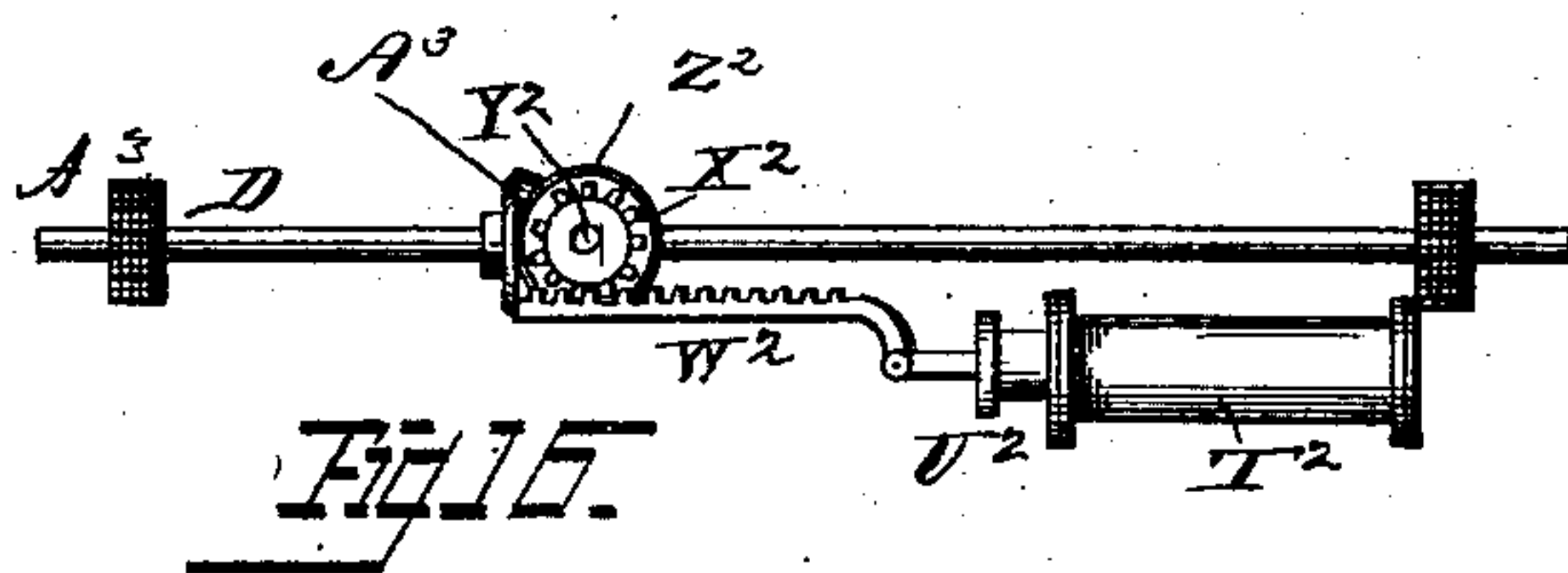
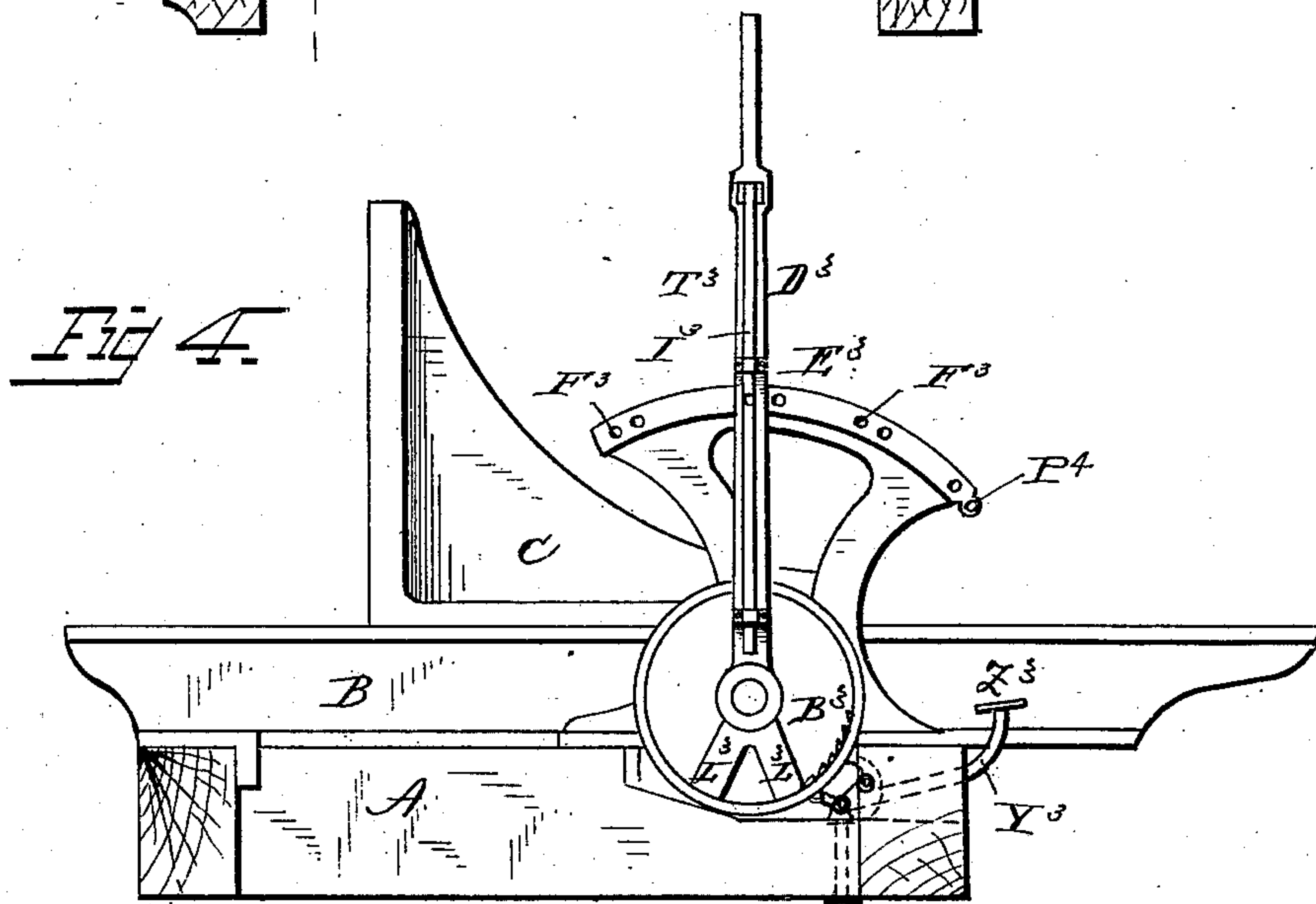
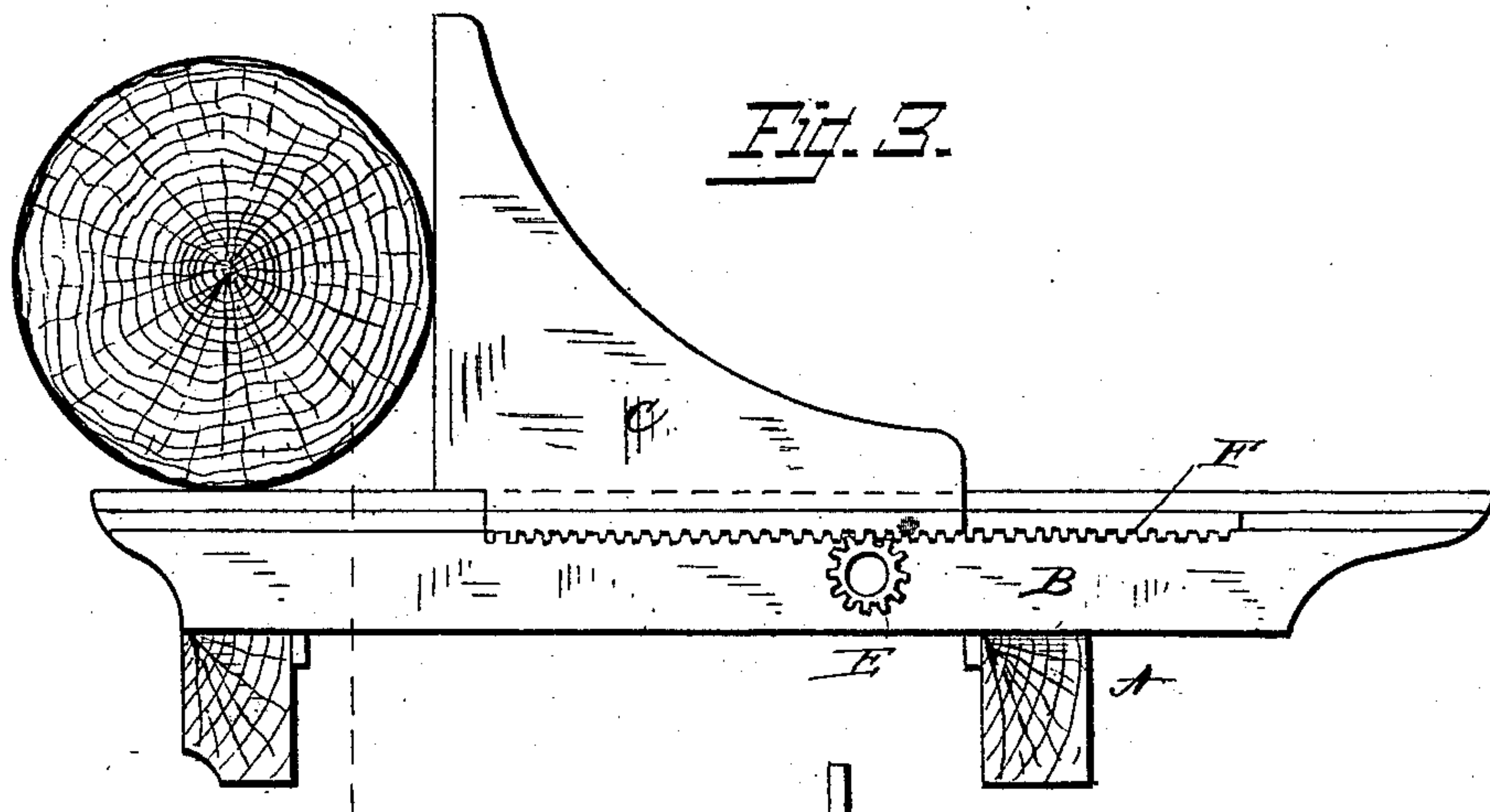
5 Sheets—Sheet 3.

G. CLARK & W. J. TAYLOR.

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Patented Apr. 10, 1883.



WITNESSES
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(No Model.)

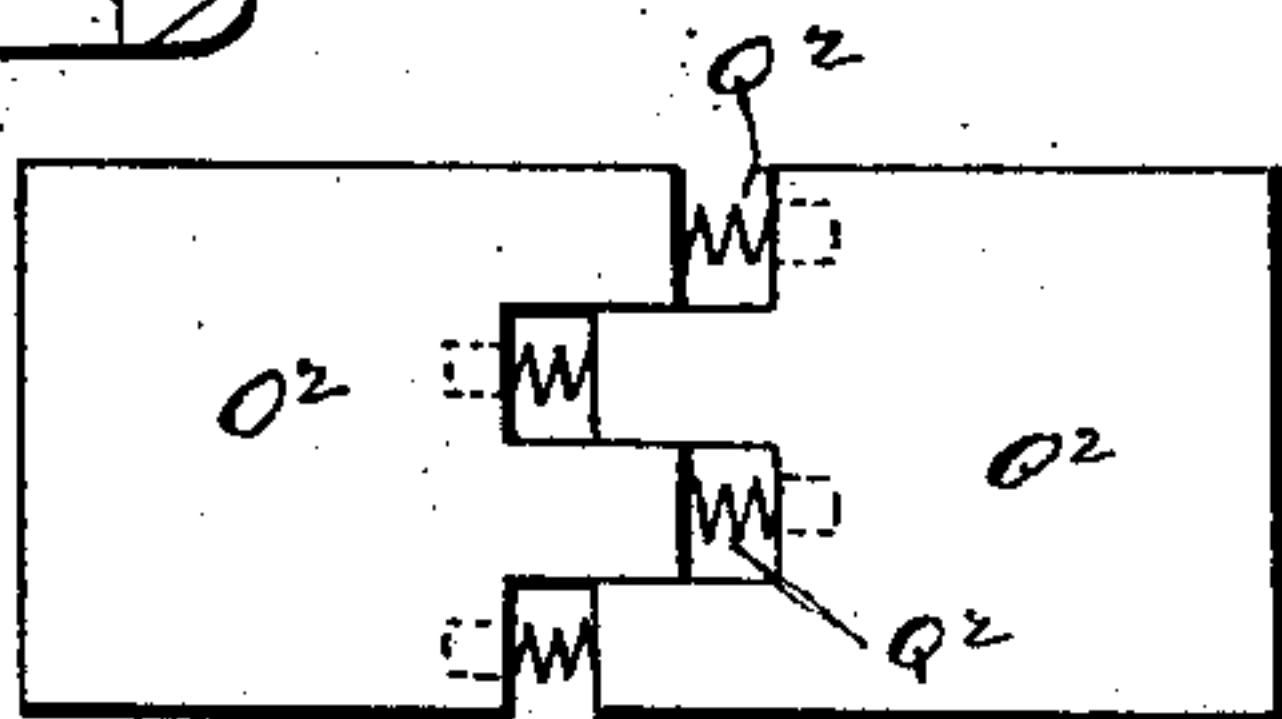
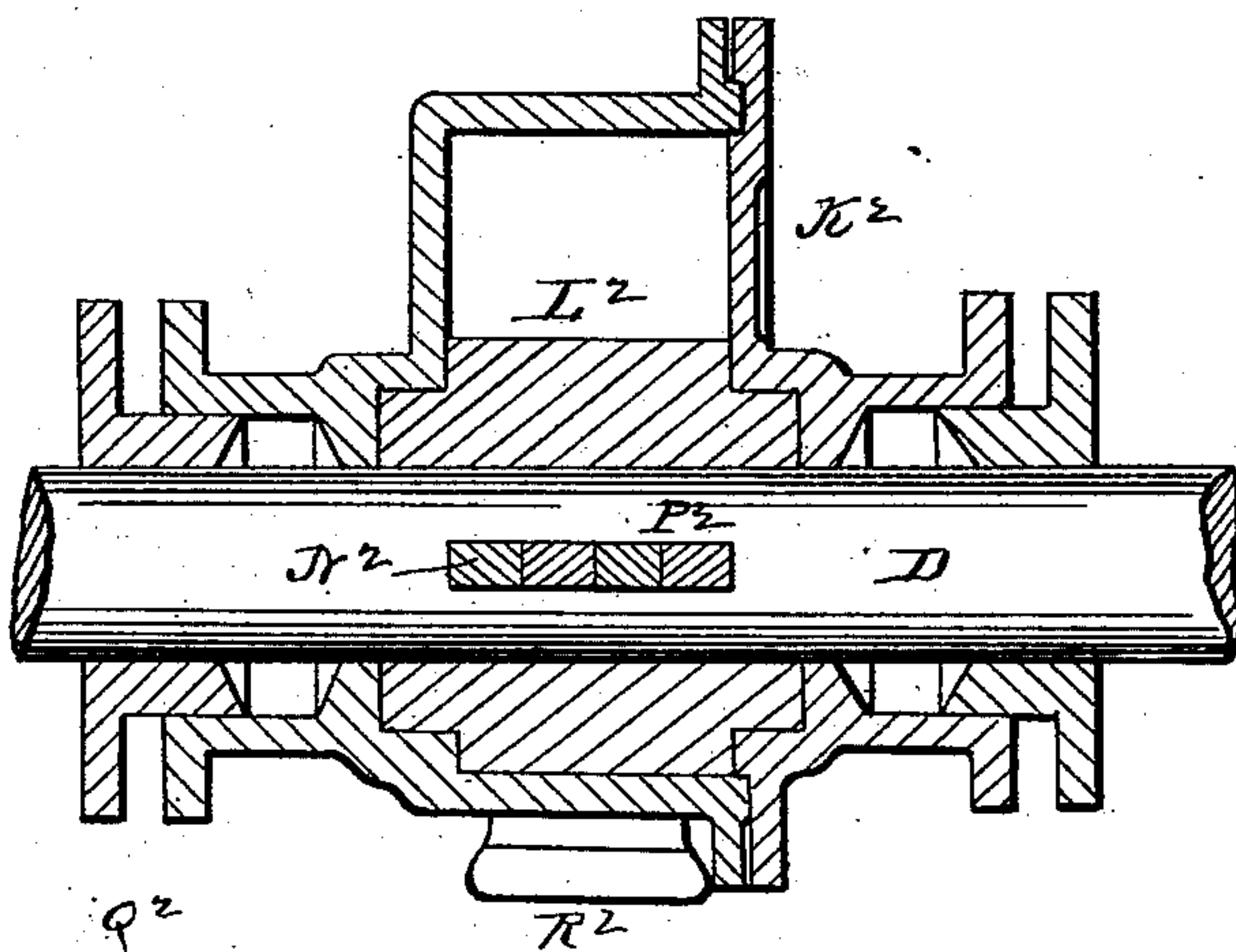
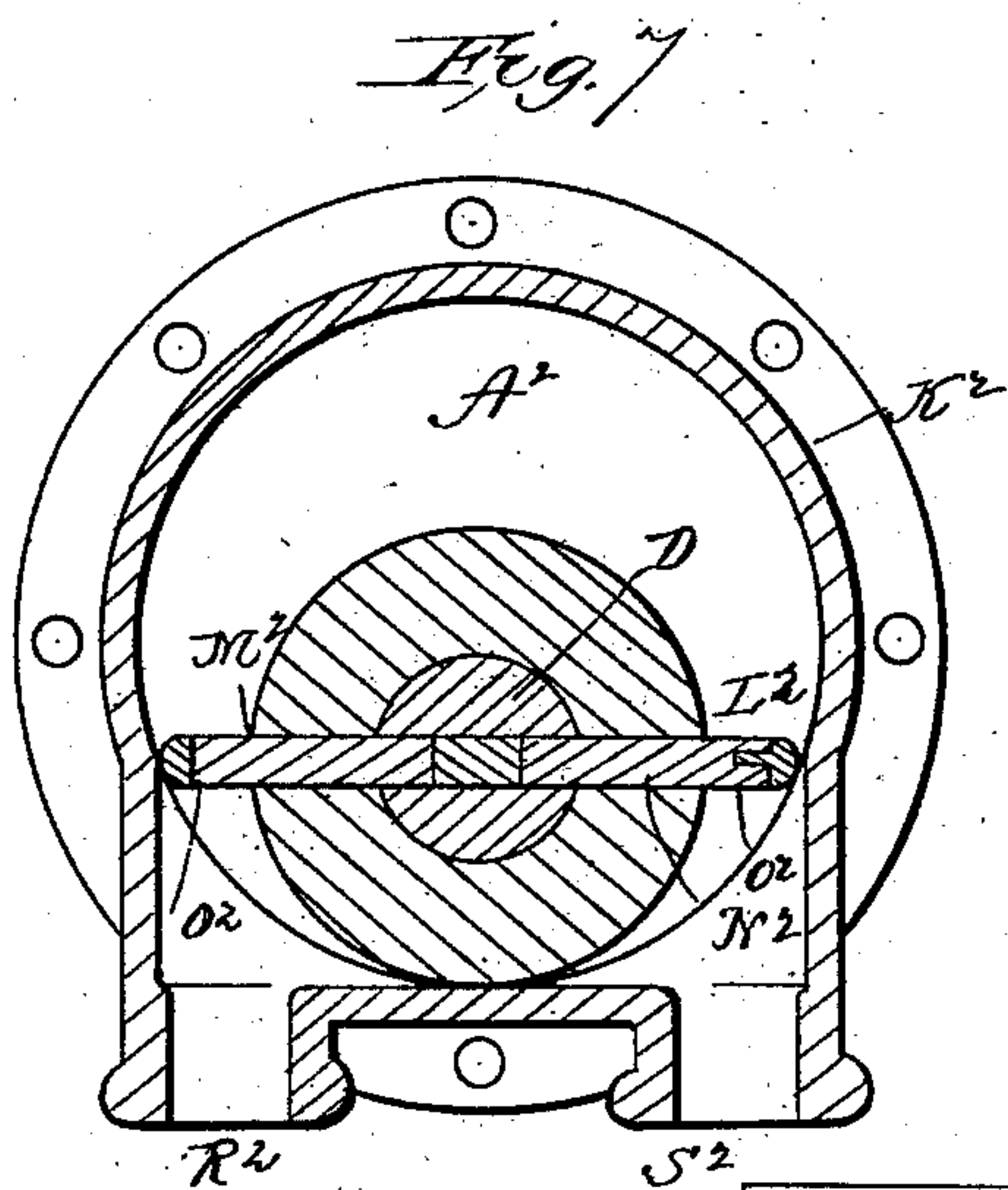
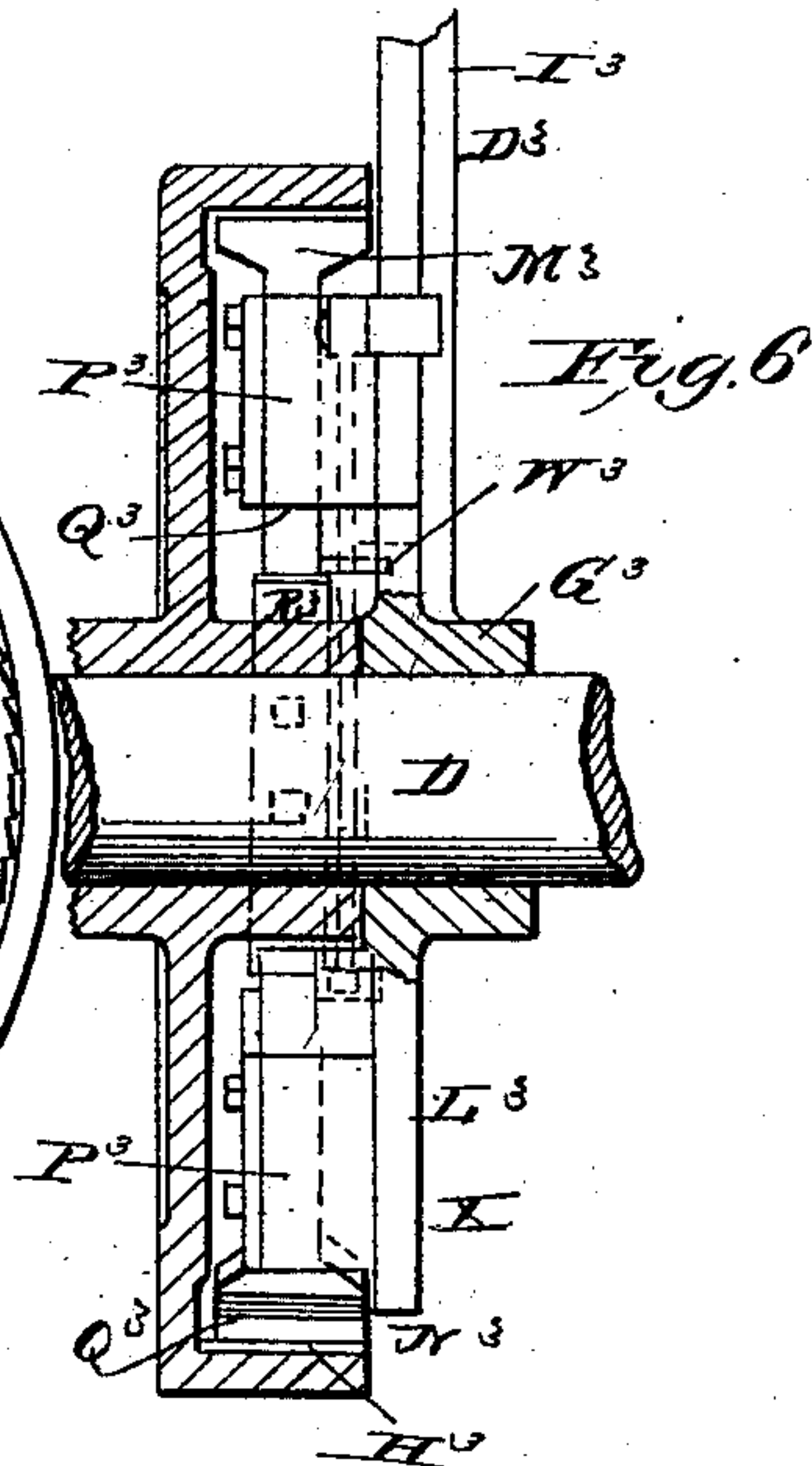
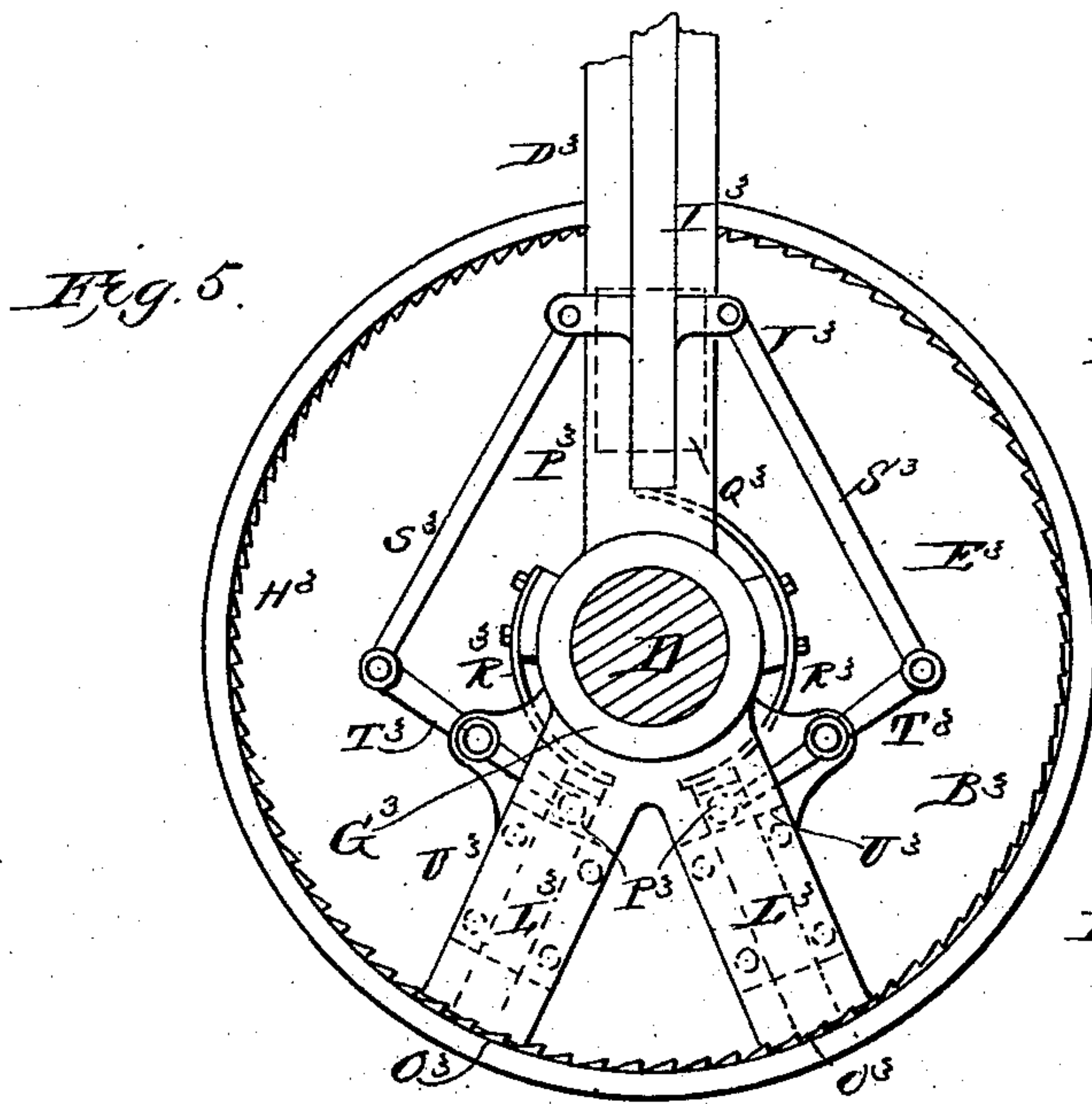
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WITNESSES

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(No Model.)

5 Sheets—Sheet 5.

G. CLARK & W. J. TAYLOR.

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Fig 10

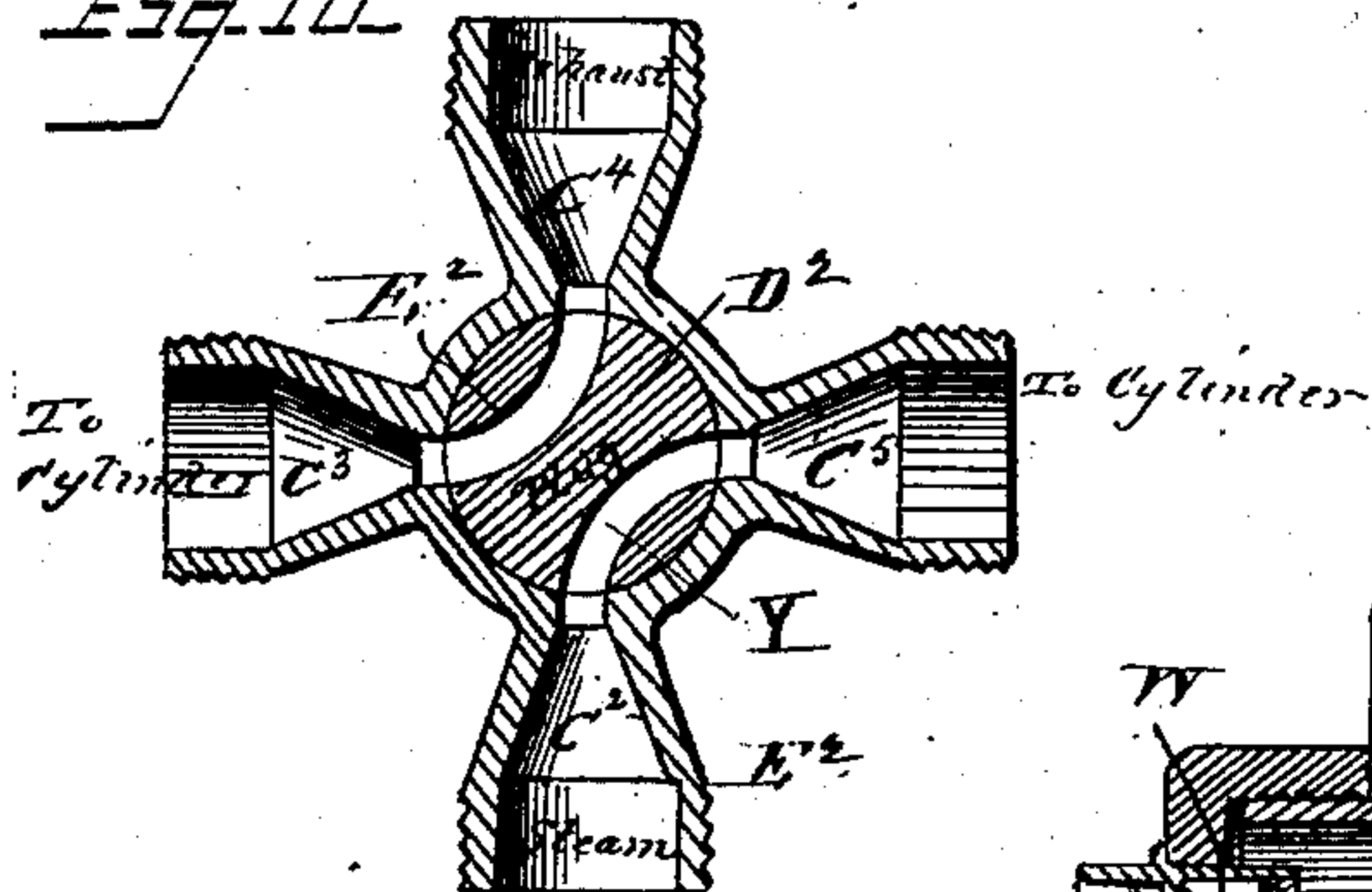


Fig 12

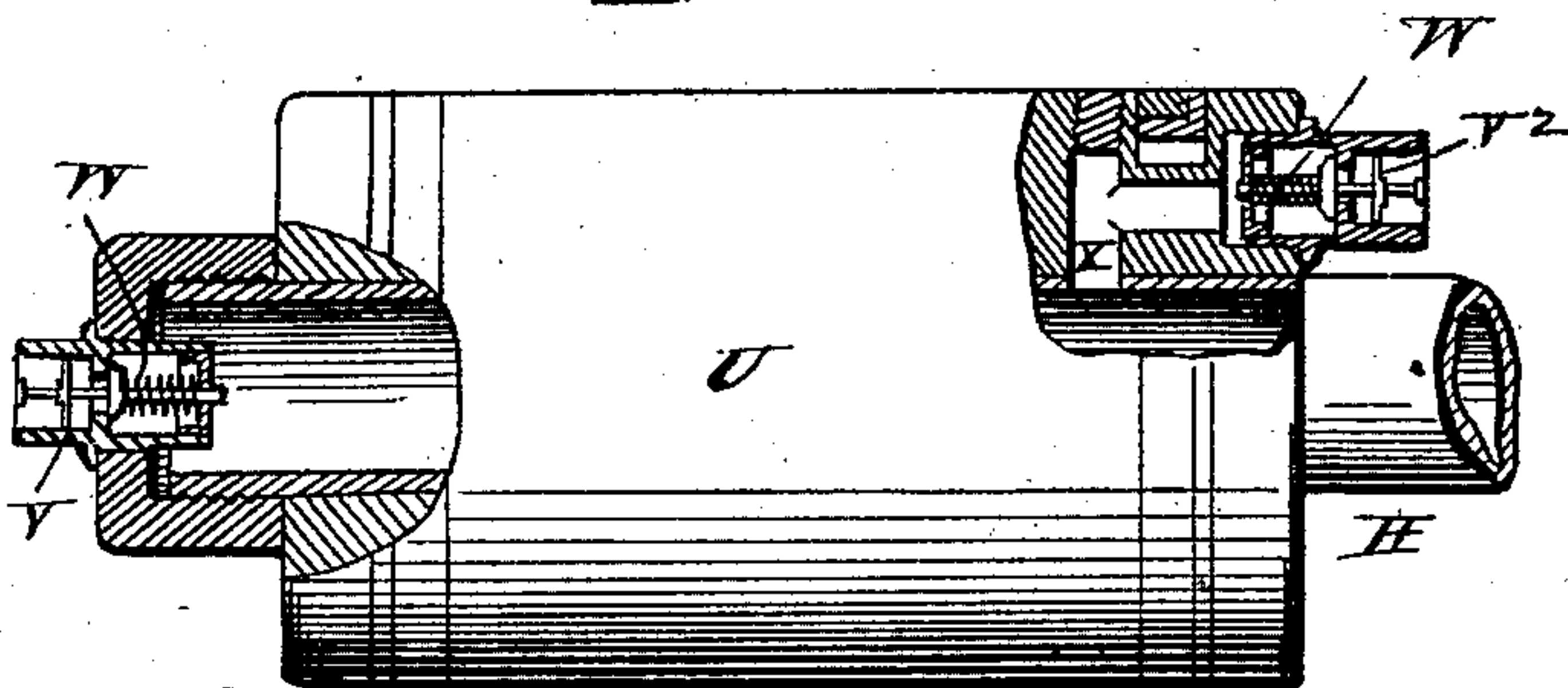


Fig 11

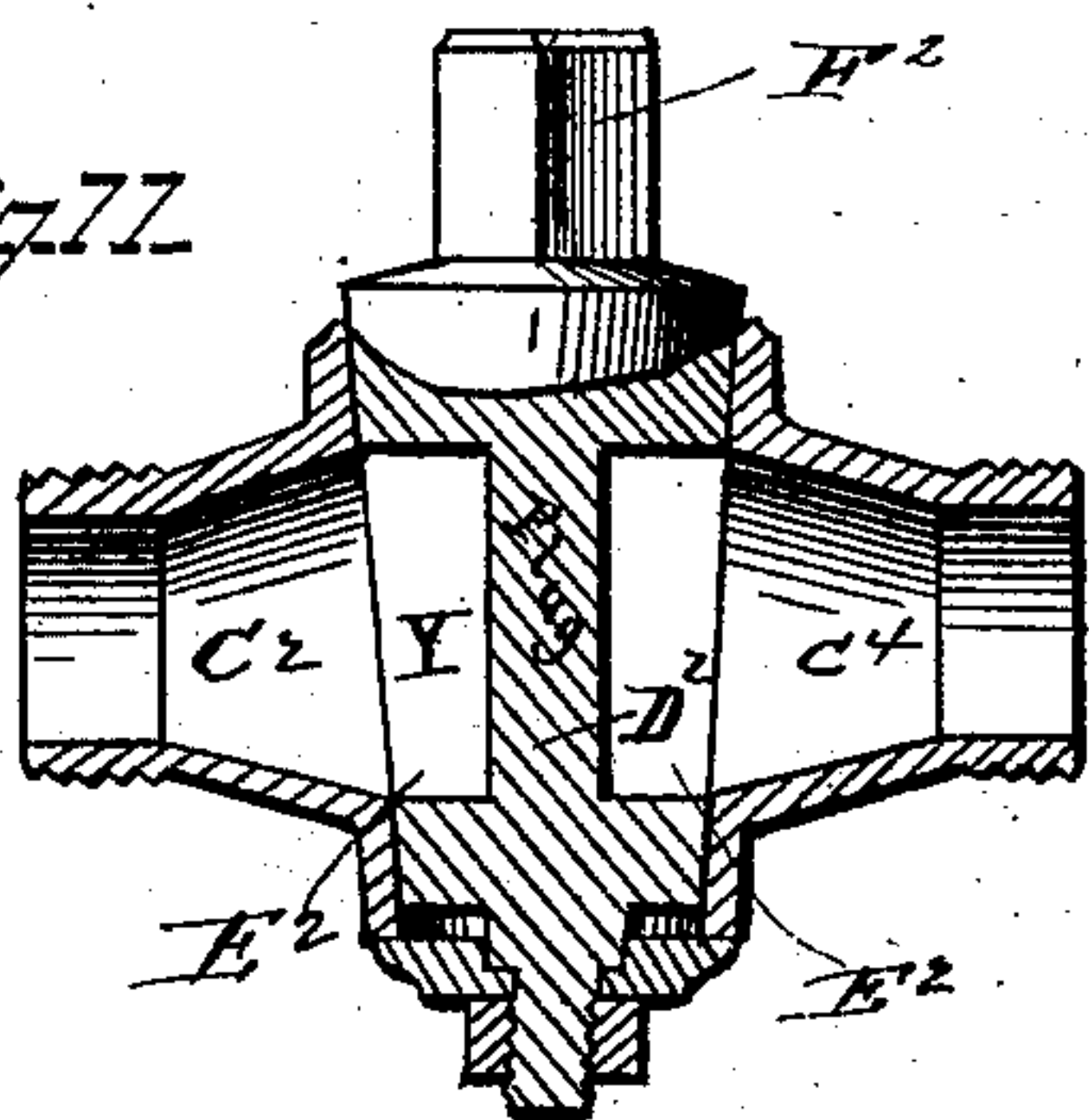


Fig 15

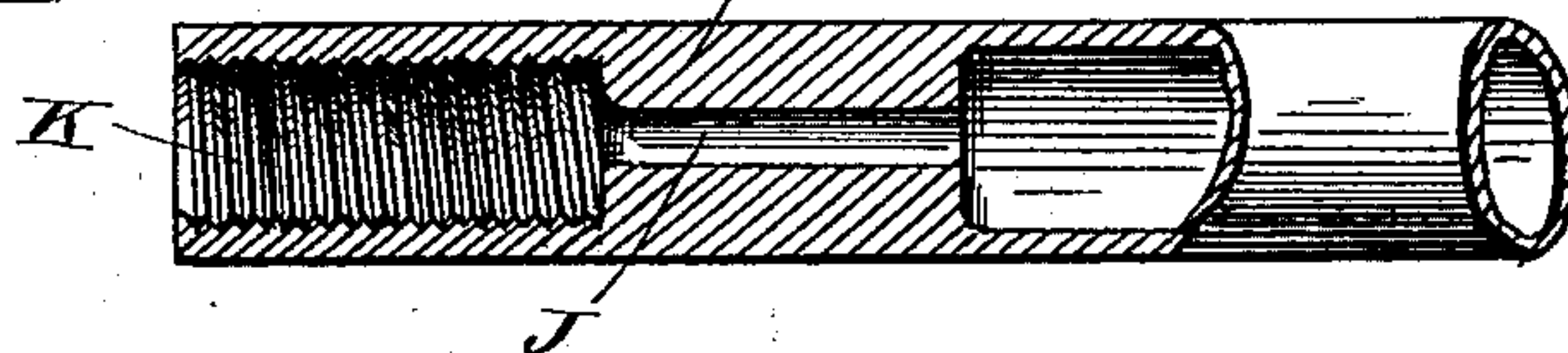
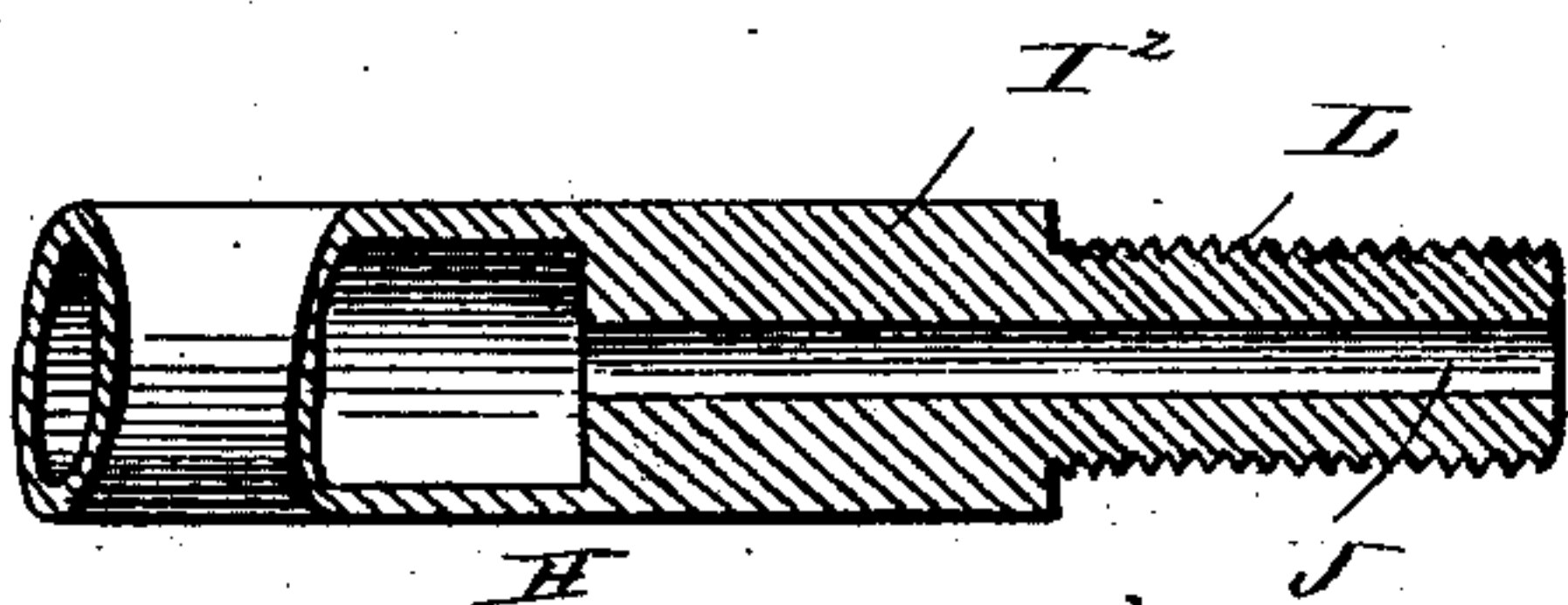


Fig 13

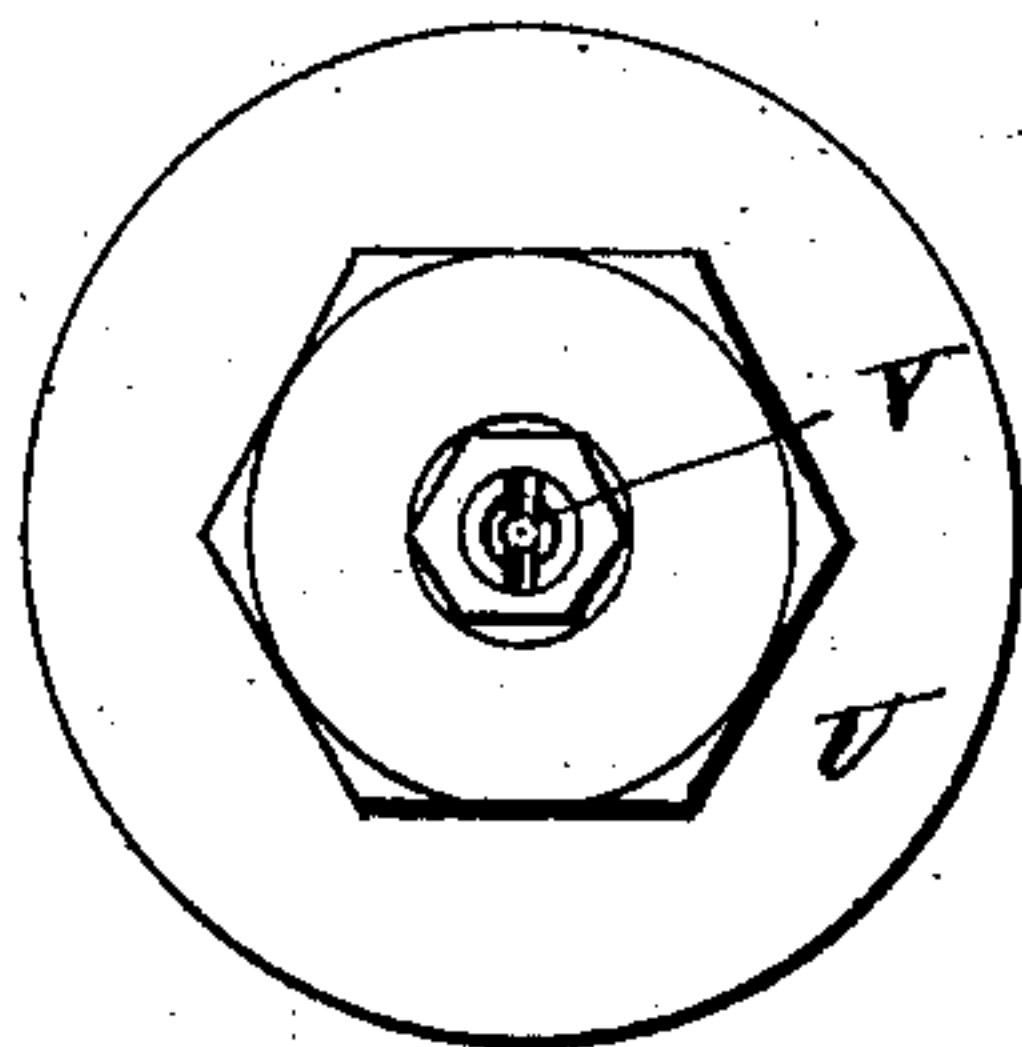
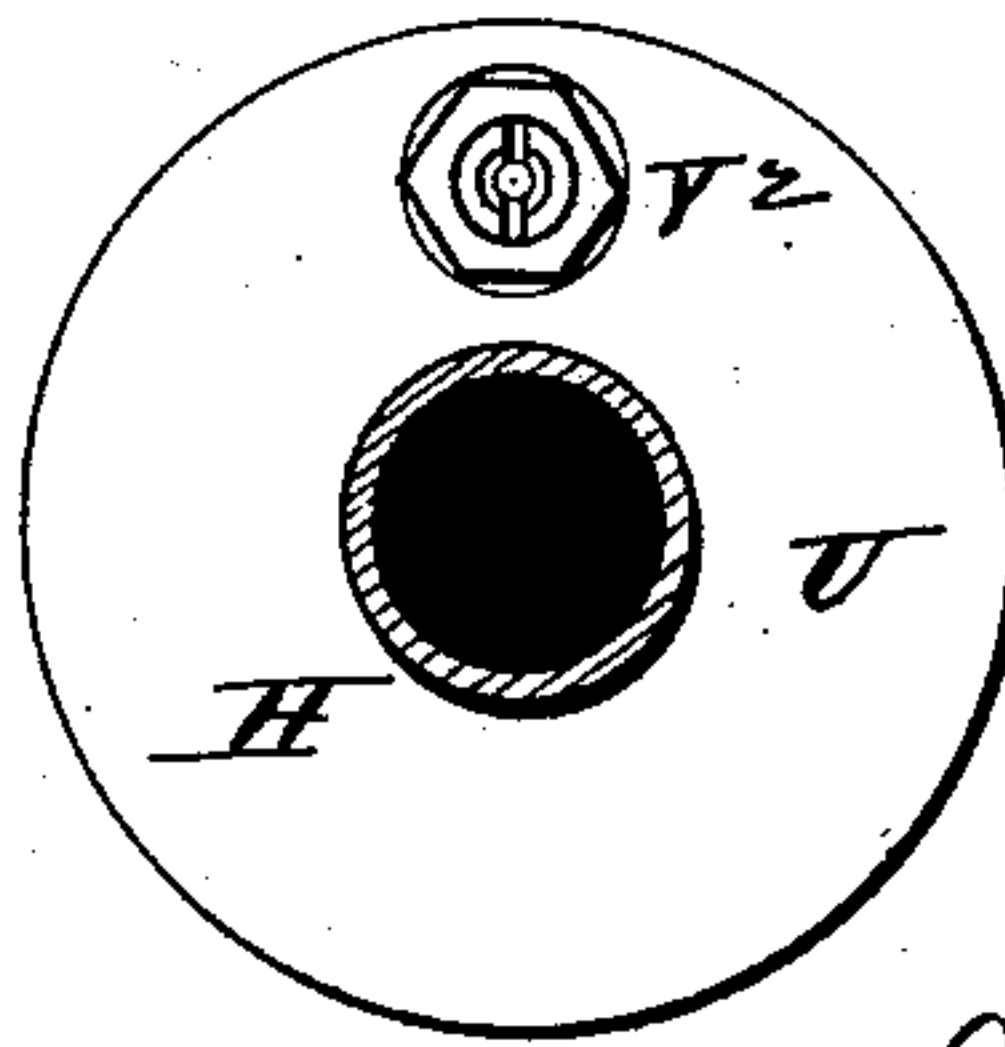


Fig 14



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UNITED STATES PATENT OFFICE.

GEORGE CLARK AND WILLIAM J. TAYLOR, OF MARINETTE, WISCONSIN.

STEAM SET-WORKS FOR SAW-MILLS.

SPECIFICATION forming part of Letters Patent No. 275,468, dated April 10, 1883.

Application filed January 17, 1883. (No model.)

To all whom it may concern:

Be it known that we, GEORGE CLARK and WILLIAM J. TAYLOR, citizens of the United States, residing at Marinette, in the county of Marinette and State of Wisconsin, have invented a new and useful Steam Receding and Setting Works for the Standards of Circular Saw Mills, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to receding and setting works for the standards of circular saw mills, by which the movement of the standards on the head-blocks is effected and controlled.

The invention consists substantially in effecting the receding and setting of the standards by means of steam-power that is obtained direct from the steam-carriage feed-works with which the herein described steam standard receding and setting mechanism is used in co-operation.

The method of obtaining the steam and the construction and operation of the different mechanism will all be hereinafter fully described.

The mechanism by which the steam is obtained on the carriage and utilized to recede and set the standards consists broadly in a suitably-arranged cylinder of a length equal to the greatest travel of the log-carriage. In this cylinder works a piston which is connected at its outer end to the log-carriage, so as to drive the latter. The head of the piston has pressure-valves arranged at each end, through which steam enters, during both movements of the piston, into a continuous interior passage, through the latter to the end which is secured to the log-carriage, through a conducting-pipe to an accumulator that is arranged on the carriage. From the accumulator the steam passes to a cylinder the piston of which operates to turn the set-shaft that recedes and sets the standards. The feed of steam from the accumulator to the said cylinder is governed by an intermediate cock, all as will be hereinafter more fully set forth.

The receding and setting of circular-saw-mill standards by steam has been heretofore impracticable by reason of the difficulty experienced to obtain the steam on the rapidly-moving carriage. It cannot be generated on

the carriage in a manner consistent with safety, convenience, and economy in space or expense. It is impracticable to convey it to the carriage by means of an elastic tube, as the rapidity and distance (which is often as much as one hundred feet) with which the carriage travels, both in sawing and gigging, necessitate a tube of corresponding length. In such a tube the steam would soon condense, while the tube itself would become continually entangled and would suffer other severe damage; but in our invention the steam is right at hand, coming, as it does, direct from the steam carriage-feed, and but little extra expense is entailed to generate the small amount of extra steam that is necessary.

In the drawings, Figure 1 is a plan view of a circular-saw-mill log-carriage having our standard setting and receding mechanism. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse sectional view of the log-carriage on the line *x x*, Fig. 2. Fig. 4 is a like view on the line *y y*, Fig. 2. Fig. 5 is a detail side view of the ratchet set-works. Fig. 6 is a vertical sectional view through the latter. Fig. 7 is a vertical sectional view of the rotary cylinder arranged on the set-shaft of the standards. Fig. 8 is a like view taken on a line at right angles to the section illustrated in Fig. 7. Fig. 9 is a detail plan view of a part of the rotary piston of the rotary cylinder. Fig. 10 is a horizontal sectional view through the four-way cock through which the rotary cylinder is fed. Fig. 11 is a vertical sectional view through the same. Fig. 12 is a side view, partly in section, of the steam-feed-cylinder piston-head. Fig. 13 is an end view of the same. Fig. 14 is a view of the other end of the piston-head. Fig. 15 is a detail sectional view of a joint of the carriage-feed piston. Fig. 16 is a side view of a portion of the log-carriage, illustrating another mechanism by which the steam obtained from the steam carriage-feed can be applied to recede and set the standards.

Corresponding parts in all the figures are denoted by the same letters of reference.

Referring to the drawings, A designates the log-carriage, which is designed to travel on a suitably-arranged track in the usual manner, and is provided with the head-blocks B B, standards C C, set-shaft D, pinions E E, and

racks F F, secured to the standards and engaged by the pinions.

G designates the steam-carriage-feed cylinder, which is of a length equal to the greatest travel of the carriage, in which works the piston H. The piston H is hollow its entire length, so as to provide a steam-passage, for purposes that will be presently set forth; but, owing to the great length of the said piston, it is necessary, under some circumstances, to construct the piston-rod in sections that are joined together as follows: The adjoining ends I I² of the sections are formed substantially solid, these solid ends being provided with longitudinal perforations J by drilling or in any other manner. The end I is provided with a screw-threaded recess, K, which is entered by the reduced screw-threaded end L of the other end, I², so that a steam-tight joint is formed, and the steam-passage through the hollow piston is continued by reason of the connecting-perforations J.

The outer end, M, of the piston-rod is constructed, like the end I² of the sections of the piston, with a reduced screw-threaded portion, N, in which is provided a longitudinal perforation, O. The portion N enters a screw-threaded eye, P, in a bracket, Q, that is secured to the end of the carriage, and is retained therein by a nut, R, as shown. The outer end of the feed-piston is thus connected to the carriage, and the interior steam-passage is still preserved.

From the end M of the piston H extends a pipe, S, to an accumulator, T, arranged on the carriage.

In the head U of the piston-rod H are arranged pressure-valves V V², that are preferably closed by springs W, placed at about five pounds pressure. One of these pressure-valves is secured in the front end of the piston-head, and opens, as shown, into the hollow piston-rod, while the other valve, V², is arranged at the opposite end of the piston-head, and opens into a passage, X, leading to the continuous steam-passage through the hollow piston-rod. It will here be observed that when either of these valves is open there will be a direct steam-passage from the carriage-feed cylinder to the accumulator on the carriage.

When the live steam in the cylinder G is acting against the end of the piston having the valve V², (which is usually when the carriage is making a forward stroke and sawing,) if the pressure in the cylinder is greater than that of the steam that may be in the accumulator, the valve V² is opened by the excess of pressure in the cylinder and remains open until the pressure is equalized by the steam, which will then pass through the passage in the piston and connecting-pipe S into the accumulator. While the valve V² is open and the steam is passing to the accumulator the pressure of the live steam that enters through the valve V² and fills the passage in the piston-rod will keep the valve V, at the other end of the

piston-head, closed against the pressure of the exhaust-steam in the cylinder, so that both valves are never open at the same time. On the return-stroke (when the carriage is gigging) the live steam is admitted to the other end of the cylinder and acts against the end of the piston-head having the valve V. This is the time, when the carriage is gigging, that the operator, usually called the "setter," recedes the standards ready to receive a new log, and if, during this operation of receding by means of the herein-described steam method, the pressure of steam in the accumulator has been reduced below the pressure of the live steam in the cylinder, the valve V is opened by the excess of pressure, and the steam passes through the hollow piston and connecting-pipe S to supply the accumulator.

There is a four-way cock, Y, intermediately arranged in a connecting-pipe, Z, between the accumulator and the cylinder, that operates the standard set-shaft, this cylinder being designated by the letter A². If this cock Y is open to the cylinder A² during the stroke of the piston-rod H, the steam will pass through the valve in the piston-head that is open, the steam-passage in the piston-rod, and the connecting-pipes, direct to the set-shaft operating cylinder A². By this it will be seen that we depend upon the accumulator only when the steam-feed piston H is not in operation.

If desired, a large valve may be placed in the front end of the piston-head in lieu of valve V, and two or more valves may be placed in the other end of the piston-head, where the valve V² is situated. Other arrangements and duplication of valves may be effected, so that there is at least one valve at each end of the piston-head.

The accumulator T consists of a simple cylinder, as shown, and is provided with a blow-off cock, B².

The four-way cock Y, that is arranged in the feed-pipe Z, between the accumulator and the cylinder A², is mainly of the ordinary construction, having the four radial passages C², C³, C⁴, and C⁵, respectively, and the central key or plug, D², provided with two channels or bores, E² E², this plug being turned and operated by a handle or lever, F². The feed-pipe Z enters the port C² of the four-way valve or cock, while a feed-pipe, G², extends from the port C³ into one end of the cylinder A², and a corresponding pipe, H², extends from the port C⁵ opposite into the other end of the said cylinder A². From the port C⁴ an exhaust-pipe, J², is carried to the end of the log-carriage, or to any other convenient point. The operation of this four-way valve or cock will be readily understood. By one-eighth turn of the plug D² the steam is shut entirely off, or may be turned on by turning the cock one-eighth turn in the opposite direction. By one-fourth turn the motion of the piston of the set-shaft operating cylinder A² is reversed, so that the setting and receding of the standards is accomplished.

The cylinder A^2 for operating the set-shaft comprises a cylindrical casing, K^2 , in which is arranged a hub, L^2 , keyed or otherwise secured on the set-shaft D , and provided with a transverse slot, M^2 , in which is arranged a sliding piston, N^2 . This piston N^2 consists of two wings, O^2 O^2 , that project from the hub L^2 laterally and on opposite sides, and also pass through a slot, P^2 , in the set-shaft D , which registers with the slot in the hub. The two wings comprising this piston N^2 are connected at their point of juncture inside the slot P^2 by springs or cushions Q^2 , as shown. The casing K^2 is stationary, and is provided with a port at each end, these ports being designated by the letters R^2 and S^2 , respectively. When steam is admitted through either port it acts against one of the wings of the sliding piston, and thereby causes the set-shaft to turn. When the steam enters at the port R^2 the port S^2 acts as an exhaust-port, and vice versa, so that the set-shaft is turned in either direction to set or to recede the standards.

In lieu of this form of cylinder and sliding piston just described, a cylinder, T^2 , of ordinary construction, as shown in Fig. 16 of the drawings, may be used. At the outer end of the piston U^2 of the cylinder T^2 is secured a rack, W^2 , which engages a pinion, X^2 , on a shaft, Y^2 , that is provided with another pinion, Z^2 , which latter pinion is engaged by a correspondingly-beveled gear-wheel, A^3 , fixed on the set-shaft D . By means of this construction the set-shaft can also be turned in either direction.

When our improved steam apparatus is arranged for receding purposes only, it is necessary to have a passage extending from the two ports of the set-shaft-operating cylinder to the exhaust-pipe J^2 at whatever position the four-way valve may be placed. This can be accomplished by connecting the two ports of the cylinder together by a small pipe, from which extends another small pipe to the exhaust-pipe J^2 , (an intervening tap being preferably provided.)

We will now proceed to describe our improved set-works that are to be used in connection with the herein-described steam-power mechanism. These set-works are of such construction that in case the steam in the accumulator should run short by accident or otherwise the setter (or man in charge) can set the standards with this improved set mechanism by manual labor. Comprised in these set-works are two ratchet-wheels, B^3 B^3 , of exactly the same construction, each wheel being provided with a set-lever, D^3 . E^3 is simply a segment having the usual stops, F^3 , fitted to it. The ratchet-wheels B^3 B^3 are both arranged on the same hub, G^3 , which is keyed or otherwise secured on the set-shaft, and have teeth H^3 on their interior surface. The levers D^3 have a rod, I^3 , extending from their thumb-latch J^3 nearly to the hub K^3 , which is loosely arranged on the set-shaft D . From the hub

K^3 extend two short arms, L^3 L^3 , that move as the said hub and its lever are adjusted or moved. To the lever D^3 is attached a pawl, M^3 , and to each arm L^3 is attached a pawl, N^3 , these pawls being provided in their engaging end with teeth O^3 , corresponding to the teeth H^3 of the wheel B^3 . The lever D^3 and the two arms L^3 are each formed or provided with a projecting portion, P^3 , in which is provided a slot, Q^3 , for the accommodation of the pawls. The latter are continuously pressing with considerable force toward the periphery of the ratchet-wheel by means of the springs R^3 R^3 , as shown. Pivoted to the rod I^3 are two divergent rods, S^3 S^3 , and to the end of each of these rods is pivoted a lever, T^3 , the free end of which acts upon a projection, U^3 , on the pawl N^3 . The rod I^3 has also a projection, V^3 , which acts upon a corresponding projection, W^3 , from the pawl M^3 . Thus only one of the three pawls in each of the ratchet-wheels B^3 B^3 is operated upon directly by the rod I^3 on the lever D^3 , the other pair of pawls of each wheel (see N^3 N^3) being operated by the rod I^3 through the agency of the rods S^3 S^3 and the levers T^3 T^3 . The springs R^3 R^3 are for the purpose of forcing the pawls into the teeth of their respective wheels, and the rod I^3 , rods S^3 S^3 , and the levers T^3 T^3 are for the purpose of withdrawing the pawls, this withdrawal being accomplished by simply closing the thumb-latch J^3 toward the handle X^3 of the lever D^3 .

In connection with one of the ratchet-wheels B^3 is arranged a powerful brake-lever, Y^3 , as shown in Fig. 4 of the drawings. This brake-lever is provided at its power end with a step, Z^3 , that is operated by the foot of the setter, or man in charge.

The pawls are so disposed that only one is in action at any one time, as the three are divided equally upon each tooth of the ratchet-wheel. Thus when one pawl is in place and fitting into the teeth of the ratchet-wheel one of the other pawls will require to travel one-third of a tooth before fitting into the teeth of the wheel, and the remaining pawl will require to travel two-thirds of a tooth before fitting into the teeth of the wheel. Therefore by moving the set-lever D^3 one-third of a tooth at any time one or other of the pawls will fall into action. By means of this arrangement a very fine adjustment is secured.

The brake-lever Y^3 is used to regulate the speed when receding and setting; or, should one set of ratchet-wheels and lever get out of order or be accidentally damaged, by means of this brake the other set can be used in place of both sets.

We will now proceed to describe the operation of our invention in connection with the above description and annexed drawings.

The log is first placed in position upon the head-blocks, as shown in Fig. 3 of the drawings, ready to saw off a slab. The carriage-feed steam mechanism is then set in motion, and the carriage travels down its track, so that the

slab is removed by the saws. The carriage is then returned, ready to saw off another slab, and during the sawing and gigging the valves at each end of the piston-head have in turn opened and admitted steam, which has passed to the accumulator. After the carriage has been returned the operator sets the log forward a distance—say one inch—equivalent to the thickness or diameter of the next slab that is to be cut, and also a distance equivalent to the width of the kerf—that is to say, the quantity the saw takes out in sawing off the next slab—which is usually about one-fourth of an inch. To accomplish this setting forward of the log the operator has to turn, by means of its governing handle or lever, the four-way valve, so that the steam from the accumulator is admitted to the setting side of the set-shaft-operating cylinder. The pins on the segment have been previously fixed or placed to regulate the desired thickness of the lumber that is to be cut from the log, and one of the set-levers is forward against a pin while the other set-lever is back against a pin. The pawl of the forward lever, that is in engagement with the teeth of the ratchet-wheel, prevents the set-shaft from turning, so as to move and set the log forward, though the steam is on. Now, say the operator desires to set the log forward one and one-fourth inch, (which will be the distance to the next pin on the segment,) he takes hold of the back lever and leaves the thumb-latch thereof open or in its normal position, so that one of the three pawls of this ratchet-wheel is in engagement with the teeth of the wheel. Then with the other hand he takes hold of the back lever and closes the thumb-latch, which removes all the pawls from the teeth of this wheel, and the pressure from the piston of the set-shaft cylinder being upon the set-shaft, the latter turns and carries the ratchet-wheels forward. As the set-shaft turns, the standards and log move forward, this movement being limited by the forward pin on the segment. At the same time the other lever is brought back, ready for a forward movement at the next cut. During this setting movement the steam is allowed to be on only partially, as but little steam is required for setting the standards and log forward until the log or cant is sawed up and is to be driven off the head-blocks onto the gang ways. When cants are being cut for a gang the cant (which is usually about twelve inches square) upon the carriage is run down to the gang-ways. The setter then places his foot upon the brake-lever of the set-works, and grasps both set-levers and the latches thereon, so as to raise all the pawls, and draws the levers quite to the back of the segment, where there is a stationary pin, P¹, for the purpose of retaining the pawls away from the teeth of the ratchet-wheels. The levers being now in position, the setter has his hands at liberty, and turns the four-way valve so as to admit steam to the setting-port of the set-shaft-operating cylinder, when the set-shaft revolves and the

pinions on it work in the racks of the standards, driving the latter forward and the cant off the head-block onto the gang ways. The carriage must now be gigged or driven back for another log, this movement being effected by the steam carriage-feed. As the carriage travels back the setter turns the four-way valve so that steam is admitted to the receding side of the set-shaft-operating cylinder, and the set-shaft revolves backwardly to recede the standards as far as desired. The pawls, in the case of receding, do not require to be changed. Now is the time for sawing again. One of the set-levers is placed forward against the pin on the segment, one of its pawls being, of course, in action. The four-way valve is again turned so that steam is admitted to the set side of the set-shaft-operating cylinder and the set-shaft revolves forwardly to set the log.

By means of this steam mechanism the setter can easily and with very little labor set and recede the standards and produce all the necessary movements of the log until it is cut into the desired number of pieces, and for pushing the remaining pieces off the head-blocks after the log is sawed up.

It will be observed that steam is obtained for and fed into the accumulator all the time the steam carriage-feed is working, both in sawing and gigging.

The advantages of our invention will be readily understood and appreciated by any one skilled in the art to which it appertains, and it is evident that numerous modifications in the construction and arrangement of the parts comprising our invention can be made without departing from the method and spirit thereof.

We claim as our invention—

1. The combination, with the receding and setting mechanism of a circular-saw-mill carriage, of a steam mechanism acting directly on the setting and receding mechanism to effect any desired movement of the log on the carriage by steam-power, as set forth.

2. The combination, with the steam feed mechanism of a circular-saw-mill carriage, of mechanism for conveying steam from the feed-works onto the carriage and mechanism on the carriage for utilizing the steam thus obtained to effect operation of the standards, as set forth.

3. In a circular saw mill, the combination of a steam-cylinder, a piston working therein, and provided with a continuous interior steam-passage, into which steam in the cylinder escapes during operation of the piston, a steam-cylinder on the carriage, having a piston that rotates the standard set-shaft, and a connecting-pipe for conveying steam from the interior passage of the piston to the set-shaft operating cylinder, as set forth.

4. The herein-described means for obtaining steam on a traveling saw-mill carriage to operate the standards, or for other purposes, the same consisting substantially in a cylinder

that is embodied in the carriage-feed works, a piston working in the said feed-cylinder and having pressure-valves arranged at each end of its head, which valves connect with a continuous interior steam-passage in the piston-rod, the latter being secured at its outer end to the carriage, and a conducting-pipe extending from the interior steam-passage in the piston at its secured end to an accumulator on the carriage, the steam being forced into this accumulator at each stroke of the said feed-piston by forcing open the valve at the end against which the steam-pressure is at the time exerted and passing into the interior steam-passage, as set forth.

5. In a circular saw mill, the combination, with the set-shaft, of a stationary cylinder having a piston for operating the said shaft, a four-way cock connected by suitable pipes with the said cylinder to feed and exhaust the steam from the same, and a steam-feed pipe leading from steam-feed mechanism into one side of the four-way cock, as set forth.

6. In a circular saw mill, the combination, with the standard set-shaft having steam operating-power, of ratchet wheels or disks (one or more) fixed on the set-shaft, an operating-lever having an auxiliary rod for throwing the pawls from engagement with the teeth of the ratchet-wheel, said lever being loosely ar-

ranged on the set-shaft, and pawls which normally press toward the periphery of the wheel, as set forth.

7. In a circular saw mill, the combination of ratchet-wheels (one or more) fixed on the set-shaft, which has steam-power rotating mechanism, pawls normally pressing toward the periphery of the wheel, an operating-lever carrying the said pawls, and having a sliding rod provided with connecting rods and levers for drawing all the pawls at one movement from engagement with the teeth of the wheel, and a segment provided with stop-pins, as set forth.

8. In a saw-mill, the combination, with the standard set-shaft, of a hub fixed thereto and arranged inside a stationary cylinder having the usual pair of ports, and a sliding rotary piston passing through a slot in the hub and set-shaft, and composed of two wings formed with a cushioned connection inside the said slot, as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

GEORGE CLARK.

WILLIAM JOHN TAYLOR.

Witnesses:

J. B. FAIRCHILD,

CHAS. C. DAILY.