

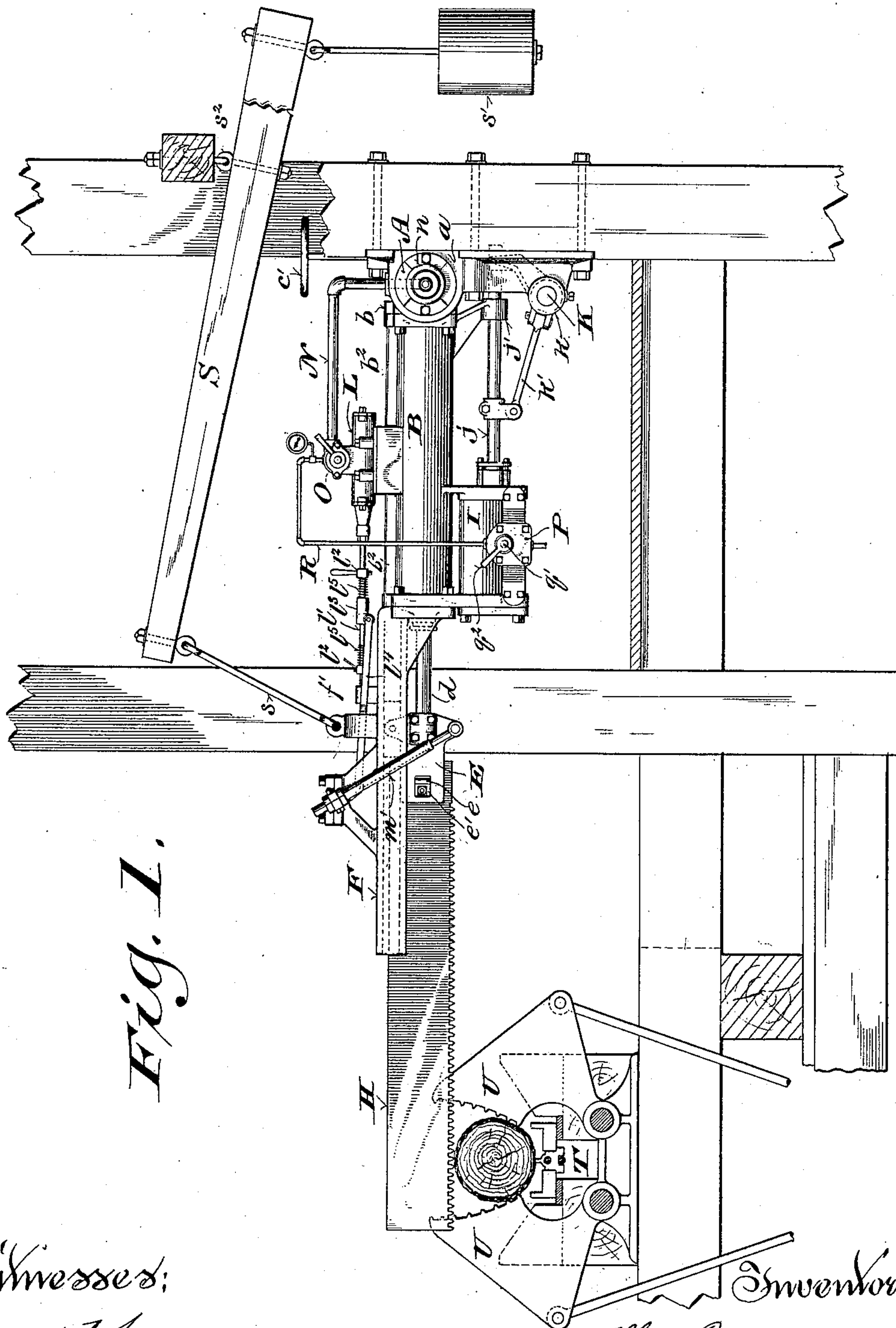
(No Model.)

4 Sheets—Sheet 1.

A. CUNNINGHAM.  
DRAG SAW.

No. 606,051.

Patented June 21, 1898.



Witnesses:  
Geo. W. Young.  
Chas. L. Goss.

Inventor:  
Albert Cunningham,  
By *Trinkler* *Henderson* *Smith* *Porter* *Wiles*  
Attorneys.

(No Model.)

4 Sheets—Sheet 2.

A. CUNNINGHAM.  
DRAG SAW.

No. 606,051.

Patented June 21, 1898.

Fig. 2.

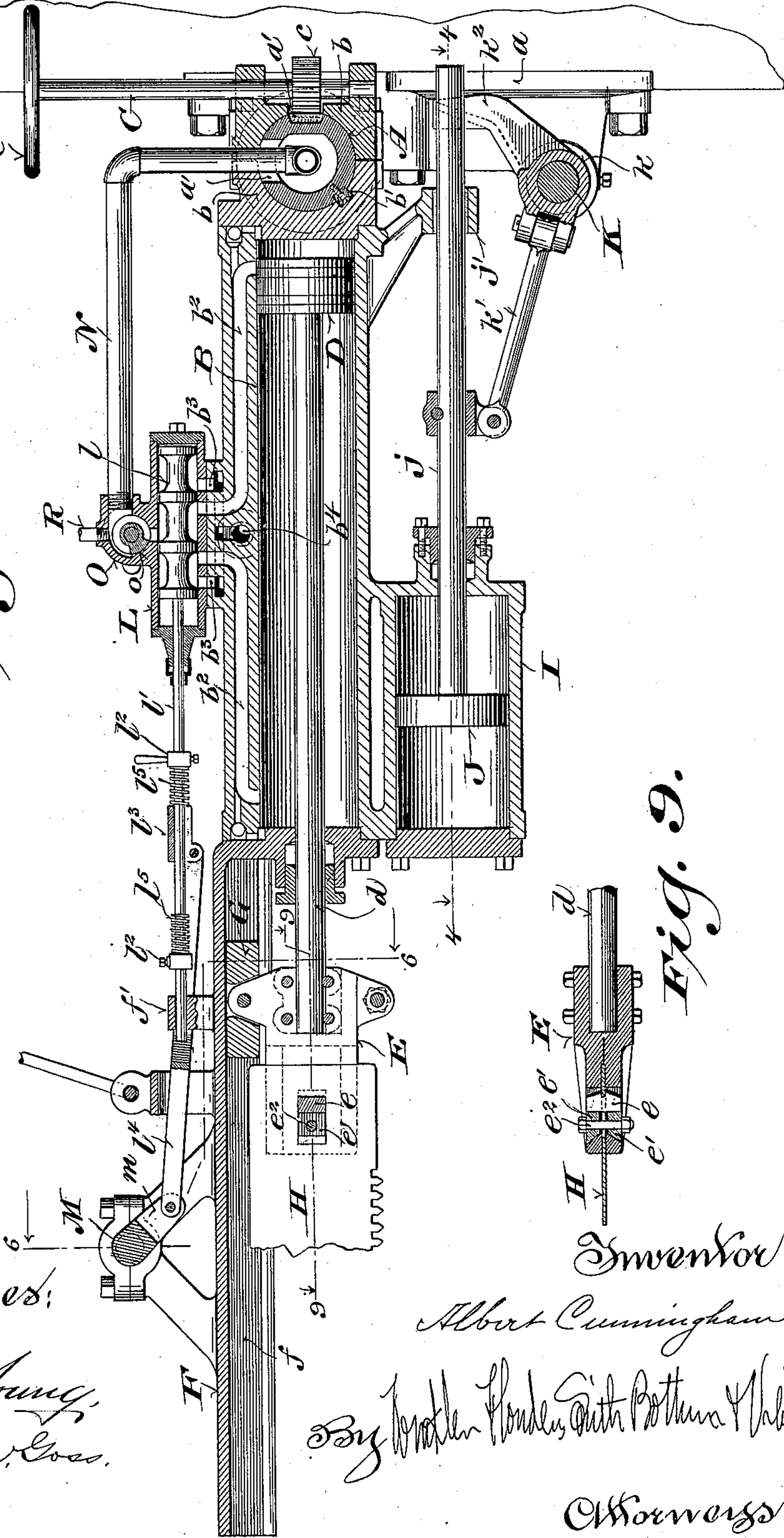
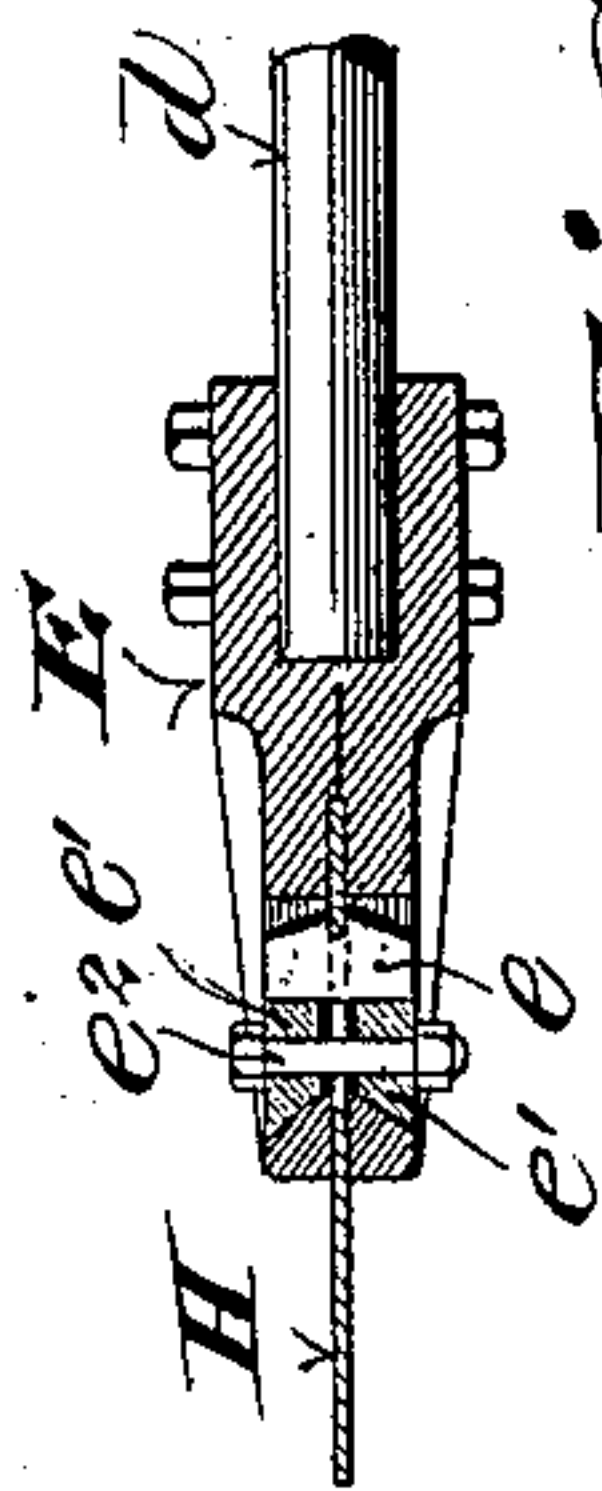


Fig. 9.



Witnesses:  
Geo. W. Young,  
Chas. L. Cross.

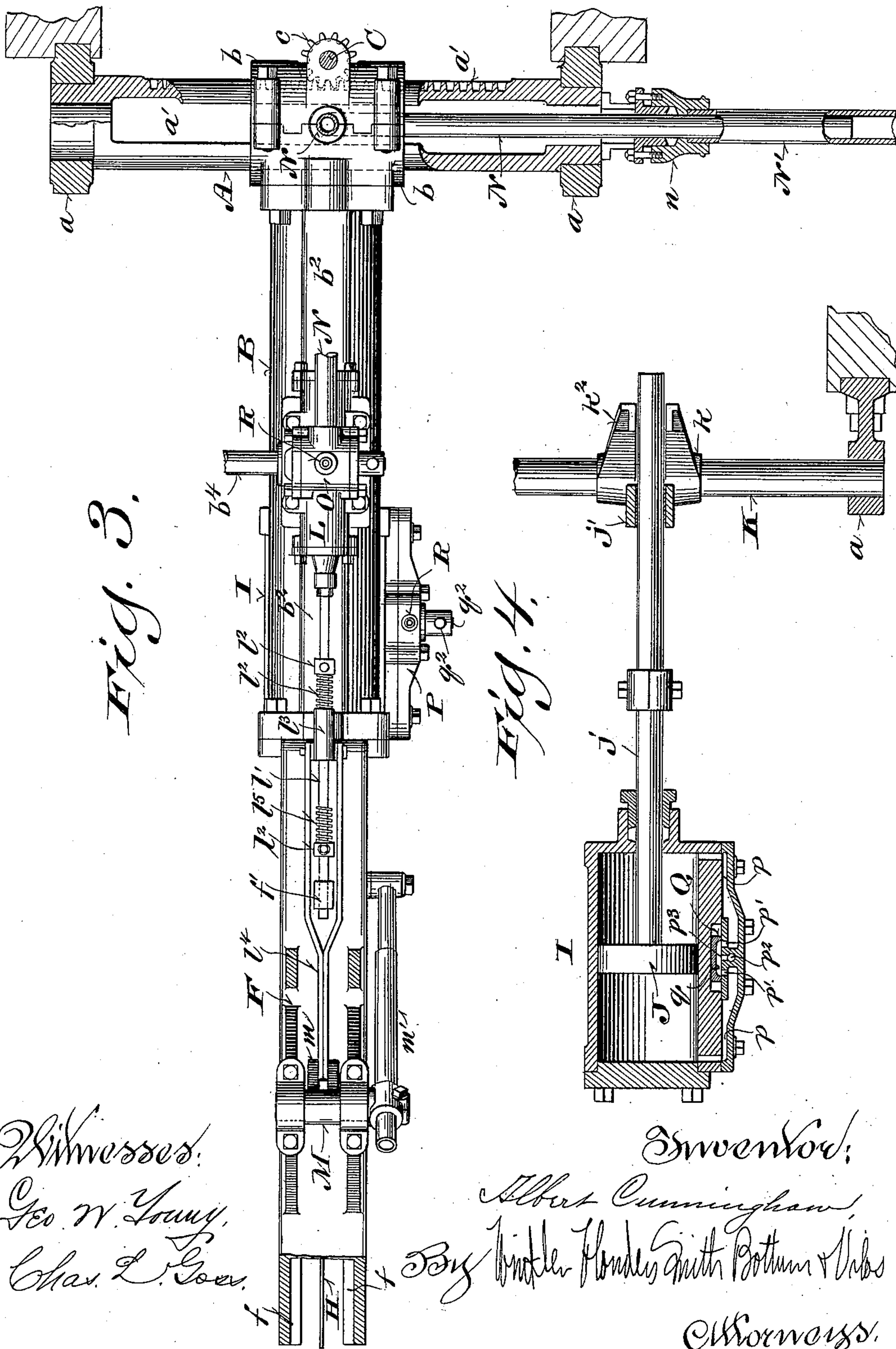
Inventor:  
Albert Cunningham,  
By *Wm. H. H. Smith* Attorney.



4 Sheets—Sheet 3.

No. 606,051.

Patented June 21, 1898.



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

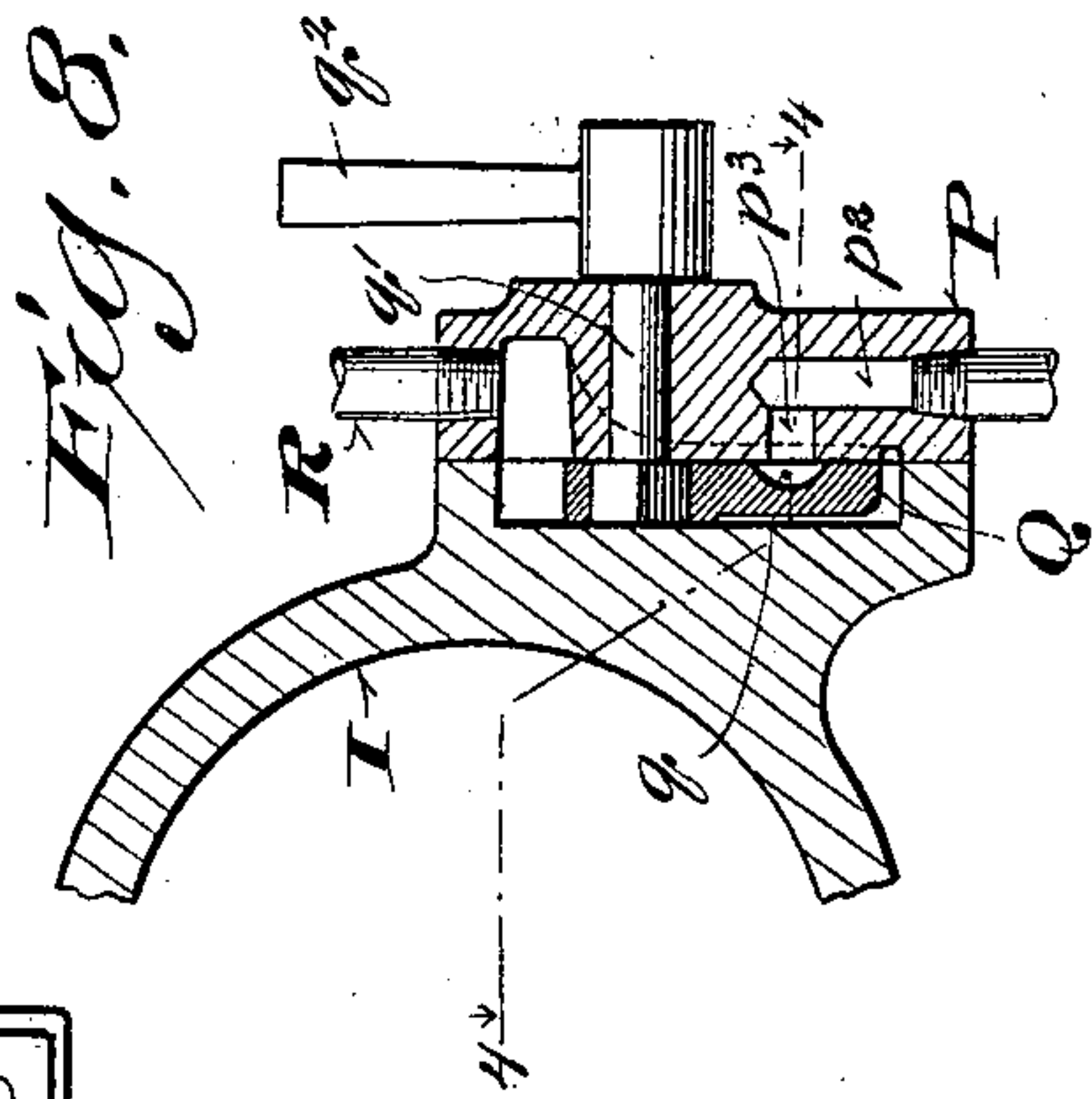
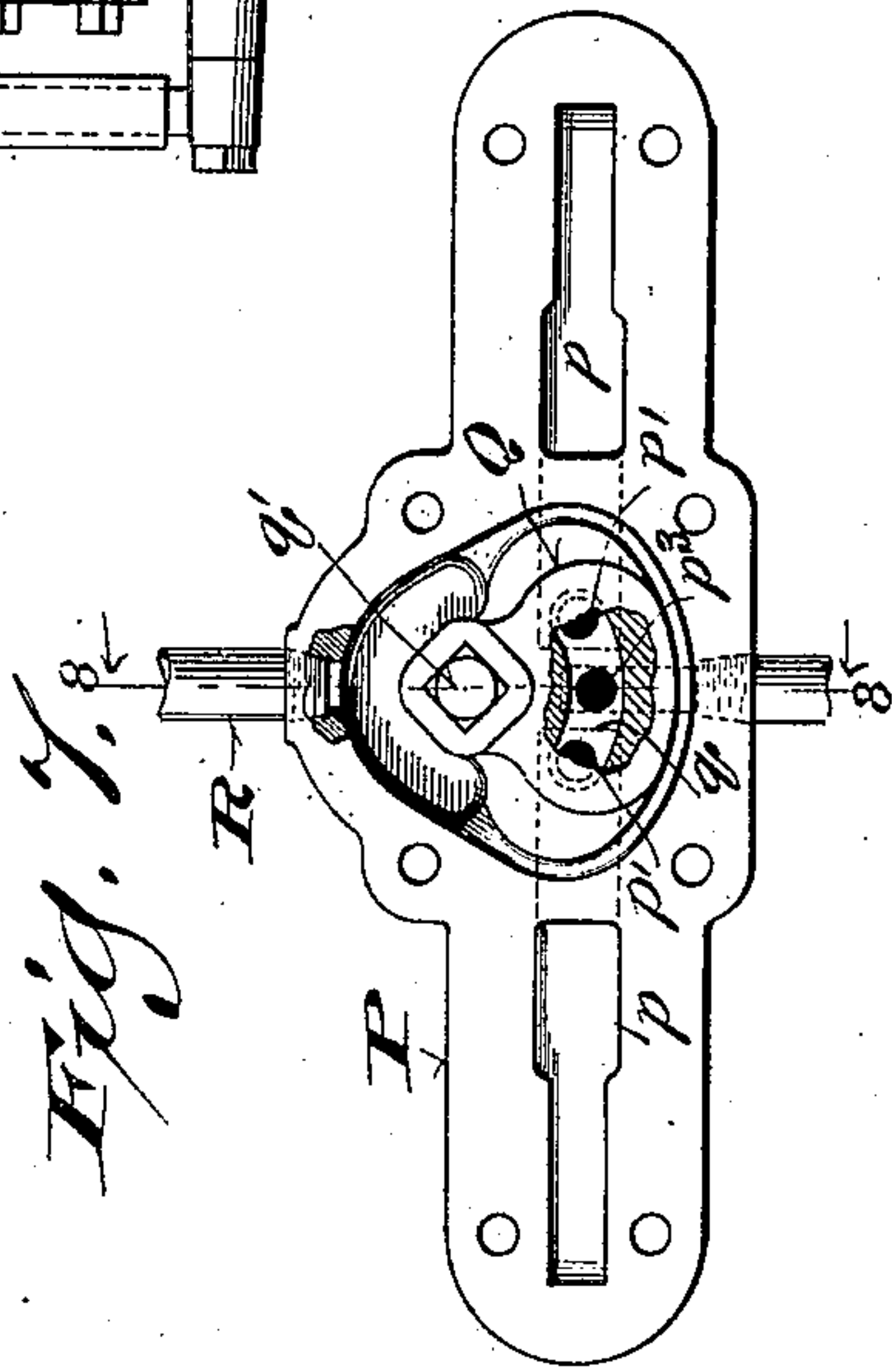
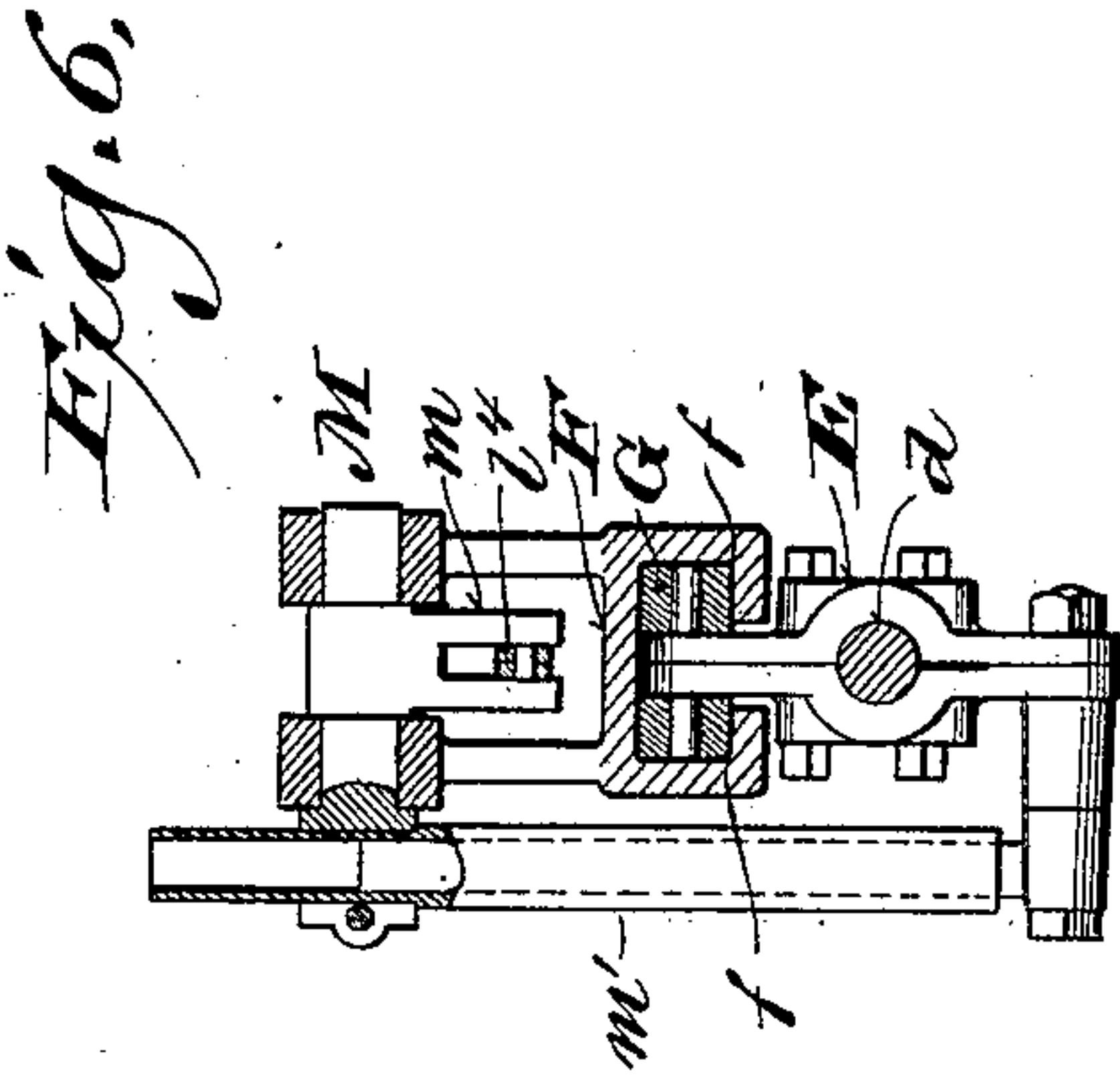
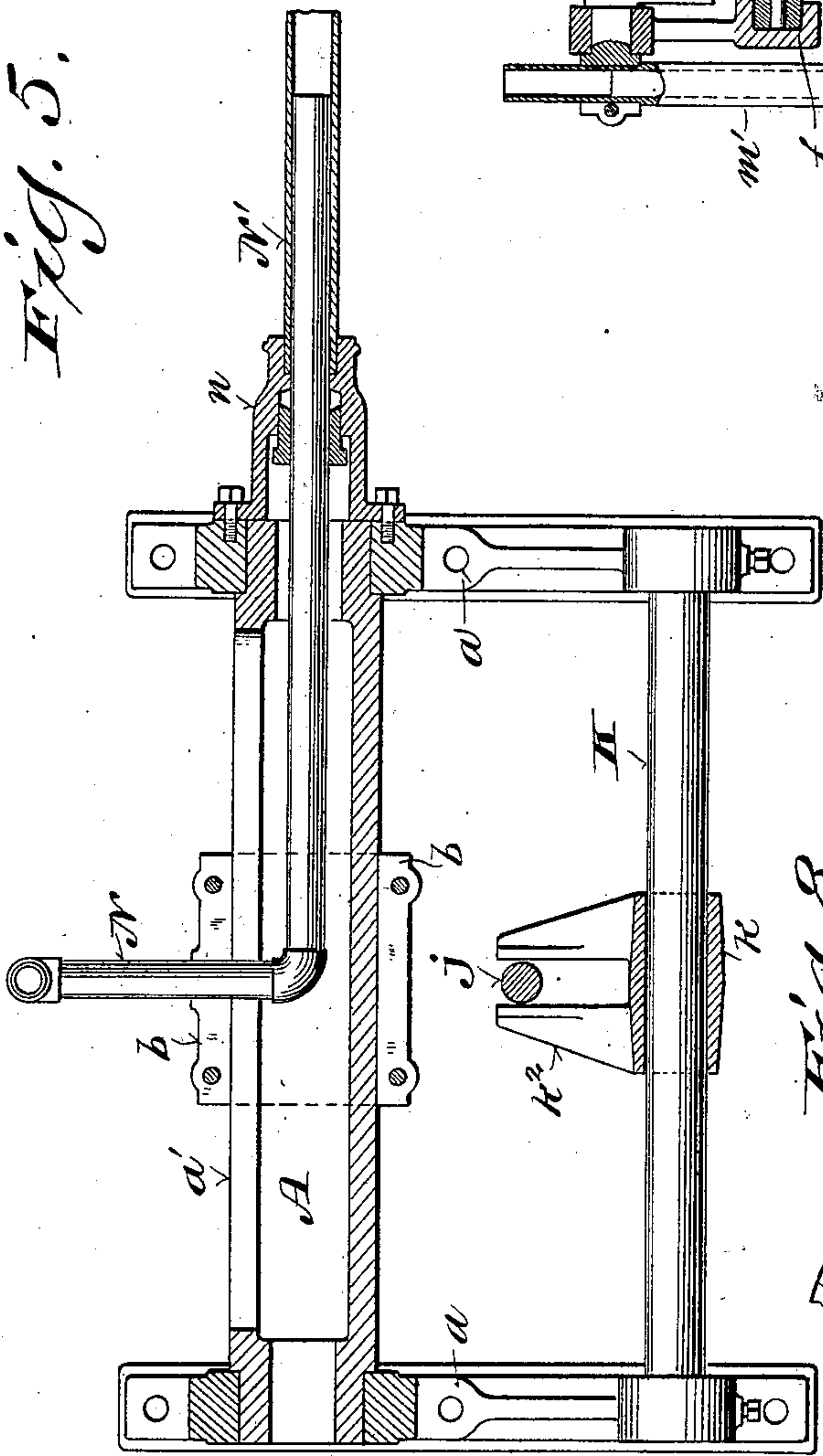
(No Model.)

4 Sheets—Sheet 4.

A. CUNNINGHAM.  
DRAG SAW.

No. 606,051.

Patented June 21, 1898.



Witnesses:  
Geo W. Young  
Chas. L. Goss.

Inventor:  
Albert Cunningham,  
By Frederick Horner Smith Patton & Jos  
Morreys.



# UNITED STATES PATENT OFFICE.

ALBERT CUNNINGHAM, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE  
FILER & STOWELL COMPANY, OF WISCONSIN.

## DRAG-SAW.

SPECIFICATION forming part of Letters Patent No. 606,051, dated June 21, 1898.

Application filed November 9, 1896. Serial No. 611,499. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT CUNNINGHAM, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Drag-Saws; 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 pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main objects of my invention are to facilitate cutting logs to the desired lengths and generally to improve the construction and operation of machines for this purpose.

It consists in certain novel features in the construction and arrangement of component parts of the machine, as hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a side elevation of my improved machine in connection with a log way, conveyer, and dogging device with which the machine is primarily designed to be used. Fig. 2 is a vertical longitudinal section, on an enlarged scale, of the actuating, tilting, adjusting, and guide connections of the saw. Fig. 3 is a plan view of the same. Fig. 4 is a horizontal section, on the line 4 4, Figs. 2 and 8, of the tilting mechanism. Fig. 5 is a vertical longitudinal section of the trunnion on which the main cylinder swings, showing in elevation a part of the tilting connections and the steam or fluid pressure supply connection. Fig. 6 is a cross-section, on the line 6 6, Fig. 2, of the saw-guiding and valve-actuating devices. Fig. 7 is a detail view, on an enlarged scale, of the valve controlling the admission and exhaust of the actuating medium to and from the auxiliary cylinder. Fig. 8 is a cross-section of the same and of a portion of the auxiliary cylinder on the line 8 8, Fig. 7; and Fig. 9 is a horizontal longitudinal section, on the line 9 9, Fig. 2, of the cross-head by which the outer end of the main piston-rod is guided and attached to the saw.

The machine herein shown and described for the purpose of illustrating my improvements is designed, primarily, for use in saw-mills in connection with a log way, conveyer, and dogging device for squaring the ends of logs and cutting them to the desired lengths as they are hauled into the mill; but it may be used for other similar purposes, either with or without the log way, conveyer, and dogging device.

Referring to the drawings, A designates a hollow cylindrical trunnion supported horizontally and adapted to turn at the ends in suitable bearings, which may be conveniently formed in brackets *a a*, bolted to uprights.

B is a cylinder, which may be designated the "main" or "working" cylinder, provided at one end with a transverse box or sleeve *b*, which is fitted to slide endwise on the trunnion A. This box is preferably made in two parts or halves, one of which forms a cylinder-head. They are bolted together upon the trunnion, which is caused to turn therewith in swinging the cylinder up and down by means of a key or feather *b'*, as shown in Fig. 2. The trunnion is formed or provided on one, preferably the rear, side with a longitudinal rack *a'*, and in the cap of the box *b* is journaled transversely to the axis of the trunnion a shaft C, provided with a pinion *c*, engaging said rack, and at its upper end with a crank or hand wheel *c'*, for turning said pinion and moving the cylinder laterally upon said trunnion.

D is a piston fitted to work in cylinder B and provided with a piston-rod *d*, which passes through a stuffing-box in the cylinder-head, opposite said trunnion. To the outer end of said piston-rod is attached a cross-head E.

F is an arm formed with or attached to the outer cylinder-head and formed with guide-ways *ff*, parallel with each other and with the axis of the cylinder. A guide-block G, fitted to slide in said ways, is attached to the cross-head E and serves to rigidly support the outer end of the piston-rod and the end of the saw attached thereto in alinement with the axis of the cylinder. The cross-head E is made in two parts, as shown in Figs. 6 and 9, which are rigidly clamped by bolts upon the end of the piston-rod *d* and upon one end of



the saw H. The inner faces of the two parts of the cross-head are recessed to form a vertical slot for the reception of the saw, and they, as well as the saw, are formed with a transverse opening to receive the fastening devices by which the saw is clamped and firmly held in the cross-head. These fastening devices consist of a key *e*, which passes transversely through said opening and engages on its rear face, which is preferably notched, as shown in Fig. 9, with the rear edge of the opening in the saw, and of two wedge-blocks *e'* *e'*, which are inserted in said opening on opposite sides of the saw, abutting at their backs against the key *e*, bearing on their opposite faces, which are inclined against correspondingly-inclined faces on the parts of the cross-head in the front of said opening and connected by a bolt *e*<sup>2</sup>, by which they are drawn inwardly on their inclined bearing-faces, thereby clamping the parts of the cross-head against the sides of the saw and forcing the key *e* rearwardly against the shoulders in the parts of the cross-head. By this construction a single bolt serves to firmly clamp and rigidly hold the saw in the cross-head, and the attachment and detachment of the saw can be effected easily and quickly.

I is a cylinder, which may be designated the "auxiliary" or "tilting" cylinder. It is cast with or attached to the under side of the main cylinder B lengthwise thereof and is provided with a piston J, the rod *j* of which passes through a stuffing-box in the rear end and a guiding sleeve or bearing *j'*, formed on or attached to the rear end of cylinder B.

K is a cylindrical rod or shaft which is supported below and parallel with the trunnion A in the brackets *a a*. *k* is a sleeve fitted to turn and slide endwise on said shaft. It is connected with the piston-rod *j* by a link *k'*, pivoted at one end to a collar which is clamped on said piston-rod and at the other end to said sleeve, the pivot connections of said link being arranged transversely to each other and to said piston-rod and shaft. The sleeve *k* is formed or provided with an upwardly-extending forked arm *k*<sup>2</sup>, which loosely embraces the piston-rod *j* and by which said sleeve is moved endwise on the shaft K by the lateral movement of the cylinders.

L designates the main valve-chamber, which is mounted on top of the cylinder B and communicates with the ends thereof through passages *b*<sup>2</sup> *b*<sup>2</sup>, as shown in Fig. 2. It also communicates through ports and passages *b*<sup>3</sup> *b*<sup>3</sup> with a common exhaust passage or connection *b*<sup>4</sup>. *l* is a valve fitted to work in said chamber and controlling the admission and exhaust of the steam or other actuating medium to and from the ends of the cylinder through said passages *b*<sup>2</sup> and the ports and passages *b*<sup>3</sup>. In the position in which the valve is shown in Fig. 2 steam is admitted to the right-hand end of the cylinder and exhausted from the left-hand end. The stem *l'* of said valve projects

through a stuffing-box in one end of the chamber L and is supported and guided at its outer end in a bearing *f'* on the guide-arm F. It is provided with collars *l*<sup>2</sup> *l*<sup>2</sup>, adjustably secured thereon, and between said collars with a tappet *l*<sup>3</sup>, which is connected by a forked link or rod *l*<sup>4</sup> with an arm *m* on a rock-shaft M, supported transversely upon the guide-arm F. This rock-shaft M is connected by a telescoping arm *m'* with the cross-head E, from which it receives its rocking movement. By making the arm *m'* in parts which telescope with each other its projection below the cross-head E and its liability to strike obstructions in lowering the saw when the machine is in operation are avoided. Between the collars *l*<sup>2</sup> and the tappet *l*<sup>3</sup> are interposed upon the valve-stem *l'* spiral springs *l*<sup>5</sup> *l*<sup>5</sup> or elastic buffers, which prevent the tappet from striking the collars abruptly and allow it to move in either direction beyond the limits of the movement of the valve without breaking or injuring the valve-operating connections.

The steam or other actuating medium is supplied to the valve-chamber L by a pipe or passage N through a valve-case O, provided with a valve *o*, by which its admission to the main valve-chamber may be cut off when desired. Passing through the box *b* and a longitudinal slot or opening *a'* in the upper side of trunnion A, upon which the main cylinder swings, said pipe N projects axially through one end of said trunnion into a main supply-pipe N', in which it is adapted to turn and telescope. The pipe N' is secured in a bonnet *n*, which is attached to one of the bearings in which the trunnion turns, over the end of the trunnion, and is formed with a stuffing-box around the pipe N, as shown in Fig. 5.

P is a valve case or cover attached to the auxiliary cylinder I and formed with passages *p p*, communicating with opposite ends of said cylinder and with the valve-chamber through ports *p'* *p'*, as shown in Figs. 4, 7, and 8. It is also formed with an exhaust-passage *p*<sup>2</sup>, which communicates with the valve-chamber through a port *p*<sup>3</sup>, between the ports *p'* *p'*.

Q is a valve inclosed by the cover P in a recess or chamber formed in the cylinder I. It is formed in one face with a recess *q*, which when the valve is in its middle position, as shown in Figs. 4 and 7, connects the several ports *p'* and *p*<sup>3</sup>, thus establishing communication between both ends of the cylinder and the exhaust-passage *p*<sup>2</sup>. Said valve has a stem *q'*, which projects laterally through the cover P and is provided at its outer end with a handle *q*<sup>2</sup> for manually operating the valve. By turning this valve in one direction or the other from its central position the steam or actuating medium which is supplied to the valve-chamber may be admitted to either end of the auxiliary or tilting cylinder I, while the other end of said cylinder is opened to exhaust. The pipe R connects the chamber of the valve Q with the valve-case O, or this



connection may be made with any convenient part of the steam or fluid pressure supply connection, such as the pipe N.

The saw and its actuating and tilting cylinders and their connections are counterbalanced by a weighted lever S, which is connected at one end by a link s with the guide-arm F, provided at the opposite end with a weight s' and fulcrumed at an intermediate point by a universal joint s<sup>2</sup> to a suitable support above the main cylinder, as shown in Fig. 1.

T designates a log way and conveyer passing transversely under the saw H, and U U are dogs for grasping and holding a log upon said way while it is severed by said saw, as shown in Fig. 1.

My improved machine operates as follows: The saw being raised, a log is drawn and stopped underneath it upon the conveyer T. In this position the dogs U U are closed against it and the saw H is lowered by turning the valve Q and admitting steam to the inner end of cylinder I. Steam being admitted to the valve-chamber L by opening the valve o is automatically admitted to and exhausted from opposite ends of the main cylinder B by the action of the valve l, driving the piston D back and forth therein. When the log has been severed, the valve Q is reversed, admitting steam to the outer end of the auxiliary cylinder I and exhausting it from the opposite end, and the saw is thus swung upwardly clear of the log. The valve Q is then turned to its middle position and the steam exhausted from both ends of the auxiliary cylinder, the weight on the lever S being sufficient to counterbalance the saw and its connections and hold them in any position in which they may be left. In case the log is not stopped in the desired position for making the cut with the drag-saw the latter is adjusted sidewise to the desired point by turning the hand-wheel c', thereby shifting the machine endwise upon the trunnion A. In handling large heavy logs it is very difficult, if not impossible, to stop them on the log way and conveyer at or close to the points where it is desired to sever them by the drag-saw, so that the provision for easily and quickly adjusting the saw sidewise is a matter of great convenience and economy of time and labor in the operation of the mill.

I do not wish to be understood as limiting myself to exact details of construction herein shown and described, as they may be variously modified within the spirit and intended scope of my invention.

When a sidewise adjustment of the saw is not necessary or desired, the trunnion A may be made short and cast with or rigidly secured to the cylinder B or its head.

I claim—

1. In a machine for cutting logs or timber to the desired length, the combination with a suitable support, of a main cylinder pivoted thereto so as to swing vertically, a piston fit-

ted to work in said cylinder, a saw rigidly attached to the piston-rod, an auxiliary cylinder attached to the working cylinder and provided with a piston which is connected with a fixed support, substantially as and for the purposes set forth.

2. In a machine for cutting logs or timber to length, the combination of a hollow trunnion supported horizontally in suitable bearings, a cylinder mounted at one end upon and movable endwise of said trunnion, a piston fitted to work in said cylinder, and a saw rigidly attached to the piston-rod, substantially as and for the purposes set forth.

3. In a machine for cutting logs and timber to length, the combination with a trunnion supported and adapted to turn in suitable bearings, a main cylinder provided at one end with a transverse box fitted to slide endwise upon said trunnion, a piston fitted to work in said cylinder, a saw rigidly attached to the rod of said piston, an auxiliary cylinder attached to the main cylinder and provided with a piston which has a sliding pivot connection with a rod parallel with said trunnion, substantially as and for the purposes set forth.

4. In a machine for cutting logs and timber to length, the combination with a trunnion supported horizontally in suitable bearings and formed or provided with a longitudinal rack, a cylinder having a transverse box at one end mounted upon and movable endwise of said trunnion, a shaft journaled in said box and provided with a pinion engaging said rack, a piston fitted in said cylinder and provided with a rod and a saw attached to the piston-rod, substantially as and for the purposes set forth.

5. In a machine for cutting logs and timber to length, the combination with a trunnion supported horizontally and adapted to turn in suitable bearings, of a main cylinder having a box at one end fitted to slide endwise upon said trunnion, a shaft journaled in said box and provided with a pinion which meshes with a longitudinal rack on said trunnion, an auxiliary cylinder attached lengthwise to the main cylinder and provided with a piston, a stationary rod parallel with said trunnion, a sleeve or collar movable endwise thereon and linked to the auxiliary piston, a piston fitted in the main cylinder and provided with a rod, and a saw attached to the rod of the main piston, substantially as and for the purposes set forth.

6. In a machine for cutting logs and timber to length, the combination of a horizontally-arranged trunnion, a main cylinder having a transverse box mounted upon and movable endwise of said trunnion, an auxiliary cylinder attached lengthwise to the main cylinder and provided with a piston, a stationary rod parallel with said trunnion, a sleeve or collar movable endwise thereon, linked to the auxiliary piston-rod and having a guide loosely engaging it, a piston fitted in the main



cylinder and provided with a rod, and a saw attached to the main piston-rod, substantially as and for the purposes set forth.

7. In a machine for cutting logs and timber to length, the combination with a hollow trunnion, a vertically-swinging and laterally-movable cylinder mounted thereon at one end and provided with a piston, a saw attached to the piston-rod, a valve controlling the supply and exhaust of the actuating medium to and from opposite ends of said cylinder, and a telescoping fluid-pressure-supply connection through said trunnion with the valve-chamber, substantially as and for the purposes set forth.

8. In a machine for cutting logs and timber to length, the combination with a hollow or recessed trunnion supported horizontally in suitable bearings, a cylinder having a transverse box mounted upon and movable endwise of said trunnion, a valve-chamber connected with opposite ends of said cylinder by passages, a valve for controlling the supply and exhaust of the actuating medium to and from the cylinder, a fluid-pressure-supply pipe attached to one end of said trunnion, a pipe telescoping with said supply-pipe and connecting it with the valve-case, a piston fitted to work in said cylinder and a saw attached to the piston-rod, substantially as and for the purposes set forth.

9. In a machine for cutting logs and timber to length, the combination with a trunnion supported horizontally and adapted to turn in suitable bearings, a laterally-adjustable cylinder mounted at one end upon said trunnion, a valve-chamber connected by passages with the ends of said cylinder, a valve controlling communication between said chamber and cylinder through said passages, a fluid-pressure-supply pipe, a pipe arranged axially in said trunnion to turn and telescope in said supply-pipe and connecting it with said valve-chamber, a piston fitted to work in said cylinder and a saw attached to the piston-rod, substantially as and for the purposes set forth.

10. In a machine for cutting logs and timber to length, the combination with a cylinder and piston of a slotted head attached to the outer end of the piston-rod and formed with a transverse opening through it, a saw having a corresponding opening through one end, a key passing transversely through the opening in the head and saw, two wedge-blocks inserted in said opening on opposite sides of the saw, and a bolt connecting said blocks for drawing them together, clamping the sides of the head against the saw and forcing and holding the key against the back of the opening in the saw and the end of the saw against the end of the slot in the head, substantially as and for the purposes set forth.

11. In a machine for cutting logs and timber to length, the combination of a vertically-swinging cylinder and piston having laterally-adjustable pivot connections with a suitable support, a saw attached to the outer end of the piston-rod, and a lever having a flexi-

ble or jointed connection at one end with said cylinder, a counterweight at the other end and a universally-jointed fulcrum connection with a suitable support at an intermediate point, substantially as and for the purposes set forth.

12. In a machine for cutting logs and timber to length, the combination of a vertically-swinging cylinder and piston pivotally connected at one end with a suitable support, a saw attached to the outer end of the piston-rod, a valve controlling the admission and exhaust of the actuating medium to and from opposite ends of said cylinder and having operating connections with the piston-rod, a fluid-pressure-supply connection with the valve-chamber, an auxiliary cylinder attached to the main cylinder and provided with a piston which is connected with a support so as to swing the main cylinder and its attachments on their pivot-bearing, a fluid-pressure-supply connection communicating with opposite ends of the auxiliary cylinder, and a valve in said connection for controlling the admission and exhaust of the actuating medium to or from either end of said cylinder, substantially as and for the purposes set forth.

13. In a machine for cutting logs and timber to length, the combination of a vertically-swinging cylinder and piston having at one end a laterally-movable pivot connection with a suitable support, a saw attached to the piston-rod, an auxiliary cylinder attached to the main cylinder and provided with a piston the rod of which is guided at its outer end in a bearing attached to the main cylinder, a rod parallel with the axis on which the main cylinder swings, a sleeve mounted upon and movable endwise of said rod and having a guiding projection loosely engaging the auxiliary piston-rod, and a link pivoted at the ends to and connecting said sleeve and auxiliary piston-rod, substantially as and for the purposes set forth.

14. In a machine for cutting logs and timber to length the combination with a log way and conveyer and dogging device for immovably holding logs thereon, of a vertically-swinging cylinder pivotally connected with a suitable support, a piston fitted to work in said cylinder, a saw rigidly attached to the piston-rod and extending therefrom transversely over said log way and conveyer, and an auxiliary cylinder attached to the main cylinder and provided with a piston which is connected with a fixed support and is adapted to turn the main cylinder and saw up and down upon their pivot connection, substantially as and for the purposes set forth.

15. In a machine for cutting logs and timber to length, the combination of a vertically-swinging cylinder and piston having a pivot connection at one end with a suitable support, a saw attached at one end to the piston-rod, and an auxiliary cylinder and piston connected with the main cylinder and arranged to swing it and the saw vertically, substantially as and for the purposes set forth.



16. In a machine for cutting logs and timber to length, the combination of a vertically-swinging cylinder and piston having a laterally-adjustable pivot connection with a suitable support, a saw attached to the piston-rod, and an auxiliary cylinder and piston connected with said main cylinder in such manner as to swing it vertically and permit of its lateral adjustment, substantially as and for the purposes set forth.

17. The combination with a log way and conveyer of a vertically-swinging cylinder and piston arranged transversely to and adjustable lengthwise of said logway, and a saw rigidly attached at one end to the piston-rod, substantially as and for the purposes set forth.

18. The combination with a log way, conveyer and dogging device for immovably holding logs upon said logway, of a vertically-swinging cylinder and piston arranged transversely to and adjustable lengthwise of said logway, and a saw rigidly attached at one end to the piston-rod, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ALBERT CUNNINGHAM.

Witnesses:

CHAS. L. GOSS,  
MARIE F. OPPEN.