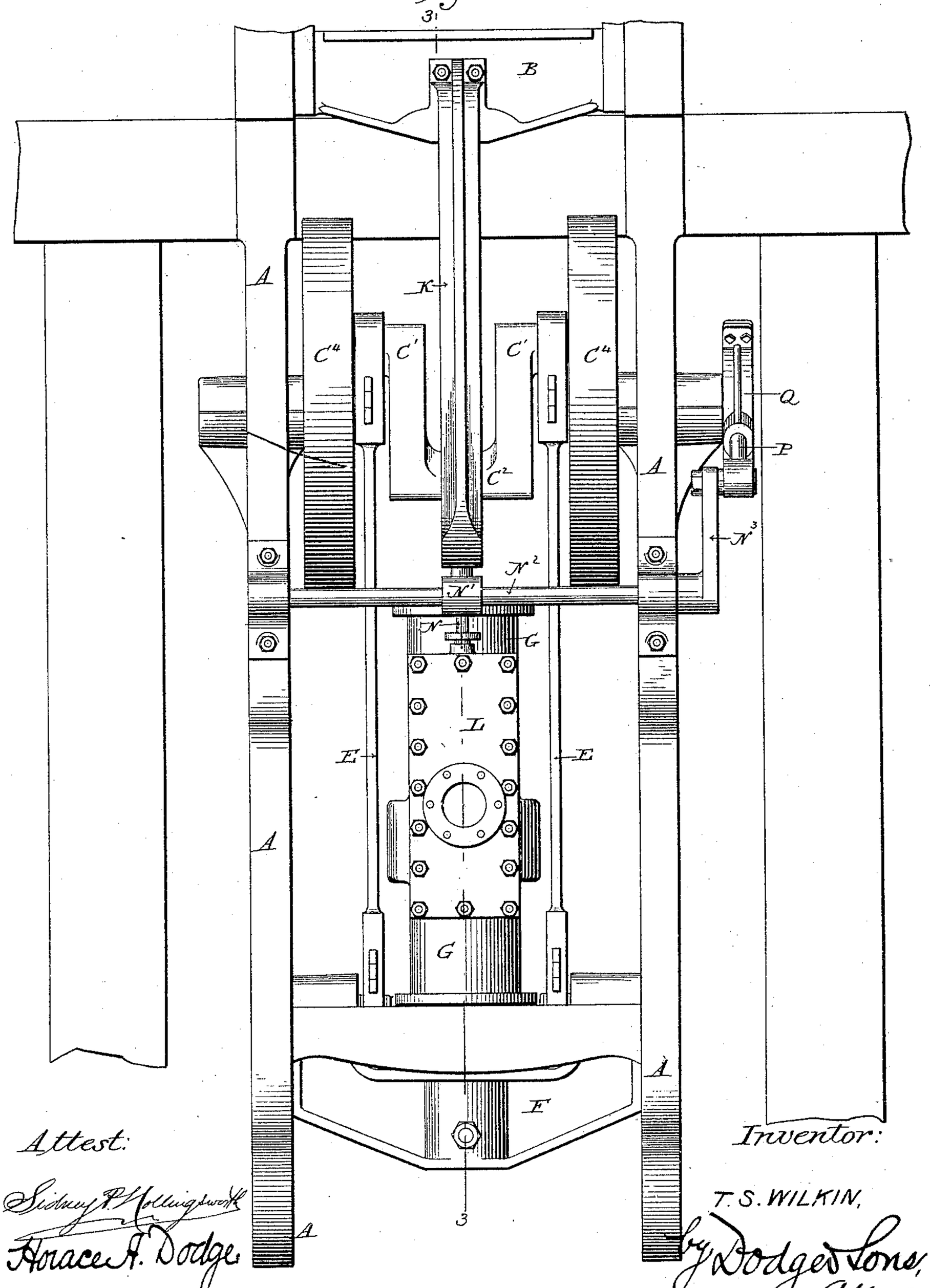
(No Model.) 3 Sheets—Sheet 1.

# T. S. WILKIN.

## SAW MILL.

No. 436,468. Patented Sept. 16, 1890.

*Fig. 1.*

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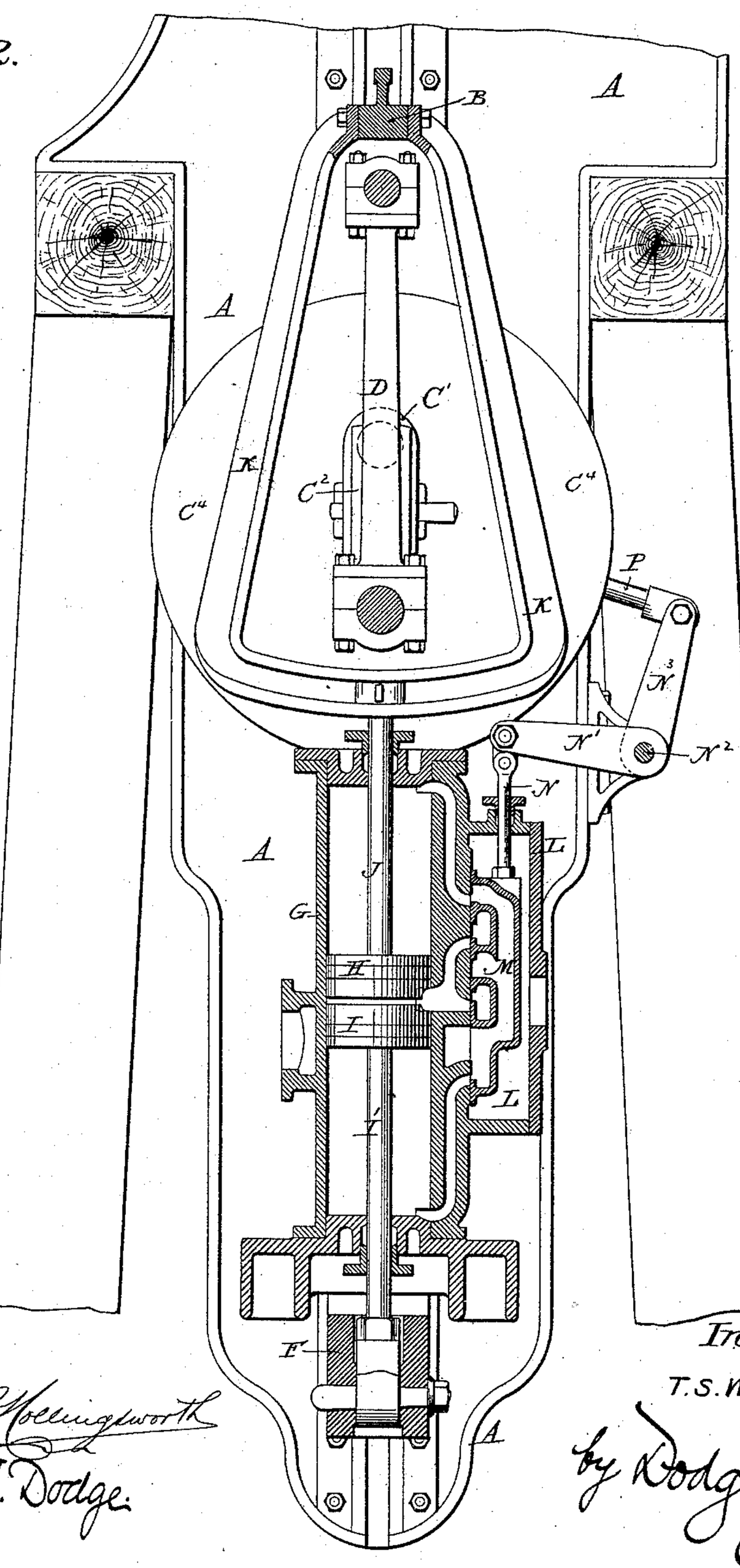
(No Model.) 3 Sheets—Sheet 2.

# T. S. WILKIN.

## SAW MILL.

No. 436,468. Patented Sept. 16, 1890.

Fig. 2.

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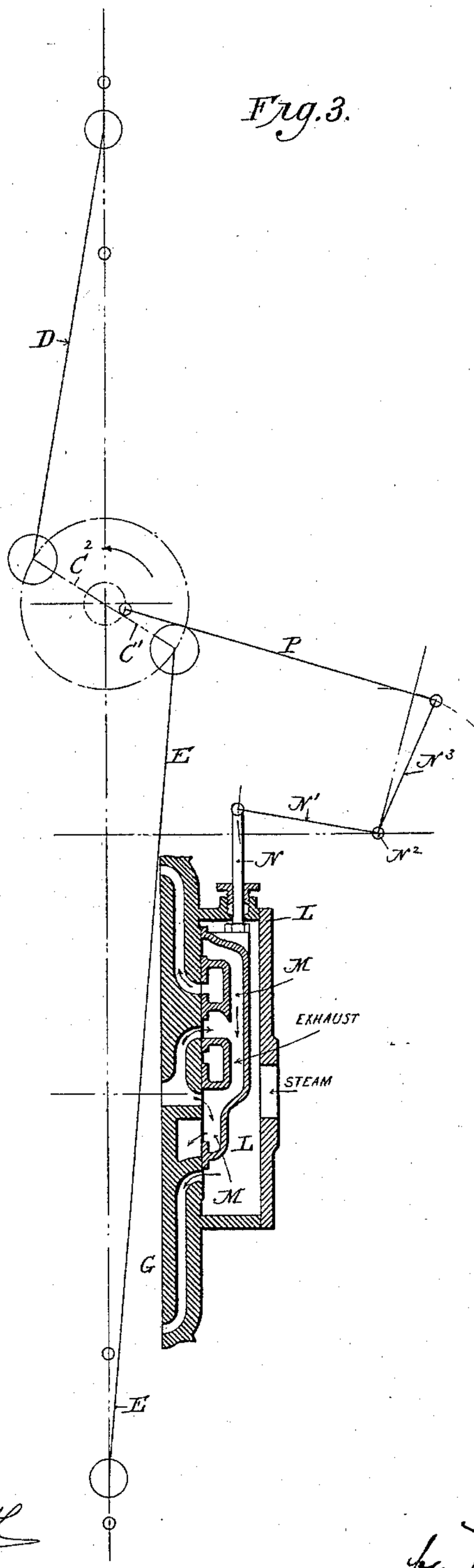
(No Model.) 3 Sheets—Sheet 3.

# T. S. WILKIN.

## SAW MILL.

No. 436,468. Patented Sept. 16, 1890.

*Fig. 3.*

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# UNITED STATES PATENT OFFICE.

THEODORE S. WILKIN, OF MILWAUKEE, WISCONSIN.

## SAW-MILL.

SPECIFICATION forming part of Letters Patent No. 436,468, dated September 16, 1890.

Application filed May 21, 1889. Serial No. 311,561. (No model.)

*To all whom it may concern:*

Be it known that I, THEODORE S. WILKIN, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Saw-Mills, of which the following is a specification.

My invention relates to reciprocating-saw mills, and has reference more particularly to means for counterbalancing and operating the saw frame or sash.

The invention consists in the combination, with the reciprocating saw gate or sash and a counter-balance, of devices for controlling the movements of these parts, whereby jars or shocks incident to the rapid reciprocation of the saw-gate and counter-balance are cushioned or taken up and the various parts of the machine relieved of undue strain.

In carrying out my invention I employ a fluid under pressure, which I admit to opposite ends and to the middle alternately of an elongated cylinder in which work two pistons, which latter are connected, respectively, with the saw-gate and the counter-balance. The admission of fluid to the cylinder is controlled by means of a valve actuated by an eccentric upon the main shaft, and its movements are so timed relatively to the movements of the counter-balance and the sash-frame that just before the saw-frame reaches its lowest position and the counter-balance reaches its highest position the valve will move so as to permit the fluid to enter at the center of the cylinder, and, acting upon the opposing faces or heads of the pistons connected to the saw-frame and the counter-balance, serves to actuate the latter, moving the saw-frame upward and the counter-weight downward. Just before the saw-frame and the counter-weight reach the limits of their movements the valve is again shifted, but so as to permit fluid to enter at the ends and exhaust from the center of the cylinder, and as the fluid enters at the ends of the cylinder it forces the two pistons (and the saw-frame and the counter-balance secured thereto) toward each other. The fluid between the opposing faces of the two pistons acts as a cushion and prevents them from coming together suddenly, and the same effect is secured when the pistons are moving in the reverse direction, as the fluid will be compressed between the ends of the cylinder and the pistons and prevents the sudden dropping of the counter-weight and rise of the saw-frame.

In the drawings, Figure 1 is a face view of a portion of a saw-mill provided with the counter-balance and with the steam or other fluid actuating mechanism; Fig. 2, a vertical sectional view on the line 3 3 of Fig. 1, and Fig. 3 a detail view.

A A indicate the uprights composing the frame of the machine, said uprights being grooved on their opposing faces to receive the sliding saw gate or sash B, as is usual in this class of mills, and C indicates a shaft journaled in suitable boxes or bearings in the uprights A A below the log floor and provided with three crank-arms C′, $C^2$, and C′, and with two balance-wheels $C^4$, as clearly shown in Fig. 1. The saw-gate is connected to the crank-arm $C^2$ by means of a rod or pitman D, while the crank-arms C′ are connected by means of pitmen or rods E with a counter balance or weight F. The counter-balance F is adapted to slide vertically between the uprights A A, the latter being grooved to receive the said counter-balance, as shown in Fig. 1. The relative arrangement of the saw-gate and the counter-balance is such that when the sash-frame is at its lowest point of movement the counter-balance will be at its highest point, and vice versa.

G indicates an elongated or double cylinder provided with two pistons H and I, the rods J and I′ of which are connected, respectively, with the saw-gate and the counter-balance, as clearly shown in Fig. 2.

In order that the connection between the piston-rod J and the sash-gate may not interfere with the action of the crank-shaft C, I secure to the upper end of the piston-rod J an open yoke or frame K, which, as shown in Figs. 1 and 2, is secured to the lower end of the saw gate or sash and permits the rotation or revolution of the crank $C^2$ within it.

L indicates the steam-chest, in which is fitted or mounted a slide-valve M, the rod N of which is connected to an arm N′, projecting radially from the rock-shaft $N^2$, journaled upon the main frame, as shown in Fig. 2. The rock-shaft $N^2$ is further provided with another radial arm $N^3$, which projects upwardly and is connected by means of a rod P with

the strap of an eccentric Q, secured upon the end of the main shaft C, as clearly shown in Fig. 1. The relative position of the eccentric Q and saw-gate and the counter-balance is such that just before the saw-gate reaches its lowest point and the counter-balance its highest point the valve M will be in such position as to cause the exhaust from the ends of the cylinder and open its inlet-ports at the center, as shown in Fig. 2. Steam or other fluid entering between opposing ends or faces of the pistons H and I moves said pistons away from each other, and thereby causes the counter-weight to descend at the same time that the saw-gate is elevated. As the shaft C continues to rotate, acting through the eccentric Q, it will cause the valve M to again shift to the position shown in Fig. 3 and admit fluid to the opposite ends of the cylinder G, thereby forcing the two pistons inward toward each other and causing the saw-gate and counter-balance to also approach toward each other. It will thus be seen that by reason of the presence of fluid between the opposing faces of the pistons during one movement of the parts, and also owing to the presence of the fluid between the ends of the cylinder and the pistons during another part of the movement of the parts, there is at all times a cushion which will take up all shocks or jars, and which will cause a regular and even movement of the parts.

It is obvious that instead of employing a single cylinder with two pistons working therein two separate cylinders, each with its own piston, might be employed; but I prefer the arrangement shown, for the reason that it is simpler to construct and, as I believe, more efficient in operation.

Steam, air, or any other suitable fluid may be employed to actuate the pistons.

It is obvious that instead of employing three crank-arms C′, C², and C′ one of the arms C′ may be omitted and the counter-balance connected with the shaft C by means of a single pitman; but I prefer the arrangement shown, as it equalizes the strain and prevents binding of the parts.

No claim is made herein to matters embraced in my pending application, Serial No. 297,595.

Having thus described my invention, what I claim is—

1. In a gang-saw mill, the combination, with a frame-work, of a cranked shaft, a vertically-moving saw-sash and a vertically-moving counter-balance, each connected with the shaft and arranged, respectively, above and below the latter, and a cylinder mounted upon the frame-work below and in line with the shaft, and having a piston to impart motion to the several parts.

2. In combination with frame A, saw-gate B, and counter-balance F, a cranked shaft C, journaled in the frame A, pitmen D and E, carried by the saw-gate and the counter-balance, respectively, and connected with diametrically-opposed cranks of the shaft, a cylinder G, pistons H and I, connected, respectively, with the saw-gate and the counter-balance and both working within the cylinder, and a valve M, adapted and arranged to admit fluid to the cylinder at the ends and middle alternately.

3. In combination with frame A, saw-gate B, and counter-balance F, a crank-shaft C, journaled in the frame, a pitman D, connecting the saw-gate with the shaft, a pitman E, connecting the counter-balance with the shaft, a cylinder G, a piston H, connected with the saw-gate and working within the cylinder, a piston I, connected with the counter-balance and also working within the cylinder, a valve for controlling the admission of fluid to and its exhaust from the cylinder, an eccentric mounted upon the main shaft, and a connection between the valve and eccentric.

4. In combination with a main frame, a saw-gate, a cranked shaft, and a counter-balance, all arranged for operation substantially as shown, a cylinder, two pistons, one carried by the saw-gate and the other carried by the counter-balance and both working in the cylinder, a valve for controlling the induction and eduction of fluid to and from the cylinder, a rock-shaft $N^2$, provided with two radial arms $N'$ $N^3$, an eccentric Q, mounted upon the main shaft C, and rods P and N, connecting the arms of the rock-shaft with the eccentric and valve, respectively.

5. In combination with a main frame, the saw-gate, crank-shaft, and counter-balance, all arranged for operation substantially in the manner shown, a cylinder, a piston I, working within the cylinder and connected with the counter-balance, an open frame K, secured to the saw-gate, a piston H, working within the cylinder and connected with the frame K, and a valve for controlling the induction and eduction of fluid to and from the cylinder.

6. In combination with a main frame comprising the uprights A A, a shaft C, journaled therein and provided between the uprights with cranks $C'$ $C^2$ $C'$ and balance-wheels $C^4$ $C^4$, a saw-gate B, a pitman D, connecting the saw-gate with the crank $C^2$, a counter-balance F, pitmen E E, connected at opposite ends with the cranks $C'$ $C'$ and the counter-balance, an open frame K, secured to the lower end of the saw-gate, a cylinder G, located beneath the crank-shaft and provided with a valve-chest L and valve M, pistons H and I, secured, respectively, to the frame K and counter-balance F and working within the cylinder, a rock-shaft $N^2$, provided with arms $N'$ and $N^3$ and eccentric Q upon the shaft C, a rod P, connecting the arm $N^3$ with the eccentric, and a rod N, connecting the valve M with the arm $N'$, all substantially as shown.

7. The combination of a cylinder and two pistons arranged to work in opposite directions in said cylinder, with a counter-weight connected with one of the pistons and a saw-sash connected to the opposite piston by means

of a double-cranked driving-shaft, the said parts being arranged for joint operation substantially as and for the purpose set forth.

8. In a reciprocating-saw mill, the combination, with a main frame, of a saw-gate, a counter-balance, a shaft provided with diametrically-opposing cranks, pitmen connecting, respectively, the saw-gate and the counter-balance with the cranks of the shaft, and a cylinder provided with two pistons connected, respectively, with the saw-gate and the counter-balance and working in opposite directions, all substantially as shown.

9. In a reciprocating-saw mill, the combination, with a main frame, of a crank-shaft, a saw-gate, a counter-balance, pitmen connecting the saw-gate and the counter-balance, respectively, with the crank-shaft, a cylinder, two pistons, one carried by the saw-gate and the other by the counter-balance and both working in the cylinder, a valve for controlling the admission of fluid to the cylinder, and a connection between the crank-shaft and the valve.

In witness whereof I hereunto set my hand in the presence of two witnesses.

THEO. S. WILKIN.

Witnesses:
C. H. GEORGE,
M. KINTZELE.