

(No Model.)

2 Sheets—Sheet 1.

W. H. RIDGWAY.
CRANE.

No. 411,681.

Patented Sept. 24, 1889.

FIG. 1.

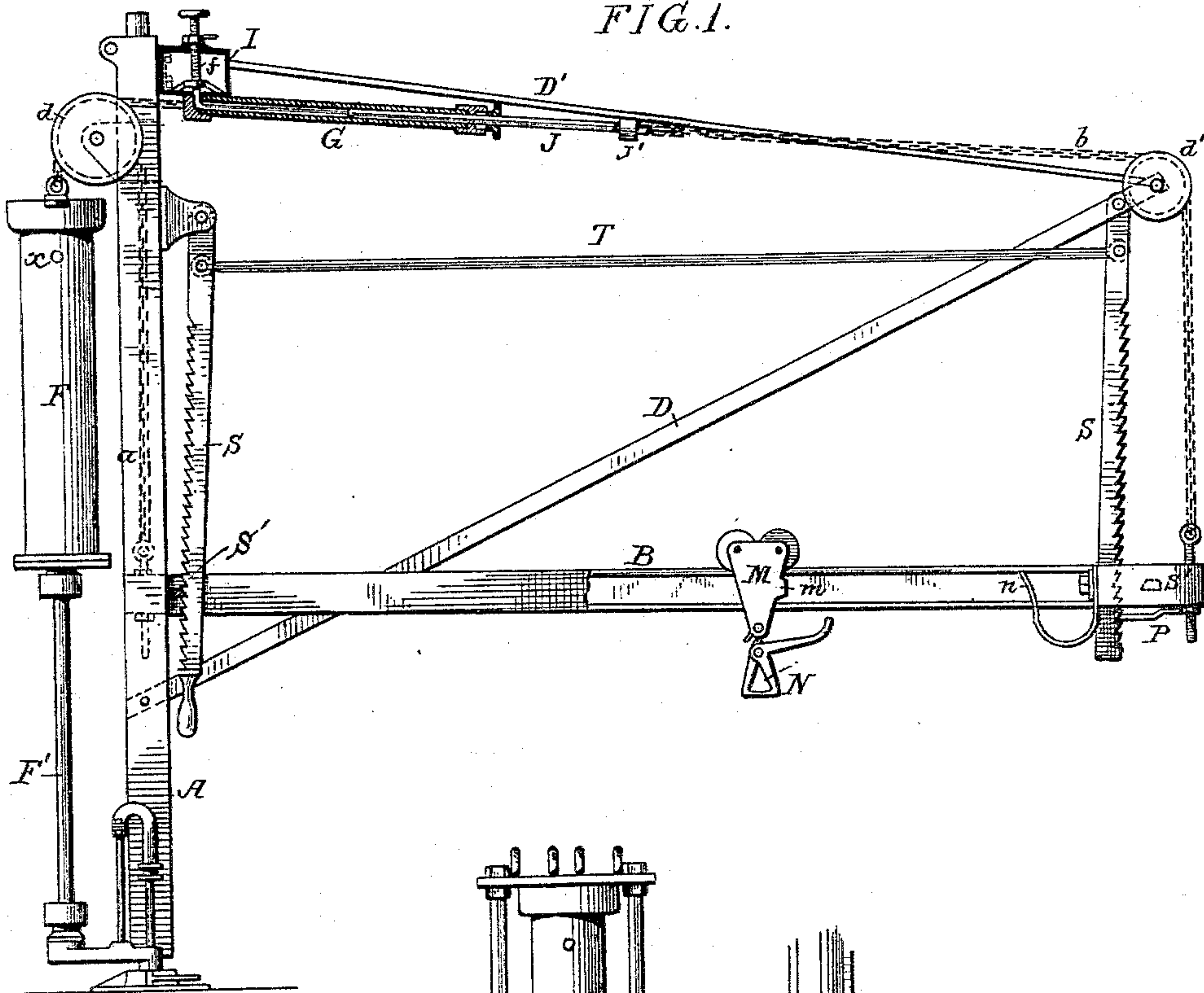


FIG. 8

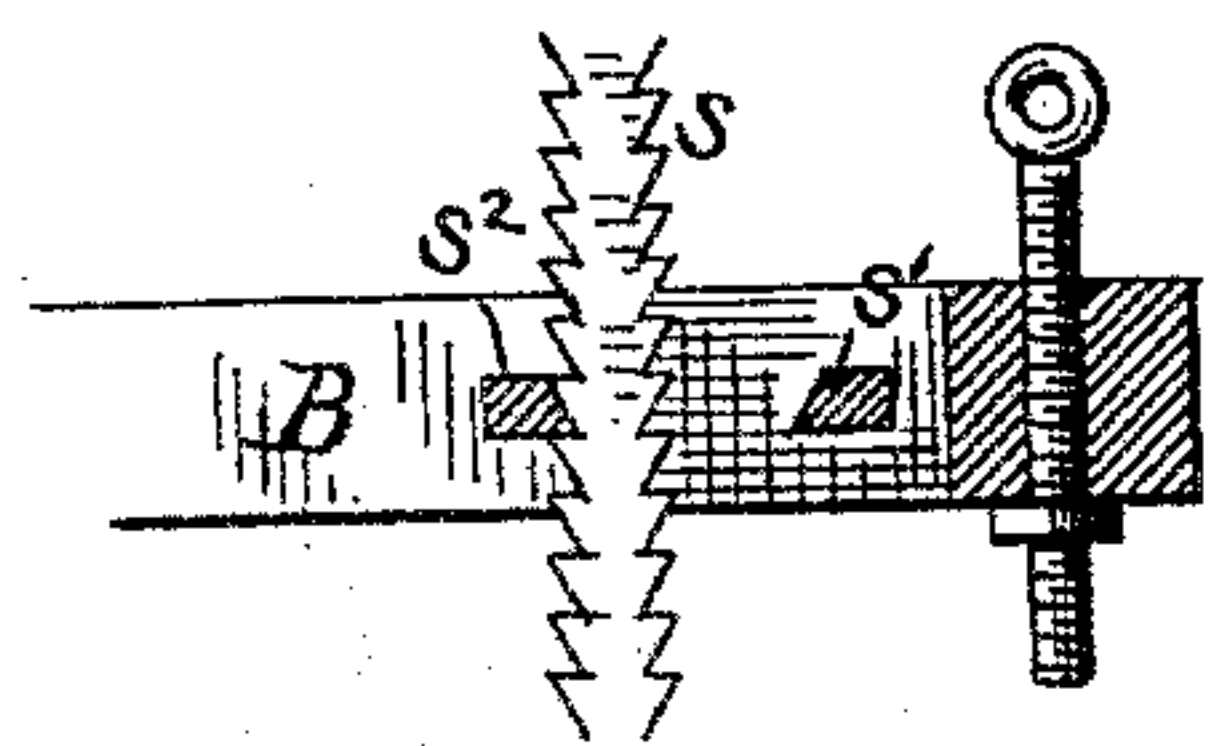


FIG. 5.

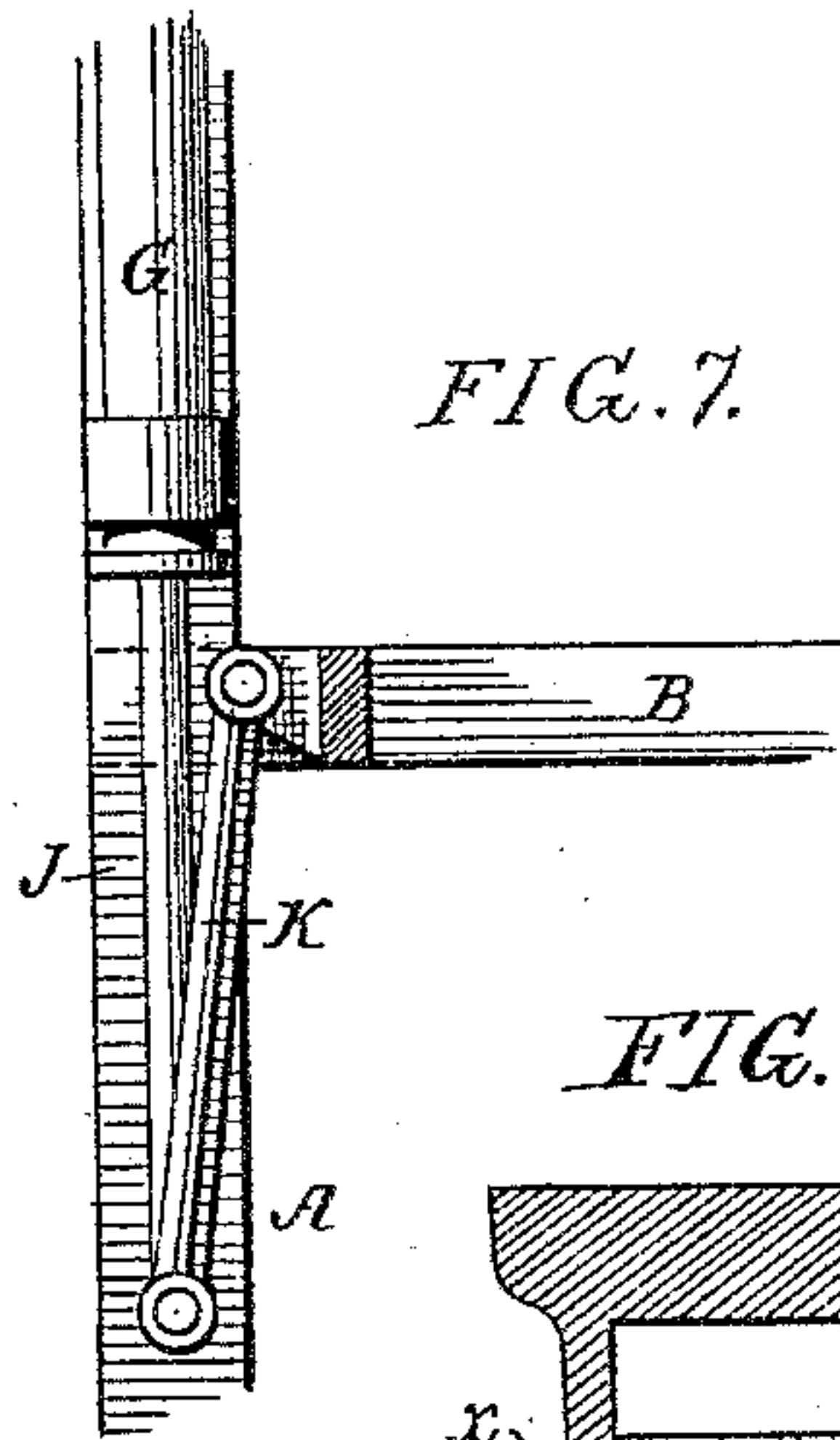
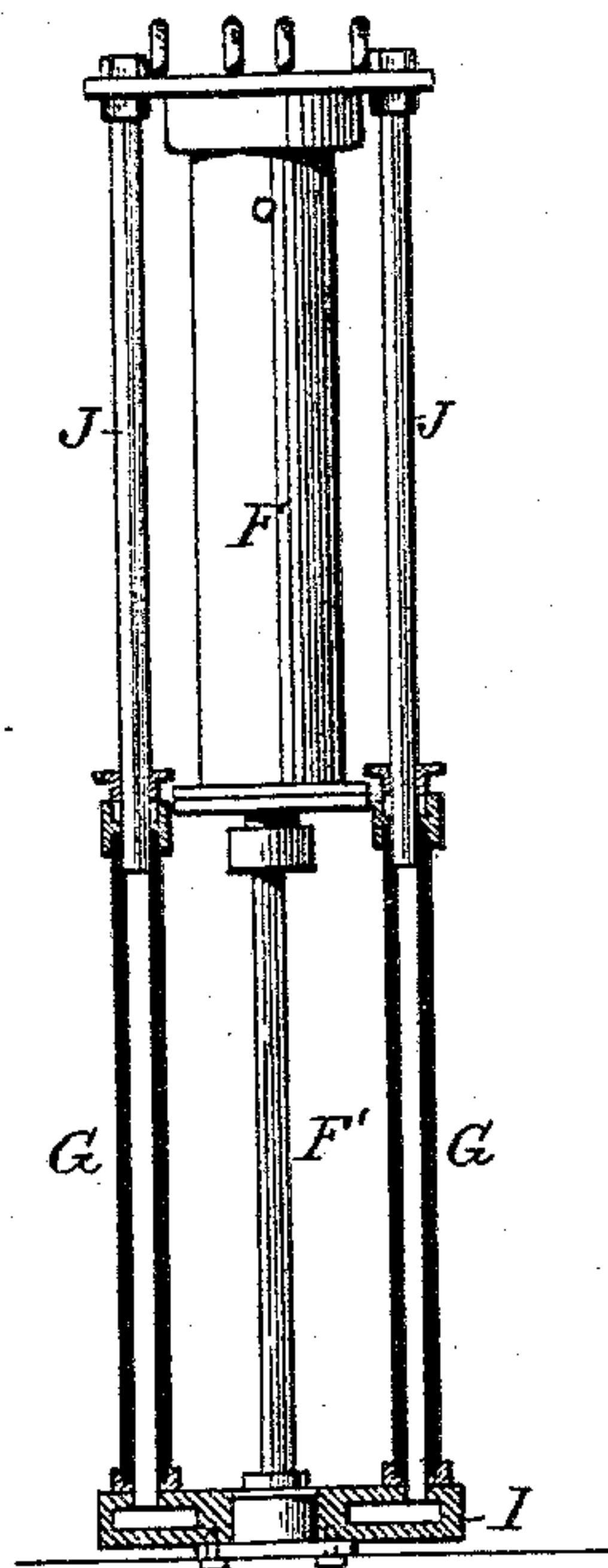
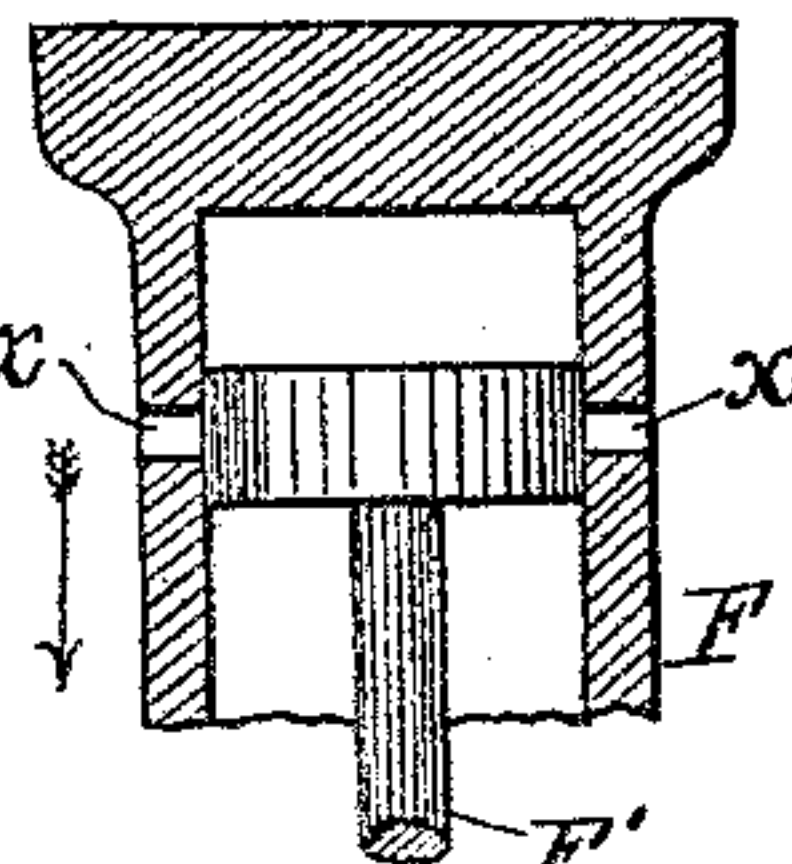


FIG. 7.

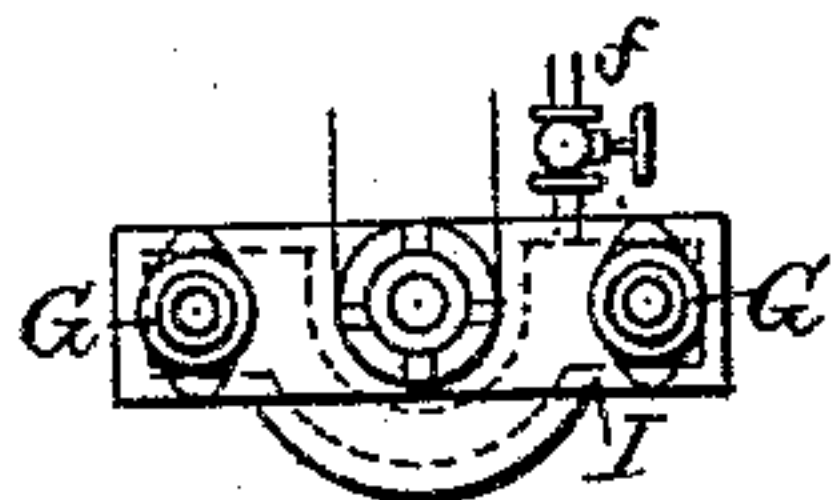
FIG. 9.



Witnesses:

John Wilson
John J. Henry

FIG. 6.



Inventor:

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Howson & Howson

(No Model.)

2 Sheets—Sheet 2.

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FIG. 2.

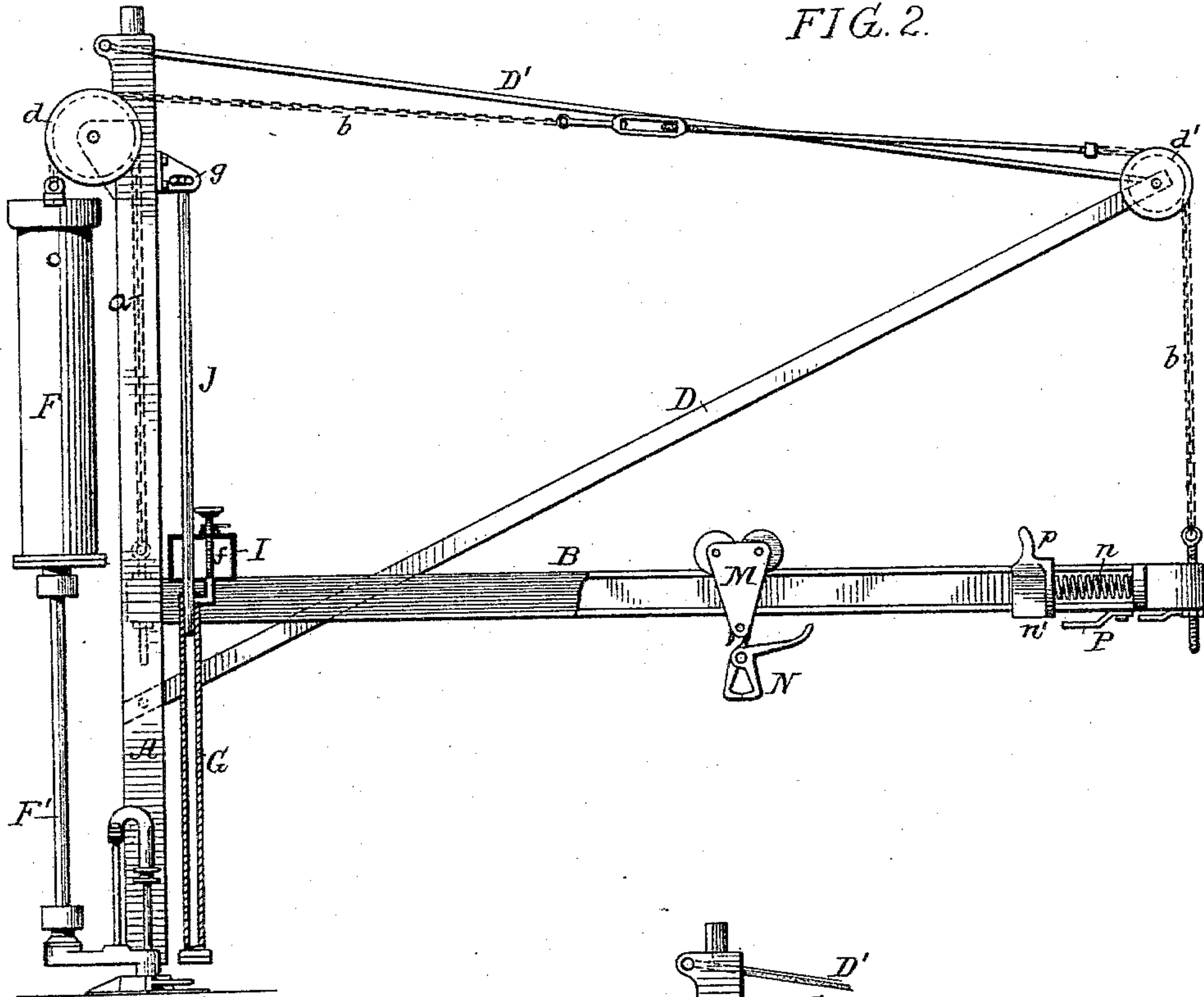
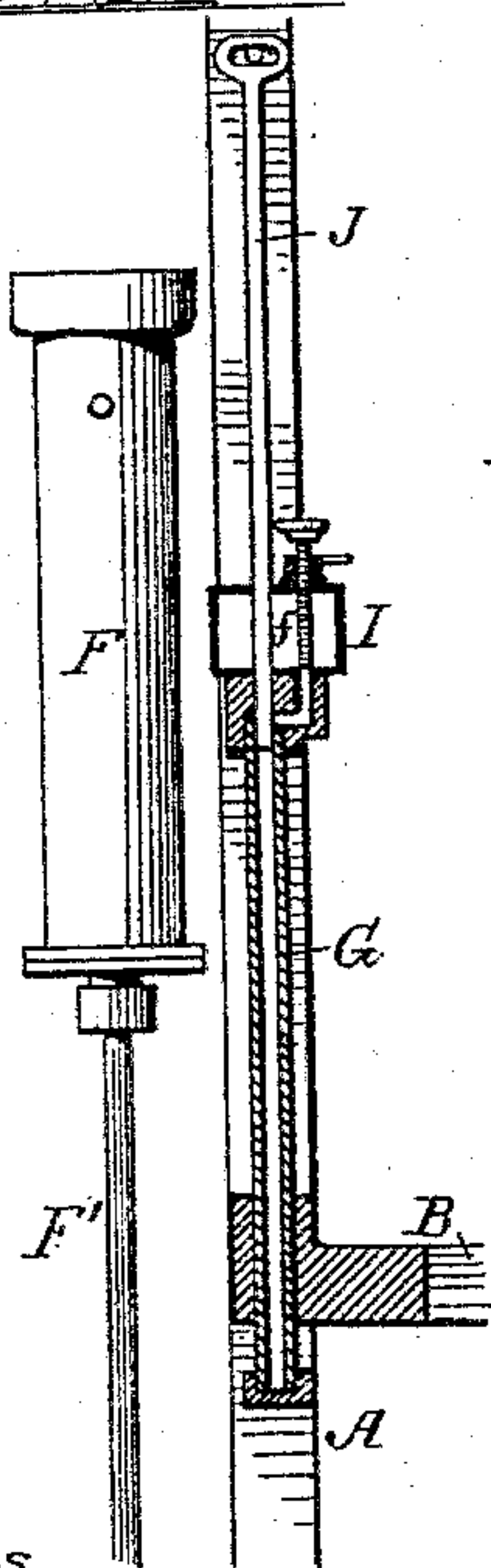
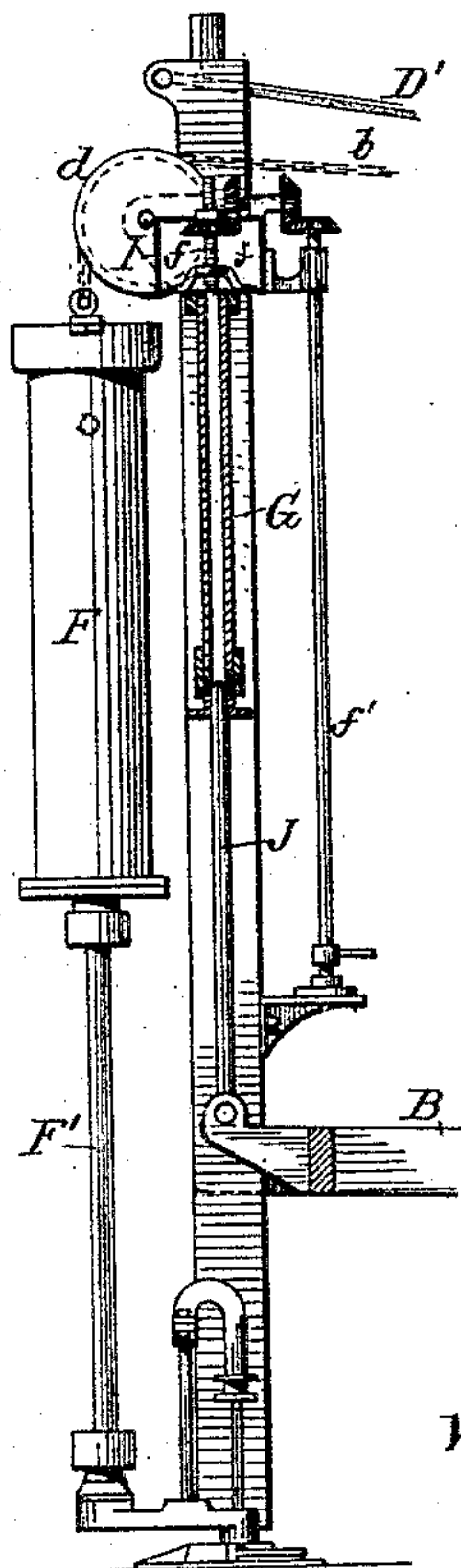


FIG. 3.



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FIG. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM H. RIDGWAY, OF COATESVILLE, PENNSYLVANIA.

CRANE.

SPECIFICATION forming part of Letters Patent No. 411,681, dated September 24, 1889.

Application filed May 18, 1889. Serial No. 311,230. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. RIDGWAY, a citizen of the United States, and a resident of Coatesville, Chester county, Pennsylvania, have invented certain Improvements in Cranes or Hoists, of which the following is a specification.

My invention consists of certain improvements in the steam or hydraulic crane for which Letters Patent were granted to me on the 13th day of December, 1887, No. 374,756, one object of my present improvements being to prevent the rise or descent of the movable jib of the crane with undue rapidity, and a further object being to effect the automatic movement of the trolley in and out on the movable jib of the crane. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a side view, partly in section, of a crane of the character shown in my former patent, but provided with my present improvements. Fig. 2 is a side view of the crane partly in section, but showing another method of carrying out some of the features of my invention. Figs. 3 to 8 are views illustrating further modifications, and Fig. 9 is a sectional view illustrating a special feature of construction.

The crane shown and described in my former patent above alluded to consisted of a vertical post or standard A, having a movable jib B suspended by chains *a* and *b*, which passed over pulleys *d* on the post A and over pulleys *d'* at the outer end of a frame composed of inclined bars D and brace-rods D', the inner ends of the chains being connected to a cylinder F, free to move vertically on a fixed rod F', which was hollow and had within the cylinder a piston fitting snugly thereto, and provided with openings whereby fluid, after passing through the hollow piston-rod, was permitted to escape into the cylinder beneath the piston, thus causing the descent of the cylinder and the lifting of the movable jib of the crane. The speed of ascent and descent of the crane in this case, however, was dependent partly on the care of the attendant in charge of the valves of the crane and partly upon the perfect fitting of the moving parts, and there was liability of the raising

or lowering of the jib of the crane too rapidly in case of any premature discharge of the load while the jib was rising, or in case of any defect in the parts, or of careless handling of the valves. In order to overcome this objection, I now provide the hoisting mechanism of the crane with a retarding device whereby the movement of the jib is regulated and the speed of the movement restricted, so that no accident is likely to occur because of careless manipulation of the crane, premature discharge of the load, or any defect in parts of the hoisting device.

The regulating device consists of a cylinder G, communicating through a contracted passage with a reservoir I of water or other liquid, a plunger J being adapted to the cylinder, and either the plunger or cylinder being connected to a movable part of the crane, while the other element of the combination is connected to a fixed part of the crane, so that in the operation of the crane the plunger is forced into and withdrawn from the cylinder, so as to cause a flow of liquid from or into the same at a rate determined by the area of the passage between said cylinder and the liquid-reservoir, this area being, by preference, controlled by means of a valve *f*. The rate of flow of the liquid through this contracted passage thus determines the rate of movement of the movable jib of the crane, and by properly regulating the area of the passage the limit of speed at which the jib can be moved may be varied, as desired.

In Fig. 1 I have shown the cylinder G and its reservoir mounted at the upper end of the fixed post or standard A of the crane, the plunger J having a cross-head J', connected to the operating-chains *b* of the jib; but it will be evident that various other constructions and locations of the cylinder, reservoir, and plunger may be adopted without departing from the essential feature of the invention. For instance, in Fig. 2 I have shown the cylinder and its reservoir carried by the movable jib, the plunger being connected at its upper end to a bracket *g* on the post of the crane, this bracket being slotted horizontally to permit movement of the upper end of the plunger, rendered necessary by the tilting of the jib of the crane, as described hereinafter; and in Fig. 3 I have shown a sub-

stantially similar arrangement, in which, however, the cylinder, reservoir, and plunger are contained between the opposite side bars of the post or standard of the crane, instead of being outside the latter.

In Fig. 4 I have shown a similar location of the parts, but have shown them in reverse relation—that is to say, with the cylinder and reservoir carried by the fixed post and the plunger connected to the movable jib—the controlling valve-stem f in this case being connected by suitable gearing to a vertical shaft f' , so as to permit it to be operated from the lower portion of the post, the reservoir itself in this case being out of reach.

In Figs. 5 and 6 I have shown a duplex arrangement, the cylinders being carried by the frame which supports the lower end of the hollow piston-rod F' and the plungers being carried by the cylinder Γ , said plungers and cylinders being located one on each side of the cylinder.

In Fig. 7 I have shown an arrangement substantially similar to that in Fig. 4; but instead of connecting the lower end of the plunger directly to the inner end of the movable jib it is connected thereto by means of depending links, so that the jib can be raised to a point above the lower end of the cylinder, instead of having its upward movement stopped by contact with said lower end of the cylinder, as in the construction shown in Fig. 4.

The regulating device may, if desired, control the movement of the jib in but one direction, although it is by preference constructed in all cases as described, so as to control this movement in both directions.

In order to arrest the descent of the cylinder as it nears the limit of descent, the cylinder has near the upper end an opening x , through which the air above the piston escapes as the cylinder descends, until the opening is closed by the piston, as shown in Fig. 9, the air above the piston being then compressed, so as to act as a cushion during the further descent of the cylinder.

In order to provide for the automatic running in and out of the trolley M on the jib B of the crane, the latter may be adjusted, so as to have a slight downward grade from the inner to the outer end, so that when the loaded trolley is released at the inner end of the jib it will run by gravity to the outer end of the same, where the tongs N , which carry the load, are operated by a tripper P , so as to open and release the load. Before reaching the limit of its outward movement a projection m on the trolley strikes and compresses a spring n near the outer end of the jib B , so that when the load has been released the recoil of this spring will be sufficient to force the empty or unloaded trolley back to the inner end of the jib, where it is caught and held while being reloaded.

In the crane shown in Fig. 2 the trolley, instead of acting directly upon the spring, acts

upon a sliding block n' , which has a lug p , to be struck by one of the wheels of the trolley as the latter approaches the outer end of the jib, this sliding block being acted upon by coiled springs n , so as to effect the backward movement of the trolley after it has delivered its load. In case it is not desired to rely upon the springs, however, for effecting the return movement of the trolley, gravity may be relied upon to move or assist in moving the trolley in both directions, and in order to effect this result I hang to the post of the crane and to the outer ends of the beams D notched retaining-bars S , connected by a rod T , one of these bars engaging with a lug S' at the inner end of the jib, and the other engaging with a similar lug S' at the outer end of the jib, the teeth of the two bars being reversely arranged in respect to each other, so that when the teeth of the inner bar are in engagement with its lug the teeth of the outer bar will be free from engagement with the outer lug, and vice versa, there being such play in the movement of the bars, however, that they may be held in the intermediate position, in which both bars are free from engagement with their lugs.

Supposing that the jib is in a horizontal position and has been raised to the desired extent, so as to lift the load while both of the toothed bars were free from engagement with their lugs, the trolley being at the inner end of the jib, in order to cause the trolley to run to the outer end of the jib the bars S are operated so that the inner bar engages with its lug and prevents any descent of the inner end of the jib. The hoisting-tackle is now slackened, so as to permit a slight descent of the outer end of the jib, thus permitting the trolley and its load to run down toward said outer end. After it has discharged its load the rod S may be moved so as to cause the outer rod to engage with its lug and free the inner rod from engagement, whereupon on again slackening the hoisting-tackle the inner end of the jib will be permitted to drop slightly and the trolley will be caused to run back toward said inner end of the jib.

In case it is desired to lock and hold the jib of the crane in horizontal position for a considerable time without keeping the steam in the cylinder, one of the bars S may be duplex, so that it may be caused to engage with a back lug S^2 , as in Fig. 8, when the other bar is in engagement with its lug, the teeth of the latter bar in this case being so long that while they may engage with their lug without causing engagement of the duplex bar with the lug S^2 sufficient extra movement is permitted to cause such engagement, if desired.

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

1. The combination of the fixed post and frame of the crane, the movable jib, the suspension-chains, and hoisting mechanism therefor, with means for retarding or restrict-

ing the movement of the jib, comprising a liquid-reservoir, a cylinder communicating therewith through a contracted passage, and a plunger adapted to said cylinder, one of the parts being carried by the fixed portion of the crane and the other by a movable portion of the same, substantially as specified.

2. The combination of the fixed post and frame of the crane, the movable jib, the suspension-chains, and hoisting mechanism therefor, with means for restricting and regulating the movement of the jib, comprising a liquid-reservoir, a cylinder communicating therewith, a valve for regulating the area of the passage between the cylinder and reservoir, and a plunger adapted to the cylinder, one of the parts being carried by the fixed portion of the crane and the other by a movable portion of the same, substantially as specified.

3. The combination of the inclined jib of the crane, the gravity-propelled trolley, and the tripping device for the tongs of the same, with an elastic stop actuated by the trolley as it approaches the limit of its outward movement and serving by its recoil to return the trolley to the higher inner end of the jib after it has delivered its load, substantially as specified.

4. The combination of the jib and its trolley, hoisting devices for the jib, and notched bars and catches for locking the inner and outer ends of the jib, so as to prevent vertical movement, substantially as specified.

5. The combination of the jib and its movable trolley, hoisting devices for the jib, the notched bars and catches for locking the jib in position, said bars being connected and constructed so that when one is in the locking position the other is unlocked, substantially as specified.

6. The combination of the frame and movable jib of the crane, the suspending-chains for the jib, the fixed piston-rod and its piston, and the cylinder connected to the suspension-chains and adapted to the piston, said cylinder being closed at the top but having an escape-opening some distance below the upper end, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. H. RIDGWAY.

Witnesses:

HORACE G. EMERY,
F. L. CAMPBELL,