(No Model.)

6 Sheets—Sheet 1.

B. L. STOWE.

AUTOMATIC CAR BRAKE.

No. 245,577. Patented Aug. 9, 1881.

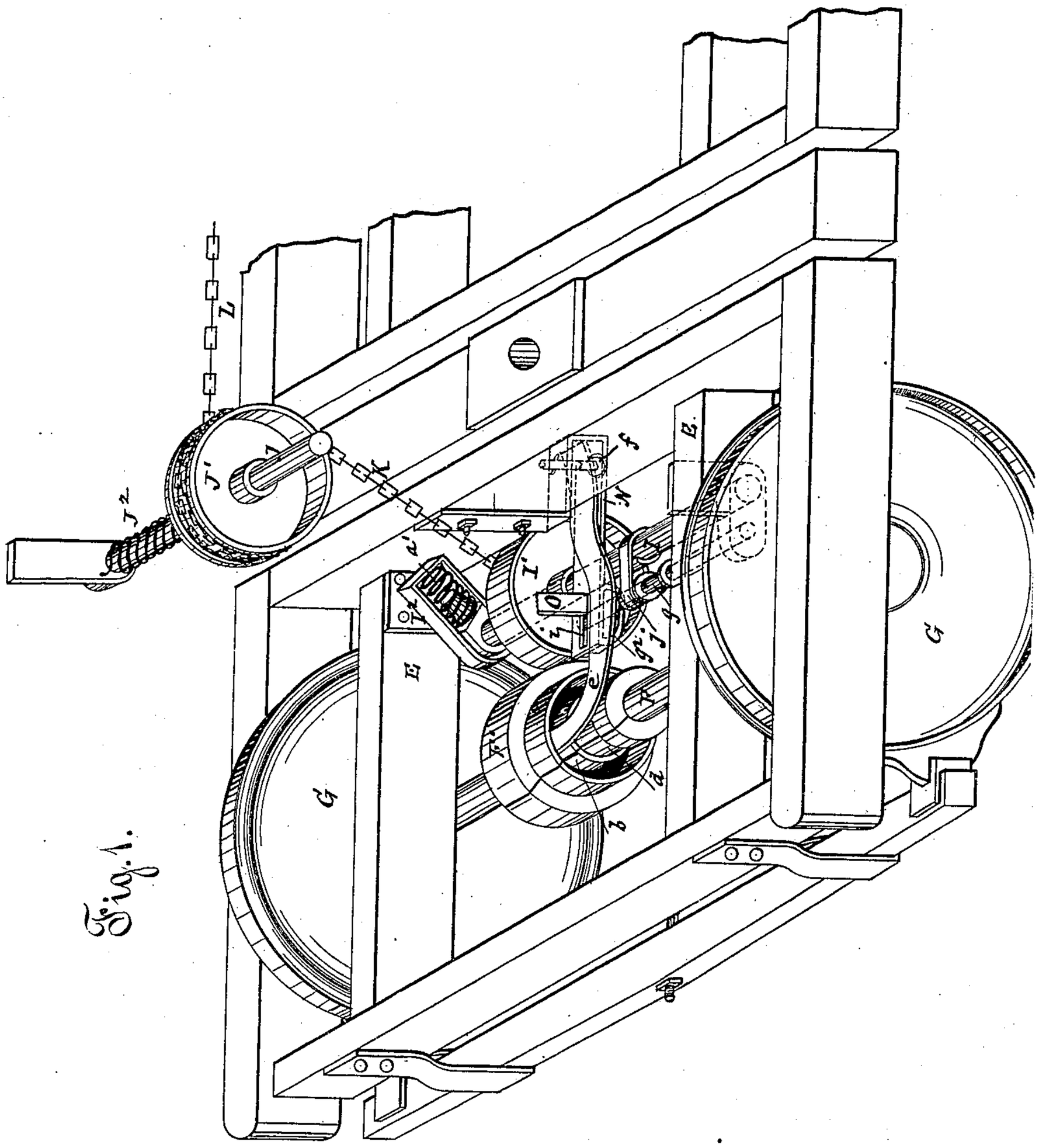


Fig. 1.

Witnesses:
Theo. G. Hoster.
Nathan Stowe

Inventor:
Benjamin L. Stowe

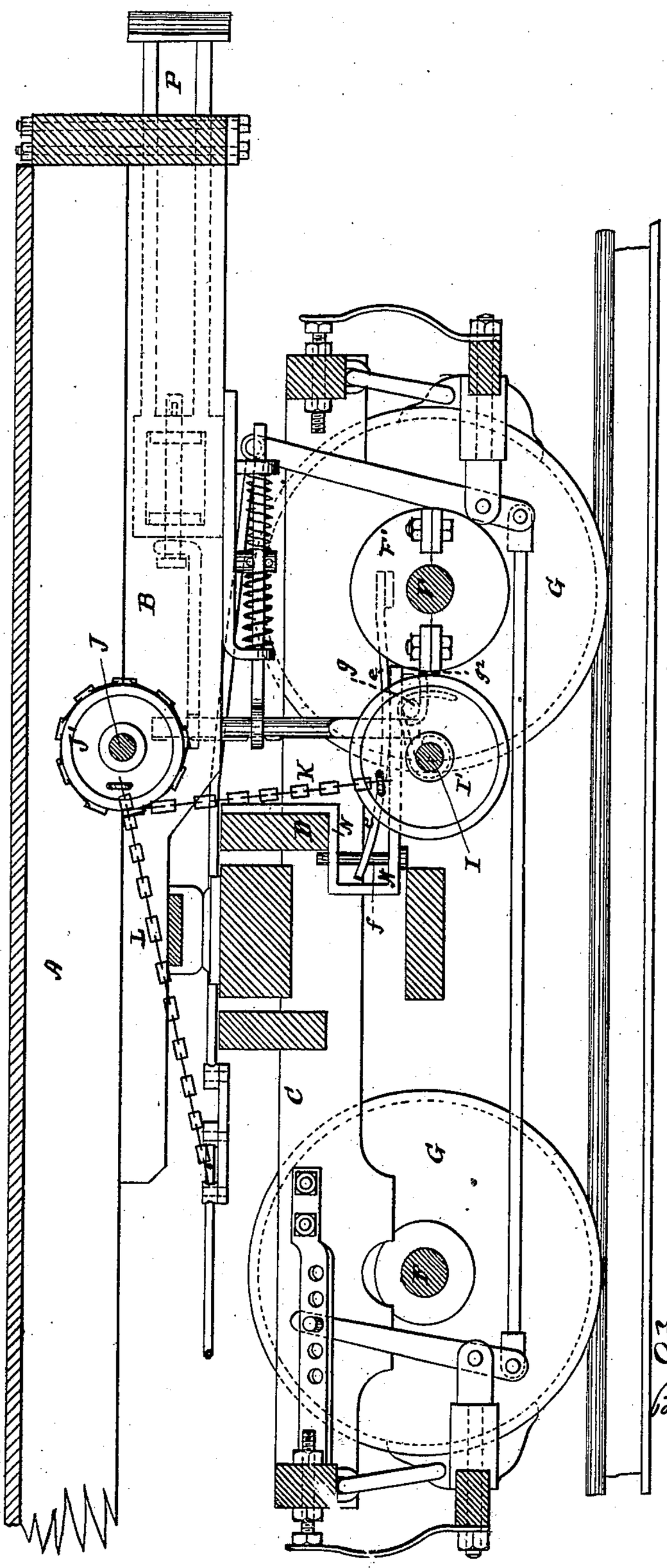
(No Model.) 6 Sheets—Sheet 2.

B. L. STOWE.

AUTOMATIC CAR BRAKE.

No. 245,577. Patented Aug. 9, 1881.

Fig. 2.



Witnesses:
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(No Model.)

6 Sheets—Sheet 3.

B. L. STOWE.

AUTOMATIC CAR BRAKE.

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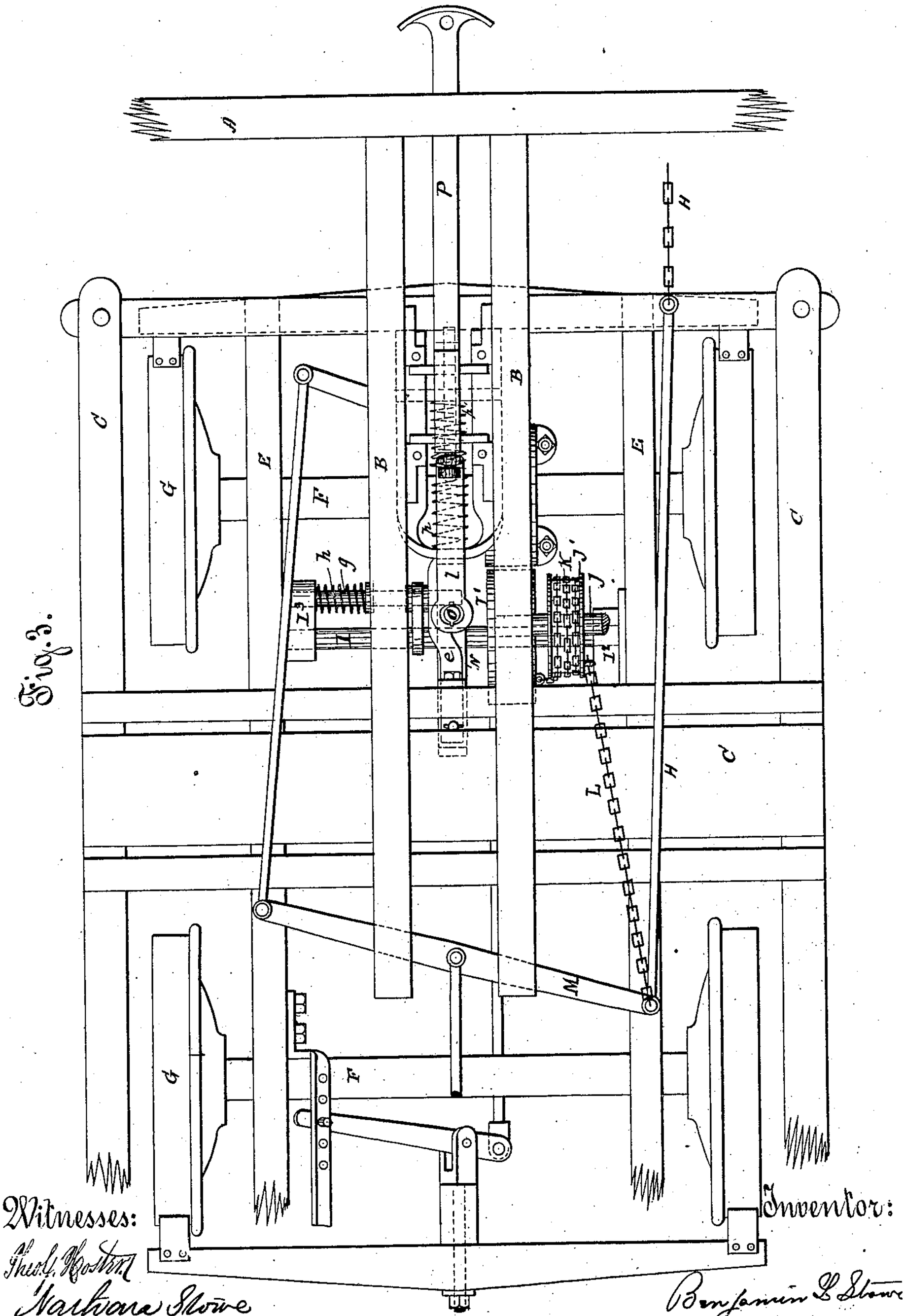

Fig. 3.

Witnesses:
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6 Sheets—Sheet 4.

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AUTOMATIC CAR BRAKE.

No. 245,577. Patented Aug. 9, 1881.

Fig. 4.

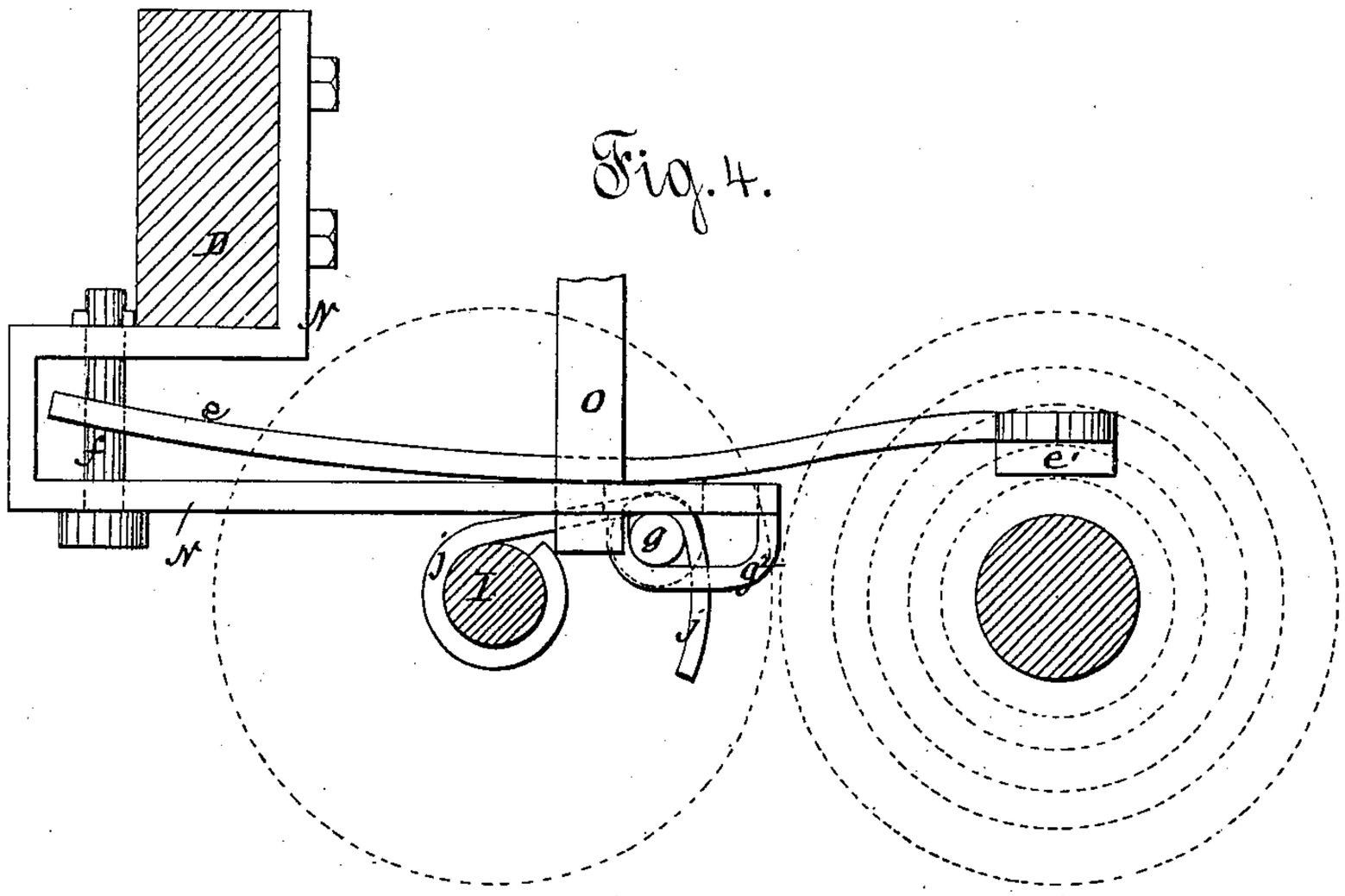

Fig. 5.

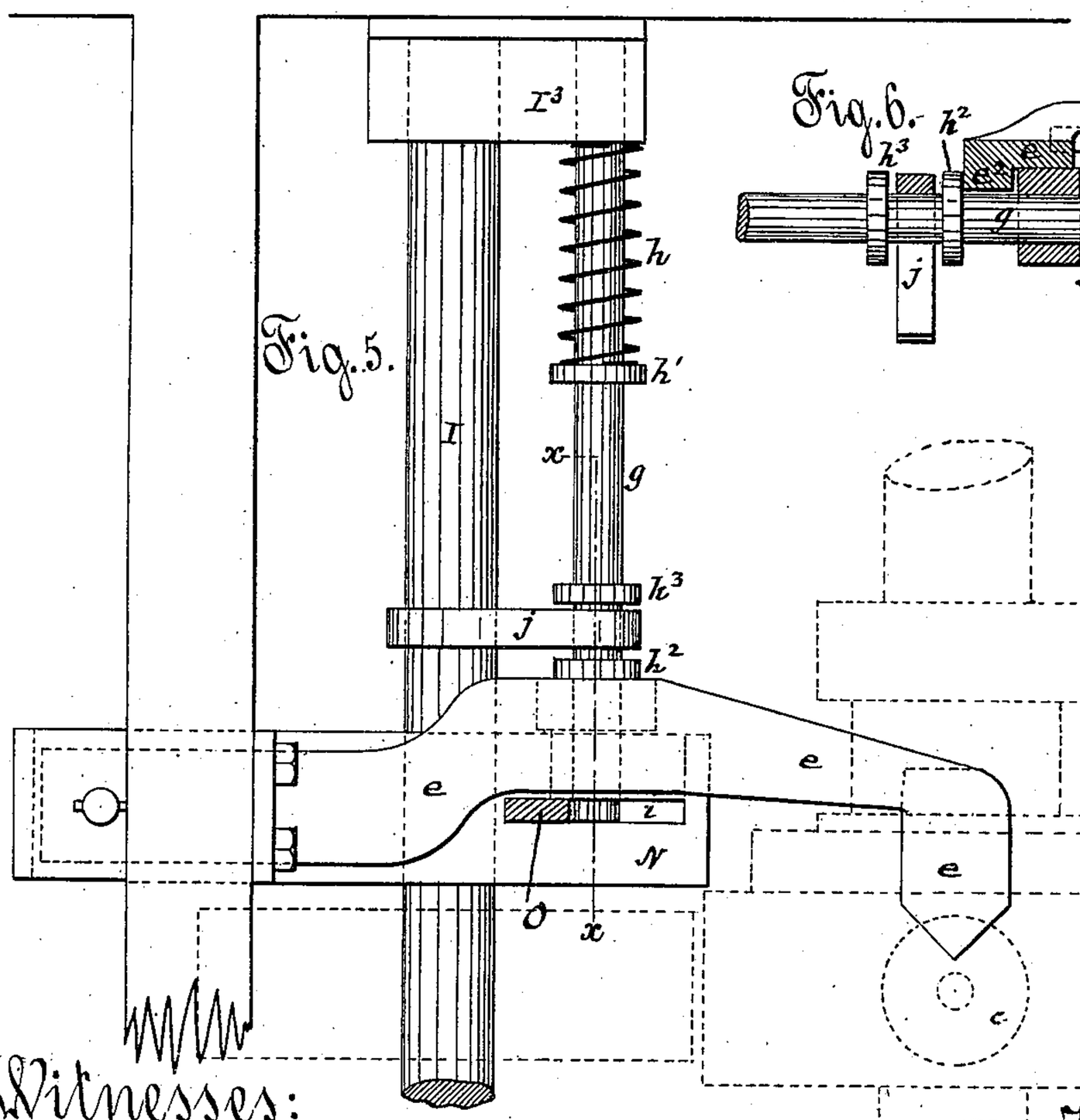

Fig. 6.

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(No Model.) 6 Sheets—Sheet 5.

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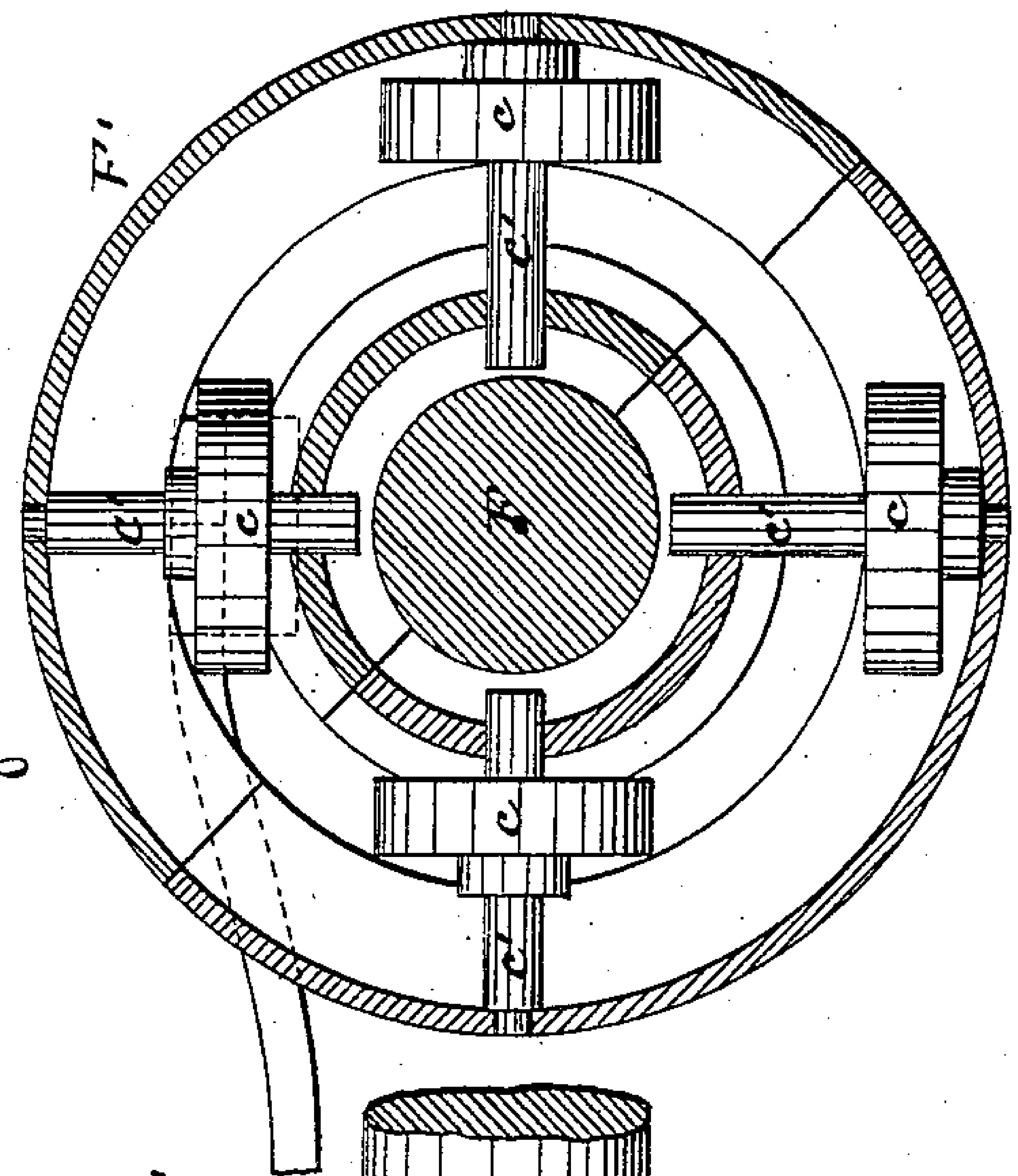

Fig. 8.

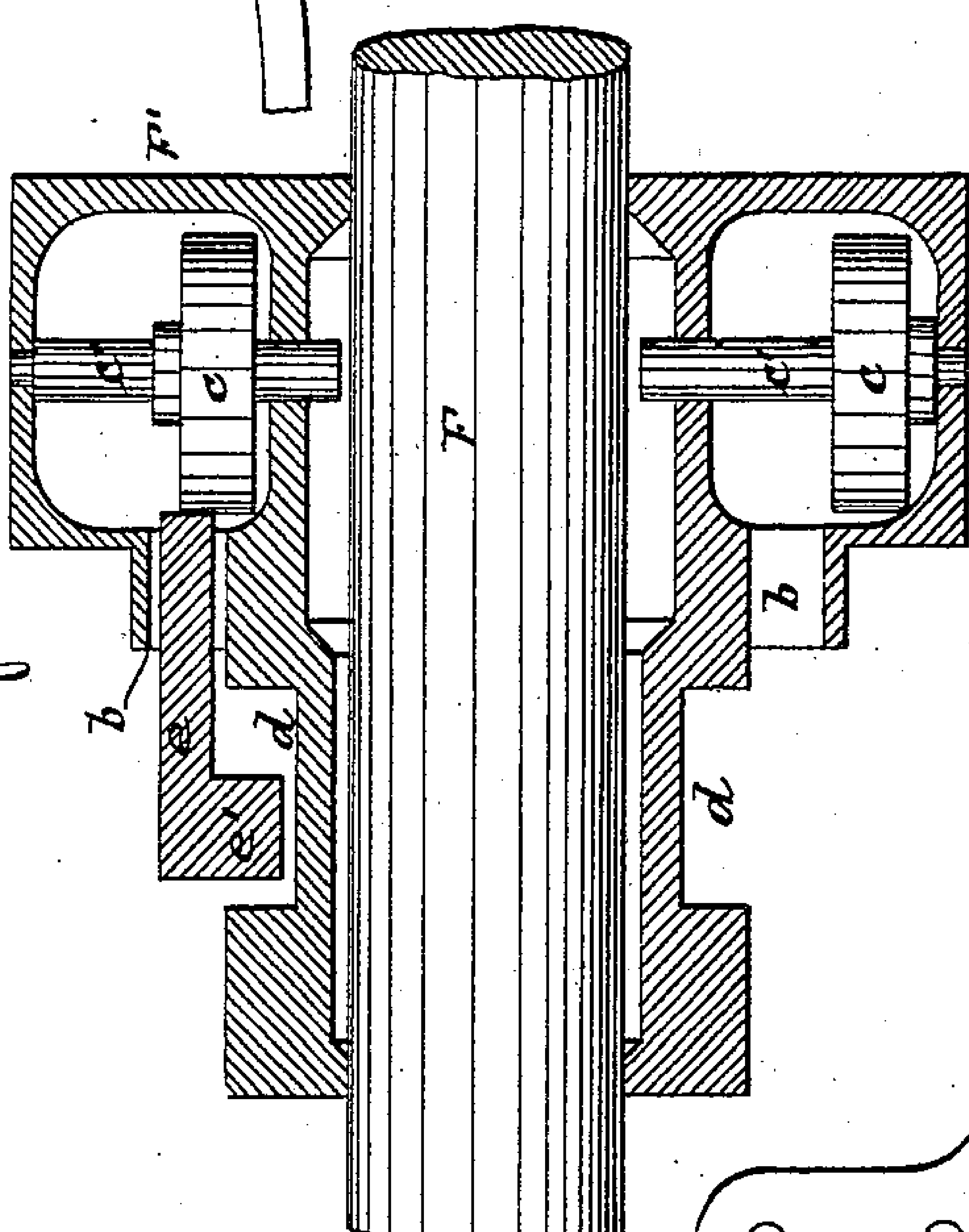

Fig. 7.

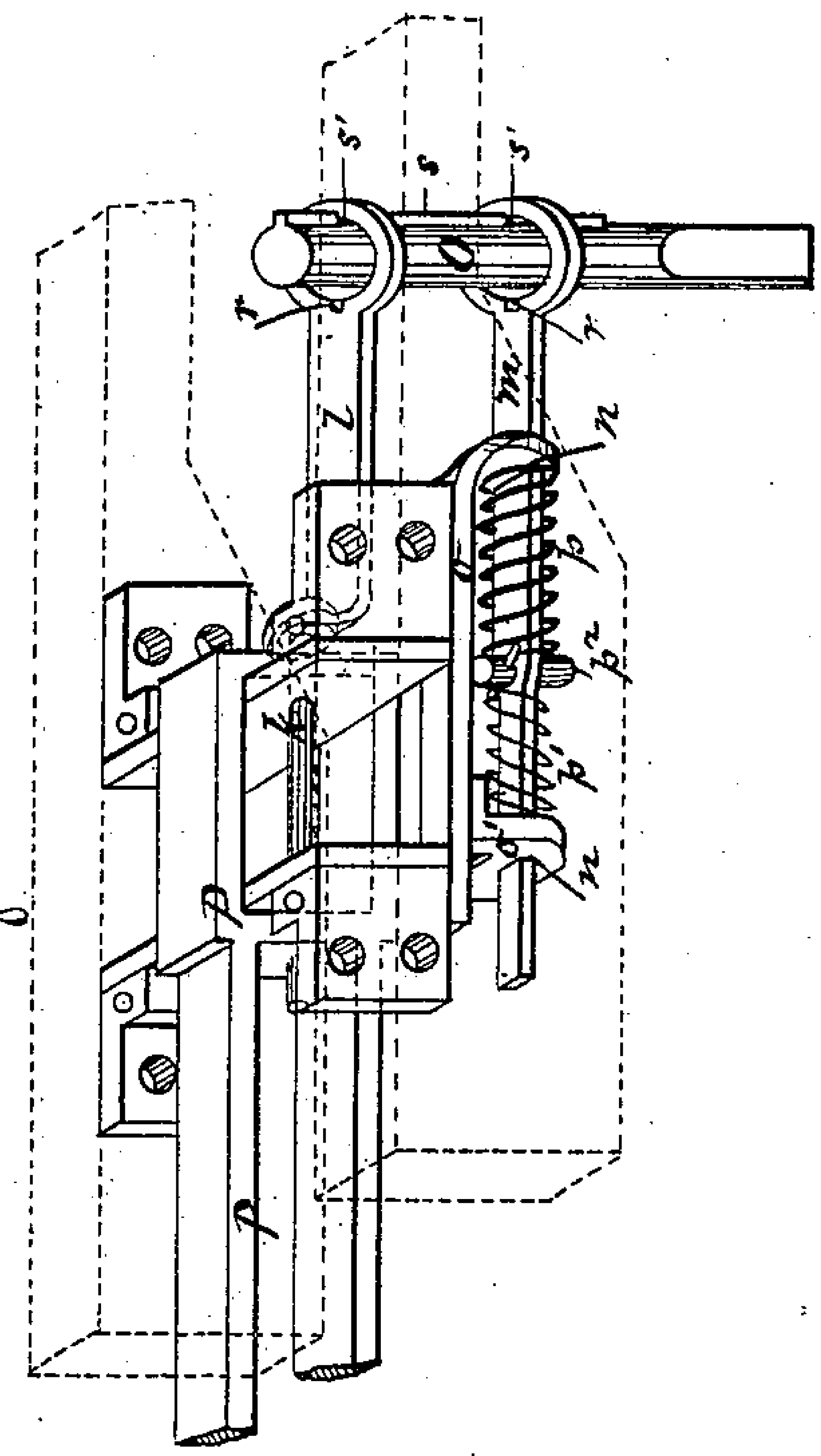

Fig. 11.

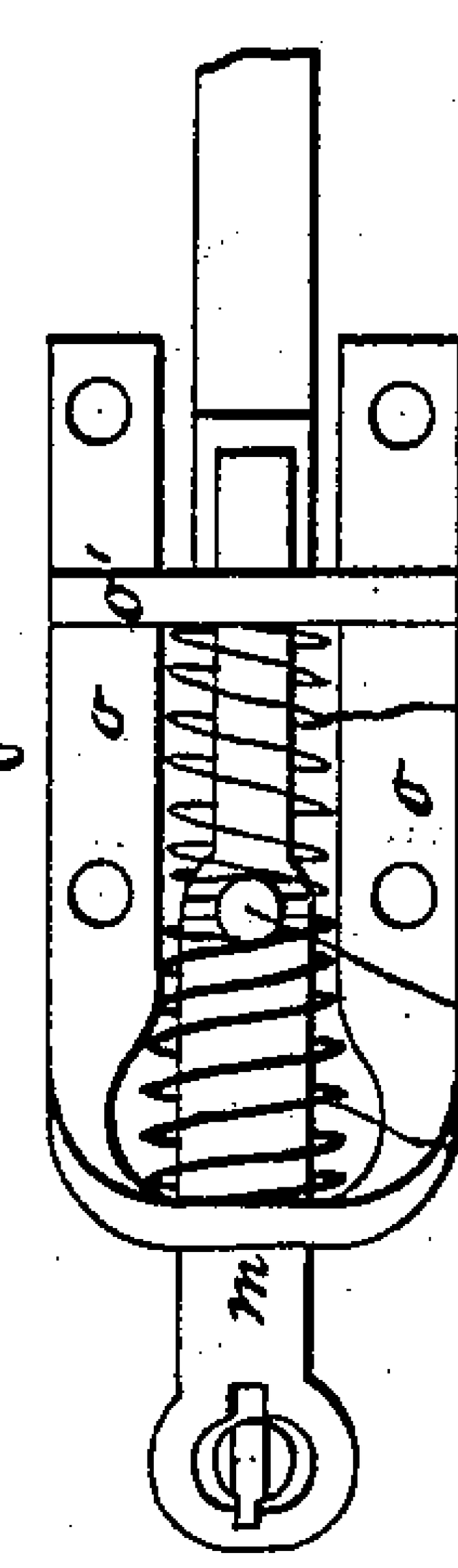

Fig. 12.

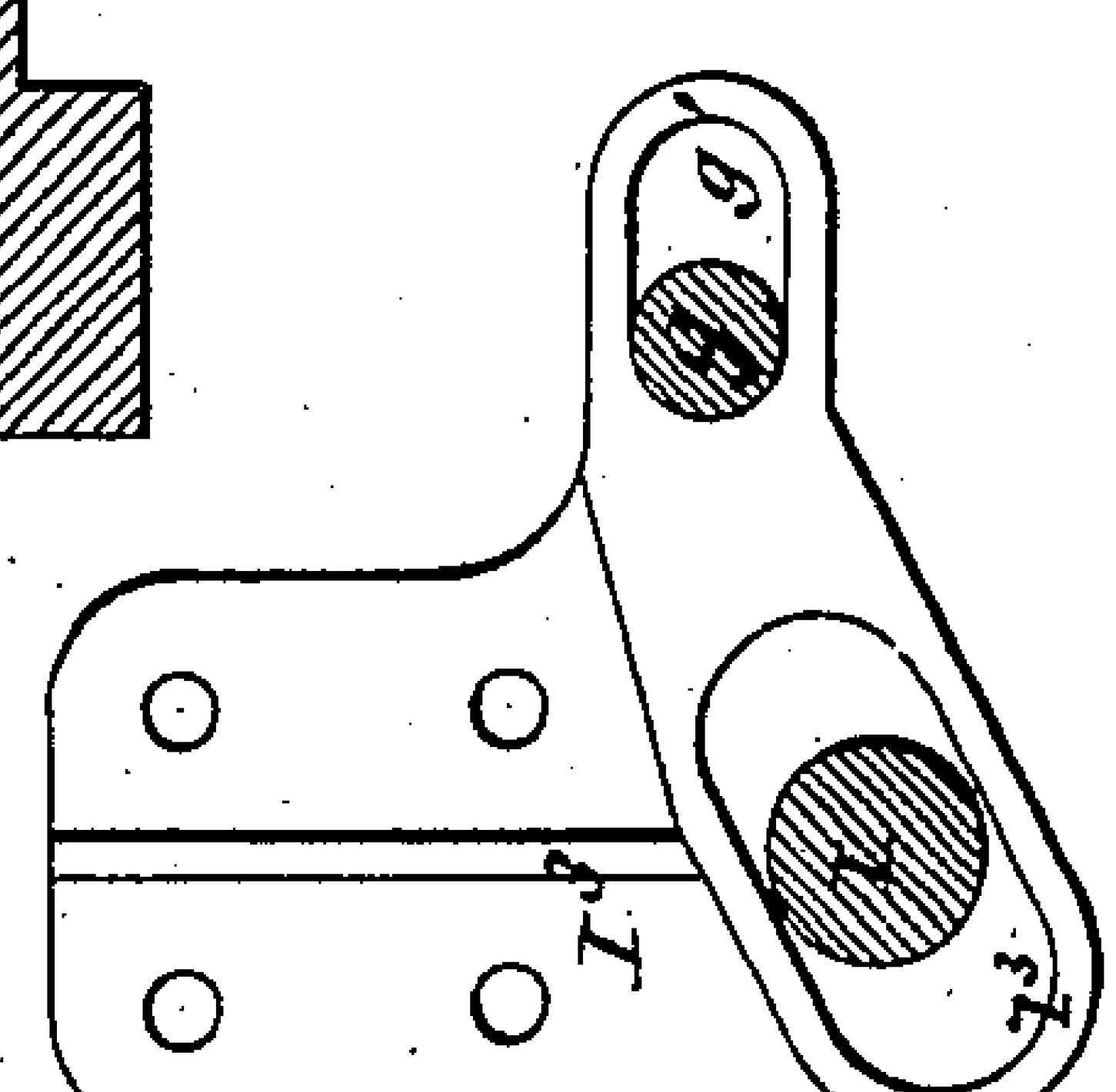

Fig. 10.

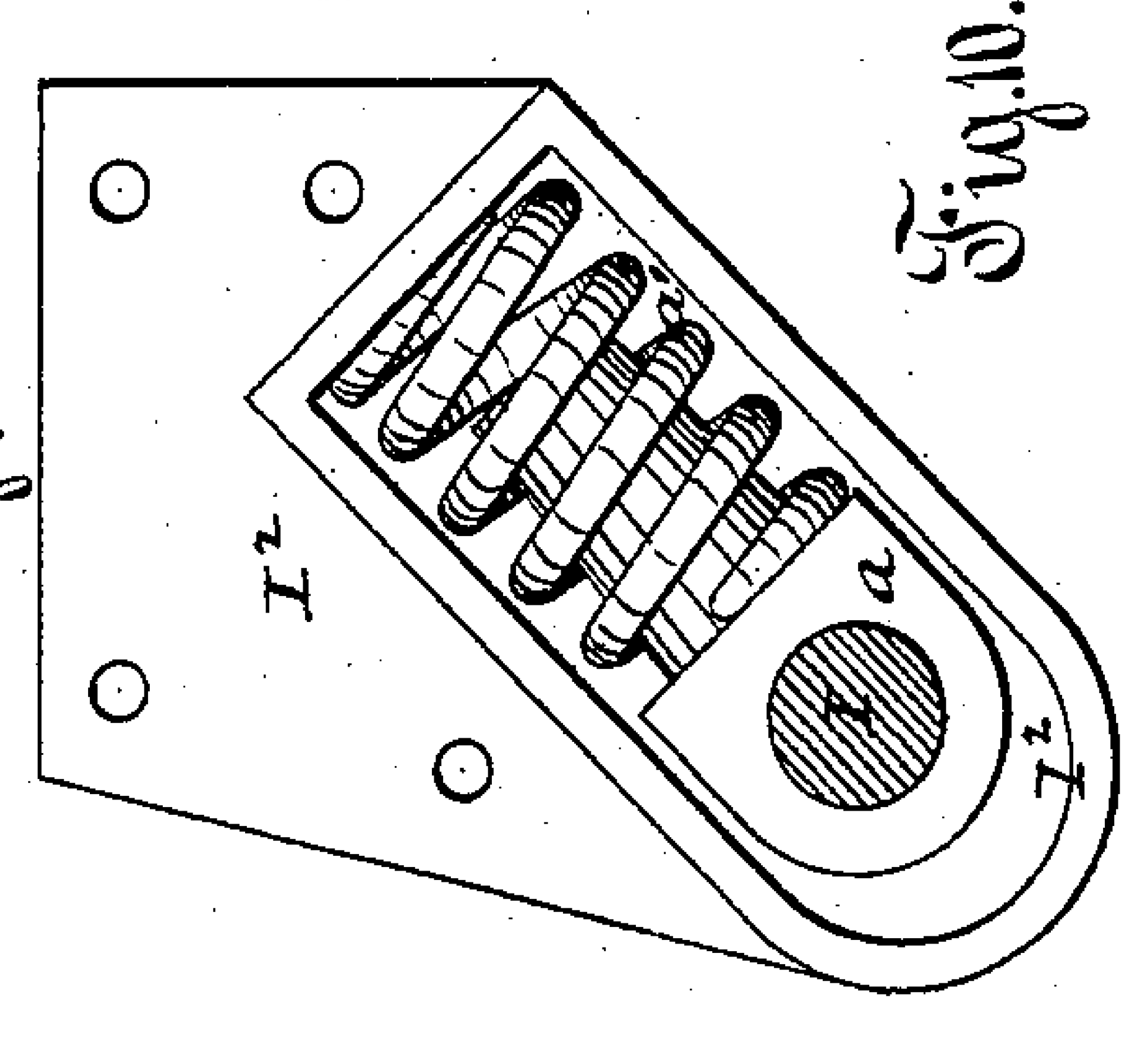

Fig. 9.

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(No Model.) 6 Sheets—Sheet 6.

B. L. STOWE.

AUTOMATIC CAR BRAKE.

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Fig. 13.

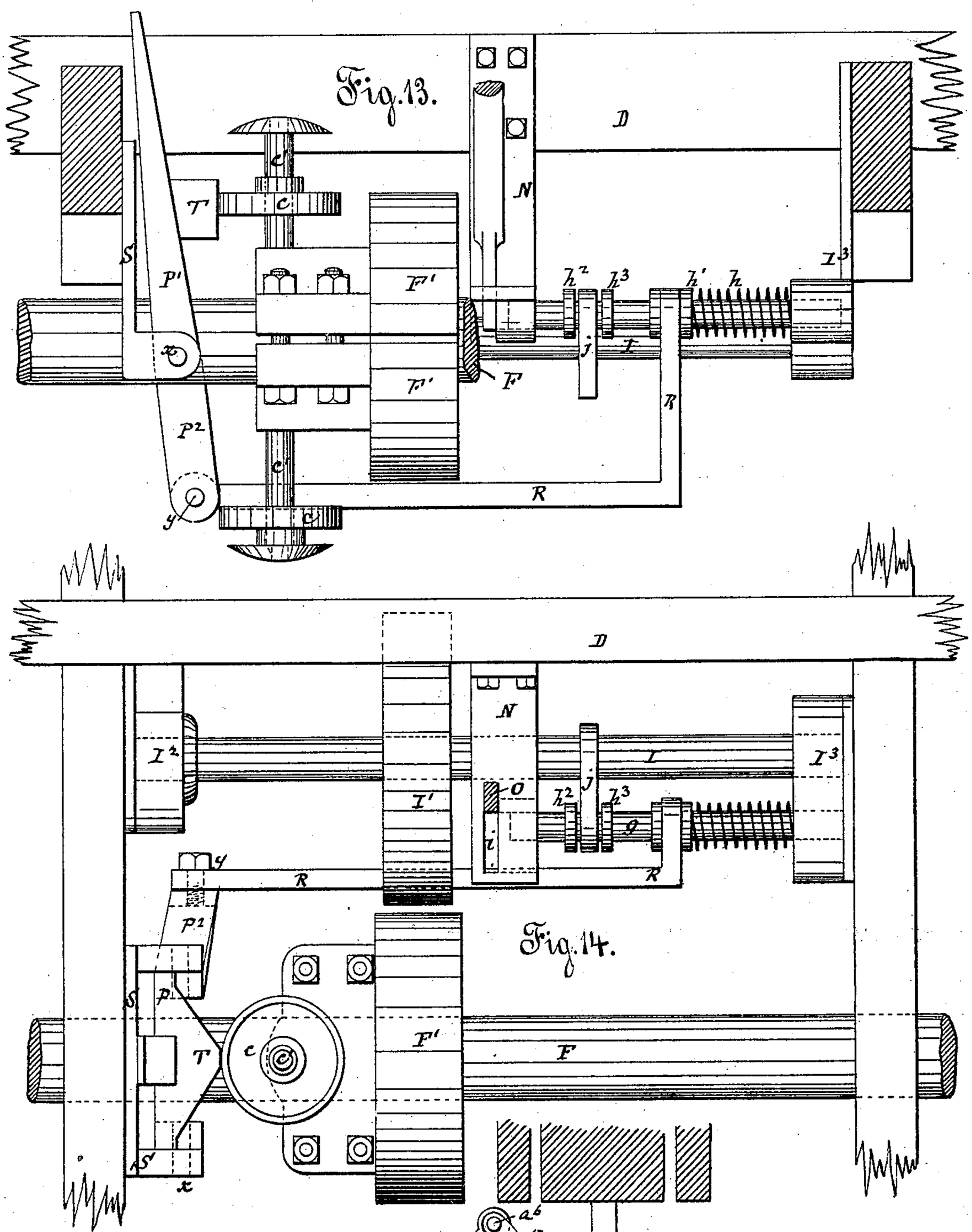

Fig. 14.

Fig. 15.

Witnesses:
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Nathan Stowe

Inventor:
Benjamin L. Stowe

UNITED STATES PATENT OFFICE.

BENJAMIN L. STOWE, OF NEW YORK, N. Y., ASSIGNOR TO J. VAN D. REED, OF SAME PLACE.

AUTOMATIC CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 245,577, dated August 9, 1881.

Application filed May 17, 1881. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN L. STOWE, of the city, county, and State of New York, have invented certain new and useful Improvements in Automatic Brakes for Railway-Cars, of which the following is a specification.

The automatic car-brake to which my invention relates is one of that class in which a shaft connected with the brake mechanism and provided with a pulley or drum is movable to and from one of the car or truck axles provided with a like pulley or drum, so that at required times the shaft may be rotated in order to put in action the brake mechanism by reason of the frictional contact between its drum and that upon the revolving axle; and it may be considered more particularly as an improvement upon the automatic car-brake shown and described in my application for Letters Patent filed in the United States Patent Office November 11, 1880, serial No. 20,425. In common with the mechanism set forth in said application, my present brake contains a friction-pulley shaft movable to and from the car-axle, and provided with a relief-spring which yields to permit the separation of the shaft and axle when the strain on the brakes exceeds the prescribed limit; also, an upper brake or winding shaft combined with a throw-off spring which is put under tension when the automatic-brake mechanism is applying the brakes. I also make use of a centrifugal or gravity mechanism for operating at required times the device which disconnects the friction-pulley shaft from the mechanism by which it is forced toward and into engagement with the car-axle, said centrifugal or gravity mechanism being similar in principle and general mode of operation to that described in my aforesaid application, but differing therefrom in construction and arrangement.

My improvements principally relate to the devices whereby the instrumentalities for moving the friction-pulley shaft to and from the axle are thrown into and out of operative connection with the mechanism which is caused to act on the same by the movement of the draw-bar, my object being to reduce the number of and simplify the parts, obtaining a mechanism which, while entirely effective, shall be free from complication and not liable to get out of order.

The improvements can best be explained and understood by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of so much of a car-truck with my improvements applied as is needed for the purpose of explanation. Fig. 2 is a sectional side elevation of the same, together with the draw bar and timbers and a portion of the car-frame. Fig. 3 is a plan of the same. Fig. 4 is an elevation, and Fig. 5 is a plan on an enlarged scale, of that portion of the mechanism which operates on the friction-pulley shaft. Fig. 6 is a sectional elevation on line *x x*, Fig. 5. Figs. 7 and 8 are longitudinal and transverse sections, respectively, of the centrifugal or gravity mechanism. Fig. 9 is an elevation of that bearing for the friction-pulley shaft which carries the relief-spring. Fig. 10 is an elevation of the other bearing for said shaft. Figs. 11 and 12 represent, respectively in perspective and inverted plan, those portions of the mechanism which are connected to the draw-bar and draw-timbers. Figs. 13, 14, and 15 represent modifications to be hereinafter described.

In the drawings, A are portions of the car-frame; B are the draw-timbers; C is the truck-frame; D, the transom; E are the safety-beams; F, the axles; G, the wheels, and H portions of the hand-brake mechanism, all of which are of ordinary or suitable construction.

I is the friction-pulley shaft, upon which is fixed the pulley or hub I′, said shaft being supported in end bearings, I^2 I^3, (shown more clearly in Figs. 9 and 10,) which are elongated to permit the shaft to be moved to and from the adjoining axle F, so as to bring at required times its hub or pulley I′ into contact with the friction-drum F′ on the axle. In the bearing I^2 the shaft I is received in a box, *a*, movable in the bearing and combined with a relief-spring, *a′*, which permits the shaft to recede from the axle when the strain on the brakes becomes excessive. Shaft I is connected to the upper brake or winding shaft, J, by a chain, K, which is attached to the sides of pulley I′ and to a drum, J′, fast on shaft J, around which drum the chain passes once or twice. The shaft

J is supported in proper bearings at one end in the draw-timber and at the other end in the car-frame, and is combined with a throw-off spring, J^2, which is put under tension when the shaft is rotated to apply the brakes, and acts, when the brakes are to be taken off, to assist in unwinding the chain L from the shaft. This chain L is attached at one end to the side of the drum J′ and at the other end to the equalizing-lever M at the same point at which the hand brake-rod H is also connected to the lever.

The parts above described, in their general arrangement and mode of operation, resemble the like parts of the automatic-brake mechanism contained in my aforesaid application for Letters Patent. They require, therefore, no special description here.

I now proceed to describe the instrumentalities whereby the friction-pulley shaft is at stated times thrown into and out of operative connection with the car-axle which carries the friction-drum.

The friction-drum, which is hollow, is made in halves, which are clamped upon the axle, Figs. 1, 7, and 8. The space within the drum communicates with the outside only through a narrow annular slot, *b*, in one side of the drum. Within the drum is placed the centrifugal arrangement, which consists of, preferably, four wheel-weights, *c*, which can slide in or out, toward or from the axle of the car, upon radial studs *c′*, which extend through and from the inner hub of the drum to and through the outer circumference of the drum. A shoulder upon each of the studs prevents it from slipping outwardly; and when the drum is clamped upon the axles the inner end of the stud rests against the axle, and is thereby prevented from slipping inwardly. The action and purpose of these wheel-weights are similar to those described in my aforesaid application, and also my Letters Patent Nos. 231,115 and 231,116—viz., to automatically destroy working connection between the draw-bar and its attached mechanism and the brake-applying mechanism when the car is moving very slowly, and to allow it to be established when the train moves at a greater speed. The hub of the drum is elongated upon the side of the drum in which is the opening *b*, and is formed with a wide peripheral groove, *d*.

To the transom D is firmly bolted the bracket N, whose lower arm supports a curved lever, *e*, secured in place by a bolt, *f*, which passes quite loosely through the rear end of the lever in such a way as to hold the lever in position without preventing it from rocking. The lever, as shown, is curved at about its center and nearly balanced, so that it will rock upon the upper surface of the arm on which it rests. The front end of the lever is bent horizontally to a right angle and beveled, as seen in Fig. 5, and this end projects into the interior of drum F′ through annular slot *b*, and extends into the plane of revolution of the wheel-weights, so that the lever will be pushed by the wheel-weights whenever the axle revolves slowly enough to allow the latter to fall toward the axle before reaching the beveled end of the lever. The lateral vibration of the lever is limited by a stop piece or plate, *e′*, (preferably of hardened steel,) of proper size, riveted to the under side of the lever and resting in the groove *d*.

The lever *e* is designed to act on a sliding locking cross-pin, *g*, which at one end is received in a horizontally-elongated bearing, *g′*, in the plate I^3, and at the other end passes through a strap or loop-like bearing-piece, g^2, on the under side of the horizontal arm of bracket N. The pin, by means of a spiral spring, *h*, (which encircles it, and bears at one end against plate I^3 and at the other against a collar, *h′*, shrunk on the pin,) is normally held in a position where it will extend across a narrow longitudinal slot, *i*, formed in the front portion of the horizontal arm of bracket N, and it is moved in the opposite direction by means of the lever *e*, which is provided with a shoulder or enlargement, e^2, that bears laterally against a collar, h^2, on the pin, as seen plainly in Fig. 6. The pin, by means of a hook-like link, *j*, is connected with the friction-pulley shaft I, so that the two shall move together when the pin is moved back and forth longitudinally of the car, the link being constructed as seen in Fig. 4, so that it may be hooked upon or unhooked from the pin at pleasure, its hook end lying between two collars, h^2 h^3, on the pin. This movement of the pin causes the shaft I to be drawn toward the the axle, and is effected through the intermediary of a vertical lever, O, which is connected with the draw-bar, and is provided with a flattened lower end that projects through the slot *i*, and when in operative position extends down behind the pin *g*. When the parts are in this position it will be seen that if the lever O be vibrated in a direction to throw its lower end forward this end will bear against the pin and press it forward also; and through the intermediary of the link *j* like movement will be imparted to the friction-pulley shaft, which will thus be drawn toward the car-axle and friction-drum thereon. When, on the other hand, the pin, by the action of lever *e*, is pushed back from across the slot *i*, operative connection between the lever O and the pin is destroyed, and the lever ceases to affect the friction-pulley shaft.

The manner of connecting the vertical lever O (which, for convenience' sake, I will term the "draw-bar lever") with the draw-bar is as follows: To the rear of the draw-bar P is loosely connected, by means of the draw-bar bolt *k*, an L-shaped strap or bar, *l*, which at its rear end is provided with a hole or opening, so as to loosely encircle the upper end of the lever O, as shown in Fig. 11. Vertically beneath bar *l*, and below the draw-bar timbers, I arrange another bar, *m*, which is a slide-bar,

supported in bearings *n*, formed, the one in the turned-down loop of a U-shaped piece, *o*, secured to the under side of the draw-bar timbers in the place usually occupied by the draw-bar guides, and the other in a bridge-piece, *o'*, fastened to the under side of piece *o*. The slide-bar *m* is also formed at its rear with a hole or opening, so as to encircle, like the bar *l*, the vertical lever O. The sliding movement of the bar *m* is subject to control of springs *p p'*, which encircle it between its bearings *n*, and are separated by a central pin or shoulder, p^2, on the bar. The spring *p'* in front is light and the spring *p* in rear is heavy, so that a backward movement of the bar will compress the heavy spring and a forward movement of the bar will compress the light spring.

Each bar, at the point where the opening in it is formed for the passage of the vertical lever, has a notch, *r*, and on the vertical lever O is a corresponding spline or feather, *s*, which at two points, *s'*, at which the lever when in position meets the bars, is cut away, as shown in Figs. 2 and 11. In putting the lever in place it is pushed upward through the openings in the bars, its feather registering with the notches. As soon as it is in place it is turned so as to carry its feather out of register with the notches, (see Fig. 11,) and is thus held securely in position.

The connections between the L-shaped bar and the draw-bar and between the two bars and the lever should be free enough to allow the lever all needed latitude of movement.

The mode of operation of my improved brake is as follows: When the train first starts (supposing it to be drawn) the draw-bar will be drawn forward, carrying with it the connecting-strap *l* and the upper end of the vertical draw-bar lever O. The lower end of the lever will consequently be thrown backward in the slot *i* in the arm N, the slide-bar *m* acting as a fulcrum and the light spring *h'* yielding for any excessive amount of motion. While the car is moving very slowly the spring-pin *g* will be forced out frequently by the action of the centrifugal weights upon the lever *e*, and by the action of this lever in turn upon the spring-pin, and will thus be disengaged from the lever O. As soon, however, as the speed of the axle becomes sufficient to prevent the centrifugal weights from acting upon the lever *e*, the pin *g* will be forced inward by its spring, and its end will project across the slot *i* in front of the draw-bar lever O. Now, if a brake be applied to the locomotive, or to any one car in the train ahead of the one having this brake upon it, the draw-bar will be forced backward, and this will cause the lower end of the draw-bar lever to be thrown forward, and that will carry with it the end of the spring-pin in front of it, and that in its turn will, by means of the connecting-link *j*, draw the friction-pulley shaft forward until its pulley or drum and the drum upon the axle are brought into contact and the brake applied, in the manner similar to that described in my hereinbefore-referred-to application for Letters Patent. The heavy spring *p* will yield for backward motion of the draw-bar in excess of that required to apply the brake. When the train is again nearly at a standstill the centrifugal weights will act upon the lever *e*, to cause the pin *g* to be withdrawn from across the slot *i*, and thus disengaged from the draw-bar lever, thereby allowing the friction-pulleys on the shaft I and axle to become separated and the brake to be released. If, when the train is started, it is pushed instead of being drawn, the draw-bar will be forced backward, and the lower end of the draw-bar lever O will consequently be thrown forward, so that when the centrifugal arrangement ceases acting on the spring-pin *g* the end of the pin will be forced across the slot *i* behind the draw-bar lever. Under these circumstances any further crowding in of the draw-bar will only cause the draw-bar lever to be forced against the forward end of the slot, while an outward pull upon the draw-bar will cause the said lever to be thrown back against the pin *g;* but, inasmuch as the latter cannot move back of the longitudinal center of the slot, the operation will have no effect upon the brake. The springs *p p'* will yield also in this case to allow for excessive motion of the draw-bar.

Upon trucks having no safety-beams the supports for the shafts and such other portions of the mechanism shown in the drawings as bolted to the safety-beams are fastened to the transom instead.

By making the loop-like bearing-piece g^2 long enough to allow the pin to travel the full length of the slot *i*, and by placing the support or fulcrum near the center of the pin, instead of at the end, and by the use of two of the connecting-links *j*, one upon each side of the support, the brake may be made double-acting—that is, to cause a pushing in of the draw-bar to apply the brake when the train is started by drawing, or to cause a drawing out of the draw-bar to apply the brake when the train is started by pushing, in a manner similar to the brakes described in my Letters Patent hereinbefore referred to.

The spring locking-pin *g* can be actuated by means other than the lever *e*. One arrangement for the purpose is shown in sectional front elevation, Fig. 13, and in plan, Fig. 14.

Like lettered parts in these figures indicate parts corresponding to those similarly lettered in the previous figures. The bracket N in this arrangement is a simple L-shaped piece, having its vertical arm fastened to the transom D. The lever *e* is dispensed with; and while the friction-drum and centrifugal-gravity mechanism are, as before, carried on the axle, the drum is a plain one, made in two parts, clamped on the axle, and provided with prolongations which carry the wheel-weights and their radial guide studs or rods, which, as shown, are exposed, and not housed within

the drum, the collars at the outer ends of the studs being enlarged to prevent any possibility of the studs catching the brake-chains. The sliding spring-pin *g*, in this case, is operated by the action of the wheel-weights upon a vibratory lever, P′, jointed to an L-shaped connecting rod or bar, R, whose upright arm encircles the spring-pin between two collars fixed thereon. The lever is forked, so as to straddle the axle, and is pivoted at *x* to a U-shaped supporting-bracket, S. One of the arms of the forked lever is prolonged before the pivot, as at P^2, and to this part P^2 is jointed at *y* the connecting-bar R. The lever is provided with a cam, T, which normally projects into the plane of revolution of the wheel-weights, so that when the axle revolves slowly enough to permit the wheel-weights to drop toward the center before reaching the cam the lever will, by the action of the weights on the cam, be pushed back with the result of pushing back, through the instrumentality of bar R, the spring-pin from across the slot *i*.

In Fig. 15 I have represented in sectional elevation an arrangement of the relief-spring *a′* by means of which the power of the brake may be varied to correspond with the load carried by the car. The spring-box *a* for the shaft I and the bearing-piece I^2 are similar to like lettered parts hereinbefore described. Upon the top of the spring rests a piston-like plate, a^2, from which extends up through the top of the spring-box, a rod a^3, loosely jointed at a^4 to a lever, a^5, pinned or pivoted at a^6 to the piece I^2, and at its other end hinged, as at a^7, to a shaft or bar, a^8, attached to the bolster or some other part of the car-frame which has the motion of the car-springs between it and the truck-frame, to which the relief-spring arrangement is fastened. Under this arrangement, as the car-body settles upon its springs under the load placed upon it, proportionate pressure will, through the intermediary of the instrumentalities just described, be applied to the upper end of the relief-spring, so that a greater strain on the brake-chain will be required to lift the shaft I and its box *a* when the car is heavily loaded than when it is light. The motion given by the operation of the springs between the axle-journal boxes and the truck may be availed of also to operate the arrangement just described.

Having described my improvements, what I claim, and desire to secure by Letters Patent, is—

1. The combination of the draw-bar, the vertical draw-bar lever, the slotted bracket, the friction-pulley shaft, the sliding spring cross or locking pin connected with said shaft, the centrifugal weights, and mechanism intermediate between said pin and weights, operated by the latter to withdraw said pin from operative connection with said lever at the times and in the manner substantially as hereinbefore set forth.

2. The centrifugal-weight device and friction-drum, mounted on one and the same car-axle, in combination with the friction-pulley shaft, movable to and from said axle, the shaft-operating mechanism connected with and actuated by the movement of the draw-bar, and means, substantially as described, acted on at stated times by the centrifugal weights to destroy operative connection between said mechanism and shaft, substantially as hereinbefore set forth.

3. The combination, substantially as hereinbefore set forth, of the draw-bar, the draw-bar lever, the connecting-bar *l*, the slide-bar *m*, and the springs *p p′*.

4. The slide-bar *m*, its U-shaped bearing-piece *o o′*, and springs *p p′*, arranged on the under side of the draw-bar timbers, in combination with the draw-bar, the draw-bar lever, and the connecting-bar *l*, substantially as set forth.

5. The combination, with the vertical draw-bar lever and longitudinally-slotted guide-bracket N, of the friction-pulley shaft, the sliding spring cross-pin, the lever *e*, the car-axle, and centrifugal weights thereon, substantially as and for the purposes hereinbefore set forth.

6. The hollow friction-drum mounted on the car-axle and provided with an annular side slot, as described, in combination with the centrifugal weights housed within said drum, and the lever *e*, substantially as set forth.

7. The sliding spring cross-pin, in combination with the friction-pulley shaft and the connecting-hook link, said shaft and pin being mounted in bearings so as to be movable to and from the car-axle, substantially as set forth.

8. The friction-pulley shaft and relief-spring, in combination with mechanism arranged and operating substantially as described, to increase the pressure upon the relief-spring proportionately to the increase of load carried by the car.

In testimony whereof I have hereunto set my hand this 10th day of May, 1881.

BENJAMIN L. STOWE.

Witnesses:
SAMUEL KILPATRICK,
JAMES W. HALLENBECK.