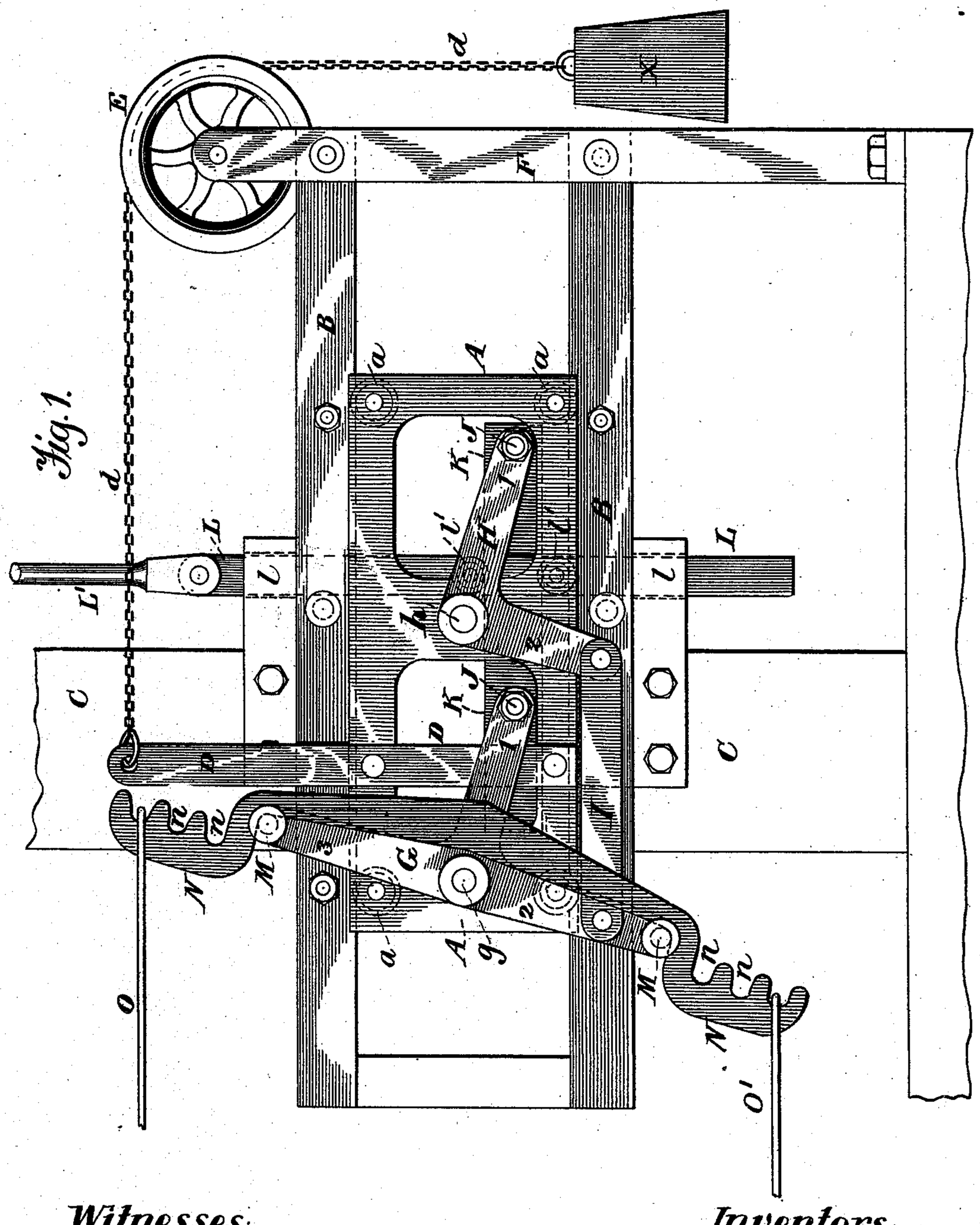
(No Model.) 3 Sheets—Sheet 1.

A. E. MITCHELL & W. N. STEVENS.

COMPENSATOR FOR RAILWAY SIGNAL AND SWITCH CONNECTIONS.

No. 402,030. Patented Apr. 23, 1889.

Fig. 1.



Witnesses:
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E. Cruse

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(No Model.) 3 Sheets—Sheet 2.

A. E. MITCHELL & W. N. STEVENS.

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Fig. 2.

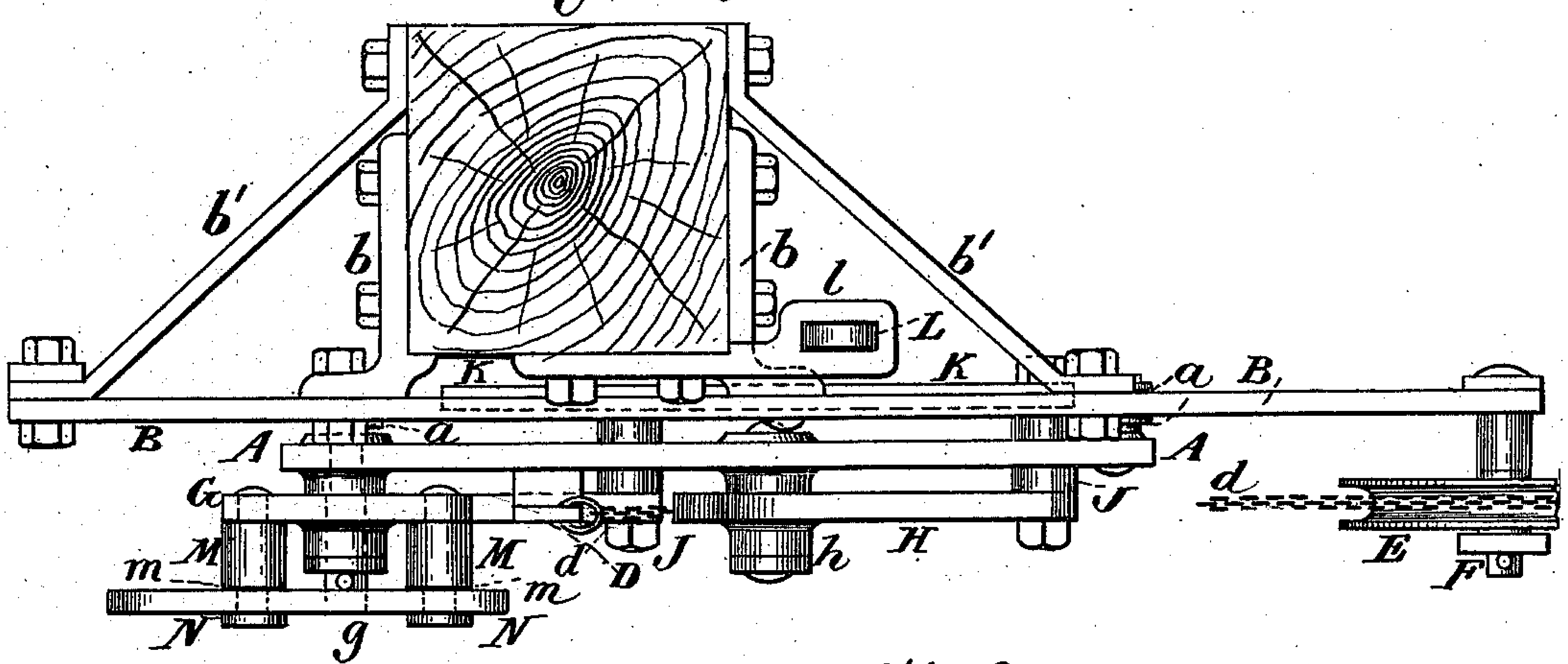
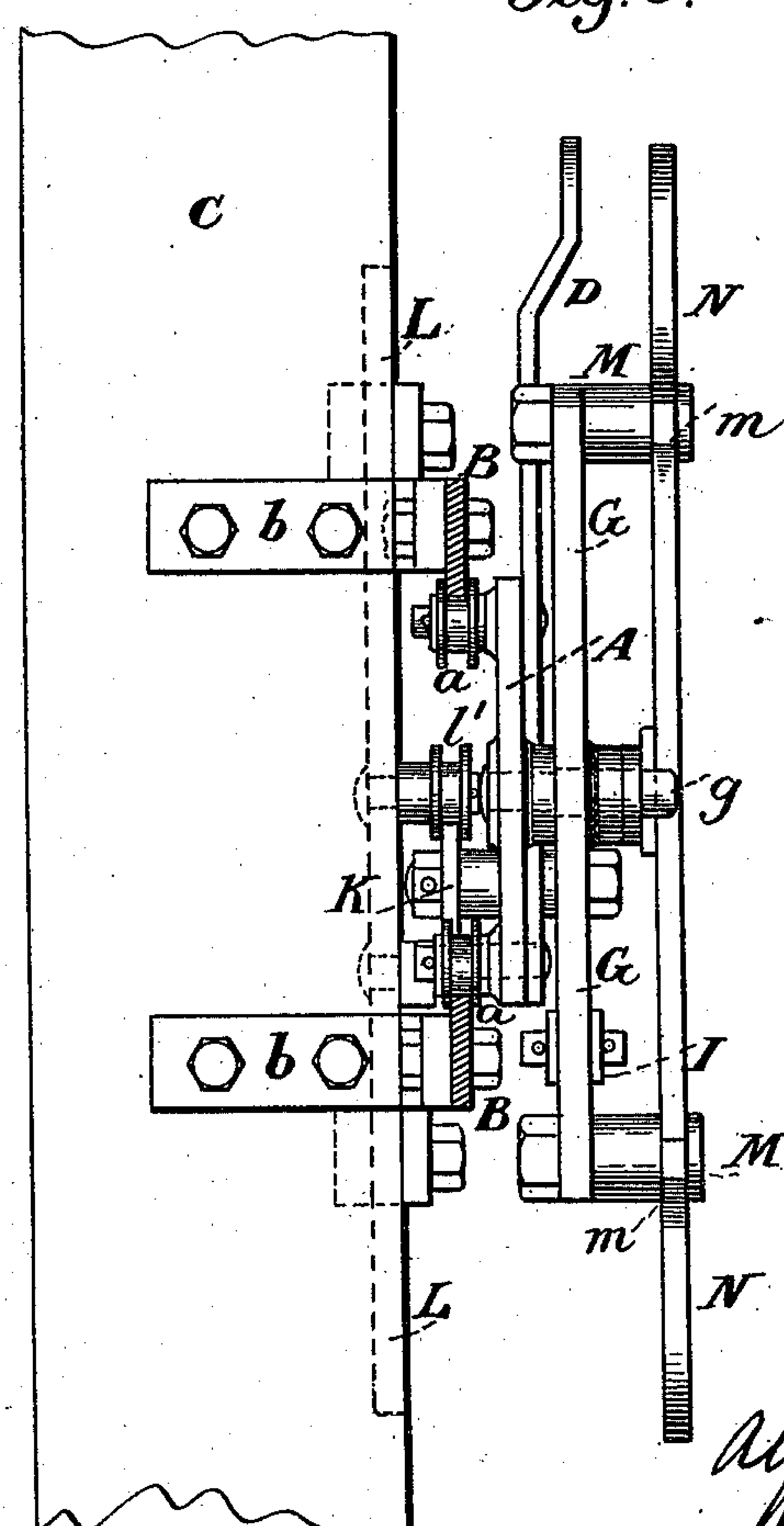


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

A. E. MITCHELL & W. N. STEVENS.

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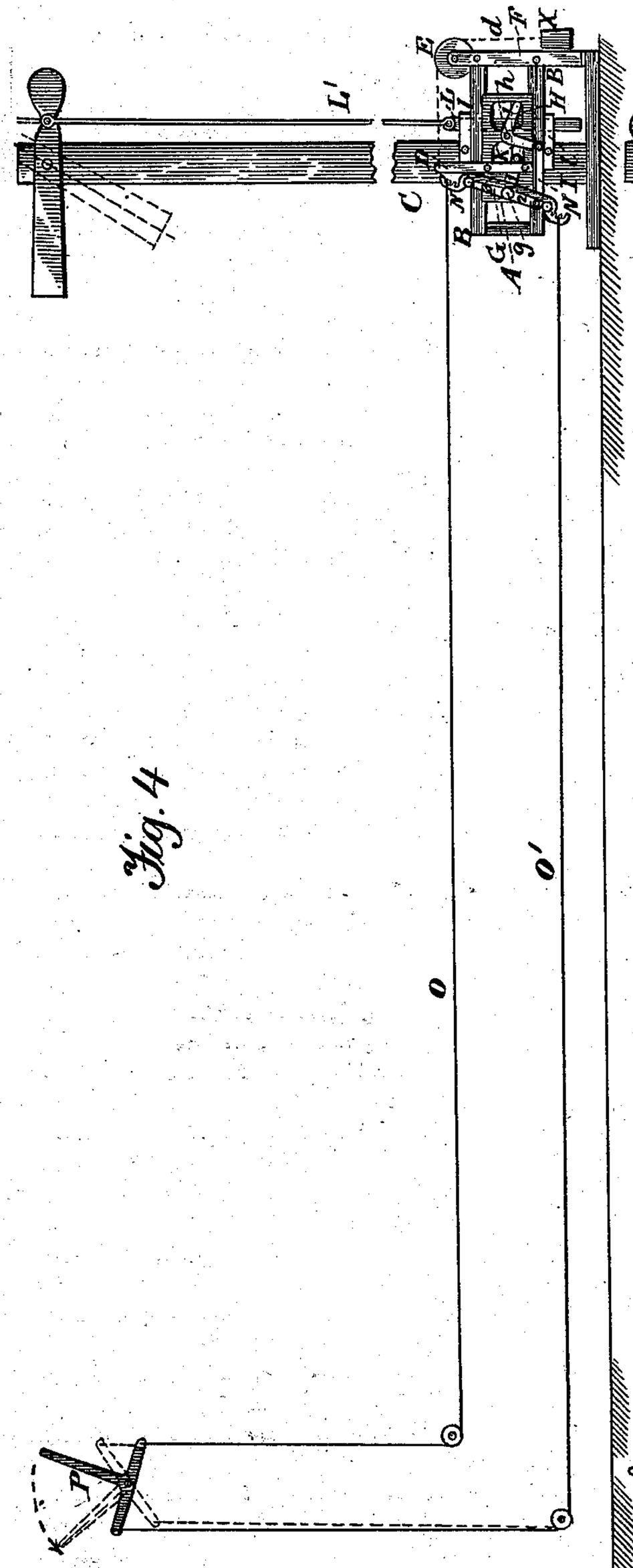

Fig. 4

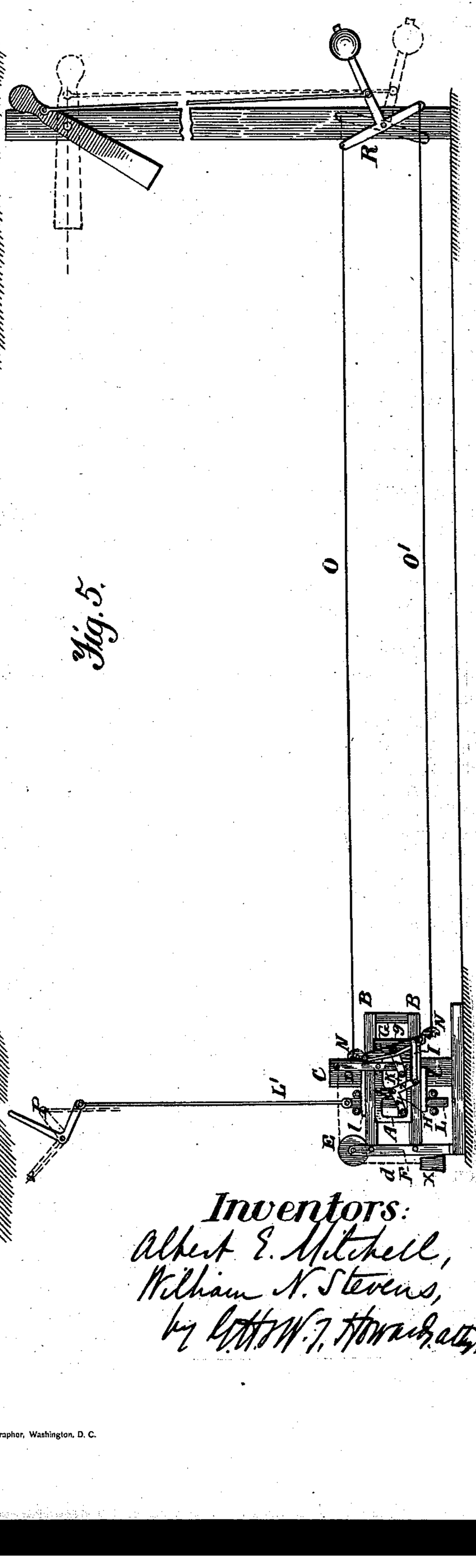

Fig. 5.

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UNITED STATES PATENT OFFICE.

ALBERT E. MITCHELL, OF PATERSON, NEW JERSEY, AND WILLIAM N. STEVENS, OF BROOKLYN, NEW YORK.

COMPENSATOR FOR RAILWAY SIGNAL AND SWITCH CONNECTIONS.

SPECIFICATION forming part of Letters Patent No. 402,030, dated April 23, 1889.

Application filed November 27, 1888. Serial No. 291,985. (No model.)

To all whom it may concern:

Be it known that we, ALBERT E. MITCHELL, of Paterson, in the county of Passaic and State of New Jersey, and WILLIAM N. STEVENS, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Compensators for Railway Signal and Switch Connections, of which the following is a specification, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The object of our invention is to provide a compensator for double wires that will be positive in its action at all times, and which in case of the rupture of either wire will permit the signal to go at once to "danger."

In the drawings, Fignre 1 is a side elevation of our improved compensator attached to a signal-post. Fig. 2 is a plan. Fig. 3 is an end view. Fig. 4 is a diagram showing the signal, the operating-lever, and the compensator, the latter being connected to the ends of the wires at the signal-post. Fig. 5 is a similar view showing the compensator attached to the ends of the wires near the operating-lever.

Like letters of reference indicate like parts in the several figures.

A is a plate of iron or other material provided with guide-rollers *a a*, which run on the tracks B B. These tracks are rigidly secured to the signal-post C by means of the angle-bars *b b* and braces *b' b'*.

D is a bar rigidly bolted to the plate A, and from the upper end of said bar a chain, *d*, leads over a pulley, E, mounted on a standard, F, bolted to a base-support and to the tracks B B. A suitable weight, X, is attached to the chain *d* to maintain the desired tension upon the operating-wires.

Secured to the plate A are two pins or journals, *g* and *h*, on which are mounted, respectively, the T-crank G and bell-crank H. A strap, I, connects the arms 2 2 of the cranks G and H, whereby they are given joint movement. Fastened to the end of each arm of said cranks and moving with them is a journal, J, each projecting through the plate A, which is cut away, as shown. The journals J carry a bar, K, which, when the cranks are turned on the pins *g h*, moves vertically up or down, but which will always remain parallel to the line of centers of the pins *g h*, and, inasmuch as the cranks are mounted on the plate A and move with it, the bar K will also move with said plate.

L is a bar moving vertically in fixed guides *l*, secured to the signal-post. The bar L is provided with friction-rollers *l' l'*, which engage with the bar K, so that when the bar K rises or falls the bar L will move with it. The bar L is connected at its upper end to the signal-rod L'.

At the outer ends of the arms 2 and 3 of the T-crank G are secured two posts, M M, and near the ends of these posts grooves *m* are cut, into each of which the safety attachment N fits freely without being allowed much lateral motion.

Each end of the safety attachment N has notches *n*, as shown, of such depth that the center of the ring or wire resting in any of said notches will be in front of the centers of the posts M M, thus holding the safety attachment securely in place and preventing it from tilting by tension of the wires. The distance between the centers of any pair of notches should be sufficient, in case of a rupture of either wire, to cause the safety attachment to rotate about the post M nearest the unbroken wire until this latter wire disengages from the safety attachment, or the safety attachment disengages from the T-crank, in either of which cases the signal will go to "danger" by gravity and the weight X will pull the compensator toward it until the bar K is released from the bar L.

O O' are the operating-wires, and P is the operating-lever.

From the foregoing it will be seen that a constant tension will be maintained on the wires irrespective of the contraction or expansion, for as the wires expand the weight X will draw the plate A and the mechanism mounted thereon toward it, and thus take up the expansion, and in case of contraction the plate A will be moved by the wires away from the weight, the latter being lifted.

The bar K is of such a length that the extreme movement of the plate A, and consequently the plate K, by the expansion or contraction of the wires will not be sufficient to

move it out of contact with the friction-rolls on the vertical bar L. As the bar K constantly preserves its parallelism to the line through the centers *g* and *h*, it will be seen that it is immaterial what point in its length is in contact with the friction-rolls *l'* on the bar L, and that its longitudinal movement in no wise interferes with the proper working of the bar L.

Referring to Fig. 4, which shows all the parts in position when the signal is at "danger," in order to change the signal to "safety" the lever P is pulled in the direction of the arrow, thus causing the wire O to draw the upper end of the safety attachment toward the lever, the wire O' and the lower end of the safety attachment at the same time moving in an opposite direction, whereby cranks G and H are made to turn on the pins *g* and *h*, lifting the horizontal bar K, and consequently the vertical bar L. The position of the signal is thus changed to "safety," as shown in dotted lines in said figure.

In Fig. 5 the compensator is shown attached to the ends of the wires O O' near the operating-lever. In this figure the parts are in the position occupied when the signal is set at "safety." To change the signal to "danger," the lever P must be pulled in the direction of the arrow. This will lift the bar L, and with it the bar K, thus causing the cranks G and H to turn on the pins *g* and *h*, and so pull the wire O' toward the compensator and thereby move the T-crank R on the signal-post. The signal is thus set to "danger," as shown in dotted lines.

While we have specially illustrated and described our compensator as applied to wires for operating a railway-signal, it is equally applicable wherever a positive and constant movement must be made at some distance from the operator through the medium of wires connecting the movable object with a motor.

We do not limit ourselves to the exact mechanical devices shown for imparting motion to any of the parts, as they may be varied in many ways by a skilled mechanic without departing from the essentials of our invention.

Having described our invention, we claim—

1. The combination, with two movable bodies located at a distance from each other and wires for transmitting motion from one to the other, of a plate sliding on ways, mechanism mounted on said plate and to which the wires are connected so as to move simultaneously therewith, a weight attached to the sliding plate, and a horizontal bar connecting the mechanism on the plate with one of the movable bodies and adapted to have a movement in a direction at a right angle to and simultaneously with the movement of the wires, substantially as specified.

2. In a compensator, a bar, L, capable only of end reciprocating movement, and a plate having end reciprocating movement in a plane at a right angle to the movement of the bar L, combined with connected cranks pivoted in said plate, to one of which cranks the operating-wires are attached, and a bar, K, carried by said cranks and engaging with the bar L, substantially as set forth.

3. In a compensator, a bar, L, capable only of end reciprocating movement, a plate having end reciprocating movement in a plane at a right angle to that of the bar L, a bar, K, carried by said plate and engaging said bar L by a sliding connection, and means, also carried by said plate, for giving movement to said bar K, substantially as set forth.

4. In a compensator, a bar, L, capable only of vertical reciprocal movement, and a plate, A, sliding on ways and capable only of horizontal reciprocating movement, combined with the connected cranks G and H, pivoted to said plate, a bar, K, carried by said cranks and engaging the bar L by a sliding connection, and the safety attachment N, mounted on one of the cranks and to which the operating-wires are attached, substantially as set forth.

5. The plate A, having end reciprocating movement in tracks B and carrying the connected cranks G and H, bar K, and safety attachment N, combined with the wires O O', bar D, chain *d*, pulley E, and weight X, substantially as set forth.

6. In a compensator, the plate A and crank G, having the grooved posts M, combined with the safety attachment N, substantially as set forth.

7. In a compensator, the crank G and grooved posts M, combined with the safety attachment N, having the notches *n* in front of the center of the said posts M, substantially as set forth.

8. In a compensator, a sliding plate, a T-crank pivoted on said plate, and posts attached to the ends of said T-crank, said posts having grooves, combined with a safety attachment which rests in said grooves and to which the operating-wires are attached, and a weight connected to said sliding plate, substantially as set forth.

In testimony whereof we have hereunto set our hands and seals.

ALBERT E. MITCHELL. [L. S.]
WILLIAM N. STEVENS. [L. S.]

Witnesses:
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ARCHD. MCLEAN, Jr.