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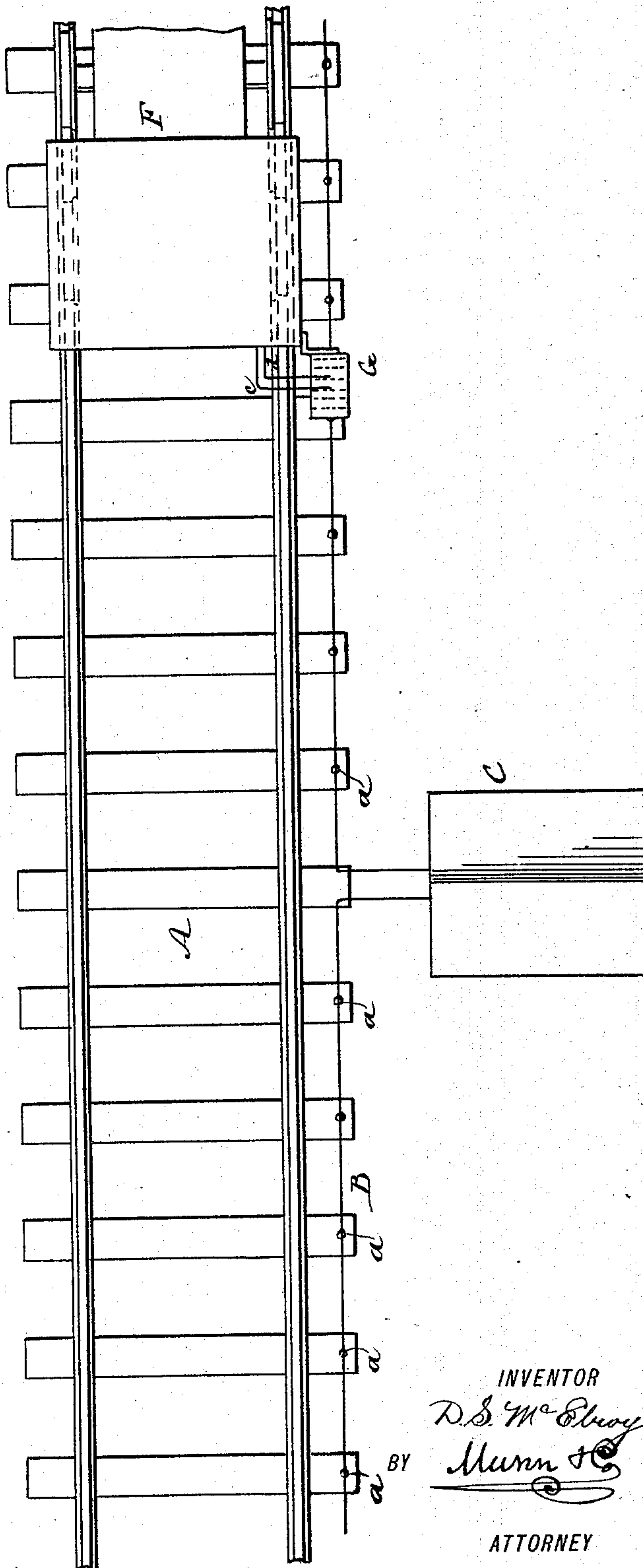
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D. S. McELROY.
RAILWAY TRAIN SIGNAL.

No. 413,409.

Patented Oct. 22, 1889.

Fig. 1.



WITNESSES:
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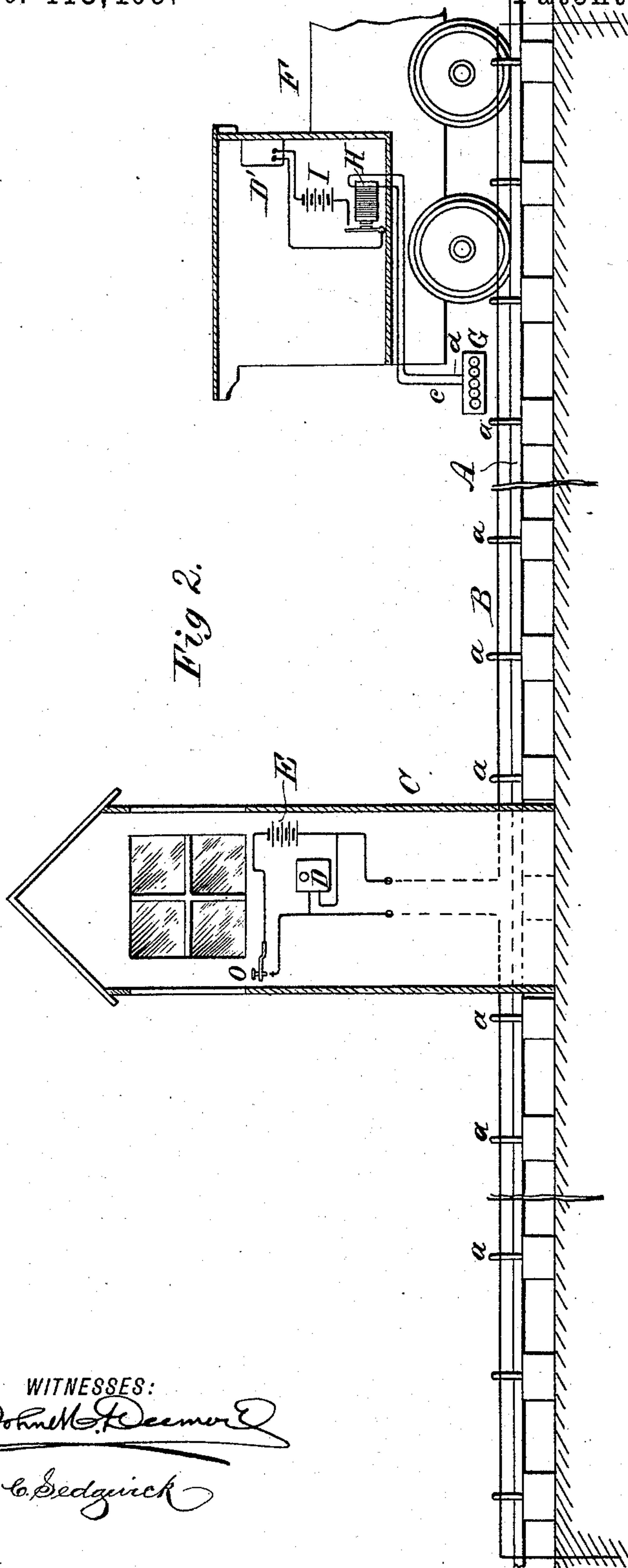
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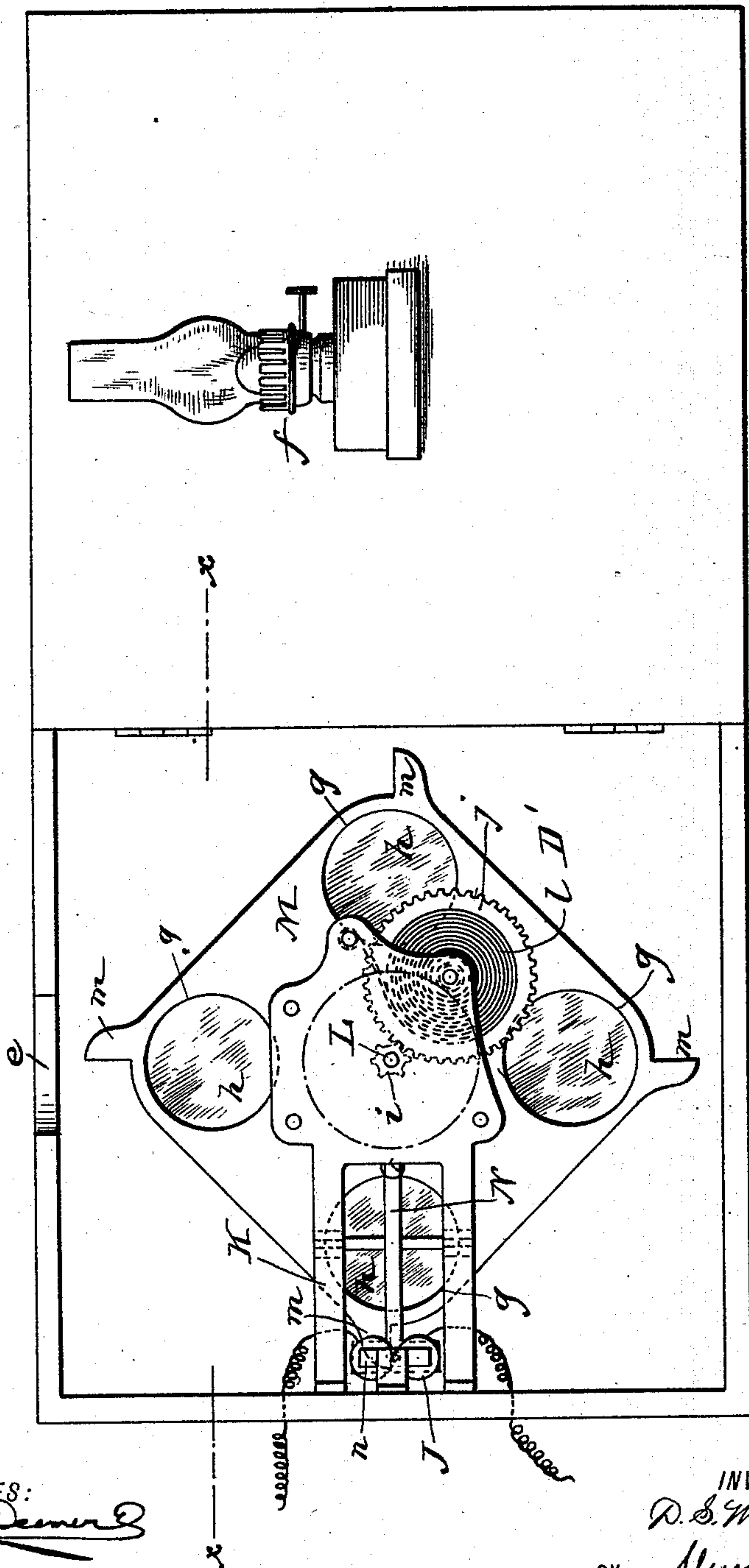
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Fig. 3.



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Fig. 4.

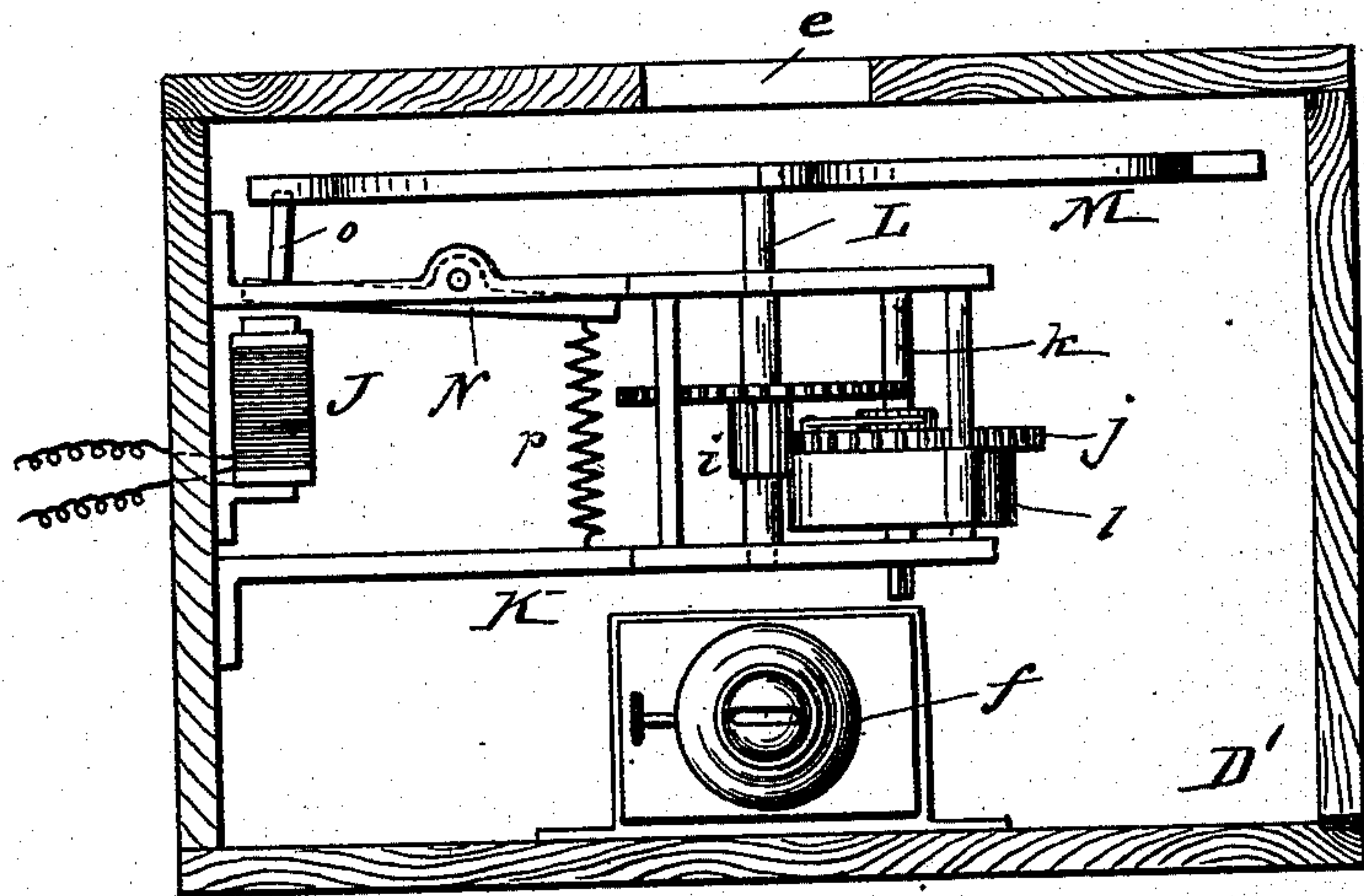
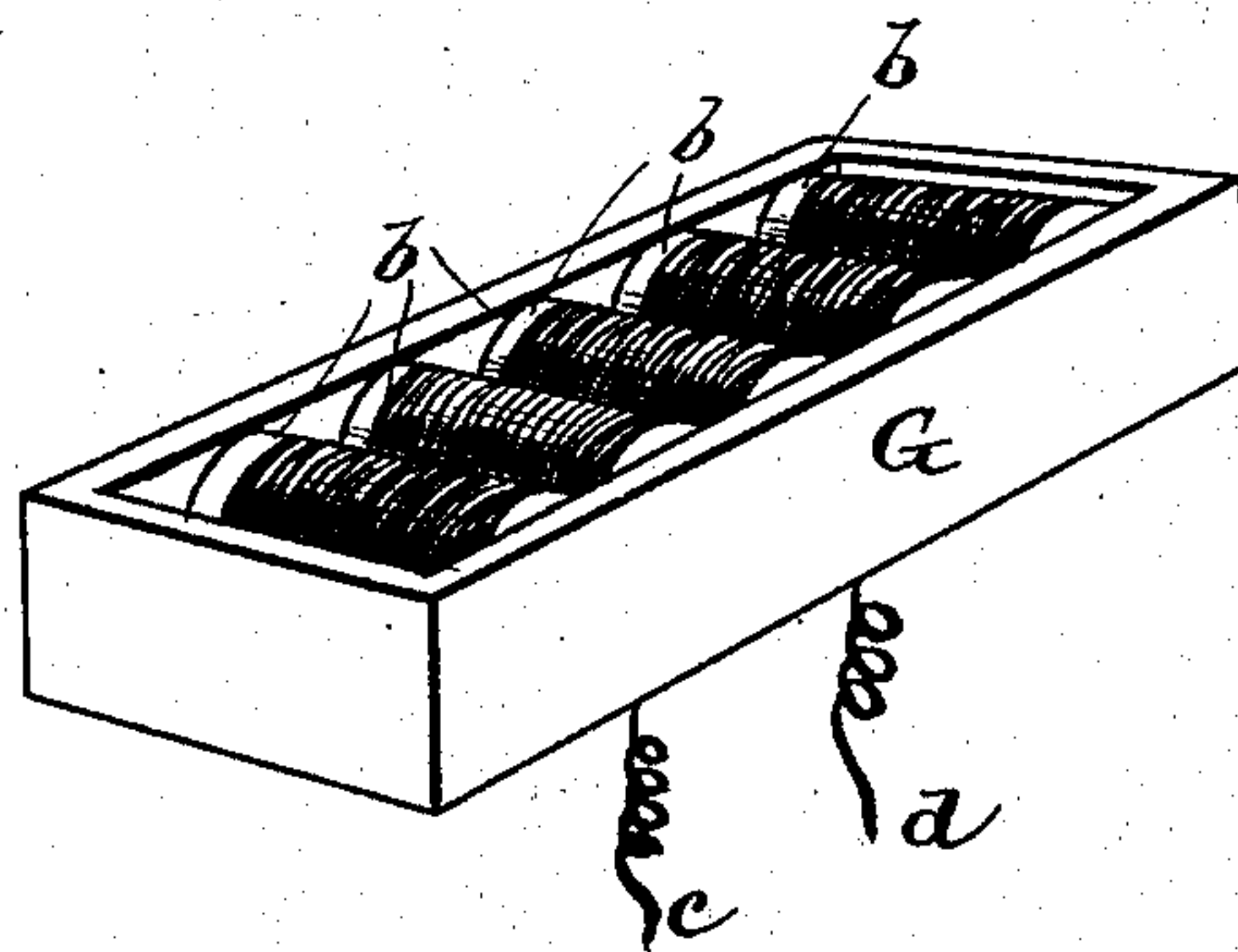


Fig. 5.



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UNITED STATES PATENT OFFICE.

DANIEL S. McELROY, OF NEW YORK, N. Y.

RAILWAY TRAIN-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 413,409, dated October 22, 1889.

Application filed February 28, 1889. Serial No. 301,489. (No model.)

To all whom it may concern:

Be it known that I, DANIEL S. McELROY, of the city, county, and State of New York, have invented a new and Improved Railway Train-Signal, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a plan view of my improved railway train-signal. Fig. 2 is a side sectional elevation. Fig. 3 is a side elevation of the signal-box with the door open. Fig. 4 is a horizontal section taken on line $x x$ in Fig. 3, and Fig. 5 is an inverted plan view of the induction-coil box.

Similar letters of reference indicate corresponding parts in all the views.

The object of my invention is to provide a train-signaling system for railroads by means of which one train may signal another, or by which signals may be sent from any fixed point on the road to any train or number of trains.

My invention consists in the combination, with the railway-track and locomotive or car running upon the track, of an insulated conductor supported parallel with or near the track and grounded at each end, a series of induction-coils carried by the locomotive or tender, a relay, a signal-box, and generator also carried by the locomotive or tender, an electric-current generator arranged at a fixed station with a signal-box or annunciator, and a transmitting-key, all as hereinafter fully described, and pointed out in the claims.

In carrying out my invention, I arrange at one side of the track A a conductor B, which is supported upon insulated posts a , connected with the ties, or in any other convenient and suitable manner. The conductor B is grounded at both ends.

At suitable intervals at the side of the track A are arranged stations C, into which the wire or other conductor B enters, passing through an indicator D, and also connected with a generator E, which may consist of a simple voltaic battery, or a magneto or dynamo electric generator may be used, and either a direct or continuous current or an alternating current may be employed for sending the signals.

Upon the locomotive F is arranged a box G, (shown in detail in Fig. 5,) the said box containing a number of induction-coils b , which are connected in series and are provided with wires $c d$, which extend upward into the cab and are connected with the relay H, of ordinary construction. The box G is suspended in any convenient manner from the locomotive or tender, so that it is always held in proximity to the conductor B as the locomotive moves along the track.

In the cab of the locomotive is arranged a local circuit which receives its current from the battery I, the said local circuit being controlled by the relay H. The wires of the local circuit are connected with the magnet J of the signal-box D'. (Shown in detail in Figs. 3 and 4.)

The signal-box D' is provided with an opening e in one side thereof, and is furnished at the opposite side with a lamp f , which is located directly opposite the said opening e . Between the lamp f and the front of the box containing the opening e is arranged a frame K, in which is journaled an arbor L, the end of which projects through the frame K toward the front of the box D', and carries a plate M, provided with apertures g , in which are inserted windows h of different colors. On the arbor L is mounted a pinion i , which is engaged by a spur-wheel j on the shaft k , the said shaft being provided with a propelling-spring l , which causes the wheel j to turn the arbor L. The plate M is provided with four arms m , and in the frame K is pivoted an armature-lever N, which carries an armature n within the field of the magnet J, and said armature-lever N is provided with a stud o , which projects normally into the path of the arms m and forms a detent or stop for the said arms.

The spring P, connected with the frame K and with a prolongation of the armature-lever N, holds the armature n away from the magnet J when no current passes through the said magnet; but when the magnet is energized by a current sent through it, in the manner presently to be described, the armature n is drawn toward the magnet J, the arm m is disengaged, and, the electrical impulses

sent through the magnet J being only instantaneous, the armature-lever N immediately regains its normal position in time to arrest the plate M by contact with the next arm *m* in order.

Each time the position of the plate M is shifted in the manner described a different-colored window *h* is carried between the lamp *f* and the opening *e* of the box D' until a revolution is completed.

The indicator D at the station C may consist of a box like that already described, or any other suitable form of indicator may be employed.

The operation of my improved signal is as follows: All of the signal-boxes D' upon the locomotives and all of the indicators D being synchronized in any suitable manner, when it is desired to signal to the engineer of a locomotive, the key O at the station is closed and an impulse is sent from the generator through the indicator, and also through the conductor B. This impulse induces a current in the coils *b* in the box G, carried by the locomotive, and the current thus induced operates the relay H, when the circuit of the battery I being closed the magnet J of the signaling-box D' is energized, thus drawing forward the armature *n* and also the stud *o*, carried thereby, releasing the plate M and allowing the spring-gearing connected therewith to turn it one space, displaying a certain colored window, thereby giving the desired signal to the engineer. If the second, third, or fourth window of the plate M is to be displayed, a corresponding number of depressions of the key O are made, thereby releasing the arms *m* of the plate M in succession until the required color is displayed.

It will be observed that it is immaterial whether the locomotive is in motion or stationary. The induction effects will be the same and the engineer will duly receive the signal.

In addition to the signal-box I may insert an alarm-bell to call attention to the operation of the signal. The indicator D at the station shows the character of the last signal sent over the conductor B.

It is obvious that my improved signaling system may be arranged for signaling trains

upon the same track, and it may also be adapted to train-telegraphy by use on semaphore-posts.

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

1. In a train-signal, the combination of a plate M, provided with windows *h* and arms *m*, spring-actuated mechanism for rotating the said plate, the magnet J, the lever N, provided with the stud *o*, adapted to engage the arms *n*, and the spring *p* for retracting the said lever N, substantially as specified.

2. In a railway train-signaling system, the combination, with a signal-box D', provided with an opening *e*, of a lamp *f*, arranged opposite the opening *e*, the plate M, provided with windows *h* and arms *m*, the magnet J, the lever N, provided with the stud *o*, and the spring *p*, for retracting the said lever N, substantially as specified.

3. In a train-signal, the combination, with the plate M, provided with the windows *h* and arms *m*, spring-actuated mechanism for rotating said plate, and an electro-magnetic releaser for releasing the said plate, of an electric generator, a transmitting-key, a conductor arranged parallel with the track, a series of induction-coils carried by the locomotive, a relay connected with the induction-coils, and a local circuit controlled by the relay and connected with the magnetic releaser, substantially as described.

4. In a train-signal, the combination, with a signal-box D', provided with an opening *e*, a lamp *f*, arranged opposite the opening *e*, the plate M, provided with the windows *h* and arms *m*, and means for rotating and releasing said plate, of an electric generator, a transmitting-key, a conductor arranged parallel with the track, induction-coils carried by the locomotive, a relay connected with the induction-coils, and a local circuit controlled by the relay and connected with the releasing mechanism, substantially as herein shown and described.

DANIEL S. McELROY.

Witnesses:

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