(No Model.) 3 Sheets—Sheet 1.

H. LEBLANC & E. V. A. LOISEAU

Electric Railway Signal.

No. 229,321. Patented June 29, 1880.

Fig: 1.

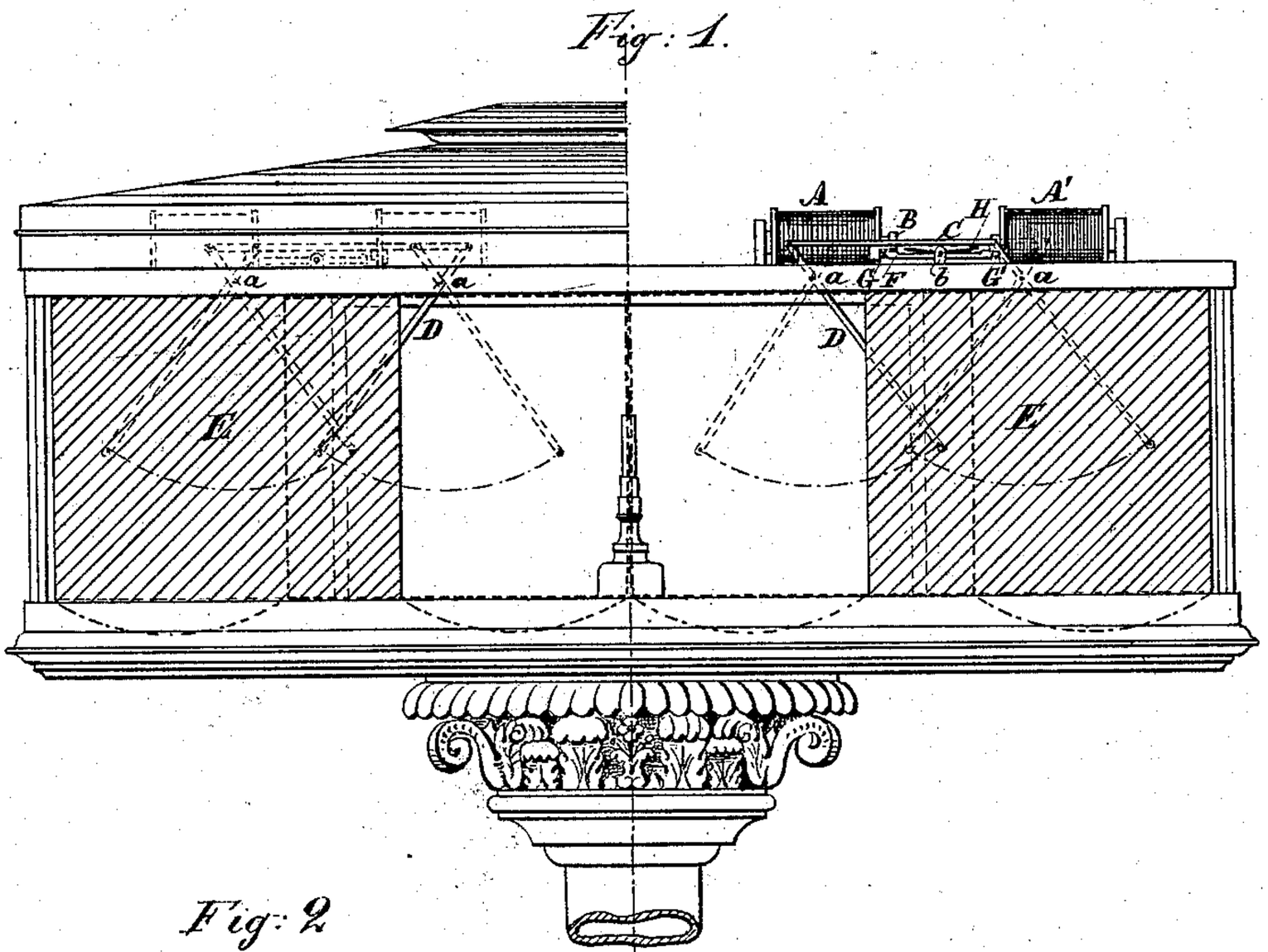


Fig: 2

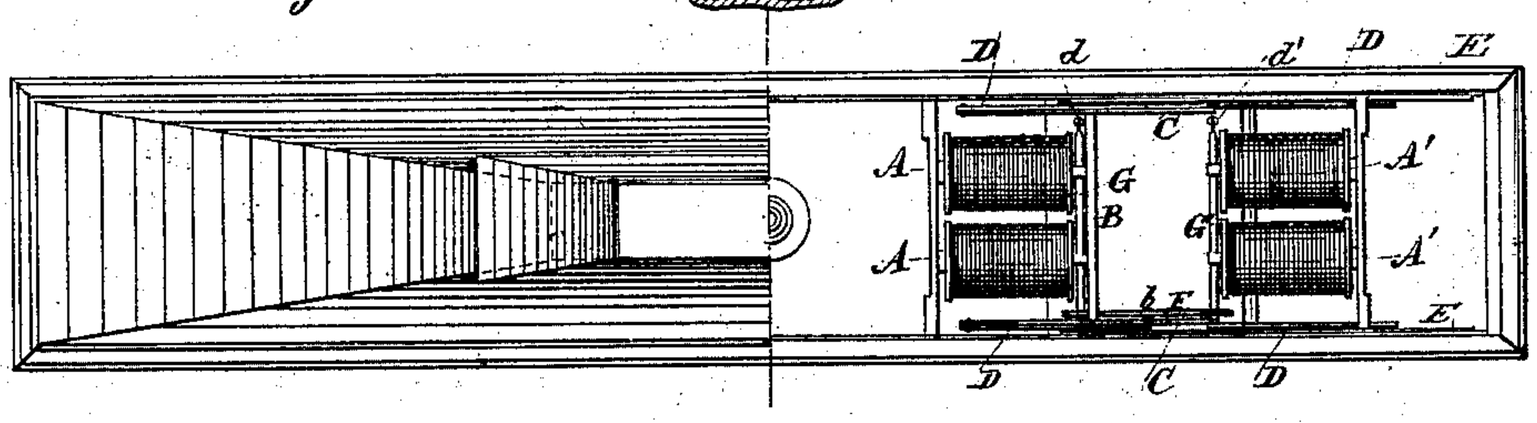
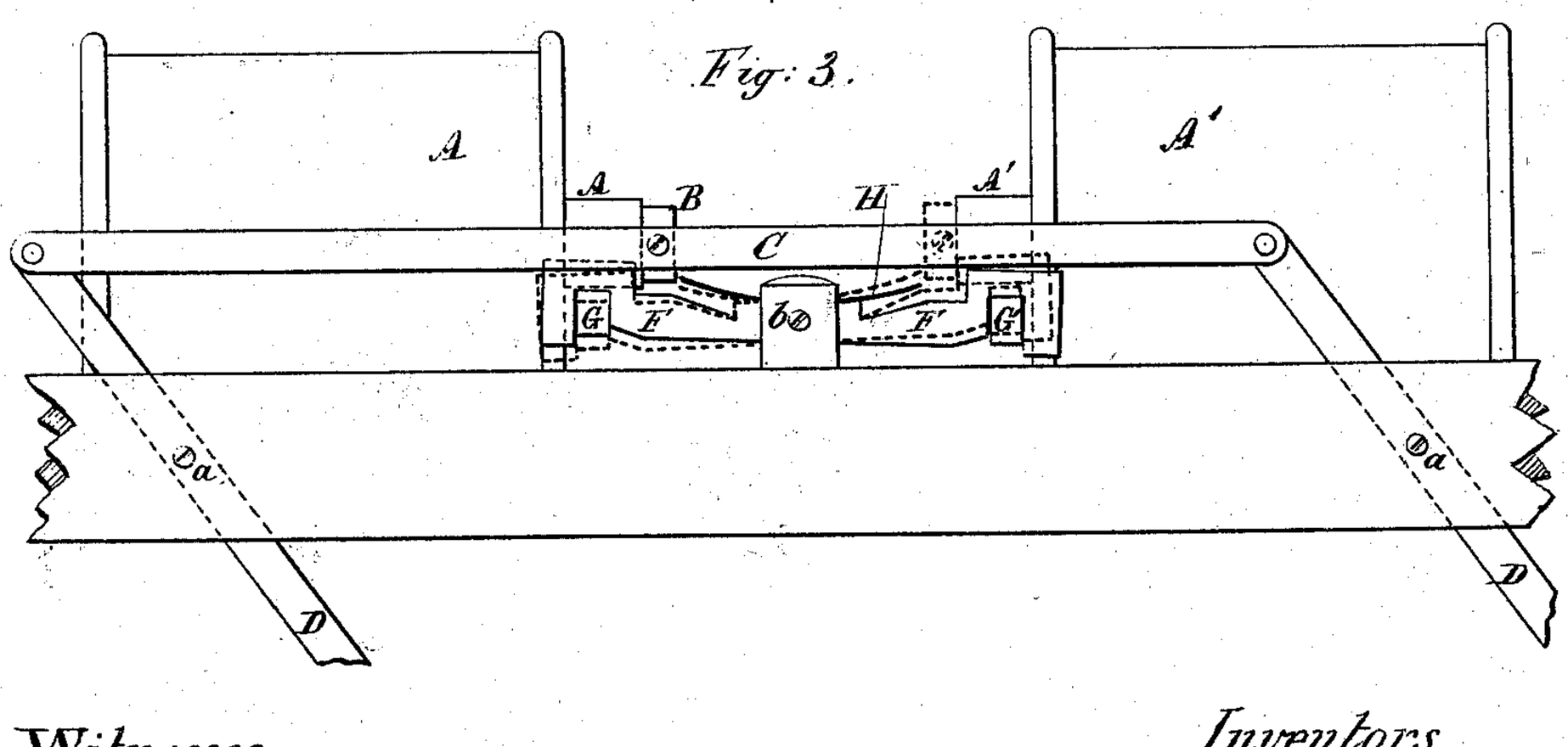


Fig: 3.



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(No Model.) 3 Sheets—Sheet 2.

H. LEBLANC & E. V. A. LOISEAU.

Electric Railway Signal.

No. 229,321. **Patented June 29, 1880.**

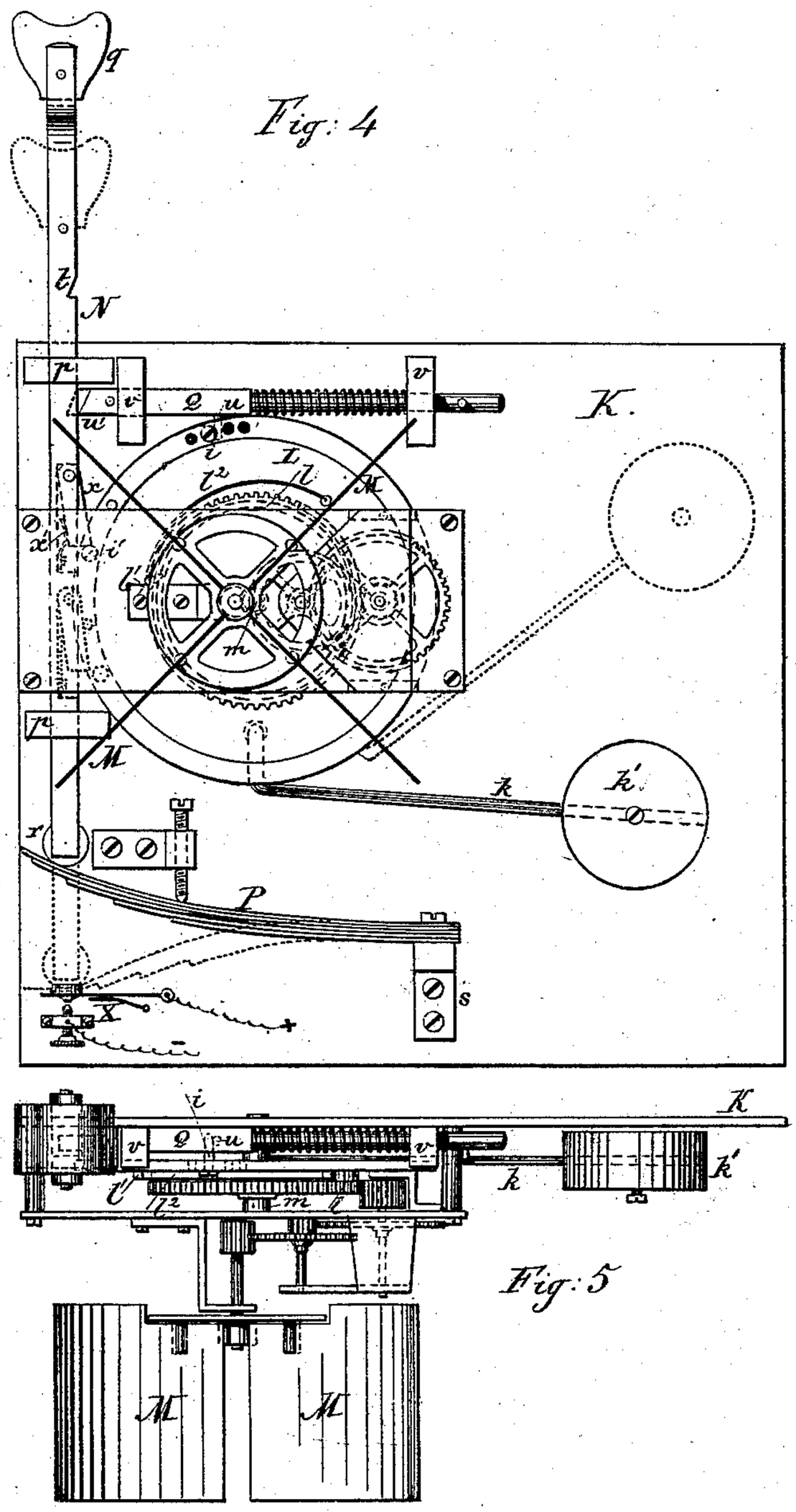


Fig. 4

Fig. 5

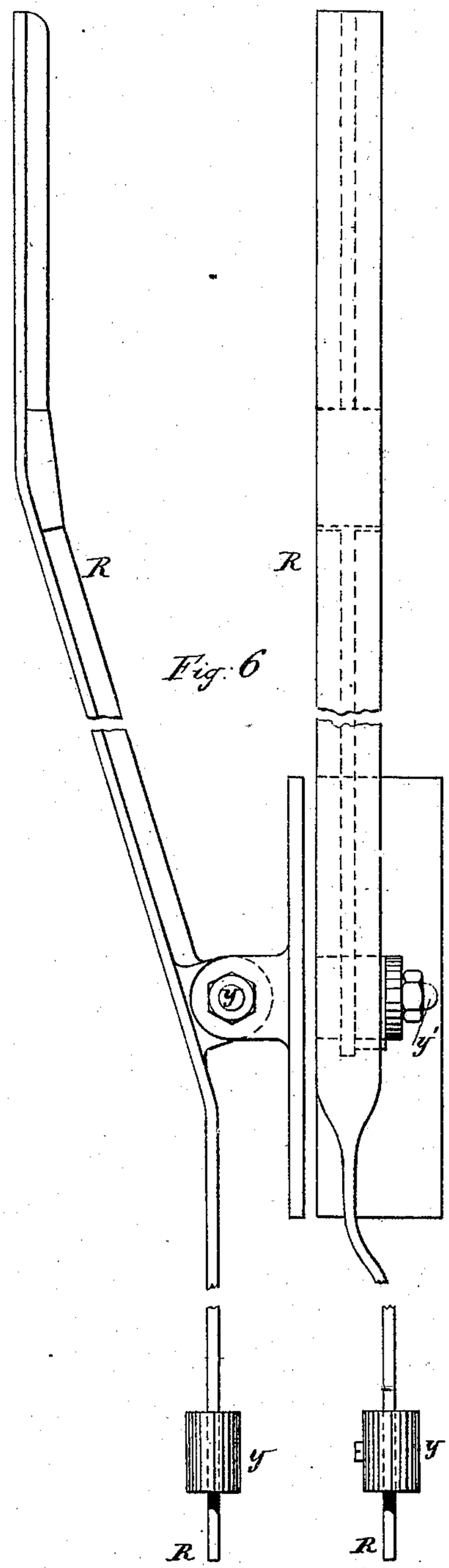
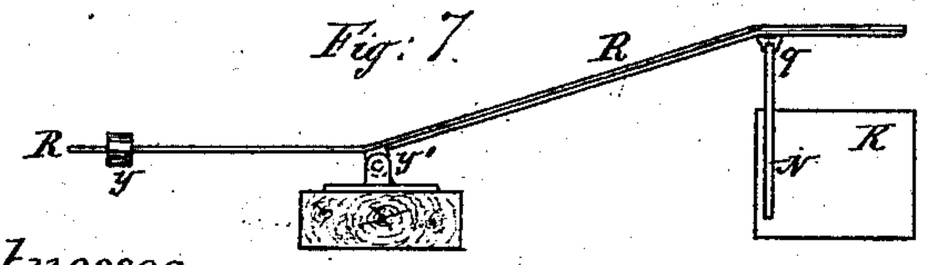


Fig. 6

Fig. 7.



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(No Model.) 3 Sheets—Sheet 3.

H. LEBLANC & E. V. A. LOISEAU.

Electric Railway Signal.

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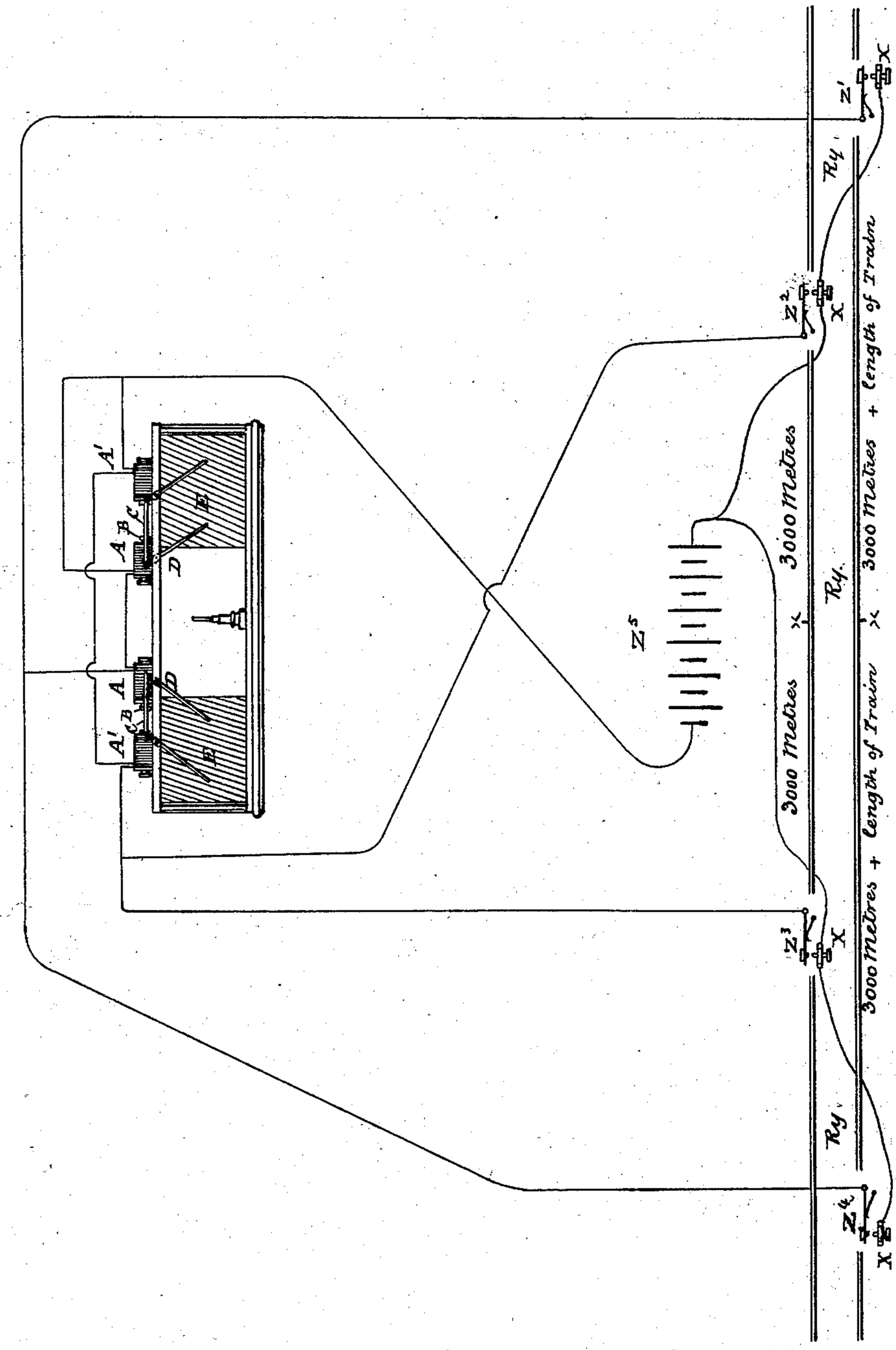
Fig. 8.



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UNITED STATES PATENT OFFICE.

HIPPOLYTE LEBLANC AND EUGENE V. A. LOISEAU, OF PARIS, FRANCE.

ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 229,321, dated June 29, 1880.

Application filed March 8, 1880. (No model.)

To all whom it may concern:

Be it known that we, HIPPOLYTE LEBLANC and EUGENE VICTOR ACHILLE LOISEAU, of Paris, France, have invented a certain new and useful Improvement in Operating Railway or Similar Signals, of which the following is a specification.

The invention relates to the operation of self-acting or automatic signal-disks of railways, tramways, &c., and especially the double-faced crossing-signals fronting the wagon-road at crossings at a level, each face being divided into two equal parts—one painted red, for example, to announce danger when it is exposed, and the other part white to give notice, when it is exposed and the red is concealed, that a crossing may be made with safety.

The red or white parts are covered or uncovered by means of cranks, levers, or tables turning upon small rails by the aid of rollers.

The cranks or levers can be operated by pedal-levers acted upon by the wheels of the locomotive-engines, and located along the line of the railway, and suitable wires supported and guided so as to establish the necessary connection between the pedal-levers and the cranks of the crossing-signal. We prefer to employ electricity to accomplish the desired result, since it can be thereby effected under such conditions as obviate all danger of derangement.

The basis or primary feature of our system is, that the signal retains its position during the whole time which the train takes to traverse the distance between the two pedals operated or points of contact made by the passage of the train. The first pedal produces the signal of arrest or danger, and a second withdraws the signal by bringing the disks or movable pieces to their normal positions. To obtain this result we combine with the pedals an apparatus so constructed that after the first wheel of the train strikes and depresses the pedal it remains depressed without receiving any shock or vibration during the passage of the train.

In order that the invention may be understood, as well as the manner of carrying the same into effect, reference is made to the accompanying drawings, which form a part of this specification, and which illustrate the construction of a danger-signal for a railway or similar crossing.

Figures 1 and 2 are respectively a sectional elevation of the head or top of the signal-lantern and a plan, both views being taken on two planes. Fig. 3 is a view in elevation, and on an enlarged scale, of the mechanism for operating the signals. Figs. 4 and 5 are a side and plan view, respectively, of the apparatus which is combined with the pedal, illustrated in side elevation and plan in Fig. 6 and shown in combination in Fig. 7, and by means of which the electric current for operating the signals is established. Fig. 8 is a diagram illustrating the electrical circuits connecting the signal with a battery and circuit-closers located at suitable points of a single-track line.

In the interior or in proximity with the pillar supporting the disk or signal-lantern is placed an electric battery of suitable power, which is connected with the coils of electro-magnets A A′, Figs. 1, 2, and 3, through the instrumentality of an apparatus, hereinafter fully described, and shown in Figs. 4 and 5. These electro-magnets attract on one side or the other the armature B, attached to the horizontal bars C, according as the current passes through the magnet A or A′. At the ends of the bars C are connected two bars, D, oscillating about the pivots *a*, and from these bars D are suspended the disks or movable plates E.

When the armature B is attracted by the electro-magnet A the disk or plate E occupies the position represented in Fig. 1 until another current of electricity moves it in the opposite direction, when the armature abandons the magnet A, and the disk or movable plate E, falling by its own weight with a pendulous movement, passes the dead-point and moves toward the magnet A′, through which the current is established. The magnet A′ attracts the armature and maintains the disk or plate E in the position indicated by the heavy dotted or punctured lines in Fig. 1, so as to conceal the danger-signal, indicated by the color of the lantern or by a notice in letters which are visible.

After the current ceases to act the disks or plates are held in position in the following

manner, reference being particularly made to Fig. 3: A bar, F, oscillating on the pivot *b*, is provided at each end with a groove or slot, in which rests a soft-iron bar, G G′, respectively hinged or pivoted at *d d′*, Fig. 2. The bar F is surmounted by a spring, H, to facilitate engagement and disengagement. Supposing the apparatus in the positions represented in Figs. 1 and 3 and the current passing through the magnet A′, the neighboring soft-iron bar G′ will be lifted, being attracted by the magnet, and will turn the bar F on its pivot, depressing the end adjacent to the magnet A. The corresponding end of the spring H will also be depressed till it is below the armature B, which, being released, yields to the weight of the disks or movable plates E, and is attracted to the magnet A′, depressing the end of the spring H, which immediately rises and holds it in position after the current has stopped. The positions of the armature B, bars F G G′, and spring H after this action are indicated in dotted lines.

We will now describe the apparatus by which the current is sent through the magnets by the passage of a train. Two such apparatus are employed; but as they are similar, the present description is limited to one.

On a plate, K, Figs. 4 and 5, is placed a train of wheels, with a circular disk, L, which communicates motion to a winged wheel or regulator, M, by means of a series of gears. The disk L is provided with two stops, *i i′*, and to it is also attached a bent lever, *k*, bearing at its outer end a weight, *k′*. Upon the axis *m* is mounted a ratchet-wheel, *l*, the teeth of which are engaged by a pawl, *l′*, attached to the disk L, and held against the ratchet-wheel by a spring, l^2. This pawl permits the disk L to turn freely from right to left, so as to lift the weight *k′*; but when, under the action of that weight, motion in the opposite direction is produced, it is communicated through the train of gears to the regulator M.

A bar, N, passing between guides *p*, carries at its upper end a bearing-piece, *q*, (which is or may be heart-shaped,) upon which the pedal R (see Figs. 6 and 7) rests, and at its lower end bears against a spring, P, fixed to a support, *s*, a roller, *r*, being interposed. On the body of the bar N is jointed an arm, *x*, which is pressed outward by the spring *x′*. At *t* is a notch, horizontal on the lower side, into which, when the bar N is depressed, the locking-bolt Q is thrown by its spring. The bolt Q moves in guides *v*, and from it projects a pin, *u*, opposite the part of the stop *i* and to the right of it. The jointed arm *x*, at its lower end, projects over the stop *i′*, as shown.

The operation of the apparatus is as follows: The parts being in their normal position, Figs. 4 and 7, if a train passes, the first wheel acts upon the pedal R, which forces downward the bar N and brings it into the position shown in dotted lines, Fig. 4. This movement turns the disk L through the engagement of the arm *x* with the stop *i′*, and lifts the weight *k′*. When the bar N reaches its lowermost limit the arm *x* is disengaged from the stop *i′*, and permits the disk L to begin its return movement under the action of the weight *k′*. The bolt Q is thrown forward by its spring, and its front end, entering the notch *t*, holds the bar N depressed. The depression of this bar completes, by means of the contact-point X and the lever which co-operates with it, as clearly shown in Fig. 4, the circuit through the proper magnet, Figs. 1, 2, 3, and effects the movement of the crossing-signal by the pendulum action before described.

When the train has passed, the counter-weight *y* at the end of the pedal, which has its center of oscillation at *y′*, returns it to its normal position. The descent of the weight *k′* is regulated by the winged wheel M, and sufficient time is therefore given for the train to pass. The turning of the disk L at length, however, brings the stop *i* into contact with the projection *u* on the bolt Q and withdraws the latter, releasing the bar N, which is immediately lifted by the spring P.

Two cases present themselves for the application of this system: first, in the case of a single line of track, and, second, in that of a double line. In the first case we place a single-disk lantern near the crossing, and on the rail nearest the lantern, and at a distance of about three thousand meters on each side of the crossing, a pedal for the red light or danger-signal, and upon the other rail a pedal for the white light or safety-signal. Each of the safety-pedals should be distant from the corresponding danger-pedals the length of a train. In other words, the distance between the danger-pedals will be equal to about six thousand meters plus the width of the crossing, and that between the safety-pedals will be about six thousand meters plus the width of the crossing and the length of two trains. After a train encounters the first danger-pedal it will pass over the other and then over the safety-pedal, which will hide the red light of the lantern and show that the crossing is clear.

A disposition such as above indicated is shown in the diagram, Fig. 8, in which R *y* indicates the railway-track. At suitable points the rail is shown broken away, and the contact-points shown in Fig. 4 are represented in side elevation at Z', Z^2, Z^3, and Z^4, in spaces between the ends of the rails.

In practice it will, of course, be understood that the rail is continuous, and that a pedal and the apparatus shown in Figs. 4 and 5 for making the required contact are suitably disposed at each of the points.

Z^5 is a battery.

A train coming from either direction first completes the circuit through magnets A, which circuit does not affect the signal. Then by means of the contact at Z^2 or Z^3, according to the direction of the train, the circuit is closed through the coils of magnets A′, which cause

the red light or danger-signal to appear. This signal is not affected by the contact at the second of the points Z^3 or Z^2, but continues until the circuit is again completed through magnets A by the contact Z' or Z^4, according to the direction of the train, and the white light or safety-signal is restored by the contact then established.

In the case of a double track we place two lanterns on each side of the crossing, one on the outgoing track and the other on the return track. At a distance of three thousand meters, or thereabout, from each lantern in the direction from which the trains are expected, a pedal for showing the red lights or danger-signals is placed, and at a distance equal to the length of the train on the other side of the crossing a pedal for showing the white light or safety-signal.

If a train is passing over the outgoing track, it encounters, first, the danger-pedal, then passes the crossing, the red light appearing until the entire train has passed, when the other pedal is operated and the white light or safety-signal is shown, the red light being hid by the movement of the disks or movable plates due to the passage of the electric currents. The same actions take place with the return track. In this second case the distance between the two danger-pedals is about six thousand meters plus the width of the crossing, and that between the safety-pedals the length of the two trains plus the width of the crossing.

An electric bell can be made to sound during the time the lantern shows the red light.

It is obvious that many modifications might be made in the details of the apparatus employed.

Having thus fully described our said invention, and the manner in which the same is or may be carried into effect, what we claim, and desire to secure by Letters Patent, is—

1. A system of disk or other signals for railway and similar crossings in which a suitable apparatus is set for a determined time by the action of a pedal, and in setting closes an electric circuit, so as to operate, by means of an electro-magnet or electro-magnets, a disk or signal, and give it a position which it retains until returned to its normal position by the depression of a second pedal, substantially as described.

2. The combination, with the electro-magnets facing each other and an armature movable between them, of one or more disks or movable plates connected with said armature, as indicated, so as to have a pendulous movement, whereby, when the armature is released by either of the magnets, the weight of the said disks or movable plates acts to carry it in the direction of the other.

3. The combination, with one or more signal disks or devices, the electro-magnets facing each other, and the armature movable between them and connected with said disks, of a catch arranged to retain the disks in the position assumed on the attraction of the armature by one magnet after the current has ceased to pass therethrough, and to release the said disks on the passage of a current through the opposite magnet, substantially as described.

4. The combination of a movable bar, a spring against which said bar bears, a spring-bolt, a disk arranged to be operated in one direction by said bar, and in the other when released from engagement with said bar by a retractor, and provided with a stop or pin for withdrawing said bolt at the proper time, and a winged wheel or regulator connected with said disk through a pawl and ratchet, all substantially as described.

In testimony whereof we have signed our names to this specification before two subscribing witnesses.

H. LEBLANC.
E. V. A. LOISEAU.

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AUG. VINCK.