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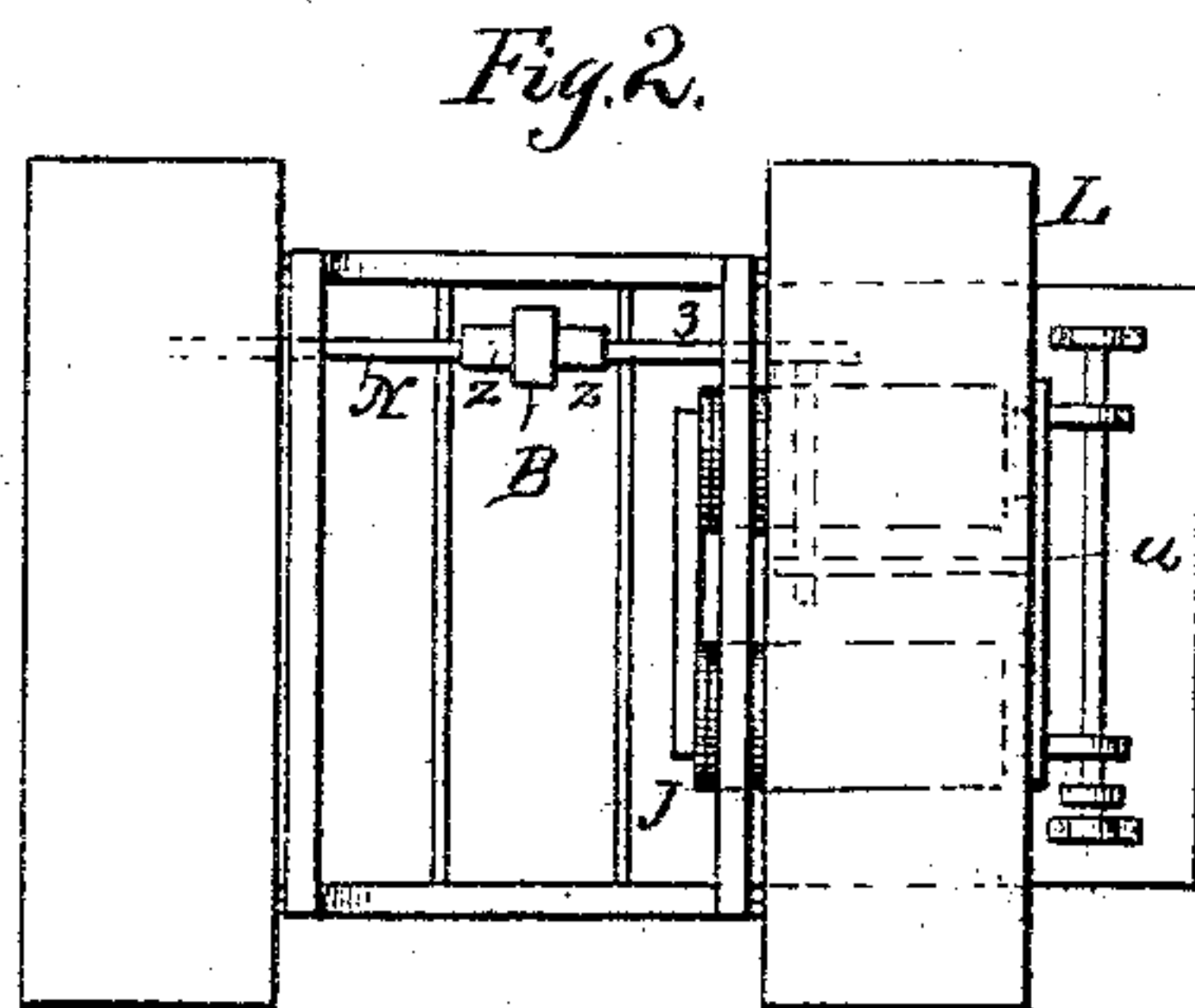
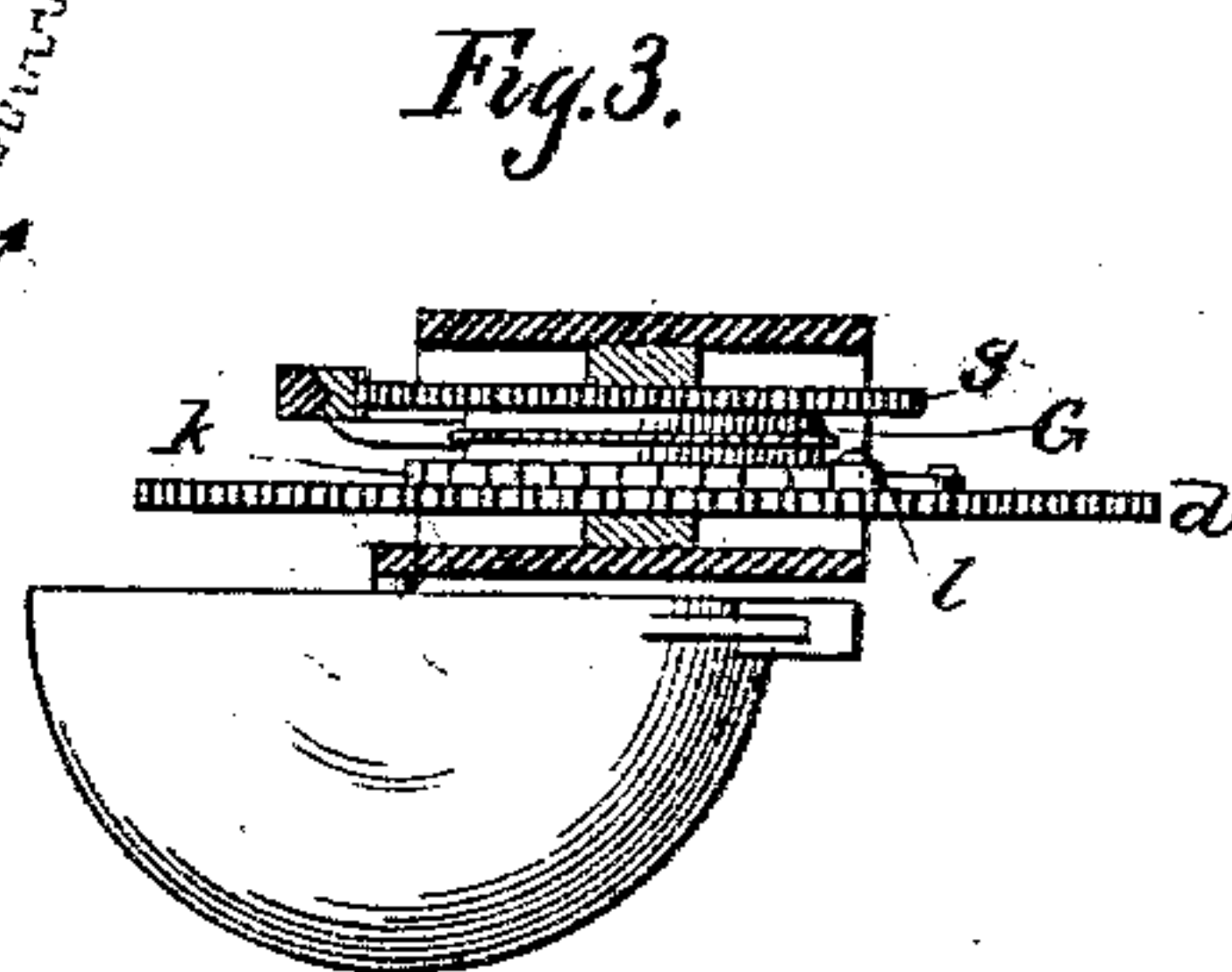
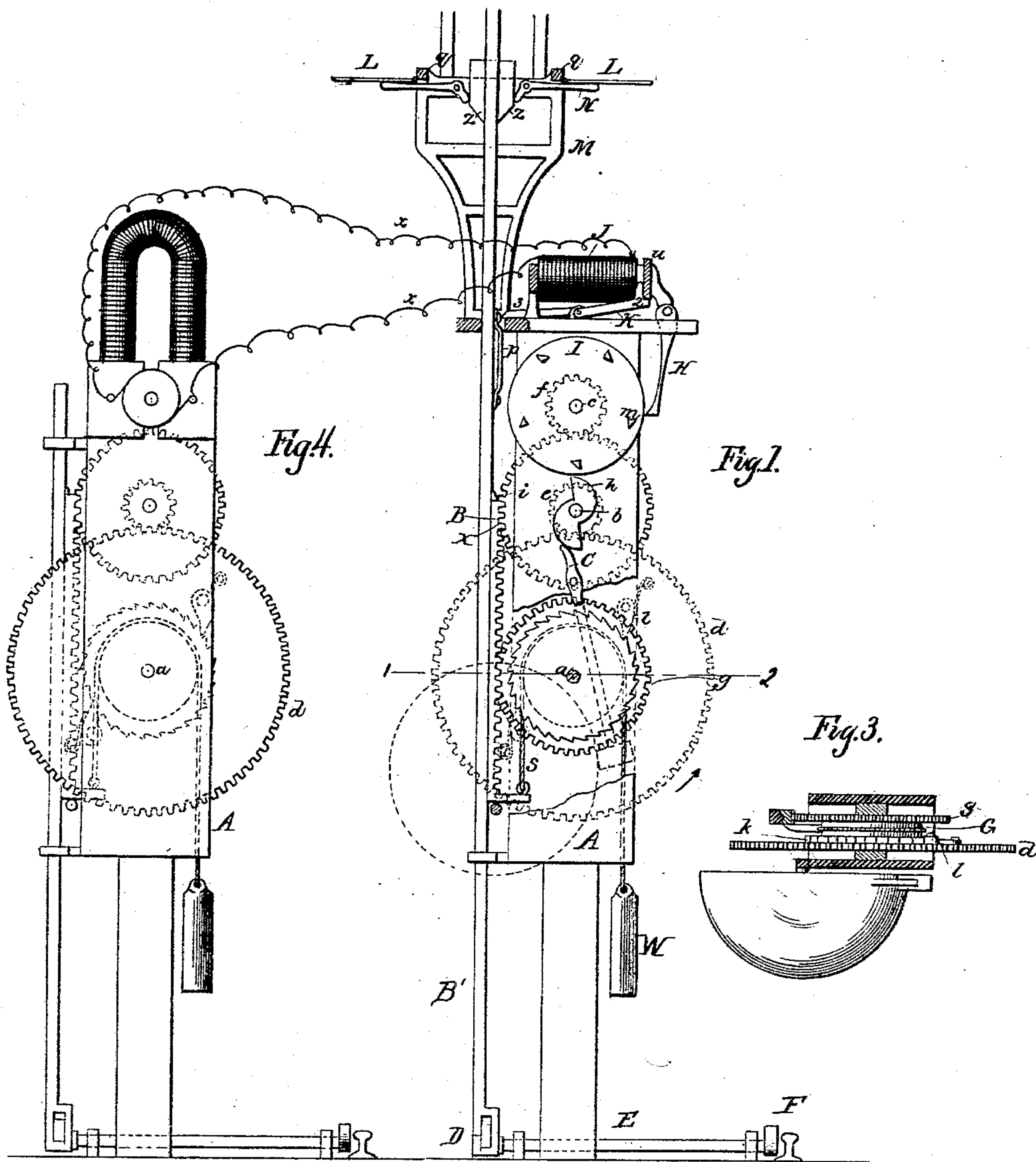
2 Sheets—Sheet 1.

J. HINDS & L. L. STIMPSON.

ELECTRIC RAILROAD SIGNAL.

No.315.785.

Patented Apr. 14, 1885.



Witnesses:
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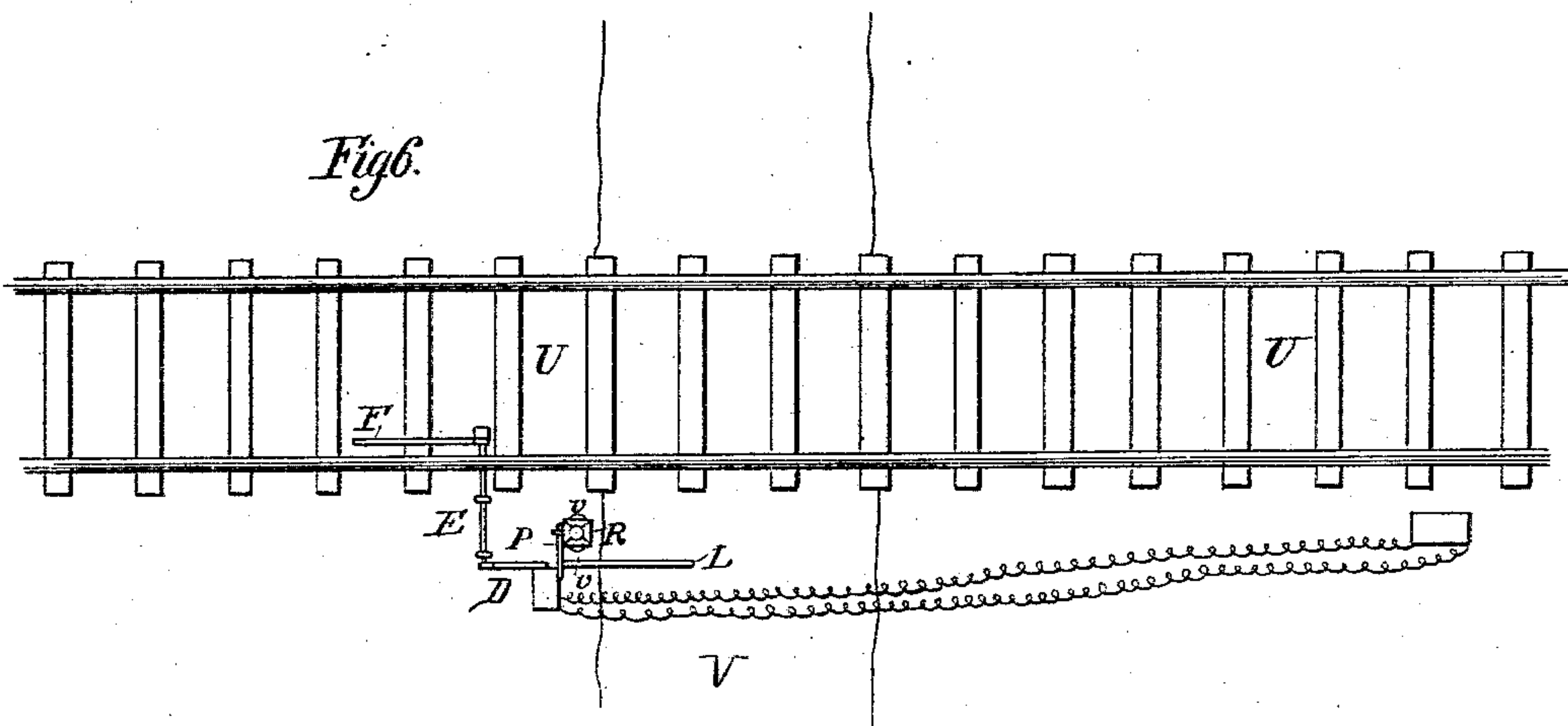
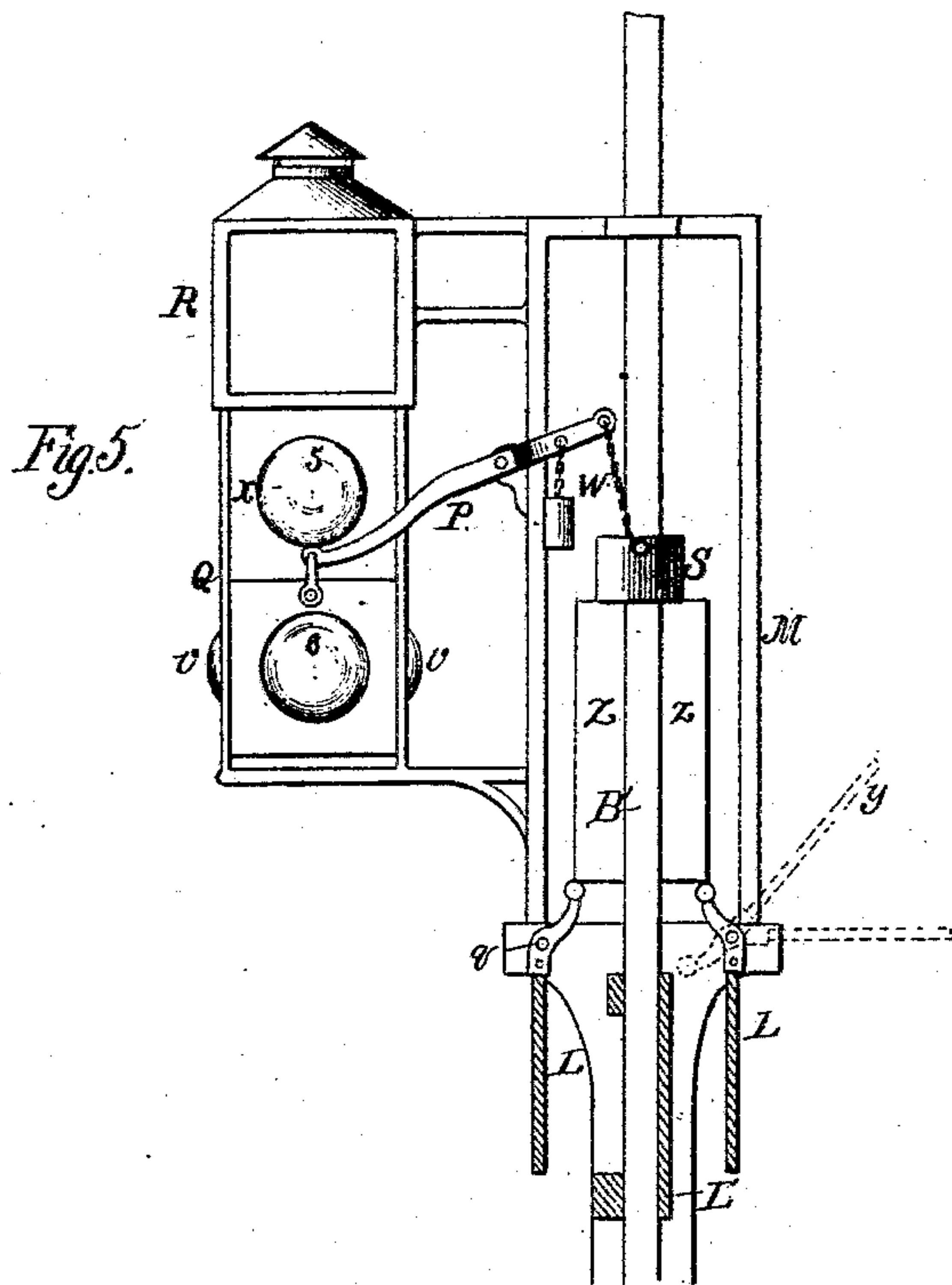
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2 Sheets—Sheet 2.

J. HINDS & L. L. STIMPSON.
ELECTRIC RAILROAD SIGNAL.

No. 315,785.

Patented Apr. 14, 1885.



Witnesses:
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UNITED STATES PATENT OFFICE.

JUSTIN HINDS AND LORENZO L. STIMPSON, OF BOSTON, MASSACHUSETTS.

ELECTRIC RAILROAD-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 315,785, dated April 14, 1885.

Application filed May 16, 1884. (No model.)

To all whom it may concern:

Be it known that we, JUSTIN HINDS and LORENZO L. STIMPSON, citizens of the United States, and residents of the city of Boston, county of Suffolk, and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Electric Railroad-Signals, of which the following is a specification.

Our invention relates to that class of railway-signals in which a visible signal is set in one position and alarm mechanism wound up by the action of a passing train, and the parts locked by a detent, and the latter is withdrawn by a current from a generator operated from a train passing a distant point; and our invention consists in certain improvements, fully described hereinafter, whereby to signal both for the railway and the highway, to secure increased efficiency, and obviate certain objections to constructions heretofore adopted.

In the drawings, Figure 1 is a sectional elevation of the signaling part of the apparatus. Fig. 2 is a plan of Fig. 1. Fig. 3 is a transverse section on the line 1 2, Fig. 1. Fig. 4 is an elevation of the generator. Fig. 5 is a sectional elevation enlarged, showing a combined target and lantern signal; and Fig. 6 is a plan illustrating the arrangement of the signaling device in respect to the roadway and railway.

The apparatus consists, especially, of a signal device represented in Figs. 1, 2, and 5, and the generator represented in Fig. 4, there being in some instances two generators connected with the signal—as, for instance, where there is a single-track road, or a single generator with each signal for a double-track road.

The signal consists of a suitably-supported frame, A, arranged in convenient proximity to the track and provided with a train of gears of suitable construction, that shown having three parallel spindles, *abc*, with multiplying gear *d e f*, as shown, whereby a comparatively slow rotation of the lower spindle will cause a rapid rotation of the upper spindle, *c*.

In apparatus heretofore employed the descent of the rack-bar B, that gears with a toothed wheel, *g*, loose upon the spindle *a*, is made the medium of rotating the spindle and its gear *d* in the direction of the arrow, the effect of this rotation being to reduce the speed at which the bar descends, and to insure a con-

tinued and lengthened revolution of the other spindles, one of which carries a double cam, *h*, that vibrates the hammer-shaft C of a bell-alarm.

In the apparatus previously employed the rack-bar is thrown up by an arm, D, upon a rock-shaft, E, provided with a second arm, F, arranged in such proximity to the rail as to be struck and depressed by the wheels or by a tappet upon the train. It has been found that the sudden movements imparted to the rack-bar will sometimes break the teeth of the gears. To avoid this, we use a sliding bar, B', independent of the rack-bar B, but provided with a lug, *i*, which, coming in contact with the upper end of the rack-bar, causes the latter to descend with the bar B' and rotate the train of gear under the combined weight of the two. When the bar B' is thrown up, however, the bar B is not carried with it, but is lifted slowly by the action of a weight, W, secured to a cord, *s*, passing over a pulley and fastened to the lower end of the rack-bar. By this means the sudden elevation of the bar B' is permitted, while the rack-bar moves so slowly that the gears are not injured; but when the bar B ceases its movement the lug *i* rests upon the bar B, so that the two bars descend together, working in unison.

To permit the free revolution of the wheel *g* in one direction independently of the gear *d*, we secure the wheel *g* to one side of a drum, G, at the other side of which is a ratchet-wheel, *k*, with which engage spring-pawls *l* upon the side of the gear *d*. When the rack-bar B ascends and turns the gear *g* in the direction the reverse of its arrow, the ratchet *k* slips beneath the pawls; but the descent of the rack-bar causes the ratchet-teeth to engage with the pawls, so that the gears are revolved by the action of the descending weight and the signal is set or sounded. As shown, the cord *s* passes over the drum G as a pulley.

As in apparatus heretofore referred to, the gears, after the rack-bar is raised, are locked by a suitable detent, which is operated to unlock the gears by an electric current created by the action of the distant generator when the train passes the same.

To prevent friction and binding and secure a sensitive action of the parts, we use a pendent

detent or lever, H, having a V-shaped end that engages with V-shaped or angular pins *m*, upon a disk, I, carried by the spindle *c*, the angular character of the pins and lever *n* insuring the passage of the lever either above or below one of the pins should it strike the same. The lever H carries at the upper end the armature *u* of an electro-magnet, J, connected by wires *x* with the distant generator, the exciting of the magnet J by the electric current drawing the armature to the magnet, carrying the lever H away from the pins *m*, and permitting the train to revolve under the action of the descending rack-bar. It is necessary that the armature be held to the magnet until the bar B descends its entire distance to secure a continued sounding or display of the signal; but it is also necessary to throw the armature away from the magnet, so as to lock the gear after the rack-bar has been raised. We therefore combine with the bar B' and the armature an intermediate device constructed to hold the armature to the magnet while the bar descends and to throw off the armature as soon as the bar begins its ascent. Thus we use a rock-lever, K, one end, 2, of which bears against the armature, while the other end, 3, is in a position to be struck by a spring projection, *p*, when the bar B' rises, the lever being thereby rocked and forcing the armature away from the magnet, but resuming its position after the projection *p* passes it, so that the armature can approach the magnet as soon as the latter is excited.

To permit the bar B' to descend freely and secure an effective display or withdrawal of the visible signal, we make the latter of one or two light panels, L, hinged at the upper edges to horizontal bars *q* of a frame, M, and swing the panels (upon which the word "Danger" may be painted) by suitable devices operated on the movement of the bar B'. One arrangement is shown in Fig. 1, where the bar is provided with wings *z*, which, by contact with short arms of bell-crank levers N, swing the latter against the panels L and lift them to a horizontal position. When the bar is raised, the wings pass from contact with the levers, which, with the panels, then swing to a vertical position.

Another arrangement is shown in Fig. 5. In this arrangement there is a signal-lantern as well as the target, the latter being hung as before to be operated by wings *z* upon the bar B'. These wings bear with their lower straight edges directly upon the short arms projecting from the panels L, and the parts are so constructed that when the bar is at its greatest height the panels will be vertical. When partly lowered, the panels will be horizontal, and when fully lowered they will be inclined, as shown in dotted lines *y*, Fig. 5. By painting the panels upon both sides different signals will be displayed according as the panels take different positions. The stationary panel L' may be arranged to be concealed when the

panels L are down, said panel being displayed when the panels L are horizontal, an additional signal being displayed when the panels L are turned to the position *y*.

It will be obvious that different means of operating the panels to secure different adjustments may be employed.

To operate the signal-lantern in connection with the targets, we connect the lever P, which carries the lantern-frame, to some moving part of the apparatus. The light is arranged at *x*, and the frame Q has two bull's-eyes, 5 6, of different colors, either of which may be brought opposite the light, a screen, R, receiving the frame as it rises.

To prevent sudden shocks from the rapid descent of the bar B', the lever P and its lantern are counterbalanced by a weight, *w*, and the inner arm of the lever is connected by a flexible connection with a weight, S, resting upon the wings *z* and sliding upon the bar B', so that the latter may descend rapidly without carrying the weight with it.

It will be apparent that other means than those described may be used for swinging the panel or panels L to horizontal and vertical positions by movements of the bar. The generator, which may be that shown in Fig. 4, is operated by the descent of a rack-bar in the same manner as the signal device, the descending weight insuring a prolonged current of one polarity, as described in Letters Patent granted to Joshua Gray, January 9, 1883, No. 270,305. The fracture of the gears of the generator is prevented by using a rack-bar separate from the bar B', thrown up by the action of the train in the same manner as a signal device, already described.

By reference to the plan, Fig. 6, it will be seen that the target L, arranged to be visible from the highway V, cannot be seen by the engineer on the train approaching on the railway U. In signaling devices heretofore made this arrangement has proved a source of danger, as the target may not be displayed without the engineer being aware of the fact. By combining with the target a lantern or visual signal, arranged (at R, Fig. 6,) so as to be visible to the engineer, and connecting it with the target or operating devices, so that when the target is displayed the lantern will be exposed, the engineer is always signaled as to the position of the target, and may act accordingly. The lantern casing or frame is painted, so as to be a signal to the engineer in the day-time.

To signal the highway at night, we put a bull's-eye, *v*, at each side of the lantern, so that a light will be displayed to the highway at the same time that the engineer's signal is displayed and upon the target taking a display position, thus avoiding the dangers incident to the sole dependence upon an audible highway-signal at night.

It will be obvious that day and night signals of any suitable construction may be employed

to co-operate, as set forth, and that the signals may be displayed or concealed to indicate the proximity of a coming train.

It will be apparent that any suitable arrangement of gears, or a revolving fan or other devices, may be used to retard the action of the descending weight, so as to prolong the sounding of the alarm and display of the visual signal, without limiting ourselves, therefore, to the construction and arrangement shown.

We claim—

1. The combination of the rack-bar driving a retarding mechanism, a sliding bar connected to levers arranged to be operated by a passing train and having a bearing upon the rack-bar, and a weight for lifting the rack-bar after the sliding bar has been raised, substantially as specified.

2. In an electric railroad-signal, the combination, with a distant generator, of a signal device provided with a sliding bar and means for lifting it by a train, a rack-bar and weight, whereby the same is raised when the sliding bar is elevated, a detent holding the bars in their raised position, an electro-magnet connected with the generator and operating when excited to move the detent, and means, substantially as described, for retarding the descent of the bars, substantially as specified.

3. The combination, with the driving rack-bar and weight for lifting it, of an independent sliding bar connected to levers operated by the train and provided with a bearing, whereby the sliding bar can rise independently of the rack-bar, but carries the latter downward with it, for the purpose set forth.

4. The combination, with an independent sliding bar connected to levers operated by the train, of the sliding rack-bar, train of wheels having a ratchet connected to a toothed wheel gearing with the rack-bar turning on the pinion of a wheel, *d*, and pawls on said wheel engaging with the ratchet, substantially as set forth.

5. The combination, with the weighted rack-bar and the train of gear, of a disk carrying pins, an electro-magnet electrically connected with a distant generator, and a suspended lever carrying the armature and arranged to make contact with the said pins, substantially as set forth.

6. In a railway-signal, the combination of the sliding target-bar, the gears, disk, electro-magnet, armature and lever having an angular end, and pins on the disk having angular edges, substantially as set forth.

7. The combination, with the armature of the magnet and with the sliding bar, of an arm or lever arranged to bear on the armature and to be struck by a projection on the bar, substantially as described.

8. The combination of the sliding bar, one or more wings upon the same, one or more signal-panels hinged to a frame at the upper edges, and connections to swing the panels to different positions as the bar moves, substantially as specified.

9. The combination, with the frame, the sliding bar adapted to be operated by a passing train, and target-panels hung to the frame, of connections on the bar, whereby the latter are moved from the bar to vertical, horizontal, and inclined positions, substantially as described.

10. The combination of the sliding bar, counterbalanced lever P, connected to the lantern-frame, weight upon the bar, and flexible connection between the weight and lever, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JUSTIN HINDS.
L. L. STIMPSON.

Witnesses:

JOHN E. FARNHAM,
CHARLES E. FOSTER.