(No Model.) 3 Sheets—Sheet 1.

J. J. HAMILTON.

AUTOMATIC RAILROAD SIGNAL.

No. 342,908. Patented June 1, 1886.

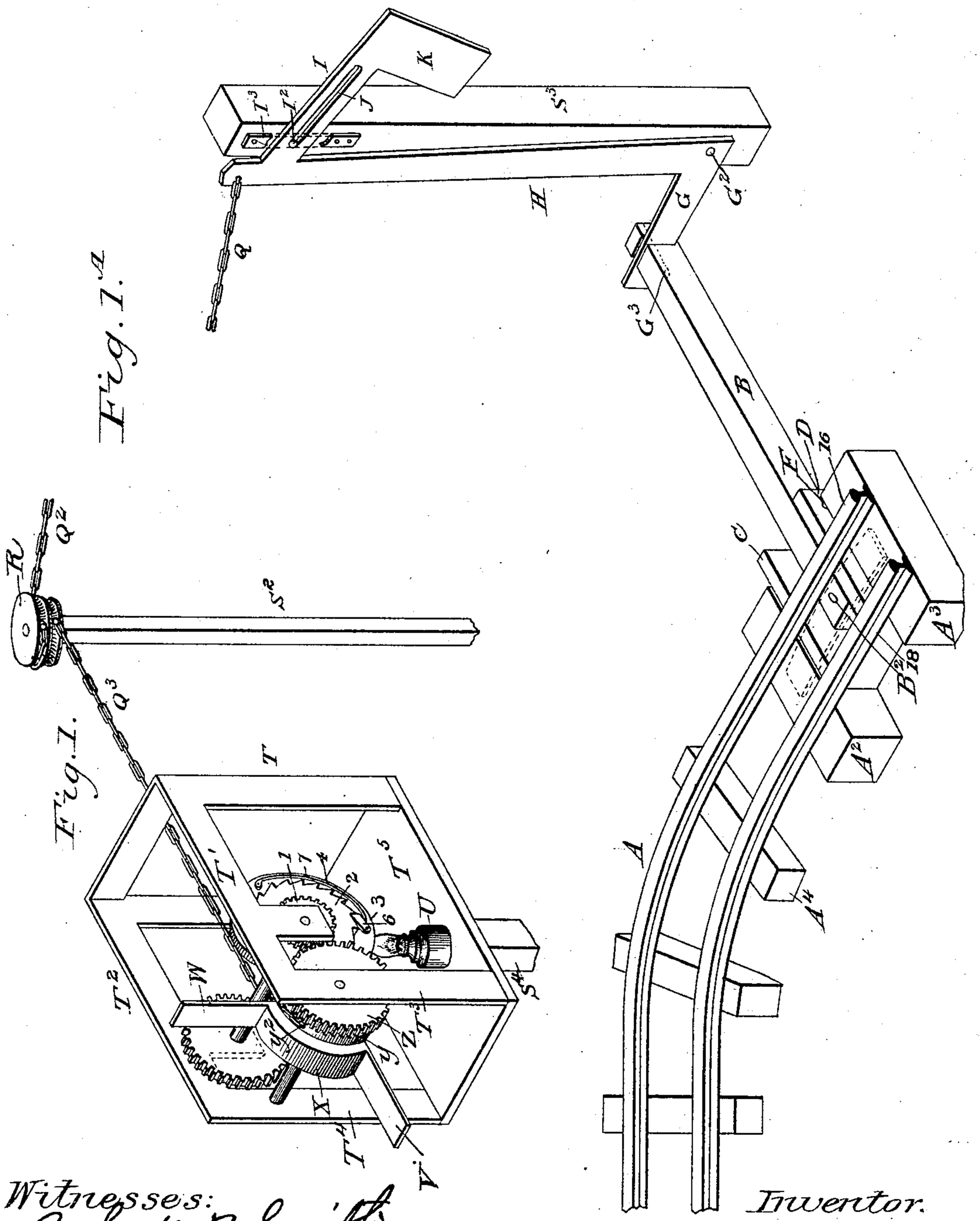

Fig. 1.

Witnesses:
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(No Model.) 3 Sheets—Sheet 2.

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AUTOMATIC RAILROAD SIGNAL.

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Fig. 2.

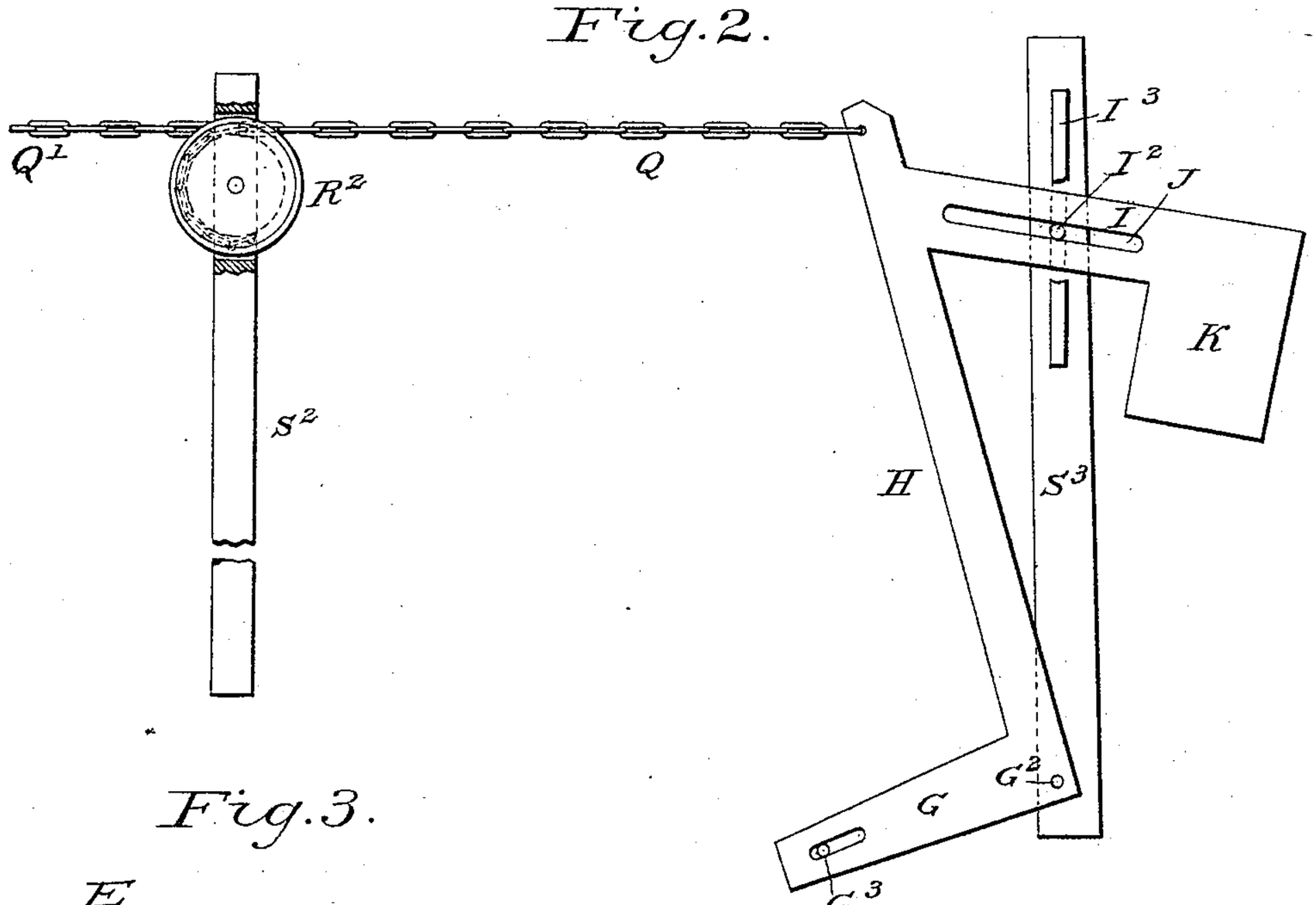


Fig. 3.

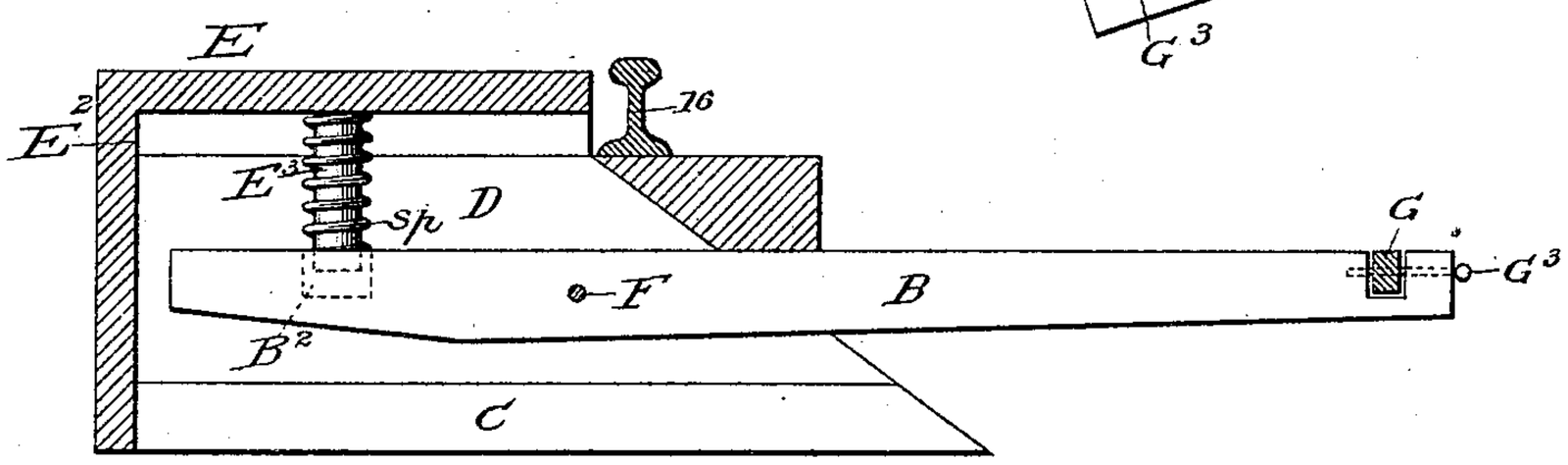


Fig. 4.

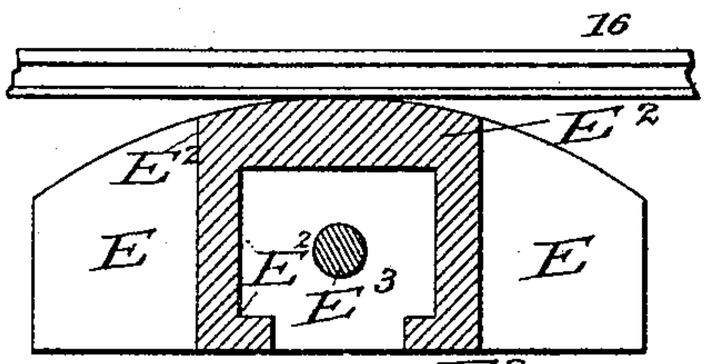
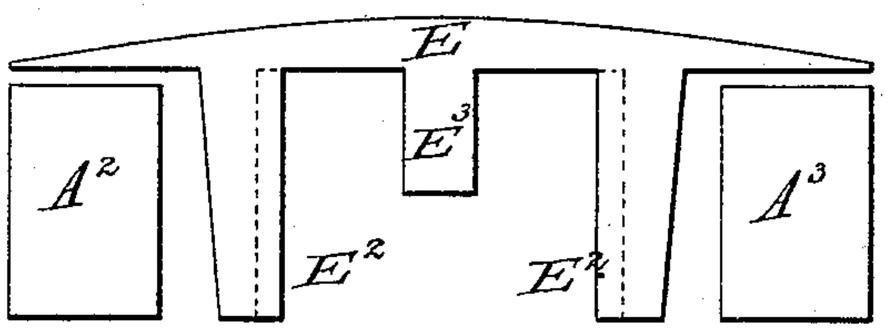


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

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AUTOMATIC RAILROAD SIGNAL.

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Fig. 6.

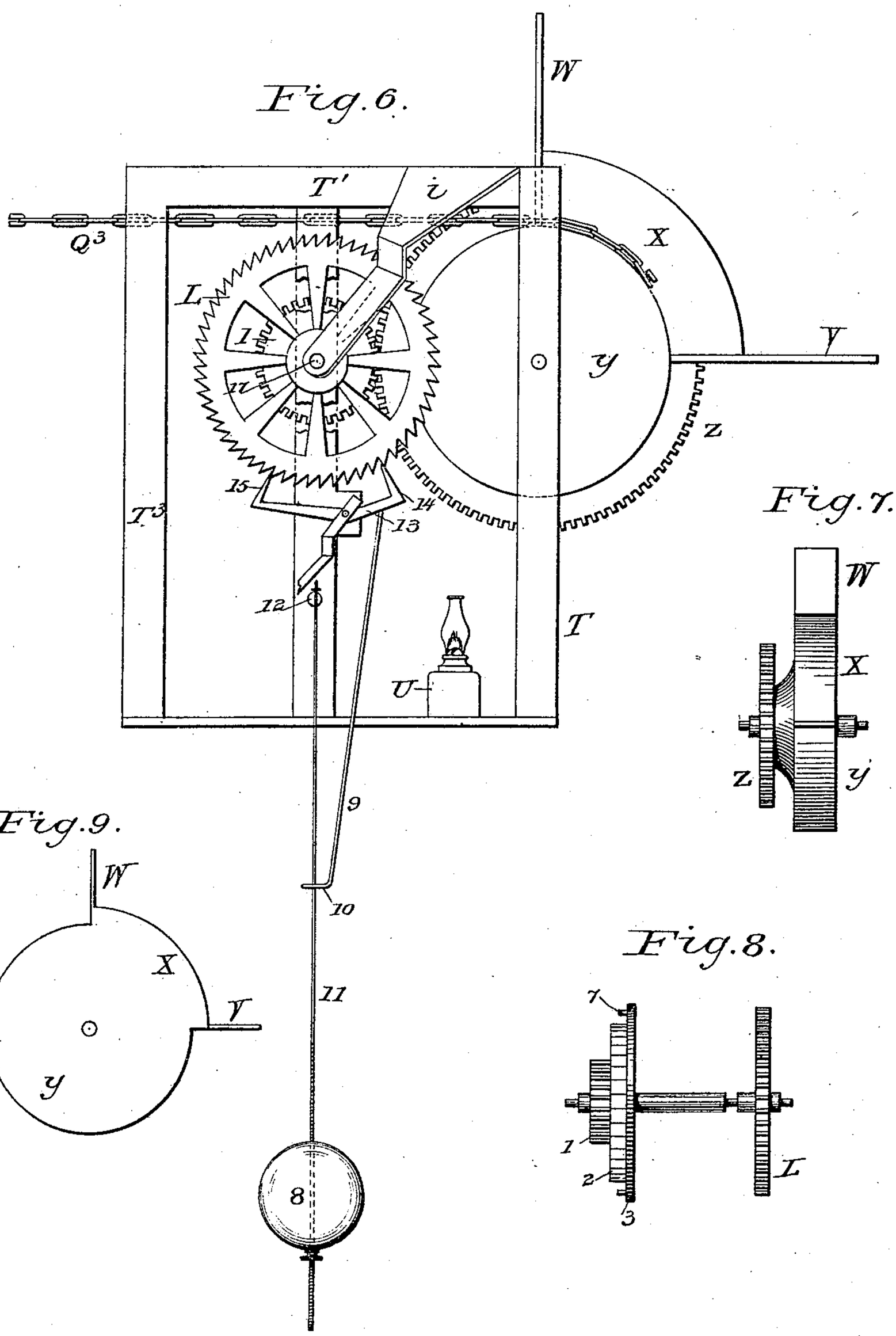

Fig. 7.

Fig. 9.

Fig. 8.

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UNITED STATES PATENT OFFICE.

JAMES J. HAMILTON, OF NEW CASTLE, INDIANA.

AUTOMATIC RAILROAD-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 342,908, dated June 1, 1886.

Application filed September 28, 1883. Serial No. 107,669. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. HAMILTON, a citizen of the United States, residing at New Castle, in the county of Henry and State of Indiana, have invented a new and useful Automatic Railroad-Signal, of which the following is a specification.

My invention relates to improvements in raidroad-signals and the means for operating same by a locomotive or car passing along the track, and is so arranged that it will display a signal the length of time desired, being regulated as to time by clock-work.

The objects of my improvement are to provide at all railroad curves, tunnels, bridges, and other places where needed, warning of the approach or proximity of any train at such places, and thereby to prevent accidents and losses of life and property by providing a signal that shall be independent of the uncertainties of personal service. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 and Fig. 1^{A} are perspective views of the mechanism at each station and of the railroad-track at a curve, showing at the right hand the mechanism upon which the locomotive or car acts, and at the left hand the signal-station where, by the mechanism put in operation, the signals are displayed. Fig. 2 shows a detached view of the cable-lever H, its connections with the post S^{3}, the cable Q, also the intermediate post, S^{2}. In a slot near the upper end of this post is shown the double-grooved pulley R^{2}, working vertically on its axis in said slot. To this pulley are attached the cable sections Q and Q′ in the manner more fully shown in Fig. 1 at R Q^{2} Q^{3}. The cables Q Q′ Q^{2} Q^{3} are not one and the same section of the cable, but different sections, which, when united with pulleys and lever and other attachments, as shown, form one continuous line between the two extreme ends of the apparatus, said sections working on and connected with the pulleys, R R^{2}, &c., as hereinafter explained, one in each groove.

Fig. 3 is a vertical section of the trip and lever and parts connected therewith on which the locomotive or car operates in passing over the track. Fig. 4 is a view of the under side of the trip, horizontal to its surface, over which the locomotive or car passes, and, depressing same, operates the lever B. (Shown in Figs. 1 and 3.) Fig. 5 is a vertical section of the trip shown in Fig. 4, with its flanges E^{2} E^{2} and center projection, E^{3}, and two railroad-ties, A^{2} and A^{3}, on or over which the ends of the trip E rest. Fig. 6 is a view of the mechanism of the opposite side of the signal-station from that shown in Fig. 1, showing in part, however, the same mechanism shown in Fig. 1. Fig. 6 shows especially the means used for regulating the time the signal shall be displayed, as hereinafter described. Fig. 7 is a view of the cable-drum Y, the segment-weight X, day-signal W, and the master-wheel Z, constituting a part of the mechanism at the signal-station. Fig. 8 is a view of the spindle 17 and wheels attached or working thereon. This spindle carries the scape-wheel L, the cog-wheel 1, ratchet-wheel 2, pawl-wheel 3. Fig. 9 represents the drum-wheel Y, day-signal W, shutter V, and segment-weight X.

The same letters refer to the same or similar parts throughout the several views.

In Figs. 1 and 1^{A} are shown the devices and mechanism whereby a locomotive or car passing along the track operates to display the signal of its presence at any suitable distance therefrom. A socket-box, C, with socket D, in which is pivoted, at F, the lever B, is fitted under one rail of the track and extends inward toward the other rail between the ties A^{2} and A^{3}. The short end of the lever B extends within the socket D a suitable distance toward the center of the track. In the upper side of the short arm of this lever B, at B^{2}, is a shallow socket for receiving the projection E^{3} of the trip E, Figs. 5 and 3. Over the socket-box C is fitted the trip E, having flanges E^{2} E^{2}. In Fig. 3 this trip is shown in vertical section. At E^{3}, on the under side of the trip E, is a projection, around which is coiled a suitable spiral spring SP. This projection extends downward from the center of the trip into the socket B^{2} in lever B, Fig. 3, but not quite to the bottom thereof. The trip E, when not under the wheels of the locomotive or car, is supported at a suitable distance above the ties A^{2} A^{3} by action of the spring SP.

Fig. 5 shows a vertical section of the trip E lengthwise, with its flanges E^{2} E^{2}, projection E^{3}, and the cross-ties A^{2} A^{3}. Fig. 4 shows said trip in flat section, with its flanges E^{2} E^{2},

projection E^3, and one of the track-rails lying at the side of the trip. The upper surface of the trip is rounded off slightly, as shown in Fig. 5, which lies lengthwise along the track. A locomotive or car passing along the track runs upon and over the edge of the trip next to the rail, and depresses it in proportion to the width of the flanges or projections of the wheels of the locomotive or car. The shock is modified by the spring SP, and as soon as the locomotive or car passes over the trip the trip, by force of the same spring, resumes its place. If the car or locomotive has no projecting flanges, the trip, being slightly raised above the top of the rail in its center, is depressed by the face of the wheel. The trip E being depressed brings the projection E^3 in contact with the upper side of the lever at B^2, in the short end thereof. The short end of the lever B is thereby depressed, while the long end thereof is raised. The length of this lever is made to suit requirements. In the long end of this lever, near its outer end, is a notch on the upper side thereof, as shown in Figs. 1^A and 3. Into this notch is pinned or fastened the distal end of the short lever G, attached to and forming the foot of the long upright cable-lever H, as shown in Fig. 1^A and in Fig. 2. The raising of the long end of the lever B raises the outer or distal end of the lever G, which being the foot of lever H, and G and H being firmly united and fastened to the post S^3 by the pivot G^2, the raising of the outer end of the lever G moves the upper end of the lever H to the right and pulls upon the cable, wire, or cord attached to its upper end, as shown at Q, Figs. 2 and 1^A. To the upper end of this lever H is attached an arm, I, with slot J, moving on the pin I^2 under the cleat I^3, the cleat and the post S^3 forming a slot, in which the arm moves back and forth, and by which the top of the lever H is kept in place in its relation to the post. To the outer end of the arm I is attached a weight, K, which pulls the lever H to the right and keeps it in position when the lever is thrown back, and thereby holds the cable Q taut until the mechanism at the other end of the line has time to operate to draw it back.

At Fig. 2, S^2 is an intermediate post. R^2 is one of the double-grooved pulleys, the same as R, but in a vertical position, revolving on an axis in a slot in post S^2, near its top end. Q is a cable connecting the pulley R^2 and the lever H; Q′, another section of cable connecting the pulley R^2 on post S^2 to the next pulley in the line between the two stations, but not shown in the drawings.

In Fig. 1 the same kind of a pulley, R, is shown in a horizontal position, and revolves on a vertical axis in the top of the post S′. The cables Q, Q′, Q^2, Q^3, &c., are connected with the several pulleys, R, R^2, &c. Thus one end of the cable Q^2 passes from the right around and behind the pulley R till the end of the cable comes to near the center of the front edge of the upper groove, where it is fastened by a pin, staple, or other suitable means. The next cable in the series, Q^3, passes from the left around and behind the pulley R in the other or lower groove to the center of the front edge of the pulley R, to a point immediately below the end of Q^2, and is there fastened in the same manner as Q^2. When the cable Q^2 is pulled upon by the intermediate cables attached to intermediate pulleys between it and the lever H, as before described, the pulley R is revolved and the cable Q^2 is unwound from around the pulley part of one revolution, while the cable Q^3 and the other end of the cable Q^2 are correspondingly wound around their respective pulleys, and the cable Q^3, with its other end fastened in the drum-wheel Y, sets in operation the signals, as herein explained. A locomotive or car passing over the trip E depresses the short arm and raises the long arm of the lever B, which lifts the outer end of the lever G, which throws back the top of the upright lever H at its top end to the right, as shown in the drawings, and this lever, pulling upon the cable Q, pulls and draws said cable from toward the other station, and it in turn acts upon all intermediate cables and pulleys between the stations. The last cable in the line, Q^3, at its farther end, is fastened by a staple, pin, or other suitable contrivance to the drum-wheel Y, as shown in Figs. 1 and 6. By pulling upon the cable Q^3 the drum-wheel Y is revolved to the right, and the master-wheel Z, Figs. 1, 6, 7, engaging by its cogs with the smaller cog-wheel, 1, winds up the mechanism at the signal-station and sets the signals in proper position. The drum-wheel Y has on one-fourth of its circumference a heavy projecting segment, X, (shown in Figs. 6, 7, and 9,) which serves as a weight to run the machine when set during the time limited by the pendulum and other mechanism hereinafter described. The drum-wheel Y, when not in position to display the signal, holds the shutter V downward vertically, while the day-signal W is held in a horizontal position—the same position that the shutter V occupies when the signal is displayed. The signal W and shutter V are attached to the ends of segment X, as shown in Figs. 1, 6, and 9. By one-fourth of a revolution of the drum-wheel Y, which is effected through the cable Q^3, Q, and other intermediate cables, as aforesaid, operated by the locomotive or car, as described, the signal W is made to assume a vertical position, as at Fig. 1. In this position the blade W serves as a day-signal. This blade may be made of thin metal and painted in any manner desired. When the signal W is made to assume the vertical upright position described, the shutter V assumes a horizontal position, and at night displays the signal-lamp light U, Figs. 1 and 6. This lamp is placed within the frame carrying the clock-work, &c., and is out of view when the shutter hangs down vertically.

When a locomotive moves forward or the hindmost car of a train moves backward over

the trip E, the mechanism and means already described revolve the drum-wheel Y one-fourth of a revolution to the right and raises the shutter V to a horizontal and the signal W to a vertical upward position, W serving as a day-signal when in this position and the lamp for a night-signal, so that any train approaching from the opposite direction is warned at once by one or the other signal that another train is approaching, or, if going in the same direction, that such train has passed within a given length of time.

The segment-weight X on the drum-wheel Y serves when the signals are displayed to operate the clock-work which regulates the time the signal shall be displayed.

The clock-work regulating the time of display of the signals is constructed and arranged as follows: Fig. 8 represents the small geared wheel 1, which is operated by the master-wheel Z, attached to the drum-wheel Y, Figs. 1, 6, and 7. This small wheel 1 is united to a ratchet-wheel, 2, Figs 1 and 8. These two wheels 1 and 2 revolve on the spindle 17, (shown in Fig. 8.) Immediately behind the ratchet-wheel 2 is a pawl-wheel, 3, Figs. 1 and 8, which is secured to and revolves with the spindle. To this wheel is attached a pawl, 6, Fig. 1, which engages with the ratchet-wheel 2. This pawl is held in place by the spring 4, attached to the pawl-wheel, and is kept in place pressing against the pawl by the pin 7, as seen in Fig. 1. As the drum-wheel Y revolves and raises the signal W and shutter V, the wheel 1 and the ratchet-wheel 2 revolve freely, and when the signal W is raised the pawl 6 holds the ratchet-wheel 2 and the small wheel 1 from revolving in the opposite direction, and holds and retains the drum-wheel Y, signal W, and shutter V in place through the master-wheel Z by the following mechanism, working on the opposite end of the spindle 17, Fig. 8. L is a scape-wheel, Figs. 6 and 8, which is attached and made fast to the spindle 17, and revolves only as the spindle revolves. Engaging with this scape-wheel is the pallet 13 14 15, Fig. 6, to which a pendulum is attached by the usual mechanism, as shown at 8 10 11 12 9 Fig. 6. The weight of the segment X of the drum-wheel Y when the signal W is in a vertical position sets the pendulum in motion through the clock-work, and the same continues in vibration till the drum-wheel Y resumes its position and the signal W occupies the horizontal position; or, when the weight X ceases to operate the time within which the signal W shall pass from vertical to horizontal position is governed by, first, the weight of the pendulum; second, length of same; third, weight of segment X; fourth, size and number of teeth in scape-wheel L. Through these means the signal is shut off within any given time determined upon, and the exact number of minutes is readily indicated by the position of signal W and shutter V, or the same may be indicated by a hand-index upon a figured dial.

The clock-work and mechanism shown in Figs. 6 and 1 may be mounted upon posts or any frame-work that may be convenient and suitable.

I briefly recapitulate the operation of the the entire mechanism: A locomotive or car passing over the trip E depresses by means of the projection E^3 the short end of the lever B and raises the long end thereof, which raises the outer end of the lever G, which, being united to lever H and pivoted to the post S^3 at G^2, moves the top of the lever H back to the right, and the cable Q, attached to the top of lever H, is thereby pulled upon in the same direction as the lever H moves, and this cable acting upon the pulley R^2 R, &c., and other intermediate cables finally operates upon the last cable, Q^3, which is attached at its farthest end to the drum-wheel Y at the signal-station, and this cable Q^3 revolves the drum Y one-fourth of a revolution, raising the segment-weight X, the signal W, and shutter V, exposing the lamp U for night-signal and painted blade W for day-signal. The revolving of the drum-wheel Y winds up the clock-work, and the weight X sets the clock-work in motion, as described above, and in any given time desired the signals are shut off.

I am aware that automatic signals for railroads have been invented and patented prior to my invention. I do not therefore claim, broadly, the invention of an automatic railroad-signal; but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination, in a railroad-signal, of the trip E, with its flanges E^2 E^2, projection E^3, the spiral spring SP, the socket-box C, with socket D, the lever B, with socket B^2, and notch on upper side of long end of same for receiving the distal end of the lever G, the lever G H, pivoted to post S^3 at G^2, arm I, weight K, cables Q Q' Q^2 Q^3, and intermediate cables, pulleys R R^2, drum-wheel Y, master-wheel Z, wheel 1, ratchet-wheel 2, pawl-wheel 3, pawl 6, spring 4, pin 7, scape-wheel L, with the pendulum and pallet, lamp-signal U, day-signal W, shutter V, and segment-weight X, the several parts suitably connected, and having connection with a railroad-track in the manner described, substantially as described and set forth.

2. In combination with a railroad-track, the socket-box C, with socket D, lever B, pivoted at F in socket-box C in socket D, the trip E, with flanges E^2 E^2, projection E^3, spiral-coil spring SP, the combined levers G H, pivoted to post S^3 at G^2, the arm I, slotted at J, weight K, cleat I^3, pin I^2, cable Q, fastened at one end to top of lever H, double-grooved pulleys R R^2, mounted vertically or horizontally upon posts S' S^2, drum-wheel Y, segment-weight X, master-wheel Z, attached to and on same spindle with Y, signal-blade W, shutter V, geared wheel 1, connected and revolving with ratchet wheel 2 on spindle 17, carrying the pawl and scape wheels, the pawl-wheel 3, pawl 6, and scape wheel L, in combination with

pallet and pendulum, all substantially as described and shown, and for the purposes described and specified.

3. With a railroad track, the combination, in an automatic railroad-signal, of the trip E, with its flanges E^2 E^2, projection E^3, spiral-coil spring SP, socket-box C, socket D, lever B, with socket B^2, in upper side of short end, and having a notch on upper side near outer end of long arm, the combined lever G H, with distal end of lever G working in notch on lever B, the lever H, with lever G, combined and pivoted at point of union to post S^3 by pivot G^2, slotted arm I, weight K, cable Q, attached by one end to upper end of lever H and by the other end to pulley R^2, cable Q^3, attached at one end to drum Y and by other end to pulley R, cable Q^2, attached at one end to pulley R and by other end to an intermediate pulley, with all such intermediate cables and pulleys as are necessary to connect the two stations, substantially as and for the purposes set forth.

4. The combination, in an automatic railroad signal, of the drum-wheel Y, segment-weight X, master-wheel Z, day-signal W, shutter V, gear-wheel 1, with the ratchet-wheel 2, pawl-wheel 3, pawl 6, spring 4, the scapé-wheel L, the pallet and pendulum, cables Q Q′ Q^2 Q^3, and intermediate cables, substantially as and for the purposes described and set forth.

5. In combination with railroad automatic signals, the post S^3, the right-angled compound lever G H, pivoted to post S^3 at G^2, arm I, with slot J at top of lever H, and held in position in relation to the post by cleat I^3, between which and the post the arm I moves on pin I^2, working in slot J, weight K, trip E, with flanges E^2 E^2, projection E^3, spiral-coil spring SP, and lever B, pivoted in socket D in box C at F, substantially as and for the purposes set forth.

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Witnesses:
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MILTON DAVIS.