(No Model.) 3 Sheets—Sheet 1.

A. E. CROSS.

CABLE CAR SIGNAL.

No. 369,275. Patented Aug. 30, 1887.

Fig. 1.

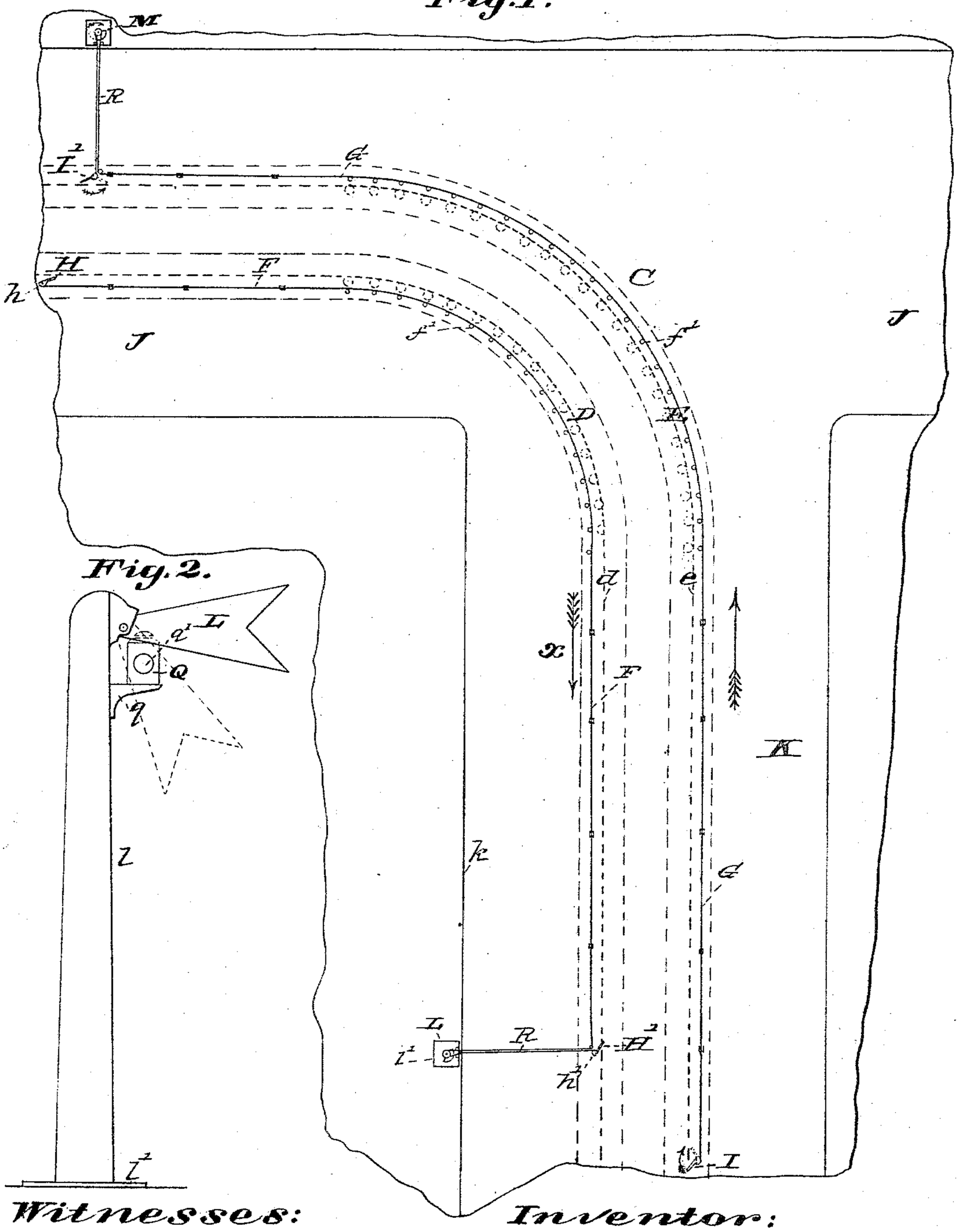

Fig. 2.

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Fig. 3.

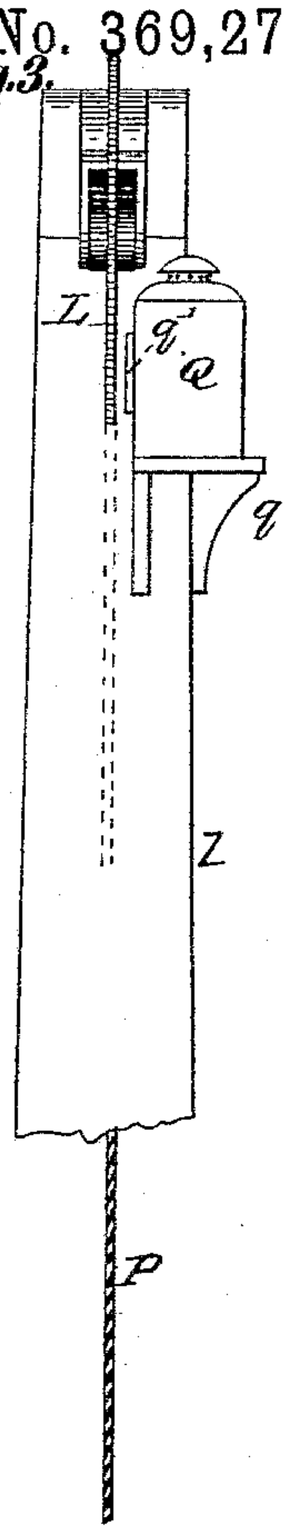


Fig. 4.

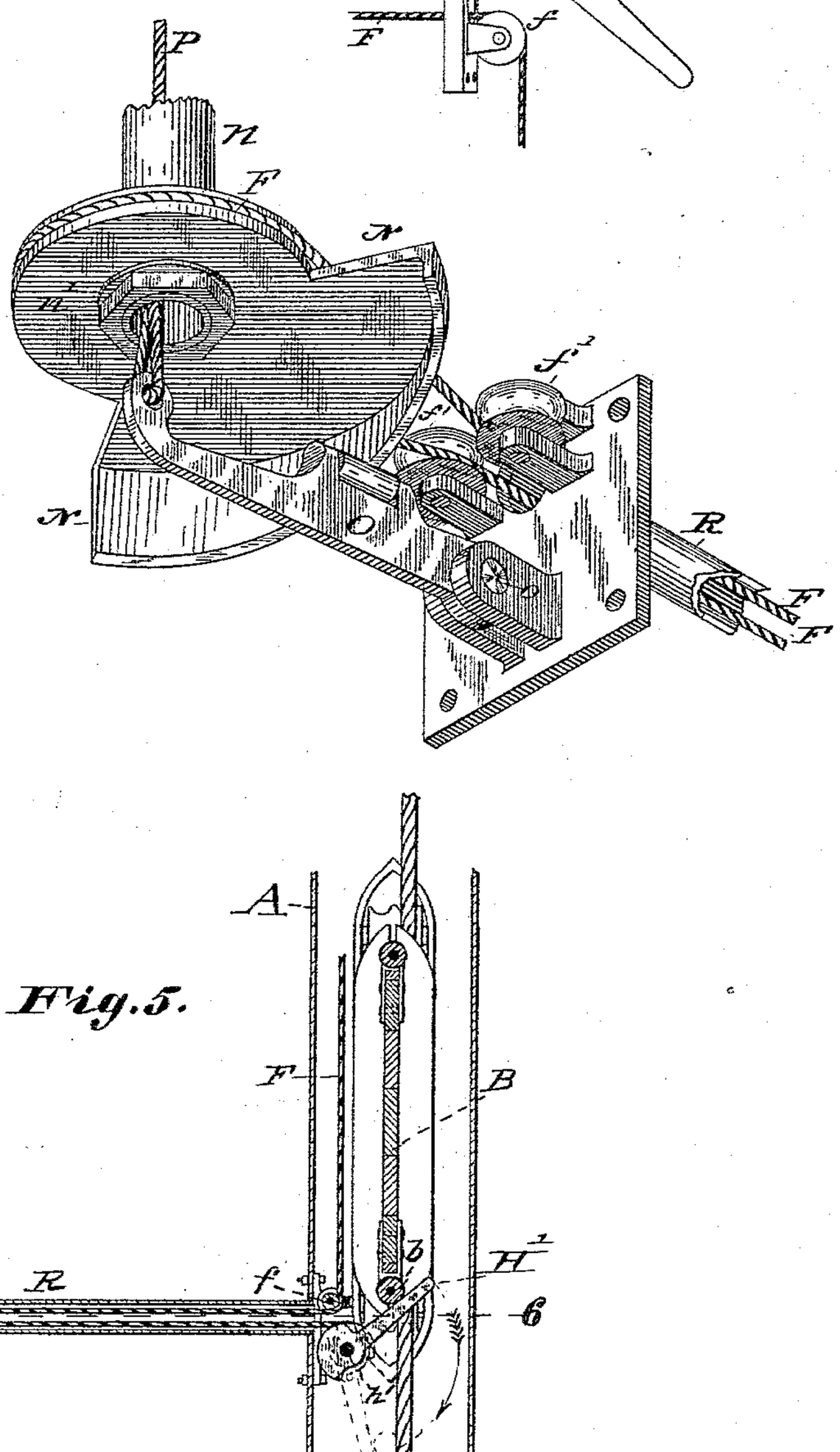


Fig. 8.

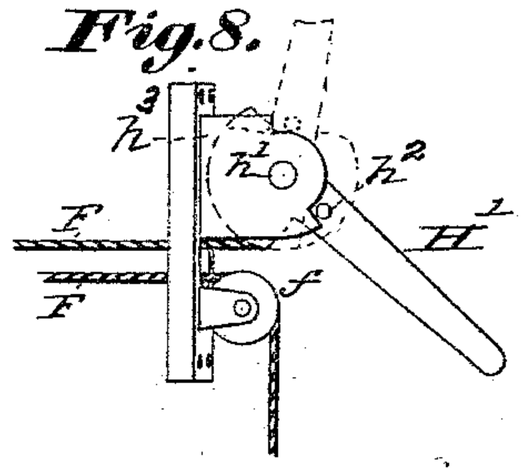
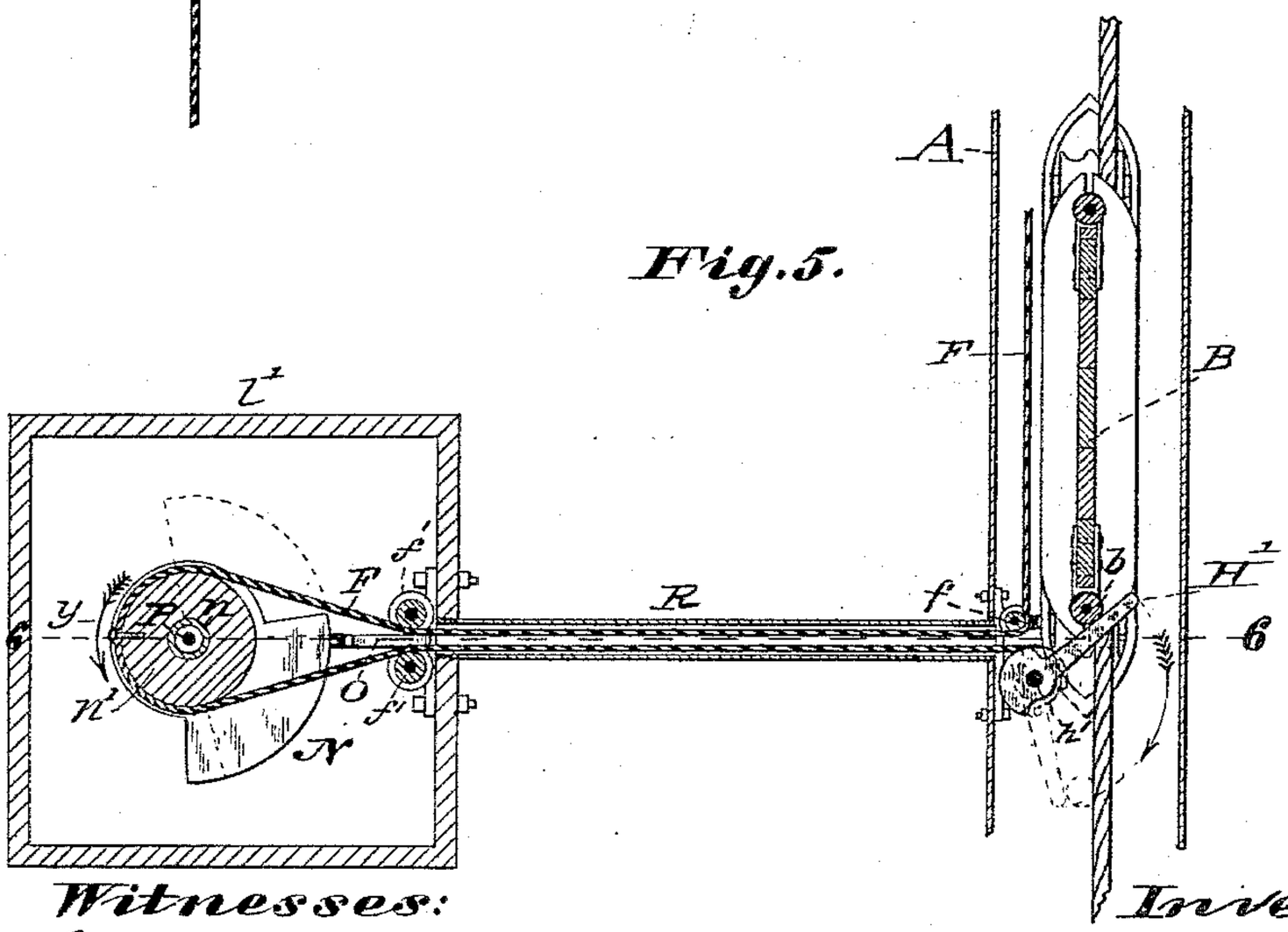


Fig. 5.



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3 Sheets—Sheet. 3.

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Fig. 6.

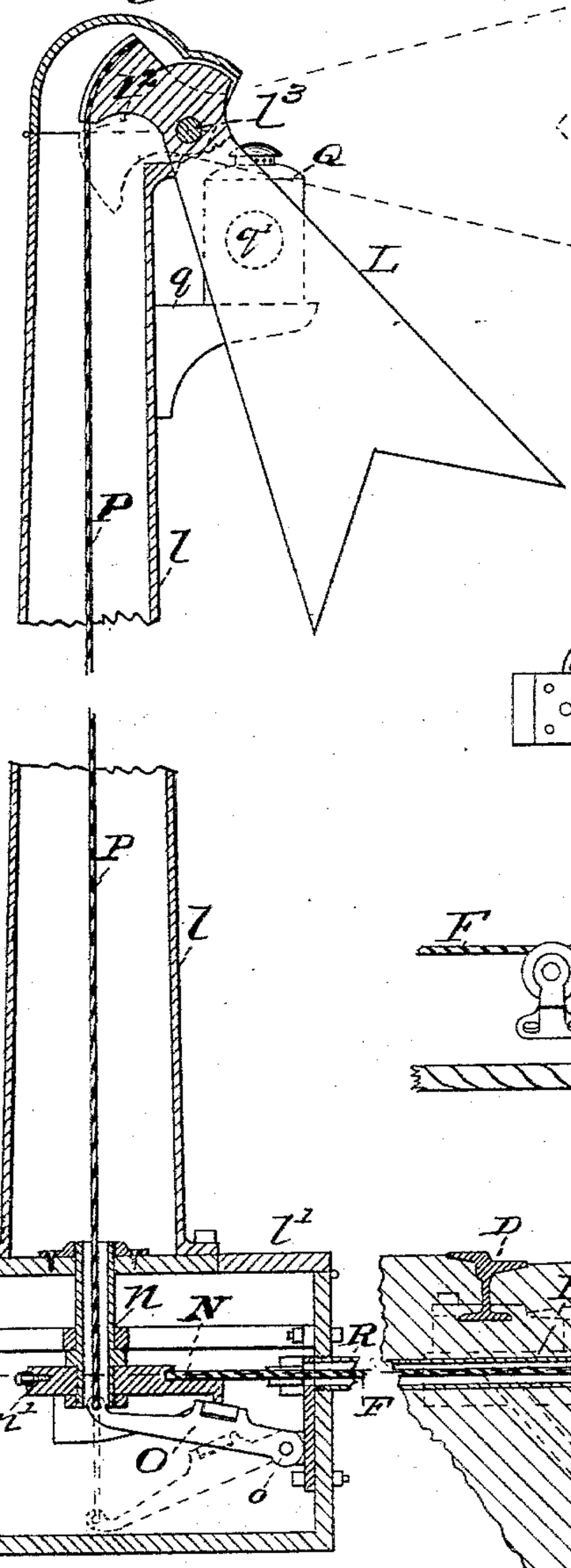
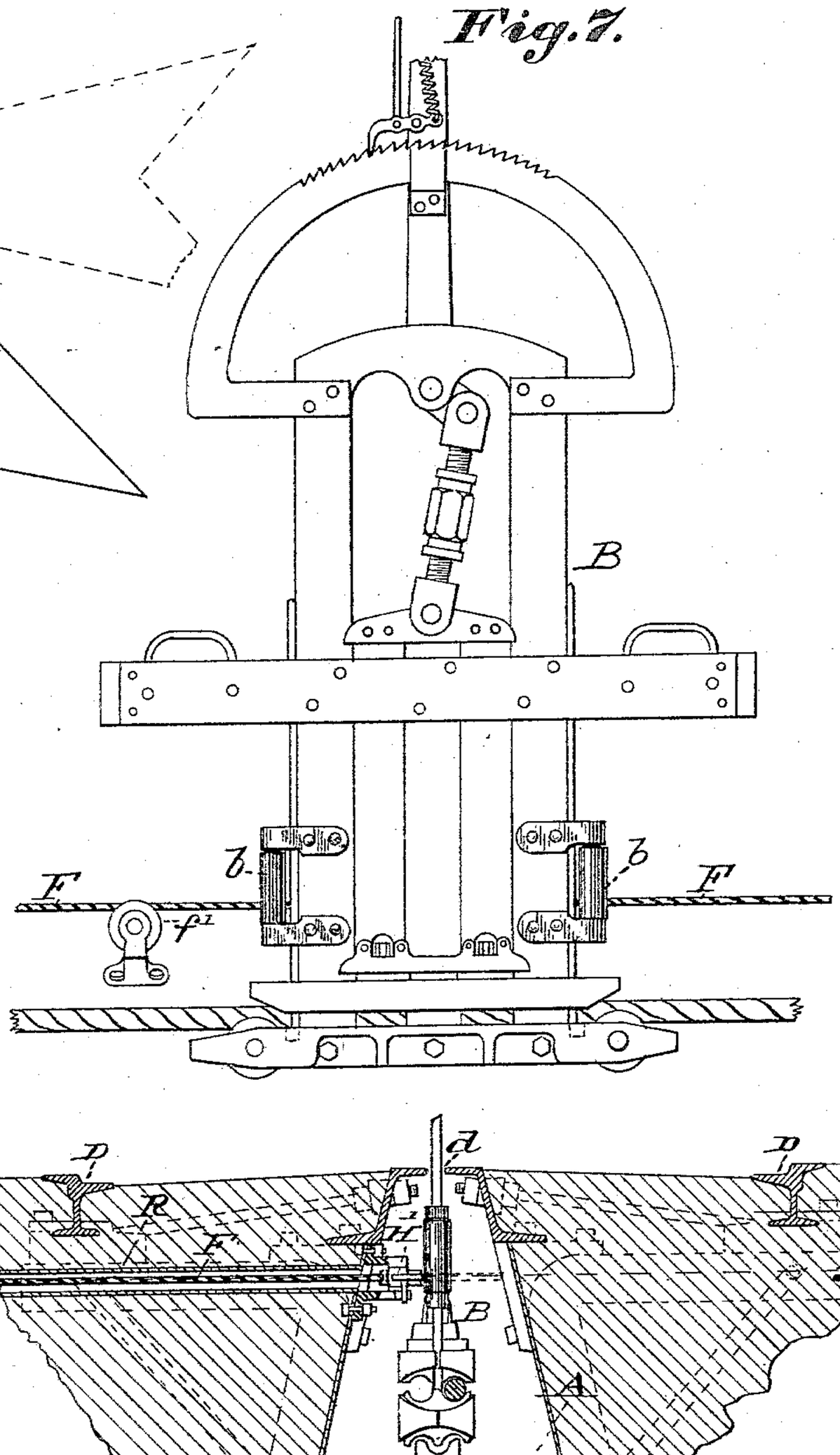


Fig. 7.



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UNITED STATES PATENT OFFICE.

ARTHUR E. CROSS, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO BENJ. F. REX, OF SAME PLACE.

CABLE-CAR SIGNAL.

SPECIFICATION forming part of Letters Patent No. 369,275, dated August 30, 1887.

Application filed February 14, 1887. Serial No. 227,588. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR E. CROSS, of the city of St. Louis, Missouri, have made a new and useful Improvement in Cable-Car Signals, of which the following is a full, clear, and exact description.

Aside from the desirableness generally of being warned of an approaching car, it is especially important to be notified of its proximity at a curve, as there the car is more liable to be derailed and to collide with any car upon an adjacent or intersecting track, and in the case of a double-track railway whose tracks are near each other it is better for cars or trains not to pass each other immediately at a curve, even if the trains remain upon their respective tracks.

The present improvement is a means by which a cable car coming to a curve, turn, or crossing is enabled to signal its position to a person or car upon the street into which the car is to pass, and thereby provide for the safe procedure of that car which has the right of way.

The improvement consists, generally, as follows: The car is provided with a projection, either the usual gripping mechanism or part thereto attached, or any other part projecting downward into the customary cable-conduit, which is adapted as the car is drawn along to encounter and move or turn a movable arm whose movement in turn and by means of a connection leading from the arm effects the setting or raising of the signal at the desired point in advance of the car. At the other end of the connection is another movable arm, which, by the described movement of the first-named arm and connection, is brought into position to be encountered by the car projection as the car moves along toward or past the position of the signal, and when so encountered the second-named arm is moved or turned and the signal-connection is drawn in the opposite direction, causing the signal to be lowered and the first-named arm to be replaced in its original position.

The improvement is more fully carried out upon a double-track railway by establishing a signaling mechanism, such as described, in connection with each one of the tracks, so that the car or train upon each track can signal its position to the car or train upon the other track. This becomes more desirable when the cars or trains going in one direction have the right of way during certain portions of the day, and the cars or trains going in the opposite direction have the right of way during the remaining portions of the day.

The most desirable mode of carrying out the improvement is shown in the annexed drawings, making part of this specification, in which—

Figure 1 is a plan of a curve in a cable railway. Fig. 2 is an elevation of one of the signal-posts. Fig. 3 is an elevation at right angles to that of Fig. 2 of the upper end of the signal-post. Fig. 4 is a view in perspective from beneath of the mechanism at the bottom of the signal-post. Fig. 5 is a horizontal section on the line 5 5 of Fig. 6, which in turn is a vertical section on the line 6 6 of Fig. 5. Fig. 7 is a side elevation of the grip mechanism of the car. The view includes the main cable and also the cord used in operating the signal, and Fig. 8 is a view from beneath of the arm moved by the car as it passes along the track and whose movement occasions the operation of the signal. The last seven views are upon various scales, and all of them upon a larger scale than that of Fig. 1.

The same letters of reference denote the same parts. Saving as a cable railway and cars are modified by the present improvement, they are of any of the customary types.

The form of cable-tube A, Figs. 5, 6, and gripper B, Figs. 5, 6, 7, is substantially that employed in the St. Louis cable railway.

C, Fig. 1, represents a curve in the cable railway, whose two tracks are respectively indicated by the broken lines D and E. The broken line *d* indicates the slot in the cable-tube for the track D, and the broken line *e* indicates the slot in the cable-tube for the track E.

The full line F, Fig. 1, indicates the connection—say a wire cord—used in operating the signal for the track D, and G represents the signal-connection for the track E.

H represents the movable arm at that end of the connection F which is farthest from the signal, and H′ represents the movable arm at the other end of the connection F, and I I′

respectively represent the movable arms at the ends respectively of the connection *d*.

J and K respectively represent the two streets containing the curve C. The signal for the track D is represented at L, and the signal for the track E is represented at M.

Fig. 1 is a diagram, serving rather to indicate the relative positions in plan view of the parts described, for in practice the movable arms, connections, and all of the signaling mechanism, saving the signal posts and targets, are beneath the ground surface.

The operation is as follows: Suppose a car to be moving upon the track D in the direction of the arrow *x*, Fig. 1. As it passes the position of the arm H, some projection which is attached to and carried along with the car, and moving along the cable-tube A—say the roller *b* upon the gripper B, Figs. 5, 7—encounters the free end of the arm H and turns it upon its pivot *h* into the position shown in Fig. 1. The cord F is attached to the arm H—say as indicated in Figs. 5, 8—so that when the arm H is turned, as described, the cord is drawn in the opposite direction to that of the arrow *x*. The arm H is located within the cable-tube, and the cord extends along the tube, substantially as indicated in Figs. 1, 5, 7, to a point therein opposite the location of the signal L, Figs. 1, 5, 6, when it is carried around a bearing, *f*, Figs. 5, 8, and thence laterally to the immediate vicinity of the signal-post *l*, which may be located at any desirable point for carrying out the object of the improvement, say at the sidewalk-line *k*. Any suitable signal, as well as any means for communicating the cord-motion to it, may be adopted. The particular method employed in the present instance is as follows: A cam, N, Figs. 4, 5, 6, is journaled upon the vertical bearing *n* in the hollow base *l'* of the signal-post *l*. The cord F is carried around and fastened to a circular bearing or pulley, *n'*, of the cam, and is thence carried back into the cable-tube again, and there, and substantially in the same manner as the cord is connected with the arm H, connected with the pivoted arm H', Figs. 5, 8, whose pivot is at *h'*, and which is adapted to be moved upon its pivot, as indicated by the full and broken lines, Fig. 5. The drawing of the cord F in the direction above named—that is, in the opposite direction to that of the arrow *x*—causes the cam and arm H' to be turned into the positions shown in the full lines in Fig. 5. The cam operates in connection with the lever O, Figs. 4, 5, 6. The lever is pivoted at *o* to the base *l'*, and extends thence beneath the cam to a point opposite the lower end of the cam-bearing *n*. A cord, P, leads from the inner end of the lever O upward through the bearing *n*, which is perforated vertically, and upward through the hollow post *l* to the upper end thereof, where it is fastened to the inner end, l^2, of the signal L, Figs. 2, 3, 6. The signal is journaled upon the bearing l^3, and is adapted to be turned vertically thereon to and from the positions indicated, respectively, by the full and the broken lines. The turning around of the cam as described causes the lever O, upon which the cam rides, as shown, to be depressed, as indicated by the broken lines in Fig. 6. This in turn causes the cord P to be drawn downward and the signal L to be raised and set in the position shown in the full lines, Figs. 2, 3. The signal can then be seen from the standpoint of a car upon the street K, and the approach of the car from the street J is made known. The signal remains set until the car from the street J is moved along to bring its projection *b*, Fig. 5, against the arm H', which is then, and by reason of the continued movement of the car in the direction of the arrow *x*, turned upon its pivot into the position indicated by the broken lines, Fig. 5. This causes the cord F to be drawn in the opposite direction—that is, in the direction of the arrow *y*, Fig. 5—and the cam thereby to be reversed and turned into the position indicated by the broken lines, Fig. 5, and in consequence of the withdrawal of the cam the lever O is free to rise, whereupon the signal, by reason of its outer end being heavier, drops into the position shown in the full lines in Fig. 6. The last-described movement of the cord F also operates to turn the arm H upon its pivot back into the opposite position to that shown in Fig. 1. The operation is then repeated as every car passes along the track D. A similar procedure takes place upon the track E, but in the opposite direction—that is, the cars moving from the street K into the street J set the signal M in the street J, and as they pass the signal M it is lowered. The signal M, so far as the day-time is concerned, may be an ordinary target, as shown; but for the night-time it may be a light.

To enable the light to be visible and to be obscured, in order that the signal may be raised and lowered, the following means are adopted: Q, Figs. 2, 3, 6, represents a lantern supported upon a bracket, *q*, and in such a position as to permit of the target L being dropped beside it, and so as to cover the glass *q'* of the lantern and thereby conceal the light. Therefore when the target is raised the light becomes visible, and when the target is lowered the light disappears. To prevent the arms H H' from being turned too far around the arms are each provided with a stop, h^2 which, by encountering the bracket h^3 or other fixture, serves to limit the vibration of the arm. The arms H H' are preferably located wholly within the cable-tube, and the connection leading from one arm to the signal-post and thence to the other arm is also preferably carried within the cable-tube until opposite the signal-post; but the arms may be partly without the cable-tube, and the connection may be be accordingly adjusted. The connection F should be properly supported upon suitable bearings, *f'*, Fig. 1, and when it is carried

from the cable-tube to the vicinity of the signal-post it should be conducted through a suitable tube, R, Figs. 4, 5, 6.

The lantern Q in the place of being stationary may be hung upon the target, and so as to conceal the light when the target is lowered.

I claim—

1. The combination of the cable-tube, the signal-post, and a channel leading from said tube to said post, as and for the purpose described.

2. The combination of the cable-tube, the signal-post, a channel leading from said tube to said post, the car projection, the two movable arms, and the connection between said arms, substantially as described.

3. The combination of the cable-tube, the channel leading therefrom to the signal-post, the signal-post, and the rope leading through said channel to the signal-post, as and for the purpose described.

4. The combination of the cable-tube, the car projection, the two movable arms provided with stops, and the connection between said arms, for the purpose described.

5. The combination of the cable-tube, the car projection, the two movable arms, the connection between said arms, and the pulley operated by said connection, substantially as described.

6. The combination of the cable-tube, the car projection, the two movable arms, the connection between said arms, the pulley operated by said connection and in turn operating a signal, and a signal-post, for the purpose described.

7. The combination of the cable-tube, the two movable arms, the connection between said arms, the pulley operated by said connection, and the channel leading from said cable-tube to the chamber containing said pulley, substantially as described.

8. The combination of the signal-post and base, the cam having the rounded bearing, the cord, the pivoted lever, the target or screen, and the connection leading from said pivoted lever to said target, as described.

9. The combination of the signal-post, the vertically-movable target or screen, the lantern Q, and the connection leading from the inner end of said target downward through said signal-post, as described.

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Witnesses;
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J. B. CASE.