2 Sheets--Sheet 1.

E. L. HOPKINS & H. P. NORTON.

Railroad-Signals.

No. 147,396. Patented Feb. 10, 1874.

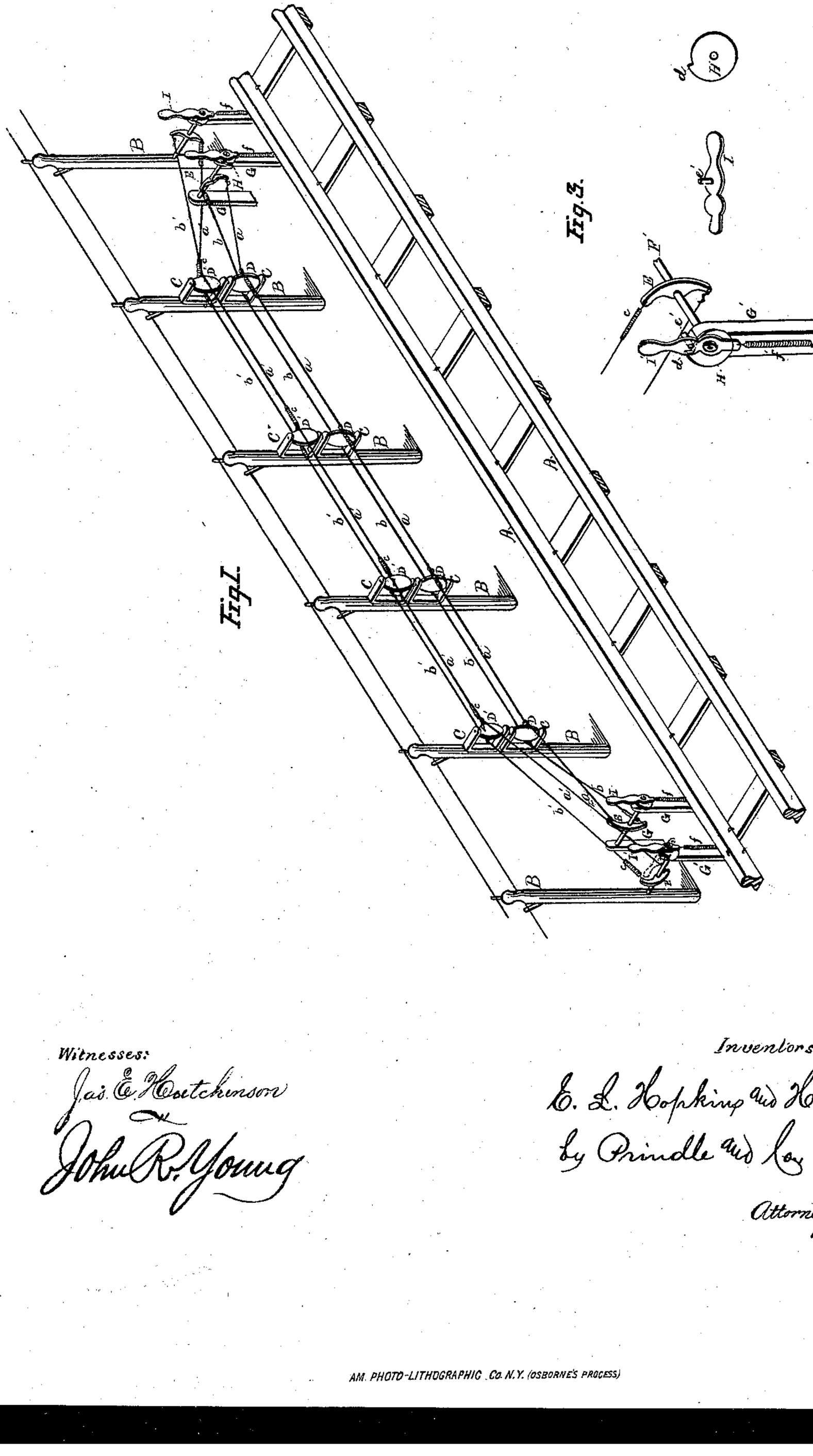

Fig. 1.

Fig. 2.

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Attorney's

2 Sheets--Sheet 2.

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Fig. 2.

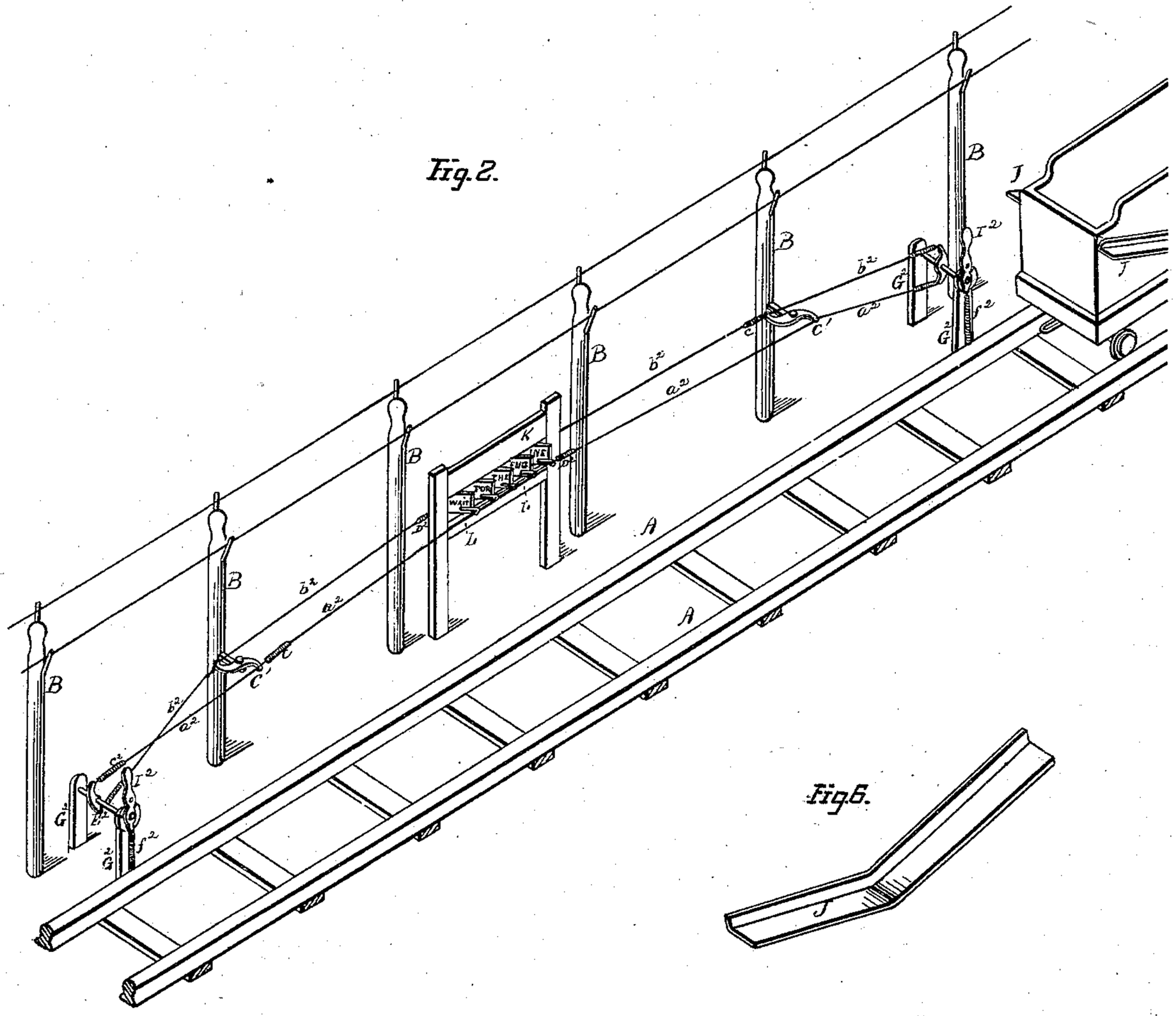


Fig. 6.

Fig. 4.

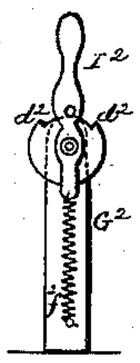
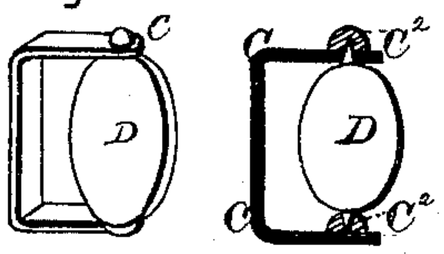


Fig. 5.



Witnesses:

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UNITED STATES PATENT OFFICE.

ESICK L. HOPKINS, OF HOMER, AND HARLAN P. NORTON, OF IONIA, ASSIGNORS TO THEMSELVES AND GEORGE C. OVERHISER, OF IONIA COUNTY, MICHIGAN.

IMPROVEMENT IN RAILROAD-SIGNALS.

Specification forming part of Letters Patent No. **147,396**, dated February 10, 1874; application filed March 8, 1873.

To all whom it may concern:

Be it known that we, ESICK L. HOPKINS, of Homer, in the county of Calhoun and in the State of Michigan, and HARLAN P. NORTON, of Ionia, in the county of Ionia and in the State of Michigan, have invented a new and useful Improvement in Danger-Signals for Railway-Curves and Railway-Crossings; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, and being a part of this specification, in which—

Figure 1, Sheet 1, is a perspective view of our system of semaphores as arranged to indicate the presence of a locomotive on a curve of the line of rails to warn the engineer of an approaching or following train. Fig. 2 is a like view of said signals as applied at a railroad-crossing. Fig. 3 shows in perspective the post, rock-shaft, lever, &c., employed for operating the curve-signals. Fig. 4 is a side elevation of the post, operating-lever, &c., employed for operating the signals at a crossing. Fig. 5 is an enlarged perspective view of one of the curve-signals, and Fig. 6 is a like view of a tripping-plate to be secured to or upon the side of the engine.

Like letters refer to like parts in each figure.

The nature of this invention relates to an improved system of railway-track and railway-crossings danger-signals, by means of which, when a railway-train is on a curve in the line of the railroad, that fact is made known to an approaching train in either direction. It also relates to a modification thereof, to be used at railway-crossings, for indicating the approach of a train by means of semaphores actuated by the trains themselves. The invention consists in a series of semaphores, which may be pivoted to poles or posts prepared for the purpose, or to the telegraph-poles at the side of railroad-line, connected by wires, which extend and are secured to two arms on a rock-shaft journaled in uprights at each end of the system, and in a trip-lever and face-plates, which, being actuated by a double-incline plane or stationary cam affixed to and projecting from the side of the engine or tender, operates the system of semaphores, in the manner more fully hereinafter set forth.

In the drawings, A represents a line of rails, alongside of which the poles B or the telegraph-poles are erected. To the sides of these poles, which are set around a curve, we secure two pairs of brackets, C, projecting toward the railroad-track. In the lower brackets we pivot, by means of a stud at the top and bottom of each, the semaphores D D, &c., all of which are connected by a wire, *a*, running along one side, and by similar wire *b* at the other side. These wires and the semaphores, as established, extend around the curve of the railroad until the end semaphores are visible on the straight track of the road, where their ends are secured to the ends of a double rocker-arm, E, keyed on a rock-shaft, F, journaled in the posts G, projecting through that one nearest the railroad-track, and carrying at that end a face-plate, H, having a hook, *d*, at one side. On the end of the shaft, outside the face-plate, a trip-lever, I, is pivoted, to the lower end of which a spiral spring, *f*, is attached, to cause the lever to assume a vertical position when free. A pin, *e*, projects from the inner face of the lever toward and across the edge of the face-plate. At the other end of the curve the wires are in like manner connected to a rocker-arm, shaft, lever, &c., similar in construction and arrangement to those just above described. At each side of every locomotive or tender there should be firmly bolted a double-incline plane or stationary cam, J, Fig. 2, with a projecting rib or flange, which should overrun the top of every lever at the end as it approaches it, and, as the locomotive or cam progresses, depresses it (the lever) to the positions shown at the left of Fig. 1 in passing it when going in either direction. In all the wires there should or may be between their connections one end of each piece of the wire formed into a coil, C, to allow for expansion and contraction under variations of temperature, and to ease the sudden strain or shock thrown on the connections by a train passing at high speed.

When all the semaphores are in line or par-

allel with the track of the road, as is the upper series, D′, it will indicate that the track is clear to the engineer of an approaching train. Now, if a train approach the curve, going from left to right, its cam J will overrun and depress the lever I in the opposite direction from that shown by the first lever without moving the rock-shaft F′, as the pin *e* travels away from the hook *d′* of the face-plate H′; passing on, it depresses the lever I to the position shown; it moves the rock-shaft, drawing the wires *a*, which rotate the semaphores on their axis a quarter-revolution, and thus present their broad sides to the view of the engineer of an approaching train from either direction, and so warn him that the curve is occupied. If one side of each semaphore be painted white, it will denote that the train is ahead of him. By painting the other side red, it will warn him that a train is approaching him. The train passing onto the end of the curve, coming in contact with the lever I, returns the semaphores to their normal position parallel with the track. A train entering the curve from the right actuates in like manner the upper series of semaphores.

Over the semaphores we can place any convenient cover or protection, to keep out the snow and rain, and thus guard against any interference in the working of our system from ice; and over the other parts of our mechanism covers or guards can be placed for like purposes.

We have shown in Fig. 5 how the rain cap or cover can be applied to the semaphore. c^2 is the cap or cover, which rests above or over the pivot, and sheds off the rain and snow. Both ends of the pivot may be provided with this protection. These caps over the pivots or pivotal caps are usually constructed of metal and as shown at c^2, and fastened to the brackets C, or cast with them, and have suitable indentations to allow the journals or pivots of the semaphore to rest and turn in. Thus constructed, they are not only very durable, but they are of a shape and size not in any manner to interfere with the sight of the signal or its operation or use.

Our said signal may be operated in the single set, as in the description before given; and in that case we use a face-plate, H″, with a double shoulder or projection, *d″*, as shown in Fig. 4, and this signal will be opened or displayed by the approach of the train, and closed as the train passes the opposite end; or we may use, as we have already fully described, a double set of semaphores, one placed above the other, and so arranged that trains approaching from one direction will operate the upper series, and those approaching from the opposite direction will operate the lower series. Either of these plans is the counterpart of the other, for the mechanism is the same, and the detail of arrangement of the several parts almost identical. So, also, we can arrange the semaphores as that they will answer for highway-crossings. In this case, we use the same mechanism before described; but we group the semaphores together, so that the letters or signs painted on them shall bear any convenient signal or warning, as in Fig. 2. Thus the approaching train sets the semaphores broad side to the carriage-road, giving the needed warning. The two signals can be readily used together or separately, as occasion may require.

Having thus fully set forth the nature and merits of our invention, what we claim as new is—

1. A series of pivoted signals suitably painted or lettered, and arranged by the side of the railway, and connected with each other by wires, and operated by the passing trains by means of the lever and face-plate and suitable mechanism placed at each end of said series, substantially in the manner and for the purposes set forth.

2. The pivoted disks having a cap, c^2, above their journals, and painted or lettered, and arranged in a series by the side of the rail, and connected together by wires for simultaneous operation, and each rotating at a right angle with its plane when moved by passing trains, by the means and in the manner set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 30th day of January, 1873.

ESICK L. HOPKINS.
HARLAN P. NORTON.

Witnesses:
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E. P. PATTER,
NATHANIEL BEATTIE,
J. S. NEWLAND.