(No Model.) H. F. COX & R. H. SOULE. 2 Sheets—Sheet 1.

Railroad Signal.

No. 238,861. Patented March 15, 1881.

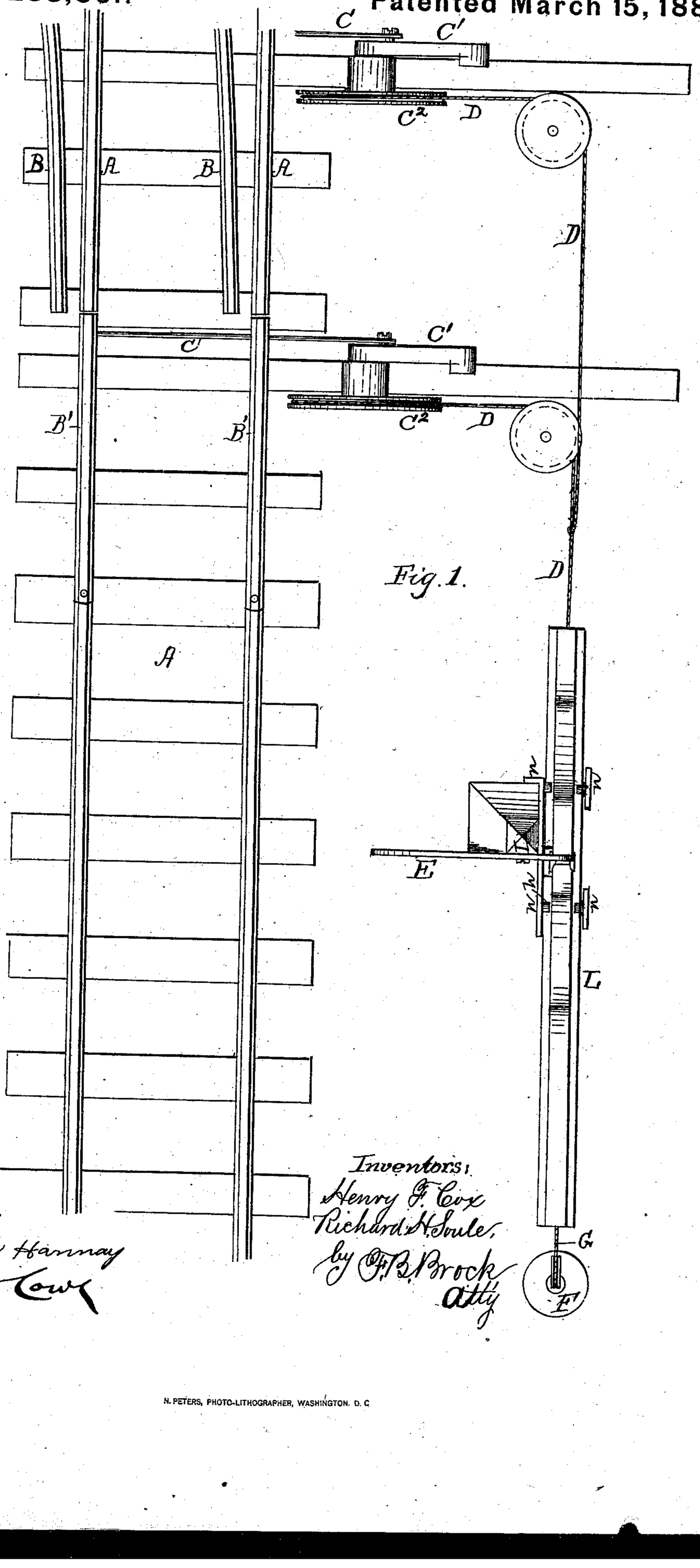

Fig. 1.

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(No Model.) H. F. COX & R. H. SOULE. 2 Sheets—Sheet 2.

Railroad Signal.

No. 238,861. Patented March 15, 1881.

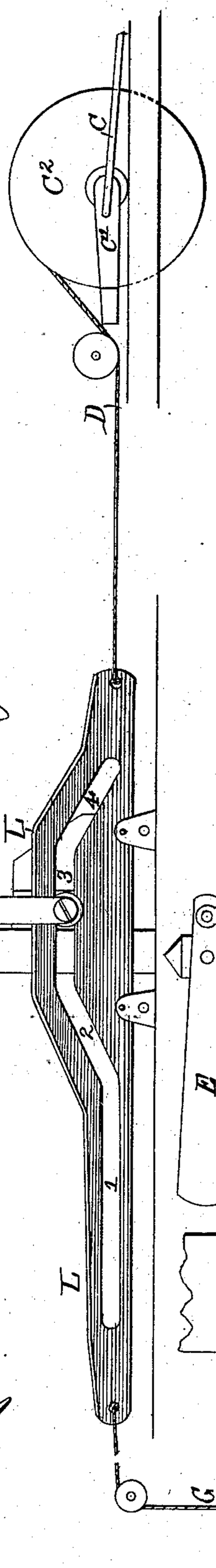

Fig. 2.

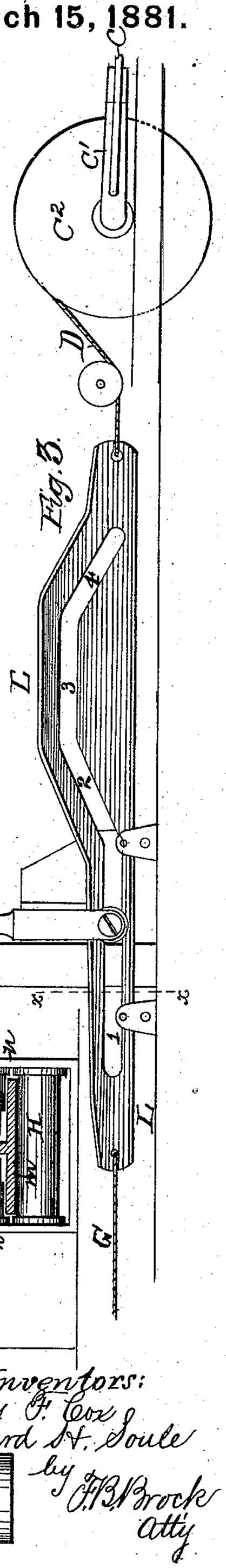

Fig. 3.

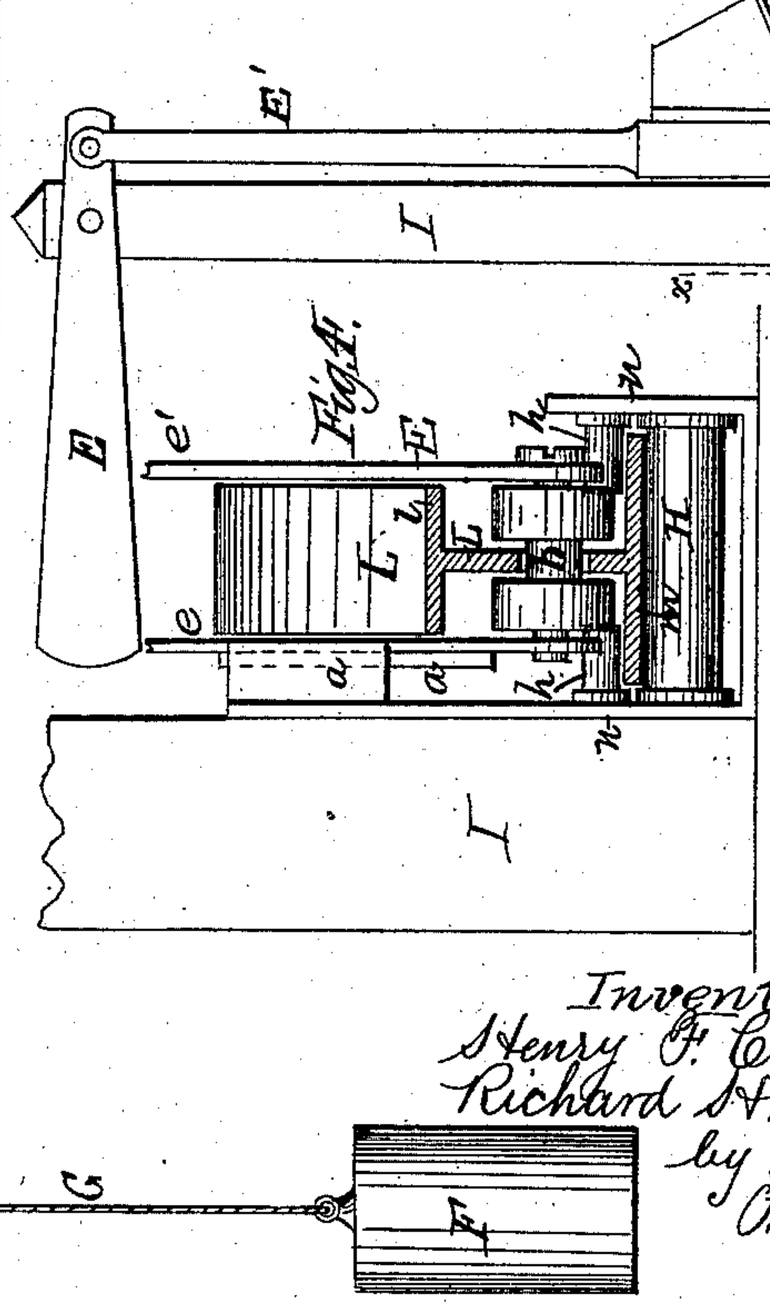

Fig. 4.

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UNITED STATES PATENT OFFICE.

HENRY F. COX, OF ALTOONA, PENNSYLVANIA, AND RICHARD H. SOULE, OF BALTIMORE, MARYLAND.

RAILROAD-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 238,861, dated March 15, 1881.

Application filed July 26, 1880. (No model.)

To all whom it may concern:

Be it known that we, HENRY F. COX, of Altoona, Pennsylvania, and RICHARD H. SOULE, of Baltimore, Maryland, have invented a certain new and useful Improvement in Railroad-Signals, of which the following is a specification.

Figure 1 represents a top-plan view of a device embodying my invention. Fig. 2 represents a side elevation of my invention, the switch-lever and semaphore or signal being turned around a quarter-turn from its position, as shown in Fig. 1, so as to lie within the same general plane as the rope or chain of the signaling device, in order to better illustrate in the drawings its operation. Fig. 3 represents a similar view to that of Fig. 2, the switch-lever being at the other end of its throw and the attached signaling device in a different position. Fig. 4 represents an enlarged detail view, taken through the line *xx* of Fig. 3, showing one method of securing the semaphore-rod in the slotted compensator and of mounting the latter upon anti-frictional bearings.

The object of our invention is to provide a switch, railroad-crossing, or draw-bridge locking-bolt or other analogous device with a signaling device connected therewith, which shall be sure in its action and which will obviate the difficulties encountered from the contraction and expansion of the connecting wire or chain due to varied temperatures. A further object of my present improvement, at the same time, is to provide a signal and its connections with the switch or switches which will not be liable to get out of order; but in case of accident—such as the severance of the connecting wire or chain—the signal will be immediately thrown into "danger" position.

To attain these objects, our invention consists, first, in a wire, rod, chain, or equivalent, in connection, at one end, with a switch, so as to be operated thereby, and at the other end to a retracting weight or force, and adapted to actuate a semaphore-arm or other signaling device, whereby the displacement of the switch causes the semaphore or signal to be thrown into "danger" position by a direct pull upon the rod or wire, and said semaphore or arm to be thrown into "safety" position by the retracting force upon the replacing of the switch to its normal position; secondly, in a novel construction and arrangement of a compensating device consisting of a series of planes or slots; thirdly, in a wire, rod, or chain, in connection, at one end, with two or more switches, so as to be operated thereby, and at the other end to a retracting weight or force, and adapted to actuate a semaphore or other signaling device, whereby the displacement of any one of the switches causes the semaphore or signal to be thrown into "danger" position by a direct pull upon the wire or rod, and said semaphore or signal to be thrown into "safety" position by the retracting force upon the replacing of the switch operated to its normal position; fourthly, a compensating device to allow for the expansion and contraction of the rod or wire due to heat and cold, said rod or wire being attached at one end to one or more switches, and at the other to a retracting weight or force, and adapted to actuate a semaphore or other signaling device, whereby the misplacement of any one of the switches causes the semaphore or signal to be thrown into "danger" position by a direct pull upon the rod or wire, and said semaphore or signal to be thrown into "safety" position by the retracting force upon the replacing of the switch operated to its normal position; fifthly, in providing a means, in connection with each of the foregoing clauses, consisting of a cam-slot in the compensating device, whereby in the event of a rupture in the rod, wire, or chain, the semaphore or signal will immediately display a signal indicative of "danger."

Heretofore in inventions of this class, for displaying a signal upon the misplacement of a switch, they have been constructed so as to "go to danger"—that is to say, upon a switch being set wrongly it allows of a weight or equivalent connected to the switch and signal to move, and thereby set the signal to "danger." This construction has been found to be defective in practice, and not to be relied upon with any degree of certainty, and to remedy which defect is one of the objects of our present invention, as hereinbefore set forth, in which the signal is operated by a direct "pull to danger."

In the drawings, A represents the main-track, B the siding, and B′ the switch, rails. The switch-rails are connected and operated by the switch-rod C. The switch-rod C is connected to the switch-lever C′ by means of a crank-connection, and the pivotal shaft of which carries the wire or chain drum C^2. Attached to and passing over the drum C^2 is a wire, rod, or chain, D, the other end of which is connected to a compensating device, L, and indirectly to the semaphore arm or signal E through the semaphore-rod E′, and to the retracting-weight F through the rope or wire G.

Figs. 2 and 3 show my improvements in elevation, one of the switches being shown in relation thereto, but in a different position from that shown in Fig. 1, in order to better illustrate their combined operation. Fig. 2 shows the semaphore-arm E in "safety" position for trains passing along the main track, the switch-lever C′ being set for the same; and Fig. 3 shows the semaphore in "danger" position, the switch-lever C′ being at the other end or limit of its throw and the switch set for the side track. This peculiar operation is effected as follows: The compensating device L has arranged within its sides a slot, 1 2 3 4, in which plays the vertical semaphore-rod E′, and is connected with the rod or wire D and G. In its normal position, as in Fig. 2, the end of the semaphore-rod E′ is within the slot 3; but upon the switch being misplaced for trains passing along the main track, Fig. 3, the rod or wire D will be taken up and wound upon the drum C^2, and consequently the plate L moved forward, and the semaphore-rod E′, having a vertical movement, will move downward through the cam-slot 2 into the slot 1, which movement sets the semaphore E to "danger." Upon the switch being reset to its normal position, the weight F, attached to the rod or wire G, will retract the plate L, and the semaphore-rod will pass from slot 1 back through cam-slot 2 to slot 3, when the signal is again in "safety" position. If by accident the rod or chain D should be parted or ruptured, the retracting force or weight F will instantly throw the semaphore-rod E′ from any position it may be in into the end of cam-slot 4, and which will elevate the signal E into "danger" position.

The plate L is preferably constructed with a double flange, *l* and *m*, arranged respectively along its upper and lower edges, and the edges of the slots 1, 2, 3, and 4 may, if desired, be provided with a rib of any suitable thickness.

The lower end of the semaphore-rod E′ is bifurcated, the two arms *e e′* passing to either side of the flange *l* of the plate L.

To the lower ends of the arms *e e′* of the semaphore-rod E′ is secured a roller, *b*, which passes through the slot 1, 2, 3, and 4. The semaphore-rod E′ has no lateral movement, but works in a vertical plane, it being held in that position and guided by the guide *a*.

H *h h* represent anti-frictional bearings for the plate L, which enable it to work freely back and forth. These anti-friction rolls H *h h* are journaled in the brackets *n n*, secured to the post I, to which is also attached the semaphore-arm E.

The peculiar and novel arrangement of the slots 1 2 3 4 compensate for the expansion and contraction of the wire, rod, or chain D due to heat and cold. For example, under extreme high degrees of temperature, the wire or rod D will expand, and the weight F will pull the plate L rearward until the semaphore-rod E′ is nearly or about at the end of slot 3 nearest the switch, the signal being in "safety" position. Now, upon the switch being misplaced, the plate L, through its connection with said switch, will be pulled through slots 3 and 2 to or beyond the latter's juncture with slot 1, thereby throwing the signal to "danger." When, however, under extreme low temperatures, the connecting rod or chain D will be contracted, and the plate L consequently moved toward the switch until the semaphore-arm E′ is at or near the opposite end of slot 3 from that last described, and upon the switch being operated the semaphore-arm E′ will move through cam-slot 2 and some distance along slot 1, and the signal thrown to "danger," as before, in both cases the semaphore-arm having the same vertical movement; from which it will readily be seen that the same result is effected when the temperature is at any point between the extremes, and the consequent lengthening and shortening of the connecting chain or rod due thereto.

We do not confine ourselves to the precise form and arrangement of the slots 1, 2, 3, or 4, because the plate L may be turned over and the same results secured, or the same operation may be effected by arranging the slots upon a disk or wheel, with the semaphore-arm secured therein, and suitably modifying the construction of the switch-connecting device.

Any desired number of switches may be connected to the same rod or wire D, in the manner shown by Fig. 1, where two are shown connected to the same rod or wire D, and actuating the same semaphore or signal. Attached in this way the switches do not interfere with each other, and the misplacement of any one of which will cause the "danger" signal to be shown. This construction is rendered impossible in that class of switches attached to signal devices which "go to danger," and hereinbefore referred to.

Instead of the semaphore-arm shown and described, any other known form of signal may be substituted suitable for the purpose.

The weight F may be arranged in any suitable way. It may be suspended from a pole or be hung within a suitable cavity below the road-bed of the track, or any known and suitable equivalent of the weight F may be substituted, such as a spring.

Having described our invention, what we claim is—

1. A railroad-switch or other analogous device connected with a signal by means of a

rope, wire, rod, or chain, or equivalent, having a retracting-weight or other force, the displacement of the switch causing a positive pull to be exerted upon said rope or chain, thereby throwing the signal to "danger," the signal being returned to "safety" position by the retracting force upon replacing the switch to its normal position, substantially as and for the purposes set forth.

2. Two or more switches or other analogous devices connected with a signal by means of a rope, wire, rod, or chain, or equivalent, having a retracting force, the displacement of any one or more of the switches causing a positive pull to be exerted upon said rope or chain, thereby throwing the signal to "danger," the signal being returned to "safety" position by the retracting force upon replacing the switch or switches operated to its or their normal position, substantially as set forth.

3. A railroad-switch or other analogous device connected with a signal by means of a rope, wire, or equivalent, having a compensating device and a retracting-weight or other force, the displacement of the switch causing a positive pull to be exerted upon said rope or wire, thereby throwing the signal to "danger," the signal being returned to "safety" position by the retracting force upon replacing the switch to its normal position, substantially as and for the purposes set forth.

4. Two or more railroad-switches or other analogous devices connected with a signal by means of a rope, wire, rod, or chain, or equivalent, having a compensating device and a retracting-weight or other force, the displacement of any one or more of the switches causing a positive pull to be exerted upon said rope or chain, thereby throwing the signal to "danger," the signal being returned to "safety" position by the retracting force upon replacing the switch or switches operated to its or their normal position, substantially as and for the purposes set forth.

5. One or more railroad-switches or other analogous devices connected with a signal by means of a rope, wire, rod, or chain, or equivalent, with or without a compensating device, and having a retracting-weight or other force, the displacement of a switch or switches causing a positive pull to be exerted upon said rope or chain, thereby throwing the signal to "danger," the signal being returned to "safety" position by the retracting force upon replacing the switch or switches to its or their normal position, and in the event of said wire or chain being ruptured the retracting force will throw the signal to "danger," substantially as set forth.

6. A railroad signaling device consisting of a rod, wire, or chain, or equivalent, provided with a compensating device having the slots 1, 2, and 3, arranged substantially as described, in combination with an arm or rod operated thereby, and to which is attached a signal, substantially as set forth.

7. The compensating device L, provided with the slots 1, 2, and 3, arranged substantially as described, in combination with an arm or rod actuated thereby for operating a signal, as and for the purpose set forth.

8. The compensating device L, provided with the slots 1, 2, 3, and 4, arranged substantially as described, in combination with an arm or rod actuated thereby for operating a signal, as and for the purpose set forth.

9. A railroad signaling device consisting of a rod, wire, or chain, or equivalent, having a compensating device consisting of the slots 1, 2, 3, and 4, arranged substantially as described, in combination with an arm or rod actuated thereby for operating a signal, as and for the purpose set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

HENRY F. COX.
RICHARD H. SOULE.

Witnesses:
JOHN T. GASUCH,
MICHAEL CAMPBELL.