

No. 757,125.

PATENTED APR. 12, 1904.

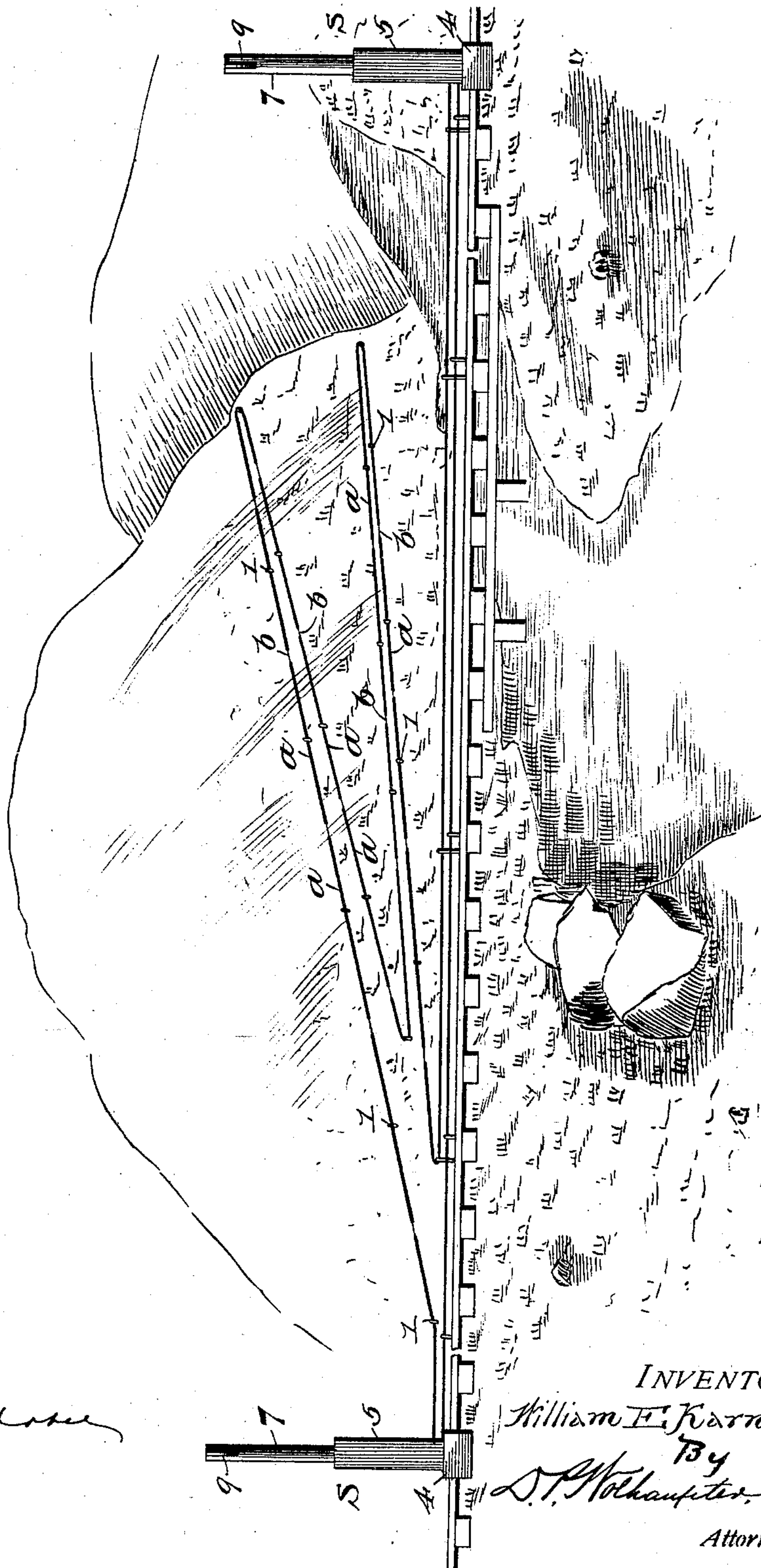
W. E. KARNS.
ELECTRICAL RAILWAY DANGER SIGNAL.

APPLICATION FILED NOV. 12, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

J. L. Moseley

F. R. Pitton

INVENTOR

William E. Karns

By

D. P. Volkmutter

Attorney

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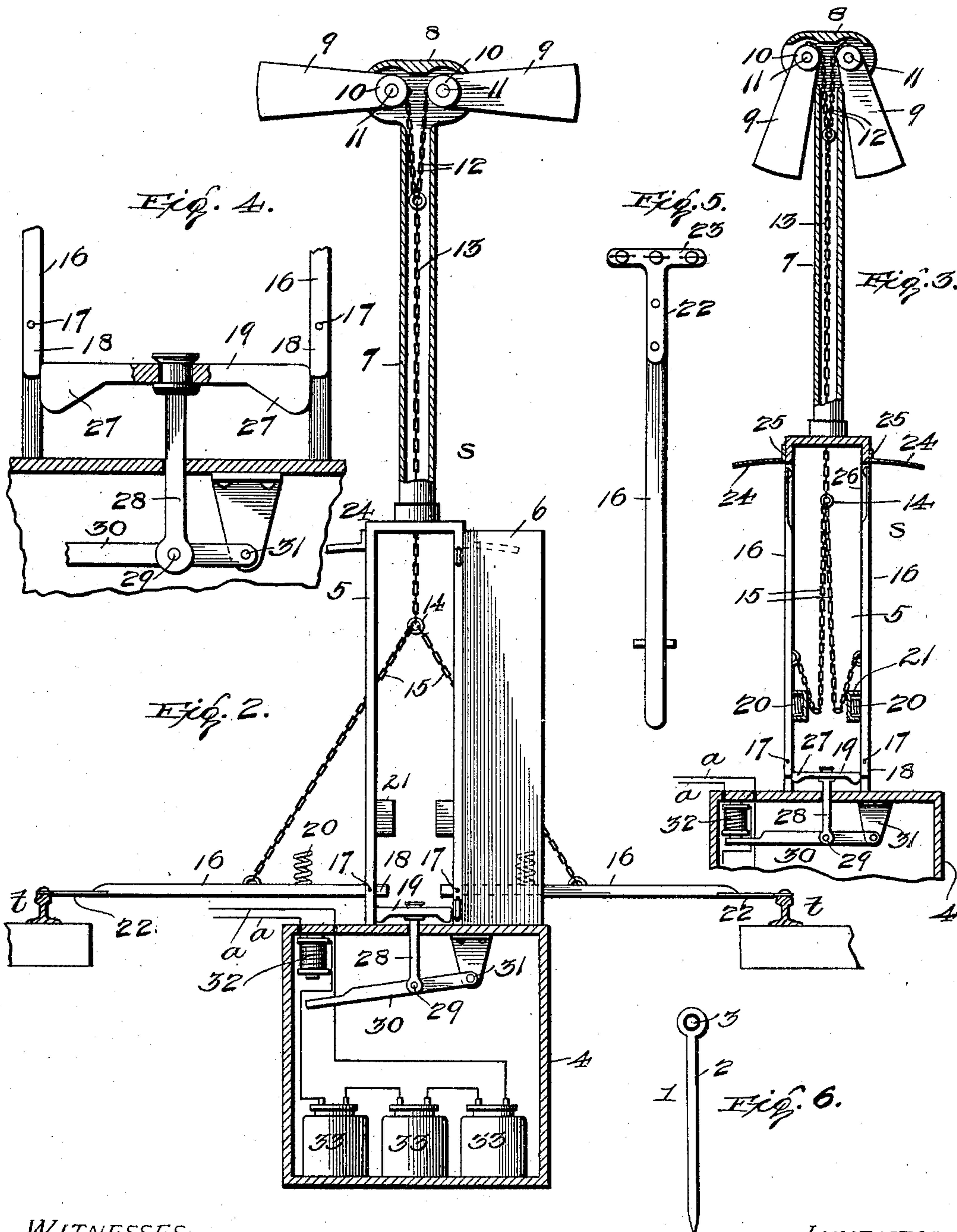
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2 SHEETS—SHEET 2.



WITNESSES:

J. A. Mochman

B. R. Fitts

INVENTOR

William E. Karns

BY

D. P. Wolhaupter
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM E. KARNS, OF PARKERS LANDING, PENNSYLVANIA.

ELECTRICAL RAILWAY DANGER-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 757,125, dated April 12, 1904.

Application filed November 12, 1903. Serial No. 180,860. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. KARNS, a citizen of the United States, residing at Parkers Landing, in the county of Armstrong and State of Pennsylvania, have invented certain new and useful Improvements in Electrical Railway Danger-Signals, of which the following is a specification.

This invention relates to electrical railway-signals, and has special reference to an improved danger-signal comprising simple, practical, and effective means for automatically signaling the presence of an obstacle on the track, such as occasioned by an avalanche or landslide, the falling of rocks or trees across the track at such exposed places as cuts, mountains, or other slopes directly adjoining the track or tracks, also for signaling danger conditions in connection with tunnels, culverts, bridges, and the like.

To this end the invention has in view the protecting of the exposed section of track by the employment of a guarding-circuit at danger points in exposed positions in conjunction with means controllable from said circuit for actuating a visual signal and also positioning detonating signals at safe stopping-points in order to give an engineer ample warning of the obstruction, thus insuring the safety of the train.

A further object of the invention is to provide a signal of the character specified which shall be equally useful in connection with single and double tracks.

With these and many other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts, which will be hereinafter more fully described, illustrated, and claimed.

The essential features of the invention involved in the means for protecting the track at exposed danger-points and for controlling both visual and detonating signals is susceptible to modification without departing from the scope of the invention; but the preferred embodiment is shown in the accompanying drawings, in which—

Figure 1 is a general view showing the danger-signal associated with the track and illustrating an effective arrangement of the rupturable guarding-circuit. Fig. 2 is a sectional elevation of the signal apparatus, illustrating the visual signal set and the detonating signals positioned upon the rails of the tracks. Fig. 3 is a similar view illustrating the parts in their normal inactive positions. Fig. 4 is an enlarged detail view showing more clearly the relation between the trip-clutch and the heel ends of the signal-carriers. Fig. 5 is a detail view of one of the signal-carriers. Fig. 6 is a detail view of one of the wired stringers preferably used for holding the conductors or wires in exposed positions at danger-points.

Like reference characters designate corresponding parts in the several figures of the drawings.

In carrying out the invention the signal apparatus—i. e., the part embodying the controlling means for the visual and detonating signals—is adapted for single or double tracks; but for illustrative purposes the construction shown in the drawings is arranged for double-track service, whereby the danger signals will be given at safe points on both tracks which skirt the exposed danger-point.

Referring particularly to the drawings, it is to be noted in the first place that the section of track or tracks skirting a cut, embankment, or slope where an avalanche or landslide is liable to occur at any time is protected through the medium of a rupturable electric guarding-circuit consisting of the conductors *aa*, strung in any desired number of loops over and around the slope or danger-point at a sufficient distance above the track to insure the safety of the train. The conductors *aa* may be positioned or strung in any convenient manner, but preferably through the medium of the wire-stringers 1, consisting of spikes or stakes 2, designed to be driven or fastened in the ground and provided at their upper ends with insulated eyes or loops 3, through which the wires or conductors are strung. By means of stringers of this character positioned at proper intervals the conductors *aa*, constituting the guard-circuit, may be held spaced in any desired relation and formed into any number

of loops, and it is also contemplated by the invention to interpose in the line of the main conductors light readily-breakable wire sections *b*, which will rupture easily when the conductors are struck by any falling object, such as rocks, trees, or earth.

The guarding-circuit *aa* is designed to protect the exposed section of the track at both ends of the danger-point, and to secure this result is wired in series with duplicates of signaling apparatus located at such opposite points and designated in their entirety by the reference character *s*. The signaling apparatus *s* are duplicates in construction and action, and as the wiring therefor is the same in each instance a description of one will suffice for the other.

Referring to the construction of the signaling apparatus *s* employed in connection with the guarding-circuit *aa*, this apparatus includes a housing-box 4, designed to be placed in the ground between the opposite tracks *t*, (shown in Fig. 2,) and from which housing-box arises a stand-casing 5, usually provided with a door 6, thus permitting of ready access to the interior thereof for purposes of repair or adjustment. From the upper end of the stand-casing 5, which projects above the ground from the housing-box 4, there is extended a tubular pole 7, at the upper end of which is mounted a signal-bracket 8, carrying the oppositely-arranged semaphore-blades 9, having at their inner ends pivotal hubs 10, turning upon the axles or pivots 11, fitted in the bracket 8. The said pivotal hubs 10 of the opposite semaphore-blades 9 have attached thereto the upper ends of the cable branches 12, the lower ends of which are connected to the upper end of a signal-operating cable 13, housed within the tubular pole 7 and having its lower end connected, as at 14, with one end of the separate adjusting connections 15, which extend, respectively, to the opposite signal-carriers 16.

The signal-carriers 16 are preferably in the form of swinging drop-arms pivoted at one end, as at 17, to the stand-casing 5, near the lower end thereof, and having at one side of their pivots 17 the short heel ends 18, designed to cooperate with the trip-clutch 19, to be presently referred to. Each of the signal-carriers or drop-arms 16 has fitted thereto at an intermediate point one end of an impelling-spring 20, designed to be compressed against a spring-rest 21 when the arm is folded upward into one side of the casing in its normal inactive position, so that when such arm is released the spring will exert its pressure in a direction for throwing the arm outward and downward from the casing for positioning the detonating signal or torpedo upon the rail. Each carrier or arm 16 is further provided at what may be termed its "outer" swinging end with the positioning-holder 22, preferably in the form of a thin spring-metal plate, having

a head portion 23, designed to accommodate thereon one of a plurality of the ordinary signal-torpedoes, which are suitably attached to the plate so as to be kept in position thereby over the rail of the track. Furthermore, by reason of employing a thin supporting-plate 22 for torpedoes or detonating signals such plate serves as a buffer to gently cushion the fall of the signal carrier or arm 16 and prevent the jarring of the torpedoes out of position. When the signal-arms are moved upward and back in a position against the casing, the torpedo carrying and positioning holders 22 (with the torpedoes thereon) are preferably protected by shields 24, extending from the sides of the casing 5 at the upper ends of the slots 26, provided therefor. When in their upright positions, the short heel ends 18 of the drop-arms 16 lie in parallel planes and are designed to accommodate in the interval or space therebetween the vertically-movable trip-clutch 19. This trip-clutch 19 essentially consists of a horizontal cross-head having enlarged ends 27, designed to engage against the inner sides of the heel ends 18, and thus lock the carriers or drop-arm 16 in their upright inactive positions, as plainly shown in both Figs. 3 and 4 of the drawings. The said clutch or arm 19 is secured at a central point upon the upper end of a carrying-stem 28, the lower end of which is pivotally connected, as at 29, to an intermediate point of the armature drop-lever 30. This lever is pivotally supported at one end, as at 31, within the housing-box 4, and the other free end thereof operates over the exposed core end of the normally magnetized or active controlling-magnet 32, suitably mounted in the box 4 and included in the circuit *aa*. The latter also includes batteries 33, housed in the boxing 4 or equivalent source of energy which normally flows through the guarding-circuit and the coil of the magnet 32, causing a retraction of the lever 30 by the magnet, so as to hold the clutch 19 in locked relation to the arms 16. In the event of the guarding-circuit being ruptured through any of the agencies referred to the controlling-magnet immediately becomes demagnetized, with the result of the lever 30 dropping and carrying the clutch 19 out of engagement with the heel ends 18 of the drop-arms 16. Thereupon these arms under the impulse of their springs 20 are thrown out and downward, with the result of carrying the torpedoes to a proper position upon the rails of the track, and at the same time the connections 15 draw down upon the cable connections 12 and 13, thus turning the semaphore-blades 9 upon their pivots, whereby the same swing upward to signaling positions. This adjustment of parts is plainly shown in Fig. 2 of the drawings.

While special reference has been made to the association of the guarding-circuit with a slope or cut, it will of course be understood that it is equally applicable for use with tun-

nels, culverts, bridges, and other danger-points along the track. The arrangement of the guarding-circuit in connection with a bridge is suggested in Fig. 1 of the drawings; but whatever the arrangement of the guarding-circuit the same is designed to be ruptured, broken, or grounded by the occurrence of the accident to be guarded against. Under such circumstances the controlling-magnets for the signals will become deenergized, with the result of setting the signals in the manner already explained.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described danger-signal will be readily apparent without further description, and it will also be understood that various changes in the form, proportion, and minor details in construction may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a railway danger-signal, the combination with the signal to be actuated and electrical controlling means therefor, of a normally closed guarding-circuit including said controlling means and comprising a conductor strung in exposed positions at danger-points and provided with a multiplicity of readily-rupturable portions.

2. In a railway danger-signal, the combination of a normally closed rupturable guarding-circuit arranged in an exposed position, and mechanism controllable from said circuit and comprising means for actuating a visual signal and also for positioning a detonating signal.

3. In a railway danger-signal, the combination of a normally closed rupturable guarding-circuit arranged in an exposed position and including a controlling-magnet, a clutch held and released by the magnet, and signal mechanism locked and released by the clutch and comprising means for actuating a visual signal and also for positioning a detonating signal.

4. In a railway danger-signal, the combination of a rupturable guarding-circuit arranged in an exposed position and including a con-

trolling-magnet, a signal-carrier for positioning a detonating signal, a visual signal operatively related to the signal-carrier, and a clutch controlled by said magnet and arranged to lock and release the signal-carrier.

5. In a railway danger-signal, the combination of a normally closed guarding-circuit including a controlling-magnet, a signal-carrier arranged to swing over the track-rail and having a holder for a detonating signal, a visual signal operatively connected with the signal-carrier, and a trip-clutch controlled by the magnet and arranged to lock and release the signal-carrier.

6. In a railway danger-signal, the combination of a guarding-circuit including controlling means, a swinging drop-arm having a supporting-plate for carrying and positioning detonating signals over the rails, a movable visual signal having an operative connection with the drop-arm, and a trip-clutch controlled by the magnet and arranged to lock and release the drop-arm.

7. In a railway danger-signal, the combination of a guarding-circuit including a controlling-magnet, an upright stand supporting a signal-bracket, pivotal semaphore-blades mounted on the bracket, vertically-swinging drop-arms pivotally mounted on the stand and provided contiguous to their pivots with short heel ends and carrying at the opposite ends supporting-plates for holding and positioning detonating signals, impelling-springs attached to the drop-arms, adjusting connections between the drop-arms and semaphore-blades, a vertically-movable trip-clutch consisting of a cross-head arranged to lie between the heels of the opposite drop-arms, a carrying-stem for the clutch and an armature drop-lever pivotally connected at an intermediate point to the carrying-stem and pivotally supported upon one of its extremities, the other extremity of said lever being controlled by the magnet.

In testimony whereof I affix my signature in presence of two witnesses.

WM. E. KARNES.

Witnesses:

E. SNYDER,

C. B. HENRY.