

(No Model.)

4 Sheets—Sheet 1.

F. A. FOX & A. P. YATES.
PYROTECHNIC RAILWAY DANGER SIGNAL.

No. 520,639.

Patented May 29, 1894.

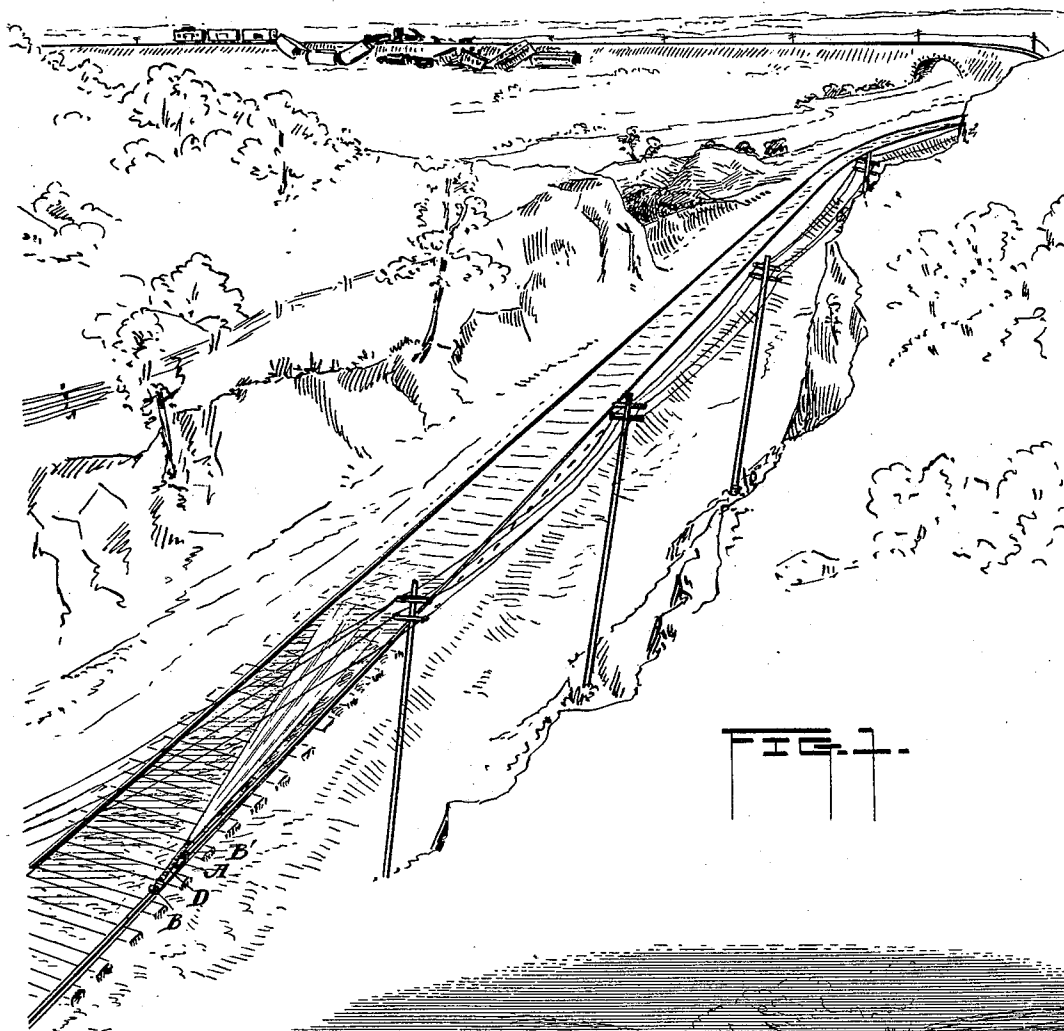
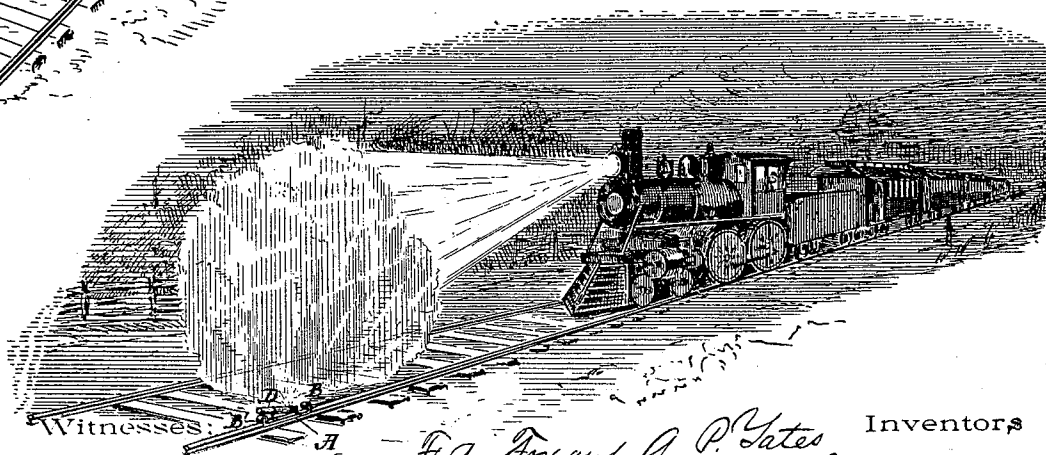


FIG. 1.



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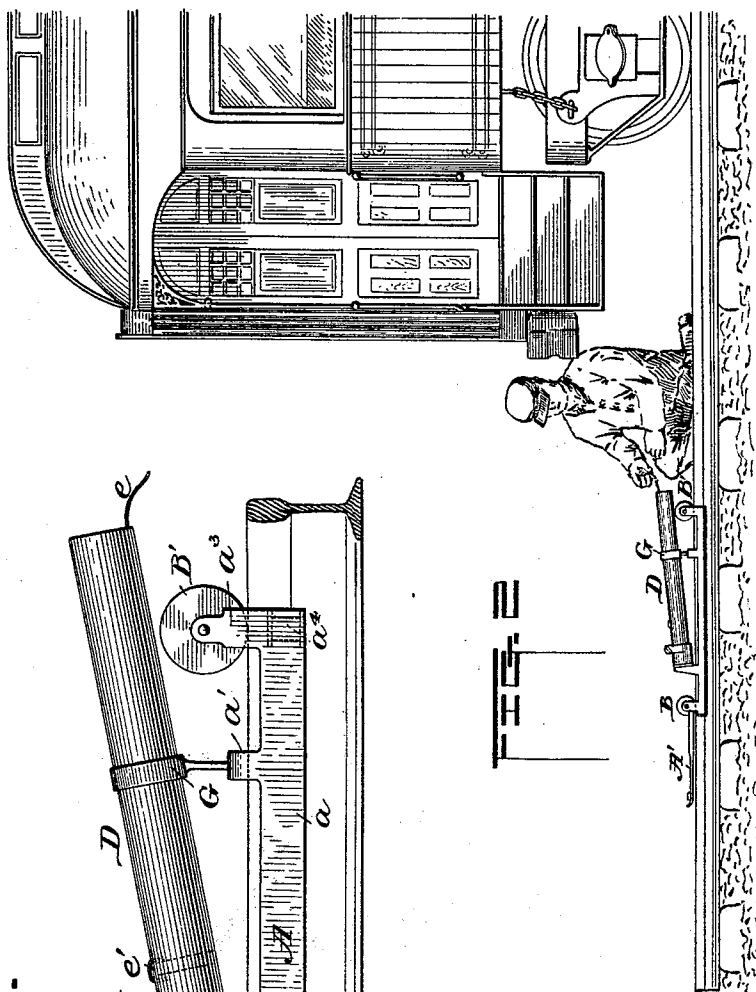


FIG. 2.

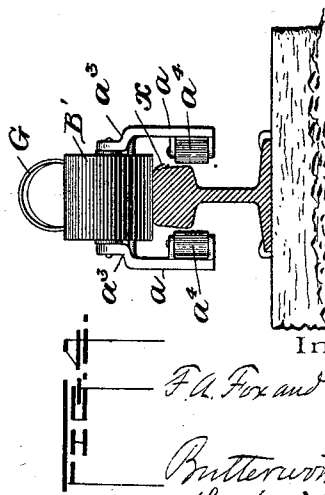
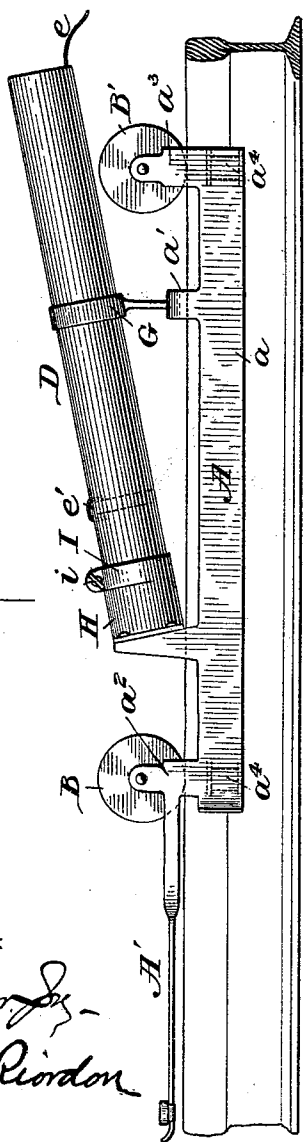


FIG. 4.

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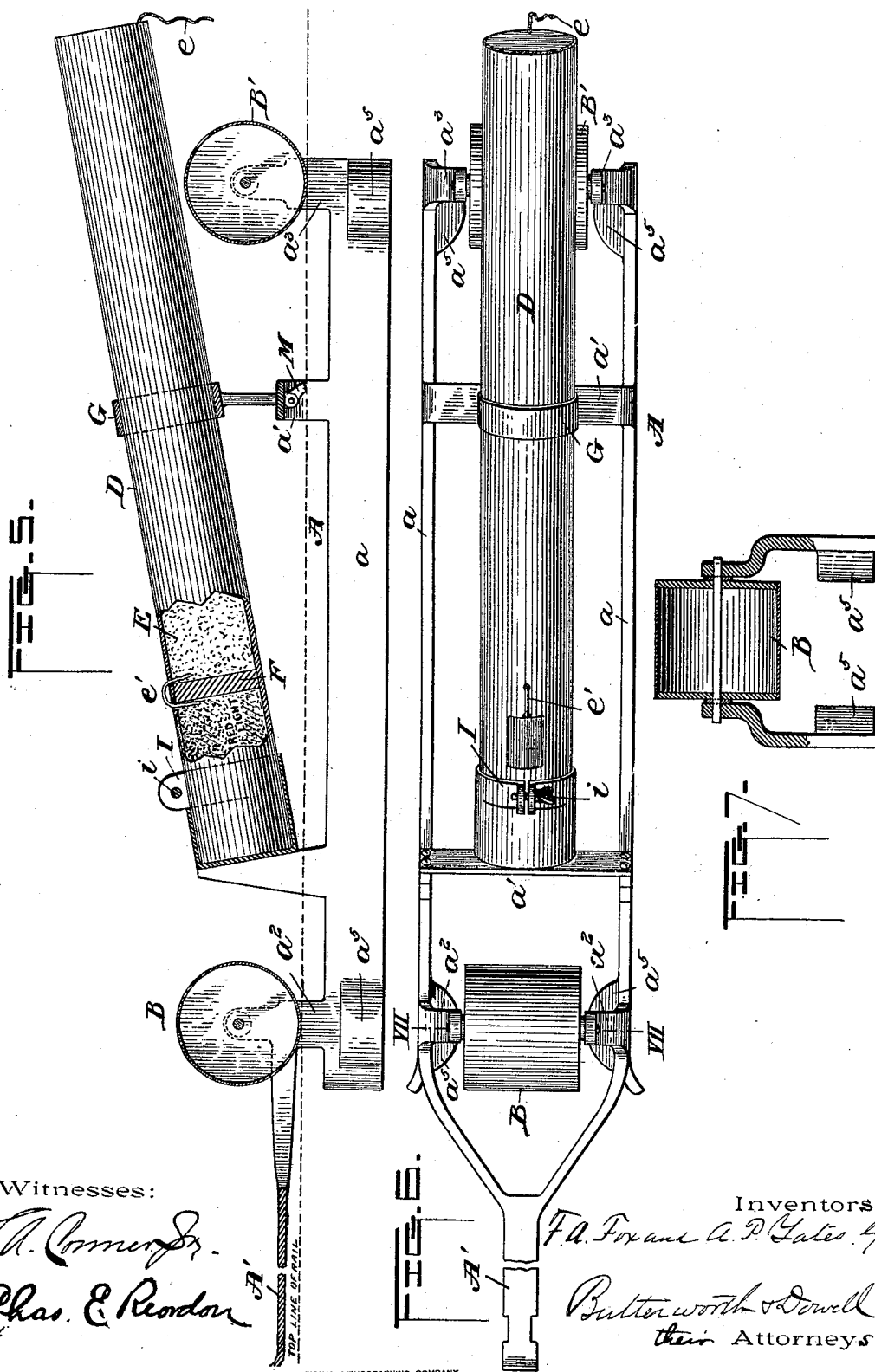
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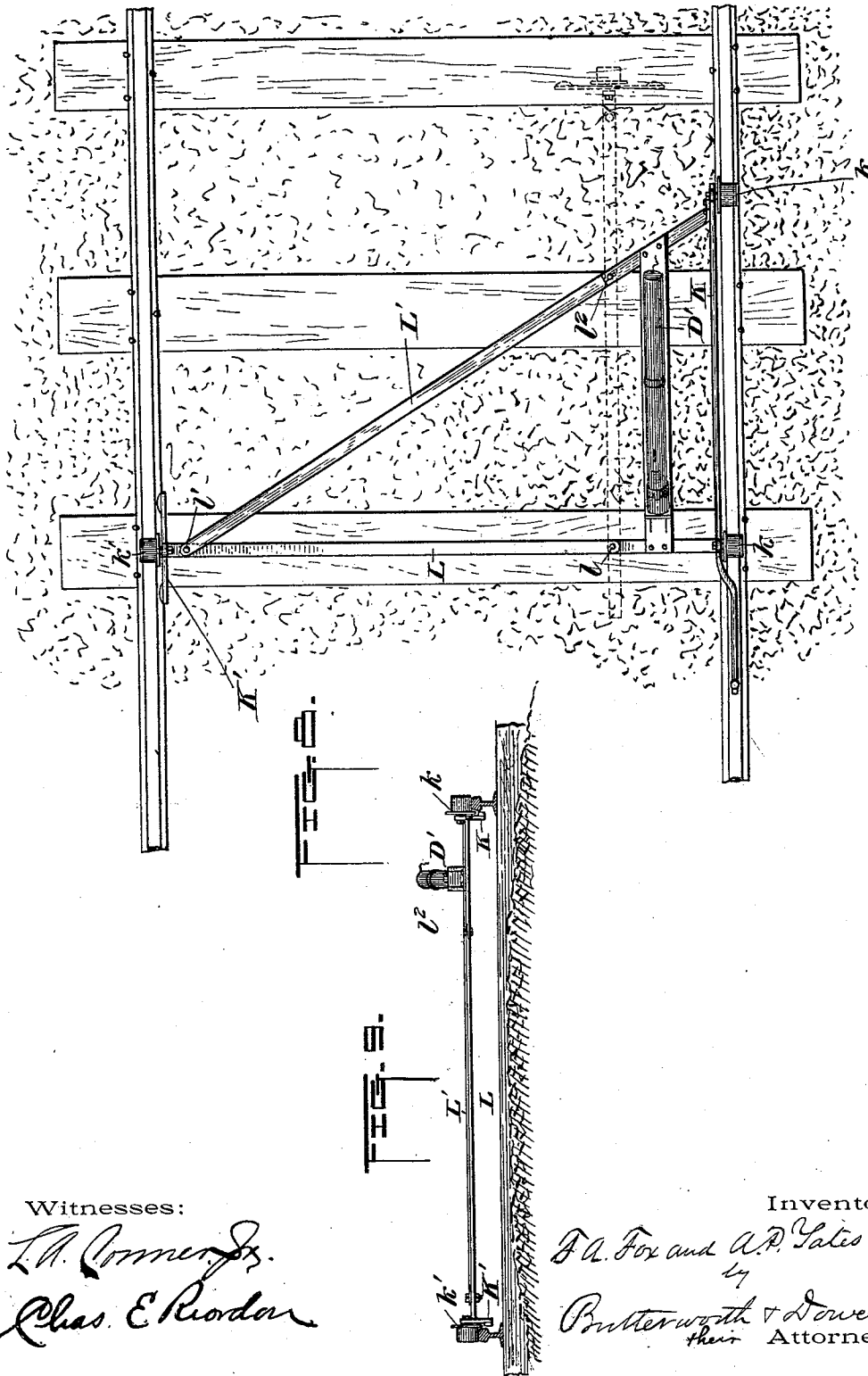
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UNITED STATES PATENT OFFICE.

FRANK A. FOX, OF NEW YORK, AND ARTHUR P. YATES, OF SYRACUSE, NEW YORK, ASSIGNORS OF ONE-HALF TO DAVID H. ROBERTS, OF NEW YORK, N. Y., AND ALBERT M. FOX, OF FOSTORIA, OHIO.

PYROTECHNIC RAILWAY DANGER-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 520,639, dated May 29, 1894.

Application filed January 23, 1894. Serial No. 497,808. (No model.)

To all whom it may concern:

Be it known that we, FRANK A. FOX, residing at New York, in the county of New York, and ARTHUR P. YATES, residing at Syracuse, in the county of Onondaga, State of New York, citizens of the United States, have invented certain new and useful Improvements in Pyrotechnic Railway Danger Signals; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in signaling devices for use on railroads, and more particularly to devices for sending out danger signals to notify the engineer or fireman of a train in motion approaching a wreck, obstruction or train at rest upon the track of danger ahead so as to stop the moving train in time to prevent collision or accident.

The primary object of the invention is to provide a simple, inexpensive and efficient pyrotechnic contrivance adapted to be quickly sent back or forward in case of accident or stoppage of a train, so as to prevent another train approaching from either direction from colliding with the wreck or train at rest upon the track, and thus avoid serious accidents which often result from the carelessness or inability of the train-man to travel far enough from the point of danger to warn the approaching train in time to prevent a collision.

The invention will first be described with reference to the accompanying drawings, and then pointed out in the claims at the end of the description.

Referring to the drawings, which form a part of this specification, Figure 1 represents a perspective view of a portion of a railway track, showing a wrecked train and a second train approaching the wreck, and illustrating our improved "rocket" or pyrotechnic danger signal and torpedo carrier operating to warn the engineer or fireman of the moving train of the impending danger. Fig. 2 represents in side elevation the rear end of a train and one of our "rocket signals" in starting position on the track rail, and the train-man in the act of igniting the rocket. Fig. 3 is a

side elevation of the device applied to one of the rails of a railway track, and Fig. 4 is a rear view of the same, showing the track rail in section. Fig. 5 is a longitudinal sectional elevation of a slightly modified form of the device on a slightly enlarged scale; the rocket or cylinder containing the inflammable substance being shown partly broken away. Fig. 6 is a plan of the device shown in Fig. 5, and Fig. 7 is a transverse section on the line VII—VII of Fig. 6. Fig. 8 is a plan of a modified form of the device, and Fig. 9 a rear elevation of said modification.

Similar letters of reference denote similar parts in the different views.

In the drawings we have illustrated a construction and arrangement of parts which we preferably employ in practicing our invention, but we do not desire to be limited to the exact construction and arrangement described and shown.

The rocket carriage may consist of a frame A, composed of longitudinal bars a, a , which extend parallel with the track rails, one at either side thereof, and arched or elevated cross bars a' , connecting the bars a ; the frame being mounted on light rollers B, B', which may have their bearings in suitable uprights or standards a^2, a^3 , respectively, secured to or formed integrally with the side bars a, a . The frame bars a, a , are adapted to straddle a single rail while the rollers rest upon and travel along the tread or top thereof, and the bars are dropped down or depend sufficiently below the tread of the rail to cause the center of gravity to fall below the same and thus insure the retention of the device upon the rail when in motion. As a further security against derailing the device, the pendent side bars may be provided with friction rollers a^4 , on the inner sides thereof, as shown in Figs. 3 and 4, or with inwardly projecting lugs a^5 , as shown in Figs. 5, 6 and 7, (or springs) adapted to impinge against the sides of the rail and prevent the device from tipping over. There should be sufficient space, however, between the tread of the rail and the friction roll, lug or spring to prevent the device from being impeded in its progress or derailed by contact with a sliver (as at x , Fig. 4) or pro-

jecting portion of the metal of the rail resulting from continuous wear and tear. These slivers, as is well known, are found on the outer side only of the rails, the inner side being kept smooth by the flanges of the wheels, so that the outer roll or lug only is liable to contact with such impediments.

On the frame of the carriage is mounted a cylindrical or other suitable case or receptacle D, charged with inflammable material as at E, Fig. 5, and provided at its rear end with a fuse *e*, by which the inflammable substance may be ignited when it is desired to start the device along the track. Near the front end of the case it may contain a partition F, separating a charge of material for producing a red light from the inflammable propelling and light-giving substance E; the substances back and in front of the partition being connected by a fuse *e'*, so that when the impelling and light-giving substance is consumed or has spent its energy, so as to permit the device to stop, a red light may be emitted for such length of time as may be deemed expedient, as indicated in Fig. 1 of the drawings immediately in advance of the moving train. The case D, is supported intermediate its ends in a yoke or ring G, mounted on the frame of the carriage and its front end projects into a socket H, also mounted on the frame and provided with a spring clamp I, controlled by a set screw *i*, by which the end of the case may be firmly secured in proper position for use, or released for removal. The case preferably extends upwardly and rearwardly on a gentle incline from the socket H toward the rear of the device so that when the powder or inflammable substance E, is ignited it will serve as a propelling force and at the same time emit a continuous beam or shower of light so long as the powder burns. When this light ceases the red light will at once appear.

The frame or carriage is provided with a forward projection or tongue A', adapted for the attachment of a torpedo or torpedoes, so that should a train pass over the device, either before or after its light has ceased to show, it will explode the torpedo and give an audible danger signal.

The rollers B, B', are preferably of metal and made hollow so as to combine lightness with strength, and extend transversely of the longitudinal frame bars and sufficiently above the same to hold the bars suspended from the top of the rail while the rollers span the single rail and have a broad bearing surface thereon which will avoid any tendency to tip over, while the side bars prevent lateral movement sufficient to unbalance the device. Wooden or other rollers may be used, but the form shown is preferred.

In Figs. 8 and 9 we have shown a modification of the device adapted to run upon both rails, and not be interfered with in passing switches, which might interrupt the progress of the single rail rocket; the device shown in the first mentioned figures being adapted to

run upon a single rail only. In this latter construction we provide a triangular frame which may be composed of the pendent bars K, K', arranged on the inner sides of the rails and having the flanged wheels *k, k'*, journaled therein and arranged so that the flanges thereof may impinge against the inner sides of the rails and prevent the device from jumping the track; the frame bars K, K', being connected by the cross-bar L, and diagonal bar L'. The frame bars in this instance will also be dropped down sufficiently to cause the center of gravity to fall below the top of the rail and prevent the device from being derailed. The frame bar L, may be formed in sections pivotally connected at *l*, and the diagonal bar L', may be pivoted as at *l'*, to the bar L, and detachably connected with the opposite frame bar at *l''*, so as to permit the joint *l''*, to be disconnected, whereupon both bars may be swung around with the wheel and bar *k', K'*, to the position indicated in dotted lines in Fig. 8, thereby folding the device into compact form when not in use.

A cylinder or case D', containing the inflammable material may be mounted upon the triangular frame in a manner substantially the same as described with reference to Figs. 3, 5 and 6, so that further description of such parts is not necessary.

In order that the machine may not run backward, in the event of a stoppage on a down grade, a pivoted pawl or stop M, (Fig. 5) may be provided, which will simply ride along the top of the rail when the device is moving forward but will engage a joint between the rails and prevent any backward movement.

The operation of the invention will be readily understood from the foregoing description. In the event of an accident or the stoppage of a train, (provided with one or more of these devices) the train-man will place the device upon the rail, as indicated in Fig. 2, and ignite the fuse *e*, which will ignite the powder or inflammable substance with which the cylinder is charged, and the device will immediately start down or up the track and at the same time begin to emit light, sending forth a continuous beam or shower of light as it moves, as indicated in Fig. 1, so as to attract the attention of the engineer or fireman of an approaching train, in case a train is closely following the train which has stopped. When the device has proceeded the desired distance, (which may be determined and regulated by the use of different kinds of rockets, or differently charged cases) the fuse *e'*, will ignite the substance for producing a red light, and this light may burn ten or fifteen minutes, more or less, as may be desired. In case of a wreck the moving or red light will ordinarily serve to stop and hold any approaching train before the train-man has had time to go back and warn the engineer of the danger ahead, but as an additional security the tongue A', may contain one or more torpedoes to be ex-

ploded by the train so as to give an additional audible signal.

The device is adapted to be constructed out of inexpensive material and made as light as possible consistent with strength, and destructible, so that it may be rapidly impelled and easily crushed and destroyed by a moving train so as not to obstruct the track or cost enough to render its preservation of any consequence.

The angular or inclined position of the case D, or D', has the effect of causing the inflammable impelling substance to exert a downward as well as a forward pressure upon the device, tending to hold it down upon the rail, and at the same time its upward inclination tends to throw the beams of light upward.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. A pyrotechnic railroad danger signal comprising a suitable carriage adapted to travel along the railroad rail or rails and carrying an inflammable substance serving the double purpose of impelling the device along the track and emitting a continuous signal light, substantially as described.

2. A pyrotechnic railroad danger signal comprising a suitable carriage adapted to travel along the railroad rail or rails and provided with a receptacle charged with an inflammable substance adapted to serve as a propelling means and at the same time emit a continuous light as the device moves over the track, substantially as described.

3. A pyrotechnic railroad danger signal comprising the carriage composed of a pair of longitudinally disposed bars suspended on opposite sides of a single rail from light rollers resting upon and extending across the top of the rail, so as to afford a broad bearing surface thereon, a tubular case mounted on said carriage and containing a suitable charge of inflammable material adapted when ignited to impel the carriage and also emit a signal light and a further charge of similar material adapted to emit a colored light, substantially as described.

4. In a pyrotechnic railroad danger signal, the combination of a pair of longitudinally disposed frame-bars adapted to straddle a railroad rail and provided with lugs or fric-

tion devices to impinge against the sides of the rail, a pair of rollers mounted upon said frame-bars, transversely thereof, and adapted to rest upon the top of the rail and hold said bars suspended therefrom so as to balance and steady the device as it moves along the rail, and means for impelling the device along the track, substantially as described.

5. In a pyrotechnic railroad danger signal, the combination with the longitudinal frame bars having the rocket or case mounted thereon charged with an inflammable impelling and light-giving substance, of the rollers arranged transversely of said bars and above the same so as to travel along the top of the rail with the bars suspended and balanced one on either side of the rail, substantially as described.

6. A rocket signal comprising a suitable carriage adapted to be impelled along the track rail or rails, a cylinder or case charged with an inflammable substance adapted to emit light and also impel the device along the track, and a torpedo-supporting tongue extending in front of said carriage, substantially as described.

7. A rocket signal comprising a carriage adapted to be mounted upon the track rail or rails and balanced thereon, a cylinder or case charged with an inflammable impelling and light-giving substance mounted on said carriage and inclined rearwardly and upwardly from front to rear thereof, and a torpedo-supporting projection or tongue extending in front of the carriage, substantially as described.

8. A railroad danger signal consisting of a pair of bars arranged to straddle a single track rail, a pair of light rollers arranged transversely of and above said bars, a tubular casing detachably supported upon the carriage in a rearwardly and upwardly inclined position, and a forwardly projecting torpedo-supporting tongue, substantially as described.

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

FRANK A. FOX.
ARTHUR P. YATES.

Witnesses:

CHAS. E. RIORDON,
THOS. S. HOPKINS.