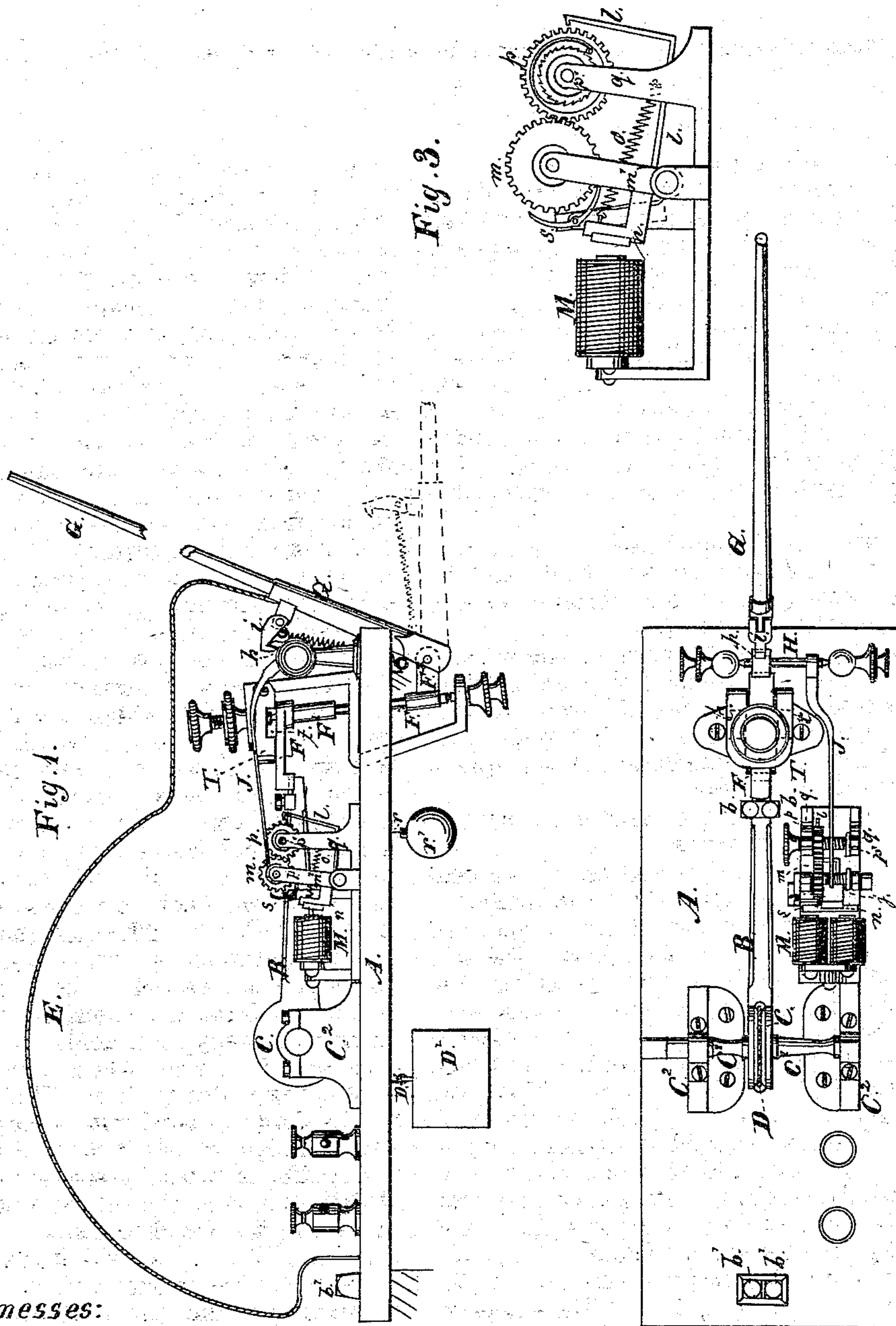


A. H. DAILEY.

Railway-Signals Operated by Electricity.

No. 153,935.

Patented Aug. 11, 1874.



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN RAILWAY-SIGNALS OPERATED BY ELECTRICITY.

Specification forming part of Letters Patent No. **153,935**, dated August 11, 1874; application filed April 11, 1874.

*To all whom it may concern:*

Be it known that I, ARTHUR H. DAILEY, of Dwight, in the county of Livingston and State of Illinois, have invented certain Improvements in Electric Railroad-Signals, of which the following is a specification:

This invention relates to a signal apparatus to be placed permanently near the railroad-track at a point between stations, and so contrived that, by means of electricity, it may set at any moment in condition, so that a passing train will cause it to operate and explode a torpedo or torpedoes, and thus give warning of danger.

The nature of the invention will be understood from the description and claims and the drawing accompanying and forming part of this specification, in which—

Figure 1 is a side elevation of the apparatus with the cover or housing shown in section. Fig. 2 is a top or plan view of same with the housing removed. Fig. 3 is a view of the magnets and gear apparatus detached and upon a larger comparative scale.

Like letters of reference used in the several figures indicate like parts.

In the said drawing, A represents the bed-plate or foundation upon which the apparatus is supported. The whole contrivance may well be mounted upon an elevated post at the side of the railroad. B is an arm projecting from the grooved wheel C, which is carried upon journals C<sup>1</sup>, bearing in the standards C<sup>2</sup>. Around this grooved wheel passes a cord, D, to which the large weight D' is attached. Upon the end of the arm are placed tablets b, to which the torpedoes are fastened, and when said arm is released from its detent, subsequently to be described, the weight D', acting upon the wheel, swings the arm rapidly over through an arc, and brings the torpedoes violently in contact with the anvils b', placed at the rear of the frame or bed, exploding them. The anvils are placed outside of the housing E, as shown at Fig. 1, so that the machinery is protected from the effects of the explosion. The detent consists of an arm, F, projecting to the rear from the upright inclined shaft F<sup>1</sup>, which bears below the bed a second short arm, F<sup>2</sup>, projecting to the front, and carrying the hinged pole G. The detent-arm F is grooved, so that it will rest

upon a wedge-like part of the torpedo-carrying arm or hammer B, and detain it in the locked position shown in the drawings; but should the shaft F<sup>1</sup> be rotated in either direction the detent will ride off and allow the hammer to escape and explode its torpedoes. This, however, can only take place when the pole G is lowered into the position indicated by dotted lines at Fig. 1, which is its position when set to warn a train. When so set the pole G lies over the track in such position as to be struck by a passing train and swung to one side, rotating the shaft F<sup>1</sup> and releasing the detent from the torpedo-hammer, and thus giving the warning signal for the train to stop. In front of the detent contrivance just described is a spring-trip, consisting of the shaft H, bearing the hook h, over which a spring-hook, i, upon the pole G takes to retain said pole in an elevated position, as shown in the full lines at Fig. 1, where it will be out of the way of passing trains. Attached to the shaft H is an arm, J, which is connected by a cord to the axis of the cog-wheel m, being wound around said axis. Now, when said cog-wheel is released and free to turn, the weight of the pole G upon the hook h will turn the shaft H, and when the hook is sufficiently depressed said pole will fall. The cog-wheel m is borne in a pivoted frame, m', which carries the armature n of a magnet, M. The retractile spring o holds the frame and armature back from the magnet normally, and holds the cog-wheel m in mesh with the cog-wheel p, which is borne in stationary standards q. This cog-wheel p has its shaft p' wound with a cord, r, to which a small weight, r', is attached. Now, if a steady and continued current is sent through the magnets M, the armature will be attracted, which will swing the attached frame so that the cog-wheel m is out of gear with its neighbor p, and is therefore free to turn and unwind the cord connecting to the arm J, allowing the arm J to rise and release the pole G, which falls across the track and in the path of an approaching train; but lest the escape of the cord should be too rapid, the anchor-escapement s is fixed, so that it will engage the cog-wheel m when lifted, as stated. In the meantime, to prevent the weight r' from running down, a pawl, l, is made to engage the cog-



wheel *p*, said pawl being attached to and operated by the frame carrying the armature and the other cog-wheel.

It will be seen that only a steady and continuous current continued for some little time will suffice to release the pole *G* and allow it to drop, because the armature must be held to the magnet long enough to allow all of the cord *j* to unwind and the arm *J* to rise to its full extent, because when the armature falls back the cog-wheel *p* will re-engage the cog-wheel *m*, and said wheel *p*, being now released from the pawl *l*, will be revolved by the descent of the weight *r'*, and will revolve the cog-wheel *m* and wind up the cord *j*, and thus draw down the arm *J* to its original position. Thus it will be seen that momentary flashes of atmospheric electricity, although they may affect the magnet, will not suffice to operate the mechanism and cause the pole to fall.

When the pole is struck by a passing train it is, of course, swung violently around, and lest it swing back again, and thus become entangled with the train and broken, I place upon the shaft *F*<sup>1</sup>, above the detent-arm *F*, a hinged yoke, *T*, with two notches, *t t*, one at each side, so that when the arm *F* reaches one of these notches it will be locked there by said yoke. The axle of the cog-wheel *p* is connected to said wheel by a ratchet to allow of the weight *r'* being wound up without rotating the wheel.

The circuit for operating the magnets above described may be as follows: All of the signals between any two stations may be connected by a wire running from one to the other of the stations, the wire being supplied with a ground-switch at each station. Now, if a current is sent into the wire at either station (the ground

being cut out at that station) it will pass through all of the signals and operate them all, going to ground at the other station; or, a wire may lead from a single station to a signal and be grounded there. The circuit is to be closed when the signal is to be made, and only then. To operate the signal the circuit must be something more than an instantaneous flash, and hence it should be closed and kept so for at least a full minute.

Having described my invention, that which I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the hammer *B*, actuated by a weight, *D'*, the swinging pole *G*, latch or detent *F*, spring-trip *H h i*, and the electro-magnet, the armature of which is attached to and operates to disengage the said spring-trip, substantially as specified.
2. The combination of the hammer *B*, the wheel *C*, weight *D'*, the detent-arm *F*, shaft *F*<sup>1</sup>, arm *F*<sup>2</sup>, and pole *G*, substantially as specified.
3. The combination of the pole *G*, detent contrivance, and the shaft *H*, provided with hook *h* and arm *J*, and the hook *i* upon the pole *G*, substantially as specified.
4. The notched yoke *T*, in combination with the swinging pole *G*, substantially as specified.
5. The combination, with the arm *J*, of the magnet *M*, the cog-wheels *m p*, swinging frame *m'*, armature *n*, pawl *l*, and weight *r'*, substantially as specified.

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Witnesses:

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