C. D. TISDALE.

Electric Signal Apparatus for Railways.

No. 218,693. **Patented Aug. 19, 1879.**

Fig. 1.

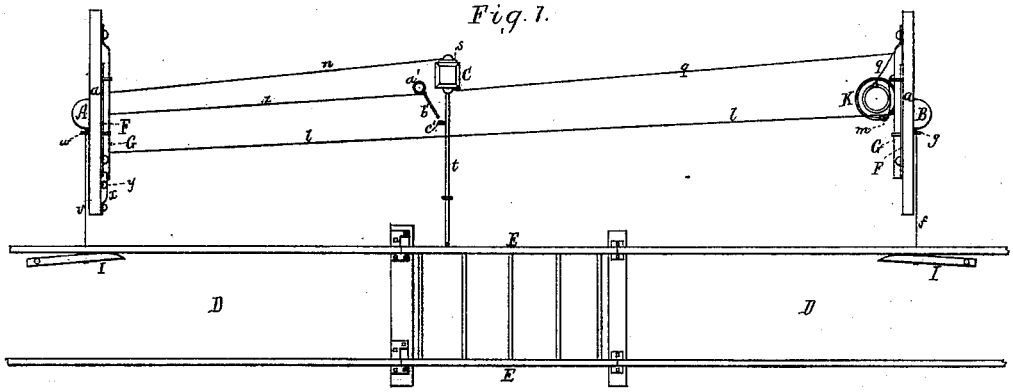


Fig. 2.

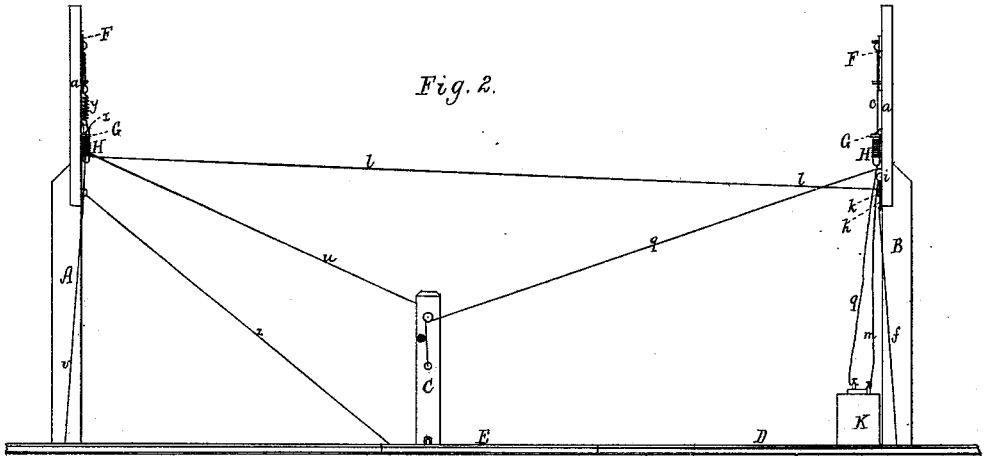


Fig. 3.

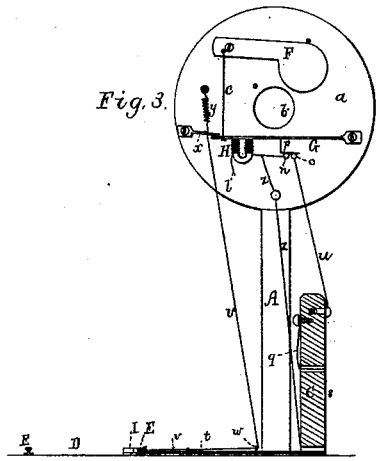
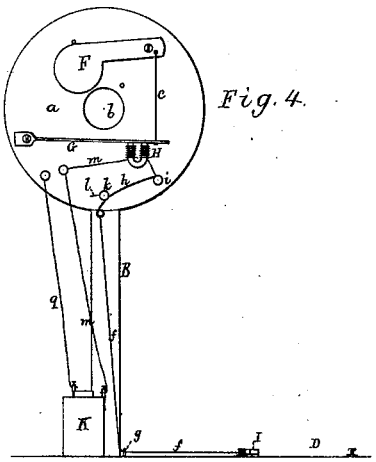


Fig. 4.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN ELECTRIC-SIGNAL APPARATUS FOR RAILWAYS.

Specification forming part of Letters Patent No. **218,693**, dated August 19, 1879; application filed April 9, 1879.

To all whom it may concern:

Be it known that I, CHARLES D. TISDALE, of Boston, of the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Electric-Signal Apparatus for Railways; and do hereby declare the same to be described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 an elevation, and Figs. 3 and 4 transverse sections, of a railway-track, two signal-posts, an intermediate post, and a switch provided with my invention. The plane of one section is taken through the short intermediate post, one section showing the mechanism applied to one signal-post, and the other section that of the other post.

The nature of my invention is set forth in the claim or claims hereinafter presented.

The object of the invention is to give notice to a car or train, when approaching one of the signal-posts, whether the section of track between the two signal-posts is clear of any train or car, or whether the switch is in a correct position for the train or car to pass throughout the section.

In this apparatus, when the signals are down there is a car or train on the section, or the switch is not in alignment with the track-rails.

The two signal-posts are generally to be placed a mile, or about a mile, apart from each other.

In the drawings, A and B denote the two signal-posts, having between them an intermediate post, C, all of which are arranged aside of the railway-track D D and a switch, E E, thereof, in manner as represented. Furthermore, each of the posts A and B has a flat head, *a*, having a circular opening, *b*, through its center. Each head has applied to it a lever-signal, F, pivoted to it, so as, when down, to cover the aperture *b*.

Arranged below each signal is an armature or bar, G, which is pivoted at or near one end of it to the head *a*, and disposed over an electro-magnet, H, the armature being connected with the shorter arm of the signal-lever by a rod, *c*.

Opposite each post A or B, and arranged in manner as shown against the next adjacent rail of the track, is a tongue or arm, I, which is pivoted so as to swing toward and away from the rail. From one of these tongues a wire, *f*, extends to and through a staple, *g*, up to a metallic circuit-breaker or spring, *h*, projecting from a stud, *i*, inserted in the head of the post B. The said spring bears against another stud, *k*, from which a circuit-wire, *l*, is led to the magnet of the other post. The circuit-wire *m* of the post B leads from the magnet of such post to a galvanic battery, K, arranged as shown.

In the head of post A, and just below its armature G, are two metallic studs, *n o*, over which, but out of contact with them, is a circuit-closer or short bent metallic wire, *p*, extended from the armature.

The other circuit-wire, *q*, from the battery may be carried directly to the stud *o* in case there is no switch to operate with the circuit; but when there is a switch, as shown in the drawings, the said wire is led to the intermediate post C, and transversely through it, so as to abut against a metallic spring, *s*, fixed to the said post at its upper part, the said spring at its lower end being free to be moved away from the post by a slide-rod, *t*, extending through the post and against one of the rails of the switch. From the head of the spring a wire, *u*, leads to the stud *o*. Furthermore, from the tongue I, next the post A, a wire, *v*, leads through a staple, *w*, up to a short arm, *x*, pivoted to the head of the post and resting on the armature thereof, and provided with a spring, *y*, to raise it off the armature.

The circuit-wire of the magnet of the post A leads from the magnet to the stud *n*, and there is an auxiliary circuit-wire, *z*, leading from the magnet circuit wire down to a stud, *a'*, near the intermediate post.

A spring, *b'*, bent upward near its free end, projects from the stud *a'*, and co-operates with a metallic projection, *c'*, extending from the slide-rod *t*.

If, now, we suppose the circuit to be closed, in which case both armatures will be against their magnets, and we also suppose a car or train to pass upon the section of track, and to be moving in the direction from the post B to the post A, the flange of one of the

forward wheels will be carried through the angular passage between the first tongue and the rail, and will force the tongue away from the rail, and thereby cause the spring or circuit-breaker *h* to be drawn away from the stud *k*. The circuit will then be broken, and both signals will fall and cover their apertures in the heads of the posts, thereby indicating to another car or train that may be approaching the section that the track-section is not clear or is obstructed.

The car or train which entered the section having passed the tongue, the spring or circuit-breaker *h* will move up to the stud *k*, and in so doing such spring will draw the tongue up to the rail. This, however, will not close the circuit because the circuit-closer *p* will be off the studs *n o*, in consequence of the armature from which such circuit-closer projects being raised off its magnet by the signal in falling.

As soon as the car or train may pass the other tongue, or that next the post A, so as to force it away from the rail, the signal will be raised, and the circuit-closer *p* will be forced down upon the studs *n o*, whereby the circuit will be closed and the other signal will be raised above its aperture. The two signals will be maintained in their raised positions by the magnets while the circuit may remain closed.

Should the switch be open, the circuit will be broken, and the two signals will fall and cover the apertures, thus giving warning that the switch is not closed or in alignment with the track. As, when the switch is thus open, the circuit-closer *p* will be off its studs *n o*, the circuit would not be closed by the closing of the switch were it not for the auxiliary circuit-wire *z*, spring *b'*, and projection *c'*. The said spring *b'* and projection *c'* are to be arranged to touch each other just as the spring *s* of the intermediate post C may touch the end of the circuit-wire *q*, while the switch is being moved to close it. This taking place, the circuit will be closed, and both magnets will draw down their armatures, and thereby cause the signals to be raised above their apertures, thus showing that the switch is closed.

This signal apparatus is specially intended for a double-track railway, where the "down cars" always run on one track and the "up cars" on the other, each section being provided with suitable signal apparatus, as described, to show when the section is obstructed, or, in case there may be a switch in such section, to indicate when the switch is either open or closed. This will be caused in consequence of the rod *t*, by the switch, being forced against the spring *s*, so as to press it out of contact with the end of the wire *q*.

From the above it will be seen that the electric circuit is twice interrupted—that is, it is interrupted at each post-head, there being to one interruption a circuit-breaker, and to the other a circuit-closer; also, that the circuit-closer is carried by the armature directly over it, the circuit-breaker having no connection with the armature immediately over it. It will also be seen that, with such devices, the spring of the intermediate post and slide-rod leading from such spring to the switch become necessary for the correct operation of the signal apparatus by the switch, the auxiliary wire *z*, spring *b'*, and projection *c'*, applied as described.

I do not claim two lever-signals, two armatures, two electro-magnets, a battery, and circuit applied to posts and a railway-track, such not being new for the purpose of indicating to an approaching train whether the section of track between the posts is interrupted.

I would further remark that my signal apparatus is to be set in operation by the wheel-flanges of a car or train, and by two tongues applied to the track in manner as represented, such causing my invention to differ materially from other signal apparatus which is to be set in motion by devices applied to a car or engine independently of the wheel or wheels thereof, especially such as are described and represented in the United States Patents Nos. 190,379 and 191,732.

What I claim as my invention is as follows:

The combination of the twice-interrupted circuit, the circuit-closer extended from one of the armatures and to be operated by a tongue, as described, and the circuit-breaker disconnected from the other armature and to be operated by another tongue, as set forth, with the spring and slide-rod adapted to the switch, the circuit, and intermediate post, as explained, and the projection *c'*, spring *b'*, and auxiliary circuit-wire *z* applied and to operate essentially as set forth.

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Witnesses:
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