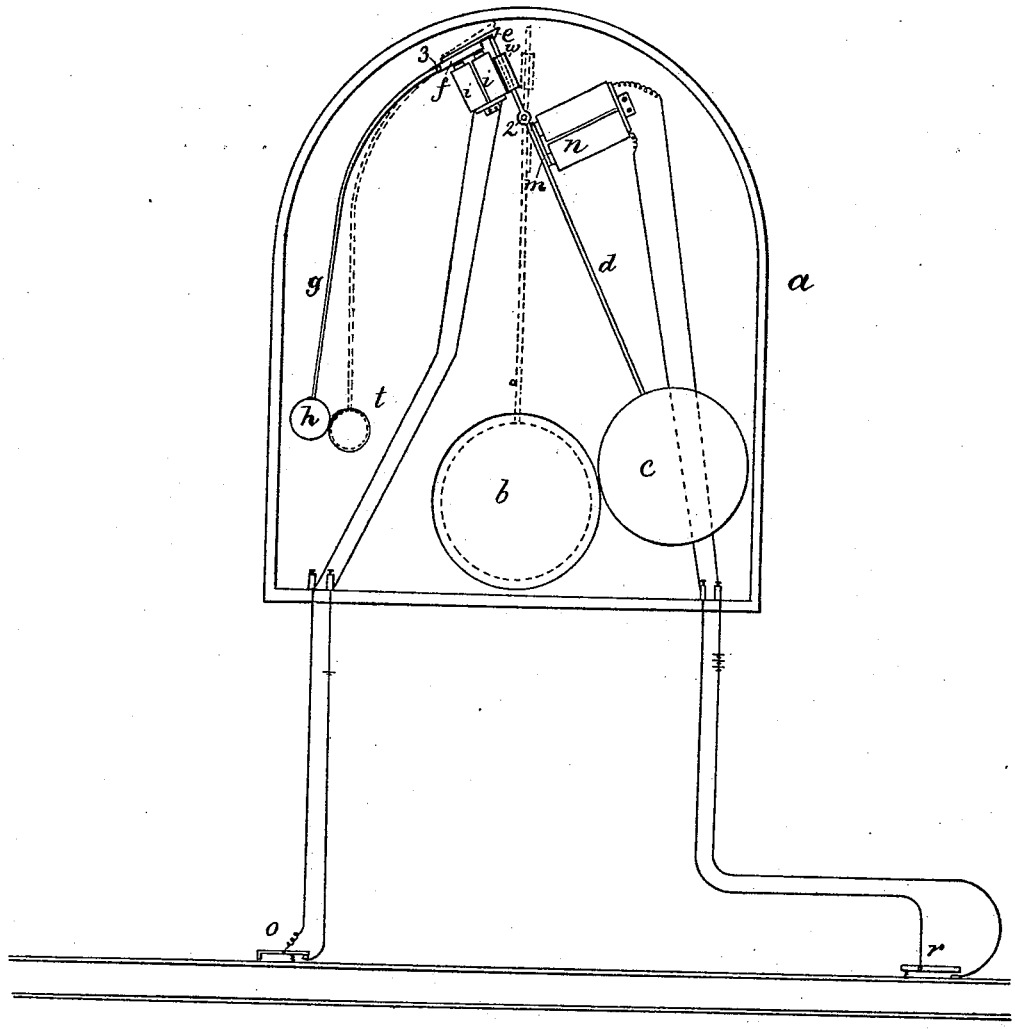
(No Model.)

J. P. LIVERMORE.

RAILWAY SIGNAL APPARATUS.

No. 266,297. Patented Oct. 24, 1882.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOSEPH P. LIVERMORE, OF BOSTON, MASSACHUSETTS.

RAILWAY SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 266,297, dated October 24, 1882.

Application filed February 13, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH P. LIVERMORE, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Railway Signal Apparatus, of which the following description, in connection with the accompanying drawing, is a specification.

My invention relates to a railway signal apparatus; and it consists in certain combinations of devices and circuits, hereinafter described.

The drawing shows in side elevation a signal apparatus embodying this invention, the side of the inclosing-case being removed, and it also shows a diagram of the circuits employed in connection with the said signal and a block-section of the track.

The signal-case *a* is provided with an opening or window, *b*, through which the signal *c* is visible when in the proper position. The said signal *c*, shown as consisting of the usual colored disk, is mounted on an arm, *d*, pivoted at 2 in such a manner that the signal *c* falls by its own weight into the position shown in dotted lines in which it is seen through the opening *b*. When in the concealed position shown in full lines the arm *d* of the signal is engaged by a latch, *e*, mounted on an armature-lever, *f*, pivoted at 3, and provided with an arm, *g*, which carries a signal, *h*, which may be called a "derangement-signal," since its function is to indicate if a circuit has become improperly broken or a battery failed. When the armature *f* is released by the opening of the circuit of its magnet *i* the weight of the arm *g* and signal *h* retract the said armature, so that the said parts occupy the position shown in dotted lines. The signal-arm *d* will thus be released by the latch *e*, permitting the signal to drop by the action of gravity to the position shown in dotted line, it then indicating danger. The signal-arm *d* is provided with an armature, *m*, which, when acted on by the magnet *n*, will draw the signal into the position shown in full lines, where it will be retained by the latch *e* if the armature *f* be attracted after the said magnet *n* has ceased to act.

The magnet *i*, which may be called the "controlling-magnet," is normally charged, it being in a closed circuit, as shown, containing a circuit-breaker, *o*, adapted to be operated by the wheels of the train entering the section to be guarded by the signal, so that the armature *f* is released and the signal permitted to drop when the said circuit-breaker *o* is operated.

The magnet *n*, which may be called a "signal-actuating" magnet, is in a normally-open circuit, as shown, provided with a circuit-closer, *r*, operated by the wheels of the train, leaving the section guarded by the said signal.

The latch *e* is made yielding on the armature *f*, so that when the signal-arm *d* is moved to the full-line position by the action of the magnet *n* the said latch yields without necessitating the breaking of the armature *f* away from the poles of its magnet, to which it will then be attracted.

In case of any failure of the circuit of the controlling-magnet *i*, its armature *f* will cease to be attracted, and the main signal *c* will thus remain in its "danger" position. The signal *h* will in this case also remain displayed through the opening *t*, thus indicating that the circuit is in fault, and that the danger-signal does not of necessity indicate that a train is on the section.

By mounting the signal *c* as a pendulum, as shown, it will be seen that it is balanced in its vertical position, and that the least power is consequently required to move it when the armature *m* is most remote from the poles of its magnet, and that consequently the power of the magnet upon its armature increases, together with the resistance to overcome.

I do not broadly claim a signal having one magnet to move it and another to lock or hold it; nor do I claim a signal having an actuating-magnet in a normally-open and a controlling-magnet in a normally-closed circuit.

If desired, a counter-weight, *w*, may be employed to nearly balance the signal *c* and arm *d*.

It is obvious that any number of magnets *i* and *n* may be included in the respective circuits and controlled simultaneously, if desired.

I claim—

1. In a railway signal apparatus, the following elements in combination: the signal arranged to be displayed when not positively held otherwise, the actuating-magnet and normally-open circuit and circuit-closer, by means of which the signal is removed from view, and

the latch and its controlling-magnet, and normally-closed circuit and circuit-breaker, the said latch being arranged to engage and lock the signal while its controlling-magnet is charged, substantially as described.

2. In a railway signal apparatus, the signal and the controlling-magnet and normally-closed circuit therefor, combined with an armature for said magnet and signal operated thereby, as described, for the purpose of indicating when the circuit of the said magnet is inoperative, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOS. P. LIVERMORE.

Witnesses:
G. W. GREGORY,
B. J. NOYES.