

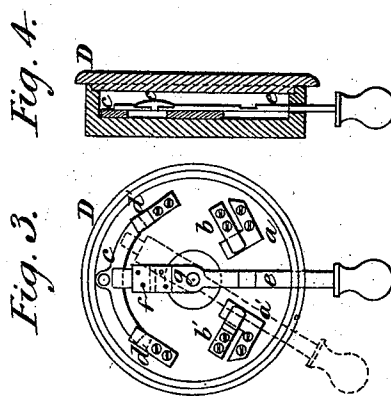
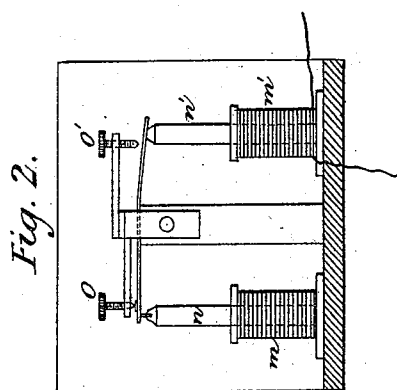
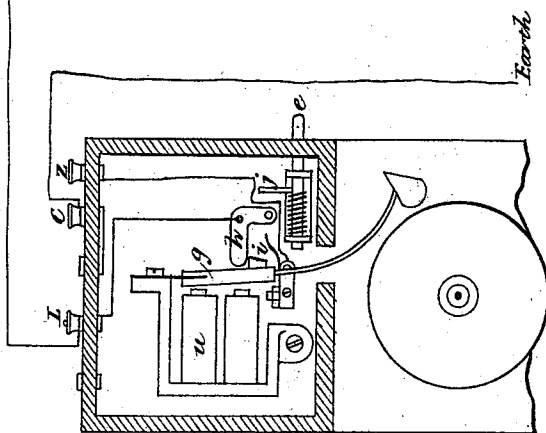
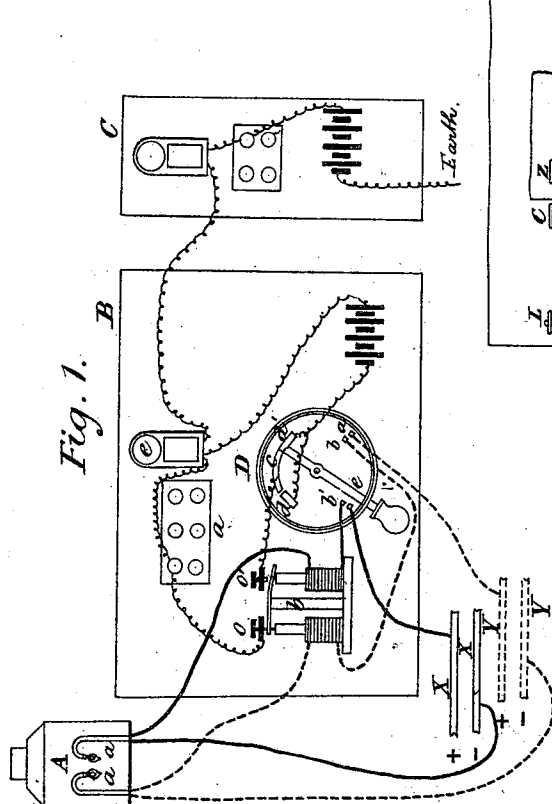
(No Model.)

J. E. H. GORDON.

MEANS FOR LIGHTING RAILWAY AND OTHER SIGNAL LANTERNS
BY ELECTRICITY.

No. 354,782.

Patented Dec. 21, 1886.



Witnesses.
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MEANS FOR LIGHTING RAILWAY AND OTHER SIGNAL LANTERNS BY ELECTRICITY.

SPECIFICATION forming part of Letters Patent No. 354,782, dated December 21, 1886.

Application filed August 21, 1886. Serial No. 211,531. (No model.) Patented in England May 7, 1885, No. 5,657.

To all whom it may concern:

Be it known that I, JAMES EDWARD HENRY GORDON, a subject of the Queen of Great Britain, residing at 28 Collingham Place, Kensington, in the county of Middlesex, England, electrical engineer, have invented certain new and useful Improved Means or Apparatus for Lighting Railway and other Signal Lanterns by Electricity, (for which I have received Letters Patent in Great Britain, No. 5,657, dated May 7, 1885,) of which the following is a specification.

My invention consists of improved means or apparatus for lighting the lamps of railway-signals by incandescent electric lamps. In order to guard against the light in such a signal-lantern being extinguished for an appreciable time, means must be provided for instantly indicating the extinction of a lamp and for immediately relighting the lantern by means of a spare lamp. For this purpose I arrange that in each lantern there shall be two lamps, which lamps are preferably on different circuits, supplied from different dynamos or groups of dynamos, or other sources of electricity. A switch is provided in the cabin, from which the signal to be lighted is controlled, such that either lamp can be lighted, as desired, or both can be extinguished, (as in the day-time,) but that both cannot be lighted at once. In the event of the lamp which is burning going out, either, for instance, by the breaking of its filament or by the stoppage of its supply of electricity or otherwise, the switch-handle can be instantly put over, so as to light the other lamp, while, if the first lamp is broken, a new one can be substituted for it at leisure.

In order that the signalman may know if any lamp has gone out, I arrange that in such an event a bell rings in the cabin and an indicator shows which lantern is in fault. This bell goes on ringing until the switch is put over, and the spare lamp lighted. At the same time a bell rings in the engine-room, and an indicator shows at which cabin the accident has occurred. This bell goes on ringing until the lampman arrives at the cabin with a spare lamp. A further arrangement is provided, such that when the lamp is switched out on purpose the bells do not ring.

The annexed diagram and drawings show the method of carrying out the invention.

The diagram gives the general scheme of connections and shows the various pieces of apparatus in outline, and the drawings show the apparatus in detail.

It will be seen that the apparatus consists partly of new apparatus, and partly of old apparatus used in new combinations with the new apparatus.

In the drawings, Figure 1 is a diagram view of the whole apparatus, showing the electrical connections. Fig. 2 shows a side view of solenoid mechanism for keeping bell from ringing while either lamp is alight. Fig. 3 is a face view, and Fig. 4 a transverse section, of the switch apparatus for lighting either the one lamp or the other of a signal-lantern. Fig. 5 is a side elevation, partly in section, of the bell apparatus placed in the signalman's cabin.

In Fig. 1, X X represent portions of the two conductors of one electric main, and Y Y two conductors of a second electric main; but both lamps might be connected to one set of mains if two are not available. The branch connections from these mains, with the electric lamps and the other parts of the apparatus, are clearly shown by the diagram.

A represents a signal-lantern with two lamps, *a*, in it.

B represents the part of the apparatus which is in the signal-cabin, and C represents that part which is in the engine-room.

The thick lines represent electric-light wires, the fine lines bell-wires.

The solenoid mechanism *b*, which forms part of the mechanism in the signalman's cabin, is shown separately at Fig. 2. It consists of two small solenoids, *m m'*, in series with the two lamps *a a*, respectively. When either lamp is burning, the solenoid connected to it sucks into it one of the iron cores *n n'*, Fig. 2. The bell-current has to pass from one of the studs O O', Fig. 2, to the other, and this it cannot do if either of the solenoids has a lamp-current passing through it. The cores are acted on by a spring, as shown, or otherwise, which tends to withdraw them from the coils. The contact over one core being always closed, the extinction of the lamp connected with the

other solenoid allows the second core to rise, and completes the circuit of a small battery through the bell *e*, and through an indicator *d*. The indicator *d* is of the usual type which is used with domestic electric bells to show from what place or room the call has come.

In the cabin there are as many switches and pairs of solenoids as there are signal-lanterns controlled from it, and there are the same number of disks in the indicator.

The solenoid apparatus may be made of the dimensions shown in Fig. 2, and may have each solenoid wound with eight layers of wire .022 inch diameter. With such solenoids, I find that with a one hundred and twenty volt Swan lamp and twenty-five candles, having an efficiency of about two hundred and ten candles per horse-power, worked by an alternating current, the solenoid absorbs about three-fourths of a volt, reducing the electro-motive force at the lamp to one hundred and nineteen and one-fourth volts, not enough to sensibly reduce the light.

The dimensions and quantity and gage of wire are given to show one useful form of the apparatus, and not as being the only useful ones that can be employed. When alternating currents are used, I preferably use cores of thin sheet-iron rolled with a sheet of paper, so that a cross-section at right angles to the axis would show a spiral line. These cores are not claimed as new.

The switches are numbered correspondingly with the disks, and on, for instance, the bell ringing and No. 6 disk coming up, it shows that No. 6 lantern is out, and No. 6 switch must be put over to relight it; on the switch being put over, and the spare lamp lighted, the second core is drawn down, and the bell stops.

D, Figs. 1, 3, and 4, shows the switch. It consists of a case of wood or other insulating material, in which are two pairs of brass blocks, *a b a' b'*. These blocks, respectively, interrupt the circuits of the two lamps. *e* is a metal bar, pivoted at the center, *g*. If it is pushed to the right, it makes contact between the pieces *a* and *b* and lights one lamp, while if pushed to the left it lights the other. When it is in the center, both are extinguished. The pivot *g* works easily, so that when not pushed either way the weight of the handle *h* keeps the bar central. An insulating-piece, *f*, is let into the bar *e*, and at the top are another pair of contact-pieces, by which the bar *e* is put into contact with either *d* or *d'*, according to the position of the bar *e*. These interrupt the bell-circuit. Their use will be explained below. The various blocks are so placed that the lamp-circuit is closed just before the bell-circuit.

On tracing the connections in Fig. 1 it will be seen that when the switch is on and either lamp burning the bell-circuit is interrupted at the contact above the corresponding solenoid. In case of the lamp going out, the core of the solenoid rises and completes the circuit,

and the bell rings, and the indicator shows which pair of solenoids has closed the circuit—*i. e.*, in which lantern a lamp is out. On the switch being put over and the spare lamp lighted, the other core is drawn down, the bell-circuit is interrupted, and the bell stops. The indicator, however, remains on for the information of the lampman until reset by him. In case the lamp is purposely extinguished by the switch, both cores rise and make contact; but the bell-circuit is then interrupted by the blocks in the upper part of the switch, and so the bell does not ring.

In order to convey information to the engine-room that a new lamp is wanted, the bell apparatus in the signalman's cabin is arranged, as shown at Fig. 5, to complete an electric circuit to a bell and indicator in the engine-room immediately that the bell in the cabin commences to ring. The armature *g* of the electro-magnet used for ringing the bell holds up a small contact-lever, *h*. When the armature is attracted and the bell commences to ring, the contact-lever drops and makes electrical connection between the contact-pieces *i j*, and thereby, as shown at Diagram 1, completes an electric circuit through the bell and indicator in the engine-room, and the bell in the engine-room continues to ring until the contact-lever *h* is again raised by the pushing inward of the stud *e*. The indicator in the engine-room shows from which cabin the call has come.

I am aware of the patent of Van Depoele, No. 285,859, October 2, 1883, and I do not claim any subject-matter shown therein.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combination, in a railway-signal apparatus or system, of a railway-signal lantern having two electric lamps, circuit-connections, and switch mechanism located at an attendant's station removed from the signal-lantern for controlling the lighting of the lamps, as described, whereby either lamp can be lighted at will, but both cannot be lighted at the same time.

2. The combination of a railway-signal lantern having in it two electric lamps, circuit-connections and switch mechanism by which the circuit for lighting either lamp can be completed or both circuits broken, a bell and indicator, a circuit in which they are included, which circuit is closed just after each lamp-circuit is closed, and solenoid mechanism in the circuit of each lamp for making a break in the bell and indicator circuit whenever either lamp is lighted, but which makes good the break when both lamps are extinguished.

3. The combination of a railway-signal lantern having in it two electric lamps, circuit-connections and switch mechanism by which the circuit for lighting either lamp can be completed or both circuits broken, a bell and indicator, a circuit in which they are included,

- which is closed just after each lamp-circuit is closed, solenoid mechanism in the circuit of each lamp for making a break in the bell and indicator circuit whenever either lamp is lighted, but which makes good the break when both lamps are extinguished, and contact apparatus actuated by the bell, which completes a second circuit, including another bell and indicator.
4. The combination, with a railway-signal apparatus or system, of a main electric circuit, a signal-lantern connected therewith having in it two independent electric lamps, each complete in itself, circuit-connections and switch mechanism independent of and removed from the lamp under the control of the signalman, by which either of said lamps may be independently lighted.
5. The combination of a main circuit or circuits, a signal-lantern connected therewith having in it two electric lamps, switch mechanism located at the station of the signalman by which either lamp may be independently lighted, and signaling apparatus which notifies the switchman when a lamp in the signal-lantern fails, and secondary signaling mechanism located at the engine-room or electric-distribution station which simultaneously notifies the attendant there of the failing of the lamp in the signal-lantern.
6. The combination of a main circuit, a signal-lantern connected therewith having two electric lamps, switch mechanism by which the signalman or attendant may light either lamp, and signaling apparatus which notifies the signalman or attendant when a lamp in the signal-lantern fails.

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