C. L. MEES & I. A. SHERMAN.

Electric Railway Car Signal.

No. 207,538. Patented Aug. 27, 1878.

Fig. 1.

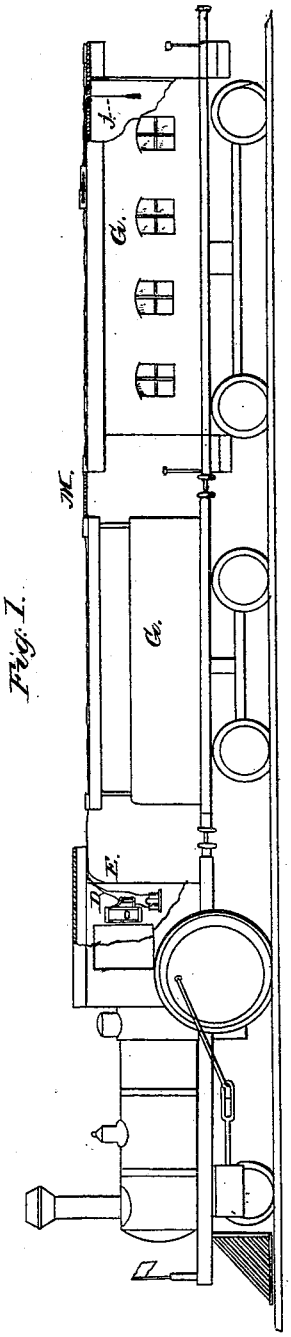


Fig. 2.

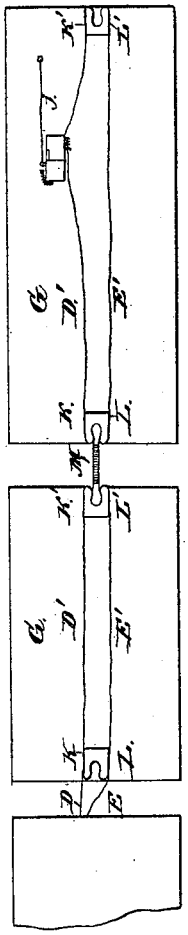


Fig. 5.

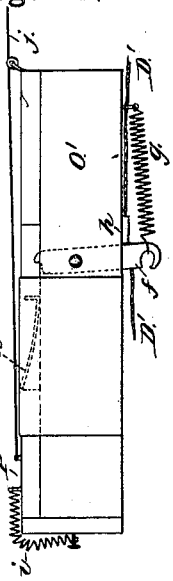


Fig. 4.

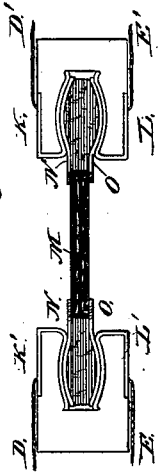
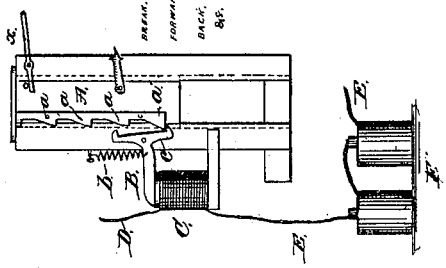


Fig. 3.



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UNITED STATES PATENT OFFICE.

CARL L. MEES AND ISRAEL A. SHERMAN, OF LOUISVILLE, KENTUCKY.

IMPROVEMENT IN ELECTRIC RAILWAY-CAR SIGNALS.

Specification forming part of Letters Patent No. **207,538**, dated August 27, 1878; application filed April 24, 1878.

To all whom it may concern:

Be it known that we, CARL L. MEES and ISRAEL A. SHERMAN, of Louisville, in the county of Jefferson and State of Kentucky, have invented a new and Improved Electric Signal for Railway-Cars, &c.; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a side elevation of a train of cars provided with our improvement. Fig. 2 is a partial plan view. Fig. 3 is a detail of the signal device on the locomotive; Fig. 4, a detail of the flexible connection between the cars; Fig. 5, a detail of the conductor's signaling device.

The invention consists in combining a signal device upon the locomotive with two circuit-wires extending through the cars of the train, and with peculiarly-constructed circuit-breaking connections extending from one car to the other, whereby the parting of the cars, or any one of them, automatically transmits to the engineer a signal to that effect.

The invention also consists in the peculiar construction and arrangement of circuit-breaking connections which, from the separation of the cars, cause a separation of metallic contact-surface and a break in the circuit.

The invention also further consists in the construction and arrangement of a key for the conductor's or any authorized person's use, whereby the said electric circuit may be made available for the transmission of signals to the engineer, or otherwise, without danger of confusion, as hereinafter more fully described.

In the drawing, A represents a signal device, which is located upon the locomotive or in the forward car of the train. This signal apparatus consists of a drop or gravity slide, having detents *a* upon its side, which detents are engaged by the armature of a magnet to control the fall of said slide. B is the armature, and C the electro-magnet, the said armature being provided with a spring, *b*, which retracts it from the electro-magnet when the latter is not charged by the current, and having also its end *c* formed into an anchor-escapement, which supports the gravity-slide by engaging with its detents in such a manner as to allow but one detent to pass for each movement of the armature, after the manner of a clock-escapement. The electro-magnet C, of which but a single one is employed, is charged by a battery, F, through the wires D E, communicating with the positive and negative poles of said battery, and extending through the entire train of cars by connections hereinafter described.

G G represent two cars of the train, each of which is provided near the top with metal contact-seats K L K′ L′, connected, respectively, by wires D′ E′, Fig. 2. Electric connection is made between the metal plates K K′ of one car and the metal plates K K′ of the next car, and also between the metal plates L L′ of one car and the metal plates L L′ of the next, by means of flexible cables M, having two insulated wires, terminating with metal contact-plates N O, having a block of rubber placed between, which plates and elastic block form a plug, adapted to be forced into the seats K L K′ L′ in such a manner that the plates N O which are connected with the two insulated wires of the flexible cables are brought into elastic connection with the plates of the seats. All of the wires D′ and the plates K K′ and N and the corresponding wires in the cable are insulated from the plates L L′ and O and the wires D′, except at the end of the train, where electrical connection is made between the two series to complete the circuit. It will thus be seen that the electro-magnet on the locomotive is habitually charged by the battery F, having a closed circuit extending back through the whole train of cars. Now, if a portion of the train becomes detached by accident, the cable M, with the plugs having contact-plates N O, separates from the seats having the plates K L K′ L′ and breaks the electric circuit. The effect of this break in the circuit is to cause the magnet C to loose its hold upon the armature B, which then responds to the tension of the spring *b* and leaves the magnet. In thus leaving the magnet the lower branch of the anchor end of the armature, Fig. 3, is removed from the first detent, *a*, of the gravity-slide, while the upper arm of the anchor is placed in position to stop and retain the second detent. The drop-slide then, from its own gravity, falls the distance of one detent, which movement brings a signal indicating a parting of the train into full view, or

causes an index-finger on the slide to point to the signal indicating the break. At the same time the slide falls a lever, *x*, is deflected by said fall, and this movement of the lever releases a bell-alarm, whose construction is too well understood to require illustration.

To enable the conductor to communicate with the engineer, or vice versa, through the electric circuit described, we locate in one or all of the cars a special form of key arranged to be pulled by the conductor's rope. This key, which is shown in Fig. 5, consists of a frame-piece, O′, having pivoted therein a metallic latch, *f*, which is connected to one end of one of the circuit-wires, and which is habitually held by a spring, *g*, into contact with a metal plate, *h*, connected to the other end of the circuit-wire, so that the closed circuit is made through the contact of latch *f* with plate *h*. In the upper portion of the frame-piece O′ is arranged a slide, P, moving in guideways and held back by a spring, *i*. This slide has a spring, Q, bent so as to strike against the upper end of the latch *f* and deflect the latter to break its connection with the plate *h*, and immediately allow it to close again when moved in one direction, but which spring passes freely over the end of said latch in the other direction. To the slide P is attached a cord, *j*, within the reach of the conductor. Now, when a signal is to be transmitted to the engineer a pull upon the cord causes the latch to be separated from and immediately restored to contact with the plate *h*, thus breaking and immediately closing the circuit. The effect of this action upon the magnet is as follows: The breaking of the circuit allows the armature to leave the magnet, moving the lower limb of the anchor from the first detent, *a*, and placing the upper limb in position to catch the second detent. This allows the slide to drop one space. Then, as the circuit is again closed by the passage of the spring Q over the latch *f*, surely and inevitably, and without regard to the length of the fall upon the cord, the armature is again attracted by the magnet, which movement causes the upper limb of the anchor to be removed from beneath the second detent and the slide allowed to fall another space, so that the second detent rests upon the lower limb of the anchor.

It will thus be seen that it is impossible to confuse an automatic break-signal, which simply breaks the circuit and moves the slide one space, with a signal from the conductor, which breaks the circuit and immediately makes it again, thus necessarily causing a double movement of the slide.

It is obvious that any number of pulls and systems of signals may be adopted between the conductor and engineer, and that the same principles and substantially the same device may be operated by closing an open circuit instead of opening a closed circuit.

With respect to the signal device A, we are aware that substantially the same construction has heretofore been employed in hotel-annunciators, and we therefore only claim it in combination with the conducting-wires and disconnecting devices, as hereinbefore described.

Having thus described our invention, what we claim as new is—

1. The combination of an electric signal device, A, located upon the forward part of the train, with two conducting-wires extending the full length of each car, and terminating at each end of the same in adjacent contact-plates K L K′ L′, forming seats, together with a flexible cable having two insulated wires terminating in metal plates N O, separated by a soft-rubber block, to continue the circuit, but permit it to be broken when the cars separate, substantially as and for the purpose described.

2. The wires D′ E′ arranged upon the cars and having terminal contact-plates K L K′ L′, forming seats, in combination with a flexible cable having two insulated wires with terminal metallic plates N O, separated by a soft-rubber block, to form an elastic plug adapted to fit in the said seats, as and for the purpose set forth.

3. The combination, with a signal device, A, located upon the forward part of the train, of the frame-piece O′, a metallic latch, *f*, connected with one end of the circuit-wire and provided with a spring, *g*, a contact-plate, *h*, connected with the other end of the circuit-wire, and a spring-retracted slide, P, having a bent spring-pawl, Q, arranged to deflect the latch *f* and allow it to be immediately restored to its first position, substantially as described.

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