(No Model.) 3 Sheets—Sheet 1.

G. D. BURTON.

ELECTRICAL TRAIN SIGNAL.

No. 427,042. Patented May 6, 1890.

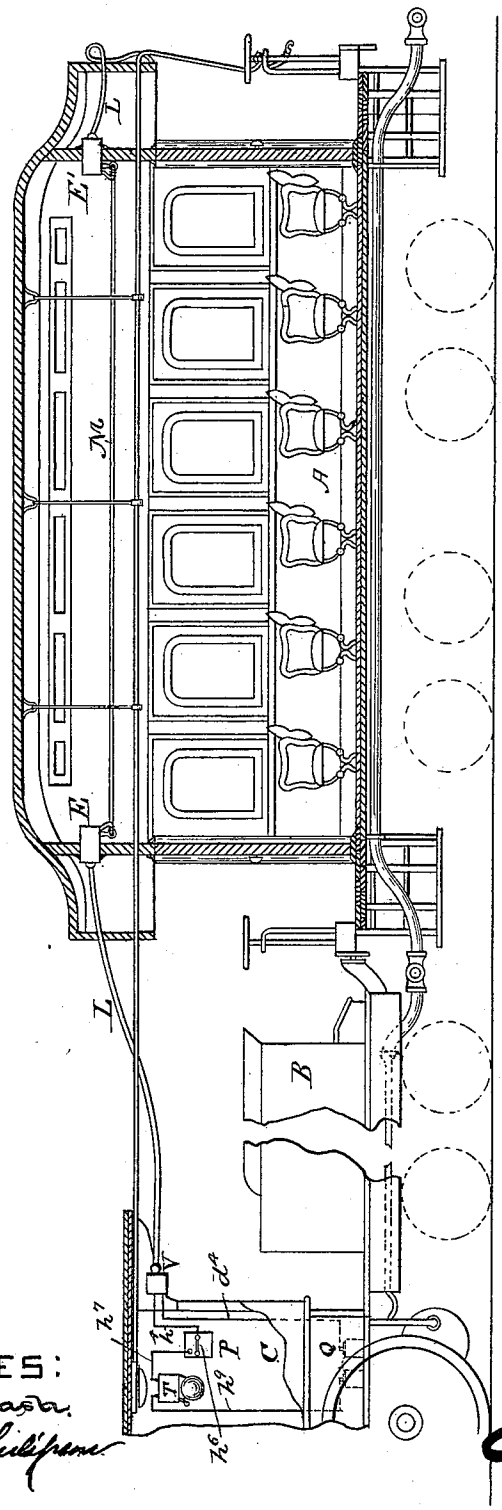

Fig. 1.

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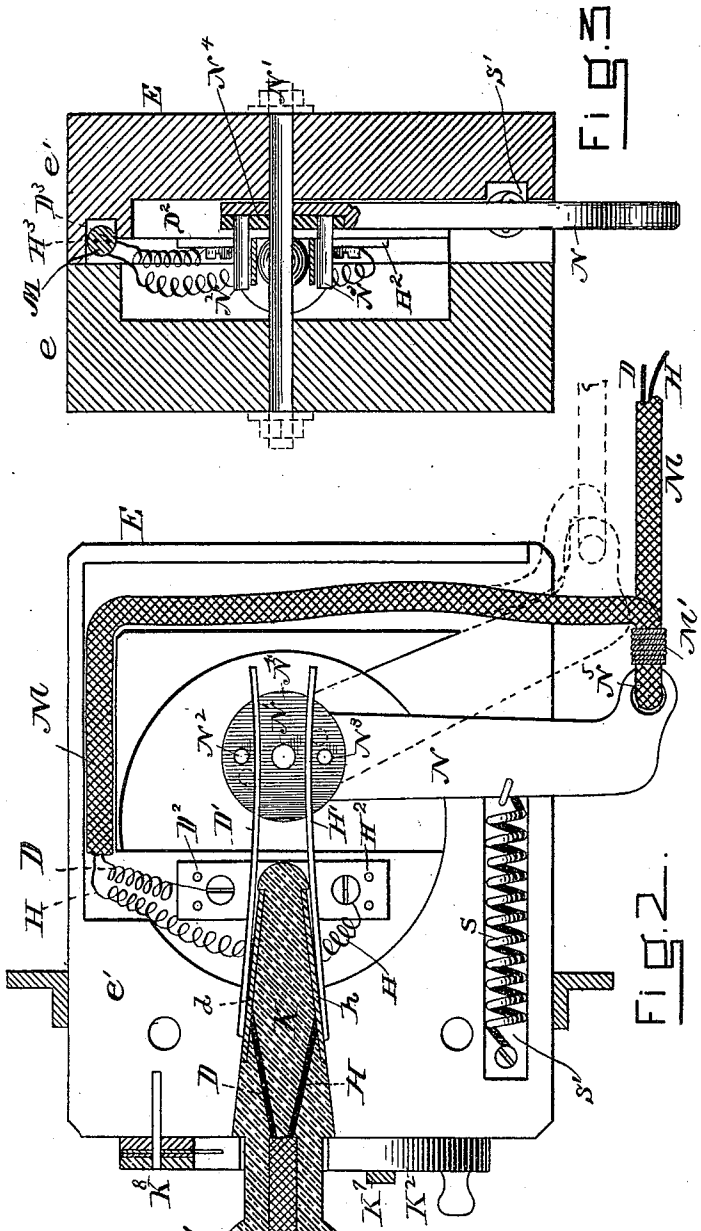

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

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ELECTRICAL TRAIN SIGNAL.

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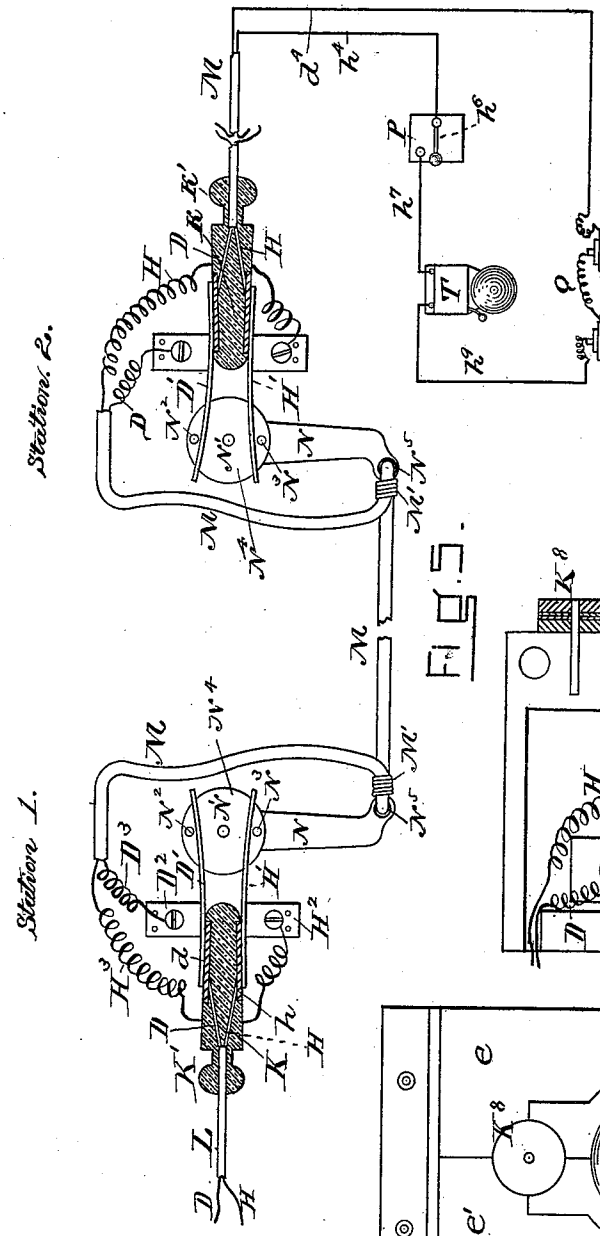

Fig 5.

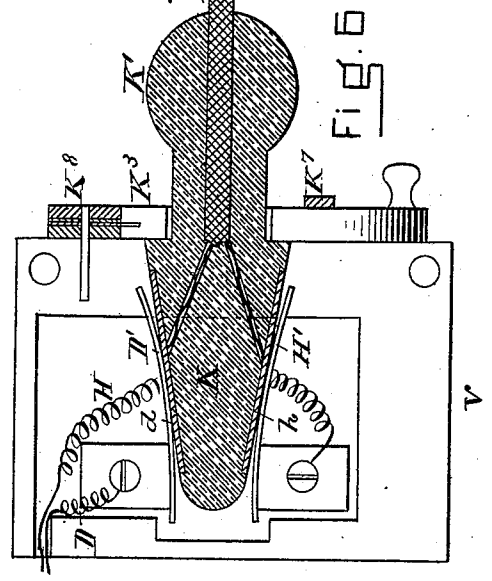

Fig 6

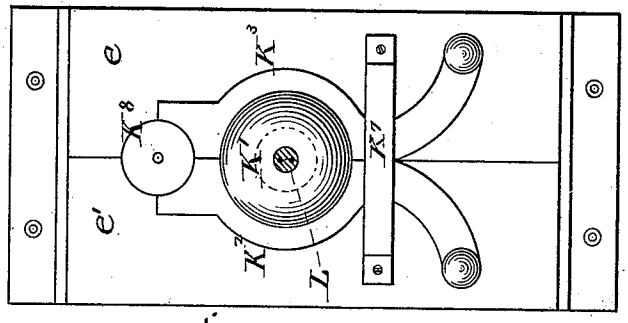

Fig 4.

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UNITED STATES PATENT OFFICE.

GEORGE D. BURTON, OF NEW IPSWICH, NEW HAMPSHIRE.

ELECTRICAL TRAIN-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 427,042, dated May 6, 1890.

Application filed November 23, 1887. Serial No. 255,973. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. BURTON, of New Ipswich, in the county of Hillsborough and State of New Hampshire, have invented a new and useful Improvement in Electrical Train-Signals, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to an electric signaling system for railway-trains, whereby the conductor or passengers in any part of the train may be enabled to communicate with the engineer in the engine, for signifying to the latter that something is needed or amiss, and that it is desired that the engine be stopped, slowed up, or reversed, as the case may be.

In pursuance of my invention I establish upon a train a system of electrical conductors embedded in a flexible cord and suspended within convenient reach for manipulation by the passengers or conductor, the electrical continuity of said conductors being continued or preserved throughout the train by adjustable couplings inserted in their proper relative position when the train is made up; and I locate at each end of any particular car a circuit-closing switch mechanically connected with the aforesaid flexible conductor-cord, so that the said switch may be operated by any person in the car when desirable, and in the circuit thus established I place upon the engine a suitable signaling device and a source of electricity, whereby when the circuit is closed in any intermediate car by one of the switches the signaling device in the cab of the engine will be actuated. Furthermore, the arrangement is such that if a mechanical pull exerted upon the flexible conductor-cord is interrupted the circuit will be automatically and instantaneously opened at the switches, so that the signal will be repeated as many times as the signal-cord is operated. Thus by a predetermined code of signals the engineer may be notified to stop, slow up, or reverse the engine, or to obey any other mandate electrically transmitted. All this will more fully appear in the following detailed description, in which reference is made to the accompanying drawings, which form a part of this application, and in which I have illustrated one of the numerous forms my invention may assume, to wit:

Figure 1 represents a longitudinal sectional elevation of a railway-train with my invention applied thereto. Fig. 2 is a view, partly in elevation and partly in vertical section, showing the interior of my electric coupling and switch-box. Fig. 3 is a vertical cross-section of the same. Fig. 4 is a front end elevation of the same. Fig. 5 is a diagram illustrating my signaling system as a whole; and Fig. 6 is a sectional elevation showing the interior of a coupling-box without the circuit-switching mechanism, said box being located upon the engine.

Like letters of reference indicate like or corresponding parts in the several views of the drawings.

In Fig. 1, A, B, and C represent a car, a tender, and an engine, respectively, constructed in any ordinary or approved manner, the details of which will not be further dwelt upon herein, since they form no part of my invention. At each end of the car there is a compound electrical coupling and switch box, marked, respectively, E and E′, both constructed as illustrated in detail in Fig. 2, and a flexible cord M, having two insulated electric wires embedded throughout its length, extends from one switch-box to the other through the interior of the car, this arrangement being repeated in every car of the train.

Flexible coupling-conductors L L, &c., connect the respective boxes E E′ of one car with their corresponding boxes in the adjacent car, and a similar flexible coupling also connects the coupling-box E of the first car with the coupling-box V upon the engine. The conductors which are embedded, respectively, in the cords M M, &c., are severally connected by the coupling-boxes E E′ with corresponding conductors embedded in the coupling-cords L L, so that there are in reality two parallel conductors insulated from each other and extending from one end of the train to the other. In the cab of the engine one of these particular conductors is connected by wire h^4 to a switch h^6, mounted upon a plate P, and from the contact-point of said switch a wire h^7 is carried to an electric bell T, from whence the circuit continues by

a wire h^9 to one pole of the battery Q and from the other pole of said battery by a wire d^4 to the other conductor embedded in a coupling-cord L. Thus it will be seen that if the switch h^6 is closed the circuit from the battery, including the signal-bell, will be still open throughout the train unless the same be closed at one of the compound coupling and switch boxes E E', &c. Furthermore, if the circuit be closed at any one of these points, the electric bell T will be actuated and will serve as a signal to the engineer. The manner in which this is accomplished will clearly appear from a description of the compound coupling and switch box E or E', the construction of which is clearly shown in Figs. 2, 3, and 4, and the explanation of which will now be proceeded with.

The box is composed of two parts e e', each consisting of a rectangular block of insulating material suitably mortised and slotted, as indicated in Figs. 2 and 3, for the reception of the parts hereinafter described. A pin N', passing through the two blocks and provided with washers and nuts at its respective projecting ends, serves to firmly secure the two parts of the boxing together, and also acts as a bearing for the pivot of a lever N, which latter is made of conducting metal and projects downwardly through an opening in the bottom of the box, as shown in Figs. 2 and 3. There is an offset formed at the inner end of lever N, and a plate N^4, preferably circular in form and made of insulating material, is fitted in said offset.

N^2 and N^3 respectively designate two metallic contact-pins, which are fixed in the insulating-plate N^4, but in contact with the metal of lever N, and are relatively located on diametrically-opposite sides of the fulcrum-pin N' and are respectively equidistant from the same. A spring S, suitably mounted in a recess S' in the block e', is connected with the lever N and holds the same normally in the position shown in solid lines. However, if the said lever is moved by the application of force to the position shown in dotted lines in Fig. 2, and is subsequently released, the spring S will, by virtue of its retractile strength, return said lever to its normal inactive position.

On one side of the lever N and extending substantially parallel therewith are two metal blocks D^2 and H^2, separated from each other a suitable distance and having each an elastic metal plate secured to it. These two plates are marked in the drawings with the letters D' H', respectively, and, as will be seen, each curves outwardly and upwardly some considerable distance beyond the sides of its respective supporting-block, thereby forming an inversely-tapering recess between said spring-plates D' H'. Against the sides of the blocks D^2 H^2, which face the lever N, the spring-plates D' H' extend, respectively, between the pivotal pin N' and one of the pins N^2 or N^3, but are arranged out of contact with both, yet in such proximity to the same that when the lever N is moved to the position shown in dotted lines the pins N^2 and N^3 will simultaneously and respectively make contact with said plates, as is also indicated in dotted lines, Fig. 2. The flexible cord M, extending through the interior of any car, is passed through an aperture or eye N^5 in the projecting end of lever N. It is then doubled upon itself and extends upwardly into the switch-box, as shown in Fig. 2, and the ends of the conductors D H embedded in said cord are connected with the metal blocks D^2 H^2, respectively, as shown. It will now be understood that if the lever N is moved to the position shown in dotted lines the terminals of the conductors D H will be electrically connected, the circuit being from conductor D through metal block D^2, spring-plate D', pin N^2, and through the body of lever N to pin N^3, and by a spring H' and metal block H^2 to the conductor H, and if the electrical signal and battery before described with reference to Fig. 1 be placed in that part of the circuit D H, which extends to the left-hand side of Fig. 2 it will be seen that, the circuit being now closed by the operation of the switch-lever N, the signal will be duly actuated.

The switch-box E is mounted in the end wall of the car, as shown in Fig. 1, with the switch-lever N projecting through into the interior, and the signal-cord M extending from said extremity of switch-lever N to the other end of the car, where it is similarly joined to a corresponding extremity of a lever N. The other end of the said switch-box projects externally beyond the wall of the car, and, as shown in Figs. 4 and 5, is provided with a circular central perforation in the end thereof for the purpose of admitting the end of a coupling-plug hereinafter described. A plug K K', of insulating material and wedge-shaped or conical at one end, as shown at K, is provided with a circular handle or knob K', formed at the other end, and with a neck of cylindrical form connecting the handle and portion K, the said neck being of smaller diameter than the parts K K'. The wedge-shaped or conical end K extends within the box between the diverging projecting ends of the spring-plates D' H', and said end K is provided with two metal plates d h, secured at diametrically-opposite sides upon its conical or wedge shaped face, which in turn, passing between the free ends of the plates D' H', forces the same apart, so as to maintain good electrical contact with said plates d h. The coupling-cord L passes axially through the plug K K' and contains the circuit-wires D and H embedded therein, the wire D diverging through the body of the plug and connected electrically with the plate d, while the wire H similarly diverges and is in electrical contact with the plate h, so that when the plug is inserted, as shown in Fig. 2 of the drawings, and the switch N is at the same time in its normal position, the circuit from the interior of the car will be continued to

the exterior and beyond the same, as follows: from conductor D in signal-cord M to metal block D^2 within the boxing, and by spring-plate D′, through metal plates *d*, to conductor D, extending through the plug and the coupling-cord L. The return-circuit will then be from conductor H in cord L to plate *h* of the plug, and by spring-plate H′ and metal block H^2 to conductor H in cord M. From this explanation it will now be understood that if the signal-bell be placed in that part of the circuit which extends on the left-hand side of Fig. 2 through coupling-cord L the operation of the switch N, hereinbefore described, will also close this circuit and will actuate the signal. It is therefore immaterial at what end of the circuit the battery and signal-bell is placed, as the operation of the switch-lever N will always close the circuit through the said signal-bell. The coupling-cord L, with its attached plugs, is of suitable length to extend from the end of one car to the adjacent end of the next or from the end of the first car to the engine. The coupling-plugs K K′ are inserted in their proper positions in the boxes E E′, as shown in Fig. 2, when the train is made up.

K^2 K^3 represent two vertical clamping-levers pivoted upon a common pin K^8, secured to the front of the box. These levers are provided with mutual curved recesses to embrace the neck of the coupling-plug, and are held frictionally in closed position by a slightly-elastic strap or hasp K^7, fixed transversely to the front of the box. When it is desired to remove the plug from its seat, the two levers K^2 K^3 are unclasped from around the neck thereof, allowing the front portion K of said plug to be withdrawn from its socket. At the point where the signal-cord M is doubled, after having passed through the eye N^5 in the lever N, the two branches of the same are firmly united by a ligature M′, so that a pull upon the signal-cord will not draw the same through the said eye.

The operation of signaling devices upon a train equipped with my invention will now be easily understood by reference to Fig. 5. In said figure there are shown two of my compound coupling and switch devices, which are supposed to be located one at each end of a car, with the signal-cord M extending between the same, or these devices may be understood as being located in different cars, in which case the cord M, extending between any two switch-levers, is supposed to be composed of suitably-coupled sections. The battery and the signal-bell, as well as the switch h^6, will ordinarily be in the cab of the engine.

In accordance with the condition of the apparatus shown in the drawings, the train is first made up, and before starting the engineer will see that the switch h^6 is properly closed. At the rear end of the train the conductors D H are electrically separated, so that the circuit of the bell is normally open. If it is now desired to signal to the engineer, any single cord M, extending between any two levers N, is pulled either to the right or to the left. If pulled to the right, the switch-lever N at that end of the car (which in the drawing is marked "station 1") will be actuated, and in the manner hereinbefore described the circuit will be closed at this station and the signal-bell T thereby sounded. If pulled to the left, the circuit will be closed at "station 2" and the signal-bell will be similarly sounded. Thus it will be obvious that no matter in what direction the signal-cord M is pulled the circuit will be thereby closed, and it will also be understood that the operation of the whole apparatus will be the same in whatever car the signal-cord may be pulled. The electric bell T may be of any desirable type, but preferably a trembler-bell, so that it will continue to ring so long as the circuit is closed. When the signal-cord is released, the spring S will return the lever N to its normal position, whereby the pins N^2 N^3 will break contact with their respective plates D′ H′ and the circuit will be opened at the point of interruption, thereby stopping the ringing of the bell. By a succession of pulls upon the signal-cord M a succession of alarms may be produced, and by the employment of a predetermined code of signals the engineer may be informed of the condition of the train according to the purport of the signals.

The coupling-box V upon the engine is substantially similar in construction to the boxes E E′, &c., with this difference, however, that the circuit-closing switch N and its auxiliaries are omitted, as shown in Fig. 6. From this explanation it is thought that no further specific description of the box V will be required.

Having now fully described my invention, what I claim, and desire to have secured by Letters Patent, is—

In an electrical train-signal, a circuit-closer consisting of a pivoted conducting-lever having its pivot located between two substantially parallel elastic plates constituting parts of two branches of an electric circuit, two metallic pins electrically connected with the lever and projecting laterally on diametrically-opposite sides of the pivot and each in proximity to its respective elastic plate, and its signal-cord for actuating the lever, whereby the pins and lever will establish an electrical bridge between the two branches of the circuit when the cord is pulled.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 10th day of November, A. D. 1887.

GEO. D. BURTON.

Witnesses:
ETTIE F. PHILIPSON,
WILLIAM H. NASH.