

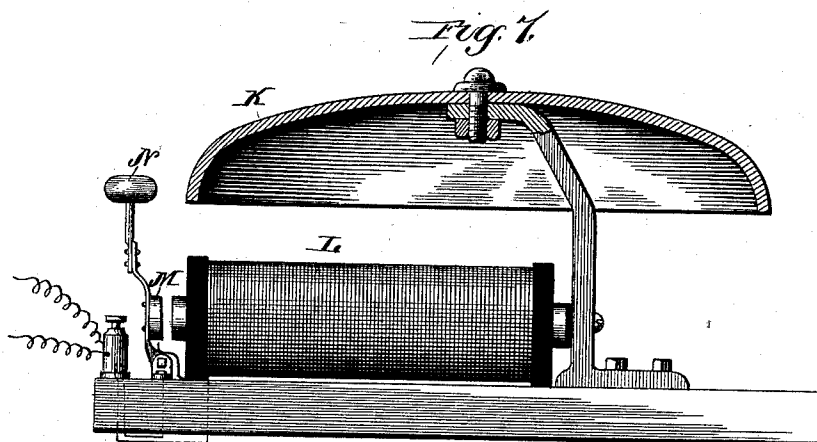
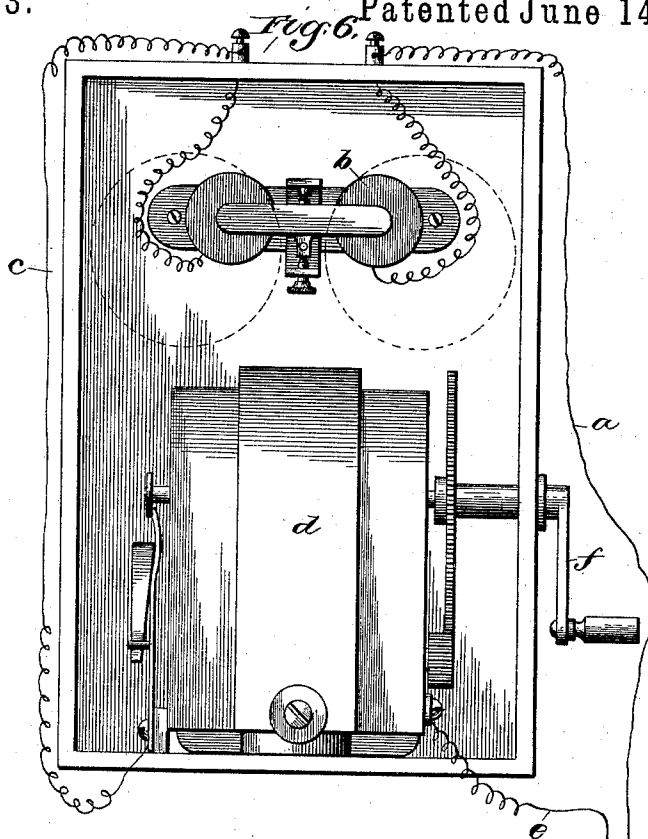
(No Model.)

3 Sheets—Sheet 2.

N. B. CREGIER.
ELECTRIC TRAIN SIGNAL.

No. 476,873.

Patented June 14, 1892.



Witnesses:

Wm. M. Rheum.

John H. Felt.

Inventor:

Nath. Banks Cregier

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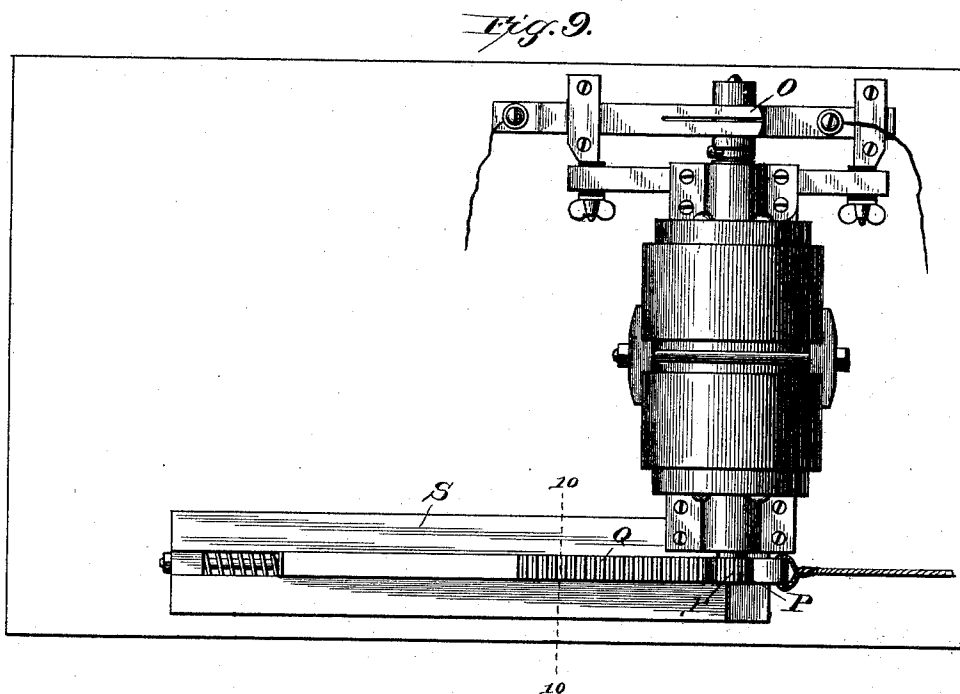
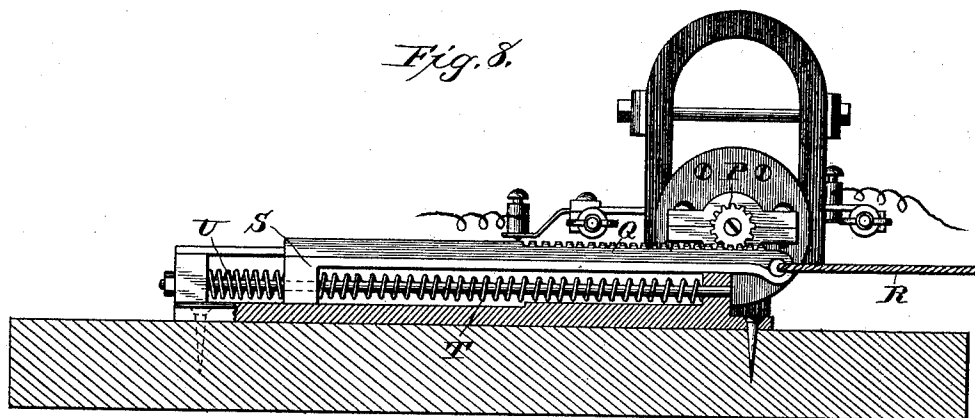
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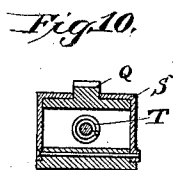
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Wm. M. Rheem
R. B. Quoad



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N. B. Cregier
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UNITED STATES PATENT OFFICE.

NATHANIEL BANKS CREGIER, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO DE WITT C. CREGIER, OF SAME PLACE.

ELECTRIC TRAIN-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 476,873, dated June 14, 1892.

Application filed October 27, 1890; Serial No. 369,384. (No model.)

To all whom it may concern:

Be it known that I, NATHANIEL BANKS CREGIER, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Electric Train-Signals, of which the following is a specification.

This invention relates to improvements in electric signaling systems for railway-trains, which prior to this invention have been operated upon open circuits, with the single exception of the system described and claimed in my application, Serial No. 253,283, filed October 25, 1887, and patented January 20, 1891, No. 444,819, upon which this invention is more especially designed as an improvement. In my said application all signals made back and forth between the engineer and conductor or other train-attendants were made with one and the same apparatus—that is to say, danger-signals and station-signals were made upon the same instruments that other signals were made upon, the only difference being in the character of the signal. This may sometimes lead to confusion and consequent disaster should an excited passenger or a person unfamiliar with the code of signals undertake to signal the engineer, and especially is this true in the case of danger or stop signals, which must be promptly given and as promptly acted upon.

The prime object of this invention is to not only enable signaling back and forth between the engineer and train-attendants from the engine to every car, and from each car to every other car and the engine, but also to enable a separate and distinct danger or stop signal to be sent from any one car direct to the engine by either a train-attendant or by any passenger unfamiliar with the code of signals employed the same as by the manually-operated bell-cords now ordinarily employed. Another object is to have the apparatus for making these different signals included in and operating upon a single closed circuit, but of such character that they are capable of independent operation, and that the operation of one does not affect the other. These objects are attained by the devices illustrated in the accompanying drawings, in which—

Figure 1 represents diagrammatically the

arrangement of the circuit and signaling-instruments upon a train; Fig. 2, an enlarged detailed view of a coupling between the cars; Fig. 3, a central longitudinal section thereof; Fig. 4, a transverse vertical section on the line 4 4 of Fig. 3; Fig. 5, a detailed face view of one of the magneto-signaling devices; Fig. 6, an enlarged detailed view showing the interior of an ordinary magneto and its connections; Fig. 7, a detailed sectional elevation of the engine alarm-gong; Fig. 8, a sectional elevation of a generator for operating the gong located upon each car of the train; Fig. 9, a plan view thereof, and Fig. 10 a transverse vertical section on the line 10 10 of Fig. 9.

Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, and more particularly to the first four figures thereof, let A represent the engine, B the cars, and C D the line-wires forming the two sides of a closed metallic circuit connecting the engine and all the cars of the train, although, obviously, one side of the metallic circuit—say the side B—might be formed by ground connection and subserve the same purpose, for in such case, while not a metallic circuit, it will still be a closed circuit, which is all that is necessary and of which the ground forms a part. Hence I wish it to be understood that by the term “closed circuit” I mean a circuit which is continuously or permanently completed, as contradistinguished to one which is provided with keys or switches for making or breaking its continuity in order to operate the electric signaling devices included therein.

So far as relates to the present invention the devices for obtaining and maintaining a closed circuit are immaterial, and any devices capable of accomplishing that result may be employed in connection with my invention; but for convenience of description and illustration I have herein shown the same devices employed in my aforesaid application for accomplishing the desired end. These consist of a switchboard E, secured at each end of each car and upon the tender or cab of the engine, one of the line-wires—say the wire D—terminates at a spring-contact jaw F, se-

cured to the board, between the opposite free end of which jaw and the board is inserted a plug G, attached to the end of the line-wire D upon the next adjacent car, and by which it is suspended when detached from the switch-board. The other line-wire C lies in a suitable recess in the board and has attached to the free end thereof, projecting beyond the board, a plug similar to the plug G, before referred to, for making connection with the switchboard on the adjacent car.

For the purpose of automatically closing the circuit at the rear end of the rear car or in the event of the accidental parting of the train a short bridging-wire H is employed at each board, connecting the wire C with a metallic contact-plate I, secured to the board immediately beneath the metallic spring-jaw F, so that when the plug is withdrawn the jaw will make contact with the plate, and thus in effect connect the wires C and D, thereby completing the circuit. On the other hand, when the plug is in position the circuit will be open at this point, because the body of the plug, which is formed of gutta-percha or some other insulating material, is interposed between the jaw and plate, the plug, however, being provided with a metallic contacting-surface J, upon which the jaw rests when the plug is in position, so as to complete that side of the circuit through the line-wire D, as before described. It will therefore be understood that when the cars are coupled together and the plugs in their corresponding switches a single complete closed circuit is established, extending from the engine through all of the cars of the train, and which circuit will not be disturbed by putting in or taking out cars, except to be correspondingly lengthened or shortened, nor will the parting of the train affect the circuits upon the two sections of the train, for both of them will be instantly closed and the devices therein contained rendered operative to the same extent as when the train was complete. In this closed circuit is contained a number of mechanical generators of electricity of any suitable character and signaling devices to be operated thereby, which in practice should preferably take the form of what is commercially known as a "magneto," in which the generator is contained within a small box, upon which is mounted a pair of magneto-electric bells operated by the generator or by any other generator of a similar nature within the circuit. There is one of these magnetos upon each car of the train and in the engineer's cab, all of which are located convenient for manipulation by hand. With an understood code of signals the conductor or any other train-attendant may signal to and receive signals from the engineer from any car of the train, and every signal of both parties will be sounded simultaneously in every other car of the train, thus informing all of the train-attendants at once if any action be necessary.

In Fig. 5 I have shown a face view of an ordinary form of magneto, and in Fig. 6 an interior view of the same, in which *a* indicates the inleading line-wire to the electro-magnets *b*, the vibrating armature of which serves to ring the bells; *c*, the wire connecting the electro-magnets with the generator *d*, which is in turn connected by the wire *e* into the line again, and *f* the crank, by means of which the generator is operated, all of which is so well understood in the art to which my invention appertains that it is not deemed necessary to herein illustrate or describe them more in detail.

In practice a very comprehensive code of signals may be employed, and, in fact, is necessary, in order to establish and maintain a perfect understanding between the engineer and the conductor and the train-attendants, and thereby avoid constant personal interviews; but with only a single set of signaling apparatus, such as employed in my aforesaid application, danger or stop signals must be made by the same instruments used for the other class of signals, which do not require the stopping of the train, and frequently have to be made by passengers unfamiliar with the code of signals ordinarily employed and at a time when they are laboring under great excitement, and should such signals be improperly given or misunderstood serious results would follow. It is also undesirable to employ a separate and additional circuit for this purpose, besides which it would materially increase the cost of the system. In order to avoid these objections, I propose to employ a separate set of signaling apparatus for giving the danger or stop signal only, but which shall be included in and operate upon the same closed circuit as the magneto-signaling devices or their equivalent without, however, affecting or being affected by such devices. To this end I place upon the engine and include in the closed circuit an electro-magnetic alarm-gong K, represented in detail in Fig. 7, the magnet L of which is so constructed that it will not be energized, or at least will not be sufficiently affected, by the current of the magneto-generators to attract its armature M and to cause the hammer N operated thereby to strike the gong and sound the alarm. This may be accomplished in many ways well understood by one skilled in the art to which my invention appertains, such as by winding the magnet so that it will offer sufficient resistance to overcome the relatively weak current of the magneto-generators, or by having the magnet wound for operation by a direct current as distinguished from the alternating current produced by the magneto-generators and which operates the bells thereof. This latter method is preferred, because it also insures the silence of the magneto-bells when it is desired to sound the gong alone. In carrying out this principle I locate in each car of the train a generator of the type illustrated in Figs. 8 and 9, included in the line-circuit

and provided with a commutator and brushes O, by means of which the current produced by the generator is converted into a straight current. This generator, which is located at one end of the car, in practice is operated by means of a spur-gear P upon one end of the armature-shaft, which engages and is driven by a toothed rack Q. To one end of this rack is fastened one end of a cord R, which extends the length of the car in the same manner as the present bell-cord, but is fastened at its opposite end to the car, so that if pulled on at any point within the car the result will be the actuation of the rack and consequently of the generator through the means before described. This rack is guided in its movements by a suitable casing S and is normally held at one end of its stroke by means of a coiled spring T, which also serves to take the slack out of the cord by restoring the rack to its normal position seated against a spring-cushion U after being operated by the cord. Obviously numerous other means may be employed for operating this generator through the medium of the cord-pull without departing from the spirit of my invention; but the means herein shown and described are preferred, because of their simplicity, directness, and certainty of operation.

While this invention contains all of the advantageous features of my prior invention before referred to, it has the additional advantage of not only absolutely separating the most important signal—that is, the danger or stop signal—from the other necessary signals, but places it within the ability of the merest novice to sound the danger-signal by the same action as would be required at the present time in the use of the ordinary manually-operated bell-cord signal, and this, too, without unnecessary multiplicity of circuits or apparatus, but, on the contrary, by the employment of a single closed circuit, in which all of the apparatus or devices are included, and upon which the different devices operate, without interfering with or affecting the other class of devices.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a train-signaling system, the combination, with a closed circuit for the electrical

current and mechanical generators included in said circuit, of signaling devices also included in said circuit, part of which are operated by some of the generators and the others by the rest of the generators, substantially as and for the purpose described.

2. In a train-signaling system, the combination, with a closed circuit for the electrical current, of a series of magneto-generators and signaling devices located upon the engine and several cars of the train and included in said circuit, and another series of mechanical generators also included in said circuit, and located upon the several cars of the train, and a signal device upon the engine included in said circuit, but operative only by the current of the last-mentioned series of generators, substantially as described.

3. In a train-signaling system, the combination, with a closed circuit for the electrical current, of a series of mechanical generators and signaling devices located upon the engine and the several cars of the train and included in said circuit, a second series of mechanical generators located upon each car of the train, a cord attached at one end to each car and at its opposite end to each generator of said second series for operating the same, and a signal device upon the engine included in said circuit, but operative only by the current of the last-mentioned series of generators, substantially as described.

4. In a train-signaling system, the combination, with a closed circuit for the electrical current, of a series of mechanical generators and signaling devices located upon the engine and the several cars of the train and included in said circuit, a second series of mechanical generators located upon each car of the train, a spring-actuated rack-bar suitably geared to for operating each generator of said second series, a cord extending the length of each car and secured at its ends, respectively, to the car and the rack-bar of the generator therein, and a signal device upon the engine included in said circuit, but operative only by the current of the last-mentioned series of generators, substantially as described.

NATHANIEL BANKS CREGIER.

Witnesses:

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JAMES R. SCOTT.