No. 627,245. Patented June 20, 1899.

J. WAYLAND.

RAILWAY SIGNAL.

(Application filed July 13, 1898.)

(No Model.)

Fig. 1

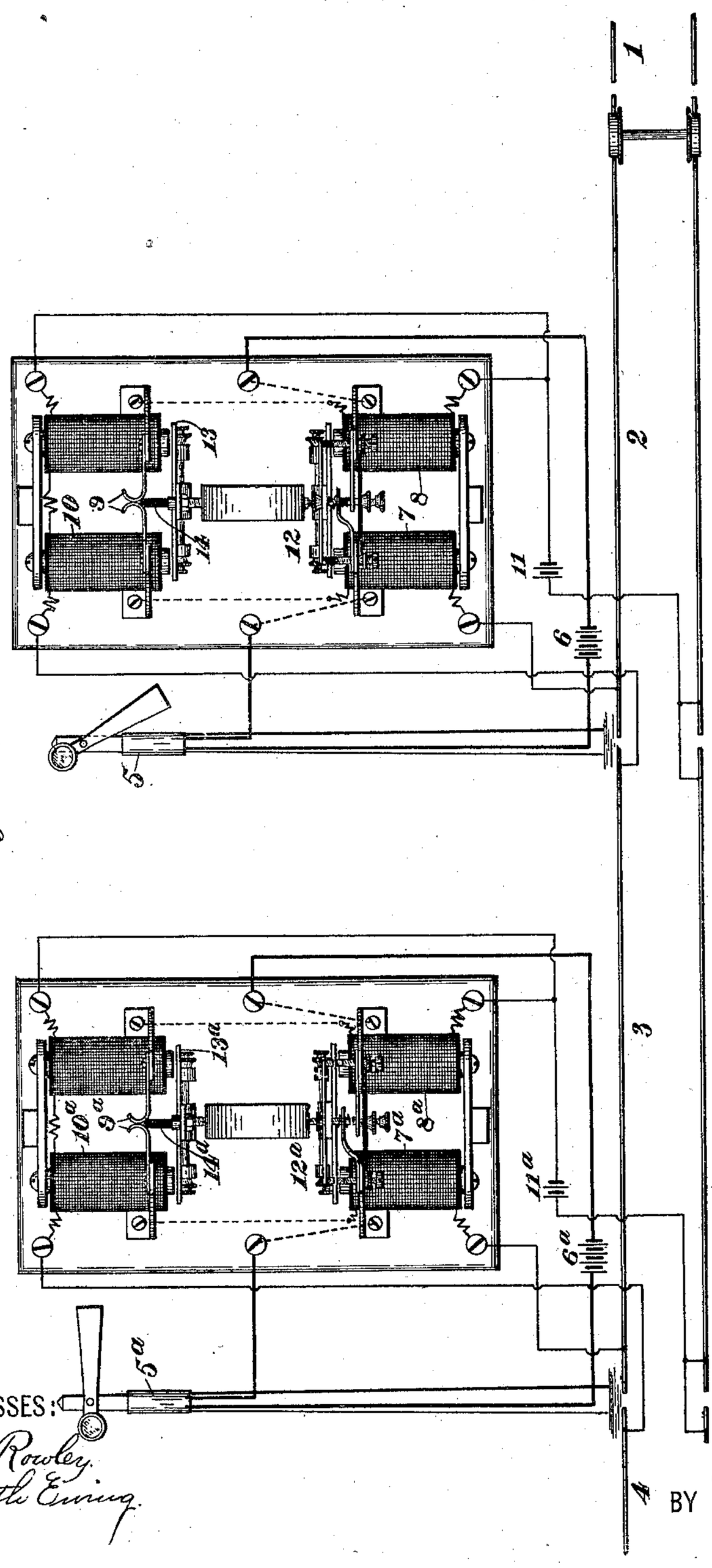
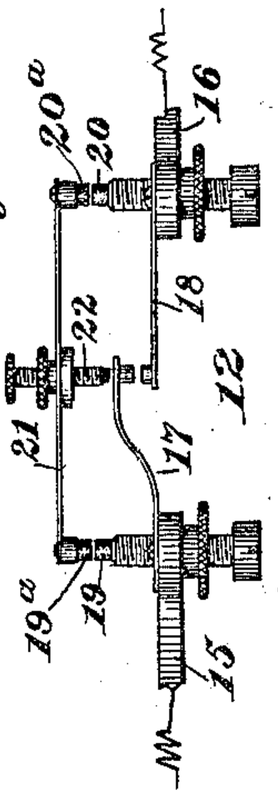


Fig. 2



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UNITED STATES PATENT OFFICE.

JAMES WAYLAND, OF NEWARK, NEW JERSEY.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 627,245, dated June 20, 1899.

Application filed July 13, 1898. Serial No. 685,887. (No model.)

To all whom it may concern:

Be it known that I, JAMES WAYLAND, a citizen of the United States, and a resident of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification.

This invention relates to railway-signals, the objects being to insure safety of operation in a system having wireless track-circuits and to prevent the uncertainties of operation due to sparking of the signal-operating contacts and to economize the use of electric current.

In carrying out the invention I subdivide a railway-circuit or one rail thereof into insulated sections of determinate length according to the distance apart desired for the signals and mount upon or adjacent to the several signal-supports corresponding to such sections the operating mechanism controlling the signals. At each signal-station are two electromagnetic operating devices electrically connected with the track-rails in such a way as to guard the movements of trains upon or into two adjacent track-sections. The current for these electromagnetic devices is furnished by an operating battery or batteries located at the station, the circuit of the batteries being normally open to insure economy in their operation. The system is preferably operated on the normal danger plan, although the improvements are equally applicable to a normal safety system, the advantage being, in the former mode of control, that any accidental derangement of the apparatus will leave the signals in a position to arrest the movement of trains. A source of considerable difficulty in electrically-operated signal systems resides in the damaging effect of sparking at the contacts which control the signal-operating circuits. I avoid this difficulty by a novel form of contact devices, in which I employ multiple contacts of carbon and platinum or other good electric conductor so arranged that in the rupture of the contact the break of the circuit will occur between carbon points, which are well adapted to take the sparks without damage to their conductivity. Thus the aggregate resistance of the contact when closed is very low by reason of the engagement of the metallic surfaces and the break does not affect the points of contact by oxidation or wear.

The several features of novelty of the invention will be hereinafter more particularly described and will be definitely indicated in the claims appended to this specification.

In the accompanying drawings, which illustrate the invention, Figure 1 is a diagram of a system embodying my improvements, and Fig. 2 is a detail of the circuit-breaker I prefer to employ.

Referring to the drawings, 1 2 3 4 represent consecutive blocks or sections of a railway-track, at the adjoining terminals of which are installed signals operated in accordance with my improvements. For convenience of illustration I have shown the operating devices detached from the signal-posts and arranged diagrammatically for clearness.

5 represents a signal-controlling magnet or solenoid, by which the movements of the semaphore or other signaling device are controlled. This may be of any usual or preferred construction—such, for example, as described in Letters Patent issued to me, dated October 13, 1896, No. 569,265. The signal-operating circuit includes a source of electric energy 6 or 6^a, mounted on the signal-post, and a circuit-breaker controlled by a magnet or a pair of magnets 7 8, depending for their energization upon the bridging of the rails of the section by a train. To this end one pair of terminals of the magnetic spools are connected to the rails and the other terminals pass through an auxiliary circuit-breaker 9, controlled by an electromagnet 10 in circuit with the rails of the next track-section in advance of the signal. A track-battery 11, placed on the signal-post, supplies current for both track-sections, one in advance of and the other in the rear of the signal. Thus the entrance of a train upon section 2 will complete the circuit through the rails of that section, track-battery 11, magnet-spools 7 and 8, and the contacts of circuit-breaker 9. Thus the electromagnetic relay or controlling device 7 and 8 will be energized, closing the signal-operating circuit through the points of contact of circuit-breaker 12, energizing solenoid 5, and drawing down from the normal danger position the signal device, thus indi-

cating to an engineer approaching the signal-station that the line ahead is clear. If, however, a train occupies advance section 3, the electromagnetic device 10 will be energized by reason of the rails of section 3 being bridged by the wheels of the train, and thus the armature 13 of the magnet will force an insulated pin 14 between the two engaging contact-springs of circuit-breaker 9, opening the contact at 9, thus interrupting the circuit which includes the magnet-spools 7 and 8. The signal-operating solenoid 5 cannot therefore draw current and the signal will not be drawn to a "safety" position, the engineer thereby being warned that it is not safe to pass the signal-station.

The type of circuit-breaker employed in the signal-operating circuit is shown in an enlarged view in Fig. 2. It comprises two metallic standards 15 16, electrically connected with the leads to the solenoid 5 and to the signal-operating battery 6. Two light metallic springs 17 18, provided with confronting platinum contacts, extend from these respective standards. On the standards are also mounted two carbon contact-points 19 20, set upon the tip of an adjustment-screw mounted on the standards. Confronting carbon contacts 19^a 20^a are mounted on a spring 21, carried by an arm 22, secured to the armature controlled by the magnet-spools 7 8. The adjustment-screws and the coöperating carbon contacts are set so that contact between the carbon surfaces will be made before the platinum contacts engage, thereby insuring that in the rupture of the circuit when the armature drops off the break will occur at the carbon contact-points after the platinum contact-points have separated. The carbon-points will therefore be the sparking-point, and no oxidation or corrosion of the platinum contacts will occur. The carbon will be wasted slowly by combustion; but the adjustability of the points will enable a proper working relation of the several sets of contacts always to be maintained. Thus it will be seen that in the normal status when no train is present in the protected track region all signals will stand at "danger." The engineer on entering a section with his train will watch the semaphore, and if when he approaches the signal he finds the semaphore in a safety position it will be an indication that no train is present in the protected region. If, however, the signal fails to drop, it will indicate that the protected region is occupied. Moreover, after passing out of a section the rear of a train will be guarded by the operation of the electromagnetic device 10 and the rupture of the rear track-circuit. I have shown both rails of each section insulated from those of the adjacent section. This, however, is not essential, as the track-battery 11 11^a connects in parallel with the terminal rails of adjoining sections on one side of the track. As shown in the drawings, a train has just entered section 2. A circuit is thus completed by way of battery 11, magnet-spools 7 and 8, and circuit-breaker 9, which is normally in closed contact. Thus the contact-points of the circuit-breaker 12 are brought together and the signal-operating solenoid 5 is permitted to draw current, lowering the semaphore to its safety position. If, however, the advance section 3 were occupied either wholly or partly by a train, magnet 10 would be energized and the insulating-plug 14 forced between the contacts of circuit-breaker 9, opening the circuit which includes the magnet-spools 7 and 8 and preventing the latter from being energized to lower the signal to "safety" when a train enters section 2.

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

1. A railway signal system comprising a plurality of track-sections and corresponding signal-stations, an electromagnetic circuit-breaker in a signal-operating circuit controlled by a rail-circuit at one side of the signal-station, said circuit-breaker being provided with elastically-mounted multiple contacts of carbon and metal and adjusting device for making the final rupture occur between the carbon surfaces, and an auxiliary circuit-breaker in the signal-operating circuit controlled by a magnet connected in a track-circuit at the other side of the signal.

2. A railway signal system comprising a plurality of insulated rail-sections, a plurality of signal-stations each having a signal-operating circuit, a relay as 8 in a track-circuit at one side of the signal, including in its circuit a circuit-breaker controlled by a relay in a track-circuit at the other side of the signal, said circuit-breaker comprising spring-contacts 9 and an armature carrying a separating insulating-pin 14, an armature controlled by relay 8 carrying multiple yielding contacts of carbon and metal, said contacts being included in the signal-operating circuit, and adjusting devices for said points of contact, for the purpose described.

In testimony whereof I have hereunto set my hand this 11th day of July, A. D. 1898.

JAMES WAYLAND.

Witnesses:
ROBT. H. READ,
H. B. TAYLOR.