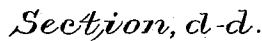


3 Sheets—Sheet 1.

RAILWAY SIGNAL.

Patented Nov. 24, 1891.



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(No Model.)

3 Sheets—Sheet 2.

E. J. SAMUELS & F. E. BEHRENDT.
RAILWAY SIGNAL.

No. 463,691.

Patented Nov. 24, 1891.

Fig: 6.

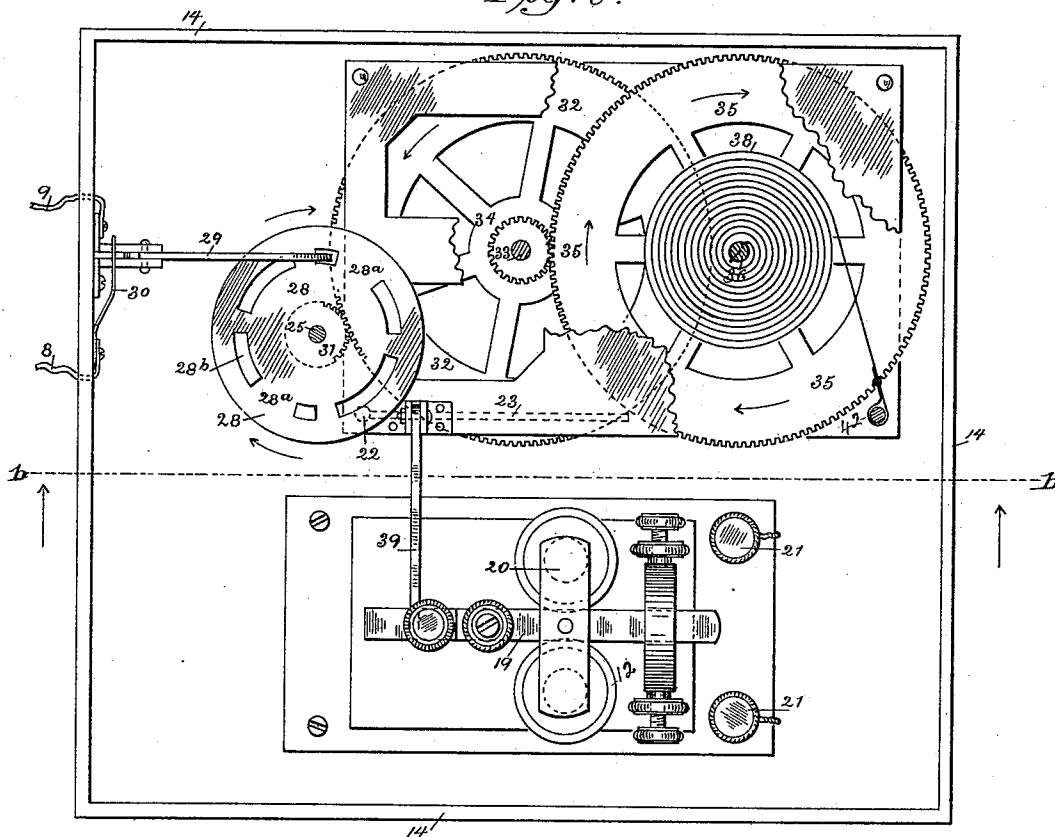
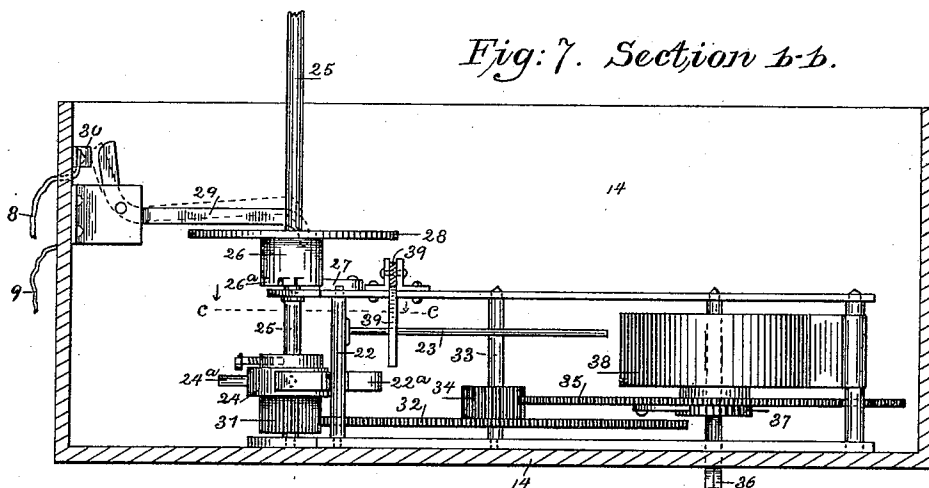


Fig: 7. Section b-b.



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Patented Nov. 24, 1891.

Fig: 8.

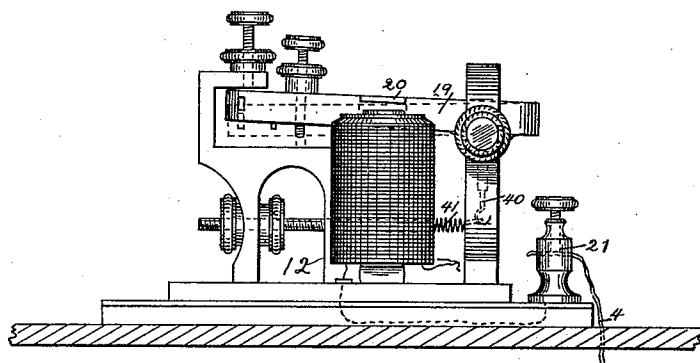


Fig: 9.

Section. c-c.

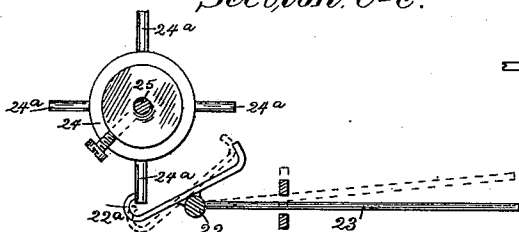


Fig: 10.

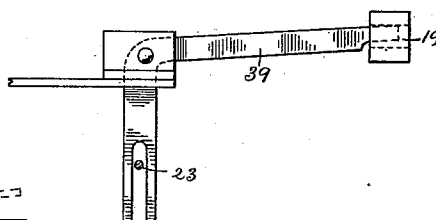


Fig: 11.

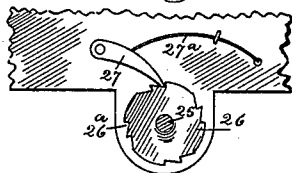
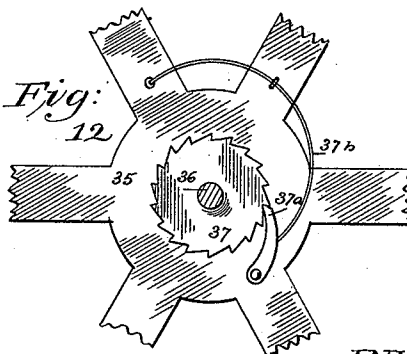


Fig: 12.



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RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 463,691, dated November 24, 1891.

Application filed May 14, 1891. Serial No. 392,783. (No model.)

To all whom it may concern:

Be it known that we, EDWIN JUNIUS SAMUELS and FRANK EDWIN BEHRENDT, citizens of the United States, residing at Janesville, in the county of Rock and State of Wisconsin, have invented a certain new and useful Improvement in Railway-Signals; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention has for its general objects, first, to provide means whereby an operator from his office may regulate a train-order signal, although located at a considerable distance from the operator, and even when the signal is out of his sight; second, to provide means by which the signal when changed relatively to the rails will automatically indicate its position to the operator in his office. These general objects we accomplish, first, by means of a suitable battery and an electro-magnet having a vibrating armature-bar connected with spring-actuated mechanism which revolves a signal-standard; second, by an electric bell and battery with connecting wires and mechanism connected with the revolving signal-standard for operating the spring-contact connecting the ends of said wires.

The special objects of the several parts constituting our invention are set forth in connection with the description.

In the drawings, Figure 1 is a plan view of the general construction and arrangement of the several parts of our invention, in connection with suitable railway-tracks and depot building. Fig. 2 is a side view of a signal with its supporting-standard and a case inclosing mechanism for revolving the standard, together with a pole upon which the case is mounted. Fig. 3 is an end view of the signal. Fig. 4 is a vertical cross-section of the signal, taken on line *a a* of Fig. 2. Fig. 5 is a horizontal cross-section of the signal, taken on line *d d* of Fig. 2. Fig. 6 is a plan view showing the spring-actuated gear mechanism which operates the signal-standard, an electro-magnet, and means for operating a con-

tact-spring. Fig. 7 is a vertical cross-section taken on line *b b* of Fig. 6. Fig. 8 is a side view of the electro-magnet shown in Fig. 6. Fig. 9 is a horizontal cross-section taken on line *c c* of Fig. 7. Fig. 10 is a side view of an angular or bent lever which connects the end of the armature-bar with the gear mechanism. Fig. 11 is a plan view of a ratchet and a notched wheel mounted on the signal-standard. Fig. 12 is a plan view of a ratchet and a notched wheel secured to the winding-standard of the gear mechanism.

As illustrated in the drawings, 10 represents suitable railway-tracks extending in front of a depot building 1. Within said building a battery 3 of ordinary construction is located, having wires 4 and 5 connected therewith, and also with an electro-magnet 12. Means for making and breaking the electric current, such as the ordinary push-button 2, is also connected with said wires. The electro-magnet is provided with a vibrating bar 19, carrying an armature 20, and the forward end of said bar engages freely with the end of a bent lever 39. This lever is pivoted upon a horizontal axis, and the lower end of the vertical portion of the lever engages with the horizontally-vibrating bar 23, which is secured to the rock-shaft 22. A trip-lever 22^a, having inwardly-curved ends, is also secured to said rock-shaft and engages intermittently with the studs 24^a, secured to the hub 24, which is mounted on the revolving standard 25. A hub or wheel 26 is also secured to the standard 25, and is provided with notches, with which a ratchet 27 engages. The ratchet is pivoted to the upper plate of the gear mechanism and is held in engagement with the notches by means of a spring 27^a. The standard 25 also supports a disk 28, which is provided with perforations 28^b and with intervening spaces or bridges 28^a. These perforations are arranged and their lengths regulated so that on one quarter of the disk and on the opposite quarter there is but one bridge or intervening space between the perforations, while on each of the intermediate quarters there are two bridges or spaces.

A bent lever 29 is mounted on a pivot and its horizontal portion lengthened, so that it

will drop downward of its own weight, and curved slightly, so as to be readily raised by the bridges of the disk in turning. In close proximity to the upper or vertical portion of the lever 29 is a contact-spring 30, by means of which the ends of wires 8 and 9 may be connected. The wires 8 and 9 connect, also, with an electric bell 6 and with a battery 7.

The lower end of the revolving standard 25 is provided with a pinion 31, which engages with a toothed wheel 32, mounted on the journal 33. The journal 33 is also provided with a pinion 34, which engages with the toothed wheel 35, mounted upon the winding-journal 36. This last-named journal is also provided with a ratchet-wheel 37, with which a ratchet 37^a engages, being held in engagement by the spring 37^b. A power-spring 38 is secured at one to one end of the power-frame posts 42 and at its inner end to the winding-journal 36.

A signal (shown in Figs. 3 and 4) is mounted upon the upper end of the standard 25 and provided with sign-boards 15 on two opposite sides. The signal displays a light from its four sides, and consists of a centrally-located light 43, four converging reflectors 18 in each side of the lantern, arranged with their apexes adjacent to the lamp, and four similarly-converging reflectors 17, arranged above the lamp, their bases resting on the upper edges of the side reflectors and their apexes being at the top of the lantern. The upper series of reflectors face the back of the upper side reflectors and cast the light downward and through the openings at the apexes of the side reflectors onto the faces of the same, and thereby greatly increase the reflecting power of said side reflectors. One of the sides of the lantern is preferably hinged to the lantern-frame and adapted to move outwardly, as indicated by dotted lines in Fig. 4.

The objects and operation of the several parts are as follows: The operator by pressing on the button 2 brings the wires 4 and 5 into communication, so that the electric current will pass through the magnet 12 and cause said magnet to draw down the pivoted bar 19 and armature 20. The downward movement of the end of the bar 19 causes a similar movement of the end of the horizontal portion of the bent lever 39 and a lateral movement of the vertical portion of said lever, which in turn causes a similar movement of the bar 23, whereby the journal or rock-shaft 22 is turned slightly in its bearings and the lever 22^a is released from engagement with the studs 24^a. When said lever is thus released, the power-spring 38 causes the several parts composing the gear mechanism to revolve in the direction indicated by the several arrows, and the standard 25 is thereby turned from left to right. The hub 24 is provided with four studs 24^a, arranged at an equal distance apart, so that when one of the studs is released from engagement with the lever 22^a the standard 25 makes one-fourth

of a revolution before the next stud comes in contact with the trip-lever 22^a. In turning quarter-way around the standard 25 turns aside the face of the signal which has been opposite the rails and presents the reverse signal. When the pressure of the operator is withdrawn from the button 2, contact between the ends of the wires 4 and 5 ceases, the current is broken, and the armature-bar 19 is drawn upward by means of a spring 41 in the ordinary manner. The horizontal portion of the bent lever 39 is at the same time lifted, and the vertical portion of said lever is moved laterally toward the magnet, thus drawing with it the bar 23 and throwing inward the curved end of the trip-lever 22^a, so as to bring it within the path of the studs 24^a and thereby arrest further movement of the standard 25 and hold the signal in the desired position. The signal is held against movement in a reverse direction by means of the spring-ratchet 27, engaging with the notched wheel 26, secured to the standard 25. The bridges 28^a raise the end of the horizontal portion of the bent lever 29 as the disk 28 revolves and press the upper end of said lever against the contact-spring 30, which is thereby brought in contact with the end of the wire 9, whereby an electric current passing from the battery 7 through the wires 8 and 9 rings the bell 6, located in the office of the operator. The end of the lever 29 is raised and the bell 6 rung as many times during a quarter-revolution of the disk 28 as there are bridges in that quarter. In this manner the bell indicates to the operator in his office by the number of its strokes which side of the signal faces the rails.

The sign-boards 15, in connection with the lamp 43, adapt the signal for both day and night use, thereby avoiding the inconvenience occasioned when separate signals are used for day and night use.

The sign-boards are preferably painted red to indicate danger and provided with openings through which the glass of the danger-signal is exposed. This glass is also red. The two sides of the lantern which are adjacent to the danger-signals and opposite to each other indicate "safety."

The ends of the sign-boards 15 are cut away, so that the safety-light may cast its rays sideways to some extent, and thereby be more readily seen by the engineer when rounding a curve.

The peculiar construction and arrangement of the plane reflectors located in front of the lamp 43, together with the corresponding series of reflectors above the lamp, cause the light to be more thoroughly reflected and diffused than is done by the lamps now in use.

Our invention is generic in its nature, and we do not desire to be limited to the specific construction of any of its elements, especially those parts connecting the magnet with the gear mechanism, the gear mechanism itself,

and the means of communication between the revolving signal-bearing standard and the spring-contact 30. Other means having similar capabilities may be used without departing from our invention.

What we claim is—

1. In a railway signal apparatus, the combination, with an electro-magnet and pivoted armature-bar, of a revolving signal-standard provided with a stud-wheel, spring-actuated gear mechanism revolving said standard, an angular lever pivotally connected with the armature-bar, and a vertical rock-shaft provided with a trip-lever and reciprocating bar, substantially as shown and described.

2. In a railway signal apparatus, the combination, with an electric circuit having an electric bell and spring-contact, of a revolving signal-standard, a disk mounted on said standard, having each quarter-section provided with a predetermined number of bridges or projections indicating "danger" and "safety," respectively, and a pivoted lever adapted to be pressed against said spring-contact by

said bridges or projections, substantially as shown and described.

3. In a railway signal apparatus, the combination, with a revolving standard, of a four-sided lantern having sign-boards on two opposite sides provided with central apertures, substantially as shown and described.

4. In a railway signal apparatus, the combination of a revolving standard and a lantern having in each of its sides four converging reflectors arranged with their apexes adjacent to a centrally-located lamp and in its top four similarly-converging reflectors arranged with their bases adjacent to the upper edges of the side reflectors and their apexes extending into the top of the lantern, substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

EDWIN JUNIUS SAMUELS.

FRANK EDWIN BEHRENDT.

Witnesses:

THOS. J. SMITH,

CHARLES H. MEYERS.