



# UNITED STATES PATENT OFFICE.

IRA LLOYD GREEN, OF KITTANNING, PENNSYLVANIA, ASSIGNOR OF FIVE-SIXTHS TO GEORGE M. FOX, WYTHINGTON REYNOLDS, AND CHRISTOPHER C. SHADLE, OF SAME PLACE, AND MARCUS D. WAYMAN, OF FORD CITY, AND JAMES M. PATTERSON, OF SHARPSBURG, PENNSYLVANIA.

## ELECTRICAL RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 516,598, dated March 13, 1894.

Application filed July 28, 1893. Serial No. 481,788. (No model.)

### *To all whom it may concern:*

Be it known that I, IRA LLOYD GREEN, a citizen of the United States, residing at Kittanning, in the county of Armstrong and State of Pennsylvania, have invented certain new and useful Improvements in Electrical Railway-Signals; and I 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.

This invention has particular reference to certain improvements in the track instrument of the electrical railway-signal patented to me January 24, 1893, (No. 490,626.) In my said patented track instrument a train entering a block engages and depresses an end of a lever, which lever is carried by a shaft which also carries a toothed segment that engages a rack-bar which is connected with an arm, whereby depression of said lever causes said arm to be pulled rearward, the forward end of said arm being, by suitable means, raised simultaneously with the rearward movement thereof. Said arm is locked in raised position during the occupancy of the block by a train, and is electrically released as the train passes out of the block, and when released is forced to its original position by a suitable means with which the apparatus is provided. When the arm is raised it is in position to engage a mechanism carried by the locomotive of a train entering the block, and thereby closes an electric circuit through an alarm in the engineer's cab; whereby when the block is already occupied the engineer of a train entering the same will be warned of the fact. As said lever and segment are mounted on the same shaft the arm will be moved rearward the same distance as and at a speed not exceeding that of the downward travel of the lever. Practical experience has demonstrated that this is objectionable in certain instances and to overcome this objection is one of the objects of my present improvement.

The invention consists in certain peculiarities in the construction, arrangement and combination of the various parts, substan-

tially as hereinafter described and particularly pointed out in the subjoined claims.

In the accompanying drawings illustrating the invention Figure 1 is a plan view of my improved track instrument. Fig. 2 is a side elevation of my said instrument. Fig. 3 is a detailed perspective of the mechanism at the rear end of the track instrument. Fig. 4 is a side view of the locking mechanism and a helix of the magnet.

The same reference characters are used to designate the same parts in the several figures.

Referring to the drawings, A designates the bed-plate of my improved track apparatus; C, the transverse shaft, which carries the toothed segment, D; G, is the rack-bar, which is engaged by said segment and moved rearward by partial rotation of the same.

H, is the movable sleeve, to which the arm I is pivoted, said sleeve and arm being moved rearward by the rack-bar; H', is the supporting rod for said movable sleeve; I' designates the stand, having an inclined surface *i'* which co-acts with a beveled lug, *i*, on said arm, I, to cause the free end of said arm to be raised as it is drawn rearward.

K is the pivoted transverse main bar, K' the trigger on the inner end thereof, and L the hook which engages the outer end of the locking bar of the mechanism for locking the arm in its rearward position during the occupancy of the block by a train.

N and N' designate the contact plates and M the electro-magnet, said electro-magnet being in the circuit with the contact plates of the succeeding instrument, and serving, when energized, to release the locking mechanism from the arm of its track instrument; and H'' is the coiled spring which forces the sleeve and arm to their original position when the same are released.

All of the above parts are substantially identical with the similar parts of my said patented track instrument, (except that the contacts N and N' are shown as of the more simple form made the subject matter of a separate application filed by me July 22, 1893, and serially numbered 481,215,) and a more

particular description thereof is for this reason considered to be unnecessary.

B designates a supplemental shaft, which is mounted in bearings a suitable distance  
5 from said shaft C. The adjacent ends of these shafts B and C are provided with cranks, *b* and *c*, respectively, and said cranks are connected by a link *d*, in such manner that the throw of said crank *b* will be much greater  
10 than the throw of said crank *c*. The lever E, instead of being mounted on the end of shaft C, as in my said patented construction, is mounted on the end of said supplemental shaft, B. By this construction the distance  
15 of travel and speed imparted to the lever E by a moving train entering the block is multiplied to the shaft C, whereby said lever, E, will not have to travel as far as in my former construction to set the arm in its raised position,  
20 and the latter will be set much more quickly than in the original construction. This is an advantage of considerable importance, as will be readily seen by those persons familiar with this class of invention.  
25 Another advantage accruing to the use of a multiplier of speed from the lever, E, to shaft C, is that it will require more power to operate the setting mechanism, (the increase in the power required to set the arm in raised  
30 position being proportioned to the difference in the throw of the two cranks,) which makes it impossible for mischievously-inclined persons to set the parts into position to close the circuit through an alarm mechanism in the  
35 engineer's cab of a train entering the block, or to otherwise warn the engineer that the block is already occupied. Said lever, E, instead of terminating at its free end above the level of the base of the track-rails P, is preferably curved at both of its ends in the arc  
40 of a circle, and its end remote from the shaft extends downward into the space between the rail-ties, P', so as to be below the level of the base of the rails and out of the path of an object moving on or beside the track and said  
45 end terminates in a flat portion *e*. My present improvement also contemplates the employment of a stop, such as the plate *e'*, for limiting the upward movement of the free  
50 end of said lever. By this construction the liability of damage to the mechanism of the apparatus by a moving object catching under and raising the free end of the lever is prevented. I have also substituted, in my  
55 present improvement, for the coiled spring E' of my original construction, (which coiled spring was secured at one of its ends to the shaft C) a carriage or leaf-spring, E', which is interposed between the lever E and the  
60 road-bed, or other suitable support therefor. This forms a much preferable means for returning the lever and its connected parts to their original or normal position as soon as said lever is disengaged from the train, but  
65 I do not wish to be understood as limiting myself to the use of a carriage spring for the

purpose, as any other suitable spring, or any suitable returning mechanism, may be employed in lieu thereof without departing from the spirit of the invention.

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

1. In a railway signal, the combination of the arm, a shaft, connected therewith, a supplemental shaft, adjacent to said first-mentioned shaft, a lever on the end of said supplemental shaft, and a speed multiplier connecting said first-mentioned shaft with the supplemental shaft, substantially as described, whereby said arm will be moved rearward, by depression of the lever, at a greater ratio of speed than that of said lever, as specified.

2. In a railway signal, the combination of the arm, a shaft, connected therewith, a supplemental shaft adjacent to said first-mentioned shaft, cranks on the adjacent ends of said shafts, the crank of the supplemental shaft having a greater throw than the crank of the other shaft, a link connecting said cranks, and a lever on the end of said supplemental shaft, for the purpose specified.

3. In a railway signal, the combination with the arm, a shaft, a segment on said shaft, a rack-bar engaged by said segment and connected with said arm, and a supplemental shaft adjacent to said first-mentioned shaft, of a lever on the end of said supplemental shaft, and a speed-multiplier connecting said shafts together, for the purposes specified.

4. In a railway signal, the combination with the longitudinally-movable arm, a shaft, a toothed segment on said shaft, a rack-bar, engaged by said segment and connected with said arm, and a supplemental shaft, adjacent to said first-mentioned shaft, of cranks on the adjacent ends of said shafts, the crank of the supplemental shaft having a greater throw than the crank of the other shaft, a link connecting said cranks, and a lever on the end of said supplemental shaft.

5. In a railway signal, the combination with a longitudinally-movable arm, a shaft connected therewith, a supplemental shaft, adjacent to said first-mentioned shaft, and a speed multiplier, connecting the adjacent ends of said shafts, of a lever secured at one of its ends to an end of said supplemental shaft, the other end of said lever extending downward to a point below the level of the base of the rails of the track, a stop at said latter end of the lever for limiting the upward movement thereof, and a spring for forcing said lever up, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

IRA LLOYD GREEN.

Witnesses:

THOS. MCMASTER,  
JAMES S. MATEER.