(No Model.)

C. W. WHITED.

AUTOMATIC RAILWAY TRACK KEY.

No. 336,190. Patented Feb. 16, 1886.

Fig. 1.

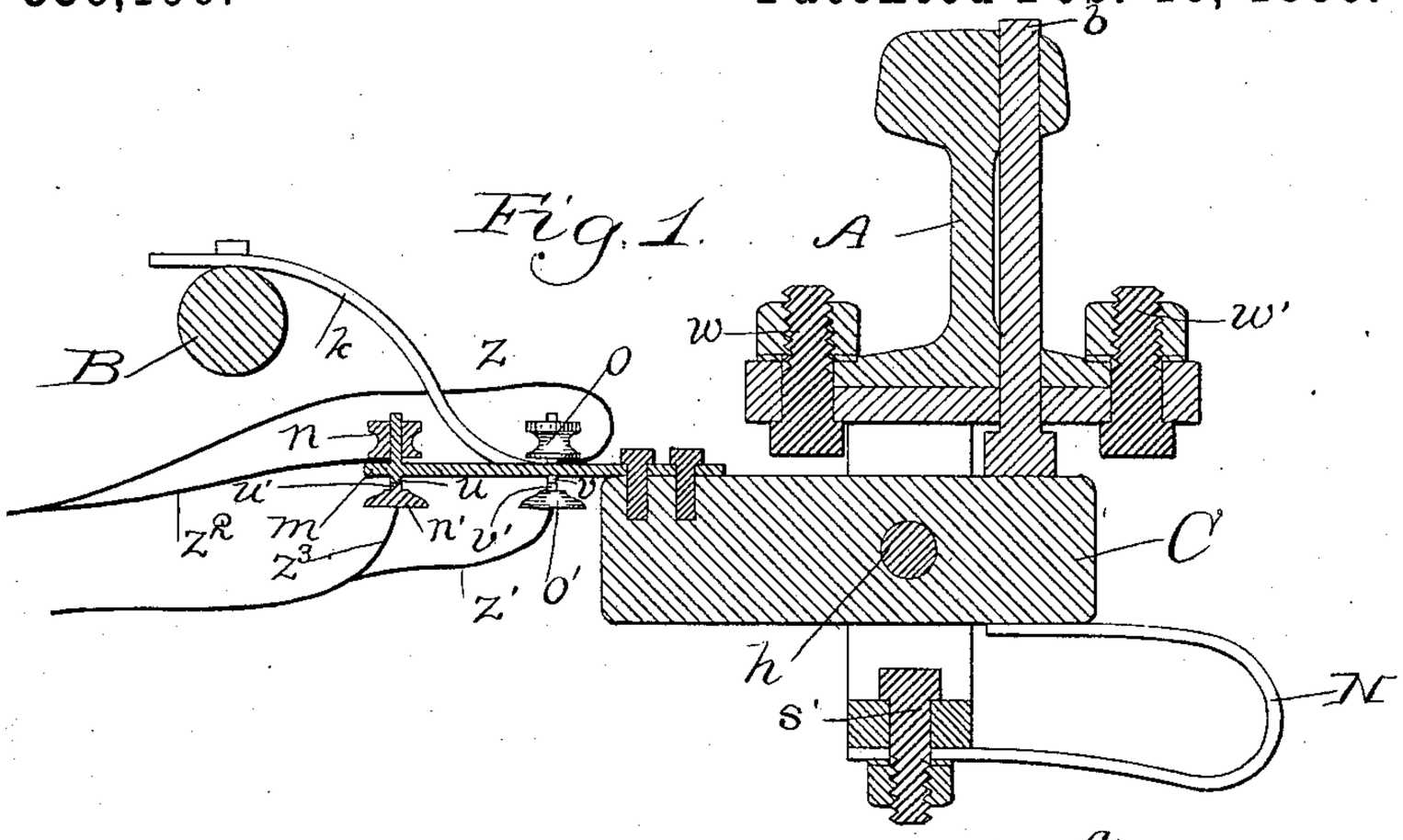


Fig. 2.

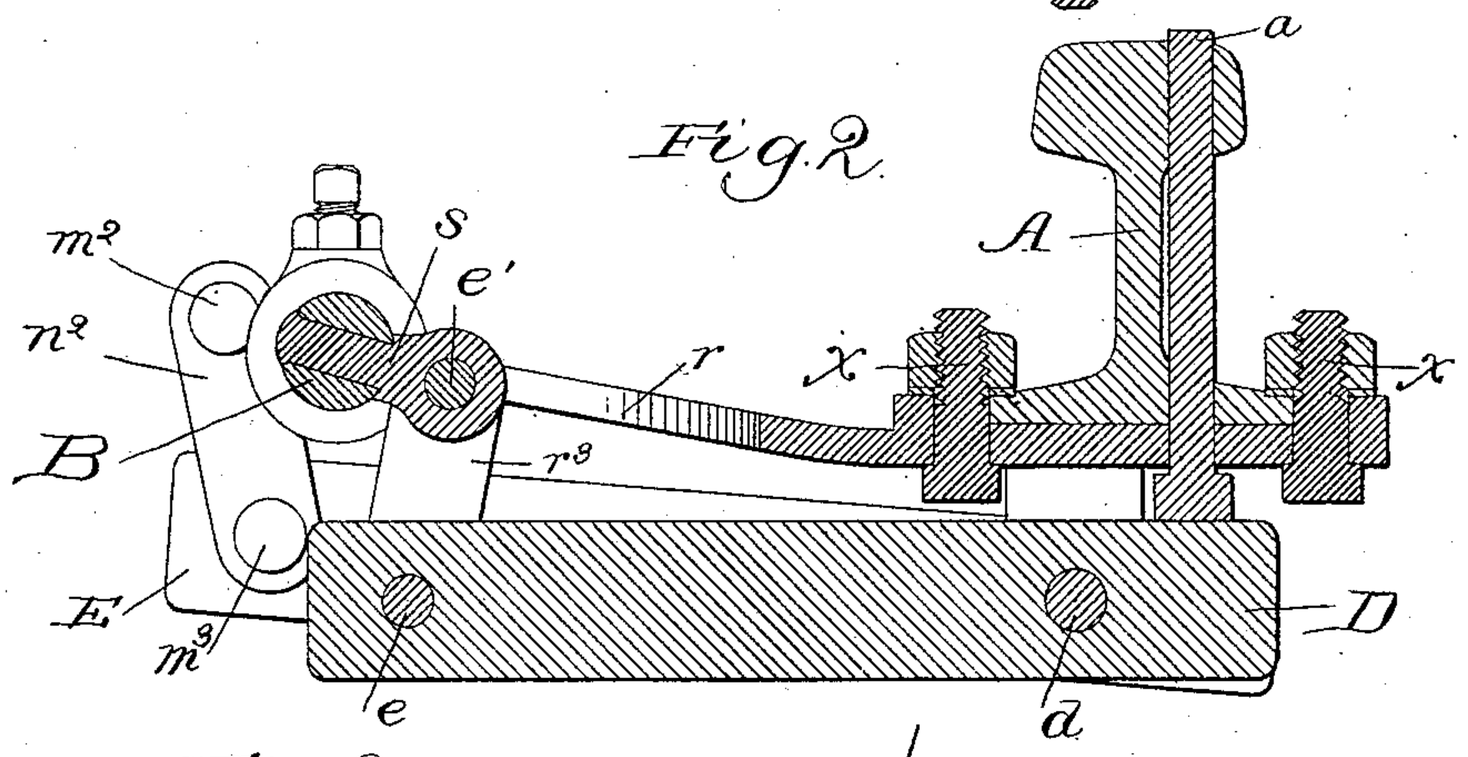
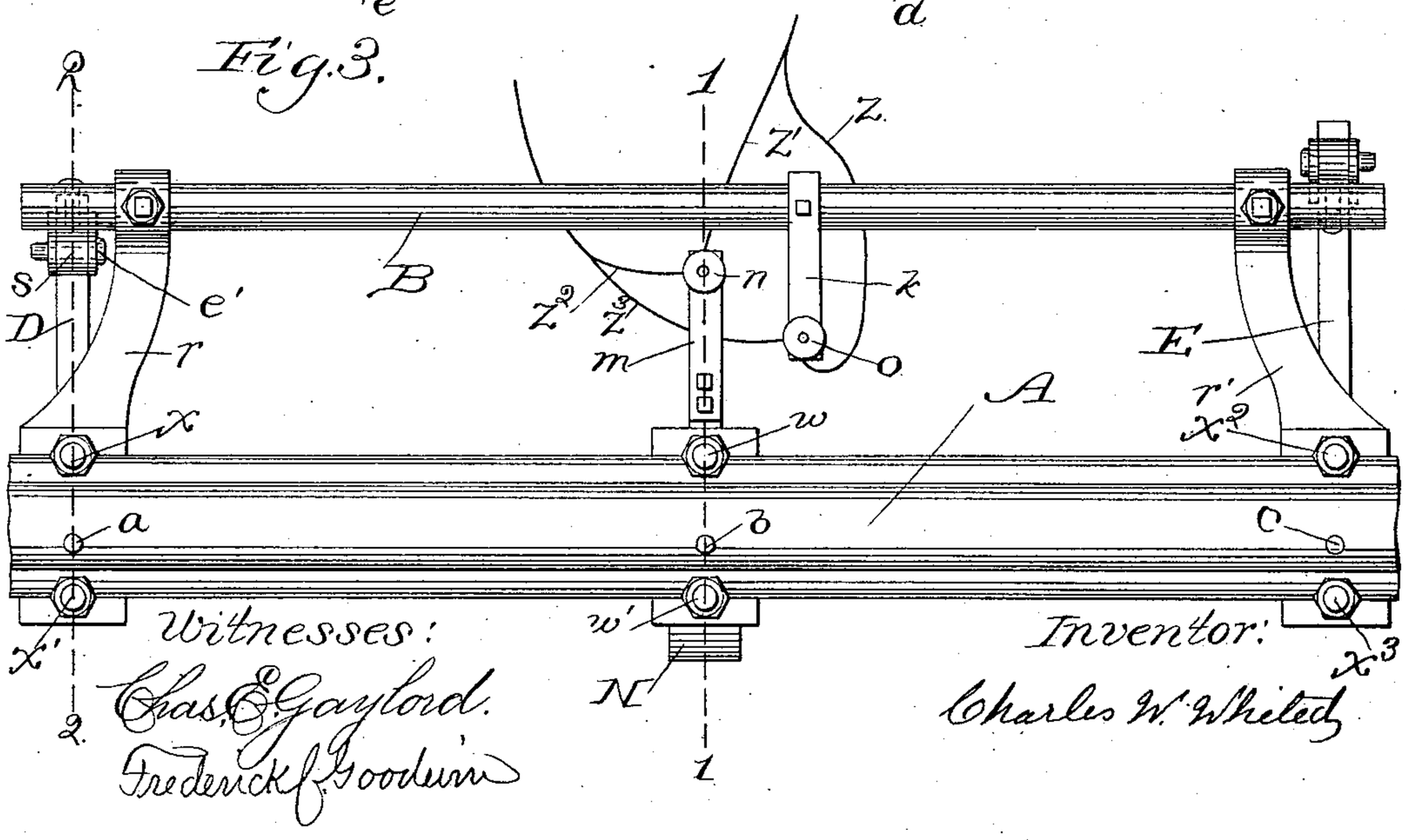


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES W. WHITED, OF BATTLE CREEK, MICHIGAN, ASSIGNOR OF ONE-HALF TO W. H. PETTIBONE, OF SAME PLACE.

AUTOMATIC RAILWAY-TRACK KEY.

SPECIFICATION forming part of Letters Patent No. 336,190, dated February 16, 1886.

Application filed June 11, 1884. Serial No. 134,593. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. WHITED, a citizen of the United States, residing at Battle Creek, in the county of Calhoun and State of Michigan, have invented an Improved Automatic Electric Railway-Track Key, of which the following is a specification.

My invention relates to the giving of electric signals by trains while in motion; and it consists of a circuit-governing mechanism connected with the rails of the track and operated by the weight of the train, said mechanism being so constructed and arranged as to be limited in its operation to the action of trains going one way only.

I have illustrated my invention by the accompanying drawings, in which Figure 1 is a cross-section of Fig. 3 on line 1 1, showing particularly the parts of my improved construction relating to the opening and closing of the electric circuit. Fig. 2 is likewise a sectional view on line 2 2 of Fig. 3, showing the connections at one end between the rock-shaft and the railroad-track. Fig. 3 is a plan or top view of my improved automatic electric track-key, all the parts being shown.

Like letters refer to like parts throughout the several views.

A indicates the rail of the railway-track.

B indicates a rock-shaft, which is held in position by the arms r and r', which arms are bolted or secured to the rail A by the bolts x x' x^2 x^3.

D and E are levers extending from the rock-shaft beneath the rail of the track, said levers being operated by the standards a and c, extending up through the rail of the track, said levers having a connection with the rock-shaft through secondary levers.

C indicates the central lever of my device, which is likewise placed beneath the rail of the track. This lever C turns upon the fulcrum h as the outer end is thrown downward by the pressure of the standard b, which likewise extends up through the rail of the track far enough to project slightly above, as shown in the drawings. The levers D and E likewise turn upon fulcrums, the fulcrum d of arm D being shown in Fig. 2.

N indicates a spring, which is placed beneath and connected with the lever C, and which acts to throw upward the standard b when the same has been forced down to a level with the top of the rail.

e indicates the fulcrum, near the outer end of lever D, which fulcrum supports a short secondary lever, r^3, having near the upper end a connection with a third arm or lever, s, the levers s and r^3 turning upon the fulcrums e e'. The lever E, which is shown in the background in Fig. 2, is likewise connected with two short levers, which turn on the fulcrums m^2 and m^3. The view given in the drawings only makes it possible to show the first of these secondary levers, the same being indicated by n^2.

w and w' indicate the screw-bolts which secure and hold in position that portion of my automatic track-key shown by Fig. 1.

s' indicates likewise a screw-bolt, which holds in position the lower end of the spring N.

m indicates an arm connected with the lever C by screws or other suitable means, and extending outward, so as to form a support for the binding-post n. The under side of this arm m carries a point, of platinum or other suitable metal, u, which forms one of the terminals of the circuit. As will be seen, one of the wires of the circuit is likewise connected with the binding-post n. n' indicates a second button, which carries a point of platinum or other suitable metal, u', thus forming the second terminal of the circuit. As will be seen, one of the wires of the circuit is likewise connected with this button n'.

k indicates a bent arm, connected with or secured to the rock-shaft B, which at its inner end supports the binding-post o and another terminal of the circuit formed by the point v, of platinum or other suitable metal. As will be seen, beneath this terminal is another button or terminal-holder, o', which supports the terminal v'. One of the circuit-wires runs to the binding-post o. The button o' has likewise connected therewith one of the wires of the circuit. The circuit-wires which have been referred to are indicated by z, z', z^2, and z^3.

As an inspection of the drawings will show, the arms r and r', together with the parts immediately connected therewith, as shown in Fig. 2, are supported or held in position by screw-bolts connected with the flanges of the

rail of the track. While the buttons or terminal holders *n'* and *o'* are not shown in connection with binding-posts or other means of support, I prefer to support the same by means of a block of wood or other non-conducting substance. As previously stated, the construction which I have shown is capable of being operated by trains going in but one direction.

The operation of the mechanism described is as follows, the direction of the train being indicated by the arrow shown in connection with Fig. 3: When the first wheel of the train comes in contact with the standard *a*, which extends up through the rail A about one-sixteenth of an inch, or far enough to answer the desired purpose, the weight of the wheel forces said standard *a* downward until it is even with the rail of the track. This standard, resting upon the lever D, near the outer end, as shown in Fig. 2, forces said arm downward, the same turning upon the fulcrum *d*, which causes the opposite end of said lever to be forced upward, thus carrying with it the short levers *s* and r^3, which turn on the fulcrums *e* and *e'*, the action of the short arm *s*, which is connected with the rock-shaft B, being to turn said shaft B outward as far as the movement of the levers D, r^3, and *s* will permit. The effect resulting from this partial turning of rock-shaft B is to cause the arm *k* to be raised, and to lift with it the binding-post *o* and the terminal *v*, or to separate the electrodes *v* and *v'*, and thus open the circuit at that point of connection.

The next step in the operation of my device is produced by the pressure of the wheel of the engine or car as the same comes in contact with the standard *b*, which likewise extends upward through an opening in the rail of the track a sixteenth of an inch, or such distance as may be suitable to accomplish the desired effect. As the standard *b* is pressed downward to a level with the surface of the rail, it forces downward the outer end of the lever C, which turns upon the fulcrum *h*, the effect of this turning of the lever C upon its fulcrum being to raise the opposite end, which supports the secondary arm *m*, which carries the binding-post *n* and the terminal *u*. The upward motion of the secondary arm *m* causes a separation of the electrodes *u* and *u'*, which breaks the circuit, and gives such signal as may be desired through the circuit-wires.

The third step in the operation of my automatic railroad-track key results from the pressure produced by the wheel of the engine or car coming in contact with standard *c*, which likewise extends upward through the rail of the track a sufficient distance to admit of its being forced downward far enough to cause the lever E, upon which the said standard rests, to turn upon its axis, the result being that the outer end of said lever D is raised or elevated, which in turn carries upward the two short levers connected therewith, which short levers are placed in the position shown in Fig. 2, the second of said short arms being connected with the rock-shaft B. As will be seen from an inspection of Fig. 2, in view of the manner in which said short arms are secured together, the result of this upward movement will be to give an inward motion to the rock-shaft B, which throws downward the arm *k* and brings in contact the electrodes *v* and *v'*, which were separated by the opposite motion of said rock-shaft B when the first wheel of the train came in contact with the standard *a*.

It will be evident that the secondary levers connected with the levers D and E should be of such length and so adjusted for turning upon their respective fulcrums as to cause the turning of said rock-shaft in one direction to be the same as the turning of the same in the opposite direction. The dimensions of the parts which I have shown and described may be varied; but I prefer to make my complete device of a length of about thirty-six inches. I likewise prefer to make the rock-shaft B of round iron having a diameter of about one inch. The lever D, I make of bar-iron, of the dimensions of about one inch by half an inch, having a length of ten inches. The lever E, I make of corresponding dimensions, with the exception that it is about an inch longer, as it has to extend outward beyond the rock-shaft. The arms *r* and *r'*, which are secured to the under side of the rail of the track, and which support the rock-shaft, I prefer to make of iron of the width of about two inches and of a thickness of about half an inch, the length of said arms being about ten inches, as they necessarily have to correspond in length with the levers D and E.

While I have shown a construction adapted for the use of a closed circuit, it will be evident to any electrician that by reversing the terminals and changing the connections between the wires of the circuit a like result may be secured by the use of an open circuit. All of the parts mentioned may be made of steel or other suitable metal.

I am aware that various constructions have been invented and patented, which are capable of use for the purpose of giving an electric signal automatically by means of trains while in motion; but as far as my research has extended I am not aware that any construction has been devised which embodies the mechanism herein described, or which secures the result stated as effectively as attained by me.

By the operation of the parts as described I am enabled to give any desired signal, or to sound an alarm as each train passes over the track. I have stated that my construction is capable of being used in connection with trains going one way only. It will be readily seen that this is due to the fact that should a train approach from the opposite direction, and first come in contact with the standard *c*, the result would not be the separation of the electrodes *v* and *v'*, as is the case when the first contact is with the standard *a*. The terminals *v* and *v'* being in contact, and being incapable of separation by the action of stand-

ard *c*, the operation of the standard *b*, when depressed, would not break the circuit—or, in other words, would fail to give the signal desired. This explanation I think will suffice to show that the construction shown is only capable of being used by trains going in one direction. The spring N, which acts to force upward the standard *b*, when pressed downward by the weight of the train, operates also to prevent said standard from being forced downward by any light weight—such as a hand-car or a person walking on the track.

It will be seen that by the operation of the mechanism described a succession of signals will be sent to the signal-station during the entire time occupied by the train in passing over my electric railway-track key. The particular application, however, for which the construction shown is designed is to have the first signal operate to stop a clock in the signal-station. When thus applied, the subsequent signals during the passage of the train have no effect. The method by which I cause the first signal which reaches the signal-station to stop a clock as well as to sound an alarm I have described and claimed in a separate application.

The mechanism which I have shown should be placed within a case or box for the purpose of protection.

Having thus described my invention both as to its construction and operation, whereby I am enabled to secure a superior result in a manner which is highly practicable as well as durable, what I claim, and desire to secure by Letters Patent, is—

1. In an automatic electric railway-track key, the combination, with a signaling-circuit having double sets of separable terminals, of the track-rail, a circuit-breaker for the first set of terminals, a circuit-breaker and automatic closer for the second set of terminals, and a circuit-closer for the first set of terminals, located consecutively along the track, and operated by the passing train-wheels, whereby a signal will be given by the passage of the train in one direction only, substantially as shown and described.

2. In an automatic electric railway-track key, the combination, with an electric signaling-circuit having double sets of separable terminals, of the track-rail, a rock-shaft bearing one of the first set of terminals, two depressible standards, the upper ends of which are in line with the tread of the car-wheels, and whose lower ends connect by reverse systems of levers with the rock-shaft, a depressible standard intermediate between the first two, and a spring-lever connected with said latter standard and bearing one of the remaining set of terminals, whereby upon the passage of a wheel over the track in one direction the first set of terminals will separate, then the second set separate, and again contact with each, and finally the first set contact with each other, substantially as shown and described.

3. In an automatic electric railway-track key, the combination, with the track-rail, of depressible standards, the upper ends of which are in line with the tread of the passing train-wheels, a rock-shaft bearing one terminal of an electric circuit, and reverse systems of levers connecting the lower ends of the separate standards with the rock-shaft, whereby the passage of a wheel over the track will rock the shaft alternately in opposite directions, separating and approaching the terminals, substantially as shown and described.

4. In an automatic electric railway-track key, the combination, with the track-rail, of supporting-arms attached to said rail, a rock-shaft loosely journaled within said arms, reverse systems of levers attached to opposite ends of the shaft, depressible standards extending above the track-rail and resting, respectively, upon the free end of each set of levers, and a closed electric circuit having separable terminals, one of said terminals being fixed and the other connected with an arm depending from the rock-shaft, substantially as shown and described.

5. In an automatic electric railway-track key, the combination, with the track-rail, of a signaling-circuit, a circuit-breaker, a circuit-closer, and an intermediate automatic signal-key, the operating-levers of the three devices extending within the range of the passing train-wheels, substantially as shown and described.

6. The combination, in an electric automatic track-key, of the rail A, the standard *b*, the lever C, the fulcrum *h*, the spring N, the screws *w*, *w'*, and *s'*, the secondary arm *m*, the binding-post *n*, the button *n'*, the electrodes *u* and *u'*, and the circuit-wires z^2 and z^3, all arranged substantially as described, and for the purpose specified.

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