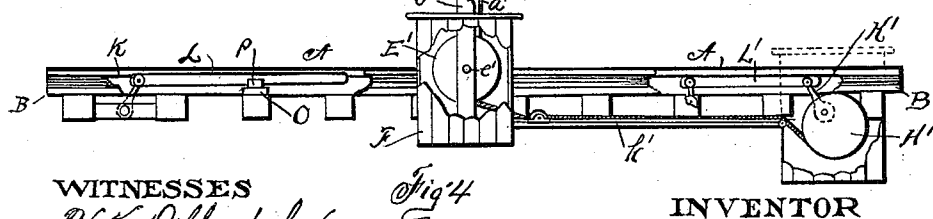
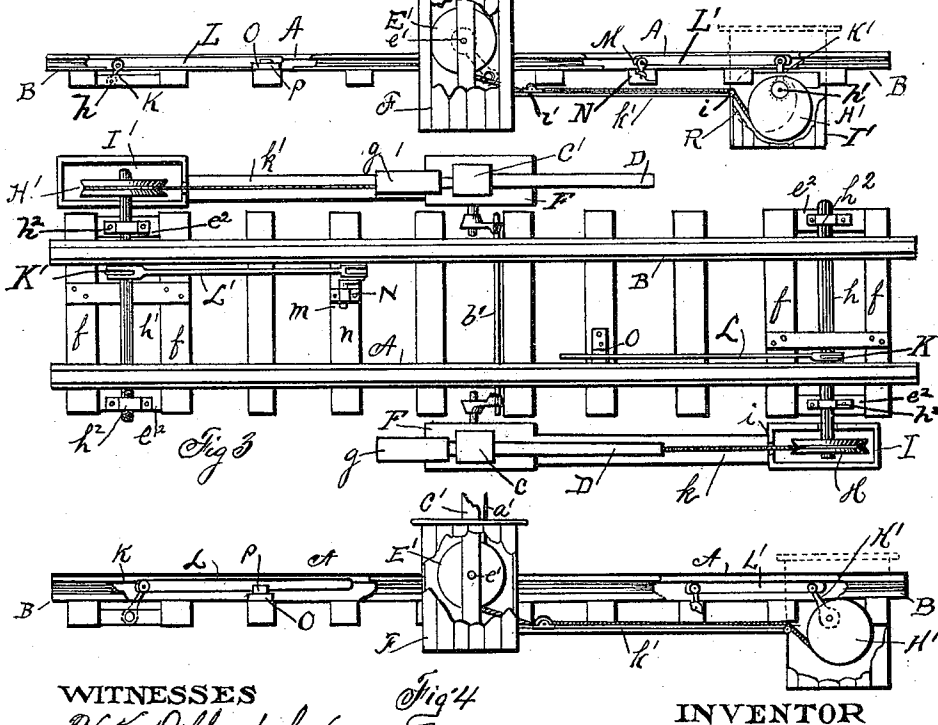
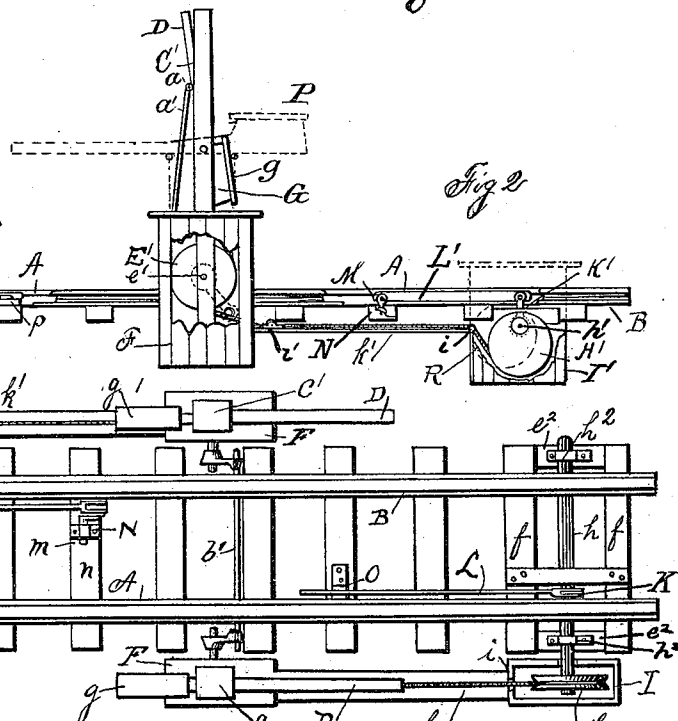
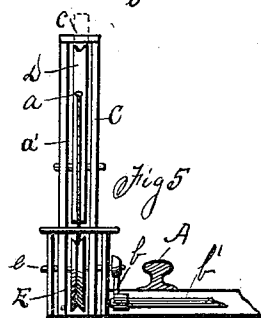
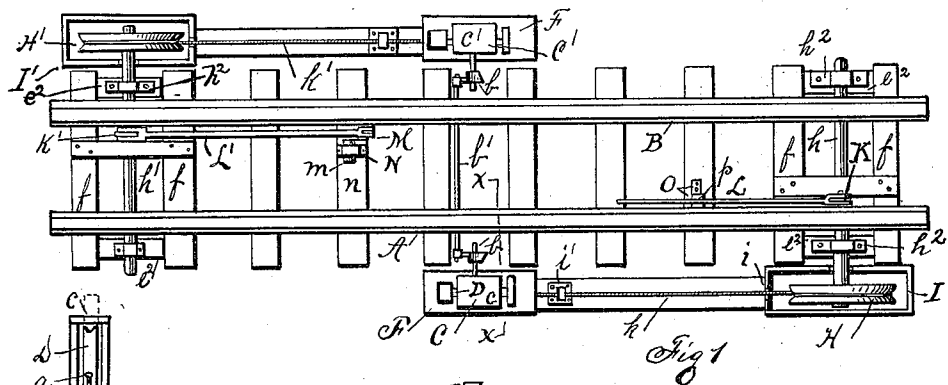


(No Model.)

B. K. HACKER.
AUTOMATIC RAILWAY SIGNAL.

No. 440,405.

Patented Nov. 11, 1890.



WITNESSES

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Fig 4

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UNITED STATES PATENT OFFICE.

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AUTOMATIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 440,405, dated November 11, 1890.

Application filed February 13, 1890. Serial No. 340,381. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN K. HACKER, a citizen of the United States, residing at Lexington, in the county of Lancaster and State of Pennsylvania, have invented certain Improvements in Automatic Railway-Signals, of which the following is a specification.

This invention relates to improvements in that class of railway-signals the mechanism for displaying which is caused to operate by engagement with the wheels of an approaching train; and it consists in the construction and combination of parts, as hereinafter fully set forth in the description, and pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a top or plan view of a section of railway-track with the apparatus embodying my invention in place, showing the signals lowered. Fig. 2 is a side elevation of the same seen from the upper or farther side of Fig. 1, portions of one of the rails and of the sides of two of the boxes being cut away. Fig. 3 is a plan view showing the signals exposed; and Fig. 4 is a side elevation seen as in Fig. 2, showing the position of the operating mechanism when the signals are exposed, portions of two of the boxes being cut away for that purpose. Fig. 5 is a vertical transverse section on the line $x x$, Fig. 1.

Similar letters indicate like parts throughout the several views.

Referring to the details of the drawings, A B indicate the two rails of a railway-track.

C C' represent two double uprights or posts, one being placed on each side of the track A B at a road-crossing or other point where it is desirable that the approach of trains should be signaled. Pivotaly secured between each pair of posts there is a signal-arm D, carrying a weighted board or signal G g at one end.

At the bottom of and between one pair of posts there is a pulley E, mounted on a rock-shaft e , and at the bottom of and between the other pair a pulley E' is mounted on a shaft e' . The lower ends of the posts with the pulleys therein are housed in by boxes F to protect them from the weather and prevent ob-

struction to the working of the pulleys. Each of these pulleys is connected with an eye a , secured to one of the signal-arms above the pivot, about which said arm works by cords a' , and this connection is made upon the same side of the posts C C'. The inner ends of the rock-shafts $e e'$ extend beyond the sides of the posts and through the sides of the boxes F and have cranks b attached thereto, connected by a rod b' , passing beneath the rails of the track, so that power applied to either pulley to revolve the same displays the signals upon both sides of the track.

The signals themselves are preferably composed of the pivoted arm D, having a signal-board G affixed to one end and provided with a weight g . The signals are displayed by the depression of the upper ends of the arms D, as shown by the dotted lines in Fig. 2, occasioned by the revolution of the pulleys E E'. Upon the return of the pulleys to their original position the signals are depressed by the weights g , the vertical adjustment of the signal-arms D being limited by contact with the caps $c c'$ of the posts C C', thus holding said arms in a more favorable position for being again acted on by the pulleys E E'.

At a sufficient distance from the post C there is an eccentrically-mounted lever H, secured near the track on a rock-shaft h , and upon the opposite side of the post C' and the opposite side of the track from the eccentric-lever H there is a similar lever H', mounted in a like manner on a rock-shaft h' . The levers H H' are housed in boxes I I', and the rock-shafts $h h'$ pass through the sides thereof and beneath the rails of the track, and are journaled in bearings $h^2 h^2$, fastened to blocks $e^2 e^2$, secured between the ends of the cross-ties $f f$. The levers H H' are of the shape of eccentrics, and are rigidly secured to the rock-shafts $h h'$. This construction causes the signals to be displayed more rapidly than they would be were levers as generally constructed used, the eccentric shape of the levers producing an accelerating movement in the signals as they are displayed.

The eccentric-lever H is connected with the pulley E by a line k . This line is fastened

to the eccentric-lever below the rock-shaft, and is carried over a friction-roller *i* and beneath a similar roller *i'* to the pulley E, where it passes up the front of said pulley E, and is fastened thereto. A line *k'* is in the same way secured to the eccentric-lever H' and connects it with the pulley E'; but in this case the line passes beneath and toward the back of the pulley E'.

Inside of the rails adjoining the eccentric-levers there are arms K K', keyed to the rock-shafts *h h'*, between the jaws of which are pivotally connected tread-plates L L'. These plates extend by the side of the adjoining rail toward the posts C C' and have their ends supported in different ways, as may seem best. The inner end of the plate L' is pivoted to a crank M on a shaft *m*, journaled in a bearing N on a cross-tie *n*, while the corresponding end of the plate L simply rests on a bearing O, fastened to one of the cross-ties and having an upwardly-extending projection *p*, which serves as a guide or keeper for said plate.

In operating, the wheels of an approaching train engage one of the tread-plates L L' and, pressing the same over toward the posts carrying the signals, cause the same to be displayed through the action of the eccentric-lever, the line connecting the same with the pulley in the bottom of one of the posts carrying the signals, said pulley, and the cord connecting the same with the signal-arms. When the treadle-plate L is lowered, the arm K is depressed thereby, as is also the crank M, and when the plate L' is lowered the arm K' is similarly depressed, the free end of plate L' sliding forward in its bearing O. The plates L L' are of such length that when the front wheels of a car are passing off of a plate the rear wheels have already commenced to pass upon the same, so that the plates are only once depressed during the passage of a train. After the train passes the signal-station it throws the arm K or K' lying beyond it back from the direction of said station. This is done as soon as the front wheels engage the treadle-plates. With the plate L' it is accomplished by the direct thrust of the wheel against the crank M and with the plate L by the weight of the wheel on said plate as it is engaged thereby. When the signals are exhibited, they assume the position shown by the dotted lines P in Fig. 2 and the operating mechanism that is shown in Fig. 4. The line connecting the pulley in the bottom of the post and the eccentric-lever may be so connected with said eccentric-lever that when the signal is in the position it occupies when lowered the part of the lever having the greatest eccentricity may be raised toward the post, as shown by the dotted lines R, Fig. 2, and when the signals are displayed because of the passage of a train approaching over the operating mechanism on the other side of the signals, said eccentric-lever may automatically assume the position shown by the full

lines at the same part of the drawings and take up the slack line between it and the signal-post. In this case the relative positions of the eccentric-levers and the arms K and K' on the shaft to which they are attached would have to be arranged so that the latter would be engaged by the wheels of a train approaching the signals.

As will be readily understood, when the signals are displayed they again resume the position they occupy when lowered by the action of the weights *g* as soon as a train has passed over the treadle-plate from the direction in which they were raised. So, also, the eccentric-levers by reason of their construction restore the arms K K' to their normal position as soon as the tread-plates are relieved from pressure.

In my invention both signals are displayed by a single mechanism on each side of the signal-station upon the approach of a train from either side, and both of the signals and the operating mechanisms automatically resume their normal positions upon the passage of each train. Thus operating-signals upon both sides of the track are of great utility, as in very many cases the approaches to a track on the two sides are not in a straight line or so located with reference to each other as to permit a signal on one side of the track to be seen from both directions, more particularly as the signal-posts may be set out at such distances from the track as may be necessary for the purpose.

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

1. In a railway-signal, the combination, with the post and a signal pivoted therein, of a rock-shaft extending under the track, an arm keyed to said shaft and adapted to be engaged by the wheels of a passing train, an eccentric-lever rigidly secured to the rock-shaft, and a line connected with the eccentric-lever and adapted to actuate the signal, substantially as and for the purpose specified.

2. In a railway-signal, the combination, with a post having a weighted signal-arm and a pulley pivoted therein, and a cord connecting the pulley and arm, of the eccentric-lever mounted on a shaft extending beneath the track, the arm keyed to said shaft, the tread-plate pivoted therein, and a line connecting the eccentric-lever and the pulley journaled in the post, substantially as and for the purpose specified.

3. In a railway-signal, a post located upon each side of the track, pulleys and weighted signal-arms journaled in said posts, a rod passing beneath the track and attached to cranks on the rock-shafts on which the said pulleys are mounted, and a connection between the pulley and signal-arm in each post, in combination with the eccentric-lever rigidly secured to a shaft, an arm secured to said shaft inside of and adjoining the rail, the tread-plate pivoted in the arm, and a line

connecting the eccentric-lever and the pulley journaled in the post on the same side of the track, substantially as specified.

5 4. In a railway-signal, the combination, with a post located upon each side of the track, the weighted signal-arms, and pulleys journaled in the posts, and a rod passing beneath the track and attached to cranks on the rock-shafts on which the said pulleys are mounted,
o of an eccentric-lever rigidly secured on one side of the track to a rock-shaft, an arm keyed to said shaft inside of the rail, the tread-plate, a line extending from the eccentric-lever to the pulley on the post and passing

up in front of the same and secured thereto, 15
an eccentric-lever mounted on a rock-shaft on the opposite side of the second post, the arm and treadle-plate connected therewith, and a line extending from said eccentric-lever to and beneath the pulley journaled in the post 20
on the same side of the track and secured thereto, all constructed and operating substantially as and for the purpose specified.

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Witnesses:

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WM. R. GERHART.