

UNITED STATES PATENT OFFICE.

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ASSIGNORS TO JOHN JAMES GRUNDY, OF SAME PLACE.

RAILWAY SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 623,090, dated April 11, 1899.

Application filed March 18, 1899. Serial No. 709,649. (No model.)

To all whom it may concern:

Be it known that we, EDWARD MAYNARD and GEORGE MAYNARD, subjects of the Queen of Great Britain and Ireland, and residents of 17 Merritt road, Brockley, London, county of Surrey, England, have invented an Improved Apparatus for Signaling on Railways During Dark or Foggy Weather, (for which we have made application for a patent in Great Britain, No. 10,991, bearing date May 13, 1898,) of which the following is a specification.

This invention relates to apparatus for use on railways during dark or foggy weather and warns the engine-driver that he is approaching a signal, so that he may stop the train. The forward movement of the engine also operates an appliance in a distant signal-cabin, so that the signalman may know where the engine is and may be able to signal to the driver when the line is clear.

To carry our invention into effect, we attach to the engine near the wheels a suitable rocking striker on one or on each side of the engine, the striker being attached to a whistle or gong alarm in the cab. The projecting end of the striker is set so that as it moves past a tongue fixed on the permanent way the striker will be operated, but when the engine is moving backward the bell will not ring the alarm in the cab. Between the semaphore-signal and the tongue above mentioned is disposed a horizontal lever with its front end projecting across or partly across one of the rails. This lever has a swiveling movement and is moved sidewise by a fixed striker on the engine, and this movement is transmitted by the usual chains, rods, or wires to the signal-cabin and operates a device in the signal-cabin to inform the signalman that the engine has reached the semaphore which is supposed to be at "danger." The signalman can then, when he wishes the engine to proceed, pull over the usual lever and lower the semaphore and at the same time operate a device to strike a gong fixed by preference on the signal-post to give the driver an audible notification that the line is clear without altering the position of the semaphore. At a short distance in advance of the semaphore is arranged a similar swiveling lever to that above described, and when the fixed striker on the engine operates it the same gong will be rung, or another of

a different tone, in the signal-cabin to inform the signalman that the engine has passed the semaphore.

The first of the swiveling levers above mentioned is capable of a tilting movement (besides a swiveling motion) under the control of the semaphore-lever. Thus when the line is clear and the semaphore-arm is lowered the swiveling lever is by the same movement canted or tilted, so that the fixed striker on the engine will not operate it. In the same way the second swiveling lever can also be tilted, or may be used in fair weather as an indication to the signalman that the train has passed out of his section.

The above-described apparatus may be disposed at any required distance from the semaphore.

By connecting the wires or chains of the first swiveling lever to the standing signal of the rear section the signal can be locked until the train has passed out of the section in advance.

Our improved apparatus is also adapted, with suitable modifications, to protect crossing, siding, loop, and branch lines.

We will now describe our invention with reference to the accompanying drawings, in which—

Figure 1, which is continued on Sheet 2, shows a condensed perspective view of our apparatus to control a section. The different parts of the apparatus may be disposed at any required distance apart. Fig. 2 shows a side elevation of the first swiveling lever. Fig. 3 shows a plan view of Fig. 2. Fig. 4 shows an end elevation of upright g^3 .

a represents the forward part of an engine, which is provided on one or both sides with a rocking striker a' , mounted upon the back plate a^2 and held in place by brackets a^3 . The upper end of the rocking striker is provided with a small crank b , which is pivotally attached to one end of a rod b' , which is connected at its other end to one arm of a bell-crank lever b^2 , fulcrumed at b^3 to some convenient part of the engine. The bell-crank lever b^2 is counterweighted, and its other arm is connected by a chain or cord to the ringing mechanism of a gong b^4 , fixed in the cab of the engine or other convenient place. Thus when the engine moves forward the lower end

of the rocking striker will be turned by contact with the tongue *c*, fixed on the permanent way, and such motion will be transmitted to and ring the gong-alarm *b*⁴. The lower end of the back plate *a*² is prolonged to form a finger, which thus forms the fixed striker *d*. Supposing the semaphore to be at "danger," as the engine progresses farther the fixed striker *d* will strike the swiveling lever *e*, mounted on block *n*¹, and push its outer end off the rail. The lever *e* is fulcrumed at *e*¹, and its inner end is connected by chains, wires, or rods to the signal-cabin, only the levers in which are shown. The swiveling movement of the swiveling lever *e* is transmitted to a rod *f* by means of chains or wires *f*¹, running over the pulleys *f*², and this movement operates a weighted lever *g*, fulcrumed at *g*¹ to a post or upright *g*³ in the signal-cabin. This movement raises a rod *g*², connected at its upper end to a crank *g*³, thereby partly rotating a latch-bolt *h*, which thereby unlocks a flap *h*¹, hinged at *h*², causing it to drop and fall onto the clapper of a bell or gong *h*⁴ and notifying the signalman that the engine has passed the first swiveling lever and is waiting at the semaphore. Only the lower end of the signal-post *i* is shown. The latch-bolt *h* is held by a spring *h*³.

When the signalman wishes the train to proceed, he pulls over the lever *j*, the motion of which is communicated by rod *j*¹, lever *j*², chains, wires, or rods *j*³ to the actuating-lever *j*⁴ of the semaphore. The lever *j*⁴ is fulcrumed at *j*⁵ and provided with the usual counterweight. The semaphore-arm (not shown) is moved by means of the vertical arm *j*⁶, attached at its lower end to the lever *j*⁴. The signalman then operates a spring-lever *k*, the movement being transmitted by rod *k*, lever *k*², chains, wires, or rods *k*³ to the outer end of and rocks a weighted lever *k*⁴, fulcrumed at *k*⁵, and when it is let fall rings a bell or gong *l* through the clapper *l*¹, thereby giving an audible signal to the driver that he can proceed. When the semaphore is lowered, the action also operates and raises the swiveling lever *e* out of contact with the fixed striker *d* on the engine. This is effected by attaching to the lever *j*⁴ a chain or wire *o*, the other end of which is connected to the arm *o*¹ of a bell-crank lever fulcrumed at *o*² near the block *n*. The other arm *p* is connected to one end of a weighted lever *p*¹, fulcrumed at *p*². The lever *p*¹ at its other end is attached to a rod *q*, which at its other end operates a crank *q*¹, fixed on a spindle *q*², on which is mounted the fulcrum *c*¹ of the lever *c*. Therefore when the weighted side of the semaphore-lever *j*⁴ is raised the action is transmitted to and thereby cants or tilts the lever *e* by the above-described mechanism. The train then proceeds and in due course the fixed striker on the engine operates a second swiveling lever *m*, pivoted at *m*¹ on the block *e*³. This lever has a similar movement to that of *e*, the movement being transmitted

to the rod *f* through chains or wires *m*³, passing over pulleys *m*³ and attached to the rod *f*, thereby ringing the gong *h*⁴ in the signal-cabin to notify the signalman that the engine has obeyed the signal.

The points of the levers *e* and *m* work on and their movement is limited by the turned-up ends of the quadrant-plates *e*² *n*, mounted on the blocks *e*³ *n*¹.

The arm *o*¹ of the bell-crank lever above mentioned is connected by means of chains or wires *r*¹ to the semaphore-lever *r* of the signal controlling the rear section.

Only the lower end of the post *s* is shown. The chain or wire *r*¹ is fixed to the weighted side of the lever *r* and the connections are so arranged that the semaphore on post *i* cannot be lowered until the semaphore on post *s* is at the danger position, or vice versa. In other words, the semaphores on both posts cannot be lowered simultaneously.

Instead of the swiveling levers *m* and *e* being arranged horizontally, as shown, they may be vertical and may be arranged between the rails, if preferred, and not outside, as shown.

Our invention can also be applied to protect level crossings to warn people of the approach of a train. This could be effected by employing a swiveling tongue or lever similar to those described, so that when operated by the striker on the engine it would complete the circuit, thereby ringing an electric bell at the crossing. When the crossing was passed, the striker would operate another swiveling tongue or lever to break the circuit and stop the ringing of the bell, or the above modifications can be applied to ring a bell at a station to warn the passengers that a train is due.

In a further modification the rocking striker might be so arranged that it will turn off the steam-supply on the engine, thereby automatically stopping it.

We claim as our invention—

1. In combination, a signal in the signal-box, a semaphore-rod with connection thereto from the signal-box, a signal at the semaphore, means for operating the same from the signal-box, a signal on the engine, and contacting means on the engine and beside the track to operate the signal on the engine to notify the engineer that he has arrived at the semaphore and to notify also the signalman, the said signal at the semaphore enabling the signalman to notify the engineer when the track is clear, substantially as described.

2. In combination, a signal in the signal-box, a semaphore-rod with connection thereto from the signal-box, a signal at the semaphore, means for operating the same from the signal-box, a signal on the engine, contacting means on the engine and beside the track to operate the signal on the engine to notify the engineer that he has arrived at the semaphore and to notify also the signalman, the said signal at the semaphore enabling the signalman to notify the engineer when the

track is clear, and a connection from the semaphore to the contacting means beside the track and to a second semaphore, substantially as described.

5 3. In combination, the semaphore, a signal in the signal-box, a contact means on the engine, contact means beside the track on each side of the semaphore connected with the signal in the box and arranged in the path
10 of the contact means on the car to operate the signal in the box, substantially as described.

4. In combination, the semaphore, the signal-station, an audible signal operated by the
15 passage of the engine to notify the engineer of his approach to the semaphore, an audible signal at the semaphore and operating connections leading thereto from the signal-box, substantially as described.

20 5. In an improved railway signaling apparatus, the combination of a fixed striker d on a railway-engine, and swiveling levers e, m , with means for operating a bell or gong alarm h^4 in a signal-cabin, said means consisting essentially of a weighted lever g , rod g^2 , crank
25 g^3 , latch-bolt h hinged flap h' , and the usual chains, wires and rods, substantially as described.

30 6. In an improved railway signaling apparatus, the combination of the chain, rod, or

wire o , bell-crank lever with arms $o' p$ weighted lever p' , rod q , crank q' , and spindle q^2 , for simultaneously tilting the swiveling lever
35 e with the semaphore on the signal-post i , substantially as described.

7. In an improved signaling apparatus, the means as described for simultaneously lowering the semaphore on signal-post i , tilting the swiveling lever e , and locking the starting-signal on the previous section of railway, in
40 the "danger" position, substantially as described.

8. In an improved railway signaling apparatus, the combination of the rocking striker a' , crank b , rod b' lever b^2 , fixed striker d ,
45 tongue c , swiveling levers e, m , the spring-lever k , lever k^4 , latch-bolt h , hinged flap h' , clappers and gongs b^4, l, l', h^4 , the bell-crank lever with arms $o' p$, rod q , crank q' , spindle q^2 , and weighted lever r , with the means for
50 connecting the various levers and transmitting their motion from one to the other, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

EDWARD MAYNARD.
GEORGE MAYNARD.

Witnesses:

THOMAS WILSON,
WALTER J. SKERTEN.