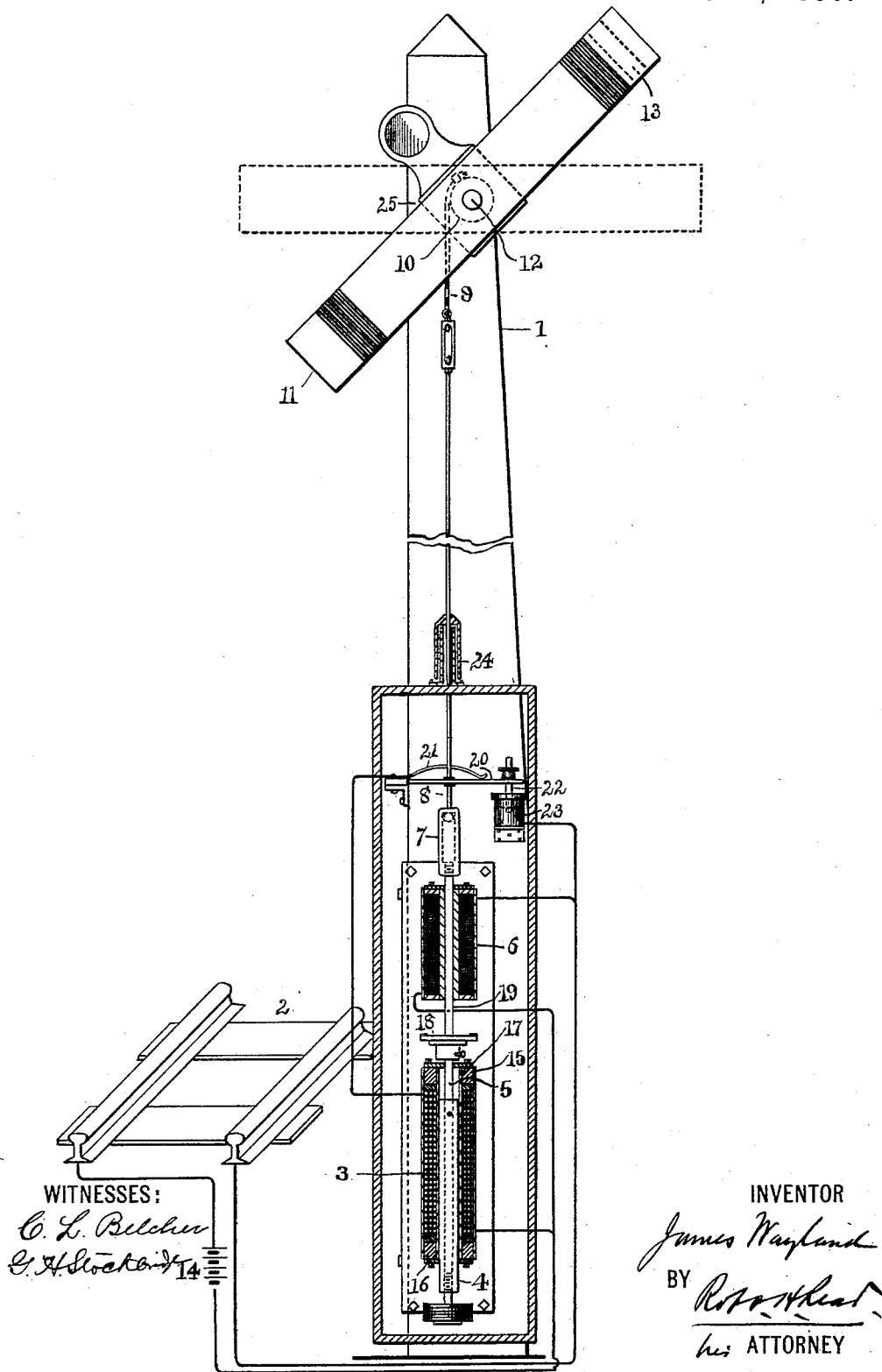


(No Model.)

J. WAYLAND.  
RAILWAY SIGNAL.

No. 569,265.

Patented Oct. 13, 1896.



# UNITED STATES PATENT OFFICE.

JAMES WAYLAND, OF NEWARK, NEW JERSEY.

## RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 569,265, dated October 13, 1896.

Application filed June 2, 1896. Serial No. 594,007. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES WAYLAND, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification.

This invention relates to electrically-controlled railway-signals, the object being to provide a signal which may be set and released by electromagnetic agencies.

In carrying out the invention I provide at the side of the railway-track an electromagnetic device capable of positively actuating the signal, said device being controlled by a circuit from the track influenced by the presence of a train, and provide for cutting said device out of circuit after it has been actuated and energizing an auxiliary device which holds the signal in the position to which it was set while the train remains in the protected region of the track. The auxiliary device is wound to a higher resistance than the motor device, thereby economizing the battery or other electric generator employed to furnish the operating power.

In a prior application filed by me, Serial No. 587,457, dated April 14, 1896, I described a signal apparatus having the same ends in view, in which was employed a special type of electromagnet constructed to give a long range of movement. In the present invention I employ another type of magnet and an improved circuit-breaker, and have provided also novel structural features of the signal apparatus.

The several features of the invention will be hereinafter more fully described, and will be definitely indicated in the claims.

In the accompanying drawing, which illustrates my invention, is shown in side elevation and part section a signal embodying my improvements.

It represents a signal-post placed adjacent to a railway-track, (indicated at 2.) On the signal-post is mounted a motor-magnet 3, provided with a movable core, the magnet having a particular construction, hereinafter fully described, to increase its tractive power. The core 4 is secured to a rod 5, which passes axially through a locking-magnet 6 and is secured to a tubular nut 7, in the top of which

is a rod 8, headed inside the nut to prevent its withdrawal. The rod 8 is connected to a chain 9, passing over a sheave or pulley 10, secured to a semaphore 11, adapted to turn on an axis 12. The electrical apparatus on the signal-post is housed over with a wooden framework 25. The semaphore is weighted at 13 sufficiently to counterbalance the chain, rod 8, and tubular nut, and turn to a "safety" position when relieved of the weight of the rod 5 and core 4. The magnet 6 is wound to a considerably higher resistance than the motor-magnet 3 for the purpose of economizing battery power during the considerable period of activity while a train occupies a protected section. The motor-magnet is in a circuit including a battery 14 and a circuit-breaker 20 22 and terminating in the track-rails. Thus when a train enters a section the wheels bridge the opposite rails and energize the motor-magnet.

The motor-magnet comprises a tubular shell of non-magnetic material, such as brass, on which the coils are wound and an iron sleeve over the outside, said sleeve being connected at the ends with annular iron disks 15 16, extending into the brass tube 17. The tube forms a guide for a plunger or movable iron core 4, which is preferably tubular, and the lower end of which carries a brass stem on which weights may be placed to vary the load of the motor-magnet and give some flexibility to the adjustment of the semaphore-counterweight. It will be seen from this construction that the motor-magnet is somewhat of the nature of a solenoid, in that its core will have a long range of movement, but is much more powerful in torque with a given current, since the lines of force developed by the coil have a good magnetic circuit through the iron shell and iron disks. The rod 5 carries a disk-armature 18 to cooperate with the locking-magnet 6, having the same construction as a similar magnet employed in a railway-signal described in my prior application hereinbefore referred to. Said locking-magnet has a tubular core of iron, through which extends the rod 19. On the outside of its coils is a tubular iron shell connected to the core by an iron disk at the top. Two annular poles lying in the same horizontal plane cooperate with the disk-armature. The coils

of the locking-magnet are connected in shunt relation to the motor-magnet and a circuit-breaker, the function of which is to open the circuit of the motor-magnet when the signal is operated. Thus the magnet 6 will be energized only when the circuit is broken by the circuit-breaker; that is to say, during the presence of a train in the protected region of the track. When the train leaves the protected region, the circuit is opened at the rails and the signal goes to its normal position. The circuit-breaker I prefer to employ comprises a pivoted arm 20, surrounding the rod 8 and adapted to be lifted by the tubular nut 7 when the motor-magnet lifts the core and the connected nut. A light spring 21 insures a gradual movement of the circuit-breaker when engaged by the nut. The arm at its free end carries an adjustable pin 22, dipping into a mercury-cup 23. The circuit-breaker is included in the circuit of the motor-magnet, one terminal entering the mercury and the other being connected with the bracket on which the arm is hinged. The motor and locking magnets are rigidly secured to a cast-iron supporting-plate. At the top of the wooden housing is a tube 24, fixed to the roof, and a cooperating tube is fitted over the rod to inclose the other and prevent rain from dripping into the housing. The operation of the signal is as follows: When a train enters a protected track region, the wheels bridge the rails and energize the motor-magnet, which lifts its core and after a sufficient traverse causes the nut to actuate the circuit-breaker, thus cutting the motor-magnet out of circuit and energizing the locking-magnet by forcing the current to traverse the high-resistance shunt which includes this magnet. The locking-magnet holds its armature, which when raised lies within range of the attractive power of its magnetic field. The semaphore then drops to the position shown in dotted lines. When the train leaves the protected region of the track, the locking-magnet is deenergized and its armature falls away, thus throwing the weight of the tubular nut 7, rod 19, and core 4 on the semaphore and restoring it to its normal position. An organization as herein

described is compact, simple, and effective, and is free from liability to get out of order during long periods of service or in any condition of weather. For displaying a signal at night I mount a shield of colored glass on the casting 26, to which the semaphore-blade is secured, which casting is journaled on a stud bolt or pin secured to the signal-post. A lamp supported on the post behind the casting displays the signal. This simple arrangement dispenses with the necessity of brackets or other attachments from the side of the post.

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

1. A railway-signal comprising a semaphore controlled by two magnets having their axes in the same line, one of low resistance to operate the signal and the other of high resistance to lock the same, a circuit-changer operated by the signal apparatus for controlling the circuit of the low-resistance magnet, and a shunt around the circuit-changer and low-resistance magnet including the high-resistance magnet.

2. A railway-signal comprising two magnets having their axes in the same line, one to operate the signal and the other to lock it, a circuit-changer comprising a pivoted arm and a mercury contact for cutting the lifting-magnet out of circuit and energizing the locking-magnet, and a projection on the signal-rod adapted to engage said arm and cut out the lifting-magnet when the latter has completed its upward movement.

3. A railway-signal comprising a motor-magnet, a signal-rod, tubular nut 7, a circuit-breaker engaged by said nut on its upward traverse, and a slip connection with the semaphore at the nut to permit the latter to rise independently of the signal.

In testimony whereof I have hereunto subscribed my name this 27th day of May, A. D. 1896.

JAMES WAYLAND.

Witnesses:

ROBT. H. READ,  
ALICK G. MACANDREW.