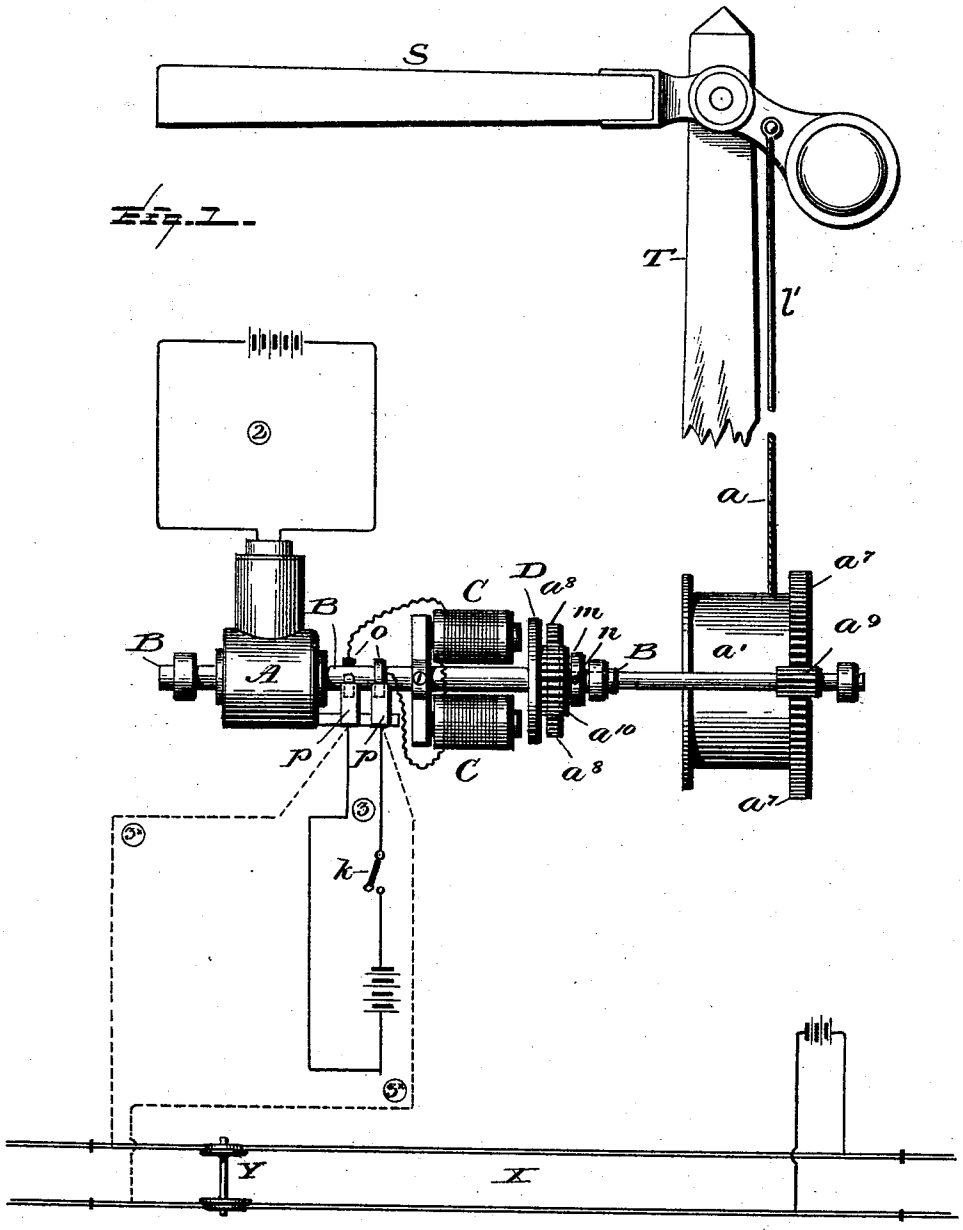
(No Model.) 2 Sheets—Sheet 1.

J. W. LATTIG.

ELECTRIC SIGNAL APPARATUS.

No. 496,787. Patented May 2, 1893.



Witnesses
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his Attorney

(No Model.) 2 Sheets—Sheet 2.

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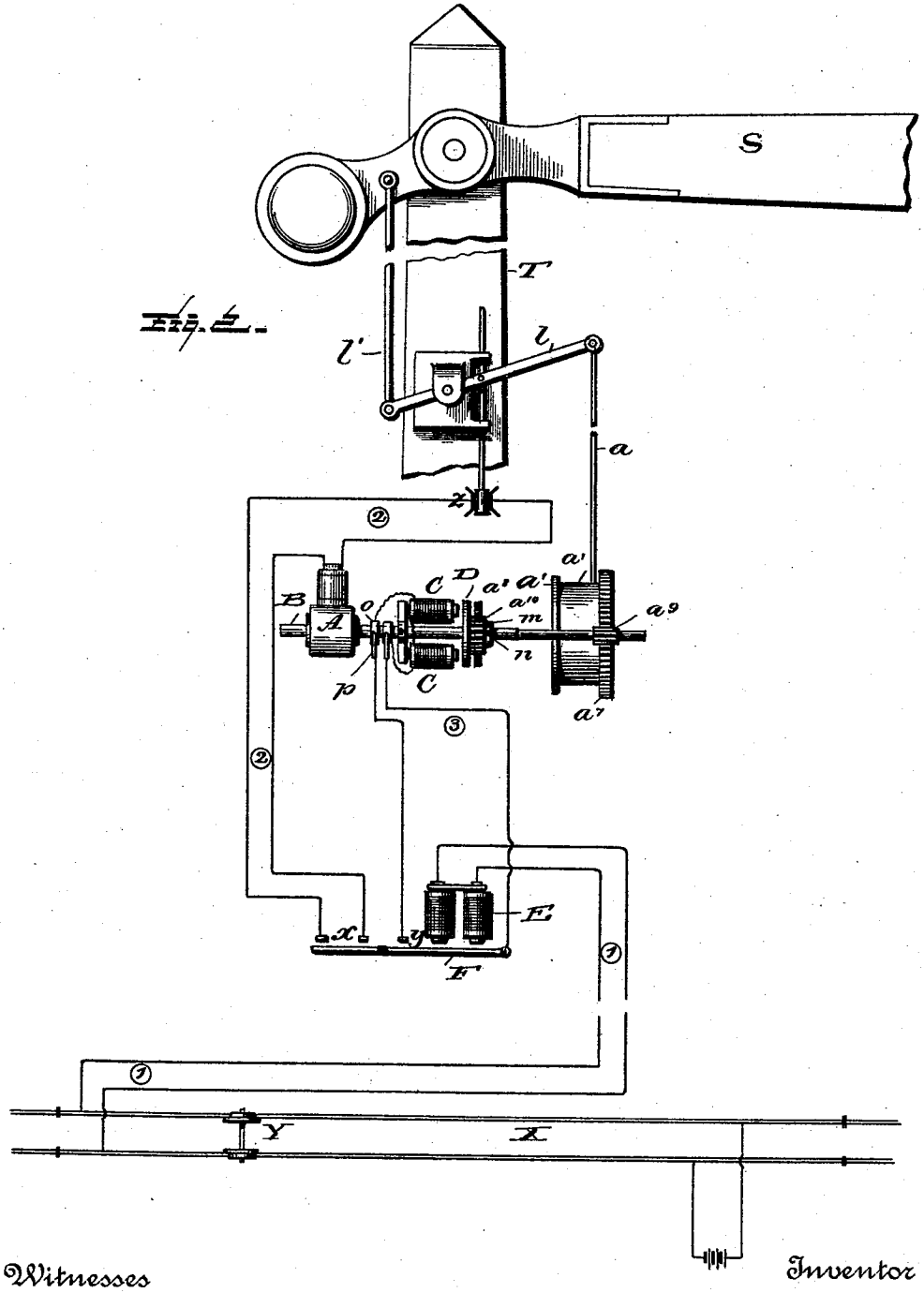
Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

JACOB WILLIAM LATTIG, OF EASTON, PENNSYLVANIA.

ELECTRIC SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 496,787, dated May 2, 1893.

Application filed January 25, 1893. Serial No. 459,729. (No model.)

To all whom it may concern:

Be it known that I, JACOB WILLIAM LATTIG, of Easton, in the State of Pennsylvania, have invented a certain new and useful Improvement in Electric Signal Apparatus, of which the following is a specification.

In another application for Letters Patent filed by me on the 27th December, 1892, Serial No. 456,380, I have described an electric signaling system for railways, embracing among other things a signal which is moved from danger to safety position by an electric motor, connected to the signal through suitable intermediaries. In one arrangement there described by me the motor after having brought the signal to safety is simply stalled—that is to say it still remains energized, but is incapable of further work because the signal has brought up against a stop and therefore cannot be moved farther by the motor; in the other arrangement the motor circuit, as soon as the signal has been pulled down to safety, is interrupted and the motor is de-energized. In each case however the motor armature is brought to a stop suddenly, and the parts are thus subjected to a certain wrench and jar which is detrimental to the apparatus.

My present invention is intended to remedy this defect, and it consists in interposing at some point in the mechanism connecting the motor with the signal an electro-magnetic clutch, comprising an electro-magnet attached to one portion of the mechanism and an armature therefor attached to the other portion of the mechanism—the arrangement being such that while the energized electro-magnet will by attracting and holding its armature transmit the movement from the motor to the signal needed to move the signal to safety, yet after the signal has been thus brought to safety, the permissible slip between the clutch armature and its magnet, will permit further rotation of the motor armature due to its momentum, the magnet by its attractive force on its armature at this time exerting a brake action on the motor armature which will gradually arrest the movement of the latter and bring it to a standstill—instead of its being abruptly checked and stopped.

The nature of my invention and the manner in which the same is or may be carried into effect will be readily understood by reference to the accompanying drawings in which—

Figure 1 is a side elevation of an apparatus embodying my invention. Fig. 2 is a view of a modification to be hereinafter more particularly described.

Like reference letters and numerals indicate corresponding parts in both the figures.

Referring now to Fig. 1, A is an electric motor, having fast on its armature shaft B an electro-magnet C (the clutch magnet). Loose on the same shaft is the disk armature D of the clutch magnet, which is capable of slight play on the shaft to and from the poles of the magnet, the extent of this movement being limited by the collar m fixed to the shaft B by set screw n. Mounted on the shaft are conducting collars o insulated from the shaft and from each other and electrically connected to the terminals of the magnet C. Brushes p bear on these collars o, and are in a circuit 3, which through the intermediaries already described includes the clutch magnet C. When the key k in that circuit is closed, the circuit will be completed through the coils of the electro magnet C which thus will be energized, and will attract its armature D which latter consequently will revolve with the magnet. Fast to the clutch armature is a gear a^{10}, which by gearing a^8, a^9, is connected to and adapted to drive a spur wheel a^7, fast to the axle of which is the winding drum a', to which is secured one end of the cord a, the opposite end of which is attached to mechanism adapted to lower or pull down the counterweighted pivoted semaphore blade S mounted on the signal pole T. The connection is made through a lever l, and connecting rod l' as in Fig. 2. The lever however is omitted from Fig. 1 on account of lack of room.

The motor circuit is shown at 2; and in this particular embodiment of my invention is supposed to be a constantly closed circuit. Under this arrangement the motor will be in constant action, and consequently its armature shaft, and the clutch magnet thereon will be in constant revolution. So long however as the clutch circuit 3 is open as shown, the clutch magnet will be de-energized, and will have no effect upon the armature D. Consequently the gearing will be inactive, the drum a' will

be at rest, and the counterweighted signal will be at danger. But whenever the clutch circuit is closed at k, the clutch magnet will be energized and will attract its armature which consequently will revolve with its magnet. This movement of the armature through the intermediate gearing puts the drum a' in rotation, and consequently by the winding of the cord a on the drum causes the signal to be pulled down to safety position. As soon as it reaches that position it is incapable of further downward movement, and the motor consequently is stalled. But by reason of the permissible slip between the two parts of the magnetic clutch the movement of the motor is not abruptly stopped, but is gradually reduced and checked until by the brake like action of the clutch the momentum of the motor armature is gradually overcome, and the parts brought to a stand-still, and will be so held with the signal at safety so long as the clutch circuit is closed. To restore the signal to danger all that is needed is to again open the clutch circuit.

One simple way of adapting the apparatus to an automatic railway block system is by modifying the clutch circuit, so that it shall be formed in part by the rails of the insulated track section or block X as indicated by dotted lines $3^{\times}$, in Fig 1. Under this arrangement the clutch circuit is a constantly closed circuit, and consequently the signal will be normally at safety. As soon however as a train enters the section, the clutch circuit will be completed through the path of lower resistance afforded by the wheels and axles of the train. The clutch magnet therefore will be cut out and the signal will at once rise to danger and stay there until the last car of the train has quitted the section.

Fig. 2 represents the apparatus embodied in a system of the same general character as the latter, with a superadded arrangement of circuits and contacts, whereby after the motor has pulled the signal down to safety the motor circuit will be automatically interrupted. In this arrangement, I employ in addition to the motor circuit 2 and the clutch circuit 3, a constantly closed primary track circuit 1, including a relay E whose armature lever F controls a pair of contacts x in the motor circuit and a pair of contacts y in the clutch circuit—these contacts being closed whenever and so long as the relay E is energized. The motor circuit contains also another set of contacts z the movable one of which is attached to and operated by the pivoted lever l to which the cord a in this instance is attached—the shorter arm of this lever being connected by a rod l', to the counterweighted end of the pivoted semaphore blade so that when the lever is pulled down by the cord, the signal will thereby be lowered to safety; and the arrangement is such that by the time the signal has reached this position, the lever in its descent will have carried down the movable contact far enough to interrupt the motor circuit.

In the position of parts shown in the drawings a train Y is supposed to be on the track section X. Consequently the relay is cut out, the contacts x and y are open, and the signal has risen to and stands at danger; the motor circuit by this movement having been closed at z. As soon as the train passes beyond the section the relay E will become energized, and by attracting its armature will close the contacts x and y, thus completing the motor and clutch circuits. The motor consequently will at once be put in motion, and through the now energized clutch will rotate the winding drum a', and thus will pull down the signal to safety. By the time this takes place the movable contact z will have been carried down far enough by the lever l to break the motor circuit. The clutch circuit however remains closed and by the brake like action of the two parts of the magnetic clutch the momentum of the motor armature is gradually overcome, and the motor is brought to a stand-still without jar or shock as above explained.

Having now described my improvement and the manner in which the same is or may be carried into effect, what I claim herein as new, and desire to secure by Letters Patent, is—

The combination with an electric motor, a signal or other movable body to be operated by the same and mechanism for imparting motion from the motor to the signal, of a magnetic clutch, forming part of said intermediate mechanism, comprising an electro-magnet fast to one part of said mechanism, and an armature therefor fast to the other part of said mechanism movable to and from the magnet and when attracted and held by its magnet adapted to slip on the poles of the same, whereby after the signal has been moved to and arrested in the desired position, the magnetic clutch while allowing continued movement of the motor armature acts as a magnetic brake to gradually arrest the movement of the latter without shock or jar, as hereinbefore set forth.

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

JACOB WILLIAM LATTIG.

Witnesses:
H. D. OSTERSTOCK,
J. BRUNNER.