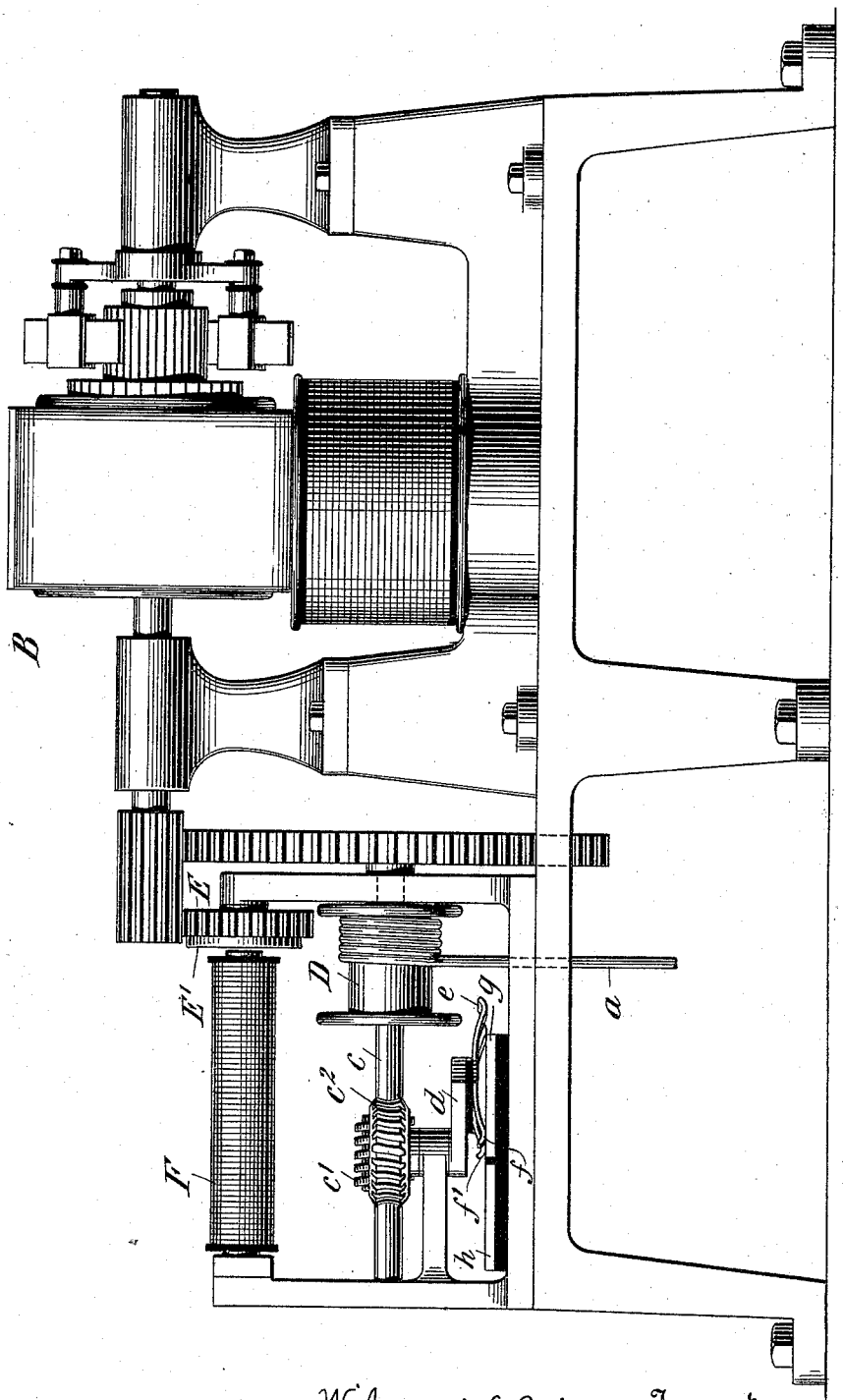
(No Model.) 2 Sheets—Sheet 1.

W. W. SALMON.

ELECTRIC SIGNAL APPARATUS.

No. 526,414. Patented Sept. 25, 1894.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

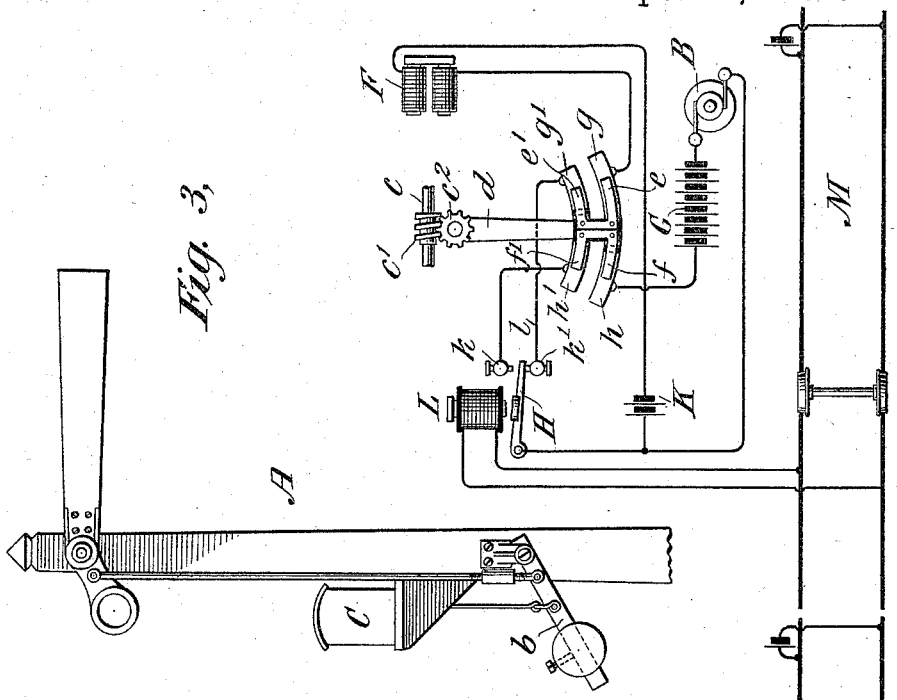
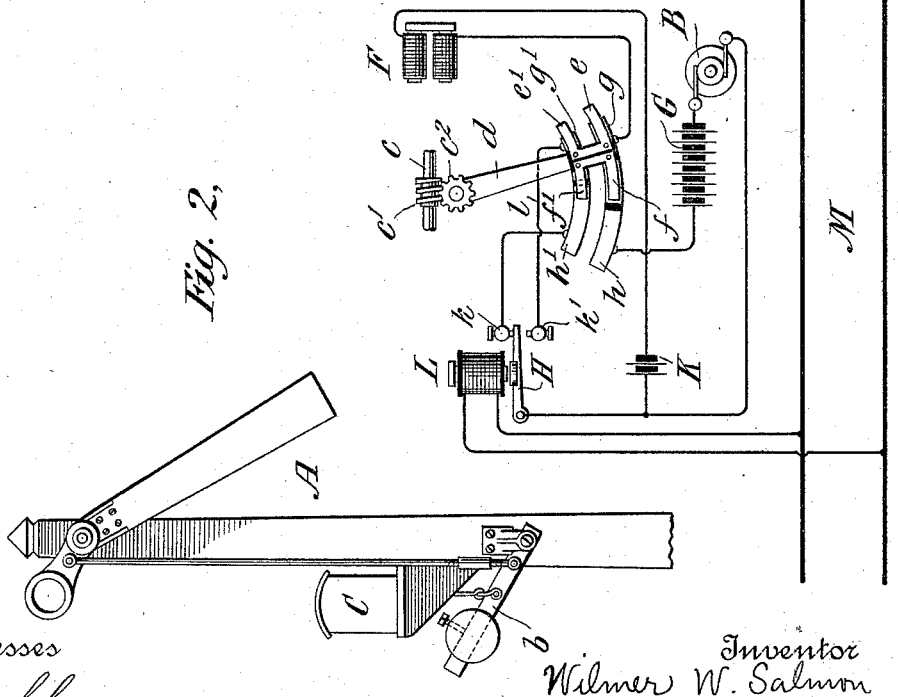


Fig. 2.



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UNITED STATES PATENT OFFICE.

WILMER W. SALMON, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE HALL SIGNAL COMPANY OF MAINE.

ELECTRIC SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 526,414, dated September 25, 1894.

Application filed February 1, 1894. Serial No. 498,719. (No model.)

To all whom it may concern:

Be it known that I, WILMER W. SALMON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Signal Apparatus, of which the following is a specification.

My invention relates to electrically operated signals adapted for use on railways, and especially of that class designed to be automatically operated upon the passage of a train.

It has for its object to provide an effective and economical means for operating the signal.

The invention comprises a motor, a device to be moved thereby, and means for retarding the moving parts when they have completed a predetermined movement.

In the present embodiment of my invention, which as shown in the drawings is applied to a railway signal, a magnetic brake is employed to retard the movement in both directions, being thrown into operation just before the signal has fully assumed its indicating position.

Referring now to the drawings, in which corresponding parts are designated by similar characters, Figure 1 is a side elevation of a motor provided with a brake and suitable gearing for operating the signal. Fig. 2 is a diagram of the motor, the brake and their controlling circuits, showing also a side elevation of a signal, all in normal condition. Fig. 3 is a diagram of the parts shown in Fig. 2, but showing them in their condition after the signal has assumed its second condition of indication.

The signal A, as shown in the drawings, is of the exposed position type and stands normally at safety. It is provided with the ordinary weight and levers by which the semaphore blade is made to assume danger position when subjected to the action of gravity alone. A motor B of any suitable type, inclosed in a box C, mounted on the signal post or otherwise conveniently located, is operatively connected to the signal preferably by means of a winding drum D and cord *a*. The drum is geared to the shaft of the motor and the free end of the cord is connected to the weighted lever *b*, so that when the cord is wound on the drum the weighted lever *b* is elevated and the semaphore blade lowered to safety. Operatively connected to some moving part of the motor or signal, which as shown in the drawings is the drum shaft *c*, is a circuit controller comprising an arm *d* provided with two pairs of contacts *e e'* and *f f'* and four fixed corresponding contacts *g*, *g'* and *h*, *h'*. The pair of contacts *e e'* are electrically connected and insulated from the pair of contacts *f*, *f'*, which are also electrically connected, the contacts *e* and *f* sweeping over the insulated contacts *g* and *h*, and contacts *e'* and *f'* sweeping over the insulated contacts *g'* and *h'*. The arm *d* is suitably geared to the shaft *c*, as by a worm *c'* on the shaft and a pinion c^2 on the arm. When these contacts are in their normal positions as shown in Fig. 1 the contacts *g* and *h'* are bridged by the contacts *f* and *f'*, and the contacts *e e'* are out of touch with the contacts *g* and *g'*; and when the arm is moved to the left the contacts *h* and *h'* are bridged by the contacts *f* and *f'*, the contacts *g* and *g'* being bridged by the contacts *e* and *e'*. Geared to the motor shaft is an idle pinion E, carrying a disk E' of magnetic metal and opposite this disk is a brake magnet F, adapted when energized to attract the disk and operating to prevent its rotation and thus to stop the motor and winding drum. The motor operating circuit includes the battery G, the contacts *h* and *h'* and an armature H and its contact *k* which is connected to the contact *h'*. The brake magnet F is included in a circuit which also includes the battery K, the contacts *g*, *h'* and the armature H and its contact *k*. The brake circuit is also provided with a branch *l* extending from the contact *g* to the contact *k'* of the armature H which is dapted to close with each of the contacts *k* and *k'*, the armature being preferably controlled, as shown, by a magnet L, operated by any convenient circuit. When the signal is to be automatically operated upon the passage of a train this circuit may be of any convenient type, whether it includes the rails

of the track or not, or whether it is normally open or normally closed. The preferred type of circuit, and which is shown in the drawings, is a normally closed circuit including the rails M of a track. The magnet L being therefore normally energized, operates normally to close the contacts H and *k*. The armature H, with its contacts *k* and *k'* may be called the primary controlling means for the brake and motor circuits, and the arm *d* with its contacts may be called the secondary means for controlling these circuits.

In the normal condition of the circuits and the signal it will be observed that the motor circuit is open at *h h'* and closed at H, *k*; that the brake circuit is closed at *g*, *h'* by the contacts *f*, *f'*, and is also closed at H, *k*, the brake magnet being therefrom energized; that the branch *l* is open at the contacts *g*, *g'* and at the contacts H, *k'*; and that the signal is held in safety position against gravity by the brake magnet.

The operation is as follows: When a train passes the signal A at safety, located near the entering end of the rails M, and passes on to these rails, it shunts the magnet L, breaking the brake circuit at *k* and closing the branch *l* at *k'*. The signal is therefore free to rise to danger behind the train. As the signal rises it unwinds the drum, revolving the motor shaft, which turns freely, and moves the arm *d* to the left. When the motor shaft and drum have completed a predetermined movement, viz., just before the signal has reached the limit of its upward movement, the contacts *h*, *h'* are bridged and the contacts *g g'* are bridged. The closing of the contacts *g g'* completes the brake circuit through the branch *l*, as shown in Fig. 3, and energizes the brake magnet F, so that the signal is retarded, thus preventing injury to the moving parts of the apparatus, which would be otherwise caused by a too sudden stoppage of the semaphore blade. When the train passes off the rails M, the magnet L is again energized, which breaks the brake circuit at *k'* and closes the motor circuit at *k*, the contacts *h* and *h'* having been already closed as explained. The motor therefore drives the drum D to wind up its cord, thus lowering the signal to safety, and moves the arm *d* to the right. When the motor shaft and drum have completed a predetermined movement, viz., just before the signal has reached the limit of its downward movement, the contacts *e e'* leave the contacts *g g'* and the contacts *f f'* break the bridge established between the contacts *h h'* and establish a bridge between the contacts *g*, *h'*, thus breaking the motor circuit and closing the brake circuit again and energizing the magnet F to retard the signal. It will be observed that by this arrangement the brake is utilized to retard the signal both before it reaches the limit of its upward movement and before it reaches the limit of its downward movement, and that in the normal condition of the circuits the brake battery, which requires but a few cells, is alone excited to enable the brake to hold the signal in normal position, the motor battery which requires many more cells being at rest.

Various changes in the form and arrangement of the mechanism and in the arrangement of the circuits could be easily suggested by any one skilled in the art without departing from the spirit of my invention. For example, the motor circuit instead of being broken when the brake circuit is energized to retard the downward movement of the signal as shown in the drawings, might be left unbroken with the brake circuit shunting the motor. While I have shown my invention as applied to a signal circuit it is of course to be understood that it may be applied to other devices as well.

What I claim, and desire to secure by Letters Patent, is—

1. The combination of an electric motor and its circuit, a device to be moved by the motor operatively connected therewith, and a brake and its circuit, said circuits so operatively connected with the moving parts that when the moving parts have completed a predetermined movement in one direction the brake circuit is energized to retard them and when the moving parts have completed a predetermined movement in the opposite direction the brake circuit is again energized to retard them, substantially as set forth.

2. The combination of an electric motor, a device to be moved by the motor operatively connected therewith, a brake, a circuit for the motor and a separate circuit for the brake, said circuits being provided with separate sources of energy, said circuits so operatively connected with the moving parts that when they have completed a predetermined movement the motor circuit is de-energized and the brake circuit is energized to retard the moving parts, substantially as set forth.

3. In an electric signaling apparatus, the combination of a signal, a motor operatively connected therewith, a brake normally operating to hold the signal at one condition of indication, a normally de-energized circuit for the motor, and a separate normally energized circuit for the brake, said circuits being provided with separate sources of energy, means for releasing the signal when in its normal position which when operated serves to release the brake and to permit the signal to assume another condition of indication, substantially as set forth.

4. In an electric signaling apparatus, the combination of a signal, a motor operatively connected therewith, a brake normally operating to hold the signal at one condition of indication, and to retard the signal both before it has reached its normal condition of indication and before it has reached its other condition of indication; circuits for the motor and for the brake, primary means for con-

trolling the said circuits, and secondary means for controlling the said circuits actuated by the moving parts of the motor, whereby when the said primary controlling means is operated the brake is released to permit the signal to assume its other condition of indication and whereby when the moving parts of the motor have completed a predetermined movement the brake is again applied to arrest the signal before it reaches its said other condition of indication, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILMER W. SALMON.

Witnesses:
L. THOMAS,
RICHARD DEVENS.