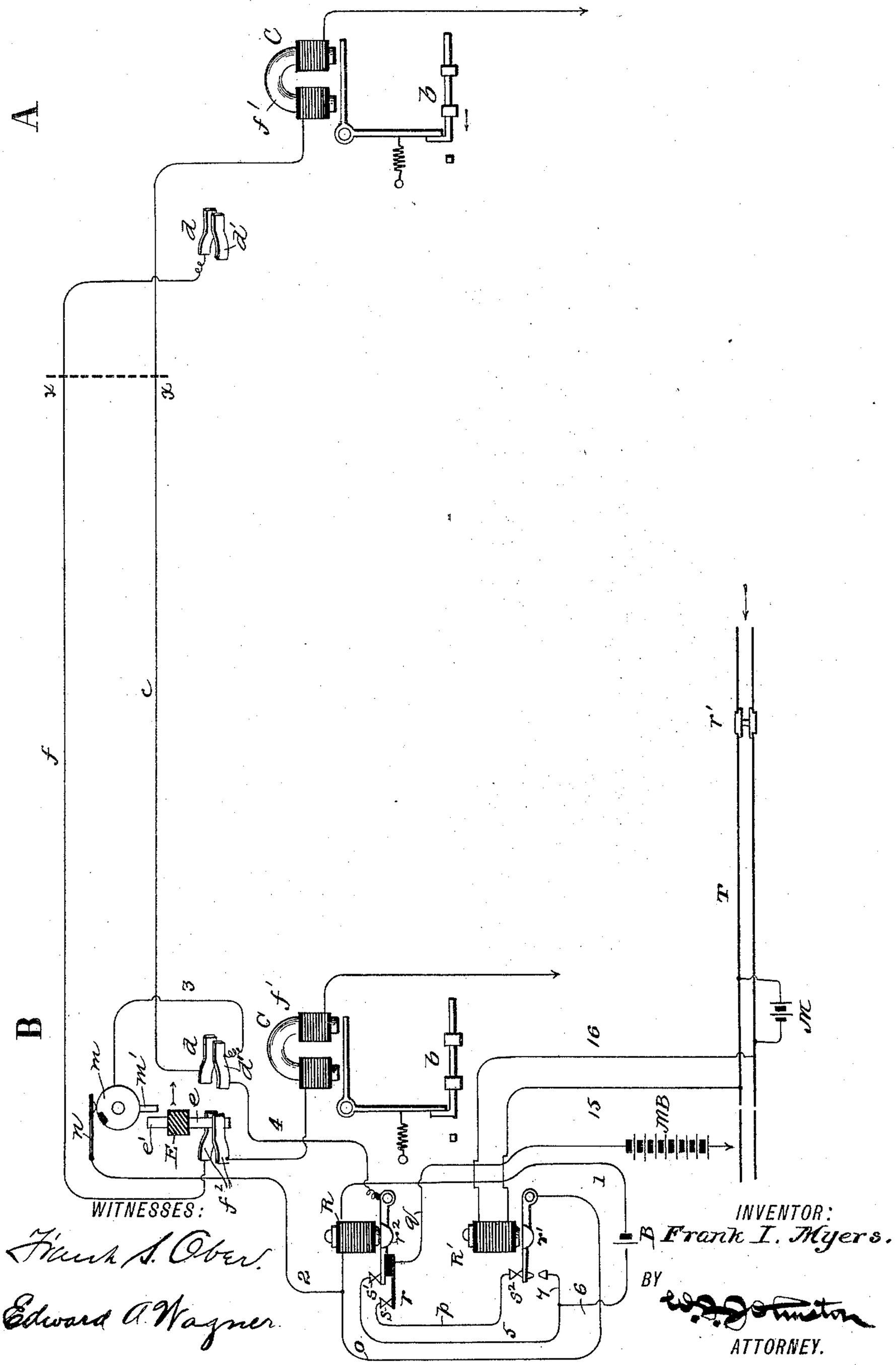
(No Model.)

F. I. MYERS.

ELECTRIC RAILWAY SIGNALING APPARATUS.

No. 467,581. Patented Jan. 26, 1892.



UNITED STATES PATENT OFFICE.

FRANK I. MYERS, OF NEW YORK, N. Y.

ELECTRIC RAILWAY SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 467,581, dated January 26, 1892.

Application filed March 16, 1891. Serial No. 385,191. (No model.)

To all whom it may concern:

Be it known that I, FRANK I. MYERS, a citizen of the United States, residing in New York, county of New York, and State of New York, have invented certain new and useful Improvements in Electric Railway Signaling Apparatus, of which the following is a specification.

My invention relates to electric railway signaling apparatus, the object being to improve and render more certain the operation of what is known as the "Sykes system" of semi-automatic signaling. This system is a combined locking and blocking system, in which the levers by which the signals are moved are locked and cannot be released until a train on the protected block has passed out of the same, and automatically put the circuits into condition for release, the release being finally accomplished manually through electric circuits. In this system also an operator at the rear of a block is dependent upon an operator at the forward end of the block.

My invention consists of the combination of circuits hereinafter described and claimed.

The drawing represents a diagram of the circuits and apparatus comprehended by my invention.

The line of railroad is divided into successive sections or blocks, and at the beginning and ending of each block is a signal-tower.

In the drawings, A represents the location of a tower at the beginning of a block, and B the location of a tower at the end of the same block. In each tower is a magnetic lock C, the function of which is to lock and release the lever which operates the signal. This lock is controlled by the operator in the tower ahead or at the end of the block through the following circuit: From ground to the lock-magnet, thence by wire *c* connecting the towers to a spring *d*, (when the circuit is closed,) wire 3, metal wheel *m*, brush *n*, wires 2 and *o*, armature *r'*, wire *p*, armature *r*, wire *q*, battery M B to ground. This circuit is called the "main locking-circuit."

I will now describe the apparatus at a tower which controls this circuit. The two springs *d* and *d'* are normally separated and insulated from each other. E represents the end of a lever carrying two metallic pins *e* and *e'* projecting from it above and below. The lever is adapted to be moved back and forth in the direction indicated by the arrow. This movement is imparted by the operator in any desired manner. It, however, is usually done by means of a thrust-rod connected with the lever, and the operation is known as "plunging." In plunging the lever first moves to a point between springs *d* and *d'* and into contact with both of them and so completing the circuit through them. This is for an instant only, and the lever in returning causes pin *e'* to strike a tail-piece *m'* on wheel *m*, making the latter rock and bring an insulated portion of itself beneath the brush *n*. Wheel *m* is held normally in the position shown by springs, and the backward movement of the lever is past the tail-piece *m*. R is a relay, whose armature carries two metallic strips *r* and r^2 insulated from each other. Their front stops are the terminals of electric circuits, to be hereinafter mentioned. R' is a second relay whose function is to control the first, as will be explained. Both the front and back stops of its armature are the terminals of electric circuits. Relay R is in the circuit of battery B, as follows: from battery by wire 1, through the relay, wire 2, brush *n*, wheel *m*, wire 3, spring *d'*, wire 4, armature r^2, front stop, and wires 5 and 6 to battery. At the rear ends of the blocks or section of track a short section—say about fifty feet—of the track is insulated from the remainder of the track, and the two rails of this section are connected with the terminals of another battery M. The circuit of this battery is normally completed by the wires 15 and 16, which include the relay R'.

The working of the apparatus is as follows: the signals normally are to "danger," and locked in that position by bolts *b*. When a train approaches tower A, the operator in that tower requests the operator in tower B to release his lever so that he may clear the signal and allow the train to pass into the block. He makes this request by telegraph or otherwise. If the block is clear, the operator in the tower B "plunges," thereby closing the locking-circuit, hereinbefore specified, at the springs *d d'*, de-energizes the locking-magnet in tower A, and the bolt *b* is withdrawn, allowing the operator in tower A to clear his

signal, and the train enters the block. It should be here stated that the locking-magnet is a permanent magnet which, when the current flows through its coils, becomes de-energized, the electro-magnetism counteracting the permanent magnetism. Immediately after closing the circuit at the springs *d d'* the lever E moves back, and in doing so rotates wheel *m*, thus breaking the circuit of relay R and allowing its armature to fall, thus making a second break at *s* in the locking-circuit, and also making a second break at *s'* in the circuit of relay R. This second break in the relay-circuit may be regarded as a permanent one, while the first break at *m* is only instantaneous. These operations take place on the act of plunging. The train then proceeds through the block, and when it reaches the insulated section of track T at the end of the block the wheels and axles T' of the train short-circuit battery M and thus de-energize relay R', allowing its armature *r'* to fall against its backstop and close the circuit of relay R as follows: from battery B by wire 1, through relay R, wire *o*, armature *r'*, and wires 7 and 6 to battery. Relay R then, attracting its armature, closes its own original circuit at *s'*, and also closes the locking-circuit at *s*. As soon as the last wheel of the train has passed off of the section T, relay R' becomes energized again and draws its armature against its front stop. It will be noticed that while the relay R' was de-energized the locking-circuit was broken at a third point s^2; but this break was reclosed as soon as the train left the insulated track-section. The circuits are now in their original condition, and if the operator in tower B plunges again upon the request of A, A's lever will be unlocked, as before, and the same operation will take place; but suppose A had called for a release before the train had passed out of the block or passed the insulated track-section. Then if B had plunged it would not have unlocked A's lever because the locking-circuit was still open at *s* and would continue so until the train itself closed it, as described above.

My invention also embraces a further improvement in the Sykes system, which is designed to prevent another fault I have discovered therein, and that is when an operator plunges in response to the call of an adjacent operator he is liable under certain conditions to release or unlock his own signal-lever. This is brought about by an accidental "cross" on the wires which extend from tower to tower.

Referring again to the drawing, the wire *f* is a part of the locking-circuit controlled at tower A and extending to the lock-magnet *f'* at tower B. The wires *f* and *c* are run side by side between the towers, and it sometimes happens that a conductor of electricity falls across them, in which case if the operator in tower B, for instance, plunges a circuit will be established, as follows, the cross being represented by dotted line *x x*: from ground through the locking-magnet *f'* by wire *f*, cross *x x*, wire *c*, springs *d d'*, wire 3, wheel *m*, brush *n*, wire 2, wire *o*, armature *r'*, wire *p*, armature *r*, wire *q*, and battery M B to ground. This would result in releasing the lock in tower B and would also short-circuit tower A. To prevent this, I insert in the wire *f* at a point between the lock-magnet and the main line two springs f^2 f^2, which are normally in electrical connection through the metallic pin *e* on lever E; but while the said lever E is over between the springs *d d'* the springs f^2 are out of contact with each other, and consequently the circuit of the lock-magnet in tower B is open, and although the cross may be on the wires it will have no evil effect.

Having thus described my invention, I claim—

1. In a railway signaling system, the combination, with a main locking-circuit, a relay, as R, controlling the same, and two local circuits, both including said relay, of a second relay, as R', controlling one of said local circuits, and a train-operated circuit-controller controlling the circuit of said second relay, for the purpose set forth.

2. In a railway signaling system, the combination of a main locking-circuit, a local circuit controlled manually, a relay, as R, in said local circuit controlling the main locking-circuit, a second local circuit controlling said relay, a second relay, as R', controlling said second local circuit, and a train-operated circuit-controller controlling the circuit of said second relay, substantially as described.

3. In a railway signaling system, the combination, with two separate locking-circuits extending side by side, each being normally open at one end and closed at the other, the closed end of one circuit being opposite or adjacent to the open end of the other, of a circuit-controller adapted to complete one circuit at one end and open the other at the same end, for the purpose set forth.

In witness whereof I have hereunto affixed my seal and signed my name in the presence of two subscribing witnesses.

FRANK I. MYERS. [L. S.]

Witnesses:
J. A. MOWHEAD,
MASON S. HALL.