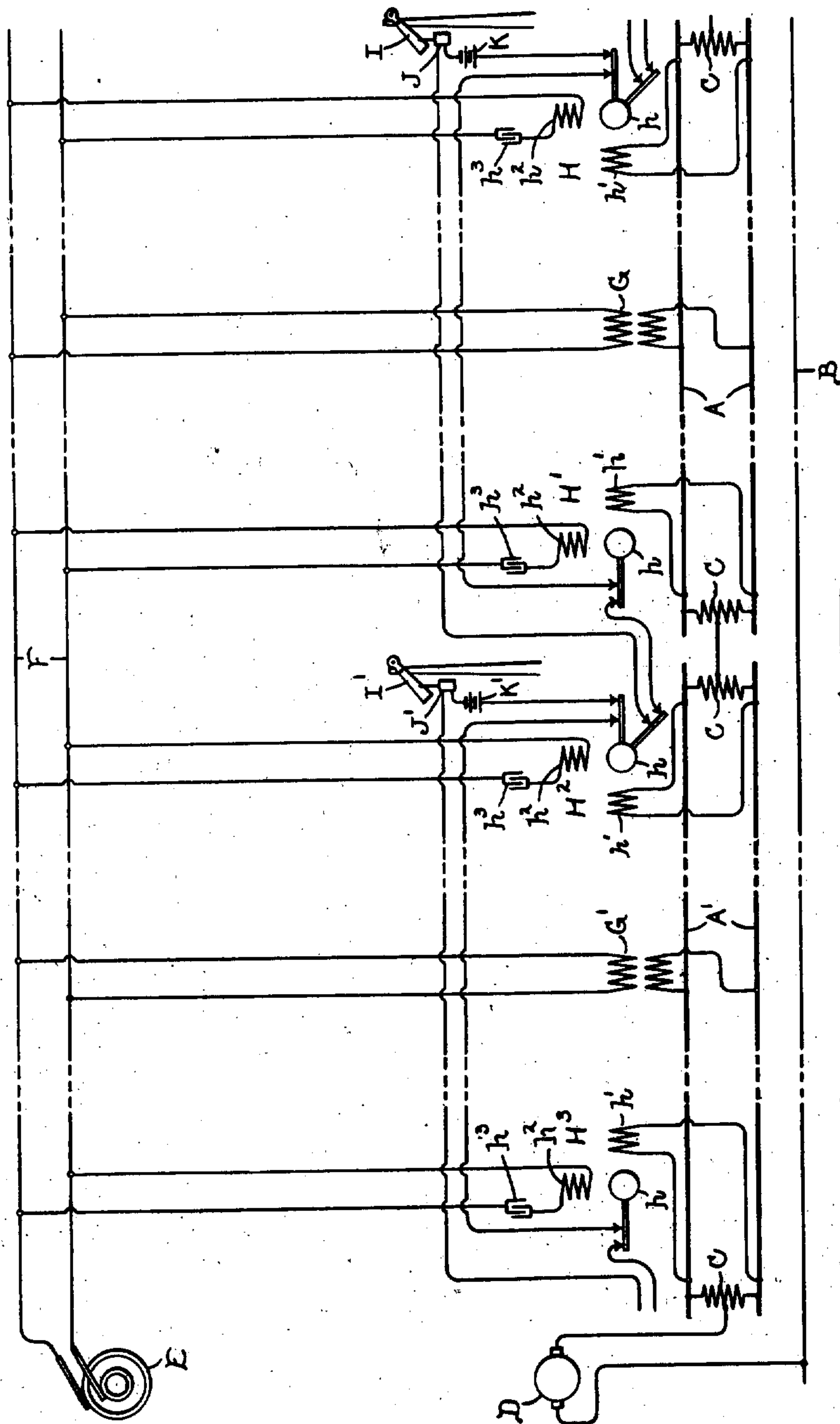


No. 897,531.

PATENTED SEPT. 1, 1908.

L. A. HAWKINS.
BLOCK SIGNAL SYSTEM.
APPLICATION FILED FEB. 19, 1908.



WITNESSES:

Wm. H. Palmer.
J. Ellis Allen.

INVENTOR
LAURENCE A. HAWKINS.

BY

Alfred H. Davis
ATTY.

UNITED STATES PATENT OFFICE.

LAURENCE A. HAWKINS, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

BLOCK-SIGNAL SYSTEM.

No. 897,531.

Specification of Letters Patent.

Patented Sept. 1, 1908.

Application filed February 19, 1908. Serial No. 416,696.

To all whom it may concern:

Be it known that I, LAURENCE A. HAWKINS, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Block-Signal Systems, of which the following is a specification.

My invention relates to alternating-current block signal systems, and its object is to provide a novel arrangement of such a system, whereby an overlap is obtained in a simple and convenient manner.

By the use of a proper overlap it is possible to dispense with distant signals. On steam roads, where the traffic consists chiefly of long heavy trains, the overlap is not a satisfactory substitute for the distant signal, since the absence of an indication of the condition of a home signal, until the home signal itself is in sight, frequently results in necessitating an emergency stop. On certain classes of electric roads, however, as, for instance, on interurban lines, where the traffic consists of single cars or short trains, quick stops, instead of being objectionable, are the rule in ordinary operation so that the overlap is a satisfactory substitute for the distant signal. Furthermore, on interurban roads long blocks are the rule, so that because of the high impedance offered by the track-rails to alternating-current, it is ordinarily desirable to supply the signal current to the rails near the centers of the blocks and to provide relay connections at both ends of the block. When this is done, my invention renders it possible to obtain the desired overlap without any addition to the apparatus, or to the wiring, and, therefore, without any additional expense whatever.

My invention will best be understood by reference to the accompanying drawing, which shows diagrammatically an alternating-current block signal system arranged in accordance with my invention.

In the drawing A A' represent the track rails of two blocks of an electric railway, and B represents the third-rail or trolley-wire. The rails A A' of the two blocks are insulated from each other, and a return path for the power-current is provided in any suitable manner, as, for instance, through reactive bonds C C.

D represents the power-generator which is

represented diagrammatically as a direct-current generator.

E represents an alternating-current generator for supplying current for the signal circuits.

F represents line-wires connected to the generator E, and G G' are transformers having their primaries connected to the line-wires and the secondaries connected across the track-rails near the centers of the blocks.

H, H¹, H² and H³ represent track relays, which are shown as of the two-phase inductive type, comprising a secondary member h, a winding h¹ connected to the track, and a winding h² supplied directly from the line-wires F through suitable phase controlling means indicated by the condenser h³.

I I' represent home signals for the blocks, J J' represent the operating mechanisms and K K' the sources of current therefor.

It will be seen that the operating or controlling circuit of the signal I extends through contacts of relays H, H¹ and H², so that the signal is controlled jointly by the relays at both ends of the block which the signal guards, and also by the relay at the adjacent end of the block next in advance. This connection of the signal circuit results in giving an overlap of something more than half a block in length. If a train is in the block between the relays H and H¹, one of these relays is short-circuited, so as to open the signal circuit. When the car or train passes out of block A into block A', the signal I is not immediately cleared, although both relays H and H¹ close their contacts. The signal circuit is open at contacts of the relay H², which is now short-circuited owing to the presence of the train between it and the transformer G'. Relay H² remains deenergized and signal I at danger until the car or train has passed transformer G' a sufficient distance to allow its secondary voltage to rise sufficiently to energize relay H³ and cause it to close its contacts. Thus, a positive overlap of something more than half a block in length is obtained without increasing the number of insulated joints, inductive bonds or relays, or the amount of wiring, as compared with any system in which the signal current is supplied at the centers of the blocks.

I do not desire to limit myself to the particular construction or arrangement of parts

here shown, but aim in the appended claims to cover all modifications which are within the scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. An alternating-current block signal system, comprising sources of alternating-current connected to the track rails near the centers of the blocks, relays connected to the rails at both ends of the blocks, and home signals for the blocks, each of said signals being controlled jointly by the relays at both ends of the block guarded by the signal and by the relay at the adjacent end of the block next in advance.

2. An alternating-current block signal system, comprising sources of alternating-current connected to the track rails near the centers of the blocks, relays connected to rails at both ends of each block, home signals, and controlling circuits for the signals, the controlling circuit of each of said signals including contacts of the relays at both ends of the block guarded by the signal and of the relay at the adjacent end of the block next in advance.

3. An alternating-current block signal sys-

tem, comprising sources of alternating-current connected to the track rails near the centers of the blocks, track relays, relay connections to the track rails at both ends of each block, home signals, and operating means and control circuits therefor arranged to permit a signal to go to danger upon a failure of alternating-current in the relay connections at either end of the block guarded by the signal or in the relay connections at the adjacent end of the block next in advance.

4. An alternating-current block signal system, comprising sources of alternating-current connected to the track rails near the centers of the blocks, relays connected to the rails at both ends of each block, and signals for the blocks, the relay at the entering end of a block being arranged to control the home signals both for that block and for the block next in the rear.

In witness whereof, I have hereunto set my hand this 18th day of February, 1908.

LAURENCE A. HAWKINS.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.