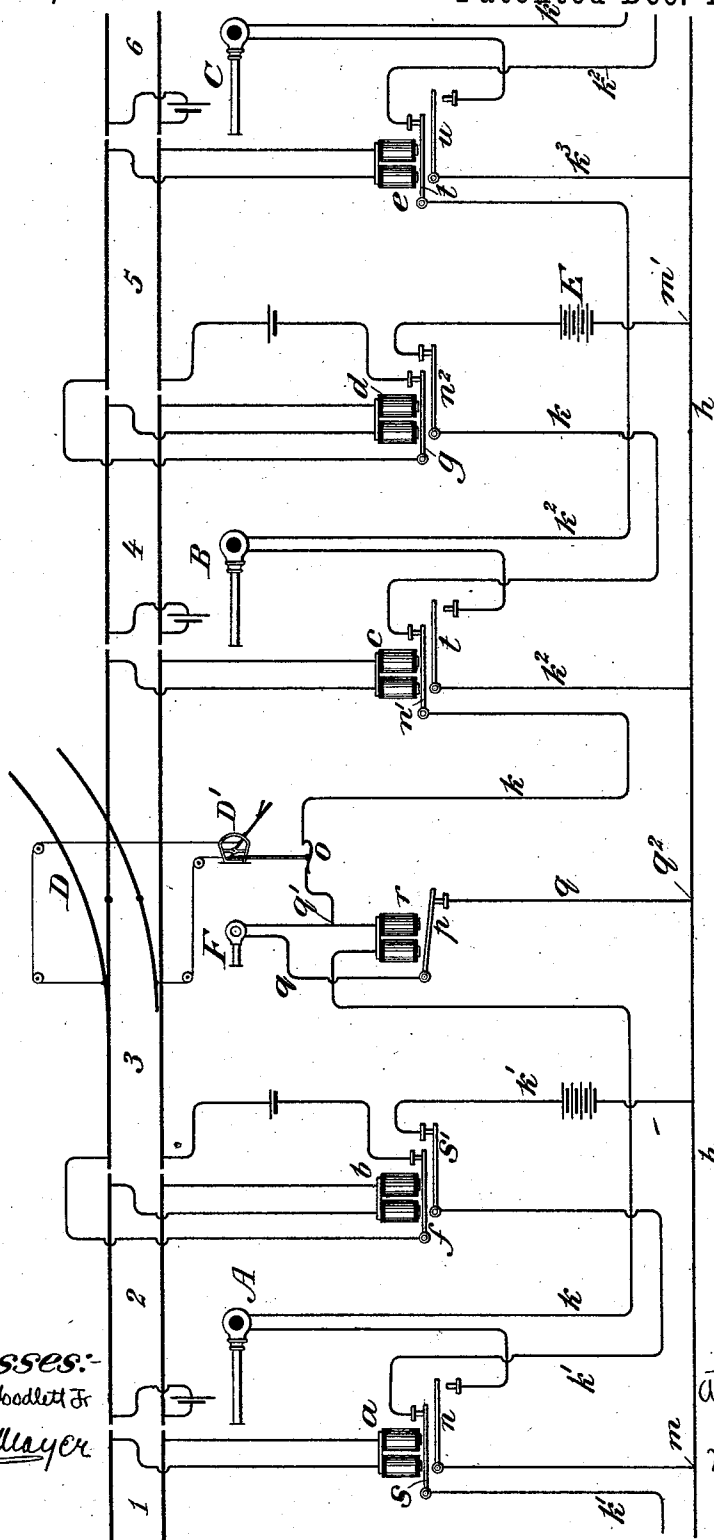


(No Model.)

A. J. WILSON.
ELECTRIC BLOCK SIGNALING SYSTEM.

No. 531,284.

Patented Dec. 18, 1894.



Witnesses:
Nicholas M Goodlett Jr
Isabel Mayer

Inventor:
Adoniram J. Wilson
by his attys
Witter & Kempton

UNITED STATES PATENT OFFICE.

ADONIRAM J. WILSON, OF PORT CHESTER, NEW YORK, ASSIGNOR TO THE
HALL SIGNAL COMPANY, OF MAINE.

ELECTRIC BLOCK-SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 531,284, dated December 18, 1894.

Application filed May 14, 1894. Serial No. 511,178. (No model.)

To all whom it may concern:

Be it known that I, ADONIRAM J. WILSON, a citizen of the United States, and a resident of Port Chester, in the county of Westchester, State of New York, have invented a new and useful Improvement in Electric Block-Signaling Systems, of which the following is a specification.

My invention relates to electric block signaling systems for railways, and it has for its main objects to simplify such systems and render more certain the operation of the signals, and also to provide means for indicating at a switch the approach of a train in order that the switchman may keep the switch in proper condition for the passage of the train, the switch being preferably so connected with a signal in the rear that a train approaching the switch will be blocked if the switch is not in proper condition for the train's passage.

The invention consists of the construction and arrangement hereinafter set forth.

In the drawing the invention is illustrated in diagram.

Referring now more particularly to the various features illustrated in the drawing, the track is divided up into a series of subsections 1, 2, 3, 4, 5 and 6. The signal A guards the subsections 2, 3 and 4, the signal B guards the subsections 4, 5 and 6, and the signal C guards the subsections 6, &c. It will thus be seen that the block guarded by the signal A overlaps at the subsection 4 the block guarded by the signal B, and that the block guarded by the signal B overlaps at the subsection 6 the block guarded by the signal C. The rails of each of the subsections are included in a track circuit which includes also a magnet at the exit end of the subsection. These magnets are lettered respectively *a*, *b*, *c*, *d* and *e*. The subsections 3 and 5 also include circuit controllers *f* and *g* respectively, each of which is operated by the magnet of the track circuit immediately in the rear. The wire *h* extends continuously along the track and constitutes one side of each of the signal operating or controlling circuits for the signals A, B, C, &c. The other side, *k*, of the signal circuit for the signal A joins the side *h* at the

points *m* and *m'*, and includes the circuit controllers *n*, *n'* and *n²*, the first of which is normally open and operated by the magnet *a*, while the others are normally closed and operated by the magnets *c* and *d* respectively. Thus this signal circuit is normally de-energized. This signal circuit also includes a circuit controller *o* near the switch D and operatively connected with the switch lever D' so that when the switch is thrown for main line running, the circuit controller *o* is closed as shown, but when it is thrown for the siding this circuit controller is open. A bridge wire *q* connects the two sides of the signal circuit at the points *q'* and *q²*, and includes a normally closed circuit controller *p* operated by the magnet *r* in the signal circuit.

The battery E of the signal circuit is preferably located at the advance or exit end of the circuit, and it will be seen that when the circuit controller *p* is closed, the battery is in a closed circuit with this circuit controller through the bridge wire *q* which includes it. This circuit operates or controls an indicator F for the switch, and may be called the indicator circuit.

The signal circuits for the other signals are similar to the circuit for the signal A just described, but they may or may not be connected with the indicator circuits. The circuit *h k'* for the signal in the rear of the signal A has the normally closed circuit controllers *s* and *s'*, operated respectively by the magnets *a* and *b*, and since a train operates the signal circuit *h, k'* after it operates the signal circuit *h, k*, it is evident that these signal circuits overlap. The circuit *h, k²* for the signal B includes the normally open circuit controller *t*, and the normally closed circuit controller *t'*, operated respectively by the magnets *c* and *e*, and the circuit *h, k³* for the signal C includes the normally open circuit controller *u*, operated by the magnet *e*. It will be seen that the signal circuits *h, k* and *h, k²* overlap just as do the circuits *h, k'* and *h, k*, inasmuch as the circuit *h, k* is operated by a train after the circuit *h, k²* is operated by the same train.

The signals are shown in the drawing as standing normally at danger with the signal

circuits normally de-energized, the indicator being normally at safety with its circuit normally energized.

The operation of the system is as follows:

- 5 A train entering the subsection 1 operates its track circuit by shunting the magnet *a*, thereby breaking the signal circuit *h, k'* at *s* and energizing the signal circuit *h, k* by closing it at *n*. This puts the signal A to safety before the train. At the same time the train holds the signal circuit *h, k'* open at *s* till the entire train has passed out of the subsection 1 and wholly into the subsection 2. When the train passes the signal A and enters the block which the signal guards, it first operates the track circuit of the subsection 2 by shunting the magnet *b*. This continues the break of the signal circuit *h, k'* by breaking the circuit again at *s'*, and also breaks the track circuit of the sub-section 3 at *f*, thereby de-energizing the magnet *c* and breaking the circuit for the signal A at *n'*, and closing the circuit *h, k'* for the signal B at *t*. The signal A is thus returned to danger, the signal in the rear of A is continued at danger, and the signal B is put to safety as soon as the train begins to pass the signal A. When the train has passed off the subsection 2 and on to the subsection 3, the signal circuit *h, k'* is closed and the track circuit of the subsection 3 is closed at *f*, but the magnet *c* of this circuit is shunted and thus continued in its de-energized condition. When the train reaches the signal B it finds the signal at safety and so enters into the block which it guards by passing upon the subsection 4, thereby continuing a break in the circuit for the signal A by opening the circuit controller *n'*. At the same time the track circuit of subsection 5 is broken at *g* and the magnet *e* is de-energized to close the circuit for the signal C at *u* and break the circuit for the signal B at *t'*. When the train enters subsection 5 it continues the magnet *e* in its de-energized condition and thus continues the circuit for the signal B broken and the circuit for the signal C energized.

While I have shown all the track circuits as normally closed and including insulated sections of the rails, yet in some cases other types of track circuits might be substituted. For instance, track circuits operated by track instruments might be used in some cases with advantage, and track circuits normally open might also be in some cases used with advantage. Again, the power for directly operating the signal may be derived from any convenient source, whether electrical, pneumatic, hydraulic, mechanical, &c. Various other changes which will readily suggest themselves to one skilled in the art may be made without departing from what I conceive to be the broad spirit of my invention as herein set forth.

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

1. In an electric signaling system for rail-

ways, the combination of a track divided into a series of overlapping blocks, each divided into subsections, a signal for each block, overlapping signal circuits for the signals, a track circuit for each subsection of a block controlling the electric condition or the signal circuit for said block, two or more of said track circuits being so connected together that when one is operated the other is also operated to affect the signal circuit, substantially as set forth.

2. In an electric signaling system for railways, the combination of a block of a track divided into subsections, a track circuit which includes the rails of the track for each subsection, a signal normally at danger and a normally deenergized signal circuit for the block, means for energizing the signal circuit in the rear of the block and means for deenergizing the signal circuit upon a change in the electric condition of each of the track circuits of the block, two or more of the said track circuits being so connected together that when one of them is operated another is also operated to affect the signal circuit, substantially as set forth.

3. In an electric signaling system for railways, the combination of a track divided into a series of blocks, each divided into subsections, a signal normally at danger and a track circuit which includes the rails of the track for each subsection, a normally deenergized signal circuit for each block, means located in one block for energizing the signal circuit of a block in advance, and means for deenergizing the said signal circuit upon a change in the electric condition of each of the track circuits of the said block in advance, two or more of the track circuits of said block in advance being so connected together that when one is operated the other is also operated to affect the signal circuit, substantially as set forth.

4. In an electric signaling system for railways, the combination of a track divided into a series of blocks each divided into subsections, a track circuit for each subsection, a normally deenergized signal circuit for each block, means included in each signal circuit for energizing it upon a change in the electric condition of each of two or more operatively connected track circuits of a block in the rear, and means included in each signal circuit for deenergizing it upon a change in the electric condition of each of the track circuits of its block, substantially as set forth.

5. In an electric signaling system for railways, the combination of a track divided into a series of overlapping blocks each divided into subsections, a track circuit for each subsection, a normally deenergized overlapping signal circuit for each block, means located in one block for energizing the signal circuit of a block in advance and means for deenergizing the said signal circuit upon a change in the electric condition of each of the track circuits of the said block in advance, two or

more of the track circuits of said block in advance being so connected together that when one is operated the other is also operated to affect the signal circuit, substantially as set forth.

6. In an electric signaling system for railways, the combination of a track divided into a series of overlapping blocks each divided into subsections, a track circuit for each subsection, a normally deenergized overlapping signal circuit for each block, means included in each signal circuit for energizing it upon a change in the electric condition of each one of two or more operatively connected track circuits of a block in the rear, and means included in each signal circuit for deenergizing it upon a change in the electric condition of each of the track circuits of its block, substantially as set forth.

7. In an electric signaling system for railways, the combination of a track divided into a series of blocks each divided into subsections, a track circuit for each subsection two or more of which are so operatively connected that when one of them is operated another is also operated, a normally open signal circuit for each block adapted to operate a signal near the entrance thereof, each block and each signal circuit overlapping respectively the succeeding block and signal circuit, means included in each signal circuit for closing it upon a change in the electric condition of each of the connected track circuits of the preceding block, and means included in each signal circuit for breaking it upon a change in the electric condition of each of the track circuits of its block, substantially as set forth.

8. In an electric signaling system for railways, the combination of a track divided into a series of blocks each divided into subsections, a track circuit for each subsection two or more of which are so operatively connected that when one of them is operated another is also operated, a normally open signal circuit for each block adapted to operate a signal near the entrance thereof, means included in each signal circuit for closing it upon a change in the electric condition of each of the connected track circuits of the preceding block, and means included in each signal circuit for breaking it upon a change in the electric condition of each of the track circuits of its block, substantially as set forth.

9. In an electric signaling system for railways, the combination of a signal operating or controlling circuit, a track circuit controlling the signal circuit, and a switch indicator connected in a bridge across the signal circuit, whereby the operation of the track circuit affects both the signal circuit and the indicator, substantially as set forth.

10. In an electric signaling system for railways, the combination of a signal, a normally deenergized signal circuit operating or controlling said signal, a switch indicator connected in a bridge across the signal circuit,

and means controlled by a train for energizing said signal circuit and simultaneously operating the indicator, substantially as set forth.

11. In an electric signaling system for railways, the combination of a signal operating or controlling circuit, a track circuit controlling the signal circuit, a switch indicator connected in a bridge across the signal circuit whereby the operation of the track circuit affects both the signal circuit and the indicator, and a switch so connected with the signal circuit that when the switch is operated the signal circuit is affected, substantially as set forth.

12. In an electric signaling system for railways, the combination of a signal, a normally deenergized signal circuit operating or controlling said signal, a switch indicator connected in a bridge across the signal circuit means for energizing said signal circuit, and simultaneously operating the indicator, and a switch so connected with the signal circuit that when the switch is operated the signal circuit is affected, substantially as set forth.

13. In an electric signaling system for railways, the combination of a signal, a normally deenergized signal circuit operating or controlling the signal, a track circuit for operating the signal circuit, a switch and an indicator for the switch, said indicator connected in a bridge across the signal circuit whereby when the track circuit is operated both the indicator and signal circuit are operated, the switch and signal circuit being so connected that when the switch is opened the signal circuit is also opened, substantially as set forth.

14. In an electric signaling system for railways, the combination of a track section divided into subsections, a signal operating or controlling circuit, a track circuit for each subsection controlling the electric condition of the signal circuit, two or more of said track circuits being operatively connected together whereby when one of the said connected circuits is operated another of said connected circuits is also operated to affect the signal circuit, a switch for the track and an indicator for the switch, a circuit for operating or controlling the condition of the indicator, and means for controlling the indicator circuit located in the rear of the indicator, substantially as set forth.

15. In an electric signaling system for railways, the combination of a track section divided into subsections, a signal operating or controlling circuit, a track circuit for each subsection controlling the electric condition of the signal circuit, a switch for the track and an indicator for the switch, a circuit for operating or controlling the condition of the indicator, and means for controlling the indicator circuit located in the rear of the indicator, substantially as set forth.

16. In an electric signaling system for rail-

ways, the combination of a track divided into a series of blocks each divided into subsections, a signal for each block, signal circuits for the signals, a track circuit for each subsection of a block controlling the electric condition of the signal circuit for said block, a switch for a block and an indicator therefor, a circuit for operating or controlling the indicator and means for controlling the indicator circuit located in the rear of the indicator, substantially as set forth.

17. In an electric signaling system for railways, the combination of a track block divided into subsections, a track circuit for each subsection, a normally deenergized signal circuit for the block, means for energizing the signal circuit in the rear of the block and means for deenergizing the signal circuit upon a change in the electric condition of each of the track circuits of the block, a switch for the block and an indicator therefor, a circuit for operating or controlling the indicator, and means for operating the indicator circuit located in the rear of the indicator, substantially as set forth.

18. In an electric signaling system for railways, the combination of a track block divided into subsections, a track circuit for each subsection, a normally deenergized signal circuit for the block, means for energizing the signal circuit in the rear of the block and means for deenergizing the signal circuit upon a change in the electric condition of each of the track circuits of the block, two or more of the said track circuits being so connected together that when one of them is operated another is also operated to affect the signal circuit, a switch for the block, and an indicator therefor, a circuit for operating or controlling the indicator, and means for operating the indicator circuit located in the rear of the indicator, substantially as set forth.

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

ADONIRAM J. WILSON.

Witnesses:

RALPH B. HIBBARD,
RICHARD DEVENS.