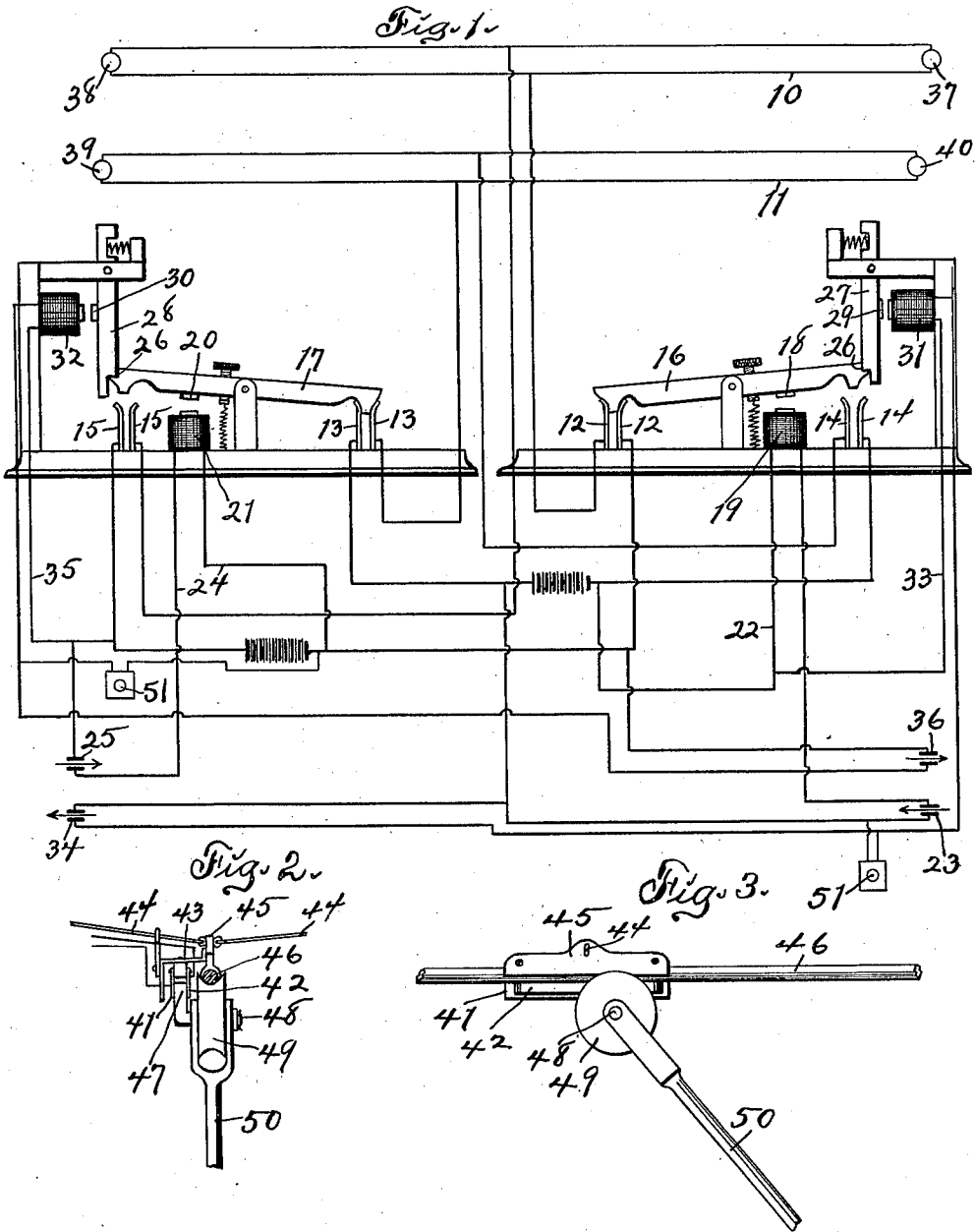


T. J. EMPFIELD.
 ELECTRIC SIGNAL FOR RAILWAYS.
 APPLICATION FILED OCT. 8, 1910.

1,001,828.

Patented Aug. 29, 1911.



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UNITED STATES PATENT OFFICE.

THOMAS J. EMPFIELD, OF DES MOINES, IOWA.

ELECTRIC SIGNAL FOR RAILWAYS.

1,001,828.

Specification of Letters Patent. Patented Aug. 29, 1911.

Application filed October 8, 1910. Serial No. 586,391.

To all whom it may concern:

Be it known that I, THOMAS J. EMPFIELD, citizen of the United States of America, and resident of Des Moines, Polk county, Iowa, have invented a new and useful Electric Signal for Railways, of which the following is a specification.

The object of this invention is to provide an improved signaling system and apparatus designed for use on railways.

My invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in my claims and illustrated by the accompanying drawing, in which—

Figure 1 is a diagram of the system embodying the improved magneto devices for making and breaking the circuits. Fig. 2 is an elevation illustrating a means employed for establishing an electric circuit, and Fig. 3 is a side elevation of the elements shown in Fig. 2.

In my improved system I employ two signal circuits 10, 11, normally closed to contact plates 12, 12, 13, 13 and normally open to contact plates 14, 15. A switch lever 16 is adapted to make a contact at its opposite ends through the plates 12, 12 and 14, 14 respectively and is spring held away from the latter plates. A switch lever 17 is adapted to make a circuit at its opposite ends through the contact plates 13, 13 and 15, 15 respectively and is spring held out of contact with the latter plates. An armature 18 on the switch lever 16 coacts with a magnet 19 and an armature 20 on the lever 17 coacts with a magnet 21. The magnet 19 is in an open circuit 22 to a switch 23 and the magnet 21 is in an open circuit 24 to a switch 25. The end portions of the levers 16, 17 adjacent to the contact plates 14, 15 are formed with notches 26 adapted to receive and be engaged at times by notched end portions of levers 27, 28, respectively, the latter levers being arranged at right angles to the former levers and normally spring held toward them. Armatures 29, 30 on the levers 27, 28 coact with magnets 31, 32. The magnet 31 is in an open circuit 33 to a switch 34 and the magnet 32 is in an open circuit 35 to a switch 36. The signal circuit 10 carries separate signals such as lamps 37, 38 and the signal circuit 11 carries separate signals such as lamps 39, 40. The switches 23 and 25 are adapted to be closed by a train entering a

block for the purpose of energizing the magnet 19 or 21 and causing said magnet to attract the armature 18 or 20 and oscillate the lever 16 or 17 and close the signal circuit 10 or 11, the alternative depending on the direction in which the train enters the block. The switches 34 and 36 are adapted to be closed by a train leaving the block in order to energize the magnet 31 or 32 and cause it to pull the armature 29 or 30 and oscillate the lever 27 or 28 to the end of releasing said lever from engagement with the lever 16 or 17 and permitting the springs to expand and oscillate the latter lever to break the signal circuit, the alternative being dependent on the direction in which the train leaves the block. It will be observed that when a signal circuit is made the corresponding lever 27 or 28 is spring pressed into engagement with the corresponding lever 16 or 17 and acts as a detent to hold the signal circuit closed until it is withdrawn by the magnet 31 or 32. The arrangement of the circuits is such that when a signal is set against a train approaching a block, and such train accidentally or carelessly proceeds through its switch, it will open the signal circuit set against it and in so doing will set one switch of signal circuit. The remaining switch of said other circuit being open, no signal is displayed. Such train then comes to a stop and backs out of the block and awaits clearing of the block ahead of it by the departure of the train therefrom and the departing train in passing through its switch normally acts to remove the signal set by it. During the time intervening between the arrival of the blocked train and the departure of the cleared train both trains are in danger as no signals are visible, either at 37, 38, 39, 40 or intermediate points. To avoid this contingency, hand-operated switches 51, 51 are provided, in circuit with the magnets 31, 32 and adapted to be operated selectively by the crew of the trespassing train to reset the signals previously set by the protected train and improperly cut out by the trespassing train. The trespassing train then proceeds as though the trespass had not occurred.

Provision is made for operating the various switches mechanically and it is illustrated here as applied to an electric railway, the switches 23 and 25 being arranged on one side of an overhead conductor and the

switches 34 and 36 being arranged on the other side of said conductor. One of the switches is illustrated in detail in Figs. 2 and 3 and comprises contact plates 41, 42 supported and protected by a hood 43 carried by a guy 44 and hanger 45, the hanger and guys also serving to carry the overhead conductor 46. Contact is made by an arm 47 which may be a lateral and upward extension of an axle 48 of a trolley wheel 49 upheld by a pole 50, the current being taken from the overhead conductor or from batteries suitably located.

I do not desire to be limited to any particular construction of interlocking armatures or any particular construction of switch-closing devices as the same may be modified in many ways without departing from the spirit of my invention.

I claim as my invention—

1. In an electric signal for railways, two signaling circuits each containing a signal at each end of the block, said circuits being normally broken, a single circuit controller for each signaling circuit, each controller operated by an electro-magnet to set all of the signals in said circuit, means for momentarily energizing each electro-magnet, locking devices for said controllers to maintain the circuits closed after said magnets

are deenergized, electrically operated devices controlled by the cars in passing out of the block to unlock said locking devices and thereby open the closed circuit, and a hand-operated switch in circuit with each unlocking device.

2. In an electric signal for railways, a signaling circuit containing a signal at each end of the block, said circuit being normally broken, a circuit controller initially operated by an electro-magnet to set all of the signals in said circuit, means for momentarily energizing said electro-magnet, a locking device for said controller and adapted to maintain the circuit closed after said magnet is deenergized, an electrically operated device for said controller controlled by the car in passing out of the block to unlock said locking device and thereby open the said circuit, and a hand-operated switch in circuit with the unlocking device and adapted to operate the same auxiliary to the car operation thereof.

Signed by me at Des Moines, Iowa, this twenty-fourth day of September, 1910.

THOMAS J. EMPFIELD.

Witnesses:

S. C. SWEET,
EARL M. SINCLAIR.