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SIGNALING.

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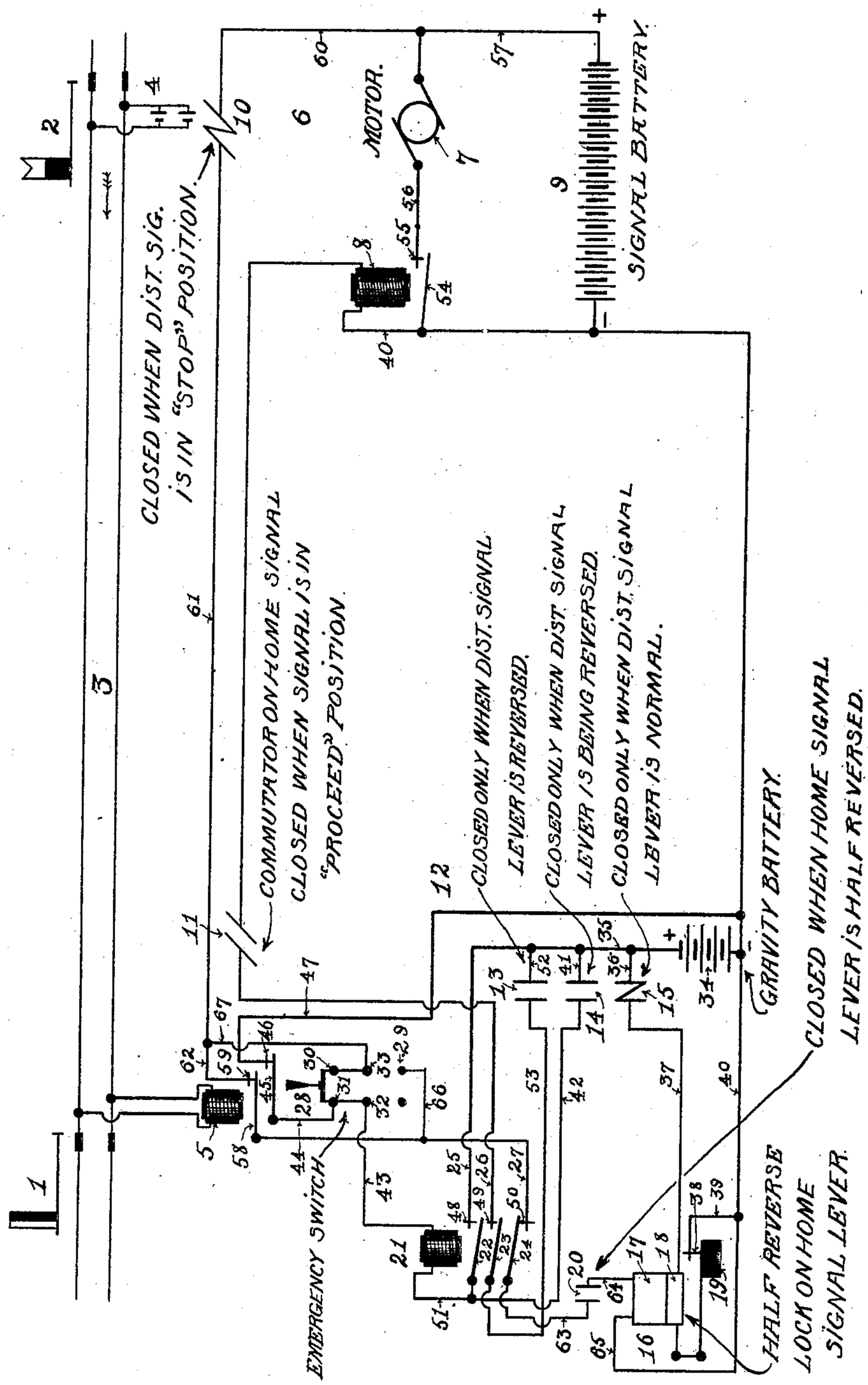

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SIGNALING.

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To all whom it may concern:

Be it known that I, MARK H. HOVEY, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Signaling, of which the following is a specification.

This invention relates to signaling and more particularly to means for controlling routes at an interlocking plant in connection with the control of an electrical distant signal.

The object of my invention is to prevent the changing of a route, after it has once been set up for the approaching train, until after such train has passed over the route and thus prevent, during the period of the passage of said train, any other train from passing over a conflicting route. These objects I am able to accomplish by employing the operating and indicating circuit of an electrically controlled distant signal.

To these ends I have produced the invention diagrammatically described in the accompanying drawing.

In the drawing 1 represents the home signal of an interlocking plant and 2 the distant signal therefor.

3 is a section of track circuit extending in this case from the distant signal to the home signal, 4 being the track battery therefor and 5 the track relay.

6 is the operating mechanism for the distant signal 2 which may be of any well known type. In the diagram I have shown such mechanism as composed of a motor 7 and a controlling relay 8 while 9 is the operating battery therefor, 10 is a circuit controller operated by the distant signal in such a way that the circuit is closed when the signal is in the "stop" position; 11 is a second circuit controller operated by the home signal 1 but in such a way that the contact is only made when the signal is in the "proceed" position.

12 is a controller operated by the lever which controls the distant signal. The contact points 13 of the controller 12 are so arranged that contact is closed only when the lever is in the position which corresponds to the "proceed" position of the distant signal 2. The contact points 14 of the controller 12 are closed only when the controller is being moved from the "stop" position to the "proceed" position. The contact points 15 of the controller 12 are closed only when the distant signal lever is in the "stop" position. The controller for the home signal 1 is not shown in the drawing but it may be the well known mechanical interlocking lever provided with a latch and tappet in the usual manner.

The lock 16 is so applied to the home signal operating lever that when the lever has once been moved to the "proceed" position, its tappet cannot be returned to the full "stop" position until the lock 16 has been energized. The magnets of the lock 16 have two windings, a high resistance portion 17 and a low resistance portion 18. The magnets of the lock 16 operate a circuit controller 19 in such a manner that circuit through it is made only when the lock magnets are energized.

20 are contact points operated by the tappet of the controller for the lever which operates the home signal 1 in such a manner that contact is made only when the tappet is at mid-stroke.

21 is an ordinary electro-magnetic relay having circuit controllers 22, 23 and 24; 22 making contact with the wire 25 when the relay 21 is energized, 23 making contact with the wire 25 when the relay 21 is energized and 24 making contact with the wire 27 when the relay 21 is deënergized.

28 is a hand operated switch having the contact points 29, 30, 31, 32 and 33.

34 is a battery which controls the relay 8 for the distant signal 2, and also the lock 16 under certain conditions which will be hereinafter described.

Having thus described the several parts of my invention I will now describe its method of operation.

We will suppose that traffic is passing in the direction of the arrow over track circuit section 3 and that it is desired to place the signals 1 and 2 in the "proceed" position. The mechanical lever for the home signal 1 is first reversed and this, in the ordinary well known way of mechanical interlocking, unlocks the controller 12 for the distant signal 2. As the controller 12 is moved, the contact points 15 are first broken. This breaks a circuit which has been normally closed and which is composed of: battery 34, wire 35, wire 36, contact points 15, wire 37, the low resistance winding 18 of the magnets of the lock 16, the circuit controller 19, contact point 38, wire 39, and wire 40 back to the opposite side of the battery 34. This deëner-

gizes the magnets of the lock 16 and allows the circuit controller 19 to drop away from the contact point 38 and, as heretofore described, locks the tappet of the operating lever which controls the home signal 1. If, however, the controller 12 is not moved so as to break the contact points 15 the lock 16 remains energized and the tappet of the operating lever which controls the home signal 1 is not locked. Therefore until the controller 12 for the distant signal 2 is moved, the lock 16 is not operated. A further movement of the controller 12 bridges the contact points 14. This makes a circuit which is composed of battery 34, wire 35, wire 41, contact points 14, wire 42, wire 51, magnets of the relay 21, wire 43, contact points 32 and 31 of the hand switch 28, wire 44, circuit controller 45 of the track relay 5, contact point 46, wire 47, wire 40, back to the opposite pole of battery 34. This energizes the relay 21 and draws the circuit controllers 22 and 23 into contact with the contact points 48 and 49 and draws circuit controller 24 away from contact point 50. This establishes a new circuit as follows: battery 34, wire 35, wire 25, contact point 48, circuit controller 22, wire 51, magnets of the relay 21, wire 43, contact points 32 and 31 of the hand switch 28, wire 44, circuit controller 45 of the track relay 5, contact point 46 and the wires 47 and 40 back to opposite pole of battery 34. The object of this last described circuit is to maintain the circuit through the magnets of the relay 21 after the contact points 14 of the controller 12 are broken. By the further movement of the controller 12, the contact points 14 are broken and the contact points 13 are bridged. The bridging of the contact points 13 establishes a circuit which is composed of: battery 34, wire 35, wire 52, contact points 13, wire 53, circuit controller 23, contact point 49, wire 26, circuit controller 11, magnets of the relay 8 and the wire 40 back to the opposite pole of battery 34. This circuit energizes the magnets of the relay 8, lifts up the circuit controller 54 into contact with contact point 55 and establishes a circuit which is composed of battery 9, wire 57, motor 7, wire 56, contact point 55, circuit controller 54 and wire 40 back to the opposite pole of battery 9. This supplies current to the motor 7 which then operates in the usual way to place the distant signal 2 in the "proceed" position.

The parts having assumed the positions last above described we will suppose the train to have entered the track circuit section 3. The track relay 5 then becomes deënergized by the action of the train and the circuit controller 45 falls away from the contact point 46 thus breaking the circuit, heretofore described, which was holding the relay 21 energized. The breaking of this circuit deenergizes the relay 21 and allows the circuit controllers 22 and 23 to fall away from contact points 48 and 49. This breaks the circuit through the relay 8 which in turn breaks the holding circuit or controlling circuit of the distant signal 2, in such a manner that the said signal 2 returns to the "stop" position. As the train leaves the track circuit section 3, the track relay 5 is again energized and the circuit controller 58 makes contact with the contact point 59. After the controller for home signal 1 has been moved towards the "stop" position so that its tappet is in mid-position, a circuit through contact points 20 is established which energizes the magnets of the lock 16 and unlocks the tappet of the home signal operating lever 1 so that the tappet can go to the full "stop" position. This circuit is composed of the following elements: battery 9, wire 57, wire 60, circuit controller 10, wire 61, wire 62, contact point 59, circuit controller 58, wire 27, contact point 50, circuit controller 24, wire 63, contact points 20, wire 64, high resistance winding 17 of the lock 16, wire 65, and wire 40 back to opposite pole of the battery 9. The controller 12 having been put to the "stop" position the contact 15 is again made and the lock 16 is held energized by a circuit which is composed of: battery 34, wire 35, contacts 15, wire 37, low resistance 18 of magnet 16 by circuit heretofore described. Thus by means of my invention, as above described, it will be evident that the relay 8 of the distant signal 2 cannot be energized unless the magnets of the relay 21 first are energized; and that the magnets of the relay 21 cannot be energized except when the contact points 14 of the controller 12 are bridged; and further that these contact points 14 cannot be bridged except when the controller 12 is moving from the "stop" to the "proceed" position. Therefore it is necessary for the controller 12 to make a complete operation every time that the distant signal 2 makes a complete operation. Further the lock 16 cannot be energized unless the circuit through the circuit controller 10 is made and the track relay 5 is energized and unless the magnets of the relay 21 are deënergized. After the controller 12 has been moved to bridge the contact points 14 and the magnets of the relay 21 have been energized, they cannot be deënergized until the circuit which includes circuit controller 22, wire 51, magnets of the relay 21, wire 43, contact points 32 and 31 of the hand switch 28, wire 44, circuit controller 45, contact point 46 and wire 47 is opened.

Since the operating circuit for the lock 16 cannot be completed until the track relay 5 is energized, it follows that after the lock 16 has been deënergized, the following movements occur: Distant signal 2 is placed in the "stop" position as a train enters the track circuit section 3 and deënergizes the track relay 5 thus deënergizing the relay 21.

Later as the train passes off the track circuit section 3 the relay 5 is again energized. Obviously, therefore, until the distant signal controller 12 is operated so as to break the circuit between the contact points 15, the lock 16 remains energized and the controller for the home signal 1 can be operated free from the control of the lock 16.

Assuming that when the train leaves the track circuit section 3, the track relay 5 fails for some reason to become energized, in that event and in order to unlock lock switch 16 I have provided the hand switch 28 which may be thrown by the operator so as to make contact between points 33 and 29 and thus establish a circuit which includes the following elements: battery 9, wire 57, wire 60, circuit controller 10, wire 61, wire 67, contact point 33, hand switch 28, contact point 29, wire 66, wire 27, contact point 50, circuit controller 24, wire 63, contact points 20, wire 64, high resistance 17 of the lock 16, wire 65, and wire 40 back to the opposite pole of battery 9. This allows the lock 16 to be energized only provided the distant signal 2 is in the "stop" position. It is evident, however, that when the hand switch 28 remains in the position last described, the circuit which controls the relay 8 for the control of the distant signal 2 cannot again be made until the switch 28 is returned to its original position so as to make contact between the points 32 and 31. It is therefore impossible for the operator to continue the operation of the functions with the track relay 5 cut out, without each time operating the switch 28 and placing it back in its normal position in which it makes contact between the contact points 31 and 32.

Having thus described my invention and its method of operation, what I claim is:

1. In a system of signaling, the combination with an electrically controlled signal, a controller therefor, and a section of track circuit of an electric lock, said lock being jointly controlled by the said signal and by the said section of track circuit, means for compelling the complete operation of said controller for each operation of said signal, means for compelling the complete operation of the track circuit for each operation of said lock, a single signal controlling circuit and a single lock controlling circuit between lock, track-relay and signal.

2. In a system of signaling, the combination with an electrically controlled signal, a controller therefor, and a section of track circuit of an electric lock, said lock being jointly controlled by the said signal and by the said section of track circuit, means for compelling the complete operation of said controller for each operation of said signal, means for preventing the operation of said lock until said signal controller is operated, a single signal controlling circuit, and a single lock controlling circuit between lock, track-relay and signal.

3. In a system of signaling the combination with an electrically controlled signal, a controller therefor and a section of track circuit of an electric lock controlled jointly by said signal and by said section of track circuit, means for compelling the complete operation of said controller for each operation of said signal, means for holding said lock locked during the complete operation of said signal, a single signal controlling circuit, a single lock controlling circuit between locks, track relay and signal and hand operated means for unlocking said lock after said signal has completed an operation.

In testimony whereof, I have hereunto set my hand in the presence of two witnesses.

MARK H. HOVEY.

Witnesses:
F. L. Dodgson,
C. J. Lewis.