

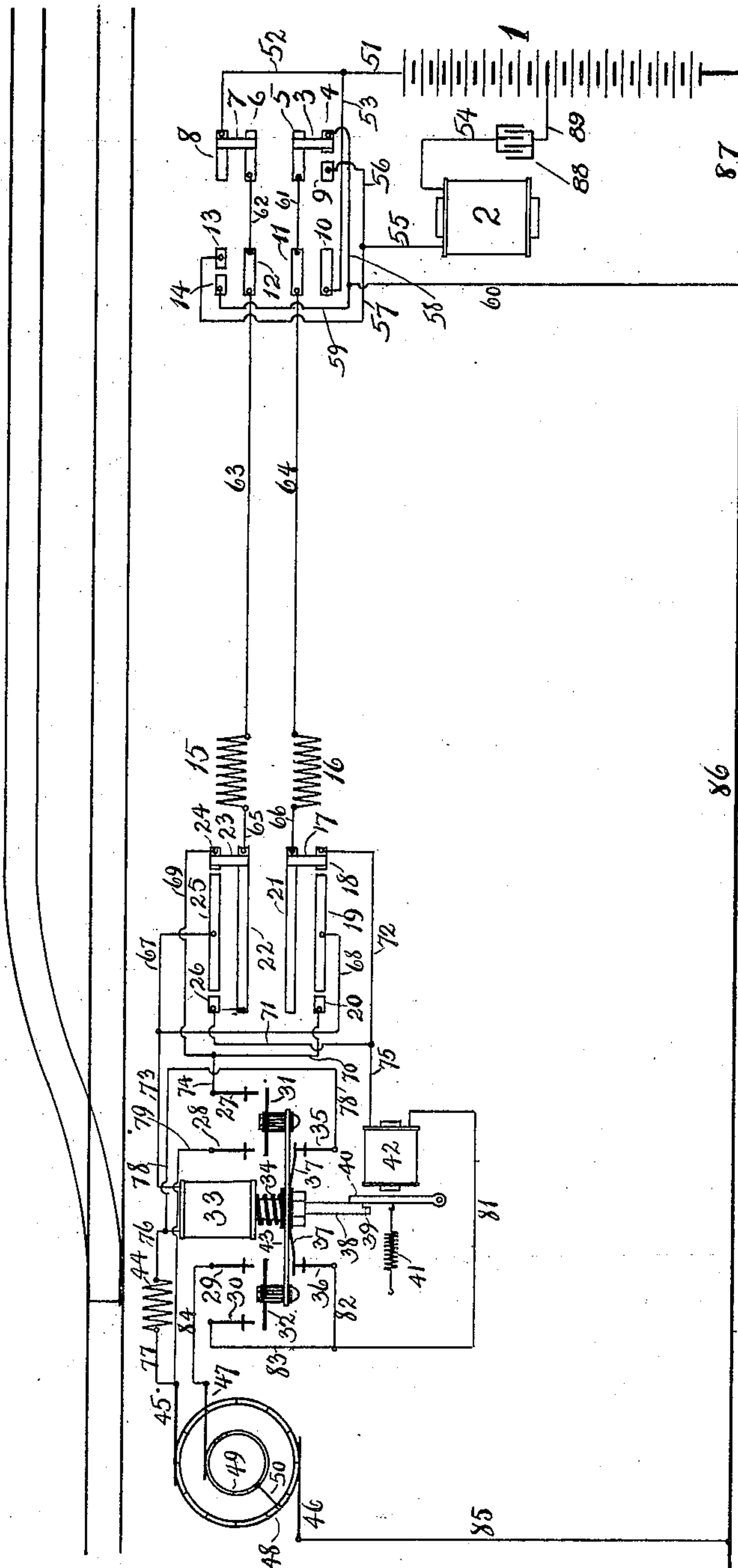
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J. D. TAYLOR.

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APPARATUS GOVERNING THE PASSAGE OF CARS OR VEHICLES ALONG
A RAILWAY AND THE CONTROL THEREOF.

APPLICATION FILED SEPT. 14, 1904.



Witnessess

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Inventor

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By Geo. E. Linn
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UNITED STATES PATENT OFFICE.

JOHN D. TAYLOR, OF EDGEWOOD PARK, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS GOVERNING THE PASSAGE OF CARS OR VEHICLES ALONG A RAILWAY AND THE CONTROL THEREOF.

No. 887,288.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed September 14, 1904. Serial No. 224,421.

To all whom it may concern:

Be it known that I, JOHN D. TAYLOR, a citizen of the United States, residing at Edgewood Park, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus Governing the Passage of Cars or Vehicles Along a Railway and the Control Thereof, of which the following is a specification.

My invention relates to apparatus for governing the passage of cars or vehicles along a railway. Such apparatus, whether mechanical or power operated, is controlled from levers comprised in what is known as "interlocking machines". In these machines the levers, and especially the lever controlling power operated apparatus, are generally provided with mechanism known in the art as "indicating mechanism", which mechanism is actuated to release its lever upon a complete operation of the apparatus controlled by the lever, thereby permitting the lever to be moved to its final position and release or lock through what is known as "mechanical interlocking" other levers controlling other similar apparatus. The operation of the indicating mechanism indicates to the operator that the apparatus controlled by the lever has completely operated in response to a movement of the lever. Where such apparatus comprises an electric motor, a prime source of current, generally a source of what is known as direct current is employed to energize the motors, and the supply of current to the motors is through circuit controllers operated by the levers of the interlocking machine. In this invention, the electro-magnetic motor of an indicating mechanism responds to a modification of a current proceeding from a prime source, the modification being preferably effected through the agency of the apparatus operating the switch or signal.

In the specific form of the invention herein illustrated the direct current for the motors of the several apparatus is rapidly reversed, and the electro-magnetic motor responds to the rapidly reversed or, as I shall hereinafter term it, alternating current to operate the indicating mechanism.

I will describe an apparatus comprising an electric motor, which apparatus is connected

with a switch rail or rails, and a control therefor embodying my invention, and then point out the novel features thereof in claims. It will be understood, however, that my invention is equally applicable to a signal device operated by an electric motor, a supply of current for which motor is under the control of a circuit controller and lever provided with an indicating mechanism comprising an electro-magnet or other analogous form of motor.

The signal device and switch rail or rails are each a part or appliance for controlling the passage of cars or vehicles along a railway.

The accompanying drawing is a diagrammatical view of certain devices comprised in or connected with an apparatus or mechanism for moving or shifting switch rails from one position to another, a circuit controller operated by a lever in an interlocking machine, an electro-magnetic device which is comprised in the indicating mechanism and a system of controlling circuits, the said diagrammatic representation embodying my invention.

I have not illustrated any mechanism by means of which motion is communicated from an electric motor to the switch rails nor the mechanism of an "interlocking machine". What is required for a mechanism for moving the switch rails is preferably a suitable gearing comprising an electro-magnetic clutch for connecting the motor armature with an ordinary switch and lock movement. In the "interlocking machine", the levers should have preliminary and final movements and be locked against final movement by an "indication mechanism" until the indication is received that the switch rails have moved in response to the preliminary movement of the lever. Instead of levers for operating the circuit controllers, push buttons or other equivalent devices may be employed. As all this apparatus is well known to the art it would be superfluous to illustrate it here.

In apparatus to which this invention relates, it is preferable for safety of operation to construct the "indicating mechanism" so that it cannot be affected by current from the prime source of energy for the "interlocking system" no matter how the said cur-

rent may reach the indicating mechanism, and to provide a current for operating the indicating mechanism different from that which can flow from the prime source of energy. It is also preferable to avoid false indications from crossed wires, that the indicating current should come from or be determined in character by a means located at or near the switch or signal to be operated. I attain this by so constructing the electromagnetic device of the indicating mechanism that it will not respond to the current from the prime source of energy, but will respond to a modification of the current from the prime source of energy. This modification should be something other than current strength and preferably is a modification of such character as to produce a different magnetic effect. I preferably convert or modify the current from the prime source of energy, which is a uni-directional or continuous current, to a current which is alternating in character, and which I shall designate an alternating current. As shown, this may be accomplished by a collector ring on the operating motor armature shaft and connected with one segment of the commutator as will hereinafter appear. The "indicating mechanism" may comprise any desired form of mechanical lock and an electro-magnetic device so constructed and arranged that the movable part thereof moves in response to the converted or modified current to operate the mechanical lock. These forms of electro-magnetic devices are well known and need not be described.

Referring now to the drawing, 1 designates a prime source of energy delivering preferably a uni-directional or continuous current, which may be in the form of a battery and will be so referred to hereinafter.

2 designates an electro-magnetic motor device comprised in the indication mechanism, so constructed as to have a movable part thereof respond to the indication current to operate the indication mechanism. The electro-magnetic motor device 2 will be hereinafter referred to as a magnet. This magnet has one of the terminals of its energizing coil joined to the middle point of the battery 1, while its other terminal is adapted to be alternately connected with the operating wires as will hereinafter appear.

4, 5, 6, 8, 9, 10, 11, 12, 13 and 14 designate fixed contacts supported on the frame of the interlocking machine.

3 and 7 designate movable contacts connected mechanically to the operating lever and together with the fixed contacts above mentioned constitute a circuit controller. A circuit controller is provided for each lever. At the final position of the lever in one of its movements in one direction, the movable contact 3 connects the fixed contacts 4 and 5; at the indicating position of the lever in its

movement in the same direction the said contact 3 connects the fixed contacts 9 and 5. At the indicating and final positions of the lever in its movements in a reverse direction, said contact 3 connects the fixed contacts 10 and 11. At the indicating and final positions of the lever in one of its movements in one direction, the movable contact 7 connects the fixed contacts 6 and 8. At the indicating position of the lever in its movement in a reverse direction, the said contact 7 connects the fixed contacts 12 and 13, and at the final position of the lever in its movement in a reverse direction, the said contact 7 connects the fixed contacts 12 and 14.

18, 19, 20, 21, 22, 24, 25 and 26 designate fixed contacts.

17 and 23 designate movable contacts connected mechanically to some movable part of the switch and lock movement, and with the contacts 18, 19, etc. constitute a circuit controller. In the "normal" position of the switch, (see the drawing) the movable contact 17 connects the fixed contacts 18 and 21 and the movable contact 23 connects the fixed contacts 22 and 24. In the "reverse" position of the switch, the movable contact 17 connects the fixed contacts 20 and 21, and the movable contact 23 connects the fixed contacts 22 and 26. During nearly the entire time of movement of the switch from one position to the other, which said time begins before the lock bolt has been withdrawn from the lock rod and ends after the lock bolt has entered the lock rod in the other position, the movable contact 17 connects the fixed contacts 19 and 21, and the movable contact 23 connects the fixed contacts 22 and 25.

15 and 16 designate the field coils of the electric motor comprised in the apparatus. Two field coils are used for the purpose of reversing the direction of rotation of the armature by sending the current through one or the other field coil. But three wires are used to operate the motor in both directions, that is, two operating wires and a common return, and these same wires are used in the indication circuits.

44 designates an energizing coil of an electro-magnetic clutch comprised in the gearing between the motor and the switch rails or the motor and signal blade. This clutch may be of any desired form well known in the art.

27 and 28 designate fixed contacts and 31 a movable contact which constitutes a circuit breaker, for breaking the operating circuit after the movement of the switch rails and the giving of the indication is completed.

29 and 30 designate fixed contacts and 32 a movable contact which constitute a circuit breaker for breaking the indication circuit after the final movement of the lever and for the purpose of preventing the said circuit interfering with the next movement.

35 and 36 designate fixed contacts and 37

a movable contact, which constitute a circuit closer for closing the starting circuit for the next movement.

The movable contacts 31, 32 and 37 are preferably moved in one direction by an electro-magnetic device 33, and in an opposite direction by gravity or a spring 34. When moved by the electro-magnetic device 33, the movable contacts are locked in the position to which they have been so moved by an armature 40 dropping into a notch 39 of a rod 38, to which the movable contacts are connected and are so held until the magnet 42 of the armature 40 is energized and withdraws the armature 40 from the notch 39. The magnet 42 is constructed so as to respond only to a direct current.

45 and 46 designate operating brushes of the motor, 49 a collector ring connected by a wire 50 with a segment 48 of the commutator, and 47 a brush which bears on the ring 49. The brushes 45 and 46, the collector ring 49 and its connection to the segment 48 of the armature and the brush 47, constitute a means for converting or modifying the battery current into a current alternating in character which is employed for operating the indication mechanism. The brushes 45, 46 are connected with the battery at points having the greatest difference of potential, while the brush 47 is connected at a point between the points of connection of the brushes 45 and 46. Thus it will be seen that when the segment 48 alternately engages the brushes 45, 46, an alternating current will flow through the magnet 2 and thereby energize it. The collector ring and its connection with the segment 48, in conjunction with the motor armature and its brushes constitute in effect a pole changer whereby an alternating current may be produced from the battery 1 for operating the indicating mechanism. The idea of employing a prime source of continuous or unidirectional current and means for rapidly reversing the current from the prime source to operate an indicating mechanism for a lever controlling the operation of an apparatus for moving a part or appliance controlling the passage of cars or vehicles along a railway, I consider broadly new, and especially do I consider it broadly new to rapidly reverse the current intended to operate or control motors included in such types of apparatus to operate the indication mechanism of levers controlling the operation of such motors.

Extending between the electric motor employed in connection with an apparatus for moving switch rails from one position to another, and the circuit controller operated by the lever in the interlocking machine controlling the operation of the apparatus are certain controlling circuits. These circuits may be better understood and described in connection with an operation of the appa-

tus in moving the switch rails from one position to another. In the drawings the switch rails are in what is technically known as a "normal" position, and the apparatuses are in the positions they would occupy after a movement of the switch rails from a "reverse" position to a "normal" position. To move the switch rails to their "reverse" position, the controlling lever is moved towards its "reverse" position until stopped by the mechanical lock of the indication mechanism. In this position of the lever the movable contact 3 connects the fixed contacts 10 and 11 and the movable contact 7 connects the fixed contacts 12 and 13. A circuit from the battery 1 is thereby closed so that current flows from said battery through wires 51, 53, contacts 10, 3, 11, operating wire 64, field coil 16, wire 66, contacts 21, 17, 18, wires 72, 75, magnet 42, wires 81, 82, contacts 36, 37, 35, wires 78, 76, energizing coil of clutch 44, wire 77, brush 45, armature of switch operating motor, brush 46, wire 85, and common return wires 86 and 87, back to battery 1. This current causes the armature to rotate, and energizes the electro-magnetic clutch to thereby have the armature to be connected with the gearing of the switch and lock movement. The contacts 17 and 23 commence movement simultaneously with the switch and lock movement and before the lock has been withdrawn from the lock rod they will have made contact with the contacts 19 and 25, respectively. The current will then pass from contact 17, through contact 19, wires 68, 73, magnet 33 to wire 76, thence through the energizing coil 44 of the clutch and the operating motor armature by the path above mentioned. This last named current continues to flow while the movable contact 17 touches the fixed contact 19 which it does until the switch has been reversed and the lock bolt has entered the lock rod in its reversed position. Flowing through the coils of the magnet 33 it energizes the said magnet and causes it to move the contact 31 so as to connect the fixed contacts 27 and 28, the contact 32 to make connection with the fixed contacts 29 and 30 and to move the contact 37 away from the fixed contacts 35 and 36. So soon as the movable contact 17 leaves the contact 18, current ceases to flow through the magnet 42, and its armature 40 is pulled into the notch 39 by the spring 41, thus retaining the movable contacts 31, 32 and 37 in the position into which they were put by the magnet 33 independent of the said magnet 33.

Near the end of the movement of the switch and lock mechanism the contact 17 passes from the contact 19 to the contact 20 and the contact 23 passes from the contact 25 to the contact 26. In this position of the parts the operating current flows from the contact 17, through contact 20, wires 70, 74,

contacts 27, 31, 28, wire 79, brush 45, switch motor armature, brush 46, wires 85, 86 and 87 back to battery. The current now does not pass through the magnet 33 nor the coil 44 of the clutch, so that the clutch is de-energized and the motor armature runs free. The magnet 33 is also deenergized but the contacts 31, 32 and 37 remain in their positions as they are locked by the armature 40. The connection of the contact 23 and the contact 26 connects the middle point of the battery 1 with the brush 47, through wire 89, condenser 88 wire 54, magnet 2, wires 55, 57, contacts 13, 7, 12, operating wire 63, field coil 15, wire 65, contacts 22, 23, 26, wires 71, 75, magnet 42, wires 81, 83, contacts 30, 32, 29 and wire 84.

One terminal of the battery may be considered positive and the other negative, and with this assumption the middle point may be considered to have zero potential. I will assume the terminal to which the wire 51 is connected to be positive, the terminal to which the common wire 87 is connected to be negative and the point to which the wire 89 is connected to be zero. With the arrangement of the parts last described above the brush 45 is connected to the positive pole of the battery, the brush 46 is connected to the negative pole and the brush 47 to the point of zero potential through the magnet 2 and since the motor is running free the difference of potential between the brushes 45 and 46 will be nearly equal to that between the terminals of the battery. As the armature rotates and causes the segment 48 to alternately make contact with the brushes 45 and 46 the potential of the brush 47 will be alternately positive and negative. When it is positive, current will flow from the said brush 47 through the indication magnet 2 to the middle point of the battery and when it is negative, current will flow from the middle point of the battery through the magnet 2 to the brush 47. At intermediate points of the travel of the segment 48, the differences of potential between the said segment and the brushes 45 and 46 will vary directly as the distance between the segment and the brushes respectively. When the segment is midway between the said brushes its potential will be zero, or equal to that of the middle of the battery. At this instant the electro-motive force tending to send current through the magnet 2, passes through the value zero. This alternating current energizes the indication magnet 2, causing it to unlock the lever and permit it to be moved to its full reversed position. The indication current passes also through the magnet 42 but has no effect on it as it is so constructed as not to respond to alternating currents.

The condenser 88 will permit alternating current to flow through the magnet 2, while it will effectually prevent direct current

flowing through the circuit of the said magnet 2.

The magnet 42 may be made unresponsive to alternating currents and still be responsive to direct currents whether uniform or pulsating by arming the poles of its armature with copper bands or rings. As it is well known that an alternating current magnet will repel a copper ring, the rings may be so proportioned with reference to the armature that their repulsion will be stronger than the attraction of the armature. Another means of effecting the same result is to make the armature polarized; magnetism of one sign in the magnet 42 would attract it while magnetism of the opposite sign would repel it, and the armature could be made heavy enough that an impulse of attraction would not have time to overcome its inertia before being succeeded by an impulse of repulsion.

When the lever is moved to its final position, the contact 7 is moved from the contact 13 to the contact 14. This connects the brush 47 with the negative pole of the battery through wires 87, 60, 59, contacts 14, 7, 12, operating wire 63, field coil 15, wire 65, contacts 22, 23, 26, wires 71, 75, magnet 42, wires 81, 83, contacts 30, 32, 29 and wire 84. When the brush 47 becomes positive, a strong current will flow through the magnet 42 and when the brush is negative no current will flow. The result is a pulsating current but always in the same direction and its effect on the magnet 42 is the same as a uniform current of a strength equal to the average strength of the pulsating current. The magnet 42 is energized by this current and withdraws the armature 40 from the notch 39 and thus releases the contact carrier 43 to be impelled by the spring 34 which puts the contacts in the position shown in the drawing. The driving current through the motor and the current through the magnet 42 are both stopped by the separation of the contact 31 from the contacts 27 and 28.

The movement from reverse to normal is exactly like that just described. In this case the wire 63 is the operating wire and the operating current passes through the field coil 15 which produces magnetism of the opposite sign to that produced by current through the field coil 16 and causes a reverse rotation of the motor armature.

The current that actuates the magnet of the indication mechanism evidently comes directly from the battery, but this current is made to flow alternately in reverse or opposite directions through the said magnet, in the specific invention herein set forth, by apparatus located at or near the corresponding track switch. As the said magnet is so constructed as to respond only to alternating currents, it is evident that no possible condition of crossed wires could cause a false indication.

I do not limit myself to the exact construction shown but may use the equivalents of the parts shown, as for instance, an induction motor would be the equivalent of the magnet

2. It is also apparent that a mechanical arrangement actuated by the switch and lock movement could be substituted for the magnet 33 for replacing the contact carrier 43.

For further and specific details of construction and arrangement of parts reference may be had to my co-pending application filed April 18th, 1904, Serial No. 203,645.

Having thus described my invention, what I claim is:

1. In combination with an apparatus for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of current supply, a lever for controlling the operation of said apparatus, an indication mechanism for the lever which comprises an alternating current magnet, circuits including a source of current supply and the magnet, and means for rapidly reversing the current from the source of supply to energize the magnet to have it operate the indication mechanism.

2. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of current supply, a circuit controller for controlling the supply of current to the motor, an indicating mechanism comprising a magnet which is not responsive to the current from the source of supply, and means operated by the apparatus for modifying the current from the source of supply to which modification the magnet will respond.

3. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of current supply, a circuit controller for controlling the supply of current to the motor, an indicating mechanism comprising a magnet which is not responsive to the current from the source of supply, and means operated by the motor for modifying the current from the source of supply to which modification the magnet will respond.

4. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of current supply, a circuit controller for controlling the supply of current to the motor, indication mechanism which comprises an alternating current magnet, circuits including the source of supply and the magnet, and means for rapidly reversing the current through said magnet.

5. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of current

supply, a lever for controlling the supply of current to the motor, indication mechanism for the lever which comprises an alternating current magnet, circuits including the source of supply and the magnet, and means operated by the motor for causing the current from the source of supply to flow alternately in opposite directions through the magnet.

6. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of current supply, a circuit controller for controlling the supply of current to the motor, indication mechanism which comprises a magnet responsive to alternating current, and means for producing alternations of the current from the source of supply.

7. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of current supply, a circuit controller for controlling the supply of current to the motor, indication mechanism which comprises a magnet responsive to alternating current, and means for producing alternations of equal potential from the source of supply.

8. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of current supply, a circuit controller for controlling the supply of current to the motor, an indicating mechanism comprising a magnet, the indication circuits which include the said magnet and the source of supply, and means for modifying the current from the source of supply, said means comprising a collector ring carried by the armature and connected with a segment of the armature and a brush bearing on the collector ring.

9. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of current supply, a circuit controller for controlling the supply of current to the motor, an indicating mechanism comprising a magnet, and the indication circuits which include the said magnet, the source of supply, the two brushes of the armature, and means for modifying the current from the source, said means comprising a collector ring carried by the armature and connected with a segment of the armature and a brush bearing on the collector ring.

10. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of current supply, a lever for controlling the supply of current to the motor, an indicating mechanism for the lever comprising a magnet, the indication circuits which include the said

magnet and the source of supply, and means operated from the armature of the motor for modifying the current from the source of supply and to have the modified current
5 operate the magnet.

11. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of
10 current supply, a circuit controller for controlling the supply of current to the motor, an indicating mechanism comprising an alternating current magnet, an indication circuit which includes a point of medial potential in the source of current supply, and
15 means for connecting a point of the indication circuit alternately with the high and low potential points of the source of supply.

12. In combination with an apparatus comprising an electric motor for moving a part or appliance controlling the passage of cars or vehicles along a railway, a source of
20 current supply, a circuit controller for controlling the supply of current to the motor, an indicating mechanism comprising an alternating current magnet, the indicating circuits which include the magnet and source of current supply, and means for causing the
25 current from the source to flow alternately in opposite directions through the magnet.

13. In combination with an apparatus comprising an electric motor and an electro-magnetic clutch for moving a part or appliance governing the passage of cars or vehicles
35 along a railway, a source of current supply, circuits extending between said source of supply and motor, comprising two operating wires and a common return, and including an electro-magnet, a lever for controlling said
40 circuits at one point, and a circuit controller operated from the apparatus for controlling the circuits at another point, said circuit controller being adapted during one part of its operation to cut out the electro-magnetic de-
45 vices and include in the operating circuit an electro-magnetic device and finally to cut out the clutch and establish the indicating circuits, a circuit controller operated by said magnetic device which establishes at the
50 time of its operation a part of the indication circuits, and the indication circuits which include either both operating wires or an operating wire and the common return.

14. In combination with an apparatus comprising an electric motor and an electro-magnetic clutch for moving a part or appliance governing the passage of cars or vehicles along a railway, a source of current
55 supply, circuits extending between said source of supply and motor, comprising two operating wires and a common return, a lever for controlling said circuits at one point, an indicating mechanism for said lever comprising a magnet, a circuit controller operated
60 from the apparatus for controlling the cir-

uits at another point, said circuit controller being adapted during one part of its operation to include in the operating circuit an electro-magnetic device, and finally to cut
out the clutch and establish the indicating
70 circuits, a circuit controller operated by said magnetic device which establishes at the time of its operation a part of the indication circuits, the indication circuits which include
75 either both operating wires or an operating wire and the common return, and means operated from the motor for modifying current from the source of supply, which modified current flows through the indication circuits and operates only the magnet of the
80 indicating mechanism.

15. In combination with apparatus comprising an electric motor for moving a part or appliance governing the passage of cars or vehicles along a railway, the source of current
85 supply, circuits extending between said source of supply and the motor, a lever for controlling said circuits at one point, a circuit controller operated from the apparatus for controlling the circuits at another point,
90 an indication mechanism for said lever comprising a magnet, indication circuits between the battery and motor and which include said magnet and which are established in part by the circuit controller and lever,
95 and means operated from the motor for modifying the current from the battery, which modified current flows through the indication circuits to operate the magnet of the indicating mechanism.

16. In combination with an apparatus comprising an electric motor for operating a part or appliance governing the passage of cars or vehicles along a railway, a source of
105 current supply, circuits extending between said source of supply and the motor, comprising two operating wires and a common return, a lever for controlling said circuits at one point, a circuit controller operated from the apparatus for controlling the cir-
110 cuits at another point, an indicating mechanism for said lever comprising a magnet, indication circuits established by said circuit controller and lever which include the said source of supply and either the two operat-
115 ing wires or an operating wire and the common return, and means operated by the motor for modifying the current from the source of supply in said indication circuits.

17. In combination with an apparatus comprising an electric motor for moving a part or appliance governing the passage of cars or vehicles along a railway, a source of
120 current supply, circuits extending from said source of supply to the motor and each comprising an electro-magnet provided with an armature, a circuit controller operated from the apparatus for opening the circuit on the electro-magnet and closing it through an
125 electro-magnetic device which operates a cir-

5 cuit controller to establish in part indication
circuits, said circuit controller being held in
position to establish the indication circuits
by armature of electro-magnet when the
10 electro-magnet is cut out of circuit, a lever
for controlling said circuits at one point, a
circuit controller operated from the appa-
ratus for controlling the circuits at another
point, an indication mechanism for the lever
15 comprising a magnet, indication circuits
comprising the magnet of the indication
mechanism, the source of supply and the
contacts established by the circuit controller
operated by the electro-magnetic device,
20 and means operated by the motor for modi-
fying the current from the source of supply
which current flows through the indication
circuit and energizes the magnet of the indi-
cating mechanism.

20 18. In combination with an apparatus
for moving a part or appliance controlling
the passage of cars or vehicles along a rail-
way, comprising an electric motor, a source
of current supply, means for controlling the
25 supply of current to the motor, a mechanism
for indicating that the part or appliance has
been moved comprising an electromagnet,
and means operated by the continuous rota-
tion of the armature after the part or appli-
30 ance has been moved for producing a modi-
fication of the current to energize the mag-
net and have it operate the mechanism.

35 19. In combination with an apparatus
comprising an electric motor for moving a
part or appliance controlling the passage of
cars or vehicles along a railway, a source of
current supply, a circuit controller for con-
trolling the supply of current to the motor,
40 indication mechanism which comprises an
alternating current magnet, circuits includ-
ing the source of current supply and the mag-
net, and means for rapidly reversing the cur-
rent from the source of supply to energize the
45 magnet and have it operate the indication
mechanism.

50 20. In combination with an apparatus
comprising an electric motor for moving a
part or appliance controlling the passage of
cars or vehicles along a railway, a source of
direct or continuous current supply, a circuit
controller for controlling the supply of di-
rect current to the motor, an indicating
mechanism comprising an alternating cur-
rent magnet, the indication circuits which
55 include the said magnet, the source of cur-
rent supply and the brushes of the motor,
and means for rapidly reversing the flow of

current from the source to operate the mag-
net, said means comprising a collector ring
carried by the armature and connected with
60 a segment of the armature and a brush bear-
ing on the collector ring.

21. In combination with an apparatus
comprising a motor for moving a part or ap-
pliance governing the passage of cars or ve-
65 hicles along a railway, a source of current
supply, operating circuits extending from
the source of supply to the motor, a manu-
ally operated circuit controller, a circuit con-
troller operated by the apparatus, an indica-
70 tion mechanism comprising an alternating
current motor, indication circuits including
the source of current supply and the alternat-
ing current motor, an electro-magnetically
operated circuit controller for controlling the
75 operating and indication circuits and means
operated by the motor for rapidly reversing
the current in the indication circuits.

22. In combination with an apparatus
comprising an electric motor for moving a
80 part or appliance governing the passage of
cars or vehicles along a railway; two sets of
batteries coupled in series for supplying cur-
rent to the motor; an indication apparatus
comprising an alternating current magnet,
85 the said magnet having one of its terminals
connected to the junction of the two sets of
batteries; and means controlled by the ap-
paratus for connecting the other terminal of
the said magnet alternately with the free
90 poles of the two sets of batteries.

23. In combination with an apparatus
comprising an electric motor for moving a
part or appliance governing the passage of
cars or vehicles along a railway; two sets of
95 batteries coupled in series for supplying cur-
rent to the motor; an indication apparatus
comprising an alternating current magnet,
the said magnet having one of its terminals
connected to the junction of the two sets of
100 batteries; and means controlled by the appa-
ratus for connecting the other terminal of
the said magnet alternately with the free
poles of the two sets of batteries, said means
comprising a collector ring connected elec-
105 trically to one segment of the commutator of
the said motor.

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

JOHN D. TAYLOR.

Witnesses:

W. L. McDANIEL,
JAMES CHALMERS, Jr.