E. McCLINTOCK.

RELAY.

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911,746.

Patented Feb. 9, 1909.

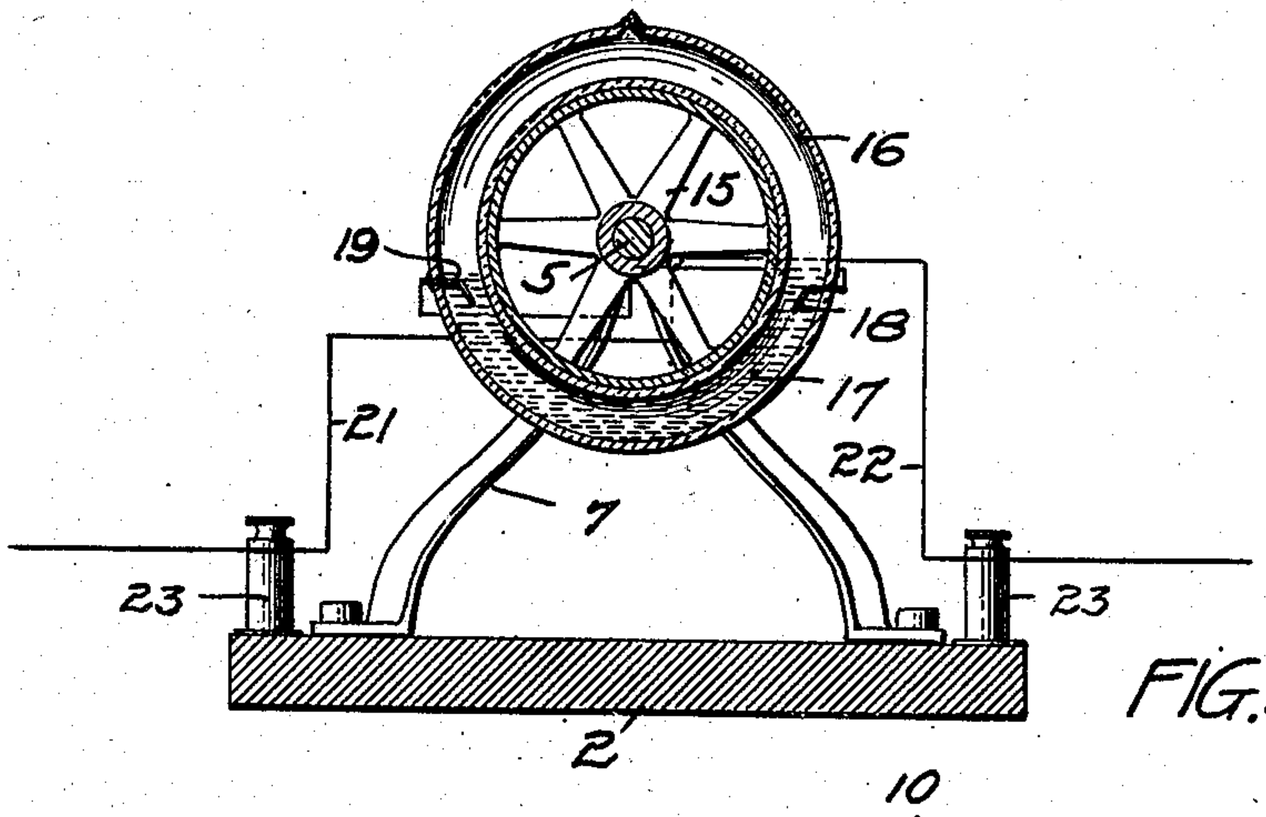

FIG. 3.

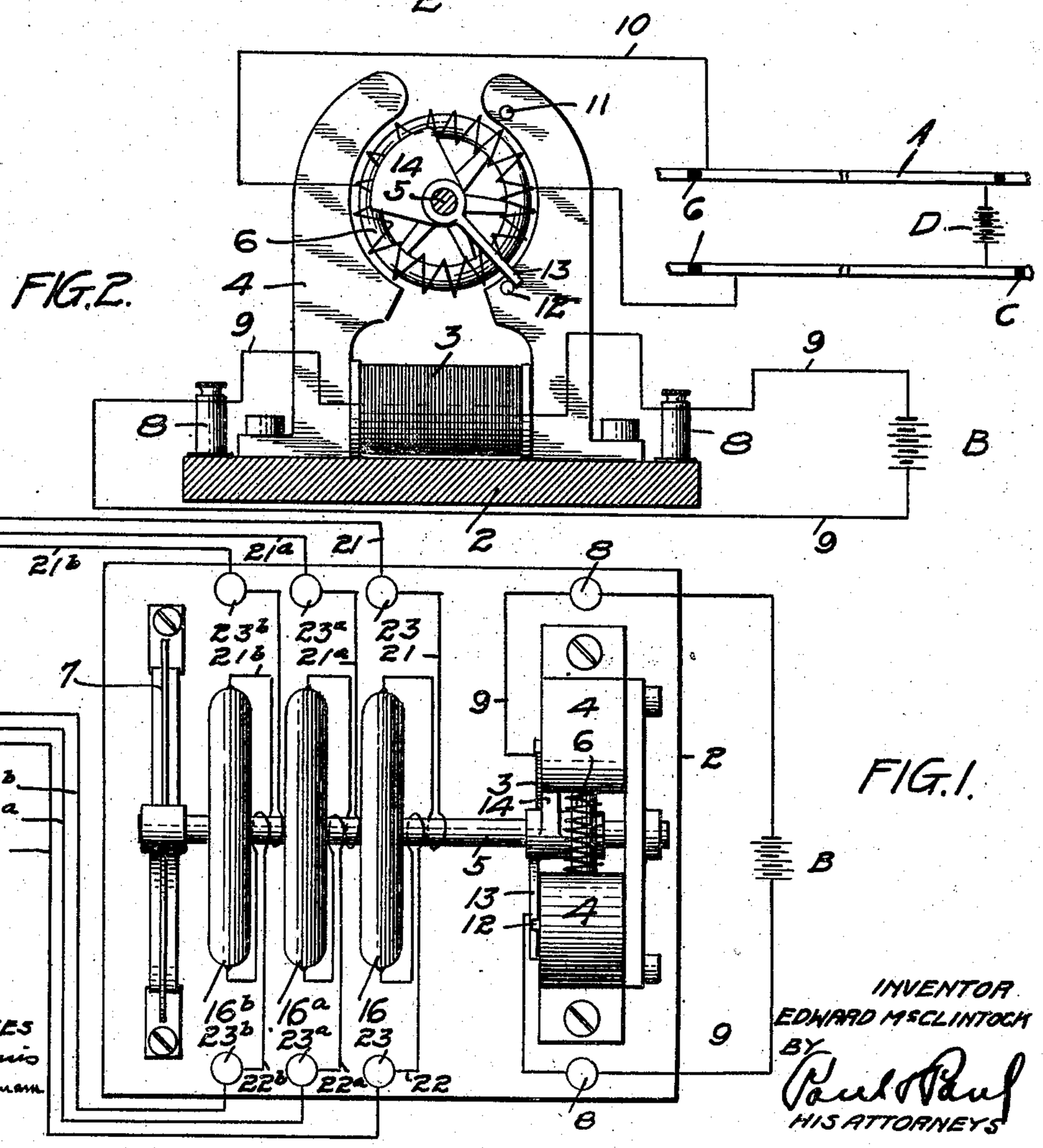

FIG. 2.

FIG. 1.

WITNESSES

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RELAY.

No. 911,746. Specification of Letters Patent. Patented Feb. 9, 1909.

Application filed January 16, 1906. Serial No. 296,245.

To all whom it may concern:

Be it known that I, EDWARD McCLINTOCK, of St. Paul, Ramsey county, Minnesota, have invented certain new and useful Improvements in Relays, of which the following is a specification.

My invention relates to relays designed particularly for use with an automatic railway signal system.

The object of my invention is to provide a relay which will be positive and reliable in its action, and adapted for making or breaking a local signal circuit, or a series of them, either closing or breaking all the circuits or closing some of them and breaking others, as preferred.

A further object is to provide a relay wherein all danger of arcing between the contact points or uncertainty of action due to corrosion of the points is entirely avoided.

My invention consists, generally, in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification, Figure 1 is a plan view of a relay embodying my invention. Fig. 2 is a vertical section of the same. Fig. 3 is a sectional view through one of the insulating rings wherein the contact points are mounted.

In the drawing, 2 represents a suitable base whereon a motor is arranged.

3 represents the field magnets of the motor, 4 the field, and 5 a shaft provided with a ring armature 6 arranged to revolve partially between the fields. The shaft of the armature is extended beyond the motor on one side, as indicated in Fig. 1, and has a bearing in a standard 7. Binding posts 8 are mounted on the base 2 and connected with a circuit 9 which leads to the field magnets 3 through a suitable battery, or other source of electricity, B. This circuit is an independent one and is normally closed.

A represents an insulated section of railroad track, of suitable length, separated from the adjoining track by suitable insulation C and in circuit at one end with a battery, or other generator, D. The other end of the track section A is connected with the circuit 10 which leads to the windings of the ring armature 6. A circuit, therefore, will normally be established through the rails of the section A on one side of the track to the ring armature windings, thence around to the other rail section and through the battery D to the starting point. The armature will, therefore, be rotated to cut the lines of magnetic force of the field. Near the armature ring I provide stops 11 and 12, and arrange an arm 13 on the shaft of said armature to move between said stops and contact therewith, thereby limiting the movement of the armature ring in both directions. A counterweight 14 is mounted on the shaft 5, and normally tends to hold the arm 13 in contact with the stop pin 11, except when the current is closed through the armature, at which time the armature will be rotated and the arm 13 swung down into contact with the pin 12, as indicated in Fig. 2; and this condition will prevail until the track circuit is broken or short-circuited, as by the entrance of a train into the block A. When this occurs a short circuit will be established through the axle of the locomotive between the opposite track rails, and the current through the armature windings will be temporarily broken allowing the counterweight to revolve the armature and swing the arm 13 away from the pin 12. This movement of the armature ring, when the track circuit is interrupted, I utilize to make or break one or more local signal circuits. The preferred means for carrying out this feature of my invention I will describe as follows: Upon the extended end of the shaft 5 I arrange one or more wheels 15 having rims upon which hollow vacuum rings 16, of a suitable insulating material, preferably glass, are mounted. I have shown a series of three wheels and as many insulating rings in this case, but it will be understood that a greater or less number may be used according to the number of signal circuits in the service. Within each insulating ring a quantity of mercury 17, or similar conducting fluid, is placed, and allowed to flow around through the ring as the wheel and shaft are rocked. Contact points 18 and 19 are mounted in said ring and arranged to project into the path of the conducting fluid therein, and said points are connected respectively with conductors 21 and 22 which run from said points in toward and around the shaft 5, and from thence through suitable binding posts 23 on the said base to the signals located at any suitable distance and not shown in this applica-

tion. The insulating rings and their connections being alike in construction and arrangement I have described one and indicated it by suitable reference numerals, and will designate the others by the same numerals with the addition of the exponents "a" and "f."

Referring to Fig. 3, the contact points are shown immersed in the conducting fluid, so that whenever the insulating ring, illustrated in said figure is in the position shown, the local circuit will be closed. The wheels supporting this ring may be re-adjusted, however, if desired, or the position of one of the points may be changed so that the local circuit will be broken at the ring, instead of closed. The wheels are so adjusted on the shaft that when the track circuit is in its normally closed condition and the arm 13 is in contact with the pin 12, the circuit through one or all of the local signals will be made or broken according to the form of signal desired. Generally, however, when the track circuit is closed the local signal circuits will be broken, but when a train enters the block and short-circuits the track circuit, then the counterweight will partially revolve the ring armature and rotate the insulating rings sufficiently to cause the conducting fluid to contact with both points and close the local signal circuit, or break it according to the position of the points. A relay motor may be provided with each track section or block, and as heretofore stated, there may be as many local circuits controlled by the relay as there are signals in the system.

I claim as my invention:

1. The combination, with an insulated track section or block having a circuit, of a motor having an oscillating armature in said circuit, said circuit being normally closed and adapted to be short circuited by the entrance of a train into the block, a normally closed circuit for the motor field, and a local signal circuit arranged to be influenced by the oscillation of said armature and including a hollow ring circuit-breaker having terminals and adapted to contain a conducting fluid.

2. The combination, with an insulated track section or block having a normally closed circuit, of a motor provided with an armature having a limited oscillating movement and included in said track circuit, said track circuit being adapted to be short circuited by the entrance of a train into the block, a normally closed circuit for the motor field, and a local signal circuit arranged to be opened or closed by the oscillation of said armature, and said local signal circuit having a circuit breaker consisting of a hollow ring provided with terminals and containing a supply of mercury substantially as described.

3. The combination with an insulated track section or block having a normally closed circuit, of a motor provided with an armature in said circuit, an arm provided on the axis of said armature, stop pins for limiting the movement of said arm and the oscillation of said armature, a counter-weight normally tending to hold said arm in contact with one of said pins when the circuit is open, and said arm being normally in contact with the other pin when the circuit is closed through said armature, said track circuit being short circuited by the entrance of a train into the block, a normally closed circuit for the motor field, and local signal circuits arranged to be influenced by the movement of said armature when the track circuit is short circuited, substantially as described.

4. The combination, with a motor armature having a limited oscillating movement, of one or more local signal circuits arranged to be opened or closed by the movement of said armature, said local signal circuits including hollow ring circuit breakers and each containing a supply of mercury and having contact points, substantially as described.

5. The combination with an oscillating armature included within a closed track circuit, of a rocking hollow insulating ring connected with the axis of said armature, said ring containing a supply of mercury, and contact points mounted in said ring and adapted to be immersed in the mercury and connected with local signals, substantially as described.

6. The combination with a motor having an oscillating armature included within a closed track circuit, of a hollow oscillating ring mounted on the axis of said armature, a supply of mercury provided within said ring and adapted to flow around therein as the ring is oscillated with said armature, and a local signal circuit having terminals mounted in said ring to make or break the circuit through the mercury when the track circuit is short circuited, substantially as described.

7. The combination with an oscillating shaft, of a hollow insulating ring mounted thereon, a supply of mercury provided in said ring, an armature controlled by a track circuit for oscillating said shaft, and a local signal circuit having terminals projecting into said ring in the path of said fluid, substantially as described.

8. The combination with an oscillating shaft and means for oscillating the same, of a wheel mounted on said shaft, a hollow glass ring inclosing said wheel, a conducting fluid provided within said ring, a local signal circuit having terminals projecting into said ring in the path of said fluid and adapted to make or break the signal circuit through said fluid, substantially as described.

9. The combination with an oscillating shaft and means for operating the same, of a series of hollow insulating rings mounted on said shaft, a conducting fluid such as mercury provided in said rings, signal circuits having terminals mounted in said rings, said conducting fluid flowing through said rings and making or breaking said signal circuits as the rings are oscillated according to the position of the terminals therein, substantially as described.

10. A circuit closing device, comprising a rocking hollow ring of insulating material adapted to contain a conducting fluid such as mercury and having contact points that are adapted to be immersed in the mercury and close the circuit between them, and the mercury in said ring on one side of the center thereof communicating with the mercury on the other side of the center whereby the accumulation of gas above the mercury will not interfere with the operation of the circuit breaker.

11. The combination, with an oscillating shaft and means for operating the same, of a hollow glass ring mounted on said shaft, a conducting fluid provided within said ring, the fluid on one side of said shaft in said ring communicating across said shaft with the fluid on the opposite side thereof, whereby the accumulation of gas in said ring will not interfere with the movement of the fluid therein, and terminals mounted in said ring and projecting into the path of said fluid.

12. The combination, with an oscillating shaft and means for operating the same, of a hollow ring of insulating material mounted on said shaft, a conducting fluid provided within said ring, the space above the fluid in said ring on one side of said shaft communicating with the space above the fluid on the other side of said shaft, whereby the accumulation of gas above the fluid in said ring will not interfere with the movement of said fluid, and terminals mounted in said ring and projecting into the path of said fluid.

13. A circuit closing device comprising a rocking receptacle having a vacuum chamber containing a conducting fluid, a space being formed above said fluid leading from one side of said chamber to the other and contact points forming the terminals of electric circuits arranged to project into said receptacle and said points being immersed in said fluid as said receptacle is rocked, substantially as described.

14. A circuit closing device comprising a hollow rocking receptacle containing a conducting fluid, a space being formed above said fluid leading from one side of said receptacle to the other, and contact points forming the terminals of electric circuits arranged to project into said receptacle and said point being immersed in said conducting fluid as said receptacle is rocked.

In witness whereof, I have hereunto set my hand this 11th day of January 1906.

EDWARD McCLINTOCK.

Witnesses:
RICHARD PAUL,
C. MACNAMARA.