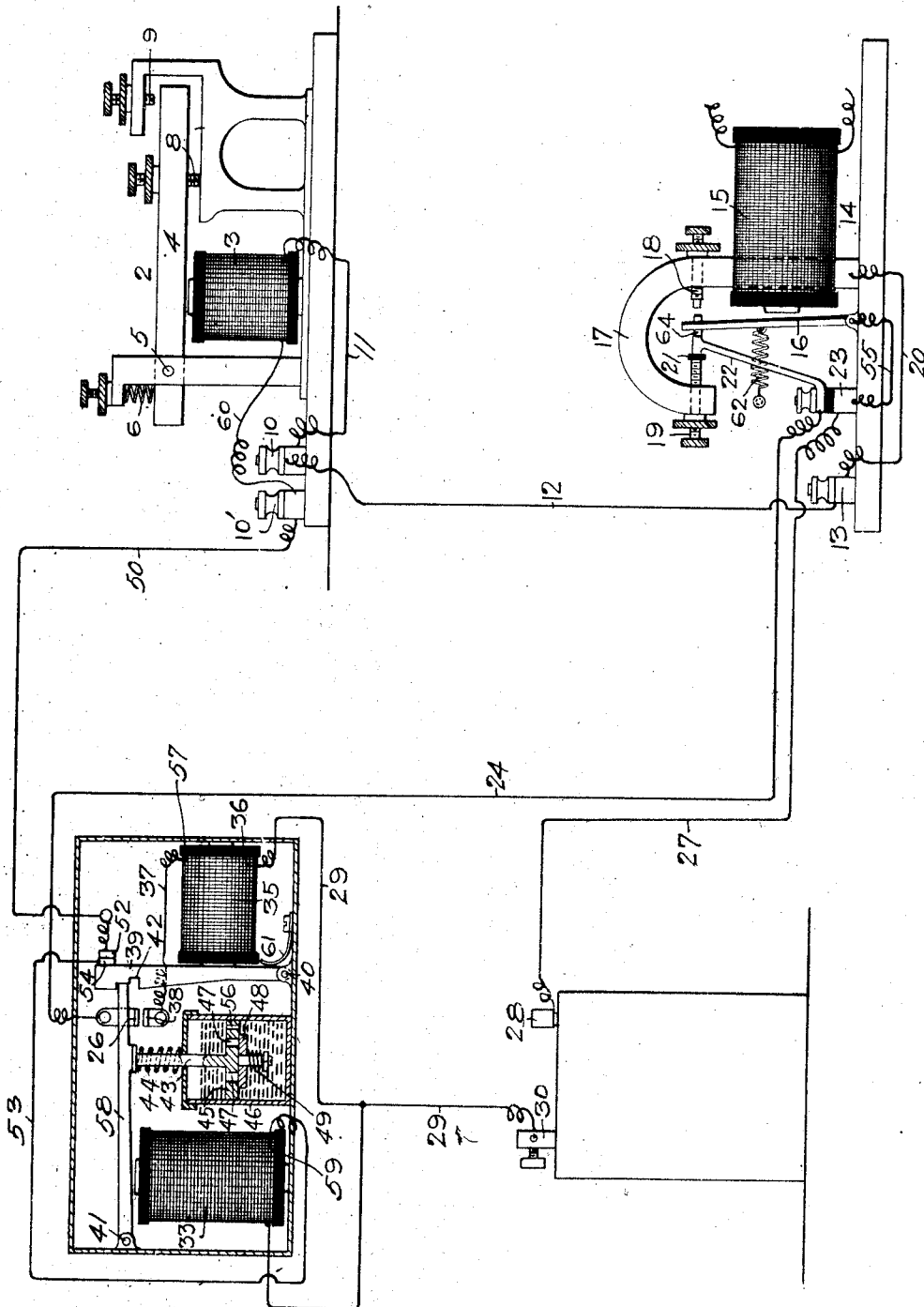


W. F. HANST.
CIRCUIT BREAKER.
APPLICATION FILED MAY 25, 1911.

1,045,141.

Patented Nov. 26, 1912.



WITNESSES.

J. R. Keller
Robert C. Fother

INVENTOR.

Willis F. Hanst
By Kay & Fother
attorneys

UNITED STATES PATENT OFFICE.

WILLIS F. HANST, OF CARNEGIE, PENNSYLVANIA.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIS F. HANST, a citizen of the United States, and resident of Carnegie, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Circuit-Breakers; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to circuit breakers adapted for use in telegraphy or for other purposes to which it may be found applicable.

The object of my invention is to provide for breaking the circuit from any continuous circuit and allowing the battery to be at rest whether the main line circuit stands open or closed, whereby it is possible to have an open circuit on the local battery instead of the present closed circuit, permitting of the use of a dry cell or an open circuit battery instead of the gravity or closed circuit battery.

To these ends my invention comprises the novel features hereinafter set forth and claimed.

In the accompanying drawing I have illustrated my invention in connection with an ordinary sounder and relay, the wiring, &c., being largely diagrammatic.

The numeral 2 designates a sounder of the ordinary construction with the magnets 3 and the armature 4. This armature 4 is pivotally mounted as at 5 and a spring 6 is interposed between the armature and the frame. The adjusting screws 8 and 9 control the movement of the armature 4 between the upper and lower stops on the frame. Two binding posts 10, 10' are provided and the wire 11 connects the binding post 10 up with the magnets 3. The wire 11 is a continuation of the wire 12 which is connected to the binding post 13 of a suitable relay 14. This relay 14 comprises the magnets 15, armature 16 and the post 17 which is arranged between the magnets 15 and said post is provided with the adjusting screws 18 and 19 to control the movement of the armature 16. The wire 20 passes over the binding post 13 to the lower end of post 17 allowing the circuit to pass through the adjusting screw 18 to the armature 16. The

adjusting screw 19 has the insulating material 21 at its end which is engaged by the arm 22 carried by the post 23. The arm 22 is insulated from the post 23 by suitable insulating material and is an addition to the ordinary relay. The wire 24 is connected to the arm 22 and said wire is connected to the contact 26. The wire 27 is connected to the binding post 23 and said wire passes to the binding screw 28 of the battery. The wire 29 is connected to the binding screw 30 of the battery and said wire passes to the magnets 33. The wire 29 also connects with the pair of magnets 35 at 36. The wire 37 passes from the magnets 35 at 57 to the contact 38. The contacts 26 and 38 are spring arms which are normally in engagement with each other.

The armature 39 is pivoted at 40 and said armature is adapted to be engaged by the armature 58 pivoted at 41. The armature 39 has the notch 42 which is adapted to be engaged by the armature 58 when said armature is lowered in the manner hereinafter set forth. The armature 58 is in contact with the upper end of the rod 43 and a spring 44 on said rod acts to normally hold the rod 43 against the armature 58, said spring being interposed between the cylinder 46 and a collar at the upper end of said rod. The spring 44 also acts to hold the armature 58 in engagement with the armature 39 at a point above the notch 42. The armatures 39 and 58 are insulated from the contacts 54 and 26, respectively.

The piston 45 is carried by the rod 43 and said piston works in the cylinder 46 containing suitable liquid, such as oil. The piston 45 has the openings 47 which are controlled by the valve 48 which is loosely mounted on the lower end of the rod 43 extending below the piston 45. The piston 45 has also a very small opening 56. The spring 49 normally holds the valve 48 in contact with the piston 45 to close the openings 47. The wire 50 leads from the binding post 10' and said wire is connected to the contact 52. The wire 53 is connected to the magnet 33 at 59 and to the contact 54. The wire 55 connects the binding post 23 with the armature 16.

In the operation of the device when the

ordinary key is operated to transmit a message, the circuit from the battery at 28 passes by the wire 27 to the binding post 23 and thence by the wire 53 to the armature 16. When the magnets 15 are magnetized the armature 16 is brought in contact with the adjusting screw 18, thereby completing the circuit. The current passes from post 17 through wire 20 to the binding post 13, and thence by wire 12 to binding post 10; thence by wire 11 to magnet 3 which draws the armature 4 down so as to bring the adjusting screw 8 into contact with the lower stop of the sounder frame. The current passes from the magnet 3 by wire 60 to the binding post 10' and thence by wire 50 to the contact 52, thence through the contact 54 to a wire 53 to the magnets 33 at 59. These magnets being energized for such a short period, no effect is apparent in the armature 58 to draw the armature down and overcome the resistance of the liquid in the cylinder 46 so that there is no movement to the piston 45 while the message is being sent. The openings 47 in the piston 45 being closed by the valve 48 in the downward movement of the piston, as the liquid has to pass through the small hole 46, causing the downward movement to be very slow. On the contrary the upward movement is very quick, as valve 48 is forced away from the openings 47 and the liquid flows through more quickly. The circuit is completed to the battery by the wire 29. When the operator has finished sending the message he closes the circuit by the ordinary switch lever on the operating key, which magnetizes the magnets 15, holding the armature 16 in contact with the adjusting screw 18 and completing the circuit of the battery through the pairs of magnets 3 and 33. By holding this circuit complete for a sufficient length of time the magnet 33 will be permitted to draw the armature 58 down which will overcome the resistance of the liquid and lower the piston 45. This movement of the armature 58 will also free said armature from its contact with the armature 39 above the notch 42 and said armature engages said notch whereby the spring 61 forces the armature 39 a sufficient distance to allow the contacts 52 and 54 to separate. By this breaking of the contact points 52 and 54 the circuit through magnets 3 and 33 is thrown open. The downward movement of the armature 58 also connects the contacts 26 and 38 so as to complete the circuit from the battery through the magnets 35 at the time when the armature 16 comes into contact with the arm 22. Just as soon as the operator throws the circuit open by his key, the magnet 15 is deenergized and the armature 16 is drawn away by spring 62 so as to bring its contact 64 into engagement with the arm 22 which completes the circuit through magnets 35,

by wire 29 to magnet 35, by wire 37 through contacts 38 and 26, thence by wire 24 to the arm 22, through armature 16, wire 55, and binding post 23 to battery by wire 27 thereby causing armature 39 to release armature 58. This permits the spring 43 to lift armature 58 instantly, separating contacts 26 and 38, thereby throwing the circuit of magnets 35 open. Armature 39 after being drawn by magnet 35 and closing contacts 52 and 54 is held by armature 58 so that the device is then ready for sending a message. In this manner I provide automatic means for resetting the mechanism for opening the circuit by the holding of the relay points in contact.

By my invention I provide for an open circuit on the local battery instead of the present closed circuit which permits the use of a dry cell instead of a wet cell, which greatly reduces the cost, and furthermore, I am enabled to break the circuit from any continuous circuit and allow the battery to be at rest whether the main line circuit stands open or closed, but the battery is immediately brought into play when the operation of sending a message is resumed.

While I have referred to a battery in the description of my invention, it is apparent that any suitable electric generator may be substituted for same, and where the word "battery" is employed in the claims, it is intended to include an equivalent electric generator.

What I claim is:

1. In a device for the purpose set forth, the combination of a relay, a battery in a local circuit, said circuit passing through armature and contact points of said relay, means for opening said circuit by holding said relay points in contact, and means for automatically resetting said first named means when said contacts are broken.
2. In a device for the purpose set forth, the combination of a relay, a battery in a local circuit, said circuit passing through armature and contact points of said relay, means for automatically breaking and holding open said local circuit when said armature is at rest with said contact points in contact and means for automatically resetting said first named means when said contacts are broken.
3. In a device for the purpose set forth, the combination of a battery, a local circuit, a relay, means for closing the local circuit by the momentary holding of the relay contact points in contact, means for opening the local circuit by the continued holding of the relay contact points in contact, and means for automatically resetting said first named means when said contacts are broken.
4. In a device for the purpose set forth, the combination of a battery, a local circuit,

a relay, a circuit breaker comprising a magnet, an armature, means for resisting the movement of said armature when the key is being operated, a second magnet, an armature in operative relation thereto, contacts held in engagement by said last named armature which is locked by said first armature when the main circuit is open, means for magnetizing the said first named magnet by the closing of the main circuit, the movement of its armature releasing said second armature and breaking said contact, and other contacts brought into engagement by the movement of said first armature to complete the circuit from the battery to said second magnet when the main circuit is open.

5. In a device for the purpose set forth, the combination of a battery, a local circuit a relay, a circuit breaker comprising a magnet, an armature, a resisting member in the path of the movement of said armature, a second magnet, an armature in operative relation thereto, contacts held in engagement by said last named armature which is locked by said first armature when the main circuit is open, means for magnetizing the said first named magnet by the closing of the main circuit, the movement of its armature releasing said second armature and breaking said contact, and other contacts brought into engagement by the movement of said first armature to complete the circuit from the battery to said second magnet when the main circuit is open.

6. In a device for the purpose set forth, the combination of a battery, a local circuit, a relay, a circuit breaker comprising a magnet, an armature, a vessel containing liquid, a piston having valve controlled apertures in said vessel in the path of said armature to retard the movement of same toward said magnet, a second magnet, an armature in operative relation thereto, contacts held in engagement by said last named armature which is locked by said first armature when the main circuit is open, means for magnetizing the said first named magnet by the closing of the main circuit, the movement of its armature releasing said second armature and breaking said contact, other contacts brought into engagement by the movement of said first armature to complete the circuit from the battery to said second magnet when the main circuit is open.

7. In a device for the purpose set forth, the combination of a battery, a local circuit, a relay, a circuit breaker comprising a magnet, an armature, a vessel containing liquid, a piston in said vessel having apertures, a spring actuated valve closing said apertures on the down stroke of said piston, said piston having an uncovered aperture, a stem connected to said piston in the path of the movement of said armature, a spring

surrounding said stem interposed between said vessel and an abutment on said stem, said spring being stronger than the spring controlling said valve, a second magnet, an armature in operative relation thereto, contacts held in engagement by said last named armature which is locked by said first named armature when the main circuit is open, means for magnetizing the said first named magnet by the closing of the main circuit, the movement of its armature releasing said second armature and breaking said contact, and other contacts brought into engagement by the movement of said first armature to complete the circuit from the battery to said second magnet when the main circuit is open.

8. A device for the purpose set forth, the combination of a battery, a local circuit, a relay, a circuit breaker comprising a magnet, an armature, means for resisting the movement of said armature when the key is being operated, a second magnet, an armature in operative relation thereto, said armature having notches adapted to be engaged by said first named magnet, contacts held in engagement by said last named armature when the main circuit is open, means for magnetizing said first named magnet by closing the main circuit, the movement of its armature releasing said second named armature and breaking said contacts, and other contacts brought into engagement to complete the circuit from the battery through said second magnet when the main circuit is open.

9. In a device for the purpose set forth, the combination of a battery, a local circuit, a relay, a circuit breaker comprising a magnet, an armature, means for resisting the movement of said armature when the key is being operated, a second magnet, an armature in operative relation thereto, contacts held in engagement by said last named armature which is locked by said first armature when the main circuit is open, means for magnetizing said first named magnet by closing the main circuit, the movement of its armature releasing said second armature and breaking said contacts, other contacts brought into engagement to complete the circuit from the battery through said second magnet, an insulated arm on the relay connected up to said second magnet, and an armature of the relay adapted to engage said insulated arm when the main circuit is open.

10. In a device for the purpose set forth, the combination of a battery, a local circuit, a relay having contact points, means for opening said local circuit by the continued holding of the relay contact points in contact, and an insulated member on said relay with which the armature contacts when released, and means for automatically resetting

ting said first named means by the contact of said armature with said insulated member.

11. In a device for the purpose set forth, the combination of a relay, a battery in a local circuit, said circuit passing through armature and contact point on said relay and supplemental automatic means for put-

ting said battery in and out of play in said local circuit.

In testimony whereof, I the said WILLIS F. HANST have hereunto set my hand.

WILLIS F. HANST.

Witnesses:

ROBERT C. TOTTEN,
JOHN F. WILL.