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H. GARRETT.

CIRCUIT BREAKER FOR STORAGE BATTERIES.

APPLICATION FILED JUNE 26, 1903.

NO MODEL.

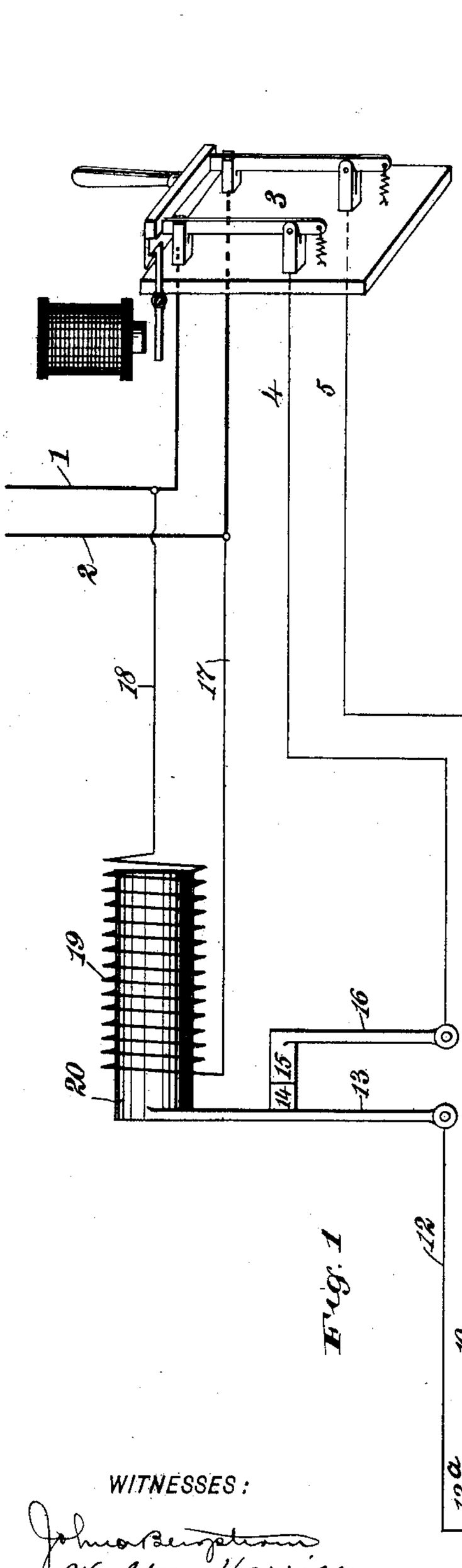

Fig. 1

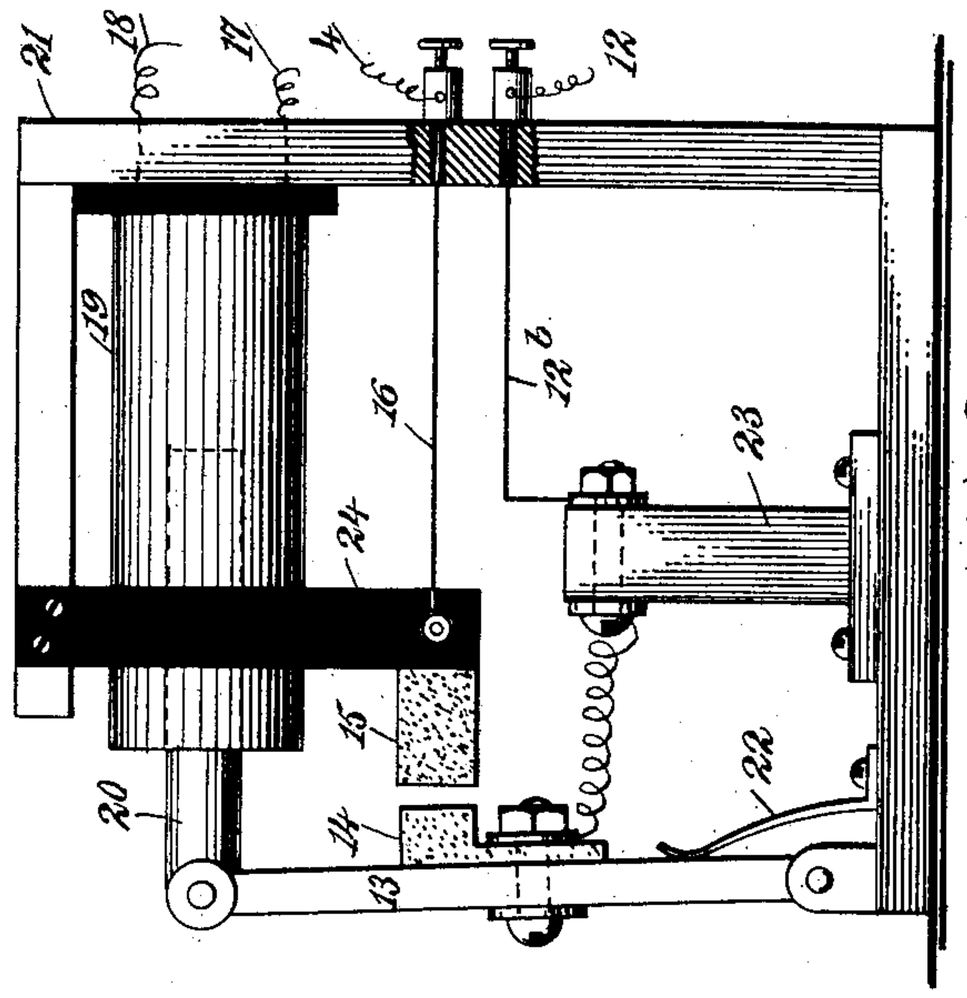

Fig. 2

WITNESSES:

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No. 746,490. Patented December 8, 1903.

UNITED STATES PATENT OFFICE.

HENRY GARRETT, OF DALLAS, TEXAS.

CIRCUIT-BREAKER FOR STORAGE BATTERIES.

SPECIFICATION forming part of Letters Patent No. 746,490, dated December 8, 1903.

Application filed June 26, 1903. Serial No. 163,210. (No model.)

To all whom it may concern:

Be it known that I, HENRY GARRETT, a citizen of the United States, and a resident of Dallas, in the county of Dallas and State of Texas, have invented a new and Improved Circuit-Breaker for Storage Batteries, of which the following is a full, clear, and exact description.

My invention relates to an improved circuit-breaker for storage batteries, and more particularly to an appliance for breaking the main circuit of the battery when the voltage reaches a predetermined minimum limit.

Reference is to be had to the accompanying drawings, in which similar characters of reference indicate corresponding parts in both views.

Figure 1 is a diagram showing the improved device and its accompanying parts in operation; and Fig. 2 is a side elevation, partly in section, of the solenoid and contacts used for breaking the circuit.

The feed-wires 1 2 are connected with an automatic electrical switch 3, this switch forming part of another invention for which I have filed a separate application. From this switch a wire 4 leads to the contacts hereinafter described, and a wire 12 leads thence to one of the storage-battery terminals, while a feed-wire 5 leads to the rheostat and thence to the other of the storage-battery terminals. The wire 5 is connected with the pivotally-mounted arm 6 of the rheostat 7, which instrument is provided with contacts 8 of the kind usually employed. From the rheostat a feed-wire 9 is connected with the terminal 10 of the storage battery 11. The other terminal 12^a of the battery is connected with the swinging arm 13, upon which is mounted the carbon contact 14. Immediately adjacent to this carbon contact 14, which is of course movable with the arm 13, is a fixed carbon contact 15, connected with a wire 16, which passes through the insulation 24 and is connected directly with the feed-wire 4.

With the feed-wires 1 2 are connected shunt-wires 17 18 for the purpose of energizing the solenoid-coil 19, thereby causing the same to draw the cylindrical armature 20, mounted upon the swinging arm 13. The solenoid and its accompanying parts are mounted in a frame 21, the swinging arm 13 being normally pressed outward by a leaf-spring 22, as indicated more particularly in Fig. 2.

A post 23 supports a wire 12^b, which connects the movable contact 14 with the wire 12. The electrode 16, as before stated, is preferably insulated by means of a rubber plate 24, as indicated more particularly in Fig. 2.

The operation of my device is as follows: The main circuit is through the feed-wire 2, switch 3, feed-wire 5, rheostat 6 8 7, feed-wire 9, battery-terminal 10 to battery 11, thence through terminal 12^a, wire 12^b, arm 13, contacts 14 15, electrode 16, wire 4, and switch 3 to the feed-wire 1. The shunt-circuit for exciting the solenoid or magnetic member is from the feed-wire 1, through the shunt-wire 18, solenoid-coil 19, and shunt-wire 17, to the feed-wire 2. The contacts 14 15 are normally closed by the continuous action of the magnetic member or solenoid, thus enabling the current to flow from one of the feed-wires through the rheostat and storage battery to the other. When, however, the voltage of the main circuit drops below a predetermined minimum limit, the swinging arm 13, impelled by the elasticity of the spring 22, moves to the left, as shown in Fig. 2, and separates the movable contact 14 from the fixed contact 15, thus breaking the main circuit. The result is that the charging of the battery is stopped the instant the voltage of the feed-wires drops too low from any cause whatever. For instance, if there be a break in one of the mains or a shut-down at the power-house the contacts are instantly separated and the storage battery is thereby disconnected from the circuit. The object is to prevent the wasting of energy with which the battery is already charged, which waste would otherwise manifest itself in the shape of back pressure from the storage battery into the mains and at the same time provide an apparatus that will automatically close the circuit again when the voltage from the power-lines reaches the proper figure. While the battery is being charged from the mains the potential of the current passing through the shunt-wires 17 18 to the solenoid steadily increases. This

increase does not affect the circuit through e carbons 14 15, for the reason that the carbons at this stage are already in contact and are merely pressed together a little more forcibly than would otherwise be the case. The maximum voltage therefore does not affect the solenoid. The solenoid is affected solely by a minimum voltage—that is to say, a voltage dropping below a certain predetermined limit.

This circuit-breaker will not spark at the carbons when the same separate, owing to a drop in voltage, the opposing pressures from the charging-current on the one side and the battery-pressure on the other side neutralizing each other, which is a most valuable feature of this circuit-breaker. When properly adjusted to open at the proper voltage, usually about five to eight volts above the battery maximum, there will be absolutely no spark at all.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a circuit-breaker for storage batteries, the combination of feed-wires of opposite sign to be connected with the storage-battery terminals, and a magnetic member connected in parallel with said feed-wires and provided with contacts normally closed by a portion of the current of said feed-wires, said portion of the current being of the same voltage as that of said feed-wires, the arrangement being such that said magnetic member is free to open said contacts and break the circuit of said feed-wires when the current of said circuit drops below a predetermined limit.

2. In a circuit-breaker for storage batteries, the combination of feed-wires of opposite sign to be connected with the storage-battery terminals, a magnetic member connected with said feed-wires and energized thereby, a normally closed contact connected with said feed-wires for opening the circuit thereof when the current reaches a predetermined minimum limit, and means controllable at will for regulating the main current and thereby controlling the sensitiveness of said magnetic member.

3. In a circuit-breaker for storage batteries, the combination of feed-wires of opposite sign to be connected with the storage-battery terminals, a solenoid connected in parallel with said wires and normally energized thereby, a normally closed contact connected with said feed-wires for opening and closing the main circuit thereof, a movable lever connected with said contact for opening and closing the same, an armature connected with said lever and attracted toward said solenoid, and a spring connected with said lever and tending to force the same in a direction away from said solenoids.

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

HENRY GARRETT.

Witnesses:
PAUL M. KAUHL,
JOHN N. PREWITT.