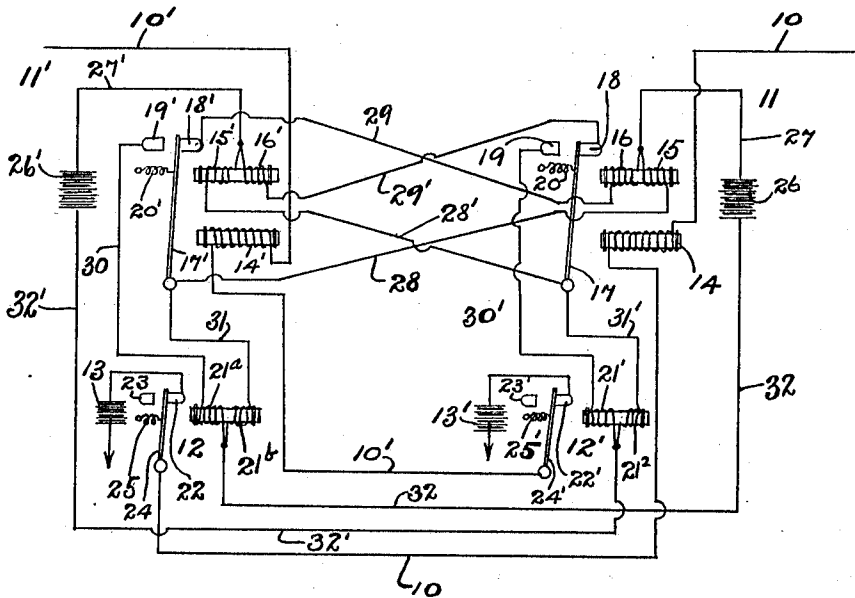


G. L. RAWDON.
TELEGRAPH REPEATER.
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1,048,209.

Patented Dec. 24, 1912.



Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE L. RAWDON, OF CLEVELAND, OHIO.

TELEGRAPH-REPEATER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE L. RAWDON, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Telegraph-Repeaters; and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to new and useful improvements in automatic telegraph repeaters and particularly to an improvement on the telegraph repeater shown in my Patent No. 914,877, dated March 9, 1909.

The object of this invention is to provide such an arrangement and combination of parts in a telegraph repeater of the character referred to as will create more of the time element insuring the locking of the opposite relay before the main line current is removed from it and the unlocking thereof after the main line current has been restored, and thereby making the operation of the repeater more secure in preventing a kick or momentary flying back of the relay armature lever in cases where high tension spring adjustment is required in adjusting the relay to receive the incoming signals.

My invention, therefore, consists in providing back contact break points adapted to be engaged by the armature levers of the main receiving relays when the relays are opened and providing the repeating sounders with differentially wound magnets, one winding of which is controlled directly by the aforementioned back contact break point of the main receiving relay while the local circuit in the other winding remains intact.

My invention also consists in the features of construction and combination of parts described in the specification, pointed out in the claims and illustrated in the accompanying drawings.

In the accompanying drawings is shown somewhat conventionally my improved telegraph repeater and various electrical connections wherein 10 represents one main line which for the sake of convenience I shall call the east line, 11 the main receiving relay, 12 the repeating sounder and 13 the main battery of the east line. Likewise 10' represents the other main line which I shall call the west line, 11' the main receiving relay, 12' the repeating sounder and 13' the main battery of the west line.

The main receiving relay 11 is provided with a main electro-magnet including a coil 14 in the east line, a differential magnet consisting of two oppositely wound coils 15 and 16 which form a part of a local circuit controlled in part by the opposite relay 11', a pivoted armature lever 17, a front contact point 18 and a rear contact point 19. A spring 20 connected to the armature lever 17 tends to pull the latter away from the front contact point 18 and against the rear contact point 19. The repeating sounder 12 is provided with a differentially wound electro-magnet consisting of two oppositely wound coils 21^a and 21^b, which are in a local circuit, a contact point 22, a pivoted armature lever 24 and a stop 23 which is connected to the battery 13 and to the ground. A spring 25 connected to the armature 24 tends to pull the latter away from the contact 22. Likewise the main receiving relay 11' is provided with a main electro-magnet including a coil 14' in the west line, a differential magnet consisting of two oppositely wound coils 15' and 16' which are in another local circuit controlled in part by relay 11, a pivoted armature lever 17', a front contact point 18' and a rear contact point 19'. A spring 20' connected to the armature lever tends to pull the latter away from the contact point 18' and against the contact 19'. The repeating sounder 12' is provided with a differentially wound magnet consisting of two oppositely wound coils 21' and 21². A contact point 22', a pivoted armature lever 24' and a stop 23' which is connected to a battery 13' and to the ground. A spring 25' connected to the armature lever 24' tends to draw the latter away from the contact 22'.

I shall now describe the two local circuits which I employ in my repeater.

The one local circuit is provided with a battery 26 which is connected by a conductor 27 to a point at which the circuit divides and to the two coils 15 and 16 of the differential magnet, which coils are in parallel to each other or in opposite legs of the divided circuit. The coil 15 is connected by a conductor 28 to the armature lever 17' of the main receiving relay 11' and the contact point 18' of the same relay is connected by a conductor 29 to one terminal of the coil 16. The other terminal of the battery 26 is connected by a conductor 32 to a point at which the circuit divides and a branch goes to the coil 21^a and to the coil 21^b. The

coil 21^a of the differentially wound magnet of the repeating sounder is connected by a conductor 30 with the back contact 19' of the armature 17' and the other coil of the differentially wound magnet of the repeating sounder is connected by a conductor 31 directly with the armature 17'. The other local circuit is provided with a battery 26' which is connected by a conductor 27' to a point at which the circuit divides one branch going to the coil 15' and the other branch going to the coil 16' of the differential magnet of the relay 11'. The coil 15' is connected by its conductor 28' to the armature 17 and the contact point 18 of the same relay is connected by a conductor 29' to the coil 16'. The coil 21' of the differential magnet of the repeating sounder 12' is connected by a conductor 30' with the rear contact point 19 and the coil 21² of the same magnet is connected by a conductor 31' with the armature 17. The other terminal of the battery 26' is connected by a conductor 32' to a point where the circuit divides, one branch going to the coil 21' and the other branch going to the coil 21² of the repeating sounder 12'.

The operation of my telegraph repeater is as follows:—Under normal conditions and when neither line is in use, both local circuits are closed, as shown in the drawings, the armature lever of each main receiving relay being held onto the front contact point against the tension of the spring by the magnetizing effect of the main magnet coil, the magnetizing effects of the oppositely wound coils being *nil*, as one coil neutralizes the other. If the operator on the west line opens the west line, the armature lever 17' of the western relay will be pulled away from its front contact point 18' by the relay spring 20', opening one branch or leg of the local circuit, and permitting the coil in the other branch or leg, by its magnetizing effect to prevent the armature lever 17 of the eastern relay from being drawn away from its front contact point 18. As soon as the armature lever 17' of the western relay reaches its back contact 19' the current again divides, and traversing both coils 21^a and 21^b of the differentially wound repeating sounder renders it *nil*, thereby causing its armature lever 24 to be drawn away from its contact point by the sounder spring 25 and causing the signal to be transmitted to the east line. The reverse operation or the restoring of the main line current, and the unlocking of the opposite relay is described as follows:—As soon as the relay armature lever 17' leaves its back contact break point 19', the circuit in the winding 21^a of the differentially wound

magnet of the repeating sounder is opened and its armature lever 24 is drawn onto its contact point 22 against the tension of the sounder spring 25 by the magnetizing effect of the oppositely wound coil 21^b thereby restoring the main line circuit. As soon as the relay armature lever 17' reaches its front contact point 18' it causes the current to again traverse both the coils 15 and 16 of the differentially wound magnet of the opposite relay rendering its magnetizing effects *nil*, as one coil neutralizes the other, and thereby unlocking or releasing the opposite relay armature lever 17.

What I claim is,—

1. In a telegraph repeater, a main receiving relay having a main magnet and a differentially wound magnet, a repeating sounder having a differentially wound magnet and means whereby the armature of the main receiving relay controls directly one coil of the differential magnet of the repeating sounder.

2. In a telegraph repeater, a pair of main receiving relays, each relay having a main magnet and a differentially wound magnet, a pair of repeating sounders, each sounder having a differentially wound magnet, means whereby the armature of one of the main receiving relays controls directly one coil of one of the differential magnets of one of the repeating sounders and the armature of the other main receiving relay controls directly one coil of the differential magnet of the other repeating sounder.

3. In a telegraph repeater, a pair of main receiving relays, each having a main magnet and a differentially wound magnet, a repeating sounder having a differentially wound magnet and a local circuit including one of the oppositely wound coils of the repeating sounder magnet and the back contact point of one of the relays.

4. In a telegraph repeater, a pair of main receiving relays, each having a main magnet, an armature lever and a differentially wound magnet, a repeating sounder having a differentially wound magnet and a local circuit including both of the oppositely wound coils of the differentially wound magnet of one relay and one of the oppositely wound coils of the repeating sounder magnet and the front contact point of the armature lever.

In testimony whereof, I sign the foregoing specification, in the presence of two witnesses.

GEORGE L. RAWDON.

Witnesses:

VICTOR C. LYNCH,
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