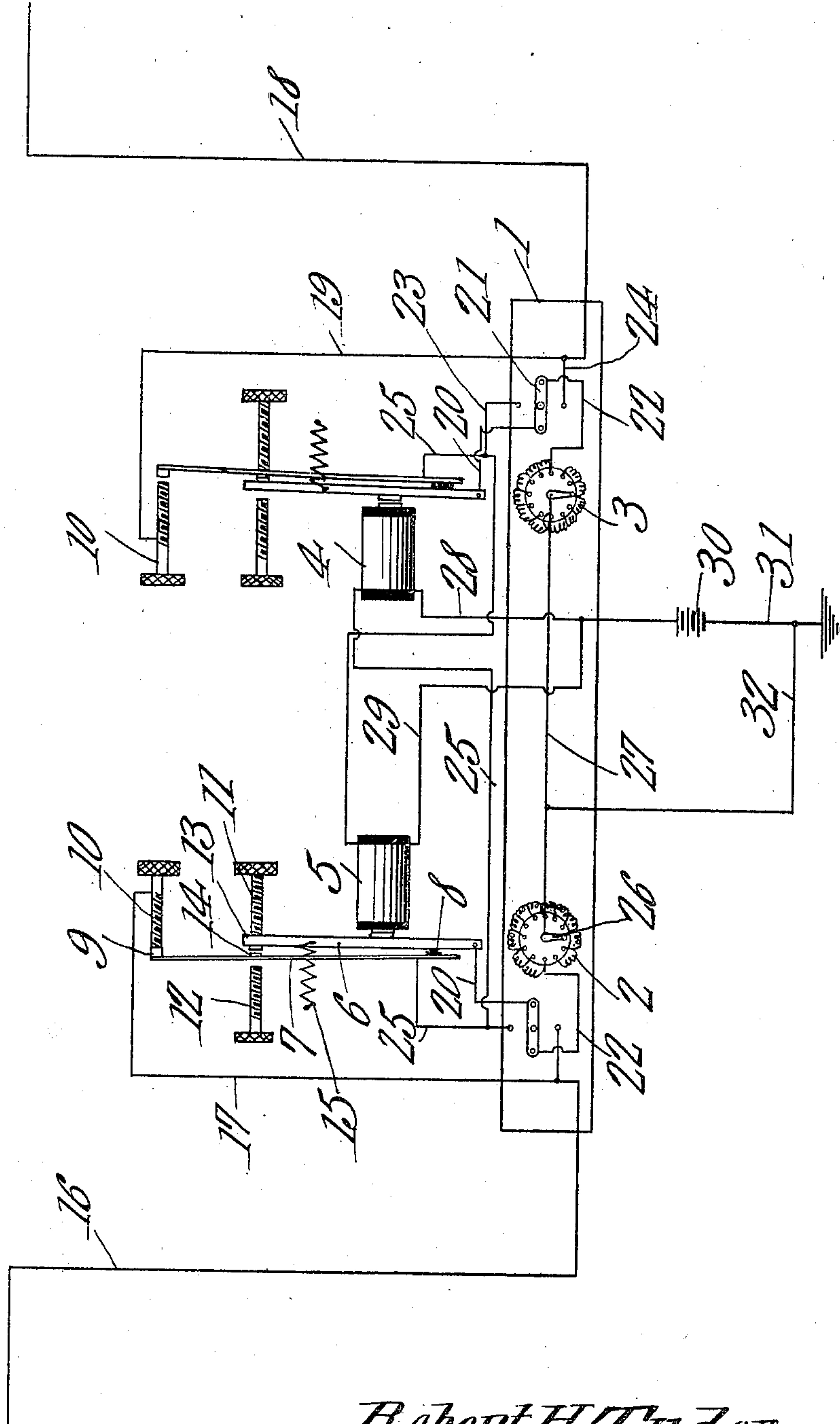


R. H. TUDOR.  
TELEGRAPH REPEATER.  
APPLICATION FILED MAY 2, 1910.

966,490.

Patented Aug. 9, 1910.



Witnesses

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# UNITED STATES PATENT OFFICE.

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TELEGRAPH-REPEATER.

966,490.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed May 2, 1910. Serial No. 558,871.

*To all whom it may concern:*

Be it known that I, ROBERT H. TUDOR, a citizen of the United States, residing at Corinth, in the county of Alcorn and State of Mississippi, have invented a new and useful Telegraph-Repeater, of which the following is a specification.

This invention has reference to improvements in telegraph repeaters and its object is to provide a repeater wherein all local circuit instruments such as transmitters, repeating sounders, and holding magnets are eliminated and by so eliminating the instruments named it also does away with the necessity for extra batteries to keep such local circuit instruments in operation.

The invention comprises two relays of standard type with connections so arranged that when the main line circuit on one side of the repeater is broken there is established a circuit whereby the relay controlled by the other main line is maintained closed irrespective of the break in the first named main line, the energy for controlling the relay which is maintained closed being drawn from the main battery.

The present invention provides means whereby the receiving operator may readily break in on the sending operator when desired.

The invention will be best understood from the following description taken in connection with the accompanying drawing forming a part of this specification, which drawing is a diagram illustrating the present invention as applied to a telegraph repeater.

For convenience the instrument may be provided with a base 1 which may be utilized to house some of the parts of the structure. Within the base may be installed two rheostats 2, 3, while on the base 1 are mounted two electro-magnets 4, 5, each magnet controlling an armature 6 carrying an elastic contact member 7 preferably in the form of a leaf spring insulated at the point of connection with the armature lever by insulating material 8. The spring 7 is continued beyond the free end of the armature lever 6 and there carries a contact 9 in the path of which is a circuit terminal 10 in the form of a thumb screw although any other suitable terminal structure may be used. The armature lever 6 is provided with front and back stop screws 11 and 12 respectively, the screw

12 engaging the spring 7 when the armature lever moves away from the respective magnet and at points preferably coincident with the screws 11 and 12 the facing portions of the armature lever and spring 7 carry contacts 13 and 14 respectively. A spring 15 for each armature lever may be utilized to move the lever away from the respective magnet.

Ignoring binding posts which are usually carried by the base 1, one line wire designated by the numeral 16 and which for convenience of description will be considered as the western circuit of the system under consideration, is connected to a conductor 17 leading to the screw 10. The other line wire which may be considered as the eastern circuit and is designated by the numeral 18 is connected to a conductor 19 leading to the other screw 10. Each armature lever 6 is connected by a conductor 20 to a contact in the path of a switch arm or lever 21, the other side of which lever when in contact with the terminal of the conductor 20 is also in contact with the terminal of another conductor 22 leading to the respective rheostat 2 or 3 as the case may be. The switch arm or lever 21 has another active position which may be at right angles to the position where the conductors 20 and 22 are coupled and in this position the switch arm bridges conductors 23, 24, one leading to a conductor 25 connected at one end to the respective spring 7 and at the other end to one side of the magnet 4 or 5 other than the one controlling the armature carrying the said spring 7. The other conductor, namely the conductor 24 is connected to the respective conductor 17 or 19 as the case may be.

Each rheostat 2 and 3 is provided with a switch arm 26 and these two switch arms are connected together by a conductor 27. The other sides of the two magnets 4 and 5 are connected by respective conductors 28, 29 to a main battery 30, which latter is also connected to ground by a conductor 31 and the conductor 27 is also connected to ground by a conductor 32 which may be coupled to the conductor 31.

It is customary to provide the instrument with four binding posts, one each for the two main line conductors 16 and 18, one for the battery 30 and one for the conductor 32, but an additional binding post may be provided for coupling an additional battery to



the conductor 29 so that two main batteries may be used if so desired.

In considering the operation of the repeater it is assumed in the diagram that the western circuit 16 is open or broken. This means that the circuit which may be traced from main line conductor 16 through the conductor 17 to the screw 10, thence by way of the contact 9 and spring 7 to the conductor 25, thence by the magnet 4, no longer causes the energization of magnet 4 and the armature lever 6 controlled thereby therefore moves away from the magnet until the spring 7 is engaged by the stop screw 12 in its path thus bringing the contacts 13 and 14 there located together while breaking the circuit between the contact 9 and screw 10 on this side of the instrument. The movement of the contact 9 away from the screw 10 breaks the eastern circuit through the conductor 18. There is however established another circuit as follows, from the battery 30 through the conductors 31, 32 to the conductor 27, thence to the rheostat 3, thence by the conductor 22, switch arm 21, and conductor 20 to the armature lever 6 of the magnet 4, thence by the contacts 13 and 14 of said armature lever and the spring 7 carried thereby, thence by the said spring 7 to the conductor 25, thence to the magnet 5 and returning by the conductor 29 to the battery 30, the magnet 5 thus remaining energized and its armature lever 6 attracted. When another impulse comes over the main line 16 on the closure of the circuit, the circuit through the magnet 4 is at once established through the terminals controlled by the magnet 5 so that the eastern circuit becomes again closed by the energization of the magnet 4. The rheostats 2 and 3 are adjusted to equal the resistance of the respective main lines so that when the current from the main battery is being shifted by the transmitting armature lever from the opposite main line circuit to the rheostat the relay circuits 4 or 5 through which the current passes will remain uniform. Should the operator on the eastern circuit desire to break in on the operator on the western circuit he opens the circuit which would reach the eastern relay 5 on the first closed stroke of the western relay armature lever and then when the circuit through the western relay 4 is broken by the break in the main line conductor 16, the break through the magnet 5 is already established by the separation of the contacts 9 and 10 on that side of the instrument so that the break through the repeater is completed.

Since the main line relay serves as a main line transmitter the action of the repeater is materially quicker than with those types of repeaters which have local circuit transmitters. With the present invention one of the main line magnets is in an energized state while the other magnets are opening and closing the armature lever and spring carried thereby to cause the sending of signals to the opposite or second wire.

What is claimed is:—

1. In a telegraph repeater, main line relay magnets, an armature lever for each magnet, a contact member on and insulated from each armature lever where attached thereto, contact terminals in the path one of the other on each armature lever and contact member respectively, another contact on the contact member, and a contact adapted to be connected to a main line conductor and engageable by the last named contact on the contact member when the latter is moved by the respective magnet.

2. In a telegraph repeater, main line relay magnets, and adjustable resistances for each magnet includable in series therewith, an armature lever for each magnet, a contact member on and insulated from each armature lever where attached thereto, contact terminals in the path one of the other on each armature lever and contact member respectively, another contact on the contact member, and a contact adapted to be connected to a main line conductor and engageable by the last named contact on the contact member when the latter is moved by the respective magnet.

3. A telegraph repeater comprising a main line relay magnet for each main line, an armature lever and contact member thereon for each magnet, a contact in the path of each contact member engageable by the latter when the respective magnet is energized, a resistance for each magnet includable in series therewith and circuit connections for the coupling of main line conductors and a source of electric energy to said repeater.

4. In a telegraph repeater, main line relays and resistances includable in series with each relay to balance the cutting out of the other relay from the circuit.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ROBERT H. TUDOR.

Witnesses:

E. F. WAITS,  
A. E. BIRCH.