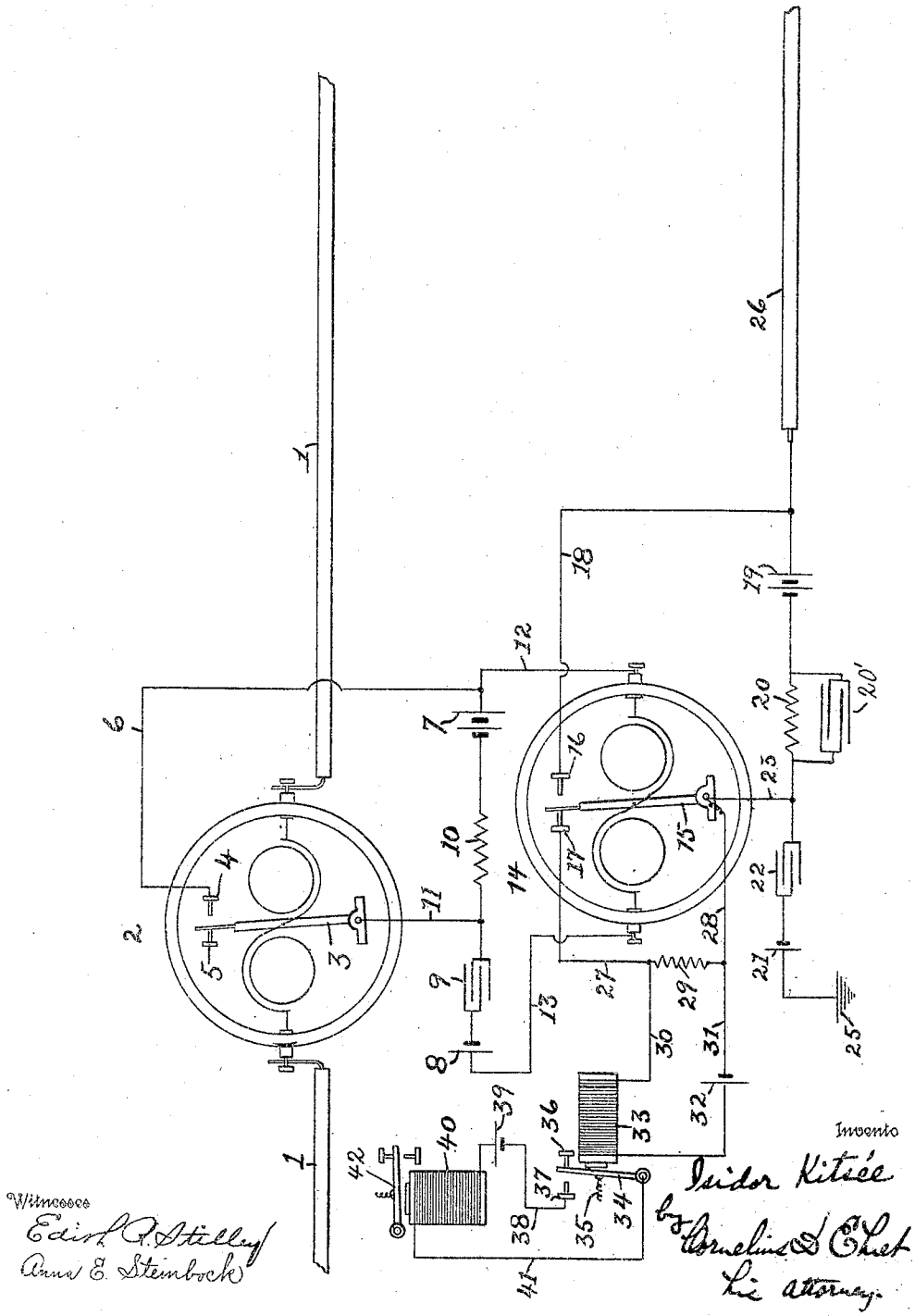
No. 888,509. PATENTED MAY 26, 1908.

I. KITSEE.

CABLE TELEGRAPHIC SYSTEM.

APPLICATION FILED DEC. 17, 1906.



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UNITED STATES PATENT OFFICE.

ISIDOR KITSEE, OF PHILADELPHIA, PENNSYLVANIA.

CABLE TELEGRAPHIC SYSTEM.

No. 888,509. Specification of Letters Patent. Patented May 26, 1908.

Application filed December 17, 1906. Serial No. 348,363.

To all whom it may concern:

Be it known that I, ISIDOR KITSEE, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Cable Telegraphic Systems, of which the following is a specification.

My invention relates to telegraphy and more especially to submarine or subterranean telegraphy, known as cable telegraphy.

It is the object of my invention to employ in a cable system an extremely sensitive relay which shall control a cicuit or circuits associated with or including a second relay of less sensitiveness, the second relay serving to produce or record messages at its station as received by the extremely sensitive relay, and to repeat such messages received by the extremely sensitive relay into another line or cable.

It is a further object of my invention that the circuit or circuits controlled by the extremely sensitive relay shall be prevented from producing any sparking or arcing with consequent welding effects at the contacts of the relay and that such circuit or circuits shall, with relatively slight energy, be enabled to sufficiently and positively actuate the less sensitive relay.

For an illustration of one form my invention may take reference is to be had to the accompanying drawing, which illustrates diagrammatically the telegraphic apparatus at a relay or a terminal station. The main line or cable 1 has impressed upon it at a distant station successive electrical impulses alternating in polarity as described in prior patents granted to me, and the transmitting apparatus at such station may, if desired, take the form illustrated in Letters Patent No. 831,355 granted me on September 18, 1906.

An extremely sensitive polarized relay 2 has its magnet windings connected in series with the cable 1. The relay tongue 3 engages alternately the contact 4 and the stop 5 as the signal impulses pass over the cable 1. The relay tongue 3 and contact 4 are included in a circuit comprising the conductor 6, a source of energy 7, as a battery, the very great non-inductive resistance 10 and the conductor 11. The battery 7 and resistance 10 are also in a circuit including in series with them the conductors 12 and 13, battery 8, condenser 9, and the windings of the polarized relay 14 here shown, by way of example, of the same type as the relay 2. The relay 14 is of less sensitiveness than the relay 2, which has, for example, a resistance of approximately five thousand ohms, while the relay 14 has a resistance, for example, of one thousand ohms. The battery 7 is shown opposed to the battery 8 and to be of twice the power or voltage. The tongue 15 of the relay 14 engages either of the contacts 16 or 17 according to the direction of current through the relay. The contact 16 is connected by conductor 18 with a terminal of the second cable or line 26, there being connected in series between such cable 26 and the earth 25 the battery 19, the inductive resistance 20, shunted by a condenser 20′, the condenser 22, and the battery 21. A conductor 23 communicates from a point between inductance 20 and condenser 22 with the tongue 15 of the relay.

The relay contact 17 communicates through conductors 27 and 30 with the winding 33 of an ordinary non-polarized telegraph relay in whose circuit is included the battery 32 and the conductor 31, the latter communicating by conductor 28 with the relay tongue 15.

29 is a resistance bridged across the conductors 30 and 31.

34 is the armature of the relay 33 and is normally retracted by spring 35, but when attracted leaves contact 37 and engages the stop 36. Included in the circuit controlled by armature 34 and the contact 37 are serially connected the conductor 38, battery 39, sounder or Morse recorder magnet 40 and conductor 41.

42 represents the normally retracted armature of the sounder or recorder.

The operation of the apparatus is as follows: The operator at a distant station sends over the cable 1 successive impulses of practically equal duration but of opposite polarities. A positive impulse coming over the cable, we will assume, will cause the tongue 3 to make engagement with the contact 4, thus closing the circuit through the conductors 6 and 11 which then short circuits the battery 7 and resistance 10, which may be, for example, of seventy-five thousand to one hundred thousand ohms. The condenser 9 then becomes charged by the battery 8 permitting an impulse, say a positive one, to pass through the relay tongue 3, contact 4, conductor 6 through conductor 12 and the winding of the less sensitive relay 14 which will cause the tongue 15 to leave contact 17 and

to engage the contact 16, thus closing the circuit, through the conductor 18 and thus permitting the battery 21 to send a single impulse to the second line or cable 26 through the condenser 22. Now suppose a negative impulse comes over the main cable 1, the tongue 3 will be moved against the stop 5 in the relay 2 and in breaking circuit with the contact 4 there will be no sticking or welding because the voltage of the battery 7 acting through the high resistance 10 cannot produce enough current for such detrimental effect in a sensitive relay. Furthermore, the battery 7 then seems to aid or cause the instant and better discharge of condenser 9, so that the tongue 15 of the polarized relay 14 will be carried back against contact 17 and breaks contact with 16. In breaking contact with 16 an impulse of opposite polarity is sent over the cable or line 26 due to the kick or impulse produced by battery 19 and inductance 20. The result is that the extremely sensitive relay 2 responds to the very weak positive and negative impulses received from the cable 1 and thereby controls the circuit of a second relay to send over the second cable 26 corresponding impulses both as to duration, polarity and time interval. Both the main cable 1 and the second cable 26 are always in communication with a source of energy as distinguished from those systems in which the cable is necessarily isolated, with resultant surgings of residual charge over the cable with consequent shifting of zero of the recording instruments. The tongue 15 and contact 16 of the relay 14 operate in effect like the key 7, 8, shown in the drawing in my prior patent No. 831,355. And by the use of the battery 7 and 8, condenser 9, and high resistance 10, the extremely sensitive relay 2 is required to handle very slight amounts of electrical energy and is nevertheless able to positively and efficiently control the less sensitive relay 14 which controls greater amounts of electrical energy in its several controlled circuits. Considering now the production of telegraphic messages at such relay station, with the relay tongue 15 engaging contact 17 the resistance 29 is short circuited and the relay magnet 33 fully energized to break the circuit between its armature 34 and the contact 37. Such rupture of circuit allows the armature 42 of the sounder or recorder to be pulled upwardly by spring against its back stop. When the relay tongue 15 moves over to contact 16, it breaks circuit with contact 17 thus throwing into circuit with the relay 33 the resistance 29 which sufficiently weakens the current through the relay 33 to cause the spring 35 to bring the armature 34 against contact 37, thus closing the circuit of the sounder or recorder 40 and causing the attraction of the armature 42. This motion of the armature 42 between its two stops enables the reading of a message by sound or the record of a message on a tape in a well known manner.

What I claim is:

1. In a telegraph system, the combination with a cable, of a relay, a second relay controlled thereby and included in circuit with a condenser and a battery, and a shunt across the break of said first relay including a high resistance and a battery.

2. In a telegraph system, the combination with a cable, of a sensitive relay, a relay of less sensitiveness controlled thereby and included in a circuit including a battery, a condenser, a high resistance, and a second battery of greater power than and connected in opposition to said first mentioned battery, said second battery and high resistance being connected across the break of said sensitive relay.

3. In a telegraph system, the combination with a cable, of a sensitive relay, a relay of less sensitiveness controlled thereby and included in a circuit comprising a battery, a condenser, a high resistance, and a battery of greater power than and connected in opposition to said first mentioned battery, a second line or cable including in its circuit a battery, a condenser, an inductive device, and a second battery of greater power than and connected in opposition to said first battery, said inductive device and second battery being connected across the break of said less sensitive relay.

4. In a telegraph system, the combination with a cable, of a relay, a second relay controlled thereby, the winding of said second relay included in a circuit with a source of energy a condenser and a resistance, said main line or cable relay adapted to short circuit said resistance.

5. In a telegraph system, the combination with a cable, of a relay, a second relay having its winding included in a circuit with oppositely disposed sources of energy and a resistance, and a circuit including one of said sources of energy and said resistance controlled by said line or cable relay.

6. In a telegraph system, the combination with a cable, of a relay, a second relay having its winding included in a circuit with oppositely disposed sources of energy and a condenser, and a circuit including one of said sources of energy and contacts of the main relay.

7. In a telegraph system, the combination with a cable, of a relay, a second relay having its winding included in a circuit with a source of energy a condenser and a resistance, said main relay adapted to short circuit said resistance, means controlled by said second relay for retransmitting the message received by said main relay, and means controlled by said second relay for translating the message received by said main relay.

8. In a telegraph system, the combination with a cable, of a relay, a second relay having its winding included in a circuit with a source of energy a condenser and a resistance, said main relay adapted to short circuit said resistance, and means controlled by said second relay for retransmitting the message received by said main relay.

9. In a telegraph system, the combination with a cable, of a relay, a second relay having its winding included in a circuit with a condenser and a resistance, a circuit including said resistance and the contacts of the main relay, and means controlled by said second relay for retransmitting the message received on said main relay.

10. In a telegraph system, the combination with a cable, of a sensitive polarized relay responding to successive impulses of alternate polarity impressed upon said line or cable, a less sensitive relay having its winding included in a circuit with a source of energy a condenser and a high resistance, said high resistance included in a circuit controlled by the contacts of said main relay, and means controlled by said second relay for translating the message received on said sensitive relay.

In witness whereof I hereunto affix my signature in the presence of the two subscribing witnesses.

ISIDOR KITSEE.

Witnesses:
ALVAH RITTENHOUSE,
ANNA E. STEINBOCK.