I. KITSEE.

CABLE TELEGRAPHY.

APPLICATION FILED FEB. 14, 1908. RENEWED OCT. 3, 1913.

1,083,259. Patented Dec. 30, 1913.

Fig. 1.

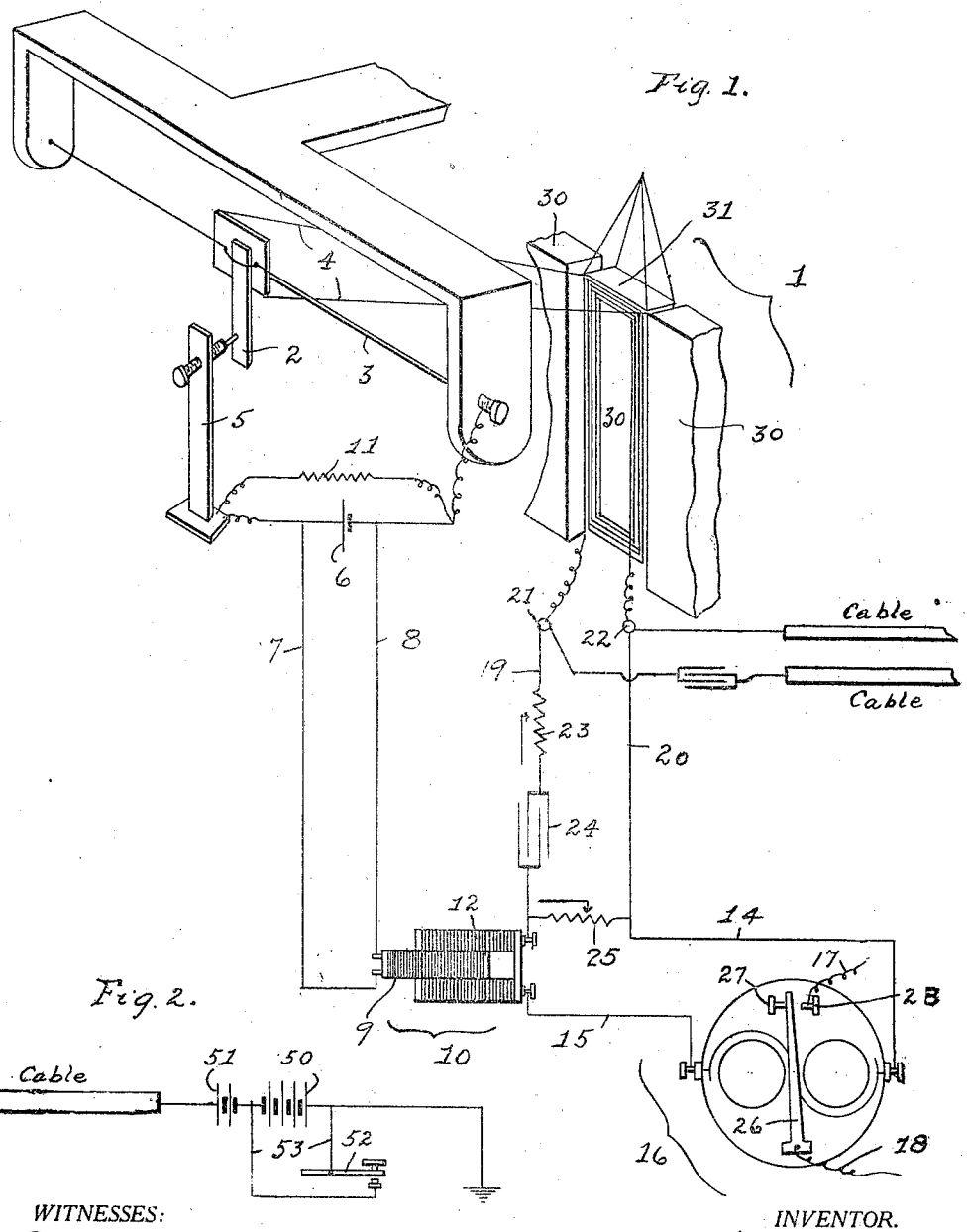

Fig. 2.

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CABLE TELEGRAPHY.

1,083,259. Specification of Letters Patent. Patented Dec. 30, 1913.

Application filed February 14, 1908, Serial No. 415,894. Renewed October 3, 1913. Serial No. 793,253.

To all whom it may concern:

Be it known that I, ISIDOR KITSEE, citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Cable Telegraphy, of which the following is a specification.

My invention relates to an improvement in telegraphy and has more special reference to the receiving organism of lines with great capacity, such as submarine cables.

The arrangement, as described in this specification, is applicable to different modes of receiving, but its great advantage is apparent in a system wherein true reversals are employed, that is, where impulses of practically the same duration and intensity, but alternately of opposite polarity, are employed and where for each character of the alphabet two impulses are transmitted, the time unit between the first and second impulse denoting the character to be transmitted. The arrangement, as illustrated, is also designed to apply to such printing systems wherein a different group of signals is transmitted over the line and each different grouping is made to actuate a different type bar. In other words, the system, as outlined, can be made to translate the received impulses into dots and dashes with the aid of a sounder, or can be made to translate the same into automatic printing.

In the drawing, Figure 1 represents in diagrammatic view a receiving organism embodying my invention. Fig. 2 is a diagrammatic view of a transmitting organism.

In this drawing, 1 is the relay proper as an entirety connected in the line transmission, here shown as the cable. This relay is here shown in conventional sign and comprises here the stationary magnets 30 and the movable coil 31. It has to be stated right here that my system is applicable to different styles of relays, but I have here illustrated one which, in practice, has proven successful.

2 and 5 are contacts; the contact 2 suspended by the wire 3 and adapted to be actuated through the means 4 with the aid of the coil 31 of the relay 1.

6 is a source of current connected to the local circuit comprising the wires 7 and 8 and the primary 9 of the inductorium 10. This source of current is here shown as to be short circuited through the contacts 2 and 5. In the working of sensitive relays I have found that this arrangement is best adapted for the prevention of sparking or sticking, and to further lessen the sparking of this arrangement I have connected the terminals of the contacts with the resistance 11. As the battery 6 has to stand a continuous short circuiting, it is necessary to select a type adapted for such purpose and I have found that the so-called "gravity" cell is well adapted for this purpose.

I have here shown the relaying contacts 2 and 5 as to normally contact with each other, but it is obvious that in the working of this system, the contacts may be normally apart from each other. I have selected the mode as illustrated, as this mode or method has proven more satisfactory in actual tests than the one in which the contacts are normally apart.

The secondary 12 of the inductorium 10 is connected through the wires 14 and 15 with the polarized relay 16. This polarized relay is provided with the means 17 and 18 to connect thereto desired t. nslating devices. The circuit of the secondary 12 is also provided with the shunt wires 19 and 20 connected to the terminals 21 and 22 of the coil 31 of the relay proper. In this shunt are means so as to reduce the energy flowing through said coil and these means are here shown as the variable resistance 23 and the variable condenser 24. In the main circuit is also connected the variable resistance 25.

The polarized relay 16 is provided with the armature 26, and the forward stops 27 and 28.

I have stated above, that the system as outlined is, preferably, to be worked with the aid of, what is known as, "true reversals." In the system of transmitting true reversals, the arrangement at the transmitting station is as follows:—In the transmitting line are inserted two sources of current, one source of greater electro-motive force than the other. Preferably, the electro-motive force of one source should be about double the electro-motive force of the other source. The sources are connected in opposition as to each other. When the impulses are transmitted through manual labor, the source of

greater electro-motive force is provided with a shunt circuit and the transmitting key is connected to this shunt in a manner, so that through the depression of the key, the shunt is closed and through the opening of the key, the shunt is broken. With this arrangement, the operator manipulates his key in the same manner as the operator manipulates his key on land lines. He depresses the lever for a short time to denote a dot and for a longer time to denote a dash. Through the depression of the key, an impulse of one polarity is sent over the line and through the opening of the key, an impulse of opposite polarity is sent over the line. In Fig. 2 I have illustrated this mode of transmitting impulses. In this figure, 50 and 51 are the two sources of current inserted in the cable; 52 is the transmitting key and 53 is the shunt around the source 50.

The mode of operation with this receiving organism (taking it for granted that the transmitting means as above referred to are employed) is as follows:—Normally, the contacts 2 and 5 of the relay are in contact with each other. The battery 6 is, therefore, short circuited. Normally also the armature 26 of the polarized relay 16 rests against the forward stop 27. When now the operator depresses his key, the source 50 is short circuited and the current will flow from the source 51 over the cable, but as the condensers in the cable limit the flow of the force, only a short impulse will be impressed upon the cable. This impulse will actuate the coil of the receiver so as to open the normal connecting contacts 2 and 5. Through the opening of these contacts, the short circuit around the battery 6 is broken and the current from this battery will flow through the primary 9 of the inductorium 10, thereby inducing an impulse in the secondary 12. The arrangement and connection of the secondary circuit as to the polarized relay 16 and the shunt circuit connecting thereto the coil 31 is such, that through the impulse generated in 12, the armature 26 will be drawn from the stop 27 and toward and in contact with stop 28. At the same time, the flow of the impulse through the shunt circuit and the coil 31 connected thereto will induce in the coil a movement in the same direction as the arrived impulse. The impulse from the secondary 12 will prolong the operation, due to the line impulse on the coil 31, but the induced impulse from 12 will also enforce the line impulse, for the reason that the slightest increase of resistance between the contacts 2 and 5 due to the moving away of the contact 2 from 5, will be sufficient to produce an impulse in 12. During the time that the key is depressed, the battery 50 being short circuited, the force from the battery 51 will prevent the entire discharge of the cable and condensers connected therein, and it will take an appreciable time until the movable part 2 connects again with the contact 5. This time was found in practice to be longer than the necessary three time-units to denote a dash. But when the operator opens his key, the shunt around 50 is opened and the force from this source will charge the condenser in opposition to the former charge, thereby impressing upon the cable an impulse of a polarity opposite to the former impulse. This impulse will operate the movable part of the relay, here shown as the coil 31 in a manner so as to bring together the contacts 2 and 5. At the moment that these two contacts touch each other, no matter how slight, the flow of the current from the battery 6, through the primary 9, will be lessened and an impulse will be generated in the secondary 12 opposite to the former induced impulse and this impulse will reinforce the second line impulse so that the contacts 2 and 5 will be closed more tightly. This second induced impulse will have this effect on the armature 26 of the polarized relay 16; that the same will be drawn away from the contact 28 and will come to rest at 27. During the entire time that the armature 26 is in contact with 28, the circuit including the wires 17 and 18 will be made and electro-magnetic devices inserted therein will be energized. To persons versed in the art, it is obvious that through these movements of the armature, the incoming impulses can be translated into dots and dashes with the aid of a sounder or other translating device. In fact, the device 16 may be of such construction so as to obviate the necessity of using a separate sounder.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In cable telegraphy, a line relay, contacting parts for said relay, a local circuit for said contacting parts, a second local circuit connected to the coil of the line relay; a converter, the primary of said converter connected to the first named local circuit, the secondary connected to the second named circuit and a translating device included in said second circuit.

2. In telegraphy, a receiving organism comprising a line relay, contacting points therefor, an inductorium, the primary operatively related to said contacting points, the secondary operatively related to the coil of said line relay and a translating device in operative relation to said secondary.

3. In telegraphy, the method of operating sensitive relays, which consists in causing for each character of the alphabet two opposing movements in the movable part of said relay through the incoming line impulses, and causing through each movement to be generated a localized impulse adapted

to affect said relay in a manner alike to the preceding line impulse.

4. In telegraphy, the method of operating sensitive relays connected in the line, which consists in causing two movements in said relay, for each character of the alphabet through line impulses, and causing the time unit of each movement to be lengthened through localized impulses.

5. In cable telegraphy, a line relay connected to the cable and adapted to be moved in one or the other direction through the incoming impulse in accordance with the polarity of said impulse, contacting points for said relay and means, operatively related to said contacting points, to induce in said line relay a movement following the movement due to the line impulse.

In testimony whereof I affix my signature in presence of two witnesses.

ISIDOR KITSEE.

Witnesses:
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