I. KITSEE.

TELEGRAPHIC RECEIVING ORGANISM.

APPLICATION FILED FEB. 14, 1908. RENEWED JAN. 13, 1914.

1,092,151.

Patented Apr. 7, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

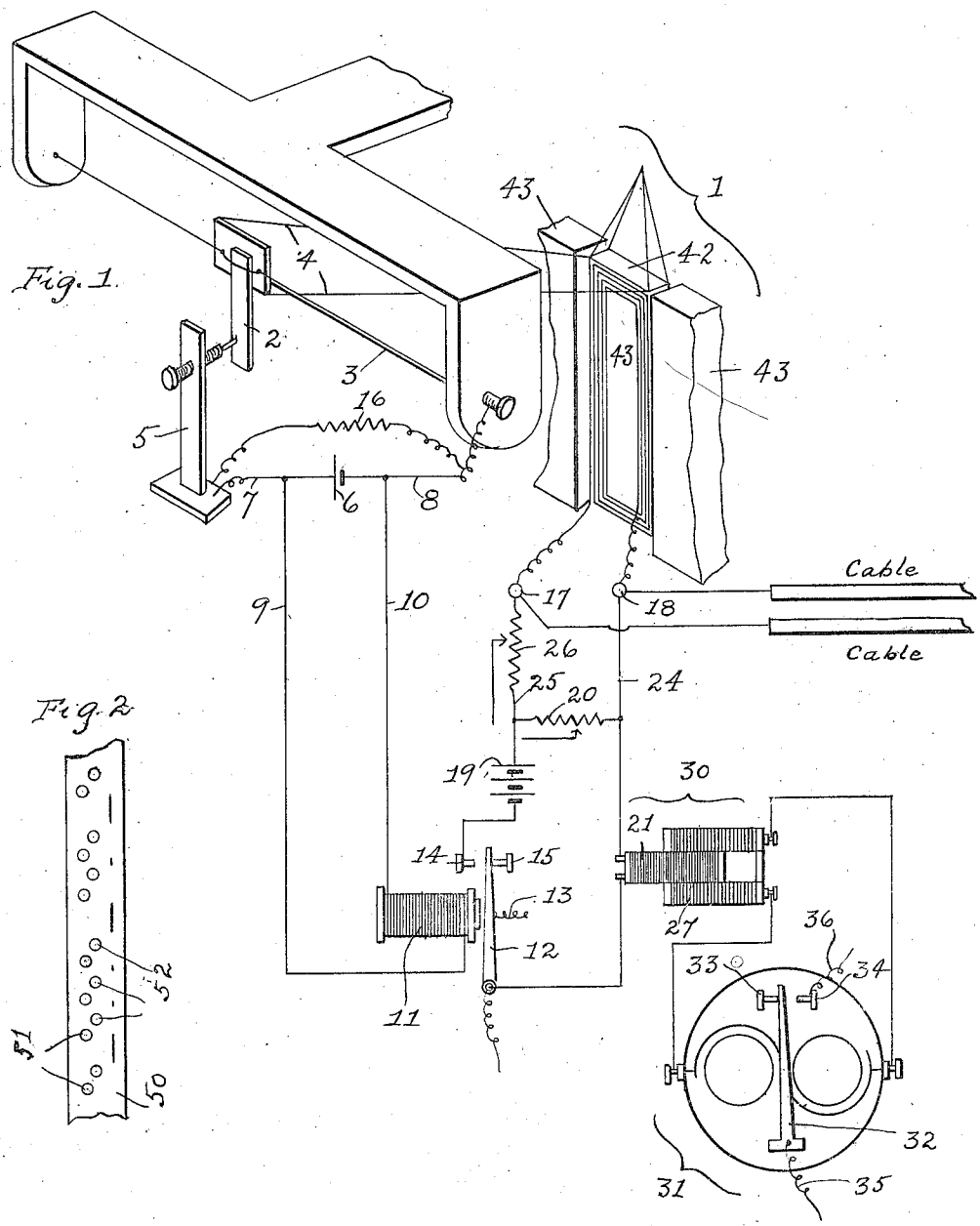

Fig. 2.

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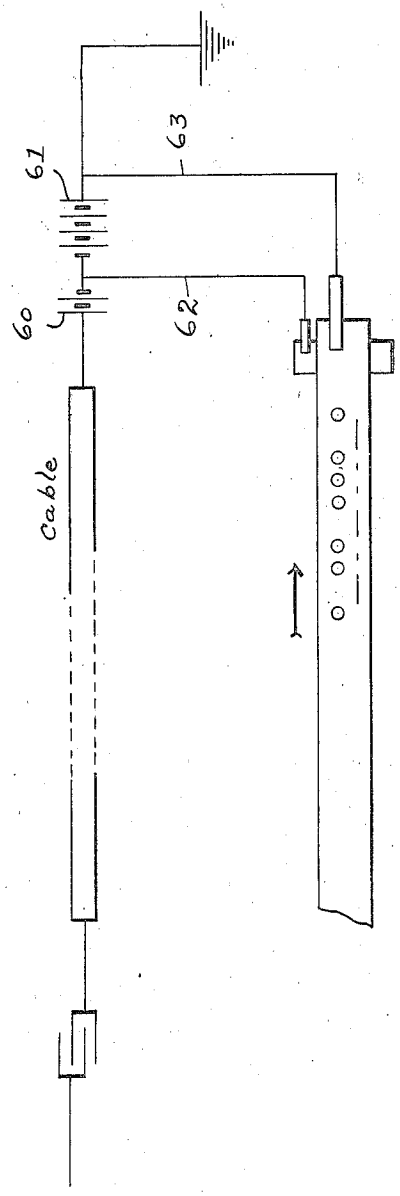

Fig. 3.

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ISIDOR KITSEE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TELEGRAPHIC RECEIVING ORGANISM.

1,092,151. Specification of Letters Patent. Patented Apr. 7, 1914.

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To all whom it may concern:

Be it known that I, ISIDOR KITSEE, a 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 Telegraphic Receiving Organisms, 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.

To persons versed in the art, it is well known that the electro-motive force of the impulse impressed upon the cable has to be limited and so also the duration o impulses impressed thereon, and it was found that the best results are obtained in cable telegraphy through the impressing of true reversals, that is, of impulses always of practically the same duration and intensity but alternately of opposite polarity. I have found that it is possible to telegraph over such lines as for instance submarine cables with the aid of a straight or direct current, making use of clearing impulses after the signal impulse.

The arrangement as outlined in this specification is applicable to different modes of receiving, but its great advantage is apparent in a system whereby the impulses are transmitted with the aid of a transmitting tape and are made to select required types, etc., at the receiving station so as to print the messages automatically. More specially is this arrangement 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 this system, the spaces between words, etc., are also denoted by a grouping of signals, which instead of actuating a type bar actuates a blank bar. Such system is well known and is in practical use in the United States and elsewhere under the name of the "Barclay printer".

For this purpose, my invention consists of the arrangement as will hereinafter be described, illustrated in the accompanying drawing, and more particularly pointed out in the claims following this specification.

In the drawing, Figure 1 is a partial perspective and partial diagrammatic view of a receiving organism embodying my invention. Fig. 2 represents a plan view of a transmitting tape. Fig. 3 is a plan view of part of a cable and the two sources of current inserted therein.

In this drawing, 1 represents a relay as an entirety. The type of relay may differ according to requirements but I have found that the type wherein a suspended movable coil is positioned in a stationary magnetic field is best adapted for the purpose in question and I have, therefore, illustrated in this drawing a relay of such type, and I have designated the coil by the numeral 42 and the stationary magnetic field by the numeral 43. The relaying contacts are shown here to comprise the stationary contact 5 and the movable contact 2. This movable contact is here held in suspension by the conducting thread 3 adapted to be actuated by the means 4 through the movement of the coil. This suspension of the movable conductor I have found more sensitive than the pivoting of same in the usual manner, and, therefore, I have made use of it in this my invention.

The localized circuit comprises the battery 6 which is normally short circuited through the wires 7 and 8 and the contact points above referred to. To this battery is also connected, with the aid of the wires 9 and 10, the coil of electro-magnet 11. The contacts 2 and 5 are also connected to each other through the resistance 16.

Careful experiments have proven to me that the arrangement as here described is most efficient in preventing the sparking or sticking of sensitive relaying devices.

The mode of operation of this arrangement is as follows:—Normally, the two contacts 2 and 5 are electrically connected with each other. The battery 6 is, therefore, short circuited and no current will flow through the circuit including the coil of electromagnet 11, but as soon as these contacts are broken, the current will flow through said coil, will energize the electromagnet, and operate the armature thereof. The resistance 16 should be of a value higher than the resistance of the coil of 11, and in practice I have found that if the coil of such electromagnet has a resistance of about five hundred ohms, the value of resistance 16 should at least be twenty five hundred ohms. In this arrangement, the type of battery has

to be taken into consideration, as not every type will stand a short circuit for a long period and I have made use of what is technically known as the "gravity" cell. The electromagnet 11 is provided with the armature 12 and the forward stops 14 and 15. The armature is normally held by the spring 13 in contact with 15. The coil 42 of the relay is connected through the terminals 17 and 18 with the cable.

19 is a source of current here shown as a three cell battery connected with one pole to the stop 14; the other pole is here connected with a variable resistance 20 and with the interposition of the primary 21 of an inductorium 30 to the armature 12. The resistance 20 is connected in shunt to the coil 42 of the relay proper through the wires 24 and 25. One of these wires, here shown as wire 25, includes the variable resistance 26. The function of this shunt circuit and the resistance thereto is as follows:—The current from the battery 19, if the circuit of same is closed, should have an effect on the coil opposite from the effect of the impulse adapted to open the connection between the contacts 2 and 5, and as it is necessary to limit the flow of this current through the coil, I have made use of the arrangement as just described. The resistance 20 should be very low and it is best to arrange the resistance so that the same may be varied from one to five ohms, as I have found that this variation is sufficient in practical working. The resistance 26 should be of high value and should be arranged so that the ohmic value of same may be varied from ten thousand to fifty thousand ohms. Certainly, the greater the number of cells comprising the battery 19, the smaller has to be the resistance 20 and the greater the resistance 26. The operator will, after a short practice, easily ascertain the necessary value of these two resistances.

As stated above, the primary 21 of the inductorium 30 is connected in the circuit including the source 19; the secondary 27 of this inductorium is connected to a polarized device 31. This device is provided with the armature 32 and the forward stops 33 and 34. The armature 32 and the forward stop 34 are provided with means 35 and 36 so as to connect the same to a necessary circuit.

The transmitting tape 50 is provided with the perforations 51 and 52 for the purpose of transmitting impulses and the spaces between the different perforations denote the character to be transmitted. One row of the perforations is designed to allow the transmission of a positive impulse and the second row of perforations is designed to allow the transmission of a negative impulse over the line. In this drawing, I have illustrated the tape as to be provided with a series of perforations denoting the arbitrary grouping of signals supposedly to represent one of the letters of the alphabet and I have marked on said tape the character denoted by said grouping.

Normally, the battery 6 is, as stated above, short circuited; normally, the battery 19 is inoperative, the circuit therefor being open, for the reason that the armature 12 rests normally against the stop 15 held there by the spring 13. Normally also the armature 32 of the device 31 rests against the stop 33. It is supposed that the impulses on the first or row 51 of the tape 50 permits the transmission over the cable of a positive impulse and that this impulse moves at the receiving station the coil 42 in a direction so as to break the contact between 2 and 5. Through the breaking of this contact, the short circuit around the battery 6 is also broken and the force from said battery will energize the coil of electro-magnet 11 thereby drawing the armature 12 away from the stop 15 and toward and in contact with stop 14 making the circuit including the battery 19. The completion of this circuit will result in the following:—First, a slight current will flow through the shunt circuit including the coil 42 and it is supposed that the flow of this current will actuate the coil in a manner so that through the movement of same, the contacts 2 and 5 will again be brought together and the battery 6 will again be short circuited. Second, the flow from the battery 19, through the primary 21, will induce an impulse in the secondary 27 and it is supposed that this impulse will draw the armature 32 into contact with the stop 33, or if the armature rests against this stop, will make the contact therewith more closely. When, now, through the opposite movement of the coil 42, the contacts 2 and 5 are again brought together, the battery 6 will again be short circuited, the electro-magnet 11 again be deënergized, the armature 12 will again fall away from the stop 14 and will come to rest at 15. The breaking of this circuit, that is, the ceasing of the flow of the current through the primary 21, will again induce an impulse in the secondary 27 but this time in opposite direction and this impulse will induce a movement in the armature 32, oppositely from the first movement and the armature will break the contact with 33 and will come to rest at 34. In this position, the armature 32 will remain until an impulse following will again move the coil in a direction so as to open the contacts between 2 and 5.

As stated, the stop 34, as well as the armature 32 of the device 31 are provided with means 35 and 36 so as to connect the same to a circuit. As it is desired to operate a printing mechanism through the incoming im-

pulses, this circuit should contain the required organism for such purpose.

It is unnecessary here to illustrate or describe the printing system above referred to, as the same is in actual use on the lines of one of the largest telegraph companies in this country. It suffices to repeat that through a grouping of dots and dashes, necessary electro-magnets are energized in a manner, so as to select the required type or space bar. To denote a dot or dash, it is only required to vary the space between one pair of impulses and the second. In this system, the second or negative impulse of each impulse-pair is only required for the purpose of clearing the cable, and if the cable is always connected to a small source of current, opposite from the current-impulse to be transmitted, then only a positive impulse needs to be sent over the line.

This system of transmission is clearly indicated in Fig. 3, which illustrates a cable, two sources of current inserted in said cable, and automatic means, such as a perforated tape, to shunt one of said sources. In this figure, 60 and 61 are the two sources of current; 62 and 63 are the means to short circuit one cell through the perforations of the tape.

In the system as outlined, the armature 32 of the device 31, will—at the end of a message—come to rest at the point 34 and it is necessary to remove, at the end of such message, the armature from the point 34 and bring the same in contact with 33.

Usually, a group of impulses is sent over the line to notify the receiving operator that the message is at an end. This group of signals can be made to actuate a local device in a manner, so that the same will force the armature 32 away from the point 34 and toward and in contact with the stop 33.

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

1. In telegraphy, means to receive and translate impulses transmitted, said means comprising a relay, relaying contacts therefor, a localized circuit including an electro-magnet adapted to be operated through said relaying contacts, a circuit adapted to be operated through said electro-magnet, an inductorium and a polarized relay, the primary of said inductorium connected to the last named circuit; the secondary connected to said polarized relay.

2. In telegraphy, a line, a relay inserted therein, relaying contacts therefor, a localized circuit adapted to be operated through said relaying contacts, an electro-magnet in said circuit, a second circuit, said second circuit adapted to be operated through said electro-magnet, an inductorium and a polar-relay, the primary of the inductorium connected in the second circuit and the secondary of said inductorium connected to said polar-relay.

3. In a relaying organism, a line relay, a localized circuit adapted to be operated through said relay, a second circuit, an inductorium and a polarized relay, and means in the first named circuit to operate the second named circuit, said circuit embracing the primary of said inductorium, the secondary connected to the polarized relay.

4. In a telegraphic relaying organism, a line relay, a local circuit operatively related to said line relay, a second circuit operatively related to said first circuit, said second circuit provided with variable means to allow electric energy, in a predetermined degree, to flow through the coil of the line-relay, an inductorium and a polar-relay, both operatively related to said second circuit.

5. A receiving device for telegraphic signaling impulses comprising a movable coil, a stationary contact and a movable contact for said coil, the movable contact adapted to be actuated through the movements of said coil, an electric circuit connecting both of said contacts with each other, an electromagnet in shunt with said electric circuit, a second electric circuit, a converter or inductorium for said second circuit, the primary of said inductorium inclosed in said second circuit, said second circuit adapted to be operated through said electromagnet, a translating relay, said translating relay connected to the secondary of said converter or inductorium.

6. In telegraphy, a relaying organism comprising the line relay, two localized circuits, one of said circuits adapted to be operated through the line relay and provided with electro-magnetic means, the second of said circuits adapted to be operated through said electro-magnetic means, said second circuit provided with means to cause part of its electric energy to flow through the coil of the line relay, an inductorium, the primary connected in said circuit, a polarized relay; the secondary of said inductorium connected to said relay.

7. In combination with a telegraphic relay adapted to operate in one direction, through the incoming impulse; localized means to cause the operation of said relay in an opposite direction, and localized inductive means adapted to be operated through said first named means, said inductive means adapted to operate necessary translating device.

8. A relaying organism for cable telegraphy comprising a line relay and electromagnetic means adapted to be operated through said line relay, electric means adapted to be operated through said electromagnetic means, said electric means adapted to influence the relay in opposition to the

influence through the incoming impulse in combination with a translating device, a polar-relay and an inductorium, the primary connected to said electric means and the secondary connected to said polar-relay.

9. Means to operate a telegraphic receiving organism, said means comprising a transmitting line, the receiver inserted in said line, relaying contacts therefor, a local circuit in operative relation to said contacts, an electro-magnet in said circuit, a second circuit operatively related to the electro-magnet and coil of the receiver, respectively, an inductorium, the primary related to said second circuit, a polar-relay, said polar-relay related to the secondary of said inductorium.

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

ISIDOR KITSEE.

Witnesses:

MARY C. SMITH,

EDITH R. STILLEY.