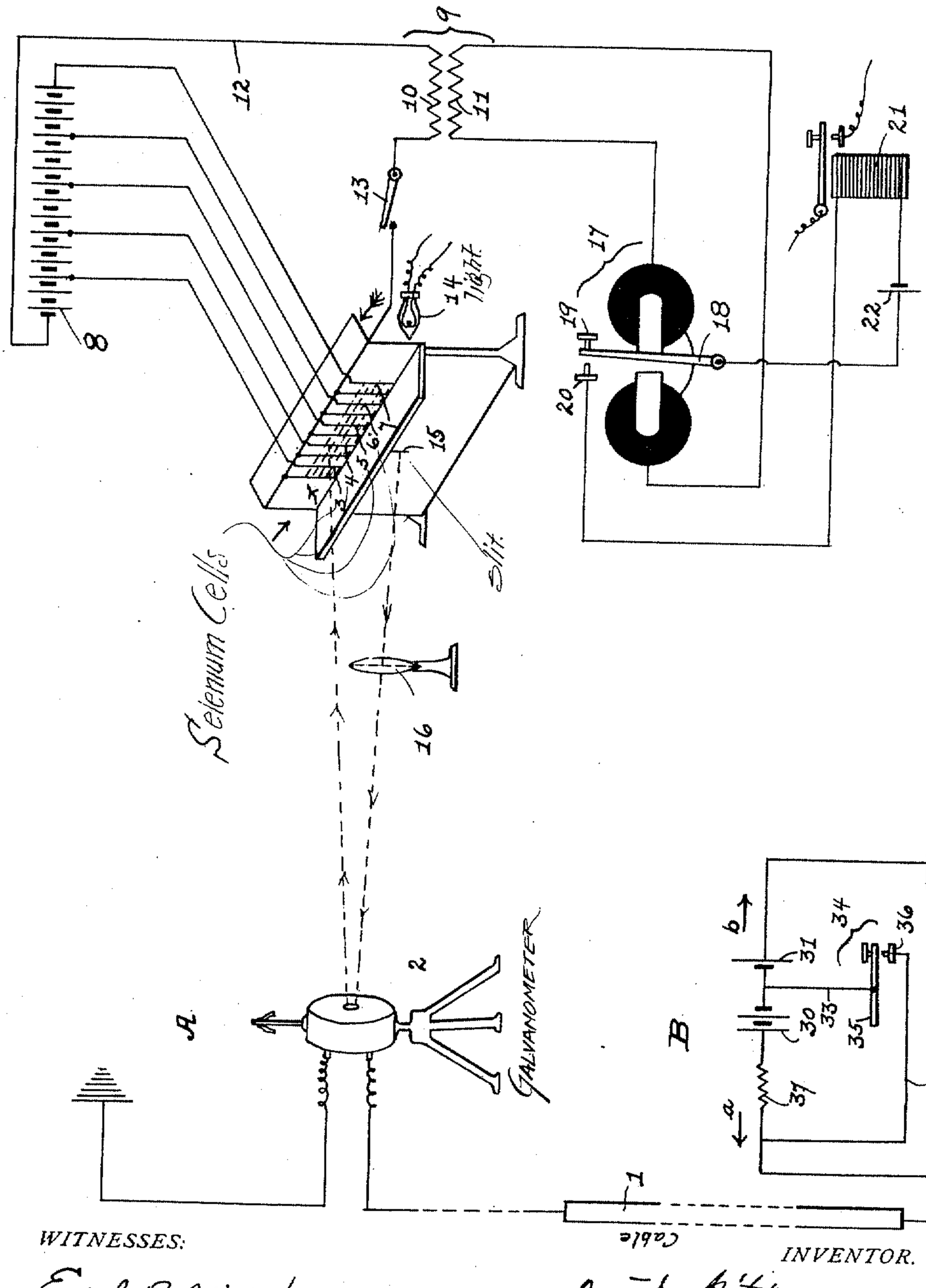
I. KITSEE.

TELEGRAPHIC RECEIVING ORGANISM.

APPLICATION FILED JAN. 27, 1910.

985,760.

Patented Feb. 28, 1911.



WITNESSES:

Edith R. Stilley

Mary C. Smith

INVENTOR.

Isidor Kitsee

UNITED STATES PATENT OFFICE.

ISIDOR KITSEE, OF PHILADELPHIA, PENNSYLVANIA.

TELEGRAPHIC RECEIVING ORGANISM.

985,760. Specification of Letters Patent. Patented Feb. 28, 1911.

Original application filed December 6, 1909, Serial No. 531,595. Divided and this application filed January 27, 1910. Serial No. 540,417.

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 Telegraphic Receiving Organism, (division of Serial No. 531,595,) of which the following is a specification.

My invention relates to an improvement in telegraphic receiving organism and is a division of an application for United States Letters Patent filed by me December 6, 1909, Serial No. 531,595; the subject matter herein described and illustrated having been originally embodied in the application aforesaid and canceled therefrom by amendment. Its object is, to translate or relay telegraphic impulses with the aid of receiving devices inserted in the line and has more special reference to telegraphing over lines with distributed capacity, such as submarine cables.

To avoid any possibility of injury to the insulating coating of the cable, it is an essential condition that none but very weak currents should be employed and the receiving device has to be, therefore, of a very sensitive nature.

With devices as are now employed in cable telegraphy, such as a reflecting galvanometer or siphon recorder, the messages transmitted can only be read with the aid of the flash or recorded curves. It is the aim of my invention to translate these impulses into sound, if so required, or to relay the same automatically to another line. I make use of the property of a selenium cell to change the resistance through rays of light. A selenium cell having normally a great resistance will offer to the flow of the current far less resistance when exposed to such rays. But the shifting of the zero bars entirely the employment of selenium cells with the arrangements of to-day.

My invention is applicable to that system of telegraphy over submarine cables, in which one character of the alphabet is symbolized by an impulse of one polarity and the second character by an impulse of opposite polarity, both impulses of short duration.

My invention is also applicable to such system whereby an impulse of one polarity signifies the commencing and an impulse of opposite polarity the ending of a character, and the time unit between these two impulses symbolizes if this character is a dot or dash.

My invention may also be practiced with the well known reflecting galvanometer or recording siphon or similar instrument, and it is the aim of my invention to produce an arrangement whereby the shifting of the zero is overcome, and the received impulse can be translated into sound or record with the aid of an electro-magnetic relay, no matter to what extent the incoming impulses actuate the line relay and no matter if the normal zero position is reached by the return movement or not.

For an illustration of one of the forms my invention may take, reference is had to the accompanying drawing, which is a diagrammatic view of a receiving organism embodying my invention.

In the drawing: 1 represents the cable; A the receiving and B the transmitting station. I have not illustrated in any of these stations condensers or similar devices and I have also not illustrated in this figure a duplex arrangement, and these omissions do not in the least interfere with the working of my invention. At the receiving station I have illustrated, in conventional sign, a reflecting galvanometer connected in series as to the cable and have designated the same by the numeral 2. The local arrangement consists here of a series of selenium cells designated respectively by the numerals 3, 4, 5, 6 and 7.

8 is a battery consisting here of fifteen cells. I prefer that this battery should be of the storage or secondary type, and so as to avoid misinterpretation, I will use hereafter for the selenium organism the designation "cell" and for the battery organism the designation "secondary." In this drawing, the selenium cell nearest the zero is connected to three secondaries, the succeeding selenium is connected to six secondaries, the third selenium cell to nine secondaries, the fourth to twelve secondaries and the fifth to the whole set of secondaries, that is, to fifteen. It is, therefore, evident that if a ray of light is moving from the zero position, which is here designated as x, in the direction of the unfeathered arrow, it will first impinge on the cell connected to the lowest electro-motive force and will, in its travel, sucessively impinge upon cells with successive higher electro-motive force, and when,

in its return movement, that ray of light travels in the direction of the feathered arrow, *i. e.*, toward the zero position, then the ray of light will impinge successively on successive cells with successively lower electro-motive force.

9 is a converter or inductorium comprising the primary 10 and the secondary 11. The battery 8 is connected with one pole, here shown as the negative pole, through conductor 12 with one terminal of the primary 10. The other terminal of this primary is connected with the interposition of the switch 13 to one terminal of each of the selenium cells 3, 4, 5, 6 and 7.

14 is a source of light, here illustrated in conventional sign as an incandescent lamp.

15 is a slot or perforation allowing a ray of light to issue from the source of light and to impinge upon the mirror on the reflecting galvanometer 2. In this drawing, a collecting lens 16 is interposed in the path of this ray.

17 is a relay, preferably of the polarized type, provided with the armature 18 and the two stops 19 and 20.

21 is a sounder or similar instrument, one terminal of the coil of 21 is connected to stop 20 and the other terminal is connected with the interposition of battery 22 to the armature 18 of relay 17.

At the transmitting station I have here shown an arrangement whereby with the aid of a single key, ordinary Morse characters may be transmitted, each character made up of two impulses. In this transmitting arrangement, I employ two sets of batteries opposed to each other; one set—by preference—of double the electro-motive force of the other set. The set with double electro-motive force is here designated by the numeral 30 and the opposing set by the numeral 31; the set 30 being provided with the shunt wires 32 and 33 adapted to be closed or opened with the aid of the key 34 comprising the lever 35 and the stop 36. To prevent short circuiting, I have provided the shunt path with the resistance 37.

The operation of this part of the device is as follows:—Normally, a current will flow over the line in the direction of the arrow *a*. When the operator wishes to transmit messages, he operates the key in the usual manner. Through the closing of the key, the shunt around the source 30 is established and the current will flow in the direction of the arrow *b*. The time that the key is closed designates the kind of character the operator desires to transmit; the short closing of the key designating a dot and the longer closing of the key designating a dash.

The operation at the receiving station is as follows:—It is supposed that the operator at the transmitting station has closed the key and that an impulse flows over the line in the direction of the arrow *b* and that this impulse will, at the receiving station, actuate the movable part of the receiving device 2 in a manner so as to deflect the same in the direction of the unfeathered arrow at said receiving station. The rays of light, therefore, will travel also in this direction and will make active one or more of the selenium cells. The rays of light, in their travel from the zero position, will first be impinged on the cell nearest the zero, here designated as cell 3, and will then, in their travel, sweep over a greater or lesser number of said cells. When the operator at the transmitting station opens the key, then the movable parts of the receiving device are deflected in the opposite direction, that is, in the direction of the feathered arrow at the receiving station. The deflected rays of light, therefore will, in their return to the former position, sweep again over that part of the organism which they swept when deflected in the direction of the unfeathered arrow. But, whereas, the rays of light, in their travel from the zero position sweep successively over selenium cells with successive high electro-motive force, the same rays of light, in their return, will sweep successively over the selenium cells with successive lower electro-motive force. When not impinged by the rays of light, all the selenium cells remain inactive. They offer such a high resistance to the flow of the electric current that the primary 10 of the converter 9 remains also inactive.

Normally, no current flows through the primary 10 of the converter 9. When, now, the rays of light, in their travel from the zero position, impinge first on the cell with the lowest electro-motive force, this cell will become active and a current will flow through the primary 10; the farther the rays advance, the greater will be this flow. The commencement of the flow as well as the increase of the flow will result in the generating of a secondary impulse in 11 of a direction opposite to the direction of the current flowing in the primary 10 and no matter how much the increase of flow of the current in the primary 10, the direction of the impulse in the secondary 11 will always remain the same. When, now, the rays of light return toward their zero position, they will successively cease to impinge on successive cells of decreasing electro-motive force, till they have entirely ceased to impinge on any of the cells. The movement of the rays of light from a cell of higher electro-motive force to a cell of lower electro-motive force will reduce the flow of current in the primary 10 and this decrease in the flow of current will result in the generation of an impulse in the secondary 11 opposite to the first induced impulse; and when the rays of light, in their travel toward the zero posi-

tion, entirely cease to impinge on the selenium cell, then the ceasing of the flow of the current in 10 will only intensify the second induced impulse, but this impulse will always be in one and the same direction; that is, opposite to the direction of the first impulse, because the starting of the flow of a current in the primary, or an increase in the flow of a current in said primary, always generates in the secondary an impulse of a direction opposite to the flow in the primary and the decrease in the flow of the current in the primary or the entire ceasing of said flow in the primary induces an impulse in the secondary in the same direction as the current formerly flowing in said primary.

Let us suppose that the impulse generated in the secondary 11 through the commencement or increase in the flow of a current in the primary 10 is of a nature so as to impel the armature 18 of relay 17 from its stop 19 toward and in contact with stop 20. The contacting of the armature 18 with the contact 20 will close the circuit including the repeating sounder 21 and battery 22. The sounder, therefore, will become active and will contact its armature with the lower stop, thereby producing the click denoting a dot or dash, as the case may be, and closing such circuits as are connected thereto for the purpose of translating said click into the required character. In this arrangement, it is immaterial if the rays of light, in their travel from the zero position, sweep the entire number of cells or only part of same; and it is also immaterial if the rays of light, in their return movement to zero, travel backward the whole series of cells, or only part of same. In other words, every movement of the rays of light toward a cell with increasing electro-motive force will produce in the secondary an impulse of one direction and every movement of the rays of light from a cell of high electro-motive force will produce in the secondary 11 an impulse of opposite direction, no matter how many cells were included in this forward or backward travel. In conjunction with this arrangement, it has to be stated that usually condensers are inserted in the cable and that, therefore, the flow of the current from the source 30 or 31 will not be continuous and the device 2 will not be unduly deflected.

I have, in this drawing, only illustrated five selenium cells, but it is obvious that the number of selenium cells may be increased in accordance with requirements; and it should be noted that the deflection of the movable part of the receiving device 2 should be limited to such an extent that the rays of light therefrom, in the course of sweeping over the cells in the direction of the unfeathered arrow, shall not go beyond the cell farthest from the zero position. The source of current 8 consists here of fifteen cells, but it is obvious that the number of cells as well as the taps from said cells may differ in accordance with requirements. In the transmitting arrangement, only two against one cell is employed, but it is also obvious that the number of these cells may be increased in accordance with requirements.

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

1. In cable telegraphy, a receiving device inserted in the line of transmission, a source of light, means at the receiving device to deflect the rays from said source, a selenium organism, a source of current comprising a number of individual electric cells and a series of taps from said electric cells to said selenium organism, each tap embracing a number of electric cells differing from the number of cells embraced by the other taps.

2. In cable telegraphy, a receiving device inserted in the line of transmission, a selenium organism, a source of light, means at said receiving device to deflect the rays from said source, a battery consisting of a number of electric cells connected together in series, a series of connections from said battery to said selenium organism, each succeeding connection embracing a number of electric cells greater than the preceding connection, an inductorium, the primary connected to one pole of said battery and one pole of said selenium organism, respectively; the secondary connected to a polarized relay and means for said relay to translate the incoming impulses into readable characters.

3. In a device of the class described, a receiving device, an inductorium, a source of current, means to make active the primary of said inductorium through said source and means to gradually increase the flow of the current through said primary in accordance with the greater degree of movement of the movable part of said receiving device, said means comprising a series of taps connecting the different selenium cells to different parts of said source of current.

4. In cable telegraphy, in combination with means to transmit true reversals, means to receive said true reversals and translate the same into readable characters, said second means comprising a receiving device inserted in the line, a battery comprising a number of electric cells connected in series, an inductorium and polarized relay, and also comprising a selenium organism connected at different parts with different numbers of electric cells of said battery and means operatively related to the movable part of the receiving device to lower the resistance of different parts of the selenium organism.

5. In a receiving organism for cable telegraphy, a selenium organism, a battery comprising a number of electric cells connected

together in series, a number of connections between different parts of the battery and different parts of the selenium organism, each connection embracing a different number of electric cells.

6. In cable telegraphy, means to receive impulses and means to overcome the effect of the shifting zero, said means comprising a receiving device inserted in the cable, a selenium organism comprising a series of selenium cells, a battery comprising a series of electric cells, connections between each selenium cell and different parts of said battery, each succeeding connection comprising a number of cells greater than the number of cells of the preceding connection, a source of light and means at the receiving device to deflect the rays from said source.

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

ISIDOR KITSEE.

Witnesses:

EDITH R. STILLEY,

MARY C. SMITH.
