

1,409,386.

Fig. 1.

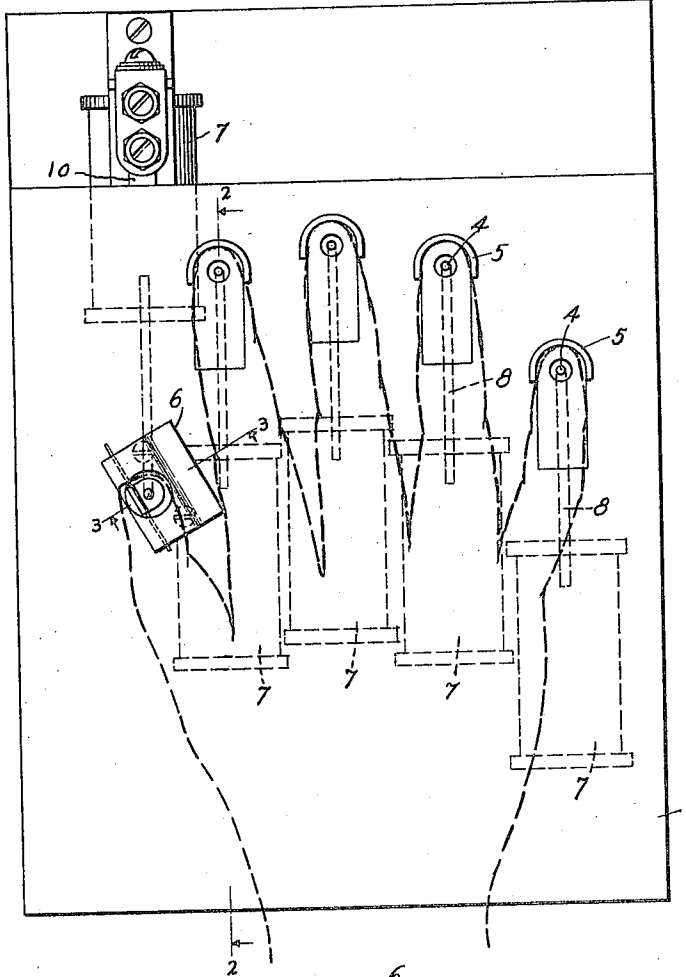


Fig. 2.

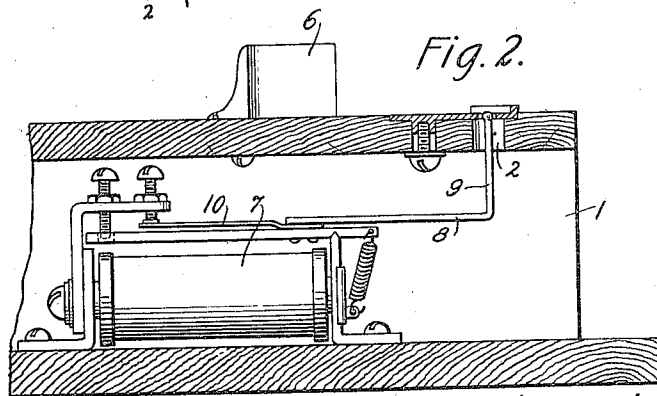
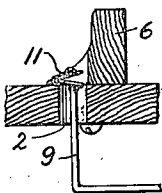


Fig. 3.



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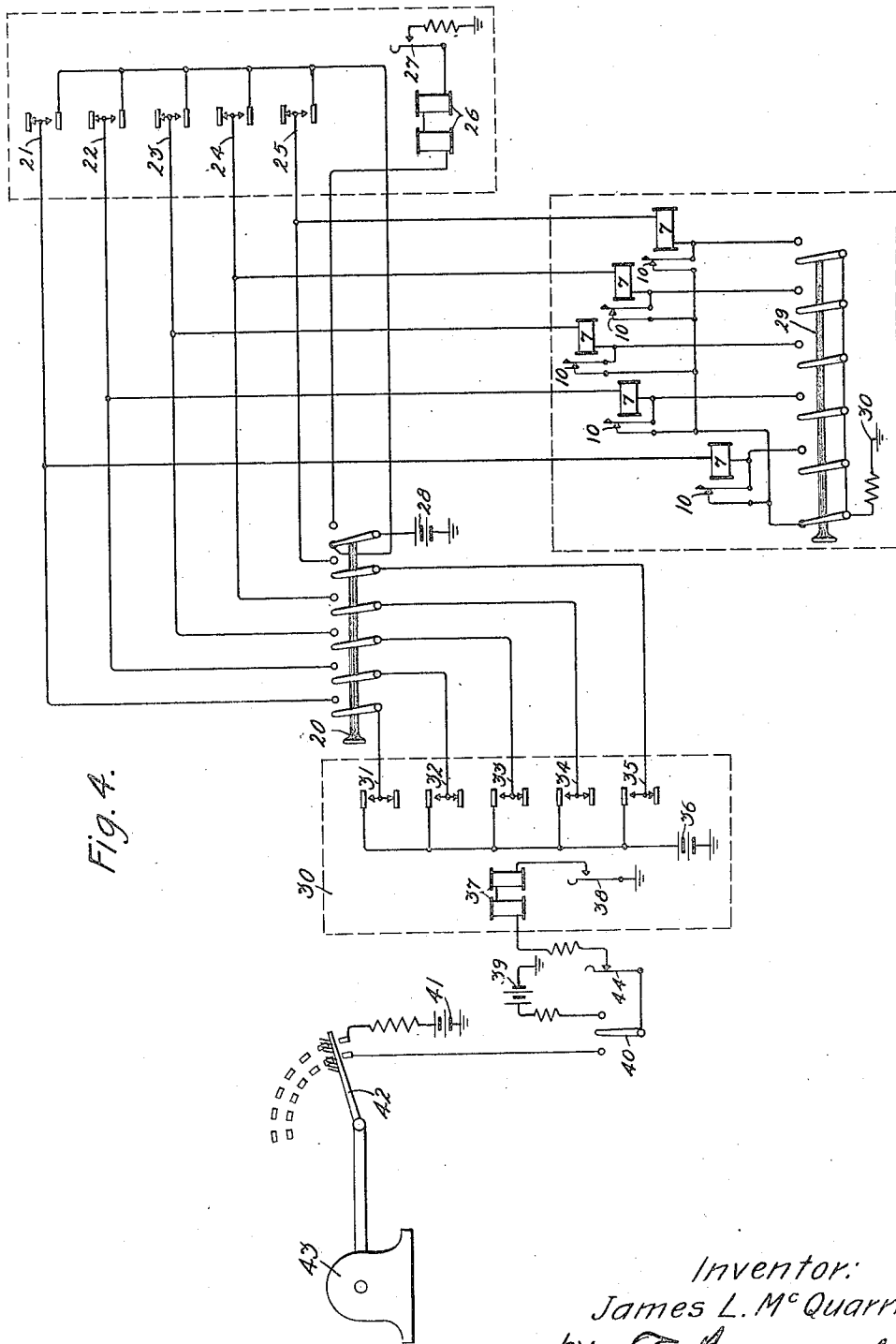


Fig. 4.

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Att'y.

UNITED STATES PATENT OFFICE.

JAMES L. McQUARRIE, OF MONTCLAIR, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TELEGRAPH SYSTEM.

1,409,386.

Specification of Letters Patent. Patented Mar. 14, 1922.

Application filed July 1, 1918. Serial No. 242,789.

To all whom it may concern:

Be it known that I, JAMES L. McQUARRIE, a citizen of the United States, residing at Montclair, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Telegraph Systems, of which the following is a full, clear, concise, and exact description.

This invention relates to telegraph systems and has for its object to provide a system by means of which persons who are blind or deaf may receive telegraph signals over the line in a convenient and simple manner.

When a person is afflicted by being either blind or deaf or both, in most cases their other senses are unusually well developed, including the sense of touch.

In accordance with this invention the sense of touch is utilized to convey an impression of telegraphic signal combinations to the person receiving. To accomplish this, a signal receiving box is provided upon which the person receiving places his hand. In the box are holes beneath the ends of the fingers and through these holes plungers operated by suitable magnets move and their movement is felt through the fingers of the hand. The magnets are selectively actuated by signal impulses coming over a suitable line from a sending mechanism. Means are provided whereby a sending operator may perforate a tape at the receiving station and that tape may be fed at a suitable speed through a transmitter to send the impulses to the receiving device above mentioned, the speed of reception in this case being controlled by the person receiving. Means are also provided for sending impulses direct to the hand without the interposition of a tape.

The invention is illustrated in the drawings, of which Fig. 1 is a plan view of the receiving device; Fig. 2 is a partial longitudinal vertical section taken on the line 2, 2 of Fig. 1; Fig. 3 is a detail vertical section taken on the line 3, 3 of Fig. 1; Fig. 4 is a diagrammatic representation of the circuit arrangements when the device is used for instruction purposes; and Fig. 5 shows the circuit arrangements when the invention is used in connection with a telegraph line. As shown in Figs. 1, 2 and 3, the receiving device comprises a box-like member 1, in the upper surface of which are arranged a plurality of apertures 2, the arrangement of

these apertures 2 being in conformity with the position of the ends of the fingers of a hand when placed on the top of the receiver. Metallic plates 3 having apertures 4 and flanged portions 5 are suitably fastened to the top of the receiver and arranged so that the apertures 4 in the plates register with the apertures 2, the flanges 5 affording a means for keeping the fingers of the hand in proper position. For the thumb a similar aperture 2 is provided and a plate 6 arranged in a vertical position to the right of the aperture 2, since it is ordinarily intended that the right hand of the operator shall be used. The thumb bearing against this plate is held in proper position. A plurality of magnets 7 are suitably arranged beneath the top of the receiver and when energized are adapted to cause the vibration of arms 8, said arms having portions 9, which extend upwardly through apertures 2 and approximately flush with the top surface of the receiver. Attached to each arm 8 is a switch member 10, which is adapted under certain conditions to open and close the circuit for the magnet 9 and acts as an interrupter. In the case of the aperture 2 beneath the thumb of the hand, a special contact arrangement is provided which consists of a pivoted bell crank plate 11, against one arm of which the lever 9 contacts, and against the other arm of which the thumb contacts. This bell crank arrangement is provided so that the thrust of the lever 9 shall be changed in direction so as to cause its effect to be felt by the center portion of the thumb, which is the part where its effect will be more noticeable.

In the operation of this particular device the hand of the operator is placed on the top plate of the receiver and the fingers and thumbs properly positioned over the apertures therein, and as the magnets 7 are selectively energized by the signals received over the line, the levers 9 are caused to move in a suitable manner and so contribute an impression to the fingers of the operator. Means to be hereafter described are provided, whereby the movement of levers 9 may be a single movement or a vibratory one, which latter movement is preferable in the case of inexperienced operators, so that the impression may have a more lasting effect.

Referring to Fig. 4, which represents the circuit arrangement which is particularly

adapted for instruction purposes, there is provided a transmitting mechanism of any suitable type, which in this case is a combined keyboard transmitter and perforator, having a plurality of movable contacts 21 to 25 inclusive, which are adapted to be selectively operated by the action of key mechanisms not shown. These contacts are connected by circuit wires to elements of a switch 20, and also to the windings of the magnets 7. An operating magnet 26 is provided with this transmitting mechanism and is connected on one side through a key 27 to ground, and on the other side to an element of switch 20. The key 27 is adapted to be operated whenever a key mechanism of the transmitter is actuated. When, therefore, the switch 20 is moved to its right-hand position, it is evident that battery 28 is connected to the winding of magnet 26, so that as the key mechanism is actuated the windings of magnet 26 are energized, this energization causing in a well-known manner the perforation of a suitable tape. When the switch 20, however, is in its left-hand position, as shown in Fig. 4, the battery 28 is connected by suitable circuit wire to stationary contacts adapted to cooperate with the movable contacts 21 to 25 inclusive, which in a well-known manner are adapted to be selectively moved by the key mechanism. In this case, dependent upon the selective movement of contact members 21 to 25 inclusive, certain of the windings of magnet 7 are energized to cause the movement of their armatures 8 as above described. Connected to the other side of the windings of each magnet 7 by suitable circuit wire is a switch 29, and with this switch in its left-hand position as shown in Fig. 4, it is evident that the windings of each magnet 7 are connected to ground 30 only through the interrupter switch 10 connected to each magnet 7 as above described. Therefore in this case whenever the key is actuated magnets 7 are so energized as to cause a vibratory motion of their armatures. When the switch 29 is in its right-hand position a ground is connected directly to the windings of the magnet 7, the interrupter switches 10 being shunted. This connection gives a single motion to the armatures of magnet 7 for each signal.

There is also provided a suitable tape transmitter 30 provided with movable contacts 31 to 35 inclusive, which are connected to elements of switch 20 and adapted to be selectively operated in a well-known manner by means of a perforated tape to contact with circuit wires connected to battery 36. These movable members 31 to 35 inclusive are adapted to be operated whenever a magnet 37 is actuated. The actuation of this magnet is effected by closing a key 38 connected to ground. Battery 39 is applied to magnet 37 when a switch 40 is moved to its

right-hand position. In its left-hand position switch 40 connects battery 41 to the magnet 39 through suitable contacts on a rotary member 42 which is rotated at any suitable speed by a source of power 43. The speed of the rotary member 42 may be adjusted by any well-known means. A key 44 is interposed in the circuit of magnet 37 and is manually operable to open said circuit whenever desired. The effect of the opening of this key is to prevent the operation of magnet 37, and consequently the movement of contacts 31 to 35, whereby the transmission of the signal combination over the tape transmitter 30 to the magnets 7 is prevented. This is useful in case the tape is being moved at too high a speed for the particular operator.

Whenever contacts 31 to 35 are moved in a well-known manner, with the switch 20 in its right-hand position, battery 36 is connected through the actuated switch members, through switch 20 and suitable circuit wires to magnets 7, whereby the magnets 7 are energized in either one of the manners above described, depending upon the position of switch 29.

There is therefore provided the following methods of transmission:

(1.) Direct transmission from the keyboard to the receiver magnets 7;

(2.) Means for perforating a tape and for the transmission of signals from this tape through a tape transmitter to the receiver magnets 7;

(3.) Means whereby in the case of tape transmission the speed of feed of the tape may be regulated, and whereby the movement of the tape may be interrupted at the will of the operator;

(4.) Means whereby the movement of the armatures of the receiving magnets 7 may be made a single stroke or continual.

With reference to Fig. 5, which shows the mechanism of the invention adapted to be used in connection with an ordinary telegraph line, there is provided a line 50, a relay 51, a battery 52 adapted to be connected by the operation of relay armature 53 to a distributor 54 of well-known type. This distributor in its rotation is adapted in a well-known manner to selectively energize the magnets 55 to 59 inclusive of a tape perforator 60 and also a magnet 61 which is connected to special contacts on distributor 54 and adapted when energized to move the tape forward one step ready to receive the next set of perforations. A tape 62 is provided and is adapted to extend from the tape perforator 60 to a tape transmitter 30 which transmitter has movable contacts 31 to 35 inclusive, which are connected in a manner similar to that above described to receiving magnets 7, which are thereby operated as above described. The magnet 37 connected to

with the tape transmitter is adapted to move the tape after the transmission of each signal, the operation of this magnet being controlled in a manner above described by key 5 38, which connects through switch 40 either to battery 39 or to battery 41, which latter battery is connected to contacts closed periodically by the rotating arm 42 of power device 43 as above described.

10 It will be evident therefore that with the mechanism above described a system is provided whereby a person unable to read ordinary telegraph signals may be instructed to interpret such signals through the sense of touch, the speed of delivery to the receiver 15 being controlled by the operator at will, so that the reception is independent of the speed of transmission. By providing two different kinds of stroke for the receiving magnet it enables a person not sufficiently 20 skillful in the reception of signals to receive continuous impressions for any suitable length of time and thereby insure more accurate reception.

25 What is claimed is:

1. In a telegraph system, a line, means for impressing on said line selective combinations of signaling impulses, receiving means connected with said line comprising a plurality of selectively operable magnets and 30 adapted to communicate impressions through the fingers of the receiving operator corresponding to the signals transmitted.

2. In a telegraph system, a line, means for

impressing on said line permutations of signaling impulses, a receiver, a plurality of electromagnetic devices in said receiver, said devices being operated selectively in accordance with the signal permutations received and means set in motion by said devices to 40 communicate their motion to the fingers of the operator.

3. A telegraph receiver comprising a plurality of electromagnetic devices operable by selective combinations of signaling impulses, and means set in motion by said devices, said means adapted to communicate their motion to the receiving operator. 45

4. In a telegraph system, a receiving device, comprising a tape transmitter, a magnet for feeding the tape therethrough, a source of energy, circuit connections between said magnet and said source of energy, means for periodically opening and closing said circuit at any desired speed, and means 50 under the control of the receiving operator for opening and closing said circuit at will.

5. In a telegraph system, a receiving device comprising a tape transmitter, a magnet for feeding the tape therethrough, a source of energy, circuit connections between said magnet and said source of energy, and means under the control of the receiving operator for opening and closing said circuit at will. 65

In witness whereof, I hereunto subscribe my name this 27th day of June A. D., 1918.

JAMES L. McQUARRIE.