(No Model.) 2 Sheets—Sheet 1.

C. LANGDON-DAVIES.

TELEGRAPH RECEIVER.

No. 453,261. Patented June 2, 1891.

Fig. 1.

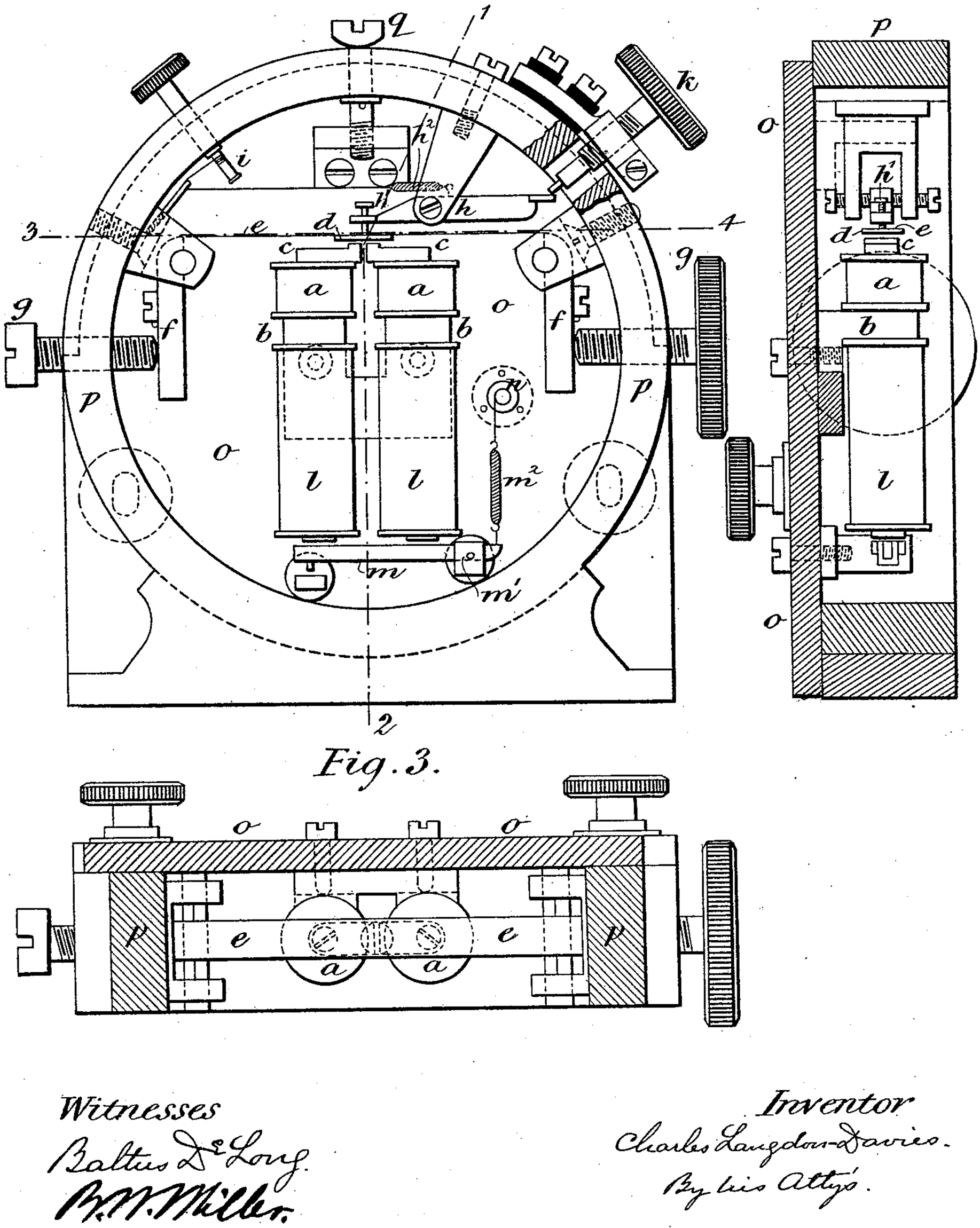

Fig. 2.

Fig. 3.

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(No Model.) 2 Sheets—Sheet 2.

C. LANGDON-DAVIES.

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Fig. 4.

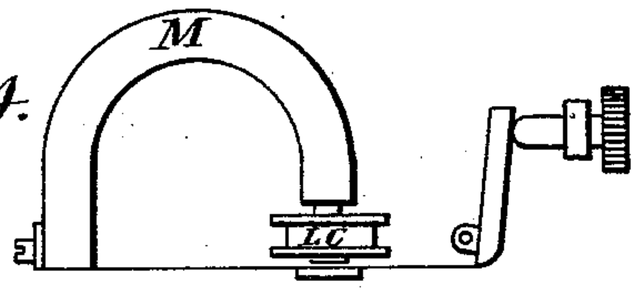


Fig. 5.

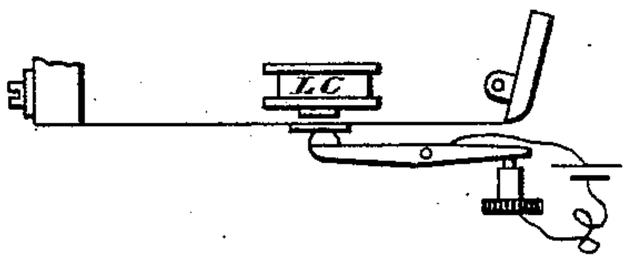


Fig. 6.

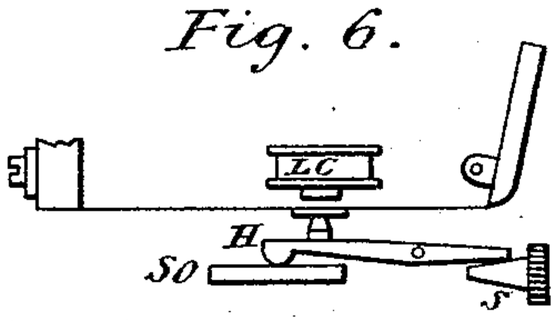


Fig. 7.

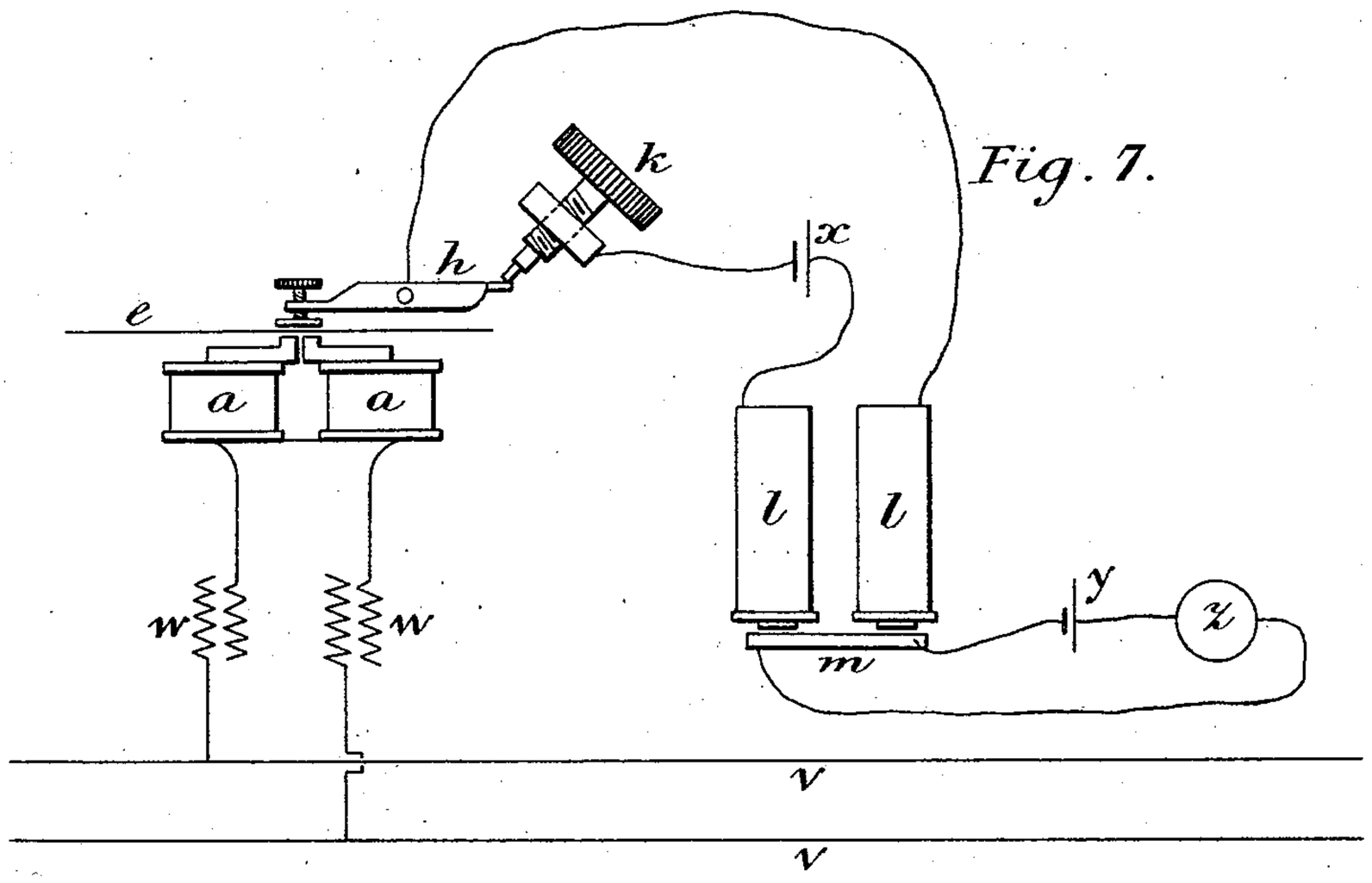
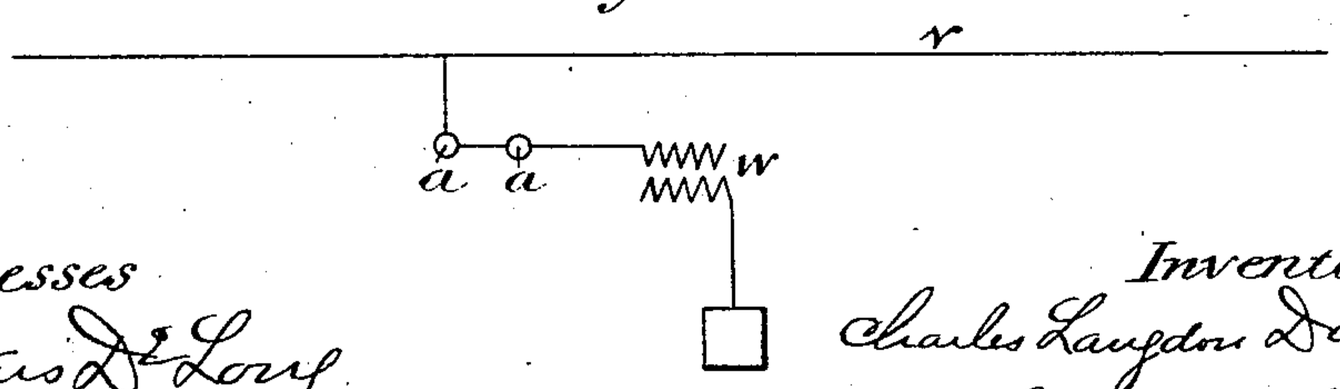


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES LANGDON-DAVIES, OF LONDON, ENGLAND, ASSIGNOR TO THE PHONOPORE SYNDICATE, LIMITED, OF SAME PLACE.

TELEGRAPH-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 453,261, dated June 2, 1891.

Application filed November 18, 1890. Serial No. 371,841. (No model.)

To all whom it may concern:

Be it known that I, CHARLES LANGDON-DAVIES, electrician, a subject of the Queen of Great Britain, residing at Mowbray House, Norfolk Street, Strand, London, England, have invented certain new and useful Improvements in Telegraph-Receivers, of which the following is a specification.

This invention has for its object improvements in telegraph-receivers for vibratory electric impulses and relates to instruments such as are described in the specification of my United States patent, No. 424,006, dated March 25, 1890, where the vibratory impulses in a line-bobbin impart movement to a reed, and thereby open a local circuit, which is normally closed, the action being aided or re-enforced by coils in the local circuit, which also influence the reed. According to my present invention I render these instruments more sensitive and efficient by constructing them in the manner shown by the annexed drawings.

Figure 1 is a front elevation. Fig. 2 is a section on the line 1 2 in Fig. 1, and Fig. 3 is a horizontal section on the line 3 4 in Fig. 1. Figs. 4, 5, and 6 show modifications. Fig. 7 is a diagram of the circuits, and Fig. 8 is a diagram of the connection.

In Figs. 1, 2, and 3, *a a* are the bobbins connected with the line-wire and which receive the vibratory impulses. Preferably the connection is made by means of phonopores, as is described in my former specification, and without any through-circuit. The bobbins are upon soft-iron cores, which are magnetized by a permanent magnet *b*. The cores are furnished with pole-pieces *c c*, which influence a small armature *d*, of soft iron, attached to a steel ribbon *e*. The ribbon *e* is strained to such a tension that it vibrates in unison with the impulses received by the line-bobbins, and for this purpose its ends are attached to levers *f f*, adjustable by screws *g g*. A lever *h* by a screw *h'*, which it carries, bears upon the ribbon *e*. It is held on by the light spring h^2, and this spring can be strained more or less by a silk thread, which can be wound upon a pin *i*.

k is an insulated adjusting-screw carrying a contact-point, which is so set as to be in electric connection with the lever when the ribbon is at rest; but when the ribbon vibrates the lever leaves the contact-point and a local-battery circuit is thereby opened.

l l are re-enforcing coils. When the instrument is at rest, the current of the local battery passes in these coils. The coils have soft-iron cores, and these are magnetized by the permanent magnet *b*. The current in the coils augments or varies the magnetism induced by the permanent magnet. This is the case both with the line-coils and the re-enforcing coils.

m is an armature or relay-tongue, which is attracted by the cores of the re-enforcing coils. It pivots at *m'*, and a light spring m^2 tends to withdraw it from the cores. The spring is adjustable by winding a silk thread upon the pin *n*. When the armature or tongue *m* falls away from the cores—that is to say, when signal-impulses enter the line-bobbins—it closes a relay-circuit in which a signal instrument or indicator of any ordinary type is included; or in some cases the signals may be read by sound produced by the armature or tongue in its movements.

The line-bobbins, the re-enforcing bobbins, the permanent magnet, and the relay-tongue or armature are carried on a slab *o*, of vulcanite or slate, forming the back of the instrument, while the steel ribbon and the parts connected therewith are mounted upon a metallic ring-frame *p*. The back is held to the frame by screws passing through elongated holes and spring-washers, and by a screw *q* passing through the ring-frame and entering a tapped hole in a lug fixed to the back slab of the instrument. This screw serves to adjust the distance between the pole-pieces and the armature carried by the strained ribbon without altering the relative positions of the parts carried on the slab.

To facilitate tuning the strained ribbon to unison with the electric impulses on the line, I employ a small mechanical telephone, and the thread of this instrument I connect with the metallic frame *p*.

In this receiving-instrument, in addition to the general arrangement of the parts which is efficient and convenient, the application of the permanent magnet magnetizing the cores

by induction is important, and so is also the ribbon and the means for straining the same, its armature, and contact-lever.

In the diagram Fig. 7, *v v* are wires forming part of an ordinary telegraph-line, through which, in addition to the ordinary signals, vibratory signals, which do not affect the ordinary telegraph-instruments, are transmitted. These vibratory signals are interpreted by the instrument above described. *w w* are phonopores, which, without metallic connection, transmit the vibratory signals to the coils *a a*, Fig. 1, and set the ribbon *e* in motion. *x* is a local battery, the circuit of which, when the ribbon *e* is at rest, is completed through the lever *h*, the screw *k*, and the coils *l l*. *y* is another local battery, the circuit of which is through the armature *m* and the receiving-instrument *z*, (of any ordinary type.) This circuit is closed and a visible signal is given when the armature *m* is no longer held by the cores of the coils *l l;* or the connection may be made in the manner indicated in Fig. 8. One of the two line-wires *v v* may be, as is here shown, simply an earth-wire. One line-phonopore *w* will generally be sufficient, and when a phonoporic transmitter is employed the phonopore of the transmitter may be used to fulfill the functions of *w*, as well as those of the transmitter.

Figs. 4, 5, and 6 show modifications to which I sometimes resort. In Fig. 4 there is no augmentor or re-enforcing coil, and the permanent magnet M serves as one of the holders of the reed, which is then tuned by a single screw. L C is a single-line coil corresponding to the coils *a a* in Fig. 1. In Fig. 5 a lever or finger in contact with the reed makes signals by opening a relay or other local circuit. In Fig. 6 a local circuit is dispensed with. A sonorous organ S O, such as a profile or other bell or a piece of strained wood, is struck by a hammer H. The normal rate of action of the hammer is governed by a spring pulling it toward the stop S. When this rate differs suitably from the normal rate of the reed, the blows struck by the hammer are fewer and stronger, and so they produce a greater effect upon the bell.

These instruments in which no augmentor is used are sufficient for short circuits and many purposes where circumstances are favorable to electrical action, and they are inexpensive; but these devices can be used in conjunction with augmentors and as modifications of the instrument shown in the Figs. 1, 2, and 3.

In the receiver a single-line coil and augmentor can sometimes be employed instead of two, and both for simplex and duplex working.

What I claim is—

1. In a telegraph-receiver, a coil receiving vibratory impulses from a line-wire and thereby varying the magnetism of a permanently-magnetized core and causing the same intermittently to attract an armature on a strained metallic ribbon, in combination with the re-enforcing coils, the circuit of which is opened as the ribbon oscillates and which also affect the magnetization of the permanently-magnetized core, substantially as set forth.

2. In a telegraph-receiver, the pair of coils *a a* on cores magnetized by the magnet *b*, which magnet also magnetizes the cores of re-enforcing coils *l l*, contained in a local circuit and influencing a relay-armature *m*, the whole so arranged that the armature *m* falls away and makes a signal or completes a local signal circuit, when the re-enforcing circuit is opened by the vibration of a spring set in motion by the intermittent action of the coils *a a*.

3. In a telegraph-receiver, the combination, substantially as hereinbefore set forth, of the slab, a metallic ring secured thereto, a strained ribbon connected with the ring and carrying an armature, the lever operatively connected with this armature, the contact-screw with which the opposite end of the lever connects, the main-circuit coils, the re-enforcing coils, the cores therefor, and the permanent magnet connected with the cores, said coils, cores, and magnets being secured to the slab, substantially as set forth.

4. In a telegraph-receiver, the combination of a coil connected with the main line, its core, a permanent magnet, a re-enforcing coil, an armature carried by a supporting-spring and oscillating in response to vibratory impulses in front of the core, a local circuit which is open so long as vibratory currents traverse the line, and means for closing the circuit when the vibrations cease.

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