(No Model.)

S. L. WIEGAND.

TELEPHONE RELAY.

No. 436,514. Patented Sept. 16, 1890.

Fig. 1

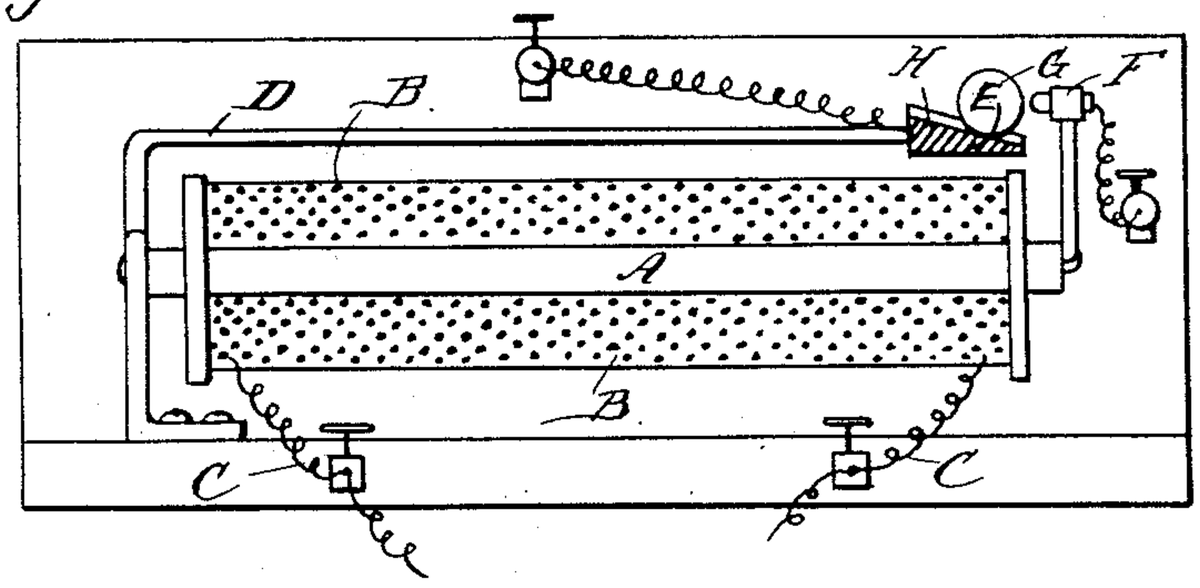


Fig. 2.

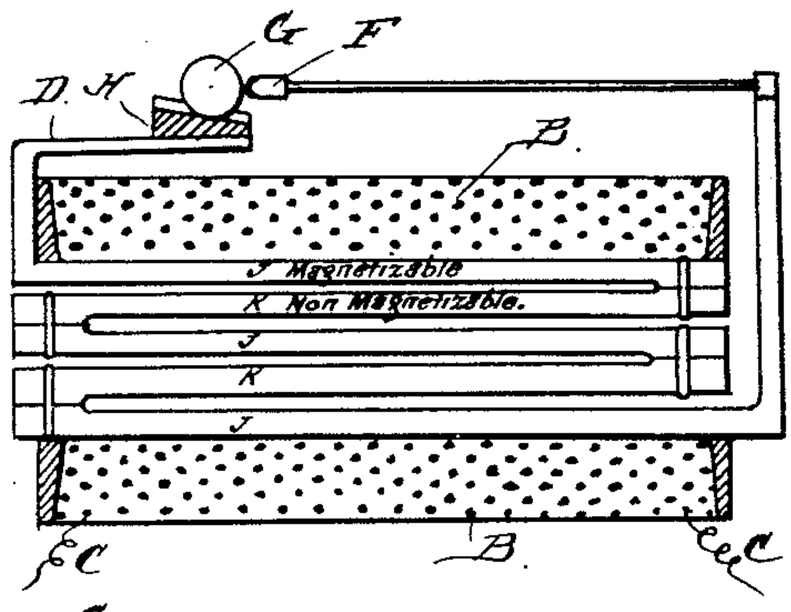


Fig. 3.

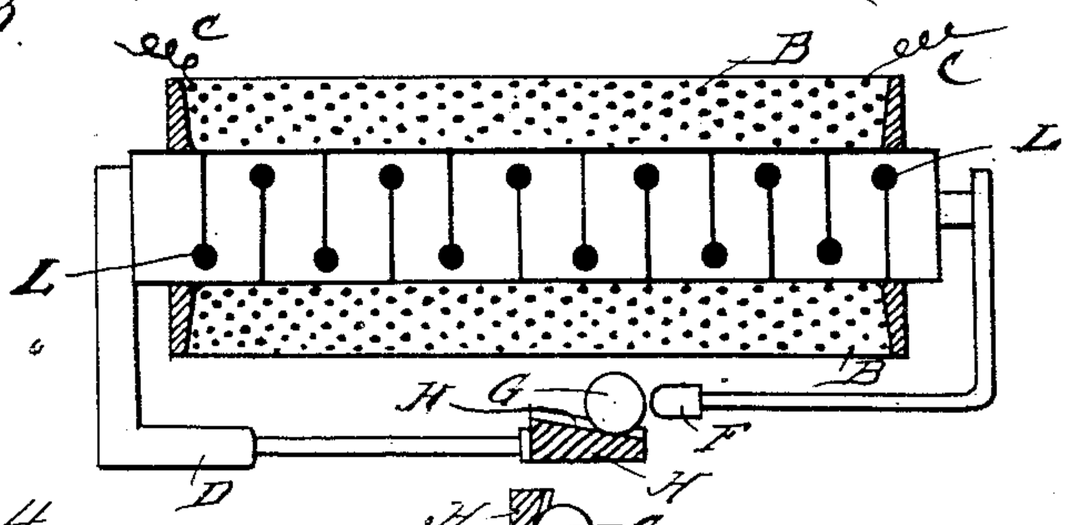
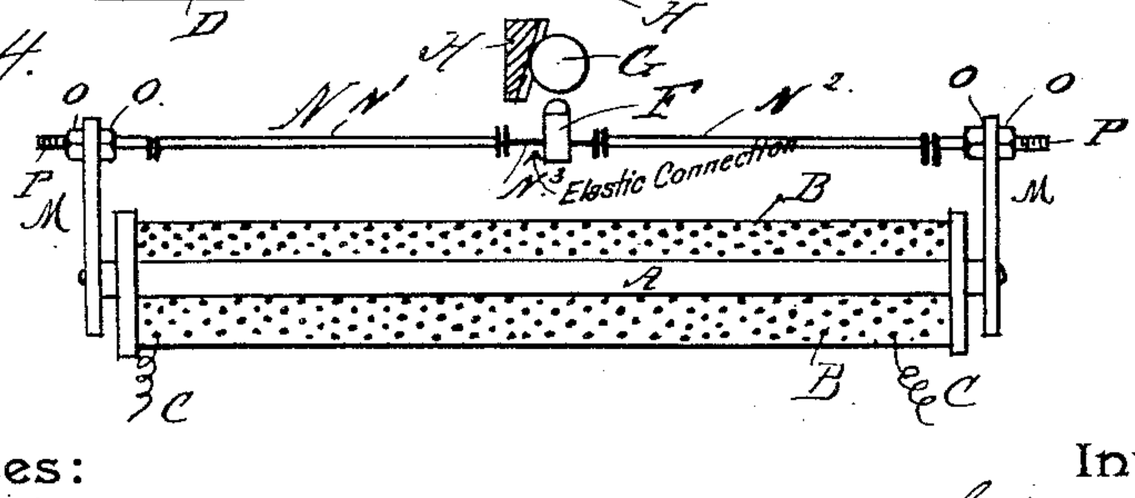


Fig. 4.



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S. LLOYD WIEGAND, OF PHILADELPHIA, PENNSYLVANIA.

TELEPHONE-RELAY.

SPECIFICATION forming part of Letters Patent No. 436,514, dated September 16, 1890.

Application filed May 28, 1889. Serial No. 312,473. (No model.)

To all whom it may concern:

Be it known that I, S. LLOYD WIEGAND, 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 Apparatus and Method for Operating Telephone and Telegraph Relays; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof to enable others skilled in the art to make and use the said invention.

This invention relates to relays and receivers for electric telegraphic service, and has for its object the performance of such service without recourse to the attractive force of magnetism, and is applicable either to a relay for controlling a second current for further distance or of different electro-motive force, which second current may be applied to reproduce articulate speech corresponding to that transmitted by the primary current or to a recording-instrument for marking such forms as are afterward susceptible of subsequently reproducing such vibrations in mechanism thereto applied.

The method of operating this invention is by the lengthwise expansion which takes place in the metallic core during the passage of an electric current through a conducting-coil arranged transversely to such core and the contraction which attends changes of such current, which expansions and contractions operate connected electrodes in a second electric circuit with sufficient promptness to respond to the vibrations of articulate speech or in any slower degree that may be required for telegraphic or other purposes. An apparatus for operating by this method is hereinafter described, and shown in the accompanying drawings, in which—

Figure 1 shows it as a simple and direct-acting relay. Figs. 2 and 3 show modified forms of cores in which by the introduction of intermediate mechanism more compact forms of helices and cores are made to develop sufficient motion to effect an adequate motion of the electrodes, and Fig. 4 shows a modification of the intermediate mechanism as applied to a simple core and helix.

A represents a core of magnetizable metal expansible lengthwise under the influence of an electric current through a surrounding helix B, the current through the helix B being derived from conductors C C, which latter may be connected in any approved manner with the instrument with which the relay is to be employed.

One end of the core A is rigidly connected by non-magnetizable material D to an inclined electrode-support E, upon which is mounted so as to roll freely thereon an electrode G, which is included in the second circuit, and the other end of the core A is connected to a second electrode F, which is also included in the second circuit, the two electrodes being so arranged that they are normally in contact with each other; but when the current passes through the helix the core lengthens and moves the electrodes away from each other. The electrodes F and G are insulated electrically, and are made when used for telephony so that they are closed by gravitation with a force proportionate to the distance through which the electrodes have been propelled.

As shown in Fig. 1 the electrode G consists of a ball of conducting material rolling on an inclined trough or support H, also of conducting material.

As shown in Fig. 2 the core is made of parallel magnetizable bars J, having their opposite extremities connected by non-magnetizable links K.

As shown in Fig. 3 the core is made with kerfs or notches L cut therein from opposite sides, so that the core is compressible and expansible in the direction of its length.

As shown in Fig. 4 the magnetizable core has projecting bars M M at the ends, to which are attached the ends of a rod N. (Preferably adjustable by nuts O, O, O, and O on screws P.) The rod N is made in two sections N' and N^2, elastically connected at N^3, where an electrode F is secured to it. Another electrode G, which is spherical in shape and is supported on an inclined guide or trough E, operates, in conjunction with the electrode F, to vary the second circuit. The rod N is made adjustable lengthwise by means of the nuts O O, so that it is cased to bow or bend slightly toward the electrodes G. When the core A

is lengthened and shortened by the changes of electric currents in the helix B, it operates to vary the contact of the electrodes F and G.

I make no claim in the patent to the method herein described, as the same forms the subject-matter of a separate application filed by me, the Serial number of which is 312,454.

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

1. In an electrical apparatus, the combination, with two electrodes, one arranged to be actuated by gravity, of an expansible magnetizable core, a helix encircling the core, and devices connecting the core with one of the electrodes, the parts being so arranged that on the expansion of the core by the action of the current flowing around it the contact of the electrodes will be diminished and subsequently increased by the gravitation of the free electrode, substantially as set forth.

2. In an electrical apparatus, the combination, with two electrodes, of an expansible magnetizable core, a helix encircling the core, and devices connecting the core with one of the electrodes, the parts being arranged so that on the expansion of the core by the action of the current flowing around it the contact of the electrodes will be diminished and will be again increased by a force independent of that exerted by the core, substantially as set forth.

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