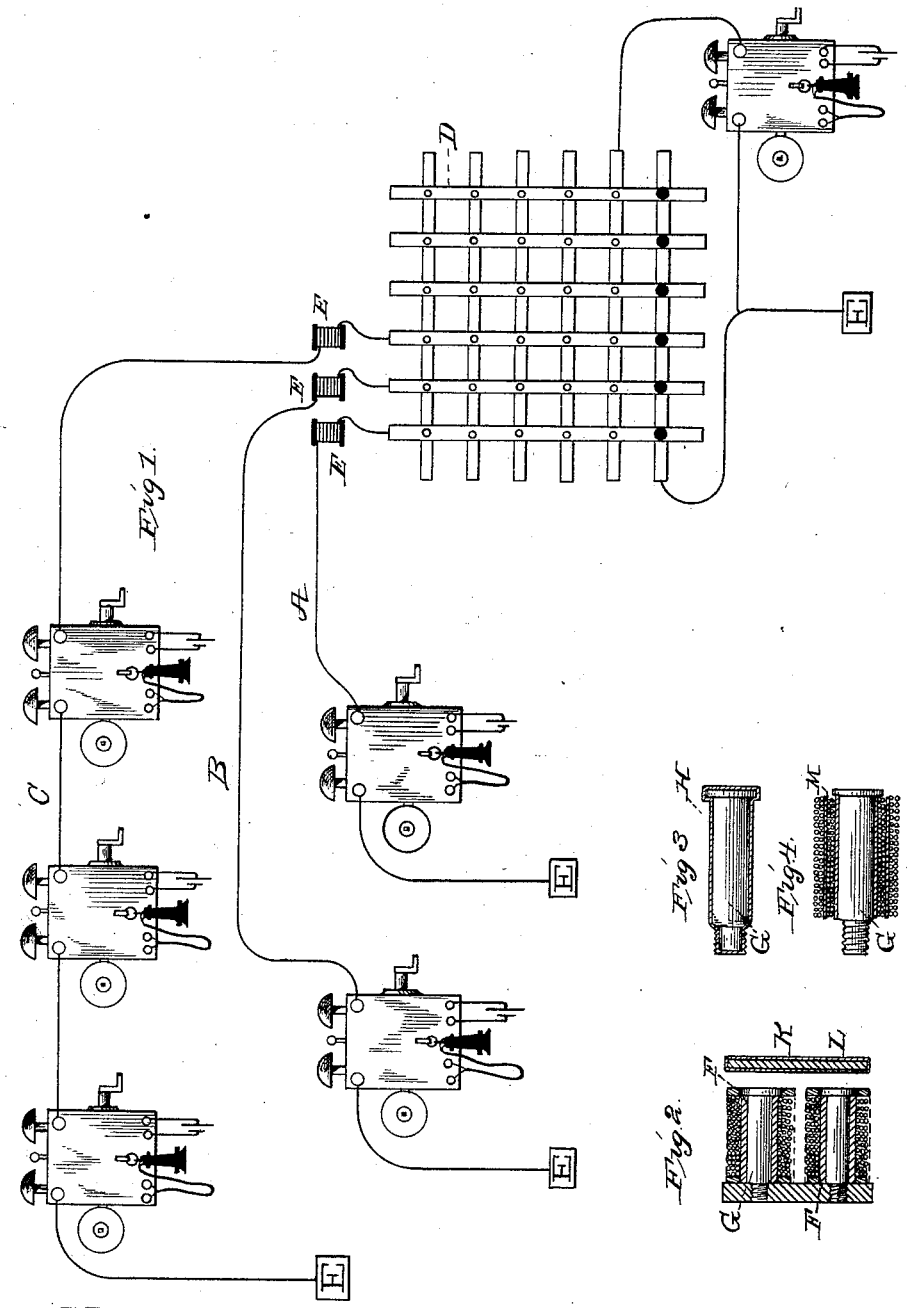
(No Model.)

T. A. EDISON & E. T. GILLILAND.

APPARATUS FOR SPEAKING TELEPHONES.

No. 422,577. Patented Mar. 4, 1890.



ATTEST
E. Rowland
J. G. Greene Jr.

INVENTORS:
Thomas A. Edison,
Egra T. Gilliland,
By Rich'd N. Dyer
Attys.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY, AND EZRA T. GILLILAND, OF BOSTON, MASSACHUSETTS.

APPARATUS FOR SPEAKING-TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 422,577, dated March 4, 1890.

Application filed December 1, 1884. Serial No. 149,231. (No model.)

To all whom it may concern:

Be it known that we, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, and EZRA T. GILLILAND, of Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Apparatus for Speaking-Telephones, of which the following is a specification.

In the operation of telephone-lines it has been found that the transmission of articulate sound is greatly impeded by the signal-magnets necessarily left in circuit, such as "drop" or "bell" magnets. This is probably due to the effect of the induction caused by the charging and discharging of these magnets upon the induced currents used in the transmission of articulate sounds. It has been attempted to overcome the difficulty by shunting each signal-magnet by a condenser; but the condensers are cumbersome and expensive, and are liable to be injured or destroyed by atmospheric discharges.

The object we have in view is to effectively overcome the difficulty referred to by means which are at once simple and compact in construction and capable of application without a considerable additional expense to all the signal-magnets of a telephone-line. This we accomplish by providing the signal-magnets, or those which it is desired to have always in circuit, with a body of non-magnetic conducting material which will absorb the inductive force of the magnets and prevent wholly or to a practical extent the injurious effect upon the speaking-currents.

In the accompanying drawings, forming a part hereof, Figure 1 is a view, principally in diagram, of three telephone-lines and a switch-board to which they are connected; Fig. 2, a sectional view of a magnet and armature embodying our improvement; Fig. 3, a section through a magnet-core, showing a slightly-modified form of the invention; and Fig. 4, a sectional view of a wound magnet-core, showing a further modification.

The lines A, B, and C are connected to switch-board D through annunciator drop-magnets E, and when two of the lines are connected two of these drop-magnets are in circuit while the lines are being used for the transmission of articulate speech and form a serious impediment to clear articulation.

In connecting telephones located at widely distant points through two or more central offices the signal-magnets in line are necessarily increased in number, with the result of increasing this difficulty. In the case of the employment of two or more telephones upon a line, as upon line C, it may be necessary to carry on the talking through a number of bell-magnets, which act in a manner similar to other signal-magnets in rendering articulation difficult.

In Figs. 2, 3, and 4 are shown constructions for absorbing the inductive force of the signal-magnets and overcoming the serious difficulty already pointed out. A shell F, of copper or other non-magnetic conducting material, is placed upon each magnet-core G. This shell may be a tube of metal forced on the core, as shown in Fig. 2, or an electroplated covering H, as in Fig. 3, or a winding of copper-foil, as in Fig. 4. The armature K of each signal-magnet is also provided with an induction-absorbing shell L, preferably of copper. The electroplating of the iron of the magnet and its armature with copper, silver, or other non-magnetic metal is preferred, since this is the cheapest construction. The back yoke of the magnet, although not so shown, may also be covered.

In addition to a shell placed directly upon the core, one or more other induction-absorbing shells M, Fig. 4, may be employed, separated from the inner shell by a part or all of the magnet-winding.

It is not necessary that all signal-magnets used upon telephone-lines should be constructed to absorb their own inductive force, although they may be so made; but the construction should be applied to all signal drop or bell magnets which are in circuit during the transmission of articulate sound. The invention is also applicable to other than signal-magnets, if such are used in telephone-lines in a relation to act in a manner similar to signal-magnets upon the transmission of articulate sound.

What we claim is—

1. A telephone-circuit all of whose bell, signaling, drop, or other magnets which are

in circuit during the transmission of articulate speech are provided with non-magnetic shields for absorbing self-induction, substantially as set forth.

2. The combination, with a speaking-telephone line, of a signal or other magnet and its armature, the magnet and armature being each provided with non-magnetic conducting material, substantially as set forth.

3. A magnet for speaking-telephone lines having its iron parts covered wholly or in part with an electroplated shell of a non-magnetic metal, substantially as and for the purpose set forth.

THOMAS A. EDISON.
EZRA T. GILLILAND.

Witnesses as to Edison:
C. F. HARRINGTON,
RICHD. N. DYER.
Witnesses as to Gilliland:
FRANK E. DONOHOE,
MORGAN BROOKS.