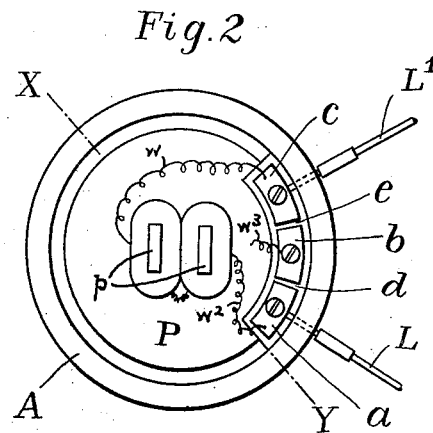
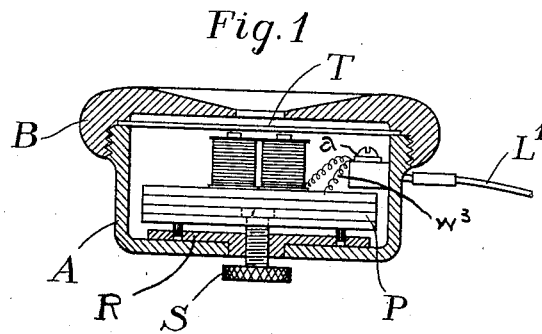


G. W. PICKARD.
 TELEPHONE RECEIVING APPARATUS.
 APPLICATION FILED MAR. 16, 1910.

972,715.

Patented Oct. 11, 1910.



WITNESSES:

David J. Walsh
 Wm. J. Forbes, Jr.

Greenleaf Whittier Pickard

INVENTOR

BY

Philip Farnsworth

ATTORNEY

UNITED STATES PATENT OFFICE.

GREENLEAF WHITTIER PICKARD, OF AMESBURY, MASSACHUSETTS.

TELEPHONE RECEIVING APPARATUS.

972,715.

Specification of Letters Patent.

Patented Oct. 11, 1910.

Application filed March 16, 1910. Serial No. 549,638.

To all whom it may concern:

Be it known that I, GREENLEAF W. PICKARD, a citizen of the United States of America, and a resident of Amesbury, Massachusetts, have invented certain new and useful Improvements in Telephone Receiving Apparatus, the principles of which are set forth in the following specification and accompanying drawing, which disclose the form of the invention which I now consider to be the best of the various forms in which the principles of the invention may be embodied.

My improvements comprise, first, a protective device for the windings of telephonic receivers, this being especially useful in connection with receivers for wireless telegraphs or wireless telephones; and, second, means whereby the pole-piece and magnet system, of a telephone receiver, may be adjusted, within minutest variations, to and from the diaphragm of the receiver.

In the accompanying drawings, Figure 1 is a sectional view, at line X—Y of Fig. 2, of a receiver casing, showing especially the means for adjusting the magnet and pole-piece system to and from the diaphragm, and Fig. 2 is a top view (the cap and diaphragm being removed) of a receiver, especially showing the use of two spark-gaps and the connection of a middle piece with the magnet.

Referring to the protective spark-gap apparatus, this comprises three spark-gap terminals, the outer terminals (*a* and *c*) being connected, as usual, with the telephone leads, *L* and *L*¹, and with the windings, *W* and *W*¹, of the magnets about the pole-pieces, *p*. A third terminal is provided, and this (the middle terminal *b*) is connected, by wire *W*², with the steel magnet, *P*, and the pole-piece system. The object of this portion of my invention is to prevent excessive potential either across the terminals, *a c* (connected with leads *L*, *L*¹), or between the magnet and pole-piece system (*P*) and said terminals.

It has heretofore been customary to place protective spark-gaps, or lightning arresters, across the terminals of telephones, and similar indicating instruments, for the purpose of preventing excessive potential across these terminals; but such protective devices do not prevent the development of high potential between the wire windings of the telephone and the metal which forms the

magnet and pole-piece system. Such excessive potentials result in a breaking down of the insulation, and, finally, in complete inoperativeness of the receiver. These disadvantages of prior existing methods of protection are particularly in evidence when the telephone receiver forms a portion of a wireless telegraph or telephone receiving circuit, owing to the extremely high potentials impressed upon this circuit by its proximity to a transmitting apparatus.

The inclusion, according to my invention, of a middle terminal (*b*), referred to, when connected with the pole-piece system (*P, p*), cures these disadvantages, because, as I understand the matter, an excessive potential existing between *L* (or *L*¹) and the magnet and pole-piece system, will have an easy discharge path, at either the gap *d* or the gap *e*.

If desired, the entire pole-piece and magnet system (*P, p*) may be moved toward or from the diaphragm *T*, by means of the screw *S*. This permits the operator to vary the sensitiveness of the receiver within any desired limits, the maximum sensitiveness being obtained when the distance between the pole-pieces (*p*) and the diaphragm (*T*) is at the minimum.

In the ordinary telephone receiver, the separation between the pole-pieces and the diaphragm is fixed once for all, so that no variation of sensitiveness can be obtained. Further than this, it is not possible for the manufacturer to reduce the separation, to that giving the maximum sensitiveness, for the reason that if this were done any slight change in the temperature, or even a mechanical jar, will allow the diaphragm to pull down to and adhere to a pole-piece, thereby rendering the instrument inoperative. In other words, the ordinary type of telephone receiver must be constructed with a comparatively large separation, in order that it shall maintain its operativeness under all conditions of practice.

In my improved form, the pole-piece may be adjusted as near to the diaphragm as the operator wishes, and if, by reason of any jar or change in the temperature, the diaphragm should pull down and adhere to the pole-piece, a fraction of a turn of the screw *S*, moving in the base-plate *R*, would release the diaphragm.

I claim:

1. In a telephone receiver, the combination with a magnet, of a winding therefor,

electrically separate therefrom in respect of ordinary telephone currents; and means for protecting the winding from discharges of excessive potential to the magnet, said means
5 consisting of a spark-gap constituting a break-down path for such discharges between the magnet and an uninsulated part of the circuit of the winding.

10 2. In a telephone receiver, the combination with the winding, terminals, and magnet-and-pole-piece system, of a spark-terminal electrically connected to the magnet-and-pole-piece system and separated by spark-gaps from the respective winding-terminals.
15

3. In a telephone receiver, the combination with the magnet-and-pole-piece system,

of line-terminals electrically connected with said system by way of spark-gaps.

4. In a telephone receiver, the combination with a magnet, of a winding therefor, electrically separate therefrom in respect of ordinary telephone currents; and means for protecting the winding from discharges of excessive potential to the magnet, said means
25 consisting of spark-gap break-down paths for such discharges between the magnet and uninsulated parts of the circuit of the winding on the two respective sides of the winding itself.

GREENLEAF WHITTIER PICKARD.

Witnesses:

EDWARD H ROWELL,
MYRA S. ROWELL.