

PATENT SPECIFICATION



Application Date: Dec. 19, 1921. No. 34,139/21.

193,203

Complete Accepted: Feb. 22, 1923.

COMPLETE SPECIFICATION.

Improvements in Toy Wireless Telegraphic and Telephonic Apparatus.

Communication from BING WERKE vorm. GEBRÜDER BING AKTIENGESellschaft, a German company, of Nürnberg, Germany.

I, PERCY CHARLES RUSHEN, of the firm of Haseltine, Lake & Co., Chartered Patent Agents, 28, Southampton Buildings, London, W.C. 2, in the County of Middlesex, a subject of the King of Great Britain, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention refers to toy stations for wireless telegraphy and telephony, and more particularly to electrodes for use in such apparatus, and its particular object is to provide electrodes for the spark gaps especially adapted to the particular requirements of toy apparatus.

The spark gaps employed in wireless telegraphy work with high tension which renders the touching of the electrodes dangerous. Even in toy apparatus for wireless telegraphy as a rule spark gaps requiring a tension of several thousand volts have been used. It is an object of my invention to provide a spark gap which requires a tension not materially exceeding 350 volts. I attain this result in the following way:

I dispose the electrodes of the spark gap almost or fully in contact with each other so that a low tension suffices for the formation of sparks, and to prevent particles of the electrode metal, which are torn off the electrodes, from bridging the narrow gap, I cover each electrode with a thin layer of little or non-conductive material such as metal oxide, which also serves to prevent the short-circuiting of the spark gap when the electrodes touch.

Further in order to be able to regulate the distance between the electrodes with

the greatest possible accuracy without being required to employ micrometer screws or the like, I employ electrodes adapted to turn relatively to one another and whose contact surfaces are eccentric with regard to their fulcrums, so that by turning one or both electrodes I am enabled to vary and accurately adjust the distance between the electrodes or the length of the gap.

In the drawings affixed to this specification and forming part thereof two spark gaps embodying my invention are illustrated by way of example.

In the drawings

Fig. 1 is an elevation of a spark gap with plain eccentric electrodes, and

Fig. 2 is a like view of a spark gap provided with a lining.

Fig. 3 is a vertical section of one of the discs or buttons serving for adjusting the electrodes.

Fig. 4 shows a detector and

Figs. 5 and 6 illustrate an apparatus fitted out with devices such as above mentioned.

Referring first to Fig. 1 of the drawings, 1, 1, are discs or buttons of non-conductive material adapted to be turned by hand about parallel pins 2, 2. The electrodes fixed to the discs are formed somewhat like scythes, the straight portions 3, 3, being preferably radially disposed on the discs, while the curved portions 4, 4 are eccentric in this sense that the distance between their free ends and the fulcrums 2 is greater than the distance between the fulcrums and the points where the parts 3 and 4 join. Preferably the arrangement is such that in the position shown in the drawings, where the parts 3, 3 are in line, the parts 4, 4 are separated by a gap of somewhat greater width than is necessary for the formation of sparks at low tension. By

turning either one or both discs 1 in the direction of the arrows, the width of the gap can be varied and be adjusted with a very high degree of accuracy, especially so where the eccentricity of the curved portions 4 is only a very slight one so that in turning an electrode through a comparatively large angle the width of the gap is nevertheless diminished only very little.

The eccentric form of electrodes adapted to be turned relatively to one another further involves the advantage that the points of the electrode surfaces between which the sparks are formed, can be changed, thus protecting the electrodes against early destruction.

In order, now, to prevent the narrow gap from being bridged by particles of the electrodes which may be torn off, I cause a cover or coating of low conductivity or which does not conduct electricity at all, to be formed on the surface of the portions 4, 4 facing one another. Such cover may be afforded for instance by a layer of coating of varnish, enamel or oxide.

I have found it most advantageous to employ covers consisting of metal oxides and I prefer using metals which on being exposed to the air have a tendency to form oxides. I have ascertained that the so-called light metals such as magnesium, cadmium and calcium are particularly useful in this respect, a superficial layer of non-conductive oxide being formed on these metals whenever they are exposed to air. Thus in employing electrodes 3, 4 of magnesium I may make the gap between them so small as to almost form a contact between the electrodes, the layer of oxide forming by itself affording the necessary protection against short-circuiting, both as a mechanical spacing means and a protective coating which prevents particles of metallic magnesium from being torn off the electrode and bridging the gap.

In order to save material I may arrange the electrodes as shown in Fig. 2 where each electrode is formed in two parts, *viz.*, a carrier 3¹, 4¹, which may consist of some suitable metal such as brass and the electrode proper 5 formed of a thin strip of magnesium or the like attached to the carrier 3¹ or 4¹ by aid of metallic clasps 6, 6, which at the same time form a conductive connection between the carrier and the light metal strip.

By curving the strips 5, 5 so as to leave a gap between them and their carriers, I obtain electrodes of high resiliency which may prove useful in the case where the electrodes are caused to contact.

The discs or buttons 1 (Fig. 3) are pre-

ferably made of insulating material, the pins 2 serving at the same time as pivots and means of attachment. Current is supplied at 8 by aid of two washers 9, 10 and a resilient strap 11 fixed on the disc by means of screws and gliding with strong pressure on the washer 9.

A detector adapted to be used in a wireless toy station together with the spark-gap above described is illustrated in Fig. 4. A small capsule 12 surrounding the detector mineral is fixed to the free end of a resilient arm 13 attached to a disc 1 of the kind above described, another disc 1 of the same kind carrying a resilient electrode 14. By turning one or the other disc the distance between the point of the electrode and the detector mineral can easily and accurately be adjusted and the point of contact between these two parts varied so as to prevent quick wearing off of the mineral.

A toy apparatus provided with a spark gap and detector as above described is shown in Figs. 5 and 6. All the parts are here disposed on the upper surface of a switchboard 15 consisting of pressed cardboard and on which is indicated the nature or function of the various parts, the wires 16 connecting them being arranged on the underside. In order to prevent the wires from being torn off or injured the switch-board is preferably removably arranged in a box 17 in such manner that the wires do not touch the bottom of the box.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, as communicated to me by my foreign correspondents, I declare that what I claim is:—

1. Toy apparatus for wireless telegraphy and telephony characterized by the fact that the metal electrodes of the spark gap are disposed almost or fully in contact with each other and are covered with a thin layer of little or non-conductive material such as a metal oxide.

2. Apparatus as claimed in Claim 1, characterized by the fact that the electrodes are provided with a metallic lining consisting of magnesium or cadmium.

3. Apparatus as claimed in Claim 2, characterized by the fact that the lining is formed by a resilient strip of a light metal such as magnesium or cadmium.

4. Apparatus as claimed in Claim 1, characterized by the fact that the electrodes are scythe-shaped and are arranged to be turned about a point disposed eccentrically to their curvature.

5. Apparatus as claimed in Claim 4, characterized by the fact that the elec-

trodes are fixed to discs adapted to be turned about a central pivot.

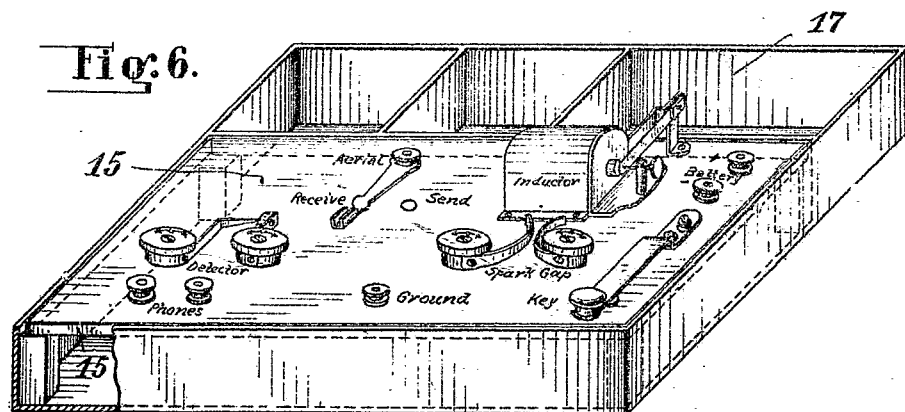
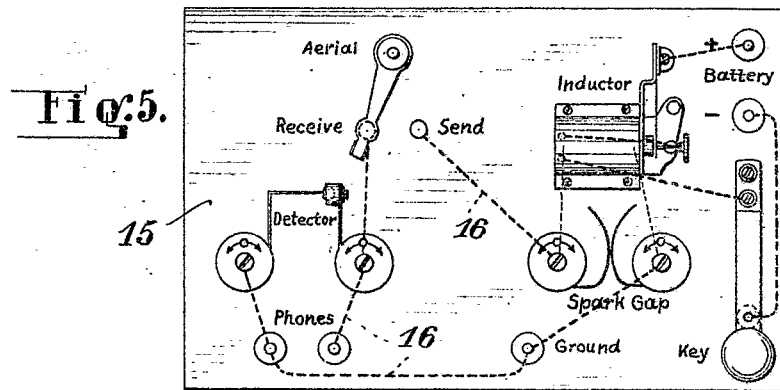
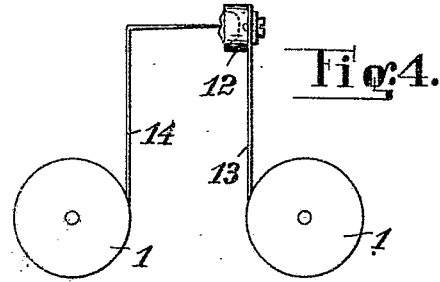
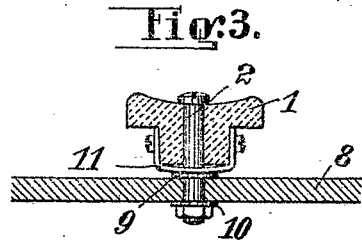
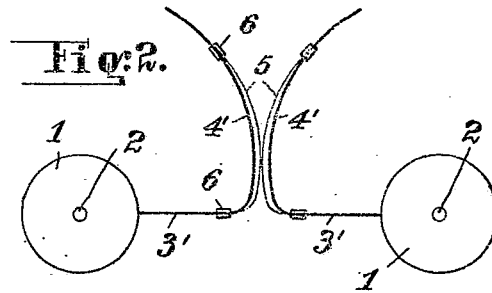
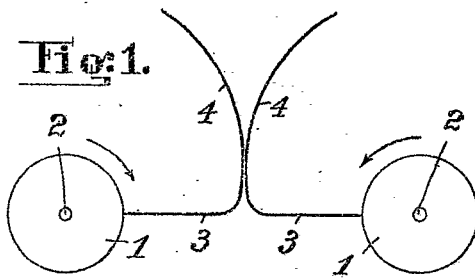
6. Apparatus as claimed in Claim 1, characterized by the several devices being
5 fixed on a switch board of cheap material such as cardboard forming the cover of a box.

7. Apparatus as claimed in Claim 6, characterized by the connecting wires
10 being attached to the underside of the switchboard but not touching the bottom of the box.

8. Toy apparatus for wireless telegraphy and telephony substantially as described with reference to the accompanying drawings. 15

Dated this 19th day of December, 1921.

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[This Drawing is a reproduction of the Original on a reduced scale]