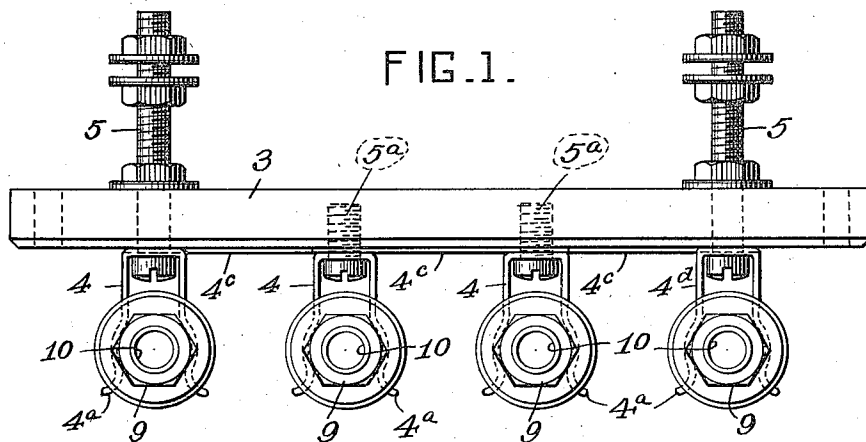
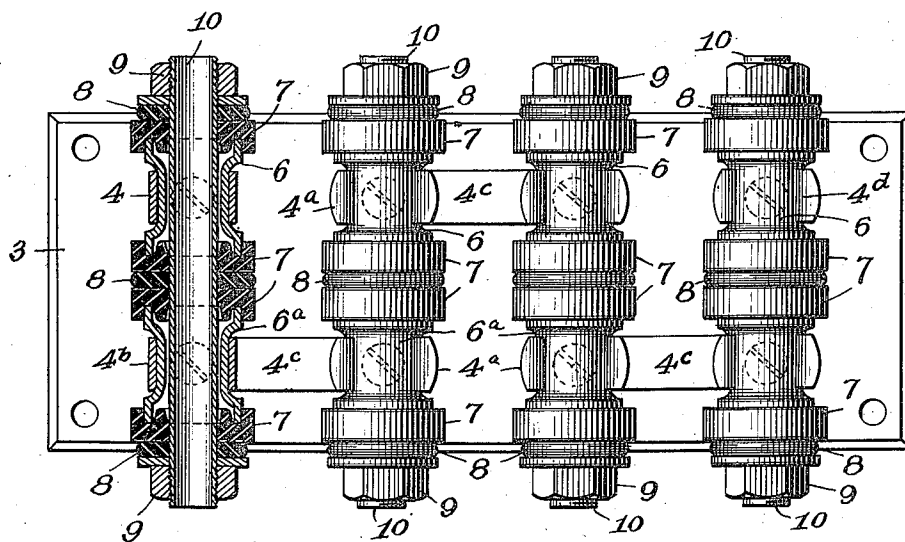


F. H. KROGER.
SPARK GAP.

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1,132,589.

Patented Mar. 23, 1915.



Fred H. Kroger

INVENTOR

WITNESSES:

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SPARK-GAP.

1,132,589.

Specification of Letters Patent.

Patented Mar. 23, 1915.

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To all whom it may concern:

Be it known that I, FRED H. KROGER, a citizen of the United States, residing at Brooklyn, New York, have invented a certain new and useful Spark-Gap for Wireless-Telegraphy Apparatus, of which the following is a specification.

My invention relates to apparatus for generating oscillating currents for radiating electro-magnetic waves and the like and is here shown as designed for a spark gap in wireless telegraphy apparatus. Its primary objects are to secure an accurate and easily adjusted series of sparking surfaces and to arrange for the spark freely playing over such surfaces so as to render the spark uniform; to provide a perfectly quiet spark gap; to cheapen and simplify the construction of series spark gaps; to render the number of sparking spaces readily adjustable, and to generally improve the construction and operation of the spark gap.

In the accompanying drawing I have shown a simple form of construction embodying my invention, Figure 1 being a plan view of the construction having a series of eight gaps, and Fig. 2 is a side elevation and vertical central section of one of the spark gap elements of the same.

It is already known that it is advantageous to distribute the spark over a series of small gaps, and that the sparking conditions are best in a closed space, from which the oxygen may speedily be exhausted. And it is also known that it is of advantage to arrange the sparking surfaces so that the discharge may freely play over an extended surface. It has heretofore been very difficult to attain these ends efficiently without great expense and very delicate adjustment. I have discovered great advantages in having the discharge take place between concentric cylinders, while at the same time such construction greatly simplifies the apparatus and renders the exclusion of air easy, as well as the proper spacing of the parts.

As shown in the drawings, I have preferably provided an insulating plate 3 upon which are mounted a series of open spring clips 4 connected in pairs by a strip of metal 4^c and held on the plate 3 by bolts 5 and screws 5^a, and bolts 5 furnishing the terminals as well as convenient means for attaching to any convenient support.

The gap itself is formed by two metal cylinders, 6 and 10, properly spaced and held in perfect alinement by grooved blocks 7 of insulating material at each end of cylinders 6. The complete unit is held together and made air tight by soft rubber disks 8 and brass nuts 9 on each end of the inner cylinder 10. Thus the spark flows from the indented part of the inner surface of the cylinder 6 to the central supporting cylinder 10 and then again from the outer surface of this cylinder back to another surrounding cylinder 6^a. The space between the elements 6 and 10 is by this construction air-tight and fixed in volume and the parts are held rigidly and accurately so that there is a very small gap between the cylinders and it is uniform around the circumference, and the discharge may thus play over the surface around the concentric cylinders in the closed space, automatically adapting itself to the various places of discharge as temperature conditions and condition of surface may change. The gap is efficiently cooled by circulation through the tube 10 as well as by free radiation from the cylinder 6.

It will be understood that as here shown there is a series of eight gaps and that the number of gaps may be varied conveniently by removing or inserting different numbers of the separate cylinder elements containing a pair of gaps. It will be observed that the clip 4^b is connected to the clip 4^a by a conducting strip 4^c and these being staggered in pairs offers a ready means of inserting or taking out any one of the gap elements.

The advantages of my construction flow from its furnishing a pair of concentric cylindrical surfaces very close together and in the same inclosed space, and from the superior cooling, the ease with which accuracy is obtained, the ease of repair, and the ease of adjustment. Other advantages will readily occur to those familiar with the art.

Having thus described my invention and illustrated its use, what I claim is the following:

1. A plural spark gap comprising a series of pairs of concentric cylinders providing sparking spaces, each cylinder being electrically connected with a like cylinder of another pair.

2. A spark gap comprising a suitable mounting, and a series of pairs of removable

concentric cylinder elements forming discharge spaces, and means to exclude air from said discharge spaces.

3. A spark gap element comprising two
5 pairs of concentric cylinders and proper mountings to cause a discharge from one outside cylinder to the inside cylinder and thence from the inside cylinder to another
10 outside cylinder insulated from the other cylinders, substantially as described.

4. In a spark gap the combination of a supporting base, a series of staggered pairs of spring clips, a series of spark gap elements supported in said clips substantially
15 as described, and each such element comprising pairs of concentric cylinders forming spark gaps.

5. A spark gap element comprising a central cylinder, an insulating support therefor
20 and a screw nut thereon, a series of insulating washers on the central cylinder and a

series of larger cylinders outside the central cylinder and supported on said washers, and spaced apart, said washers forming air-tight compartments between the central and the
25 outside cylinders, substantially as described.

6. A spark gap for wireless telegraphy apparatus comprising a series of pairs of alternately large and small cylindrical surfaces concentrically arranged, and means for
30 causing a discharge serially between said cylindrical surfaces, each cylinder being electrically connected with a like cylinder of another pair.

In testimony whereof I have hereunto
35 signed my name in the presence of the subscribing witnesses.

FRED H. KROGER.

Witnesses:

WALTER J. JONES,
JOSEPH H. ESQUIRO.