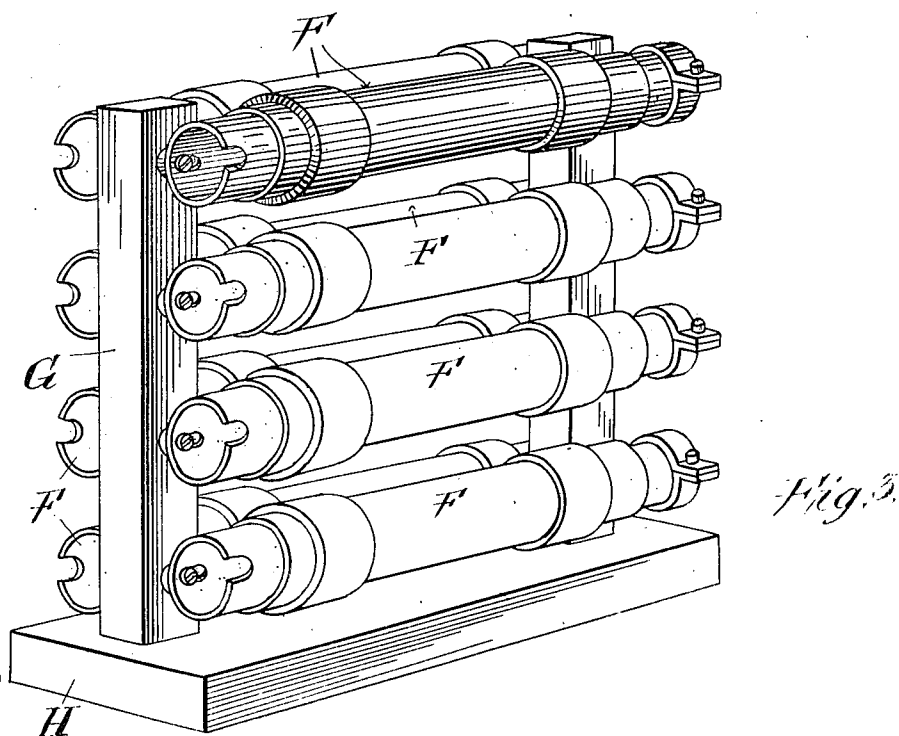
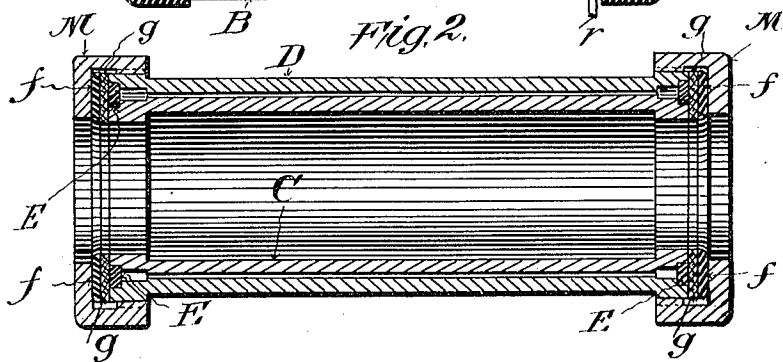
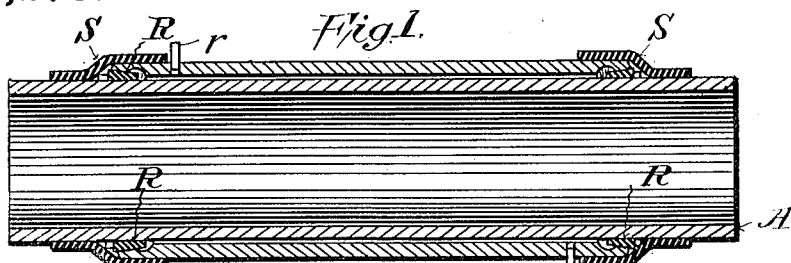


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QUENCH SPARK GAP.

APPLICATION FILED DEC. 1, 1911. RENEWED JUNE 16, 1917.

1,256,270.

Patented Feb. 12, 1918.



Witnesses:
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UNITED STATES PATENT OFFICE.

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QUENCH-SPARK GAP.

1,256,270.

Specification of Letters Patent.

Patented Feb. 12, 1918.

Application filed December 1, 1911, Serial No. 663,320. Renewed June 16, 1917. Serial No. 175,212.

To all whom it may concern:

Be it known that I, GEORGE SEIBT, a subject of the Emperor of Germany, residing at Schöneberg, near Berlin, Germany, have made a certain new and useful Invention in Quench-Spark Gaps, of which the following is a specification.

This invention relates to spark gaps and particularly to spark gaps of the quenched spark type such as are employed in connection with the oscillating systems of wireless telegraph apparatus.

The object of the invention is to provide a spark gap construction which is simple, economical and efficient.

A further object is to provide an apparatus of the nature referred to which permits of efficiently cooling the spark gap elements.

A further object is to provide an apparatus of the nature referred to which readily permits the introduction of a gas medium into the space in which the spark takes place.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing and finally pointed out in the appended claims.

In the drawing—

Figure 1 is a view in central longitudinal section of a spark gap element embodying the principles of my invention.

Fig. 2 is a similar view showing a slightly modified construction element included within my invention.

Fig. 3 is a perspective view showing a spark gap made up of a plurality of elements.

The quench spark gaps at present most commonly employed in connection with wireless telegraph systems consist of metal disks or plates piled or stacked up the one upon another with separating, air excluding gaskets between adjacent plates, the entire stack being pressed together and held in assembled relation under pressure applied endwise of the stack or pile, to prevent the admission of air to the spaces between adjacent plates.

This construction is open to several practical disadvantages, which are especially noticeable when large amounts of energy are

to be employed in connection therewith. In the first place it is important to maintain the spark gap cool. With the built up plate construction in order to reduce the heat generated therein by the action of the electric current, it is necessary to provide the plates with heat radiating surfaces or ribs to dissipate the heat. Sometimes channels or spaces are formed to contain water for cooling purposes, or to permit a stream of water to constantly flow therethrough to absorb and carry off the generated heat.

Moreover, the presence of gas in the space where the spark occurs is advantageous in that it increases the quenching effect. With the built-up plate construction it is difficult to fill the spaces between adjacent plates with gas.

Again, in case of injury to any plate in the pile necessitating its removal and replacement it is necessary to take apart the entire structure in order to effect such removal and replacement.

It is among the special purposes of my present invention to avoid these objections and to provide a construction of quench spark gap which is self cooling or which is capable of being easily cooled; wherein gas can be readily and easily admitted to the spark gap spaces; wherein each element of the structure is supported independently of the others and may be readily removed and replaced when desired, without disturbing the other elements in the structure.

In carrying out my invention I propose to make each element or unit of the spark gap structure of hollow sections, or electrode members, arranged the one inside the other, the exterior surface of the inner section being separated sufficiently from the interior surface of the outer section to produce and form the spark gap space, and the two sections so packed at their ends as to exclude air from such space.

In Fig. 1 the gap element or unit is shown composed of the inner tubular section, or electrode member, A, and the outer tubular section, or electrode member, B, the former being mounted concentrically within the latter with both ends thereof extending beyond the ends of the outer section B. The exterior diameter of the inner section is slightly less than the interior diameter of the outer section so that when said sections are assembled concentrically, or with their geo-

metric axes coinciding, a spark gap space of uniform thickness is formed between said sections. The sections may be maintained in their axially centered relation in any suitable or convenient manner. For this purpose I have shown the packing rings R interposed between the sections at their ends and formed of course of suitable insulating material.

It is important that provision be made to exclude air from the spark gap space between the sections. This may be accomplished in many different ways. The packing R may be made to serve the purpose, but additional means is best provided, and I have shown a simple arrangement wherein a packing sleeve S, of rubber or other suitable material is applied over the joints between the ends of the sections.

If it is desired to fill the spark gap space between the sections A, and B, with a suitable gas, a short pipe section *r*, may be tapped or otherwise inserted through a transverse hole formed through one of the sections, as B, and delivering into the space between the sections. Through this pipe section the gas may be supplied to the spark gap space, and when this space is sufficiently filled with the gas, the pipe section *r*, may be closed up.

In Fig. 2, a slightly modified construction of spark gap element or unit is shown, which is embraced within the scope of my invention. In this construction the inner and outer sections C, D, are of substantially equal length, and are held assembled, the one concentrically within the other by means of cap rings or nuts M, applied thereto over the ends thereof. The sections C, D, are separated or spaced apart from each other and held in coaxial relation by means of the separating rings E, at their ends. Packing rings or disks *g*, of rubber or other suitable material serve to exclude air from the space between the sections, while the caps or nuts M, are insulated from the inner section C, by means of insulation indicated at *f*.

A spark gap structure is made up by assembling together into a set or group a plurality of the elements or units, indicated generally by reference letter F, as in Fig. 3, and when so assembled they may be held or supported, preferably in parallel relation by suitable supporting standards G, on the same base H, and in one or more sets or groups of such assemblages as may be desired to increase the number of units as required.

By employing tubular sections for the units, and then setting the same into vertical position, the well known chimney or smoke-stack effect is produced. That is the heat developed creates a natural draft of air through the bore of the inner tube, thereby absorbing and carrying off the heat. This

cooling action may be increased, of course, by maintaining artificially a draft of air through the bore of the inner tube. An air draft may be delivered not only through each unit but also between adjacent units or around the outer surface of the outer tubes of the units as well, thereby increasing the cooling effect.

It is obvious that the walls of the sections A, B, C, D, may be made comparatively thin, and consequently any heat developed therein in the use of the apparatus has but a very short distance to travel, namely, the thickness of the section, before it is absorbed by the draft of air passing through the bore, or around the sections. In contrast with this the heat, in the piled up plate construction at present employed, is required to traverse a comparatively long distance of the metal of the plate before it reaches the air or other heat absorbing medium, thereby preventing efficient cooling.

It will be observed that the various units of my invention are all interchangeable and when arranged in sets or groups and the sets or groups are assembled for use they also are interchangeable.

Having now set forth the objects and nature of my invention, and constructions embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent of the United States is:—

1. A quench spark gap element or unit comprising two hollow cylindrical thin-walled electrode members arranged concentrically one inside the other, the exterior surface of the inner member being separated from the interior surface of the outer member to provide a sparking space of uniform thickness therebetween, and the inner member being open at both ends.

2. A quench spark gap element or unit comprising a plurality of hollow cylindrical thin-walled electrode members arranged concentrically one inside another, the facing surfaces of said members being separated to provide a sparking space of uniform thickness therebetween, and the inner member being open at both ends.

3. A quench spark gap element or unit comprising two hollow cylindrical thin-walled electrode members arranged concentrically one inside the other, the exterior surface of the inner member being separated from the interior surface of the outer member to provide a sparking space of uniform thickness therebetween, spacing means interposed between said members at both ends thereof, and air excluding means extending between the members outside of said spacing means.

4. A quench spark gap element or unit comprising longitudinally disposed hollow members arranged the one inside the other,

the exterior surface of the inner member being separated from the interior surface of the outer member, to form a space there-between, means for excluding air from said
5 space, and a tubular connection extending through one of said members and communicating with said air tight space.

In testimony whereof I have hereunto set

my hand in the presence of the subscribing witnesses, on this 4th day of November, 10
A. D. 1911.

GEORGE SEIBT.

Witnesses:

F. WARREN WRIGHT,
FLORENCE M. EDENBOHN.