E. F. BELL.

QUENCH ROTARY SPARK GAP.

APPLICATION FILED SEPT. 20, 1920.

1,418,518. Patented June 6, 1922.

FIG. 1

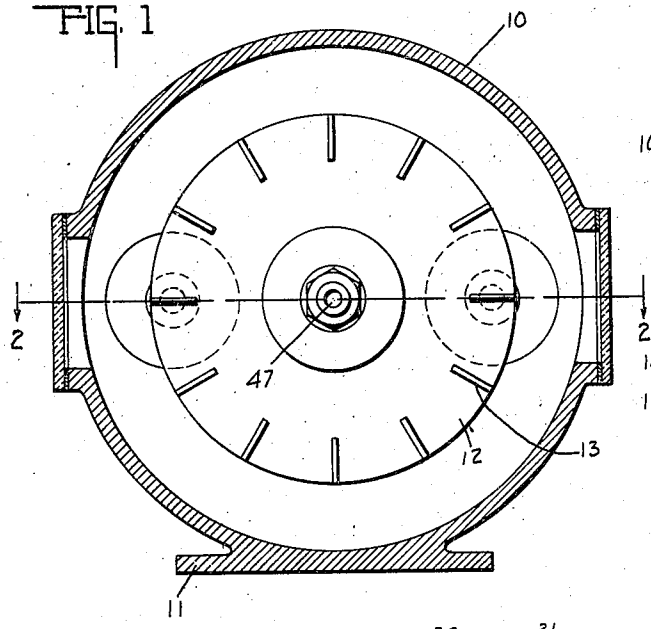


FIG. 3

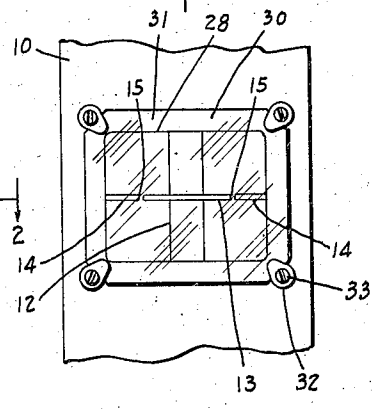
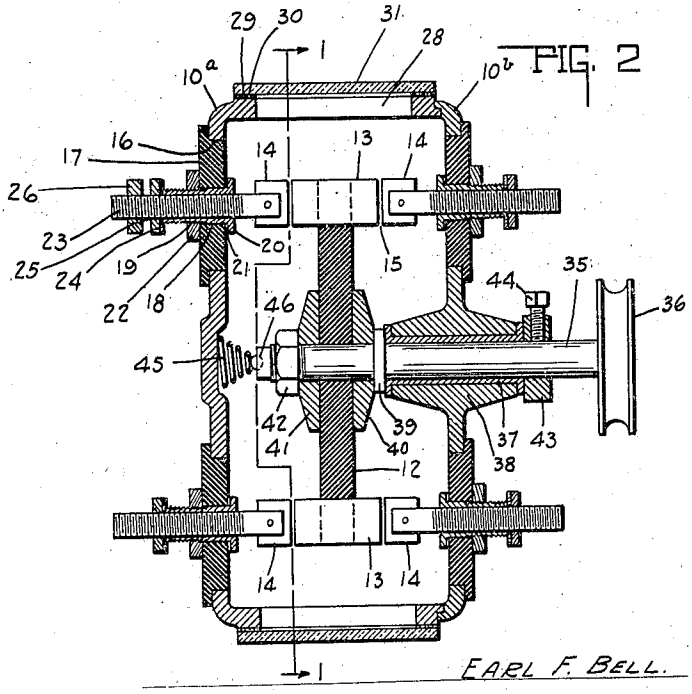


FIG. 2



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QUENCH ROTARY SPARK GAP.

1,418,518. Specification of Letters Patent. Patented June 6, 1922.

Application filed September 20, 1920. Serial No. 411,640.

To all whom it may concern:

Be it known that I, EARL F. BELL, a citizen of the United States, and a resident of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Quench Rotary Spark Gap; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

This invention relates to the transmitting circuit of radio telegraph systems wherein the spark gap is secured by a rotating element which also cools and quenches the arc which tends to form when the spark is produced.

The chief object of this invention is to provide a rotary quench spark gap and enclose the same in an air tight casing. When thus enclosed the oxygen contained within the casing is transformed by the spark into the unstable form known as ozone, in the presence of which the rotary spark quencher becomes more efficient.

The full nature of this invention will be understood from the accompanying drawings and the following description and claims.

In the drawings Fig. 1 is a cross sectional view of a rotary quench spark gap device embodying the features of the invention, and is taken along the broken line 1—1 of Fig. 2. Fig. 2 is a central cross sectional view taken on the line 2—2 of Fig. 1 and in a plane at right angles to said figure. Fig. 3 is an end view of the observing means secured to the casing.

In the drawings there is illustrated the preferred embodiment of the invention and the same is herein illustrated as provided with four independent spark gaps which may be connected in series or may be connected in parallel relation in the sending circuit of a wireless telephone or telegraph outfit.

10 indicates an enclosing cylindrical casing provided with a supporting base 11, by which the casing may be suitably supported in any desired position. In the present instance the casing comprises a body portion 10^a and a cover portion 10^b, see Fig. 2, said cover portion being secured to said body portion in any suitable manner, as by being threaded thereto or otherwise secured by bolts and the like, with the addition of an air tight joint between the body and the cover when in assembled relation.

Within said casing is rotatably mounted a spark forming and quenching insulating disk 12, said disk being provided with radial fin members 13 substantially near the periphery thereof, as shown. The radial fin members 13 are in spaced relation with each other and of any suitable number, being insulated from each other by being supported in said disk. Each fin member in the present construction extends outwardly from said disk toward the flat sides of the cylindrical casing. Adjacent the outwardly extending ends are suitable terminal plates or contacts 14 which are in alignment with each other and are separated by the insulating disk 12 and are electrically connected together by one of said fins 13, the latter being separated from each of said terminal plates by a small spark gap designated by the numeral 15.

In the present arrangement four spark contacts or plates 14 are shown in spaced relation mounted within the casing 10 so that a description of the mounting of one of said plates will be sufficient for an understanding of all. The cylindrical casing 10 is provided with an opening 16 into which is secured an insulating bushing 17 of considerable size, said bushing 17 having a circular flange portion 18 abuttable upon the casing adjacent the opening 16. Said bushing 17 may be secured in the opening 16 by means of a threaded engagement or by being pressed therein under pressure, or in any other suitable manner, such that an air tight joint or connection is secured between said members. The insulating bushing 17 is provided with a central opening 18 through which extends, a preferably metallic bushing or sleeve 19. The sleeve 19 is provided with a large circular flange portion 20 upon the end which extends within the casing so that a suitable washer or gasket means 21 may be interposed between the bushing 17 and the flange 20 to provide an air tight joint. The sleeve 19 is exteriorly threaded and upon the same is secured a nut 22, by which said sleeve is rigidly and tightly secured in the central opening 18 of said insulating bushing. The sleeve provides a suitable bearing guide for the supporting terminal rod 23, which slidably extends through said sleeve and which carries upon its inner end the contact or spark plate 14 secured thereto in any suitable manner. The

terminal rod 23 is exteriorly threaded, and adjacent the outer end of said sleeve 19 is supported a washer or other suitable gasket means 24 against which the lock nut 25 bears to form an air tight connection between the sleeve 19 and the terminal rod, and by which said terminal rod is adjustably secured within the sleeve 19. Upon the terminal rod 23 and adjacent the lock nut 25 is secured a terminal cap member or knurled nut 26, by which the circuit wire may be secured to the terminal rod.

The foreging construction permits of the adjustment of said terminal rod longitudinally of said sleeve, as desired, without the necessity of opening said casing, since by turning the nut 25 the rod 23 will be moved longitudinally of the sleeve. This construction also permits the replacement of any of the several parts should they for any reason become damaged, without the necessity of replacing the entire machine.

Adjacent each pair of oppositely and inwardly extending terminal rods 23 and in the cylindrical portion of said casing, is provided an observation opening 28, the edge surrounding said opening being raised at 29 to form a seat for suitable gasket or washer means 30. Covering said observation opening and resting upon said gasket 30 and the supporting boss 29, is a transparent plate 31 which is preferably formed of heavy glass and suitably secured to said covering by means of the clamping fingers or members 32 secured to the cylindrical casing by means of the bolts 33. As shown clearly in Fig. 3 said observation opening 28 exposes the sparking plates 14, the disk 12, the intermediate radial and transversely extending fin 13, and especially the intervening spark gaps 15. This construction, therefore, permits the adjustment of the terminal rods 23 from without the casing, and the observation opening 28 permits the observation thereof during the adjusting operation.

The means for rotatably supporting said disk and rotating the same comprise a shaft member 35, carrying upon its outer end a drive pulley 36 by which the same is revolved. The shaft 35 is provided with an elongated portion which is supported in an elongated bearing sleeve 37, the same being secured in an elongated bearing member 38 formed in the present instance in the cover plate 10^b. Upon the inner end of said shaft and adjacent the bearing 37 is a collar member 39 which limits the longitudinal movement of said shaft in one direction. Adjacent the collar 39 is suitably secured a supporting flange or guide plate 40, and adjacent said plate is supported the insulated disk 12, while upon the opposite side of said disk, and also supported upon said shaft, is a similar guide plate member 41, said disk and said plates being secured together by means of a nut 42 having a threaded engagement with the inner end of the shaft 35, as shown. Adjacent the bearing sleeve 37 and upon the shaft 35 without the casing is a collar 43, said collar being secured to said shaft by means of a set screw 44 to prevent longitudinal movement thereof inwardly through the bearing and into the casing.

Means, in addition to the collar 44 for normally maintaining the shaft and the collar 39 in position such that the latter abuts the bearing sleeve 37, comprises a tension means interposed between the end of said shaft and the wall of said casing opposite the cover plate 10^b. In the present instance said tension means comprises a conical shaped spring 45 upon the apex of which is suitably secured a ball bearing 46, said ball bearing being substantially a thrust bearing and being seatable in the semi-spherical seat 47 formed in the inner end of the shaft 35.

While the invention has been described in detail it will be understood that many modifications thereof will suggest themselves to those skilled in the art in addition to many of the modifications herein mentioned, all of which are within the purview of this invention.

The invention claimed is:

1. In a rotary quench spark gap machine including in combination an enclosing casing, a pair of separated terminals, a rotatable member, a conducting member extending parallel to the axis of rotation of said rotatable member and movable into position when rotated to complete the circuit through said terminals, a bearing in said casing, a shaft rotatable in said bearing and supporting said rotatable member, and tension means for preventing said shaft and rotatable member moving longitudinally of said bearing.

2. In a rotary quench spark gap machine including in combination an enclosing casing with a detachable cover, a pair of separated terminals, a rotatable member, a conducting member extending parallel to the axis of rotation of said rotatable member and movable into position when rotated to complete the circuit through said terminals, an elongated bearing in said cover, a shaft rotatable in said bearing and supporting said rotatable member, and tension means for preventing said shaft and rotatable member moving longitudinally of said bearing.

In witness whereof I have hereunto affixed my signature.

EARL F. BELL.