No. 886,303. PATENTED APR. 28, 1908.

W. W. MASSIE.

SPARK GAP APPARATUS.

APPLICATION FILED MAY 2, 1907.

Fig. 1.

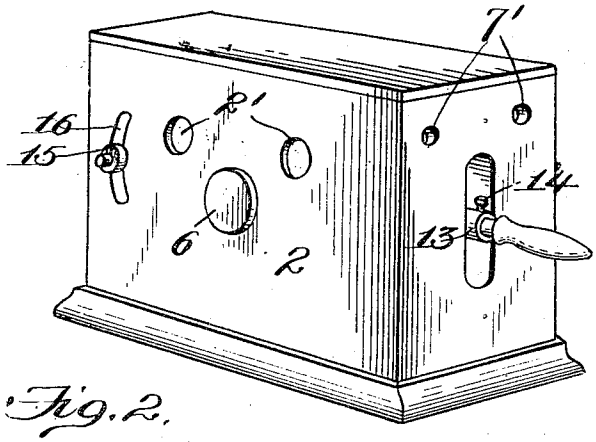


Fig. 2.

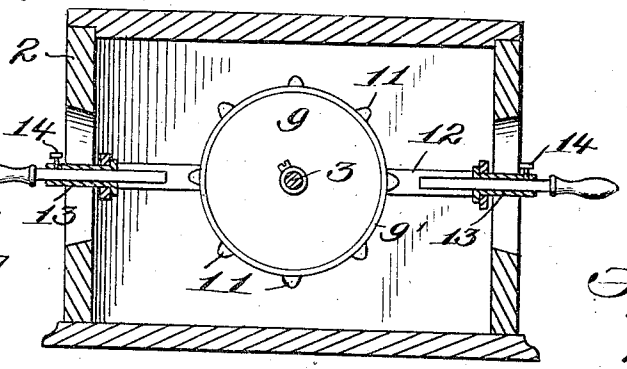


Fig. 5.

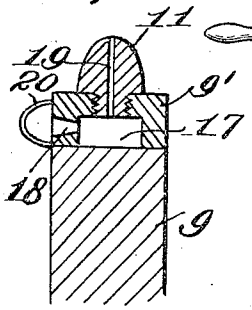


Fig. 4.

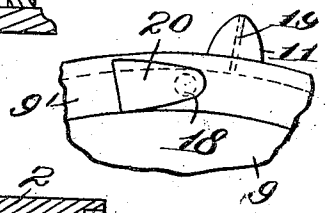
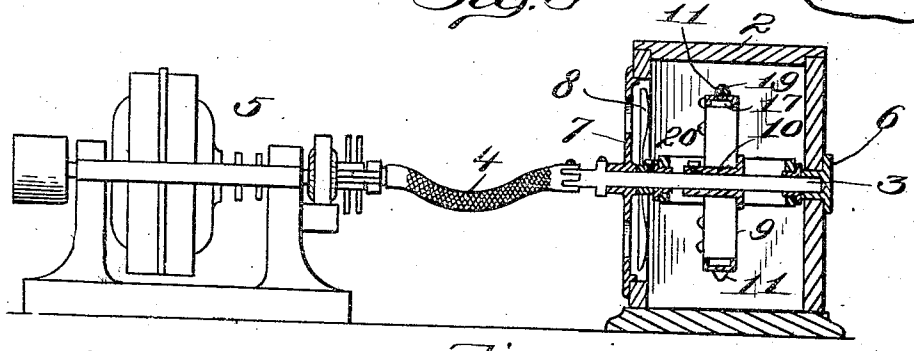


Fig. 3

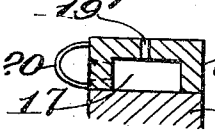


Witnesses:

C. A. Keller

H. B. Keller

Fig. 6.



Inventor

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UNITED STATES PATENT OFFICE.

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SPARK-GAP APPARATUS.

No. 836,303 Specification of Letters Patent. Patented April 23, 1906.

Application filed May 2, 1907. Serial No. 371,448.

To all whom it may concern:

Be it known that I, WALTER W. MASSIE, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Spark-Gap Apparatus, of which the following is a specification.

This invention relates to spark gap apparatus, the object of the invention being to provide effective apparatus of this character which is susceptible of advantageous use in many connections; for example, as a part of a wireless telegraphic system.

The apparatus possesses several features of utility which will be fully brought out in the following description wherein I set forth in detail that form of embodiment of the invention which I have selected for illustration in the accompanying drawings forming part of this specification, with a view of indicating the character of the invention. The novelty of the latter will be included in the claims succeeding said description.

Referring to said drawings: Figure 1 is a perspective view of the box which houses certain of the parts. Fig. 2 is a longitudinal sectional view of the box at one side of the rods. Fig. 3 is a transverse sectional view of the box and shows a motor constituting part of the apparatus. Fig. 4 is a detail face view of a portion of the spark-gap wheel. Fig. 5 is a cross-section of the same. Fig. 6 is a view corresponding with Fig. 5 of a modified form of wheel.

Like characters denote corresponding parts throughout the several figures.

In my apparatus there is a spark disk or wheel mounted on a shaft which is connected with a suitable motor by a flexible shaft so that the box or casing which contains the spark gap disk or wheel and rods can be put on a bench as it is known in wireless telegraphy, while the motor can be placed under said bench. If the spark gap wheel were placed upon a rigid continuation of the motor shaft, this would present an inconvenient relation to the operator and would also involve the necessity of making bad connections with the condenser constituting part of the sending circuit of a wireless telegraph system. By virtue of the construction to which I have briefly alluded as constituting part of my invention I eliminate the inconvenience in question and provide for proper connections or leads with said condenser. Moreover by placing the spark gap apparatus proper or box or casing containing the spark gap rods on the bench the same is always in plain view of the operator.

Referring now to the drawings in detail the numeral 2 designates a box or casing which may be of any desirable shape and in which is located for rotation the shaft 3, one end or terminal of which extends beyond one side of the box 2 and is connected by some suitable flexible joint with the flexible shaft 4 which in turn is likewise connected with the shaft of the motor 5. One end of the shaft 3 is shown as supported by the blind bearing or thimble 6, while said shaft 3 is supported near its opposite end in any desirable way, for example, by the webbed casting 7 closing an opening in the box 2, said casting or plate 7 having one or more slots or ports for the supply of fresh air into the interior of the box 2. This air can also be utilized for keeping cool the spark gap wheel and rods hereinafter described. The box or casing has also one or more vent openings as 7′ for the escape of the vitiated or foul air. I prefer not to rely upon atmospheric pressure of the air to secure the circulation of the same through the interior of the box 2, but provide positive means for this purpose, such as a fan 8 fastened suitably to the shaft 3 for rotation therewith.

A spark gap wheel or disk as 9 of suitable construction is rotative with the shaft 3 and spark gap rods as those hereinafter described are coöperative therewith, and these parts are so related that the point of discharge can be instantly and readily adjusted without stopping the shaft 3. The rim of the said wheel 9 is generally made of brass, while the body thereof may be of rubber, fiber, or other similar material and may be fastened to a suitable bushing as 10 pinned or otherwise connected with said shaft for rotation therewith. The spark points around the rim or periphery of the wheel 9 are designated by 11 and they may be of any desirable number. They preferably have threaded shanks which are tapped into the rim of the disk or wheel.

The spark gap rods, of which there are two, are diametrically opposite each other, their inner ends being in proximity to the periphery or circumference of said wheel. These rods are preferably adapted for simultaneous adjustment and, in the present case,

they are supported by an oscillatory carrier as 12 which may be of fiber, rubber, or other suitable material, and which is shown as consisting of a substantially rectangular or open frame. The spark gap rod carrier or frame 12 is supported for oscillatory movement preferably by the shaft 3 and, as both rods are supported by it, it will be evident that, when one is moved circumferentially of the wheel 9, the other is necessarily similarly moved.

The two end bars of the carrier or frame 12 are equipped with sleeves or collars as 13 through which the spark gap rods are slidable, by virtue of which they can be longitudinally adjusted; that is, their tips can be moved toward or from the periphery of the spark gap wheel, and set screws as 14 carried by said collars can be provided for holding the spark gap rods in their longitudinal adjusted relations, or, in their adjustment radially of the wheel.

I show a set screw 15 on one of the side bars of the carrier 12 and the shank of which extends through a vertically elongated slot as 16 in the box 2, the head of the screw being located outside said box. By tightening up the screw its head will bind against the outer surface of the box to hold said carrier in an adjusted position, by reason of which the circumferential adjustment of the spark gap rods can be maintained. By loosening the screw the carrier 12 can be rocked to change the adjustment and, when the new adjustment is effected, it can be retained by setting up the said screw 15.

I prefer not to rely solely upon the circulation of air through the box 2 for the purpose of keeping the spark gap means cool, but have illustrated and will now describe a more positive means whereby this result can be accomplished. The spark gap wheel 9 in the present case is chambered as at 17, and this chamber can be produced by the formation of an annular channel around the inside of the rim 9′ of said spark gap wheel. There are shown a number of inwardly tapering ports as 18 in said rim 9′ leading from the outer surface thereof into said chamber 17 and the inlet ends of these ports are in proximity to the fan 8. The spark gap points 11 have passages as 19 entirely therethrough which communicate with said chamber 17, and it is therefore evident that the air from said chamber can flow outwardly through these several passages 19 by means of which the peripheral portion or rim of the wheel, as well as the spark gap points, can be kept cool. I arrange upon that side of the rim 9′ next to the fan 8 hood-shaped vanes or buckets as 20 which overlie the ports 18. As the wheel 9 rotates these vanes or buckets 20 collect or scoop and compress air therein which passes therefrom into the chamber 17 by way of the ports 18, such air passing from the said chamber through the passages 17, by virtue of which the several parts subjected to such action are kept in a cool condition. In some cases I might dispense with the fan 8, and rely simply on the other construction to maintain the wheel and rods cool, but prefer that the fan be employed.

It is not essential that the spark gap rods 13 be mounted for circumferential adjustment with respect to the spark gap wheel, nor is it essential that the spark gap points 11 be provided. In Fig. 6 I have shown a wheel 9 without the spark gap points. This wheel has in its rim 9′, however, the air chamber 17 and on the side of said rim the hood-shaped vanes or buckets 20. The air for cooling the peripheral portion of the wheel passes outwardly through passages or perforations as 19′ in said rim, which passages or perforations communicate with the said chamber 17.

The box or casing 2 may have one or more peep-holes or sight-openings as 2′ by which the interior thereof can be inspected from time to time.

What I claim is:

1. In an apparatus of the class described, a rotary spark gap wheel having an air chamber and also having an inlet leading to and an outlet leading from said chamber, and spark gap rods coöperative with said wheel.

2. In an apparatus of the class described, a rotary spark gap wheel having an air chamber and also having an inlet leading to and an outlet leading from said chamber, and spark gap rods coöperative with said wheel, said spark gap rods being mounted for adjustment circumferentially of the wheel.

3. In an apparatus of the class described, a rotary spark gap wheel having an air chamber and also having an inlet leading to and an outlet leading from said chamber, and spark gap rods coöperative with said wheel, said spark gap rods being mounted for adjustment circumferentially of the wheel and being also longitudinally adjustable.

4. In an apparatus of the class described, a rotary spark gap wheel having an annular air circulating chamber, lateral inlets for the admission of air into said chamber, and outlets leading from the chamber to the periphery of the wheel, and spark gap rods coöperative with said wheel.

5. In an apparatus of the class described, a casing, a spark gap wheel rotatively mounted in the casing, the latter having an opening for the entrance of air thereto and the discharge of air therefrom, a fan independent of and rotative with the wheel, and spark gap rods coöperative with said wheel.

6. In an apparatus of the class described, a casing, a shaft rotatively supported by said casing within the same, a spark gap wheel carried by said shaft for rotation therewith, spark gap rods coöperative with the wheel, and a carrier for the spark gap rods, in said

casing, loosely supported by said shaft for angular adjustment.

7. In an apparatus of the class described, a casing, a spark gap wheel rotatively mounted in said casing, spark gap rods coöperative with the wheel, the casing having openings through which said rods extend, and a carrier for the rods, in said casing, said carrier being movably mounted to provide for the adjustment of the rods circumferentially of the wheel.

8. In an apparatus of the class described, a spark gap wheel having an air chamber, a port extending from the exterior of the wheel into said chamber, a passage leading from the chamber to the exterior of the wheel, and a vane on the wheel overlying the port.

9. In an apparatus of the class described, a casing, a rotary spark gap wheel in said casing having a chamber, and means independent of and rotative with the wheel for drawing air into the casing and said wheel having an air circulating chamber and also having an inlet for the entrance of air into said chamber.

10. In an apparatus of the class described, a casing, a rotary spark gap wheel in said casing having a chamber, and means rotative with the wheel for drawing air into the casing for circulation therethrough, said wheel being provided with peripheral points having passages through the same and communicating with said chamber.

11. A spark gap wheel having a chamber, a passage leading from the chamber to the interior of the wheel, a port leading from the exterior of the wheel to said chamber, and a vane overlying the entering end of said port.

12. A spark gap wheel having air collecting and compressing means, an air circulating chamber for receiving the air thus collected and compressed, and a passage leading from said chamber to the exterior of the wheel.

13. A rotary spark gap wheel, a shaft to support the said wheel, rods coöperative with the wheel, and a carrier for the rods supported for oscillation by the shaft to provide for the adjustment of the rods circumferentially of the wheel, said rods being adjustably supported by the carrier for movement toward and from the periphery of the wheel.

14. The combination of a spark gap wheel, a rotary shaft to which said wheel is fastened, a box supporting the shaft and inclosing the wheel, rods coöperative with said wheel, a carrier for the rods supported for oscillation by said shaft, and a fan in the box connected with said shaft for rotation therewith, the box having openings for the circulation of air therethrough.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WALTER W. MASSIE.

Witnesses:
L. E. HINCKLEY,
FRANKLIN D. FORD.