Sept. 13, 1949. W. B. SMITS 2,481,887

SPARK GAP AND LAMP

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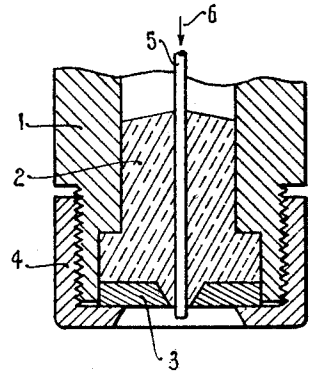


FIG.1

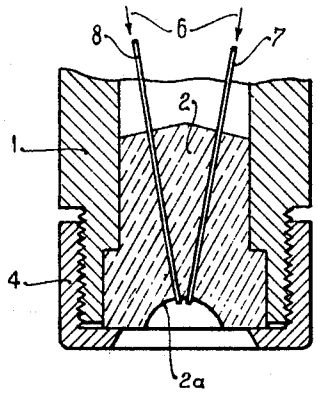


FIG.2

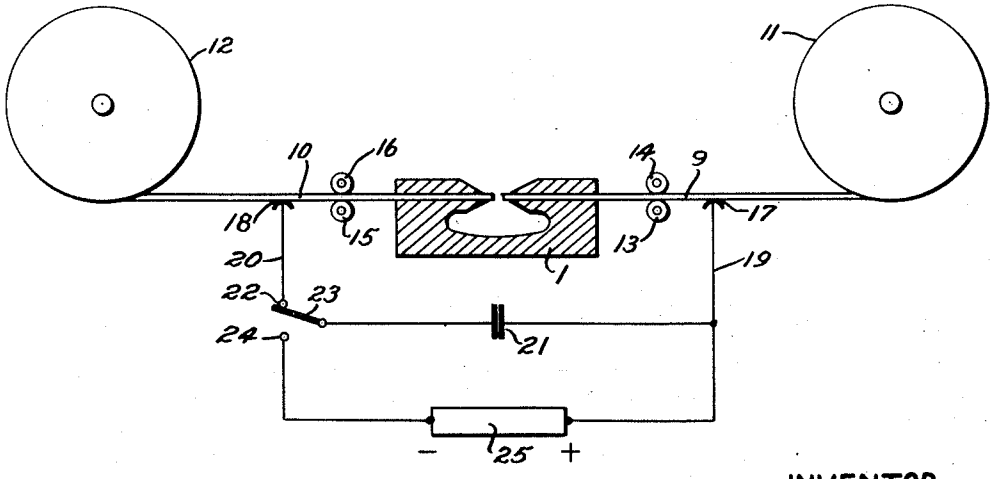


FIG.3

INVENTOR
WIJTZE BEYE SMITS
By Haselline Lake & Co
AGENTS

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SPARK GAP AND LAMP

Wijtze Beÿe Smits, Voorburg, Netherlands, assignor to Smitsvonk N. V., The Hague, Netherlands

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3 Claims. (Cl. 176—41)

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The invention relates to a spark gap for sparks generated by the discharge of a condenser and particularly to a spark gap for low tension and operating according to the sliding spark principle.

Generally the sparks produced by the discharge of a condenser are of very short duration and great intensity. They strongly affect the material of the electrodes of the spark gap. According to the invention this phenomenon is used to produce intensive igniting sparks or flames or to generate flashes of light of very short duration. The invention consists in this that at least one of the electrodes of the spark gap is adapted to be continuously or periodically moved towards the other electrode or electrodes and is formed of solid material, which is easily pulverized by the discharging sparks and, in pulverized condition, is easily ignited. Due to the combustion of the material of the electrodes a flame can be produced, which may be used for igniting purposes and, if the material to be pulverized and ignited is well selected, also for the production of light for photographic purposes, projection, stroboscopic measuring, etc. As inflammable material of the electrodes magnesium, copper, carbon, iron, mixtures of moulded and pressed powders of these substances or their alloys may be used. Apparently, also other metals or metal powders may be used.

The invention also relates to a lamp provided with a spark gap, in which, during operation, the material of at least one of the electrodes is periodically pulverized and ignited by a spark produced between the electrodes by the discharge of a condenser and continuously supplied by moving up said electrode. If the sparks are produced with a determined frequency such a lamp is adapted to be used for photographing moving or varying objects, projecting cinematographic films or stroboscopic measurings. When, for instance, for photographic purposes the material of the electrodes is selected right, the colour of the flame may be adjusted to the sensibility of the photographic material to be used.

In order that the invention may be better understood reference is made to the accompanying drawing, which illustrates by way of example several embodiments of the invention.

Fig. 1 is a sectional elevational view of a part of a spark gap.

Fig. 2 is a same view of a part of an otherwise constructed spark gap.

Fig. 3 is a sectional view of a third construction of the spark gap.

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In Fig. 1 of the drawing 1 designates a holder, 2 is an insert member of insulating or semi-conductive material, 3 is an annular electrode of refractory electrically conductive material and 4 is an annular screw member keeping the parts 2 and 3 assembled within the holder 1. Passed through a central boring of the insert member is a bar-shaped electrode 5 of magnesium or like material. Said electrode is continuously or periodically moved up in the direction of the arrow 6. However, this electrode may also be constructed as a tube through which a conductive liquid, pulpy or viscous inflammable substance is supplied. The annular electrode metallically contacts the holder 1. Said holder and the electrode 5 are inserted in the discharge circuit of a condenser (not shown), which is periodically loaded and thereupon discharged through the spark gap 3, 2, 5. The electrode is made of material, which can easily be pulverized and, when in pulverized condition, inflamed by the discharging spark.

The spark gap as shown in Fig. 2 is provided with two wire-shaped electrodes 7, 8 arranged at an angle and adapted to be moved towards each other. Both electrodes are made of material which can easily be pulverized and ignited. They may be made of the same material or of different materials. The ends of the electrodes closely approach each other at the bottom of a bowl-shaped recess 2a of the insert member 2.

The electrodes may be very thin and every time they may be projected such a length from the bottom of the recess 2a that the free ends of said electrodes are entirely pulverized by the discharging spark. In that case a source of light concentrated in a small spot is obtained in the recess 2a. Such a light is very suitable for projection purposes.

In the embodiment according to Figs. 1 and 2 a creep-path is formed upon the insulating or semi-conductive material between the electrodes. The products due to the decomposition of the electrodes deposit on the surface of the insert member and stimulate the generation of the discharging sparks.

In Fig. 3 the electrodes 9 and 10 are in mutual alignment and they are slidably mounted in a member 1 consisting of insulating material. In this embodiment the insulating member 1 is also provided with a bowl-shaped recess. The electrodes 9 and 10 which are preferably very thin wires, may be uncoiled, for example from drums 11 and 12, suitable means such as cooperating pairs of rollers 13, 14 and 15, 16 being provided to advance and guide the wires from the drums

into and through the requisite channels in body 1. The rollers 13, 14 and 15, 16 may be driven continuously or intermittently in any suitable manner not shown and of conventional construction.

The electrode wires 9 and 10 are in sliding contact at 17 and 18 with electric conductors 19 and 20. Conductor 19 for example is connected to one side of a condenser 21 and to one of the poles of a source of direct current voltage 25. The conductor 20 is connected to one of the fixed contacts 22 of a throw-over switch, the movable contact of which is connected to the other side of condenser 21. The other fixed contact 24 of the switch is connected to the other pole of the source 25. The switch is adapted to be periodically thrown over, for example twenty-four (24) times per second for normal cinematographic purposes, in order that the condenser 21 may be alternately loaded by the source and discharged through the electrodes across the gap.

Many other embodiments and shapes are possible within the scope of the invention. For instance, in Fig. 3 one of the electrodes may be stationary and be made of refractory material adapted to resist the destructive force of the sparks.

The spark gaps shown in the drawing may be used in lamps. They may also be used as spark plugs.

What I claim is:

1. A lamp for emitting light produced by electric sparks, comprising at least two electrodes having their active ends electrically separated to form a spark path, means adapted to move at least one of said electrodes towards the other, said movable electrode being made of a material easily atomized by the sparks and which, in atomized condition, is inflammable, a condenser, means for loading said condenser and means for periodically connecting the loaded condenser directly to the electrodes whereby said condenser is periodically discharged through said spark path.

2. A lamp as claimed in claim 1 including a body of insulating material having a bowl-shaped recess therein, the electrodes being mounted in the body with the active ends thereof protruding from the wall of the recess.

3. A lamp as claimed in claim 1 wherein at least the movable electrode comprises a thin conductive wire having a diameter of less than one millimeter.

WIJTZE BEŸE SMITS.

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The following references are of record in the file of this patent:

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