

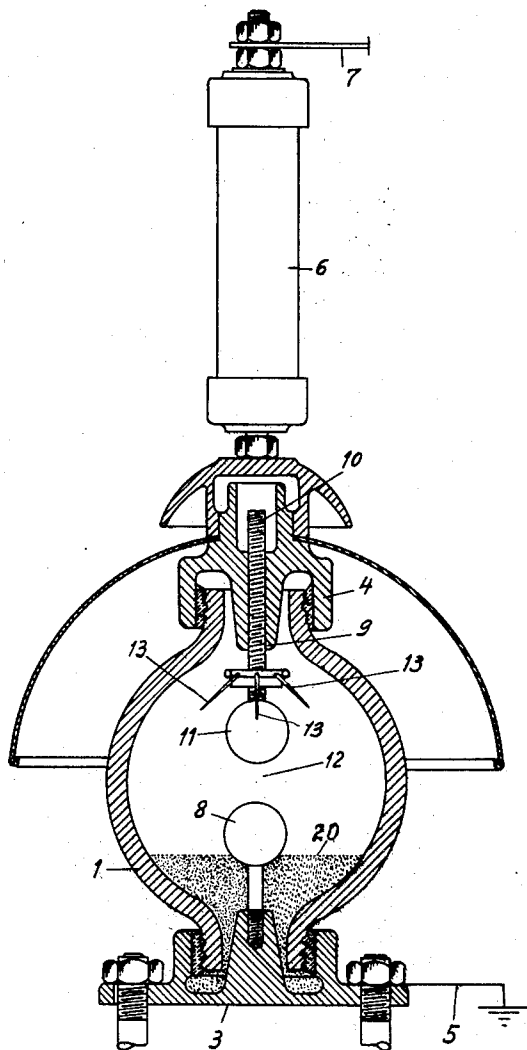
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SURGE PROTECTOR

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SURGE PROTECTOR

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1 Claim. (Cl. 250—27.5)

It is well known that a spark passing between two electrodes needs a certain time to attain the necessary voltage which time is extremely short. If the electromotive force raises quickly the spark is produced at a higher voltage, than if it raises but slowly.

The object of the invention is to effect improvements in surge protecting apparatus such as to cause a reduction of or to eliminate altogether the lag in the discharge of an electric spark.

I attain this and other objects as will be pointed out hereinafter by ionizing the gap through which the spark has to pass and to keep said space permanently ionized. The ionization that is the production of ions and electrons is effected by electrical means, for instance by discharging electrical energy either by auxiliary electrodes having points, edges etc. which under the effect of electric fields glow or spark or by incandescent bodies with or without oxide covering or else by photo-electric substances.

The place where the ionization is effected may be anywhere within the spark gap or outside thereof, at either of the electrodes or between them or quite separate therefrom. Means are provided to bring the ionization charge into the gap between the electrodes over which the spark has to pass. The shifting of the ionized charge to the place where the spark has to occur may be effected by diffusion by means of electric fields or with the aid of the electric wind generated at the points or by pressing, by sucking or by heating or by using the difference in the specific weights.

The accompanying drawing is an elevation partly in section of an apparatus constructed and arranged in accordance with this invention.

The apparatus shown comprises a container 1 of glass which is hermetically closed by a lower metallic support 3 and an upper cap 4, both support and cap are cemented to sockets of said container 1. The support 3 is connected to earth by wire 5 and the cap 4 is electrically connected over a resistance 6 to the line 7. In the support a ball shaped electrode 8 is fixed and in a boss 9 of the cap 4 the stem 10 of a second ball shaped electrode 11 is screwed. The gap 12 through

which the sparks have to pass may be varied in size by adjusting the electrode 11. On said stem 10 above the electrode 11 a circular row of sharply pointed needles 13 is arranged which are slightly inclined downward. Within the container 1 a substance 20 is arranged which absorbs and retains water, nitric acids etc. freely in such a manner that the air in the container 1 is perfectly dry. The electrodes do not oxidize. The container 1 may be partly evacuated or may be filled by any suitable gas, gas mixture, vapor etc. under any pressure. If any gas other than air is used only such gases are used which facilitate the pre-ionization and which by discharges do not change their behaviour materially. The absorbent material 20 keeps the gas or air space free of the products of decomposition for instance of nitric acid, and of water etc.

If current is on line 7 a discharge is effected over the needles 13 thereby the space within container 1 is ionized. The distance at which the electrodes 8 and 11 are placed corresponds to the voltage on the line. By the discharge over the needles 13 the space is pre-ionized and if a sudden increase of pressure occurs a spark will pass over the gap without any lag of time. The electrodes may be of any suitable metal or alloy. Instead of needles one or more sharp edged disks may be used as auxiliary electrodes.

What I wish to claim and secure by U. S. Letters Patent, is:—

Surge protecting apparatus comprising a pair of spherical electrodes arranged to form a spark gap therebetween, means to electrically connect one of said electrodes to the line to be protected, means to electrically connect the other electrode to earth, an auxiliary electrode, having a plurality of discharge points, adjustably connected to the first said electrode, said discharge points arranged concentrically with respect to and equidistant from the spark gap and active to preionize the spark gap and produce free space charges, a container in which the electrodes are hermetically contained, and absorbent material in the said container to dry the air therein.

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