P. B. SPOFFORD.

JUMP SPARK TESTER.

APPLICATION FILED FEB. 13, 1914.

1,187,670. Patented June 20, 1916.

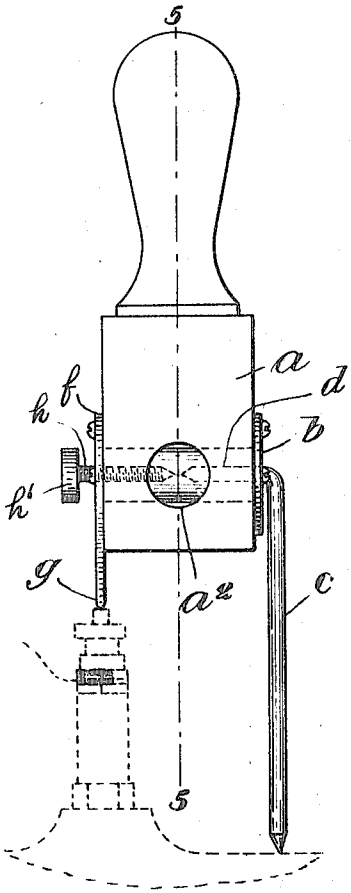


Fig. 1.

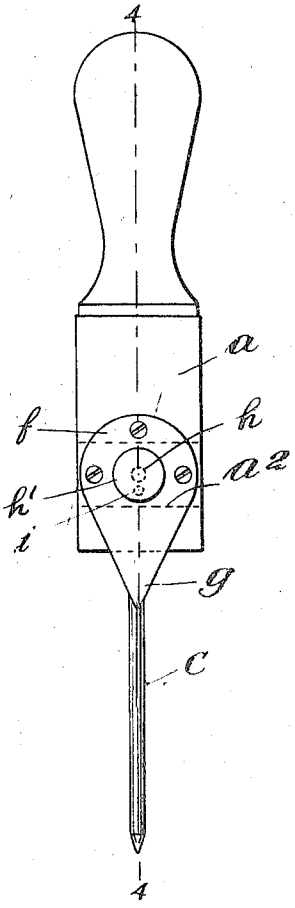


Fig. 2.

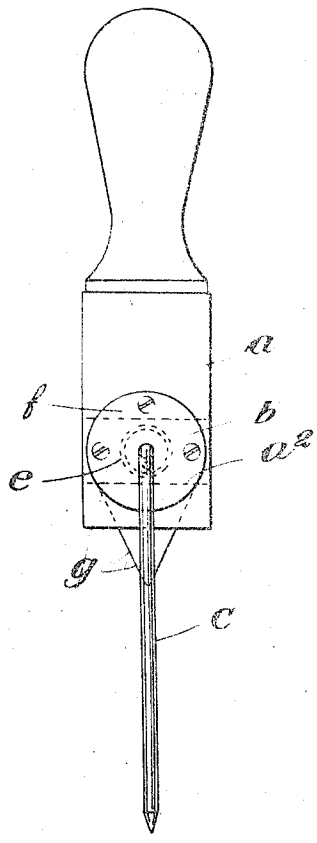


Fig. 3

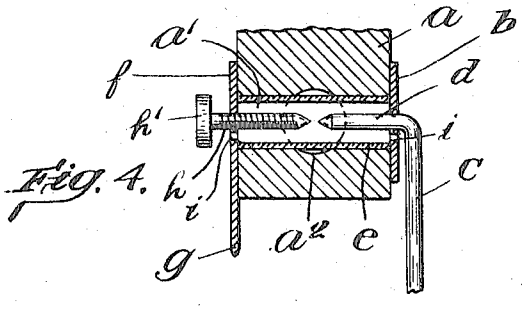


Fig. 4.

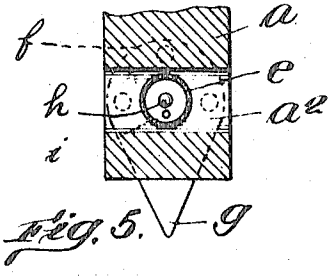


Fig. 5.

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UNITED STATES PATENT OFFICE.

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JUMP-SPARK TESTER.

1,187,670. Specification of Letters Patent. Patented June 20, 1916.

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To all whom it may concern:

Be it known that I, PERCY B. SPOFFORD, a citizen of the United States, residing at Haverhill, in the county of Essex and State of Massachusetts, have invented an Improvement in Jump-Spark Testers, of which the following is a specification.

This invention relates to certain improvements in devices known as jump spark testers, *i. e.*, devices which comprise a handle having two projecting contact arms, one of which is adapted to be placed on the spark plug terminal and the other grounded on the engine cylinder, said contact arms having terminals held in sufficiently close relation to provide a spark-gap across which the spark will jump, if a spark also jumps between the plug spark-points. In using said devices I have ascertained that they have but little practical value when used in the daytime, as it is difficult to see whether a spark is jumping between the terminals of the detector, or not. I have also ascertained that a spark will not jump the spark-gap under some conditions, as the gap is too wide, although the gap should be wide enough to cause a spark which may be readily seen.

The objects of my invention are to provide a detector of the above described type, with which the spark may be as readily seen, in bright sunlight, as in the dark, and which may be conveniently adapted to different conditions or strength of current.

I accomplish these objects by arranging the sparking terminals in an inclosed chamber formed within the handle and providing an aperture through a wall of the chamber, so arranged that the line of sight therethrough will be directed to the spark-gap, while the spark at this gap will be otherwise shielded from the light, so that the presence of the spark may be readily detected in daylight, and, further, by providing an adjustable sparking terminal on one of the contact arms which will enable the length of the spark-gap to be varied according to conditions.

For a more complete understanding of my invention reference is made to the accompanying drawings, in which,

Figures 1, 2 and 3 are elevations showing different sides of a device, made according to my invention. Fig. 4 is a detail sectional view on the line 4—4, of Fig. 2. Fig. 5 is a similar view on the line 5—5 of Fig. 1.

As shown in the drawing, the handle *a* has a square end-portion, or holder, to one side of which a plate *b* is secured. A conductor is mounted in said plate, said conductor comprising a contact arm *c* which extends longitudinally of the handle and a sparking terminal *d* which extends at right angles thereto into a cylindrically shaped chamber *a'* formed through the handle and lined with a glass tube *e*. One end of said chamber *a'* is closed by the plate *b* and the other end by a plate *f* and said plate *f* has a short arm *g* extending therefrom parallel to the arm *c*. The difference in length of said arms *c* and *g* is sufficient to enable them to be respectively placed in contact with the engine cylinder and the spark-plug terminal, as indicated in Fig. 1.

A sparking terminal, consisting of a pointed screw *h* is threaded in the plate *f*, in alinement with the terminal *d*, said screw having a head *h'* and being adapted to be adjusted, so that its pointed end may be moved into contact with the pointed end of the terminal *d*, or to within a short distance therefrom, to provide a spark-gap of suitable length therebetween, as shown in Figs. 1 and 4. The handle and holder *a* is of wood, or other insulating material, so that the contact arms and terminals are insulated from each other, and the handle is also protected from the terminals by the glass tube *e*.

If the ends of the glass tube *e* are tightly closed, so that the spark gap is located in an air-tight chamber, as has been the case with prior devices, the passage of the sparks will consume the oxygen of the air, so that either a partial vacuum will be created, or the amount of oxygen in the chamber will be so deficient that the spark will be practically invisible.

As in the construction, as thus far described, the plates *b* and *f* would tightly close the ends of the tube *e*, I avoid the difficulty above referred to, and insure a sufficient supply of oxygen to said tube, by providing one or more vent apertures *i* in said plates *b* and *f* in the portions thereof opposite the interior of said tube. Air may thus pass readily into said tube *e*, so that

sufficient oxygen will be supplied thereto to insure the formation of sparks at the terminals which will be sufficiently yellow to enable them to be readily observed. These apertures *i* are so arranged that they do not permit the passage of light directly to the spark gap.

To enable the spark at the spark gap to be observed, I provide the holder with a circular sight aperture a^2, which extends therethrough with its center line at right angles to the center line of the terminals *d* and *h* at the middle of the spark gap. As either end of this aperture a^2 may be readily closed, if necessary, by placing the finger thereover as it is held in the hand, it will be apparent that the spark at the spark gap will be shielded from the direct rays of light from all sides, except through the sight opening, so that the chamber will be practically, otherwise closed.

In use the device is placed in the position of Fig. 1, and, if the plug is sparking at its points, sparks will also pass across the spark-gap between the ends of the terminals *h* and *d*, and will be shielded from the outside light, so that they may be readily observed through either sight hole a^2 which may be used most conveniently.

By making the terminal *h* adjustable the length of the spark-gap may be varied to conform to currents of different strengths or conditions of use, which is very desirable, as these terminals should be separated far enough to enable the sparks to be readily seen and yet must not be separated so far that the spark will not readily jump the gap.

I claim:—

1. A jump-spark tester, comprising a holder of insulating material having a sight aperture therethrough, a transparent tube extending through said holder transversely of said sight aperture, metal plates connected to said holder and closing the ends of said tube, conductors mounted in said plates and extending oppositely within said tube, so that their ends are in sparking relation and contact arms extending from said plates beyond the holder, substantially as described.

2. A jump spark tester comprising an insulating holder having a transparent insulating tube extending therethrough, metal plates connected to said holder and closing the ends of said tube, and contact arms extending from said plates having sparking terminals within the tube, said plates having vent apertures leading to the interior of said tube and said holder having a sight aperture directed to the spark gap, and constructed otherwise to shield said spark gap from the direct rays of light thereto, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

PERCY B. SPOFFORD.

Witnesses:
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H. B. DAVIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."