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MOUNTING ASSEMBLY FOR A HIGH VOLTAGE GASEOUS DISCHARGE TUBE

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Fig. 1.

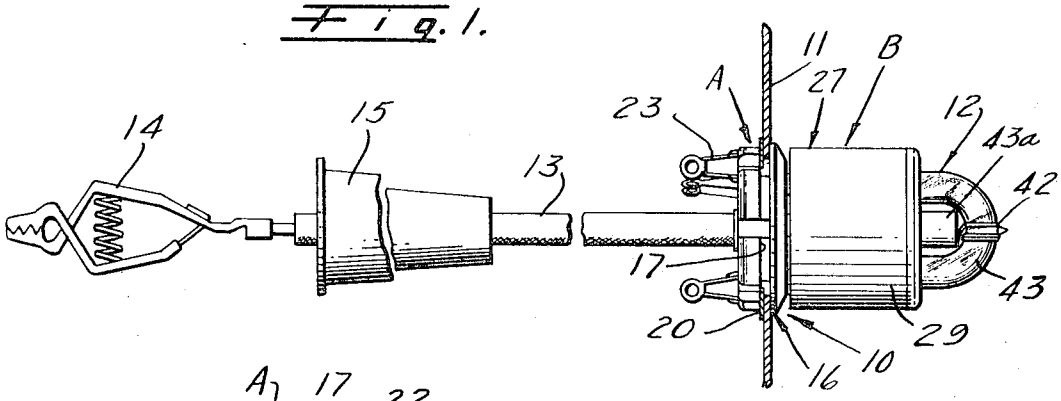


Fig. 2.

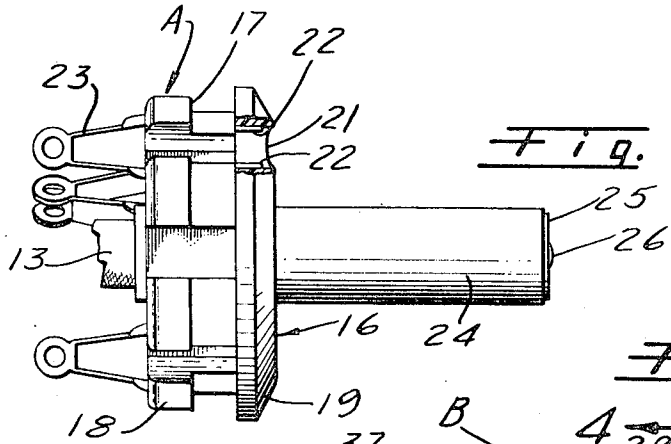


Fig. 3.

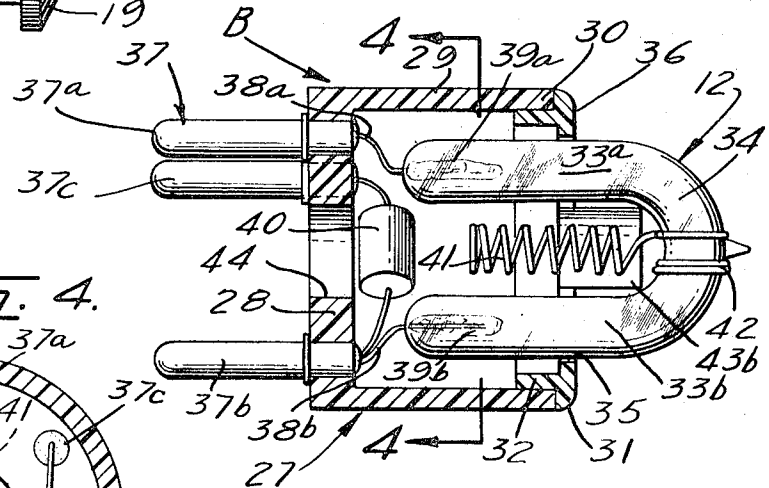
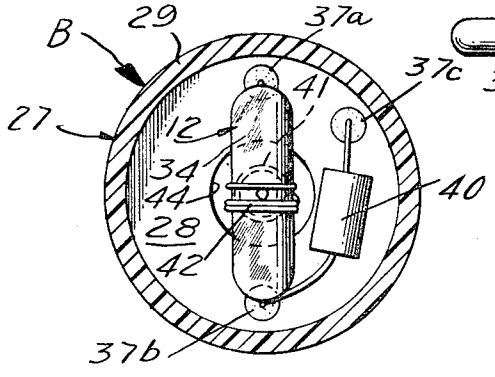


Fig. 4.



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MOUNTING ASSEMBLY FOR A HIGH VOLTAGE GASEOUS DISCHARGE TUBE

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ABSTRACT OF THE DISCLOSURE

A mounting structure for a pulse triggered gaseous discharge tube, which can be connected directly to a spark plug. A U-shaped tube is mounted in a hollow body with its U-shaped portion extending through a diametric slot in one end wall. A flexible conductor having an end portion encircling the bridging portion of the tube and having a coiled portion forming a compression spring extends through the slot into the interior of the hollow body. The other end wall of the hollow body has plug connectors adapted to enter sockets on a support which has a male connector adapted to enter the body and contact the compression spring portion of the triggering electrode, a high voltage cable connector being connected with the male connector.

The present invention relates generally to means for mounting gaseous discharge tubes, and is more particularly concerned with an improved combination plug-socket type mounting device for high voltage pulse triggered light sources.

Heretofore, high voltage pulse triggered light sources, such as the xenon tubes utilized in automobile ignition timing devices, have for the most part been fixedly mounted in a metal casing or on a panel by more or less make-shift-means in which it was difficult to provide suitable insulation to prevent subsequent arcing to ground. Such arrangements also make it very inconvenient, if not impossible, to replace the tubes in the field, and usually it was necessary to return the unit for factory replacement of the light source tubes.

With the foregoing inherent disadvantages in mind, it is one object of the present invention to provide an improved plug-socket type of mounting for high voltage pulse triggered light sources, which will permit tube changes and replacements to be quickly and easily made.

A further object is to provide a mounting of the above character which can be connected directly to a spark plug in the case of timing devices, and wherein the possibility of high voltage arcing to ground will be minimized and/or substantially eliminated.

Another object is to provide an improved base structure for a high voltage pulse triggered gaseous discharge tube, which embodies unique connections for the terminal and triggering electrodes of the tube.

Still another object is to provide in a high voltage pulse triggered gaseous discharge tube assembly, a base structure which incorporates a light reflecting surface.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.

Referring to the accompanying drawings, which are for illustrative purposes only:

FIG. 1 is a complete assembly of an ignition timing light arrangement embodying the present invention;

FIG. 2 is a side view of one part of the two-part mounting means of the present invention;

FIG. 3 is a sectional view of the other part of the two-part mounting means, including a longitudinal section to show the relationship of the tube and connected parts; and

FIG. 4 is a transverse sectional view taken substantially on line 4—4 of FIG. 3, certain of the parts being shown in full lines.

Referring more particularly to the drawings, for illustrative purposes, the present invention will be described in connection with an ignition timing device arrangement, although the invention is not to be limited to this particular use, since the invention is susceptible of general application.

As generally shown, the complete assembly in FIG. 1 includes a two-part mounting means as generally indicated at **10** consisting of a socket part A which is affixed to a support **11** which may be a panel or a cabinet wall or the like. A cooperatively connectible and disconnectible base part B supports a high voltage pulse triggered light source such as a xenon tube **12** which is arranged to be triggered through a triggering connection which includes a high tension cable **13**, this cable having one end associated with the socket part A and its other end connected with an alligator clip **14** by means of which the cable may be connected to a source of a triggering voltage such as the first spark plug of the engine which is to be timed. An insulating boot **15** is slidable on the cable into a position for insulating the clip.

As best shown in FIG. 2, the socket part A comprises a cylindrical body **16** of insulating material which is formed with a peripheral groove **17** that is bounded on one side by a peripheral flange **18** of slightly less diameter than a flange **19** on the opposite side of the groove. With this conventional construction, the socket part can be inserted endwise into a round opening in a panel member or a thin wall, as shown in FIG. 1, and retained in mounted position by means of a spring washer **20**.

The body is provided with the usual circumferentially spaced sockets each of which is of conventional construction with an axially extending passage which terminates in an entrance opening **21** in the flange **19**. Spaced contact members **22**—**22** are positioned on opposite sides of the passage, these contact members being electrically connected with a terminal connector **23** extending from the flange **18**. The sockets as thus formed provide female connection assemblies which are adapted to receive in each case a male plug member therein.

Centrally of the body **16**, there is mounted on elongate tubular member **24** of suitable insulating material, this member projecting outwardly from the flange **19** on the opposite side of the body from the terminal connectors **23**. A central passage (not shown) in the body **16** receives therethrough an end of the high tension cable **13**, this cable also extending into the tubular member **24** and having its central conductor connected with a contact washer **25** as by soldering as indicated at **26**. The high tension cable is thus anchored and electrically connected to a male terminal which is adapted to establish a triggering circuit with the xenon tube, as will hereinafter be further described, when the socket part A and base part B are interconnected in the manner shown in FIG. 1.

The base part B will now be described. This part, as best shown in FIGS. 3 and 4 comprises a cup-shaped body **27** formed of a suitable insulating material to provide an end wall **28** at the bottom of the cup and a cylindrical integrally formed wall **29** which extends outwardly therefrom and terminates in a brim **30** which defines an open end of the cup-shaped body. This end of the body has an end wall formed by a cap member **31** having an inner peripheral flange **32** adapted to fit within the brim of the body.

As shown in FIG. 3, the xenon tube **12** is U-shaped with parallel spaced legs **33***a* and **33***b* which are inter-

connected at one set of their corresponding ends by means of a bridging portion **34**. This tube is supported in the cap member **31** with its legs extending through a diametric slot **35** and in which the tube is so positioned that the bridging portion **34** will project outwardly of the end wall formed by the cap member **31** while the ends of the legs **33***a* and **33***b* will be positioned within the interior of the body. With the bridging portion **34** of the tube extending outwardly of the cap, the cap may be constructed of a suitable material or its outer surface **36** covered with a material so as to form a reflecting surface for the light flashes when the xenon tube is triggered.

The end wall **28** is provided with a plurality of plug connectors, as generally indicated at **37**. These connectors are of conventional construction and are anchored at their inner ends in the end wall **28**, the outer ends of the connectors being rounded and adapted to mate with the female socket contacts of the socket part A, when the socket part A and base part B are interconnected. Two of the plug connectors, for example connectors **37***a* and **37***b* are connected by conductors **38***a* and **38***b* respectively with terminal electrodes **39***a* and **39***b* of the tube. A surge resistor **40** is also mounted within the body member **27**, this resistor having one terminal connection with the plug connector **37***b*, and its other terminal connection with a third plug connector **37***c*.

A high voltage contact for establishing a triggering circuit for the tube is provided in the form of a compression coiled spring **41** which is positioned centrally of the cup-shaped body member **27** between the legs **33***a* and **33***b*, one end of this spring extending to the interior of the body through the slot **35**, while the other end extends beyond the cap member **31** where several turns are taken around the bridging portion **34** so as to form a trigger electrode **42**. For shielding the portion of the coiled spring outwardly of the cap member **31** on each side of the slot **35**, a pair of confronting arcuate side wings **43***a* and **43***b* are provided, these wings projecting from the end wall of the cap on opposite sides of the slot. The innermost end of the coiled spring **41** is positioned on the central axis of the body **27** in alignment with a central opening **44** in the end wall **28**, this opening being adapted to receive endwise therethrough the tubular member **24** of the socket part A, when the socket part A and base part B are interconnected into assembled relation. When so assembled, the outermost end of the tubular member **24** with the contact washer **25** thereon will be positioned and stabilized between the side wings **43***a* and **43***b*, with the washer **25** and the adjacent end of the spring **41** being engaged so as to form a triggering circuit connection between the high tension cable **13** and the trigger electrode **42**.

With the mounting arrangement of the present invention, it is a simple operation to replace a defective tube or interchange tubes simply by disconnecting the base part B from the socket part A. This operation is effective to disconnect the terminal electrode connections of the tube as well as the high voltage triggering circuit, and in no way disturbs the permanent mounting for the high tension cable **13** and its anchored position as determined by the socket part A. Subsequent arc over is thus prevented.

Various modifications may suggest themselves to those skilled in the art without departing from the spirit of our invention, and, hence, we do not wish to be restricted to the specific form shown or uses mentioned, except to the extent indicated in the appended claims.

We claim:

1. A mounting assembly for a high voltage gaseous discharge tube, comprising:

(a) a hollow body having end walls at its opposite ends;

(b) a U-shaped gaseous discharge tube supported by said body with its bridging portion positioned outwardly of one of said end walls and with its leg portions extending therethrough to the body interior, each of said leg portions having an end terminal connection;

(c) plug connectors supported in the other of said end walls and having ends extending outwardly therebeyond, each of said terminal connections being electrically connected to one of said plug connectors;

(d) means adapted to be secured to a support, said means including sockets for respectively receiving said plug connectors, and a male connector adapted to enter said body when the plug connectors are positioned in said sockets; and

(e) a triggering electrode on said tube having electrical connection with said male connector.

2. A mounting assembly according to claim **1**, including a high voltage cable connected with said male connector.

3. A mounting assembly according to claim **1**, wherein said male connector enters said body through an opening in the other of said end walls, and has its outer end positioned in an opening in said one of said end walls.

4. A two-part mounting means for a high voltage gaseous discharge tube, comprising:

(a) a first part including: means for anchoring said part to a panel structure, a projecting male contact member, and a plurality of socket connectors; and

(b) a second part releasably connectible into assembled relation with said first part, including: a gaseous discharge tube having a pair of terminal electrodes and a triggering electrode, and plug connectors respectively connected with said terminal electrodes, said plug connectors being adapted to respectively enter the socket connectors, and the male contact member being adapted to make electrical contact with said triggering electrode, when said first part and said second part are interconnected into assembled relation.

5. A mounting assembly for a high voltage gaseous discharge tube, comprising:

(a) a hollow body having end walls at its opposite ends, one of said walls having a diametric slot;

(b) a U-shaped gaseous discharge tube supported by said body with its bridging portion positioned outwardly of said one of said end walls and with its leg portions extending through said slot to the body interior, each of said leg portions having an end terminal connection;

(c) a flexible conductor having an end portion encircling the bridging portion of said tube to provide a high voltage triggering electrode, said conductor having a coiled portion forming a compression spring extending through said slot between the leg portions of said tube and having an inner free end positioned within the hollow body; and

(d) plug connectors supported in the other of said end walls and having ends extending outwardly therebeyond, each of said terminal connections being electrically connected to one of said plug connectors.

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U.S. Cl. X.R.

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