Aug. 8, 1939 P. W. BLACKBURN 2,168,861

STROBOSCOPIC LAMP

Filed June 30, 1934

Fig. 1.

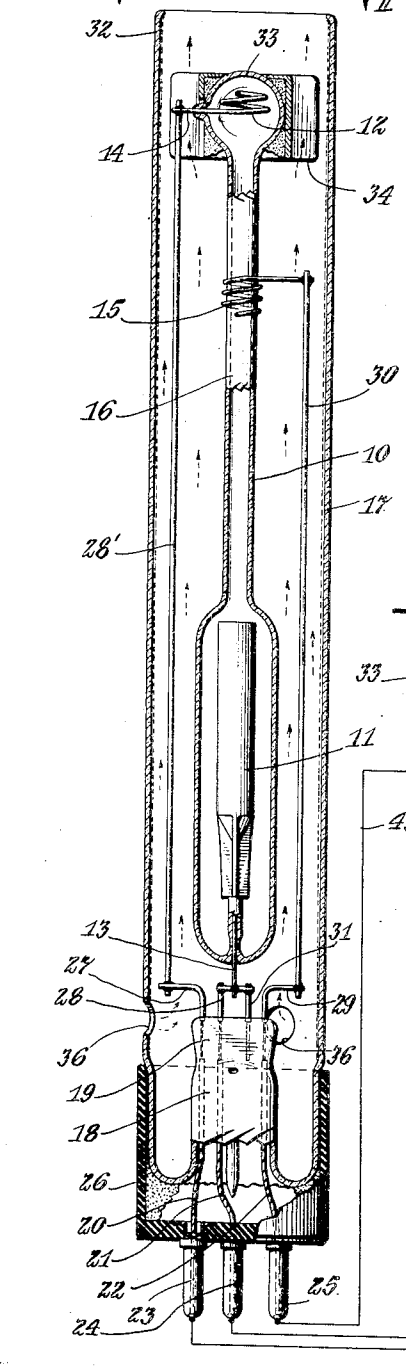


Fig. 2.

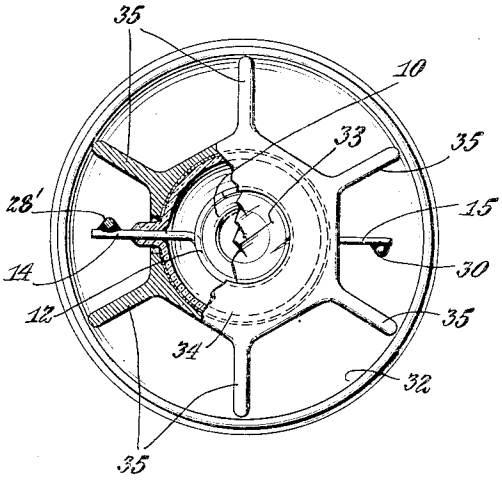
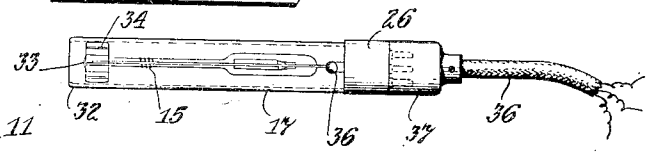
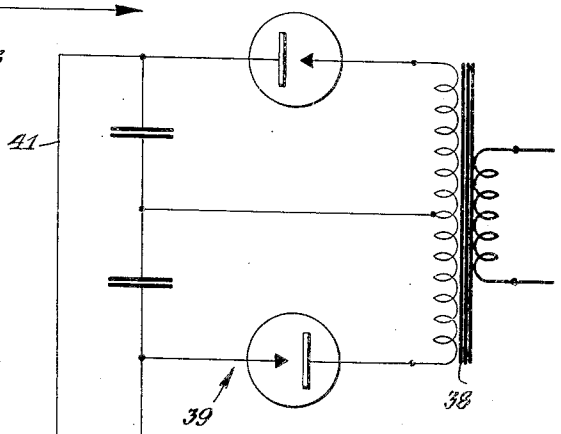


Fig. 3.





INVENTOR
P. W. BLACKBURN
BY M. F. Reges
ATTORNEY

Patented Aug. 8, 1939 2,168,861

UNITED STATES PATENT OFFICE

2,168,861

STROBOSCOPIC LAMP

Philip W. Blackburn, East Orange, N. J., assignor, by mesne assignments, to Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application June 30, 1934, Serial No. 733,156

8 Claims. (Cl. 176—122)

This invention relates to a discharge lamp and relates more particularly to a lamp for use where instantaneous flashes of intense illumination are desired.

It has been the practice in connection with stroboscopic devices to use a discharge lamp and by means of a suitable circuit including a condenser which is charged and suddenly discharged through the lamp by electronic means it has been possible to obtain a flash in less than ten millionths of a second. Such lamps, usually mercury vapor lamps, have been used and the flashes synchronized with the movement of the travelling object to be photographed or inspected. Recently it has been found of advantage to use a stroboscopic lamp in connection with the timing of an automobile engine. For this purpose a lamp is put in circuit with the spark and a mark is made on the fly wheel. The lamp is held to illuminate the fly wheel each time the mark appears and the position of the mark determines the relative operation of the spark.

It is an object of the present invention to provide a stroboscopic lamp of simple construction and capable of giving a beam of light of high intensity.

Another object of the invention is to provide a lamp operable at a pressure and voltage so selected as to cause the discharge to be achromatic when using a gas giving a monochromatic light at other voltages and pressures.

A further object of the invention is to provide a discharge lamp for the purpose described so supported and arranged as to facilitate the use thereof in directing a light beam.

A still further object of the invention is to provide a discharge lamp which may be conveniently handled to project a beam of light.

Another object of the invention is to provide a discharge lamp of tubular form arranged to give a concentrated beam of light from one end thereof.

An additional object of the invention is to provide a discharge lamp for producing a light column of high intensity and means for utilizing the said light to its greatest extent by permitting the same to pass through an end of said lamp.

Other objects and advantages of the invention will be more clearly understood from the following description together with the accompanying drawing in which

Fig. 1 is a side elevational view of the device constructed in accordance with the present invention and showing an operating circuit in diagram;

Fig. 2 is an enlarged view on line II—II in Fig. 1; and

Fig. 3 shows the device connected to the socket of a cable for use in directing a beam of light.

Although the present form of discharge lamp may be useful for various purposes, it is shown herein as used as a hand lamp to project a beam of light on a selected surface or object.

The disclosed embodiment of the invention may comprise a sealed envelope 10 having electrodes 11 and 12 supported on conductors sealed through the wall of the bulb. The electrode 11 is of tubular form and may be of the construction shown in co-pending application Serial No. 662,273 filed March 23, 1933, now Patent #2,029,013, dated January 28, 1936, and assigned to the present assignee.

This tubular electrode, disposed at one end of the envelope or bulb 10, is provided with a conductive support member 13 extending through the bulb wall. The electrode 12 is disposed at the other end of the envelope and may consist of a wire shaped to helical or spiral form to provide an annulus serving as an electrode and open to permit the passage of light. The electrode may be supported on a conductor 14 extending through the bulb wall.

The envelope is formed with a discharge chamber 16 of relatively small area in transverse cross section and with a relatively large chamber at each end to receive the electrodes 11 and 12. The electrode 12 may have an aperture with an inside diameter substantially the same as the inside diameter of the attenuated or discharge chamber 16. An exciter or trigger member for starting the discharge may consist of a coil 15 wrapped about the discharge chamber.

The discharge device is mounted in a casing 17 which may be glass painted or otherwise covered with an opaque material to prevent lateral emission of light rays. The casing may be provided with a reentrant tube 18 having a press 19 through which are sealed leading-in conductors 20, 21 and 22 connected with contact pins 23, 24 and 25 respectively on a base 26. The base may be secured to the casing by cement as in the manner common in the lamp art.

A support wire 27 extending from the press is connected to lead wire 20, another support wire 28 connects with lead wire 21 and support wire 29 connects with lead wire 22. The support wire 27 is connected by means of conductors 28' with conductor 14 of electrode 12. Support 28 connects with conductor 13 of electrode 11. An auxiliary

support member 31 serves to give rigidity to the structure.

The support wire 29 is connected with the trigger member 15 by a conductor 30. The end 32 of the casing is open for the passage of light emanating from the end 33 of the discharge tube. The tube may be held on the axial line of the casing 11 by spacer members 34 constructed with vanes or fins 35 for the dissipation of heat and aperture 36 may be provided so that a circulation of air may occur to keep the device cool.

With a device as above described it is possible to produce a high intensity column of light in the form of an attenuated discharge and by so constructing the device that the light is taken endwise a projected beam of light of high intensity is furnished.

It will be evident that the above described device may be handled, using the casing for a hand grip, and the light directed on a selected surface in much the same manner as when using a battery flash lamp. For the purpose of facilitating the use of the present device while connected to a cable 36 constituting flexible conductors of the circuit with which the lamp is used, a socket 37 is provided suitably attached to the cable and having apertures and contacts to receive the contact pins of the base 26.

As above diagrammatically shown, a circuit for operating the device may comprise a transformer 38 connected to a commercial line to provide a potential between electrodes 11 and 12.

Since it is necessary to use direct current between the electrodes any suitable rectifying means 39 may be employed and conductor 41 connects with lead 21 and a conductor 42 connects with lead wire 20. A potential is thus constantly impressed between the electrodes but not of sufficient strength to produce a discharge. A conductor 43 leading from a high frequency source, to be checked in conjunction with a moving body, connects with lead 22 of the trigger member 15.

A lamp of the above type may be made to give good results when the attenuated portion of the bulb is about one-quarter inch inside diameter and about twelve inches long. Neon gas may be used at a pressure of about 25 millimeters for operation at 800 to 1000 volts. An increase in the diameter of the tube requires an increase in pressure and a decrease in the length of the tubing also requires an increase in pressure.

It has been found that in order to obtain proper control a high voltage breakdown is necessary, otherwise the device becomes too sensitive and might operate without excitation by the trigger circuit.

One feature of this lamp is that a nearly white light results for illumination due to the high pressure of gas and high current density. In ordinary neon gas devices a red discharge is produced.

A small amount of mercury may be introduced with the neon which will give a blue discharge which is not so good for visual work but is better for photographic work.

It will be evident from the above that the present device not only provides a means for conveniently directing the light from a lamp of the discharge type but also operates to produce an extremely intense source of white light when using a gas such as neon which, under the usual operating conditions of a discharge lamp, gives a red or orange glow. The white light produced in the present lamp is particularly advantageous when the lamp is to be used for the visual inspection of a moving part.

Although a preferred embodiment of the invention is shown and described herein, it is to be understood that modifications may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. A discharge device comprising a tubular sealed envelope, an ionizable medium in said envelope, a vitreous casing, a press integral with said casing, a base at one end of said casing, a plurality of contact members on said base, electrodes in said envelope, lead wires extending from said press supporting said envelope and connected to said contacts, said casing having an opening at the other end thereof for the passage of light rays from an end of said envelope.

2. A discharge device comprising a tubular sealed envelope, an ionizable medium in said envelope, a vitreous casing having a reentrant tube, a base at one end of said casing, said base having a plurality of contact members, electrodes in said envelope, lead wires extending from said tube supporting said envelope and connected to said contacts, said casing having an opening at the other end thereof for the passage of light rays from an end of said envelope, a trigger element at one side of said envelope and a lead wire connecting said element to one of said contacts.

3. A discharge device comprising a tubular sealed envelope, an ionizable gas in said envelope, a tubular casing surrounding said envelope, a reentrant tube at one end of said casing, a press on said tube, a pair of electrodes in said envelope, lead wires connected with said electrodes and extending through said press, heat dissipating means for holding said envelope in spaced relation to said casing, said casing having an opening at the other end for the passage of light rays from an end of said envelope.

4. A discharge device comprising a tubular envelope, a pair of electrodes and an ionizable gas in said envelope, a casing enclosing said envelope, a base at one end of said casing, contact members on said base, lead wires connected with said electrodes and said contact members and heat dissipating spacer members for holding said envelope in fixed relation to said casing.

5. A discharge device comprising a sealed envelope, a gas in said envelope, an opaque casing therefor, a press and a base at one end of said casing, a plurality of contact members on said base, electrodes in said envelope, lead wires connected to said contact members and extending from said press for supporting said envelope, said casing having an opening at the end opposite said base for the passage of light rays.

6. A discharge device comprising an envelope, a gas in said envelope, an opaque casing therefor having a reentrant portion provided with a press, a base at the end of said casing adjacent said press, said base having a plurality of contact members, electrodes in said envelope, lead wires extending from said base, through said press, and supporting said envelope, said casing having an opening at the unbased end for the passage of light rays, a trigger element associated with an intermediate portion of said envelope, and a lead wire connecting said element to one of said contact members.

7. A discharge device comprising an envelope, a gas in said envelope, a casing surrounding said envelope, said casing having one end thereof formed re-entrant to provide a press, a pair of

electrodes in said envelope, lead wires extending through said press and connected to said electrodes, means extending from the end of said envelope remote from said press for holding it in spaced relation with respect to said casing, that portion of said casing adjacent, said spacing means being open for the passage of light rays from the end of said envelope.

8. A discharge device comprising an envelope, a pair of electrodes and a gaseous filling therein, a casing enclosing said envelope, said casing being provided with a base having contact members, lead wires extending from said contact members to said electrodes, and means extending from said envelope toward said casing for heat dissipating and spacing purposes.

PHILIP W. BLACKBURN.