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E. GERMER

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ELECTRIC DISCHARGE DEVICE

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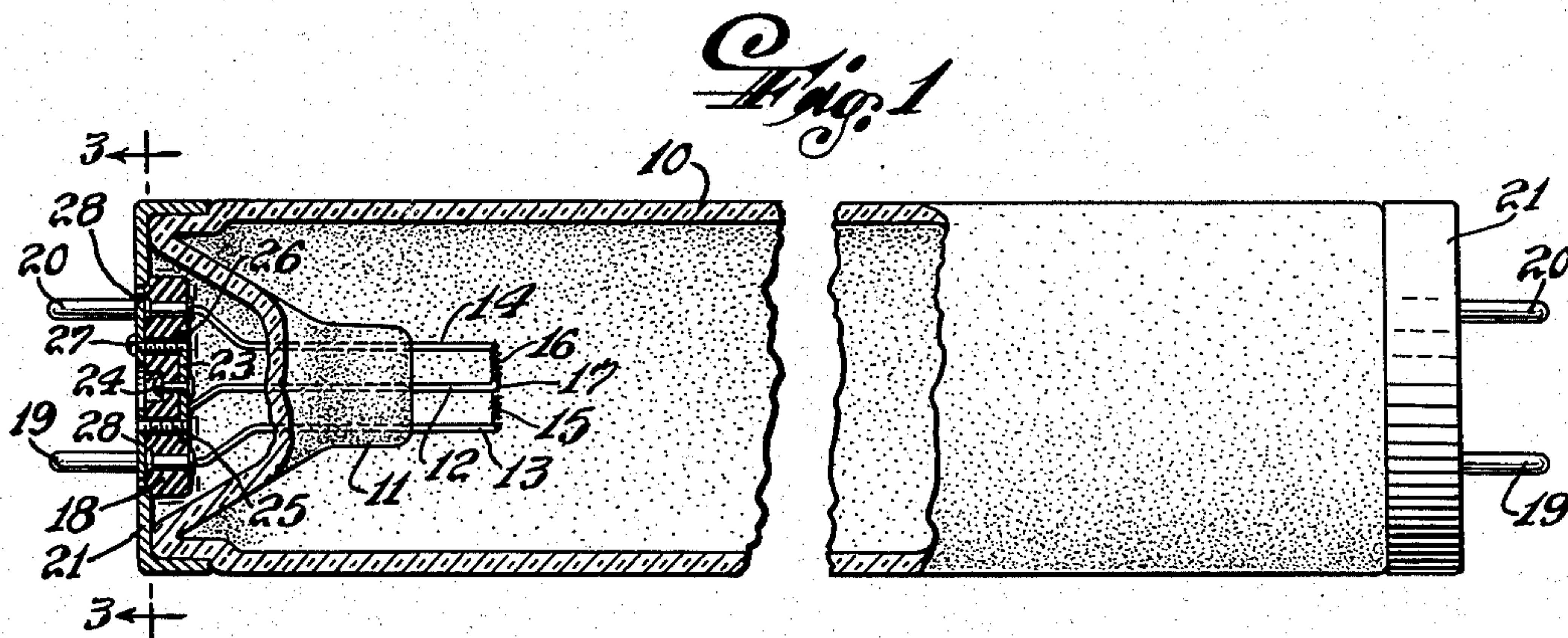


Fig. 2

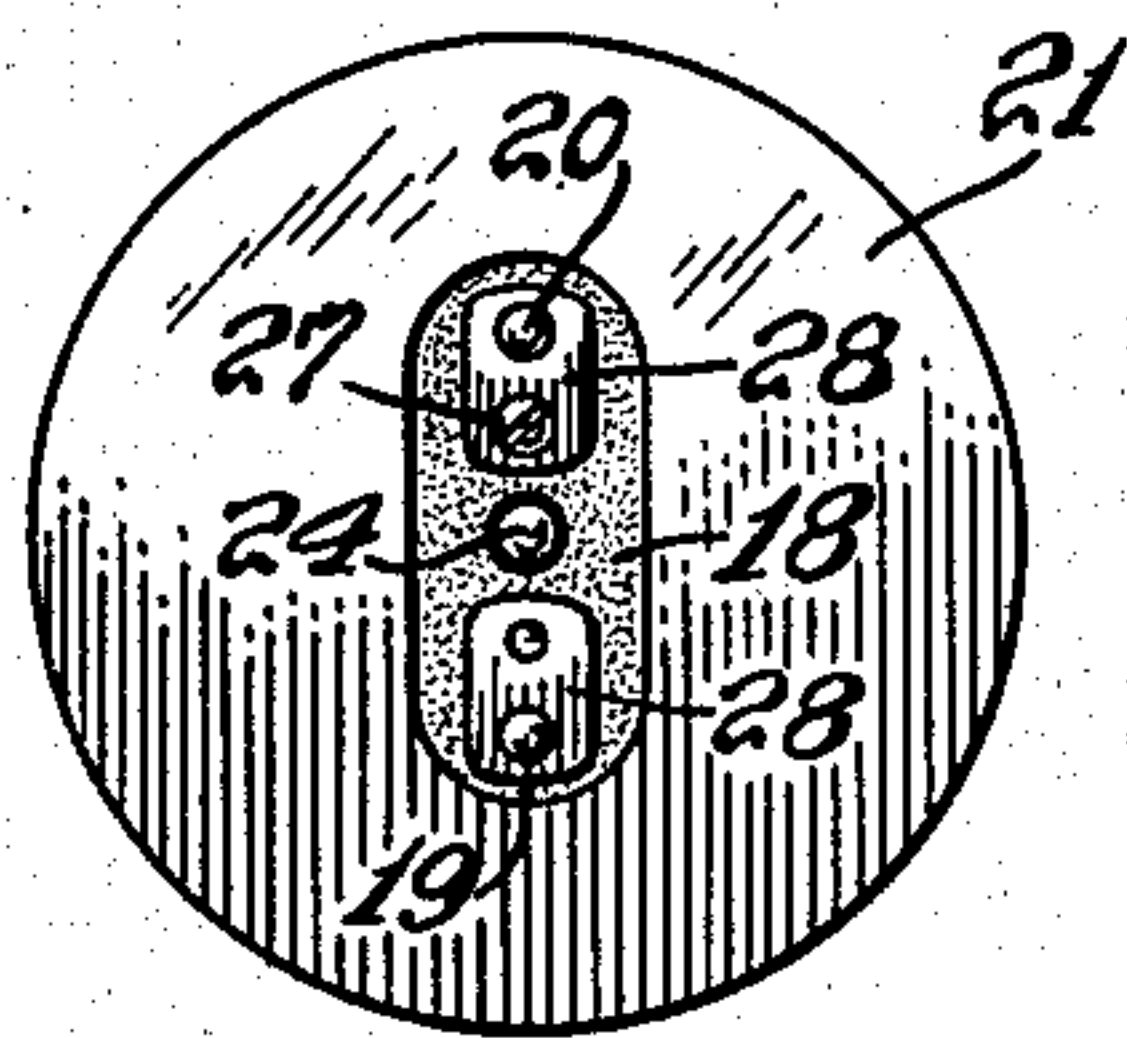


Fig. 3

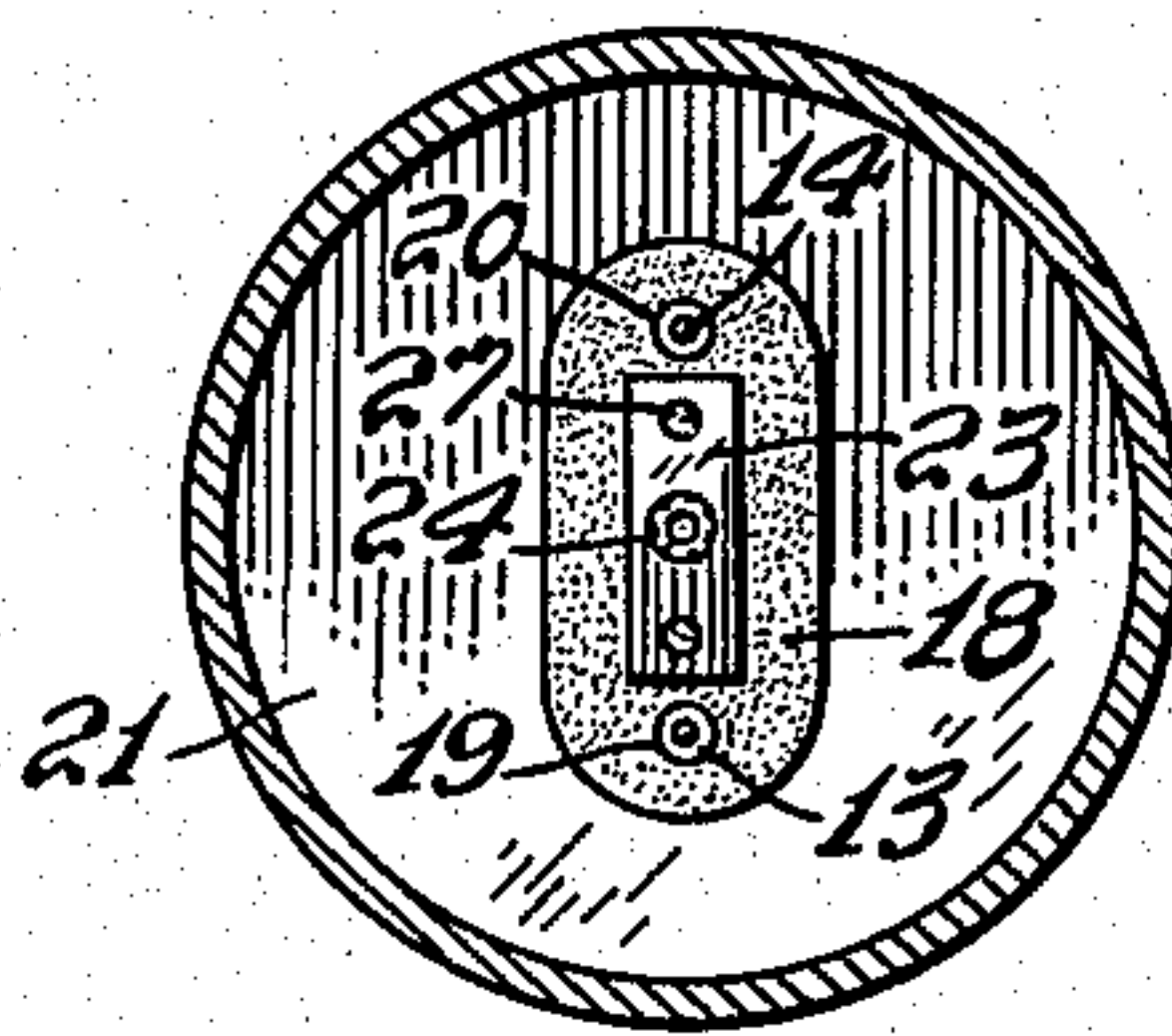


Fig. 5

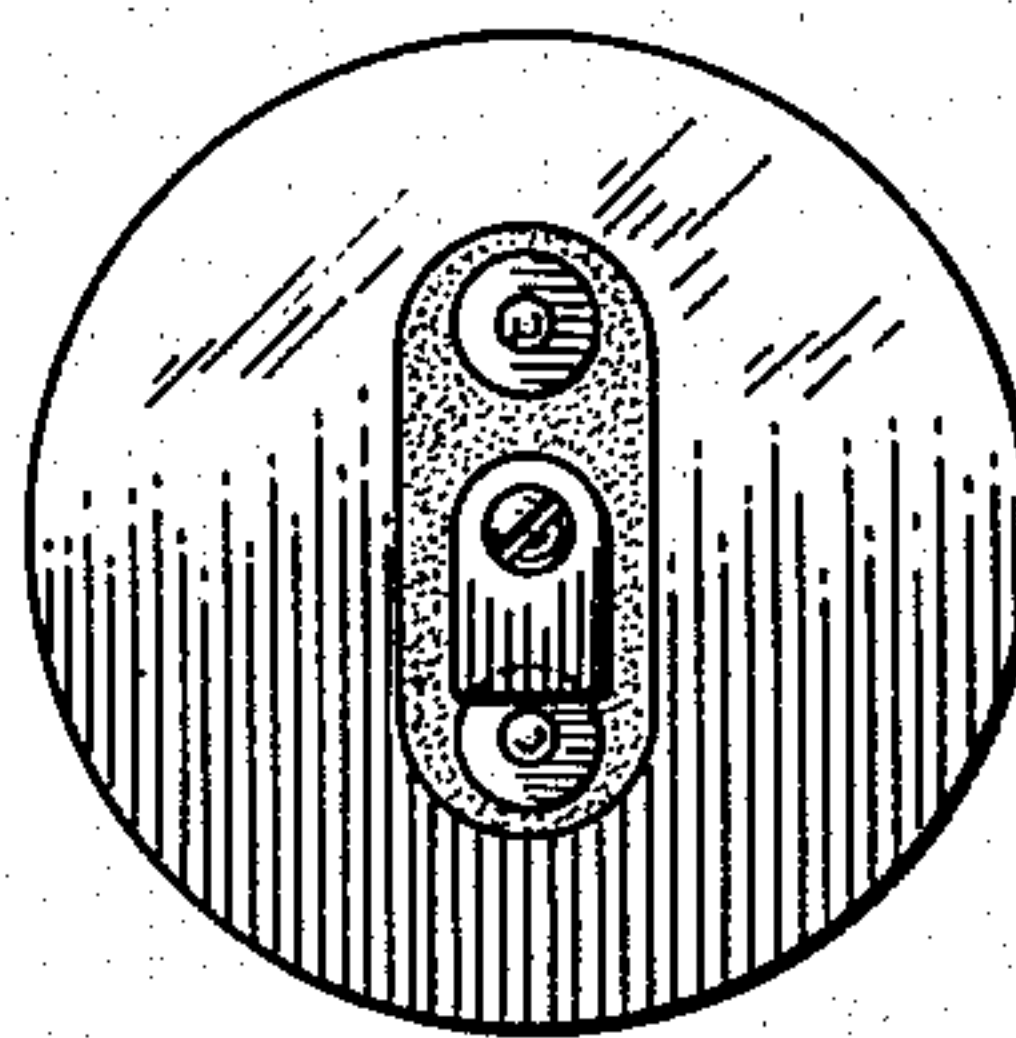


Fig. 4

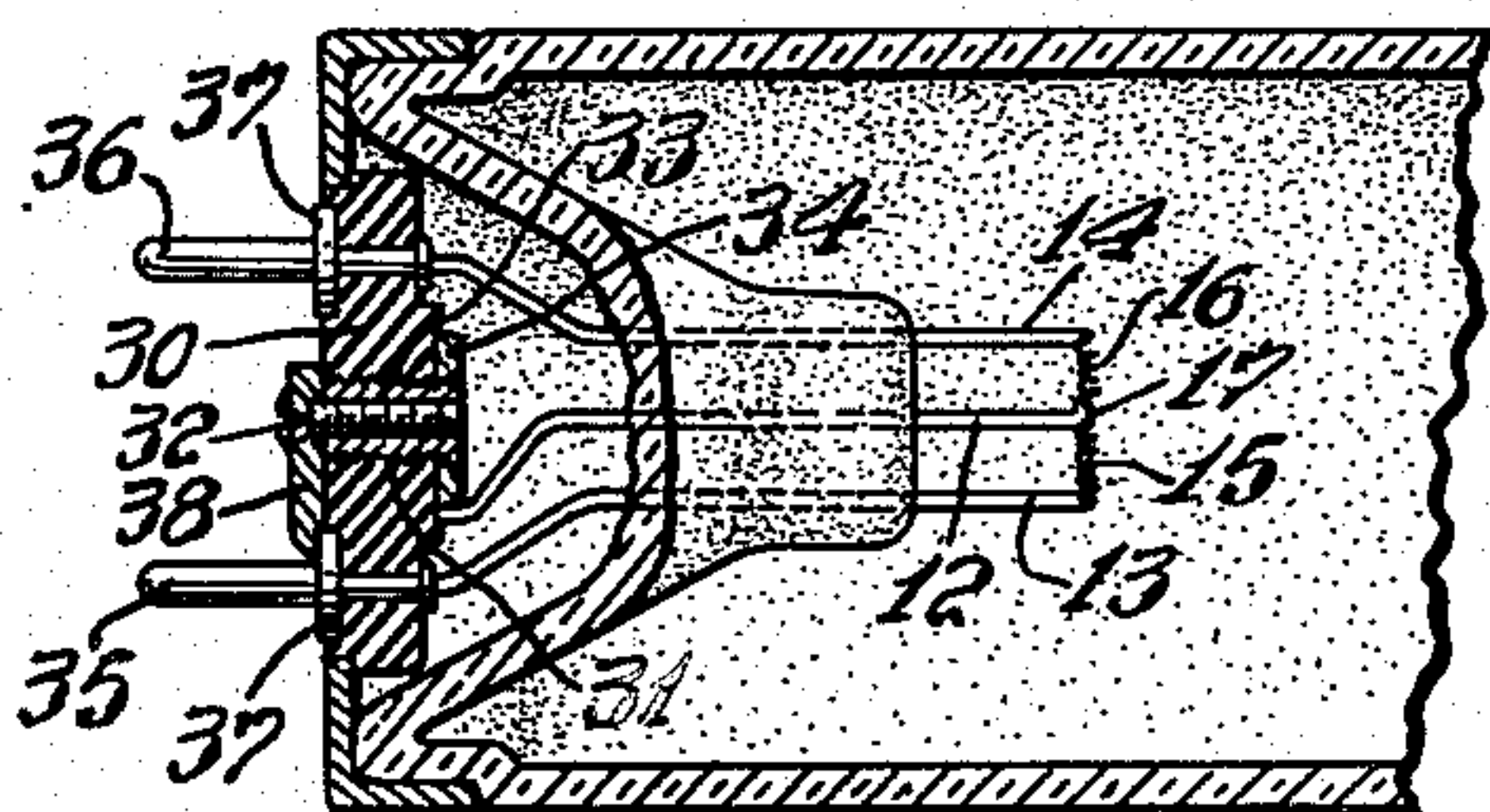
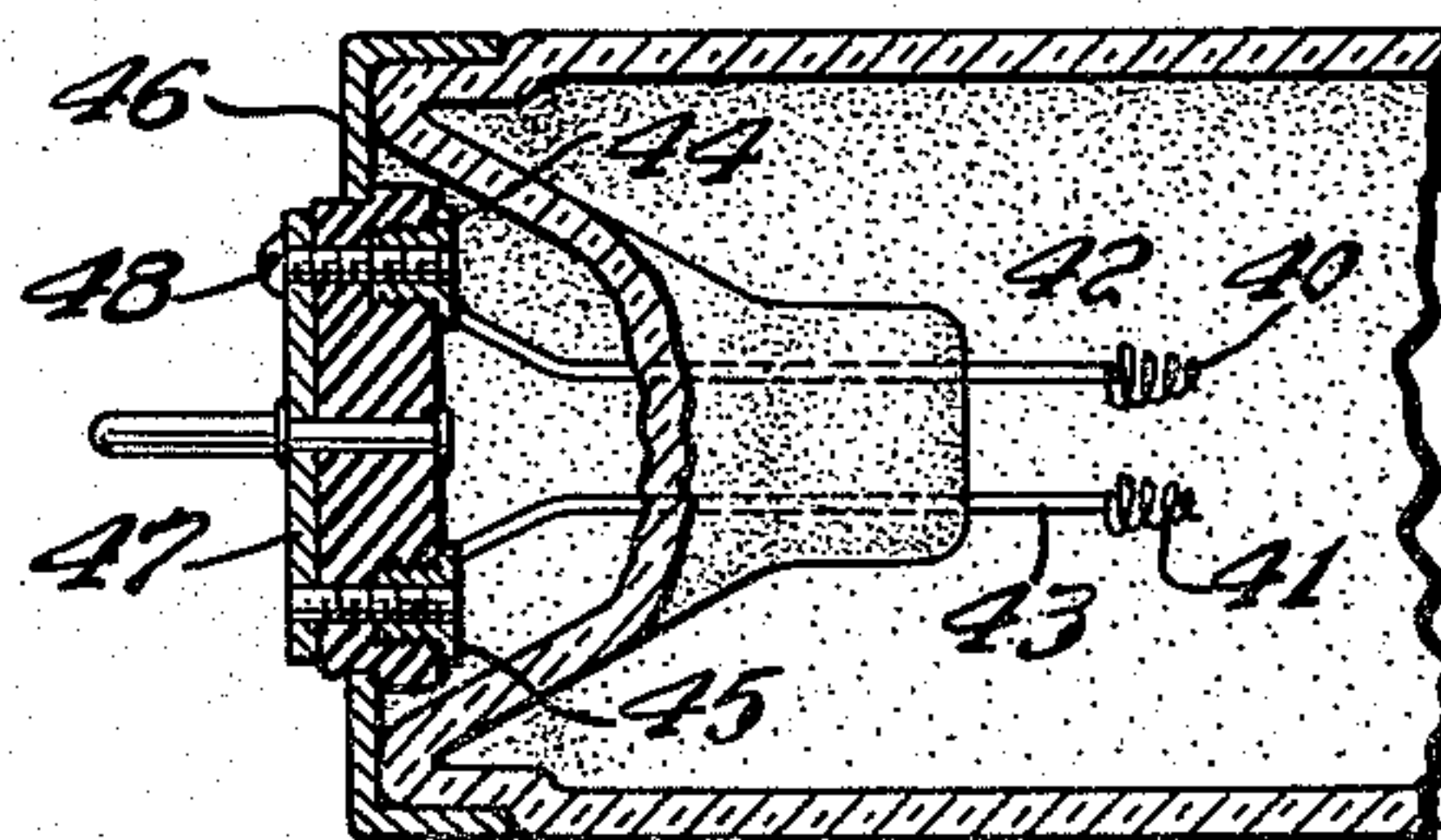


Fig. 6



INVENTOR.

Edmund Germer

BY

J. L. C. C. C.

ATTORNEY

UNITED STATES PATENT OFFICE

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ELECTRIC DISCHARGE DEVICE

Edmund Germer, Berlin-Wannsee, Germany, assignor to Hanovia Chemical & Manufacturing Co., Newark, N. J., a corporation of New Jersey

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1 Claim. (Cl. 313—236)

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This invention relates to electric discharge devices and is concerned in particular with arrangements for electrodes and terminals in such devices.

Electric discharge devices fail during operation usually because of failure of the electrodes or of a lead-in conductor connecting an electrode to a contact terminal of the device. The electrodes may become broken or when activated electrodes are used they may in time become inactivated, whereby the device can no longer function in the manner for which it was designed.

It is a general object of the invention to provide an electric discharge device having a substantially longer useful life than devices of such type manufactured heretofore. Another object is to provide a discharge device having the above stated advantage and yet is simple in construction and inexpensive to manufacture. A further object of the invention is to construct the new device in a manner whereby it may be employed in conjunction with already existing auxiliary equipment such as lamp sockets, reflectors, etc., without requiring alteration of such auxiliary equipment. Further objects and various advantages will appear from the following detailed description, taken in connection with the accompanying drawing in which:

Fig. 1 is a view, partly in section, of an electric discharge lamp constructed according to the invention;

Fig. 2 is an end view of the lamp shown in Fig. 1;

Fig. 3 is a cross-sectional view taken on the line 3—3 of Fig. 1 in the direction of the arrows;

Fig. 4 is a sectional view of an end portion of a modified form of a lamp constructed in accordance with the invention;

Fig. 5 is an end view of the lamp shown in Fig. 4; and

Fig. 6 is a sectional view of an end portion of still another form of a lamp according to the invention.

Like numerals designate corresponding parts throughout the several views of the drawing.

Broadly stated, the invention resides in the provision in a vapor discharge device of a plurality of electrodes and connecting them to the contact terminals of the device in a suitable manner, whereby upon failure of one electrode, or of a lead-in conductor, another electrode may be readily connected to the source of current and the device again be used as before the failure.

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Referring now to Fig. 1 of said drawing, there is illustrated a lamp, constructed in accordance with the invention, having an envelope 10 of light transmissive material. If the lamp is designed to emit ultra-violet rays, its envelope is formed of quartz or other ultra-violet transmissive material as is well understood by those skilled in the art. The lamp may be of the known fluorescent type, i. e. it may have a coating of fluorescent material on its inner surface for converting invisible radiations to visible light. The lamp is preferably filled with rare gas and contains a small amount of mercury or other vaporizable metal. Each end of the tubular envelope 10 is closed by a flared seal-stem 11 in known fashion.

Stem 11 has three lead-in conductors 12, 13 and 14 vacuum tightly sealed therein for supporting the two electrodes 15 and 16 within the envelope. The center conductor 12 is provided with a head 17 on its inner end which may be suitably formed by bending the end of the wire 12 as shown in the drawing. Electrode 15 is fastened to the end of wire conductor 13 and to the head 17 while electrode 16 is connected between head 17 and conductor 14. The head 17 separates the two electrodes so that heat from one of them will not be directly conducted to the other during operation of the lamp. Electrodes 15 and 16 may be of the known activated or non-activated types depending on the use for which the lamp is designed.

A block 18 of electrically non-conductive material and having two terminal pins 19 and 20 attached, is supported on the end of the envelope 10 by means of the flanged sleeve 21. Sleeve 21 may be of metal or of non-conductive material. If it is formed of non-conductive material such as of a molded plastic, the block 18 may be made integral with the sleeve 21 to form an end cap in a single piece. The lead-in conductors 13 and 14 are electrically connected to the terminal pins 19 and 20 respectively.

The center conductor 12 is connected to a metal plate 23 which is supported on the inside of the block 18 in a suitable manner as with the rivet 24. The plate 23 is provided with a hole in each end thereof as shown at 25 and 26. The block 18 is also provided with holes aligned with the holes 25 and 26. The holes in the plate 23 are threaded to accommodate a screw 27 that extends through the block 18.

Terminal pins 19 and 20 are each provided with a washer type plate 28 that extends over the nearest of the holes in the block 18. Each

of said plates 28 is provided with a hole aligned with the corresponding holes in the block 18 and the plate 23.

When the lamp is connected into an electric circuit and with the parts arranged as shown in Fig. 1, current will pass from the terminal pin 20 to the terminal pin 19 through the plate 28, screw 27, plate 23, lead-in conductor 12, electrode 15 and lead-in conductor 13, whereby the electrode 15 will become heated and in a short time will cause an arc to form between it and an electrode located in the opposite end of the lamp. The electrode 16 is, of course, in parallel with the circuit just described, but it will not become energized due to its greater resistance than the lead-in conductor 12 which constitutes the other arm of the parallel circuit.

When the electrode 15 fails for any reason as by being burned out or by becoming inactivated, if originally activated, it may be easily disconnected from the circuit by merely removing the screw 27 from the position illustrated in Fig. 1, and inserting it in the aligned holes adjacent to the terminal pin 19, whereby current will then pass between the terminal pins to the electrode 16 through the conductors 12 and 14.

Each of the electrodes 15 and 16 are located nearer to the axis of the tubular envelope by bending the inner portion of the center lead-in conductor 12 out of the plane of the conductors 13 and 14, whereby the electrodes lie substantially side by side, rather than in an end to end relation.

Referring now to the modification illustrated in Figures 4 and 5 the block 30, which corresponds in function to the block 18 described above, is provided with a single hole 31 rather than with two holes as shown in Fig. 1, to accommodate the screw 32. The screw 32 is held in the block 30 by means of the internally threaded tubular insert 33 that fits tightly into the hole 31 and is flared over on its end to hold the plate 34 against the wall of the block. The lead-in conductors 12, 13, and 14 are connected to the plate 34 and terminal pins 35 and 36 similarly as explained in the description of the embodiment of Fig. 1. Each of the terminal pins 35 and 36 is provided with a washer 37. The screw 31 holds a metal bar 38 or the like against one of the washers 37 to establish a closed circuit between one of the terminal pins (pin 35 in Fig. 4) and the center lead-in conductor 12. By this construction it is seen that first one and then the second of the electrodes may be energized by merely rotating the bar 38 on the screw 31 to contact first one and then the other of the washers 37 that are in electrical contact with the terminal pins 35 and 36.

The invention is also adapted for use in devices employing self-heated electrodes. Such devices require only one terminal pin on the end of the lamp, the pin being connected by a single lead-in conductor to an electrode. The modification illustrated in Fig. 6, shows a portion of a lamp constructed in accordance with the invention, and employing self-heated electrodes. Referring to Fig. 6, electrodes 40 and 41 are supported on the lead-in conductors 42 and 43, respectively, which in turn are connected to the

sockets 44 and 45 respectively, in the end cap 46. A plate 47 is suitably mounted on the outside of the cap and has a hole near each end thereof aligned with holes in the cap and the sockets 44 and 45. Electrical contact is made with either of the electrodes 40 and 41 by means of the screw 48 that forms a connection between the plate 47 and one of the sockets 44 and 45, depending on which of the electrodes is to be energized.

It has been proposed heretofore to construct radio tubes, X-ray tubes, and incandescent lamps with supplementary filaments which could be connected in circuit upon failure of the first used filament. This, to my knowledge, has not, however, been done heretofore with electric discharge devices, and it has not been accomplished with the simplicity and effectiveness that characterize this invention.

While I have described the invention more specifically with reference to a mercury or other vapor lamp, which may be a low pressure lamp, e. g. a germicidal or fluorescent lamp, or a high pressure lamp, it will be noted that the invention is equally applicable to other types of electric discharge devices having a gaseous or metal vapor filling, or both.

The foregoing disclosure is to be regarded as descriptive and illustrative only and not as restrictive or limitative of the invention, of which obviously an embodiment may be constructed without departing from the general scope herein indicated and denoted in the appended claim.

What I claim is:

In an electric discharge device including a tubular envelope of vitreous material, each end of said envelope having two electrodes therein, said electrodes having lead-in conductors extending therefrom, the combination therewith of a flared seal stem formed at each end of said envelope, said lead-in conductors being vacuum tightly sealed in said stem, end cap members closely fitting each outer end of said envelope, an electrically non-conductive block member fitted within each end cap member, an electrically conductive plate affixed to the outside of said block member, the plate and block member having a terminal pin extending therethrough, an electrically conducting socket means in said block member electrically insulated from the plate, said socket means comprising two metallic plug members spacedly mounted in said block and extending only partially through said block and having one lead-in conductor affixed to each member, threaded aligned holes extending through the plate and block to each of said members, an electrical switching contact means comprising an electrically conductive screw adapted to be alternately inserted into one of said holes to electrically connect a lead-in conductor to the pin.

EDMUND GERMER.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,411,679	Cox	Nov. 26, 1946
2,513,091	Frohock	June 27, 1950