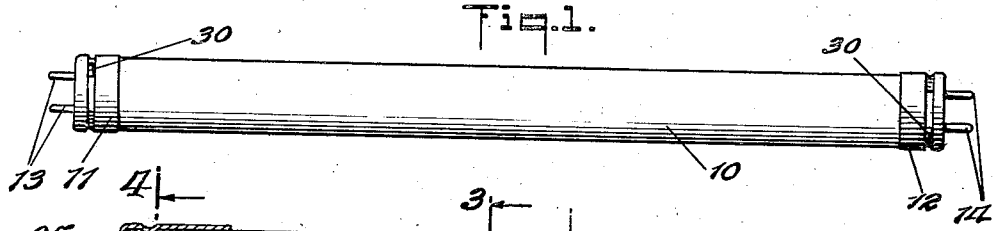
Nov. 26, 1946. J. L. COX ET AL 2,411,679

FLUORESCENT LAMP

Filed March 31, 1945

Fig. 1.



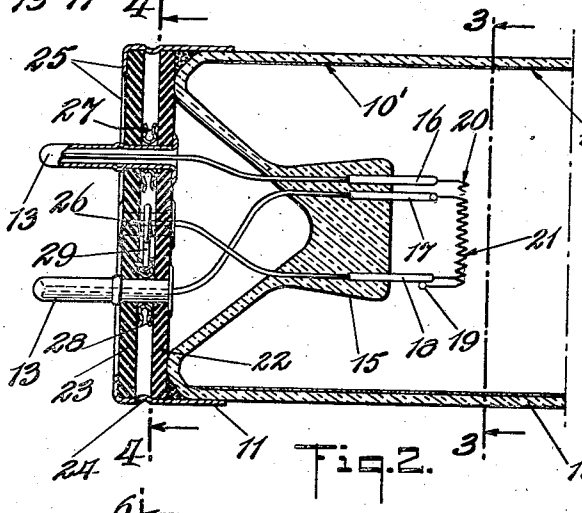


Fig. 2.

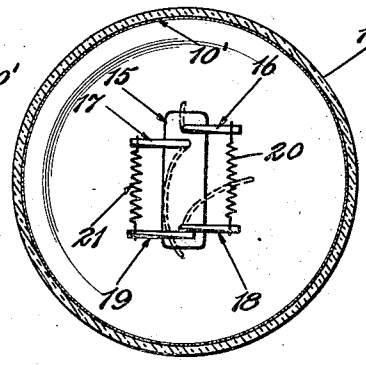


Fig. 3.

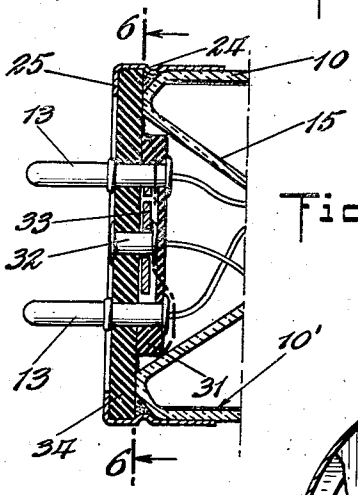


Fig. 5.

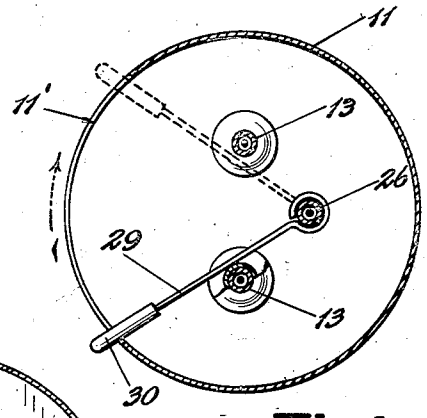


Fig. 4.

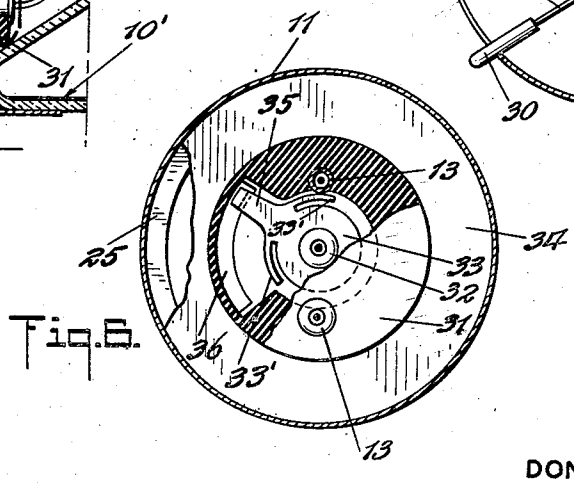


Fig. 6.

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Patented Nov. 26, 1946

2,411,679

UNITED STATES PATENT OFFICE

2,411,679

FLUORESCENT LAMP

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Application March 31, 1945, Serial No. 585,918

1 Claim. (Cl. 315—65)

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This invention relates to electron discharge devices especially of the type employed as luminous sources, as for example fluorescent lamps.

A broad object of the invention is to provide structural features whereby the life of such devices is greatly increased.

A more specific object of this invention is to provide duplicate electrodes, as for example in a fluorescent lamp duplicate cathodes at each end thereof, and built-in switching devices, whereby one cathode at each end is rendered inoperative while the other is operative until its useful life ends, whereupon by means of the switching devices the previously inoperative cathodes are rendered operative and the operative cathodes inoperative.

Other and more detailed objects of the invention will be apparent from the following disclosure of several embodiments thereof as illustrated in the attached drawing.

This invention resides substantially in the combination, construction, arrangement and relative location of parts, all as will be described in detail below.

In the accompanying drawing,

Figure 1 is an elevational view of a fluorescent lamp employing the features of this invention;

Figure 2 is an enlarged longitudinal, central, cross-sectional view through one end thereof;

Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 2;

Figure 5 is a cross-sectional view similar to that of Figure 2 of a modified structure in accordance with this invention; and

Figure 6 is a cross-sectional view taken on the line 6—6 of Figure 5.

In the operation of electron discharge devices generally, and as luminous sources more particularly, as for example in fluorescent lamps, it is common to provide cathodes having electron emissive coatings thereon. The life of such devices is in a large measure determined by the life of the coating which when it becomes exhausted terminates the useful life of the entire device. In the case of fluorescent lamps, the phosphors employed in the luminescent coatings have a very long life, and hence are far from exhausted when the cathodes wear out. In other words, except for the cathodes all fluorescent lamps when worn out as a light source are still capable of extensive continued use.

An object of this invention is to provide a simple, practical and inexpensive structure by

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means of which the life of such devices may be doubled by providing two or more cathodes at each end thereof and a switching mechanism for successively rendering the cathodes active as the previously active cathode becomes exhausted by reason of the deterioration of the emissive coating to a point of no further utility.

In the modification illustrated in Figures 1 to 4 inclusive, a fluorescent lamp has been illustrated comprising the usual glass tube 10, having a fluorescent coating 10' on the interior wall thereof in the usual manner. Structurally each end of the tube is the same, so that the illustration in Figure 2 can be taken as representative of either end thereof. The cylindrical glass tube 10 is sealed at its ends by means of the re-entrant press 15 in which is molded in gastight relation the cathode supports 16, 17 and 18. As illustrated the support 18 has welded or otherwise attached thereto a transversely extending supporting arm 19. Between the supports 16 and 18 is mounted the cathode 20, and similarly the cathode 21 is mounted between the supports 17 and 19. The structure of the cathodes themselves forms no part of this invention and should be in accordance with any of the accepted practices in the electron discharge devices art. The cathodes are, of course, conductively as well as mechanically attached to these supports and are provided with the usual coating or coatings of electron emissive materials, all in accordance with common practice in this art.

Mounted on each end of the cylindrical tube 10 is a cap or base 11 attached thereto, as is usual by means of some form of cement. In the case of the structure under discussion the base 11 in each case comprises a metal cylinder in which is supported in spaced relation by means of the bead 24 and the flange 25, a pair of discs 22 and 23 of insulating material. Mounted on the insulating base thus formed are the terminal or contact pins 13 which are shown eyeletted in place. At the center of the discs is a metallic eyelet 26 upon which is rotatively mounted the switch arm 29 having an insulating handle 30. Mounted on the pins 13 between the discs 22 and 23 are the contacts 27 and 28 of any suitable form for frictionally engaging and holding the switch arm 29. The operating handle 30 projects a short distance exteriorly of the base 11 through a slot 11' formed therein. For emphasis it is again noted that the construction at each end of the lamp is the same. As is clearly illustrated in Figure 3, support 16 is connected by conductor to the upper pin 13, support 17 is connected to the lower pin 13, and sup-

port 18 which is the common support for each of the ends of the two cathodes is connected by a wire to the eyelet 23.

It will be seen then that when the eyelet engages in one of the contact spring clips 27 and 28 one of the cathodes is short circuited. As illustrated, the switch blade 29 engages the clip 28 so that the cathode 21 is short circuited, placing cathode 20 in operative condition. When the coating of the operative pair of cathodes has become exhausted for any useful purpose, as is usually indicated by "end blackening" of the tube, the switch blades 29 at both ends of the lamp are thrown over to their opposite position so as to engage the contact clips 27. As a result the previously short circuited cathodes 21 are open circuited and rendered operative, while the previously operative cathodes 20 are short circuited and rendered inoperative. The new cathodes 21 with their fresh coatings are then used until they are exhausted, resulting in approximately a double life for the lamp in view of the fact that except for a minor reduction in efficiency, as is well understood in the art, the fluorescent coating remains entirely useful.

An important feature of this invention is presented by the fact that the lamps may be placed in the sockets commonly used with them in such manner as to leave the switch handles 30 exposed so that the switchover described above can be effected without taking the lamp out of its fixture.

Figures 5 and 6 disclose a modified switching arrangement for accomplishing the same result. In this case, the base 11 is provided with a bead 24 and a flange 25 to lock in place the insulating disc 34. Mounted on the inner face of this disc is an insulating disc 31 which has been recessed to form a chamber in which a switch blade 30 is rotatably mounted. The switch blade 33 is eyeletted on the base 34 by means of the eyelet 32 so as to leave the switch blade free for rotational movement. The terminal pins 13 are eyeletted to the base so as to firmly attach the disc 31 to the inner face of the disc 34. One end of each of the filaments is connected as before to the terminal pins 13 respectively while the common lead therefor is attached to the eyelet 32. The disc 34 is provided with an arcuate slot 36 (see Fig. 6) through which the outturned end of the arm 35 forming part of the switch blade 33 may project a slight distance. The blade 33 is provided with a pair of integral spring arms 33′ and 33″ so that it can be made to alternately engage the terminal pins 13 in each of the two possible extreme positions of the operating arm 35. Thus, as before, the switch blade 33 can be positioned to short circuit one cathode while leaving the other open circuited. Of course, for this modification the construction is the same at both ends of the lamp. It will, of course, be understood that the housing will be evacuated and/or charged with gaseous vapors at sub-atmospheric pressures in accordance with the usual practice, depending upon the nature of the electron discharge device with which the subject matter of this invention is employed.

As those skilled in the art will readily understand the principal and structural features of this invention may be embodied in other physical forms, and we do not, therefore, desire to be strictly limited to the disclosure as herein given, but rather by the scope of the claim granted us.

What is claimed is:

A fluorescent lamp having a sealed envelope with a pair of spaced re-entrant stem tubes, a pair of cathodes supported on each of said stem tubes, a base attached to each end of said envelope, a pair of terminal pins mounted on each base, a connection from one end of each cathode to the associated terminal pins respectively, a movable contact member mounted on each base, and a connection from both of the remaining terminals of each pair of said cathodes to said members, said members being operative from the exterior of said envelope into engagement with either of the associated terminal pins to short circuit either cathode at each end of said tube.

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