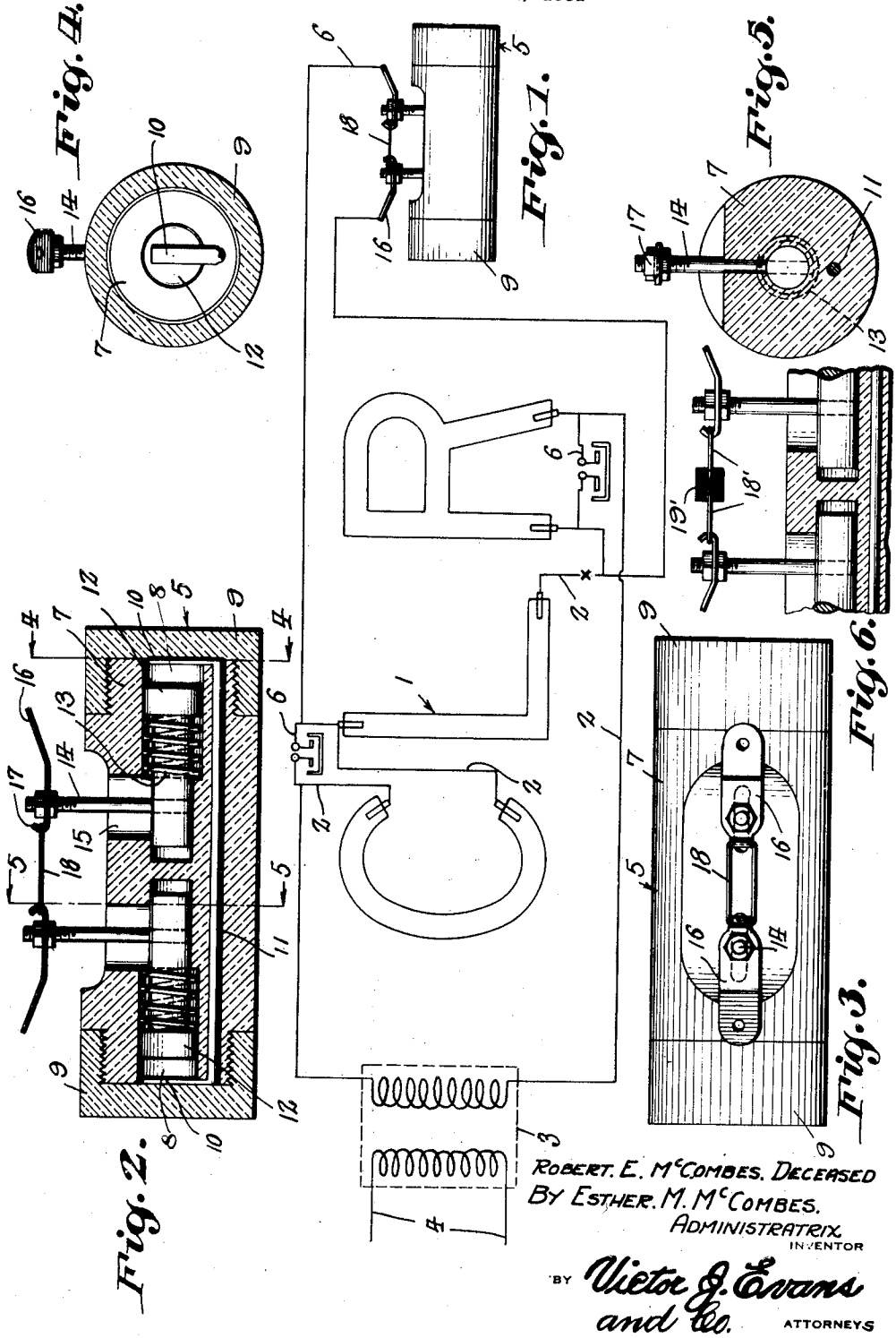
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NEON TUBE BY-PASS

Filed June 24, 1931



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NEON TUBE BY-PASS

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This invention relates to by-passes for neon tubes and more particularly to means for restoring to operation neon tubes which have been rendered inoperative by one of the tubes of the series becoming defective or burnt out, thereby permitting the remaining tubes of the series to again function and also allows quick detection of the defective tube.

Another object of this invention is the provision of a neon tube by-pass of the above stated character which will be simple, durable and efficient and which may be manufactured and sold at a comparatively low cost.

With these and other objects in view, this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of his invention, reference is to be had to the following description and accompanying drawing, in which

Figure 1 is a diagrammatical view illustrating a by-pass for each of the neon tubes of a series and constructed in accordance with his invention.

Figure 2 is a sectional view drawn on an enlarged scale illustrating the by-pass.

Figure 3 is a top plan view illustrating the same.

Figure 4 is a sectional view taken on the line 4—4 of Figure 2.

Figure 5 is a similar view taken on the line 5—5 of Figure 2.

Figure 6 is a fragmentary sectional view illustrating a modified form of fusible element.

Referring in detail to the drawing, the numeral 1 indicates a plurality of neon tubes connected in series by conductors 2 with a high tension transformer 3 and the latter being in circuit with a house current 4. The tubes 1 operate from a high voltage and when connected in series as shown in Figure 1, one of the tubes becoming defective or burnt out renders the remaining tubes inoperative consequently destroying the device for further use until the defect is located and which is difficult when all of the tubes are extinguished and to render the detection of the defective tube easy and also permit the other tubes of the series to be restored to operation should one of the tubes burn out or become defective, his invention is employed and consists of a by-pass element 5. A by-pass element is provided for each of the tubes and is electrically connected parallel with the respective tube by conductors 6.

The by-pass element 5 includes an insulated body 7 having oppositely disposed chambers 8 closed by removable caps 9 of insulated material. Stationary contacts 10 are electrically connected by a conductor strip 11 embedded in the body 7 with the contacts arranged in the outer ends of the chambers 8. Spring pressed plungers or movable contacts 12 are slidably mounted in the chambers 8 and adapted to be urged into engagement with the stationary contacts by expansion springs 13. The movable contacts or plungers 12 carry terminal posts 14 that extend through openings 15 of the body 7 and have terminals 16 removably secured thereto and to which the conductors 6 are secured. The opposing ends of the terminals 16 are bent to form hooks 17 to be engaged by a non-conductive fusible element 18 adapted to retain the plungers 12 in a retracted position or disengaged from the contacts 10. The posts 14 and terminals 16 when in the last named position form an air gap between the posts, so that during the normal operation of the tubes, the by-pass circuits will be broken and should one of the tubes become burnt out or defective so as to render the same inoperative, the voltage of the electrical current is consequently increased in the series and will jump the air gap fusing or destroying the element 18 permitting the plungers 12 to engage the contacts 10 restoring the electric circuit to the other tubes and eliminating from said circuit the defective tube. It is to be understood that the by-pass element is placed in parallel with each of the tubes so that should any one of the tubes become defective or the respective circuit thereof, the respective by-pass element will function to restore the circuit to the other tubes. The restoring of the circuit to the other tubes and cutting out of the defective

tube permits a person to easily detect which tube of the series is inoperative whereby necessary repairs may be made to restore all of the tubes to operation and eliminates considerable time and expense.

Should one of the tubes happen to have a poor contact at either of its points of connection with the wires 2 of the sign, or the display in which it is employed, the by-pass will function or operate. In other words the by-pass furnishes protection whether the tube is defective or not and the reason for having said protection is obvious, that is, any arcing anywhere in the electric circuit of the tube will create a sympathetic arcing at the next weakest point and the trouble becomes cumulative. The by-passes will be automatically operated by the arcing above referred to or in case of a tube becoming inoperative or defective and also will become operative in case of a broken connection between the tubes and their respective wires.

The fusible element 18 may be constructed from shellacked cotton or silk threads or horsehair and as shown in Figure 6 a pair of fusible elements 18′ are connected together by an insulating block 19′ and applied to the hooks 17 of the terminals 16 to hold the plungers retracted breaking the circuit and forming the desired air gap. This gap should be approximately 1/8 of an inch or may be increased and decreased as to size by lengthening or shortening the fusible element.

While he has shown and described the preferred embodiment of his invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of his invention, as claimed.

Having thus described his invention, what he claims is:

1. A by-pass element comprising an insulated body having opposed chambers, removable caps carried by the body for closing the chambers, electrically connected stationary contacts in said chambers, spring pressed movable plungers to engage the stationary contacts, posts carried by the plungers, terminals carried by the posts and connected in an electrical circuit, hooks on said terminals, and a fusible means connecting the hooks to disengage the plungers from the contacts and providing an air gap between the posts to break the circuit until the voltage of the electricity of said circuit increases sufficiently to jump the gap and destroy the fusible means for freeing the plungers to engage the stationary contacts and complete the circuit between the posts.

2. A by-pass element comprising an insulated body having chambers, electrically connected stationary contacts in said chambers, spring pressed movable plungers in said chambers to engage the contacts when freed, posts carried by the plungers and connected in an electric circuit, and a fusible element connecting the posts to maintain the plungers out of engagement with said contacts and providing an air gap between the posts to break the circuit until the voltage of the electricity of said circuit increases sufficiently to jump the gap and destroy the fusible element, thereby freeing the plungers to engage the stationary contacts and complete the circuit.

In testimony whereof I affix my signature.

ESTHER M. McCOMBES,
Administratix of Robert E. McCombes, Deceased.