

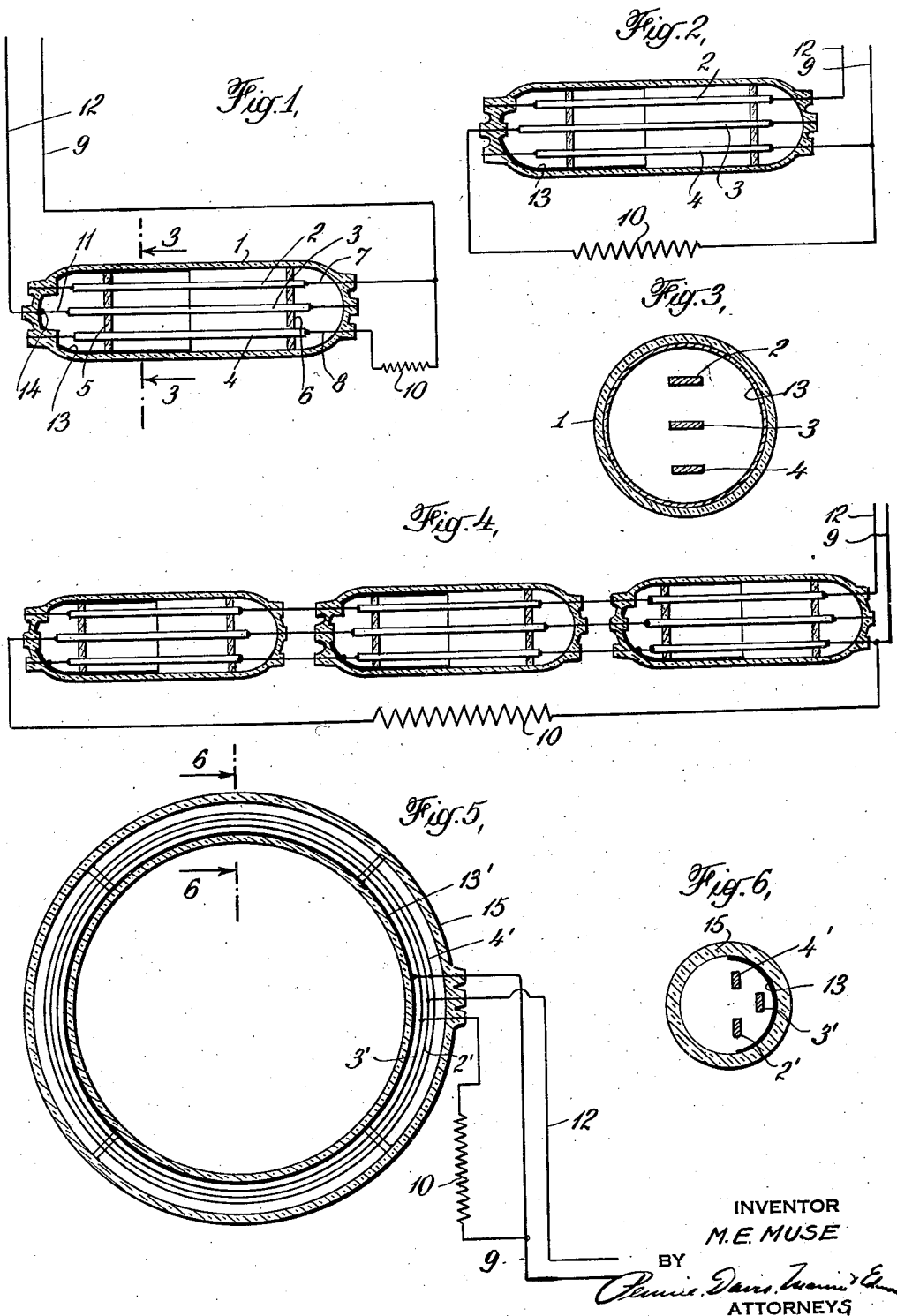
April 24, 1934.

M. E. MUSE

1,955,972

ILLUMINATED TELEPHONE DIAL

Original Filed March 29, 1932 2 Sheets-Sheet 1



April 24, 1934.

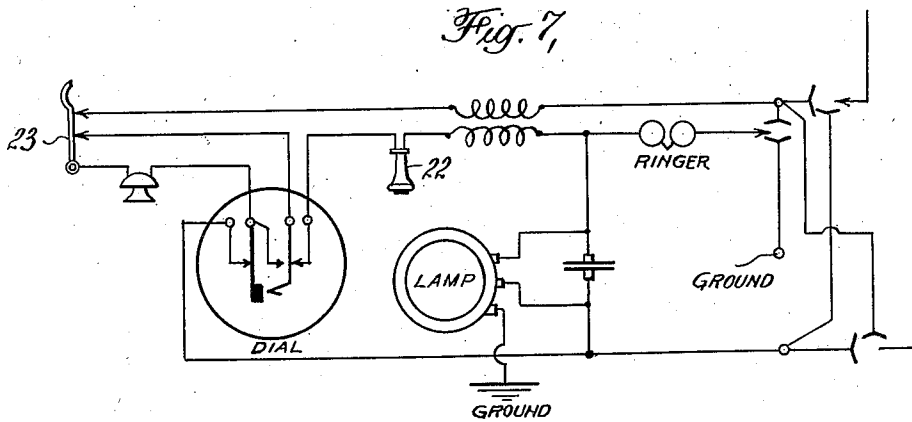
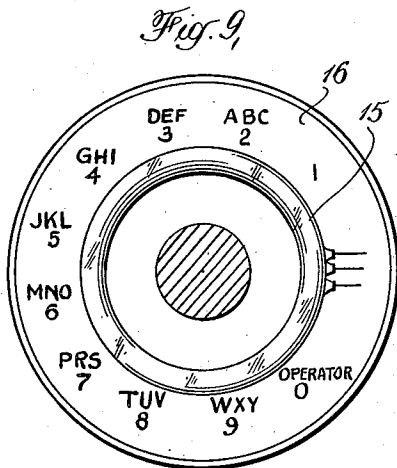
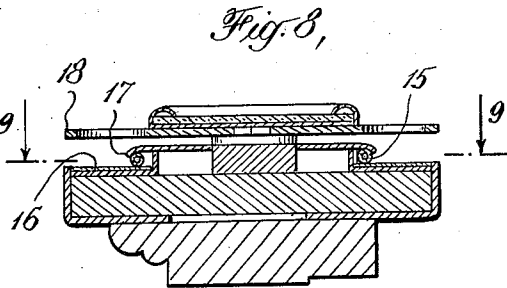
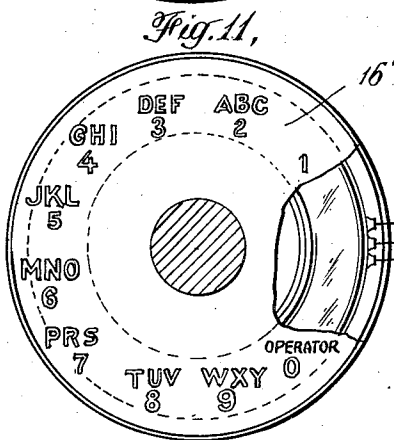
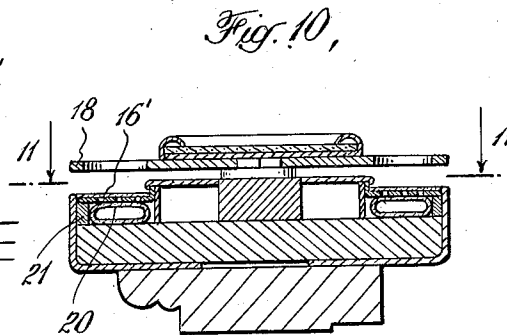
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ILLUMINATED TELEPHONE DIAL

Original Filed March 29, 1932

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,955,972

ILLUMINATED TELEPHONE DIAL

Melvin Edward Muse, Richmond, Va., assignor to
William Floyd LeeOriginal application March 29, 1932, Serial No.
601,756. Divided and this application January
11, 1933, Serial No. 651,101

11 Claims. (Cl. 179-81)

This application is a division of my co-pending application, Serial No. 601,756, filed March 29, 1932. The invention relates to the art of illumination and particularly to that branch of the art which deals with luminous discharge lamps.

Much consideration has been given to the problem of providing special illumination for the dial of an automatic telephone so that it can be seen distinctly no matter where the telephone might be located. Various types of lamps have been proposed for this purpose, but so far as I am aware, none has had practical application because no one has yet devised a lamp which answers all of the requirements. These requirements are both physical and electrical. From the physical standpoint, the shape and size of the lamp must be such that it can be positioned where it will not be in the way to the least extent so that there can be no possible objection to its presence. From the electrical standpoint, it should be a low voltage lamp and thus capable of operation from the standard 24 volt telephone circuit; and yet it should be capable of withstanding the electrical surges which take place during dialing and which sometimes increase the voltage to as much as 800 volts or more.

I have provided a lamp which answers all of these requirements. It is of the luminous discharge type and can be given such physical characteristics that it can be combined with the dial structure of the telephone so as to properly illuminate it and yet its presence is hardly noticeable. Notwithstanding the fact that it is of the luminous discharge type the lamp is capable of operating at a voltage as low as 24 volts, and can therefore be connected directly to the telephone circuit. Moreover, it is capable of withstanding the large increases in voltage which take place during dialing.

The lamp itself will first be described and then the manner in which it may be associated with the telephone dial and electrically connected in the telephone circuit will be explained.

In the accompanying drawings:

Figure 1 is a horizontal section of a lamp embodying the invention.

Fig. 2 is a horizontal section of a modified form of the lamp.

Fig. 3 is a transverse section taken on the line 3-3 of Fig. 1.

Fig. 4 illustrates how several lamps of the type shown in Fig. 2 may be connected in multiple, each lamp being represented in horizontal section.

Fig. 5 is a horizontal section of a lamp of the

kind shown in Fig. 2, but which has been given a ring-like shape to adapt it for use in combination with a telephone dial.

Fig. 6 is a transverse section taken on the line 6-6 of Fig. 5.

Fig. 7 is a diagrammatic view showing how the lamp may be connected in the telephone circuit.

Fig. 8 is a vertical section of the dial mechanism of a telephone showing the lamp associated therewith.

Fig. 9 is a horizontal section taken on the line 9-9 of Fig. 8.

Fig. 10 is a vertical section through the dial mechanism of a telephone illustrating another way in which the lamp may be associated therewith; and

Fig. 11 is a horizontal section taken on the line 11-11 of Fig. 10.

Referring first to Figs. 1 and 3, the lamp comprises a tube 1 made of glass or other transparent material. It contains three electrodes, 2, 3, and 4, suitably supported within the tube and held in spaced relation as by means of the supports 5 and 6 made of glass or the like. The electrodes may be made of nichrome, tungsten, silver, or any other suitable material. The electrodes 2 and 4 are electrically connected by lead-in wires 7 and 8 to the same side 9 of an external circuit. The electrode 3 is connected in series with a high resistance 10. When the lamp is connected to a telephone circuit this resistance should be of the order of 100,000 ohms. The remaining electrode 3 is connected by means of a lead-in wire 11 to the other side 12 of the external circuit. The lead-in wires 7, 8, and 11 are sealed in the glass tube as represented in the drawings. Located within the tube against its wall is a deflector 13 which is electrically connected with the electrode 3 as represented at 14. The deflector may be made of chromium, silver, or any other material which is a conductor of electricity and which is capable of receiving a high polish. The deflector may be formed of thin metal or may be electrically deposited on the glass.

The tube is filled with helium, neon, or mercury vapor, or any mixture of these gases. Preferably, it contains all three of the gases in combination. A mixture of the three gases has been found especially suitable where the lamp is to operate at low voltages. The helium gas is believed to be the principal one. The others may be added as desired to suit special conditions. If the neon is omitted altogether, the lamp will give a white light and can be operated at about 110

volts, but for a very low voltage lamp the use of neon is advisable because it, when used with the other gases, still further reduces the required voltage and the current consumption.

5 The electrode 4 is preferably coated with a radioactive substance such as thorium or cerium oxide. The electrodes 2 and 3 may likewise be coated if so desired.

10 The electrode 4 is the starting electrode as it causes the initial ionization of the gas. Its thorium coating makes it more effective for this purpose, especially at low voltages, and also causes the glow to be continuous. The deflector 13 materially aids in the ionization of the gas by deflecting the electric charges back to the interior of the tube. It also serves as a reflector of the light. The deflector should be as long as possible from the electrical and light-reflecting point of view, but as short as necessary to obtain the desired amount of direct illumination.

20 The lamp shown in Figure 2 is structurally the same as that shown in Figure 1, but the circuit connections are different. In Figure 2, the electrode 2 is connected to the external lead 12, and the electrodes 3 and 4 are connected to the external lead 9. In this case, the electrode 3 is the starting electrode and is connected in series with the resistance 10. The electrode 4, in this case, is the one which is electrically connected to the deflector 13. At the present time, I prefer the circuit arrangement shown in this figure.

30 Figure 4 shows several lamps connected in multiple, the circuit connections being the same as shown in Figure 2.

35 The tube of the lamp may be made in the shape of a ring as shown at 15 in Figure 5. The lamp is preferably given this shape when it is to be associated with the dial of an automatic telephone in the manner hereinafter described. The electrodes in this case are likewise given a ring shape as represented at 2', 3', and 4'. The deflector, corresponding to the deflector 13 in Figures 1 and 2, is represented at 13' and is so located within the tube that it will reflect the light radially outward.

40 The way in which a lamp of the kind shown in Figure 5 may be associated with the dial of an automatic telephone is shown in Figures 8 and 9. The number plate of the dial is represented at 16. It is usually held in place by the edge of a clamping disc 17. I modify this disc to the extent of elevating it slightly and also extending it radially a sufficient distance for it to act as a shield for the lamp which is positioned just under its marginal edge. The light reflected outwardly by the deflector 13' thus shines directly on the number plate 16. The usual finger disc which rotates above the number plate is represented at 18.

50 In Figures 10 and 11, the lamp is located under the number plate. In this case, the numbers and letters are cut out of the number plate so that the light from the lamp may shine through them. The lamp tube is represented at 20 and is somewhat flattened. A ring 21 preferably made of fibre elevates the number plate 16' so that it can be located above the lamp. The vertical dimensions of other parts of the dial mechanism may be increased wherever necessary to bring the rotatable finger disc 18 in its proper position above the number plate.

60 The lamp may be connected across the telephone lines, in which case it will be constantly illuminated, or it may be connected so that it

will be illuminated only when the telephone receiver is off the hook. Figure 7 shows a circuit arrangement which will accomplish this. When the telephone receiver 22 is on the hook 23 the supply of current to the lamp will be interrupted, but when the receiver is removed from the hook, the necessary connections are established to supply current to the lamp and cause it to illuminate the dial.

80 It will now be seen that from the physical standpoint, the lamp is well adapted for use in combination with a telephone dial. From the electrical standpoint, it is also well adapted for this use because it is capable of operating at a voltage as low as 24 volts. It will also stand much higher voltages such as occur during dialing.

I claim:

1. The combination with the dial of an automatic telephone of a luminous discharge lamp for illuminating the dial, the lamp comprising a ring-like tube located adjacent to the number plate of the dial and being electrically connected with the telephone circuit and adapted to be operated thereby.

2. The combination with the dial of an automatic telephone of a ring-like transparent tube located adjacent to the number plate of the dial, said tube containing a plurality of electrodes and an ionizable gas, the electrodes being electrically connected in the telephone circuit and adapted when energized thereby to produce in conjunction with the ionizable gas a luminous glow to illuminate the figures on the telephone dial.

3. The combination with the dial mechanism of an automatic telephone of a luminous discharge lamp for illuminating the dial, the lamp comprising a ring-like tube housed by the dial mechanism, a plurality of electrodes, and an ionizable gas within the tube, the electrodes being electrically connected in the telephone circuit and adapted when energized thereby to produce in conjunction with the ionizable gas a luminous glow to illuminate the figures on the telephone dial.

4. The combination with the dial mechanism of an automatic telephone of a luminous discharge lamp for illuminating the dial, said lamp comprising a casing, three electrodes in the casing, at least one of said electrodes being coated with a radio-active substance and a gaseous atmosphere in the casing, composed at least in part of helium, the electrodes being electrically connected in the telephone circuit and adapted when energized thereby to produce in conjunction with the gaseous atmosphere a luminous glow to illuminate the figures on the telephone dial.

5. The combination with the dial mechanism of an automatic telephone of a luminous discharge lamp for illuminating the dial, said lamp comprising a casing, three electrodes in the casing, at least one of said electrodes being coated with a radio-active substance, a gaseous atmosphere in the casing composed at least in part of helium, and a deflector located against and covering a part only of the wall of said casing and electrically connected with one of the electrodes, the electrodes being electrically connected in the telephone circuit and adapted when energized thereby to produce in conjunction with the gaseous atmosphere a luminous glow to illuminate the figures on the telephone dial.

6. The combination with the dial mechanism of an automatic telephone of a luminous discharge lamp for illuminating the dial, said lamp comprising a casing, three electrodes in the casing,

a gaseous atmosphere in the casing composed at least in part of helium, and a deflector located against and covering a part only of the wall of said casing and electrically connected with one of the electrodes, the electrodes being electrically connected in the telephone circuit and adapted when energized thereby to produce in conjunction with the gaseous atmosphere a luminous glow to illuminate the figures on the telephone dial.

7. A combination in accordance with claim 5 in which the gaseous atmosphere in the casing of the lamp comprises a mixture of helium, neon and mercury vapor.

8. A combination in accordance with claim 6 in which the gaseous atmosphere in the lamp casing comprises a mixture of helium, neon and mercury vapor.

9. The combination with the dial mechanism of an automatic telephone of a luminous discharge lamp for illuminating the dial, said lamp comprising a casing, three electrodes in the casing, at least one of said electrodes being coated with a radio-active substance, and a gaseous at-

mosphere in the casing comprising a mixture of helium, neon and mercury vapor, the electrodes being electrically connected in the telephone circuit and adapted when energized thereby to produce in conjunction with the gaseous atmosphere a luminous glow to illuminate the figures of the telephone dial.

10. The combination with the dial mechanism of an automatic telephone of a luminous discharge lamp for illuminating the dial, said lamp comprising a casing, three electrodes in the casing, and a gaseous atmosphere in the casing comprising a mixture of helium, neon and mercury vapor, the electrodes being electrically connected in the telephone circuit and adapted when energized thereby to produce in conjunction with the gaseous atmosphere a luminous glow to illuminate the figures on the telephone dial.

11. The combination with the dial of an automatic telephone of a luminous discharge lamp for illuminating the dial, said lamp being electrically connected with the telephone circuit and adapted to be operated thereby.

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