Jan. 8, 1935. G. KOITO 1,987,532

DEVICE FOR CHANGING LAMPS IN AN ILLUMINATING UNIT

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FIG. 3

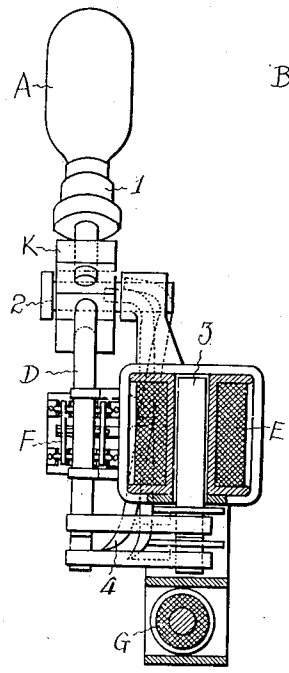


FIG. 1

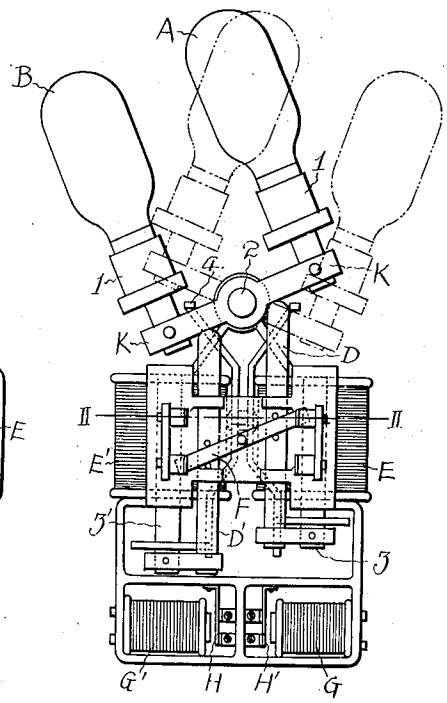
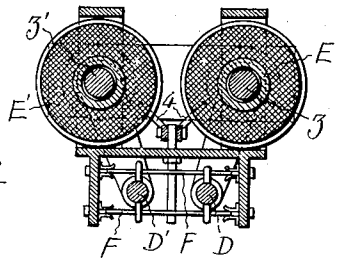


FIG. 2



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FIG. 4

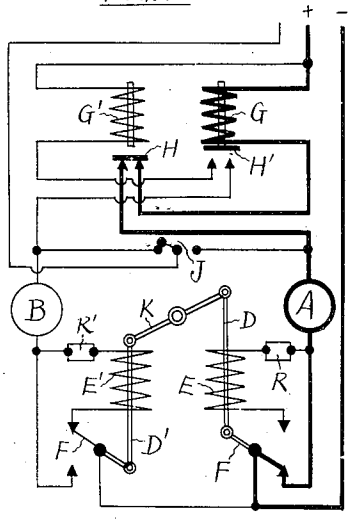


FIG. 5

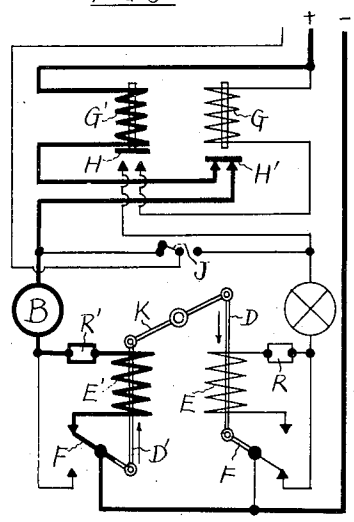


FIG. 6

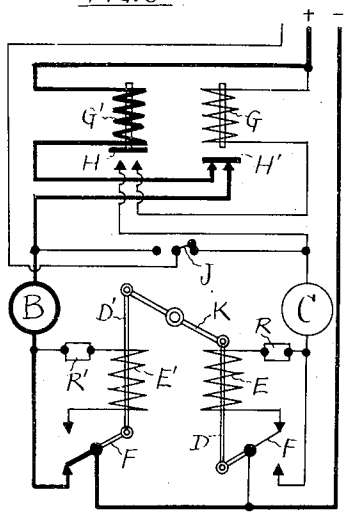
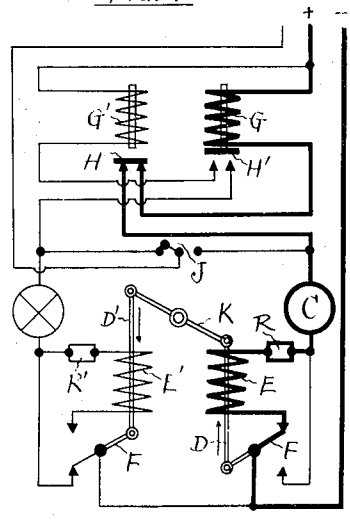


FIG. 7



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UNITED STATES PATENT OFFICE

1,987,532

DEVICE FOR CHANGING LAMPS IN AN ILLUMINATING UNIT

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Application June 23, 1933, Serial No. 677,310
In Japan June 25, 1932

1 Claim. (Cl. 240—37.1)

This invention relates to a device for changing lamps in an illuminating unit. In contradistinction to the existing illuminating unit which is provided with main and auxiliary lamps of different nature or of different candle power, according to this invention the main and auxiliary lamps are the same in all respects, so that both lamps may be termed the main lamps. The device according to this invention comprises a base plate carrying two lamps adapted to be alternately moved into position, solenoids connected in series with the respective circuits of said two lamps for moving said base plate, a change-over switch actuated in accordance with the movement of said base plate, an electro-magnetically controlled switch connected in series in each of two lamp circuits, and an electro-magnet connected in series in each of said lamp circuits, each electro-magnet in one circuit controlling the electro-magnetically controlled switch in the other circuit, and the arrangement is such that in case of failure in one circuit the solenoid in the other circuit is temporarily energized so as to render the other circuit operative to light the lamp in said circuit which at the same time is brought into the focus position.

The object of the invention is to provide a lamp changing device of simple construction and adapted to be automatically and effectively actuated in case of failure of the lamp in focus position.

In the accompanying drawings in which the preferred form of the invention is shown,

Fig. 1 is a front view of a device according to this invention.

Fig. 2 is a cross section taken along line II—II of Fig. 1.

Fig. 3 shows a side elevation thereof, partly in section.

Figs. 4–7 are wiring diagrams of the device.

Referring to the drawings, lamp bulbs A and B are mounted in sockets 1, 1 mounted on a lever or rockable base plate K which is supported by a shaft 2 and is adapted to be rocked up and down or to be turned in horizontal plane, thus to place either one of the lamps into focus position.

In the drawings the lamp unit is shown as mounted on a lever or base plate adapted to be rocked up and down, lifting rods D, D' are for alternately lifting either end of the base plate K, and said lifting rods are connected at their lower ends to movable cores 3, 3' respectively of solenoids E, E'. A change-over switch F is associated with said lifting rods D, D', so that the lifting rods actuate the switch at the same time when they actuate the base plate K of the lamp unit. Electro-magnet coils G, G' and electro-magnetically controlled switches H, H' are connected in series respectively in the circuits of the lamps A and B, one of the coils controlling the switches connected in series with the other coil, and vice versa. The arrangement is such that when no current is established through the circuits both electro-magnetically controlled switches remain closed. When current is established as shown in Figure 4, in the circuit of the lamp B the current flows through resistance R' as well as through the solenoid E', so that the magnet coil G' in the circuit of the lamp B is not energized sufficiently to open the switch H on account of greater resistance in the circuit, and consequently only the magnet coil G in the circuit of the lamp A will attract the armature forming the switch H', opening thereby the circuit of the lamp B. Thus, the current flows only through the circuit of the lamp A. As soon as the lamp A is extinguished for any reason, the switch H' will be automatically closed and the current flows through the circuit of the lamp B as shown in thick lines in Fig. 5. Thus, the solenoid E' being energized pulls the rod D' upwardly, at the same time turning the change-over switch F so as to open the circuit through the solenoid E', thereby completing the circuit including the lamp B, as shown in Fig. 6, whereby the latter lamp is placed into focus position and is lighted. In the meantime, the broken lamp A is replaced by a fresh lamp C. When the lamp B which is now lighted is extinguished, the parts assume the position shown in Fig. 7, and then return to the position similar to that shown in Fig. 4, the lamp C being placed in position and lighted. The above-mentioned operation is repeated over. For the purpose of giving alarm of trouble in the lamp, there is provided a switch J connected with the circuits of both lamps, and a signal lamp (not shown) is provided in suitable position. 4, 4 are latches for locking the base plate K in either position.

From the foregoing, it will be seen that this invention is characterized by the fact that by a single operation of the solenoid two lamps interchange their positions, and at the same time the circuits of two lamps are automatically changed over by said operation of the solenoid. According to this invention, there is not any difference between the main and auxiliary or emergency lamps, so that practically the lighted lamp in focus position is always the main lamp, and the broken main lamp may be changed without leaving any time unlighted.

What I claim is:—

A lamp changing device of the character described, comprising a pivotally mounted, vertically rockable base plate, a pair of electric lamps mounted respectively at opposite sides of the axis of said base plate, lifting rods for alternately lifting the respective ends of said base plate, said rods being pivotally attached at their lower ends to the vertically mounted cores of a pair of solenoids, a change-over switch operatively associated with each core, the said lamps being respectively in separate branches of a circuit leading from a common generator and having electrically operated switches in circuit with said lamps, and arranged and adapted to establish a closed circuit through an inactive lamp, on the failure of a circuit through the other lamp, each operating magnet in one branch controlling the switch in the other branch.

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