Aug. 26, 1969 H. L. PRIVETT ET AL 3,463,964

FLUORESCENT LAMP-DIMMING CIRCUIT

Filed Nov. 28, 1967 2 Sheets-Sheet 1

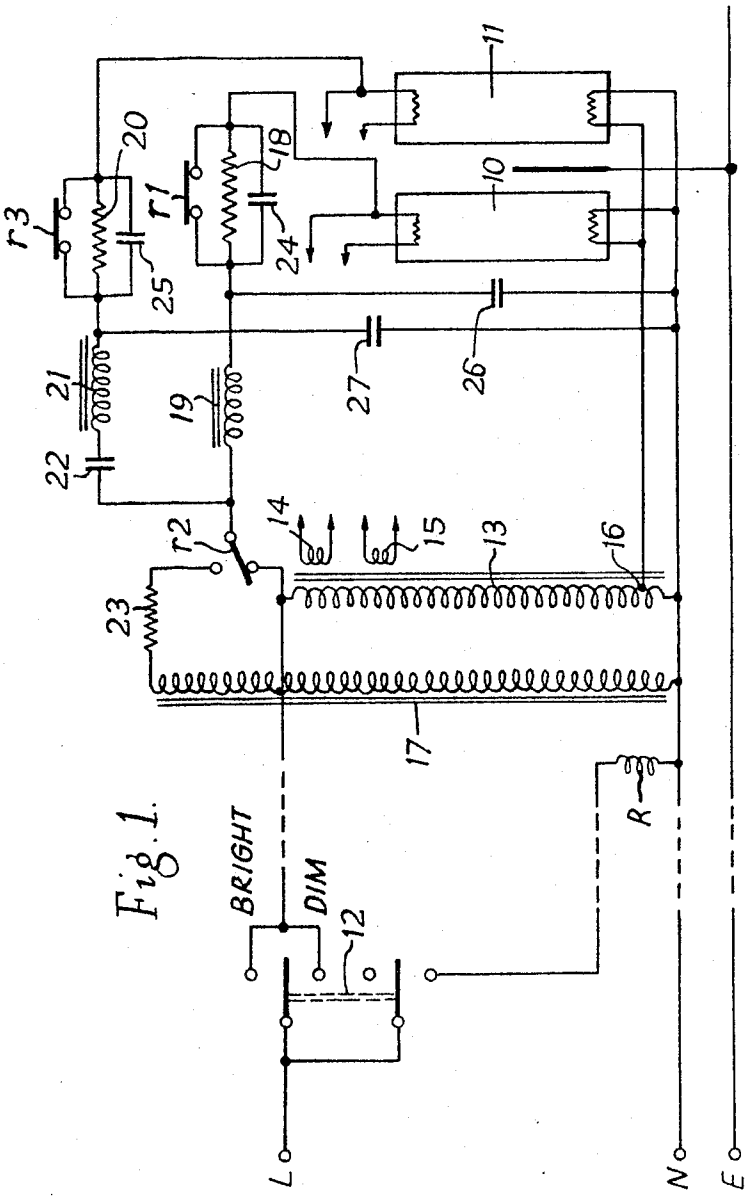


Fig. 1.

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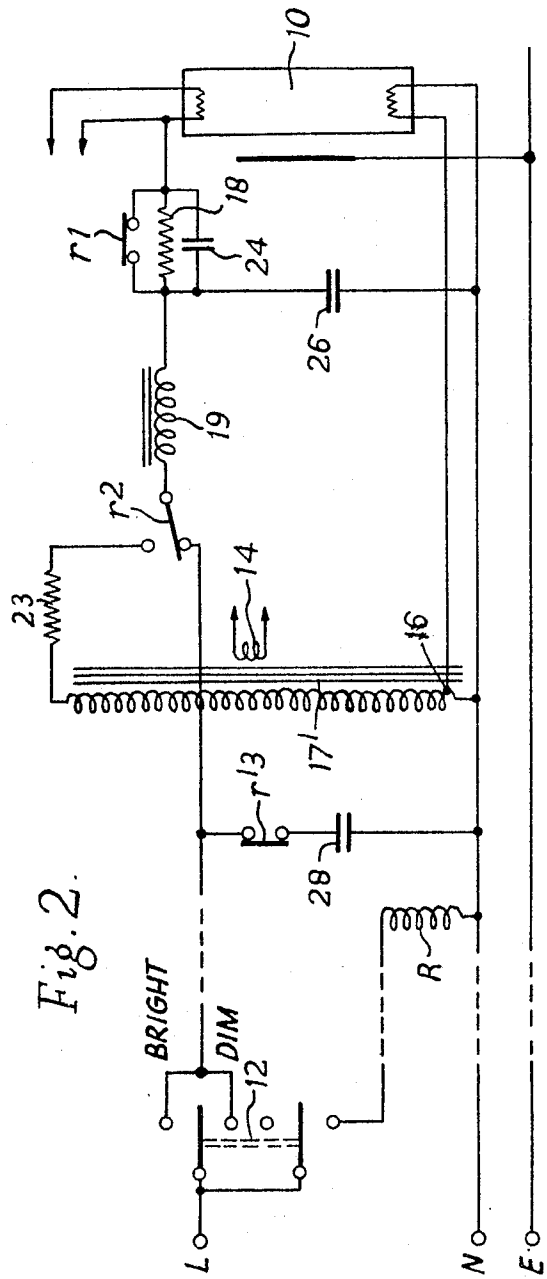


Fig. 2.

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3,463,964
Patented Aug. 26, 1969

3,463,964

FLUORESCENT LAMP-DIMMING CIRCUIT

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Filed Nov. 28, 1967, Ser. No. 686,050
Int. Cl. H05b 41/42
U.S. Cl. 315—247 5 Claims

ABSTRACT OF THE DISCLOSURE

A light dimming circuit for gas lamps provides a high and low or dim state. In the high state the lamp is directly connected to the power supply through a ballast reactor. In the low state the lamp is connected to the high voltage terminal of an autotransformer through first and second resistors and a reactor. In the low state a transfer relay with its contacts makes the necessary connections. The primary winding of the autotransformer is permanently connected across the power supply and may also furnish the supply for the heaters of the lamp. Condensers for power factor, RF elimination, shimmering of lights and other purposes may be added if so desired.

The present invention relates to fluorescent lamp circuits which can be switched between bright and dim conditions of the lamp or lamps in the circuit.

In accordance with the invention there is provided a fluorescent lamp circuit including at least one lamp and a switch for switching the lamp between dim and bright conditions, the switch serving in one position to energise a relay which has a first set of contacts which in the dim condition of the switch cause the lamp to be fed through a resistor of high impedance to reduce the current through the lamp to a low value and a second set of contacts arranged when the switch is in its dim condition to apply an increased voltage to the lamp from a transformer to maintain the stability of the discharge when the lamp is being fed through the said resistor.

Preferably, the circuit includes a radio interference suppression capacitor connected across the lamp in conventional manner and in order to ensure that this is effective in both conditions of the circuit one pole of the capacitor is connected to the side of the said resistor remote from the lamp.

A capacitor may be connected across the said resistor to reduce shimmer in the lamp in the dim condition.

The invention will now be described in more detail with the aid of examples illustrated in the accompanying drawings in which:

FIG. 1 is a circuit diagram of a twin-lamp circuit in accordance with the invention, and

FIG. 2 is a circuit diagram of a single lamp circuit.

The circuit of FIG. 1 has two lamps **10** and **11** which are supplied from live, neutral and earth terminals, L, N, and E of the electric mains supply. A ganged switch **12** connected to terminal L has a central off-position as shown, an upper bright position and a lower dim position. In both dim and bright positions the terminals L and N are connected to the primary winding **13** of a transformer which supplies heating current to the electrodes of the lamps **10** and **11** from secondary windings **14** and **15** and a tapping **16** on the winding **13**. An auto-transformer **17** also has the lower part of its winding connected across the terminals L and N. One electrode of the lamp **10** is connected directly to the terminal N while the other electrode is connected through a resistor **18** shunted by relay contacts *r*1, a ballast choke **19**, and relay contacts *r*2 to the terminal L through the switch **12**. Similarly, one electrode of the lamp **11** is connected directly to terminal N and the other electrode through a resistor **20** shunted by relay contacts *r*3, a ballast choke **21** and capacitor **22**, and relay contacts *r*2 to the terminal L through the switch **12**.

In the bright position of the switch **12** the relay contacts *r*1, *r*2 and *r*3 are in the positions shown and the lamps are fed in conventional manner. When the switch **12** is placed in its dim position a relay coil R is energised, causing contacts *r*2 to change over and contacts *r*1 and *r*3 to open. The resistors **18** and **20** are thus placed in series with the lamps **10** and **11** respectively to reduce the current flowing through them to a value suitable for producing a dim light. The change-over of contacts *r*2 applies an increased voltage to the lamps from the auto-transformer **17** to maintain the stability of operation of the lamps at low current densities. A protective resistor **23** is connected in series between the contacts *r*2 and the auto-transformer **17** to avoid excessive currents should the contacts *r*1 and *r*3 fail to open. To reduce shimmer of the lamps in the dim condition, capacitors **24** and **25** of small value are connected across the resistors **18** and **20** respectively.

Conventional radio interference suppression capacitors **26** and **27** are connected across the lamps **10** and **11**, respectively. One pole of each of the capacitors **26** and **27** is connected directly to one electrode of the associated lamp and the other to the side of the resistor **18** or **20** remote from the lamp. Thus in the bright condition the capacitors **26** and **27** are connected directly between the electrodes of the lamps while in the dim condition each of them is connected across the associated lamp and the series resistor. Interference suppression is thus effective in both conditions of the circuit.

FIG. 2 shows a single lamp circuit corresponding to the circuit of FIG. 1 with the lamp **11** removed. The transformer **13** is omitted and the electrode heating current is taken from the transformer **17'**. The other circuit elements are largely the same as in FIG. 1, the same reference numerals having been used, and the manner of operation is fundamentally the same. The circuit of FIG. 2 contains a third set of contacts *r'*3 of the relay R, which are connected in series with a power factor capacitor **28** across the live and neutral terminals and are closed while the circuit is in its bright condition. When the circuit is switched to the dim condition the power factor is improved by removal of the capacitor **28** from the circuit.

In a modification of the circuits shown, the choke **19** and the choke-capacitor combination **21** and **22** can be placed in series with the relay contacts *r*1 and *r*3 across the resistors **18** and **20** so that they are out of circuit in the dim condition.

We claim:

1. A fluorescent lamp circuit comprising

a lamp,

a switch for switching said lamp between dim and bright conditions,

a relay having first and second sets of contacts, a resistor of high impedance, and

a transformer connected to generate operating voltage across the lamp,

said relay being coupled to the switch for energisation in one position of the switch,

said first set of contacts connecting the resistor between the transformer and the lamp upon actuation of the switch to its dim condition, and

said second set of contacts connecting the transformer to apply an increased voltage to the resistor and lamp upon actuation of the switch to its dim condition to maintain stability of the lamp discharge at low currents.

2. A fluorescent lamp circuit as claimed in claim 1 in which said first set of contacts is in shunt with the said resistor.

3. A circuit as claimed in claim 1 comprising a capacitor connected across the said resistor to reduce shimmer in the lamp in the dim condition.

4. A circuit as claimed in claim 1 including a radio interference suppression capacitor connected across the lamp one pole thereof being connected to the side of the said resistor remote from the lamp.

5. A circuit as claimed in claim 1 comprising a power factor capacitor, said relay having a third set of contacts connected in series with said power factor capacitor across supply terminals of the circuit, said third set of contacts being open in the dim condition of the switch.

References Cited

UNITED STATES PATENTS

2,665,394	1/1954	Arvidsson et al.	315—97
2,774,917	12/1956	Passmore	315—97
2,829,314	4/1958	Vradenburgh	315—200

FOREIGN PATENTS

1,169,035	4/1964	Germany.

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U.S. Cl. X.R.

315—97, 105, 391