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GB 0335618

GB 0280022

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(54) Pre-set dimmer switch

(57) Most dimmer switches available
incorporate a Triac, or similar control
arrangement for continuously adjusting
the light level. However, in many

domestic applications, such a switch is
unnecessarily expensive, and indeed
not precise, particularly where two or
more pre-set levels of lighting may be
required.

In a relatively inexpensive dimmer
switch at least one capacitor 1 can be
switched into series with the mains 2,
the value of the capacitor being
selected in dependence upon the re-
commended wattage of the lamp 3 it is
to control, to produce a required level of
dim illumination. Preferably, the circuit
provides for more than one pre-set dim
level of illumination or more than one
lamp wattage by incorporating a num-
ber of capacitors and a combination of
series/parallel switch connections (6,
Figure 2). A resistor 5 discharges the
capacitor 1 when the circuit is discon-
nected from the mains. Alternatively,
the selector switch 4 may be arranged
to short out the capacitor in its "OFF"
position. A neon 7 indicates the dim
setting of the switch 4.

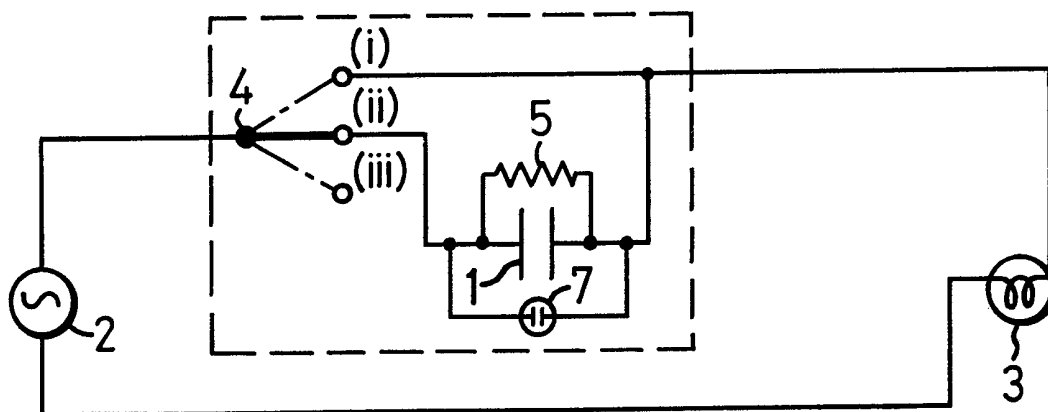


FIG.1

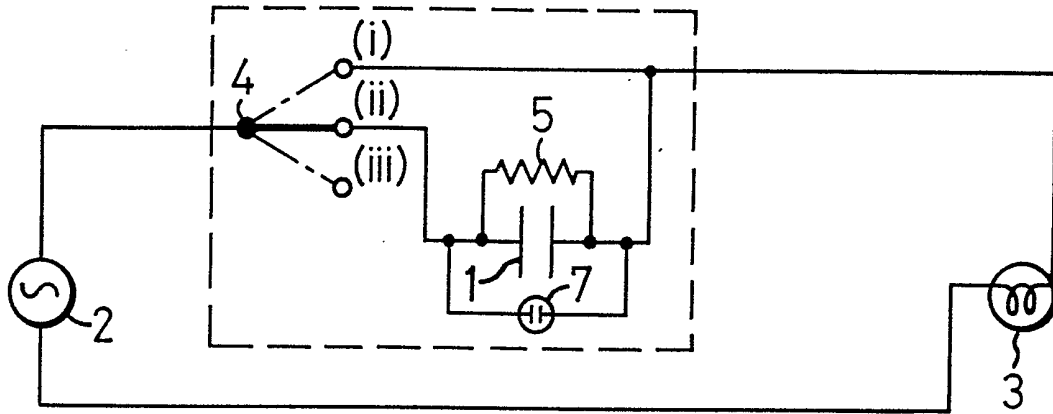


FIG. 1

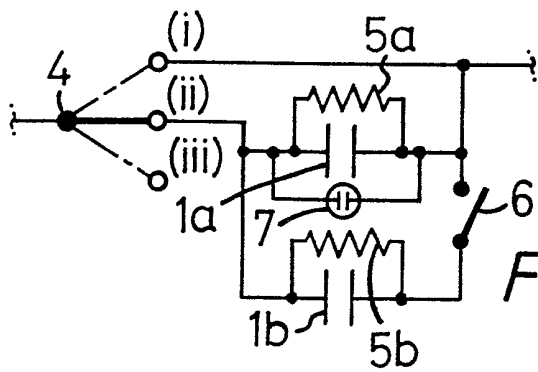


FIG. 2

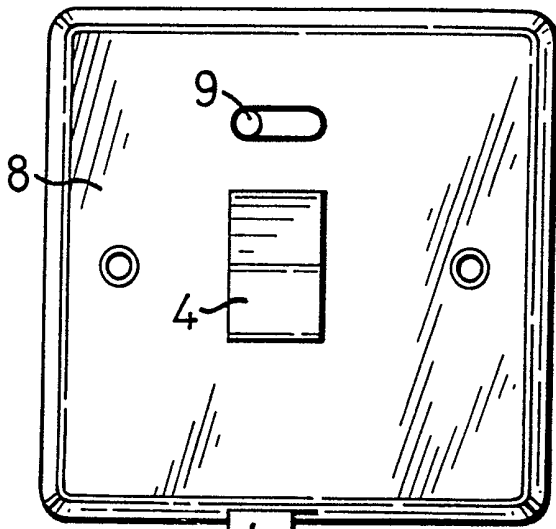


FIG. 3A

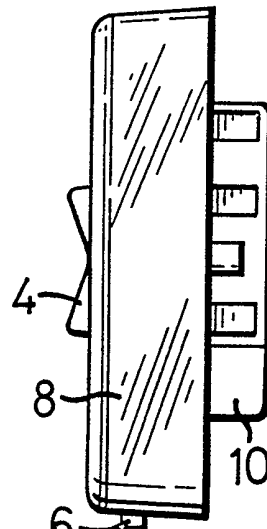


FIG. 3B

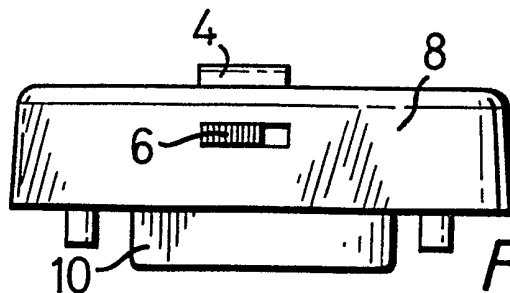


FIG. 3C

SPECIFICATION

Pre-Set dimmer switch

5 This invention relates to dimmer switches particularly for domestic use. 5

Most dimmer switches available incorporate a Triac, or similar, control arrangement by which the light can be adjusted continuously from its brightest setting to a dim level, or completely extinguished. However, in many domestic applications, such as for a night light for a child's or invalid's bedroom, hall/stairway lighting, etc. all that is required is a dimmer switch capable of two levels of lighting, i.e. one level at full illumination for normal use, and the other at a pre-set dim illumination. For such applications the standard dimmer switch available is expensive and, in fact, may not be entirely suitable, since adjustment to a preferred dim level of illumination with such switches is not precise. 10

An object of the invention is to provide a relatively inexpensive dimmer switch which can simply be switched between a high and at least one dim level of illumination.

15 According to the invention, a dimmer switch comprises a circuit having at least one capacitor which, in use, can be switched into series with the mains, the value of the capacitor being selected in dependence upon the recommended wattage of the lamp it is to control, to produce a required level of dim illumination. 15

The said circuit preferably also has means for discharging the capacitor (e.g. a resistor) when the circuit is disconnected from the mains.

20 If more than one dim level of illumination is required, or if a pre-set dim level is to be provided for more than one recommended bulb wattage, the circuit may use a number of capacitors and a combination of series/parallel connections, as appropriate, to provide the required number of illumination levels, or wattage recommendations. 20

In order that the invention may be readily understood and further features made apparent, embodiments of dimmer switch in accordance therewith will now be described with reference to the accompanying drawings in which:- 25

30 *Figure 1* is a diagram of a simple circuit incorporating one capacitor to give one dim level of illumination, *Figure 2* is a diagram of a circuit incorporating two capacitors in parallel, and *Figures 3A to 3C* are plan, side and end elevations of a suitable dimmer switch body for incorporating the circuits. 30

Referring to *Figure 1*, the circuit shown comprises a capacitor 1 connected in series with a source 2 of alternating current and a lamp bulb 3, via a three-position switch 4, the positions being as follows:-

(i) circuit set for full illumination
(ii) circuit set for said dim illumination
35 (iii) circuit open. 35

Thus, with the switch in position (i) the circuit is closed and the capacitor 1 switched out, whilst in position (ii) the capacitor 1 is switched in to reduce the current to the bulb and hence effect the dim illumination level. It will be appreciated that the light intensity at said dim illumination level depends upon the level of the current (I) fed to the bulb 3, which, in turn, depends upon the supply voltage (V) and bulb resistance (R) using the formula:- 40

$$I = \frac{V}{\sqrt{R^2 + (X_c)^2}}$$

45 where X_c = the reactive capacitance 45

However, in a practical embodiment, it has been found that for a bulb of 60W from a standard 240V, 50 Hz. AC supply, a preferred dim illumination level can be obtained using one, or a number, of capacitors, of a total value of $1\frac{1}{2}\mu\text{F}$, $1\mu\text{F}$ of capacitance passing approximately 85mA of current. It will also be appreciated that the light output of the bulb is not directly proportional with the current used and, hence, it is important to use the recommended wattage in any particular application to achieve the preferred dim illumination level. As mentioned above, instead of a single capacitor a number of capacitors may be used in parallel or series. 50

Thus, a single capacitor of $1\frac{1}{2}\mu\text{F}$ or more can be somewhat bulky, and hence not be easily accommodated in the switch body. On the other hand, two or three similar capacitors e.g. of Class X type, can more compactly be accommodated within the body. After use, it will be appreciated that some residual charge could remain, and this is preferably discharged almost instantly upon "switch-off" by a resistor 5 of suitable size connected in parallel with the capacitor, or capacitor network. For a $1\frac{1}{2}\mu\text{F}$ capacitor a resistor value of $1\text{M}\Omega$ would be suitable. It is envisaged that other means may be employed to discharge the capacitor. For example, the switch 4 may be arranged to short out the capacitor "plates" when in its "off" (open circuit) position. To complete the circuit a neon bulb 7 is connected therein to indicate when the dim illumination level is switched in. 60

Referring now to *Figure 2*, that part of the circuit shown in *Figure 1* within the dotted area is modified as shown, to provide two parallelly connected capacitors 1a and 1b (or two capacitor network) each having an associated parallel connected discharging resistor 5a, 5b respectively, although by appropriate circuit configuration only one discharging resistor may be needed. 65

Thus, either two dim illumination levels for a particular recommended bulb wattage can be achieved by switching in one or both capacitors as appropriate, or a preferred single dim illumination level can be selected for two recommended wattages of bulb to be used, a separate two-way selector switch 6 being provided between the capacitors for this purpose. Of course, more than two dim illumination/selection
5 wattage levels could be provided for by a suitable capacitor network/switch arrangement.

Naturally, in the embodiments described, the capacitors would have a voltage rating sufficient to withstand the intended supply voltage.

Referring now to Figures 3A to 3C, a suitable switch body comprises a front cover plate 8 e.g. of moulded plastics material, in which is mounted a three-position two-pole rocker switch 4, and which has a window 9
10 for the neon bulb 7. It will be appreciated from Figure 3A and from the circuit shown in Figure 1 that the limit positions of the rocker switch are "off" and "full illumination", the "dim" setting being at the intermediate position. A rear cover plate 10 is provided to enclose the circuit elements. Referring also to Figure 2, where the switch is to provide two (or more) dim illumination/wattage selection settings, the selector switch 6 is also mounted separately in the cover plate 8.

15 An advantage of a dimmer switch incorporating a circuit as described above is that it would be free from radio interference. Also, in the circuit, the current leads the voltage (negative reactance). Thus, a dimmer switch constructed in accordance with the invention would tend to correct the mainly positive reactance produced by inductive domestic equipment, such as refrigerators, food mixers, etc.

20 CLAIMS (Filed on 12.10.83.)

1. A dimmer switch comprising a circuit having at least one capacitor which, in use, can be switched into series with the mains, the value of the capacitor being selected in dependence upon the recommended wattage of the lamp it is to control, to produce a required level of dim illumination.

25 2. A dimmer switch according to Claim 1, wherein the circuit includes a number of capacitors and a combination of series/parallel connections, as appropriate, the arrangement being such that a number of different pre-set illumination levels, or wattage ratings can be switched in.

3. A dimmer switch according to Claim 1 or 2, wherein said circuit includes means for discharging the capacitor when the circuit is disconnected from the mains.

30 4. A dimmer switch according to Claim 1, 2 or 3, wherein the switch body includes a selector switch separate from the on/off switch, the selector switch being switchable to one or more settings, depending upon the number of capacitors included in the circuit.

5. A dimmer switch constructed, arranged and adapted for use substantially as hereinbefore described with reference to, and as shown in, Figures 1 and 3, or modified in accordance with Figure 2.