'Magic candle' is a beaut party novelty

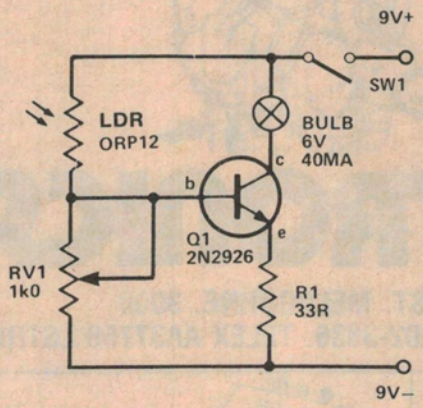
ELECTRONIC PARTY TRICKS are always popular. The majority of people have very little understanding of electronics and even simple tricks can mystify them. This circuit, a 'magic candle', uses only a handful of common components and can be built very quickly. However, as with many projects of this type, the ingenuity in building is probably more important than the circuitry. This however, is left to the reader, though some general tips are given later.

The idea of the magic candle is to demonstrate that light bulbs can be lit by a match or cigarette lighter and then 'snuffed' like a candle. The bulb should be the only item that is actually showing but it is important that the LDR — light dependant resistor — is very close by with the active face pointing at the bulb.

When a match is struck and brought up to the bulb this causes light to fall on the LDR. The resistance of the LDR then falls considerably and since this forms a potential divider with RV1, which is coupled to the base of the transistor, the voltage here rises and causes the transistor to conduct. This causes current to flow through the bulb which in turn lights up.

When the match is withdrawn, the light from the bulb takes over as the source which keeps the resistance of the LDR low and so the transistor will remain on and the bulb will stay alight. If now the bulb is 'snuffed' by breaking the path of light between the bulb and the LDR, the bulb will go out and remain so until the light level once again reaches a sufficient brightness to turn the transistor on.

The use of a 6 V bulb is simply because these types are widely available and cheap and in order to prevent too high a voltage being applied the resistor R1 is connected in the emitter circuit. In the conducting stage there is a small voltage drop across Q1 and about 1.5-2 V will be dropped across the resistor, thus ensuring that the bulb is not overdriven.



Since the circuit will have to operate in widely differing light levels, it is necessary to control the sensitivity of the circuit and this is accomplished by RV1. In high ambient light levels the value of RV1 should be low, this means that the transistor will remain switched off until the light level created by the match goes above this level. In low light levels the value of RV1 will be high.

RV1 can take the form of a miniature preset control which, for normal uses, can probably be left at some level found experimentally for general purpose use. It is not possible to give even an indication of this value as the resistance of light dependant resistors varies considerably with the individual unit.

The current drain of 40 mA is rather heavy for a PP3 battery, though one in good condition will work for a short period. The heavy current drain may be acceptable as the circuit is unlikely to be on for long periods and this battery has the advantage of being small in physical size and cheap.

The on-off switch can take any convenient form, it may even be omitted, the circuit being switched off by removing the battery clips.

As we mentioned before the bulb should be the only thing that observers can see, all the other components being hidden in a small box on which the bulb is mounted. An LDR is about 16 mm in diameter. This can be well disguised since the active surface is rather smaller and in any case not all of it has to be exposed, even a 6 mm diameter hole should be sufficient and this hole should be close to the bulb and pointing at it. It must of course be possible to easily interrupt the light path between the bulb and the LDR in order to 'snuff' the lamp.

SHORT CIRCUITS is a feature that lies somewhere between Ideas for Experimenters and complete Projects. Generally, the items published in Short Circuits will involve tried circuits that have not necessarily been fully developed, but fairly complete details are included as a guide to readers. Unfortunately, owing to the nature of these items, we cannot give further details other than what is provided in the article. Contributions for Short Circuits are always welcome.