# ELECTRONIC AIR FRESHENER

YOU have no doubt noticed how muggy the air is before a storm and how fresh it can be when the storm is over, even if the temperature has not changed. Have you ever wondered what caused the difference? No, not humidity, but the balance between two types of charged particles in the air; charges due to the electrical discharges we call lightning. These particles are called ions, and come in two versions, positive and negative. When the balance between these two is not equalised, the air can feel heavy and humid, or fresh and light. With an excess of positive ions the air is oppressive; with an excess of negative ions it is invigorating. This same effect causes the difference between vitality-lowering jungle air, and invigorating Swiss mountain air. No one as yet can explain why we are effected in this way, but negative ions have been used experimentally with great temporary success to treat disorders such as asthma.

Your first step is to cut an aluminium cover for the machine and bend it as shown in the diagram. Drill three holes on each side to screw it to the wooden base. Now screw the ignition coil to the base so that it is central. If you intend to mount the dimmer on the base as I did it will be necessary to mount the coil at a third the distance from one edge to allow for the box. However, it would probably be neater to mount your control on the wall direct.

Now wire up according to the circuit. If you have the dimmer on the wall, connect the combination to a terminal block on the base board to anchor the wires as shown.

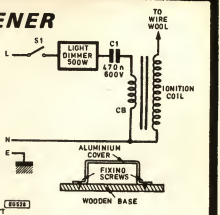
Now make a wick of wire wool and insert into the h.t. outlet at the top of the coil. Put on the aluminium cover you have made, connecting it to earth, and screw it down. You have now completed the working end of the negative ion generator.

A useful addition, for the sake of safety, is to fix a piece of zinc gauze across the top and bottom of the cover to allow free access of air, but which will keep inquisitive fingers away.

Now wire your terminal block to the light dimmer and switch on. If the dimmer has no mains switch, you will need to add one, but most now incorporate their own on/off switch. However, an extra switch in the line will add to safety as only you will now be able to switch the device on.

Having switched on you will be able to hear a high voltage discharge coming from the ignition coil. Now turn the dimmer *up* slowly till this discharge just ceases, and the air in your room will become like the Swiss Alps.

To understand the operation it is enough to know that a light dimmer contains a triac which is switched on part the way through each half cycle of the mains. The earlier during each half cycle it is switched on the more power it will pass.




The capacitor in our circuit passes this rapid switching charge through to the ignition coil at 100 times per second for 50Hz mains, rather like the contact breaker on the car opening 100 times per second, while at the same time isolating the mains from being directly connected to the ignition coil. Therefore 100 high voltage pulses are produced per second, the amplitude of which are controlled by the dimmer setting.

To convert this high voltage to negative ions, a silent discharge of electrons is required from a pointed object. I first tried a bunch of needles, but later found that wire wool provided thousands of minute sharp points for the purpose.

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# SNAP

THIS simple 'Snap' circuit is built around one 7400 (Quad NAND) which makes it very simple and cheap to build. The first two gates are in an R.S. flip-flop configuration, but both their outputs are held at '1' by connecting both switched inputs to '0'.

As soon as one of the switches is thrown then the gate has two '1' inputs and so gives a '0' output, which is put into the other gate, and thus prevents it from giving anything but a '1' output. Thus, while the switch is held the other switch cannot affect the state of the flip-flop. When the first switch is set back to '0', then the circuit is reset to its original stable state. The two other NAND gates are wired to invert the outputs from the flip-flop. Thus, when the switches are at '0' the l.e.d.s are not lit, but the appropriate l.e.d. is lit by the first switch to be set at '1'.

If s.p.d.t. push-to-make switches are used then the circuit will provide a sensisitive 'who pushed first' snap indicator which resets itself when both buttons are released.

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