

Electric brake for a radial saw

BY DR. JOHN D. GRIFFITH

Press a button
and eliminate the irritation
of waiting for the whirring blade
to coast slowly to a stop

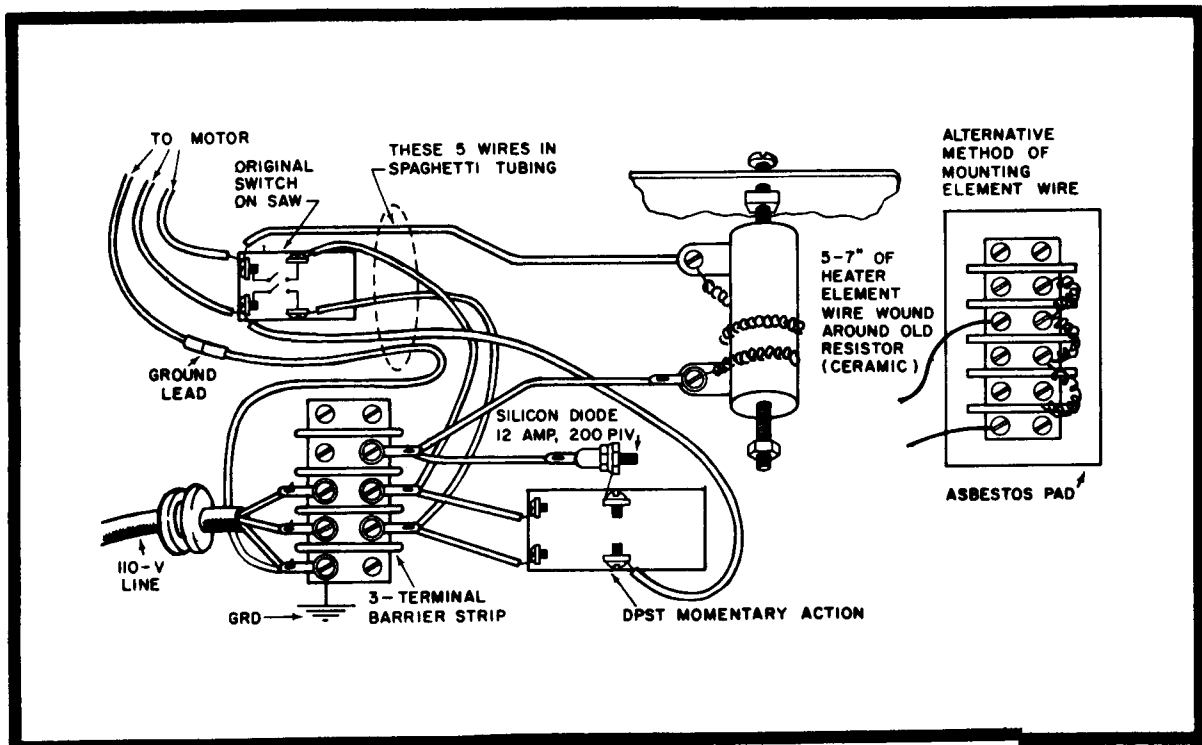
■ WAITING IMPATIENTLY for the blade of your radial-arm saw to coast to a stop can be for the birds. Not only is this an irritating waste of time, but a coasting saw blade can be the source of a serious injury.

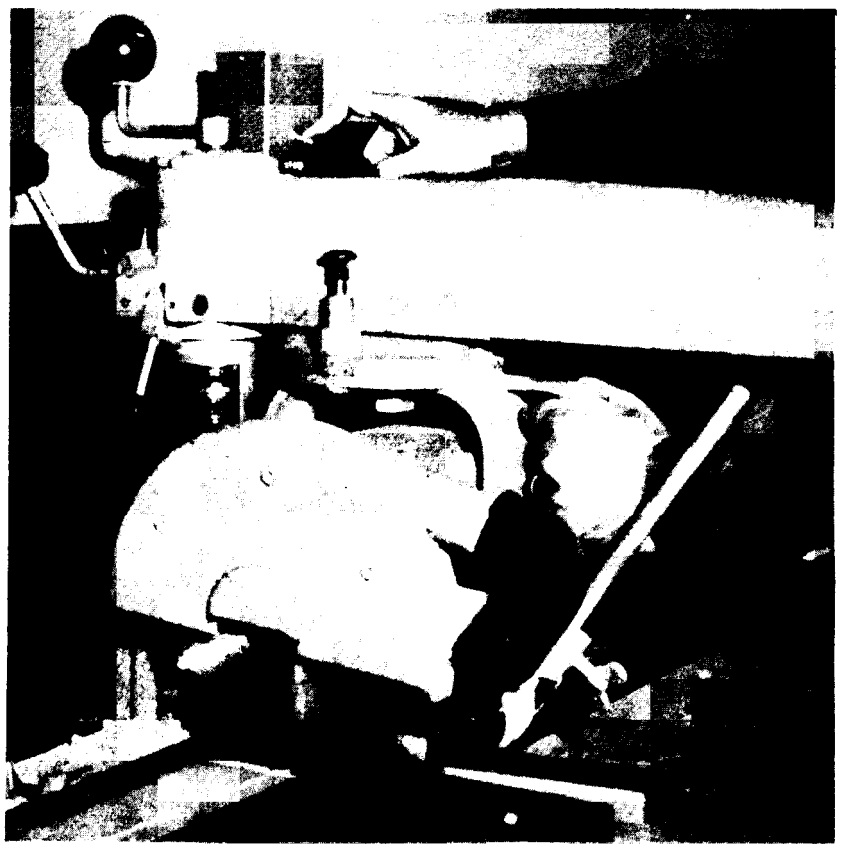
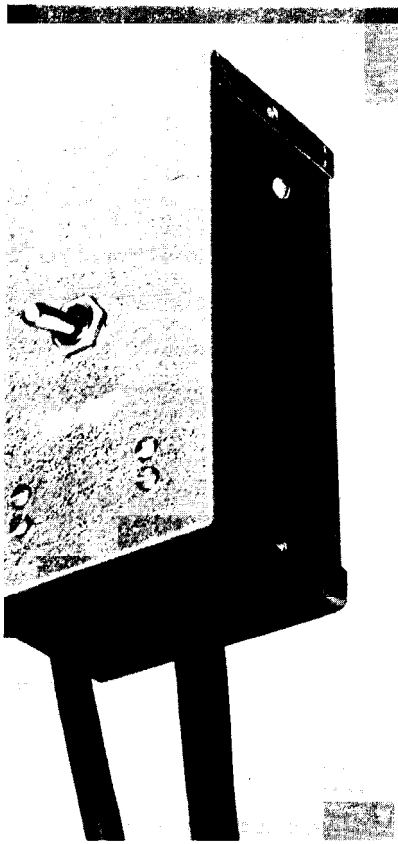
These are two reasons why you should take the time to add the electric brake described here to your saw.

Here's how it works: After the saw's motor is shut off, the brake button is pressed. This puts a silicon rectifier and a resistor in series with the motor's leads and the line, which in turn converts AC to DC. Direct current added to the fields of the motor causes the armature to slow down, and the more DC you induce, the quicker the motor will come to a stop.

The unit shown places about 12 amp of DC current to the fields, which is safe against overload on motors ranging from ½ to 1½ hp. The brake cannot be used on DC or small universal motors.

All components tuck neatly in a Minibox measuring only 2½ x 3 x 5¼ in. You should watch to see that no connections touch when the cover goes on, and plan to locate the glowing ceramic resistor so there is ample space around it. There's no need to worry about which end of the silicon





rectifier is cathode or anode for it works equally well even when installed in reverse position.

The resistor, which you make, is nothing more than a 7-in. length of $\frac{1}{4}$ -in. heater-element wire (B & S 20-ga. 1.1 ohm), wound around a $\frac{1}{2}$ x 3-in. high-value ceramic resistor. If you have trouble finding this, you can use a piece of ceramic from a lead-in insulator. Attach the ends of the element wire to the original terminals of the resistor, but do not solder them; either use lock washers or crimp-on lugs.

The silicon rectifier does not need a massive heat sink for occasional operation if you use one having the rating indicated. This hookup will work nicely with a heavy copper wire and spade lug as your heat sink. Since rectifiers have two current ratings (continuous and peak), watch out for "bargain" units in which the 12-amp rating actually turns out to be the peak (1 cycle) rating. Such units will literally explode when subjected to 12 amps for even a few seconds.

To install the brake, disconnect the line cord to the motor and rewire it as a line cord to the Minibox, following the diagram and making sure

that you connect the ground wire to the box itself. Now fish the 5 wires from the box to the saw's motor through a 36-in. length of spaghetti tubing and attach the leads as shown in the diagram. The important thing is not to reverse leads 3 and 4 to the motor switch; if you do, you will blow a fuse as soon as you switch on the motor.

Test the completed brake with the blade securely tightened on the mandrel. Note the number of seconds it takes for the blade to coast to a stop. If *more* than 8 seconds, keep shortening the length of the resistance wire, but don't try for a quicker stop as sudden braking action could loosen the saw blade.

PARTS LIST

- 1— $2\frac{1}{8}$ x 3 x $5\frac{1}{4}$ " Bud Minibox
- 1—Silicon diode, 12 amp. 200 P.i.v.
- 1—7" length of $\frac{1}{4}$ " coil, B & S 20-ga. heater element wire (1.1 ohm/inch)
- 1—D.p.s.t. toggle switch; off, momentary on
- 1—Barrier strip, 3-terminal
- Assorted hardware, grommets