A SIMPLE SHOCK CIRCUIT FOR RATS¹

JOHN A. BARLOW

EARLHAM COLLEGE

The simplest shock circuit is arranged by connecting every other bar of the shock grid to one electrical potential and the alternate bars to a second potential. The rat thus receives a shock only when it is touching both types of bars. Two problems confront the investigator using such a circuit with white rats or other small animals as subjects: (1) Animals tend to learn to escape the shock by standing on bars with the same potential, and do not learn the response that the experimenter wishes to reinforce; and (2) A single piece of feces will short out the entire shock circuit.

Wyckoff and Page (1954) present a solution to these problems through the use of a "scrambler" or "grid confuser" which constantly changes the shock potentials on the individual bars. A much less expensive method, which is satisfactory for some purposes, is to wire the shock grid-bars in series rather than in parallel. In the extreme form of the series circuit, each bar across the entire grid would be charged at a different potential by connecting resistances between bars.

We have used several circuits based on this principle. In one, two banks of four No. 7 copper bus bars were used as the grid. The front bar was connected to the ground side of 117 volts AC; and the rear bar, to the hot side through a 60,000-ohm resistor. Numbering from the front, these pairs of bars were connected together: 2 to 5, 3 to 6, and 4 to 7; and 15,000-ohm resistors were wired between bars 1 and 2,

3 and 4, 5 and 6, and 7 and 8. The bars are 0.375 inch from center to center, and the banks are 0.5 inch apart in a total floor space of 3.5 by 10 inches.

With this circuit, one or two fecal boli do not short out all the shock, and the number of positions in which the rat can completely escape the shock is reduced. Standing on Grids 2 and 5, 3 and 6, or 4 and 7 will still eliminate the shock. For this reason, the bars need to be close together (0.09 inch or less) so that each foot normally touches two bars. In addition, in the circuit described, there is about a threefold range of shock currents that the rat can receive depending on which grids it touches. For most purposes, these disadvantages seem to make this procedure inferior to the scrambler technique. However, we have found it is a satisfactory shock arrangement that may have advantages over other techniques when the precise time of onset or termination of shock is an important consideration.

REFERENCE

Wyckoff, L. B., and Page, H. A. A grid for administering shock. *Amer. J. Psychol.*, 1954, **67**, 154.

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