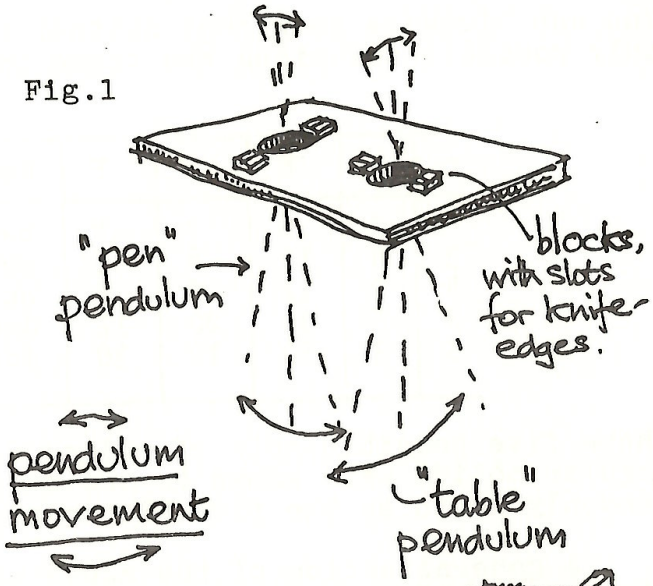
THE HARMONOGRAPH

This machine is easily constructed from scrap material, using simple tools. The method below may be followed, or modified according to available means.

Start with a table; i.e. a strong platform on which to base the mechanism. Cut holes about 2½" dia., about 10" apart. Two pendulums have to be mounted in these holes, so that their oscillations will be exactly at right-angles, and without any irregularities of movement. (Fig.1) The best way is probably by means of knife-edges, passing through the pendulum body, about 6" from the top, and resting in carefully-cut or filed slots, in bed blocks, on opposite sides of the two holes. (Fig.2)

Fig.1



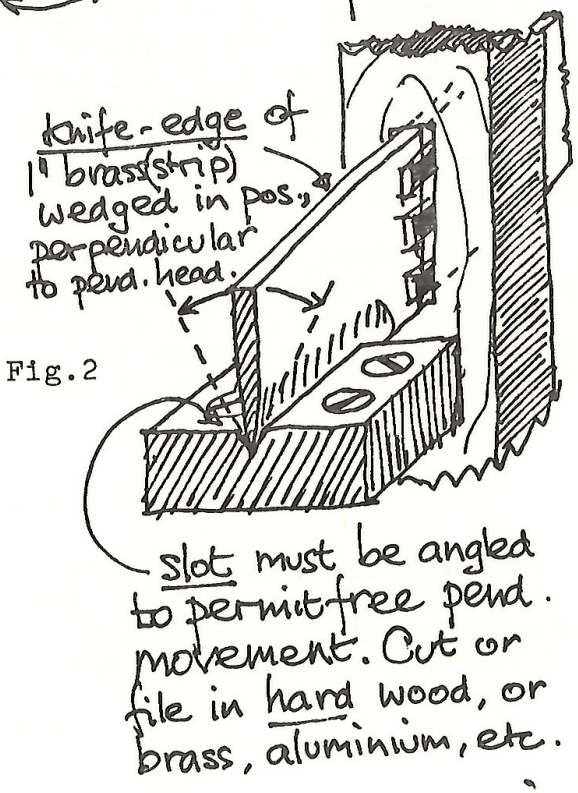


Fig.2

The pendulums should have an effective length of about 40" (minimum) for a good-shaped figure. Make from thin, light, but strong wood, and drill holes at about 1" intervals along the bottom 2 ft, so that, with a nail through it, weighted cans may be moved up and down, to experiment with different periods, producing different patterns. (Fig.3)

The pendulums must be linked by a very light, freely-pivoted crossing arm mounted on one pendulum, the free end having a pen, which

traces out the developing pattern on a small table (approx. 9" sq.) mounted firmly at right-angles on the top of the other pendulum. (Fig.4)

This pen arm must be carefully made, without any sideways movement in the pivot, since this will destroy the purity of the pattern. Make the pivot-pin very thin, and smooth, to minimise friction, with holes in a bent tin attach-ment-bracket, on top of the appropriate pendulum, exactly to size. A 1/32" drill is ideal to bore the holes with, and then to use as the pin. (Use only the unfluted part.)

If slightly heavier pieces of wood are joined to the tops of the pendulums, it will be easier to mount the pen-arm bracket and the drawing-table, as well as forming a wider section to take the knife-edges. How-ever, make them as light as possible, since they tend to offset the pendulum effect, making it "slope".

The drawing-table, too, should be light: 3/8" ply-wood is quite adequate. Joining to the pendulum might be difficult; if possible, cut out a wooden collar, with hole to fit the top of the pendulum, then screw to the centre of the table, and carefully glue/screw to the pendulum.

When finally assembled, the"infernal machine" should be fixed level, and free from vibrating influences.

general arrangement - side view

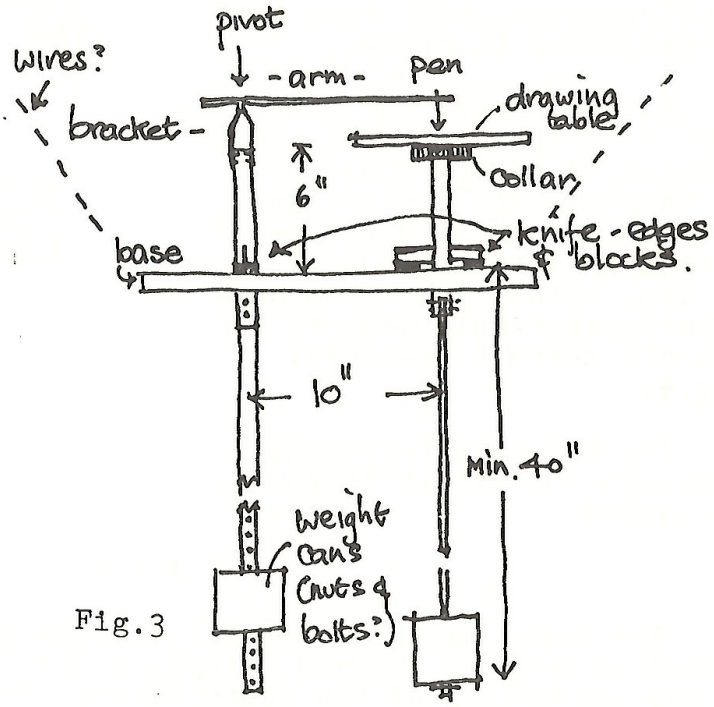
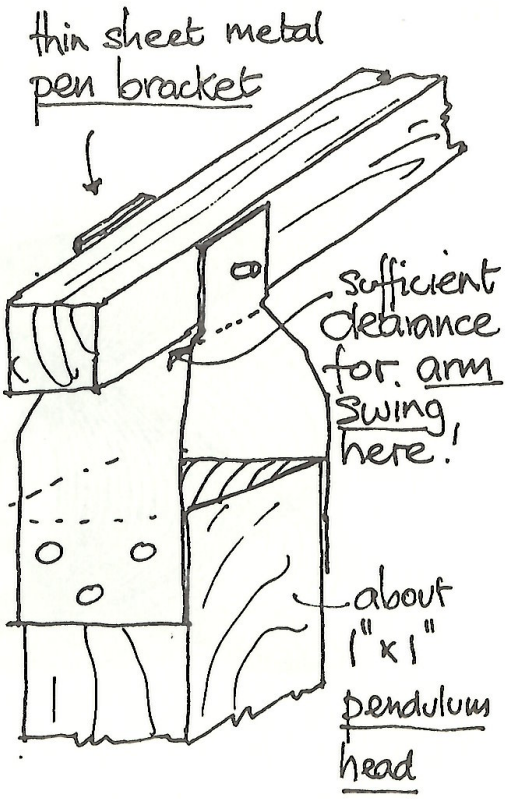


Fig.3

Fig.4



Suspend the corners of the base by diagonal wires from a solid support, or place the ends of the base on level supports, with room for the pendulums to swing.

A final word: the pen might be a problem. The best solution is to buy a 0.3 or 0.2 "Rapidograph" cartridge unit, and mount in a close-fitting hole on the end of the arm, which might then have to be counter-balanced, to give the correct pressure. (Fig.5)

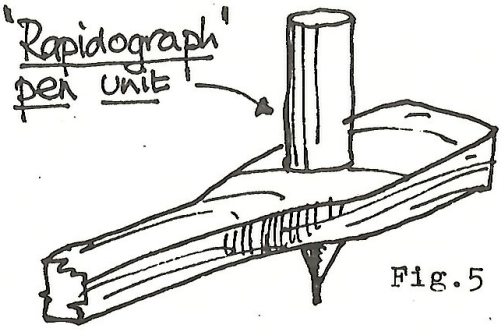


Fig.5

The end result is well worth all the effort as you will agree.

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The Harmonograph, with its descriptive diagrams, was contributed by Mr Richard Jermyn, a 2nd Year Architecture student at the University of New South Wales. The resulting graphics throughout this issue have been prepared by the machine he built himself.

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