Among the Model-Builders

By "Spanner"

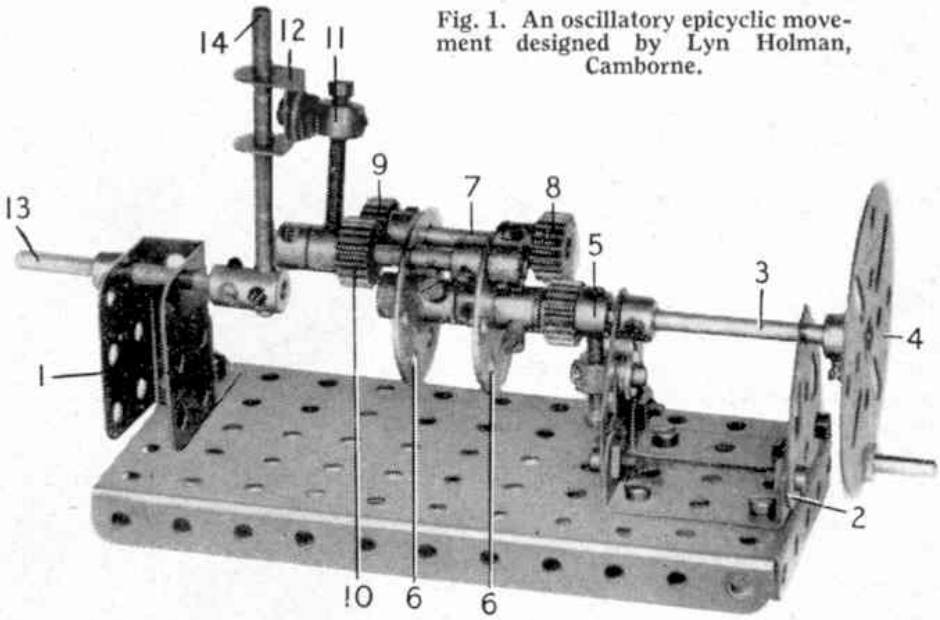

Fig. 1. An oscillatory epicyclic movement designed by Lyn Holman, Camborne.

An Oscillatory Epicyclic Movement

A CHANNEL Bearing 1 is attached to a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate with a $1'' \times 1''$ Angle Bracket. Two Flat Trunnions 2 are bolted to two $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips secured to the Flanged Plate. Through the Flat Trunnions a $4\frac{1}{2}''$ Rod 3 with Hand Wheel 4 is journalled. A $\frac{1}{2}''$ Pinion 5 is loosely placed on the Rod with a $\frac{3}{4}''$ Bolt in its boss. The Bolt is anchored in a Collar bolted to the inner Flat Trunnion. Two six-hole Bush Wheels 6 fastened to the Rod 3 are spaced apart with a Collar and Washer as shown. Secured to the $1\frac{1}{2}''$ Rod 7 are two $\frac{1}{2}''$ Pinions 8 and 9. Pinion 9 engages with a $\frac{1}{2}''$ Pinion 10 on a $2''$ Rod that is held in position in the Bush Wheels by three Collars, and is free to rotate. A $1\frac{1}{8}''$ Bolt is inserted in the boss of the Pinion 10 and it carries a Collar 11, which is lock-nutted to a Double Bracket 12. A $2''$ Rod 13 mounted in a Channel Bearing, supports a Short Coupling holding a $2\frac{1}{2}''$ Rod 14, upon which the Double Bracket slides. Before finally securing the $\frac{1}{2}''$ Pinions on the Rod 7, they should be rotated so that the $1\frac{1}{8}''$ Bolt is located in an upright position, so imparting an oscillatory movement to the Rod 14.

The mechanism, which was designed by Lyn Holman, Camborne, is intended for converting continuous rotary motion into oscillating motion about the same centre line, but without using any fixed point other than that on the centre line. It makes use of a condition in epicyclic gearing in which two gears move bodily around a third gear, which is fixed from rotation, all the gears meshing. If the outer gear has the same number of teeth as the fixed gear it will not rotate about its axis. Any point on this outer gear therefore remains in the same relative position regardless of its rotation around the "sun" wheel. This "point" is represented in the model seen in Fig. 1 by the $1\frac{1}{8}''$ Bolt is the boss of the $\frac{1}{2}''$ Pinion.

Inconstant Speed Gear Box

This gear-box, designed by H. C. Geesink, The Hague, Holland, transforms a constant speed into an inconstant speed, which can be interrupted or given a back and forward movement by fixing or loosening the set-screws of the $2\frac{1}{2}''$ Face Plate 44. This gear-box might be used for many interesting models such as a meccanograph designing machine and mechanical tools.

Details of the mechanism are as follows. Two $7\frac{1}{2}''$ Angle Girders 1 are joined together by five $5\frac{1}{2}''$ Angle Girders and braced at each corner with $1''$ Corner Brackets. Now bolt the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates 2 and 3, with $2\frac{1}{2}''$ Angle Girders, to the $5\frac{1}{2}''$ Angle Girders 4. A $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plate is then bolted to the $2\frac{1}{2}''$ Angle Girders to support the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates. The $1\frac{1}{2}''$ Angle Girder 5 holds a Flat Trunnion. To the remaining $5\frac{1}{2}''$ Angle Girders secure $1\frac{1}{2}''$ Angle Girders at each end, and connect each pair with a $5\frac{1}{2}''$ Slotted Strip and a $5\frac{1}{2}''$ Flat Girder, the middle two having a $2\frac{1}{2}''$ Flat Girder bolted to them. The $2\frac{1}{2}''$ Angle Girder and the $1\frac{1}{2}''$ Angle Girders are joined together by a $7\frac{1}{2}''$ Strip 6 and a $3\frac{1}{2}''$ Strip 7. Two $1\frac{1}{2}''$ Strips 8 and 9 are attached to the $1\frac{1}{2}''$ Angle Girders with a Double Bent Strip to support the $1\frac{1}{2}''$ driving Rod 10.

To the Rod 10 a Face Plate 12 is secured and also a $\frac{3}{4}''$ Contrate Wheel 11 that engages with a $\frac{1}{2}''$ Pinion 14 fixed to the $2\frac{1}{2}''$ Rod 13. On each end of the Rod 13 is fixed a Rod Socket 15, each of which is tightly