Magnificent Meccanograph 32—33

Meccanomen around the world and Elastic Band Gun 35

Meccano Road Grader 38

MECCANO
DINKY TOYS AND TRIANG-HORNBY

by Spanner

A Magnificent Meccanograph

ONE of the most fascinating gadgets that can be built in Meccano is the Meccanograph—an ingenious pattern-producing machine.

Credit for designing the original model is due to Mr. Andreas Konkoly of Budapest, Hungary, and building instructions are given below. However, before starting, I must stress that when I refer to 'above' and 'below', I am assuming that the model is in an upright position.

Framework

A rectangle is built up from two 9½ in. Angle Girders 1, connected three holes from each end by two 5½ in. Angle Girders 2 and 3, Girder 2 being fixed in place by Rod Sockets. Mounted in each of these is a 1½ in. Rod 4 carrying two Collars. At one end the rectangle is further strengthened by a 5½ in. Flat Girder 5, to both ends of which an Angle Bracket 6 and a ½ in. Reversed Angle Bracket are bolted. The Reversed Angle Brackets are joined by a 4½ in. by ½ in. Double Angle Strip 7.

To the opposite ends of Girders 1 are bolted a 3½ in. Strip 8 and a 3 in. Strip 9. Strips 9 are joined, via Angle Brackets, by a 5½ in. Strip 10. A 2½ in. Flat Girder is fixed to the side flange of Girder 1 and to Angle Bracket 6, then is connected to Strips 8 and 9 by a 9½ in. Angle Girder 11. Angle Girders 11, at each side, are joined by two 5½ in. Angle Girders 12.

Also fixed to Girders 11 is a 5½ in. Strip 13 held by 1⅛ in. Bolts each carrying two Collars and a 1 in. fixed Pulley with Tyre, while the 2½ in. Flat Girders are joined via Angle Brackets, by a 5½ in. Angle Girder 14. This Girder is attached to the Angle Brackets also by 1⅛ in. Bolts carrying two Collars and a 1 in. fixed Pulley with Tyre.

Revolving Table and Gearbox

It is best to build the revolving table and its corresponding gearbox separately. A frame is obtained from two 3½ in. Angle Girders 15, connected by a 4½in. by 2½ in. Flat Plate. Two 2½ in. by ½ in. Double Angle Strips bolted one to each Angle Girder 15, are joined by a 4½ in. Strip 16, a Washer spacing the Strip from the lug of each Double Angle Strip. Also bolted to the Double Angle Strips are Angle Brackets which are joined, in turn, by another 4½ in. Strip 17.

Journalled in a six-hole Bush Wheel, bolted to the underside of the Plate to act as a bearing and in Strips 16 and 17, is a 3½ in. Rod 18, held in place by a six-hole Bush Wheel above the Plate and by a 3½ in. Gear Wheel 19 beneath Strip 16. This Gear has been removed in one of the accompanying illustrations. Mounted on the Rod, between the lower Bush Wheel and Strip 17 are, in order, a 50-teeth Gear 20, a Collar, a Washer, another Collar, a 60-teeth Gear 21 and a 57-teeth Gear 22. Also mounted on the Rod, but between Strips 17 and 16, are two Washers, a 2½ in. Gear 23 and another Washer.

Journalled in the Flat Plate and Strip 17 is a 2½ in. Rod which carries, from top to bottom, a Washer, a ¾ in. Pinion 24, a Washer, a Coupling 25, mounted through its centre transverse bore, another Washer, a 7/16 in. Pinion 26 and a ½ in. Pinion 27. Pinion 24 is in mesh with Gear 20, Pinion 26 with Gear 21 and Pinion 27 with Gear 22.

A 1½ in. Rod carrying a ½ in. Pinion 28 and a Washer above Strip 17 and another ½ in. Pinion 29 between the Strips, is journalled in Strips 16 and 17. Pinion 28 is meshed with Pinion 27 and Pinion 29 with Gear 23.

Also journalled in Strips 16 and 17 is a 2 in. Rod. This carries a Collar, a ½ in. Pinion 30 and a Washer above Strip 17, and two Washers and a ½ in. Pinion 31 beneath Strip 16. Pinion 30 meshes with Pinion 28 and Pinion 31 with Gear 19.

Mounted in the longitudinal bore of Coupling 25 and in the Double Angle Strip bolted to one Angle Girder 15 is a 2½ in. Rod that carries a ¾ in. Contrate Wheel 32, in mesh with Pinion 24 and a six-hole Bush Wheel 33. The Rod is secured by two Collars, fixed one each side of the Double Angle Strip.

The whole assembly is positioned in the main framework on two 8 in. Rods mounted in Girders 2 and 3 and held by Collars.

Additional Gearing

A 5 in. Rod, on which a ½ in. Helical Gear 34 and a Worm 35 are mounted, is journalled in Strips 8 being held in place by a Collar and a Crank. A 1⅛ in. Bolt, supporting a loose Coupling is fixed to the arm of the Crank to act as a handle. The Worm is in mesh with a 57-teeth Gear 36 on a 4 in. Rod mounted in Strips 10 and 13. Also secured on this Rod are a 50-teeth Gear 37, two Collars, and a ¾ in. Pinion 38, this last unmeshed at present.

Another 4 in. Rod is journalled in Strips 10 and 13. On this is mounted, in order from top to bottom, a Single Throw Eccentric 39, a Washer, a ⅞ in. Bevel Gear 40, a Collar, a Coupling 41, another Collar, a 50-teeth Gear 42 (unmeshed at present), two Washers, a ¾ in. Pinion and a third Collar. Gear 37 meshes with Pinion 43.

Yet a third Rod, a 4½ in., is journalled in Strips 10 and 13. On this is secured a Face Plate 44, a 1½ in. Helical Gear 45, two Washers, three Washers and a 50-teeth Gear 46. Helical Gear 45 meshes with Helical Gear 34.

A 1½ in. Rod is mounted in the longitudinal bore of Coupling 41 and in the apex hole of a Trunnion 45, bolted to Angle Girder 3. Fixed on the Rod is an eight-hole Bush Wheel 47, a Collar, three Washers and a ⅞ in. Bevel Gear 48. This last meshes with Bevel Gear 40, while Bush Wheel 47 is connected to Bush Wheel 33 by two ¾ in. Bolts, fixed in diametrically opposite holes of Bush Wheel 33 with their shanks projecting through corresponding holes in Bush Wheel 47.

The arm of Eccentric 39 is extended two holes by a 2 in. Strip, through the end hole of which a Threaded Pin is fixed. The shank of the Pin, in turn, is passed through the circular hole in one lug of an Angle Bracket, attached to Angle Girder 3 by Bolt 49.

At the other end of the model, a 5 in. Rod 50 is journalled as shown, being held

in place by a Collar and a 50-teeth Gear 51 with a Washer acting as a spacer. Two Face Plates 52 with three ¾ in. Bolts passed through them, are also fixed on the Rod to serve as a cam working against the pen arm.

The pen arm itself, is an 11½ in. Rod held in a Handrail Coupling 53 fixed to a 4½ in. Rod mounted in two 1½ in. Flat Girders bolted to Angle Girders 1 and 11. A Collar above the upper Flat Girder prevents the Rod from falling through. Loose, on the 11½ in. Rod is a Coupling 54 that carries a Long Threaded Pin 55, a Handrail Support 56 and a Threaded Pin 57. Secured on Pin 57 is a Small Fork Piece in which a ball-point pen is clamped by a ½ in. Bolt. A 2 in. Rod is fixed in Handrail Support 56 and a Cone Pulley is added to act as a weight.

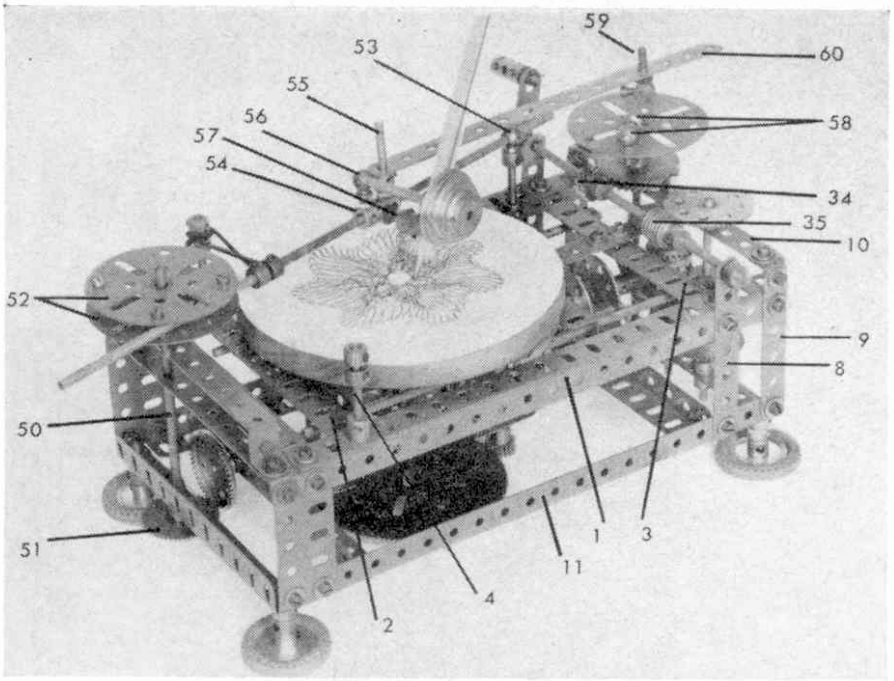
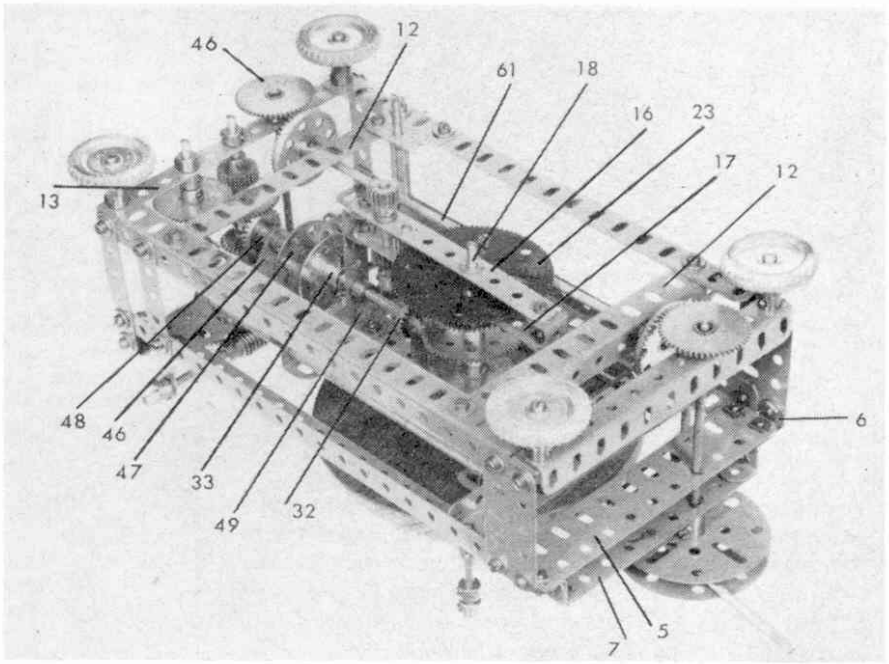
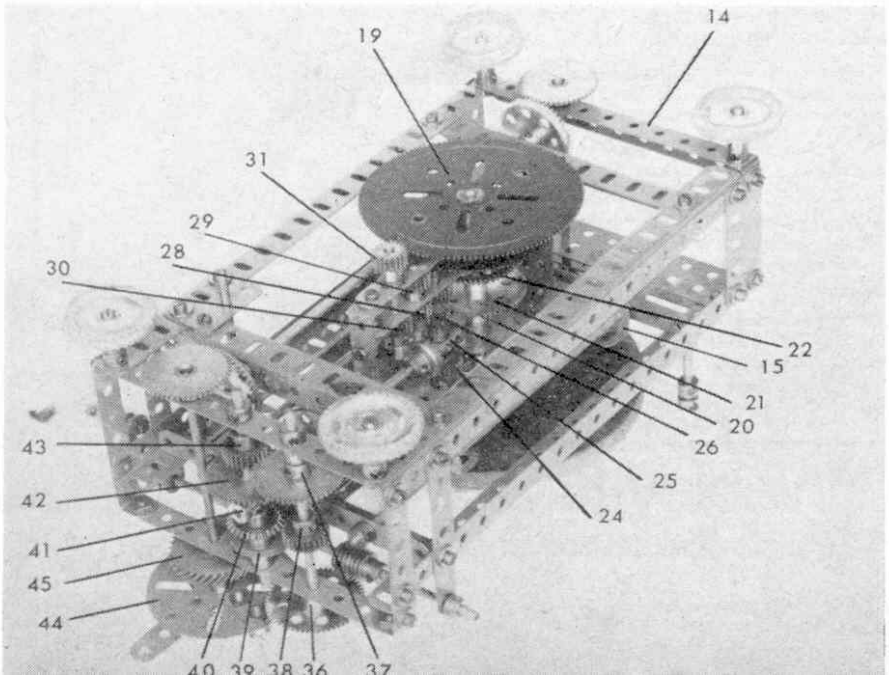
Two Handrail Supports 58 are attached to Face Plate 44, and in these a 2½ in. Rod is mounted. Fixed on this Rod is a four-hole Collar, Part No. 140y, in which a Threaded Pin 59 is mounted. Another four-hole Collar is added to Long Threaded Pin 55 then a 7½ in. Strip 60 is slipped over Pins 55 and 59.

The pin arm is kept in contact with the cam by a Driving Band wrapped round one of the Rods 4 and round the 11½ in. Rod, being prevented from sliding by two Collars. The actual revolving table is a disc made of wood or another suitable material, bolted to the Bush Wheel at the top of Rod 18.

Finally, an 8 in. Rod 61, with a 1½ in. Contrate Wheel at each end is mounted in Girders 12, Washers being used as spacers so that the Contrates mesh with Gears 46 and 51.

Varying the Pattern

Many different patterns can be obtained in several ways. The length of Strip 60 can be altered by fitting Pin 59 in different holes or the cam can be modified by changing the number and position of the Bolts. Also, Pinion 43 can be taken out of mesh with Gear 37, while Pinion 38 is brought into mesh with Gear 42. Even the pen arm, itself, can be moved to the other side of the cam, provided that the Driving Band is transferred to the other Rod 4.

Parts Required

1 of No. 1b	2 of No. 24b	1 of No. 103
2 of No. 2	3 of No. 25	2 of No. 103f
2 of No. 2a	5 of No. 26	2 of No. 103h
2 of No. 3	1 of No. 26c	3 of No. 109
2 of No. 3a	5 of No. 27	5 of No. 111
2 of No. 6	2 of No. 27a	3 of No. 111a
4 of No. 8a	1 of No. 27b	5 of No. 111d
5 of No. 9	1 of No. 27c	3 of No. 115
2 of No. 9b	1 of No. 27d	2 of No. 115a
9 of No. 12	2 of No. 28	1 of No. 116a
1 of No. 13	1 of No. 29	1 of No. 123
3 of No. 13a	2 of No. 30	2 of No. 125
1 of No. 14	1 of No. 32	1 of No. 126
1 of No. 15	69 of No. 37a	1 of No. 130a
2 of No. 15a	56 of No. 37b	3 of No. 136
2 of No. 15b	78 of No. 38	1 of No. 136a
1 of No. 16	2 of No. 48a	2 of No. 140y
3 of No. 16a	1 of No. 48c	4 of No. 142c
2 of No. 17	1 of No. 53a	2 of No. 179
4 of No. 18a	32 of No. 59	1 of No. 186a
4 of No. 22	1 of No. 62	1 of No. 221a
1 of No. 24	4 of No. 63	1 of No. 221b