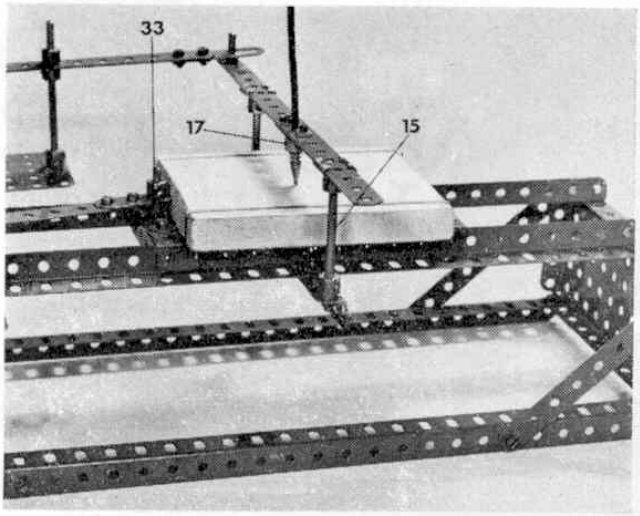


VARIABLE LINE PATTERN MACHINE

Another in the Meccanograph machine series by SPANNER

IN MECCANO Magazine over the years we have featured various types of designing machines. These have included straight-forward "Meccanographs," producing completely circular patterns, and even a more complicated "Spiralograph" where the chosen pattern spirals to the centre of the material on which it is being drawn. Thanks to Mr. H. Revvar we are now able to expand the series with an interesting model which I have titled a "Variable Line Pattern Machine." Although this may sound rather complicated, it is, in fact, a machine that draws "wavy" lines, but, before you dismiss it as being beneath your interest, let me say that with skill and practice, some very intricate designs can be produced.

To get down to actual construction, however, two 17 in. compound angle girders 1 are each built up from a 12½ in. Angle Girder extended nine holes by a 5½ in. Angle Girder; then the compound girders are connected at one end by a 5½ in. Angle Girder 2 and at the other by a 5½ × 2½ in. Flanged Plate 3.

Bolted to each Girder 1, as shown, are two 7½ in. Angle Girders 4, joined at the top by a 4½ in. Angle Girder 5 and, six holes down, by a 4½ in. Strip 6. The centres of Girder 5 and Strip 6 at one side are joined by a 3 in. Strip 7, Girders 5 at each side then being connected by a 5½ × ½ in. Double Angle Strip 8 while Strips 6 are connected by another, similar, Double Angle Strip 9

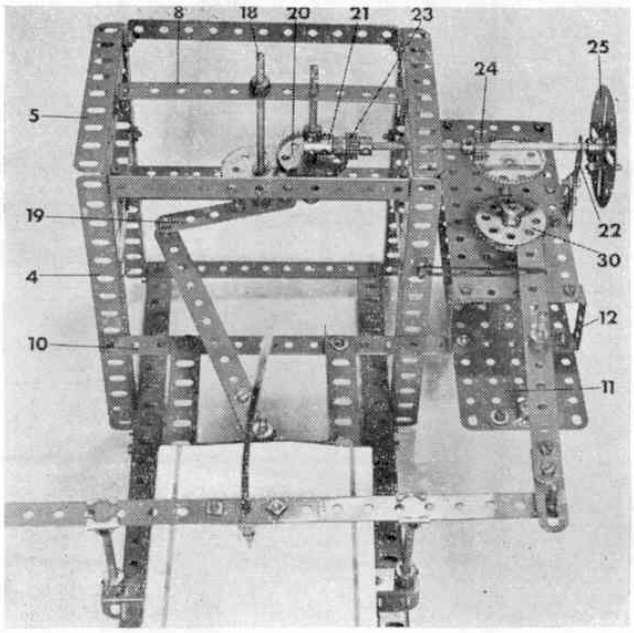
Bolted between opposite Girders 4 at each side are two 5½ × ½ in. Double Angle Strips and two 9½ in. Angle Girders 10 which project a distance of six holes in one direction only. Attached to the projecting part of these Girders is a 7½ × 2½ in. compound flat plate 11, obtained from two 4½ × 2½ in. Flat Plates. The Bolts securing the plate to the Angle Girders also fix in place four 1½ × ½ in. Double Angle Strips 12, the upper lugs of which provide anchoring points for a 5½ × 2½ in. Flat Plate 13. Inside Angle Girder 10 is joined to Flanged Plate 3 by two 12½ in. Angle Girders 14, bracing between the Plate and Girders being supplied by two 4½ in. Strips.

Having dealt with the general framework, we now come to the pen arm mounting. A 5½ in. Angle Girder is fixed to Girders 14, through their fourteenth holes, by ⅜ in. Bolts, two Washers on the shank of each Bolt serving as spacers between the Girders. Two Rod Sockets, carrying 2½ in. Rods 15, are fixed one in each end hole of the 5½ in. Girder, then a Slide Piece is mounted on the top of each Rod. Held in these Slide Pieces is a 9½ in. Strip in one end hole of which a Threaded Pin 16 is fixed and to the underside of which is bolted a Double Arm Crank 17, its boss coinciding with the eleventh hole in the Strip, counting from the Threaded Pin end.

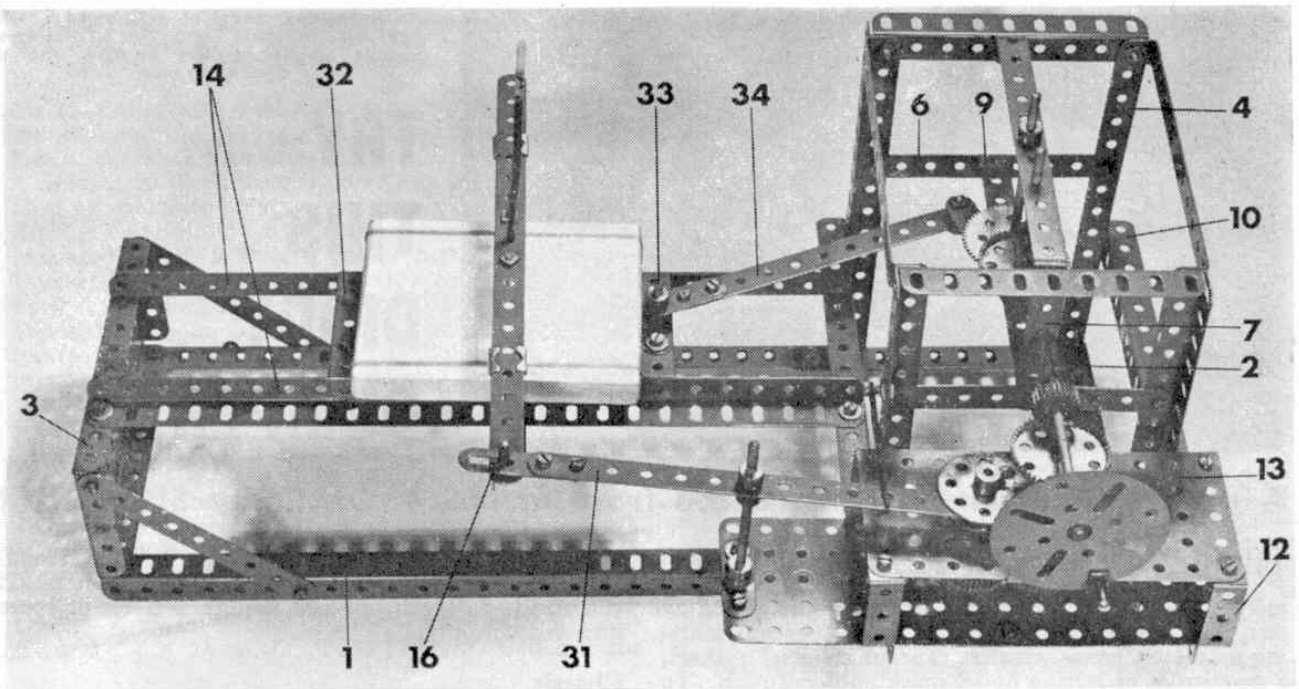
Gearing and drive

As this model is hand-driven, we are saved any complications involved in fitting a motor, but a fairly detailed gearing system must still be included to convert the single input drive to the two output movements, one controlling the work-table and the other the pen arm. A 4 in. Rod 18, carrying a 60-teeth Gear is journalled in Double Angle Strips 8 and 9, being held by a Collar and a Double Arm Crank extended by a 3 in. Strip 19. The Gear Wheel meshes with a 7/16 in. Pinion on a 3½ in. Rod also journalled in Double Angle Strips 8 and 9 and carrying, in addition to the Pinion, a 1½ in. Contrate Wheel 20 and a Short Coupling 21, the latter loose on the Rod, but prevented from rising up it by a Collar.

Free in the longitudinal bore of the Short Coupling is a 5½ in. Rod journalled in one Strip 7 and a 2 in. Strip 22 attached to Flat Plate 13 by a Trunnion. Mounted on the Rod are a ½ in. Pinion 23 in mesh with Contrate 20, a Collar against Strip 7, a ¾ in. Pinion 24 and a Faceplate 25 in which a Threaded Pin is fixed



Above, a close-up view of the pen arm and work table. Spanner used a ball-point refill for the pen which was kept in contact with the work table by a Compression Spring. Left, the "business" end of the machine showing the general layout of the gearing and drive mechanism. Note the Driving Band which keeps the pen arm connecting strip located between Bush Wheels 30.



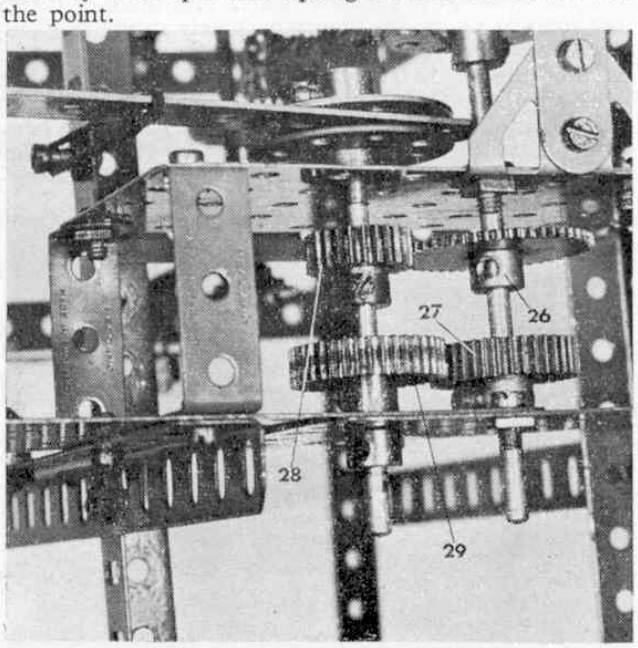
to serve as a handle. Pinion 24 meshes with another $1\frac{1}{2}$ in. Contrate Wheel on a $3\frac{1}{2}$ in. Rod held by a Collar in Flat Plates 11 and 13. Also mounted on this Rod, between the Plates, are a 50-teeth Gear Wheel 26 and a 1 in. Gear 27, the former engaging with a $\frac{3}{4}$ in. Pinion 28 and the latter with another 1 in. Gear 29, both on a 3 in. Rod, at the top of which two 8-hole Bush Wheels 30 are secured. Note that both Gears 26 and 27 cannot be used to transmit the drive at the same time. One must be loose on its Rod while the other is fixed in mesh. The design of the pattern will, of course, vary according to which Gear is in use.

Engaging between Bush Wheels 30 is a $7\frac{1}{2}$ in. Strip 31, extended by a 2 in. Slotted Strip and pivotally held by Collars on a 3 in. Rod mounted in the boss of a Double Arm Crank bolted to compound flat plate 11. Threaded Pin 16 engages in the slot of the Slotted Strip. Bolts are inserted in the holes in the faces of Bush Wheels 30 and Strip 31 is held against these by the tensioning action of a $2\frac{1}{2}$ in. Driving Band slipped over both the Strip and a $\frac{3}{8}$ in. Bolt held by Nuts in nearby Girder 4. Alterations in the movement of the pen arm are effected by changing the number and positions of the Bolts in Bush Wheels 30.

PARTS REQUIRED

1	—	1a	2	—	17	2	—	50
1	—	1b	2	—	18b	2	—	52
1	—	2	2	—	24	2	—	53a
4	—	2a	2	—	25	1	—	55a
2	—	4	1	—	26	9	—	59
1	—	6	1	—	26c	4	—	62b
4	—	8	1	—	27	1	—	63d
2	—	8a	1	—	27a	1	—	70
4	—	8b	2	—	28	1	—	109
4	—	9	2	—	31	3	—	111c
2	—	9a	70	—	37a	3	—	115
1	—	14a	62	—	37b	4	—	125
1	—	15b	30	—	38	1	—	126
2	—	16	4	—	48	2	—	179
2	—	16b	4	—	48d	1		186

Above, a general view of the completed Variable Line Pattern Machine for producing " wavyline " designs. Right, a close-up view showing the gearing transferring the drive to the pen arm oscillator cam. Note that Gear 27 must be left free on its rod when Gear 26 is in mesh with Pinion 28, and vice versa.

We are now left with the work-table which consists of a block of wood approximately $4\frac{1}{2}$ in. long by $3\frac{3}{4}$ in. wide by $\frac{1}{2}$ in. thick, to the underside of which a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plate 32 is fixed with small wood screws. The Flanged Plate slides on the vertical flanges of Angle Girders 14, four guides being provided by four Reversed Angle Brackets beneath the Plate. Bolted to the top of the Flanged Plate, at one end, is a Double Arm Crank in the boss of which a 1 in. Rod 33 is held. This Rod is connected to a Threaded Pin fixed in the end of Strip 19 by a 6 in. compound strip 34, obtained from a $1\frac{1}{2}$ in. and a $5\frac{1}{2}$ in. Strip, Collars holding the strip in place.

Finally, the marking instrument (we used a ball-point pen refill) is carried loose in the boss of Double Arm Crank 17, the point being held against the work-table by a Compression Spring between the Crank and the point.