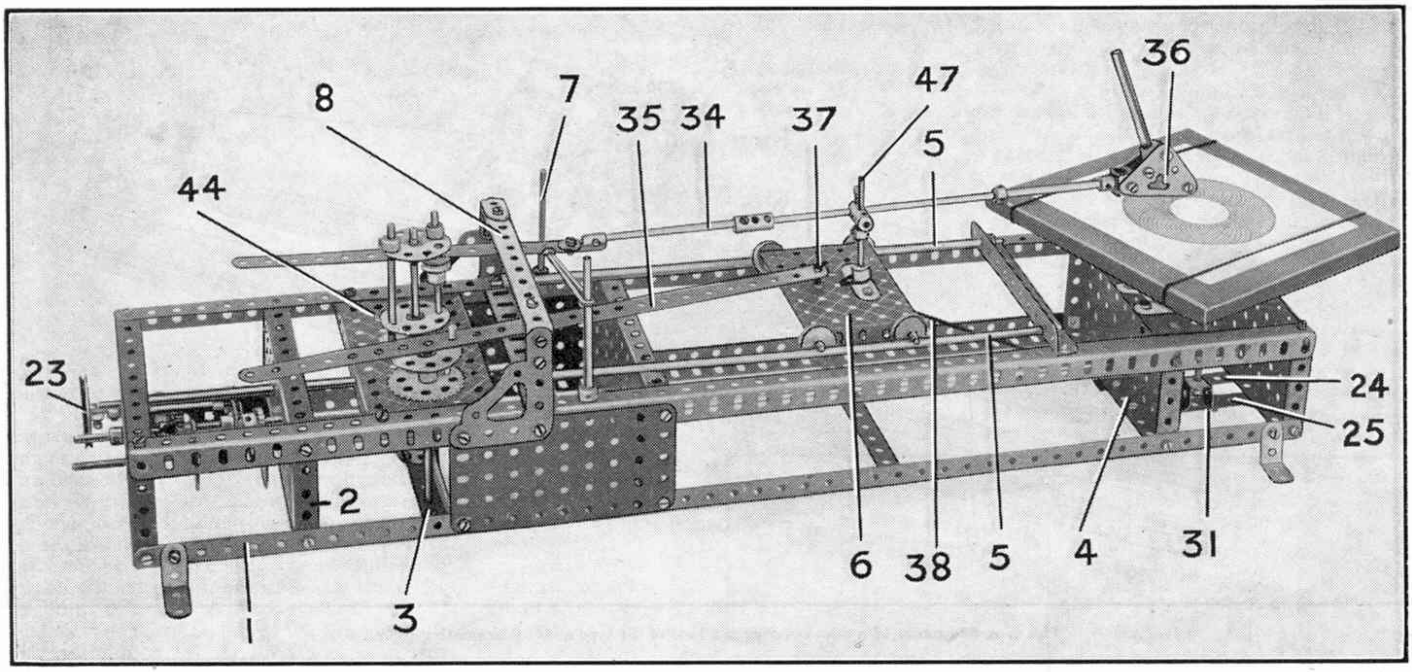


Fig. 1. General view of the new Meccanograph.

A New Meccanograph

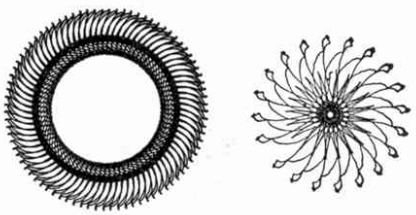
Make Fascinating Designs With This Fine Model

AMONG the limitless number of models that Meccano builds it would be difficult to find any other one that has excited so much interest as the Meccanograph, of which several versions have been described. Young and old alike find pleasure in the variety of beautiful designs that can be produced with this ingenious machine, and all who have been attracted by them will welcome the further model illustrated on these pages. This incorporates various improvements the purpose of which is to increase the variety of fascinating designs that can be produced.

The model is shown in Fig. 1 and is quite simple to build, and it is equally easy to operate. All that is necessary is to pin a sheet of paper to the table of the machine, fix a pen or pencil in the holder provided and rotate the driving spindle of the machine, either by hand or by means of an Electric Motor.

The appearance of many designs produced by the machine may be enhanced greatly by the use of coloured inks, or by filling in spaces in the designs with water colours.

The model is shown fitted with a Pulley 23 for taking the drive from an Electric Motor. If it is desired to operate the model by hand the Rod on which this Pulley is fixed should be replaced by a Crank Handle. On turning the Pulley 23 the Designing Table is caused to revolve. At the same time the writing arm 34 is actuated by the Rods 39, Fig. 4, which act like cams, and the pen is moved to and fro across the table. By a combination of these two movements an amazing number of different designs can be produced by varying the relative speeds of operation of the table and writing arm. This can be done by means of the gear-box at the front of the machine, or by varying the position at which the arm is pivoted to the carriage 6.



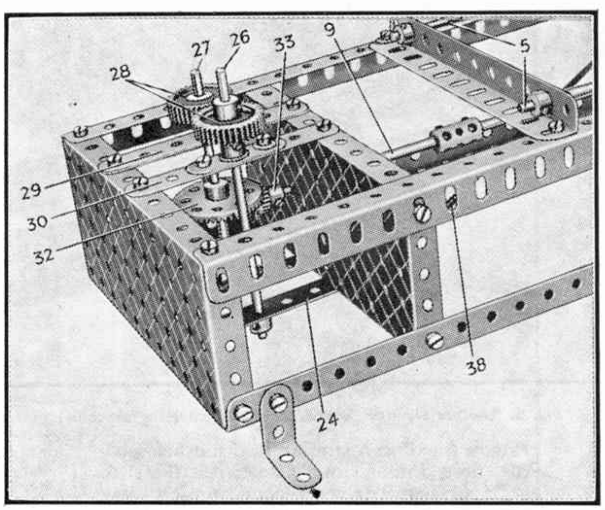


Fig. 2. The rear end of the Meccanograph, showing the table mechanism.

A further variety of movement may be given to the writing arm by causing the carriage 6 to slide to and fro along the guide Rods 5.

Construction of the model should be commenced by building up the frame, which is shown in Fig. 1. It consists of four 24½″ Angle Girders 1 bolted to two 5½″ × 2½″ Flanged Plates. Two other 5½″ × 2½″ Flanged Plates 2 and 4 are then bolted in the positions shown. At a distance of 2½″ from the Flanged Plate 2 a 5½″ Angle Girder 3 is fixed, and 4″ away from this Girder is another 5½″ × 2½″ Flanged Plate.

Two 3½″ Strips 29 are bolted to the two rear Flanged Plates as shown in Fig. 2, and they provide a bearing for one end of the Rod 27, the other end of which is journalled in a Double Bent Strip 31, Fig. 1. The upper bearing for Rod 26, Fig. 2, consists of a 3½″ Strip to which a Double Arm Crank is bolted, and the lower bearing for this Rod is a 3½″ Strip 24 bolted to the frame, as shown in Fig. 2.

Another 5½″ × 2½″ Flanged Plate 44 is bolted between the 24½″ Angle Girders, and a pair of 5½″ Angle Girders are bolted across the top of the frame to provide bearings for the Rods 5. Another 5½″ Angle Girder 3 is bolted across the bottom of the frame, centrally under the Flanged Plate 44. Architraves 45 are now bolted at each side of the machine, and to them two 5½″ Strips 46 are attached by means of 1″ × 1″ or ½″ × ½″ Angle Brackets.

The gear-box and the various Rods and gears of the table-operating mechanism are shown in Figs. 1, 2 and 3. The driving Pulley 23, Fig. 2, is mounted on a 4½" Rod 22. A ½" Pinion 16 on this Rod engages a 57-teeth Gear 17 on a 6½" Rod 14, which is journalled in the Flanged Plates. Rod 14 carries also a ½" Pinion 15 and a ¾" Pinion 18. The third rod in the gear-box is a compound rod 9, which transmits the drive from the gear-box to the Designing Table. It consists of a 12½", a 9½" and a 3½" Rod joined together by Couplings. At the gear-box end of this compound rod is a 50-teeth Gear 19, a ½" Pinion 20 and a 57-teeth Gear 21.

In one of the alternative gear-trains that can be brought into use a ½" Pinion 16 meshes with 57-teeth Gear 17, and Pinion 15 engages with 57-teeth Gear 21. The second gear train consists of Pinion 16 meshed with Gear 17, which in turn is meshed with Pinion 20. In the third gear train ½" Pinion 16 meshes with 57-teeth Gear 17, and ¾" Pinion 18 with 50-teeth Gear 19. It is important to note that only those gears included in a particular gear-train should be fixed to their shafts. Gears not actually in use at any time should have their set screws loosened so that they run freely on their shafts.

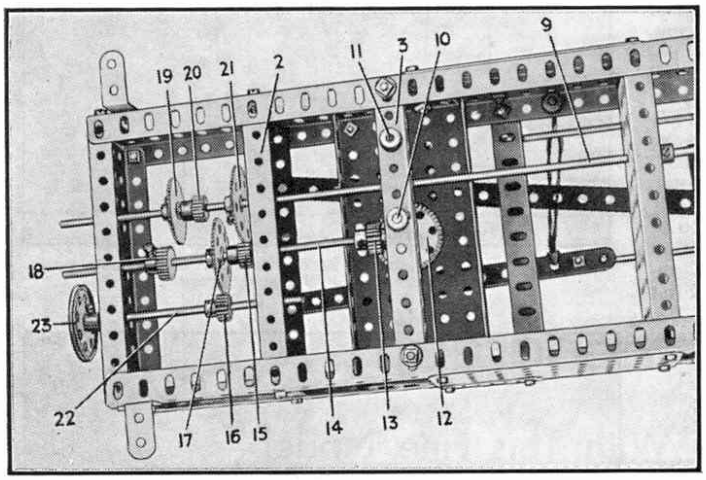
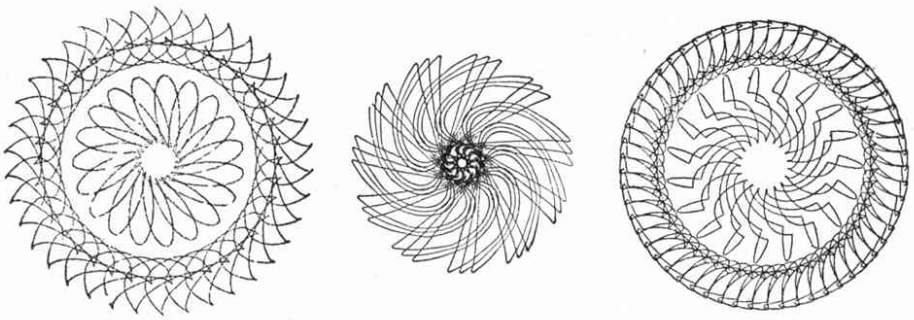


Fig. 3. This illustration shows how the drive is transmitted to the crown head.

The mechanism that operates the side-to-side movement of the writing arm and moves the sliding carriage to and fro is known as the crown head, and is shown in Figs. 3 and 4. A 5½" Rod 10 is journalled in Flanged Plate 44 and Angle Girder 3, and it carries a 1½" Contrate Wheel 12 meshed with a ½" Pinion on the end of Rod 14. A Collar is placed on the end of Rod 10 below Angle Girder 3. Above the Flanged Plate 44 Rod 10 carries a 57-teeth Gear 42 and two Bush Wheels, which are fixed to it in the positions indicated. Two 3" Rods 39, each bearing a Collar, are pushed through holes in the two Bush Wheels, and one of the Rods is fitted with a ½" Pulley 40. The Collars on Rod 10 are adjusted so that the Rods project into holes in 57-teeth Gear 42. By removing one of the Rods 10 or altering their positions in the Bush Wheels, it is possible to vary considerably the designs that can be produced on the machine.

The 57-teeth Gear 42 engages a similar Gear 43 mounted on a 3½" Rod journalled in the frame. On the Rod above the Gear is a Bush Wheel, which is fixed in place boss downwards and has a Threaded Pin 41 fitted in one of its holes. This part of the crown head operates the sliding carriage 6 by means of a 12½" Strip 35, Fig. 4, which



forms a link between the Threaded Pin 41 and a second Threaded Pin 37 fixed to the carriage. The latter consists of 3½" × 2½" Flanged Plate 6, to which is bolted a Double Arm Crank. In the boss of the Crank is fixed a 2½" Rod 47, which carries a Coupling mounted loosely on the Rod at right angles to it.

Two 4½" Rods are pushed through the end holes in the flanges of the Flanged Plate 6, and each is held in place by two Collars placed on it inside the flanges. Four or five ¾" Discs are then placed on the protruding ends of each Rod to act as guides and space the Flanged Plate centrally between the Rods 5. The movement of the carriage is smoothed out by means of a tension brake consisting of a 6" Driving Band 38, Figs. 1 and 2. The Band is attached to the carriage and also to the base of the Flanged Plate 4.

The writing arm 34 is built up from a 7½" Strip, a 3½" Rod and a 7½" Rod. The two Rods are joined by a Coupling, and the other end of the 3½" Rod is connected to the 7½" Strip by a Rod-Strip Connector. The 7½" Strip slides between the two 5½" Strips 8, Fig. 1, and the longer Rod passes through the Coupling on the Rod 47 of the sliding carriage. The pencil or pen is gripped between two 1½" Corner Brackets 36, which are bolted to the arms of a Large Fork Piece fixed on the end of the writing arm. Two ¾" Bolts are placed in the free top holes of the Corner Brackets and one is passed through the holes in their front corners. The pencil or pen is placed between the two upper ¾" Bolts and is pulled backward slightly by means of a piece of elastic until its lower end comes up against the front ¾" Bolt.

Two 3½" Rods 7 are fixed by means of Collars to the upper 24½" Angle Girders of the frame, and these serve as points of attachment for one end of a 3" Driving Band, the other end of which is passed around the 7½" Strip of the writing arm. The Band may be attached to either of the Rods 7, and its purpose is to hold the writing arm against the Rods 39 of the crown head as the latter rotates.

The only part of the model that now remains to be described is the driving mechanism of the designing table. This is shown best in Fig. 2. The Rod on which the Designing Table is mounted is journalled in 3½" Strip 24 and the Double Arm Crank bolted to the 3½" Strip 30. A 1" Gear 28 is fixed to it in the position shown. The drive is transmitted to the spindle of the table by means of a ½" Bevel (*Continued on page 262*)

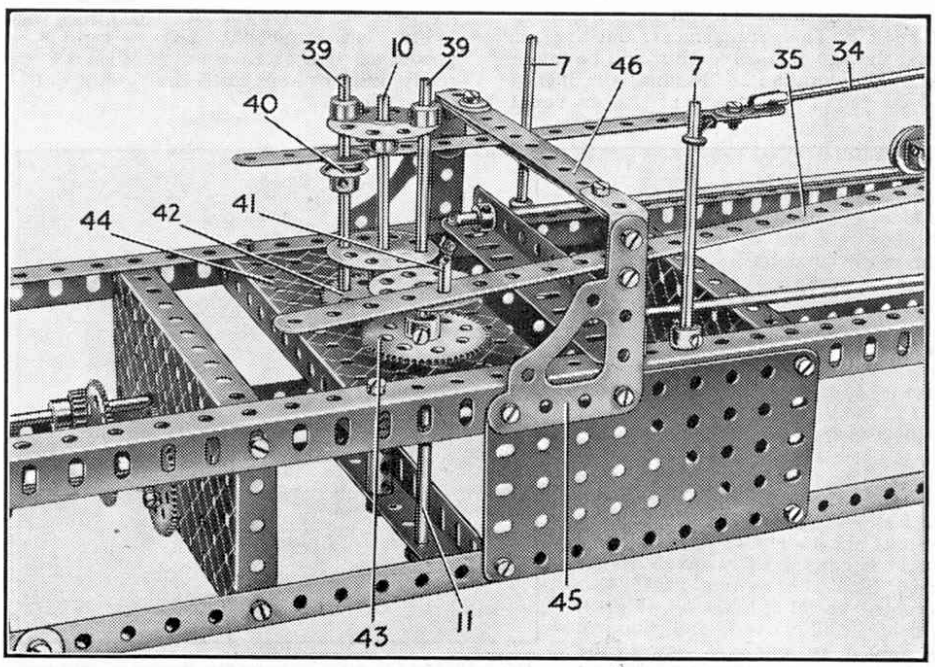


Fig. 4. The crown head, which operates the writing arm and the sliding carriage.

New Dinky Toys

This month's additions to the range of Dinky Toys are splendid miniatures of two more types of bombers. The first is a reproduction of the latest or long-nosed version of the well-known "Bristol" Blenheim, available in Camouflage (Dinky Toys No. 62d) and in Aluminium Finish (Dinky Toys No. 62b). This is one of the types of twin-engined bomber extensively used by the Royal Air Force. Blenheims have taken part in raids on Kiel and Borkum.

The long-nosed Blenheim is known as the Mark IV, and is fitted with two 920 h.p. "Bristol" Mercury engines that give it a top speed of 295 m.p.h. Normally it carries a crew of three and a considerable bomb load, and it is armed for defence against enemy pursuers. It has been adapted also for fighter duties. The machine has a range of 1,900 miles.

The other new Dinky Toys aircraft is a model of the German Junkers Ju 89 (Dinky Toys No. 67a), a military development of the Ju 90 40-seater air liner. This four-engined bomber is one of the largest used by the German Air Force. It carries about 8,000 lb. of bombs, and has a top speed of about 260 m.p.h. There are gun turrets in the nose and stern, and machine gun positions in the top and bottom of the fuselage.

The Closest Motor Race Ever—

(*Continued from page 217*)

chased for the full 15 laps.

By lap 13 they had both passed Goodacre and were now first and second in the race, which fact I confirmed by signalling to Bira. At last they passed our pit for the 14th and last time. With the utmost anxiety I waited for them to re-appear. Could Bira really do it?

At what seemed long last they came down the hill, Bira in front. Dobson made another magnificent attempt at Stadium Dip, but could not get by, and Bira passed the finishing line by just half a length ahead of Dobson. Surely it was the closest motor race ever!

A reproduction, by permission of the National Savings Committee, of a splendid poster designed by Mr. Tom Purvis to encourage the sale of National Savings Certificates.

Resignalling with Colour-Lights—

(*Continued from page 219*)

the signals at Eryholme were not working.

While engineers were busy in the new signal boxes testing out and coupling up, so-called telephone block working was being used to get the trains through. During the progress of the work all south-bound trains, for example, were stopped at Eryholme Junction; one of the temporary men, acting variously as "look-out," or pilotman, climbed up to the footplate and in each case told the driver to ignore all signals, and proceed to Cowton, the next signal box, for further instructions. Later in the day when most of the work was complete the new colour lights were functioning; Cowton box had been finally cut out and trains were able to run through from Eryholme to Wiske Moor, though stopping for instructions at both places.

During the day, while unobtrusive and intricate work was being done inside the cabins, and at the various locations along the line, some quite spectacular demolition was in progress. Men with oxy-acetylene blow-pipes were busy cutting up the old point rodding; sledge-hammers were wielded with a will, and many an old mechanical roller-frame, or signal lamp went into scrap iron at one blow. To have dismantled completely all the old mechanical signals on the opening day would have taken too long, so the semaphore arms were just sawn off. In one or two cases however considerations of sighting the new colour-light signals called for the removal of the old structures.

Again there was no time to be wasted, for even on a Sunday there is a fair amount of traffic passing on the main line; all such big demolition jobs naturally had to be done in the intervals between trains. A bracket signal post just outside the Eryholme signal box provided quite a thrill. The mast was a lattice tower; the cross lattice was quickly cut with the blow-pipe, and then two of the main legs were tackled, after rust and scale had been chipped off. The deadly flame went through each leg in less than two minutes; the gang, with ropes attached, gave a sharp pull, and the other two legs quickly collapsed, sending the whole structure crashing to the ground. Twenty minutes clearing up, and the next train was able to come through.

By late afternoon all the colour-light signals had been brought into commission and it only remained to carry out the final inspection. A curious little cavalcade then set out from Eryholme, first a petrol-driven "bogie"—a kind of glorified platelayer's trolley—and then an inspection saloon pushed by a locomotive. The bogie went ahead, and engineers watched from the saloon. In such a test the bogie acts as the equivalent of a train; when it passes a colour-light signal the watchers in the saloon see the light change from green to red and know that all is well. The bogie in the meantime is speeding on to the next signal, and on passing that the first signal tested changes to yellow, as the bogie is now one section ahead. So they proceed from signal to signal right through the section, up one line and down the other, and when all has been seen satisfactory the new signal boxes are handed over to the traffic department.

A New Meccanograph—

(*Continued from page 243*)

Gear 33 on the end of compound rod 9, which engages with a 1½" Bevel Gear fixed to a Rod 27 journalled as indicated. A second 1" Gear 28 on Rod 27 engages the 1" Gear on the spindle of the Designing Table.

The sliding movement of the carriage 6 and the traversing action of the crown head give the motion of the pen. The third movement, that is the rotation of the table, does not affect the movement of the writing arm.

The traversing movement and the sliding movement can be employed together if desired, or the carriage 6 may be kept stationary and the traversing movement of the arm only be used. To obtain this result the Strip 35 is removed from the Threaded Pins 41 and 37.

Parts required to build the Meccanograph: 1 of No. 1; 1 of No. 1b; 3 of No. 2; 5 of No. 3; 2 of No. 7; 3 of No. 9; 6 of No. 12a; 3 of No. 13; 2 of No. 13a; 2 of No. 14; 4 of No. 15a; 5 of No. 16; 1 of No. 16a; 3 of No. 16b; 1 of No. 22; 1 of No. 23; 3 of No. 24; 1 of No. 25; 4 of No. 26; 1 of No. 27; 4 of No. 27a; 1 of No. 28; 1 of No. 30a; 1 of No. 30c; 2 of No. 31; 66 of No. 37a; 64 of No. 37b; 14 of No. 38; 1 of No. 45; 6 of No. 52; 1 of No. 52; 1 of No. 57c; 25 of No. 59; 2 of No. 62b; 5 of No. 63; 2 of No. 70; 1 of No. 107; 2 of No. 108; 3 of No. 111; 2 of No. 115; 1 of No. 116; 2 of No. 133; 2 of No. 186; 1 of No. 212; 19 of No. 217b.

A Portable Hornby-Dublo Layout—

(*Continued from page 254*)

Then the goods train leaves the upper loop and continues its journey on the inner main line, while the suburban train at the same time traverses the outer track. While this is going on the shunting engine that we left in the shed runs into the station and draws out the now empty coaches of the express, shunting them into the carriage shed or into one of the departure platforms. It then returns to the shed, and the express engine, now released, also goes to the shed.

Then the goods train from the inner main line is worked into the centre section of the layout and stops in the shunting spur, whence its engine shunts the wagons into the various sidings. The suburban train also is worked into the terminus; the shunting engine from the shed draws out the coaches of this train and pushes them either to the carriage shed or the remaining departure road. The various tank engines now go finally to the engine shed.

The last move is to turn the express engine round by running it from the shed, backing it out of the centre section via one diagonal part of the inner main line, and in again via the other diagonal. Matters are now substantially as they were at the start of the programme. The same procedure can be followed again, or alternative schedules can be worked.

Astra Pharos Fort Gun—
A Correction

One of the items illustrated in the announcement of Astra Pharos Ltd., Landor Works, Askew Road, London W.12, on page 221 of our April issue was our advertiser's Fort Gun. The price of this was given inadvertently as 2/11 instead of the correct price 3/11. We regret any inconvenience that this may have caused.