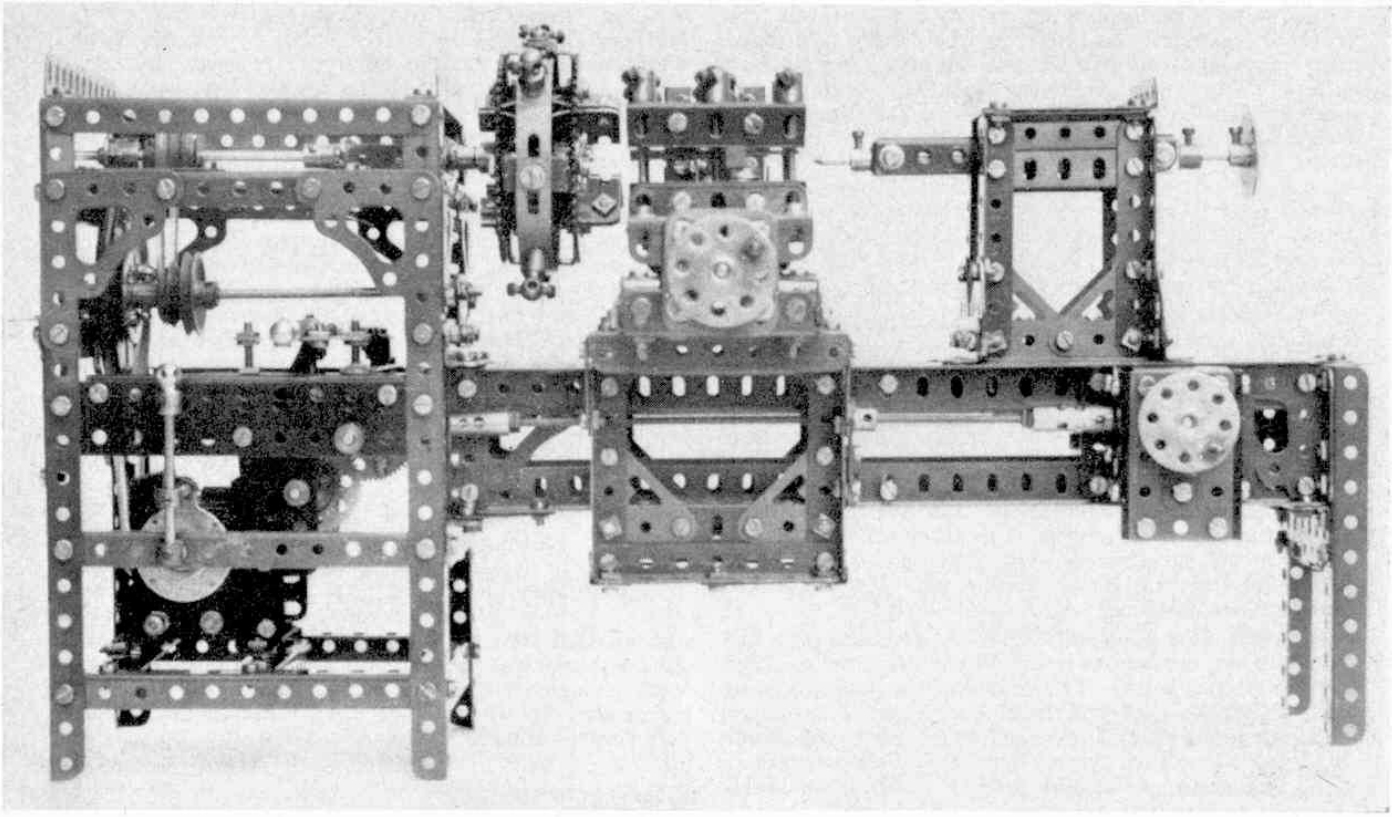


MECCANO LATHE PART I

An advanced model built and described by Dutch Reader Dr. J. DE ZEEUW

AMONG METAL-WORKING MACHINES, the lathe is one of the oldest and, at the same time, one of the most interesting to use—a fact which applies equally to model metal-working machines. Meccano makes an ideal medium for a model lathe, but, because vibration is a serious drawback when working with relatively light material, a Meccano lathe requires a very rigid and sturdy construction. This can be achieved by reinforcing nearly all rectangular connections, making quite certain that the connections themselves are at 90 degrees exactly. Moreover, the sliding parts must be strictly parallel and the moving parts must be carefully adjusted, as all unnecessary play causes vibration and this, in its turn, causes inexact work.

The advanced modeller, who does not object to filing and re-shaping some standard parts, will not encounter many difficulties while assembling the lathe featured here, the construction of which is, in fact, rather simple. If the builder proceeds carefully, using only straight and undamaged Angle Girders for the sliding parts, and bearing in mind the above principal constructional requirements, the completed model will give satisfactory results when turning wood or a soft metal such as brass.

Motor and Gear Casing

Construction of the lathe is started with its motor and gear casing. This part consists of four vertical 9½ in. Angle Girders 1, connected, at the top, by four 5½ in. Angle Girders and, in the third hole from the bottom, by three 5½ in. Angle Girders, as shown. The two lateral Girders are connected by two transverse 5½ in. Angle Girders 2 on which the Electric Motor will later be mounted.

Girders 1 are then further connected through their third holes down, by another four horizontal 5½ in. Angle Girders, the side two of which are themselves joined by a 5½ in. Angle Girder 3. Mounted in the centre of this Girder, and also in the centre of the two Girders on each side of it, are the three bearings 4 of the main shaft 5, these bearings consisting of a 1½ in. Angle Girder and a Double Arm Crank bolted through the slotted holes. Both right-hand bearings are flanked by two other 1½ in. Angle Girders bolted to the 5½ in. Angle Girders to form a sturdy construction. Another similar bearing is bolted to a horizontal 5½in. Angle Girder 6 fixed to the left-hand side of the casing. As is apparent from the illustrations the casing is reinforced by eight Corner Gussets.

Bolted between Girders 1 at each side is a 5½ in. Flat Girder 7, to which a 4½ in. Angle Girder 8 is fixed. Girders 8 then being connected by a 5½ in. Strip 9 fixed through the second holes of the Girders. Mounted on a Pivot Bolt fixed in the fourth hole of Strip 9 is a Ball Crank 10, to one arm of which two

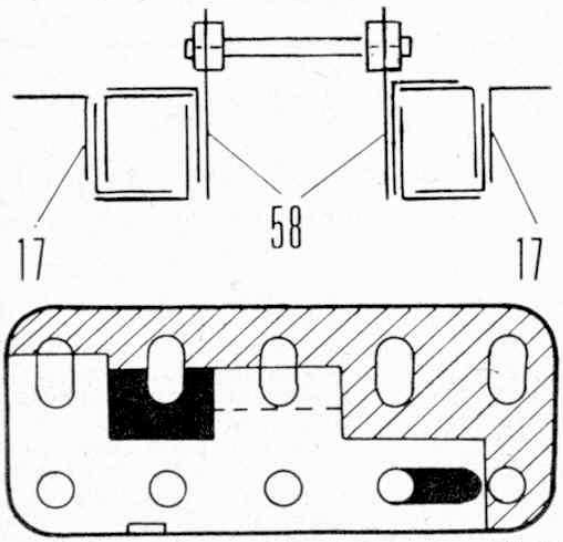
right-angled Rod and Strip Connectors are fixed. Held in these Rod and Strip Connectors is a 4 in. Axle Rod 12, serving as the stop/reverse lever of the motor-driven lead-screws 68, as will be later described. The Rod rests on a 2 in. Strip 13 that is fixed to Front Angle Girder 8 by means of two inverted ¾ in. Bolts. Two additional $\frac{5}{32}$ in. Bolts are fixed in the remaining holes of this Strip, as shown, a Tension Spring 14 preventing the Rod from slipping over the Bolts when it is set in position. A 5½ in. Angle Girder 15 carries the motor control lever, supplied by a 2½ in. Axle rod fixed in a Collar 16, connected to Girder 15 by means of a Bolt. Later, when the Motor is placed into the casing, the motor lever is fixed to a 2 in. Screwed Rod which is locked by a Nut in the bore of a Collar, fixed on the motor reversing lever 16.

The Lathe Bed

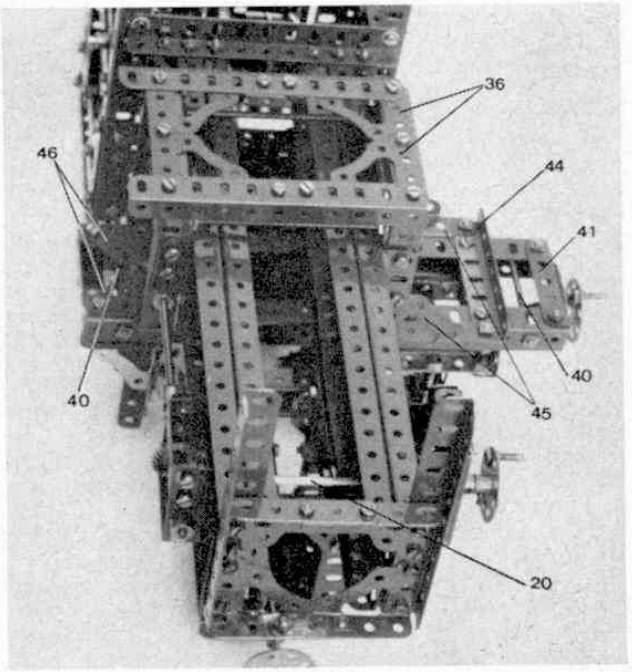
Coming to the lathe bed, this consists of four specially-prepared compound angle girders, the upper girders being made up of a pair of compound girders 17, each supplied by three 12½ in. Angle Girders, arranged to form a compound T and E Girder (Diagram 1). The lower slotted side of the E Girder is inserted between those sides of the other two Girders which form the T 'leg'. The two E sides of the compound Girders are facing each other and form the guides along which the loose headstock slides.

Each of the two lower compound girders 18 consists of two 12½ in. Angle Girders that form an inverted T profile. The outer sides of the four T girders are the guides along which the lathe saddle will slide. The upper and lower compound girders are connected at each end by a 2 in. Angle Girder and a Corner Gusset 19, one of the securing Bolts in the case of one of the Corner Gussets at each side helping to fix a 2 in. Strip between the two girders, five holes in from the leg end. The lower end of this Strip is spaced from the lower compound girder by Washers. Journalled in the 2 in. Strips at each side is an Axle Rod 20, carrying Bush Wheel 21.

At this stage, the two outside legs of the bed are assembled before fitting, these being built up from two 5½ Angle Girders 22 bolted to four Flanged Brackets 23, the flanges of which are overlapped



Upper, Diagram 1: A cross-section of upper compound girders 17 and the sliding parts—with Flat Girder 58—of the loose stock-head. Bolts and Nuts are omitted.
Lower, Diagram 2, showing the way in which the side parts of the jaws are filed and sawn. The small upper black part is filed on a slant.



This picture shows construction of the main bed of the Lathe. It is important to ensure that the framework is perfectly rigid and that all angles are exactly 90 degrees.

three holes. Bolted between the fifth hole from the top of the legs is a 3½ in. Angle Girder 24, the second and sixth holes of which must be elongated somewhat, in the direction of the third and fifth holes respectively, by means of a round file, and in these slotted holes the ends of the inner lower bed girders are bolted. Two holes of two 5½ in. Angle Girders 25 are also filed in the same way, the holes here being the fourth and eighth holes, which should be enlarged in the direction of the fifth and seventh holes respectively. Girders 25 are to be fixed at the upper and lower inside ends of the bed.

The legs are now bolted to the bed and, after this is done, great care should be taken to ensure that the compound girders are perfectly parallel, preferably by means of a slide gauge (which may be made of Meccano parts if not at hand). The bed is then bolted to the motor casing along with Angle Girders 25. In the centre of upper Girder 25, a 1½ in. Flat Girder is fixed with its elongated holes upward. In these holes a Double Arm Crank is bolted to serve as one of the bearings of Axle Rod 26. *The angle between bed and casing should be exactly 90°.*

The Chuck

An important part of any lathe is the "chuck" which holds the material to be turned. In the model, the chuck is a four-independant-jaw example, the material for turning being centred by the centre point of the main shaft 5 which protrudes about $\frac{5}{32}$ in. through the boss of the 3 in. Sprocket Wheel serving as the front plate of the chuck. General construction of the chuck is apparent from the appropriate accompanying photograph, from which it can be seen that a little "doctoring" of parts is necessary here.

Two 3 in. Sprocket Wheels are each provided with four slots, using a round file, the sprockets first being mounted on a common Rod, bolted together and clamped in a vice. The length of each slot should be 1 in., its width being equivalent to the diameter of a hole.