

Fig. 1. Full instructions for building this fine Diesel Express Locomotive are given on these pages.

## New Meccano Model Diesel Express Locomotive

THE attractive model shown in Fig. 1 on this page represents a main line diesel locomotive and its general design follows that of the experimental Fell Diesel Mechanical Locomotive in service on British Railways.

The main frames of the model are made from two  $12\frac{1}{2}$ " Strips on each side overlapped three holes. These Strips are connected together by two  $3\frac{1}{2}$ "  $\times$   $2\frac{1}{2}$ " Flanged Plates 1, a  $3\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Double Angle Strip 2 and by two similar Double Angle Strips 3. The  $12\frac{1}{2}$ " Strips are fitted with eight Fishplates and two 1" Corner Brackets 4, and to these are bolted two  $1\frac{1}{2}$ " Strips positioned at 5, two  $2\frac{1}{2}$ " Strips 6 and a  $3\frac{1}{2}$ " Strip 7. The short Strips serve as supports for the spring hangers.

The spring hangers are Angle Brackets bolted by their slotted holes to the Strips 5, 6 and 7, and each spring consists of a  $2\frac{1}{2}$ " and a  $1\frac{1}{2}$ " Strip. The Strips are fixed tightly together by a nut and bolt, and a Collar 8 is screwed partly on to the bolt so that a Rod in the Collar is able to rotate freely. The spring is attached to its hangers by two  $\frac{1}{2}$ " Bolts. Each of these is fixed in one of the Angle Brackets by a nut, and the spring is then held in place between two nuts at the upper end of the Bolt.

The driving axles are 5" Rods, and each is supported in two of the Collars 8. In order to obtain a smooth drive to each axle, they are connected by Sprocket Chain passed round  $\frac{1}{2}$ " Sprockets as shown in Fig. 4.

Double Arm Cranks 9 fixed to the ends of the driving axles form the coupling rod cranks. The coupling rod itself is in three sections in order to allow for movement of the axles caused by the action of the springs. The centre section is a  $4\frac{1}{2}$ " Strip, and the end sections are  $3\frac{1}{2}$ " Strips. These Strips are lock-nutted by  $\frac{3}{8}$ " Bolts to the Double Arm Cranks, two Washers on each Bolt being used to space the Strips from the Cranks. A 1" Corner Bracket is bolted to the free arm of each Double Arm Crank to represent the balance weight.

An E20R Electric Motor is attached by its flanges to four Double Brackets bolted to the Double Angle Strips 3. A  $1\frac{1}{2}$ " Corner Bracket 10 is fixed to each of the Motor side-plates, and a  $\frac{1}{2}$ " Pinion on the armature shaft meshes with a 57-tooth Gear on a  $2\frac{1}{2}$ " Rod 11. A  $\frac{1}{2}$ " Pinion on this Rod engages a 57-tooth Gear 12 on a  $2\frac{1}{2}$ " Rod, and a  $\frac{1}{2}$ " Pinion on the same Rod drives a further 57-tooth Gear on a  $2\frac{1}{2}$ " Rod 13. A 1" Sprocket on Rod 13 is connected by Chain to a  $1\frac{1}{2}$ " Sprocket 14 on one of the driving axles.

The Motor switch is controlled by a Rod 15 mounted across the main frames. A Collar on this Rod is connected by a bolt to one arm of a Double Arm Crank fixed on a 5" Rod 16. This Rod is supported in a  $1" \times 1"$  Angle Bracket bolted to one of the Double Angle Strips 3, and in a Fishplate fixed to a  $3\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Double Angle Strip 17. A Crank on Rod 16 is linked by a  $2\frac{1}{2}$ " Strip and lock-nutted bolts to one arm of the Motor switch.

Each bogie unit is made by bolting two  $4\frac{1}{2}$ " Strips to Angle Brackets fixed to a  $2\frac{1}{2}$ "  $\times$   $1\frac{1}{2}$ " Flanged Plate. A Bush Wheel is attached to the centre of the Flanged Plate, and a  $1\frac{1}{2}$ " Rod is passed through the boss of the Bush Wheel. The Rod is fixed in a Slide Piece 18, but the bogie is spaced from the Slide Piece by a Compression Spring and is held on the Rod by a Collar 19. The Slide Piece is slipped over a  $2\frac{1}{2}$ " Strip attached to one of the Flanged Plates 1

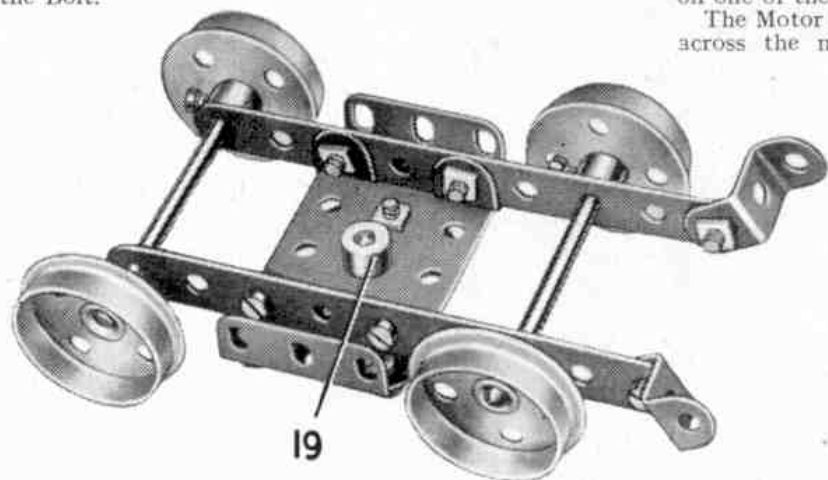
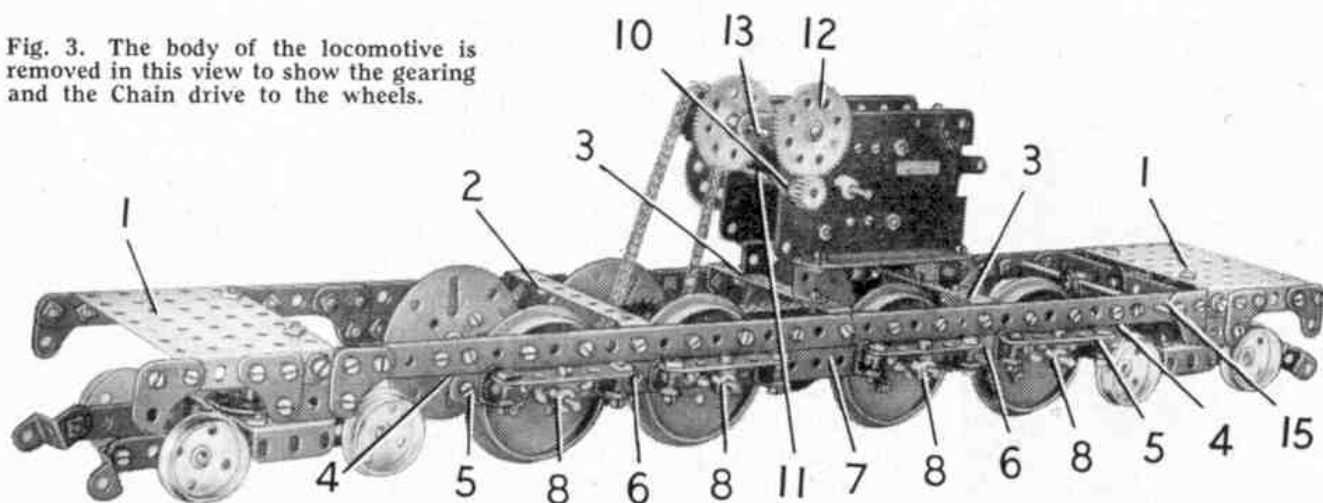


Fig. 2. An underneath view of one of the bogie units showing the method used to attach the wheel bearings.

Fig. 3. The body of the locomotive is removed in this view to show the gearing and the Chain drive to the wheels.



by  $\frac{3}{8}$ " Bolts, and the Strip is separated from the Flanged Plate by three Washers on each Bolt.

The main frames are completed by adding three 1" Corner Brackets and a  $1\frac{1}{2}$ " Strip to each end to form the arches for the bogie wheels.

The body is assembled as a separate unit on a framework formed by two  $24\frac{1}{2}$ " Angle Girders connected at their ends by  $4\frac{1}{2}$ " Angle Girders. The centre section of each side consists of two  $12\frac{1}{2}$ " Strip Plates, and the upper edge of the top Strip Plate is strengthened by a  $12\frac{1}{2}$ " and a  $3\frac{1}{2}$ " Strip 20. These Strips overhang the Strip Plate by three clear holes at each end.

Each end of the body is formed by two  $4\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plates 21 overlapped along their longer edges by three holes. The Flexible Plates are bolted to the  $24\frac{1}{2}$ " Angle Girders, and they are edged by a  $3\frac{1}{2}$ " Angle Girder 22 and a  $4\frac{1}{2}$ " Strip 23. A  $1\frac{1}{2}$ " Strip is attached between the ends of Strips 20 and 23. Each door is made by bolting two  $3\frac{1}{2}$ " and two  $1\frac{1}{2}$ " Strips to a  $2\frac{1}{2}$ " x  $1\frac{1}{2}$ " Flexible Plate as shown in Fig. 1. The upper ends of the  $3\frac{1}{2}$ " Strips are fixed to the Strips 20, and the lower edge of the Flexible Plate is attached to a  $2\frac{1}{2}$ " Strip bolted between the Flexible Plates and the Strip Plates. The completed sides of the body are connected across by  $4\frac{1}{2}$ " x  $\frac{1}{2}$ " Double Angle Strips held by the Bolts 24, and the air grilles in the sides are represented by  $2\frac{1}{2}$ " Flat Girders and Flat Trunnions as shown in Fig. 1.

The edge of the roof (Fig. 1) is made from two  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plates arranged to leave a gap at the centre. The opposite side also uses two  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plates, but the centre is filled in by a  $3\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plate. The Flexible Plates are bent over and their inner edges are joined by two  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plates and a  $4\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plate. A Sleeve Piece 25, fitted at each end with a Chimney Adaptor, is bolted to a  $2\frac{1}{2}$ " Flat Girder, and the latter is attached to a  $2\frac{1}{2}$ " Angle Girder fixed to the side. The edges of the gap that accommodates the Sleeve Piece are filled by Semi-Circular Plates attached to the side by Angle Brackets. The rear of the gap is filled by a  $2\frac{1}{2}$ " x  $1\frac{1}{2}$ " Flexible Plate fixed to a  $2\frac{1}{2}$ " Angle Girder bolted to the roof.

The driving cab window at each end of the locomotive is formed by Formed Slotted Strips 26 bolted between the roof and the ends of Strips 20. The window frame consists of two  $2\frac{1}{2}$ " Stepped Curved Strips bolted to the ends of a  $2\frac{1}{2}$ " Strip 27,

which is attached to the roof by an Angle Bracket. A centre division of the window frame is provided by a 2" Strip, and two 4" Stepped Curved Strips overlapped seven holes are bolted to the lower end of the 2" Strip. A  $2\frac{1}{2}$ " x  $1\frac{1}{2}$ " Flexible Plate 28 is bolted to each corner of the roof to fill the gap between the  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plate and the Formed Slotted Strip.

Two  $4\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plates 29 are attached to Angle Brackets bolted to the Strips 23. The radiator is a  $3\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plate fitted as shown with five  $2\frac{1}{2}$ " Strips, and it is connected by Fishplates to a  $4\frac{1}{2}$ " Strip 30 and to the  $4\frac{1}{2}$ " Angle Girder bolted to the ends of the  $24\frac{1}{2}$ " Angle Girders.

The buffer beams are  $4\frac{1}{2}$ " Strips bolted to Angle Brackets fixed to 1" Corner Brackets 31. Each buffer consists of a  $\frac{3}{4}$ " Washer, a number of ordinary Washers and a Chimney Adaptor fitted over a  $1\frac{1}{2}$ " Bolt. The train coupling is made by joining together two small Fork Pieces with a  $\frac{1}{2}$ " Bolt, and the jaws of the upper Fork Piece are pivoted on a  $\frac{3}{4}$ " Bolt passed through a Double Bracket that is bolted to the buffer beam.

The completed body is attached to the main frames by two Angle Brackets 32 on each side.

The vacuum brake pipe is represented by a Spring looped over a  $1\frac{1}{2}$ " Rod and held in place by a Collar, which is fixed to each end of the Rod. A bolt fitted with three Washers is passed through the buffer beam and is screwed into a threaded hole of one of the Collars to fix the assembly in position.

The steps to the driving cabs are each made from two  $1\frac{1}{2}$ " x  $\frac{1}{2}$ " Double Angle Strips connected by a Double Bracket, and they are bolted to the  $24\frac{1}{2}$ " Angle Girders of the body.

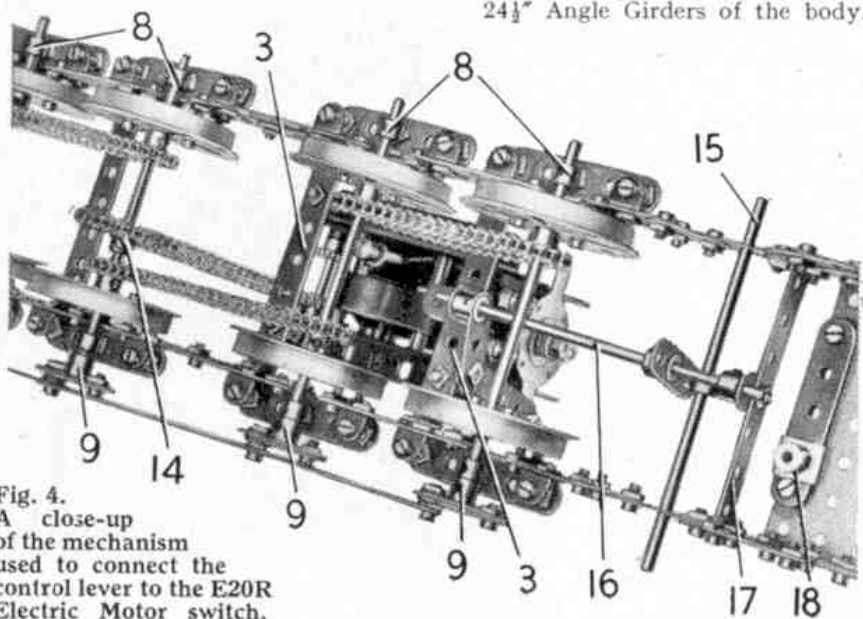


Fig. 4. A close-up of the mechanism used to connect the control lever to the E20R Electric Motor switch.