New Meccano Model

Steam Engine and Boiler

THE steam engine and boiler shown in Fig. 1 is designed so that it can be built from the parts in an Outfit No. 7. The model represents a complete steam power plant and the engine has realistic valve gear and a dummy governor.

Each side of the base of the model consists of three 12½″ Strips and two 12½″ Angle Girders bolted at their ends to 2½″ Strips. The sides are connected by Angle Brackets to 5½″ × 2½″ Flexible Plates strengthened along their edges by 2½″ and 5½″ Strips. The top of the base is filled in by two 12½″ × 2½″ Strip Plates, and the inner edges of these Plates are braced by 12½″ Angle Girders.

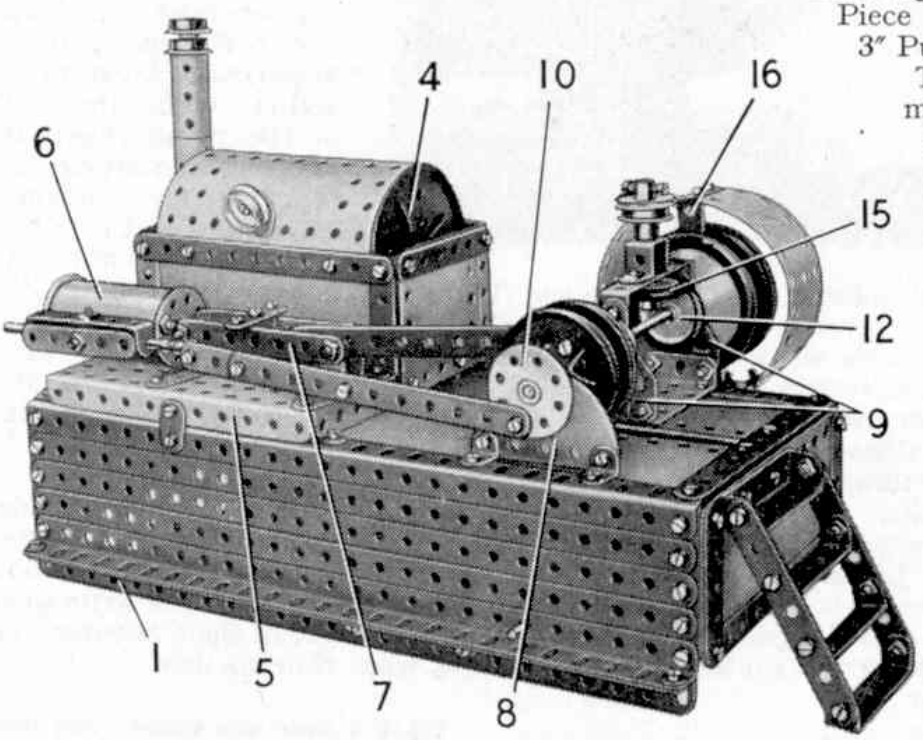

Fig. 1. A steam power plant that can be built from the parts in Outfit No. 7.

A 12½″ Angle Girder 1 is bolted to each side to increase its depth so that an E20R Electric Motor can be fitted. The Motor is bolted inside the flanges of a 5½″ × 2½″ Flanged Plate, and the Plate is fixed in position between the Girders 1 as shown in Fig. 3. A Worm 2 on the Motor shaft meshes with a ½″ Pinion fixed on a 6½″ Rod mounted in the sides of the base and held in position by Collars. A ½″ Pulley 3 is positioned as shown on the Rod.

The boiler and cylinder assembly is built as a separate unit and is attached to the base by Fishplates when it is completed. A Boiler is opened out slightly so that it fits tightly round a 3″ Pulley 4 at each end. The Boiler is bolted to 5½″ × 2½″ Flexible Plates edged by 5½″ and 2½″ Strips, and the sides are attached at each end to two 2½″ × 2½″ Flexible Plates overlapped four holes and braced by a 3″ Strip.

The smoke stack consists of two Sleeve Pieces connected by a Chimney Adaptor and capped by two ¾″ Flanged Wheels on a 3½″ Rod. The lower Sleeve Piece is bolted to one of the 3″ Pulleys 4.

The cylinder assembly is mounted on a 5½″ × 2½″ Flanged Plate 5 bolted to the side of the boiler unit. A Cylinder 6 is fixed to the Flanged Plate, and Wheel Discs are clamped to its ends by 3″ Screwed Rods fitted with nuts. Before the Wheel Discs are placed in position the valve chest is fitted, and this consists of a 2½″ × ½″ Double Angle Strip and a 2½″ Strip fixed to a Double Bracket bolted to the Cylinder.

The slide bars are two 3½″ Strips 7, each of which is supported by two 1″ × 1″ Angle Brackets bolted to the Flanged Plate 5. The crosshead consists of two 1½″ Strips connected by two Double Brackets that are free to slide on the Strips 7. The piston rod is fixed in a Collar connected to one of the 1½″ Strips by a bolt, and a Rod and Strip Connector is fitted to the end of the Rod. The valve rod is free to slide in the lugs of the Double Angle Strip forming part of the valve chest, and this Rod carries also a Rod and Strip Connector.

The crankshaft is mounted in three bearings, one of which consists of a Semi-Circular Plate 8 attached to the base by Angle Brackets. The other bearings are Flat Trunnions 9 bolted to a 2½″ × 1½″ Flanged Plate fixed to the base. The crank webs are 2″ Pulleys. One of these is fixed

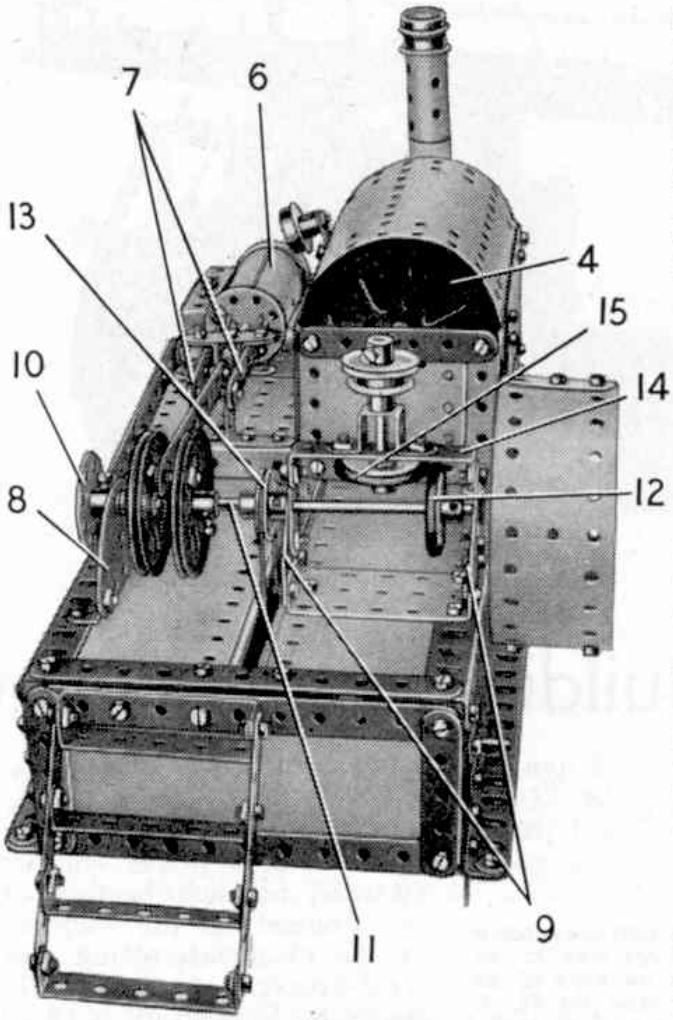

Fig. 2. Another view of the steam engine and boiler showing the details of the crankshaft.

on a $1\frac{1}{2}''$ Rod passed through the Semi-Circular Plate 8 and fitted with a Bush Wheel 10. The other 2″ Pulley is carried by a Rod 11 that is fitted with a 1″ Pulley and Rubber Ring 12 and a 1″ Pulley 13. Pulley 13 is connected by a Driving Band to the $\frac{1}{2}''$ Pulley 3.

The connecting rod is a $5\frac{1}{2}''$ Strip lock-nutted to the Rod and Strip Connector on the piston rod, and pivoted on a $\frac{3}{4}''$ Bolt that connects the crank webs. The Bolt is passed through one 2″ Pulley and is fixed in place by a nut. The connecting rod is slipped over the Bolt, which is then fixed by two nuts in the second 2″ Pulley. Two Washers are placed on each side of the connecting rod to space it from the Pulleys. A built-up strip, consisting of a $5\frac{1}{2}''$ and a $3\frac{1}{2}''$ Strip overlapped five holes, is *lock-nutted* to Bush Wheel 10 and to the Rod and Strip Connector on the valve Rod.

The governor is represented by a 1″ Pulley and a $\frac{3}{4}''$ Flanged Wheel fixed on a 2″ Rod. The Rod is mounted in a Double Bent Strip and a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 14, and it carries at its lower end a 1″ Pulley and Rubber Ring 15 that engages the Rubber Ring on Pulley 12. Three Washers are used to space Pulley 15 from the Double Angle Strip, which is bolted to $1\frac{1}{2}''$ Strips fixed to the Flat Trunnions 9.

The flywheel rim is made from two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate connected to form a ring round a $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 16. This Double Angle Strip is clamped between two Road Wheels fixed on the end of Rod 11.

The model is completed by adding a ladder made from four $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips bolted between two $3\frac{1}{2}''$ Strips as shown in Figs. 1 and 2. The top ends of the $3\frac{1}{2}''$ Strips are bolted to a further $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip fixed to one end of the base.

Before setting the Engine in motion the gears and bearings should be oiled.

Parts required to build the Steam Engine and Boiler: 6 of No. 1; 11 of No. 2; 5 of No. 3; 2 of No. 4; 12 of No. 5; 3 of No. 6a; 8 of No. 8; 3 of No. 10; 3 of No. 11; 18 of No. 12; 4 of No. 12a; 1 of No. 12c, 1 of No. 14; 1 of No. 15; 1 of No. 15b; 2 of No. 16; 1 of No. 17; 1 of No. 18b; 2 of No. 19b; 2 of No. 20a; 4 of No. 20b; 4 of No. 22; 1 of No. 23a; 1 of No. 24; 2 of No. 24a; 1 of No. 26; 1 of No. 32; 131 of No. 37; 18 of No. 37a; 20 of No. 38; 1 of No. 45; 7 of No. 48a; 1 of No. 48b; 1 of No. 51; 2 of No. 52; 5 of No. 59; 2 of No. 80c; 1 of No. 111; 1 of No. 111a; 4 of No. 111c; 2 of No. 126a; 2 of No. 155; 1 of No. 162b; 2 of No. 163; 1 of No. 164; 1 of No. 186a; 2 of No. 187; 2 of No. 188; 2 of No. 189; 4 of No. 190; 4 of No. 192; 2 of No. 197; 2 of No. 212; 1 of No. 214; 1 of No. 216; 1 E20R Electric Motor

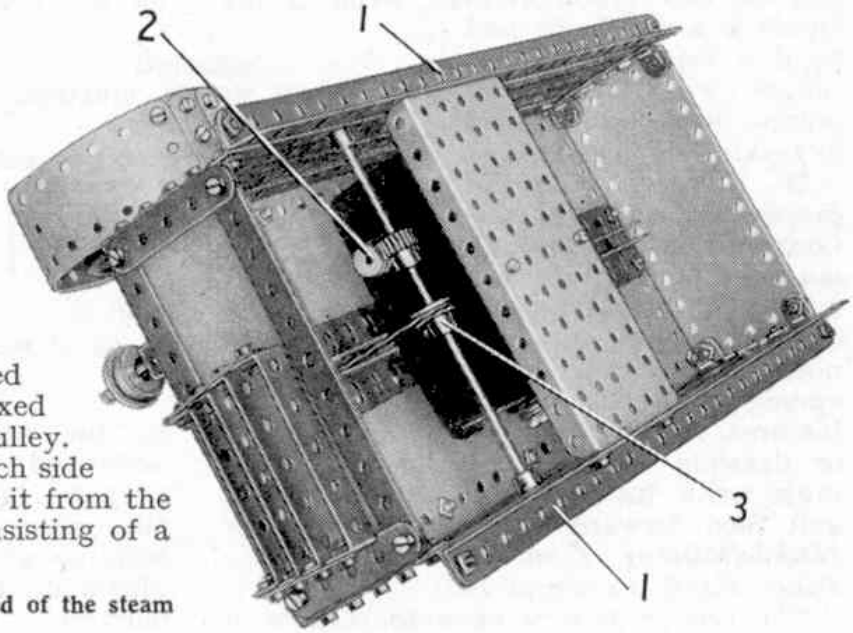

Fig. 3. An underneath view of the bed of the steam engine and boiler.