

# New Meccano Model

## Vertical Steam Engine and Dynamo

OUR new model this month is a neat reproduction of an electric generating unit, consisting of a vertical steam engine coupled to a dynamo.

The base of the unit consists of two  $18\frac{1}{2}$ " Angle Girders, which are joined at one end by a  $9\frac{1}{2}$ " Angle Girder 1, and at the other end by two  $9\frac{1}{2}$ " Angle Girders 2 and 3. The Girders 2 and 3 are attached to  $4\frac{1}{2}$ " Angle Girders bolted to the sides, and the space between these Girders is filled in by two  $9\frac{1}{2}" \times 2\frac{1}{2}"$  Strip Plates. The engine bed is made by bolting a  $9\frac{1}{2}" \times 2\frac{1}{2}"$  Strip Plate vertically to each of the  $18\frac{1}{2}$ " Angle Girders. The Strip Plates are braced along their upper edges by  $9\frac{1}{2}"$  Angle Girders, and at each end by a vertical  $2\frac{1}{2}"$  Angle Girder. The sides of the engine bed are connected by a  $9\frac{1}{2}"$  Angle Girder at each end.

Supports for the crankshaft bearings are provided by five  $9\frac{1}{2}"$  Angle Girders. Two of these Girders are arranged to form a central T-section girder 4, and the others as shown at 5, 6 and 7.

Each of the columns consists of two  $12\frac{1}{2}"$  Angle Girders joined by  $5\frac{1}{2}" \times 2\frac{1}{2}"$  Flexible Plates, and is attached to the platform at its upper end by a Corner Angle Bracket. The columns are braced by vertical  $7\frac{1}{2}"$  Angle Girders 8. The platform consists of two  $5\frac{1}{2}" \times 3\frac{1}{2}"$  Flat Plates edged by  $7\frac{1}{2}"$  Angle Girders.

The slide bars for the crosshead are  $7\frac{1}{2}"$  Strips extended by Fishplates, and they are attached at their upper ends to  $5\frac{1}{2}"$  Angle Girders bolted underneath the platform. The Fishplates at the lower ends of the  $7\frac{1}{2}"$  Strips are attached by  $\frac{1}{2}"$  Bolts to  $7\frac{1}{2}"$  Angle Girders 9. The slide bars are spaced from these Girders by ten  $1\frac{1}{2}"$  Strips on each side, and the Girders are connected by  $7\frac{1}{2}"$  Flat Girders to further  $7\frac{1}{2}"$  Angle Girders that are bolted to Girders 8. The crosshead is a  $3\frac{1}{2}"$  Rod fitted at each end with a Bush Wheel 10 and a Wheel Disc 11, placed one on each side of the slide bars. The  $3\frac{1}{2}"$  Rod carries at its centre a large Fork Piece 12 held in position by Collars, and the piston rod is fixed in the Fork Piece. The connecting rod is formed by two  $5\frac{1}{2}"$  and two  $2\frac{1}{2}"$  Strips, which are shaped as shown and pivoted on  $\frac{1}{2}"$  Bolts screwed into the boss of the Fork Piece. A Collar and a Washer are placed on each Bolt.

The crankshaft is carried in three bearings. The centre bearing consists of a Semi-Circular Plate attached to two  $2\frac{1}{2}"$  Flat Girders that are bolted to Girders 4. Four Wheel Discs are fixed to each side of the Semi-Circular Plate to increase the bearing surface. The other two bearings are identical, and each consists of two Semi-Circular Plates fitted with four Wheel Discs. The Semi-Circular Plates are bolted to  $2\frac{1}{2}"$  Angle Girders that are connected together by further  $2\frac{1}{2}"$  Angle Girders bolted to the Girders 13. A cover plate consisting of a  $5\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plate is also bolted to Girders 13.

The crankshaft is in two sections, and consists of a  $3\frac{1}{2}"$  Rod 14 and a  $6\frac{1}{2}"$  Rod 15. The inner ends of these Rods are fitted with Cranks, and further Cranks bolted to them are connected by a 2" Rod. The connecting rod pivots about the 2" Rod. A Triple Throw Eccentric is fixed on the  $6\frac{1}{2}"$

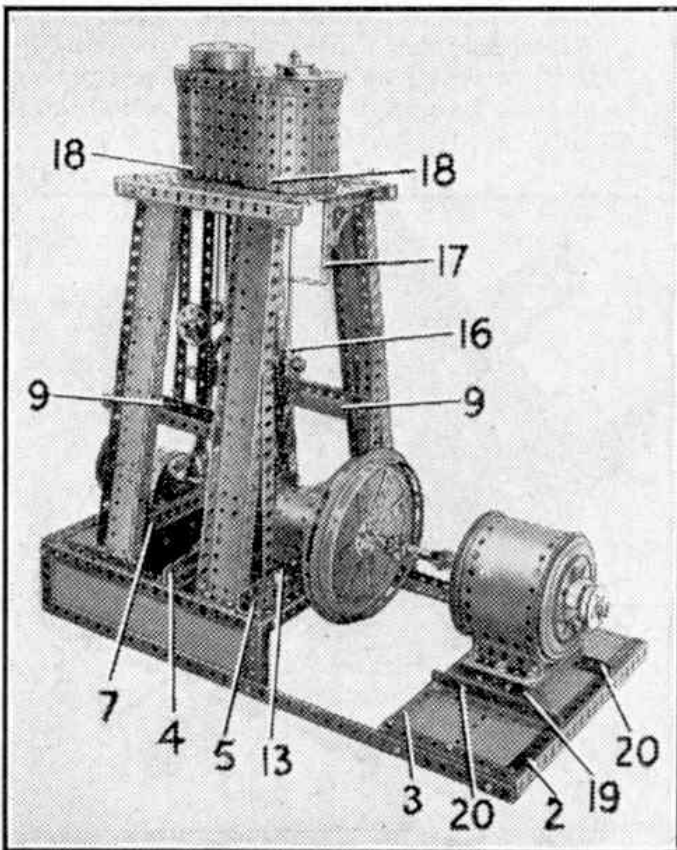


Fig. 1. A model of a vertical steam engine coupled to a dynamo that is interesting to construct and operate.

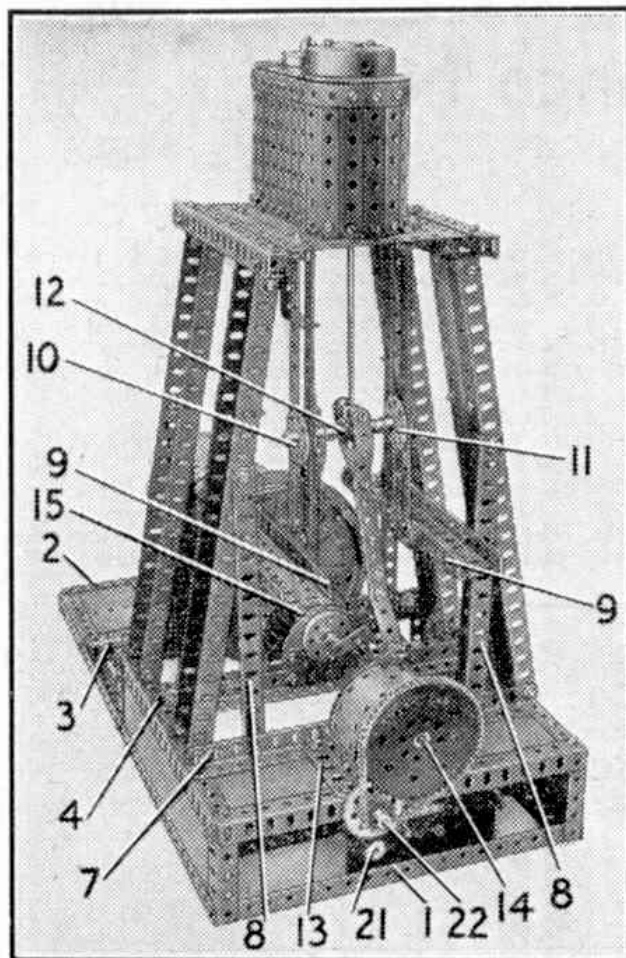


Fig. 2. The engine and dynamo, showing the cross-head and guides and the arrangement of the driving motor.

Rod between the bearings, and is extended by two  $4\frac{1}{2}$ " Strips bent as shown in Fig. 2. These Strips are passed over a  $1\frac{1}{2}$ " Rod held in a large Fork Piece 16, Fig. 1, by Collars, and the valve rod is fixed in the boss of the Fork Piece. The valve rod is mounted in the platform, and a guide is provided by passing it through a  $3" \times 1\frac{1}{2}"$  Double Angle Strip 17.

The cylinder block consists of vertical  $3\frac{1}{2}"$  Strips bolted to a framework formed by  $5\frac{1}{2}"$  and  $3\frac{1}{2}"$  Strips curved to shape. The lower edges of the block are connected by two  $2\frac{1}{2}" \times \frac{1}{2}"$  Double Angle Strips held by bolts 18 on each side, the Double Angle Strips being bolted to the platform. The top of the block is filled in by a  $4\frac{1}{2}" \times 2\frac{1}{2}"$  Flat Plate fitted at each end with a Semi-Circular Plate, and a Boiler End and a  $1\frac{1}{8}"$  Flanged Wheel form the cylinder and valve covers respectively. A  $5\frac{1}{2}" \times \frac{1}{2}"$  Double Angle Strip is bolted lengthways across the top of the block, and the Flat Plate is fixed by two nuts to a  $\frac{3}{4}"$  Bolt fixed in the Double Angle Strip by a nut. The base of the generator unit consists of a  $3\frac{1}{2}" \times 2\frac{1}{2}"$  Flanged Plate edged by

$3\frac{1}{2}"$  Angle Girders, and it is fixed to  $2\frac{1}{2}"$  Flat Girders 19 attached to  $4\frac{1}{2}"$  Angle Girders 20. The ends of the generator consist of a Ball Race Flanged Disc fixed to a  $4"$  Circular Plate. The two ends are joined by  $2\frac{1}{2}" \times 1"$  Double Angle Strip. A  $9\frac{1}{2}" \times 2\frac{1}{2}"$  Strip Plate is curved to shape and attached to two  $2\frac{1}{2}"$  Angle Girders fixed to the platform. A Rod passed through the generator is connected by two Universal Couplings to the Rod 15.

A  $\frac{1}{2}"$  Pinion on the shaft of the Motor engages a 57-tooth Gear on a Rod carrying Pinion 21. This Pinion engages a 57-tooth Gear on Rod 22, from which Sprockets take the drive to Rod 14.

Parts required to build model Vertical Steam Engine and Dynamo: 4 of No. 1b; 4 of No. 2; 4 of No. 2a; 30 of No. 3; 6 of No. 5; 1 of No. 6; 17 of No. 6a; 2 of No. 7a; 8 of No. 8; 14 of No. 8a; 10 of No. 8b; 2 of No. 9; 6 of No. 9a; 2 of No. 9b; 17 of No. 9d; 2 of No. 9e; 1 of No. 9f; 4 of No. 10; 3 of No. 11; 1 of No. 13a; 2 of No. 14; 1 of No. 15; 3 of No. 16; 1 of No. 16b; 1 of No. 17; 1 of No. 18a; 1 of No. 18b; 2 of No. 20; 3 of No. 24; 2 of No. 26; 2 of No. 27a; 225 of No. 37; 78 of No. 37a; 90 of No. 38; 1 of No. 47a; 6 of No. 48; 5 of No. 48a; 1 of No. 48d; 2 of No. 52a; 1 of No. 53; 1 of No. 53a; 16 of No. 59; 4 of No. 62; 10 of No. 94; 1 of No. 95b; 1 of No. 96a; 6 of No. 103f; 4 of No. 103k; 1 of No. 108; 10 of No. 111; 19 of No. 111a; 40 of No. 111c; 4 of No. 111d; 2 of No. 116; 1 of No. 116a; 2 of No. 118; 1 of No. 130; 3 of No. 133; 1 of No. 140; 1 of No. 146; 2 of No. 146a; 2 of No. 154a; 2 of No. 154b; 1 of No. 162a; 1 of No. 165; 3 of No. 168a; 14 of No. 189; 1 of No. 191; 6 of No. 196; 7 of No. 214; 35 of No. 219; 1 E20R Electric Motor.

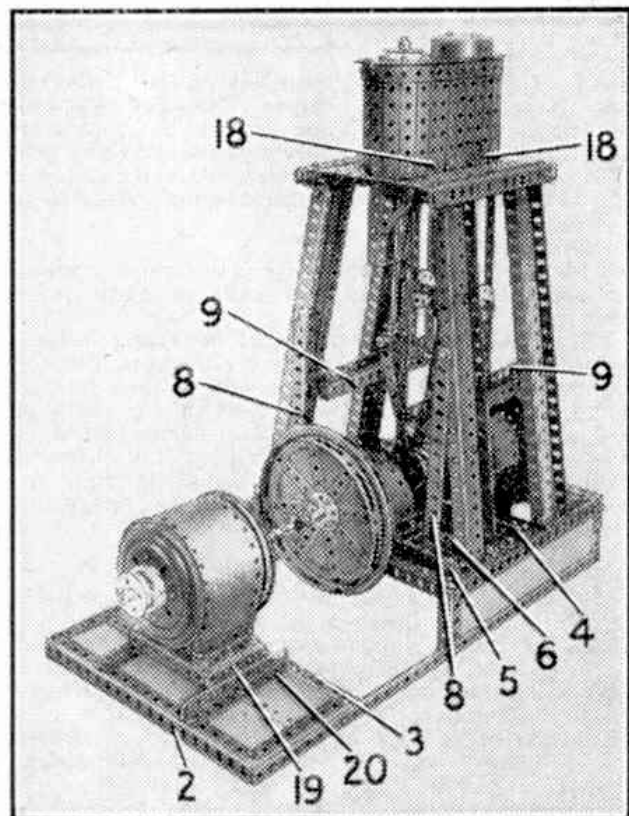


Fig. 3. Another view of the completed engine and dynamo.