

# New Meccano Model

## Electrically-operated Steam Road Wagon with Trailer

THE number of steam road vehicles in use on British roads has increased considerably during recent years. This is no doubt due to their ability to transport heavy loads at a cost which, according to statistics, is little more than half the amount required for a petrol lorry.

This month we describe an oertype steam wagon, the term "oertype" meaning that the engine and cylinder unit are mounted over the boiler. The model wagon consists of three distinct units—the main frame, carrying the bodywork; the boiler and engine unit, which also includes the front road wheel assembly; and lastly the power unit. These units should each be constructed separately, and then assembled to form the complete model.

The main frame and bodywork should be constructed first. The frame consists essentially of two Girders 1 (Fig. 2), each formed from two  $12\frac{1}{2}$ " Angle Girders overlapped 18 holes and bolted together. These girders are spaced apart by  $5\frac{1}{2}$ " transverse Girders, to the ends of which are bolted  $12\frac{1}{2}$ " Girders forming the sides of the platform. Two  $12\frac{1}{2}$ " Flat Girders 2, secured by means of Angle Brackets to the front ends of the Girders 1, carry  $1" \times 1"$  Angle Brackets, to which  $1\frac{1}{2}$ " Strips are bolted as shown. A Channel Bearing is also secured to the right hand composite Girder, as can be seen in Fig. 6.

The boiler unit (Fig. 1) is held in position between

two Girders 1 by two  $3\frac{1}{2}$ " Rods 2 that are passed through holes in the Girders,  $5\frac{1}{2}$ " Strips being bolted to the latter to cover the elongated holes. A Sleeve Piece is mounted on the boiler to represent the steam cylinder, on the inside of which an Angle Bracket is secured to hold a short Rod 4, forming the piston connecting rod. A small Fork Piece is secured to the end of the Rod, and its forked end is slipped on to the 3" Rod 5, which represents the crankshaft. This latter Rod is journaled in a Double Bracket secured to the Boiler, and also in a Flat Bracket 7 (Fig. 2) that is bolted to the Channel Bearing on the frame (see Fig. 6). Two 2" Pulleys serve as a flywheel, while a 1" Pulley also mounted on the crankshaft is connected to a similar Pulley secured to the armature of the Electric Motor by a crossed belt composed of Meccano Cord. This arrangement

enables the crankshaft to be rotated in a realistic manner when the complete model is set in motion.

A Chimney Adaptor is pushed into the end of the Sleeve Piece forming the steam cylinder, and the Adaptor is secured to the base of the chimney by an Angle Bracket. The chimney itself consists of three  $3\frac{1}{2}$ " Strips held together at the base by a Double Bracket. The upper portion is secured to the roof of the cab and surmounted by a  $\frac{3}{4}$ " Flanged Wheel, which is mounted on a short Rod carrying a Collar. The latter is held in place by a bolt passed through a hole in the  $3\frac{1}{2}$ " Strip forming the front of the chimney.

The "firebox" is formed by two pairs of Flat Trunnions held together by  $1\frac{1}{2}" \times 1\frac{1}{2}"$  Double Angle Strips, one of which is

secured to the boiler. The frame

so formed supports the

steering mechanism, which is operated by the hand wheel 9. The hand wheel is mounted on the upper end of a 4" Axle Rod that is journaled in an Angle Bracket secured to the firebox and also in a Flat Bracket bolted to a  $\frac{1}{2}"$  Reversed Angle Bracket, which in turn is

secured to the left-hand composite Girder 1, as can be seen in Fig. 2. The lower end of the Rod carries a Worm, which engages with a  $\frac{1}{2}"$  Pinion 10. This Pinion is secured on the end of a 2" Rod carrying a Coupling

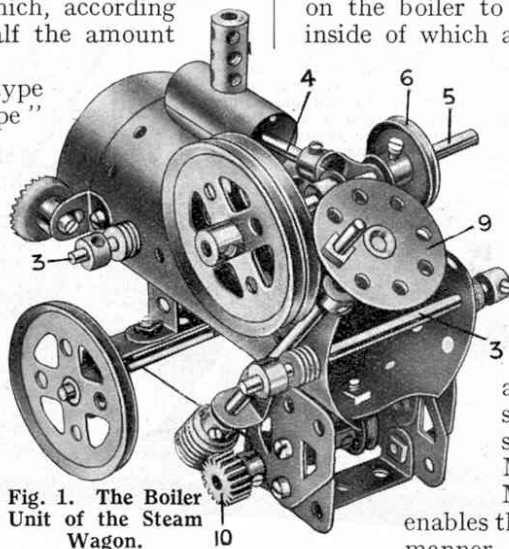


Fig. 1. The Boiler Unit of the Steam Wagon.

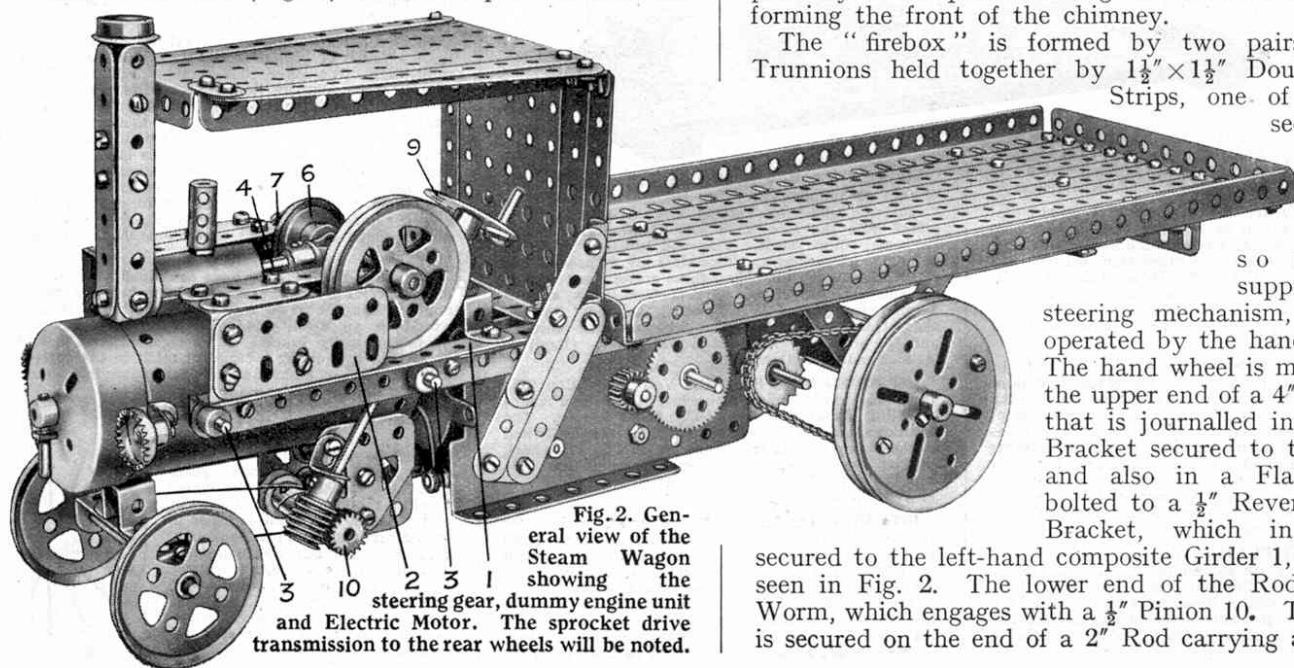


Fig. 2. General view of the Steam Wagon showing the steering gear, dummy engine unit and Electric Motor. The sprocket drive transmission to the rear wheels will be noted.

between two  $\frac{1}{2}$ " loose Pulleys, and a length of cord wound round the Coupling has its ends secured to the Double Angle Strip carrying the front axle. The Double Angle Strip is bolted to a Double Bent Strip, which is pivoted by a bolt and two nuts to the underside of the Boiler (see Fig. 1).

A 6-volt Electric Motor

is suspended beneath

the frame of the model to represent the water tank, and supplies the drive to the rear axle. The arrangement of the gearing is shown in Fig. 5. A  $\frac{1}{2}$ " Pinion on the Motor armature spindle meshes with a 57-teeth Gear on a Rod that carries a further Pinion engaging with a second 57-teeth Gear on a second Rod. The latter Rod carries two 1" Sprockets, from which the drive is led by means of endless lengths of Sprocket Chain to 2" Sprockets on the Rod carrying the rear road wheels. Each of these wheels consists of two 3" Pulleys butted together face to face. As previously mentioned, the armature shaft of the Motor carries a 1" fast Pulley for transmitting motion to the crankshaft. The endless cord, after passing round the Pulley 6, is crossed, passed on either side of the  $\frac{1}{2}$ " loose Pulley 8 (Fig. 5), and again crossed before being led round the Pulley on the Motor spindle. The Motor is held in position by the Angle Brackets 12.

The switch arm of the Motor is extended by means of a short Rod held in a Coupling, to facilitate control from the cab. This Coupling is secured by two bolts passed through the holes in the switch arm and screwed into the tapped holes of the Coupling. Each of the bolts carries a nut for spacing purposes.

After the three main units have been constructed, they may be assembled in their respective positions, thus completing the model wagon.

A double length of rubber-covered wire is used for connecting the Accumulator to the Motor, and it will be noted from Fig. 6 that the wires in the model have been coiled to give the effect of a miniature hose. The coil should be tied to the side girder of the wagon and to the flange of the Electric Motor, so that the wire can be passed through the platform to the Accumulator. The Steam Wagon possesses considerable power, and will haul a load of 18lb. in addition to the Accumulator.

### Construction of the Trailer and Coupling Gear

After the model steam wagon has been completed, the next step is to build the four-wheel trailer shown in Figs. 3 and 4. A Face Plate 1 is bolted to the 12 $\frac{1}{2}$ " Strips forming the platform, and a  $1\frac{1}{2}$ " Rod 2 is secured in its boss and passed through the centre hole of a Boiler End that is held in position by a Collar. Two  $3\frac{1}{2}$ " Strips are bolted on top of the Boiler End, and to these,  $3\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strips are secured, a Collar and Washers being used in each case for spacing purposes.

A further Double Angle Strip, to which the drawbar is secured, is attached loosely by lock-nutted bolts 3. The drawbar proper consists of a 2" Rod fitted with a small Fork Piece and an End Bearing, and the Rod is free to slide in a Double Bracket. A Spring (part No. 43), attached to the End Bearing by a bolt, is secured to the  $3\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip, and enables the hauling force to be applied gradually to the trailer when starting from rest.

A brake is provided by the Sprocket Chain 4, which passes over a drum formed from a Flanged Wheel and Bush Wheel. The tension on the Chain is varied by operating the hand wheel 5.

In order to build the Steam Wagon the following parts will be required:—

9 of No. 1; 6 of No. 2; 6 of No. 3; 10 of No. 5; 1 of No. 6a; 6 of No. 8; 3 of No. 9; 4 of No. 10; 5 of No. 11; 19 of No. 12; 4 of No. 12a; 1 of No. 15; 2 of No. 15a; 5 of No. 16; 3 of No. 17; 2 of No. 18a; 4 of No. 19b; 4 of No. 20a; 1 of No. 20b; 2 of No. 22; 3 of No. 23; 1 of No. 24; 2 of No. 26; 2 of No. 27a; 2 of No. 29; 1 of No. 32; 1 of No. 35; 127 of No. 37; 5 of No. 37a; 24 of No. 38; 1 of No. 45; 2 of No. 48; 3 of No. 48a; 1 of No. 52; 1 of No. 53; 10 of No. 59; 2 of No. 63; 19" of No. 94; 2 of No. 95; 2 of No. 96; 2 of No. 103f; 2 of No. 111; 6 of No. 111c; 2 of No. 115; 1 of No. 116a; 1 of No. 125; 4 of No. 126a; 1 of No. 160; 1 of No. 162a; 1 of No. 162b; 1 of No. 163; 1 of No. 164; 1 Electric Motor.

The parts that will be needed for the trailer are:—

9 of No. 1; 4 of No. 2; 4 of No. 3; 8 of No. 5; 2 of No. 8; 4 of No. 9; 2 of No. 10; 1 of No. 11; 2 of No. 15a; 1 of No. 17; 1 of No. 18a; 4 of No. 19b; 1 of No. 20; 1 of No. 24; 68 of No. 37a; 6 of No. 38; 1 of No. 43; 1 of No. 46; 3 of No. 48b; 3 of No. 59; 2 of No. 63; 1 of No. 90a; 7" of No. 94; 1 of No. 109;

2 of No. 111; 1 of No. 111c; 1 of No. 115; 1 of No. 116; 1 of No. 162a; 1 of No. 166.

Fig. 3. (Above) General view of Trailer.

Fig. 4. (Right below) Underside view showing brake and steering mechanism.

Fig. 5. The power unit with transmission gearing.

Fig. 6. The completed Steam Wagon and Trailer coupled together.