

One end of the model showing the imitation control wheel and entrance door. Note that the "lamp bulb" in the middle of the headlight is supplied by one of the plastic studs used to hold the parts contained in the Outfit in place.

THIS NEAT little working model of a sea-side tram is an excellent example of the realistic models that can be built with the Power Drive Set. It uses most of the parts in the outfit to full advantage and works in a very realistic manner picking up the current from an overhead wire through a proper trolley-pole mounted on the roof. It runs with great realism from a supply varying between 6 and 12 volts D.C.

Construction

As far as construction goes, the framework of the model is completely symmetrical, therefore both sides are similarly built, as also are both ends. Each side consists of two $12\frac{1}{2}$ in. Strips 1 and 2 connected by four $5\frac{1}{2}$ in. Strips 3, 4, 5 and 6, the upper Bolts securing Strips 4 and 5 also holding a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 7 in place as well as fixing a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plate

Power Drive Tram

A working model of a single-deck sea-side tram with authentic overhead pick-up built from the contents of the Power Drive Set.

by B. N. Love

7a between the sides. The upper Bolts securing Strips 3 and 6 each fix an Obtuse Angle Bracket in place and a $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 8 between the sides, then Flanged Plate 7a is extended eight holes at either end by a $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 9, itself extended by a Semi-circular Plate 10, also bolted to Double Angle Strip 8. A Formed Slotted Strip 11 is bolted between the Obtuse Angle Brackets at each side, at the same time "sandwiching" a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Transparent Plastic Plate between the Formed Strip and the Obtuse Brackets to serve as the driver's windshield.

Bolted between the lower ends of Strips 4 and 5 at each side are two further $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strips 12, spaced from the sides by a Washer on each securing Bolt. This extra spacing later allows two Flanged Sector Plates 13, forming the driving platforms, to be fixed in position between Strips 2, but, first, a Trunnion 14 is bolted each side of the Tram at the entrance to serve as the passenger step. Secured to this Trunnion and to a Fishplate fixed to Strip 2 is a $2\frac{1}{2}$ in. Stepped Curved Strip 15, a similar Curved Strip 16 being bolted to a $1 \times \frac{1}{2}$ in. Angle Bracket and another Fishplate fixed to Strip 2. The Bolt securing the latter Curved Strip to the Fishplate also holds an Angle Bracket 17 in place to balance the $1 \times \frac{1}{2}$ in. Angle Bracket. The Curved Strips, of course, will provide the bearings for the bogie wheel axles.

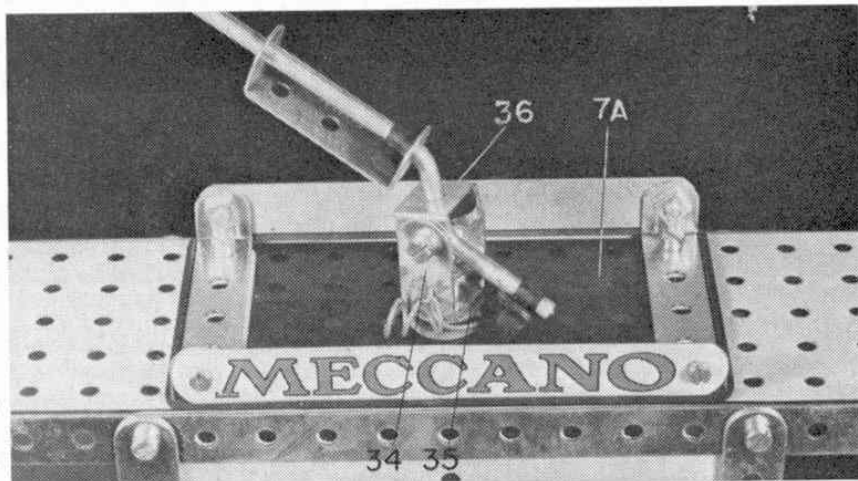
Flanged Sector Plates 13 can now be positioned, an operation achieved by bolting the wider ends of the Sector Plates to the side frames of the Tram and by attaching the front of the Plate, by means of an Angle Bracket, to a $4\frac{1}{2} \times 2\frac{1}{2}$ in. compound flexible plate 18, forming the front of the driver's cab and obtained from two $2\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plates, the join overlaid by a $2\frac{1}{2}$ in. Strip 19. The front securing Bolt also holds in place a $\frac{1}{2}$ in. Reversed Angle Bracket, to which a Double Bracket 20 and a Formed Slotted Strip 21 are bolted, the latter acting as the bumper, and the former serving as a towing shackle.

The sides of the model are now completed with a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 22 and a $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 23, overlapped two holes. Plate 23 is edged along the top by a $3\frac{1}{2}$ in. Strip 24 while Plate 22 is

PARTS REQUIRED

4-1	1-19s	1-51	2-188
8-2	1-20a	1-52	2-189
2-3	4-22	2-53a	4-190
9-5	2-22a	2-54	2-191
6-10	1-23	4-90a	2-192
2-11	2-23a	6-111c	2-193
1-11a	2-24	2-125	2-193a
10-12	8-35	2-126	1-194
2-12b	100-37a	2-126a	2-194a
4-12c	90-37b	2-155	1-212
1-15b	18-38	1-176	2-212a
4-16	2-38d	1-186	1-213
2-17	10-40	1-186a	2-214
2-18a	1-48	1-186b	4-215
1-18b	6-48a	2-187	4-221

In this close-up view, the construction of the trolley pole swivel is clearly shown.



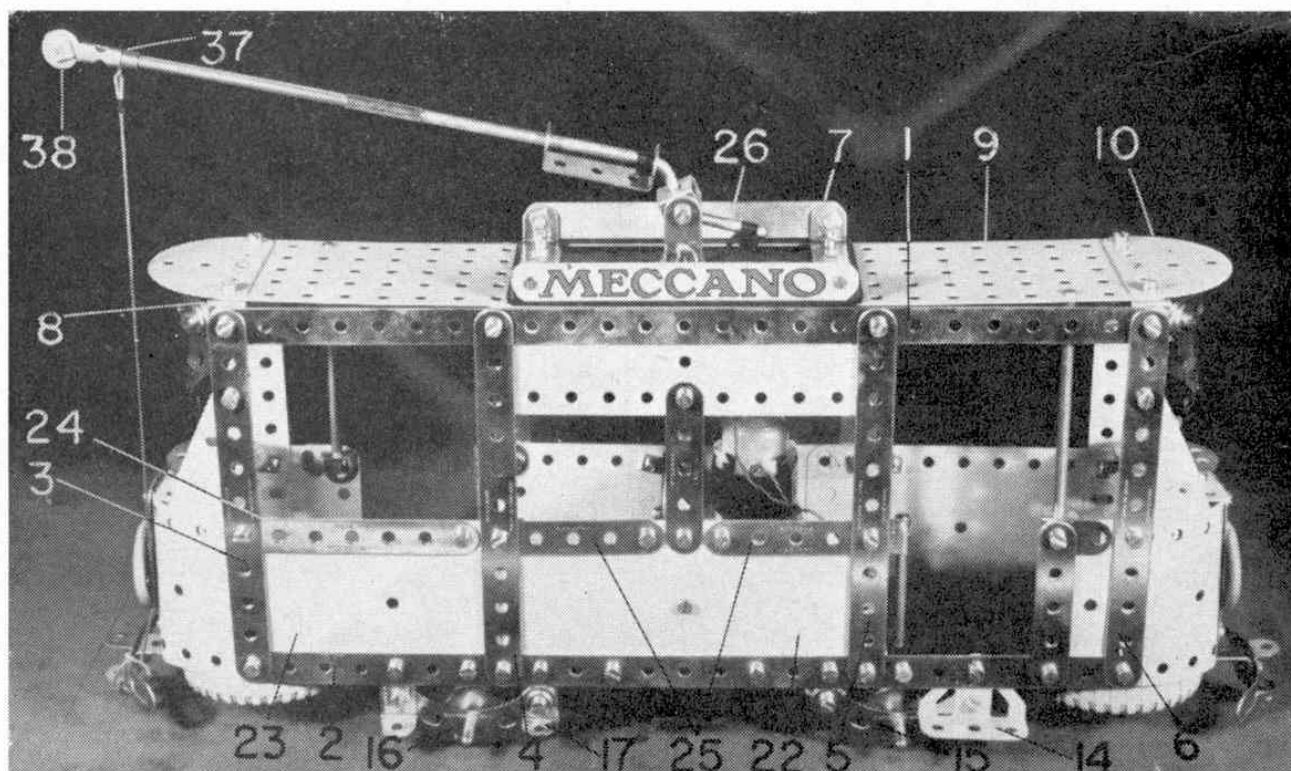
This little Tram model, built with the contents of the Meccano Power Drive Set, is authentic in operation, picking up the current from an overhead wire through a working roof-mounted trolley pole.

edged by two $2\frac{1}{2}$ in. Strips 25, a half-inch space being left between them to allow a third $2\frac{1}{2}$ in. Strip 26 to be bolted between Plate 22 and Plate 7, as shown. Compound flexible plate 18 is extended by a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 27, edged by a $2\frac{1}{2}$ in. Strip and a Fish-plate 28, the securing Bolt also holding an Angle Bracket in place. A $3\frac{1}{2}$ in. Rod is journaled in this Angle Bracket and roof Flat Plate 9 to act as a handrail. Another handrail is supplied by another Rod 28a held in a right-angled Rod and Strip Connector bolted to Strip 5.

Windows for the central motor compartment are supplied by $2\frac{1}{2} \times 2\frac{1}{2}$ in. Transparent Plastic Plates. There are only two of these available in the Power Drive Set, but they may of course be fitted in the alternative window positions. The driver's cabs are completed with $2\frac{1}{2} \times 1\frac{1}{2}$ in. Triangular Flexible Plates 29, then a headlamp is added to each of the two cab fronts. Each of these headlamps is obtained from a

1 in. Pulley with Rubber Ring 30, overlaid in the centre by a $\frac{3}{4}$ in. Washer and held in place by one of the special plastic studs used to retain parts in the tray of the Power Drive Set. The stud is secured inside the Tram by a standard Nut run onto the stud by the Spanner contained in the Outfit. This simulates an electric lamp bulb in the middle of the headlamp with great effect, but, in the absence of the plastic studs, a $\frac{3}{4}$ in. Bolt may be employed.

Inside each cab, the imitation driving control handle is made from an 8-hole Bush Wheel 31, fitted with a $\frac{3}{8}$ in. Bolt fixed in the centre hole of a Flat Trunnion 32 secured to the cab front by an Angle Bracket. A $2\frac{1}{2}$ in. Road Wheel 33 is mounted below the driver's cab at either end of the model to add depth to the control gear appearance. These Road Wheels are secured on short Rods passed through Flanged Sector Plates 3 and held in place in one case by a Spring Clip and Washer and, in the other case, by a 2 in. Pulley.



Motor and electrical pick-ups

Coming, now, to the power plant, a Power Drive Unit is fixed to a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flanged Plate bolted between the centre holes of Flexible Plates 22 and spaced from the sides by a Washer on the shank of each securing Bolt to maintain a uniform width between the sides of the Tram. The motor leads are passed up through the roof ready to be connected to the trolley pole. This is built up from a $1 \times \frac{1}{2}$ in. Double Bracket 34 pivotally attached to Flanged Plate 7a, but spaced from the Plate by a $\frac{1}{2}$ in. Pulley without boss 35. As the Pulley in the Power Drive Set is produced from red plastic, it acts as an insulator between the Double Bracket and the Flanged Plate but note that the securing Bolt must also be insulated from the Plate. The best way of doing this is to use a non-metallic bolt such as the nylon type than can be obtained from some electrical suppliers, but, failing this, the 10 in. Driving Band included in the Power Drive Set may be threaded through Pulley 35 and then secured to the Flanged Plate carrying the Power Drive Unit by threading it through a suitable hole and securing the loop with a Spring Clip slipped through it. On the other hand, a standard Meccano Bolt could be used provided it was adequately insulated from the metal parts by a suitable insulator. If the nylon bolt method is chosen, however, its thread form needs to be 5/32 in. Whitworth to be used with Meccano Nuts.

Lock-nutted to the lugs of Double Bracket 34 is a $\frac{1}{2} \times \frac{1}{2}$ in. Double Bracket 36 in which a $3\frac{1}{2}$ in. Crank Handle is held by a Spring Clip wedged against the locking Nuts. This combination makes a very satisfactory locking device as it not only wedges the trolley pole in the correct position, but it also prevents the trolley pole from shifting and the locking Nuts from shaking loose. The pole is "sprung" by a $2\frac{1}{2}$ in. Driving Band which runs round the groove of Pulley 35 and is then twisted to form a loop that is passed round another Spring Clip mounted on the end of the Crank Handle. Adjusting the size or twists of this loop will vary the tension on the trolley pole.

The Crank Handle itself is extended by a $3\frac{1}{2}$ in. Rod attached by a Rod Connector and on the end of the Rod is mounted a pick-up shoe consisting of a Cord Anchoring Spring 37 and a Rod and Strip Connector 38. A Nut, sandwiched between a Washer and the head of a $\frac{3}{8}$ in. Bolt, is fixed in the Rod and Strip Connector, the Nut being so arranged that it presents a flat edge to the overhead pick-up wire. A length of Cord acting as the trolley rope is attached to the eye of Cord Anchoring Spring 37, the other end being attached to some part of the back of the Tram such as the bumper. As it must be possible to reverse the position of the trolley pole according to the direction in which the Tram is to travel, the trolley rope should be so fixed to the model that it can be easily disconnected. One of the motor leads is now connected to Double Bracket 34, the other lead being "earthed" by bolting it to some metal part of the model's framework.

The wheels are supplied by 1 in. Fixed Pulleys 39 mounted in pairs on two $3\frac{1}{2}$ in. Rods journaled in Stepped Curved Strips 15. Also mounted on one of the Rods is a $\frac{1}{2}$ in. fixed Pulley 40 which is connected by a 6 in. Driving Band to a $\frac{1}{2}$ in. Pulley fixed on the output shaft of the Power Drive Unit. For short runs on two or three feet of track, the Power Drive Unit is set on the 32 : 1 ratio but, if a longer length of track is available, the 16 : 1 ratio may be used to take advantage of a higher speed. Tram rails are made from Angle Girders which are, of course, additional to the Outfit. They are best joined together by fishplates made from brass Elektrikit 2 in. Perforated Flexible Strips to ensure a smooth continuity of rail. The stanchions which support the overhead wire can be made to suit the constructor's personal taste, but the bare copper wire contained in the Elektrikit forms an ideal overhead conductor wire and, if the stanchions are secured to a board or a wooden floor, no special insulation is required. The original model was controlled by a 12 volt. DC model railway power control unit, one lead being connected to the rails and the other to a nearby stanchion.

A close-up view of the driven axle showing the position of the Power Drive Unit.

