

TRAMCAR

*Built from the contents of Meccano Outfit No. 3
Designed and described by Dr. Keith Cameron*

TRAMS have been popular subjects with modellers since the earliest days of Meccano, and a well-proportioned 'Trolley-Car', (as they are called in the United States), appeared in the 1915 Meccano Book of Prize Models. With few exceptions American Trams have been single-deckers. One of the largest systems, and one of the oldest, was that of the city of Cincinnati, Ohio, and the history of these interesting vehicles is described in great detail in the protusely illustrated series entitled 'Cincinnati Streetcars' by Richard Wagner and Roy Wright. My model is based on one of the early four-wheelers that appeared around 1888.

A version of the model powered by an M5 Power Drive Unit and capable of running on track is also described, this requires the use of a few extra parts not contained in the No. 3 Set.

THE FRAME

A $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate 1 and a $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flat Plate 2 are bolted together, overlapping one hole. $5\frac{1}{2}$ " Angle Girders 3 with their round hole flanges directed upward are fixed to these with their slotted hole flanges under the Plates. Three rows of holes project beyond each end of the Girders, these form the two platforms. Along one side of each platform a step consisting of a $1\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip held by two lock-nutted $3/4$ " Bolts is fixed.

SIDE FRAMES

Each side frame consists of a $5\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plate edged above and below by $5\frac{1}{2}$ " Perforated Strips. Vertical Narrow Strips spaced as shown, (a $3\frac{1}{2}$ ", a $2\frac{1}{2}$ ", a further $2\frac{1}{2}$ ", and a 3" Strip) form the window frames and are connected at their upper ends by a $7\frac{1}{2}$ " Strip, the fixing Bolts also securing two $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strips and four $\frac{1}{2}$ " Angle Brackets, (two each side). The Double Angle Strips are slightly formed and the $\frac{1}{2}$ " Angle Brackets made slightly obtuse to provide the roof curve.

THE ROOF

This comprises a central $2\frac{1}{2}$ " x $2\frac{1}{2}$ " Plastic Flexible Plate joined at both ends to $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plates and held in place by the Double Angle Strips and the $\frac{1}{2}$ " Angle Brackets. Rounded ends are provided by slightly formed $2\frac{1}{2}$ " Curved Strips. 3" Formed Slotted Strips are bolted by Obtuse Angle Brackets to the $7\frac{1}{2}$ " Strips. A raised roof section (or clerestory) is formed from three $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Plastic Flexible Plates bolted together to form a compound $5\frac{1}{2}$ " x $1\frac{1}{2}$ " Plastic Flexible Plate. This is fixed to the main roof by $\frac{1}{2}$ " Bolts using $\frac{1}{2}$ " Pulleys as spacers near the centre, and Washers for this purpose at each end.

PLATFORM ENDS

At one end, a $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flanged Plate is

bolted to the flange of the $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate 1. At the other end a composite $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flat Plate comprising two $1\frac{1}{2}$ " x $1\frac{1}{2}$ " Flat Plates is fixed by means of a $1\frac{1}{2}$ " Angle Girder to the $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flat Plate 2. This composite Plate is edged on one side by a $1\frac{1}{2}$ " Angle Girder. The headlights consist in each case of a $3/4$ " Washer and a 1" Pulley secured by a $\frac{1}{2}$ " Bolt. 2" Perforated Strips form 'no-entry' barriers on one side of each platform as shown.

THE UNDERCARRIAGE

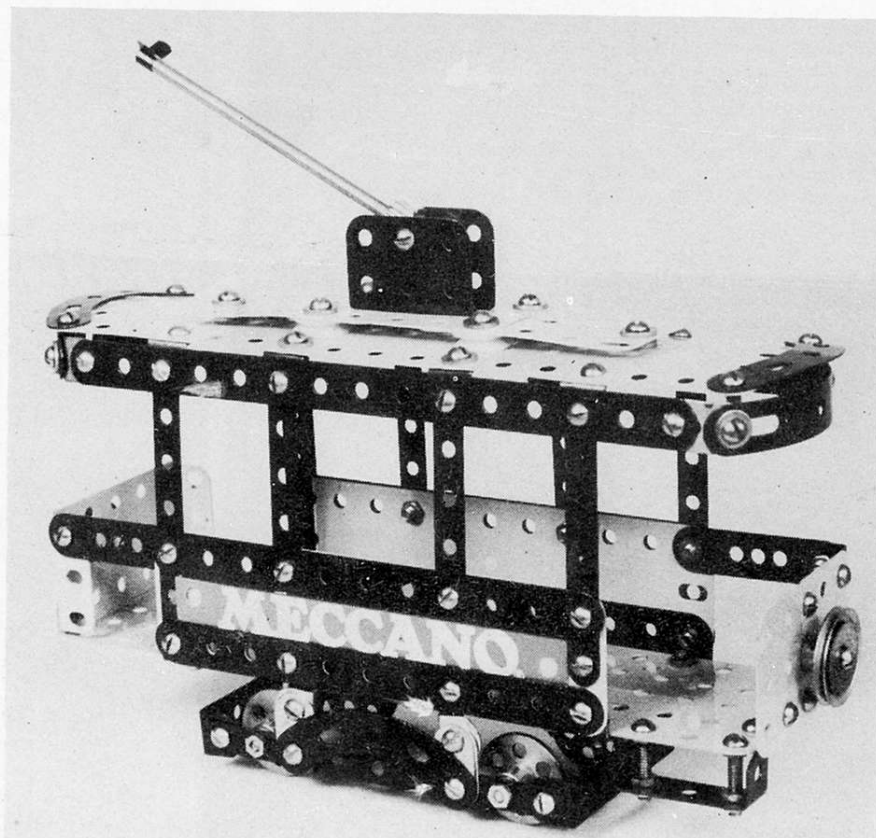
This is rectangular, and formed from two $4\frac{1}{2}$ " Narrow Strips connected via their end holes by two $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strips. This is held to the frame on one side by two 1" x

$\frac{1}{2}$ " Angle Brackets, and on the other side by Fishplates and Corner Angle Brackets. The fixing Bolts also secure $2\frac{1}{2}$ " Curved Strips. The undercarriage wheels are represented by 1" Bush Wheels, bosses outward, free to rotate on Bolts lock-nutted to the Narrow Strips.

THE TROLLEY POLE

A 4" Axle Rod is held in a $\frac{1}{2}$ " Pinion wedged between the two sides of a Channel Bearing, but free to pivot on Bolts held in its transverse threaded bores. The Channel Bearing is free to rotate on a $\frac{1}{2}$ " Bolt in its centre hole and the centre hole of the roof, secured below by lock-nuts.

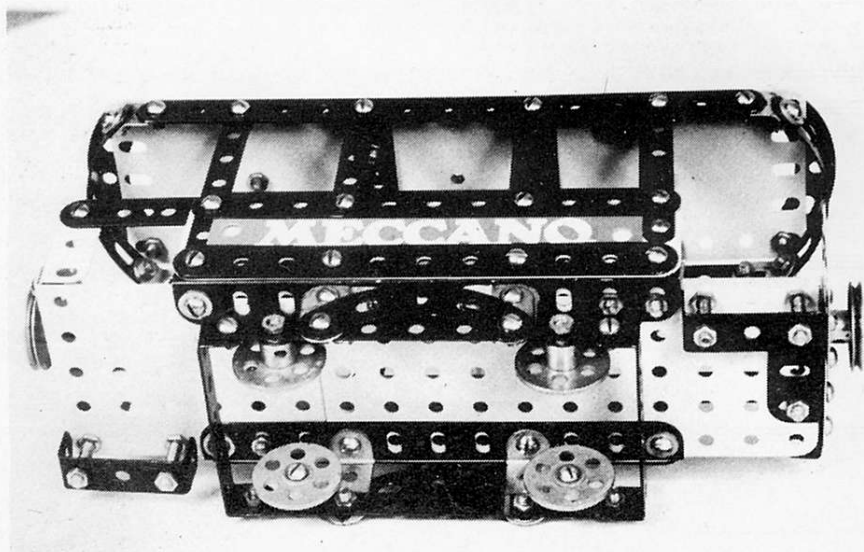
General view of the non-powered version of the Tramcar.



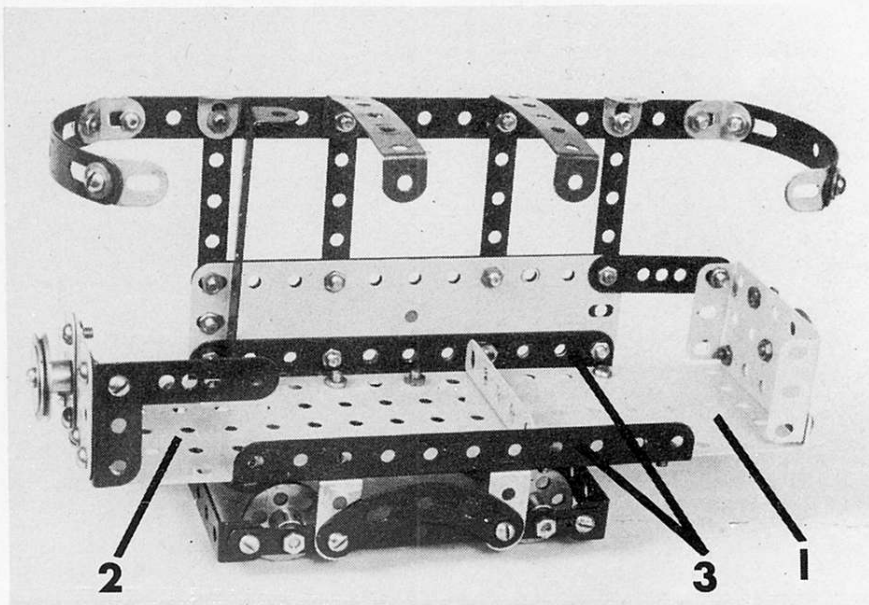
PARTS REQUIRED— Non-powered version

| | |
|----------------|----------------|
| 2 of No. 1B | 1 of No. 53 |
| 4 of No. 2 | 20 of No. 38 |
| 2 of No. 6 | 1 of No. 70 |
| 2 of No. 9 | 2 of No. 74 |
| 2 of No. 9F | 4 of No. 90A |
| 2 of No. 10 | 4 of No. 111 |
| 4 of No. 12 | 11 of No. 111A |
| 2 of No. 12B | 1 of No. 154A |
| 4 of No. 12C | 1 of No. 154B |
| 1 of No. 15B | 1 of No. 160 |
| 2 of No. 22 | 2 of No. 189 |
| 4 of No. 23 | 2 of No. 190A |
| 1 of No. 26 | 3 of No. 194 |
| 1 of No. 35 | 1 of No. 194A |
| 84 of No. 37B | 2 of No. 215 |
| 108 of No. 37C | 4 of No. 235 |
| 2 of No. 38D | 2 of No. 235A |
| 2 of No. 48 | 2 of No. 235B |
| 4 of No. 48A | 2 of No. 235D |
| 2 of No. 48B | 4 of No. 518 |
| 1 of No. 51 | from 187C) |

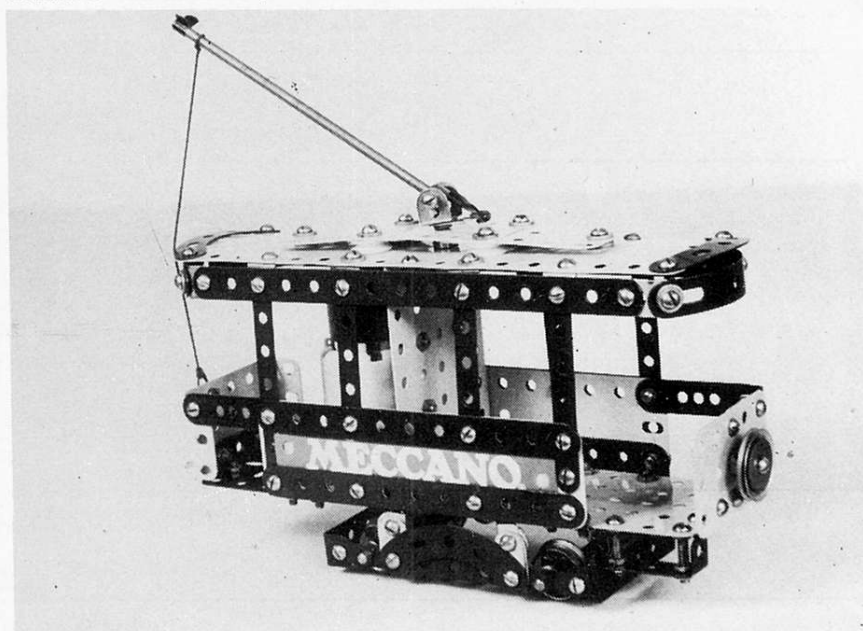
'Meccano' emblem for side panels



Partly-dismantled view showing interior construction.



General 3/4 view of the M5 powered version.



Tramcar undercarriage showing method of attachment to main frame.

MOTORISED VERSION

This requires an M5 Powerdrive Unit, a Worm Gear, two 3" Axle Rods, four 3/4" Flanged Wheels, five Collars, a 5" Axle Rod, two extra 1/2" x 1/2" Angle Brackets, a 1 1/2" Angle Girder, a Fishplate and a 2 1/2" Driving Band. These parts also provide a neat, operating Trolley Pole.

THE FRAME

This must be altered to allow passage of the drive to the wheels. The 5 1/2" x 2 1/2" Flat Plate is retained exactly as in the non-powered version. However, the 3 1/2" x 2 1/2" Flanged Plate is bolted by one of its flanges to the Flat Plate along the second row of holes as shown, and the M5 Motor is secured to this Flanged Plate.

THE REAR PLATFORM

The platform closer to the Motor is composed of two 2 1/2" Flat Girders bolted by their round holes to the slotted hole flanges of the 5 1/2" Angle Girders, overlapping two holes in each case and placing the Flat Girders above the Angle Girders. A 2 1/2" x 1 1/2" Flanged Plate is attached by a 1 1/2" Angle Girder to the end holes of the 2 1/2" Flat Girders.

THE WHEELS

These are 3/4" Flanged Wheels fixed on 3" Axle Rods journalled in the 4 1/2" Narrow Strips as shown. Collars and Washers are used for spacing purposes, and the rear axle also carries a 1/2" Pinion which meshes with a Worm Gear on the output shaft of the M5 Motor.

THE TROLLEY ARM

This is a 5" Axle Rod secured at its lower end by a Collar pivoting in the slotted holes of two 1/2" x 1/2" Angle Brackets by means of 1/2" Bolts, secured by Nuts in the Collar's transverse threaded bores. The 1/2" x 1/2" Angle Brackets are held in the form of a Double Bracket to a Fishplate by a 1/2" Bolt and a Nut. This Bolt passes through the centre hole of the roof, a Collar being placed between the sections of the roof for stability. A 2 1/2" Driving Band looped through the free hole of the Fishplate is held on the 5" Axle Rod above the Collar and exerts enough tension to maintain trolley pole contact with an overhead wire, this being tracked by a

Spring Clip mounted at the top of the 5" Rod as shown. A length of cord tied to the upper end of the pole can be looped around a Bolt on the platform end.

OPERATION

A wire is used to connect the $\frac{1}{2}$ " Bolt of the trolley pole to one terminal of the M5 Motor. The ground lead should be taken from the $\frac{4}{2}$ " Narrow Strips forming the undercarriage sides,

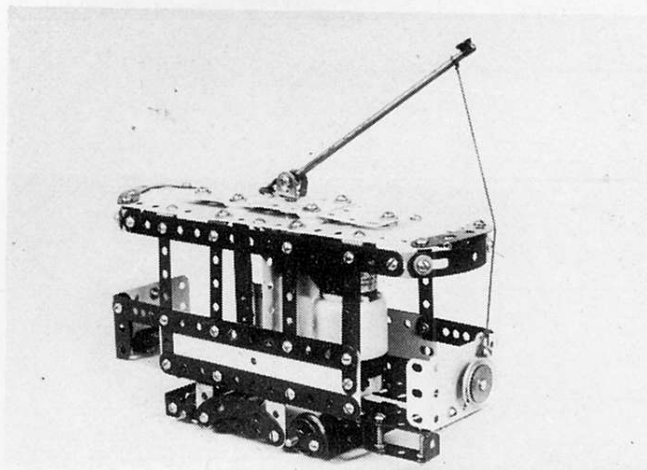
first removing a small portion of enamel to ensure good electrical contact.

2ND MOTORISED VERSION

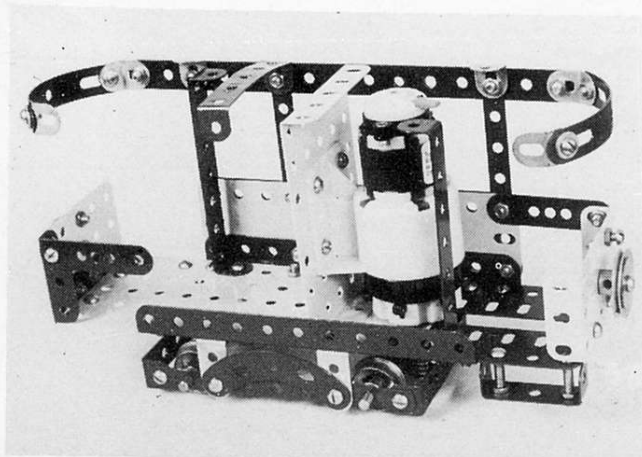
This arrangement utilises the 11053 Powerdrive Unit Mark II, and is described for those who do not have an M5 Powerdrive Unit and wish to motorise the tram using the motor supplied with the No. 3 Set.

The frame is built up as in the non-powered

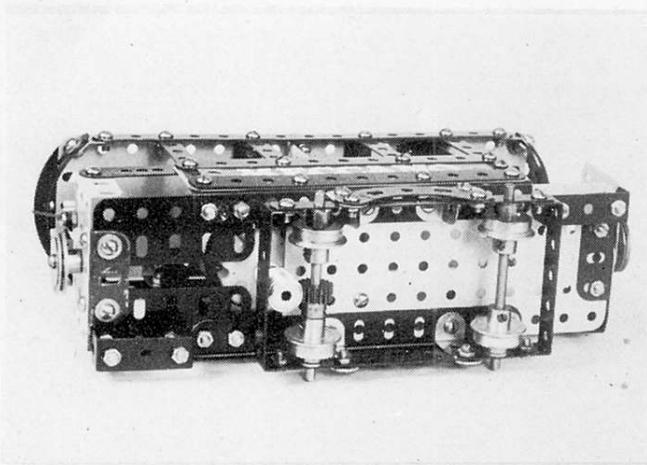
version using the $3\frac{1}{2}$ " x $\frac{1}{2}$ " Flanged Plate and the $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flat Plate. A $1\frac{1}{2}$ " Axle Rod is journalled vertically through the Flat Plate and a Double Bent Strip as shown. This Rod carries at its lower end a Worm Gear driving a $\frac{1}{2}$ " Pinion as described in the M5 version. At its upper end, the $1\frac{1}{2}$ " Rod carries a 50t Contrate Wheel which is driven by a 15t Pinion on the Motor output shaft. Washers are employed where necessary for spacing purposes. The remainder of the tram is constructed as already described.



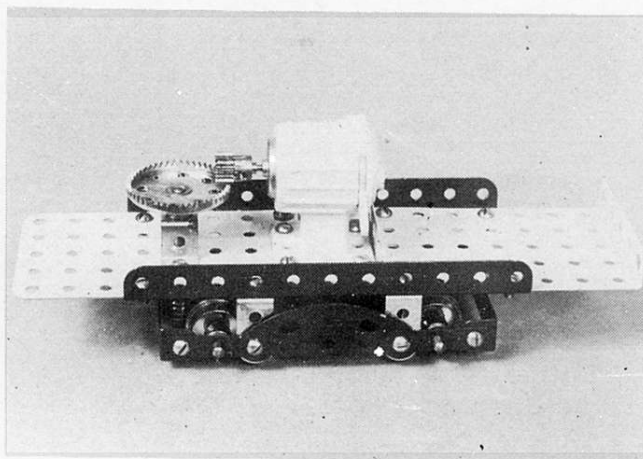
View from the rear (motor) end of the M5 powered version.



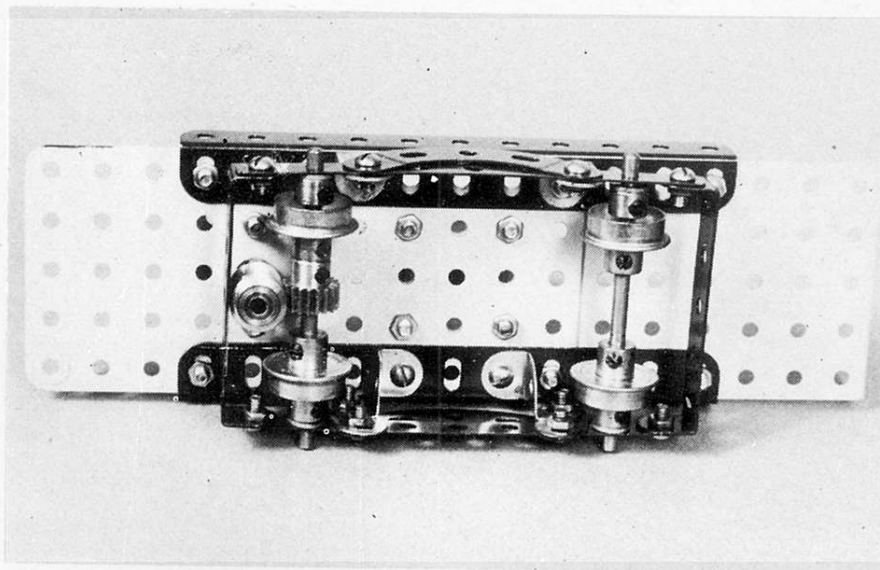
Interior construction; M5 version.



Gearing arrangement of M5 powered Tramcar.



Upper view of chassis frame, 11053 version.



Lower, underside of 11053 version.

Extra parts required to complete the 2nd Motorised Version.

2 of No. 16b
4 of No. 20b
1 of No. 26
1 of No. 26c
1 of No. 28
1 of No. 32

6 of No. 37b
6 of No. 37c
6 of No. 38
1 of No. 45
4 of No. 59

1 of No. 11053 Motor.

(An operating trolley pole, as described in the M5 version, will add to the realism of this model).

Spring Clip mounted at the top of the 5" Rod as shown. A length of cord tied to the upper end of the pole can be looped around a Bolt on the platform end.

OPERATION

A wire is used to connect the 1/2" Bolt of the trolley pole to one terminal of the M5 Motor. The ground lead should be taken from the 4 1/2" Narrow Strips forming the undercarriage sides,

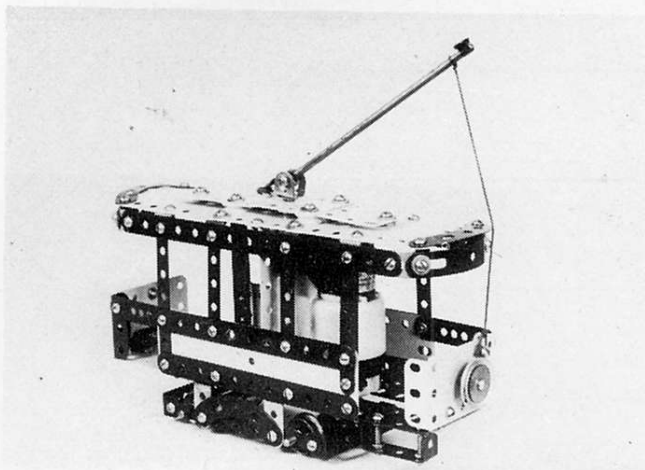
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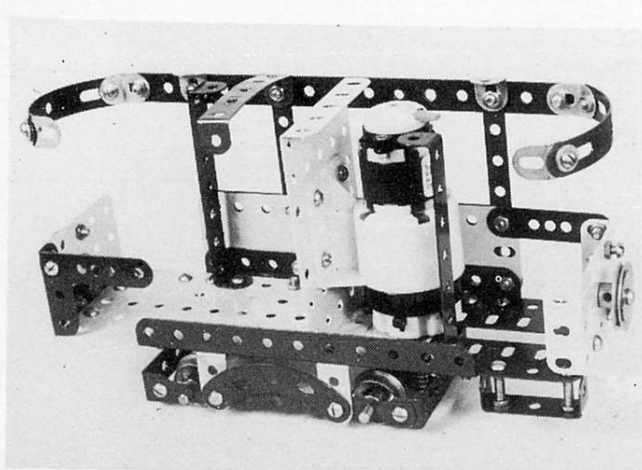
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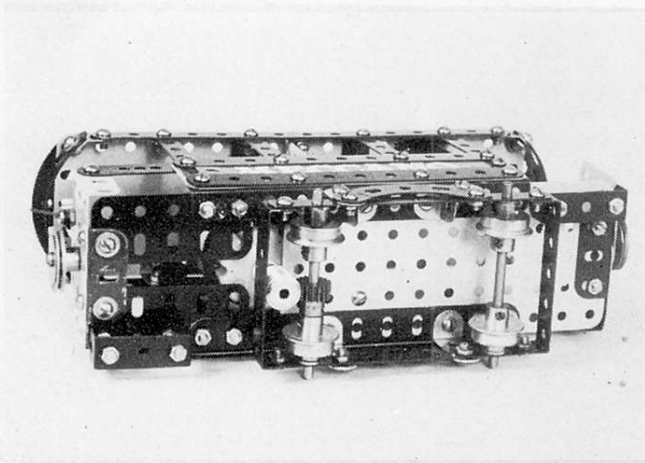
version using the 3 1/2" x 1/2" Flanged Plate and the 5 1/2" x 2 1/2" Flat Plate. A 1 1/2" Axle Rod is journalled vertically through the Flat Plate and a Double Bent Strip as shown. This Rod carries at its lower end a Worm Gear driving a 1/2" Pinion as described in the M5 version. At its upper end, the 1 1/2" Rod carries a 50t Contrate Wheel which is driven by a 15t Pinion on the Motor output shaft. Washers are employed where necessary for spacing purposes. The remainder of the tram is constructed as already described.



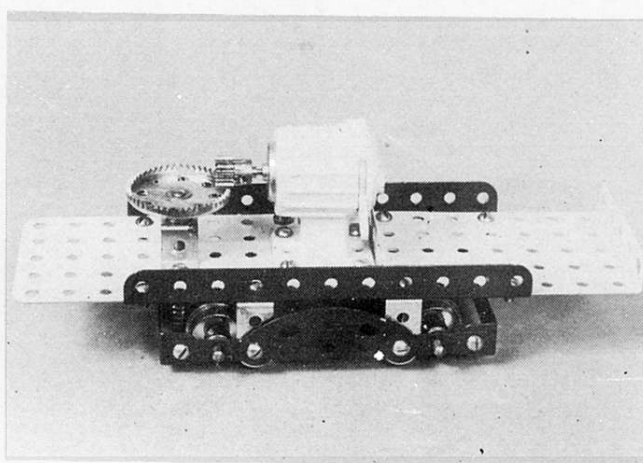
View from the rear (motor) end of the M5 powered version.



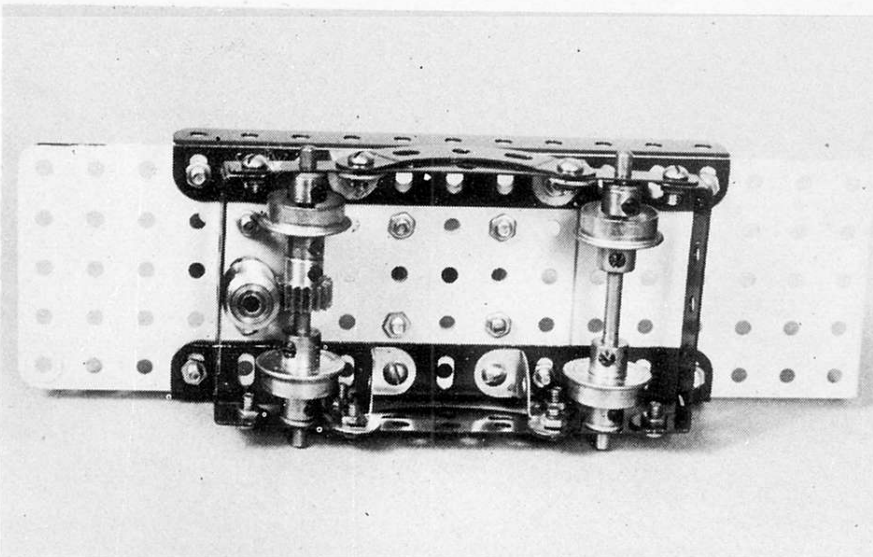
Interior construction; M5 version.



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Lower, underside of 11053 version.

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