

A WORKING PLATFORM SWEEPER IN MECCANO

*An unusual and interesting model for
Meccano builders described by SPANNER*

Part I

MANY A SCATHING COMMENT on the "dirty state" of British railway stations has been heard muttered in the dark recesses of austere station waiting rooms up and down the country, but I wonder if the disgruntled passengers who make the comments are being strictly fair. I'm no expert on British Rail, but I do know that I have travelled literally thousands of times on a short commuter line running into Liverpool from the Wirral Peninsula and perhaps the most common sight of all from the train is to see a porter busily engaged in sweeping the platforms of the small stations dotted along the line. This, to my mind, proves that station staff are concerned with cleanliness and, in fact, I understand that a good, wide-headed

sweeping brush is an essential piece of any station's equipment!

Considering the size of station platforms in this country, keeping them clean must be a bit of a problem. In the case of small two-platform stations, the porter with a sweeping brush might be able to do the job reasonably well, but what about large terminal and main-line stations with an enormous platform area to be kept clean? If this was done by hand, a whole company of cleaners would need to be employed full-time on the job and the cost would be so high as to make this course of action quite out of the question. What has happened, instead, is that the railways, like the roads, have made use of special sweeping machines

which enable one man to do the whole job with a minimum amount of trouble and effort. At least one such machine can be seen in regular use at Lime Street Station in Liverpool city centre and although we cannot show the full-size machine, we do at least feature here a very good scale reproduction of it, built in Meccano. Although only a model, it works extremely well, powered by an E15R Electric Motor carried inside the body and with brushes supplied by bristles cut from an old paintbrush.

Chassis

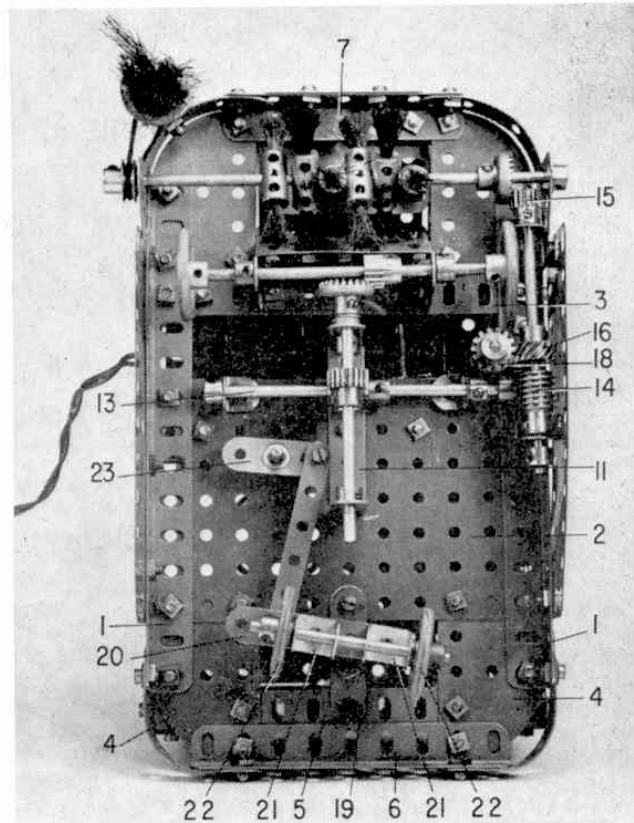
As is usual, construction of the model begins with the chassis. Two $7\frac{1}{2}$ in. Angle Girders 1 are connected by a $5\frac{1}{2} \times 3\frac{1}{2}$ in. Flat Plate 2 and a $5\frac{1}{2}$ in. Flat Girder 3, both being so positioned as to leave two holes free at each end of each Angle Girder. Bolted to the rear end of each Girder 1 and to the Flat Plate is a Semi-circular Plate 4, these Plates at each side being connected by a $5\frac{1}{2}$ in. Angle Girder 5, spare flange pointing upwards, and a $4\frac{1}{2}$ in. Angle Girder 6, spare flange pointing downwards. The latter Girder is joined to each Girder 1 by two Formed Slotted Strips which round off the corners nicely.

Now bolted to the forward ends of Girders 1 and to Flat Girder 3 are two further Semi-circular Plates, these being connected at the front by a $3\frac{1}{2}$ in. Angle Girder 7 which is, in turn, connected to each Girder 1 by two further Formed Slotted Strips to round off the corners. Note that the Bolt fixing each of these Formed Slotted Strips to respective Angle Girder 1 also helps to secure a $1\frac{1}{2}$ in. Corner Bracket 8 to the Girder, the other Bracket-securing Bolt helping to fix a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 9 to the same Girder. The Corner Brackets will later serve as the bearings for the main sweeping-brush assembly.

Bolted to the centre underside of Flat Girder 3 is a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Double Angle Strip the securing Bolts helping to fix an E15R Motor (operating switch to the right) to the top of the Girder, this Motor also being fixed to the top of Flat Plate 2. Held by Collars in the end holes in the lugs of the Double Angle Strip is a $4\frac{1}{2}$ in. Rod, carrying a $\frac{1}{8}$ in. Pinion and two 1 in. Pulleys fitted with Rubber Rings, the latter mounted one on each end of the Rod. In mesh with the Pinion is a $\frac{3}{8}$ in. Contrate Wheel 10 on the end of a $3\frac{1}{2}$ in. Rod journalled in the end holes in the lugs of another $2\frac{1}{2} \times 1\frac{1}{2}$ in. Double Angle Strip 11, bolted to the underside of Flat Plate 2. The Contrate is spaced from the lug of the Double Angle Strip by three Washers.

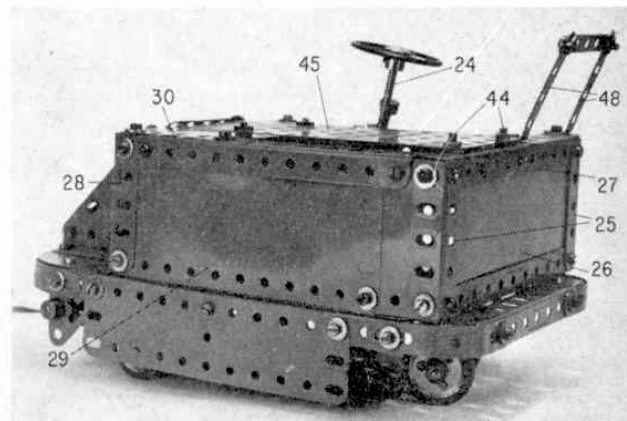
Also fixed on the Rod, between the lugs of the Double Angle Strip, is a $\frac{1}{2}$ in. Pinion which meshes with a second $\frac{1}{2}$ in. Pinion 12 on a $2\frac{1}{2}$ in. Rod, held by Collars in the centre holes in the lugs of the Double Angle Strip. This Pinion is in constant mesh with a Worm fixed on a $4\frac{1}{2}$ in. Rod 13, held by Collars in two Angle Brackets bolted to Flat Plate 2. Each Angle Bracket is spaced from the Plate by a Washer on the shank of the securing Bolt. Mounted on the left-hand end of Rod 13 is a $\frac{1}{2}$ in. Pinion which, itself, meshes with a Worm 14 on a 4 in. Rod, held by a Collar and a $\frac{1}{8}$ in. Pinion 15 in one right-hand and one left-hand Corner Angle Bracket bolted to nearby Girder 1. Also fixed on the Rod in the position shown is a $\frac{1}{2}$ in. Helical Gear 16.

Turning to the E15R Motor, a $\frac{3}{8}$ in. Pinion 17 is mounted on the rear-pointing end of the output shaft, this Pinion meshing with a 50-teeth Gear Wheel on a $2\frac{1}{2}$ in. Rod journalled in the Motor sideplates. Also mounted on this Rod, between the Motor sideplates, is



Above: An underside view of the model showing the layout of the chassis, the steering linkage and the drive to the sweeping brushes.

Below: In this view of the Platform Sweeper, construction of the left-hand side and rear of the body is clearly shown.



a $\frac{1}{2}$ in. Helical Gear which meshes with another similar Helical Gear 17a on a vertically-mounted $3\frac{1}{2}$ in. Rod. This Rod is held by Collars in Flat Girder 3 and in an Angle Bracket bolted to the centre of a $1\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip which is in turn bolted to the upper corners of the Motor sideplates. The Rod, itself, projects downwards through the Flat Girder and on its lower end is fixed a further $\frac{1}{2}$ in. Helical Gear 18 which meshes with Helical 16. This completes the drive linkage to the sweeping-brush assemblies, but it is best to leave the actual brush assemblies till the last.

TO BE CONTINUED

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Steering

At this stage the rear, steerable wheels and the steering linkage should be added. A 2 in. Strip 19, overlaid by a Double Arm Crank, is bolted between the centre of Angle Girder 5 and Flat Plate 2. Journalled, free, in the boss of the Double Arm Crank is a 2 in. Rod, held in place by a Collar above the Crank and by another Double Arm Crank below the Strip. This second Double Arm Crank is bolted to a 2½ in. Strip 20, the securing Bolts also fixing two 1 in. Double Brackets 21 to the underside of the Strip. Incidentally, please note that the Strip projects two holes beyond one end of the arm of the Crank. Journalled in the end holes in the lugs of the Double Brackets is a 2½

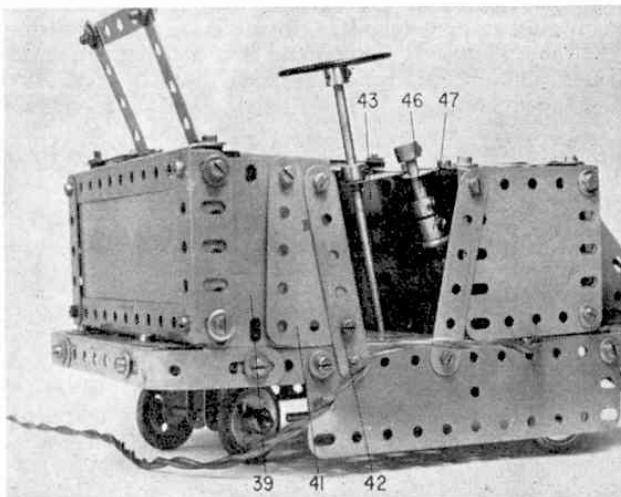
in. Rod, on which two 1 in. loose Pulleys 22, fitted with Rubber Rings, are held by Collars. Each Pulley is spaced from the nearby Double Bracket by two Washers.

Lock-nutted through the second hole in the protruding end of Strip 20 is a shaped 3 in. Narrow Strip, the other end of which is lock-nutted to the arm of a further Double Arm Crank 23, fixed on the lower end of a 4½ in. Rod 24, forming the steering column. This Rod is mounted in one hole in Flat Plate 2 and will also later be mounted in 1½ in. Strip bolted to the body.

Bodywork

The bodywork, itself, is fairly straightforward. Two vertically-mounted 2½ in. Angle Girders 25 are bolted, one to each end of Angle Girder 5, at the same time fixing a 5½ × 2½ in. Flexible Plate 26 in position. The upper ends of Girders 25 are joined by a 5½ in. Angle Girder 27. Two further vertically-mounted 2½ in. Angle Girders 28 are fixed by Angle Brackets, one to each end of Flat Girder 3, then a 6½ in. compound flexible plate 29 is bolted between left-hand Girders 25 and 28, the compound plate consisting of one 5½ × 2½ in. and one 2½ × 2½ in. Flexible Plate, overlapped three holes. The compound plate is edged along the top by another 5½ in. Angle Girder 30.

Towards the front of the models, two Obtuse Angle Brackets and two 2½ in. Angle Girders 31 are bolted to the top of Flat Plate 3, the Angle Brackets spaced by a distance of three holes and the Girders by a distance of five holes. Secured through its second holes to the free lugs of the Obtuse Angle Brackets is a 2½ × 2½ in. Curved Plate 32 which projects downwards to form a back plate for the sweeping-brush "compartment", while bolted to the spare flange of each 2½ in. Girder is a 2½ × 2½ in. Triangular Flexible Plate 33. A 5½ × 2½ in. compound flexible plate 34,

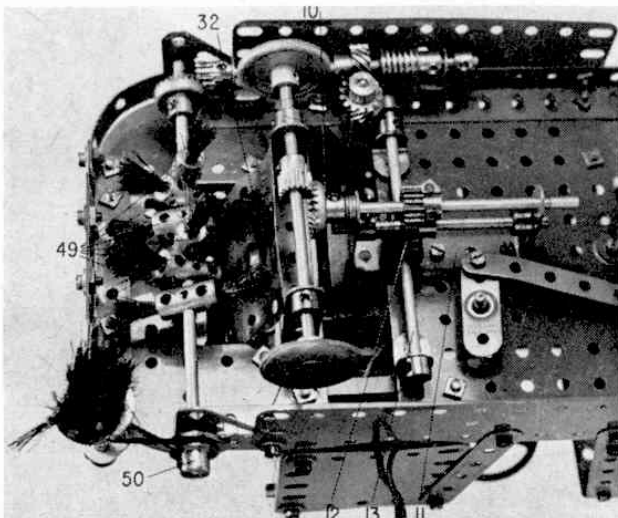


With the model completed, the E15R Motor is controlled from the cab by means of a short extension lever connected to the Motor switch.

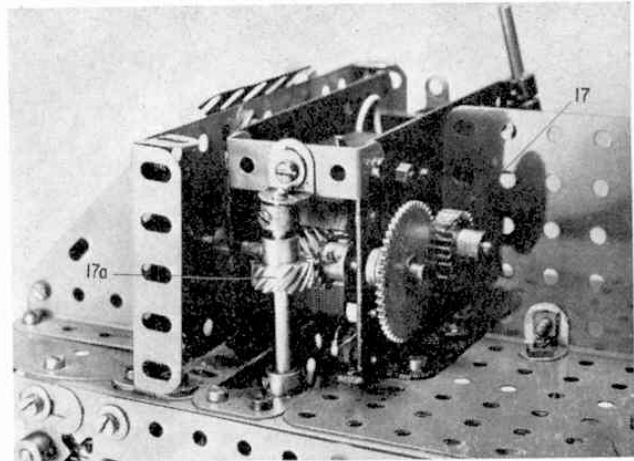
obtained from one $3\frac{1}{2} \times 2\frac{1}{2}$ in. and one $2\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate, is then bolted between Angle Girders 28 at each side, the two upper securing Bolts each holding an Angle Bracket in place, after which a $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 35 is fixed to Angle Girder 7, being bent back to follow the slope of Triangular Flexible Plates 33.

At the right-hand side of the model, a $2\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 36 is bolted to Angle Girder 28, a 3 in. Strip 37 and an Angle Bracket being bolted to the upper rear corner of this Plate. The Strip is angled, as shown, and the lower end bolted to Flexible Plate 9, whereas a $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 38 is bolted to the spare lug of the Angle Bracket, this Plate also being fixed to the two Angle Brackets held by the upper Bolts securing compound plate 34 to Girders 28, as well as to Angle Girder 30. A $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 39 is bolted to right-hand Angle Girder 25, a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flanged Plate 40 and a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Triangular Flexible Plate 41 in turn being fixed to Plate 39, as shown. The right-hand flange of Flanged Plate 40 is connected to Flexible Plate 9 by a 3 in. Strip 42, while bolted to the left-hand flange is a $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 43, this Plate also being attached to Angle Girder 27 by an Angle Bracket. Two Bolts 44, shanks pointing upwards, are held by Nuts in Angle Girder 27, another two corresponding Bolts being held in Flexible Plate 38. Located on these Bolts, and held in place by further Nuts, is a $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 45.

Fixed to Flexible Plate 38 in the positions shown are a $1\frac{1}{2}$ in. Strip and a Fishplate, both bent to a very slight obtuse angle. The Strip serves as the upper journal for the steering column, a Collar above the Strip holding the column in place. A $1\frac{3}{8}$ in. Steering Wheel is mounted on the end of the steering column. The Fishplate serves as the journal for a $1\frac{1}{2}$ in. Rod 46, on the end of which an End Bearing 47 is mounted, the arms of the End Bearing being lock-nutted to one arm of the E15R Motor control switch. The Rod of course slides in the Fishplate to actuate the switch, "stops" consequently being provided by two Collars fixed on the Rod. A back for the driver's seat comes in the form of two $2\frac{1}{2}$ in. Narrow Strips 48, the lower ends of which are bent and bolted to Angle Girder 27, while the upper ends are joined by another $2\frac{1}{2}$ in. Narrow Strip.



A close-up view of the drive to the sweeping brushes and the sweeping brushes, themselves.



Motive power for the Platform Sweeper comes from a Meccano E15R Electric Motor, normally hidden from view, but illustrated here to aid construction of the initial drive system.

Sweeping brushes

Everything else having been completed, the sweeping brush assemblies can now be built up and fitted. Two assemblies are included, a main centre-positioned assembly and a smaller side assembly, the bristles for both of which are approximately 2 in. long and cut from a stiff paintbrush, being formed into a number of smaller brushes by the simple expedient of folding groups of 2 in. bristles in half to make 1 in. "brushes" and then by sticking the folded ends together by dipping them into glue. While the glue is still wet, the resulting "brushes" should be positioned in their holders to ensure that the bristles remain in position. The holders in the case of the main assembly consist of six Couplings 49 mounted at varying angles on a $6\frac{1}{2}$ in. Rod journalled in Corner Brackets 8 and held in place by a Collar and a $\frac{1}{2}$ in. fixed Pulley 50. Also fixed on the Rod is a $\frac{3}{4}$ in. Contrate Wheel which meshes with Pinion 15. Two "brushes" are fixed, one in each end of each Coupling, as shown.

The brush holder in the case of the small side assembly is an electrical 1 in. Bush Wheel 51 mounted on the lower end of a $1\frac{1}{2}$ in. Rod held by Collars in a Double Bracket bolted to the right-hand Formed Slotted Strip of the chassis. Six brushes are fixed, one in each hole in the face of the Bush Wheel, the complete assembly finally being driven by a $2\frac{1}{2}$ in. Driving Band passed round the lower Collar on the Rod and around Pulley 50.

PARTS REQUIRED

2-4	3-26	1-154b
1-5	2-26c	1-154b
1-6	1-27	4-155
1-6a	2-29	1-166
2-8b	2-32	1-185
3-9	124-37a	1-186
1-9b	102-37b	2-188
4-9d	33-38	2-189
1-11	2-47	4-190
2-11a	1-48	1-190a
10-12	1-51	1-191
1-14	1-52a	2-192
1-15	2-53a	4-211a
2-15a	20-59	4-214
1-16	3-62b	4-215
2-16a	6-63	1-221
2-16b	2-103	2-223
2-18a	1-103c	3-235
2-22	2-111a	1-235a
2-22a	6-111c	1-518
1-23a	2-133	
1-25	1-133a	
		1-E15R Motor