

## A CO-CO DIESEL ELECTRIC LOCO

### *An advanced Meccano Model by Spanner*

I AM DELIGHTED to present the advanced Co-Co Diesel Electric Loco featured here. It is a first-class model built to a high degree of accuracy and is fully-operational in both directions' powered by a Meccano 3—12 volt D.C. Motor with 6-speed Gearbox. The "Co-Co" title, by the way, refers to the axle arrangement of the full-size loco, i.e. two bogies, each with three driving axles, although only two of the axles in each bogie are driven in the model.

#### Chassis

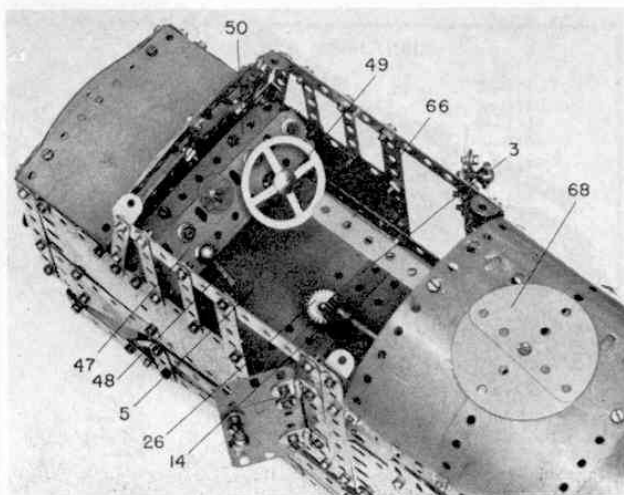
Beginning construction with the chassis, two  $29\frac{1}{2}$  in. compound angle girders 1 are each built up from a  $24\frac{1}{2}$  in. Angle Girder, the ends of which are extended by  $3\frac{1}{2}$  in. Angle Girders, then the two compound girders are connected together, one hole from each end, by two  $4\frac{1}{2}$  in. Angle Girders 2. Also bolted between the girders in the positions shown are two sets of two  $4\frac{1}{2}$  in. Strips 3, placed one on top of the other for strength, seven  $4\frac{1}{2} \times 2\frac{1}{2}$  in. Flat Plates 4 and four  $4\frac{1}{2} \times 2\frac{1}{2}$  in. Flexible Plates 5, these latter Plates being positioned two at each end of the chassis. Note that a space is left between the second and third Flat Plates from each end, the drive chains later passing through these spaces. The larger space is partially enclosed by two  $2\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plates 6 bolted between the relevant second and third Flat Plates.

Now bolted to the top of the three centre Flat Plates are a D.C. Motor with 6-ratio Gearbox and two  $5\frac{1}{2}$  in. Angle Girders, the latter providing a "bed" for an imitation generator. Fixed to the vertical flange of one of the Girders is a  $5\frac{1}{2} \times 2\frac{1}{2}$  in. Flexible Plate, edged by two  $2\frac{1}{2}$  in. Strips. Another  $5\frac{1}{2}$  in. Angle Girder is bolted to the upper edge of the Plate then a further  $5\frac{1}{2}$  in. Angle Girder 7 is bolted to this Girder.

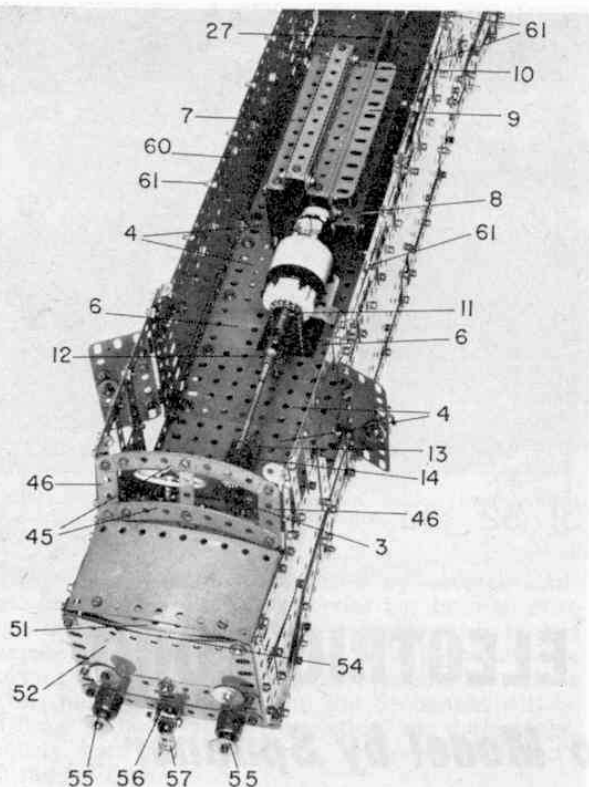
Fixed to the vertical flange of the second Girder Bolted to Plates 4 is a  $5\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plate, this edged by  $1\frac{1}{2}$  in. Strips. Bolted to the upper edge of the Plate is another  $5\frac{1}{2}$  in. Angle Girder 8, to which yet

another  $5\frac{1}{2}$  in. Angle Girder is fixed by six  $\frac{3}{4}$  in. Bolts, the shanks of the Bolts pointing upwards to represent generator fittings. The vertical flange of the last Girder is extended by a  $5\frac{1}{2}$  in. Flat Girder, to which a further two  $5\frac{1}{2}$  in. Angle Girders 9 and 10 are bolted. One more  $5\frac{1}{2}$  in. Angle Girder is bolted to Girder 10, this being attached to Girder 7 by two Double Brackets, to which a  $5\frac{1}{2}$  in. Strip is secured. The end of the generator is then enclosed by a  $2\frac{1}{2}$  in. Strip and by two  $2\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plates, arranged in an inverted "T" with the crosspiece bolted to a  $2\frac{1}{2}$  in. Angle Girder fixed to appropriate Flat Plate 4.

Mounted on the output shaft of the motor is a  $\frac{3}{4}$  in. Sprocket Wheel 11, then the shaft is extended, via a Universal Coupling 12, by a  $3\frac{1}{2}$  in. Rod mounted in a  $1 \times 1$  in. Angle Bracket 13. This Angle Bracket is



A close-up view of one of the two identical cabs. The controls of course are only imitations and do not operate.

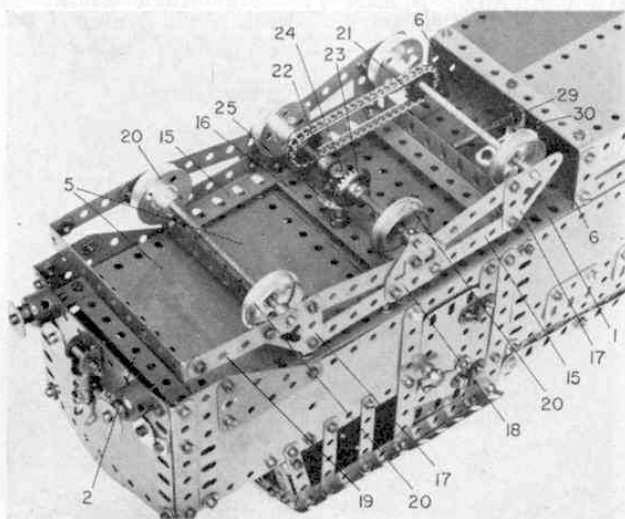


In this view of the model the roof has been removed to show the interior. Note the motor and imitation generator.

fixed to one end Flat Plate 4, but is spaced from it by a Collar on the shank of each securing  $\frac{1}{2}$  in. Bolt. A  $\frac{1}{2}$  in. Pinion 14 is mounted on the end of the Rod.

### Bogies and Drive

Fitted to the model, as to the full-size locomotive, are two swivelling bogies, each of which is similarly built up from two  $5\frac{1}{2}$  in. Angle Girders 15 joined together, at the ends, by two  $4\frac{1}{2}$  in. Angle Girders and, in the centre, by a  $4\frac{1}{2}$  in. Strip 16. Bolted to each Girder 15 are two  $1\frac{1}{2}$  in. Corner Brackets 17 and a Flat Trunnion 18, these three items being themselves joined



An underside view of one end of the loco showing construction of the bogie and the transmission to two of its three axles.

as shown by two 3 in. Strips. A  $2\frac{1}{2}$  in. Strip 19 is bolted to the outside Corner Bracket, then these Strips at each side are joined by a  $4\frac{1}{2} \times \frac{1}{2}$  in. Double Angle Strip.

Now journalled in Corner Brackets 17 and Flat Trunnions 18 at each side are three 5 in. Rods, all held in place by Collars and all fitted with two  $1\frac{1}{2}$  in. Flanged Wheels 20. In addition, however, the innermost Rod carries a  $\frac{3}{4}$  in. Sprocket Wheel 21, while the centre Rod carries a  $\frac{3}{4}$  in. Sprocket Wheel 22, a  $\frac{7}{8}$  in. Bevel Gear 23, a Short Coupling 24 and an extra Collar which keeps the Coupling centralised. Note that the Rod passes through one end transverse bore of the Coupling to leave the longitudinal bore free for a 3 in. Rod mounted loose in the bore and held by Collars in Strip 16. A second  $\frac{7}{8}$  in. Bevel Gear 25 mounted on the Rod meshes with Bevel Gear 23, while Sprocket Wheels 21 and 22 are connected by Chain.

The bogies are now mounted in place in the model, the 3 in. Rod in each case being passed through the centre hole in one or other set of Strips 3 and secured by a Collar, with packing Washers being added as necessary. A  $\frac{3}{4}$  in. Contrate Wheel 26 is fixed on the upper end of the Rod. This Contrate, in the case of one bogie, meshes with  $\frac{1}{2}$  in. Pinion 14, but, in the case of the other bogie, it meshes with a  $\frac{1}{2}$  in. Pinion on a 4 in. Rod 27, held by a Collar in two  $1 \times 1$  in. Angle Brackets fixed to the relevant two end Flat Plates 4, but spaced from the Plates by a Collar on the shank of each securing  $\frac{1}{2}$  in. Bolt. Mounted on the inside end of the Rod is a  $\frac{3}{4}$  in. Sprocket Wheel which is connected by Chain to another  $\frac{3}{4}$  in. Sprocket Wheel 28 on an  $11\frac{1}{2}$  in. Rod 29, journalled in two  $1 \times 1$  in. Angle Brackets 30 bolted direct to the underside of two Flat Plates 4. The Rod is held in place by a Collar and another  $\frac{3}{4}$  in. Sprocket Wheel, the latter connected by Chain to Sprocket Wheel 11 on the motor output shaft.

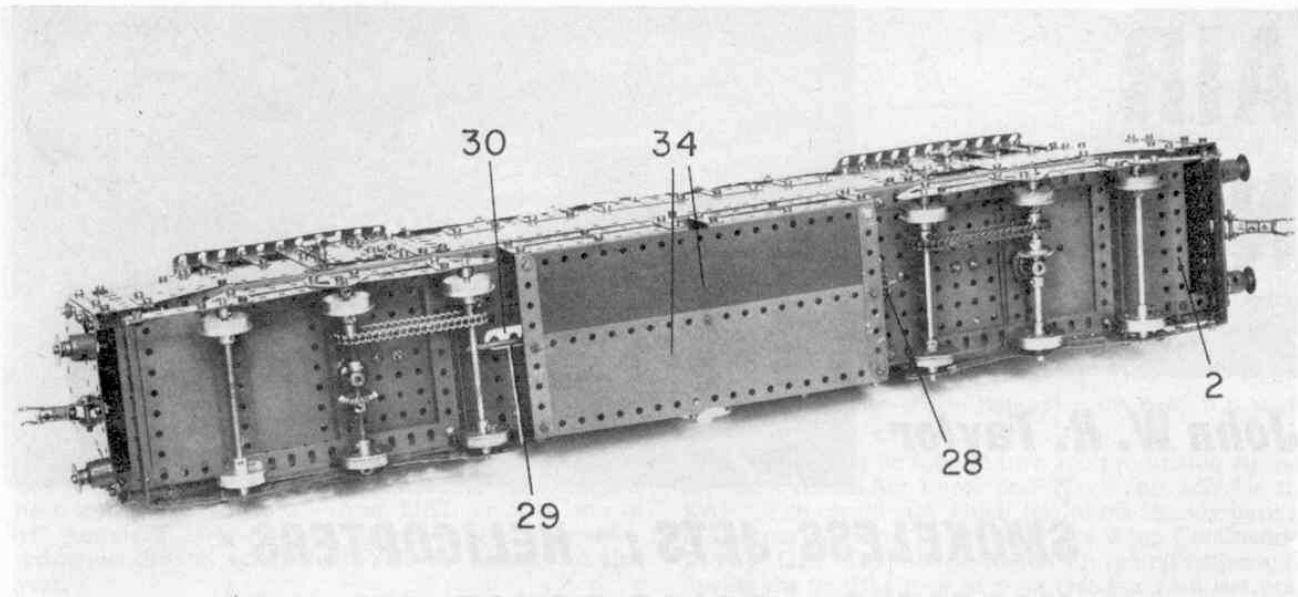
A casing for the exposed section of the drive system is provided by four  $4\frac{1}{2}$  in. Angle Girders 31, bolted two to each compound girder 1. Bolted to the vertical flange of each Girder 31 are two  $2\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plates 32, overlapped one hole and edged by two  $1\frac{1}{2}$  in. Strips 33. Another  $4\frac{1}{2}$  in. Angle Girder is fixed to the lower edge of each pair of Flexible Plates, two  $9\frac{1}{2} \times 2\frac{1}{2}$  in. Strip Plates 34, edged by two  $4\frac{1}{2}$  in. Strips, then being bolted to these Girders at each side.

### Cabs and Body

One of the features of a Co-Co Diesel Electric Loco is its identical twin cabs, one at each end which mean that, no matter in which direction the loco is travelling it is always "headed in the right direction!" Twin cabs are, of course, fitted to the Meccano model, both being identical in construction. Bolted to each compound girder 1 in the positions shown are three  $4\frac{1}{2}$  in. Strips 35, 36 and 37, plus one  $5\frac{1}{2} \times 2\frac{1}{2}$  in. Flexible Plate 38, a  $2\frac{1}{2} \times 1\frac{1}{2}$  in. Triangular Flexible Plate 39, a  $1\frac{1}{2} \times 1\frac{1}{2}$  in. Flat Plate 40 and a  $3\frac{1}{2}$  in. Angle Girder 41, the last three items also being connected together. The upper ends of Strips 35, 36 and 37 are connected by a  $5\frac{1}{2}$  in. Strip, this Strip also being connected to Plate 38 by three  $2\frac{1}{2}$  in. Narrow Strips 42, the forward Narrow Strip being angled slightly to correspond with the windscreen slope.

A door is provided by a  $3\frac{1}{2} \times 1\frac{1}{2}$  in. compound flexible plate 43, built up from two  $2\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plates, and is attached to Strip 35 by two Hinges. The door catch is a Fishplate held by Nuts on the shank of a Handrail Support mounted in plate 43, with a 1 in. Rod in the head of the support acting as a handle.

At the front of the cab a  $5\frac{1}{2} \times 2\frac{1}{2}$  in. Flexible Plate



44 is bent to shape and bolted between Plates 37 and Angle Girders 41 at each side, then the windscreen frame is added. This consists of two  $4\frac{1}{2}$  in. compound stepped curved strips 45, each built up from two 4 in. Stepped Curved Strips, the compound strips being joined together at the ends by two 2 in. Strip 46 and joined in the centre by a  $2\frac{1}{2}$  in. Narrow Strip, the whole unit being fixed to forward Narrow Strips 42 by Angle Brackets. Also attached by Angle Brackets—this time between the centre top edges of Plates 38—is a  $4\frac{1}{2}$  in. Flat Girder 47, forming the control panel. Various dials on the panel are supplied by three ordinary Washers and one  $\frac{3}{4}$  in. Washer, while hand controls are represented by a 1 in. Rod 48, held in a Handrail Support bolted to the panel, and by a  $1\frac{3}{4}$  in. Steering Wheel 49, this being mounted on a  $\frac{1}{2}$  in. Bolt held by a Collar in the panel. A  $4\frac{1}{2}$  in. Strip 50 is attached to the upper end of Flat Girder 47 by Obtuse Angle Brackets.

Bolted to the forward edge of Flexible Plate 44 is a shaped 4 in. Stepped Curved Strip 51, then the "nose" is completed by three  $4\frac{1}{2}$  in. Strips bolted between Girders 41, the securing Bolts also fixing in place one  $4\frac{1}{2} \times 2\frac{1}{2}$  in. Flexible Plate 52 and a  $4\frac{1}{2} \times 1\frac{1}{2}$  in. compound flexible plate 53, built up from two  $2\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plates. Note that another shaped 4 in. Stepped Curved Strip 54 is sandwiched (not bolted) between the upper  $4\frac{1}{2}$  in. Strip and Plate 52.

Two buffers 55 are each provided by a Chimney Adaptor, five ordinary Washers and a  $\frac{3}{4}$  in. Washer, all secured to the front of the model by a  $1\frac{3}{8}$  in. Bolt. Situated mid-way between the buffers is a coupling produced from a Double Bracket 56, to which a Small Fork Piece is pivotally attached by a  $\frac{3}{4}$  in. Bolt. Fixed in the boss of the Fork Piece is a 1 in. Rod, on which a second Small Fork Piece 57 is mounted. Riding lights are represented by two  $\frac{3}{4}$  in. Washers, bolted to the cab front as shown, whereas the cab roof consists simply of one  $5\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plate 58 and two  $5\frac{1}{2} \times 2\frac{1}{2}$  in. Flexible Plates 59, all bent to shape and attached to the sides by Angle Brackets, the lugs of which are opened out to a slight obtuse angle.

Running between the cabs is the main body section which presents no problems whatsoever. Bolted between Strips 35 at each side is a  $13\frac{1}{2}$  in. compound

flat girder 60, built up from two  $7\frac{1}{2}$  in. Flat Girders, with Strips 35 projecting one hole above the flat girder. Seven Bolts 61 are held by Nuts in the upper row of holes in the girder, the shanks of the Bolts pointing outwards, then the side is enclosed by a  $12\frac{1}{2} \times 2\frac{1}{2}$  in. Strip Plate 62, two  $5\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plates 63 and a  $2\frac{1}{2} \times 1\frac{1}{2}$  in. Flexible Plate 64. Bolted to the Plates in the positions shown are four  $1\frac{1}{2}$  in. Flat Girders and a  $2\frac{1}{2}$  in. Flat Girder 65, representing ventilator grilles.

We are now left with only the roof to complete, and the model is finished. First of all, an  $18\frac{1}{2}$  in. Angle Girder 66 is bolted between the existing cab rooves, being centrally fixed to the underside of the rooves. Secured to the Girder are six shaped  $6\frac{1}{2} \times 2\frac{1}{2}$  in. compound flexible plates 67, each built up from two  $4\frac{1}{2} \times 2\frac{1}{2}$  in. Flexible Plates overlapped five holes. Note that two of the Bolts fixing the compound plates in position also secure two circular discs 68 in place, each disc consisting of two Semi-circular Plates. The ends of the compound plates are finally secured on the shanks of Bolts 61. The realistic lines of the finished model are clearly shown in the upper illustration on page 277.

#### PARTS REQUIRED

7-2	8-18b	2-111c
24-2a	12-20	4-111d
8-4	2-26	8-1144
8-5	2-29	4-116a
4-6	4-30	4-126a
17-6a	444-37a	8-133
2-7	398-37b	6-136
1-7a	108-38	1-140
13-9	10-38d	4-164
14-9a	2-48c	2-185
8-9b	7-53a	26-188
1-9d	28-59	7-189
4-10	2-63d	18-191
4-11	4-74	11-192
16-12	12-89b	2-196
5-12a	1-94	2-197
8-12c	8-96a	4-214
1-13	1-103	4-221
1-14a	2-103c	4-235
6-15	2-103d	5-235a
2-15b	8-103h	3-235b
2-16a	4-103k	1 D.C. Motor with 6-ratio Gearbox
2-18a	8-111	