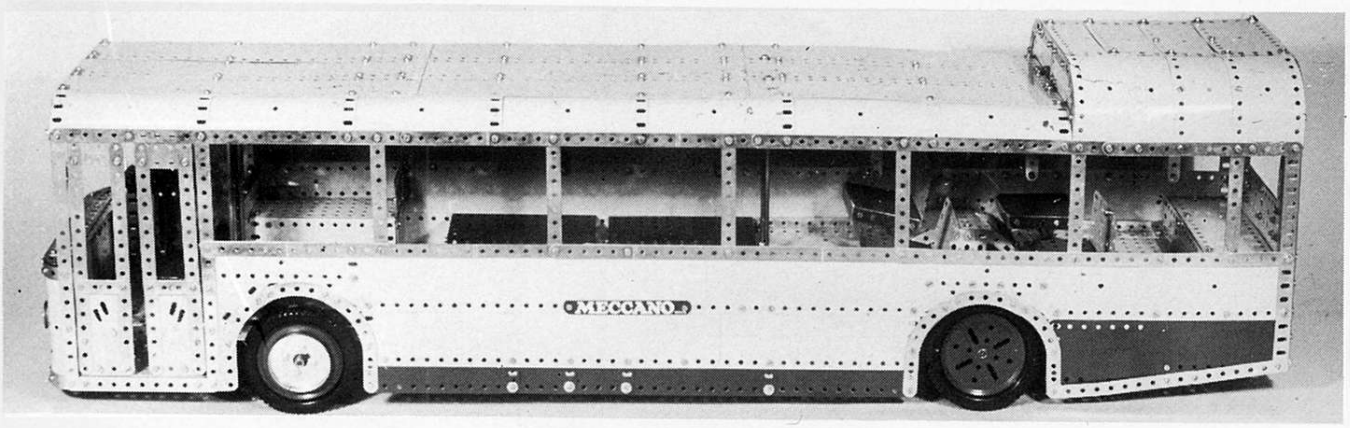
LEYLAND NATIONAL SINGLE-DECK BUS

Part 1 of a new No. 10 model designed and built by ROGER WALLIS

JUDGING by the interest aroused at Meccano exhibitions by any public service vehicles on display, model buses hold a universal appeal. Indeed, the Double Deck Bus featured in the current No. 10 leaflet is one of the most popular models in the series. It must be admitted, however, that that particular model is based on a now-outdated prototype and we therefore felt it was about time the No. 10 Set scene was brought up to date. So here we feature a distinctly modern Single Deck Bus. Built by that well-known and advanced modeller, Roger Wallis of Solihull, Editor of the Midlands Meccano Guild Gazette, it is based on a Leyland National—a vehicle now widely used by operators all over Britain.



CHASSIS

Beginning construction with the chassis, this is ridgidly constructed from two 31" channel girders 1, each built up from a 24½" and a 5½" Angle Girder bolted to an 18½" and a 12½" Angle Girder, the 18½" Girder of the channel projecting two holes rearwards beyond the end of the 5½" Girder side of the channel. The two channel girders, positioned nine holes apart, are connected at their front end by a 7½" Angle Girder 2, bolted through the 6th and 14th holes of this Girder. Note that the channel girders are positioned with their flanges pointing inwards.

Towards their rear ends, the channel girders are connected by a 5½" Strip 3 (13 holes from the rear ends of the girders), a 4½" x 2½" Flat Plate 4, another 5½" Strip 5 (three holes from the end of the girders) and a 4½" x ½" Double Angle Strip 6. Note that Strips 3 and 5 project one hole outwards from the girders and bolted to these projecting ends are two 18½" channel girders 7, each built up from two 18½" Angle Girders. These channel girders are connected together by three pairs of 5½" Strips 8, 9 and 10 attached to the girders by Angle Brackets inside the channels of the girders. These Strips will later form the bearings for the Rods of a 2-speed automatic gearbox.

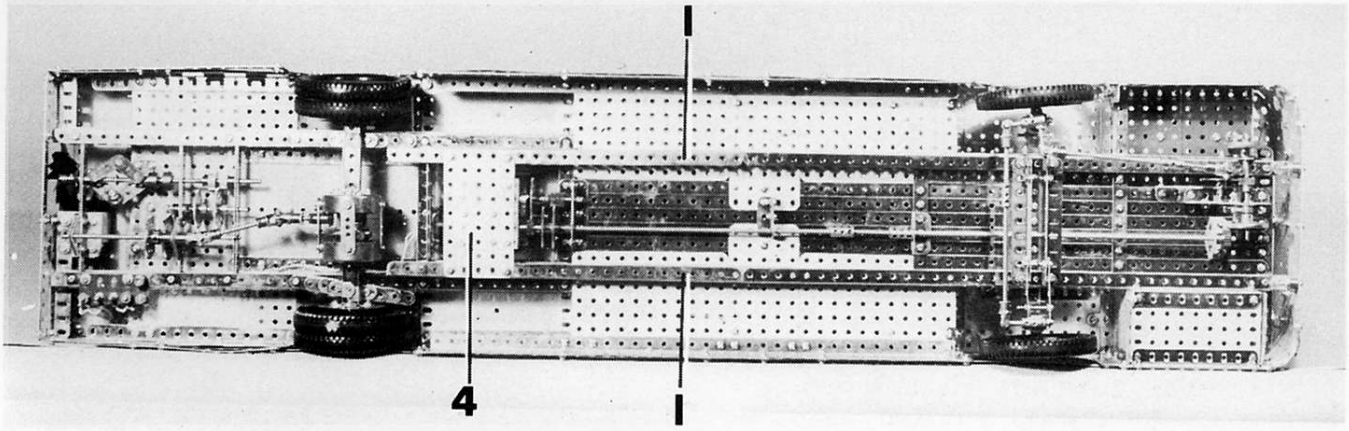
Before coming to the gearbox, however, it is advisable to complete the floor of the bus. Working from the front, this is provided by six longitudinal 12½" Strips positioned between the channel girders and bolted to Angle Girder 2 and to two 4½" x ½" Double Angle Strips 11 and 12 running between the channel girders. Note that a gap the width of one Strip is left alongside the right-hand channel girder to later accommodate a gear wheel of the steering mechanism. Further back, this space is enclosed by a 7½" Strip running between Double Angle Strips 11. Further back still, five more 12½" Strips are bolted to Double Angle Strip 12, their rear ends being attached to Strip 3 by a 2½" Flat Girder, the securing Bolts also fixing a 2½" Angle Girder 13 to Strip 3. The centre section is enclosed by four 5½" x 3½" and two 4½" x 2½" Flat Plates, arranged as shown.

The rear section of the floor is raised an inch or so above the level of the centre section and is not in fact attached to the chassis members. It is actually later fixed in position by being secured to the sides of the bodywork, but it is as well to construct the floor for fixing in due time. It is built up from two overlapping 12½" Strip Plates 14, edged underneath by 12½" Angle Girders and extended five holes outwards and six holes rearwards by two 5½" x 3½" Flat Plates with a 5½" x 2½" Flat Plate between them. The wheel arches are each enclosed by two 2½" x 2½" Curved Plates joined by a 2½" Flat Girder, while the forward section of the floor is extended outwards at each side by a 5½" x 2½" Flexible Plate 15. Bolted to the outer edge of this Plate is a 5½" Angle Girder, while a 7½" Angle Girder is bolted to the outer edge of the corresponding 5½" x 3½" Flat Plate. The 7½" Angle Girders at each side are connected through their fourth holes by a 9½" Angle Girder 16, to which the three Flat Plates are connected by a 3½" Flat Girder. Bolted to the top forward ends of Plates 15 and the Strip Plates and to the front ends of the 5½" Angle Girders edging Plates 15 is a 9½" Angle Girder.

In due course, the floor is attached to the body by means of the side 5½" and 7½" Angle Girders.

Returning to the front of the model, the driver's floor is supplied by two 3½" x 2½" Flanged Plates 17 attached to the right-hand longitudinal 12½" Strip by a 3" Angle Girder bolted to the inner flanges of the Plates. At the other side of the model, the access step is provided by a 4½" x 2½" Flat Plate edged by two 4½" Angle Girders, the inner one of which is

A general underside view of the model.



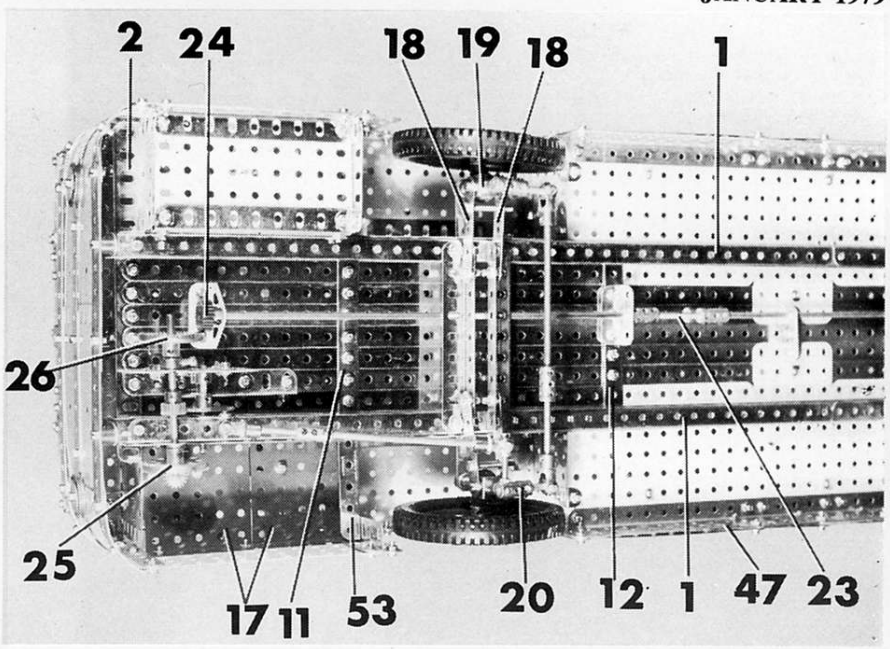
bolted to a 4½" Flat Girder which is in turn bolted to the left-hand chassis member.

FRONT AXLE AND STEERING

Indicative of its status as an enthusiast-designed advanced model, the bus is fitted with working front suspension and remote powered steering. The front axle is built up from two 4½" Angle Girders bolted through the 16th and 18th holes of chassis members 1. Lock-nutted through the second holes from each end of these Girders are two 2½" Strips 18, firmly connected together through their second holes by Nuts on a 1⅛" Bolt. Pivotting on lock-nuts in the end holes of the Strips is a Large Fork Piece 19, in the boss of which a 2½" Rod, free to turn, is carried. The upper end of this Rod locates in the end hole of a 7½" Strip bolted to the chassis members and on the Rod, between the Strip and Fork Piece, are mounted in order, a Washer, a Compression Spring, a second Washer, a Handrail Coupling, a third Washer and a ¾" Washer, the latter locating against the lugs of the Fork Piece. Note that the Rod passes through the round head of the Handrail Coupling which is locked on the Rod. The Rod is held in position by a Collar above the Strip and a Coupling 20 below the Fork Piece. A 1" Rod carrying an End Bearing is locked in the longitudinal bore of this Coupling, the End Bearings at each side being connected by a tie-bar provided by a 2" and a 4" Rod connected by a Coupling.

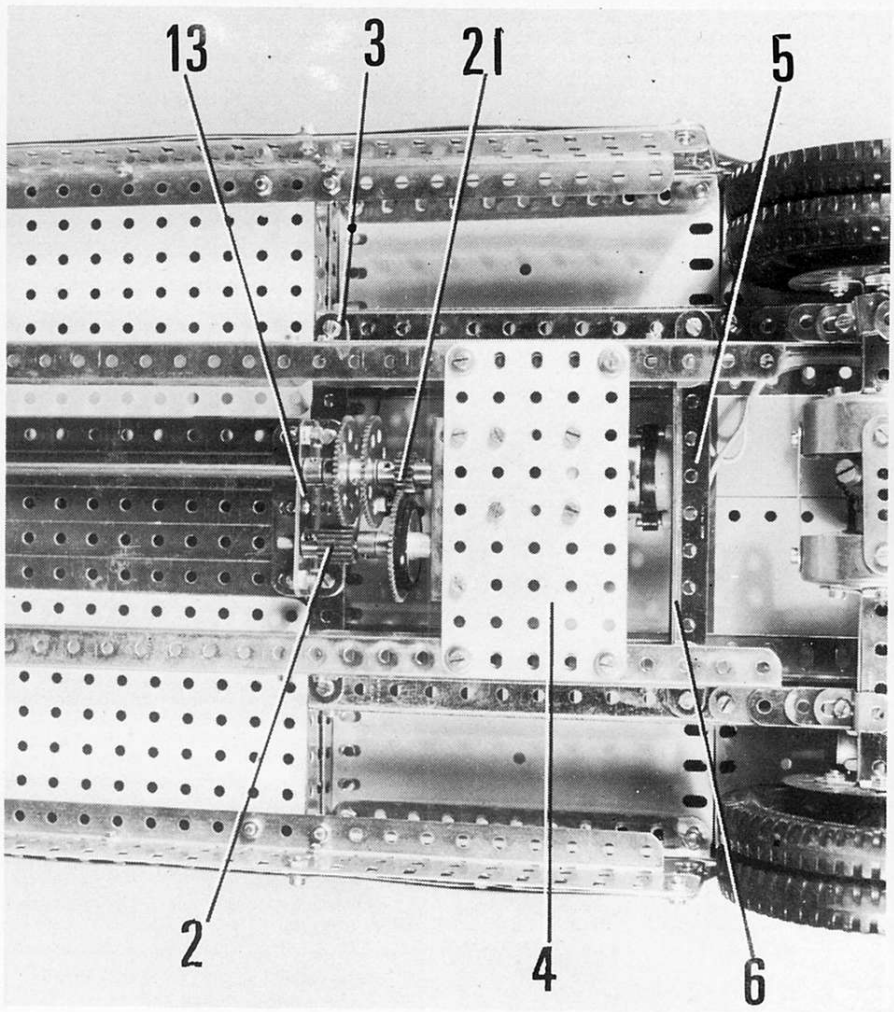
Carried in the base of the Handrail Coupling is a 1" Rod on which the front wheel, free to turn, is mounted. Each front wheel consists of a 3" Pulley with Motor Tyre bolted to a Wheel Flange, and it is held on the Rod by a Collar.

In the case of the power steering, this is driven from a Power Drive Unit set in the 32 : 1 ratio and bolted to Flat Plate 4. A 2½" Angle Girder is bolted to the forward end of this Flat Plate, while a 2½" Strip is bolted to the vertical flange of the previously described 2½" Angle Girder 13 to convert the elongated holes of the Angle Girder into circular holes. Journalled in this Strip and the Angle Girder bolted to the Plate are a 2½" Rod and an 11½" Rod, the latter also supported in a 1½" Strip overlaying the vertical flange of a 1½" Angle Girder bolted to the 4½" x 2½" Flat Plates of the centre floor section.



An underside close-up view showing the automatic gearbox and drive to the rear wheels.

A close-up view of the power steering motor fitment and initial gearing.



Fixed on the 11½" Rod between the 2½" Angle Girders are a Collar, a ½" Pinion 21, two 57-teeth Gear Wheels and another Collar. Mounted on the 2½" Rod are a fixed 1" Pulley with Rubber Ring, a loose 57-teeth Gear Wheel, a Collar and a ½" x ½" Pinion 22. Although the Gear Wheel is loose on the Rod, it is held tightly against the Rubber Ring on the Pulley by the Collar, this arrangement providing a friction clutch to protect the motor if the steering locks.

A ½" Pinion on the motor output shaft meshes with the first of the 57-teeth Gears on the 11½" Rod, while the second 57-teeth Gear on the Rod meshes with Pinion 22 on the 2½" Rod. The 57-teeth Gear on this Rod meshes with Pinion 21. The 11½" Rod is connected by Couplings and a Flexible Coupling Unit 23 to another 11½" Rod journalled in a 1½" Angle Girder bolted to the floor and supported at its forward end in a Trunnion bolted to the 12½" Strips of the floor. A ¾" Pinion 24 on the end of the Rod meshes with a 1½" Contrate Wheel on a 3½" Rod journalled in two 1" Triangular Plates, one of which is bolted to the right-hand chassis member and the other of which is bolted to a 3" Angle Girder secured to the 4" Angle Girder holding Flanged Plates 17.

Between the Contrate Wheel and the Triangular Plate is a Collar in which a ½" Bolt is fixed to provide a 'stop' which limits the movement of the Rod to less than one revolution. A second 1½" Contrate Wheel 25 is fixed on the other end of the Rod to later receive the drive from a manual steering wheel in the driver's cab. A ½" Pinion 26 fixed on the Rod between the Triangular Plates meshes, at non-standard spacing, with a 50-teeth Gear Wheel on a 2" Rod held by a Collar and a Crank in the left-hand chassis member and in the circular hole of a Fishplate overlaying elongated holes of the nearby 3" Angle Girder. The arm of the Crank is lock-nutted to an End Bearing fixed on a 5½" compound rod supplied by a 1½" and a 4" Rod joined by a Coupling. Another End Bearing is fixed on the rear end of the compound rod and this is attached to Coupling 20 by a 1⅛" Bolt, being locked by Nuts on the shank of the Bolt as far away from the Coupling as possible to ensure maximum leverage.

Inside the driver's cab, two 2½" x ½" Double Angle Strips, lugs upwards, are bolted to Flanged Plates 17. Bolted, in turn, to the lugs of the Double Angle Strips are two 3" Flat Girders 27 and two 3" Angle Girders. Fixed directly to the upper ends of the Angle Girders is a 2½" x ½" Flanged Plate 28 which is angled upwards and attached by Fishplates to the upper front corners of the Flat Girders at the same time fixing two 1" x ½" Angle Brackets, one to the inside of each flange of the Plate.

Bolted to these Brackets is a 2½" Strip 28A, to which another similar Strip is attached by a Fishplate. Mounted in the Flanged Plate and in an appropriate hole in forward Flanged Plate 17 is a 5" Rod fitted with a steering wheel and carrying a ½" Pinion on its lower end. This Pinion meshes with Contrate Wheel 25 to complete the manual steering linkage.

REAR AXLE AND GEARBOX

Turning to the rear axle, a substantial casing is first built up in two sections, one consisting of four 1½" x ½" Double Angle Strips 29 arranged to form a box and bolted between a Face Plate and a Boiler End, and the other consisting of four 2½" x ½" Double Angle Strips 30, also arranged to form a box and bolted bteween a Face Plate and a Boiler End. The two sections are then connected by bolting four 2" Strips between the Boiler Ends as shown.

The Boiler Ends and Strips form the casing for the differential which is of fairly standard Meccano construction. Free to turn in the longitudinal bore of a Coupling are the half shafts, one provided by a 4" Rod and the other by a 5½" Rod. Loose on the longer Rod is a 1½" Bevel Gear, while a ¾" Contrate Wheel is fixed on the inner ends of both Rods. These Contrate Wheels mesh constantly with two ¾" Pinions revolving freely on Pivot Bolts locked in the central transverse threaded bores of the Coupling. Carried in the central transverse smooth bore of the Coupling is a 1½" Rod on which two Collars are fixed, these Collars being secured to the Bevel Gear by a ¾" Bolts 31 and Nuts.

Bolted to one of the 2" Strips of the casing is a 1½" Strip overlayed by a Double Bent Strip 32. The Strips and Double Bent Strip form the bearings for a 1½" Rod held in place by a Collar inside the Double Bent Strip and a ½" Bevel Gear on the inner end of the Rod. This Bevel Gear meshes with the 1½" Bevel Gear.

Two leaf springs are next built up from a 4½", a 3½", a 2½" and a 1½" Strip, all slightly curved and secured, one on top of each other to the chassis members, the securing Bolts passing through the end holes of the 4½" Strip. Note that the forward end of the Strip is bolted directly to the chassis member, while the rear end is spaced away from it by three Washers and a Nut on the securing ½" Bolt. The completed axle is fitted to each spring by two ½" Reversed Angle Brackets which actually clamp the axle to the spring, no bolt passing through the Axle and outer lugs of the Reversed Angle Brackets. Twin rear wheels are each provided by two 3" Pulleys fitted with Motor Tyres.

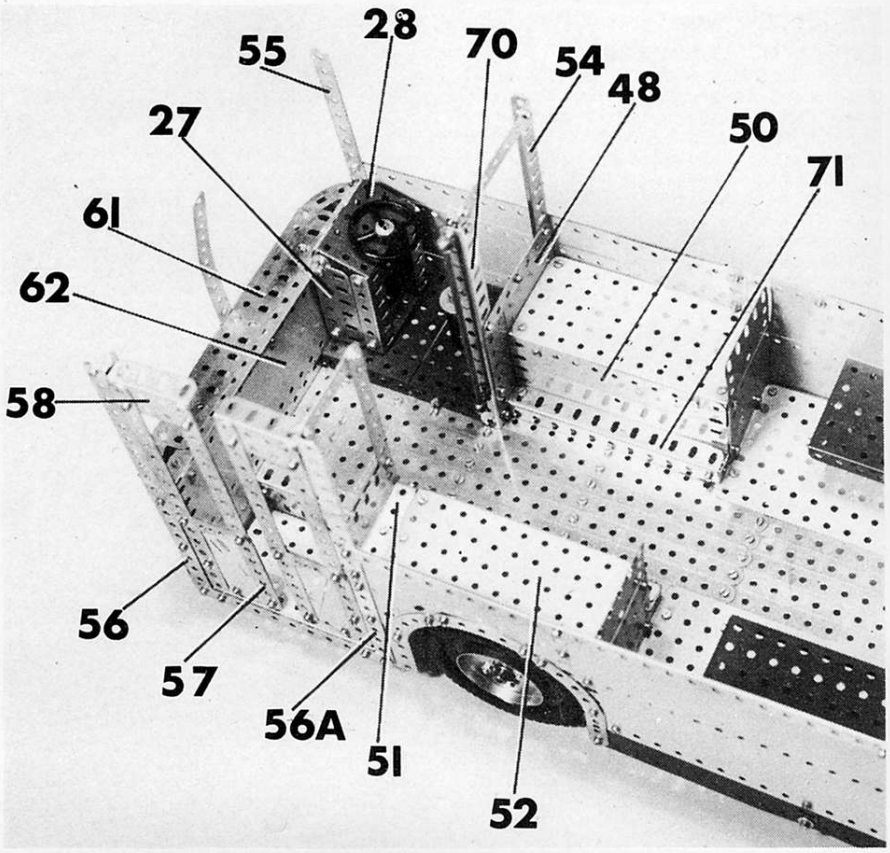
Before building up the gearbox, a second Power Drive Unit, set in the 3 : 1 ratio, is bolted to a 1½" Angle Girder 33 bolted in turn to a 5½" Strips 10, the securing Bolts also fixing two Flat Trunnions to the Strips. Journalled in the apex holes of these Flat Trunnions, and in two other Flat Trunnions 34 secured to Strip 9, is a 4½" Rod carrying a 57-teeth Gear 35 and a Universal Coupling. This Universal Coupling is joined by a 2" Rod to another Universal Coupling on the end of the 1½" Rod projecting from the differential.

Gear Wheel 35 engages with a ½" Pinion vertically above it on the rear end of a 3" Rod held by a 60-teeth Gear and a Collar in Strips 9 and 10. The 60-teeth Gear engages with a 7/16" Pinion 36 on the end of another 3" Rod also journalled in Strips 9 and 10. Fixed on the Rod between the Strips are a 50-teeth Gear and a 57-teeth Gear, while fixed on a sliding layshaft journalled alongside in Strips 9 and 10 are a ¾" Pinion 37 and a ½" Pinion 38. The Gears and Pinions are so positioned on their Rods that, with the layshaft rearward, the 50-teeth Gear meshes with Pinion 37 while the 57-teeth Gear and Pinion 38 are out of mesh. As the layshaft is moved forward, however, the 57-teeth Gear and Pinion 38 should move into mesh a fraction after the 50-teeth Gear and Pinion 37 disengage. When the layshaft reaches its maximum forward travel, Pinion 38 should move out of mesh to result in a neutral period when the engine is 'ticking over'. The layshaft is provided by a 3½" Rod.

Movement of the layshaft is controlled by a centrifugal mechanism built up from two pairs of 1½" Strips 39, the two Strips in each pair being pivotally connected to each other by a ¾" Bolt on which a ½" Pinion is carried to serve as a weight. The rear Strip in each pair is loose on a standard Bolt locked by a Nut in a Collar which is *fixed* on a 3" Rod journalled in Strips 10. The ends of the forward Strips are free to pivot on further Bolts locked by Nuts in the end transverse threaded bores of a Coupling, but note that the Bolts must not foul the Rod as the Coupling must be free to slide on the Rod. Mounted on the Rod between the Coupling and Collar are two Compression Springs separated by a Washer and with another Washer at each end. The forward end of the Coupling is locked on a Collar fixed on the rear end of the layshaft.

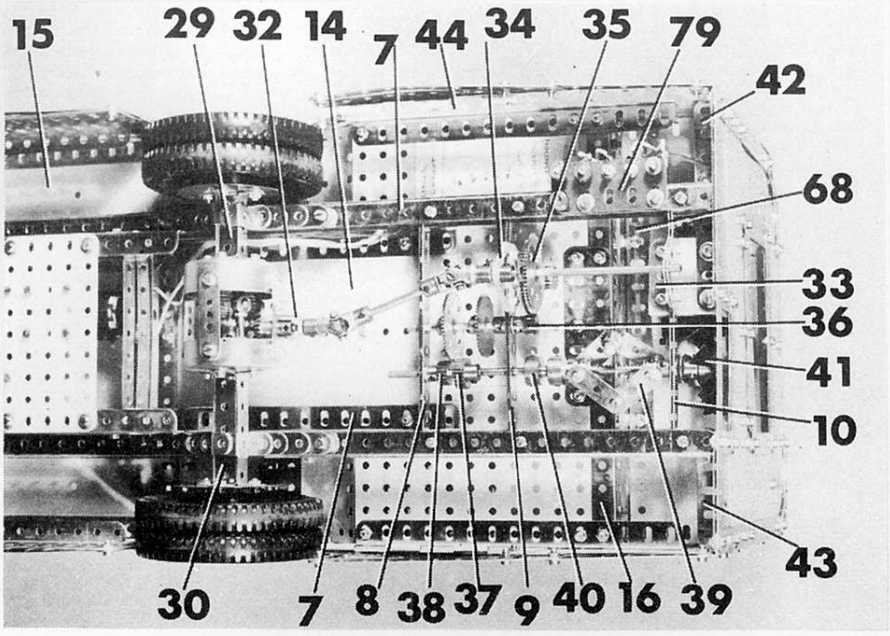
The Rod carrying the centrifuge is held in place by a Collar at one side of Strips 10 and a ½" Pulley at the other side, while a Fan 41 is fixed on the rear end of the Rod. The Pulley is connected by a short length of Spring Cord to another ½" Pulley on the output shaft of the Power Drive Unit. Note, incidentally, that, as well as being secured to Angle Girder 33, the Power Drive Unit is also secured to a 4½" Angle Girder 42 bolted to the rear end of the left-hand chassis member. A 2½" Angle Girder 43 is bolted to the rear end of the right-hand chassis member.

To be concluded next issue with details of the bodywork, seating and roof.



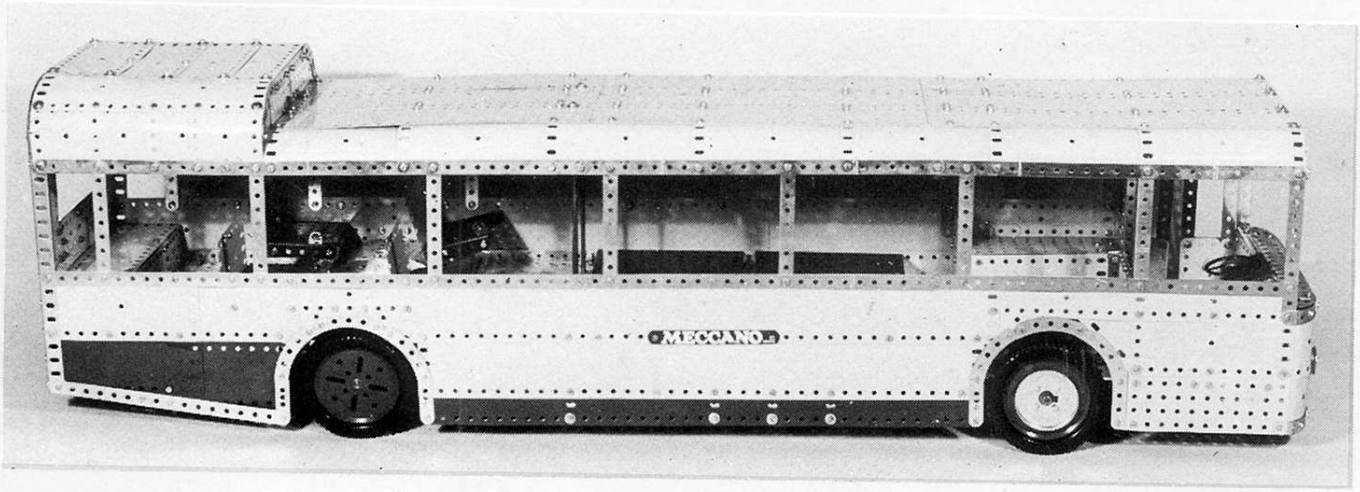
A view with the roof removed looking into the driver's compartment.

An underside close-up view of the front axle and steering mechanism.



LEYLAND NATIONAL SINGLE-DECK BUS

Part 2 of a new No.10 model designed and built by ROGER WALLIS



BODYWORK

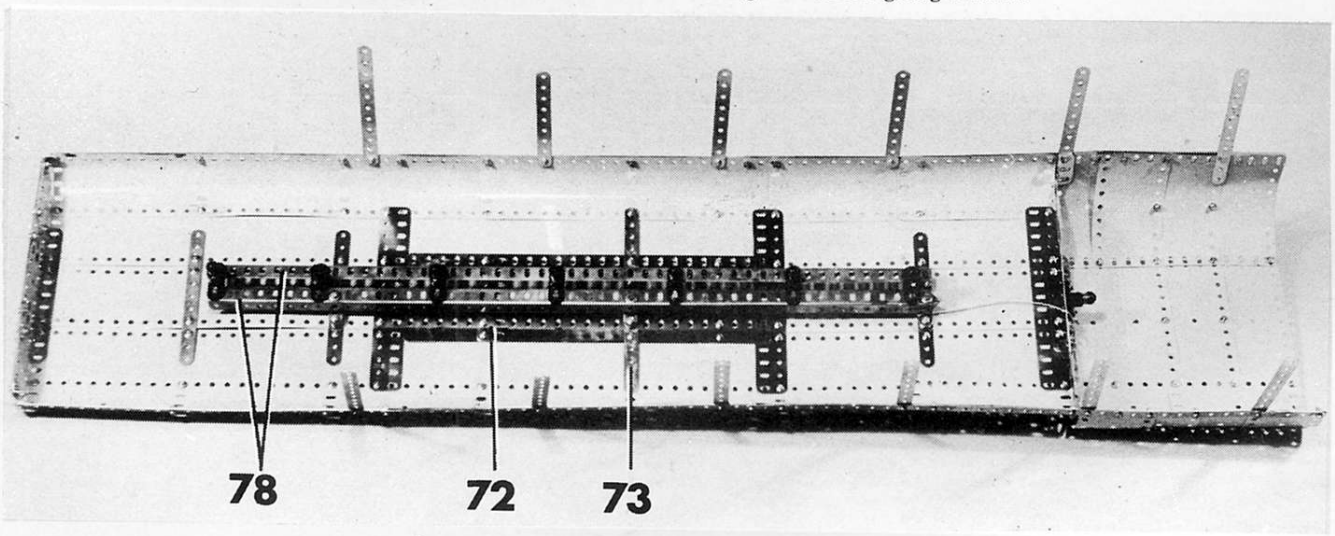
From the rear door pillar backwards, each side of the bodywork is similarly built up from a 5½" x 1½" Flexible Plate, a 2½" x 2½" Triangular Flexible Plate and a 2½" x 1½" Triangular Flexible Plate around the front wheel arch, with Strip Plates and a lower banding of 1½" wide Flexible Plates of various lengths, these overlayed by Plastic Plates to give a colour variation between the two wheel arches. A 5½" x 1½" Flexible Plate and two 2½" x 1½" Triangular Flexible Plates edge the top of the rear wheel arch, while the rear section of the side is enclosed by a rectangle formed by three 5½" x 2½" Flexible Plates and one half of a Hinged Flat Plate 44, all appropriately overlapped. The two lower Plates are overlaid by a 4½" x 2½" Plastic Plate 45 and a 5½" x 2½" Plastic Plate 46, Plate 45 extending one hole beneath Plate 46. The lower edges of the Plates are edged by a 5½" and a 3½" Strip angled as shown to give the correct outline. The rear wheel arch is edged by two 2" Strips and three 2½" Curved Strips, the three latter Strips joined by Fishplates.

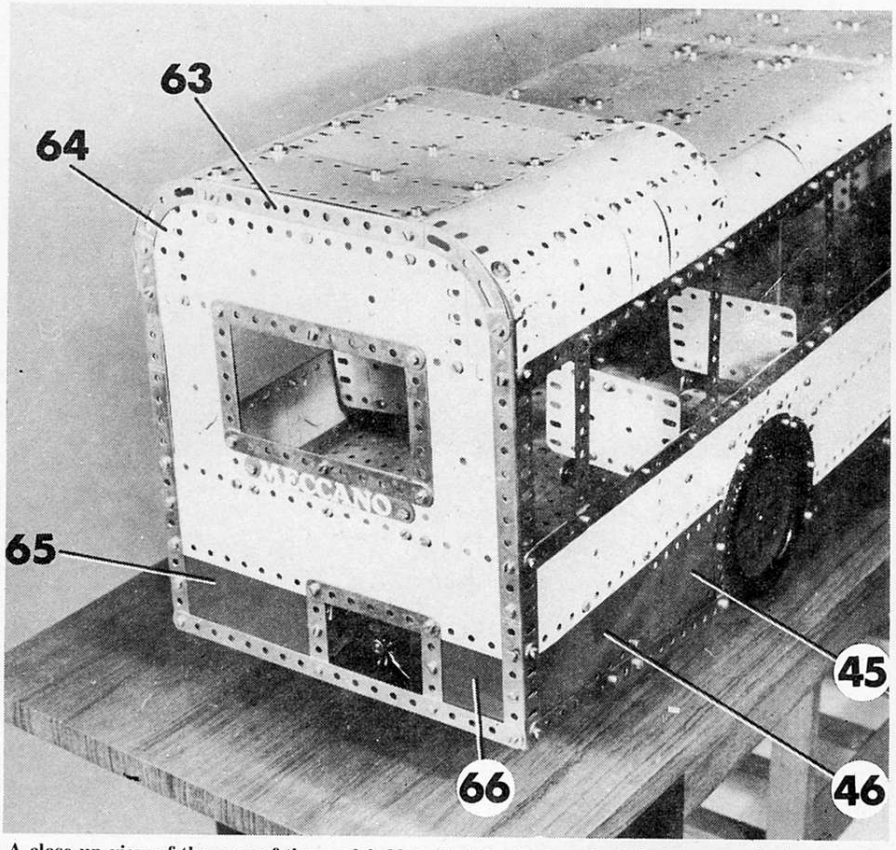
The front wheel arch is similarly edged, with the exception of the vertical front component. At the left-hand side of the model this is a 2½" Flat Girder and, at the right-hand side, a 2½" Strip. The upper edges of the side plates are overlaid along their full length by three 12½" Strips with a 2½" Strip at the rear.

The sides this far built can now be attached to the chassis by bolting them to the 7½" Angle Girder edging the rear Flat Plates of the floor and to the 18½" Angle Girders bolted to the outer edges of the central Flat Plates of the floor. Once this has been done, the lower edge of each side is overlaid, on the inside, by a 19½" compound flat girder 47 built up from a 12½" and a 9½" Flat Girder. This Flat Girder rides over the lower edge of the vertical flange of the 18½" Angle Girder, although it is not actually bolted to it.

Inside the bus, the left-hand front wheel arch is encased by a vertical 5½" x 2½" Flexible Plate 48 at the front and a 2½" x 2½" Flat Plate, extended three holes upwards by a 2½" x 2½" Flexible Plate 49, at the rear. The equivalent of Plate 48 in the right-hand wheel arch is a 3½" x 3½" compound flexible plate supported by two overlapping 3½" x 2½" Flexible Plates. The sides of both wheel arches are each enclosed by a horizontal 5½" x 2½" Flexible Plate 50, this Plate being edged outside along the top by a 5½" Angle Girder. The left-hand side Plate only is also edged along the bottom by a 5½" Strip, this Strip projecting one hole forwards beyond the edge of the Plate. Bolted vertically to the end of the Strip is a 2½" Strip, the upper end of which is bolted to the lug of a 2½" x ½" Double Angle Strip 51 secured to the side of the model. The lower rear corner of each Plate 50 is attached to the back Flat Plate

A general underside view of the roof showing the interior lighting fitments.





A close-up view of the rear of the model. Note that the darker-shaded plates are plastic plates overlaying stronger flexible plates for visual effect.

of the wheel arch by a 1" x 1" Angle Bracket. The top of the arch is encased by a 5½" x 2½" Flat Plate 52 bolted to the 5½" Angle Girder just mentioned. The rear edge of the Plate is connected by a 2½" Angle Girder to the Flat Plate at the back of the wheel arch.

Dealing now with the right-hand side of the model only, a 3½" Angle Girder 53 is bolted to the chassis member and fixed to the outer end of this Girder is a vertical 9½" Angle Girder 54, the securing Bolt passing through the fourth hole of the vertical Girder. The lower end of the Girder is connected to the 2½" Strip of the wheel arch by a Fishplate and the side panelling is then completed by a 5½" Flat Plate, a 5½" x 2½" Flexible Plate and a 5½" x 1½" Flexible Plate, the latter edged along the front by a 1½" Strip and along the top by the 12½" Strip edging the rest of the side panels. The forward edges of the Plates are bolted to a 9½" Strip 55 forming the front window pillar, then another six window pillars are provided at each side by a 5½" Strip, three 4½" Strips and two more 5½" Strips, the latter at the rear and projecting two holes higher than the others to provide strengtheners for the raised rear portion of the roof.

Along the left-hand side of the model, similar window frame uprights are provided, but instead of the bodywork being enclosed forward of the front wheel arch, a space for the access doorway is left clear. The doorway is edged by a vertical 9½" Strip 56 and a 9½" Angle Girder 56A bolted to the ends of a 5½" Strip overlaying the vertical flange of a 4½" Angle Girder 57 secured to the outer edge of the access step Flat Plate by two Adaptors for Screwed Rod. These Adaptors serve as the lower hinge pivots for the twin doors, each of which is built up from two 7½" Strips connected at the top by a Girder Bracket 58 and further connected by a 2" Angle Girder at the bottom and a 2" Strip seven holes up, at the same time fixing two 3½" x 2" Triangular Flexible Plates in place to provide door panelling. The Adaptor for Screwed Rod locates in the inner end hole of the 2" Angle Girder where it is held in place by a Spring Clip when the doors are mounted in position. However, the doors should not be fitted at this stage.

The front bodywork is supplied by four overlapping 4½" x 2½" Flexible Plates extended outwards and backwards by two 2½" x 2½" Flexible Plates at each side, these curved gently to shape. The Plates are edged at top and bottom by a 7½" Strip extended at each end by a 2" Strip, the latter also curved to shape and bolted to Strip 55 or forward Strip 56 as appropriate. A 5½" Strip 59 is bolted to the front Plates for decoration, while two headlamps are each provided by a 1" loose Pulley overlaid by a ¾" Washer. Bolted to the centre of the upper 7½" Strip edging the front panelling is a 5½" Strip 60 curved gently backwards to serve as the windscreen divider.

A sill behind the windscreen is built up from a 7½" Flat Girder 61 extended at each end by a 2½" Stepped Curved Strip and attached to the front panelling by Angle Brackets. The Flat Girder partially overlays, though is not attached to, a 9½" Strip attached to Strips 55 and 56 by Angle Brackets. Attached in turn to this Strip by further Angle Brackets is a 9½" x 2½" Strip Plate 62 extended downwards at the left-hand side by a 2½" x 1½" Flexible Plate which is also bolted to the vertical flange of the 9½" Angle Girder bolted to the front ends of the floor 12½" Strips.

Turning to the rear of the model, two rigid corner posts are provided by vertical 9½" Angle Girders bolted to the rear ends of the side panelling. The upper ends of the Girders are connected by two 3½" Stepped Curved Strips joined by a 5½" Angle Girder 63, then the back is enclosed by, working from the top downwards, two overlapping 4½" x 2½" Flexible Plates extended outwards at each end by a Semi-circular Plate 64 with, below them, two vertical 4½" x 2½" Flexible Plates and, below again, a 9½" x 2½" Strip Plate, a 4½" x 2½" Flexible Plate, completely overlaid by a 4½" x 2½" Plastic Plate 65, and 2½" x 2½" Flexible Plate, this also completely overlaid by a 2½" x 2½" Plastic Plate 66. Between Plates 65 and 66 there is a gap serving as an air vent for the fan and this is edged by a 3½" Strip, two 2½" Strips and a 9½" Strip, the last bolted between the lower ends of the corner Angle Girders. The rear window is edged by two 5½" Strips and two 3½" Strips, the resulting gap between the lower Strip and the 9½" Strip Plate being enclosed by two 2½" x ½" Flexible Plates.

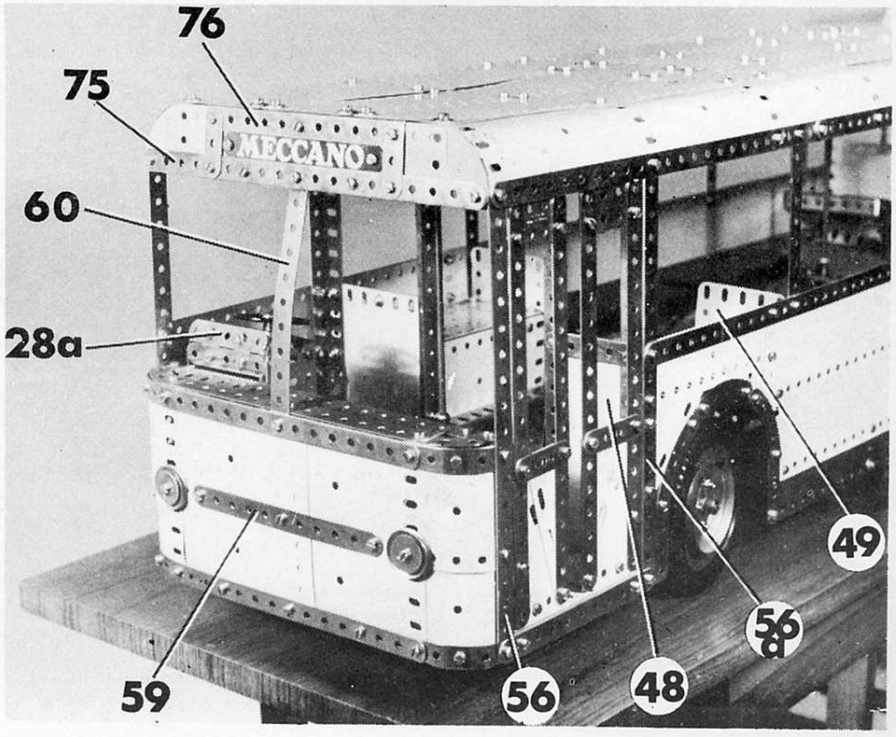
The upper edge of the back is attached to Angle Girder 63 by a 5½" Flat Girder.

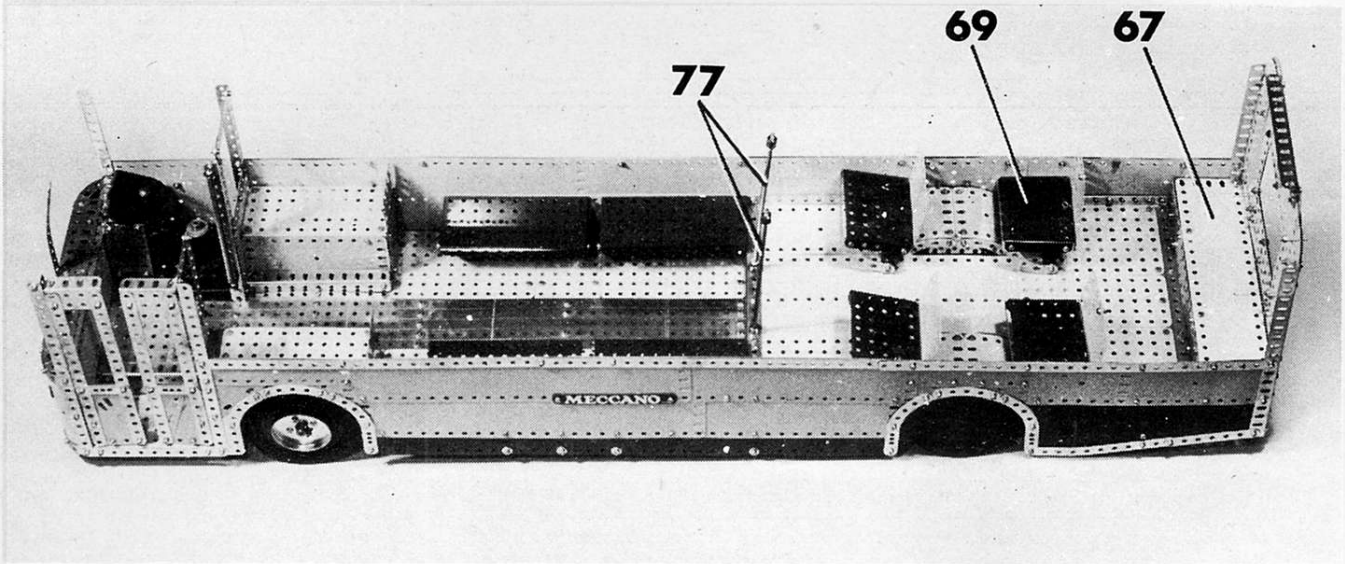
SEATING

Before building and fitting the roof, the internal seating should be completed. The rear seat is provided by a 9½" x 2½" Strip Plate 67 attached to the back of the body by Angle Brackets and enclosed at the front by a 9½" x 1½" compound strip plate built up from a 5½" x 1½" and two 2½" x 1½" Flexible Plates bolted to the vertical flange of Angle Girder 16. The compound plate is attached to Plate 67 by a 5½" Angle Girder 68.

Still in the rear, or raised, section of the model, all additional seats are each provided by a 3½" x 2½" Flanged Plate 69 between the corners of the flanges of which two 3½" x ½"

A close-up view of the front of the model showing the doors, windscreen and front panelling.





A view of the model with the roof removed to show the interior seating layout.

Double Angle Strips are bolted, the outer forward fixing Bolt at the same time securing the Plate to the side of the model. The inner forward fixing Bolt also holds a 2½" Stepped Curved Strip in place, this Strip being attached to the floor by a 1" x ½" Angle Bracket. In the case of two of the seats, a seat back is provided by a 3½" x 2½" Flexible Plate, while in the other two cases, two overlapping 2½" x 2½" Flexible Plates serve the same purpose.

In the forward compartment, four larger, inward-facing seats are each provided by a 5½" x 2½" Flanged Plate bolted to the side and braced at the front corners by 2½" Strips angled backwards and attached to the floor by Angle Brackets.

The driver's seat is provided by a Sleeve Piece attached to the floor by a Chimney Adaptor and topped by a ¾" Flanged Wheel. Behind the seat, Plate 48 is edged along the top by a 3½" Strip and extended upwards by a 7½" Angle Girder 70, the upper end of which is extended, via a 1" Corner Bracket and a 3½" Strip, to the top of Angle Girder 54. Attached to Angle Girder 70 is handrail supplied by a 6½" Rod held in Handrail Supports. At the other side of the model Plate 48 is edged by a 2½" Strip and extended upwards by a 7½" Strip which is attached to the upper end of Angle Girder 56A by another 2½" Strip.

At both sides of the model a footrest for the seat provided by the front wheel arch casing is supplied by a 5½" Angle Girder 71 attached to Plate 50 by Double Brackets at each end of the Girder.

ROOF

At last the roof can now be built, but, because internal lighting is attached to the underside, this should be built separately and attached to the model when substantially completed. The roof may be described as having two parts, a main section and a raised rear section. The main section, 35" long, is built up from nine 12½" x 2½" Strip Plates arranged in threes, side by side, with curved roof edges supplied by 5½" x 2½" Flexible Plates. Note that, towards the rear end of the section the roof angles downwards very slightly and this is achieved by taking full advantage of elongated holes and slight 'play' in the circular holes. Underside bracing is provided by two longitudinal 12½" Flat Girders, three transverse 7½" Flat Girders, a 3½" Flat Girder 72, the 5½" Strips and a 7½" Strip 73, all arranged as shown. Note particularly that one of the 7½" Flat Girders is situated at the rear end of the roof section and Bolts fixing it in place also secure a 4½" Angle Girder to the back of the section. Bolted to the vertical flange of this Angle Girder is a 2½" x 1½" Flexible Plate, extended four holes outwards at each end by a 3" x 1½" Flat Plate 73. Each Plate 73 is itself extended outwards by a 2½" x 2" Triangular Flexible Plate 74.

The outer upper edges of Plates 73 and 74 are edged by a 5½" Angle Girder extended at each end by a 3½" Stepped Curved Strip. The outer end of the Curved Strip is attached to the outer corner of Triangular Plate 74 and at the same time is bolted to the upper end of a 1½" Angle Girder which will later be secured to one of the side window uprights.

The rear raised section of the roof is then enclosed by four central 5½" x 2½" Flexible Plates, suitably overlapped, extended outwards at one side by four overlapping 4½" x 2½" Flexible Plates and, at the other side, by two longitudinal 4½" x 2½" Flexible Plates themselves extended by four 2½" x 2½" Flexible Plates. The outer plates are of course all curved to shape to round off the edge of the roof. The rear plates of the roof are bolted to Angle Girder 63.

LIGHTING

As the designer used his original model for demonstration purposes, he included an internal lighting system which makes use of some electrical components not included in the No. 10 Set. Modellers who do not wish to include the lighting may now finish the model by edging the roof along its entire length by suitable Perforated Strips, at the same time bolting the roof to the upper ends of the side window uprights. Note that the Bolt fixing the left-hand front corner of the roof to Strip 56 also holds an Angle Bracket and a left-hand Corner Angle Bracket in place. The spare lug of the Corner Angle Bracket serves as the upper pivot point for the front door, a ⅜" Bolt held by a Nut in the inner end hole of Girder Bracket 58 of the door locating in the hole in the Corner Angle Bracket lug. A ⅜" Bolt held by a Nut in the Girder Bracket of the other door locates in the hole of an ordinary Angle Bracket bolted to the top of Angle Girder 56A.

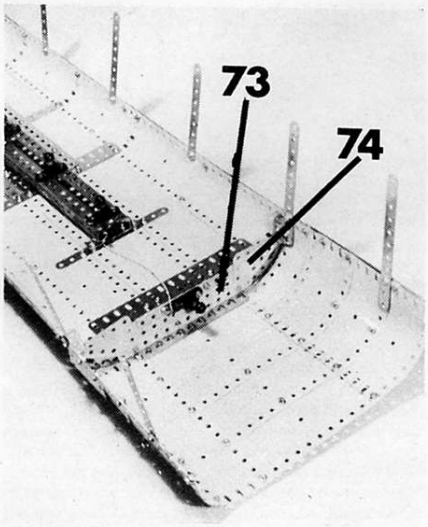
Bolted between the ordinary Angle Bracket at the top of Strip 56 and Strip 55 at the other side is a 9½" Strip 75, the securing Bolts also holding two Semi-circular Plates in position, one at each side. The space between the Plates is enclosed by three 2½" x 1½" Flexible Plates bolted to Strip 75 and edged along the top by a 5½" Angle Girder 76. Bolted between each end of this Angle Girder and Strip 75 is a 1½" Strip, the resulting box representing the route indicator panel. A Meccano nameplate makes a good substitute for a route indicator! The front end of the roof is bolted to the horizontal flange of Angle Girder 76.

Inside the model, two roof supports 77 are each provided by an 8" Rod located by a Collar in a hole in the 9½" Girder edging the front of the raised portion of the floor. The upper end of the Rod is fixed in a Rod Socket secured to the roof.

For those modellers who do have the equipment and wish to include lighting, a support-frame is built up from two 24½" Angle Girders 78 attached to two 2½" Strips which are themselves secured to two of the 5½" Strips bracing the underside of the roof, but note that they are held away from the roof by two Washers and a Nut on the shank of each Bolt. Note also that one Girder 78 is attached to the Strips by Insulating Spacers to electrically isolate it, while the other is attached by Angle Brackets on Bolts packed appropriately with Washers.

Bolted to Angle Girders 78 are seven Lampholders, with lamps, while another Lampholder is attached to the vertical flange of the Angle Girder to which Plates 73 are bolted. Note that one terminal of this Lampholder must be earthed by bolting it direct to the metal of the model, while the other terminal must be insulated. This can be achieved by using a non-Meccano nylon bolt or a thin 6 B.A. bolt fitted with an insulating washer. The insulated terminal is connected by a length of insulated wire to insulate Angle Girder 78.

Another length of insulated wire is taken from any point on the insulated Angle Girder, is run down one of the rod roof supports 77 and taken to a 2½" Insulating Flat Girder 79 bolted towards the rear end of the left-hand chassis member. One of the fixing Bolts serves as the other terminal for the lighting circuit. Insulated wires from the two Power Drive Units are taken to separate insulated terminals added to the Insulating Flat Girder and this finally completes the model.

See the contents list of the No. 10 Set for the Parts Required list for this model.

An underside view of the rear of the roof in close-up.