Steam Era Models
C/- P.O. Rhyll, Victoria, 3923.

VICTORIAN RAILWAYS AEC RAIL MOTOR AND TRAILER

Prototype Notes

In 1922 the VR Newport Workshops constructed a Single Ended Rail Motor car based on an AEC road truck chassis, together with a matching trailer, which appears to have been built on a Brill four wheeled tram underframe. Passenger accommodation was quite spartan and the bodies were open above the waist with canvas blinds provided in case of bad weather. This pair of vehicles, Motor No.1 and MT1, were used to operate a 'suburban' service between Mildura, Merbein and Redcliffs.

The Mildura suburban service proved to be successful and a further 18 rail motors and 22 trailers were constructed, featuring glazed windows amongst other improvements, at Newport Workshops over the following three years. This kit is representative of a 'series production' motor and trailer. Being single ended, the AEC rail motors required turning at each end of the line, necessitating a light 'rail motor' turntable at stations that did not have a locomotive turntable available. These rail motors and trailers were used to provide passenger services on branch lines, providing more economical service than the locomotive hauled passenger/mixed trains they replaced. The AEC motors and trailers continued in this role through to the late 1940s when they were replaced by the 102 and 153hp Walker rail motors, at which time most were withdrawn.

Two rail motors, 9RM and 15RM lasted a little longer, operating a service between Fawkner and Somerton up until 1956, being known in this role as "The Beetle". Unfortunately these two rail motors were not spared from scrapping and apparently none of the Single Ended Rail Motors have survived for posterity.

General Assembly Notes

While this kit is highly detailed, it is a model of a quite small prototype. Therefore many parts are very small and fiddly to fit. In an effort to minimise the difficulty in assembling the parts into a successful and satisfying model, tabs and slots are used to locate both etchings and castings in their correct relative position. In every case pay particular attention to remove any extraneous lumps or flaws from the castings and small burs from the etchings, to ensure that the parts are located correctly before securing them in place.

The majority of this kit is brass, therefore the method of choice for assembly is soldering. However this does not preclude the use of Epoxy Resin glues or Cyanoacrylate for assembly. Solder is very strong and it is not necessary to wait for an assembly to reach full strength before moving on to the next step. The kit designer highly recommends the use of solder paste rather than wire for assembly. It has a number of advantages. It is clean, easy to place small quantities using a pin and because it can be placed before use of the iron, leaves one hand free to hold parts. The use of a resistance soldering kit or hot air gun is also recommended when using paste.

Use a piercing saw or heavy-duty side cutters to remove the brass castings from their feed sprues. Trim the remains of the feed sprue with a file.

As a general rule the half etched line used to locate folds in etched parts goes to the ***inside*** of the fold where the fold required is 90º or less. Where a part is to be folded double, or 180º, the half etched line is to the ***outside*** of the fold. The only exceptions to this rule are parts 13 and 18 of the rail motor kit and part 3 of the trailer.

If you are not comfortable with soldering, the next choice would be an epoxy resin glue such as Araldite, or finally a medium cure speed super glue. There is no shame in using adhesives to assemble the kit, in fact it is recommended for some parts of the kit that are simply too difficult to solder. A soldering iron will definitely be required to make the electrical connections, however.

Some parts require you to drill or open up holes using fine diameter twist drills. This should always be done by hand using a pin vise to hold the twist drills. Do not use a Dremel or electric drill as it is very easy to drill too far and ruin the part.

When reference is made to the left or right side of the vehicle, this is to be taken as the side when viewed from the cabin looking forward.

Tools Required or Recommended

Sharp knife, such as a Stanley knife with snap-off blades, or a scalpel.

Fine pointed tweezers.

A set of needle files in assorted shapes.

Wooden pegs for holding parts during soldering.

Wire cutters.

Needle nose pliers.

Round nosed pliers.

Small model maker's vice with smooth jaws.

Pin vise for holding twist drills.

A 150mm single cut mill file.

Super glue, such as Maxbond 108.

Super Strength Araldite or other epoxy resin glue

Soldering iron for electrical connections and/or kit assembly.

Piercing saw.

Glass fibre burnishing tool.

Emery paper, 300 and 1200 grit.

A range of metric twist drills including: 0.35mm, 0.5mm and 1.0mm.

A set of tapered broaches, for clearing out and/or enlarging holes.

Spare Parts

There are some spare parts on the etched brass fret, particularly the very small parts that vanish in a ping and cannot be found until after the model is finished and painted.

Rail Motor

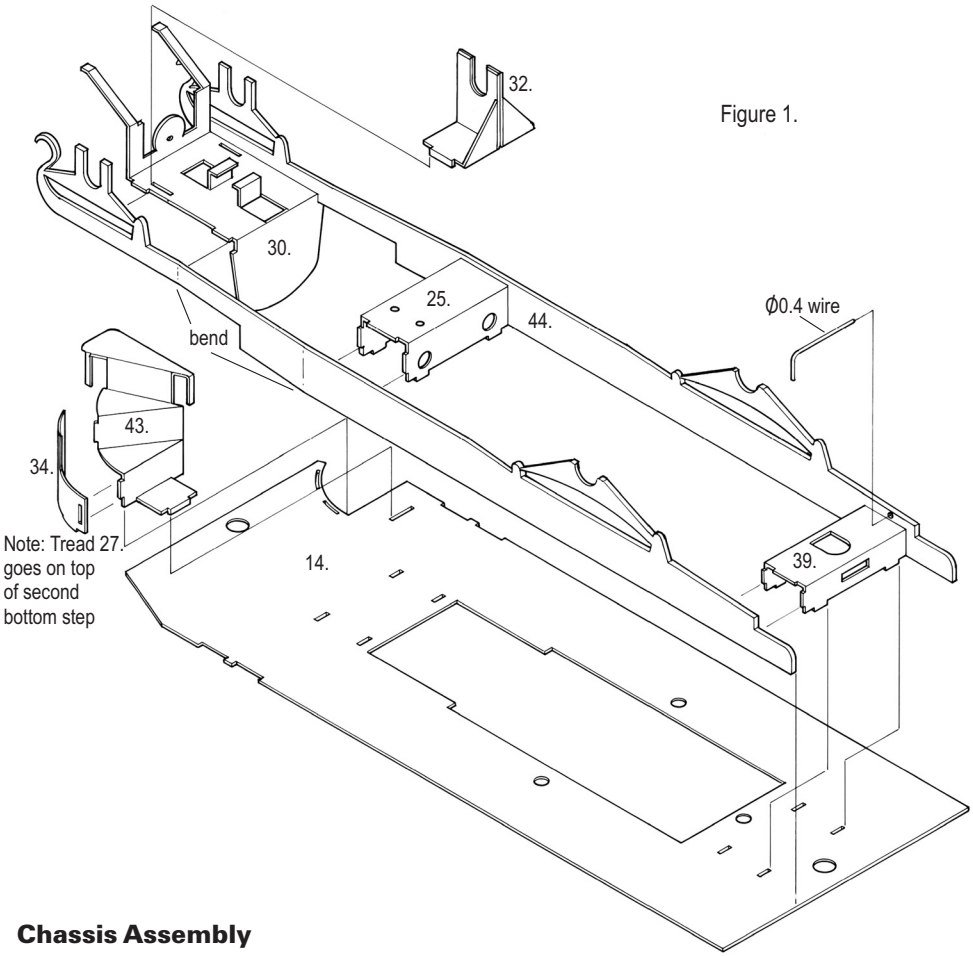


Figure 1.

Chassis Assembly

Please refer to figure 1.

Lightly tin the backs of the two chassis rails and then fold them over double, with the central half etched line on the ***outside*** of the fold. Solder each rail together, taking care that solder does not clog the slots in the inside face. Fold the central chassis spacer (25) and the rear chassis spacer (39) into channel sections and locate the tabs in the slots in the inner side of one chassis rail. Orientate part 25 so that the two small holes in the centre are closest to the right chassis rail. Solder the spacers to one rail and then position the second chassis rail and secure it with solder. Check that the two chassis rails make a true and square assembly. Bend each chassis rail inwards slightly, immediately in front of the central spacer, and then bend each rail slightly outwards immediately to the rear of the slot used to locate the front chassis spacer (30). Form the front chassis spacer (30) to shape, locate its tabs in the forward slots in the chassis rails and secure with solder. Form the front axle support (32) to shape, locate its

tags in the slots towards either side of the front chassis spacer and secure with solder. Check the fit of the front axle in the central slot. The axle should 'clip' into the slot, but needs to turn freely once located. If necessary, carefully enlarge the size of the opening with a round needle file. Add the detail etching (8) to the centre of each front wheel, securing with contact cement or superglue.

Prepare the chassis plate, (14) and remove the nut cages (17) and driver's step (23) from the central opening. Set these parts aside for later use. Solder the chassis to the chassis plate, so that the tags in the chassis spacers locate in the slots in the plate.

Fold the step treads (43) to shape and then use the round nosed pliers to curve the step side plate (34) so that it matches the shape of the steps. Check the fit of these parts and when satisfied, solder them together. Locate the tags on this subassembly in the slots in the chassis plate and solder in place. Solder the tread (27) on top of the second bottom stop.

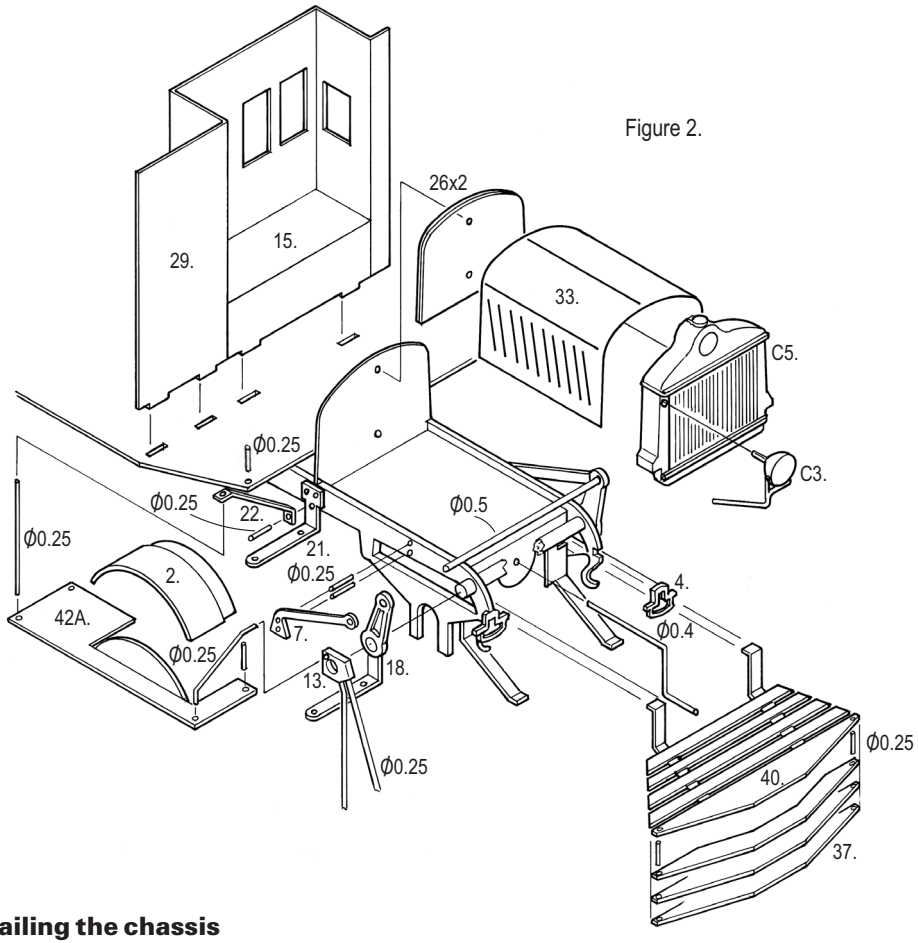


Figure 2.

Detailing the chassis

Refer to figures 2 and 3.

Place the two bonnet supports (26) against the firewall (incorporated in the front chassis spacer) and locate with two short pieces of 0.5mm wire through the holes. Secure with solder.

Thread the short length of 1.0mm wire through the holes in the chassis rails immediately in front of the front spacer and trim so that 1.2 mm projects from the face of each chassis rail. Fold the front mudguard supports (18) to shape. Note: As located in the etched fret, the upper part is for the right side and the lower part is for the left side.

The half etched line where each part bends double is to the ***inside*** of the fold. After soldering each double fold the tag remaining may be filed off. Locate each step support over the projecting end of the 1.0mm wire, but do not solder in place yet. Thread two short lengths of 0.25mm wire through the holes in the chassis rails above the front axle spring and use them to locate the brace (7). Thread a length of 0.5mm wire through the upper end of the brace and through the upper hole in the front mudguard support. Set up both sides in this way and solder the parts in place. If viewed from the front, the upper sections of the front mudguard supports should be vertical, so the braces (7) will need to splay out slightly. Trim the various 0.25mm and 0.5mm wires so that about 0.2mm projects from the face of each brace.

Lightly tin the surfaces of the three strips for the bottom of the cowcatcher (37) and thread them onto two short lengths of 0.25mm wire. The two strips with notches in their back edges go on top. Sweat the parts together and then dress the front face smooth with a file to get rid of the cusp edges. Now add the cowcatcher on top and secure with solder. Bend the cowcatcher to the shape shown on fig.2, with the slatted portion inclined at about 30º to the horizontal. Check the fit on the strips extending from the front chassis spacer. When satisfied, secure with solder. Add the towing hook detail parts (4), locating them in the notches in the ends of the chassis rails. Bend up a crank handle from 0.4mm wire and solder it in the hole in the front chassis spacer.

Fold the two brackets for the cowcatcher stays (13) double, so that the half etch line is ***inside*** the fold. Thread two lengths of 0.25mm wire into the 'holes' in the edge of each part, which are created by the etched grooves. Secure the wires with solder and then bend the wire closest to the 1.0mm hole out at an angle of about 10º. Thread the wires through the gap between the bottom of the cowcatcher and the first slat and install the bracket on the end of the 1.0mm wire across the front of the chassis. Adjust the wires so that the inner wire is vertical, when viewed from the front. Secure the brackets and the wires with solder and trim any excess wire flush with the underside of the cowcatcher.

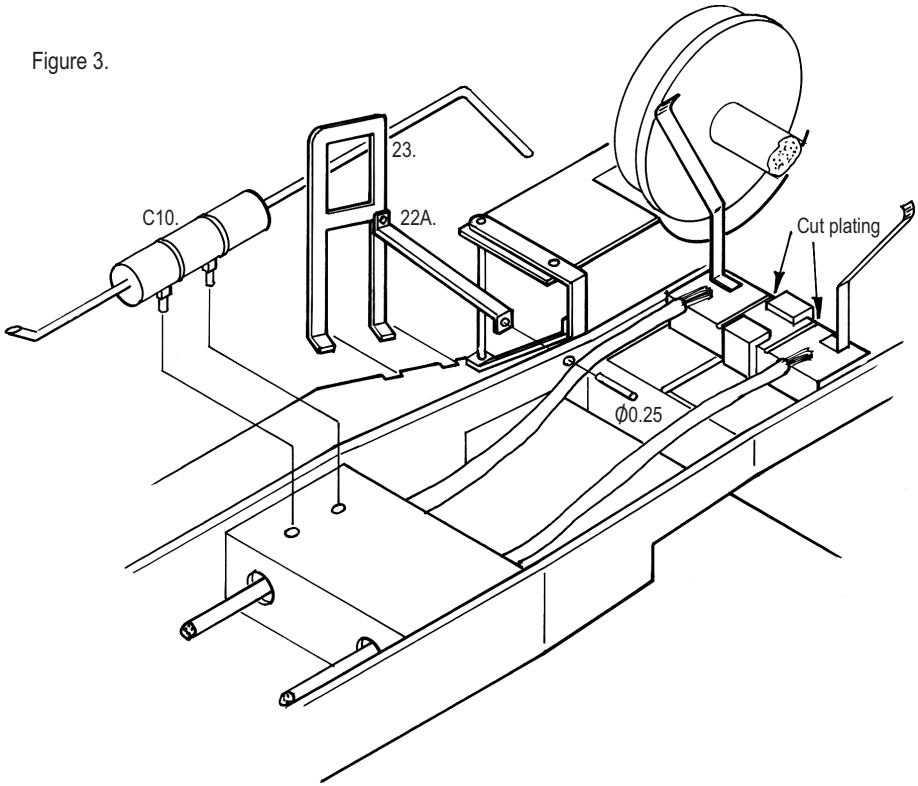
Fold the crescent shaped piece on the side step/mudguard supports (42A & 42B) up at 90º. Use a pair of round nosed pliers to roll the mudguards (2) to shape and test the fit against 42A and 42B. The mudguards are deliberately made over length to make them easier to assemble. When a good fit is achieved solder the parts together and then trim the excess mudguard flush with the underside of the step.

Thread two 15mm long pieces of 0.25mm wire through the holes in the chassis rails below the firewall. Bend the rear mudguard supports at 90º and thread the brackets over the wires. The bracket with a section trimmed from the outer end goes on the left side. Solder the brackets to the chassis and trim the wires so that about 0.2mm projects from the face of the bracket. Bend the brace (22) to shape and check the fit against the right hand rear mudguard support and the underside of the floor. Solder the lower end to the rear mudguard support bracket with a short length of 0.25mm wire. Run a 10mm length of 0.25mm wire down through the floor, the upper end of this brace, the side step/mudguard and the rear mudguard support bracket. Also run short lengths of 0.25mm wire through the inner holes in the side step/mudguard and the support brackets (18). Solder in place when everything lines up. Bend diagonal braces to shape from 0.25mm wire to run from the small hole in the bracket (13) down to the outer front corner of the mudguard. Trim any excess wire so that about 0.2mm projects. Repeat this exercise for the left hand side, but there is no brace up to the floor on the left.

Tin the under surface of the front and rear edges of the bonnet (33) and bend it to shape around a 2.0mm drill shank, so that it matches the profile of the firewall. Drill a 0.5mm hole about 1.0mm deep at the mark near the top corner of the radiator casting. Position the bonnet and the radiator on the front chassis spacer so that the bonnet is supported against the firewall by parts 26. Solder the bonnet in place and solder the base of the radiator to the front corner of the front chassis spacer. Trim the headlight casting so that there is a stalk about 1.5mm long projecting from the back. This locates in the hole drilled in the front of the radiator. The bracket runs down the side of the brace (7). When a good fit is achieved solder the headlight bracket to the brace.

Bend the driver's seat (15) and the driver's partition (29) to shape and interlock the two parts, using the tabs and slots provided. Solder the seat to the partition and then solder the partition to the floor, located by the tabs and slots.

Figure 3.



Bend the top of the driver's side step (23) over at 90º and solder the step to the chassis plate so that the step locates in the notches in the edge of the floor. Reinforce the step with the brace (22A), securing the brace with solder and short lengths of 0.25mm wire. Trim any excess wire after soldering.

Check the fit of the small section of circuit board in the clips under front chassis spacer. Cut grooves through the plating on either side of the clips and tin the copper surfaces. Solder the circuit board to the clips, but leave the wires and wiper pickups off for now.

Locate the pins cast onto the muffler in the holes in the middle chassis spacer and solder in place. Solder the front section of the exhaust pipe to the back edge of the front chassis spacer.

Fold a rear step (20) double and solder a length of 0.4mm wire between the tags on the underside. Bend this wire up at 90º and then form a joggle and make another 90º bend, as shown on figure 4. Thread the wire through a hole in the rear corner of the chassis plate and solder the wire to the top surface of the floor. Repeat so that there is a step on each rear corner.

To make up a drawbar, tin part 46 while it is still attached to the fret, remove it and fold it double before sweating the two layers together. Bend a length of 0.4mm wire into an 'L' shape and solder it into the hole in the left side chassis rail below the rear chassis spacer. The vertical leg of the wire runs through the centre of the opening in this chassis spacer and through the hole in the large end of the drawbar.

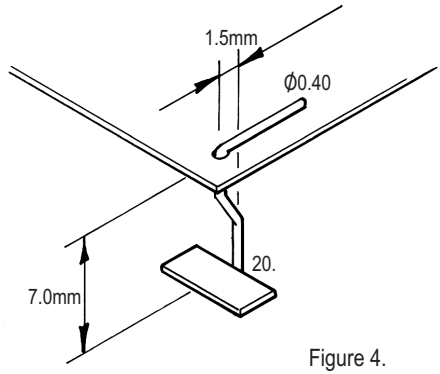


Figure 4.

Motor and Gearbox

Refer to figure 5.

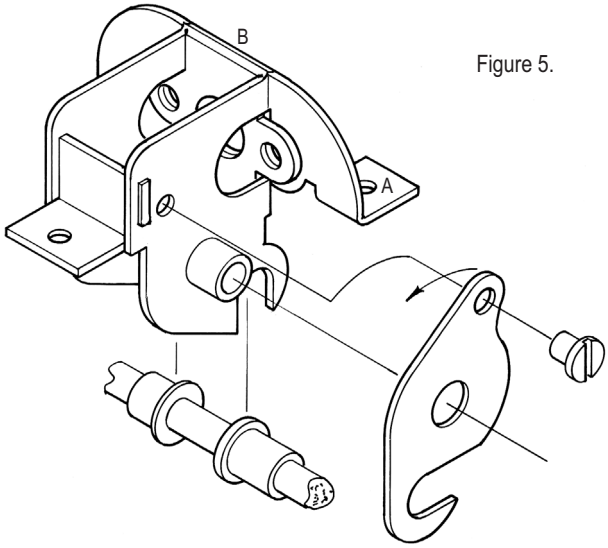
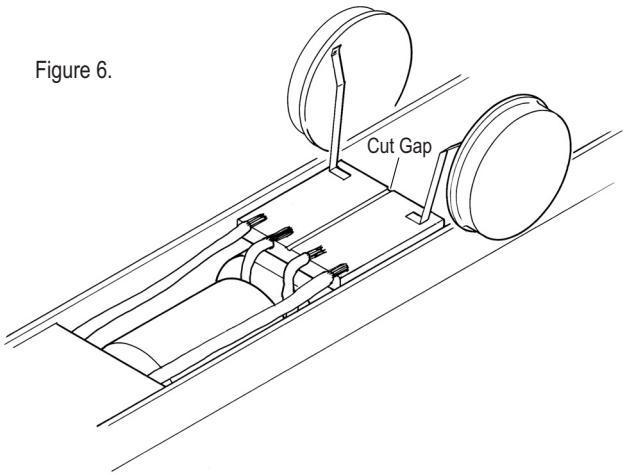


Figure 5.

Remove the gearbox etching from the 0.5mm nickel silver fret. Bend the two tags, marked 'A' on figure 5, at 90º. Bend the etching double at the bend 'B' and pinch the fold closed in a vice. Check that the boss on the end of the motor casing will fit in the large hole in the gearbox. Now bend the sides up, but only at about 60º, and put a brass 'top hat' bearing in each side hole. ***Do not*** solder the bearings in place at this time. Position the idler gears, which are already mounted on a short shaft, between these two bearings and then fold the sides at 90º. Note that it does not matter which way around the idler shaft is orientated. Remove the rear gearbox bracket from the fret, fold it at 90º and place the tags in the slots in the gearbox sides. It may be necessary to file the tags slightly thinner to enable them to enter the slots. Check that everything is square and true, that the idler gears can spin freely and solder the rear bracket to the gearbox sides. Use the bare minimum of solder to secure the bearings to the side plates. Thread the motor shaft with worm attached into the gearbox and attach the motor with two M1.4 x 2.0mm screws. Orientate the motor so that the Mashima label will face the roof of the finished model. Check that the motor operates freely. Position the rear axle in the slots in the gearbox, orientated so that the axle gear meshes with the smaller of the two gears on the idler shaft. The overall reduction is approximately 18:1, ***not*** the 48:1 etched on the side of the gearbox. Position the central hole in one of the locking plates over the brass bearing and rotate it about 45º so that the hook on the lower edge secures the axle and the hole in the top lines up with the tapped hole in the side of the gearbox. Secure the locking plate with an M1.4 x 2.0mm screw. Repeat for the other side. Check that the motor runs freely and the driving wheels turn smoothly. Cut the cast driving wheel centres from the feed sprue and file so that the back of each casting is quite flat. Check the fit in the recess on the front face of each driving wheel and secure with superglue.

Figure 6.



Cut a slot through the centre of the plating on the large piece of circuit board and attach the circuit board to the bottom of the motor with contact cement or super glue. Trim the motor leads and solder the leads to the circuit board, so that the lead on the right side of the motor goes to the right half of the circuit board. Use the offcuts of wire from the motor to make two leads, each 50mm long, and solder one to each side of the circuit board. Tin the other end of the circuit board, but do not add the pickup wipers yet.

To install the motor gearbox in the model, remove the screws securing the locking plates, rotate the plates back and remove the driving axle. Lower the motor and gearbox into the opening in the chassis plate and

secure it in place with three M1.4 x 3.0mm screws from under the chassis plate up into the three mounting points on the gearbox. Position the driving axle back in the slot, rotate the locking plates and secure them with the M1.4 x 2.0mm screws. Removal of the motor gearbox is the opposite of this procedure.

Body Assembly

Refer to figures 7, 8, 9 and 10. Remove the main body etching (1) from the fret but leave the inner and outer halves connected to each other by the various tags. Form the various bends in the corners of the body ***before*** folding the inner sides back against the outer sides. This will make it easier to get sharp 90º bends at the back corners. Form the bend marked A-A on figure 8 first and take care that the bend is even down the narrow pillar between the window openings. Repeat for the corresponding bend on the left side. Form the bend in the front right corner of the driver's cab and then form the rear corners at 90º. Now fold the inner sides up inside the outer sides and the inner cab front up inside the cab. Pinch the tags along the lower edge closed with some smooth jawed pliers. Use a sharp instrument, like a small jeweller's screwdriver, to bend the tags at either end of the sides and at either end down at 90º, as shown on fig.7.

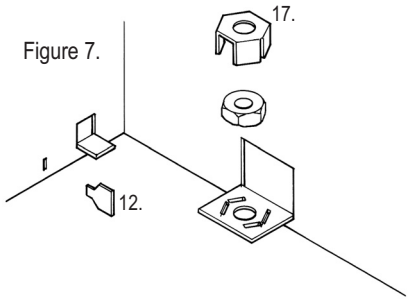
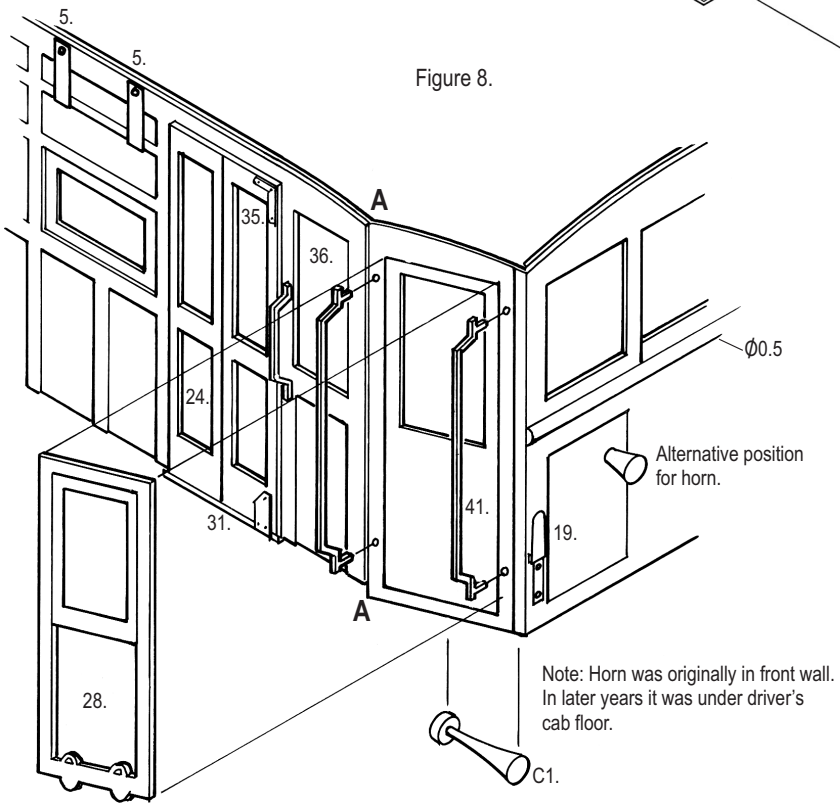


Figure 7.

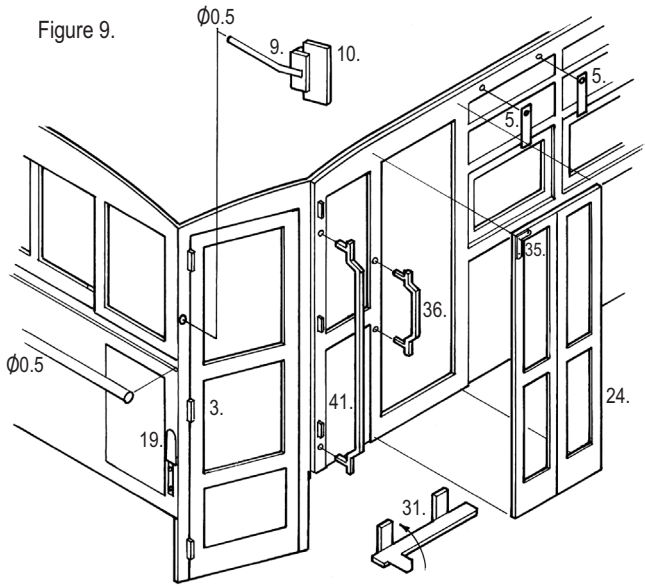
Figure 8.



Secure the inner and outer sides to each other by applying a small amount of superglue along the top and bottom edges, so that it travels between the sheets by capillary action. When the superglue has gone off, file the lower edge of the body smooth and solder the front left corner of the driver's cab closed. Bend the tags along the top edge of the body inwards. Don't panic if some get broken off as the roof can still be glued on top of the body without them.

Bend a nut cage (17) to shape and use it to secure an M1.4 nut to the bracket inside the back wall of the body. Repeat at the other end and also use a small amount of solder to reinforce the bends in these tags and the tags in the sides of the body.

Figure 9.



Hinges for the various doors are represented by small tags, inserted from the inside through slots in the body. Once soldered in place the large part of the tag can be wiggled back and forth until it breaks off. It will help if the tag is given a small bend to and fro ***before*** inserting it in the slot, but be careful not to over do it. The hinges down the left side of the low-level passenger door are 4" size (3), but all the rest are 3" size (12).

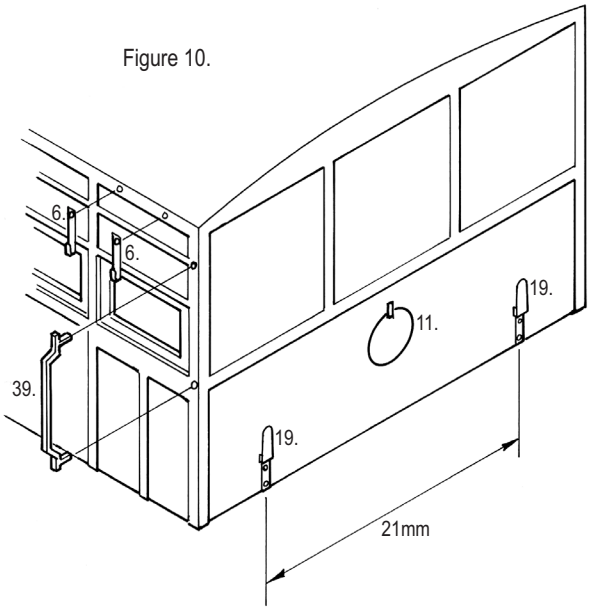
Solder a length of 0.5mm wire in the groove across the cab front below the front windows. File any excess flush at either end.

Tin the backs of parts 5 and 6 while still attached to the fret. Sweat parts 5 to the upper body side adjacent to the passenger door, so that they are centred over the small dots etched in the side, as shown on figure 9. Repeat for the right side, although no dots are etched on that side. Repeat for parts 6 at the back end of the right side. Once parts 6 are in place bend the lower portions round into hook shapes. These hooks appear to have been used for carrying a canvas water bag in hot weather.

Tin the back of each passenger door (24) and the upper door brackets (35) while still attached to the fret. Sweat each door centrally over the door opening in the body side, so that the bottom edges are flush. Sweat a bracket (35) to the top front corner of each door. Bend the two tags on the lower door guide (31) up at 90º and solder the bracket to the body below the passenger door. The small triangular bracket should line up with the front edge of the door. When the door guide is soldered in place bend the triangular plate up at 90º so that it sits on the front face of the door.

Add the rear side handrails (39), the small side handrails (36), and the large handrail (41) adjacent to the low-level passenger door, soldering them from the inside. Solder a tail disc (11), either open or closed, centrally on the rear wall, and solder two lamp irons to the rear wall and two lamp irons to the front

Figure 10.



corners of the driver's cab. The two large handrails (41) either side of the driver's door on the right side are best left off until ***after*** painting and decaling.

Solder the two parts of a rear vision mirror (9 & 10) on top of each other and then solder a short length of 0.5mm wire into the slot in the edge of this part. Bend a kink of about 20º in the wire and then thread the wire through the hole in the front corner of the cab, soldering from the inside, so that the inner edge of the mirror is aligned with the body side. Repeat for the other side.

Tin the back of the driver's side door frame (28) while still part of the fret and then sweat it to the body so that it is centred over the outline of the door.

The AEC railmotors originally had the horn mounted through the front wall of the cab. For this arrangement, drill a 0.5mm hole in the front panel, trim the horn casting and solder the stem of the horn in the hole. For the later arrangement (which seems to coincide with silver stripes on the driver's cab) when the horn was installed under the cabin, locate the pin on the horn casting in the hole etched in the driver's cab floor and solder from the top surface.

That completes assembly of the brass work for the body and chassis. At this stage the motor and gearbox can be removed so that all the brass work can be soaked in methylated spirits and washed in warm soapy water to remove flux residues and the like. Once thoroughly dry, give the model a coat of grey etch primer.

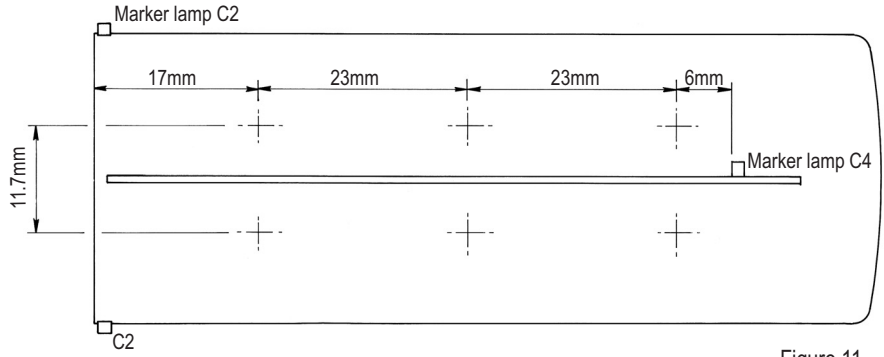


Figure 11.

Roof Assembly

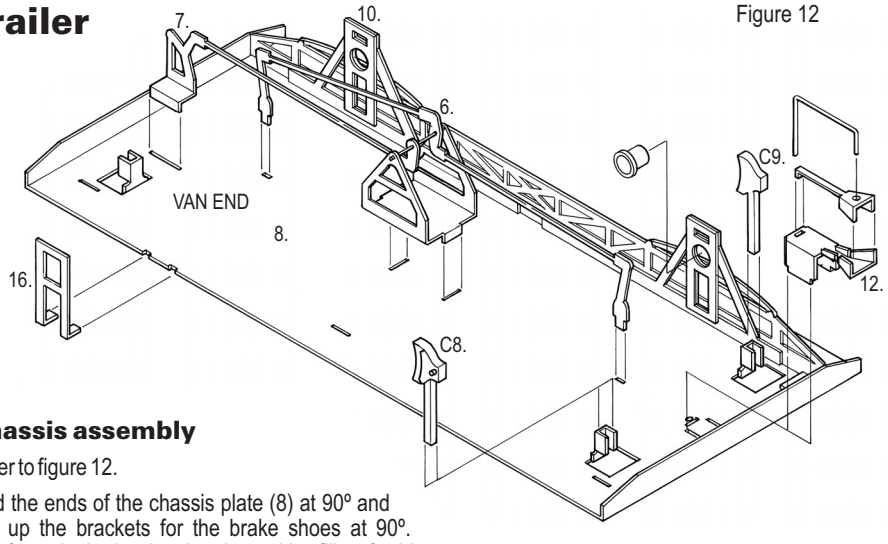
Refer to figure 11.

A heat formed piece of plastic is provided for the roof, with a pencil outline on the upper surface. Use a pair of scissors to trim close to the pencil line and then use a large file to gradually trim the roof to final size, so that it overhangs the sides and rear by about 0.3mm and the cab front by 8.0mm, as measured horizontally. The front edge of the roof should be vertical, and round the front corners with about 2.0mm radius. When satisfied with the shape of the roof, mark out and drill 1.0mm diameter holes for the torpedo vents, as shown in fig.11. Cement the torpedo vents in place and then attach the roof to the body. This is best done with gel type superglue, applied from inside the body. Add a lighting conduit made from 0.010" x 0.030" polystyrene strip running down the centre of the roof.

Mark out and drill 0.5mm holes for the three marker lamps. One lamp casting only has one recess for a lens and this casting goes above the driver's cabin. The other lamps go at the rear end of the roof. Because the rear lamps overhang the edge of the roof, it will help if the 0.5mm holes are drilled through the roof at an angle. Trim the castings from the sprue, insert the 0.5mm cast wire peg on each lamp into the hole in the roof and secure with superglue from inside. Make sure that each lamp stands up vertical. That completes assembly of the motor. Painting can be left until the trailer is ready to paint as well.

Trailer

Figure 12



Chassis assembly

Refer to figure 12.

Fold the ends of the chassis plate (8) at 90º and fold up the brackets for the brake shoes at 90º. Reinforce the brake shoe brackets with a fillet of solder ***before*** bending the sides of these brackets round at 90º.

Bend a chassis side (12) to shape so that the W irons run behind the lattice and the central reinforcing runs behind the W iron. Solder the W irons to the lattice side sill. The detail overlay for the spring folds over in front of the base spring attached to the lattice side sill. Solder a brass flanged pinpoint bearing into each axle hole and solder the leaf spring detail in place. Bend the brackets at either end of the side sill at 90º, locate the three tabs on the side sill in the slots in the chassis plate and solder the side sill to the chassis. Ensure that the W irons stand perpendicular to the chassis plate. Repeat for the other side sill and spring the W irons apart to allow the wheels to be installed. Check that the wheels turn freely without undue slop.

Insert the stem on a brake shoe casting into a bracket folded up from the floor. Rest the shoe against the wheel tread so that the centre of the shoe is approximately level with the axle centre line and solder in place. After soldering, gently bend the shoe away from the wheel by about 0.4mm, to prevent friction and short circuits. Repeat for the other three shoes.

Bend the central brake bracket (11) into a 'U' shape and bend the small tags down at 90º. Locate the tags in the slots in the centre of the chassis plate and solder the bracket in place. Make two 90º bends in the handbrake pull rod (7), locate the tag in the slot in the van end of the chassis plate and solder it in place. Locate the tags on either end of the brake crank/pull rod (6) in the slots in either end of the chassis plate and solder. Thread a short length of 0.5mm wire through the holes in the central bracket and the two pull rods and secure these parts with solder, so that the pull rods are parallel to the centre line of the floor. Trim the excess wire flush with the sides of the central bracket.

Fold the tags at the top of a side step (16) at 90º and solder the step to the chassis plate, located by the notches in the edge of the plate. Repeat for the other step. Make up side steps for the rear corners using parts 20 and 0.4mm wire, as was done for the motor. (Figure 4)

Bend the sides of the 'trumpet' section of a coupler (12) up at 90º. This can be done by holding the central portion flat on a hard surface with the edge of a steel rule and then levering up the sides with the point of a knife. Fold the sides of the bracket down at 90º, locate the tags in the slots in the floor and secure with solder. Bend the bottom portion of the coupler to shape, position it in the rest of the coupler and solder it in place. Bend a length of 0.4mm wire into a square 'U' with one long leg and one short leg. Insert the short leg in the hole in the coupler head and the long leg in the hole in the floor, where it is soldered. A jeweller's screwdriver can be used to lever the short leg up, allowing a coupler drawbar to be inserted in the coupler 'trumpet', which is then retained if the wire is allowed to spring back. To make a drawbar for coupling trailers together, tin part 24 while it is still attached to the fret, remove it, fold it double and sweat the two halves together.

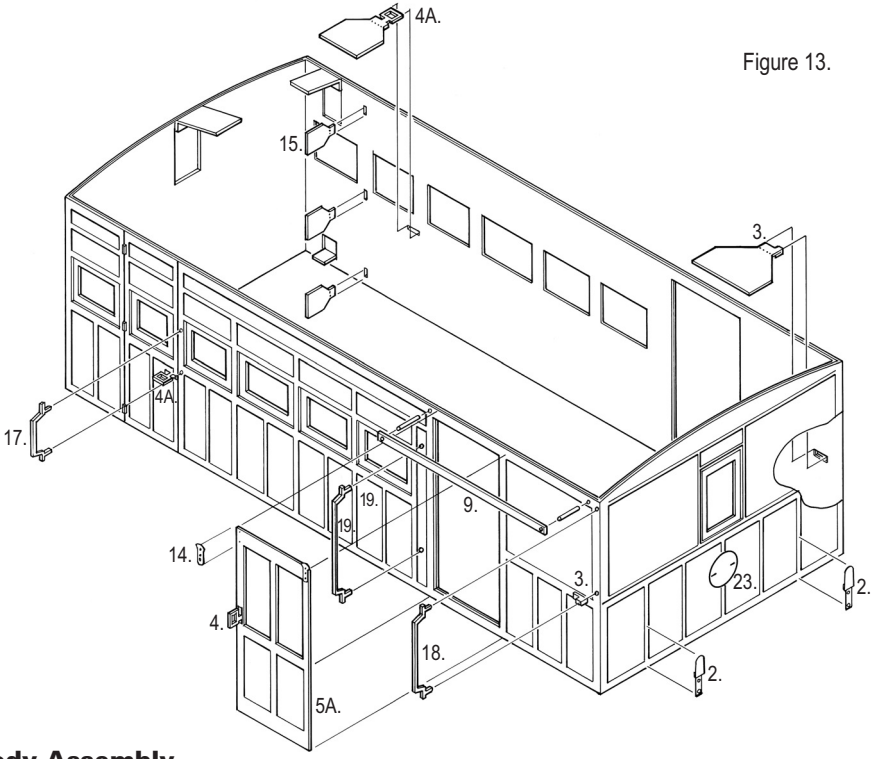


Figure 13.

Body Assembly

Refer to figure 13.

Remove the body (1) from the fret and leave the inner and outer halves connected by the tags along their edges. Remove the various parts from the doorway openings and set aside for later use. Fold the outer body into an open box, ensuring that the corners are 90º. Fold the inner sides and ends up inside the body and use a sharp pointed instrument to fold the tags at the base of each side and end out at 90º. Secure the inner and outer sides to each other by applying a small amount of superglue along the top and bottom edges, so that it travels between the sheets by capillary action. Solder the open corner of the body together, using the interlocking tags of the inner side and end to locate the parts. Reinforce the bottom brackets with solder and add the M1.4 nuts and nut cages, in the same way as was done with the motor. Bend the tags in the upper sides and ends upward and then over at 90º.

Solder the door hinges into the various slots and remove the excess tag from the inside. Fold the end of the door-stop bracket (3) over double and insert it through the slot in the waist rail and solder from the inside. Note that the half etched line is to the ***inside*** of the fold. Remove the excess tag on the inside and repeat for the other side. Solder the door tracks to the top of the body sides above the van door openings, using lengths of 0.25mm wire to align them. Tin the back of each door and then sweat them centrally over each door opening. Tin the backs of the roller brackets (14), and sweat them to the top corners of the doors so that they overlap the door tracks. Push the door handles (4) through the slots in each van door and solder from the inside. Repeat for the handles (4A) for the passenger doors and remove the excess tags from the inside. Add the various handrails (17, 18 & 19), soldering from the inside. Add two lamp irons (2) and a tail disc (22) to each end.

Finally solder the van partition to the top of the floor. Two alternative sets of slots are provided. MT numbers 2, 8 and 20 had small van compartments so the tags on the bottom edge of the partition should be located in the slots closest to the van end, i.e. the end with the side steps. All the other nineteen MT had a larger van compartment, so the partition should be located in the slots furthest from the van end. In each case the etched detail face of the partition is orientated towards the van compartment.

Soak the brass work in methylated spirits and wash in warm soapy water to remove any flux residues. When dry give the model a coat of grey etch primer.

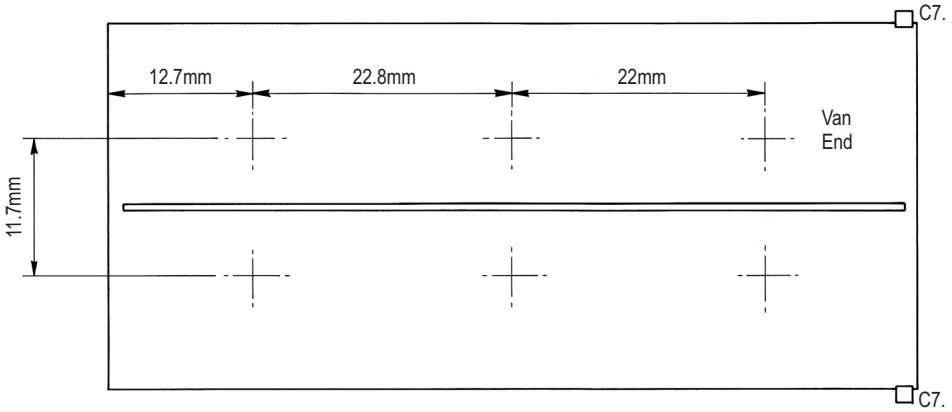


Figure 14.

Roof Assembly

Refer to figure 14.

A heat formed piece of plastic is provided for the roof, with a pencil outline on the upper surface. Use a pair of scissors to trim close to the pencil line and then use a large file to gradually trim the roof to final size, so that it overhangs the sides and ends by about 0.3mm. When satisfied with the fit, mark out and drill six 1.0mm holes for the torpedo vents. Cement the vents in place and add a lighting conduit from 0.010" x 0.030" styrene strip down the centre of the roof. Attach the roof to the body using gel type superglue applied from inside the body. Drill 0.5mm holes through the roof at the corners above the van compartment for the marker lamps. Angle the holes so that the lamps will overhang the sides.

Painting and Decals

For both motor and trailer paint the bodies, including the edges of the roofs and the bonnet of the motor, with a light grey (Humbrol No 40 with some brown added). This provides the window sash colour and a suitable undercoat for the red. Mask the window sashes with small pieces of tape and spray the bodies and bonnet with pass car red. When the red is dry remove the tape and mask the bonnet. Now the chassis of both the motor and trailer can be sprayed with a mix of etch black and etch grey primer to create a less stark black. Paint the roofs brown (Humbrol matt dark earth), which can be done by brush, although take care not to clog the torpedo vents.

Trim the decals close to the lettering required with a sharp knife or scissors, dip in water and set aside on a surface to soak. Wet the model with a small brush dipped in water and slide the decal off the backing paper and onto the model. Push the decal into the desired location with a damp brush and use the brush to soak up any excess water. When the decal is dry apply some decal setting solution, such as 'Solvaset' to help bond the lettering to the surface. Apply the lettering to the top of the body sides as shown in the photos. Motors numbered 7, 9, 14 and 18 were composite, with 1st written adjacent to the front passenger doors and 2nd at the rear end of each side. Motors numbered 1 - 6, 12 and 13 were all 2nd class and motors 8, 10, 11, 15 - 17 and 19 were all 1st class. All the single class motors had the class designation on the body side behind the passenger door. In every case the number and RM was written above the centre passenger window. The trailers were all 2nd class, with 2nd written adjacent to the passenger door and the number and MT written adjacent to the van door.

The rail motors were originally painted plain red, but apparently had the diagonal silver stripes added in the early 1930s. Apply the patch of three stripes to the bonnet and use 'Solvaset' to help the decal to conform to the raised detail. Patience will be needed to apply the stripes to the front of the body. Trim the large patch of stripes to the shape printed and cut the top three stripes off each corner. Also remove the strip of clear material that was between the 3rd and 4th stripes. This will allow the decal to dodge the brackets for the rear vision mirrors. Soak each portion of decal and apply it to the model, with the stripes continuing straight over the window openings. Check that the gap between the three portions matches the gap between the other stripes and the central inverted vee is centred over the middle window pillar. Now allow the decal to dry for an hour or so and use a very sharp knife, like a new scalpel, to trim the excess decal from the window openings. Once the decal has been trimmed, apply

'Solvaset' to help the decals to conform to the various lumps and bumps on the front of the motor. Some motors had silver stripes across the edge of the overhanging roof. It was not practical to supply decals for this feature, but it can be done by brush painting a 50:50 mixture of silver and matt white in alternating 6" wide bands of red and silver.

Once the decals are dry the model can be given a coat of matt clear finish to seal the decals. Add the two handrails (41) either side of the driver's door on the right side, securing with a little superglue on the inside. Pick out the frame of the radiator with silver and the marker lamps, the top portion of each lamp iron and all the handrails with black.

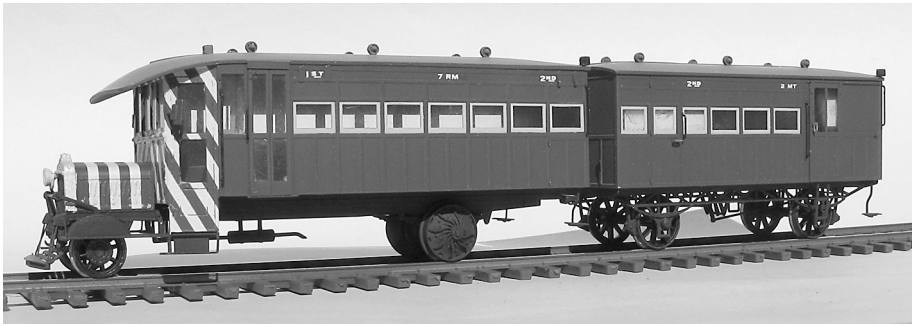
Final Assembly

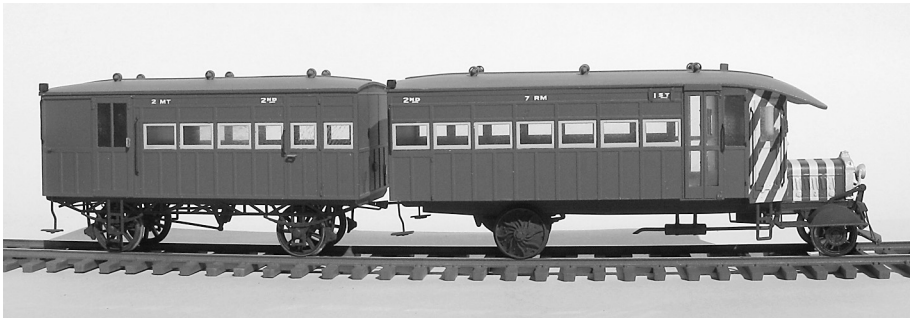
Cut sections of clear plastic glazing and secure them inside the body with superglue, applied sparingly on the end of a pin. Install each body on its respective chassis and secure with an M1.4 x 3mm screw at each end.

Electrical Pickups

Cut pieces of phosphor bronze approximately 0.5mm x 12mm using scissors or tin-snips. Make a 90° bend about 2.5mm from the end of each strip and solder them in place on the circuit boards, orientated as shown on figures 3 and 6. Bend the strips so that they will rub on the back of their respective wheel. Pay particular attention to the strips for the front wheel so that they maintain contact if the front axle rocks slightly, but they don't stop the wheel from turning. Run the wires from the rear circuit board through the holes provided in the centre chassis spacer and solder them to the front circuit board. The driving wheels and the tyres of the front wheels can be chemically blackened with a product such as Carr's Metal Black to provide a dark finish without interfering with pickup. The portion of the phosphor bronze not actually rubbing on the wheels can be brush painted black.

Finally you may wish to add some weight in the form of sheet lead to the floors of both the motor and the trailer. Take care that the weights do not interfere with the fixings and access to the screws used to secure the driving axle in the gearbox.





Parts List

1. **Etched brass fret for Rail Motor.**
2. **Etched brass fret for Trailer.**
3. **Etched nickel silver fret for gearbox.**
4. **Bag of brass investment castings, with the following sprues packed in the order below.**

Sprue	Part No	Description
1.	C1	Horn
	C2	Rear marker lamp x 2
	C3	Headlight
	C4	Central marker lamp
2.	C5	Radiator
	C6	Driving wheel centre x 2
3.	C7	Trailer marker lamp x 2
	C8	L/H Trailer brake shoe x 2
	C9	R/H Trailer brake shoe x 2
4.	C10	Exhaust pipe and muffler

5. **Bag of components, packed in the order listed.**

Description	Quantity
M1.4 hexagon nut	4
M1.4 x 2.0mm screw	4
M1.4 x 3.0mm screw	7
23.8mm pinpoint axle wheelsets	2
Brass pinpoint bearings	4
Brass top hat bushes	2
0.005" phosphor bronze	1
Sprue of 12 torpedo vents	1
Fibreglass circuit board	2
Spoked wheelset	1
Disc wheelset	1
Geared idler shaft	1

6. **Decal.**
7. **Wire.**
   0.25mm straight brass wire
   0.40mm straight brass wire
   0.50mm straight brass wire
   1.0mm straight brass wire
8. **Moulded plastic roof for Rail Motor.**
9. **Moulded plastic roof for Trailer.**
10. **Motor with flywheel and worm.**

Illustration shows AEC rail motor with two trailers. This kit includes only one trailer.