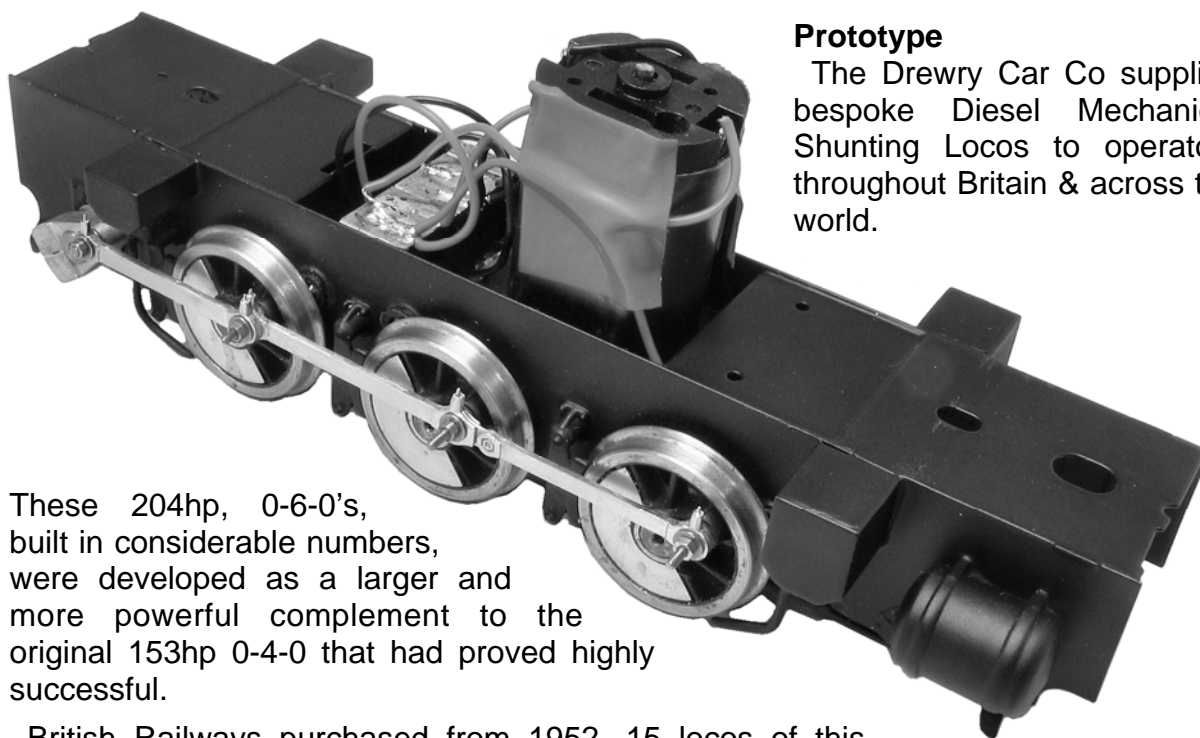


CONNOISSEUR MODELS

- 0 Gauge -

Drewry 204hp, 0-6-0 Diesel Mechanical Shunter British Railways Class 04 & Industrial Operators Parts Identification & Chassis Assembly Instructions



Prototype

The Drewry Car Co supplied bespoke Diesel Mechanical Shunting Locos to operators throughout Britain & across the world.

These 204hp, 0-6-0's, built in considerable numbers, were developed as a larger and more powerful complement to the original 153hp 0-4-0 that had proved highly successful.

British Railways purchased from 1952, 15 locos of this initial design, D2200 - D2203 noted for working on the Wisbech & Upwell Tramway & D2204 - D2214 distributed throughout the British Railways system. A number of these locos remain in operation today on preserved railways & heritage sites.

Parts Required To Complete

1 X Slater's Drewry 040 Shunter Wheel Pack (Slater's Catalogue Number 7839id)

This pack contains 4 X wheels, 3 X axles, 6 X crankpins.

1 X Slater's 3' 3" Driving Wheel (Slater's Catalogue Number 7839i)

This pack contains 2 X wheels, 1 X axle & crankpins, everything additional for 060

Plunger Pickups if desired (Slater's Catalogue Number 7157)

Available From Slater's Plastikard, Old Road, Darley Dale, Matlock,
Derbyshire, DE4 2ER, Telephone 01629 734053.

1833 Motor and 40/1 Gear set, *available from Connoisseur Models.*

**Jim McGeown, Connoisseur Models, 1 Newton Cottages,
Nr Weobley, Herefordshire, HR4 8QX, Telephone 01544 318263**

Prototype Inspiration

By using "Drewry 204hp Diesel Shunter" as a search term on the internet interesting information can be found.

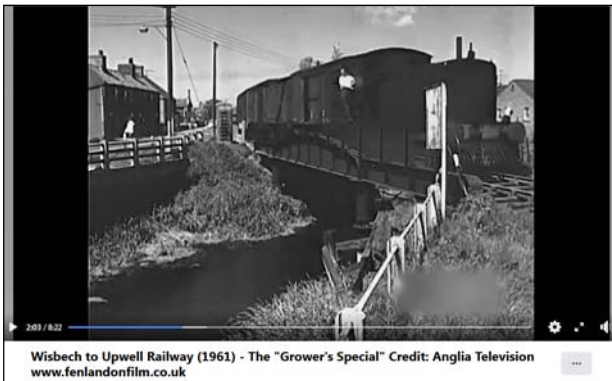
Left & Below is a selection of screen shots & links from May 2023



https://en.wikipedia.org/wiki/British_Rail_Class_04



<https://www.rail-online.co.uk/p419583910>
Also
<https://railphotoprints.uk/p142024154>



<https://ne-np.facebook.com/FenlandOnFilm/videos/wisbech-to-upwell-railway-1961-the-growers-specialcredit-anglia-television/405785104520003/>

Scan of Manufacturers Catalogue from 1957.

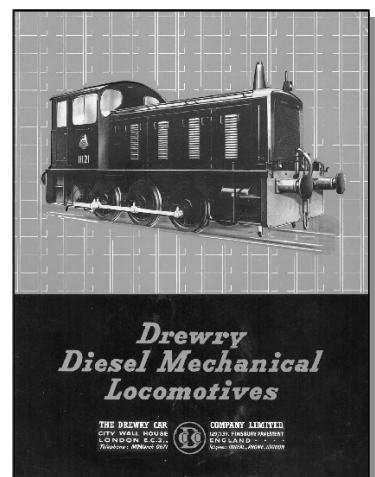
Additional resource available to download & print off from my website (<http://www.jimmcgeown.com/Loco%20Kit%20Pages/Drewry%20Diesel%20Shunter%20Manufacturers%20Catalogue%20print%20off%20pdf.pdf>) or if preferred contact me & I will be pleased to send a printed version.



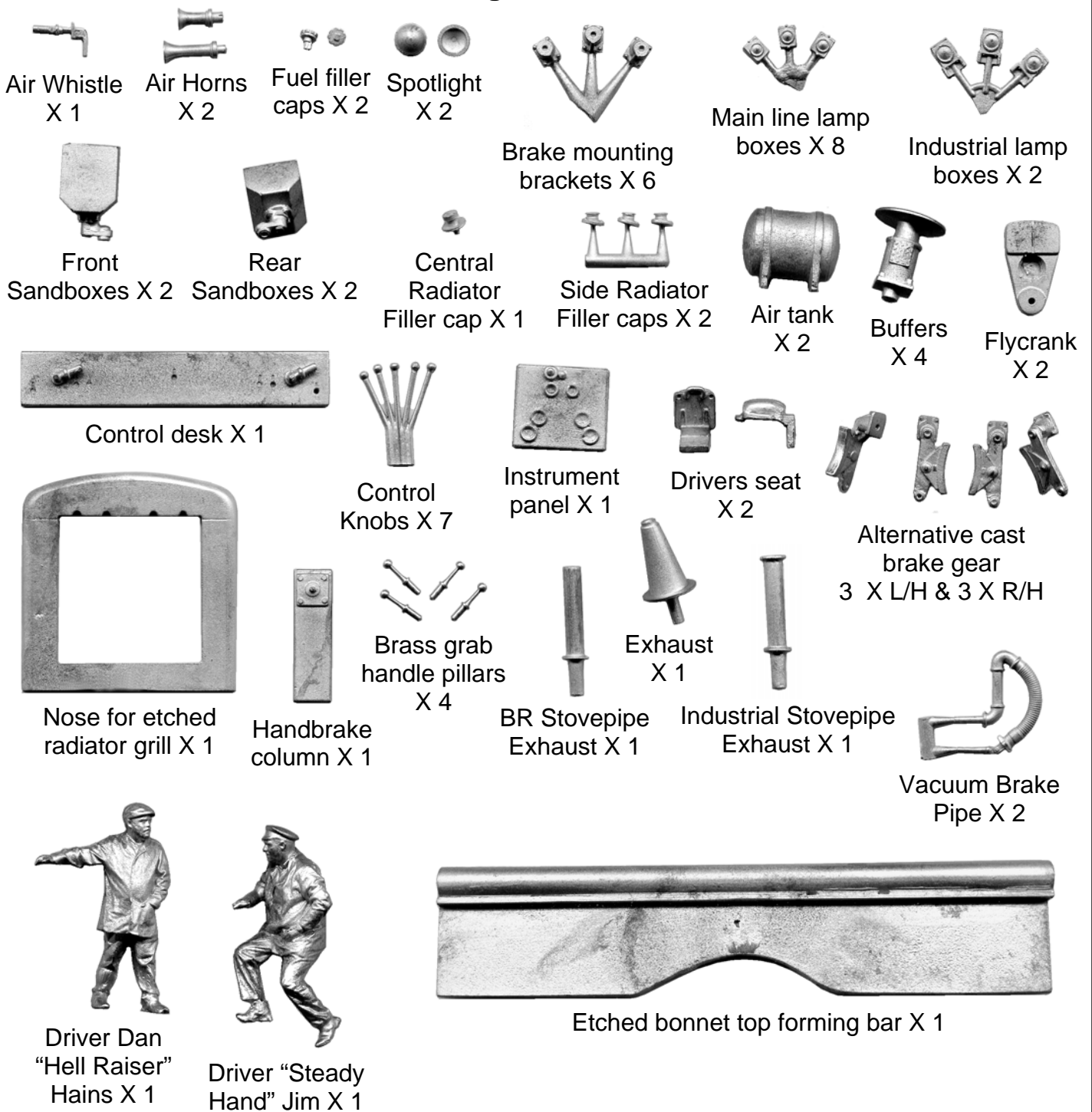
https://www.flickr.com/photos/12a_kingmoor_klickr/6360331779/in/photostream/



11103 in the flowerbeds at Great Yarmouth, following the flagman, Paul Rogers. From: <https://www.embsayboltonabbeyrailway.org.uk/aboutus/class-04-11103-d2203>



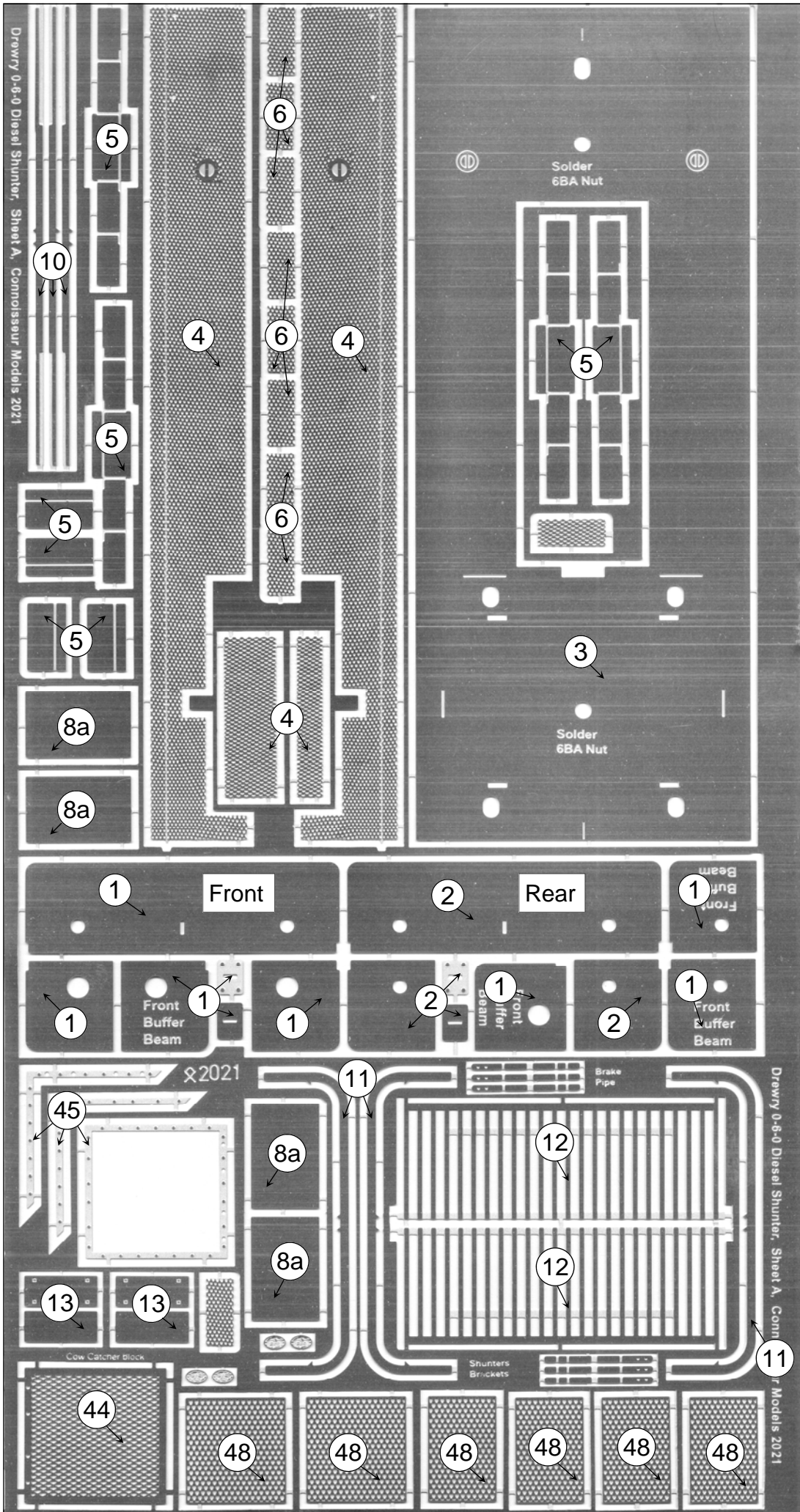
Casting Identification



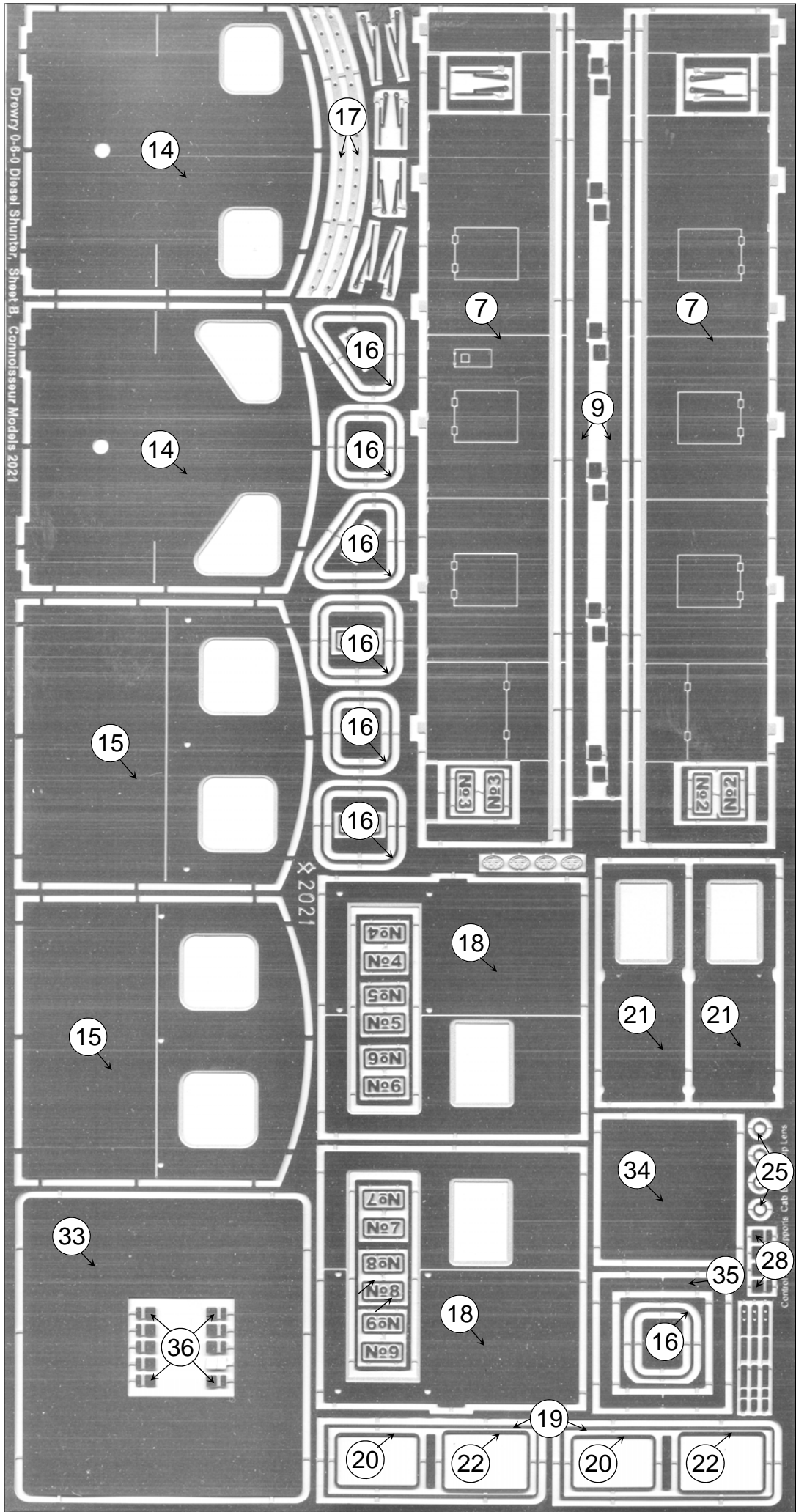
Sundry Parts:- 3 X pieces copper clad PCB. 2 X electrical wire for pickups. 8 X axle bearings. 2 X 6BA short screws. 2 X 6BA nuts. 35 X short handrail knobs. 1 X brass grab handle pillars, horn & whistle casting. 6 X coupling links. 1" X 2.4mm brass rod. 2" X 1.4mm copper rod.

Wire:-
 3 X 0.45mm brass wire.
 4 X 0.7mm brass wire.
 3 X 0.9mm brass wire.
 6" X 24swg tinned copper wire.

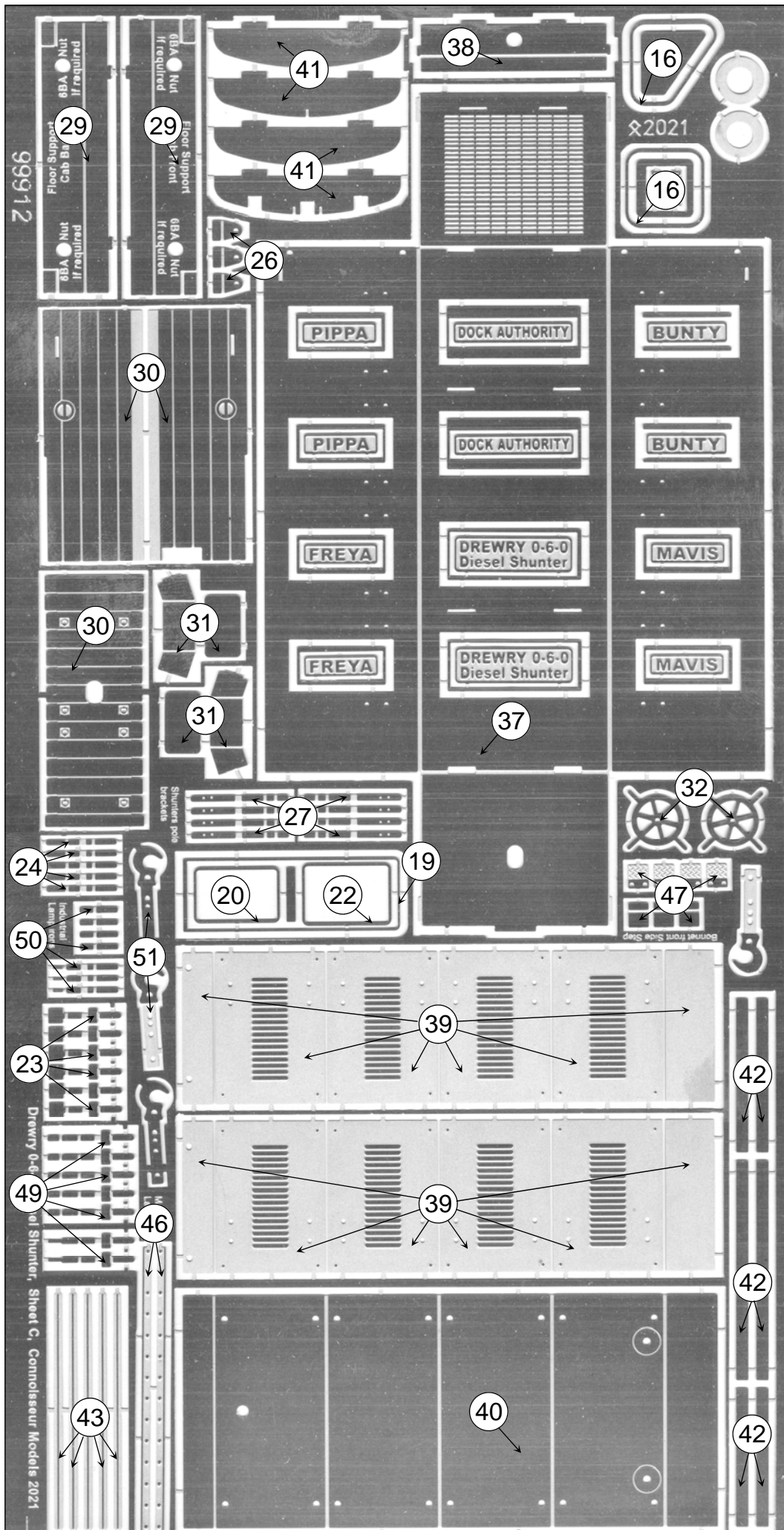
Etched Parts Identification, Sheet A, 0.015" Brass

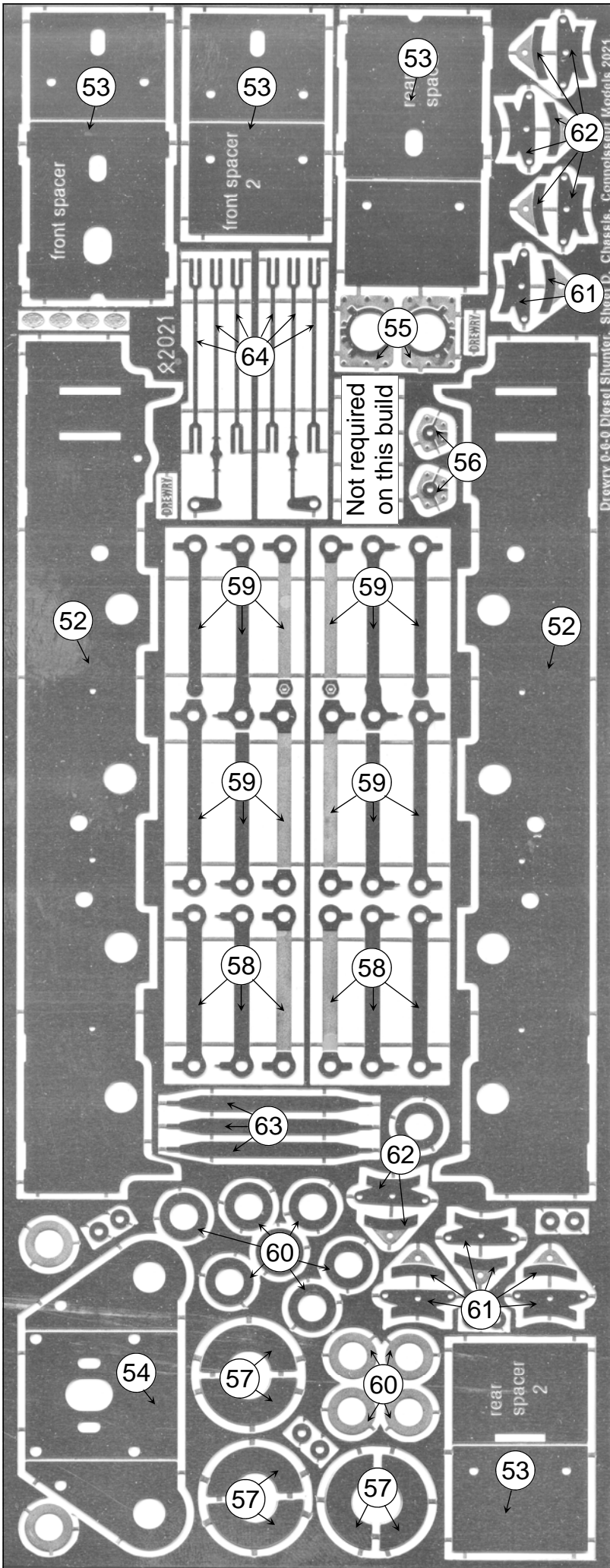


Etched Parts Identification, Sheet B, 0.015" Brass



Etched Parts Identification, Sheet C, 0.015" Brass



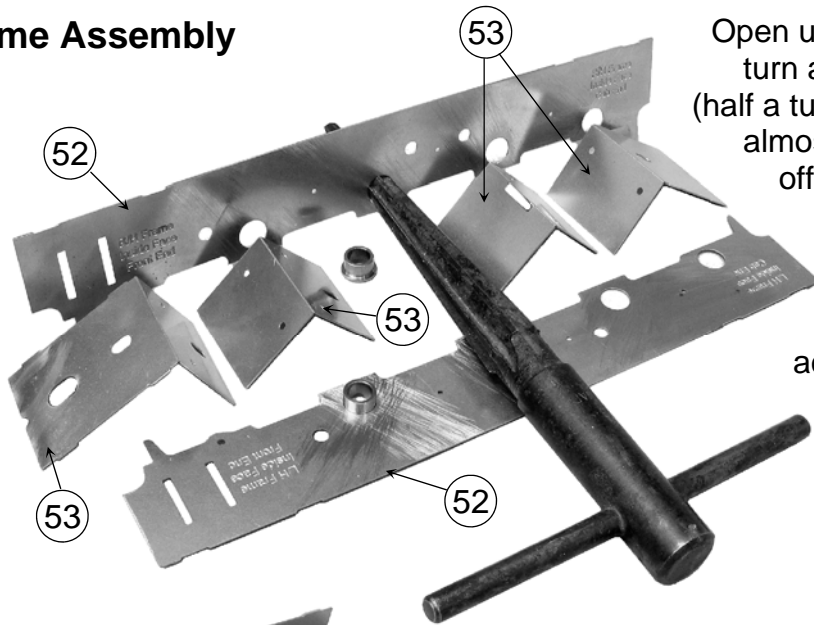


Etched Parts Identification, Sheet D, 0.015" Nickel Silver

Stage 1, Chassis Sideframe Assembly

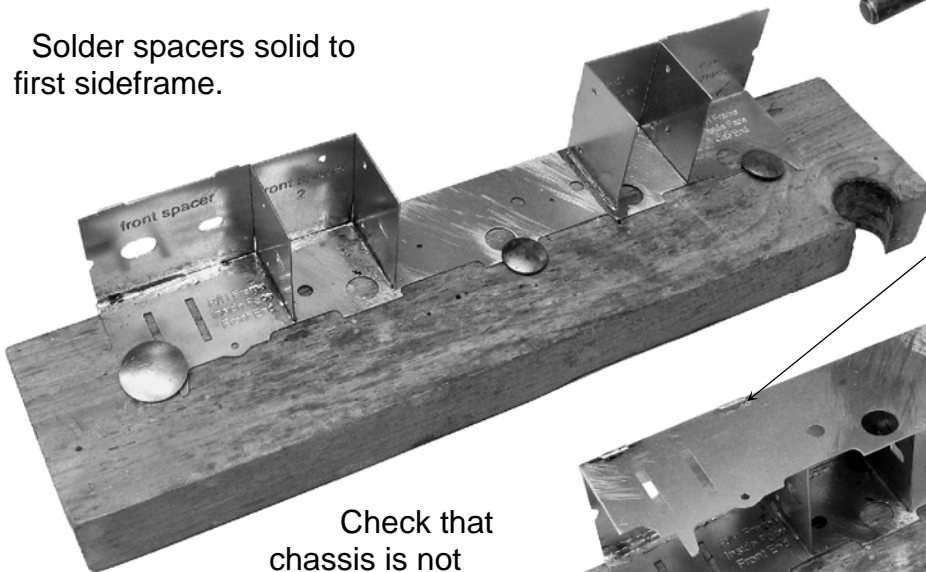
The etching process can not produce holes of consistent diameter. So holes are designed deliberately undersize so that they can be opened up gently with a tapered reamer/broach to accurately accept a component.

Fold up spacers & check for snug, but not tight, location of tabs into sideframe location cutouts.

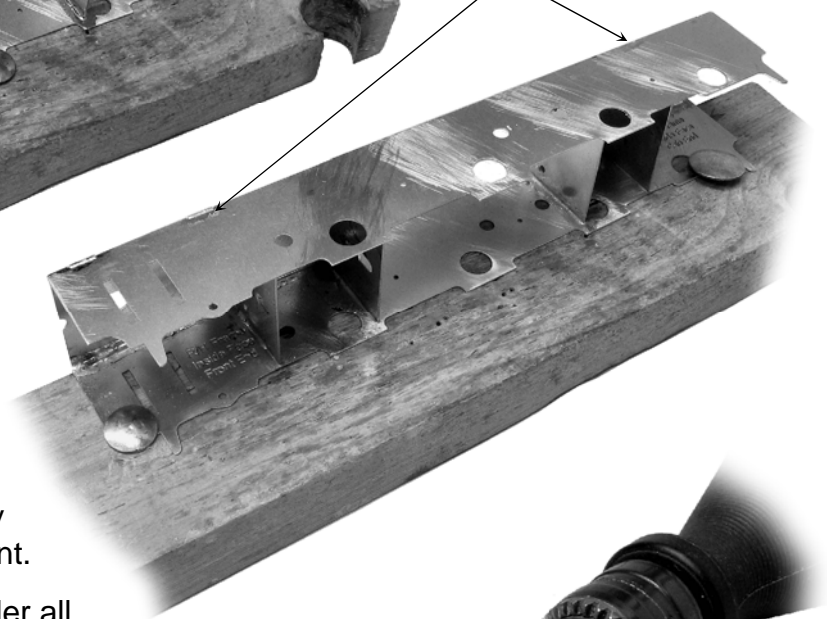


Open up hole a turn at a time (half a turn when almost there) offering up bearing until a snug fit is achieved.

Solder spacers solid to first sideframe.



Tack solder second side frame at tabs only. Work from centre towards alternate ends.



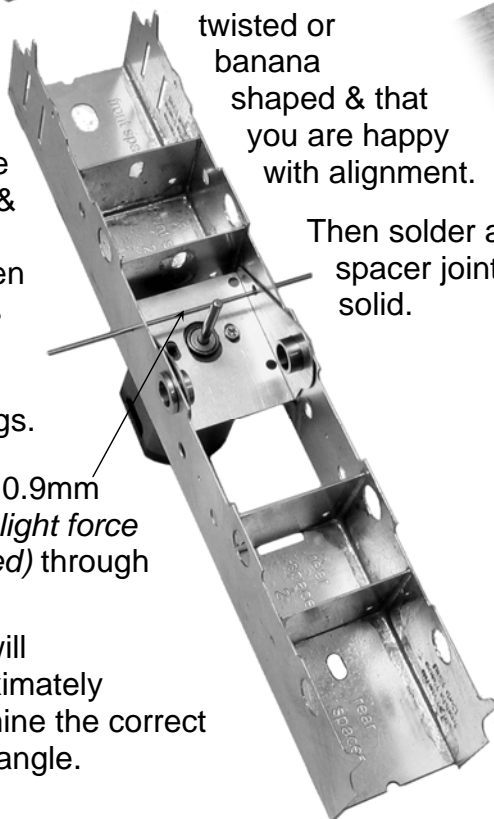
Check that chassis is not twisted or banana shaped & that you are happy with alignment.

Locate motor & cradle between frames using lose bearings.

Then solder all spacer joints solid.

Pass 0.9mm wire (slight force required) through holes.

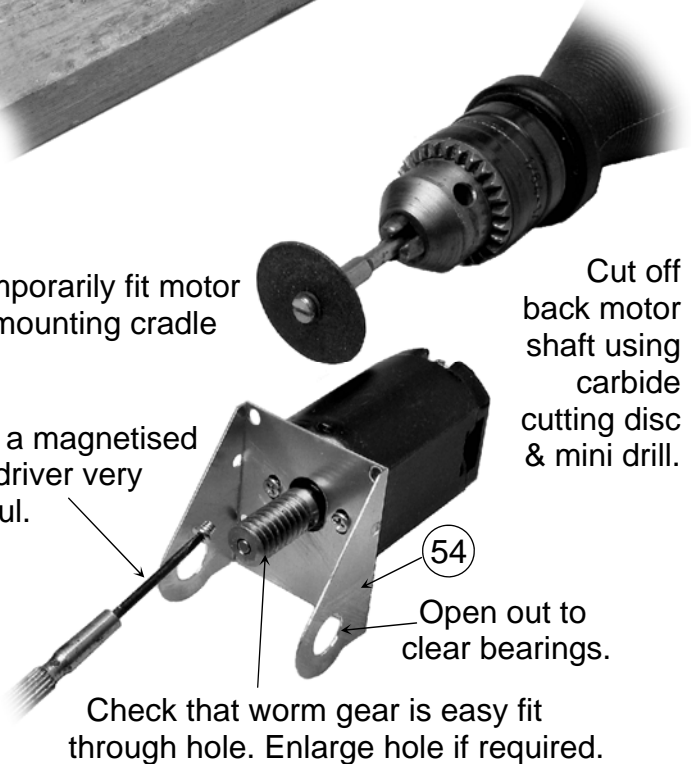
This will approximately determine the correct motor angle.



Temporarily fit motor into mounting cradle

I find a magnetised screwdriver very useful.

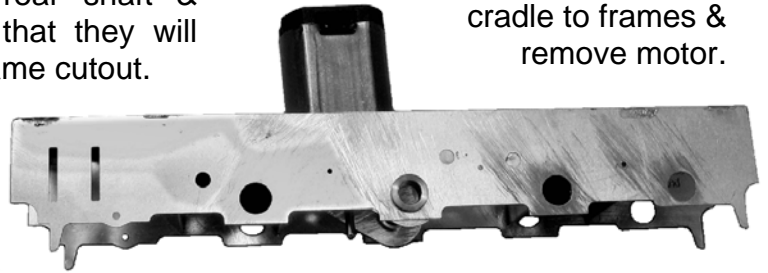
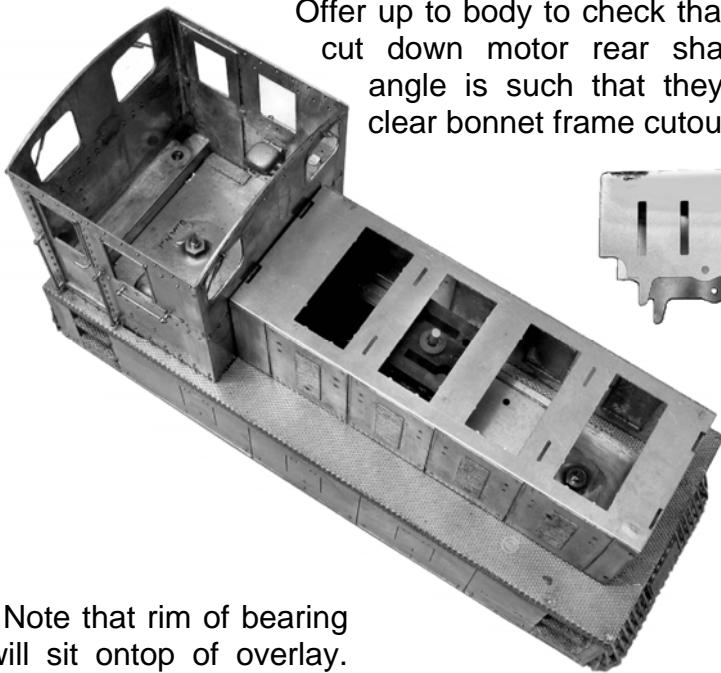
Cut off back motor shaft using carbide cutting disc & mini drill.



Check that worm gear is easy fit through hole. Enlarge hole if required.

Offer up to body to check that the cut down motor rear shaft & angle is such that they will clear bonnet frame cutout.

When clearance is correct tack solder cradle to frames & remove motor.



If desired body construction can now be completed with the confidence that a potential problem has been avoided.

Also modellers wishing to fit DCC control & sound can work out how to accommodate this.

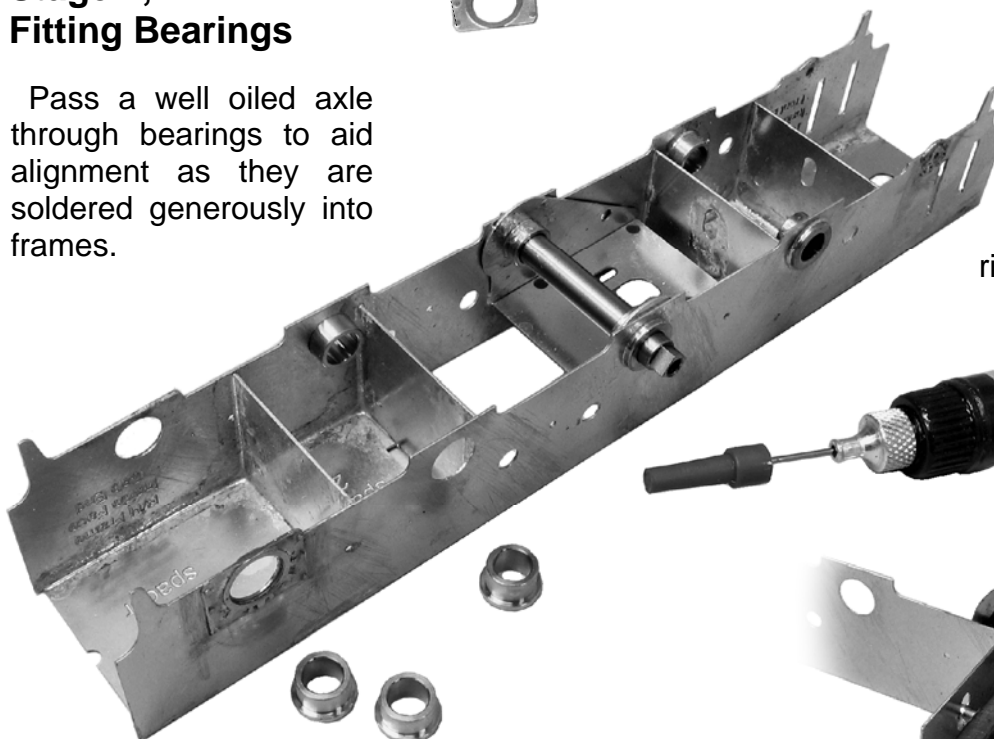
Note that rim of bearing will sit on top of overlay. This will help reduce sideplay of fly crank.



Stage 2, Fitting Bearings

Pass a well oiled axle through bearings to aid alignment as they are soldered generously into frames.

With bearings fitted the motor mounting cradle can be soldered to frames at every place possible to achieve maximum strength & rigidity.



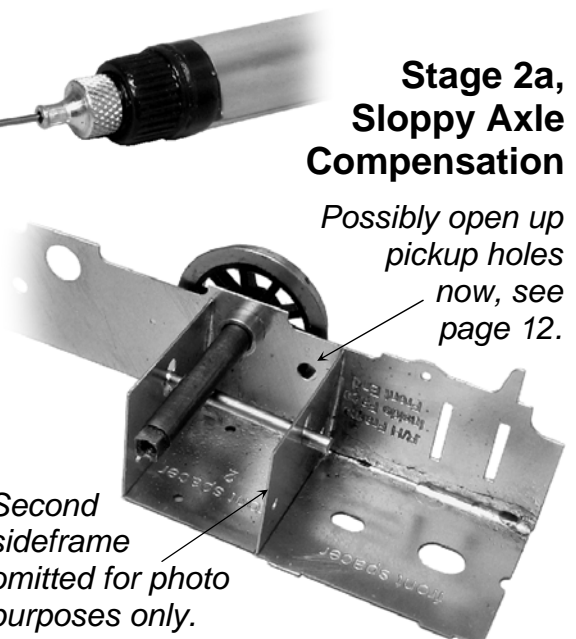
Stage 2a, Sloppy Axle Compensation

Possibly open up pickup holes now, see page 12.

An optional refinement is to introduce a little sloppy axle compensation.

With an axle passing through bearings solder a length of 2.4mm brass rod so that it bears down on the axle.

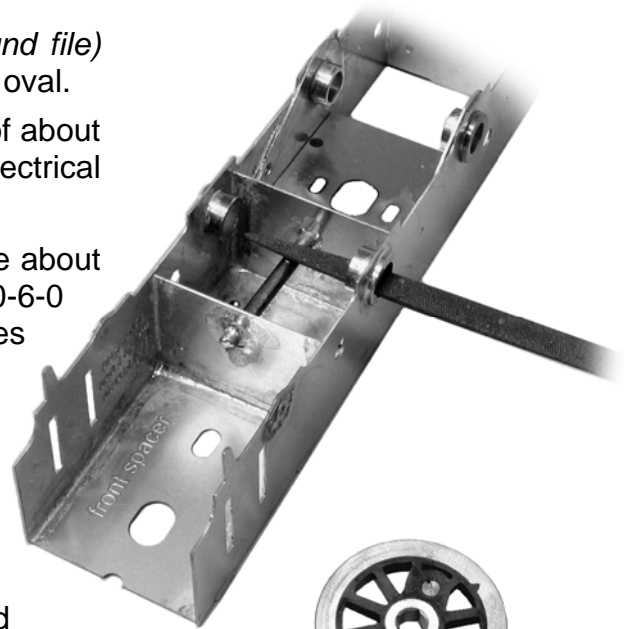
Second sideframe omitted for photo purposes only.



Remove the axle and file (*sharp/new half round file*) the top & bottom of the bearing hole into a slight oval.

Refit the axle & you should have a slight rock of about 5 thou on each side, this does wonders for electrical pickup.

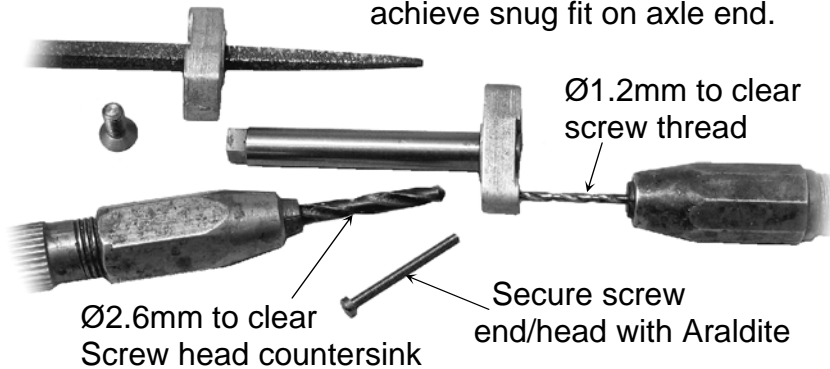
Also note that the centre axle is designed to be about 10 thou higher than the outer axles. All my 0-6-0 chassis are designed like this and again this does wonders for electrical pickup and track stability (this is allowed for on the coupling rods).



Stage 3, Flycrank & wheel Preparation

The cast flycranks are designed to be used with Slaters axle & crankpins in exactly the same way as their wheels.

Gently dress square hole in flycrank to achieve snug fit on axle end.



Drill Ø2.6mm countersink hole for crankpin screw head. The screw is intended to self tap into the plastic but I feel this provides insufficient strength.

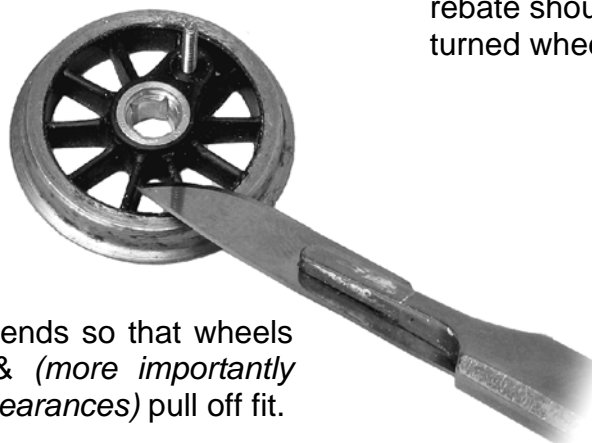
Cut nicks at joint of spoke and wheel boss on bottom four spokes (*horizontal spokes may also require slight dressing*).



So fill hole with Araldite before making last few turns of crankpin screw, so that the head is encapsulated.

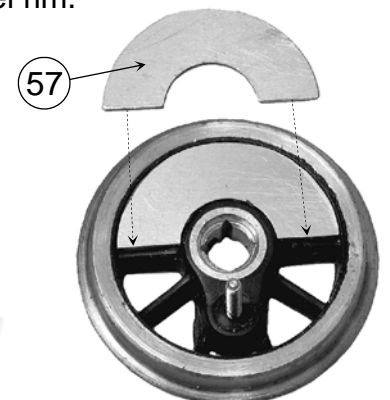


Pare away curved sections back towards nicks to leave level spoke tops.

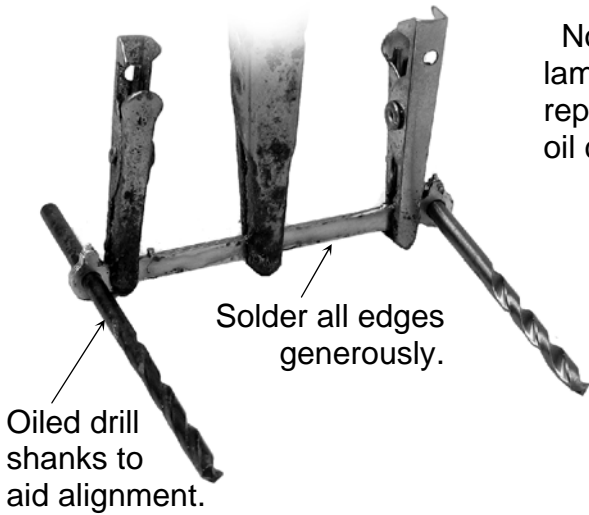


Also dress square axle ends so that wheels are a gentle push on & (*more importantly because of brake block clearances*) pull off fit.

Fit balance weights using a generous application of Araldite. An etched rear rebate should aid positioning just below turned wheel rim.

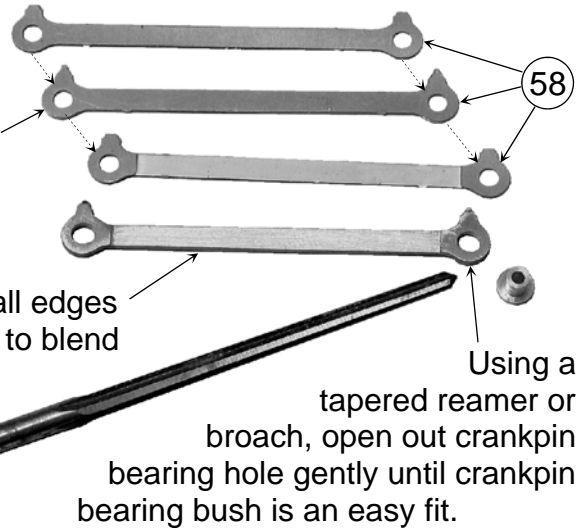


Stage 4, Coupling Rods



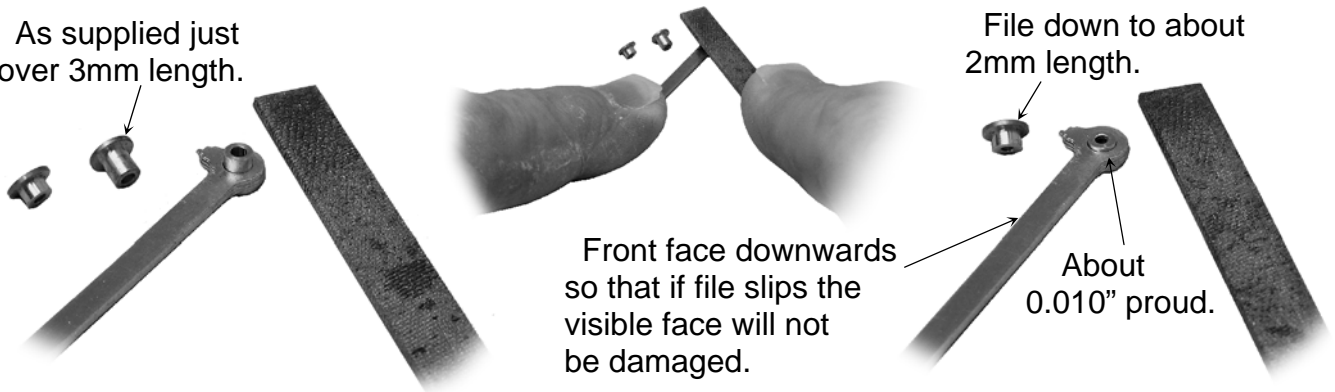
Note centre lamination has a representation of oil corks.

Note how all edges are dressed to blend into solid.



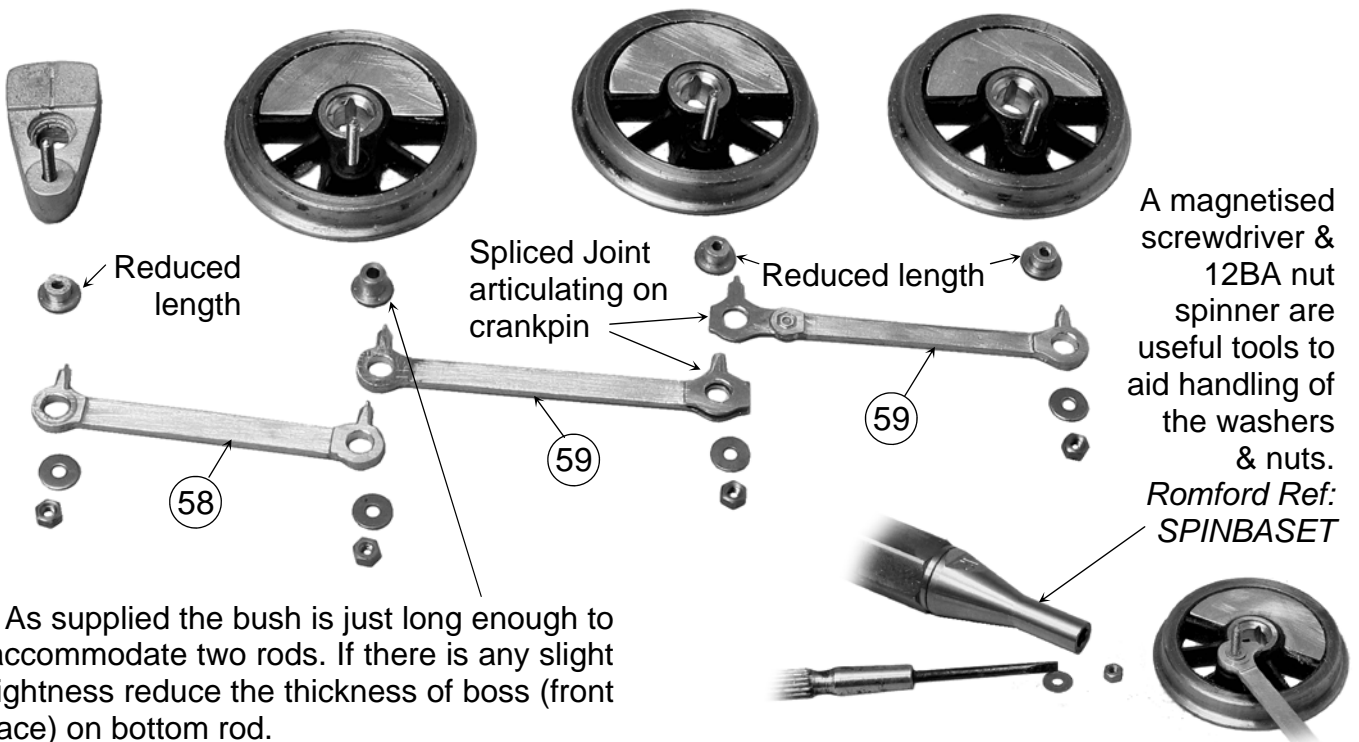
I recommend reducing the length of six of the bushes to prevent sloppy side play in the rods. Place a bush onto a block of wood then place a coupling rod face down over the bush. By pressing down on the rod with your finger you should be able to gently file the bush until it is about 0.010" proud of the rod.

As supplied just over 3mm length.



Front face downwards so that if file slips the visible face will not be damaged.

These bearing bushes are not soldered into the rods but locked onto the crankpin with a nut & washer. So it is important that they will revolve freely in the holes in the rods.



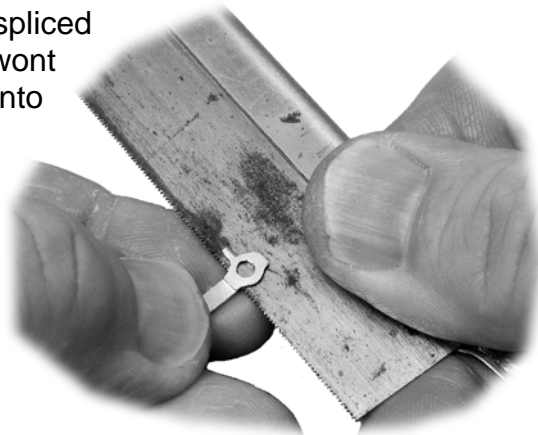
As supplied the bush is just long enough to accommodate two rods. If there is any slight tightness reduce the thickness of boss (front face) on bottom rod.

The wheel coupling rods are laminated to form a spliced joint on the centre crankpin. Chances are they won't fit together because a little solder has crept into the gap between top and bottom layers.

This can be gently removed using a razor saw, hold with fingers for maximum control of the blade. Insert

front rod to check progress.

Expo Razor Saw Set
Squires Code 140-544

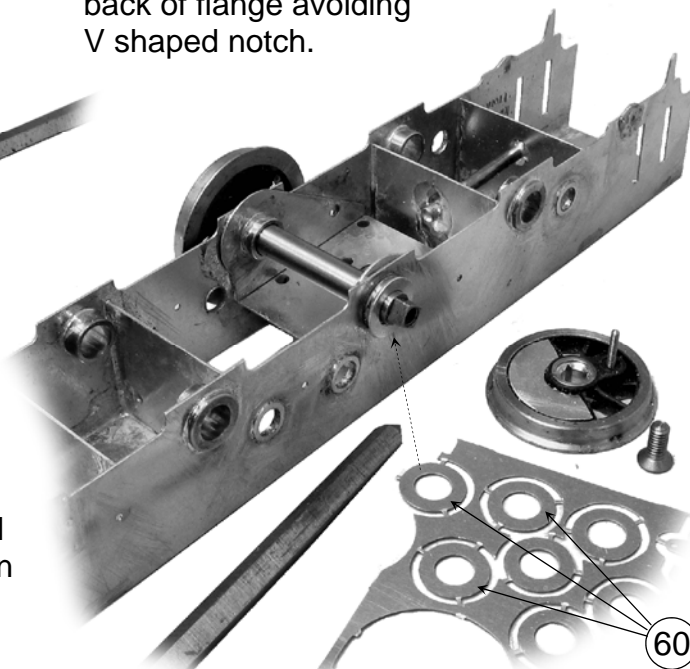


Stage 5, Free Rolling Chassis

If using Slater's plungers open pilot holes up to provide snug fit. Make up a sample pickup and using this check with sample wheel and axle that pickup point will run correctly on back of flange avoiding V shaped notch.



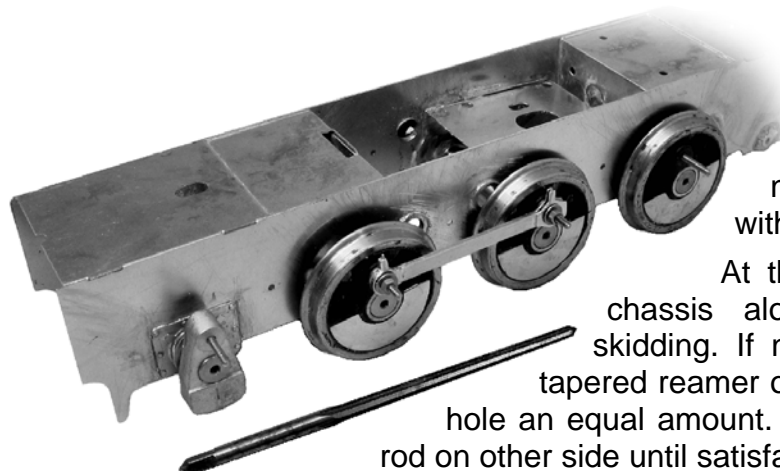
Included in packet with Slater's pickups are (use if required) etched spacing washers. I fitted them but then dressed the faces back slightly.



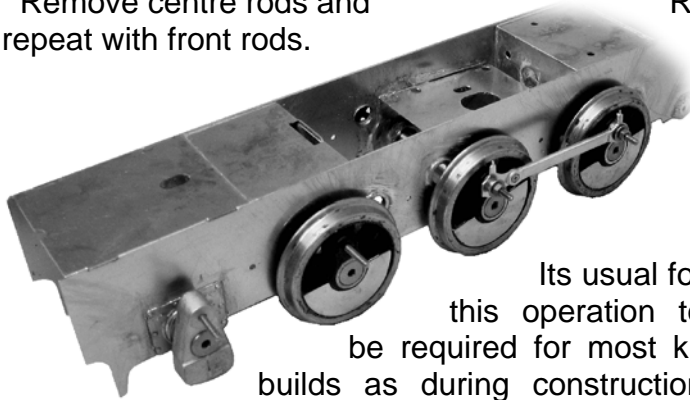
If required bearings can be eased out, using tapered broache, to allow free revolving of axle. Packing washers (full & Half thickness) to reduce sideplay can be slipped onto axle end, always a good idea for gearwheel axle, if required on others. On this build I found a full thickness each side and a single half thickness one side only was about right but you may need half thickness both sides.

Fit reduced length bushes onto the crankpin screws & fit the centre coupling rods. Gently locking them into place with the washers and nuts. Check that the wheels will turn without binding or tight spots.

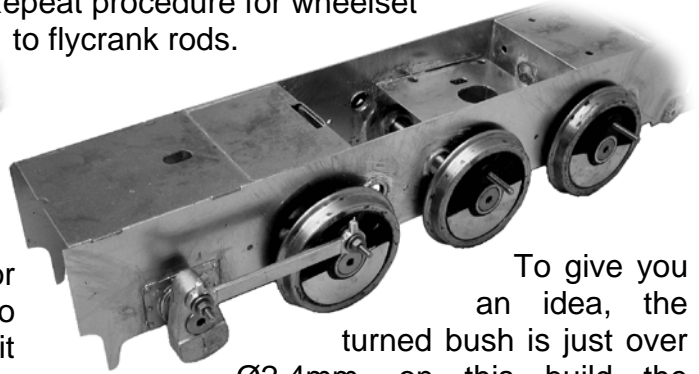
At this stage you are looking to push the chassis along the bench without the wheels skidding. If not achieved remove a rod & using a tapered reamer or broach gently open out each crankpin hole an equal amount. Try again & if required, then repeat for rod on other side until satisfactory.



Remove centre rods and repeat with front rods.



Repeat procedure for wheelset to flycrank rods.

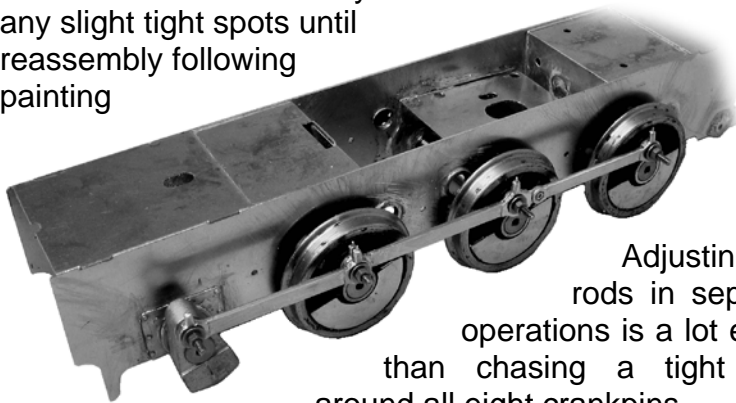


Its usual for this operation to be required for most kit builds as during construction imperfections occur with each component fitted and these tend to compound. Its not precise but you will soon get the feel for what clearance is required for this technique.

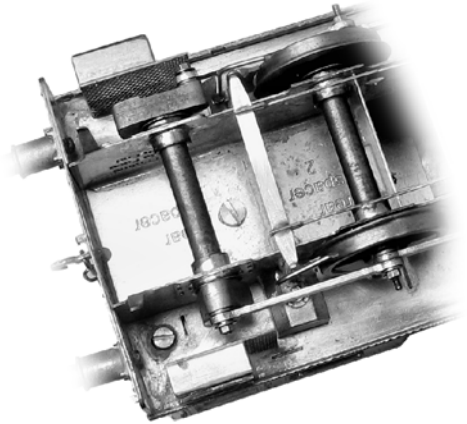
To give you an idea, the turned bush is just over $\text{Ø}2.4\text{mm}$, on this build the wheelset rods required all six holes opening to just over $\text{Ø}2.5\text{mm}$ & wheel to flycrank rods a snug $\text{Ø}2.6\text{mm}$.

Fit all rods. Hopefully the chassis will roll along with the sweetness of a Swiss Cuckoo clock. Don't worry about any slight tight spots until reassembly following painting

Cut down & dress ends of flycrank crankpins. Then check clearance for rotation between cab steps.



Adjusting the rods in separate operations is a lot easier than chasing a tight spot around all eight crankpins.

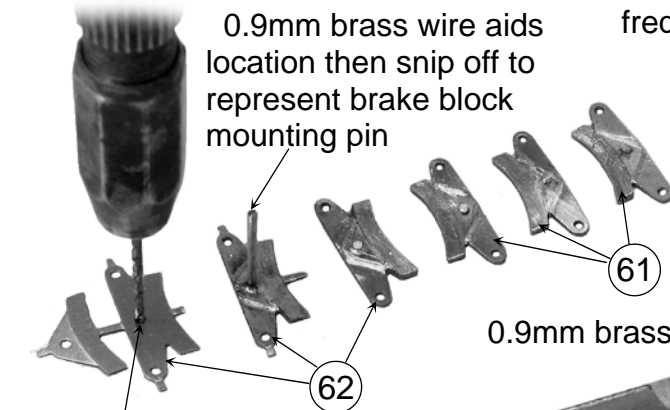


Stage 6, Brakegear

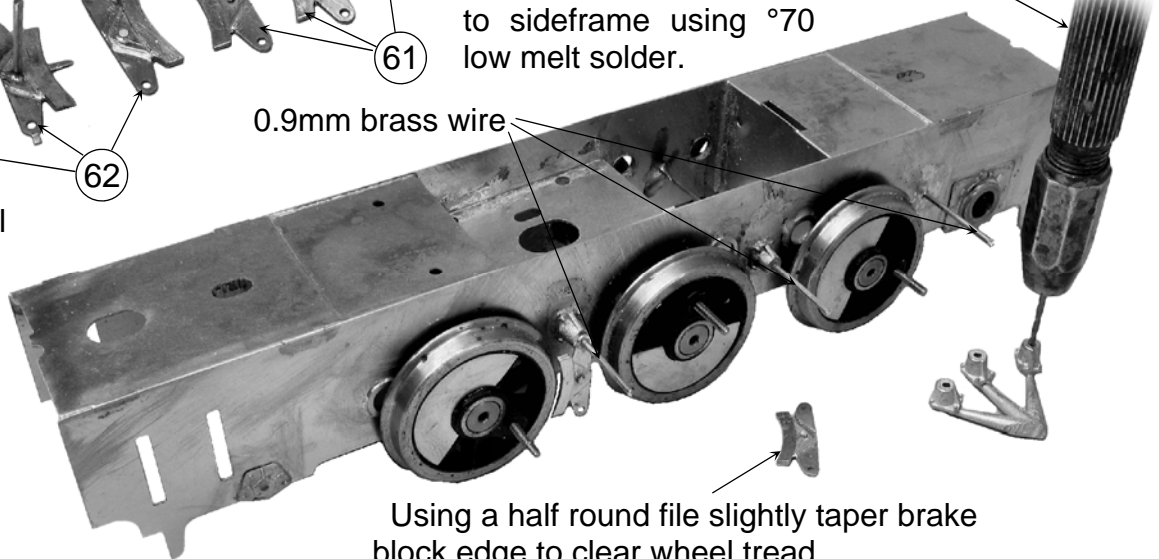
Etched brake hangers & blocks prove very durable for models that work hard on a layout & receive frequent handling. Make up three L/H,61 & R/H,62.

0.9mm brass wire aids location then snip off to represent brake block mounting pin

Drill $\text{Ø}0.95\text{mm}$ through cast mounting brackets (*drill part way through from each side*). Then separate into individual brackets & slide onto cross wires. Solder bracket base to sideframe using $^{\circ}70$ low melt solder.



Drill through all holes $\text{Ø}0.95\text{mm}$

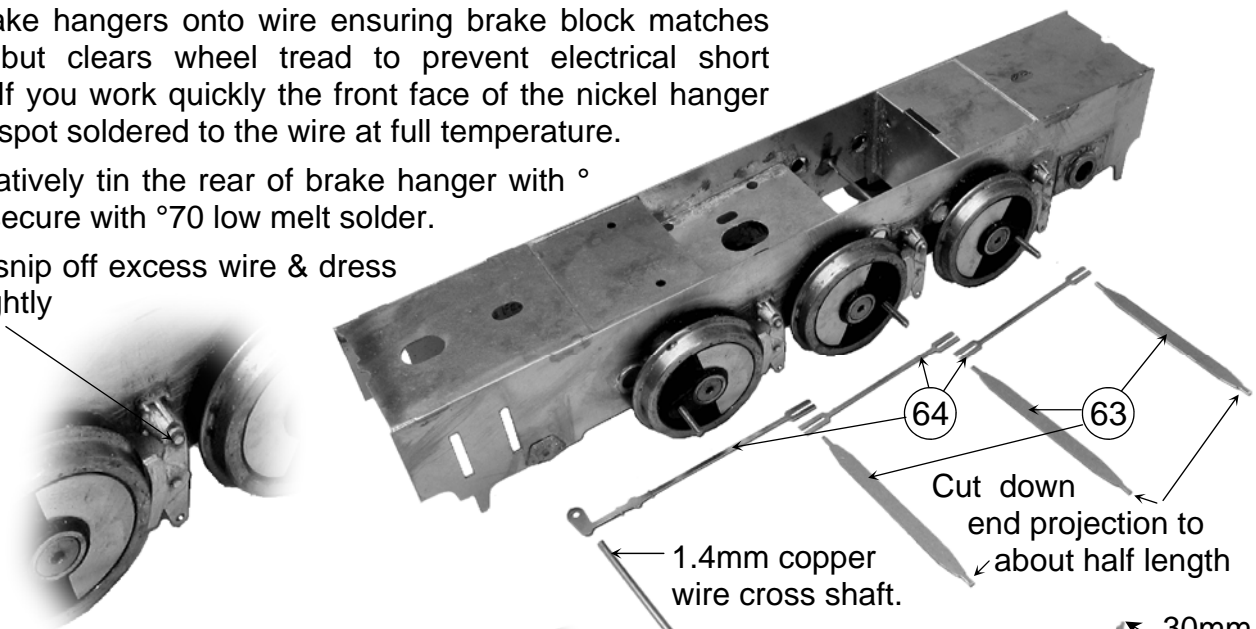


Using a half round file slightly taper brake block edge to clear wheel tread.

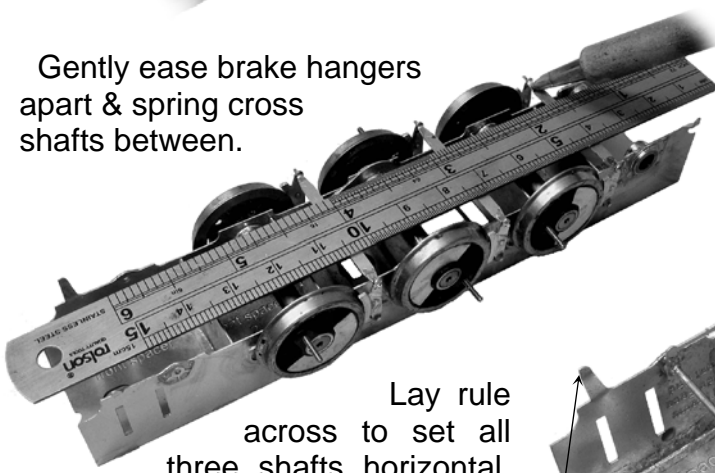
Fit brake hangers onto wire ensuring brake block matches radius but clears wheel tread to prevent electrical short circuit. If you work quickly the front face of the nickel hanger can be spot soldered to the wire at full temperature.

Alternatively tin the rear of brake hanger with ° 145 & secure with °70 low melt solder.

Then snip off excess wire & dress end slightly raised.

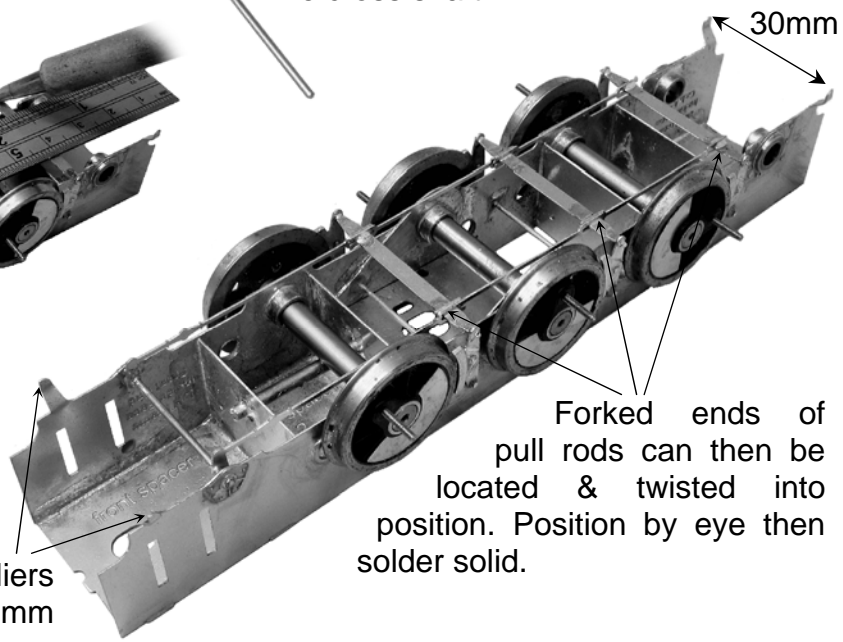


Gently ease brake hangers apart & spring cross shafts between.



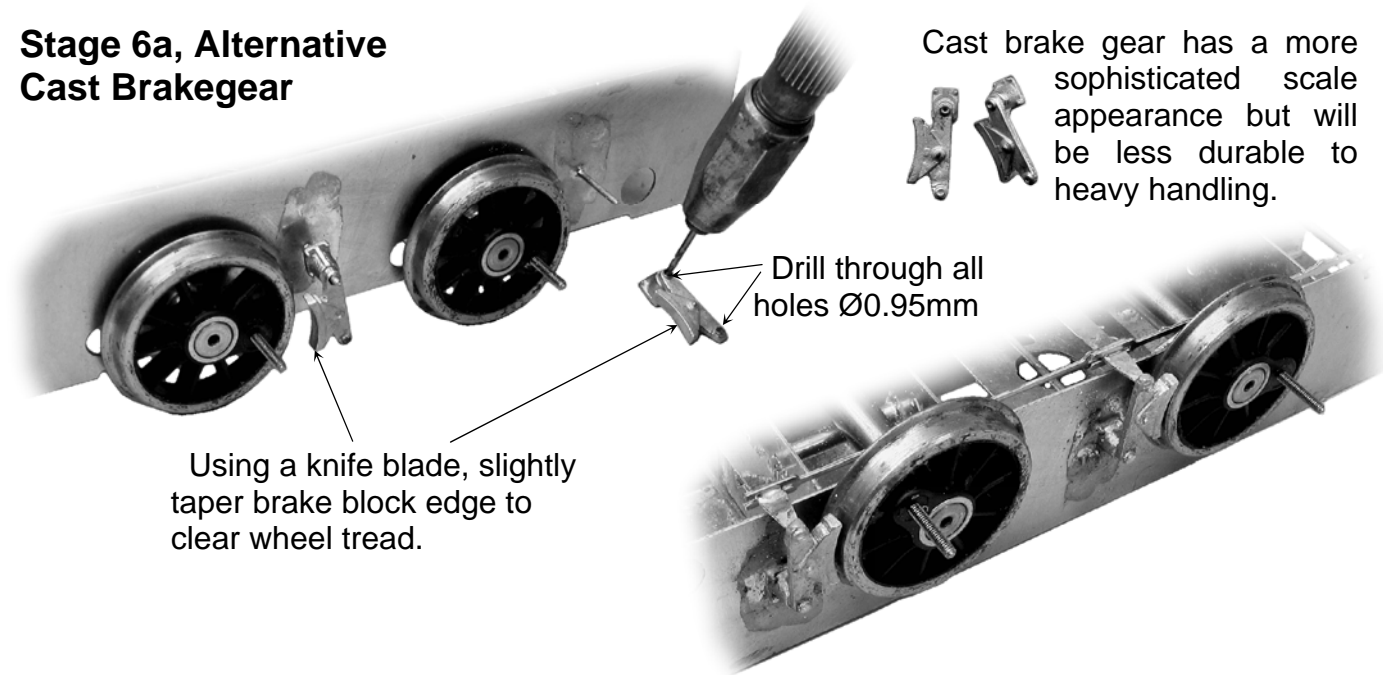
Lay rule across to set all three shafts horizontal, then solder solid.

Using two pairs of long nosed pliers bend out guard irons. About 30mm apart looks about right.



Stage 6a, Alternative Cast Brakegear

Cast brake gear has a more sophisticated scale appearance but will be less durable to heavy handling.



Stage 7, Sandboxes & Air Tank

Fit sandboxes to sideframes, scribe some marks to aid positioning. Mount slightly below top edge of sideframe (*well above as you have chassis upside down on a flat surface*) by using a thin piece of card packing.

Note how sand boxes are mounted slightly below top edge of sideframe.

123mm

Drill $\text{\O}0.95\text{mm}$ to provide firm fixing for sandpipe, I suggest a depth of hole so that the drill just breaks out the bottom, then fit boxes to sideframes.

26mm

Tin brass wire with 145° solder. Form curve in sandpipe by eye. pass wire through casting to project slightly and solder firmly with 70° .

0.9mm brass wire sand pipes, fit over length to aid manipulation & positioning, then trim to clear rail top.

Air tank supports locate into slots. Check clearance before fixing.

If extra clearance is required, file flats between supports so back of tank blends into frame.

Stage 8, Pickups & Electrics

If using wire wiper pickups I would recommend fitting pickups first then painting chassis.

If using Slater's plunger pickups, my preference, I would recommend fitting termination plate and then painting chassis before fitting pickups.

Wiring from pickups can be connected direct to the motor tags but there is wisdom in having a termination plate. Don't forget to cover with masking tape before spraying chassis.

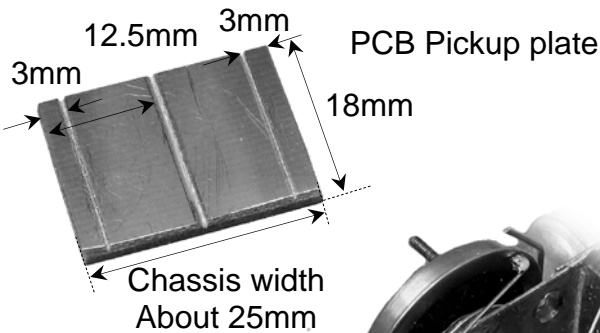
10mm

Insulating gaps made with triangular file

Note double sided PCB, wire termination plate, positioned slightly below sideframe tops.

Solder PCB plate to sideframes, inside faces.

Use packing (coffee stirrers) to slightly set termination plate below sideframe tops.



A suggestion for a wire wiper pickup system as fitted to 0-4-0 Drewry but the concept is equally appropriate for the 0-6-0 using two pickup plates.

Wire formed to pass over brake pull rods.

Wire loops filled with solder.

0.45mm spring brass wire. Fit over length to aid positioning & application of slight spring tension on wheel back. Then spot solder into position.

PCB soldered to sideframe.

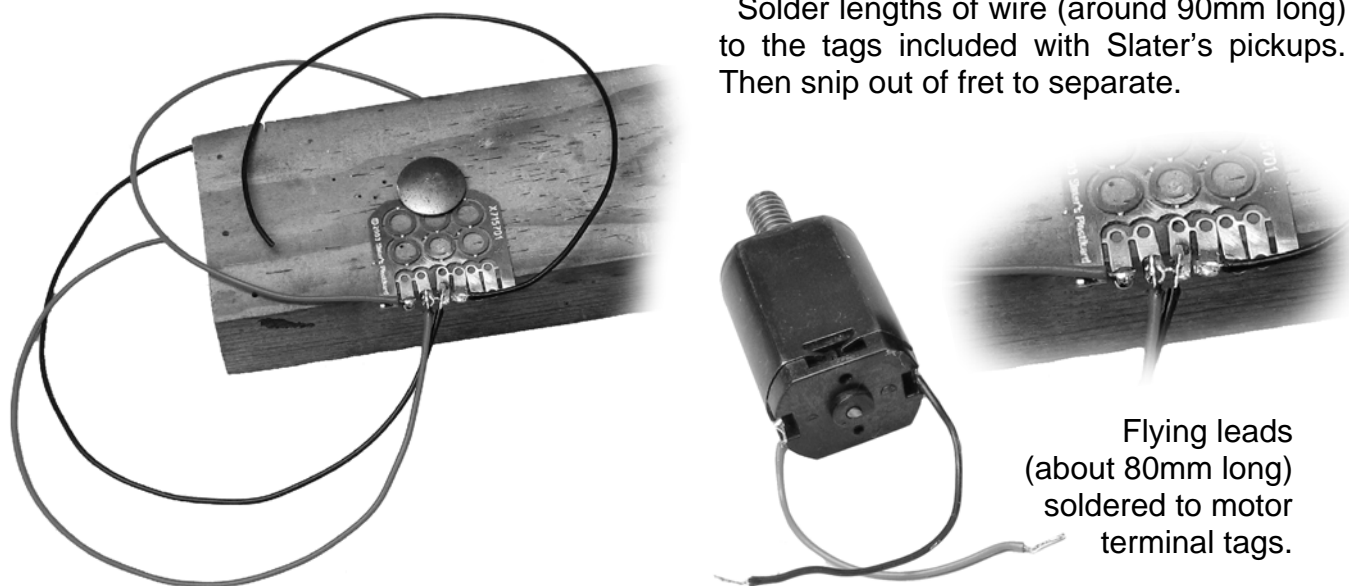
Fit electrical wire to run through holes back to motor/terminal plate. Snip off over length wire tails & tidy up. Check that there is sufficient electrical clearance to avoid a short circuit through chassis components.

I would now recommend removing wheelsets, masking off the wire loop pickup ends, & spray painting the entire chassis, including pickups, with primer & black.

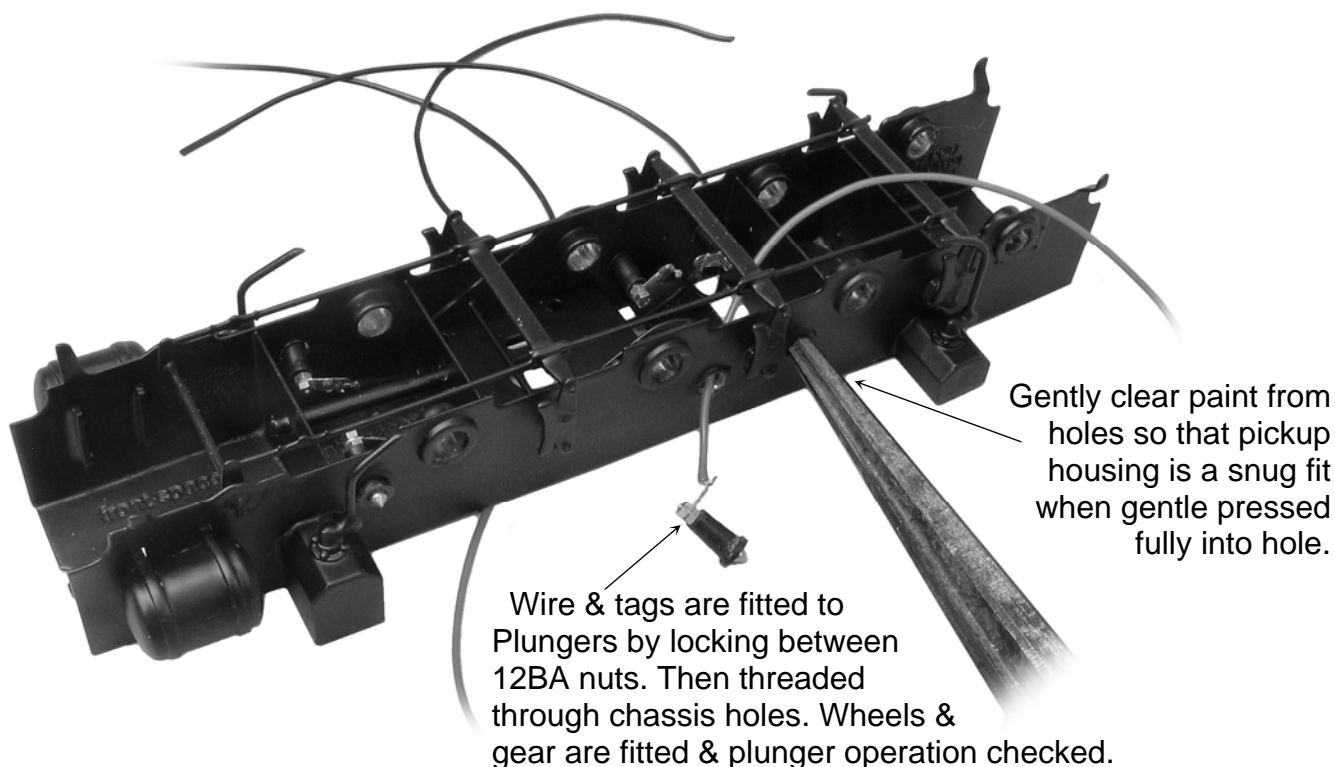
If fitting Slater's plunger pickups, my preference, I would recommend removing wheelsets and painting the chassis first. Painting is covered in more detail in my downloadable hints and tips booklet, ([www.jimmcgeown.com/Print Outs.html](http://www.jimmcgeown.com/Print%20Outs.html)) or please contact me for a free printed copy of my hints and tips booklet. This chassis has been painted using, rattle can type, car touch up spray paint from Halfords (their own brand). Undercoat with, grey, Etch Primer & finish with Matt Black.

During reassembly I would fit the Slater's plunger pickups and wiring. If you are not familiar with the techniques for fitting pickups, motor & achieving a sweet running chassis. Then on my website ([www.jimmcgeown.com/Print Outs.html](http://www.jimmcgeown.com/Print%20Outs.html)) downloadable detailed help sheets cover these operations in full detail or please contact me for a free copy of my hints and tips booklet.

Solder lengths of wire (around 90mm long) to the tags included with Slater's pickups. Then snip out of fret to separate.



Flying leads (about 80mm long) soldered to motor terminal tags.

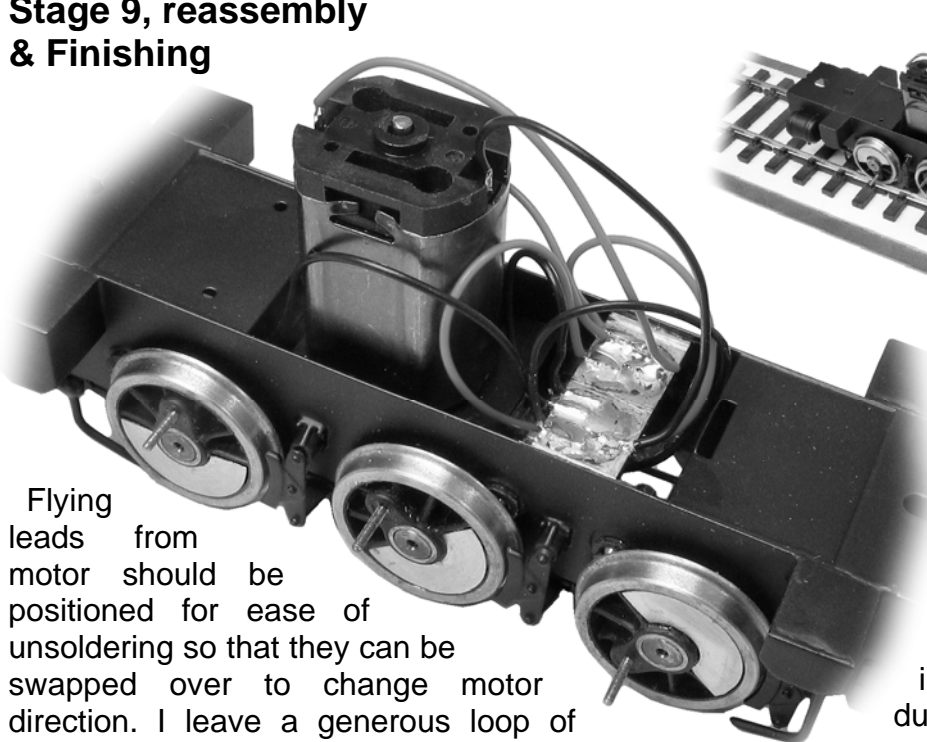


Wire & tags are fitted to Plungers by locking between 12BA nuts. Then threaded through chassis holes. Wheels & gear are fitted & plunger operation checked.

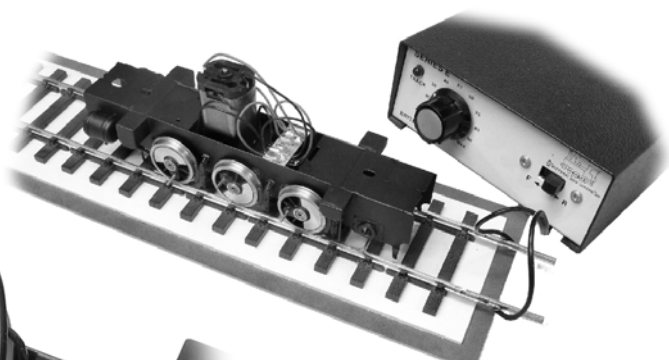
Gently clear paint from holes so that pickup housing is a snug fit when gently pressed fully into hole.

Secure pickup housings with a dab of Araldite applied using a match stick onto the inside face of the sideframes. Allow Araldite to fully harden and secure pickups before manipulating wire and completing the wiring

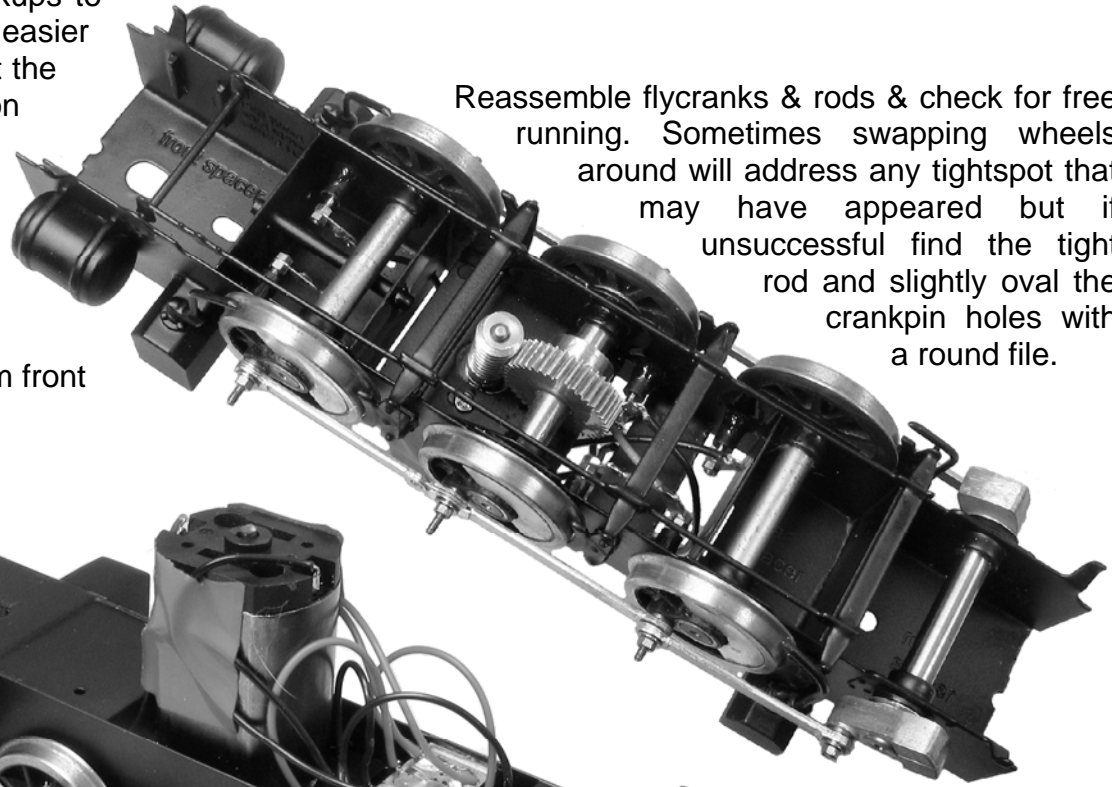
Stage 9, reassembly & Finishing



Flying leads from motor should be positioned for ease of unsoldering so that they can be swapped over to change motor direction. I leave a generous loop of wire from the pickups to make handling easier when soldering at the PCB termination plate.

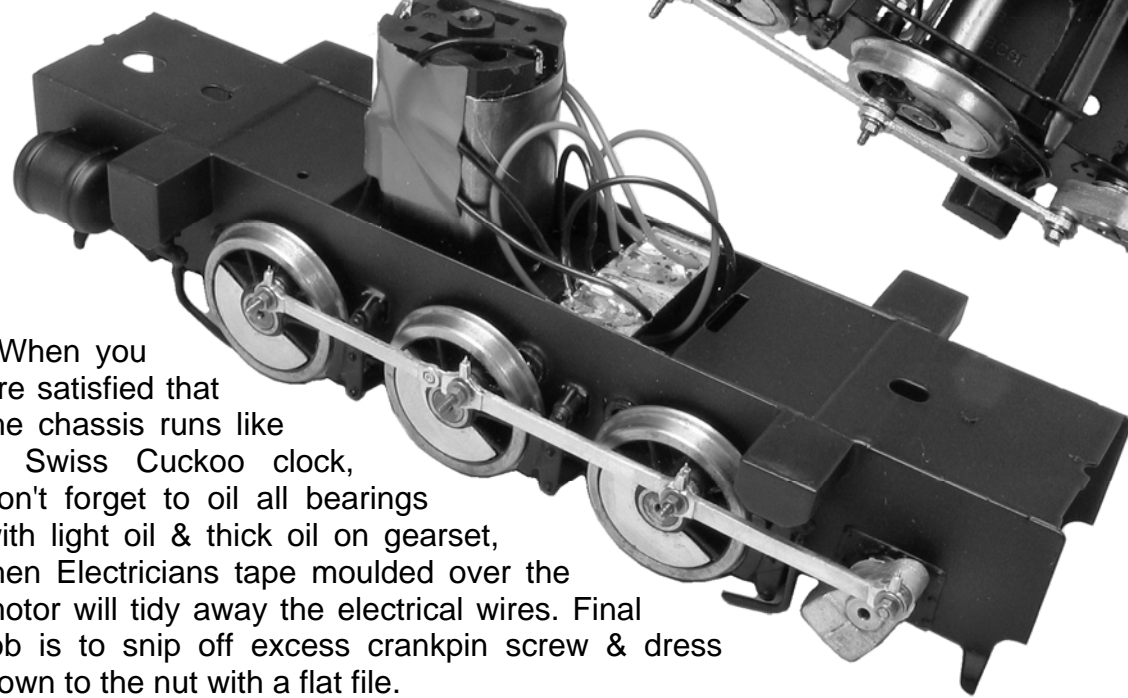


It's a good idea to check that all pickups are effective by pushing along a powered test track with the motor revolving at slow speed. Lift one end to check Individual wheelsets. Any hesitancy will indicate a break in contact during the wheel revolution.



Route wires from front pickups through holes in chassis spacer.

Reassemble flycranks & rods & check for free running. Sometimes swapping wheels around will address any tightspot that may have appeared but if unsuccessful find the tight rod and slightly oval the crankpin holes with a round file.



When you are satisfied that the chassis runs like a Swiss Cuckoo clock, don't forget to oil all bearings with light oil & thick oil on gearset, then Electricians tape moulded over the motor will tidy away the electrical wires. Final job is to snip off excess crankpin screw & dress down to the nut with a flat file.