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BUILD NOTE

ROD Pershing 2-8-0 Build - 09/10/15

Most people thinking of WW1 and Baldwin engines immediately call to mind the trench railway 4-6-0 tanks made by the company, of which several have been preserved in the UK. However, their standard gauge 2-8-0 'Pershing' class, was ultimately the more numerous. Apart from the original saturated steam version built for the British army, a superheated version was developed from this for the Americans. Several of the latter survived both world wars in Europe, and apart from a couple of engines in France, there is even an operable example in Romania.

The model is based upon the DJH Modelloco kit - which is for the French and Belgian superheated examples - and features jig drilled and tapped mainframes and other components. A nice touch is the keeper plate chassis system, and the double reduction gear drive as standard for high torque at low speeds. Rather than a blow-by-blow account, this page is going to be more of a 'photo essay' of milestones in the build.

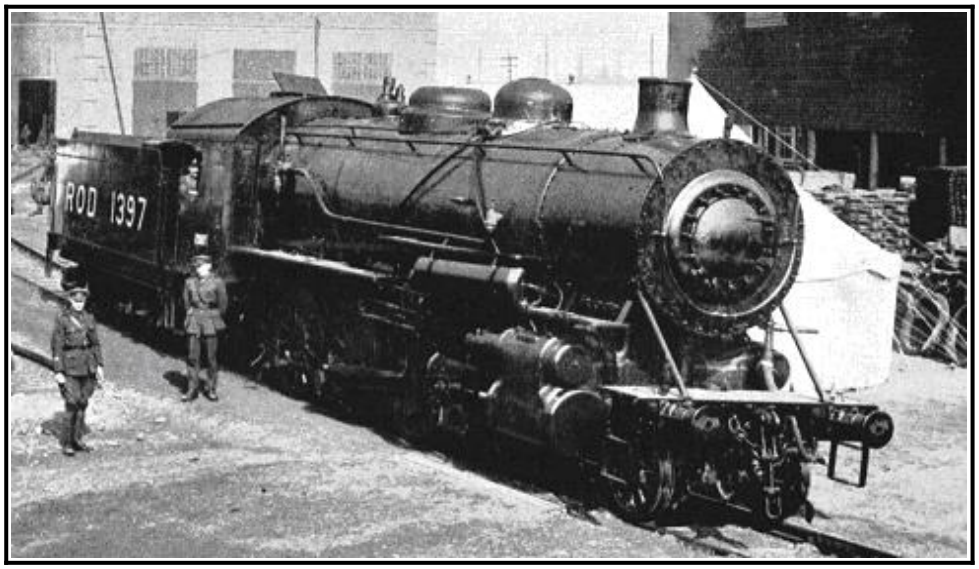


Photo of prototype Railway Operating Division WW1 'Pershing' as supplied to me by the client.

Chassis body assembly

The chassis needs to be tackled first with any American engine - or indeed anything without a convenient footplate - because without the wheels on the track or a level surface, there will be no way to check whether cab, boiler and fittings are level or square.

Chassis assembled with Walschaerts gear and checked for free rolling on the level..

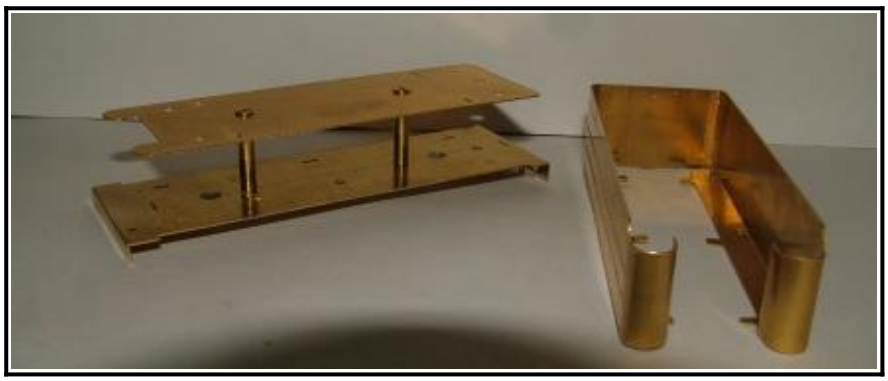
The boiler to cab joint is soldered with low melting point solder, as is the cab roof, to make for a structurally rigid 'backbone' to the engine. An M2 brass insert was made up to replace the existing tapped mounting hole under the smokebox.

Electrical current collectors on loco. Note the brass slotted 'pegs' in the copper clad paxolin that hold the phosphor bronze strip wipers.

The idea of making the engine self-contained for current collection means that there is no need to bother with the DJH 'American' style positive loco, negative tender and insulated drawbar arrangement. Next job is to apply the power and see how it runs....

Tender construction

Talking of tenders, this is quite a complex fold and tab construction, made the more problematic by the fact that you cannot fold the 'base' tabs up until the corners have all been rolled around a former. (I use the nearest undersize drill shank to the finished radius for these.) The kit has a pair of whitemetal inserts to go inside to support the tender inner top, but these are of course no use if you want to solder the structure together, so I opted to make up a pair of tapped spacers to hold everything at the right distance apart.



Tender wrapper all folded ready for soldering to tender underframe. Note the screwed spacers used to hold tender top at the right height for assembly.

If I was doing one of these again, I would probably make a 1mm thick false bottom for the tender tank - by tracing round the kit's top part as a pattern, then assemble the superstructure around this as a separate unit. The underframe being in due course screwed up to this later.

With everything together into a more or less rigid 'box' the detailing could begin. One problem was that the footsteps are etched into the side beams of the underframe, and need more than the usual amount of care to stop them from being bent during the rough and tumble of assembly. The fold-up angles for the rear of the tender provided by DJH also prevent the back of the water tank seating flush on the etched platform - luckily (?) these broke off by themselves after several trial fittings, so I did not bother replacing them.

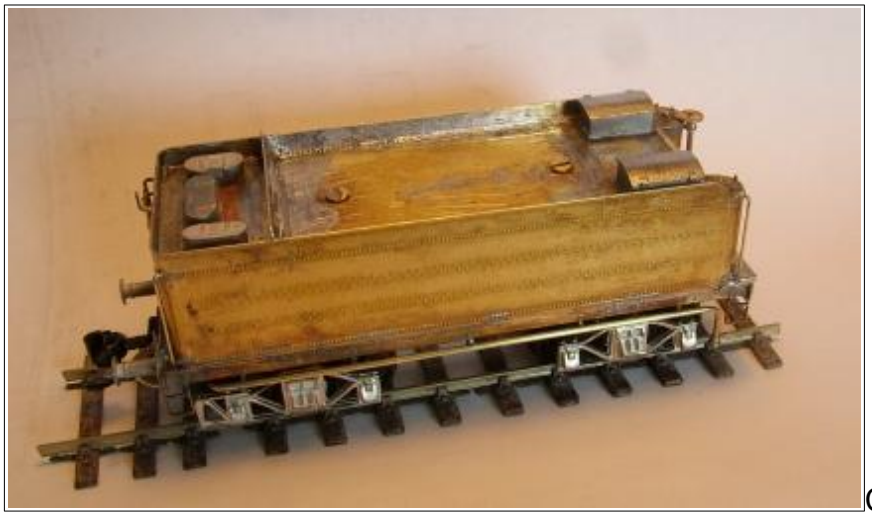
T*ender inverted. Note the Kadee coupling mounting pad, and the adjusting screw - secured with Loctite - to set the tender level and prevent the rear truck (bogie in Anglo-Saxon parlance...) from wobbling around its central pivot.*

On the original ROD engines, there is a coalspace divider a little way forward of that on the French rebuilds, and none at the front. Pictures of the engines in service during WW1 show the coal piled high right up over the two toolboxes.

As is now my usual practice with kits that employ whitemetal, I now use Loctite superglue to secure these parts as being a lot less troublesome than low melting point solder. As a point of note, it is often useless to try to clean up any moulding lines on such castings with anything other than a scrape of a modelling knife blade; the casting process invariably produces a 'stepped' part, and trying to correct this on small components only makes this error worse in the smaller scales - at least that's my excuse!

Rear view showing just the three ROD lamp irons, and a single air pipe - relocated from below the kit's buffer to clear the swing of the Kadee couplers. Buffers are the kit's items, unfortunatley not of the correct pattern, but at least now have the central hole that shows up in the pictures of the real thing.

Instead of the Continental 'loop' coupling, this engine will have Kadees, which meant adding a slab of approx 3mm thick brass plate to the base of the tender to ensure that nothing comes adrift later in this locomotive's life.



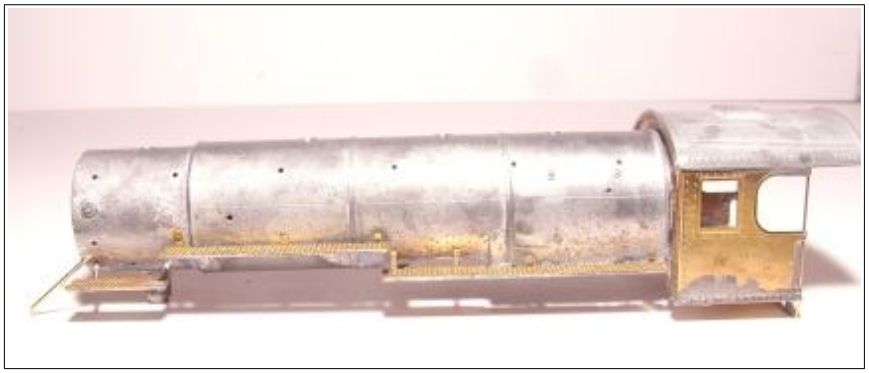
Completed tender. Note the large pipe along the RH side: this was soldered on the the supports using clamps made from cut up paperclips and bent into 'chain links' with the break in the chain being filed into a 'V' so as to hold the round section brass bar. Coalspace screws to be covered with driop-in coal load.

Front end detailing

One of the problems the builder of American -type locomotives needs to consider, is the way that there is no logical break between a model's superstructure and the chassis, in the form of the running plate that is found on most English or European engines. The foot boards on most modern US locomotives are also multi-level, except on sem-streamlined designs such as the CPR and CNR pacific and Northerns, and on a model really have no visible means of support. RTR manufacturers of course now get around this by moulding

the footboards integrally with the boiler - or half-boiler, if they are feeling conscientious!

DJH provide etched parts for these, but they are located by very small 'pips' into corresponding 0.5mm holes that need to be drilled into the boiler casting. In the case of this engine, each board also needed to have a chequer plate overlay added - from the Scale Link N scale range. The front end foot boards also needed to be relocated further down the smokebox, to match the non-superheated ROD Pershings which had no outside steam pipes.

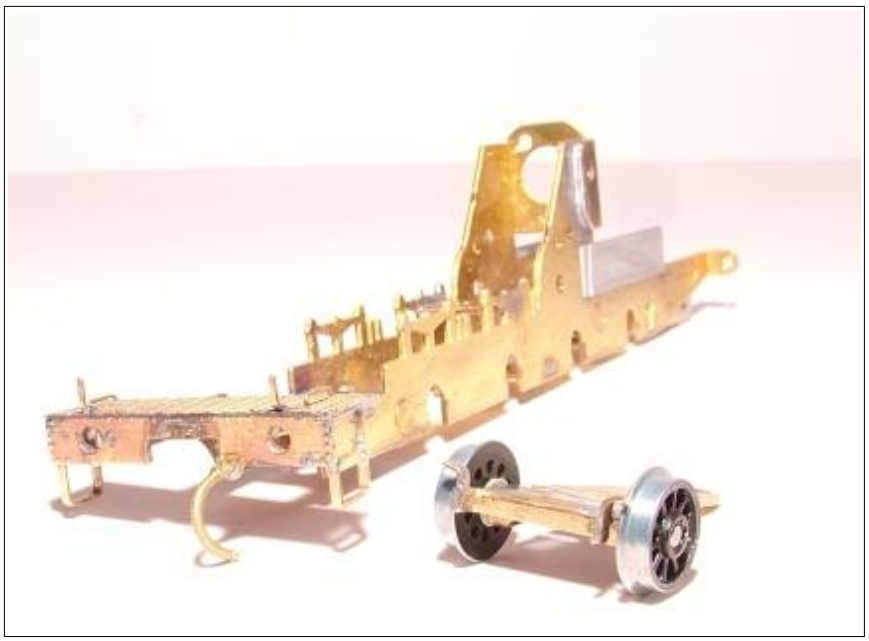


Foot boards affixed to boiler. New Chequerplate overlays added to all to match those fitted to smokebox pair on account of the fact that the kit's components are not fully etched in the location of the outside steam pipes, which are not fitted to this model.

To ensure that the whole arrangement would be robust enough to stand repeated handling, the foot board boiler mountings were beefed up with soldered on straps once their correct height had been determined with the aid of surface plate and scribing block. I dispensed with the etched on brackets for the smokebox boards, and made new securing straps from 1mm brass rod, filed flat on the top surface to appear 'strap-like'.

Underside of Pershing boiler. Strapping and brackets soldered with low-melt solder to undersides to beef up the kit's locating arrangement.

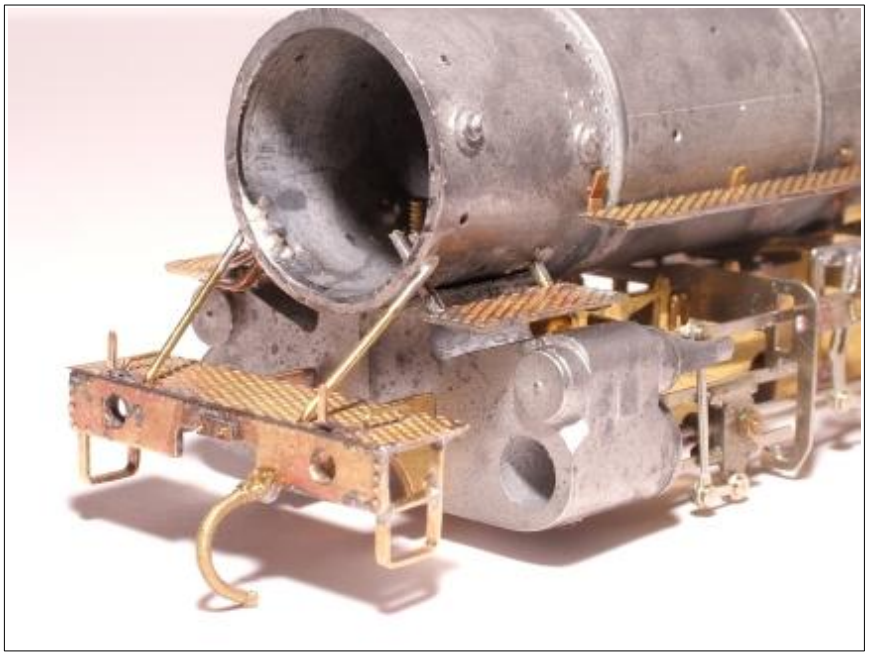
Some nifty soldering with the aid of clamping wires - made from paper clips - was required to produce a sufficiently strong front buffer beam. Glue could not really be used here, anything in this area will take quite a hard knock in the event of a derailment. The DJH etched steps provided with the kit are very delicate, so these were replaced by ones bent up from 0.30mm strip, which whilst a bit on the heavy side, are I think an acceptable compromise.



Chassis front end complete with air pipe added, but awaiting buffers. The pony truck needed to have its pivot point moved 1mm further forward to pull the front back level with the front of the buffer beam. And yes...I know it is upside down!

The characteristic stays from smokebox to buffer beam - or should that be pilot? - are fixed to the smokebox, and locate in holes drilled into the top footplating. Because of the risk of wandering - and the chance of the drill breaking through and then catching on underlying brass components - this is very much a pin-vice job rather than something that can safely be entrusted to the pillar drill

For what it is worth, most of the low-melt soldering for the support brackets for the front footboards and the stays was carried out from inside the smokebox to avoid the chore of trying to get a decent finish on the outside of the whitemetal casting. The inside locating flange of the smokebox front being cut out to clear any protrusions accordingly.



Complete front end with boiler temporarily assembled onto chassis and cylinder block. Constant reassembly and dismantling is necessary when building any model, both to check clearances and also to clean all trace of flux from components after soldering.

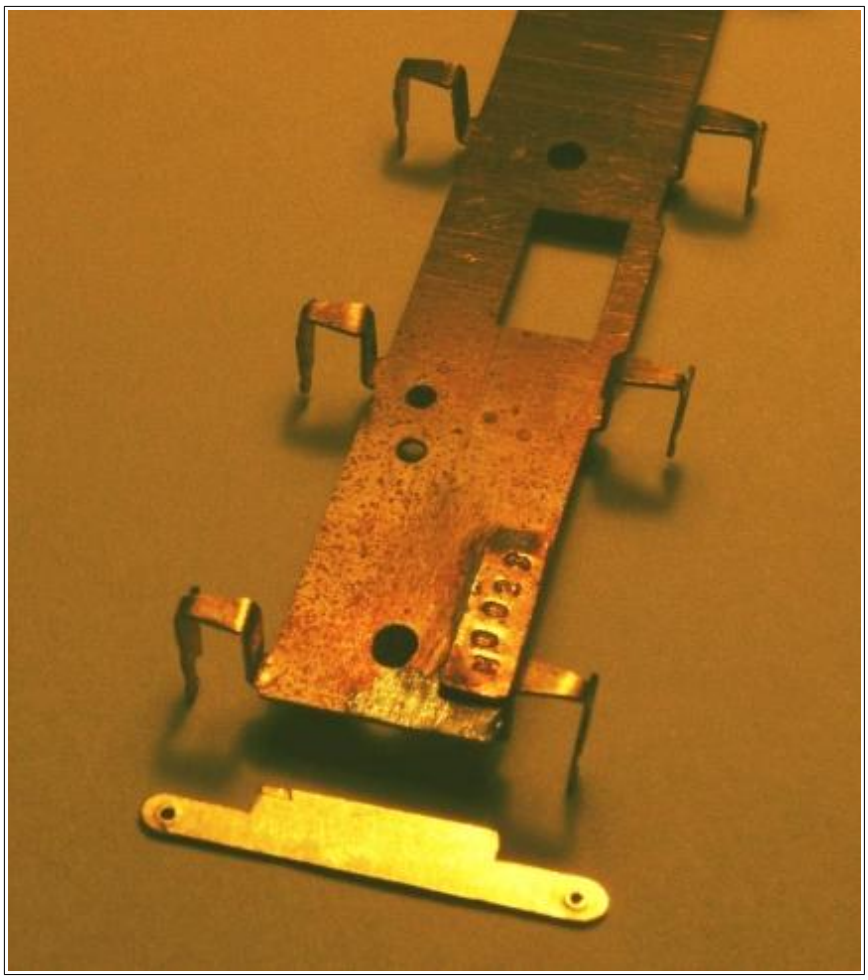
Notch in the buffer beam is for Kadee coupler.

Pipework and handrails

American locomotives tend to have their injectors sited prominently either side of the cab above the footboards, and the Pershing is no exception. I used the lost wax castings that came with the kit as being acceptably near the prototype's, first drilling 0.75mm holes where the various water, steam, overflow and feed pipes would be fitted later. The pipes themselves are brass wire rather than my usual choice of fusewire, because there are some long unsupported runs on this engine, and brass is less prone to marking as it is bent to shape with the pliers than soft copper. Loctite 401 superglue applied with a pin is used to secure the various pipes to the engine superstructure and the injector casting. The various pipes really need to be made to fit 'on the job', and the risk of marring the job with low melt solder at this stage of construction is I consider too great.

However, I did use low-melt to fix a pair of rectangular washers about 1.5mm x 3mm each side, pierced with holes for tender feed and injector overflow, beneath the footboards. This makes for a stronger job I feel than just using a fillet of solder where the pipes run through the footboards.

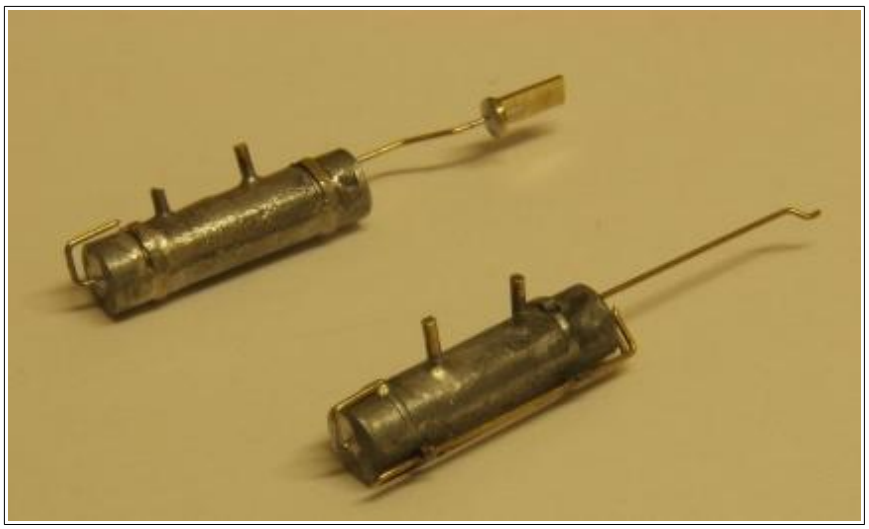
Injectors fitted, and tender water connections in the process of being bent up. Just visble behind the rearmost brake hanger, is the injector overflow pipe bracket soldered to the chassis keeper plate. This should keep them safe in case of derailment or trackside obstruction.



Cruel enlargement of chassis bracket for injector overflow pipes before soldering to underside of keeper plate.

Routing the various pipes for the Westinghouse system proved a bit problematic, especially in the case of the air tanks and their associated cooling coils. In the end, I compromised by securing the main air line from the pump to the boiler proper, and adding short stubs of wire to the individual tanks to represent the air feeds. Note that the Westinghouse system has two tanks, one fed from the other, with at least 25 feet of scale pipe run before the first tank, so as to allow the compressed air to radiate some of the heat it has acquired during compression in the pump.

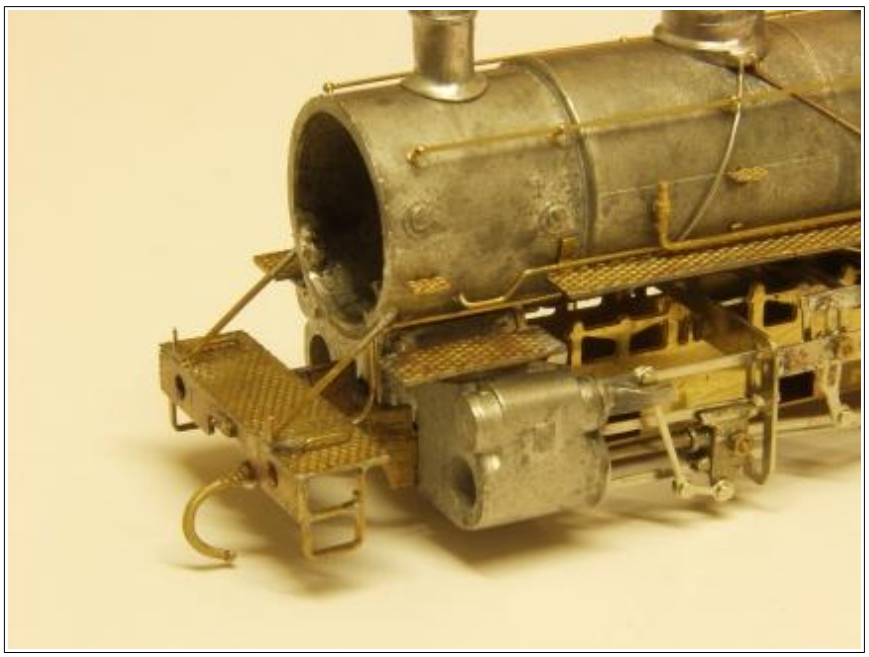
Due to the position of the reach rod on RH side it did not prove possible to run the air line from the tank all the way back to the driver's brake valve in the cab, so another compromise was in order here by connecting the RH air tank direct to the equalising reservoir. This in itself is a brass turning rather than the whitemetal casting provided by DJH, filed down to half its depth to sit atop the boiler side footboard



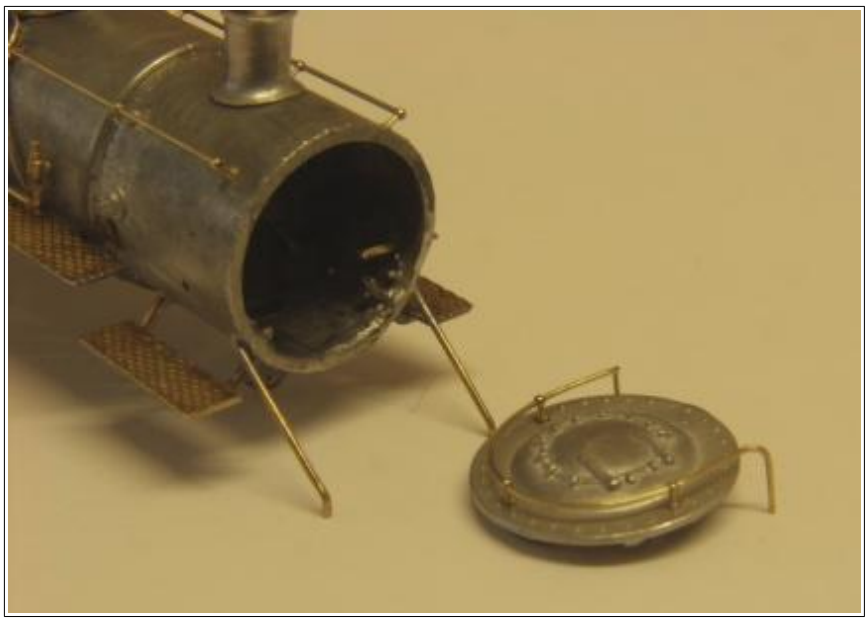
Air tranks modified from DJH items to include mounting 'pegs' and made as self contained units complete with pipework. Top is RH side; nearest is LH with cooling coils for feed nearest the pump.

The air tanks have had the original cast on detail removed, and new strapping added in about 0.15mm brass strip. These were cut over-long, with final bending up of the brackets to suit the underside of the running boards taking place once the complete assemblies were offered up to the superstructure.

All the pictures of these engines I have seen show clearly a curved pipe dropping from smokebox to the front platform, which appears to be the main train air brake line. Fixing this to the smokebox would have meant having a rather delicate and easily-bendable piece of wire hanging rather vulnerably in the wind during both final construction and any subsequent removal of the superstructure. I therefore attached this section of pipe run with low-melt solder into the angle formed by the underside of the front platform and chassis, leading the free end up to locate into a hole in the lower edge of the smokebox.



Front end revisited - this time with steam exhaust line from air pump and also train air line dropping to front platform. Footsteps for sandbox filler and smokebox top added.



Smokebox front with handrail. Once assembled, join with the boiler handrails will be hidden in first handrail knob on smokebox side.

Finishing touches

Whilst sustantially complete, there still remained a few jobs to be done before the Pershing could be classed as ready for the paint shop. I could have just stuck in the backhead with a puddle of Loctite 401, but as I have an abhorrance of things dropping off sometime in the future - however remote and unlikely - decided to do the job properly with a tapped plate and a screw through the cab footplate. Likewise with boiler footsteps on the smokebox and for the enginemen to have access to the sandbox filler. The original etched parts having locating 'pegs' of 1mm wire soldered to them, 'thinned' by filing them flat on their undersides to make them less obtrusive.

Backhead with soldered on tapped bracket for secure fitting inside cab.

Track testing

With the majority of major subassemblies complete, it was time to track test the almost completed locomotive. I always do this before painting, as there is invariably a degree of 'tweaking' to the mechanism at this stage, and if any modifications are needed, there is no risk of marring the finish.

One thing that did indeed emerge was a desire on the part of the third, driven, set of drivers, to 'climb out of mesh' with the double reduction gear that DJH have designed into this kit. This was due to the keeper plate not being snug against the brass axleboxes - even though I had filed the bottom of the chassis doen flush with the frame spacers. The solution was to add two bits of brass strip underneath the third axle on each side of the gear opening, so that the axleboxes were held tightly in mesh. Problem sorted!

Though the chassis will go around 18 inch radius curves, the front overhang and the position of the front Kadee coupler draft gear box, will tend to tip the pony wheels off the track, so my guess is that 24 inch radius would be a safer curvature for normal running. I could have mounted the coupler on the pony, but at the expense of losing detail from the front buffer beam - air hoses and the like - and having to provide for springing to keep the wheels on the track in the event of the locomotive having to propel its train.

And here's one I made earlier...the completed locomotive (sans paint) undergoing track testing.

Paint and preparation

Or should that read 'preparation and then paint'....? Unlike solder, or even modern adhesives that can take around a day to reach full strength, paint, I find, is something that cannot be rushed. Rather than believe what it says on the tin, I like to leave each coat at least a couple of days at least to dry - prefereably assisted by a period of hibernation within a card box placed in a warm airing cupboard, after first letting the majority of the solvent to evaporate off after about three hours.

I am now adopting a regime of first bathing major body components in cellulose thinners, or else going over with fine emery, a small suede brush with brass bristles or a glass fibre scratch pencil. This removes any grease on the metal to be painted, and from then on, such components are only handled with a gloved hand to avoid subsequent contamination from oils on the skin.

So far, I am playing it safe - and being lazy - by using for a primer and black basecoat automotive acrylic paints from a spray can. This is misted on almost, from a distance of between four to eight inches away, with a series of fast passes, starting and finishing the spray with the nozzle pointing clear of the model. The idea being to provide coverage with a build-up of several near dry coats, rather than one heavy application which might obscure some of the more delicate detail.

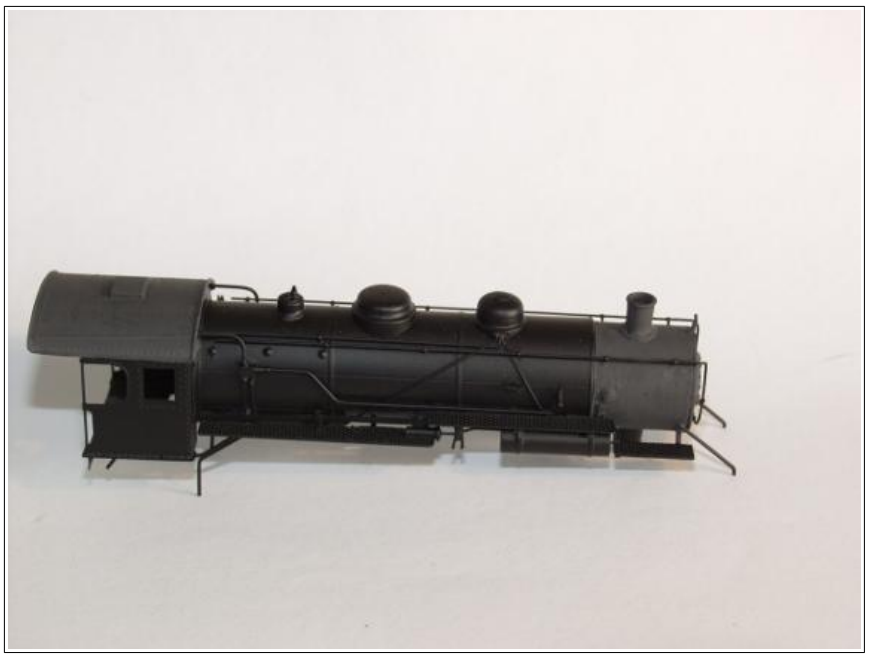
Small and more intricate subassemblies - wheel sets, cylinders, valve gear unit - are brush painted with an etching primer. On this model I have switched to Pheonix Precision's primer, which goes on very thin and dries nearly transparent. Mix up a lot less of the the activating thinner and the etching primer that you think you will need - a little goes a long way!

Thin coat of automotive primer applied from spray can. The photo was taken whilst the paint was still 'wet' in places, but will dry off to a matt finish in an hour or so.

Once the etch primer is dry, the first colour coat is applied to these subassemblies with a brush. I find that the key here to get an even finish is to work the brush with a mixture of a stippling and downward strokes. Any strokes that remain visible when dry, will look like oil or water streaks.

Lately, I am finding myself using an jeweller's eyeglass to check for blemishes and missed areas, and as a result am finding myself going back with a small nearly-dry brush to 'touch-in' areas that have got overlooked first time around.

A particular problem with the Pershing, was the need to match the main sprayed colour coat - which is a borderline satin/matt 'Rally' black - with brush painted areas of the model. For what it is worth, I have found that Humbrol's 'Hull Black' no. 85 is a close enough call, especially when thinned right down and applied almost as a wash.

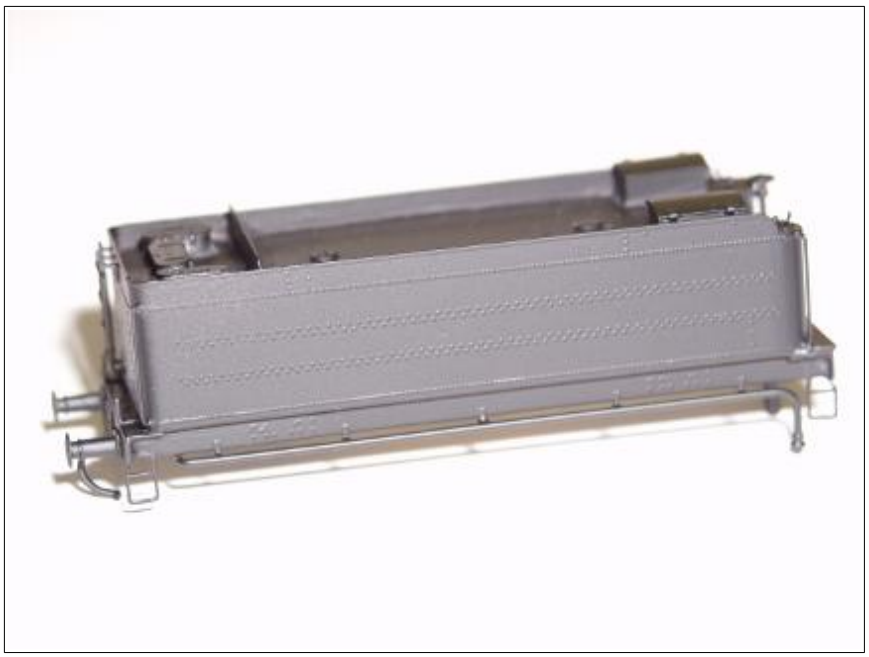


The locomotive body in main spray colour coat. Smokebox and cab roof have been picked out by brush in flat black.

Mechanical components and those which need to transmit electric current, need to be checked and if necessary cleaned before final re-assembly. Chassis axle slots can be cleaned out with fine emery, as can wheel treads and crank pins. Valve gear brackets if painted - as here - have a nasty habit of 'drawing in' paint into pivots for expansion links, and if not attended to now, can give rise to all sorts of mysterious tight spots which were not there before.

The ROD colour scheme appears to have been a plain black with white lettering. As there are no commercially-available transfers (to my knowledge at least) I made my own on an inkjet printer as for the NSWGR D52 2-8-0. This time however, I used a Linux-based PC, which enabled me to push the ink density several times highter than that provided by some off-the-shelf manufacturer's printer drivers under Windows. I always make two sets of transfers when I am doing this, just in case something goes wrong with the application of the first set...

Unlike a 'proper' transfer, these are a bit on the thick side by the time a coat of acrylic varnish has been sprayed on, but will conform to rivets and suchlike given a generous application of a softening agent such as Walther's Solvaset. If any 'bubbles' persit, then these can be carefully 'lanced' with a pin, and the area flooded again with the agent.



Tender in final coat of black. Lettering still to be applied, together with coal load and trucks and couplers.

Transfers were made on an inkjet printer, then sealed with acrylic matt spray - this does not affect the inks, and seals the transfer from water during the separation of carrier film and paper backing.

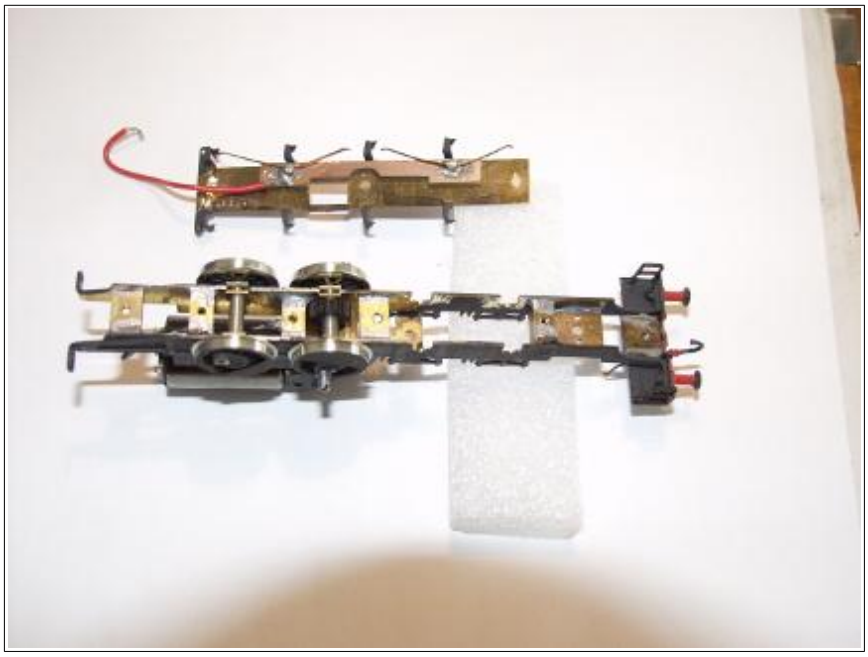
I try to leave these 'home-browed' transfers to 'settle' face up for at least a day before turning the model over to do the other side. On the Pershing, the process of making these decals conform over the various rivet lines of the tender took nearly a week start to finish, possibly because I was applying direct to a matt instead of a gloss varnished surface. There is always going to be a degree of 'bleed' under the edges where the transfer has been cut out of the surrounding sheet, and the ink-jet printing is exposed to water. This can

be concealed by the 'stipple' overpainting as part of the process of getting the lettering to blend into the model's base colour.

Ink-jet transfers applied to tender after application of decal film softening solution. Note the white 'bleed' where the solution has crept under the cut edge of the transfer film and disolved the inks

Final assembly

However careful one is with masking tape or brush, even a thin sliver of paint in the wrong place can play havoc with a model's running and electrical pickup. With the Pershing, a couple of the axle slots had to be gently scraped clear of matt black to allow the hornblocks to 'sit' properly in the top of the frame 'U' cutouts. For the same reason, I took extra care to both scrape then finish-polish the driving wheel treads with fine emery cloth.



Reassembly of the chassis in progress. Axle slots in frame scraped clean of any stray paint before horns and wheelsets inserted.

Track testing of the bare chassis then revealed a bind on one side which was not there before. Initially I put this down to my putting the rods on the wrong way around - except that on this model, each one is handed, so I had got it right the first time around. Careful examination of one of the crankpin screws with a jewellers eyeglass revealed that this had a slightly malformed thread, and was tightening up 'on the skew' when right home. A few strokes of a needle file to make the coupling rod hole 'a little bit oval' did the trick, and then chassis now runs perfectly as I can make it.

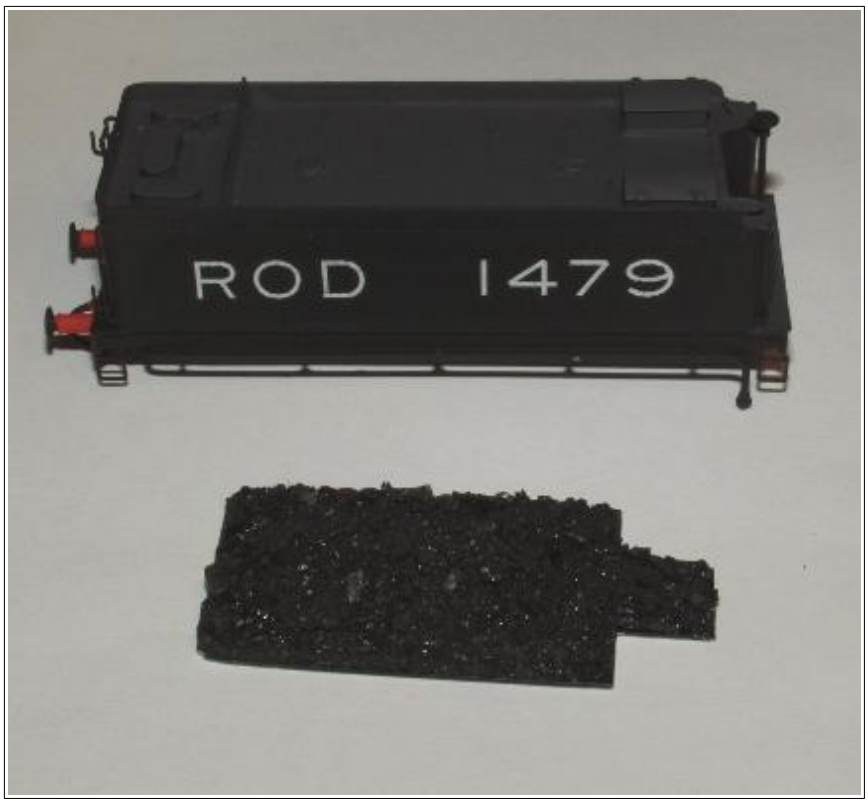
Cruel enlargement of crankpin screw on second driving axle, left side. Look carefully and you can just make out that the screw head is tilted out of paralell with the wheel - and it was this that was causing the coupling rod to bind on that side. Black 'crescent ' shape to top of picture is etched brake shoe.

Painted wheelsets ready to go back into the chassis. Even though these come from Markits in a black finish, the add-on etched counterweights provided in the kit still need to be painted. Note the spacing washers on the axle to control sideplay, and those shiny wheel treads. Brown ring on rear wheelset is rim insulatated.

The 'coal' in the Pershing's tender is actually a 'drop-in' item, complete with its own base. This takes the form of a several layers of 60 thou. plastic card, built up to a rough profile of the finished coal load from prototype photos, and painted matt black.

A 'fence' of masking take is then stuck around the lowest edge of this assembly - which is the same shape as the base of the tender's coal space - and a 50/50 mix of white glue and water is then spread over the plastic card layers. Fine crushed coal - almost dust - is then sprinkled into this. A few drops of water with just a pinhead of washing up liquid to dispell the surface-tension and applied with an eye-dropper over the top of the coal, helps the glue to 'wick' upwards and so bind everything together.

About 24 hours or perhaps a little more later, the tape can be peeled away to leave a coal load that is almost touching the tender sides, yet can be slipped in without risk of marring the finished engine's finish.



Coal load is separate and will be added once all painting and assembly is completed. A sliver of double-sided adhesive tape will secure it to the tender coal space. This image also shows how the ink-jet transfers have been blended into the paintwork on tender sides.

Reuniting the locomotive body to the chassis was relatively straightforward, though a replacement tender to loco fallplate had to be made up at the proverbial last minute. Yes, I know I had checked and re-checked, but best laid plans of mice and men, etc...

Given the number of pipes and rods that bridge the gaps between boiler and cab, and the chassis, there are bound to be little nicks here and there that need touching up. Indeed one of the last jobs after track testing - again, after paint and final assembly - is to go around the model with a fine paint brush and a dab of matt black.

...and here's the finished article. Coal load is secured in tender with double sided tape, once all painting and final touch-up work has been completed.