

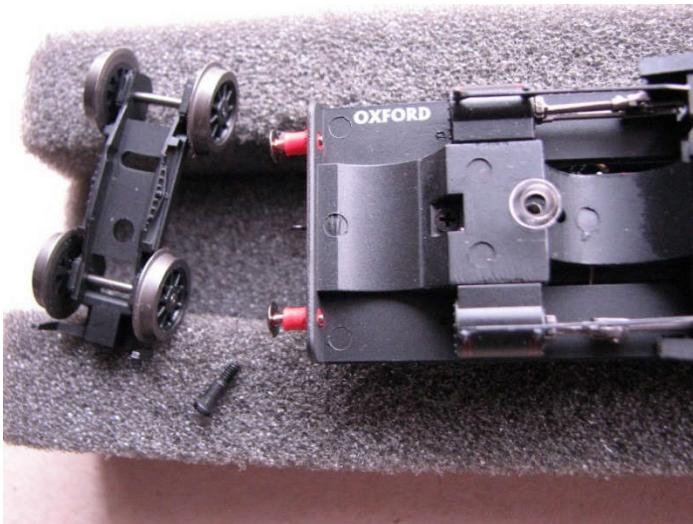
## Oxford Rail Adams Radial Tank EM Finescale Conversion.



Before you start, it is a good idea to have some small containers or snap top poly bags to put screws and components in for safe keeping.....much better than crawling about on the floor trying to find lost bits!

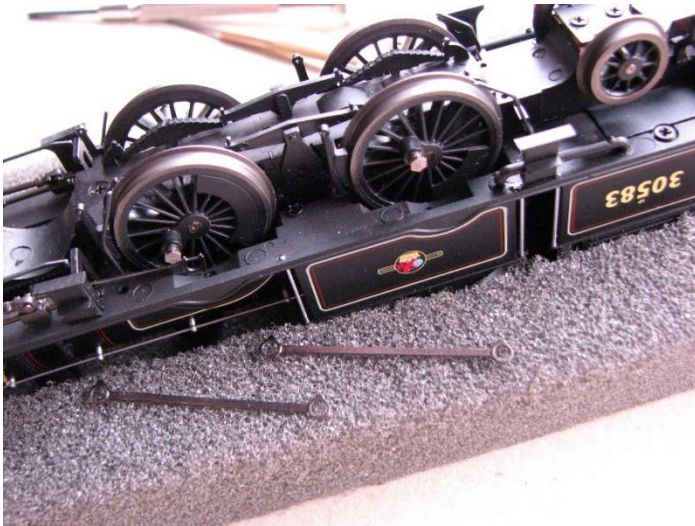
### LOCO CONVERSION

1. With the loco inverted and well supported, first undo the bogie retaining screw and lift the bogie clear from the loco. Be careful, as there is a spring and plastic washer underneath! We replaced the screw in the chassis, which also retains the spring and washer so these do not get lost.



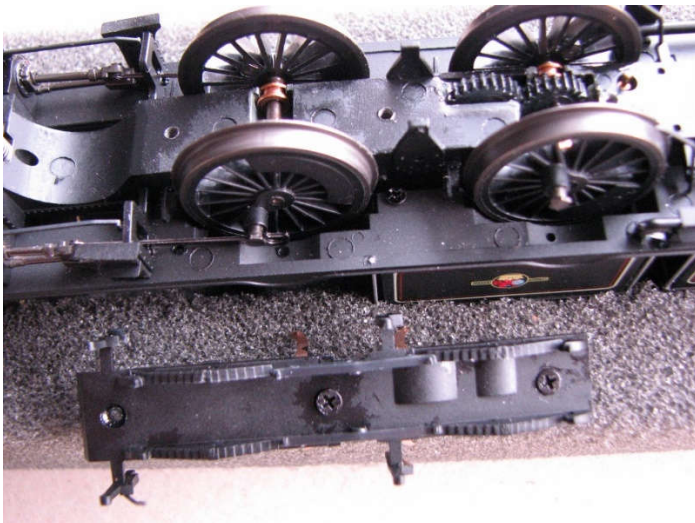
Bogie removal

2. Slacken crankpin screws and remove the coupling and connecting rods. The connecting rods can be left dangling, and the coupling rods are identical each side, so do not need to be marked left and right!



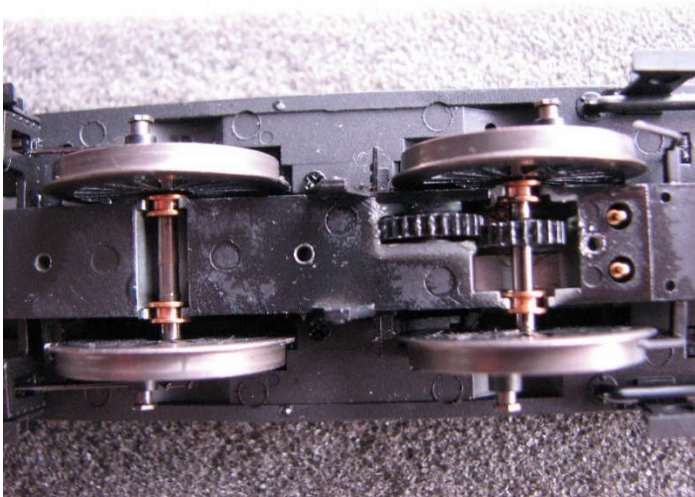
Coupling rod removal

3. Undo the screws holding the keeper plate, and lift away. The brake linkage at the rear under the cab gets in the way a bit, but it will come off the chassis easily, making life a bit easier.



Keeper plate removed.

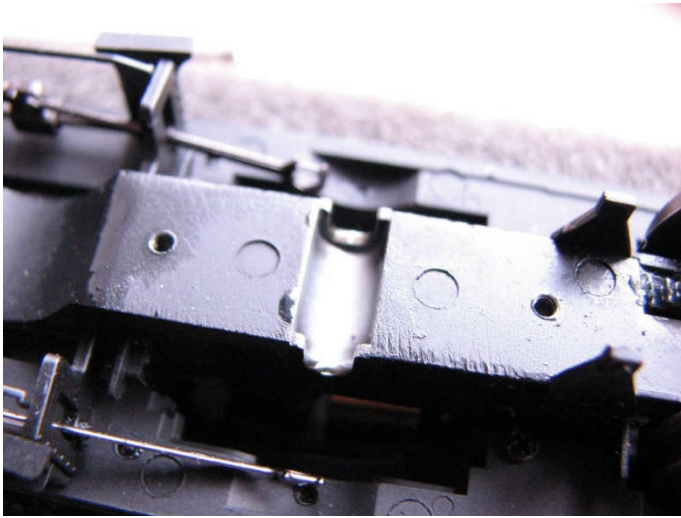
4. It is worth looking at how Oxford have designed this chassis. The driving wheels are on 2mm diameter axles, running in very nice brass bushes. All very standard apart from the axle size!



As Oxford built it....



5. If we now lift out the wheels, we find a very well cast pair of slots for the bearings to sit in.....these just happen to be exactly the right size to take a standard 1/8 inch axle. Even with the keeper plate on, the 1/8" axles fit perfectly.



The Oxford axle slots – 1/8"!!!

6. This conversion is based on this fact....and as yet, no one makes suitable wheels on 2mm axles, so our replacement driving axles will revolve directly in the cast chassis block, no different to earlier Hornby and Bachmann models, except that the 1/8" axles are a much better fit than some of those other chassis provided!

7. Once the keeper plate is removed, lift out the two small pins at the rear behind the back axle that collect current from the keeper plate to the motor. They will fall out at some point otherwise. Keep them safe!!

8. Having decided to follow this route, suitable wheels are found in the existing Alan Gibson range. These can now be prepared with crankpins fitted and balance weights from 10 thou plasticard, made with the aid of a compass cutter.



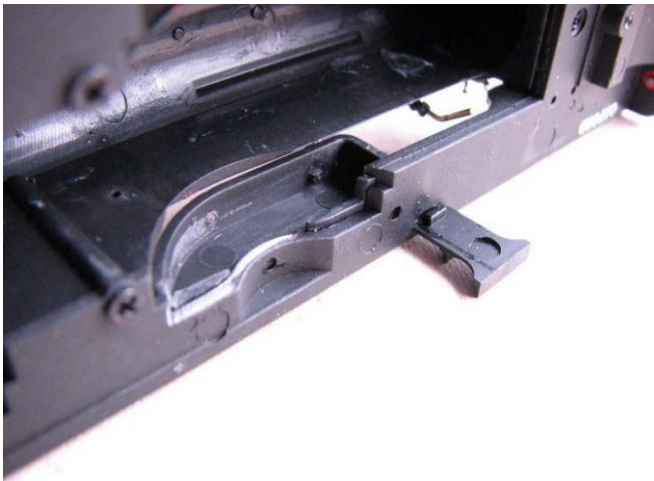
Driving wheels prepared.

9. The leading wheel set can now be assembled along with suitable spacing washers. We use the GW Models press as this also quarters the wheels as well as pressing them on the axles square. Being from the standard range the axles are supplied to the correct length for the wheels used. We used 2 x 1mm plus 1 x 0.5mm 1/8" bore washers each side. (The same spacing washer values are used on the trailing axle also)



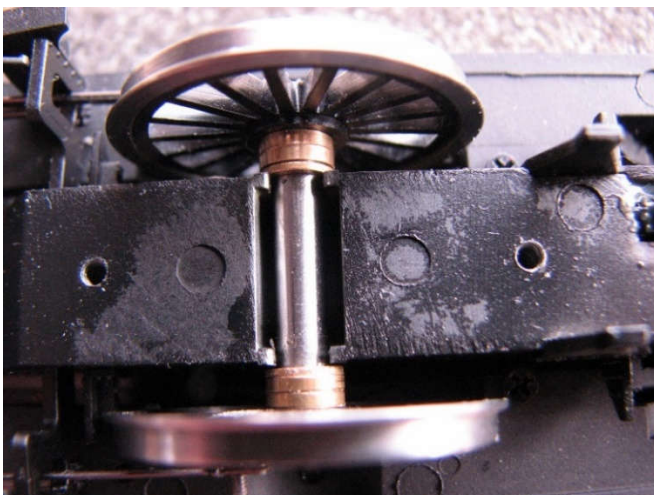
Leading wheel set.

10.If you try to place the wheels in the chassis with the body still on, they will just fit, but rub on two projections inside the leading splashers. These seem to be locating ledges to help in assembling the body at the factory, and need to be trimmed back. This can be done easily with a needle file.



Projection on left removed, the right hand one to do

11. With this done, the wheels now fit and revolve freely.



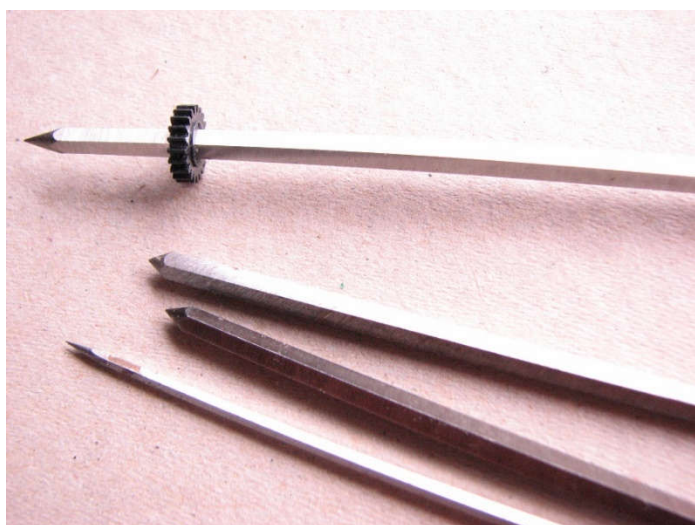
Leading wheels installed.

12. The rear, or in our case, the geared axle wheel set is next. You will need to recover the Oxford gear from its axle. Do this by pulling or twisting off the driving wheels first. Remove the brass bushes, and keep for a rainy day...we do not need them.

Stand the axle on end on a solid surface, and push down on the gear. Thumb pressure alone will push the gear off its spline, and you can then recover it from the axle. Do not try and twist the gear off....this may damage it.

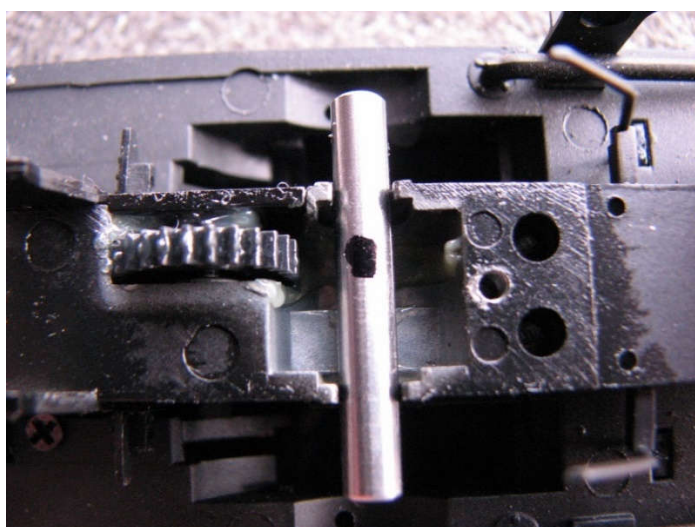
13. Next is probably the hardest part of this conversion. The gear has a 2mm bore.....we need it to become 1/8"! This is achieved by using cutting broaches in increasing sizes until we achieve 1/8". Fortunately, the plastic is not as hard as some other manufacturers!

Hold the outside teeth of the gear in your fingers, and twiddle away with the cutting broaches, constantly checking when you approach the final size. Aim for a firm as opposed to tight push fit. Also, hold the edges of the gear using a cloth.... You will realise why when the broach sticks and the gear revolves in your fingers.....



Increasing the gear bore with cutting broaches.

14. Once the gear is opened out, we need to spline the new axle to retain it. Place the plain axle in the chassis, and centralise it. Then mark the axle where the gear needs to fit.



Marking gear position on the axle.

15. Place the marked axle onto a cutting mat, and take a large hand file, about an 8" one is ideal. Roll the edge of the file over the axle in the desired position with downwards pressure.... this will produce an acceptable knurl or splined effect to hold the gear firmly.

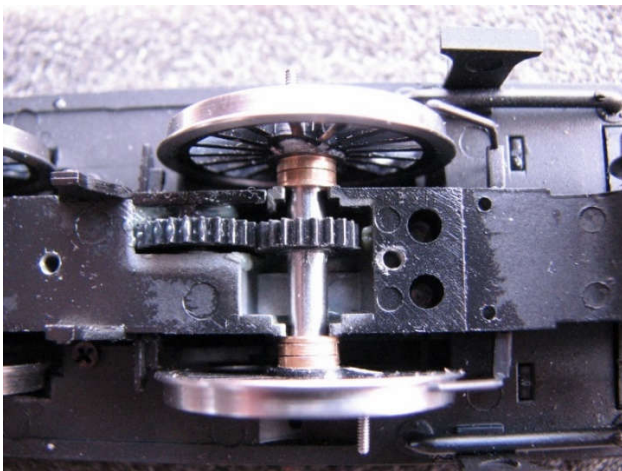




Not pretty, but it works!

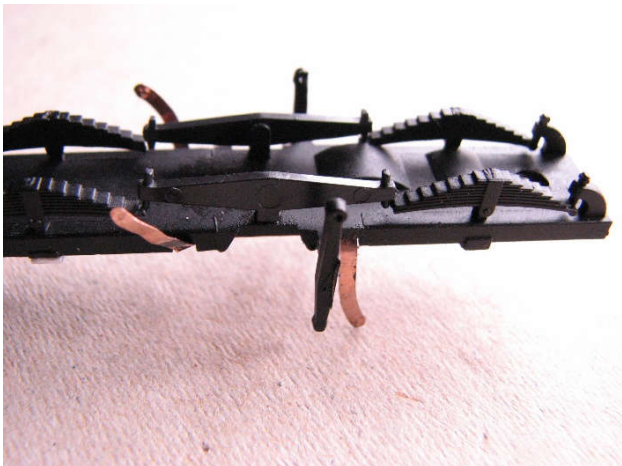
16. The gear can now be pushed on to the axle and carefully positioned in the right place. Check by placing in the chassis to see that the gears align correctly. If you managed to re bore the gear correctly, nothing else should be needed to retain the gear. If it is just a bit slack, re do the knurling with the file to make it a bit deeper, or resort to Loctite or similar.

17. The rear wheels and spacing washers can now be assembled in the press, and then placed into the chassis



Rear wheels in chassis.

18. The keeper plate now needs a bit of attention. You may want to do step 19 before this one. First, the brake shoes need to be cut off the brake hangers to allow the wheels to revolve. The pickups point downwards, which makes it more difficult to adjust them (if needed) in service. Therefore they were bent to point upwards, just more convenient in the long run.



Left hand pickups bent upwards, right hand as supplied, brake shoes removed too.

19. Place the keeper plate into position. You may find that when screwed down, the axles do not revolve completely freely. This will be because there are four small projections from the bottom edge designed to trap the original bearings tightly in the chassis. Just remove the plate and shave a SMALL amount off them with a needle file and re try. Do not over do this, or the axles will have vertical movement, all we want is for them to revolve freely. However, if you do over do things, just remove the projections completely and substitute small pieces of styrene...Plastic Magic liquid glue will stick them perfectly. Then simply re do the adjustments with the file till all is well. You might ask how I know this.....



No comment – see above!

Once happy, adjust the pick ups and screw down the keeper plate. Do not forget the current pick up pins need replacing before finally fitting the plate.

20. Next we tackle the coupling rods and the connecting rod big ends. The Oxford holes are too large for Gibson crankpins, so we need to bush them with the Gibson bushes available just for this purpose. First, file the plating back to the brass base metal on the rear of the rods. Place a bush in the rod hole, and solder in position. Do this for all 4 coupling rod holes, and do the connecting rods by laying the chassis on its side, working on the rear of the rod which is face down on the work surface. It is easier to do the connecting rods first before screwing the keeper plate down because you can remove the driving wheels out of the way. If you fill the bush completely with solder.....don't panic! As the solder sets, it contracts slightly, leaving a dimple in the centre – use this to as your centre for drilling out. A suitable drill twiddled with fingers in a pin vice is all that is needed.



Bushes in rod ready for soldering.

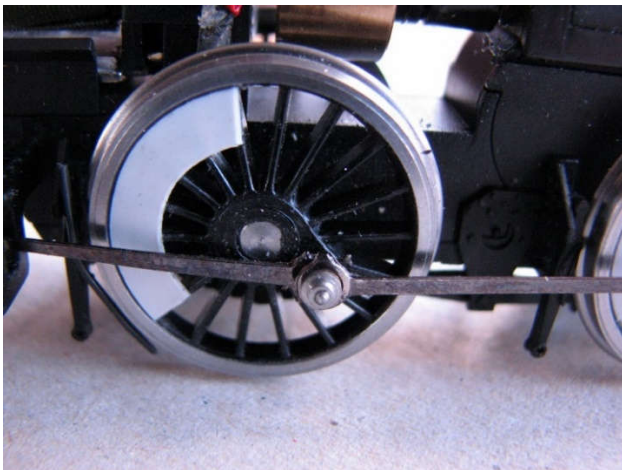


The resulting central dimple after over enthusiastic soldering.

21. The rod bushes then need a gentle opening out to be a good running fit on the crankpin bushes.... use a cutting broach and a Gibson bush as a guide.

22. Place a long crankpin bush on the leading wheel, and a short one on the rear

23. Place the connecting rod inside the coupling rod on the leading driver, and retain with a crankpin nut. You may want to shorten the leading bush slightly, as supplied they are a touch long for this application.



Leading wheel with rods attached.

24. As the connecting rod is inside the coupling rod, it is better if we place a washer on the rear crankpin before the rod to keep the rod parallel to the chassis. We used a spare bush of the variety used to solder in the coupling rods, opened out slightly with a broach so that it slips over the crankpin bush. Fit the crankpin nut.

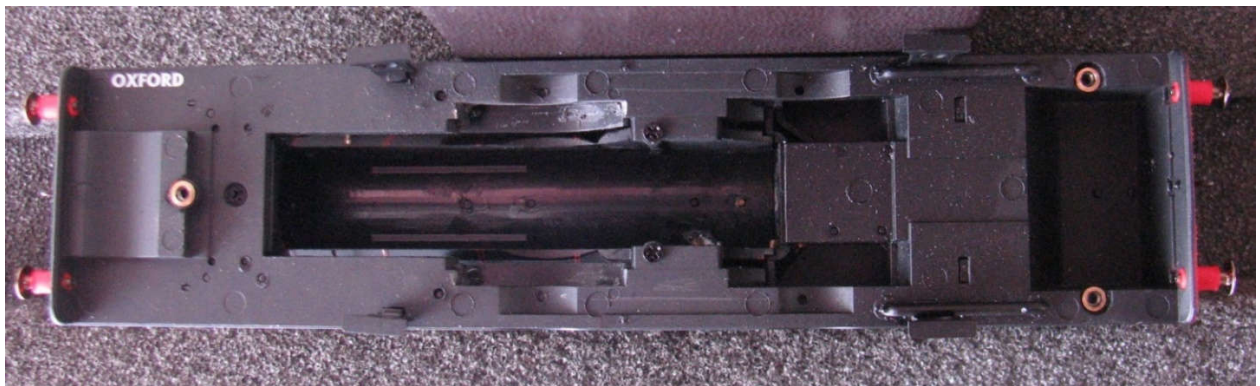




Washer placed on crankpin before the rod.

25. That completes the driving wheels and rods and if you take the trailing wheels off, (see below for the warning about springs and things first!), you can track test the chassis as an 0-4-0.

26. Putting the completed chassis back in the body revealed a problem with the coupling rods just touching the underside of the footplate. Thinning the already slim rods did not seem an option, so we placed a 0.25 x 2mm bore axle spacing washer between the chassis and the body at each of the three body fastening screw points. This raises the body sufficiently to get round the problem, and is not noticeable. See picture below.



## THE FRONT BOGIE

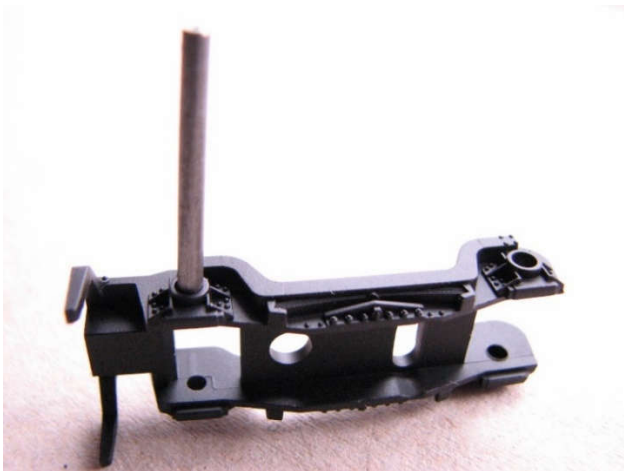
The bogie and trailing wheels unusually use 1.5mm axles, instead of the more usual 2mm diameter axles, so we need to modify the bogie to accommodate 2mm axles.

1. Dismantle the bogie by simply twisting and pulling one Oxford wheel from its axle, and slide the remaining wheel and axle out the other side. Do this for both axles.



Removing the Oxford wheels

2. You will notice with the wheels removed that the outer axle hole is in fact 2mm bore – see picture with a 2mm axle stood in it!



Outer bore is 2mm....

3. All that needs to be done is to put a cutting broach through the bogie and gently open the bore to take a 2mm axle. Keep test fitting an axle to avoid going too far.



Opening out to 2mm with a cutting broach.

4. Before we fit the wheels, it is as well to fix the Oxford bogie problem. As has been well documented on various web forums, the front top edge of the bogie hits the underneath of the buffer beam, with the result that any slight track imperfection causes the bogie to rise and lift the loco driving wheels clear of the track. All that is needed is to relieve the front edge, which will allow the bogie to rise behind the buffer beam. We simply filed the leading upper edge to a chamfer.



Bogie front upper leading edge chamfered.

5. Assemble the Gibson wheels onto their axles, and then slide the appropriate spacing washers on, thread through the bogie axle holes, adding the appropriate spacing washers and remaining wheel. We used 2 x 1mm 2mm bore brass spacing washers each side.



Re wheeling the Bogie.



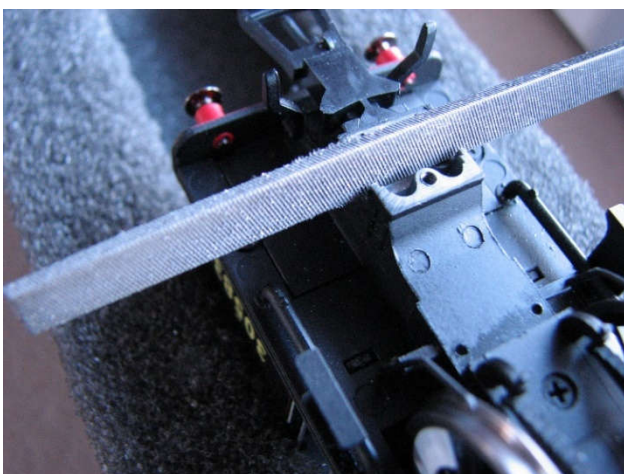


Completed bogie.

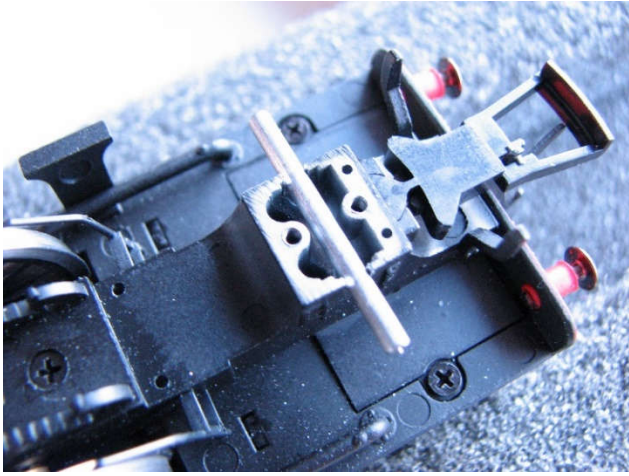
6. Refit the bogie to the chassis with the spring and plastic washer.

## REAR RADIAL AXLE.

1. Finally we come to the rear radial axle. This has pickups and 2 springs bearing on the axle to keep it in contact with the track.
2. Undo the two very small screws securing the cover plate. Very carefully, lift off this cover, whilst holding the axle in place. Lift out the two current contact plungers and store safely.
3. Carefully lift out the wheels and axle, making sure the two springs do not come away with the axle, or fly off! Recover these springs and store safely.
4. The axle is again 1.5mm, so the slot needs opening out carefully to take a 2mm axle. As before we used a flat needle file on edge to do this, keep test fitting the axle to ensure a good running fit. Very little needs removing!
5. The final check is to place the cover plate back with the axle in place to make sure we have a freely revolving axle.

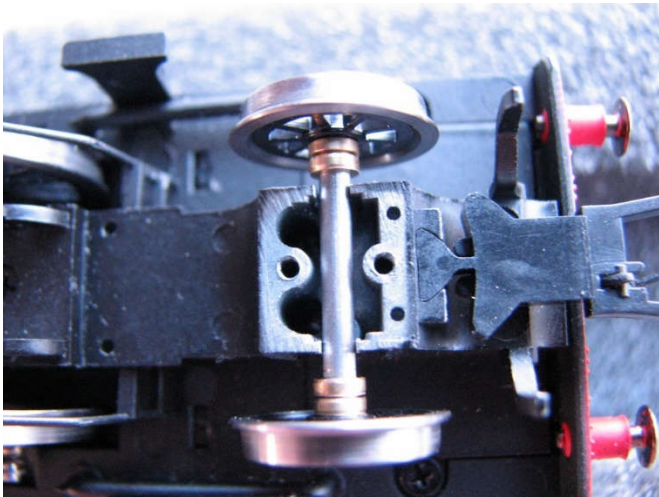


Opening out the radial axle slot.



Test fitting an axle.

6. The wheels can be mounted along with 2 x 1mm spacing washers each side, and then placed in the chassis. Refit the current plungers.



Radial axle fitted.

7. Tweak the pickups so they just bear on the rear wheel tyre rims, and fasten the screws.
8. Track test the complete loco, and see how the radial truck performs. We found it ran perfectly ok without the axle springs fitted and so left them off, but saved them carefully in the loco box just in case!
9. Finally, lubricate all the new axles sparingly.
10. Congratulations, and enjoy your efforts on the track!!



**Pete Hill**

**March 2016.**

Driving Wheels	2 x 4868L
Bogie and Radial Truck	3 x 4836GP
Crankpins	1 x 4M42A
Crankpin Bushes	1 x 4800
2mm Spacing Washers	1 x 4M67/2
1/8" Spacing Washers	1 x 4M67/3