

Hornby GWR King Class 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!

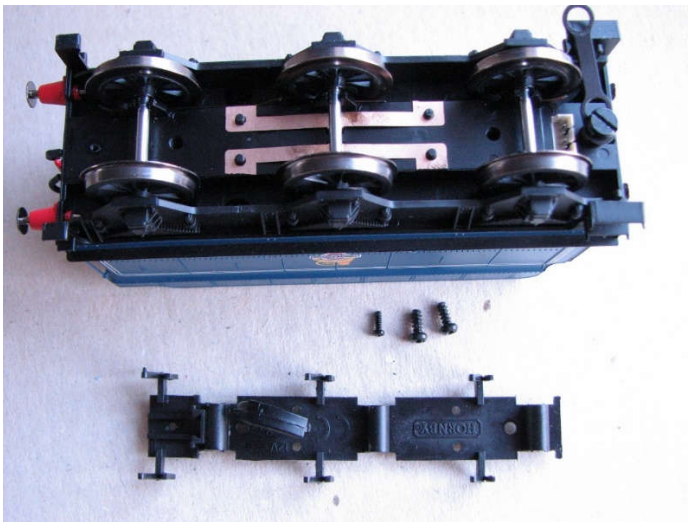
We suggest converting the tender first, as this will be needed to test the loco chassis later because of the electrical engine/tender connection plug and socket. Disconnect the two carefully before starting work.

TENDER CONVERSION

1. Invert the tender, and hold in a suitable device. We use a foam cradle – the Peco loco service cradle being ideal.
2. Unclip the brake gear, and place to one side.
3. Undo the screws holding the keeper plate – one is visible, the second being beneath the water scoop, which we could twist out of the way enough on our sample to undo the screw. The third is much smaller right at the rear.

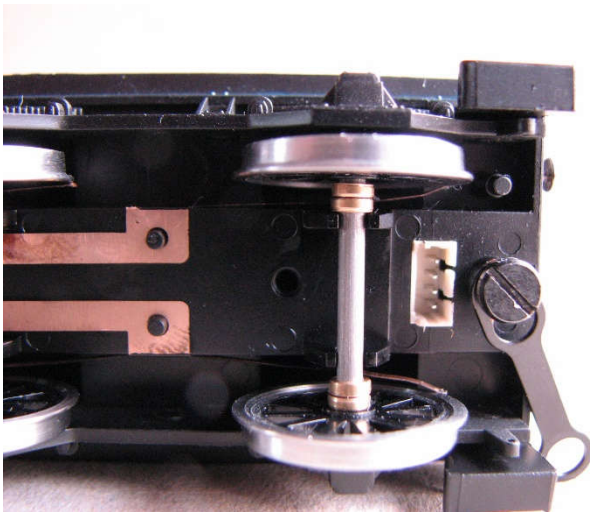


Water scoop twisted to reveal the screw.



Keeper plate removed.

4. Lift out the 3 wheelsets.
5. Assemble the Gibson wheelsets onto the appropriate plain axle supplied with the wheels. We used 2x1mm 2mm bore spacing bushes each side to limit side play.



View showing spacers on Gibson wheelset.

6. Place wheelsets into the chassis, ensuring the pickup wipers bear against the back of the wheel tyre.



Chamfer brake shoes.

7. Before replacing the keeper plate, chamfer the back of the brake shoes with a needle file to provide clearance with the wheel tyre/flange.
8. Replace the keeper plate and screws. Push test the tender through some track work to ensure all is well.

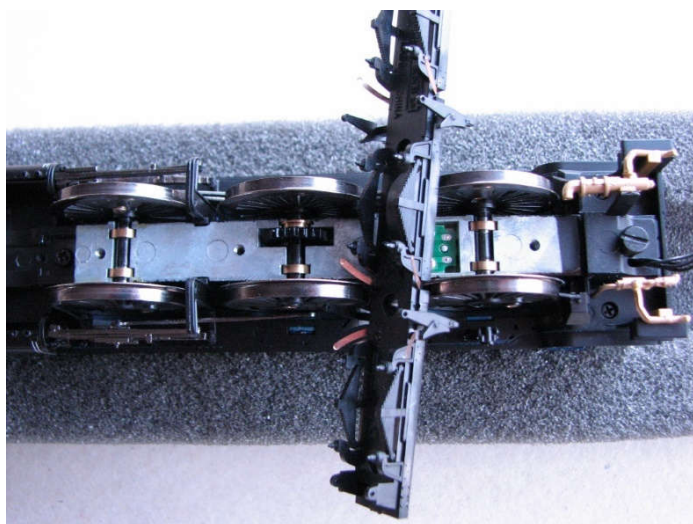


Completed tender.

9. Clip brake rods back into position.

LOCO CONVERSION

1. Remove the loco bogie by undoing the screw behind the rear of the bogie on the loco chassis, and place to one side.
2. Remove the loco body by undoing the large screw behind the buffer beam. Gently pull the chassis out by gripping the cylinders – not the wheels/valve gear.
3. Support the chassis upside down in a suitable cradle - undo and remove the loco/ tender coupling bar; place to one side safely.
4. Undo and remove the crankpin screws, remove the connecting rods and leave dangling. Recover the coupling rods and place to one side.
5. Undo the 3 cross head screws in the keeper plate - store these safely – and gently lift away the keeper plate, which simply lifts clear complete with pickups. There are no wires to worry about and nothing to fall apart either.



Keeper plate removed.

6. The wheelsets should now lift out.

7. Remove the gear wheel after removing the wheels from the axle. The gear needs to be pushed off. Simply support the axle end on a solid surface, pushing straight down with your thumbs. The gear should slide off. Do not TWIST the gear, as it sits on a knurled part of the axle and you may damage the inside surface of the gear bore. Note the orientation of the Hornby brass bush next to the gear. Recover the Hornby bushes from all three axles.

8. The Gibson wheels can now be prepared. Crankpins themselves are inserted and any balance weights made up and glued on. We make these from 10 thou plasticard and use a compass cutter. The axles were used at the supplied length. We also used a BS1 centre drill to put the hollow axle effect in the axle end.....but this needs a lathe, and is not essential, just cosmetic!



Gibson wheels fitted with crankpins.

9. Now begin to assemble the front and rear wheelsets. We will need some spacing washers to take up the side play. We used 2 x 1mm thick spacing washers each side on the centre and trailing axles, and added a 0.25mm washer each side on the leading axle.

10. Do not forget to assemble the Hornby brass bearing bushes on the axles at this point!

11. We use a GW Models wheel press for assembly, which will also quarter the wheels as well as press them on square.



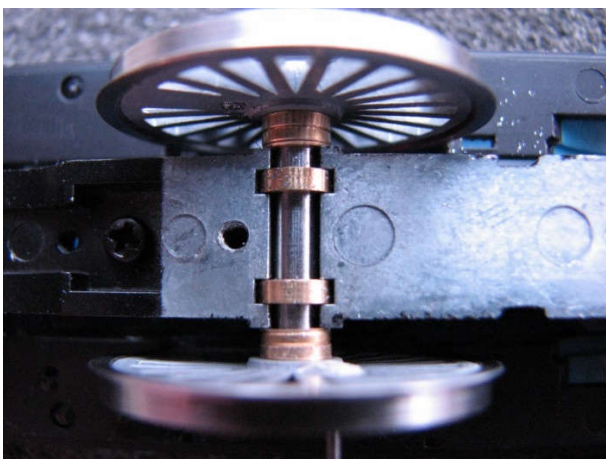
Rear wheels assembled – note spacing bushes.

12. Before these two wheel sets are placed in the chassis, it is a good idea to remove the cylinders/slidebar assembly from the chassis, otherwise the currently over long front crankpins will interfere with the slidebars



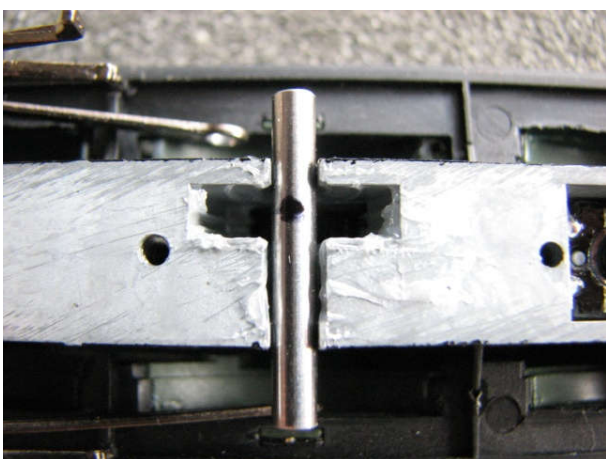
Cylinder assembly removal.

13. The front and rear wheel sets can now be installed. We must emphasize that there needs to be zero sideplay on the leading wheelset, whilst still allowing it to revolve freely.



Leading wheels installed with zero side play.

14. The centre axle needs to be “knurled” for the gear wheel first. We place the plain axle into the chassis, measuring the overhang each side to make sure it is central. Take a permanent marker pen, and mark the position of the gear on the axle.



The black dot marks the spot!

15. Place the axle on a cutting mat or similar. Take a small hand file, we use a 4inch second cut file, and using the file on Edge, roll it with firm downward pressure over the axle where you marked the gear position. Do not stray away from this narrow area, as bushes run on the axle very close to the gear, and knurling in these areas won't help good running!



Not too neat....but it works!

16. The gear can now be slid onto the axle and pressed over the "knurling". We found that the side of the gear was 7.5mm from the axle end (shorter end!) Place in the chassis and check...if all is well you can slide the gear to one side, apply a little Loctite if you wish, replace and check gear is in the correct position. Leave alone to cure. In fact on this sample, no Loctite was used, the knurling being more than sufficient. After all, Hornby only rely on knurling to retain the gear on their axles. Treat yourself to a cuppa or similar if you have applied Loctite.....or deal with the bogie (see later)

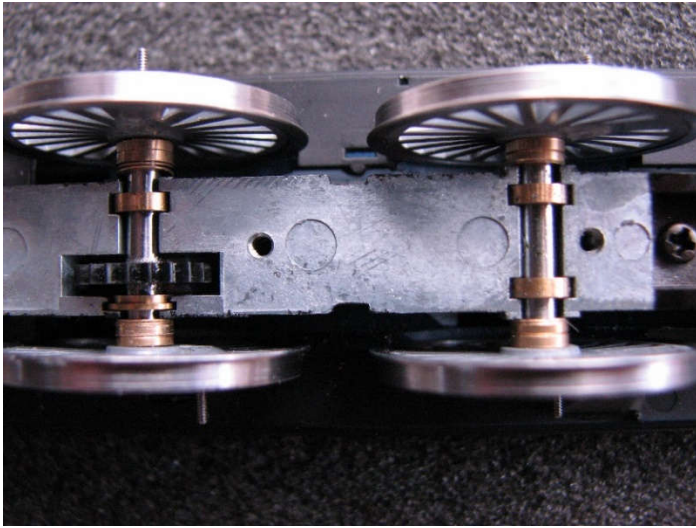


Assembled axle and Hornby gear.

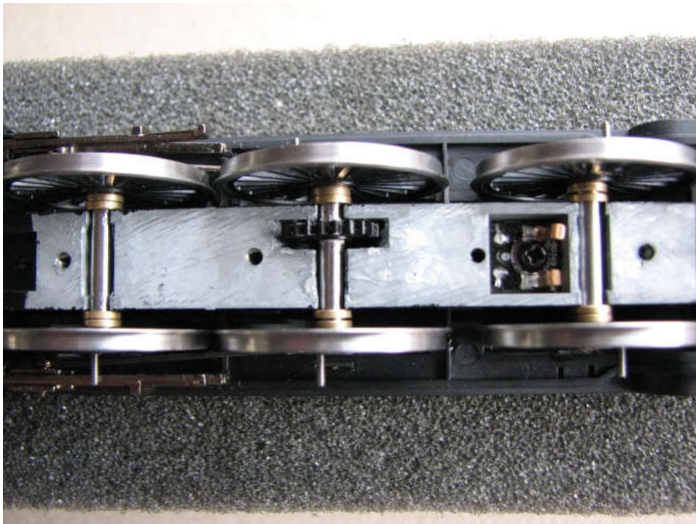
17. Assemble the driven axle in the press, not forgetting the spacing bushes.



Centre wheels with gear, spacing washers and bushes.

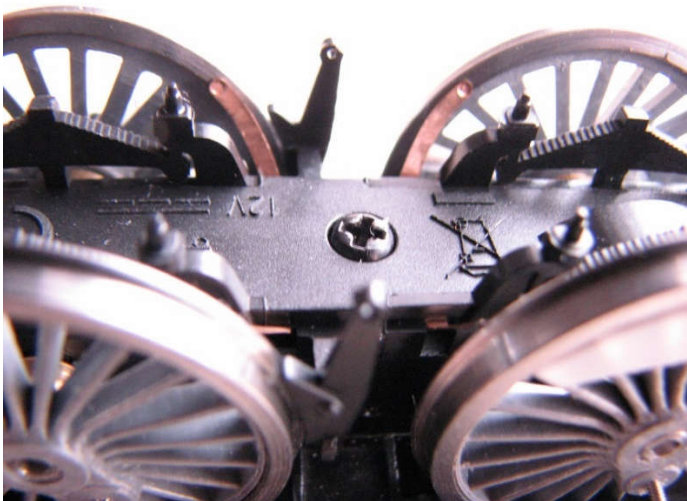


Centre axle in chassis.



All three axles installed.

18. Lift the keeper plate back into position, having tweaked the pickups out a little for the wider back to back, and fasten down with the three screws.



Pick ups touching rear of wheel tyres.

19. Next we tackle the coupling rods. The Hornby 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 coupling rods. Place a bush in the rod hole, and solder in position. Do this for all 6 coupling rod holes.

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.



Bush in rod ready for soldering.



The resulting central dimple after over enthusiastic soldering.

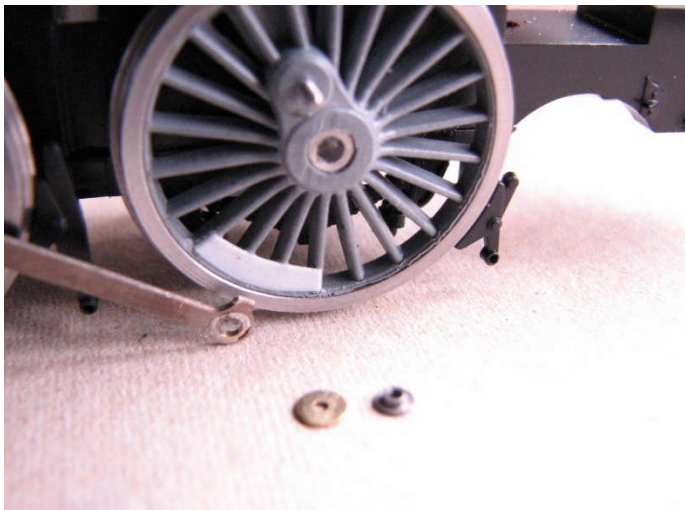
20. The bushes then need a gentle opening out to be a good running fit on the crankpin bushes, simply use a suitable cutting broach and use one of the Gibson bushes as a guide.

21. Assemble the rods onto the wheels. Use a long crankpin bush on the centre wheels, and a short one rear. Temporarily fasten with crankpin nut at the rear only.

22. The front crankpin fastening needs a slightly different approach as clearance behind the slidebars is less than marginal! We used a Romford crankpin spacing washer placed over the crankpin, followed by the coupling rod and the Gibson crankpin nut wound on back to front. The smaller diameter of the crankpin nut goes through the rod, allowing the rod to revolve on this smaller portion.

The Romford washer is basically a large washer with a small hole, used to space the rod from the front of the wheel. Normally the rear flange of the Gibson crankpin nut does this, but we are using it the opposite way round so its flange retains the rod.

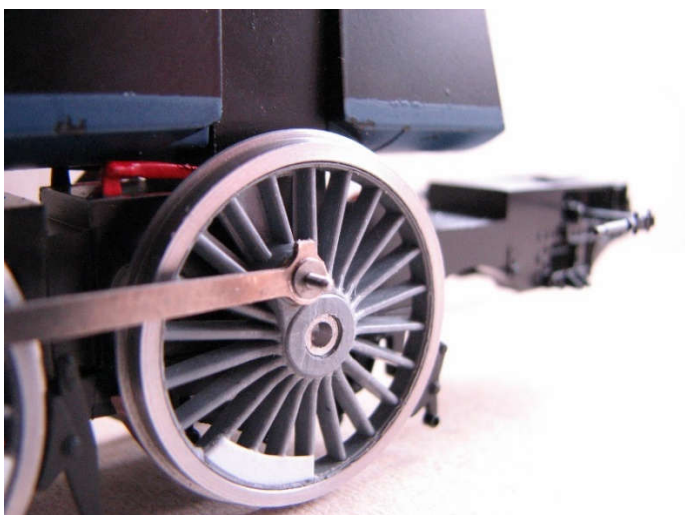
It is a good idea to thin down the Romford washer a touch, and to make sure the front end of the coupling rod around the bush is completely smooth and free from any burrs.



Showing Romford washer and Gibson crankpin nut.



Romford washer in place.



Gibson crankpin nut screwed on back to front.

23. Once satisfied you have just sufficient clearance for the coupling rod, then slacken off the nut, carefully introduce a TINY amount of Loctite retainer using the end of a piece of wire, and tighten the nut back up, finger tight is all that is needed. Beware, too much Loctite and you could lock the whole thing solid!

24. Walk away at this point, time for a cuppa or stronger whilst the Loctite does its stuff.

25. Once the Loctite has set, cut off the excess crankpin screw and clean back to the face of the crankpin nut with a needle file so you end up with a perfectly smooth face to the nut.

26. Now we can get the chassis running smoothly as an 0-6-0 before proceeding further. (Don't forget to re connect the tender electrical plug, otherwise it will not run!)

27. Once satisfied with the running of the chassis, undo the rear coupling rod nuts and let the coupling rods dangle from the front crankpins only.

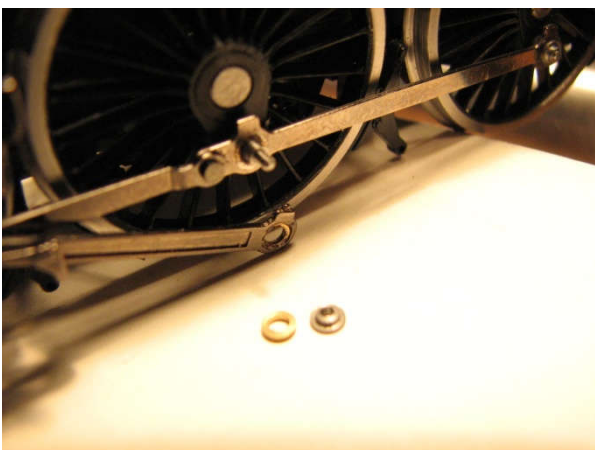
28. The connecting rod holes need bushing in the same manner as the coupling rods by soldering in brass bushes. Make sure these are well cleaned up on the inside faces. This is best done before the cylinder/slidebar assembly is placed back in the chassis.

29. Now carefully reinstall the cylinder/slidebar/connecting rod assembly. You will find that you have to carefully thread the coupling rods through the gap behind the slidebars, between the cylinder rear face and the motion bracket, and then between the top and bottom of the motion bracket at the rear of the slidebars. Good job the rods are articulated!

30. Once the above is done, the rods can be replaced over the rear crankpin bushes and fastened permanently

31. Before placing the connecting rods over the centre crankpins, we need to provide a small spacing bush on the crankpins, and one of the Alan Gibson brass coupling rod bushes is ideal. Place one over each of the crankpins, followed by the connecting rods, and finally the centre crankpin retaining nuts.

32. If there is insufficient crankpin thread protruding from the centre pin bush for the crankpin nut, remove the bush and reduce its length a touch with a file, then re assemble and tighten the nut. There is sufficient length in the bush to allow this.



Bush to space Connecting rod from coupling rod.

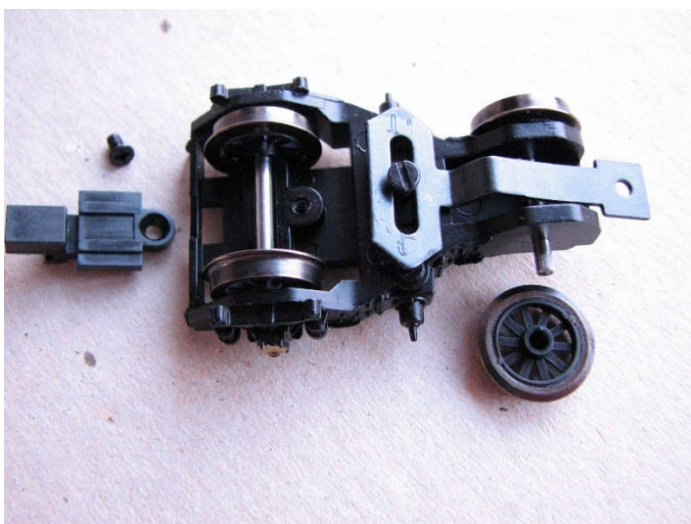
33. It is worth removing the chassis gear cover again and turning the worm by hand to check for any binds etc. Before applying power.

34. Then at this point, you should be able to track test the completed chassis. Gently apply power, checking to ensure no parts are going to hit other parts or bind. If all is well, admire your chassis and tender moving around!

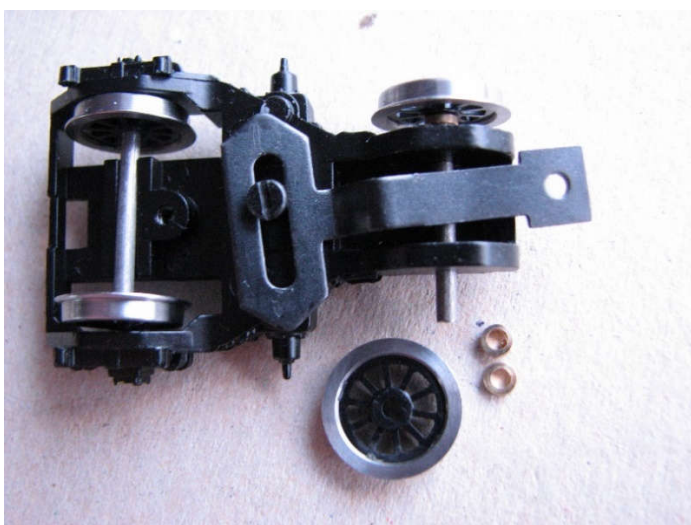
35. Once satisfied with the running chassis, before replacing the completed chassis in the body, trim off and clean up the rear crankpins excess length.

THE BOGIE

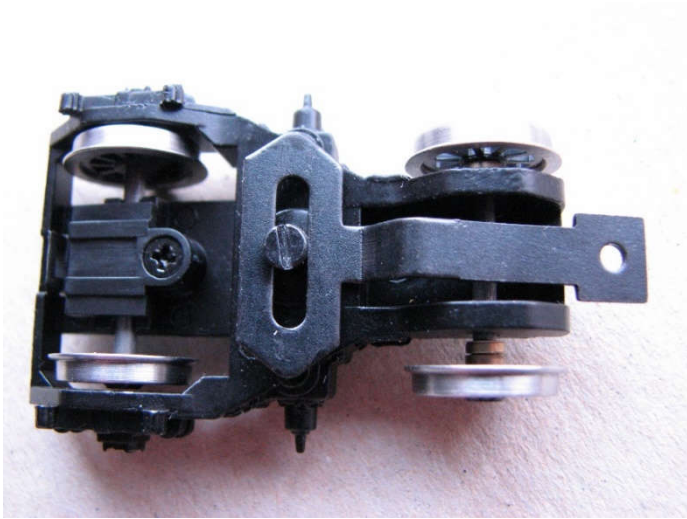
1. For the rear axle, simply twist and pull one Hornby wheel from its axle, and slide the remaining wheel and axle out the other side.



One Hornby wheel removed and the coupling mount.



Gibson wheels and spacing washers.



Gibson wheel sets installed

2. Assemble one Gibson wheel onto its axle, and then slide the appropriate spacing washers on, thread through the rear bogie casting hole, adding the appropriate spacing washers and remaining wheel. Assemble the second axle, and drop into the front axle position. Replace the NEM coupling mount. We modified ours by cutting the pocket off as we intend to use a front scale screw coupling. We used 2 x 1mm 2mm bore brass spacing washers each side on the rear axle only. The front axle sideplay is controlled by the outside frame!

FINAL ASSEMBLY

Reassemble the chassis to body, and track test. If all is well, fasten the bogie back to the chassis, and you should have a completed loco. Don't forget to lubricate it!



Pete Hill, February 2016.