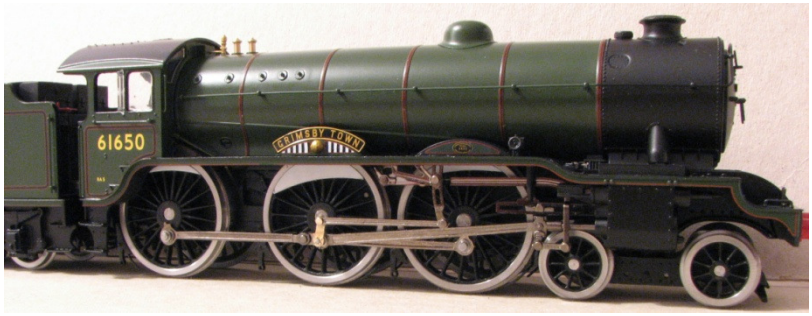
Hornby B17/6 EM Finescale Conversion.

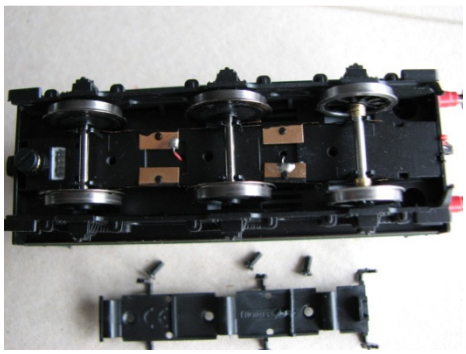


Before you start, it is a good idea to have some small containers or snap top poly bags to put screws and components in for safe keeping.....much better than crawling about on the floor trying to find lost bits!

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.

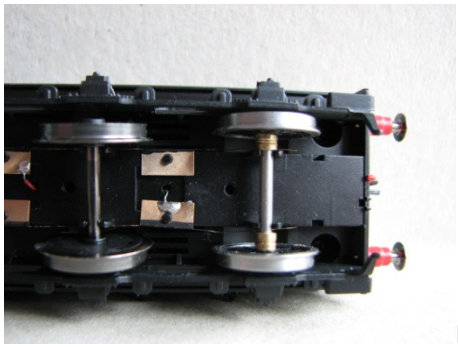
TENDER CONVERSION

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 three screws holding the keeper plate – two are visible, the third being beneath the water scoop, which was glued in position on our sample, so had to be surgically removed and glued back in position on re assembly.



Keeper plate removed and one Gibson wheelset installed.

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.



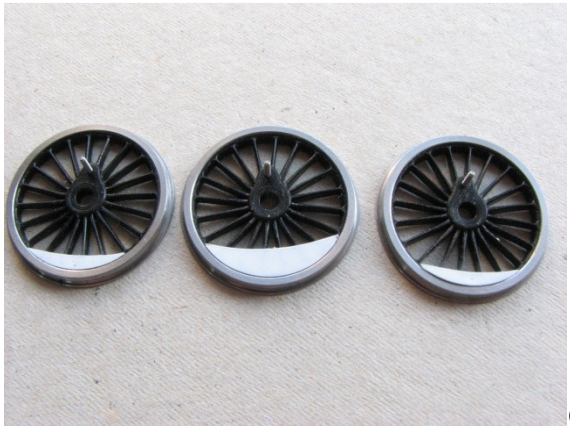
Enlarged view showing spacers on Gibson wheelset.

6. Place wheelsets into the chassis, ensuring the pickup wipers bear against the back of the wheel tyres.
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.
9. If satisfied, replace the water scoop moulding by gluing back into position.
10. Clip brake rods back into position.

LOCO CONVERSION

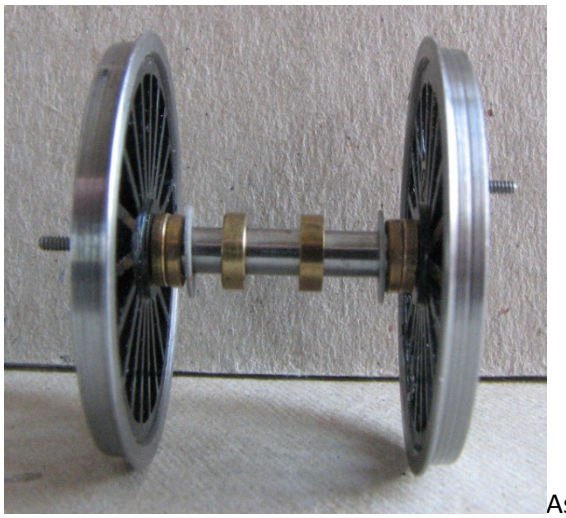
1. Remove the loco bogie by undoing the screw behind the rear of the bogie on the loco chassis, and place to one side.
2. Remove the loco body by undoing the large screw behind the buffer beam. Gently pull the chassis out by gripping the cylinders – not the wheels/valve gear.
3. Undo, or loosen the wiring “knitting” at the rear of the chassis – the reason will become clear!
4. Support the chassis upside down in a suitable cradle - undo and remove the loco/ tender coupling bar; place to one side safely.
5. Undo and remove the crankpin screws, remove the return cranks and connecting rods and leave dangling. Recover the coupling rods and place to one side.
6. Undo the 4 cross head screws in the keeper plate - store these safely – and gently tease the keeper plate upwards from the front end. Be careful, as at the rear, there are two wires coming down through the chassis to the pickups. By previously having loosened the bundle of wires above the chassis, this should allow the keeper plate to lift away enough to be able to lay it over behind the chassis out of the way. Try not to let the two parts of the keeper plate
   Separate. Ours appeared glued at one end, but it makes life easier to keep them together.
7. The wheelsets should now lift out.....but do note how the various axle bushes sit in the chassis!
8. Remove the wheels from the axles – we need to recover and reuse the brass bushes from all 3 axles, as well as the gear wheel. The bushes simply slide off, but 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.

9. The Gibson wheels can now be prepared – crankpins inserted and any balance weights made up and glued on. We make these from 10 thou plasticard and use a compass cutter. The supplied axles were reduced to 21.75mm long.



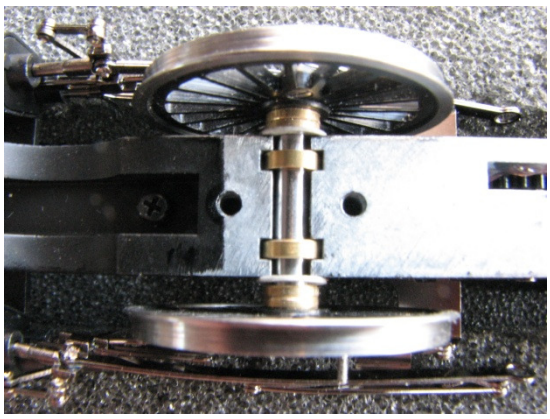
Gibson wheels fitted with crankpins and balance weights.

10. 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 washers each side, plus 1 Peco fibre washer per side as well. These are to prevent the Hornby pickup strips touch the brass spacers which could otherwise cause a short when running.
11. We use a GW Models wheel press for assembly, which will also quarter the wheels as well as press them on square.

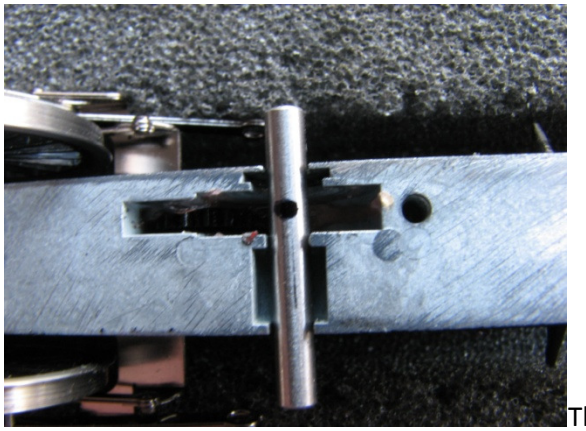


Assembled wheels for front or rear. Note from left to right on the axle; 2x1mm spacers, Peco fibre washer, two Hornby chassis bushes, fibre washer and 2x1mm spacers.

12. These two wheel sets can now be placed in the chassis.


Front wheelset installed.

13. 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.

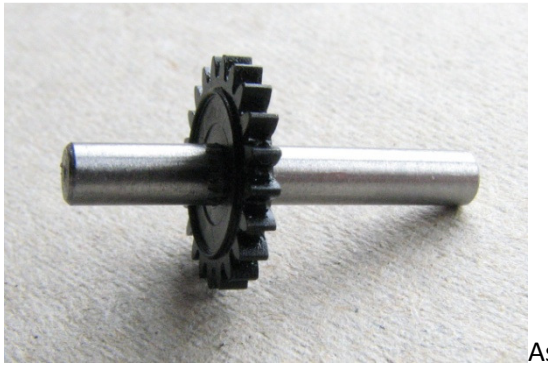

The black dot marks the spot!

14. 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!

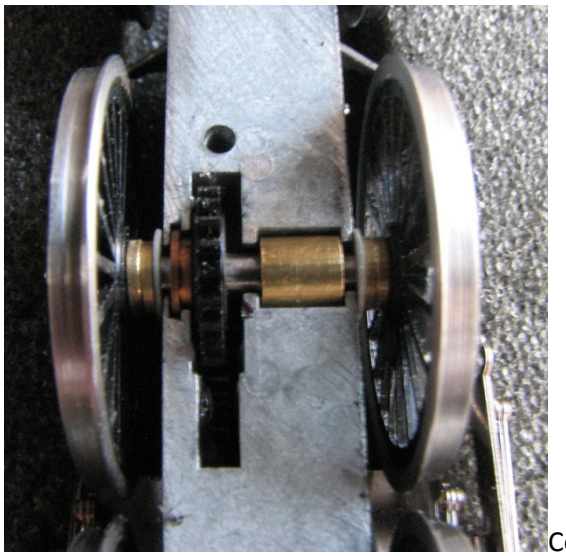

Not too neat....but it works!

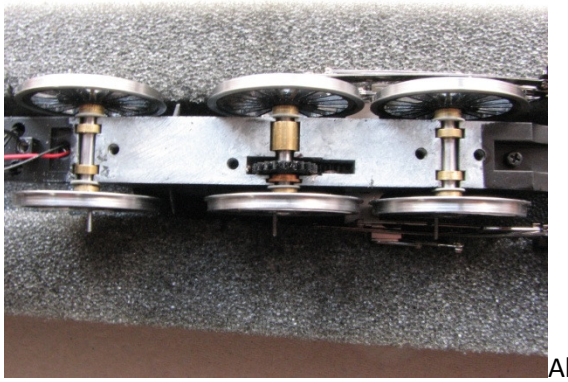
The gear can now be slid onto the axle and pressed over the “knurling”. We found that the side of the gear was 7mm from the axle end (shorter end!) Place in the chassis and check...if all is well you can slide the gear to one side, apply a little Loctite 601, replace and check gear is in the correct position. Leave alone to cure.

Treat yourself to a cuppa or similar.....or deal with the loco body or bogie (see later)

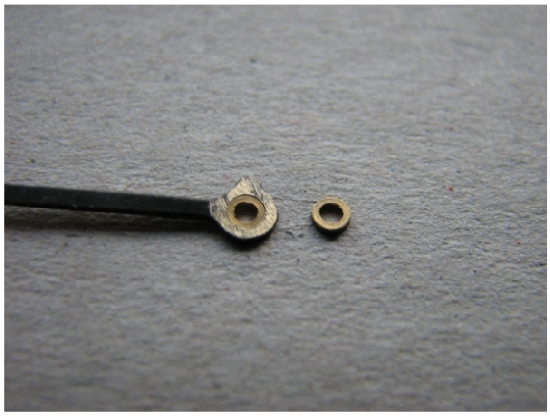

Assembled axle and Hornby gear.

15. Once the Loctite has cured, assemble the driven axle in the press with spacers, fibre washers and the Hornby bushes.
    Make sure you put the narrow Hornby bush on the right way round! It’s so easy to get it wrong!!


Centre axle installed.

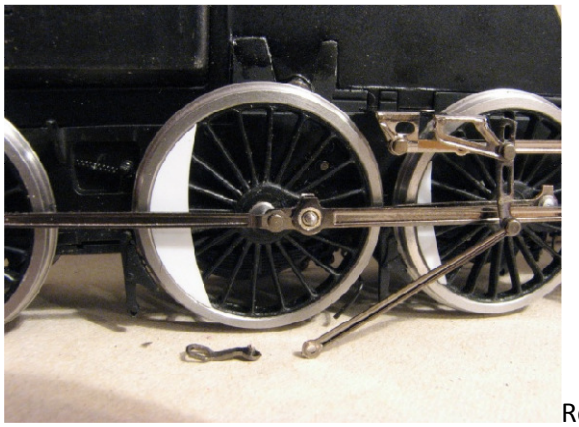
 All three axles installed. Note keeper plate folded over out of the way.

16. Before we replace the keeper plate, chamfer the rear of the brake shoes with a needle file to make sure the brakes
    don't foul the wheels.
17. Lift the keeper plate back into position, trying not to let the two parts of it separate, and fasten down with the four
    screws. You can now place on the track and apply a little power to make sure the driven axle revolves freely.
    Remember to connect the tender plug otherwise it won't work!
18. Next we tackle the coupling rods and the connecting rod big ends. 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 rods. Place a bush in the rod hole, and solder in position. Do this for all 6 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.
    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.

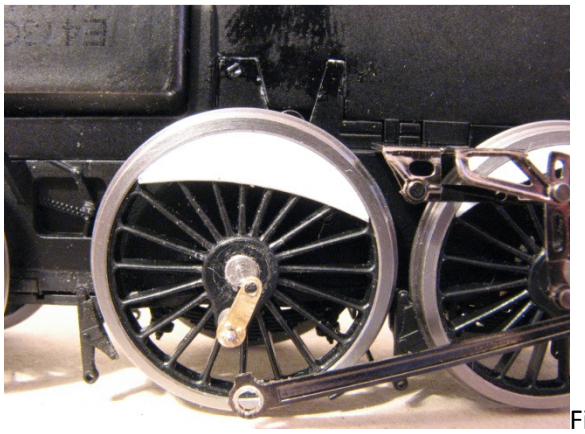
19. The bushes then need a gentle opening out to be a good running fit on the crankpin bushes....simply use a suitable cutting broach and use one of the Gibson bushes as a guide.
20. Assemble the rods onto the wheels. Use a long crankpin bush on the centre wheels, and short ones front and rear.
    Fasten with crankpin nuts front and rear only. Tighten and trim back the front crankpins, and file the nuts to about half their thickness, in order to give clearance for the connecting rod. The rear pins can be left for now if you wish.
21. The Hornby return crank is not much use to us as it fastens in a different way, so we remove these using side cutters under the head of the valve gear rivet.


Return crank removed from rod.

22. Next we prepare the new Gibson return cranks. These need tapping 14BA, and we do this with the cranks still attached to their sprue as it makes holding easier. The tap is held in a pin vice rather than a normal tap wrench – much easier to use.
    Once tapped, they can be cut from the sprue and cleaned up.


Return cranks as supplied with a prepared pair and tap alongside.

23. Wind a crank onto one of the centre crankpins, and naturally it will go tight and stop in the wrong position! Undo, file a small amount from the rear face of the crank boss, and try again. It will now be tight at a point further round,
so by trial and error, we get it to tighten at the correct angle. Repeat for the opposite side, then remove, but make sure you know which one fits which side.

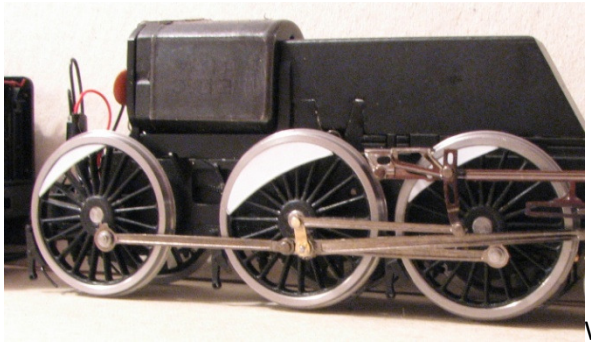

Fitting the return cranks.

24. Lay the chassis on its side, so that the rod is pointing away from the chassis. Place a valve gear rivet into the rod hole.
Then place a small piece of paper over the rivet, with the correct return crank on top of that. Solder the rivet to the Crank, and then tear out the piece of paper. Hopefully, the crank will be free to revolve.....
Clean up the excess rivet and solder.


Rod with rivet in place through hole.


Paper placed over rivet with crank placed on top ready to solder.

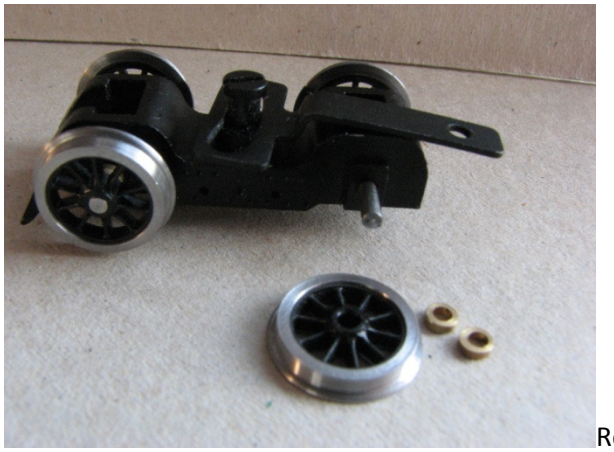
25. The connecting rod should be lifted onto the crankpin and bush, the return crank can now be wound on and tightened. This is easier to accomplish with the wheels rotated so that the crankpins are halfway between six and seven o'clock.....so that the attached valve gear can move about without binding as the crank is tightened.
26. Repeat for the opposite side, and remember to move the wheels so the crankpins are at the six to seven o'clock position. You can gently, repeat gently! move the wheels the small amount required under power.


What the valve gear should now be like!

27. At this point, you should be able to track test the completed valve gear. 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!

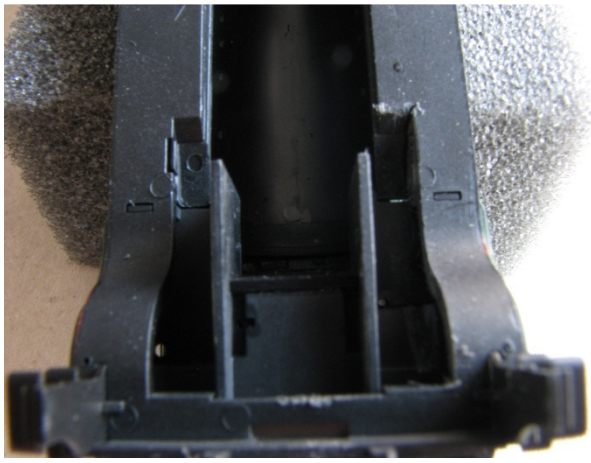
THE BOGIE

1. Simply twist and pull one Hornby wheel from its axle, and slide the remaining wheel and axle out the other side.
2. Repeat for the other Hornby wheelset.
3. Assemble one Gibson wheel onto its axle, and then slide the appropriate spacing washers on, thread through the bogie casting hole, adding the appropriate spacing washers and remaining wheel. Repeat for the second axle. We used 2 x 1mm 2mm bore brass spacing washers each side.


Re wheeling the bogie.

LOCO BODY

1. When we tried to refit the re wheeled chassis to the body, we found that the wider EM wheels would just fit inside the splashers, but were something of an interference fit. So a bit of careful scraping is required.
2. Take a new scalpel blade, we use a curved one, as it seems to give more control. Scrape carefully inside the front and middle splashers with a curving motion, following the curve of the splasher. This will produce a lot of plastic dust/shavings, but is better than trying to slice or cut the plastic body. Cutting tends to be a good way of loosing bits of minor things like fingers, or important parts of the loco we wanted!
3. The rear splashers, or really the void under the cab, can be done with a file basically; just the leading portion of actual splasher needs scraping with the scalpel. Aim to remove around ½ to 1 mm each side. It really depends on how much side play you have in the chassis. We found that with the spacer sizes we have used above, the loco would go through a 36" radius turnout.


Right hand splasher has been widened.

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 **January 2013.**

Parts Used in this Method

4800 Coupling rod Bushes
4M42B Crank pins
4M822 Return Crank
4M67/2 2mm Spacing Washers
Valve Gear Rivets, ours are steel and difficult to solder, we do intend to produce a brass one in the near future, in the meantime Markits produce a Nickel Silver type
Fibre Washers
Loctite, Pete uses some of his precious stock of 601 and we wouldn't want to comment on the suitability of other products.