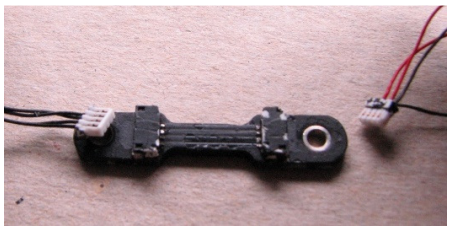
Heljan 02 2-8-0 EM Finescale Conversion.

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.

ENGINE/TENDER COUPLING

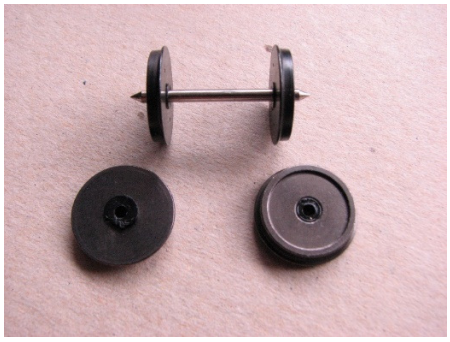
1. The first task is to separate the engine and tender. The drawbar has a screw at each end, and 2 electrical plugs, one at each end of the drawbar. I would suggest undoing the engine end plug and screw only, although the picture below shows both ends disconnected!
2. The plugs slide out sideways, ie. Towards the loco in the case of the engine end, or towards the tender at the tender end. Either way, they are quite tight, and require a lever in the form of a small screwdriver to remove. DO NOT pull the wires, and take care as the wires are very fine.



Drawbar and electrical plugs.

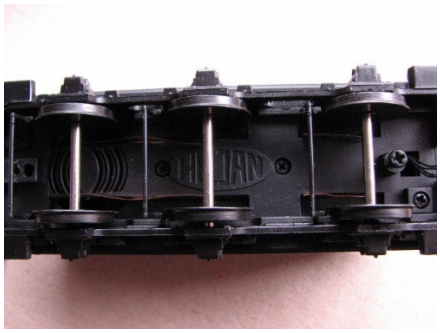
TENDER CONVERSION

1. Invert the tender, and hold in a suitable device. We use a foam cradle – the Peco loco service cradle being ideal.
2. The Heljan wheels are mounted on pin point axles, so need to be carefully sprung out from the tender. Be careful of the brake gear when doing this, as it is glued in position and therefore not easily removed.



Replacement wheels mounted on Heljan axle with original Heljan wheels below

3. Remove the Heljan wheels from the axles, and as these are longer than standard axles (approx. 28mm long), we need to re use these axles and mount the replacement wheels on them, setting the appropriate back to back.



Re wheeled tender

4. Place wheelsets into the chassis, ensuring the pickup wipers bear against the back of the wheel tyres.

Completed tender.

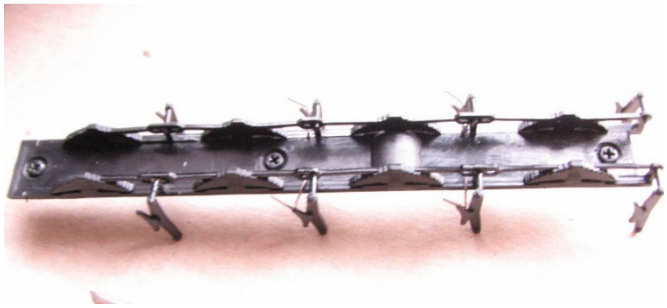
LOCO CONVERSION

1. Remove the loco pony truck by undoing the screw behind the rear of the pony on the loco chassis, and place to one side.
2. Support the chassis upside down in a suitable cradle - undo and remove the loco/ tender coupling bar; place to one side safely.

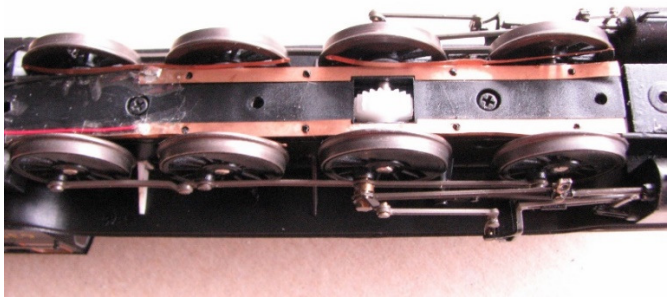
3. Remove the crankpins, remove the return cranks and connecting rods and leave dangling. Recover the coupling rods and place to one side. The crankpins need levering upwards gently and then pulling out of the wheel with pliers. Unlike other manufacturers, Heljan have push fitted crankpins into the wheels rather than using screws. Take care with this as the Heljan valve gear is very fragile and a few of the joints had to be re riveted as they fell apart on our sample.

Crankpin removal!

4. Undo the 3 cross head screws in the keeper plate - store these safely – and gently tease the keeper plate upwards and away from the chassis. This mainly contains the brakes, but reveals a second keeper plate housing the pickups and retained by two screws.

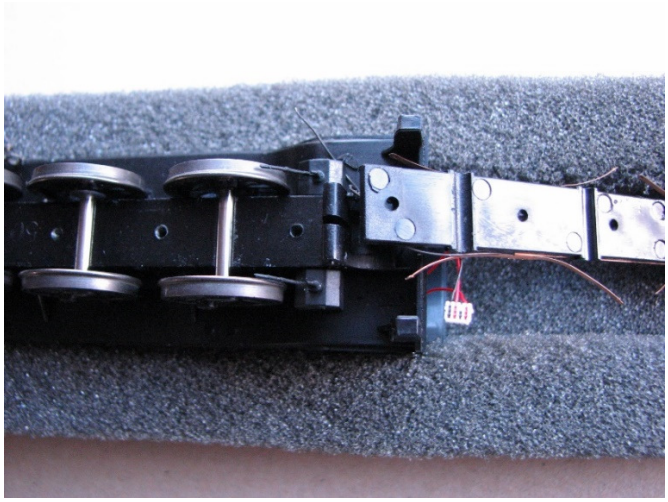


Keeper plate 1 removed……..



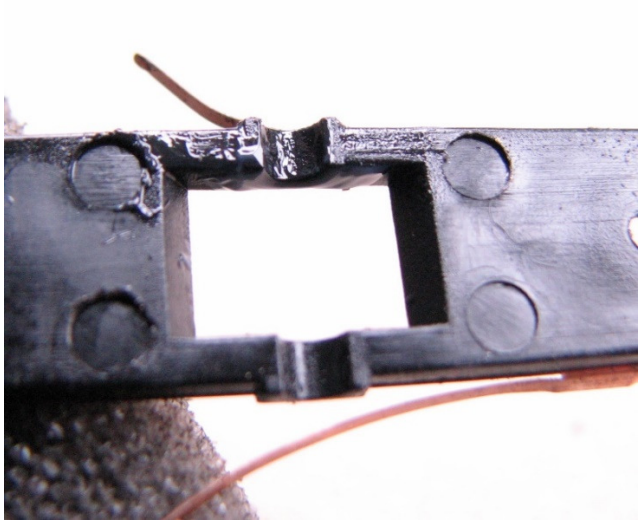
…..revealing second keeper plate and pickups.

5. Undo the two screws in this second keeper plate, and lift away from the front, folding it backwards carefully as it is attached by wires from the pickups. Be careful not to damage the fragile pick ups.



Pickup keeper plate folded back.

6. The driving wheels should now lift out. Notice that half the axle hole is in the metal chassis and half in the plastic keeper plate.
Notice also that the **widest** part of the chassis is the plastic lugs that protrude from the side of the axle groove in this plastic keeper plate, not the metal chassis. Worth noting for reference when working out the amount of sideplay spacing washers you need. You may well ask why we mention this……..

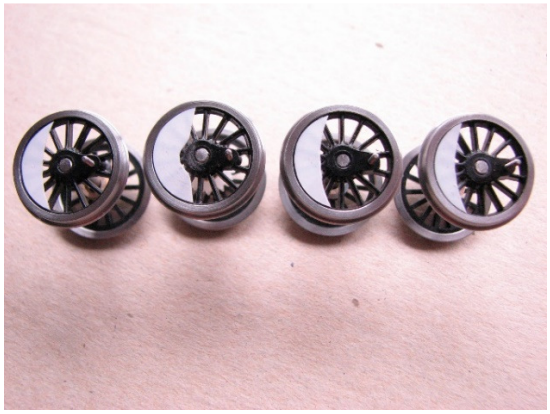


Lugs each side of axle slots on keeper plate.

7. Note also that the removed wheels have a plastic washer next to the chassis……presumably to prevent any contact and therefore short circuit between wheels and pickups.

8. Remove the wheels from the axles – we need to recover and reuse the plastic washers from all axles, as well as the gear wheel. 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 fairly easily, as the axle underneath it is plain.

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 21.5mm long.



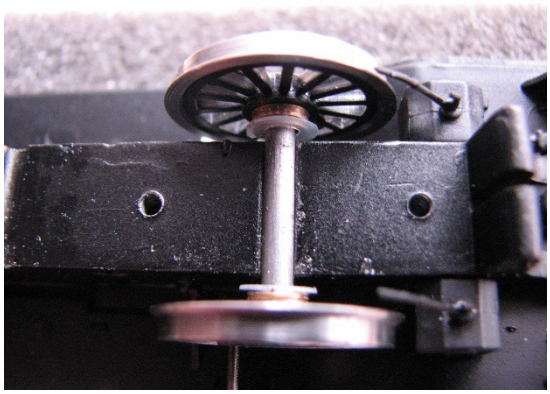
Gibson wheels fitted with crankpins and balance weights.

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 the Heljan plastic washer each side on the front axle. All other axles had 1 x 1mm + 1 x 0.5mm + plastic Heljan washer each side. The plastic washer should be inboard of any brass spacing washers and are to prevent the Heljan pickup strips touching the brass spacers which could otherwise cause a short when running. On our sample, one axle did not have these plastic washers, so we substituted Peco fibre washers to be safe!

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 the non-geared axles. Note from left to right on the axle; 1mm & 0.5mm spacers, Heljan plastic or Peco fibre washer, plastic or fibre washer and 1mm &1.5mm spacers.

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

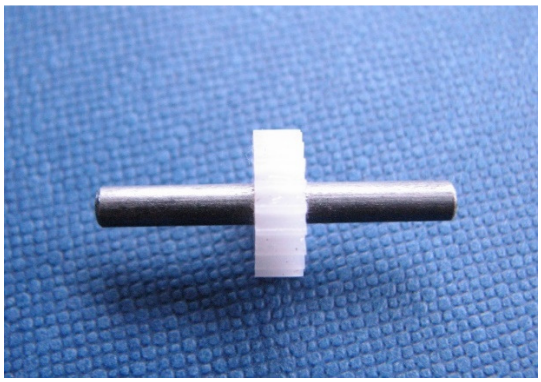


Rear wheelset installed.

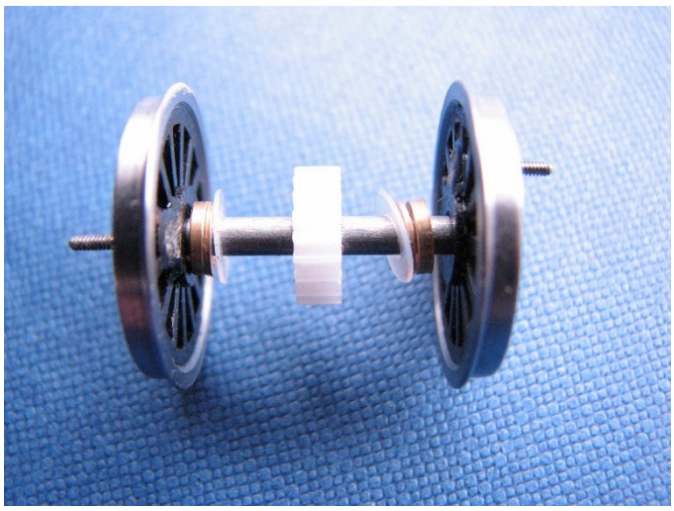
13.The geared axle needs to be “knurled” to retain the gear and prevent it rotating on the axle. As the gear is central on the axle, we can place the axle on a cutting mat or similar, take a small hand file, we use a 4 inch second cut file, and using the file on edge, roll it with firm downward pressure over the axle in the centre.

Not too neat....but it works!

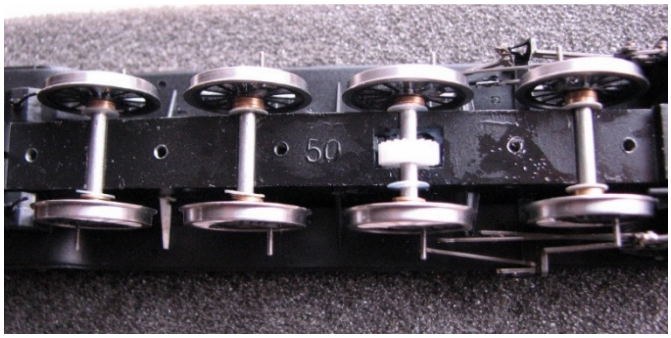
14.The gear can now be slid onto the axle and pressed over the “knurling”. Ensure that it is central.



Assembled axle and Heljan gear.



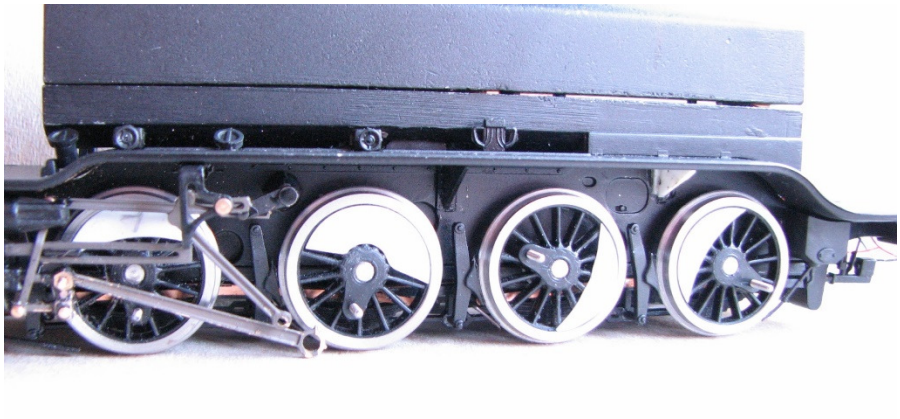
Driven axle assembled with spacers plus plastic washers.



All four axles installed.

15. Before we replace the keeper plate, trim the brake shoes with a needle file to make sure the brakes don't foul the wheels.

16. Lift the keeper plate back into position, taking care with the pick ups, and fasten down with the two screws. The outer brake keeper plate can then be replaced and retained with the three 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!



Wheels and keeper plates installed.

17. Next we tackle the coupling rods and the connecting rod big ends. The Heljan rod holes are just slightly too small for Gibson crankpin bushes so need opening slightly with a cutting broach to fit the Gibson bushes.

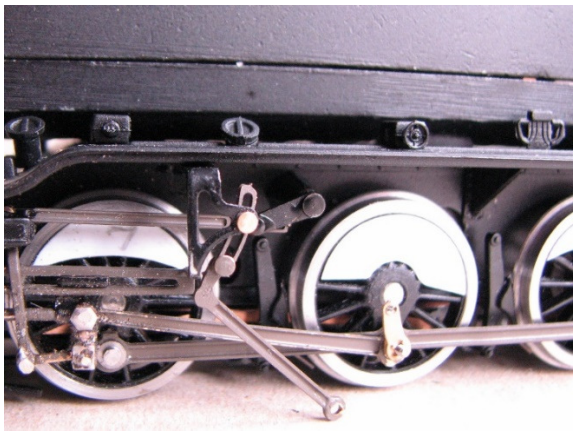
18. Assemble the rods onto the wheels. Use a long crankpin bush on the second axle, and short ones on the remaining three. Fasten with crankpin nuts front, third and rear only. Tighten and trim back the front crankpins, and file the nuts to about half their thickness to give clearance for the connecting rod. The rear two axles pins can be left for now if you wish.

19. The Heljan 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 it's valve gear rivet.

20. Next we prepare the new Gibson return cranks. These need to be tapped 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.

21. 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.

22. 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.

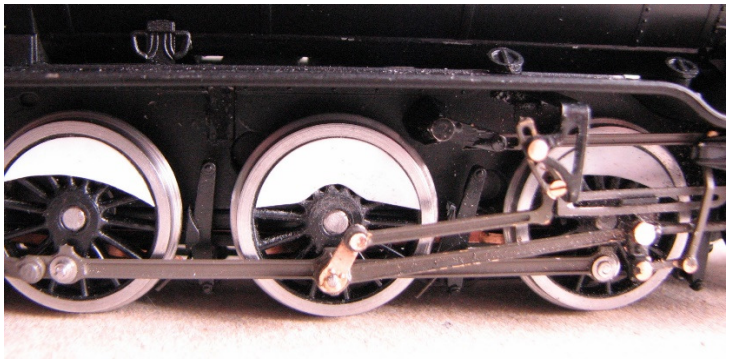
Rod with rivet in place through hole.

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

23. 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.

24. It can be easier to move the wheels by removing the centre screw in the large cast chassis weight on top of the chassis, this gives access to the motor and flywheel. Simply rotate the flywheel manually to revolve the wheels.

25. 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.



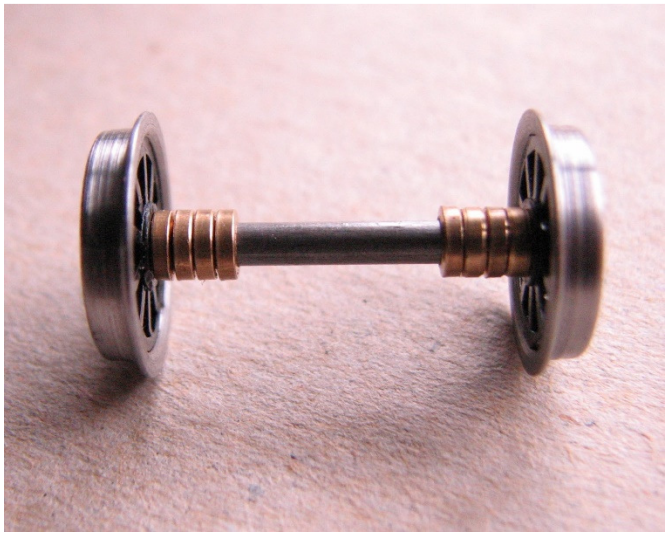
How the Valve gear should now appear!

26. 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 PONY TRUCK

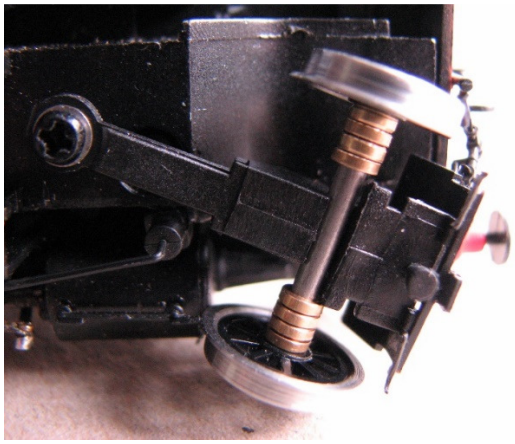
1. The Heljan pony wheels simply unclip or pull out from the bottom of the pony truck

2. Assemble one Gibson wheel onto its axle, and then slide the appropriate spacing washers on, and remaining wheel. We used 4 x 1mm 2mm bore brass spacing washers each side.



Pony wheels assembled.

3. Clip the replacement wheels into the Heljan pony truck, and attach back to the chassis.



Completed pony truck.

FINAL ASSEMBLY

Reassemble the chassis to body, and track test.

Don't forget to lubricate it!

Pete Hill, November 2016.

Note** The GW wheel press can be used for 2.5 mm axles if the locating pins are removed and turned round.

Alan Gibson Parts Used
Conversion Driving Wheels 4800/62
Pony Wheel 4842
Tender Wheels 3 x 4851
Crankpins 4M42
1/8" Spacing Washers 4M67/3
2mm Spacing Washers 4M67/2
Return Crank 4M822

Other Parts
Peco Fibre Washers
Nickel Silver Rivets – Markits?
0.010" Plasticard