## GER Y14 / LNER J15 Loco Chassis Instruction

### The John Gardner Memorial Etches

This J15 locomotive chassis along with the S23 and Z14 tender underframes are dedicated to the memory of the late John Gardner. John did so much for thorough and accurate G.E. locomotive histories and these detailed etches depend directly on his work.

## Notes

This chassis kit is designed as a modern replacement for the one included in the Alan Gibson locomotive kit. It includes CSB suspension as well as cosmetic inside motion and covers many of the prototype variations. The chassis can be built in EM and P4 and is designed to negotiate a 1m radius curve in both gauges using the same subframe. There is therefore only 1 set of 'framespacers'.

As with a lot of locomotives of the period, the GER Y14/LNER J15s featured many changes over the course of their build program and in service. A lot of these changes are covered in this chassis kit. I will not give exhaustive prototype information here as it is covered in depth elsewhere but will suffice to say that the prospective builder would be wise to consult the Great Eastern Railway Society material along with the relevant RCTS and Yeadon volumes on the subject in question for the scope of these variations for. To assist the prospective builder however, the following is a list is a summary the variations covered by this kit.

- Square bottom fireboxes
- Bevel bottom fireboxes
- Bevel bottom fireboxes for locos originally built with square bottom fireboxes
- Inside and outside of frame guard irons
- Short and long buffer beam to sideframe reinforcing plates
- Short and long brake shoe brackets
- Sharp Stewart brakes for the first batch built
- Steam brakes
- Westinghouse air brakes
- Plain or fluted coupling rods

All fold lines are through  $90^{\circ}$  with the fold line on the inside unless stated otherwise.

Refer to the instruction drawing as you progress.



# **CSB** Springing

The kit is designed to use CSB suspension. Fulcrum points for the spring wire and carriers to attach to the High Level bearings are included. The CSB plot is set up to use 0.014" steel wire (14 gauge guitar wire - included) with a total loco weight of 300g. This is a practically achievable weight for the loco, especially given the nature of the body kit. If your loco weight far exceeds this figure (which is probably unlikely) then consider using 0.015" wire. If it significantly less than the 300g consider adding some ballast to bring it closer to this figure. Care must be taken to ensure the centre of gravity is just behind the middle axle.



# **Materials List**

0.4mm, 0.45mm, 0.5mm, 0.8mm and 1mm wire1/8" outside diameter tube for steam brake cylinder4.5mm outside diameter tube for Westinghouse air brake cylinder12BA bolts for fixing the body in place

Eileen's Emporium are good source for wire, tube and bolts. Also they do a mixed sizes pack of wire if you don't want to buy large quantities. Contact details are as follows:

## **Eileen's Emporium**

Unit 19.12 Highnam Business Centre, Newent Road, Gloucester, GL2 8DN www.eileensemporium.com

High Level Hornblock bearings - 1/8" diameter Spacesaver bearings are required for the driven axle (designed to be the rear axle) and also for the front and centre axle if using the cosmetic inside motion. Standard bearings can be used for the non-driven axle but there won't be enough room for the inside motion to be constructed as intended if you do. You'll only need the bearing as the guides are included in the chassis.

The recommended gear box is the High Level HiFlier mounted on the rear axle with the motor vertical in the firebox. A 20mm long 14mm flat can motor should just about fit.

High Level Kits can be found via the following information:

High Level Kits 14 Tudor Road, Chester-le-Street, Co. Durham DH3 3RY www.highlevelkits.co.uk

Rumney Models J15 Loco Chassis 2

## Parts List - Chassis Frets

- 1A Sideframes (square bottom firebox)
- 1B Sideframes (bevel bottom firebox)
- 2 Loco subframe

3A - Brake shoe brackets & rivet overlays (short)

3B - Brake shoe brackets & rivet overlays (long)

3C - Brake shoe brackets (for rear axle of locos fitted with ashpan reinforcing ())

4 - Ashpan reinforcing overlays (for locos built with square bottom fireboxes but later given bevel bottom fireboxes)

5A - Guard irons (inside frame)5B - Guard irons (outside frame)

6A - Sideframe to buffer beam reinforcing plates (short)

6B - Sideframe to buffer beam reinforcing plates (long)

7 - Motion bracket

8 - Middle frame spacer

9 - Steam brake cylinder former & overlay10 - Westinghouse air brake cylinder former& overlay

- 11 Westinghouse air brake shaft bracket
- 12 Rear frame spacer

# 13A - Spring carriers (Spacesaver High Level Hornblocks) 13B - Spring carriers (Standard High Level Hornblocks) 14 - Hornguides 15 - Axle washers 16 - Coupling rods

17A - Ashpan (square bottom firebox)

17B - Ashpan (bevel bottom firebox)

18 - Slidebars

19 - Brake Shoes

- 20 Sharp Stewart brake pull rods
- 21 Brake pull rods
- 21A Brake pull rods (front axle overlays)
- 21B Brake pull rods (middle axle overlays)
- 21C Brake pull rods (rear axle overlays)
- 22 Sharp Stewart brake links

22A - Sharp Stewart brake links (pull rods overlays)

22B - Sharp Stewart brake links (crank overlays)

- 23 Steam brake links
- 23A Steam brake links (crank overlays)
- 24 Westinghouse air brake links

23A - Westinghouse air brake links (crank overlays)

25 - Driving wheel springs

26 - Drawbar

#### Parts List - Inside Motion Fret

A1-Q2 Inside motion parts B/W - Balance weight detailing C/H - Crosshead R/L - Reversing lever crank





## **Chassis Construction**

The basis of the loco chassis is a fold up subframe onto which the sideframes are fixed. This should be done before either the sideframes or the subframe are removed from their frets as the surrounding fret will be used to align the parts. To aid joining the parts together it is useful to create a jig to locate the parts on. Take the subframe (2) and drill 1mm diameter holes into a piece of suitable mdf or similar using the holes in the surrounding fret. These are marked in green in Fig.1. Remove the subframe from the jig but not from the fret at this point.



There are two choices of sideframe. Which type you need will depend on whether you are modelling a square bottom (1A) or bevel bottom firebox (1B). If you are constructing a square bottom firebox loco you will need to remove the area shaded green in Fig. 2 below. If you are constructing a loco which was originally built with a square bottom firebox but later converted to use a bevel bottom one use sideframes 1A and leave the area shaded green in Fig. 2 in place. Fig. 2



Whilst still attached to the surrounding fret press out the half etched rivets on your choice of sideframes. Leaving the sideframes attached to the fret split the sideframes and fret in two. There is a half etched line on the fret midway along the short side to mark where it should be cut and then remove the washers to separate the two sides.

Use short lengths of 1mm wire to align the sideframes on the jig created earlier. They should be arranged so that the pushed out rivets are facing the piece of mdf or similar. Remove parts 14 from the subframe and fold out the 8 fulcrum points for the CSB suspension. The later items are shaded yellow in Fig.1 above. Place the subframe over the sideframes using the short lengths of 1mm wire to align everything. The subframe should be arranged so that the half etched fold lines and the CSB fulcrum points are facing away from the piece of mdf. The sideframes and subframe can then be soldered together.

Once securely soldered together the subframe/sideframe assembly can be removed from the jig and cut away from the surrounding frets. Any connecting tags can then be cleaned up. Do not fold up for the moment.

Before folding the subframe up it may be easier to add some details to the sideframes. Start with the brake shoe brackets and associated rivet overlays. There are two main choices of bracket and rivet detail depending on whether the bracket is short (3A) or long (3B). Which type you need will depend on your loco of choice. I'm not sure that there was much of a pattern. Note that these brackets were only fitted to the middle and rear axles. If you are modelling a loco that was originally built with a square bottom firebox but converted to use a bevel bottom firebox then you will need to use brackets 3C on the rear axle. There is no associated rivet overlay with brackets 3C. The brackets can be fitted in place using the larger slots in front of the holes for locating the brake shoes. In all cases the top of the bracket comes flush with the top of the sideframe. Solder in place. Solder the rivet overlays in front of the brackets.

If you are modelling a loco that was originally built with a square bottom firebox but converted to use a bevel bottom firebox then now is the time to fit the ashpan reinforcing overlays (4) in place. The outline of the sideframes will guide where they should be located along with brake shoe bracket 3. Solder in place.

Next the guard irons can be fitted. There are two types depending on whether the irons were mounted in the inside (5A) or outside (5B) of the frames. Check your prototype for which type you need. Use 0.4mm wire to fit the guard irons to the frames and solder in place. The wire can then be trimmed to represent bolt heads.

Lastly before folding the sideframe up, the sideframe to buffer beam reinforcing plates can be fitted along with their associated rivet overlays. Again there are two types; short (6A) and long (6B) and again refer to your prototype for which type you need. The reinforcing plates can be fitted at the front of the sideframes using the slots provided. The rivet overlays can be soldered in pace below the triangular plates.

Now is the time to fold up the subframe. Make sure that the sides are parallel and perpendicular to the top spacers. Fold down the two spacers that represent the front and back of the cylinders, theses are the parts shaded light blue in Fig. 1. They will locate into slots in the sides of the subframe. You will need to gently open out the sides to get the tabs into the slots.

Next fit the motion bracket (7) along with the middle frame spacer (8). There are half etched rivets in the middle of the motion bracket. Press these out and then fold the motion bracket double. Solder the two halves of the motion bracket together and fit to the chassis. There are slots in the subframe at an angle between the front and middle axles to locate the motion bracket and the side of the motion bracket with the fold line should go at the top when fitted. The middle frame spacer fits into vertical slots just behind the middle axle.

Once all the spacers are in place double check that the chassis sides are parallel and perpendicular to the top spacers and then solder everything in place.

Before moving on to the business of creating a running chassis it is worthwhile fitting the steam or Westinghouse brake cylinders.

These are created from formers and overlays along with a short length of tube for the cylinders. You will need a piece of 1/8" outside diameter tube 5.4mm long for the steam brake cylinder. For the Westinghouse brake cylinder you will need a piece of 4.5mm diameter tube 3.45mm long. For the steam brake cylinder remove the former and overlay (9) from the fret. Fold the former into a U shape and locate the 1/8" outside diameter tubing into the rings etched on the inside. Solder in place. The overlay can then be fitted to one end of the former using the circular outline and slot in the centre to align it. Note that there are two notches on the top of the former which are offset a little towards one end; the overlay should go on the end closest to the notches. See Fig. 3a below. Note also that the locating tab at one side should be made flush with the top. This is the side furthest from the notches in the top. See Fig. 3a again.



Attach overlay to outside of this end

For the Westinghouse brake cylinder remove the former and overlay (10) from the fret. Fold the former into a U shape and locate the 4.5mm outside diameter tubing into the rings etched on the inside. Solder in place. Note that on one side of the U there is a cut out where one of the fold lines is. This is to allow some clearance for the bolt that will be used to fix the body and tender coupling in place at the rear of chassis. Fit the overlay to the end of the former with the cut out using the circular outline to align it.

If modelling a Westinghouse fitted loco you will also need to remove and fold into a U shape the Westinghouse air brake shaft bracket (11).

Fig. 3b below shows a drawing of what you will encounter when looking at the rear of the loco chassis from underneath. There are various slots etched into the spacer at this location. The following should be used to locate the steam/Westinghouse brake cylinders:

- Green slot Steam brake (Sharp Stewart built locos only)
- Yellow slot All other steam brake fitted locos
- Red slots Westinghouse brake
- Light blue slots Westinghouse air brake shaft bracket
- Dark blue slots Rear frame spacer (12)

Fit the brake cylinders of choice (and in the case of the Westinghouse locos the brake shaft bracket) using the tabs provided and the appropriate coloured slots in Fig. 3b below. Note that the Westinghouse air brake shaft bracket should be arranged so that the holes for the brake shaft are towards the centre of the loco.

Once these parts are in place the rear frame spacer (12) can be fitted using the dark blue slots in Fig. 3b.



Next we can move on to setting up a running chassis.

There are two types of spring carriers depending on whether you are using Spacesaver High Level Hornblocks (13A) or Standard High Level Hornblocks (13B). The choice of bearing was covered in the intro but if you intend to fit the cosmetic inside motion you will need to use Spacesaver hornblocks on all axles.

Before removing from the fret check the fit of the bearing in the circular hole and use a broach to open the hole up if too tight. The bearing should be a nice fit in the hole. Remove from the fret. The spring carriers have ears on them with a small V etched into the top into which the spring wire will fit. Fold out these ears and then fit and solder to the back of the bearing.

The bearings can be fitted in the cut outs in the chassis with the ears for the CSB springs to the top. It is useful to keep each bearing in its own cut out. To this end arrange the ears on the spring carriers so they all face towards the front (the spring carriers come in mirrored pairs for this) and then mark them according to axle.

The hornguides (14) can be removed, folded into a U shape and fitted into slots in the subframe either side of the cut outs. The slot at the front should be a tight fit but the one at the rear allows for a little lateral movement in case some tweaking is necessary with the hornguides.

The wheels can be fitted next with axle washers (15) to remove side play on the front and rear axles.

Next assemble the coupling rods (16). There are three layers to the coupling rods and they should be assembled whilst still attached to the surrounding fret. Before putting the rods together split each layer down the middle to separate them for each side. There are 4 holes etched into the surrounding fret which will be used in a similar fashion to those on the fret for the subframe to pin everything together. Take the two halves of one of the layers and use the fret to drill 1mm holes into a piece of mdf or similar. The three layers for each side can be layered up using 1mm wire and these holes to locate everything. Layer them so the fluted side is at the bottom, the middle in the middle and the plain on the top. Solder together then remove from the fret. Clean up the connecting tags and fix the front and back parts for each set of coupling rods using or piece of 0.8mm diameter nickel silver wire. Carefully solder the wire to the outer layer only to create the joint. This joint goes forward of the middle axle. The coupling rods can be arranged to be fluted or plain depending on which side they are located.

The ashpans can be fitted next. There are two depending on whether you are modelling a square bottom (17A) or bevel bottom firebox (17B). The pair for square bottom fireboxes have three small half etched rivets on each of the larger parts which should be pressed out.

Each side of the ashpan comes in two layers which need to be soldered together using 0.5mm wire to locate the two parts. The holes shaded green in Fig 4 will give you an idea of which ones to use. Once soldered together the locating wire can be removed or filed flush if soldered in place. Each side of the ashpan then locates onto the inside of the subframe (2) using slots in the bottom of the middle frame spacer and the rear top spacer of the subframe itself. Solder in place.

The slidebars (18) can be assembled now. There are four on the fret but you will only need two. They should be folded double and soldered together before fitting to the loco. Note that on one half of the slidebar there is a small rectangle etched at one end which is designed to fit into a tab on the motion bracket. If you do not wish to use the inside motion then you can fix in place now by passing the slidebar through the slots in the cylinder spacers and locate the slot on the motion bracket and soldering in place. If you are using the inside motion then put to one side for the time being as they are best fitted with the crossheads.

The brake shoes (19) come in three parts: A small brake shoe detailing overlay which goes on top of a brake shoe and hanger along with a fold out locating tab at the top which in turn goes on top of completely full thickness shoe and hanger. Use 0.5mm wire in the holes at the top of the hanger and the brake shoe to align the three layers and solder together. Once soldered together the small locating tab at the top of the hanger on the middle layer can be folded up. You will note that this locating tab is a different orientation on one of the sets. This is the set of brake shoes for the front axle. The locating tab can be used in conjunction with the small slots on the sideframes next to fit the brake shoes.

Next we need to deal with the brakegear pull rods and links. There are broadly speaking two sets, one for the original Sharp Stewart locos and one, with variations in links for steam of Westinghouse fitted locos, for everything else. It makes sense to deal with the two sets separately.

You may wish to give some though as to how the brakegear may be made removable for dropping the wheels out. Steam braked locos shouldn't present too many issues but you may wish to simply pin the brake links to the pull rods rather than soldering them in place. Westinghouse locos are complicated by the gearbox which will prevent you from sliding the brake links out of the cylinder. I'd consider soldering the brake links to the pull rods, not putting the shaft through the bracket and shortening the tab on the brake links that goes into the cylinder to the minimum necessary in order to locate it. You can then remove the brakegear as one unit.

## **Original Sharp Stewart Locos**

If you are building one of the original Sharp Stewart locos remove the appropriate brake pull rods (20) from the fret. They can be fitted to the brake shoes on the front and middle axles using 0.5mm wire. The pull rods go outside of the wheels. Don't fit to the rear axle yet as there is a set of brakegear links for this.

Remove the Sharp Stewart brake links (22) along with the overlays for the pull rods (22A) and crank (22B). Use 0.5mm wire to align the pull rod overlays on the top and bottom of the brake links using the outer and centre holes. Solder together and file the wire flush on the outer holes and trim to represent a bolt on the centre holes. Note that some of these holes may need opening out a little using a broach or 0.5mm drill. In a similar fashion use 0.5mm wire to align the crank overlays on either side of the brake links and solder together. Trim the wire to represent bolts.

Solder short lengths of 0.5mm wire into the slots on the pull rod and then twist the brake link just behind the pull rod through 90°. The pull rod can be fitted by sliding the link into the steam brake cylinder and then locating on the rear set of brake shoes and pull rods.

# **Everything but the Original Sharp Stewart Locos**

Remove the brake pull rods (21) along with the associated overlays for the front (21A), middle (21B) and rear (21C) axles. Use 0.5mm wire to align the overlays on the top and bottom of the pull rods and solder firmly in place using the pair of holes towards the outside of each overlay. You will need to open out the ends of the pull rods to accommodate 0.5mm wire which will locate with the brake shoes. Use a 0.5mm drill to do this and solder short lengths of 0.5mm wire in place. This brake pull rod unit can then be fitted to the brake shoes. Note that the links between the pull rods on this unit should be on the same side as the brake cylinder.

There are two sets of brake links for depending on whether you are modelling a loco with steam (23) or Westinghouse (24) brakes.

For steam brake fitted locos remove the steam brake links (23) and crank overlays (23A). Use 0.5mm wire to align the crank overlays on both sides of brake link and solder in place. Trim the wire to represent bolts. The links can be fitted by sliding them into the steam brake cylinder and then locating on the small bracket created by the overlays at the rear of the pull rods. There is a hole in the pull rod unit and the brake link that can be fitted to though this is not recommended if you want to make the brake pull rods removable.

For Westinghouse brake fitted locos remove the Westinghouse brake links (24) and crank overlays (24A). Use 0.5mm wire to align the crank overlays on both sides of brake link and solder in place at the top and bottom only. Trim the wire to represent bolts. The links can be fitted by sliding them into the Westinghouse brake cylinder and then locating on the small bracket created by the overlays at the rear of the pull rods. There is a hole in the pull rod unit and the brake link that can be fitted to though this is not recommended if you want to make the brake pull rods removable. A length of 0.5mm wire can then be fitted through the Westinghouse air brake shaft bracket and the middle hole on the brake link crank.



The cosmetic driving wheel spring can now be fitted. Each spring is made up of two parts that need folding up and then soldering to each other. See Fig. 4 above. Note that the fold lines through 180° are with the fold line or half etch on the outside. Once folded use 0.4mm wire to locate the two parts together using the green holes, solder together and trim the wire to represent bolts. Each completed spring unit can then be fitted to the chassis using 0.5mm wire through the holes in the hornguides and the holes shaded yellow on the driving wheel springs in Fig. 4. The locating wire can be bent at the ends to retain them.

A drawbar (26) is provided which will need folding double and soldering together. It is designed to use 12BA bolts.

# **Inside Motion**

The inside motion is designed to be purely cosmetic and cannot be make to work. The bulk of the motion is designed to be pinned together using two lengths of 0.45mm wire. There is however a lot of layers so you may want to do it in two halves. The layers are numbered and you should start with A1 then add A2, etc. It probably makes sense to only remove 1 part at a time so you don't loose the numbering. Fig.5 on the Inside Motion Drawings sheet at the end of these instructions shows an exploded drawing of the left hand side of the inside motion. The right hand side of the motion follows the same idea using parts J-Q2. Note that part I is a spacer between the two hales and could be fitted to either if doing the halves separately. Once all the layers have been soldered together you can add the wire to represent bolts on the rockers and also the 'crankpin'. Leave the reverser shaft until fitting the inside motion in place.

**Important:** Note that you should <u>not</u> use parts C4 and O4 when assembling the motion. If you do the motion won't fit between the hornblocks.

The last item to do is the crosshead (C/H). This should be folded up as per Fig. 6. 0.5mm wire can be added through the 6 holes in the top (shaded yellow) to represent bolts if wanted. The holes shaded green are to align the three layers on the top using 0.5mm wire.

## **Inside Motion Assembly**

Pass the slidebar through the slots in the cylinder spacers noting that there is a small rectangle etched at one end which is designed to fit into a tab on the motion bracket. Before fitting to the motion bracket slide the crosshead onto the slidebar and then fix the slidebar to the motion bracket using the tab and slot provided.

Locate the inside motion in place using a length of 0.8mm wire for the reversing rod, passing it through the loco chassis sides and the twp halves of the inside motion.

You can fix the crosshead to the ends of the connecting rods on the inside motion using 0.8mm wire and then solder everything in place.

A reversing lever crank (R/L) is included with the inside motion for fitting to the end of the reversing shaft should you wish to use it.

#### Thanks

A special thank you should be made to Alan Fell who supplied much information that was helpful in designing this kit.

Justin Newitt - September 2019

