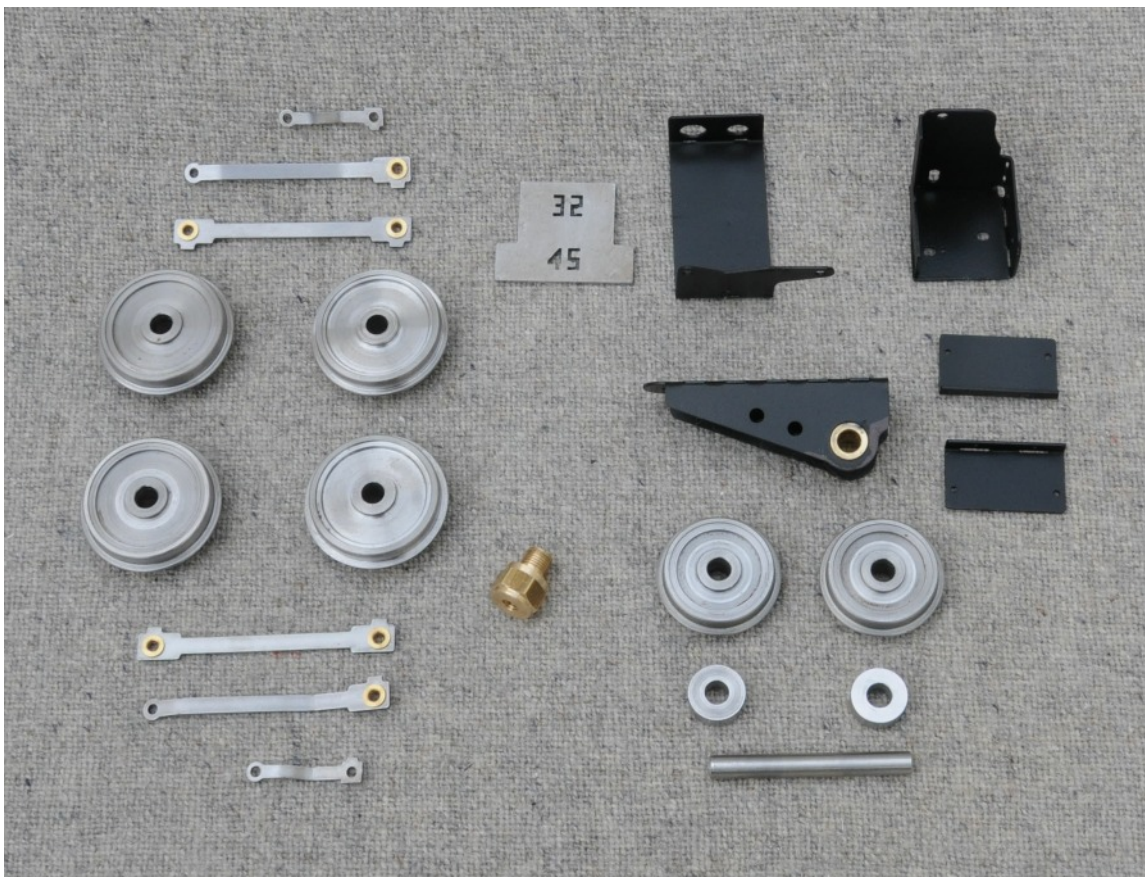
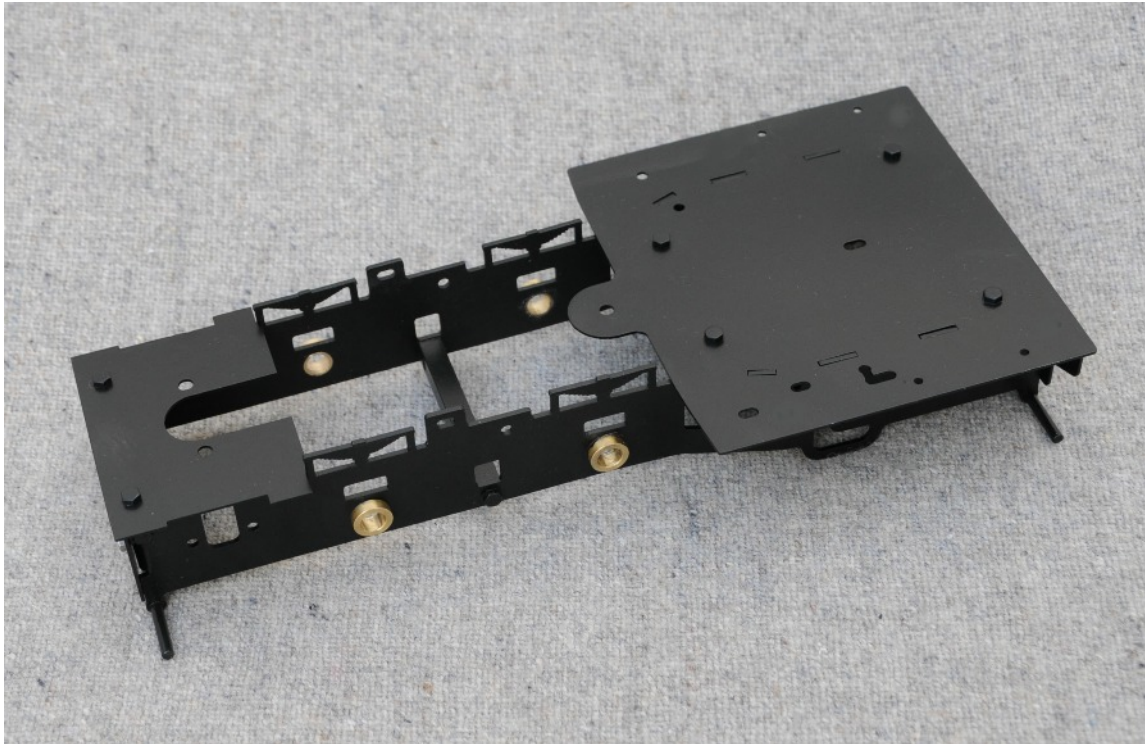


“Victory” Assembly of Laser Cut Parts 1.0 mm & 1.5 mm Mild Steel



These photographs show the laser cut parts, assembled and painted as well as the machined items included in the kit.

The instructions for fitting the driving wheels and the “sand box” locating plug will be described in the second section of this guide, covering assembly of the parts supplied by Roundhouse.

Parts provided in shipping box

Description	Qty
#7 decal	2
0.9 mm etch brass - 305mm x 145mm	1
0.9 mm etch brass - 305mm x 460mm	1
1.0 mm mild steel laser parts	1
1.5 mm mild steel laser parts	1
12" 6 BA stud	1
Bag of fixings	1
Coupling and connecting rod bushes	6
Cab handrails	4
Clamping jigs	2
Driving axle bushes	4
Driving wheels + allen head set screws	4
Frame spacer	2
Front catcher bar 92mm	1
List of fixings	1
Pony truck axle	1
Pony truck axle bush	1
Pony wheels + allen head set screws	2
Rear catcher bar 110mm	1
Sand box dome	1
Sand box location plug	1
Sand box pipes (under the bag of fixings)	2
Spacers pony truck wheels	2
Whistle	1



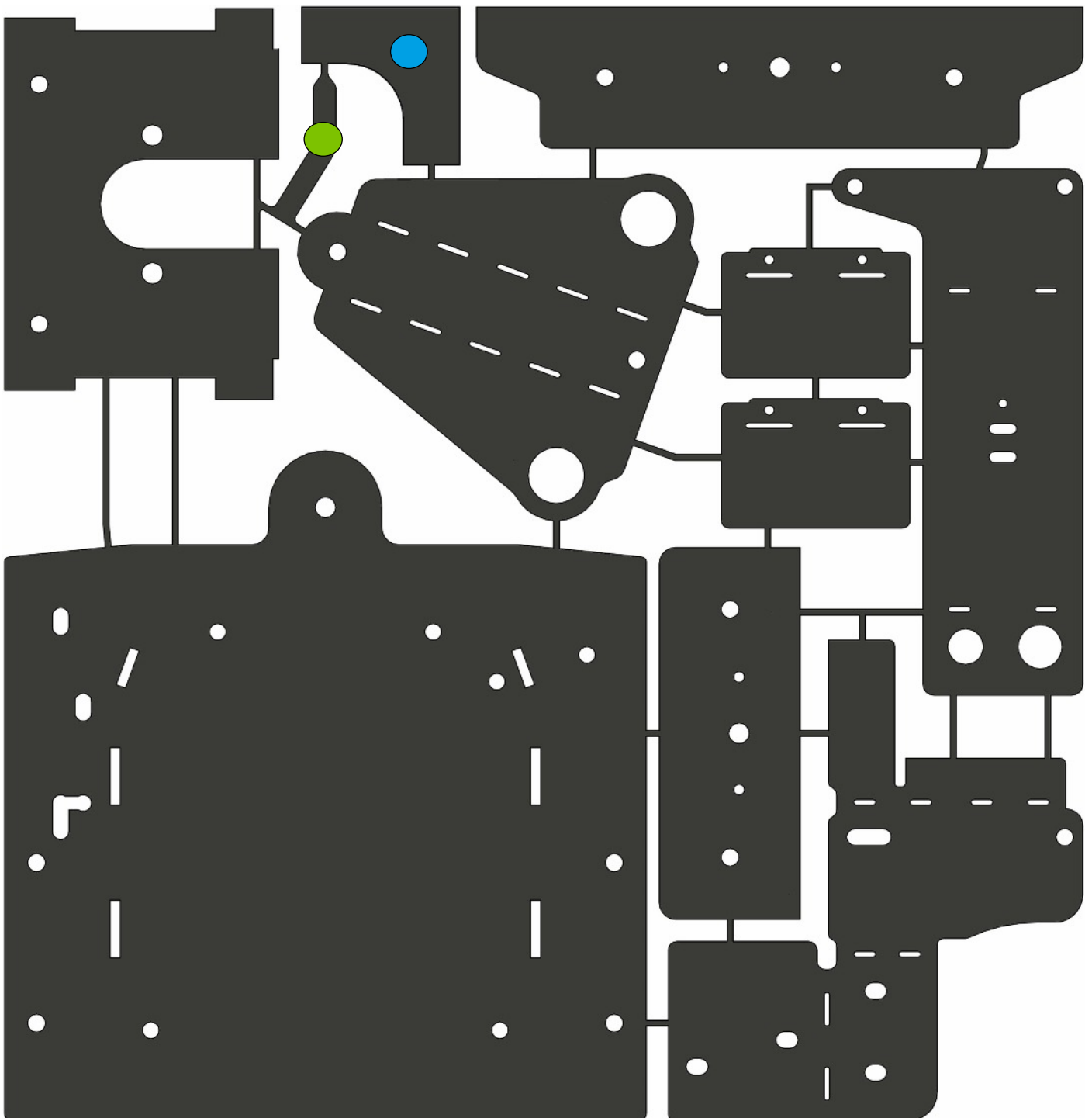
The tools shown above were used during assembly of the laser cut parts, as well as a vice and spanners for the 6 BA items. Bolts are 4.5 AF & nuts are 4.9 AF (approximate AF's). A 6 BA x 7 BA box spanner is also useful.

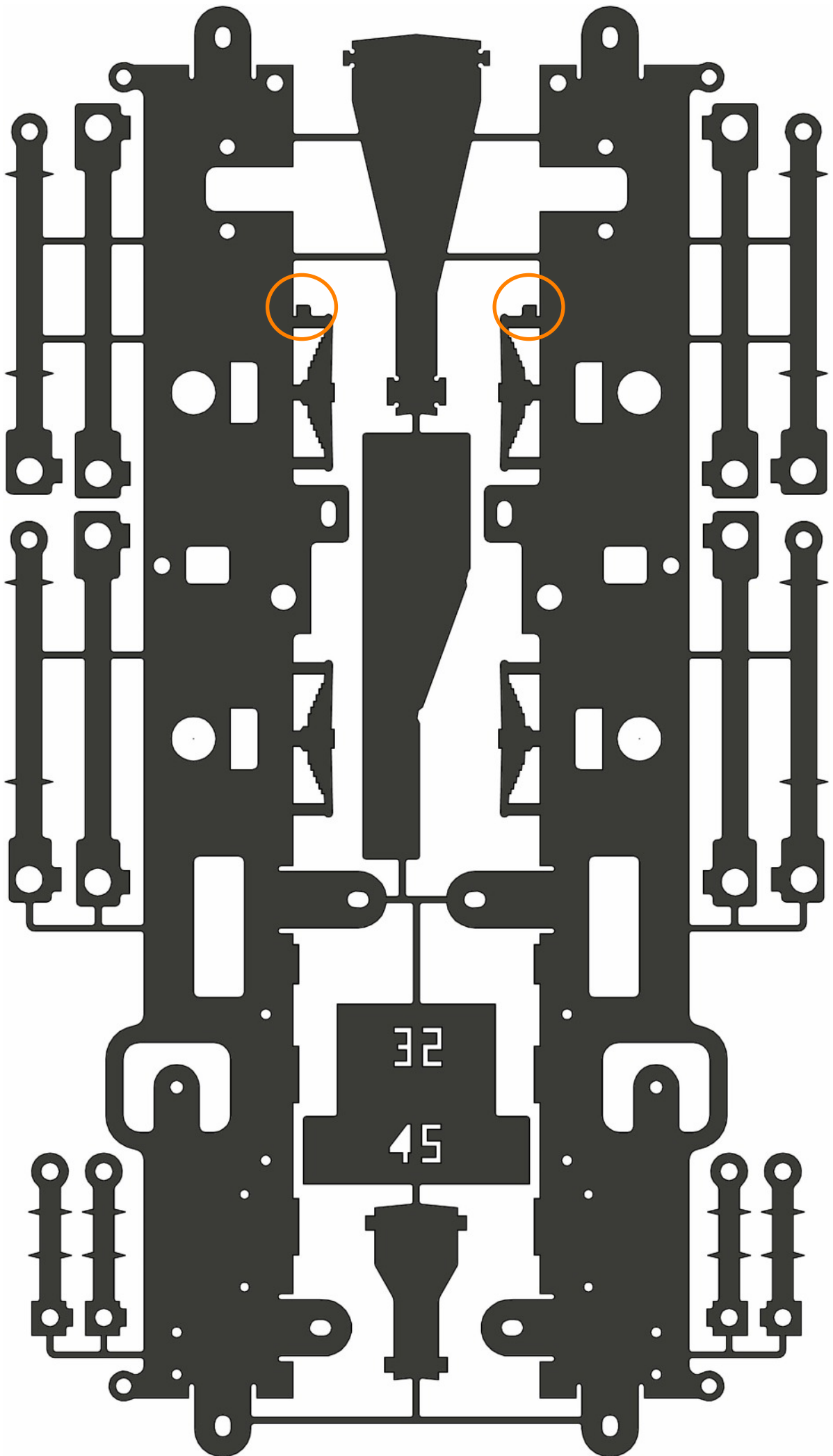
Mild Steel Laser Profiled Sheets

On this page one can see the 1.0mm thick parts. The “L” shaped item at the top is a jig to form the radius for the wooden form, which you will make, for setting up the superheater. ●

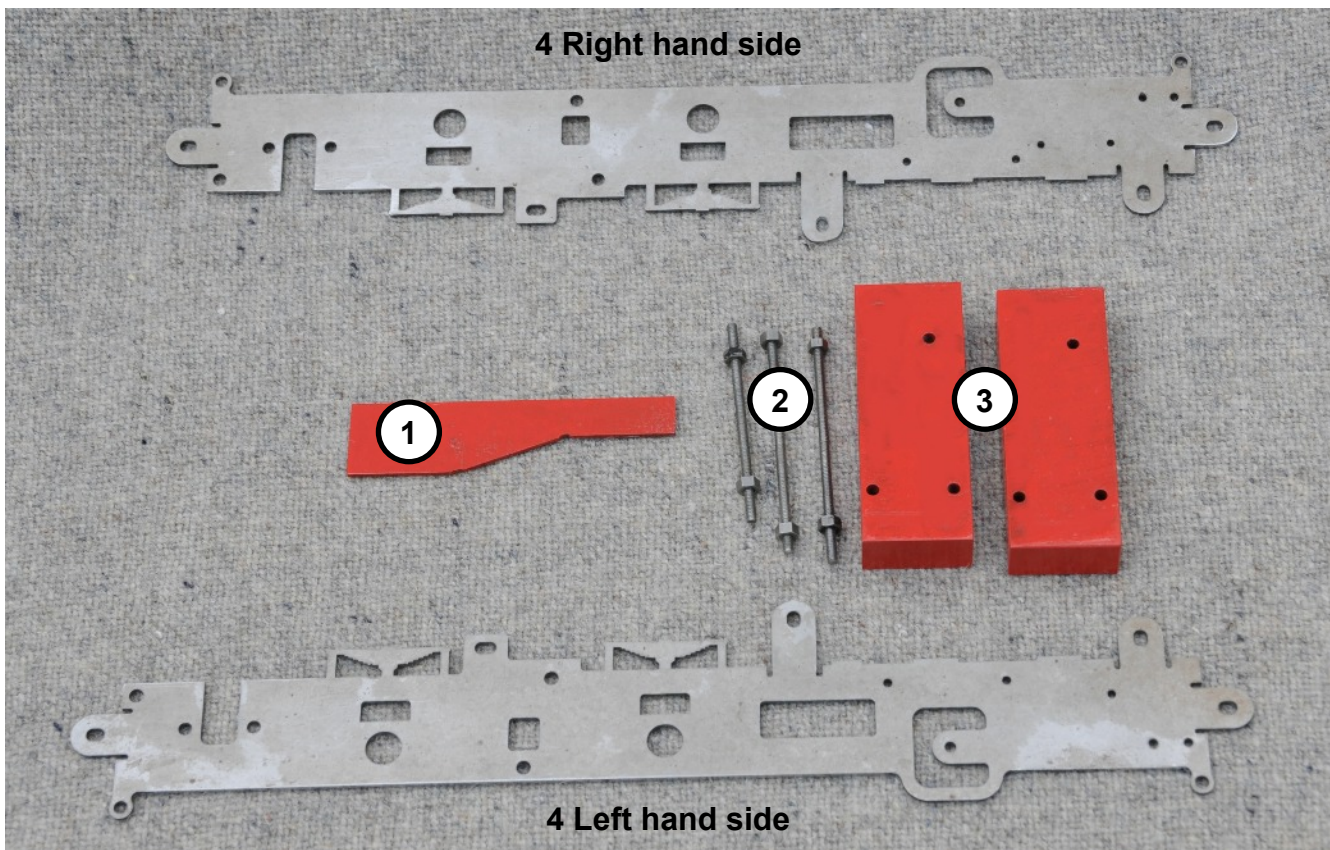
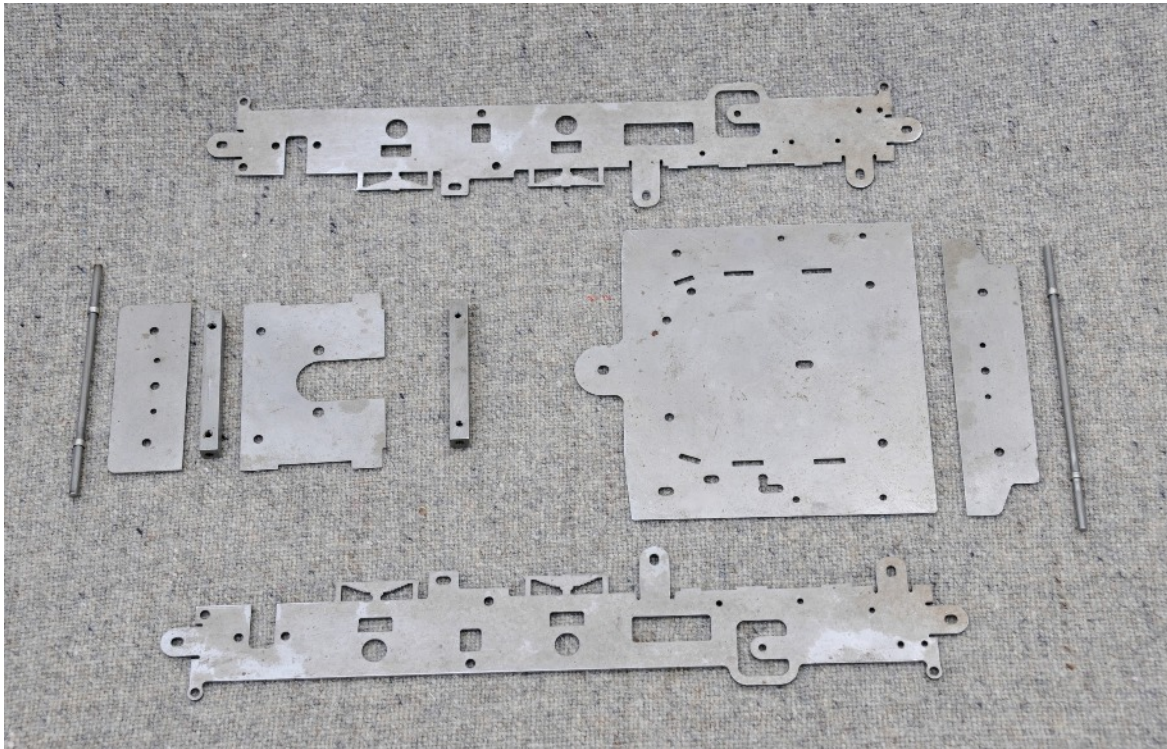
Any “lines” joining each item are just there for ensuring the stability of the laser “cut”, see as shown below. ●

The 1.5mm thick parts are shown on the next page. Confirm that the cut-out surrounded by the **orange circles** is 1.0mm high. The front footplate slots into the cut-out and it is best to confirm fit before you assemble the frames.





The Chassis Assembly



The parts are as follows:

1. Angle jig
2. Clamping jig fixings - 6 x 6 BA Nuts and three studs, 1 x 40 mm long and 2 x 60 mm long. Note the studding is made from the length supplied with the kit. A further 65 mm of studding is also used to fix the body to the chassis – see Cab and Tank assembly, page 34.
3. Clamping jigs.
4. Main frames. They are identical, but one will be formed for the left hand side and the other for the right.

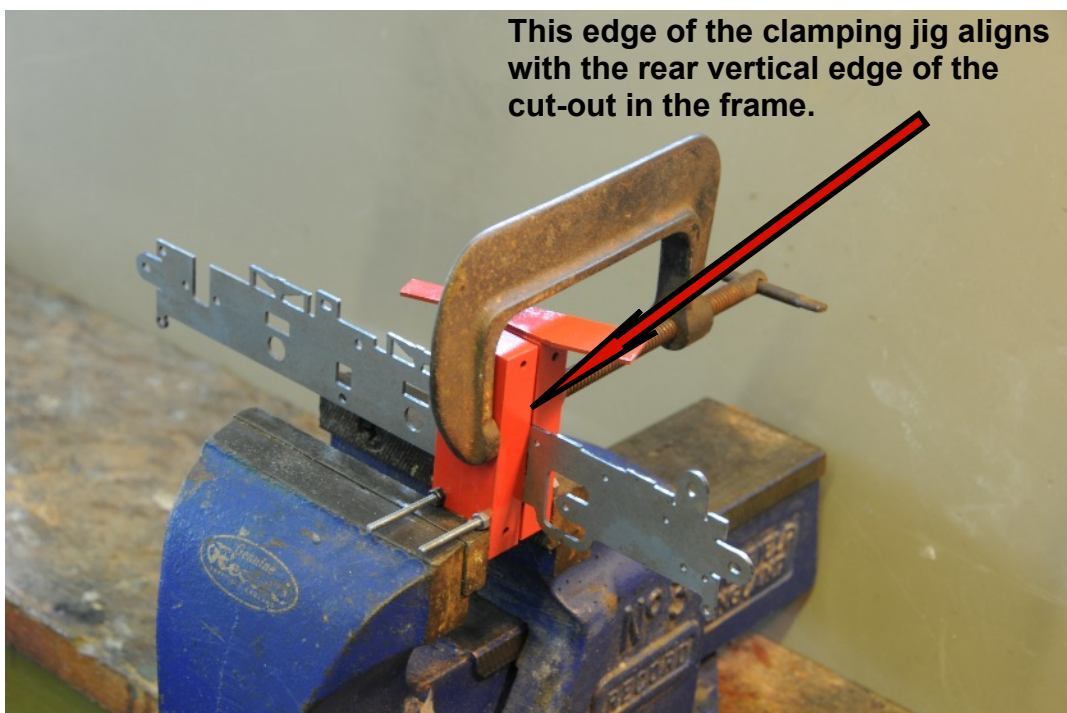
The Left Main Frame



The main frame being set up for forming the angles. The clamping jigs are held together with the 6 BA fittings and the tool is set up to the front and rear vertical edges of the frame to be formed. Note that the jig can be fitted such that the upper 6 BA stud passes through the hole in the bracket above the cut-out in the frame. This will ensure the correct location of the jig. A square should also be used to locate, accurately, the position of the tool.

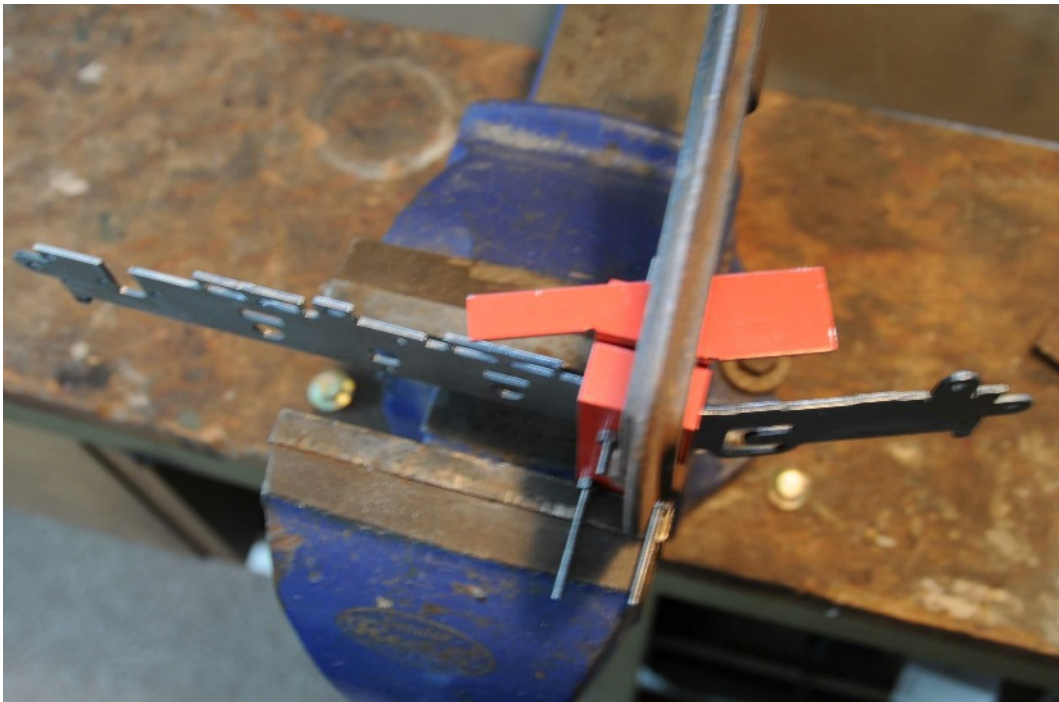
The assembly should be positioned in the vice as shown. Note the use of an additional clamp and the space left above the forming tool, so that the angle jig can be used to verify the required degree of bend.

The lower photograph shows the angle jig on top of the clamping jig, so that by looking down past the jig to the frames, the required degree of bend can be confirmed.



The Left Main Frame

The rear section of the frame has now been formed to align to the desired angle. Note that the frame behind the bend has a hole in it where the dummy pony truck axle box will be fitted. This makes the frame that little bit weaker in this area. To compensate for this, when creating this bend, use a piece of hardwood with a square end which at least covers the frame top to bottom. This will



enable you to apply uniform pressure across the material and better control the degree of bend.

This same technique can beneficially be used when forming the other bends to the frames and particularly when forming the brackets. It enables you to direct the pressure to the point at which you want to form the bend as opposed to further along the material being bent.

The front bend can now be formed. The bending jig does not need to be repositioned, nor is it absolutely necessary to move the work in the vice. However, if you do so, you can apply pressure to the bend from the front as opposed to pulling the frame towards you.



The front section of the frame has now been formed, again aligning to the desired angle shown.

As you use the clamping jig the jaws of the vice will make marks in the material of the jig. Mark the face of each piece of the clamping jig and continue to use this to face the vice on future bends. This will ensure that the face of the jig which touches the frames or brackets remains in smooth and original condition.



After bending, if the frame has formed to a gentle radius in the unclamped area immediately adjacent to where the bend was made, use the clamping tool as shown to flatten the area concerned.



The front section of the main frame being clamped and straightened



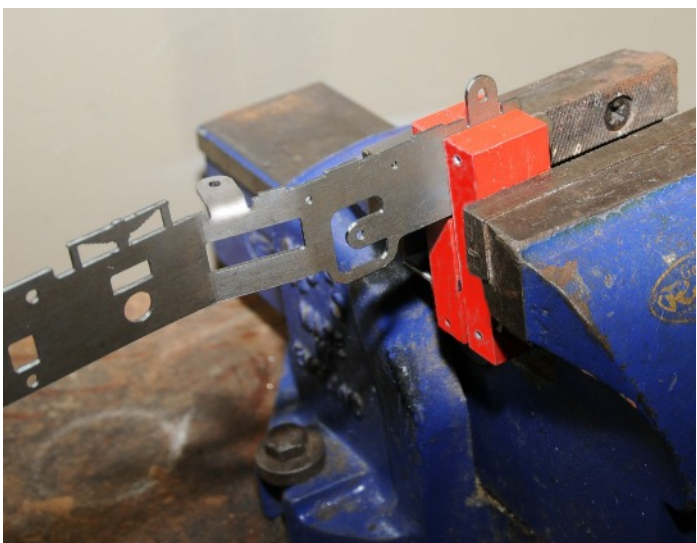
This is still the left hand main frame.

We will next form the brackets to which the footplate will later be attached.

This shows the clamping tool set up in preparation for bending the brackets. The top of the clamping tool is set to the bottom of the cut-outs either side of the bracket to be bent, which will be the case when bending any of the brackets.

The angle jig is placed on top of the upper surface of the clamping tool during bending and creates the lower edge of the bracket being formed. The angle jig will tend to slide backwards during bending. This will ensure that the top of

the bracket formed is level with the top of the frame against which the footplate will locate. **This is shown in the pictures on page 10.**



The photo to the left shows the front bracket after being formed and the rear one ready for bending.

Review also the next page of this guide as the positioning of the clamping tool differs for each bracket, but the general technique is the same.

The photo below shows a piece of steel being used to form the bend. Alternatively, start the bend by pushing squarely on the bracket with a piece of hardwood and form the top of the bracket level with the top of the frame using a piece of steel or large, flat headed punch.

Tap the steel with a small hammer to achieve a 90 degree bend.

Note also that pliers can be used to start forming the bend, as shown on the next page.

Once you have formed both brackets, whilst the frame is still clamped in the jig, offer the rear footplate up to the frame and slot it into position above the bracket. Hold the footplate firmly down against the bracket and, looking from the side, confirm that the bottom of the footplate rests on the edges of the frame and is not prevented from doing so by the bracket. Another way of verifying correct location is that the raised "tongues" on the frames should engage completely into the corresponding slots in the footplate and be at the same height as the top of the footplate. Run your finger across each slot to confirm this. If the footplate is held proud, check the position of the bending jig - it may have been set too high or the bracket may not have been formed to a 90 degree bend. Use a piece of steel or large, flat headed punch, gently flatten the point of the bend until the footplate fits properly. Also do this after forming each of the brackets which secure the footplate to the other half of the frames.





NOTE: All the front and rear brackets are bent towards the inside of the frame.

This shows the brackets for the rear buffer beam bracket with the angle jig.



NOTE: This information should be read to assist the bending in the previous page.

The angle jig is located so that the bend position is in line between that and the height of the material between the bending. The thickness of the main frame and the angle jig is the same, 1.6 mm.



An alternative method of forming the bracket is starting to create the bracket and then tap it in place with a piece of steel.



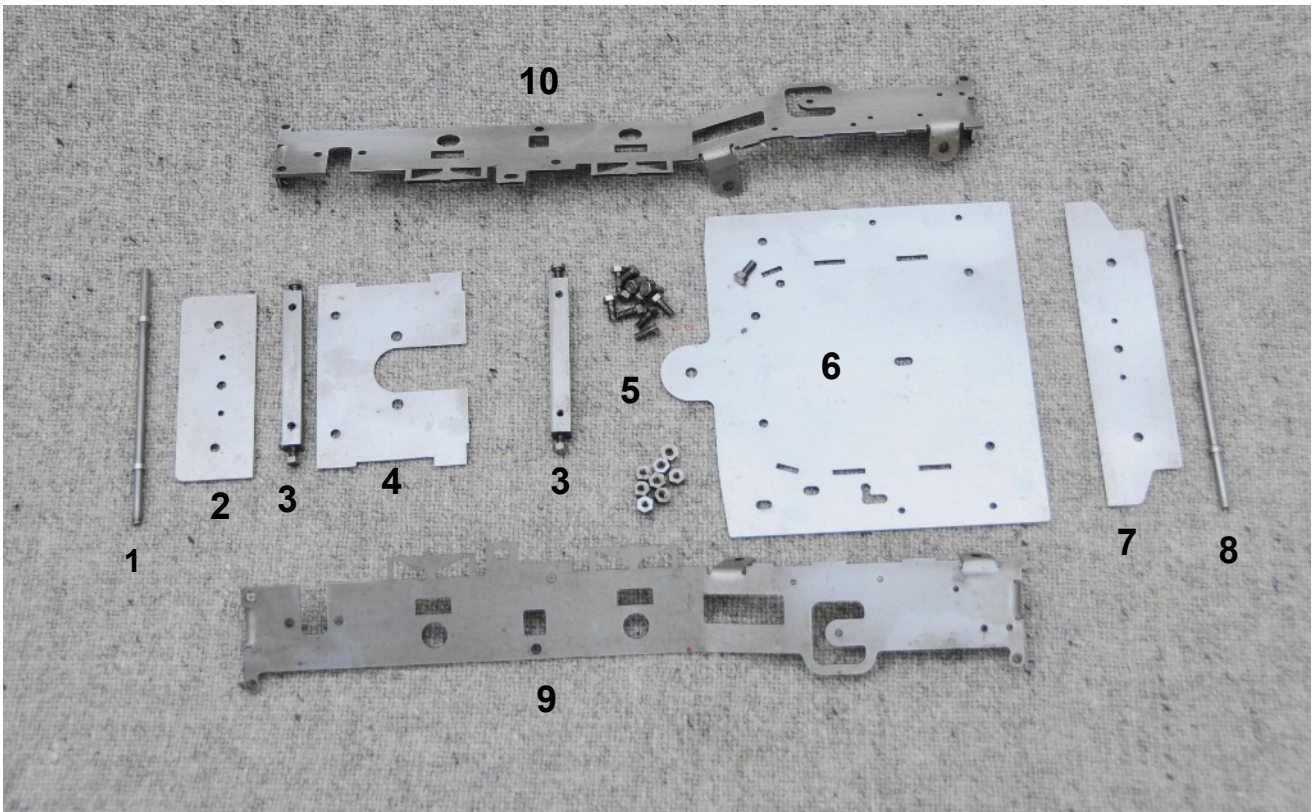
This shows the right side main frame, which is a mirror image of the left hand side.



The right hand main frame.

After both frames have been formed, place them on edge, back to back, sandwiched either side by a block or T square. This will enable you to verify that both are bent to the same degree and that no twist has occurred which, if present, is likely to be apparent on the rear part of the frame. As this will not carry an axle, if it is minor, it may not need to be corrected because the frames will tend to become square in this area when the rear buffer beam is fitted and the footplate is clamped to the frames.

You should now be ready to complete the Frame Assembly



The parts are:

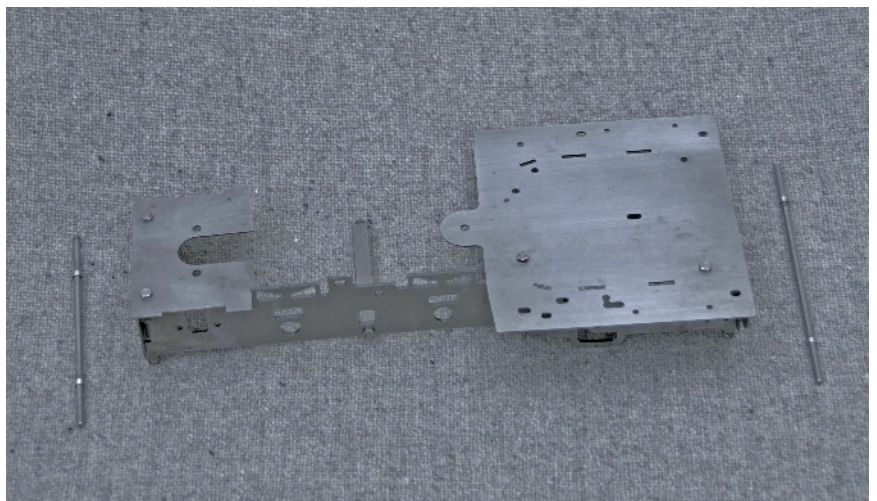
- | | |
|---|----------------------|
| 1 Front catcher bar | 6 Foot plate. |
| 2 Front buffer beam. | 7 Rear buffer beam. |
| 3 Frame spacer. (2 off) | 8 Rear catch bar. |
| 4 Smoke box plate. | 9 Left main frame. |
| 5 Fixings - 14 x 1/4" x 6 BA Hex Head
smaller size & 8 x 6 BA Nuts | 10 Right main frame. |

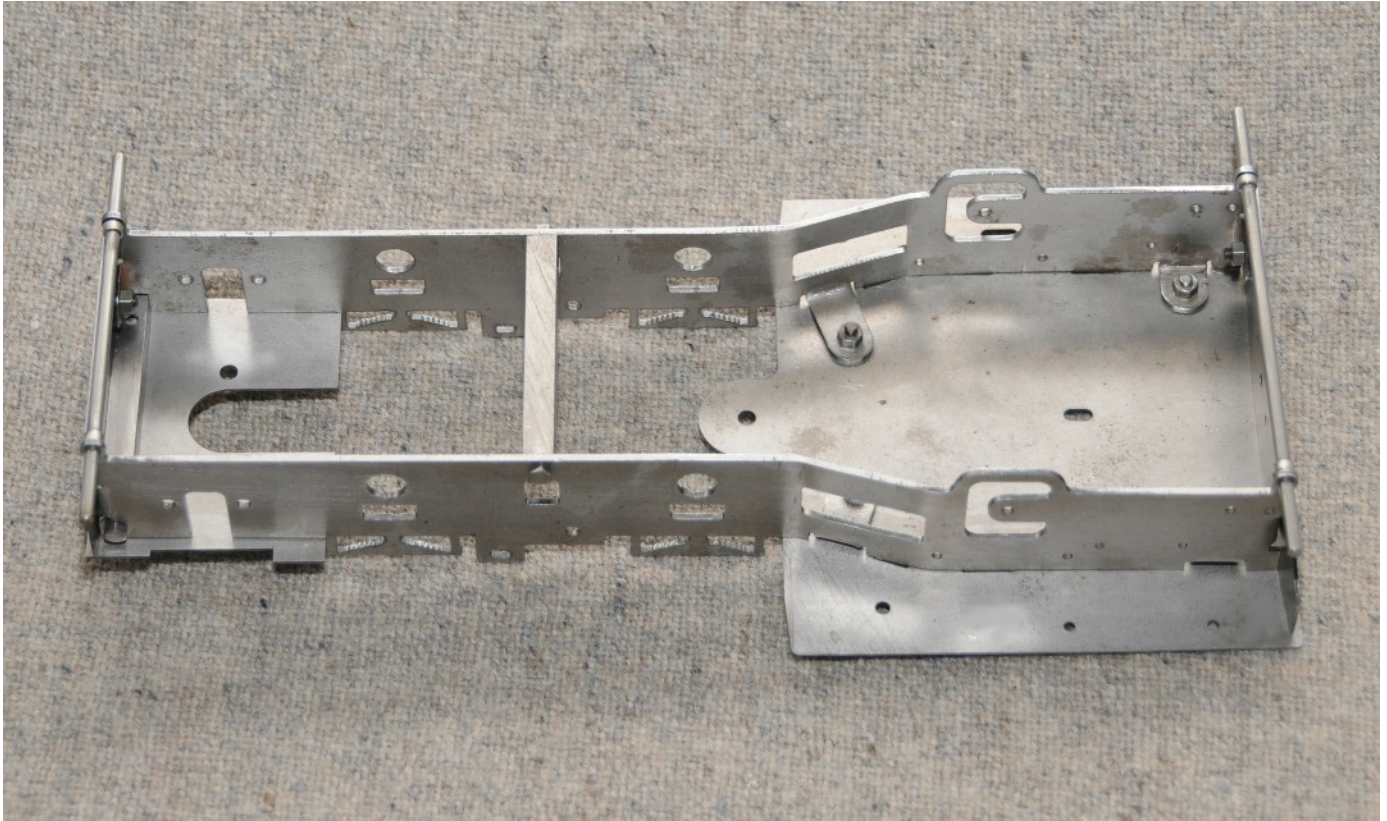
Starting with the left hand side push the catch bars into place. If they are tight gently open the holes up - you are trying to achieve a snug fit.

Fit a washer to the bolts through the frames to the front frame spacers so that, when tightened, the thread will not foul the vertical threaded hole.

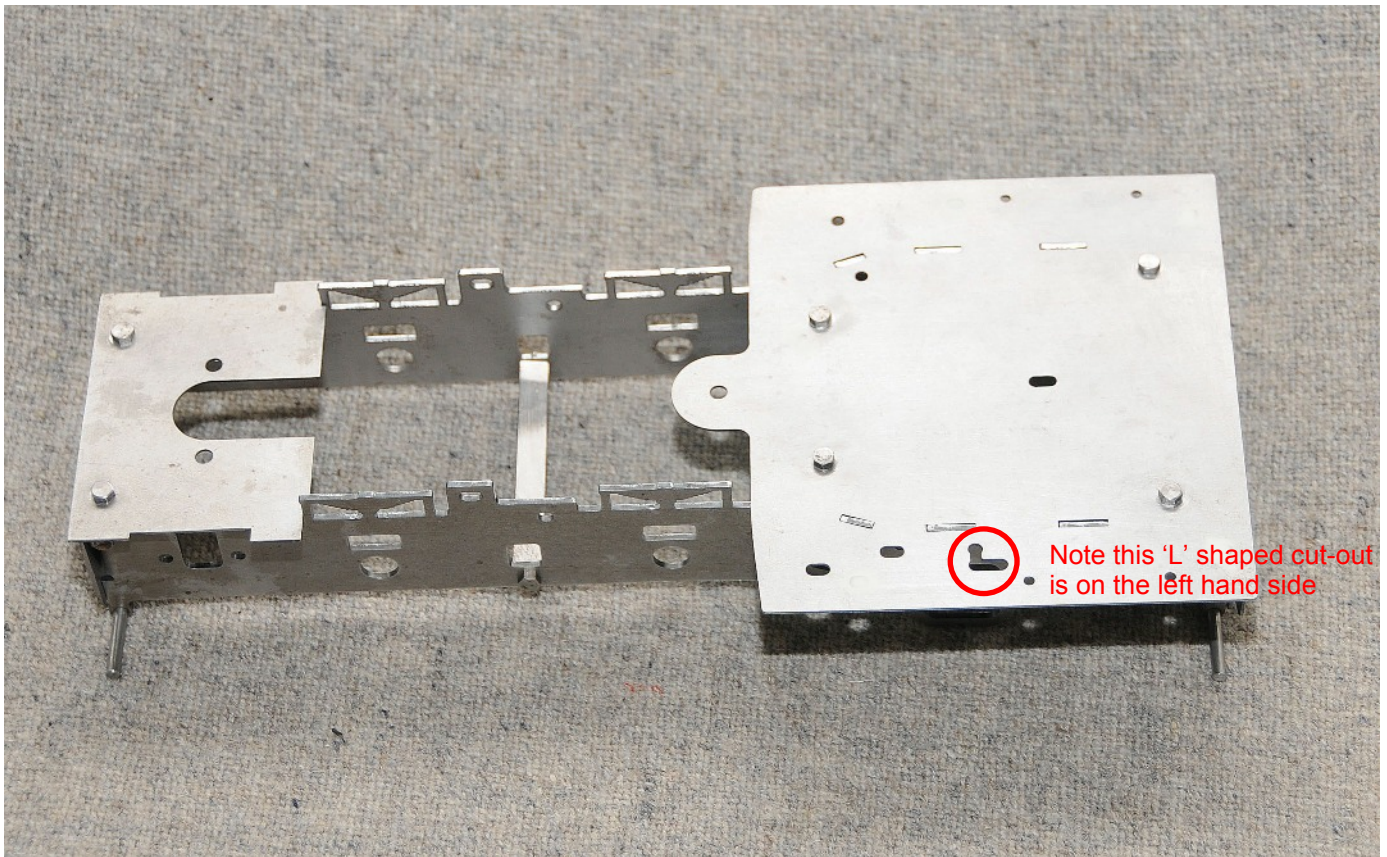
The foot plate is attached to the left main frame using the fixings provided. The other

items are straightforward and can be seen on the next page. The smokebox mounting plate, at the front of the frames, locates at the rear under a cut-out in front of the front dummy spring. You may need to open this up slightly, in which case a small V-shaped needle file will be useful. Remove material a little at a time until the hex bolt at the front of the frame passes through the hole in the plate. Repeat as necessary for the right hand side.



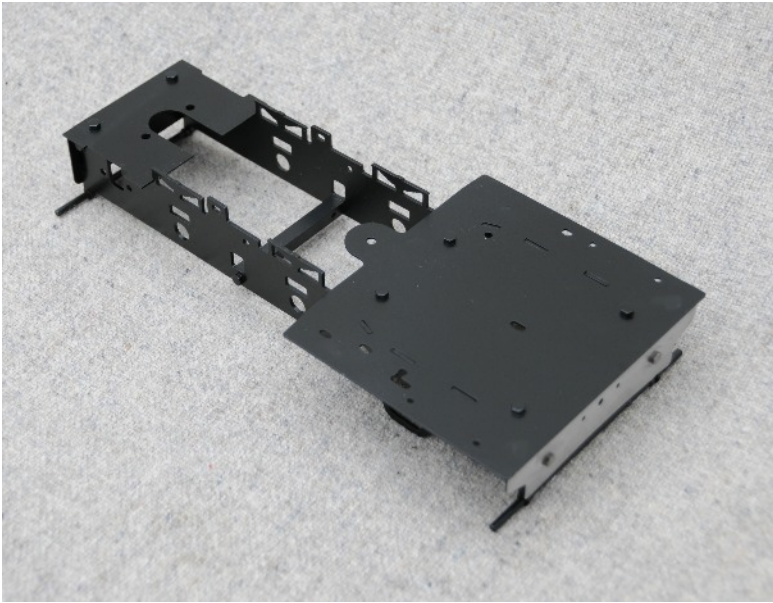


Here is the main frame assembled looking from the underside.

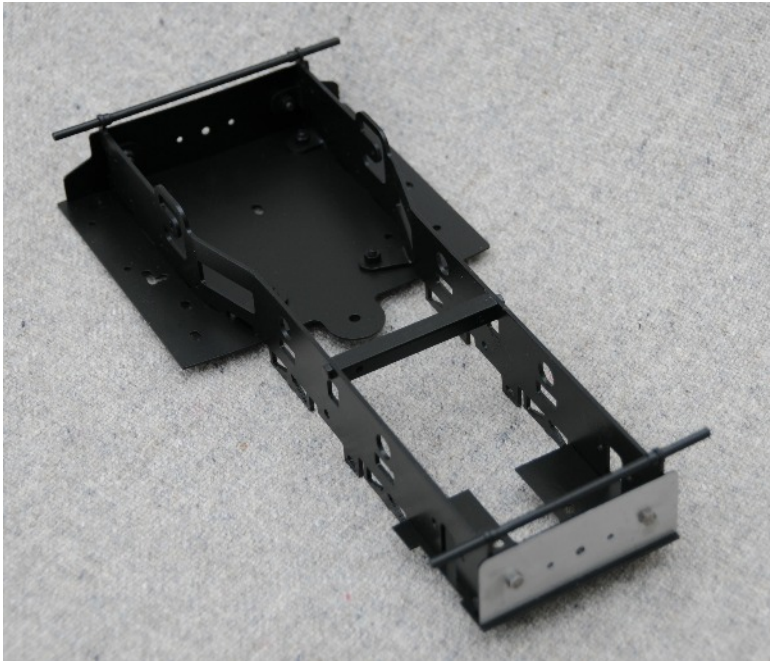


Here looking at the top, the frames are ready for painting. Acid #8 or a suitable etch primer should be used.

I suggest that the outer face of the buffer beams are not painted as they will be covered with the etched beams with the etched parts described in section 3 of this guide. Note also that the front footplate will need to be removed when fitting the steam pipes, so you may wish to leave this unpainted initially. It is however shown painted on subsequent pictures.



Looking at the rear
from the top.

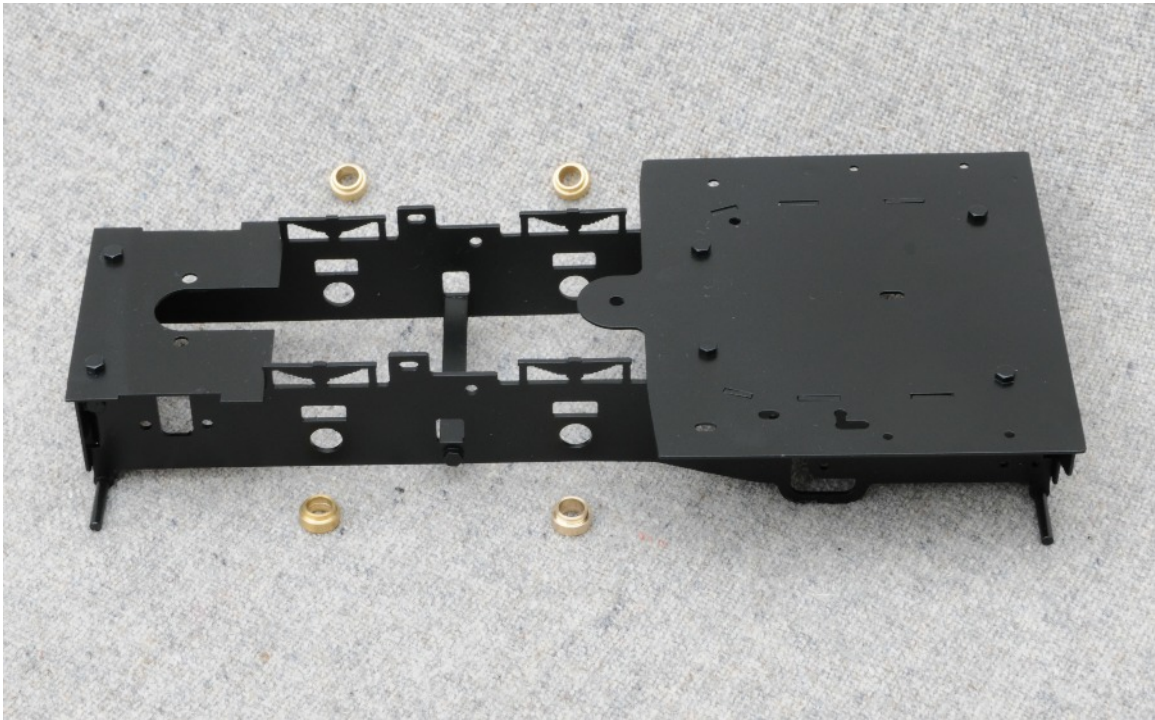


Looking at the front from
the underside.



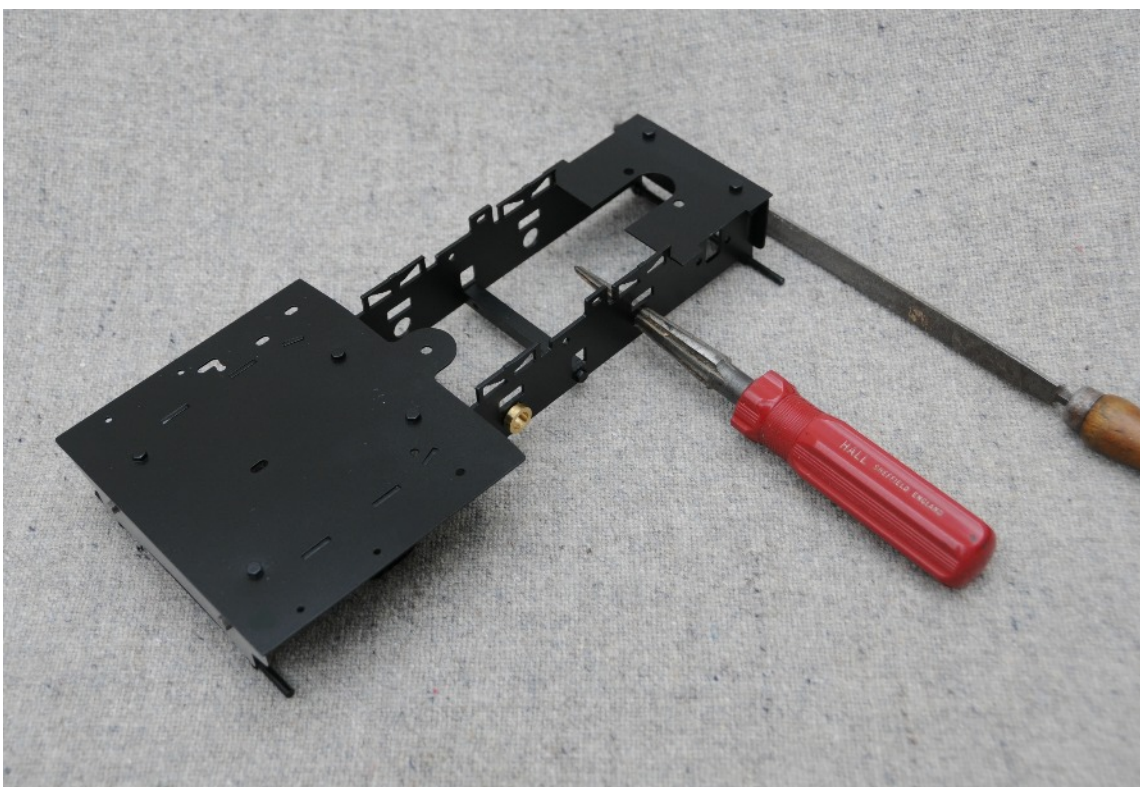
Looking at the underside
with the left hand side be-
ing the nearest shown.

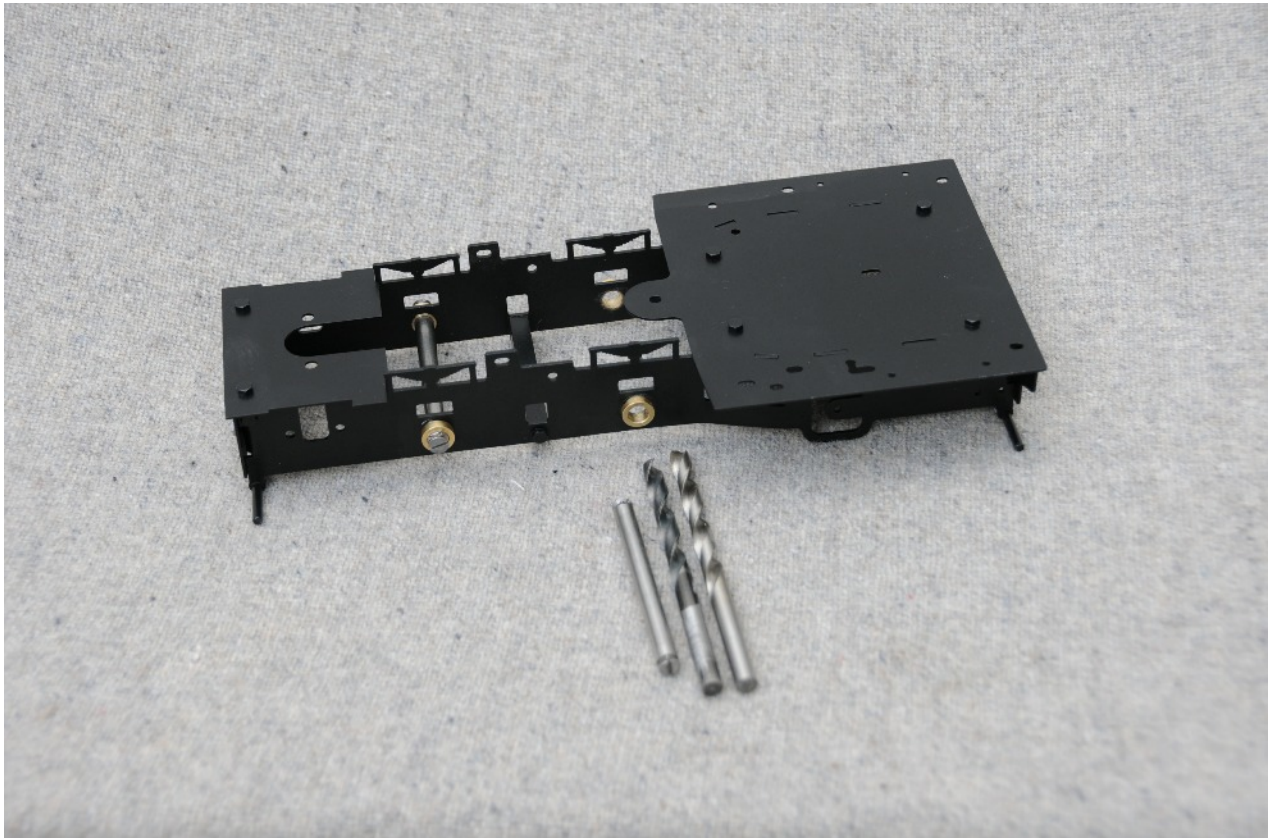
Fitting the Driving Axle Bushes



The driving axle bushes are pushed into the holes as shown. It is important that the bushes are fitted from the outside, as shown in the picture.

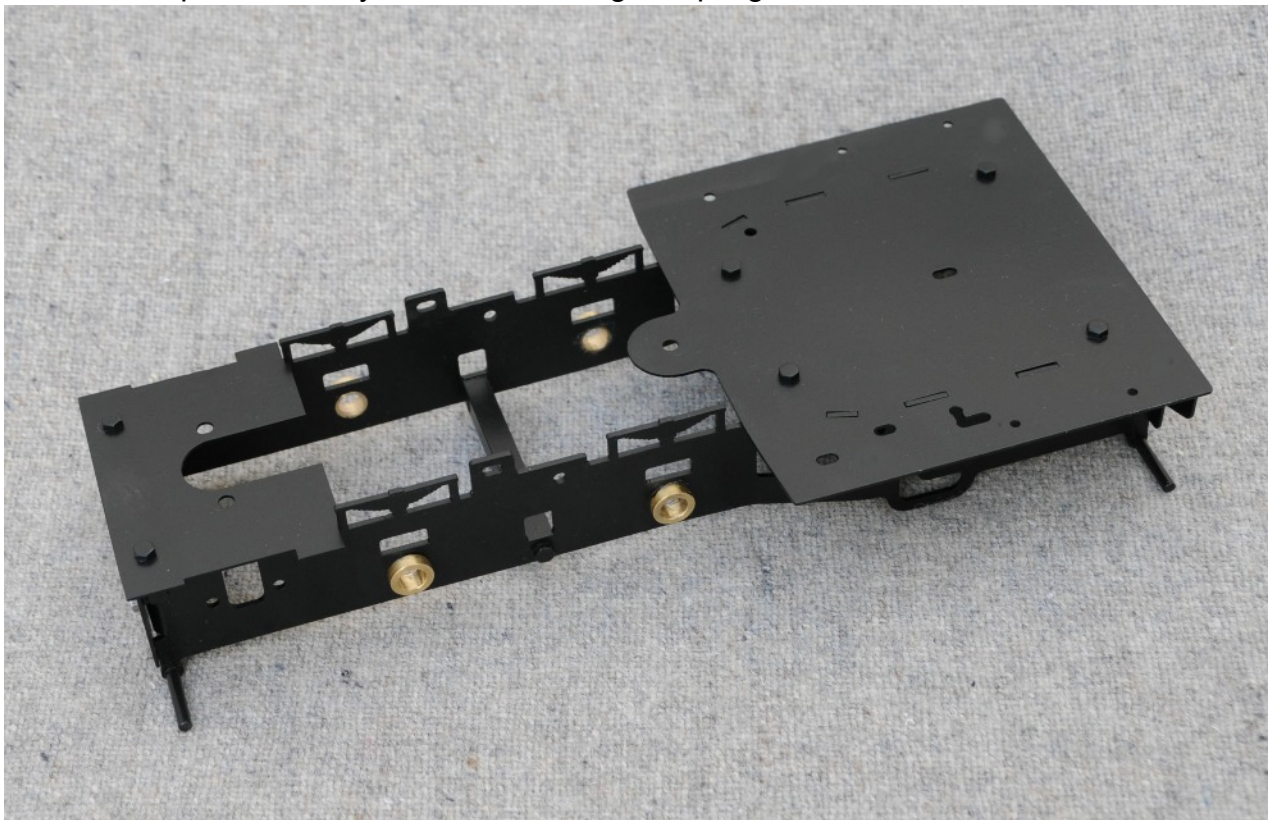
Below a single bush has been fitted. If it is loose, secure in place with a suitable fixing agent like Loctite 603 or failing this, a good quality super glue, ensuring that none gets onto the inner surface of the bush. The hole is cleaned and prepared with a tapered reamer, in order that the bush enters the hole in the frame squarely. Alternatively a small "Three square file" can be used. Another way to ensure that the bush enters the hole in the frame easily is to use a countersink bit, turned gently by hand, to introduce a slight taper to the hole.



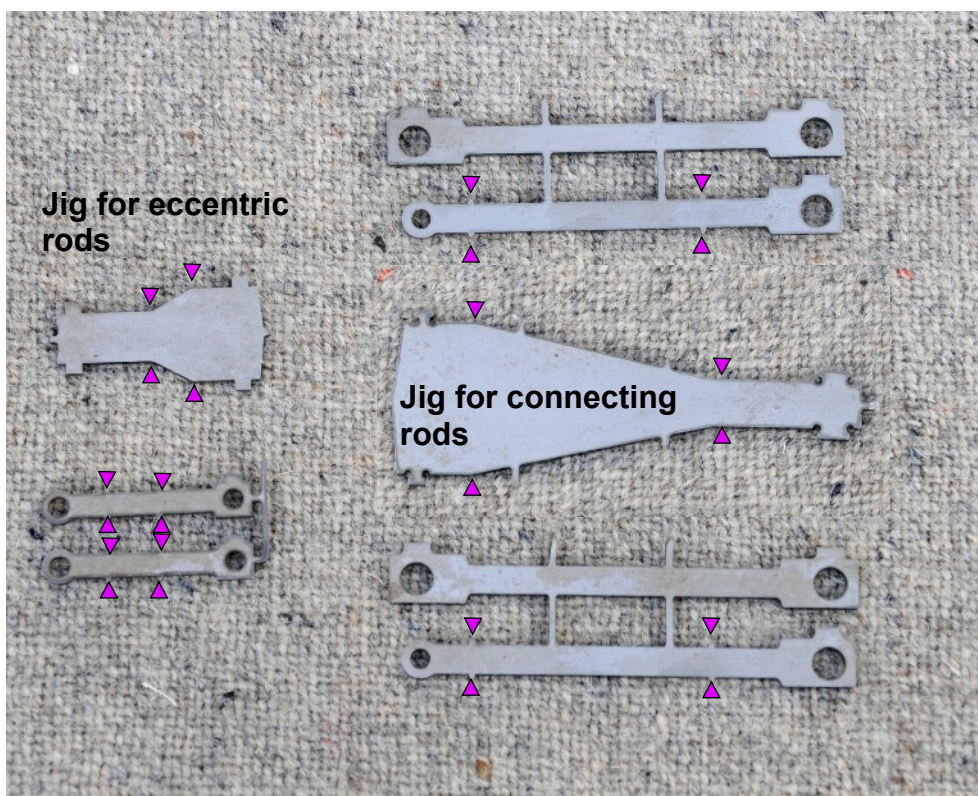


The bushes are now fitted and should align with each opposite bush. If you have the Roundhouse axles to hand trial fit them in place. If the axles are tight gently twist a $\text{Ø}0.25$ ($\text{Ø}6.4\text{mm}$ or $\frac{1}{4}$ inch) drill through by hand so that each pair aligns, but ensure that they are done together. The axles need to turn without binding and you may need to run the drill through the bushes from both sides for some time to achieve this. Be patient because if the axles don't turn freely you will have problems at a late stage in the build.

The next step is assembly of the connecting, coupling and eccentric rods.

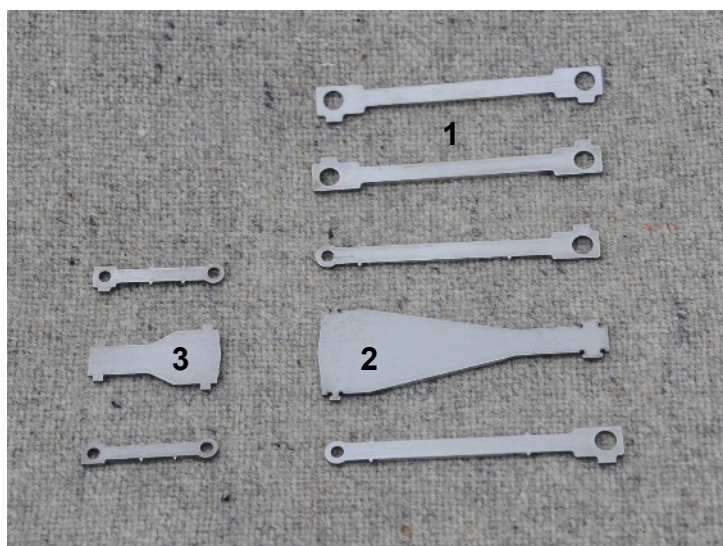


The Connecting, Coupling & Eccentric Rods



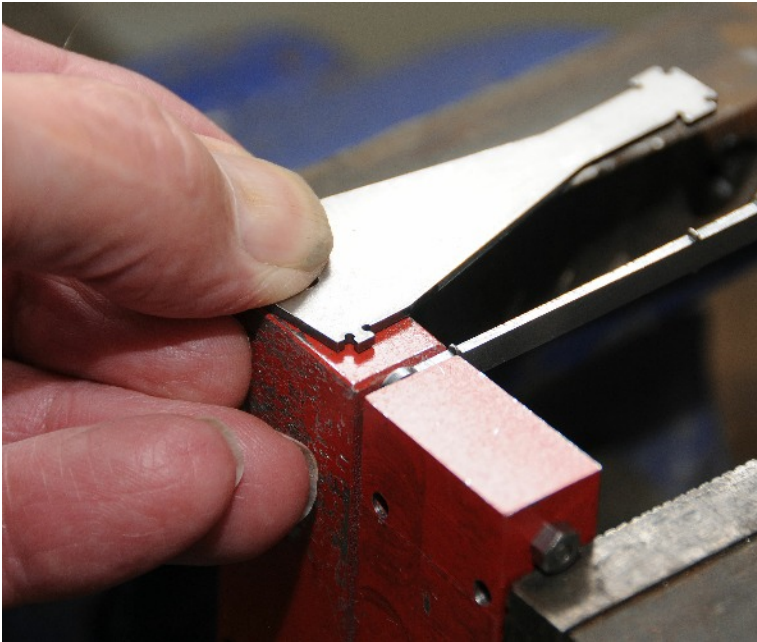
Gently detach these items and their joining strips from the fret. DO NOT file off the locating points on the rods marked with a ▲ at this stage. These act as reference points when using the rod forming jigs.

Four sets are supplied, two sets of each being spares



The rods are now ready to finish as shown.

1. The coupling rods are now ready for fitting the bearings - this is described later on Page 19.
2. The connecting rods are formed using the connecting rod jig.
3. The eccentric rods are formed using the eccentric rod jig.



The following steps describe how to form the connecting rods.

Clamp the rod between the clamping jig as previously shown. Use the smaller face of the jig as shown.

The area being clamped will attach to the crosshead.

Before forming the angle, make sure that the pips on the rod align with the change in angle on the jig.

The forming jig should be laid alongside the rod being bent to ensure the accuracy of the angle achieved.



The second bend is at the end that will attach to the return crank on the driving wheel.

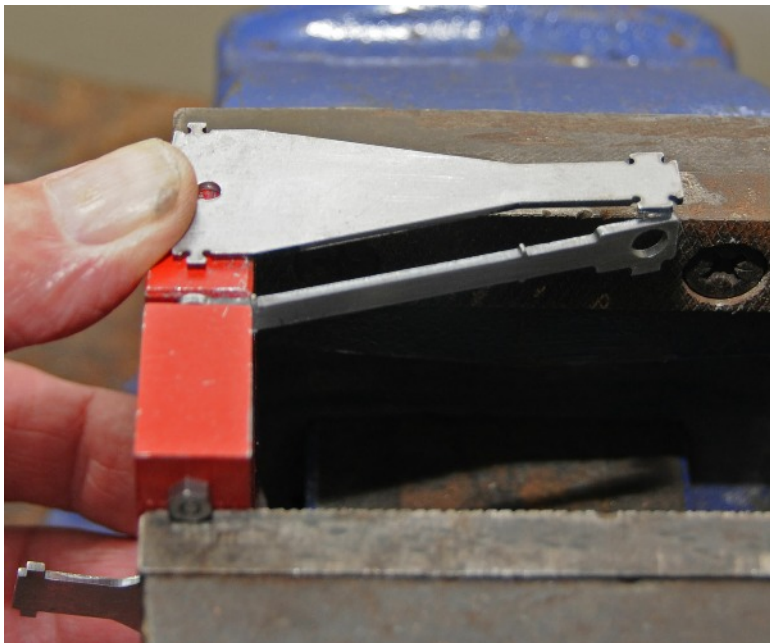
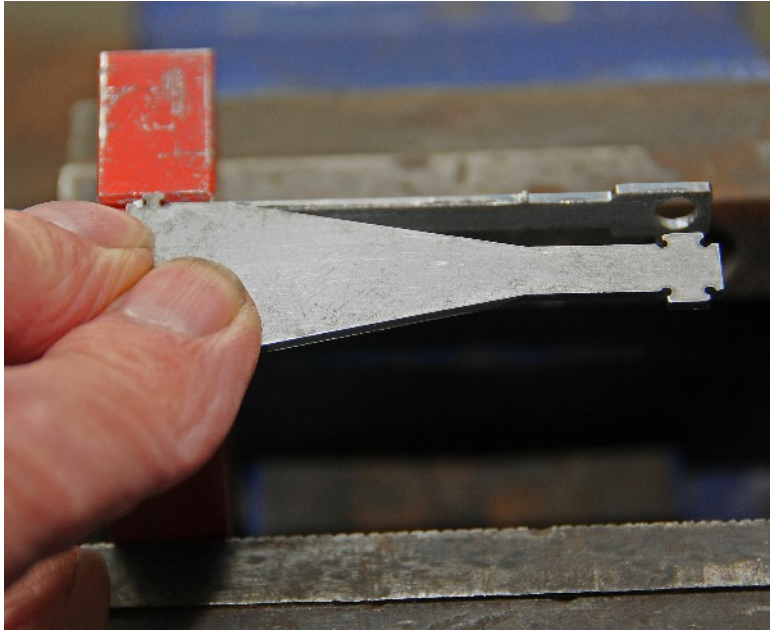
Note that this is being formed to fit on the left hand side of the locomotive.



Here is the "Oil filler"

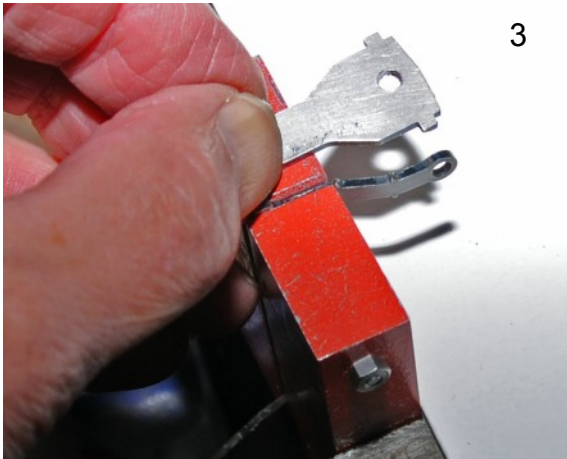
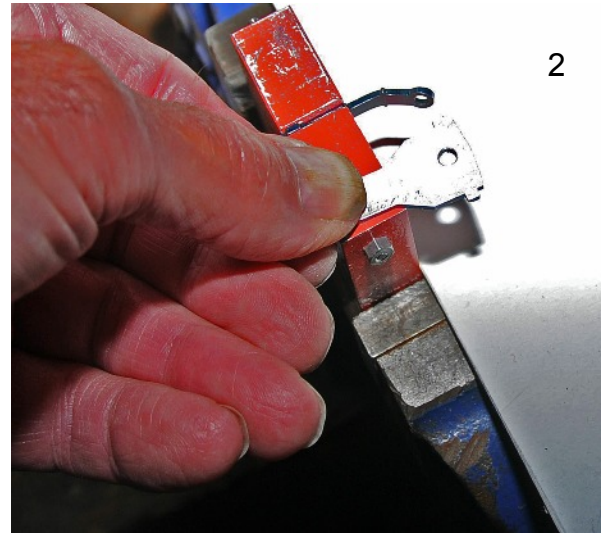
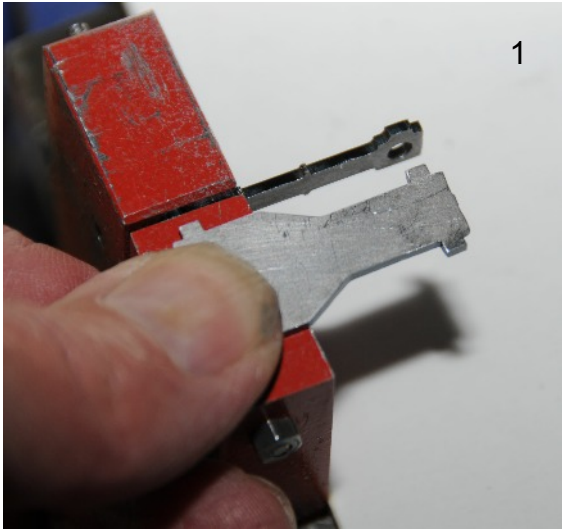
Forming is now complete. The test of accuracy is that the holes for the bushes will locate over the pips on the bending jig and that the edge of the rod follows the face of the jig.

The left hand rod is a **mirror** image of the right hand rod.



This shows forming the right hand connecting rod.





The eccentric rods are formed using the same technique as for the connecting rods, albeit using the eccentric rod jig. Note also that like the connecting rods there is a left and a right version.

The rods are now formed and checked against the jigs as shown below.



If you have not achieved the required angle, or the holes are not correctly aligned, gently bend the rod a little at a time to achieve a snug alignment to the jig, as shown in the picture.

If correct alignment has been achieved the pips on the rods can now be filed off.

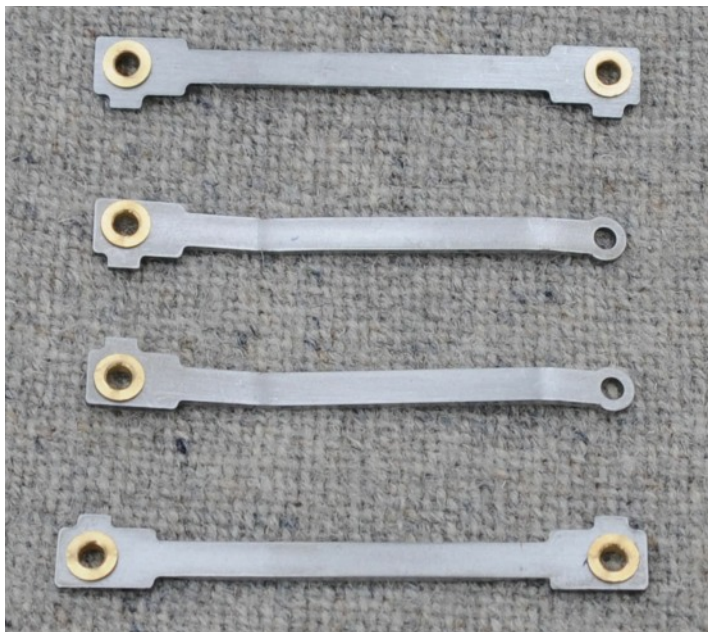
The next page shows the bearings being fitted to the connecting and coupling rods. Note: the eccentric rods are not fitted to bearings.



The coupling and connecting rod bearings are pressed in place using the clamping jigs to ensure that the bearings enter the holes in the rods parallel to the hole. Tightened evenly by the studs i.e. in rotation, half a turn per stud. Locate the rod and bush in the centre of the clamping jig so that the bearings are pushed in parallel.

The overall length of the part of the bush which presses into the coupling or connecting rod is 1.7mm, i.e. slightly longer than the thickness of the rods themselves, which are 1.5mm. To ensure that they are pressed home fully, use some protective materi-

al (like 2 pieces of copper or brass sheet) to cover the jaws of your vice, put a little Loctite between the bush and the rod, clamp it in the vice and tighten to press the bush fully home. Remove it from the vice and clean off any surplus Loctite, paying particular attention to the hole in and the front and rear surfaces of the bush. Repeat for the other 5 bushes.

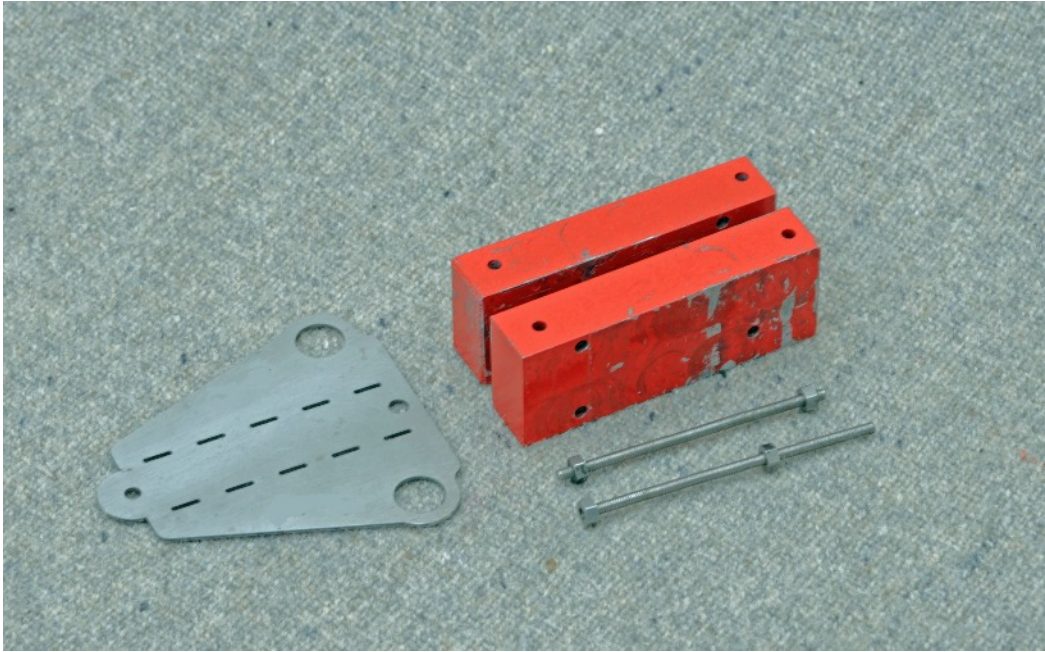


When you have finished the rods will look as shown on the left.

The photo below shows the rods on edge and emphasises the fact that the rods are handed left and right and that the shoulder of each bush is on the outside of the rod. The top of each rod carries a representation of the oiling point present in most prototype coupling and connecting rods.



The Pony Wheel Assembly



The clamping jigs and studs are used in this step.



Position the pony "plate" as shown ensuring that the plate is central to the centre line of the jig. Gently tighten the nuts when the position is correct.

Forming the Pony Wheel Frame



The pony "frame" can now be clamped in the vice. A piece of steel or hard wood can be used to "roll" the bend. Form the bend by working "away" from you, i.e. push away and gradually down on the side of the pony frame side being formed.

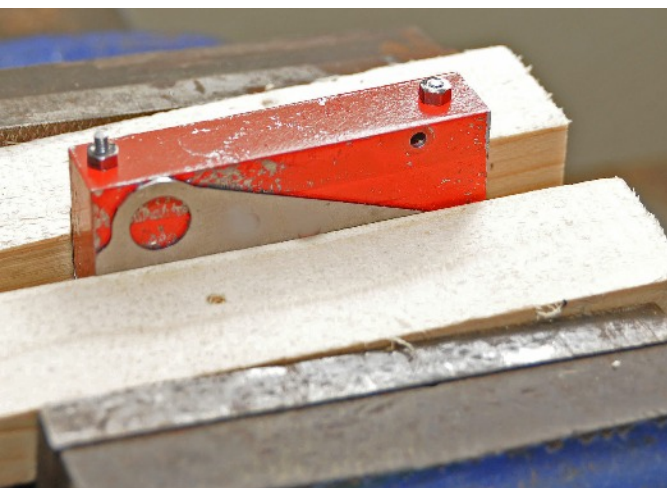


You need to ensure that the edges are flat to the bending jig and that no "fold" has occurred where the bend has been formed. There are 2 ways to do this:

1. Use two pieces of steel or hard wood to compress both sides of the pony truck frame at the same time to ensure that the edges are flat and square to the top of the truck (shown between the clamps in the picture to the left)

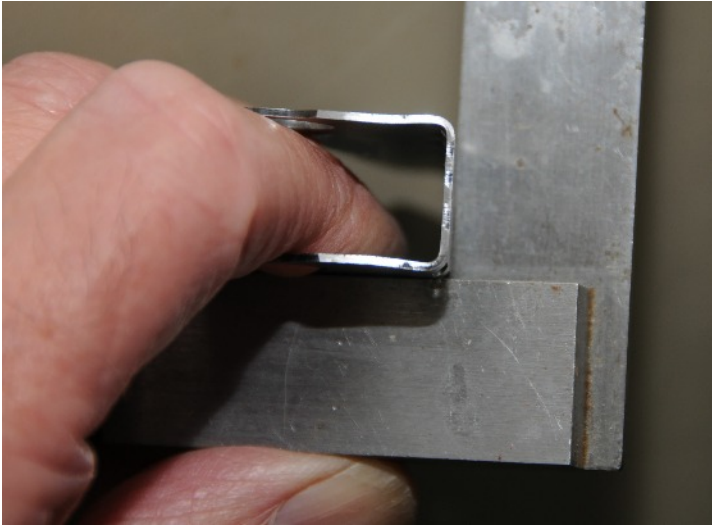
2. Alternatively, without releasing the frame from the clamping jig, take it from the vice and place it with one side face down on a solid, flat surface.

Gently tap the opposite face of the frame with a small hammer to ensure that the bend has formed tight to the face of the clamping jig. Turn it over and repeat for the other side. Then, still with the frame in the bending jig, from the end with the hole for the axle bush, look along the line of the frame. You should be able to see no or negligible daylight between the back of the insides of the frame and the face of clamping jig.



The pony truck frame is now ready for the fitting of the pony axle bush.

Fitting the Pony Truck Axle Bush

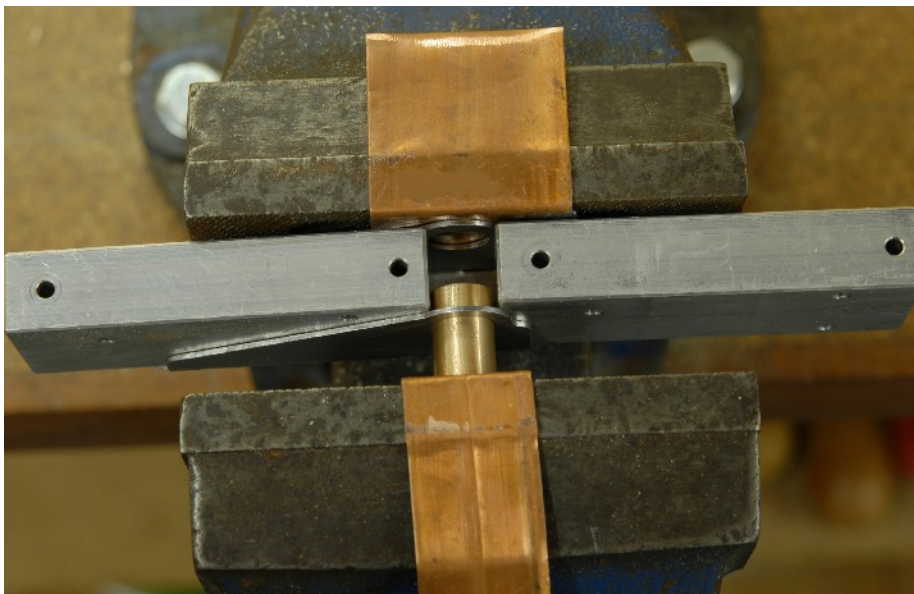


Check that each bend is at 90° to the top surface.

The pony axle bush should now be fitted.



If the axle bush will not fit into the frame, open up the holes with a tapered reamer. Alternatively a small "three square file" can be used.



It is easier to control pushing the axle bush into the pony truck frame if you use a vice. The clamping jigs are used to maintain separation between the sides of the frame and the scrap pieces of copper are used to protect one side of the frame and the axle bush. Before pushing the bush through the "other" side of the frame, remove the assembly and confirm that the bush is aligned with the hole - adjust if necessary.

Finally, once the bush is fully home, release the assembly from the vice and insert a spacer between the rearmost jaw (upper in the picture above) and the face of the frame (I used a socket with a hole at least as big as the outside diameter of axle bush). Then, press the bush a little further through the frame until the bush is central in the frame with a little material protruding either side. This will ensure that the wheels bear on the bush rather than the face of the frame.



The pony truck is now ready to assemble. The axle bush can now be soldered in place or secured with Loctite 603 or failing this, a good quality super glue. Make sure that the bearing surface of the axle bush is free from solder or super glue.

Although not shown 4 x M3 grub screws are supplied to secure the wheels to the axle.

The spacer should be fitted regardless of gauge as it increases the pony weight, which promotes better contact with the rail.



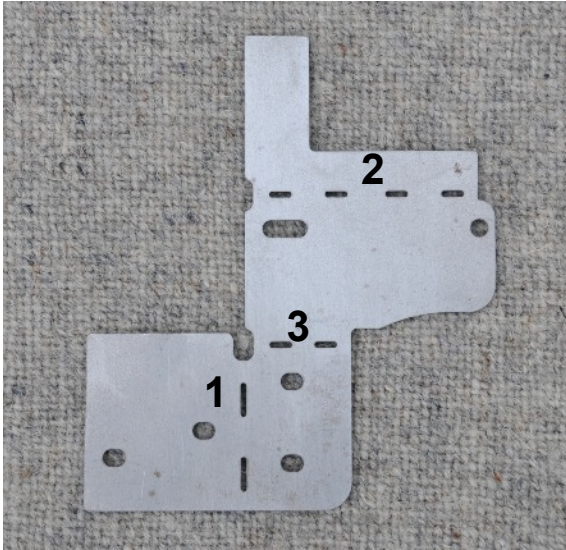
This shows the pony truck assembled for 32mm gauge.



This shows the pony truck assembled for 45mm gauge.

Once complete, take the pony truck apart and paint it.

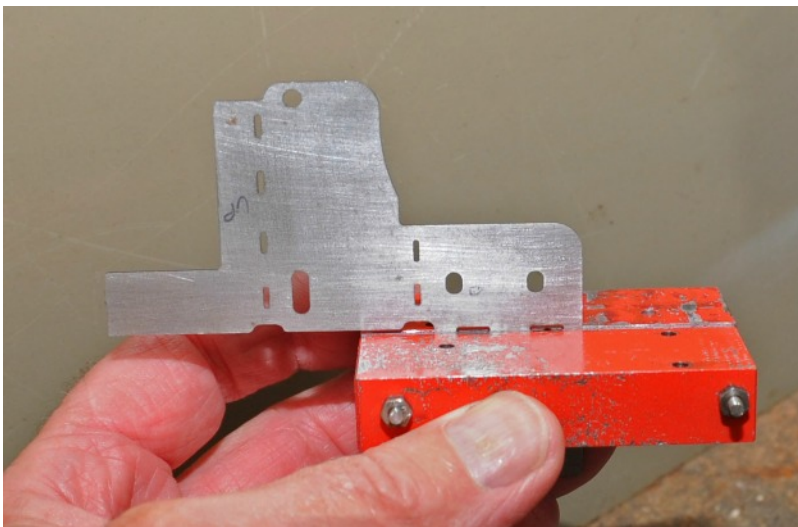
Bracket for Gas and Regulator Servo



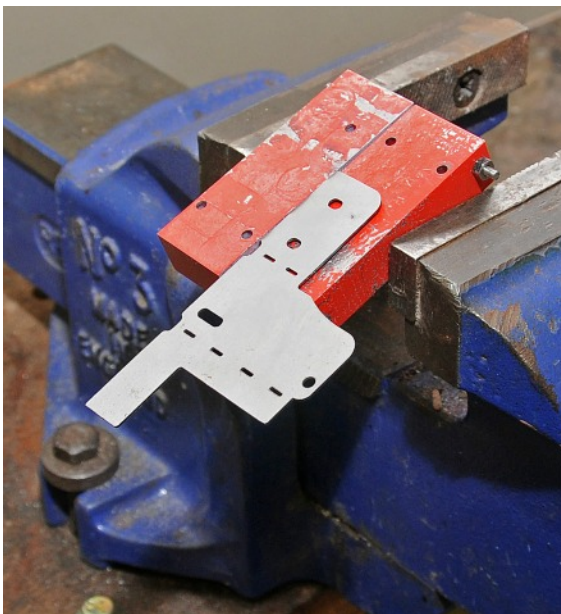
This shows the bracket looking at the inside face.

Again, use the clamping jigs so that the bends can be aligned accurately, independent of a vice.

The numbers shown indicate the order in which the bends should be made.



Prior to making each bend, check that the top of the jig aligns to the centre line through the slots where the bend is to be made.



The jig and bracket are shown fitted to the vice ready for bending.

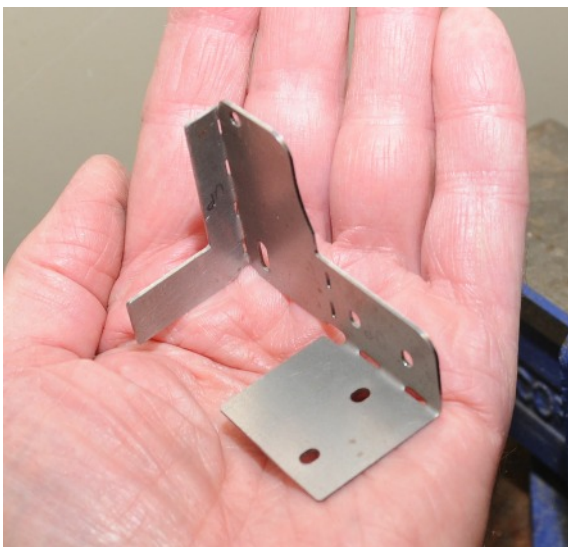
A gentle tap with a hammer will make sure that the bend is square. Use a piece of steel to make sure the edge is smooth.



The first bend is now completed.



The second bend is now being set up on the vice between the jigs.



The second bend is complete.



The third bend is being set up as shown.



The three bends are now complete.



The picture shows the completed bracket ready to paint.

Bends one and two should be 90° with three just less so that the gas tank can rest on that edge as well as the support brackets.

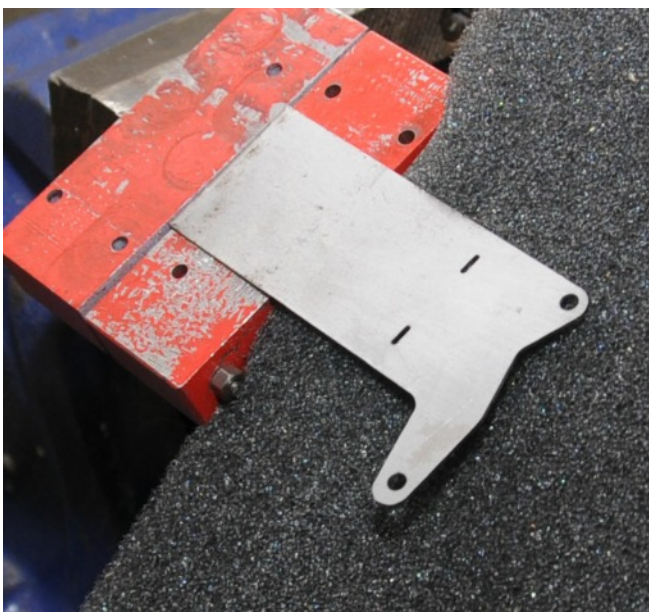
Bracket for the Servo, Battery Switch and Charger Socket



This part is only required if you are building a radio controlled locomotive.



Clamp as shown ensuring that the bend will be formed at the right side as shown in the next photograph.



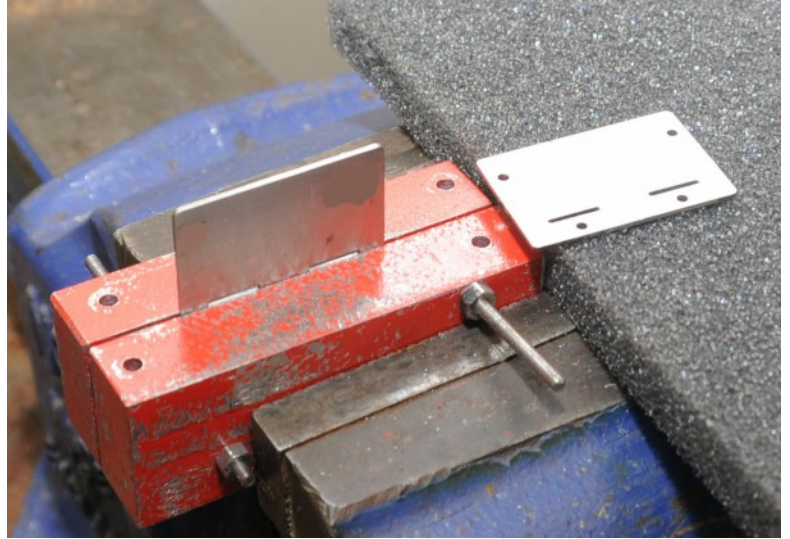
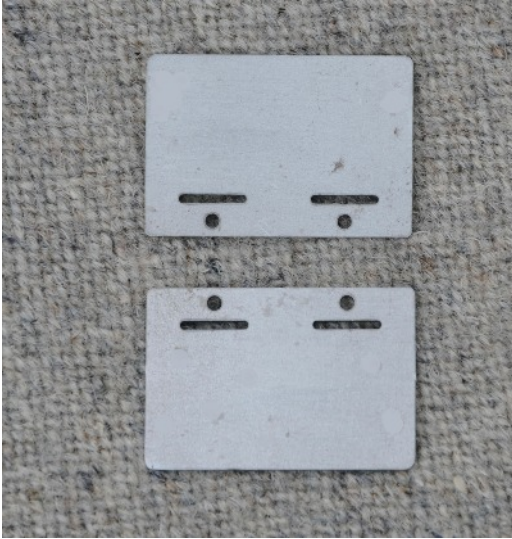


The next bend is shown above - the completed bend is shown in the next picture.

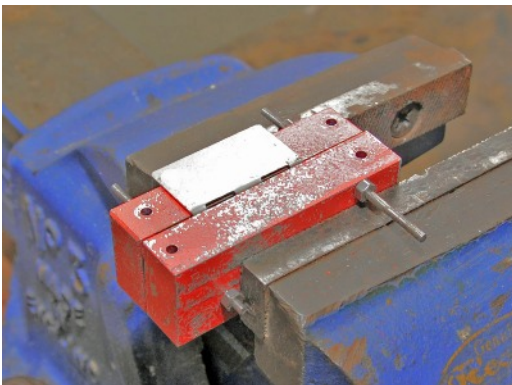
The lower bend allows the bracket to be fitted to the foot plate between the 2 brass posts on which the reversing lever servo is mounted and the servo itself. This is shown in the section of the guide covering installation of the radio control components.



Cab Step



The left and right hand version are identical and can just be folded as shown.



The photographs show the parts completed and ready for fixing in the frames at a later stage in the build.

Congratulations! You have completed the frames and are now ready to add the Roundhouse parts as shown in the next section of the guide.