

# Great Western Railway Macaw F Four Wheeled Bolster Wagon



The Taff Vale Railway built twenty four of these four wheeled, ten ton bolster wagons which were absorbed by the Great Western Railway. The wagons were placed into traffic without modification at Swindon and ran in service into British Railways days. They were used for a wide variety of loads including timber,

pipes and steel slabs for the Port Talbot Rolling Mills.

**Wheels, 3'1"**, Three hole disc are required to complete (Slater's Cat No 7122, Temple Rd, Matlock Bath, Derbyshire, DE4 3PG, Telephone 01629 583993)

**Connoisseur Models, 33 Grampian Road, Penfields, Stourbridge, DY8 4UE, Tel 01384 371418**

## GENERAL INSTRUCTIONS

Please read this section carefully, especially if this is your first etched brass kit. Many modellers fight shy of working in this medium, but the basic skills are relatively easy to acquire. Once you've learned how to form and solder brass, you'll find all kinds of modelling possibilities will open up for you.

Assembling an etched kit involves exactly the same skills that a scratchbuilder uses – the only difference is that the cutting out of the parts is already done for you. Some filing and trimming will, however, be necessary from time to time. Where this is the case, I have highlighted it in the instructions.

The main skill to master is soldering and I would recommend a Weller 40 Watt soldering iron. This has a 6mm diameter, removable copper bit. The bit is shaped like a screwdriver and has a bright coating of solder (tinned). This combination of iron and bit shape is ideal for running fillet joints and has a good reserve of heat, that is necessary for soldering small parts on to large components. Note the shape and condition of a new bit, as this won't last long and will need restoring back to this condition.

It is important to keep the bit clean and in good condition as you work. Get a soldering iron stand containing a damp sponge; old oxidized solder is wiped off on this before picking up fresh solder for each joint. If you haven't made a joint for some time you may find that a hard black crust has formed on the bit. Remove this with a brass wire brush (suede brush) and then feed some multicore solder onto each side of the bit to restore a bright surface (referred to as wetting or tinning the bit). After about 8 hours use you will find the bit is in poor condition, with holes and a ragged edge. File the bit back to its original shape using a hand bastard file and then polish the surfaces on emery cloth. Coat the bit with Fluxite Soldering Paste (traditionally used by plumbers) and this will prevent the bare copper oxidizing as the iron heats up. Then feed multicore solder onto the bit to form a generous coating and leave to bubble away for a couple of minutes before wiping excess off to give a bit almost as good as new.

A smaller Antex 25 Watt iron with a 3.2mm screwdriver bit is very useful for small assemblies and detail work such as handrails, but will have insufficient heat reserve for main assembly work. The Antex has a plated iron bit, after a little use with 145° solder a grey oxide appears on the bit that will prevent you from picking up the solder. Touch the bit to some multicore solder and it will flash over the bit, wetting it so that you can continue picking up 145° solder. I have found no problems with mixing the two solders in this way.

I use 145° solder for virtually all assembly work. I prefer it in wire form, available from Branchlines, but it is also produced in stick form by Carrs. I find that its lower working temperature helps to give a quick clean joint. Limiting the build up of heat in components, which may cause distortion. I find that I can hold parts together with my finger ends and make a joint before heat reaches my fingers or other etched parts drop off.

I use 60/40, tin/lead, fluxed multicore electrical solder (melting point about 190°) mainly to keep the iron bits in good condition. As it gives a slightly stronger joint than 145° I sometimes use it for small spot joints on handrail wire, lamp brackets etc, but still use extra liquid flux.

For all brass and nickel silver work I use Carrs green label liquid flux. You will soon get the feel for how much to use but more problems are caused by too little flux than too much.

Before soldering components together, thoroughly clean both surfaces along the join line with a glass fibre burnishing brush. Using your tweezers or a knife blade etc, hold the parts together in the correct position and, with an old paintbrush, run some flux along the area to be joined. Still keeping the parts correctly aligned, pick up a small quantity of solder on the tip of your iron and carry it to the joint (unlike electrical soldering, when you feed solder into the joint). Hold the iron against the joint just long enough for the solder to flash between the parts. Don't let go of the parts until the solder has cooled – this takes from five to ten seconds. To run a fillet of solder along a joint, wait until the solder flashes between the parts and then pull the molten solder along

the joint with the iron tip. Don't load the iron tip with a lot of extra solder, but work the joint in 1" lengths, bringing in small quantities of solder. Brass is a very forgiving material and if you get something out of alignment, use heat from the iron to desolder the joint before starting again. For complicated assemblies, it is a good idea to only tack solder parts together. You can then make adjustments by desoldering until you are happy with the location of parts and then solder solid.

When you need to laminate two or more layers of brass together, align the parts and carefully clamp them together, either in the vice or by holding them with miniature crocodile clips. Run flux around the edges, and then go around with the soldering iron. Clean up thoroughly afterwards.

To fit small parts and overlays on to a larger assembly, such as strapping to a wagon side, when you need to prevent finely detailed areas such as planking becoming clogged up with solder. Tin the back of the small component first, then hold in place on the model and apply flux. Carefully wipe the tip of your iron on a sponge to remove any solder from it (dry iron), and then touch it against the parts to be joined. After a few seconds you'll see molten solder bubbling from the edges. Remove the iron, still holding the parts in place, and allow the joint to cool. An alternative is to use solder paint (I would recommend Carrs 188 solder paste). As the name suggests, this is a flux and solder in one. Simply apply a thin coat of solder paint to the back of the component instead of tinning. Still apply a small amount of liquid flux before you solder the part into place.

Any surplus solder should be removed using a craft knife, I find No 10 curved scalpel blades ideal, then burnish clean with a glass fibre brush. With practice, you'll learn how to use the minimum amount of solder to do the job. Flux is corrosive so, after each soldering session, give your model a good scrub with washing up liquid or Jif. After a day or two, any remaining flux residues will show as a green film, which should be washed away.

To cut parts from the fret, use a sharp Stanley knife on a piece of hardboard or a pointed scalpel blade on a block of softwood. Remove tags and burrs with a fine file.

Three-dimensional parts are formed by folding. On an etched brass kit, the fold lines are normally half-etched on the inside of the fold. You'll be able to fold most parts using smooth-jawed pliers. For longer parts folding bars are desirable.

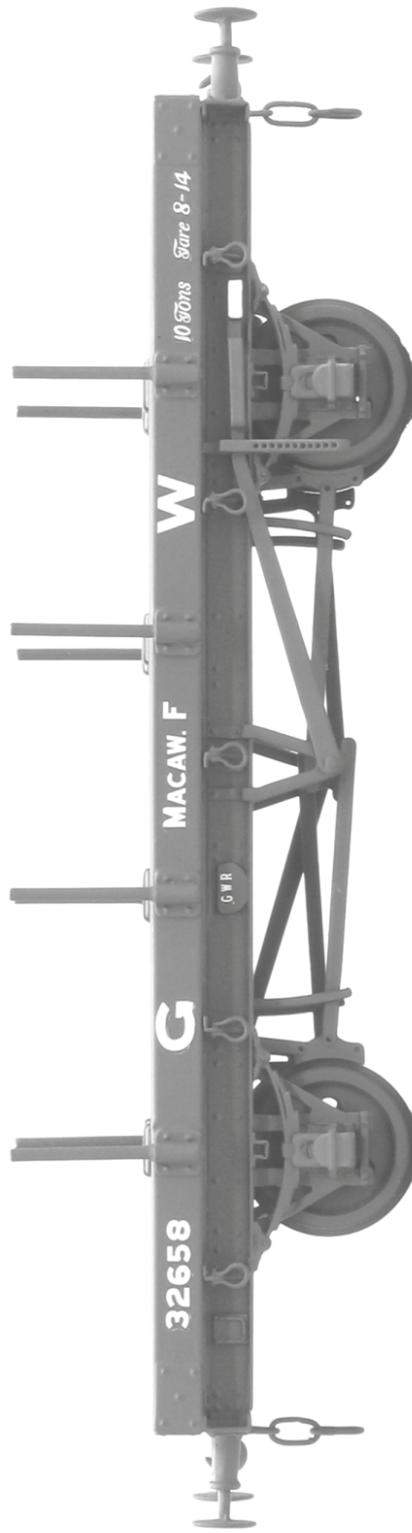
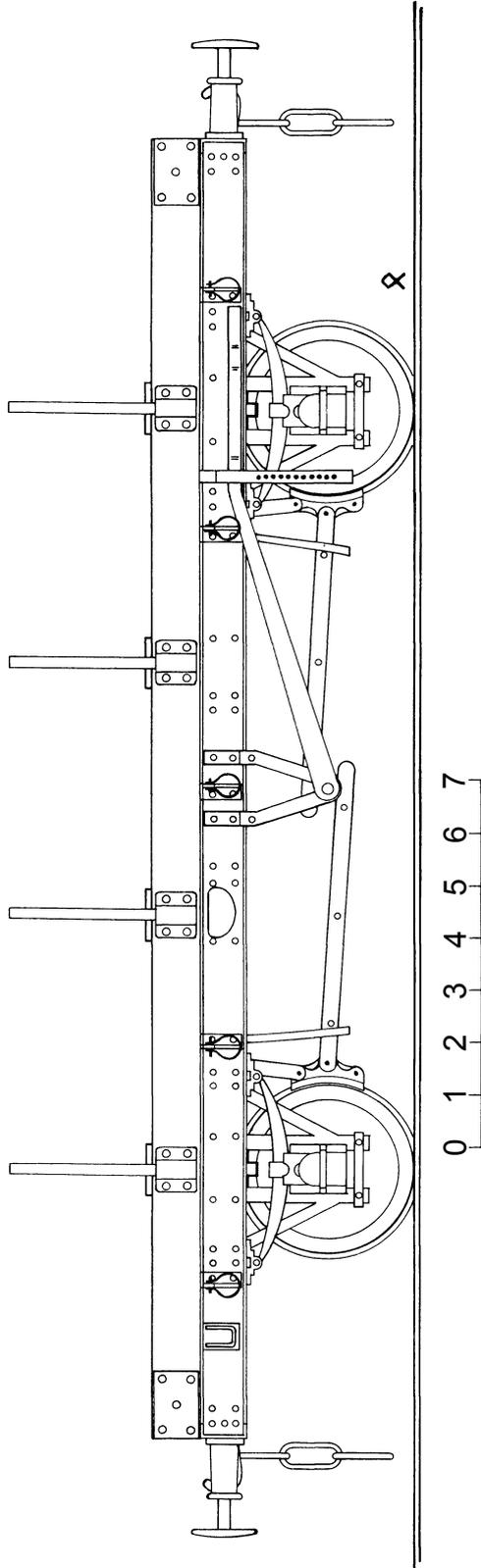
Other useful tools include a bench vice, a good pair of tweezers, a set of Swiss files (get a full set of cheap ones and then buy quality replacements for the three that you use the most), a pin vice with a selection of drills from 0.5mm to 2.1mm plus a few larger sizes that you use regularly (2.6mm for axle bearings etc), some square-nosed pliers and some very pointed-nosed ones, preferably with smooth jaws. Buy cheap tools first and duplicate the most used ones with quality.

Try to complete all high-temperature soldering before attaching any of the cast whitmetal parts. These can be attached with two-part epoxy resin such as Devcon or Araldite Rapid. Ensure the surfaces to be glued are clean and free of grease.

A better alternative is to solder your white metal castings using Carrs 70 degree low melt solder and Carrs red label white metal flux. The iron should be run at a much lower heat so that you do not melt the castings. I have a domestic light dimmer switch and plug socket fixed to a piece of wood, wired up with a lead and 3 amp mains plug to the input side of the dimmer switch and the output of the dimmer switch into the plug socket (remember to continue the earth). Plug your 40 Watt iron (25 Watt iron won't work) with a clean and freshly tinned bit into this and experiment with adjusting the switch until you find the range of temperature at which the solder melts, but a scrap casting does not. **Note** as the iron is running at a lower voltage it will take longer to heat up, so when you think the adjustment is correct do check a few minutes later on another scrap casting to see that it doesn't melt. Then scribe a mark on the switch knob to indicate this position.

When attaching white metal fittings to brass the surface of the brass must be tinned with 145° solder, to allow the solder to grip. The surface of the casting at the joint should be burnished bright. The casting can then be soldered into place with 70° solder and fillets of solder run into any gaps with no risk of melting the casting.

# GREAT WESTERN RAILWAY MACAW F



I have tried to reproduce this photograph to scale size so that it will aid positioning of the lettering

GWR Livery. All over GWR wagon grey (Railmatch enamel spray No1604). Planked floor, dirty wood (Humbrol enamel No 110 with small amounts of a light grey No 64 and gunmetal No 53 or matt black No 33 streaked and blended in to represent the direction of the wood grain). White end to brake lever. White lettering.

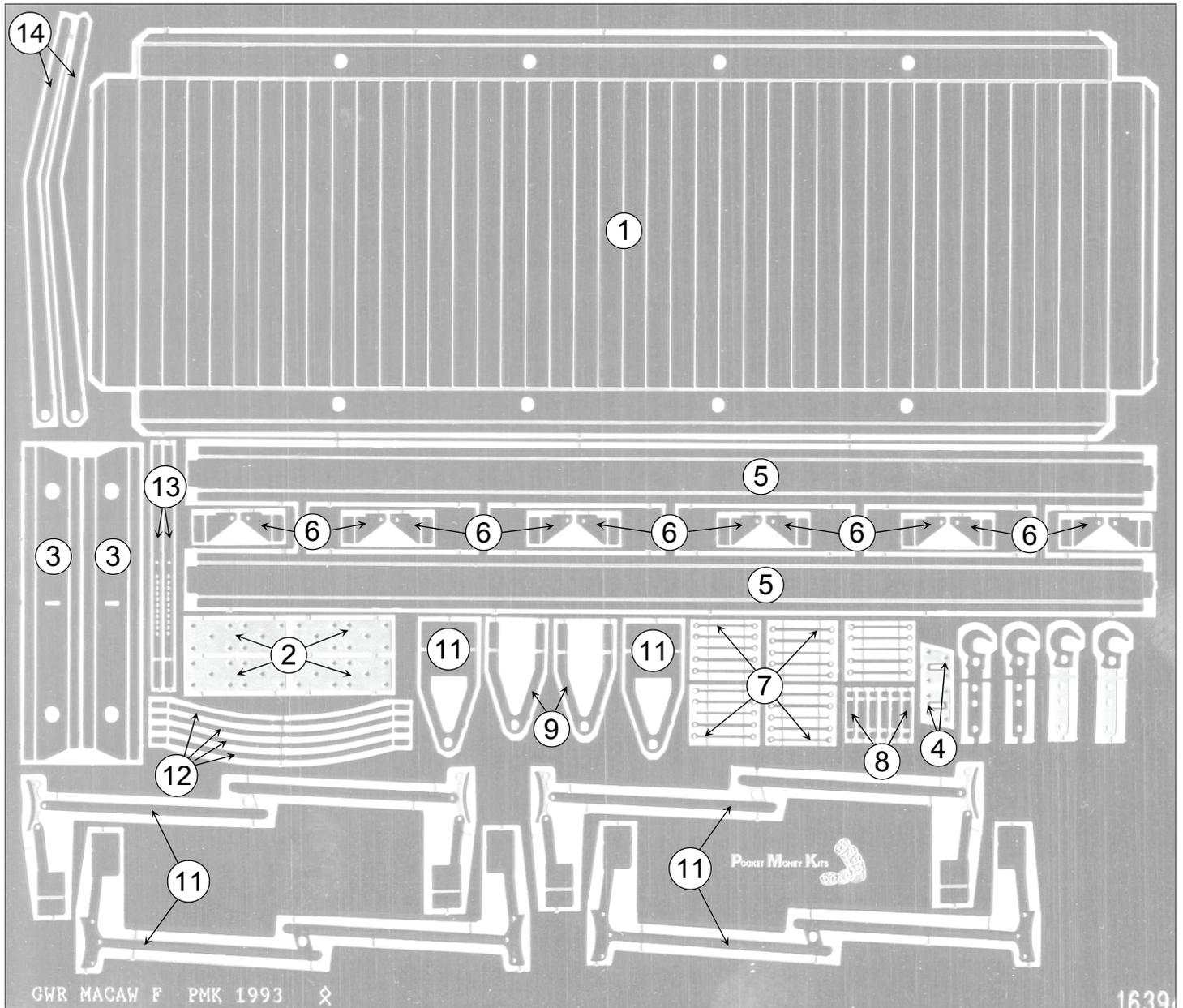
Standard BR livery, grey body sides and ends. Buffer beams, solebars and below, black. White end to brake lever. White lettering on

black patches and number preceded by W.

Transfers for lettering are available from the Historical Model Railway Society, 8 Gilpin Green, Harpenden, Herts, AL5 5NR. Also stocked by some specialist model shops. You will require sheet 11, GWR goods vehicle insignia or sheet 25, BR revenue wagons.

Running Numbers, 32357 to 32360, 32630, 32633, 32634, 32637 to 32640, 32647, 32648, 32651 to 32660, 32663.

## GWR Macaw F Etched Parts Identification and Suggested Assembly Order



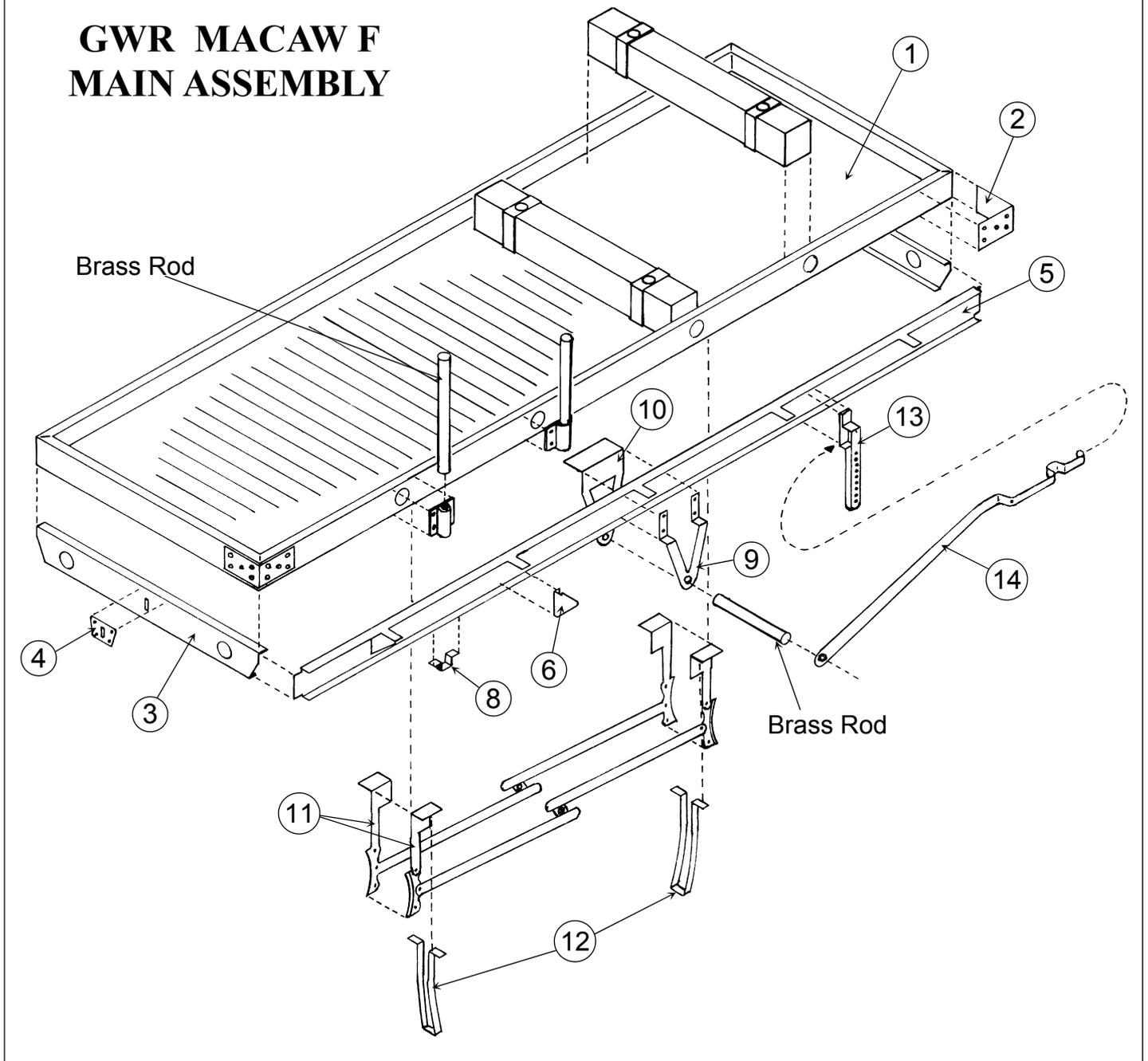
1. Using bending bars fold up the main body (part 1). The suggested order of folding being the top lips of the sides first, then the main sides, then the top lip of the ends and finally the ends. For the last fold of the ends you will not be able to use the bending bars so place the main body on a flat surface and place a piece of square off cut of 2"X1" wood, hard down inside the floor. The ends can then be folded up using finger pressure, the wood ensuring a 90° fold. Ensure that all is square and then run a fillet of solder into each corner.

Even with bending bars you may find it a little difficult to make a crisp fold and you may find it helpful to deepen the fold line by pushing a triangular file up it until a faint witness mark appears on the other side of the brass. This should reduce the amount of pressure required to make the bend and give you a crisp square corner. Fold up and fit the four corner strapping plates (parts 2). Their centre line and folding point is marked by etched notches.

2. Fold through 90 degrees the top and bottom edges of the buffer beams (parts 3) and then fit to the body flush with the ends. Fit the coupling plates (parts 4) to the buffer beam. Ensure that the coupling slots line up and that they are free of solder.

3. Emboss the rivet head detail on the solebars (parts 5). This is best achieved with a rivet-forming tool. Alternately you can use a scribe with the point rounded off slightly on an oilstone. Place the part face down onto a block of softwood and then firmly press down into the half etched hole. This may distort the part so gently correct this by bending back with finger and thumb pressure. Then fold the top and bottom edge through 90 degrees.

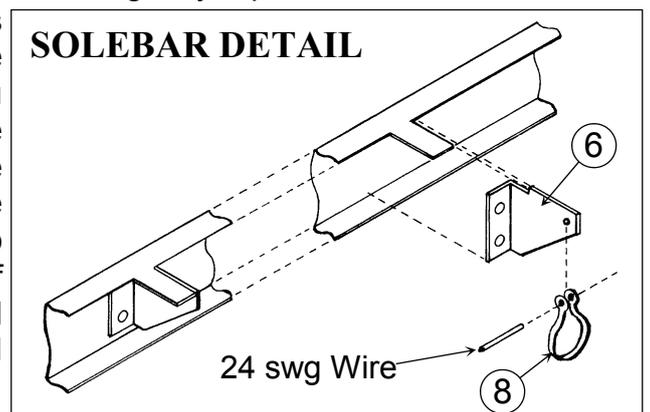
# GWR MACAW F MAIN ASSEMBLY



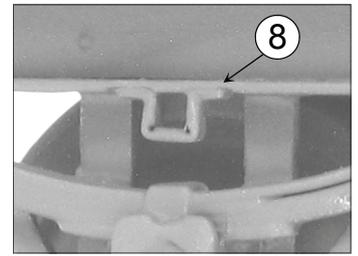
I now prefer to detail up the solebars before fitting to the main assembly as I find it easier to fit components and clean up without the bulk of a main assembly. Emboss rivet heads, fold up and fit the triangular reinforcing plates (parts 6). Note that these are handed down the length of the solebar so refer to main drawing and photos. Form up and fit the chain securing shackles (parts 7). First clear the holes in the ends of the shackles with a drill so that a length of 24 swg soft tinned copper wire will be a snug fit through them. Then remove from the etched fret and form up around a 2mm drill shank into a closed U shape. Then with the shackle still on the drill shank gently squeeze the top with round nosed pliers to form the reverse curves so that the two holes are opposite each other. There are plenty of spare shackle etches so don't worry if you have a couple of failures. Now slip the ends of the shackle onto the reinforcing plate so that the holes line up and pass a length of 24 swg soft wire through the holes. Solder solid and snip the wire off to give two short tails either side of the shackle. If you slip a fold of cigarette paper between the reinforcing plate and shackle before threading the wire through this should prevent soldering solid and allow the shackle to pivot.



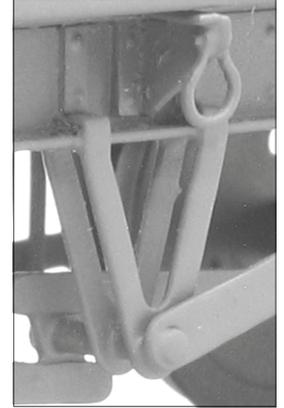
## SOLEBAR DETAIL



Fold up and fit the spring stops (parts 8). These locate into etched rebates on the underside of the solebar. Then fit the solebars to the underside of the body. You may have to file the ends of the solebars to achieve a snug fit into the buffer beams. There are etched dotted lines on the underside of the body to give a guide for the position of the backs of the solebars but try to get them parallel and the backs about 43mm apart. Solder generously at the buffer beams to give a neat joint with no gaps.

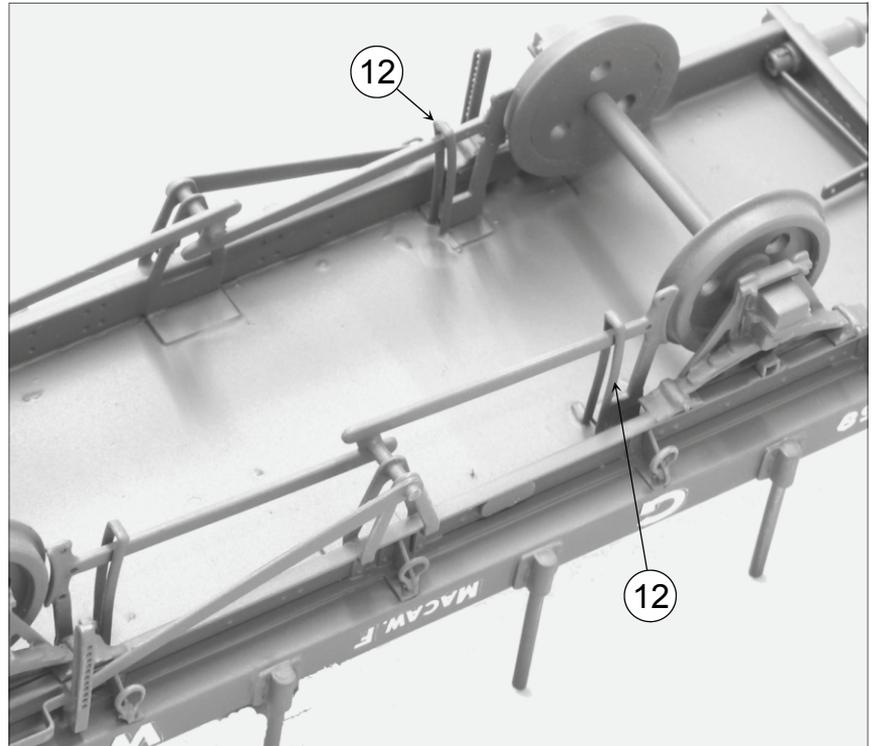


4. Emboss bolt heads and fold up the outside vee hangers (parts 9) and inside vee hangers (parts 10) then fit on the wagons centre line. It is probably best to spot solder into place the inside vee hangers first as there are etched marks on the underside of the floor to help with positioning. Then slip a length of 1.5mm brass rod through the holes in the vee hangers. Check by eye that this rod runs square across the wagon, adjust the positions of the vee hangers if necessary and then solder the vee hangers solid to the underside of the wagon floor. With the rod still temporarily in place fit the outer vee hangers soldering solid into the web of the solebar. The rod will help with positioning the vee hangers correctly.



Emboss bolt heads on the brake push rods and fold through 90 degrees the base of each brake hanger. Then laminate together the two etches of each set of brake gear (parts 11). Only temporarily tack solder the brake gear to the underside of the wagon floor using the loose brass rod to help locate its position.

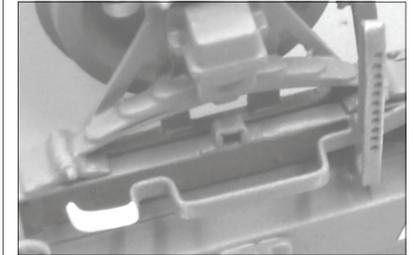
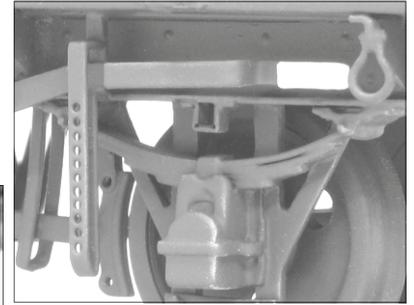
5. Fit axle guards and wheel sets. My casting technology is not very sophisticated and I never seem to be able to cast axle guards cleanly, so clean out any flash between the W irons with a sharp pointed scalpel blade. Drill out to 2.6mm diameter the hole to take the brass axle bearing (go carefully as you don't want to drill through the front of the axle box). This hole is formed by a small rubber peg in the mould which tends to flex as metal flows into the mould cavity and you will probably find that the hole is not quite square to the back of the axle guard. To correct this use a drill held in a hand pin vice (chuck) and by applying a gentle sideways pressure as you drill out the hole, you will be able to square it up. Then fit the axle bearing into the slightly oversize hole in the axle guard with a blob of Evostick, (have a dry run first with axle guards and wheel sets to check that all will fit OK) as this takes a little time to set you can make adjustments to the axle guards and then leave the wagon on a flat surface for the glue to set.



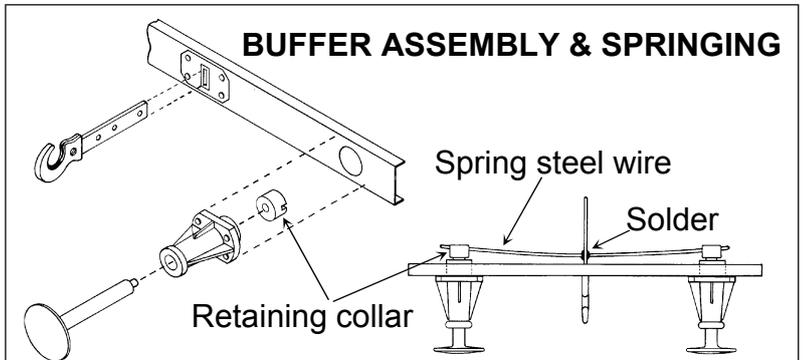
Slip wheel sets with the axle guards on between the solebars and tack solder each axle guard with low melt solder to the solebar. There are etched axle centre line marks on the underside of the floor to eye up to and the brake blocks and spring stops will help set the correct axle guard position. Check that the axles are parallel and the wheel centres are about 101.5mm apart. Place the wagon onto a flat surface and adjust if necessary by re-soldering each axle guard until the wagon sits without rocking, when happy solder solid.

Then re-solder brake gear so that the brake blocks sit just back from the front of the wheel. You can now fit a length of brass rod into each set of brake gear and vee hangers with 1.5mm of rod projecting through the front vee hanger.

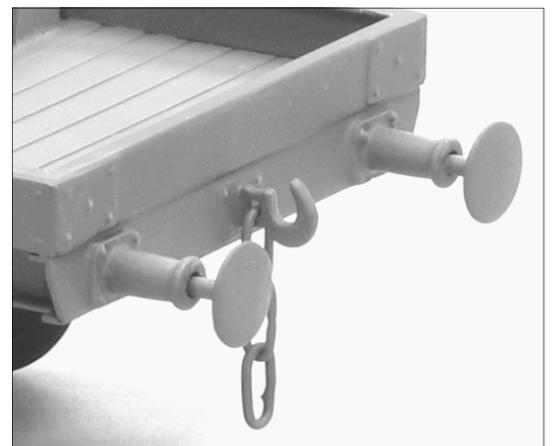
6. Fold up and fit the brake safety loops (parts 12). Fold up the brake pin guides (parts 13) note that the bottom 180° fold is a curved bend. Reinforce the folds with 60/40 solder and fit to solebar with the top locating onto the edge of the top and bottom solebar lip (not into the web of the solebar). Fold up the brake levers (parts 14), thread through the pin guide and solder end over rod at vee hanger and to brake pin guide. Note how the end of the brake lever is shaped so that it would clear the axle box. The bend centre lines are indicated by etched marks on the back of the brake lever.



Drill out 2.1mm the buffer bodies to take the cast head/shank. I hold the drill bit in a pin vice (chuck) and grip the buffer body between finger and thumb. Drill through the body from each end so that the hole breaks through in the middle. Use a little spot of spit on the end of the drill (some more technical people have a block of furniture polisher's bees wax that they smear on the drill end). This will prevent the drill wandering in the white metal and breaking through the side of the buffer (a little lubrication on the drill will make drilling holes in any white metal casting more accurate). Then fit the shanks through the buffer body, snip off some of the narrow end of the shank to leave just over 1mm from the step and solder a retaining collar onto the shank. Open up the holes in the buffer beam with a tapered reamer and then fit the assembled buffers into the holes.



Now laminate together both halves of the coupling hook, and make up the links. I close up the links by holding the curved end in the jaws of a pair of round-nosed pliers in one hand and squeeze the flat parts of the link parallel with long-nosed pliers held in the other hand. Once you have six even-shaped closed links, you can open each one slightly and thread three together. The last link passes through the hole in the coupling hook. I reinforce the joint of each link with a spot of 60/40 solder.



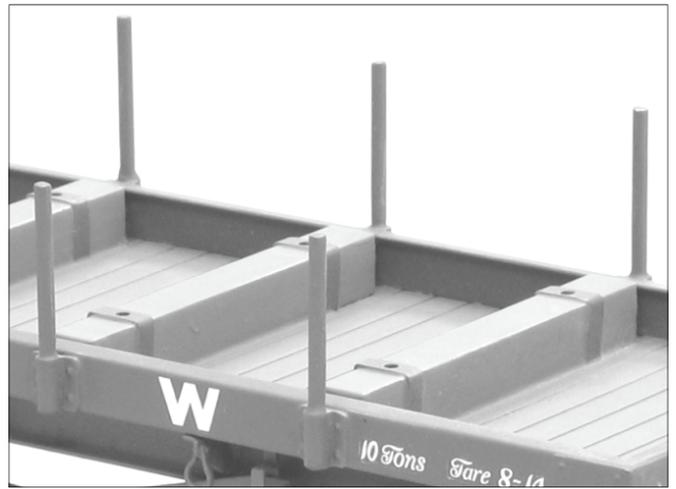
Pass the coupling hook through the buffer beam slot and retain it with a length of spring wire. Polish the centre of this wire with emery cloth first so that you can solder it to the coupling hook shank once you are happy that the buffers spring freely.



7. Fit the cast stanchions and stanchion pockets. On the prototype wagon these stanchions were movable to suite different loads and could be placed in the side pockets or into holes in the bolsters. I have included castings for pockets with stanchions fitted and empty pockets so that you are free to fit whatever combination you wish depending upon the requirements of the load being carried.

If your wagon is to receive rough handling you may wish to replace the cast stanchions with brass rod. If this is the case fit eight empty pockets and then drill out pockets 1.6mm and fit 25mm long lengths of brass rod. You can also use this rod to make stanchions for fitting into the bolsters.

Fit the cast bolsters positioned to correspond with the cast stanchion pockets. Information from J.H.Russell (a Pictorial Record of Great Western Wagons, page 78) states that usually these wagons had four bolsters but the photograph in the book shows a wagon running with only two outer bolsters. So again it looks as if the bolsters were removable, or at least the centre two were, to suite the requirements of the load being carried. Again the choice is yours.



Fit the cast wagon label clips and number plates to the solebars. Refer to the main drawing and photos for position.



8. Painting is a vast subject that cannot be covered fully here. The important thing with a metal model is to get a good base coat of primer. Hopefully you have been cleaning up and washing the model at the end of each modelling session, but it will still need thoroughly cleaning before painting. I give my models a good scrub with a stiff-bristled paint brush in a sink full of hot (as hot as your hands can bear) water and cheap washing up liquid (the expensive stuff that's kind to your hands has an oil in it that will stop the paint keying to the metal). If you know somebody who works in catering and can scrounge you some industrial-strength liquid this is better still. Then rinse the model a couple of times in clean warm water and place in a dust-free box to dry. I use car aerosol primer and Halfords grey primer is one of the best. For the best results you want to spray at room temperature (25°C) on a dry (avoid cold, damp or humid) day. I find it helps to warm the model to about 30°C (put it in the airing cupboard overnight) and I warm up the paint tin by putting it onto a radiator (about 40°C, but use your common sense as I don't want anybody blowing themselves up). I find it best to prime the model in two light coats, about 15 minutes apart and then leave for 48 hours to harden off (in the airing cupboard in a dust-free box).

I brush-paint my models with Humbrol enamel. For years I just stirred it up and painted straight from the tin but I was never completely happy with the results. Recently two things have transformed my painting. The first was a copy of Martyn Welch's book, *The Art of Weathering*, Wild Swan Publications, ISBN 1 874103 11 9. Martyn's basic techniques are very useful and almost foolproof. Martyn's method of creating worn and weathered planking for wagon floors by blending brown and grey paints to form a base. Then dry brushing darker shades to represent the wood grain is particularly effective on this type of wagon. The second thing is to mix the paint in the tin and then transfer it to a palette (a sheet of clean plasticard) with blobs of lighter and darker shades of paint surrounding the main colour. Then work the paint with the brush on the palette, slightly varying the

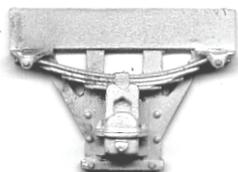
tones of the paint. This seems to totally change the texture of the paint and the way it goes on and covers on the model.

For more information and photographs of the prototype wagon I would recommend, GWR Goods Wagons, Atkins, Beard & Tourret, Tourret Publishing, ISBN 0-905878-07-8. Get it from your local library via their book order system.

Or if you can get a copy the original reference book is A Pictorial Record of Great Western Wagons, J.H.Russell, Oxford Publishing Co, ISBN 902888 01 3.

### Casting Identification and Parts Check List

1.5mm Brass rod for brake shafts and stanchions X 11", Spring steel wire for buffers (may be blackened) X 6", 24swg soft tinned copper wire for shackle pivots X 12".



4 X Axleguards



4 X Bolsters



8 X Stanchion pockets



8 X Stanchions



4 X Buffers



6 X Coupling links



4 X Buffer Heads/Shanks



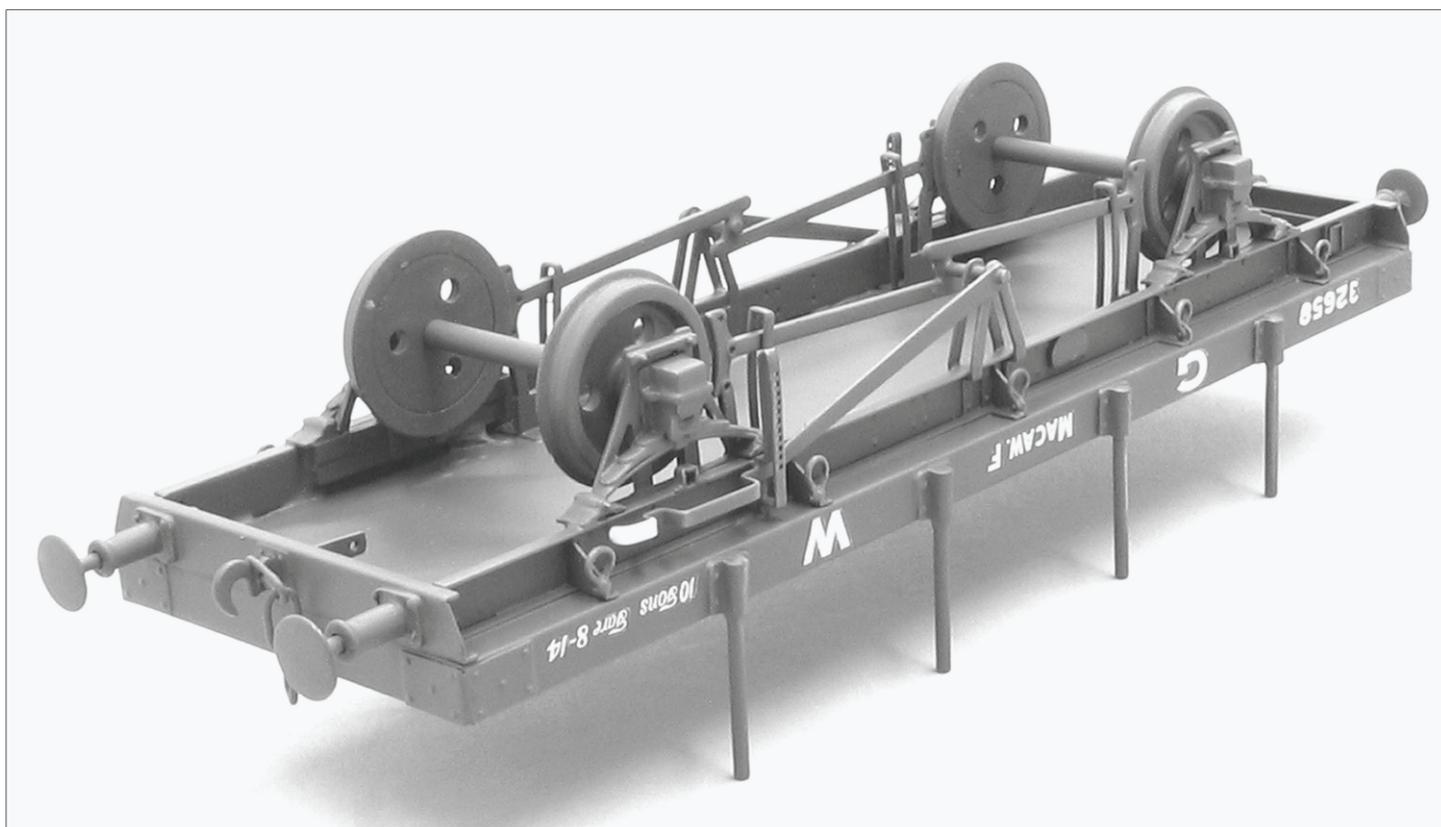
2 X Number plates and label clips

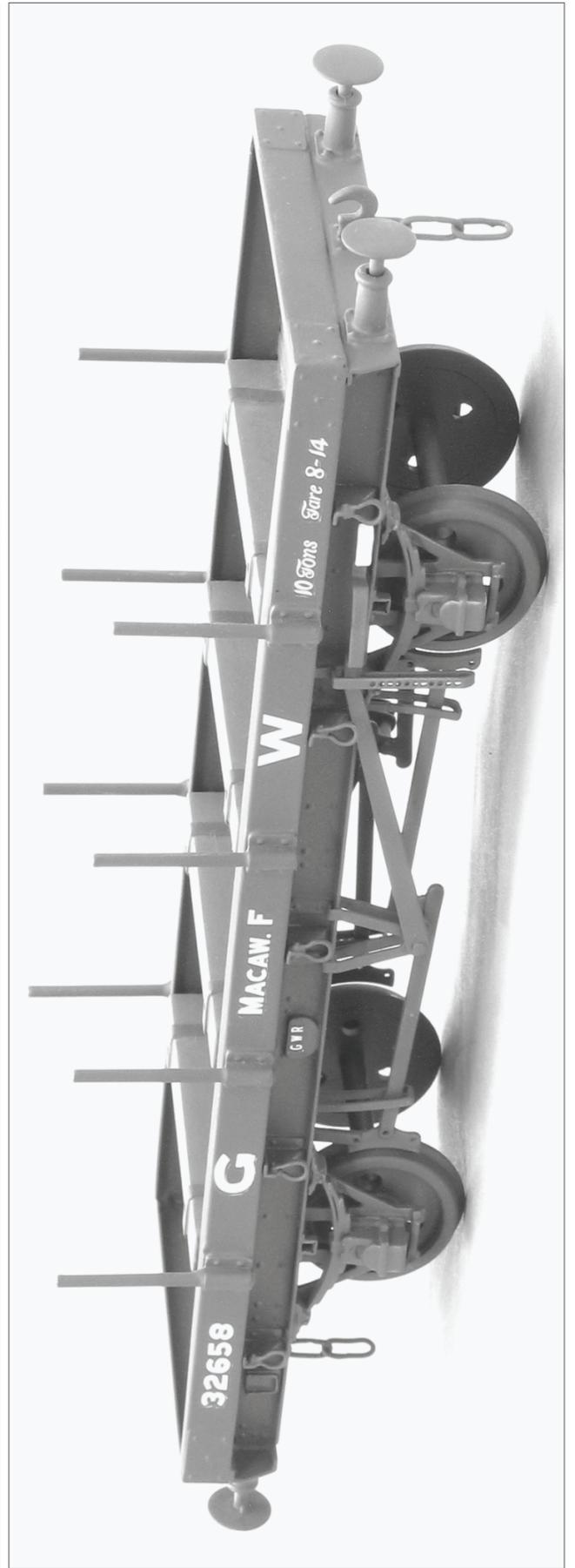
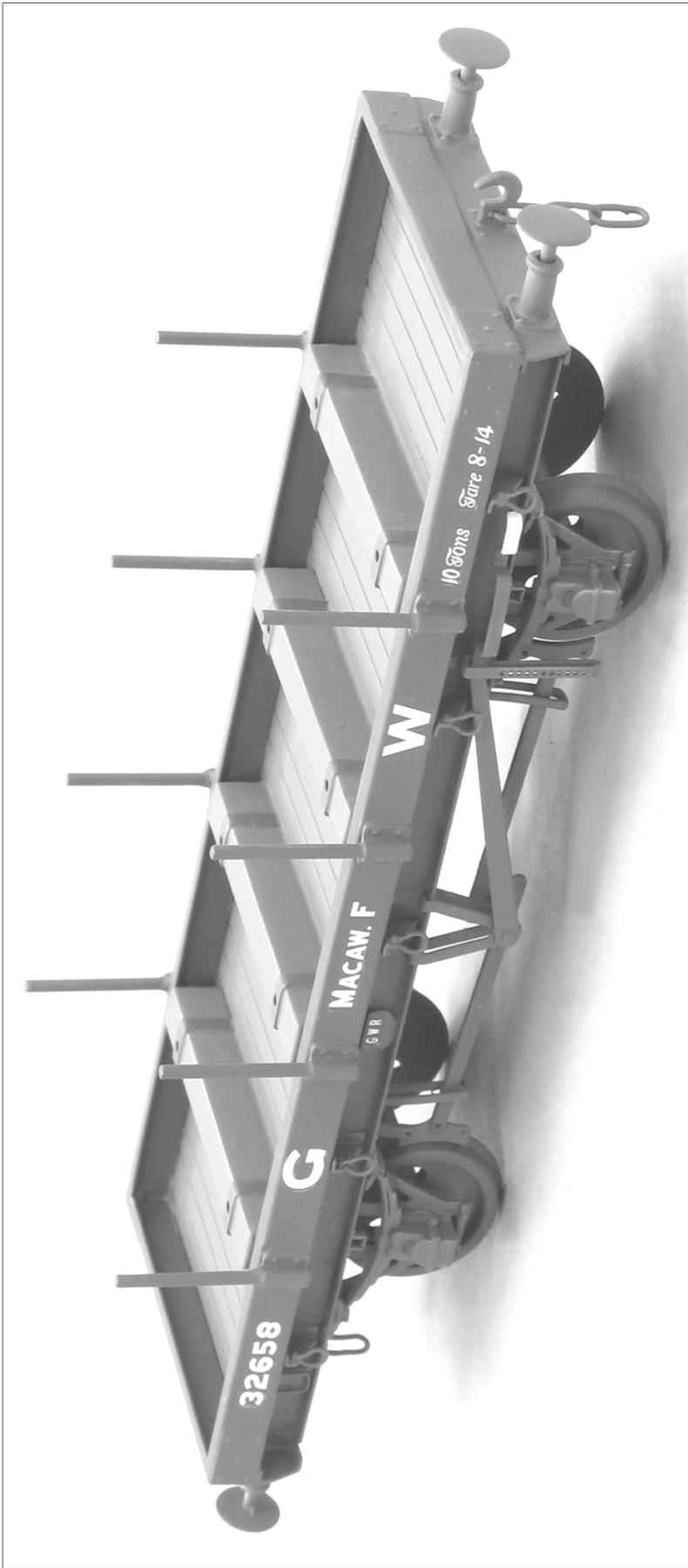
*I try to include extra castings when I make the moulds for a kit to cover failures so hopefully you will have some spare castings.*



4 X Buffer Retaining Collars

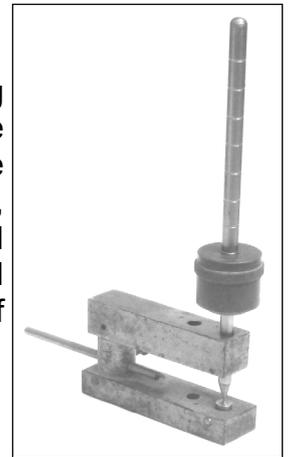
## Great Western Railway Macaw F Bolster Wagon





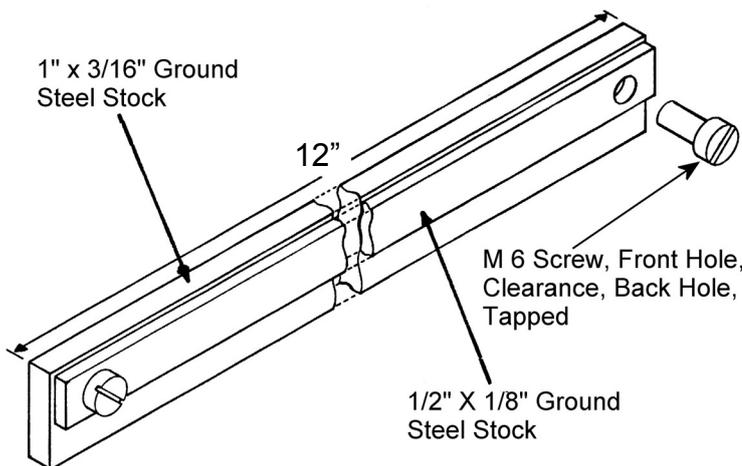
## Bolt Head and Rivet Forming Tool

Although a very reasonable job can be done with a scriber point, a rivet forming tool is very desirable if you are going to do a lot of kit building. These are produced by a number of different people but I use and would recommend the one produced by Dick Ganderton, Graskop, Dewlands Road, Verwood, Dorset, BH31 6PN, Tel 01202 822701. It is available with a number of different sized punches and anvils but if you were only going to get one size then I would recommend the 7mm scale 1½" diameter. I have got ten years hard use out of mine so far so this is an ideal tool to put onto your Christmas present list.



## Fibreglass Scratch Brush

The use of this tool is mentioned in the instructions. This is like a propelling pencil holder into which a fibreglass refill is fitted and which will give a vigorous abrasive action. I find this tool indispensable for cleaning up and removing solder. One very useful tip is to soak the refills in dilute PVA glue (Evostick resin W wood glue let down 50/50 with water and a spot of washing up liquid) and then drill holes in a block of wood and stick the ends of the refills in the holes while they harden off. This will make the refills much more abrasive and longer lasting, and also stops the fibres breaking off and ending up in your fingers. You will need to give the refill a good rub to get it started but if you use green label flux you will soon have plenty of rusty tools that need cleaning. These and most other general modelling tools can be obtained from Squires Model and Craft Tools, 100 London Rd, Bognor Regis, West Sussex, PO21 1DD, Tel 01243 842424. They do a free catalogue and a very good mail order service.



## Folding Bars

You will find a set of these very useful and here are details of the set that I have made for myself, in fact I have made three sets of different sizes. The dimensions or materials are not critical so make yourself a set to suit the materials you can get hold of. The important thing is that you can clamp the part along its entire length, with the etched fold line just above the front bar. Then clamp the bars in the jaws of your vice, a couple of 1" G clamps are also useful for long folds, and laying a steel rule at the back of the part to

help transfer the pressure from your fingers evenly, pull forward to make the fold. Once the fold is close to 90° you can finish by pressing down on it with a block of wood and moving the block along the fold with a stroking action or by giving gentle taps with a small hammer on the wood block. Occasionally it is necessary to emboss bolt heads onto a part before folding, by lining the face of one of the bars with two or three layers of masking tape, you can still clamp the part without crushing the bolt heads but you won't get such a tight fold, so deepen the fold line with a triangular file.

## Can You Help Me?

If you have enjoyed building this kit and have been satisfied with the quality, I would be most grateful if you could recommend it to your friends and fellow modellers. Although my kits are not perfect, I try to put a lot of time and effort into producing them. If I can get extra sales of a kit through customer's personal recommendation and I find that word of mouth is the best form of advertising. This will help me to put extra time and money into developing the next kit. Hopefully this will give me more satisfied customer to recommend my kits to their friends.

If you are not happy with this kit then please tell me. Hopefully I will then be able to help and sort out any problem.

**Best Regards And Happy Modelling**

**Jim McGeown**