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COVER PICTURE

Pictured in the Varshavski Railway Museum in St. Petersburg is Esh 4444 Locomotive.

Photograph: Harvey Smith

THE MAGAZINE FOR MODEL ENGINEERS ENGINEERING in Miniature

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The LMS Tank Wagon Project

'Marty' Burners for L. P. G.

Southern Federation of Model Engineering Societies Autumn Rally September 2009

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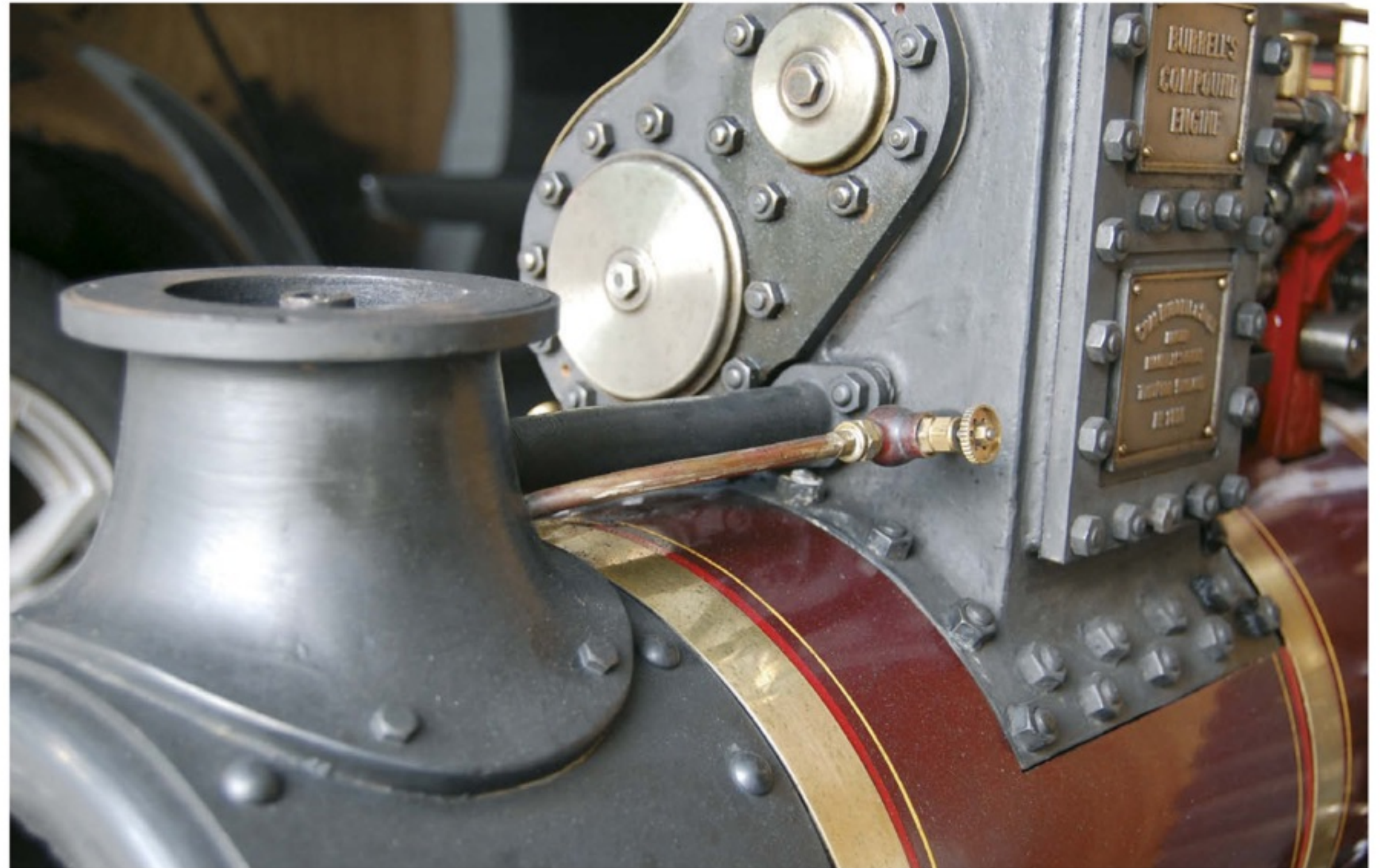
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Blast Nozzles for Miniature Traction Engines

By **Martin Johnson**

As a colleague pointed out at a recent rally, there is very little published information on traction engine blast pipes. His particular problem was selecting a suitable blast pipe nozzle size for two 4½" scale engines. By coincidence, another engine's owner was having a terrible time trying to make steam on a 3" scale Marshall. My engine is fitted with the arrangement described here which has proved to be very effective. On one memorable occasion, we started the grand parade with around 30p. s.i. on the clock and hardly any fire, but with careful firing finished it with a full head of steam. This is not a feat I want to repeat too often, but it shows how effective good draughting arrangements can be.

But what constitutes a 'good' draughting arrangement? Fundamentally, the blast pipe and chimney form a jet pump using energy in the exhaust steam to pump flue gases (and hence air) through the fire. The energy of the exhaust steam is used by giving it a velocity in the blast nozzle, and the high



Photograph 1: Typical traction engine chimney base, exhaust pipe and blower.

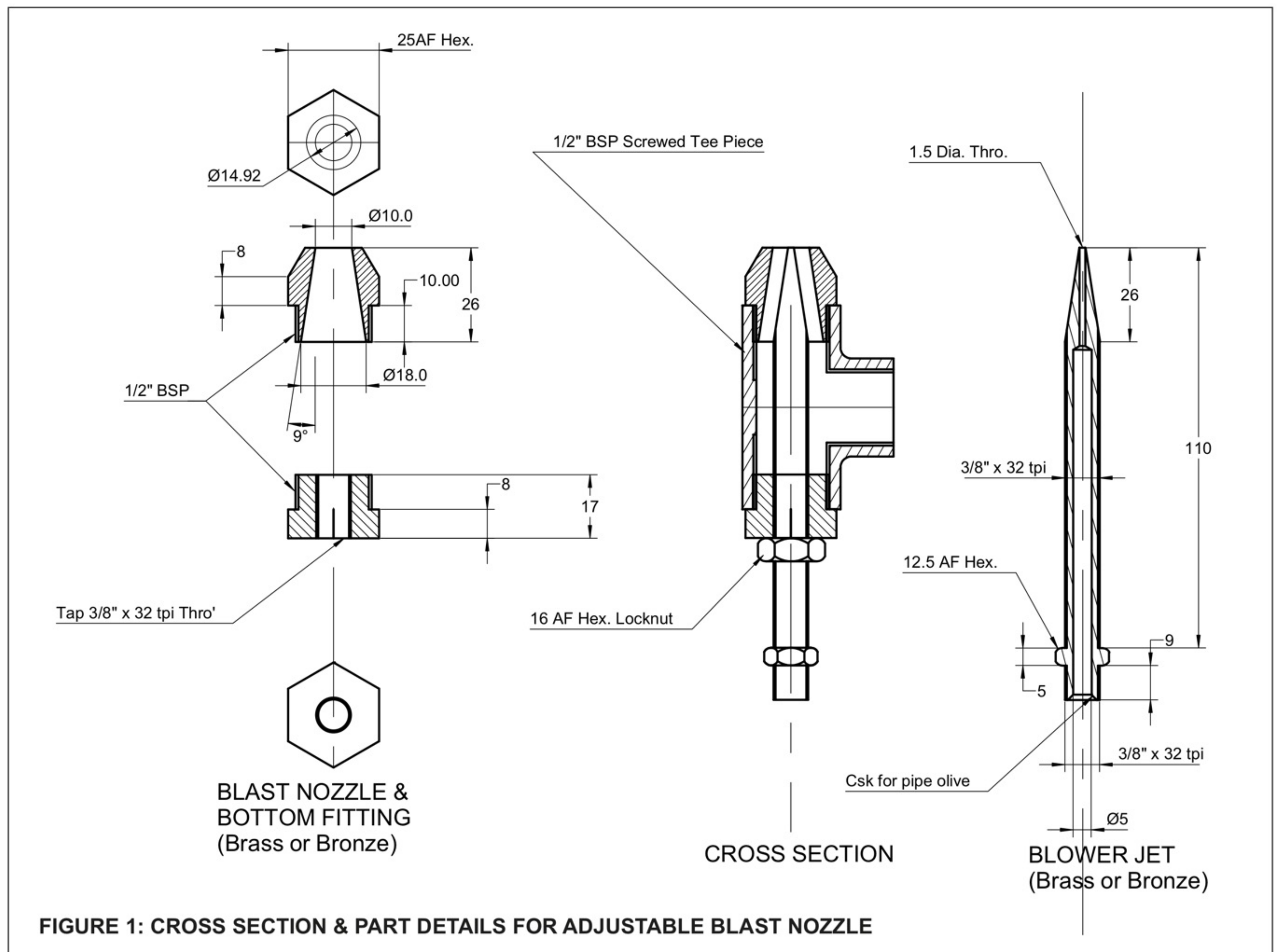


FIGURE 1: CROSS SECTION & PART DETAILS FOR ADJUSTABLE BLAST NOZZLE

speed steam then entrains flue gases. If we put the steam through a small nozzle, we create a high velocity and pull plenty of flue gas through, making loads of heat and hence steam. However this requires pressure in the exhaust steam which reduces the energy available to the engine. So a 'good' blast nozzle has the largest bore possible, consistent with pulling enough air through the fire.

However, there are other factors that affect the efficiency of the blast. The jet issuing from the blast nozzle must be well formed – a well defined coherent flow of high speed steam not a ragged 'splutter'. The jet must also mix effectively with the flue gas so that the momentum of the jet is efficiently transferred to the flue gas. As a matter of interest, most of the later advances in locomotive exhausts were concerned with improving this latter aspect. Finally, the flue gases must have a free flow path with minimal restriction to the flow.

applicable to traction engines.

Above all, most builders of any steam engine agree that the blast nozzle diameter will need some fine tuning once a model is up and running. However, not many of us actually take the time (and material) to make up a range of nozzle sizes and most of us never quite get around to making that new smaller blast nozzle so we soldier on with an engine that never quite makes enough steam. So it seemed to me that an adjustable blast nozzle would be worthwhile.

In an attempt to overcome some of these problems, I came up with the arrangement shown in Figure 1. I have used a Tee piece instead of the usual 90° bend. The blower enters from the bottom of the Tee and is arranged to partially block the blast nozzle – depending on the axial position of the blower jet the blast nozzle size can be varied. The blower position can be adjusted with the engine in steam if necessary. The arrangement ensures an

not drill and tap the $\frac{3}{8}$ " $\times$ 32 thread yet. Part it off.

- Turn the thread for the blast nozzle, but do not bore the taper yet. Screw the tee piece on to this 'mandrel' as it is shown in Figure 1 and face off the end of the tee to clean it up – the ends are not always very square. Reverse the tee piece and face the other end.

- Now screw in the bottom fitting and drill and tap the $\frac{3}{8}$ " thread.

- Screw in the part complete blower jet as far as it will go and lock with a locknut. Drill the 1.5mm hole and form the taper on the end. Remove the blower jet and silver solder the 12.5AF nut onto the lower end.

- Unscrew the Tee piece and bottom fitting.

- Complete the blast nozzle and part off.

To install the blast nozzle, it is screwed onto the exhaust pipe with plenty of sealant. I used a domestic plumbing fitting and a



*Left – Photograph 2:
View of blast nozzle
from above.*



*Right – Photograph 3:
View of blast nozzle
from below, showing
blower pipe route.*

Photograph 1 shows how a typical traction engine differs from railway practice. The blast nozzle in a traction engine is usually located immediately after a sharp 90° bend in the exhaust pipe. This means that the flow exiting the blast pipe will tend to be 'lop sided' as the exhaust steam will not turn sharp 90° which will impair the overall performance of the blast pipe. Since the blast nozzle is usually situated within the chimney throat (The blast nozzle can just be seen in the first photograph, level with the chimney flange) the blast nozzle (and blower nozzle) block off a significant area of the chimney throat, thus restricting the exhaust gas flow. Some miniature designs can be particularly poor in this respect.

It is worth pointing out that the relatively long traction engine chimney with a gentle taper, is much more effective than the short stubby chimney found on rail applications where loading gauge restriction tend to dictate a greater angle of divergence. A gently tapering chimney (less than 7° included angle) will give a more efficient conversion of blast nozzle energy into flue gas flow. Also, since the blast pipe is within the chimney the vertical position is not critical unlike the railway configuration where the diverging blast must fill (but not overflow) the petticoat pipe. This suggests to me that the published guidelines on rail locomotive draughting will not be directly

even flow pattern leaves the blast pipe since the blower jet helps to straighten the flow pattern leaving the blast nozzle. A secondary advantage is that the blower pipe occupies minimum space within the chimney throat.

Figure 1 is drawn up for use on a 4" scale engine and uses a standard $\frac{1}{2}$ " BSP Tee piece for the body. Other sizes can be scaled to suit. In the smaller scales, it may be preferable to use a copper 'end feed' Tee of suitable size and silver solder the fittings in top and bottom. The components are simple enough, but it is important that concentricity is maintained across the blast nozzle and bottom screwed adapter; I went about it this way:

- Start with the blower jet by screwcutting the $\frac{3}{8}$ " $\times$ 32t.p.i. thread onto $\frac{3}{8}$ " round material. The thread can be finished with a die, but you will need to screwcut most of it to avoid a drunken thread over this length. If you have a long series drill, you can drill the 5mm hole to depth. If not, an alternative is to drill 5mm from both ends and then silver solder in a separate nozzle for the 1.5mm jet. Do not drill the jet at this stage. Put the part to one side.

- Make up two hexagon nuts, one at 16mm AF and one at 12.5mm. While you are set up for these you may as well make the union nut for the blower pipe as well.

- Turn up a blank for the lower fitting from 25mm AF brass or bronze, but do

length of 15mm water pipe screwed in place of the blast nozzle to check that the whole assembly was aligned with the chimney centreline. Take care to ensure the blast nozzle is in the centre of the chimney, and truly aligned to the chimney centreline; this helps the efficient exchange of momentum between steam jet and flue gas.

Photograph 2 shows the assembly from above. The blast nozzle came level with the chimney flange. In a 'pipe' configuration as this is, the vertical position nozzle position is not very critical. The theoretical best position would be either below the chimney as in locomotive practice or a wee bit below the narrowest part of the chimney. However, you would need more exhaust steam 'plumbing' to achieve the optimum position and the blockage effect of this would outweigh any gain in efficiency.

Photograph 3 shows how the blower pipe is taken vertically downwards within the chimney. It then takes a loop round, avoiding the chimney area before entering the blast pipe assembly via a union nut. This photograph also shows the access for adjusting the blast nozzle. The procedure is to loosen the pipe union nut, loosen the locknut around the blower jet, then screw the blower jet up or down as necessary and re-tighten everything. I have found that one or two turns of the blower jet make a difference to the steaming of the engine.

I hope you find this design useful. ▲

'Wessie' – The LNWR 0-8-0 Heavy Goods Engine in 5" Gauge

Nigel Thompson describes the blower valve and blast pipe details

Continued from page 166, November 2009

The valve which operates the blower is situated on the side of the smoke box and takes its steam supply directly from the inner dome via the pipe coming through the front tube plate. I have never liked the usual method of having the blower valve sticking out from the boiler back head on the end of the hollow stay with the steam supply on the spindle gland – these always leak and end up at the right moment to drip boiling water on to the fingers of the operator! Therefore after my first engine I have always had the blower valve as part of the turret. This means that the steam supply is under the valve with only the steam passing through on the spindle gland. It also makes for a better appearance to the footplate as the pipe connection is flat on the boiler, but with LNWR engines have their valves on the side of the smoke box and operated by the handrail, the hot bits are well away from 'delicate' fingers. The operating handrail passes right along the side of the boiler supported by the pipe on the right hand side which originally was used to pass the cylinder oil from the sight feeds from the lubricator in the cab to the cylinders, however on the superheated engines this pipe was not used. There are four hand rail stanchions screwed into this pipe on each side of the boiler, but make sure they are all in line, otherwise the hand rail will not only not look very straight but will also be tight to turn. There is also a handrail stanchion or a small bracket bolted to the inside of the right hand side of the cab lower side sheet, right in line with the handrail to support it just in front of the small operating handle fastened on the end.

Originally the hand rail on the left hand side of the engine was used on all the superheated fitted engines to operate a damper in the smoke box which allowed the driver to control the gas flow through the superheater flues. To get the maximum power and steaming capacity from his engine, he could regulate the flow allowing more hot gasses to flow through the small tubes if the boiler pressure was a bit low.

These pipes are $\frac{5}{16}$ " in diameter and I used copper tube 18s.w.g. thickness which I drilled in the milling machine to ensure that all the stanchion holes were straight and square and tapped to take the $3\frac{1}{2}$ " gauge handrail stanchions. These handrail supports had their holes opened out with a No. 41 drill to allow the handrail to rotate freely when being used to operate the blower. The 5" gauge stanchions are a little too big for scale size. Most handrails were around one inch diameter. The left hand pipe was treated in the same way regarding

the hole drilling and tapping but the hand rail cross holes were left as supplied as there is no need to have a loose handrail on this side of the engine, although if the original class 'G1' is being modelled then a nice touch is to allow the handrail to slide in and out with a dummy damper control fitted at the smoke box end.

The $\frac{5}{16}$ " pipes are fastened to the smoke box by an elbow bolted to the side of the smoke box. The elbows are made from $\frac{7}{16}$ " diameter brass bar reduced to $\frac{3}{8}$ " for $\frac{1}{2}$ ", the end of which was machined to 45 degrees as shown on the drawing. A piece of $\frac{3}{8}$ " diameter brass was also angled the same. The $\frac{7}{16}$ " diameter was then parted off in the lathe, reversed in the chuck, and centred. The two pieces were held together with a 10BA brass screw and silver soldered and the corner finished to shape with a file. The hole for the pipe was then opened out to $\frac{5}{16}$ " and the final operation was to just put a small curve on the end with a half round file to allow it to fit well onto the side of the smoke box. Finally this curved end was drilled and tapped 6BA for the fastening screw inserted from the inside of the smoke box. A tip to make life easier is to use a bolt with a nut on it to firstly locate the elbow on the screw and then use the nut to tighten it up. This saves an awful amount of fiddling in an awkward place!

The body of the blower valve is made from $\frac{1}{4}$ " round brass, reduced in size to $\frac{7}{32}$ " for $1\frac{9}{32}$ ". Centre and drill the end $\frac{3}{32}$ " diameter, $\frac{1}{8}$ " deep. This is to accept the handrail which goes around the smoke box front and will be fitted later. Reverse in the chuck and carefully drill and tap the end to the drawing dimensions. Make the two inlet and outlet pipes which connect the valve to the smoke box $\frac{5}{32}$ " diameter and thread them 40TPI. These have to be threaded to the correct length as it is not possible to add any more after the three parts are silver soldered together. The length of them is governed by the distance from the centre line of the handrail. I use ordinary 4BA nuts tapped out and shaped to look like the flanges where the pipes enter the smoke box as well as plain ones for holding the valve body in place to adjust the final positioning of the valve at the required spacing. Handrail stanchions from different makers can vary slightly so check the distance and adjust how far the blower valve needs to be from the smoke box side. The pipe nearest the door is the one connected to the steam supply from the dome via the nipple on the tube plate so that the steam is under the valve and not on the gland. Note that this pipe has an elbow screwed on the end to make

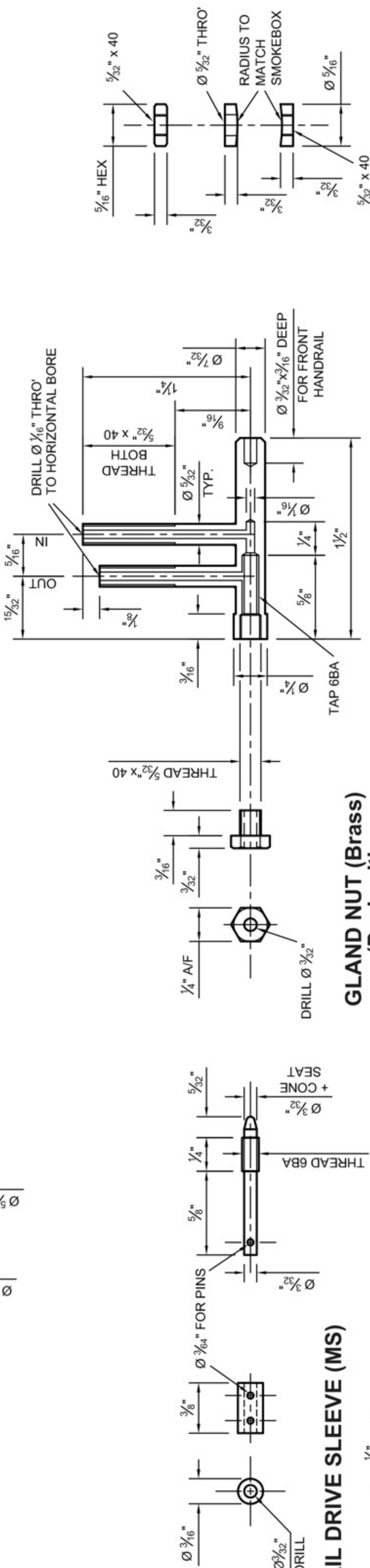


less obstruction for tube cleaning and ash disposal. The rear pipe also has a nipple screwed on the end to allow fitting of an ordinary nut and nipple to attach the actual blower pipe which is fastened to the side of the blast pipe with a nozzle screwed on the end with a No. 60 drilled hole in the end. Should it ever become blocked it is then an easy matter to remove the nozzle with a tube spanner down the chimney and clear the hole.

I never use a multiple jet blower because they are unreliable. The holes are so small that they easily become blocked in this particularly dirty environment and it is never until the last hole is blocked that you are aware of it. With the single jet the hole is much bigger so the hole does not block, and it is just as efficient as the multiple ones.

The smoke box can now be fitted onto the frames, but before it is fitted to the boiler and finally fixed. The actual blast pipe needs to be made and fitted to the cylinder exhaust. On most inside cylinder engines, the cylinder block is inclined upwards at the front end to clear the leading wheels, so the blast pipe extension will also require bending to bring the blast nozzle upright and in the centre of the chimney. On my own 'D' class engine I used a $2\frac{1}{2}$ " long piece of copper tube $\frac{3}{8}$ " diameter. This was externally threaded for $\frac{1}{2}$ " of $\frac{3}{8}$ " $\times$ 32 threads for the blast pipe cap. At the other end of the tube a piece of $\frac{5}{8}$ " diameter hexagon $\frac{3}{4}$ " long was drilled $\frac{3}{8}$ " diameter and the copper tube silver soldered into it. The end of the hexagon was then drilled $\frac{29}{64}$ " and tapped $\frac{1}{2}$ " $\times$ 32 thread to fit the exhaust passage coming-up through the slide valve steam chest cover. The other end was drilled part way $\frac{1}{2}$ " to fit the stem of the blast pipe. The hexagon part requires screwing on to the exhaust passage from the centre of the cylinder block and a mark made on the flat of the hexagon which is almost at the front of the cylinders. Of course the thread must be cut on the copper pipe before the soldering as otherwise the soft annealed copper is almost impossible to thread as the die just tears the metal.

The blast pipe now requires bending to finish up with the hole in the centre being both vertical and right in the middle of the chimney, so the smoke box now

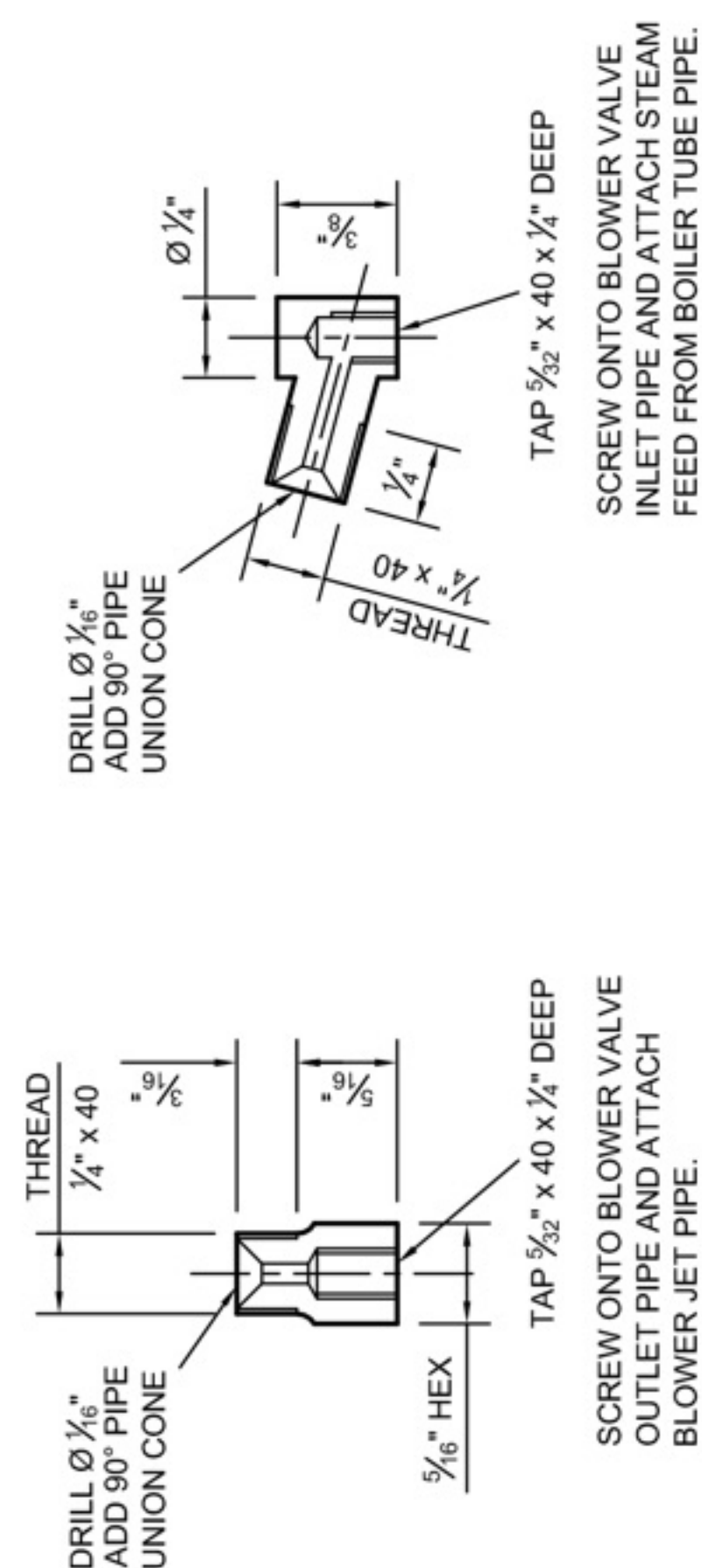


BLOWER VALVE SPINDLE
(Stainless Steel)

BLOWER VALVE BODY ASSEMBLY (FAB)
(Brass or Bronze)

**LOCKING NUT, SEATING SPACER
AND EXTERNAL COLLAR (Brass)**

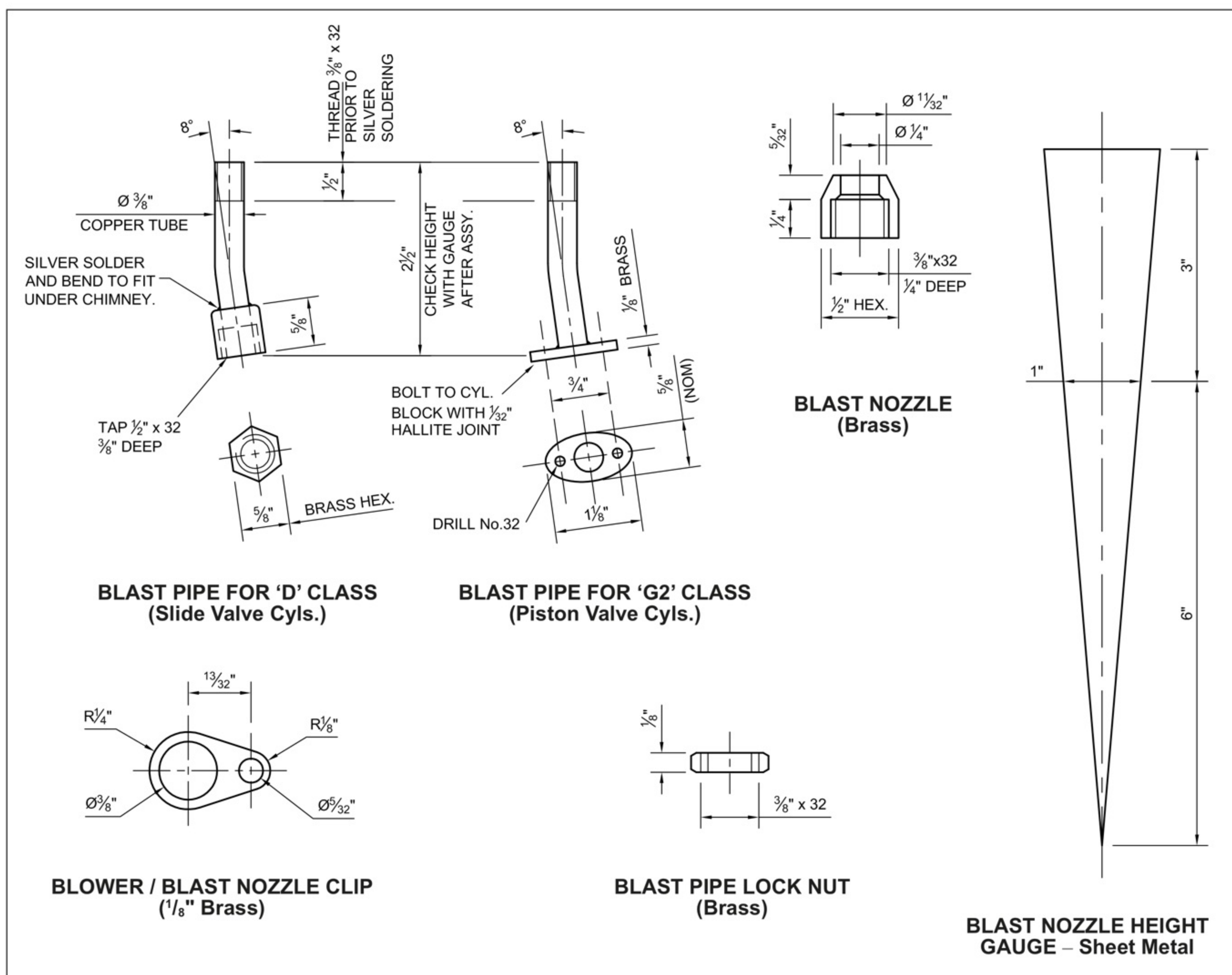
To bend the blast pipe, a piece of steel rod needs to be reduced in size to fit in the end of the blast pipe. This will allow the pipe to be bent whilst it is still soft from the silver soldering operation. However because the thread is comparatively thin walled it would be a good idea to screw a brass nut onto the $\frac{3}{8}$ " diameter thread so that it can be bent with no fear of damaging the threads. With the large hexagon end held in the vice and with the marked flat visible, insert the bar into the opposite end and gently bend the blast pipe towards the mark on the base nut, sufficient to line it up with the chimney. Replace the pipe onto the cylinder



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block and check to see it is in the middle. To accurately check the position, I have a piece of aluminium drilled and reamed $\frac{3}{8}$ " in an externally turned taper. This will fit

any size of chimney and is allowed to slide down into the bending rod inserted into the blast pipe and is light enough to just rest on the chimney top showing instantly which

way and how much the blast pipe needs bending. The blast nozzle must be in the middle so spend some time getting it right!

The most critical factor which will make the world of difference to any locomotive is the height of the blast pipe cap relative to the chimney. It obviously has to be in



Two views of the preserved G2A Class locomotive on the North Yorkshire Moors railway showing the smoke box detail including the boiler valve and handrail arrangement.

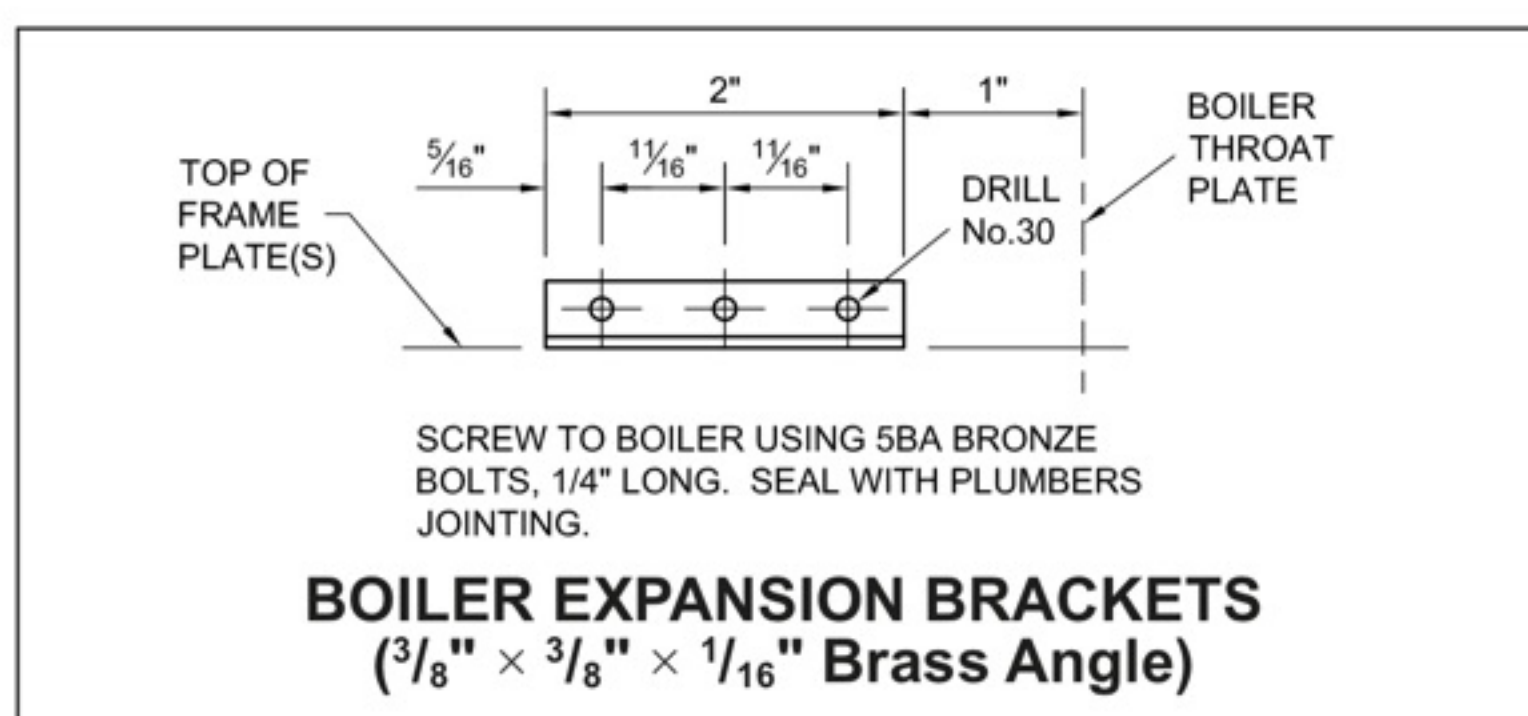


exactly the centre of the hole, but just as important is the height below the top of the chimney. I personally do not bother with a chimney choke, but its use is a matter of choice. The way that I measure the blast pipe height is to use a one in six taper cut from thin gauge sheet metal of sufficient length to reach down the chimney and to rest exactly in the blast pipe top. The late LBSC used to show this in his writings, but he never stressed the importance. It follows that any adjustment to the blast pipe nozzle size requires adjustment to its height – the contact points must touch exactly. I recall reading a most interesting article some years ago where all the factors which affect steaming had been examined scientifically with every possible dimension measured including such factors as blast pipe pressure, smoke box vacuum and all measurements of chimney, petticoat pipe, different grades and size of coal. Everything was collated and the most vital measurement was blast pipe height to chimney top. A $\frac{1}{32}$ " gap was found to make a tremendous difference to the steam raising ability, so the precise height needs to be capable of adjustment so the actual pipe requires not only to be threaded, but also requires a locknut underneath. I have included a drawing of the one in six template. Mine is cut from 22SWG steel and I would most strongly suggest one be made. It does of course fit all engines but I have never seen another one being used! I sandwich the bracket made from sheet metal which positions the blower nozzle between the cap and locknut to secure the blower pipe and nozzle securely in place to point to the centre of the chimney.

The piston valve engines are dealt with in exactly the same way. The blast pipe can be held in place by either threading the bottom of the blast pipe to fit in the central exhaust passage or by silver soldering the copper tube to a flat plate and fastening it to the cylinder block with a couple of bolts. The correct position for the hole into the central exhaust passage is found in the same way as the alignment of the blast pipe in the slide valve engine, by fitting a suitable guide in the chimney, anything will do – use wood, aluminium, brass, steel. It just needs to fit the chimney with a hole in the middle to position a suitable steel rod with the end turned to a point like a centre punch. This will be fine for making one dent in the metal, but that is all what is necessary.



The G2A being loaded for road mileage.



Put the punch down the chimney with the guide in place and check that it looks fine. Now hit the punch once which should leave a sufficient dent to be able to pick it up with a small drill. Open out the hole to $\frac{29}{64}$ " into the exhaust way in the cylinder block for either tapping $\frac{1}{2}$ " $\times$ 32TPI or for the passage way into the blast pipe dependent on the method of blast pipe fitting you wish to use. The copper pipe will now require bending in exactly the same way as was used for the slide valve engine to bring it square to the chimney bore.

There is now only one more job to be done before erecting the boiler into the frames and that is the fitting of the main steam pipe and the running nut which is screwed into the bush in the smoke box tube plate to secure the pipe and to which is bolted the 'wet' end of the superheaters. This bush has the same pitch thread on both, the inside and outside, so that there is no tension on the steam pipe, but if everything is secured at both ends the pitches can be up to $\frac{1}{64}$ " long or short to screw in easily, so I do not fasten the regulator down until the whole assembly is all in place. This allows the threads to screw in place without being too tight with the strong probability of stretching the main steam pipe or even shearing it. Give all the threads a good dose of 'Boss White', both inside and out before final fixing. I find the tang end of a file useful for screwing the main steam pipe into the regulator.

When the regulator assembly is finally fixed to the boiler, the next item to make is the wet header, to which the two feeds to the actual superheater tubes are joined, so the actual position is most important and because of the position care must be taken in making sure that the tubes are in exactly the right place or they will not pass down the flues because of the limited clearance.

I have become very much in favour of radiant type superheaters. They really do give that extra boost of power and for 'Wessie' I have used two elements $\frac{5}{16}$ " diameter which come right across the firebox with the return bends up out of the way in the top rear corners. Now stainless steel is awkward to join without special equipment but can be silver soldered so the way I make my elements is as follows: I make the return block from a $1" \times \frac{1}{2}" \times 1"$ long stainless and using the vertical milling

machine drill the holes $\frac{1}{8}$ " deep at $\frac{5}{16}$ " diameter followed with $\frac{9}{32}$ " tapping size for $\frac{5}{16}" \times 26$ thread at $\frac{3}{8}"$ centres. I do it in the milling machine to make sure that the tubes are as close as possible without any fear of the drill running out of the position as stainless is a comparative hard material. I also tap a couple of threads in the block. The cross hole is also tapped a couple of threads and a blank piece of round stainless screwed in the same way. The tubes are also given a couple of threads using the tailstock die holder.

The reason why the tubes and return block are made this way is because the threading holds all the pieces together whilst they are all silver soldered together. Putting the return blocks up in the rear corners keeps them away from the hottest part of the fire. Brazing and welding of stainless can be a very tricky job, but using 'Tenacity No 5' flux will silver solder easily using a high melting point spelter such as B6. I have never had any problems with superheaters made in this way and I have been doing it since the early 1980's.

When all the joints of the return bend have been completed, the outside of the return block can be reduced to a size that will just fit down the superheater tubes – being large in size will have no effect on heating performance of the saturated steam, as the block is well away from the hottest part of the fire and relatively small in size to the length of tube passing from the tube plate.

The boiler, complete with smokebox fitted on to the barrel, can be placed in position over the cylinders with the firebox fitted between the frames. The throat plate should just rest upon the back of the intermediate axle spring suspension spacer as the boiler will expand lengthways backwards about $\frac{1}{16}$ " when in steam. With the engine's frames supported each end on a level surface, and the wheels off the ground, the rear end requires the boiler expansion angles fitting. These are plain $\frac{5}{16}"$ brass angle screwed to the boiler outer shell using either bronze or stainless steel screws tapped onto the boiler outer shell. There is no need to either silver solder or any other fixing than a dose of 'Boss White' on the 5BA turned screw threads. These are similar screws to those used to screw the crown stays to the outer wrapper. Do not use ordinary brass screws, as they need to be zinc free so no dezincification can take place. To make sure the boiler is in the right place put a spirit level on the top of the frames first and pack them up to be level and when it is, put the spirit level on the top of the boiler and place packing between the frame plates and the barrel until this also is parallel. The whole assembly now needs to be checked that the boiler is upright with the safety valves, dome and chimney all exactly in line. When they are, place the expansion angles on the top of the frames each side and spot through the angle holes to the boiler and drill a hole in each side No. 39 drill and tap 5BA. The packing can now be removed and the angles checked so that the boiler is in exactly the correct position. The remaining holes can then be drilled and the screws fitted, not forgetting the all important 'Boss White'.

To be continued

Model Welsh Slate Trucks in 5" gauge (The Slate Tipper Truck)

By Peter Evans

Following on from my previous article on the construction of 5" scale slate trucks (*EIM* page 24, issue July 2009), this article records the latest truck construction project. I decided I wanted to make a tipping truck and was looking for a suitable example to base my model on. During a visit in 2008 to the Ravenglass & Eskdale Railway in Cumbria, I discovered what I was looking for. I was taken by this design because unlike the standard side tipping trucks, this

Iroco window frames that I could cut up for this job. I expect on the original full size version they would probably have been made from English Oak. The model buffer beams are $1\frac{3}{4}" \times 1"$ and $8\frac{1}{2}"$ long. The side and buffer beams were then clamped onto a $\frac{3}{4}"$ thick plywood board for assembly to make sure it was kept square and flat. The parts were both glued and screwed together, the screws being counter sunk through the

source for this type of bolt, I had to manufacture these fastenings. To save time I used coach screws in certain places, which I made by cutting off the heads on some brass wood screws and silver soldering a square in its place. These could then be put in with a spanner instead of a screw driver. In my opinion putting standard screws in models and



Two views of the prototype tipping slate truck in Cumbria.



example had a body that could be slewed and tipped in any position. In addition the whole chassis was made of impressively large sections of timber, presumably because of the enormous extra stress involved when side tipping. The full sized truck that was on display was photographed

buffer beams, then filled later so as not to be visible. There are also steel angle strengthening pieces bolted in each inside corner.

All fixings on the original truck used square headed fastenings and because I have not been able to find a commercial

leaving them visible just spoils the whole appearance, hence the extra effort taken in constructing authentic looking heads.

I also had to manufacture square headed bolts. These bolts are quite easy to make from square rod turned down for the length of the shank and threaded at the ends, in this case mostly 2BA. The nuts are made from the same square rod, but just drilled,



Machining the plates for the pivot tube on which the tipping body rotates.



Below: The bearing assembly in place on the truck cross beams.

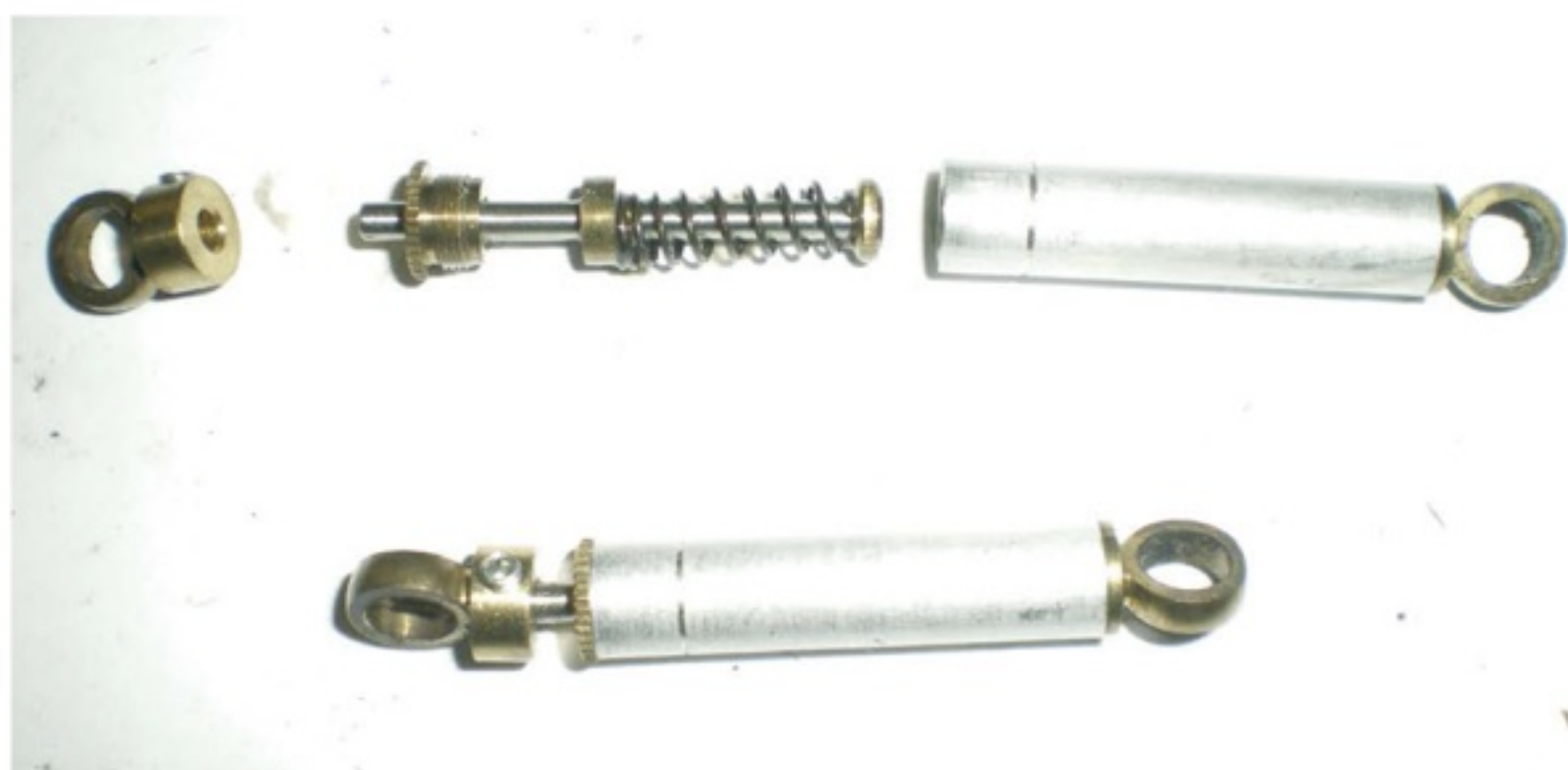
from all angles and the rough overall dimensions taken for reference.

The 5" gauge model was started by roughly copying this example, but I made some minor modifications to the original design, mostly for my own benefit. The side beams on the model when scaled came out as $1\frac{3}{4}" \times \frac{3}{4}"$ and 14" long. I used Iroco wood for all my chassis woodwork, as that gave a nice close grain and more importantly to me, I had some old



tapped and then parted off in the lathe. It sounds hard work making these items when you write it down, but I would call it boring rather than hard. As there were only a few to make, I made them on the Myford lathe in a 4-jaw chuck. Had I had a great many to do it would have been worth setting up my capstan, but for just a few it is not worth the set up time.

Getting back to the chassis construction, for added strength there



Left: Details of the spring dampers fitted to the skip chains.

Right: The dampers and chains assembled.



are also two steel tie rods that go straight through the chassis from end to end. These are passed through a steel plate on the outside of each buffer beam. The rods are $\frac{1}{4}$ " diameter turned down at each end and then screwed 4BA and fitted with square nuts. Across the top of the chassis are two massive pieces of timber the dimensions of which are $2" \times 1\frac{3}{4}"$ and $8\frac{1}{2}"$ long. These are then bolted through to take the top skip, using $3\frac{1}{2}"$ long 2BA bolts. Small plates are put under these bolts to stop them pulling into the wood beams.

The main bearing on which the skip turns consists of a bottom and top plate with a central tube in which the main shaft rotates. I have modified the construction of this component just to make it easier to construct and put in place. In today's world, the whole thing would be mounted on fancy roller bearings. What I have made here is probably not exactly as the original because I did not have a viable photograph of this part, so a bit of guess work had to come into play. On my model the central tube is turned down at each end and the one end silver soldered to the bottom plate. These plates are machined a close fit to the tube. The top plate traps the top of the tube and stops it moving about. The tube length to the shoulders is such so that the two plates when they come against these shoulders exactly fit the cross bearers depth. I also made provision for an oiler near the top, but I think that this oiler is not a requirement providing it is greased on assembly.

The main turning shaft is steel and has a separate large top plate silver soldered on the top. The bottom of the shaft is turned down to accept a 2BA thread long enough to get a nut and collar in place, to stop the whole shaft lifting. The shaft length is governed by the length of the tube plus the depth of the top plate, plus the length of the thread at the bottom. On this top plate there is a hinge at each front corner to attach the skip because it has to turn and lift to make it tip.

There was also a retaining chain to stop the skip going right over on the full size version. Here again I made a slight

Details of the coupling shackle and iron work on the end beams.



modification by fitting two chains instead of just the one and a spring loaded stop to each one, this was just to slow it down before the chains come tight. To accommodate these chains there are two jaws on the top plate fastened at the opposite end to the hinges. I will see how it all operates later on, but I may also have to modify this bit later by fitting a small thrust washer under this top

Fabricated axle horn plate parts.



plate so that it is not metal to metal when turning. Just in case this is needed, I have left the 2BA thread on the bottom end of the shaft much longer than needed, just so there will be room to take the extra thrust washer if required. If not required, I can always cut off the surplus, but it would be a bit of a job to make it longer later on, if it was needed. It would mean making a new shaft no doubt.

The two plates on the buffer beams are $1" \times \frac{1}{8}"$ strip and there are three holes, two for the tie rods and the central one for the coupling. Here again I changed the plan because all my slate trucks have chain couplings so this truck had to follow that pattern. I just fastened a steel block with a cross hole to take a D link and two link chain. To make the D links I bent a suitable sized piece of round bar and then made a tube to go right across. This tube was silver soldered in place and then the centre section cut out. This method ensures that both eyes are directly in line.

The horns are fabricated assemblies, the top of each one is made using 20mm angle $5"$ long. The two side pieces are cut at an angle from $2" \times \frac{1}{8}"$ strip. These are then riveted to the angle at the correct spacing for the axle box. There is a steel keep plate at the bottom made from strip fixed with two 4BA bolts. The axle boxes can either be squares of bronze or made from square steel and bushed. I have in fact used both methods and they are both fine, but unless you have the bronze available then the steel version is far cheaper to make.

The top of the axle box is recessed for the coil spring. Size of this recess is to fit the available springs, a tight fit is required

to stop the springs jumping out. My first springs proved to be much too light as the skip was quite heavy and I had to put extra smaller springs inside the existing ones and that did the trick. The horns are bolted to the underside of the chassis with the usual square headed bolts, or as I did use coach screws from underneath. This saved me putting top plates on the wood to take the nuts and avoided making yet more long bolts.

The axles and wheels were pretty straight forward, the wheel castings are from Reeves, their Reference T4. These were the right diameter but had 10 spokes so I removed half the spokes. This operation started out with just cutting them out with a junior hacksaw and filing to make good, but when I changed my blade I found I had purchased some cheap and nasty blades. So bad in fact, just one cut and there were no teeth. I finished throwing the whole packet

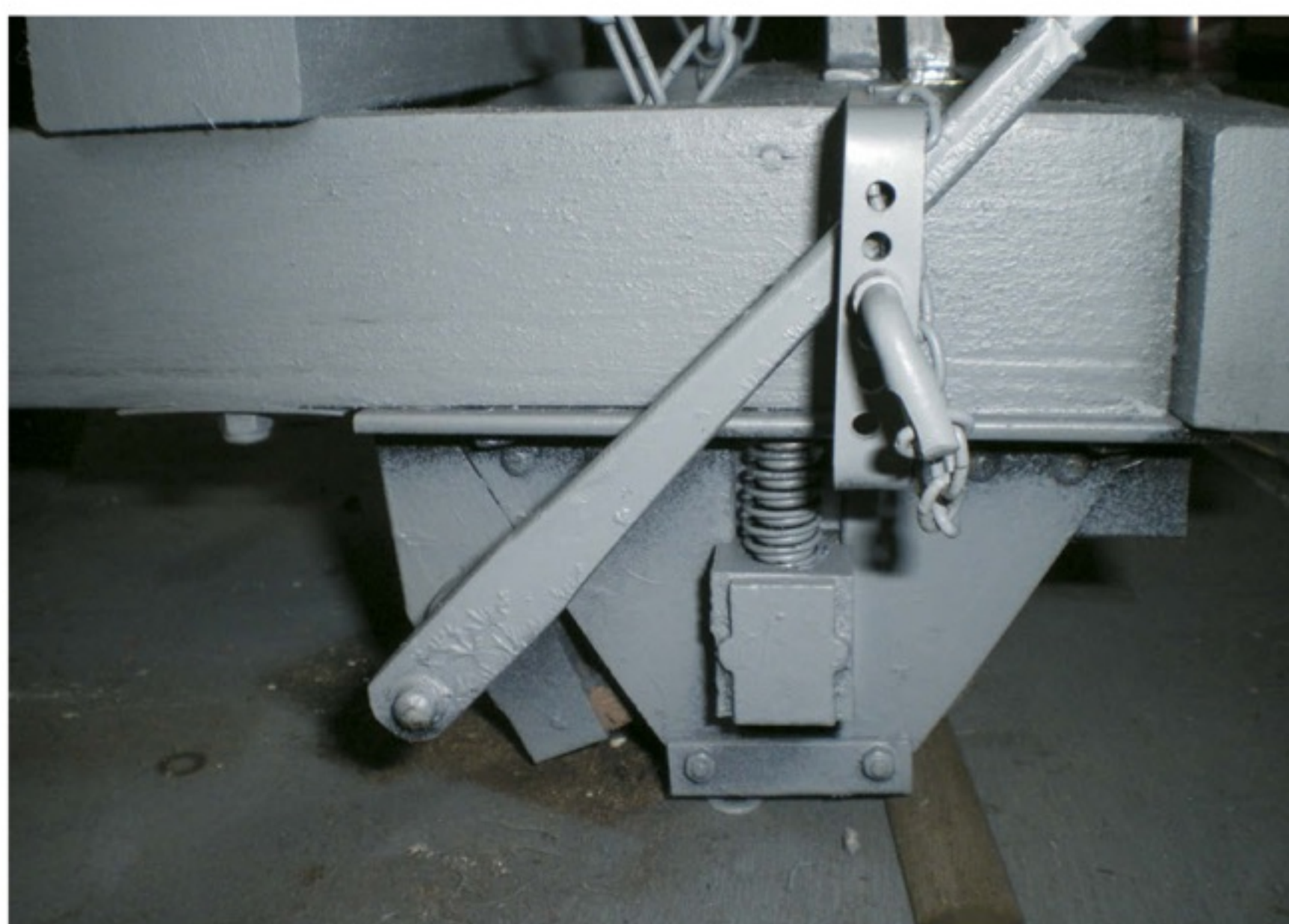
Milling away the extra spokes to produce a more realistic wheel.



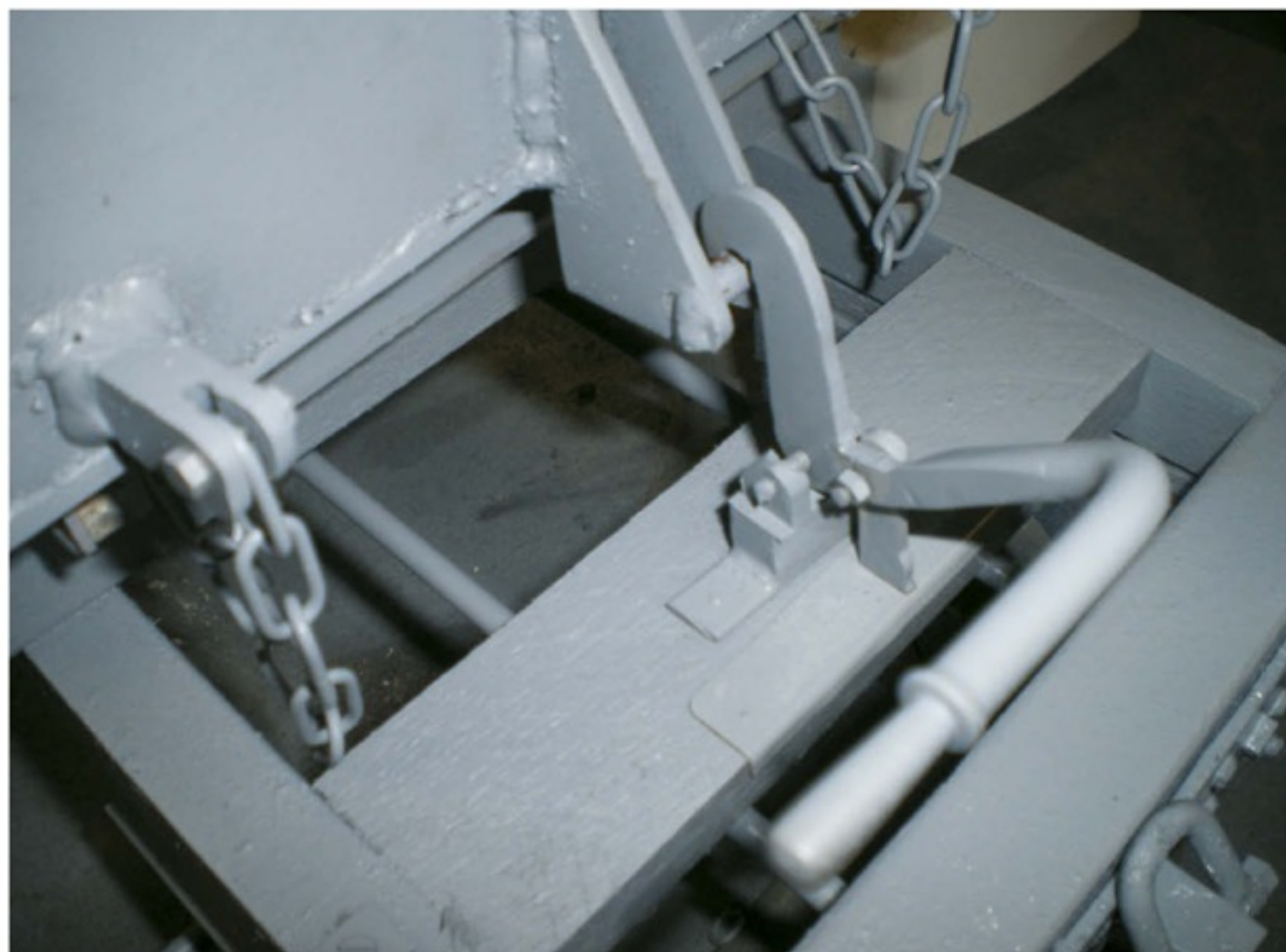
in the bin, so much for cheap blades they are not cheap at all, in fact they are very dear. To get on, I just milled the rest out but the hacksaw method is far quicker, if you have a proper blade.

At this stage I thought a brake of some sort might be a good plan. I constructed a typical brake for that period which worked from a hand lever. Not everybody may want to do this, but I once had a truck left parked on a steaming bay and it rolled off to the floor as somebody moved the turntable. This made a bit of a mess, so I now make it a policy to try and have some sort of brake if anything is left unattached. A couple of blocks of wood is better than nothing, but a brake is even better. It is a bit of extra work to make these brake bits I will agree, but a lot less work than rebuilding a very battered

A close up view of the suspension and brake mechanism.



The securing handle to handle to prevent accidental slewing and tipping.



saws and an Evolution Tungsten carbide tipped blade. I was very impressed with the speed and the accuracy and no burrs to clean up afterwards. I now use one of these saws for most of my steel cutting because it is so quick and easy.

I then welded the skip together however on the full size version the skip was all riveted together and the rivets were a very prominent feature. As there is a protection strip all round the top of the skip I used rivets to hold this in place. It just makes it look authentic. For the purists there should be rivets on all the skip joints. Of course these could be put in as dummies but I did not bother on mine. Just getting old and lazy I guess.

In addition I riveted the skip hinge plates to the outside of the skip for show. There

truck, as I found out to my cost.

These brake parts just follow normal practise of that period. A large hand operated lever onto a cross shaft. On the shaft are steel pieces that then hold wooden blocks which rub on the wheels. Very simple and quite easy to make, however to keep the brakes on, there is a rack on the truck side with holes and a pin that goes through to trap the hand lever in any required position. An alternative to this would be a lever working on a quadrant, like you get for a reversing lever. Both types were used in those earlier times.

The truck is now starting to take shape. The next major item is the skip. I made a cardboard mock up of the skip to start with and modified to make it look the part then used that as my template to cut the steel. The skip was cut from $\frac{1}{8}$ " thick steel plate using one of these hand held electric wood

The skip turned and tipped to show the usefulness of the model.



The finished truck has all the rustic charm as the original.

are also two chain attachment brackets at the backend. I then found that the skip could easily have turned in transit so I made a catch at the back to stop it all tipping and turning unannounced. This could have been a bit embarrassing to put it mildly. This catch seems to work well as there is also a gravity safety lock on it as well so it can neither tip or move unless that is taken off first. Tests have proved that once the loaded skip starts tipping, the momentum is sufficient to complete the tipping cycle.

Although this construction project was more complex than the trucks detailed in my previous article, this design has proved to be well worth the extra effort involved. All that now remains to make a few more different types of truck to complete the train! ▲

Notes on an Exhibition: Confessions from a standholder's wife

By Suzanne High

Although I'm all for husbands and wives having separate hobbies, I've often felt guilty for not taking more of an interest in my husband's model engineering exploits. A sympathetic 'How's it going?' has been about the limit of my involvement. However, after Malcolm became a trader, providing laser cut parts, and began to sell at exhibitions, I had my chance to take a more active role, and believe me, for traders at an exhibition, the emphasis is very much on 'active'.

The Alexandra Palace exhibition is always two or three weeks after Christmas, but before the last mince pie disappears from the tin, Malcolm begins to show signs of feverish 'exhibition-itis'. There's so much for us to do in the run-up to a big 'show'. Malcolm has to make sure that he has enough stock – and the right stock – to take with him, and then there's the stand to prepare. The spaces available for traders to hire at the various exhibitions come in all shapes and sizes. There are decisions to be made – single or double, large or small? Then there's the position in the hall to consider. Would we be overlooked if we were here? Would this be a 'good' spot? Hiring a space happens long before an exhibition, so at least the dimensions are fixed, and Malcolm can put up our stand in the garage – we have to park our cars elsewhere for the duration – to see which pieces he'll need to make a counter that will fit the space perfectly. For the first few exhibitions we transported the stock in the back of the car, but there's just so much of it now, and it wasn't doing much for the car's interior, so now Malcolm hires a trailer. Amidst the laminating of posters, and packaging, and checking prices, there are the very regular phone calls from customers, who, quite rightly, are seeking to avoid paying postage by picking up their orders at the show. These requests are always welcome – who would ever want to turn custom away? If they ask before Malcolm's deadline, he'll try hard to accommodate them.

While Malcolm is busy getting ready, I'm making a list of things we need to take with us. This is necessary, as it always comes as a vague surprise to Malcolm that he and I will need to take clothes and other essentials. It's all very well to make sure we have enough connecting rods with us, but we can't clean our teeth with them.

Picking up the trailer means a trip to Sheffield the day before we're due to leave. Every year we think we'll take the chance to have a look round the shops and enjoy a spot of lunch, and every year we decide we don't have time. So I leave Malcolm to collect and



Peter and I preparing the stand before the doors open to the public.

fill the trailer, while I clean the house, pack the suitcase, and shop for food for the kids, who'll stay behind.

Set-up day sees us on the road early, stopping briefly to pick up our friend and sharer of our stand, Peter. It's a fair way from Doncaster to Alexandra Palace, but with a following wind we can be there roughly when the doors open for traders, at 12.30 on the Thursday. Vans, trailers and cars are allowed into the Great Hall to unload, at the end near the organ, where the radio-controlled planes will fly when the exhibition starts. This is the bit where you need a decent trolley – or two – as unloading the stock, counter and display equipment takes a good few 'runs' back and forth from car to allotted space. It's usually my job to take as much as I can carry on the first 'run', then park myself at the stand, to guard the stuff (against what? I don't know) and 'supervise'. The stock is heavy, as are the counter pieces. I try to do my share of the humping about, but I generally have to bow to Malcolm and Peter's greater strength, and leave them to it. To be honest, this bit, where I'm just waiting for things to arrive, is the boring part for me. This year though, we were lucky enough to be positioned bang opposite the space for the Luton & District Model Boat Club. Their lads kept me royally entertained for hours, putting up their first-prize-winning boat stand, complete with full-size wheel-house. It made fascinating watching. Very labour intensive, with much head-scratching, but boy, were their efforts worth it – it looked pretty good when it was finished.

It usually takes about three hours to get the stand to a point where we're all happy that it's ready for the grand opening

the next day. It's always good when we decide we can safely leave it behind and battle our way through the London traffic, via good old Muswell Hill, to our hotel. We've stayed at the same hotel for the last three Alexandra Palace exhibitions, although some of our fellow traders have been staying there a lot longer. It's good to return there each evening and see some familiar faces, who know from experience the ups and downs of life at an exhibition.

I've always scoffed at those footballers who visit the most interesting places in the world and never take the time to do any sight-seeing. I have to admit, though, that after three years visiting Alexandra Palace, I know virtually nothing about the grand old building, although I do have a deep knowledge of the tradesmen's lift and the service yard at the back. For the whole exhibition, our life is reduced to

a focused routine of waking early, leaving for Alexandra Palace, working non-stop until closing time, leaving for the hotel, cashing up, eating, sleeping, and waking early again. As the journey from the hotel is always horrendous on week-day mornings, we aim to arrive about an hour before the doors open to the public. Apart from the odd lull towards the end of each day, this is the only quiet time, when Malcolm and Peter can potter about seeing friends, and I can stand behind the counter, pretending I know what I'm doing.

By opening time we've a fully-manned stand. It's always difficult to predict how soon the first customers will wend their way over to us. This year we were busy from the word 'go'. I'm just about accustomed to facing a sea of faces – there's nowhere to hide really. They're not really looking at you anyway, apart from some of the women, who're probably thinking, 'which one is she married to', and 'why is she wearing that jumper', the sort of questions that men just don't seem to need the answers to. I'm envious of people like Jacquie from Blackgates Engineering, and Jenny from JB Cutting Tools, who are fully involved in their respective businesses, and who can, no doubt, answer any and every question that comes their way. There are a few questions that crop up over and over again, such as 'What sort of thicknesses of brass can you cut?', but when faced with a question about a specific locomotive, or part of a locomotive, I can only admit that I can't tell a Horwich Crab from a Holmside and pass the would-be customer on to someone who does know what they're doing.

Continued on page 196

An LMS Stanier 2-8-0 8F Locomotive in Gauge 1 (part 2)

By Roger Thornber who constructs the mainframes

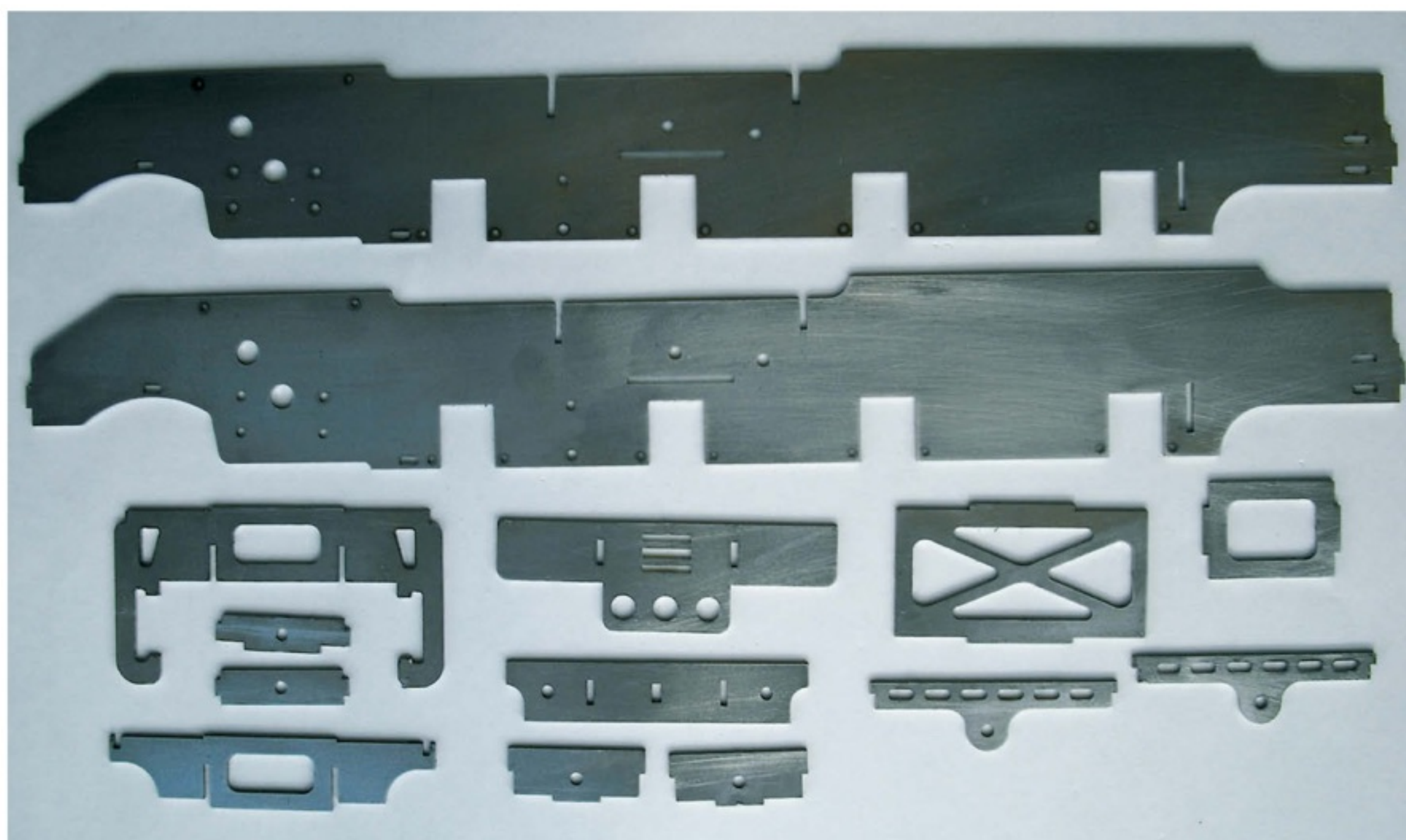
Continued from page 163, November 2009

This series is perhaps unusual, as I do not intend to fully dimension many of the sheet metal components. Age has caught up with me and time is now the enemy, so I use the easy way out and get parts laser cut. I am assuming that anyone building this locomotive will take the same line. The laser parts come from Model Engineers Laser (with whom I have no connection). The drawing indicates how the parts fit together and everything should slot together to form a rigid structure. I suppose that soft solder would be good enough to hold them together but I prefer to use silver solder. The only snag here is that the frames need to be cleaned up, and this can be tedious. Nonetheless a fully assembled set of frames can be achieved in a very short time.

No attempt has been made to model the correct spacers as they are not very visible – on ‘Evening Star’ with the high running boards the spacers were rather more visible and some attempt was made to make them near prototype. Actually, using the laser cut parts and tab and slot fixing, it would not have been difficult. Figure 1 shows the various laser cut components.

There is a little job that should be done first however, and this is to attach small lugs to the motion plate for attaching the slide bars. Possibly the best way to do this is to bend a piece of steel $\frac{3}{16}$ " wide to form a U shape with $\frac{5}{8}$ " between the uprights. This is then clamped to the motion bracket for silver soldering. The surplus metal is then cut away. The isometric view from the underside front shows the completed motion bracket on the assembly – the photograph should clarify the result. The next part of the series will show the horncheeks and hornstays. These need drilling from the frames after assembly, so do not tap the holes in the frames yet.

It is probably best to start with the frames, motion bracket, the link bracket and the horizontal stretcher. These should slot together nicely and ensure a square structure. Note that the motion bracket is not vertical, being at right angles to the



Above: Chassis components.



Right: Motion bracket with lugs added for slide bars.

centre line of the motion. This centre line is actually 1.72 degrees from the horizontal. The link brackets can now be added. The cautious amongst us might like to put a $\frac{1}{8}$ " rod through the holes in the frame to ensure that the holes in the link bracket all line up – it should not be necessary! Once they are fastened the ends of the rear link bracket frame should be trimmed flush with the sides of the link bracket. This is important as otherwise it will foul with the running board valances. There should be enough spring in the frames to allow the rest of the components to be slotted into place.

The pump stretcher is made up from three pieces. This could have been done as

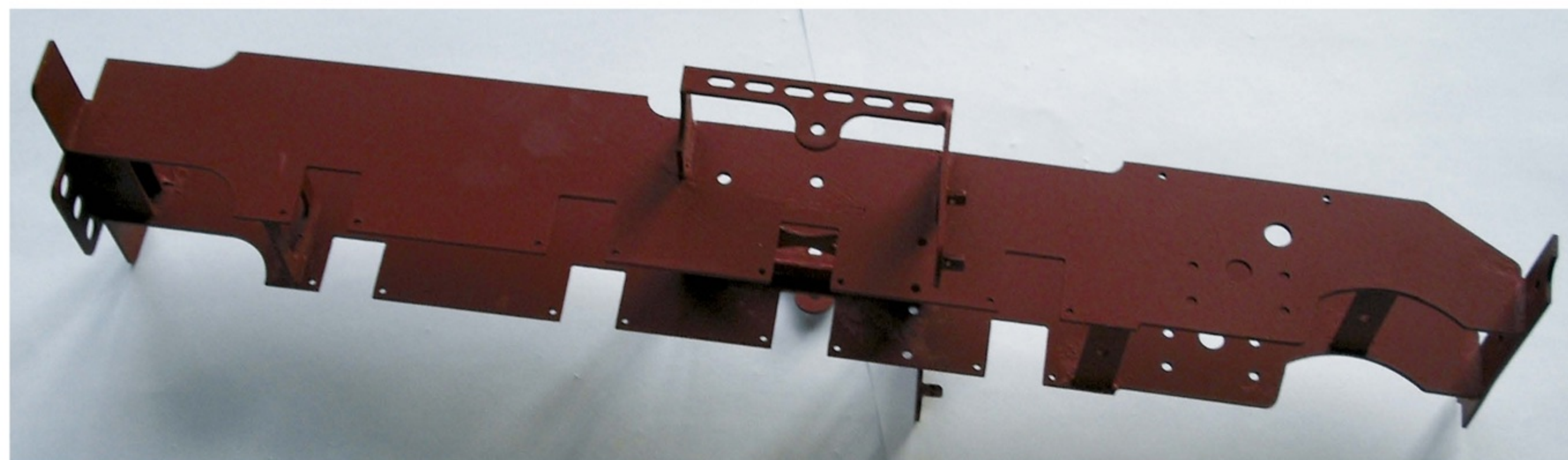
a single piece slotted into the frames, but it was felt better to make it removable in case of trouble with the pump.

All that remains is to open out and tap various holes in the buffer beam, front stretcher, pony pivot beam and the pump stretcher. The main drawing Figure 2 shows the frame assembly.

Slight differences may be noticed between the photographs and the drawings. Some changes were felt necessary during build which have been incorporated in the drawings.

To be continued

Frames assembled and prime painted.



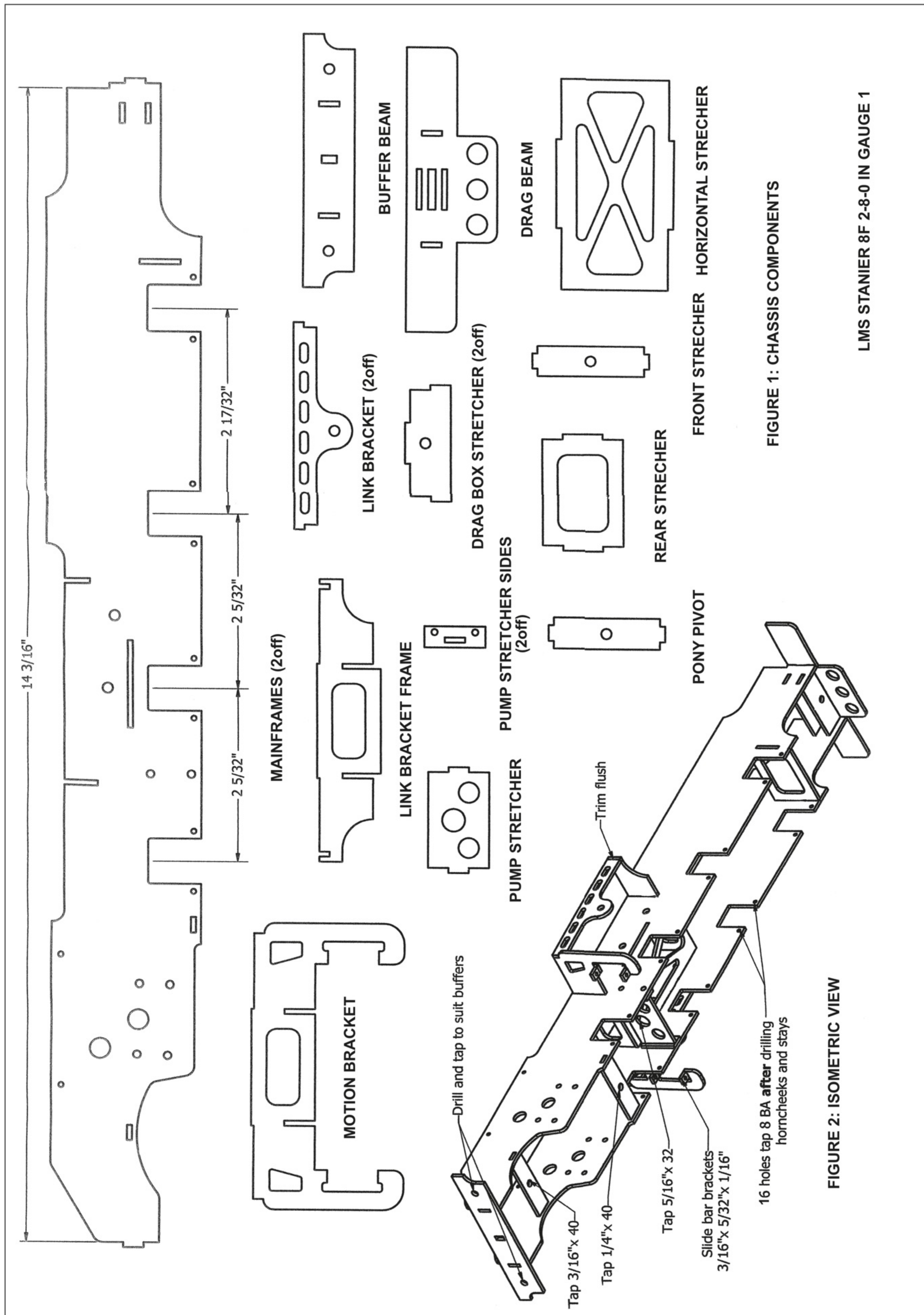


FIGURE 1: CHASSIS COMPONENTS

FIGURE 2: ISOMETRIC VIEW

LMS STANIER 8F 2-8-0 IN GAUGE 1

BR STANDARD CLASS 4 4-6-0 TENDER LOCOMOTIVE IN 5" GAUGE

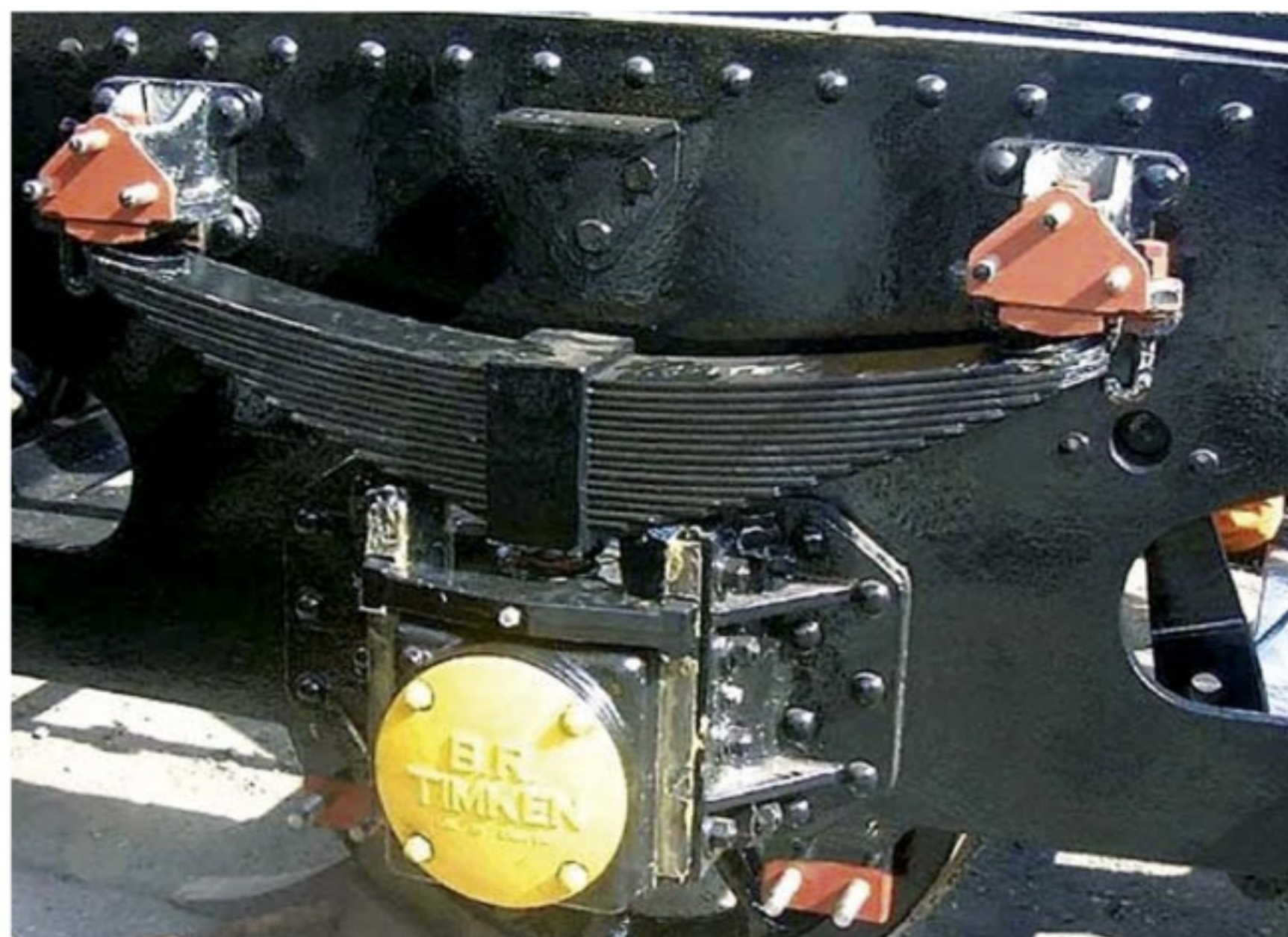
DOUG HEWSON describes further details
on the tender underframes



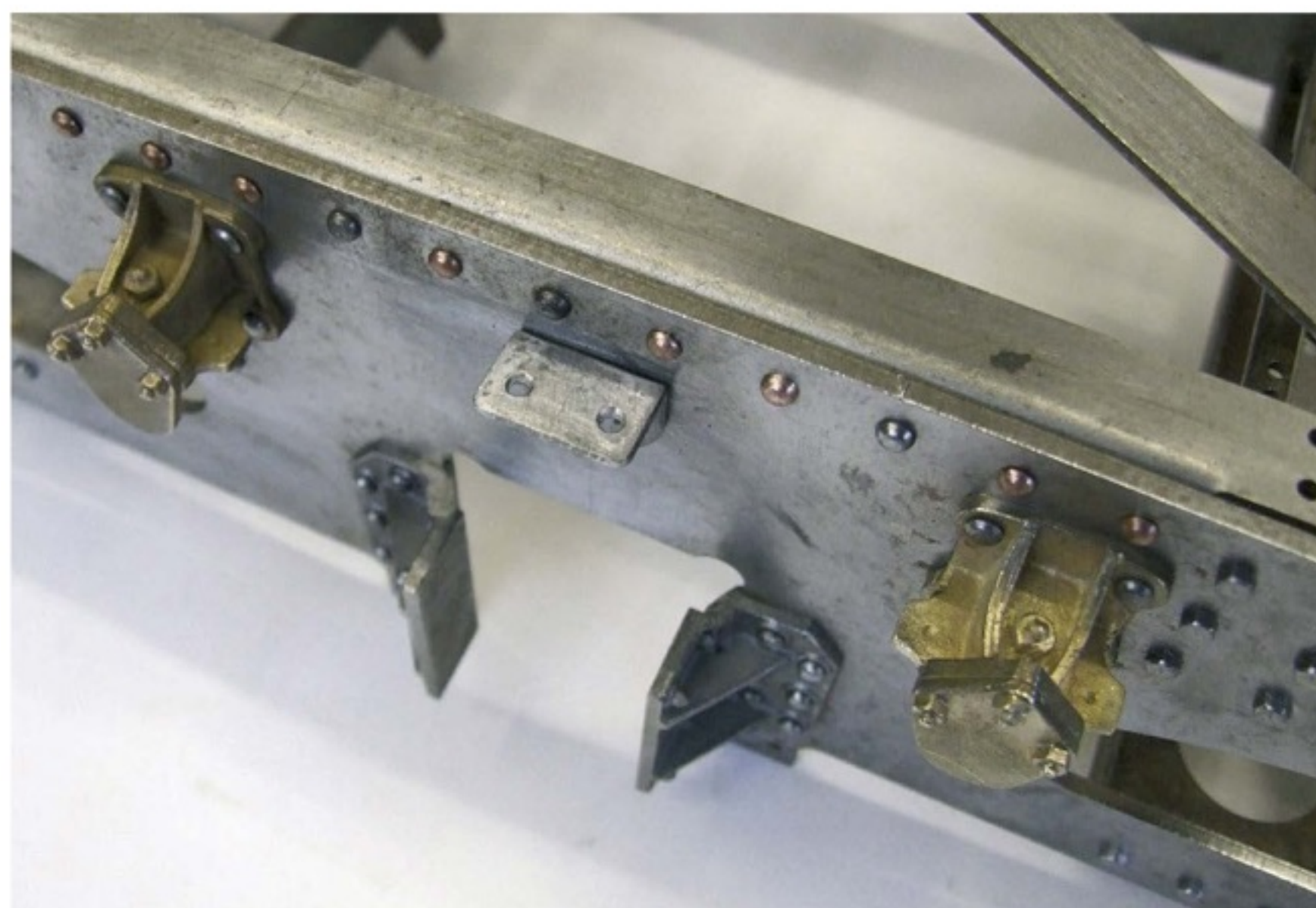
Continued from page 137, October 2009

The riveting of the tender underframe is much the same as the locomotive so no need to dwell on that. There is one little detail which I omitted from the drawing but Geoff has added it to his tender. That is the support brackets for the underside of the tank. There is one either side bolted to the frame plates so I have attached a

Right: The tank support bracket on the tender frame for 92214 (Photograph courtesy of 92214 Society).



Left: The tank support bracket added to Geoff's frames.



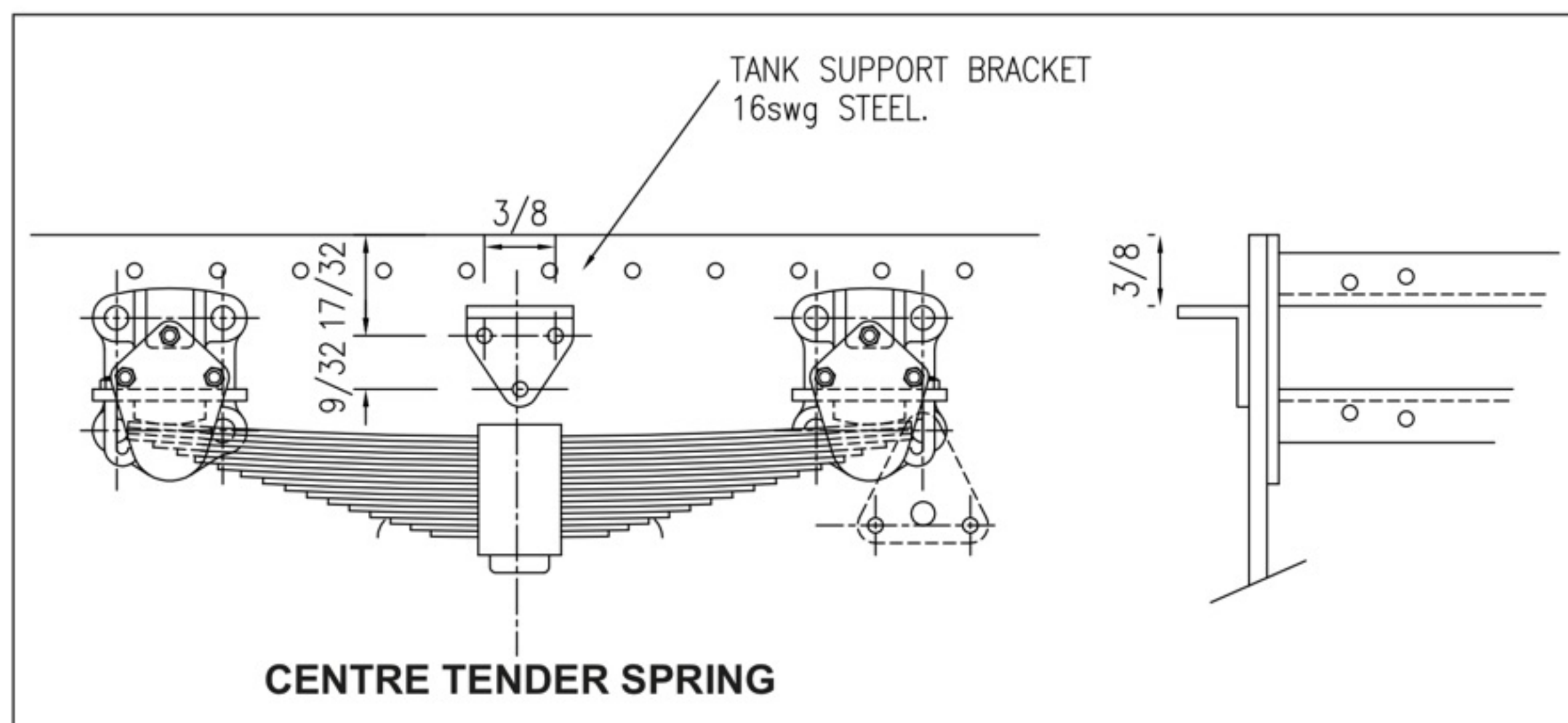
scrap section showing it here for those who want to add it and I will add it to the main drawings. It really just consists of a piece of bent 16swg plate riveted or bolted to the frame plate. On the underside of the tank is a 'U' shaped bracket which bolts to this.

The intermediate buffers were the next job to be tackled. The bodies were turned down from 1" square bar to fit the hole in the drag beam and the bolt holes were located from the plate itself. In fact, as Geoff says, it is best to make these parts before the drag

Right: Finishing off the buffer by turning the recess in the end to copy the photograph, I apparently missed this detail off my drawing, tut, tut.



box is assembled, and in fact Geoff ended up putting the buffer bodies in from the back and spotting through from the front. The buffer recess in the body was firstly drilled to take out most of the material and then bored to final size. The buffers were actually made from stainless steel.



The recess for the spring was drilled and finished to size with a small boring tool but drilled right through $\frac{1}{8}$ " for the spring pin. The pin was silver soldered into the buffer head. It was an easy job to mount the buffer in the 3 jaw, and turn clean up the end, then curve it slightly, and finally Geoff decided to turn down a step of about $\frac{3}{64}$ " in the end of the buffer for a distance of about $\frac{1}{8}$ ", the photographs will show what I mean.

The front platform for the tender was made from a piece of 20swg steel plate and simply mounted on a couple of pieces of $\frac{5}{16}$ " square bar to achieve the correct height. The plate will ultimately be supplied with the kit for the tank.

Next job was making the steps and a laser cut set of parts is provided for these, including the dimpled step treads if you wish. However, for those who want to do



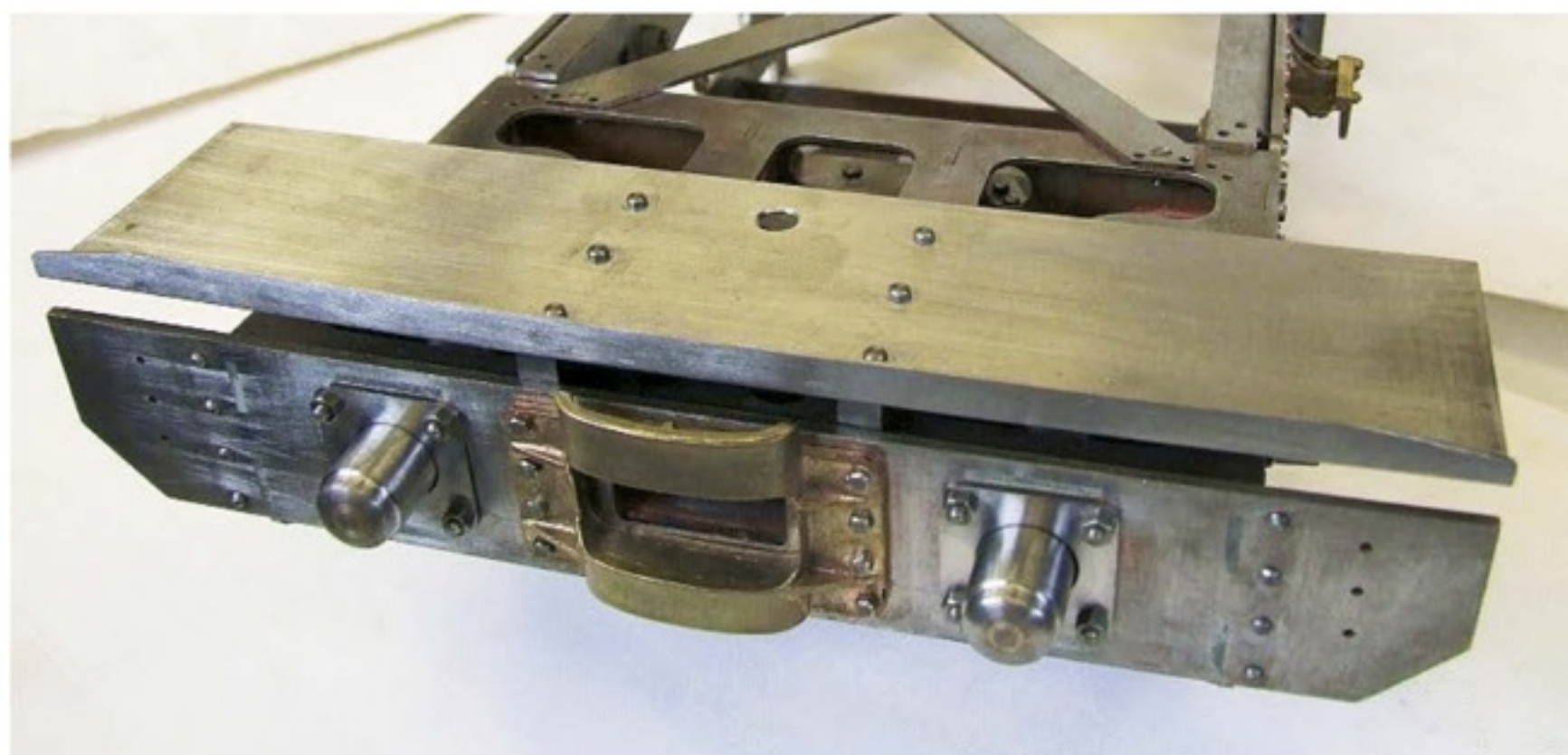
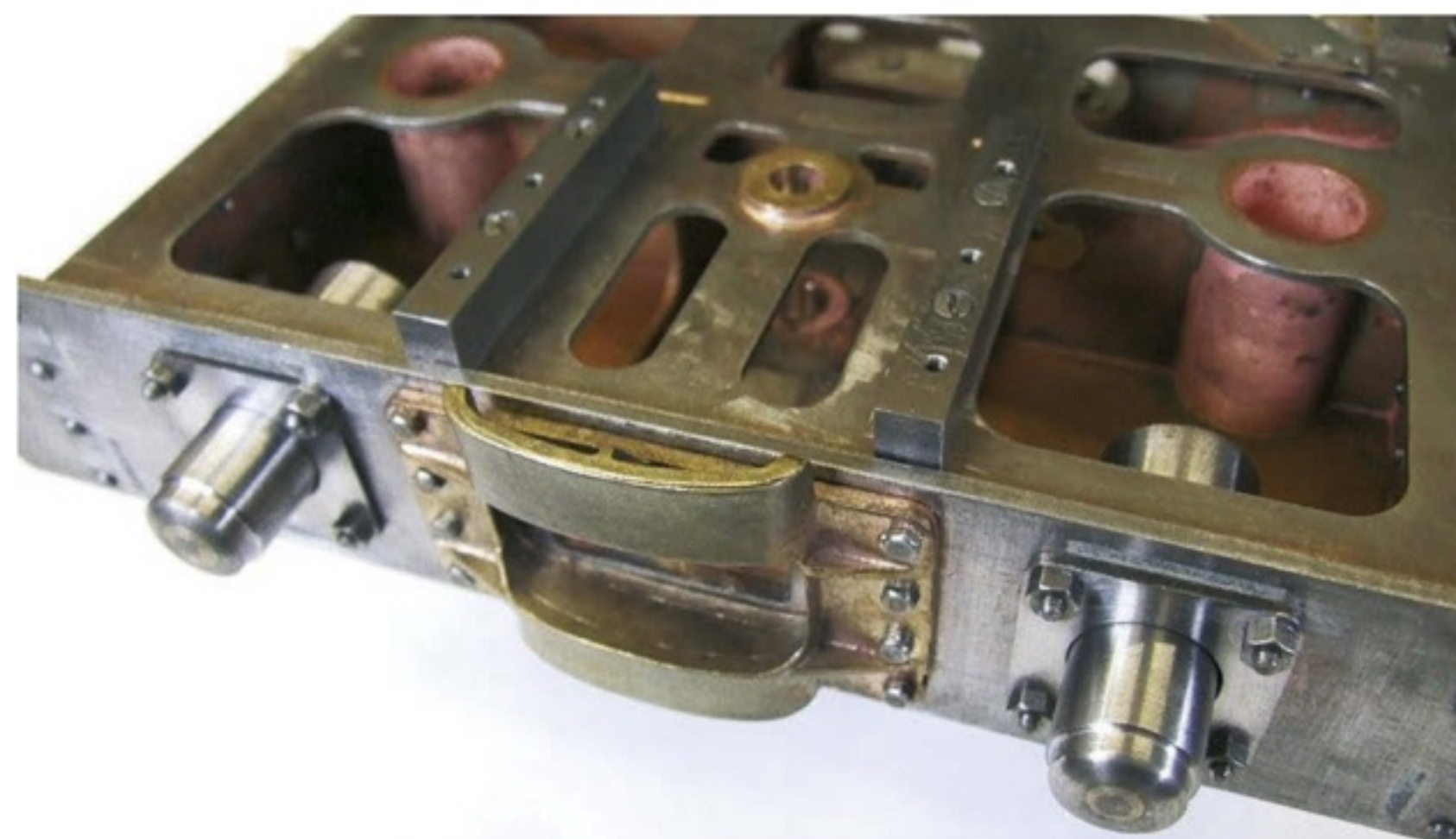
Left: The finished parts for one of the intermediate buffers.

Right: Fitting the intermediate buffers to the tender for 92214 (Photograph courtesy of 92214 Society).



it themselves the treads are actually made using a small toggle press and a simple template for spacing the dimples. We made several templates for all kinds of steps and the same template is used for bending up the ends. In fact there are two templates which work in pairs, a top plate and a bottom plate. The bottom plate has a pattern of countersinks in it to match the top plate just so that the punch can form the dimple. The countersinks are all made the same depth by using the stop on the drill. The toggle press is just a very simple item bought off the shelf and mounted on a couple of pieces of steel channel. It comes in very useful.

Right: Both buffers finally fitted to Geoff's underframe. Note also the two $\frac{5}{16}$ " sq. bars across the top plate to support the front platform. For those wanting to ride on the tender these bars will also support the human footrests. Note also the central buffer casting bolted in place.



Left: The front platform made from 18swg plate and fitted.

The treads are made from 22swg Zintec sheet which is a zinc coated steel plate. The tread is cut to the appropriate size and then sandwiched between the template and the lower plate and the dimples are simply pressed one at a time.

The front steps on the BR1G tender paired with 73050 at the Nene Valley railway.

It sounds tedious but it doesn't take long. The step ends are bent up and then filed to shape. The back plates for the front steps

The rear footsteps on the same tender. A very nice restoration job I have to say and we noted it even had the correct 'black' Timken axle box covers. Top marks this week go to the lads at the Nene Valley.

require bending at the top where they bolt to the underside of the front footplate and then the treads are just silver soldered on. Again we use a simple jig for this. The treads are dropped in vertically and then laid on the back plate for silver soldering. At the rear of the front steps are a couple of stays which brace the step to the frame plate. The two small grab handles at the top can just be made from a bit of bent up gas welding rod; this comes in handy for all sorts of items.

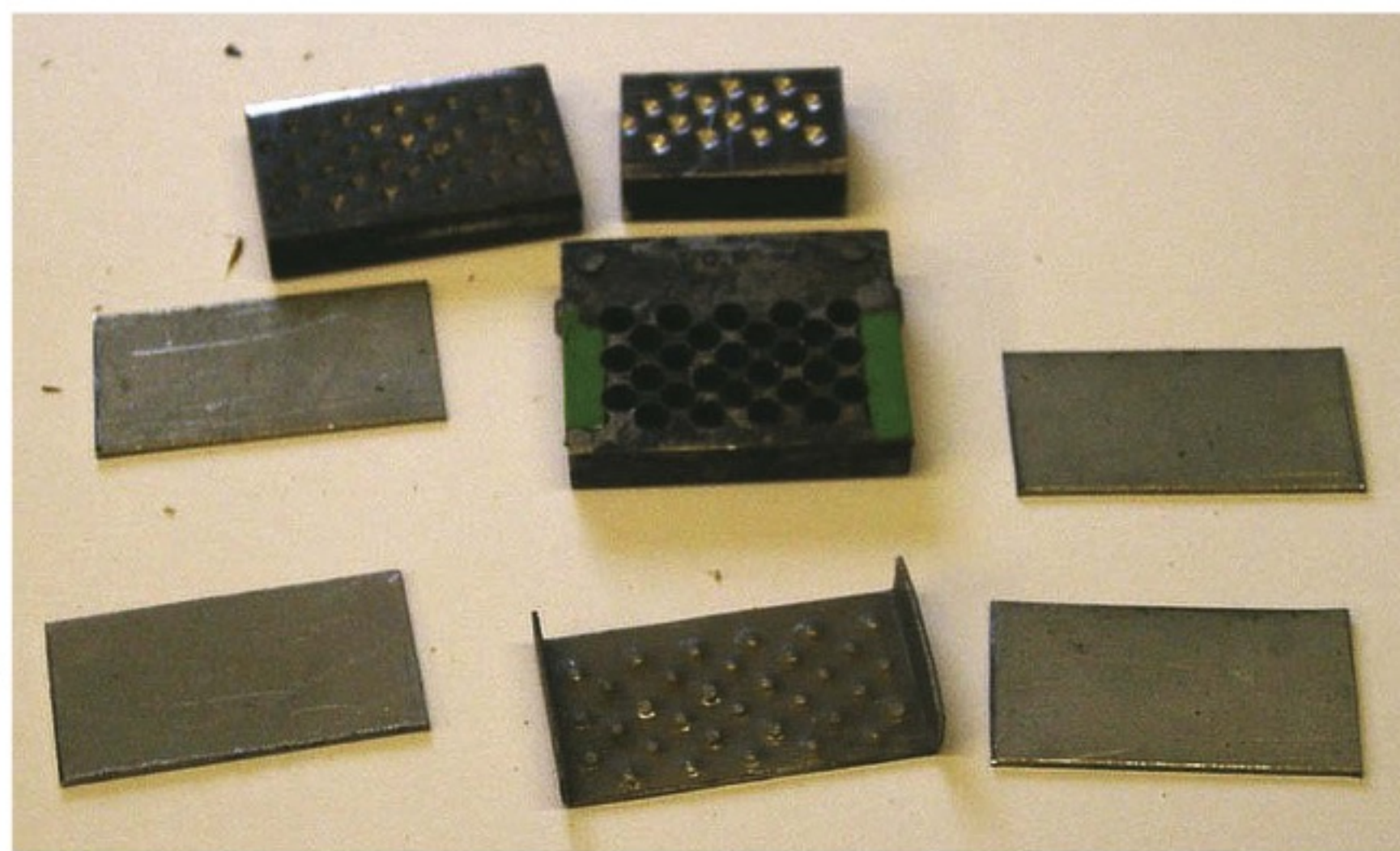
The rear steps are slightly different in that they are narrower and have a handrail across the top. The bracket for this is included in the kit and needs the ends folding up and after the top of the step

The support brackets behind the rear step on the LHS. Worthy of note is the shape of the rivets fixing the brackets to the frame.





Left: Detail of the handrail on the RH rear of the BR1F tender at Loughborough (Photograph courtesy of Pete Lang).



Right: A selection of templates, blanks and part completed step treads.

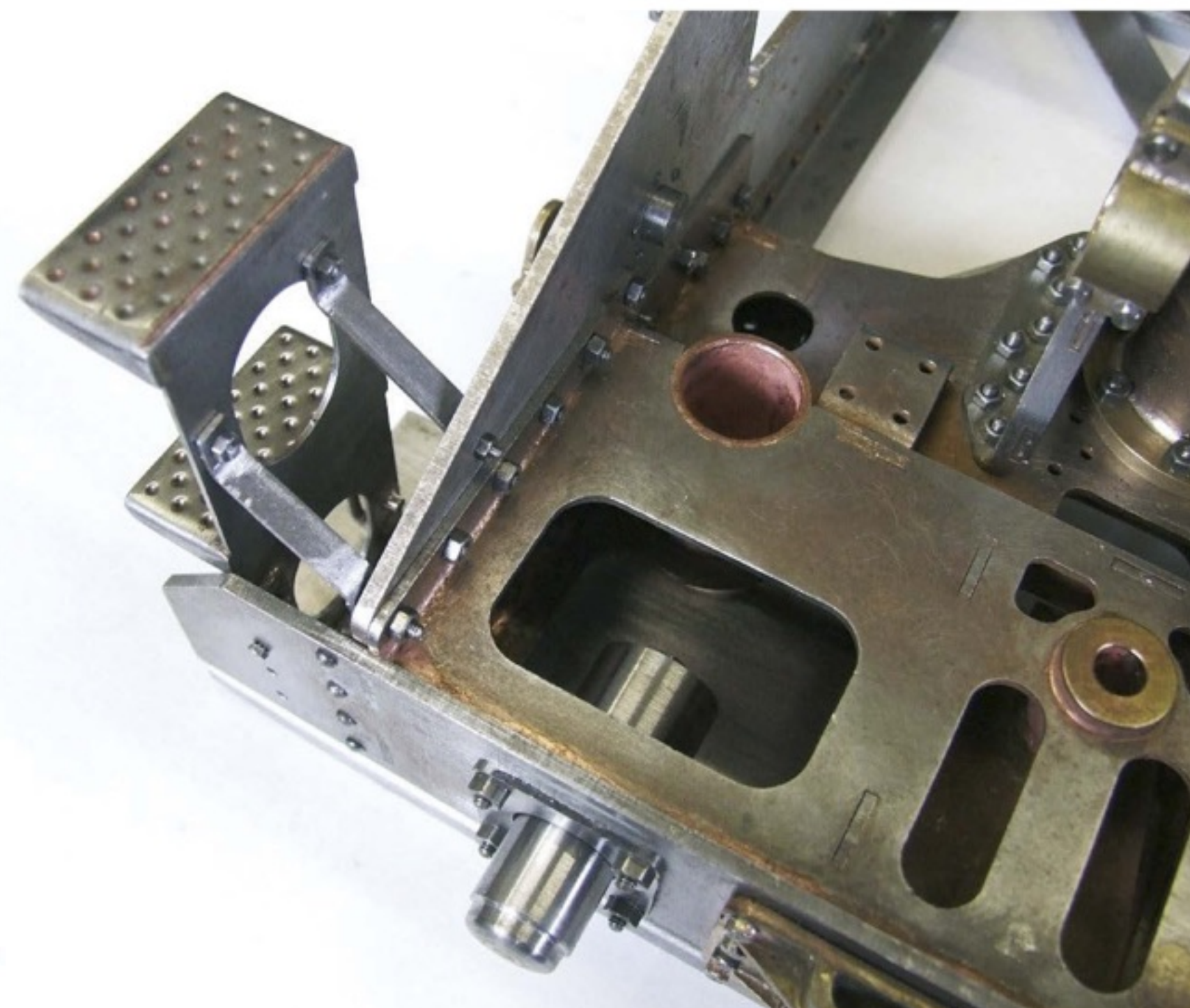


Above: The bracket on the rear of the tender frame ready for attaching the step.

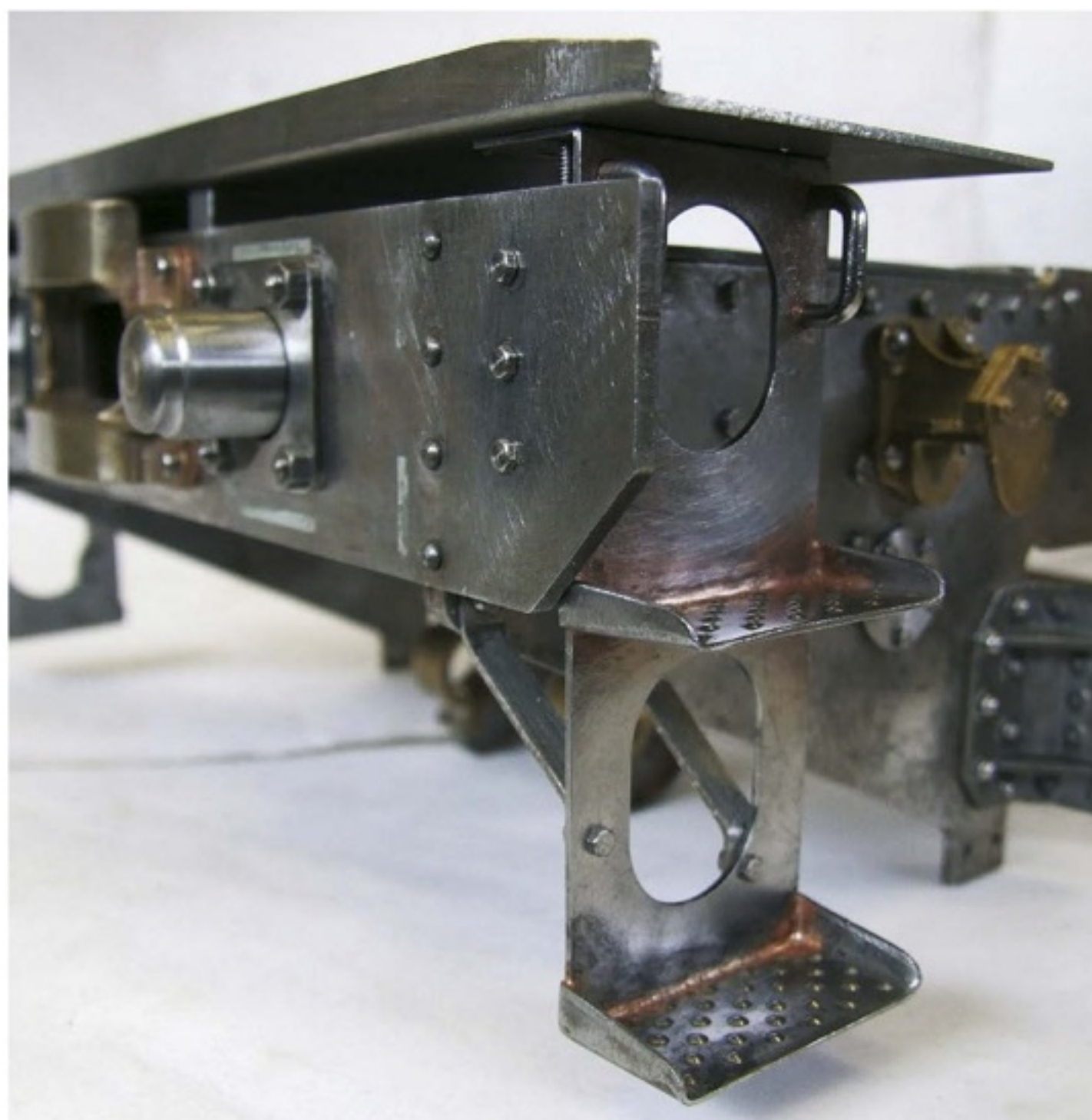
Below: A completed front step.



Right: An underside view of the front step showing the stays bolted to the frame.



Below: The completed front end of the tender with step in position.



has been bent over at right angles it is silver soldered underneath the top flap. The hand rail is just another short length of $\frac{1}{8}$ " welding rod. At the bottom of the step there is a channel shaped bracket which secures the step to the frame plate. In the kit there are two types, one for this tender and one for the Winson version, and the one for our tender has a vertical stiffener across it. The bracket needs bending up at the ends and then the stiffener drops into a couple of slots and needs silver soldering in place. On both steps there are angle brackets which secure the steps to the backs of the buffer beams.

The only thing left to do at the front end of the underframe is to bolt on the central buffer casting.

To be continued

Notes on an Exhibition: Confessions from a standholder's wife

Continued from page 191

My main jobs are going for the coffees, handling the money, keeping a record of items sold, and moving Malcolm's glasses when I see an elbow about to flatten them.

As I don't know enough to get involved in actual selling, I can spend a bit of time people-watching. Although model engineering is a predominantly male occupation, exhibitions

seem to attract a surprisingly wide cross-section of people. We see plenty of female enthusiasts, and the number of young people accompanying family members, or building themselves, seems to suggest that the hobby will be popular for many years to come. Customers vary from the browsers, the card collectors, the ones on the verge of building, to the ones who know exactly what they want. One of the pleasures of life at an exhibition is seeing the same faces year after year. By the end of an exhibition like Alexandra Palace, we'll have seen thousands of people walking by the stand, or even better, stopping and buying.

Three days of standing, smiling at people, skipping lunch and going back starving to the hotel – it all takes its toll. It's surprising how tired and how grubby you get. At the end of those three days, there's the whole setting-up process to go through in reverse. By the time we're making our way back up north, we're exhausted, but do you know what? We're also happy and satisfied. Exhibitions are like giant club meetings – a chance to make contact with like-minded people. My involvement in Malcolm's working hobby might be small, but I'm always secretly happy when he starts showing signs of 'exhibition-itis'. ▲

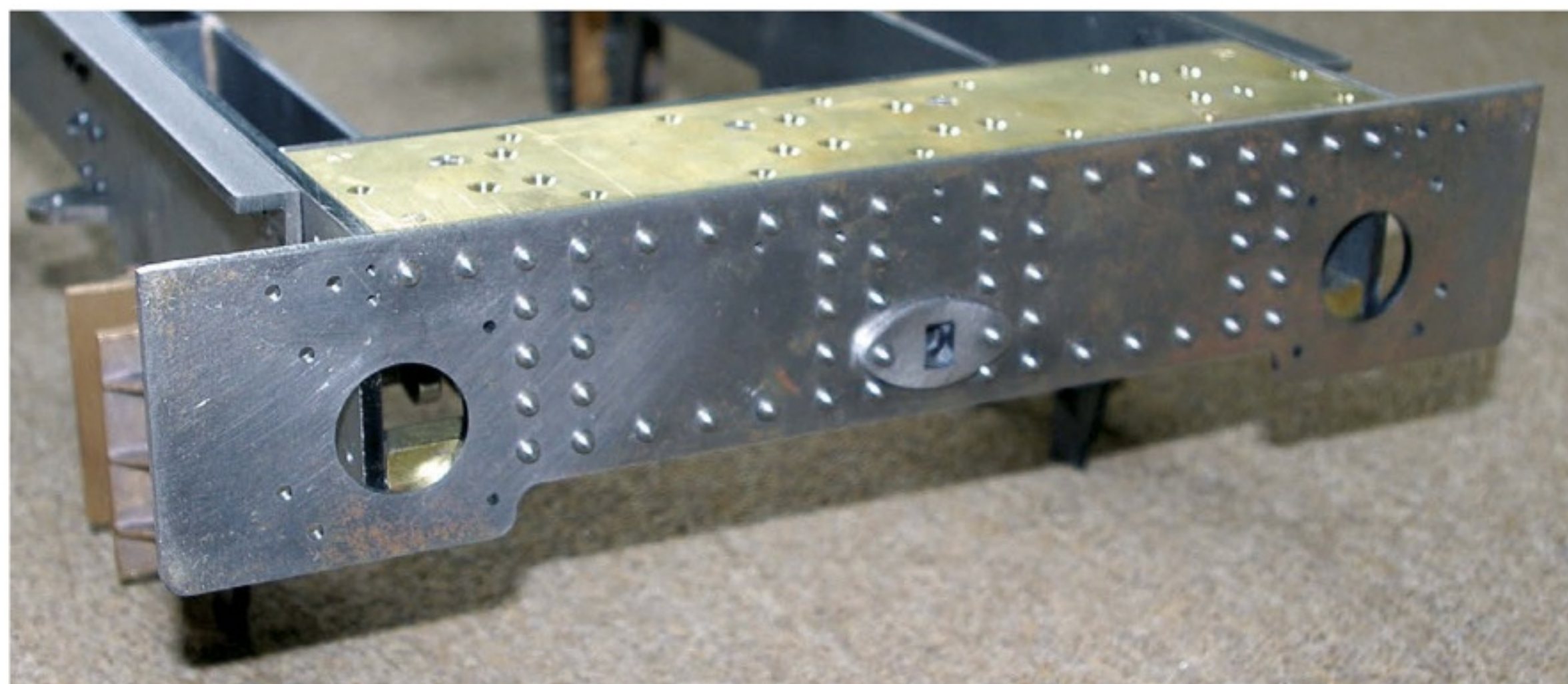
GWR Collett 0-6-0 2251 Class Goods Locomotive for 7¼" Gauge

David Aitken begins the construction of the Churchward tenders

Continued from page 170, November 2009

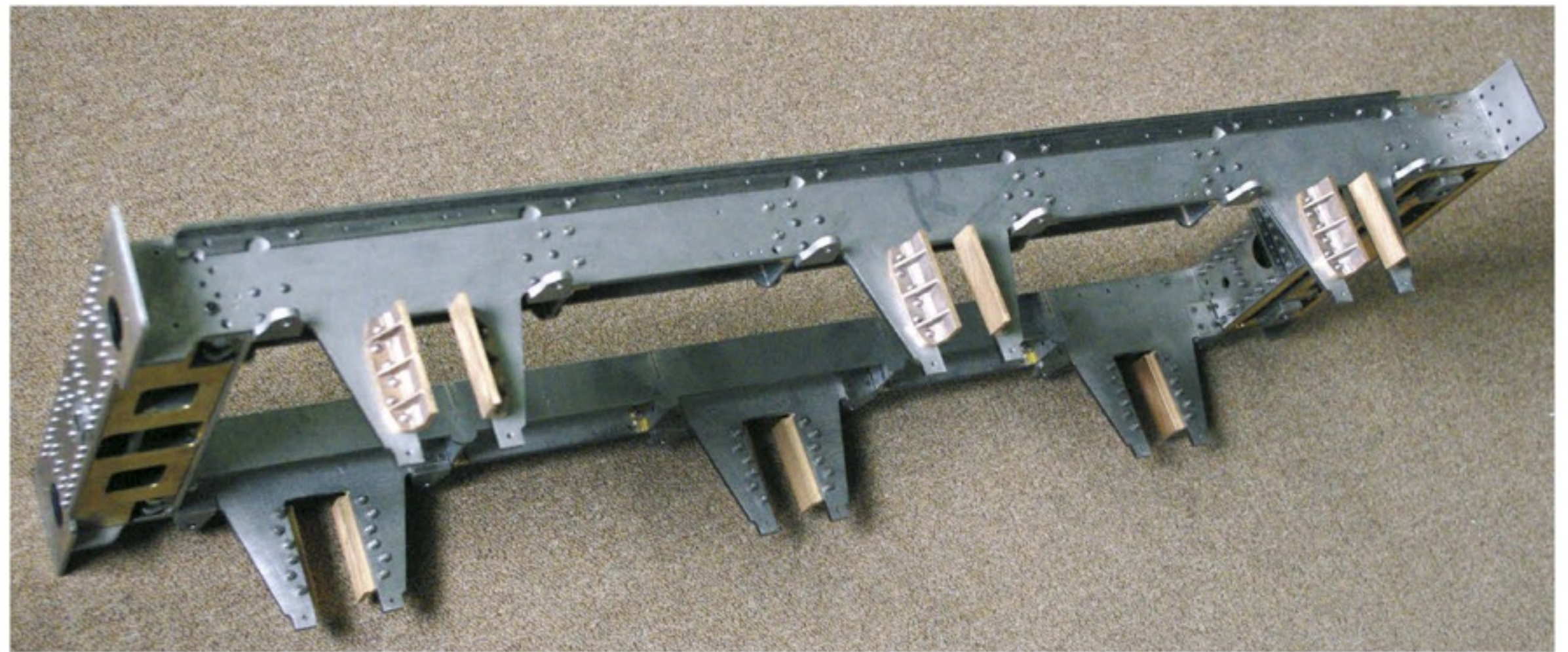
The approach to describing and drawing the tender is slightly different to that adopted for the engine. A great deal of effort has gone into designing and producing a significant number of components using CNC techniques and it is not considered that such production engineering information will be of much value to model engineers who may choose to make parts using more traditional methods. Equally it is assumed that many model builders will wish to take advantage of ready made parts which not only make the building much quicker but are incredibly accurate.

Looking at the frame assembly, the first items to consider are the side frames. After drilling all holes, spring hanger support brackets should be made and fitted – use $\frac{7}{64}$ " snap head rivets formed into countersinks on the back. The frame doublers and the parts which represent the stretchers through the sump can be slotted together and silver soldered. Do a dummy assembly first as two parts have holes for brake hanger supports and two are plain.



Angles need attaching to the outside of these stretchers to fix everything to the frames. As everything GW, the fits are precise, so ensure the spring hanger supports are not wider than shown. There is very little room for the stretcher angles, you will need one size smaller headed nuts – i.e. 7BA Hex on 6BA and a bit of patience.

Make the brake hanger support brackets – a bit of milling and drilling from steel bar – and screw to the stretchers. Fit a pin through the holes in the frames to ensure it lines up with the holes in the supports. The rear pair of brake hanger supports will be fitted to the buffer beam assembly. The other items permanently fitted to the frames are the horns. A word of caution if using Reeves King/Mogul horns; these are supplied as a pair in one casting placed end on end. If you cut where indicated and place them side by side, the webs do not line up horizontally and this looks dreadful, so



Frame assembly.

line them up and carefully trim the profiles so they look a mirror image. Whichever supplier you choose, machining them square is tricky. Place in the machine vice and mill or fly cut the face which runs against the axlebox. If the castings are a consistent thickness, always remove the same amount so the resulting flanges are all the same thickness. Now clamp this face against a piece of square tool steel

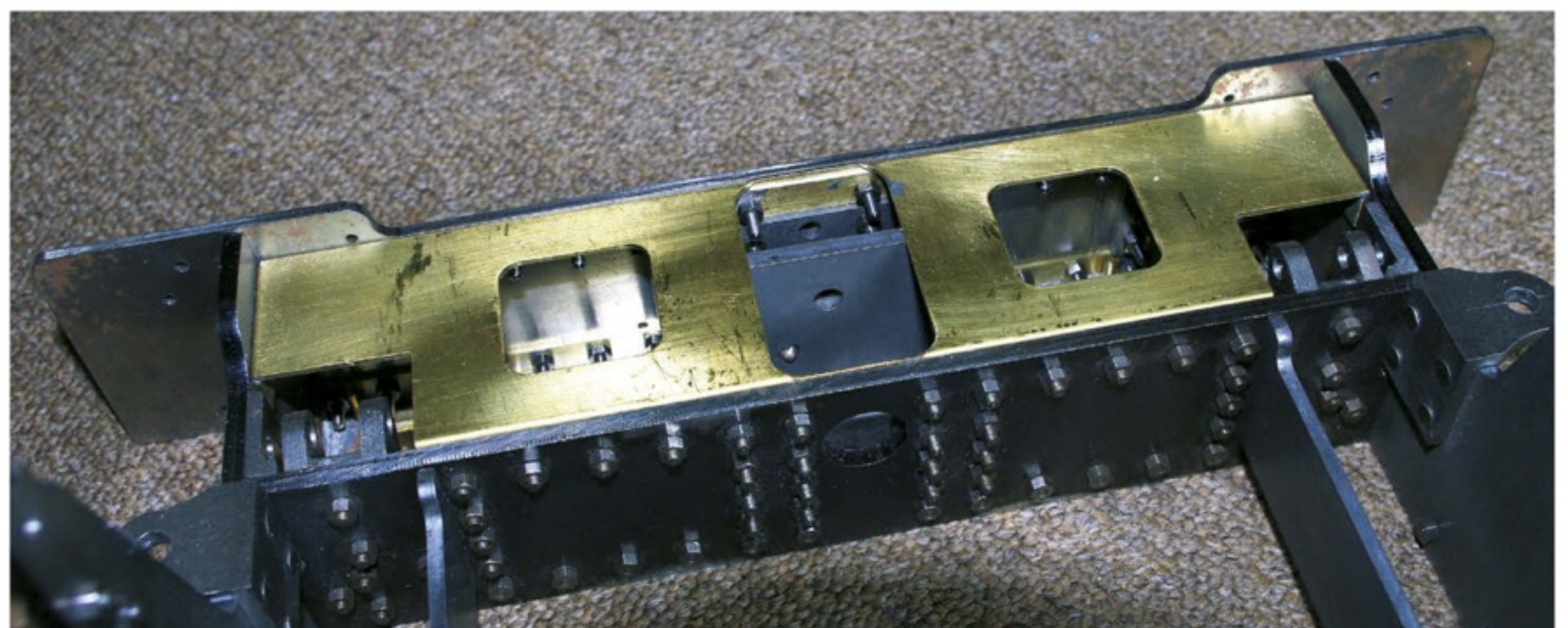
which is itself clamped to the table. Pack the two ends up to an equal height and machine this face. By turning them over, the outer edge can be milled parallel to the bolting face. The rebate in the corner can be milled in a vice provided it is set up in line with the table and the castings are packed so they are level. Bearing in mind previous remarks, the ends should be milled so the horns are symmetrical and all a consistent length.

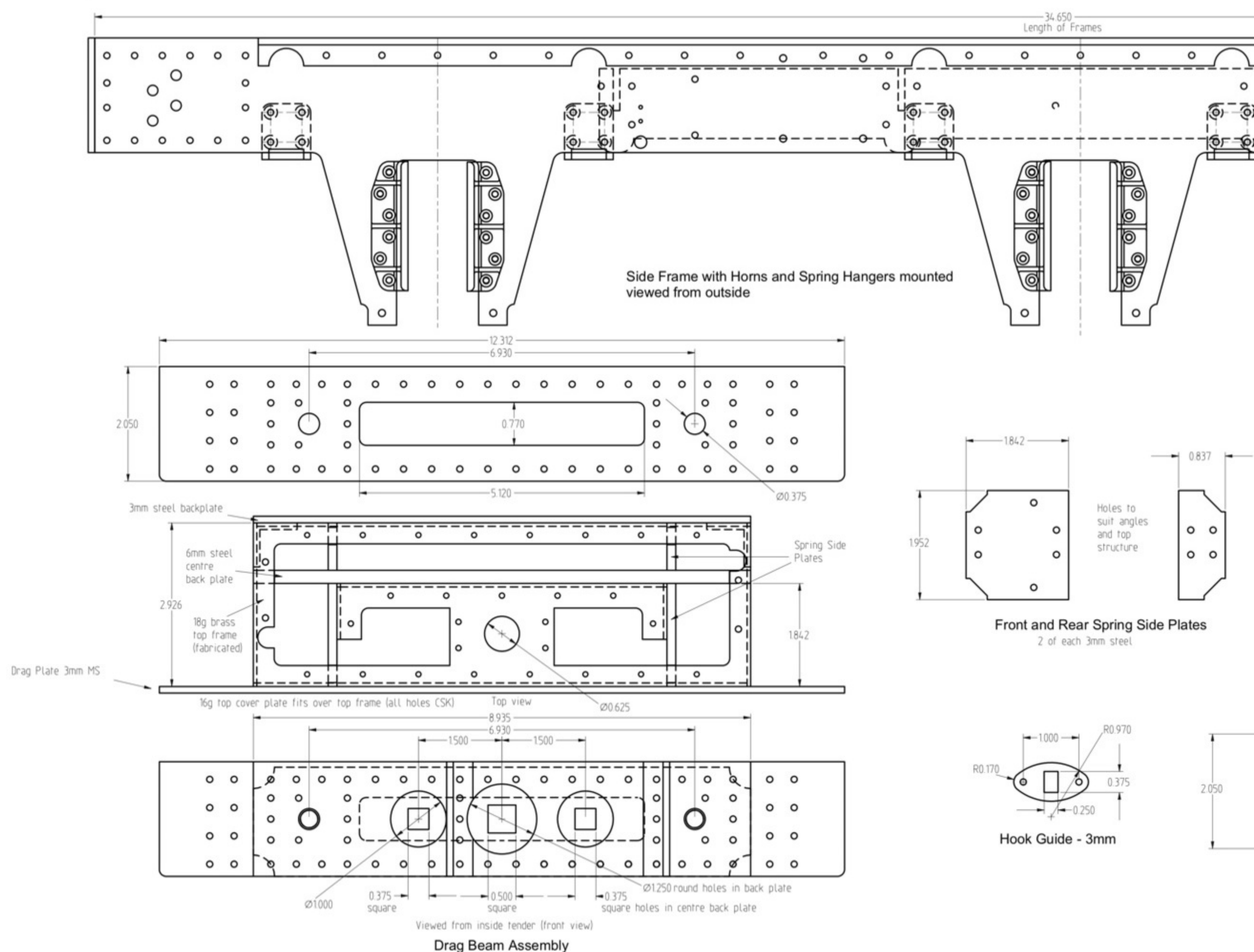
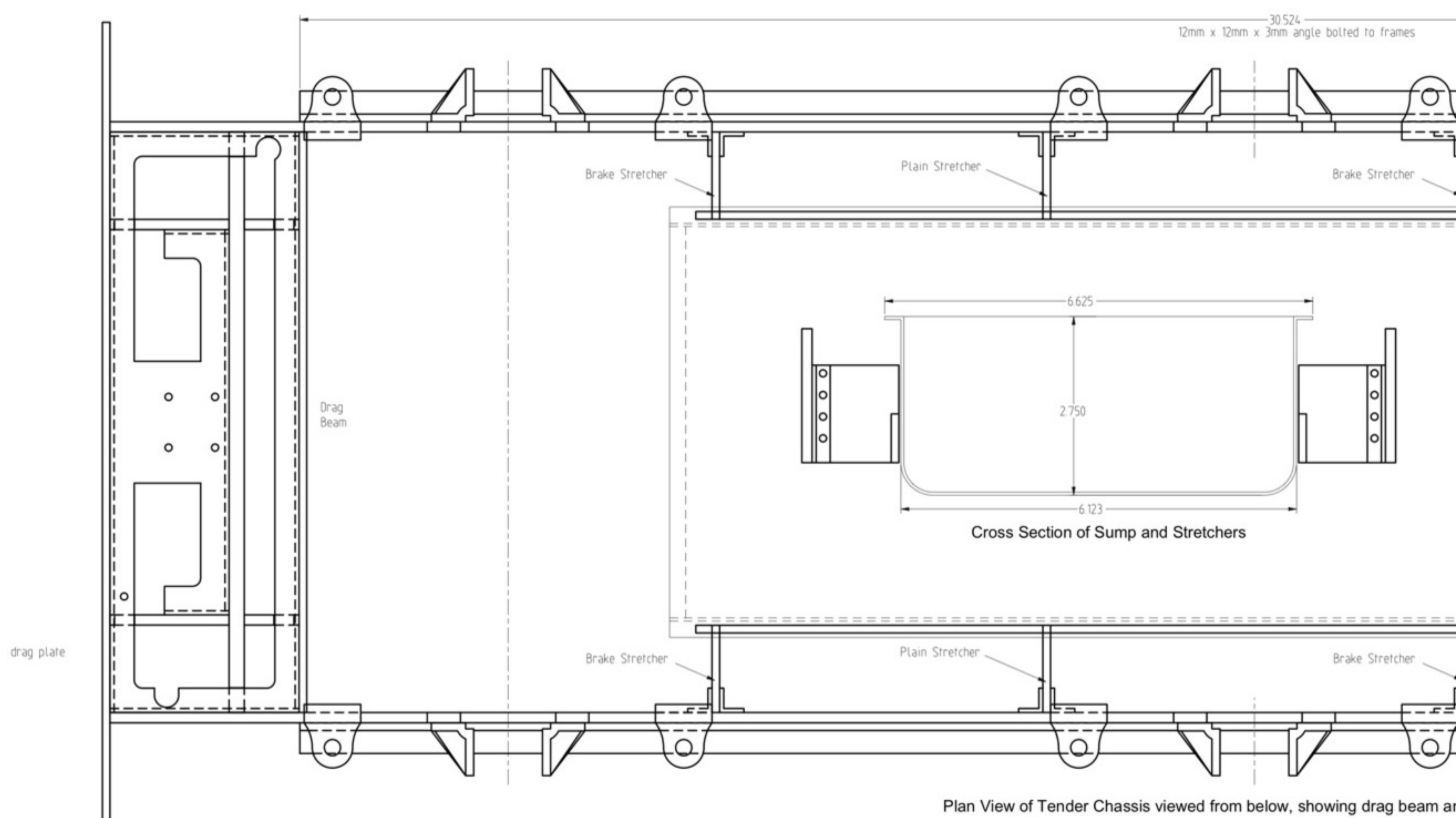
We now come to drilling the fixing holes – the proverbial chicken and egg, do we drill the horns from holes in the frames or vice versa. My tried and tested method is to make a drill jig from steel angle. Cut a piece and mill it so it is the exact length of the horns. Mark and drill the bolt holes so when a horn is clamped inside the angle and drilled, you get what you want, i.e. take account of the thickness of the steel. Check the quality of the horn castings to see if the webs are crisp and free from excess metal in the corners, otherwise you will be playing with slot drills or a Dremel to enable the bolt heads to go down.

De-burr the holes on the bolting face otherwise the castings will not sit down flat. Make up a similar drilling jig from angle to drill the frame. Ensure the corner inside the angle is sharp so it butts up against the horn slot, and make it symmetrical so the length from the bottom hole to the bottom of the horn slot is the same if fitting to the left or to the right side.

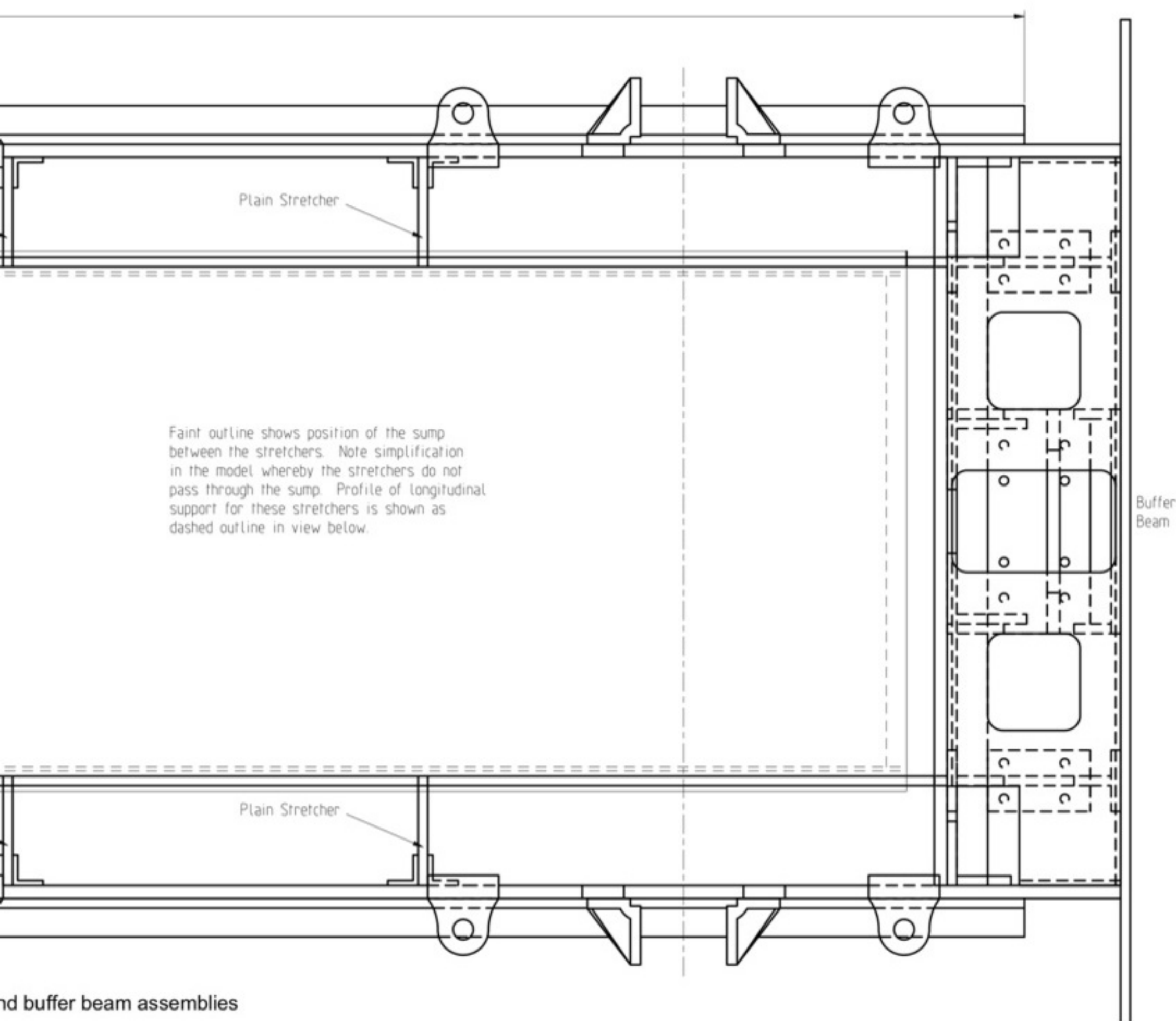
Above: The buffer plate showing holes for buffer fixing as on the locomotive and draw hook re-inforcement plate.

Below: The buffer beam detail (underside) – showing bottom plate with cutouts in the corners adjacent to the frame to accommodate the brake hanger brackets.

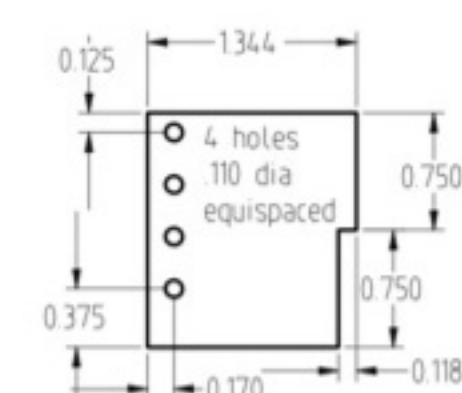
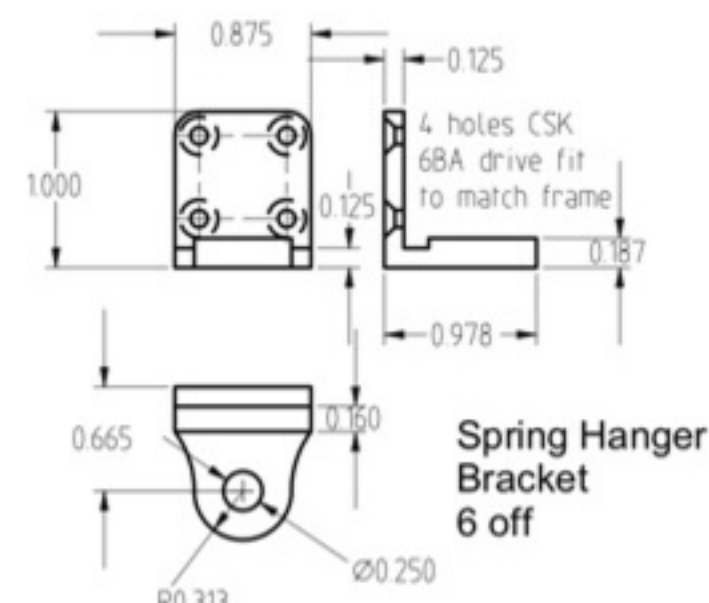
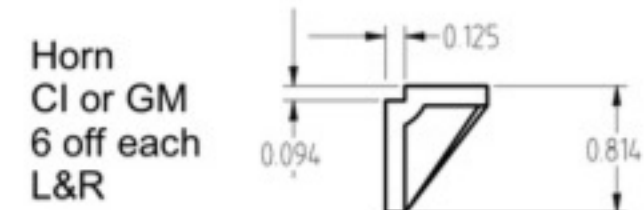
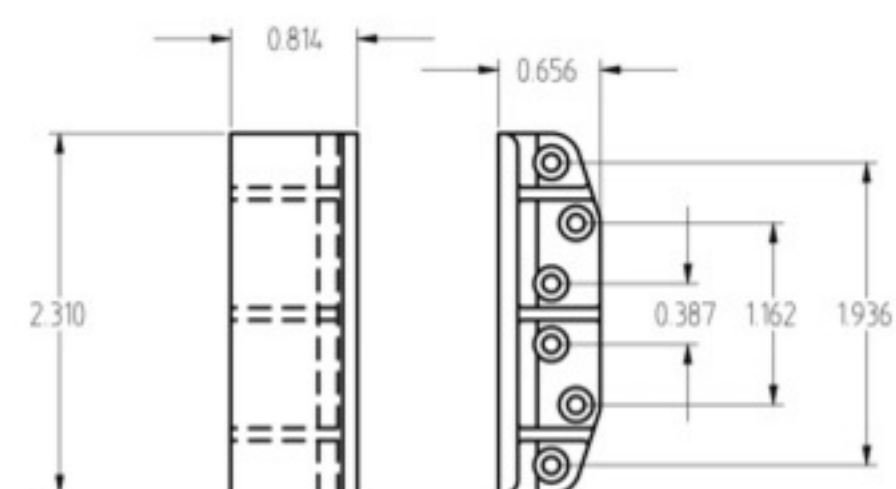
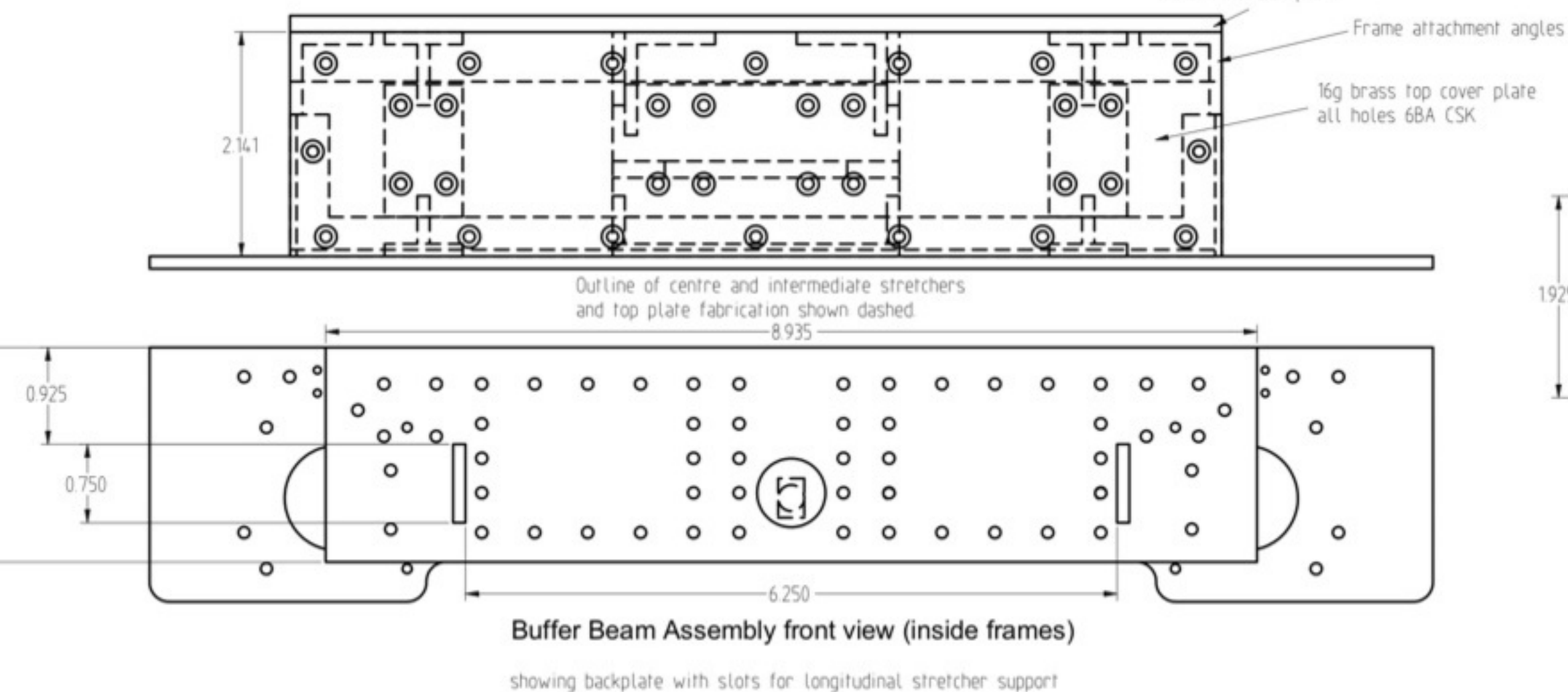
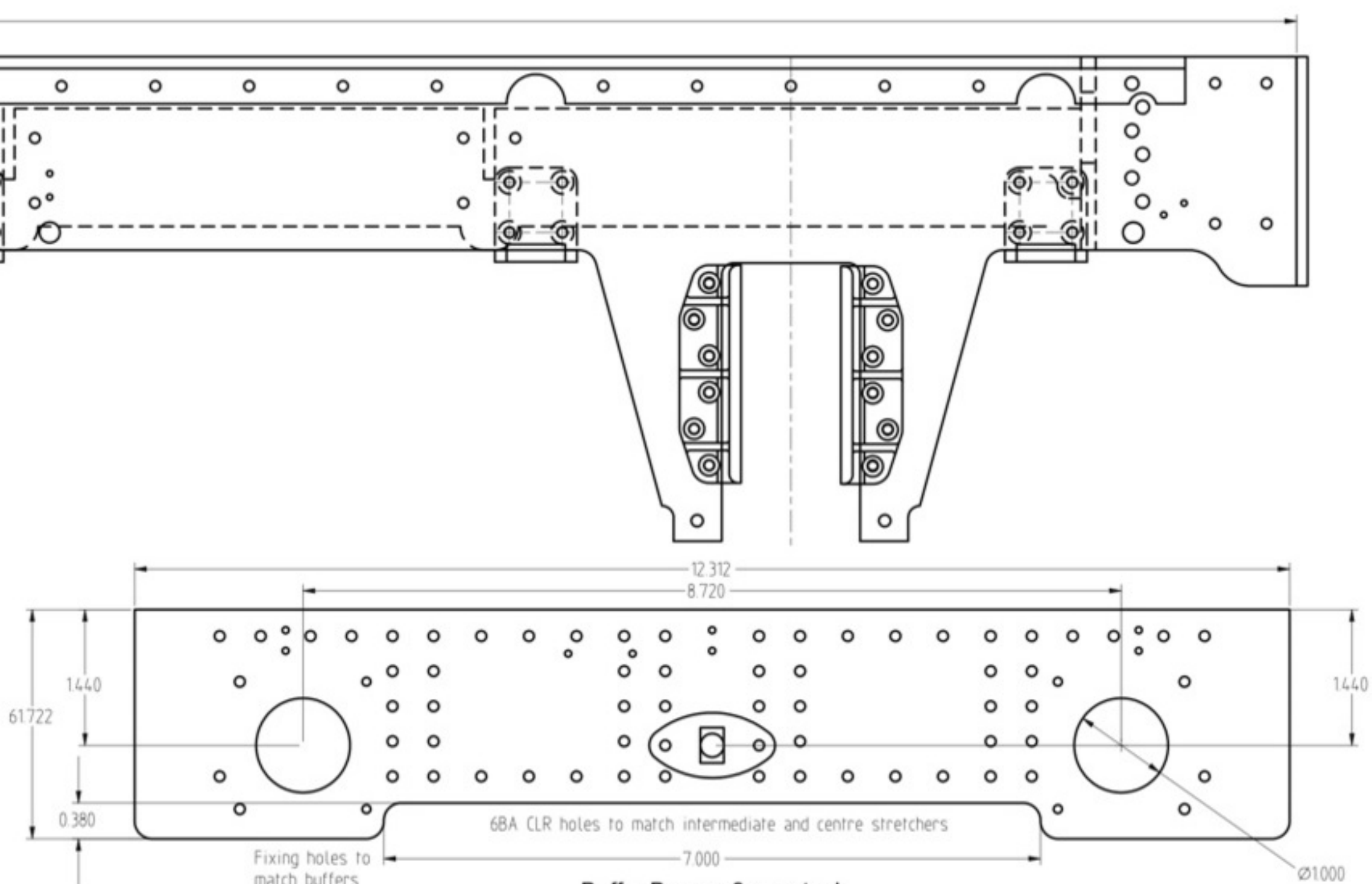




GWR CHURCHWARD 3500 GAL

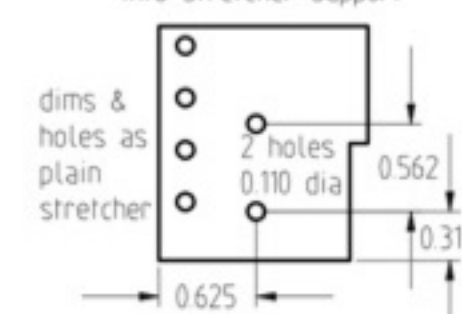


nd buffer beam assemblies

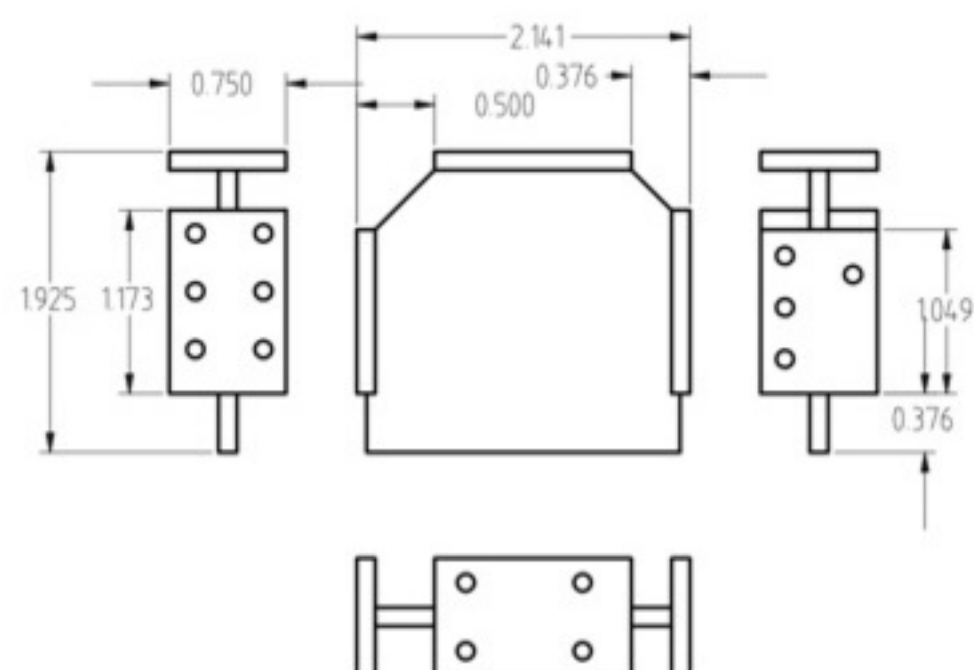


Plain Stretcher 3mm steel - 4 off

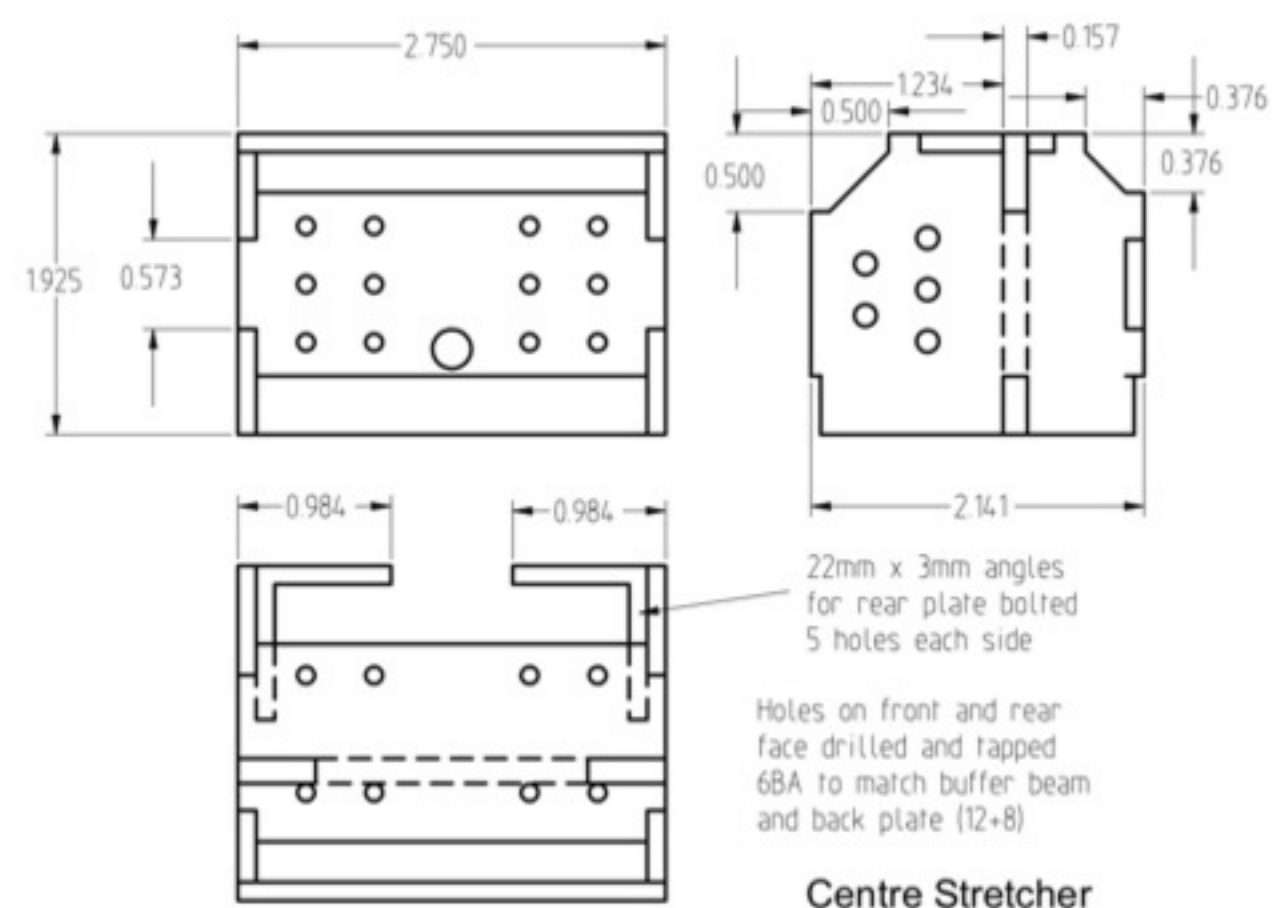
Silver Solder Stretchers
into Stretcher Support



Brake Support Stretcher 3mm steel - 4 off



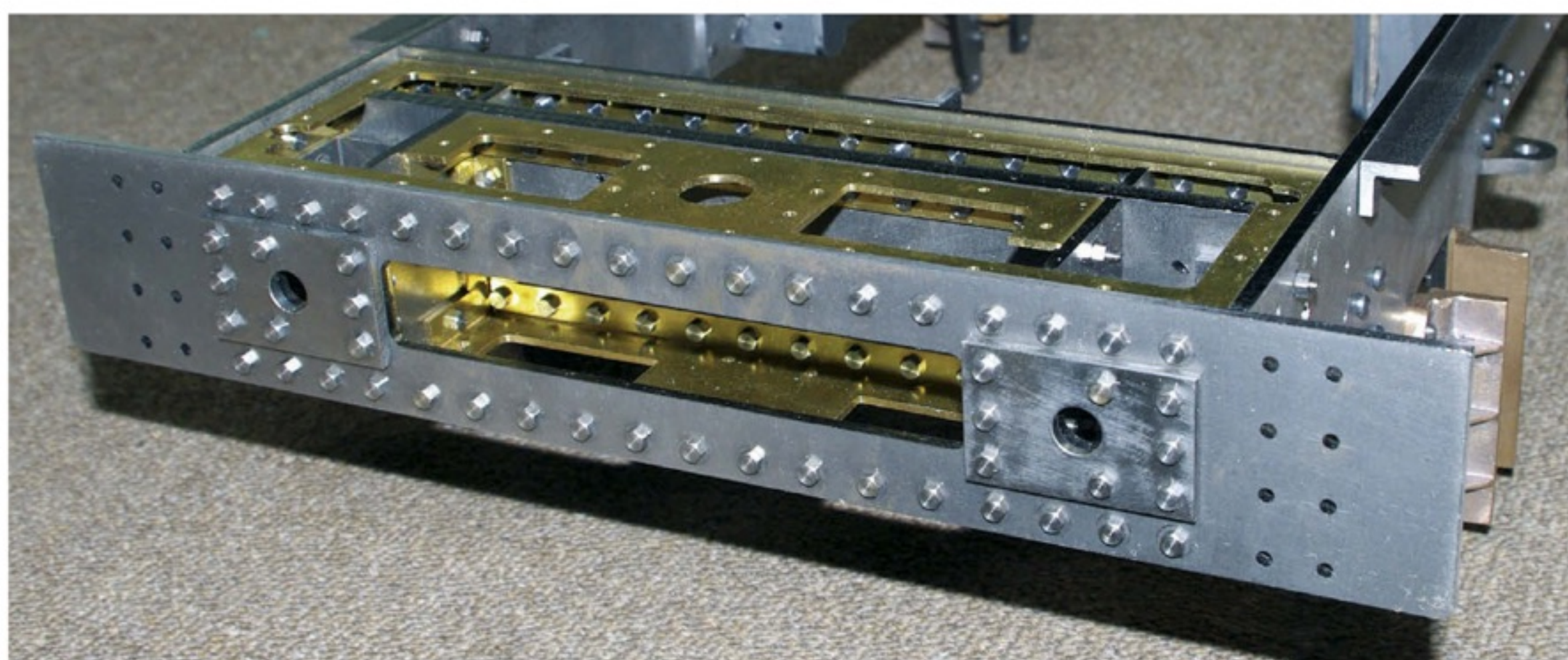
Intermediate Stretcher - 3mm L&R



The horns can be fitted with rivets, but I find they do allow a little movement while being fitted so the gaps are not consistent. This can be overcome by initially holding the horns on with a pair of nuts and bolts, but I prefer assembly with slotless round headed screws. To prevent the screws turning, when they are finger tight, hold the thread with pliers while tightening the nut. The excess thread can be sawn or snapped off (naughty me!). If in doubt use Loctite on the nuts. Use a block about 0.004" wider than an axlebox as a gauge and assemble a pair of horns at the same time.

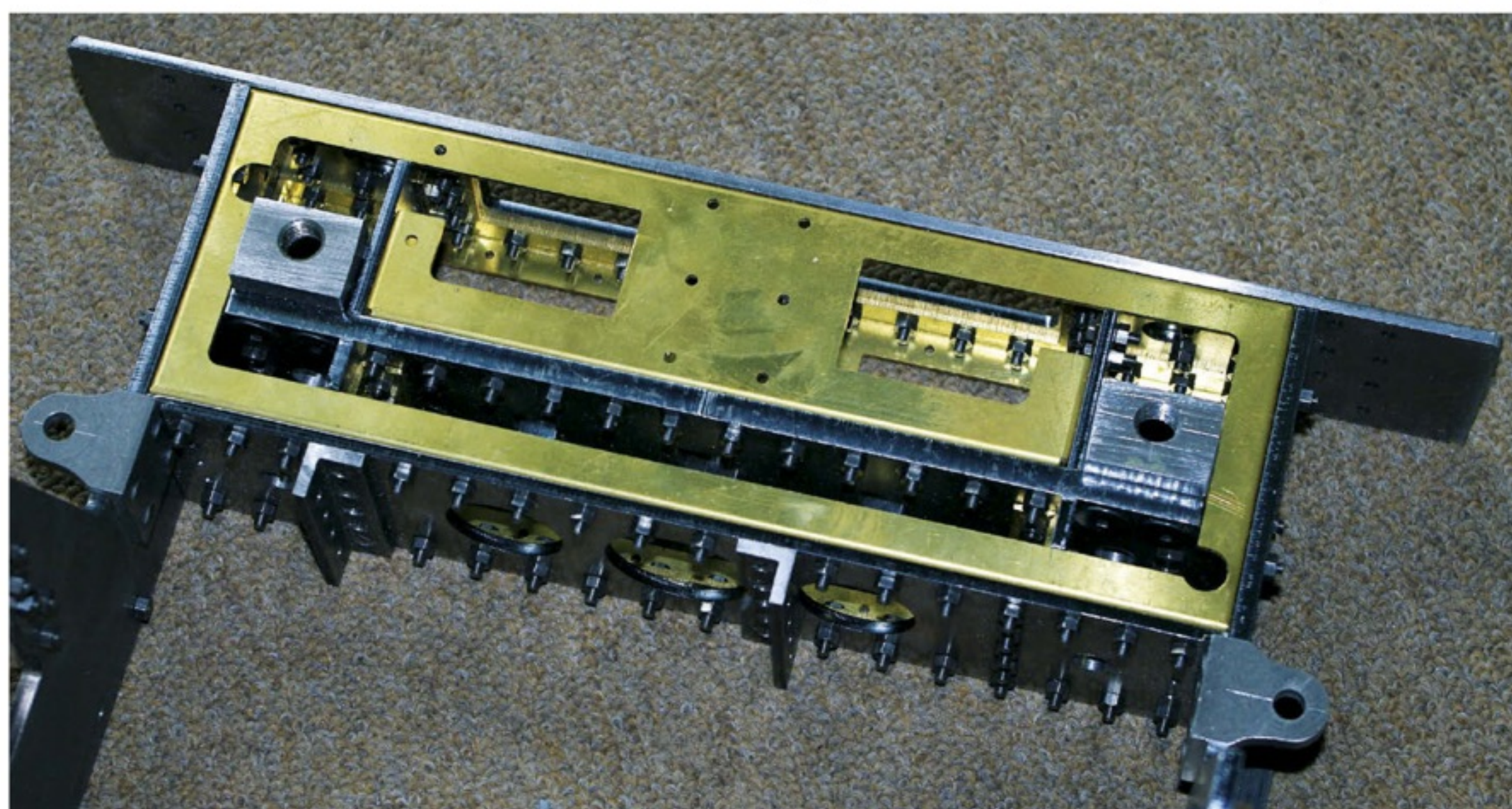
The horn keeps are strips of steel joggled in the centre section. It proved extremely difficult to get an S bend in each end even when annealed. The answer as we Brummies say, is plenty of hot and 'gee it some 'ammer'. Make up a press jig, cook the strip to red heat and don't dither! Drill the holes and trim to length after bending.

Having got two sides, we can tackle



Above: The drag plate front view with coverplate removed showing the reinforcing plates for buffers and slot for drag links.

Below: The drag beam detail (underside) – showing construction with centre back plate (note the access holes in the back).



the ends, the buffer beam first. This is basically a box structure – back, front, top and bottom with webs between. A bottom frame is bent up from brass – Polly (aka Pete) will provide this ready rebated, so when bent it takes up the correct shape. It is worth clearing out all the pre-drilled holes on these 'bendy bits' as they are cut from CZ108 to allow the bend as opposed to CZ120 engraving brass which can be used on flat components, and CZ108 can be a bit 'chewy' to be very technical.

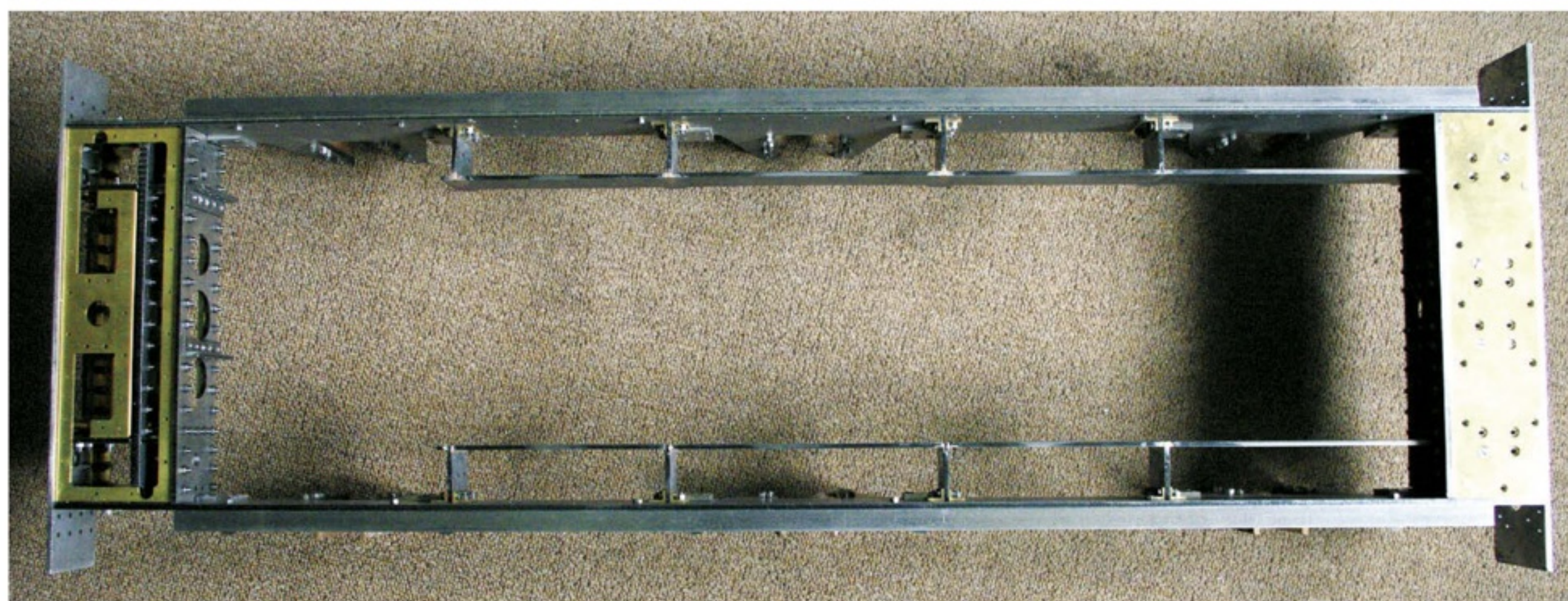
A slender top frame is bent up or could be made by brazing some angle. Use round head slotless 6BA screws to fix the two frames to the buffer beam. There is a pair of intermediate stretcher assemblies and a

centre stretcher assembly which are made up by slot and tab construction then silver soldered. When brazing the centre assembly, I suggest leaving one end off and fixing the cross piece first, otherwise the end pieces act as a shield and get overheated when trying to braze the cross piece. Laser parts are a vast improvement on hand cut parts, but you still need to clean out the corners of cut outs so the parts fit snugly.

The intermediate stretcher assemblies can be screwed directly to the buffer beam, but the centre stretcher is fixed to two angles which must be fixed in place first otherwise the nuts cannot be tightened. The hook guide must also be fixed at this stage.

The back of the box – or is it the front,

Chassis top view – note coverplate on RH end over drag beam.



since we are at the back of the tender? – anyway, the backplate is a 4mm steel sheet with a 12mm × 12mm × 3mm angle fixed to the top. This is held to the centre stretcher with a pair of angles and bolted directly to the intermediate stretchers and bottom plate – use ordinary hexagon headed bolts here to make life easier. As we are using overscale thickness material for this backplate, the end areas need milling to clear the spring hanger supports – do a loose assembly and mill them before finally bolting together. The backplate is fixed to the frames with the backplate side angles which must be trimmed to clear the brake hanger supports. This buffer beam assembly is completed with a top plate which is fixed with countersunk screws.

The holes for the vacuum pipe and steam heating valve, if fitted, are best drilled and tapped before assembly of the frames, likewise the holes for the buffers and lamp irons. The buffers on post WW2 engines are as drawn for the locomotive, so need no further comment suffice to say it is worth using high tensile studs to fix them.

For those building a GW model that represents the 1910 – 1940 era, different buffers will be required. Another little variation to keep us on our toes is the position of the vacuum and steam heating pipes. Before WWI, the vacuum stand pipe was fitted to the right side of the hook as viewed from the rear, with the steam heating on the left. Some time in the 1920's these positions were reversed. I am grateful to Pete Rich for pointing this out to me.

The buffer beam cannot yet be fitted to the frames as the step and step support need making. On the full size engines, the front and rear steps were riveted to the channel which ran under the sole plate, but on the model, this channel is fixed only to the soleplate and therefore is lifted off with the tank. To maintain the illusion, rivets are fixed in the channel but countersunk on the back – the rear steps are therefore only held in place by the step support, which is fixed to the frame and buffer beam. The step support can be laser cut and then bent round a steel former, or a brass one with rebates to locate the bends, either way it is best to spot drill the location holes from the buffer beam when assembled together, as variation in thickness of steel etc. can cause a problem, but do remember the dimension over the step plate is critical if it is to be a good fit between the side channels which are positioned from the sole plate.

To be continued

PROJECT TIGERLI

The first from an occasional series by **Mike Ellis**

Introduction

Please let me introduce myself: my name is Mike Ellis, I'm 47 years of age, and confess to never having built a steam locomotive, what you may consider makes for a strange qualification to write such a publication as this article. Possibly. However I hope that in the following chapters, during the next months to prove otherwise.

The following diary of events will endeavour to show how the realisation of a lifelong dream was brought about. As this is, at the time of writing, very much a story in progress I do not expect the progress to be very structured, I give no guarantees of successful conclusion as there are still real risks that the project will fold. It will attempt to deliver some do's and don'ts as we learn by our mistakes and it will also give, I hope, some degree of insight into a 'modern method' to build a working steam locomotive of respectable size. I am not aware of any other group doing anything similar at the moment and certainly not in the way we are.

Presenting the whole project from a non-UK standpoint is maybe a little different for UK readers. What follows will not be a technical description and step by step 'Follow Me' guide. I have too little knowledge to bluff my way through that and I have too much respect for the skills of others who may read this. This will simply be a story following our project, hopefully showing that anyone with some degree of common sense, willingness for hard work, and good support can achieve what they want in life.

My last metalworking skills were learnt at the age of 13 at school, some 34 years ago! I've got some catching up to do to say the least during the next couple of years. If anyone gains something by reading this article I'll be happy. If someone follows in our footsteps and also finds their way to completing such a project, great! It will have been worthwhile. I'd like to hear from you at: ellis@gmx.ch

Background

Some more background to myself: I've been living in Switzerland since



SLM works view of short version E 3/3 'Tigerli' in 1908. Later modified with front platform. Photograph: SLM

1989, the past eight years in Einsiedeln (ein-see-deln), where I'm a member of the Modelleisenbahn-Club Einsiedeln (MECE).

A couple of years ago the club members elected me to be in charge of the outdoor infrastructure, where as you may imagine my time is rather well booked during the summer months.

Before moving out to Switzerland I worked 11 years for British Rail, in the S & T department based in York. I was never happier than when out on the track surveying for cabling projects (at least, with the passage of time that's how I now seem to remember it). Lineside working however is hard, dirty, dangerous and holds little glamour when it has to be done. The sheer force of a train passing at very close quarters whilst one is standing in the Cess and a couple of open toilets are being flushed is a feeling no railway person forgets easily! Regardless, railways have always held a fascination for me – it's in the blood, there's no escape, despite the open toilets!

Some background to our club – the MECE. Club was formed 21 years ago by some local, like-minded railway enthusiasts. They ran a small 5" gauge locomotive on a loop of temporary track wherever they had

some space available and that was about it. Around 1999 the chance arose for them to obtain a redundant patch of infill land between the river and railway on the outskirts of town. Funding was raised and in 2000 the landscaping work commenced in the 'Blatten', the location now for some 800 metres of dual gauge 5" and 7 1/4" gauge track work. Buildings, a tunnel, lake and lineside furniture are being continually added enhancing the layout, which at 2880 feet, 878m above sea level is the highest garden railway in Europe. Yes – we do run in snow and down to about -10°C is not unusual.

Active steam members running locomotives number about 12, and locomotives about 30, of which about 8 are electric (battery) powered. Our members are a real cross-section and range from Plant Hire Contractors to a Tax Man, a number are in the fine (tool and die making) mechanical engineering business and they as you may imagine are invaluable to those of us running the live steam side of things. The club maintains a very close relationship with the local railway, the Südostbahn (SOB) but more about it later. Further information regarding the club and activities is available on <http://www.mece.ch>

An Idea Emerges

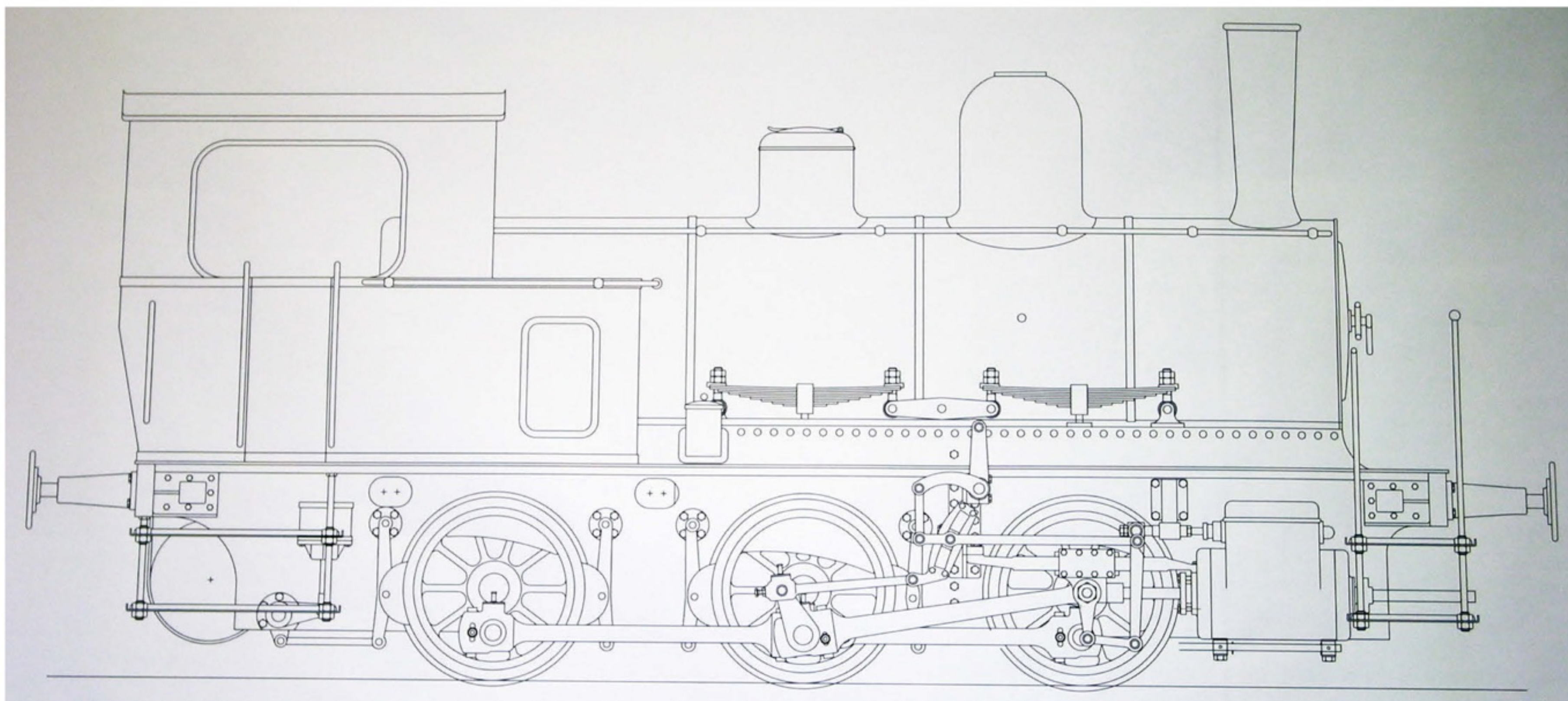
It was sometime during the latter half of 2004 that it could be said the seed of an idea for 'Project Tigerli' first germinated. One Autumn evening during a weekly gathering of the MECE our then Vice President (current President) Thomas Minder mentioned in passing an idea he had of improving upon his 5" gauge Tigerli with a 7 1/4" gauge version. He went on to elaborate that some 20 years ago he together with his father had built a 5" gauge model. Thomas can tell a story when he wants and the larger than life undertaking he recalled kept us all entertained for an evening. This tale was all in Swiss-German (Einsiedler, dialect) you understand but closely followed the classic Monty Python format, "now-when-I-wuz-a-lad-we-ad-nowt – but wur appy". Nevertheless, it



View of the E 3/3 'Tigerli' built by Thomas and his father.

This picture was taken at Sinsheim in 2006 proving that despite its age good workmanship pays off. 5" gauge versions of this E 3/3 Rangierlok (0-6-0 Shunting Locomotive for UK readers) exist in and around Switzerland, a 7 1/4" gauge version however, has never been built.

Photograph: Ruedi Heeb



was an inspiring story and the style only added to the telling. Although the original locomotive in question is now in a well worn condition it still makes appearances and is simply in need of an overhaul. Having been used as the club's first live steam 'multi-user' locomotive, one can well imagine how it has been used and abused over the years, which just proves it was well built to a proven design.

Thomas had at home a copy of the original plans from the Schweizerischen Lokomotiv und Maschinenfabrik (SLM) in Winterthur and from these he had built the 5" gauge locomotive. He thought a 7 1/4" gauge would be possible. By this point in the proceedings I was wide awake and enthralled, my beer had been forgotten: Mike was 'hooked'.

As many of you know well these 'Pipe Dreams' form and then disperse when the cold winds of reality blow through and costs start to get discussed. Materials: castings for instance – where would we ever get castings produced for just two models? Workshops: who had machining facilities for such an undertaking and skills and knowledge required to profile wheels for instance, let alone a couple of pairs of cylinder blocks? Such basic problems and many more stand in the way of this type of project and as the effects of the beer wear off their magnitude increases and the good idea fades away and is quietly forgotten.

At least that's what can happen. Suffice to say at this point we are a resourceful cross-section of guys in the MECE and the support I mentioned earlier was never too far away.

A Brief description of the E 3/3 'Tigerli' Locomotive

I will digress slightly yet again at this point for the benefit of most of the UK readers to provide a few details about just what it is we are talking about here. The loco in question is termed in Swiss railway (SBB) classification as an E 3/3 affectionately known as a 'Tigerli'. The E relates to its speed classification, which in this case is pretty low being maximum 50 km/h. The 3/3 is simply the wheel arrangement: 3 axles defined as drivers from a total of 3. A British equivalent would

The first detailed drawing we were given from the SOB.

be an 0-6-0 shunter or something similar to a 'Jinty'. 'Tigerli' is the nickname these locos were given as they were delivered to the SBB. 'Tigerli' translating to 'little tiger' or 'tiger cub', the name refers to the way in which the locomotives were forever darting around in the depots to which they were assigned. The design as depicted below is a well proportioned light shunting locomotive. They were produced in short form and later in a lengthened design with the famous Shunter's platform at the front end. It is this latter design that we will be attempting to build.

The basic E 3/3 form that interests us first appeared in 1896 when the Schweizerische Centralbahn (SCB) and the Jura-Simplonbahn (JS) together ordered 'off the shelf' from the SLM 10 locomotives developed from earlier E 3/3 designs. Following satisfactory service this fleet of 10 was enlarged by a further order of 25 placed in 1902.

Three further examples were ordered by the SCB but were delivered in reality to the Schweizerische Bundesbahn (SBB) as it became during 1902. These locomotives were eventually numbered E 3/3 8451 – 8453 by the SBB. Due to a severe shortage of shunting motive power at this time the newly formed SBB decided in 1903 to place an order for further machines.

The building period for these Tigerli continued up until 1915, the later locomotives continuing the numbering sequence from 8454 – 8533. Continuous modifications were made during the 19 years and it is a near impossibility to produce a table covering all the permutations made during such a long period. Suffice to say the major alterations were made to the cab sizes, which ended up longer and also the wheel spacing from 3120mm to 3320mm from N° 8486 onwards. In later chapters I have attempted to provide a tabulation of the class and differences therein.

With the arrival of N° 8486 a riding platform at the front had appeared. This was a modification made to all later locomotives. It is this enhancement above all others that

made the 'Tigerli' so popular with the SBB crews who were assigned to them.

Locomotives 8459, 8460, 8471 – 8481, 8488 – 8495, 8503 – 8505, 8513, 8524, 8525, 8528, 8529 were fitted with Hasler Speedometers and were classified for mainline use, their top speed being 50 km/h compared with 45 km/h for the others.

Other differences within the class included the strength of the frames, the number of brake blocks fitted and the weight. Braking was primarily air with a 'swing-over-centre' weight as parking brake. Six examples N°s. 8478 – 8481 and 8519, 8520 were assigned duties around Basel St. Jakob depot and were fitted with coal bunkers above the cab roof! Photos of these look decidedly odd to say the least and the modification spoils the original lines. Mine needless to say will be without the roof bunker.

During the Second World War the SBB experimented with ideas to conserve coal, a costly commodity in a coal-less country during wartime. This led to N°s. 8477 and 8488 being fitted with pantographs for electric boiler heating! The first modification trial was not a big success and they were retired, however, two further converted examples: N°s 8479 and 8522 still exist in preserved service however without the kettle attachments! Due to the electric heating elements passing through the flue pipes the maximum voltage allowed was 20V delivering some 480KW. You may work out the current requirement yourself!

These must have been very interesting engines as they were able to work on non-electrified lines for short periods utilising reserve steam pressure. For periods of more than 20 minutes a small fire was lit. The calculated cost savings with this method of heating were estimated at 700 - 1200 Kg / day or 300 Tonnes/year equating to 36,000 Swiss Francs per year at WWII prices. The generation of railway power remember being Hydro-Electric and therefore of low cost to the railway. A further advantage with these converted engines was the very quick start up time, using overhead power; a cold engine could be in service in a little over an hour.

The general 'Tigerli' design remained throughout the class as two cylinder

Data Comparisons	Original Locomotive	Model Locomotive scale 7.8:1
Built	1902 – 1915	2006 – 2010
Numbering	E 3/3 8451 – 8533	1 – 6 (2 models copying N°s 8522 and 8527)
Weight empty	34t	150 – 180 Kg
Boiler capacity	4.2 m ³	8 Litres (using 16 litres/hour)
Working Pressure	12 bar	10 bar
Bunker capacity	1.7 t	3 Kilo (estimate bunker)
Length over Buffers	8715 mm	1117 mm
	Power rating 500 HP	Tractive Effort: 73.6 Kg (on paper and not proven!)
Top Speed	50 km/h	7 km/h (sensible and to scale)
Gauge	1435	7¼" / 7½" (see later chapters regarding 7½")
Cylinders	D 360 x / S 500 mm	D 42 x S 64 mm
Grate Area	1.2 m ²	?
Water Tank	4.2m2	None planned as functional on loco.

saturated steam type and all, as far as I can ascertain, were fitted with steam train heating apparatus. This meant they could haul local passenger stock or be used to provide initial heating to passenger trains. All were produced by the SLM, which succeeded in exporting numerous examples to Norway and the Netherlands where preserved examples are still to be found in service today.

The class remained in service up until the very last days of steam service with the SBB, after then they were available for scrap value, making them a serious option for many enthusiast groups on a budget. – Is there a group not on a budget? I would estimate from the whole class of 83 in service with the SBB approximately 8-12 exist in preservation in various guises and states of road worthiness.

Plans - December 2004 ~ October 2005

Back to the story, it was a month or so later following our initial idea session, when one evening Thomas entered the club wagon carrying a bundle of papers under his arm.

E 3/3 8518 Bäretswil, photo taken at the 100 year festival in Sursee 22nd September 2007. Photograph: Luzia Ellis



These sat prominently on the table while Thomas played ‘hard-to-get’ waiting until someone gave in and asked the inevitable question of what they were. Thomas had brought his copies of the SLM construction drawings with him. It is not difficult to obtain sets of plans for locomotives from works in Switzerland. You’ll have to pay the copying and postage of course but they are generally available.

Anyway, as we eagerly pored over the plans the question of scaling drawings and the sheer volume of work involved in this became very apparent. This was no simple job for the next couple of weekends; this was work and an awful, awful lot of work at that.

Enter the Schweizerische Südostbahn (SOB) – Swiss South Eastern Railway. They run an apprentice training school nearby in their workshops in Samstagern, where the apprentices spend two of their four training years building steam and electric 5" and 7¼" models. When they set out to build a new locomotive design they have their plans scaled by a company in Germany who are experienced in this type of work. Just reducing by 7.8:1, as you will appreciate, is simply not enough, compromises have to be made and workarounds found, not always

an easy matter when the finished result is supposed to function, and ours incidentally will have to function, they will not just be sat on a shelf. So, to cut a long story short, we gave the drawings via the SOB to this firm to work on. The deal being that the SOB would hold the rights to the future design. This was November 2004 – I had mentioned we have access to resources hadn’t I?

Suddenly the project had become serious, it might just work after all and this change of mood very quickly brought another member – Christian Reiser – on board and now we were three!

There was still plenty of time available at this stage before wives needed to know about details like future finances and that their husbands would be living in the workshop until the divorce papers came through!

What followed now was now a long period of waiting. The production of detailed designs is not done overnight and with the summer season approaching we set ourselves a start date of October 2005.

The first drawings were returned to us for appraisal in March 2005. These included the large side elevation view shown above. At a scale of 1:1 it is quite big being 1½m long. This is an inspiring drawing and was the first ‘thing’ that we had in our hands. It was real!

Having gained the experience of building a 5" version Thomas was very quick to point out shortcomings and suggest alterations and compromises. One compromise being the grate area. The E 3/3 is – when all said and done – a shunting engine. It does not have a large firebox, indeed the boiler and grate are rather narrow. If we are to expect the finished machine to pull a 500 kg train up a 3% gradient 3000’ above sea level when it’s -10°C things will have to be modified. The workaround we have chosen is to extend the length of the grate into the footplate area an extra 20mm. This is not too noticeable as the cabin is very roomy.

The next problem to resolve was removal of the fire bars to drop the fire. The usual answer is to slide them out sideways or pull out through the cab above the floor. Sideways is not an option as the frame, wheels and steps are in the way. As the firebox reaches quite a way below the floor removal through the cab is only possible if we have a sloping grate. This option was ruled out due to anticipated firing problems. The solution which has been accepted by us and the boiler certification people is to remove the bars rearwards under the floor, the compromise being that the brake reservoir tank is in the way and has to be given a flat top.

These updates and others were returned for inclusion in the final set of drawings.

Getting Serious

The end of November 2005 saw further additions to our group with Sigi Leithinger and my son Urs joining our team. Urs is an apprentice at the SOB.... Are you getting the picture?

The finalised sets of drawings were passed to us from the SOB in January 2006 for the final checking. This point was the real commencement of the project, we had something in our hands and we were at the point where ordering and fabrication could begin.

To be continued

A REGULATOR CLOCK

By **Peter Heimann**

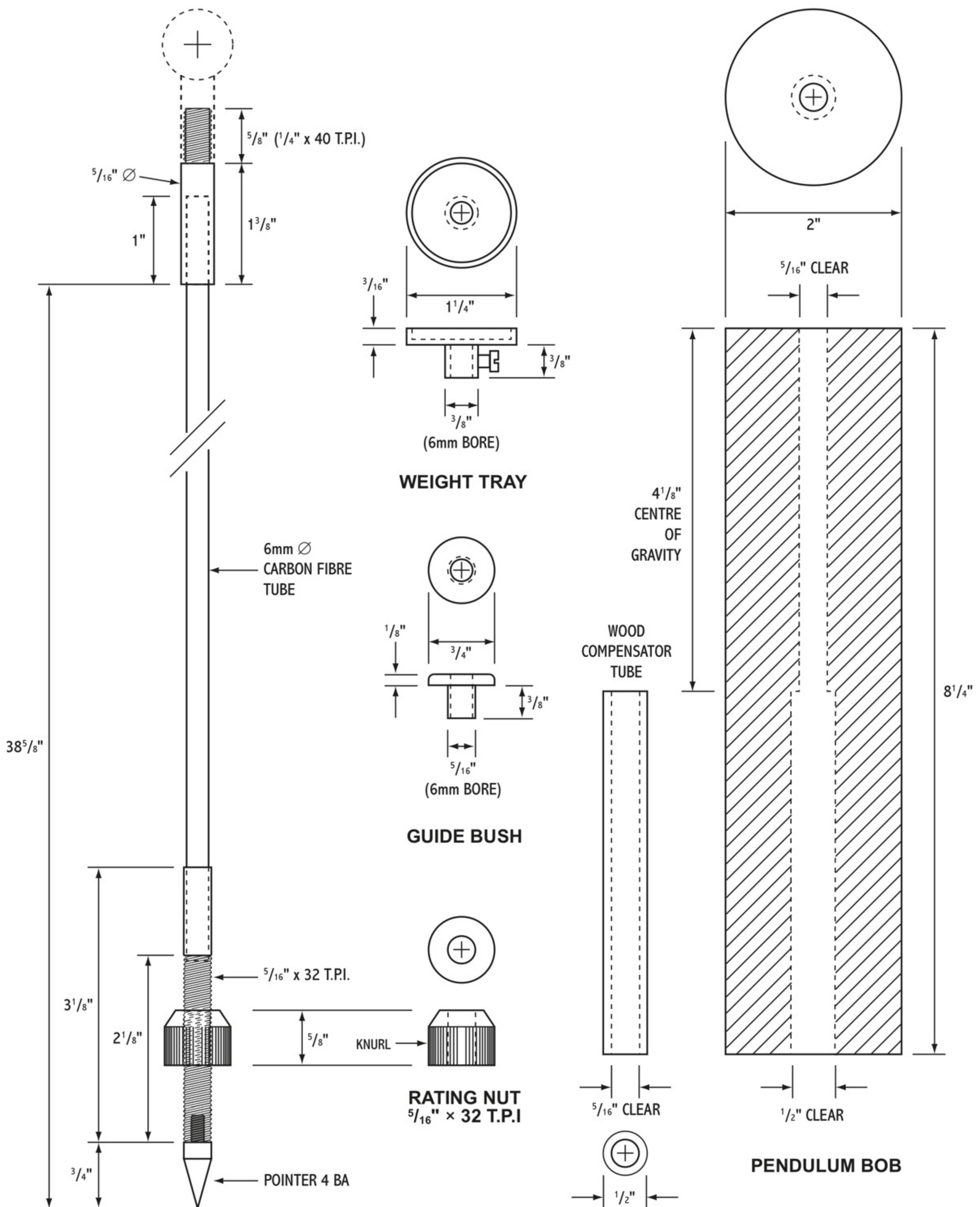
Continued from page 154, November 2009

PENDULUM

Photograph No. 29 shows the complete pendulum apart from the top-fitting.

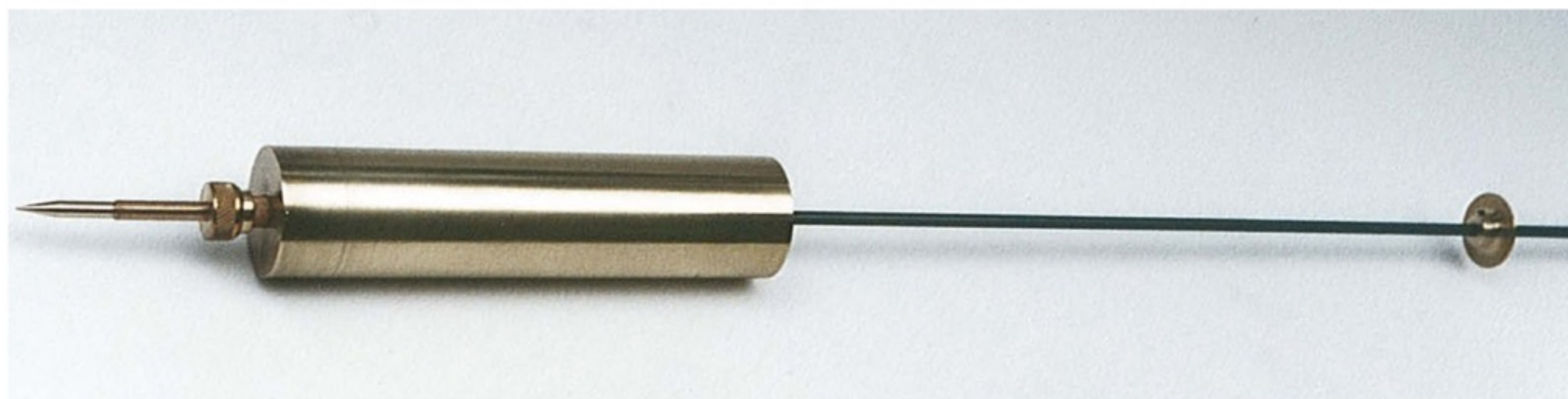
Drawing No. 14 gives all the dimensions. The BOB is 2" diameter brass or bronze, or indeed could be in steel if funds are stretched. It is supported at its centre of gravity by a hardwood compensating tube.

Expansion and contraction of the bob is thus cancelled out, and the compensator tube takes care of any other slight movement. The pendulum rod is a 6mm carbon fibre tube as listed at the beginning of the series.



DRAWING No. 14: PENDULUM COMPONENTS

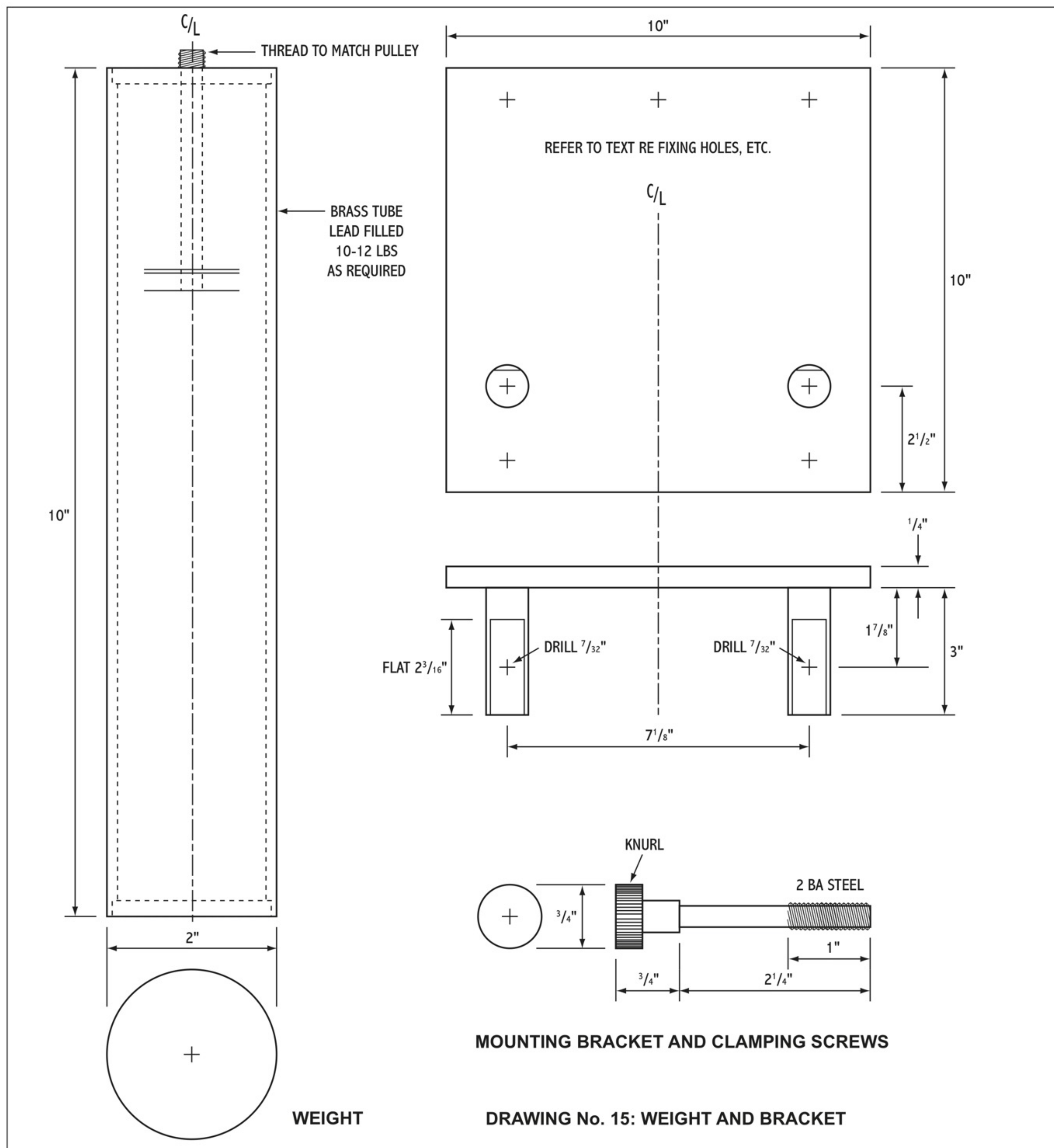
Photograph 29.



This material is remarkably stable and yet strong whilst retaining the necessary flexibility. It is also a great deal cheaper than the conventional Invar. Photograph No. 30 shows the top termination threaded $\frac{1}{4}" \times 40$ TPI, which fits into the pallet assembly

arm. Photograph No. 31 shows the bottom end as well as the other components. I found that a perfect fit for the carbon fibre rod in the $\frac{5}{16}"$ brass bar was achieved by progressively drilling 5.6mm, 5.7mm, and 5.8mm. However do experiment in case

of variation. Insert an approximately $1\frac{1}{4}"$ length of brass rod turned to fit into the bore of the tube. Rough the outside of the tube slightly and apply Araldite. When set drill and fit say two $\frac{1}{16}"$ silver steel pins right through at each end. Clean the outside





to be flush. However, first fit the adjustable weight tray and the bob guide bush on to the rod. There is no way of doing this after the ends have been fitted! The rod must be able to move freely, but not sloppily, within the guide bush. The same applies to the wood compensator tube in order for it to fulfil its function. The 32 TPI thread shown is my choice, but any similar thread can be used if more convenient. The surface

Left: Photograph 30.

Below: Photograph 31.



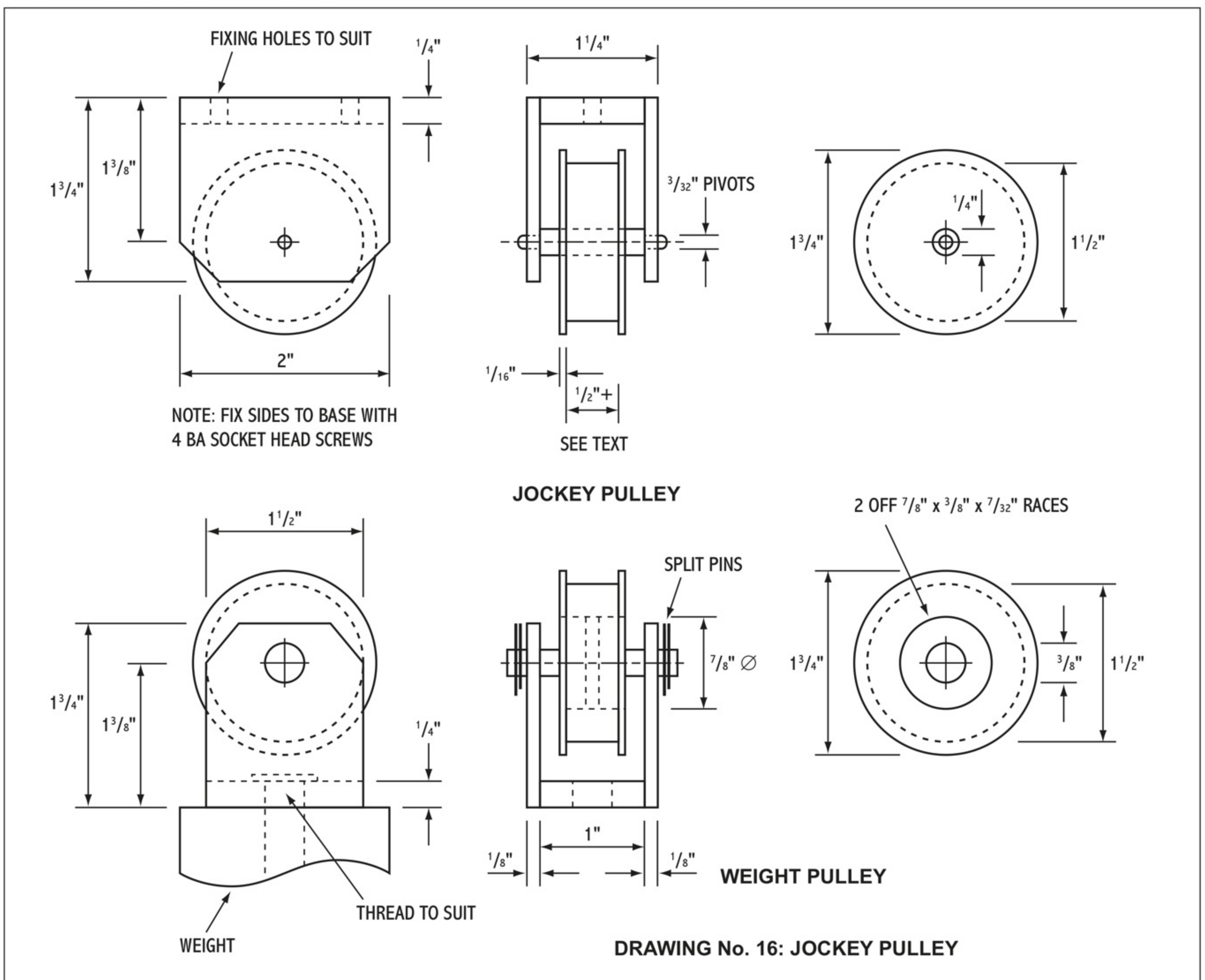
finish on the bob may be either fine turned or polished. Personally I prefer the turned effect. As this component is handled, I recommend giving it a coat or two of clear cellulose spray lacquer.

WEIGHT

The weight is shown on drawing No. 15. It consists of a 2" diameter lead-filled brass tube. A brass bottom is silver soldered in place. It is wise to form a centre in this, as it will then enable the finished weight to be cleaned up or polished very gently on the lathe. A threaded extension fitted with some sort of anchor is cast into the lead. Clearly the threaded end must be central, to allow a drilled top plate to be dropped on and soft soldered. Melting and pouring lead can be unpleasant. I now go to a local firm of lead fabricators and ask them to fill the shell for me. (The complete weight including pulley will be approximately 10 to 11 lbs).

The pulley is detailed on drawing No. 16. I like to fit a couple of ball-races because this component has to take the highest loading of all. The drawing will be self-explanatory. Remember to make the width of the spool between its end plates the same as that on the barrel sub-assembly, to allow for the flattening of the tape. Photograph No. 32 shows the complete item.

Continued on page 213



Marcle Steam Rally 2009

by John Arrowsmith

Once again, to the dismay of the organisers, the wonderful British weather intervened to seriously affect the normal smooth running of this long established Steam Rally. Torrential rainfall on the previous two days ensured that it was not possible to get a full complement of exhibitors and participants even on to the rally field, let alone have any sort of Main Ring program.

Those brave souls who did get there tried very hard to make the best of the extremely muddy conditions and put on a show in the best traditions of steam rallying. However, that is the bad news over, so what exhibits were on show to provide a decent display for visitors.

The model tent had a good range of exhibits from 7 $\frac{1}{4}$ " gauge locomotives to Match Stick models. The main external exhibits ranged from the mighty traction engines to demonstrations of Rural crafts, such as rustic pole making. Add to this the wide range of trade stands and craft displays plus the ubiquitous Can Can dancers, and you had a show with something for everyone. The one thing missing was any sort of display that involved moving

vehicles. The ground was just too wet to allow these programs to proceed, however as I said before it did not stop good crowds and in typical British style, they made the best of the attractions available to them.

The program listed thirty three engines in the Steam section but I think there was only ten who actually made it onto the rally field. They were in steam but could not move any distance so visitors had to just enjoy the sight and smell of the static engines as they quietly simmered in the sunshine between the showers.

Pride of place in the Best Engine competition went to the 1917 built 4 NHP Garrett Showman's Tractor 'Margaret' owned by Richard Hall. It was originally built for the Ministry of Munitions, but was sold to Harris of Ashington and converted to a Showman's Tractor in 1920. This was its first rally after a major rebuild and repaint. The Tractor was awarded the H.T.E. Tom Walker Perpetual Steam Engine Trophy, for the best engine on show. Among the other full size engines who managed to get onto the rally field was the immaculate looking Tasker, built in 1910 and called 'Will O the Wisp'. It is nominally a 4nhp type engine and is



'Little Audrey' the Davey Paxman traction engine circa 1911 owned by W.J.Dakin.

currently owned by Richard Willcox who bought it in 2008. Alongside this diminutive engine was the large Russian Fowler type TE2. Built in 1917 for the Russian Army it was never delivered – instead it was sold into civilian use in the UK. Nominally 8nhp it was sporting a traditional traction engine green livery instead of the more familiar Fowler Black. Owned now by David Williams.

Considering the ground conditions the 4nhp Type 4 CD Garrett Road Roller 'Baroness' built in 1921 and now owned by John Millington, looked very spick and span with its fine paintwork and polished brass. A regular visitor to this show is the Davey Paxman 'Little Audrey' 6nhp Traction Engine, built in 1911 is owned by W.J.Dakin.

The sole survivor of a batch of seven engines built by Gibbons & Robinson No 959 was built in 1890 and has had an extensive rebuild by Richard Hesbrook.

To contrast their big brothers, the selection of miniature traction engines and lorries provided a good variety for visitors to admire. It was



Above: Winner of the H.T.E Trophy for the best engine in show was this 1917 Garrett Showmans tractor owned by Richard Hall.

Left: The Garrett Road Roller 'Baroness' owned by John Millington.

Right: The 1910 built Tasker 'Little Giant' owned by Richard Willcox.



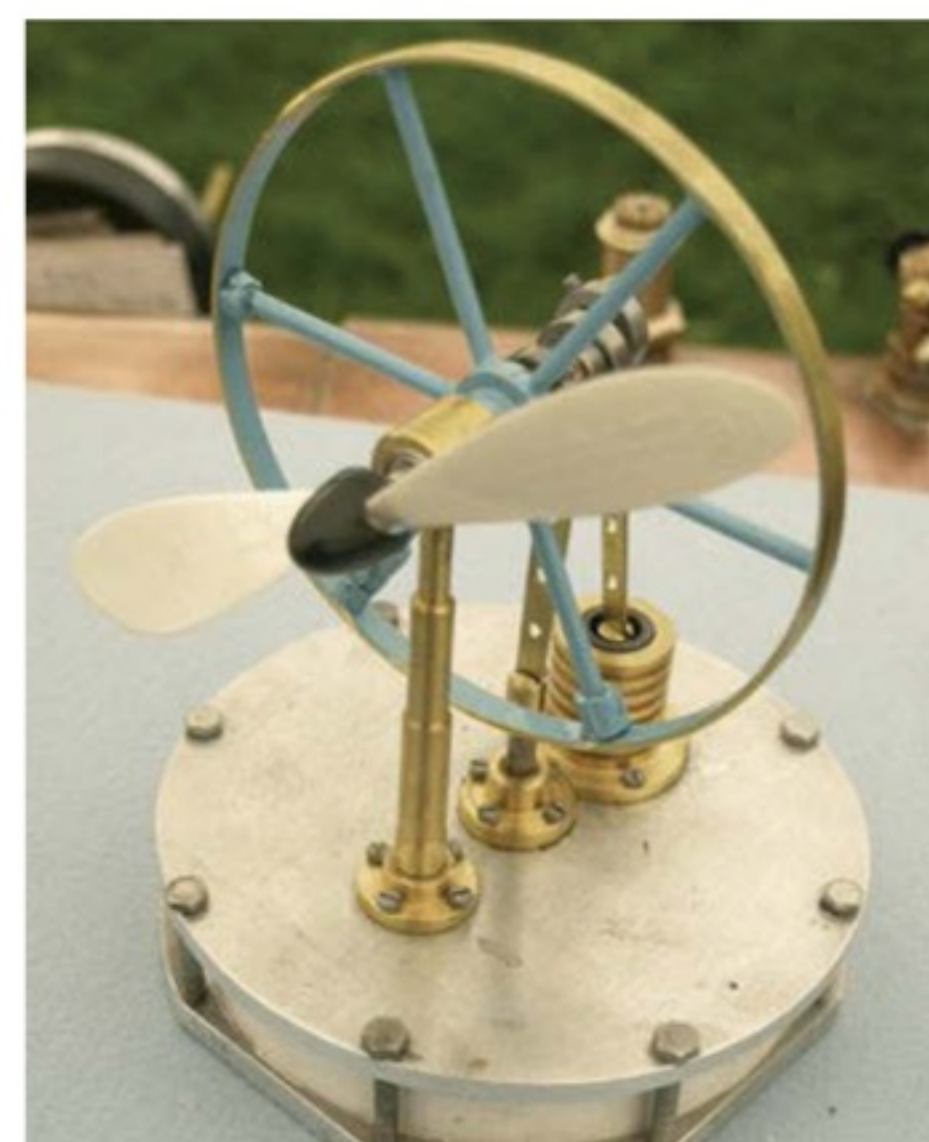
gratifying to see the number of young people involved with this section of the rally.

None more so than thirteen year old James Lilwall from Ross with a 4½" scale Burrell Traction Engine 'Sir Adrian'. This engine is reputed to be the second oldest in the country but James was extremely knowledgeable about this machine. He explained how he helps his Dad with the maintenance and how much he enjoys his involvement with steam. He is in fact a Steam Apprentice under the auspices of the National Traction Engine Trust, and proudly showed me the paperwork relating to this scheme of which he is a member. A delightful 1:3 scale chain driven Scammell

Below: Martin Peckham owns this very nice 4½" scale Foden Type C Steam Lorry.

James Lilwall with his 4½" scale Burrell traction engine.

of a Garrett. Bill a member of the Black Country Steamers is making a splendid job of the construction of this engine. It will be a superb piece of engineering when it is finished. Just note the standard of workmanship being shown in the building of the rear wheels – excellent. One of the larger scale locomotives on show was the Manning Wardle tank engine being built by Andy Stait from the Hereford Society. Also on display were two more 7¼" gauge engines from the same club – Chairman Stewart Read brought along his Thomas Two and



Above: Teifion Thomas from South Wales with his 1/3rd scale Scammell Chain Driven lorry unit.

Above: The little Hot Air Engine built by Stan Compton.

lorry circa 1941, built by Teifion Thomas was able to move over the wet ground and provided me with a good picture of this well built model. A fine freelance traction engine owned by Richard Cox from Bridgend was waiting for an attention as it had developed a crankshaft problem. There was also a very well built 4½" scale Foden 6 ton Type C steam lorry owned by Martin Peckham parading around on the drier parts of the site, which provided a pleasant site of steam in action.

The model tent provided a wide range of exhibits for visitors to enjoy and continuing with the traction engine theme was Bill Petts from the Black Country with his 1:3 scale model

Wally Sykes brought his version of a Santa Fe diesel engine. Wally also had his recently finished Clarkson 2" x 2" Vertical Steam engine with reversing gear on show. Stan Compton displayed a fine little Napoleonic Cannon built by the late Alf Tucker from Wanganui in New Zealand together with his ME designed Hot Air Engine.

In the process of being built by Nigel Linwood, was a Worden Tool and Cutter grinder, which should be a useful tool when completed. Nigel also had his 5" gauge Midland three plank wagon chassis on

display. From the Llanelli Club, Garth Mosey displayed his scratch built 16 ton steel coal wagon 7¼" gauge. The Guild of Model Wheelwrights had their usual comprehensive display of members' work. This compliments the steam rally very well as many of the wagons and implements displayed in model form would have been in use when their larger brothers were also in action. I particularly liked the British Army 9lb Napoleonic Field



Left: Andy Stait's 7¼" gauge Manning Wardle tank.



Right: Some of the detail work and castings for the Garrett by Bill Petts.

Gun and Limber in 1:10 scale built by Jim Allcock and its Ammunition wagon. A delightful two wheeled Bakers Van built by Brian Kerly in 1:10 scale also caught the eye. Among the many other entries in all the different classes from Classic cars to Stationary engines and organs was the fine little Lea Francis 1 LFS Classic Car belonging to Peter Whitehouse. It just stood out for me and with the open bonnet enabling the 'works' to be studied just provided that good contrast between steam and I/C machines.

Right: Brian Kerly's delightful little Bakers Van in 1:10th scale.



Above: The 'Worden' Mk 3 Cutter Grinder under construction by Nigel Linwood.



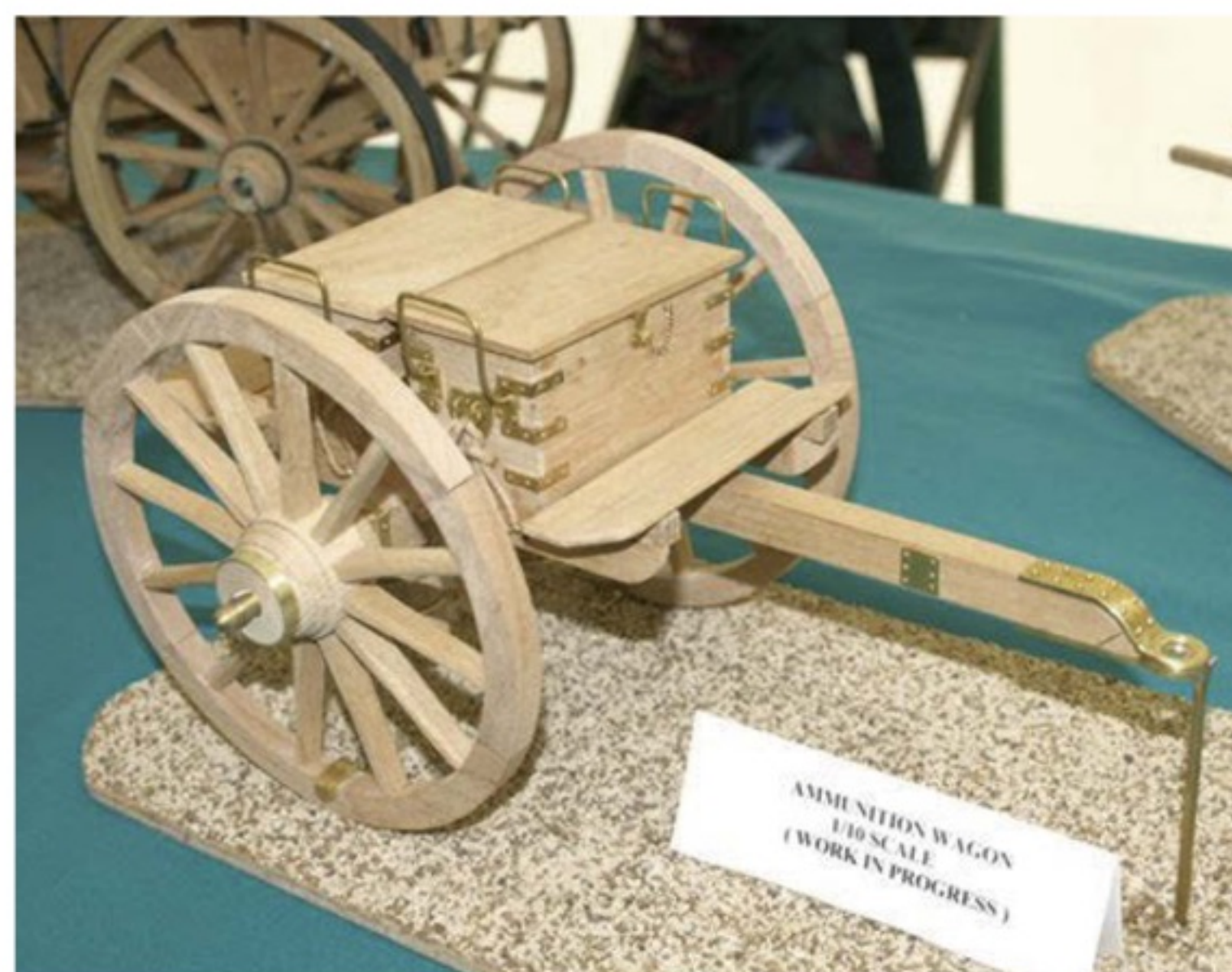
Above: A fine 7 1/4" gauge scratch built 16ton Coal Wagon built by Garth Mosey.

In concluding my notes on this show I have to thank all the entrants for making the effort to get there and for their good humour in the most adverse of ground conditions. The land owners and the organisers are to be congratulated as well for allowing the event to take place, and I'm sure every visitor enjoyed their day. Once again, I am sorry that not all exhibits can be acknowledged or described but rest assured they all contributed to a great show. ▲

Below: A British Army 9 Pounder Napoleonic Gun and Limber built by John Allcock in 1:10th scale.



Below: Work in progress on Brain Kerly's Ammunition Wagon in 1:10th scale.



Left: The 1927 Lea Francis Classic LF1 owned by Peter Whitehouse.



Right: Wally Sykes built this 7 1/4" gauge Santa Fe Diesel locomotive.

44767 – LMS Class 5 with STEPHENSON'S GEAR

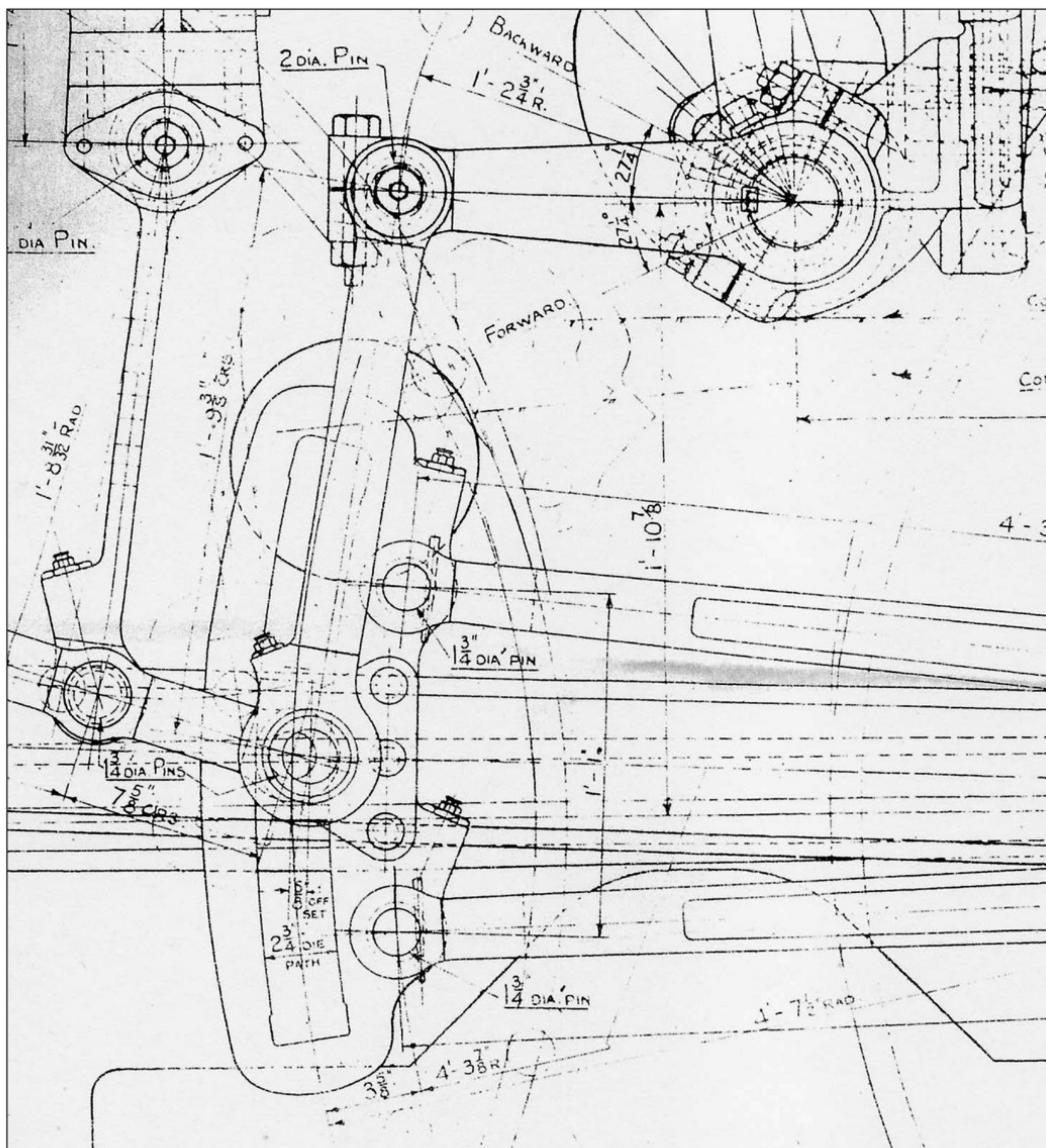
By Don Ashton

The ubiquitous Black Five provides as popular a model in all gauges as it performed in full size.

One of their number was designed with Stephenson's outside gear and little appears to be known as to the purpose of this exercise. It would be instructive to know what the official assessment of this gear was – the only comments of which I am aware are those of the drivers who liked the engine. The resultant figures in the official table of events must have taken a lot of time to evaluate. They are good results and it must have been clear even before she took to the road that these exceeded the event equality of the standard version.

One can perceive in the gear the (then) current LMS thinking, so it was not an attempt to equip a Class 5 with a Western gear and this sort of idea probably survives only as an over-enthusiastic locospotters' rumour. There appears to be some attempt to equate with the lead and exhaust characteristics of the Walschaerts' equivalent, maybe for comparison – LMS penchant for 200-300 thou lead and some exhaust clearance at this time shows clearly enough. It would require a new generation to supplant this sort of thinking, whatever was happening on other railways.

Unusually, the drawing displays a lot of dimensioning. The eccentric throw and advance angle lay out precisely the centres, yet these are confirmed by some superfluous trigonometry in four decimal places! CAD indeed proves it. Beyond that, the neat gear is perfectly conventional, employing a double return crank. The weighshaft position is exactly that of the other Class Fives so the gear size has been built around this(!) and its nominal sizes therefore reflect the GW layouts but without the rocker arm differences, hence the whole travel is derived from the gear itself. That is reflected in the 27.25° angle of the full gear lifting arms, where 25° suffices on the Western. The swing of the lifting link is not symmetrical around a vertical (1 in 24) meridian and lays open to question the suspension offset of $5/8$ ths, though this is not critical – more does it point to a shorter than optimum lifting arm



DETAILS OF THE PROTOTYPE EXPANSION LINK AND SUSPENSION ARRANGEMENT

length, as the lifting link should ideally be vertical at the half stroke for the offset to take proper effect.

The two hangers which carry the motion from dieblock to valve rod transfer the travel to the upper plane in similar fashion to the GW arrangement and have perceptively little effect even though the first hanger is ahead, and not in line with dieblock – it occasions a very small dieslip of little consequence in practice. It does, however, require a little interpretation in drawing out. If the extension bar is started at the dieblock centre and produced through the first hanger point it does not reach the elevation of the valve rod. Aligning the rod between the two hanger arcs places

the dieblock a fraction below its central position to equalise the dieslip about that centre through a cycle of the gear. The draughtsman casually ignores this (frequently done on motion drawings but impossible using CAD) perhaps wisely, as one can tie oneself in unwarranted knots with this sort of thing – unwarranted because the cause and effect are not of import. Oddly, one of the hanger pivots is dimensioned partly through the 1 in 24 gear inclination and partly through the frame horizontal.

Placing the valve centrally over the ports reveals a lap of 1.4375" and an exhaust clearance of $1/16$ th. From the eccentric advance there is a nominal positive lead of 0.1075", increasing to just over $3/8$ ths

LMS 44767 Cut offs			REVERSER ANGLE 27.25°		
FOREGEAR			BACKGEAR		
FWD	BACK	DIFF%	FWD	BACK	DIFF%
79.84	78.43	1.41	78.50	78.51	-0.01
76.30	75.04	1.26	74.64	74.49	0.15
72.00	70.94	1.06	69.97	69.62	0.35
66.75	65.99	0.76	64.32	63.73	0.59
60.37	59.99	0.38	57.55	56.65	0.90
52.69	52.80	-0.11	49.60	48.31	1.29
43.78	44.35	-0.57	42.72	38.91	3.81
34.14	34.92	-0.78	31.57	29.20	2.37
24.84	25.42	-0.58	23.08	20.29	2.79
17.01	17.08	-0.07	16.05	13.21	2.84
11.08	10.77	0.31	10.76	8.20	2.56

THE TABLE OF CUT-OFFS AND CORRESPONDING EVENT DIAGRAM IN THE AS BUILT CONDITION

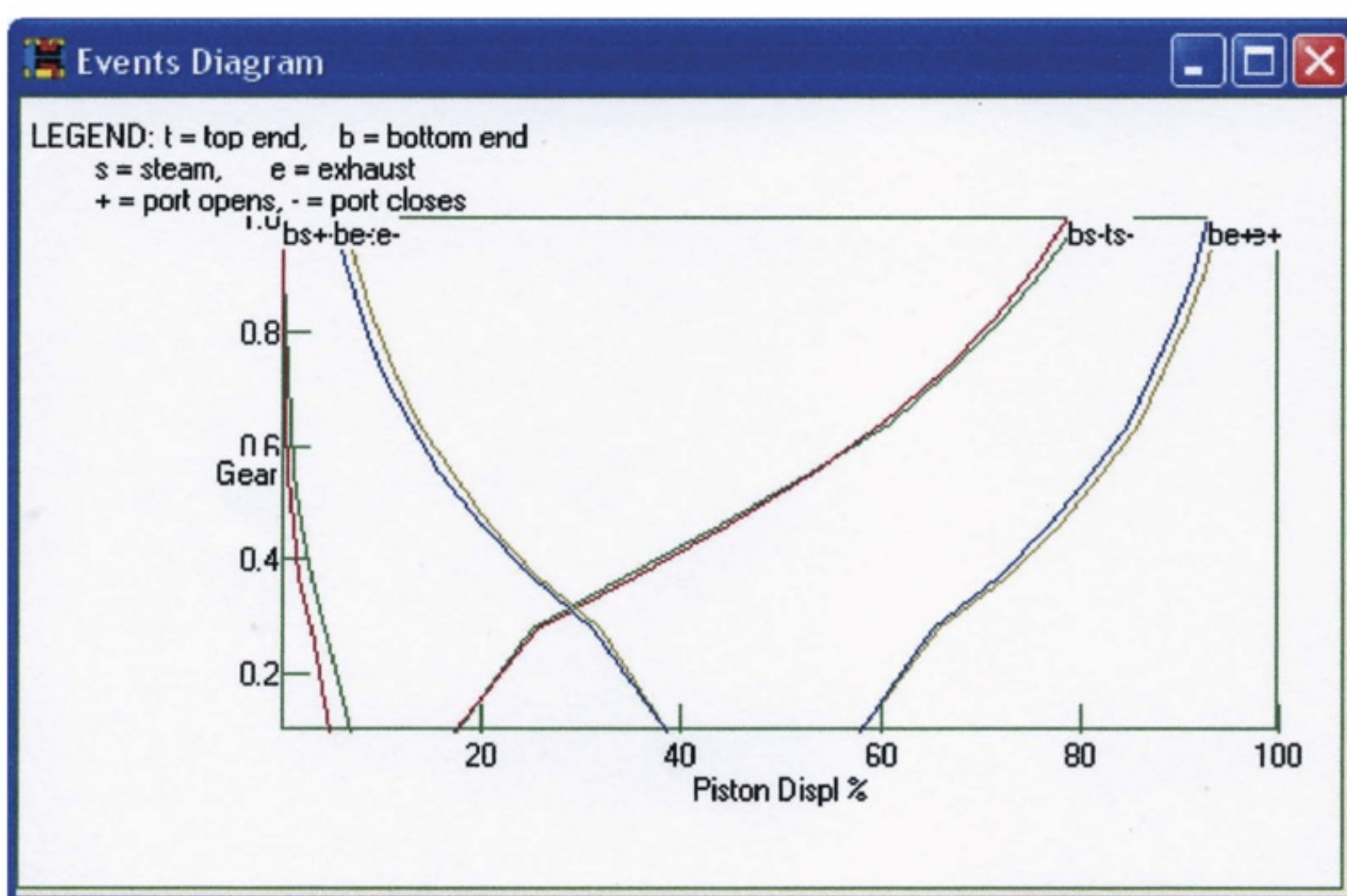
in mid gear. On simulation this reveals very heavy preadmission in comparison to the GWR gears. End clearance of the piston, at 5/16ths, is little different to the GWR standard and one wonders whether the cushioning is rather overdone. Judging from indicator diagrams the GWR gauged the preadmission pressures rather well by applying negative lead in full gear. With the simulator valve set to favour the best events the leads appear a little more disparate than the official table results and both the events and cut off tables for this simulation are illustrated herewith. The events graph clearly shows clean events, but with exhaust symmetry slightly to the left, and the disparate leads and overbearing preadmission are prominent in the left hand corner. The good basic quality in the design of the gear is apparent from the almost overlapping event curves and this is a sure sign of intuitive design.

The cut off table follows the results expected from the graph and the release figures are also good, though the release at 25% cut off does not better Willie Pearce's (GWR) 65% penchant of the early 1930s. By 1947 we could have expected this to be much nearer 70%. The preadmission is a worry as this does not feature in the official table in order to draw one's attention to the large amount, except perhaps through the expansion columns. It is certainly enough to cause problems in a model. By comparison, the Walschaerts' gear of the regular Class 5's produced considerably

less preadmission at 25% cut off, where the release approached some 69%. With regard to performance this may well be splitting hairs, and we are more concerned here with the excellent potential of Stephenson's gear and the minutiae of the design that can achieve the optimum results.

As expected, the simulation does not entirely reproduce the official figures but the resemblance and characteristics are identical. This is to be expected because the simulation produces a geometry without bearing clearances. Both are sourced by different means, though congruence is satisfied.

To experiment I made minimal alterations to the gear as follows. To make the lifting link's excursions more symmetrical I increased the length of the lifting arm by 1.75" and the suspension offset to 7/8ths. This resulted in the necessity of no more than a 24° angle of the lifting arm for full gear. The valve was altered to sit line-in-line with an increased lap of 1.5625" and reset accordingly. Other than the latter modification, nothing specific has yet been carried out to curb the preadmission, yet already the percentage at 20% cut off has been shaved considerably and the leads equalised. A new graph for events shows the achievements due to minor things which could readily have been diagnosed at the design stage, unless perhaps, the method of producing the events tabulation persuaded otherwise. As a 'bonus' the exhaust symmetry has improved noticeably.



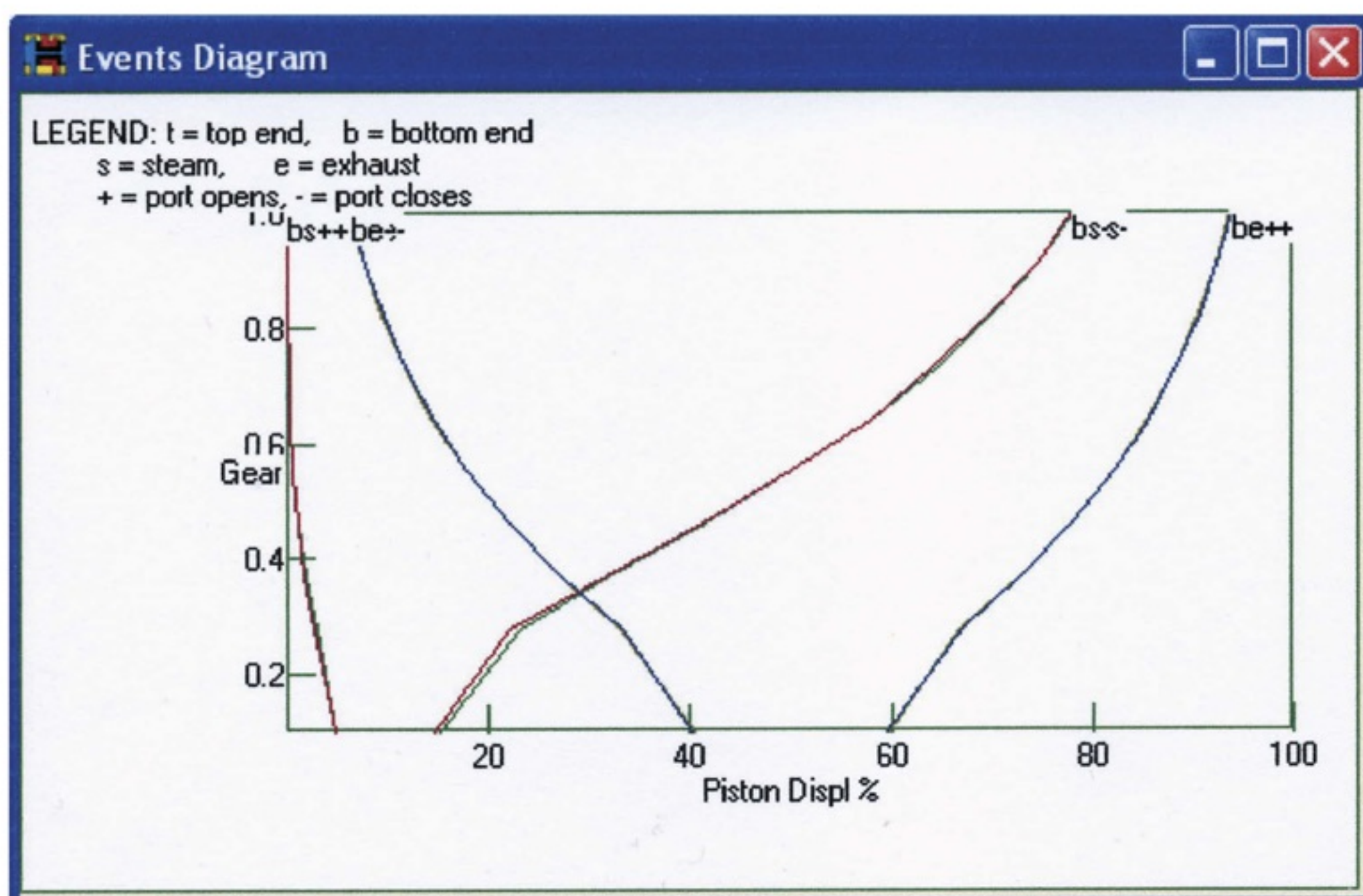
These figures are well within those of the official table and could even be improved to take account of the piston rod in the rear cylinder half. They prove out the efficacy of providing the correct suspension offset in combination with the more symmetrical lifting link excursions. The reduced reverser angle supplies full gear without yielding to large swings.

Neither the LMS nor the GWR seemed to be aware that the leads of Stephenson's gear can be equalised over the reverser's range by a small addition to the length of the eccentric rods, which centralises the difference between the open length (horizontal) at one dead centre and the reduced crossed length at the other.

It has to be said in conclusion that it is doubtful that better performance would be detected – it is merely an exercise in correcting the minor issues in the original gear and striving for the best results obtainable from that gear. The initial remit still holds. In the light of a further 50 years of study the original remit would change and a better performance could be obtained, yet the symmetry of the gear could hardly be bettered, and remains better than a Walschaerts' gear would display. For a model the eccentric angle of advance should be lessened slightly to bring down the compression levels at the shorter cut offs so that we can dash along the track with impunity. Big sister currently resides on the North Yorkshire Moors railway awaiting overhaul. ▲

THE TABLE OF CUT-OFFS AND EVENT DIAGRAM REPEATED WITH THE CHANGES DESCRIBED

LMS 44767 Modified Cut offs			REVERSER ANGLE 24°		
FOREGEAR			BACKGEAR		
FWD	BACK	DIFF%	FWD	BACK	DIFF%
78.06	77.55	0.51	76.49	75.44	1.05
74.27	73.85	0.42	72.07	71.12	0.95
69.71	69.4	0.31	67.09	65.98	1.11
64.23	64.02	0.21	61.09	59.87	1.22
57.67	57.52	0.15	53.91	52.69	1.22
49.93	49.78	0.15	45.55	44.50	1.05
41.10	40.85	0.25	36.33	35.63	0.70
31.70	31.22	0.48	27.08	26.78	0.30
22.73	22.03	0.70	18.87	18.82	0.05
15.24	14.45	0.79	12.42	12.46	-0.04
9.71	9.00	0.71	7.86	7.88	-0.02



GOLD, SILVER & BLACK DIAMONDS

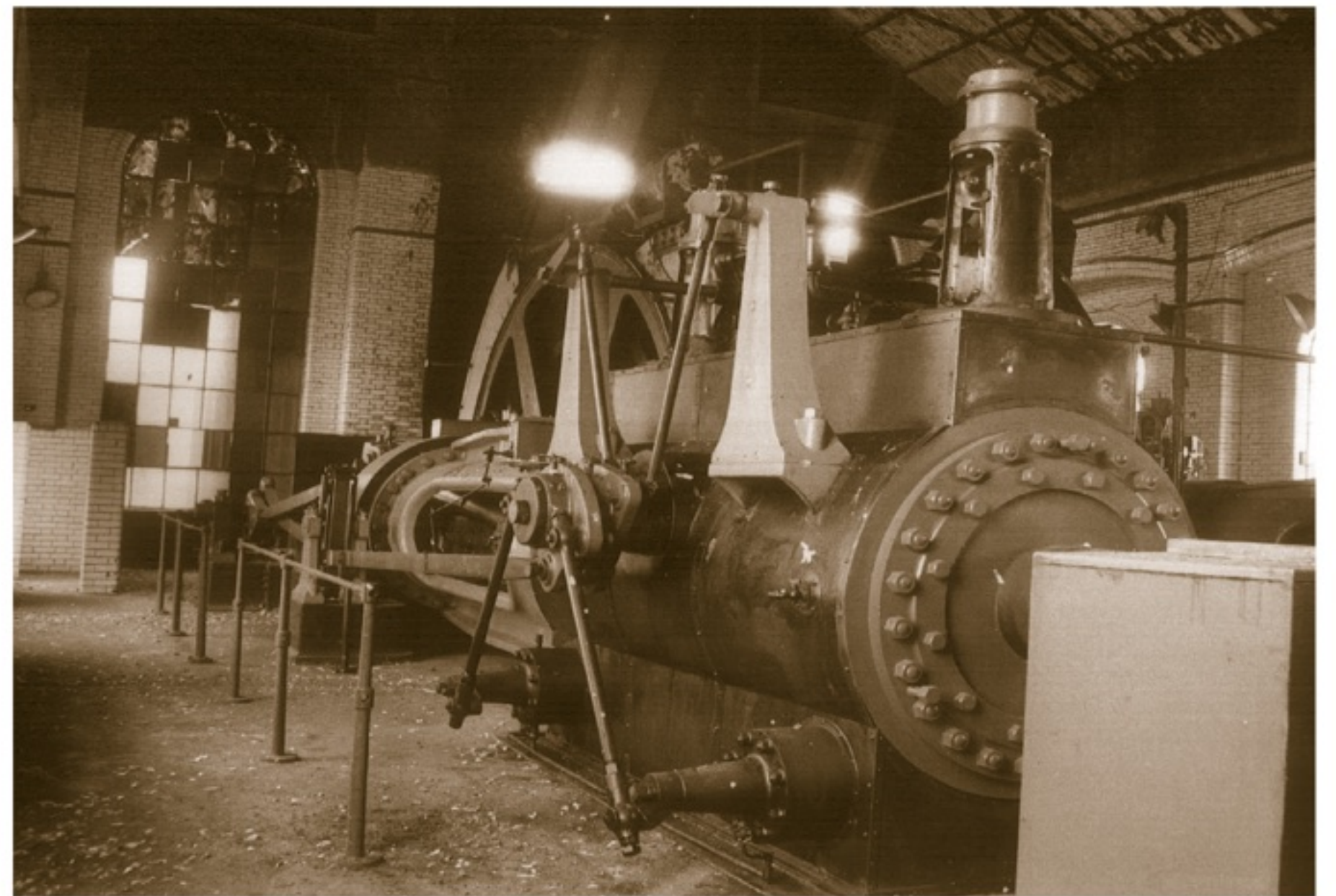
By Geoff Hayes

Continued from page 161, November 2009

Chatterley Whitfield Colliery at Tunstall, Staffordshire, had something of a reputation for being in the forefront of colliery engineering and also for the quality of its coal. A powerful twin cylinder winding engine, although far from the largest in the UK, was installed at the Hesketh shaft in 1914. Built by the Worsley Mesnes Ironworks, Wigan, the engine incorporated the latest features of that company's design.

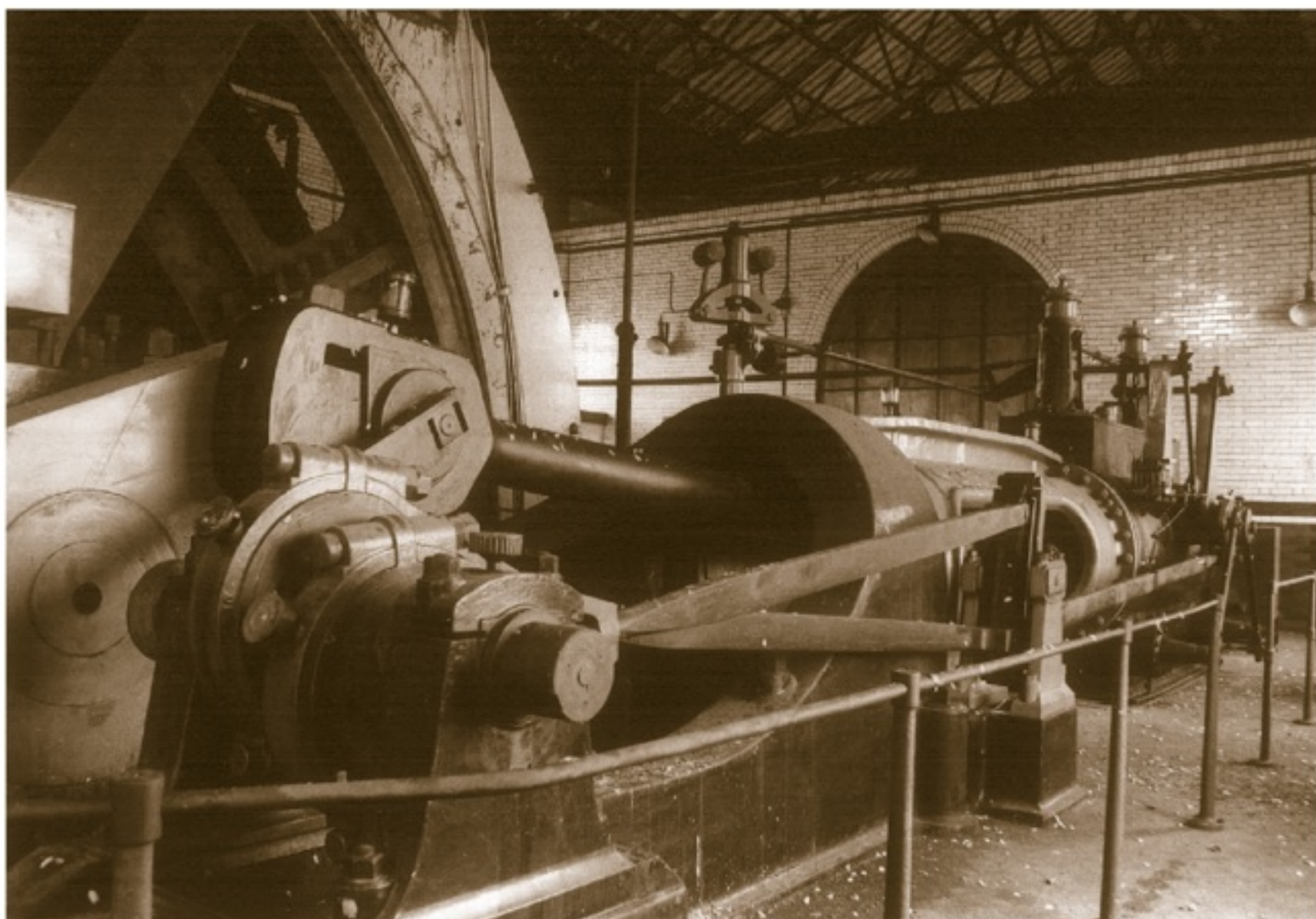
Winding from a depth of 640 yards, a bi-cylindro-conical winding drum was provided, 14 feet to 20 feet diameter, the winding rope being 1¾ inches diameter locked coil pattern. The cylinders were 36 inches bore and 72 inches stroke, the pistons being fitted with tail rods. Inlet drop valves and Corliss exhaust valves were provided, the valves being worked by linkage from a wrist plate which in turn was operated by Gooch link motion.

Left hand side of the Worsley Mesnes winding engine at the Hesketh Pit of Chatterley Whitfield Colliery.

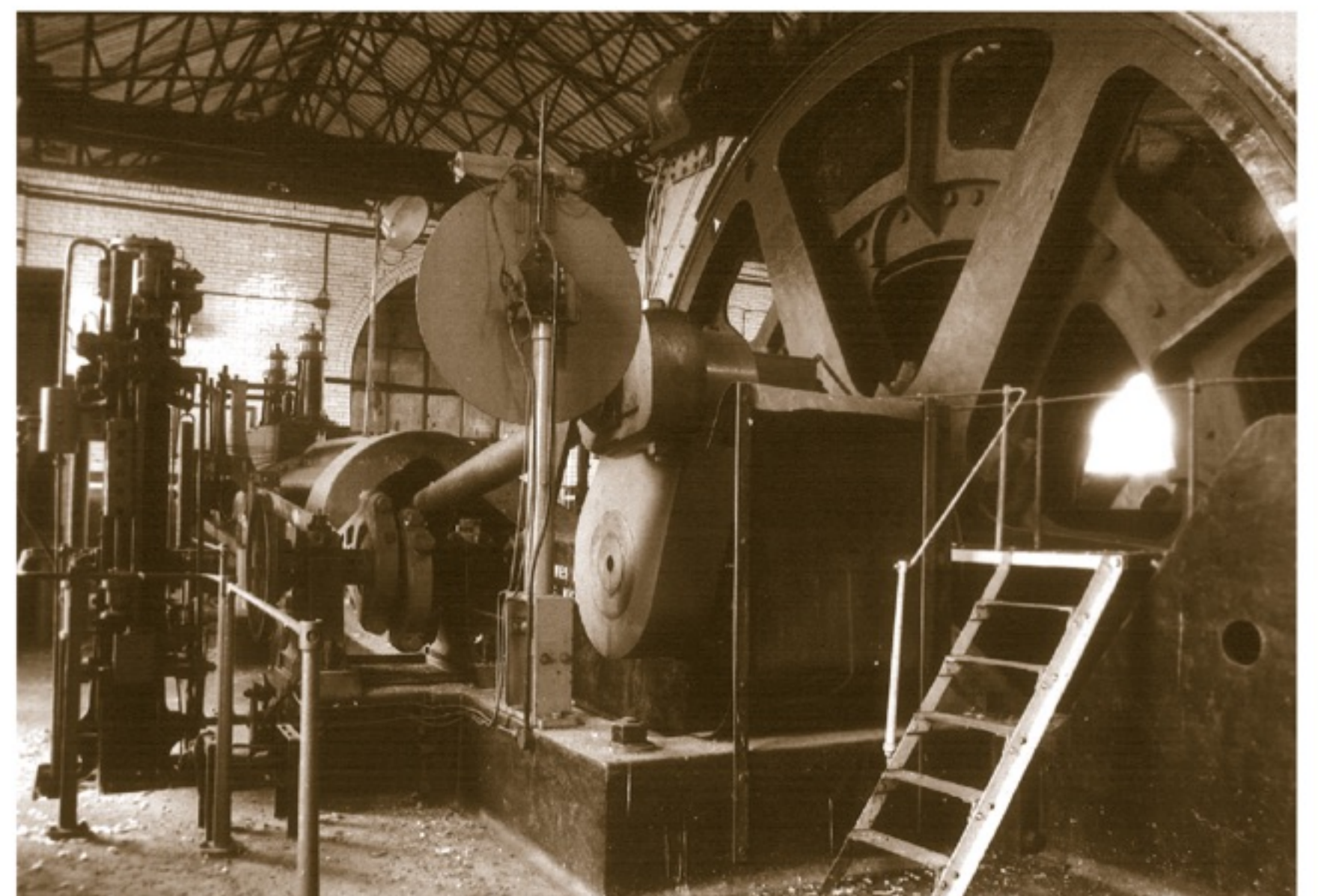


Unlike the Cefn Coed engine, the valve gear was on the outside of the engine, the eccentrics of the Gooch link motion being mounted on outboard shafts driven by drag

links from the main crankpins. A spring loaded governor actuated the trip gear of the admission drop valves.

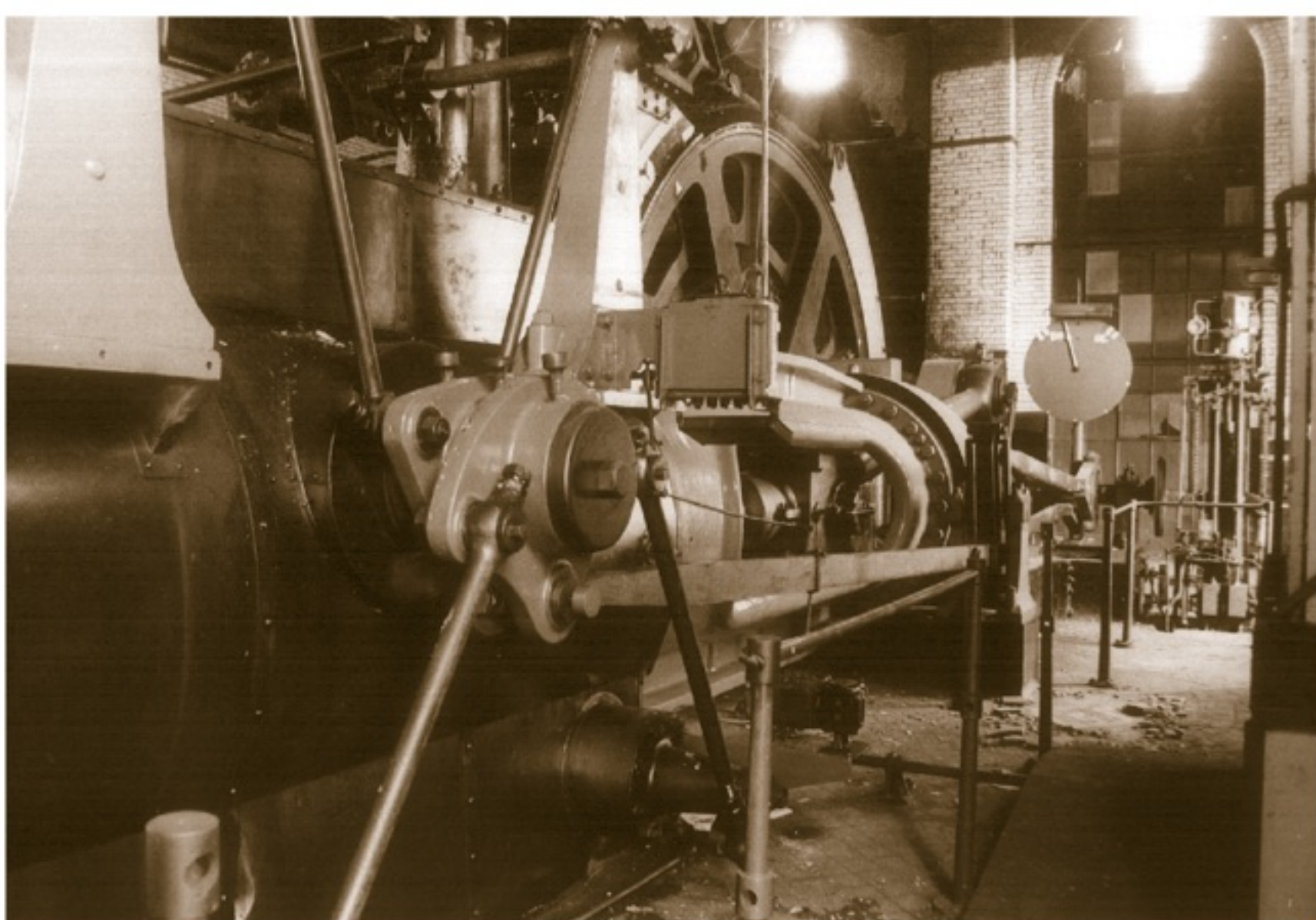


Above: View of the Hesketh Pit left hand engine showing the outboard shaft carrying the eccentrics for the Gooch link motion. Also visible is the governor for controlling the trip gear.

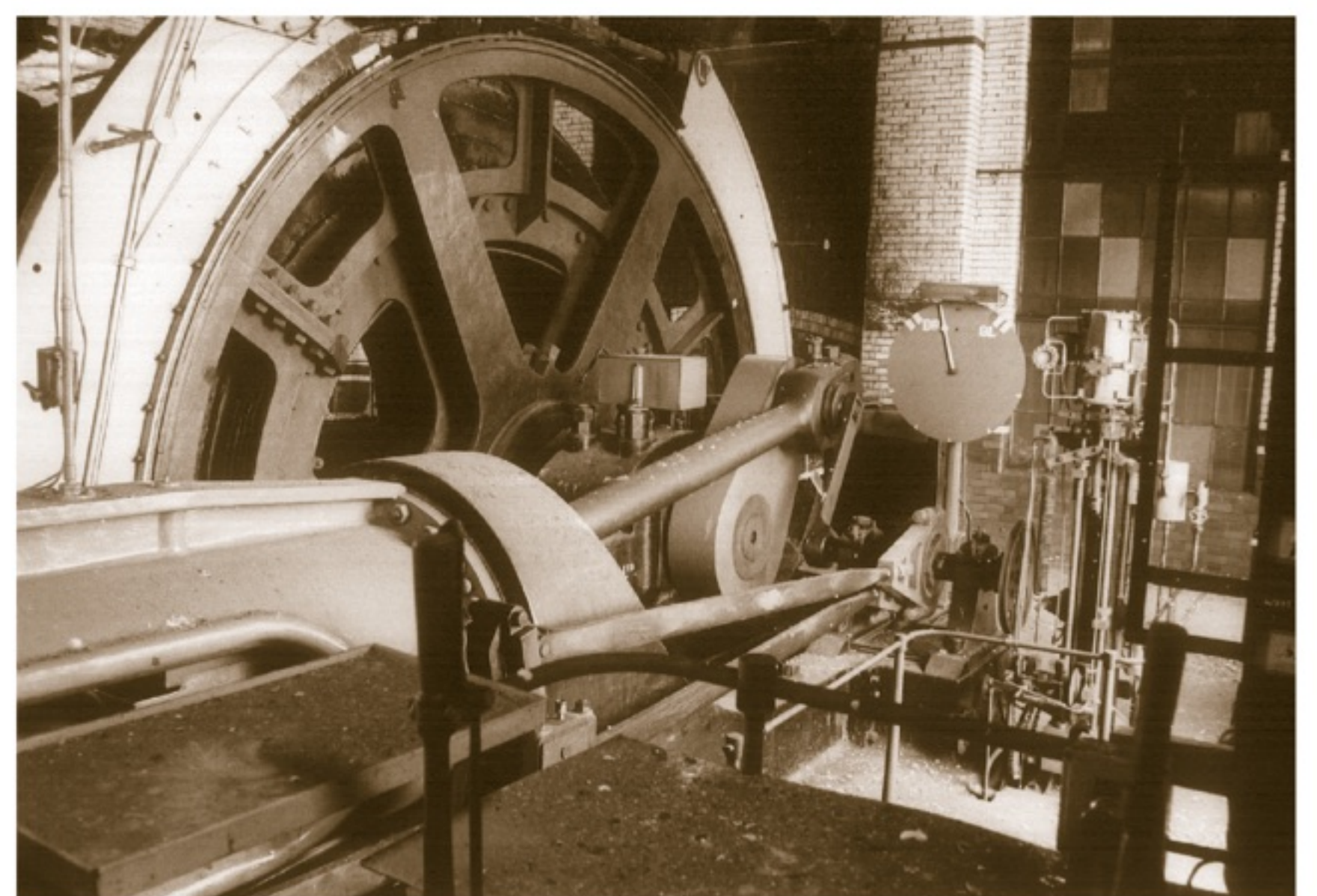


Above: Crank end view of the Hesketh Pit engine showing the winding drum and a glimpse of the brake gear.

Below: Right hand engine at the Hesketh Pit showing the wrist plate and valve gear linkage.



Below: Driver's eye view of the Hesketh Pit engine showing the winding depth indicator and the Melling's pneumatic controller standing alongside.



Structurally, the engine was of very heavy construction with Mammoth bedplates incorporating trunk crosshead guides. Caliper brakes operated on the winding drum, these being Andrew Barclay type, probably 1950's replacements for post brakes. Other auxiliaries were Melling's reversing engine and pneumatic overwind/

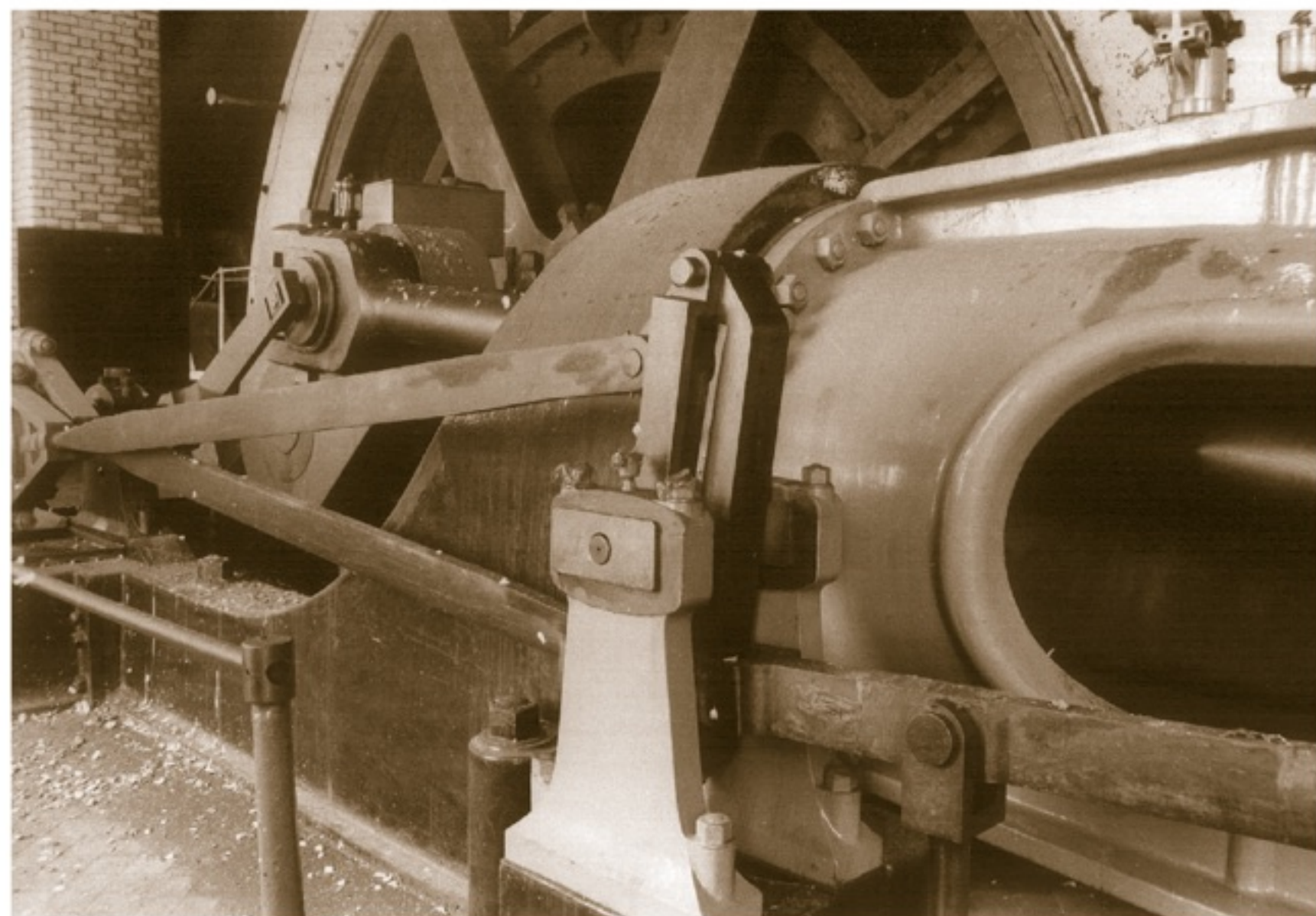
overspeed controller.

Steam was provided for the colliery by a range of ten very large Lancashire boilers. These were 10 feet diameter and were made in 1938 by Foster, Yates & Thom of Blackburn. This firm was an amalgamation of James Foster of Preston and Yates & Thom of Blackburn. Working pressure

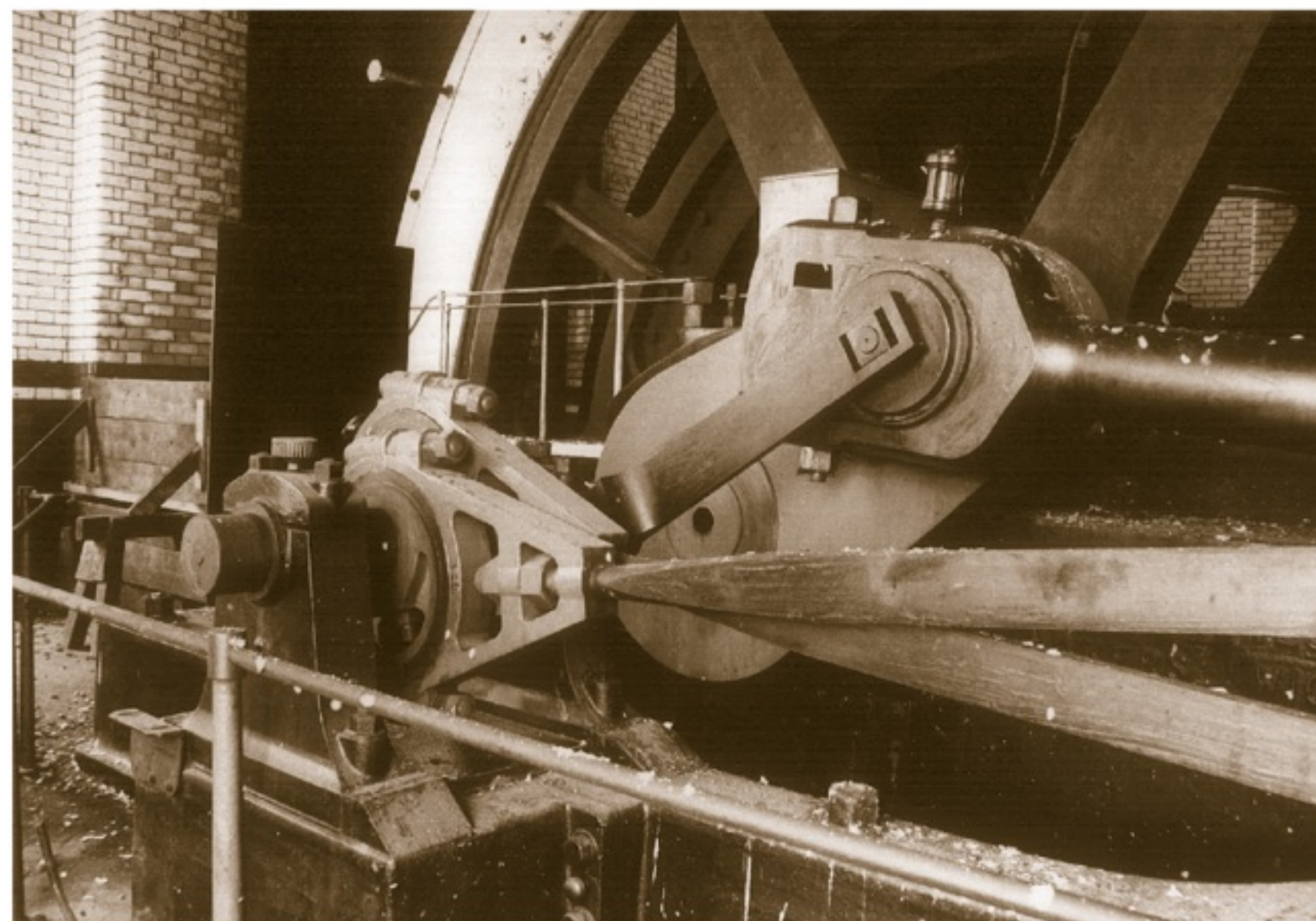
was 200 psi. Originally the boilers were fitted for burning pulverised coal but this equipment was later replaced by chain grate mechanical stokers. Latterly two boilers were fitted for burning methane.

To be continued

Detail view of the Gooch link motion on the Hesketh Pit winding engine.



Eccentrics, outboard shaft and drag link, Hesketh Pit winding engine.



A REGULATOR CLOCK by Peter Heimann

Continued from page 206

Whilst you are producing this pulley, you may find it convenient to also make the Jockey pulley shown on the same drawing No. 16. (This item will be fitted to the inside of the top of the wood case). The spool is the same size as the first one, but unless you wish, there is no need for ball-races. Fixing



holes in the base should be suitable for No. 10 countersunk head wood screws. On both items the side plates should be fixed to the $\frac{1}{4}$ " steel base plates with 2BA or similar socket head screws.

(The author has advised that the weight may be made only 9" long – Ed.)

MOUNTING BRACKET

This item is also detailed on drawing No. 15 and pictured on photograph No. 33. You will notice an angle top rail on the picture, which please ignore. I used this to support a dust-cover, when running the clock on test for a considerable time. The main essential for the bracket is absolute rigidity – $\frac{1}{4}$ " thick aluminium would be ideal, or of course mild steel plate. I happened to have some $\frac{3}{8}$ " hard plastic material available and so used that. The two support bars in my case are $1\frac{1}{8}$ " diameter aluminium, top surface ends slightly flattened, and obviously drilled for the clamping screws. The profile of these supports can equally

well be rectangular. The important point is that they are very firmly fixed with screws through the main plate from the back.

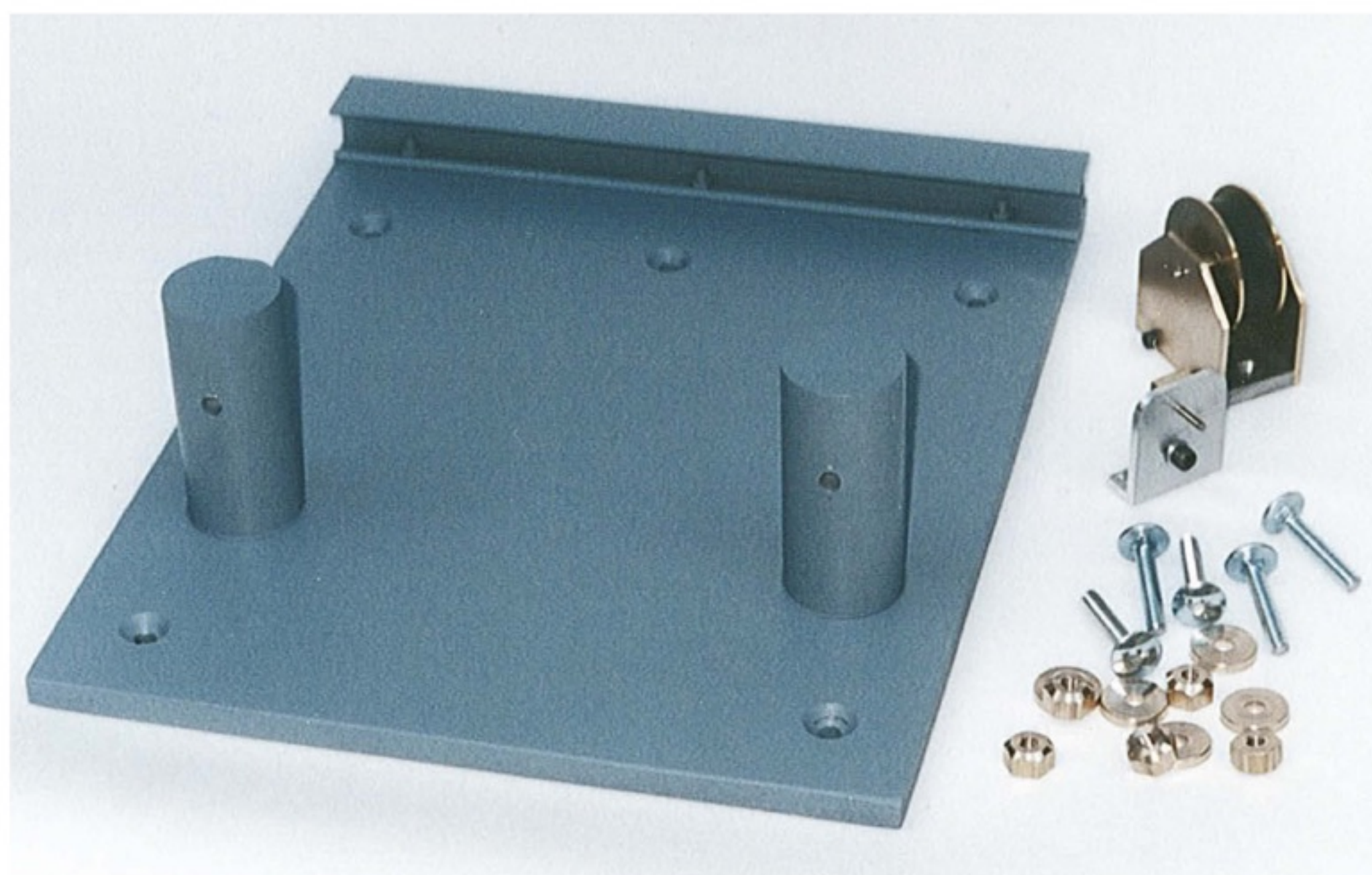
You will note that five fixing holes are specified. Assuming that 6mm coach bolts are used, the 6mm centre hole in the top acts as a fulcrum. The remaining two top holes can be $\frac{3}{8}$ " diameter and the two bottom holes are $\frac{1}{2}$ ". The bolts will be fitted at centres. This arrangement will allow the complete movement to be slightly tilted, but only by a merest whisker, to assist setting into beat. The steel coach bolts are equipped with nicely turned brass washers and brass hexagon nuts.

The assembly is primed and spray painted to choice. I used a matt grey finish, but matt black also looks the part. Eventually the bracket will be fitted to the back of the wood case, but it could with advantage be fixed somewhere convenient now, to enable the movement to be test-run on it.

To be continued

Left: Photograph 32.

Below: Photograph 33.





Dear Sir,

I read, with interest, the article "Regrounding End Mills Using a Bench Grinder" by Jim Winrow and the Editors' safety note. On the subject of safety I would further submit the following points:

1. The flange and nut of the wheel arbor shown should be at least $\frac{1}{3}$ rd of

the grinding wheel diameter (when new), should be of equal diameter, and recessed as shown in the sketch below.

2. The wheel arbor and nut should be made from a material having adequate strength (preferably steel – certainly not cast iron).

3. The screw thread on the wheel arbor and nut should be the same 'hand' as the end

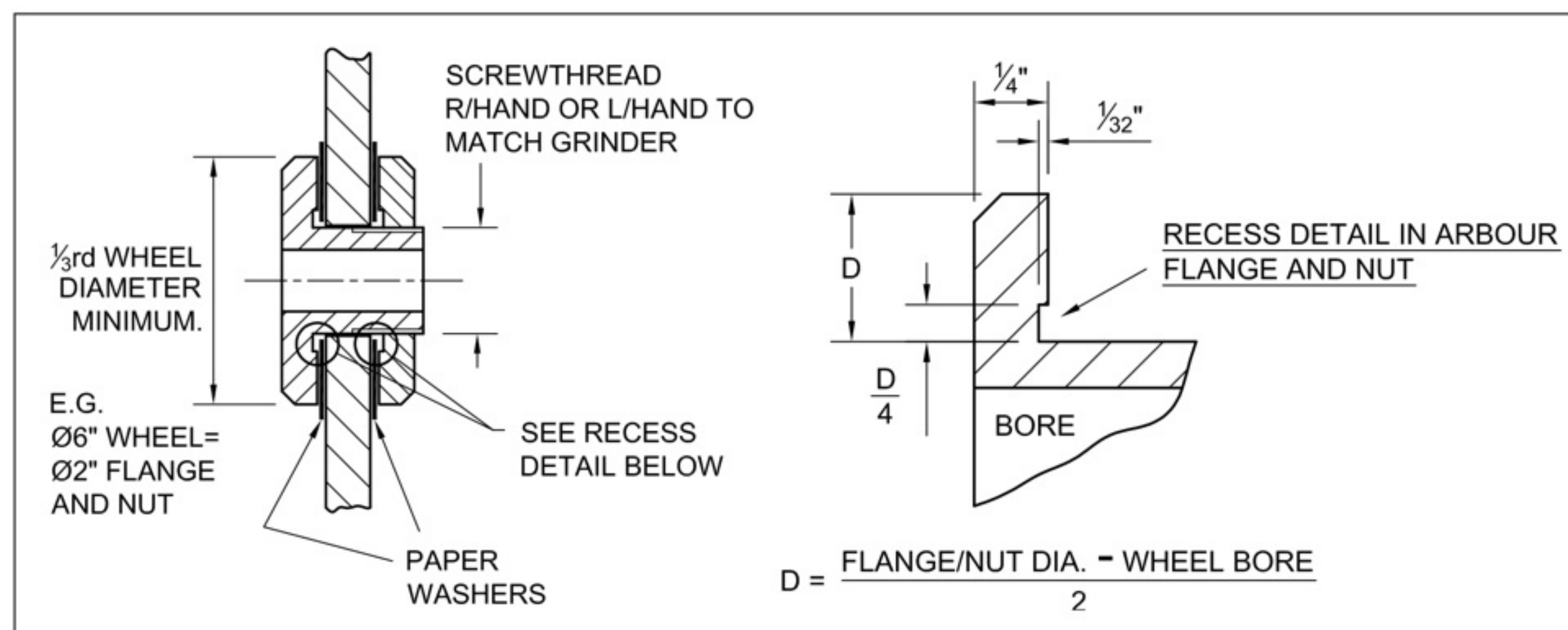
of the grinding machine on which it is to be mounted. Off hand bench grinders usually have left and right hand threads at opposite ends of the spindle – the nuts then tighten in the opposite direction to wheel rotation.

4. Paper washers (known as 'blotters' in grinding wheel 'parlance') are fitted to both sides of the new wheels. They are marked with all the relevant data to the wheel including the maximum rpm at which the wheel should be operated. These should be left on the wheel when it is fitted onto the arbor. The grinding machine operating speed (usually marked on the makers' plate) should always be less than that of the wheel.

5. Never operate a grinder without all wheel guards and tool rests (maximum gap between wheel and rest $\frac{1}{8}$ ") securely fitted.

Finally it is probably worth mentioning that new end mills and slot drills have about 2° of 'dish' as standard.

Jim Mayer, Derbyshire



YOUNG ENGINEERS

By John Arrowsmith

I am amazed that twelve months have passed since the introduction of the Young Engineers section in EIM. It has been pleasing to read about the activities of younger model engineers and the pleasure they seem to derive from such a great hobby. All clubs want to see their memberships enhanced by young people and some are actively encouraging them to get involved in many different ways. This can only be good for the hobby and I hope over the next year that even more young people get involved. Even the government seem to have woken up to the fact that the country as a whole needs young engineers, never mind model engineering.

The $7\frac{1}{4}$ " Gauge Society promoted a new scheme at their 2008 AGM both for their members and other clubs to consider, to try and push this momentum even more. I can do no better than print the first part of a short article written by Rex Mountfield on the introduction of the $7\frac{1}{4}$ " scheme to the Little Orchard Railway and the interest it generated.

Steam oil in the blood

by Rex Mounfield

The $7\frac{1}{4}$ Inch Gauge Society's new proficiency scheme is not just for the younger members of the family.

Some of my first memories are of standing with my dear old Mum, on the footbridge near Chingford railway station and waiting for the steam engines to come underneath us. We would breathe in the smell of the smoke. I used to love that almost sweet smell and the fact that the footbridge offered protection from the actual blast

as the train went past so that we were in danger but at the same time perfectly safe. Sometimes the bridge would hold onto some smoke and let it leak slowly through the gaps between the planks after the train had gone, to ensure we gained a full size fix of steam oil. Not that I knew about steam oil, or anything else about railways then, but I loved them just the same.

Another early memory I have is queuing up to give a thrup'ny bit in exchange for a ticket to ride on the miniature railway at the Ridgeway Park, Chingford. We were usually there on a Bank Holiday Monday. My Dad would save these magical little coins for me out of his pocket change all year and whilst they lasted, I would ride on the train. The part that I enjoyed just as much as the ride was when there was a change of engine. I would lean over the fence looking at these hot steaming engines and take great breaths of the fumes as they smelt as lovely as being on the footbridge.

I'm certain in my mind that it is these early memories and their placement of steam oil in my blood which brought me, in my late forties, back to the hobby of miniature railways and so I joined the ' $7\frac{1}{4}$ Inch Gauge Society'. That means that the gap between the rails on our miniature railways is $7\frac{1}{4}$ " wide.

Of course there are no bridges worth standing on now, well certainly not on the main line where the stench of diesel fumes is much more

likely to assail your nostrils, and you can get that by standing by the roadside.

Due to this lack of steam around us in our daily lives, I feel very strongly that our hobby is, for many of us, a hobby for two ages of life. The younger years when we were quite literally a passenger on the train, probably miniature and if that experience is good and nurtured well – then perhaps for when we are older, the children are off our hands, we have started getting under our life partner's feet at home and it is time to return to the miniature railways of our childhood.

The second half of Rex's article will appear in the January issue.

The assembled Junior Engineers at the $7\frac{1}{4}$ " Society Junior Weekend (Photo courtesy of the $7\frac{1}{4}$ " Gauge Society).



Where has the year gone, I hope you have all had a good year at your clubs and that you are looking forward to 2010 with the same enthusiasm as in previous years. May I wish all of you and your families a very Merry Christmas and New Year. Don't forget the major exhibitions coming up in January with the Alexandra Palace event taking place over the weekend of the 22nd to the 24th January. I hope to see many of you there. This exhibition is preceded by the new venue in Germany, which is replacing the old Sinsheim event. Karlsruhe is the venue for this large European show, which many of you attend. I will be there reporting for EIM, so if you attend and see me struggling with my limited German, stop and have a chat.

The current issue of the 7 $\frac{1}{4}$ " Gauge News from the 7 $\frac{1}{4}$ " Gauge Society has some interesting articles from around the world. None more so, than the report of the Australian Association Convention at Castledare Miniature Railway. As the author puts it, it was like having the 7 $\frac{1}{4}$ " AGM in New York, such was the distance travelled by many attendees. There were about 250 people registered as attending together with around seventy five locomotives. During the AGM, long time President of the AALS Barry Glover stood down, he had attended 47 consecutive conventions. It sounds like a very good event enjoyed by all. One thing I did note and luckily we don't have to put up with this sort of problem in the UK, is that the area of the track is part of the natural environment for Tiger snakes, and they don't like visitors so you don't walk the track there! The Society had a good show at Harrogate and their Junior weekend was also well attended. The **Bradford MES** ground level track will be undergoing some major repairs during the winter months. The track has developed some severe gradients due to ground settlement, and to rectify the problem two lengths of the track will have to be removed so that the trackbed can be raised and levelled. A good attendance at their Open Day found a number of visiting locomotives operating on both the ground level and elevated track. Together with an excellent supply of food and drinks served by the ladies of the club, a good time was had by all.

Down in the Antipodes the **Canterbury Society of Model Engineers** have contracted an Architect to draw up the new plans for a clubhouse and engine shed and like all model engineering clubs, the important bit now is to raise the necessary finance. They also have to decide whether to build it themselves or employ a builder. It will be interesting to hear how they get on, as many clubs seem to be either just about to start building or deciding if they can afford too.

It is pleasing to report that the **City of Oxford SME** have received all the permissions they need and work has started on their new club house. The Charity Day in support of Cancer Research UK was very successful and a very good donation was made to the charity. During the Sweet Pea Rally at the **Sheffield SME** the June Drake Award went to Oxford member John Marriage for his newly completed locomotive 'P.Green'. Simon Mulford also received an award for his 'Sweet Sue' locomotive.



Cutting the first sod for the new City of Oxford S.M.E.E Clubroom.

The club has also had displays at both Harrogate and the Midlands Exhibition, where they were both well received. Talking of clubrooms, the **Furness Model Railway Club** are still looking for a new clubroom, so if you live in that area and know of any suitable premises, the club will be delighted to hear from you. The model engineering section of the club have been running on Sunday's and usually have the club Simplex and an 08 in operation. It was good to meet a couple of members from the **North Norfolk Society** when I was over in that part of the world earlier this year. They have a nice station set up adjacent to the North Norfolk Railway at Holt and the traverser arrangement for the station is similar to that at the Mold Society except that it is a manual operation.

Members at the **Pinewood Miniature Railway** had a treat back in April when Clifford Perry a member from the **Reading Society** brought along a 7 $\frac{1}{4}$ " gauge Merchant Navy Class locomotive 'Clan Line'. A number of Pinewood members were able to try out their driving skills and thoroughly enjoyed the experience. Provisional Santa days are scheduled for the 6th and 13th December.

Members at the **Rochdale SMEE** had a visit from Derek Brown who presented his 'Locomotive Design by CAD' talk and illustrated this with examples of the construction of 'Anna' a Manning Wardle 0-4-0 tank engine. There will be some new track laying during the winter months at the **Rugby Society**, when it is hoped the outer curve will be re-laid. Chairman Aubyn Mee will also be involved in revamping the steaming bays to provide a larger turntable and new loading facilities. The



The station set up at the North Norfolk Society track at Holt in Norfolk.

club celebrated their 60th Anniversary in August with an all day running session and free Bar-B-Que for members.

One club that is already well ahead with its plans for 2010 is the **Scunthorpe Society**, who are based in the Normanby Country Park. Their Model Engineers Festival and Locomotive Weekend is already on the calendar for May 1st – May 3rd and in addition a Training Day for people who want to learn to drive a locomotive is also being planned.

John Barrett is the new newsletter editor for the **Southampton Society of Model Engineers Ltd** and in his first presentation, he reports on the successful attendance by the club with their portable tracks at the Eastleigh Centenary weekend. Good support from members and locomotives ensured it was well received by the public. Some 66 miles were covered by the locomotives over the weekend. Their public running days are continuing to be well supported by both the club members and the public.

At the 74th Annual Exhibition held at the **Sutton Model Engineering Club** the Sir Malcolm Campbell Challenge Trophy for Craftsman of the Year, was awarded to Philip Wickenden-Taylor for his example of a Quorn Tool & Cutter Grinder. Their current club magazine features many of the prize winners and pictures from the exhibition. The Club have decided to build a Spark Erosion Machine so that should be a useful piece of kit to own when it is completed.

A very pleasant day was had by members and guests at the **Wigan & District Society**, when they entertained the children from Chernobyl during their annual visit to the area. The youngsters thoroughly enjoyed their time at the club and under supervision were allowed to drive, which obviously brought a smile to many faces.

Members also enjoyed a very entertaining evening meeting when Keith Wilson was the speaker. At their Open Day back in July they had twenty three visiting locomotives from nine different societies and although the weather was poor only three engines did not run so the heavy rain did not put anybody off.

I note that the **Wortley Top Forge Society** have been building a new carriage shed together with the associated track work and points at their site. The photographs of this new building look very impressive and should provide a very useful facility for members and club stock.

Members of the **Urmston & District MES** have had a severe shock with the sad loss of their secretary Tony Fussell. Tony died in September after a short illness, and was well known to many of you for his attendance at all the major exhibitions organised by Meridienne Exhibitions and EIM. He sorted out the wired security systems for all the entries on display as well as doing a multitude of other jobs during the shows.

Personally, I would like to express my condolences to Tony's family and colleagues, as he was a great help to me when I first started to report the events for the magazine. He was a lovely man who will be greatly missed by us all at EIM, and by all his friends at the Urmston Society.

Diary December

EVENTS OF INTEREST TO MODEL ENGINEERS

- 1 Basingstoke & District MES, Meeting Night, 7pm to 9pm, Unit 5, Viables Craft Centre, The Harrow Way, Basingstoke, Hampshire.
- 1 Romney Marsh MES, 'Single Track Obsession', with Rob Sissons, 7.30pm, Rolfe Lane, New Romney, Kent.
- 2 Bristol SM&EE, Quiz Evening, Begbrook Community & Social Club, Frenchay Park Road, Bristol, Avon.
- 3 Cardiff MES, 'More Engineering Topics 7', with Carl Pickstone, Heath Park (entrance opposite 167 King George Fifth Drive), Cardiff. Contact: Don Norman on 01656 784530.
- 4 Maidstone MES, Bring & Buy, Fish & Chips and Cheesecake, 7.30pm, Mote Park, Maidstone, Kent.
- 4 Romford MEC, Competition Night and Millennium and Rusty Titford Cup, 8pm, Ardleigh House Community Centre, Ardleigh Green Road, Hornchurch, Essex.
- 5 Bradford MES, Competition and Display, Saltaire Methodist Church, Saltaire, Shipley, West Yorkshire.
- 5 York City & District SME, AGM, 7pm, clubhouse, adjacent to East Coast Main Line, off North Lane, Dringhouses, York. Contact: Pat Martindale on 01262 676291.
- 5/6 Bedford MES, Santa Specials, tracksite: 'Summerfields', A600 nr. Haynes, Bedfordshire. Contact: Ted Jolliffe on 01234 327791.
- 5/6 Nottingham SMEE, Santa Specials, Nottingham Heritage Centre, Ruddington, Nottingham.
- 6 Basingstoke & District MES, Public Running Day, 11am to 4pm, Unit 5, Viables Craft Centre, The Harrow Way, Basingstoke, Hampshire.
- 6 Bristol SMEE, Santa Special, Ashton Court Estate, Clifton Lodge Entrance, Bristol.
- 6 Cardiff MES, Santa Special Day (by ticket only), Heath Park (entrance opposite 167 King George Fifth Drive), Cardiff. Contact: Don Norman on 01656 784530.
- 6 Malden & District SME, Santa Special Public Running, Claygate Lane, Thames Ditton, Surrey.
- 6 Reading SME, Public Running, tracksite: Prospect Park, Bath Road, Reading, Berkshire. Contact: Ian Fothergill, 01189 421679.
- 6 Tynside SMEE, Santa Claus Run, Exhibition Park, Newcastle Upon Tyne.
- 7 Lancaster & Morecambe MES, informal club meeting, 7.30pm, Clubroom, Cinderbarrow Picnic Site, nr. Carnforth, Lancashire. Contact: Mike Glegg on 01995 606767.
- 7 Leicester SME, 'Visual Illusions', a talk by David Siddons, arrive from 7.15pm for prompt start at 7.30pm, Cricketers, Grace Road, Leicester.
- 7 Peterborough SME, 'Bits & Pieces', 7.30pm, 'The Great Hall', Thorpe Hall, Thorpe Road, Peterborough.
- 8 King's Lynn & District SME, Christmas Party, The Wembley Room, Lynnsport Leisure Complex, King's Lynn, Norfolk.
- 8 Norwich & District SME, 'The Norfolk Wherries', illustrated talk by Mike Sparkes of the Norfolk Wherry Trust, 7.30pm, Angel Road Middle School, Norwich, Norfolk.
- 9 St. Albans & District MES, Christmas Social Evening, Christchurch Centre, New Greens, St. Albans, Hertfordshire.
- 9 Harrow & Wembley SME, Russell Newland on The BR Standards-Hengist Project, Roxbourne Park, Field End Road, Eastcote, Middlesex.
- 9 High Wycombe MEC, 'Down Memory Line', a talk by Colin Brading, Rossetti Hall, Little Missenden Parish Offices, 38 New Pond Road, Holmer Green, High Wycombe, Bucks.
- 10 Cardiff MES, 'An Evening With Tony', with Tony Bird, Heath Park (entrance opposite 167 King George Fifth Drive), Cardiff. Contact: Don Norman on 01656 784530.
- 10 Leyland SME, Project Night, 8pm, The Conservative Club, Farington, Leyland, Lancashire.
- 11 Polegate & District MEC, 'The History of Lighting', talk by Dr. Maureen Dillon, 7.30pm, Polegate Community Centre, Windsor Way, Polegate, East Sussex. Contact: David Pratt on 01323 645872.
- 12 Erewash Valley MES, Santa Special, tracksite: Fairfax Avenue, Borrowash, Derby.
- 12 G-Wizz Garden Railway Display Team, Christmas Charity Model Railway Exhibition 'G-Wizz It's Christmas Again', 10.00-16.30, St. Annes URC Hall, Clifton Drive/St. Georges Road, St. Annes on the Sea, Lytham St. Annes, Lancashire, FY8 2AE. Entry: Adults £2.50, Children £1.50 (all proceeds from this event will be donated to North West Air Ambulance).

- 12/13 Nottingham SMEE, Santa Specials, Nottingham Heritage Centre, Ruddington, Nottingham.
- 13 Bournemouth & District SME, Santa Run, Littledown Park, Chaseside, Castle Lane East, Bournemouth, Hampshire.
- 13 Frimley & Ascot Locomotive Club, Santa Run, 11.30am, Frimley Lodge Park, Sturt Road, Frimley Green, Surrey.
- 13 Harlington Locomotive Society, Mince Pie Run, tracksite off High Street, Harlington, Middlesex.
- 13 Harrow & Wembley SME, Santa Trains Run at HWSME, 13.00-16.00, Roxbourne Park, Field End Road, Eastcote, Middlesex.
- 13 Leicester SME, Santa Specials at Abbey Park, Leicester (access from St. Margaret's Way). Contact: John Lowe on 01455 272047.
- 13 North West Leicestershire SME, Santa Specials at tracksite, Hermitage Leisure Centre, Whitwick, Leicestershire.
- 13 York City & District SME, Running Day, adjacent to East Coast Main Line, off North Lane, Dringhouses, York. Contact: Pat Martindale on 01262 676291.
- 14 Bedford MES, Quiz Nite, Wilstead Village Hall, Wilstead, Bedfordshire. Contact: Ted Jolliffe on 01234 327791.
- 14 Erewash Valley MES, Ladies Evening, 7.30pm, Moon Hotel, Station Road, Spondon, Derby.
- 15 Basingstoke & District MES, Meeting Night, 7pm to 9pm, Unit 5, Viables Craft Centre, The Harrow Way, Basingstoke, Hampshire.
- 15 Chesterfield & District MES, Meeting: Photograph Competition, tracksite, Hady Hill, Chesterfield. Contact: Mike Rhodes on 01623 648676.
- 15 Nottingham Society of Model and Experimental Engineers, 'The Flora and Fauna of Nottinghamshire Railway Lines' talk by Tony Loy, 7.30pm, Clubroom, Heritage & Transport Centre, Ruddington.
- 16 Bristol SM&EE, 'Hints & Tips' with Jack Shettle, Begbrook Community & Social Club, Frenchay Park Road, Bristol, Avon.
- 16 Leeds SMEE, Quiz Night, 7.30pm, Eggborough Sports & Social Club, Eggborough, Yorkshire.
- 17 Cardiff MES, Club Chat, Heath Park (entrance opposite 167 King George Fifth Drive), Cardiff. Contact: Don Norman on 01656 784530.
- 18 Romford MEC, Bring and Buy Sale (members only), 7.30pm, Ardleigh House Community Centre, Ardleigh Green Road, Hornchurch, Essex.
- 19 Chesterfield & District MES, Public Running Day, tracksite, Hady Hill, Chesterfield. Contact: Mike Rhodes on 01623 648676.
- 19/20 Nottingham SMEE, Santa Specials, Nottingham Heritage Centre, Ruddington, Nottingham.
- 20 Taunton ME, Santa Special Charity Run, 12 noon - 3pm, Creech St. Michael Sports Field, Taunton, Somerset.
- 20 Worthing & District SME, Christmas Specials, rides available from 10am to 2.30pm, tracksite at Field Place, Durrington, near Worthing, West Sussex.
- 21 Lancaster & Morecambe MES, 'Jacob's Join', (wives very welcome), 7.30pm, Clubroom, Cinderbarrow Picnic Site, nr. Carnforth, Lancashire. Contact: Mike Glegg on 01995 606767.
- 21 Model Steam Road Vehicle Society, Grand Christmas and Get Together End of Year Party, The Gloucester Club, Greville Close, Sandhurst Road, GL2 9RG. Contact: John Bagwell on 01452 304876.
- 21 Peterborough SME, Party Night, 7.30pm, 'The Great Hall', Thorpe Hall, Thorpe Road, Peterborough.
- 26 Cardiff MES, Steam-Up and Family Day (a.m.), Heath Park (entrance opposite 167 King George Fifth Drive), Cardiff. Contact: Don Norman on 01656 784530.
- 26 High Wycombe MEC, Boxing Day Steam Up, Holmer Green Sports Association, Watchet Lane, Holmer Green, High Wycombe, Bucks.
- 26 Leeds SMEE, Boxing Day Steam Up, 10am, tracksite, Eggborough Power Station, Whitley Bridge, Goole, South Yorkshire.
- 26 Leyland SME, Boxing Day Mince Pie & Steam Up, tracksite: Worden Park, Leyland, Lancashire.
- 26 Maidstone MES, Boxing Day Run, Mote Park, Maidstone, Kent.
- 26 Malden & District SME, Boxing Day Run, 10am-2pm, Claygate Lane, Thames Ditton, Surrey.
- 27 Bradford MES, Mince Pie Steam Up, 1.30pm, Northcliffe Woods, off Cliffwood Avenue, Shipley, West Yorkshire.
- 28 Bedford MES, Steam Up - If You Dare!, tracksite, 10.30am, (no evening meeting), 'Summerfields', A600 nr. Haynes, Bedfordshire. Contact: Ted Jolliffe on 01234 327791.
- 29 Wigan & District MES, 'Free & Easy', St. Mary's Church Hall, Warrington Road, Lower Ince.

Details for inclusion in this diary must be received at **least EIGHT** weeks prior to publication. Please ensure that full information is given, including the *full address* of where every event is being held. Whilst every possible care is taken in compiling this diary, we cannot accept responsibility for any errors or omissions.