

**Reading Society  
of Model  
Engineers  
Charity Number  
1163244**

# The Prospectus

**October 2023**



**President  
John Billard**

**Secretary  
Stuart Kidd**  
07966 278968

**Editor  
John Billard**  
john@jegbillard  
.plus.com  
01189 340381  
07834 998971

**Free to members  
220**



HMS Warrior is framed by the Mudlarks Memorial at Portsmouth on September 14th. Photo John Billard

**LEVELLING UP  
A BOILER INSPECTOR SPEAKS  
PROBLEM SIGNALS  
CHIMNEY FOR ELECTRIC LOCO  
PISTONS AND RINGS  
STEAM IN '63  
CLUB TALKS PROGRAMME 2023/4**

## THE VIEW FROM THE CHAIR

John Billard

Not so much to report this month following our trustees meeting. All is going well and it is good that we are able to settle down for a period. The Wednesday gang continue their digging of the conduit trench for the new lamp posts and work carries on with a multitude of other tasks including further work on the raised track carriages that remain troublesome on occasion.

All this has to be done but what was not welcome was a further vandal attack at our site. More time diverted on rectification and repairs. We are continually finding ways to combat these attacks including new cameras and signs.

Peter Culham reported that he has organised 45 birthday parties this year with eight to do plus a series of school visits. A massive effort. I know that Peter would like to be relieved of some of these duties for some well earned relief, and this is a message to members—**please come and help**. Importantly I'm sure that Peter will still be around as a guiding hand, and as they say, full training will be given.

Together with the parties and successful public running this has put our finances in a healthy state. Our membership campaign, underpinned with a reduced subs, has given us a total of 96 to date. And I'm sure more to come. We have decided to move the date of our AGM to a new date of Thursday 16 November. Timescales have caught up with us and we want members to have plenty of notice to consider the trustee elections and to put motions as required. Three trustees are retiring by rotation (and I hope will be re nominated!) and we have a vacancy to bring us up to the usual eight.

As you may remember, we are negotiating a new ten year lease with Reading Council and I hope it will be possible to give further news of this at the meeting. Reflecting on this, we are very fortunate to have an established site in this way for which other clubs would pay dearly.

## A WORD FROM OUR BOILER INSPECTOR

### Nigel Penford reports

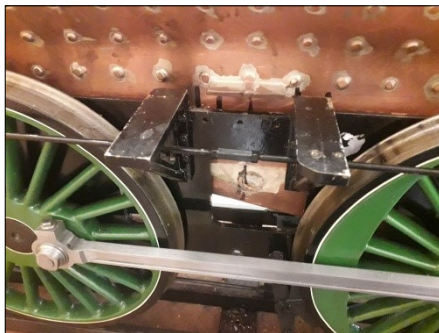
Nigel says that he is seeing far too many boilers for inspection that are not ready to be examined. Some have not even been capable of holding water, let alone any pressure! So he pleads that any boiler presented first must be well prepared at home. This means that all plugs in place with fibre or copper washers, and particular attention given to larger holes such as dome or regulator bushes that can be plated over together with a suitable gasket. Application of mains pressure is all that is necessary at this stage, or a few pounds applied with a hand pump. This identifies any leaks that should be fixed. And don't forget to bring paperwork including previous certificates.

Anything less caused a waste of time for all concerned. Your boiler inspector does not want to fail any boiler for any engine. To keep him in a good mood, make an appointment, usually at a club running, and arrive at a time agreed. Nigel is always available for advice and help—just ask!.

## A Model Engineers 'Levelling Up'

by David Wilkinson

One of the tasks confronting me whilst building my 7 ¼ inch Sandringham locomotive is to try to ensure that the boiler sits level in the chassis frame. It is complicated—aren't they always - by the discovery that the support pedestals on each side of the boiler that normally sit neatly into recesses in the top of the frames were set around an inch high, see below. The reason was clear—in retrospect-I specified the design of the B1 boiler to Paul Tompkins at 'Southern Boiler Works', not realizing that my locomotive has six foot eight driving wheels whereas the B1 has six foot two—this has implications for the boiler height in the frames, not accounted for, and the chimney height,



which I have allowed for.

It means that I shall have to redesign the clamps that fit over the frame and pedestal to set the boiler height, and incidentally secure the boiler at the firebox end. This is a task that must be sorted well before the boiler is finally fitted into the loco. At this stage the ultimate weight and correct spring settings are unknown, both of which will affect the way the loco sits on the track. Head scratching eventually

produced the realization that what is really necessary is to set the boiler and smokebox accurately in relation to a datum, and I decided this was the top edge of the frame, and that for this springs, weight and buffer heights are irrelevant.

The method I hit upon is shown in the pictures, where the first task, before the boiler was fitted, was to check that the buffer and drag beam heights conformed to the drawings and were sitting approximately level on the stands and length of supporting track. This could be done with the spirit level set directly on the frame. These appeared horizon-



tal but confirmed that the rear end of the engine looked to be about 4mm low. This proved that using a level on the installed boiler wouldn't work, and the chassis frame would have to be levelled first. I installed a jacking strut, pictured, underneath the frames and set on the track. This would set the frame height independently from the springs and supporting track, and not affect the chassis height with the boiler weight applied.

This jacking screw was then used to raise the rear of the chassis until the top edge of the frame was level, as indicated by the spirit level. I also checked the buffer beam height at the front end which I assumed would not vary. This was the case during subsequent checks, and I then realized that of course it would because no weight was being applied during the checks



I then installed the boiler and gently set the firebox height using the jack on the engine hoist to level the top of the boiler which is a parallel tube. Clearance pads were fixed to the level to clear the dome and safety valve bushes. I was pleased that small pumps of the hoist jack produced reassuring tiny shifts of the level bubble, so the method appeared quite sensitive. I measured the gap between the firebox pedestals and the frame on both sides.

The first readings indicated that the boiler was twisted slightly, caused by the lifting sling not being vertical. This was reset, and the result of two further readings are tabulated below.

The next task was to check the level of the smokebox and a small electronic level confirmed that this needed a 1 mm insert to set it correctly, and incidentally confirmed a snug fit between the boiler ring and smokebox.

Firebox pedestal heights above frame, mm.				
	left		right	Average
	17.6		14.8	16.1
	18.2		15.2	16.7
avg	17.9		15.0	

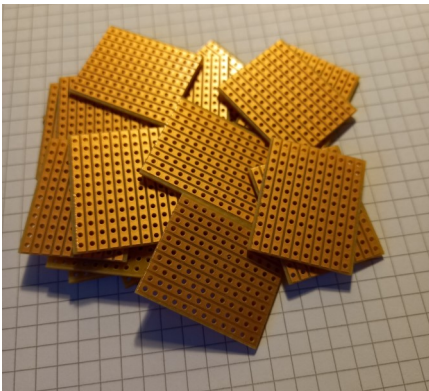
Measured results are by no means exact, but suggest a reasonable consistency. If I allowed for the pedestals not being exactly level then it seemed a reasonable assumption that the desired dimension for the supporting bracket should be 16.5 mm., and just as importantly that this should result in the boiler *appearing* to be set correctly. As with all things on this project, it raises another issue, this being that insertion of the ashpan might well raise the desired level to around 19mm, so minor modification of the ashpan will be necessary. Not a surprise—just frustrating! We shall see .....

## SIGNAL PROBLEMS ON THE GROUND LEVEL TRACK

By Mike Manners

You may not be aware that we have been having problems with a couple of signals on the ground level track. Specifically, the signal immediately after the level crossing and the next one at the bottom bend. The one at the bottom bend has had the green aspect changed several times and just recently has failed again. Last Wednesday afternoon I spent some time looking at the fault trying to understand what was going on. I discovered that what should have been a nice healthy 12 Volt supply was in fact only measured as 6.5 Volts! I removed the Logic Block that controls the signal and the supply was back to 12 Volts. Interesting. We tried connecting a 12 Volt blower to the supply and were rather surprised when it worked. The signal should only be taking a supply current of around 35mA. The blower will be taking considerably more than this so a power supply problem looked unlikely. I decided to remove the Logic Block and take it home for further investigation. This, unfortunately, leaves this signal and the previous one out of action for the moment.

I have been concerned for some time that the Logic Blocks that control all the signals are of a design produced and constructed by me. As far as I am aware no commercial equivalent exists. I have also been aware that as time passes some of the components to make them are becoming increasingly hard

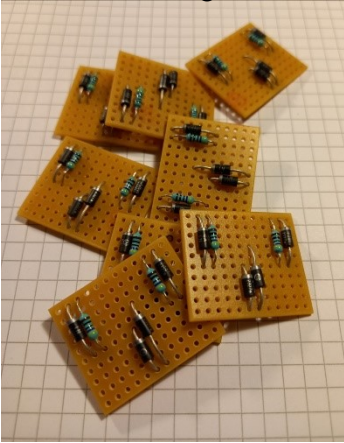


to find. At the moment we are existing with zero spares of these Logic Blocks. The recent unresolved problem has prompted me to do something before making any more Logic Blocks becomes impossible. They have proved to be very reliable but we have had failures in the past caused by a local lightning strike.

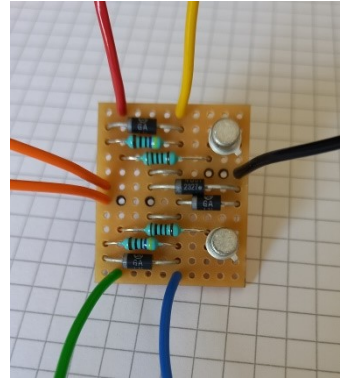
I have now started to build a batch of nine spare Logic Blocks using a batch of integrated circuits I had specifically put aside for this very purpose. I spent a couple of hours this afternoon cutting



and finishing all the circuit boards. Two circuit boards required for each Logic Block. While I was doing this I had the Logic Block from the bottom bend signal on test on the bench. It worked perfectly! More head scratching needed. More investigations another Wednesday.



**Right**  
One of the logic blocks complete and  
**Left**  
Others awaiting component parts



Photos Mike Manners

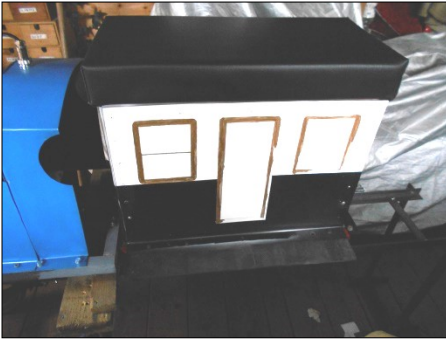
## A NEW 7 ¼" ELECTRIC LOCO continued by TERRY WOOD



After building the loco and getting it running properly it was now time to do some detailing work on it to make it look more like a steam engine and being a steam outline loco it would need some kind of dummy chimney so I looked around for some suitable pipe and found a piece 2" x 5 1/2 " that would be near enough to make a long chimney like the ones used in very early locos.

The next problem was to make a base for it and a flared top and seeing as I didn't fancy trying to flare the actual pipe I decided to make both the top and base out of hard wood seeing as its never going to get hot! All the hole saws that I had were too small, so I cut a piece of 1" thick hardwood from a square into a hexagon then drilled an 8mm hole in the centre then placed a bolt through it and very carefully started turning it on the lathe until it was round I then parted it off in the middle to make the top and bottom of the chimney.

The bottom part had to be machined with a groove to fit the metal pipe into and then the base had to be shaped to follow the contours of the dummy boiler which was achieved using a very coarse semi circular carpenters file which took some time but would have been even longer if I had used an ordinary file.



I then machined another groove in the top part for the pipe to fit into then proceeded to cut the outside edge to form a flare using a round carpenters chisel resting on a metal bar until it looked ok then I cleaned both parts up with glass paper and put a coat of varnish on them and painted the pipe black. After the varnish and paint had dried I then drilled a hole in the dummy boiler and bolted the chimney to it using some

8mm studding and placed a M8 ferrule on the top which looks much neater than if a nut was sticking out. The next thing was to put some kind of dummy safety valve on and this was easily achieved by bolting on a large plastic bottle top on the back of the boiler near the control cab.

Next I wanted to put some detailing on the driving trolley so I painted on two windows and a door to replicate the windows of an early passenger carriage this proved a bit tricky because I decided to hand paint the window surrounds in gold Humbrol paint and my hands aren't as steady as when I was younger!



## CLUB TALKS PROGRAMME 2023/4

<b>26 October 2023</b>	<b>On Steam Ploughing</b>	<b>James Hodgson</b>
<b>23 November 2023</b>	<b>The Desk—a Locomotive Mystery Revealed?</b>	<b>Peter Venn</b>
<b>21 December 2023</b>	<b>The Christmas Quiz</b>	<b>Stephen Millward</b>
<b>18 January 2024</b>	<b>The Parsons Turbine</b>	<b>Bill Richardson</b>
<b>25 February 2024</b>	<b>On Crofton</b>	<b>TBC</b>

**All at the club house commencing at 8 pm**

## BUILDING A CLAUD by John Billard

### Pistons and Rings

Having completed all the machining on the cylinder casting it was time to consider making the pistons. These were to be in cast iron and to include two piston rings each. For this I had purchased ready made rings from a well known supplier to suit the 1.5 inch bore.

For me, the pistons themselves were a relatively straightforward turning exercise the greatest care to obtain the correct fit in each bore. I made a bit of a rod for my own back because following honing one bore was about two thou bigger than the other. The objective was to end up with a piston on its rod (before the rings had been fitted) to slide very slowly down the bore under its own weight taking at least 10 seconds to do it.

To be successful the final sizing of the piston has to be done with the rod in place. Reading the books there are several ways of doing this. In the end I went for the Martins Evans method thinking that he had made plenty of engines and I had never heard of a problem there. I thought that putting a nut on the end was asking for trouble. The method employed was to bore and tap the oversize piston at 5/16ths x 40 TPI and screw the rod similarly except for the final 1/8th that should be a press fit in the piston.

All good so far. The piston went on fine until the press fit portion was reached. This then required considerable force and I finished with the rod firmly clamped longitudinally in the vice and the piston screwed on hard with the use of mole grips. One thing—I am certain they won't move again! Then it was back to the lathe with each rod in a collet to finish to size, finally taking off a half thou diameter at a time.

At that stage I started to look again at the piston rings that I had bought. Researching, it seems like the optimum section for the ring at this scale would be a 16th inch square. The ones I had were a 16th deep but an eighth wide. Also inserting this ring into the bore this produced a ring gap way above a recommended one thou per inch of diameter. Also concerned about friction I decided to have a go at making new ones to fit a 16th groove.

The operation of piston rings is that steam enters the piston ring gap and forces the ring against the bore from behind. So some careful machining was required. But if all this went wrong I could still revert to the wider ring.

I machined grooves in the pistons sufficiently deep for the purpose. I then made the piston rings from a bar of Meehanite cast iron with plenty of spares just in case. Taking a tip from Alan Thatcher I split each ring after a quick blow with a hammer on a Stanley knife.

At this stage there was no hope that the brittle ring would stretch over the piston so some heat treatment was required. Placing a piece of 3/32" steel (I guessed this) in the gap to open the ring they were heated to dull red then quenched in oil. They were amazingly springy after that and it was little

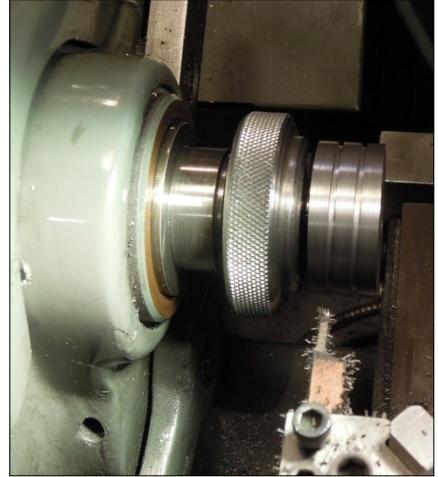


trouble to insert the rings in the piston making sure that the gap behind in the groove was sufficient.

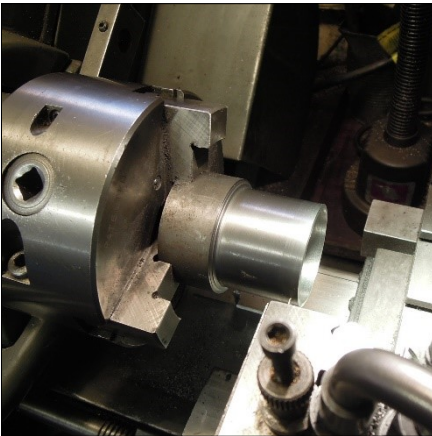
Now—how to put the piston in the cylinder! There is a counterbore to register the cylinder ends and this was causing interference. After some head scratching I made a sort of funnel to fit exactly into the register so to compress the rings into place. Another job—but problem solved.



Screwing the piston on to the rod.  
Not for the faint hearted!



Machining the grooves. These  
were deepened later.



Above—the rings here consist of a  
cast iron tube. Here they are being  
separated to size by one of my fa-  
vourite tools—a hacksaw blade for  
parting off.

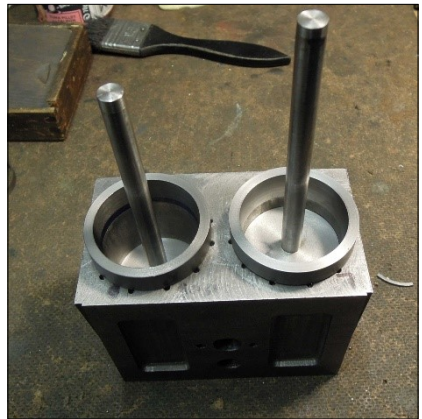




Here is the difference between the bought-in ring (right) and my own. Ring gap was an issue.



The result - pistons and rings.



Here is my solution to introducing the pistons into the cylinder past the counterbore step. A close fitting ring tapers internally to bore size. Here they are in place. There are two because one bore was two thou larger after honing!

This has been an interesting learning curve (with no known outcome!) for me but the outcome is the reward. There seems to be just about the right friction in the cylinders though this is before any lubrication or running in.

The next job is to make the slide valves and finding a way to keep them on their faces as they are inverted.

### **NOTICES TO MEMBERS**

We welcome new members, mother and son Julie Maskell and Gabriel, and David Corringham of Emmer Green. We wish them every success with RSME.

# SIXTY YEARS AGO

October 1963

Photos  
John Billard



B-12 4-6-0 61572 on a special approaching Finsbury Park from Broad St. After the fire was dropped later that day it did not steam again for 30 years.



Scrapping of steam was apace that year. Here is the end of J-50 tank 68964 at Doncaster Works.



I travelled on the Thames, Avon and Severn Raitour. These taken as the train passed, with a T-9 and U class in front, through Reading on its way to the Great Central, Lickey and Cheltenham the return to Paddington being Castle hauled. Do these pictures have any memories of Reading that you can share with PROSPECTUS readers?



## DIARY

### OCTOBER 2023

Sunday	1st	Public running	12.00-16.00
		Setting up from 0930	
Saturday	7th	Club running	10.30 onwards
Monday	9th	Trustees meeting	19.30
<b>Thursday</b>	<b>12th</b>	<b>On the Bench Night</b>	<b>19.30</b>
Tuesday	17th	Club running	10.30 onwards
<b>Thursday</b>	<b>19th</b>	<b>RSME AGM</b>	<b>19.30</b>
<b>Thursday</b>	<b>26th</b>	<b>Club Talk</b>	<b>20.00</b>

**The Wilder Ploughing  
Engine  
James Hodgson**

### NOVEMBER 2023

Sunday	5th	Public running	
		Setting up from 09.30	12.00-16.00
<b>Thursday</b>	<b>9th</b>	<b>On the Bench Night</b>	<b>19.30 onwards</b>
Saturday	11th	Club running	10.30 onwards
<b>Thursday</b>	<b>16th</b>	<b>RSME AGM</b>	<b>19.30</b>
Tuesday	21st	Club running	10.30 onwards
<b>Thursday</b>	<b>23rd</b>	<b>Club Talk</b>	<b>20.00</b>
		<b>The Desk</b>	<b>Peter Venn</b>

**Note from the Editor. Please provide photographs as separate files and not embedded into the text. No pdf files please.**

Opinions expressed in PROSPECTUS are the personal views of the contributor and cannot be taken as reflecting the views of the trustees or editor.

**The deadline for the November issue is 20 October**

Contributions may be submitted in had or soft copy to the editor.

John Billard Old Station House Twyford Reading RG10 9NA  
01189 340381 or 07834 998971 [john@jegbillard.plus.com](mailto:john@jegbillard.plus.com)

***Please write for Prospectus. Photos welcomed.  
Comments by RSME members on any subject appearing in  
Prospectus are welcomed by the editor.***