
N G Sand & Gravel

014 Industrial Layout Part 4 – Locomotives and Sound

FOR MANY YEARS, I've felt that a layout without sound, however good the modelling is a bit of a dissapointment. However good our three dimensional modelling, the 'fourth dimension' – sound, provides an extra layer of realism quite unlike anything else. In narrow gauge circles, we are fortunate indeed, to have a real expert who has dedicated himself to better sound, in the shape of Otto Schouwstra. His well known 'Ossynths' sound systems go well beyond simple 'chuff and whistle' sound. Your layout can come alive with all the other noises appropriate to both the rolling stock and the surroundings.

Otto kindly made a special unit for 'N G Sand & Gravel' some years ago. It provides i.c. loco sound, plus rolling stock sound and separate sounds for the various plant (conveyors and the like). These latter are easily dealt with, static speakers being placed as near as possible to the relevant item. There is even a continual 'background' sound of light wind and bird song.

LOCOMOTIVES

Locomotives, however, when they are small, are quite demanding, particularly as the 'Ossynths' system requires coreless motors in order to operate properly. For many years, on 'NGSG', I've only had a single loco suitably equipped. This is a re-worked version of the RCL 14mm gauge 'LBT' loco kit. The original milled brass chassis block is retained but a new gearbox connects a 1616 coreless motor to the layshaft via a compound gear train. There is just enough room left for the necessary electrical components, the speaker being fitted in the cab roof, facing downwards. As a challenge, I added working lights – another feature of the unit Otto built. Recently, I determined to make a second loco, partly because the sound unit provides support for a pair (two and three cylinder i.c.) but, mainly, to provide a spare when the layout is being exhibited.

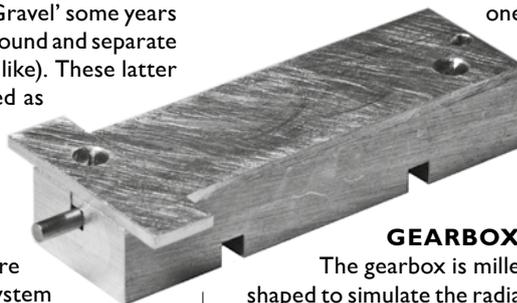
RUSTON LAT

Years ago, the first loco in the RCL 14mm gauge 'industrial' range was a Ruston Hornsby LAT. This ran on a customised Ibertren chassis, a particular feature being the open sided engine housing, featuring a dummy power unit. Later, when Ibertren ceased to trade, a brass milled chassis design was developed. With a more prominent motor, the side sheets were added to the engine housing and the model altered to represent the three cylinder 'LBT' version.

For the second loco, I decided to try to reproduce the old 'LAT' version, but with a coreless motor and sound, as per the LBT. Fortunately, the LAT castings have the lamp positions blanked off, for a non lit version, saving a bit of work.

CHASSIS

I took the brass chassis block and shortened it, at the front only, by 1.5mm. This gives a little extra space for the enclosed gearbox. While the cast whitmetal axle keeper plate was retained, I made a new top plate from 1mm thick brass. This has sideways extensions at the front, like the newer whitmetal 'LBT' kit parts, to support the superstructure. Wheelsets use the existing axles and steel tyres but have solid turned brass centres on one side and paxolin



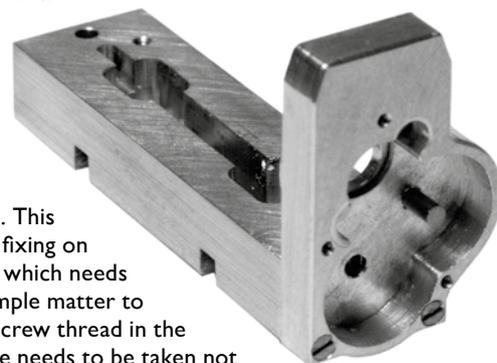
ones on the other. The layshaft assembly is 'as is' apart from shortening to accomodate the gearbox and a different spur gear. Two holes are drilled centrally in the block sides, tapped 12ba to accept screws to hold the pickups in place.

GEARBOX

The gearbox is milled from brass, the upper profile being shaped to simulate the radiator on the prototype. A brass turning was added to represent the pipe to the cylinder block. Steel spur gears, taken from old gear trains, were used to plan out the centres, the reduction being about 6:1 (in addition to the 14:1 gears on the layshaft and axles). A brass cover is provided, which screws in place, allowing grease to be used on the gears. Like the LBT, this model has a characteristic 'whine' at high speed. As both are models of i.c. locomotives, a bit of gear noise just adds to their character. At slow speeds they are silent.

MOTOR

The motor is a Faulhaber 1016 coreless 12volt single ended unit. I got mine from Branchlines. This type has a screw fixing on the motor 'nose' which needs altering. It is a simple matter to machine off the screw thread in the lathe, though care needs to be taken not to remove too much! A brass plate, with two holes threaded 12ba, forms the revised mounting. The plate is cyanoacrylated in place. See the photos, at the top of the next page.



With two or more locos on the same layout, it is important to make sure they both go in the same direction when the controller is operated! I follow the NMRA practice of the right hand rail being positive, when the loco is running in a forwards direction. To this end, I drilled a 'dimple' on the LH side of the gearbox casing. With the motor fitted, a matching mark was made on the black plastic of the motor, ensuring it always goes back with the terminals aligned the same way. When wiring the chassis, once the connections are correctly made, there is no panic later!



Left to right: Un-modified motor, motor with threaded 'nose' turned off, motor with new brass mounting and screws.



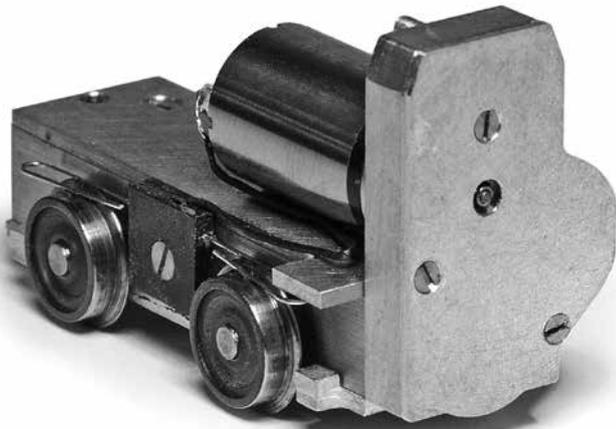
When hardened and released from the vice, trim the edges and drill a 12ba clearance hole (1.40mm) through the assembly. The p.b. wire is shaped to run behind the flanges and then curve outward and back inward to run on the treads. This ensures that the wire has sufficient 'spring'.

SUPERSTRUCTURE

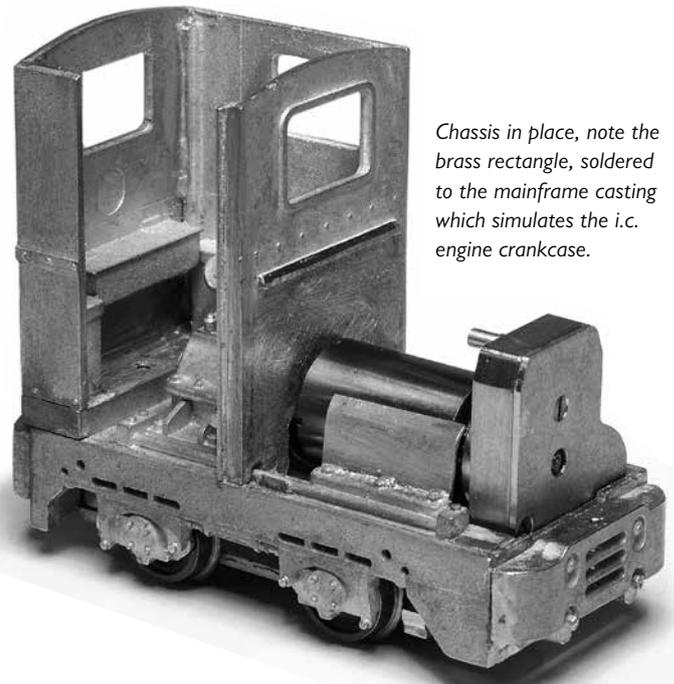
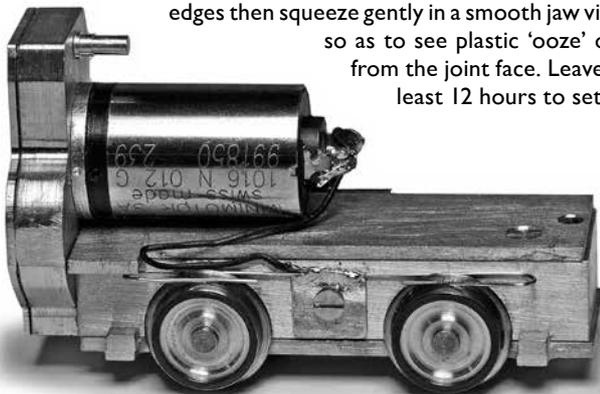
Some modifications are required to the body castings to make the new chassis fit. Although the motor fits (just) in the engine housing, the area immediately behind needs opening out to take the terminals and wiring. There is already a partial cavity, in the form of the replica gearbox. This is opened out further, the flywheel housing casting being omitted. At the front, the mainframe casting is cut away completely, right up to the front cast buffer block. Two shaped rectangles of brass are soldered to the mainframe, simulating the motor sides. These reach up to just meet the pair of cast 'motor' sides, which fit to the engine housing top plate.

The mainframe modifications are best done after the basic body, minus engine housing, is soldered together. I use 'Cerrobend' as solder, with a dilute phosphoric acid flux. The low melting point of this alloy (under 100°C) means there is no chance of melting the kit metal if a temperature controlled iron is used. It also acts as a

Pickups are fitted on all four wheels, though, with non-insulated wheels on one side, this is strictly not necessary. You can see them in the photos. Phosphor-bronze wire is used; mine is 0.28mm in dia. On the non-insulated side it is soldered direct to a rectangular brass plate. The insulated side is a little more elaborate. A piece of fine stranded wire is soldered mid way to a length of p.b. wire about 50mm long. Two rectangles, about 6-7mm square, are cut from 0.75mm plastic sheet. On one, a fine groove is cut,



just 2mm down from the top edge. A second groove, rather more generous, is cut on the centre line, running up from the first groove to the top edge. After applying liberal quantities of liquid solvent, the two rectangles are put together, with the wire assembly trapped between. Apply more solvent around the edges then squeeze gently in a smooth jaw vice, so as to see plastic 'ooze' out from the joint face. Leave at least 12 hours to set.



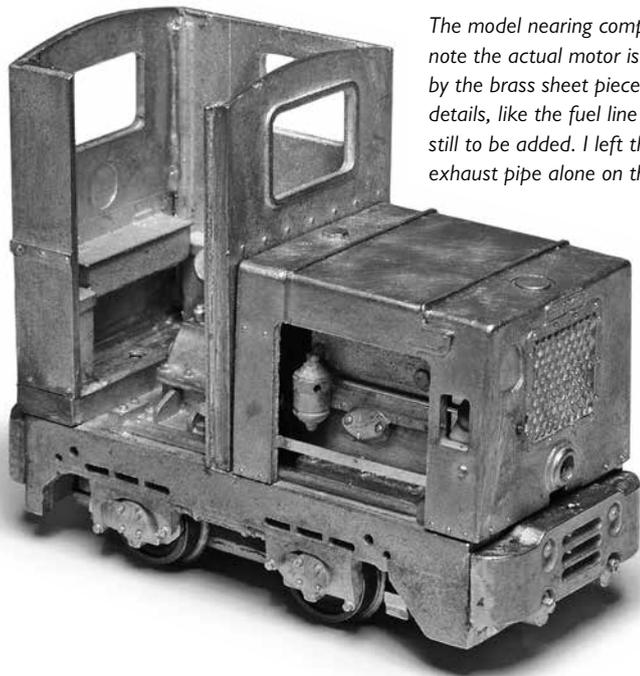
Chassis in place, note the brass rectangle, soldered to the mainframe casting which simulates the i.c. engine crankcase.

perfect 'filler' – indistinguishable from the kit metal once fettled. Should a part be incorrectly assembled, pour boiling water on the problem area and the parts come apart unharmed.

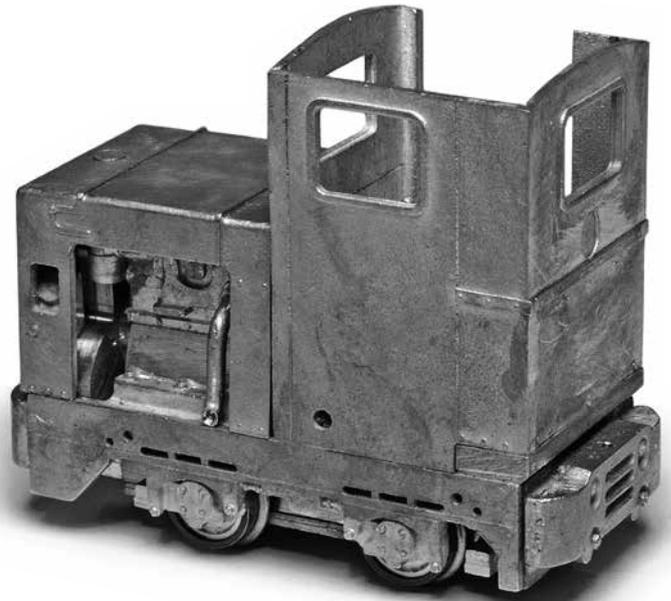
Little in the way of alterations are required to the engine housing assembly, though this was left 'loose' until I was satisfied with the fit of the chassis.

EQUIPPING FOR SOUND

Very few extra items have to be found space for, but it is still something of a challenge with regard small models. If there is no HF



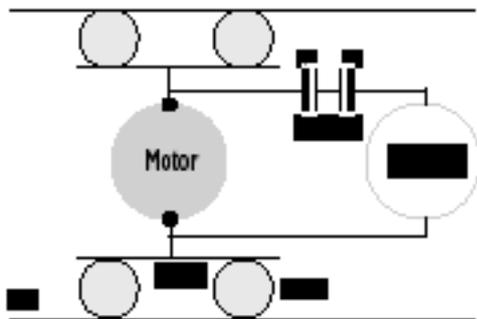
The model nearing completion. note the actual motor is hidden by the brass sheet pieces. Fine details, like the fuel line etc., still to be added. I left the exhaust pipe alone on this one.



lighting, all you need is a small speaker plus two capacitors to act as a filter and to protect it. Very basic wiring is required, as shown in the diagram below.

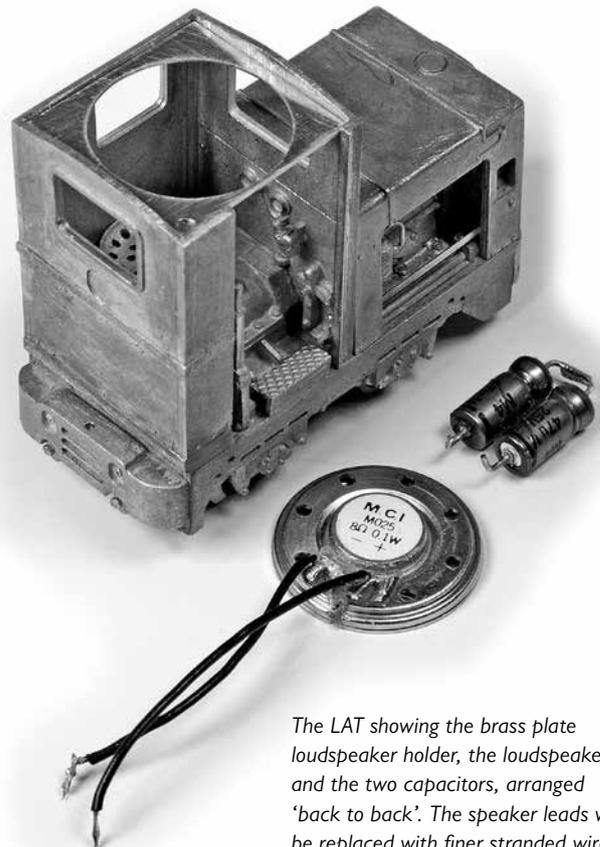
The speaker is 19mm diameter and *just* fits under the cab roof. Although very thin, a small pocket needs milling out from the underside of the roof casting to receive it. A plate, cut from 0.25mm thick brass sheet, holds the speaker in place. It can be 'earthed' to the plate, as the chassis (and body) are 'live' and only one feed wire is required. To accommodate this, a 1mm dia. hole is drilled, right through the mainframe, in the corner where the cab rear meets the RH side sheet. As the speaker protrudes down into the cab area and would be easily seen, a cab 'curtain' or similar artifice has to be added to the cab opening. Likewise, the driver figure needs the top of his head removing, about level with his hairline. The result is a little odd looking (shades of Baron Von Frankenstein) but not really noticeable once fitted in position.

The two capacitors are mounted in the space between the two 'engine' side pieces in the upper engine housing. From this point it is a simple matter of connecting everything up with thin stranded wires – about 0.50mm o.d. is fine – they do not carry a lot of current.



Wiring Diagram – Two capacitors. 40 μ f, 25volt
Speaker - 8 ohm impedance

From here on it is plain sailing and my own model is now awaiting its turn in the 'paint shop'. This will probably be done after this issue of the REVIEW goes to print. To make it obviously different, this loco will be painted in standard 'RH' colours – olive green and black. It will, no doubt, be subjected to the 'dirt, damage and decay' treatment as well. The driver figure casting will need some modification to make him look different from the chap in the LBT; no-one can be in two places at once!



The LAT showing the brass plate loudspeaker holder, the loudspeaker and the two capacitors, arranged 'back to back'. The speaker leads will be replaced with finer stranded wire.