



# FENCE HOUSES

## MODEL-FOUNDRY

### 2mm Finescale 0-6-0 LMS 3F ("Jinty") Chassis kit No 3 for use with 9mm dia wheels

This chassis kit is designed for you to build on and complete your loco. What you are getting here is a time saver, in the form of a kit, which is very accurate and will, given a bit of patience and positive thinking from you, produce a nice working model.

The Farish Jinty body has been used by some to complete their loco.

These instructions therefore, describe how the chassis can be constructed, and it is left to the builder to make whatever provision felt necessary to mate his chassis to the proposed body. See later page for the exploded sketch detailing general construction methods.

I have for convenience, included in the kit, paper patterns and PCB strip for chassis spacers, taken from my previous J72 tank loco kit. However, there is nothing to stop you altering whatever you wish to suit your own requirements.

The frames for the loco have extensions to take the Association assembly jig. I would recommend you use it to get a square and parallel chassis.

As the jig is designed for use with a different thickness frame material than you are about to use, two replacement spacers are included for you to fold up and use with the jig.

A motor mount is supplied to take the Mashima motor supplied from shop 3, and is to be fixed to a PCB spacer at the rear of the chassis. The motor has to be cut around the rear wheels to seat correctly.

The front of the motor is best anchored by soldering the phosphor bronze brush strips directly to the loco frames, after checking for correct worm/gear mesh. You as Chief Mechanical Engineer, may of course choose any fixing position, or even a completely different motor, it's up to you.

#### PRELIMINARIES

The instructions are primarily for the beginner, but even the experienced need to know how the kit has been designed to fit together! Don't blame me if you can't be bothered to read them! So BEFORE starting any work on the model, look at the 'exploded' sketch, read through these instructions and make yourself familiar with the various parts on the etched sheet, and the numerical references on the sketch. Half etched fold lines for the jig spacers, frames and motor mount are on the INSIDE of the bend. HOWEVER, the hinge tabs for the coupling rods are on the OUTSIDE, that is, the flush faces should be bent so they come together.

There are various methods of constructing etched kits, but soldering is recommended as the only practical method of assembly.

#### TOOLS

25 watt soldering iron, flux and solder, and a resistance soldering unit if you can afford it. A good selection of needle files, pin vice or archimedian drill with a stock of small drills 0.3mm and up. Jewellers broaches are also handy items to have as alternatives to the small drills for clearing out or increasing hole sizes. A five sided cutting broach, No 40 (0.098 ins - 2.46mm) is required for the fitting of the axle bushes (Eileens Emporium, but other model suppliers will have them). A modelling knife, for cutting tabs to release individual items from the etch sheet, is required. A firm base such as chipboard should be used to press on, otherwise distortion of the metal could occur. Metal or hardwood bending bar(s) or good vice with smooth parallel jaws to assist with the bending processes. A piercing saw, drill and cutting discs are required. If using the "springing" method referred to later, you also need a 1.6mm dia drill.

#### KIT CONSTRUCTION

This kit has been designed to utilize components available from the 2mm scale Association. You need the following:-

S3-007 9mm spoked driving wheels (3 pairs)

S3-100 muffs

S3-101 gear muffs

S3-110 loco axle steel

S3-113 frame bushes

S3-251 Mashima 9/16 motor

S3-340 64 DP 13T gear (or 3-341 14T as alternative)

S3-343 64 DP 18T gear

S3-362 100 DP worm/gear set 30-1

The above can be ordered from Shop 3.

In addition, if you don't already have one, you need 3-270 Loco frame assembly jig, and your choice of couplings.

Only remove items from the fret as and when required, in case of loss. Alternatively a tin to keep things in can be handy.

The coupling rods have fold "hinges" to keep them together whilst soldering to form the double thickness, also the end and middle "bosses" to the rods. Don't cut them off until after soldering the unit together.

Study the fret and identify all the bits. After detaching the various parts you need to clean off the attachment tabs, ESPECIALLY any on the base of the frame extensions, as these will need to lie flat on your building board, to keep the chassis square.

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2) Refer to the 'exploded' sketch. Start with the replacement loco jig assembly spacers 1). If you have already made these up for one of my other kits, you can use them, as they are the same size (7mm overall width outside). The spacers are required to suit the kit frame material, which is thinner than that for which the jig was designed. Simply fold up the spacers into a box and solder at the edges, cleaning off any surplus solder afterwards. Ream out the holes if necessary to JUST fit the 1.5 axle steel of the jig. Take 8 No frame bushes (3-113) and using your five sided cutting broach, ream out the loco frames 2) & 3) to JUST take the individual bushes. Identify each bush to each hole, as there can be very slight differences in the outside diameters. Make sure you don't have any rogue bushes, where the hole in the bush is way off centre. This would be unusual but has been known! The big flange of the bush goes on the INSIDE of each frame, and fits tight against it. To obtain this fit, file off any raised edge burr on the frames, caused by the reaming process. Note the frames are handed left and right, numbers and firebox rivets etc. are on the OUTSIDE. Solder the big flange of the bushes on the INSIDE of the frame, and file flush with the OUTSIDE of the frame. DON'T distort the frames when filing!

Ream out the holes in the bushes to take the 1.5mm dia wheel axles and rod for the gear idler, doing this equally from each side. The axles/rod should spin freely, but without "slop", MAKE SURE you ream the holes square to the frames. It's easier to do this, with the frames in the jig.

Make sure there are no tab remnants on the bottom of the frame extensions, these need to be perfectly flat on your workbase (preferably plate glass etc.), to ensure the chassis is not twisted, when soldering in the PCB spacers, later on. Fit left hand loco frame 2), and right hand loco frame 3) in the jig using the new spacers 1). Do not distort the frames when handling from now on.

At this point I would recommend you use the "electrical springing" method of pickup. I mention it now, as if you go with this, you need to plan the positions of the spacers, to miss the wire springs involved. Holes for the wires are etched in the frames. Having seen the difference that springing makes to the running qualities, I offer the system if you wish to try it. The whole thing is described in the August 1999 issue of the 2mm Magazine.

Cut out, IN ONE PIECE, each of the full size paper spacer template strips (see bottom of page 4), and lightly glue to the PCB strip. When dry, and to suit YOUR OWN REQUIREMENTS, drill out any holes 1.4mm dia to clear 12BA screws, and cut the WHOLE STRIP to correct width as one unit. Cut slightly oversize and file to final width, keeping this constant. Cut individual spacers to length as required, and gap the spacers by running a sharp edged needle file along the paths suggested on the paper template. NOTE the dotted lines are for the OTHER side of the PCB, I.E. both sides of the PCB need to be gapped. Ensure that the copper coating is fully removed by your needle file in the narrow line you are filing, say 0.5/1mm wide. Check that each section is ELECTRICALLY SEPARATED from its neighbour. This is best done with a meter, if you have one. Make sure any fixing bolt heads will not bridge the gapped areas. Remove the paper from the copper, and clean up ready for soldering to the frames.

Reassemble the frames (correct way round!) in the jig, and solder each spacer in place, TO SUIT YOUR LOCO, depending on where you have decided to fit the chassis to the footplate/smokebox/cab etc. Ensure the frames stay isolated from each other and be sure to miss any gear positions (see below under Muffs and Gears) on the loco chassis.

NOTE the TOPS of the loco frames 2) and 3), have slight steps both front and rear, to take 5 thou plastikard insulation strips. Any spacers fitted here should have their tops fitted level with the lower part of the step. The position of your frame spacers should take account of your proposed motor design, and it's fitting requirements.

Remove the jig and store it away, and check the frames for electrical isolation from each other and squareness. Cut off the frame extensions for the jig, and ensure the frames do not make contact with your footplate/body. Use thin plastikard for isolation as required.

#### MUFFS AND GEARS.

The following gear arrangement is illustrated bottom left, on page 10 of the 1999 year book, but a 20T gear is shown instead of the 13T and a 28T instead of the 18T that we are going to use. Before fitting the gears, you need to cut the muffs to length (see below), and put holes in them, one for each half axle, to allow the air to escape when fitting and securing the wheel axles. This is done by drilling, a 1.5mm dia. hole from one side of the muff, through to the centre, axle hole. When the wheels are fitted, these holes are to be filled with superglue to secure the axles. The muff with both gears on, will only allow one hole, due to the gears getting in the way, so drill the hole near to the centre on the other side of the gears. Try to get holes each side of the centre, on the muff with the 18T gear.

Take the two gear muffs (3-101), and check for length between the frame BUSHES. You need say 5 thou clearance EACH SIDE (more clearance is required if using the "springs", on the driving wheel axles, as the springs fit between the end of the muff and the inside of the bush). NOTE, Don't shorten the short shoulder, reduce the LONG SHOULDER ONLY, and make sure the ends are square and neatly finished off, otherwise the muff could catch and drag against the bush when revolving. On ONE muff, fit the 18 tooth 64 DP gear (3-343) on the SHORT shoulder, tight up against the raised rib, and square to the muff, using your favourite super glue. Keep any glue away from the gear teeth!. On the OTHER muff fit the 13 tooth 64 DP gear, again on the SHORT shoulder of that muff. Now, on this same muff with the 13 tooth gear, fit the 30 tooth 100 DP gear on the LONG shoulder, again tight up against the raised rib, and square to the muff. The 18T gear/muff is to have a set of wheels fitted later, and the 13/30T/muff will have two half axles of the 1.5 rod, fixing it to the raised hole in the frames.

Axle muffs (3-100) come next. Check as for the other muffs, reduce length as necessary, and drill air/glue holes. Check the muffs will take the wheel axles, but don't force them in. The wheels are not to be fitted till later, and in anycase they have to pass through the frames first!. If the axles are very tight in the muffs, you will have to GENTLY ream out, BUT NOT TOO MUCH. The fit should still be tight.

#### COUPLING RODS AND WHEELS

Remove left hand coupling rod assembly 4). Use a knife to press gently in the middle of the tabs on the flush side, to cause a bend to start. Continue the bend through 180 deg, line up the holes and solder together along the edges. Try not to get solder in the holes. The end bosses are now bent over and soldered in a similar manner, again with the flush side bending back on itself, and the holes lining up. Repeat the process for the centre dummy pivoted boss, making sure this is on the same side as the two end bosses and the flutes on the rods. Clear the holes of any solder, and ream out, if necessary, to take the 0.65mm crank pins. Clean off any fret and "hinge" tabs. Repeat with right hand rods 5).

Fit each crank pin from the rear of the wheel, making sure it is set at 90 degrees to the wheel. The pins are approx 0.65mm dia, and are supplied in the kit. Fit the pins independently, as you did the frame bushes, by carefully reaming out to fit quite tightly. Cut off each pin head before fitting. Use minimum solder to fix to the inside of the wheel, and file excess solder flat to finish off. Cut off the surplus on the outer side of the wheel, leaving about 4mm of the pin protruding, and smooth off the end, so that you can fit temporary plastic retaining rings later (sheathing from layout wire), to keep the coupling rods in place.

3)

If you intend to use the springing method, now is the time to fit them.

Fit the muff with the 18 tooth gear, at the rear wheel position in the chassis. There is not a lot of room to play with, from the ends of the muff to the bushes, so you have to ensure that as well as getting the wheels to the correct 'back to back' (use the Association gauge) the muff is set CENTRAL on the two half axles, between the frames and bushes. ALSO you will have to quarter the wheelset with the correct "lead", that is, when the LEFT hand crank boss/pin (looking towards the front of the loco from the cab) is vertical and facing downward, the RIGHT hand boss/pin is horizontal and facing backwards (towards the cab). It does not matter if the lead is not exactly 90 degrees, but all subsequent wheelsets must be the same. Each time you alter the 'lead', check the 'back to back' again. Different Railway company's "lead" was not always the same as here.

Secure the axles in the muffs, check for free running, then superglue through the 1.5mm holes you drilled out. This wheelset is now the datum to match the others to.

Fit the second wheelset, at the front, doing all the checks as above, but glue only the half axle on the left hand wheel. To quarter the second wheelset, set both left hand wheels with cranks vertical, then turn the chassis over and alter the right hand wheel crank pin of the second wheelset to match the first. Check the 'back to back' and repeat this and the quartering as necessary until all looks well. Try the coupling rods, and make sure these are the correct way round, with the flutes on the outside, and the oil boxes on top. Note the wheel centres are not equal. The chassis should roll when placed on a slight gradient, but will be restricted by the springs, if you have used that method. There is a big difference between this restriction and "binding" or "sticking" due to quartering problems, or too small holes in the rods. Take time to study the chassis movements and don't jump too soon, into carving lumps of metal off! If it sticks, try one rod at a time, and if it works with one rod but not two, then the quartering is out and needs adjusting. If the quartering is good, you may have to VERY slightly open up the holes in the coupling rods by reaming. Detect where it is tight, and open up in that direction. Do not overdo the enlarging.

When satisfied the chassis will roll WITHOUT ANY TRACE OF BINDING, secure the other half axle of the second wheelset with glue, and again check the 'back to back'

Be very critical, don't proceed further until everything works correctly.

Now tackle the middle wheelset, same procedure as before, and try the rods. It may be necessary to alter the quartering and/or the holes in the rods slightly, but again, be careful, and remember the all important 'back to back' before gluing the last axle.

Do not finally secure the coupling rods yet, (see brakes, below), rods need to be off to fit brakes). Use temporary fixings of short lengths of small dia electrical wire coating, stripped off and pushed over the crank pin ends.

#### DRIVE AND SPUR GEARS

Two short lengths of loco axle steel rod (3-110) are required, approximately 3.25mm long, extending from the outside of the topmost frame bushes to 0.5mm SHORT of the centre line of the chassis, I.E., leaving a 1mm gap in the middle for electrical isolation. Clean up the ends which are offered to the muff, by putting a slight chamfer around the edge to provide a 'lead in'. Before fitting the 13/30T gear muff to the chassis, ensure once more that the axle rod will revolve freely in the bushes. When happy with this, fit the muff between the frames, with the 13 or 14 tooth gear in line with the 18 tooth gear on the driven axle, and make sure the 30T gear and the muff, are set CENTRAL when the ends of the rods are flush with the outside of the bushes in the frames. Check that the gear unit and wheels/coupling rods spin freely, when flicked with a finger (again, allow for any "springing" restriction). Fill the glue holes to secure the axles, and make sure you don't allow any to stray where it should not.

Usually the worm is too long, and should be cut down in length to suit.

#### MOTOR.

Motor mount inner 6), and outer 7) should be bent through 90 deg at the fold line near the two round holes. Note 7) fits on top of 6), and the holes all line up. Solder along the edges to form one unit, BUT DONT solder the fold line, as this may need to be altered from 90 deg, to get the worm to fit properly to the gear later on.

Rear tab latch 8) is bent over 180 deg, to line up the hexagonal holes, and soldered together. Solder two 12 BA nuts in the holes, so that they are flush one side of the latch, and square to it. (The latch will eventually be threaded through the slot in 6/7, see below).

Secure motor mount UNDERNEATH the rear frame spacer of the chassis, by passing two 12BA screws through from underneath, and through the nuts in the tab latch, which sits with the flush face on TOP of the rear frame spacer. Tighten the parts together (tab latch, spacer and motor mount), cut off the projecting screws, and file flush with the top of the nuts. The tab latch 8), could be used to secure the chassis to the body by making a slot in the rear buffer beam for this to pass through.

The motor may have to be cut down to get it to fit in the body. I know at least one person who has completed a "Jinty", so if you get stuck, give me a call and I will get some advice for you.

Ensure the motor is working satisfactorily, and check for correct directional rotation of shaft. With POSITIVE electric wire on RIGHT brush, that is, looking from the rear of the motor, the shaft should rotate clockwise. If it does, mark the top. If the rotation is wrong, turn the motor over and then mark the top. If your other locos/motors run the other way, then make this one the same. Once cut to shape, the motor only fits in one way! Set the motor to the lowest setting in the elongated holes in the mount that still keeps the motor above the chassis frames, bending the motor mount if necessary, and bring down the worm into contact with the 30 tooth gear on the chassis. Be carefull not to keep bending back and forth, as this could snap off the mount at the fold line. Bend the brush arms in around the motor, towards the worm, then forward again towards the raised rounded part of the chassis, where you need to solder ONE of the arms to secure the worm in the correct position over the 30 tooth gear. Mesh the worm and the gear, and make sure the worm is CENTRAL over the gear. Try revolving the armature gently with a finger. Hopefully you get it right first time, but if not, de-solder the arm, and try again. Assuming no tight spot, you can solder the second arm on. Now test the meshing with the power on.

#### 4) BRAKES AND RODDING

Fold up three left hand brake cradle/hangers (10), as sketch below. If you intend to permanently fix the brakes, after fitting the wheels, then just locate the units by lining up the holes with those on the chassis, using 0.3mm wire, at the same time mating the tab of the cradle with the slot on the chassis frame, and solder together. Brake connecting rod (12), is designed to fit outside the frame, and onto the wire holding the cradles. The rear end fits (via a piece of 0.3mm dia wire) in line with the bracket extension on the rear of the chassis. Repeat the brake/cradles for the right hand side, using part 9).

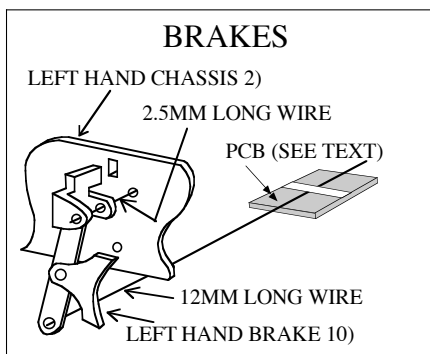
If you wish to make the brakes removable, use the method shown in the sketch below, where the top short wire springs the cradle against the frame, to keep it in position. The bottom, longer wire, spans the full chassis width. Locate the right hand cradle (9), with the 12mm long wire threaded through the bottom hole of the hanger, in the opposite side of the chassis, using the same method, and, holding the cradles against the chassis with thumb and forefinger, solder the 12mm wire, such that the brake shoes line up with the wheels. Snip off the excess of the 12mm long wire, and clean up the ends. Now use the same procedure, to fix on the middle and then the rear brakes.

Nothing is soldered to the chassis with this method, but we have still caused a short circuit, by bridging the two frames. To get over this problem, gap one side of the 0.32mm thick PCB supplied, and solder the other, ungapped side, to the middle of the wire spanning the chassis. Next, cut through the wire and the remaining copper coating of the PCB. This is best done with a cutting disc in your small drill, as sawing would snag and distort the unit. Repeat for the remaining brakes and ensure the short is no longer there.

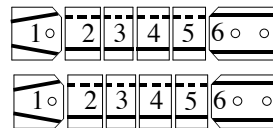
The idea is that removal of the brakes can be carried out by 'springing' the top 2.5mm wires and cradle tabs, out of the holes, but keeping the unit as one, by the connection of the bottom wire.

To finish off the coupling rods, use a washer (14) on the crank pin on top of the rod, as a retainer. Place thin paper between the units, so you don't solder the things together! and remove after soldering the outer washer on.

If you have enjoyed putting this kit together, don't be shy, tell others about it!!



SPACER TEMPLATES FOR FRAMES  
AS USED FOR ONE OF MY PREVIOUS KITS. (THE J72 TANK)  
USE OR ALTER TO SUIT YOUR OWN SITUATION.



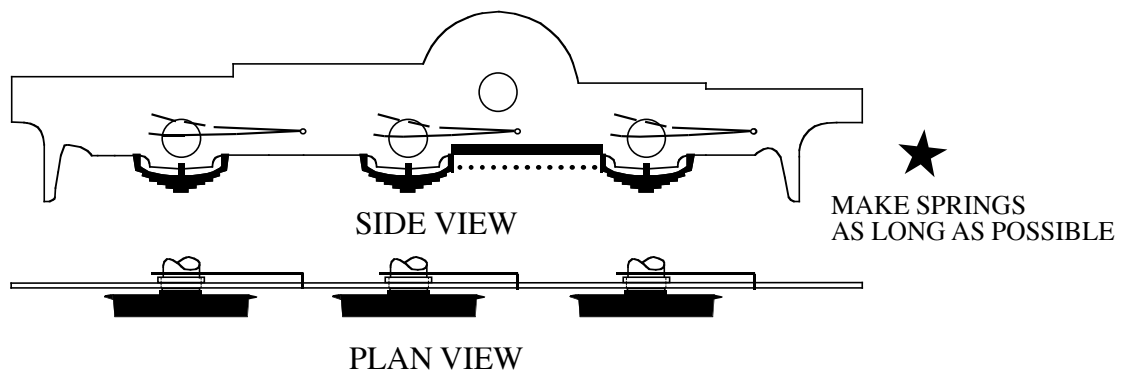
## FENCE HOUSES MODEL FOUNDRY

### AN ALTERNATIVE METHOD OF CHASSIS CONSTRUCTION, INVOLVING SPRINGING OF THE AXLES

Having now built my second J72 loco kit, and seen the difference that springing makes to the running qualities, I offer the following details if you wish to try it.

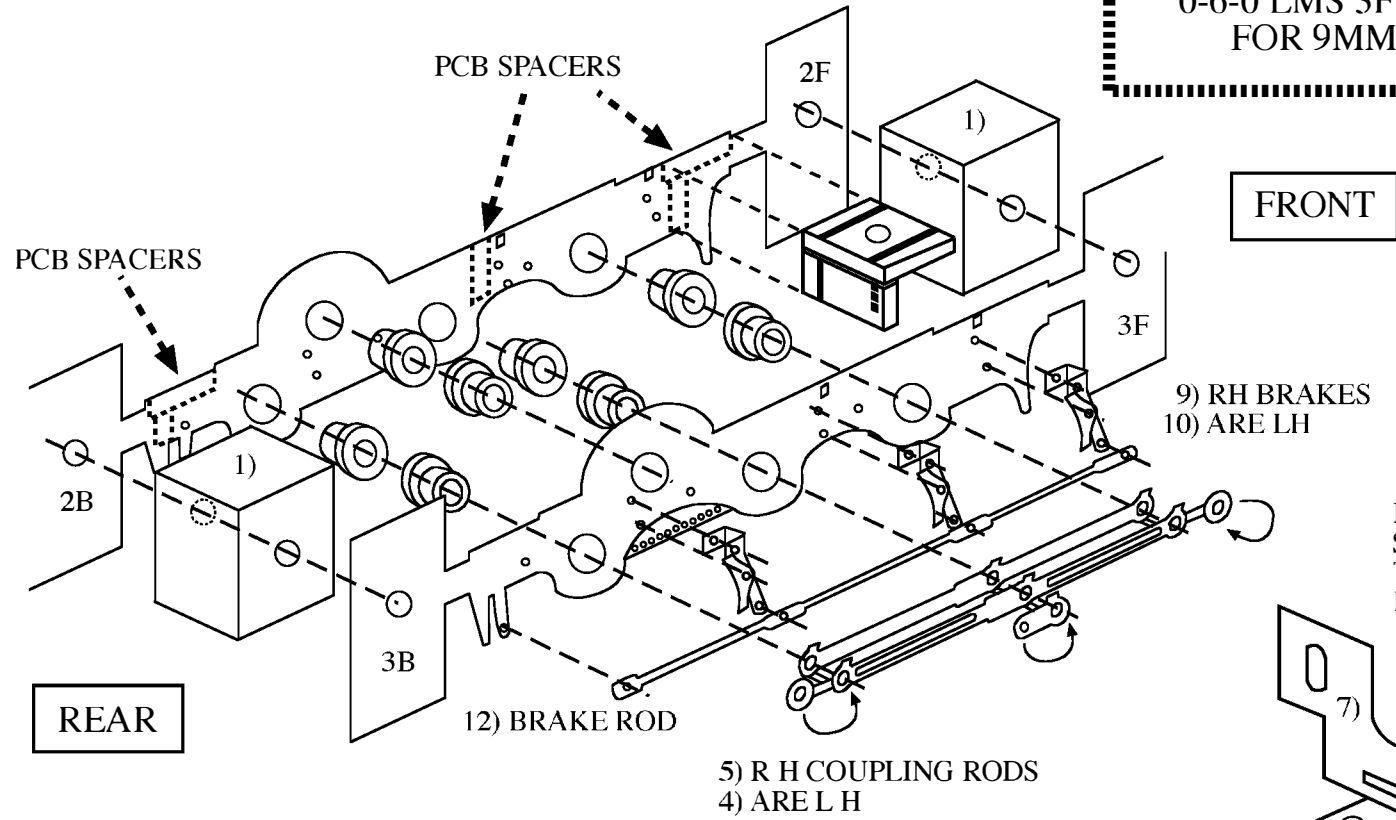
The original idea comes from Mick Simpson, and involves going against all those rules concerning chassis construction, that have been passed down to us through the years, and included in my original instructions! Instead of keeping everything 'just so', regarding clearances of axle / hole, with this method you deliberately create 'slop' in the hole, and then spring each axle independently. The result, is that all the wheels stay in contact with the track, and electrical contact, and therefore good running, is virtually guaranteed. The 'springs', are in fact not for pressing the wheels down, but floating electrical contacts. Only very fine phosphor bronze spring wire is used, such as can be obtained from spare 'N' gauge couplings, or motor brush springs. This is straightened out, bent 90 deg and soldered to the inside of the chassis, so that it lies parallel with the frame, just between the bush and the end of the muff, and bears down onto the top of the axle. The holes (in the case of the J72 kit, the bushes), are reamed out as the kit instructions, but then, a 1.6mm drill is used carefully and HAND TURNED using a pin vice, to produce the requisite enlargement in diameter.

As I was aware of Mick's preference for springing when designing the kit, I incorporated three holes in each frame for the wire, see sketch below. Note how the springs lie across the middle of the axle hole, prior to inserting the wheel, and are then deflected upwards by the axle. Make the springs as long as possible, so as not to create too much pressure on the axle, although due to the small dia. of the wire, this is unlikely to cause any problem.

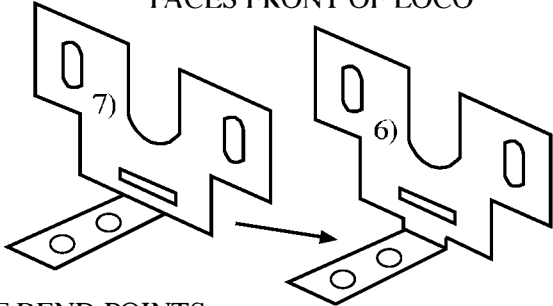


LOCO CHASSIS

FENCE HOUSES MODEL FOUNDRY  
 CHASSIS KIT No 3  
 0-6-0 LMS 3F ("JINTY") CHASSIS  
 FOR 9MM DIAM. WHEELS



MOTOR MOUNTS  
 SHOWN THIS WAY FOR CLARITY  
 TURN 180 DEGREES SO TWO HOLE TAB  
 FACES FRONT OF LOCO



NOTE BEND POINTS  
 7) FITS ON TOP OF 6)  
 AND HOLES LINE UP.  
 SLOTS ARE TO TAKE 8) TAB LATCH

INSTRUCTION SHEET No 1  
 LOCO CHASSIS  
 GENERAL ARRANGEMENT  
 (NOT TO SCALE)