EDM Models

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MANNING WARDLE ex-Penrhyn Quarry Railway Narrow Gauge 0-4-0 `Jubilee 1897'

7mm Scale kit for 16.5mm or 14mm Gauge

Introduction

This kit, which was researched jointly by Jonathon Matthews and Pete Stamper, can be assembled to produce a 7mm scale model of the narrow gauge Manning Wardle "Jubilee 1897" to run on either 16.5mm or 14mm gauge track. The kit, designed for ease of assembly, has comprehensive illustrated instructions.

This kit, like all the others in the EDM Models Agenoria Range, was originally released by Pete Stamper trading as Agenoria Models. EDM Models acquired the narrow gauge part of the range when Pete retired and we are delighted to continue to make them available. The 0 & 00 standard gauge Agenoria Models are available from others

An 'Antex' 25 watt soldering iron, 'Fry's Powerflo Flux'and 145 degree or 60/40 solder are recommended. Please familiarise yourself with the kit before commencing. The loco appeared with different modifications at various stages of its life. Some the variants can be accommodated with this kit. At one stage it had dumb buffers and simple centre coupling hook' At a later stage, and in its present state, it has a centre combined steel buffer and coupler. Both can be accommodated with this kit or you may wish to use your own coupling system.

The kit has etched nickel silver (0.015") inner and outer (dummy) chassis, with two sets of spacers (one for 14mm and one for 16.5mm gauge) designed to give correct relative positioning of the frames. Two sets of spacers are supplied: one for 16.5mm gauge and one for 14mm. Make sure that you use the correct spacers. The etched brass (0.012" body has pre-rolled tank, boiler, smokebox and firebox. Cast fittings are a mixture of white metal (w/m) and lost wax (l/wl brass. Wheel bearings, handrail knobs IHRK) and wire are supplied.

Name/works plates are available

If you want to build an accurate model of this particular loco it essential to have a clear idea with photographs, of your requirements. This kit, produced from measurements made of 'Jubilee 1897' preserved and presently located in the Narrow Gauge Museum at Tywyn.

The basic kit requires gears, wheels; pick-ups and motor (see below) to produce a complete unpainted running model. To complete an unpainted running model you require the following components:

a) 2 Romford extended axles (for either 14mm or 16.Smm);
b) 2 Romford 15mm insulated wheels (RP25 profile);
c) 2 Romford 15mm plain wheels (RP25 profile);
d) (Alternatively use 4 Romford 15mm insulated wheels (RP25) with pick-ups wired on both sides of the chassis.)

e) Paxolin (copper clad) plus brass, phosphor bronze or nickel silver wire;
f) Mashima 12120 motor;
g) Ultrascale 38:1 gears.

Please Note: At present EDM Models cannot supply these components

Special thanks are due to the following for their assistance in the production of this kit:

- Jim Wood and the staff at the Talyllyn Railway and the Narrow Gauge Railway Museum at Tywyn;
- Keith Millard for supplying GA drawings and permission to use them.

PROTOTYPE NOTES

This kit is based on the unique 1ft 11.5in gauge (nominal2') engine built in 1897 (w/no 1382) by Manning, Wardle & Co Ltd of Leeds. Originally the loco was supplied to the Cilgwyn Quarry, Nantlle in North Wales. In 1928 it was sold to the Penrhyn Quarry Railway for £150. Originally, it was purchased as a replacement for the Baldwin locos. The Fullersite traffic that it was intended for did not materialise and after originally working at Port Penrhyn it worked in the quarry on Red Lion level until it was withdrawn in 1955. It went to Tywyn, in 1963, for preservation, after being stored disused at Penrhyn's Coed-y-Parc workshops. The loco has been cosmetically restored in non-working order and currently resides in the Narrow Gauge Railway Museum at Tywyn. At one time, while working in the quarry, 'Jubilee 1897' was painted unlined black, while at another time (and today in preservation) it carried the lined black Penrhyn livery. The lined black Penrhyn livery is very similar to that of the LNWR.

Manning, Wardle & Co Ltd constructed many narrow gauge locos. 'Jubilee 1897' is typical of and similar to many narrow gauge designs from this manufacturer with a saddle tank that does not cover the smokebox or firebox. The latter is of the classical 'haystack' design, so popular with this manufacturer. The cab is commodious, a rare luxury on many quarry locos. The loco is relatively large, especially considering that it is an 0-4-0ST.

The loco seems to have changed relatively little during its lifetime, a rarity among industrial locos. At one time it was fitted with ordinary wooden steel-faced dumb buffers and a simple central coupling. Later it lost its dumb buffers and acquired a centre-mounted steel buffer which had an integral coupler. At the same time it probably acquired chain haulage hooks on its buffer beams. When constructed, the loco had a pair of front but no rear sandboxes. However, at some time in its life it lost the right hand box, but retained the left one. A front lamp bracket also appears to have been fitted at one time. Two types of smokebox dart have been fitted. The original one was probably the standard Manning, Wardle wheel-type. A two-handled version is now fitted. In its preserved (stuffed and mounted) condition the loco has the following: central buffers with integral coupler; chain haulage hooks; left hand sandbox only; no front lamp bracket and a two-handled dart. All of these variants are covered with this kit.

Useful references

- 'Narrow Gauge Railways in North Caernarvonshire', Volume 1 `The West'.
- 'Narrow Gauge Railways in North Caernarvonshire', Volume 2. 'The Penrhyn Quarry Railways'

Both by JIC Boyd

For those with online access:
http://www.ngrm.org.uk/Collections/IndustrialRailways/PenrhynQuarries/PQ042

ASSEMBLY INSTRUCTIONS

STAGE 1, CHASSIS

a) Two sets of spacers for the inner frames are supplied. For 16.5mm gauge use: front (85); middle front (84); middle (84)(cut off the part of the spacer which does not have the side pieces); middle rear (86) and rear (85). For 14mm gauge use: front (88); middle front (89); middle (89)(cut off the part of the spacer that does not have the side pieces); middle rear (87) and rear (88). The middle front spacer ((84) or (89)) serves as a platform in which lead weight can be placed, if required to balance the weight of the motor. The outer (dummy) frames fit against the extended spacer tabs - do not file down these tabs, except for those on rear spacer (85) or (88) (see diagram). Remove after assembling inner chassis.

b) Solder wheel bearings (shoulders to the outside) into inner chassis sides (71): these are not handed, but remember to make a right and a left handed pair. Assemble the inner chassis using the correct spacers. Remove excess metal from the outsides of the shoulders so that the wheels run freely, with minimum side-play, when fitted.

c) Solder 0.45mm wire through brake hanger holes in (71) and fit brakes (74) on each side - rear wheels only. You can laminate 2 x (74), if you wish, but ensure that the brakes line up with, but miss the wheels when fitted. Bend up lower firebox/ashpan assemblies: left (32); right (34), and solder to chassis (tabs/slots).

d) Solder on end plates (95), in which there are three pairs of slots: the outer dummy frames slot into the outer pair; 14mm frames fit into the inner set and 16.5mm frames go into the middle pair (see diagram).

e) Fit correctly-quartered wheels (right-lead). The motor and gears can be fitted at this stage. If they are fitted later, a partial dismantling job will be necessary. The gear wheel can be left loose until the rods have been fitted and set-up. The motor (Mashima 12/20) with flat faces to front and rear, fastened to mount (NG14J), fits behind the rear wheels and sits back at a slight angle in the firebox. If fitting axles for14mm gauge, position the spacer (on the mount fret) in between the motor and the mount, to enable the motor to clear the flanges.

f) The following instructions apply to the fitting of Romford RP25 wheels for either 16.5mm or 14mm gauge. If fitting wheels from another manufacturer, follow their instructions. Run a 10BA nut down the threaded part of the extended axle up to the locking screw of the wheel and tighten. Pass a lost wax cast crank over the end of the axle up against the nut. Check that the outer frames will just clear the cranks, if not, fit a 10BA washer between the nut and wheel. As a rough guide you should need one washer for 16.5mm and two for 14mm, but do check. Line-up, by eye, three of the cranks with holes in the wheels and solder cast cranks to the nuts. The fourth one is soldered after final adjustment when fitting the rods. Cut off extended axles, level with cranks.

g) Laminate coupling rods: inner (82); outer (81) and fit to crankpins. When free running is achieved, solder fourth crankpin to nut (see above) on extended axle. Solder brass collars to front crankpins only and file down, to ensure crosshead will be missed when fitted. As an alternative you can use etched collars (113), again on the front wheels only.

h) To fit top wiper pick-ups, solder copper-clad (Paxolin) strip into slots in tops of chassis. Remember to cut a gap in the copper on the insulated side. Use nickel silver, phosphor bronze or brass wire, soldered on underside of copper-clad, for contact with the wheels. If fitting insulated wheels on each side, carry out the above procedure on both sides.

i) Pass 0.7mm wire through holes on bottom rear edges of frames and thread on and solder two laminated brake pivots (72), positioned 3mm from the outside of the right frame side. Cut outer sides of wire level with outside edges of extended spacer tabs, i.e. level with outside frames.

j) Fit outer frames (70), which fit in the outside pair of slots in (95) and up against the outer extended tabs of the spacers. When all is finished the outer frames can be soldered in place.

k) Fold up cylinders (90), bend down tabs and solder an 8BA screw through each hole. Fold up slide bars (75) with half-etched marks on the outside. Solder together and remove half-etched cross pieces (see diagram). Assemble into cylinders and remember to make a right and a left handed pair. When fitting to cylinders you may find it easier if you open up, to the edge, each rectangular hole in the rear face of the cylinder. Fit half-etched strips (76) to outer faces of slide bars (note the shape). Solder front end plates (98) & (99) to cylinders, drill out middle hole an insert a small HRK. Add rear flanges (96) and (97) and wrapper (91). Fit cast white metal stuffing glands to cylinders and ensure that piston rods will move in them freely. Secure each cylinder to outer frame with an 8BA nut screwed onto the screw in the cylinder.

l) Fabricate connecting rods by lamination of inner (80) and outer (79). Use 16BA nut and screw to attach to cast crosshead and assemble into cylinders; cut piston rod to required length. Add bearing brass (62) to each connecting rod and use brass collar, or etched variety (113), to secure to crankpin.

m) Lamination of two (105) makes a motion bracket, which is soldered into slots in outer frame top. Dimple rivets, fold up brackets (104) and solder to outer frames up against and either side of the motion brackets.. Adjust cylinder position and cut slide bars to length. On the outer frames solder cylinder brackets (93) to front and rear edges of each cylinder. Add end frame brackets (92).

n) Solder a long 8BA screw through the front hole in front spacer (85)/(88). This is for attaching the front coupling. The rear coupling fastens on the same long screw that is used for the rear chassis/body mounting.

STAGE 2, CAB & FOOTPLATE

a) Dimple out rivets in footplate (1). Fold down pieces at front of footplate to make ledges on which (41) sits - fit (41) after fitting the smokebox/tank assembly, later. Fold down front buffer beam and solder on outer buffer beam (20). Solder valances (11) into half-etched strips along edge of (1) and up against front buffer beam. Laminate inner (23) and outer (22) rear buffer beams and solder up against rear edges of valances. Add strengthening brackets (52) to rear buffer beams and underside of footplate (half etched position marks).

b) The loco had two different types of buffing/coupling systems at different times: the central buffer (as fitted now) with integral coupler; and a pair of dumb buffers with separate coupler.

I. <u>Central buffer/coupling.</u>

Drill out the four (marked) holes in front and rear outer buffer beams for chain haulage hooks and fit short large HRKs with holes horizontal. Open up central slots in outer beams to size of inner beams and check that the cast central buffer/coupling will fit through slots. Solder folded brackets (109) centrally to top and bottom edges of slots. Attach buffer plate (77) to centre of cast buffer/coupling and bend back slightly, the two outer edges of (77). Attach cast link, using a short length of wire. Fit coupler assembly at finishing stages.

II. <u>Dumb buffers & separate coupling.</u>

Fold up buffer bodies (107), attach front faces (108) and solder to buffer beams with the taper side on the buffer to the outside. The buffers are positioned 0.5mm from the bottom and 0.5mm from the edge of the buffer beam. Attach link (cast or etched) to coupling using brass wire. Fit coupling at final stage.

c) Dimple out rivets in cab backplate (49) and cab sides: (25) right; (30) left. Solder spectacle rims (2) to outside of (49) (half-etched rims are inside). Solder spectacle rims (27) to outside of cab front (51) (half-etched rims are inside). Retain 0.75mm of tabs on (27) for spectacle pivots, which are located at top and bottom. Add cover plate (9) to outside of opening in (49) and to the inside add bent hooks (110) & (111), which fit over dimpled rivets directly below spectacles.

d) Solder cab rear plate (49) inside and against rear edges of cab right (25) and left (30). Solder cab front (51) inside and against upper front edges of cab sides - the cab front plate lines up with marks on the bottom edges of the cab sides. Add headings to bottom edges cab side openings. Do not cut out cross pieces or headings in cab openings until the cab is attached to the footplate. Add folded strapping (46) (face upwards) to inside of (49), level with the bottom edges of cab openings. Attach rear lamp bracket (112) to middle outside of (49) at half-etched point mark. Bent 0.45mm wire through holes in cab sides makes grab handles.

e) Solder four formers (33) into slots in (51), curved corners outside and outer edges against side sheets (25)/(30). Bend round front extensions of cab sides to produce front outer bunkers. Cut to length and add top headings (24) to bunker tops.

f) Solder a short 8BA screw into hole in front of footplate and solder a long 8BA screw centrally into half-etched panel under cab end: these are for chassis/body mounting.

g) Fit cab assembly to footplate (tabs/slots) and cut out cross pieces and headings (36) in cab openings. Dimple rivets in roof (19), bend to cab profile and add rivet strip (8) centrally across middle. Fold up roof edges to make rain strips. Add safety valve openings (26).

h) Solder reverse lever pivot (103) into half-etched panel under right side of footplate.

i) Fold up cab steps (16), add rivet strips (61) and solder assemblies to underside of footplate - line up with marks and add gussets (31). You may prefer to do this job later if you are afraid that you might damage the steps.

STAGE 3, TANK, BOILER & SMOKEBOX

a) Assemble tank from pre-formed wrapper (58) (arrow to front) and formers: front (39); middle (38) and rear (37). The front and rear formers fit inside the wrapper right against the edge, and centre marks on each former line up with the corresponding marks on the tank. Formers (37) & (39) fit inside the tank wrapper right against the edges. Start with front and rear formers and finish with the middle one. Start at the centring marks and solder down to the half etched fold lines on the wrapper. When all the formers are in place fold under the bottom strips to make the tank base. Solder in small HRKs from the inside.

b) Construct smokebox from pre-formed inner wrapper (55) - arrow to front, and front former (13) and rear former (40). Line up centring marks. As with the tank, the formers fit inside the wrapper right against the edges. Use fine abrasive paper to round off slightly the front and rear smokebox edges. Solder half etched wrapper (35) centrally over smokebox - the line of missing rivets is to the rear. Remove excess metal from bottom of (35), if necessary. Solder two spacers (12) to smokebox rear - slots should all line up. Drill out holes (0.4mm) in (35).

c) Solder smokebox assembly centrally and squarely to front of tank assembly - the location support (100) in tank front fits slot in smokebox. Add weight to tank, if required.

d) Fit bracket (47) centrally and squarely to top of smokebox rear up against tank and add rivet bracket (14) to tank front-up against (47). Solder front handrail wire into inner pair of holes in (39) (see GA). Solder two large long handrail knobs (holes horizontal) into outer pair of holes in (39), and solder into these two cast lubricators (see GA). Thread thin wire along underside of tank and into front right hand hole in smokebox (blower pipe). Thin wire passes from the bottom of each lubricator and into the remaining hole in each smokebox side. Fit cast tank filler to centre of tank.

e) Add handrail wire (0.45mm brass) to tank sides. Fit short length of 0.45mm wire to hole in right front tank side and add plate (4) and pivot (5), these are for the drain cock levers. When the tank assembly is fastened to the footplate, pull lever (17) is attached to the pivot and passes through slot 'A' in (51) (see stage 2 drawing). Add lever (18) to (5)

but bend (18) to pass through slot 'B' in footplate (see stage 2 drawing). Solder cast injectors into holes in tank sides (see GA). The injectors are handed.

f) Offer tank assembly up to cab front (51) - remove any excess metal from the inner sides of the front bunkers, if necessary.

g) Assemble outer firebox from pre-rolled wrapper (54) and former (28), which is at the front of the firebox; line up centre marks. Fit throatplate (50) to front of firebox side extensions and remove centre portion from (28). Solder firebox assembly centrally to tank rear, with the tops of the side extensions against underside of the tank. File off the rear tabs on the pre-rolled boiler (56) if these have not been removed already (ARROW on the BOILER is to the FRONT). Fit the tabs on the boiler front into slots in smokebox rear and see if boiler rear will fit against firebox throatplate (50) - a small amount of metal may have to be removed from the boiler length as this has been made deliberately slightly oversize. Solder boiler in place between smokebox and throatplate - the boiler bottom should run parallel, front to rear, with the tank bottom. Ignore slots in throatplate (50). Remember to add weight to the boiler/tank, if you require this, before fitting boiler. Add cast clack valves (these are not handed) to the boiler (location holes). Use copper wire for pipework between injectors and clack valves (see GA for the left). Pipework for the right hand injector passes forward level with the tank bottom, dips down below the footplate just ahead of the front spring and into the clack. Copper wire is used for the tank balance pipe, which passes between holes in tank bottoms.

h) If fitting cast springs, remove the fold-down spring on footplate and glue or solder cast rear springs in place (the centre of each spring should be about 0.75mm above the footplate).

Check that the rear springs will fit between the bunkers and the firebox sides. If not CAREFULLY remove metal from the spring. Glue or solder front cast springs in place, in line with rear pair. Fit reverse lever pull rod (48) to pivot (103). (48) Passes in front of the right rear spring and bends in front of the spring to meet the pivot. If fitting etched springs, fold up the springs on the footplate and laminate each with two of (83) and one of (106) - see stage 2 drawing.

i) Fit smokebox/tank/firebox assembly to footplate - tabs/slots. Add support brackets; left (53) and right (29) (both with hole to the bunker) to the bunker fronts and up against the tank sides. Use copper wire for pipework between injectors and holes in cab front and for the overflows which pass through holes in the footplate. A short piece of straight brass wire passes from the rear of each injector, backwards and horizontally towards the brackets (53) and (29). File plate (41) to size so that it fits the ledge at the footplate front just in front of smokebox.

j) Fold up sand box body (42), solder onto base (15), add top (15) and pass a thin piece of wire through hole in top. Thread (59) and (60) onto wire and solder to top to make filler cap. Attach to footplate (see GA). You can attach two (one each side) or one on the right hand side only, as the loco is today.

k) Add front lamp bracket (114) to smokebox top, if required. Glue on chimney, smokebox door and required dart: either the conventional type, or the one with a wheel. Add cast whistle to hole in centre of cab front. The steam feed-pipe is a short length of copper wire passing from the base of the whistle and through the adjacent hole 'C' in the cab front (see stage 2 drawing).

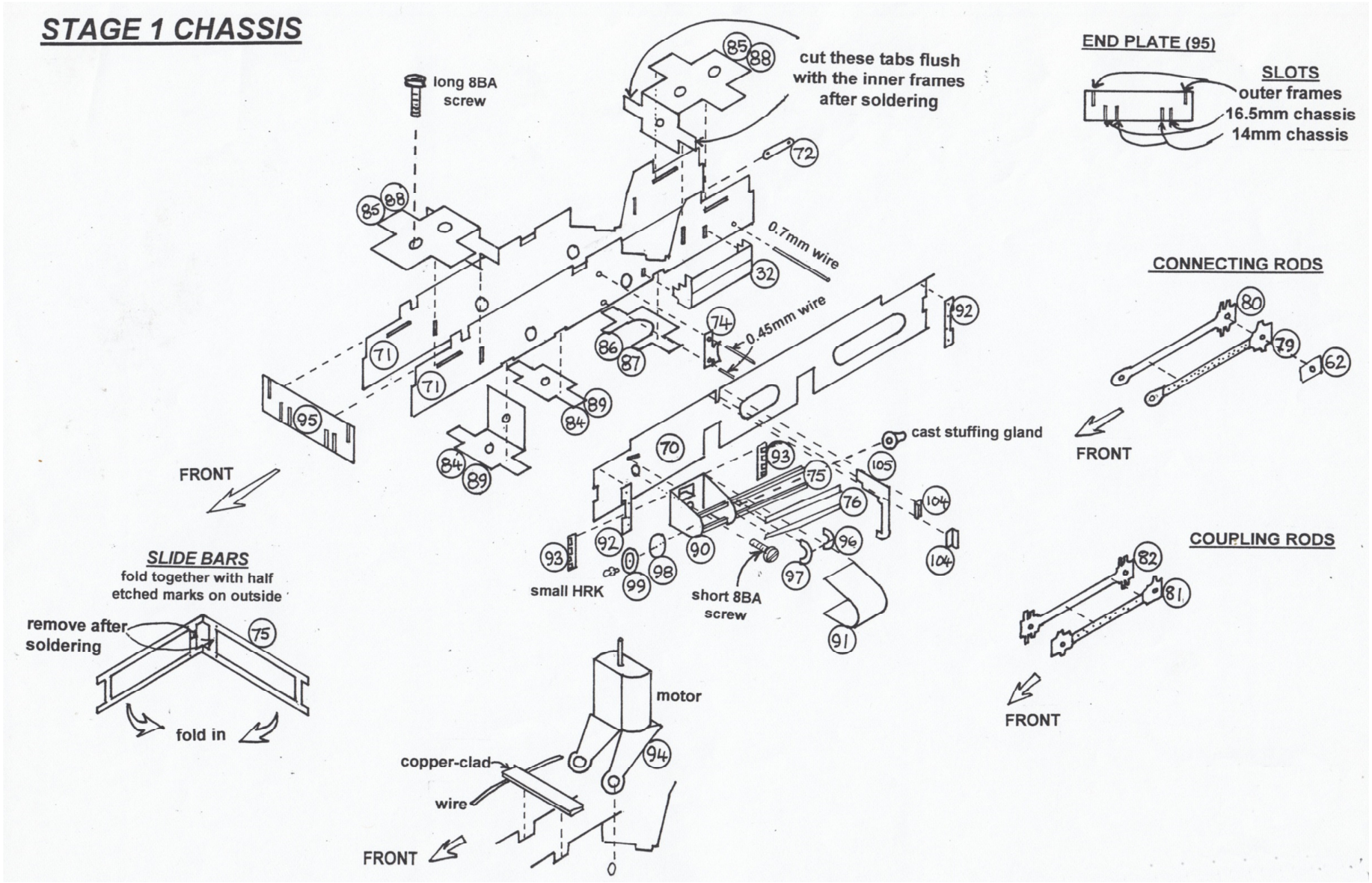
Cab detail

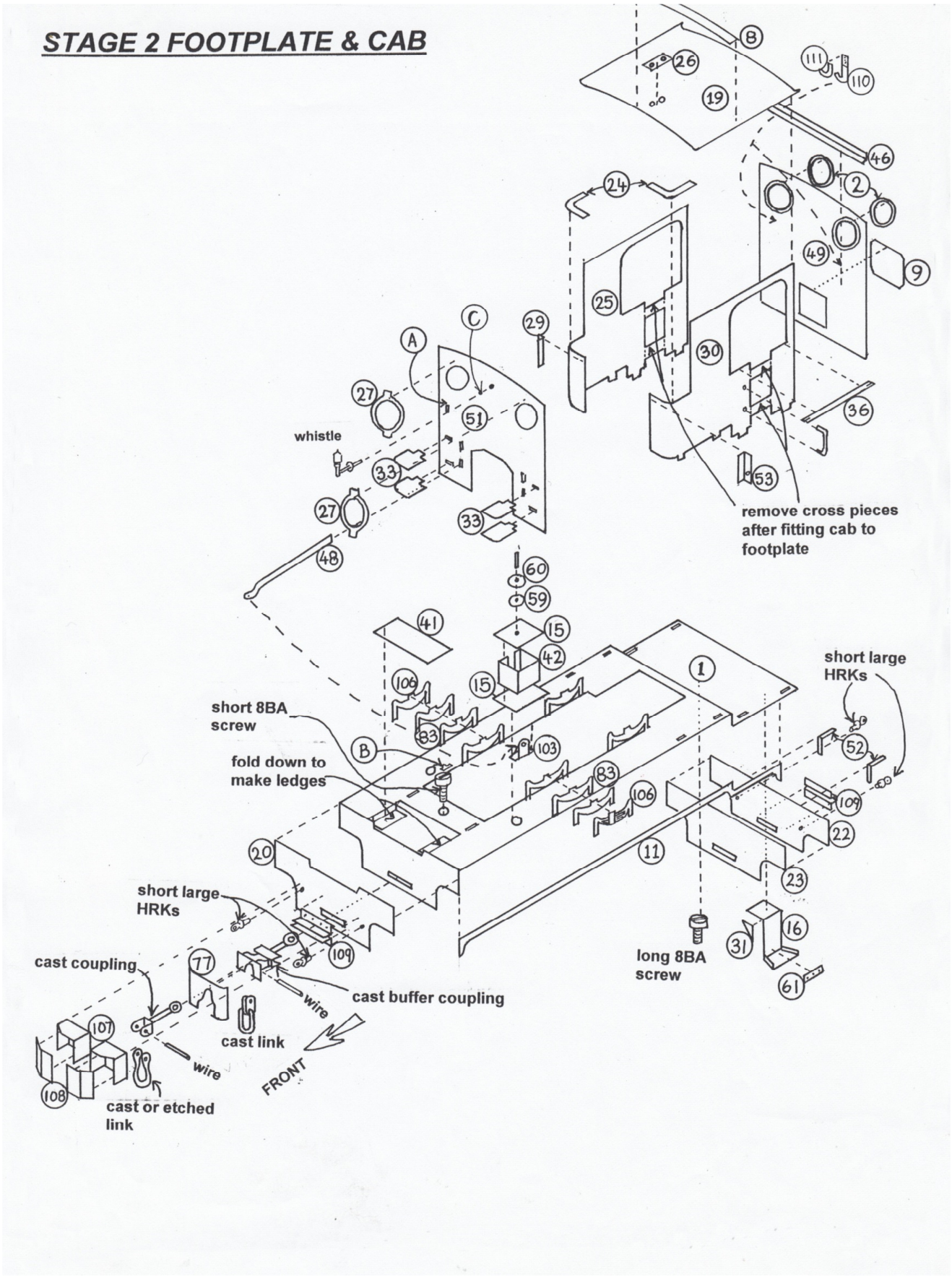
l) Assemble inner firebox from pre-formed wrapper (57) and backhead (45). Dimple rivets in the latter and round off edges. Fit firebox door (6), hinge (7) (use wire for hinge pin) and shelf (3). Glue/solder in the following castings (see diagram): gauge glass (left hand side only); level tap (right side only); regulator flange and handle; blower/injector valves, safety valves. Use copper wire for pipework. Fit suitably folded (101) or cylindrical w/m castings to top of safety valve assembly, to direct steam out of cab and through openings in roof.

m) Assemble reverse lever by folding over ends of (73), adding (78), also with ends folded over - solder together so that folded ends face each other. Laminate two of (102) for handle, smooth off and fasten whole assembly with wire to hole in right side of firebox wrapper. The wire can also be used as a pivot to make a moveable lever. Fold and fit inner bunkers (tabs/slots): left (43) and right (44). Fit firebox assembly into cab (tabs/slots) and glue pressure gauge to inside of (51). Copper wire can be used for pipework.

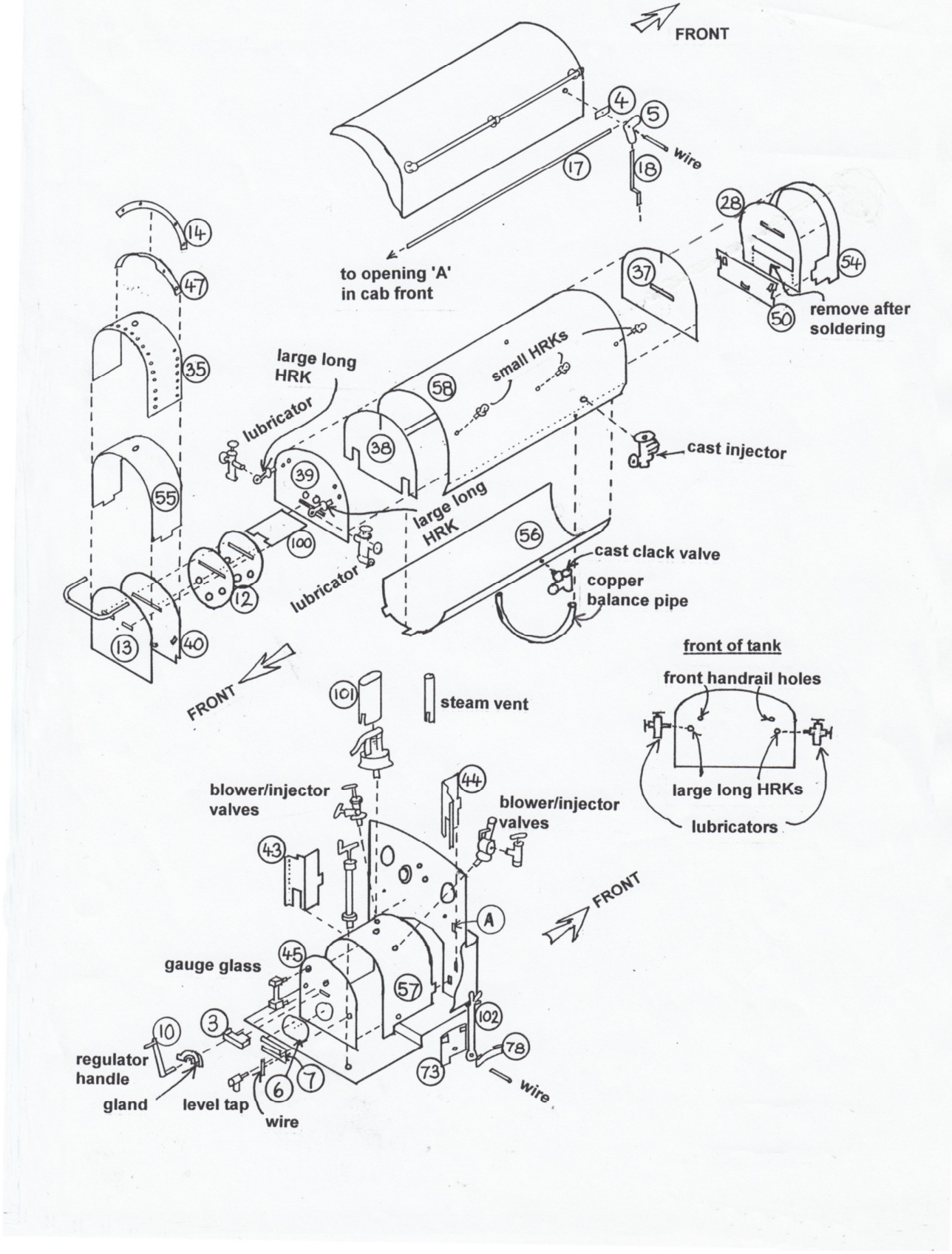
n) Combine the body and the chassis. Fit the appropriate couplers by passing them through the slots in the buffer beams and over the long 8A screws. You may need to remove some metal, with a slitting disc, from the screws. Fasten with 8BA nuts.

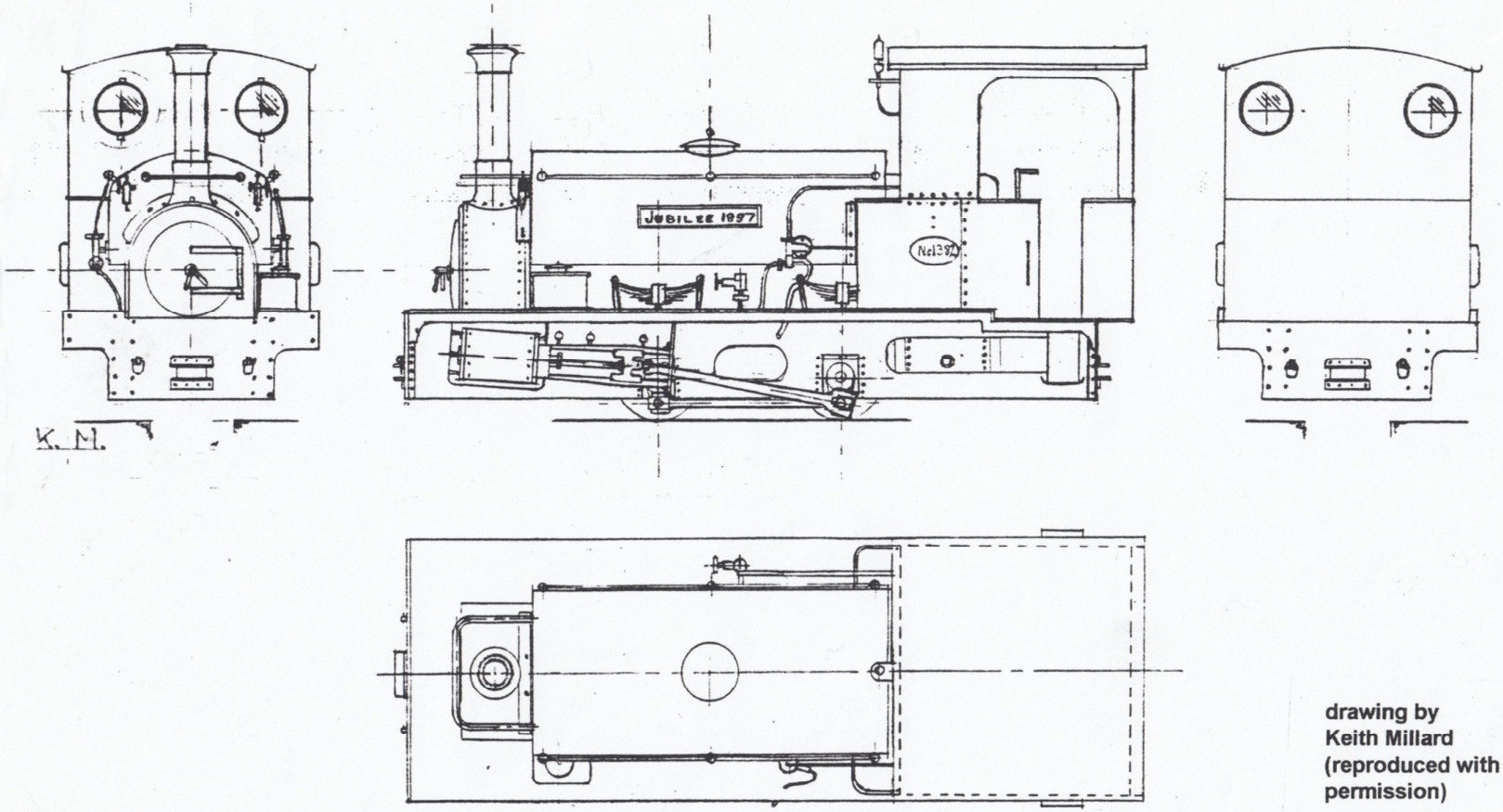
(Originated by Pete Stamper, October 2002 Revised EDM Models May 2013)


STAGE 1 CHASSIS
long 8BA screw
cut these tabs flush with the inner frames after soldering
END PLATE (95)
SLOTS
outer frames
16.5mm chassis
14mm chassis
0.7mm wire
0.45mm wire
CONNECTING RODS
cast stuffing gland
FRONT
SLIDE BARS
fold together with half etched marks on outside
remove after soldering
fold in
small HRK
short 8BA screw
COUPLING RODS
motor
copper-clad
wire


STAGE 2 FOOTPLATE & CAB
remove cross pieces after fitting cab to footplate
whistle
short 8BA screw
fold down to make ledges
short large HRKs
short large HRKs
long 8BA screw
cast coupling
cast buffer coupling
wire
cast link
wire
FRONT
cast or etched link

STAGE 3 TANK/SMOKEBOX/FIREBOX





drawing by
Keith Millard
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