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ASSEMBLY INSTRUCTIONS

'S' SCALE E.B.T #6 FOR STANDARD GAUGE

General:

This kit uses several manufacturing techniques including pewter castings, lost wax castings and photo engravings. Match the parts with the drawings and photos as you build your particular model. The modelers can assemble the model using low melt solder, super glues or epoxy adhesives or a combination of all three.

Clean all the pewter castings by washing with hot water with detergent. Lost wax castings should be carefully cleaned up only on surfaces to be soldered. Soldering should be done using liquid flux except electrical connections where paste flux should be used to prevent corrosion. Where liquid or acid fluxes are used, thoroughly wash the parts in water using a tooth brush to remove all traces of flux after each soldering session. If low melt solder is used make sure the water is not so hot that it re-melts the solder and you end up with a new kit in the bottom of the sink!

The drawings in these instructions have each part **numbered in order of their installation.** Parts can be clearly identified from the drawings and only need matching against appropriate castings or engravings. Instead of noting each individual step these instructions will note installation of (say) parts 2 - 11 etc., however, special instructions are individually noted. Just build the locomotive in the order given and you won't go wrong. It will pay to cross off each step on the drawings as you go - a colored marker will be ideal for this.

Where fittings have piping or handrails connecting them, drill holes at appropriate places to match the wire size before fixing to the model.

Piping wire is mostly brass except for sand pipes which are fuse wire which bends easily and stays put without springing back and is also nice and easy to solder. The layout of piping shown on the drawings is to give an idea of what goes where, but reference to photos will help. Note that the phosphor bronze pickup wire is a copper color and is springy. Don't use this for piping.

Tools:

A selection of drill sizes will be required including .4 mm, .5 mm, .6 mm, .8 mm, 1.0 mm, 1.2 mm, 1.6 mm and 2.0 mm, along with a pin chuck. Needle files are required. A piercing saw, soldering iron, pliers and side cutters will be needed. A fiber glass eraser available from drawing supply stores will be helpful for cleaning up after soldering, to clean up parts.

It would be advisable to have a set of jewelers broaches with sizes up to just over 2.0 mm so that holes may be reamed as required.

If you don't have a temperature controlled soldering iron for low melt soldering, use a 30 watt iron fitted with an in line light dimmer unit so temperature can be kept to a minimum so solder will melt but not the castings.

Chassis:

The chassis is a simple sprung unit. The leading and center drivers are lightly sprung and the trailing drivers are rigid. The chassis is built up using the engraved brass components. The horn blocks must slide freely but not loosely in the slots. The slots may need gentle filing on one face only so the axle spacing will not be altered. File only faces marked 'x' on the drawings. All screw holes in the chassis have been tapped for you.

1 - 21 Assemble parts in order. Make sure the chassis is assembled square. The ash pan assembly has cast on rests which sit on top of the chassis and is glued or soldered in place.

22 - 23 Bend up and screw the motor mount inside the ash pan.

24 – 27 This seems a strange place to have the cab assembly but it is the way the drawing sequence worked out! Assemble now and put to one side for later.

28 Assemble the quartering jig.

29 Fit the worm wheel to the center axle, fit bearings and washers as shown and push wheels onto axles. Check the back to back is .800 inch. With crank pins fitted, place each wheel and axle assembly into the quartering jig and with one crank pin against the stop, rotate the other wheel until its crank pin rests on its stop. The wheels will now be quartered . Fit the wheel assemblies into the chassis.

30 Etched brass counterweights are provided and are to be glued against spokes. Refer to the plans for positioning of counterweights.

Rods:

31 - 32 Align rods with tooth picks in crank holes, hold lightly with pliers and apply solder to the top edge and at the ends. Try not to get solder into the forked rod ends. File edges smooth. The holes should be etched to the correct size but if crank pins are a tight fit enlarge holes using jewelers broaches or use a round file. Rotate the file in the holes in an anti-clockwise direction to remove small amounts of metal at a time, checking as you go that crank pins will just drop into the holes.

Join the rods together with cast nut and bolt (on the sprue with the springs). Solder very quickly at the back to fix. Not much solder is needed and we don't want to solder the whole set of rods up solid! They have to pivot. Cut off excess casting and file nearly flush on the back. This is important to avoid interference with the wheel boss.

Fit the rods to the wheels using crank pins. Check that the wheels turn freely without binding. In the unlikely event that binding occurs, check the quartering. If quartering is OK then check that the crank pins are not tight against wheels by slightly easing out crank pins. If this is the cause, file the back of the rods where they contact the wheels so making the rods thinner. If the rods still bind, ease off crank pins, rotate wheels till they bind then wiggle each rod at each crank pin using a screw driver to find if one is tight and ream out that hole. Check and repeat until wheels turn freely.

Cylinders:

33 - 42 Assemble in order. Make sure cross heads slide freely in the slide bars and file as necessary to clear any obstruction. The file inside the slots in the slide bars, grind a file on one face to remove teeth so that the file will fit in the gap. An old needle file is all that is needed to be used. Screw connecting rods to center drivers.

Motor and Gearbox:

Assemble the gearbox but cut the shaft so that only about ¼" projects beyond the casing. Fit the plastic ball joint to the shaft. Screw the motor to the mounting and ensure the universal joint lines up. Apply power to the motor and test run the chassis. If there are any tight spots, deal with them now (see above section dealing with rods).

Locomotive Body:

43 Drill all holes in boiler and running boards. Check relevant castings to determine hole sizes.

44 Fix cab to running boards. Drill holes in cab floor for the fall plate and reversing quadrant. The assembly can be slid on to the boiler and fixed.

45 – 51 Fix parts in order. The J wires fixing the fall plate will need to be cut flush to allow fixing block to sit properly (48).

Boiler Fittings:

Drill sand domes for .6 mm fuse wire sand pipes and fit sand domes, steam dome, generator, funnel and bell. The headlight may be drilled through the casting sprue if lighting is to be fitted. Do this before fixing the light to the loco. Fit the pipe bend on the smoke box with .5 mm brass wire back to the cab. Fix sand pipes then fit all other pipes, brackets, valves in any desired order. Fix handrails and sand levers and rods last.

Front Platform:

Fix the etched brass front platform. Drill for and fix coupler lifting rod brackets, hand grabs, front steps as shown. Two types of coupler boxes are provided. If using the box for multi gauge use, Kadee #5 couplers will need to be cut to length and drilled through the shank and the box will be drilled so a wire pin can be inserted to fix coupling. The main coupling should be fixed as per Kadee practice with spring and box cover fitted then the assembly fixed to the front platform.

Backhead Detail:

Fix the regulator, reversing quadrant and gauges castings to the cab interior..

Brakes and Pickups:

Use a large drill bit (say ¼") to countersink and remove copper cladding to clear screw head on the PC board. Screw PC board over the keeper plates and then solder on the brakes. Make sure the brakes don't touch the wheels and cause a bind. Mark the location of the pickup wipers so they are in line with the wheel rims. Remove PC board and solder on phosphor bronze pickup wires so they sit out straight about 15 mm. After soldering bend wires down at nearly 90°. Check length of wires against wheels and cut off length as needed so contact is made center wheel. They all should just touch back of rims with not too much pressure. Connect wires from motor to PC board.

Tender:

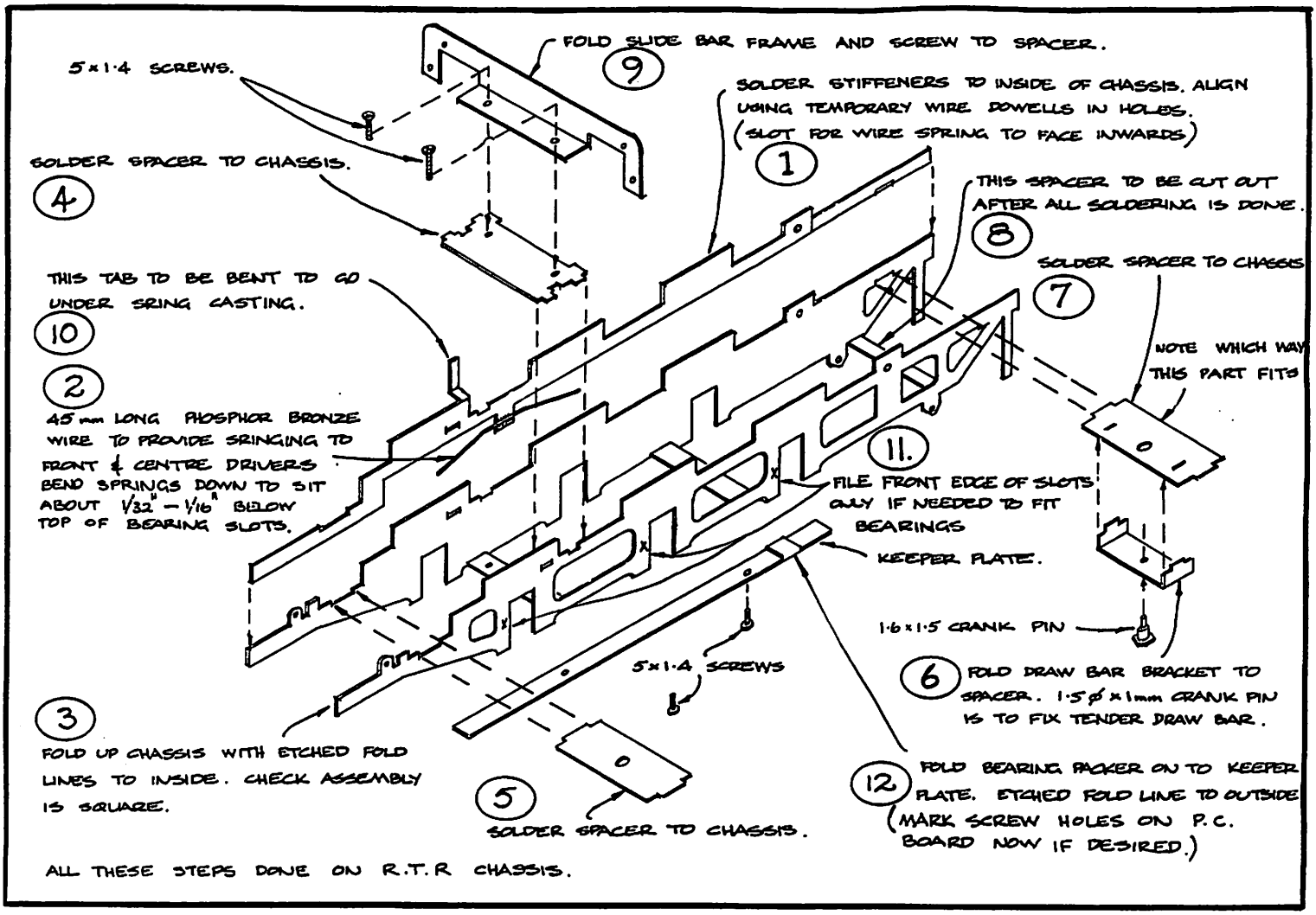
Assemble the tender in the order shown. The floor may be drilled for wiring as required. As with the loco, the light may be drilled for lighting. Note the drawbar has a pocket to take wires to the loco without drooping. Note that the tender top steps are assembled but not fixed until painting is complete.

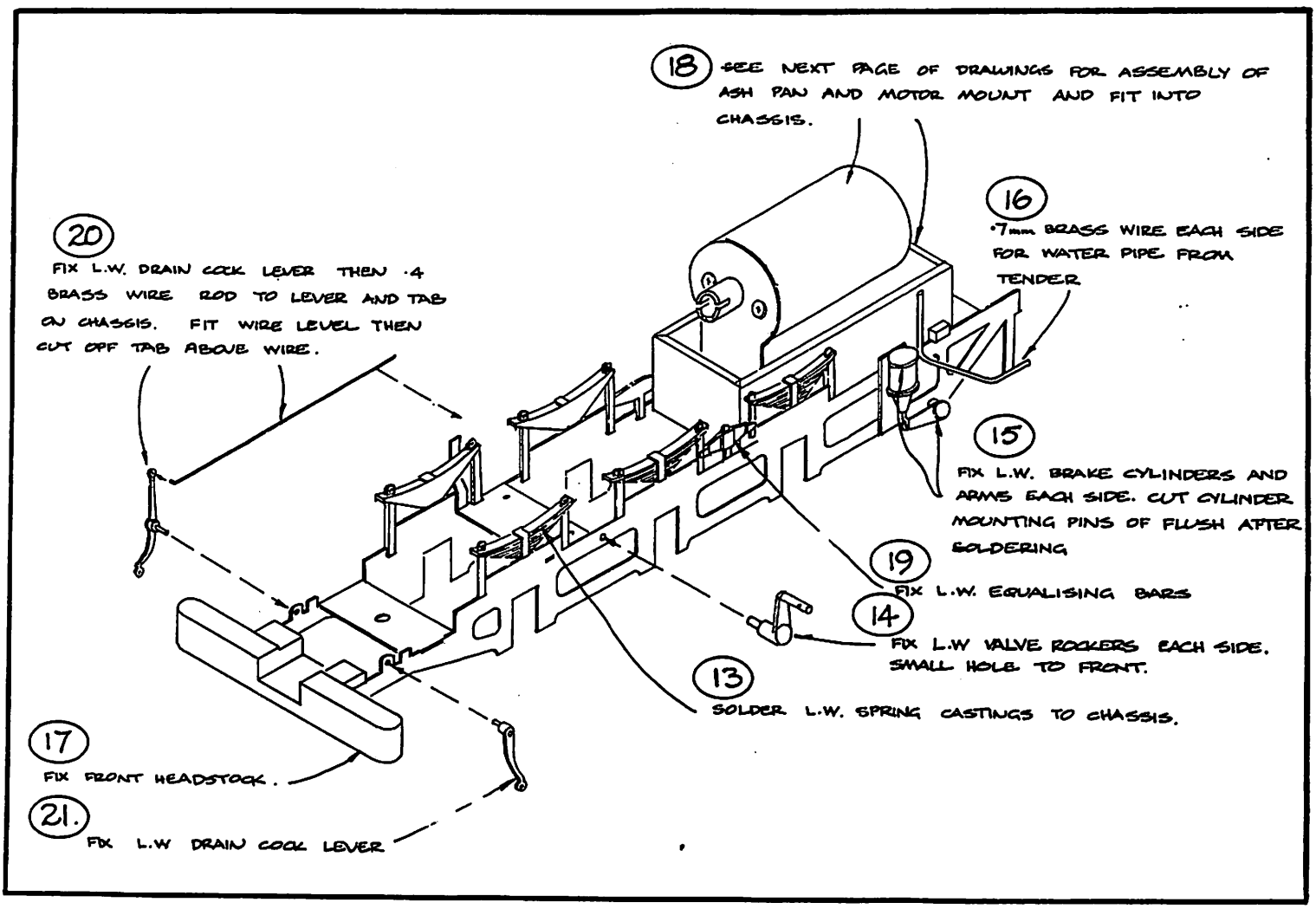
Painting:

Clean all metal thoroughly with water and detergent. Undercoat with an undercoat compatible with the paint you have chosen for final finish. Paint the loco and tender black. Paint backhead black with white gauges and piping brass.

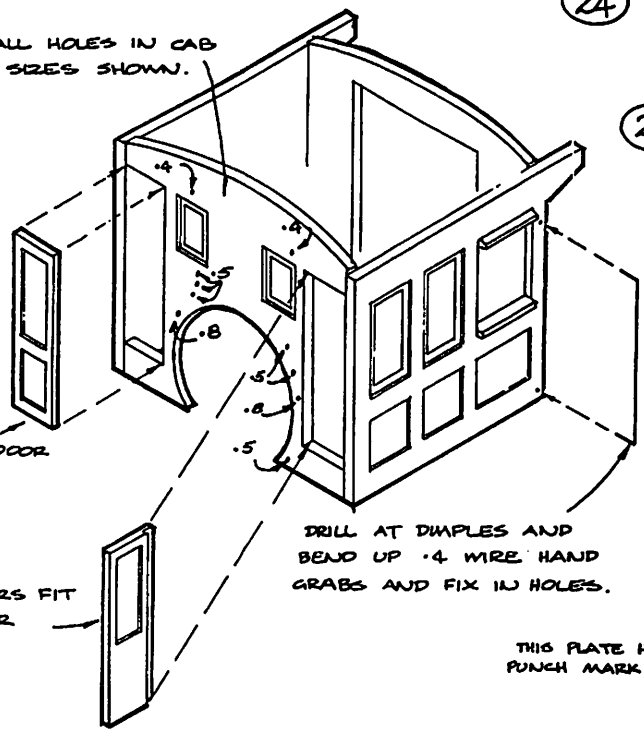
After all painting, install glazing, and install roof. Fit lighting and headlight lenses provided

Fit number plates and makers plates and apply decals.


5×1·4 SCREWS.
9 FOLD SLIDE BAR FRAME AND SCREW TO SPACER.
SOLDER STIFFENERS TO INSIDE OF CHASSIS. ALIGN USING TEMPORARY WIRE DOWELLS IN HOLES. (SLOT FOR WIRE SPRING TO FACE INWARDS)
1
SOLDER SPACER TO CHASSIS.
4
THIS SPACER TO BE CUT OUT AFTER ALL SOLDERING IS DONE.
8
SOLDER SPACER TO CHASSIS
7
THIS TAB TO BE BENT TO GO UNDER SRING CASTING.
10
NOTE WHICH WAY THIS PART FITS
2
45 mm LONG PHOSPHOR BRONZE WIRE TO PROVIDE SRINGING TO FRONT & CENTRE DRIVERS BEND SPRINGS DOWN TO SIT ABOUT 1/32" – 1/16" BELOW TOP OF BEARING SLOTS.
11.
FILE FRONT EDGE OF SLOTS ONLY IF NEEDED TO FIT BEARINGS
KEEPER PLATE.
1·6×1·5 CRANK PIN
5×1·4 SCREWS
6 FOLD DRAW BAR BRACKET TO SPACER. 1·5ø×1mm CRANK PIN IS TO FIX TENDER DRAW BAR.
3
FOLD UP CHASSIS WITH ETCHED FOLD LINES TO INSIDE. CHECK ASSEMBLY IS SQUARE.
5
SOLDER SPACER TO CHASSIS.
12 FOLD BEARING PACKER ON TO KEEPER PLATE. ETCHED FOLD LINE TO OUTSIDE (MARK SCREW HOLES ON P.C. BOARD NOW IF DESIRED.)
ALL THESE STEPS DONE ON R.T.R CHASSIS.


18 SEE NEXT PAGE OF DRAWINGS FOR ASSEMBLY OF ASH PAN AND MOTOR MOUNT AND FIT INTO CHASSIS.
16
·7mm BRASS WIRE EACH SIDE FOR WATER PIPE FROM TENDER
20
FIX L.W. DRAIN COCK LEVER THEN ·4 BRASS WIRE ROD TO LEVER AND TAB ON CHASSIS. FIT WIRE LEVEL THEN CUT OFF TAB ABOVE WIRE.
15
FIX L.W. BRAKE CYLINDERS AND ARMS EACH SIDE. CUT CYLINDER MOUNTING PINS OF FLUSH AFTER SOLDERING
19
FIX L.W. EQUALISING BARS
14
FIX L.W VALVE ROCKERS EACH SIDE. SMALL HOLE TO FRONT.
13
SOLDER L.W. SPRING CASTINGS TO CHASSIS.
17
FIX FRONT HEADSTOCK.
21.
FIX L.W DRAIN COCK LEVER

(25) DRILL ALL HOLES IN CAB FRONT. SIZES SHOWN.



CLOSED DOOR

OPEN DOORS FIT INTO DOOR OPENING

DRILL AT DIMPLES AND BEND UP ·4 WIRE HAND GRABS AND FIX IN HOLES.

(27) A CHOICE OF OPEN OR CLOSED CAB FRONT DOORS IS PROVIDED. CLOSED DOORS CAN BE FIXED NOW, OPEN DOORS BEST FIXED AFTER ALL PIPING IS INSTALLED.

(24) CUT OUT ALL CAB WINDOW GLAZING TO FIT INTO RECESSES AND PUT ASIDE FOR FIXING AFTER PAINTING IS COMPLETE

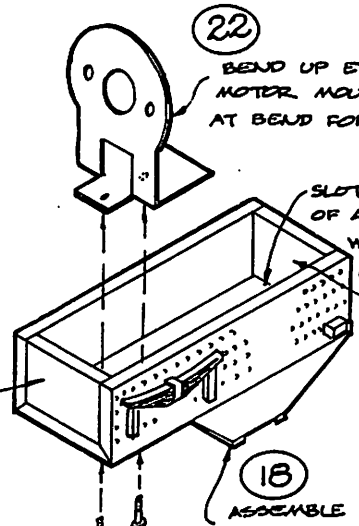
(26) ASSEMBLE CAB SIDES, FRONT AND REAR KEEPING JOINS FLUSH AT BOTTOM. USE CAB ROOF TO KEEP SQUARE BUT DONT FIX ROOF.

(22) BEND UP ETCHED BRASS MOTOR MOUNT. SOLDER FILLET AT BEND FOR STRENGTH.

SLOT FORMED AT BASE OF ASH PAN TO TAKE WIRES FROM D.C.C. UNITS IN TENDER.

THIS PLATE HAS THREE PUNCH MARKS

THIS PLATE HAS ONE PUNCH MARK

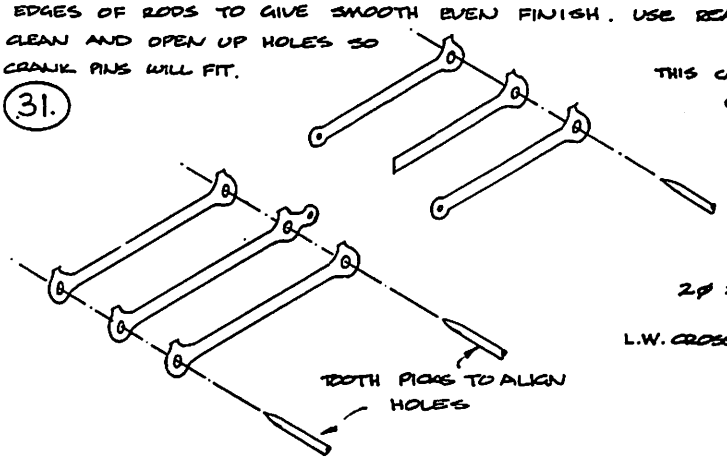


(18) ASSEMBLE W.M. ASH PAN.

(23) 5x1·4 SCREWS TO FIX MOTOR MOUNT

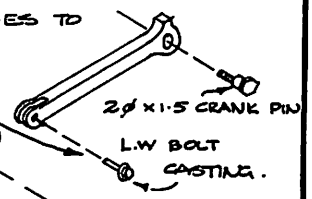
ALIGN HOLES IN COUPLING RODS WITH ROUND TOOTH PICKS AND FLUX AND SOLDER TOGETHER. FILE EDGES OF RODS TO GIVE SMOOTH EVEN FINISH. USE REAMER OR JEWELLERS BROACHES TO CLEAN AND OPEN UP HOLES SO CRANK PINS WILL FIT.

(31)

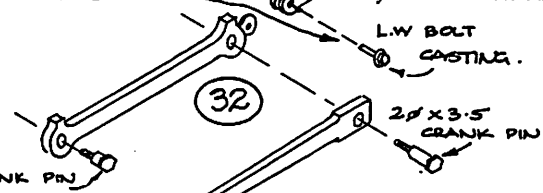


TOOTH PICKS TO ALIGN HOLES

THIS CASTING ON SPRUE WITH CHASSIS SPRINGS.



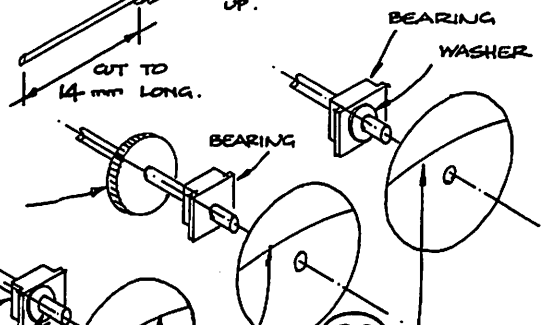
(32)



L.W. CROSS HEAD

OPEN FORK END AND FIT OVER PINS ON CROSS HEAD THEN CLOSE UP.

CUT TO 14 mm LONG.



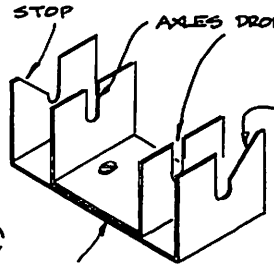
(30) PAINT COUNTER WEIGHTS THEN GLUE TO WHEELS. SEE PLAN TO DETERMINE POSITION.

(29) ASSEMBLE WHEELS.

CRANK PIN STOP

AXLES DROP INTO SLOTS

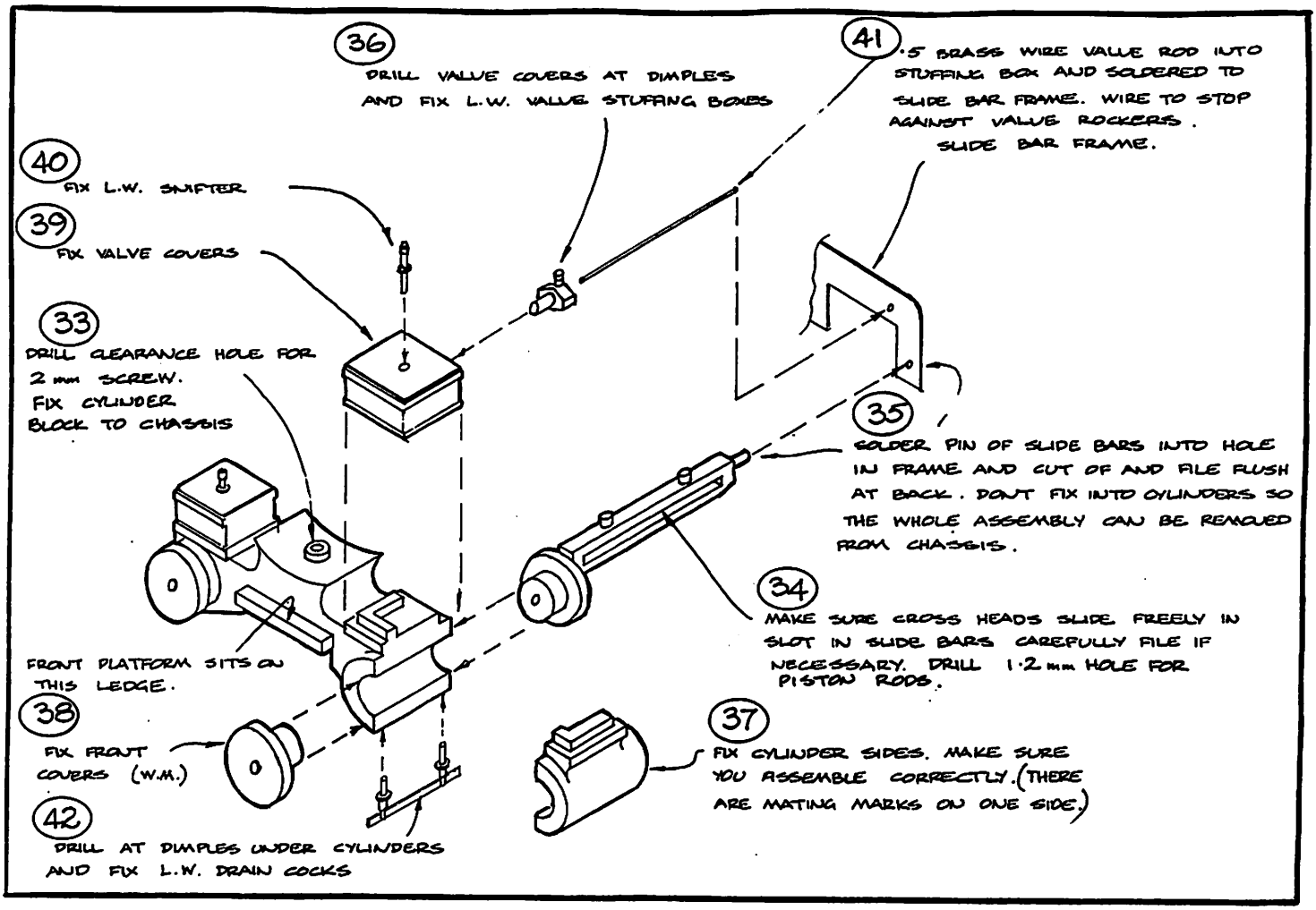
CRANK PIN STOP.

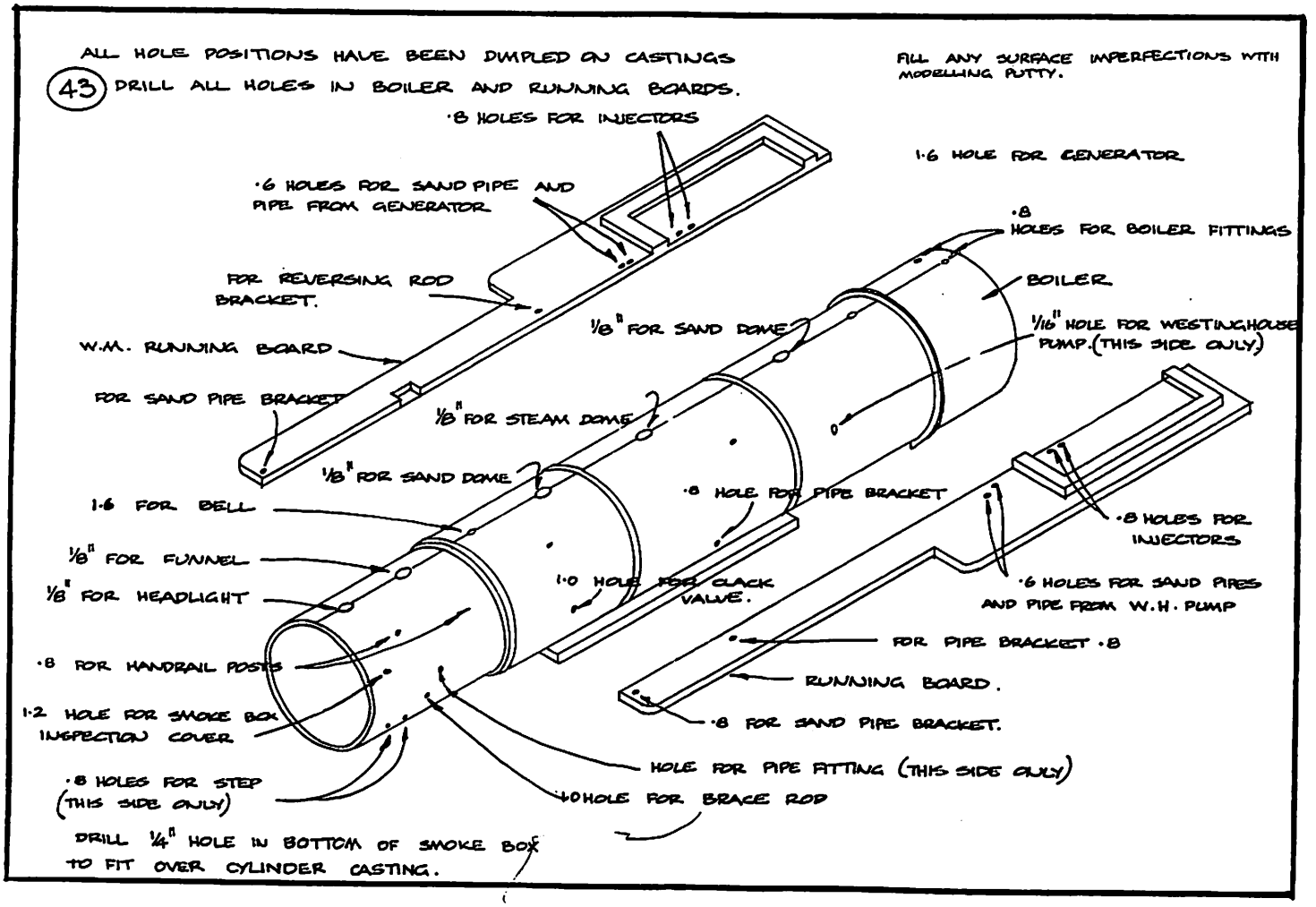


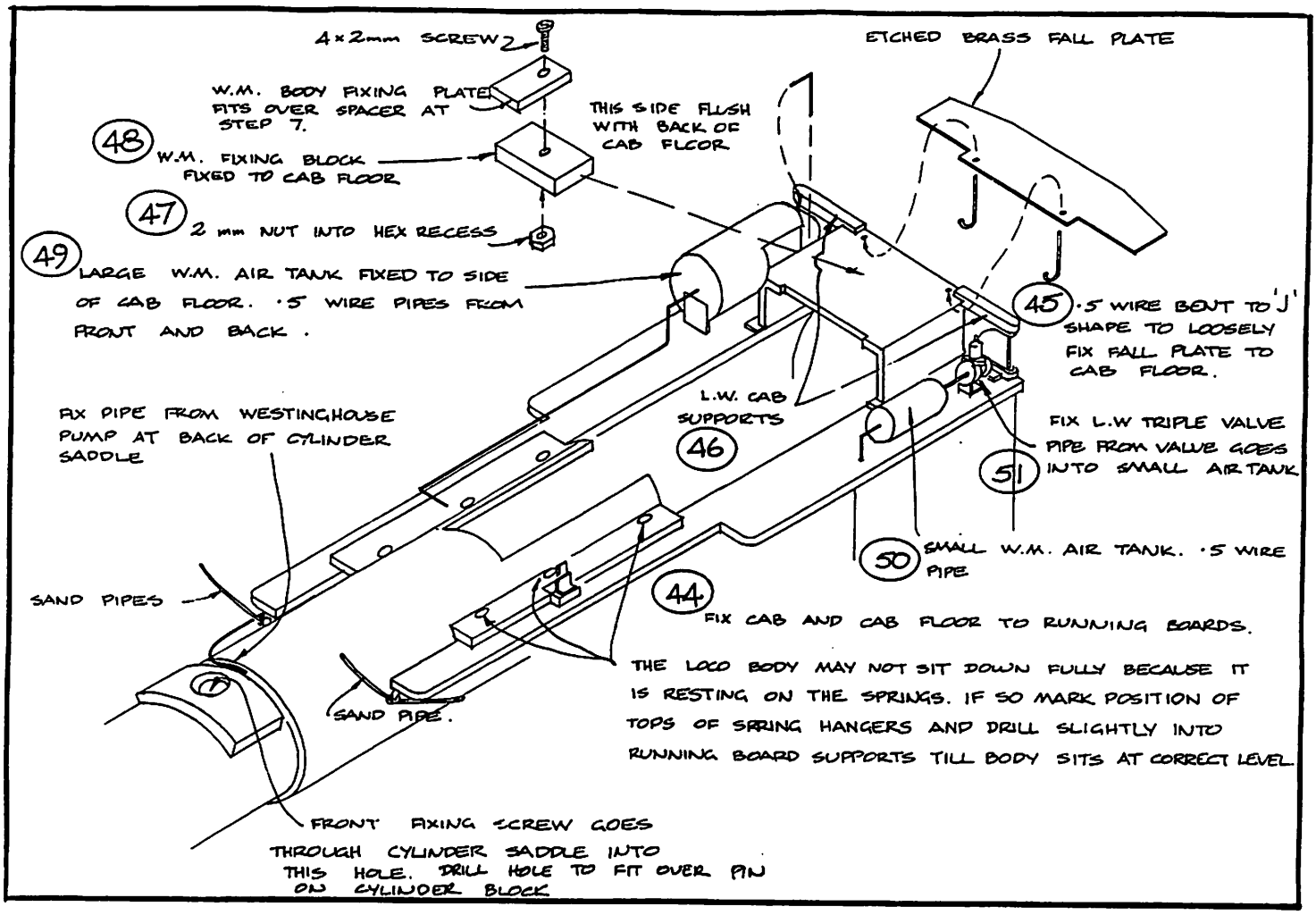
(28) FOLD UP QUARTERING JIG PARTS AND FIX WITH 2mm SCREWS AND NUTS OR SOLDER ALONG EDGES

SEE INSTRUCTIONS FOR FITTING WHEELS TO CHASSIS.

AFTER FITTING WHEELS FIT P.C BOARD, BRAKES AND PICKUPS AND TEST. SEE LAST SHEET OF DRAWINGS.

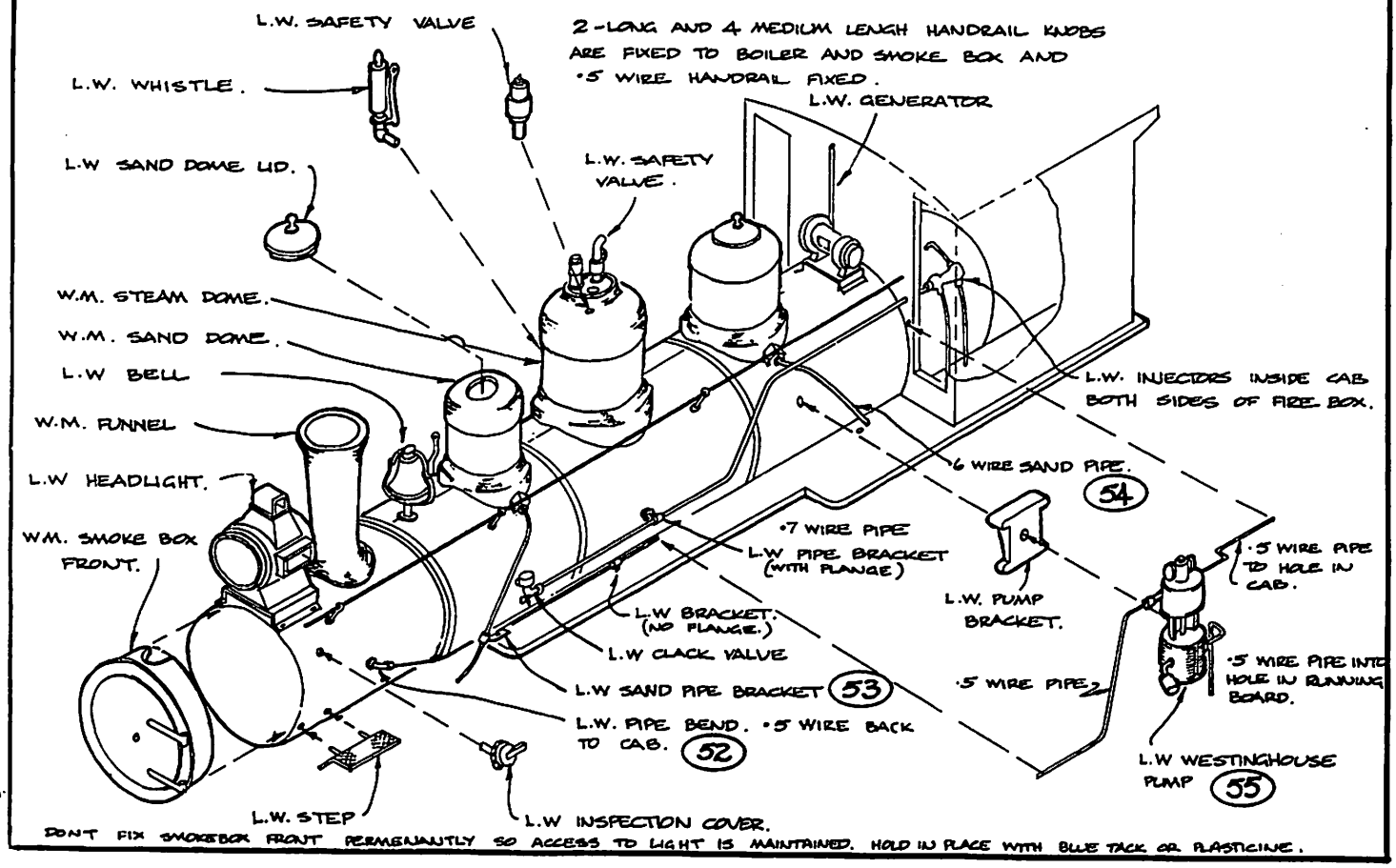

36
DRILL VALVE COVERS AT DIMPLES AND FIX L.W. VALVE STUFFING BOXES
41
·5 BRASS WIRE VALVE ROD INTO STUFFING BOX AND SOLDERED TO SLIDE BAR FRAME. WIRE TO STOP AGAINST VALVE ROCKERS.
SLIDE BAR FRAME.
40
FIX L.W. SHIFTER
39
FIX VALVE COVERS
33
DRILL CLEARANCE HOLE FOR 2 mm SCREW. FIX CYLINDER BLOCK TO CHASSIS
35
SOLDER PIN OF SLIDE BARS INTO HOLE IN FRAME AND CUT OF AND FILE FLUSH AT BACK. DONT FIX INTO CYLINDERS SO THE WHOLE ASSEMBLY CAN BE REMOVED FROM CHASSIS.
34
MAKE SURE CROSS HEADS SLIDE FREELY IN SLOT IN SLIDE BARS CAREFULLY FILE IF NECESSARY. DRILL 1·2 mm HOLE FOR PISTON RODS.
FRONT PLATFORM SITS ON THIS LEDGE.
38
FIX FRONT COVERS (W.M.)
37
FIX CYLINDER SIDES. MAKE SURE YOU ASSEMBLE CORRECTLY. (THERE ARE MATING MARKS ON ONE SIDE.)
42
DRILL AT DIMPLES UNDER CYLINDERS AND FIX L.W. DRAIN COCKS


ALL HOLE POSITIONS HAVE BEEN DIMPLED ON CASTINGS
43 DRILL ALL HOLES IN BOILER AND RUNNING BOARDS.
FILL ANY SURFACE IMPERFECTIONS WITH MODELLING PUTTY.
·8 HOLES FOR INJECTORS
·6 HOLES FOR SAND PIPE AND PIPE FROM GENERATOR
FOR REVERSING ROD BRACKET.
W.M. RUNNING BOARD
FOR SAND PIPE BRACKET
1·6 FOR BELL
⅛" FOR FUNNEL
⅛" FOR HEADLIGHT
·8 FOR HANDRAIL POSTS
1·2 HOLE FOR SMOKE BOX INSPECTION COVER
·8 HOLES FOR STEP (THIS SIDE ONLY)
DRILL ¼" HOLE IN BOTTOM OF SMOKE BOX TO FIT OVER CYLINDER CASTING.
1·6 HOLE FOR GENERATOR
·8 HOLES FOR BOILER FITTINGS
BOILER
⅛" FOR SAND DOME
1/16" HOLE FOR WESTINGHOUSE PUMP. (THIS SIDE ONLY)
⅛" FOR STEAM DOME
⅛" FOR SAND DOME
·8 HOLE FOR PIPE BRACKET
1·0 HOLE FOR CLACK VALVE.
·8 HOLES FOR INJECTORS
·6 HOLES FOR SAND PIPES AND PIPE FROM W.H. PUMP
FOR PIPE BRACKET ·8
RUNNING BOARD.
·8 FOR SAND PIPE BRACKET.
HOLE FOR PIPE FITTING (THIS SIDE ONLY)
·0 HOLE FOR BRACE ROD

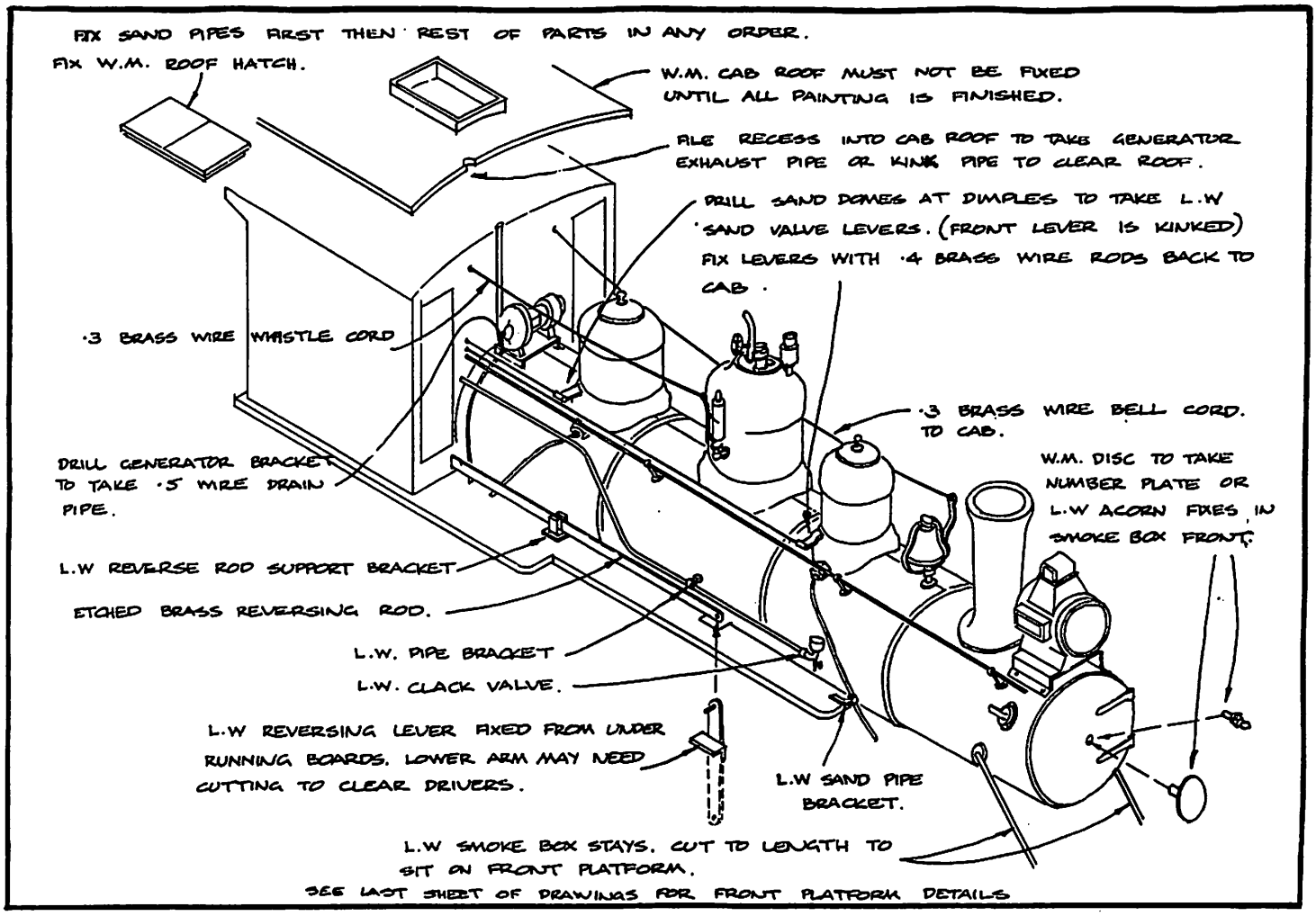


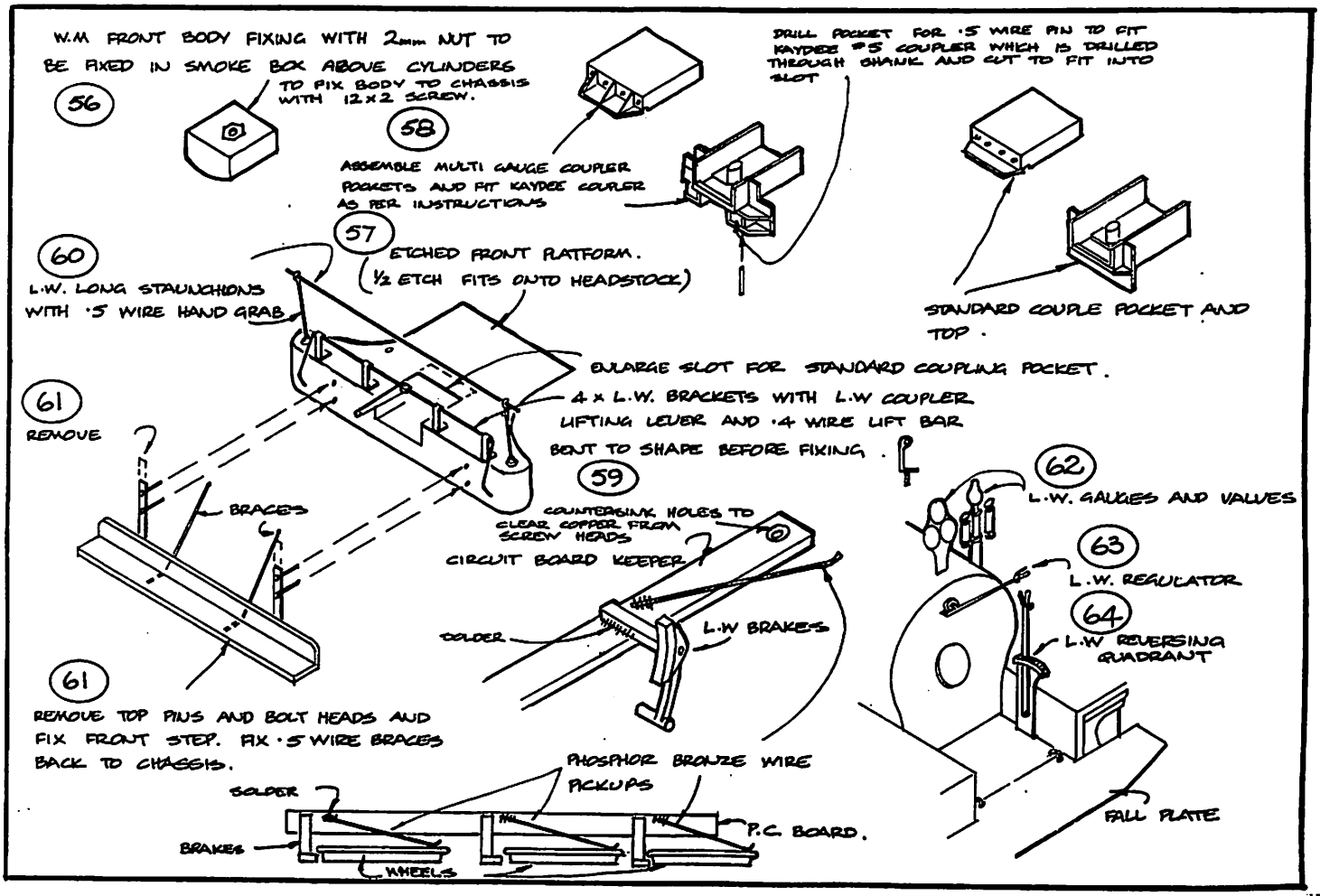
(TWO SMOKEBOX FRONTS PROVIDED. E.B.T. 6 HAD FLAT DOOR. OTHERS HAD DOMED DOOR.)

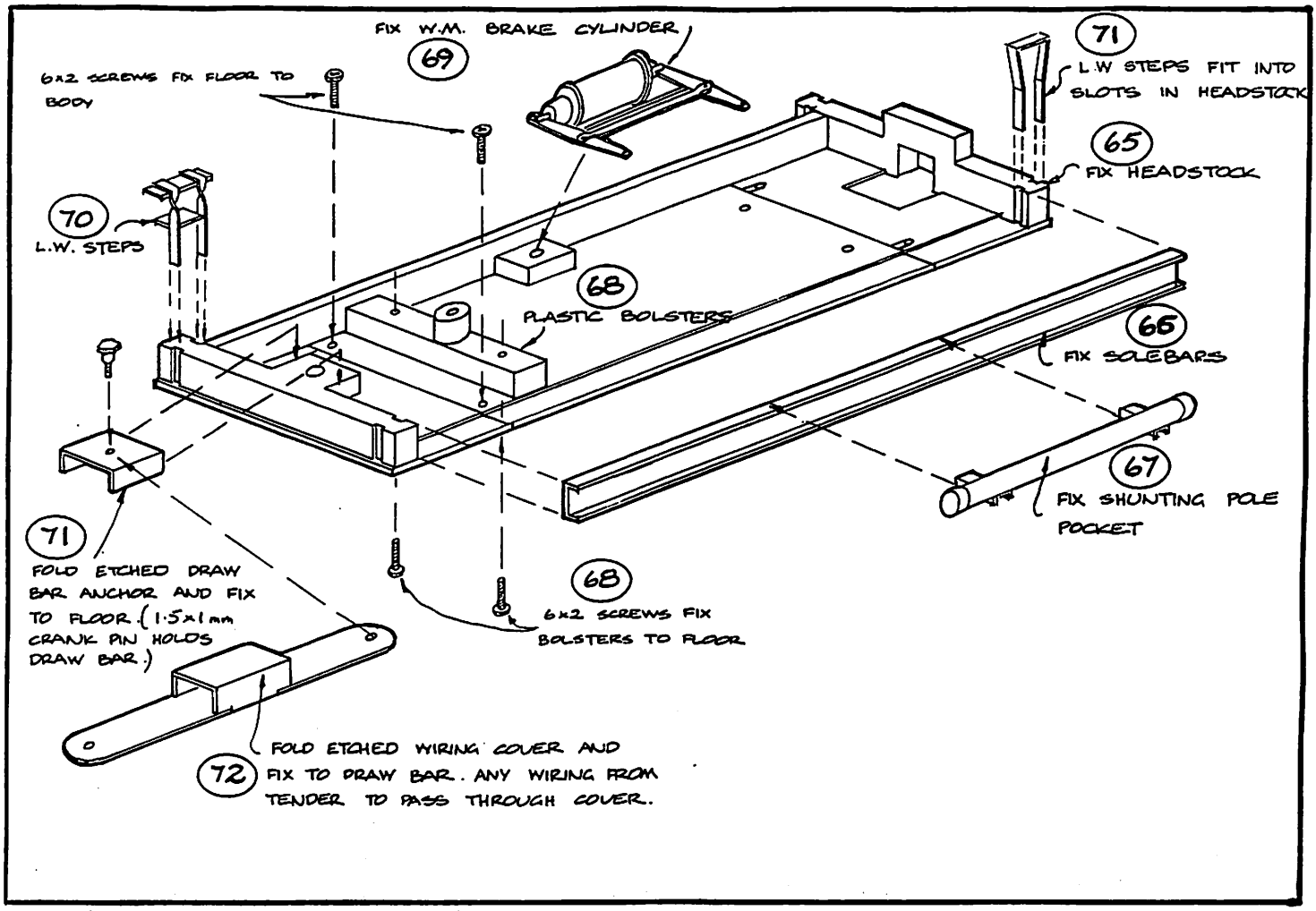
FIX SAND DOMES AND STEPS 53 — 55 THEN REST OF PARTS IN ANY ORDER.

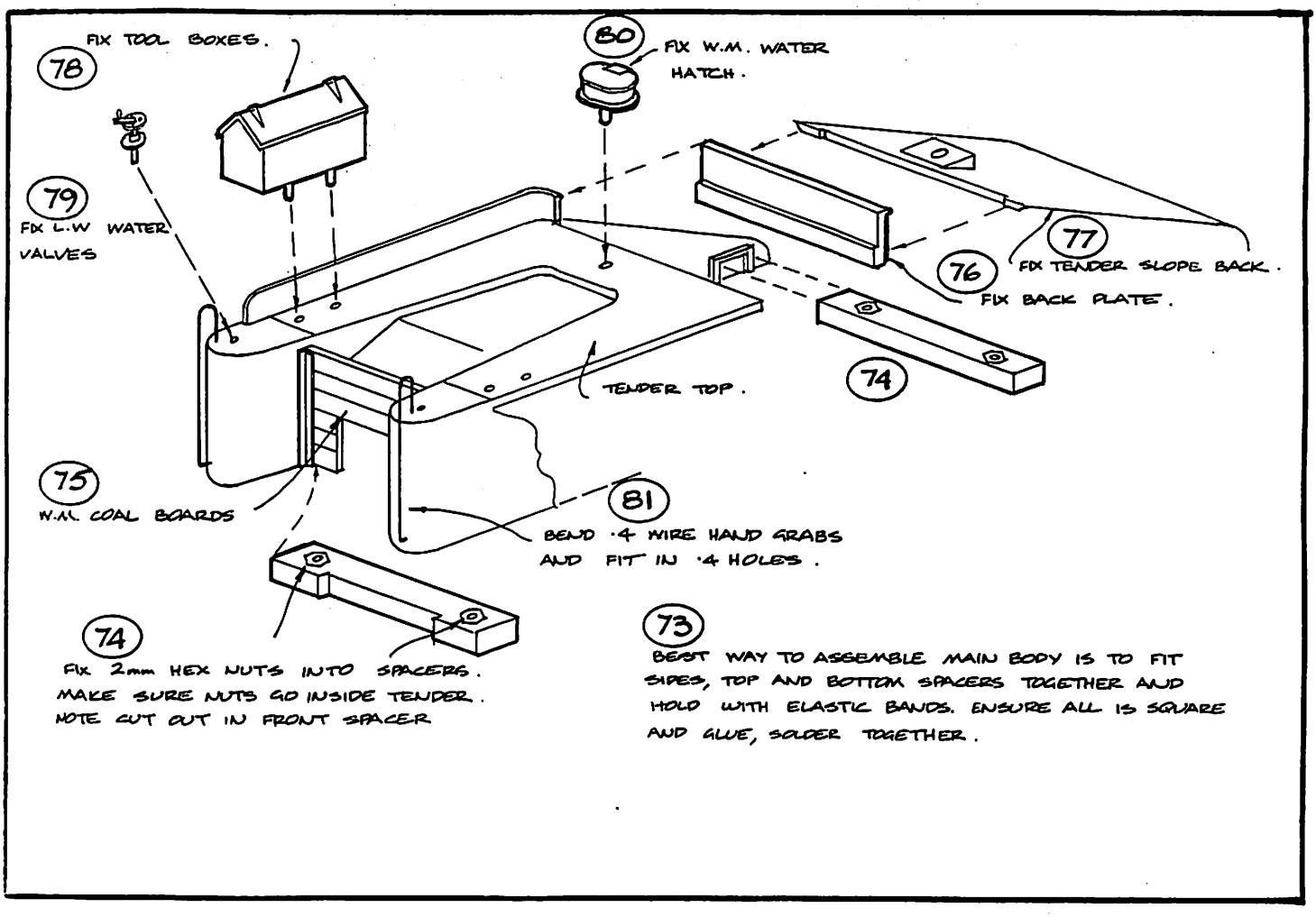


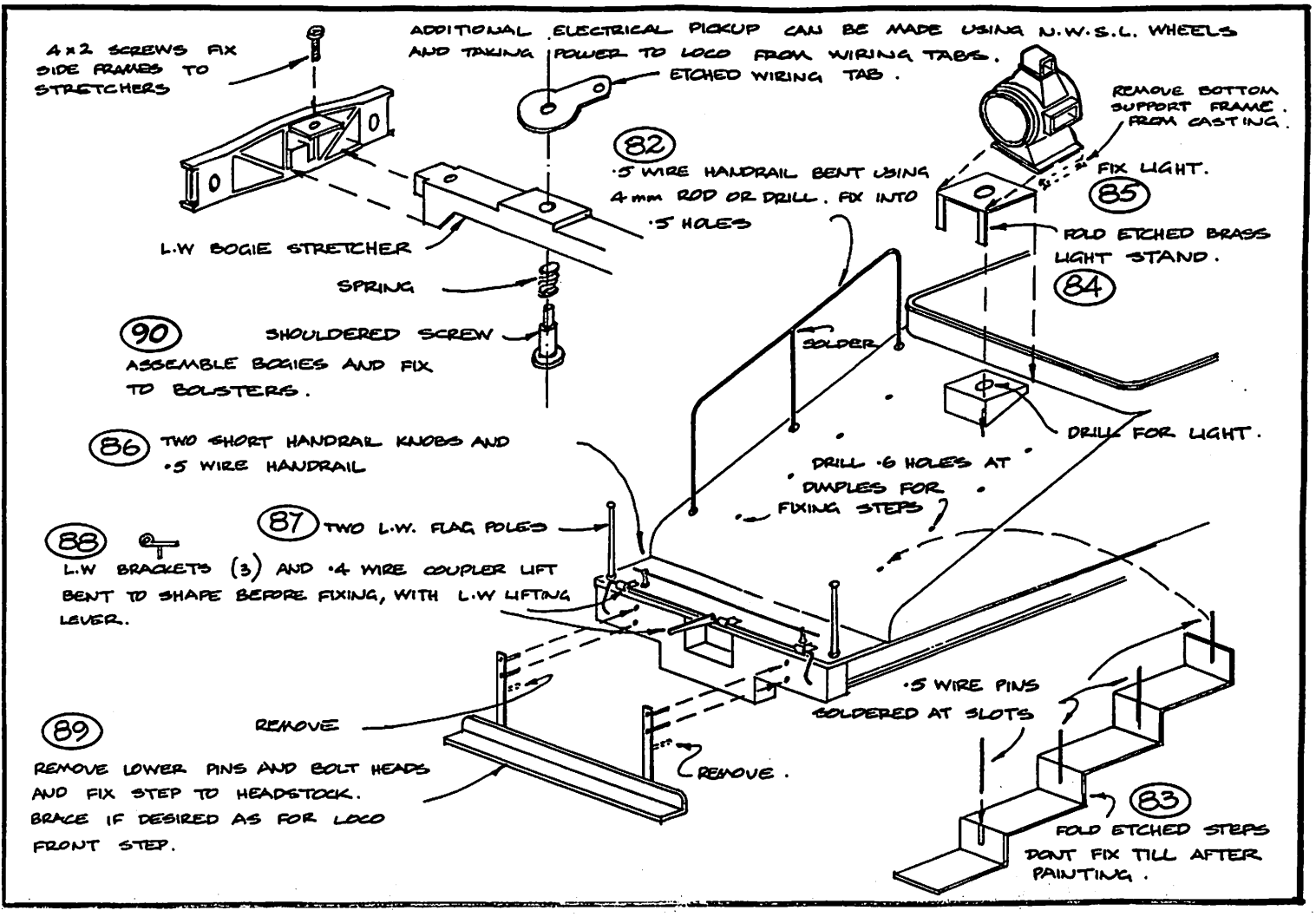
DONT FIX SMOKEBOX FRONT PERMENANTLY SO ACCESS TO LIGHT IS MAINTAINED. HOLD IN PLACE WITH BLUE TACK OR PLASTICINE.

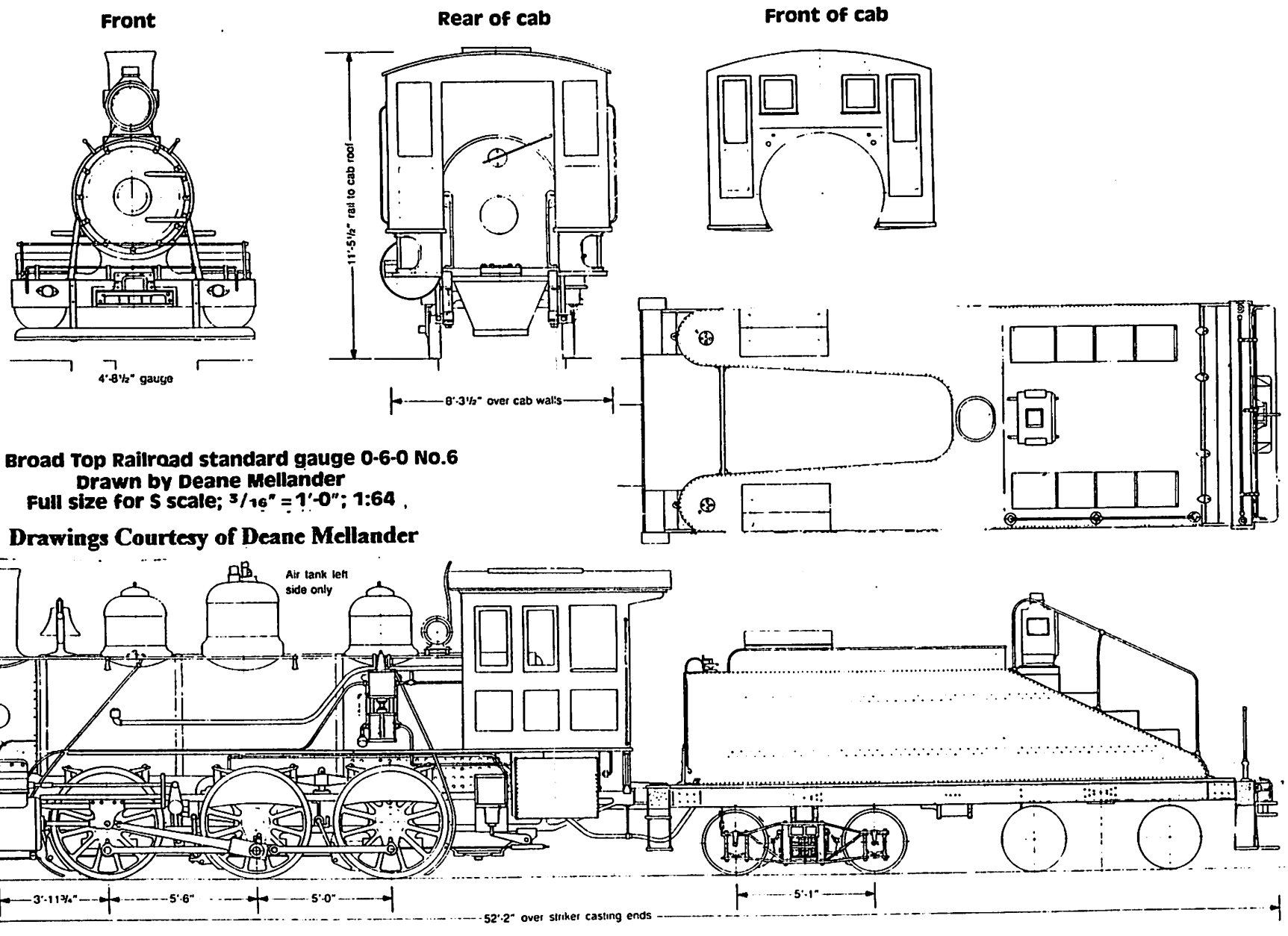

FIX SAND PIPES FIRST THEN REST OF PARTS IN ANY ORDER.
FIX W.M. ROOF HATCH.
W.M. CAB ROOF MUST NOT BE FIXED UNTIL ALL PAINTING IS FINISHED.
FILE RECESS INTO CAB ROOF TO TAKE GENERATOR EXHAUST PIPE OR KINK PIPE TO CLEAR ROOF.
DRILL SAND DOMES AT DIMPLES TO TAKE L.W SAND VALVE LEVERS. (FRONT LEVER IS KINKED) FIX LEVERS WITH .4 BRASS WIRE RODS BACK TO CAB.
.3 BRASS WIRE WHISTLE CORD
.3 BRASS WIRE BELL CORD. TO CAB.
W.M. DISC TO TAKE NUMBER PLATE OR L.W ACORN FIXES IN SMOKE BOX FRONT.
DRILL GENERATOR BRACKET TO TAKE .5 WIRE DRAIN PIPE.
L.W REVERSE ROD SUPPORT BRACKET
ETCHED BRASS REVERSING ROD.
L.W. PIPE BRACKET
L.W. CLACK VALVE.
L.W REVERSING LEVER FIXED FROM UNDER RUNNING BOARDS. LOWER ARM MAY NEED CUTTING TO CLEAR DRIVERS.
L.W SAND PIPE BRACKET.
L.W SMOKE BOX STAYS. CUT TO LENGTH TO SIT ON FRONT PLATFORM.
SEE LAST SHEET OF DRAWINGS FOR FRONT PLATFORM DETAILS


W.M FRONT BODY FIXING WITH 2mm NUT TO BE FIXED IN SMOKE BOX ABOVE CYLINDERS
56
TO FIX BODY TO CHASSIS WITH 12x2 SCREW.
58
ASSEMBLE MULTI GAUGE COUPLER POCKETS AND FIT KAYDEE COUPLER AS PER INSTRUCTIONS
DRILL POCKET FOR .5 WIRE PIN TO FIT KAYDEE #5 COUPLER WHICH IS DRILLED THROUGH SHANK AND CUT TO FIT INTO SLOT
STANDARD COUPLE POCKET AND TOP.
57
ETCHED FRONT PLATFORM.
(½ ETCH FITS ONTO HEADSTOCK)
60
L.W. LONG STANCHIONS WITH .5 WIRE HAND GRAB
ENLARGE SLOT FOR STANDARD COUPLING POCKET.
4 x L.W. BRACKETS WITH L.W COUPLER LIFTING LEVER AND .4 WIRE LIFT BAR BENT TO SHAPE BEFORE FIXING.
61
REMOVE
BRACES
59
COUNTERSINK HOLES TO CLEAR COPPER FROM SCREW HEADS
CIRCUIT BOARD KEEPER
SOLDER
L.W BRAKES
61
REMOVE TOP PINS AND BOLT HEADS AND FIX FRONT STEP. FIX .5 WIRE BRACES BACK TO CHASSIS.
62
L.W. GAUGES AND VALVES
63
L.W. REGULATOR
64
L.W REVERSING QUADRANT
PHOSPHOR BRONZE WIRE PICKUPS
SOLDER
P.C. BOARD.
BRAKES
WHEELS
FALL PLATE


FIX W.M. BRAKE CYLINDER
69
6x2 SCREWS FIX FLOOR TO BODY
71
L.W STEPS FIT INTO SLOTS IN HEADSTOCK
65
FIX HEADSTOCK
70
L.W. STEPS
68
PLASTIC BOLSTERS
66
FIX SOLEBARS
67
FIX SHUNTING POLE POCKET
71
FOLD ETCHED DRAW BAR ANCHOR AND FIX TO FLOOR. (1.5x1mm CRANK PIN HOLDS DRAW BAR.)
68
6x2 SCREWS FIX BOLSTERS TO FLOOR
72
FOLD ETCHED WIRING COVER AND FIX TO DRAW BAR. ANY WIRING FROM TENDER TO PASS THROUGH COVER.


78
FIX TOOL BOXES.
80
FIX W.M. WATER HATCH.
79
FIX L.W WATER VALVES
77
FIX TENDER SLOPE BACK.
76
FIX BACK PLATE.
74
TENDER TOP.
75
W.M. COAL BOARDS
81
BEND .4 WIRE HAND GRABS AND FIT IN .4 HOLES.
74
Fix 2mm HEX NUTS INTO SPACERS. MAKE SURE NUTS GO INSIDE TENDER. NOTE CUT OUT IN FRONT SPACER
73
BEST WAY TO ASSEMBLE MAIN BODY IS TO FIT SIDES, TOP AND BOTTOM SPACERS TOGETHER AND HOLD WITH ELASTIC BANDS. ENSURE ALL IS SQUARE AND GLUE, SOLDER TOGETHER.


4 x 2 SCREWS FIX SIDE FRAMES TO STRETCHERS
ADDITIONAL ELECTRICAL PICKUP CAN BE MADE USING N.W.S.L. WHEELS AND TAKING POWER TO LOCO FROM WIRING TABS.
ETCHED WIRING TAB.
REMOVE BOTTOM SUPPORT FRAME FROM CASTING.
FIX LIGHT.
82
·5 WIRE HANDRAIL BENT USING 4 mm ROD OR DRILL. FIX INTO ·5 HOLES
85
FOLD ETCHED BRASS LIGHT STAND.
L.W BOGIE STRETCHER
SPRING
84
SOLDER
90
SHOULDERED SCREW
ASSEMBLE BOGIES AND FIX TO BOLSTERS.
DRILL FOR LIGHT.
86
TWO SHORT HANDRAIL KNOBS AND ·5 WIRE HANDRAIL
DRILL ·6 HOLES AT DIMPLES FOR FIXING STEPS
87
TWO L.W. FLAG POLES
88
L.W BRACKETS (3) AND ·4 WIRE COUPLER LIFT BENT TO SHAPE BEFORE FIXING, WITH L.W LIFTING LEVER.
·5 WIRE PINS SOLDERED AT SLOTS
89
REMOVE
REMOVE.
REMOVE LOWER PINS AND BOLT HEADS AND FIX STEP TO HEADSTOCK. BRACE IF DESIRED AS FOR LOCO FRONT STEP.
83
FOLD ETCHED STEPS DONT FIX TILL AFTER PAINTING.



East Broad Top Railroad standard gauge 0-6-0 No.6
Drawn by Deane Mellander
Full size for S scale; 3/16" = 1'-0"; 1:64

Drawings Courtesy of Deane Mellander

Side

East Broad Top No. 6