3

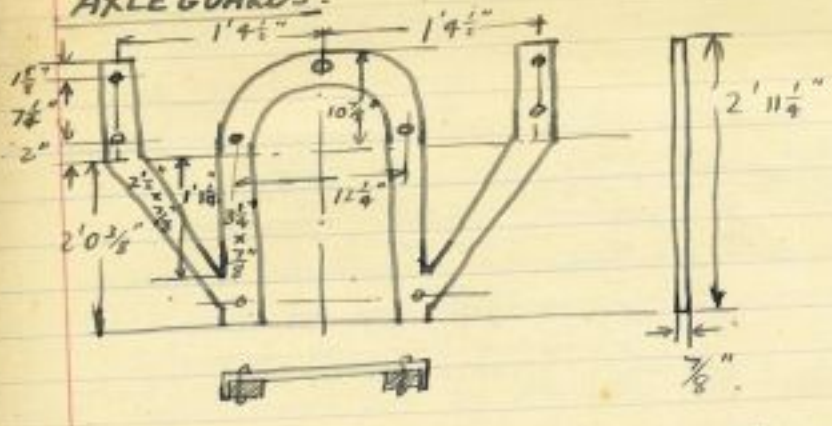
COLLEGE OF TECHNOLOGY,

MANCHESTER.

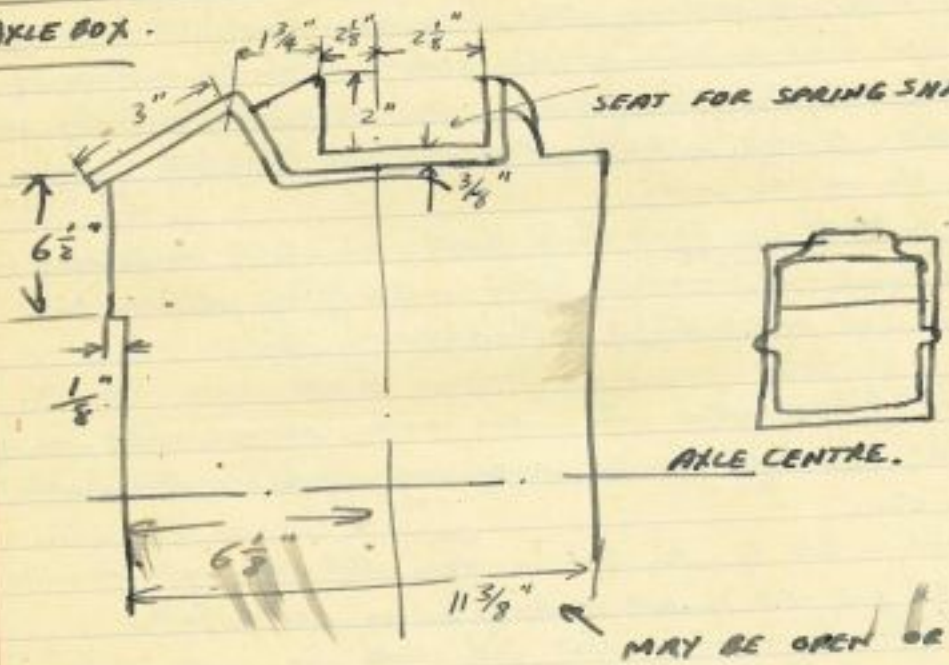
Name .....

Subject .....

AXLE GUARDS.



AXLE BOX.



AXLE CENTRE.

R.C.N. AXLE BOX.

Adams chimneys and domes M.R.N JUNE 1936. dwgs

Auto Couplings. See under Jackson.

FOR 15 mm CENTRE GAUGE USE CROSSED OUT SIZES

BUSH = ·62
TUFNOL = ·~~66~~
SPANNER = ·~~330~~ ·315

'0' SIZES IN RED

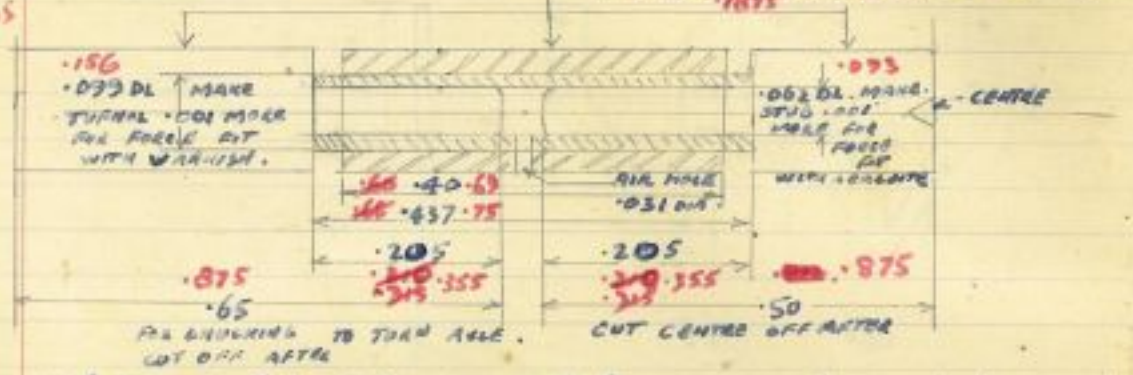
3/16" DIA FOR '0'
1/8" DIA FOR 00.

·218 OR ·203 (5 MM JUST POSSIBLE WITH CARE)

AXLES (SPLIT) ·156 OR ·140 MAT^L M/S. (OR 3·5 MM)

TURN TO ·115 AFTER ARALDITE HAS SET.

·1875

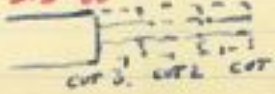


NOTE:- BE CAREFUL TO MAKE BOTH ENDS EXACTLY EQUAL IN LENGTH WHEN FINISHED TO TAKE MAX POSSIBLE AXLE PLAY.

Method. Machine stub axles and bushes. Use depth stop when 'ending up' to length and machining stubs to ensure uniformity.

To get correct projection of T-fuf bush, make the T-fuf blanks ·450 long (~~·686~~ ·76) then, after fitting, and before drilling, turn end and to length by setting top slide to 0, touching up to the steel bush and turning back ·02" (60 setting) to face the end ·02 proved. ·03 (50 SETTING)

Turn T-fuf for ·50 length in three equal cuts of ·166 (2 turns of top slide) for support. ~~·205~~ ·80 ·25 ·3



Part off by fretsaw.

After bushes are fitted with aluminium varnish, CAREFULLY centre with ~~3000~~ centre drill, drill ·052 thru ~~·078~~ ·093 use cut to ·062. If the hole starts accurate, it will run true.

NOTE:- ·093" IS THE ·092 HOLE IN A 3 mm DRILL ~~·0955"~~ HOLD ~~·0995~~ ·093"

Drill the hole by putting bush on ·062 steel rod chucked at centre height in tool post. OK if drill is sharp and run gently.

Assemble with nut and in collet with depth stop support and ⅛" dia axle in chuck in tailstock. Use carbide. Finally turn to length of ·~~750~~" which will accomodate Gibrin wheels ·125 thick bore and 16·75 back to back in EM (18·20 mm or 17·75 back-to-back ~~EM~~ P4.

'0' gauge. make ~~1·50~~ 1·60 long blanks. to cut to length as required.

Method of manufacture ('0' gauge)

Half axles turned down to size in 3 cuts + ·03 finish cut using a honed ⅛" square tool with slight nose radius (sketch). Length set by initial. Actual size of shank to aim at = ·0925/·0930. FOR ·0915/·0910 BORE ~~FORCE FIT MUST BE ·0915~~ ~~·0910~~ AIM FOR ·0930 GIVING. ·001 FORCE FIT MIN ABSOLUTE.

facing cut and final part-off. Bushes drilled by 1/8" slocomb followed by .140" and .156" drills in turret with length set by initial face-up and part-off. The .156 drill was .1556" actual and produced a .156" bore. Both drills were very carefully sharpened and in new condition. The .140 hole was taken out in two settings of .375" length, the .156 being used in between to give my a swarf clearance. Bush ends were cored by hand using 60° c/sink plus 120° drill. Bushes were well washed to remove cutting lubricant. (50% ejne oil 50% paraffin).

Press bush in using 1/4" x 7/32" recessed bush with length stop

Tufnol inserts cut by box cutter with a trace of oil to reduce rubbing friction. Diameter = .1569/.1570. Pressed into bushes by tailstock with .03" plate as a gauge to ensure correct projection. Armature varnish squirted into bush with Tufnol just inserted. Drilled out using 1/8" slocomb and 7/32 (actual = .0928") drill in turret. Drill .031 air hole with bush on steel mandrel in tool post.

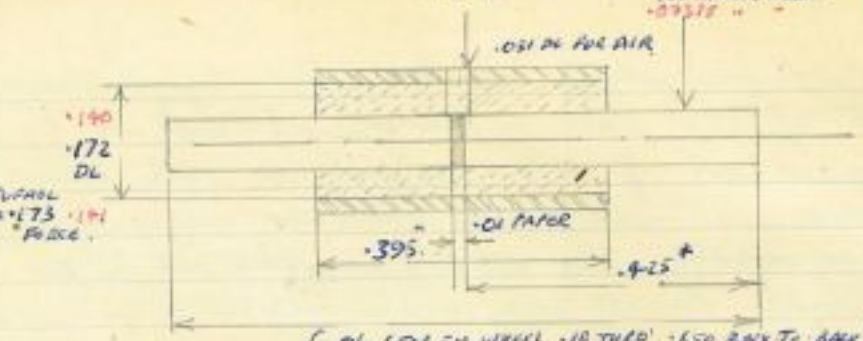
Assembly - Use end stop. Push bush at least half home on stub axle in collet using back centre. Then push other stub in using back centre. Withdraw back centre before spinning lathe or collet will seize due to assembly pressure. Pull off excess adhesive with fingers.

Final turning: Use power traverse 2 cuts + finish. Part off ends using stop in collet.

SEE NEXT PAGE FOR SIMPLE SPLIT AXLES (4MM).

·187
·218 F/C MS.

·125 SILVER STEEL · BLUE - LOCO
·0938 " " RED - BOGIE.



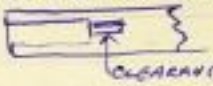
* { ·86 (FOR EM WHEEL · 10 THRD · 650 BACK TO BACK)
· 90 (FOR P4 WHEEL · 10 THRD · 699 BACK TO BACK).
· 95 (FOR GENERAL USE WITH WHEELS UP TO · 125 THRD (SWITCH AS NEEDED)
ADD · 180 TO EACH END (· 360 TOTAL) FOR OUTSIDE CRANKS · 110 DIA.
MACHINE DOWN TO · 110 DIA BOGIE ASSEMBLY.

ASSEMBLY:-

1) PF STUB AXLE IN 1/8" COLLET WITH STOP SET FOR · 25 PROJECTION. - ARALDITE AND PRESS ON BUSH WITH · 18 PROJECTING. STOP

2) PRESS IN OTHER STUB (ARALDITE) USING SHORT (· 50) BUSH FOR NORMAL OR LONG (· 70) BUSH FOR OUTSIDE CRANK AXLES (BUSHES MOUNTED ON · 127 SPIGOT IN CHUCK.

3) TO PF THE STUBS. MAKE A BUSH THUS

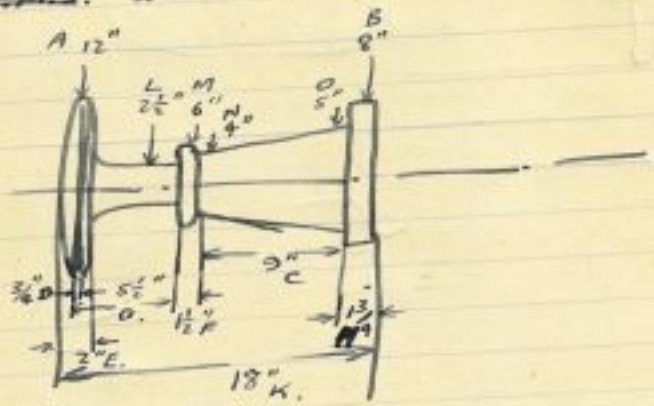


FIT IN TAILSTOCK. PUT COLLAR ON TAILSTOCK SCREW TO SET DEPTH. FEED INTO BUSH TO SUPPORT PF. FILE RAD ON THE END IN THE COLLET. THIS GIVES LEAD FOR ASSEMBLY.

BUFFER CENTRES. - 5'8½ AVERAGE BUFFER HEIGHTS 3'4½" TO 3'6"
R.C.H. STD. 5'8½" CENTRES & 3'5" FROM RAIL.

BUFFERS.

L.N.E. ~~L.M.S.~~ WAGON BUFFER. ACTUAL MEASUREMENT.



	L.M.S.
A.	13"
B.	11"
C	11"
D.	½"
E.	1¼" - 1⅜"
F.	1½"
G.	5½"
H.	⅞"
K.	18"
L	3"
N.	4½"
M.	6"
O	5"
P.	

R.C.H. SPEC.
BUFFERS TO BE 18" HEADSTOCK TO FACE.
WHICH IS TO BE 2" FACE.

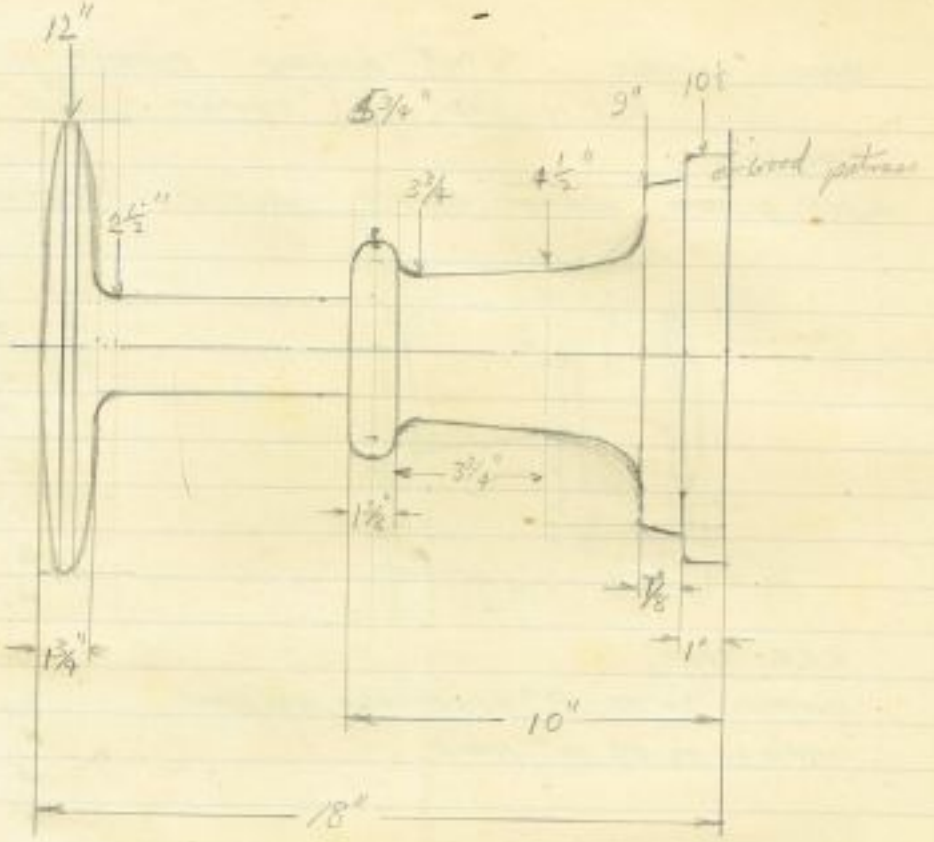
CARRIAGE BUFFER.
16" ND x 2¾" SHANK.

BUFFER STOPS. TYPES.

2 TYPES OF RAIL BUILT STOPS

Bell Code M.R.N March 1941 P41. full list of codes.

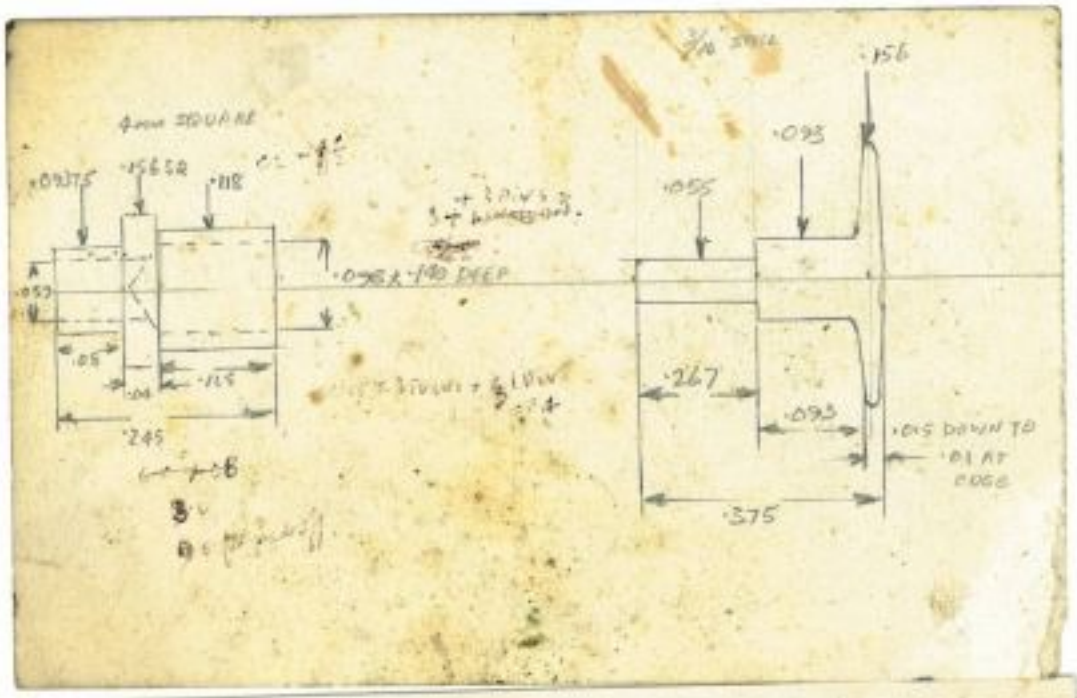
BACK-TO-BACK 4mm WHEELS - SEE STANDARDS PAGE 58

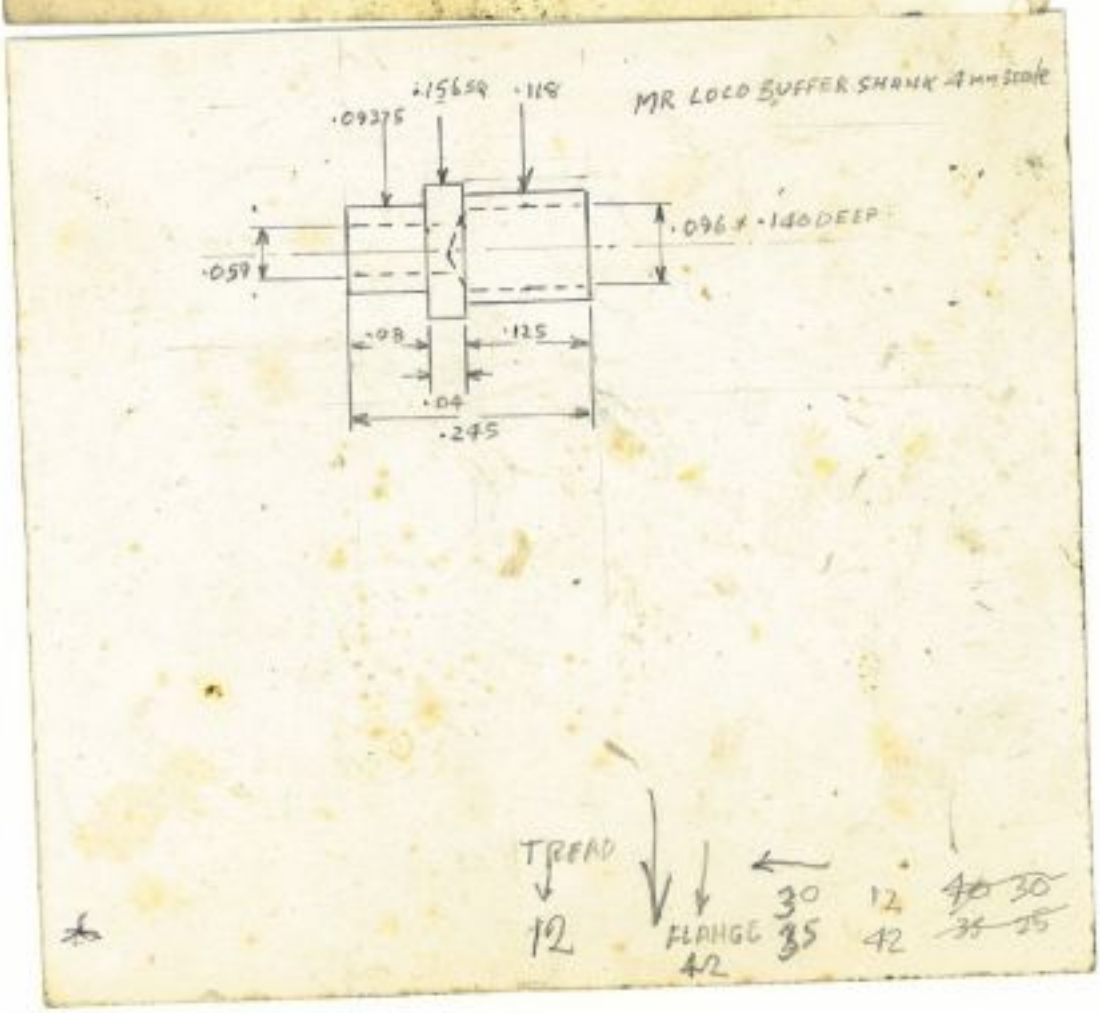


MIDLAND WAGON BUFFER.

BICYCLES. Golden Jubilee Link. March 1975 (SUPPLEMENT).

BRAKES - MIDLAND - HANDWHEEL TYPE - SEE HANDWHEEL


4mm SQUARE
·09375
·15652
·118
·096 x ·140 DEEP
·053
·05
·04
·125
·245
·156
·093
·055
·267
·093
·015 DOWN TO
FLAT
EDGE
·375

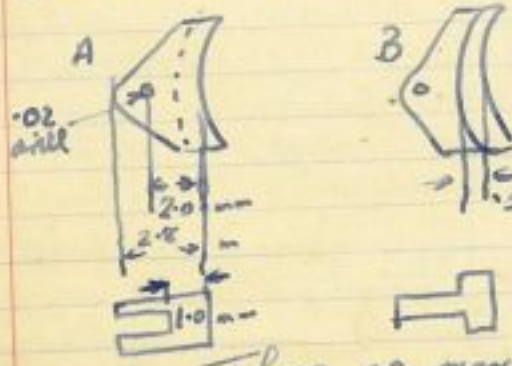

MR LOCO BUFFER SHANK 4mm SCALE
·09375
·15652
·118
·096 x ·140 DEEP
·059
·08
·125
·04
·245
TREAD
12
FLANGE
42
30
35
12
42

			Yearly Total	Year.	Total.	Notes.
Bentley Cars	3 litre.	—	145	1922		506 "Speed" models
			204	1923		
			403	1924		
			305	1925		15 100 mph models.
	4 cyl		295	1926		
			190	1927		
			45	1928		
			8	1929		
			4	after 1931.	1625.	
*	4 cyl	4 litre	50	1931	50	
	4 cyl	4½ litre	273	1928		
			260	1929		56 Supercharge (Blowers).
			158	1930		
			56	1931		
			6	after 1931.	733.	
	6 cyl	6½ litre.	58	1926		171 Short chassis Speed cars
			127	1927		
			99	1928		
			129	1929		
			126	1930	539.	
	6 cyl.	8 litre	100.	1931.	100	
				Grand Total	3,061.	

* Push rod - clamp & cupola with small Rolls. Used 8 litre chassis was underpowered and failed to reach the finish

BRAKE BLOCKS - GENERAL STOCK - (1/16" INSULATION BOARD OR BRASS should be thinned to .055 to make.

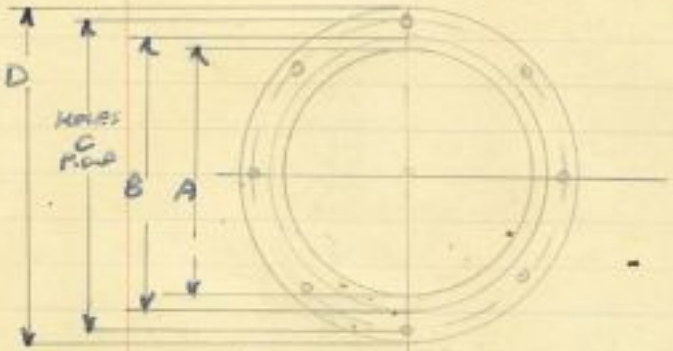
In general, a 4-way block is 7mm overall MAX. It may be single Ranger (about 60% of prototypes) or double Langer (about 40% of prototypes). Other dimensions are as shown.



These are maxima (except ·50 mm of B which is min).
If stock rings are turned to these sizes and blocks cut off, they can be filed down on the ends or face or shaped in other ways.

See one for for stock ring sizes for 14, 18, 22 and 2
blocks covering 12/16 16/20 20/24 24/28 mm shoes.

N.B. Brake blocks OUGHT to be about .055 thick for cycle wheels. not .062



A	B	C	D	NO OF SEGMTS
(14) .551	(15) .590	(18) .709	(19.6) .772	6
(18) .709	(19) .748	(22) .866	(23.6) .929	7
(22) .866	(23) .906	(26) 1.023	(27.6) 1.087	9
(26) 1.023	(27) 1.062	(30) 1.181	(31.6) 1.244	10.

Method 1) drill blanks for .218 either end then in slow 2 at a time.
2) For type A, mount in slow 1 at a time and turn in a slot in rim
3) For type B, turn down end side to leave .035 land in middle
4) Open out bore.

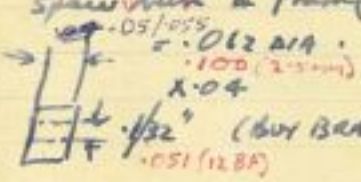
a) divide in thirds, drill .02 drill. b) with narrow pointed tool, then use a 0.015 fretsaw to deepen this slot to take the hanger

The above assumes 8 mm per blank & allows 1 mm waste when sawing off the rings.

Brake hangers are 2mm x .012 N/S strip suitably filed to shape after drilling. Pins are .02 ~~hill pin rivetted~~ N/S wire cropped off and rivetted.

OUTSIDE (DOUBLE) HANGERS

"C" GAUGE IN USE.



O.K. Checked

ALSO Use same bushes as spacers between double hanger at the top (16SH) and BUT make .03 thin.

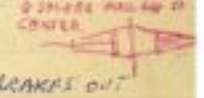
Brother 'O' gauge bush.

BRAKE STRETCHERS

.04 SRPB .062

A SIMPLER METHOD IS TO SOLDER A WIRE ON BEFORE CUTTING THEN FILE CENTRE AWAY

RIVETTED OVER & SOLDERED TO COPPER

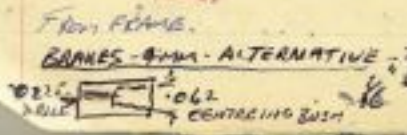


SPACER HANGERS

USE .015 THICK HANGER. THE BUSH IS THEN .075 LONG TO SPACE THE BRAKES OUT FROM FRAME.

.130

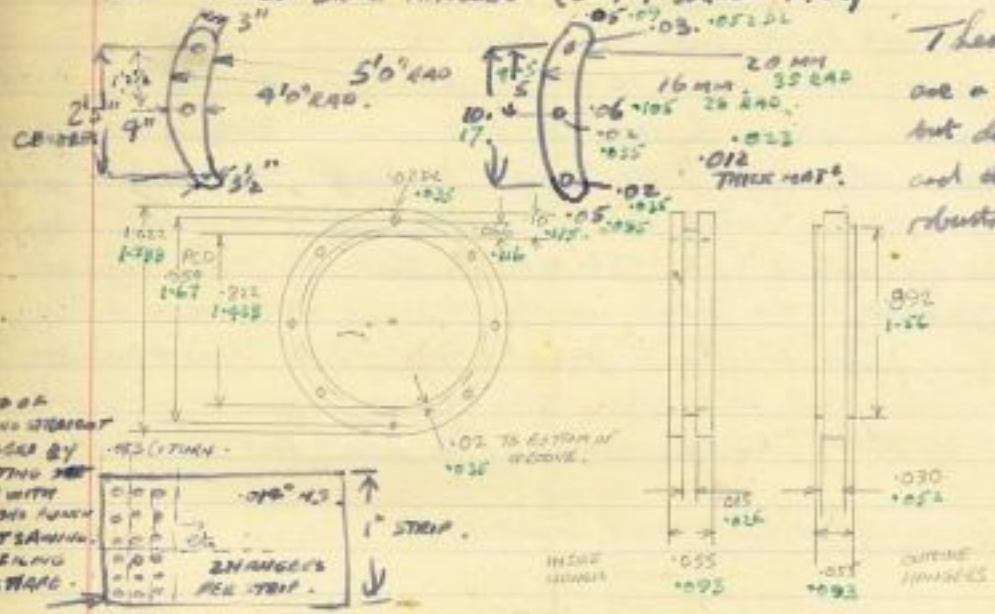
.025



BRAKES - 8mm - ALTERNATIVE

See over for "0" gauge longer. for Patrick

MIDLAND LOCO BRAKE HANGERS (0-4-4 JOHNSON TANK)



These dimensions are a little above scale but don't seem too bad and may give a bit of robustness. 7 mm in green.

4mm SCALE IN RED
7mm SCALE IN GREEN.

Make bore equal to crank dia.

METHOD OF MAKING STRAIGHT HANGERS BY PUNCHING STRIP WITH CENTRE PUNCH & FRET SAWING ONE SIDE OF FILING ITEN STRAIGHT.

BRAKES (WAGON) A comprehensive series of articles with drawings in the "Link" June, July and August 1981

BOILER MOUNTINGS (SEE ALSO NEXT PAGE FOR MIDLAND)

CHIMNEYS (4 mm). NORMALLY FITTED WITH 8BA SCREW, COUNTERBORED ·1875 & MACHINED ON A ·1875 MANDREL. COMED IN BORE AT TOP TO GIVE SCALE RIM THICKNESS.

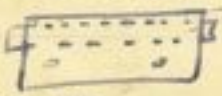
DOMES (4 MM). TAP 6BA AS DEEP AS POSSIBLE BUT FIRST, CENTRE, DRILL ·051 & SPOT FACE BASE ·1875 USING THE PILOTED CUTTER FOR OPENING OUT FRAME HOLES. THEN MOUNT ON ·1875 MANDREL WITH 6BA SCREW THROUGH, LOCK UP & TURN.

"0" gauge. Take ·1 and use ·250 mandrel. (OR 2½ ·120 MANDREL)

SAFETY VALVES (MIDLAND). AS FOR CHIMNEYS BUT 10BA SCREW WITH HEAD REDUCED IN DIA BECAUSE ONLY AS SMALL BORE IS POSSIBLE.

BRAKE PULL RODS (LOCO)

FROM ·04" X ·01" STRIP. DRILL ·02". FILE DOWN TO ·03" BETWEEN HOLES USING FILING JIG IN DRAWER.

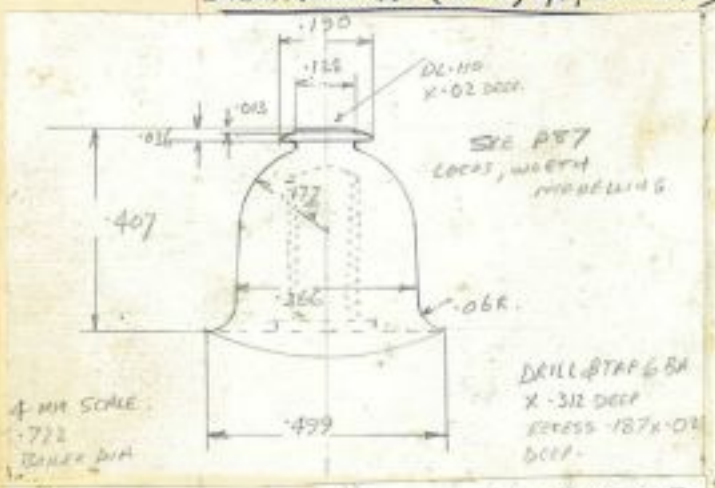


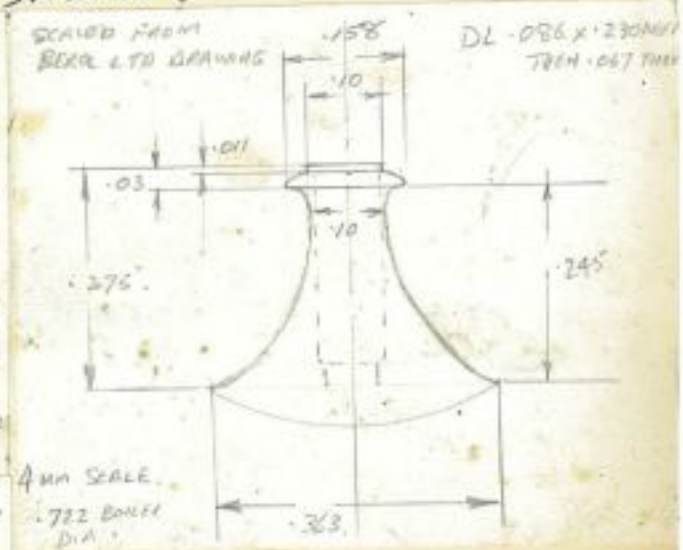
GRIP IN VICE.

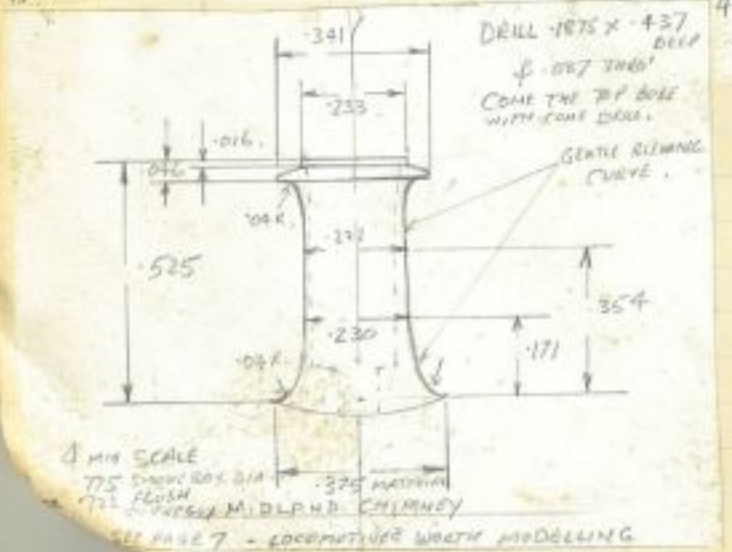
Brake Hangers (Patrick) "O" Gauge. The loco has double hangers, the LMS 3500 gall tender, single brake hangers.

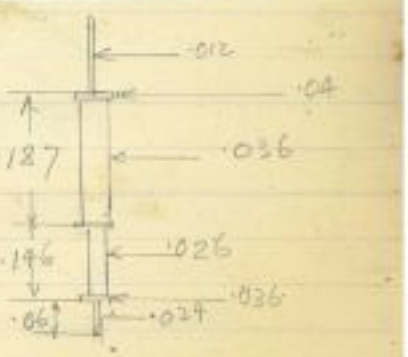
In the box of brake hangers are sets of filing buttons Ø 0·115 dia, 0·098 dia and 0·09 dia. both with 12BA & 16BA screws. Method is to lay out ONE hanger (·017" double, ·022" single). by drawing the radius at which the holes are to be located and centre popping VERY carefully. Then drill the fixing bolt hole, ·052" and the block and pull rod holes ·031". ~~Then the~~ For the tender, use the ·09 jig at each end and the ·098" jig in centre and file to jigs. For loco - ·098" (top) ·115 (centre) and ·09 (bottom pull rod). Drill ·052 holes in sufficient plate and drill all the others from the master. Then file, two at a time.

BOILER MOUNTINGS (DOME, S/V, CHIMNEY) MIDLAND





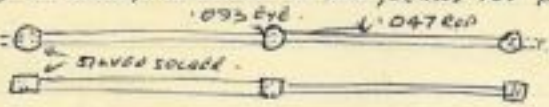




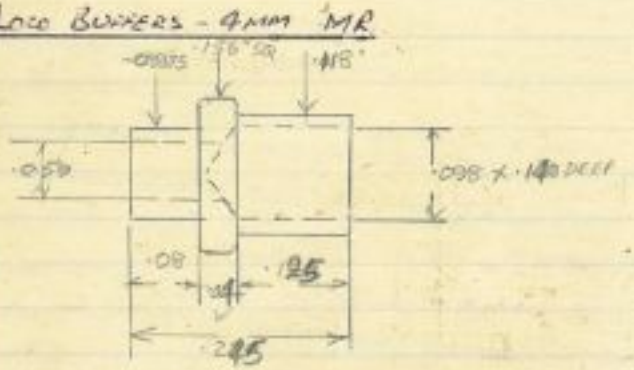
SEE PAGE 7 - LOCOMOTIVES WORTH MODELLING

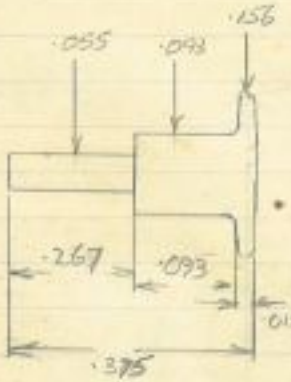
BRAKE ACLE RODS (TENDER, 'O' GAUGE, ONE EACH SIDE 4-4-0 ASPINALL) —

·047 N/S WITH ·093" "SLICES" PUSHED ON. DRILL ·093" WITH ·096 DRILL USING 'V' CROTCH IN TAILSTOCK. WHEN ASSEMBLED, SILVER SOLDER HOLDING IN TOOLMAKER'S CLAMP IN VISE. FINALLY, FILE "SLICES" (EYES) TO NEARLY THICKNESS OF ROD, CENTRE POP & DRILL FOR ·026 LIL PINS



Loco BUFFERS - 4mm 'MR'



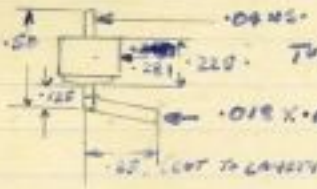


SPRING - ·008 WIRE ON ·052 DRILL. PULL OUT TO ABOUT 2½"; TIMES THEN CUT OFF BY THIN GRINDING WHEEL TO ⅛" LONG (5-6 TURNS).

ASSEMBLING USE ·05 SPACER BETWEEN BUFFER HEAD & BODY THEN SQUEEZE END OF SHANK IN VISE BETWEEN TWO HIGH SPEED ¼ BITS (SUPPORTED BETWEEN VISE JAWS ON SUITABLE PACKINGS — 2 STRAIGHT EDGES & A LATHE TOOL PACKING)

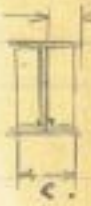
BUFFERS - OVAL Mickey buffers are 17" x 10". Punch out ·25 x ·02" N/S WASHERS (Punch in wheel/underframe box). Turn wrong buffer down to ·045 dia x ·03 long, ⅛" collar and sharp tool and force on the washer - drilled ·042". Solder. Hold buffer in ⅛" pin chuck and saw off to ·150 wide. File oval still in pin chuck for a flat and polish face of buffer. In my case, I made them ·240 x ·145" a bit over scale.

BRAKE CYLINDERS - 6 WHL COACHES.



TURN FROM ·312 OR ·281 BEADS

BRIDGE - GIRDER



4½mm is OK.

	MAULDETH ST JOE SHILLING ROAD.	
A =	5'0	2'9"
B =	9'0"	3'4"
C =	2'0"	1'6"
SPAN	56'0"	30'0"

GIRDER END RESTS ON 1'0" THICK STONE, AND IS INSET ABOUT 2'0"

See also Harmsworth Vol 1 Page 51 etc etc.

TO MAKE VERTICALS. ⅛" ·01 2mm

CUT STRIPS 2mm WIDE & ⅛" WIDE IN ·02" PLASTICARD. PART OFF WITH FINE FRETSAW TO EQUAL "D". FIX 2mm STRIPS WITH NEWPAX. THEN ⅛" STRIPS.

CHECK RAILS.

B.R.M.S.R. SCALE 0-0. 1.0mm (STRAIGHT) 1.25 mm. (CURVED).
(FLANGEWAY).

FULL SIZE PRACTICE. FLANGEWAY 1¾" = .023" or .583mm

OVER CHECK RAILS (B.R.M.S.R.) = 16·0mm or 15·5 (CURVES).

CATTLE TRUCKS.

R.C.H. SPECIFICATION (FOR TARIFF CHARGES).

SMALL 13'6" LONG.
MEDIUM. 15'6" -"-
LARGE. 18'0" -"-

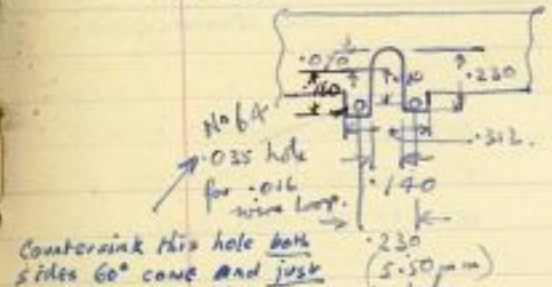
COLOURS. SEE "LIVERY."

COUPLINGS. SEE HOOKS. See also "Jackson" and MRN JAN 1960

Chimney - Johnson. P.7 "Locos Wood Modelling"

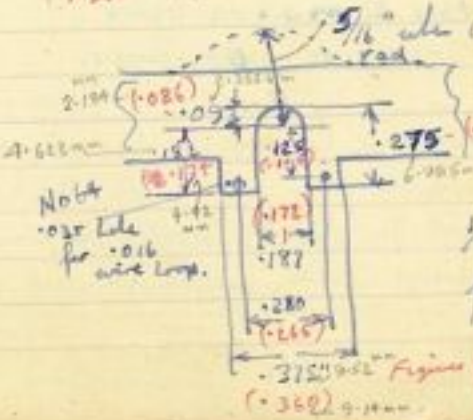
Chassis (Locomotives)

(SEE CATEL NOTES FOR BOSH)
3126S



over frames (·538 '00') (·528) (1·065 EM) 1·010.

filed down by ·02 each side to allow bogie swing

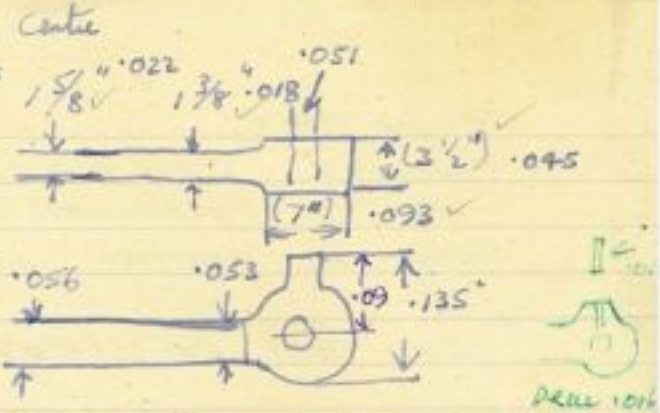


·See later for '0' gauge coupling rods.
ALSO SEE LATER FOR EM COUPLING RODS

COUPLING RODS (MIDLAND).

·08 JOINT.

FOR JOINTED RODS, USE ·08" FILING BUTTONS ON 10BA SCREW AND USE A ·031 JOINT PIN
USE A ·018 FRETSAW FOR THE SLOT IN THE FORK.
USE BRASS JIG (IN TOP PLANNED WITH 4 REAR KNOBS ETC) TO SUPPORT RODS IN A ·156 GROOVE WHEN FILING BOSS TO THICKNESS
ALSO FILE JOINT TONGUE IN THIS JIG.

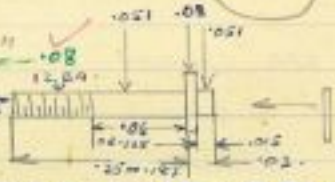


CRANKPINS (See also later note) (SEE ALSO JACKSON TYPE BELOW).

(Based on Stroud thick fore & ·10" 4mm in pencil
·093 ·168" 7mm in green
(GEOF SHOWN).

N.B. ALLOW ONLY ·0005 INTERFERENCE WHEN PRESSING INTO CAST IRON LAYBE 4-6.
FOR '0' GAUGE USE ·093 MATERIAL & 10BA.
FOR EM USE ·062 MATL & 12BA.

Washer SEE NOTE for new fixing
·072 OD ·125 ·1
X ·035" bore ·059 ·0
X ·008 thick ·016



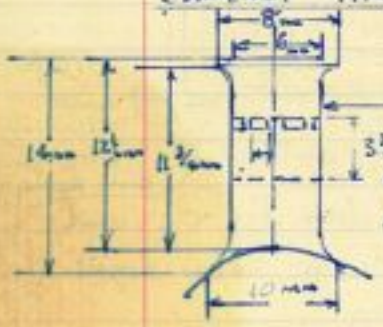
ALEX JACKSON TYPE CRANK PINS

PRESS FIT ·016 WIRE IN FRETSAW SLOT TO ACT AS A COTTER. SOLDER WITH SOLDER

COACH DWGS (MIDLAND).

MAC JUNE'55, NOV'55, OCT 57, SEPT'58, OCT'64, MAR'65, APRIL'65, MAY'65, JUNE'65
RM SEPT'55.

CHIMNEY - HIGHLAND - JONES - FLUTED.



SLOT PUNCH IN COLLET WITH DEPTH STOP TO TAKE HAMMER BLOW.

SMOKEBOX 21 mm DIA ON 'STRATH'

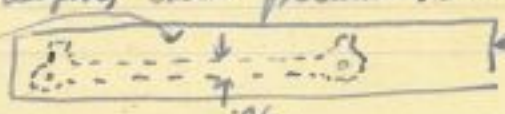
MATERIAL DURALUMIN.

AFTERWARDS, MOUNT ON MANDREL IN COLLET AND TAP PUNCH WITH HAMMER TO CORRECT SLOTS BY HAND.

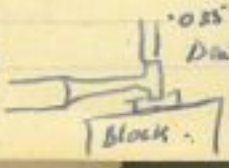
COUPLING RODS (FLUTED) ACTUAL EXAMPLE FOR LEY 2-4-2

Were made from ·036 N/S. An extra piece was left on till finished and used for clamping whilst milling the flute with dental burr and also for clamping whilst fretsawing out.

Fretsaw



for extra for clamping



CHASSIS 1) EM. 1/16" THICK FRAMES. MIKE SHARMAN WHEELS (NO BOSS ON BACK). INSIDE WIDTH (SPACERS) ·965. WIDTH OVER FRAMES ·590. BUSH FLANGE ·020 THICK. GANG. ·02 SIDE PLAY.

2) EM ·026 THICK FRAMES. GIBSON WHEELS (·006 BOSS ON BACK). ·580 OVER FRAMES ·02 BUSH FLANGE THICKNES ·02 SIDE PLAY/ SPACERS ·505 INSIDE WIDTH.

3) P4. (·699/·696 BACK-TO-BACK). ·660/·650 BUSH ·016 (·006 FOR FINE SCALE).

CARDAN SHAFTS - COUPLINGS (GEARBOX TO MOTOR) SEE "GEARBOX SHAFT DRIVES"

CAB FITTINGS -

① Gauges.

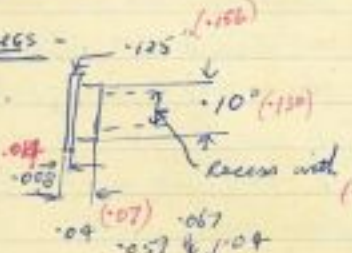
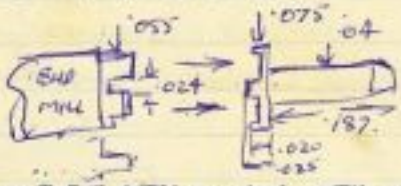
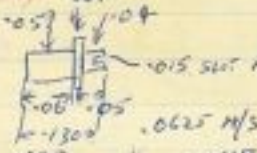


Figure in red after + cms before = PATENT 4 gauge.

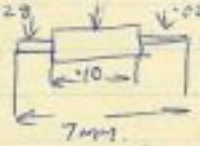


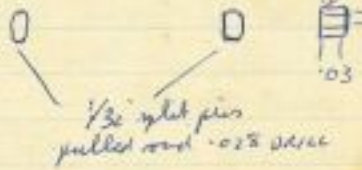
Handrails (Recess with ·055 cutter.

② Handle in cab



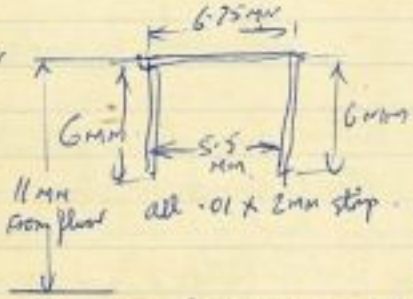
③ Water gauge

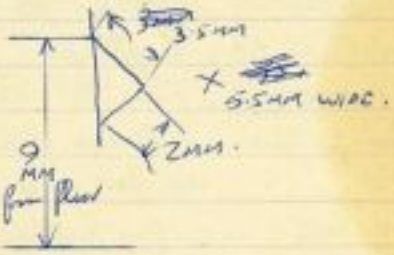




Small bush for lower end.

④ Firebox door





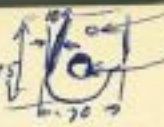
⑤ HAND WHEELS - SEE 'HANDWHEELS'

COUPLINGS SEE MICRUS

COUPLINGS - SCREW 4mm ϕ7mm. Tich Langan. 'LINK' April 1983.

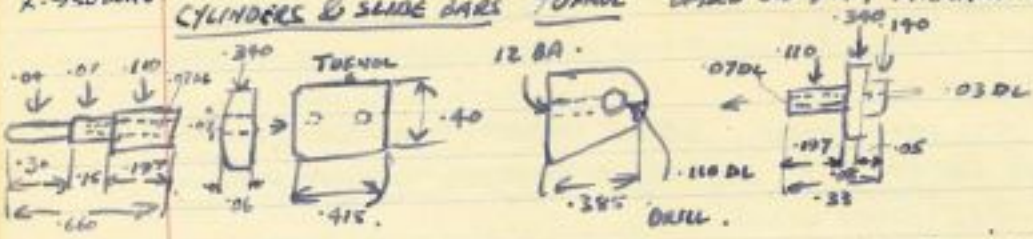
CHIMNEYS (MANUFACTURE) SEE BOILER MOUNTINGS.

GW CYLINDERS SLICE FROM 7/8" SQ TURNOL 0" GAUGE MACHINED TO .700 WIDE. X-SECTIONS



MOUNT ON FACE FITTED 1/4" DIA BRASS ROD WITH CENTRE AT OUTER EDGE THEN MILL RADIUS BY INDEXING 55T WHEEL AND MILL 10° TUMBLE HOLE BY INDEXING 1 TOOTH (= 10°) PAST VERTICAL.

CYLINDERS & SLIDE BARS TURNOL BASED ON 4 MM MIDLAND COMPOUND.



Machine 2 blocks per loco of Turfol making sure the lamination go across the cylinder. (.40 x .415 x .385) Find size but I made them such that the .110 drill (cylinder centre) was in the centre as block WAS .46 x .46 is convenient to start with. Centre found by using marking gauge from all four sides. Centre popped and set up in chuck with wobbler and drilled .110. Then blocks reduced by amounts needed to give above (e.g. .460 - .385 = .075; .460 - .400 = .060) Blocks then bird up in place on frame and clamped and drilled for 12 BA and tapped. Then two hardened washers .340 put on 6BA bolts thro' .110 hole and cylinder filed to radius and slope inside. WATCH HANDING.

FRONT & BACK COVERS & TAIL RODS machined from MS

Front cover drilled in dividing head at .192 centres x .057 drill for slide bars, then Araldited to cylinder block. When set, drill cylinder block through cover .052" using cover as jig. Use pillar drill.

SLIDE BARS From .051" dia MS. Use a filing rest in tailstock (keep in small tools tin)  (Drill .052 and file down nearly half way.

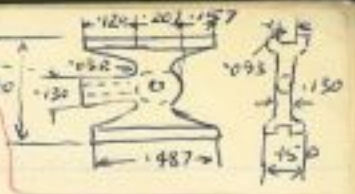
File to .038 x .035" using 40T wheel on index plate on lathe spindle Araldite bars in place.

CROSSHEADS. From 1/4" NS turned down to .218. Machine each end of bar for fit thro'.

1) Recess with cutter (in small tool tin) and drill .027 for .028 rod
2) Set up in dividing head and mill slide bar slots using .04 fly cutter in watch lathe 3 jaw to leave width between slide bars (.160) Because we haven't got Two 1/4" collets
3) Mill sides to .07" using 1/4" slot mill in watch lathe chuck
4) Mill recess for con rod small end .05 deep using .110 slot drill held in watch lathe collet.
(N.B. using watch lathe chuck + collet because 1/4" collet is in dividing head).
5) File smoothed & shape.

NOTE. THERE WAS NO TROUBLE IN MILLING "O" GAUGE FROM 7/16" BAR. PROVIDED ALL WAS TIGHT AND THE PISTON END WAS SUPPORTED BY CENTRE IN OVERHANGING ARM OF DIVIDING HEAD.

"O" GAUGE GWR 51xx



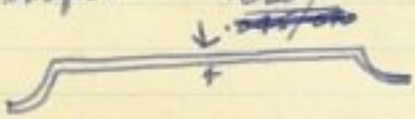
(crosslead continued).

THE HOLLOW CUTTER PLUS TWO 3/32" SR MEASURING PINS IS USED TO MEASURE OVER SLIDE BAR. SLOTS 45 IN THE PACKET ENABLES 4-4-0 COMPOUND CYLS.

ROUNDED END OF HOLLOW CUTTER FOR GWR LOCO.

use the hollow cutter - ·055 deep in end of bar to give ·07 bore and ·125 dia recess.

after milling, use knife file (ground in back) to file back of slot to taper shape.



Coal Rails

Fret out 2 (or 4) from ·014 N/S. soldered + form a stack and file.

Use 1mm Left round brass for structure (or 7mm ⊥ if available)
Solder in the brass rails from ·030 x ·01 strip.

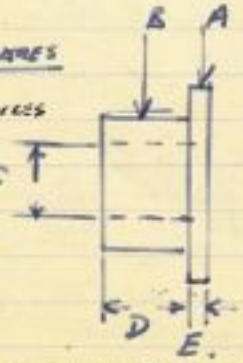
CRANKPINS (SEE ALSO PREVIOUS NOTE)

Fitting. If pin is ·052", drill with ·051" drill (THIS APPLIES TO PLASTIC WHEELS AS WELL) Hold pin in blunt tweezers and nibble length then put in No 3 collet and turn off to desired length (·150 for wheel ·10 dia with ·046 thick rod). Tap in pin from front of wheel using drift with ·031 hole. Use a ·051 thick spacer plate (both drift and plate are in washing box). Tap in a hole bed and use little bed as stop if pin protrudes at rear. Smear Loctite in holes of plastic wheels.

CHASSIS AXLE GUIDES

FOR 3/32" TENDER AXLES

A = ·1875
B = ·190
C = ·093
EM/P4/00.

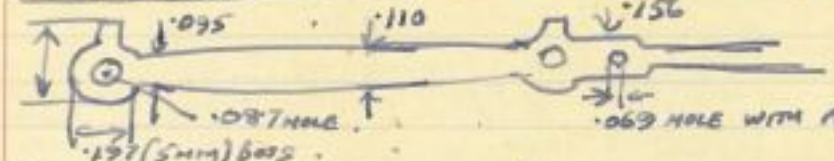


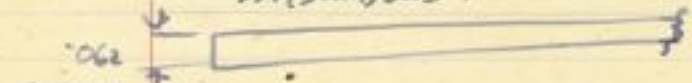
	EM/P4	00	"O"
A	·25	·25	·375
B	·1875	·1875	·3125
C	·125	·125	·1875
D	·074	·060	·125
E.	·008/·016.	·008/·016.	~~·008/·016~~ ·014/·025

1) N.B. "C" VARIES AS SIDE PLAY IS CALLED FOR
2) NB. FOR EM/P4 USE ·036/·030 THICK SIDE FRAMES. FOR "00" -·02 (SMALL CLEARANCE) FOR "O" GAUGE USE ·04 - ·06.

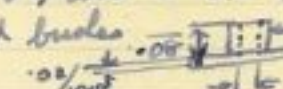
ACTUALLY MADE BY VU

COUPLING RODS "O" GAUGE. - PATRIOT (ALTERING CBW SOLID RODS.





FOR ALAN HARNI WHEELS, USE THE NORMAL ·093 DIA CRANK PIN.

1) Actual bosses should be ·08 through
2) Wednesbury wheels crankpins are ·110 in dia so hole needs to be ·114
Method of modifying.
~~3) Open up all big ends to ·110 hole.~~ 3) Drill ·05 HS plate ·087 off the hole
4) Turn up big end bushes  and pivot bushes 

2) Open up all big ends to ·140 hole. and gun up plate hole to ·140
4) Temporarily fit pivot bush in one rod & drill ·051 holes from rod

 — leave enough plate to provide oil boss when filed to big end shape.

5) Fit steel plug  to pivot hole & fretsaw round it to cut rod in half.

6) Temporarily fit large bush in big end & file in the half rod. Also, cut off to give flat.

7) Slot big ends by two cuts with ·01 fretsaw, leaving web on the back of rod. Clean with ground down knife file.

8) Fit tongues by pressing in bush & sweat.
9) Fit pivot bushes, solder, file to shape & slot as above, testing till tongues go in.

CYLINDER RELIEF VALVES - GW See Relief valves.

i) Fit other big end and saw and file all to shape
ii) Make joint pin 

in steel, fit and rivet.

BUT BEFORE RIVETING, draw file, clean and polish the rods.

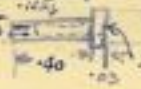
EM COY/COUPLING RODS BASED ON GWR SET FOR TIM STANTON

1 Generally as Midland. (See previous) Use ·05 steel sheet. Drill ·051 for crankpin ·031 for knuckle. Use ·08 die filing jig for knuckle & whatever is correct for big end.
2. Having filed big/little ends, put in vertical slide and mill away metal between with 3/16" slot mill (FOR ONE OF PAIR ONLY). Then file to size in toolmaker's clamps AND BOLT TO SECOND BLANK AND FRETSAW SPARE METAL AWAY USING FIRST ROD AS GUIDE)
3) Use 3/16" Square brass (in drawer with Midland jig) for filing sides drilling brass from rod and using suitable (·01) packing beneath for 2nd side. Generally, the metal is ·098" thick so file off ·01 and measure across rod at jig. This will give the SAME overall figure for BOTH sides
4) ~~Set rods~~ Set rods on side in vice in vertical slide & drill for ·093 (VERY SHORT, DEAD TRUE DRILL IN ECLIPSE CHUCK, NO NEED TO CENTRE) Then force in ·02" M/S WIRE, CUT OFF AND FILE TO REPRESENT OILER.
5) Complete knuckle by drilling inside tongue ·032, outside tongue ·0315 and using ·0315 steel welding wire as rivet
6) Cut outside fork using ·018 fretsaw and file inner fork to fit at same time as rod sides are cut.

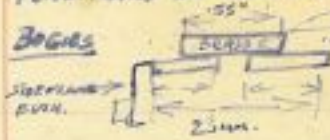
CAB WINDOWS (SEE WINDOWS - CAB)

CRANK PINS FOR 'O' gauge ASAHALL 4.4.0

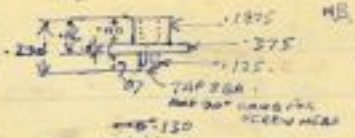
COACHES · RATIO — CLOAK THICKNESS WITH ·065 x ·937 STEEL PLATE WITH ·03 PLASTICARD ON TOP. EXHIBITION SECURING BUSH →



BOGIES

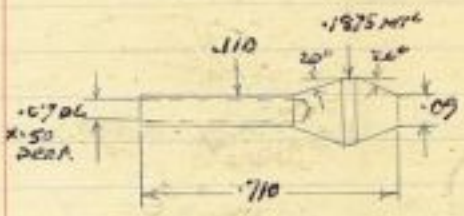


PLASTICARD USE ONE SIDE AND CUT TO CONFORM AFTER ASSEMBLY



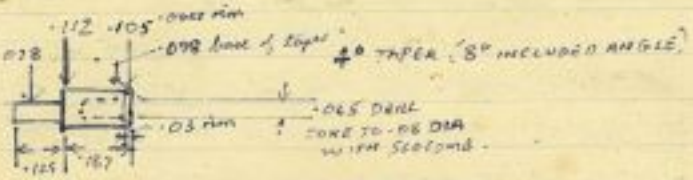
NB. THE HOLES IN CHAIRS MUST BE TO A FINISH OF 1/4 INCHES AND TO BE NUMBERED.

COLLETS FOR MINI DRILL



CYLINDER LUBRICATORS - 4MM - MIDLAND.

CHIMNEYS - HOUSE.



☐ I want to appoint another person to notify (maximum is 5) – use Continuation Sheet 1.

Drawings

Midland Ground Frame box - Cliffe Stokes MRN July 1962
Midland 2-4-0. 1400 class. MRN. Dec 1961.
Midland 8-10 ton long wagon MRN Nov 1961.
Midland 10T 4 wh brake MRN. Nov 1961.
Midland 8 ton lowside (2 numbers) MRN Sept 1961.
Midland Banana Van MRN June 1961.
Midland Meat Van MRN May 1961.
Midland 10T single bolster timber MRN March 1961.
Midland 0-6-0 tender class M (Johnson) MRN March 1961.
P.O. Wagons including coke wagon MRN March 1961.
Midland loading gauge and water tank (Garsdale) MRN Feb 1961.
Midland 0-4-4 Tank (Johnson). No 2227. MRN Dec 1962.
Hull and Barnsley Railway long bolster wagon MRN Dec 1962
Midland Weighing M/c adjuster van APRIL 1963 MRN.

DAS modelling medium. See drystone walling.

DOMES SEE BOILER MOUNTINGS.

DRYSTONE WALLING USING DAS.

Cut @ .093 card 5/8 high. ▭ - round top → make top uneven.

Tack a straight piece of wood/tufnol on board, put strip against it

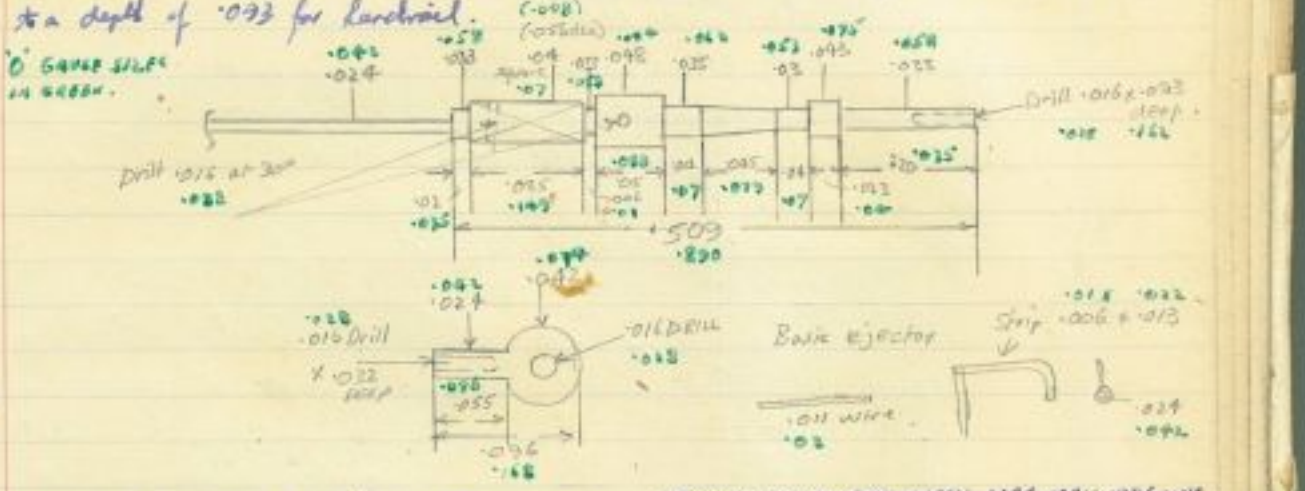
use double sided tape on card. Apply Das rolled to about 3/16" dia to centre of tape and flatten with putty knife to cover. Allow some to overlap top edge. <u>Moisten putty knife on wet cloth, also fingers.</u> When side covered, turn over and flatten down on wood/Tufnol strip. Also cut off with scalpel, the excess on the wall base. Lay down on covered side and repeat for the second side using the putty knife to unite the surplus Das with that protruding from first side to ensure covering of wall top. Again flatten and trim excess from base. Now mould the top round by hand. Leave for 1/2 to 1 hour then, using the ·01 top ~~[illegible]~~ cutter  in loco tool box

indent the top stones. Then with blunted penknife (in wagon tool box) cut horizontal lines ROUGHLY, straight and use a "dabbing" motion to break the lines a bit. Then go along with knife point "stabbing" the verticals unevenly till all wall is covered. Turn over and repeat. Leave 24 hours to set. Clean up base on coarse sandpaper.

Efficiency of model locomotives. Major Sheppard M.R.N. Feb 1942
" " " " A.F. Webbe "Tractive effort" March 1943.

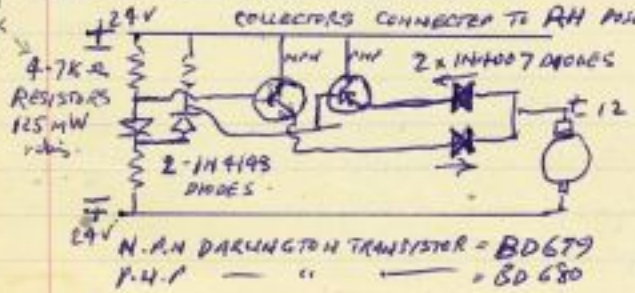
Ejectors (Midland-Johnson).

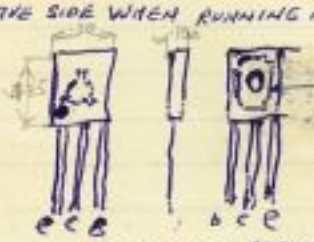
These are fitted on RH to 2·0" dia pipe with fittings screwed on. In model form, take ·024" wire and slip a length of NS drilled ·029 over it and solder then turn the NS as drawn and drill the end of the assembly ·016" to a depth of ·093 for hardrail.



ELECTRONIC VOLTAGE DIVIDER 24-12 VOLTS.

ORIGINAL DESIGN - PETE CURRY MAR-MAY 1986 LMR.
MY VERSION REVISION - FEB 1987 LMR.





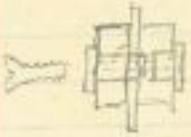
When top (RH) rail is positive, current flows thro' LH diode giving +12V for base of N.P.N BD 679. RH diode blocks any current flow through RH resistor so base of P.N.P = 24 V, BD 680 is reverse biased and is switched off because nothing can flow through top diode IN4007. Reversing polarity of tracks switches N.P.N off, switches P.N.P. on. so motor is reversed. Different voltages at motor could be arranged by choosing different value of voltage divider resistors.

The two darlington transistors can be mounted on a heat sink (·02 copper) and the metal face contacting the heat sink which is made positive. The collector lead on the transistor is then redundant and can be cut off

In the event of failure, disconnect from motor and check voltage output from each transistor. Also, check across electrolytics. The 2-2-2 might only run one way. It was found that one 4148 diode was not conducting in the forward direction. It was replaced and all seemed well. On first 'wagging' the wire made it conduct intermittently so obviously it had broken inside.

Electronic voltage divide continued.

10 or 12 BA screw →



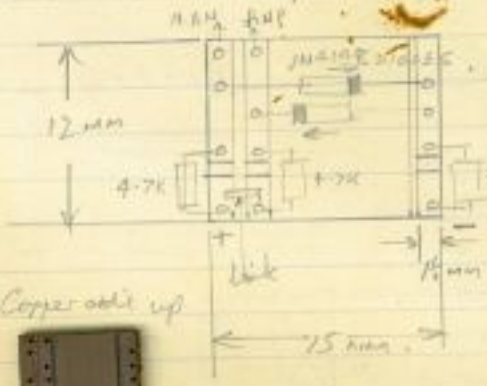
The brushes can be Tufnol if insulation of motor is needed or brass if close is no close by screw shaft body of motor. One end can be tapped or screw can go right through for bolting to a bracket, either tapped or nutted

Heat sink - large as possible

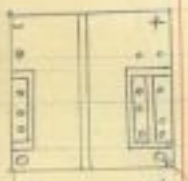
One method is to fit a heat sink bracket to R.H. (positive) loco frame and to mount the transistor sheets either back to back or one above the other, inside tank, tender, bunker etc or between frames. (with lead weights bolted on as weight plus heat sink). The bases are then fed via fine tinned lead from printed circuit. The two IN4007's are joined and a common lead taken to +ve of motor. Negative of motor is taken to terminal block or negative frame (VIA a 10Ω or 22ohm resistor to protect stalled motor).

IN 4148 →|

IN 4007 →|



'Printed' circuit. Actually, make as a long strip with the gaps cut along then saw off to make separate boards. Drill holes .024" at 5/8 mm spacings for resistors. Set out and drill one board and use as jig for rest.



THE CIRCUIT IN 2-2-2 SHOWN.

Copper side up

P.W. TO CHASSIS

Mount motor frame by brackets bolted OUTSIDE FRAME By frame screws (See Johnson 0-4-0T and 0-6-0 half cab) In the case of the Johnson 0-4-0T, the two transistor are also mounted on the board by a 10 BA screw. The bracket legs are soldered across the bottom 3 mm of the board and a further gap cut up the middle to make one half of the middle +ve as feed for the collectors.

The Hornby 0-4-0 tank has the full width of the frames to play with and so has a special horizontal 'printed' circuit fitted round the motor. It carries the transistor and is plugged into four sockets for +ve and negative by means of pins soldered in the board. It could be wider but has to slide up between the outside frames in this case.

Etching. M.R.C. May 1973.

Notes: Use pyrex to avoid attack.
Use rubber gloves. USING BLICK OR LETTRASET.

Materials.
Hydrogen peroxide (30% W.V. or 100 volumes) quantity 100 ml
Hydrochloric Acid (25% concentration) 100 ml. } enough for 4 plates.
Nail varnish
Nail varnish remover or acetone
Small ink rubber
(This relates to copper sheet but try brass).
Metal sheet clean, dry, flat. Scrub clean with kitchen pad.
Don't press letters too hard or wax may be put on the metal. Rub letter through a glassine sheet of paper.
Paint border or other protected area with nail varnish or use blick lines. Varnish over blick lines anyway to prevent lifting.
Cover excess copper with nail varnish to protect for re-use.

BAKE the sheet at 60°C (140°F) for 30 minute minimum. This improves adhesion of letter and sets the varnish. Higher temperature may cause the letters to peel. If no thermometer use lowest stove setting.

Prepare etch immediately before use. Reaction it goes off.

Quantities = 3 measures of water (75 ml).
then 1 measure of Hydrogen peroxide (25ml)
then 1 measure of hydrochloric (25 ml)

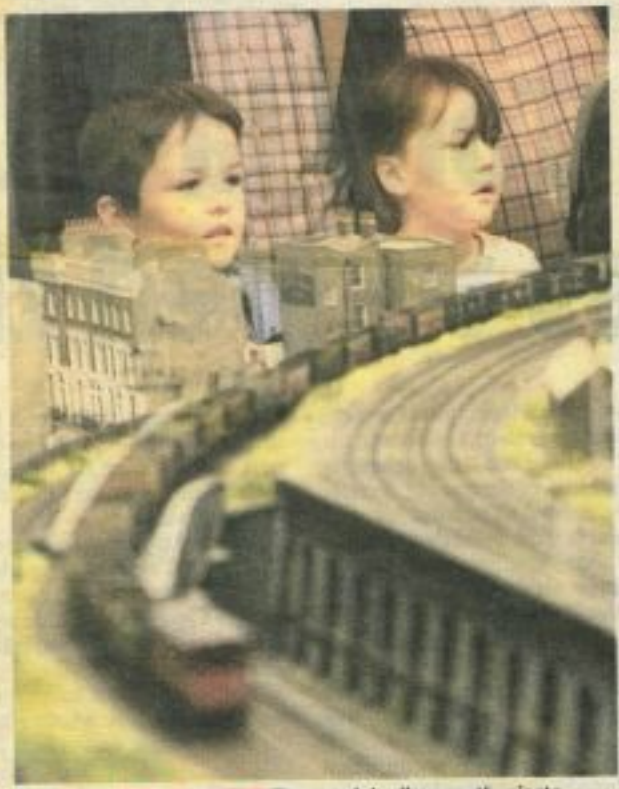
The correct etch solution should effervesce slightly like lemonade.

Put copper sheet in etch. If varnish with a bit protruding it can be withdrawn for inspection and washing. If too vigorous, add water. Etch for 15 min or until letter lifts off. Rinse thoroughly. Dry on paper tissue. Remove lettering and varnish with acetone. Blacken background with black felt tip and polish surface with ink rubber

MAN EVENING NEWS OCT 14 2006

4,500 TURN OUT FOR SOCIETY'S ANNUAL EXHIBITION

LOCO COMMOTION A young model railway enthusiast gets a close look at one of the displays at the exhibition Photographs: Constantine Tofalos



FULL STEAM AHEAD Two model railway enthusiasts watch as a train shoots past them on one of the displays

All aboard for model railway fun

IT WAS full steam ahead for train enthusiast as they rushed to Manchester Model Railway Society's 70th annual exhibition.

More than 4,500 people turned up to see the displays on show at the three-day event at New Century Hall.

The exhibition included a display of the Bachmann Branch-Line, plus track layouts of The Gresley Beat at King's Cross and the 37th Street Yard in New York.

Sidney Stubbs, president of the Manchester Model Railway Society, said: "The show went very well.

"Visitor numbers were up on last year's exhibition and there were some fantastic displays."

MAN EVENING NEWS SEPT 23 2000

Guardian of a bygone age

Stan's 70 years as a model rail enthusiast

Exhibition to draw fans from all over world

TERRY JOHNSON

NEARLY three quarters of a century has gone by since Sid Stubbs was bitten by the railway modelling bug.

Back then, he was a fresh-faced 15-year-old, captivated by an era of grit and steam. And while the original old railway companies like the LMS and LNER have long gone, the excitement of making intricate replicas of these mighty engines and early rolling stock has not diminished for Sid.

EARLY DAYS the society held its first exhibition in 1931

The 85-year-old, from Chorlton, Manchester, is President of the Manchester Model Railway Society, which he dreamed of joining by his 16th birthday.

His name now dominates railway modelling because of the high standards he set and his pioneering work.

The society celebrates its 70th annual exhibition at New Century Hall, Corporation Street, from September 29-October 1, and enthusiasts from all over Britain and overseas will be attending.

One of the oldest amateur societies in Manchester, it held its first exhibition in 1931 in the Lever Street Sunday School. There were no exhibitions during the war years. Over the years, the groundswell of interest has made it the longest running model railway show in Britain.

» **DISTINGUISHED SERVICE** Model railway enthusiast Sid Stubbs with his 1890s model railw attic of his Chorlton home Picture: Christian Bragg

The Manchester show will open on Friday, 5-9pm; Saturday, 10am-6pm; and October 1, 10am-5pm.

Admission prices are: adults, £5.50; juniors, £3; seni £4.50; family ticket (2 -

Tickets also via th www.mmrs.co.uk


FISH PLATES

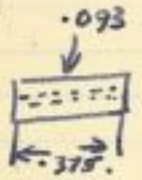
Frames (Locomotive) see classic

FLYWHEELS To suit Faulhaber 1616/1629 motor. For EM 0-9-4 tank dia = ·60 width = ·25. Solid brass. For '0' gauge 0-4-4 tank dia = ·780 width = ·25. LATER CHANGED TO LEAD.
In all cases, the flywheel was fitted with 2-12BA set screws at 180° where the flywheel is on the coupling sleeve (·156 dia), the screws also pass through the sleeve. Where on the gearbox (the sleeve being a 'slip' fit) the screws close the split by bearing on it.

Screw sizes

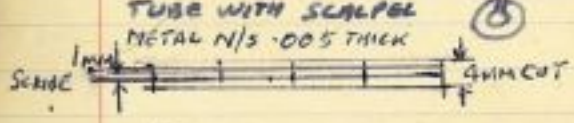
Footplates (Midland).

Wire = ·011S
Tube = ·025 O/D x 18 mm long.



FISHPLATES - INSULATED - TUFNOL →

ALTERNATIVELY BUT NOT SO GOOD
BLACK INSULATION FROM ·026 SINGLE STRAND WIRE. CUT INTO THE INSULATION TUBE WITH SCALPEL



SAMPLE ·005 METAL ONLY MARKED

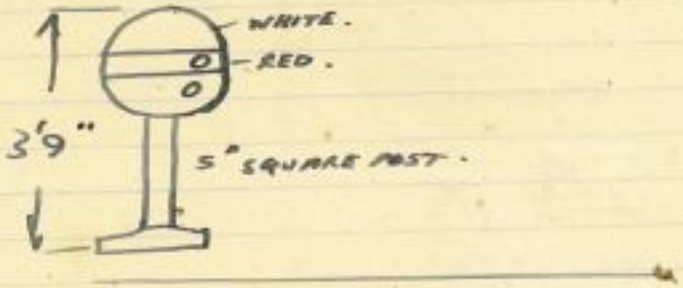
L BEND No 1 - PLIERS

U BEND No 2 - FINE NOSED PLIERS. ALSO PUT RAIL IN AND BEND TO CLOSE

BEND No 3 USING METAL CUTTING PLIERS + RAIL

GROUND SIGNAL.

L.M.S. SIGNAL AT CHORLTON-C-HARDY.



GEARS :-

GEARS FOR MODELS IN 7mm SCALE.

a) WORM GEARS. BEST EFFICIENCIES ARE OBTAINED WHEN WORM HELIX IS ABOUT 20°-40° EFF DROPS RAPIDLY WHEN HELIX IS BELOW ABOUT 10° & IS LESS THAN 50% (SELF LOCKING) FOR NORMAL ¼" WHIT WORMS FOUND IN MOST MECHS (HELIX 9° 20').

IT IS THEREFORE RECOMMENDED THAT WORM GEARS FOR MODEL LOCOS AGREE WITH THE FOLLOWING :-

a) TOP DIA .156" (5/32") TO REDUCE ADVERSE TORQUE TO MINIMUM.

b) BOTTOM DIA .096" (3/32" APPROX). ARMATURE SHAFT DIA.

GREAT WESTERN LIVERY DETAILS IN 'GREAT WESTERN WAY' - HMRS.

POST 1928 LIVERY. - FRONT CAMP IRONS - BLACK, REAR - GREEN.

MOTION BRACKET (GUIDE BARS & BOILER SUPPORT) - ALL BLACK.

FOOTPLATE TOP, TANK TOP, SPLASHER TOP, BEADING ROUND BUNKER, CAB & TANK. BLACK

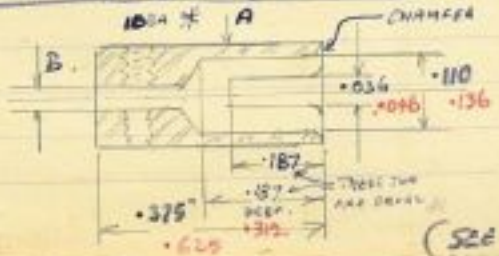
CAB ROOF - BLACK. HANDRAILS ON GOODS & TANK LOCOS - PAINTED, GREEN

AGAINST GREEN BODY CHANGING TO BLACK AGAINST SMOKE BOX, SMOKEBOX

DOOR HINGES & DART BLACK. ON ~~MAROON~~ EXPRESS PASSENGER LOCOS ALL

ABOVE WERE POLISHED. NUMBERS ON FRONT & REAR BUFFER BEAMS

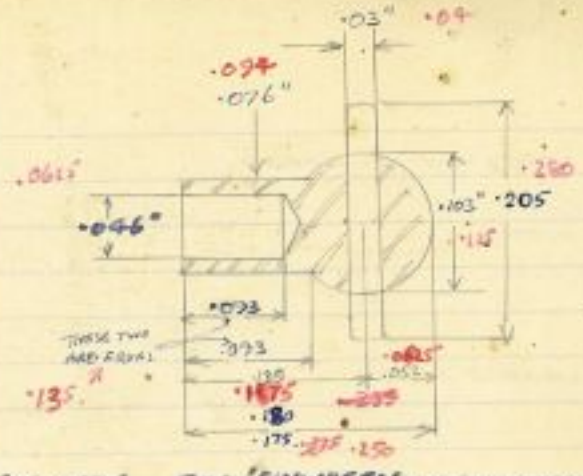
See Later GEARBOX SHAFT DRIVES & COUPLINGS. The following are the dimensions for couplings.



	A	B
	.187"	.093" (FOR .093 MOTOR SHAFT)
*	.156"	.09" - .063" (1½ mm) - .0625" (FOR .09 - .0625 SHAFTS.
	.25	.093 - .063 (1.5mm) FOR 'D' GAUGE.

* NOTE. FOR GEARBOX SHAFT, SPLIT .005" FOR MOTOR SHAFT - 12 BA

(SEE OVER)



BALL JOINT FOR SHAFT DRIVE.

"O" gauge for 2½ mm - ⅜" shafts.

1 Mini COUPLINGS "O" 3/16 line
1) END UP.
2) DRILL WITH #51/·131 BULB TO CENTRE
3) PART OFF.

SHAFT LENGTH = OVERALL LENGTH LESS 1½ mm (·590")

1/16" Mk3
1mm Mini

·028

1/16" BALL

"O" GAUGE DIMENSIONS.

your specified bore
SLOT ·25

·137 DIA
·25 DEEP

·525

3/16" Mk3
5/32" Mini

·25
·032
·052

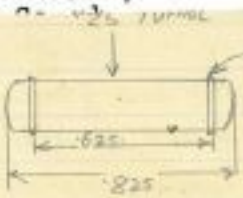
Gearbox end coupling

Motor end coupling

1) GRIP BALL IN ⅛" COLLET, CENTRE WITH ¼" SLOCOMB DRILL ·096 OPEN OUT WITH ·09 DRILL & FINALLY BROACH 3/16" TIGHT FOR SHAFT. FIT SHAFT & ROUND OFF END WITH FILE.

2) FIT BALL & SHAFT IN CROSS DRILL JIG IN ¼" COLLET, CENTRE WITH 60° JOINT TO BIT. DRILL ·026, FOLLOW WITH ·027 THEN USE ·028 DRILL IN PIN CHUCK BY HAND TO GO IN FROM BOTH SIDES JUST LEAVING MIDDLE. THIS SHOULD BE TIGHT FOR ·028 PIN CUT PIN OFF SHORT & DRIVE HOME (WITH LOCTITE IF A BIT LOOSE) FINALLY, CUT OFF POINT & GRIND PIN TO (SAY) ·218 OVERALL.

GAS CYLINDERS - 6 WHL COACHES.



·03 WIDE GUMMED STRIP FROM RECTANGULAR LASERS 3½" x 1⅞" ·002 THICK (·008" INCLUDING BACKING PAPER) WOUND ROUND SEVERAL TIMES THEN SMEARED WITH WHITE WOOD GLUE TO SECURE.

32 Tkds. = 32) 100 (3125 .03125 pitch.
96
40
32
80
64
160
160

DP = 32 × π = 3.1416 .
32
6.2832 .
94248
100.5312

= 100.5312.

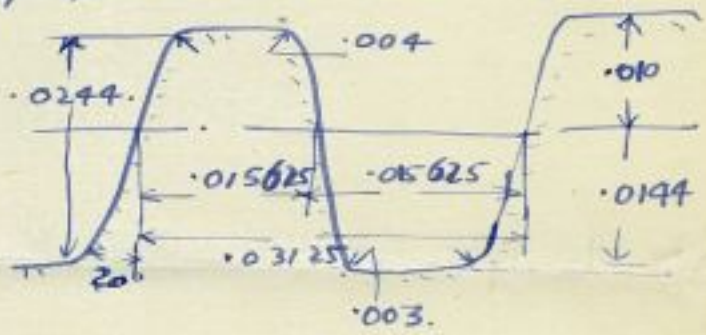
.01571
.03142

Module = 1 / 100.5312 (in inches)

.05625
.03125

= .01 inches approx

Basic rack = (minimum backlash)



.125
.098
.027. fotter dia.

.105 P.C.D.

Cutter for hob is as tool form

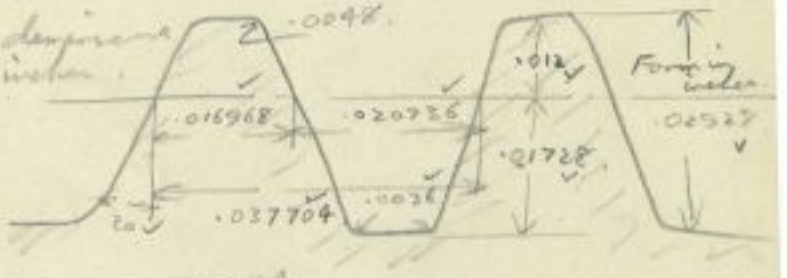
Cutter for worm is as gap form.

Make cutter for worm first then store .003 rad to .004. on tool

Module - 30 80 DP
m. - 30 Backlash form.

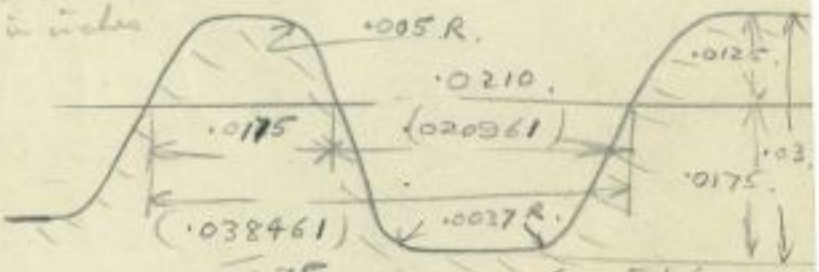
all dimensions in m/m

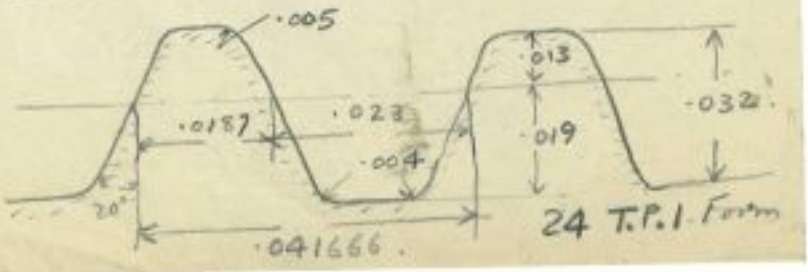
all dimensions in inches.



·0384

all dimensions in inches





Supply M.S. wire 8 S.W.G. from 5 S.W.G.
in 2 pulls.

Pickling is important.
Coating for hard steel —
water coat - hydrated oxide of iron
or wet rust.
or copper sulphate

leave small parallel portion.

Equal area	wire S.W.G.	Reduction %	Length of bearing surface	Half angle
5	6	21	.1036	6° 30'
6	6½	28·7	.216	9° 24'
5	8	43.	.213.	9° 40'

Lubricant Tallow or fat but for heat generated saponified fat is used or soap. (Olive oil does)

Bottoming of die if it wears reasonably, the die is ~~[illegible]~~ after even when made of high carbon steel

M.S. can be reduced 2 - 3 gauges at a pass and patented steel wire 1 - 1½ S.W.G per pass

30% area reduction in steel — quite common

Speeds 250 - 500 ft/min in steel.
copper 900 ft/min

Tensile strength of metal.

	Annealed Tons/□"	Hardened Tons/□"
Copper	14	29
P.B	22	65
Nickel	30	70
Monel	35	65

Nickel alloy - reduction may have to be less than for steel.
Short bearings to reduce friction & non-ferrous.
Use tallow

26.) 1000 (038461
78 .037704
220 .000757
208
120.
104
160.
156.
4.

.01
.038461
.0175
.020961

.03
.0125
.0175

.0385
.0175
.0210

$\frac{1}{280}$ $\frac{1}{4} \times \frac{1}{7} \times \frac{1}{10}$

$\frac{1}{12} \times \frac{1}{7} \times \frac{1}{10}$

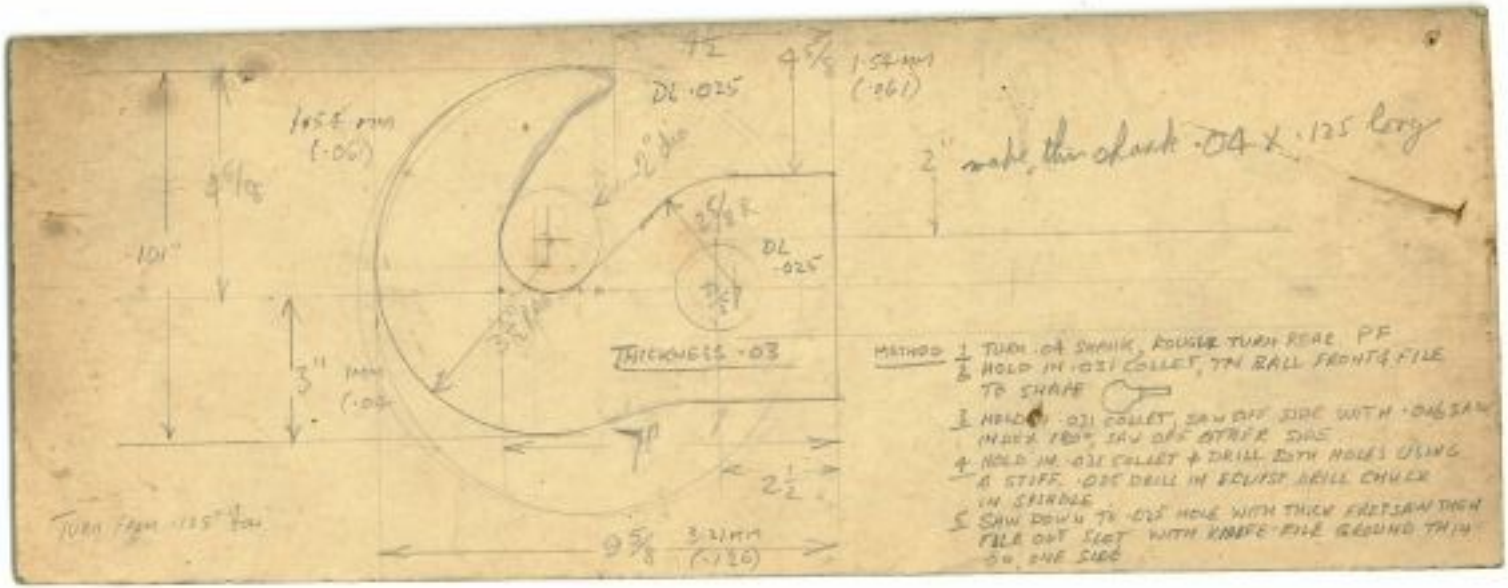
·126. 395.

3·146.
·126.
3196.
·06292
·018876.
·396396

·0385.
·077

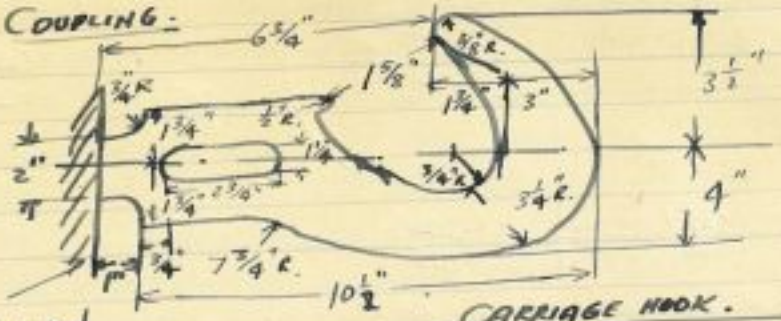
·077

si blanc = ·077 / ·396396.


DL .025
1.52 mm (.061)
2" make the shank .04 x .125 long
1.65 mm (.06)
4 5/16
1.01"
DL .025
THICKNESS .03
3" mm (.04
2 1/2"
9 5/8 3.21 mm (.126)
METHOD
1 TURN .04 SHANK, ROUGH TURN REAR PF
2 HOLD IN .031 COLLET, TIN BALL FRONT & FILE TO SHAPE
3 HOLD IN .031 COLLET, SAW OFF SIDE WITH .046 SAW INDEX 180°, SAW OFF OTHER SIDE
4 HOLD IN .031 COLLET & DRILL BOTH HOLES USING A STIFF .026 DRILL IN ECLIPSE DRILL CHUCK IN SPINDLE
5 SAW DOWN TO .025 HOLE WITH THICK FRETSAW THEN FILE OUT SLOT WITH KNIFE FILE GROUND THIN ON ONE SIDE

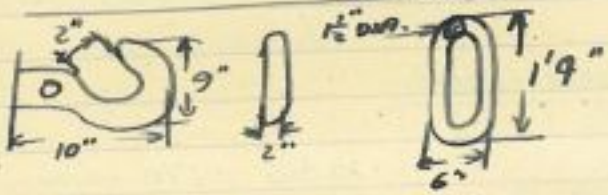
HOOKS.

COUPLING:-



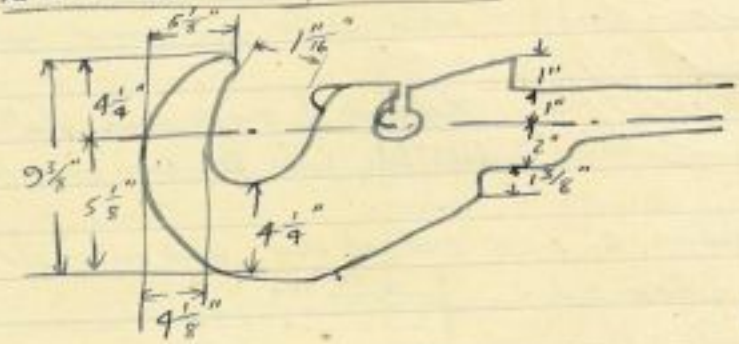
Headstock

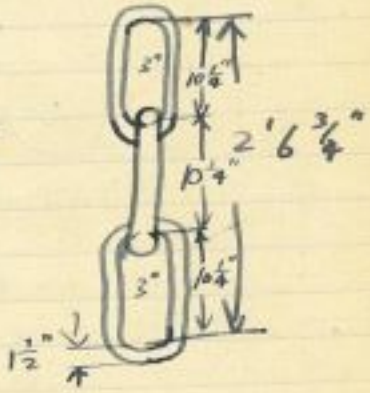
CARRIAGE HOOK.



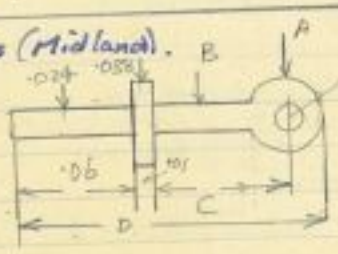
ACTUAL L.N.W.R. LINK AND HOOK. MEASURED ON WAGON.

R.C.N. WAGON COUPLING.





Handrail Knobs (Midland).

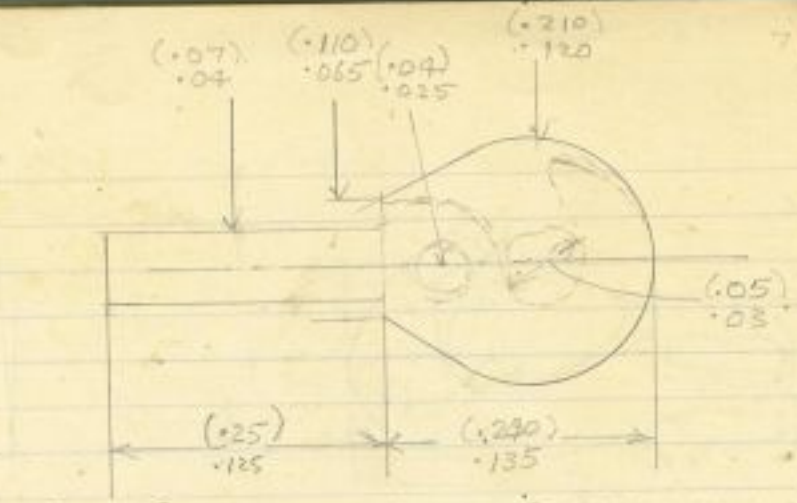


	A	B	C	D	E
·016 Rail	·032	·018	·06	·146	·016
·024 Wire Pipe	·042	·024	·06	·157	·024
·016 Rail (Short for smoke box side or front	·032	·018	·03	·116	·016

If B can be slightly larger, it should be

See later for "O" gauge all for extra Lug

OR USE 1/32 BRASS SPLIT PINS AND ·02 N/S WIRE. SECURE IN ·02 HOLE WITH DEVCON OR SOLDER SPREAD DIN AT BACK.



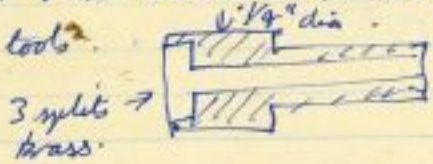
4mm Coupling hook blank (to gauge sizes in brackets)

Handwheel - Midland - Brake.

.20 dia .170 under rim
Bored .031 and mounted on a 0.04" shaft shouldered down to 0.031.
5 holes .050" dia on 0.10 PCD.
Filed out to give curved spokes.

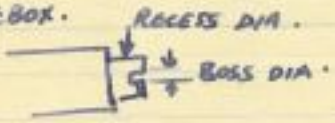
Make out of 0.018 thick plate material drill hole first then turn on mandrel.

Reduce arm thickness to 0.015 one side only. Hold in step chuck. Kept in box of loco tools.



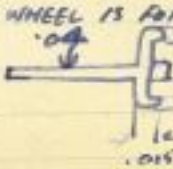
Handwheels - Cab & Smokebox.

Use a recessing cotter



Wheel dia	Recess dia	Boss dia
.075	.055	.075
.134	.114	.04

The .075 wheel is for cab & it has no spokes but is made of brass like a nail

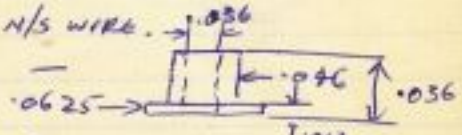


The .134 wheel is for the smokebox. It is drilled .02 for a .02 pin

AND THE FOUR HOLES ·028" ARE SET OUT BY EYE WITH A CENTRE PUNCH ON A ~~BRASS~~ STEEL BLOCK. THE WHEEL IS THEN HELD ON A ·02" DRILL IN TAILSTOCK & FED INTO THE LATHE ·140 COLLET AND HELD THERE WHILST THE HOLES ARE DRILLED BY THE SMALL MOTOR DRILL

WHEN TURNING FROM THE BAR, TURN THE BOSS TO ·025" OR ·04" BY ·005 PROUD AND USE THIS BOSS AS THE CENTRALISING DEVICE FOR THE RECESSING BIT (IN TAILSTOCK). PART OFF BY USE OF FINE FRETSAW ON RUNNING LATHE WITH "02" DRILL IN PLACE TO PREVENT LOSS OF BLANK. FOR SMALL WHEELS, GRIP ·04 SHANK IN COLLET WHEN RECESSING.

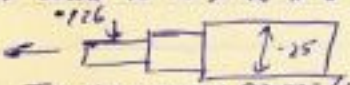
HAND RAILS "0" GAUGE. USE ·036" (20" gauge) N/S WIRE FOR MAIN ONES WITH SLATERS LONG/SHORT KNOBS. USE "0935" (SPECIALLY REAMED) DRILL FOR KNOB HOLES. FOR HAND GRAB HANDLES, USE ·032 N/S WIRE. CAB STANCHIONS NEED FOOT ~~BREAD~~ BUSHES —



HANDRAIL KNOBS "0" GAUGE. (for ·051" ejector pipe).
For the ejector pipe on a 'Patriot'. Use 1mm ½ round wire. Bend to "U". Clinch with pliers. Pull thro' ·092" hole (in handrail knob box) Put back in hole (tip only) and solder shank. Put in 3/64" collet & file shank smooth. Hold in pin chuck and run onto ·051" drill for ejector pipe

HORN BLOCKS. SOME HORNBLOCK MATERIAL IN LENGTHS WAS MADE FOR TIM STANTON IN 1956 MATERIAL, AL. BRONZE 5/16" dia MILLED DOWN TO ¼" x 3/16" x 1/8" BORE (·126) IN DIVIDING HEAD

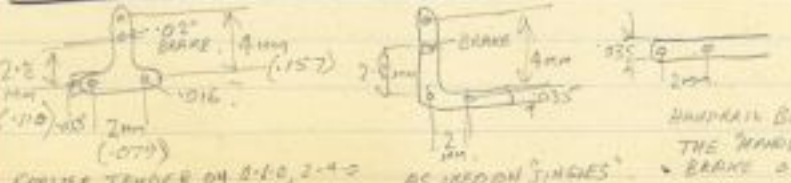
Grip in ¼" collet



THIS CYLINDRICAL CENTRE (SUPPORT) WAS MADE TO ENTER THE ·126" BORE. IT IS KEPT IN DRAWER WITH OTHER SMALL CENTRES.

CHARGED AT £20 PER 3 PAIRS.

HANDRAILS - TENDER - MIDLAND.



EARLIER TENDER ON 8-10, 2-4-2 + 4-6

AS USED ON "JINGLES"

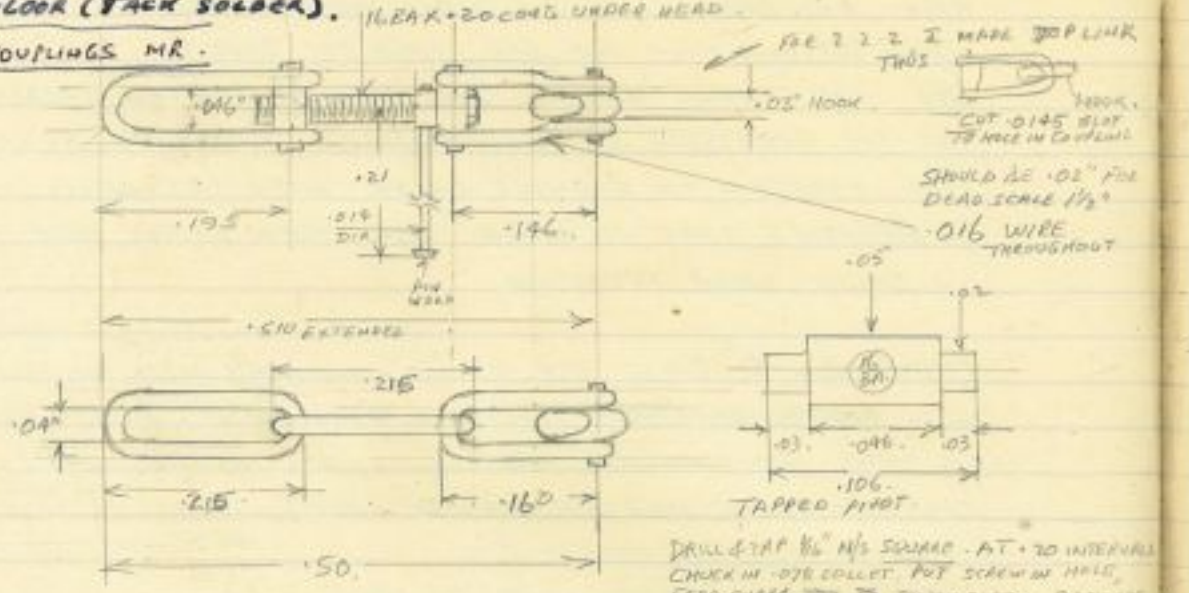
HANDRAIL BETWEEN WATER TROUGHS. AFTER WHEELS, THE "HANDLE" TYPE WAS FITTED BOTH SIDES. BRAKE ON "LH" SIDE, WATER SCRAPER "RH"

OVER.

HAVDLANS - TENDER - MIDLAND (CONT).

SPARES ARE IN GLASS TUBE. THEY ARE DRILLED FROM JIG WHICH IS SET OUT IN LATHE BY RIVETING PUNCH. JIG ALSO ACTS AS DRILLING JIG FOR TENDER FLOOR (TACK SOLDER).

COUPLINGS MR.



FOR 2 2 2 I MADE TOP LINK THUS

HOOK. CUT ·0145 SLOT TO MAKE IN COUPLING

SHOULD BE ·02" FOR DEAD SCALE 1½"

FOR NORMAN SALE'S ARTICLE ON 3 LINK COUPLINGS SEE "THE LINE" MARCH 1987. I HAVE BENDING JIG IN "COUPLINGS" BOX, USED WITH CLAMP & LATHE TOOL

FOR "LOOPED" LINKS, START BY BENDING THE WIRE AT ONE END

THEN FOR ·196 LINKS "A" = ·390
FOR ·195 LINKS "A" = ·462
FOR CLOSED LINKS ·215 LONG.
THE WIRE IS ·450 LONG.

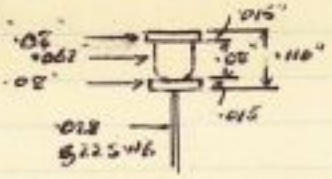
DRILL & TAP 8 BA M/S SQUARE · AT ·20 INTERVALS CHUCK IN ·078 COLLET. PUT SCREW IN HOLE, FEED SHARP TOOL TO TOUCH SCREW. BACK OFF 40 THOU' TURN DOWN TO ·02 FOR 20 THOU' THEN TO ·05 FOR TOTAL FROM END. TAKE OUT. RUN TAP THRU' TO CLEAN WHILST STILL ON BAR. RE-CHUCK, FILE OFF BURR, SAW OFF. TURN ROUND IN ·046 COLLET. END UP MEASURE, RE-CHUCK & TURN DOWN TO ·106 THEN TO ·02 FOR 90 THOU.

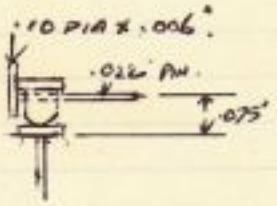
INJECTION MOULDING.

Plastics using 125 Watt Solon ~~od~~ crucible mounted thereon (Colin Binnie) Plug fitted to crucible which has bottom vent. Plug is pressed under arbor (or drill) press. Crucible is Lead soldered & bit ~~d~~ has bottom vent to fit mould. Material is black granules supplied by Fysons under name Nylon 6 - It is glass filled nylon. For full article by Colin Binnie, see MRN - 1968 ~~od~~ also "moulding A" frames page 30 Oct 1971 MRN.

INJECTORS 4mm MIDIANS

BODY & DISC - BRASS
PIPE - COPPER
PIN - STEEL





Relays for "0" gauge Jackson Couplings.

26 s gauge wire (·018). 50·6 turns per inch = ·02" over enamel
resistance = ·0944 ohms per yard.

Coil details. Core = ·375" (assumed. could be ½" or over)
Top dia = ·875"
Length = 2·375"

Then. mean coil dia = $\frac{·875 - ·375}{2} + ·375 = ·625$"
and mean circumference of 1 turn = $\pi \times ·625 \simeq 2·0$"
or 6 turns per foot.
Number of turns in one layer = 2·375 × 50·6 = 120
Number of layers = $\frac{·875 - ·375}{2} = ·25/·02 = 12·50$
Total number of turns = 120 × 12·5 = 1500
Footage = 1500/6 = 250 ft or 83·33 yds.
and total resistance = 83·33 × ·0944 = 7·866 ohms.

28 s gauge wire (·0148) 61·4 turns per inch = ·0163 over enamel
resistance = ·1398 ohms per yd
Number of turns in 1 layer = 2·375 × 61·4 = 145
Number of layers = ·25/·0163 = 15
Total number of turns = 145 × 15 = 2175
Footage = 2175/6 = 360 ft = 120 yds
Total resistance = 120 × ·1398 = 16·776 (17 ohms)

30 s gauge wire (·0124) 73·3 turns/inch = ·0136 over enamel.
·1991 ohms per yd.

over.

number of turns in 1 layer = 2·375 × 77·3 = 174
number of layers = ·25/·0136 = 18
Total number of turns = 174 × 18 = 3132
Footage = 3132/6 = 522 ft = 174 yds.
Total resistance = 174 × ·1991 = 35 ohms.

Current	12 volts	24 volts
26s	1·52 amps	3·05 amps.
28s	·70 amps	1·40 amps.
30s.	·34 amps.	·6865 amps.

In other words going down 2 gauges.
Doubles the resistance and halves the current.
and in terms of Wattage, halves the power (watts)

On the basis of my own coils, using above sizes
32s gauge would give 70 ohms and 39s 140 ohms.

32s wire (·0108) 83·0 turns per inch. (·0120 over enamel).
Number of turns in 1 layer = 2·375 × 83 = 200
Number of layers = 20
Total number of turns = 20 × 200 = 4000
Footage = 4000/6 = 666·6 ft = 222 yds
Total resistance = 222 × ·2625 = 58 ohms.

34s wire (·0092) 98 turns per inch = ·0102 over enamel
Turns in one layer = 2·375 × 98 = 230
Number of layers = ·25/·0102 = 24
Total number of turns = 230 × 24 = 5520
Footage = 5520/6 = 920 = 300 yds
Total resistance = 300 × ·3617 = 108·51

·02Ω wire. Dropper = 2mm above rail
100Ω works at 12 volts · ·12 amps.
with the armature under the sleeper Peco Track
= 9½ mm distance from dropper 7½ mm from base of track level.
It does not uncouple whilst being pulled.

However 100Ω at 24 volts = ·24 amp does uncouple whilst being pulled.

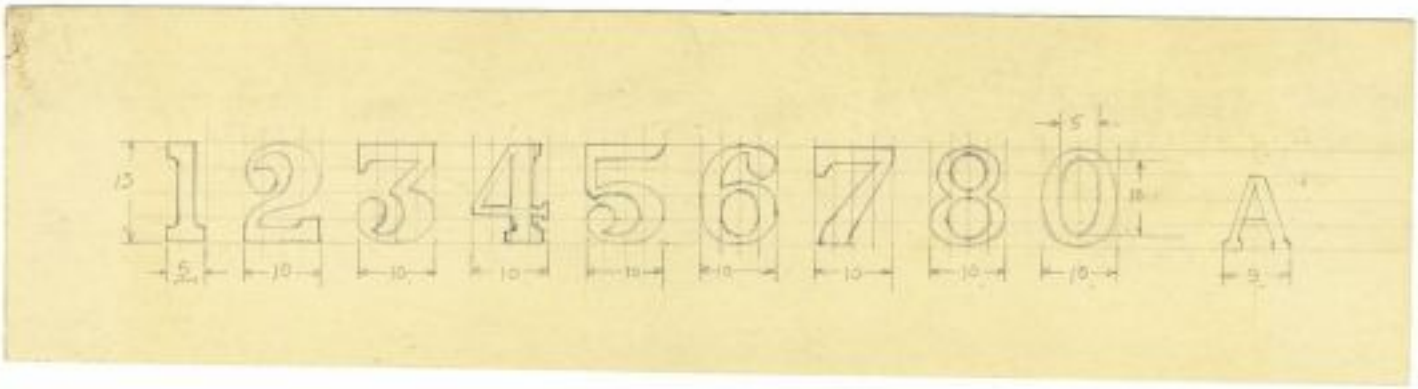
By screwing in the 4BA button and lifting it just below sleepers, the whilst will uncouple on being pulled even at 12 volts
This reduces dropper to coil distance to 6½ mm.
Could put a resistance in series with the coil and adjust to suit all cases.
Putting in a 1" long 4BA extension to the coil makes no difference to the above
However, withdrawing the coil downwards (by using sheet plastic) does make a difference in between.
as one would expect as the magnetic gap is increased.

All above were on wagons having a coupl

length of 5". Coaches might well be shorter and, of course, axle height is higher. Even so, there should be sufficient "pull" to work the coupling and sufficient "drop" to uncouple.

J.

Jackson Automatic Coupler
Link ~~Many Jan~~ March, April, May and June 1953.
and Feb, Mar, April 1957. MRN. 1960 (JAN).
Also Model Railways July/August 1977. ANP MIRS EXHIBITION
CATALOGE 1962 - FULL DIAGRAMS.


1 2 3 4 5 6 7 8 0 A

Extract from "MOORES MONTHLY MAGAZINE" (Locomotive Magazine)
March 1896

THE COLOURS OF LOCOMOTIVES, CARRIAGES & WAGONS

. . . The next railway on our list is the Midland. About 1884 the bright green of this company's engines was replaced by the present dark red, on the score of economy. All the engines are painted the same colour, but the lining slightly varies. The passenger engines and most of the g oods have a black band with a yellow stripe on either side, the band being drawn with rounded corners. On some of the tank engines the the black band is omotted and the yellow lines are quite square, whilst on the others the band and lines are dispensed with, and the tank, splashers, cab, etc., are simply pannelled round with black and a yellow line run on the inners edge. The interior of the cab is painted and grained a light colour, and edged round on the express engines with black, having a white line inside it. The buffer beams are vermilion with the letters M.R. in gold shaded in blue. The numbers are put on in separate solid figures of brass, whilst the letters M.R. on the tender are in gold shaded with blue. The domes are painted, but the safety valve casings are bright brass. Midland carriages are dark chocolate red, pannelled round with black, the inner edge of the panels being run round with a gold stripe having a fine vermilion line on either side. The underframe is painted black withs gold stripe and thin vermilion line. The sleepers are rather gaudily painted in dark umber brown with profuse decorations in gold and scarlet, with gold lettering shaded with light blue, grey and white. For the wagon stock the Midland use a light grey with large white letters, and underframes in black.

LOADING GAUGE.

GN 13'6" MAX. HEIGHT.
GE. 13'0" MAX. "
LMS. 13'6" MAX. (L.N.W.R.)
" 13'9" MAX (MIDLAND).
G.W. 13'6" MAX.

WIDTH.

9'0" MAX ON MOST LINES.
9'3" MAX ON PARTS OF L.M.S. & L.N.E.
9'8" G.W.R.

LIVERY. MIDLAND RAILWAY PRE-GROUPING. SEE ALSO LATER NOTE. ON BUILDING COLOURS

Note: Vide M.R.N. April 37 Present L.M.S. Lake is now an old Midland and is Crimson Lake.

~~GOODS~~. DEEP CRIMSON RED ON BOILER, DOME, SPLASHERS, FRAMES, CAB, WHEELS, SPOKES & TENDER. ALSO FRAMES, SANDBOXES, ~~SMOKEBOXES~~, GUARD IRONS. SAFETY VALVE CASING :- BRIGHT BRASS. THE PARTICULAR SHADE OF RED WAS ALMOST AS PRESENT L.M.S. A LITTLE LIGHTER & BRIGHTER. BOILER BANDS - BLACK, PICKED OUT IN LIGHT BUFF YELLOW. WHEEL TYRES BLACK EDGED WITH YELLOW LINES. FRAMES OF ENGINE AND TENDER & THE CAB WERE EDGED WITH BLACK, FINE LINED YELLOW, BUT TENDER SIDES HAD TWO PANELS FORMED BY BLACK BANDS WITH YELLOW LINES ON INNER & OUTER EDGES PRIOR TO 1884 MR. ENGINES WERE GREEN, ABOUT L.N.E. COLOUR ON ALL PARTS WHICH WERE LATER RED. THE LINING WAS BLACK & WHITE. BACKHEAD - BLACK. REST OF CAB. LIGHT OAK GRAINED. INSIDE FRAMES, AXLES, BUFFER BEAMS & BUFFERS - VERMILLION ALSO, OUTSIDE CRANKS.

L.B.S.C. LIVERY.

M.R.N. FEB'36 page 48 GIVES:- STROUDLEYS IMP. ENGINE GREEN MIX YELLOW OCHRE & ORANGE CHROME EQUALLY. MIX BURNT SIENNA & SAGE GREEN AS 2 TO 3 RESPECTIVELY. MIX EQUAL QUANTITIES OF BOTH MIXTURES. TWO OR 3 COATS AND VARNISH. FULL DETAILS OF COLOUR SCHEME IN M.R.N FOR JULY 1930 PAGE 204. (SEE LATER NOTES).

L.M.S. LETTERING STYLE INTRODUCED IN 1926. PLAIN BLOCK. GILT. NUMBERS ON CABSIDES LETTERS ON TANK OR TENDER. BLACK SHADING ON RED AND RED SHADING ON BLACK ENGINES. ON FREIGHT ENGINES, NO SHADING. M.R.N. MAY 1936

L.M.S. WAGON PAINTING INTRODUCED 1932. COLOUR "BAUXITE" LETTERING AND NUMBERING - WHITE. AXLEGUARDS, BRAKES, WHEELS - BLACK. SMALL SLATE GREY PANEL OVER EACH NEAR SIDE R.H. WHEEL HAS IN WHITE "DATE OILED." AND "DISTRICT NR"

L.B.S.C. LIVERY. (MRH JULY 1930)
Main colour - Stroudley's Improved Engine Green. Bordering and Panelling - Dark Olive Green (Saige green according to late authority) edged with black band; on green side of black band - fine red line, on yellow side white line. (Black band about ½" wide). Clothing bands - Black - red line round each edge, next to red line on either side of band i.e. on tanks, olive green stripe with white line next to yellow (body.) Wheels - Imp Eng Green with olive green tyres and axle ends. Frames, soleboard steps - claret edged all round with black band, outer edge of black band edged with fine yellow line, inner edge with fine red line. Names - Gold plain block shaded white, emerald green and fine black lines. Buffer beams - claret with bright red panel in middle which was bordered with black stripe lined yellow and red. Coupling rods claret (ends bright). Number plate - polished brass with title of railway to round border in black whilst slightly raised brass figures were on bright blue background. Polished copper chimney cap, Brass beading round cab windows. (? smokebox black).
Later:- Most engines had black frames not claret.

Lining: Attach stick to ruling pen when going round wheels etc Rotate wheels.

use tube paint thinned with turps to consistency of ink.

L.M.S Lettering M.R.N. May 1936.
L.N.W.R cab, chimney and dome designs M.R.N. March and April 1936

Lamps Midland Loco. P.8 "Loco Work Modelling"

Crimson spoke lined yellow

Wheels all black with yellow line on inner edge of tyre

Coupling rods bright

Cranks bright vermillion edged black with fine yellow line on inside.

Springs and hangers red with yellow line on top and bottom leaf. Top of top leaf - black.

Outside frames red with ½" black band at edge and fine yellow inside.

Horn cheeks & outside frames black.

Dome. ½" black round edge and yellow inside.

CHIMNEY, SMOKEBOX, FOOTPLATE, STEPS, BRAKE HANGERS & RIGGING FRONT OF SMOKEBOX SADDLE. - BLACK.

118 : tender has raised panelling.

Royal blue -

Black.

All bars & letters in gold are 1⅜" thick

BRASS NUMERALS ON TANK SIDES FLANKED WITH MR SERIF

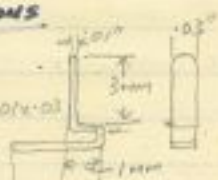
MR ON BUFFER BEAMS IS SANS-SERIF SEE DOW'S BOOK.

LAMP IRONS

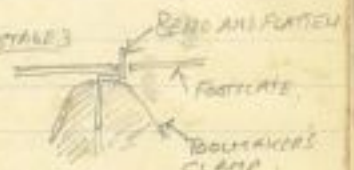
Will suit all other railways.

G.W.

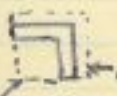
Make from ·014 - ·03 strip



Pan clear of ·033" hole punch & shape



STAGE 4. SOLDER BENEATH FOOTPLATE.



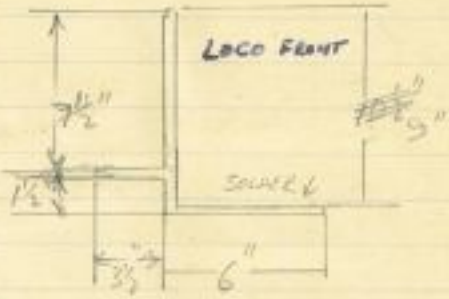
← GWR. 7mm square ·014" mat⁴ for "O" gauge.
4mm " 1010 " " "00" "

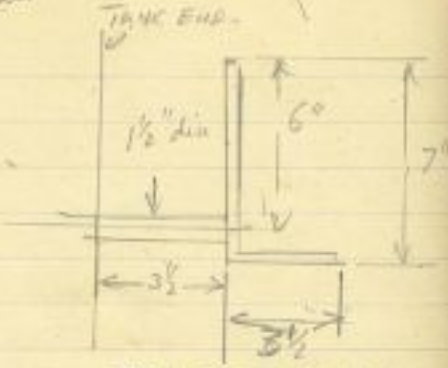
LIVERY GREAT WESTERN - SEE 'G'

Take it on here

the same

LAMP IRONS (MIDLAND).

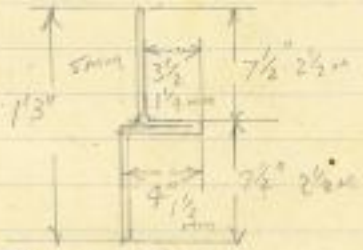




TANK OR TENDER REAR.

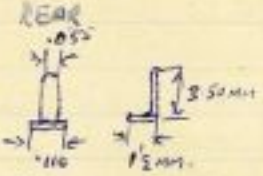
Make from .046 x .01 ('0' gauge)
.025 x .01 (EM)

USE THE SAME METHOD AS TENDERS. ~~BEND AT THE TIME~~ BUT THE LAMP EDGE NOW BECOMES THE STAGE. FILE THIS STAGE DOWN IN WIDTH, PUT THRU' HOLE & SOLDER.



TENDER REAR

USE BENDING JIG FILED IN DRAWER WITH SPARE LAMP IRONS. SOLDER AFTER BENDING THEN FILE TO A POINT BEFORE CUTTING OFF. CUT LOWER OR UPPER BEND TO MAKE TENDER OR LOCO IRON. FILE SOLDERED STRIP TO MAKE THIN AT SIDES.



QTY. '0' GAUGE →

.018 - .017 MAT AS ADJUSTABLE.

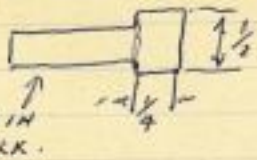
FILE TO HARDENED FILING JIG IN DRAWER USING .110 STRIP.

LUBRICATORS (SEE WAKEFIELD)

LIVERY - MIDLAND BUILDING: See Gauge '0' Guild Gazette Vol 12 No 10 MARCH 1985. Give themtrol numbers.

LINT - VERNAID ABSORBENT LINT BPC 20'0" x 18" WIDE 500 GM (1 LB) COST 1996 £17.00 DYED BY DYLON NO 34 OLIVE GREEN 1 TIN = 250 GM.

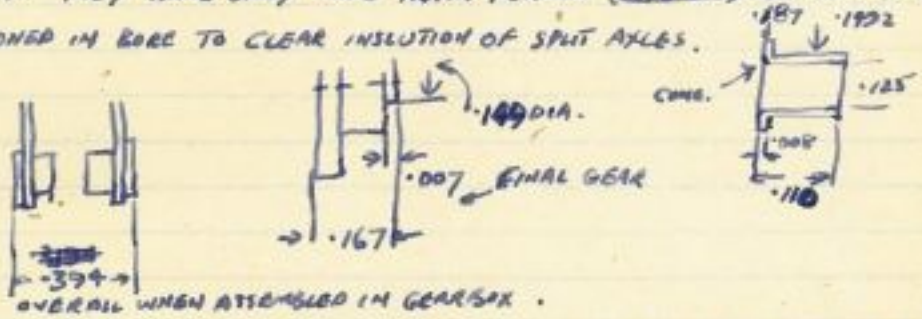
LAMP BULB HOLDERS ALL SEEM TO HAVE THE SAME THREAD



Midland 2-4-0 No 1476 - J.E Kite's model - photo (very clear)
M.R.N. 1938.
Midland 0-4-4 tank 1430 (Johnson) model MRN April 1939 P 97
Midland 2-4-0 No 20002 Kitley photo and notes MRN May 1939 P 127.

MOTORS PORTESCAP (KEAN - MAYGIB).

Fit new PB bushes at lower end of box. They are .1492" DIA to give a FORCE FIT. THEY HAVE ONLY .008 THICK FLANGE ~~(3/16" DIA and 3/16" DIA)~~ (3/16" DIA) SLIGHTLY CONED IN BORE TO CLEAR INSULATION OF SPLIT AXLES.



Also, cut back boss of final gear steel by .007" down to .150/.153 to clear the adjacent steel gear on the 3rd shaft, the ~~coupled~~ just be touching.

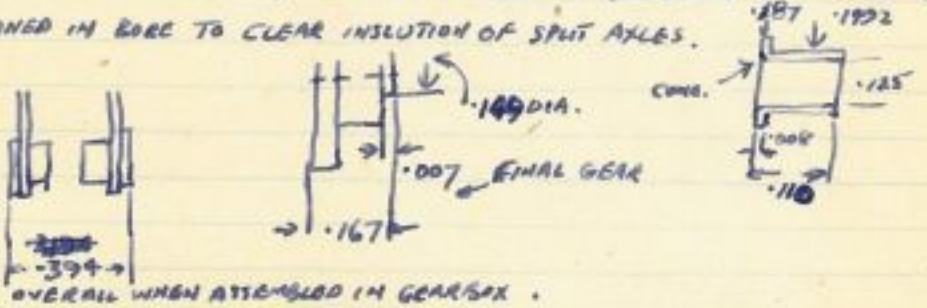
POLARITY. Loco to run forward when RIGHT HAND side wheels are POSITIVE.

MOULDING PLASTICS See under 'injection moulding'.

Midland 2-4-0 No 1476 - J.E Kite's model - photo (very clear)
M.R.N. 1938.
Midland 0-4-4 tank 1430 (Johnson) model MRN April 1939 P 97
Midland 2-4-0 No 20002 Kirtley photo and notes MRN May 1939 P 127.

MOTORS PORTESCAP (KEAN-MAYGIS).

Fit new PB bushes at lower end of box. They are .1492" DIA TO GIVE A FORCE FIT. THEY HAVE ONLY .008 THICK FLANGE ~~(3/16" DIA AND~~ (3/16" DIA) SLIGHTLY CONED IN BORE TO CLEAR INSULATION OF SPLIT AXLES.



Also, cut back boss of final gear steel by .007" down to .150/.149 to clear the adjacent steel gear on the 3rd shaft, the ~~could~~ just be touching.

POLARITY. Loco to run forward when RIGHT HAND side wheels are POSITIVE.

MOULDING PLASTICS See under 'injection moulding'.

NICKEL PLATING.

CATHODE = NEGATIVE POLE = ARTICLE TO BE PLATED.
ANODE = POSITIVE POLE = METAL FOR DEPOSITING.
USE DRY CELLS AT 1½ VOLTS. 1 2 CELLS SUFFICIENT. WATCH CURRENT TOO STRONG CAUSES BUBBLES AT CATHODE, TOO WEAK CAUSES MILKY DEPOSIT. BEST IF HEATED TO 100°F. USE GOLD OR PLATINUM WIRE FOR BEST RESULTS. SOLDER ON TO ANODE.
1"-2" BETWEEN ANODE & CATHODE. ANODE MUST EQUAL CATHODE IN SIZE
ALLOYS MUST BE COPPER PLATED FIRST.
WHEN MAKING SOLUTION, DISSOLVE ALL SALTS EXCEPT METAL FIRST METAL SALTS LAST.

COPPER PLATING SOLUTION.

COPPER SULPHATE.	16 PARTS BY WEIGHT.
CONC. SULPHURIC ACID.	8 —— " ——
DISTILLED WATER.	128 —— " ——

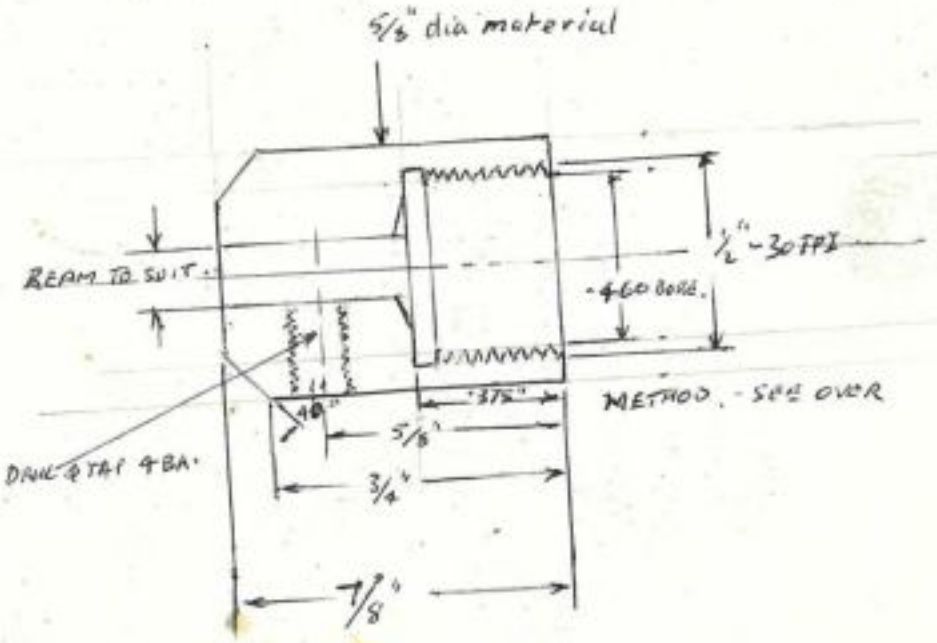
DISSOLVE THE COPPER SULPHATE IN THE HOT DISTILLED WATER & AFTER COOLING, GRADUALLY ADD THE ACID.
PURE COPPER AS ANODE.

NICKEL PLATING SOLUTION.

NICKEL SULPHATE	12 PARTS BY WEIGHT.
NICKEL CHLORIDE.	4 —— " ——
BORIC ACID, POWDER.	2 —— " ——
DISTILLED WATER.	128 —— " ——

CLEANING BEFORE PLATING.
BOIL IN SOLUTION OF CAUSTIC POTASH (1 OZ TO 1 PINT OF WATER) REMOVE WITH WIRE HOOK, WASH, DON'T TOUCH AGAIN. IF OXIDIZED, BOIL IN WEAK SOLUTION (1:10) SULPHURIC OR HYDROCHLORIC ACID.
TO STOP OFF USE ASPHALT VARNISH, MAKE SURE IT IS DRY
AFTER PLATING. BOIL IN WATER THEN DRY WHILE HOT IN SAWDUST
TIME FOR PLATING. ONE-HALF TO FIVE HOURS.

PROFILE MILLER CUTTER COLLETS.



FOR THREE.

1) 4" length EMCO MACHINED SQUARE IN ML2.
2) Knurl in front tool post ML7, PT tool in rear. Drill chuck. 3 Jaw. a) Knurl. b) Centre 3/16" c) Drill 1/4" 7/16" deep.
3) Drill .990 - 3/8 + 1/32 deep.
4) Part off (may have to saw last bit) "7/8 + 1/32" long.
5) End up in ML2 for 3rd piece.
6) Set up ML2 4 jaw to hold end piece dead true.
7) Open out to .965 right-using chuck & .465 drill as gauge and using tungsten carbide tipped boring tool with stepped end (in 'O' gauge gear box tools). Use the stepped end to undercut the bore for screwcutting and make the depth .375.
8) Recheck each one in turn and centre and drill with lathe at full speed BUT don't take out of chuck. Have the lathe set for screwcutting with tool already set. Change gears and book gears and screwcut (gears are 20/50 40/60)
9) Put each back in 4 jaw and turn other end to 7/8" length.
10) Chamfer with top slide at 40°
11) Drill end .110 for setscrew using tailstock Vee block.
12) Tap 4 BA
13) For grubscrews cutting down length in lathe if necessary
14) Number punch using sharpened nail end for dividers 1/8 1/4 etc

constructed an award
ot layout called Chee Tor
dland railway line near
. Apart from the railway,
e also been modelled to
, using photographs and
hese photographs of the
of how well we have

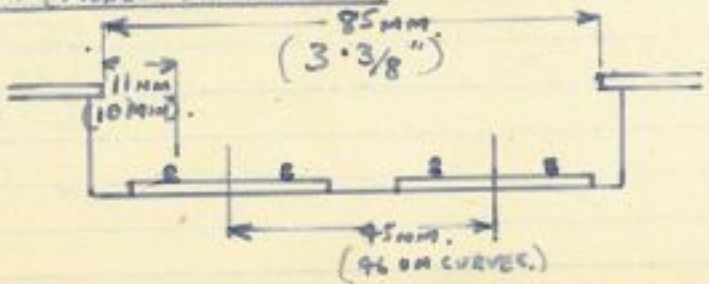
PLATFORMS -

HEIGHT OF PLATFORM - (OLD STATIONS) 2'6" - 2'9"
" - " - (NEW STATIONS) 3'0" -
(GOODS STATIONS) 3'3" - 3'6"

DISTANCE TO NEAREST RUNNING RAIL (INSIDE FACE) 2'3"
BUT NOW NOT LESS THAN 2'4½"

Painting See M.R.N. Sept '38 page 244. AND "LINK" OCT NOV, DEC 1950 - R.D. PEGNIN.
Pantechnicon Model MRN May 1938
Photography Models. J.H. Alexis MRN. April 1941.
Photography of Model Locos J.M. Jarvis MRN Nov 1943 P 217.

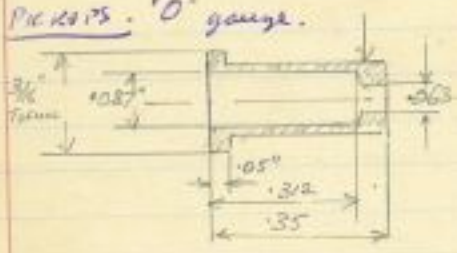
PLATFORMS (MODEL STANDARDS)

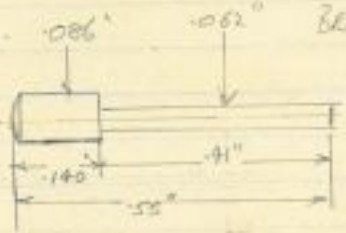


POLARITY (2 RAIL) LOCO MOVED FORWARD when RIGHT HAND side, looking forward, is POSITIVE.

PLASTICS - moulding see under 'injection moulding"

PICKUPS. "O" gauge.

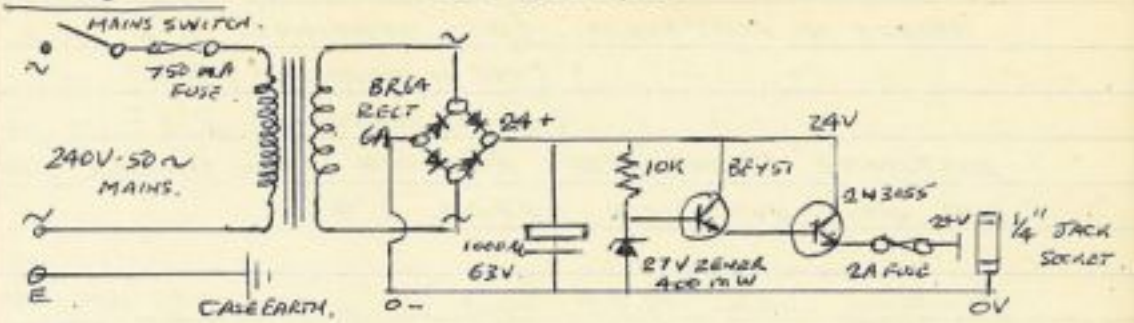




BRASS STRINGS WOUND ON No 54 (·055") DRILL CUT TO ·312" Long. ·008" WIRE.

Painting and lining. Link April 1931 My notes on water-colour lining etc.
Indian yellow, a touch of flame red, perhaps a slight touch of brown mix with a little water to same consistency as lettering white then add lettering white as required.

POWER UNIT 2A - 24V. USED WITH PORTABLE CONTROLER

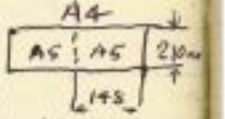


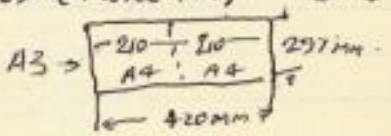
PAPER SIZES

A5 210mm (8·27") x 148mm (5·83")

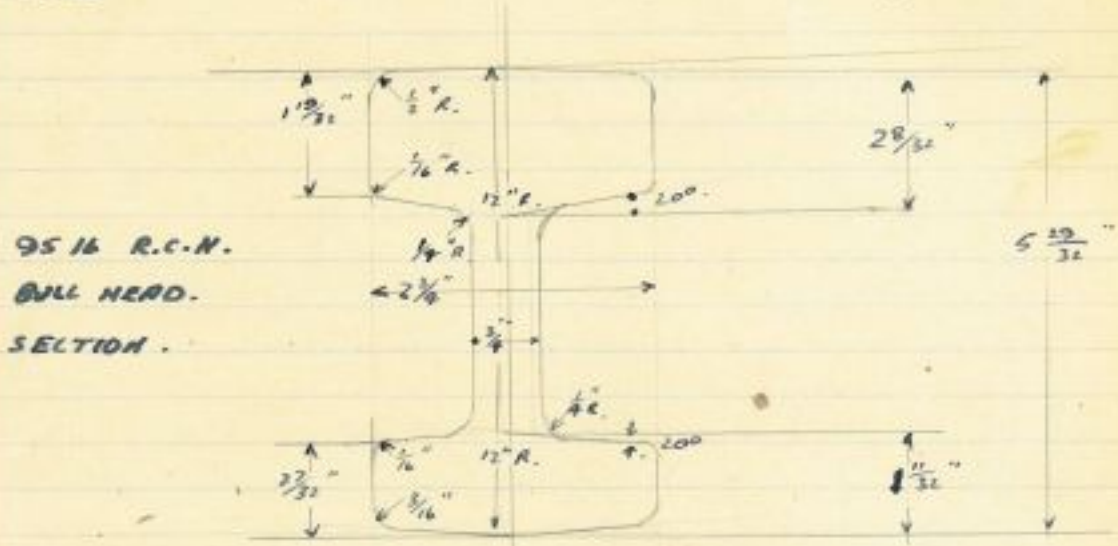
A4 297mm (11·69") x (8·27") 210mm (TWICE A5)

A3 420 mm (16·54") x 297mm (11·69" (TWICE A4)





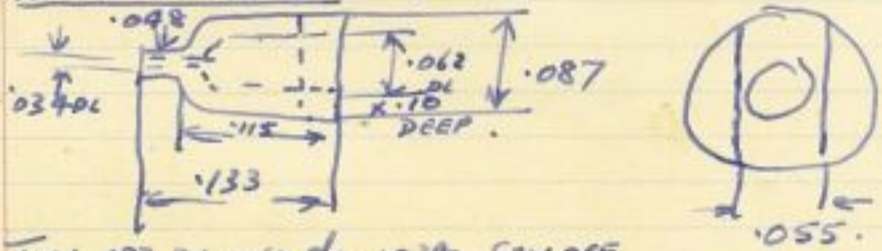
RAIL. 4mm RAIL STANDARDS - SEE STANDARDS PAGE 58



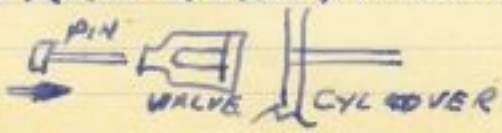
B.R.M.S.E. SCALE 0-0. RAIL. = 2·0 MM x ·75 MM.

Road Vehicle Victorian cab modelled etc by F.J. Rode March and Feb 1939
M.R.H

RELIEF VALVES - GW '0' GAUGE. NICKEL SILVER (·093 ROD).



TURN ·087, DL ·062 thn ·034. SAW OFF & FACE TO LENGTH THEN TURN ROUND IN ·078 COLLET & TURN DOWN TO ·048 & FILE ROUND. THEN GRIP BY ·062 DRILLED END IN ·078 COLLET - ABOUT ·02 DEEP & FILE TWO FLATS AT 180° TO BREAK INTO ·062 BORE LEAVING ·02 COLLAR AT OPEN END. DRILL CYLINDER COVER & TUFNOL BODY ·163 FROM CENTRE (BELOW CENTRE) & FIX BY DRIVING IN ·034 PIN WITH HEAD TURNED DOWN TO ·048 x ·015.



Standard sleeper is 8'6" long × 10" × 5"

Head throw is greatest distance by which vehicle overhangs the running face of rail on outside of curve.

R = rad G = gauge W = widest of vehicle L = length of vehicle

B = w'base or bogie centres all in feet

$$\text{End throw} = \frac{W-G}{2} + \frac{L^2 - B^2}{8R} \text{ feet}$$

or centre throw (overhang of centre of vehicle on curve inside)

$$= \frac{W-G}{2} + \frac{B^2}{8R}$$

	Ft in
Outside of widest stock to face of structure =	2'-4" min
Face of signal posts, water columns etc between tracks spaced at 9'0" intervals to bodywork	1'-6" min
Between outside leads of double track rails	6'-0" "
For additional single running line alongside main line	10'-0" "
Running face of rail to structure	4'-9¾" "
Overhead clearance between load gauge and structure	6" min 12" desirable
Clearance between adjacent stock	1'-6" min.
Height of structure above rail level	15'-0" desirable
Between structures single track	19'4" min
" " " double "	25'6" min.

STANDARDS.

RAIL TO TOP OF UNDERFRAME - 3'11"
" " BOTTOM OF BODY - 9'0"

SOLEBARS - 9" TO 10" STEEL OR WOOD.
" (MODEL). 3 MM OR .120".

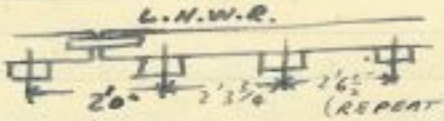
SIX FOOT WAY. - 6 FT BETWEEN INSIDE FACES OF RUNNING RAILS.

SIX FOOT WAY. - B.R.M.S. SCALE 0-0. 45·0 MM (MAIN LINE). ~~46~~ MM ON CURVES.
(CENTRE TO CENTRE). 50·0 MM (SIDINGS).

SLEEPERS. 9'x10"x5" (B.R.M.S.B. SCALE 0-0. 36 MM x 9 MM x 20 MM (BALLASTED) · 16 MM. UNBALASTED).

SLEEPER CENTRES.

L.N.W.R.

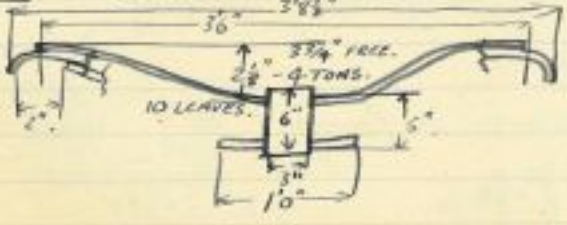


MIDLAND RAILWAY.
SLEEPER CENTRES 2'0", - 2'3 1/2", 2'6", 2'7" (REPEAT).

AVERAGE SLEEPER CENTRE DISTANCE = 2'7 1/2".

B.R.M.S.B. SLEEPER CENTRE DISTANCE = 10 MM. (12-19 MM SIDINGS).
APPROX 90 PER YARD.

SPINGS. R.C.H. PRIVATE OWNER WAGON SPRING.

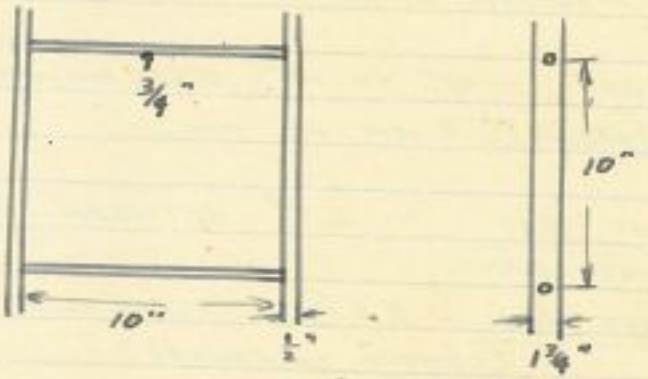


MUST SEAT INTO AXLEBOX BY 2"

10" = -131" and that = 125 dwts on my little. So, when punching ladders, under 0-90-0-90 etc C 1/8"

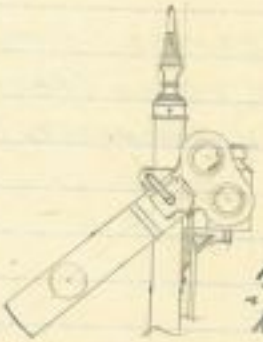
SIGNALS.

GROUND SIGNALS. SEE "G"



See Work Opp. 197

Full size signal ladder.



Midland Railway Signal. The lamps had no "bulls eye". It had a large reflector. (see later drwg.).

MIDLAND SIGNALS.

FROM DERBY MUSEUM DRAWING.

The platform lengths of bracket signals are as shown (see copy of M.E. drwgs for further data).

Signal layouts outside St Pancras.

Midland Railway Signals (Model Engineer 30/1/41) ~1900 - 1910.
Midland Signals were somewhat short. with as many arms as possible on one mast.
Fig 1 (Dwg 1) is standard arrangement of home and distant arms, (ladders omitted).
Combined bearing and stop was universal (Fig 2). permitting 45° movement of the arm. Arms were 4 feet (5 feet where long sighting was required see Fig 3) with 4 foot radius on end of home signals. All posts tapered from 7" square at top The upper part of the finial was uniform section when seen from above.
Fig 3 is a characteristic Midland arrangement - 2 distants on one post
all signals had a white disc on the face. (white line for distants according to Derby Museum?). The faces were red They were white on reverse with black spot (or bar for distant).
The back light of the lamp shines through a square aperture
all straight signals had landings and ladders even short platform stations of 15 TO 20 feet. The landing was supported by 2 diagonal stays, one to post, one to ladder. ladders were 15" wide
Bracket signals had very short dolls at 6'6" centres so no ladder was needed. and the height between arms was not very pronounced (12" see fig 4).
The cast iron platform support were standard over a wide range of platforms.
Short arms carried standard ~~pivot~~ pivot and spectacle.
Lamp suppt.

Posts - white.
Cap - Black.
Finial - white.

Back slide pivot bolt.
arm and lamp bracket
(Derby
Back blade ribbed & wire on arm.

S.R. "Schools" class chimney and dome drgs M.R.N May '36
South Midland Cly (Bonnybridge) MRN May 1940
Signals O.S. Nock wrote in ME. 1940/41

Standards B.R.M.S.B. M.R.N April 1942 O.O. gauge
—"— —"— March 1943 1. gauge
—"— —"— June 1943 0 gauge.

Safety Valve Johnson. PP 5. ed 87 "Locomotive work & modelling."

Splashers (loco).

Machine thus

Salter Valves (Midland)

Make steelyards from ·01 x ·03 NS strip. Frets two ·01 grooves in capuchon of dome at ·056 ·046 centre using the upright (·046 ·036) jig and mount the steelyards in. Use small plate jig to drill holes for balances.

SPRINGS (OUTSIDE)

Make up a strip of brass wide enough to take the springs length across. Turn ends of spring leaves with sharp tool mounting the brass on the jig. Cut out springs. Make hangers from ·01 x ·03 strip punching rivet positions correct centres dia drilling ·016.

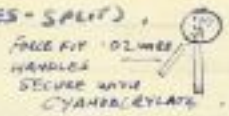
Mount hangers on by pushing a shortened pin through BOTH hangers and spring and supporting spring on a Tufnol plate with the pin located in a small ·02 hole. To fit to footplate. Drill ·028 hole at hanger centres the slot with fine fretsaw.

SEE LATER NOTE RE 'FORKED' HANGERS →

– See later for 0 gauge Fowler (Patriot).

SMOKEBOX DOORS (DEEGLEY).

SPLIT AXLES (SEE AXLES - SPLIT).

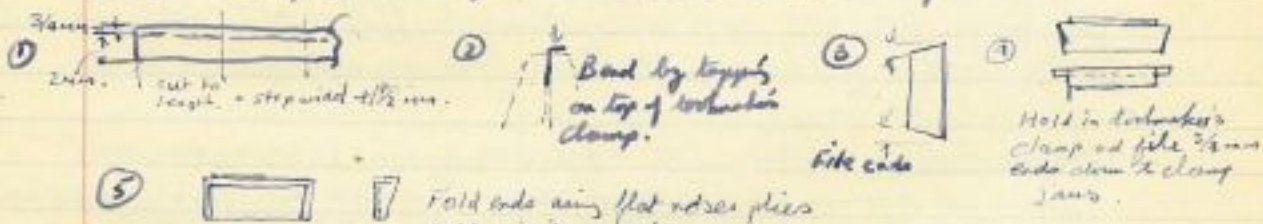


STANDARDS. P4.

GAUGE - 18·83mm = ·741' BACK-TO-BACK 17·75mm = ·699" MAX
17·67m = ·696" MIN.

↑ SEE TWO PAGES FURTHER FOR FULL STANDARDS

STEPS. See page 45 Guy Williams' book or make as follows



SCENERY Papier mâché covered with Alabastine.

SHAFT DRIVES. SEE "GEARBOX SHAFT DRIVES & COUPLINGS"

SCREW COUPLINGS SEE COUPLINGS – SCREW.

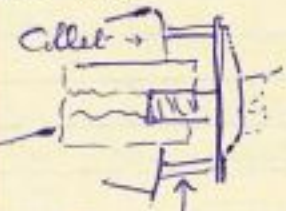
SAFETY VALVES (MANUFACTURE) SEE 'BOILER MOUNTINGS'.

SLIDEBARS (SEE CYLINDERS & SLIDE BARS.

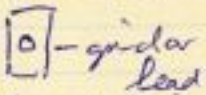
SMOKEBOX DOORS '0' GAUGE FOWLER (PATRIOT).

These were turned IN ONE PIECE (NO N/S DISC AT BACK) from ·08 brass sheet
A 4 BA screw was put thro' tapped centre hole and driven home

whilst solder was molten. The lead was then turned off whilst turning the door

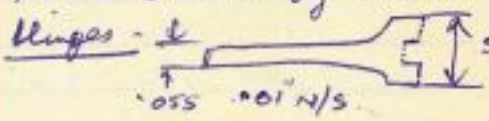


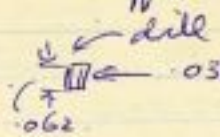
·034 holes were then drilled into the outer ring in the dividing head with the door held as for turning. ·031 steel pins were machined and filed thus.



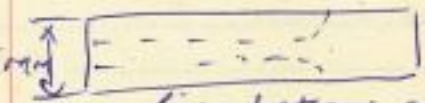
Solder pin - place in clamp and cut off surplus at back. Door is secured by 4-BA nut.

Hinges -





Put the bush in at pass ·016 wire pin thro'.



curl this ed round ·016" wire and THEN fretsaw the hinge cutting sideways with fine fretsaw with hinge held in toolmakers clamp in vice.

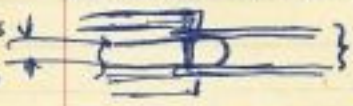
SPRINGS & FORKED HANGERS (EG MR KIRTLEY 0-4-4T) (SEE ALSO NEXT PAGE)

SPRINGS ARE ATTACHED BY 16BA SCREWS THROUGH FOOTPLATE AND STAND ON THEIR HANGLES

HAVING FITTED ·04 STRIP ROUND CENTRE AS BUCKLE, SET UP IN VERTICAL SLIDE VICE & DRILL ·024

THEN RELIEVE TOP OF HOLE ·032 TO REDUCE TAPPING DISTANCE & TAP 16BA. LEAVE HOLE OPEN FOR TIME BEING.

MAKE FORKS BY TAKING ·04 x ·01 STRIP AND PUTTING ·02 HOLE AT END. THEN PUT ON EACH SIDE OF ·06 BRASS WITH ·02 PIN THROUGH, USE DRILLED SPACERS AS PACKINGS, CLAMP IN TOOLMAKERS' CLAMP AND NIP TOGETHER WITH PLIERS TO FORM FORK.

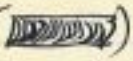


CUT TO LENGTH (ALLOW A BIT) FILE THINNER TO LEAVE EYE →

ASSEMBLE TO SPRING USING ·02 PINS WITH HEAD THINNED & FILED DOWN TO ·04 AT REAR. SOLDER AT REAR. NOW OFFER SPRING TO FOOTPLATE USING ·02 PIN

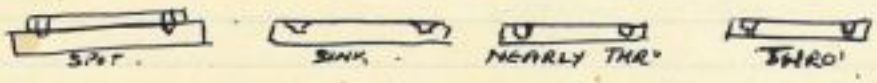
THROUGH FOOTPLATE HOLE & HOLE IN SPRING. SEE HOW MUCH OF HANGER NEEDS CUTTING OFF. CUT OFF WITH WIRE CUTTER & CLEAN BY TOUCHING TO GRINDER. WHEN OK. PUT A TOUCH OF SOLDER ON TOP OF BUCKLE TO FILL HOLE & FILE FLAT. IF FOOTPLATE IS FLAT & CENTRE OF SPRING STANDS PROUD, USE A BIT OF HYPODERMIC NEEDLE ON SCREW AS DISTANCE TUBE (OR JUST LEAVE SCREW VISIBLE).

SPRINGS "LHD-OUTSIDE" (SEE ALSO PREVIOUS PAGE).

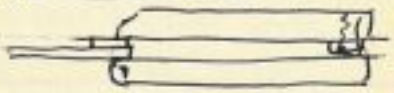
PRODUCED BY FLY-CUTTING ⅛" x ·05" BRASS BAR (). USE THE HARDENED FILING JIG STRIPS, ONE FOR TENDER, ONE FOR LHD. CLAMP IN DRILL JIG & USING ·018 (77) DRILL JUST SPOT. THEN USE ·07 DRILL IN AN CHUCK TO PUT SLIGHT SINK ON EACH. THEN DRILL WITH ·024 (73) DRILL IN DRILLING MACHINE SET JUST NOT TO PENETRATE. FINALLY DRILL THROUGH WITH ·018 DRILL. CLAMP FLAT BRASS ON WATCH LATHE TABLE WITH ·06 CLEARANCE HOLE UNDER DRILL IN WHICH TO BREAK THROUGH. ATTEMPTS TO GO THRO' THE FULL ·05" WITH THE ·018 DRILL JUST BROKE DRILLS IN METAL.

NB WE SHOULD BE ABLE TO GO THRO' WITH ·018 DRILL. I THINK I WAS RUNNING DRILL WRONG WAY.

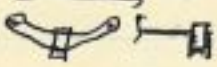
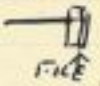
NB. MAKE SURE DRILL IS NOT RUNNING BACKWARDS. I THINK IT WAS.



SAW OFF WITH HARDENED U66 HELD IN PLACE BY STAINLESS STEEL PINS HOLDING BY RIVETING TOOL CLAMP IN VISE.



THEN FILE IN TOOLMAKERS' CLAMPS. WILL BLUNT FILE. BUT CAN'T BE HELPED.

TO MAKE CENTRE SHACKLES — ·035/·04" x ·01 M/S STRIP. ① BEND & HAMMER SQUARE ON VEE BLOCK EDGE. ·10  ② SOLDER TO BACK OF SPRING WITH LONG LENGTH ON SPRING TOP.  ③ FILE DOWN TO BOTTOM OF SPRING. 

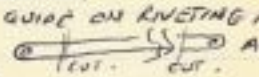
④ BEND OVER STRIPS AND HAMMER DOWN ON VEE BLOCK 

⑤ PLACE IN TOOLMAKERS' CLAMP AND HAMMER STRIP DOWN TO BOTTOM OF SPRING. 

⑥ SOLDER, HOLDING IN FINE TWEEZERS

⑦ CUT OF SURPLUS STRIP WITH FRETSAW ⑧ FILE & CLEAN UP.

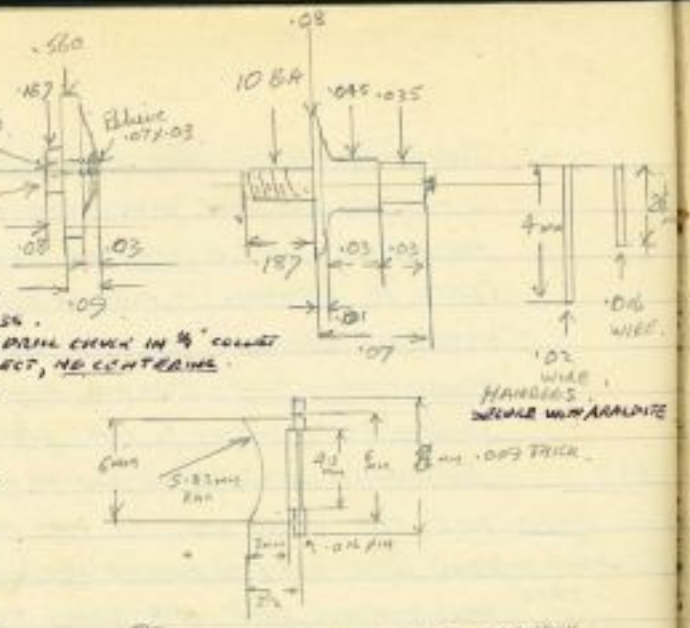
⑨ HANGERS. USE ·035/·032" STRIP. USE A CENTRING GUIDE ON RIVETING PRES 

— centring guide. USE FINEST RIVET PUNCH 

AND PUNCH BOTH ENDS OF STRIP. DRILL ·016 - CUT OFF. BEND AS SHOWN ON PREVIOUS PAGE BUT USE ·05" STEEL RADIUSED BAR.  FIT TO SPRING WITH ·016 PINS AND FLAT HEADS ON GRINDER.

SEE ALSO

STONE WALLING. see "daytime walking" and DAS modelling medium

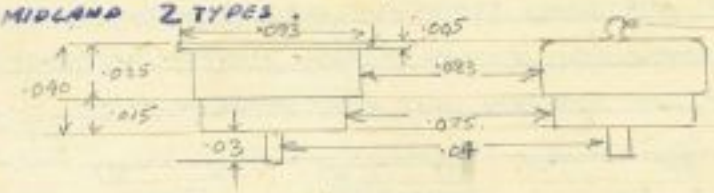


SMOKEBOX DOORS - JOHNSON. 4MM.
This post for chuck, cut off after turning the dome.

LOCK FROM ⅜" P/C. TURN TO .058 X .280. SCREW ¼ THREAD. SAW OFF. RE-CHUCK. TURN .098/.054. SET IN DIVIDING HEAD AND USE CAMERA MOTOR DRIVE CHUCK IN ¼" COLLET WITH .024 DRILL PROJECTING .12 DRILL DIRECT, NO CENTRING. FINISH SHAPE A BIT WITH SADDLE LOCK.

SANDBOX FILLERS

MIDLAND 2 TYPES.



KNOB = .07 x .07 HIGH.
MADE FROM 3/32" M/S USING 2MM WATCH LATHE COLLETS WHICH RAN TRUER.

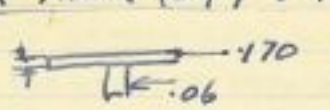
SCENERY (see also "books")

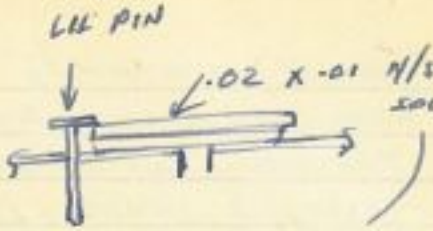
4MM TRACK & BACK-TO-BACK STANDARDS

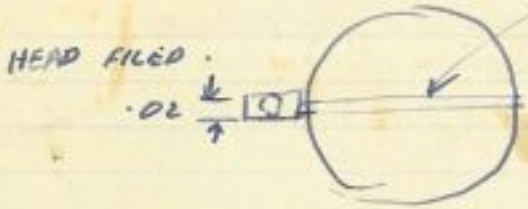
TRACK	GAUGE	BACK-TO-BACK
00	16.50mm 0.650"	14.50mm 0.571"
EM 18mm	18.0mm 0.709"	16.5mm 0.650"
EM 18.2mm	18.2mm 0.717"	16.7mm 0.657"
P4 18.83	18.83m. 0.741"	17.71mm 0.6975"

T.

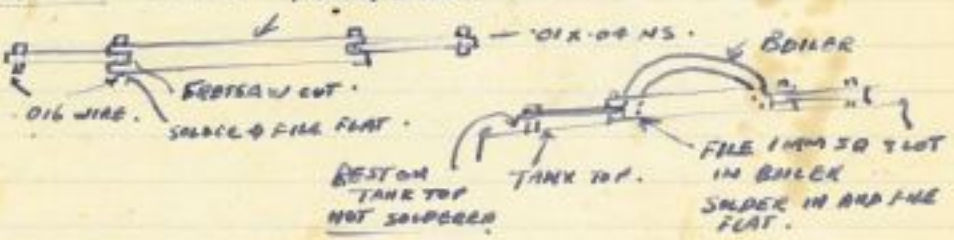
TANK FILLER (LfY 2·9·2)







TANK/BOILER STAY - MR 4mm.



TENDER HANDRAILS: - SEE HANDRAILS - TENDER

TRAIN HEATING PIPES - SEE VACUUM PIPES

TREES. LMR 1950 MARCH. JUBILEE BLUE COVER. C.E. NEIGHBOUR.
LMR 1933 JAN. AUSTIN RATCLIFFE.

· WIRE - 48 x ·0076 (BT BMS) 30 x ·010 - HEAVY (18 AM) 3 CORE ROUND WHITE FLEX.
44 x ·016 SINGLE STRAND HEAVY DUTY CAR WIRE.

USE THE ·0076 FOR SMALL TREES & BUSHES

USE THE ·010 FOR TREES - NEED 2 x 3 STRANDS = 6 x 30 = 180 = 22½ x 8 TWISTED.
USE THE ·016 FOR 6" & ABOVE TREES 2 x 3 STRANDS @ 6 LENGTHS = 6 x 40 = 240
= 30 x 8 TWISTED, GIVES A VERY HEAVY TREE

FOR THE HEAVIER (·010 & ·016) WIRES, DON'T TWIST MORE THAN 8
INSTEAD, LEAVE THEM UNTWISTED & PARALLEL AFTER 8 (2+2+2+2)
AND LAY TOGETHER, BIND WITH FINE WIRE & SOLDER JUST AT THE TOP
JOIN. AFTERWARDS, DO THE SAME WITH THE SOLDERED 16's = 2 x 16 = 32
AND SO ON. THESE WILL GIVE 18" DIA TRUNK.

PAINT ON EMULSION WITH A BRUSH AND ALSO THE FINAL COLOUR COAT
DON'T TRY TO SPRAY

SOLDER WITH SMALL IRON FOR BRANCHES, LARGE IRON FOR TRUNKS.
WRAP CORED SOLDER ROUND TRUNKS ALSO USE TINMAN'S SOLDER.
USE BLOWLAMP TO ENSURE SOLDER PENETRATION.
SAW OFF AT BASE, & FILE FLAT, ~~SOLDER~~ CENTRE WITH SCRIBER

Cut 3·5 mm before end ch

ENLARGE CENTRE WITH 1/8" SLOCOM IN LATHE HOLDING TRUNK BY HAND. THEN DRILL IN ABOUT 3/8" / 5/16 WITH .067 DRILL IN LATHE.
TAP 8BA. BOLT ON BASE WASHER WITH 8BA SCREW. SOLDER WASHER & WITHDRAW SCREW WHICH SHOULD HAVE BEEN OILED OR GREASED SO IT WON'T SOLDER.
TO OBTAIN A CONICAL TYPE TREE WIND THE CENTRE TRUNK FROM 2, 3 OR 4 x 8 x 6" LONG, THEN (SAY) 4 x 5", THEN 4 or 8 x 4".

NOTE:- IN MANY CASES, THE LOWEST BRANCHES COME OUT A 6' TO 8' FROM GROUND.

CAR WIRE.

44 x .0116 : (31s G). EACH STRAND OF SINGLE CABLE.

On basis of 2·4·5·16·32, this leaves 12

~~Using 32 as our branch. ad xxxtis~~

or if 16s = 2x16 = 32 leaving 12

So if we take 4 x 6" length = 4x44
= 176

This gives us 11 branches each of 16 wires.

Take (say) 6" + 5½" x 5" x 4½"

The tree will have 6" light + lower lights for the branches spreading near the ground.

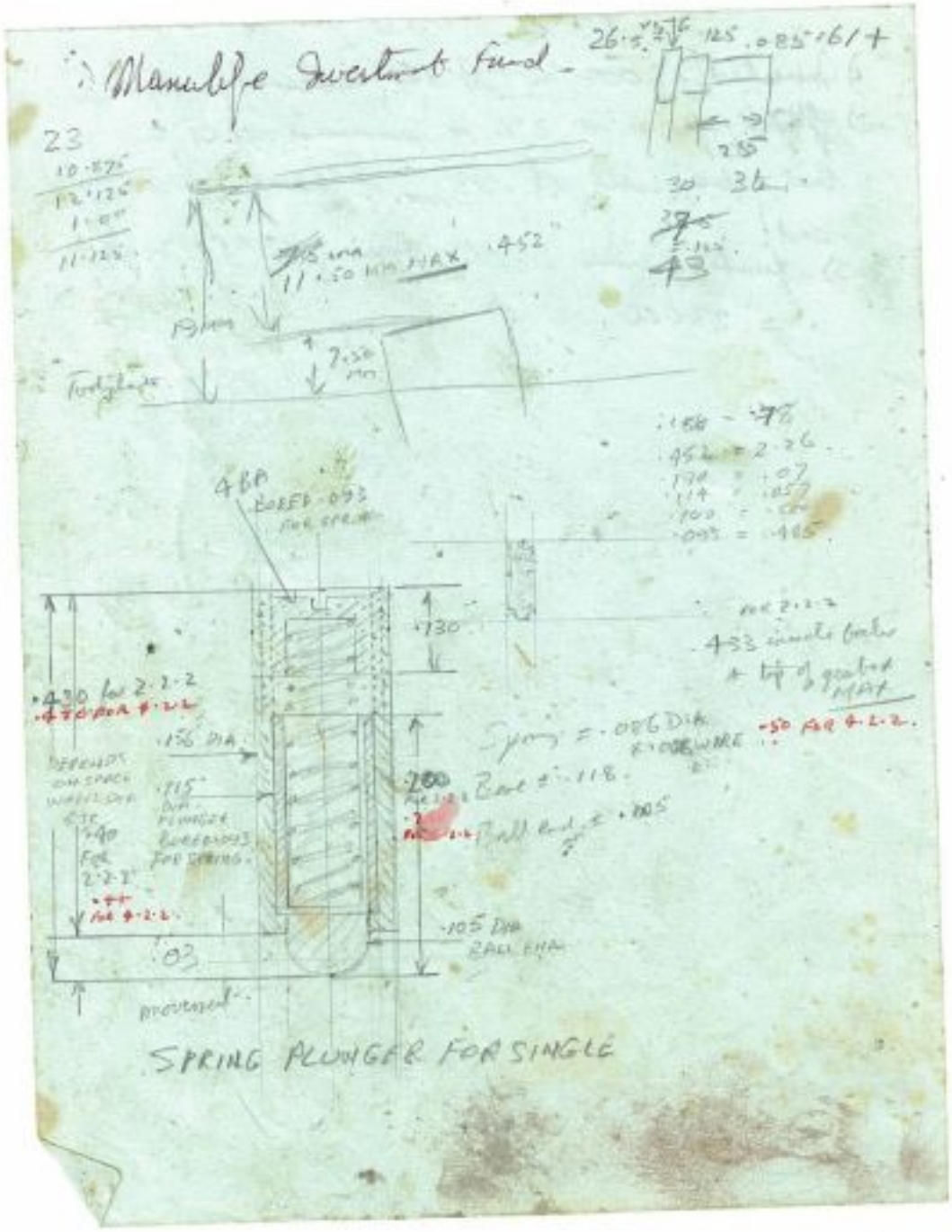
This gives a very decent tree.

~~Then~~

Each strand has 40 × .0026 (36°).
= basis of 2 - 4 - 8 - 16 - 32 strands each
This means that for 3 tranches (2 + each)
we have 3 × 32 = 96 = 120 × .0026
and 3 × 8 strands left = 24.
To make a fourth tranch, we need
another 8 strands and so, from one
cable (40 strands) we can get ~~[illegible]~~
enough for 3 tranches ~~or from 3 cables~~
~~we can get enough for 15 tranches~~
~~(5 × 8 = 120 = 3 × 40 strands)~~.

So for FOUR lengths of cable, cut FIVE
to make FOUR lots = 16 tranches and
of 32 strands = 16 × 32 = 512 strands

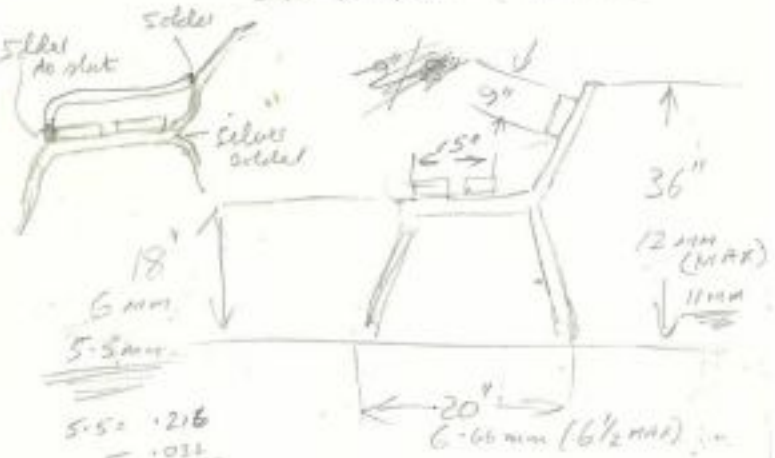
Proof 4 × 3 = 12 + 1 = 13 × 40 = 520
And we will have 2 cables left
= 40 × 2 = 80 strands, enough for
2 more tries.


Manifold Investment Fund
SPRING PLUNGER FOR SINGLE

See plate 76 M.R. Architecture painted in a chocolate shade with white name on ultramarine panel.

II - 9

Slats Back 9" x 1⅓" = 3 mm x ·02"
Seat 6" x 1½ = 2 mm x ·02



5·5 = ·216
— ·031
·185

6½ = ·255"
— ·065"
·190

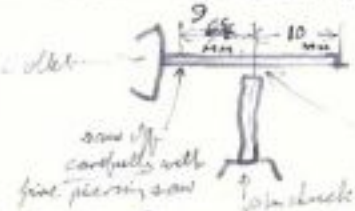
Length = 5 x seat height.
So if height = 18" = 6 mm
Length = 30 mm.

Midland Station Seats.

1) Material .0325 N/s wire and .02/.125 strip (in coil) for back rest and .023 sheet for seat.

2) Design.

3) Method. Hold one wire in ⅛" collet and one in pin chuck at right angles.



stops held in tailstock chuck. Set to 1" out. when feeding to stop, then retract stop.

The wire in the pin chuck should have end ground flat then put in vice and sawn across with piercing saw. Then filed half round to fit other wire

light candle, fill pencil torch. Heat up fluxed joint and just "dab" silver solder.

4) ~~Hold~~ Then cut off with ~~wire cutters~~ piercing saw

And cut off the 6½ mm will wire cutters.

file joint till no solder is visible gripping in small pin chuck. Also clean metal thoroughly.

3rd Bend →

4) Bend the 10mm length using flat nosed pliers

Bend the rear ~~leg~~ leg to give a curve.. Use the brass 3/16" bar with end filed to shape.

5) Take 2-30 mm lengths of .023 x 2mm and solder together with slight gap for seat

6) ~~Sit~~ Hold ~~seat~~ leg in toolmakers' clamp, bottom up. Hold ~~leg~~ seat in hand and ~~in pin chuck, tin and~~ solder to underside of seat at filed notch. Repeat at other end. Then fit middle legs.

~~Then it already has the 3rd bend in it~~

7) Bend up the remainder of the 10 mm length to form the back support-

seat

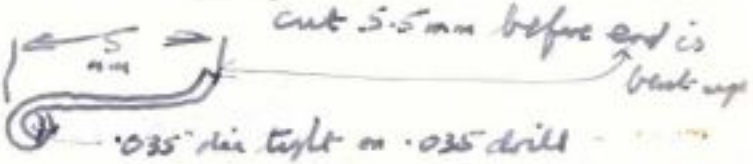
bending as close to the seat as possible using flat pliers. Finally, bend the tops of the seat supports backwards.

Hold the .02x.125 back strip in place by hand and quickly solder to one end leg. Then to the other end. Then to the middle leg.

The seat is now complete but may need a slight grind on some legs to sit "all square". Test on flat lathe bed.

OVER

8) End arms. ·02 wide strip.



Mount tight on ·035 drill in fine pin chuck, located end in slot in seat-pressbent up and against back support below the back plank and quickly solder. Then press down the end arm round end into the seat slot and solder. Withdraw drill. Hold seat by legs in clamp whilst doing this

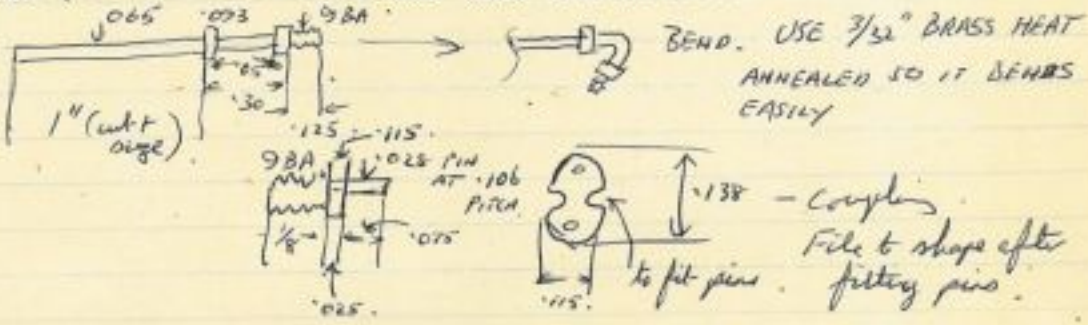
SEATS

VACUUM PIPES & TRAIN HEATING PIPES.

VACUUM PIPES '0' GAUGE (AND TRAIN HEATING PIPES)

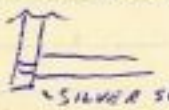
BASED ON CAVALIER COACHES DESIGN.

FLEXIBLE ARMS - ·008 SPRING WIRE WOUND ON ·051 (DRILL) MANDREL TO GIVE ·087 DIA (2mm APPROX). THESE ARE THEN SCREWED ON TO 9BA THREAD.

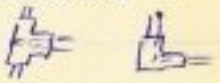


TO MODIFY CAVALIER (OR OTHER) PIPES.

CAREFULLY DRILL ·02 USING NOTCH CENTRE IN TAILSTOCK. OPEN OUT BY SUCCESSIVE DRILLS TO ·025. TAKE ·062 DIA BRASS AND TURN 'PIP' TO ·025. PUT TOGETHER AND SILVER SOLDER

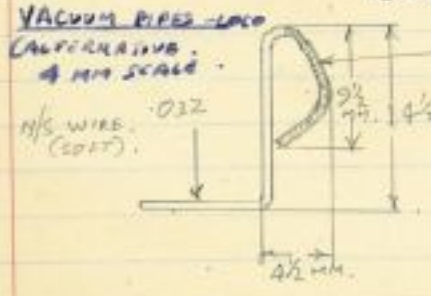


DRESS OFF TO GIVE APPEARANCE OF ELBOW OR TEE.

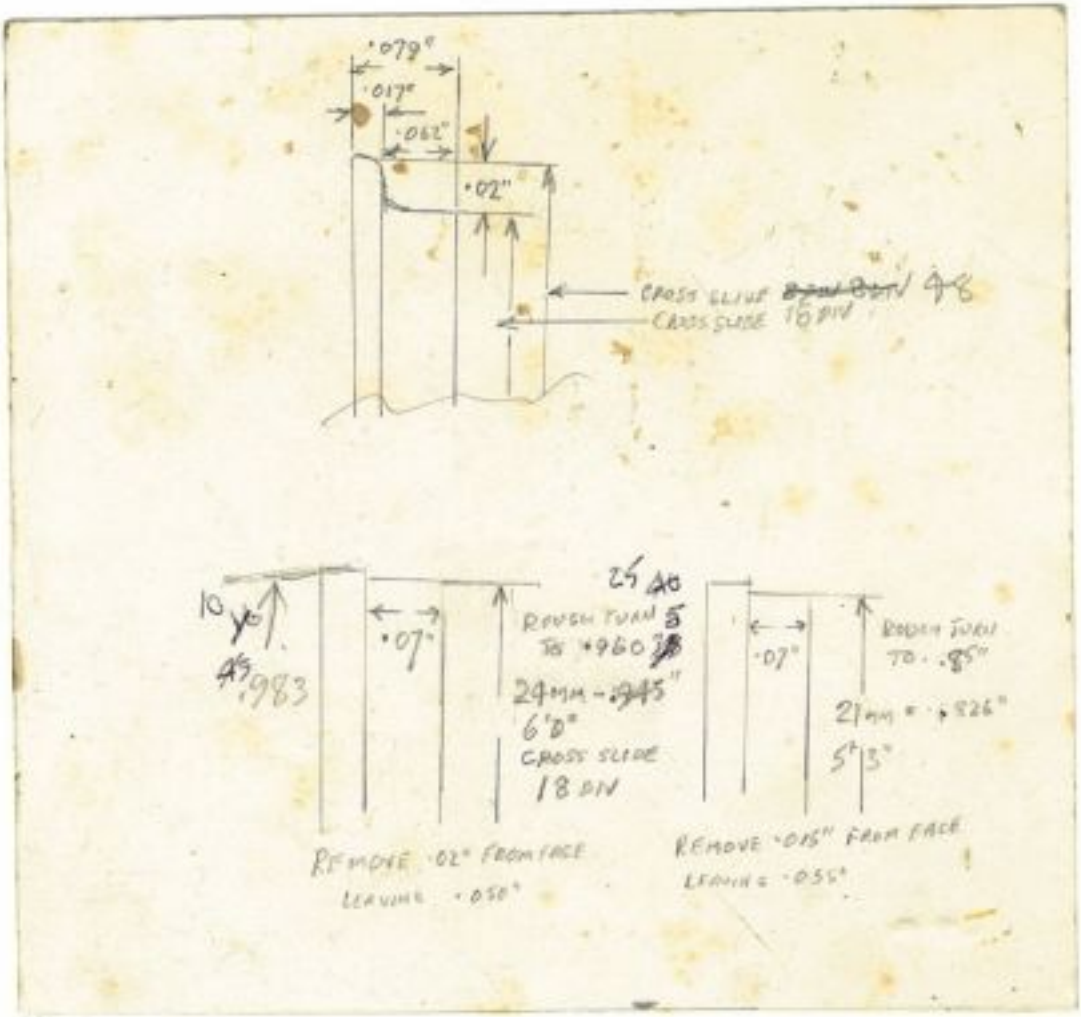


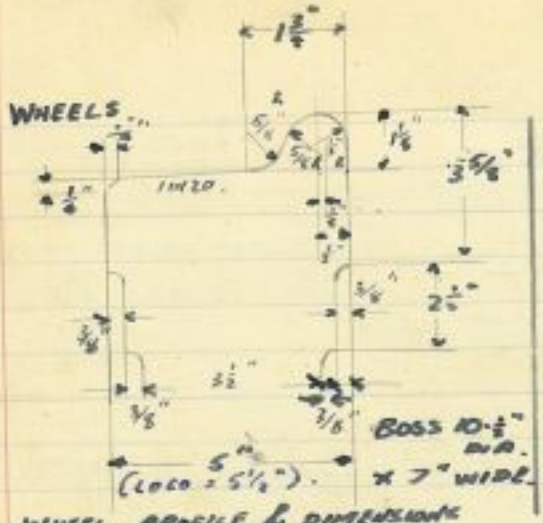
VACUUM PIPES - LOCO

CALIFORNIA VIVE. 4 mm SCALE.

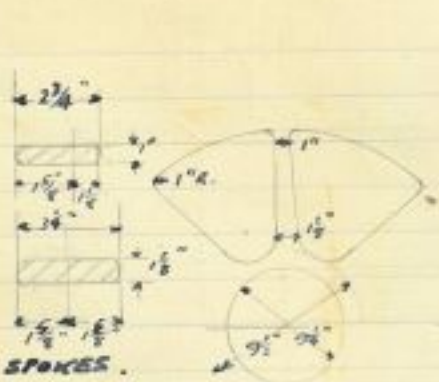


METHOD
1) SQUARE END OF WIRE IN PIN CHUCK.
2) PLACE IN LATHE COLLET - 12 mm PROTRUDING.
3) THREAD (14 BA - DIE CLOSED IN) TO GIVE 10 mm THREAD
4) GRIP IN SMALLEST ROUND NOSE PLIERS AT SMALL END OF JAWS WITH END OF THREAD IN CENTRE OF JAW AND BEND OVER.
5) SLIGHTLY CURVE TOP THREADED PART USING ROUND NOSED PLIERS. THEN GRIP HALFWAY DOWN AND FORCE LOWER END OF THREAD (DUMMY PIPE) TIGHT ON TO UPRIGHT.
6) GRIP IN RIVETING TOOL CLAMP WITH END OF THREAD AGAINST CLAMP AND BEND OVER THE TAIL AT 90°. HAMMER DOWN AGAINST CLAMP TO GIVE A TIGHT BEND. CUT-OFF AND REPEAT.

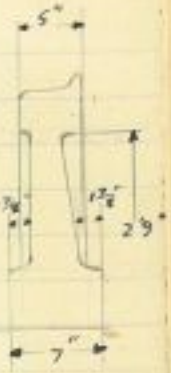

.079"
.017"
.062"
.02"
CROSS SLIDE
CROSS SLIDE 16 DIN
10 yo
.983
.07"
ROUGH TURN
TO .960
24MM
6"0"
CROSS SLIDE
18 DIN
REMOVE .02" FROM FACE
LEAVING .050"
.07"
ROUGH TURN
TO .85"
21MM = .826"
5"3"
REMOVE .015" FROM FACE
LEAVING .035"



WHEEL PROFILE & DIMENSIONS OF MANSEL WHEEL.



R.C.H. WAGON WHEEL.



WHEEL DIAS. = R.C.H. WAGON. = 3'1" } WHEEL BACK TO BACK.
R.C.H. COACH. . 3'7" } 4'-5⅝" (4'5½" min).

B.M.R.S. STANDARDS FOR WHEELS SCALE 0-0

FLANGE THICKNESS	=	·50 mm = ·02.	= 1/16" (max).
" DEPTH	=	·75 mm = ·03. (max).	= 2¼"
WHEEL THICKNESS	=	20 mm = ·08	= 6"
BACK TO BACK.	=	16·5 mm = ·649. ±½	= 4'1½"

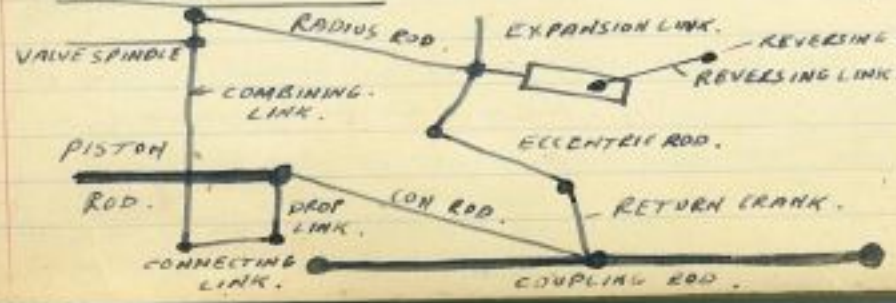
WAGONS.

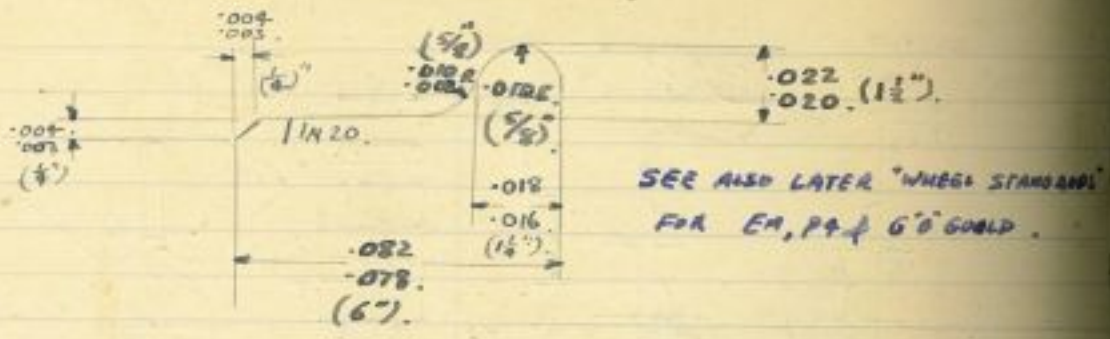
R.C.H. SPECIFICATION. (PRIVATE OWNER). 10 TON.
MAX 8'6" WIDE x 10'0" HEIGHT AT SIDES x 11'6" AT CENTRE x 16'6" OVER HEADSTOCKS x 8'0" MIN OR 9'0" MAX. W'BASE.
WOOD BODY OF 2½" OR 3" SHEETING.

UNDERFRAMES. (WAGON).

STEEL. - HEADSTOCKS & SOLEBARS 9" x 3" x ⅜" CHANNEL
WOOD. - " " 12" x 5" (5½") HEADSTOCKS.

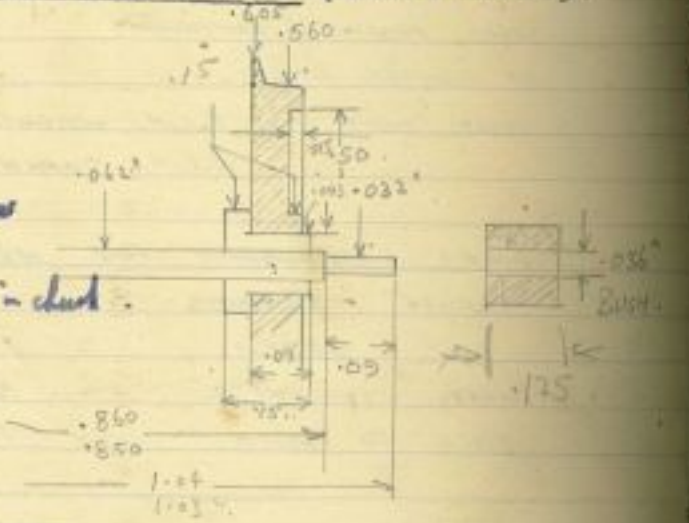
WALSCHAERT GEAR.





SEE ALSO LATER "WHEEL STANDARDS" FOR EM, P4 & 6'6" GAUGE.

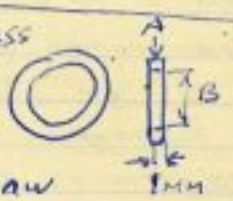
DIMENSIONS OF "SCALE" O-O FLANGE. (COACH WHEELS).



Quantity production
1). Back part a 5" length to flange depth and form.
2). Part down to ¼" with saw blade parting tool.
3). Cut off with slitting saw in chuck. (Turn between centres).

MY ARTICLE — WHEEL PRODUCTION ARTICLE. MRN JUNE/JULY 1959.

Road VEHICLE. WHEELS BRASS

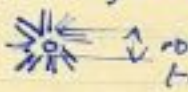


RIM 1mm wide, 1 mm thick.

	A =	B	Cu
	·364 (9·25mm)	·2854 (7·25 mm)	
	·413 (10·5mm)	·3346 (8·5mm)	

10 spokes.

Cut on ·087 mandrel in dividing head using ·017 SAW

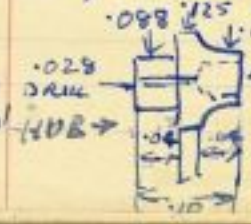


root dia = ·135 (3½mm).
top dia a force fit in rim.

OK FOR DIFFERENT SIZES & SPOKE NUMBERS.

Spokes should be sawn ·025 thick max and thinned by filing if necessary

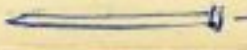
Taper spokes by filing on mandrel AFTER sawing.



Use a fine round file ALONG spokes to thin the front edges

DRILL ·06 DIA x ·035/·04 DEEP. HUB.

Press all together then solder with solder paste + blowlamp



FILE RIM HEAD TO ·08 DIA & ·02 THK.

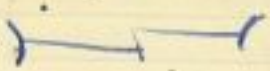
1/16" x 5/32" BRASS STRIP KEPT IN "BRASS STRIP TUBE"

Wagon modelling

Open Wagons Sides = length of wagon, Ends are wider less 2 sides thickness and go between sides. Underframes are 5/32" x 1/16" brass. Buffer beams are 1/16" x 5/32" wood. There is a jig for buffer centre holes. (22½ mm centres)
Sides are 1/32" deeper than ends and overhang floor by 1/32"
Floor = 1/8" thick by body inside dimensions. There is a jig for tapered → end timbers. Stanchions is .006 phosphor bronze (copper) wire.
(True floor thickness = 4½" ÷ 1/16 scale).

N.B. SOLDER THE SPACERS TO THE MILDWAYS IN THE JIG AND PUT THE FRAME SIDES, FITTING RAILGAUGES, SPACERS ETC. OTHERWISE YOU CAN'T GET THE JIG INTO POSITION FOR SOLDERING SPACERS

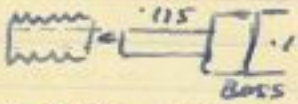
Spacer between sidebars is 24 mm. There is a jig for drilling the screw holes in spacers. Spacers 1/16" x 5/32". The jig is in fact a spare spacer.
Grind off the back of axleguard flat then drill 0.072" x 0.125" deep for bush.
Set axleguard by gauging FROM ONE END using 'L' shaped plate with divider hole in at 5mm and adding 5 mm to divider setting. GAUGE A 'RIGHT' & 'LEFT' sidebar from 'SAME' end. Then set wheel centre by trammels.
Clamp to a piece of wood whilst sawing the stretchers to part the frames.
Thin ends of sidebars if necessary to fit 10BA nuts for buffers.
Brakes. There is a clamping jig for filing shoes and slitting hook. Kept with shoes in tube
Brake levers from 0.09" strip filed down to taper in jig.
Pull rods from 0.02" strip. Brake pin drawing of bracket from 0.03" strip filed to recess cut in top of sidebar. Retaining hangers from 0.02" strip.
To allow for rather high 'V' iron centre, fit brakes thus:-



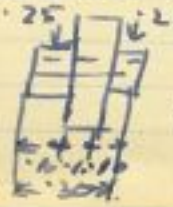
This angles the lower levers up and flattens the upper levers.

WORMS & WHEELS

2 BA. USE 2BA ROD FOR .071 MOTOR SHAFT WITH BOSS TURNED DOWN TO .145". THIS WILL ACCEPT A 10BA GRUBSCREW (.067 STEEL ROD THREADED).
IF 3/32" SHAFT. IT WILL BE SIMPLEST TO BORE .125 & FIT A BUSH TO GIVE.
THE BOSS



THE WHEEL IS BRASS. SINK CUTTER IN .015. SINK 2BA TAP IN .020.



USE SMALL CUTTER WITH 2/8 SHANK ARBOR. MOUNT WHEEL ON .125 ARBOR. BOTH ARBORS IN TOOL POST.

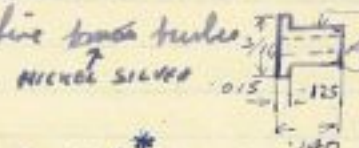
	TOP DIA.	PCD.	
60°	.628	.603	HELIX = 3°30'
50°	.547	.508	
40°	.425	.406.	

WASHOUT PLUGS. LMS & BR don't have round nose. Drill .04" Back with lead. Drill .016. Sharpen piece of .016 wire. Recess .016 tube at rear of lead if one can. Press in pin flush. Secure rear with CYANO or DEVCON (or solder). Snip off excess inside

WHEELS – PLASTIC – SHRINKING. (ACTUAL TIME – 5 HOURS FOR EIGHT WHEELS).

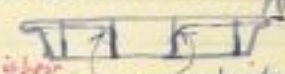
16 mm GIBSON 12 SPOKE. – .120" BORE FOR .115" AXLE. .110 THO' BOSS. FLUSH AT BACK

1) Machine bush in turning



Put a decent lead* on for fitting and initial bore to .078 to ease final machining.

2). With Eclipse hacksaw cut across back of flange and along spoke don't be afraid to go halfway through flange. Use a knife file edge to clean out slot well. Also round off the slot into the bore with a fine, square file.



3) Cut strips of .002/.003 ~~tomorrow~~ brass with scalpel .02/.015 wide.

4) ~~Solder to each rim slot and cut off to overlap bore by .06~~ YES SOLDER BEFORE PRESSING IN BUSH

5) Bend with into bore. PUT ARALDITE IN BORE, ROUND BOSS AND ALONG SPOKE

6) Drive in bush, supporting the wheel by the boss USING FINGER CLAMP AS PREV

7) ~~Put Cyano glue on three strips and bend back flange~~ Gently drive the bush home using a steel ~~stop~~ strip with ~~a hole~~ 0.135" hole for the projecting bush to go in USE A ZRA OR 6BA WASHER AS 'HOLE' TO FEED INTO.

8) CAREFULLY face off the solder flush on the bush in the lathe (don't face right down to the plastic or the strip may tear away) Then face the centre flange down to .01 proud of rim.

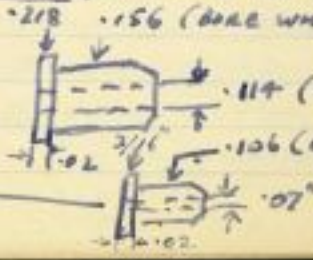
9) Bore with sharp single point tool. .0005 ±0 below axle size

10) NOTE. IF WE HAVE TO DRILL A BUSH WHEN IN THE WHEEL, USE A SHARP DRILL AND PUT SOME DRAG ON TAILSTOCK, OTHERWISE THE DRILL WILL SNATCH & SPLIT BUSH OUT.

BUSHES FOR 1/8" AXLES

NICKEL SILVER.

FOR 2MM (.0787")



LATER NOTES IN RED

* Important

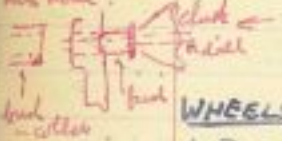
MAKE THE LEAD A GOOD ONE ALSO ROUND THE SLOT WALL OTHERWISE THE BUSH SHEARS OFF THE LEAD ENDS IN THE BORE

LATER

BEND THE TWO STRIPS ABOUT 1/16" AND HOOK OR INTO BORE HOLDING IN PLACE BY ARALDITE ALONG BACKS OF SPOKES THEN PRESS IN BUSH BY HAND AND USING FINGER CLAMP IN VICE PRESS BUSH HOME WITH WASHER BELOW TO TAKE PROJECTION ON FINAL PRESS THEN PRESS DOWN STRIP ON TO ARALDITE CRIMP OVER RIM AND SOLDER.

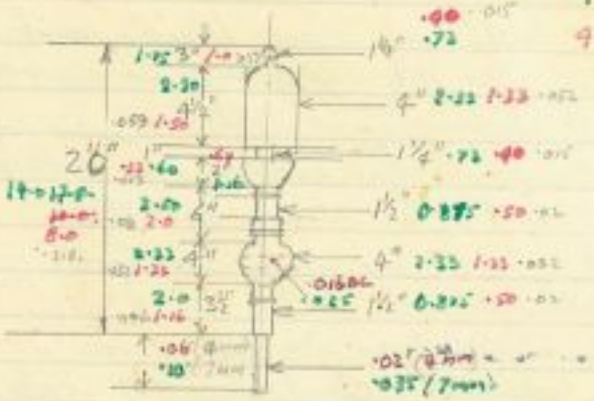
TRACTION WHEELS.

1) Mark strip where using fine plier
2) Hold one strip in vice, press down on A with side and SOLDER in vice
3) Cut off spare strip and repeat 2.
4) Place a bush (·138 bore (wash) in collet. Place short drill shank (·030 dia) in tailstock chuck, thread a short rod from back home.



WHISTLES (MIDLAND).

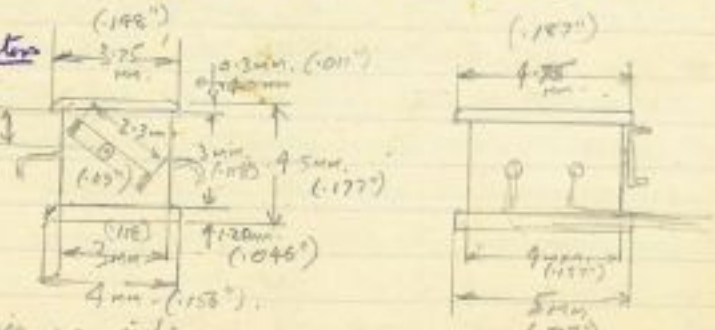
7 MM SCALE (MM).
9 MM SCALE (MM).



WHEELS ROMFORD - RE-MACHINING.

1) Bore with fine tool from back either 3/16" or 5/32" depending on diameter of axle.
2) Bush with 3/16" M.S. turned down to 5/32" if need be plus ·001 a bore for fit.
3) Cut off the bar leaving a 1/16" protrusion for chucking in 3/16" collet.
4) Part rim off from front.
5) Use TWO TURNS of ·0005 coms foil as packing and refit rim with back of wheel onto against collet bush in lathe and with flat face against poppet.
6) Chuck by 3/16" spigot and turn wheel front and flange as desired FILE RADIUS ON FLANGE
7) Hold in vice chuck and turn back to give ·08 thickness at ·017 flange thickness.
8) Bore from back to ·124 for 1/8" axle or ·114 if 5/32" bush is used.
9) Turn axles to ·114 +·0005 force if necessary or file 1/8" axles to ·0005 force fit (taper). Time Two per hour price £2.

Wakefield Lubricator



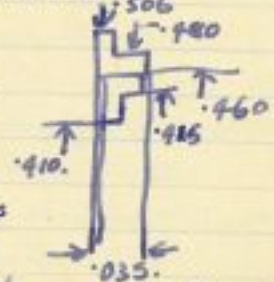
4 MM Scale.

Only TWO pairs per side.
This is the type fitted to ex-Midland Compounds and on the left hand side only. It is NOT the same as those fitted to later LMS and Stanier Engines.

Wheels Alan Harris - Turning

Use ML7 lathe and 3 jaw. Always mark the jaw position using a marking pen. N.B. The castings are absolutely concentric

1). Chuck on turning spigot .4375.
2). Hold by spigot, face boss and rim - centre boss - mark jaw. - also turn top to flange dia and treat
3) Reverse - chuck by rim and turn back.
4) Recheck on spigot, use centre, turn form.
5) Cut off spigot
6) Recheck and drill bore .172 FOR .1875 axle or .140 for .156 axle (bogie, trucks)
7) Chuck in collet chuck in ML7, check for true the bore .1875 (or ream or D bit
Further notes. Cut Balance weights, fit with araldite.
Drill .067 for work in the use/.1875 arbor (in crankpin box) to drill the rest.
Open out to .093 using jiller drill. Centre all axles (.03"). Press on hub and quarter Before painting. Use paper shield Behind wheels and spray frame. If axles are to be left bright, spray wheels Bearec fitting
See 'Crankpins' IN REG N.B. .093 material x 10 BA

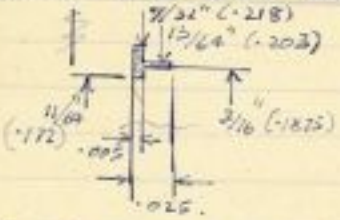


WINDOWS - CAB - "O" GAUGE ASPINAL 4-4-0.
The outer ring is STEEL, inner - BRASS.
I turn a STEEL tube in 4 jaw to .520 outside x .460 inside. I turn a BRASS push to .460 outside x .375" inside.
Force BRASS push into STEEL push will locate the turn outer STEEL to .506 and bore inner BRASS to .410. Using a SHARP boring tool, set well out from tool post, just touch up to .410 face the cut in from face by .003" to .460 to give the slight inset of BRASS. Then reset in to .025 x .415 to take glass. THEN PUT LATHE IN REVERSE AND CUT IN .025 DOWN TO .480 FROM REAR TO GIVE RECESS ON STEEL. TRY TO PART OFF BUT, IF NOT SUCCESSFULL, CUT OFF WITH HACKSAW. Reverse in collet chuck and face back using the boring tool as, again, recess steel in by .003
To cut hole in cab front, set boring bar to give .480 dia cut, using a piece of .012 x .75 brass with a .25 hole, thread tool through .25 hole in apex plate, clamp to turn backing and trepan hole out. For windows, use .415 punch and .01 plastic sheet.

WHEEL STANDARDS.

	A	B	C	D.	E.
MY OWN EM.	·079".	·017"	·028"	·01"	·01"
P4	·073"/·073"	·017"/·016"	·016"	·01"	·01"
"O" G.GUILD.	·122"/·157"	·03"/·04"	·047"/·047"	·027"/·028"	·01"

WINDOWS - CAR 4 MM MIDLAND.



On theory, we need ·187" dia glazing. But, in fact, it is not easy to cut this exactly. Therefore, there are 3 punches 4·5mm (·177). 4·60mm (·181") & 4·70 mm (·185 mm). The ·185 JUST forces in. Lets with varnish. Cut by using finger clamp in vice as press with plastic backed by card for the punch to press into.

WINDOW LOCKS (CHUBB BOLT) MODIFICATIONS.

1). Turn down square end, cutting away the screw until overall length of square portion is ·218". This makes the screw flush with the thread inside the brass bush. File the turned length to match existing square and turn away the end of the square until it measures ·160" long.

2) Drill square axially ·076" dia (1·9mm) x ·130" deep.

3) Make ⅛" Dia silver steel stub

4) File slight air relief flat and drive stub into end of square

5) Drill key ·134 (3·4mm) x ·125" ~~long~~ deep.

WORKSHOP NOTES. (1) HEAT TREATMENT OCT 1948 (2) ALTERNATIVE WINDING NOV 1948 AND FEB 1950 (3) WHEELS. FEB 1949. (4) BASEBOARDS - PLUG & SOCKET JOINT. MAR 1949. (5) TAPS, DIES - JUNE - 1949. (6) CARE OF MECHS - OCT 1949 (10) SOLDERING IRON - SCRAPERS - TOOLS - DEC 1949. (13) DRILLS - MAY 1950. (15) ACCURACY IN MODELLING - MARKING OUT JULY 1950. (16) GEARS & GEAR HOBBING. - (DEC 1950) (FEB 1951)

MIDLAND RAILWAY COMPANY

wagon drawings in MRN

8 ton box van (July 1933, p 186)
8 ton dropside open wagon (November 1938, p 304)
10 ton single bolster timber wagon (March 1961, p 93)
Meat van (May 1961, p 160)
Banana van (June 1960, p 208)
8 ton low sided wagon (September 1961, p 354)
8/10 ton low sided wagon (November 1961, p 406)
ex- S. & B. R. brake van (June 1960, p210)
4-wheel brake van (November 1961, p 406)
6-wheel brake van (February 1960, p 51)
(weighing machine adjusting van (April 1949 p 76)
plus photograph in MRN Oct 1950)

Mr Stubbs

Model Loco Standards E.M.

Width over frames on non-bogie locos. .614/.610.
Width over frames where bogie is to swivel .595/.590.