

PART NUMBERS AND WEIGHTS

RAIL SECTION	GAUGE	ASSEMBLY DRG NR.	PART NUMBERS						APPROX. WEIGHT (Kg.)					
			PLATE	TIE BAR	TWO WAY KEY	COTTER	PLATES (2)	TIE BAR (1)	TWO WAY KEYS (2)	COTTERS (4)	COMP. SLEEPER			
UIC 60 kg														
52 kg & 90 R.	B.G.	TA 20001	T 10221	T 404(M)	T 405 (M)	T 401(M) OR T 423(M) OR T 424(M) OR T 432 (M)		87.10	12.62	0.97	1.48		102.17	
75 R.	B.G.	TA 20002	T 10222	T 404(M)	T 405 (M)	DO			12.62	0.97	1.48			
90 R.	M.G.	RDS0/T-2664	RDS0/T-2663	RDS0/T2368	T 405 (M)	DO			8.966	0.97	1.48			
75 R.	M.G.	TA 32 (M)	T 439 (M)	T 433(M)	T 405 (M)	DO		49.00	6.45	0.97	1.48		57.90	
60 R.	M.G.	TA 20027	T 10232	T 433(M)	T 413 (M)	DO		51.00	6.45	0.86	1.48		59.79	
50 R.	M.G.	TA 20028	T 10233	T 433(M)	T 413 (M)	DO			6.45	0.86	1.48			

MAIN DIMENSIONS OF PLATES

GAUGE	RAIL SECTION	D I M E N S I O N S (in mm)																		
		A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T
B.G.	UIC 60 kg.																			
	52 kg, 90 R, 75 R	800	330	516	51	38	16	19	102	125	68	64	95	54	89	175	51	87	60	51
M.G.	90 R.	700	300	510	50	38	16	16	96	12	68	64	85	54	86	16	50	75	60	51
	75 R, 60 R, 50 R.	650	270	362	45	32	13	14	81	11	54	54	8	48	77	15	50	65	50	50

DIMENSIONS AT RAILSEATS

RAIL SECTION	GAUGE	PART NUMBER	D I M E N S I O N S (in mm)																		
			a	b	c	d	e	f	g	h	j	k	l	m	n						
UIC 60 kg	B.G.																				
52 kg, 90 R.	B.G.	T 10221	76	47	17	11	14	35	16	16	16	146	114	32	128	213					
75 R.	B.G.	T 10222	66	47.6	17	10.5	13.5	48	15	15	145	113	45	128	165						
90 R.	M.G.	RDS0172663	76	47	16	11	14	35	16	16	140	111	32	128	213						
75 R.	M.G.	T 439(M)	72	42.1	14	10	13	38	14	14	120	92	45	128	16						
60 R.	M.G.	T 10232	62	39	14	8	11	38	12.5	12.5	120	92	45	128	16						
50 R.	M.G.	T 10233	56.3	38	14	8	11	38	13	11	120	92	45	76	15						

CHAPTER IV

STEEL TROUGH SLEEPERS

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Brief notes on steel sleepers	SSa & SSb
Steel trough sleepers—Broad and Metre Gauge for use with loose-jaws and two-way keys	SS1
Steel sleepers for turnouts—Broad and Metre Gauge for use with loose jaws and two-way keys	SS2
Steel trough sleeper—Broad Gauge for use with elastic rail clips	SS3

Brief notes on steel sleepers

Steel trough sleepers (Main Line) : There are two different rolled sections of sleeper plates from which the standard sleepers for the various BG and MG rail sections are pressed to a suitable trough shape with the rail seat canted 1 in 20, i.e.:

- (1) Plate 13 mm thick at rails seat, for 52 kg and 90 R (BG), weighing 28.66 kg/metre length.
- (2) Plate 9 mm thick at rail seat, for 75R, 60R & 50R (MG) weighing 17.55 kg/metre length.

In these sleepers, holes are drilled or punched in the plate to accommodate loose jaws. For loose jaw refer sheet 1 of page SF5 and its relevant note in Chapter II.

Standard two-way keys vide page SF5 sheet 2 and its relevant notes in Chapter II are used with the loose jaw types of sleeper. The over size keys as per page SF5 sheet 3 are also used when holes get elongated.

The sleeper to drawing No. 460(M) with drilled or punched holes and having rolled section of 13 mm thickness at rail seat and the modified loose jaws referred at page SF5A sheet 1, along with its relevant note in Chapter II can be used for 52 kg rail section.

The details of the rolled sections, main dimensions and weights and properties of the sleepers and also the dimensions of the rail seat which differ for each rail section, together with part numbers, are tabulated with reference to the various explanatory sketches on pages SS1 in 4 sheets.

Steel sleepers for turnouts, BG and MG : A special rolled section of sleeper which needs no pressing except for splaying out the ends, has been designed for BG turnouts and is detailed on IRS Drg. No. T 455(M). This sleeper is available in lengths suitable for cutting into the various lengths of

turnout sleepers. The thickness of the plate at the rail seat is 13 mm so that spring type loose jaws for 52 kg and 90R rails can be made use of. The weight of this sleeper per metre length is approximately 35.50 kg as against 28.66 kg per metre length of the standard BG main line trough sleeper for 52 kg and 90 R and is considerably stronger than the latter.

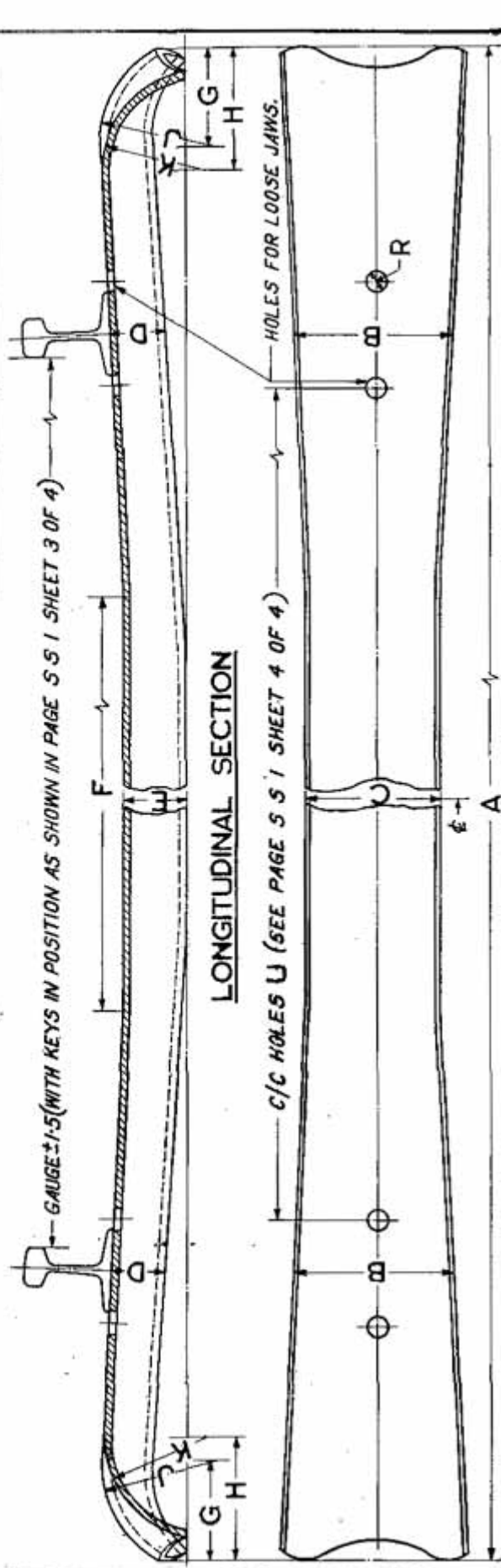
In the case of turnouts for MG, the rolled plate available is detailed on IRS Drg. No. T358 (M). The thickness of the plate at the rail seat is 9 mm and spring steel loose jaw T-419(M) have been found to suit in the case of 75R rail. For 60R and 50R rails, spring steel loose jaws to Drg. No. T10002 shall have to be used. The weight of this sleeper is approximately 23.60 kg/metre length and the table of the sleeper is pressed 150 mm flat to provide a seat for the uncanted rail.

Details of the sleeper section for broad gauge as well as metre gauge are given on pages SS2 in 2 sheets, where sleeper and the hole spacing to suit the various rail sections have been tabulated with reference to the sketches showing the general arrangement.

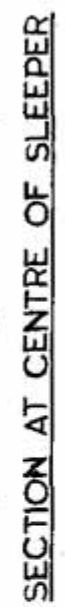
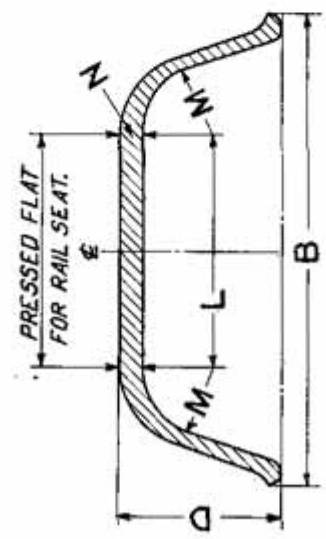
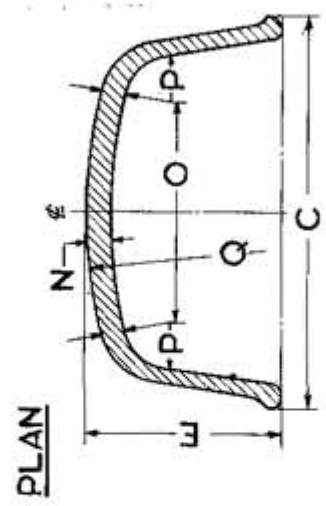
Specification No. IRS T-9 is to be referred for steel sleepers.

Steel trough sleepers with elastic rail clips BG: The steel rail pad of requisite size matching that of the rail foot is welded on the steel trough sleeper at an appropriate place as indicated on page SF6A sheet 1. A rubber sole plate is interposed between the rail foot and top of the sleeper to impart elasticity to the assembly. The elastic rail clips driven into position complete the assembly. Details are shown on page SS3.

B. G. & M. G. STEEL TROUGH SLEEPERS



S S 1
SHEET 1 OF 4



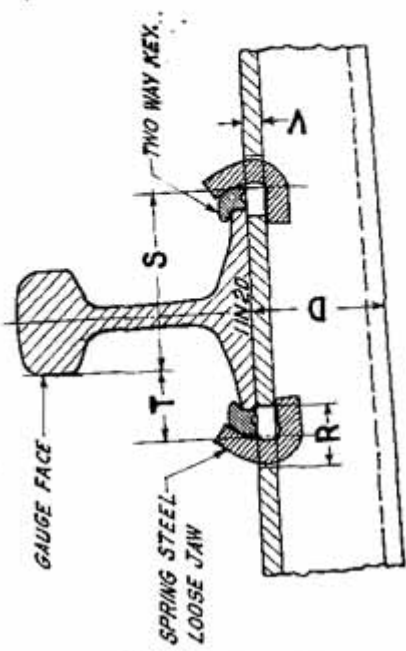
PART NUMBERS & MAIN DIMENSIONS

RAIL SECTION	GAUGE	APPROX: WT OF EACH TROUGH	PART NUMBER	D I M E N S I O N S (mm)																
				A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R
52Kg & 90R.	B.G.	78.69kg	T 460(M)	2680	257	216	89	106	900	162	200	190	165	127	38	13	121	25	305	36.5
75R, 60R & 50R.	M.G.	33.01kg	T 10271 T 10272 T 10277	1630	215	206	79	95	610	136	165	152	143	102	25	9	78	31	140	32

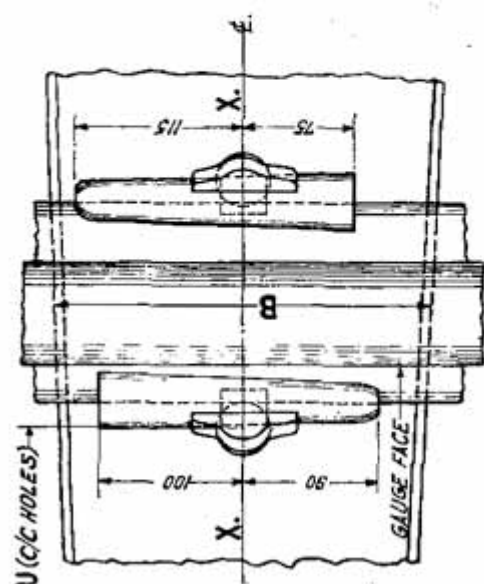
PROPERTIES

RAIL SECTION	GAUGE	APPROX: WT OF EACH TROUGH	PART NUMBER	AT RAIL SEAT			AT CENTRE		
				MI CM ²	Zc CM ³	Zc CM ³	MI CM ⁴	Zc CM ³	Zc CM ³
52Kg & 90R.	B.G.	78.69kg	T 460(M)	379	102	38.58	249	111	52.73
75R, 60R & 50R.	M.G.	33.01kg	T 10271 T 10272 T 10277	172	69.46	31.72	112.8	35.1	17.95

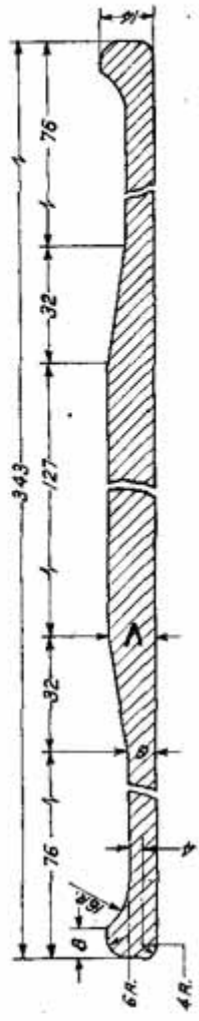
B.G. & M. G. STEEL TROUGH SLEEPERS



SECTION ON X.X.

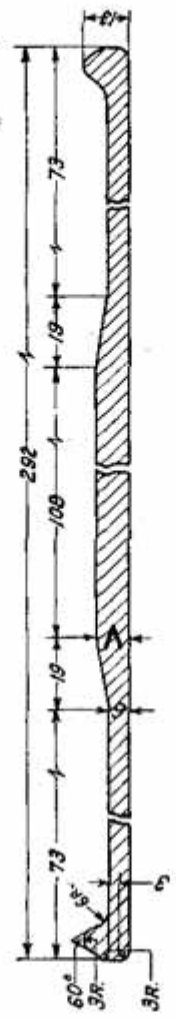


PLAN AT RAIL SEAT



ROLLED SECTION OF THE PLATE
USED FOR PRESSING B.G. SLEEPERS

WEIGHT PER METRE LENGTH FOR 52Kg & 90R. = 28.66Kg



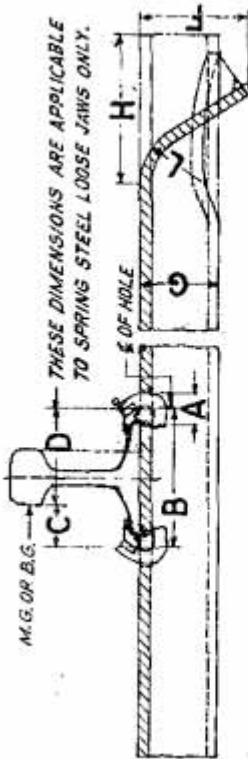
ROLLED SECTION OF THE PLATE
USED FOR PRESSING M.G. SLEEPERS

WEIGHT PER METRE LENGTH = 17.55Kg

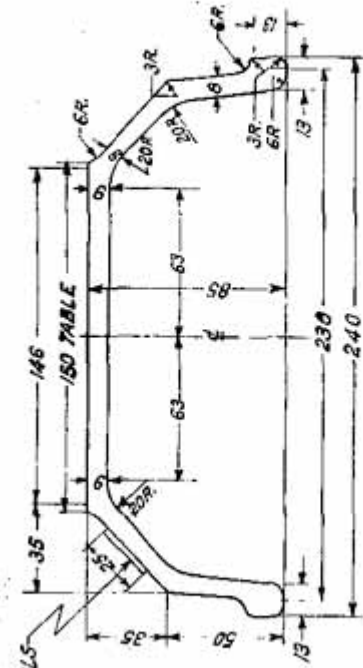
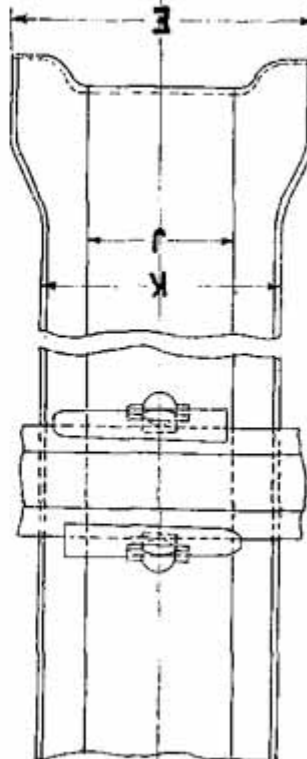
PART NUMBERS AND MAIN DIMENSIONS

RAIL SECTION	GAUGE	PART NUMBER	TWO WAY KEY	SPRING STEEL LOOSE JAW	D I M E N S I O N S (^m m)						
					B	D	R	S	T	U	V
52kg & 90R.	B.G.	T 460(M)	T 405(M)	T 415(M)	257	89	36.5	118.5	50.5	1586.5	13
75 R.	M.G.	T 10271	T 405(M)	T 419(M)	215	79	32	109	47	917	9
60 R.	M.G.	T 10272	T 413(M)	T 10002	215	79	32	101	43	924	9
50 R.	M.G.	T 10277	T 413(M)	T 10002	215	79	32	93	40	929	9

**STEEL SLEEPERS FOR
TURNOUTS B. G. & M. G.**

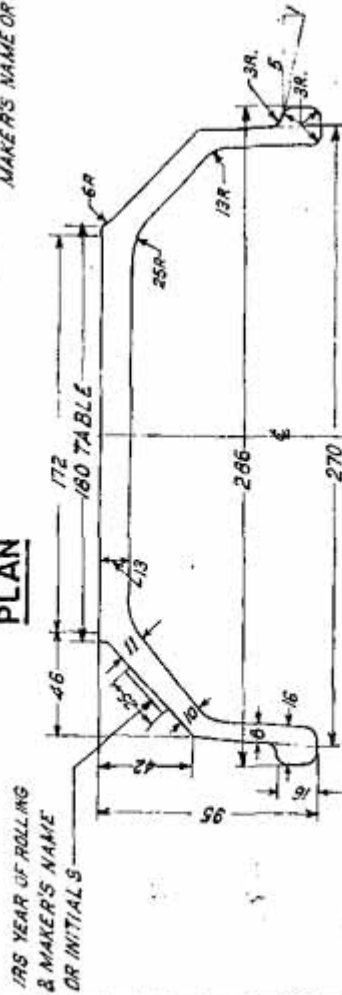


SECTIONAL ELEVATION



**ROLLED SECTION OF SLEEPER
FOR METRE GAUGE TURNOUTS**

IRS, YEAR OF ROLLING &
MAKER'S NAME OR INITIALS



**ROLLED SECTION OF SLEEPER
FOR BROAD GAUGE TURNOUTS**

IRS YEAR OF ROLLING
& MAKER'S NAME
OR INITIALS

PART NUMBERS & MAIN DIMENSIONS

RAIL SECTION	GAUGE	PART NUMBERS				D I M E N S I O N S (mm)										
		SECTION FOR TURN OUT SLEEPERS	TWO WAY KEY	SPRING STEEL LOOSE JAW	A	B	C	D	E	F	G	H	J	K	L	
52Kg&90R.	B.G.	T 455(M)	T 405(M)	T 415(M)	36.5	169	50.5	118.5	360	130	95	180	180	286	75	
75R.	M.G.	T 358(M)	T 405(M)	T 419(M)	32	156	47	109	300	115	85	150	150	240	65	
60R.	M.G.	T 358(M)	T 413(M)	T 10002	32	144	43	101	300	115	85	150	150	240	65	
50R.	M.G.	T 358(M)	T 413(M)	T 10002	32	133	40	93	300	115	85	150	150	240	65	

PROPERTIES

RAIL SECTION	GAUGE	APPROX. WT. OF ROLLED SECTION (PER METRE)	PART NUMBER	AT RAIL SEAT			AT CENTRE		
				MZ CM ⁴	Zc CM ³	Zt CM ³	MZ CM ⁴	Zc CM ³	Zt CM ³
52Kg&90R.	B.G.	35.5kg	T 455(M)	391	144.79	57.19	391	144.79	57.19
75R., 60R. & 50R.	M.G.	23.6kg	T 358(M)	220.43	83.37	37.64	220.43	83.37	37.64

METHOD OF UTILISING STEEL TROUGH SLEEPER WITH ELASTIC RAIL CLIPS

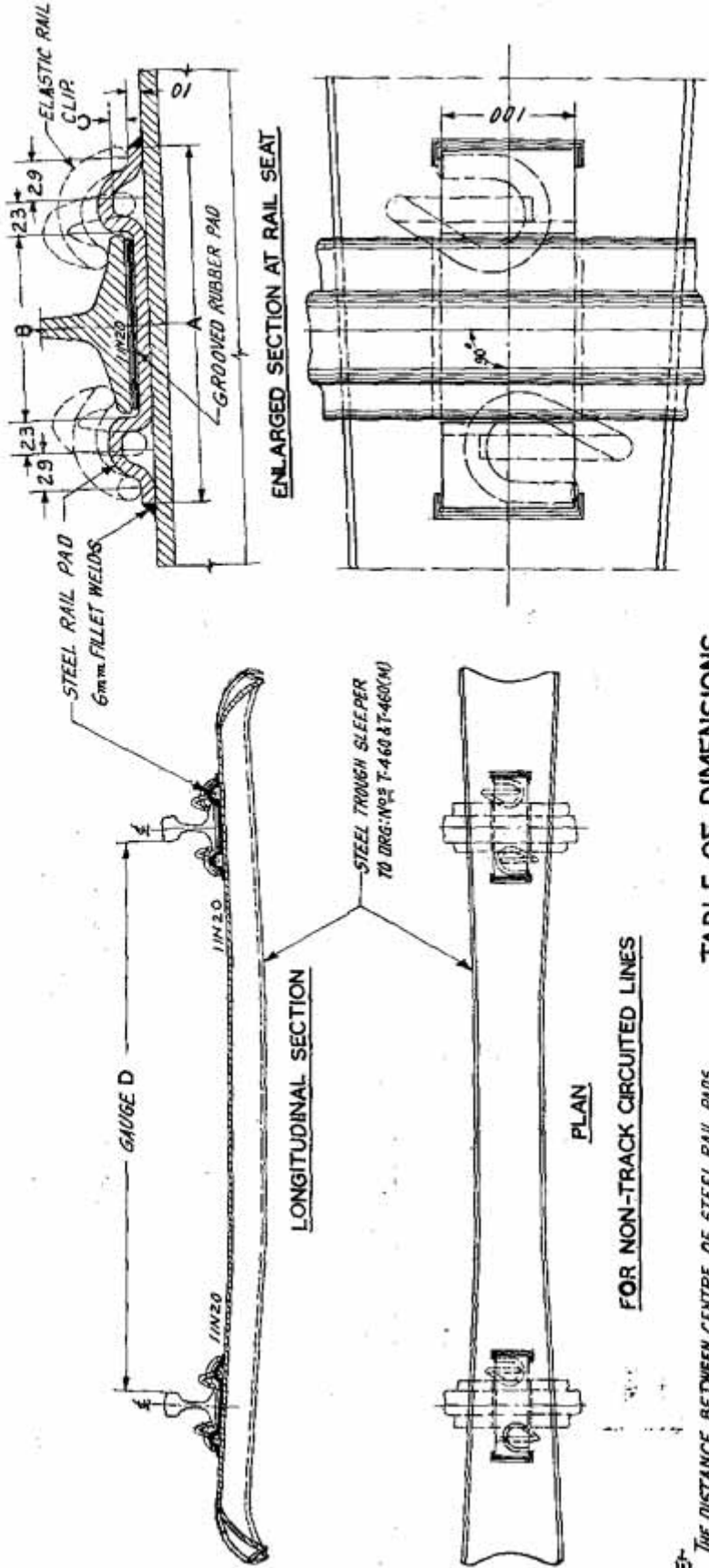


TABLE OF DIMENSIONS

RAIL SECTION	DRAWING NUMBER	DIMENSIONS (mm)			
		A	B	C	D
UIC 60 kg	RD50/T-1029	295	154	14.5	1673 ± 0.5
52 kg & 90 kg	RD50/T-361	280	138	14	1676 ± 0.5

NOTE- THE DISTANCE BETWEEN CENTRE OF STEEL RAIL PADS DEPEND UPON THE GAUGE AND RAIL SECTION.

CHAPTER V

TURNOUTS, SWITCHES AND CROSSINGS

	Page
Brief notes and general definition	TSCa to TSCj
Table of assemblies, sub-assemblies and their parts	TSC
Definitions	TSC 1
Main dimensions of turnouts (BG, MG & NG)	TSC 2
Main dimensions for setting out turnouts (BG, MG & NG)	TSC 3
Rail lengths of turnouts (BG, MG & NG)	TSC 4
Offsets for turnouts (BG, MG & NG)	TSC 5
Typical 1 in 8½ crossing (BG, MG & NG)	TSC 6 to TSC 10
Typical 1 in 12 crossing (BG, MG & NG)	TSC 11 to TSC 15
Typical 1 in 16 crossing (BG & MG)	TSC 16 to TSC 19
Typical 1 in 20 crossing (BG)	TSC 20
Typical short switch (BG, MG & NG)	TSC 21 to TSC 25
Typical long switch (BG, MG & NG)	TSC 26 to TSC 30
Typical curved switch for 1 in 8½ turnouts (BG & MG)	TSC 31 to TSC 34
Typical curved switch for 1 in 12 turnouts (BG)	TSC 35 & TSC 36
Typical curved switch for 1 in 16 turnouts (BG & MG)	TSC 37 to TSC 40
Typical curved switch for 1 in 20 turnouts (BG)	TSC 41
Typical partly curved switch for 1 in 12 turnouts (MG)	TSC 42 & TSC 43

Bolts and turned bolts for points & crossings	TSC 44
Special bolts and bolts with grooved nuts for switches	TSC 45
Spherical washers and switch anchor (BG & MG)	TSC 46
Typical check rail (BG, MG & NG)	TSC 47
Typical crossing tie plate (BG, MG & NG)	TSC 48
Typical insulated acute crossing tie plates (BG)	TSC 49
Typical switch tie plate (BG, MG & NG)	TSC 50
Typical insulated switch tie plate (BG & MG)	TSC 51
Typical leading & following insulated stretcher bars (BG & MG)	TSC 52
Typical alternative leading insulated stretcher bars (BG)	TSC 53
Typical leading and following stretcher bars (ordinary) (BG, MG & NG)	TSC 54
Typical leading and following stretcher bars (ordinary) for curved switches (BG & MG)	TSC 55
Alternative typical leading and following stretcher bars (ordinary) (MG & NG)	TSC 56
MS bracket for stretcher bars (BG, MG & NG)	TSC 57
Typical slide chair for OR switches (BG, MG & NG)	TSC 58
Typical special flat bearing plates	TSC 59

Brief notes and general definitions : Crossings, switches and turnouts are the essential adjuncts of a track structure which are provided at the intersection of two tracks to permit the rolling stock to pass from one track to another. The smooth passage of the rolling stock from one track to another depends among other factors on the angle of the crossing which is kept as small as possible for high speed traffic on the running lines. On the Indian Railways, four sizes of crossings, namely, 1 in $8\frac{1}{2}$, 1 in 12, 1 in 16 and 1 in 20 are used. For high speed junctions a special layout with 1 in 16 crossing has been designed.

There are different methods of denoting the angle of the crossing by a number. In the IRS designs the angle of the crossing is denoted by the cotangent of the angle. Thus when a crossing is stated to be 1 in 12, the cotangent of the angle of crossing is 12. The various terms used in the layouts are briefly defined as follows :—

Turnout : is an arrangement of points and crossings with lead rails by means of which rolling-stock may be diverted from one track to another.

Lead of turnout : is the distance from the theoretical nose of the crossing to the heel of the switch measured along the straight.

Overall length : is the distance from the end of stock rail to the heel of the crossing measured along the straight.

Theoretical nose of crossing : is the theoretical point of intersection of the gauge lines of a crossing, which is used as a reference point for all calculations. The actual nose of crossing is the point at which the spread between the gauge lines of a crossing is sufficient to allow for an adequate thickness of the point, from consideration of manufacture and strength.

Throat of a crossing : is the point at which the converging wings of a crossing are closest.

Tongue rail : is a tapered movable rail, a pair of which

with necessary connections and fittings form a switch.

The running rail against which a tongue rail operates is a stock rail.

A pair of tongue rails with their stock rails are commonly known as "points".

Heel of switch : is an imaginary point midway between the end of the lead rail and the tongue rail. In case of fixed heel switches, it is a point at the centre of the heel block itself.

Divergence : The divergence at the heel of the switch is the distance between the gauge lines of stock rail and the tongue rail or in other words, it is the clearance between these two rails plus the width of the tongue rail head.

Switch angle : is the angle between the gauge lines of the tongue rail at its point and of the stock rail (in the closed position). It is also called entry angle in the case of curved switches.

Theoretical toe of switch : is the point of intersection of the gauge lines of a tongue rail at its point and its stock rail in closed position. The actual toe of switch is the point where the spread between the gauge lines of the stock rail and the switch rail is sufficient to allow for adequate thickness from considerations of manufacture and strength.

Tables of main dimensions of turnouts

The main dimensions of turnouts are:—

Gauge	. . (G)
Crossing angle	. . (W)
Lead of turnout	. . (Z)
Distance of actual nose of crossing to heel	. . (S)
Length of straight portion of crossing from the actual nose to the tangent point of turnout	. . (Q)

Radius of turnout with straight switch	. . (R)
Radius of turnout with curved switch	. . (RI)
Radius of turnout with partly curved switch	. . (R2)
Divergence at heel of switch	. . (X)
Switch angle	. . (V)
Distance of theoretical toe of switch to heel	. . (Y)
Distance of actual toe of switch to heel	. . (T)
Overall length of turnout	. . (L)

These dimensions have been given in plates TSC2 for the various turnouts..

The lead of the turnout and its radius are the most important of the turnout dimensions to be computed and the method followed in computing these dimensions are given in Chapter XI.

Tables of rail lengths for turnouts : The lengths of the rails connecting the points with the crossing known as lead rails have been given in plates TSC4. On timber sleepers the standard lengths of the rails shown in the plates may be substituted where necessary, by altering suitably the spacings of the sleepers. On steel sleeper layouts, such substitution will require repositioning of the sleeper holes provided for the fastenings. However, the substitution of standard rails for turnouts on timber sleepers or repositioning of the sleeper holes on steel sleeper layouts are not applicable for welded turnouts.

Offsets for laying turnouts : The lead curves can be set out by the perpendicular offsets from the gauge face of the straight lead rail to the gauge face of the curved lead rail given in plates, TSC 5.

Typical built-up crossings : It was not considered necessary to design separate crossings for use in right hand and left

hand turnouts, as it would entail duplication of stocks without any material gain, for though the main line may take the fast traffic, the number of trains passing on the loop may be more. Drawings standardised for various types of crossing layout for being used in ordinary turnouts are listed in TSC 1.

A list of drawings for acute and obtuse crossings for diamonds, switch diamonds, scissors cross-overs, etc. and special purpose layouts will be found in subsequent chapters.

The IRS crossings are built of four pieces of rails, properly bent, shaped, planed and joined together by distance blocks and bolts. Plates TSC6 to TSC20 illustrate the names of parts of a crossing and give, for important rail sections in use, tables of leading dimensions of BG, MG and NG crossing assemblies for the 1 in 8½, 1 in 12, 1 in 16 and 1 in 20 crossings. The salient features of the design of IRS crossings are as follows :—

- (a) As it is not practicable to work out the point rails to a knife edge—as apart from the manufacturing difficulty, it would soon break away under traffic—it is the standard practice to make a working point when the spread between the gauge lines is equal to the thickness of the web.
- (b) If the path of a wheel tyre is traced across the flange way gap of an ordinary crossing, it will be seen the contact area in the wing rails progressively narrows and the increasing concentration of load has a tendency to cause heavy wear on the wing rails opposite the nose. The latter also receives heavy impacts from the wheels and is quickly battered down. There is also a tendency for the passing wheel to 'drop in' leaving the wings and riding on to the nose due to the 1 in 20 coning of the tyre. In order to reduce impact and battering of the nose by the passing wheels, the Vee rails of crossing are planed down by 6 mm at the actual nose and this planing is run out in a distance of 90 mm.

Typical cast manganese steel crossings : In order to afford better wear resisting properties and to reduce the cost of maintenance and frequent renewals, cast manganese steel crossings are being increasingly used on heavy traffic density sections. Their drawings have been included in Chapter IX of IRS Track Manual Vol. II.

Typical short and long straight switches : Plates TSC21 to TSC 30 illustrate the names and parts of straight switches and give, for important rail sections in use, tables of leading dimensions of BG, MG and NG straight switches. Plates TSC21 to TSC25 give details and dimensions of typical straight short switches, and plates TSC 26 to TSC 30 give details and dimensions for typical long switches for the three gauges.

The following important considerations govern the length of tongue rails and stock rails :—

- (i) The switch forms what in reality is the equivalent of a bend in the track and it is desirable to make the angle, as small as other practical considerations, such as the initial cost and length of lead will allow;
- (ii) It is desirable that a tongue rail should be longer than the greatest distance between adjacent wheels of four-wheeled stock, whether these wheels are on the same or adjacent vehicles. If this is not the case, the switch tends to rise and therefore gape at the toe every time a wheel load bears on the heel of a loose-heel type of switches;
- (iii) A stock rail should be of sufficient length to remove the joints from the vicinity of the toe and heel of the tongue rail.

Taking all the foregoing points into consideration the following lengths of straight switches have been adopted for the BG, MG and NG :—

6400 mm and 4725 mm for the broad gauge;

5485 mm and 4115 mm for the metre gauge and the narrow gauge.

Switches are of two types :

- (a) *The ordinary switches* in which the foot of the stock rail is planed in order to accommodate the tongue rail.
- (b) *Over-riding switches* in which the foot of the tongue rail only is planed so that it over-rides the foot of the stock rail, which is maintained of full section.

Now only over-riding type of switches have been standardised on the Indian Railways. The advantages claimed in the adoption of the over-riding type of switches are as under :—

- (a) The stock rail being uncut is very much stronger.
- (b) As all the work of manufacture will be confined to the tongue rail, the cost of planing the tongue rail is lesser than the cost of planing both tongue and stock rails.
- (c) Although the tongue rail in the over-riding switch may appear to be weaker than that in the ordinary switch, it is supported by the stock rail for the whole of the weakened portion of its length and the combined strength of the two rails between sleepers is greater than that of the tongue alone in the undercut switch.

Another important feature of the over-riding switch is that the head of the tongue rail for part of its length is higher than that of the stock rail by 6 mm, as this reduces the amount of undercut in the foot of the tongue rail. Care should be taken in adjusting the resulting difference in level by putting in the special machined bearing plates behind the heel.

The 'loose heel' in which the tongue rails are joined to the lead rails at the heel with fishplates is used for short switches. This form of heel joint is weak, to overcome which

the 'fixed heel' joint is used in long switches in which the tongue is held to its stock rail at the heel by a distance block and bolts. The clearance between the stock and the tongue rail should nowhere be less than 44 mm for BG and 41 mm for MG. To avoid any trouble with stretcher bar connections, the holes for fixing the stretcher bars should be drilled at site with one switch open to give the required throw at the toe and the other housed properly against the stock rail.

Typical curved and partly curved switches : In order to permit higher speeds on turnouts, curved switches or partly curved switches are being increasingly used which permit a more gradual entry of the train into the turnout track and an increase in the radius of the curve. A curved tongue rail in a switch assembly for 1 in 12, 1 in 16 and 1 in 20 turnouts is strengthened with two reinforcing straps on either side of the web from the toe to the point where the side machining of the head starts, thereby ensuring adequate lateral stiffness. It is usual to provide one or more additional following stretcher bars depending upon the length of the tongue rail. For smooth working of the point, it may also be desirable to provide operation at two places i.e. at the leading and the third or fourth following stretcher bars. Drawings of curved switches with switch length varying from 6400 mm to 11150 mm for BG and 5500 mm to 7420 mm for MG have been prepared and included in this chapter in plates TSC 31 to TSC 43. A few drawings of partly curved switches, 6700 mm to 7130 mm long for MG, have also been included in plates TSC 42 and TSC 43.

Use of rail screw/plate screw in lieu of dog spike/round spike in turnouts : In this chapter, drawings of sub-assemblies for switches and crossings as well as the drawings for parts viz. slide chairs, tie plates and MS flat bearing plates show the use of dog spikes/round spikes. This is because a large number of the standard drawings are yet to be revised to incorporate the use of rail screw/plate screw in lieu of dog spike/round spike. It should, however, be noted that rail screw/plate screw is considered a better sleeper fastening than dog spike/round spike and therefore their use should be preferred.

Bolts for points and crossings : All the bolts for points and crossings are usually of the same diameter as fishbolts for the same section of rail and are also provided with fishbolt nuts to obviate the use of any separate spanners. It is not practicable to include the details of all types of bolts in this Manual. However, the salient details and drawing numbers of 25 mm and 22 mm dia bolts for points and crossings, including the turned bolts and the special bolts with split pins for switches, are given in plates TSC 44 and TSC 45.

Spherical washers : To obviate the necessity of holding stocks of a number of varying MS sections to suit the different positions in which tapered washers have to be used, spherical washers have been designed consisting of two pieces in spherical contact which will adjust themselves to allow for any deviation of the bolt in either horizontal or vertical direction and has the effect of centralising the load on the bolt for any angle. Plates TSC 46 give the important dimensions of the following three types of spherical washers :—

T 023 (M)—suitable for turnouts of 52kg, 90R and 75R rails;

T 10322—suitable for turnouts of 60R rails; and

T 006 (M)—suitable for use with 50R rails.

Switch anchors : Plates TSC 46 give the drawing numbers and dimensions of switch anchors. Switch anchors are optional fittings to be used behind the heel of the switch when excessive relative longitudinal movement between the tongue rail and the stock rail occurs.

Check rails for turnouts : Plates TSC 47 contain information pertaining to the dimensions of typical check rails used with crossings for the various sections of rails. Check rails are so designed as to give the minimum clearance when used with a 'flare' at the ends, but should any appreciable side wear take place, the check rail can be moved-in towards the running rail by removing one or both of the 3 mm packings.

provided with the distance blocks between the check rail and the running rail.

Tie plates : Tie plates are provided at the toe of switches and nose of crossings to ensure exact gauge. To reduce their number, three different sizes of plates are commonly used :—

250mm x 12mm for BG switches and crossings;

220mm x 10mm for MG and NG switches and MG crossings;

180mm x 12mm for NG crossings.

Plates TSC 48 & TSC 50 give the dimensions and the numbers of the standard drawings for the crossing and switch tie plates. The switch tie plates are provided with 'stops' or butt straps to ensure that the slide chairs are properly located on the tie plates.

Plates TSC 49 & TSC 51 give the dimensions and the numbers of the drawings for the insulated tie plates for use in acute crossings and switches of track circuited sections. Fibre plates and bushes are used to provide the insulation.

Square hole/rectangular hole for dog spike and round hole/oblong hole for rail screws may be provided in tie plates.

Stretcher bars : Plates TSC 54 to TSC 56 give the leading dimensions and the drawing numbers of leading and following stretcher bars for straight as well as curved switches. Plates TSC 52 and TSC 53 give the corresponding details of insulated stretcher bars.

MS brackets for stretcher bars : Plates TSC 57 show the leading dimensions and the drawing numbers of stretcher bar brackets designed for BG, MG & NG. The MS Bracket T 10380 shown in plates TSC 57 has been designed for MG & NG and permits of greater flexing length.

Typical slide chairs : Plates TSC 58 give dimensions of typical slide chairs for over-riding switches for the three gauges. These slide chairs have pressed up 'lands' on which the switch rail slides when the switches are operated.

Typical MS flat bearing plates : (a) Drawings have been prepared for the MS flat bearing plates used for various rail sections on turnouts. The number of such plates being very large, it is not practicable to give the leading dimensions for all. Plate TSC 59 shows for guidance the following three types of bearing plates used in turnouts :—

- (1) Eight-holed and six-holed plates can only be used for the section of rail they have been designed for, as the dimensions of the rail foot is one of the controlling dimensions;
- (2) Four-holed plates can, with a little manipulation, be found to fit other than the standard points and crossings, provided the crossing angle is the same.

(b) Square hole/rectangular hole for dog spike and round hole/oblong hole for rail screw may be provided in bearing plates.

Sections of turnout sleepers : The following sections of timber sleepers are used for turnouts :—

Gauge	Sections (mm)
BG	250 x 150, 280 x 150 and 300 x 150;
MG	200 x 130, 250 x 130;
NG	180 x 130, 200 x 130.

In addition to turnouts, these sections of sleepers are also used for diamond crossings, scissors cross-overs and other special purpose layouts.

Details of steel sleepers for BG and MG turnouts are given in the relevant notes in Chapter IV and plates SS2.

ASSEMBLIES AND SUB ASSEMBLIES IN TURNOUTS SWITCHES AND CROSSINGS

GAUGE CROSSING	RAIL SECTION	DESCRIPTION	LAYOUTS / TSC 3 SHEET 2 OF 2		SWITCH		CROSSING		PAGE NO	PAGE NO
			WOODEN	STEEL	WOODEN	STEEL	WOODEN	STEEL		
	UC60kg	7135 mm SWITCH CURVED , FIXED HEEL.	RDSQF-300		RDSQF-300		TSC 31	RDSQF-300		TSC 6
	52kg	4725 mm SWITCH STRAIGHT, LOOSE HEEL.(SHORT SWITCH)	TA 2004	TA 20804	TA 20106	TA 20805	TSC 21	TA 20105		TSC 6
		6400 mm SWITCH CURVED , FIXED HEEL.	TA 20196	TA 20836	TA 20197	TA 20836	TSC 31	TA 20105		TSC 6
		4725 mm SWITCH STRAIGHT, LOOSE HEEL.(SHORT SWITCH)	TA 20110	TA 20810	TA 20112	TA 20811	TSC 21	TA 20111		TSC 6
		4725 mm SWITCH STRAIGHT, LOOSE HEEL.(SHORT SWITCH) WITH WOODEN SLEEPERS	TA 20210		TA 20112			TA 20111		TSC 7
	90R.	4725 mm SWITCH STRAIGHT, LOOSE HEEL (SHORT SWITCH) WITH WOODEN SLEEPERS	TA 20211		TA 20112		TSC 21	TA 20111		TSC 6
		4725 mm SWITCH STRAIGHT, LOOSE HEEL (SHORT SWITCH) WITH WOODEN SLEEPERS	TA 20212		TA 20112			TA 20111		
		4725 mm SWITCH STRAIGHT, LOOSE HEEL (SHORT SWITCH) WITH WOODEN SLEEPERS	TA 20213		TA 20112			TA 20111		
		6400 mm SWITCH CURVED , FIXED HEEL.	TA 20148		TA 20149		TSC 31	TA 20111		TSC 7
B.G.	UC60kg	10125 mm SWITCH CURVED , FIXED HEEL .	RDSQF-258	TA 20822	RDSQF-258	TA 20823	TSC 32	TA 20812		TSC 11
		6400 mm SWITCH STRAIGHT, FIXED HEEL.(LONG SWITCH)	TA 5268M	TA 20801	TA 5270(M)	TA 20802	TSC 26	TA 5268(M)		TSC 11
	52kg	7730 mm SWITCH CURVED , FIXED HEEL.	TA 20171	TA 20831	TA 20172	TA 20832	TSC 27	TA 5268(M)		TSC 12
		6400 mm SWITCH STRAIGHT, FIXED HEEL.(LONG SWITCH)	TA 5044(M)	TA 20807	TA 5272(M)	TA 20808	TSC 36	TA 5268(M)		TSC 12
	90R.	7730 mm SWITCH CURVED , FIXED HEEL.	TA 20125	TA 20839	TA 20126	TA 20840	TSC 26	TA 5271(M)		TSC 11
	52kg	9750 mm SWITCH CURVED , FIXED HEEL.	TA 20141	TA 20828	TA 20143	TA 20829	TSC 37	TA 20142		TSC 16
	90R.	9750 mm SWITCH CURVED , FIXED HEEL.	TA 20138		TA 20139		TSC 38	TA 20830		TSC 17
	90R.	11150 mm SWITCH CURVED , FIXED HEEL.	TA 20122	TA 20813	TA 20123	TA 20814	TSC 37	TA 20140		TSC 16
							TSC 38	TA 20815		TSC 17
							TSC 41	TA 20124		TSC 20

ASSEMBLIES AND SUB-ASSEMBLIES IN TURNOUTS, SWITCHES AND CROSSINGS

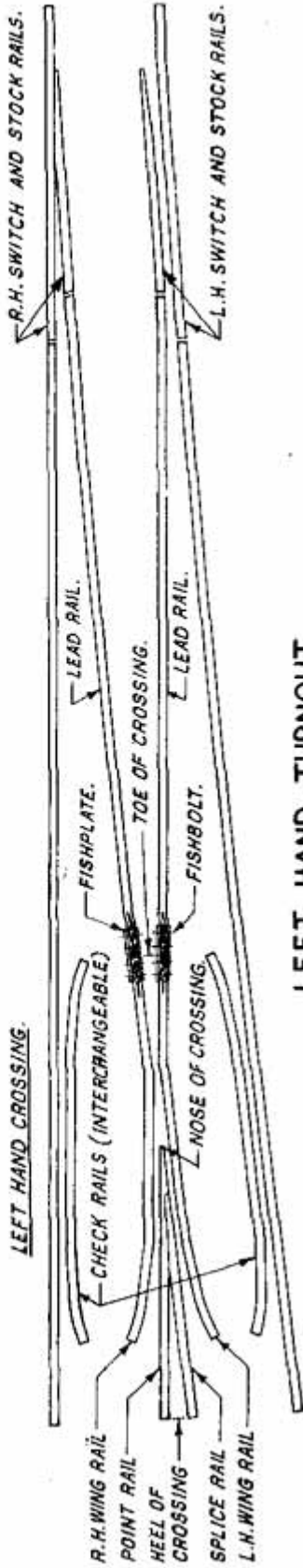
GAUGE CROSSING	RAIL SECTION	DESCRIPTION	TSC-3 LAYOUTS/ SHEET # OF 2		SWITCHES		CROSSINGS		PAGE NO	PAGE NO
			WOODEN	STEEL	WOODEN	STEEL	WOODEN	STEEL		
M.G.	90R.	5500 mm SWITCH CURVED, FIXED HEEL.	TA 20497	—	TA 20498	—	TSC 33	TA 20499	—	TSC 8
			—	TA 21025	—	TA 21026	TSC 34	—	TA 21027	TSC 9
	75R.	4115 mm SWITCH STRAIGHT, LOOSE HEEL. (SHORT SWITCH)	TA 20404	—	TA 20405	—	TSC 23	TA 20406	—	TSC 8
			—	TA 21004	—	TA 21005	TSC 24	—	TA 21006	TSC 9
	60R.	5500 mm SWITCH CURVED, FIXED HEEL.	TA 20451	—	TA 20452	—	TSC 33	TA 20406	—	TSC 8
			—	TA 21019	—	TA 21020	TSC 34	—	TA 21006	TSC 9
		4115 mm SWITCH STRAIGHT, LOOSE HEEL. (SHORT SWITCH)	TA 20407	—	TA 20408	—	TSC 23	TA 20409	—	TSC 8
			—	TA 21007	—	TA 21008	TSC 24	—	TA 21009	TSC 9
		4115 mm SWITCH STRAIGHT, LOOSE HEEL. (SHORT SWITCH) INTERLACED WITH WOODEN SLEEPERS	TA 20460	—	TA 20462	—	TSC 23	TA 20461	—	TSC 8
			TA 20463	—	TA 20462	—	TSC 23	TA 20461	—	TSC 8
	5500 mm SWITCH CURVED, FIXED HEEL. WITH CST-9 SLEEPERS.	TA 20416	—	TA 20417	—	TSC 33	TA 20409	—	TSC 8	
	90R.	7130 mm SWITCH PARTLY CURVED, FIXED HEEL.	TA 20494	—	TA 20495	—	TSC 42	TA 20496	—	TSC 13
75R.	5485 mm SWITCH STRAIGHT, FIXED HEEL. (LONG SWITCH)	TA 20401	—	TA 20402	—	TSC 28	TA 20403	—	TSC 13	
		—	TA 21022	—	TA 21023	TSC 43	—	TA 21024	TSC 14	
	6700 mm SWITCH PARTLY CURVED, FIXED HEEL.	TA 20464	—	TA 20465	—	TSC 29	TA 20403	—	TSC 13	
		—	TA 21016	—	TA 21017	TSC 43	—	TA 21003	TSC 14	
	60R.	5485 mm SWITCH STRAIGHT, FIXED HEEL. (LONG SWITCH)	TA 20410	—	TA 20411	—	TSC 28	TA 20412	—	TSC 13
			—	TA 21010	—	TA 21011	TSC 29	—	TA 21012	TSC 14
90R.	6700 mm SWITCH PARTLY CURVED, FIXED HEEL.	TA 20466	—	TA 20467	—	TSC 42	TA 20412	—	TSC 13	
		TA 20504	—	TA 20505	—	TSC 39	TA 20506	—	TSC 18	
60R.	7976 mm SWITCH CURVED, FIXED HEEL.	—	—	—	—	—	—	—	—	
		TA 20413	—	TA 20414	—	TSC 39	TA 20415	—	TSC 18	
N.G.	1 IN 12	4115 mm SWITCH STRAIGHT, LOOSE HEEL. (SHORT SWITCH)	—	TA 21013	—	TA 21014	TSC 40	—	TA 21015	TSC 18
			TA 20604	—	TA 20606	—	TSC 25	TA 20605	—	TSC 10
60R.	5485 mm SWITCH STRAIGHT, FIXED HEEL. (LONG SWITCH)	TA 20601	—	TA 20603	—	TSC 30	TA 20602	—	TSC 15	

CROSSING SUB-ASSEMBLIES AND MAIN PARTS

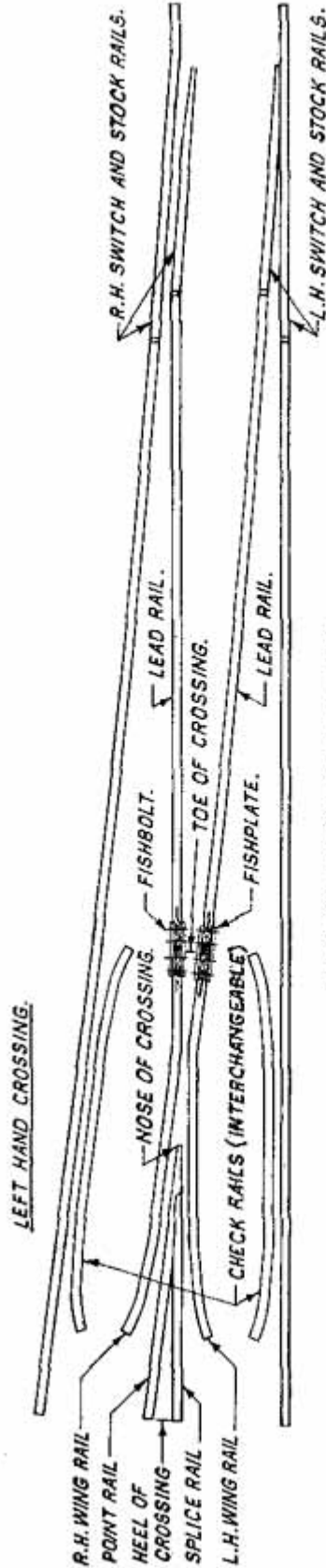
GAUGE	CROSSING	RAIL SECTION	CROSSING SUB-ASSEMBLIES										CHECK RAIL TSC-47 (SHEET 106370) SHEETS 106373
			SUB-ASSEMBLY NUMBER	WOODEN				TIE PLATES INSULATED (TSC-48 SHEET 1 & 2 OF 2)				STEEL SUB-ASSEMBLY NUMBER	
				ORDINARY TSC-48 SHEETS 106370 SHEETS 106373	LEFT PIECE	MIDDLE PIECE	RIGHT PIECE	SUB-ASSEMBLY NUMBER					
									LEFT PIECE	MIDDLE PIECE	RIGHT PIECE		
B.G.	1 IN 8 1/2	UIC 60Kg	RDSQ/T-3010	RDSQ/F-3025 RDSQ/F-3026	T 15003	T 15086	T 15067	T 15088	TA 20806	RDSQ/T-3012			
		52Kg	TA 20105	T 15011	T 15073	T 15074	T 15075	TA 20812	T 4777(M)				
		90R	TA 20111	RDSQ/T-2580	RDSQ/T-2597 RDSQ/T-2598	T 3164(M)	T 15083	T 15084	TA 20803	RDSQ/T-2582			
	1 IN 12	UIC 60Kg	TA 5269(M)	T 3166(M)	T 15070	T 15071	T 15072	TA 20809	T 4776(M)				
		52Kg	TA 5271(M)	T 15038	T 15033	T 15017	T 15121	TA 20406	T 4777(M)				
		90R	TA 20142	T 15038	T 15033	T 15017	T 15121	TA 20409 TA 20461	T 19010				
M.G.	1 IN 16	UIC 60Kg	TA 20124	T 15017	T 15017	T 15017	TA 20499	TA 21027	T 19006				
		52Kg	TA 20140	T 15033	T 15017	T 15017	T 15017	TA 21006	T 19042				
		90R	TA 20124	T 15017	T 15017	T 15017	T 15017	TA 21009	T 19003				
	1 IN 20	75R	TA 20406	T 15008	T 15008	T 15008	T 15008	TA 21024	T 19004				
		60R	TA 20409 TA 20461	T 15009	T 15009	T 15009	T 15009	TA 21003	T 19042				
		90R	TA 20496	T 15115	T 15115	T 15115	T 15115	TA 21012	T 19003				
N.G.	1 IN 12	75R	TA 20403	T 15004	T 15004	T 15004	T 15004	TA 21015	T 19009				
		60R	TA 20412	T 15018	T 15018	T 15018	T 15018	TA 21015	T 19008				
		90R	TA 20506	T 15208	T 15208	T 15208	T 15208	TA 21015	T 19008				
	1 IN 16	75R	TA 20506	T 15208	T 15208	T 15208	T 15208	TA 21015	T 19008				
		60R	TA 20415	T 15037	T 15037	T 15037	T 15037	TA 21015	T 19008				
		90R	TA 20605	T 15036	T 15036	T 15036	T 15036	TA 21015	T 19008				
1 IN 12	60R	TA 20602	T 15034	T 15034	T 15034	T 15034	TA 21015	T 19008					
	60R	TA 20602	T 15034	T 15034	T 15034	T 15034	TA 21015	T 19008					

NOTE:- FOR SUB-ASSEMBLIES PAGE NUMBER REFER TSC-1 SHEETS 3 OF 6 & 4 OF 6.

DEFINITIONS OF TURNOUTS CROSSINGS AND SWITCHES



LEFT HAND TURNOUT



RIGHT HAND TURNOUT

NOTE:-

FOR DEFINITIONS REFER PLATE TSC I SHEET 2 OF 6.

DEFINITIONS:-

STANDING AT THE TOE OF THE SWITCH AND FACING THE CROSSING :-

A LEFT HAND TURNOUT DIVERTS A TRAIN TO THE LEFT OF THE STRAIGHT MAIN LINE OR OF THE MORE IMPORTANT LINE IN THE CASE OF A TURNOUT FROM A CURVE.

A RIGHT HAND TURNOUT DIVERTS A TRAIN TO THE RIGHT OF THE STRAIGHT MAIN LINE OR OF THE MORE IMPORTANT LINE IN THE CASE OF A TURNOUT FROM A CURVE.

THE LEFT HAND SWITCH & STOCK RAILS ARE ON THE OBSERVER'S LEFT.

THE RIGHT HAND SWITCH & STOCK RAILS ARE ON THE OBSERVER'S RIGHT.

IN BOTH R.H. & L.H. TURNOUTS THE BUILT-UP CROSSING USED IS LEFT HANDED i.e. HAS THE SPLICE RAIL ON THE LEFT.

THE L.H. WING RAIL IS ON THE LEFT OF THE OBSERVER.

THE R.H. WING RAIL IS ON THE RIGHT OF THE OBSERVER.

MAIN DIMENSIONS OF TURNOUTS

(B.G., M.G. & N.G.)

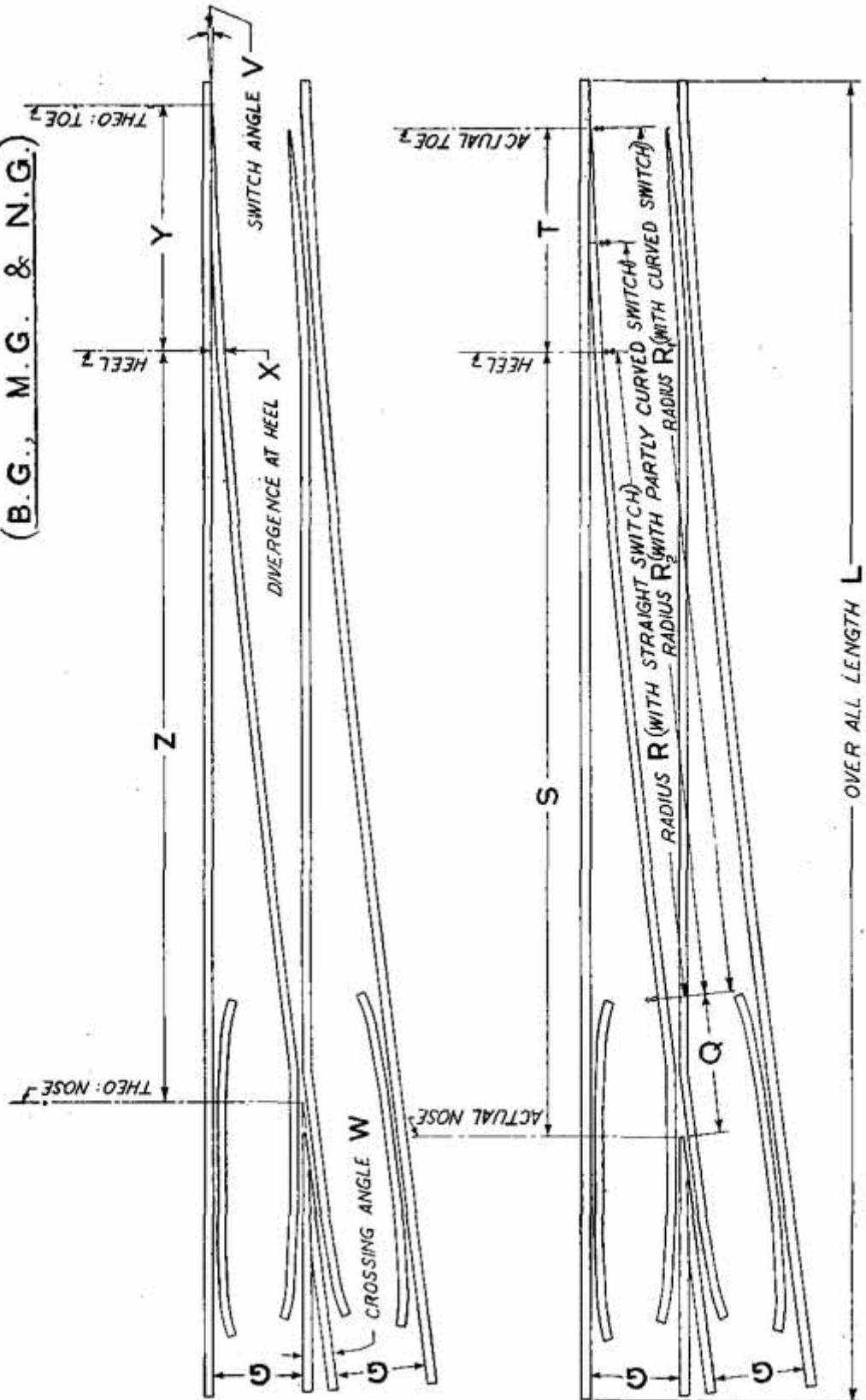


TABLE OF MAIN DIMENSIONS

GAUGE	CROSSING NUMBER	RAIL SECTION	DRAWING NUMBER	D I M E N S I O N S (in mm)													TYPE OF OVER-RIDING SWITCH	
				Z	Y	V	W	S	T	R	R ₁	R ₂	X	Q	L			
B.G.	/IN6	52Kg	RD507-3009	18424	7135	0°-35'-0"	6°-42'-38"	18565	7135	-	231440	-	182-5	1021	29516	CURVED, FIXED HEEL		
			TA 20104, TA 20604	20730	4950	1°-34'-27"	6°-42'-35"	20862	4725	222360	-	136	996	29516	29516	STRAIGHT, LOOSE HEEL		
			TA 20186, TA 20835	18395	6835	0°-47'-27"	6°-42'-35"	18527	6400	-	232320	-	182-5	996	29516	29516	CURVED, FIXED HEEL	
			TA 20005, TA 20810 TA 20210 TO TA 20213	20730	4950	1°-34'-27"	6°-42'-35"	20848	4725	222360	-	136	982	29502	29502	29502	STRAIGHT, LOOSE HEEL	
	/IN12	90R	52Kg	TA 20146, TA 20662	18395	6835	0°-47'-27"	6°-42'-35"	18513	6400	-	232320	-	182-5	982	29502	CURVED, FIXED HEEL	
				RD507-2579	25831	10125	0°-20'-0"	4°-45'-43"	26029	10125	-	441360	-	175	2075	41004	CURVED, FIXED HEEL	
				TA 2266W4, TA 20801	29200	6724	1°-6'-0"	4°-45'-49"	29386	6400	442120	-	133	1418	41004	41004	STRAIGHT, FIXED HEEL	
				TA 20171, TA 20831	27670	8478	0°-27'-35"	4°-45'-49"	28058	7730	-	458120	-	133	1418	41004	41004	CURVED, FIXED HEEL
				TA 20441W, TA 20807	29200	6724	1°-6'-0"	4°-45'-49"	29367	6400	442120	-	133	1399	40985	40985	STRAIGHT, FIXED HEEL	
				TA 20125, TA 20839	27670	8478	0°-27'-35"	4°-45'-49"	28037	7730	-	458120	-	133	1399	40985	40985	CURVED, FIXED HEEL
M.G.	/IN15	60R	TA 20141, TA 20826	37170	10594	0°-24'-27"	3°-34'-35"	37418	9750	-	824225	-	133	1625	52422	CURVED, FIXED HEEL		
			TA 20407, TA 21007 TA 20460, TA 20463	11560	4320	0°-24'-27"	3°-34'-35"	37392	9750	-	824225	-	133	1599	52396	52396	CURVED, FIXED HEEL	
			TA 20416	9515	6206	0°-24'-27"	2°-51'-45"	46488	11150	-	1303610	-	133	1803	64174	64174	CURVED, FIXED HEEL	
			TA 20497, TA 21025	9515	6206	0°-29'-14"	6°-42'-35"	9633	5500	-	130210	-	169	1033	19676	19676	CURVED, FIXED HEEL	
	/IN18	75R	60R	TA 20404, TA 21004	11560	4320	1°-35'-30"	6°-42'-35"	11672	4115	119610	-	120	1027	19676	19676	STRAIGHT, LOOSE HEEL	
				TA 20451, TA 21019	9515	6206	0°-29'-14"	6°-42'-35"	9627	5500	-	130210	-	169	1027	19676	19676	CURVED, FIXED HEEL
				TA 20407, TA 21007 TA 20460, TA 20463	11560	4320	1°-35'-30"	6°-42'-35"	11655	4115	119610	-	120	1010	19659	19659	STRAIGHT, LOOSE HEEL	
				TA 20416	9515	6206	0°-29'-14"	6°-42'-35"	9610	5500	-	130210	-	169	1010	19659	19659	CURVED, FIXED HEEL
				TA 20494, TA 21022	14678	7974	0°-24'-27"	4°-45'-49"	14645	7130	-	258300	130	1387	26504	26504	PARTLY CURVED, FIXED HEEL	
				TA 20401, TA 21001	16323	5777	1°-9'-36"	4°-45'-49"	16480	5485	240600	-	117	1377	26495	26495	STRAIGHT, FIXED HEEL	
N.G.	/IN12	60R	TA 20454, TA 21016	15108	7544	0°-24'-27"	4°-45'-49"	15265	6700	-	240600	-	258300	117	1377	26494	PARTLY CURVED, FIXED HEEL	
			TA 20410, TA 21010	16323	5777	1°-9'-36"	4°-45'-49"	16457	5495	240600	-	117	1354	26472	26472	STRAIGHT, FIXED HEEL		
			TA 20466	15108	7544	0°-24'-27"	4°-45'-49"	15242	6700	-	240600	-	117	1354	26471	26471	PARTLY CURVED, FIXED HEEL	
			TA 20504	19305	8815	0°-24'-27"	3°-34'-35"	19727	7975	-	472400	-	130	1600	31975	31975	CURVED, FIXED HEEL	
	/IN16	75R	60R	TA 20413, TA 21013	20060	8264	0°-24'-27"	3°-34'-35"	20238	7420	-	472400	-	117	1556	31975	31975	CURVED, FIXED HEEL
				TA 20604	8280	4320	1°-35'-30"	6°-42'-35"	8375	4115	82800	-	120	1010	16365	16365	STRAIGHT, LOOSE HEEL	
				TA 20601	11723	5777	1°-9'-36"	4°-45'-49"	11857	5485	167340	-	117	1354	21861	21861	STRAIGHT, FIXED HEEL	

**MAIN DIMENSIONS FOR SETTING OUT
TURNOUTS
(B.G. M.G. & N.G.)**

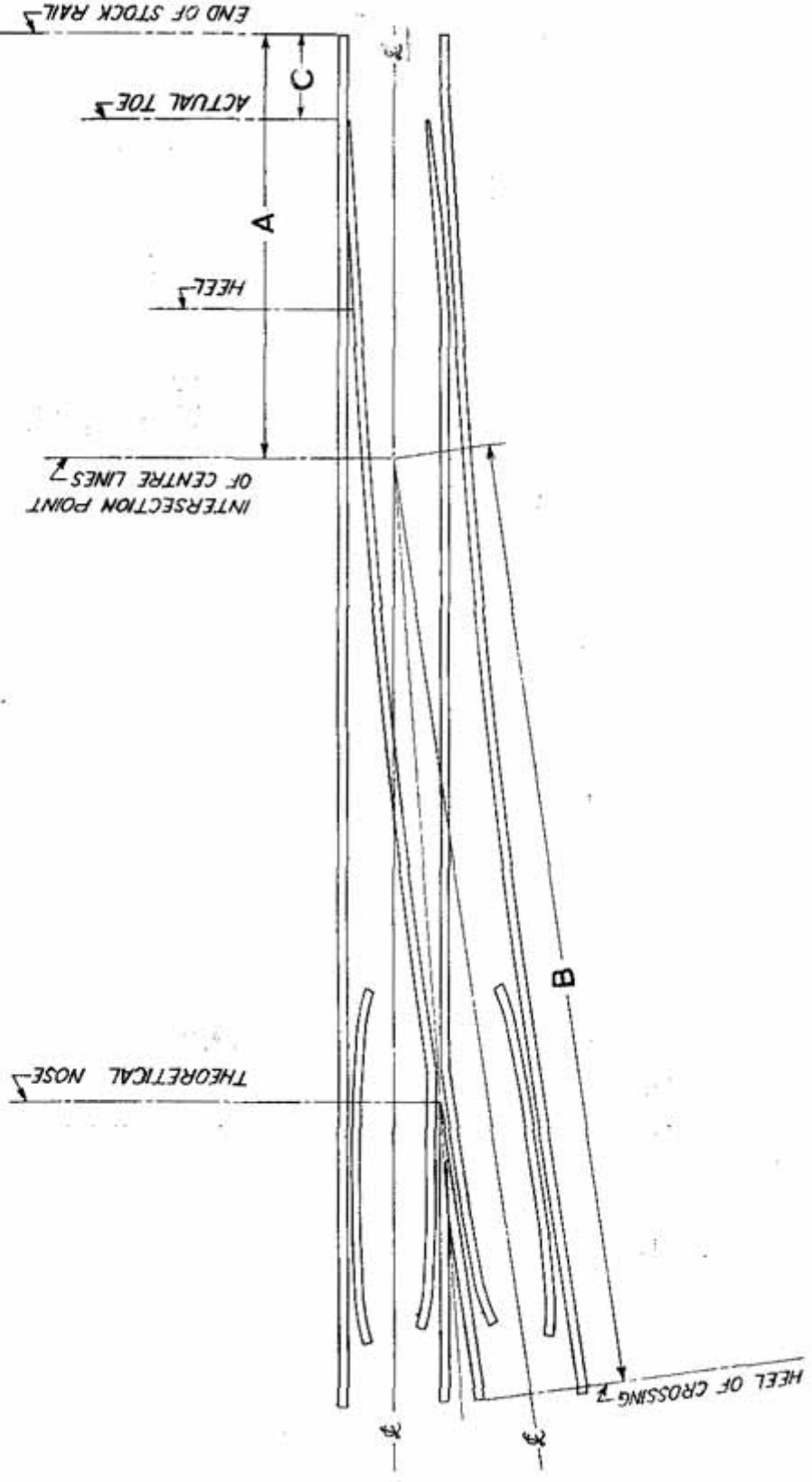
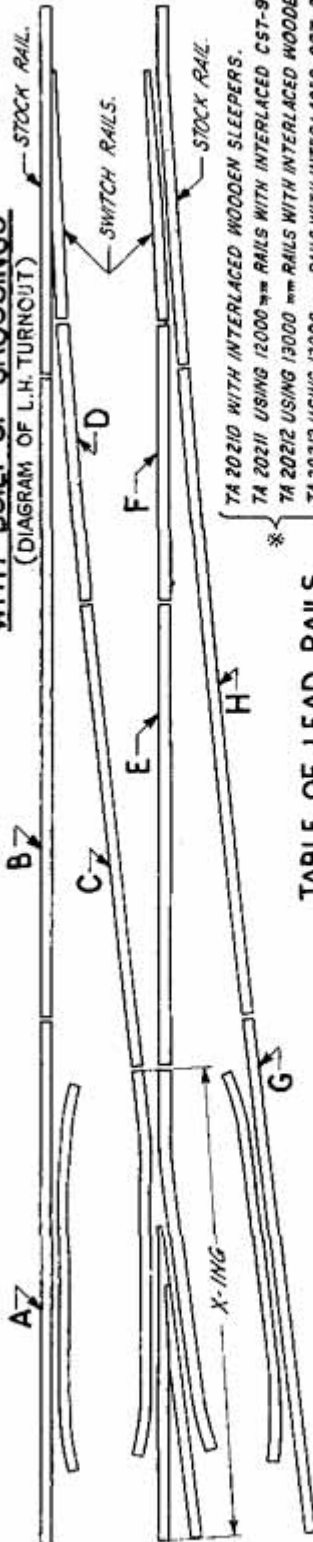


TABLE OF MAIN DIMENSIONS

GAUGE	CROSSING NUMBER	RAIL SECTION	ASSEMBLY DRAWING NUMBERS	DIMENSIONS (mm)			TYPE OF OVER - RIDING SWITCH
				A	B	C	
B.G.	1 IN 8 1/2	UIC 60kg	RD50/T-3009	12000	17417	797	CURVED, FIXED HEEL
		52 kg	TA 20104 & TA 20804	12000	17418	840	STRAIGHT, LOOSE HEEL
		52 kg	TA 20196 & TA 20895	12000	17418	1500	CURVED, FIXED HEEL
		90 R.	TA 20110, TA 20210, TA 20211, TA 20212, TA 20213 & TA 20810	12000	17404	840	STRAIGHT, LOOSE HEEL
		90 R.	TA 20148 & TA 20822	12000	17404	1500	CURVED, FIXED HEEL
B.G.	1 IN 12	UIC 60kg	RD50/T-2579	16989	23945	1144	CURVED, FIXED HEEL
		52 kg	TA 5268 (M) & TA 20801	16953	23981	1500	STRAIGHT, FIXED HEEL
		52 kg	TA 20171 & TA 20831	16953	23981	1500	CURVED, FIXED HEEL
		90 R.	TA 5044 (M) & TA 20807	16953	23962	1500	STRAIGHT, FIXED HEEL
		90 R.	TA 20125 & TA 20839	16953	23962	1500	CURVED, FIXED HEEL
B.G.	1 IN 16	52 kg	TA 20141 & TA 20828	20922	31447	844	CURVED, FIXED HEEL
		90 R.	TA 20136 & TA 20813	20922	31421	844	CURVED, FIXED HEEL
M.G.	1 IN 20	90 R.	TA 20122	24664	39470	844	CURVED, FIXED HEEL
		90 R.	TA 20497 & TA 21025	7986	11638	1500	CURVED, FIXED HEEL
		75 R.	TA 20404 & TA 21004	7986	11632	840	STRAIGHT, LOOSE HEEL
		75 R.	TA 20451 & TA 21019	7986	11632	1500	CURVED, FIXED HEEL
		60 R.	TA 20407, TA 20460, TA 20463 & TA 21007	7986	11615	840	STRAIGHT, LOOSE HEEL
M.G.	1 IN 12	60 R.	TA 20416	7986	11615	1500	CURVED, FIXED HEEL
		90 R.	TA 20494 & TA 21022	11287	15176	1500	PARTLY CURVED, FIXED HEEL
		75 R.	TA 20401 & TA 21001	11287	15166	1500	STRAIGHT, FIXED HEEL
		75 R.	TA 20464 & TA 21016	11287	15166	1500	PARTLY CURVED, FIXED HEEL
		60 R.	TA 20410 & TA 21010	11287	15143	1500	STRAIGHT, FIXED HEEL
M.G.	1 IN 16	60 R.	TA 20466	11287	15143	1500	PARTLY CURVED, FIXED HEEL
		90 R.	TA 20584	12309	19635	844	CURVED, FIXED HEEL
N.G.	1 IN 8 1/2	60 R.	TA 20413 & TA 21013	12309	19635	844	CURVED, FIXED HEEL
		60 R.	TA 20604	6736	9585	840	STRAIGHT, LOOSE HEEL
		60 R.	TA 20501	9548	12282	1500	STRAIGHT, FIXED HEEL

RAIL LENGTHS OF TURNOUTS WITH BUILT-UP CROSSINGS (DIAGRAM OF L.H. TURNOUT)



* TA 20210 WITH INTERLACED WOODEN SLEEPERS.
 TA 20211 USING 12000 mm RAILS WITH INTERLACED CST-9 SLEEPERS.
 TA 20212 USING 13000 mm RAILS WITH INTERLACED WOODEN SLEEPERS.
 TA 20213 USING 13000 mm RAILS WITH INTERLACED CST-9 SLEEPERS.

TABLE OF LEAD RAILS

RAIL SECTION	GAUGE	CROSSING NUMBER	DRAWING NUMBER	TYPE OF SLEEPER	TYPE OF SWITCH	OVERALL RAIL LENGTHS		LENGTHS (mm)								
						X-ING	SWITCH	A	B	C	D	E	F	G	H	
52 kg.	B.G.	1 IN 8 1/2	TA 20104	WOODEN	STRAIGHT, LOOSE HEEL	4800	9000	4722	9504	11000	8037	11000	8032	9372	11000	
52 kg.	B.G.	1 IN 8 1/2	TA 20196	WOODEN	CURVED, FIXED HEEL	4800	11000	7620	7604	11000	6014	7529	8014	7460	7376	11000
52 kg.	B.G.	1 IN 8 1/2	TA 20804	STEEL	STRAIGHT, LOOSE HEEL	4800	9000	4722	9504	11000	8037	11000	8032	9372	11000	
52 kg.	B.G.	1 IN 8 1/2	TA 20835	STEEL	CURVED, FIXED HEEL	4800	11000	7620	9474	9030	4590	10953	4564	10910	9300	9076
90 R.	B.G.	1 IN 8 1/2	TA 20110	WOODEN	STRAIGHT, LOOSE HEEL	4800	9000	4722	9490	11000	11000	6063	11000	8018	9358	11000
90 R.	B.G.	1 IN 8 1/2	TA 20211	WOODEN	STRAIGHT, LOOSE HEEL INTERLACED	4800	9000	4722	9490	11000	12000	7063	12000	7018	8358	12000
90 R.	B.G.	1 IN 8 1/2	TA 20213	WOODEN	STRAIGHT, LOOSE HEEL INTERLACED	4800	9000	4722	7490	13000	13000	6063	13000	6018	7358	13000
90 R.	B.G.	1 IN 8 1/2	TA 20148	WOODEN	CURVED, FIXED HEEL	4800	11000	7620	7490	11000	8000	7529	8000	7460	7362	11000
90 R.	B.G.	1 IN 8 1/2	TA 20810	STEEL	STRAIGHT, LOOSE HEEL	4800	9000	4722	9490	11000	11000	8063	11000	8018	9358	11000
90 R.	B.G.	1 IN 8 1/2	TA 20822	STEEL	CURVED, FIXED HEEL	4800	11000	7620	9460	9030	10800	4729	10800	4660	9332	9030
75 R.	M.G.	1 IN 12	TA 20401	WOODEN	STRAIGHT, FIXED HEEL	4800	10000	6500	11000	5463	6200	5458	6194	5437	11000	5427
75 R.	M.G.	1 IN 12	TA 21001	STEEL	STRAIGHT, FIXED HEEL	4800	10000	6500	11000	5463	6200	5458	6194	5437	11000	5427
60 R.	M.G.	1 IN 12	TA 20410	WOODEN	STRAIGHT, FIXED HEEL	4800	10000	6500	11000	5460	6200	5435	6194	5414	11000	5341
60 R.	M.G.	1 IN 12	TA 21010	STEEL	STRAIGHT, FIXED HEEL	4800	10000	6500	11000	5460	6200	5435	6194	5414	11000	5341
90 R.	M.G.	1 IN 16	TA 20504	WOODEN	CURVED, FIXED HEEL	5490	11000	7975	9963	11000	4937	11000	4913	11000	9925	11000
60 R.	M.G.	1 IN 16	TA 20413	WOODEN	CURVED, FIXED HEEL	5490	10000	6676	9963	12000	4937	12000	4913	12000	9870	12000
60 R.	M.G.	1 IN 16	TA 21013	STEEL	CURVED, FIXED HEEL	5490	10000	6676	9963	12000	4937	12000	4913	12000	9870	12000

NOTE:- RAILS FOR R.H. TURNOUTS SAME AS FOR L.H.

RAIL LENGTHS OF TURNOUTS WITH BUILT-UP CROSSINGS (DIAGRAM OF L.H. TURNOUT)

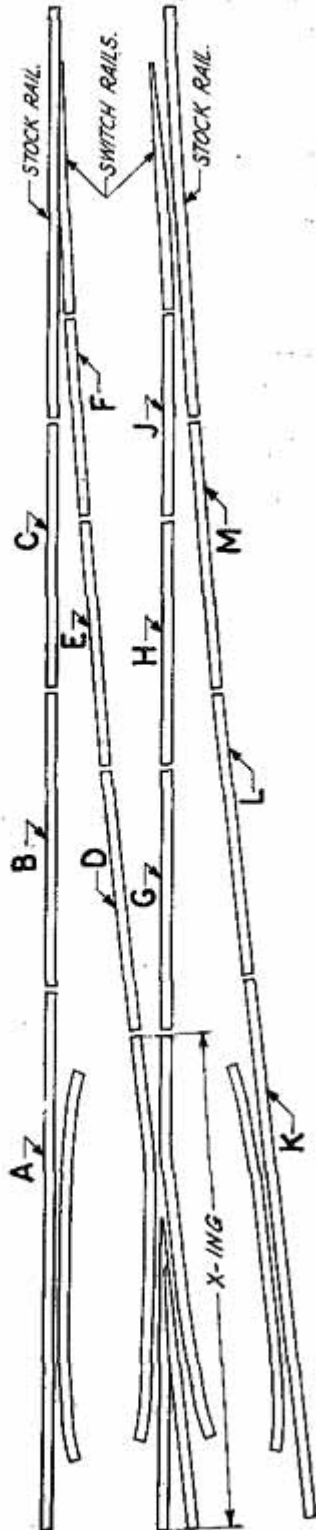


TABLE OF LEAD RAILS

RAIL SECTION	GAUGE	CROSSING NUMBER	DRAWING NUMBER	TYPE OF SLEEPER	TYPE OF SWITCH	OVERALL RAIL LENGTHS	LENGTHS (mm)													
							X-ING	STOCK SWITCH	A	B	C	D	E	F	G	H	J	K	L	M
52 Kg.	B.G.	1 IN 12	TA 5268(00)	WOODEN	STRAIGHT, FIXED HEEL	5970	11000	7620	11000	7986	11000	10000	4962	11000	10000	4817	11000	11000	7892	11000
52 Kg.	B.G.	1 IN 12	TA 20801	STEEL	STRAIGHT, FIXED HEEL	5970	11000	7620	11000	7986	11000	10000	4862	11000	10000	4817	11000	11000	7892	11000
90 R.	B.G.	1 IN 12	TA 5044(00)	WOODEN	STRAIGHT, FIXED HEEL	5970	11000	7620	11000	7967	11000	10000	4843	11000	10000	4798	11000	11000	7873	11000
90 R.	B.G.	1 IN 12	TA 20807	STEEL	STRAIGHT, FIXED HEEL	5970	11000	7620	11000	7967	11000	10000	4843	11000	10000	4798	11000	11000	7873	11000

NOTE:- RAILS FOR R.H. TURNOUTS SAME AS FOR L.H.

RAIL LENGTHS OF TURNOUTS WITH BUILT-UP CROSSINGS (DIAGRAM OF L.H. TURNOUT)

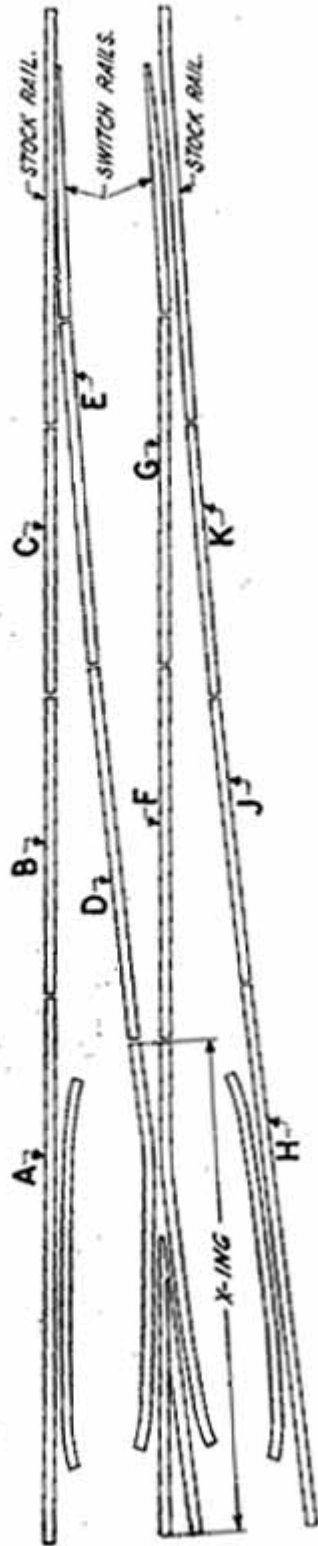


TABLE OF LEAD RAILS

RAIL SECTION	GAUGE	CROSSING NUMBER	DRAWING NUMBER	TYPE OF SLEEPER	TYPE OF SWITCH	OVERALL RAIL LENGTHS		LENGTHS (mm)										
						X-ING	STOCK SWITCH	A	B	C	D	E	F	G	H	J	K	
52 kg	B.G.	1 IN/12	7A 2071	WOODEN	CURVED, FIXED HEEL	5970	11000	9020	13000	4986	12000	12468	12000	12423	12000	13000	4905	12000
52 kg	B.G.	1 IN/12	7A 208U	STEEL	CURVED, FIXED HEEL	5970	11000	9020	11000	7845	11630	12839	11630	12793	11630	11000	7765	11140
50 R.	B.G.	1 IN/12	7A 2072S	WOODEN	CURVED, FIXED HEEL	5970	11000	9020	13000	4967	12000	12446	12000	12402	12000	13000	4874	12000
50 R.	B.G.	1 IN/12	7A 2083N	STEEL	CURVED, FIXED HEEL	5970	11000	9020	13000	4967	12000	12446	12000	12402	12000	13000	4874	12000

NOTE:-RAILS FOR R.H. TURNOUTS SAME AS FOR L.H.

**RAIL LENGTHS OF TURNOUTS
WITH BUILT-UP CROSSINGS**
(DIAGRAM OF L.H. TURNOUT)

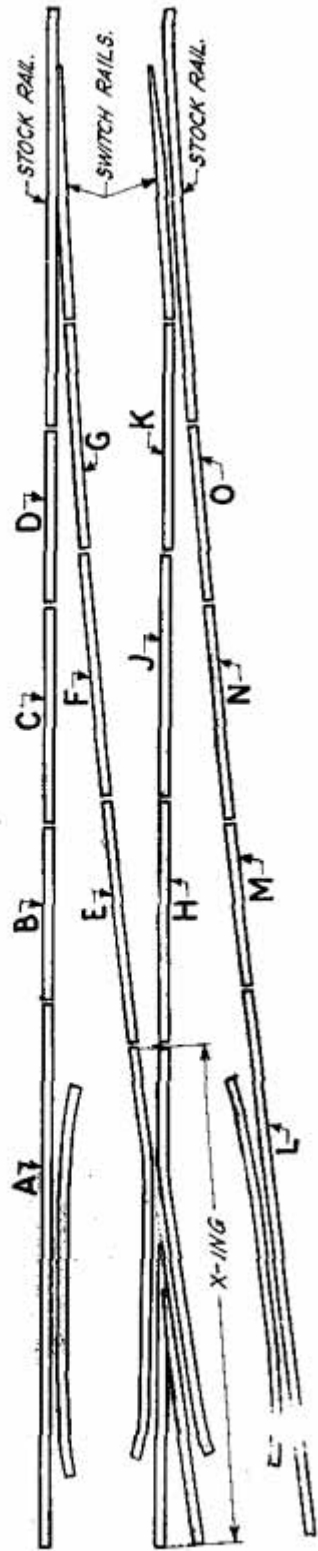


TABLE OF LEAD RAILS

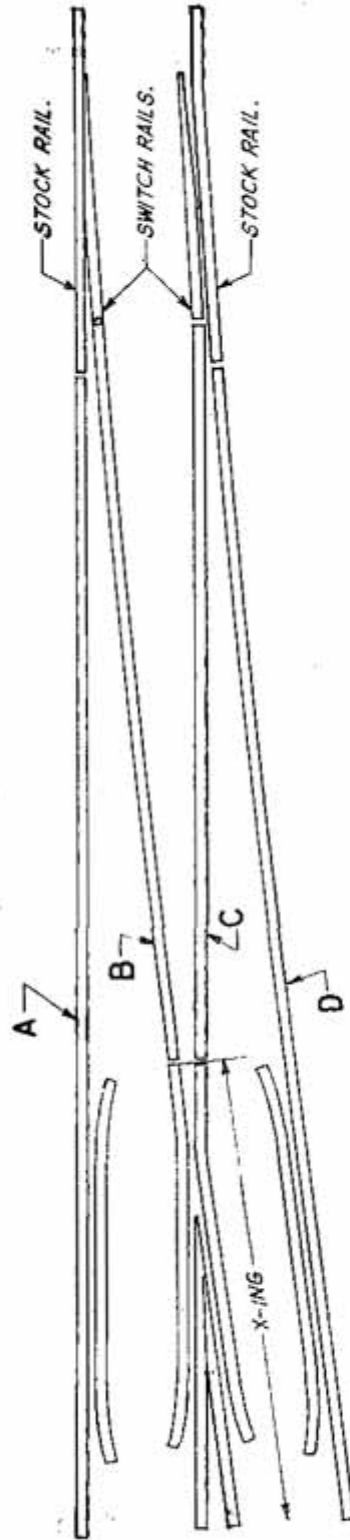
RAIL SECTION	GAUGE	DRAWING NUMBER	TYPE OF SLEEPER	TYPE OF SWITCH	OVERALL RAIL LENGTHS		LENGTHS (mm)														
					X-ING	STOCK SWITCH	A	B	C	D	E	F	G	H	J	K	L	M	N	O	
52 kg	B. G.	TA 20141	WOODEN	CURVED, FIXED HEEL	7000	13000	9000	6398	11000	13000	13000	9542	11000	13000	9500	11000	13000	9000	6336	11000	13000
52 kg	B. G.	TA 20828	STEEL	CURVED, FIXED HEEL	7000	13000	9000	6398	11000	13000	13000	9542	11000	13000	9500	11000	13000	9000	6336	11000	13000
90R.	B. G.	TA 20138	WOODEN	CURVED, FIXED HEEL	7000	13000	9000	6372	11000	13000	13000	9515	11000	13000	9472	11000	13000	9000	6310	11000	13000
90R.	B. G.	TA 20813	STEEL	CURVED, FIXED HEEL	7000	13000	9000	6372	11000	13000	13000	9515	11000	13000	9472	11000	13000	9000	6310	11000	13000

NOTE:— RAILS FOR R.H. TURNOUTS SAME AS FOR L.H.

RAIL LENGTHS OF TURNOUTS

WITH BUILT-UP CROSSINGS

(DIAGRAM OF L.H. TURNOUT)



NOTE:- RAILS FOR R.H. TURNOUTS SAME AS FOR L.H.
DIMENSION MARKED THUS * ARE WELDED RAILS WITH MACHINED JOINTS ON EITHER SIDES.

TABLE OF LEAD RAILS

RAIL SECTION	GAUGE	CROSSING NUMBER	DRAWING NUMBER	TYPE OF SLEEPER	TYPE OF SWITCH	OVERALL RAIL LENGTHS			LENGTHS (mm)			
						X-ING	STOCK	SWITCH	A	B	C	D
UIC 60Kg	B.G.	1/IN 8½	RA20430/RA20438	WOODEN	CURVED, FIXED HEEL	4850	10000	7863	19516*	16027*	15960*	19404*
UIC 60Kg	B.G.	1/IN 1/2	RA20457/RA20479	WOODEN	CURVED, FIXED HEEL	5970	12000	12356	29004*	21507*	21459*	28913*
90R.	M.G.	1/IN 8½	TA20497	WOODEN	CURVED, FIXED HEEL	4800	10000	8500	9670	4841	4800	9600
90R.	M.G.	1/IN 8½	TA21025	STEEL	CURVED, FIXED HEEL	4800	10000	8500	9670	4841	4800	9600
75R.	M.G.	1/IN 8½	TA20404	WOODEN	STRAIGHT, LOOSE HEEL	4800	9000	4112	10670	9887	9845	10592
75R.	M.G.	1/IN 8½	TA21004	STEEL	STRAIGHT, LOOSE HEEL	4800	9000	4112	10670	9887	9845	10592
75R.	M.G.	1/IN 8½	TA20451	WOODEN	CURVED, FIXED HEEL	4800	10000	8500	9670	4844	4800	9595
75R.	M.G.	1/IN 8½	TA21019	STEEL	CURVED, FIXED HEEL	4800	10000	8500	9670	4844	4800	9595
60R.	M.G.	1/IN 8½	TA20407	WOODEN	STRAIGHT, LOOSE HEEL	4800	9000	4112	10653	9870	9828	10575
60R.	M.G.	1/IN 8½	TA20460	WOODEN	STRAIGHT, LOOSE HEEL WITH INTERLACED WOODEN SLEEPERS	4800	9000	4112	10653	9870	9828	10575
60R.	M.G.	1/IN 8½	TA20463	WOODEN	STRAIGHT, LOOSE HEEL WITH INTERLACED CSP-9 SLEEPERS	4800	9000	4112	10653	9870	9828	10575
60R.	M.G.	1/IN 8½	TA21007	STEEL	STRAIGHT, LOOSE HEEL	4800	9000	4112	10653	9870	9828	10575
60R.	M.G.	1/IN 8½	TA20416	WOODEN	CURVED, FIXED HEEL	4800	10000	8500	9653	4830	4780	9578
60R.	N.G.	1/IN 8½	TA20604	WOODEN	STRAIGHT, LOOSE HEEL	4800	9000	4112	7360	6580	6548	7230
60R.	N.G.	1/IN 1/2	TA20601	WOODEN	STRAIGHT, FIXED HEEL	4800	10000	8500	11855	7038	7018	11764

RAIL LENGTHS OF TURNOUTS

WITH BUILT-UP CROSSINGS

(DIAGRAM OF L.H. TURNOUT)

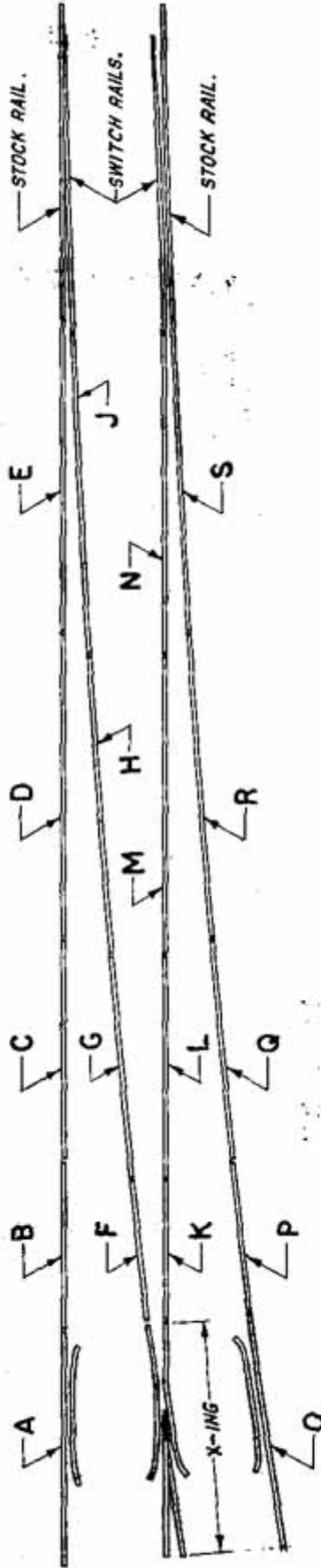


TABLE OF LEAD RAILS

RAIL SECTION	GAUGE	CROSSING NUMBER	DRAWING NUMBER	TYPE OF SLEEPER	TYPE OF SWITCH	OVERALL RAIL LENGTH		L E A D R A I L S (in m)																			
						X-ING	STOCK SWITCH	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	
90 R.	B.G.	1 IN 20	TA20122	WOODEN	CURVED, FINED HEEL	9310	13000	12635	9313	6633	9000	12000	13000	13000	6341	9900	13000	13000	6310	9000	13000	13000	5313	6708	9000	12000	13000

NOTE:- RAILS FOR R.H. TURNOUTS SAME AS FOR L.H.

RAIL LENGTHS OF TURNOUTS WITH BUILT-UP CROSSINGS

(DIAGRAM OF L.H. TURNOUT)

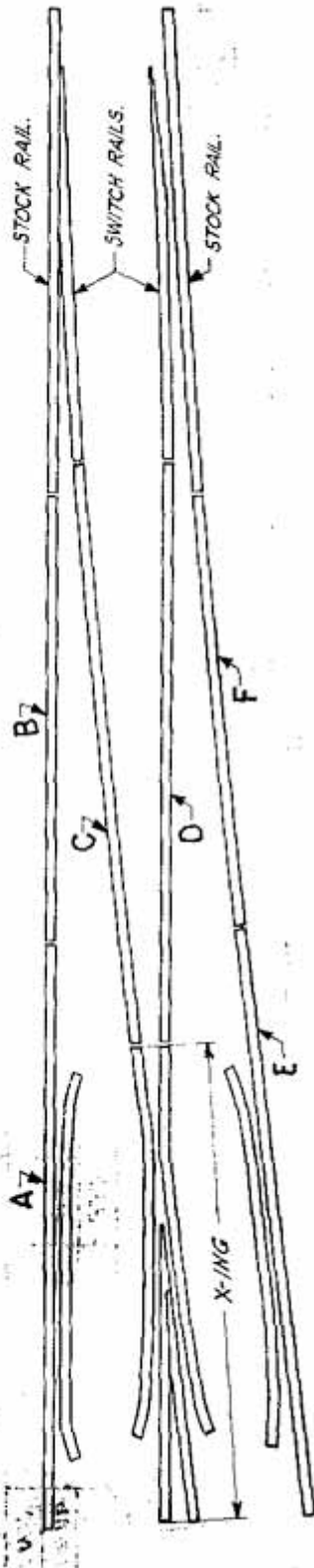


TABLE OF LEAD RAILS

RAIL SECTION	GAUGE	CROSSING NUMBER	DRAWING NUMBER	TYPE OF SLEEPEE	TYPE OF SWITCH	OVERALL RAIL LENGTHS			LENGTHS (mm)					
						X-ING	STOCK	SWITCH	A	B	C	D	E	F
90 R	M.G.	1 IN 12	TA 20494	WOODEN	PARTLY CURVED, FIXED HEEL	4800	11000	9500	9168	6324	10675	10647	9168	6269
90R	M.G.	1 IN 12	TA 21022	STEEL	PARTLY CURVED, FIXED HEEL	4800	11000	9500	9168	6324	10675	10647	9168	6269
75 R	M.G.	1 IN 12	TA 20464	WOODEN	PARTLY CURVED, FIXED HEEL	4800	10000	8500	9840	6642	11666	11637	9840	6588
75R	M.G.	1 IN 12	TA 21016	STEEL	PARTLY CURVED, FIXED HEEL	4800	10000	8500	9840	6642	11666	11637	9840	6588
60 R	M.G.	1 IN 12	TA 20466	WOODEN	PARTLY CURVED, FIXED HEEL	4800	10000	8500	9842	6677	11643	11614	9817	6588

NOTE: RAILS FOR R.H. TURNOUTS SAME AS FOR L.H.

OFFSETS FOR TURNOUTS

B.G., M.G. & N.G.

(DIAGRAM OF L.H. TURNOUT WITH STRAIGHT SWITCH)

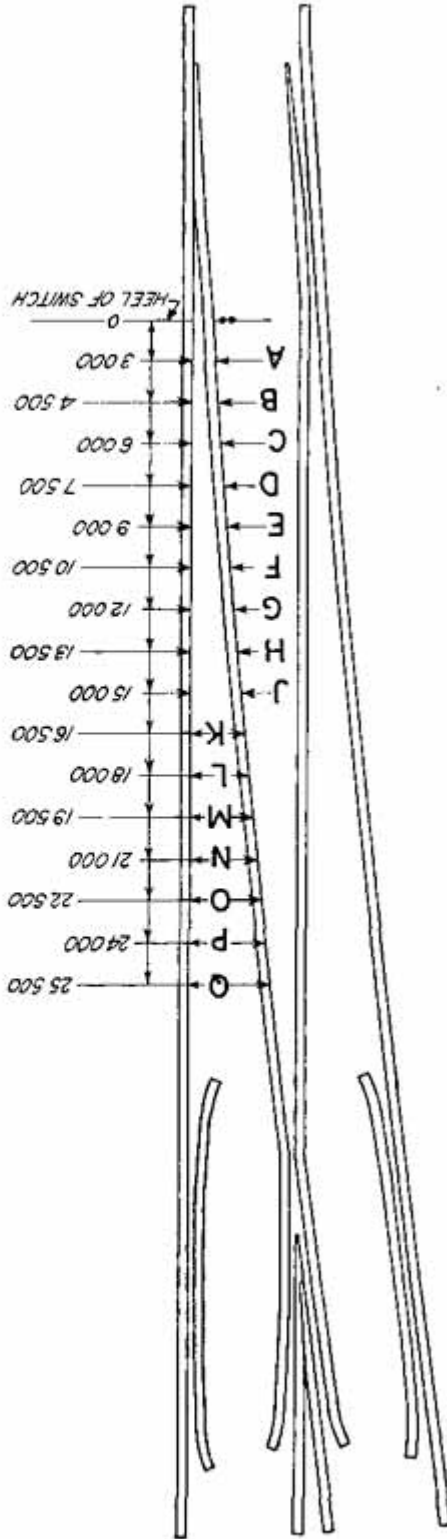


TABLE OF OFFSETS

GAUGE	CROSSING NUMBER	SWITCH TURNOUT LENGTH	TURNOUT RADIUS	OFFSETS FROM GAUGE FACE OF STRAIGHT TRACK TO GAUGE FACE OF CURVED TRACK (mm)																
				A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
B.G.	1 IN 8 1/2	4 725	222 360	-	-	382	469	565	672	790	917	1 055	1 202	-	-	-	-	-	-	-
B.G.	1 IN 12	6 400	442 120	-	-	293	345	403	466	532	606	685	767	856	950	1 047	1 151	1 260	-	-
M.G.	1 IN 8 1/2	4 115	119 610	241	330	437	564	709	-	-	-	-	-	-	-	-	-	-	-	-
M.G.	1 IN 8 1/2	5 500	130 200	612	358	475	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.G.	1 IN 12	5 485	240 600	-	-	313	386	468	559	659	769	-	-	-	-	-	-	-	-	-
N.G.	1 IN 12	5 485	167 340	-	-	346	437	541	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: OFFSETS FOR R.H. TURNOUTS SAME AS FOR L.H. *TURNOUT WITH CURVED SWITCH

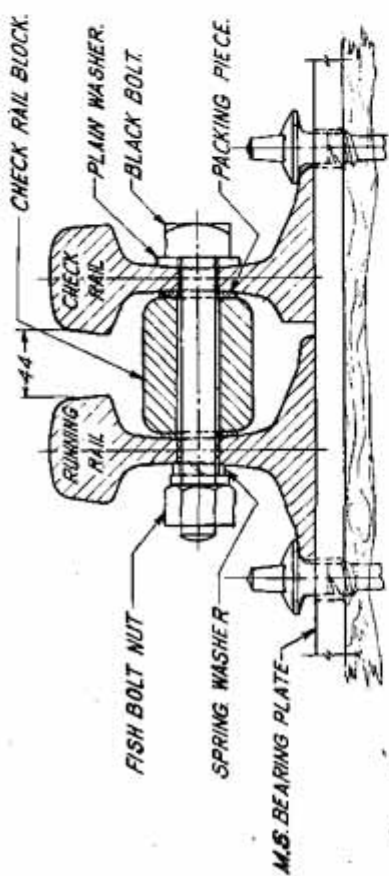
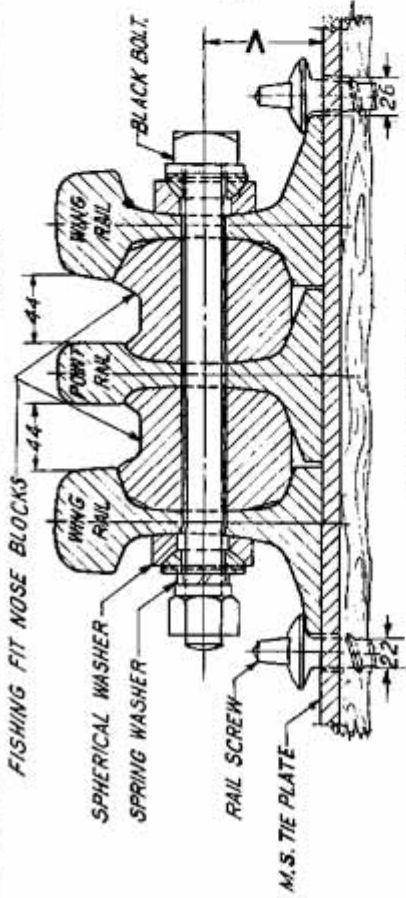
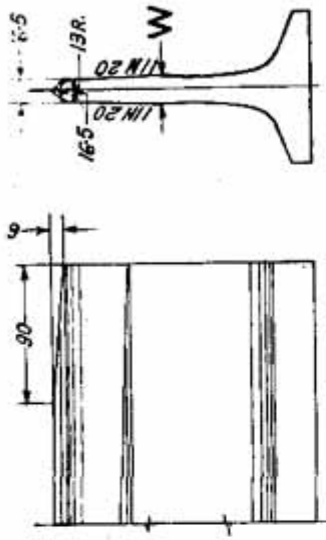
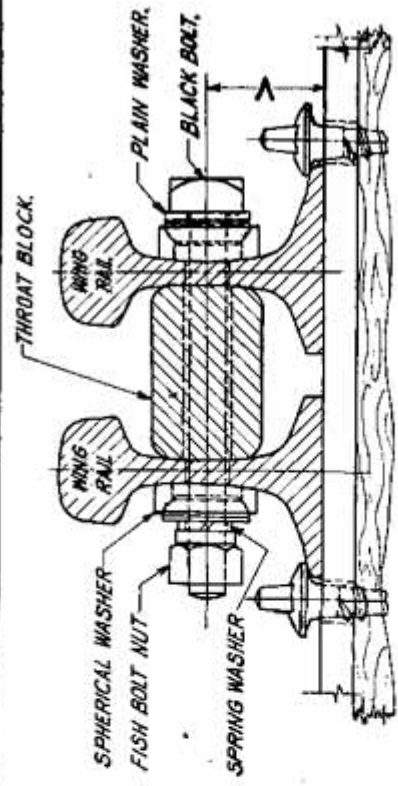
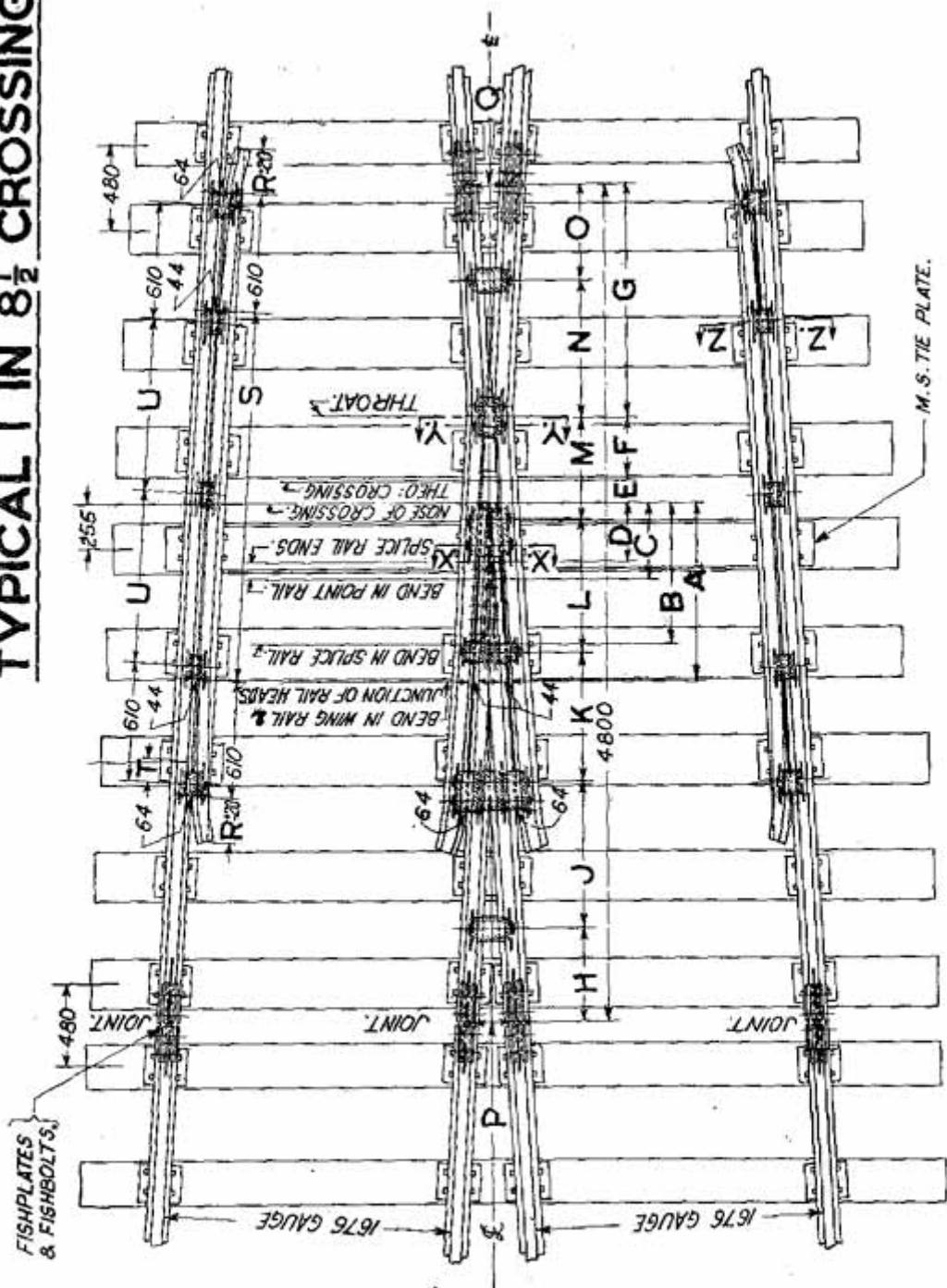


TABLE OF DIMENSIONS

RAIL SECTION	ASSEMBLY DRAWING	DIMENSIONS (mm)																					
		A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
UK 60kg	R050(F-300)	1090	648	474	374	141	519	1215	550	705	820	800	760	665	550	221	203	250	1100	40	975	7625	16.5

TYPICAL I IN 8½ CROSSING B. G.



NOTE - ALL M.S. FLAT BEARING PLATES 220x20 THICK.

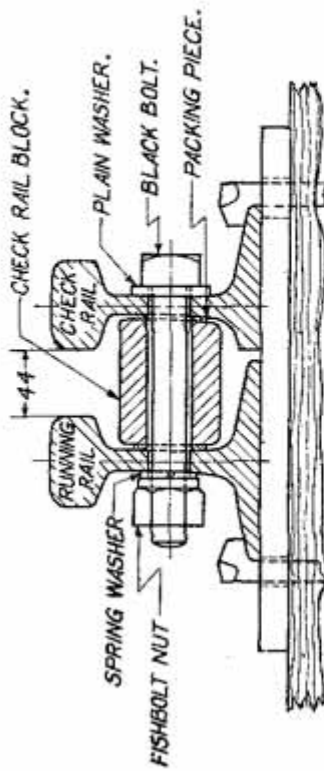
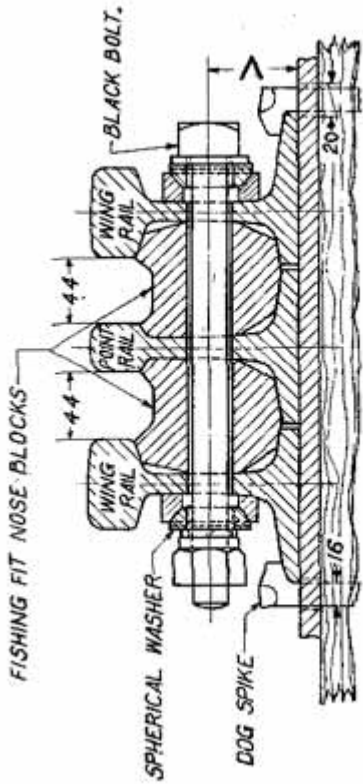
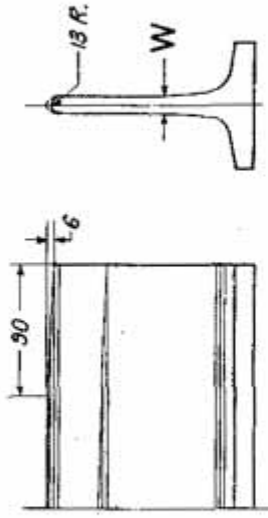
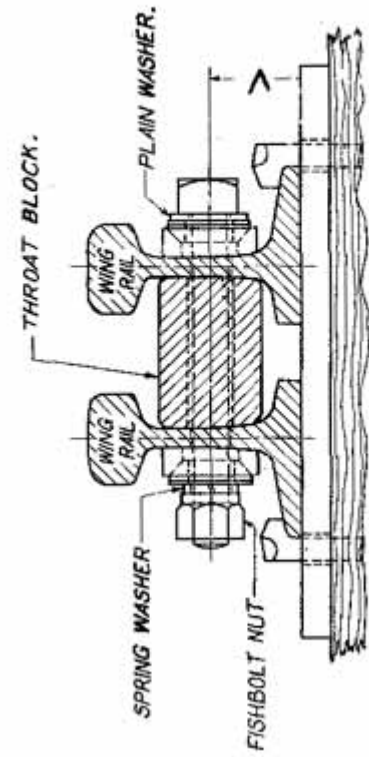


TABLE OF DIMENSIONS

DIMENSIONS
(in mm)

RAIL ASSEMBLY SECTION DRAWING No.	DIMENSIONS																					
	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
52 Kg. TA 20105		780	440	340	132	376	1307	545	820	760	760	608	752	555	231	197	255	235	140	1055	67	15.5
90R. TA 20111		804	452	352	118	376	1321	545	820	760	760	594	766	555	230	199	255	235	140	1055	60	18.8

**TYPICAL 1 IN 8 1/2 CROSSING
B. G. WITH STEEL SLEEPERS.**

