

TABLE SHOWING WEIGHTS & QUANTITIES OF

RAILS & FASTENINGS

LENGTH OF RAIL IN USE		9 METRES	10 METRES	11 METRES	12 METRES	13 METRES
NUMBER PER TRACK KILOMETRE		444.44	400.00	363.64	333.33	307.7
50 R. CSO/C- 1898 (M)	WEIGHT PER PAIR	6.307 kg = 0.008307 TONNE				
	WEIGHT PER TRACK KILOMETRE (TONNES)	1.846	1.661	1.510	1.385	1.276
60 R.	WEIGHT PER PAIR	9.975 kg = 0.009975 TONNE				
	WEIGHT PER TRACK KILOMETRE (TONNES)	2.217	1.995	1.813	1.663	1.535
75 R.	WEIGHT PER PAIR	13.58 kg = 0.01358 TONNE				
	WEIGHT PER TRACK KILOMETRE (TONNES)	3.017	2.716	2.468	2.263	2.088
90 R.	WEIGHT PER PAIR	18.54 kg = 0.01854 TONNE				
	WEIGHT PER TRACK KILOMETRE (TONNES)	4.341	3.908	3.551	3.256	3.005
T 059 (M)	WEIGHT PER TONNE	102.3				
	NUMBER PER TONNE	28.71 kg = 0.02871 TONNE				
52 kg T 090 (M)	WEIGHT PER PAIR	28.71 kg = 0.02871 TONNE				
	WEIGHT PER TRACK KILOMETRE (TONNES)	6.381	5.742	5.220	4.785	4.418
UIC 60kg RDSO /T1898	WEIGHT PER TONNE	69.7				
	NUMBER PER TONNE	35.20 kg = 0.0352 TONNE				
UIC 60kg RDSO /T1898	WEIGHT PER TRACK KILOMETRE (TONNES)	7.822	7.040	6.400	5.866	5.415
	NUMBER PER TONNE	56.818				

FISHPLATES

TABLE SHOWING WEIGHTS & QUANTITIES OF

RAILS & FASTENINGS

LENGTH OF RAIL IN USE		9 METRES	10 METRES	11 METRES	12 METRES	13 METRES
NUMBER PER TRACK KILOMETRE		888.89	800.00	727.27	666.67	615.38
WEIGHT PER SET OF 4		1.68 kg = 0.00168 TONNE				
WEIGHT PER TRACK KILOMETRE (TONNES)		0.373	0.336	0.305	0.280	0.258
NUMBER PER TONNE		2380.95				
WEIGHT PER SET OF 4		2.616 kg = 0.002616 TONNE				
WEIGHT PER TRACK KILOMETRE (TONNES)		0.581	0.523	0.476	0.436	0.402
NUMBER PER TONNE		1529.05				
WEIGHT PER SET OF 4		3.76 kg = 0.00376 TONNE				
WEIGHT PER TRACK KILOMETRE (TONNES)		0.836	0.752	0.684	0.627	0.578
NUMBER PER TONNE		1063.83				
WEIGHT PER SET OF 4						
WEIGHT PER TRACK KILOMETRE (TONNES)						
NUMBER PER TONNE						

FISHBOLTS

50 R.
T 11503

60 R.
T 11502

75 R. 90 R.
& 52 kg.
T 11501

UIC 60 kg
R50/T-1899

TABLE SHOWING WEIGHTS & QUANTITIES OF

RAILS & FASTENINGS

LENGTH OF RAIL IN USE		9 METRES	10 METRES	11 METRES	12 METRES	13 METRES
50 R.		51.8	51.6	51.4	51.3	51.1
60 R.		62.3	62.0	61.8	61.6	61.5
75 R.		78.1	77.7	77.4	77.1	76.9
90 R.		94.4	93.9	93.4	93.0	92.8
52 kg		111.0	110.3	109.7	109.2	108.8
UIC 80kg						

RF7
SHEET 4.F4

**TOTAL WEIGHT (TONNES) PER
TRACK KILOMETRE OF RAILS AND
FASTENINGS**

CHAPTER II

SLEEPER FASTENINGS

	Page
Brief notes on sleeper fastenings	SFa to SFf
Dogspikes, fangbolts, round spikes and rail screws, plate screws	SF1
Hook bolts for sleepers	SF2
Bearing plates—mild steel—(single rail) canted and flat	SF3
Bearing plates—cast iron—(single rail) —Anticreep C I one key and two key types	SF4
Spring steel loose jaws, mild steel keys ordinary and over-size	SF5
Modified loose jaws, special key	SF5A
Fastenings for CI sleepers	SF6
Grooved rubber sole plate and steel pads for ST sleeper	SF6A
Table showing approximate weights and quantities of sleepers and fastenings for various densities of sleepers	SF7

Brief notes on sleeper fastenings

Dogspikes : The head and point of all sizes of dogspikes are identical and the shank is a uniform 16 mm square section. The length under the head is varied to suit sleepers with or without bearing plates for the various gauges, viz. Broad, Metre and Narrow. The part numbers, lengths and weights of the spikes have been tabulated on page SF1 sheet 1. Specification IRS T-2 covers other requirements.

Fang and bolt : This fitting is employed for fastening slide chairs to sleepers under switches of turnouts and is an alternative to round spike. It is, however, a more effective fastening and its use is advisable particularly on the sleepers carrying switch tieplates. Some railways use fang bolts for securing ordinary track chairs to sleepers and others use them for all the chairs through turnouts. Details of the fang and bolt are shown on page SF1 sheet 2. The CI fang, the bolt head and the diameter of the shank are standard but the length of the bolt has to be specified by the purchaser. Specification No. IRS T-13 are to be referred for fangs and bolts.

Round spikes : As mentioned under "Fang and bolt," the round spike is an alternative fitting and has been mentioned as such on all the IRS assemblies of switches on wooden sleepers. The standard anti-creep cast iron bearing plates are designed to be secured to sleepers by means of round spikes also. As in the case of dogspikes, the shape of the head and point and the diameter of the shank i.e. 18 mm, have been standardised, the length being specified by the purchaser. The details are given on page SF1 sheet 2. Specification No. IRS T-4 is to be referred for round spikes.

Rail Screws : Rail screw is employed for fastening the rails to sleepers with or without bearing plates and is an alternative to dogspikes. It is, however, a more effective fastening and its use is preferable to dogspikes. The overall length under head and length of unthreaded portion are varied to suit sleepers with or without bearing plates for various gauges, viz. Broad gauge and Metre gauge. The part numbers, overall lengths, lengths of unthreaded portion and

other dimensions of rail screws have been tabulated on SF1 sheet 4. Specification IRS T-16 covers other requirements of manufacture.

Plate screws : This fitting is an alternative to round spikes. It is, however, a more effective fastening and its use in place of round spikes is advisable. The overall length under head is varied to suit crossing timbers (special) and CI anticreep bearing plates. The part numbers, overall length and other dimensions of the plate screws are tabulated on SF1 sheet 4. Specification IRS T-16 covers other requirements of manufacture.

Hook bolts : There are two types of hook bolts, viz. (1) with straight lips meant for securing sleepers to plate girders and (2) with sloping lips for securing sleepers to joists. In both types, the hook is an integral part of the bolt. The details of both the types of hook bolts are given on pages SF 2 in 2 sheets, together with sketches showing the application of the hook bolts in the various cases. With the help of an arrow head stamped on the top end of the bolts, maintenance staff are enabled to check the position of the hook on the under-side of the sleeper.

Bearing plates, mild steel (single rail) flat : These bearing plates are only meant for use in turnout track, except in the portion where the use of combined bearing plates is unavoidable, e.g. under the crossings and near the heel of switches, as the rails through the turnouts and crossovers with FF rails are generally laid flat. The main dimensions, weight and part numbers are tabulated on pages SF3 in 2 sheets. The bearing plates for BG sections are 20 mm thick and those for MG 16 mm thick. Four holes 20 mm square are provided to suit 16 mm square dog spikes. Specification No. IRS T-10 is to be referred for bearing plates MS flat.

Bearing plates, mild steel (single rail) canted : The various bearing plates for the four rail sections are cut from three sizes of specially rolled plates and by varying the position of holes for dogspikes, rail screws, five different types are

obtained; the main dimensions and part numbers of which are tabulated on pages SF 3 sheets 3, 4, 5 & 6.

The salient features of these bearing plates are :—

- (1) A shoulder on the outside of the rail foot;
- (2) A recess under the middle of the rail seat to prevent rocking of the rail on its seat;
- (3) A cant of 1 in 20 incorporated in the rolling of the plate.

Specification No. IRS T-5 is to be referred for bearing plates MS canted.

Bearing plates, cast iron, ordinary, canted (single rail)

These bearing plates shown on pages SF 4 sheet 1 serve the same purpose as the mild steel canted plates shown on pages SF 3 sheets 3 & 4 but they are more suitable than the latter when used in conjunction with anticreep cast iron bearing plates which have the same thickness and overall dimensions. When a track is laid with these bearing plates, it can be made to resist creep simply by substituting some anticreep type bearing plates for the ordinary ones, the number of the anticreep bearing plates per rail length depending on the severity of creep experienced in the section of track under consideration. These bearing plates are suitable for dogspikes and the main dimensions for 90R section have been tabulated. Designs of bearing plates for other sections of rails have not been prepared.

Specification No. IRS T-7 is to be referred for bearing plates CI ordinary canted.

Bearing plates, cast iron, anticreep, canted : As stated in the foregoing notes, the anticreep type bearing plates are effective against creep, when some of the sleepers in a rail length are provided with these plates. The sleepers throughout may advantageously be provided with this type of bearing plates, if the creep is severe and the extra cost is financially justified by the traffic demands on the track.

One key anticreep bearing plates have a single two-way key provided on the gauge side jaw only. As some railways experienced difficulty in obtaining the chaired sleepers true to gauge, when the sleepers are pre-bored, designs of two-key bearing plates were prepared so as to be able to make adjustment in gauge, which is not possible when a single key is used. The directions of keys can be fixed to suit that of creep in the track.

Designs exist for one-key and two-key bearing plates for UIC 60 kg, 52 kg/90R, rail sections for BG and 90R, 75R, 60R and 50R rail sections for MG. The main dimensions of these plates have been tabulated in pages SF4 under sheets 2 to 10. Specification No. IRS T-7 is to be referred for bearing plates cast iron anticreep.

Loose jaws : These jaws form a very efficient sleeper fastening for steel sleepers and have replaced the pressed up jaws of the older type of sleepers which were liable to get more easily damaged, cracked or permanently deformed.

The spring steel loose jaw has been standardised. The part numbers, weight and dimensions of the spring steel loose jaws for various rail sections are tabulated on page SF 5 sheet No. 1. Specification No. IRS T-17 is to be referred for loose jaws.

Two-way keys : The dimensions and the taper have been so adjusted that they suit cast iron anticreep bearing plates and cast iron plate sleepers as well as steel sleepers alike. Their chief advantage lies in their two-way feature, which enables them to be used as either LH or RH keys and at the same time makes the key light in weight due to the double recess, i.e., one on either side of the central fin.

These keys are cut from a special rolled bar section thus:

Four sections have been designed. one for UIC 60kg, the other for 52 kg/90R/75R rails, the third for 60R/50R rails and the fourth section of over-size two-way keys for 52

kg/90R/75R rails. The horizontal taper in all the designs is 1 in 32. The part numbers and main dimensions for the four sections have been tabulated on page SF5 sheets 2 & 3. Specification No. IRS T-8 is to be referred for two-way keys.

Modified loose jaws : The modified loose jaws form an efficient and elastic fastening with steel trough sleepers and are meant for use with elastic rail clips. The part numbers, weight and dimensions of modified loose jaws are tabulated on page SF5A sheet 1. The relevant Specification No. is IRS T-31.

Special key : The dimensions shown at page SF5A sheet 2 and taper have been modified to suit the steel sleepers for turnouts beyond the heel of switch where switch rail is reduced in steps of 1.5 mm height till it attains the level of stock rail.

CI sleeper fastenings : Cotters and tie bars are now the only fastenings peculiar to CI sleepers, gibs etc., used in the earlier and experimental types of sleepers have been withdrawn.

Cotters : There are four different types of cotters but the overall dimensions, taper, etc. are very nearly identical in all cases and all are interchangeable. The difference is in the manner of forming or splitting the cotter. Railways can choose any of these types for use with the standard CI sleepers. The various types are fully detailed on page SF6 Sheet No. 1. Specification No. IRS T-8 is to be referred for cotters.

Tiebar : The tiebars for sleepers dealt with in the next chapter on CI sleepers are fully detailed on page SF6 sheet 2. The section of the tiebars are 50 mm x 12 mm and 45 mm x 10 mm. Specification No. IRS T-8 is to be referred for tiebars.

Steel rail pad for steel sleepers : The dimensions of steel rail pads and their position of welding on steel trough sleeper are shown on page SF6A sheet 1. Specification IRS T-38 is to be referred for steel rail pad. The designs are suitable

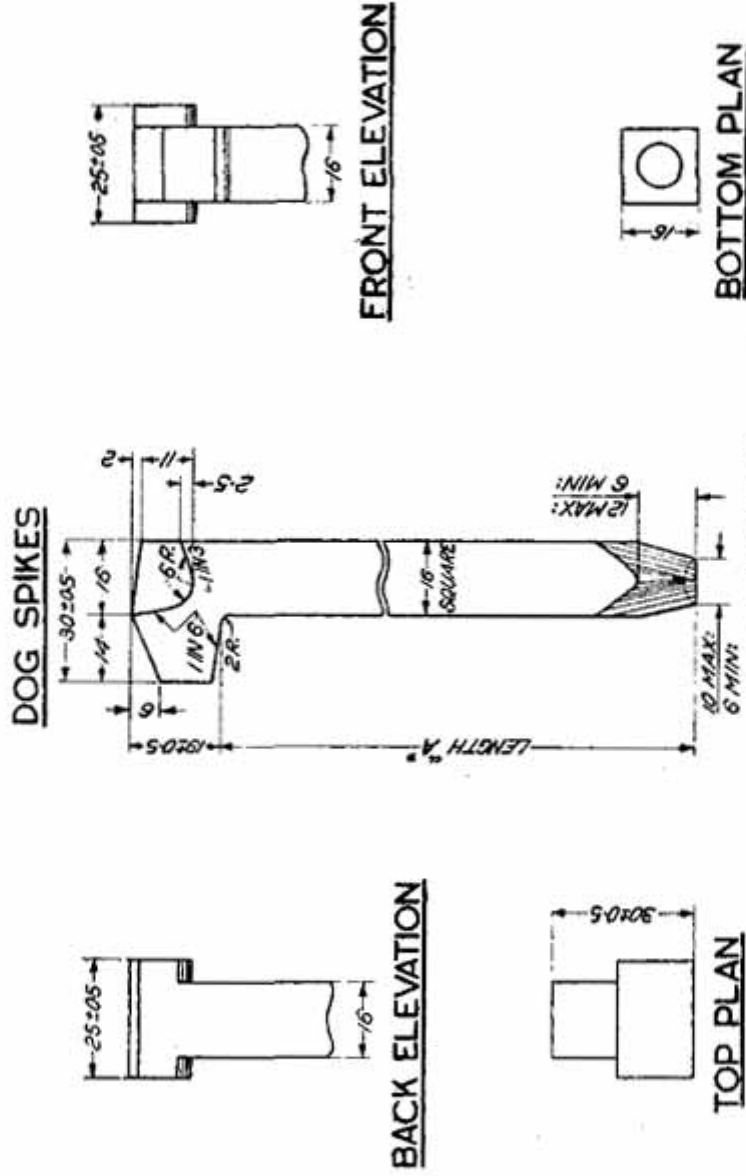
for steel trough sleepers to Drg. Nos. T-460 and T-460 (M) for UIC 60 kg, 52 kg and 90R rail for BG. It should be ensured that specified tolerances are strictly adhered to get the correct toe loads.

Table showing weights and quantities of sleepers and fastenings : Estimates of quantities and weights of sleepers for track projects are often required to be made by the permanent way staff. To facilitate this work, the table on pages SF 7 in two sheets gives the number and weight per track kilometre of sleepers of various types, for different standards of sleeper density and for rail lengths in more common use viz. 9 metres, 10 metres, 11 metres, 12 metres and 13 metres.

Elastic fastenings for concrete sleepers have been included in IRS Track Manual Vol. II.

WOODEN SLEEPER FASTENINGS

SFI
SHEET 1 OF 4

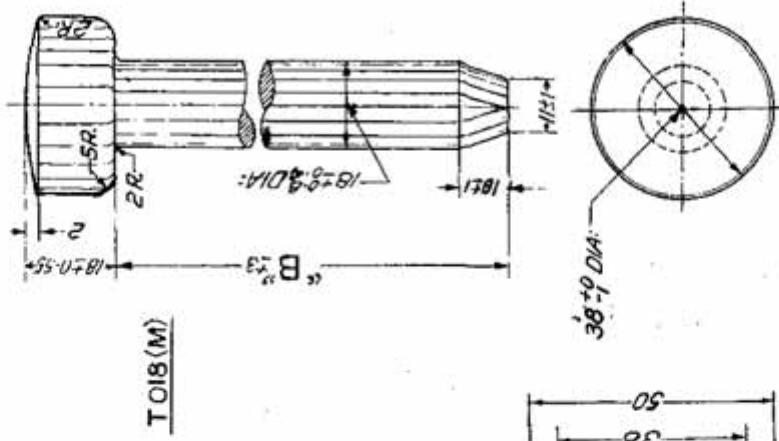


DESCRIPTION	B. G.		M. G.		N. G.		CALCULATED WEIGHT PER 100 SPIKES
	LENGTH 'A'	PART NO	LENGTH 'A'	PART NO	LENGTH 'A'	PART NO	
FOR USE WITH XING TIMBERS (SPECIAL)	160 ± 3	T 276 (M)	135 ± 3	T 277 (M)	120 ± 3	T 278 (M)	T 276 (M) 38.51 kg
FOR USE WITH BEARING PLATES	135 ± 3	T 277 (M)	120 ± 3	T 278 (M)	110 ± 3	T 279 (M)	T 277 (M) 33.49 kg
FOR USE WITHOUT BEARING PLATES	120 ± 3	T 278 (M)	110 ± 3	T 279 (M)	"	"	T 278 (M) 30.48 kg
							T 279 (M) 28.47 kg

WOODEN SLEEPER FASTENINGS

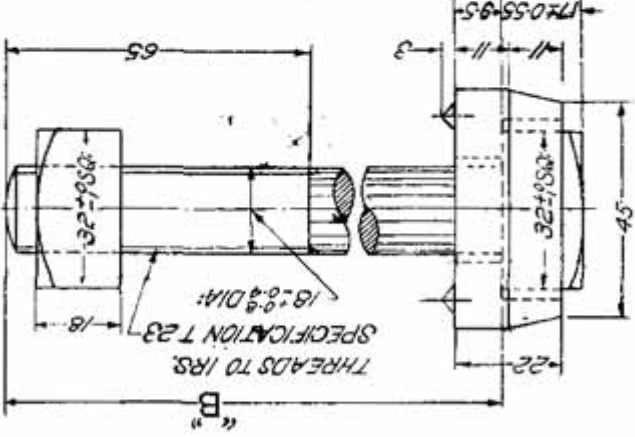
FOR ROUND SPIKE
WEIGHT OF EACH = 0.459 kg WHEN "B" IS 150.
WEIGHT OF EACH = 0.439 kg WHEN "B" IS 150.

ROUND SPIKE

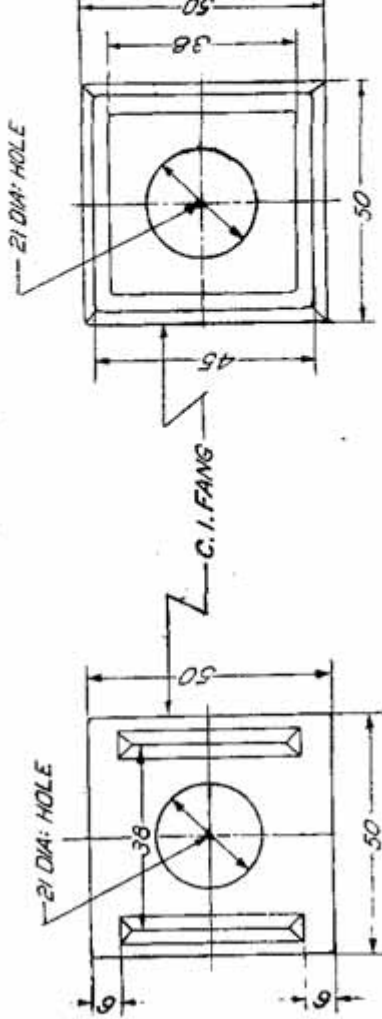


NOTE:-
LENGTH "B" TO BE SPECIFIED
BY THE PURCHASER.

FANG & BOLT



T O 17 (M)



PLAN FROM BOTTOM

PLAN FROM TOP

T O 18 (M)

RAIL SCREWS

TABLE OF DIMENSIONS

GAUGE	DESCRIPTION	DRAWING NUMBER	D I M E N S I O N S (mm mm)										
			A	B	C	D	E	F	G	H	J	K	
	FOR USE WITH CROSSING TIMBER SPECIAL.	T 10681	160±3	30±5	30	22	11	34±2	4	6	35	50±0.5	
B.G.	FOR USE WITHOUT BEARING PLATES.	*RDS0/T-1034	120±3	20±5	30	22	11	34±2	4	14	35	50±0.5	
	FOR USE WITH BEARING PLATES.	*RDS0/T-1035	135±3	30±5	30	22	11	34±2	4	14	35	50±0.5	
M.G.	FOR USE WITHOUT BEARING PLATES.	T 10675	110±3	20±5	30	22	11	34±2	4	6	35	50±0.5	
	FOR USE WITH BEARING PLATES.	T 10676	120±3	30±5	30	22	11	34±2	4	6	35	50±0.5	

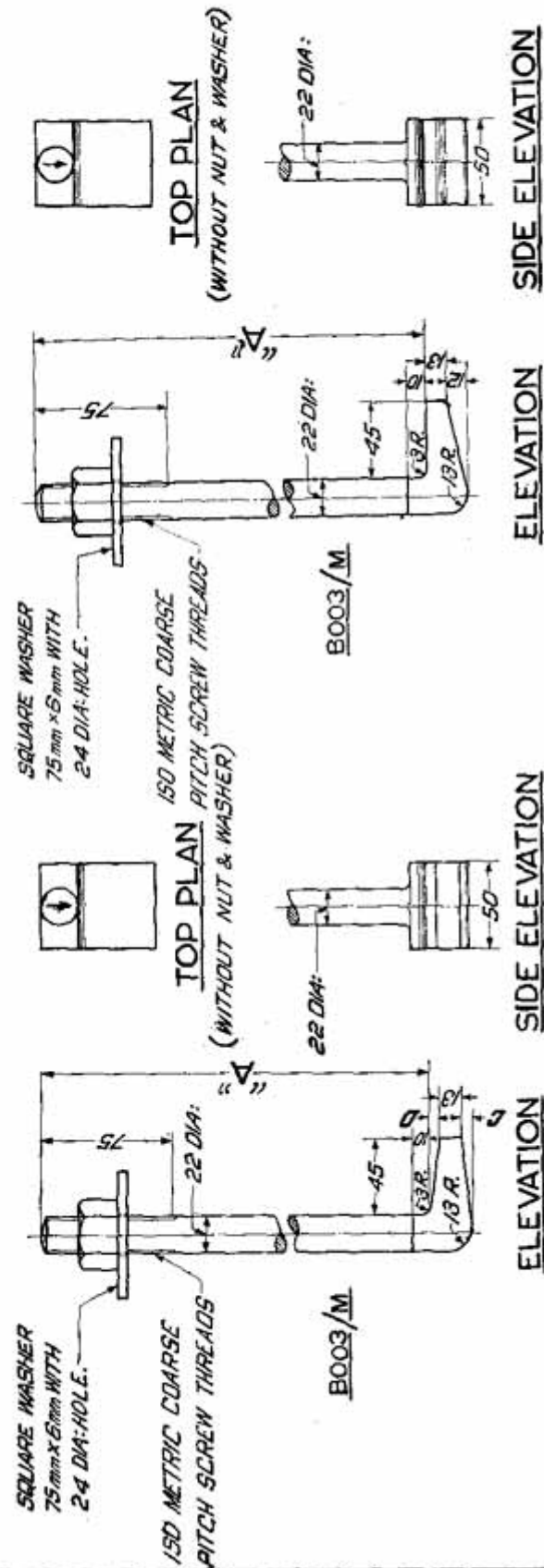
* THESE DRAWING NOS ARE EXCLUSIVELY FOR
USE WITH UIC 60kg RAIL/C.I. ANTI-CREEP
BEARING PLATES FOR UIC 60kg RAIL.

PLATE SCREWS

TABLE OF DIMENSIONS

GAUGE	DESCRIPTION	DRAWING NUMBER	D I M E N S I O N S (mm mm)										
			A	B	C	D	E	F	G	J	K		
	FOR USE WITH TIE PLATES & SLIDE CHAIRS (WITH DCS WASHER ONLY)	T 10725	190±3	60±5	30	20	7	30±2	1	25	35±0.5		
	FOR USE WITH CROSSING TIMBERS(SPECIAL).	T 10726	185±3	20±5	30	20	7	30±2	1	25	35±0.5		
B.G.	FOR USE WITH CROSSING TIMBERS(SPECIAL).	T 10677	160±3	30±5	30	20	7	30±2	1	25	35±0.5		
	FOR USE WITH C.I. ANTI- CREEP BEARING PLATES.	*RDS0/T-1036	135±3	30±5	30	22	11	34±2	1	35	50±0.5		
M.G.	FOR USE WITH C.I. ANTI- CREEP BEARING PLATES.	T 10678	135±3	30±5	30	20	7	30±2	1	25	35±0.5		
	FOR USE WITH CROSSING TIMBERS(SPECIAL).	T 10679	120±3	30±5	30	20	7	30±2	1	25	35±0.5		
	FOR USE WITH CROSSING TIMBERS(SPECIAL).	T 10678	135±3	30±5	30	20	7	30±2	1	25	35±0.5		

HOOK BOLTS FOR BRIDGE SLEEPERS



SQUARE WASHER
75 mm x 6 mm WITH
24 DIA. HOLE.

150 METRIC COARSE
PITCH SCREW THREADS

150 METRIC COARSE
PITCH SCREW THREADS

SQUARE WASHER
75 mm x 6 mm WITH
24 DIA. HOLE.

150 METRIC COARSE
PITCH SCREW THREADS

NOTE:-
LENGTH 'A' TO BE SPECIFIED
BY THE PURCHASER.

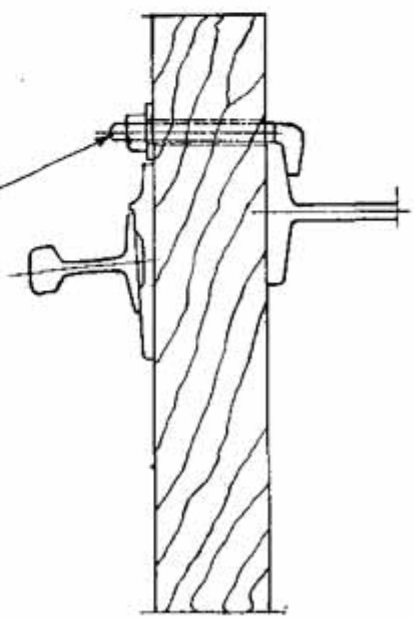
	DIMENSION	
	C	D
FOR BEAM 15MB 600x210	6	6
FOR CHANNEL 15MC 400x100	7	5

DETAIL WITH SLOPING LIP FOR IRS JOISTS

DETAIL WITH STRAIGHT LIP FOR PLATE GIRDERS

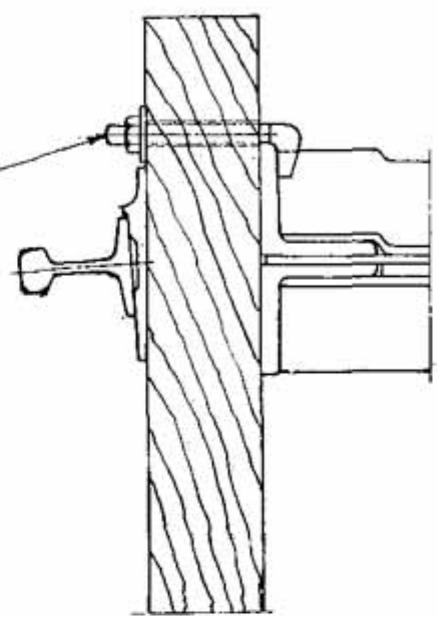
HOOK BOLTS FOR BRIDGE SLEEPERS

HOOK BOLT 5 003/M



METHOD OF FASTENING WOODEN
SLEEPERS ON JOIST SPANS

HOOK BOLT 5 003/M



METHOD OF FASTENING WOODEN
SLEEPERS ON PLATE GIRDER SPANS

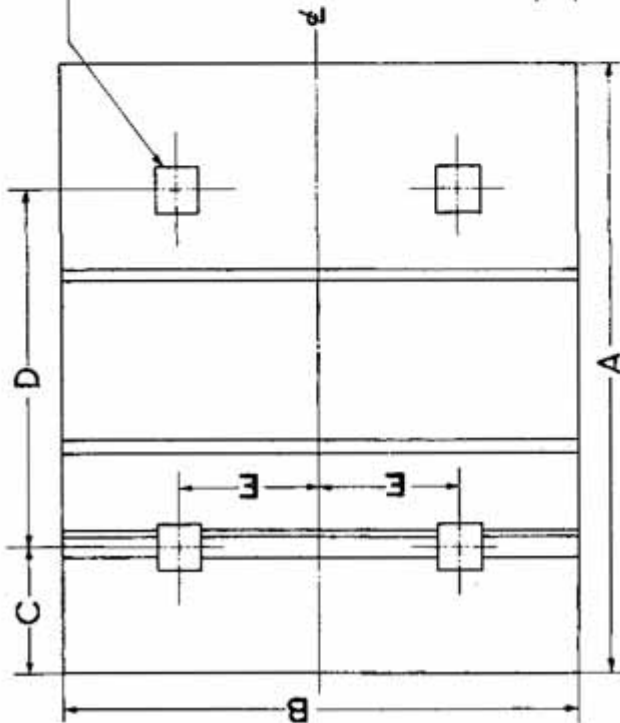
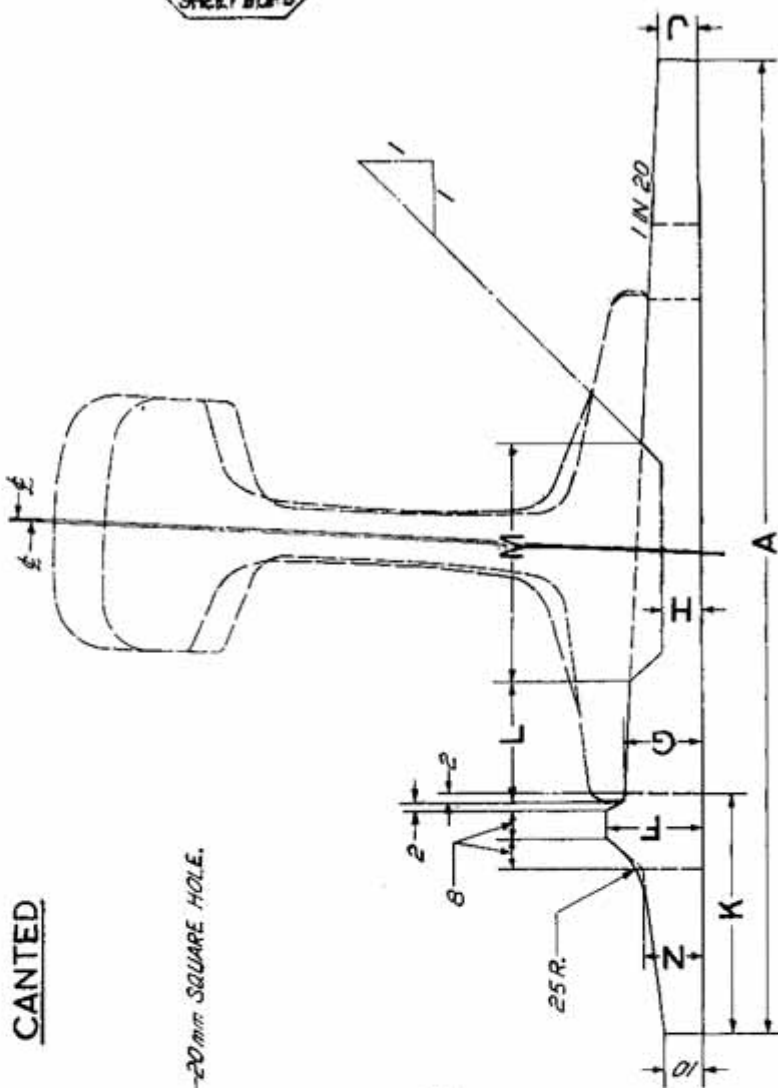
PART NUMBERS AND DIMENSIONS

RAIL SECTION	PART NUMBER	GAUGE	APPROX WEIGHT OF EACH IN kg	DIMENSIONS (mm)						
				A	B	C	D	E	F	G
52 kg & 90 R.	T 1994(M)	B. G.	8.72	260	220	152	120	54	50	20
75 R.	T 12545	M. G.	3.57	200	150	138	80	31	35	18
60 R.	T 12581	M. G.	3.57	200	150	125	80	38	35	16

BEARING PLATES MILD STEEL

(SINGLE RAIL)

CANTED



PART NUMBERS AND DIMENSIONS

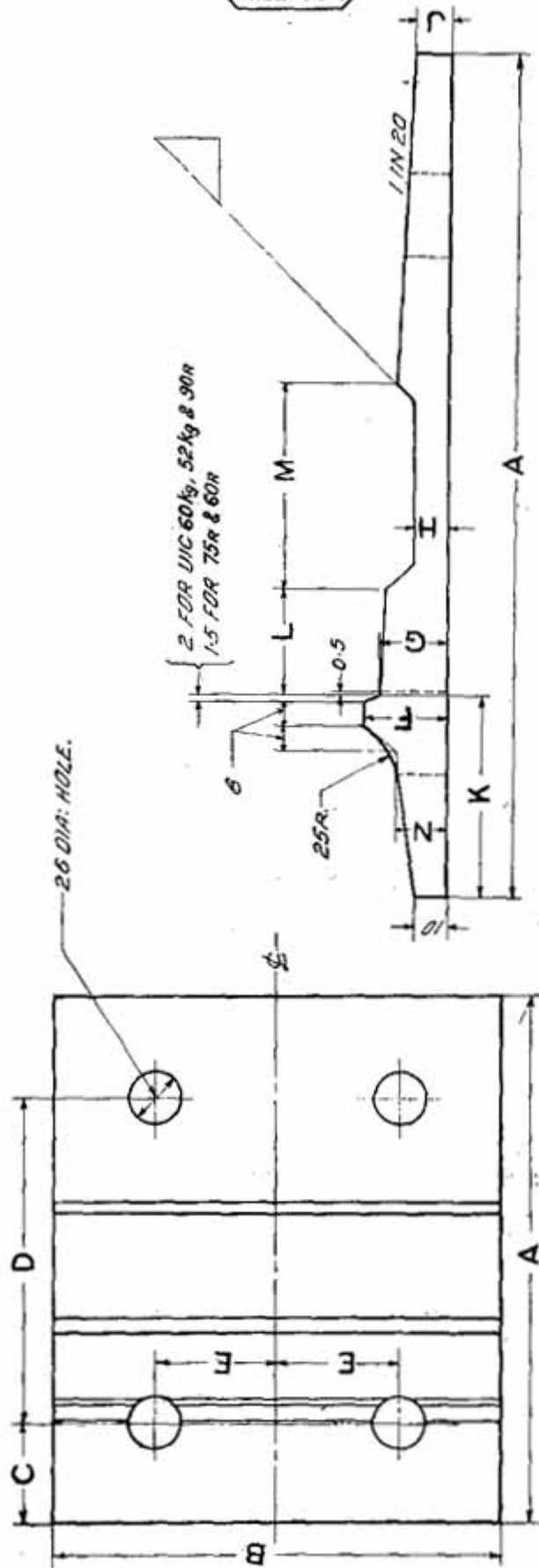
RAIL SECTION	WEIGHT PER METRE OF ROLLED SECTION IN kg (APPROX)	PART NUMBER	GAUGE	WEIGHT OF EACH IN kg (APPROX)	DIMENSIONS (mm)												
					A	B	C	D	E	F	G	H	J	K	L	M	N
52 kg & 90R	29.59	T10430	B.G.	6.27	260	220	54	152	60	26	21	11	11	64	32	68	16
75 R.	21.94	T10431	M.G.	3.30	210	160	40	138	40	25	18	10	10	50	27	48	13
60 R.	21.94	T10432	M.G.	3.30	210	160	40	125	40	25	18	10	10	50	27	48	13

BEARING PLATES MILD STEEL

(SINGLE RAIL)

SF 3
SHEET 5 OF 6

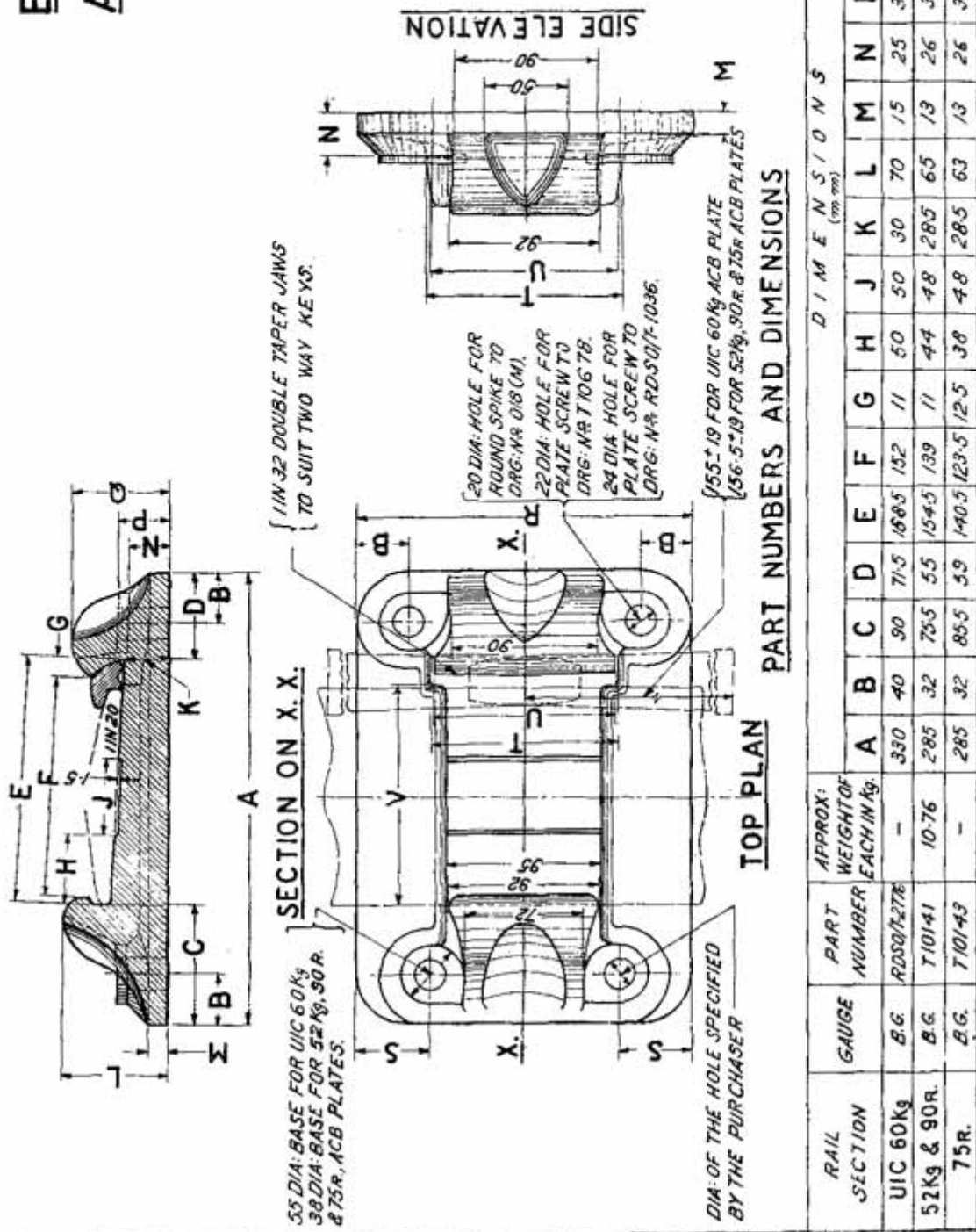
CANTED
(USING RAIL SCREWS)



PART NUMBERS AND DIMENSIONS

RAIL SECTION	WEIGHT PER METRE OF ROLLED SECTION IN Kg (APPROX.)	PART NUMBER	GAUGE	WEIGHT OF EACH IN Kg (APPROX.)	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
UNC 60Kg	-	RD50/F1033	B.G.	-	270	220	47.5	174	60	27	22	12	11.5	60	38	74	16
52Kg 90R	29.18	T 10671	B.G.	6.12	264	220	49.5	160	60	26	21	11	11.5	62	32	68	16
90R	28.18	RD50/F2551	M.G.	4.37	254	160	49.5	160	40	26	21	11	11.5	62	32	68	16
75R	22.48	T 10692	M.G.	3.34	220	160	37.5	146	40	23	18	10	9.5	50	36	50	13
60R	22.48	T 10672	M.G.	3.34	220	160	37.5	134	40	23	18	10	9.5	50	36	50	13

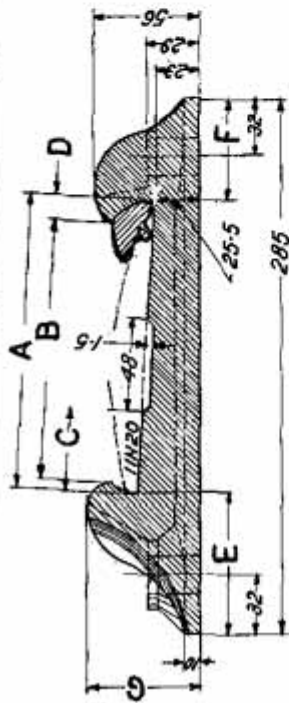
BEARING PLATES ANTI-CREEP C.I. (ONE KEY)



PART NUMBERS AND DIMENSIONS

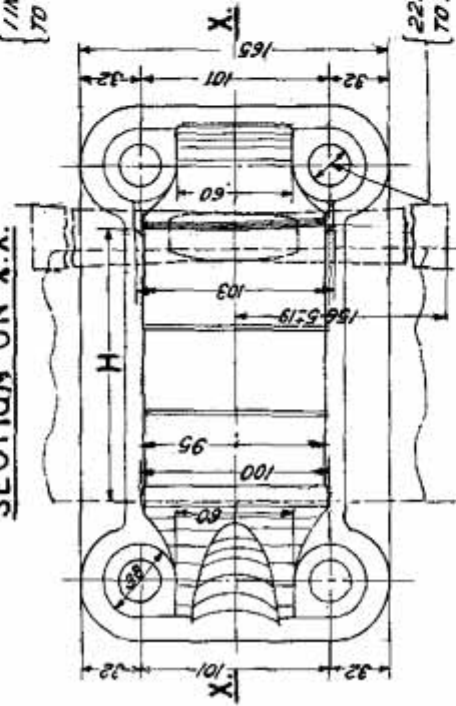
RAIL SECTION	GAUGE	PART NUMBER	APPROX. WEIGHT OF EACH IN Kg.	D I M E N S I O N S (mm)																			
				A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
UIC 60kg	B.G.	RD50/T-27E	-	330	40	90	71.5	188.5	152	11	50	50	30	70	15	25	30	64	230	50	105	100	155
52kg & 90R.	B.G.	T10141	10.76	285	32	75.5	55	154.5	139	11	44	48	285	65	13	26	32	59	205	45	114	111	143
75R.	B.G.	T10143	-	285	32	85.5	59	140.5	123.5	12.5	38	48	285	63	13	26	32	59	205	45	114	111	127

BEARING PLATES
ANTI-CREEP C.I.
(ONE-KEY)

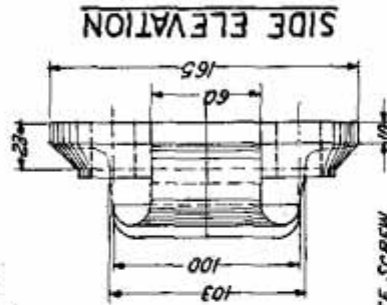


SECTION ON X-X.

1/16 IN. 32 DOUBLE TAPER JAW
TO SUIT TWO WAY KEY.



TOP PLAN



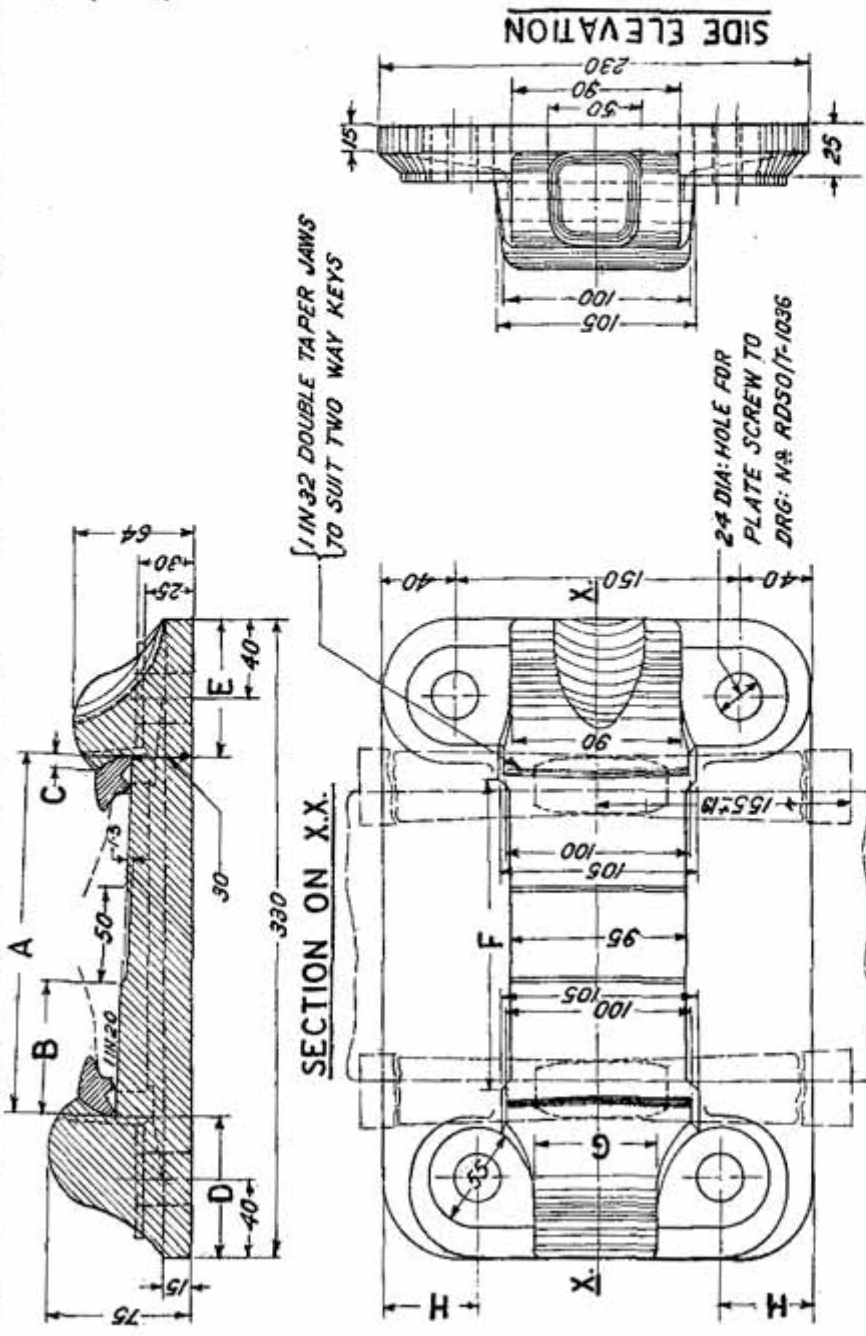
SIDE ELEVATION

22 DIA. HOLE FOR PLATE SCREW
TO DRG: M& T 10679.

PART NUMBERS & DIMENSIONS

RAIL SECTION	PART NUMBER	GAUGE	APPROX. WEIGHT OF EACH IN Kg.	DIMENSIONS (mm)							
				A	B	C	D	E	F	G	H
90 R.	RDS07-3506	M.G.	---	154.5	139	44	11	55	75.5	62	145

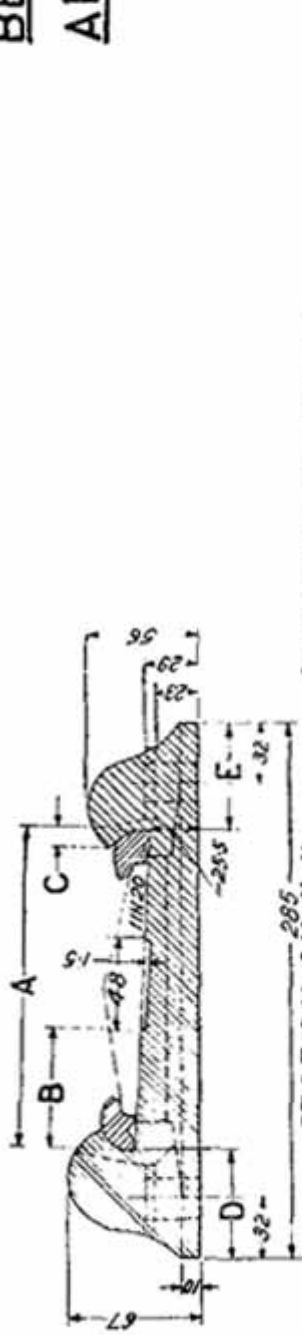
BEARING PLATES
ANTI-CREEP C.I.
(TWO KEYS)



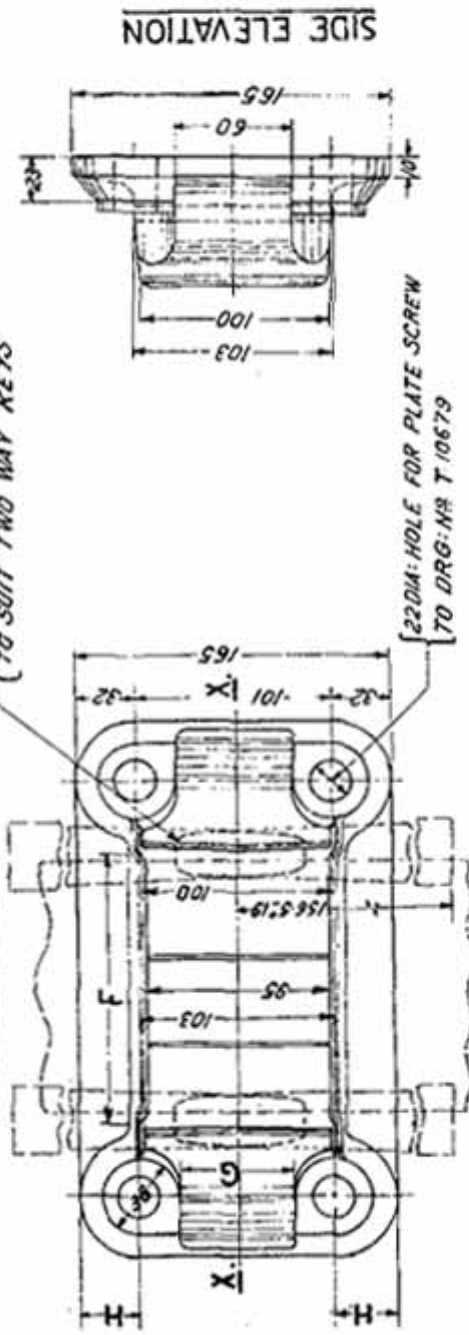
PART NUMBERS AND DIMENSIONS

RAIL SECTION	GAUGE	PART NUMBER	APPROX: WEIGHT OF EACH IN Kg	DIMENSIONS (mm)							
				A	B	C	D	E	F	G	H
UIC 60kg.	B.G.	RDS07F-1040	-	187	69	11	71.5	71.5	165	65	50

BEARING PLATES
ANTI-CREEP C.I.
(TWO KEYS)



1/16 IN 32 DOUBLE TAPER JAWS
TO SUIT TWO WAY KEYS



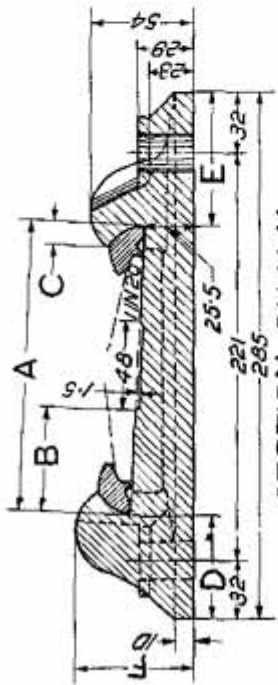
220M HOLE FOR PLATE SCREW
TO DRG: N^o T 10579

SIDE ELEVATION

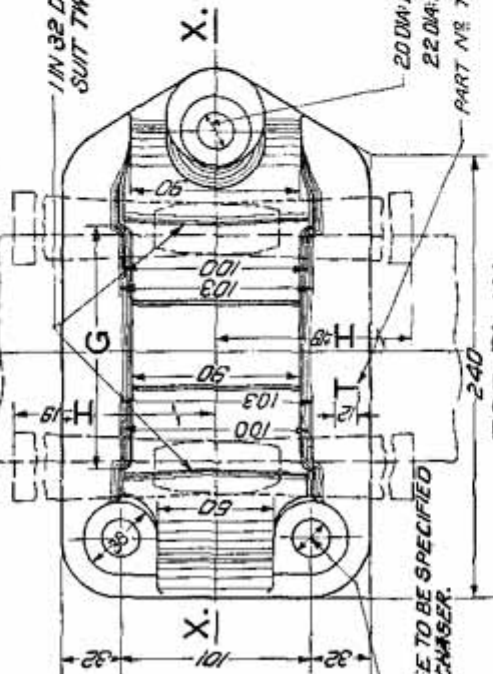
TOP PLAN **PART NUMBERS AND DIMENSIONS**

RAIL SECTION	GAUGE	PART NUMBER	APPROX. WEIGHT OF EACH IN Kg.	DIMENSIONS (mm)							
				A	B	C	D	E	F	G	H
90 R.	MG.	RO50/T-2552	-	173	63	11	57	55	145	60	32

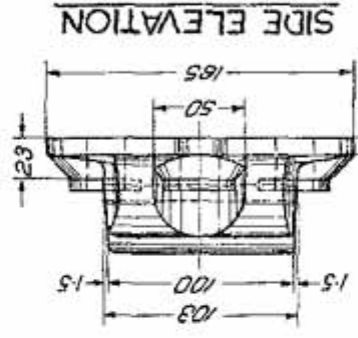
BEARING PLATES ANTI-CREEP C.I. (TWO-KEYS)



SECTION ON X-X.



TOP PLAN



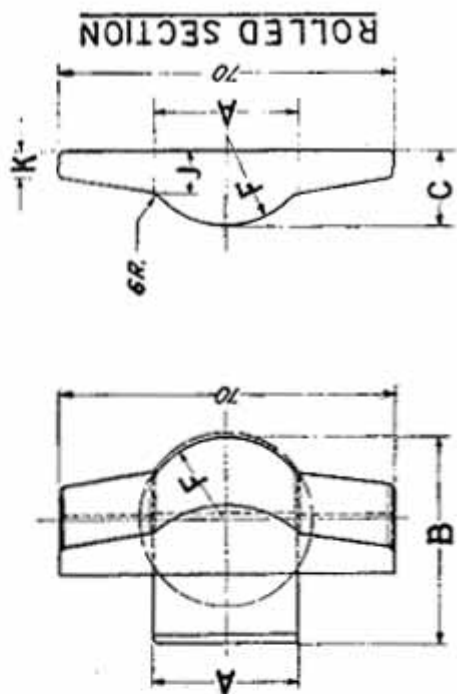
SIDE ELEVATION

PART NUMBERS & DIMENSIONS

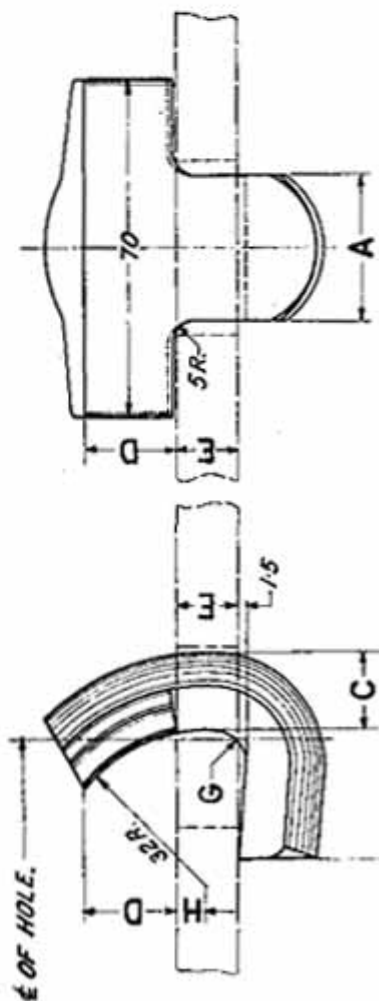
RAIL SECTION	GAUGE	PART NUMBER	APPROX. WEIGHT OF EACH IN LB	DIMENSIONS (in)							
				A	B	C	D	E	F	G	H
75 R.	M.G.	T 10146		153.5	57	12.5	55.5	71	63	133	156.5
60 R.	"	T 10148		142.5	50	11	66.5	76	63	120	156.5
50 R.	"	T 10150		136	45	11	72.5	76.5	62	111	130.5

SPRING STEEL LOOSE JAWS

SF 5
SHEET 1 OF 3



PLAN



FRONT ELEVATION

SIDE ELEVATION

PART NUMBERS AND DIMENSIONS

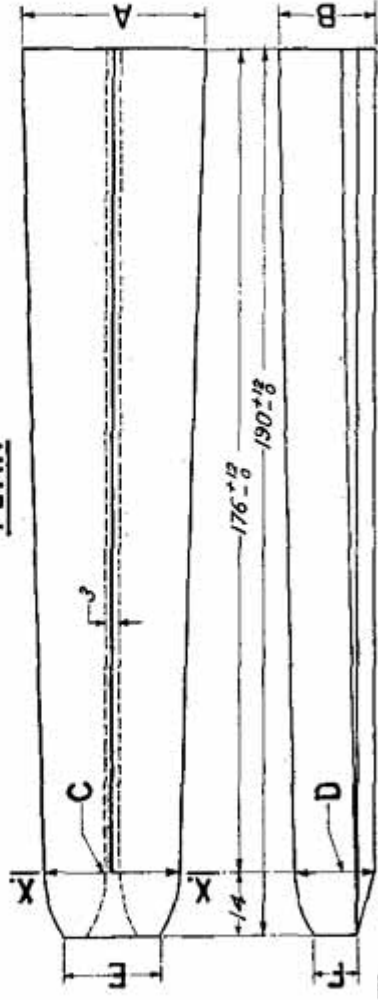
RAIL SECTION	GAUGE	PART NUMBER	WT. OF 100 JAWS (IN KG) (APPROX.)	DIMENSIONS (mm)										
				A	B	C	D	E	F	G	H	J	K	
UIC 60 Kg	B.G.	R2001F-2571	-	30	45	16	22.5	13	19	7	4	9	6	
52 Kg & 90R.	B.G.	T-415 (M)	28.8	30	43	16	19	13	19	7	6	9	6	
75R.	B.G.	T 10003	28.1	30	43	16	18	11	19	7	7	9	6	
75R.	M.G.	T-419 (M)	23.1	27	35	13.5	19	9	16.5	4.5	6.5	6.5	5	
60R. & 50R.	M.G.	T 10002	21.5	27	35	13.5	16	9	16.5	6	9.5	6.5	5	

TWO WAY KEYS

(MILD STEEL)

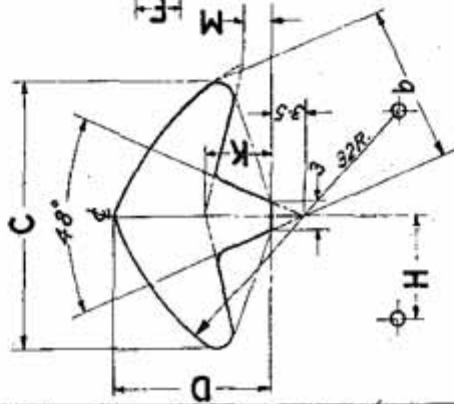
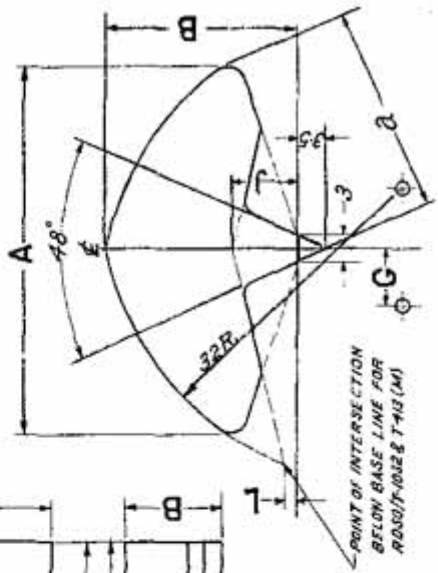
SF 5
SHEET 2 OF 3

PLAN



ELEVATION

HORIZONTAL TAPER ON KEY = $\frac{a-b}{176} = 1 \text{ mm IN } 32 \text{ MILLIMETRES} = 1 \text{ IN } 32$



SECTION ON X.X.

END ELEVATION

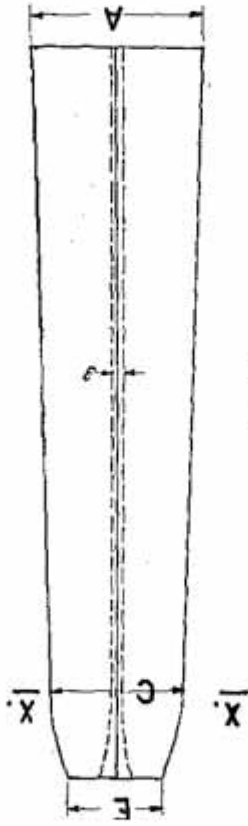
PART NUMBERS AND DIMENSIONS

RAIL SECTION	PART NUMBER	WT. OF 100 KEYS IN Kg (APPROX)	DIMENSIONS (mm)												
			A	B	C	D	E	F	G	H	J	K	L	M	
UIC 60Kg	RD001F-1032	-	39	20	28.5	16.5	21	9	6.5	11	7.5	7.5	0.6	1.75	
52Kg, 90R, & 75R.	7-405 (M)	48.5	39	20.5	28.5	16.5	21	9	6.5	11	7	7	1.5	3	
60R. & 50R.	7-413 (M)	43.0	35.5	18	25.5	14.5	19	8	4	9.5	5.5	5.5	1	1	

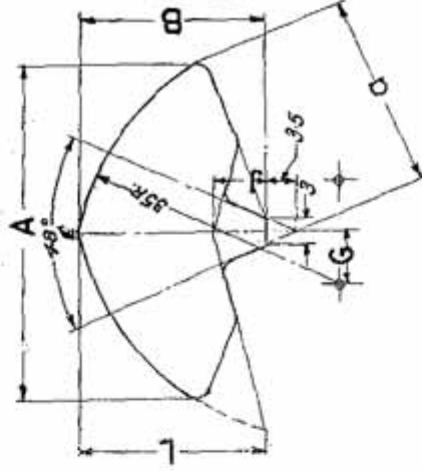
TWO WAY KEYS

(OVER SIZE)

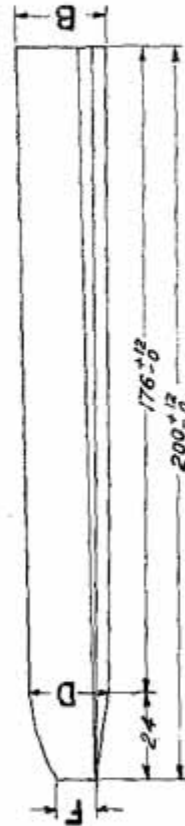
SF 5
SHEET 3 OF 3



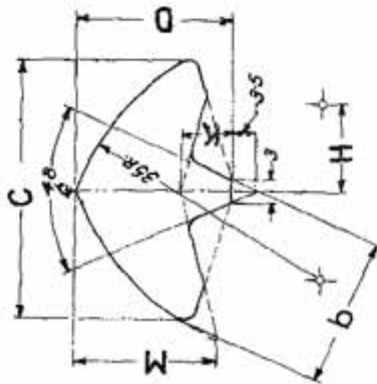
PLAN



END ELEVATION



ELEVATION



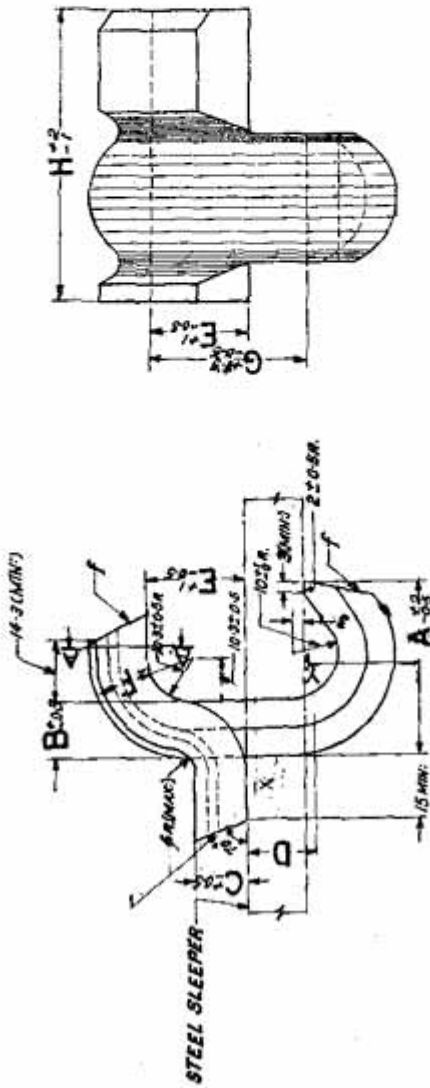
SECTION ON X.X.

HORIZONTAL TAPER ON KEY = $\frac{9-b}{176} = 1 \text{ mm}$ IN 32 mm = 1 IN 32.

PART NUMBERS AND DIMENSIONS

RAIL SECTION	PART NUMBER	WEIGHT OF 100 KEYS IN Kg (APPROX.)	DIMENSIONS (mm)												
			A	B	C	D	E	F	G	H	J	K	L	M	
52 kg, 90R. & 75R.	RD50/T-580		45	25	35	21	25	11	7	12	7	7	25	19.5	

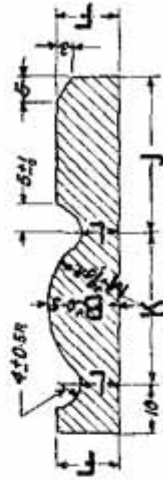
MODIFIED LOOSE JAWS (FOR ELASTIC RAIL CLIP)



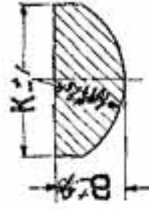
FRONT ELEVATION

SIDE ELEVATION

NOTE: - EDGE SHOWN THUS ----f SHOULD BE FORMED FROM STRAIGHT SHEARED EDGE BEFORE FORMING.



SECTION ON A.A.

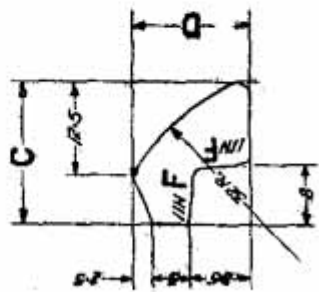
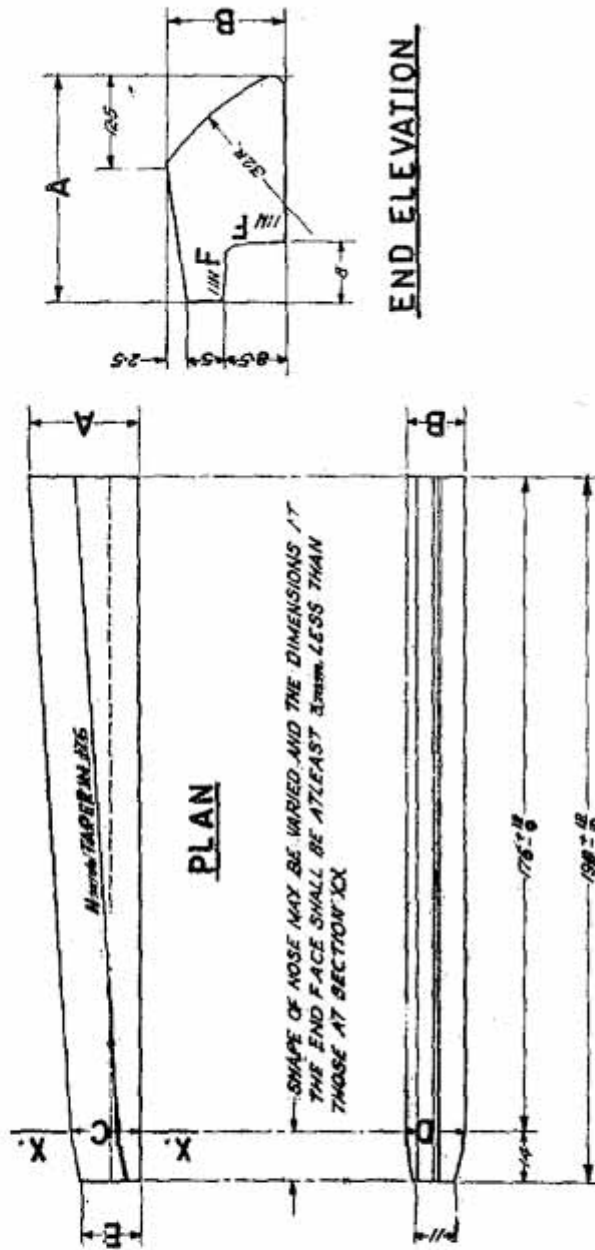


SECTION ON Y.Y.

PART NUMBERS AND DIMENSIONS

RAIL SECTION	GAUGE	PART NUMBER	WEIGHT OF 100 JAWS IN Kg (APPROX.)	D I M E N S I O N S (mm)												
				A	B	C	D	E	F	G	H	J	K	L	M	
52 kg.	B.G.	RDS&F1801	-	41.5	13.5	11.7	15	22.1	12	35.1	70	30	30	7.5	17.5	

SPECIAL KEY



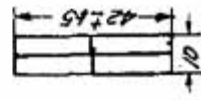
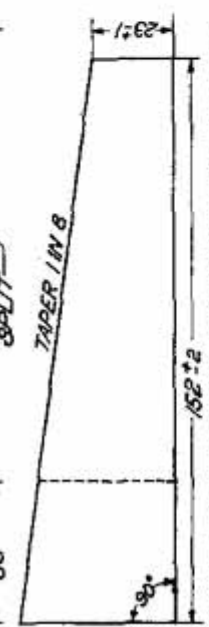
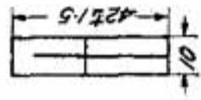
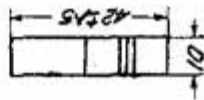
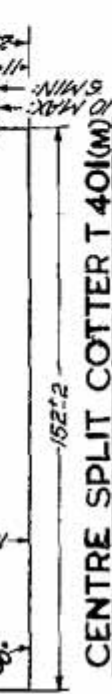
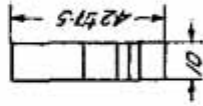
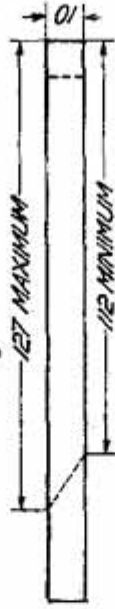
PART NUMBERS AND DIMENSIONS

RAIL SECTION	PART NUMBER	WT. OF 100 KEYS IN LB. (APPROX)	DIMENSIONS					
			A	B	C	D	E	F
60R-52kg	7-10011	35	30	16	19	16	16	12

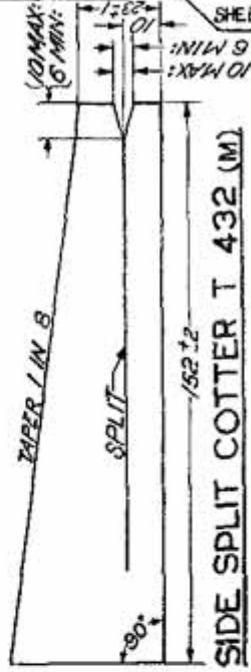
C.I. SLEEPER FASTENINGS

(M.S. COTTER)

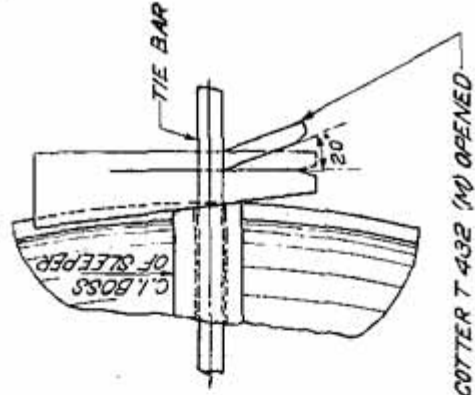
WEIGHT 0.37 kg EACH (APPROX.)



10 MAX. 6 MIN. 23±1



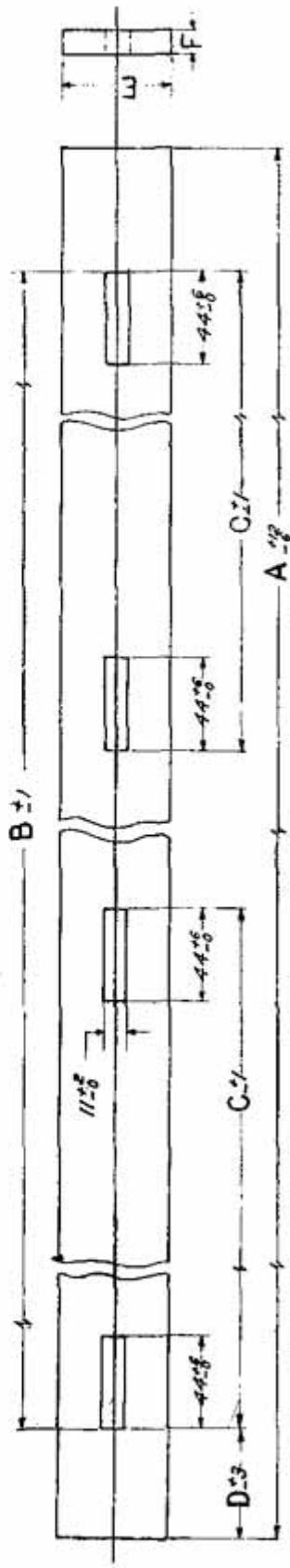
SF6 SHEET 1 OF 2



COTTER T 432 (M) OPENED

CAST IRON SLEEPER FASTENINGS

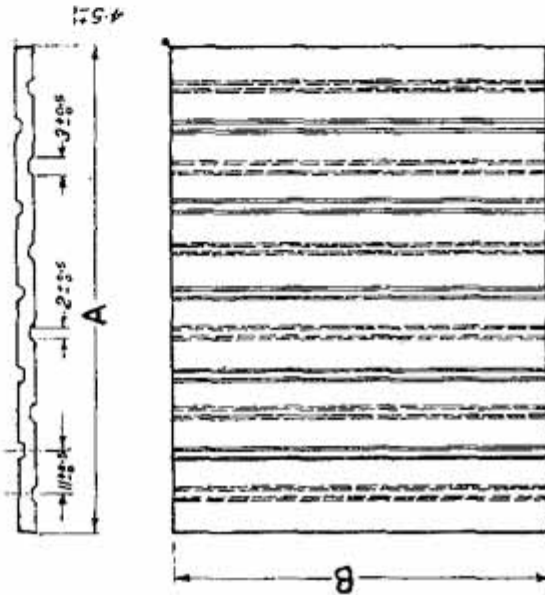
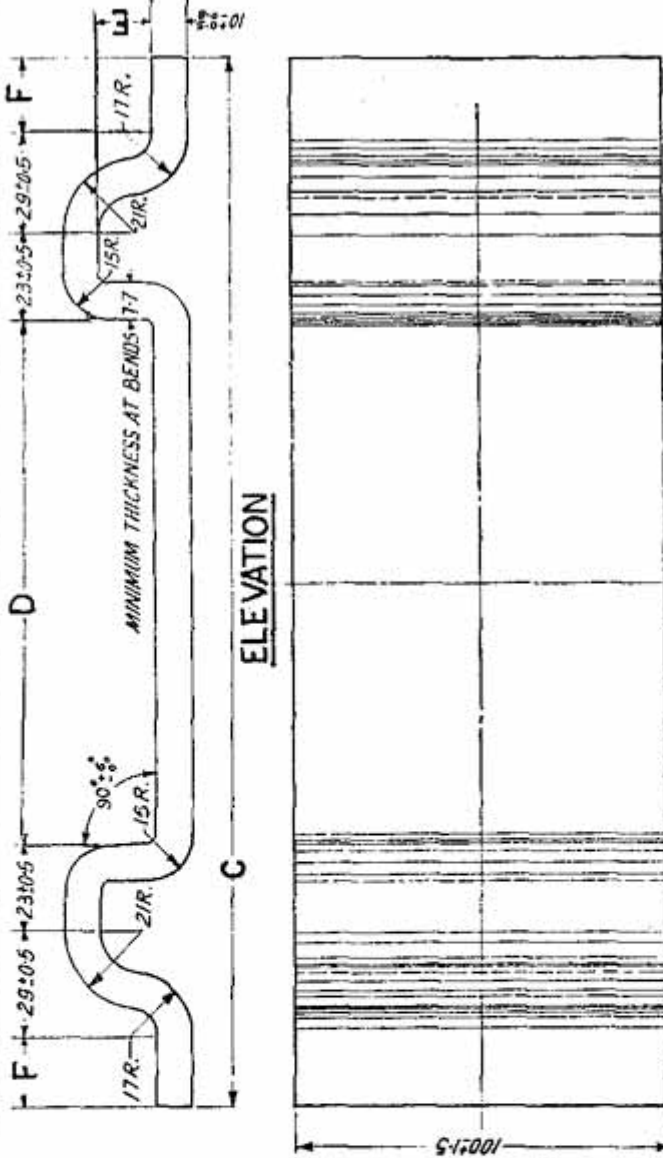
(M.S. TIE BARS)



PART NUMBERS AND MAIN DIMENSIONS

PART NUMBER	GAUGE	WEIGHT IN KG.	D I M E N S I O N S (IN MM)					
			A	B	C	D	E	F
T 404 (M)	B.G.	12.62	2720	2618	857	50	50	12
RDSJIT-2368	M.G.	8.996	1950	1839.5	755	55	50	12
T 433 (M)	M.G.	6.45	1870	1778	705	45	45	10

GROOVED RUBBER SOLE PLATE & STEEL RAIL PADS FOR S.T. SLEEPER B.G.



GROOVED RUBBER SOLE PLATE

PLAN

STEEL RAIL PAD FOR NON TRACK CIRCUITED LINES

TABLE OF DIMENSIONS

THE VALUES OF RADII GIVEN IN THE ABOVE SKETCH OF STEEL RAIL PAD ARE NOMINAL. THEIR TOLERANCES MAY VARY FOR DIFFERENT RAIL SECTIONS.

RAIL SECTION	GROOVED RUBBER SOLE PLATES		STEEL RAIL PADS				
	PART NUMBER	DIMENSIONS (m m)	PART NUMBER	DIMENSIONS (m m)			
	A	B	C	D	E	F	
UIC 60 kg	RDSO/T-2057	95±5	RDSO/T-1030	295±13	154±6	145±0.75	185±0.5
52 kg & 90 R.	RDSO/T-2056	100±5	RDSO/T-362	280±13	138±6	140±0.75	19±1.5

TABLE SHOWING APPROXIMATE WEIGHTS & QUANTITIES OF SLEEPERS & FASTENINGS

RAIL LENGTH IN METRES		WEIGHT IN TONNES PER TRACK KILOMETRE OF SLEEPERS OF VARIOUS TYPES																							
		STEEL TROUGH SLEEPERS										CAST IRON SLEEPERS (C.S.I. 9 TYPE)										WOODEN SLEEPERS			
		WITH SPRING STEEL LOOSE JAWS																				WITH SPIKES ONLY		WITH M.S. BEARING PLATES (CANTED)	
N ^o OF ORDINARY SLEEPERS	PER RAIL LENGTH OF TRACK	PER TRACK KILOMETRE	B.G.			M.G.			B.G.			M.G.			ANY RAIL SECTION		ANY RAIL SECTION		UIC 60 kg		52 kg 90R.		M.G.		
			UIC 60kg	52kg 90R.	75R.	90R.	75R.	90R.	60R. 50R.	60R.	75R.	90R.	75R.	90R.	50R.	75R.	90R.	50R.	60R.	75R.	90R.	50R.	60R.	75R.	90R.
9	11	1222		99.94	91.48		43.83	43.49		124.86		70.75	72.01		115.96	54.76		87.76		42.72	42.72		60R.		
10	12	1200		98.14	89.84		43.04	42.71		122.62		69.48	70.72		113.87	53.78		86.18		41.95	41.95		75R.		
11	13	1182		96.66	88.49		42.40	42.07		120.78		68.44	69.66		112.16	52.97		84.89		41.32	41.32		90R.		
12	14	1167		95.44	87.37		41.86	41.53		119.24		67.57	68.77		110.74	52.30		83.81		40.79	40.79		52kg 90R.		
13	15	1154		94.37	86.39		41.39	41.07		117.92		66.82	68.00		109.51	51.72		82.88		40.34	40.34		60R.		
9	12	1333		109.01	99.79		47.81	47.44		136.21		77.18	78.55		126.49	59.74		95.73		46.60	46.60		75R.		
10	13	1300		106.31	97.32		46.63	46.27		132.83		75.27	76.61		123.36	58.26		93.36		45.44	45.44		90R.		
11	14	1273		104.11	95.30		45.66	45.31		130.08		73.71	75.02		120.80	57.05		91.43		44.50	44.50		52kg 90R.		
12	15	1250		102.23	93.58		44.84	44.49		127.73		72.38	73.66		118.62	56.02		89.77		43.69	43.69		60R.		
13	16	1231		100.67	92.16		44.16	43.81		125.78		71.27	72.54		116.81	55.17		88.41		43.03	43.03		75R.		
9	13	1444		118.09	108.10		51.80	51.39		147.55		83.61	85.09		137.02	64.71		103.71		50.48	50.48		90R.		
10	14	1400		114.49	104.81		50.22	49.83		143.05		81.06	82.50		132.85	62.74		100.55		48.94	48.94		60R.		
11	15	1364		111.55	102.11		48.93	48.54		139.37		78.98	80.36		129.43	61.13		97.96		47.68	47.68		75R.		
12	16	1333		109.01	99.79		47.81	47.44		136.21		77.18	78.55		126.49	59.74		95.73		46.60	46.60		90R.		
13	17	1308		106.97	97.92		46.92	46.55		133.65		75.73	77.08		124.12	58.62		93.94		45.72	45.72		60R.		

9	14	1556	127-25	116-49	55-81	55-38	158-99	90-09	91-70	147-65	69-73	111-75	54-39
10	15	1500	122-67	112-30	53-81	53-39	153-27	86-85	88-40	142-34	67-22	107-73	52-43
11	16	1455	118-99	108-93	52-19	51-78	148-67	84-24	85-74	138-07	65-20	104-50	50-86
12	17	1417	115-88	106-08	50-83	50-43	144-79	82-04	83-50	134-46	63-50	101-77	49-53
13	18	1385	113-27	103-69	49-68	49-29	141-52	80-19	81-62	131-43	62-07	99-47	48-41
9	15	1667	136-33	124-80	59-80	59-33	170-33	96-52	98-24	158-18	74-70	119-72	58-27
10	16	1600	130-85	119-78	57-39	56-94	163-49	92-64	94-29	151-83	71-70	114-91	55-93
11	17	1545	126-35	115-66	55-42	54-99	157-87	89-46	91-05	146-61	69-24	110-96	54-01
12	18	1500	122-67	112-30	53-81	53-39	153-27	86-85	88-40	142-34	67-22	107-73	52-43
13	19	1462	119-56	109-45	52-44	52-03	149-39	84-65	86-16	138-73	65-52	105-00	51-11
9	16	1778	145-40	133-11	63-78	63-28	181-68	102-95	104-78	168-72	79-68	127-69	62-15
10	17	1700	139-03	127-27	60-98	60-50	173-71	98-43	100-18	161-32	76-18	122-09	59-42
11	18	1636	133-79	122-47	58-68	58-23	167-17	94-72	96-41	155-24	73-32	117-50	57-19
12	19	1583	129-46	118-51	56-78	56-34	161-75	91-66	93-29	150-21	70-94	113-69	55-33
13	20	1538	125-78	115-13	55-17	54-74	157-15	89-05	90-63	145-94	68-92	110-46	53-76

1. THE NUMBER OF DOG SPIKES/RAIL SCREW PER SLEEPER VARIES BETWEEN 4 & 8 DEPENDING ON REQUIREMENT OF THE TRACK ON VARIOUS RAILWAYS. AN AVERAGE OF 6 DOG SPIKES/RAIL SCREW PER SLEEPER HAS BEEN ALLOWED IN THESE CALCULATIONS. IN THE CASE OF C.I. BEARING PLATES USING ROUNDSPIKES/PLATE SCREW, 8 SPIKES/SCREWS PER SLEEPER SHOULD BE ADOPTED FOR CALCULATIONS.

2. SLEEPERS WITH BEARING PLATES HAVE BEEN ASSUMED TO BE OF SOFT WOOD E.G. DEODAR @ 640.74 kg/m³ WHEREAS THOSE WITHOUT BEARING PLATES HAVE BEEN ASSUMED TO BE OF HARD WOOD E.G. SAL @ 1041.21 kg/m³.

3. THESE CALCULATIONS ARE BASED UPON THE COMPONENTS WITH DOG SPIKES/ROUND SPIKES ONLY. FOR RAIL SCREWS/PLATE SCREWS CALCULATION WILL DIFFER.

CHAPTER III

CAST IRON SLEEPERS

	Page
Brief notes on cast iron sleepers	SCa & SCb
CST-9 type plate sleepers, BG & MG	SC1
Reversed jaw CST-9 plate sleepers, BG & MG	SC2

Brief notes on cast iron sleepers

CST-9 type plate sleeper : This sleeper is the last of the series of experimental sleepers designed and tried out on railways between the years 1926 and 1935 under the recommendations of the Track Standards Committee and contains the best features of its fore-runners and also includes as a unique feature two pockets for retaining packed ballast (somewhat after the principle of the bowl or pot). It has been extensively used since 1935 and its comparatively satisfactory behaviour has resulted in the withdrawal of all previous designs. The drawings for the CST-9 plate sleepers, have been standardised.

Some of the other salient features of this sleeper are :

- (1) A long through tiebar which is fastened to the plate by means of four standard cotters; (the alternative type with a short tiebar, gibs and cotters has been withdrawn as it was found to be not quite efficient).
- (2) The rail seat, which is canted 1 in 20, is only 114 mm wide (along the rail) and this narrow bearing tends to reduce the rocking of the sleeper plate under the wave motion of the rail.
- (3) A single two-way key is provided on the gauge side jaw, any small adjustment in the gauge being obtained by altering the relative position of four cotters.
- (4) By virtue of the double tapered jaw and the two-way key the direction of the key can be fixed to suit that of the creep in the track.
- (5) A part from the lateral stability provided by the keying up of the ballast in the pockets a keel is provided centrally along the rail to give additional anchorage.
- (6) The sleeper provides bearing area approximately equal to the effective bearing area of the standard main line wooden sleeper.

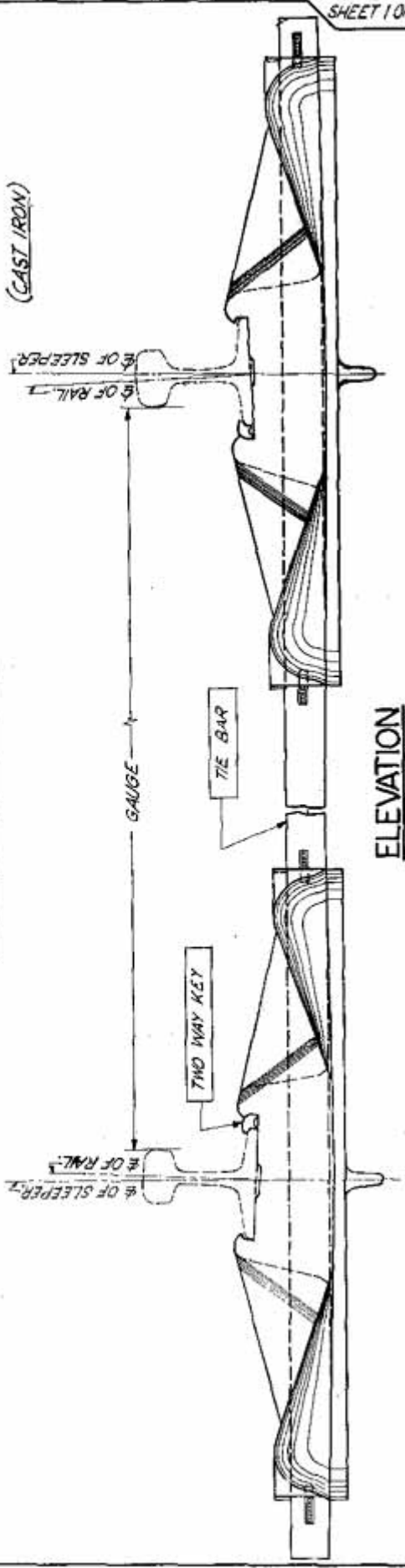
These sleepers have also been designed with the key side jaw reversed in position, i.e. on the outside of the rail, and serve as an antisabotage measure, when a few of this latter type are introduced in each rail length. They prevent the rail being removed without the removal of the tiebar fastenings.

The ordinary and the reversed jaw types of CST-9 sleepers are detailed on pages SC1 in 4 sheets and SC2 in 4 sheets respectively and the main dimensions and part numbers relevant to the various rail sections are tabulated. Designs have been prepared for 52 kg, 90R and 75R BG, 90R, 75R, 60R and 50R MG rail sections.

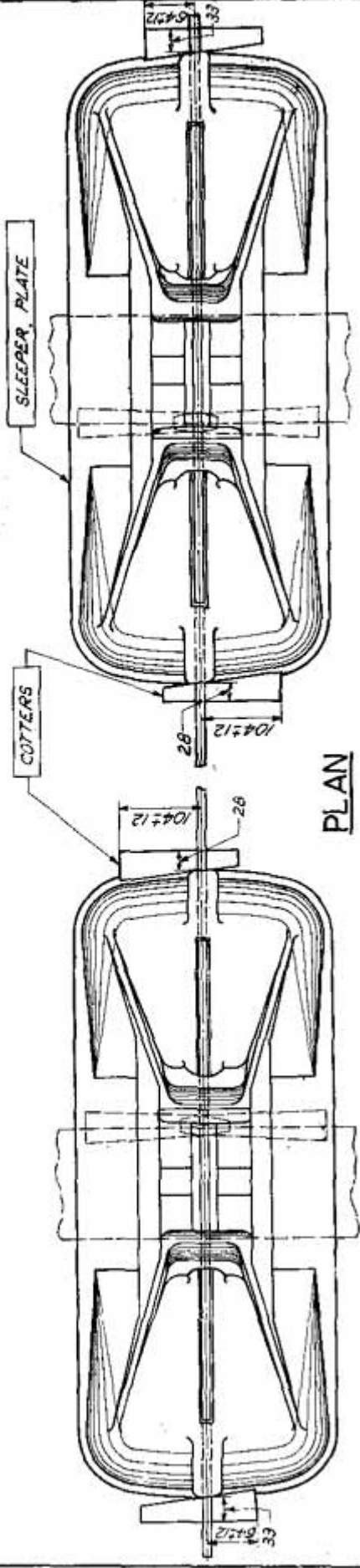
Specification No. IRS T-7 is to be referred for CST-9 type of sleepers.

C.S.T 9 TYPE ASSEMBLY OF SLEEPER

(CAST IRON)



ELEVATION

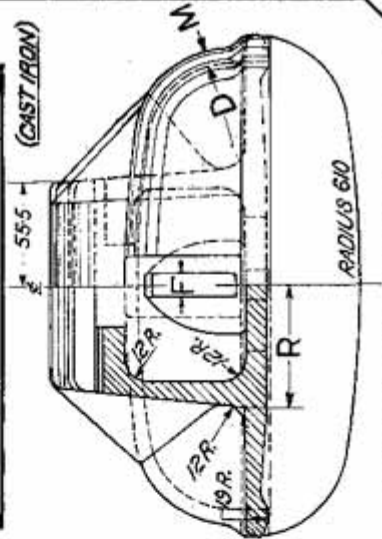


PLAN

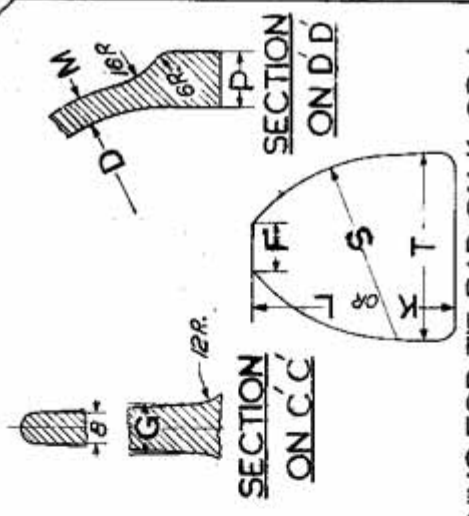
PART NUMBERS AND WEIGHTS

RAIL SECTION	GAUGE	ASSEMBLY DRG-NB	PART NUMBERS					APPROX. WEIGHT (Kg)					COMP. SLEEPER	
			PLATE	TIE BAR	TWO WAY KEY	COTTER	PLATES (2)	TIE BAR (1)	TWO WAY KEYS (2)	COTTERS (4)				
UIC 60 kg	B.G.													
52 kg & 90R	B.G.	TA 9 (M)	T 478 (M)	T 404 (M)	T 405 (M)	T 401 (M) OR T 423 (M) OR T 424 (M) OR T 425 (M)	87.10	12.62	0.97	1.48	102.17			
75 R	B.G.	TA 2005 I	T 10246	T 404 (M)	T 405 (M)	DO		12.62	0.97	1.48				
90 R	M.G.	RDSO/F-2367	RDSO/F-2366	RDSO/F-2368	T 405 (M)	DO	69.00	8.996	0.97	1.48	80.446			
75 R	M.G.	TA 20 (M)	T 498 (M)	T 433 (M)	T 405 (M)	DO	49.00	6.45	0.97	1.48	57.90			
60 R	M.G.	TA 20077	T 10257	T 433 (M)	T 413 (M)	DO	50.14	6.45	0.86	1.48	58.93			
50 R	M.G.	TA 20078	T 10258	T 433 (M)	T 413 (M)	DO		6.45	0.86	1.48				

C.S.T 9 TYPE PLATE SLEEPERS

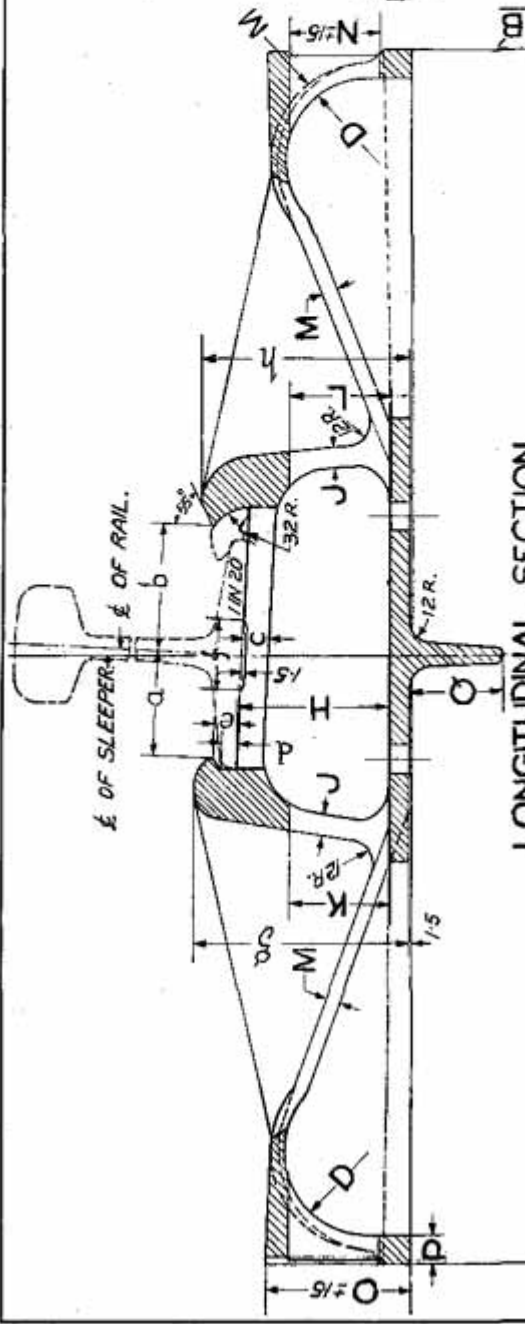


SECTIONAL ELEVATION
ON A A' B B'

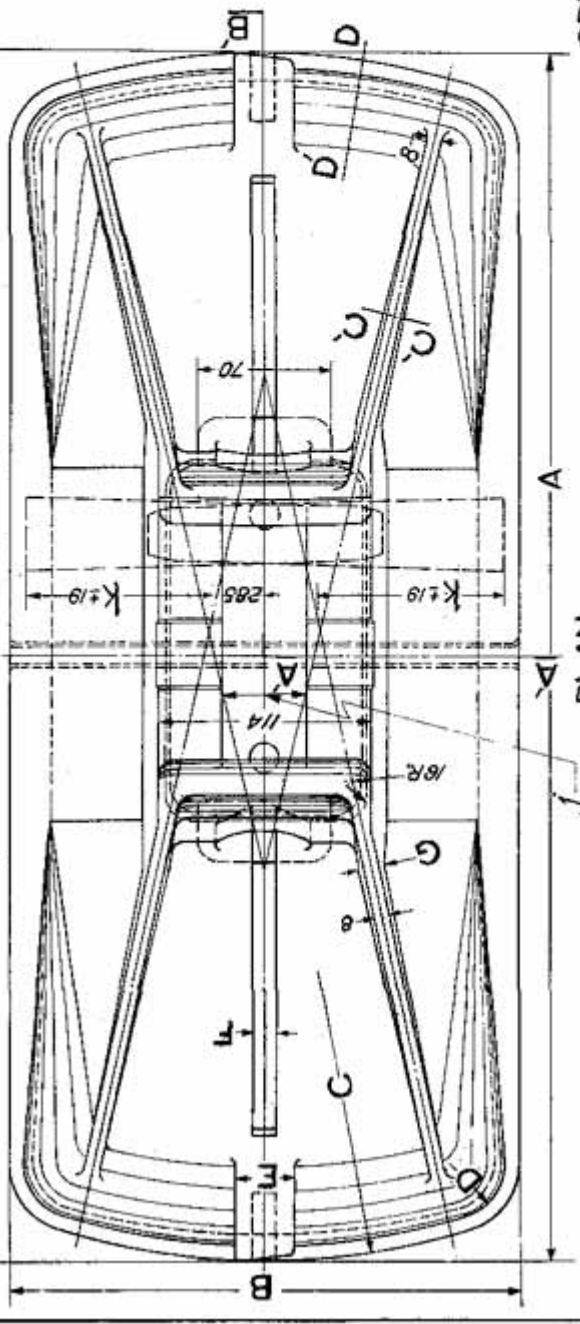


SECTION ON C C'

SECTION ON D D'



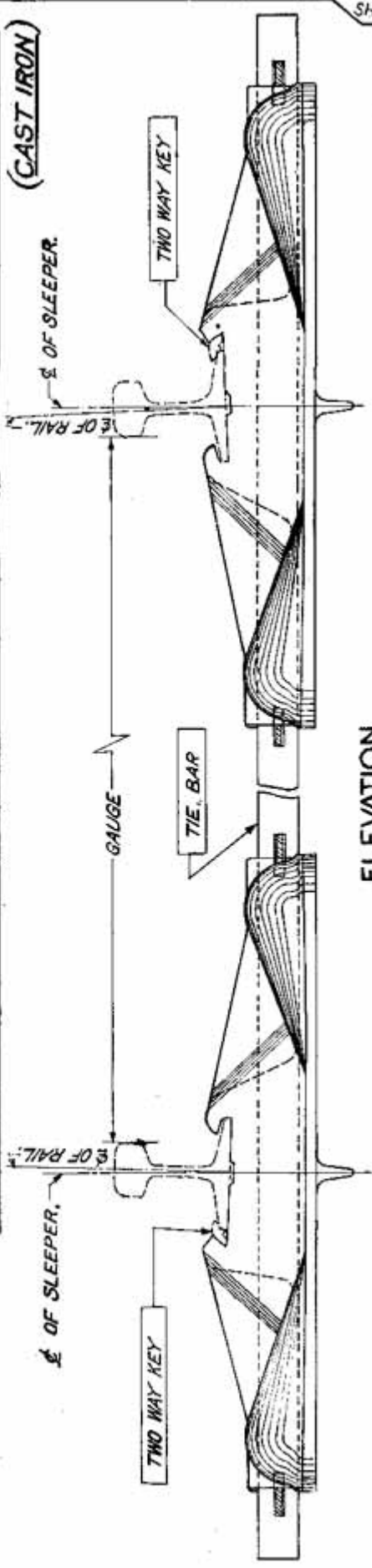
LONGITUDINAL SECTION



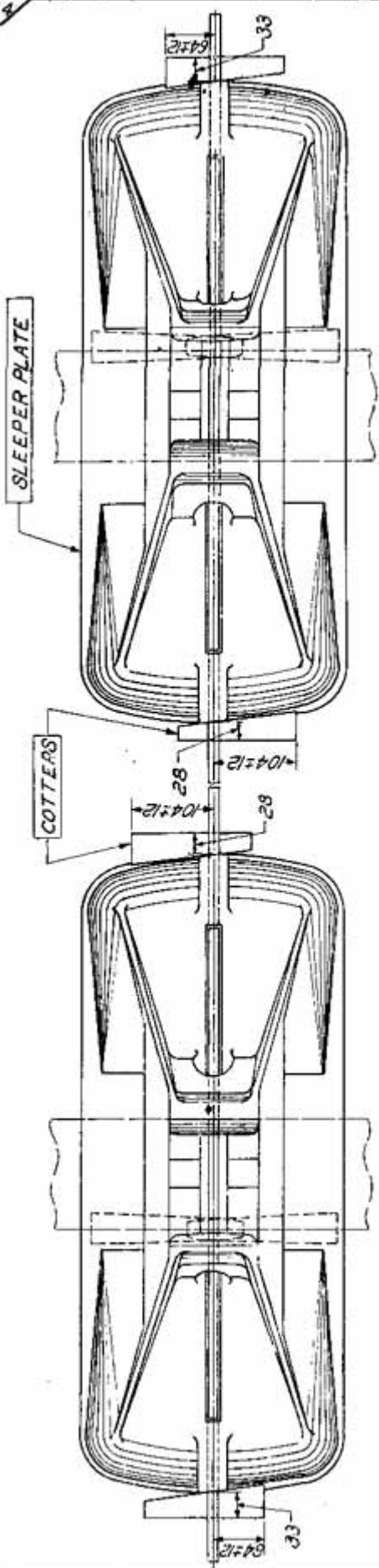
PLAN

OPENING FOR TIE BAR ON K OR L

REVERSED JAW C.S.T 9 TYPE ASSEMBLY OF SLEEPER (CAST IRON)



ELEVATION



PLAN