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Government of India
Ministry of Railways

**Instructions for Inspection and Maintenance
of
Casnub Bogies**

Technical Pamphlet No, G-95
(Revision-1)
March 1997

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**Research Designs & Standards Organisation
Manak Nagar, Lucknow-226 001**

**Amendment slip No. 5 (June 2003) to the Instructions for
inspection and Maintenance of CASNUB Bogie -Technical
Pamphlet No. G-95 (Rev.1 of March 1997)**

- “Para 5.2.11 read in place of “new/renewed” as “New” only”
- “Para 5.2.12 read in place of “new/renewed” as “New” only”
- “Para 5.2.13 read in place of “new/renewed” as “New” only”
- “Para 5.2.14 read in place of “new/renewed” as “New” only”

S.No. 84

Amendment Slip No. 4. of (April—2002) to the Inspection
Maintenance of CASNUB -Bogie-Technical Pamphlet No.G-95
(Rev.) of March 1997

Fig. 16 Adapter Crown Seat Gauge revised and enclosed

"Amendment Slip No. 3 (January 2002) to the Inspection &
Maintenance of CASNUB Bogies – Technical Pamphlet No. G-95
(Rev. I) of March 1997"

Para 5.3.8 – 5th paragraph shall be read as

" With the gauge in position as shown in Fig. 34 (a) if a given in Annexure D After reclaiming it should be ensured that the gauge admits in the jaw opening Side frame pedestal opening vertical profile check gauge to RDSO Drg No. WD-98/22-S.10 may be used for checking the contour".

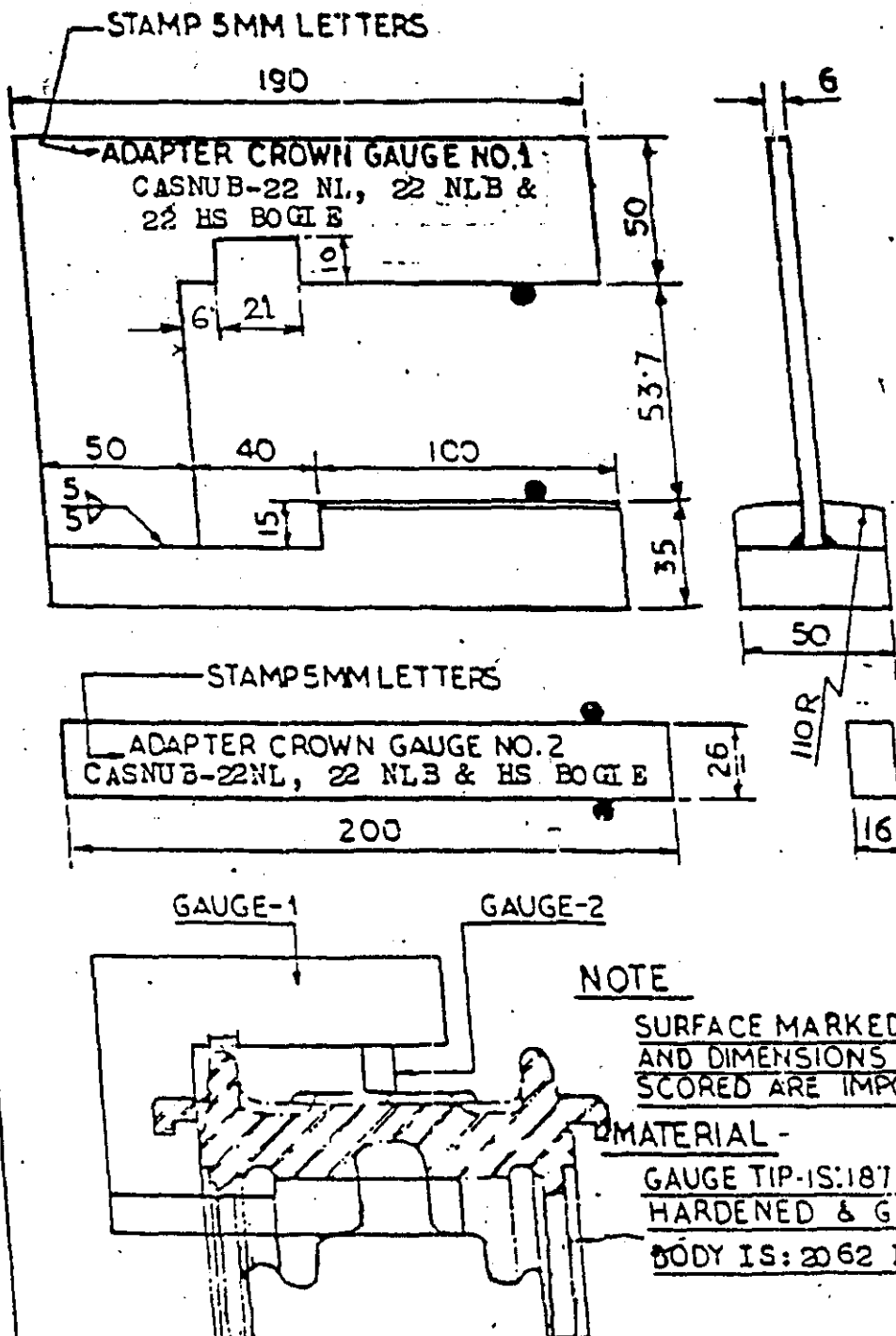


FIG. A

ADAPTER CROWN SEAT GAUGE
CASNUB-22 NL, 22 NLB & 22 HS BOGIES

2

FIG.16

Amendment Slip No.2 of February 2000 to the "Inspection and Maintenance of CASNUB bogies-Technical Pamphlet G-95 (Revision I) of March 1997 (Printed July, 1998)".

1. Para 4.1.3 Shall be deleted and shall read follows .

4.1.3 The bogies shall be dismantled during ROH. The bogie clearances and tolerances should be checked and rectified, if found necessary. The brake beam safety support to RDSO drg.No.WD-87078-S/1 shall be provided for the bogies of all versions with spring planks which are already provided with holes for fixing brake beam support.

2. Para 4.1.9 Shall be deleted and shall read as follows:

4.1.9 During POH of wagon in shops, all wearing surfaces of bogie shall be brought to "As new condition". The brake beam safety support to RDSO drg.No.WD-87078-S/1 shall be provided in the bogies of all versions. wherever these brake beam safety support is not already provided. In case holes are not provided in the spring plank, the same may be drilled in position by taking suitable precaution to avoid distortion.

3. Figure 44- The dimension 170 shall be read as 175.

4. Figure 45 The dimension 64 shall be read as 59 in the elevation and side elevation.

Page 1 of 1. Checked by- sd/-

CDA/Bogie dt 14/2/2000

Approved by- sd/-

ADE/BD dt 14/2/2000

Amendment slip No.1 of June, 1999 to Instruction and Maintenance
Of Casnub Bogies-Technical Pamphlet No.G-95 (Revision I)
Of March, 1997 (Printed July, 1998)

The following para shall be added as para 5.8.1, 5.8.1.1, 5.8.1.2 after para 5.8

5.8.1 Important: The studies have indicated failures of centre pivot top are occurring on account of dimensional inaccuracies, therefore.

5.8.1.1 Inspect the bore of the top centre pivot ($270 +0.5 \text{ mm}$
 -0.0 mm

WD 85079-S/2 for W (M) NL, NLB, HS Bogies) which should have a push fit with retainer ring (outer dia $270 + 0.0 \text{ mm}$) so that

-0.1
longitudinal forces are transmitted through retaining ring and not through rivets

5.8.1.2 Before fitment of new top centre pivots (for NL NLB/HS Bogies) Centre pivots shall be checked by applying the gauges to Drg.No WD.99033-S/3 and ensure rivet holes are as per drawing No WD-85079-S/2.

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

**INSTRUCTIONS FOR INSPECTION AND MAINTENANCE
OF
CASNUB BOGIES**

**TECHNICAL PAMPHLET No. G-95
(Revision-1)**

Printed JULY 1998

**RESEARCH DESIGNS AND STANDARDS ORGANISATION
MANAK NAGAR, LUCKNOW-226 011**

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1. INTRODUCTION : The Cast Steel CASNUB Bogies comprise of two cast sideframes and a floating bolster. The bolster is supported on the side-frames through two groups of spring, which also incorporate the load proportional friction damping. The side-frames are connected by a fabricated mild steel spring plank to maintain the bogie square. The various bogie versions developed are as under :—

1. CASNUB-22W
2. CASNUB-22W (Retrofitted)
3. CASNUB-22W(M)
4. CASNUB-22NL
5. CASNUB-22NLB
6. CASNUB-22HS

These bogies have been fitted under following wagons—BOXN, BCN, BCNA, BRN, BTPN and BTPGLN.

All Casnub 22W bogies are to be converted to Casnub 22W (retrofitted) by the maintenance depots and workshops.

2. HISTORY : The CASNUB Bogie was first tested in 1972 under BOI Wagon, and was found safe to run at test speeds up to 110 km/h. Test results have been published in RDSO's Mechanical Engineering Report No. M-265.

In 1981, trials were again undertaken on this bogie under 'BOXN' Wagon on track maintained to mainline standards and its behaviour was well within safety limits up to 90 Km/h speed. This bogie was first fitted under open BOXN wagons and was designated as Casnub 22W. This was modified as Casnub 22 W(M), mainly to take care of high wheel wear reported on earlier version. Subsequently Casnub 22 NL (Narrow jaw) and Casnub 22 NLB (Narrow jaw with fish belly bolster) versions were introduced.

Casnub 22 IIS bogies have been developed for high speed operation with maximum permitted speed upto 100 km/h. This is presently at trial stage.

3. SALIENT FEATURES : The salient features of the bogie are :

Gauge :	1676 mm
Axle Load :	20.3t However, all bogies except Casnub 22IIS, can be upgraded upto 22.9t.
Wheel Diameter :	1000 mm(New) 956 mm (New) for retrofitted casnub 22W
Wheel Base :	2000 mm

Type of Axle Bearing :

- Casnub-22W & 22W(M)**
- (a) Cylindrical roller bearing axle box in limited no. on Casnub 22W Bogies only.
 - (b) Standard AAR Tapered cartridge bearing class 'E' suitable for 152.4×276.4 mm (6"×11") wide jaw.

Casnub-22NL, 22NLB & 22 IIS.
Standard AAR tapered Cartridge Bearing Class 'E' suitable for 152.4×276.4 mm (6"×11") narrow jaw.

Distance between journal centres :

2260 mm

Distance between side bearers :

1474 mm

Type of side bearers :

Casnub 22W
Roller type (clearance type)
Retrofitted Casnub 22W, Casnub 22W(M), 22NL, 22NLB

Constant contact type (Metal bonded rubber pad, housed inside side bearer housing).

Casnub 22IIS
Spring loaded constant contact type side bearer.

Type of pivot :

Casnub 22W
IRS Type
Top Pivot—RDSO Drg. No. W/BE-601.

Bottom Pivot—RDSO Drg. No. W/BE-602 or similar mating profile integrally cast with bolster.

Casnub-22W(M), 22NL, 22NLB, 22IIS

Spherical type RDSO Drg. No. WD-85079-S/2.

Anti rotation features :

Anti rotation lugs have been provided between bogie bolster and sideframe.

Type of brake beam :

Casnub-22W, 22NL, 22NLB and 22IIS
Unit type fabricated brake beam supported and guided in the brake beam pockets.

Casnub-22W(M)

Unit type Cast Steel Brake beam suspended by hangers from side frame brackets.

Suspension details: Long travel helical springs.

Elastomeric pads: On All types of bogies except Casnub 22W Subsequently provided in retrofitment.

4. MAINTENANCE OF THE BOGIE

4.1 GENERAL

4.1.1 The CASNUB Bogie, as designed, is not expected to call for break-down maintenance. However, to obtain optimum life of the bogie, it is desirable to maintain the various clearances, within the recommended limits.

4.1.2 Due to wear of the mating components, increase in clearance takes place which should be monitored.

4.1.3 The bogies should be dismantled during ROH only. The bogie clearances and tolerances should be checked and rectified, if found necessary.

4.1.4 Whenever the wear reaches the recommended limits, or it is felt that it will cross recommended wear limit before next ROH, the repairs should be undertaken by either building up the wear on surfaces, or changing of their liners, as the case may be.

4.1.5 Fig. 37 indicates the method of checking the combined wear in bolster/sideframe liners and wedge. Due to wear in bolster/sideframe liners and wedge surfaces, the wedge will move upwards. If the holes in bolster pocket wall and wedge start crossing, repair shall be undertaken. Alternatively, gauge shown at Fig. 38 shall be used to determine the wear limit, to decide whether repair shall be undertaken.

4.1.6 The above repairs should be carried out by positioning the job for down-hand welding and suitable manipulators arranged to ensure this.

4.1.7 After the repairs, the repaired surfaces should be checked with the relevant gauge for correctness. Excess material, if any, should be removed by grinding/machining.

4.1.8 The class of electrode, gauge of electrode, welding current and welding precautions to be taken while repairing the surfaces by welding, should be followed as per Annexures C to F.

4.1.9 During POH of wagon in shops, all the wearing surfaces of bogie shall be brought to, "As new condition".

4.2 ASSEMBLING AND DISASSEMBLING OF THE BOGIE

4.2.1 Method of Dis-Assembling

4.2.1.1 Dis-connect Bogie Brake Rigging attachments to underframe and underframe brake Gear and raise

car body after removing shackle lock/castle nut etc. Run out the bogie.

4.2.1.2 Insert assembly pins (12 mm dia×250 mm long) to retain friction shoes.

4.2.1.3 Raise bolster to contact top member of sideframe.

4.2.1.4 Remove outer, inner and snubber springs.

4.2.1.5 Remove assembly pins and lower wedge blocks to take them out.

4.2.1.6 Lower bolster to rest on the spring plank.

4.2.1.7 Slide the bolster to one side to take it out.

4.2.1.8 Take out side frame key to release the wheelset.

4.2.1.9 Take out the side frames and spring plank assembly.

4.2.1.10 In case of bogie fitted with cartridge type bearing with wide jaw adapters, remove the adapter retainer bolt to release the adapter.

4.2.2 Method of Re-Assembling: Re-assemble the bogie by reversing the procedure, outlined in Para 4.2.1.

Also see Fig. 5, 6 and 7 "Assembly Procedure".

IMPORTANT: Inspect all the load and snubber springs for proper seating after wagon body is on bogies.

For matching of load bearing springs, refer Para 5.6.2.

The centre Pivot of the bogie shall be lubricated with graphite flakes to IS : 495 at the time of assembly. No other mating surface in the bogie shall be lubricated.

4.2.3 Nominal Clearances: The nominal clearances and the tolerances of the bogie assembly are shown in figure 3 and 4. The main clearances are:—

Description	Type of Casnub Bogies			
	22W 22 W (Retro)	22W (M)	22NL NLB	22HS
1. Lateral clearance between sideframe & bolster.	18mm	18mm	18mm	25mm
2. Lateral clearance between sideframe and axle box/adaptor.	25mm	25mm	16mm	16mm
3. Longitudinal clearance between sideframe & axle box/adaptor.	2mm	10mm	9mm	9mm
4. Longitudinal clearance between sideframe and bolster.	6mm	6mm	6mm	6mm
5. Clearance between anti-rotation lug & bolster.	4mm	4mm	4mm	4mm

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5. BOGIE COMPONENTS : The Casnub bogie assembly consists of the following components—

- (1) Wheel set with cylindrical roller bearing or wheel set with cartridge bearing.
- (2) Axle box/adaptor, retainer bolt & side frame key assembly.
- (3) Sideframe with friction wear plates.
- (4) Bolster with wear liners.
- (5) Spring plank, fitbolts & rivets.
- (6) Load bearing springs and snubber springs.
- (7) Friction shoe wedges.
- (8) Centre pivot arrangement comprising of centre pivot top, centre pivot bottom, centre pivot pin, centre pivot retainer & locking arrangement.
- (9) Side bearers.
- (10) Elastomeric pads.
- (11) Bogie brake gear.
- (12) Brake beam.

Detailed description of each item and the maintenance requirement is given in the following paragraphs.

5.1 WHEEL SET WITH BEARINGS : The Initial lot of Casnub bogies were fitted with cylindrical roller bearing axle box and matching wheel set. However standard AAR taper cartridge bearings have been subsequently standardised for these bogies. Fig. 2 indicates these components.

5.1.1 Maintenance requirement of cartridge taper roller bearings have been issued under "Instructions for inspection and maintenance of cartridge taper roller bearing fitted on cast steel bogies" Technical pamphlet No. G-81, 1st revision by RDSO.

5.1.2 Cylindrical Roller Bearing axle boxes fitted on the Casnub Bogies are supplied by M/s NEI Jaipur to their Drg No. 92-4289A. The maintenance instructions to be followed are indicated in their Drg No. M 33128.

5.1.3 Wheel profile used had been standard 1 in 20 taper, after the root radius, earlier. However, currently a worn wheel profile has been prescribed to reduce wheel wear and increase wheel life. The worn wheel profile for new wheels is as per the Drg. No. WD-88021. During reprofiling, wheels should be turned as per intermediate profiles having varying wheel flange thicknesses, selecting the appropriate flange thickness out of the four flange thicknesses, so that minimum material is removed at the time of turning. These are as per Drg. No. WD-89060-S/2.

5.1.4 Wheel diameter for new wheels is 1000mm. However, for Casnub 22W (retrofitted), maximum permissible wheel diameter is 956mm. Condemning wheel dia is 906mm for all versions, but with suitable packings, as described in para 5.12.

5.1.5 Axle

5.1.5.1 Axles have to be subjected to ultrasonic testing during ROH/POH or whenever the wagons are sent to shops. Wheel sets, whose axles have undergone ultrasonic testing, shall be stamped on the hub fillet as per RDSO's Drg. No. WD-81089-S/1.

5.1.5.2 Some axles on Casnub bogies have been reported to have grazing on account of main pull rod. These can be reclaimed, in case depth of notches/scratch/nicks is less than 5mm as per the instructions issued vide RDSO's letter No. MW/WA/GENL dt. 20-12-91. The reclamation of the axles for the reasons other than those indicated in the above quoted letter is not permitted.

5.1.5.3a Whenever axles are renewed, the workshop shall punch in 5mm letters the following particulars on the axle end.

- (i) Serial No.
- (ii) Workshop code where pressing has been done.
- (iii) Date of pressing.
- (iv) Journal Centre.
- (v) Pressing on pressure in tonnes (Both ends).

5.1.5.3b For Re-disced Wheels, the stamping shall be as per RDSO Drg. No. WD-87080/S-1.

5.1.5.4 Axle end holes should be properly cleaned and lubricated before reuse. Thread should be checked with standard thread gauge. Reclamation of axles with defective cap screw holes shall be carried out as per the instructions given in RDSO's letter MW/WA/GENL dated 8-5-92.

5.2 AXLE BOX/ADAPTER WITH RETAINER BOLT

5.2.1 Casnub 22W : Initial lot of wheel sets with cylindrical roller bearing were provided with axle box on Casnub 22W type bogies. However, cartridge taper roller bearing was soon standardised which are provided with adapter & adapter retainer bolt. Casnub 22W bogies are provided with wide jaw adapter as per RDSO sketch No. SK-78527 but without elastomeric pads with wheel set to Drg. No. WA/WL-4902, SK-68512 and WD-89025-S/1 and retainer bolt to Drg. No. SK-69594.

5.2.2 Casnub 22W(M) : Wheel sets with wide jaw adapter, cartridge roller bearing and adapter retainer bolt. (WA/WL-4902/WD-89025-S/1 for wheelsets).

5.2.3 Casnub 22NL, 22NLB & 22HS bogies : Wheel sets with narrow jaw adapter and cartridge roller bearing. (WD-89025-S/1 for wheelsets).

Casnub 22W (Retrofitted) : Bogies are provided with modified wide jaw adapters but these are not

interchangeable with Casnub 22W & Casnub 22W(M).

5.2.4 Axle Box

Axle Box Crown Lugs (Cylindrical Roller Bearings)			
Wear limit	=	4 mm	
Gauge	=	Fig 18	
		<u>New/Renewed</u>	<u>Worn</u>
Axle Box Crown Lugs		159 mm	167 mm

Determine the amount of wear in the axle box crown outer and inner lugs by using the gauge shown in Fig. 18.

To determine the wear on the outer and inner lugs, with gauge in position as shown in Fig. (A). If a 5mm thick shim can be inserted between the worn lug and the gauge on either sides, at any point, repair should be made following the procedure given in Annexure-D.

NOTE : Before using the gauge, the centre line of the crown seat is to be marked taking the un-worn surface of the crown lugs as datum. While using the gauge, the centre line of the gauge and the marked centre line of the crown seat should be kept in the same line. The gauge should be moved for the full length of crown surface to measure wear.

The repaired side lugs should be checked with the gauge as shown in Fig. 18 (A) and (B). Excessive material is to be removed by grinding.

5.2.5 Axle Box Crown Seat (Cylindrical Roller Bearing) :

Wear limit	=	3.5 mm	
Gauge	=	Fig. 19	
		<u>New/Renewed</u>	<u>Worn</u>
Bearing housing to Crown Seat		36.5 mm	33 mm

Determine the amount of wear on the axle box crown seat by using the gauge shown in Fig. 19.

To determine the amount of wear on the axle box crown seat the gauge should be applied as shown in Fig. (A) of Fig. 19. If a 3.5 mm thick shim can be inserted between gauge 1 and gauge 2, it would indicate the limit of wear.

5.2.6 Axle Box Side Lugs (Cylindrical Roller Bearing) :

Wear limit	=	3 mm	
Gauge	=	Fig. 20	
		<u>New/Renewed</u>	<u>Worn</u>
Axle Box Side Lugs		130 mm	136 mm

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Determine the amount of wear on the axle box side lugs by using the gauge shown in fig. 20.

To determine the amount of wear on the side lugs with the gauge in position as shown in Fig. 20 (B), if a 4 mm thick shim can be inserted between the worn surface of the lug and gauge at either sides at any point, repair should be made following the procedure at Annexure-D.

NOTE : Before using the gauge, the vertical centre line of each side is to be marked taking the unworn surface of the side lugs as datum. While using the gauge, the centre line of the gauge and the marked centre line of the side lug of the axle box should be kept in the same line. The Gauge should be moved for the full length of worn surface to measure wear.

The repaired side lugs, should be checked with the gauge as shown in Fig. 20 (A) and (B). Excessive material is to be removed by grinding.

5.2.7 Axle Box Sides (Cylindrical Roller Bearing) :

Wear limit	=	3 mm	
Gauge	=	Fig. 21	
		<u>New/Renewed</u>	<u>Worn</u>
Axle Box Sides		268 mm	262 mm

Determine the amount of wear on the axle box sides by using the gauge shown in Fig. 21.

With gauge in position as shown in Fig. (A), if a shim of 3.5 mm thickness can be inserted between the casting and the gauge at each end at any point, repair should be made following the procedure indicated at Annexure-D.

NOTE : Before using the gauge the centre line of the axle box sides is to be marked on the axle box sides taking the un-worn surface of the axle box as datum. The gauge centre line should be kept to fall in the same line of the centre line of axle box sides. Two, 3.5 mm thick shims are required to be used simultaneously.

5.2.8 Adapter : WIDE JAW/NARROW JAW ADAPTERS TO BE USED WITH TAPERED CARTRIDGE ROLLER BEARING : REFER SK-78527 & WD-85093-S/1 WIDE JAW & MODIFIED WIDE JAW ADAPTERS RESPECTIVELY & WD-89067-S/9 (FOR NARROW JAW ADAPTER).

When bogies are dismantled for any purpose adapter must be thoroughly inspected for soundness and wear. The inspection for wear shall include the application of gauges at locations detailed in Fig. 8 & 13A.

The following conditions shall render the adapter to be scrapped and replaced :—

- (a) Cracked or broken at any location.

(b) Warped or twisted or otherwise distorted. To check the adapter for distortion, place the adapter on the bearing outer ring. It should sit firmly on the outer ring without rocking when hand pressure is applied on the top of the adapter.

(c) When uniform wear band on the outer cup is not observed where the adapter sits and shining marks are seen on the wear band area, the adapter should be scrapped. The shining marks at the ends of the wear band corresponding to (A) in Fig. 13 & 17 should not be the cause for rejection. Non-uniform wear band on the outer cup indicates that the adapter bore does not match with the outer cup dia.

(d) Worn to the extent that ridges or grooves prevent the proper seating of the adapter on the bearing.

(e) When the wear at the thrust shoulder, adapter bore, adapter crown lugs, adapter crown seat, adapter side lugs and adapter sides reaches the limits indicated in subsequent paragraphs.

(f) Whenever visual marks of the adapter seating are found to be confined on a limited length circumferentially on the outer cup, the bearing should be rotated so as to bring that portion of the outer cup seating area under the adapter which does not have adapter seating marks. This procedure will facilitate shifting of the loaded zone during the life of the bearings and thus increase the life of the Cartridge Bearing which are worn in one side between lugs from brake reactions but which are otherwise satisfactory for reuse should be reversed when reused. When both sides exceeds 3 mm wear, do not reuse adapter.

5.2.9 Thrust shoulders :

Wear limit	=	0.7 mm
Gauge : Wide jaw	}	= Fig. 9
Narrow jaw		

The thrust shoulder of the used adapters may show grooves due to contact with the ends of roller bearing outer ring. The depth of such grooves shall be gauged by using gauge at Fig. 9.

If, at any point on the periphery of adapter, the gauge touches i.e. the groove is 0.7 mm, the adapter shall be scrapped.

5.2.10 Adapter bore (bearing seat) :

Gauge	=	Fig. 9
-------	---	--------

Machined relief has been provided by the side of the bearing seats at a different level. When measured, machined relief depth shall be 0.8 mm or more. The gauge shown at Fig. 9 B shall seat on the bearing seat without touching the machined relief. If the gauge touches the machined relief, the adapter shall be scrapped.

The adapter bearing seat must be checked over full arc by this gauge.

5.2.11 Adapter Crown Lugs :

Wear limit	=	4 mm
Gauge Wide Jaw	=	Fig. 10
Narrow Jaw	=	Fig. 14

	New/Renewed	Worn
Adapter Crown Lugs (Wide Jaw)	156 mm	164 mm
Adapter Crown Lugs (Narrow Jaw)	155.5 mm	163.5 mm

To determine the amount of wear in the adapter outer and inner lugs use the gauge shown in Fig. 10/14.

With gauge in position as shown in Fig. 10/14 (A), if a 5 mm thick shim can be inserted between the worn lug and the gauge on either side at any point, the adapter should be scrapped.

Before using the gauge, the centre line of crown seat is to be marked taking the unworn surface of the crown lugs as datum. While using the gauge, the centre line of the gauge and the marked centre line of the crown seat should be kept in the same line. The gauge should be moved for full length of crown surface to measure wear.

5.2.12 Adapter Crown Seat :

Wear limit	=	3.5 mm
Gauge Wide Jaw	=	Fig. 11
Narrow Jaw	=	Fig. 16

	New/Renewed	Worn
Adapter bore seat to Crown Seat		
Wide Jaw Adapter	48.5 mm	45 mm
Modified Wide Jaw Adapter	25.5 mm	22 mm
Narrow Jaw Adapter	26.2 mm	22.7 mm

Determine the amount of wear on the adapter crown seat by using the gauge shown in fig. 11/16.

The gauge should be applied as shown in Fig. A of Fig. 11/16. If a 4.5 mm shim can be inserted between gauge 1 and gauge 2, it indicates the limit of wear and the adapter should be scrapped.

5.2.13. Adapter Side Lugs :

Wear limits	=	3 mm
Gauge : Wide Jaw Adapter	=	Fig. 12
Narrow Jaw Adapter	=	Fig. 15

Adapter Side Lugs	New/Renewed	Worn
Wide Jaw	130 mm	136 mm
Narrow Jaw	97 mm	103 mm

Determine the amount of wear on the adapter side lugs by using the gauge shown in Fig. 12/15.

With the gauge in position as shown in Fig. 12/15 (A), if a 4 mm thick shim can be inserted between worn surface of the lug and gauge at either sides at any point, the adapter shall be scrapped.

Before using the gauge, vertical centre line of each side is to be marked taking the unworn surface of the side lugs as datum. While using the gauge, the centre line of gauge and the marked centre line of the side of adapter should be kept in the same line. The gauge should be moved for full length of worn surface to measure wear.

5.2.14. Adapter Sides :

Wear limit	- 3 mm
Gauge : Wide Jaw	- Fig. 13
Narrow Jaw	- Fig. 17

Adapter Sides	New/Renewed	Worn
Wide Jaw	268 mm	262 mm
Narrow Jaw	181 mm	175 mm

Determine the amount of wear on the adapter side by using the gauge shown in Fig. 13/17.

With gauge in position as shown in Fig. 13/17 (A), if a shim of 3.5 mm thickness can be inserted between the casting and the gauge at each end at any point, adapter should be scrapped.

Before using the gauge the centre line of the adapter sides is to be marked on the adapter sides taking unworn surface of their adapter as datum. The gauge centre line should be kept to fall on the marked centre line of adapter sides. Two: 3.5 mm thick shims are required to be used simultaneously.

5.3 SIDE FRAME WITH FRICTION WEAR PLATES

5.3.1 Side Frame : The wearing surfaces in the side frame are shown in Fig. 22/23. Details of reclamation procedure for each location are given in the following paragraphs :

5.3.2 Side Frame Column Friction Plate :

(Common for all versions)

Wear limit	- 4 mm
Reference	- Fig. 24.

Side Frame columns have been provided with 10 mm thick Silico Manganese Steel wear liners to IS : 3885 Pt. 1, Gr. IV welded on the columns. The liners may be permitted in service up to a thickness of 6 mm to be ensured by suitable gauge centrally placed, or

whenever found broken. Use friction plate as shown in Fig. 24.

Dress the surface of column face.

The new friction plate is to be held tight against the column face during welding which should be done in downhand position.

Start welding at diagonal ends of the plate and work towards the centre.

Refer Annexure 'F' for other welding details.

No paint or grease should be applied on the friction plate.

5.3.3 Side Frame Column Sides :

(Common for all versions)

Wear limit	= 5 mm
Gauge	= Fig. 25.

	New/Renewed	Worn
Column Sides	216 mm	206 mm

This gauge determines the amount of wear on the outside and the inside of side frame columns.

Mark the centre line on the friction plate or steel casting and place the gauge so that the centre line of the gauge falls in line with the centre line of the side frame column as shown in Fig. 25. If a 6 mm shim can be inserted between the casting and gauge at each side, at any point, the surface should be dressed to enable welding of suitably thick liners of Silico Manganese Steel following welding procedure as per Annexure 'F'. After putting liners, admissibility of the gauge should be ensured.

NOTE : Two: 6 mm shims are required to be used simultaneously.

5.3.4 Side Frame Anti-Rotation Lug :

(Common for all versions)

Wear limit	= 3 mm
Gauge	= Fig. 26.

	New/Renewed	Worn
Anti-rotation lug	522 mm	528 mm

This gauge determines the wear on the anti-rotation lug. With gauge in position centrally placed, if a 4 mm shim can be inserted between the casting and the gauge at each rotation stop, at any point the surface should be dressed to enable welding of suitably thick liner of Si-Mn Steel, following welding procedure given in attached Annexure 'F' (Refer Fig. 26).

NOTE : Two: 4 mm shims are required to be used simultaneously.

The gauge is designed to use with friction plate applied to the side frame columns. If anti-rotation lugs are

gauged without friction plates two 10 mm thick spacers (one at each side) should be positioned within the column and the gauge to simulate friction plates on the columns.

5.3.5 Pedestal Crown Roof:

Wear limit	=	5 mm
Gauge	=	Fig. 27 & 28 (for 22W, 22W Retrofitted, 22W(M) and other versions respectively).
		<u>New/Renewed</u> <u>Worn</u>

Key Seat to Pedestal	22W	273 mm	278 mm
Crown Roof	22W(M)	318 mm	323 mm
	22NL/NLB/HS	323 mm	328 mm

Determine the amount of wear on the side frame pedestal Crown Roof by using the relevant gauge shown in Fig. 27 & 28 as the case may be.

With the gauge in position, as shown in Fig. 27/28 (A), if a shim of 6 mm thickness can be inserted between the casting and the gauge at any point, the surface should be dressed to enable welding of suitably thick liner of Si-Mn Steel, following welding procedure as per Annexure 'F'.

The repaired Crown Roof should be checked with the gauge for flatness excessive material is to be removed by grinding.

5.3.6 Pedestal Crown Sides and Sides of the Pedestal:

Wear limits	Crown Sides	= 4 mm
	Pedestal Sides	= 2 mm
Gauge	Fig. 29 for Casnub 22W, 22W (retrofitted) & 22W(M) Fig. 30 for Casnub 22NL, 22NLB & 22HS Bogies.	

Bogie	New/Renewed	Worn
All Bogies Crown Sides	152 mm	144 mm
22W, 22W(M) Pedestal Sides	105 mm	101 mm
22NL/NLB/HS Bogies	81 mm	77 mm

Determine the amount of wear on pedestal crown sides by gauge shown in Fig. 29 or 30 as the case may be.

Pedestal Crown Sides: With the gauge in position as shown in "A" of Fig. 29/30 if a shim of 5 mm thick can be inserted between the casting and the gauge at each end at any point, repair should be made by welding, following the instructions given in Annexure 'D'.

NOTE: Before using the gauge the centre line of the pedestal crown sides is to be marked taking the

unworn surface as datum. The gauge centre line should be kept to fall in the same line of the centre of the pedestal crown sides. Two 5 mm thick shims are required to be used simultaneously. The gauge should be moved for the full length of worn surface to measure wear.

Pre-heat the area to be reclaimed up to a temperature of 250°C before undertaking the reclamation work.

After welding, the welded portion should be allowed to cool slowly by covering it with asbestos/sand.

Sides of the Pedestal: With the gauge in position as shown in "B" of Fig. 29/30, if a shim of 3 mm thickness can be inserted between the casting and the gauge at each end at any point, repair should be made by welding following the instructions given in Annexure 'D'.

NOTE: Before using the gauge the centre line of the sides of each jaw is to be marked taking the unworn surface as datum. The gauge centre line should be kept to fall in the same line of the centre line of the jaw. Two 3 mm shims are required to be used simultaneously. The gauge should be moved for the full length of worn surface to measure wear.

Pre-heat is not necessary.

5.3.7 Pedestal Jaw for Casnub 22W, 22W (Retrofitted) & 22W(M) Bogies:

Wear limit	=	4 mm
Gauge	=	Fig. 31
		<u>New/Renewed</u> <u>Worn</u>
Casnub 22W	270 mm	278 mm
22W (Retrofitted)		
Casnub 22W(M)	278 mm	286 mm

Determine the amount of wear on the pedestal jaw (outer and inner) by using the gauge shown in Fig. 31.

With the gauge in position as shown in Fig. 31 (A), if a shim of 5 mm can be inserted between the casting and the gauge at each end at any point, repair should be made.

Casnub 22W Bogie (Cyl. Roller Bearing): Worn out surface shall be reclaimed by welding following the instructions given in Annexure 'D'.

Casnub 22W Bogie (Cartridge bearing), Retrofitted Casnub Bogie and Casnub 22W(M) Bogie: Worn out surface shall be reclaimed as per instruction given in Fig. 32.

NOTE: Before using the gauge the centre line of the jaw opening (i.e. distance between outer and inner jaws) is to be marked taking the un-worn surface of the jaws as datum. The gauge centre line should be kept to fall in the same line of the centre line of the jaw

opening. Two 5 mm thick shims are required to be used simultaneously.

Pre-heat is not necessary.

5.3.8 Pedestal Jaw of Casnub 22NL/NLB/HS Bogies :

Pedestal Jaw (Short)

	New/Renewed	Worn
Distance between Pedestal Jaw (Outer and Inner)	190	198
Wear limit	= 4 mm	
Gauge	= Fig. 33	

Determine the amount of wear on Pedestal Jaws (outer and inner) by using gauge as shown in Fig. 33

With the gauge in position as shown in Fig. 33(A) if a shim of 5 mm can be inserted between the casting and the gauge at each end at any point. Pedestal jaw face should be dressed to enable welding of suitably thick silico manganese steel liners as shown in Fig. 33. Procedure for welding shall be followed as per Annexure 'F'. After welding of liners it should be ensured that gauge admits between the jaws.

NOTE : Before using the gauge centre line of the jaw opening is to be marked taking the unworn surface of the jaw as datum. The gauge centre line should be kept to fall in the centre line of the jaw opening for Pedestal Jaw long & short. Two 5 mm thick shims are required to be used simultaneously.

Pedestal Jaw (Long) :

Wear limit	= 4 mm	
Gauge	= Fig. 34	
	New/Renewed	Worn
Distance between jaws	236	244

Determine the amount of wear on pedestal jaw (outer and inner) by using the gauge shown in Fig. 34.

With the gauge in position as shown in Fig. 34 (A) if a shim of 5mm can be inserted between the casting and the gauge at each end at any point, pedestal jaw face should be reclaimed and restored to original contour by welding and grinding as per the procedure given in Annexure-'D'. After reclaiming it should be ensured that gauge admits in the jaw opening.

Sideframe key with key bolt spring washer nut and split pin has been provided as per RDSO's Drg. No. SK-69594. Adapter retainer bolt as per Drg. No. SK-69594 has been provided on Casnub 22W, 22W(Retrofitted) and Casnub 22W(M) bogies but has been eliminated on Casnub 22NL, 22NLB, and 22HS.

5.3.9 The repaired sideframe should be checked for its wheel base (distance between centre lines of the jaw openings) and ensure whether the correct button marking is left on the repaired sideframe. While pairing the sideframe for a bogie, it should be ensured that there should not be any difference between the number of buttons on the two sideframes.

5.4 BOLSTER : The wearing surfaces in the Bolster are shown in Fig. 39. Details of reclamation procedures for each location are given in the following paragraphs :

5.4.1 Bolster Pocket $35 \pm 1^\circ$ Slope Surface Nominal

Liner Wear Limit : 5mm

Bolster pocket has been provided with 8mm thick Silico Manganese Steel Liner to IS : 3885 Pt. I Gr. IV Welded with Pocket Slope. The liner may be permitted in service upto a thickness of 3mm.

Chip off the welded liner to prepare the surface for welding new liner.

For welding of liner procedure given in Annexure 'F' be followed.

No paint or grease should be applied on plate.

5.4.2 Bolster Land Surfaces and Rotation Stop Lugs (Common for all Casnub Bogies)

NOTE : Some bogie bolsters such as those of Casnub-22NLB & 22HS bogies have been provided with 5 mm thick wear liners on land surfaces & same are to be required to be replaced after 3mm wear.

Wear limit :

Bolster land surface/= 3mm wear liner

Rotation stop lug = 3mm

Gauge = Fig. 40

	New/Renewed	Worn
Dim. over Bolster land surface/Wear Liner.	444	438
Dim. over rotation Stop lugs	518	512

Before repair is undertaken the exact wear is measured by using the gauge as shown in fig. 40. The Centre line of the gauge should fall in line with the marked centre line of the bolster as shown in Fig. 40.

With the gauge in position if a 4mm shim can be inserted between the casting/wear liners and the gauge at each land surface or rotation stop lug at any point, the wornout surfaces should be dressed/worn out liners, if provided, should be chipped off & surfaces should be dressed smooth to enable welding of suitable thickness of Silico manganese steel liner following

welding procedure as given in Annexure 'F'. The width over land surfaces and rotation stop lugs after the welding of liners should admit the gauge.

NOTE : Two shims of size 4 mm are required to be used simultaneously. Preferably liners on land surfaces should be welded after reclaiming inner column gib by welding and before reclaiming outer gibs by liners.

5.4.3 Bolster Column Gibs :

Wear limit Outer Gib = 5mm
 " Inner Gib = 5mm

Gauge	Fig. 41			
	New/Renewed		Worn	
	Others	Casnob	Others	Casnob
	22HS		22HS	
Outer Gib	234	241	244	251
Inner Gib	136	136	146	146

This gauge determines the wear on outer and inner column gibs.

With the gauge in positions as shown in Fig. 41 if a shim of 6mm for outer and inner gib can be inserted between casting and the gauge at each end at any point outer gibs are to be reclaimed by welding Silico manganese steel liners of suitable thickness as shown in Fig. 41, following the welding procedure as per attached Annexure 'F'.

Inner Gibs are to be reclaimed by welding procedure as per Annexure 'D'.

After reclaiming both the Gibs, it should be ensured that width over the Gibs should admit the gauge.

NOTE : Two 6 mm Shims are required to be used simultaneously for each locations.

5.5 SPRING PLANK : Spring plank is a member made of mild steel (flanging quality) to IS : 5986 Gr. Fe 360. It joins two sideframes of casnob bogie by eight 24 dia rivets and four M24 'fit' bolts to keep bogie frame square.

Spring plank should be examined for defects like loosening of rivets/cracks/bending, welding failure of springs spigot etc. Whenever, spring plank is renewed, the leading dimensions of the bogie as per Drg. No. SK-69599(W), WD-85054-S/6 (22WM), WD-90042-S/1 (NLB), WD-92058-S7(HS) must be measured on the fixture. Special care is to be taken regarding the use of 'fit' bolts as well as quality of rivetting. Fitment of spring plank with the side frames should be done on suitable fixture.

5.6 LOAD BEARING SPRINGS AND SNUBBER SPRINGS : The bogies are fitted with two groups of long travel helical springs nests. The spring group for bogie for various axle load applications are shown in fig. 42 & 43. Spring details are shown in WD-83069-S/1

(Common for all versions except Casnob-22HS Bogie). The spring details for Casnob-22HS bogies are shown in WD-92058-S/5.

5.6.1 Damping : The suspension is provided with load proportional friction damping arrangement with the help of a Mn Steel Cast Wedge supported on the snubber springs. The details of the snubbing arrangement are shown in fig. 42 & 43.

5.6.2 Load and Snubber Springs : The spring groups for 'Casnob' bogies are shown on the "Details of Snubbing, Spring Group Arrangement Drawing Fig. 42 & 43 for different type of Axle Load.

The springs are condemned on the basis of free height. Springs should replaced if minimum spring height is at or less than shown below :

Bogie	Springs	Free height nominal (mm)	Recommended free condemning height (mm)
All versions except Casnob	Outer	260	245
22 HS	Inner	262	247
	Snubber	294	279
Casnob 22 HS Bogies	Outer	260	245
	Inner	243	228
	Snubber	293	278

Grouping : Matching of both, load and snubber springs, is important. It is recommended that springs having not more than 3 mm free height variation should be assembled in the same group.

Mixing of new and old springs should be avoided.

The 'Casnob' bogie springs are manufactured out of Silico Manganese Steel to IS : 3195 Gr. 60 Si 7, Gr. 60Cr4V2. IRS Specification R2 & RDSO Specification WD-01-HLS-94 (Rev. 1).

5.7 FRICTION SHOE WEDGE BLOCK (SK-77579 Common for all versions)

Wear limit	Vertical Surface	7 mm
	Slope Surface	3 mm
	Gauge	Fig. 44
	New/Renewed	Worn
Vertical surface from centre line of spigot.		61 mm 54 mm

This gauge determines the wear on the friction shoe of the two wear surfaces.

5.7.1 Vertical Surface : With gauge (Fig. 44) in position if an 8mm shim can be inserted between the casting (Vertical surface) and the gauge at any point, repair

should be made. The worn surface shall be reclaimed by welding.

5.7.2 Slope Surface : The wear on the slope surface is to be measured with gauge (Fig. 44). With the gauge in position if a 4mm shim can be inserted between the casting and the gauge at centre point (marked on the gauge), the wedge is to be replaced by a new one.

5.7.3 Reclamation of Friction Wedge : Method-I (Preferable during POH)

Surface Preparation : The surface should be cleaned properly to remove dust, oil, cracks, scales, dent marks etc. prior to welding.

Electrode : 4mm size dia of any of the following electrodes approved under Class H2 as per IRS M-28-1976 should be used. The brand name of electrodes are :

1. "Griduc-M" manufactured by M/s General Electrodes Equipments Ltd., Bombay.
2. "Manganic"—manufactured by M/s Modi Arc Electrodes Co., Modinagar.
3. "Philips MN" manufactured by M/s Philips India, Ltd., Bombay.
4. "Manganic India", manufactured by Rockwell India, Madras.

Current Conditions : The power source as recommended by the manufacturer of the electrodes shall be used. The lowest possible current capable of producing satisfactory welding should be used. Over heating should be avoided.

5.7.4 Welding Procedure :

1. Short and stringent welding bead should be used.
2. Skip welding sequence should be followed.
3. Short arc should be maintained.
4. Weaving is not recommended.
5. The subsequent runs are only to be given after the preceding runs have been cooled to 'hand warm'.
6. The weld bead should be peened immediately after welding.
7. The crater should be filled up by removing the electrodes slowly after going backward.
8. Post weld heat treatment : It should be ensured that the weld metal is quickly cooled.

5.7.5 Inspection : The welded surface after being cooled should be ground properly to the required dimensions and then subjected to dye-penetrant test to ensure freedom of surface cracks. During grinding it should be ensured that small area is ground and immediately cooled by pouring water or applying compressed air to avoid formation of surface cracks.

Method—II (For ROH Depots) :

Reclamation of Wedge Block by Welding a plate.

- (a) Plate to be used has to be about 5mm shorter in dimensions all around the Wedge Block.
- (b) A manganese steel liner of 120 mm × 140 mm × 6 mm is required to be welded on the wedge face by using Class H2 electrodes as per IR Classification.

5.8 CENTRE PIVOT :

- (a) Centre pivot arrangement for Casnub 22W bogie is as per RDSO Drg. No. W/BE-601 for top centre pivot and W/BE-602 for bottom centre pivot (for separate cast bottom pivot) or bottom pivot integrally cast with bolster (SK-77578).
- (b) For Casnub Bogies of versions other than Casnub 22W type centre pivot bottom and centre pivot top are as per RDSO Drg. No : WD-85079-S/2.
- (c) Centre pivot pin for Casnub 22W bogie is headless pin while for other versions is a special type of pin provided with castle nut/shackle lock for locking. (Refer Fig. 47).
- (d) **Centre Pivot Gauge :** To be used for integral/separate type centre pivot of Casnub 22W & for spherical type bottom centre pivot of Casnub-22W(M), 22NL, 22NLB & 22HS Bogies.

	CASNUB 22 (W)	OTHERS
Wear limit Vertical Side	5.5 mm	4 mm
Seat	4 mm	4 mm
Gauge	Fig. 45 & 46	

Determine the amount of wear on the seat and sides of centre pivot bowl by using the gauge shown in Fig. 45/46.

To determine the seat wear, the gauge should be placed in position as shown in Fig. 45/46 (A). If the pivot surface starts touching the surface marked as* on the gauge at any point, repair should be made following the Welding Procedure given at Annexure 'D'. The gauge should be moved on the complete worn surface to be measured. The surfaces after reclamation shall be to the original dimensions as per the respective drawings for proper matching of surfaces with top centre pivot.

To determine the wear on vertical wall of the bowl with gauge in position if a 9 mm (for Casnub 22W) & 7 mm (for other Bogies) thick shim can be inserted for the full depth between the worn surface and the gauge at any point repair should be made as per procedure given in Annexure 'D'. The gauge should be moved on the complete worn surface to be measured.

During ROH/POH the wear on the vertical side of the bowl seat of the bowl should be built up by welding.

Pre-heat the surface to be reclaimed upto a maximum temperature of 250°C and after welding it should be allowed to cool slowly by covering the welded portion with Asbestos/Sand.

The repaired pivot should be checked with gauge in Figs. 45/46 applying two 4 mm thick shims between the casting and the gauge surface marked as *.

The gauge should be moved around to check the proper fit up.

5.9 SIDE BEARERS :

Casnut 22W Bogies : Bogies are fitted with roller type side bearers which are free to move in a cast steel housing riveted on the bogie bolster. The details are shown in Fig. 35.

Casnut 22W (Retrofitted), Casnut 22W(M), 22NL, 22NLB Bogies : Bogies are fitted with constant contact type of side bearer rubber pads located in Cast Steel Housing which is riveted to the Bogie Bolster. The details are shown in Fig. 36 for Casnut 22W(M), 22NL, 22NLB Drg. No. WD-89094 for Casnut 22W (Retrofitted).

Casnut 22 HS Bogie : Bogies are fitted with Helical spring loaded constant contact type side bearers riveted/bolted on bogie bolster. The details are shown in WD-92058-S/9/WD-92093-S/1.

Condemnation criteria for side bearers are given in Para No. 5.10.1.

5.10 ELASTOMERIC PADS : Elastomeric pads are provided in all the versions of Casnut Bogie except Casnut 22W. The main purpose of providing elastomeric pads is to reduce wheel flange wear.

5.10.1 Elastomeric pads to WD-89067-S/10 & WD-92058-S/8 (For HS) and side bearer rubber pads to WD-85076-S/1 shall be condemned on the following grounds and shall be replaced by new ones :

- If the top or the bottom plates or intermediate plate in case of side bearer pads show any crack in service.
- If any crack of more than 50 mm is developed at any surface of rubber.
- If a bond failure giving way more than 40 mm in any direction is developed in service.
- When in free condition, the pad has taken a permanent set of the order given below :—

Type of Pad	Nominal Dimensions	Dimension after permanent set
Elastomeric pad	46 mm	42 mm
Side Bearer	114 mm	109mm
Rubber Pad		

- If any sign of crushing of rubber is noticed.

5.11 BRAKE GEAR MAINTENANCE : The general arrangement of brake gear are shown in Fig. 48, WD-85054-S/4, WD-89067-S/5. Bogie Brake details are shown in SK-69597.

The brake gear consists of mainly : Brake Beams (with brake head and brake block assembly), Equalizing Levers, Push Rod, End Pull Rod, Brake Beam Hangers (in Casnut-22W(M) Bogie).

The bushes provided are either IRSM-4 Class IV or Class I case hardened (IS-2073 C-45 or C-14 case hardened/IS 5517-45 C8) and pins are made from steel to IS : 226 Fe 410S/IS 2062 Fe 410 WA. The maximum permissible wear on the pin diameter and bush inside diameter is limited to 1.5 mm.

In service as the tread dia. of wheel decreases due to wear, pins located in End pull rod with underframe are to be relocated as shown in Fig. 50.

The brake beam of Casnut 22 W is of a purely fabricated (structural steel members) design with integrally fabricated brake head. In case of Casnut 22W(M) bogie it is of Cast Steel and Brake Head & Block Assembly is a separate assembly. This sub-assembly is attached at the circular ends of a Cast Steel Brake Beam by means of a pin.

In case of Casnut 22 NL/22NLB/22HS bogies the brake beam is fabricated one. Brake beam strut and End piece casting are of cast steel. Brake head is integral part of 'End Piece Casting'. Same brake beam has now been specified for Casnut 22W also.

The standard brake shoe to Drg. No. WA/BG 6158 which is used on 'BOX' Wagon can be locked in position on the brake head by means of a key. The brake shoe should be replaced when worn 48 mm i.e. when 10 mm metal is left from the base of the shoe.

5.11.1 BRAKE BEAM : Casnut 22W, 22NL, 22NLB & 22HS Bogies : Bogies are fitted with Unit type fabricated brake beams which slide in guide cavity provided on sideframes.

Cavities are provided with Silico Manganese Steel liners. The brake heads are integral parts of the brake beam. The details of standard versions of brake beam for all versions of Casnut bogies [except Casnut 22W(M)] are shown in Fig. 49. The details are shown in WD-89033-S/1. However, the brake block to WA/BG-6158 is common for all versions.

Casnut-22W(M) Bogie : The bogie is fitted with Unit type suspended cast steel brake beams. The brake head is a separate sub-assembly which is fixed with brake beam circular ends by means of pin passing thorough brake beam end and brake shoe adjuster alongwith spring loaded brake head. Assembly provides rotational flexibility to brake head. Details are shown in Drg. No. WD-85084-S/1, WD-88012-S/1 & WD-86034-S/1.

RECLAMATION OF BRAKE BEAM ON ACCOUNT OF WORN OUT BRAKE HEADS : Reclamation procedure for different versions of Casnub bogie brake beams shall be as follows :

Casnub-22W Bogie : Brake heads are welded with brake beam channel, side rest and outer stiffener plate as shown in Drawing SK.69596. Repair procedure for worn out brake heads is as follows :—

Replacement :

- Remove worn out brake heads by gas cutting the welds indicated in drawing SK.69596 with as little damage to other members as possible. Other members, if damaged, should be built up by welding using electrodes and taking precautions as per Annexure 'C' followed by proper cleaning and finishing operation.
- Weld new brake head at correct position with brake beam channel, outer stiffener plate and 'Side Rest' by fillet welds of Sizes indicated in drawing No. SK.69596.

Repair by Welding : Depending upon extent of wear on brake head it is optional for Repairing Shops/Depots to either go for total replacement of worn out brake heads or to build up worn out portion by welding as per Annexure (C), followed by proper finishing operations.

Casnub 22W(M) Bogie : Brake Heads are fitted on brake beam with the help of Brake Shoe Adjuster as shown in drawing No. WD-88012-S/1. They are further secured on brake beam ends by Washer and split pin. Procedure of replacing worn-out brake heads is as under :—

- Remove split pin and washer from brake beam ends. Remove pin securing brake shoe adjuster with brake beam by removing split pin.
- Take brake heads out of brake beam alongwith brake shoe adjuster.
- Disengage brake shoe adjuster from brake head by removing bolt after disengaging split pin, nut, cover, spring and adjusting piece.
- Assemble new brake head with brake shoe adjuster by using items mentioned in Para (c) as shown in drawing No. WD-88012-S/1.
- Slide new brake heads assembled with brake shoe adjuster on brake beam end and engage brake shoe adjuster with brake beam by using pin and split pin as shown in drawing No. WD-88012-S/1.
- Further secure brake heads on brake beam end by putting washer and split pin as shown in drawing No. WD-85054-S/4.

Casnub-22NL, 22NLB & 22HS Bogies : Brake head is integrally cast with End Piece Casting which is welded with structural steel brake beam channel and 'Truss Flat' at ends as shown in drawing No. WD-89033-S/1. Depending upon the extent of wear, worn out brake heads can either be built up by welding following procedure as per attached Annexure-D or worn out brake heads can be replaced by new brake head as follows.

Removal of worn-out 'Brake Head' from 'End Piece Casting' : Fig. 51, 52 and 53 are to be referred for this purpose. Gas cut material shown as cross Hatched' in Fig. 51 & 52. Gas cutting may be followed by grinding operations to achieve contour shown in fig. 53.

Fabrication of New 'Brake Head' : New 'Brake Head' shall be manufactured as per details in Fig. (54). Alternatively 'Brake Head' can be produced by modifying Brake Head of brake beam to SK-69596 meant for Casnub-22W bogie. Only modifications to be carried out is provision of opening of size 41×27 mm.

Fabrication of New Brake Head with Brake Beam : Fig. (55) & (56) should be referred for this purpose. New brake head shall be welded with the brake beam as per welding details shown in above quoted figures and following welding procedure and type of Electrodes etc. as per Annexure 'E'.

5.12 ADJUSTMENT OF CBC/BUFFER HEIGHT : To maintain CBC/Buffer Height within permissible limits following packings shall be provided as described below for different versions of Casnub Bogies :

Casnub 22W, Casnub 22W (Retrofitted with Elastomeric Pad and Constant Contact Side Bearers) Casnub 22W(M), Casnub 22NL/22NLB/22HS Bogies :

S. No.	Type of Bogie	Wheel Dia	Drawing to be followed
12 mm thick packing			
1.	Casnub 22W	948	WD-86021-S/1
	Casnub 22W (Retrofitted)	910	
	Casnub-22W(M)	954	
2.	Casnub-22NL	954	WD-91074-S/1
	Casnub-22NLB	954	
	Casnub-22HS	954	
37mm thick special packing			
1.	Casnub-22W	924	WD-88039-S/1
	Casnub-22W(M)	930	
2.	Casnub-22NL	930	WD-91074-S/1
	Casnub-22NLB	930	
	Casnub-22HS	930	

NOTE : 37mm thick special packing is not required for Casnub-22W(Retrofitted) Bogie due to use of worn out wheel from initial stage.

5.13 PRECAUTIONS TO BE TAKEN WHILE DOING WELDING OPERATION ON WAGON OR BOGIE FITTED WITH ROLLER BEARINGS : Whenever Wagon or Bogies fitted with roller bearings require welding in Workshops/ROH Depots Sick Lines. Special attention should be paid so that electric current may not pass through the bearings. The return current lead for earthing purposes should be fixed very close to the welding area and the earthing wire should be tightly secured at both ends. If wagon is not properly earthed the current passing through the bearings will cause arcing in between the rollers and raceways, leading to failure.

6. PROCUREMENT OF SPARE PARTS : Certain spare parts, which are considered important in the performance of Casnub bogie, are to be procured from approved sources only. These items are also to be compulsorily inspected by Executive Director, (I&L)/RDSO, or his representative. List of such components is given below—

- (a) Brake beam
 - (b) Spring plank
 - (c) Springs
 - (d) Silico Manganese steel liners of Casnub bogies.
 - (e) Adapters
 - (f) Elastomeric pad and side bearer rubber pad
 - (g) Centre pivot
 - (h) Wedge
- } To be purchased from
Class 'A' foundries only, as
per list issued by RDSO.

The list of approved manufacturers is updated by I&L Dte., RDSO from time to time, and are issued under MW/IL/VENDOR APPROVAL. THIS IS REVISED HALF YEARLY.

7. FAILURE REPORTING : Proper failure reporting and analysis is an important activity for ensuring proper maintenance and quality check on components leading to improved performance. Feedback is needed for making design improvement also.

All base depots should maintain performance statistics, which should cover defectwise wagon detachments and repairs analysis, components life statistics & vendor rating etc. These are general guidelines and may be modified to suit specific requirements.

Premature failure of items inspected by RDSO should be directly reported to Wagon Dte. and I&L Dte. of RDSO by the concerned division.

Failure reports should have following information—

1. Wagon No.
2. Date of failure.
3. Station of failure.
4. Station where failed component has been kept.
5. Location of failure with a sketch.
6. Year of manufacture.
7. Name of manufacturer.
8. Metallurgical investigation report. This is necessary to know the cause of failure and affix responsibility.

Year of manufacture and name of manufacturer are to be provided by manufacturers on following components—

Bogie side frame, Bogie bolster, Springs, Elastomeric Pad, Side bearer pad, Centre pivot, Adapter, Wedge, Brake beam Spring plank. Any of these components without these particulars cast/embossed on them should not be fitted on wagons.

Metallurgical investigation report can be sent later after conducting the investigation.

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Differences among different versions of Casnub Bogies

Sl. No.	Description of Item	Casnub 22W	Retrofitted Casnub 22W	Casnub 22 W(M)	Casnub 22 NL	Casnub 22 NLB	Casnub 22 NLMI	Casnub-22 HS
	Weight (Approx.)	5.35t.	—	5.7t.	5.5t.	5.4t.	5.125t.	5.4t.
	Yr. of Manufacture	72	—	86	89-90	90-91	92	93
	TYPE	(1)	(1)	(2)	(3)	(4)	(5)	(4)
1.	Sideframe (Five Types)	Wide Pedestal jaw opening, pocket for sliding of brake beam. Provided with hole for retainer bolt in outer jaws. <u>Material :—</u> IS : 1030 Gr. 27-54. Drg. SK. 69592.	Sideframe of Casnub 22W shall be provided with another hole for retainer bolt below existing one at a distance of 32 mm as shown in Drg. WD-89094-S/1	Wide jaw opening, brackets for brake beam suspension, pedestal portion modified to accommodate 'Elastomeric Pad'. Provided with hole for retainer bolt in outer jaws. <u>Material :—</u> IS : 1030 Gr. 27-54. Drg. No. WD-85054-S/3.	Narrow jaw opening, pocket for brake beam sliding, pedestal suitable for accommodating Elastomeric Pad. <u>Material :—</u> Initially it was IS-1030 Gr. 27-54. Subsequently revised for Casnub 22NLB Drg. No. WD-89067-S/3. There is no hole for retainer bolt in outer jaws.	Same as in Casnub 22NL bogie except material. <u>Material :—</u> Special Alloy Cast Steel having composition as follows— C. 0.2 to 0.3% Mn. 0.6 to 1.0% Si. 0.3 to 0.5% S 0.04 Max. P 0.04 Max. Drg. No. WD-89067-S/3	Other features same as in Casnub 22 NL/ 22NLB except material which is special cast steel having following composition— C-Equivalent —0.85% (Max.) S-0.05% (Max.) P-0.05% (Max.) Superior metallurgy has enabled reduction in wall thickness and weight. Drg No. WD-89070-S/3.	Same as in Casnub 22 NLB Bogies. Drg. No. WD-89067-S/3.
2.	Bolster (Six Types)	Type (1) & (2) Two Types 1. Integral IRS Bottom Pivot. (Profile of W/BE-602) SK. 77578. 2. Separate IRS Bottom Pivot. (Drg. W/BE-602) riveted on bolster to Drg. No. WD-81023-S/1 Bottom of bolster is straight. It is to be fitted with 'Side bearer housing for rollers' (Item-2 of SK. 69594)	Same as in Casnub 22W Bogie.	(3) Drg. No. WD-85079-S/3 Bolster has been modified to suit fitment of spherical bottom pivot. (WD-85079-S/2 Item-1). <u>Material :—</u> IS : 1030 Gr. 27-54 Bottom of bolster is straight. It is to be fitted with side bearer housing for metal bonded rubber pads. (Item-4 of SK. 69594)	Bolster is same as in Casnub 22W (M) Bogie.	(4) It is suitable for fitment of spherical bottom pivot. (Item-1 of WD-85079-S/2). It has been given shape of 'Fish Belly' at the centre and wall thicknesses have been reduced. Consequently weight has been reduced considerably. <u>Material :—</u> Same as for Sideframe. (Drg. No. WD-89067-S/4)	(5) Other design features are same as in the bolster of Casnub 22NLB except that the material of construction is same as is for sideframe and weight has been further reduced by reducing Wall Thicknesses. Drg No. WD-89070-S/4.	(6) Bolster differs from that for Casnub 22 NLB in respect of diameters for spring spigots and increased outer gib opening from 234 + 2 to — 0 241 + 2 — 0 Drg. No. WD-92058-S/3.

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Sl. No.	Description of Item	Casrub 22W	Retrofitted Casrub 22W	Casrub 22 W(M)	Casrub 22 NL	Casrub 22 NLB	Casrub 22 NLM	Casrub 22 HS
		<u>1st Type</u>		<u>Ind Type</u>				
3.	Centre Pivots (Two types)	1. IRS type bottom pivot. (Drg. W/BE-602) integrally cast or separately riveted and welded. 2. IRS Top Pivot. (Drg. W/BE 601) rivetted with underframe bolster.	Same as in Casrub 22W Bogie.	Spherical type bottom pivot. (Item-1 of Drg. No. WD-85079-S/2) and Top pivot. (Item-2 of WD-85079-S/2) with retainer, retaining ring, Washer and Dust Shield etc.	Same as in Casrub 22W(M)	Same as in Casrub 22W(M)	Same as in Casrub 22W(M)	Same as in Casrub 22W(M)
4.	Centre pivot pins (Four Types).	Type (1) Plain which rests on the platform in bolster (Drg. W/BE-613).	Same as in Casrub 22W Bogie.	(2) Pin with provision of locking at bottom by Castle nut and split pin. Pin head is 80φ suitably modified for preventing rotation of pin at the time of tightening castle nut. Subsequently design was modified for locking by Shackle lock Pin head dia. was made 70φ mm.	(3) Pin locked by shackle lock. Pin head dia. = 70 mm.	(4) Same type of pin as in 22 NL except reduced length.	Same as in 22 NLB.	Same as in 22 NLB.
5.	Side Bearers	Clearance type Rollers placed in side bearer housing. (Item 2 & 3 of SK. 69594)	Constant contact Side Bearers. Metal bonded rubber pads (Drg. No. WD-85076-S/1) are placed in housing. Item 2 of SK. 69594 with packing piece (Item-9 of Drg. WD-89094-S/1)	Same as in Retrofitted Casrub 22W except housing which is as per Item 4 of SK. 69594.	Same as in Casrub 22W(M).	Same as in Casrub 22W(M).	Same as in Casrub 22W(M).	Constant contact Side Bearer (spring loaded). Drg. WD-92058-S/6.

ANNEXURE—A
(SHEET—3)

Sl. No.	Description of Item	Casrub 22W	Retrofitted Casrub 22W	Casrub 22 W(M)	Casrub 22 NL	Casrub 22 NLB	Casrub 22 NIM	Casrub 22 HS
6.	Brake Beam (Unit type) & brake block.	Sliding type fabricated structural steel construction having integral brake head. (Drg. No. SK. 69596) and Brake Block to Drg. WA/BC-6158 which are secured together by a key.	Same as in Casrub 22W Bogie	Hanging type Cast Steel Brake Beam to Drg. No. WD-85084-S/1. Brake heads and brake blocks are secured by key and they are further assembled with brake beam through spring loaded brake shoe adjuster as shown in Drg. WD-88012-S/1. It is further recommended to suspend brake beams from strut to prevent their drooping as shown in Drg. WD-89075-S/1	Sliding type brake beam fabricated out of Cast Steel Strut and 'End Piece' castings having integral brake heads with structural steel members as shown in Drg. No. WD-89033-S/1. This brake beam is interchangeable with purely fabricated brake beam of Casrub 22W to Drg. SK. 69596. Brake Block to Drg. No. WA/BC-6158.	Same as in Casrub 22NL	Same as in Casrub 22NL.	Same as in Casrub 22NL.
7.	Bearings with axlebox/adapters.	Initial design was with cyl. roller bearing inside axlebox but subsequently use of standard AAR tapered Cartridge bearing Class 'E' (6"×11") was standardised along with wide jaw adapter to Drg. SK. 77578.	Standard AAR Cartridge bearing Class 'E' (6"×11") with modified wide jaw adapter to Drg. No. WD-85053-S/1. Height of this adapter has been reduced by 23 mm from that of standard wide jaw adapter to SK. 77578.	Standard AAR Cartridge bearing Class 'E' (6"×11") with wide jaw adapter to SK. 77578.	Standard 'AAR' Cartridge bearing Class 'E' (6"×11") with narrow jaw adapter to Drg. No. WD-89067-S/9.	Same as in Casrub 22 NL.	Same as in Casrub 22 NL.	Same as in Casrub 22 NL.
8.	Elastomeric Pad	Basic design is without Elastomeric Pad.	Elastomeric Pad to Drg. No. WD-89067-S/10 is to be retrofitted between modified wide jaw adapter and sideframe pedestal crown for minimising wheel flange wear.	E. Pad to Drg. No. WD-7621-S/1 (Renumbered as WD-89067-S/10) is fitted between wide jaw adapter and sideframe pedestal crown.	E. Pad to Drg. No. WD-89067-S/10 is being fitted.	Same as in Casrub 22 NL Bogie.	Same as in Casrub 22 NL bogie.	Fitted with Elastomeric Pad to Drg. No. WD-92058-S/8 which is 35% stiffer in lateral mode and has nil clearance with adapter in longitudinal direction.

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ANNEXURE—A
(SHEET—4)

Sl. No.	Description of Item	Casnuh 22W	Retrofitted Casnuh 22W	Casnuh 22 W(M)	Casnuh 22 NL	Casnuh 22 NLB	Casnuh 22 NLM	Casnuh 22 HS
9.	Wheel Dia	1000 (New) 906 (Condemning) Previously condemn- ing dia. was 925 mm.	956 mm (New) 906 mm (Condemn- ing).	1000 (New) 906 (Condemning) Previously condemn- ing dia. was 925 mm.	Same as for Casnuh 22 W(M).	Same as for Casnuh 22 W(M).	Same as for Casnuh 22 W(M).	Same as for Casnuh 22 W(M).
10.	Brake Beam Safety Strap.	Not provided.	Not provided.	Loop type brake beam safety straps (Latest design) to Drg. No. WD-88108-S/1 have not been fitted and bogies are fitted with 'Brake Beam Support' to Drg. No. WD-87017-S/1. Item 1. These straps are to be removed at the time of fitment of 'Additional Brake Beam Hangers' to Drg. No. WD-89075- S/1.	Not Provided.	Not Provided.	Not Provided.	Not Provided.
11.	Safety strap for push Rod.	In original design safety Strap was provided. Now it can be removed after modifying equalising levers and brake push rod to Drg. No. SK. 69597.		Safety strap to Drg. No. WD-87017-S/1. Item 2 has been removed and push rod and equalising lever design have been modified to Drg. No. SK-69597 to take care of this safety aspect.	Same as for Casnuh 22 W(M).	Same as for Casnuh 22 W(M).	Same as for Casnuh 22 W(M).	Same as for Casnuh 22 W(M).
12.	Spring Plank	Drg. No. SK. 69594 Item-I. Material: Structural Steel to IS: 226 St. 42S which was later on changed to flanging quality Steel to IS: 3747-66.		One 130 mm dia. opening is provided at the centre. Twelve holes for 12 ϕ rivets are made for fitment of 'Brake Beam Sup- port' Four out of twelve holes (Meant	Both the longer openings (Measuring 400 \times 200) and all 12 ϕ rivet holes have been 'eliminated'. Other features are same as in Casnuh 22W(M) bogie.	Same as in Casnuh 22 NL Bogie.	Same as in Casnuh 22 NL Bogie.	Drg. No. WD-92058- S/4 Item-1. Arrange- ment and dimensions of spigots for springs have been changed. Other details are same as in Casnuh 22

ANNEXURE—A
(SHEET—5)

Sl. No.	Description of Item	Casnuh 22W	Retrofitted Casnuh 22W	Casnuh 22 W(M)	Casnuh 22 NL	Casnuh 22 NLB	Casnuh 22 NLM	Casnuh 22 HS
		<p>Height : Initially 60 mm and subsequently increased to 75 mm.</p> <p>Provided with one 100 ϕ hole at the centre which was, later on, closed and two longer openings measuring 400 mm \times 200 mm at 200 mm on either side of centre line. It is provided with eight holes for 12 mm dia. rivets for fitment of safety strap for push rod and twelve holes for 24 ϕ rivets for fitment with Side Frames.</p> <p>Initially top of flange was not given any regular profile, later on square/round bars were welded with flanges all along its length. Finally top of flange was given regular radius of 6 mm.</p>		<p>for fitment with side-frame) are made suitable for M-24 'Fit Bolts'. Other design features are same as finally in Casnuh 22W bogie.</p>				NLB and 22 NLM Bogies.

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CASNUB-22W BOGIE INDEX

S. No.	Drawing No.	Description	
1.	SK-74513	INDEX	
2.	SK-74512	GENERAL ARRANGEMENT.	
3.	SK-69592	CAST STEEL SIDE FRAME.	
4.	SK-77578	CAST STEEL BOLSTER (SPHERICAL PIVOT).	
5.	SK-69594	BOGIE DETAILS.	
6.	SK-69595	BOGIE BRAKE GEAR ARRANGEMENT.	
7.	SK-69596	BRAKE BEAM.	
8.	SK-69597	BOGIE BRAKE GEAR DETAILS.	
9.	SK-69599	LEADING DIMENSIONS AND TOLERANCES.	
10.	SK-69600	ASSEMBLY PROCEDURE.	
11.	SK-77579	WEDGE	
12.	SK-69601	WHEEL AND AXLE	
13.	STR.NO.-AB/RB-06-77	AXLE BOX	CYLINDRICAL R. B. APPLICATION.
14.	SK-69594 (ITEM-5)	SIDE FRAME KEY OR	
15.	SK-69601	WHEEL AND AXLE	
16.	STR.NO.AB-RB-13-80	MODIFIED CARTRIDGE R. B. ASSEMBLY	MODIFIED CARTRIDGE APPLICATION.
17.	SK-69594 (ITEM-6)	SIDE FRAME KEY	
18.	SK-78527	WIDE JAW ADAPTER	
19.	SK-69594 (ITEM 8)	RETAINER BOLT & NUT OR	
20.	SK-68512	WHEEL & AXLE	
21.	STR.NO. AB/RB/13-80	STD. AAR CLASS 'E' CARTRIDGE R. B. ASSEMBLY	STD. AAR CARTRIDGE R. B. APPLICATION.
22.	SK-69594 (ITEM-6)	SIDE FRAME KEY	
23.	SK-78527	WIDE JAW ADAPTER	
24.	SK-69594 (ITEM-8)	RETAINER BOLT & NUT	
25.	SK-69594 (ITEM-9)	KEY BOLT WITH SPRING WASHER, NUT & SPLIT PIN.	APPLICABLE FOR ALL TYPE OF BEARINGS.

Note : Refer Drg. No. WD-89094-S/1 for Casnub 22W (Retrofitted) bogie.

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CASNUB—22W(M) BOGIE INDEX

S. No.	Drawing No.	Description
1.	WD-85054-S/1	INDEX
2.	WD-85054-S/2	GENERAL ARRANGEMENT.
3.	WD-85054-S/3	CAST STEEL SIDE FRAME.
4.	SK-69594	BOGIE DETAILS.
5.	WD-85054-S/4	BOGIE BRAKE GEAR ARRANGEMENT.
6.	WD-85054-S/1	CAST STEEL BRAKE BEAM.
7.	SK-69597	BOGIE BRAKE GEAR DETAILS.
8.	WD-83069-S/1	SPRING DETAILS (20. 3t AXLE LOAD).
9.	SK-77579	WEDGE
10.	WD-85054-S/6	LEADING DIMENSIONS AND TOLERANCES.
11.	WD-85054-S/7	ASSEMBLY PROCEDURE.
12.	WD-85079-S/3	CAST STEEL BOLSTER (FOR MODIFIED SEPARATE TYPE PIVOT)
13.	WD-89025-S/1	WHEEL & AXLE.
14.	STR. No. AB/RB-35 90 STD. REV.-1	STD. 'AAR' CLASS 'E' CARTRIDGE ROLLER BEARING ASSEMBLY
15.	SK-69594 (ITEM-6)	SIDE FRAME KEY
16.	SK-78527	WIDE JAW ADAPTER.
17.	SK-69594 (ITEM-8)	RETAINER BOLT AND KEY.
18.	SK-69594 (ITEM-9)	KEY BOLT WITH SPRING WASHER, NUT & SPLIT PIN.
19.	WD-89067-S/10	METAL BONDED RUBBER PADS FOR SECONDARY SUSPENSION BOGIES WITH CARTRIDGE BEARING.
20.	WD-88012-S/1	BRAKE BLOCK ASSEMBLY AND DETAILS.
21.	WD-85084-S/3	BRAKE HEAD & DETAILS (FABRICATED).
22.	WD-85079-S/2	CENTRE PIVOT ASSEMBLY DETAILS.
23.	WD-85076-S/1	METAL BONDED RUBBER PADS FOR SIDE BEARER.
24.	WD-88108-S/1	DETAILS OF SAFETY LOOP FOR BRAKE BEAM.
25.	WD-85079-S/1	CENTRE PIVOT AND SIDE BEARER ARRANGEMENT.
26.	WD-86034-S/1	BRAKE HEAD (CAST STEEL).
27.	WD-86038-S/1	MARKING SCHEME FOR CAST STEEL SIDE FRAME & BOLSTER.

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INDEX—II. S. BOGIE

S. No.	Drawing No.	Description
1.	WD-92058-S/1	INDEX
2.	WD-92058-S/2	GENERAL ARRANGEMENT.
3.	WD-89067-S/3	CAST STEEL SIDE FRAME
4.	WD-92058-S/4	BOGIE DETAILS.
5.	WD-89067-S/5	BOGIE BRAKE GEAR ARRANGEMENT.
6.	WD-89033-S/1	BRAKE BEAM.
7.	SK-69597	BOGIE BRAKE GEAR DETAILS.
8.	WD-92058-S/5	SPRING DETAILS
9.	SK-77579	WEDGE
10.	WD-92058-S/7	LEADING DIMENSIONS AND TOLERANCES.
11.	WD-85054-S/7	ASSEMBLY PROCEDURE.
12.	WD-92058-S/3	CAST STEEL BOLSTER
13.	WD-89025-S/1	WHEEL AND AXLE.
14.	STR. No. AB/RB-35/90	STD. A.A.R. CLASS 'E' CARTRIDGE R. B. ASSEMBLY.
15.	WD-92058-S/4 (Item-2)	SIDE FRAME KEY.
16.	WD-89067-S/9	NARROW JAW ADAPTER.
17.	WD-92058-S/4 (Item-4)	KEY BOLT NUT, SPRING WASHER & SPLIT PIN.
18.	WD-92058-S/8	METAL BONDED RUBBER PADS FOR CARTRIDGE BEARINGS.
19.	WD-85079-S/2	CENTRE PIVOT ASSEMBLY DETAILS.
20.	WD-92093-S/1	SPRING LOADED SIDE BEARER ASSEMBLY AND DETAILS
21.	WD-92058-S/6	CENTRE PIVOT AND SIDE BEARER ARRANGEMENT.
22.	WD-89006-S/1	BG, MG & NG COIL SPRING DRAWING CODE.
23.	WD-86038-S/1	MARKING SCHEME FOR CAST STEEL SIDE FRAMES AND BOLSTERS.

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ANNEXURE—C

Welding of Structural Steel to IS : 226 Fe 410S/IS : 2062 Fe 410 WA

Type of Electrodes and other precautions to be taken while building up worn out brake heads of Casnub—22W Bogies :

- (1) Electrodes conforming to Class B2 of IRS M 28—66 are to be used.
- (2) Welding must be done by properly trained welders under qualified supervision.
- (3) Welding should be done under cover in wet weather and dry storage of electrodes should be ensured.

ANNEXURE—D

Welding of Cast Steel Components

Components :

- (1) Brake heads for brake beam of Casnub-22NL, 22NLB & 22HS Bogies.
- (2) Centre pivots (Material to IS : 1030 Gr. 27—54/IS : 1030 Gr. 280—520W).
- (3) Sideframe and Bolster (Except Casnub 22 NLM Bogie).

Electrode

Low Hydrogen Electrodes approved by RDSO under both the Class C2 & D1 shall be used. Electrodes shall be preheated in an drying oven at temperature of 150°—200° C or as per recommendations of manufacturers atleast one hour before use. The size of electrode shall depend upon extent of wear.

Alternatively RDSO approved electrodes under Class C & D may be used. Examples are Supercord, Supercito of M/S Advani, Superthermie & Indothermie of M/S General Electrodes, Indare ferroweld-2 of M/S Indian Oxygen. These Electrodes are to be dried before use as recommended by manufacturers. Short arc is to be maintained. 4 or 5 mm electrodes are to be used.

Procedure

- (a) The wornout area shall be cleaned preferably by grinding with portable grinder.
- (b) The ground area shall be examined visually for presence of any crack.
- (c) Each run of weld metal shall be deslagged thoroughly before further run is applied, particularly at the junction region between the weld metal and fusion faces. Visible defects such as cracks, porosity, voids and other depositing faults shall be removed before depositing further weld metal.

- (d) Each bead shall be peened with a ball pen hammer immediately after deposition, starting from the hot end and then proceeding backwards.
- (e) The welding operation, once started, shall be completed in one stretch maintaining an interpass temperature between 250°—300° C.
- (f) All welding shall be carried out preferably in down hand position with the help of manipulator whenever required. In case of necessity, welding can also be carried out in horizontal; or vertical up position.
- (g) While using low hydrogen electrode, it shall be ensured to maintain shortest possible arc and minimum weaving of electrodes.
- (h) The crater ends must be filled up by retracing back the electrodes to about 12mm followed by withdrawal from weld pool. When a new electrode is to be started, this shall be struck a little started ahead of crater end of previous run, then travel back over the crater end and then forward again.
- (i) No post weld heat-treatment is necessary.
- (j) The build up area shall be finished grinding up to the original dimensions avoiding formations of grinding cracks.
- (k) The reconditioned area shall be examined visually as well as by magnetic particle Test/Dye penetrant Test to ensure freedom from any defects/cracks. If any crack/defect is still evident/persists the same should be removed and repaired and then rechecked by MPT/DPT.

Welders

All welding shall be done by welders qualified as per IS : 7318 Pt. I.

Welding current—

As recommended by Electrode Manufacturers.

ANNEXURE—E

Welding of Structural Steel to IS : 226 Fe 410S/IS : 2062 Fe 410WA to Cast Steel to IS : 1030 Gr. 27-54/IS : 1030 Gr. 280-520W

Welding of new brake head (Structural Steel to IS : 226 Fe 410S/IS : 2062 Fe 410WA) with 'End Piece Casting' (IS : 1030 Gr. 27-54/IS : 1030 Gr. 280-520W).

Electrodes to be used

Any brand of Low Hydrogen Electrodes approved by R.D.S.O., against Class C2 and D1 of IRSM-28 shall be used.

Welding procedure :

- (1) The Brake head shall be held in position with the help of suitable clamps and then tack welded on either side.
- (2) The weldment area shall be cleaned properly to make it free from heavy scale, rust, paint, oil, grease etc. before welding.
- (3) Welding shall be carried out in down hand position with the help of suitable clamps.

- (4) Each run shall be deslagged thoroughly before depositing subsequent run.
- (5) Shortest possible arc and minimum weaving shall be maintained while using 'Low Hydrogen Electrodes' Stray arcing should be avoided.
- (6) The crater end must be filed up properly by retracing back slightly.
- (7) Visible defects such as cracks, porosities, voids and other deposition faults shall be removed by gouging before depositing further weld metal.

Precaution :—Low Hydrogen Electrodes shall be preheated in an Electrode drying oven at a temperature of 150°-200° C or as per recommendations of Electrodes Manufacturer for at least one hour before use.

Welding of Spring Steel Liners to IS : 3885 Part-I Gr. IV on Cast Steel Surface (Except Casnub 22 NLM)

Electrodes to be used

Austenitic Stainless Steel Electrode having nominal composition of 18% Chromium, 8% Nickel and 5% manganese and approved by RDSO against Class M1 of IRSM-28 shall be used.

General Welding Procedure :

- (1) The liner shall be held in position by tack welding at mid points of the length side.
- (2) Welding shall be done in down hand position.
- (3) Fillet size shall be maintained as stipulated in the drawing.

Precautions :

Uniform bead is to be deposited. Weaving is not permitted. Each weld is to be followed by light peening, if any crack is noticed, welding shall be removed by cutting electrode and reweld.

Welding of Spring Steel Liner to IS : 3885 Part I Gr. IV with Cast Steel Bolster :**Electrodes to be used :—**

Same as recommended earlier for welding spring steel liners on Cast Steel Surfaces in general.

Welding Procedure : Fig. 'C' is to be referred.

The liner shall be held in position by tack welding on either side (Side AE & MR). Tack welding shall be done at the mid point of the length side on either side i. e. top (AE) and bottom side (MR).

Welding shall be done in down hand position preferably as per the sequence given in Fig. 'C'.

The length of the spring steel liner is about 150 mm. This length shall be divided in to four equal sizes and marked as 1, 2, 3 & 4 on one side and 5, 6, 7 & 8 on the opposite side.

Start welding at (C) and weld up to (B). Start again at (C) and weld up to (D).

Then start at (B) and weld up to (X) covering the corner (A). Start at (D) and weld up to (Y) covering the corner (E).

The opposite side (Side MR) shall be welded in the manner as per sequence given on Fig. 'C'.

The width sides (Sides AM and ER) are not accessible for welding.

The fillet size shall be maintained as stipulated in the drawing.

Welding is to be done in two passes firstly with 3.15 mm dia. Electrode and then with 4 or 5 mm dia.

Precautions :

Same as mentioned for general application under same Annexure (E).

Welding of Spring Steel Liner to IS : 3885 Part I Gr. IV on the side-frame Column (Except Casnub 22NLM).

Type of Electrodes to be used, their size and precautions to be taken shall be same as described for bolster liner application. Down hand welding shall be used. Regarding welding Sequence refer Fig. 24.

Welding Sequence :

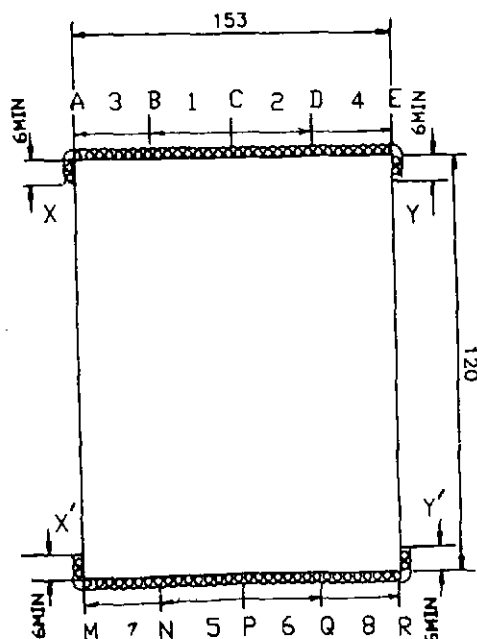
Start from one corner and then weld opposite corner and so on till all four corners are completed in the same pass.

Sequence of Welding Corner (A), (M), (L) and (N) :

Sequence of welding at each corner (e. g) Corner (A).

Leg. (A), (C) & (B) : Start at (C) and weld outwards towards (A). Start again at (C) and weld outwards towards (B).

Leg. (A), (E) & (D) : Start at (E) and weld towards (A). Start at (E) and weld towards (D).



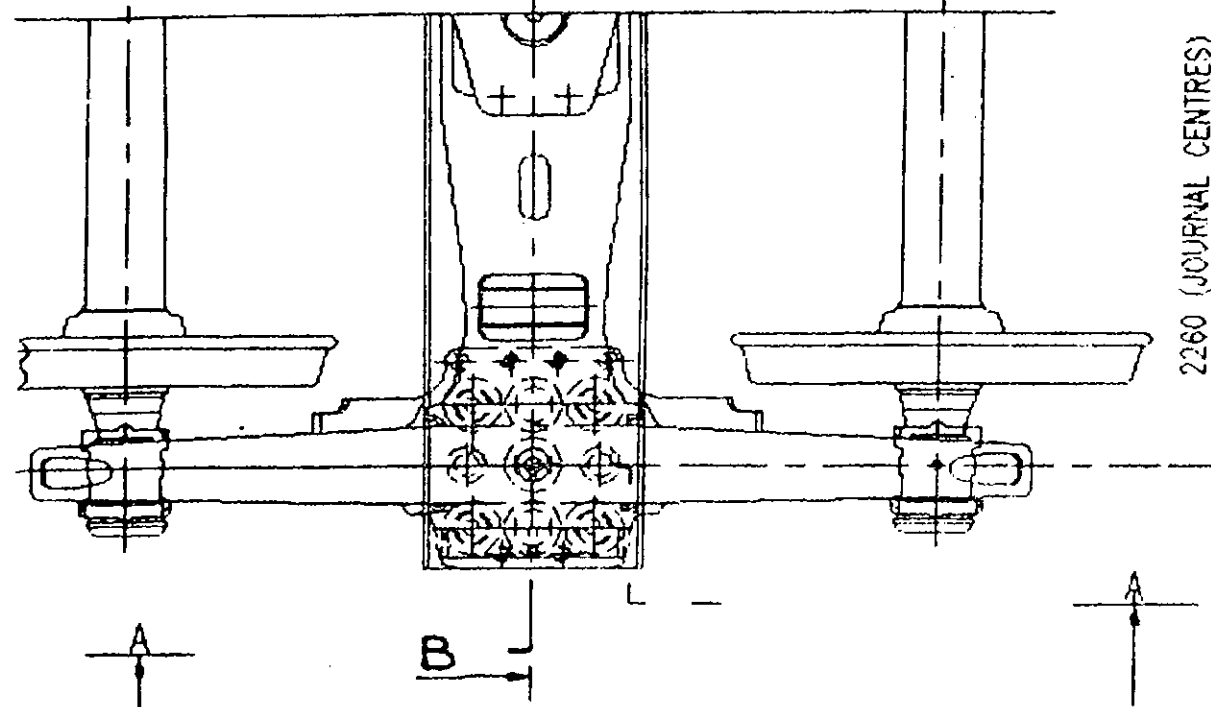
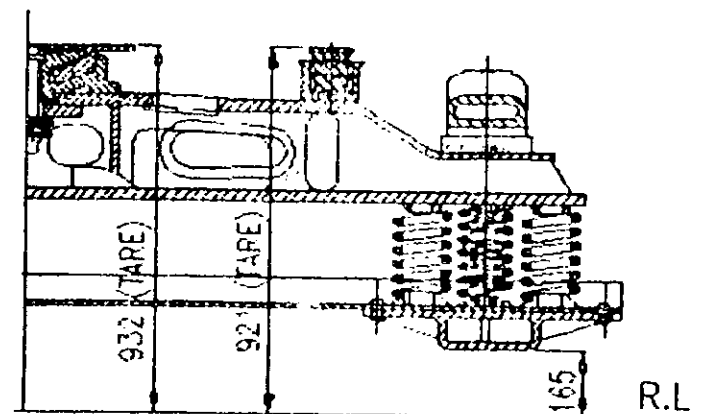
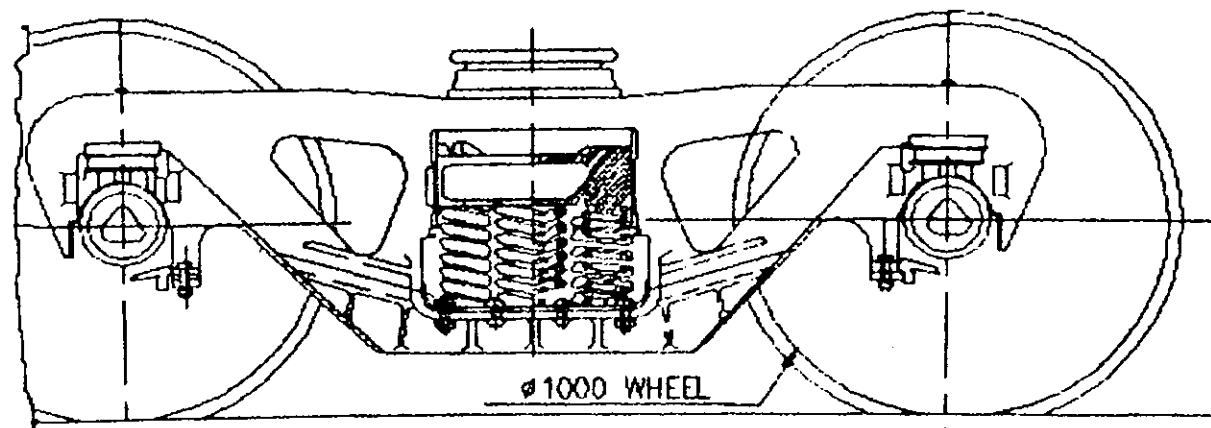
(All dimensions are in mm not to scale)

0000000621 Fig. 'C' Bolster Liner showing welding sequence

LIST OF IMPORTANT MODIFICATIONS

S.No.	Item	RDSO's Ref.	Sick Line	To be done in ROH	POH
1.	To prevent the brake beam failures, the brake beam SK-69596 of 22W bogies to be modified by boxing the channel as indicated in SK-69596 Alt. 7.	MW/BOXN/MAINT. dt. 10/11.9.90.	NO	YES	YES
2.	Strengthening of pivot W/BE-601 & deleting grease grooves as per Alt. 5.	MW/BOXN/MAINT. dt. 10/11.9.90.	NO	YES	YES
3.	The existing push rod support arrangement are to be removed & replaced by arrangement shown in SK-69597 Alt. 22 for 22W & WD-85054-S/4 Alt. 7 for 22W (M) bogies.	MW/BOXN/MAINT. dt. 10/11.9.90.	NO	YES	YES
4.	Retrofitment of E. pad & constant contact side bearers on 22W bogies.	MW/PLNG/CSNB dt. 15.1.90	NO	YES	YES
5.	Fitment of strengthened brake shoe adjuster to Drg. No. WD-88012-S/1 Item 4.	MW/BOXN/MAINT. dt. 10/11.9.90.	NO	YES	YES
6.	Fitment of brake beam hanger & suspension bracket as per Drg. No. WD-89075-S/01 Alt. 2 & removal of safety strap as per Drg. No. WD-87017-S/1 Alt. 2.	MW/BOXN/MAINT. dt. 10/11.9.90.	NO	YES	YES
7.	Provision of extra roller type pull rod supports as per Drg. No. WD-90016-S/1 Alt. 12.		NO	YES	YES
8.	Fitment of brake beam hanger & suspension bracket to provide central support to brake beam in Casnub 22W (M) bogies.	MW/PLNG/CSNB/M dt. 2/7.5.91.	NO	YES	YES
9.	Modification of centre pivot bottom on Casnub 22W bogies to avoid jamming.	MW/PLNG/CSNB/M dt. 31.1.94.	NO	YES	YES
10.	Provision of wear liner on wearing surfaces of Casnub 22W(M) & NLB bogies.	MW/PLNG/CSNB/M dt. 28.12.93.	NO	YES	YES
11.	Replacement of Nylon bush by steel bushes on Casnub bogies.	MW/NYLON BG/COMP dt. 18.5.94.	NO	YES	YES
12.	Rivetting of centre pivot top of BOXN/BCN wagons with Casnub bogies.	MW/BOXN/MAINT dt. 28.6.93.	NO	YES	YES
13.	Conversion of top centre pivot arrangement from bolted to riveted design on BCNA/BRN wagons.	MW/PLNG/CSNB dt. 3.5.94.	NO.	YES	YES
14.	Fitment of centre pivot top with body bolster by rivets in place of bolts in BTPN wagon.	MW/BTPN dt. 18.7.94.	NO	YES	YES
15.	Retrofitment of E. Pads and constant contact side bearers in Casnub 22W bogies.	MW/PLNG/CSNB dt. 15.1.90.	NO.	YES	YES
16.	Fitment of strengthened brake shoe adjuster in Casnub 22W(M) bogies.	MW/BOXN/MAINT dt. 10/11.9.90.	NO	YES	YES
17.	Use of bulb cotters in place of standard split cotters in Casnub bogies.	MW/PLNG/CSNB dt. 14.9.94.	YES	YES	YES
18.	Modification to push rod safety strap.	MW/PLNG/CSNB dt. 13.9.94.	NO.	YES	YES
19.	The brake beam WD-89033-S/1 Alt. 14 has been strengthened by providing stiffner plate.	MW/PLNG/CSNB dt. 9/17.11.95.	NO	YES	YES
20.	In centre pivot details WD-85079-S/2 Alt. 15 assembled height with tolerances indicated & material of top pivot changed to AAR-201 Gr. C.	MW/CSNB/PLNG dt. 2.4.96.	NO	YES	YES
21.	Instructions for welding of bottom centre pivot with bolster has been given by welding size and type of electrode.	MW/CSNB/PLNG dt. 2.4.96.	NO	YES	YES

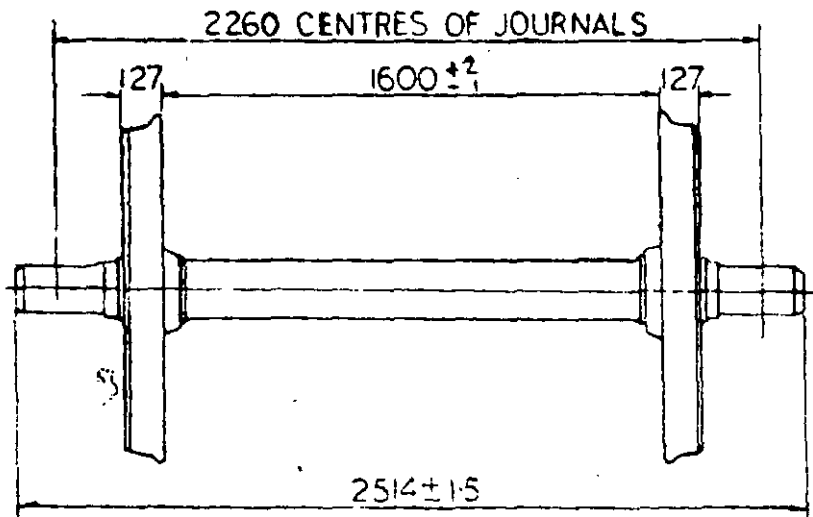
0000000623



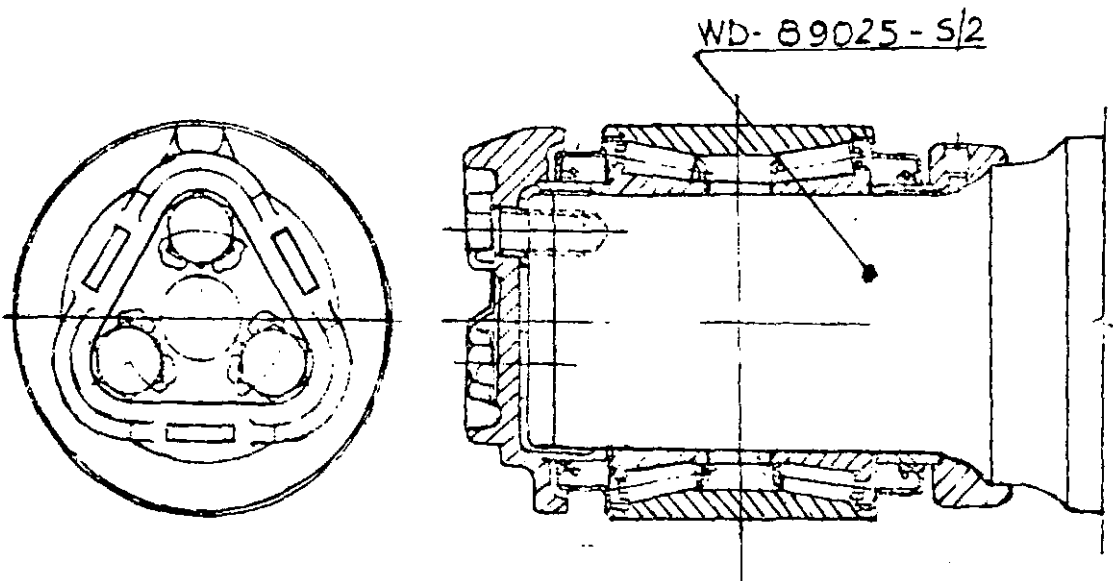
BOGIE GENERAL ARRANGEMENT

[CASNUB-22NLB]

FIG.NO.-1



WHEEL SET



TAPERED ROLLER BEARING UNIT

REFER G-81 FOR MAINTENANCE DETAILS

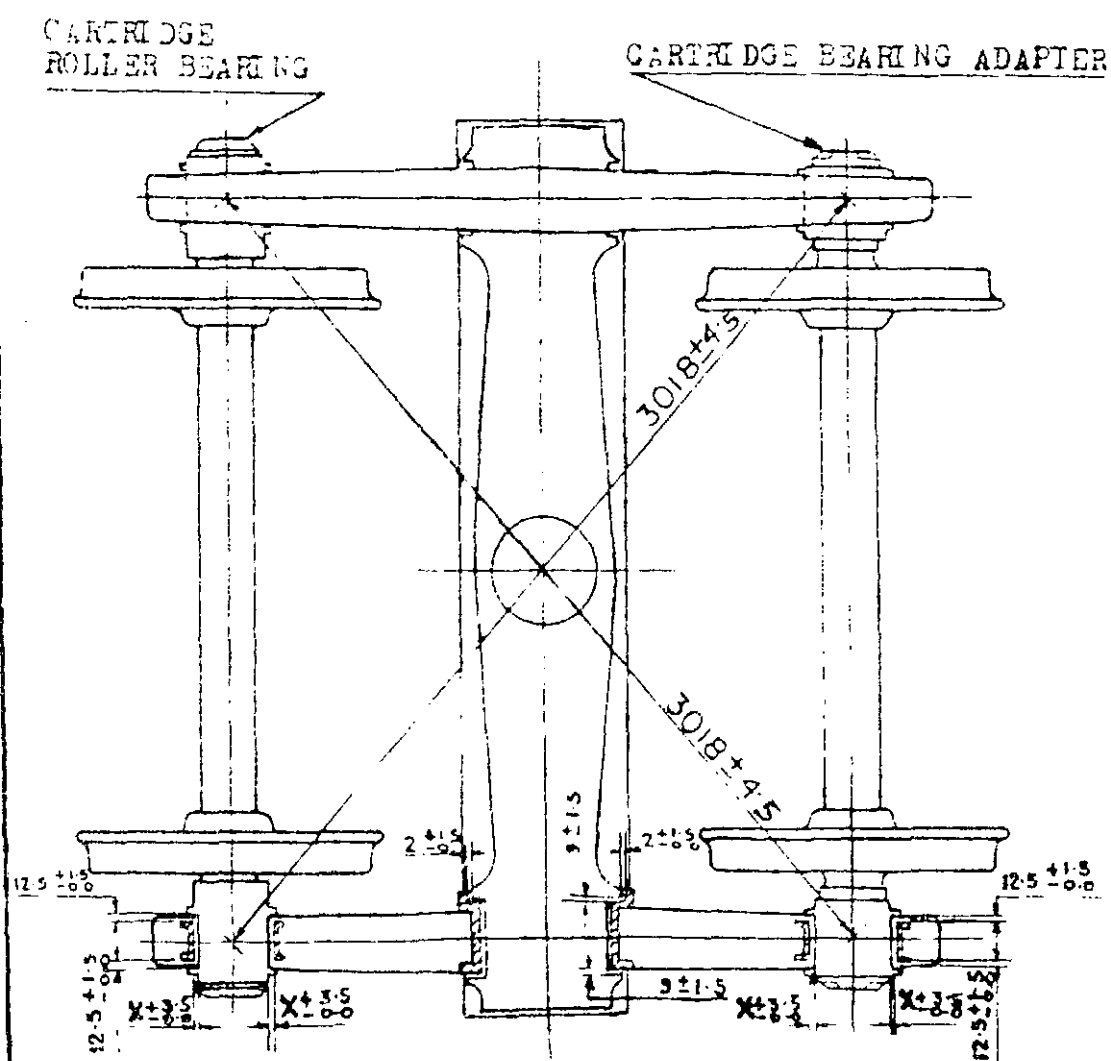
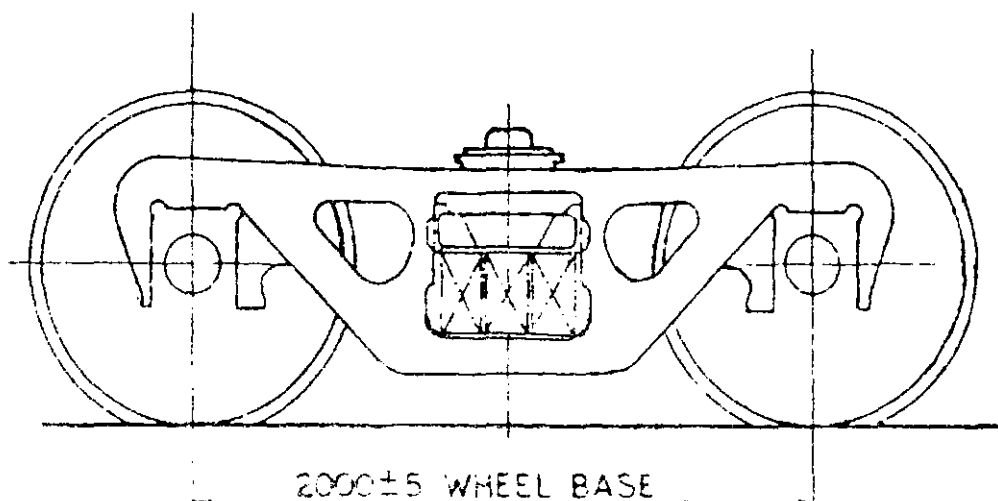
WHEEL SET & ROLLER BEARING UNIT

[CARTRIDGE BEARING]

[CASNUB-22W, 22W(M),
22NL, 22NLB, 22HS

BOGIES

FIG.-2

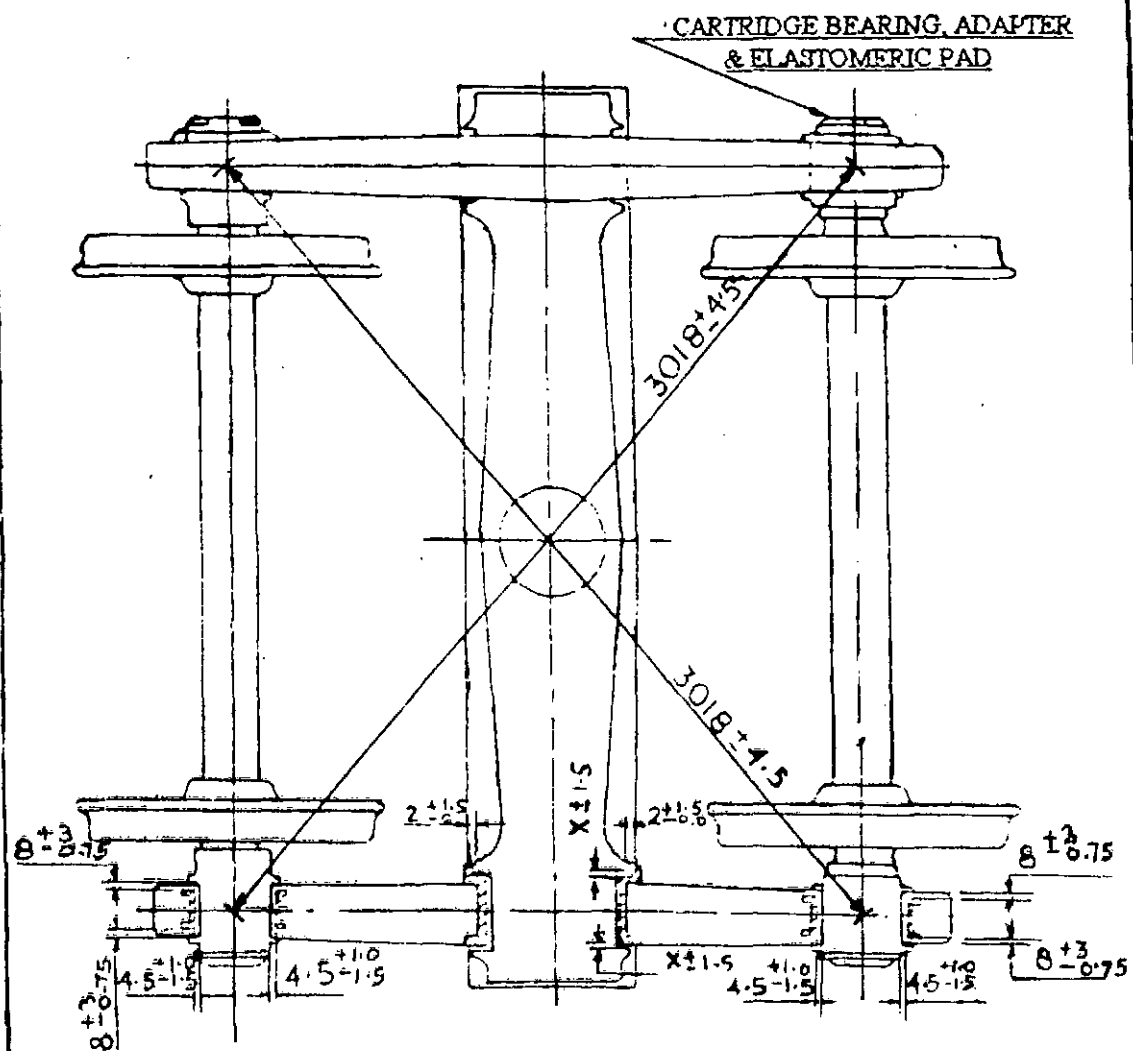
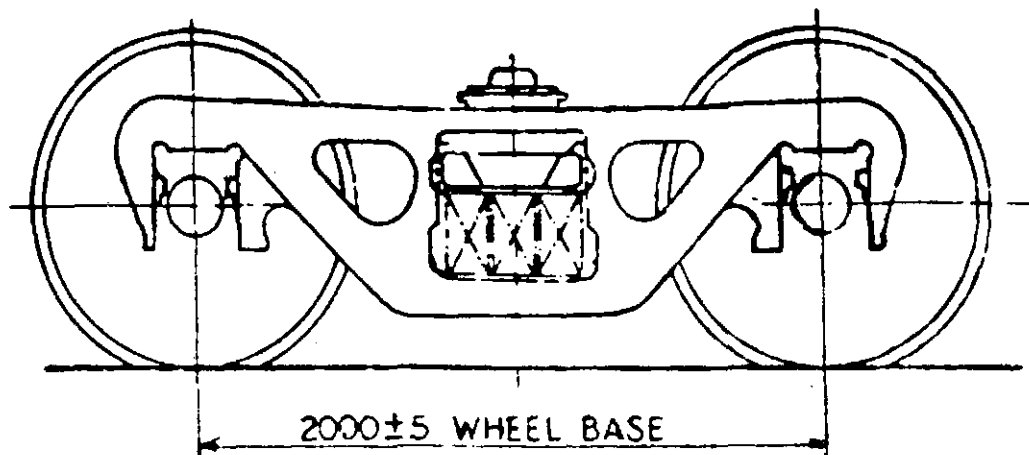


BOGIE	DIM. 'X'
CASNUB 22W	1
CASNUB 22W(M)	5

NOMINAL CLEARANCES
CASNUB-22W,22W(M) BOGIES.

FIG.-3

0000000625

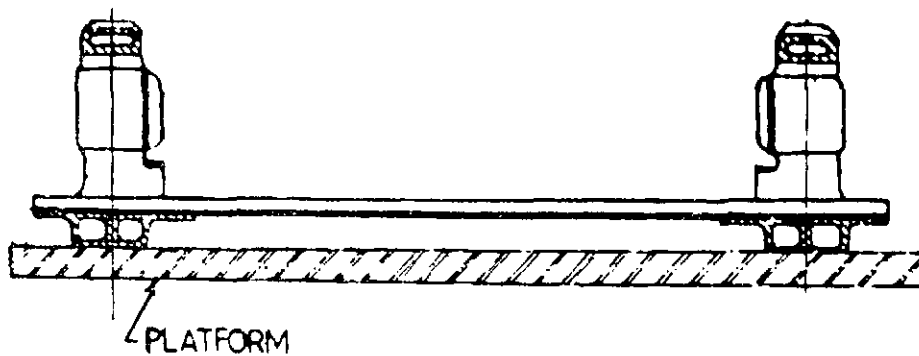


BOGIE	DIM 'X'
CASNUB-22NL/NLB	9
CASNUB-22HS	12.5

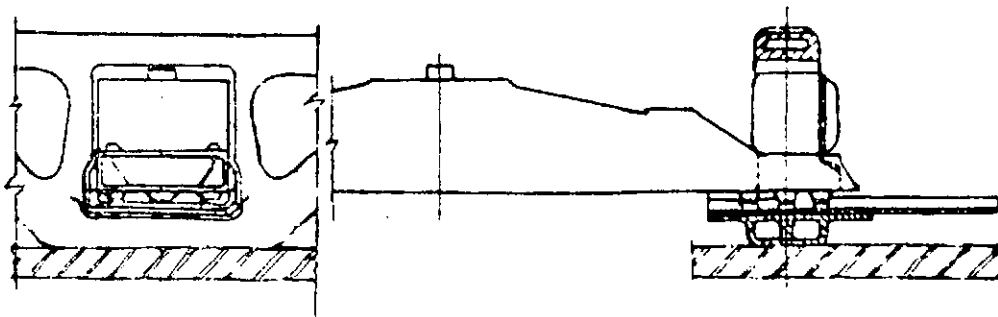
NOMINAL CLEARANCES
(CASNUB-22 NL/NLB/HS)

FIG.4

0000000626



- (1) ASSEMBLE SPRING PLANK WITH TWO SIDEFAMES BY RIVETING & FIT BOLTS.



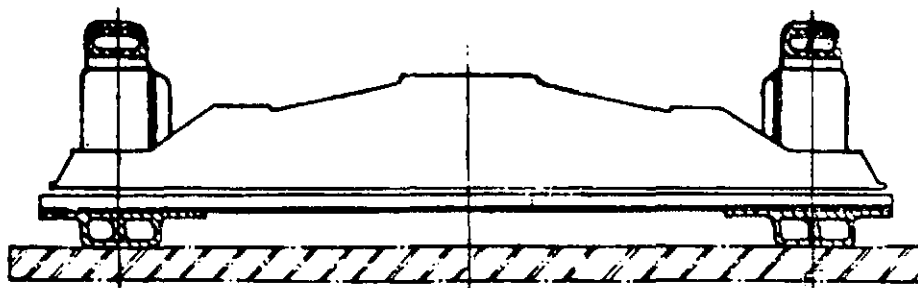
- (11) INSERT BOLSTER THROUGH THE CENTRAL OPENING IN ONE OF THE TWO SIDEFAMES.

ASSEMBLY PROCEDURE
(SHEET -1)

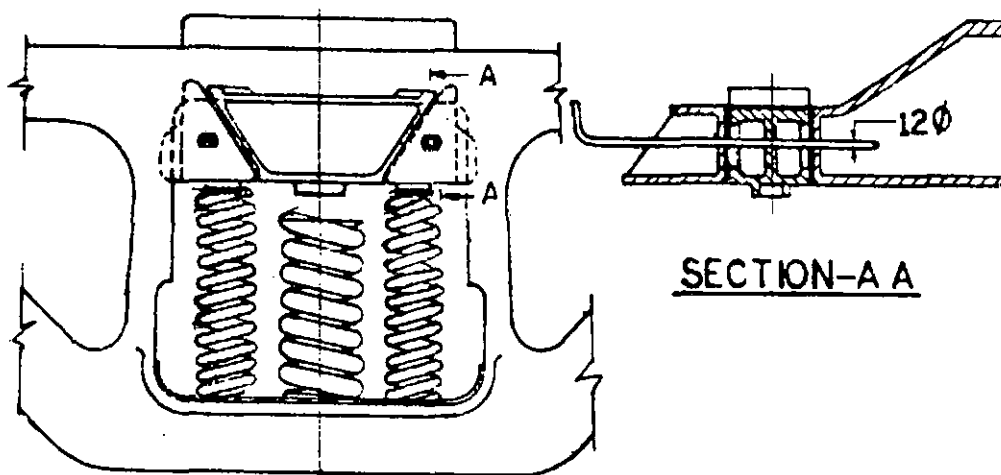
CASNUB -22W, 22W(M), 22NL, 22NLB & 22 HS BOGIES.

FIG.-5

0000000627



BOLSTER SHOWN FULLY INSERTED



SECTION-A A

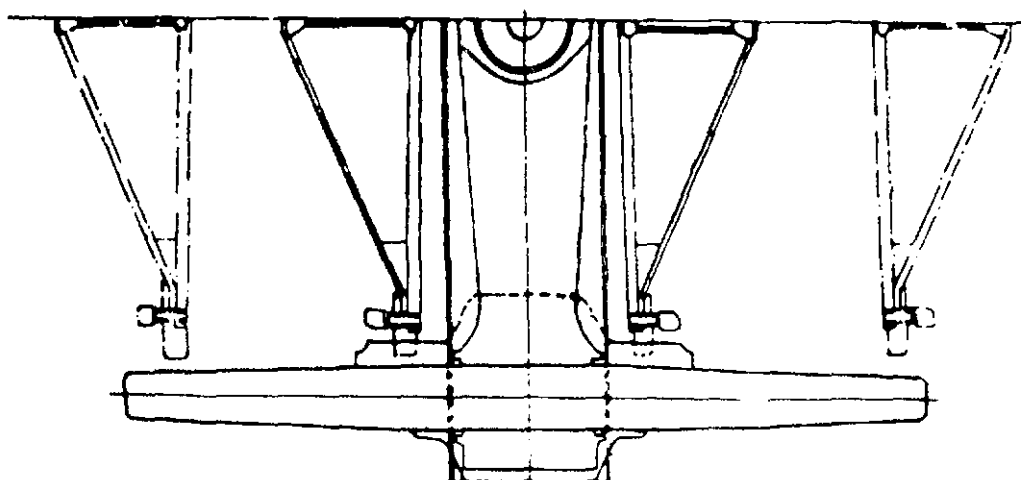
- (iii) RAISE BOLSTER TO THE MAXIMUM POSSIBLE EXTENT
- (iv) INSERT SNUBBER WEDGE INTO THE BOLSTER TAIL POCKET AND HOLD THEM BY PINS AS SHOWN.
- (v) PLACE THE LOAD BEARING SPRINGS OVER THE LOWER SPIGOTS. LOWER THE BOLSTER TO SETTLE ON THE SPRINGS AND REMOVE THE WEDGE PINS.

ASSEMBLY PROCEDURE

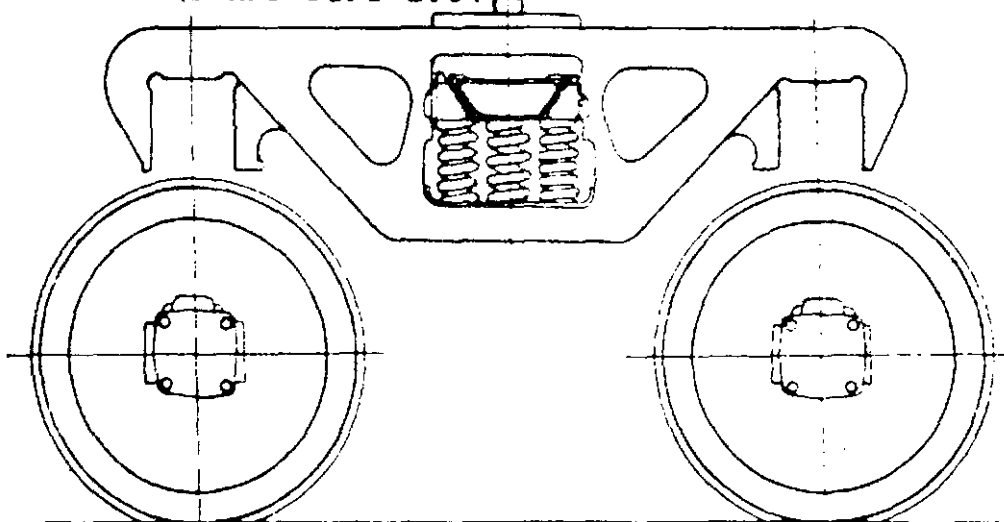
(SHEET-2)

CASNUB-22W, 22W(M), 22NL, 22NLB & 22 HS BOGIES.

FIG.-6



(VI) ASSEMBLE BRAKE BEAM WITH SIDEFRAMES, AFTER FITTING THE BRAKE BEAM WEAR LINERS INTO THE CORRESPONDING INNER GUIDES ON THE FRAME (EXCEPT CASNUB 22W(M)). FOR CASNUB 22W(M) - ASSEMBLE CAST STEEL BRAKE BEAM WITH BRAKE HEAD AND BLOCK ASSEMBLY (DRG. WD-88012-S/1). HANG BRAKE BEAMS FROM BRACKETS THROUGH HANGERS AND PINS ETC.



(VII) RAISE THE COMPLETE ASSEMBLY AND LOWER OVER THE AXLE BOXES/CTG. BEARING ADAPTERS AND ELASTOMERIC PADS FITTED ON JOURNALS.

(VIII) PLACE THE KEY THROUGH THE SLOT IN SIDEFRAME AND BOLT IT WITH SIDEFRAME.

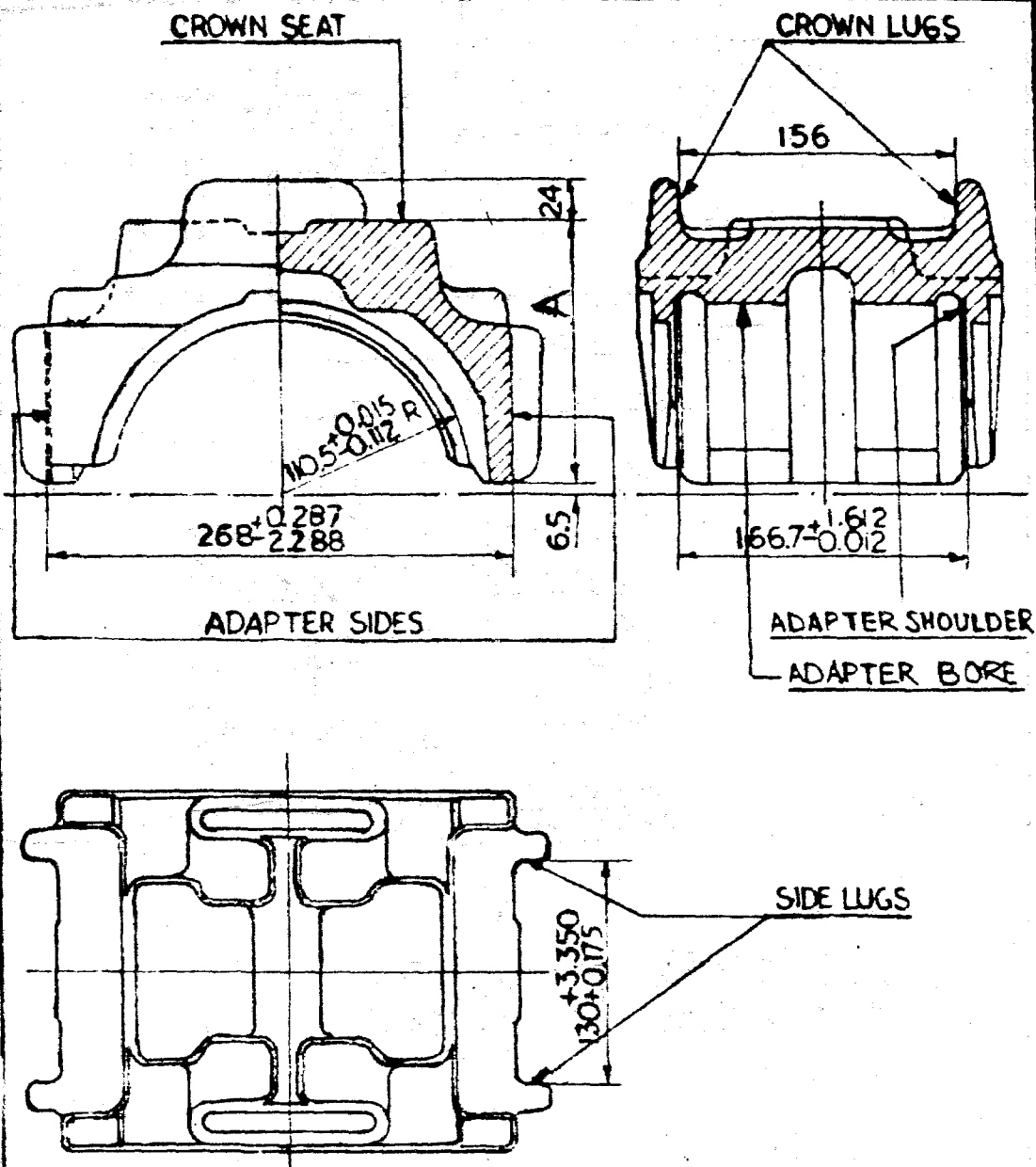
(IX) ASSEMBLE "ADAPTER RETAINER BOLTS" WITH SIDEFRAME (ONLY IN WIDE JAW BOGIES WITH CTG. BEARINGS BUT WITHOUT 37mm PACKING.)

NOTE: THOUGH SHAPES OF SIDEFRAME AND BOLSTER (SHOWN HERE FOR CASNUB 22W) DIFFER IN VARIOUS VERSIONS, ASSEMBLY PROCEDURE IS BASICALLY SAME.

ASSEMBLY PROCEDURE (SHEET-3)

CASNUB-22W, 22W(M), 22NL, 22NLB, 22HS BOGIES.

FIG. 7



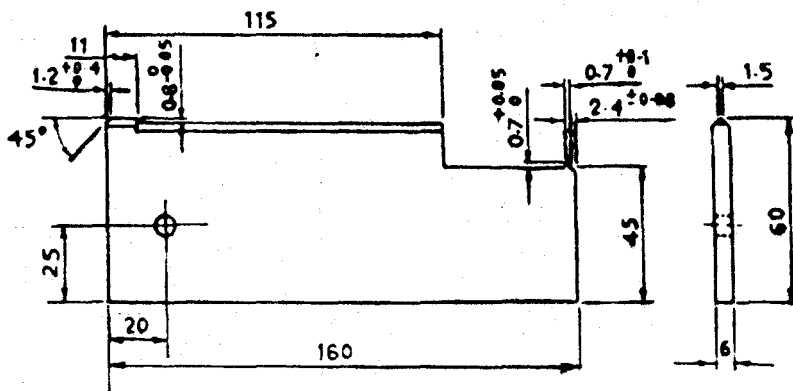
LOCATIONS WHEN SCRAPED

1. ADAPTER BORE WEAR.
2. ADAPTER SHOULDER WEAR.
3. ADAPTER SIDES.
4. ADAPTER CROWN LUGS.
5. ADAPTER CROWN SEAT.
6. ADAPTER SIDE LUGS.

DIM.	CASNUB 22W 22W(M)	RETROFITTED CASNUB-22 W
A	152.5	129.5

SCRAP LOCATIONS OF WORN ADAPTER
CASNUB-22W, 22W(RETROFITTED) , 22 W(M)

FIG.8



ADAPTER WEAR GAUGE

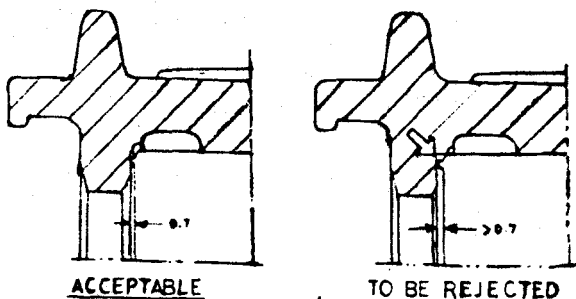


FIG. A

METHOD OF GAUGING THRUST
SHOULDER WEAR

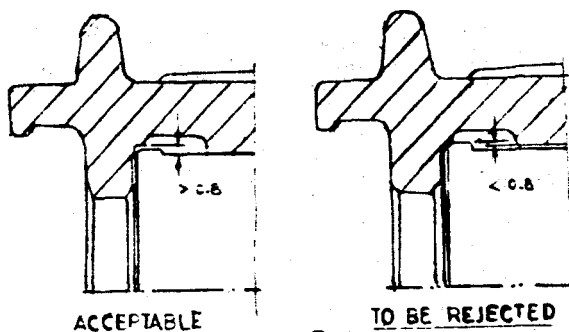


FIG. B

METHOD OF GAUGING BORE WEAR

NOTE:

SHARP CORNERS TO BE
REMOVED.

ALL GAUGING SURFACES TO
BE HARDENED & GROUND.

MATERIAL-IS: 1875 CL-4

ADAPTER THRUST SHOULDER & BORE WEAR GAUGE

(CASNUB-22-W, 22W (RETROFITTED), 22W (M), 22NL, 22NLB, 22NLM, 22HS
BOGIES)

FIG. 9

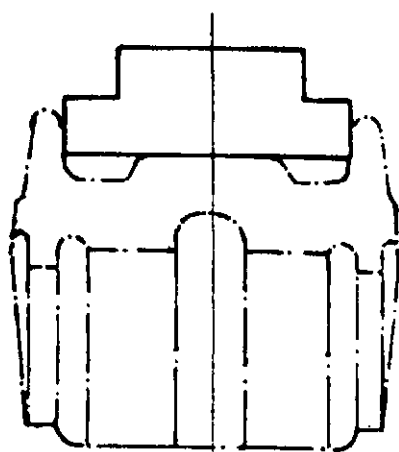
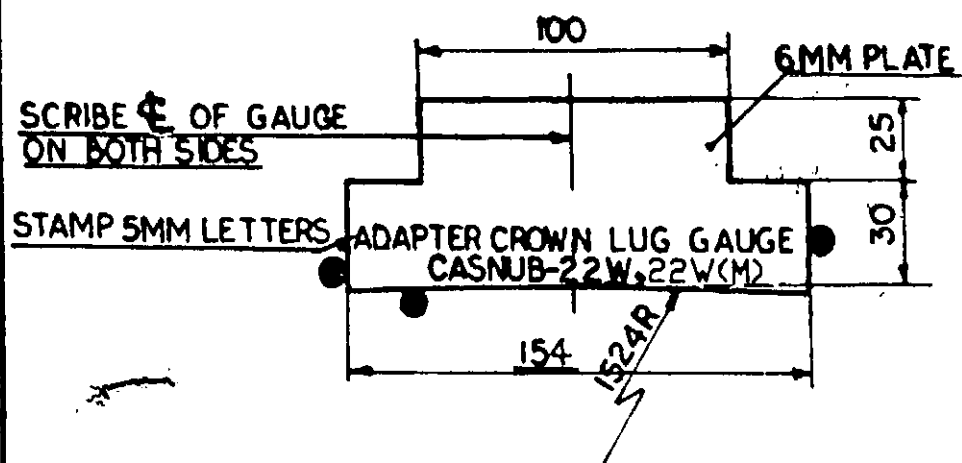


FIG-A

NOTE:

SURFACE MARKED '0' AND
DIMENSION UNDER SCORED
ARE IMPORTANT.

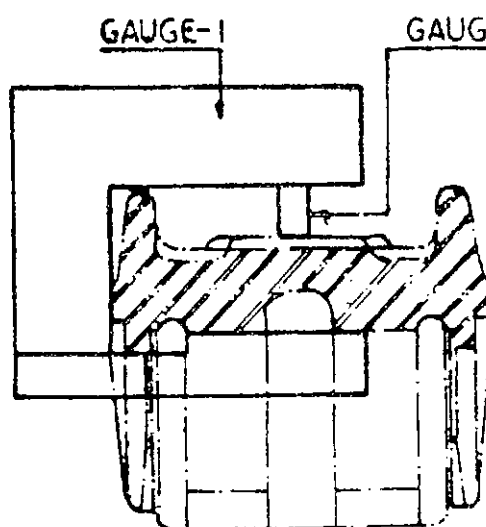
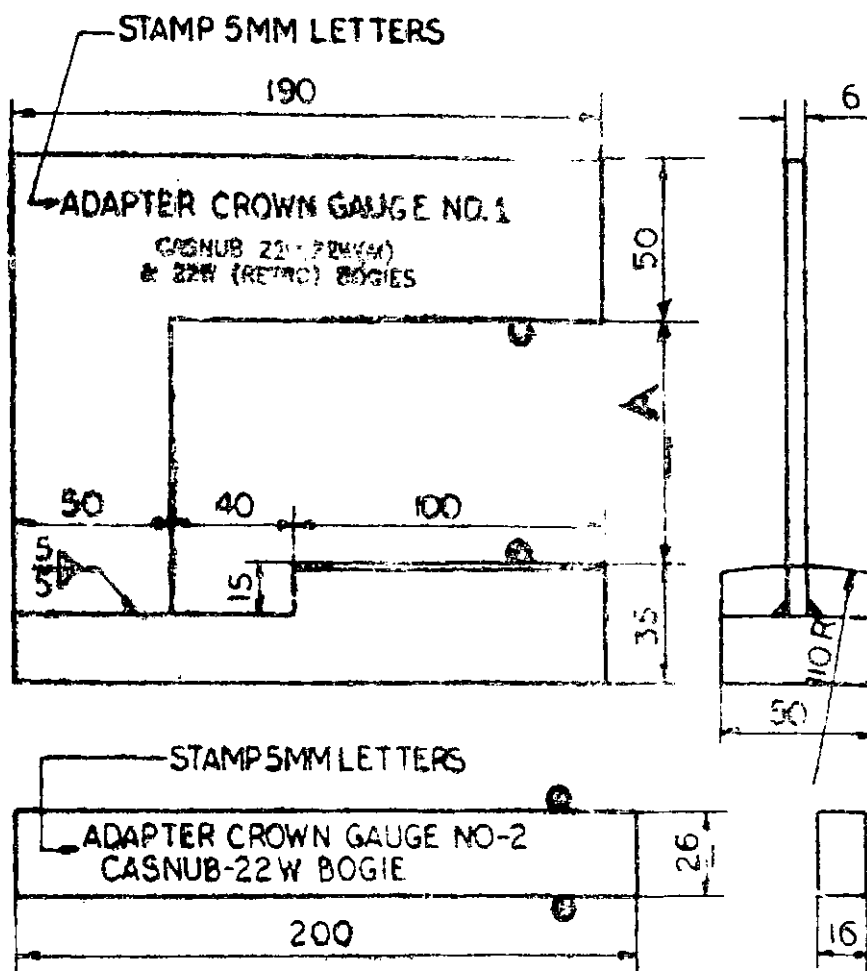
MATERIAL:

GAUGE TIP-IS:1875 CL4
HARDENED AND GROUND
BODY-IS:2062 Fe 410WA

ADAPTER CROWN LUG GAUGE
CASNUB-22W, 22W(RETROFITTED), 22W(M)

FIG.10

0000000632



NOTE

SURFACE MARKED '●' THUS
AND DIMENSIONS UNDER
SCORED ARE IMPORTANT.

MATERIAL -

GAUGE TIP-IS:1875 CL.4
HARDENED & GROUND

BODY - IS:2062 F_o 410 WA

FIG. A

ADAPTER CROWN SEAT GAUGE
CASNUB - 22W, 22W (RETROFITTED), 22W (M)

DIM	CASNUB-22W 22W(M)	RETROFITTED CASNUB-22W
A	76	53

FIG. 11

0000000633

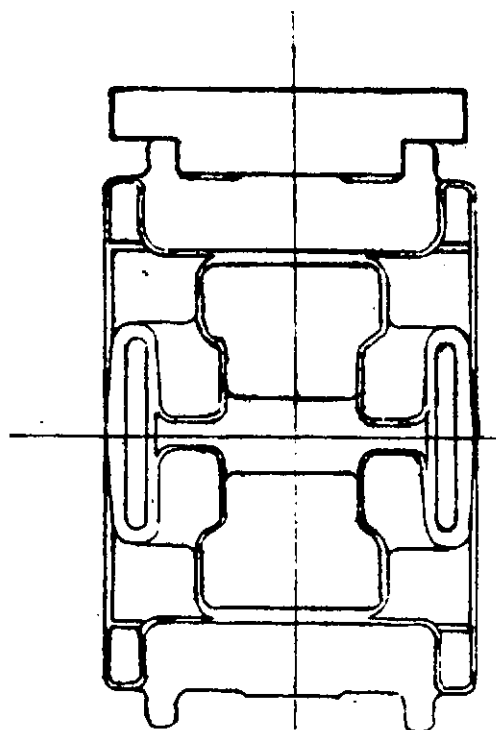
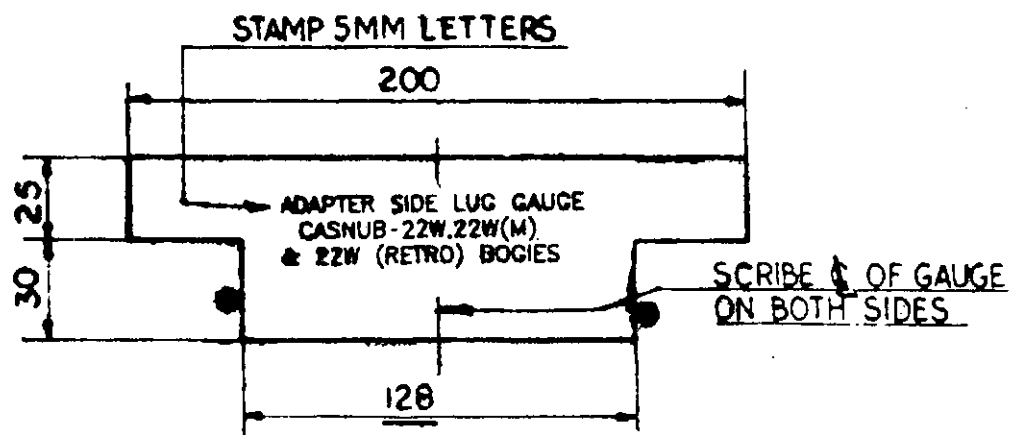


FIG-A

NOTE:

SURFACE MARKED '0' AND
DIMENSION UNDER SCORED
ARE IMPORTANT.

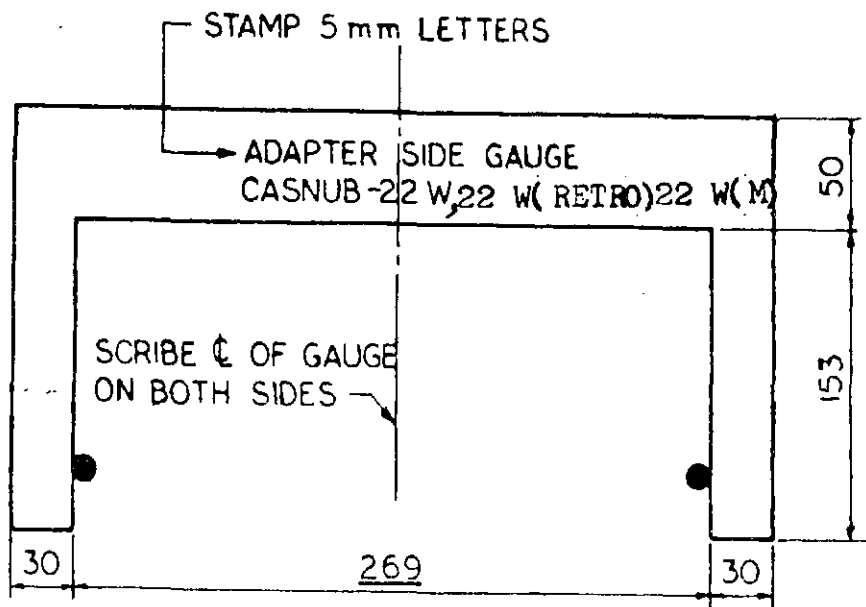
MATERIAL:

GAUGE TIP-IS:1875 CL4
HARDENED AND GROUND
BODY-IS:2062 Fe 410WA


ADAPTER SIDE LUG GAUGE
CASNUB-22W.22W(RETROFITTED).22W(M)

FIG.12

0000000634



NOTE —

SURFACE MARKED 
THUS AND DIMENSION
UNDER SCORED ARE
IMPORTANT.

MATERIAL:

GAUGE TIP-IS: 1875 CL 4

HARDENED & GROUND

BODY- IS: 2062

Fe 410 WA

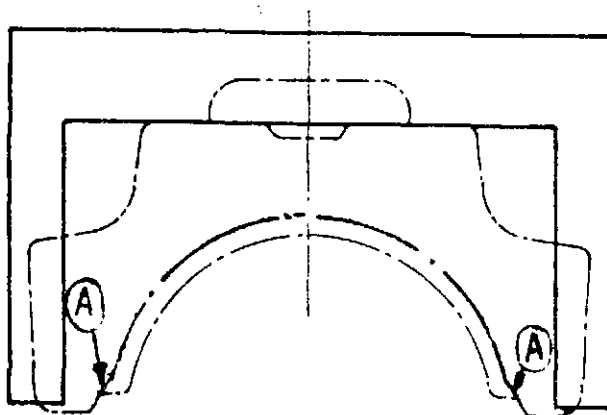
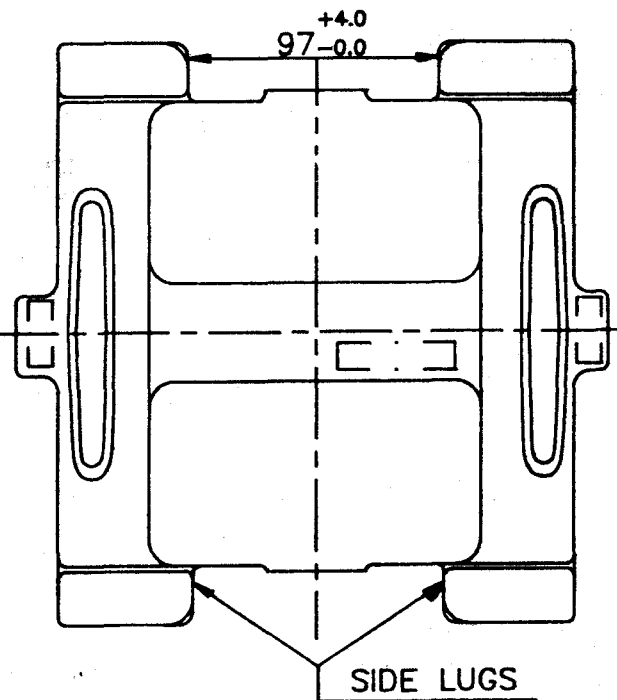
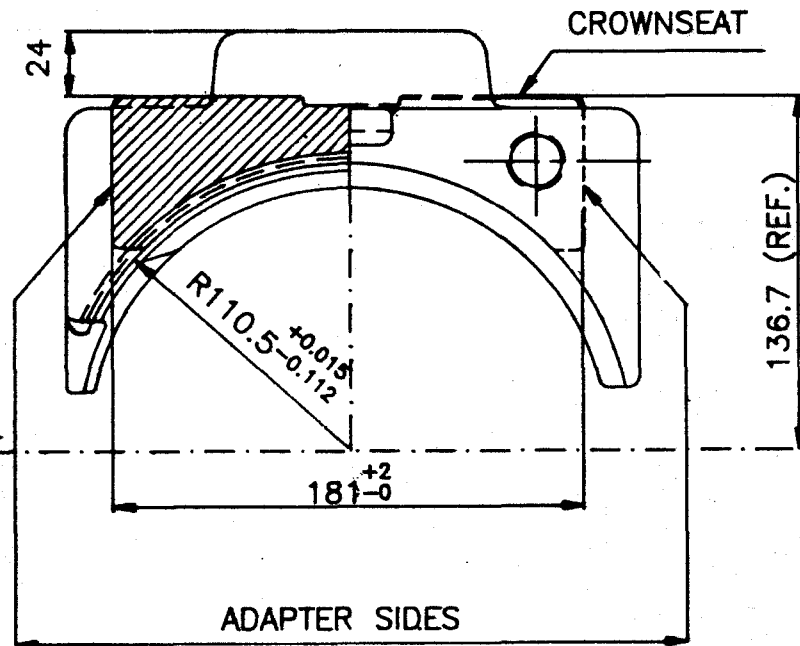
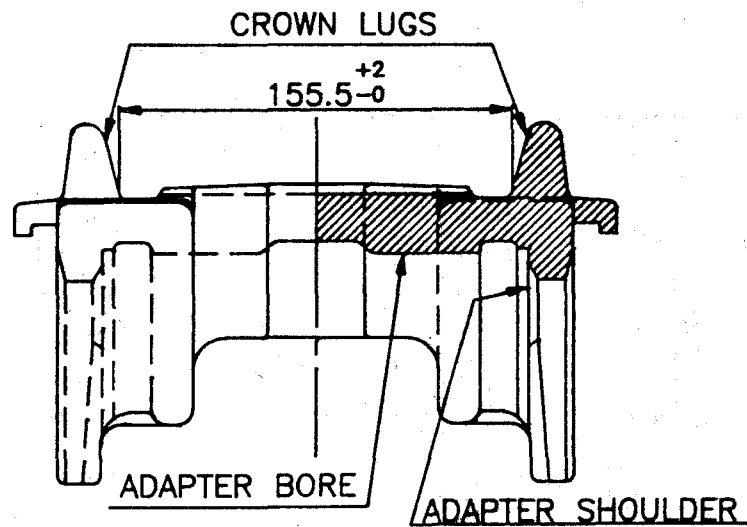


FIG-A

ADAPTER SIDES GAUGE
CASNUB-22 W, 22 W(RETROFITTED), 22 W(M)

FIG.13

0000000835



LOCATIONS WHEN SCRAPED

1. ADAPTER CROWN LUGS
2. ADAPTER CROWN SEAT
3. ADAPTER SHOULDER WEAR
4. ADAPTER BORE WEAR
5. ADAPTER SIDES
6. ADAPTER SIDE LUGS

SCRAP LOCATIONS OF WORN ADAPTER

CASNUB-22NL,NLB,& HS

FIG.—13A

0000000000

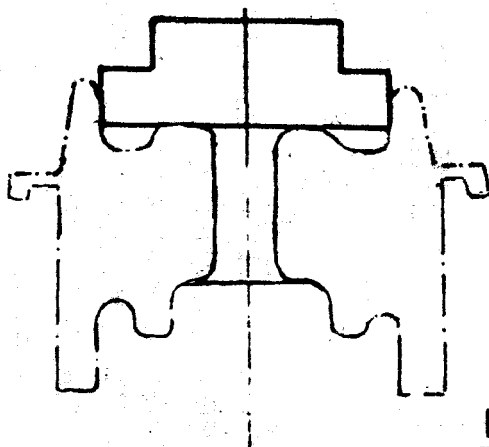
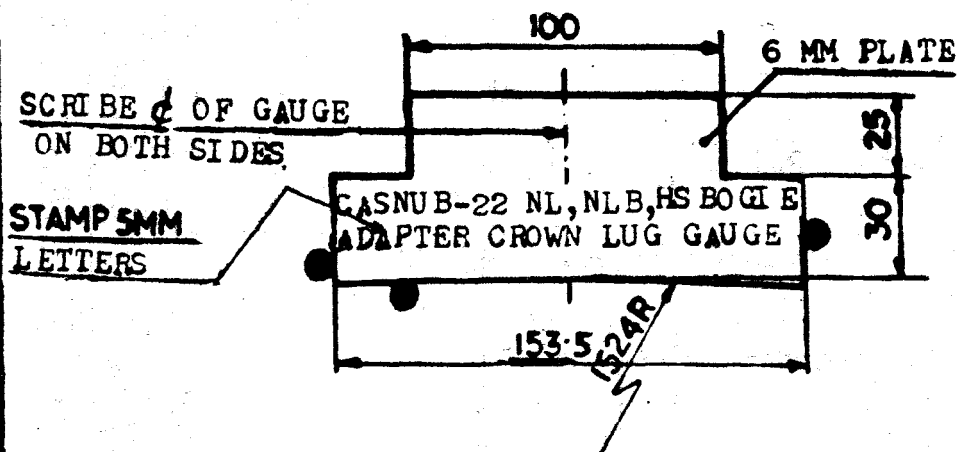


FIG-A

NOTE:

SURFACE MARKED ● THUS AND
DIMENSION UNDER LINED
ARE IMPORTANT

MATERIAL

GAUGE TIP-IS: 1875 CL-4

HARDENED & TEMPERED

BODY- IS: 2062 Fe 410 WA

ADAPTER CROWN LUG GAUGE
CASNUB-22 NL, 22 NLB & HS BOGIES

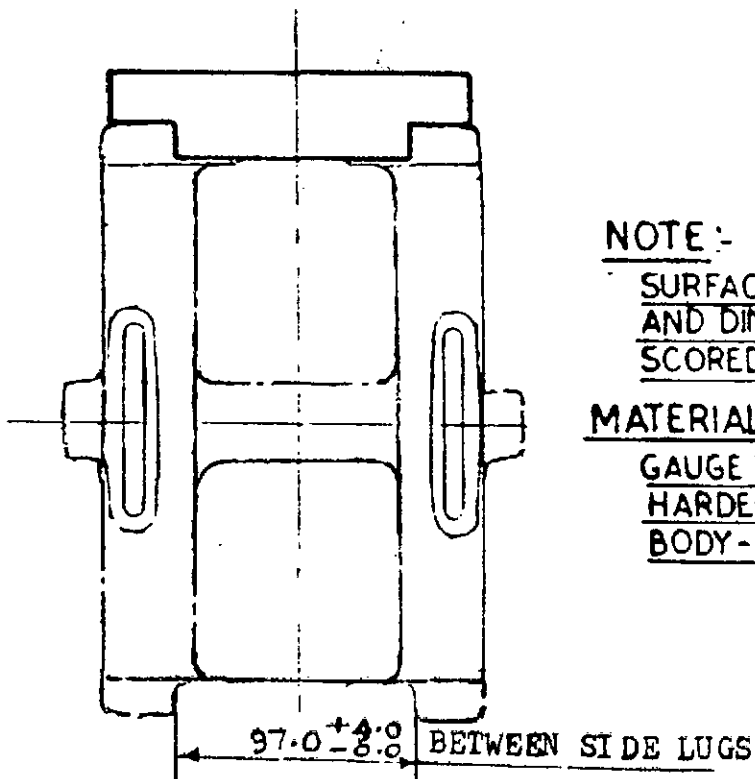
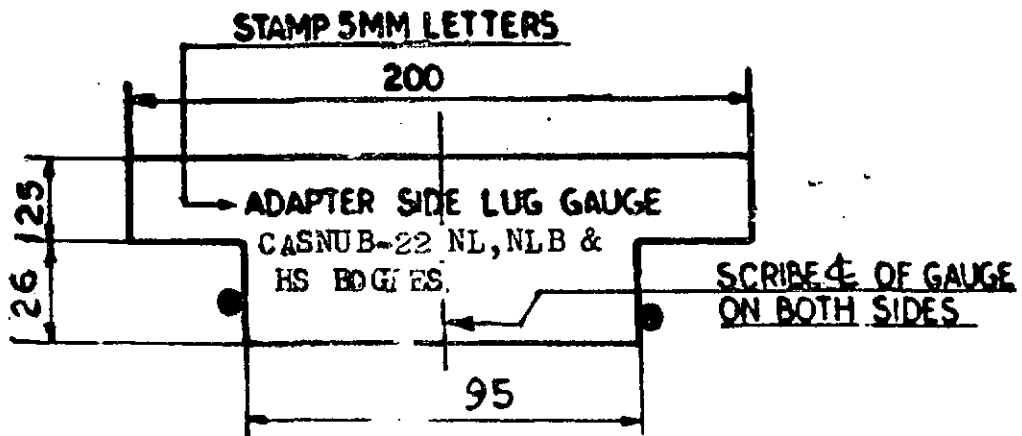


FIG.A

NOTE :-

SURFACE MARKED \bullet THUS
AND DIMENSION UNDER
SCORED ARE IMPORTANT.

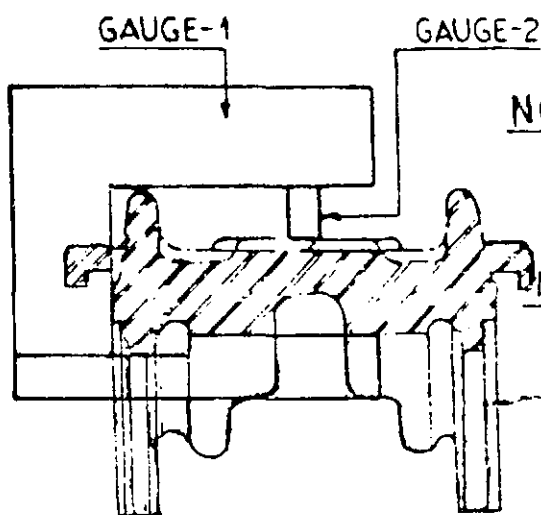
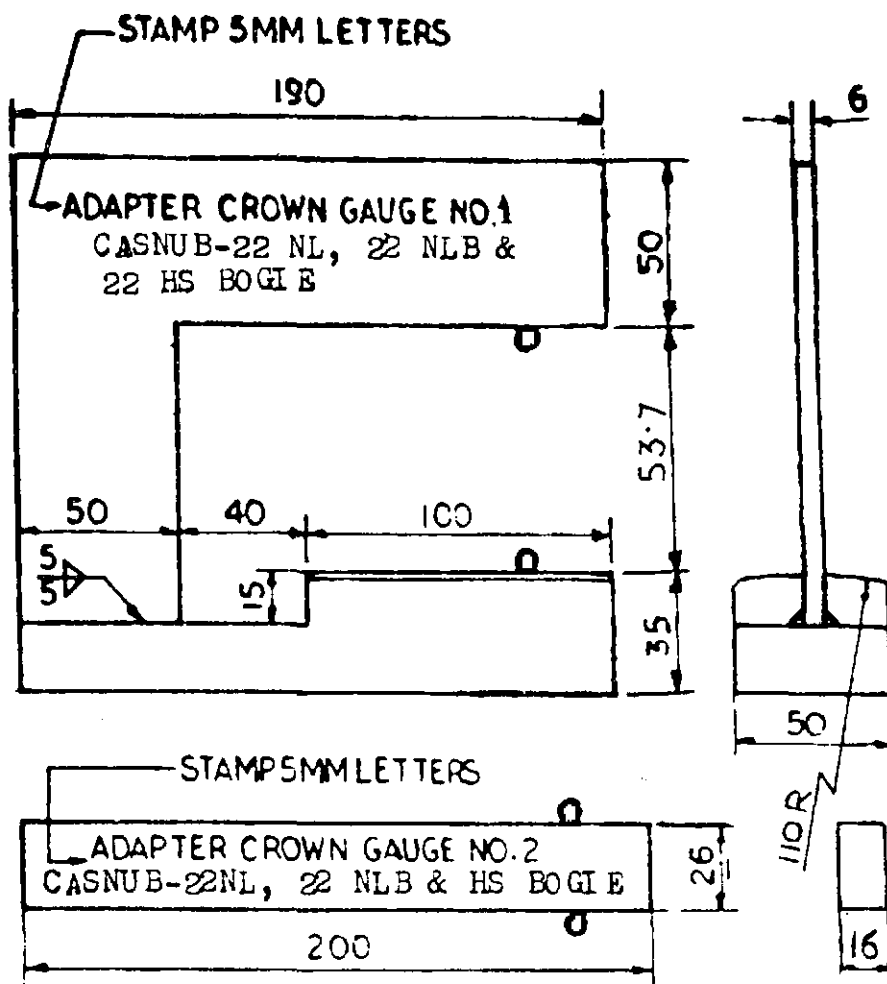
MATERIAL :-

GAUGE TIP- IS: 1875 CL4
HARDENED & GROUND
BODY- IS: 2062 Fe
 410 WA

ADAPTER SIDE LUG GAUGE
 CASNUB-22 NL, 22 NLB & HS BOGIES

FIG.15

0000000635



NOTE

SURFACE MARKED 'O' THUS
AND DIMENSIONS UNDER
SCORED ARE IMPORTANT.

MATERIAL -

GAUGE TIP-IS:1875 CL.4
HARDENED & GROUND

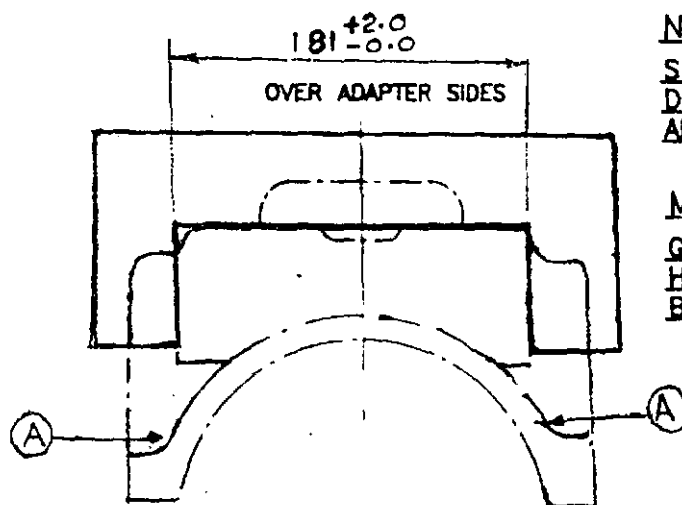
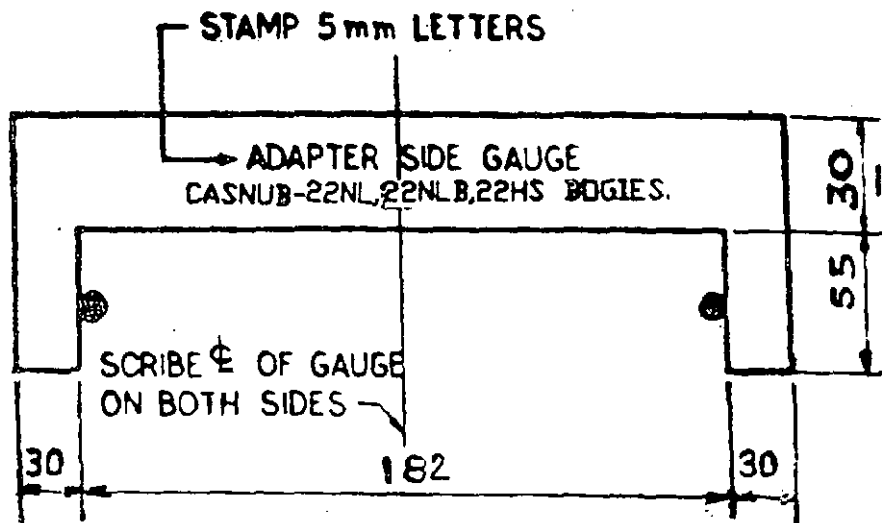
BODY IS:2062 Fe 410 WA

FIG. A

ADAPTER CROWN SEAT GAUGE
CASNUB-22 NL, 22 NLB & 22 HS BOGIES

FIG.16

0000000639



NOTE:

SURFACE MARKED '0' AND
DIMENSION UNDER SCORED
ARE IMPORTANT.

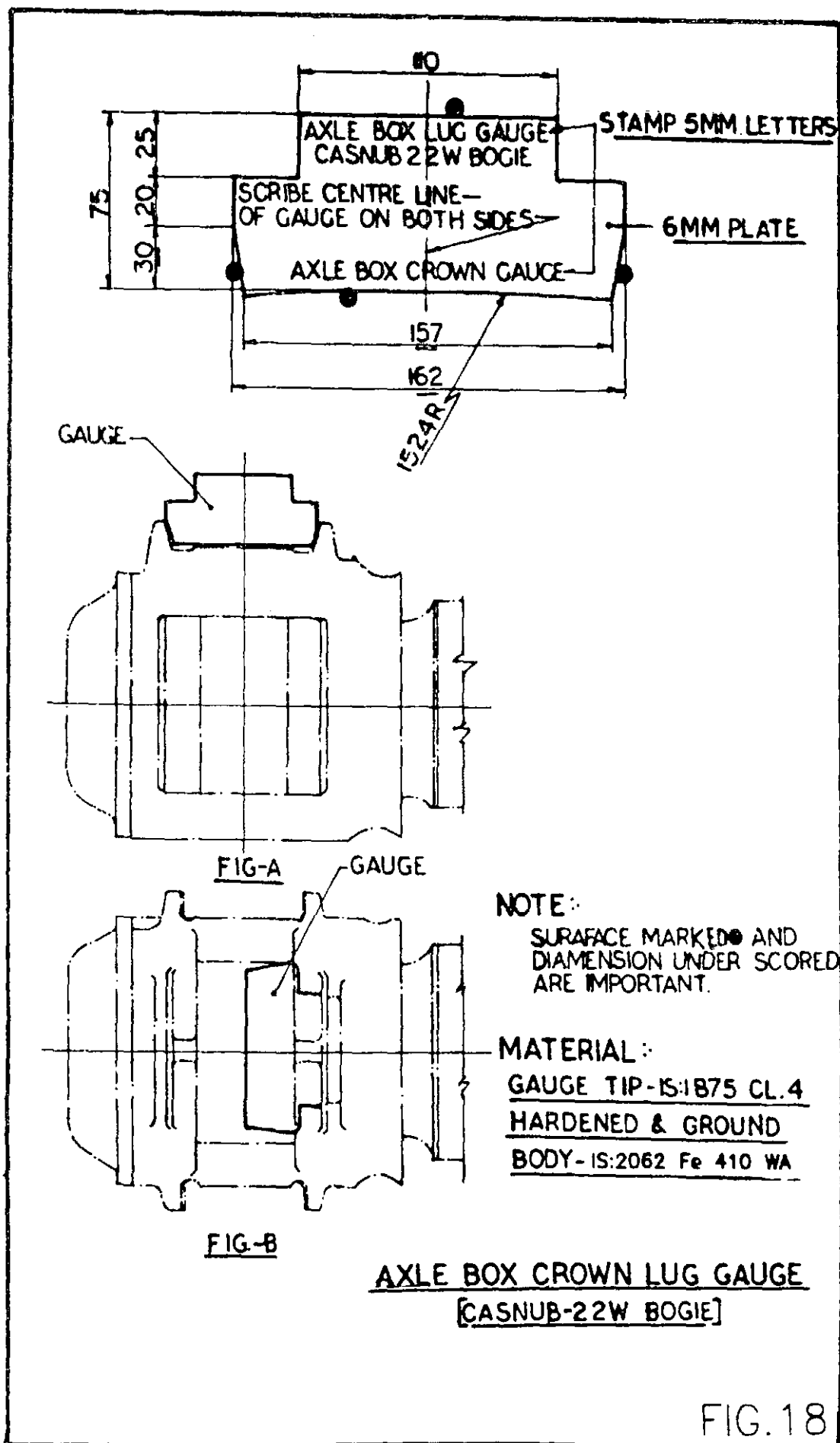
MATERIAL:

GAUGE TIP- IS: 1875 CL4
HARDENED AND GROUND
BODY- IS: 2062 Fe 410WA

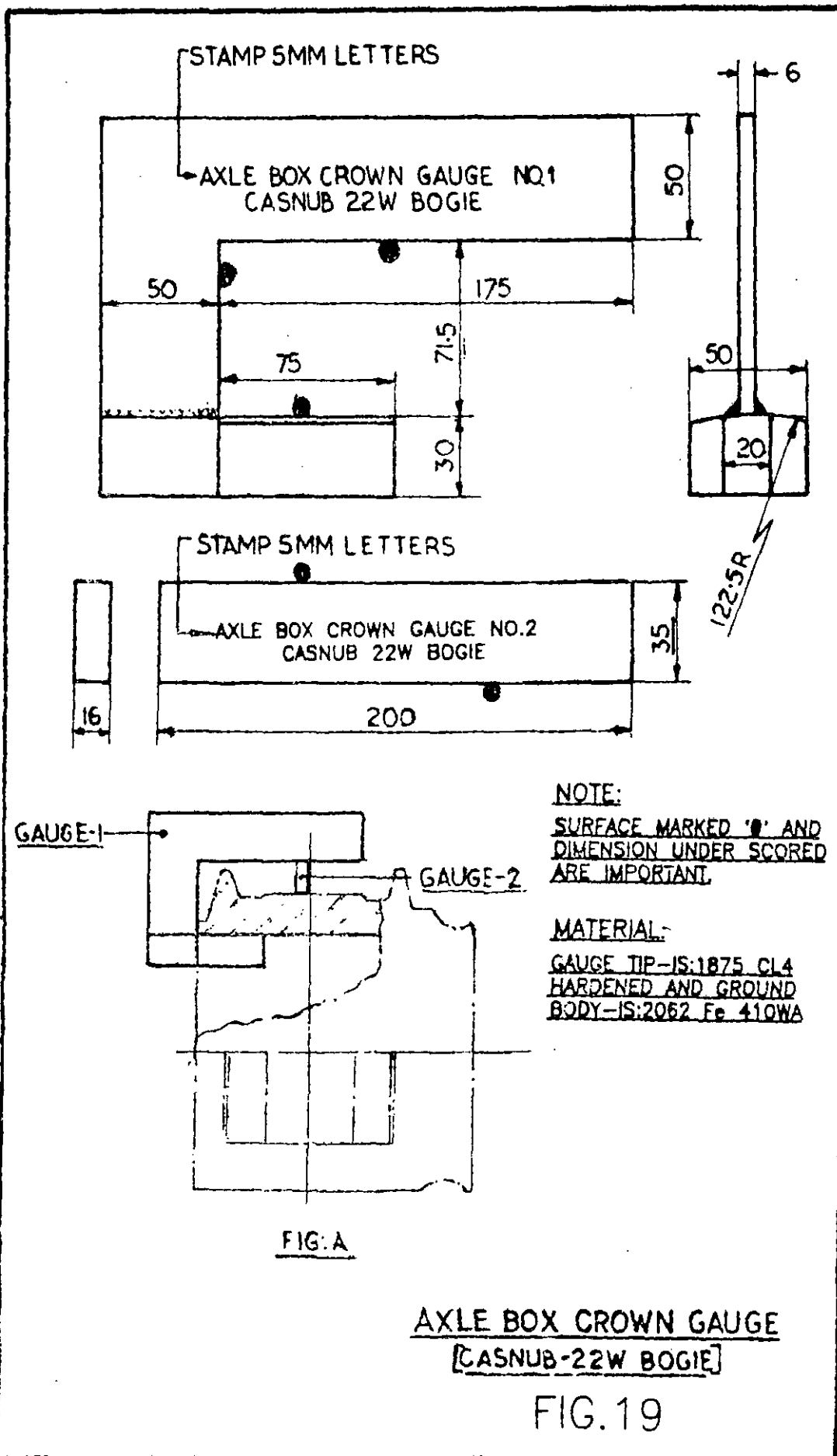
FIG-A

ADAPTER SIDES GAUGE
CASNUB- 22NL, 22NLB, 22HS BOGIES.

FIG.17



0000000641



0000000642

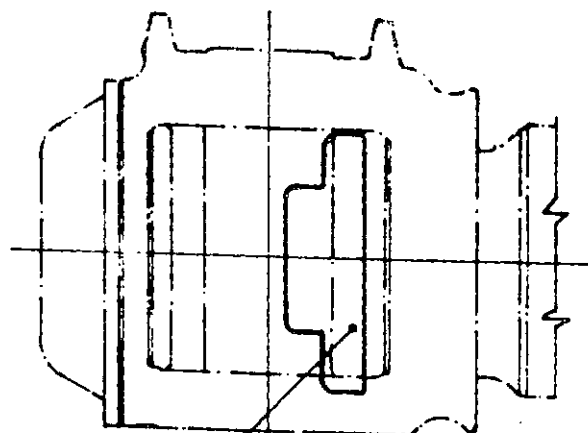
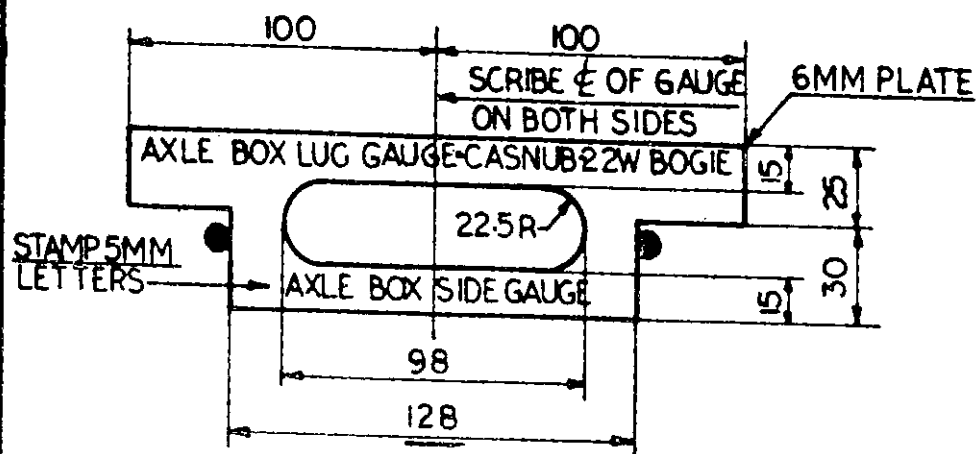


FIG-A

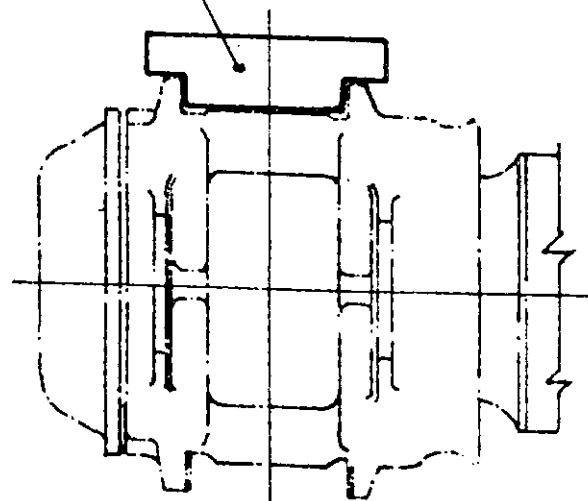


FIG-B

NOTE

SURFACE MARKED AND
DIMENSION UNDER R SCORED
ARE IMPORTANT

MATERIAL

GAUGE TIP-IS:1875 CL.4
HARDENED & GROUND
BODY-IS:2062 Fe 410 WA

AXLEBOX SIDE-LUG GAUGE
[CASNUB-22W BOGIE]

FIG.20

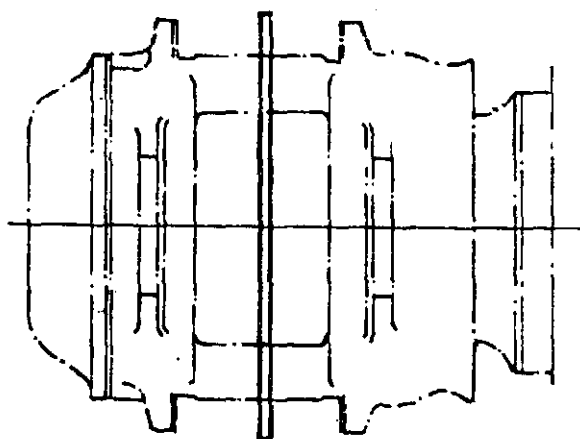
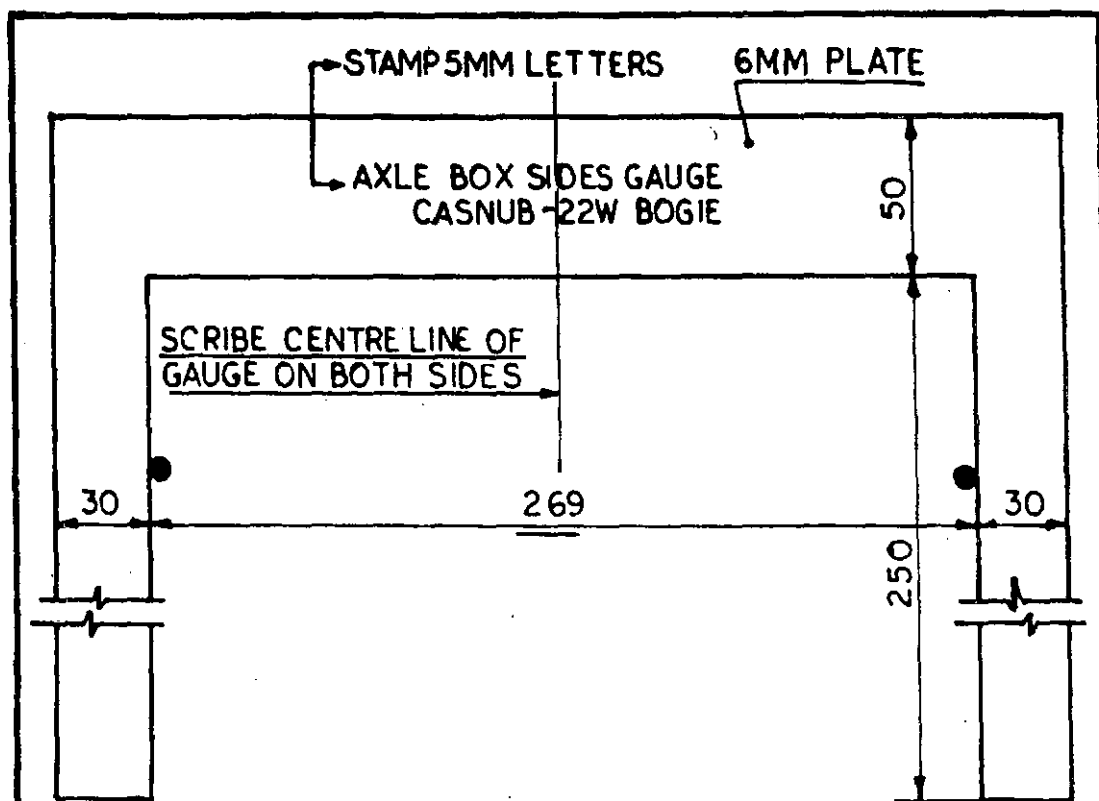


FIG. A

NOTE

SURFACE MARKED '●' AND
DIMENSION UNDER SCORED
ARE IMPORTANT

MATERIAL

GAUGE TIP- IS: 1875 CL 4
HARDENED & GROUND
BODY - IS: 2062 Fe 410 WA

AXLEBOX SIDES GAUGE
[CASNUB-22W BOGIE]

FIG.21

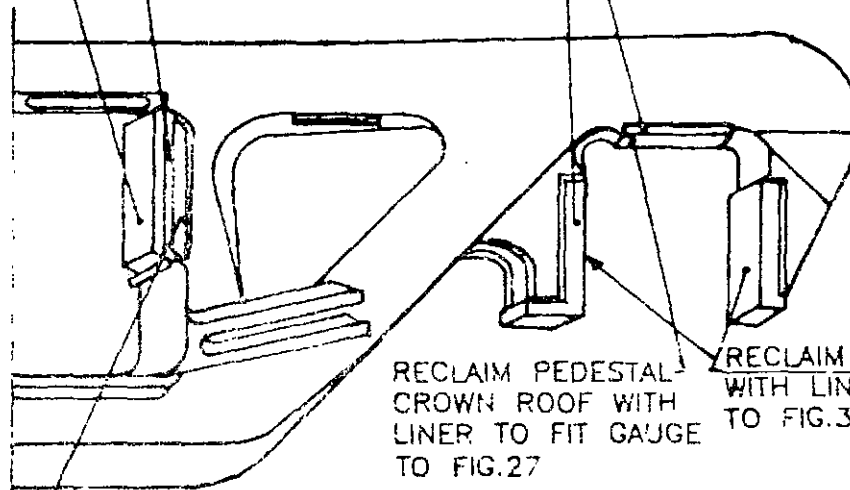
0000000644

0000000645

WELD LINERS AS
SHOWN IN FIG.24

RECLAIM COLUMN
SIDES WITH LINERS TO
FIT GAUGE TO FIG.25

RECLAIM CROWN SIDES &
PEDESTAL SIDE WITH WELD TO
FIT GAUGE TO FIG.29



LOCATIONS TO BE RECLAIMED

1. SIDE FRAME COLUMN SIDES.
2. ANTI-ROTATION LUGS.
3. SIDE FRAME FRICTION LINERS.
4. PEDESTAL CROWN ROOF.
5. PEDESTAL CROWN SIDES & PEDESTAL SIDES.
6. PEDESTAL JAW.

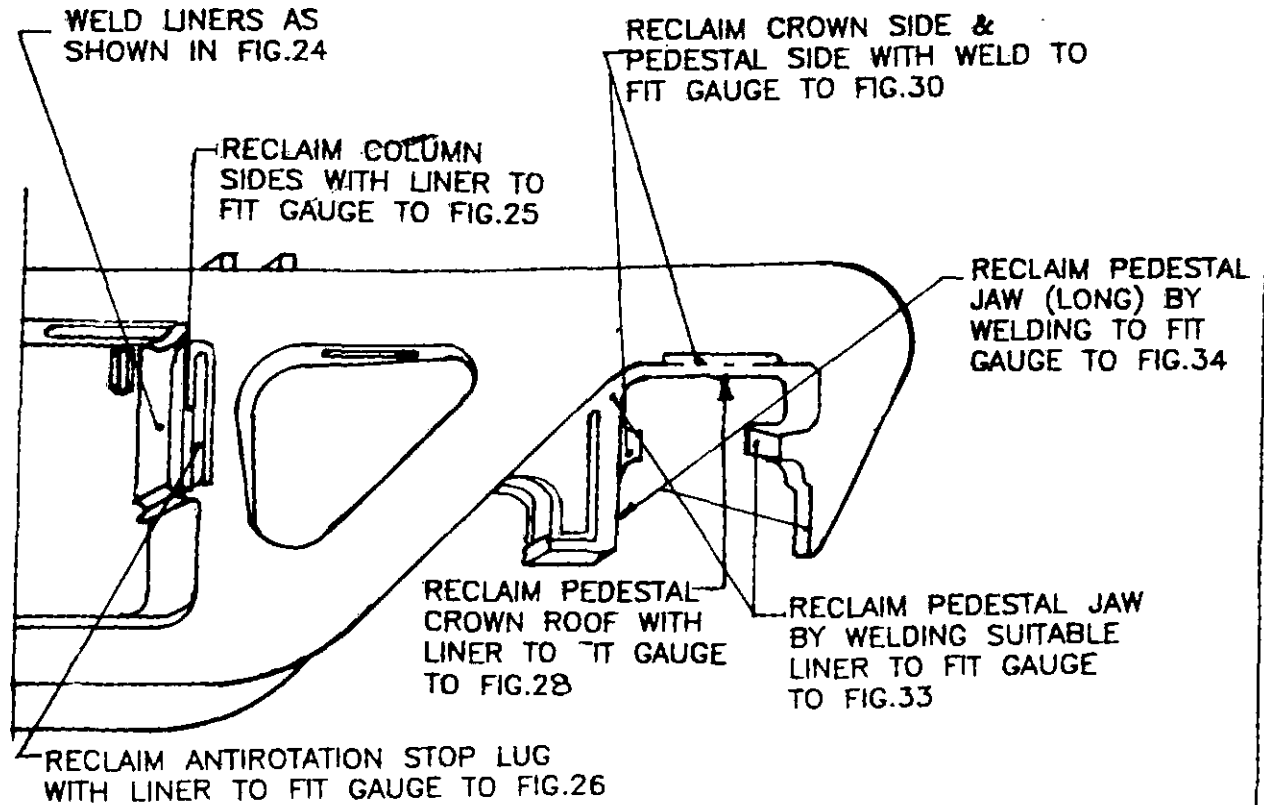
RECLAMATION LOCATIONS OF WORN SIDE FRAME

[CASNUB 22W.22W(M) BOGIES]

FIG.22

LOCATIONS TO BE RECLAIMED

1. SIDE FRAME COLUMN SIDES.
2. ANTI-ROTATION LUGS.
3. SIDE FRAME FRICTION LINERS.
4. PEDESTAL CROWN ROOF.
5. PEDESTAL CROWN SIDES & PEDESTAL SIDES.
6. PEDESTAL JAW.



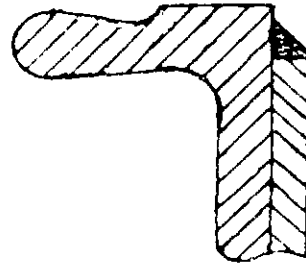
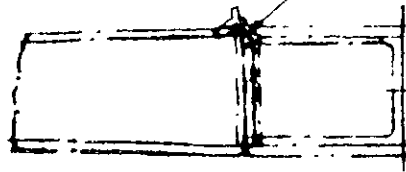
RECLAMATION LOCATIONS OF WORN SIDE FRAME

[CASNUB-22NL,NLB, & 22HS BOGIE]

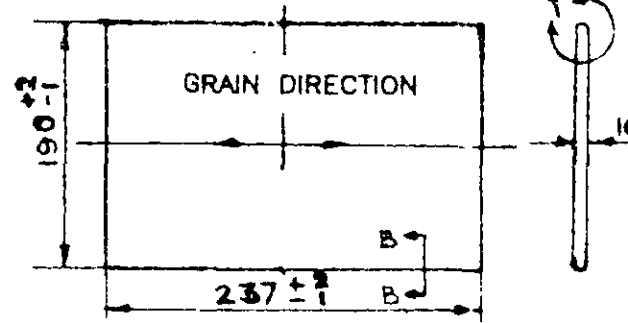
FIG.23

000000641

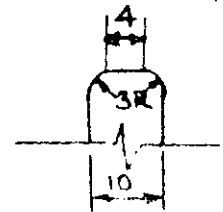
WELD NOT TO EXTEND BEYOND
FACE OF SIDE FRAME



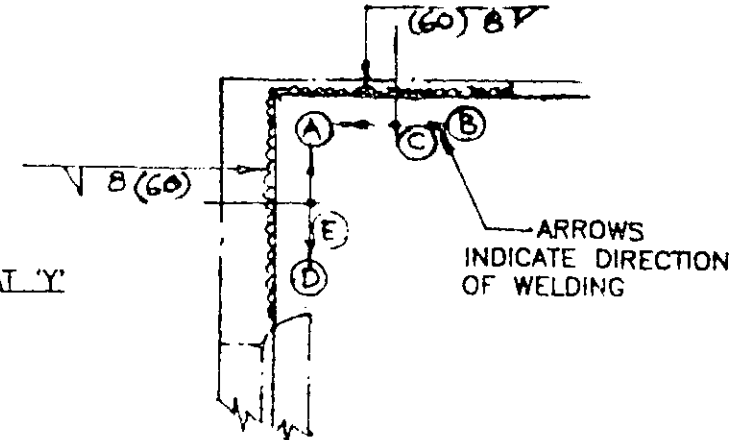
SECTION-AA



SECTION-BB
ALTERNATIVE



ENLARGED DETAIL AT 'Y'



DETAIL AT 'X'

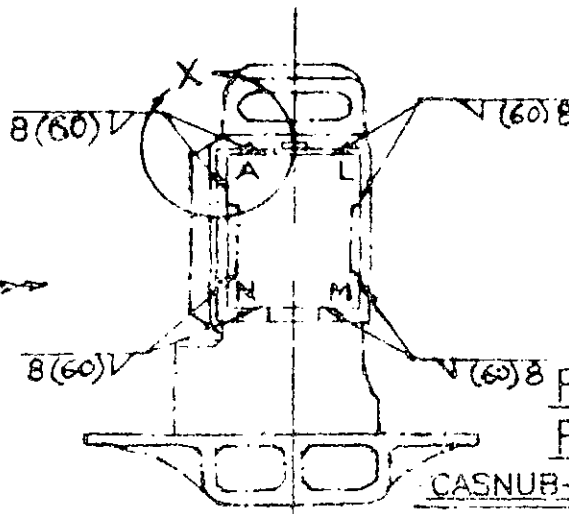
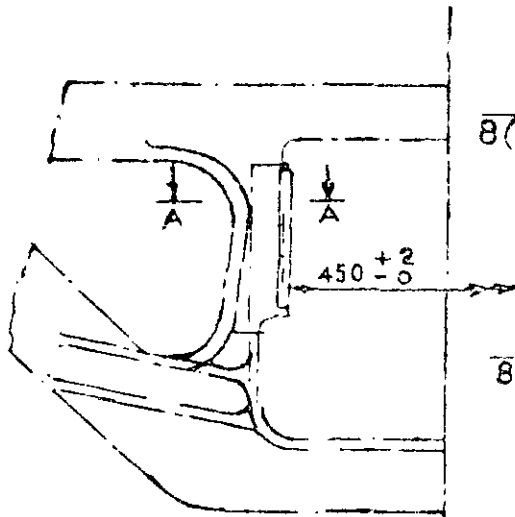
FLAT MUST NOT BE WARPED MORE THAN 0.5 mm AND
MUST BE FREE FROM SCALE.

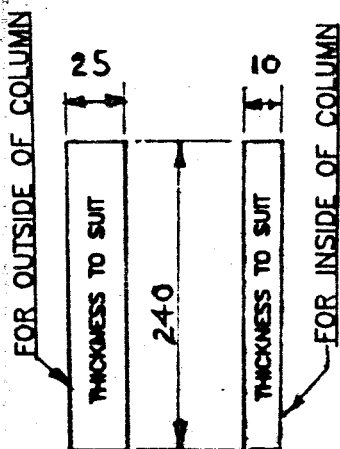
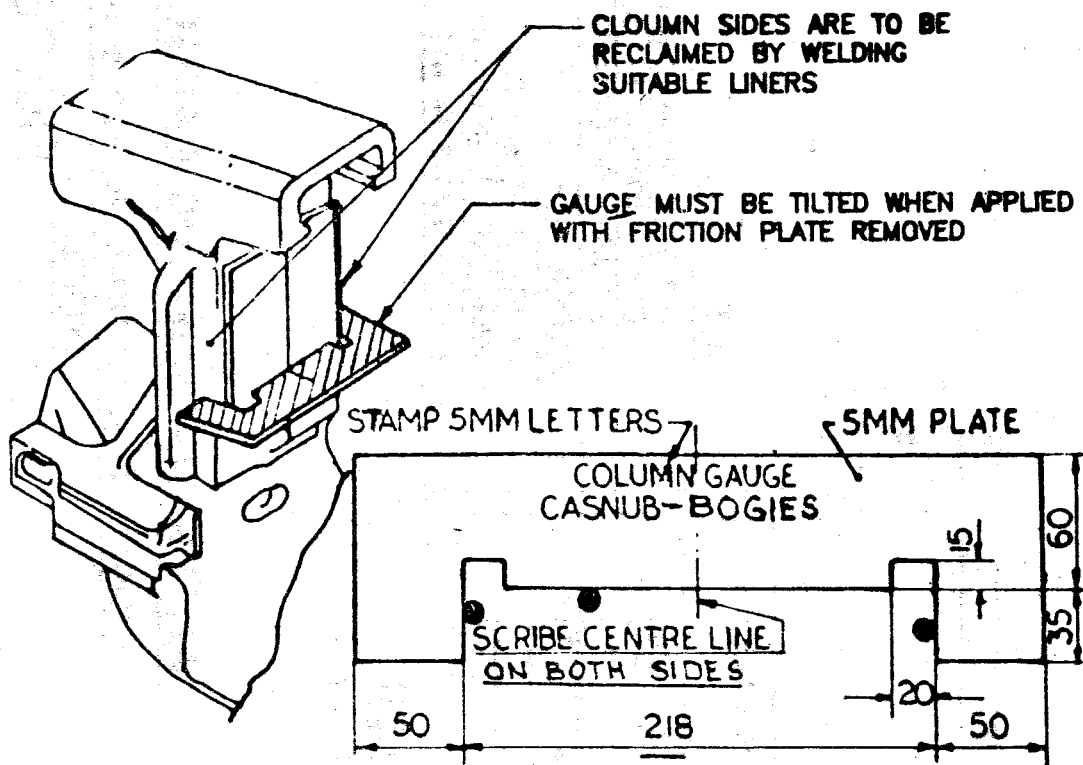
MATERIAL:- SPRING STEEL-IS:3885 Pt 1,Gr.1V
BHN (380 TO 420)

FRICTION PLATE DETAIL & PROCEDURE
FOR APPLICATION TO SIDE FRAME

CASNR-22W,22W(M),22NL,22NLB,22HS BOGIES.

FIG.24





DETAILS OF LINERS

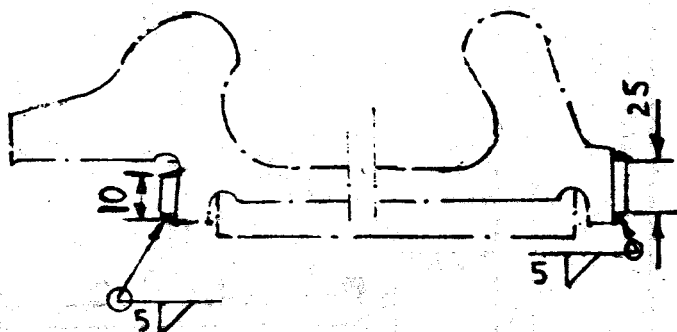
MTL :- IS:3885 Pt. I
Gr. IV

NOTE

DIMENSIONS UNDER LINED AND SURFACE MARKED ● ARE IMPORTANT

MATERIAL -

GAUGE TIP - IS: 1875 CL. 4 HARDENED
& GROUND, BODY - IS:2062 Fe 410 WA



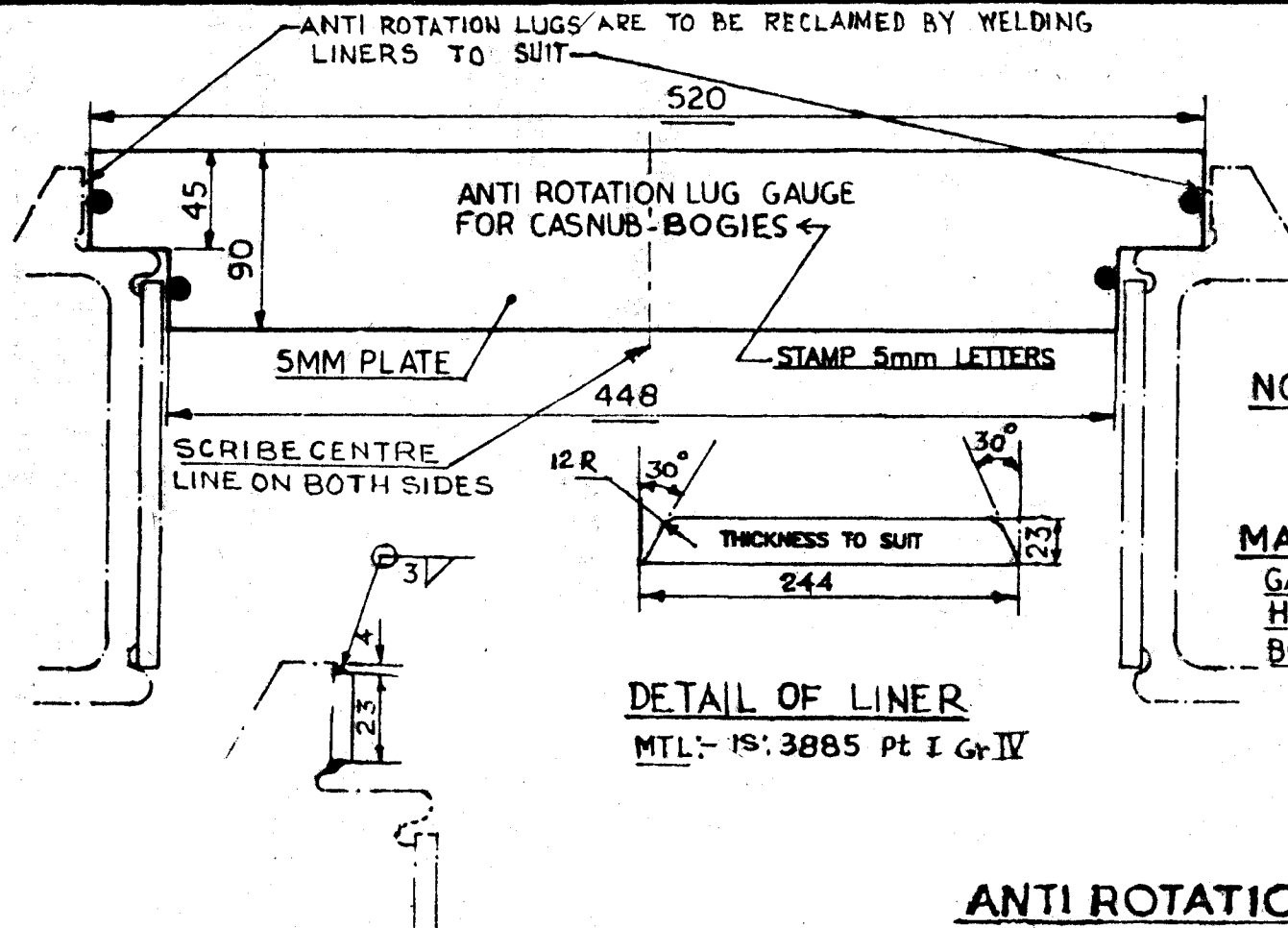
COLUMN GAUGE

CASNUB-22 W. 22 W(M). NL. NLB & HS
BOGIES

FIG.25

0000000648

0000000649



NOTE:

SURFACE MARKED AND
DIMENSION UNDER SCOR-
ED ARE IMPORTANT

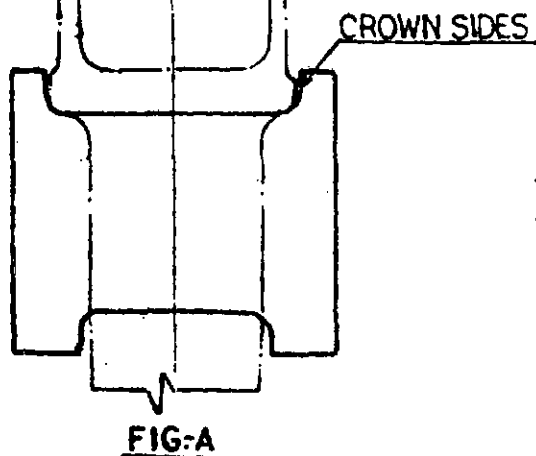
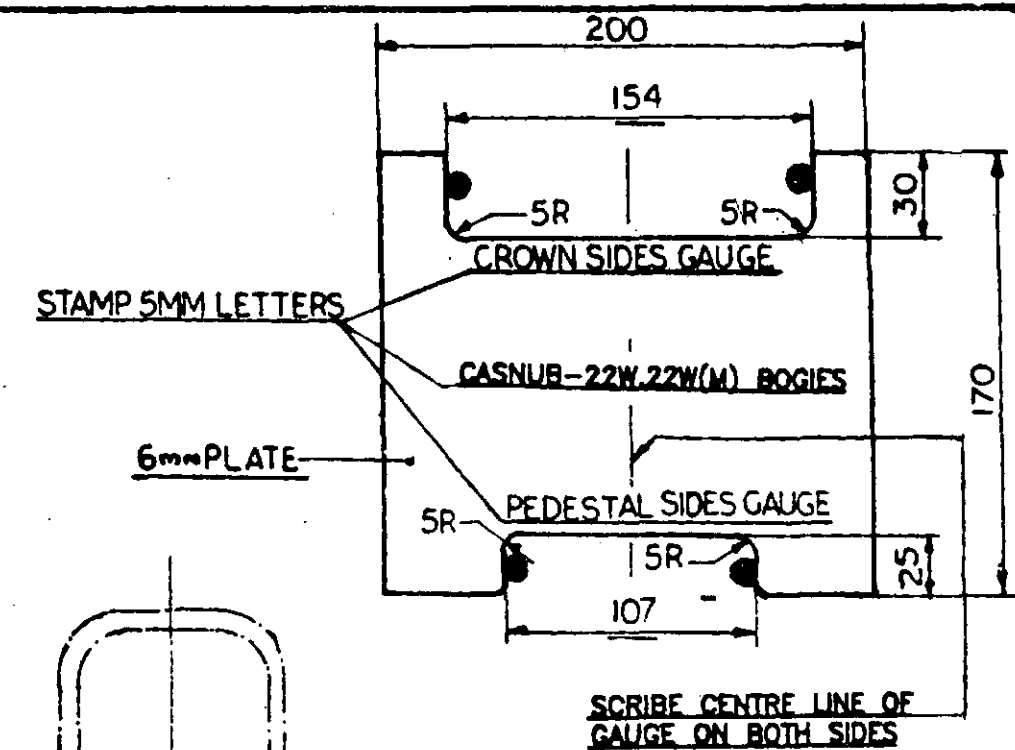
MATERIAL -

GAUGE TIP- IS: 1875 CL 4
HARDENED & GROUND
BODY - IS: 2062 Fe 410 WA

ANTI ROTATION LUG GAUGE

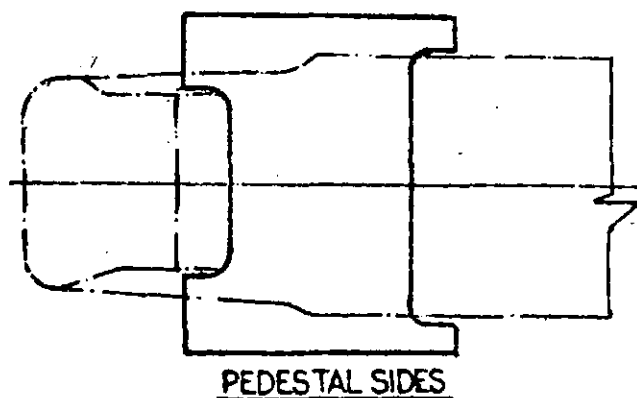
CASNUB-22 W, 22 W(M), NL, NLB & HS
BOGIES.

FIG.26



NOTE:
SURFACE MARKED 'R' AND
DIMENSION UNDER SCORED
ARE IMPORTANT.

MATERIAL:
GAUGE TIP- IS:1875 CL4
HARDENED AND GROUND
BODY- IS:2062 Fe 410WA



PEDESTAL SIDES & CROWN SIDES
GAUGE [CASNUB-22W,22W(M) BOGIES]

FIG.29

0000000652

STAMP 5mm LETTERS

6mm PLATE

CROWN SIDES GAUGE
CASNUB-22NL,NLB & HS
BOGIES

PEDESTAL
SIDES GAUGE

SCRIBE CENTRE LINE
OF GAUGE ON BOTH
SIDES.

CROWN SIDES

NOTE:

SURFACE MARKED 'O' AND
DIMENSION UNDER SCORED
ARE IMPORTANT.

MATERIAL:

GAUGE TIP-IS:1875 CL4
HARDENED AND GROUND
BODY-IS:2062 Fe 410WA

FIG-A

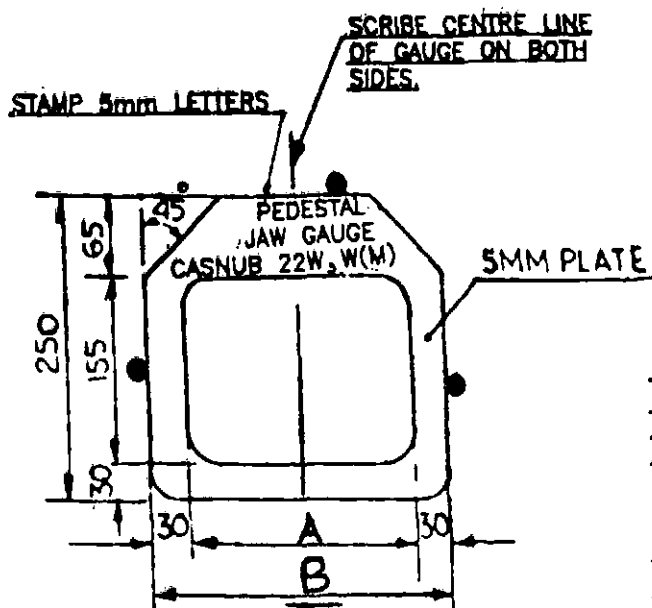
FIG-B

PEDESTAL SIDES

PEDESTAL SIDES & CROWN SIDES GAUGE
(CASNUB 22NL,NLB & HS BOGIES)

FIG.30

0000000653



NOTE:
 SURFACE MARKED 'G' AND
 DIMENSION UNDER SCORED
 ARE IMPORTANT

MATERIAL
 GAUGE TIP IS: 1875 CL 4
 HARDENED & GROUND
 BODY-IS: 2062 Fe 410 WA

DIMENSION	CASNUB - 22W	CASNUB - 22W(M)
A	208	216
B	268	276

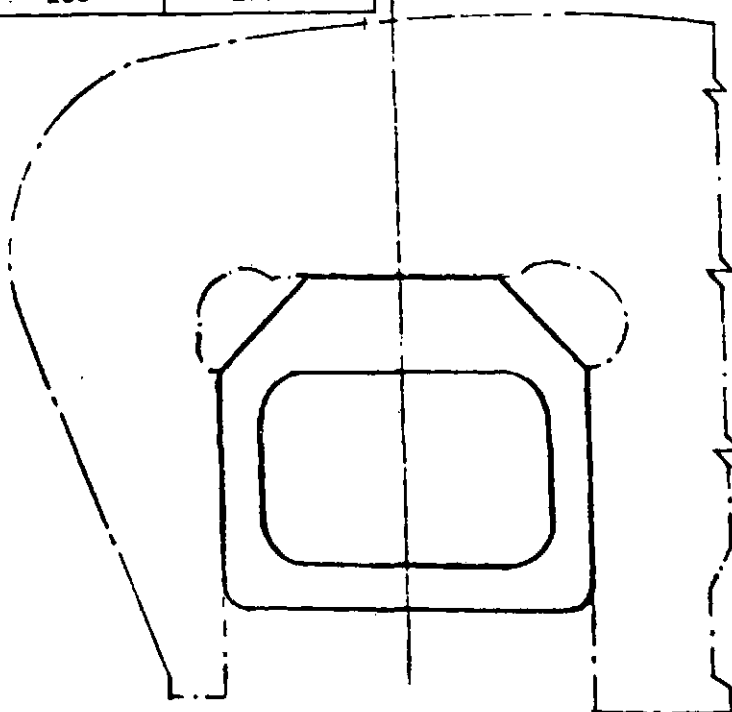
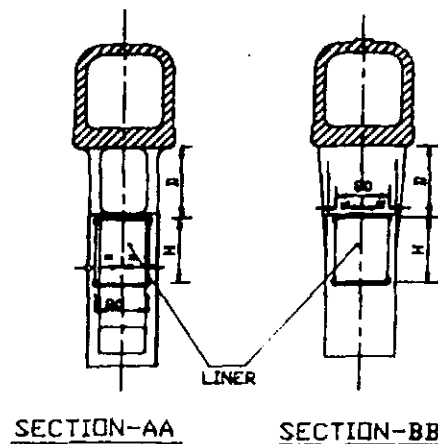
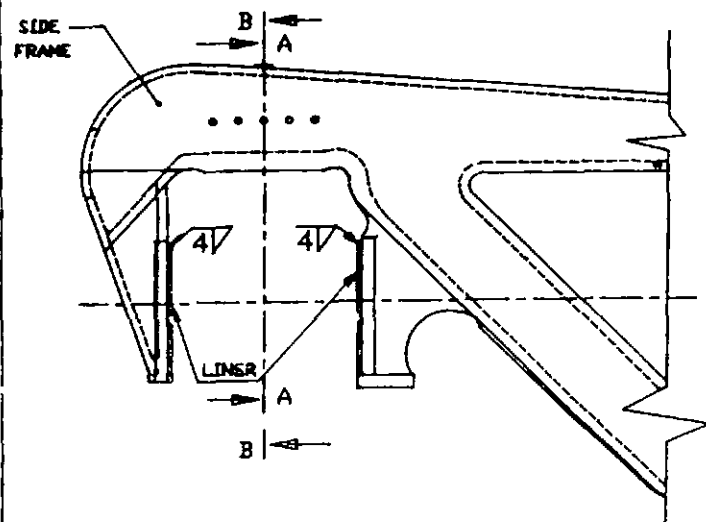


FIG A

PEDESTAL JAW GAUGE
[CASNUB-22W, 22W(M), BOGIES]

FIG.31

0000000654



DIMENSION	CASNUB-22V	CASNUB-22V (RETROFITED)	CASNUB-22V(00)
D	66	90	111

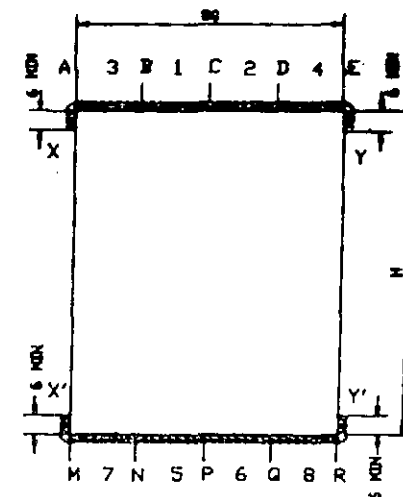


FIG. 1

LINER SHOWING WELDING SEQUENCE

SIZE OF LINER -

WIDTH-80mm.

HEIGHT (H)-75 OR 87 OR 100 DEPENDING UPON HIGHT OF
WORN OUT SURFACES, THICKNESS TO SUIT.

WELDING PROCEDURE:

TYPE OF ELECTRODE = AUSTENITIC STAINLESS STEEL ELECTRODE HAVING NDMINAL COMPOSITION OF 18% CHROMIUM, 8% NICKEL AND 5% MANGANESE AND APPROVED BY R.D.S.O. AGAINST CLASS M1 OF IRS-M28 SHALL BE USED.

1. THE LINER SHALL BE HELD IN POSITION BY TACK WELDING ON EITHER SIDE (AE AND MR) TACK WELDING SHALL BE DONE AT THE MID POINT OF THE LENGTH SIDE ON EITHER SIDE i.e. TOP (AE) & BOTTOM SIDE (MR).
2. WELDING SHALL BE DONE IN DOWN HAND POSITION PREFERABLY AS PER SEQUENCE GIVEN IN FIG.1.
3. WIDTH OF LINER SHALL BE DIVIDED INTO FOUR EQUAL SIZES AND MARKED AS 1,2,3,4 ON ONE SIDE AND 5,6,7,8 ON THE OPPOSITE SIDE
4. START WELDING AT (C) AND WELD UPTO (B) START AGAIN AT (C) AND WELD UPTO (D),
5. THEN START AT (B) AND WELD UPTO (X) COVERING THE CORNER (A), START AT (D) AND WELD UPTO (Y) COVERING THE CORNER (E).
6. THE OPPOSITE SIDE (MR) SHALL BE WELDED IN THE MANNER AS GIVEN ABOVE AND AS PER SEQUENCE GIVEN IN THE SKETCH.
7. THE FILLET SIZE SHALL BE MAINTAINED AS STIPULATED IN THE SKETCH.
8. WELDING IS TO BE DONE IN TWO PASSES FIRSTLY WITH 3.15 mm DIA ELECTRODE AND THEN WITH 4 OR 5 mm DIA.

PRECAUTIONS:-

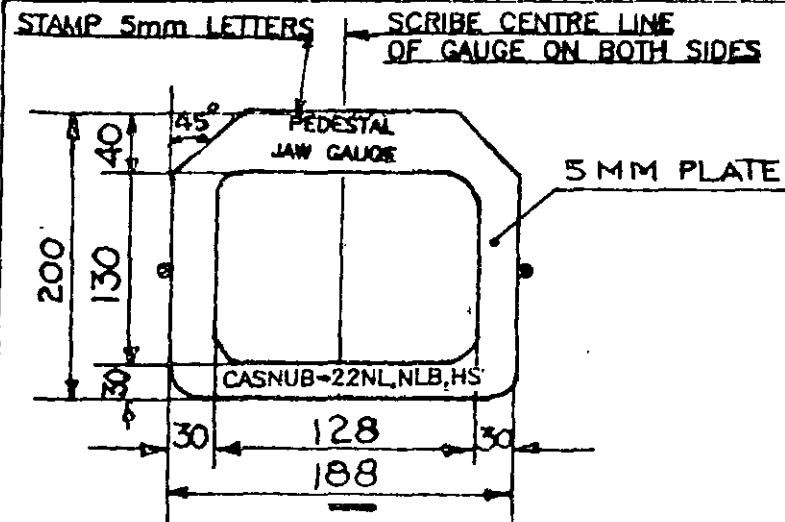
UNIFORM BEAD IS TO BE DEPOSITED. WEAVING IS NOT PERMITTED. EACH WELD IS TO BE FOLLOWED BY LIGHT PEENING. IF ANY CRACK IS NOTICED, WELDING SHALL BE REMOVED BY CUTTING ELECTRODE AND REWELD.

REPERCUSSIONS OF IMPROPER WELDING PRACTICES:-

1. IF PROPER ELECTRODE AND WELDING PROCEDURE IS NOT FOLLOWED, IT WILL RESULT INTO CRACK IN WELDING AND LINER WILL GET SEPERATED AND FALL.
2. SETTING OF LINER ON UNEVENLY DRESSED SURFACE WILL RESULT INTO ITS BREAKAGE DURING SERVICE, DUE TO UNEVEN SUPPORT.
3. IF WORN OUT SURFACE IS NOT DRESSED TRUELY SQUARE AND LINER IS WELDED IT WILL RESULT INTO IMPROPER CLEARANCES AFFECTING FUNCTIONING OF BOGIE.

RECLAMATION OF WORN OUT
PEDESTAL JAWS BY WELDING
SPRING STEEL LINER

FIG. 32



NOTE:—

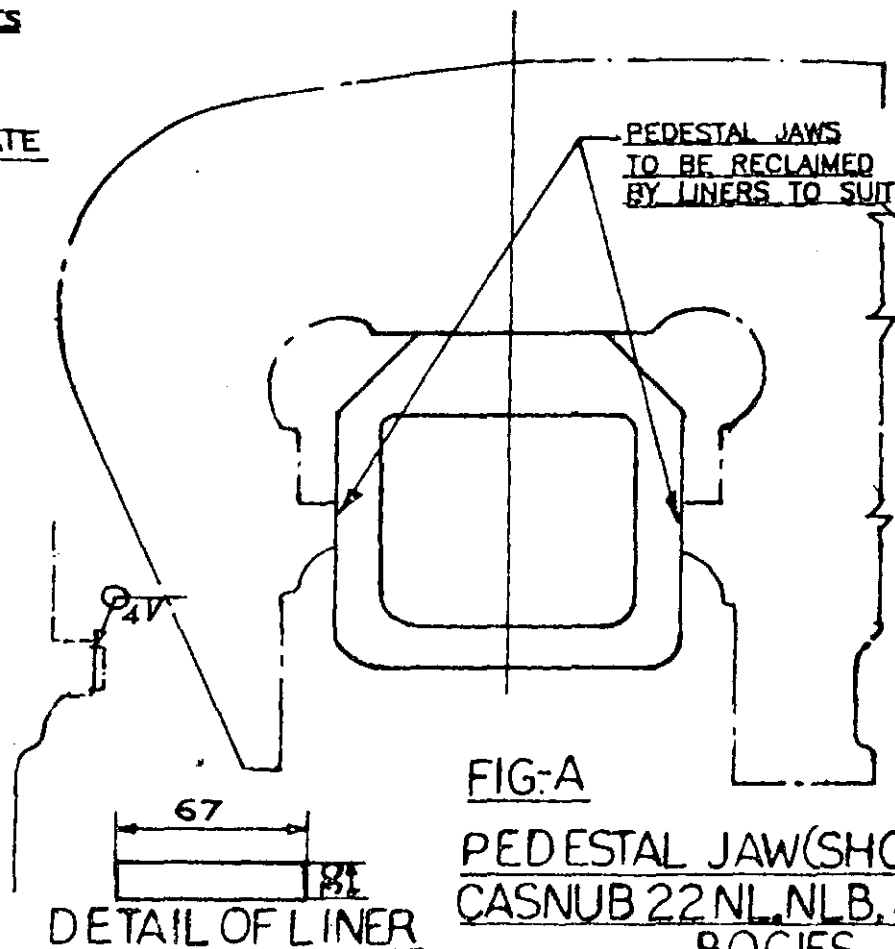
SURFACE MARKED '©' AND
DIMENSION UNDER SCORED
ARE IMPORTANT

MATERIAL

GAUGE TIP IS: 1875 CL4

HARDENED & GROUND

BODY- IS:2062 Fe 410 WA

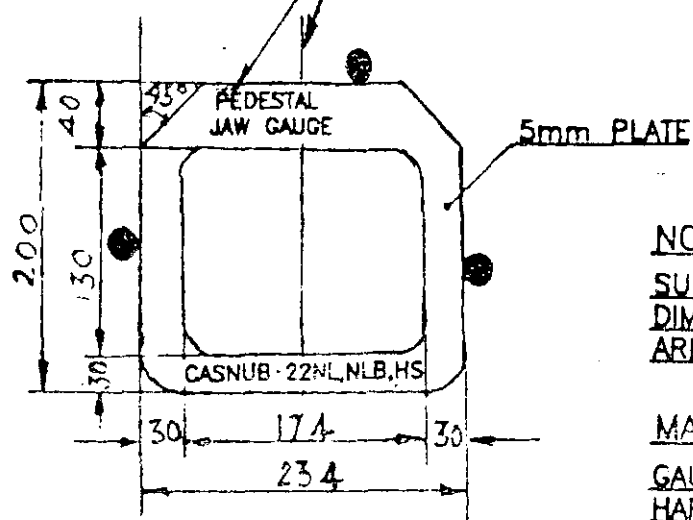


MATERIAL:—IS:3885 PtI GrIV

FIG.33

0000000656

STAMP 5mm LETTERS
SCRIBE CENTRE LINE
OF GAUGE ON BOTH
SIDES.



NOTE:
SURFACE MARKED '0' AND
DIMENSION UNDER SCORED
ARE IMPORTANT.

MATERIAL:
GAUGE TIP-IS:1875 CL4
HARDENED AND GROUND
BODY-IS:2062 Fe 410WA

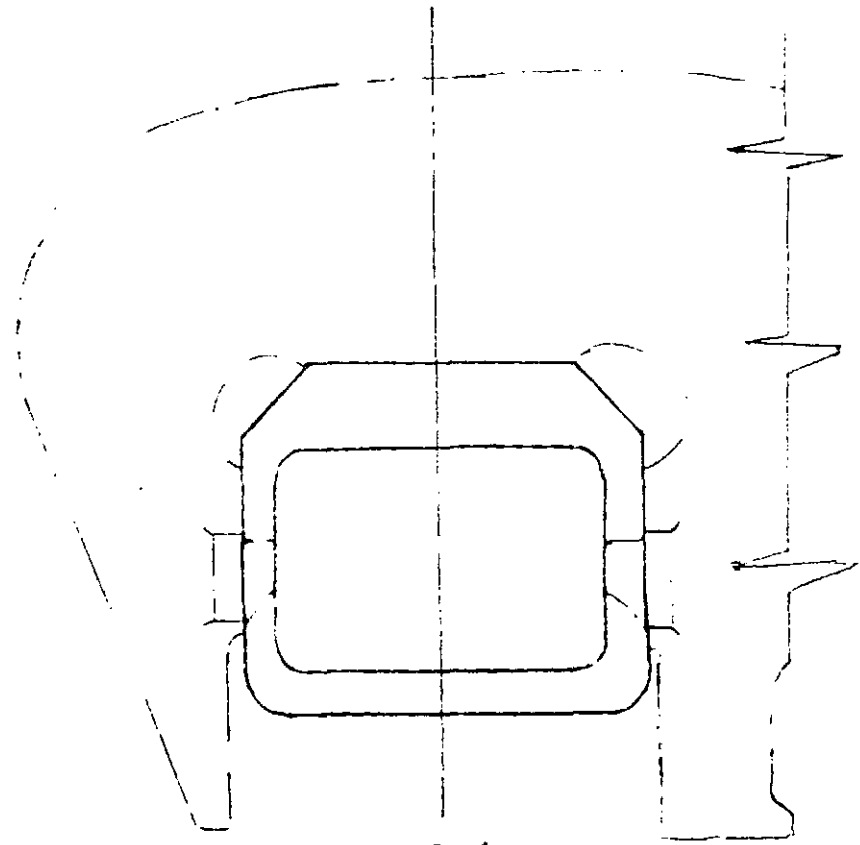


FIG-A

PEDESTAL JAW(LONG) GAUGE
CASNUB-22NL,NLB,HS
BOGIES

FIG.34

Technical drawing of a mechanical part, likely a cross-section of a cylinder or pipe. The drawing shows a central circular feature with a diameter of 100 DIA. The overall width is 250, and the overall height is 120. A horizontal section line is indicated by a dashed line. The bottom edge has a total width of 216, with a central section of 40 labeled "STRAIGHT". A small dimension of 20 is shown on the left side, and a small dimension of 6 is shown on the right side.

TO BE CHANGED OVER TO
RETROFITTED DESIGN AS PER
ORG.NO.WD-89094-S/1

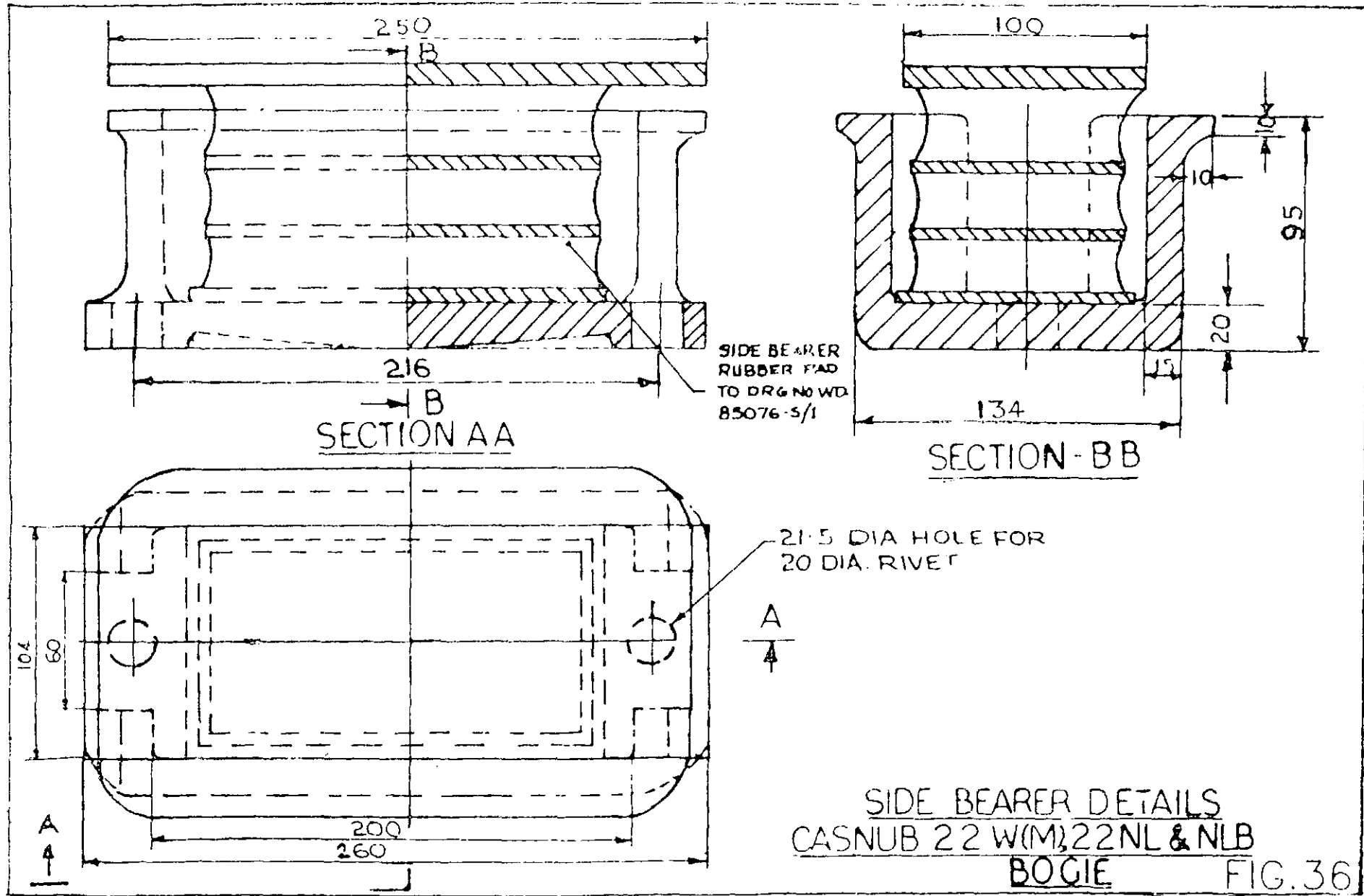
Technical drawing of a mechanical part, likely a bracket or plate, showing dimensions in millimeters. The part is symmetrical about a vertical centerline. Key dimensions include:

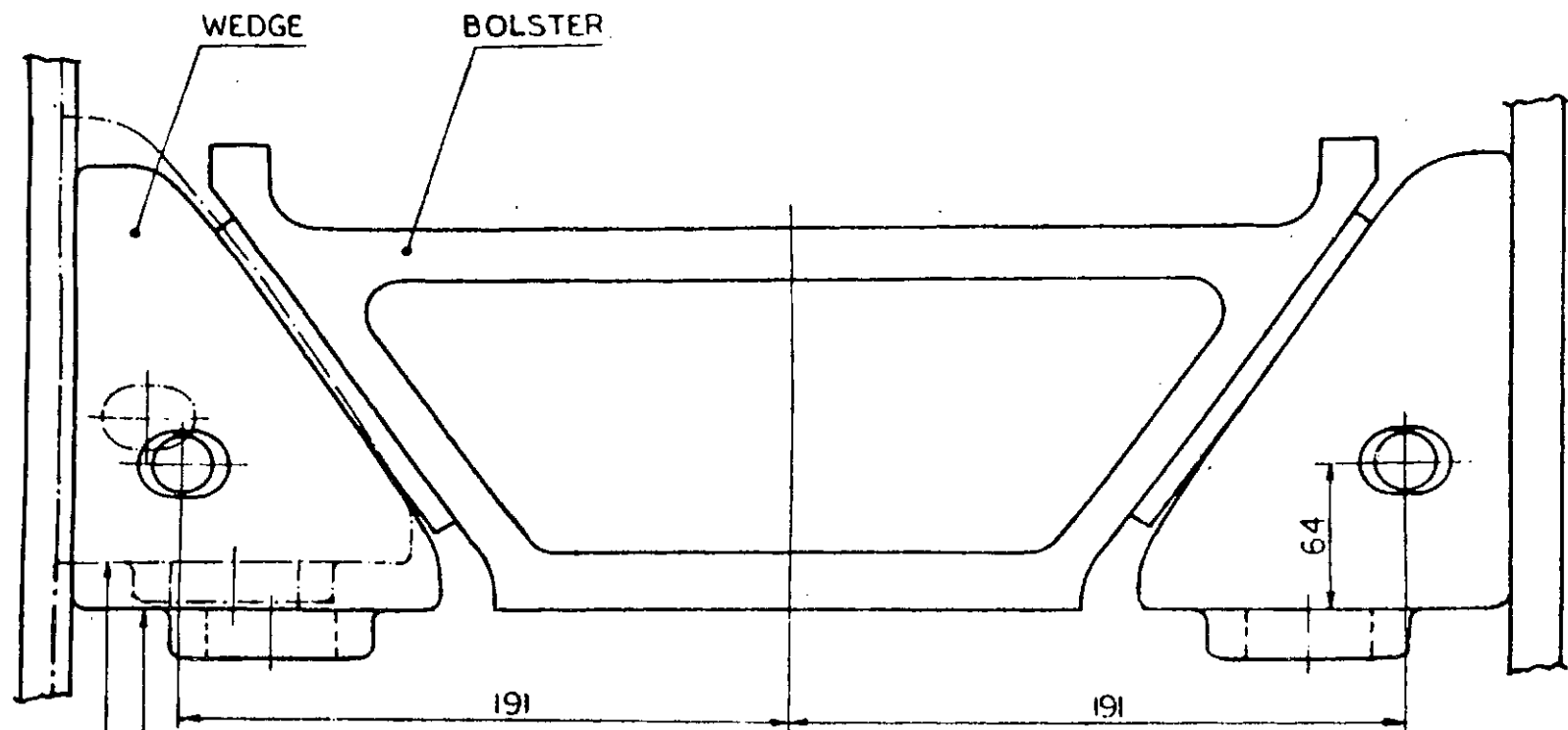
- Overall width: 260
- Overall height: 60
- Inner rectangular cutout width: 190
- Inner rectangular cutout height: 100
- Distance from the inner cutout to the outer edge (on the right side): 104
- Radius of the outer corners: 30R
- Radius of the inner corners: 30R

[CASNUB-22W BOGIE]

FIG. 35

0000000659





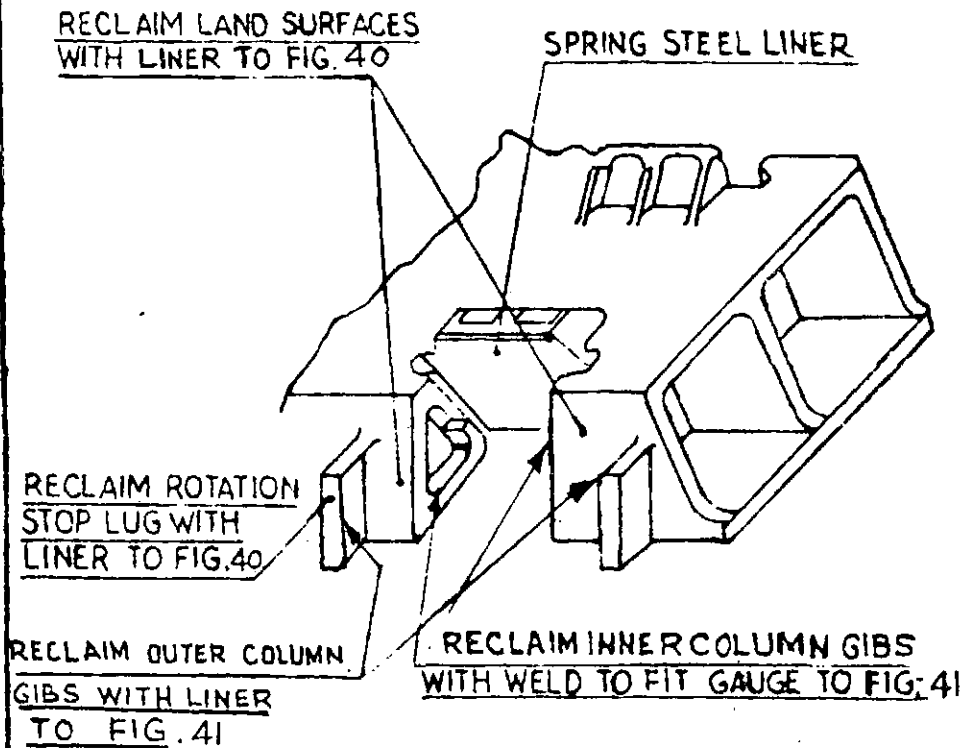
POSITION OF WEDGE WHEN NEW.

POSITION OF WEDGE AFTER SOME
WEAR WHEN RECTIFICATION IS REQUIRED.
(HOLES IN BOLSTER WEDGE POCKET & WEDGE
START CROSSING THE EDGES)

PROCEDURE FOR CHECKING THE
COMBINED WEAR OF BOLSTER,
SIDE FRAME LINERS AND WEDGE
CASNUB-22W, 22W(M), 22NL, 22NLB,
22HS BOGIES.

FIG.37

0000000000



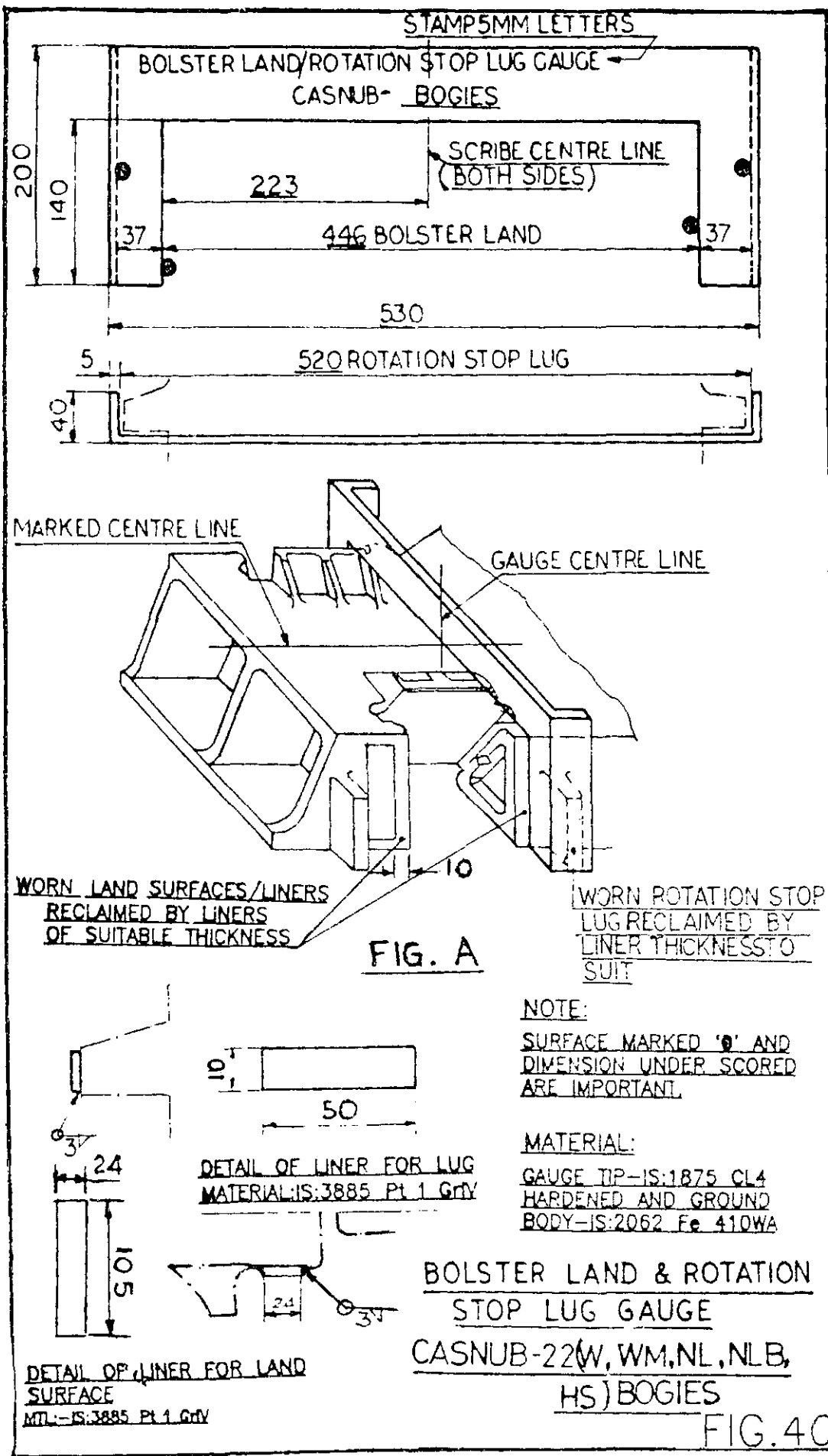
LOCATION TO BE RECLAIMED

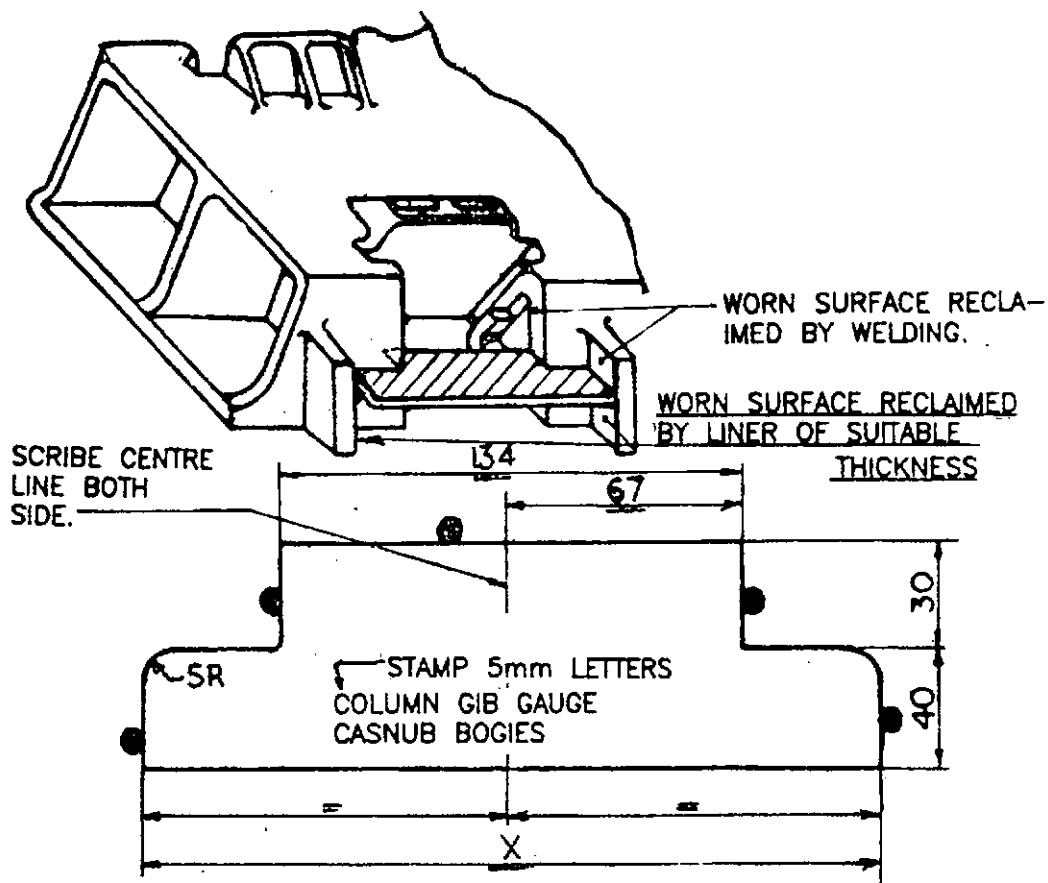
1. BOLSTER POCKET SLOPE SURFACE LINER.
2. BOLSTER LAND SURFACES & ROTATION STOP LUGS/LINERS
3. BOLSTER COLUMN GIBS.

RECLAMATION — LOCATIONS
OF WORN BOLSTER
CASNUB 22(W, WM, NL, NLB. & HS)
BOGIES

FIG.39

0000000662



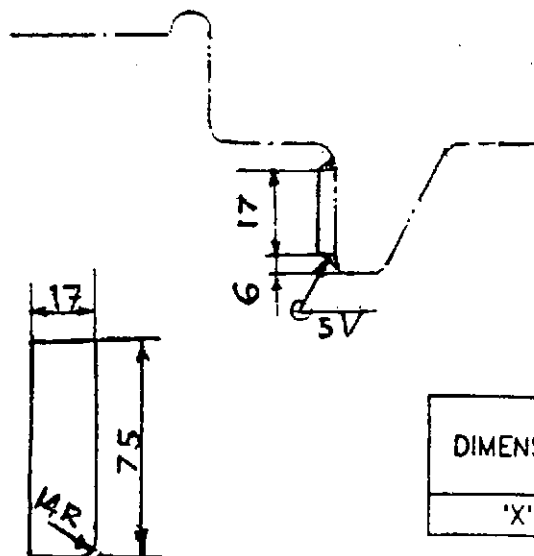


NOTE:

SURFACE MARKED '0' AND
DIMENSION UNDER SCORED
ARE IMPORTANT.

MATERIAL:

GAUGE TIP-IS:1875 CL4
HARDENED AND GROUND
BODY-IS:2062 Fe 410WA



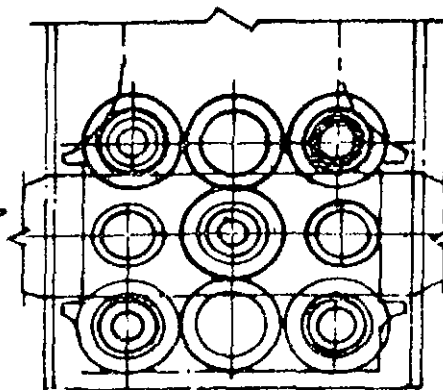
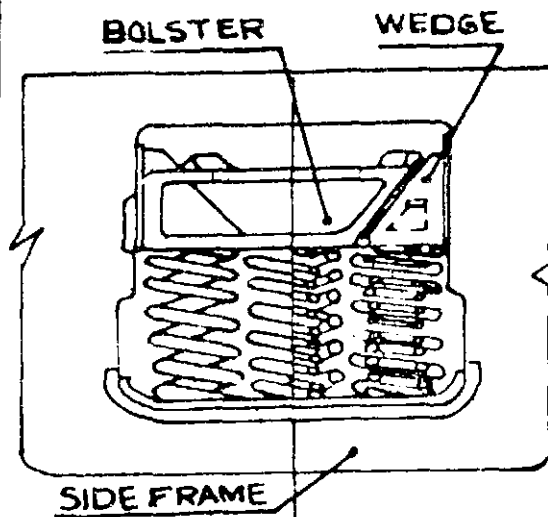
DIMENSION	CASNUB BOGIES EXCEPT CASNUB-22HS	CASNUB 22 HS BOGIE
'X'	232	239

DETAIL OF LINER
FOR OUTER GIB
MTL-IS:3085 Pt2 GrV

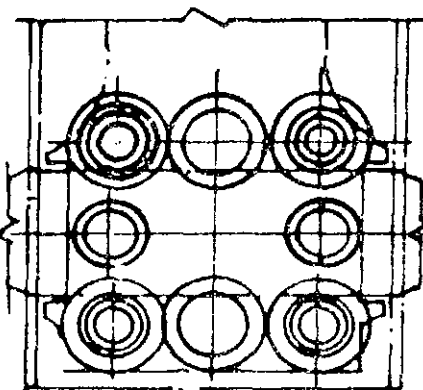
COLUMN GIB GAUGE

CASNUB-22 W, 22 W(M), NL, NLB &
HS BOGIES.

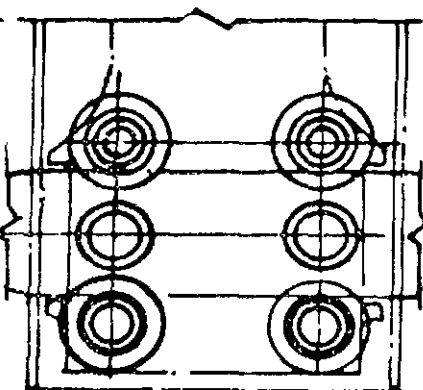
FIG.41



22.9t AXLE LOAD



20.3t AXLE LOAD



16.2t AXLE LOAD

NOTE:-

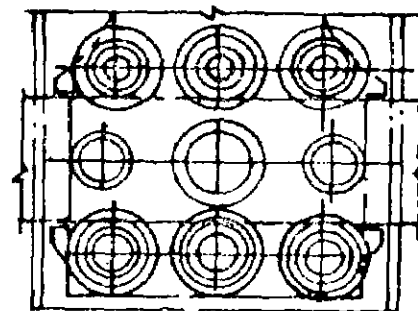
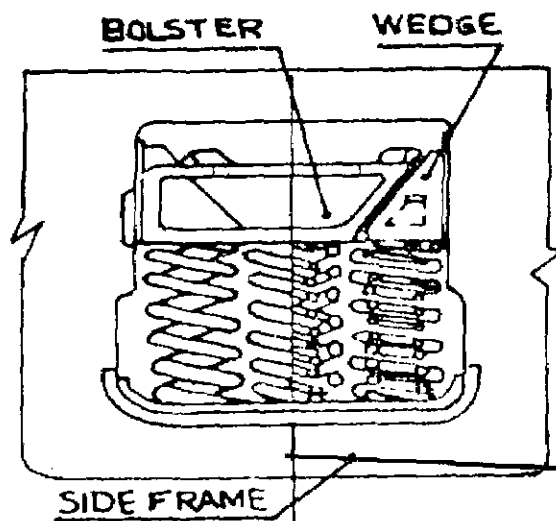
1. SNUBBING ARRANGEMENT & SNUBBER SPRINGS ARE SAME FOR 22.9t, 20.3 t & 16.2t AXLE LOAD.
2. DETAILS OF THE SPRINGS ARE AS PER ORG.NO. WD-83069-S/1.

AXLE LOAD	NO. OF SPRINGS REQUIRED		
	OUTER	INNER	SNUBBER
22.9t	7	5	2
20.3t	6	4	2
16.2t	4	4	2

DETAIL OF SNUBBING, SPRING GROUP ARRANGEMENT

CASNUB BOGIES (EXCEPT CASNUB-22 HS BOGIE)

FIG.4.2



AXLE LOAD	NO. OF SPRINGS REQUIRED		
	OUTER	INNER	SNUBBER
20.3t	7	6	2

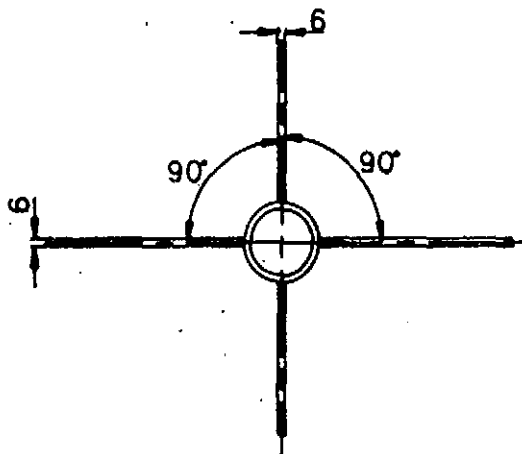
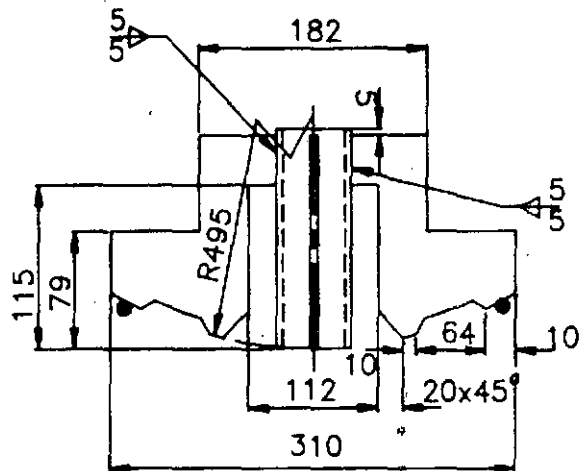
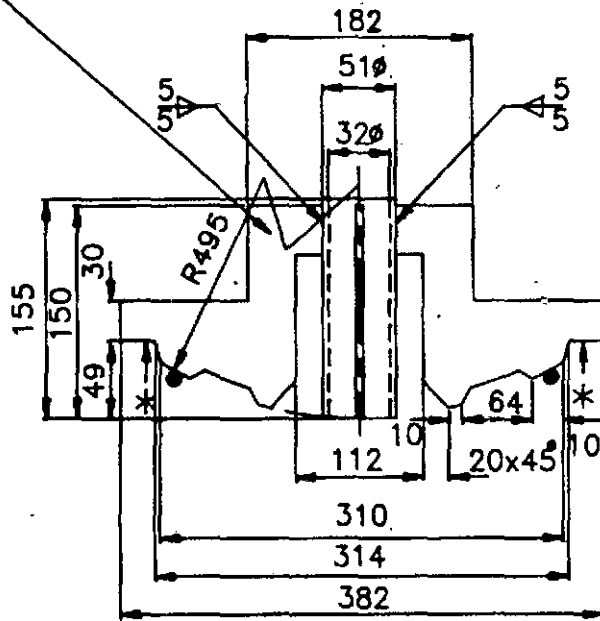
NOTE:

1. DETAILS OF THE SPRING ARE AS PER
DRG.NO. WD-92058-S/5

DETAIL OF SNUBBING SPRING, GROUP ARRANGEMENT
(CASNUB-22 HS BOGIE)

FIG.43

STAMP 5mm LETTERS
CENTER PIVOT GAUGE
CASNUB-22W BOGIE

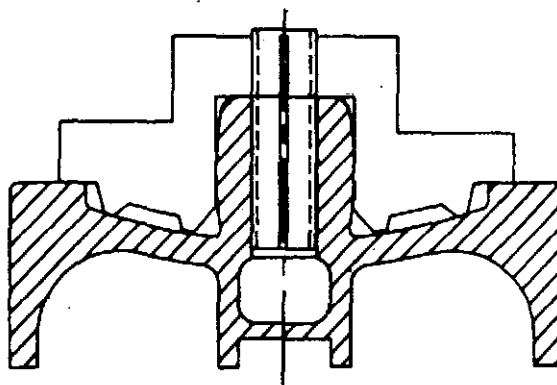


MATERIAL

GAUGE TIP-IS:1875.CL-4
HARDENED & GROUND
BODY-IS:2062Fe410WA

NOTE:-

SURFACE MARKED '●':
DIMENSION UNDER
SCORED ARE IMPORTANT



BOGIE BOLSTER
TO SK-77578

NOTE:-

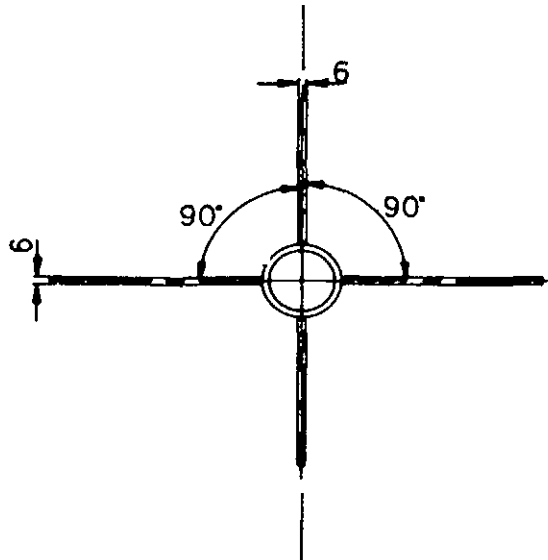
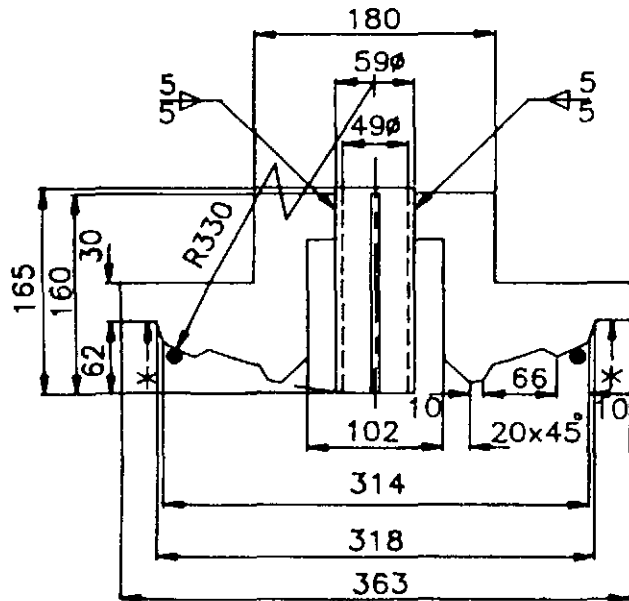
GAUGE IS ALSO APPLICABLE
FOR BOTTOM CENTER
PIVOT TO W/BE-602

FIG-A

CENTRE PIVOT GAUGE
CASNUB- 22W,22W(RETROFITTED)
BOGIES

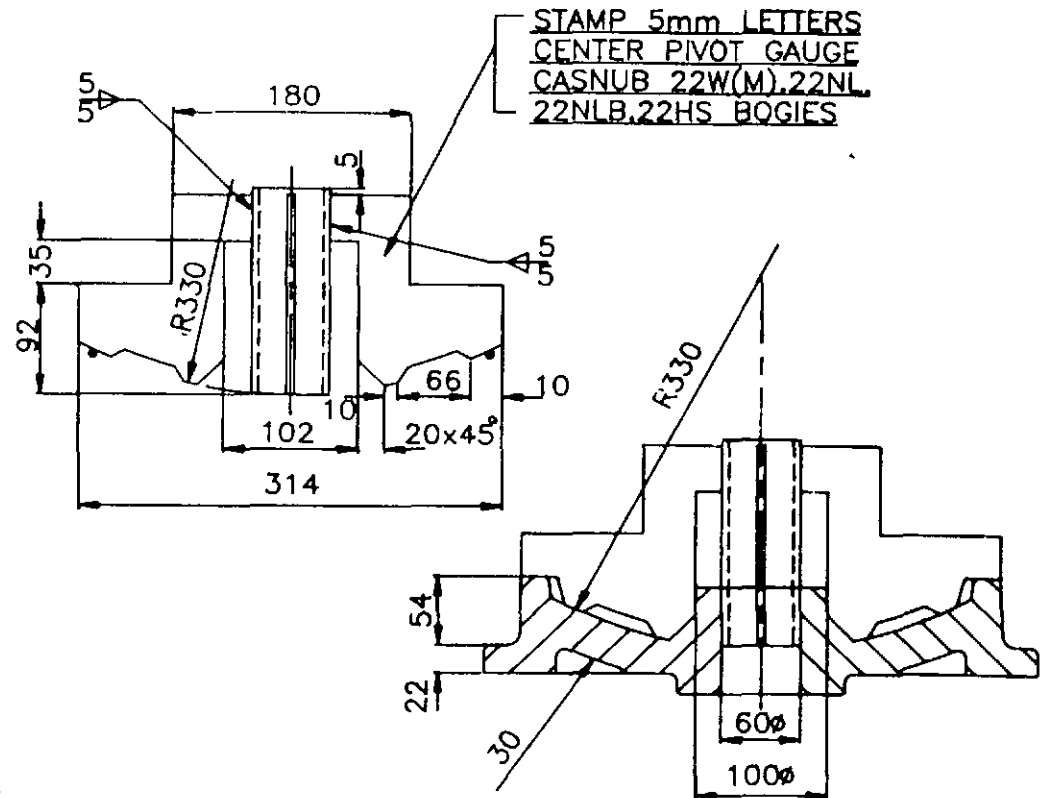
FIG.-45

1990000000



NOTE:-
SURFACE MARKED '●'
DIMENSION UNDER
SCORED ARE IMPORTANT

MATERIAL
GAUGE TIP-IS:1875 CL-4
HARDENED & GROUND
BODY-IS:2062Fe410WA



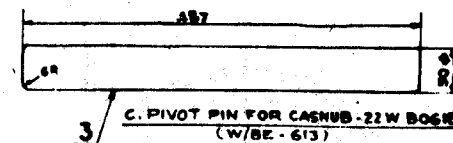
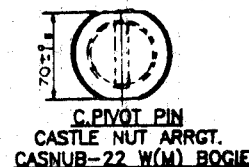
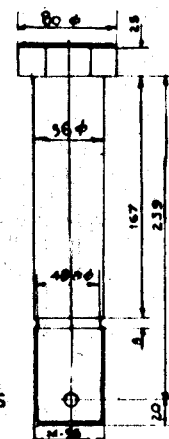
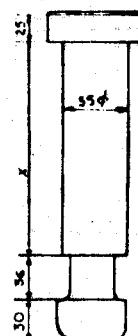
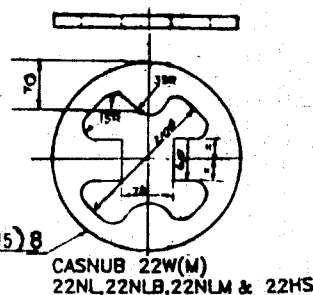
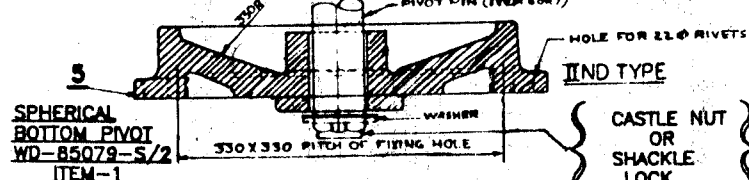
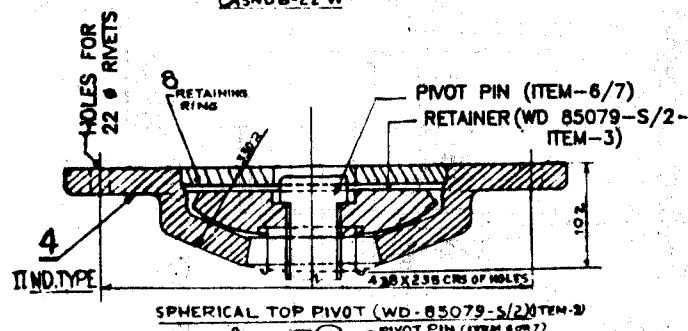
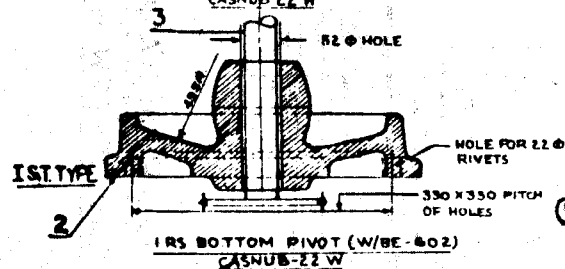
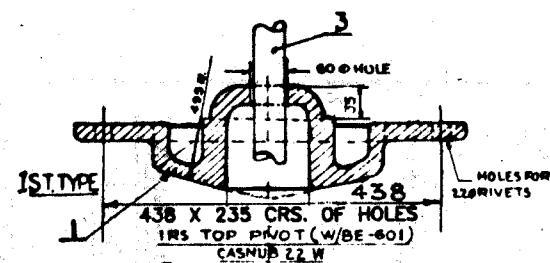
STAMP 5mm LETTERS
CENTER PIVOT GAUGE
CASNUB 22W(M).22NL
22NLB,22HS BOGIES

FIG-A

CENTRE PIVOT GAUGE
CASNUB- 22W(M).22NL.22NLB
AND 22HS BOGIES

FIG.- 46

0000000000



DETAIL OF C.P. PIN (ITEM-7)		
DIM 'X'	BOGIE	REF. DRG.
173	CASNUB-22W(M), 22 NL	WD-85079-S/2 ITEM-5
149	CASNUB-22NLB, 22NLM, 22HS	" " "

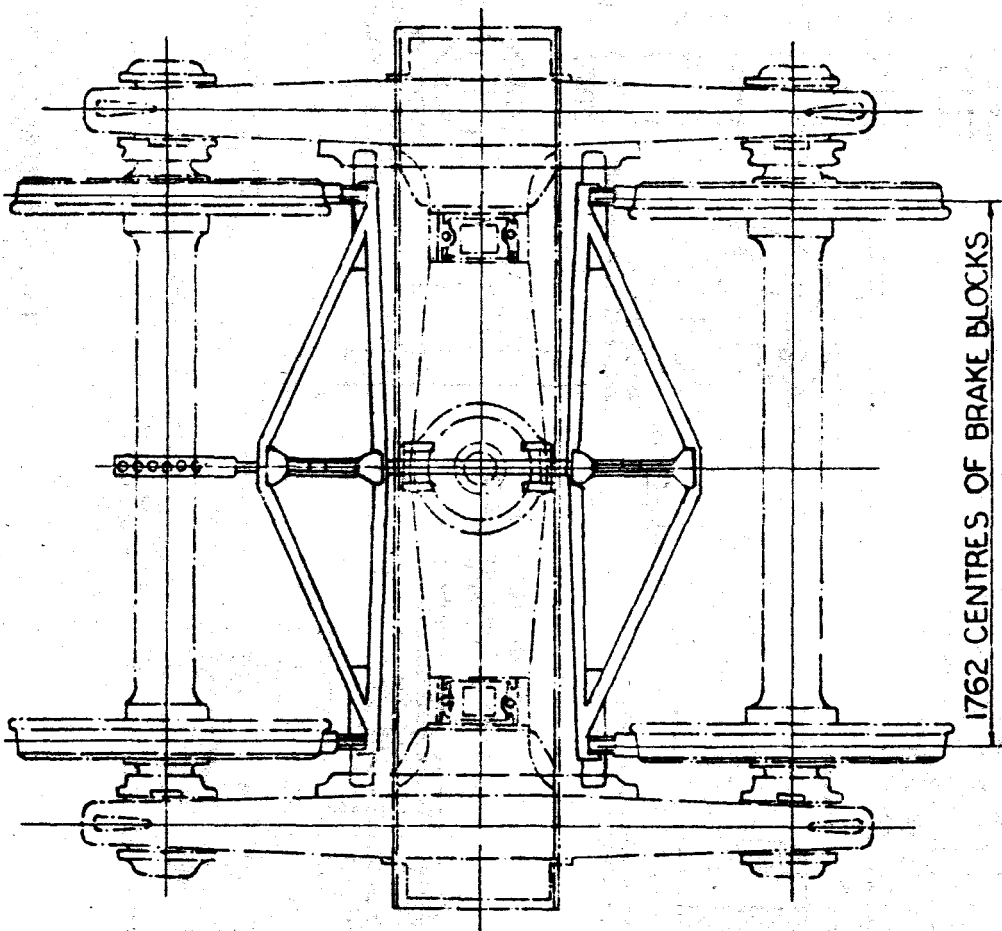
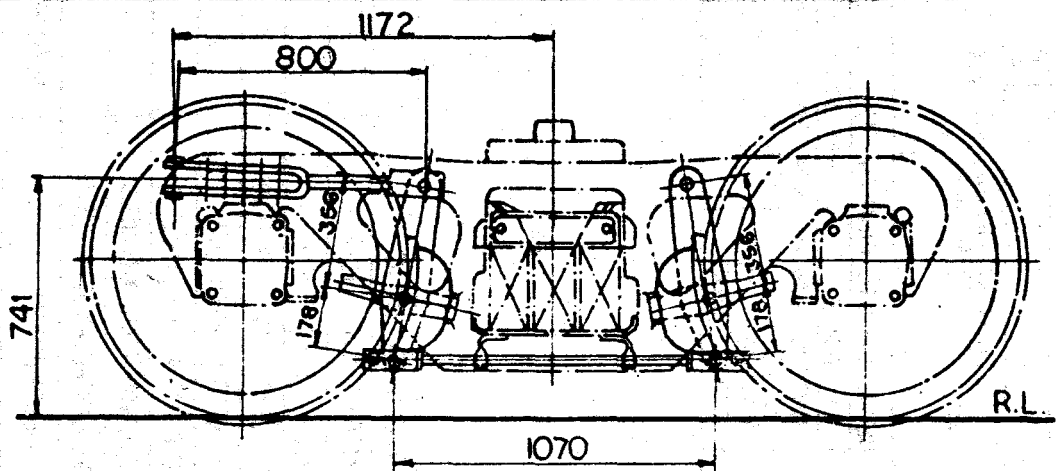
8	RETAINING RING.	
7	CENTRE PIVOT PIN	
6	CENTRE PIVOT PIN	
5	BOGIE CENTRE PIVOT BOTTOM.	*
4	BOGIE CENTRE PIVOT TOP	*
3	BOGIE CENTRE PIN (B.G)	
2	BOGIE CENTRE PIVOT BOTTOM (B.G)	
1	BOGIE CENTRE PIVOT TOP (B.G)	
ITEM	DESCRIPTION	REMARKS

* NOTE:-
MATERIAL AAR M 201 Gr. C (CARBON=0.32% MAX.)
IS USED FOR BOGIES MANUFACTURED AS PER
WD-85079-S/2 ALT. 16, ONWARDS

CASNUB 22W BOGIES

CENTRE PIVOTS & CENTRE PIVOTS PINS
CASNUB 22W, 22W(M), 22NL, 22NLB, 22NLM & 22HS BOGIES

FIG. 47



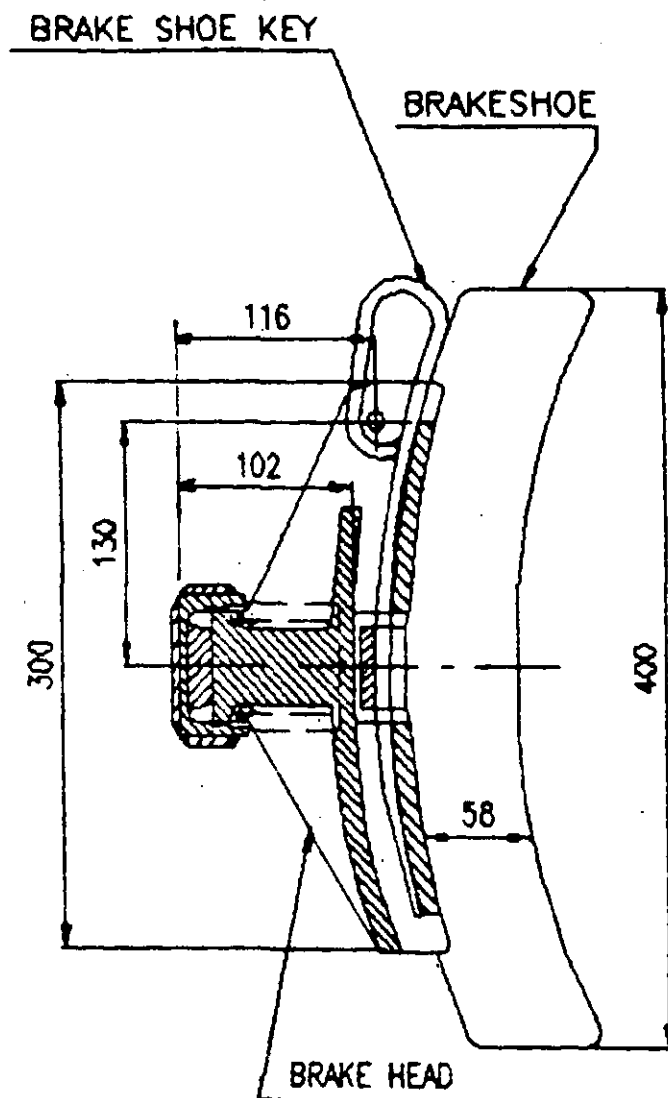
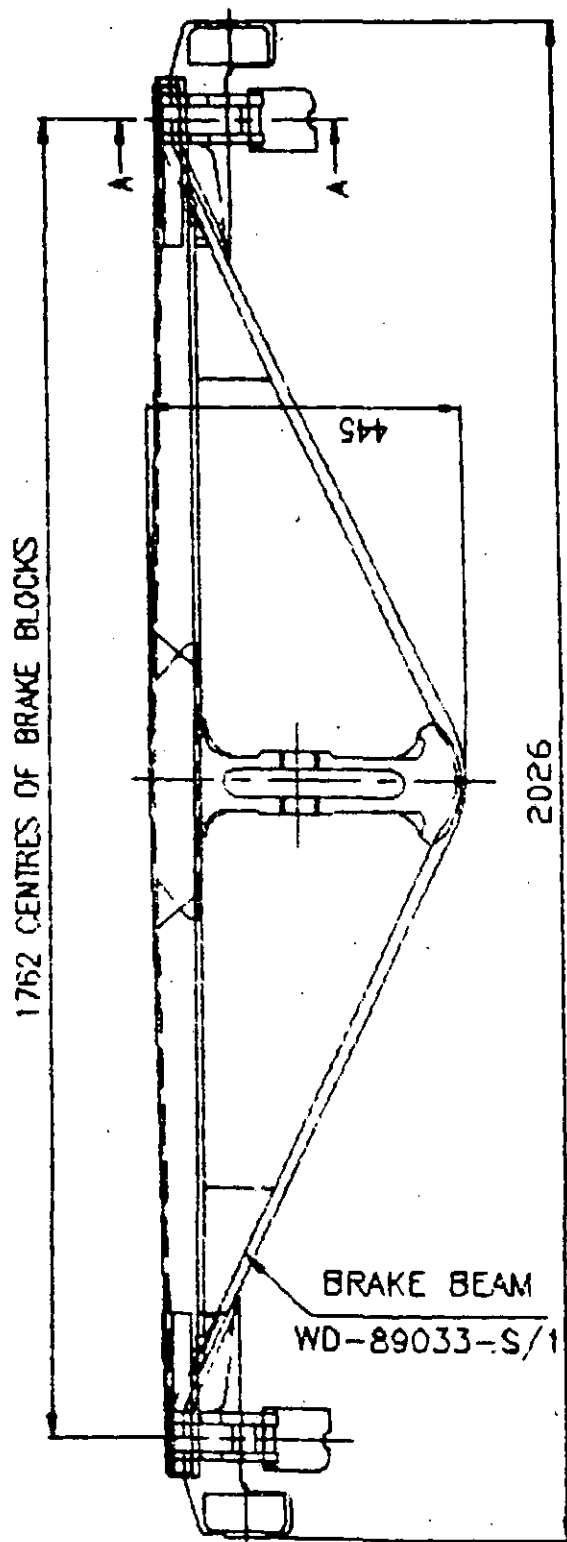
BOGIE LEVERAGE = 1:6

BRAKE GEAR ARRANGEMENT

[CASNUB-22W BOGIE]

FIG.48

0000000669



SECTION-'AA'

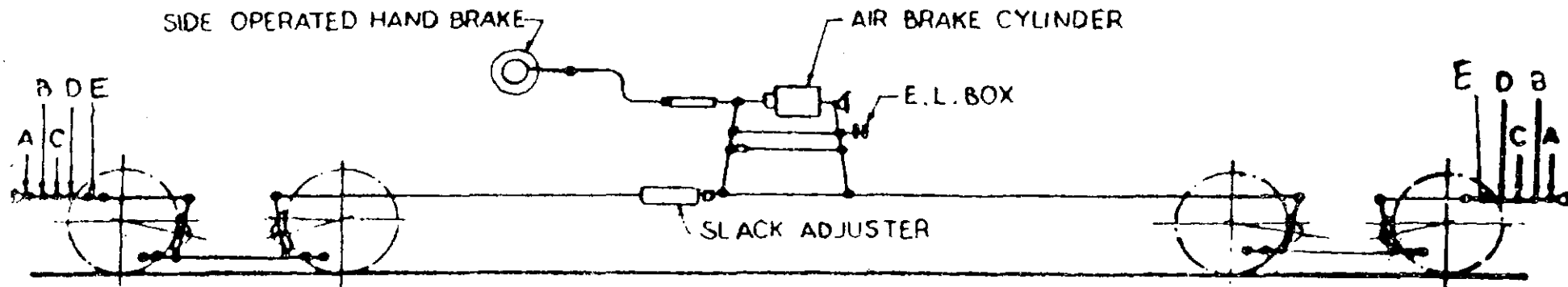
BRAKE BEAM & SHOE

[CASNUB-22W,NL, NLB & HS BOGIES]

FIG.-49.

0000000670

000000671



LIMITS OF WHEEL DIAMETER FOR MANUAL
ADJUSTMENT OF BRAKE GEAR.

HOLES TO BE USED FOR BRAKE ADJUSTMENT	WHEEL DIA. ON TREAD				
	BETWEEN 1000 & 982	BETWEEN 981 & 963	BETWEEN 962 & 944	BETWEEN 943 & 925	BETWEEN 924 & 906
	A	B	C	D	E

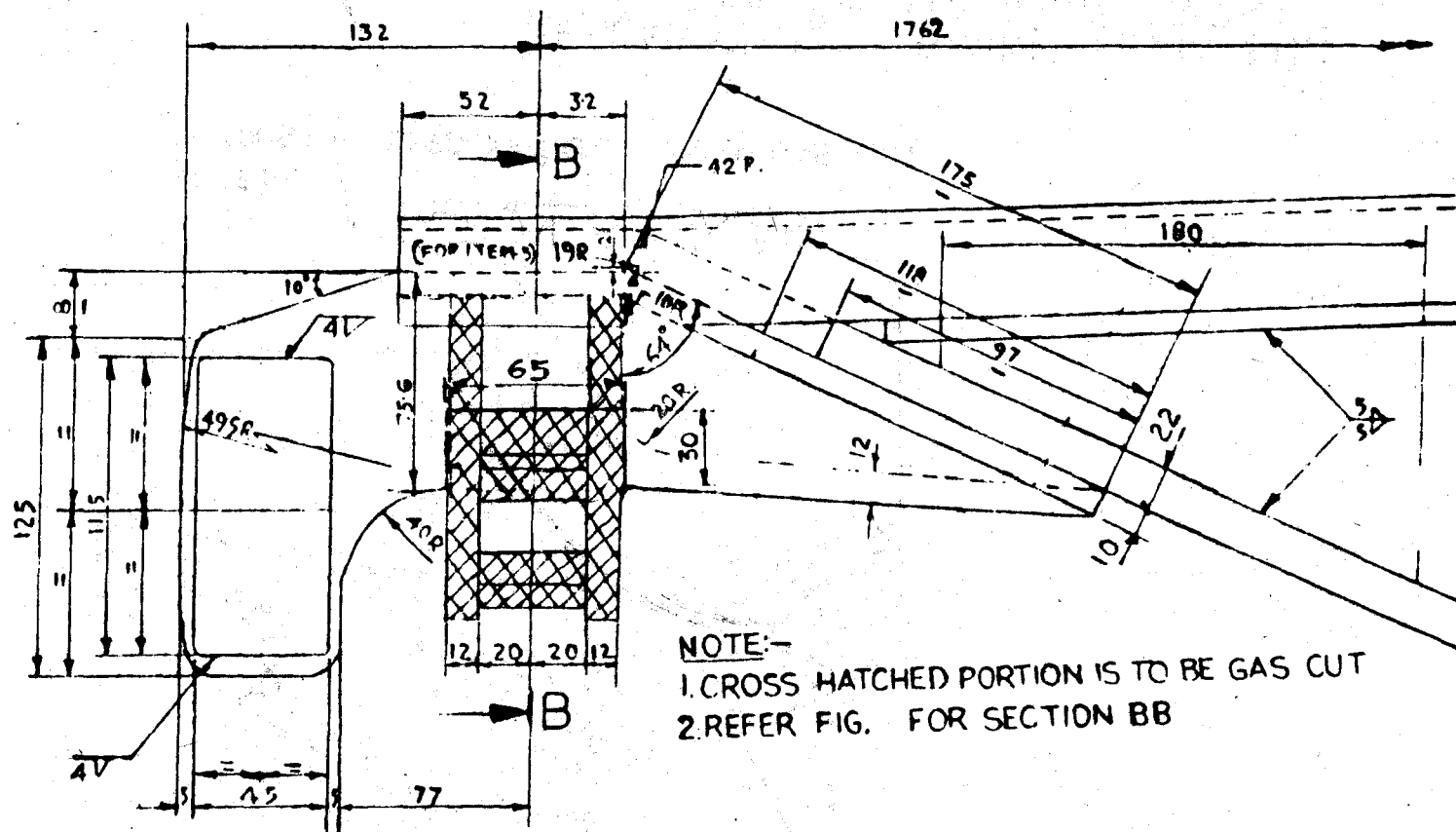
NOTE :-

THE ADJUSTMENT OF BRAKE GEAR PINS SHOULD BE MADE
DURING THE CHANGE OF BRAKE BLOCKS & AS WHEEL WEARS.

MANUAL ADJUSTMENT
OF BOGIE BRAKE
GEAR ON WAGONS

CASNUB-22V,22W(M),22NL,
22NLB,22HS BOGIES.

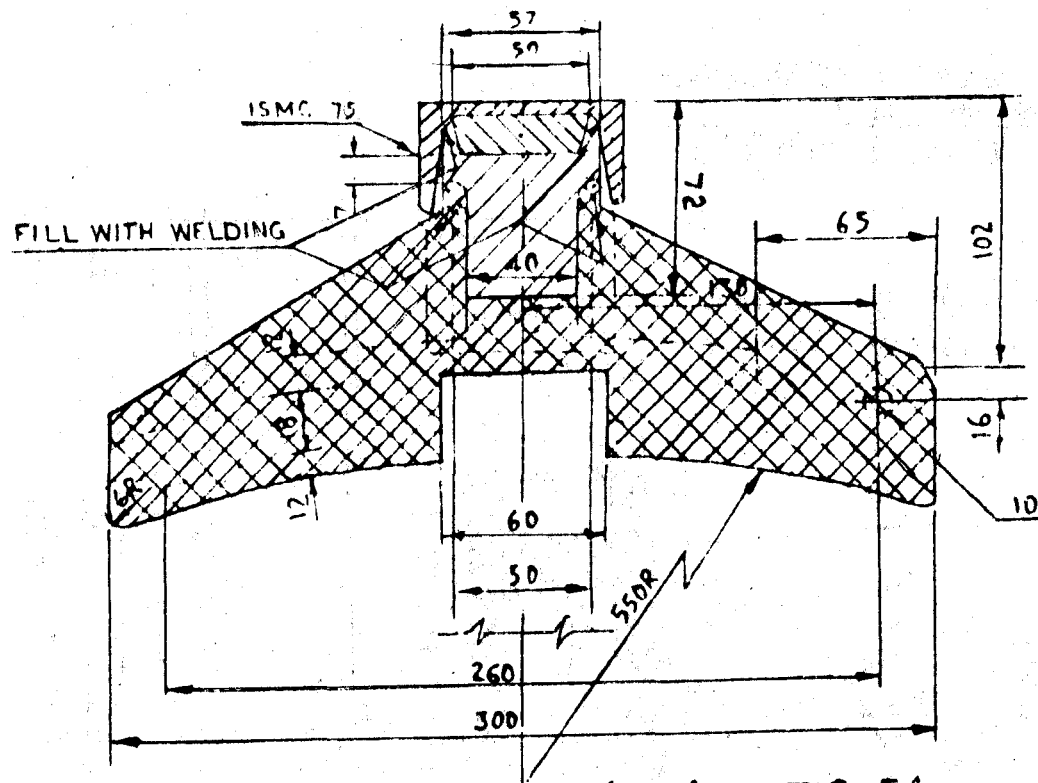
FIG.50



RECLAMATION OF BRAKE BEAM END
 (DRG. NO. WD-89033- S/1)
 CASNUB 22NL, NLB & H.S. BOGIES

FIG. 51

0000000672



SECTION 'BB' OF FIG. 51

NOTE:—

CROSS HATCHED PORTION IS TO BE GAS CUT

RECLAMATION OF BRAKE BEAM END
CASNUB 22 NL, NLB AND H. S. BOGIE

FIG. 52

RECLAMATION
OF
THE SEAM END

RECLAMATION
OF
BRAKE BEAM END
DRG. NO. WD 89033-S/1
(AFTER GAS CUTTING)
CASHUB 22NL, NLB & H. S. BOGIES

FIG. 53

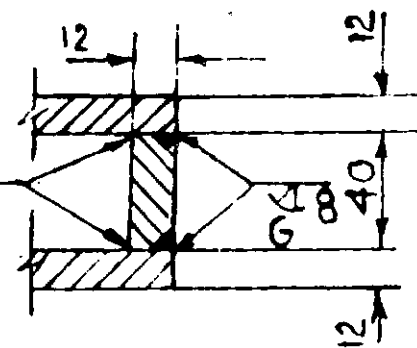


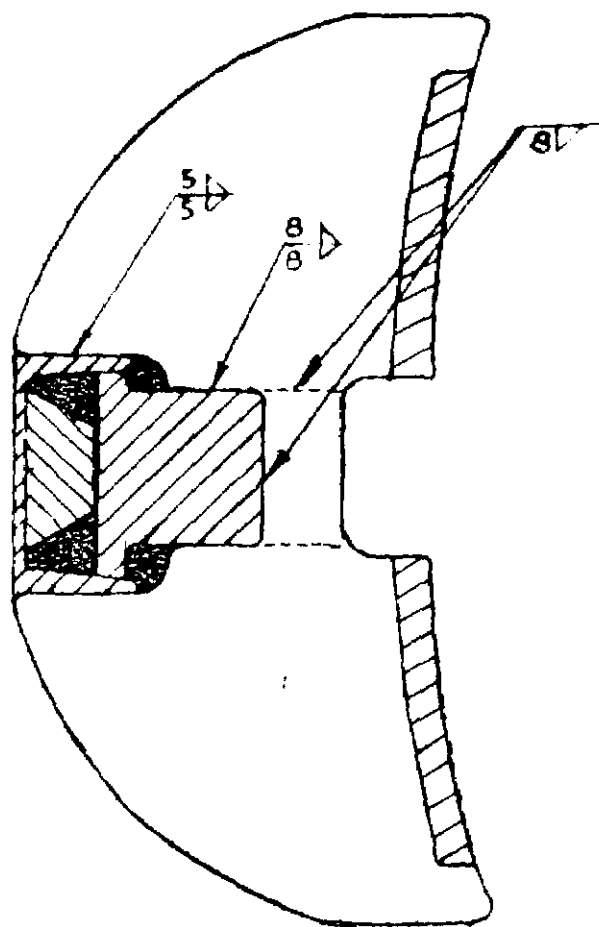
FIG.54

THIS CAN BE MADE BY MODIFYING
BRAKE HEAD.OF BRAKE BEAM TO
SK.NO. 69596 (FOR CASNUB-22 W)

2000



FIG.55



SECTION 'AA' OF FIG. 55 RECLAMATION
OF BRAKE BEAM END

CASNUB-22 NL/NLB/HS BOGIES

FIG.56

0000000675

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