

ST-22

POINT MACHINE

CONTENTS

1. Combined Type Point Machine IRS, Siemens, 220mm TWT and High Thrust Point Machine
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6. Point Control Circuits, Using Siemens Point Group, Using QBCA relays, Using Power relays
7. Precaution while working on Point machine, Clamping When and How
8. Adjustment of Points, Maintenance Skills

IRS ROTARY TYPE ELECTRIC POINT MACHINE (143mm STROKE)

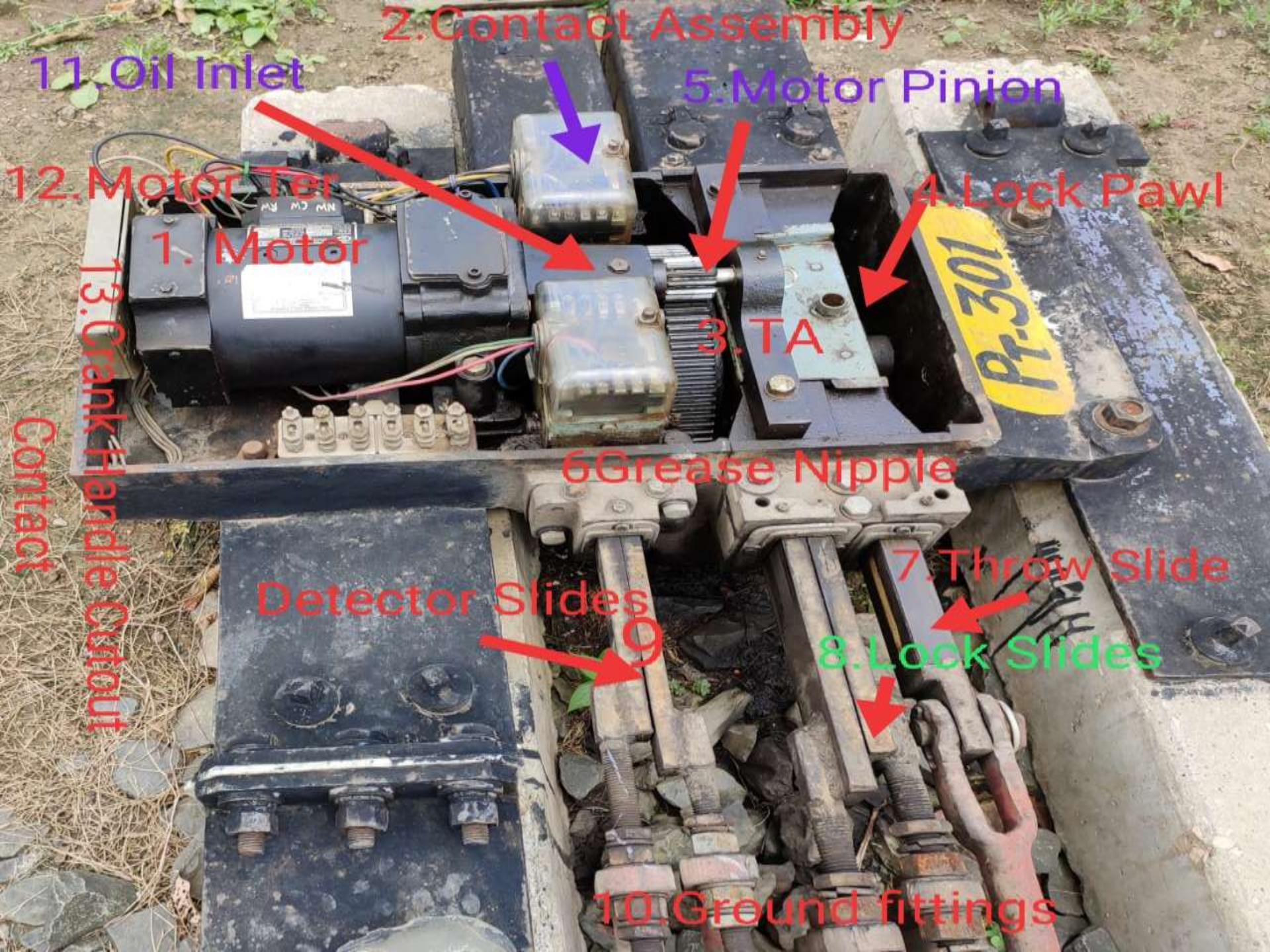
Manufactured as per IRS Specification S-24/2000 and RDSO Dr. No. S10.800

➤ Salient Features

- Independent locking for Normal and Reverse Position of Switch with Rotary type locking arrangement.
- No need of any adjustment in friction clutch at site and does not require electrical Snubbing for smooth stoppage of motor as the friction clutch is integral part of the main Gear disk.
- Detection and Controlling Contacts are of Heavy duty and Self wiping type
- Conversion of Rotary motion into Linear motion is achieved by rack and Pinion arrangement

IRS ROTARY TYPE ELECTRIC POINT MACHINE STROKE 143mm





2. Contact Assembly

11. Oil Inlet

5. Motor Pinion

12. Motor Ter

1. Motor

4. Lock Pawl

3. TA

6. Grease Nipple

Detector Slides

7. Throw Slide

8. Lock Slides

10. Ground fittings

13. Crank Handle Cutout

Contact

Main Parts

- 1.DC Series Split field Motor with in built reduction gear Unit
- 2. Transmission Assembly
- 3.Throw Rod,Lock Slides and Detection Slides
- 4.Detection and Control Contact Switch Assembly
- 5.Cast Iron Case
- 6.Cover With locking mechanism
- 7. Hand Crank



1.

ELECTRIC MOTOR

ELECTRICAL PARAMETERS OF MOTOR

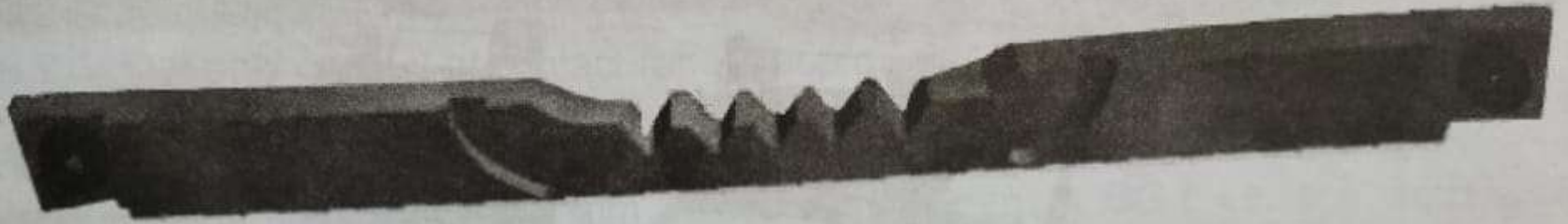
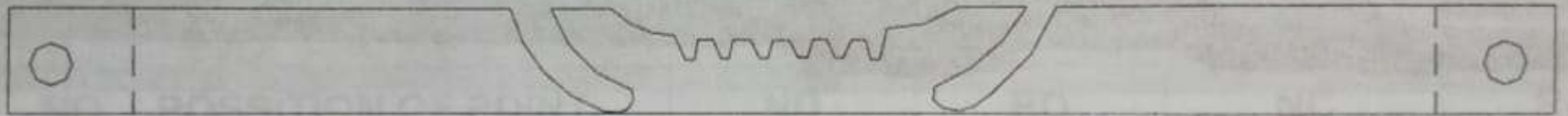
- >Rated Voltage- 110 VDC +- 25%
- >RPM 1700+- 15%
- >Rated Current 5,3A & Maximum 8.5 A
- >Operating Time 4 to 5 Seconds
- >Power 440Watts
- >Gear oil SAE 30
- EPM Thrust-450kg
- Stroke 143mm

Transmission assembly

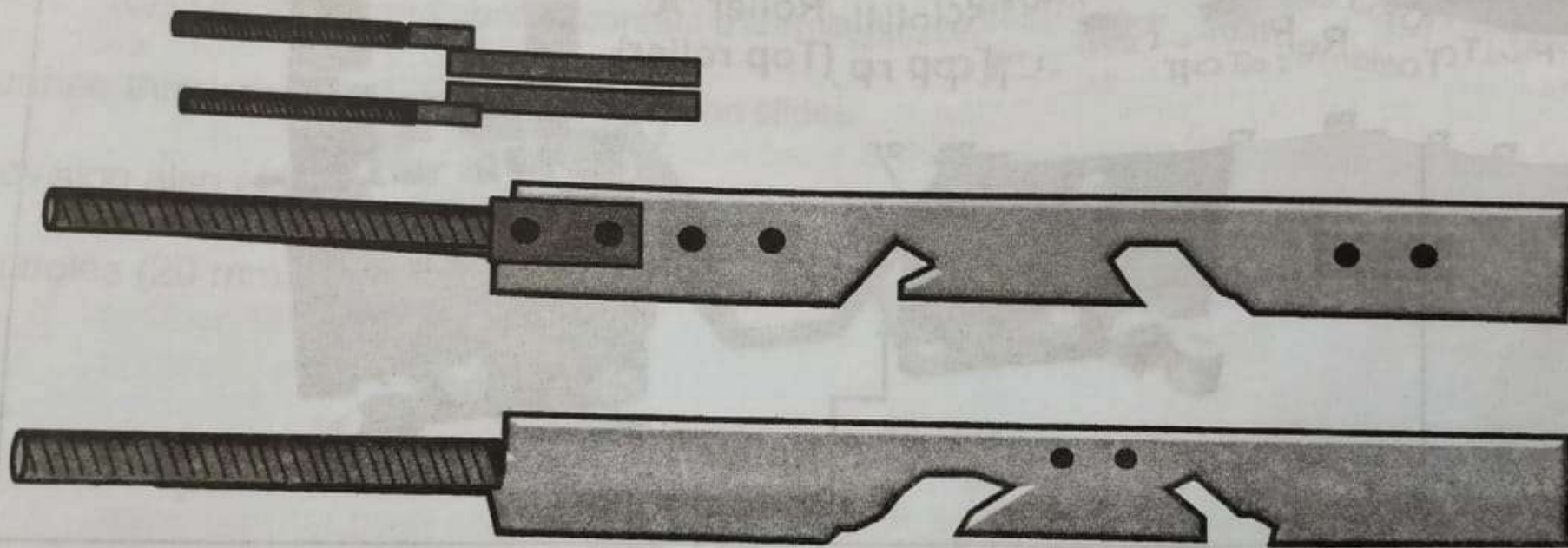


TRANSMISSION ASSEMBLY

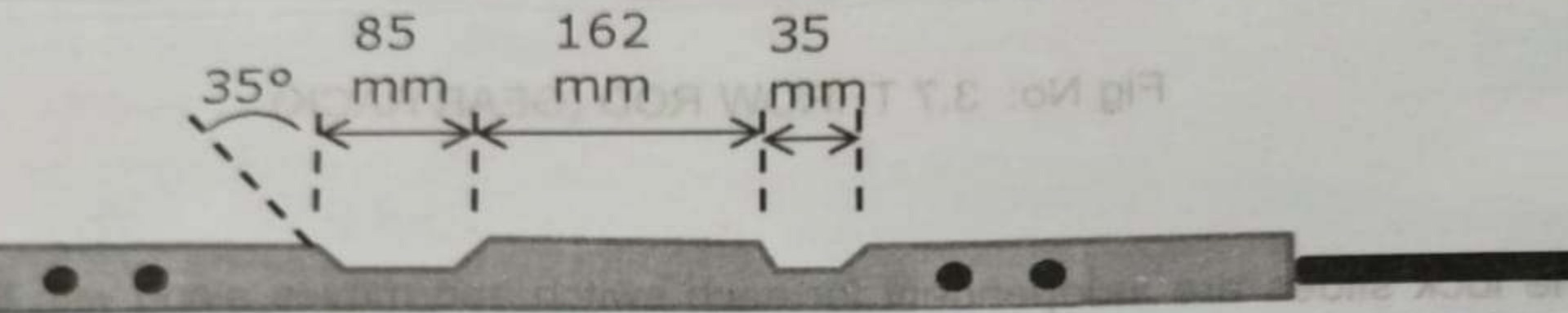
2.



THROW ROD



LOCK SLIDES



DETECTOR SLIDE

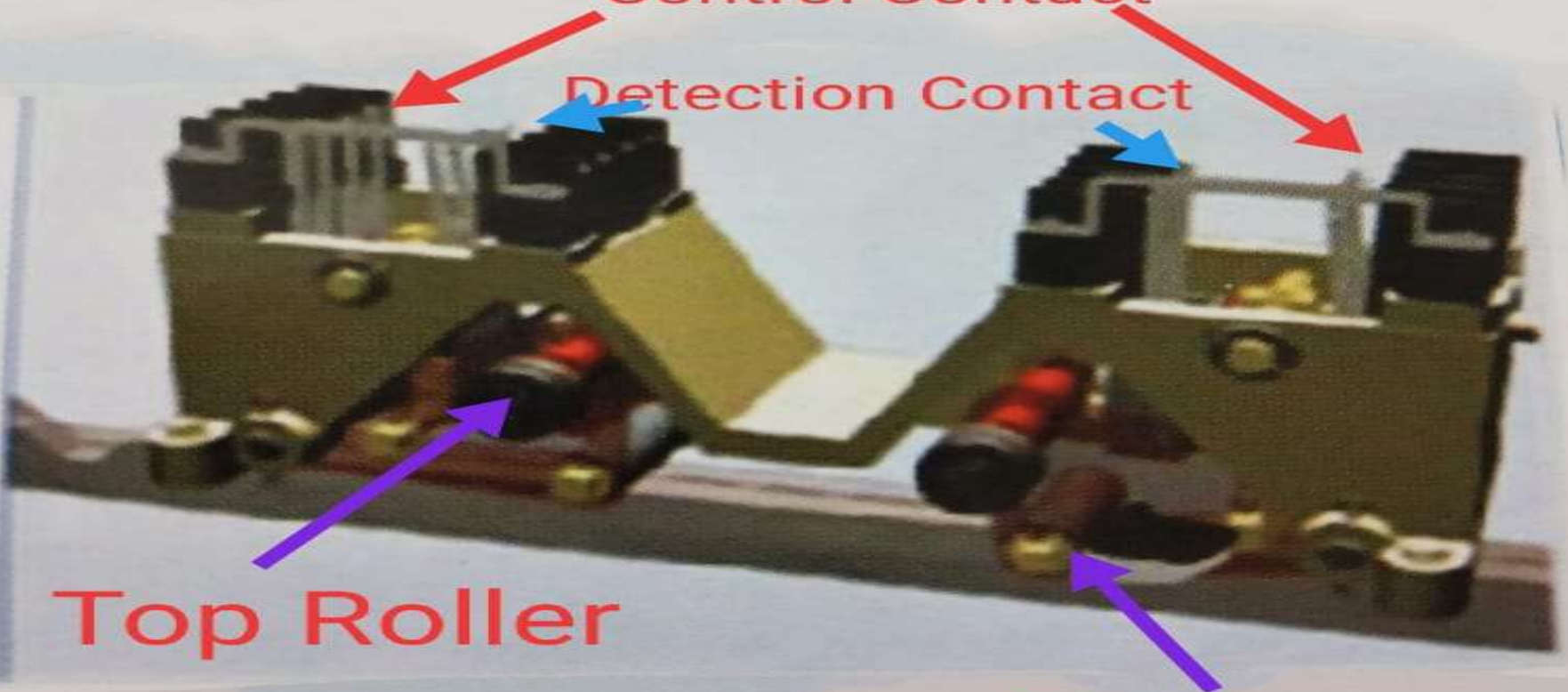
CONTACT ASSEMBLY

Control Contact

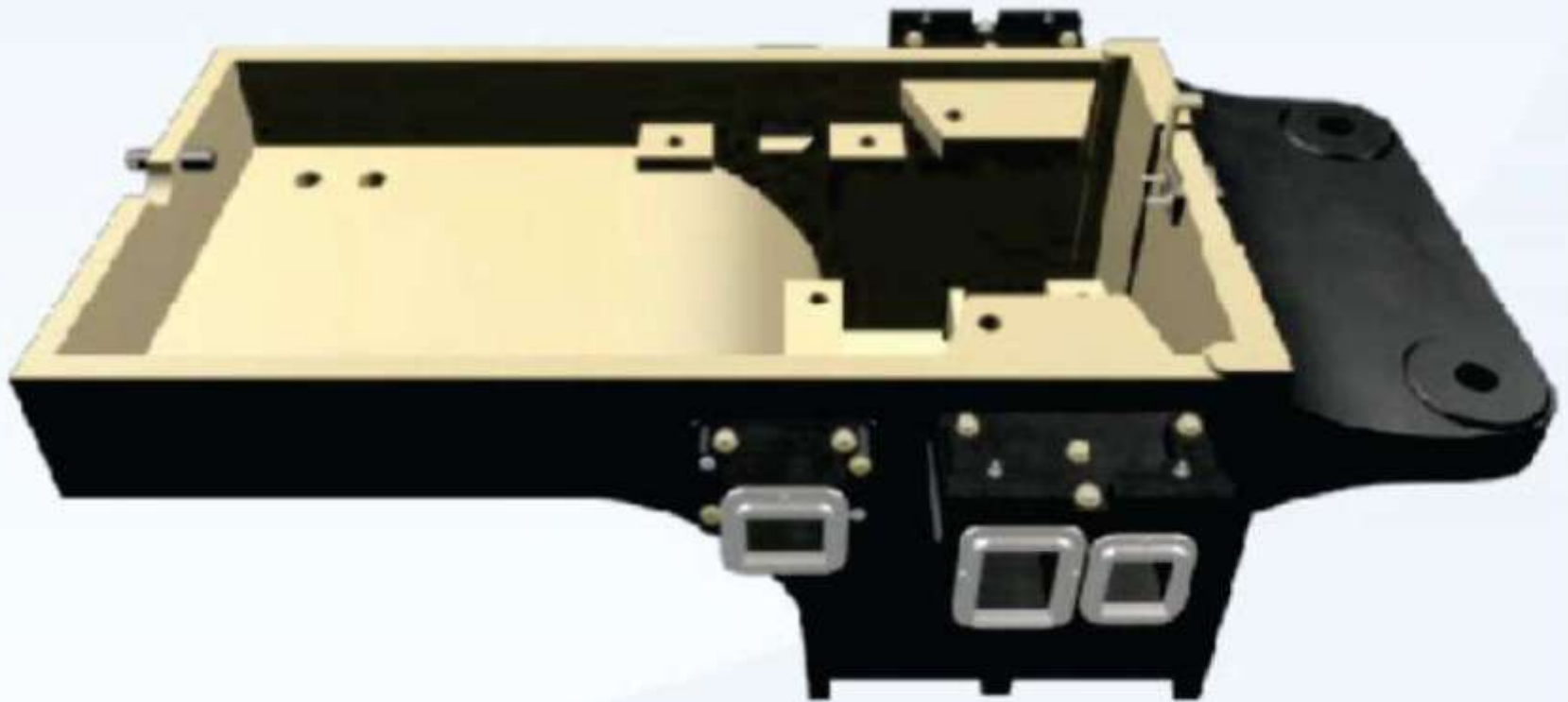
Detection Contact

Top Roller

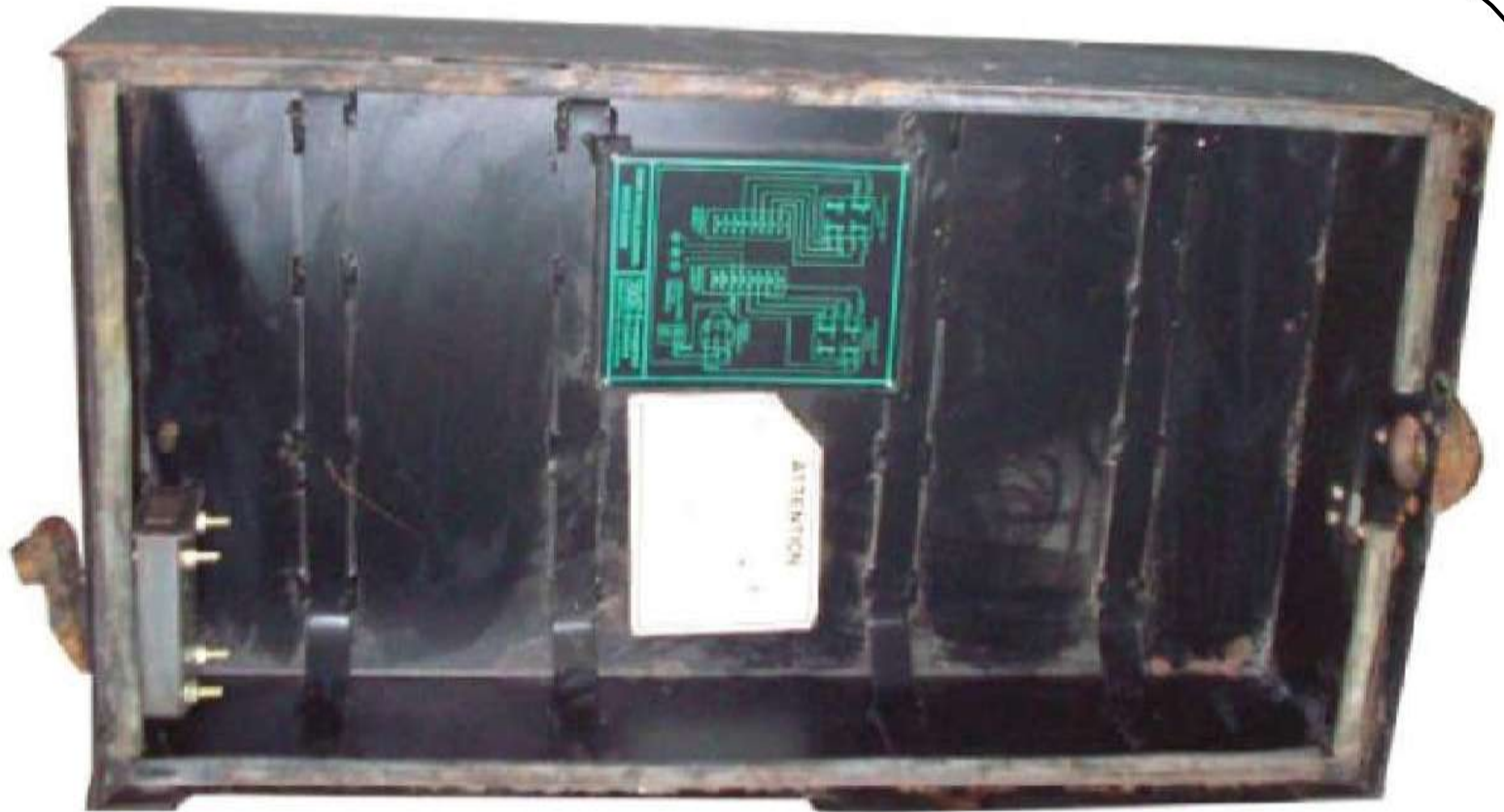
Bottom
Roller



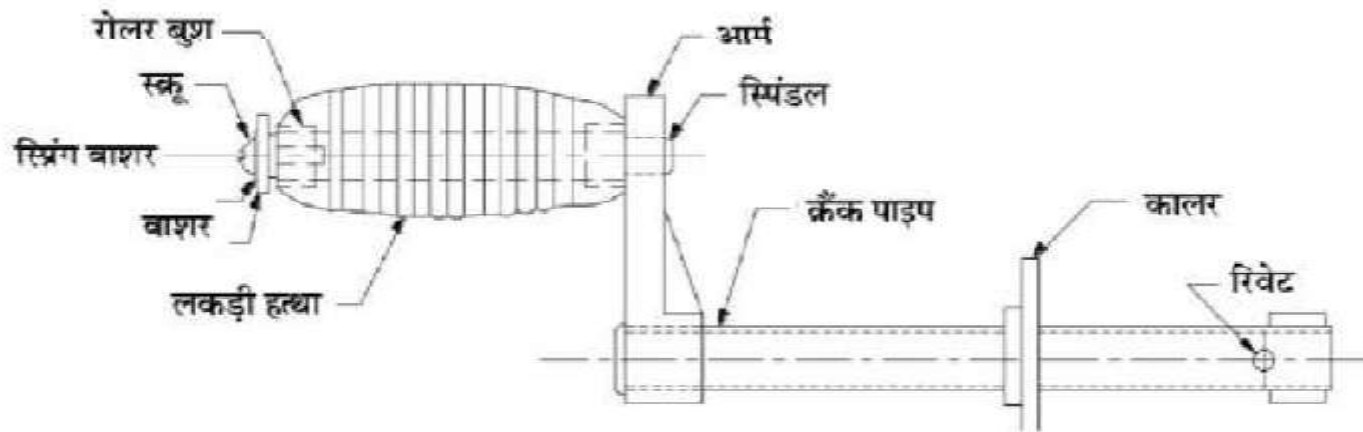
CAST IRON CASE



POINT MACHINE COVER WITH LOCKING MECHANISM



HAND CRANK

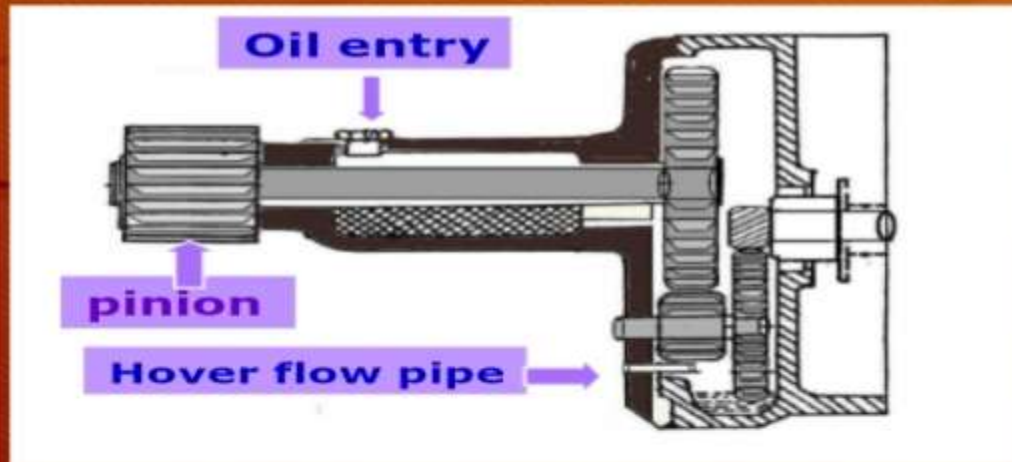


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Reduction Gear



OIL INLET



CRANK HANDLE CUTOUT CONTACT ASSEMBLY



- (a) Switch extension brackets (P brackets) – 2 Nos. (Fig.8.12)

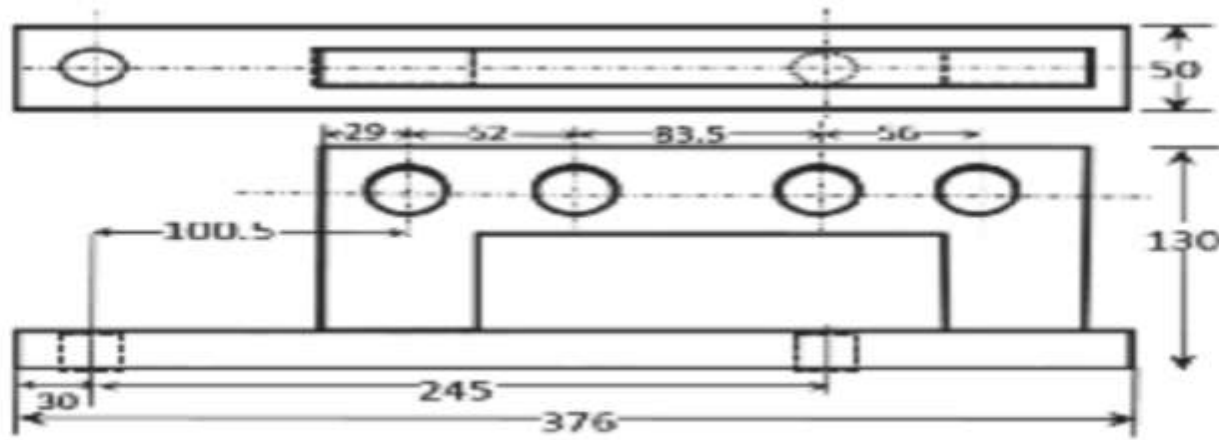


Fig. 8.12

- (b) Drive Rod or throw rod- 1 No. (Fig.8.13)

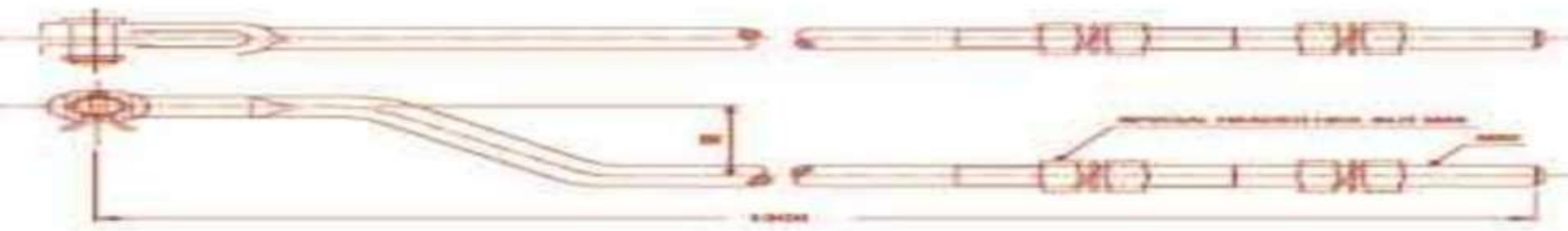
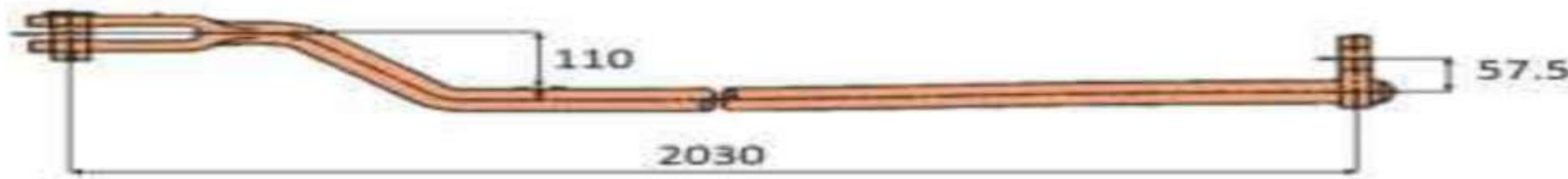


Fig. 8.13

- (c) Lock rod long (far end) – 1 No. (Fig.8.14)



(d) Lock rod short (near end) – 1 No. (Fig.8.15)



Fig. 8.15

(e) Detector rod long (far end) - 1 No. (Fig.8.16)

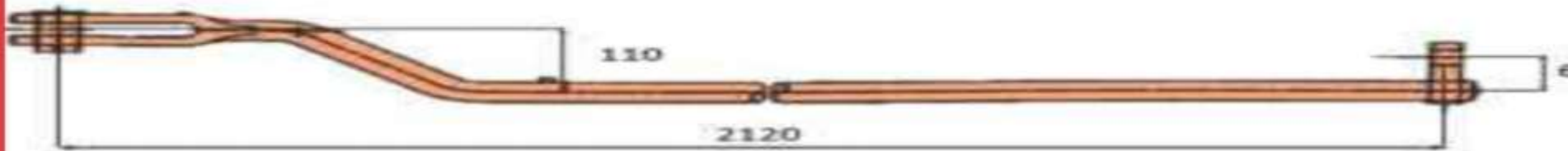


Fig. 8.16

(f) Detector rod short (near end) - 1 No. (Fig.8.17)

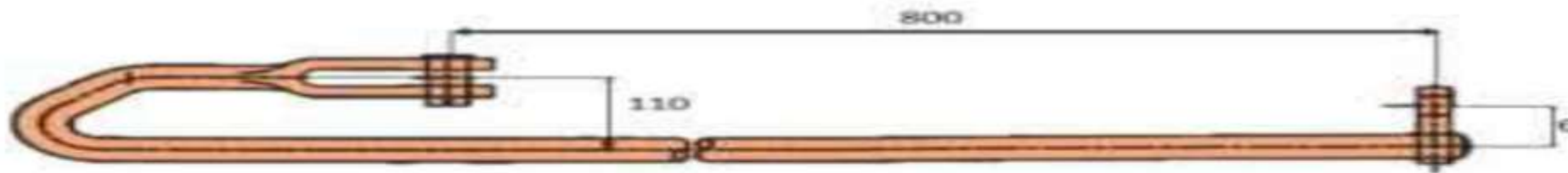


Fig. 8.17

(g) Drive lug – 1 No.& viii. Sleeve arrangement (Fig.8.18)



Installation of ELECTRIC POINT Machine

1. Sleeper Spacing= Spacing between Sleeper no 3&4 Centre to centre

685mm(Siemens Point)

710mm(IRS Rotary type 143mm Stroke)

745mm(IRS Clamp type 220mm Stroke)

2. Fixing of Point machine on Sleeper no 3&4 Using Correct Bolt&Nuts with Spring Washer, Should be **1050mm** from Stock Rail inner face to EPM's Centre line.

3. Leading Strecher Bar is Located at a Distance 470mm from the Toe of Tounge Rail.

4. Opening of Switch Should be 95mm-115mm+/-3mm(BG)

5. Ensure Proper Lubrication of Various moving Parts and apply greases wherever Provisions are given for that and pour SAE30 oil in Gear Box if required.

6. Fixing of 'P' Block on Both Switches= Mark 1st Hole on Tounge Rail at a distance of 52.5mm from the Toe of Tounge rail and 2nd Hole after 1st Hole at a distance 245mm.

7. Ground Connection Rods should be Straight ,level and Clear from the Bottom of the Rail (25mm)

>Connect the Throw Rod 1st to the Leading Strecher Bar with L-Block and adjust the nuts to give the required stroke i.e Opening 115mm

Spring Required is 3mm

Ideal Stroke to be given is $143 - (115 + 3) = 25\text{mm}$

Maximum Stroke of Throw Bar is 143mm.

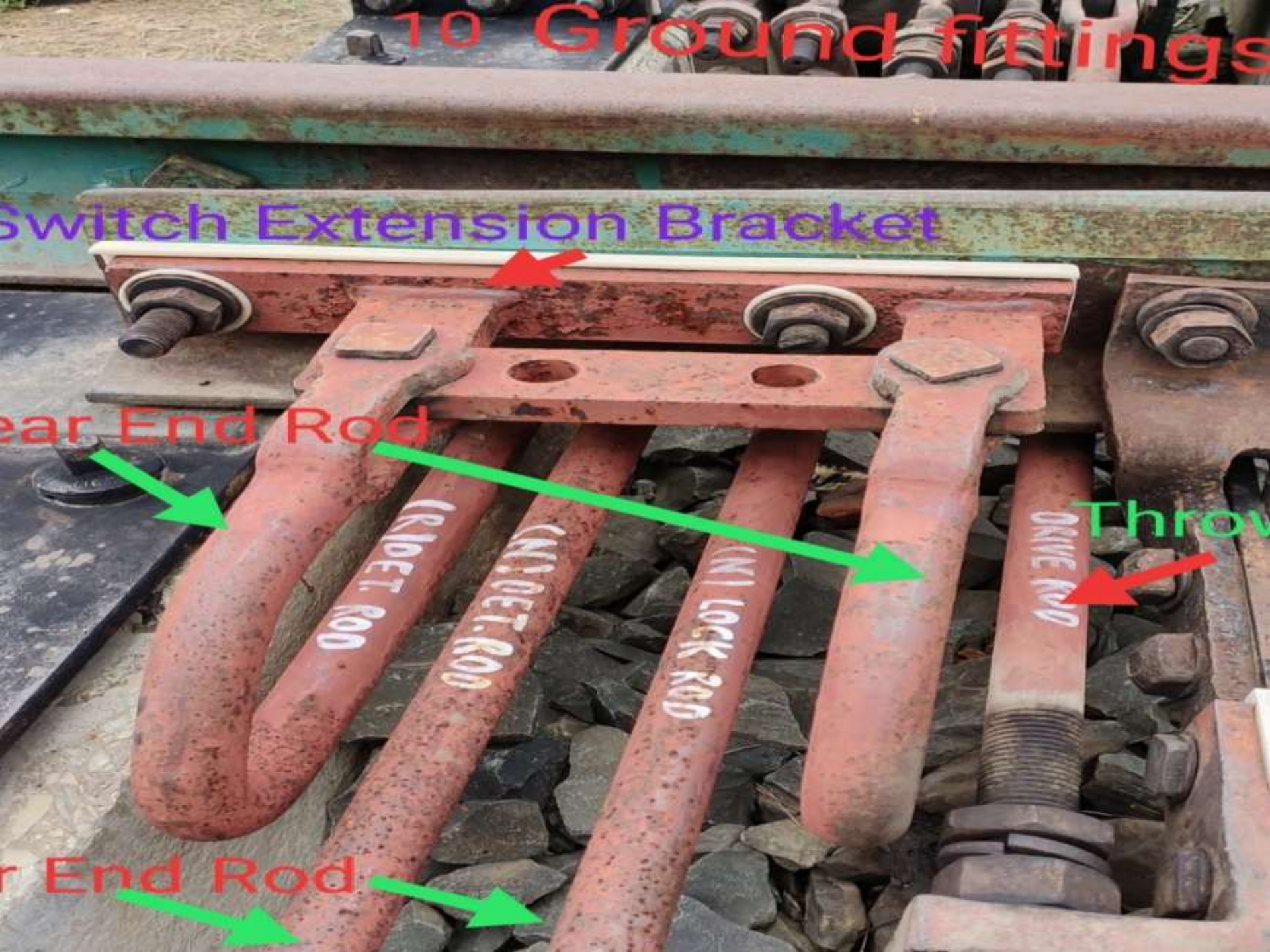
10 Ground fittings

Switch Extension Bracket

ear End Rod

Throw

r End Rod





52.5mm

245mm

(R)DET. ROD

(N)DET. ROD

(N) Lock ROD

DRIVE ROD



115mm

470mm

(K)DET. ROD

(N)DET. ROD

(N) Lock ROD

DRIVE ROD

Locating...

Spacing of Sleeper no 3
and 4





1050mm

SRJ

18 1/2 60KG RE 171

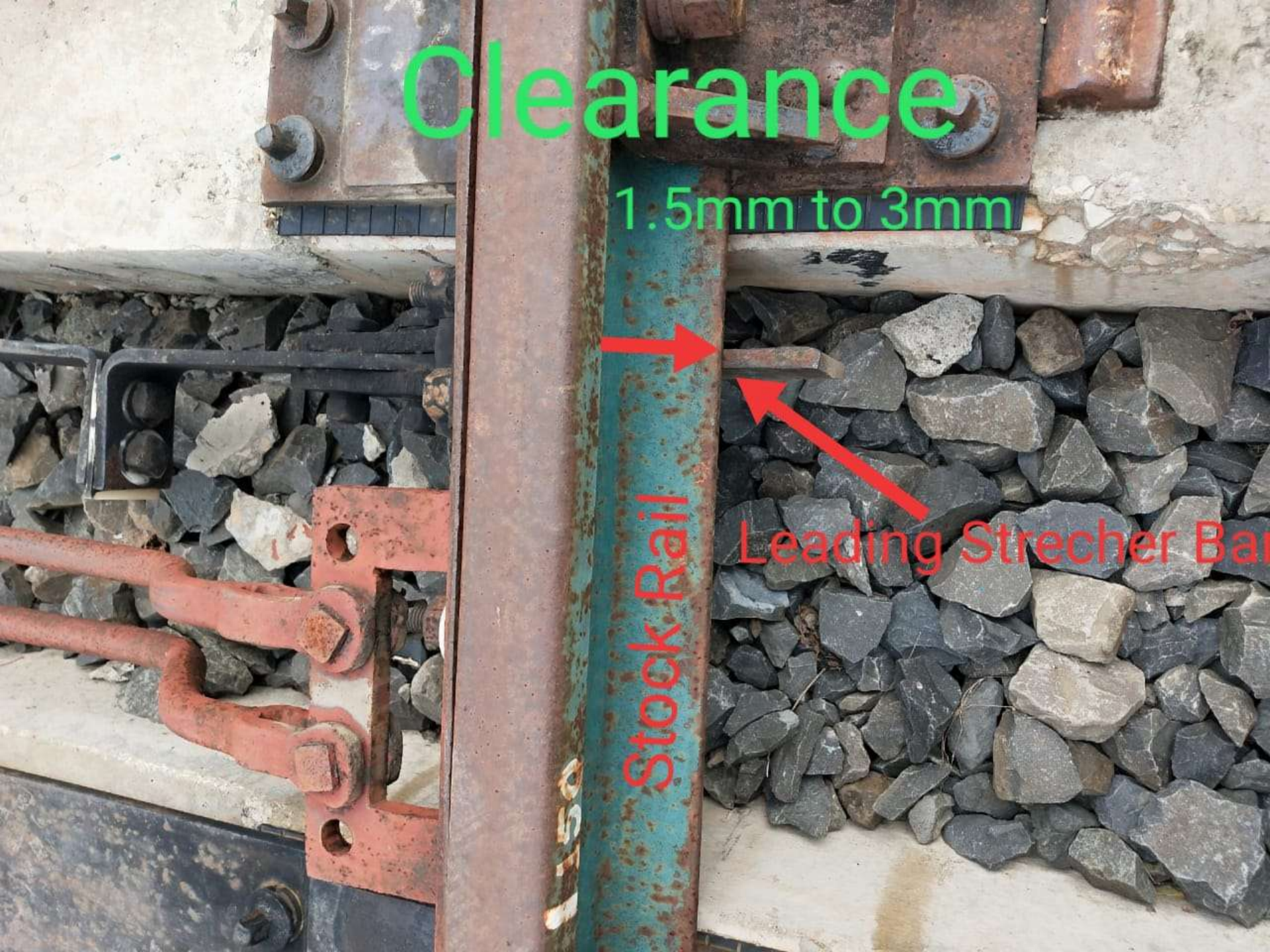
301-W

Clearance

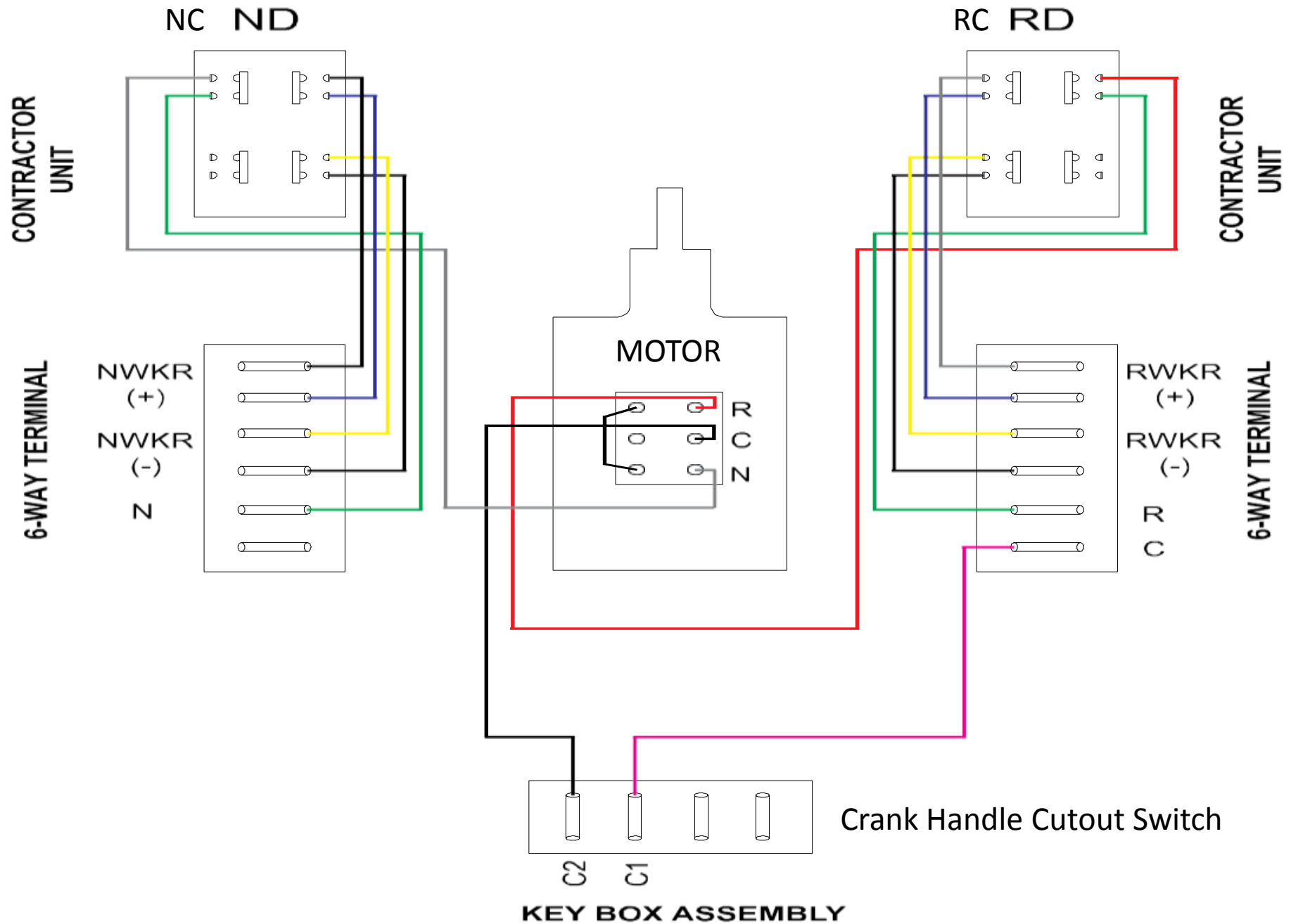
1.5mm to 3mm

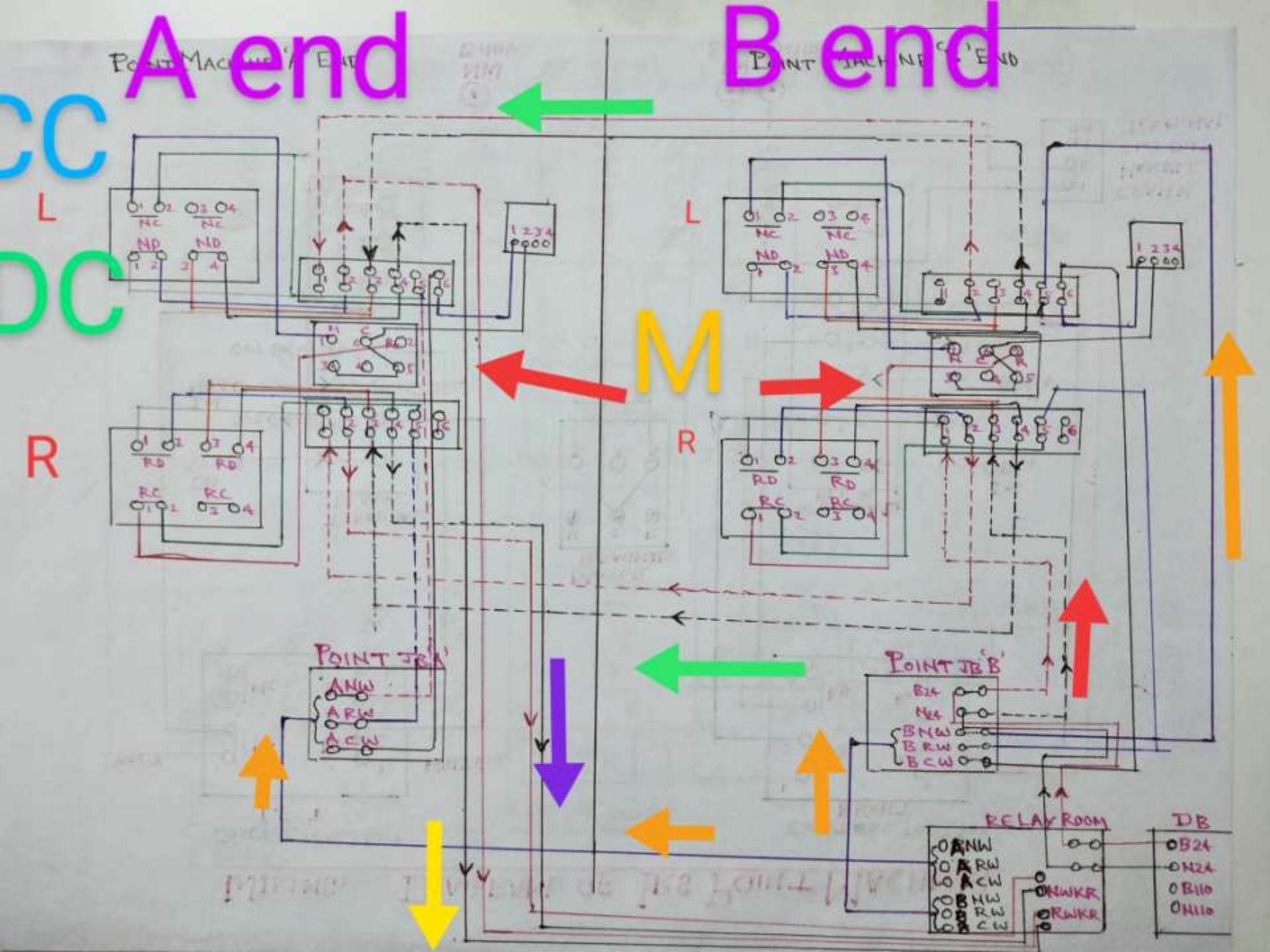
Stock Rail

Leading Strecher Bar



WIRING DIAGRAM OF IRS TYPE ELECTRIC POINT MACHINE





MI (MACHINE I)

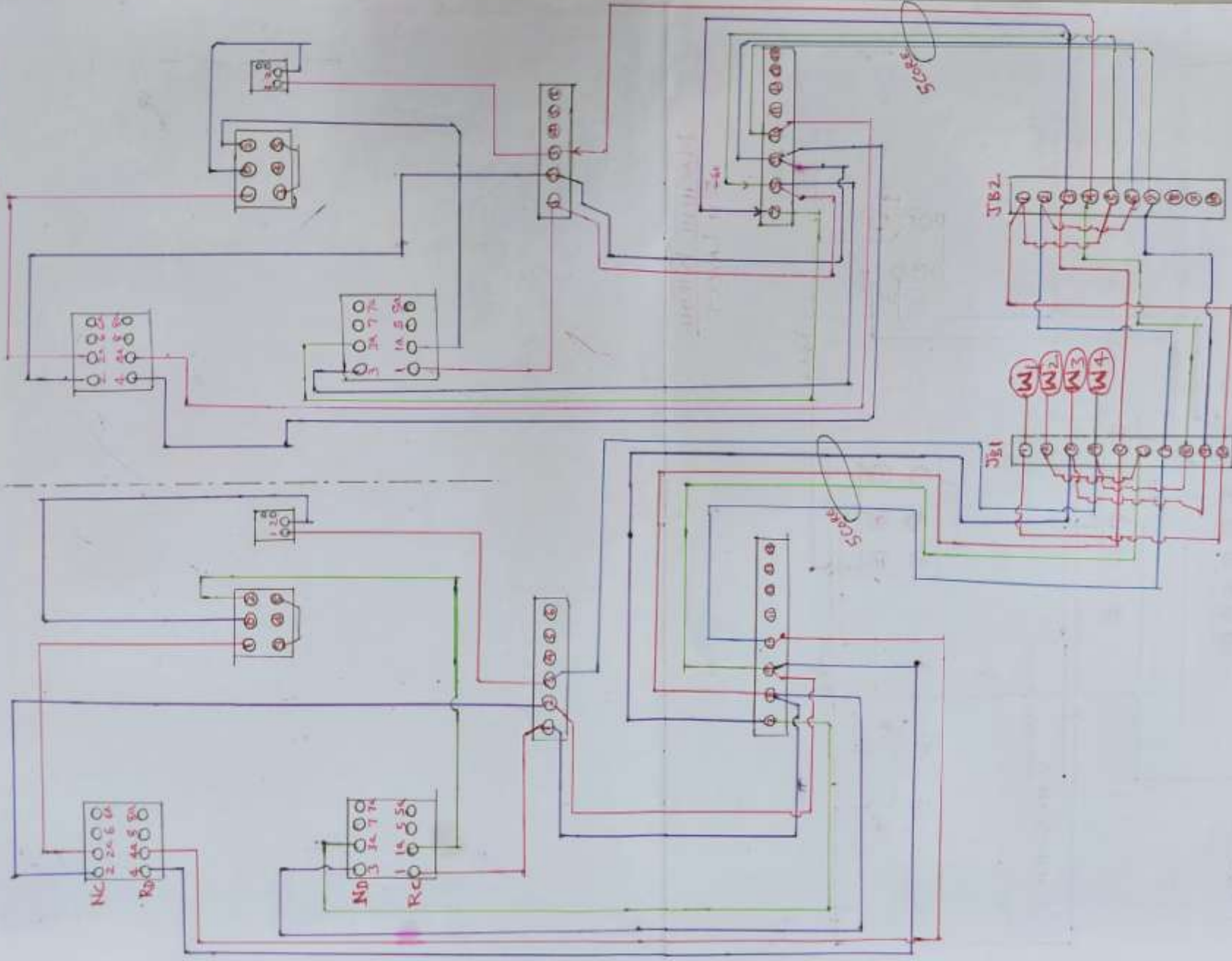
NC
2 2 6 6
R₂ 4 4 8 8

NC
3 3 7 7
R₂ 1 1 5 5

MI (MACHINE 2)

0 0 0 0
4 4 5 5

0 0 0 0
3 3 7 7
1 1 5 5

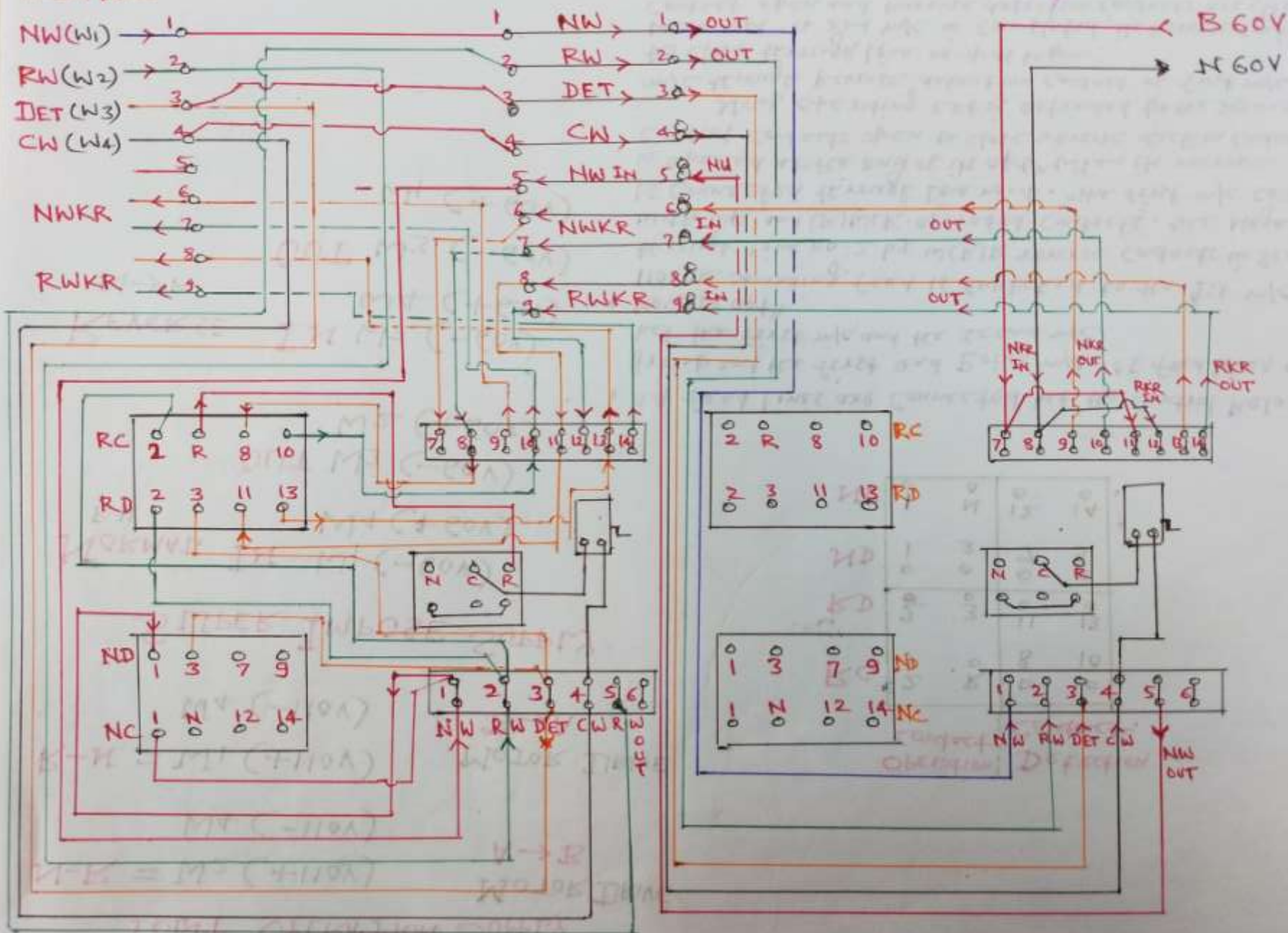


FROM RRI

PT. JB 'A'

SIEMENS CKT POINT M/C WIRING

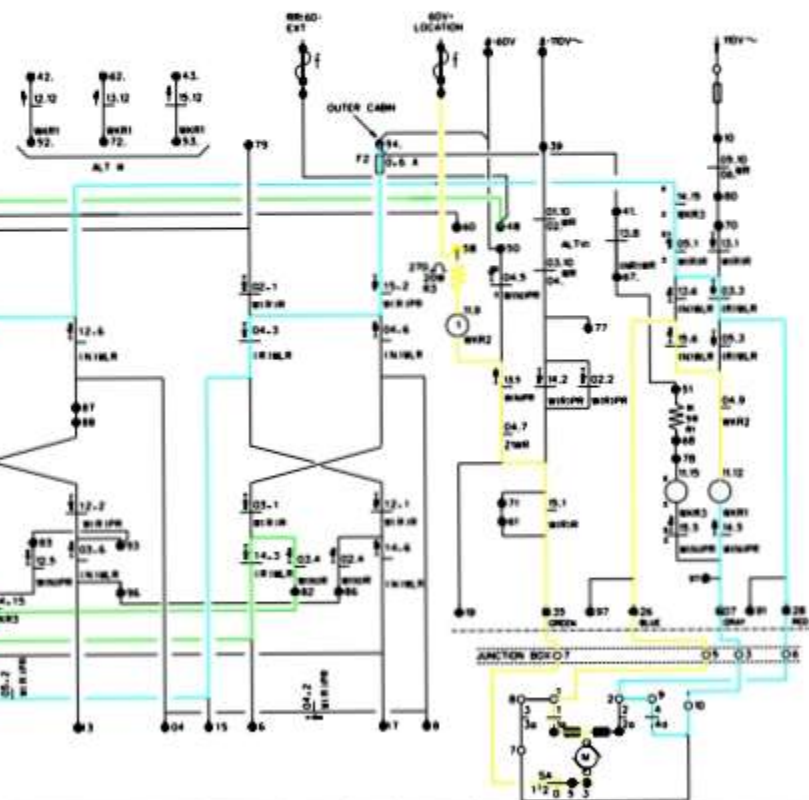
PT. JB 'B'



CIRCUIT DIAGRAM
INVERTED TO COMPLETION
USING DIAGRAM TO
LIST BY HOLCOMB-PHONY
MAY 1975

BLDGGROUP	BLDGGROUP	BLDGGROUP	BLDGGROUP	BLDGGROUP
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POINT GROUP - POINT SWITCHING GROUP
- SIEMENS MOTOR WIRING

Maintenance of EPM

1. Check & Ensure all fixing bolts and other bolts in the machine are tight, Split pin if any are intact in open condition.
2. Check and ensure the tightness of Throw bar cast Iron Lug fixing bolts and leading strecher bolts(12nos)
3. Check and ensure the ground connection rod lug connection and bracket fixings are in tight condition.
4. Check for any wear&tear/breakage in gears and other moving parts any abnormal sound if found while working, correct it or bring to the notice of higher officials.
5. check&ensure that the locking Segment is freely entering into the respective notches and responds for 5mm obst. Test.
6. Ensure the sleepers are well packed and ground connection rods are free from ballast.
7. Check with 5mm obstruction ,lock should not enter ,Detection should not make even if lock enters. Also ensure that the driving Main gear Rim only Rotates(i.e.slipping)
8. Measure Working Current and Slipping Current(1.5 to 2times of Working Current) at least once in quarterly .
9. Detection Test with 3,25mm Test Piece, For each Switch Lock shall enter into lock slide notch but detection contact shall just open.
10. Go Test with 1.6mm Test Piece for each switch, lock shall enter into lock slide Notch and Detection contact shall just make.

SIEMENS DC ELECTRIC POINT MACHINE (Non Trailable)

➤ Main Parts

➤ 1. Motor with Train of Gears

➤ 2. friction clutch

➤ 3. Driving and Locking bars with locking curves

➤ 4. Locking Segment

➤ 5. Detector Slides

➤ 6. Contact assembly

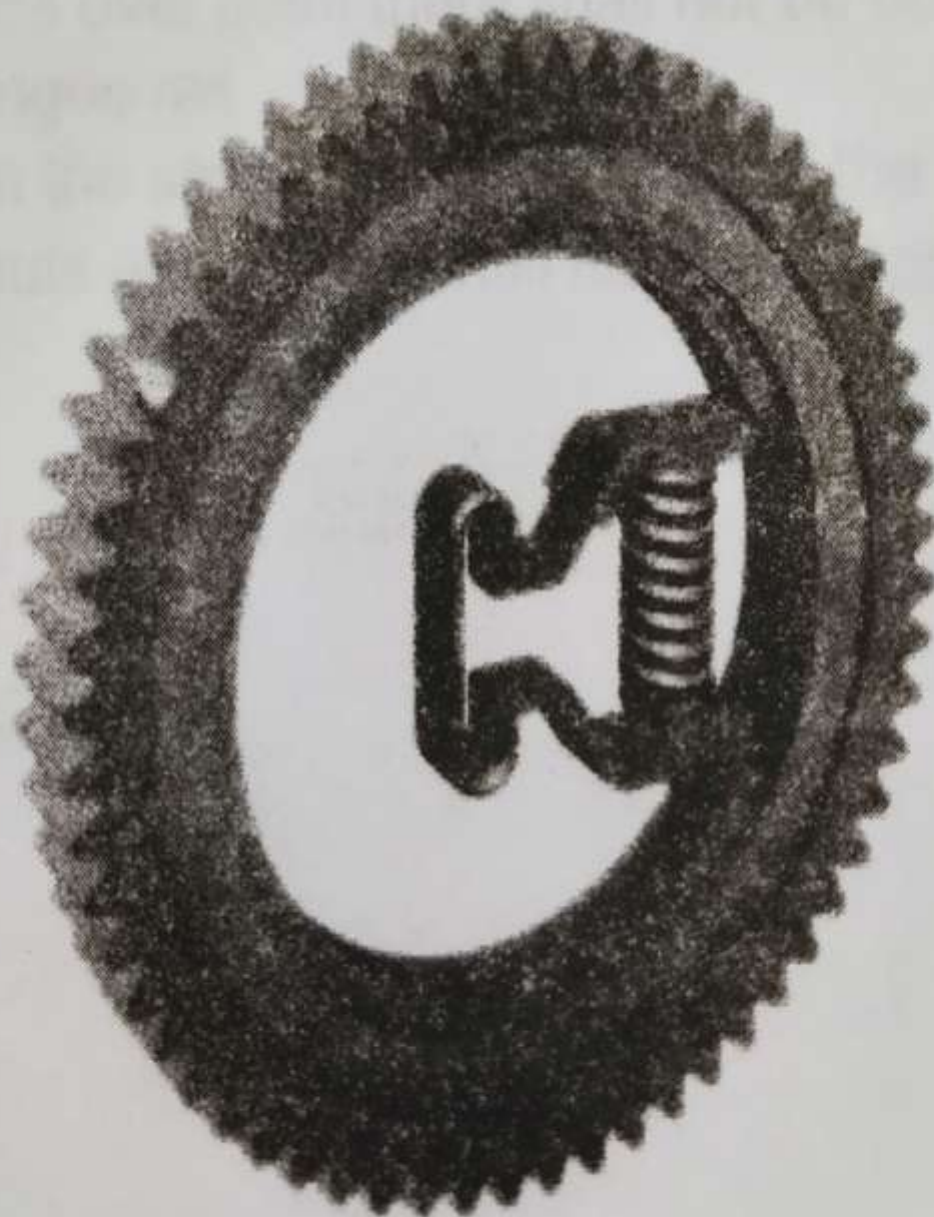
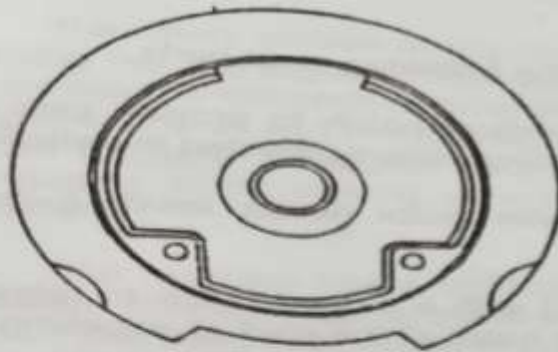
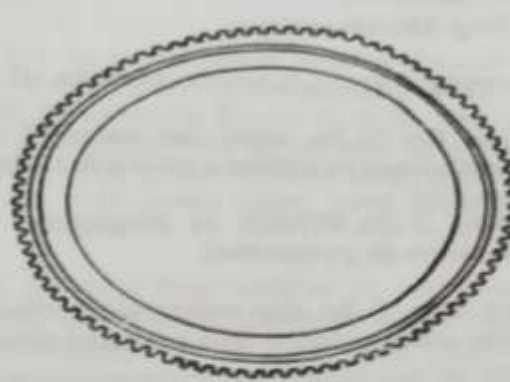


Fig No: 5.1 FRICTION CLUTCH WITH MAIN GEAR



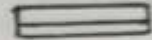
a) CONTROL DISC.



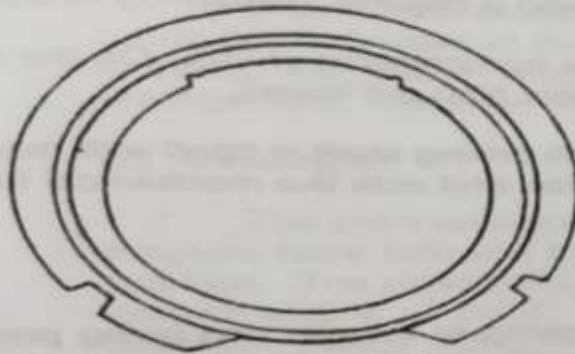
b) GEAR RIM



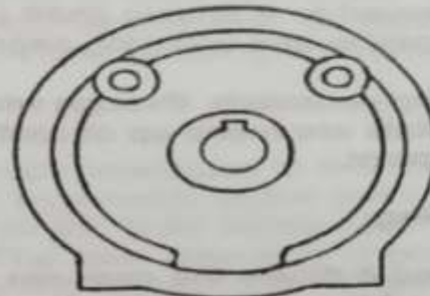
LUBRICATING
NIPPLE



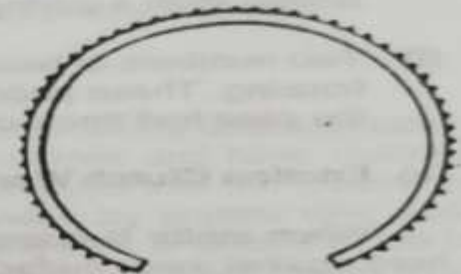
BOLT FOR DRIVE &
CONTROL DISCS.



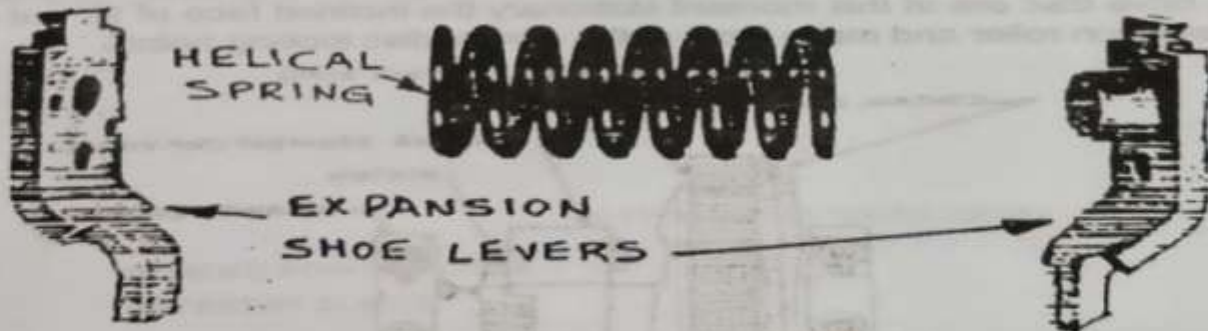
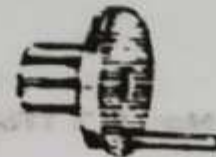
c) LIFT OUT DISC.



d) DRIVE DISC.



e) SLIP RING

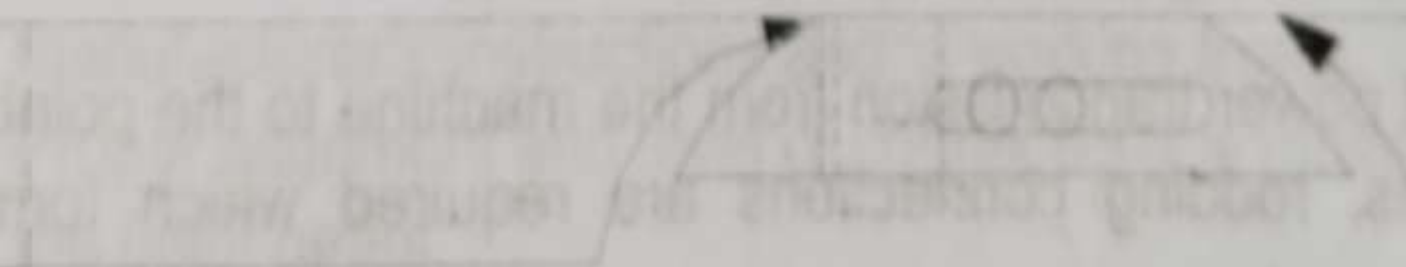




(a) THROW BAR (GEAR RACK)

SIEMEN'S POINT MACHINE

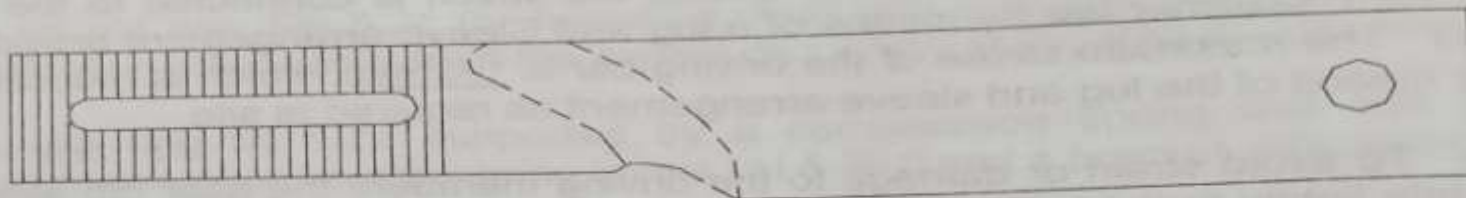
DIFFERENT SLIDES



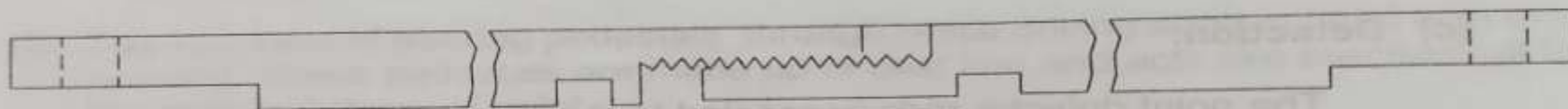
(b) LOCKING BAR (SIDE VIEW)



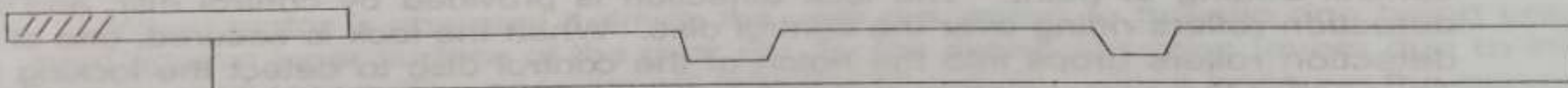
(c) LOCKING BAR (MAIN)



(c) LOCKING BAR (AUXILIARY)



(c) LOCKING BAR TOP VIEW



(d) DETECTOR SLIDE (RIGHT)



(e) DETECTOR SLIDE (LEFT)

Fig No: 5.4(a to e) POINT THROW, LOCK & DETECTION SLIDES

IRS CLAMP TYPE ELECTRIC POINT MACHINE STROKE 220mm

ELECTRIC POINT MACHINE



MAIN PARTS

- Dc Series Split field Motor with inbuilt Reduction Gear
- Transmission Assembly
- Detection &Control Contact Assembly
- Throw Slide,Lock Slides and Detection Slides
- Cast Iron Case With Cover
- Crank Handle cut out Assembly

OPERATING PARAMETERS

IRS:S/24/2002 Amendt.No 1

- Motor-DC Series Split field
- Throw of Point Machine- 220mm +4/-1
- Time of Operation – 5 Sec Max
- Current Consumption- 5.5Amp.
- Rated Voltage- 110vDC
- Thrust- 450Kg

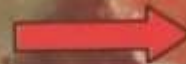
MAIN PARTS OF CLAMP LOCK ASSEMBLY

- Locking Bar(LH,RH)
- Locking Washer
- Locking Arms
- Insulating Plates
- Stopper
- Lug(Drive Lug)

LOCK BAR



STOCK RAIL
BRACKET



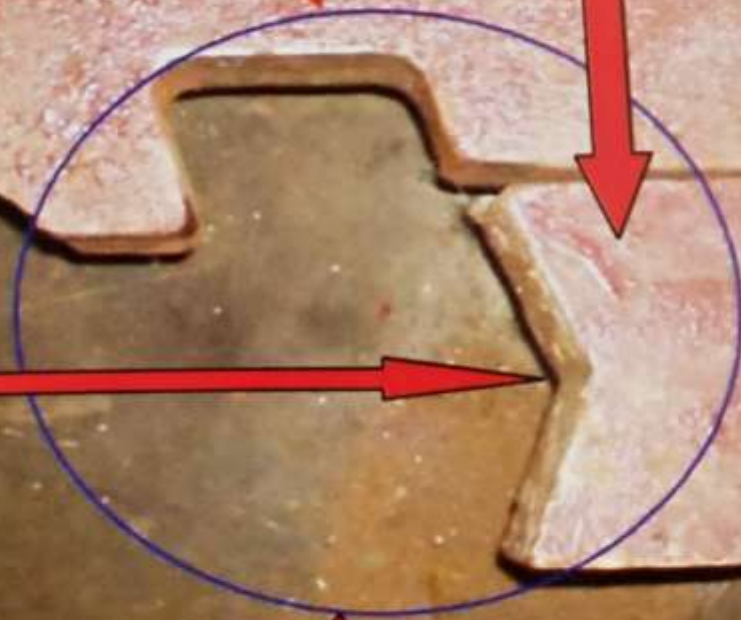
LOCK ARM



LOCK ARM



CLOSED SWITCH LOCKING



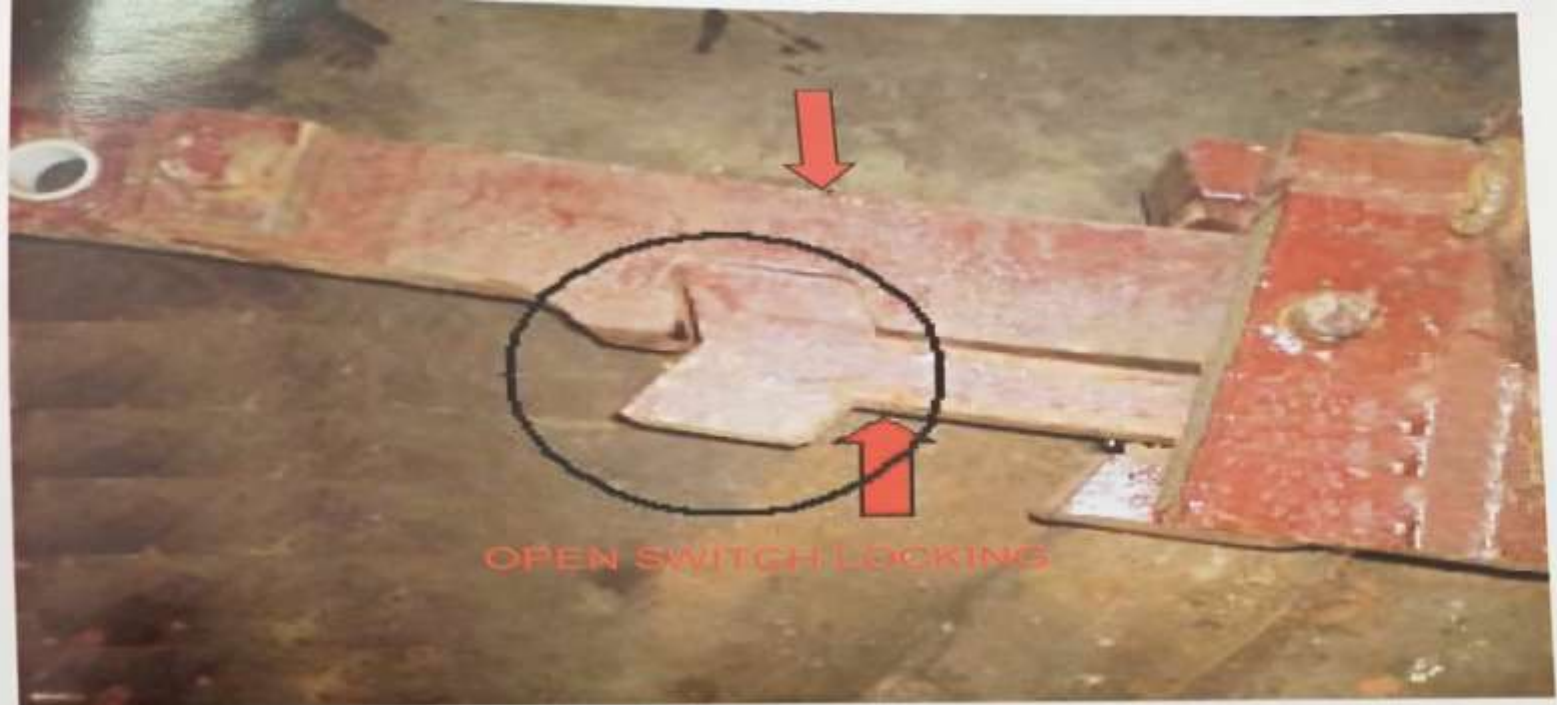


Fig No: 6.4 OPENED SWITCH LOCKING



Fig No: 6.5 SPRING SETTING DEVICE

INSTALLATION OF IRS CLAMP TYPE POINT M/C

1. Bring the Toe 32mm in advance of centre line of Sleeper no.3 and the distance between Sleeper No. 3 and 4 to 745mm(from centre to centre)
2. Ensure that insulated gauge tie plate is provided on sleeper no 3.
3. Remove all leading and following stretcher bars.
4. Provide spring setting device at JOH(junction of rail Head).
5. Maintain gap at JOH not less than 57mm for every flange way

Marking Holes for Clamp Lock Assembly

(a) Stock Rail

- i) Mark centreline on the web of stock rail at the height of 76mm from bottom of stock rail upto the length of 550mm from toe.
- ii) Mark Centre punch to the length of 450mm for 1st hole and 530mm for 2nd Hole from the edge of tongue rail toe. Ensure gap between 1st and 2nd Hole should be 80mm(C to C)
- iii) Drill two holes of 22mm dia in the web of both stock rails for fixing stock rail brackets.

(b) Tongue Rail

- i) Mark centreline on the web of Tongue rail at the height of 55mm from bottom of Tongue rail upto the length of 500mm from toe.
- ii) Mark Centre punch to the length of 428mm for 1st hole and 498mm for 2nd Hole from the toe. Ensure gap between 1st and 2nd Hole should be 70mm(C to C)
- iii) Drill two holes of 22mm dia in the web of both Tongue rails for fixing switch rail brackets.

Marking Holes for Ground Connection

(a) RHS Point m/c.

- (i) 1st make the centreline in the flange of both tongue rails upto 350mm length from toe
- (ii) Mark Punch upto length of 148mm for 1st Hole and 328mm for 2nd hole from toe in
LHS Tongue rail.
- (iii) Mark Centre punch up to the length of 200mm for 1st hole and 272mm for 2nd hole from the toe in the RH tongue rail.

(b) LHS Point m/c.

- (i) 1st make the centreline in the flange of both tongue rails upto 350mm length from toe
- (ii) Mark Punch upto length of 200mm for 1st Hole and 272mm for 2nd hole from toe in
LHS Tongue rail.
- (iii) Mark Centre punch up to the length of 148mm for 1st hole and 328mm for 2nd hole from the toe in the RH tongue rail.

ADJUSTMENT

- (a) Lubricate all the moving parts of clamp Lock assembly.
- (b) Put greases on the bronze brush in the lock arm assembly.
- (c) put grease on the notches of the lock slide and fishtail portion of the lock arm.
- (d) loosen the nuts of stock rail bracket so that it can be moved freely in its oblong holes and takes its own portion.
- (e) Operate the machine with crank handle and adjust the lock and detector slides usually(Near end 1st)

- (f) If clamp lock is not locking point then do the following
- (g) For proper locking on both sides additional number of packing shims have been provided between switch rail and tongue rail bracket.
- (h) Required no of shims will be put outside the tongue rail bracket to facilitate locking on either side.
- (i) Six nos of packing shims are provided with each clamp point assembly.
- (j) Now tighten the nuts of the stock rail bracket.

MAINTENANCE

- 1.Ensure graphiting or lubricating of slide chairs at every week.
- 2.Ensure that all nuts and bolts are tight and split pins are opened properly.
- 3.lubricate at the following moving parts of the clamp lock assembly.
- Stock rail bracket groove,moving part of tongue rail and loc arm assembly.
- 4.Ensure that the rodding and other connections are tight.
- 5.check that the point area is well ballast,packed and free from vegetation.
- 6.check that water does not stagnate in the vicinity of points.
- 7.Ensure information to engineering dept. regarding to avoid any emergency failure.

- 8.Ensure that wire connections of the m/c are tight and laced properly.
- 9.The slipping of friction clutch during obstruction shall be ensured and slipping current shall not exceed twice the normal working current.
- 10.Ensure carbon brushes are exerting sufficient pressure on commutator.
- 11.check that contact pressure of control and Detection contact is adequate.
- 12.Apply NCAT(Non corrosive all temp.) grease(IS-507/508)through the entire grease nipple by a grease gun after 6month or 8000 optn
- Pour 100 ml lubricating oil (SAE30/SHELL 100) through inlet into oil reservoir of reduction gear after every 6 months.

Description	Siemens EPM	IRS Rotary Type EPM	IRS Clamp Type EPM
1.STROKE	143mm	143mm	220mm
2.AC IMMUNITY LEVEL	160v AC	160v AC	160v AC
3.Mode of Locking	Rotary type locking	Rotary type locking	Rotary&Clamp type locking
4.Locking of Switches	Common one lock slide	Independent two lock slide	Independent two lock slide and Cclamp lock on open& close Switch
5.Operating Time	3-5 Sec.	3-5 Sec.	5-6 Sec.
6.Friction Clutch	Self Adjustable	Self Adjustable	Self Adjustable
7.Slooper Spacing	685mm	710mm	745mm

Description	Siemens EPM	IRS Rotary Type EPM	IRS Clamp Type EPM
8.Snubbing	Mech.	Mech.	Mech.
9.Motor Type	DC Series Split field Motor	DC Series Split field Motor	DC Series Split field Motor
10.Insulation	10M ohm	10M ohm	10M ohm
11.RPM	1700	1700	1700
12.POWER	440 Watt	440 Watt	440 Watt
13.Rated Motor Current	5.3 A	5.3 A	5.3 A

DO'S

- 1.Tight all fixing Bolts & others associate fittings.
- 2.Lubricate all moving Parts either With Oil /grease and clean Excessive Oil/grease.
- 3.Clear the Ballast from ground Connection rods.
- 4.Watch for any Unusual Noise while working if so,take remedial measures.
- 5.Issue Disconnection notice whenever required & Do not disconnect without giving Notice.
- 6.Watch for any Iron Burrs in the Stock rail if so clear the same.
- 7.Watch for Excessive Creep (15mm is Permitted)
- 8.Check for Excessive Opening if so,take remedial measures.
- 9.Ensure Proper packing of Sleepers.
- 10.Check for proper making and Breaking of detection contacts.
- 11.Clean the motor armature and ensure it is free from carbon deposits.
- 12.Use only crank handle for manual working of point machine.
- 13.Test for effective Track locking once in 03 months.
- 14.Use proper tools while carrying out maintenance ,Testing & adjustment.
- 15.Drain out water if collected inside the machine and close the Drainout Hole.

Don't

1. Do not operate the machine locally without crank Handle.
2. Don't adjust Lock & Detection slides straightaway without checking switch opening.
3. Donot use oil in MGR (Main Gear Rim) .Donot allow water to get stagnated inside the m/c.
4. Donot through any electrical contacts under any circumstances.
5. Don't Disturb the presetting of the detection contacts at Site.