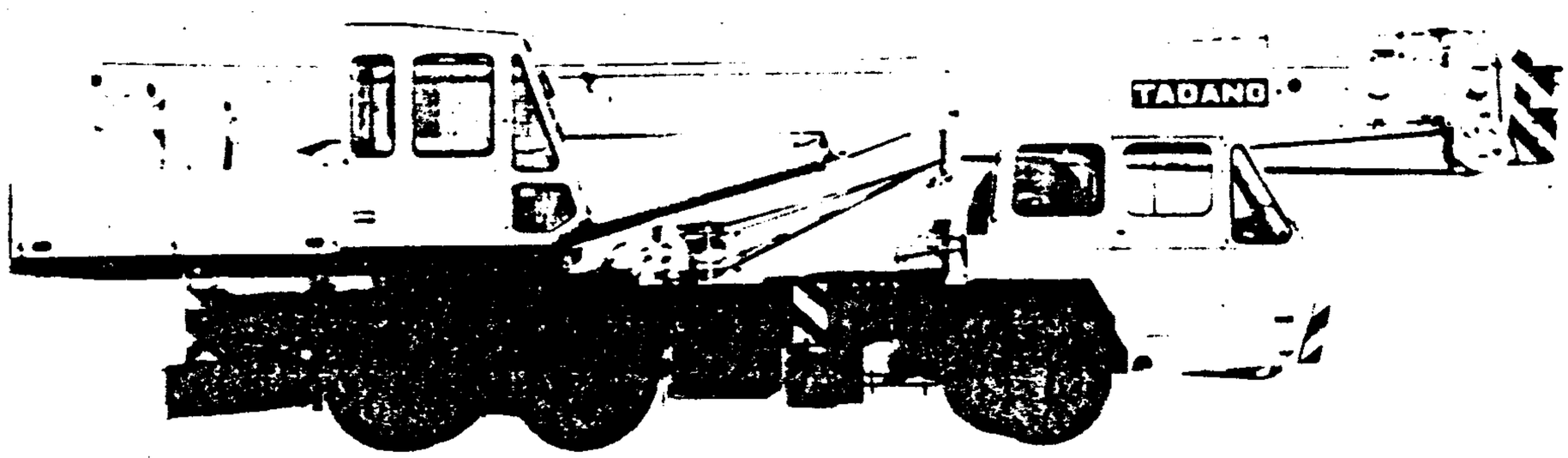
عمران ساحل
مدیریت نت
کد: ۱۵۱

Operation Manual

Crane

TADANO TL200



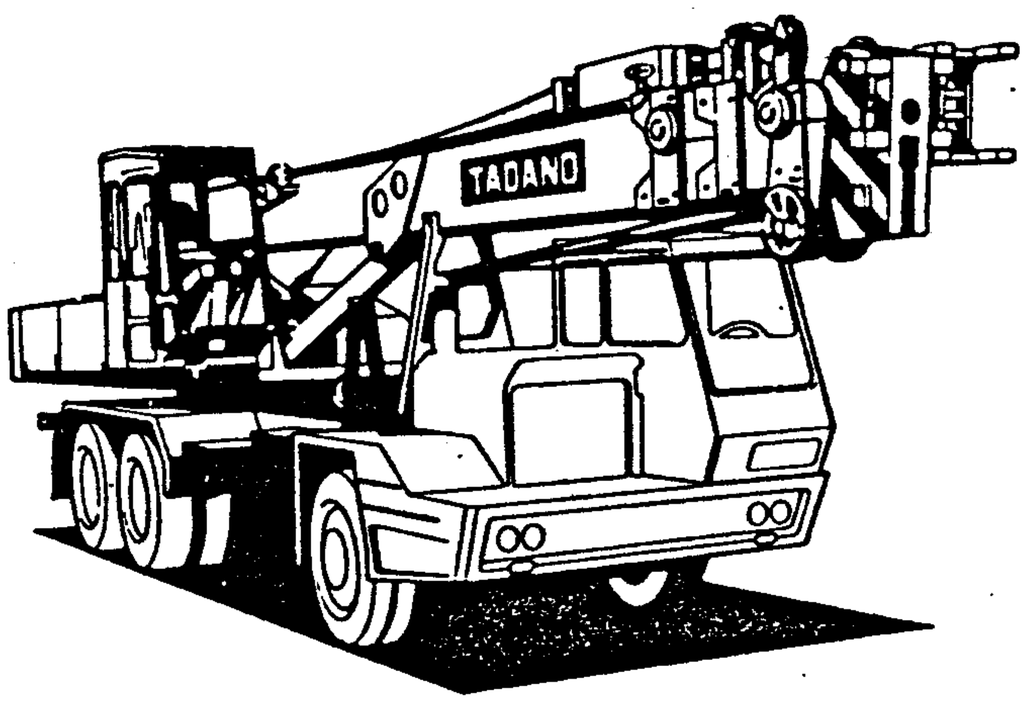
TL-200L

OPERATION AND MAINTENANCE MANUAL

FOREWORD

This manual explains the correct handling as well as inspection and adjustment of your new TADANO crane. Following the advice in this manual will assure the high performance of this crane through efficient operation with safety.

This manual does not cover the handling of the carrier. For this, please refer to the carrier manual.



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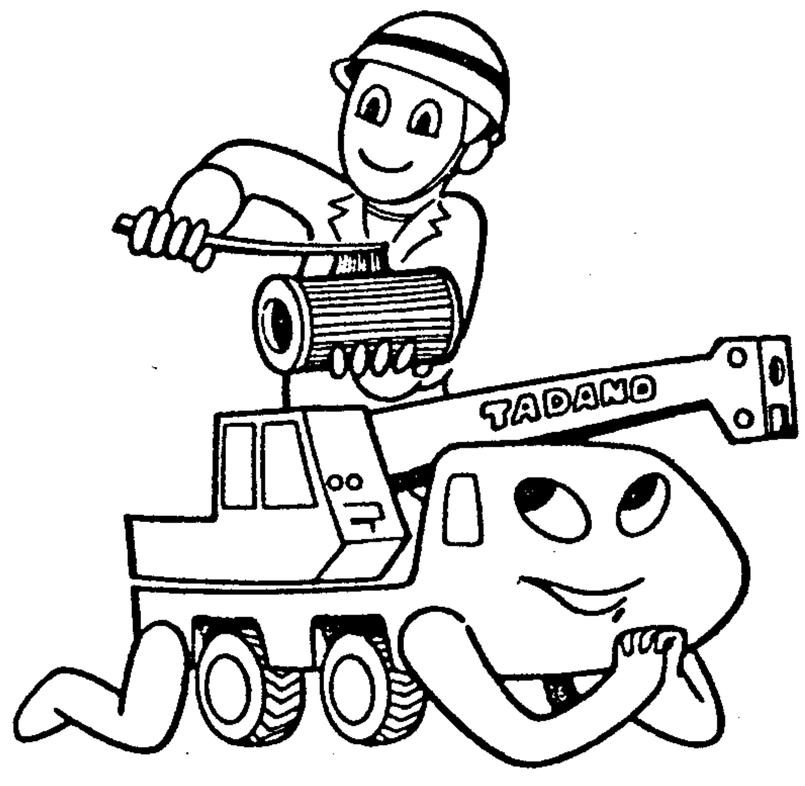
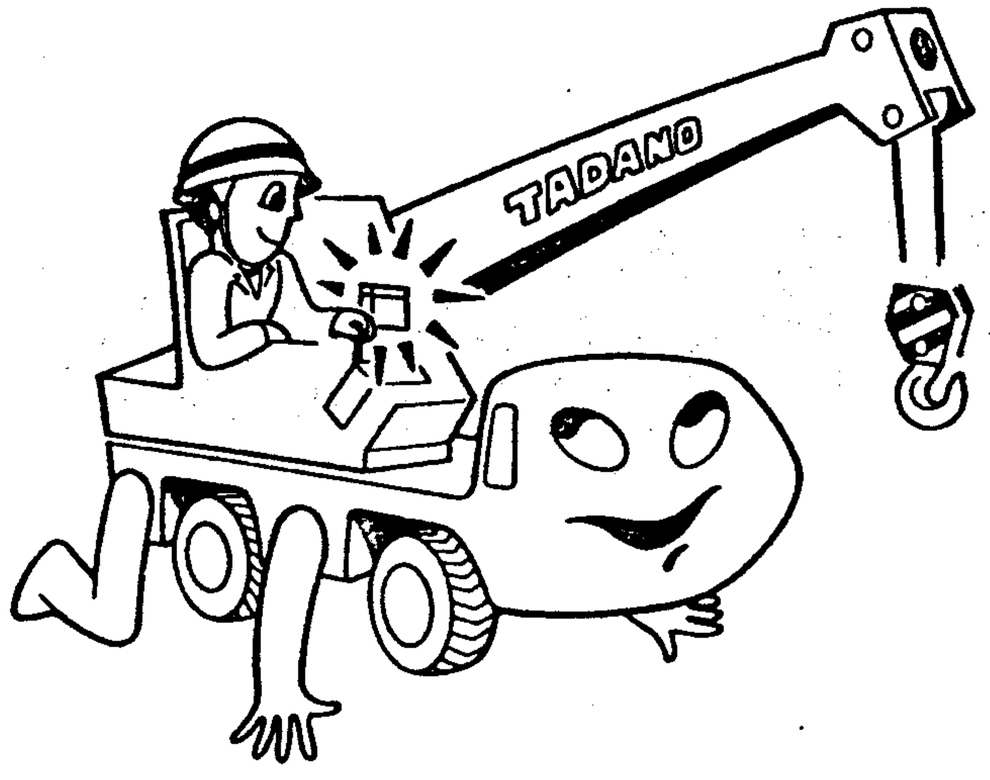
Hamamatsu-cho Minato-ku Tokyo, Japan
Telex: 2422018 TADANO J
TADANO J23755

CLEANING OF FILTER



CONTENTS

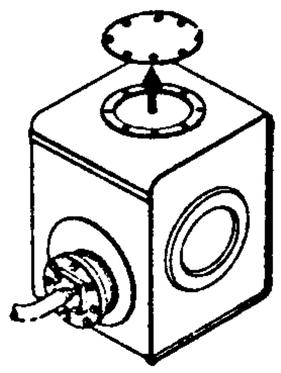
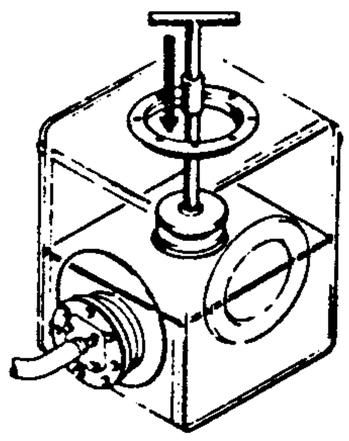
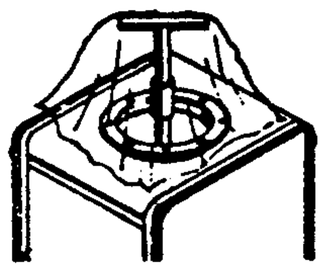
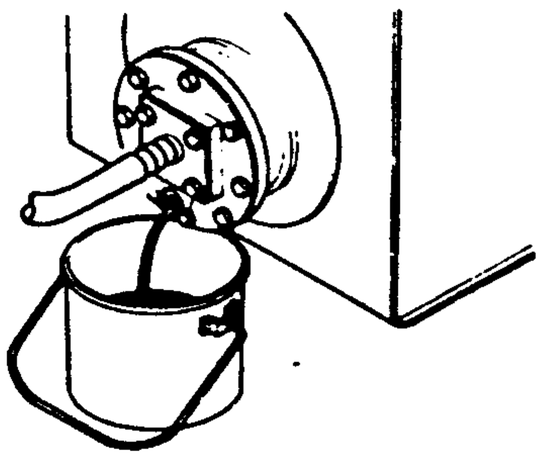
INDICATION PLATES



CLEANING OF STRAINER

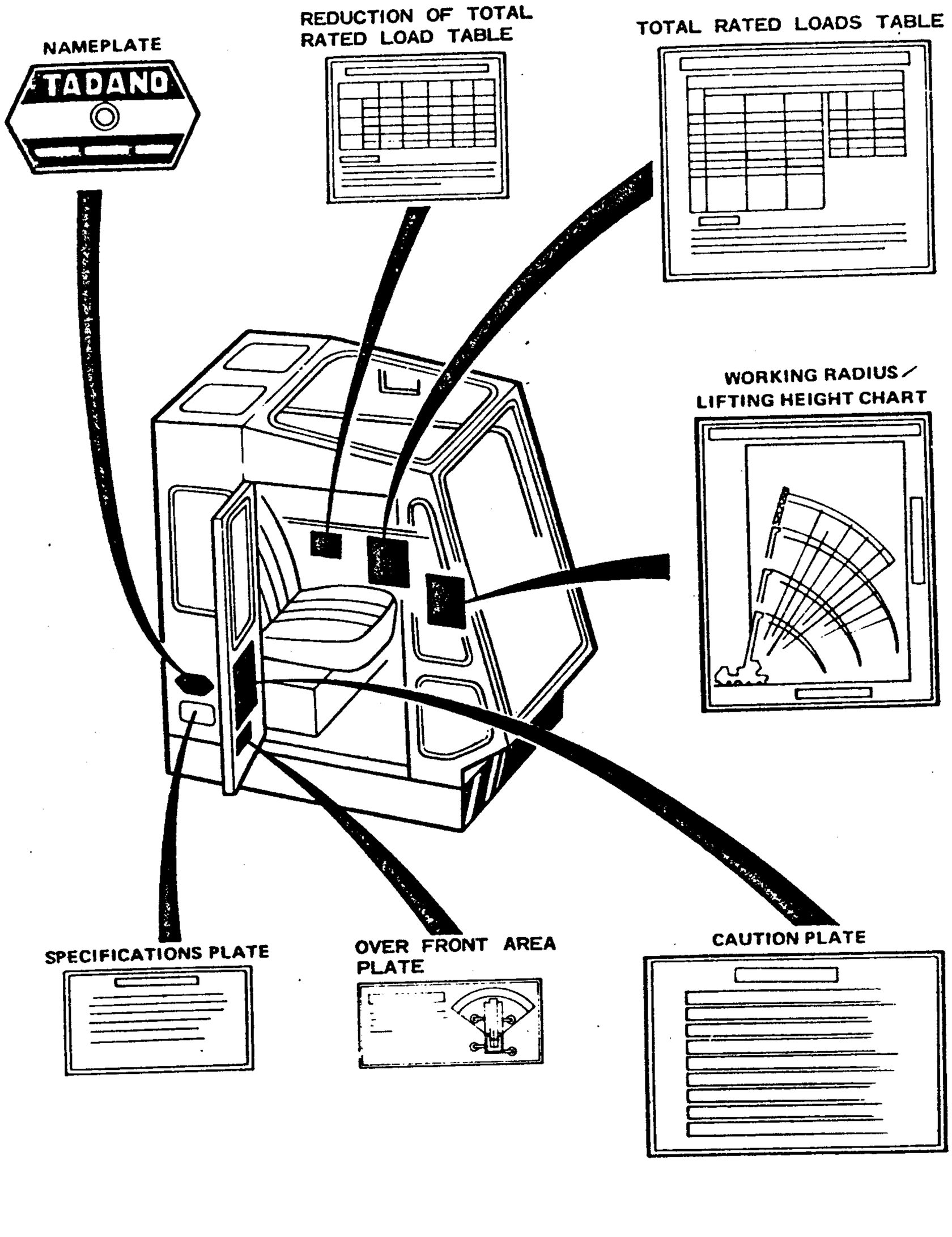
NOTES ON OPERATION

1. Boom should be stored on the boom rest.
2. Pump should be kept undriven.

No.	Procedure	Note	Maintenance standard and tools
1	Remove the cover. 		Spanner
2	Insert the oil plug through the hole, and place it on the internal hole accurately.  Otherwise oil inside all comes out.	Cover the hole not to allow foreign materials to enter. 	Oil plug
3	Remove the strainer case oil plug. 		Oil container (approx.20 lit.) Spanner

INDICATION PLATES

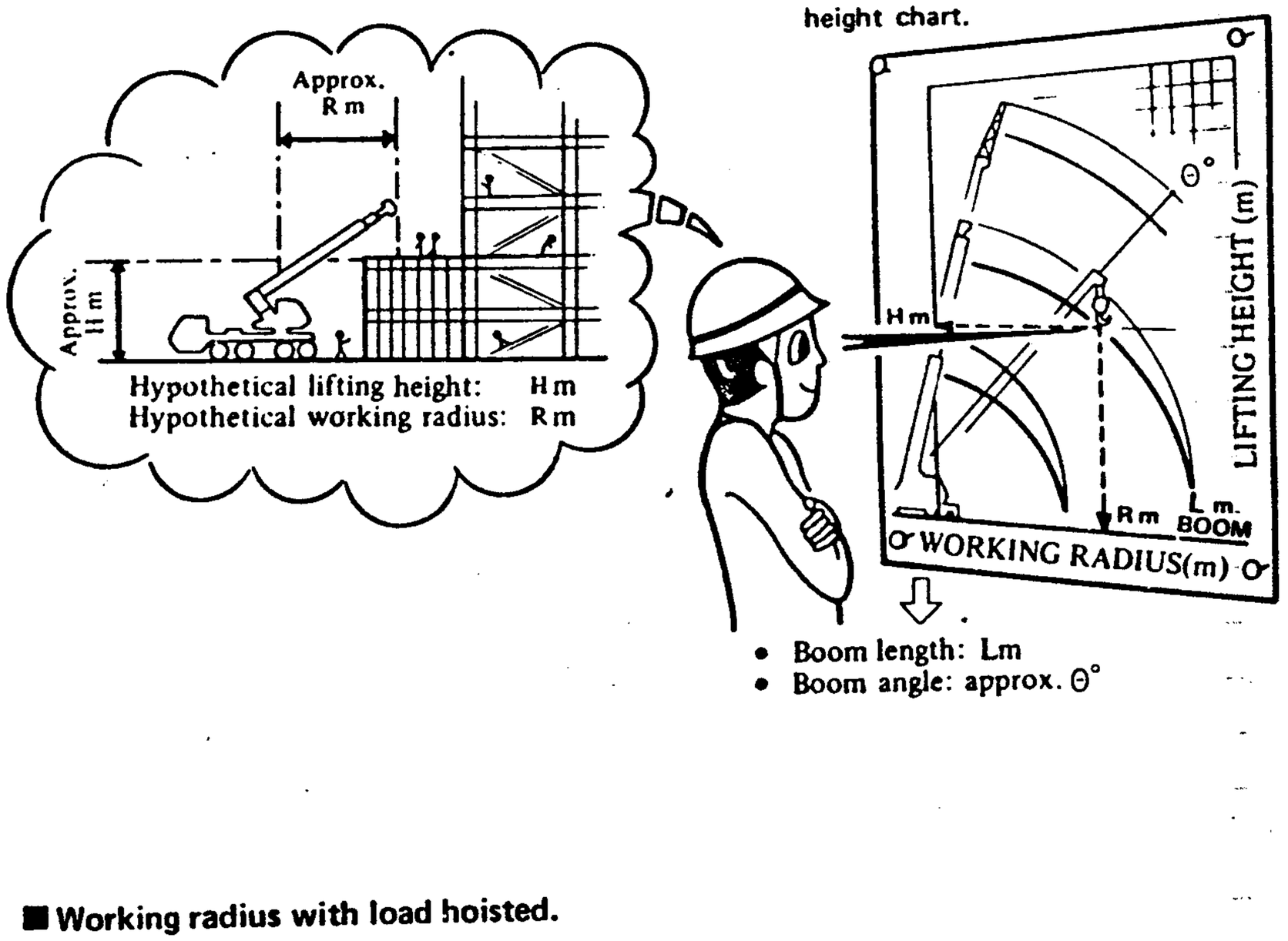
POSITIONS



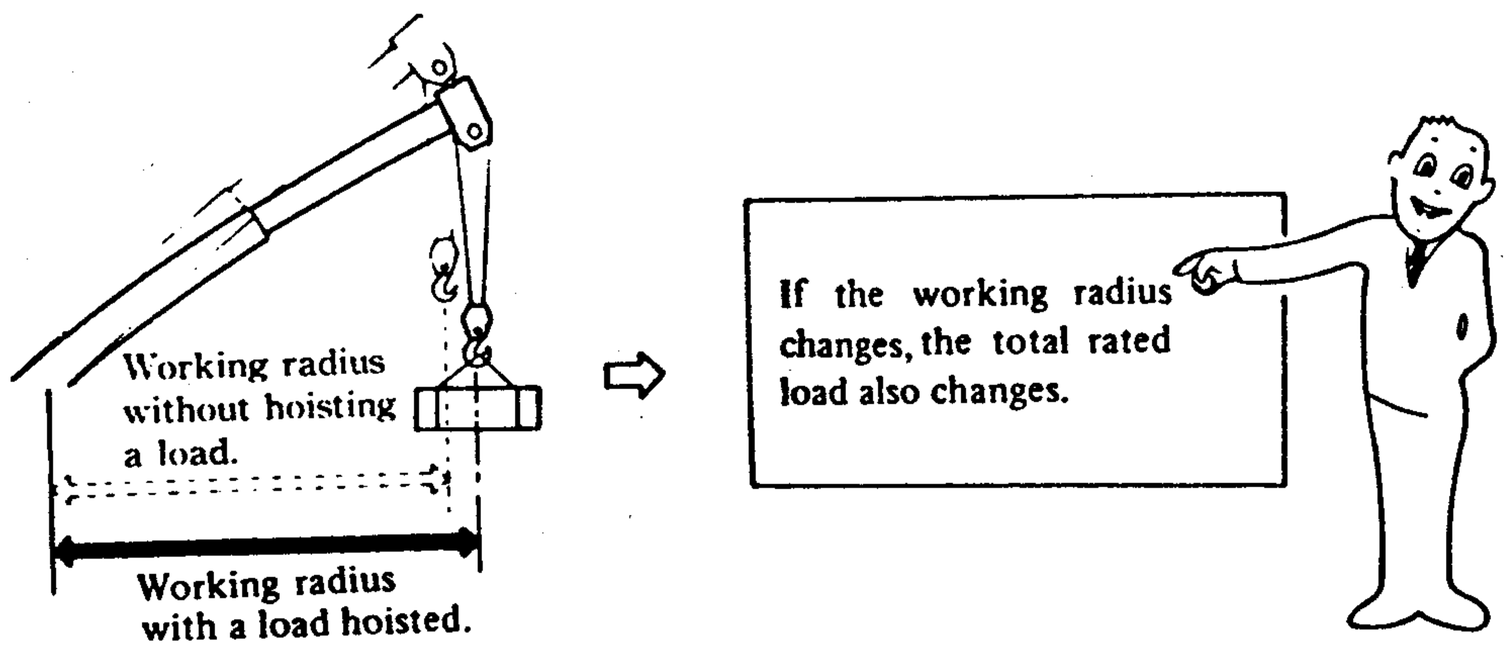
MEMO

HOW TO READ

□ WORKING RADIUS/LIFTING HEIGHT CHART



■ **Working radius with load hoisted.**



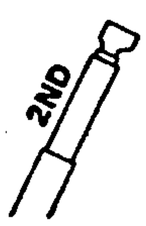
□TOTAL RATED LOADS TABLE

When the outriggers are extended to middle or the boom is in the following three conditions with the outriggers extended fully, the total rated loads can be read on this table.

1.

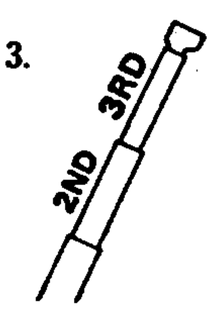
L1 m BOOM
(OVER SIDES OR REAR)

2.



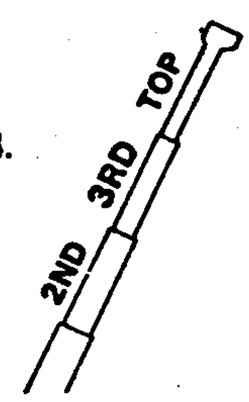
L2 m BOOM
(OVER SIDES OR REAR)

3.

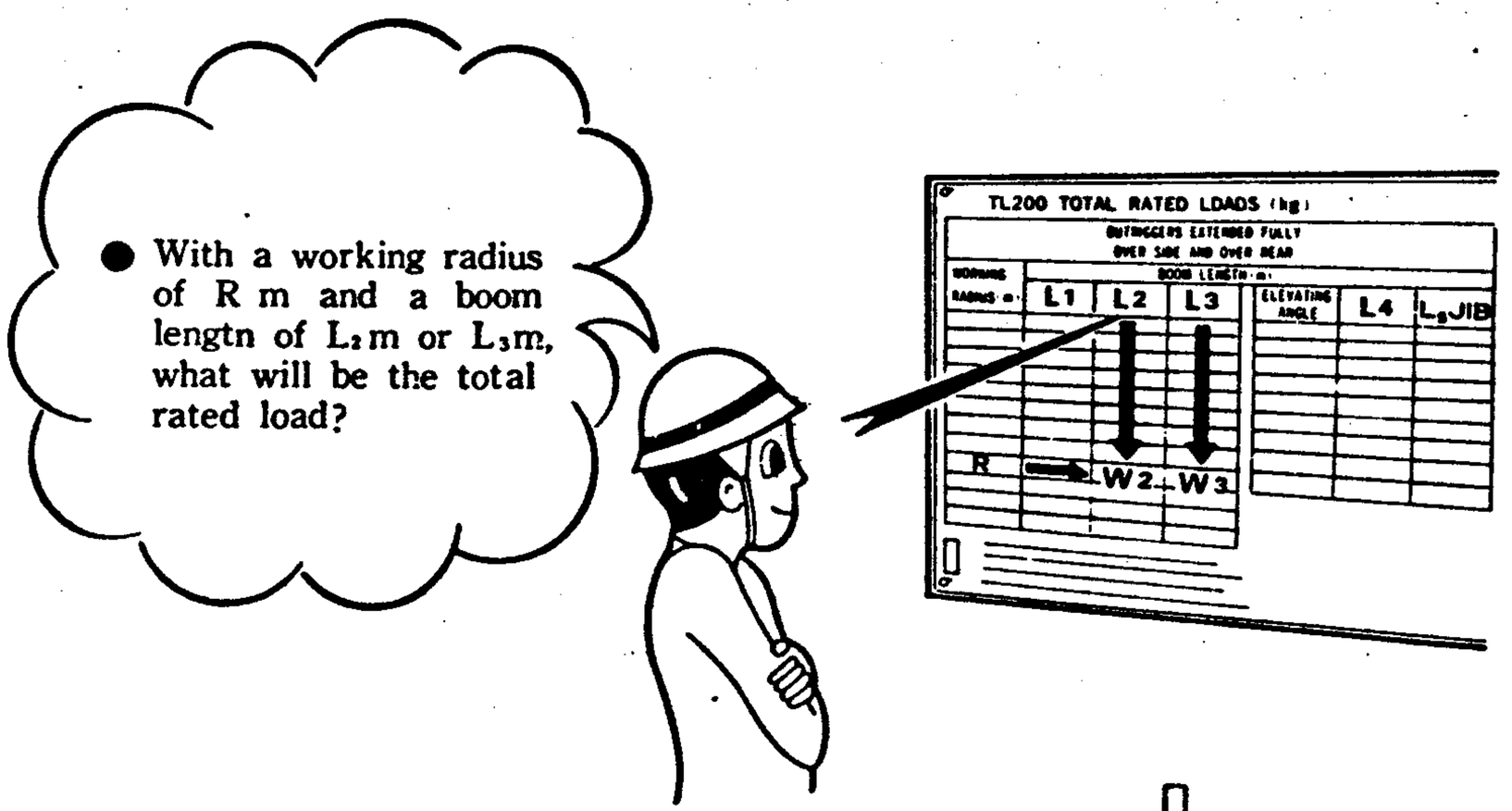


L3 m BOOM
(OVER SIDES OR REAR)

4.

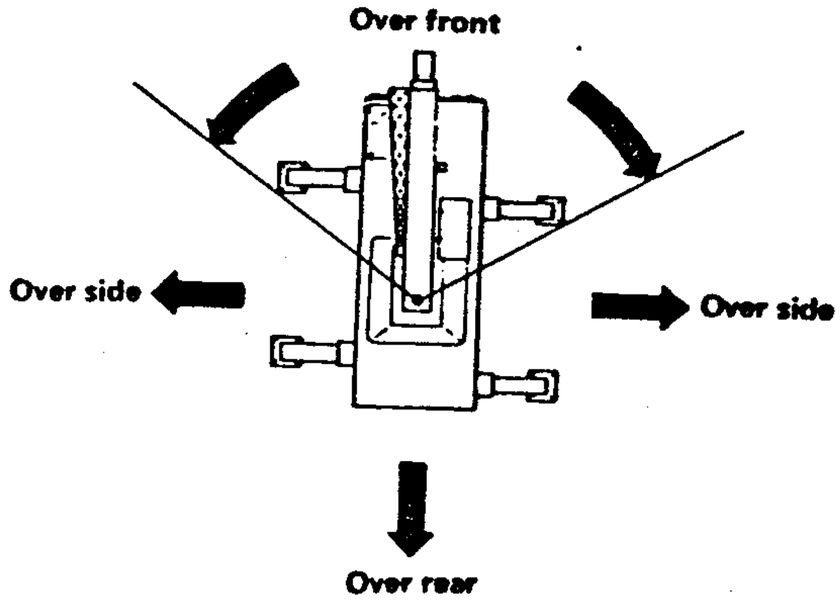


L4 m BOOM
(OVER SIDES OR REAR)

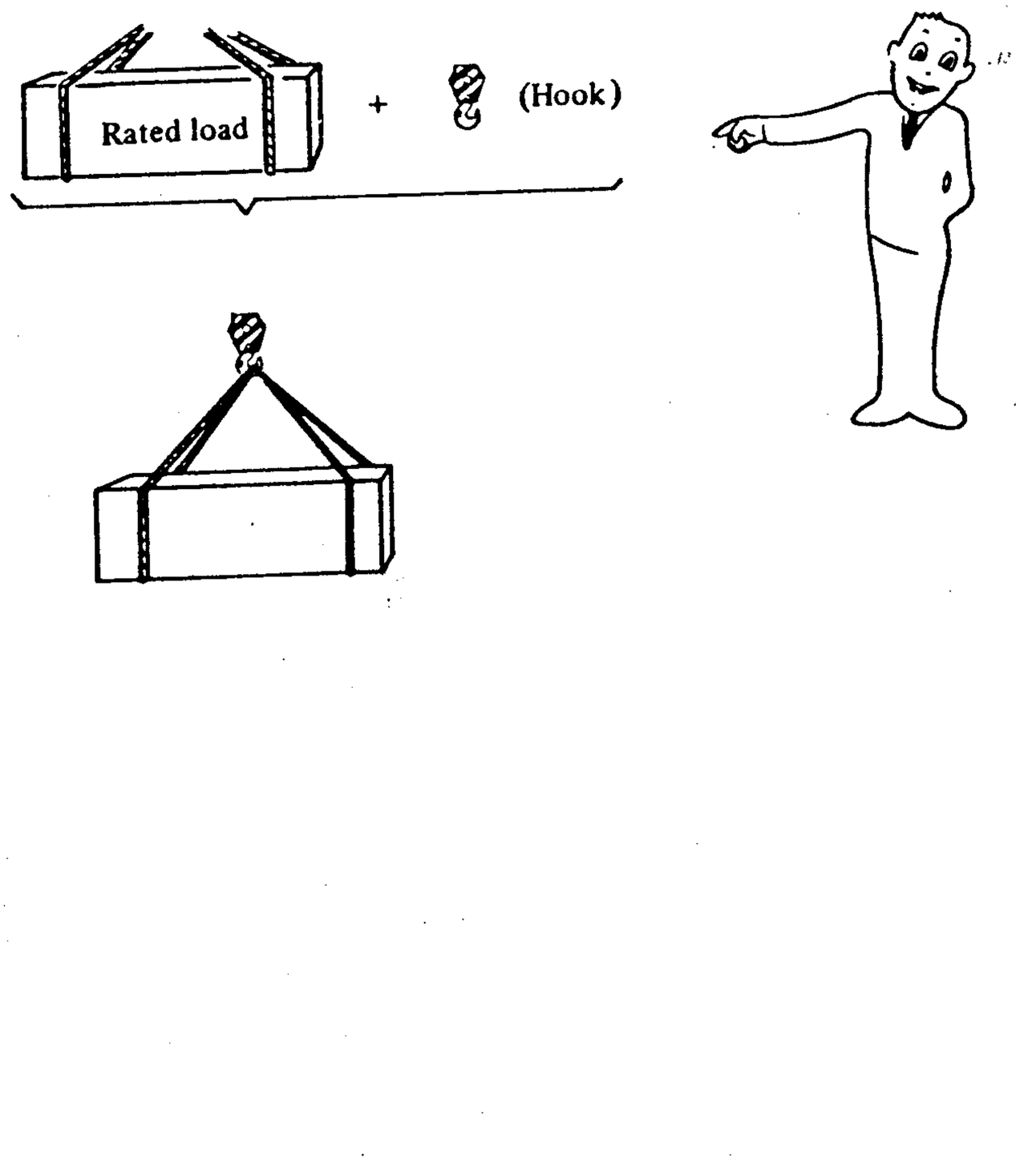


The total rated load:
With a L_2 m boom length = W_2 Kg.
With a L_3 m boom length = W_3 Kg.

■ Boom positions

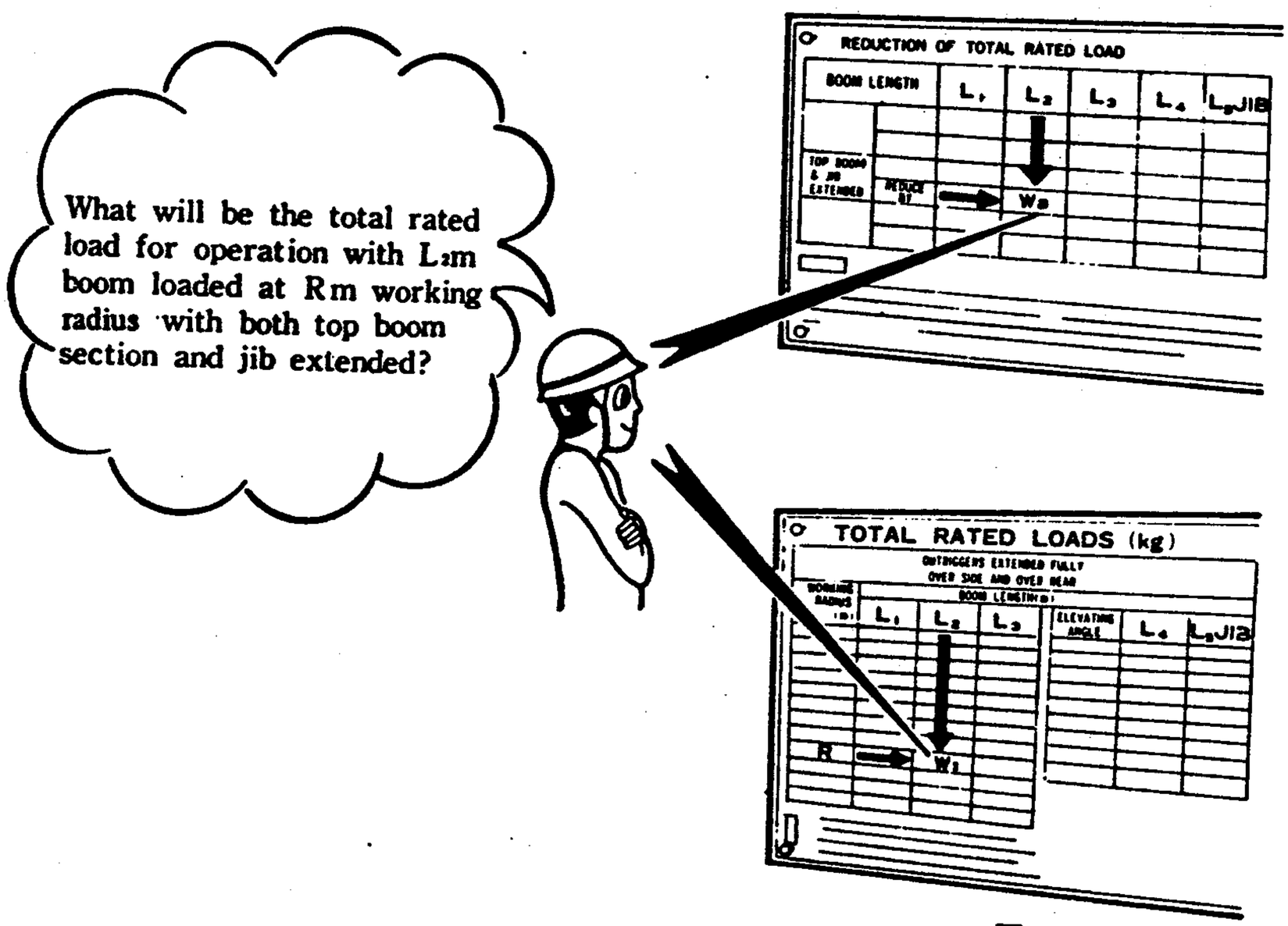


Total rated load



☐ REDUCTION OF TOTAL RATED LOAD TABLE

If it is necessary to load the base, the second, or the third boom section with the top boom section and/or the jib extended, the total rated load is subject to reduction.



⇩

The total rated load:
With a L_2 m boom length
$= (W_2 - Wa)$ Kg

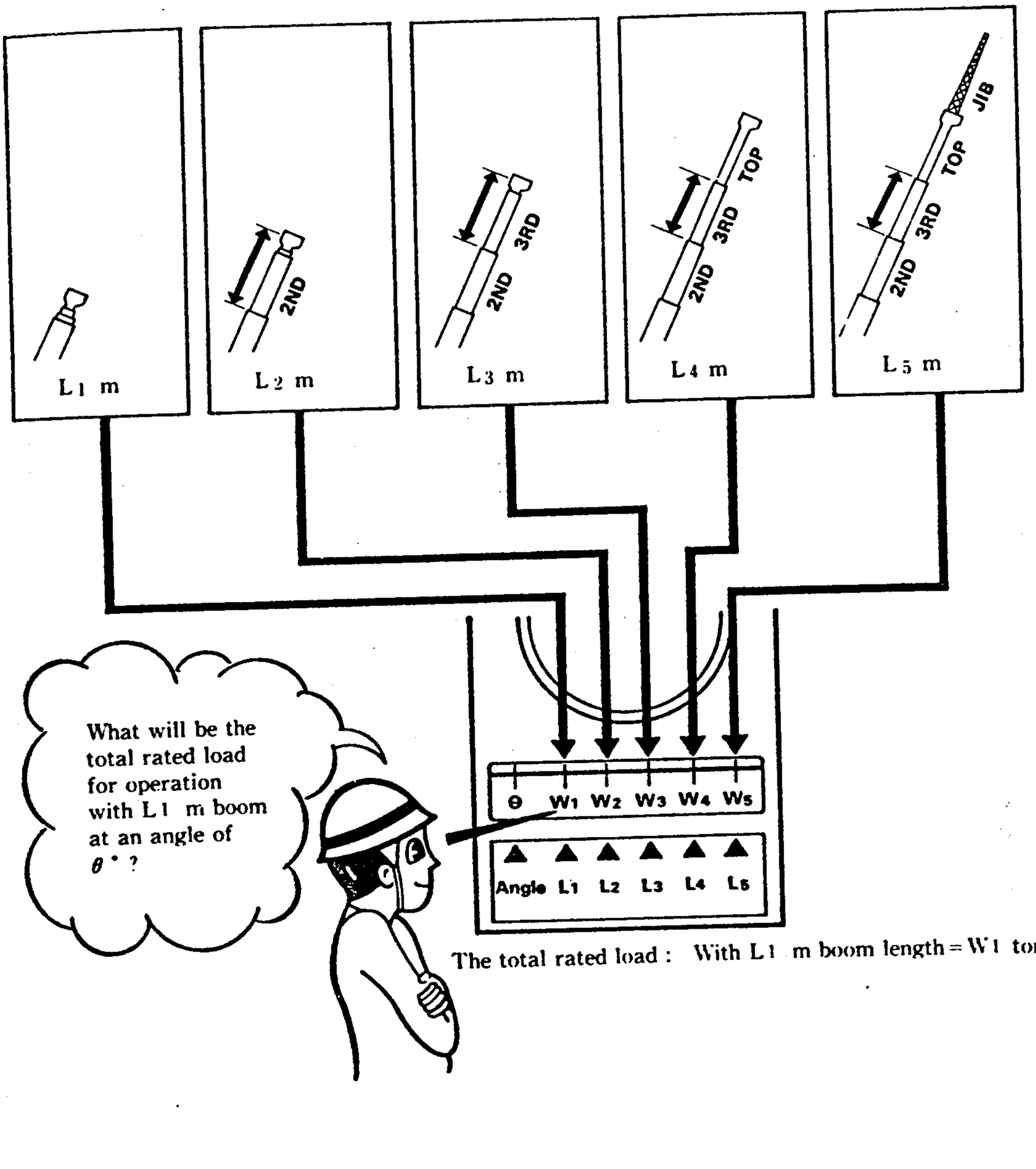
NOTE:
Besides reduction in capacity, the elevating limit is changed for this kind of crane operation. Details of this change are given in REDUCTION OF TOTAL RATED LOAD table.
Watching the load indicator, give care to the load not to exceed the limit.

□LOAD INDICATOR

This indicator shows the total rated loads under all the boom conditions, not limited as in the TOTAL RATED LOADS TABLE. Use this, however, only when the outriggers are fully extended and the boom is positioned over the sides or over the rear of the crane.

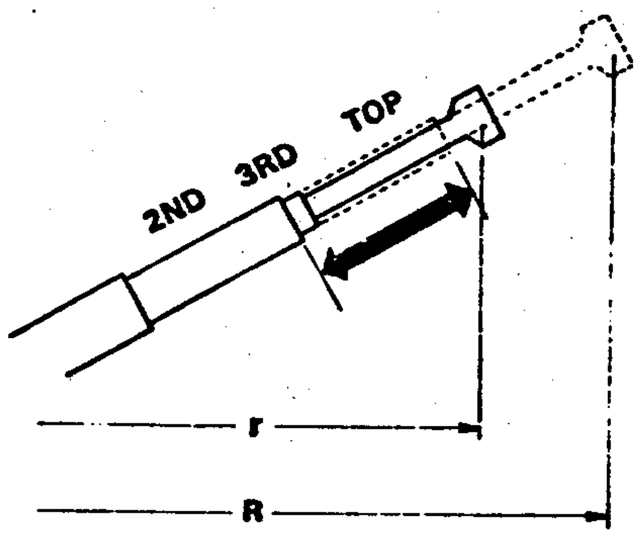
According to the boom length, a proper scale must be chosen as illustrated below.

NOTE : Mark |⟷| indicates the range where the boom section is permitted to be telescoped.



The total rated load : With L1 m boom length = W1 ton.

DANGER : When the 3rd boom section is fully retracted or partially extended with the top boom section extended, the total rated loads must be read on the L4 scale. Should the L3 scale be used, the crane will be damaged.

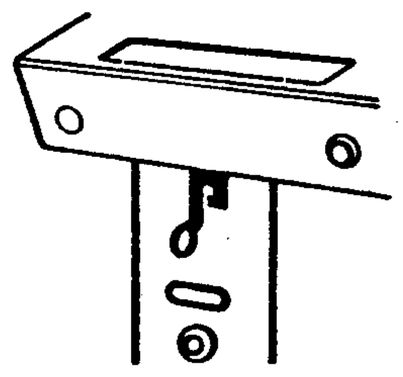


→ See L3 scale.

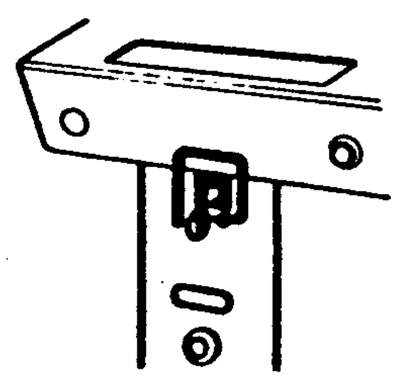
If the TOTAL RATED LOADS TABLE is used in this case, the boom length of L4 m and the working radius of R m (boom full extension) must be employed. Should the actual working radius of r m be used, the crane will be damaged.

■ NEEDLE LOCKING

Lock for travel so that indicator needle does not move.



In crane operation



At traveling

☐ OVER FRONT

In this plate is give
area.

☐ NAMEPLATE

☐ SPECIFICATI(

The specifications are
tions Plate located out

☐ CAUTION PLA

General caution for
shown here. Read it
the crane.

☐ OVER FRONT AREA PLATE

In this plate is given general caution on operation with the boom in the over-front area.

☐ NAMEPLATE

Date of manufacture
Serial number
Crane model

} Always specify these data when service is requested.

☐ SPECIFICATIONS PLATE

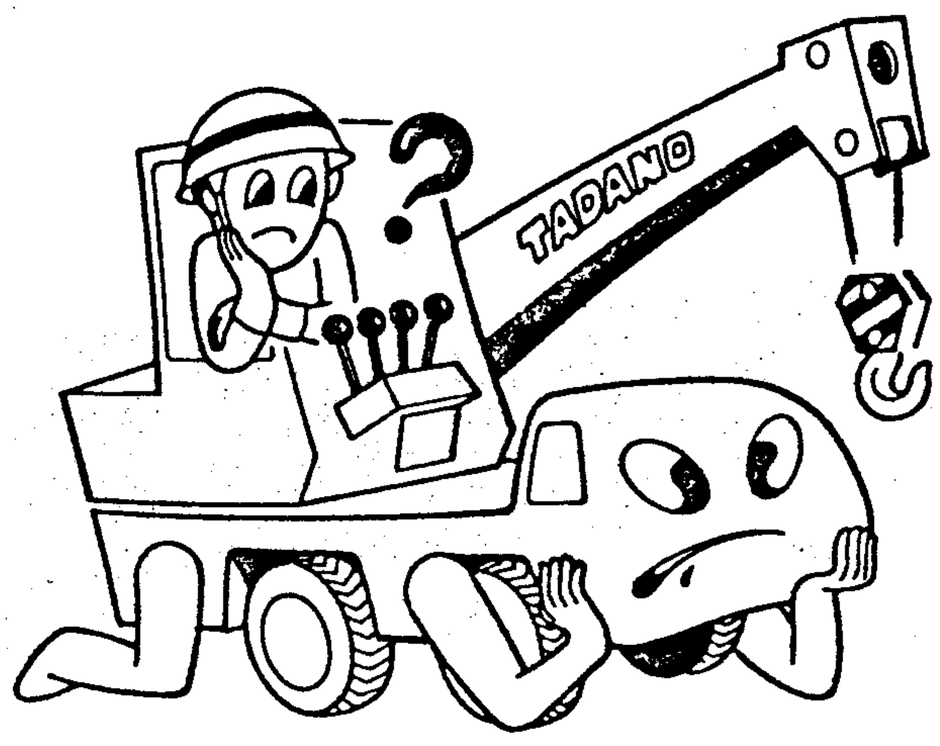
The specifications are shown on the Specifications Plate located outside the crane cab.

☐ CAUTION PLATE

General caution for operating the crane is shown here. Read it through before operating the crane.

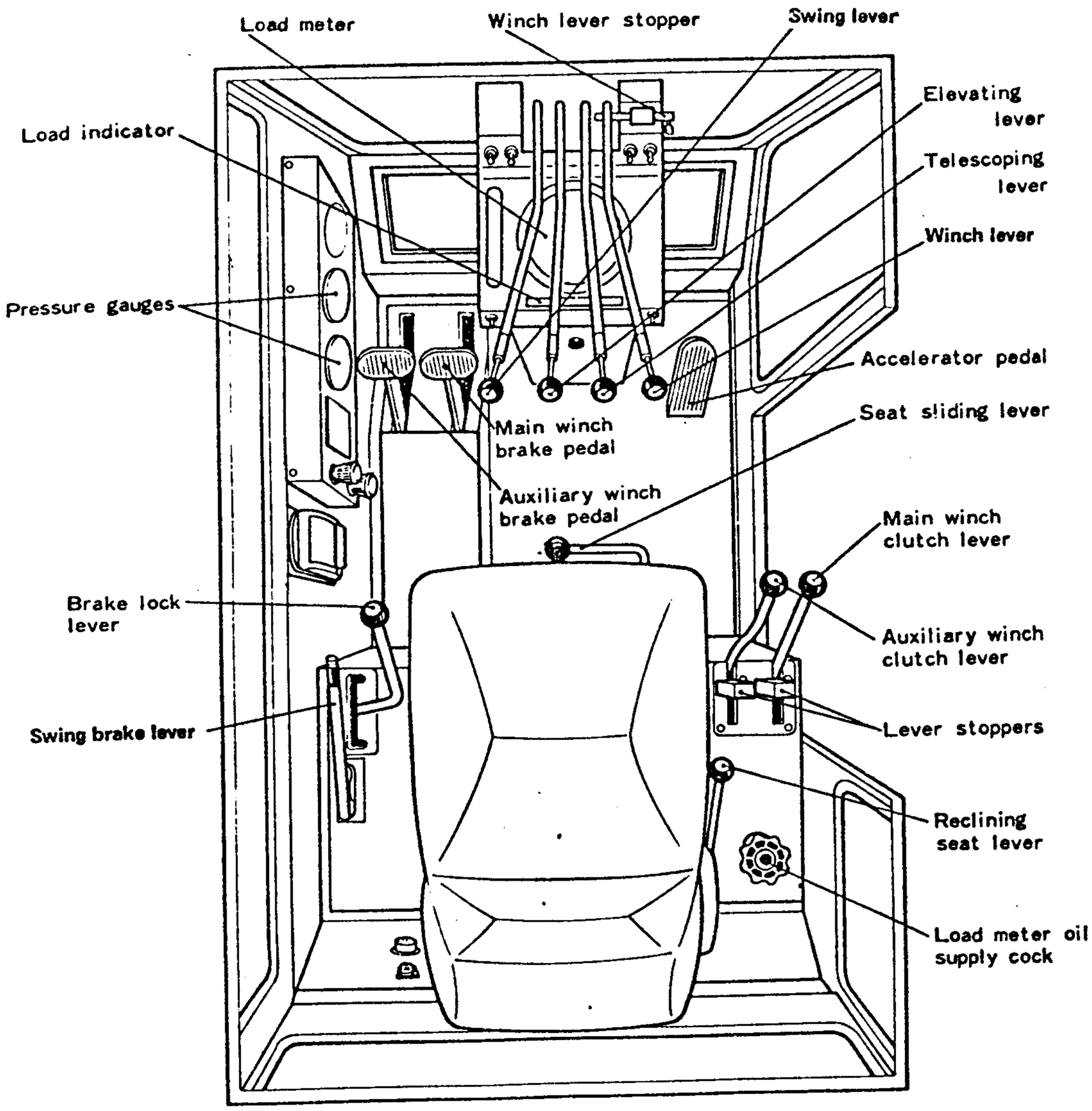
MEMO

CONTROLS

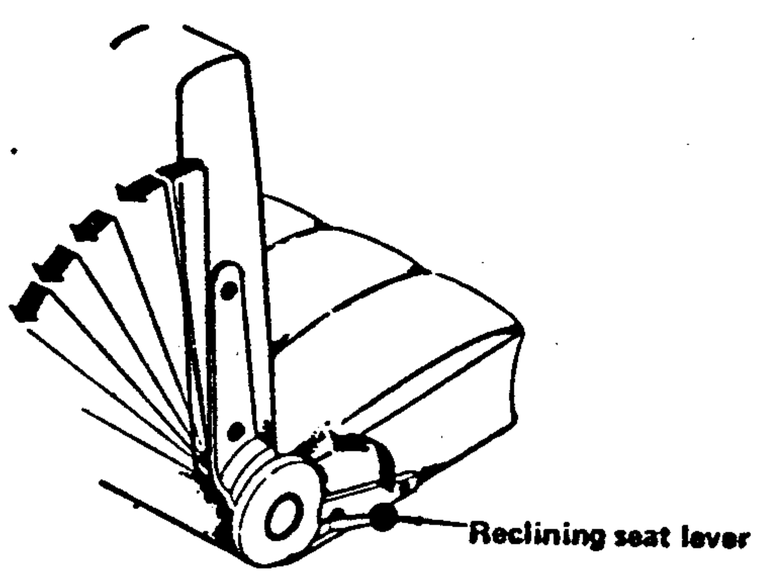


CONTROLS

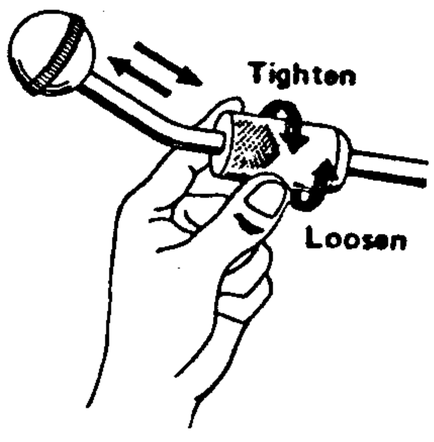
CRANE OPERATOR'S CAB



☐ OPERATOR'S SEAT

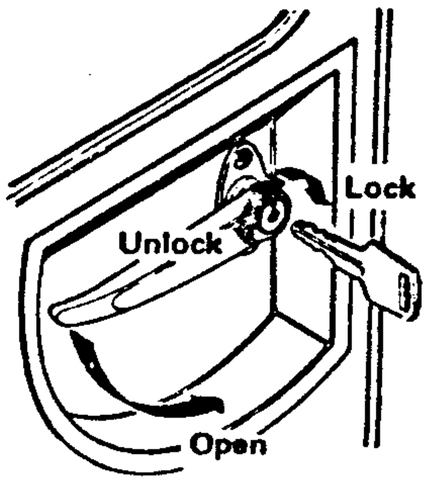


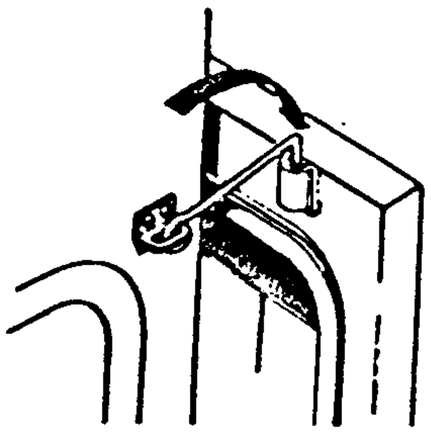
☐ CONTROL LEVERS



WINCH LEVER
ELEVATING LEVER
TELESCOPING LEVER
SWING LEVER
} LENGTH ADJUSTMENT

☐ CRANE CAB DOOR

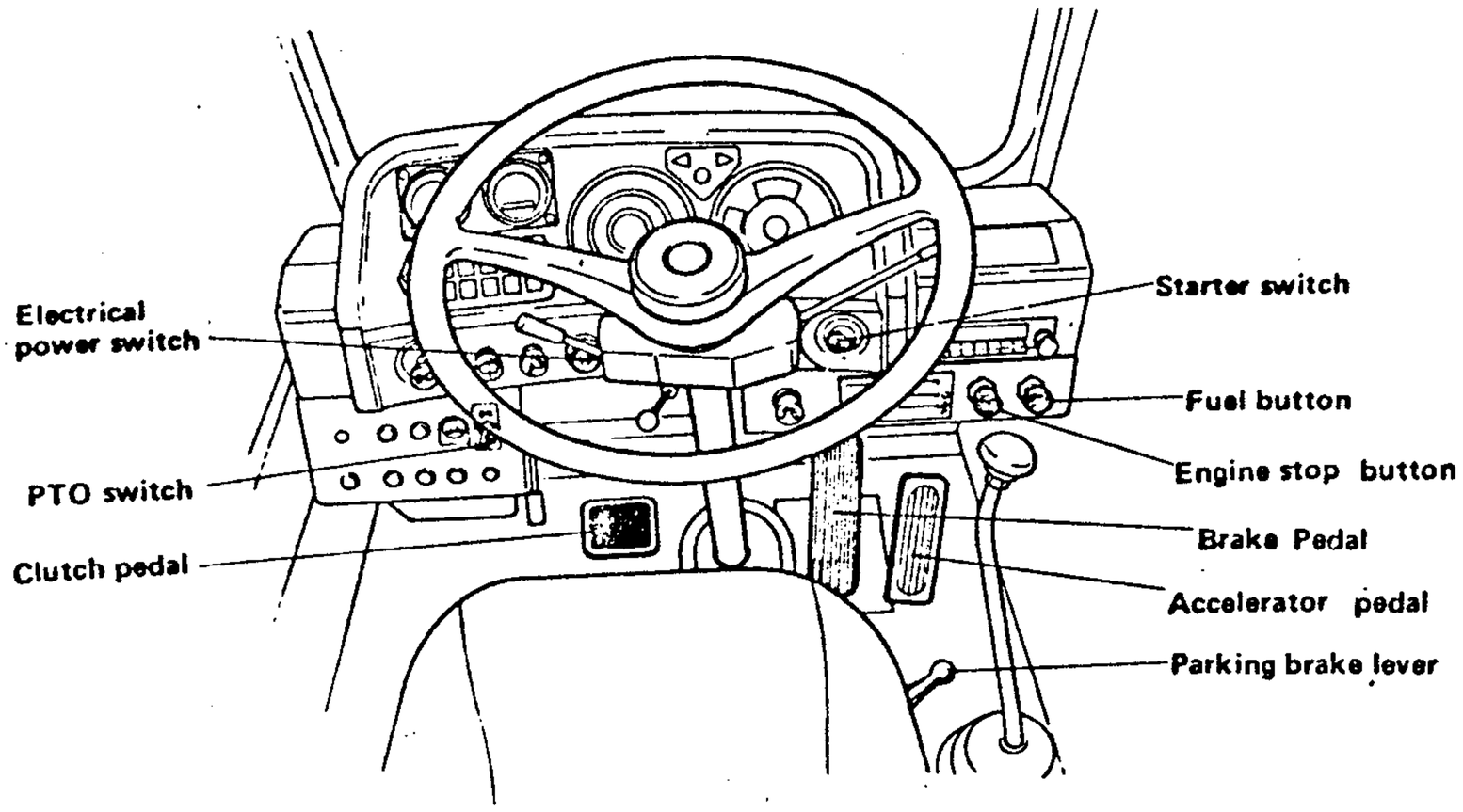




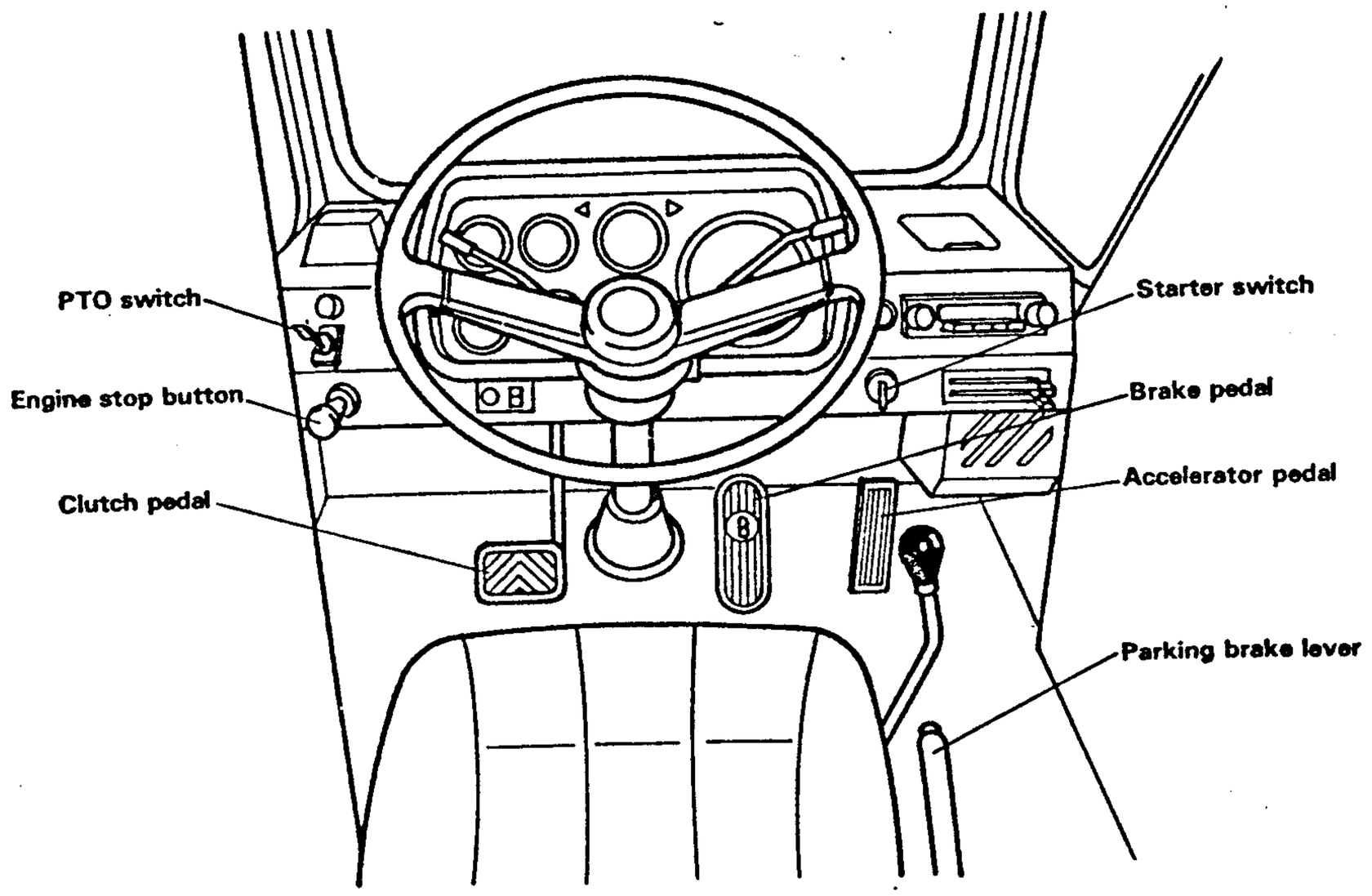
When door is open.

CARRIER OPERATOR'S CAB

□MITSUBISHI

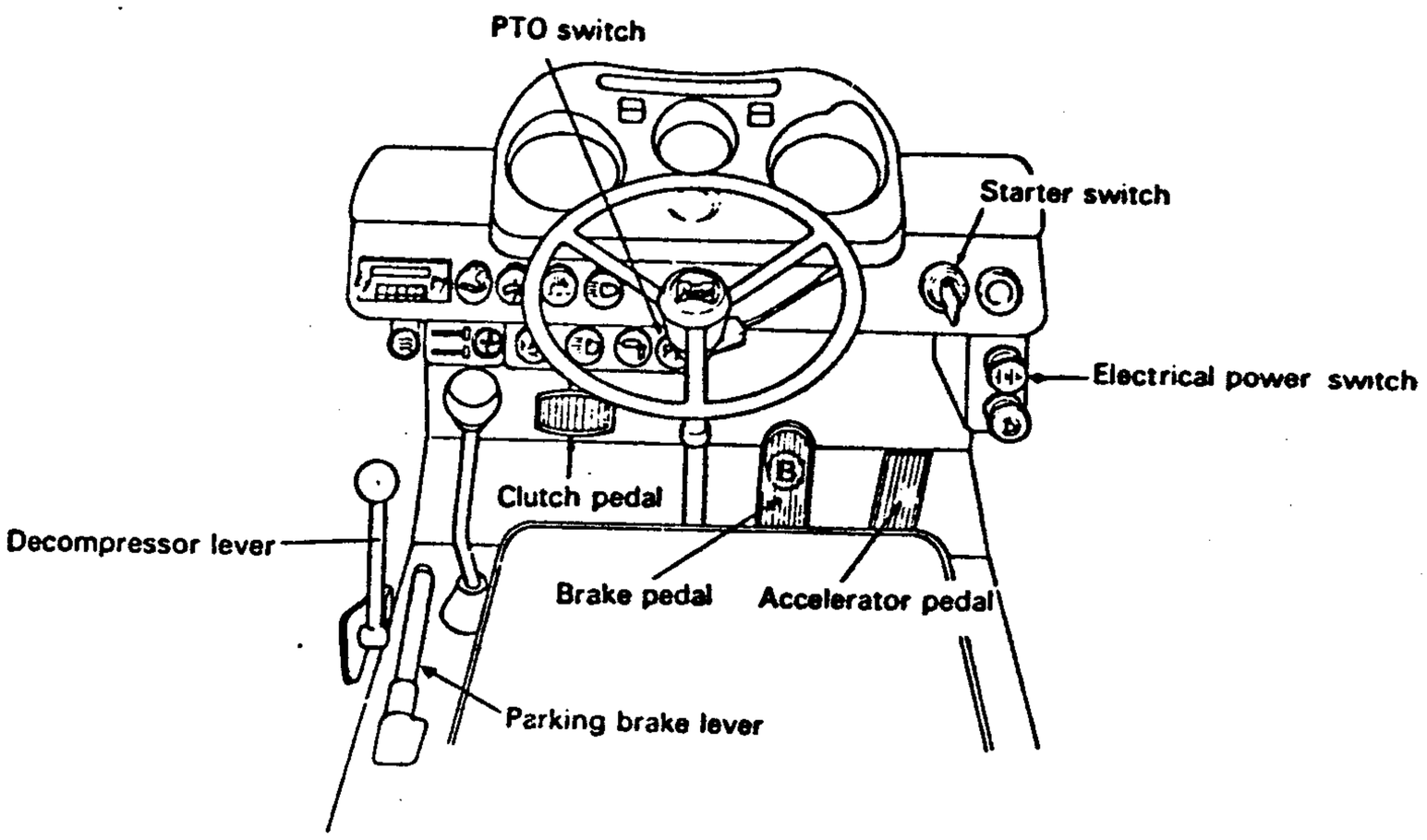


□NISSAN



TADANO

□HINO



NOTE: Arrangement of controls may change due to minor modification of the carrier.

TADANO

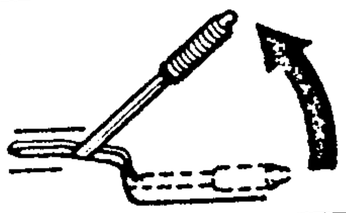
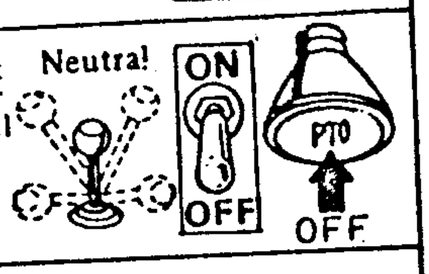
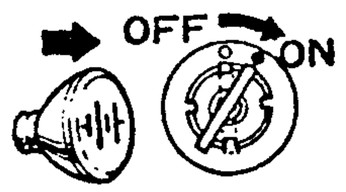
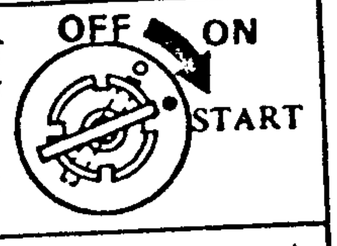
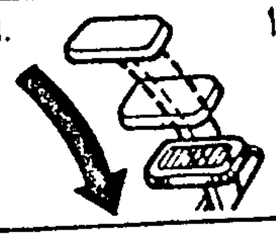
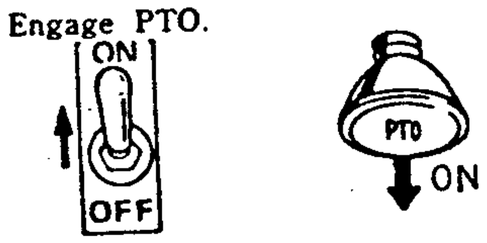
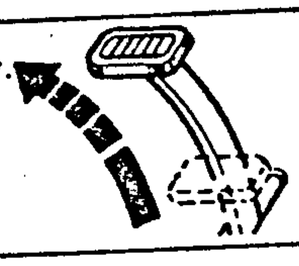
OPERATION

er.

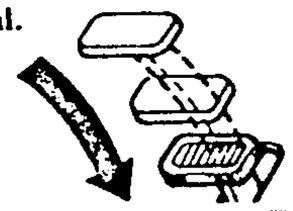
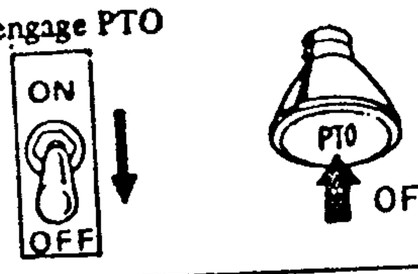
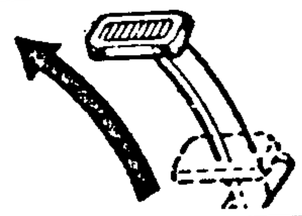
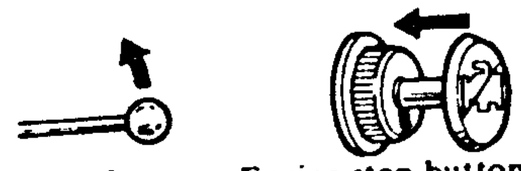
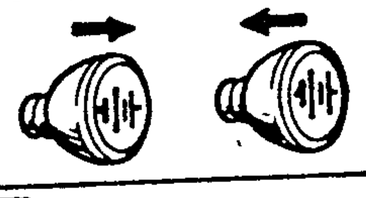
DANO ANO

OPERATION

STARTING ENGINE AND OPERATING P T O

No.	Engaging P T O
1	Pull up carrier parking brake lever. (Also, apply digging brake, if equipped.) 
2	Make sure gear shift lever and PTO lever or switch are in neutral or OFF position. 
3	Pull power switch "ON" and turn the stater switch to "ON." (No electric power switch on Nissan's carrier.) 
4	Start engine by means of starter switch on carrier side. Pre-heat engine if not warm. 
5	Fully depress clutch pedal. 
6	Engage PTO. 
7	Release clutch pedal slowly. 

This completes preparations for crane operation. Warm up engine for 15 to 20 minutes in cold weather.

No.	Disengaging P T O
1	Fully depress clutch pedal. 
2	Disengage PTO 
3	Release clutch pedal. 
4	Stop engine. 
5	Turn off the starter switch. 
6	Pull or Push power switch "OFF" (No electric power switch on Nissan's carrier.) 

The crane now cannot be operated.

NOTE:

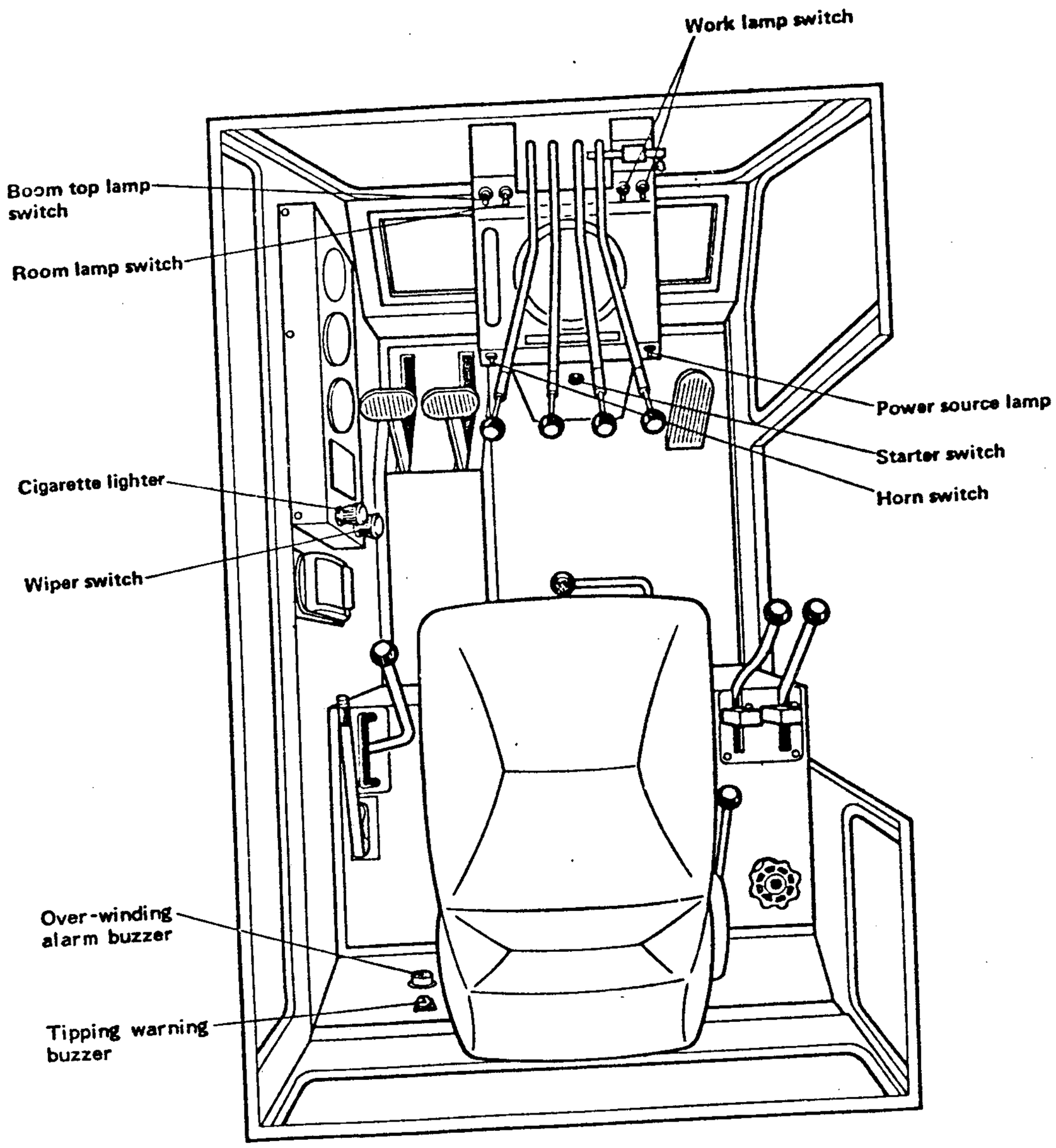
·Observe the items "Starting and Stopping Engine" in the carrier instruction manual.

16352-05012

MEMO

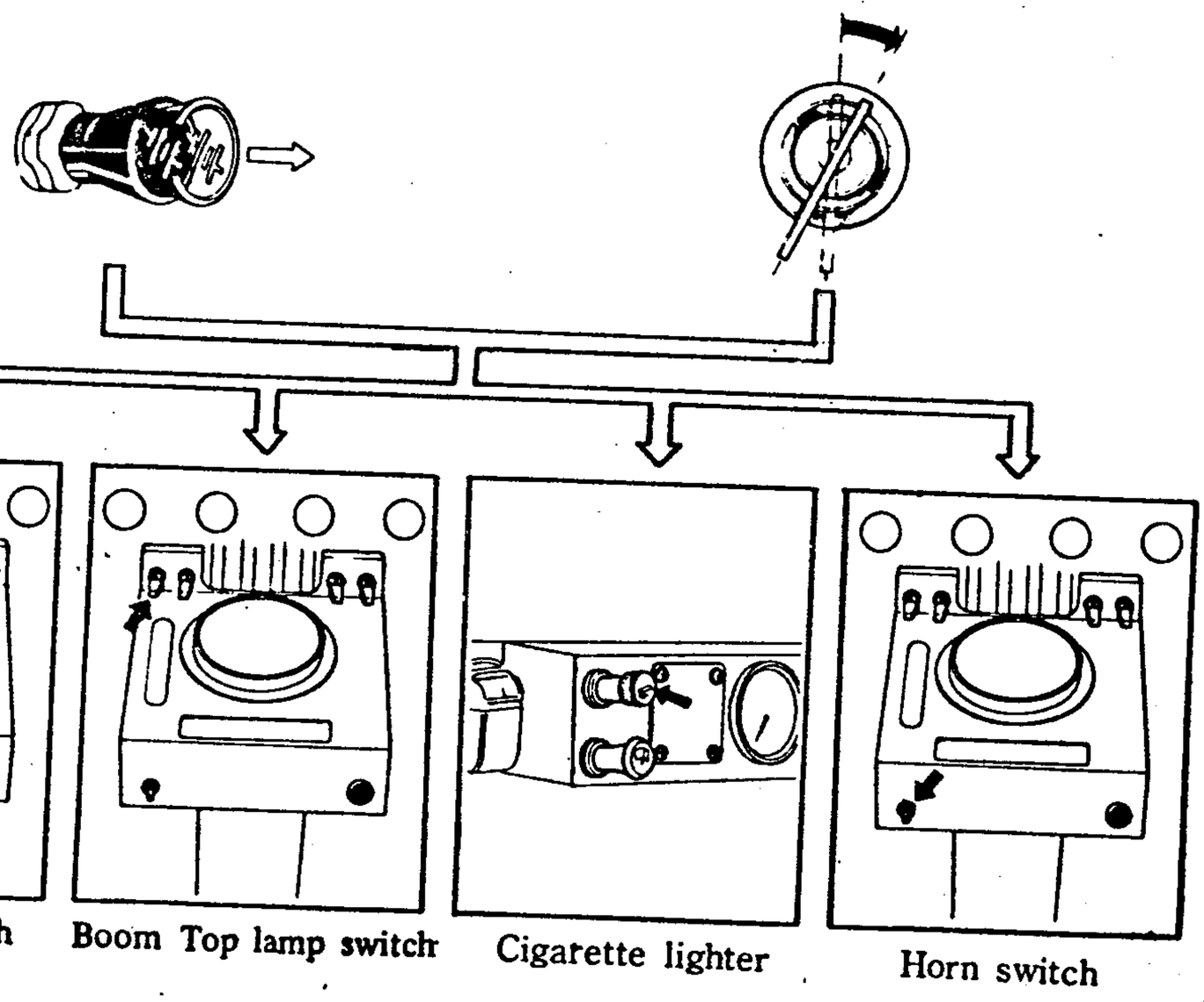
ELECTRICAL EQUIPMENT

☐ ARRANGEMENT OF SWITCHES

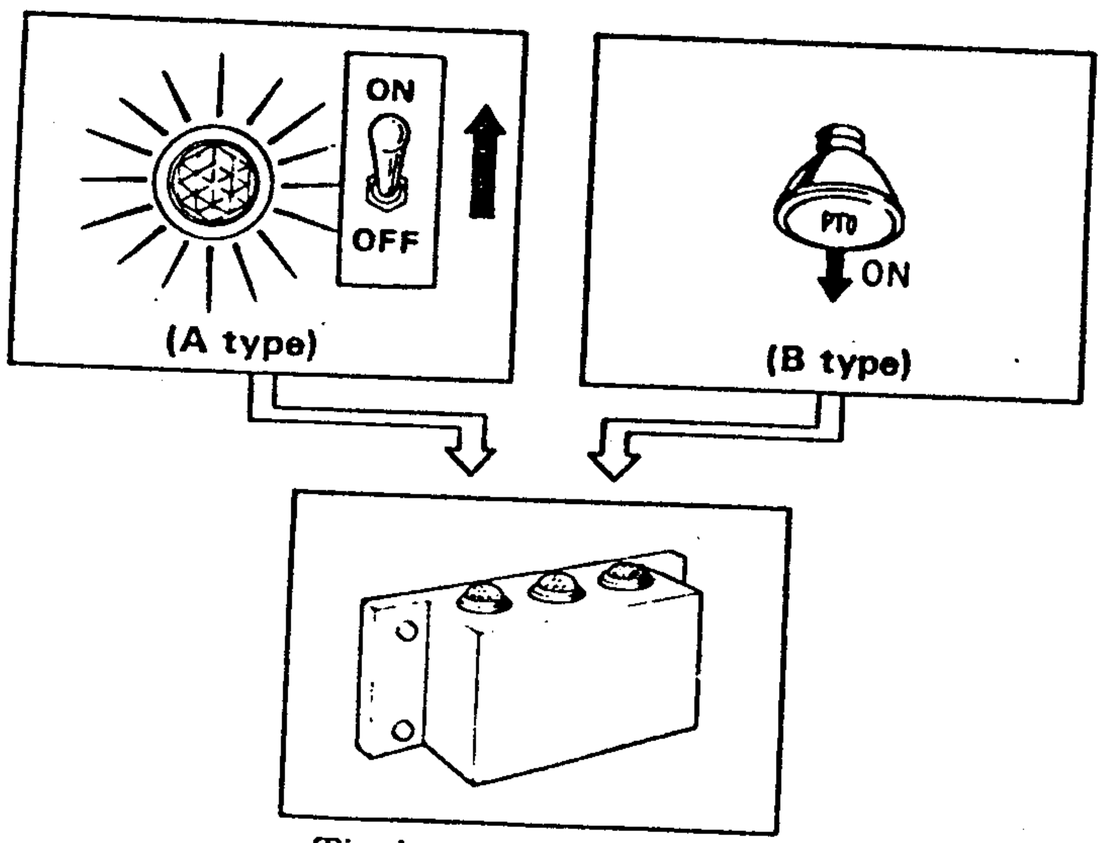


□TRANSMISSION OF ELECTRICITY TO VARIOUS DEVICES

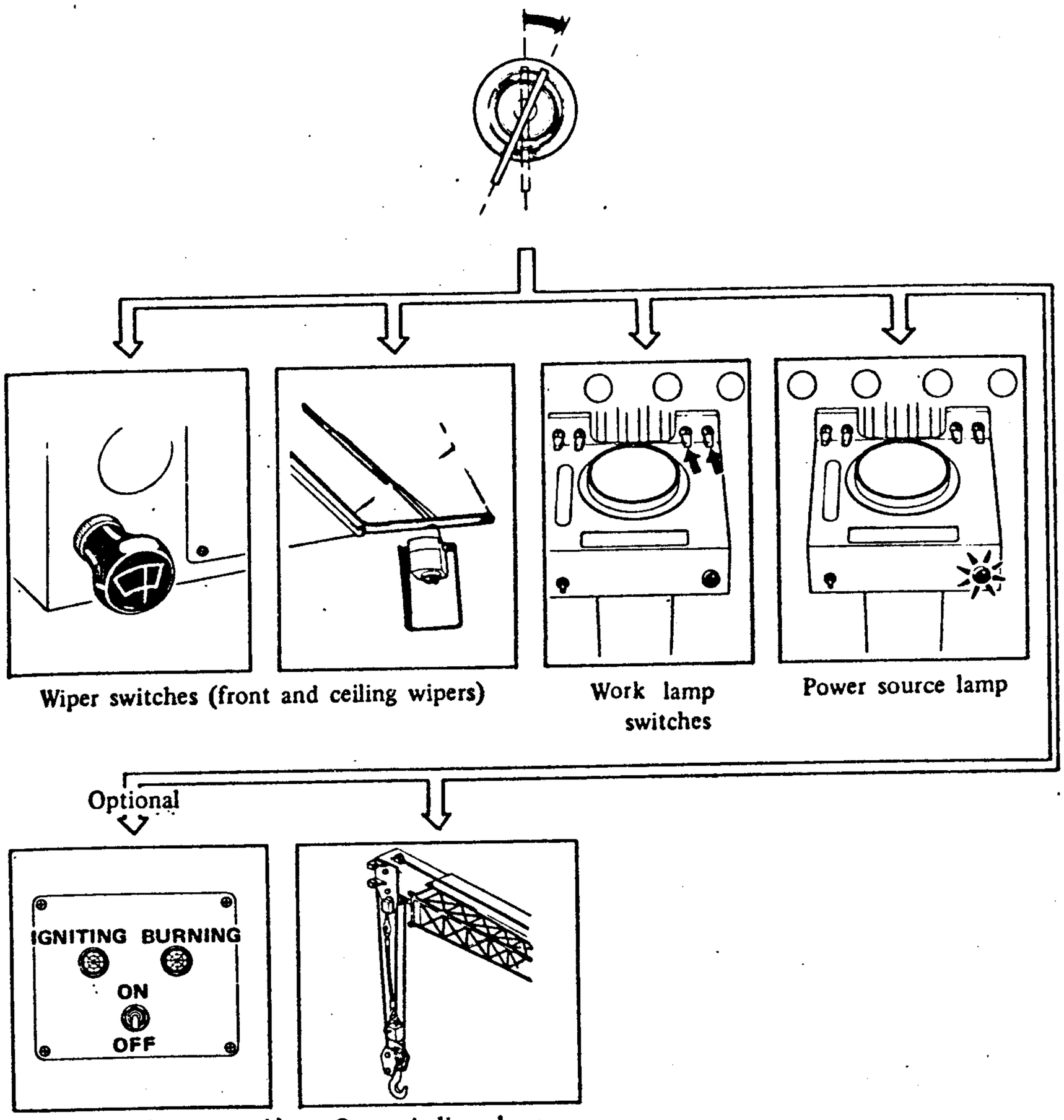
1. Turn the electric power switch in the carrier operator's cab to "ON" position and turn the ignition switch "clockwise by one step". (Nissan's carrier is not provided with electrical power switch.)



2. Set PTO switch or lever to ON.



3. Turn the starter switch one step rightward. (in the crane cab)



Wiper switches (front and ceiling wipers)

Work lamp switches

Power source lamp

Optional

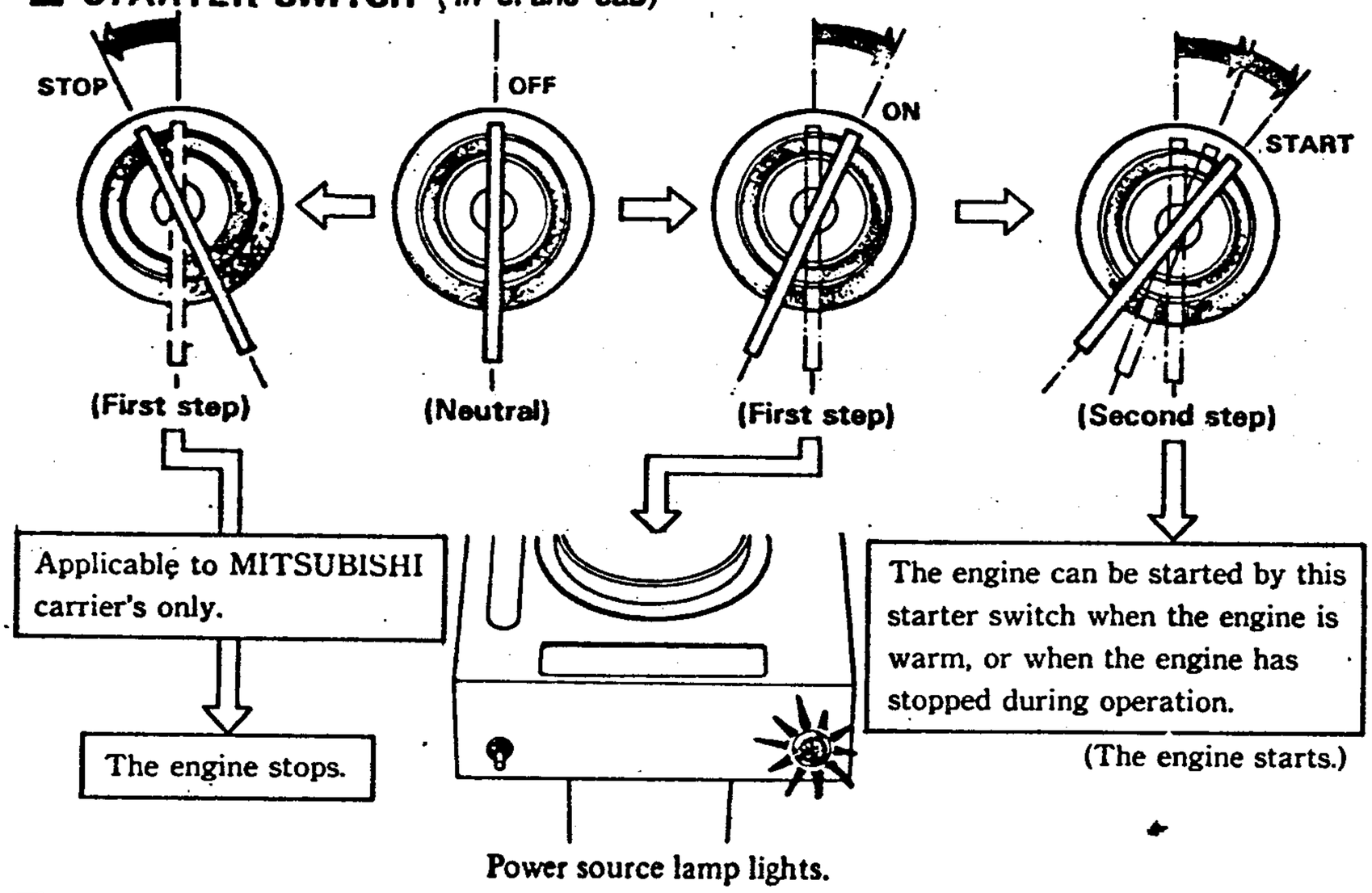
Heater switch (in crane cab)

Over-winding alarm device

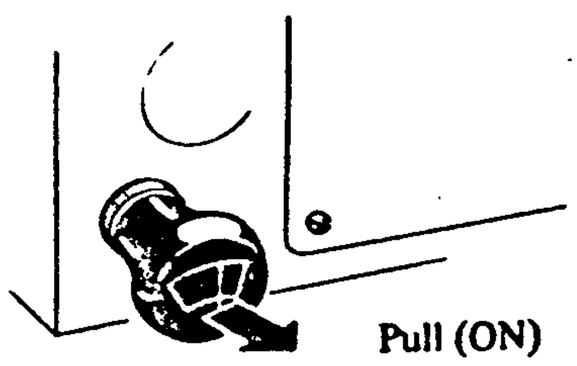
NOTE:
Switch on the power switch and starter switches (in the carrier cab and crane cab) before crane operation. Otherwise the safety devices will not work.

☐ SWITCHES AND FUSE PANEL

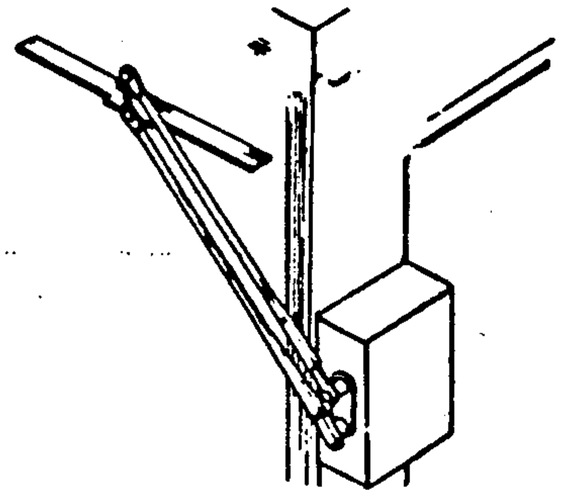
■ STARTER SWITCH (in crane cab)



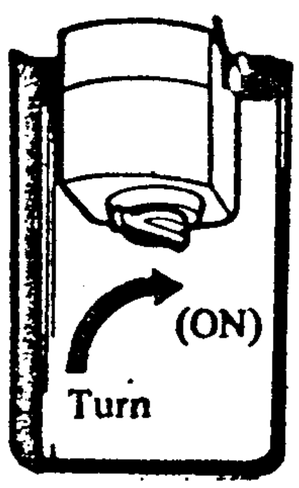
■ WIPER SWITCHES



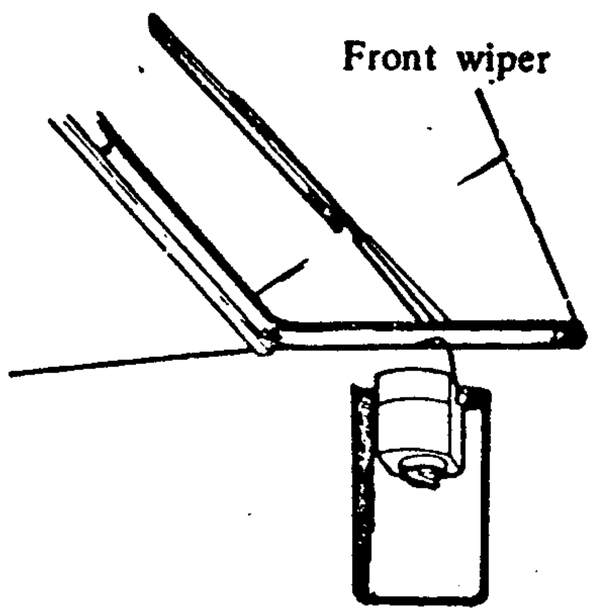
Front wiper switch



Front wiper

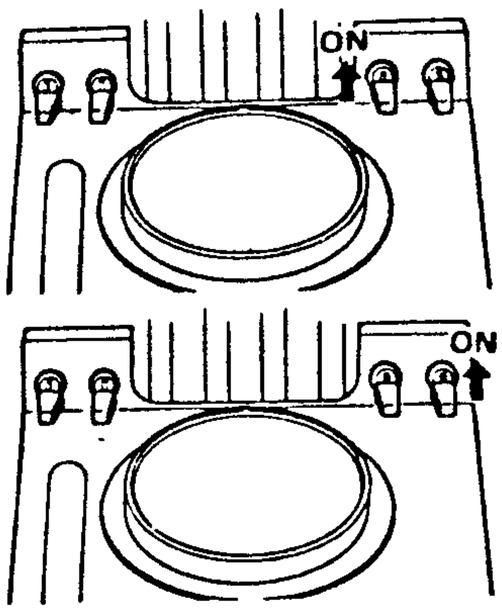


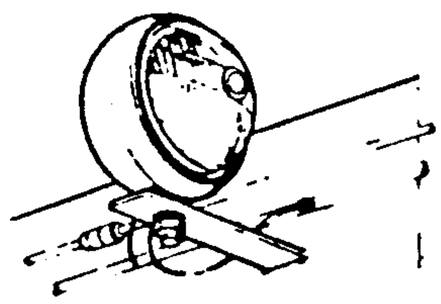
Ceiling wiper switch

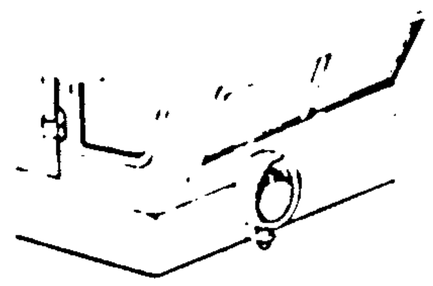


Ceiling wiper

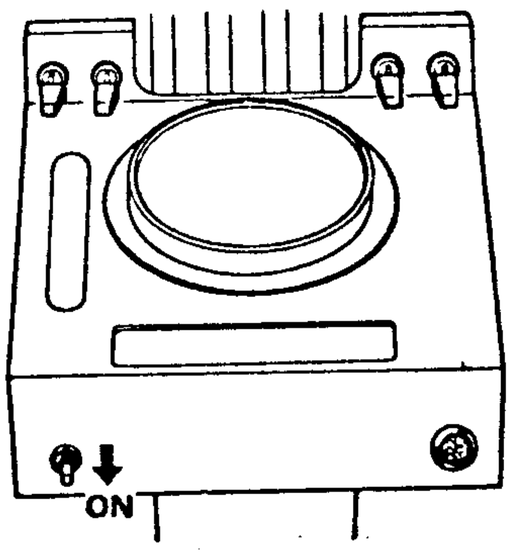
■ WORK LAMP SWITCHES



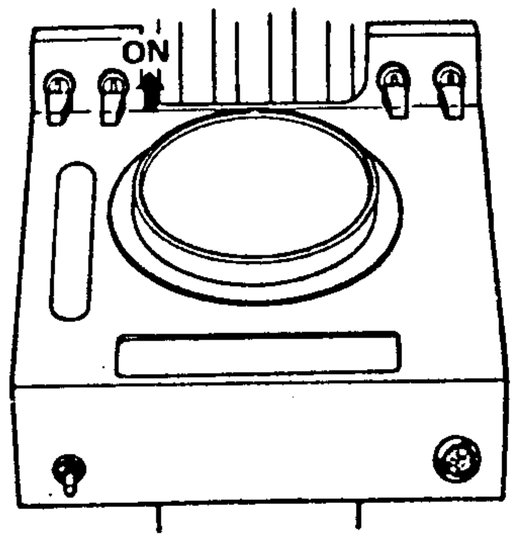


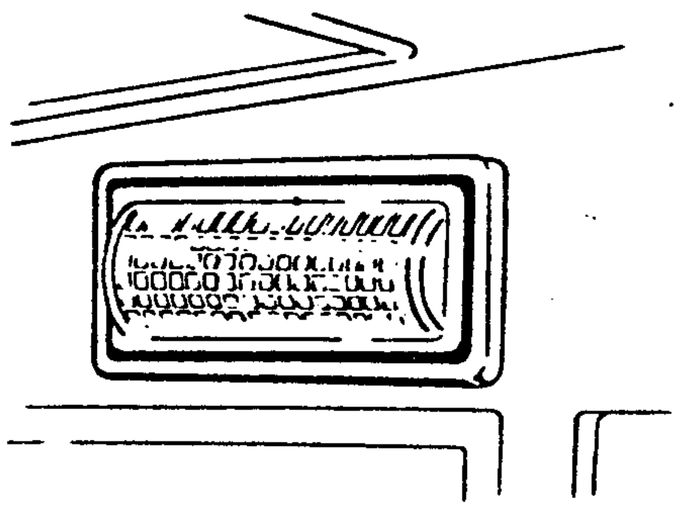


■ HORN SWITCH

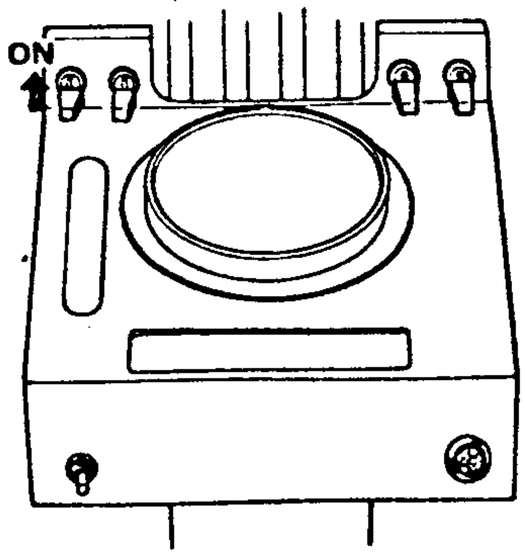


■ ROOM LAMP SWITCH

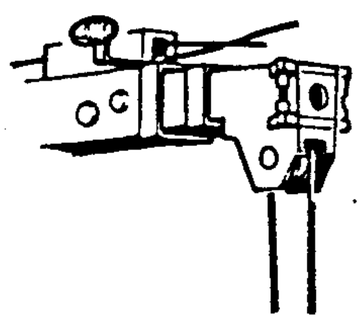




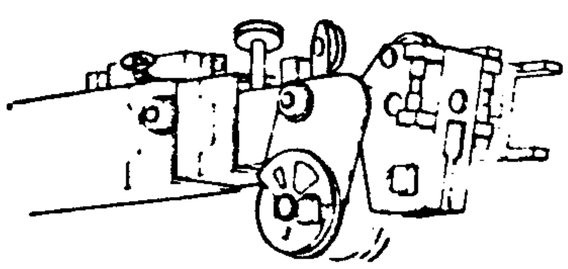
■ BOOM TOP LAMP SWITCH



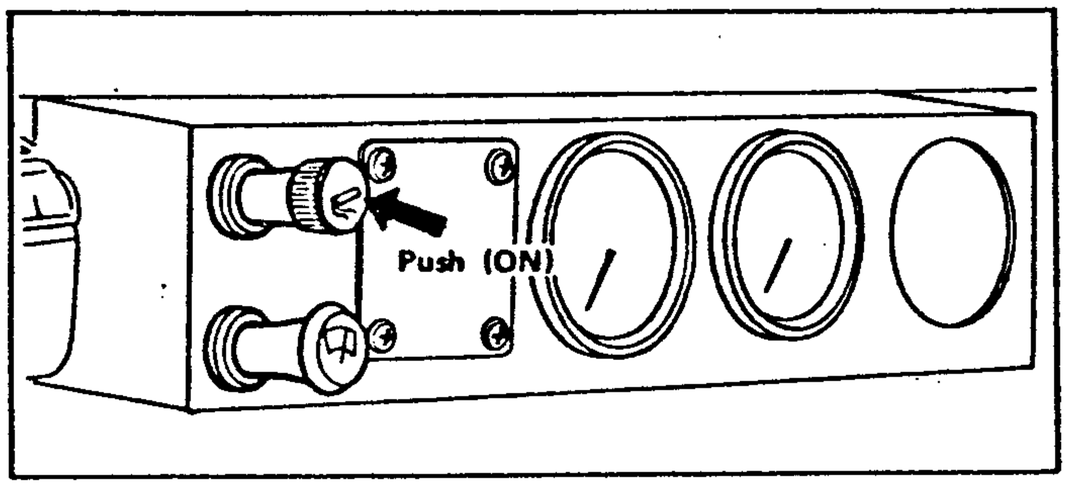
Boom top lamp



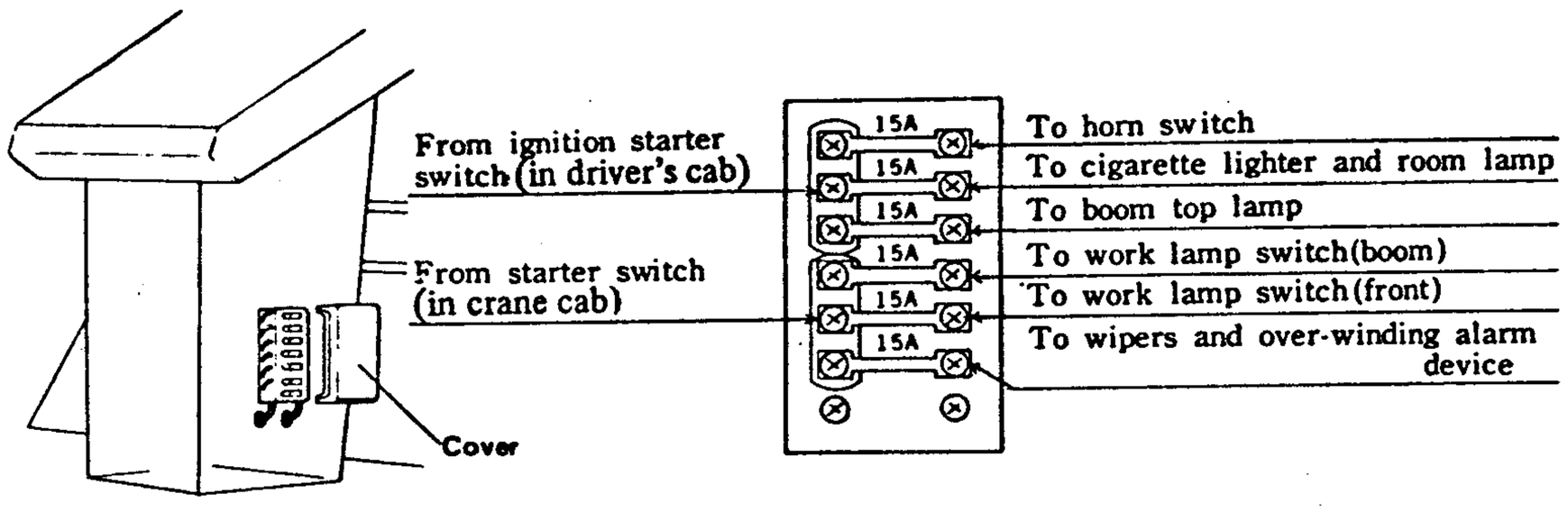
or



CIGARETTE LIGHTER



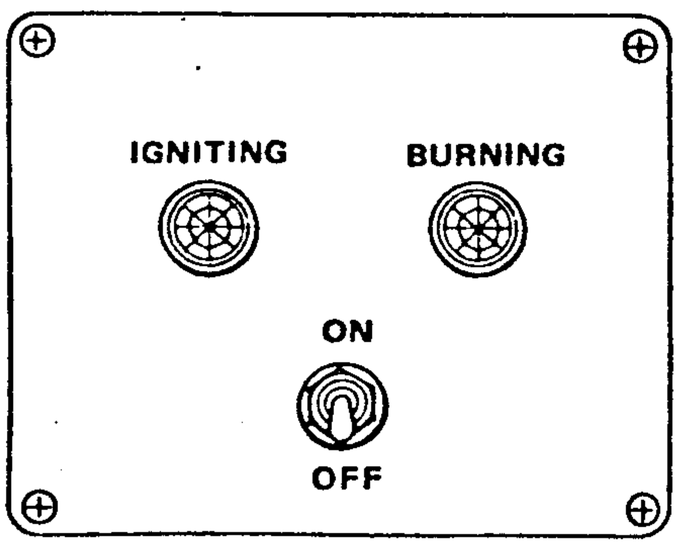
FUSE PANEL



Replacing fuses

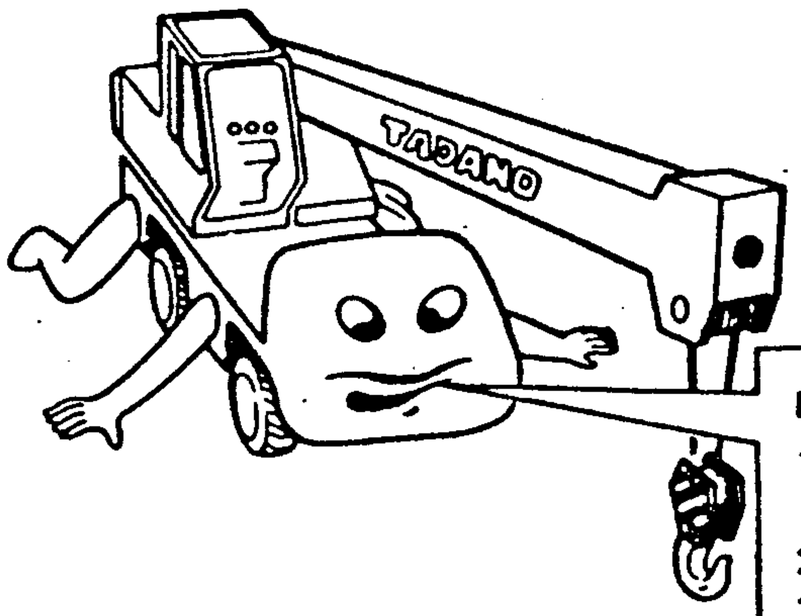
Spare fuses are provided inside the cover. Replace the melted fuses with a new one of the correct rating.

HEATER (OPTIONAL)



Consult the heater manual for operating instructions.

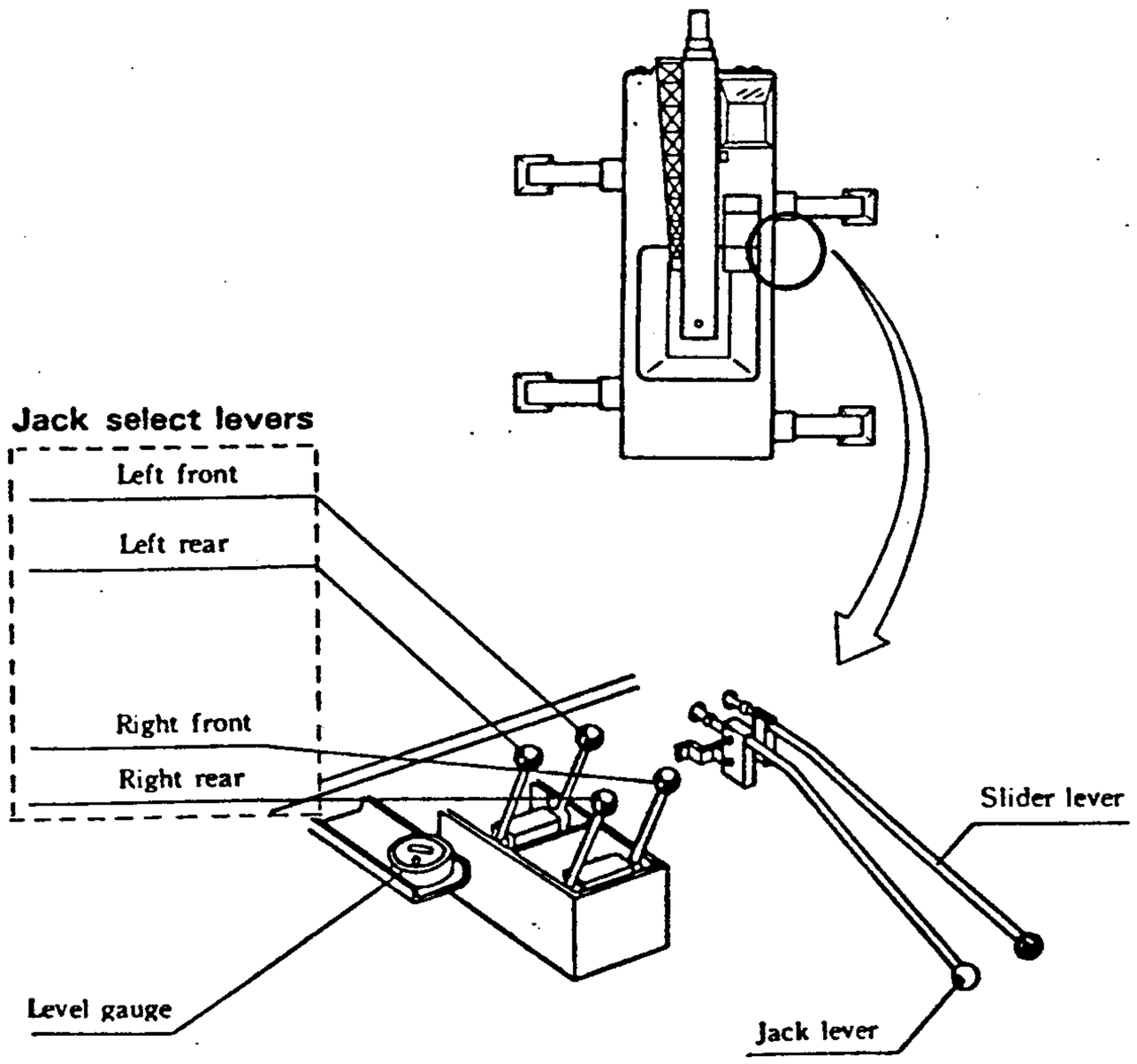
OPERATING OUTRIGGERS (H-configuration outriggers)



NOTES ON OPERATION

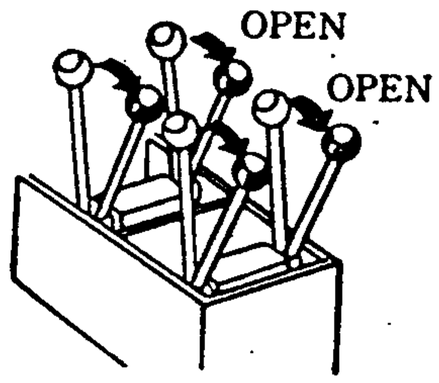
1. When setting up the crane, use fit wood blocks in accordance with ground conditions.
2. Keep the tires off the ground.
3. Extend the sliders fully. It is prohibited to use the crane with the sliders partially extended.
4. Before crane operation, make sure crane is set up level.

☐ CONTROLS

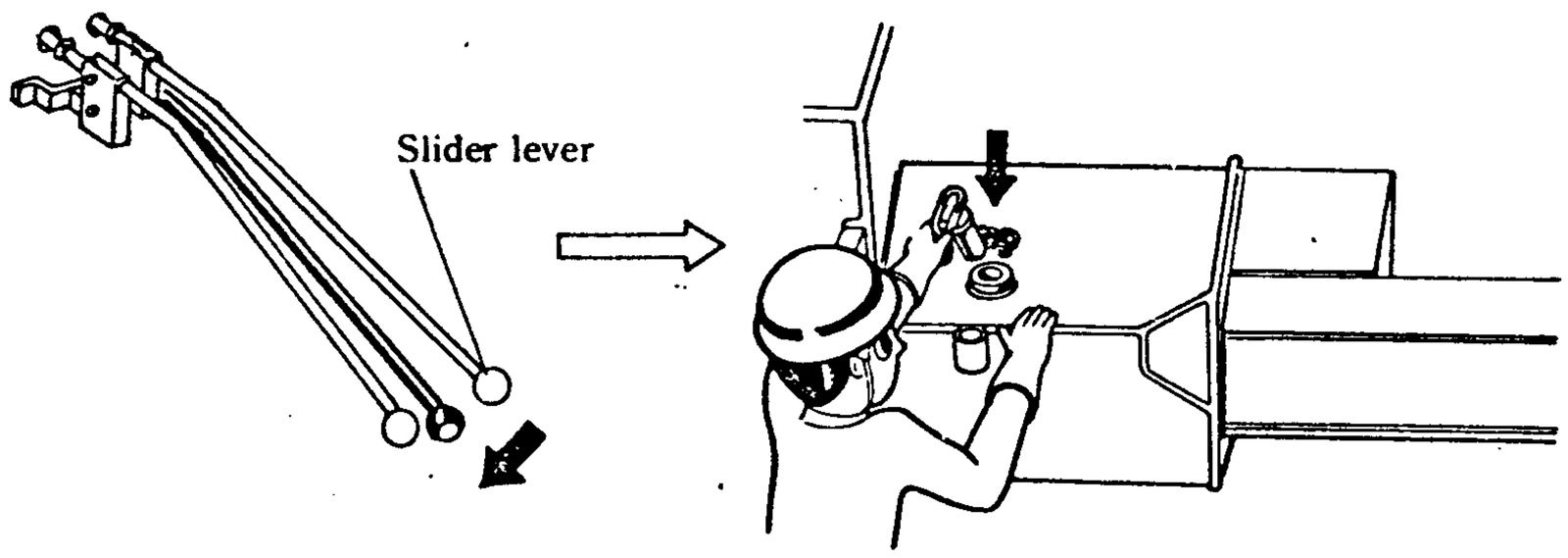


☐EXTENDING OUTRIGGERS

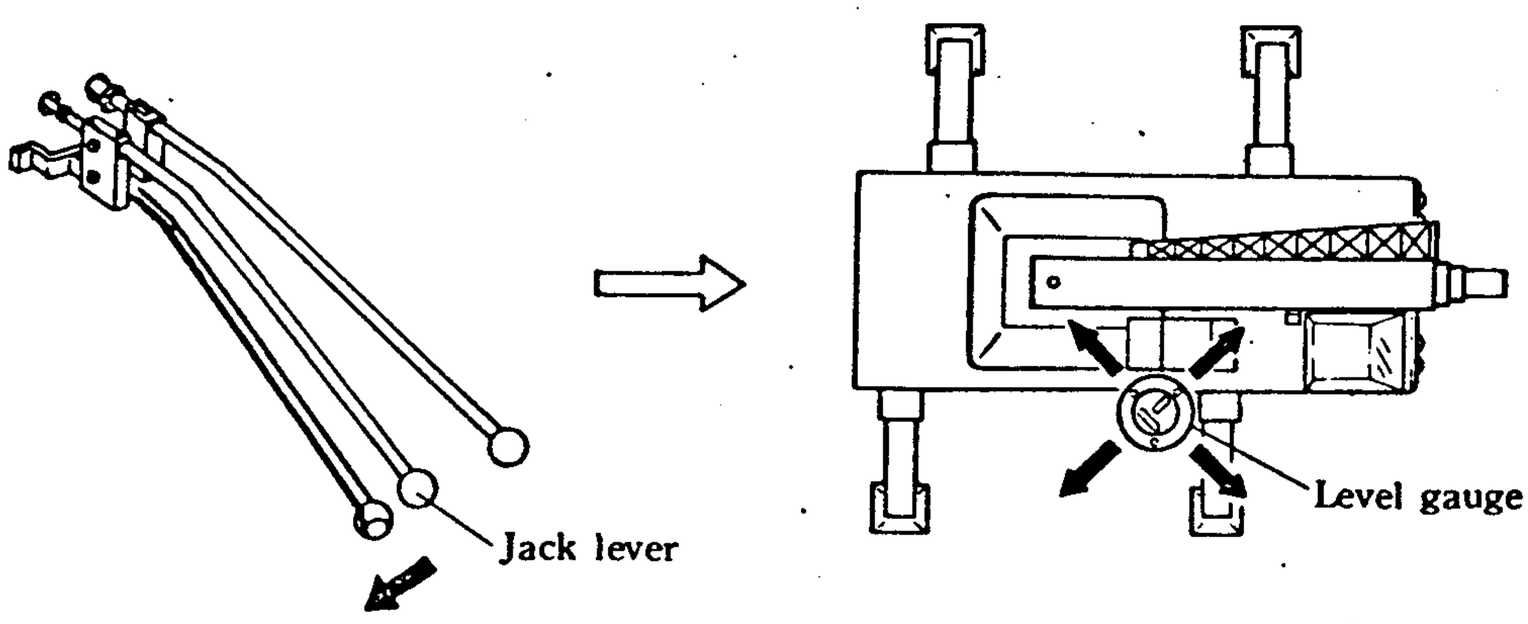
1. Move all of the jack select levers to "OPEN" positions.



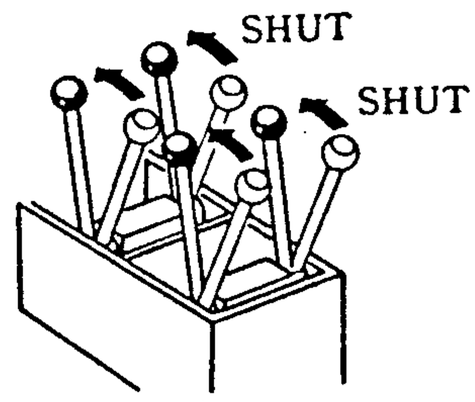
2. Extract the slider lock pins and move the slider lever to "EXT" position. (Assure that extension to full width has been made, and then insert lock pins for sliders.)



3. Move the jack lever to "EXT" position to set up the jacks, and assure by the level gauge that the crane is level. If the crane is not level, see the section of "HOW TO LEVEL UP CRANE".

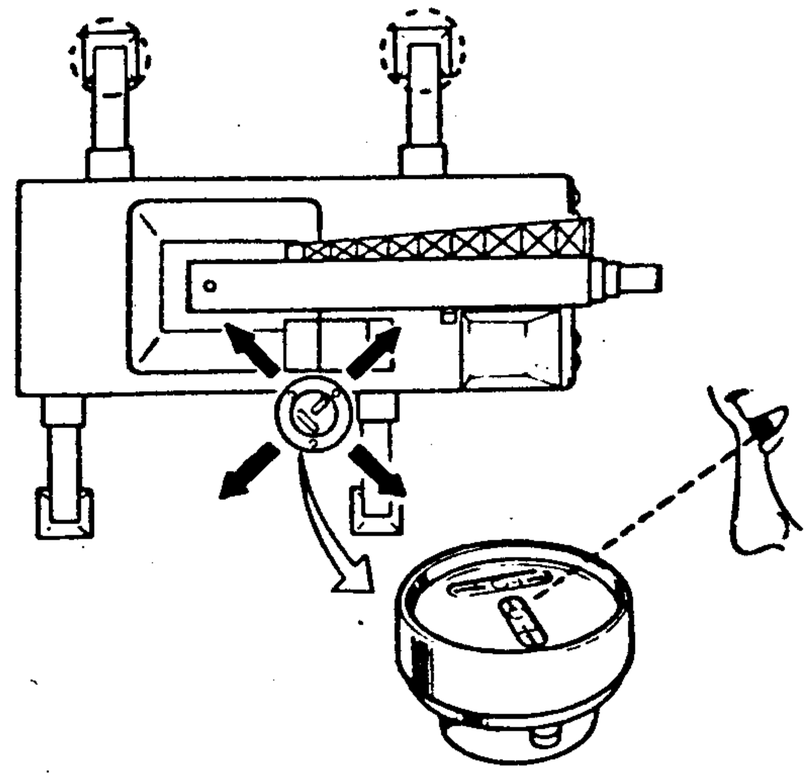


4. Move all of the jack select levers to "SHUT" positions.

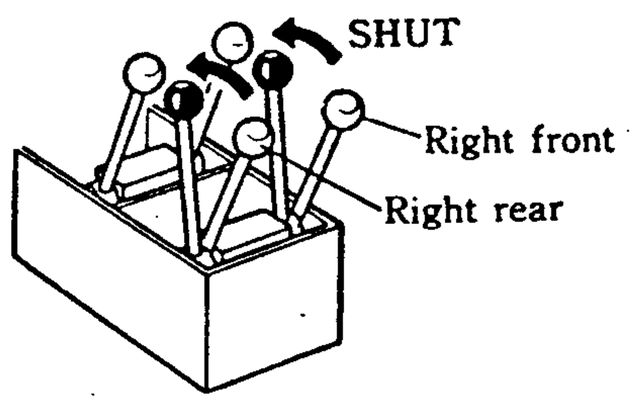


□HOW TO LEVEL UP CRANE

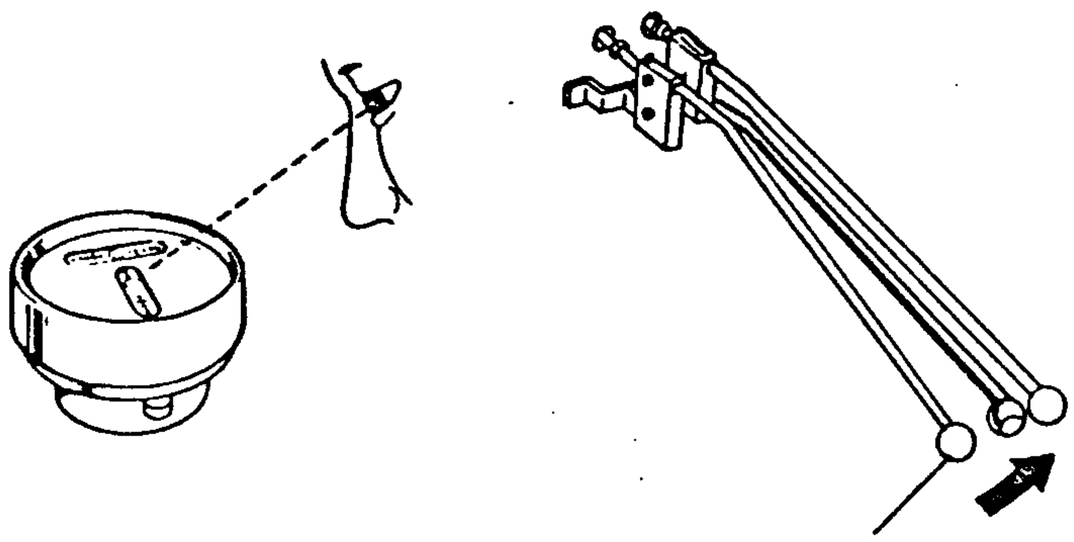
Use the jack select levers when setting up the crane on sloped or uneven ground.
With a jack select lever placed in "SHUT" position, the corresponding jack cannot be extended or retracted, while the others can.
[Example] When left side is higher.



1. Move the right front and right rear jack select levers to "SHUT" position.

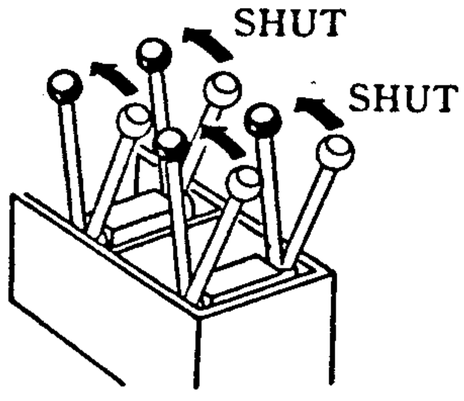


2. Monitoring the level gauge, operate the jack lever slowly to retract the left front and left rear jacks. After setting up the crane level, confirm that all the four jack floats are in contact with the ground. If not, extend the applicable jack.



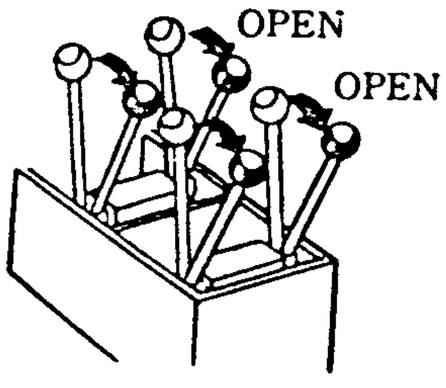
Jack lever

3. Move all of the jack select levers to "SHUT" positions.



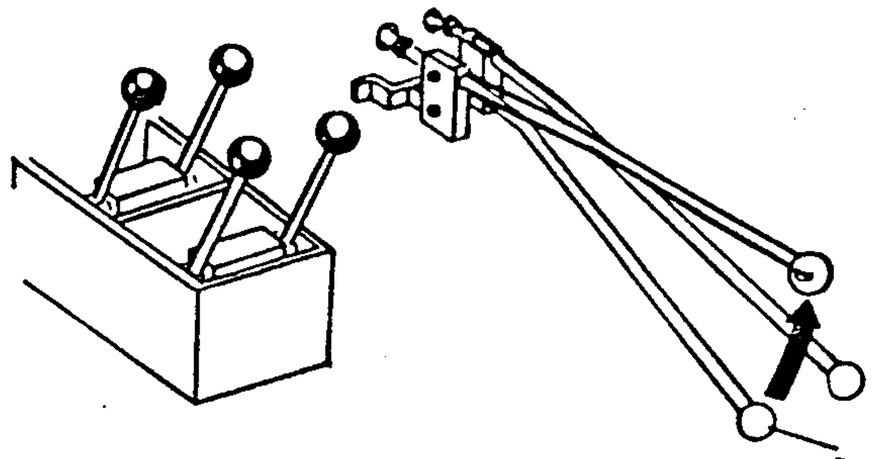
☐RETRACTING OUTRIGGERS

1. Move all of the jack select levers to "OPEN" positions.

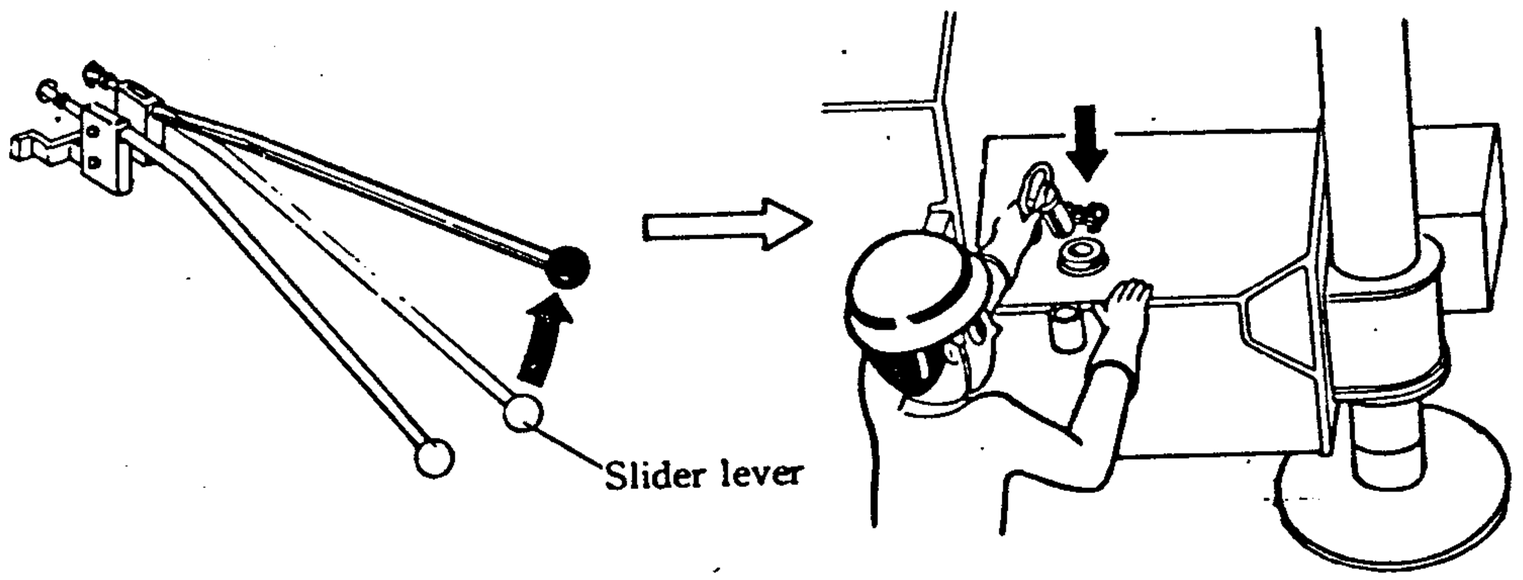


2. Move the jack lever to "RET" position.

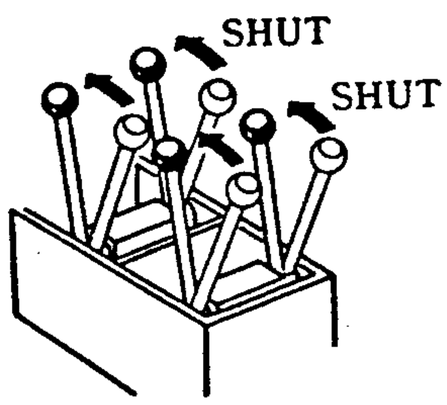
NOTE: Assure that the jacks have been fully retracted.



3. Extract the slider lock pins and move the slider lever to "RET" position. (Assure that the sliders are fully retracted, and then insert the lock pins.)



4. Move all of the jack select levers to "SHUT" positions.



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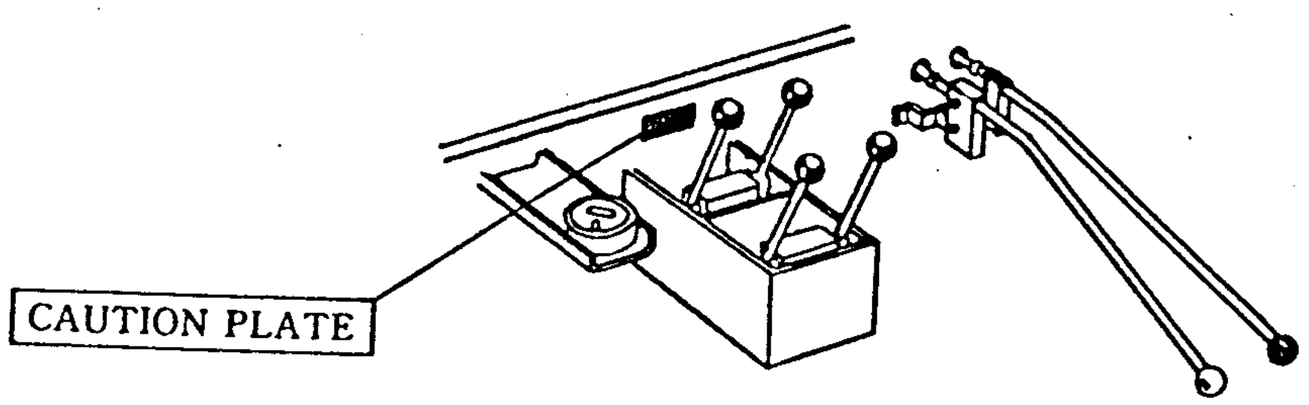
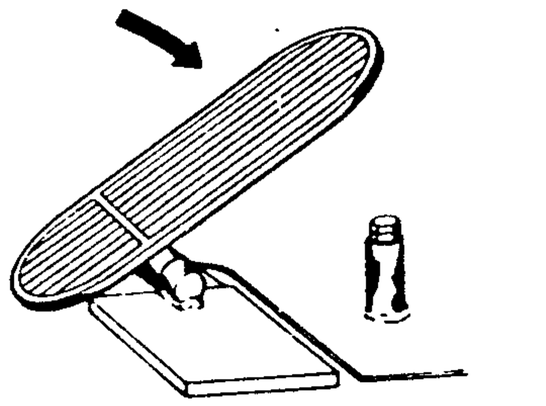
MEMO

NOTE: As for the cranes of Serial Nos. 308736 and precedent, after extending or retracting the outriggers, shift all jack select levers to "OPEN" position as noted on the caution plate.



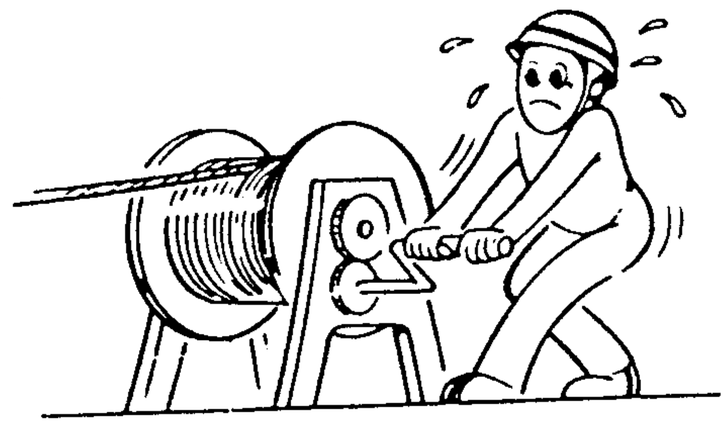
ACCELERATION

Depress the accelerator pedal, and the speed will be increased in boom swing, boom elevation, boom telescoping and winch operation.



MEMO

OPERATING WINCHES



NOTES ON OPERATION

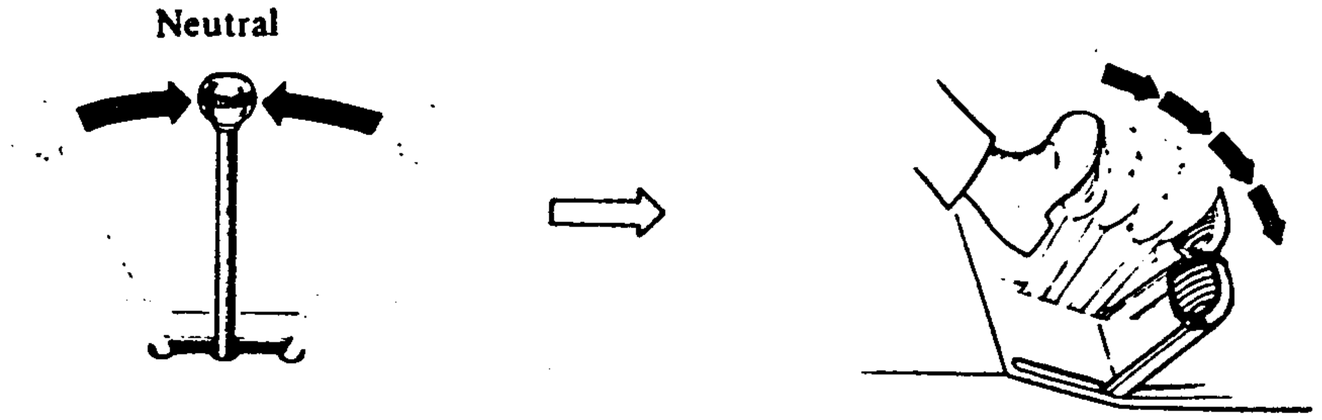
1. When operating the main (auxiliary) winch, the auxiliary (main) winch brake pedal should be locked at the first notch, not to allow the hook to lower, and the auxiliary (main) winch clutch, disengaged.
2. When suspending a load in the air, depress the brake pedal and lock so the load does not lower.
3. Load Limit for free fall operation.
   Free-fall operation can be performed only when the load to be lowered does not exceed 1/3 of the total rated load, nor 1/3 of the wire rope tensile strength (tensile strength per part-line being 2,900 kg).
4. After crane operation, lock the both brake pedals at the third notch respectively and position the winch lever to neutral and the clutch lever to "OFF."

☐ LOCKING BRAKE PEDALS

After setting the brake lock lever in the neutral position, depress the brake pedal. (Locking is possible in three stages).

(Both main and auxiliary winches are locked.)

Neutral

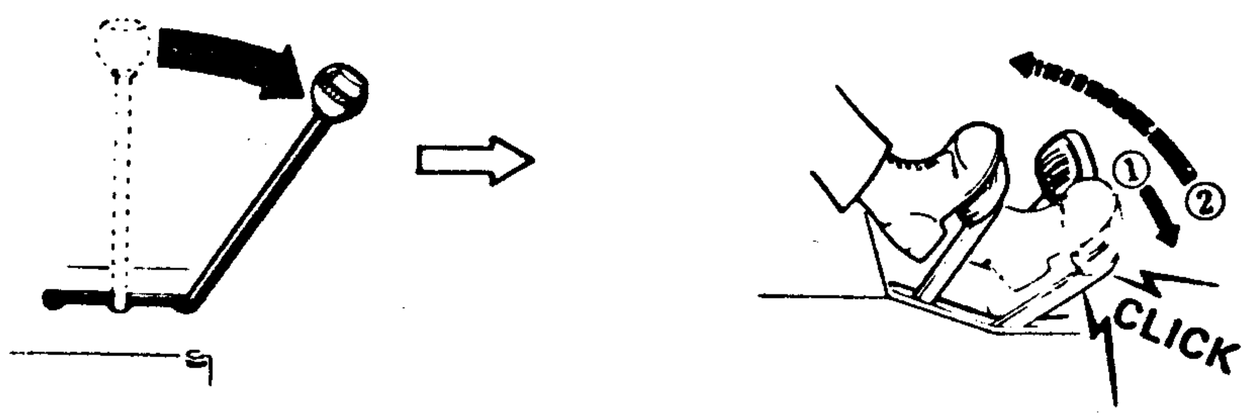


☐ UNLOCKING BRAKE PEDALS

■ BRAKE PEDAL (FOR MAIN WINCH)

Move the brake lock lever forward to the "MAIN FREE" position.

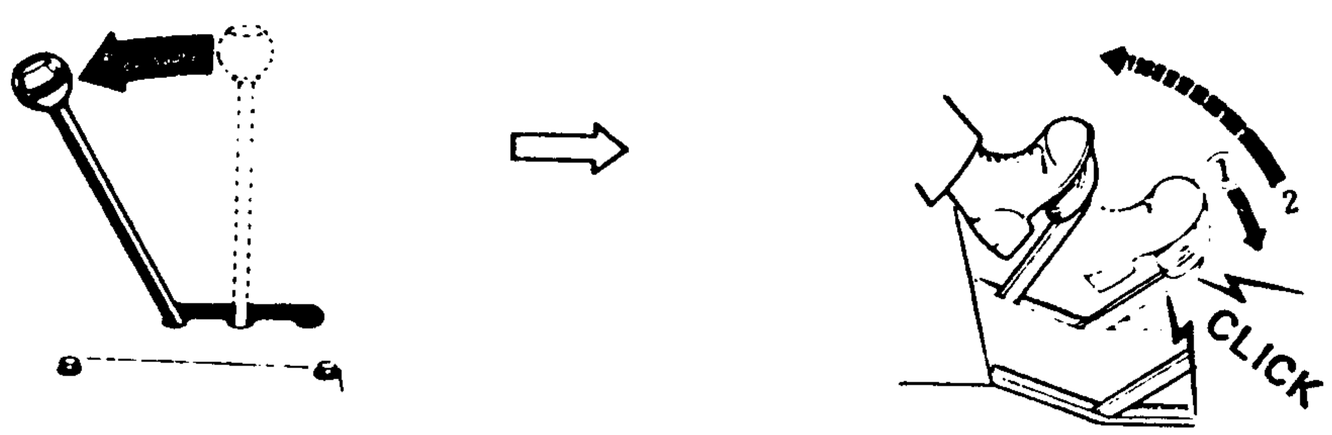
Depress strongly the brake pedal and release slowly after a "click" sound is heard.



■ BRAKE PEDAL (FOR AUXILIARY WINCH)

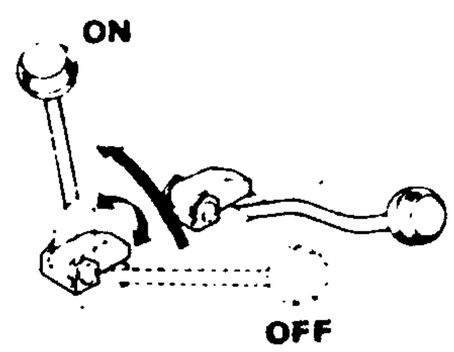
Move the brake lock lever back to the "AUX. FREE" position.

Depress strongly the brake pedal and release slowly after a "click" sound is heard.

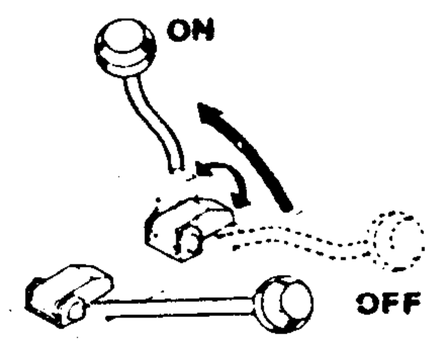


☐ ENGAGING AND DISENGAGING CLUTCHES

Main winch clutch lever



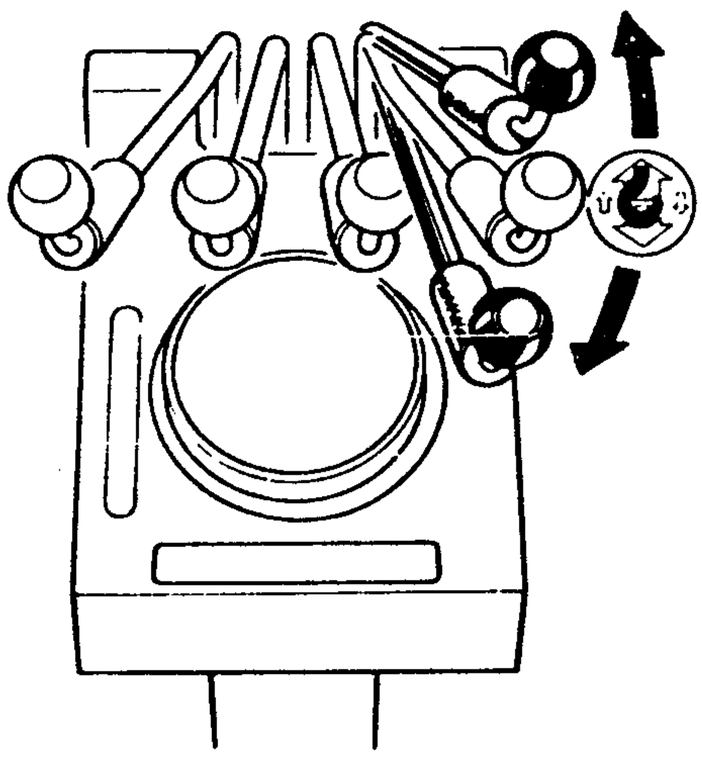
Auxiliary winch clutch lever



NOTES:

1. Always apply the stopper to the levers in either engaged (ON) or disengaged (OFF) position.
2. After positioning the clutch lever to "ON", push the winch lever forward a couple of times to ensure clutch engaging.

☐ WINCH LEVER



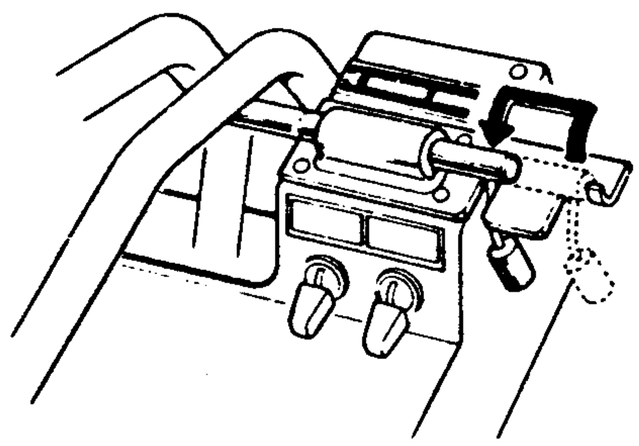
Push (winch down)

Neutral (stop)

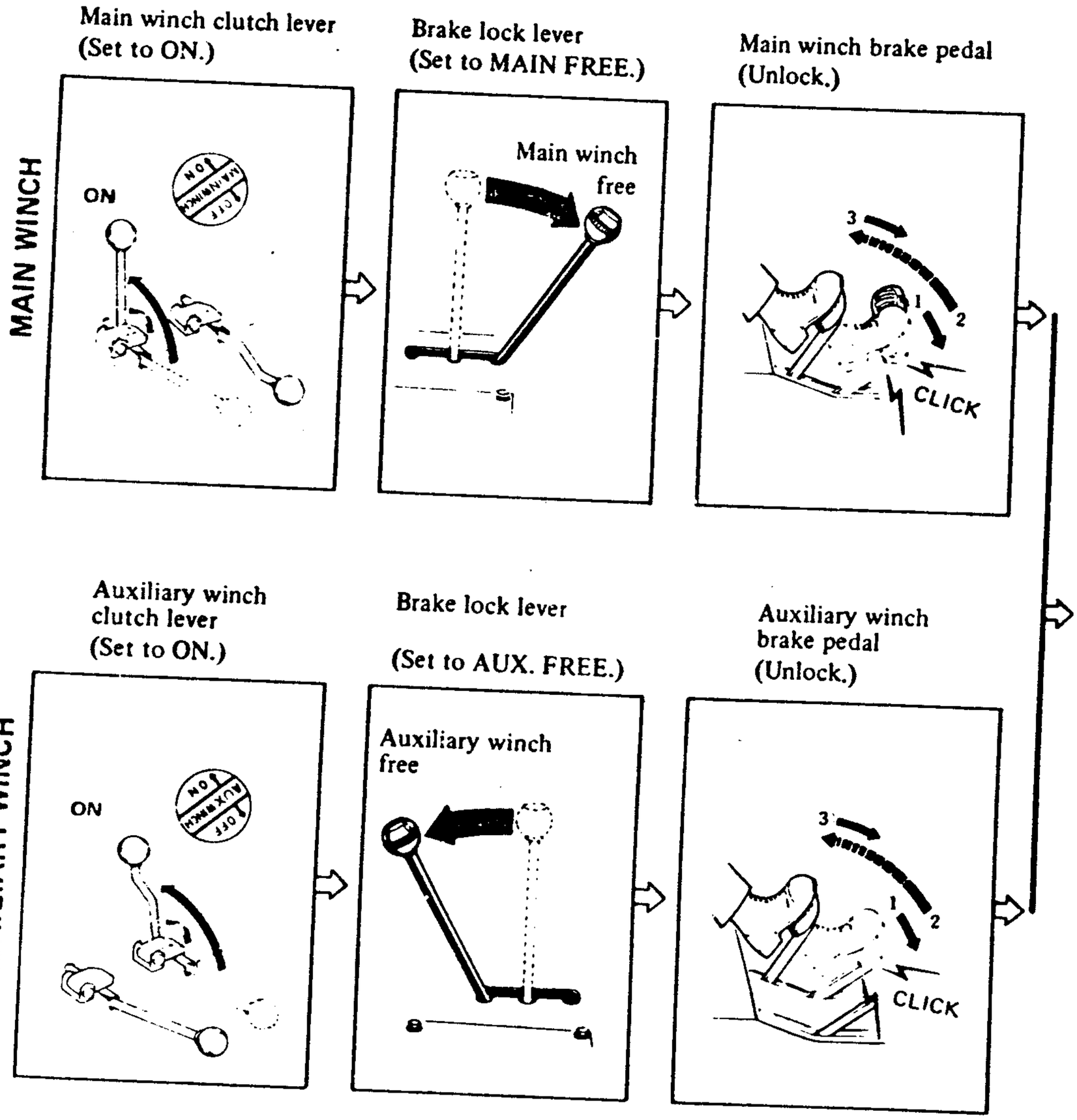
Pull (winch up)

NOTES :

1. Return by hand.
2. Winch lever should be locked with the stopper while the crare is travelling and while the winch is not used.

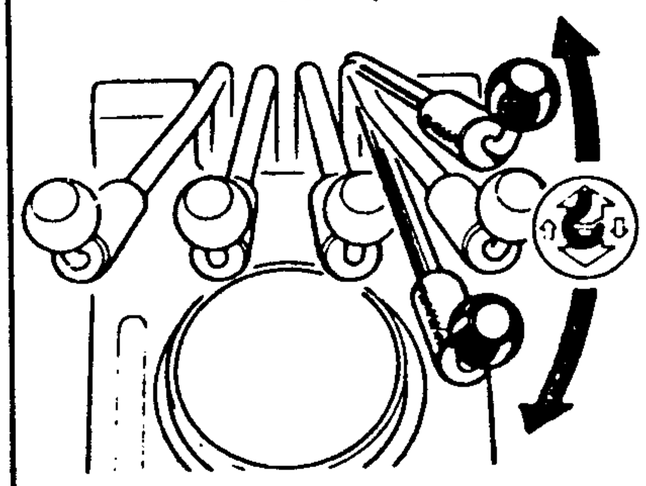


☐ WINCH OPERATION



WINCH LEVER

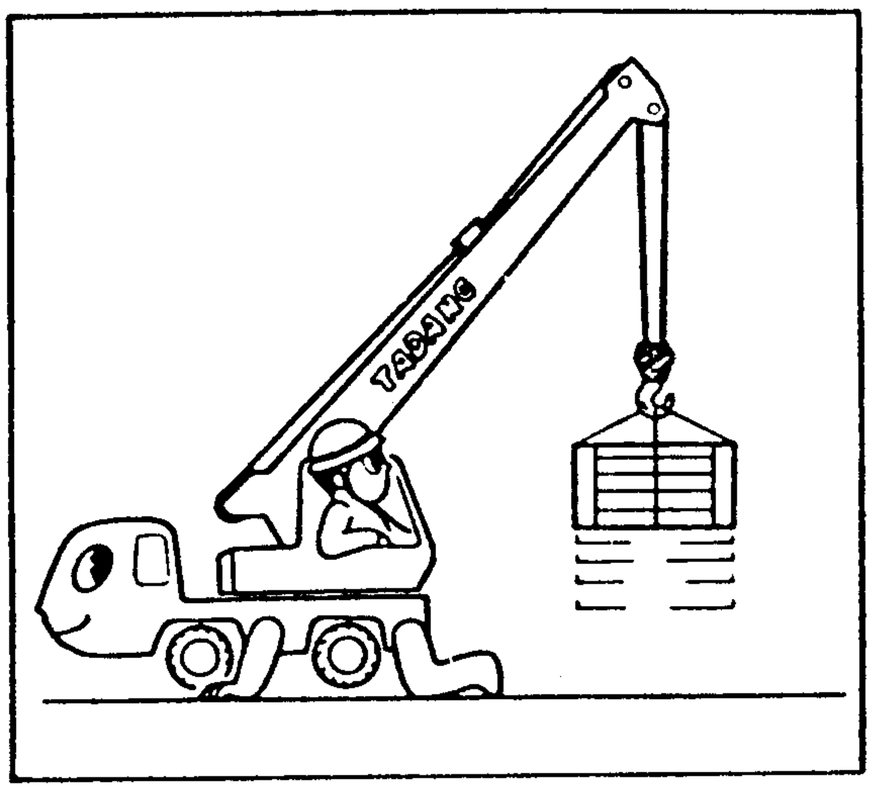
Push (winch down)



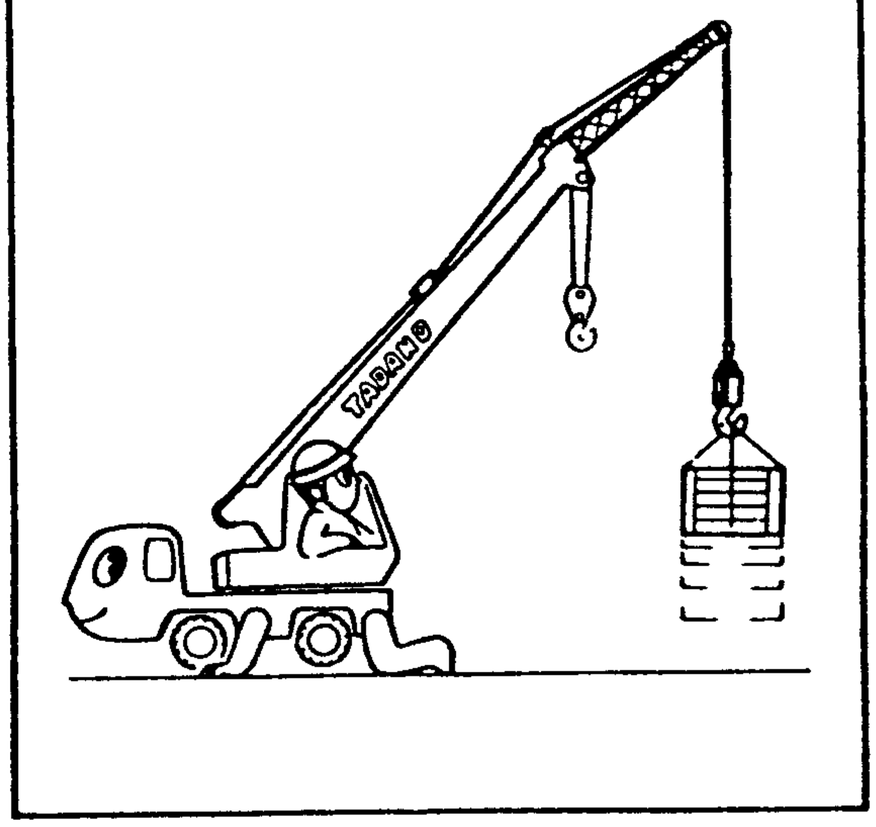
Pull (winch up)

NOTE:
Release the winch brake pedal just after moving the lever.

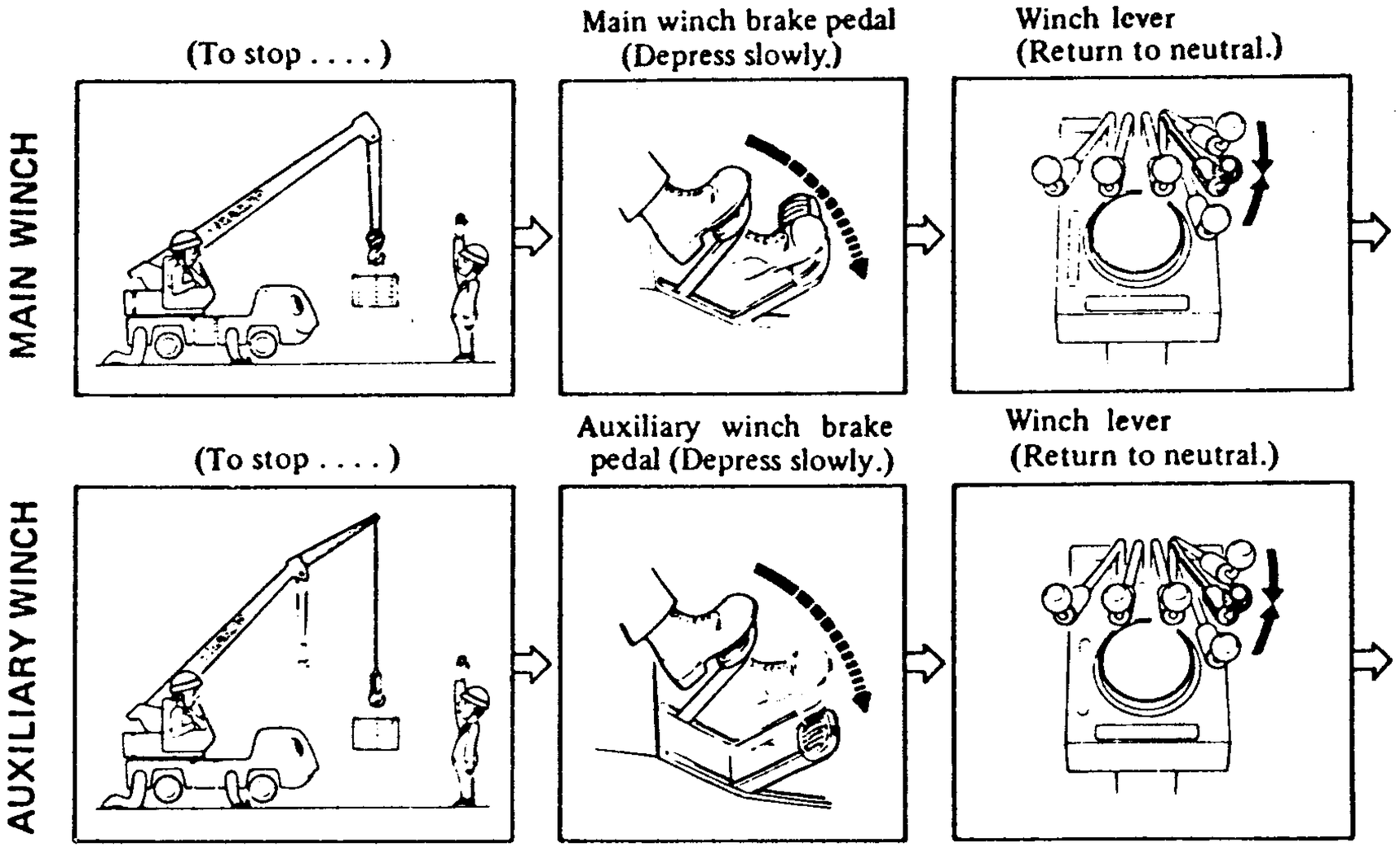
MAIN WINCH



AUXILIARY WINCH

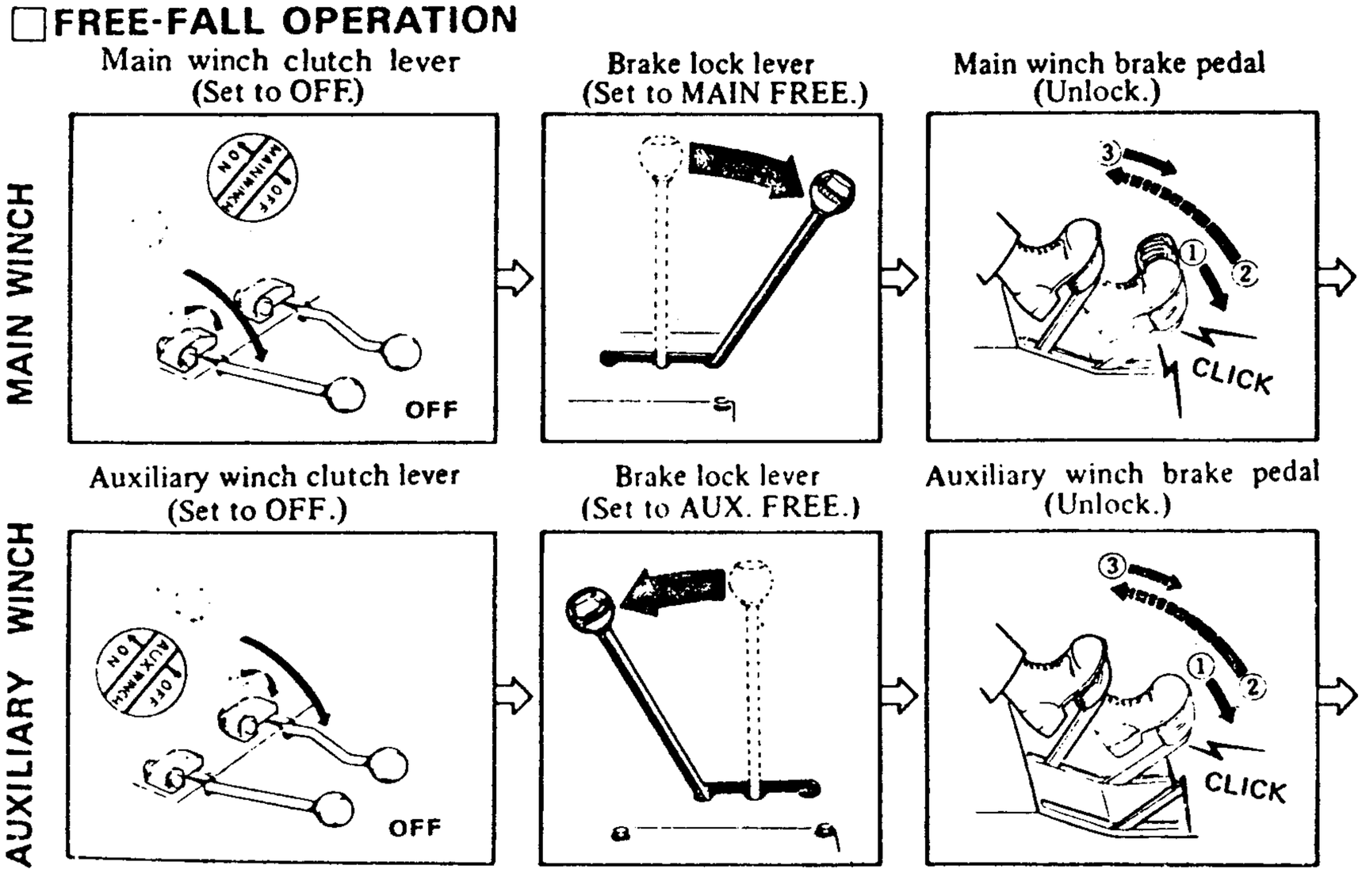


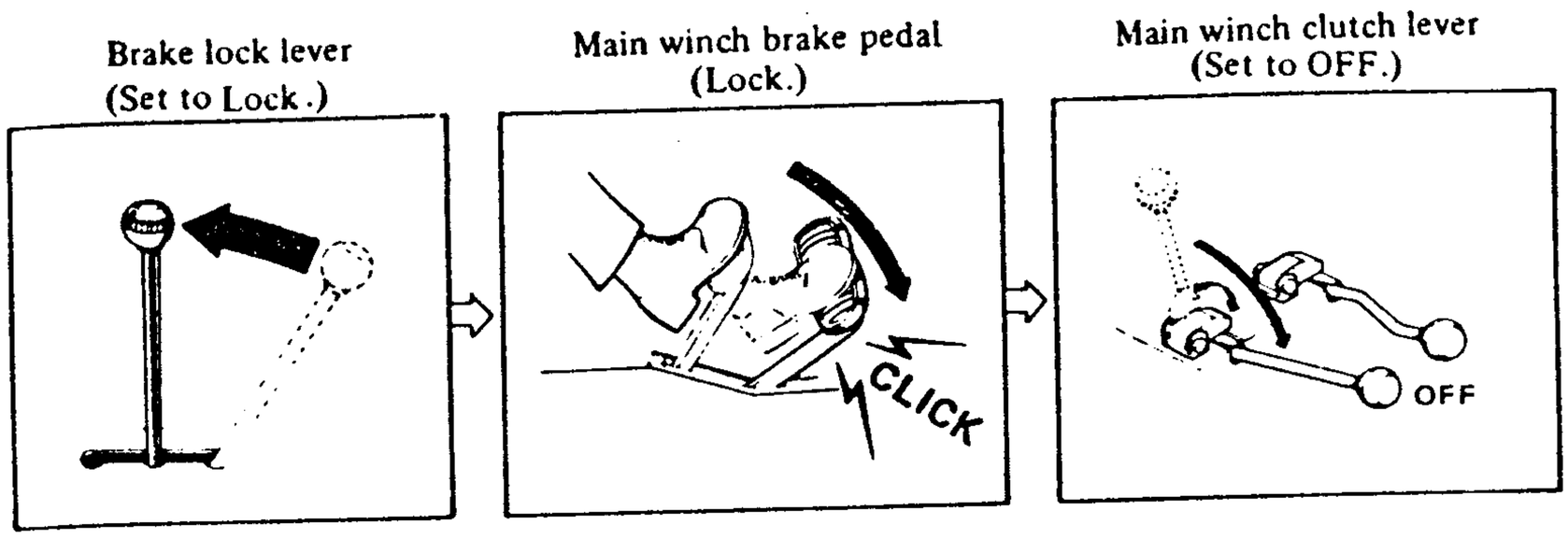
☐ SUSPENDING WINCH OPERATION



NOTE :
Before returning the winch lever to neutral, slowly depress the winch brake pedal.

☐ FREE-FALL OPERATION



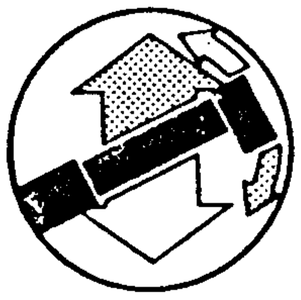


NOTES:

1. In free-fall operation, never fail to keep your foot on the brake pedal.
2. Always control free-fall speed by means of the brake pedal.

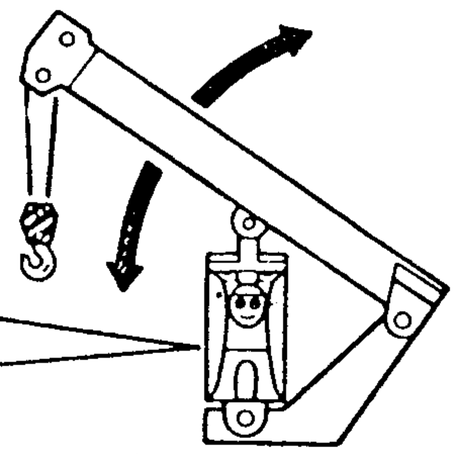
MEMO

ELEVATING OPERATION

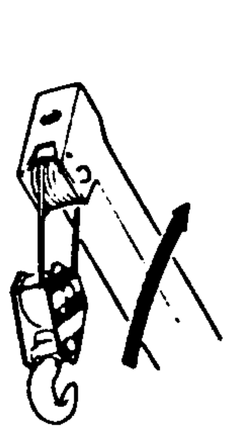


NOTES ON OPERATION

1. Lift up a load in the vertical direction only. Avoid dragging it on the ground or side-loading.
2. Observe the elevating angle limit.
3. Operate the control lever slowly when starting or stopping elevation.

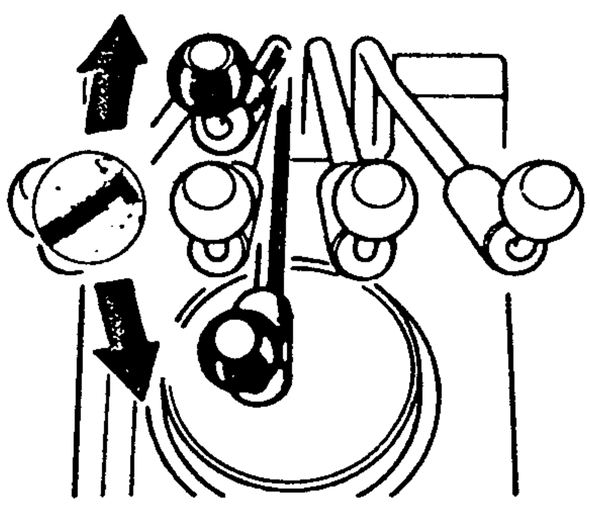


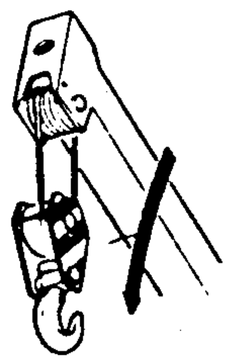
☐ ELEVATING LEVER



Push.(Boom lowers.)

Neutral.(Boom stops.)

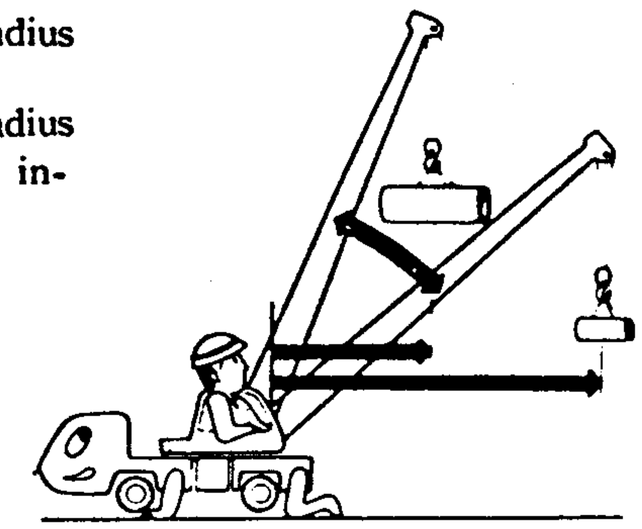




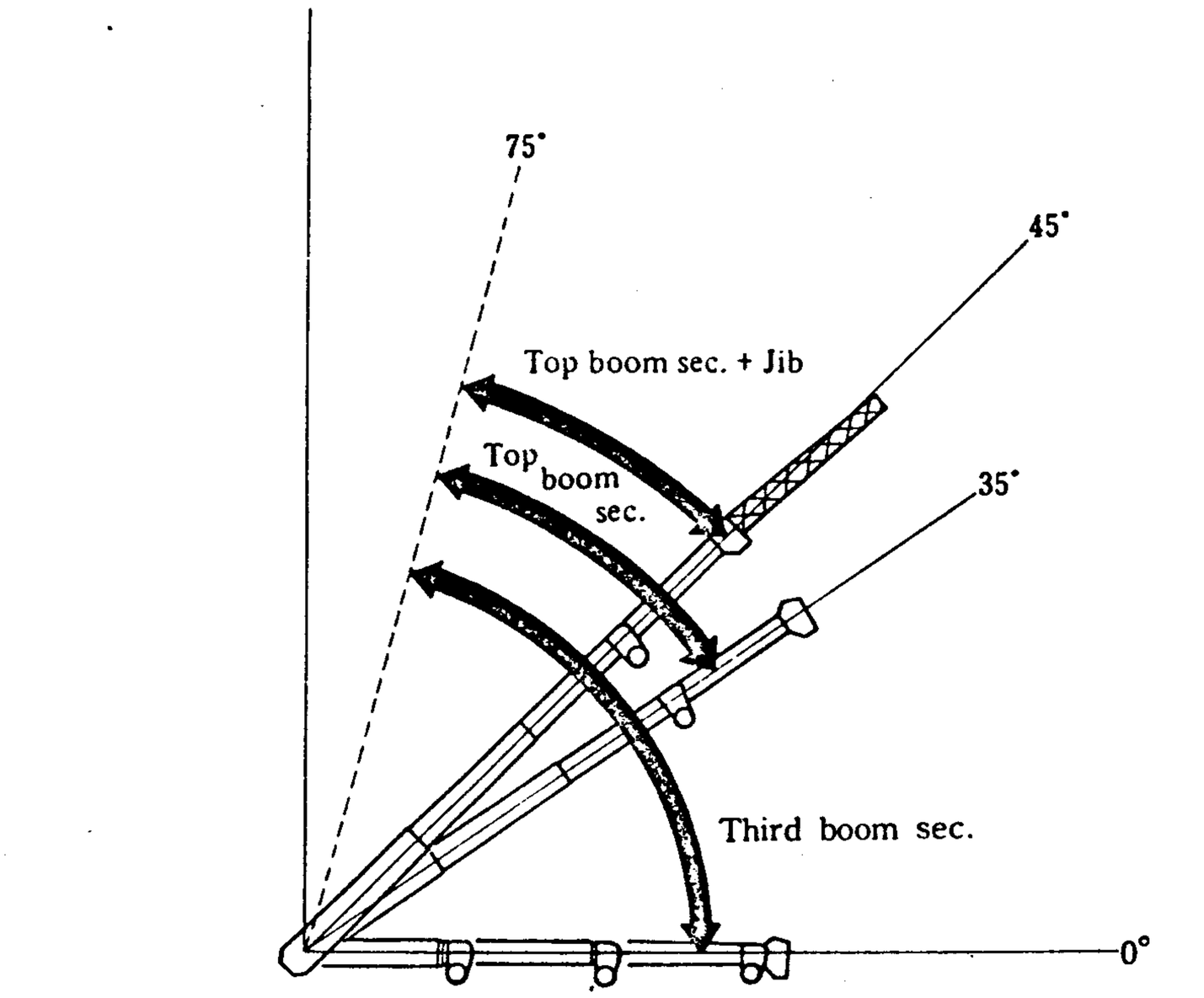
Pull.(Boom rises.)

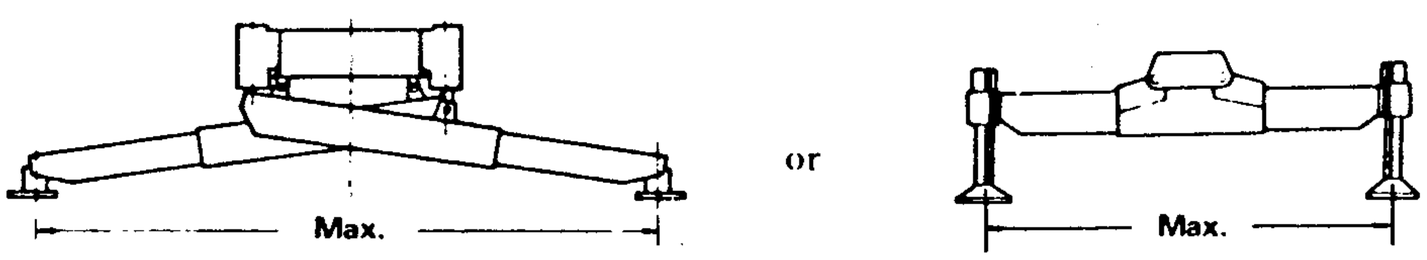
☐ RELATIONSHIP AMONG BOOM ANGLE, WORKING RADIUS AND TOTAL RATED LOAD

Lowering the boom increases the working radius but the total rated load value decreases.
(Elevating the boom decreases the working radius and consequently the total rated load value increases.)



□ELEVATING LIMIT (RANGE OF USE)





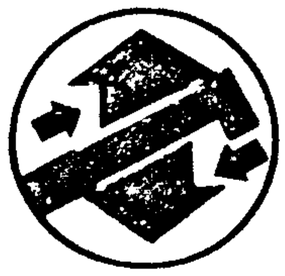
With outriggers extended fully. (over side and over rear)

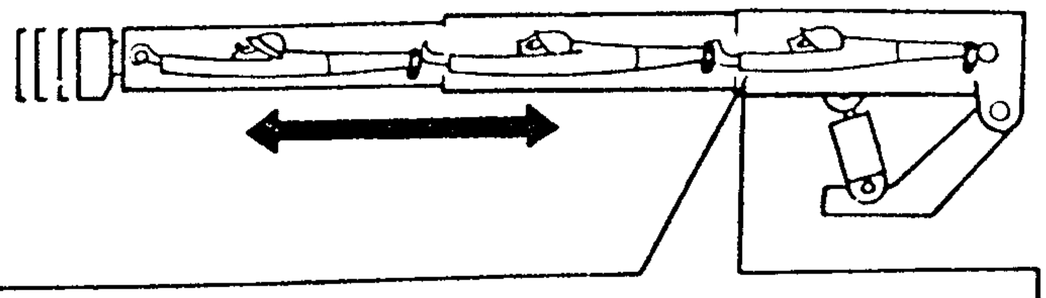
NOTES:

1. The jib must not be operated over front even with outriggers extended fully.

2. If it is necessary to load the base, the second, or the third boom section with the top boom section and/or the jib extended, the elevating limit is changed and different from the above illustrated. The limit under such conditions is given in the REDUCTION OF TOTAL RATED LOAD table.

TELESCOPING OPERATION

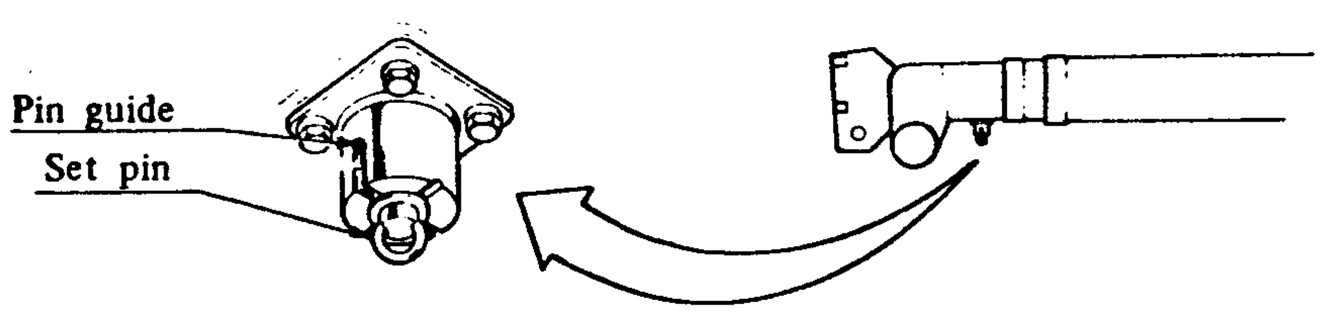




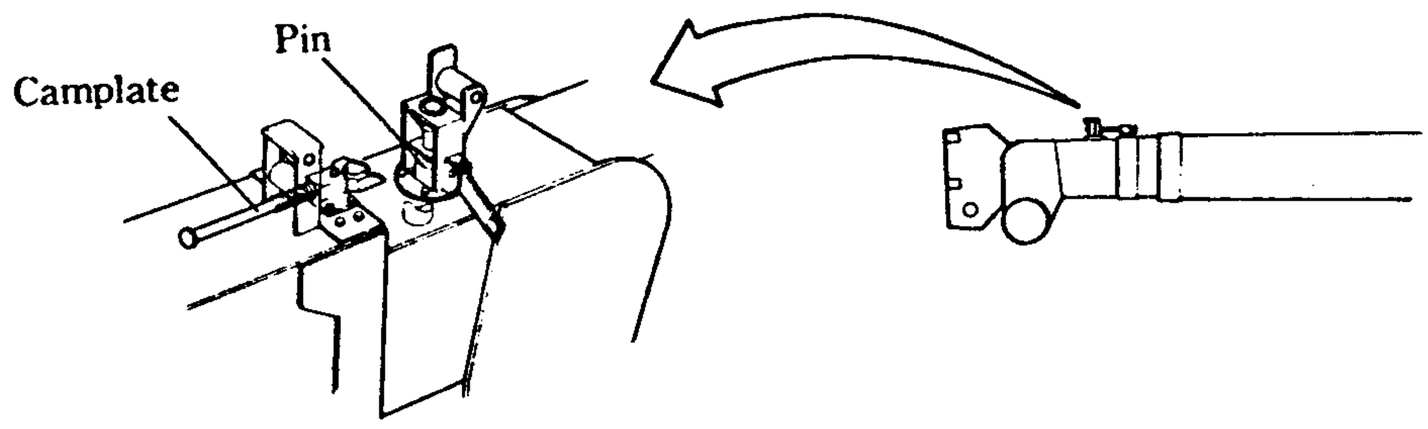
NOTES ON OPERATION

1. Lift up a load in the vertical direction only. Avoid dragging it on the ground or side-loading.
2. The hook nears the boom nose as the boom is extended, which may cause over-winding.
   To avoid this, operate the winch to let off the rope so that enough distance is provided between the hook and the boom nose.
3. Before operation with top boom section, make sure it is fully extended and held firmly with automatic pin.
4. Before extending boom, see jib pivot pin and jib stowing pin. Unless said pins are positioned correctly, jib will be damaged.
5. Extension or retraction of the top boom section should be carried out at the boom angle of more than 35° without any load.
6. Slowly extend or retract the top boom section near the stroke end, controlling the speed with the telescoping lever.
7. If it is necessary to extend the top section when the third section is in use, retract the third section first, and then extend the third and top sections.

□TOP BOOM SECTION SET PIN



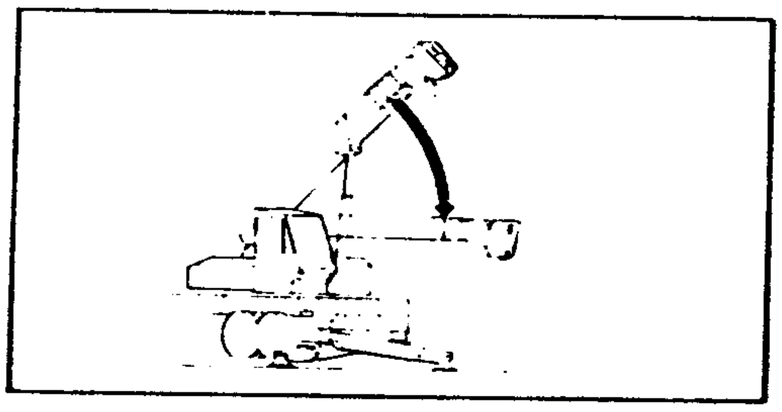
□TOP BOOM SECTION AUTOMATIC PIN



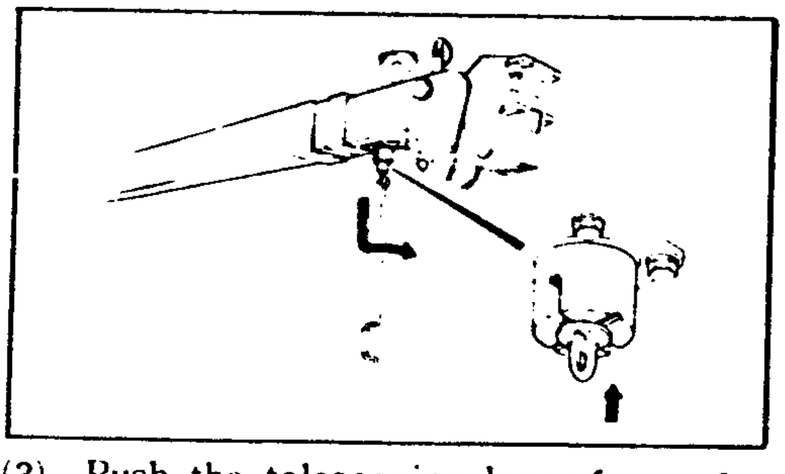
☐ WITH TOP BOOM SECTION RETRACTED

☑ BOOM EXTENSION

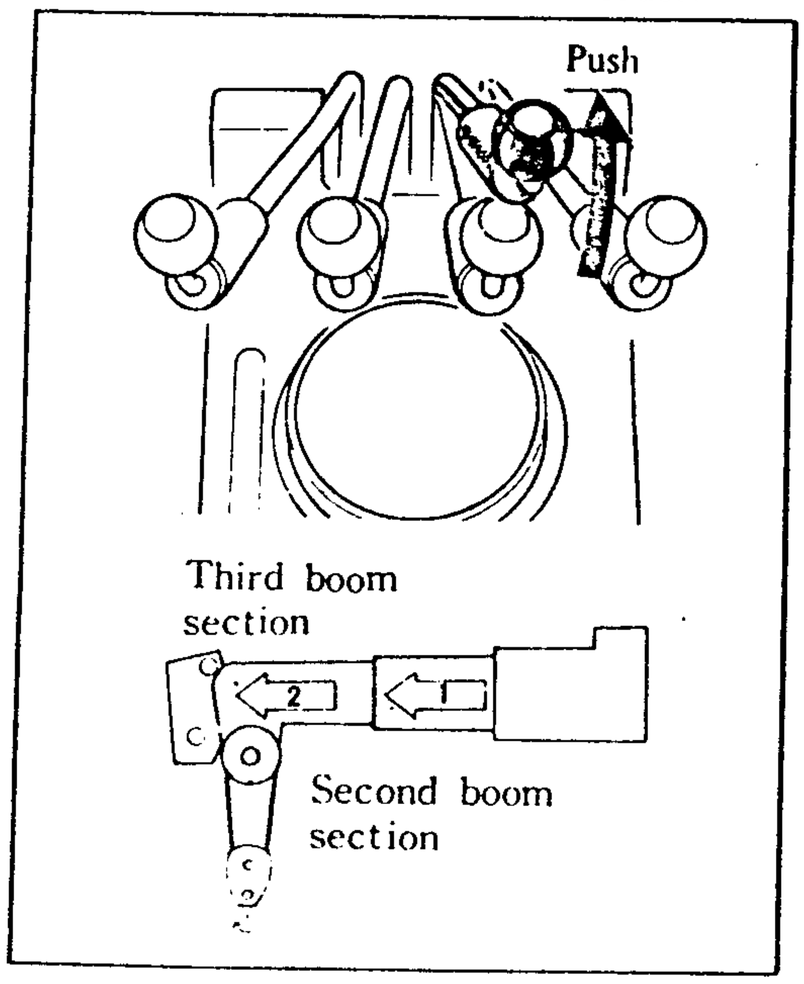
(1) Retract all the boom sections and lower the boom to the horizontal position.



(2) Turn the set pin by 90° with the handle and put the pin guide in the deep groove.
(The top section will be fixed to the third section.)

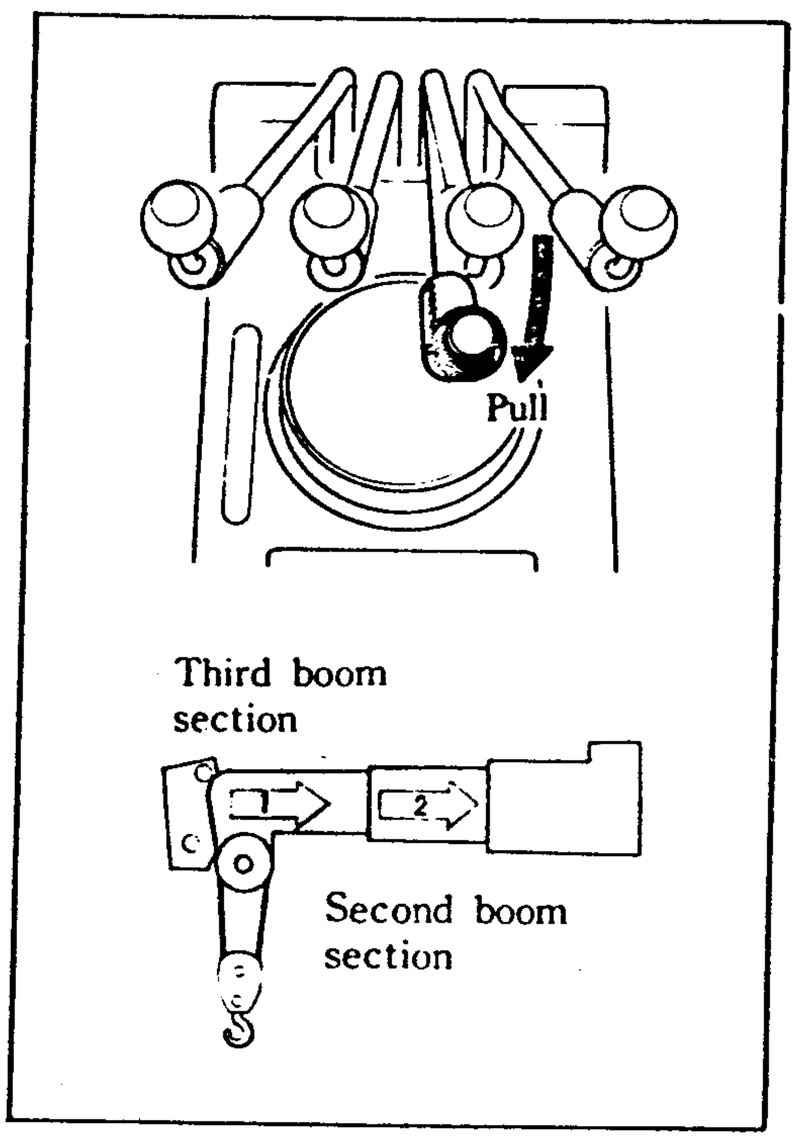


(3) Push the telescoping lever forward.
The boom will extend in order.



☑ BOOM RETRACTION

Pull the telescoping lever backward.
The boom will retract in order.

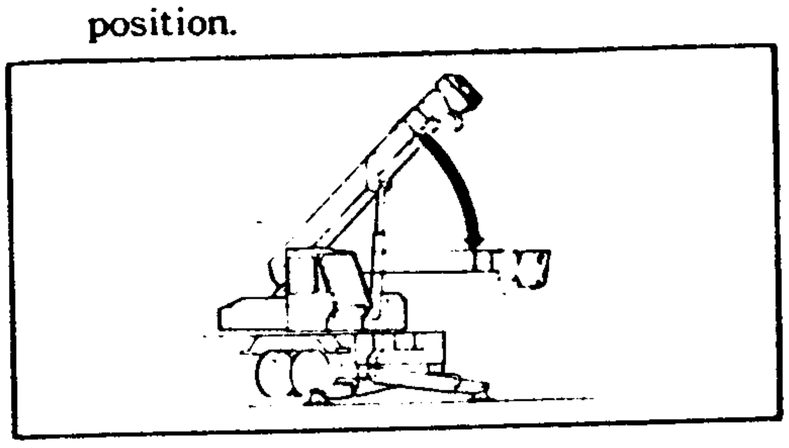


NOTE:
Whenever the top section is not in use, it should be fixed to the third section with the set pin.

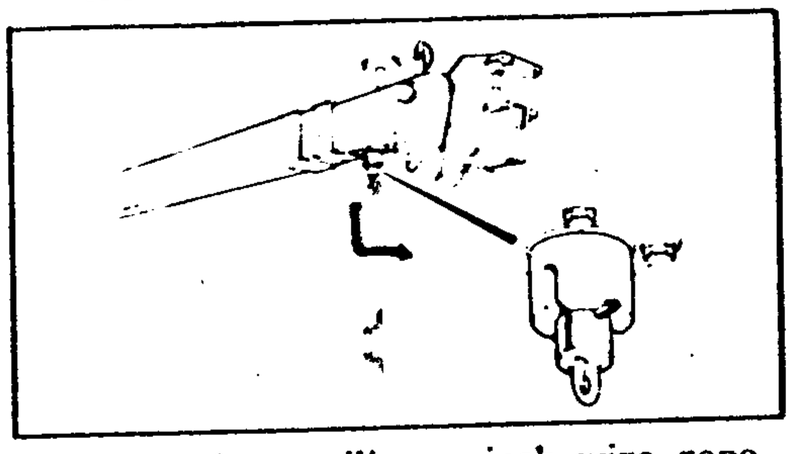
□ WITH TOP BOOM SECTION EXTENDED

■ BOOM EXTENSION

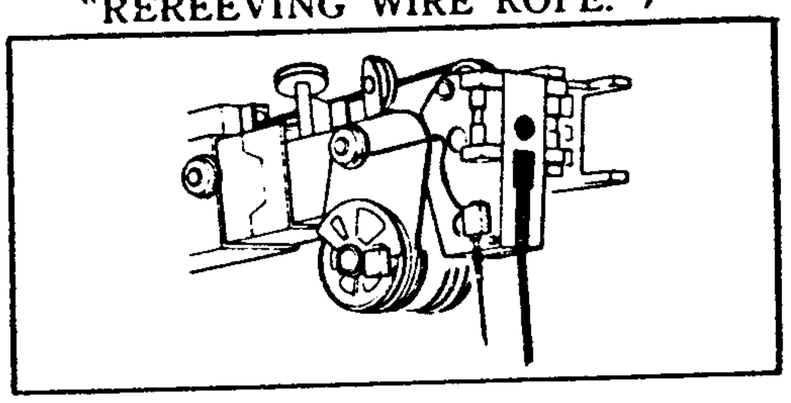
(1) Retract all the boom sections and lower the boom to the horizontal position.



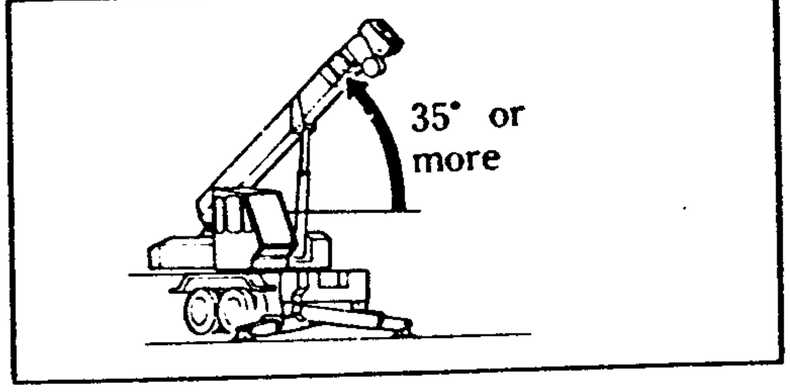
(2) Pull down the set pin with the handle, turn it by 90°, and put it in the shallow groove.
(The top section will get free from the third section.)



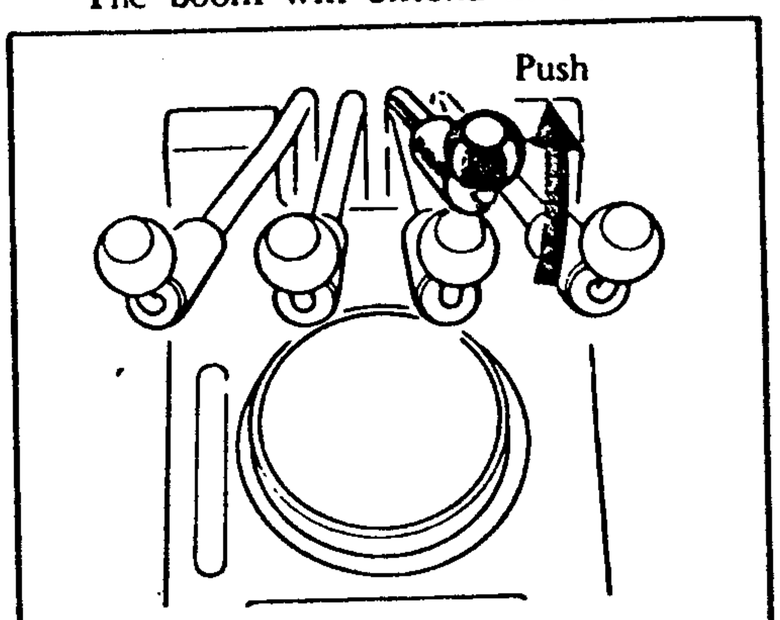
(3) Pass the auxiliary winch wire rope on the top section.
(The steps are given in "REEVING AUXILIARY WINCH WIRE ROPE ON TOP BOOM SECTION", of "REREEVING WIRE ROPE.")

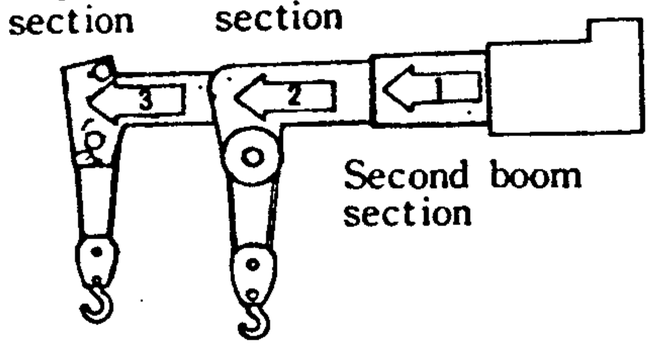


(4) Raise the boom to 35° or more.



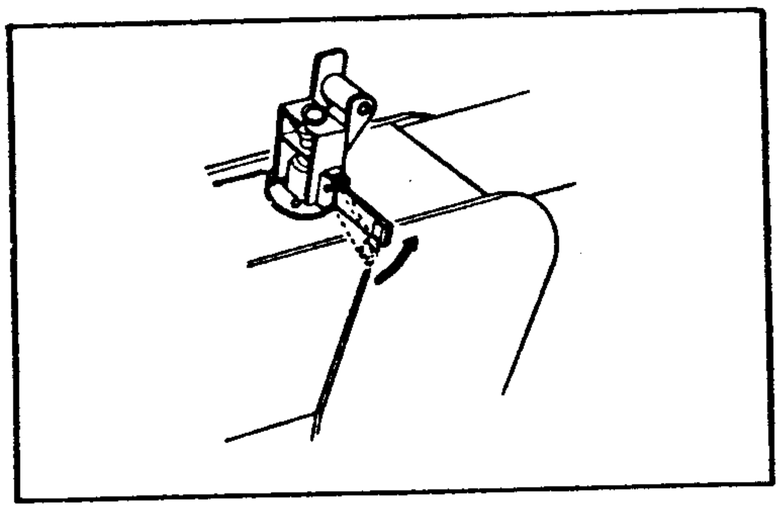
(5) Push the telescoping lever forward.
The boom will extend in order.





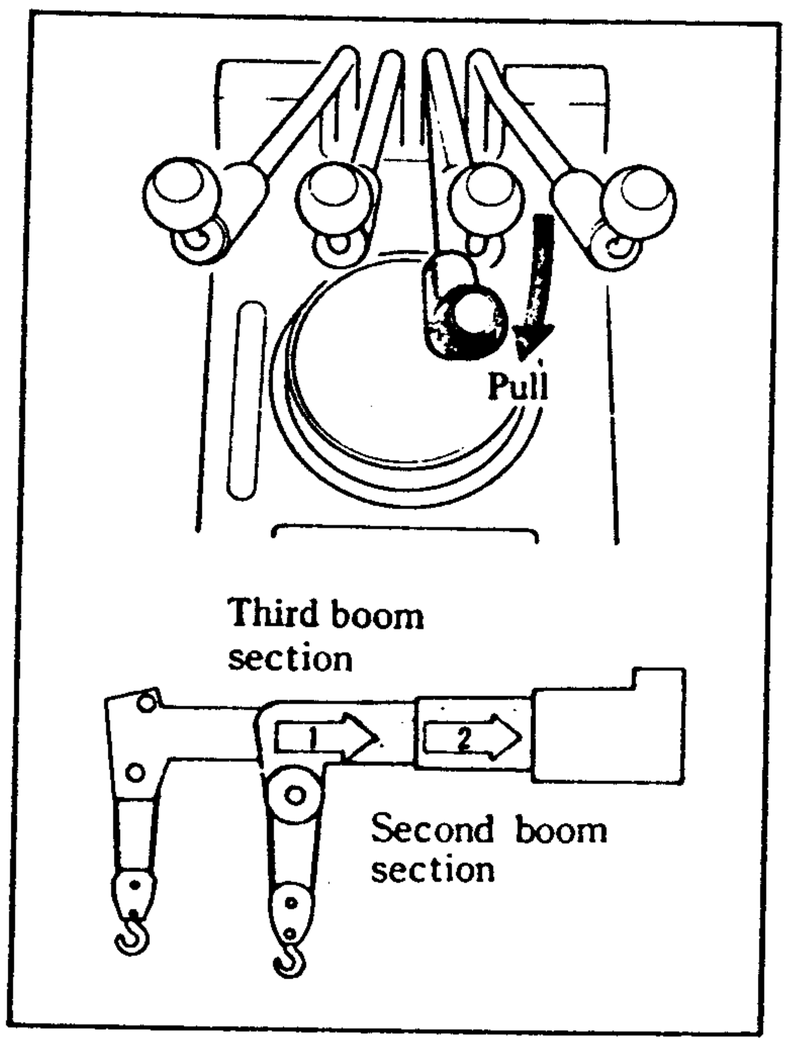
NOTE:
Before the top section is extended fully, you must not retract it.
When it is necessary to retract the partially extended top section, extend it fully first, and then retract.

(6) When the top section is extended fully, it is automatically fixed to the third section with the automatic pin.
(The bar on the boom rises, indicating that the top section has been fixed.)



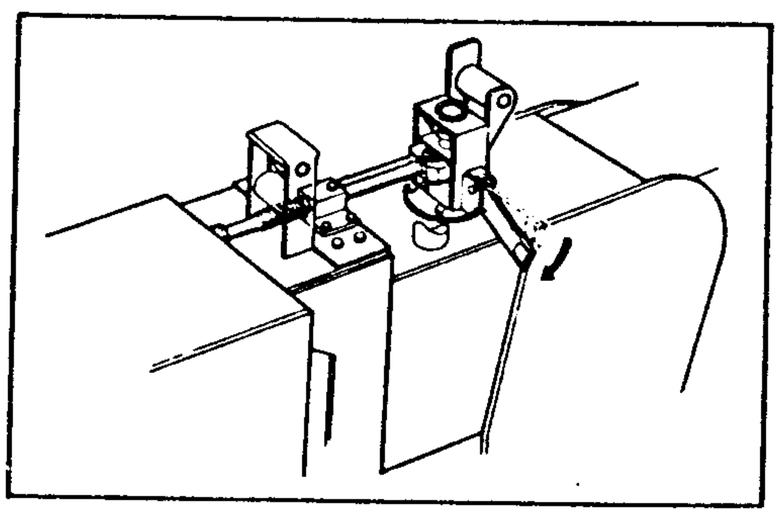
BOOM RETRACTION

(1) Pull the telescoping lever backward. The boom will retract in order.

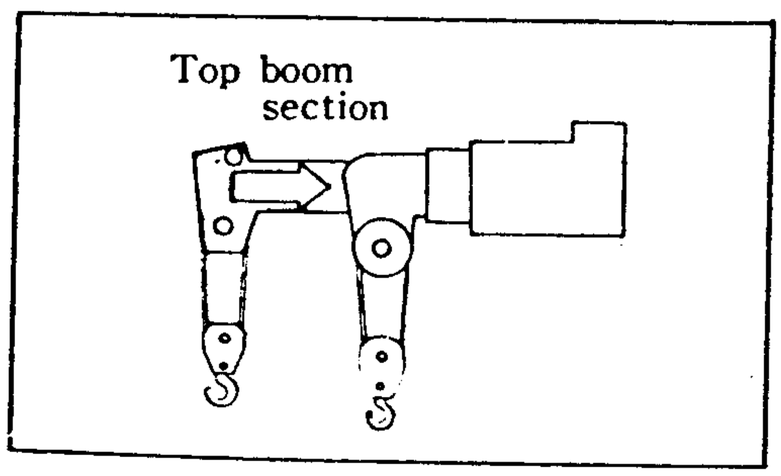


NOTE:
When the boom is elevated too high, the top section may retract rapidly. So release your foot from the accelerator pedal and return the telescoping lever to neutral as necessary, to control the speed.

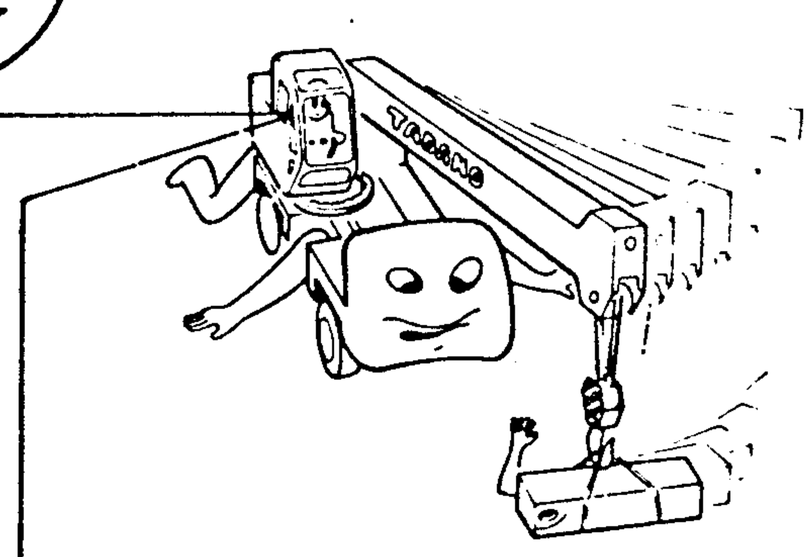
(2) When the second section is retracted fully, the automatic pin is released, unlocking the top section from the third section.



(3) Then, the top section will retract.



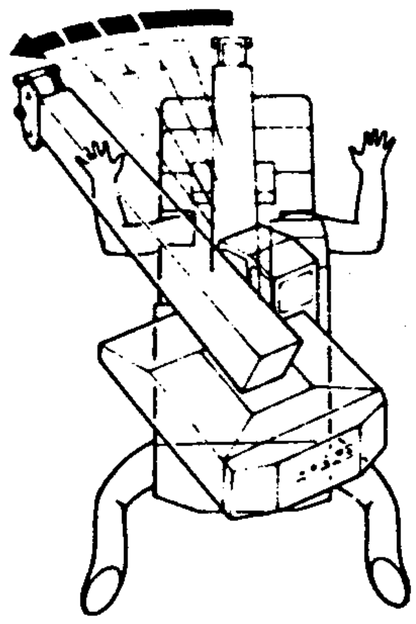
SWING OPERATION

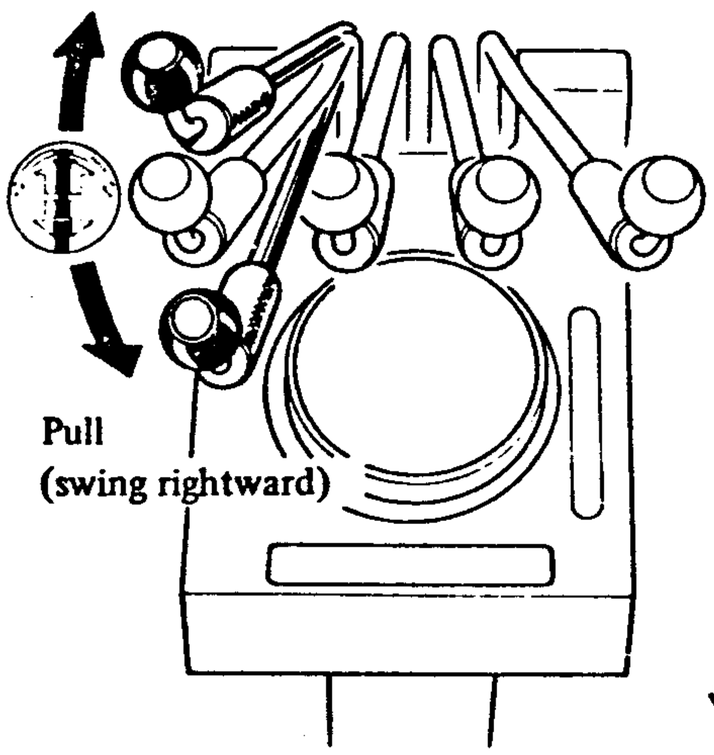


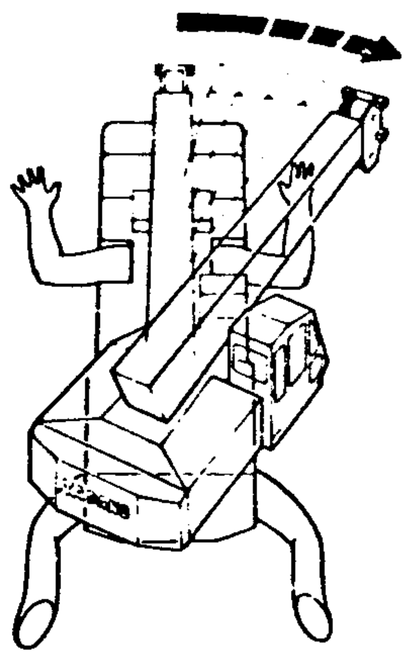
NOTES ON OPERATION

1. Lift up a load in the vertical direction only. Avoid dragging it on the ground or side-loading.
2. Check the extension of the outriggers before swinging the boom.
3. Check for working space.
4. Operate swing lever slowly.
5. Keep swing brake locked except when swinging

☐ SWING LEVER

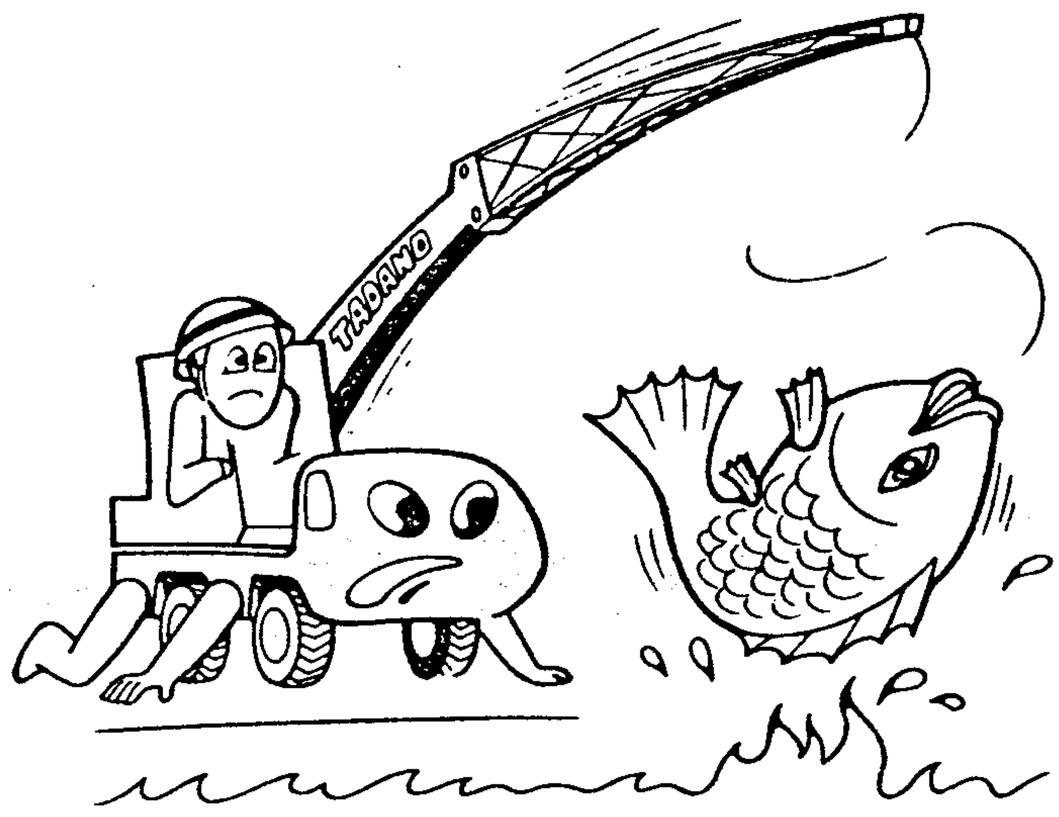






MEMO

JIB

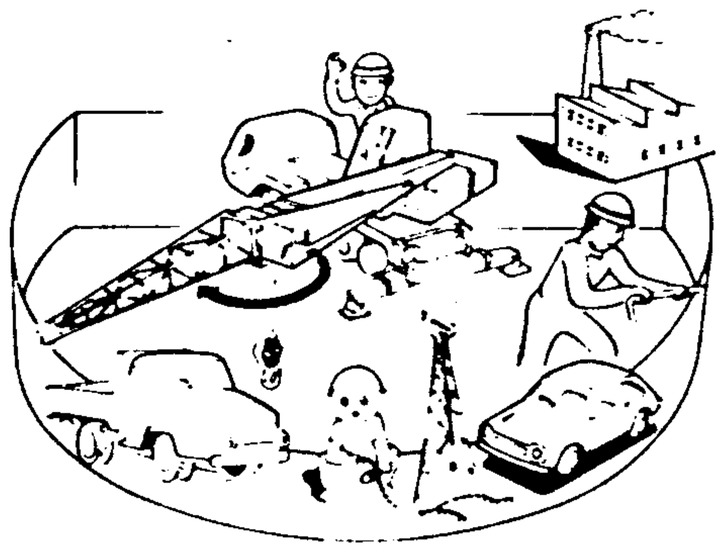


JIB

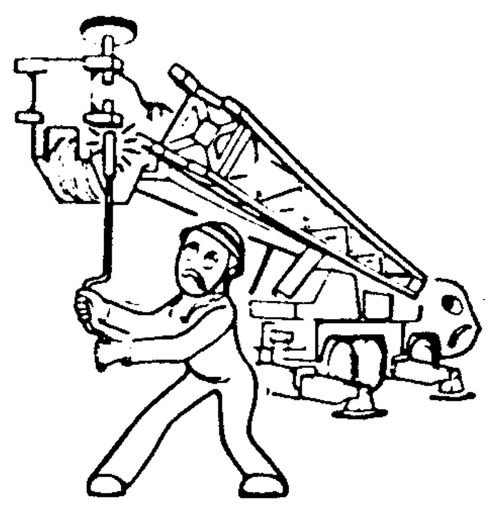
EXTENSION AND STOWING OF THE JIB

NOTES ON OPERATION

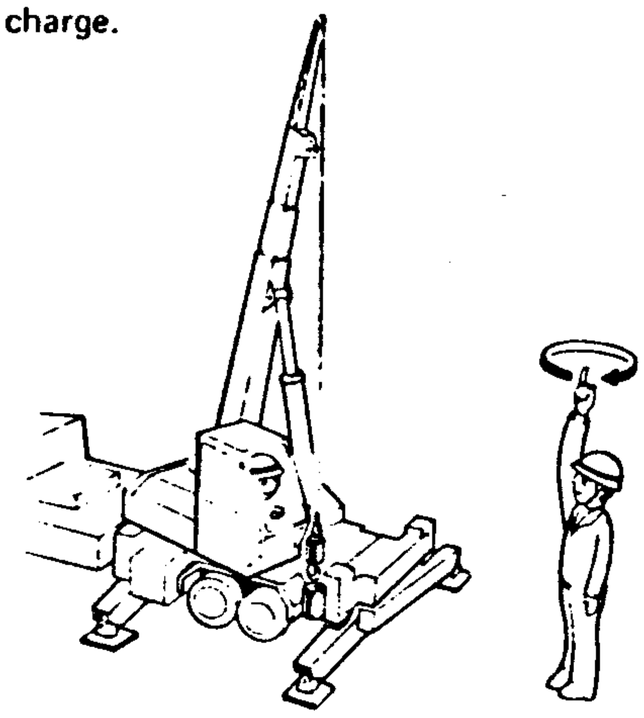
1. Make sure there are no obstacles within the working area of the extended jib.



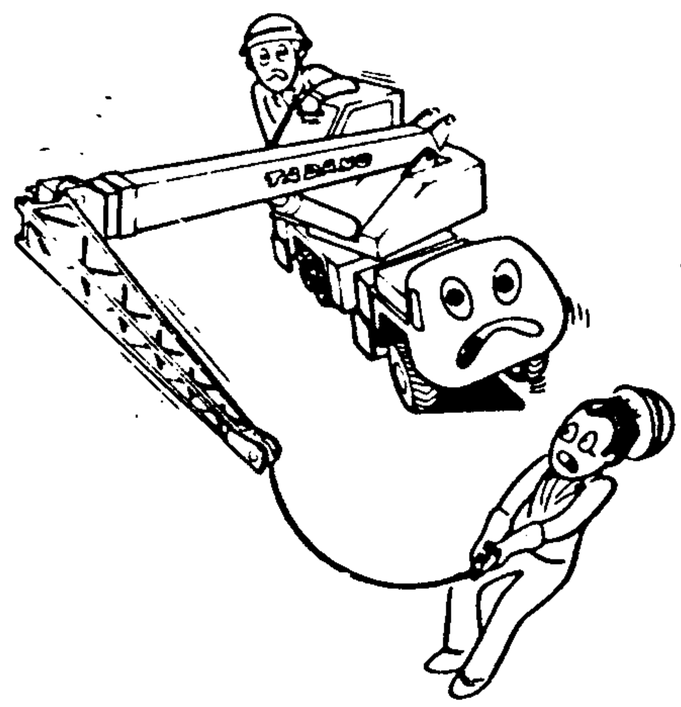
2. Make sure the pins have been duly inserted or drawn off completely.



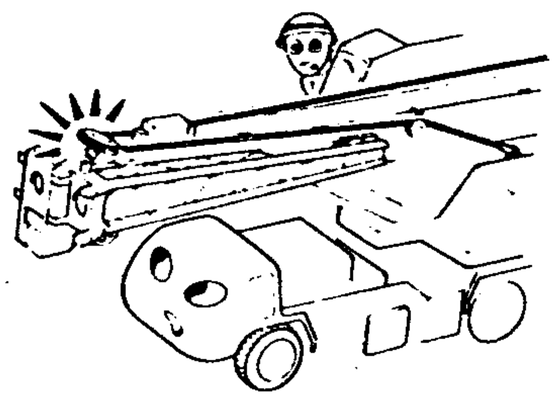
3. Take out or store the auxiliary hook in accordance with the signals of the person in charge.



4. Outriggers should be fully extended when the jib is extended and stowed.

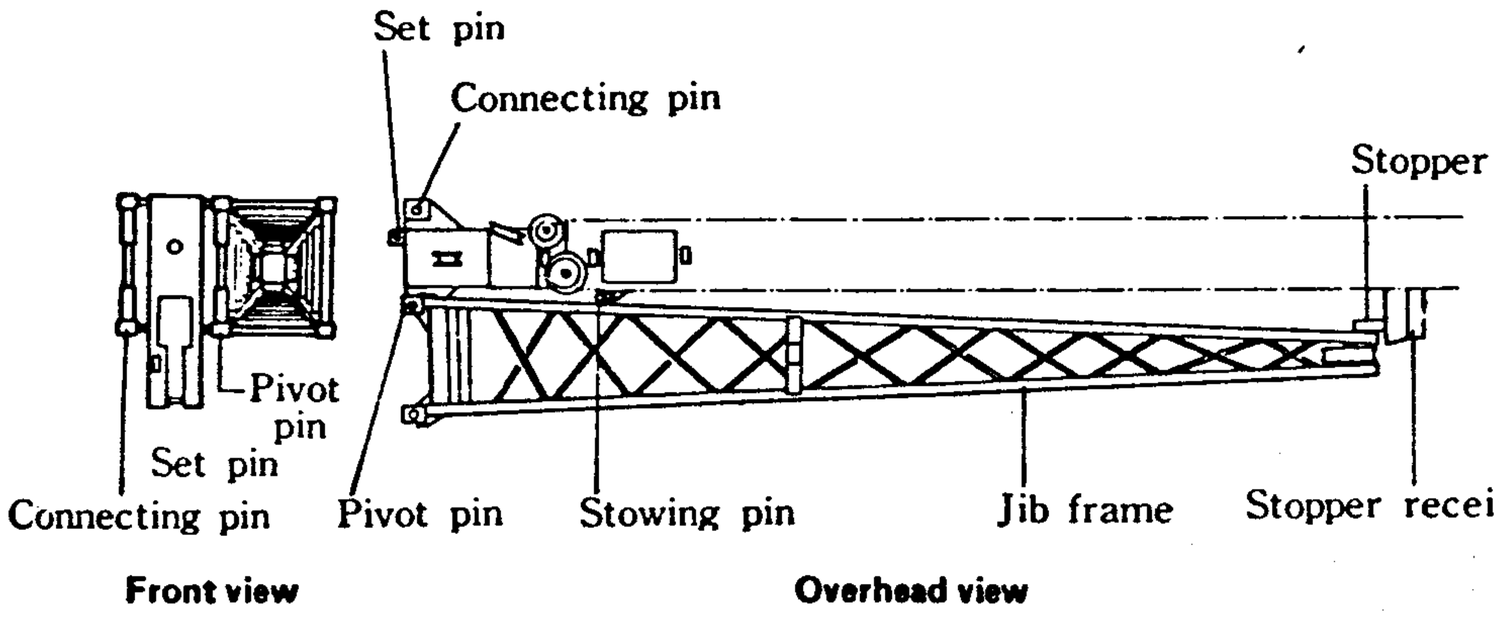


5. When stowing the jib, take extreme care not to over-tighten the auxiliary winch rope.



6. The boom should be elevated at more than 45° for crane work with all the boom sections and jib extended.

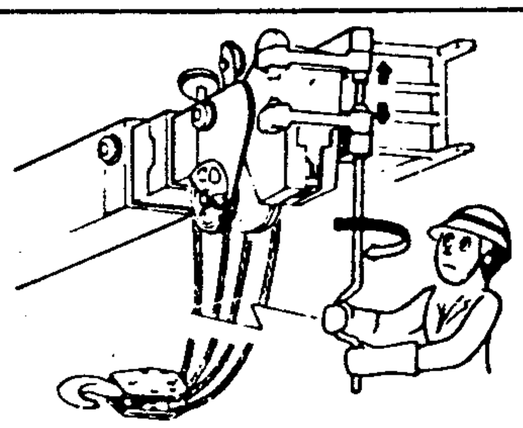
NAMES OF JIB PARTS



☐ EXTENSION

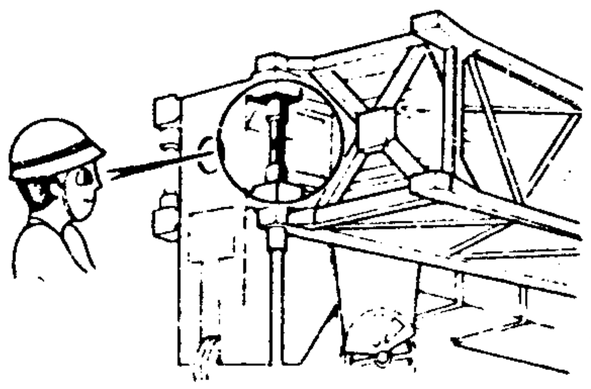
When it is necessary to extend the top section after jib extension, follow the steps (1) and (2) of "WITH TOP BOOM SECTION EXTENDED before starting jib extension.

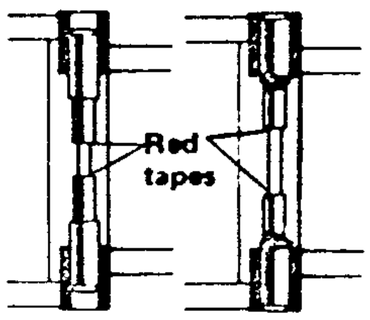
(1) Insert the pivot pin.



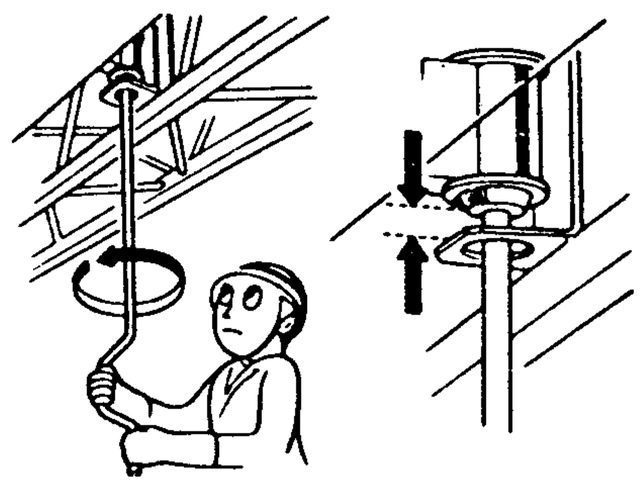
Turn the pivot pin to the arrow direction about 26 rotations using the handle.

Make sure the pivot pin has been firmly inserted.



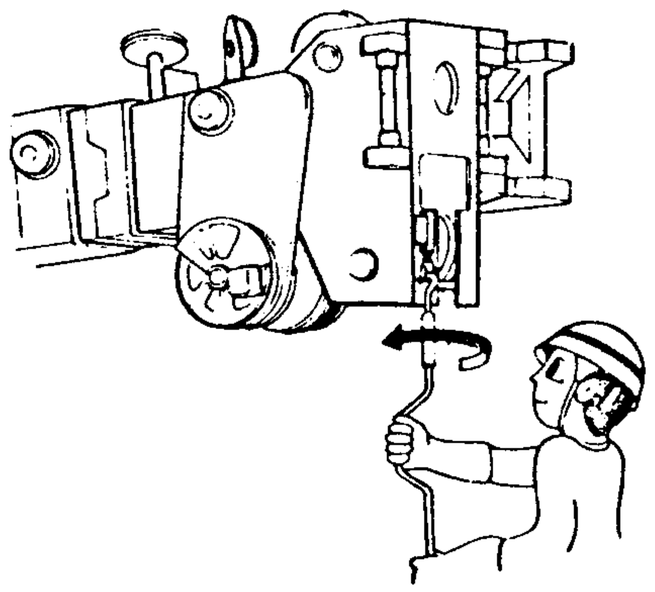


(2) Draw out the stowing-pin.

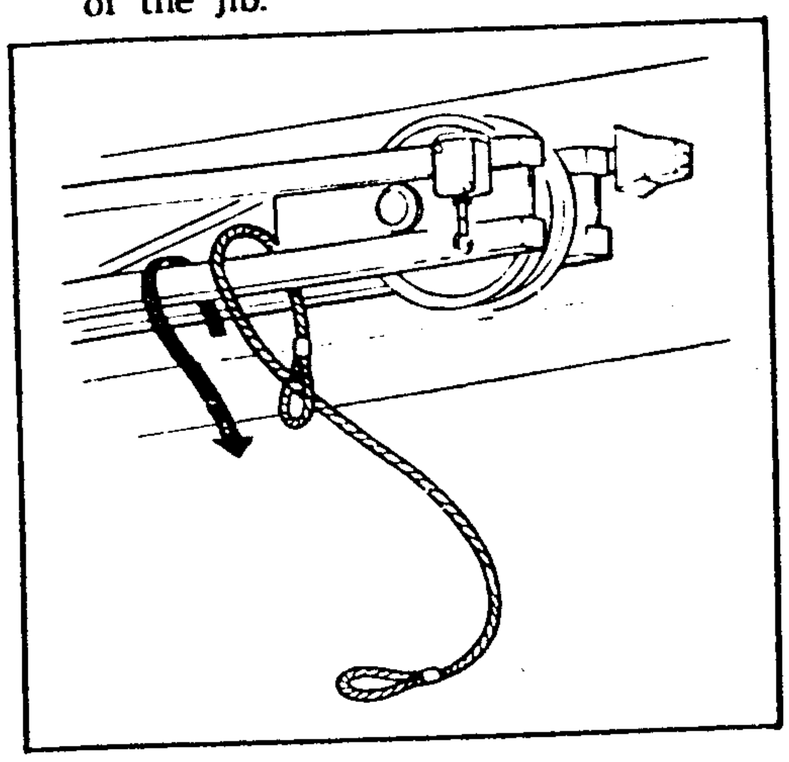


Turn the pin to the arrow direction about 13 rotations using the handle.

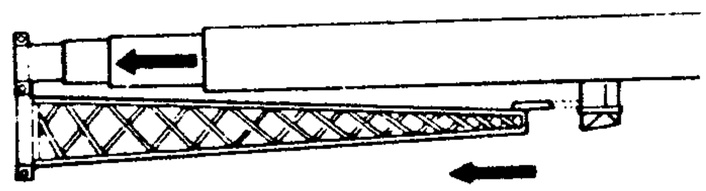
(3) Turn the set pin free using the handle.



(4) Apply a wire rope to the top end of the jib.

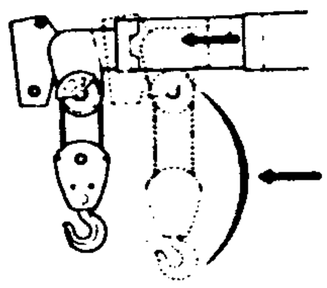


(5) Extend the boom until the jib stopper comes out of the stopper receiver.

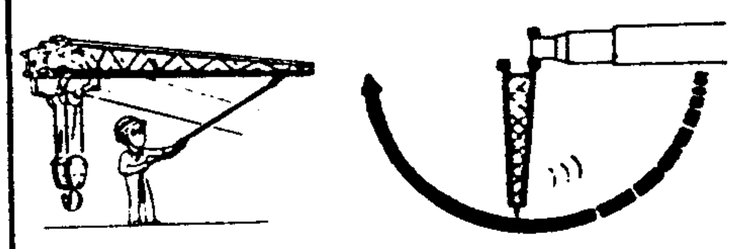


NOTES:

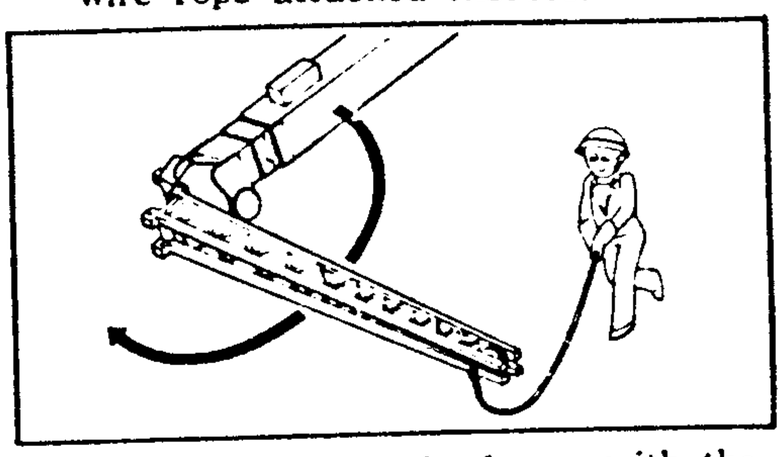
1. When extending the boom, be careful not to overwind the main winch hook.



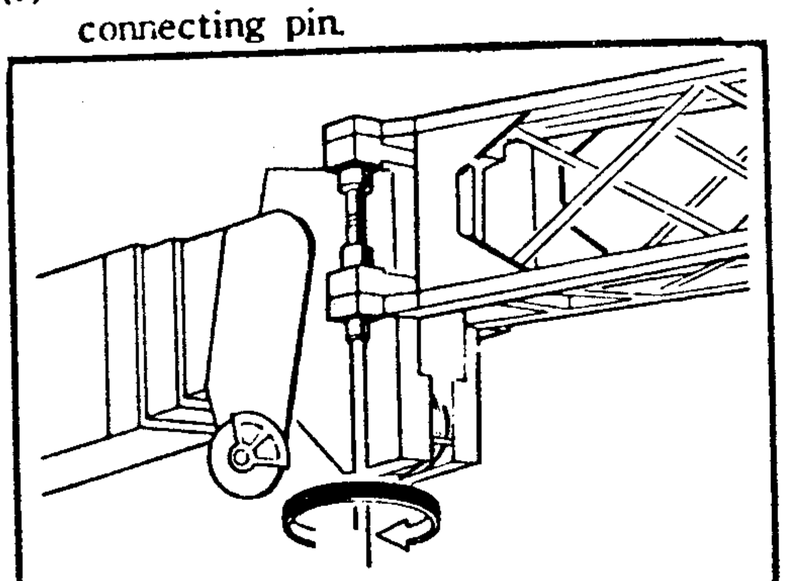
2. After the jib has come out of the stopper receiver, it will turn frontward by itself.
   So keep it by the rope.



(6) Extend the jib, keeping it by the wire rope attached thereto.

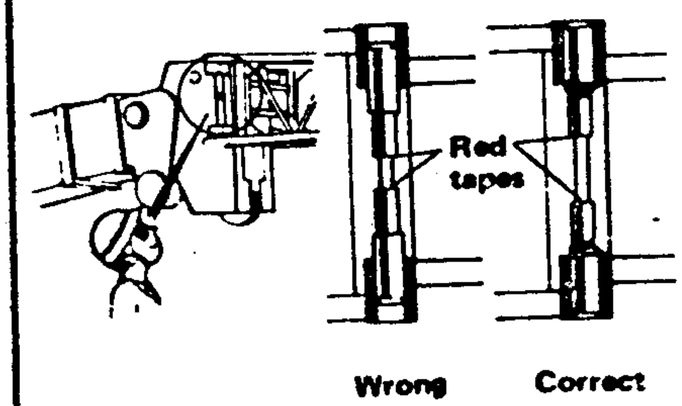


(7) Secure the jib to the boom with the connecting pin.

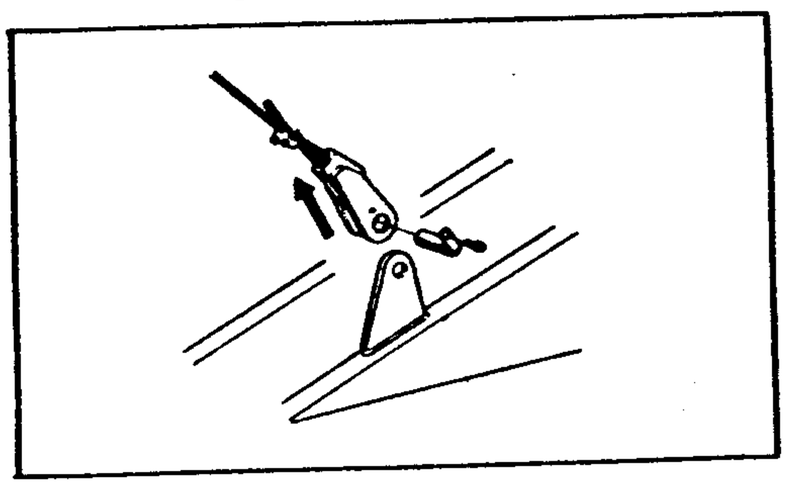


Turn the pin to the arrow direction about 26 rotations using the handle.

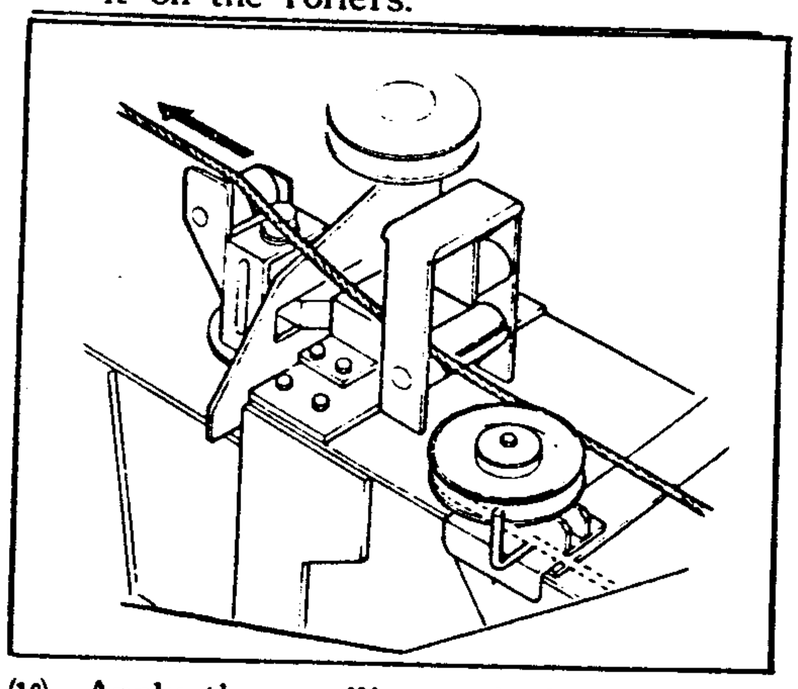
Make sure that the connecting pin has been firmly inserted.



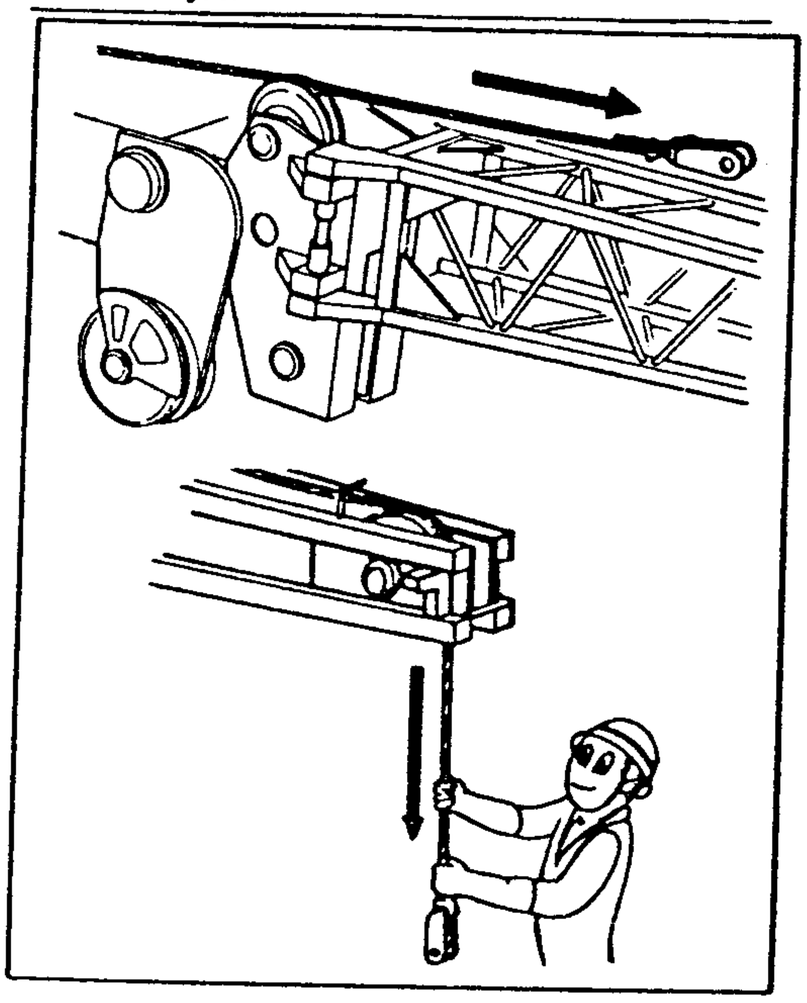
(8) Remove the wire rope socket from the swing table.



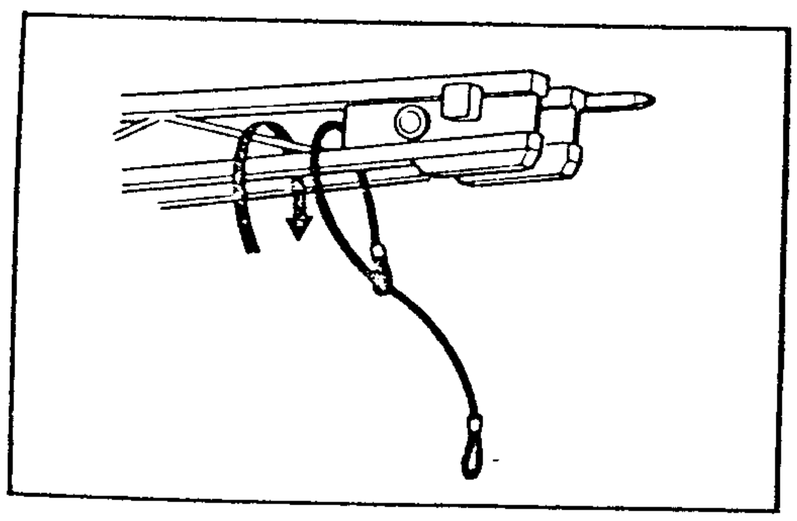
(9) Take the auxiliary winch rope off the horizontal sheave, and place it on the rollers.



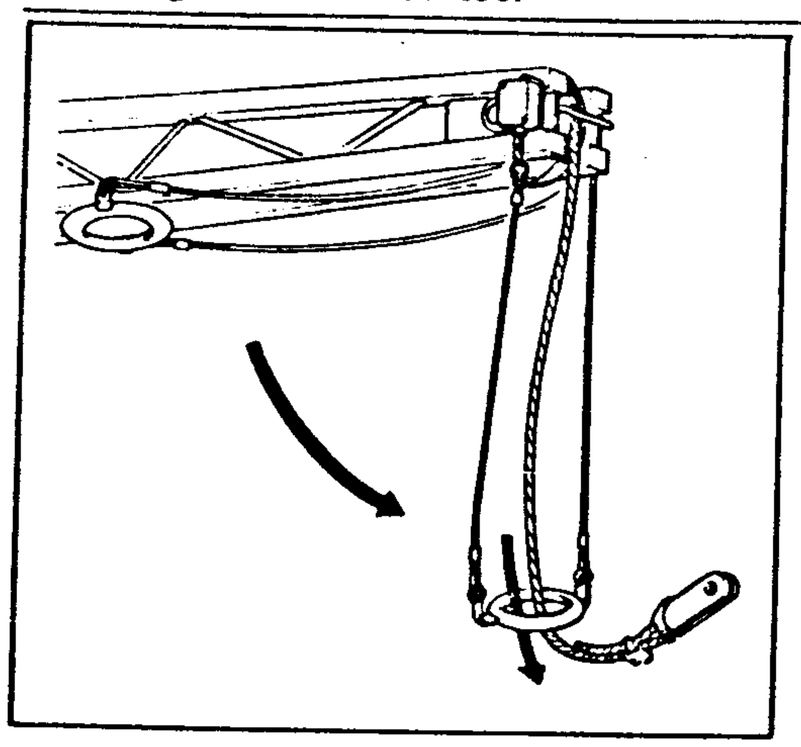
(10) Apply the auxiliary winch rope to the jib.



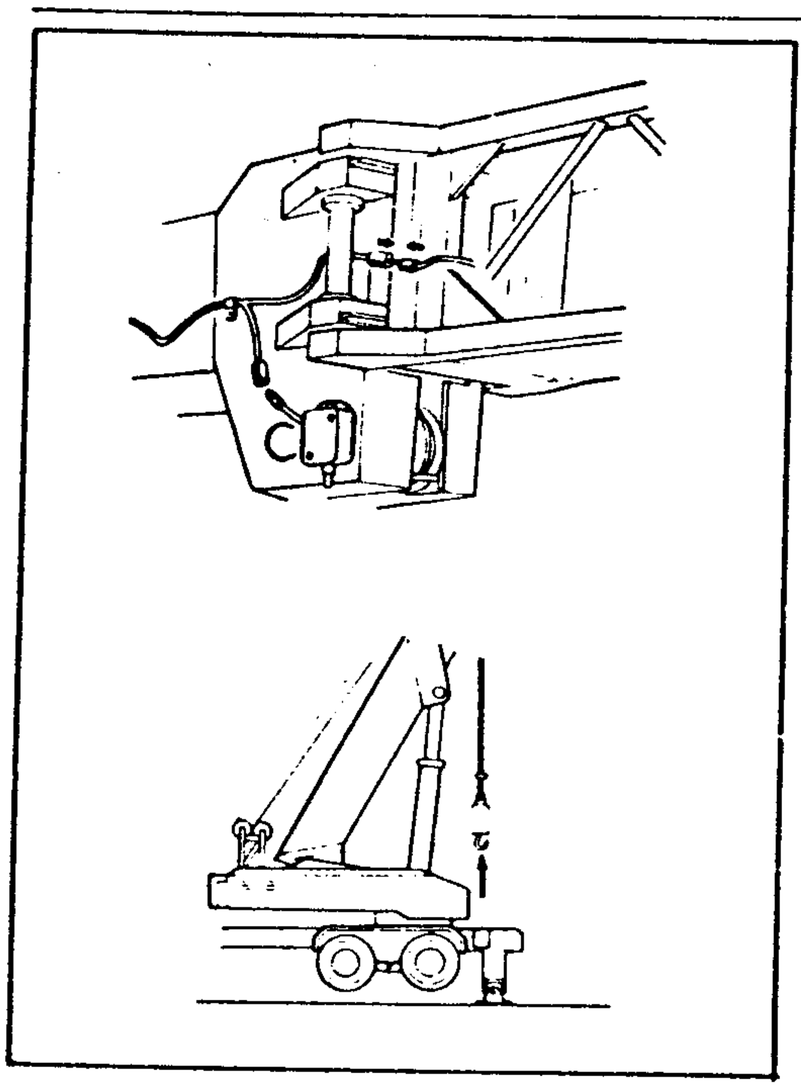
(11) Remove the rope.



(12) Remove the over-winding alarm device wire rope and then pass the auxiliary winch rope through the weight for the device.

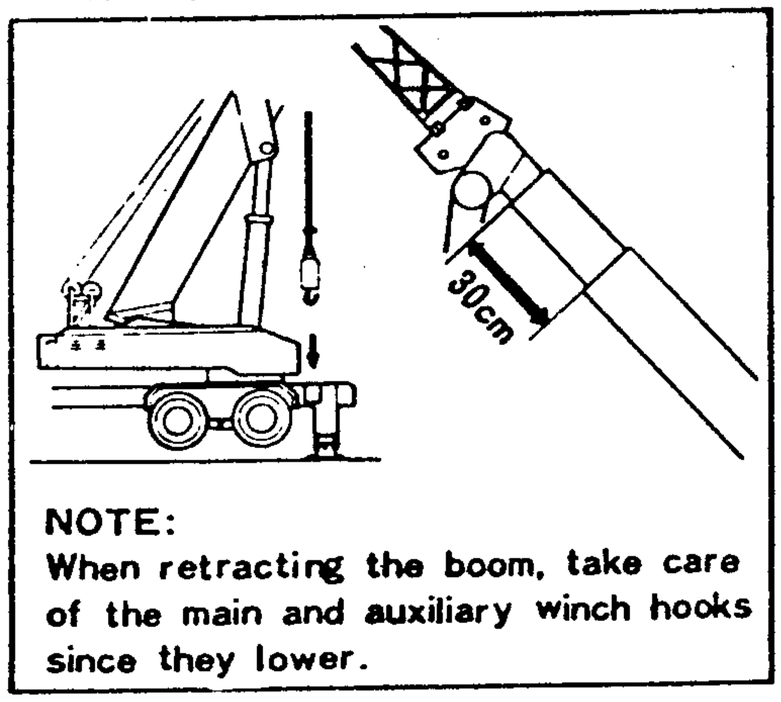


(13) After connecting the over-winding alarm device cord, take out the auxiliary winch hook.



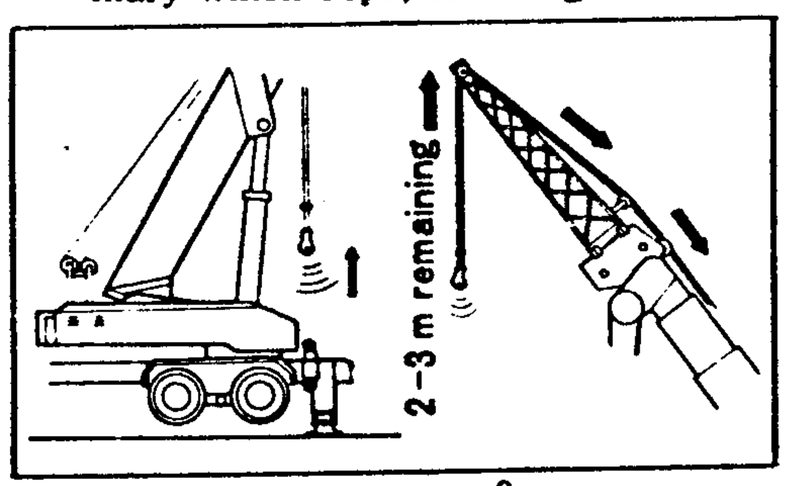
□STOWING

(1) Bring the auxiliary winch hook over its stowing place.(Extend the boom about 30cm.)

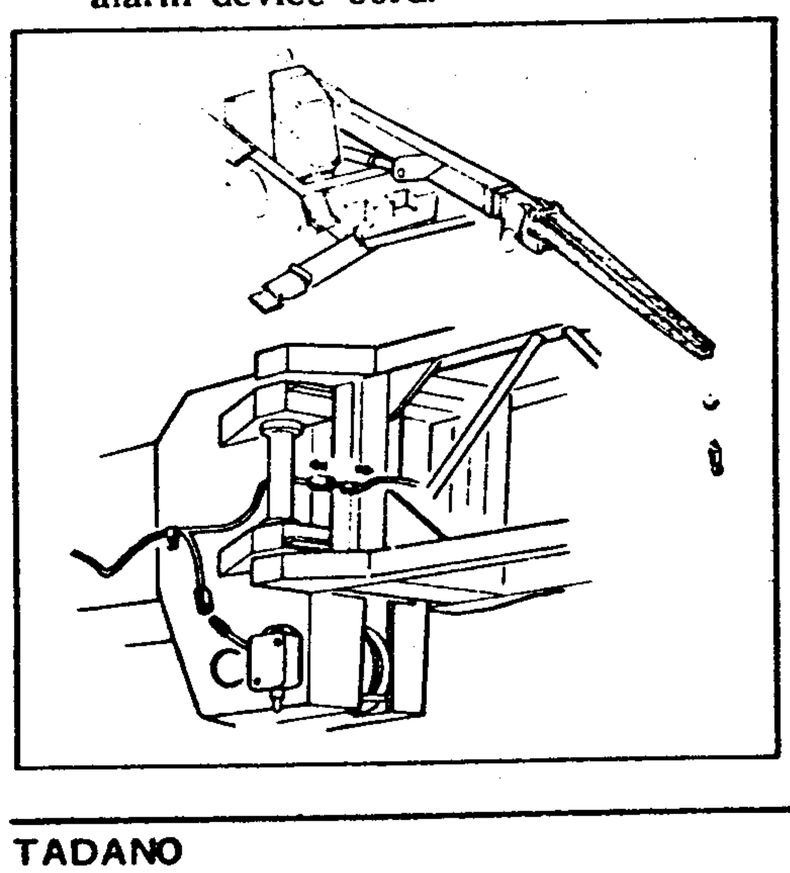


NOTE:
When retracting the boom, take care of the main and auxiliary winch hooks since they lower.

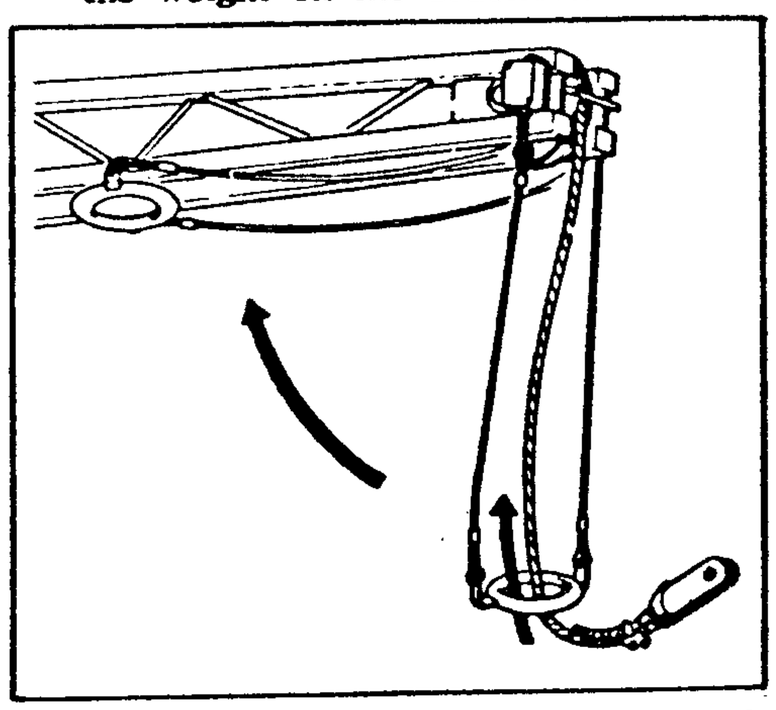
(2) After stowing the auxiliay winch hook, remove the auxiliary winch hook from the rope socket and wind up the aux iliary winch rope, lowering the boom.



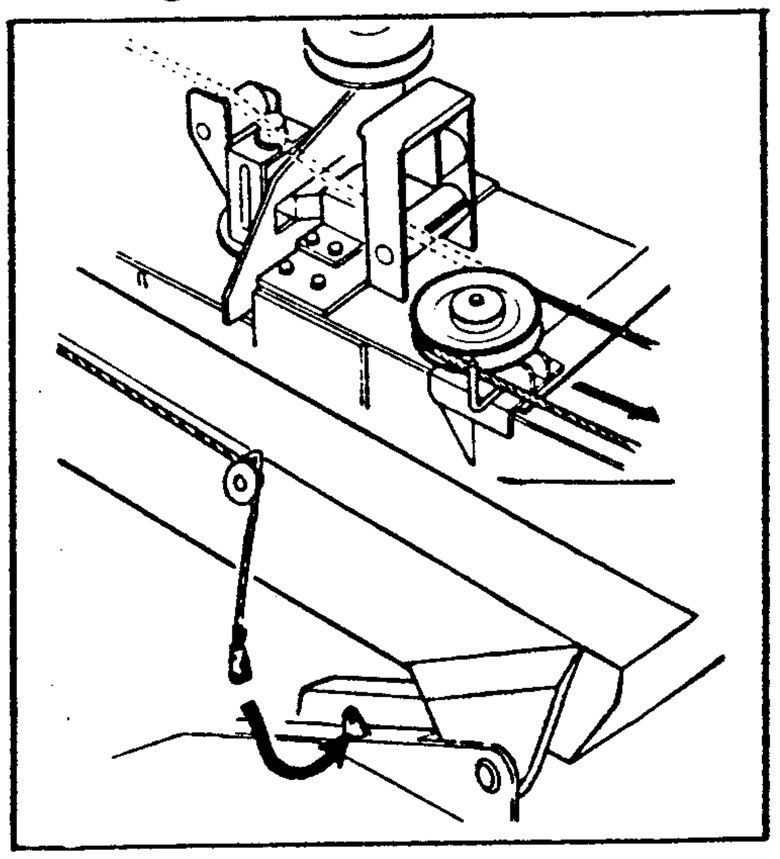
(3) Lower the boom to 0°.
Then disconnect the over-winding alarm device cord.



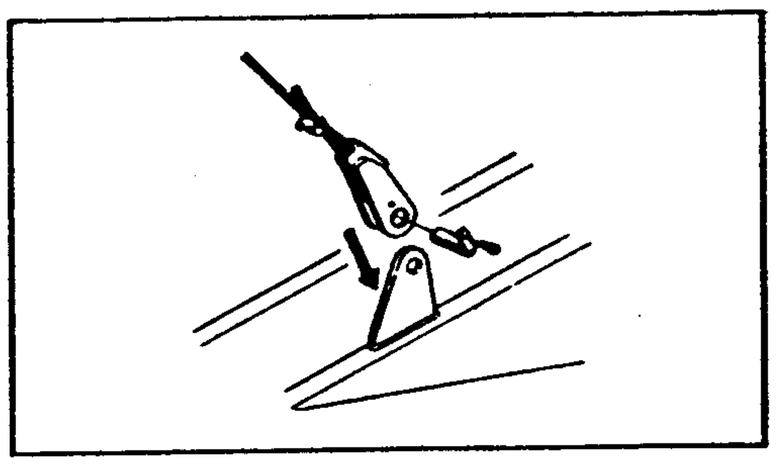
(4) Take the rope off the weight of the over-winding alarm device, and stow the weight on the brackets.



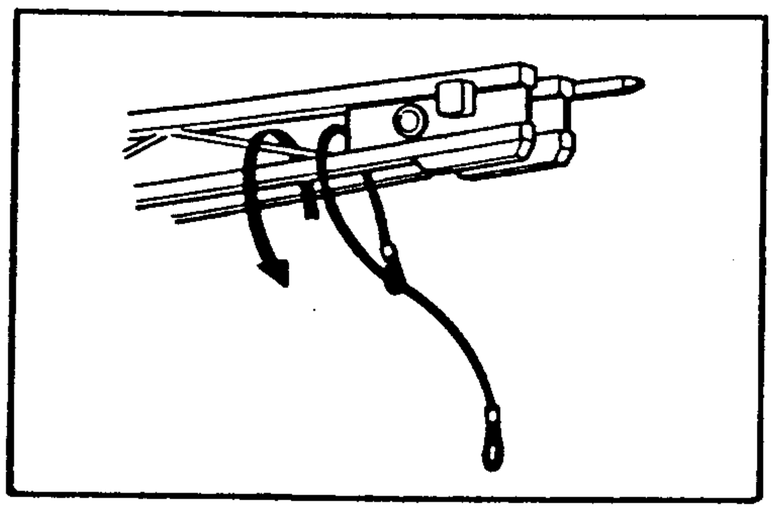
(5) Draw out the rope from the jib and rollers, and pass it on the horizontal sheave on the top of the base section and guide roller on its side.



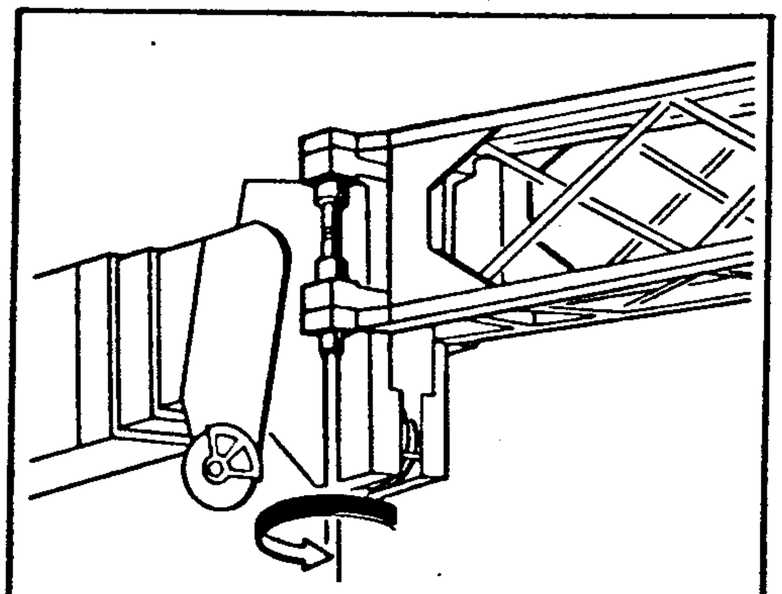
(6) Fasten the rope socket to the bracket.



(7) Apply a wire rope to the top end of the jib.

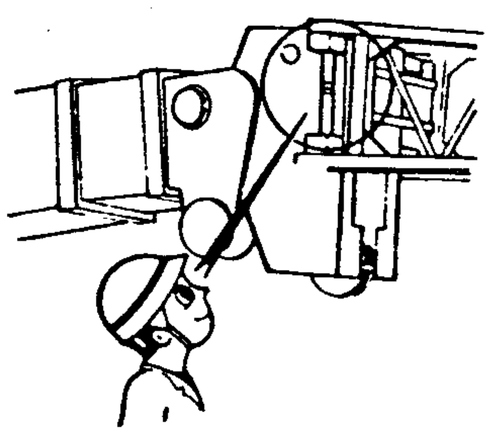


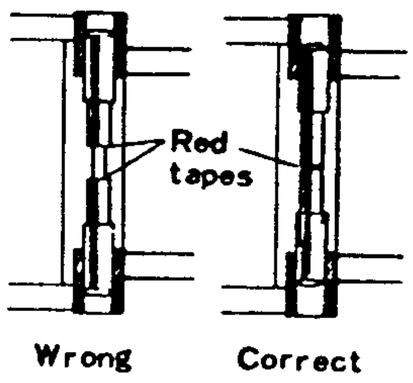
(8) Turn off the connecting pin.



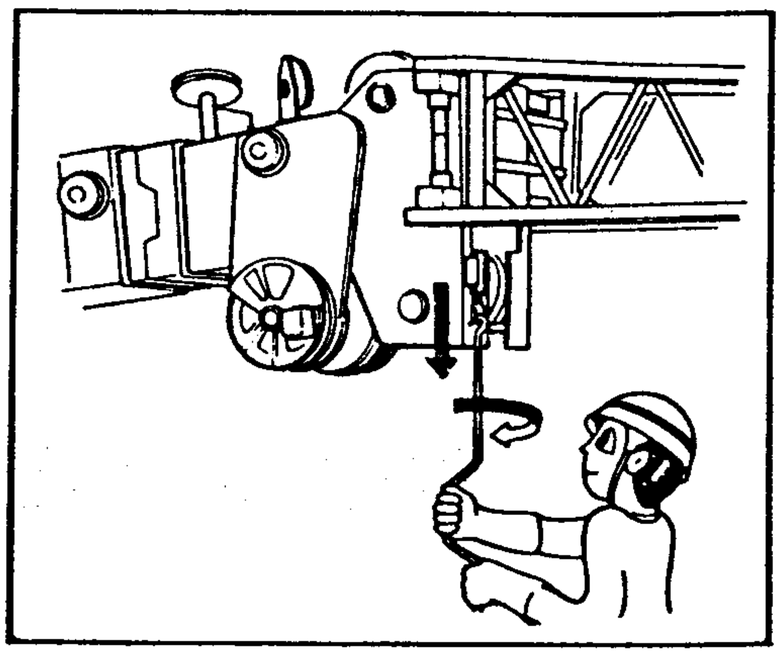
Turn the pin to the arrow direction about 26 rotations using the handle.

Make sure that the connecting pin has been completely drawn out.

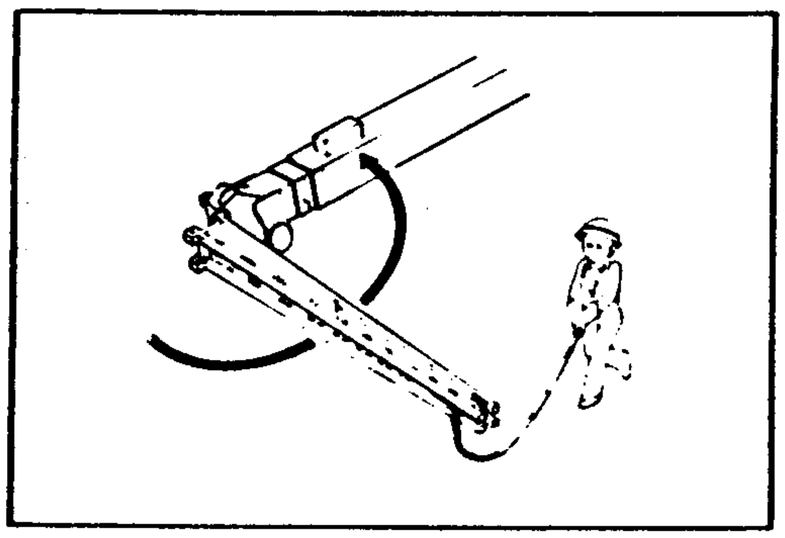




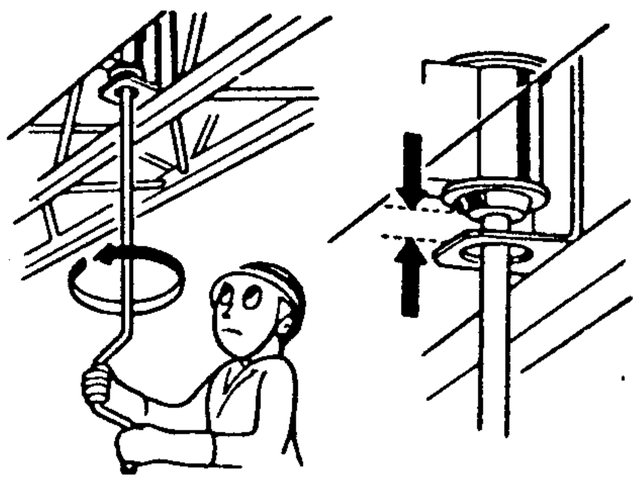
(9) Pull down the set pin and turn it so that the stopper is retained on the bracket.



(10) Fold the jib to the side of the boom. Retract the boom and the jib stopper enters the receiver.
(Retract the boom by inching.)

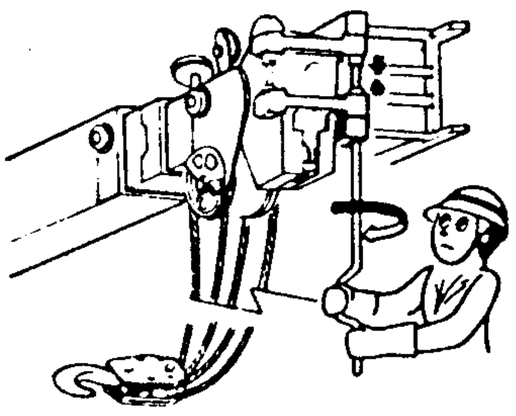


(11) Insert the stowing pin and the jib will be secured to the boom.



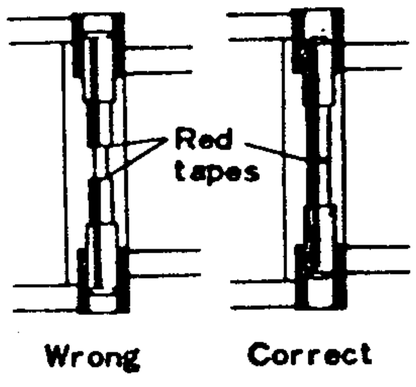
Turn the pin to the arrow direction about 13 rotations using the handle.

(12) Turn off the pivot pin.

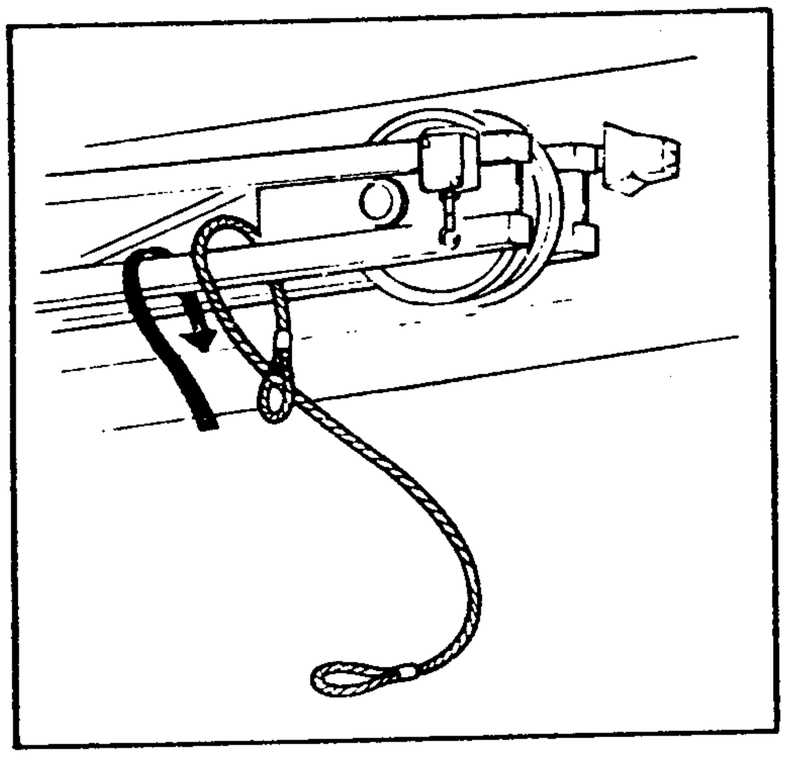


Turn the pin to the arrow direction about 26 rotations using the handle.

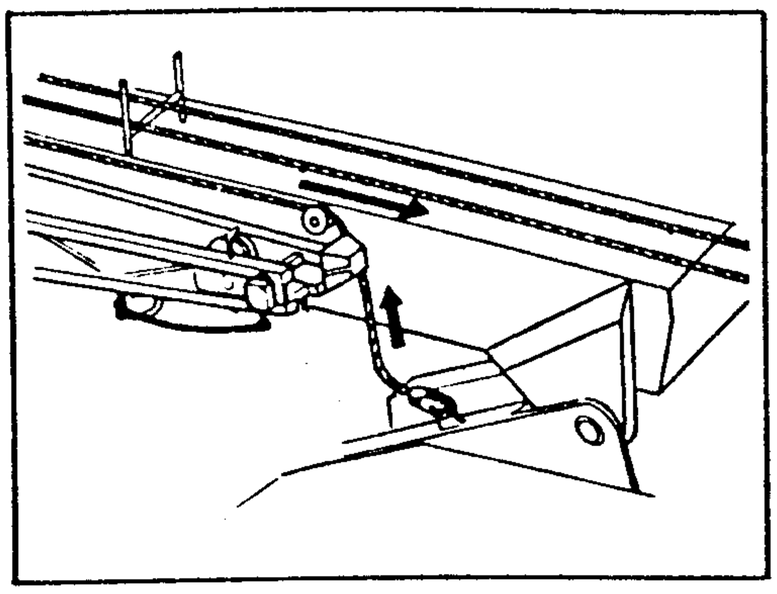
Make sure that the pivot pin has been completely drawn out.



(13) Remove the wire rope.



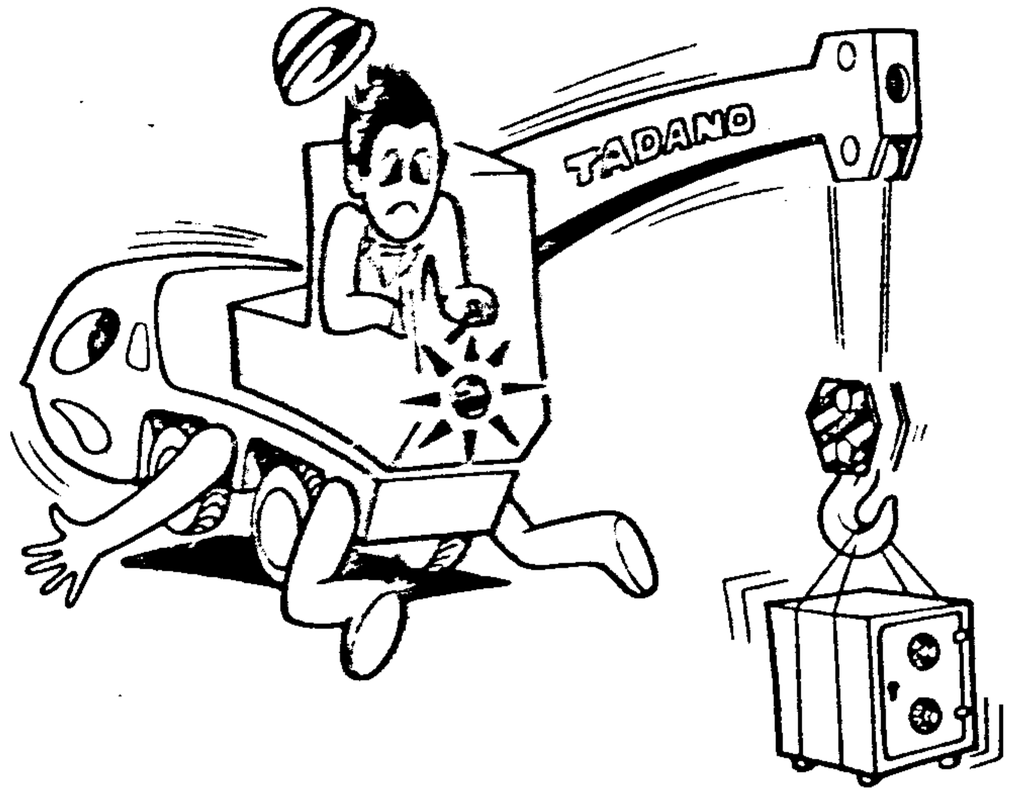
(14) Wind up the rope until it becomes slightly slack.



16352-06011

MEMO

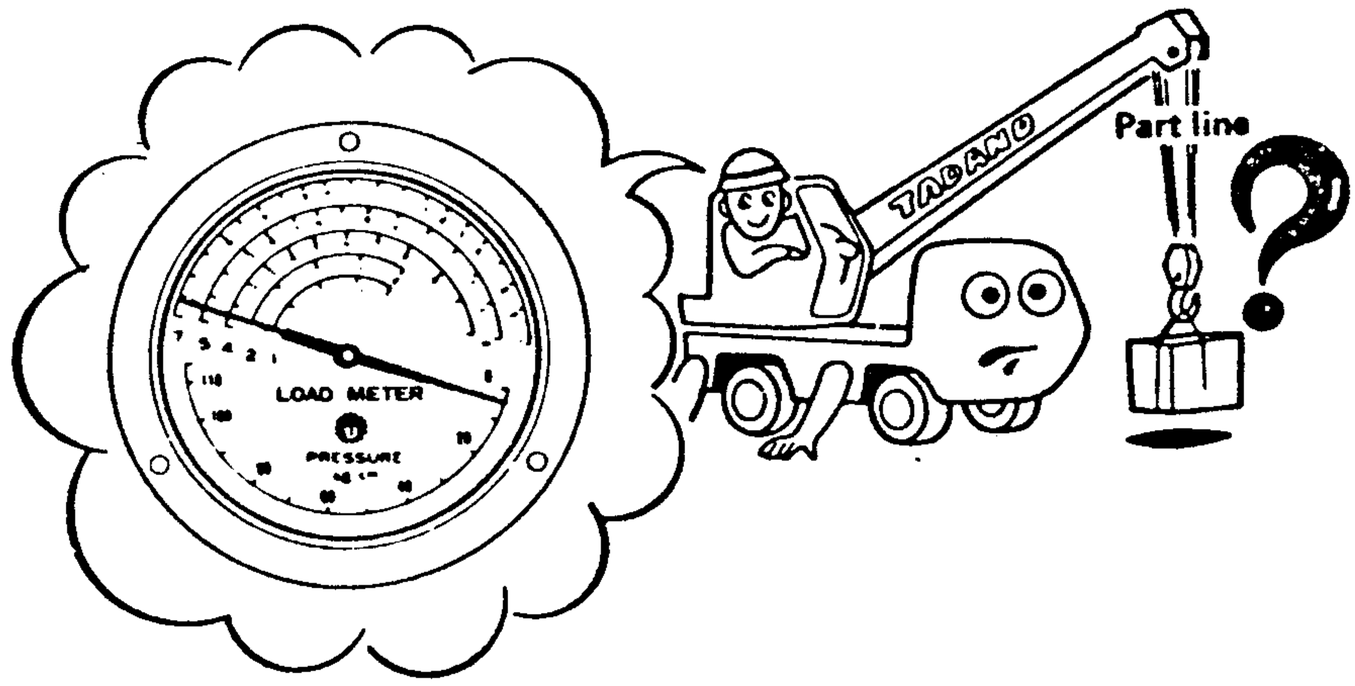
SAFETY DEVICES



SAFETY DEVICES

LOAD METER

Operate the crane safely by reading the weight of load in accordance with the number of part line used.

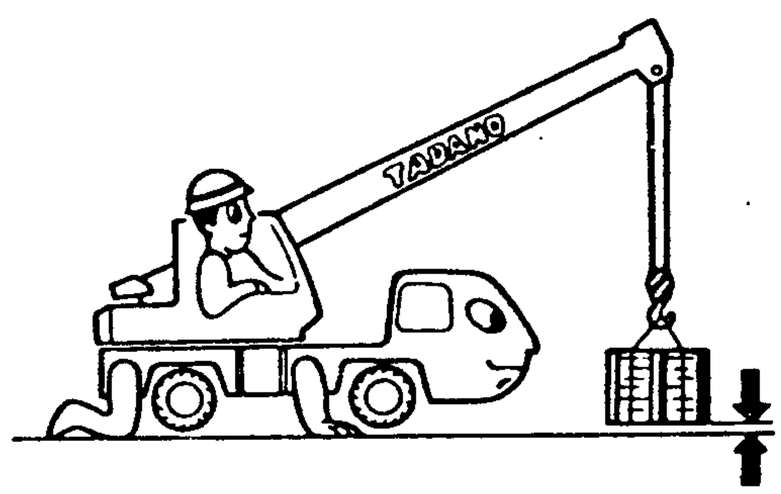


There is no scale for 6 - part line on this gauge.
However, the load will be known by the following calculation.

Example : Work is being performed on 6 - part line.
The indicator needle reads 4,000kg on the 4 - part line scale.

$$\text{The result is } 4{,}000 \text{ Kg} \times \frac{3}{2} = 6{,}000 \text{ Kg}$$

NOTE:
Read the weight of a load, lifting it slowly and slightly from the ground.

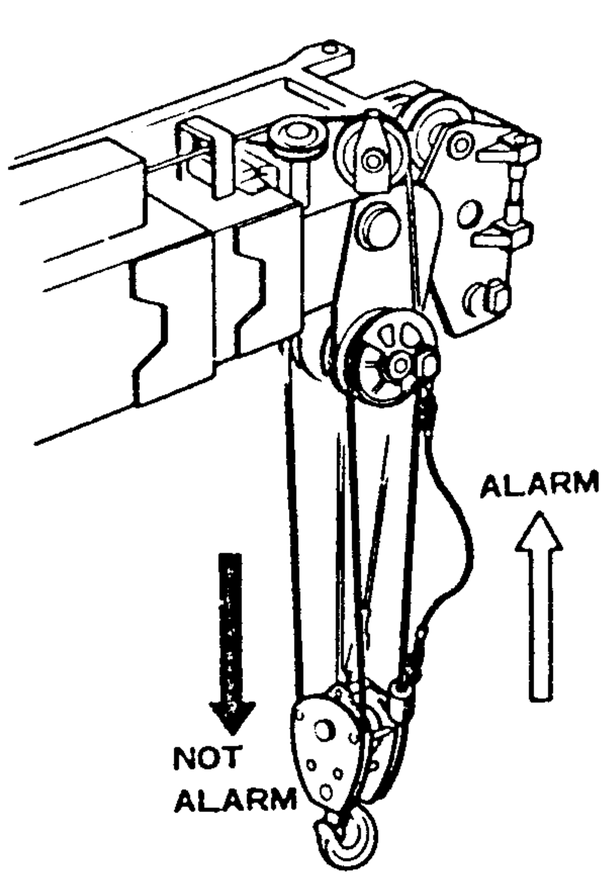


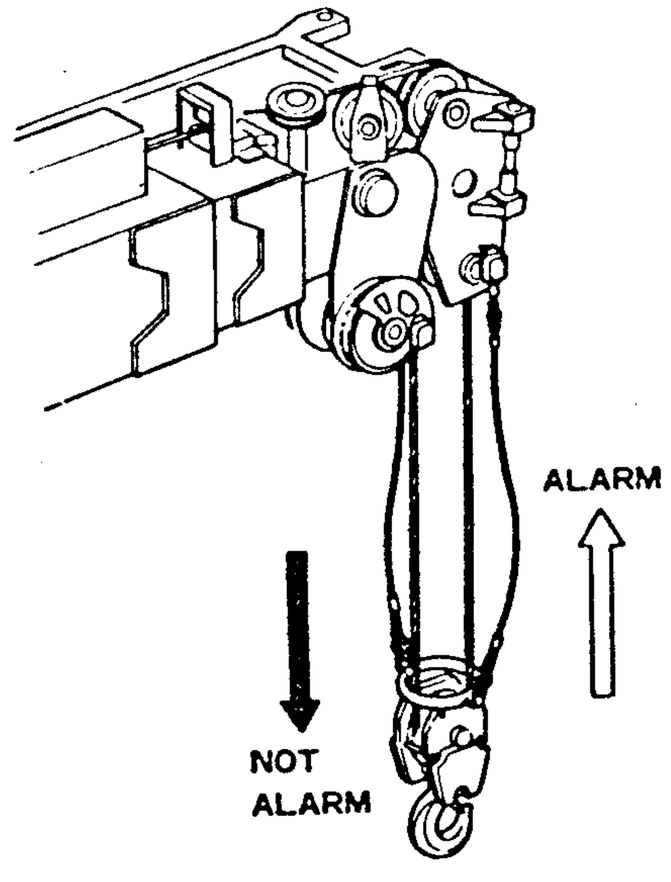
MEMO

OVER-WINDING ALARM DEVICE

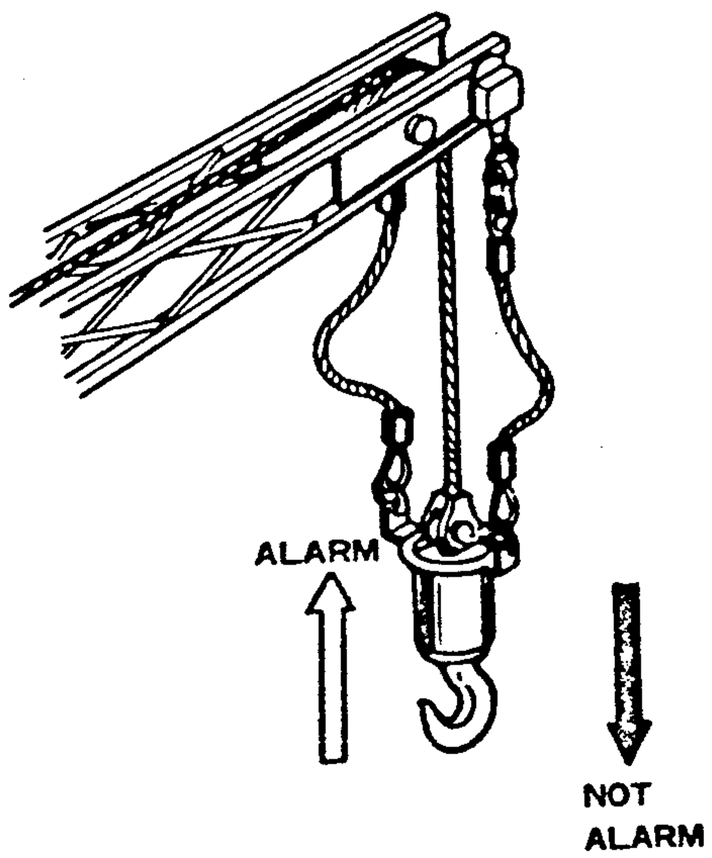
This device automatically alarms over-winding when the hook nears the boom nose or jib top.

☐ FOR BOOM





☐ FOR JIB

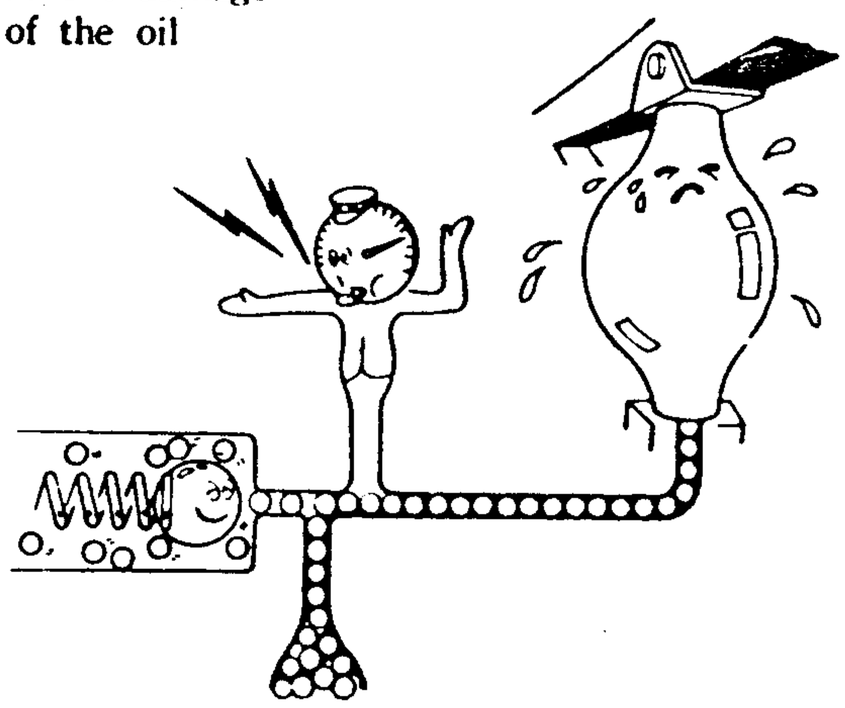


NOTE :
The weight of the over-winding alarm device for jib can serve as that for the top boom section. Hang it on the top section or jib as necessary.

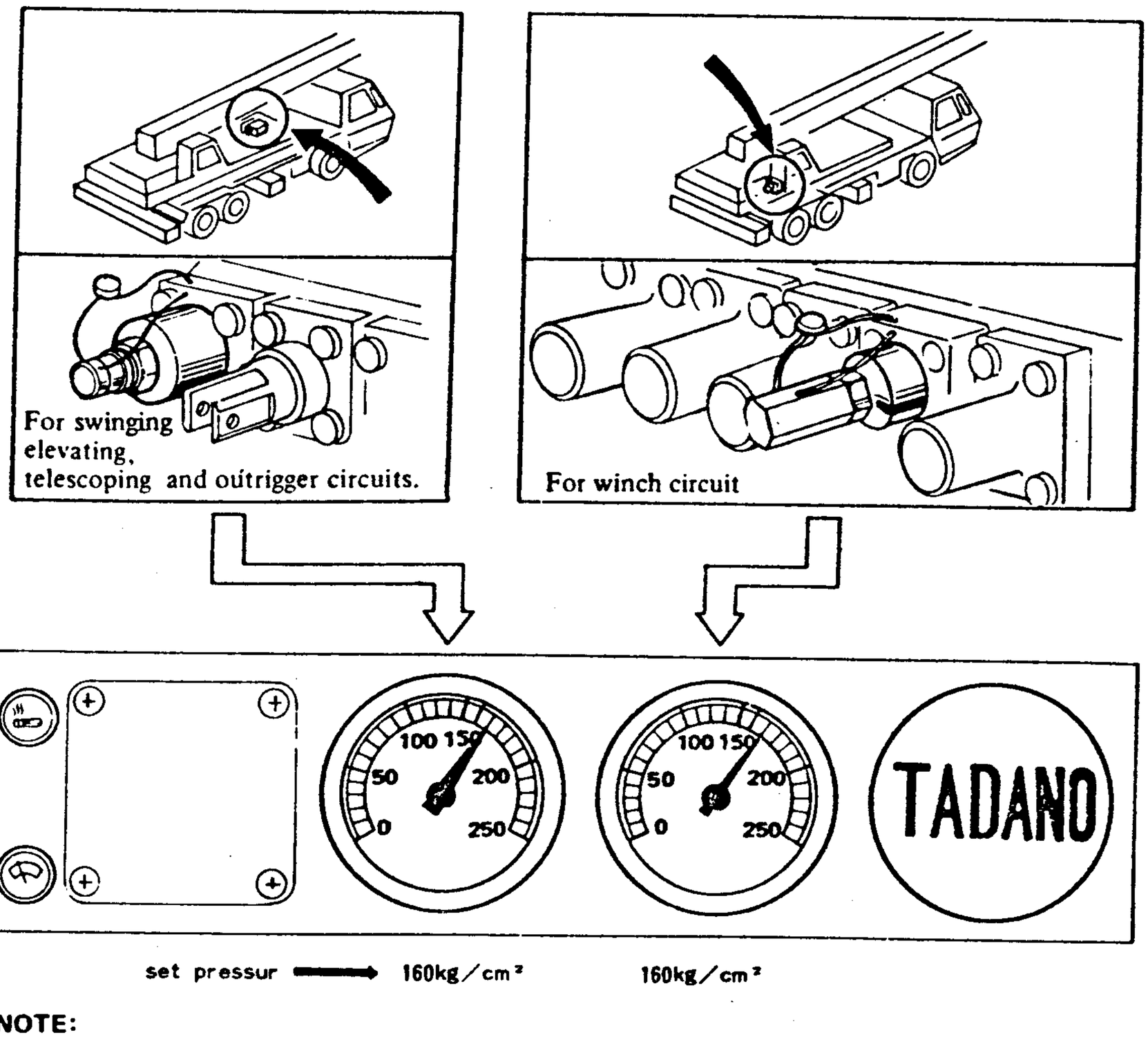
MEMO

SAFETY VALVES

Two safety valves are provided to prevent damage to the crane due to abnormal rising of the oil pressure.



LOCATIONS



NOTE:

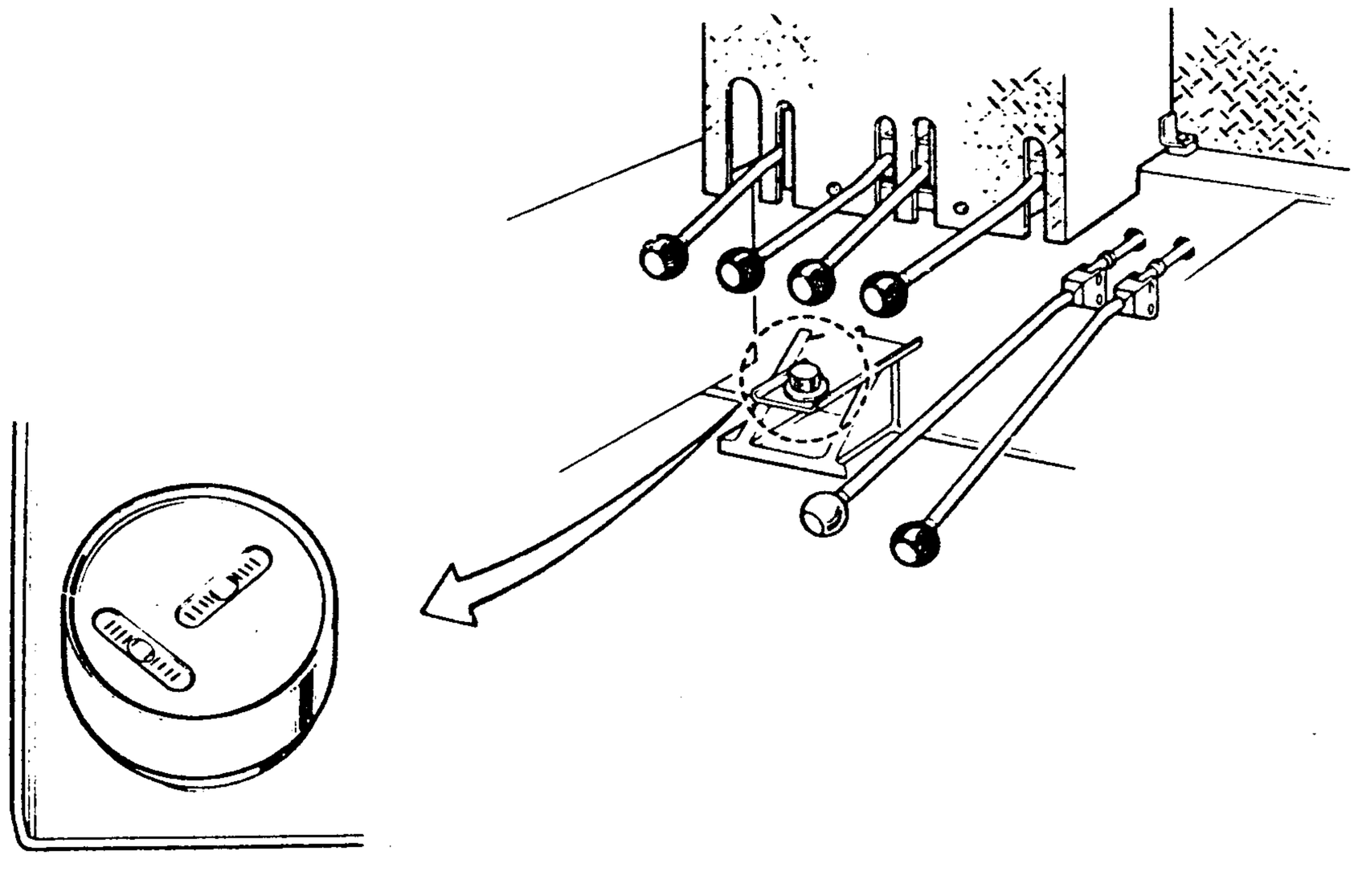
Do not tamper with the safety valves.(They are sealed.)

16351-07031

MEMO

LEVEL GAUGE

When setting up the crane, see this gauge to check the levelness.

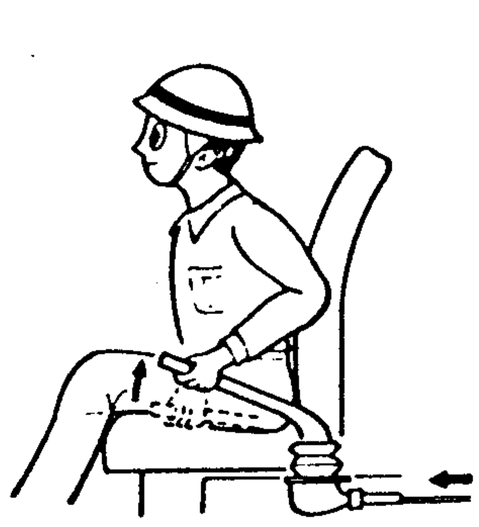


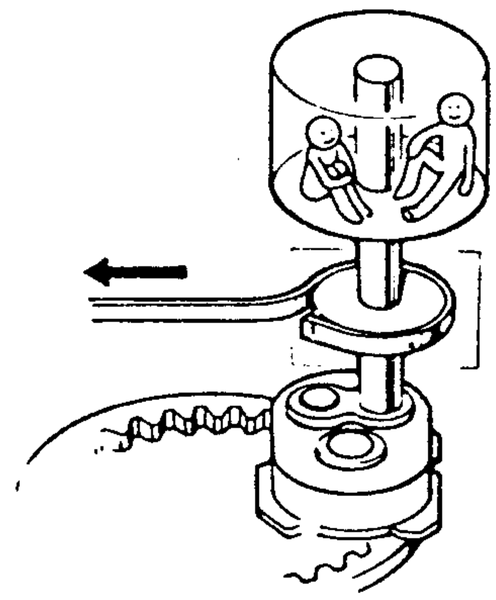
MEMO

SWING BRAKE (OPTIONAL)

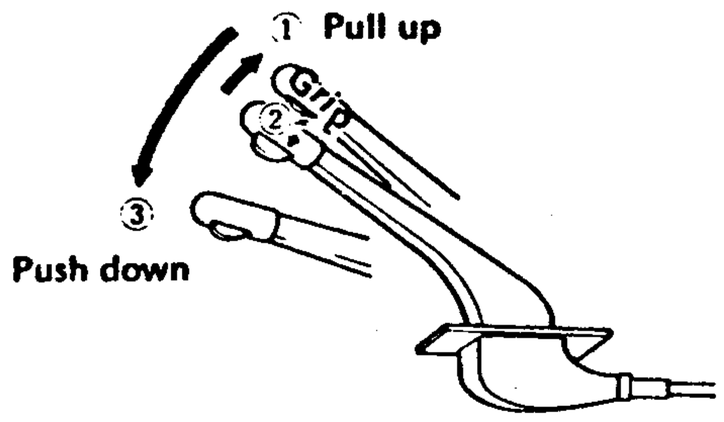
The brake is applied by pulling upward the swing brake lever located on the left side of the operator's seat.

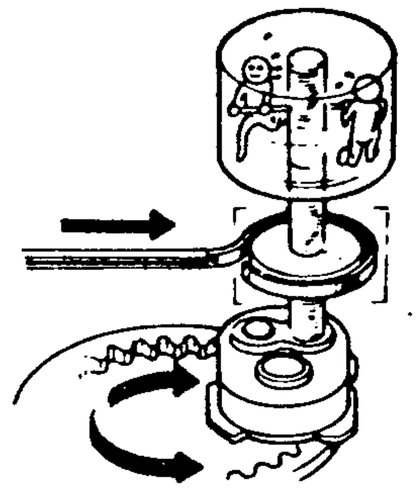
● **Brake application**





● **Brake releasing**



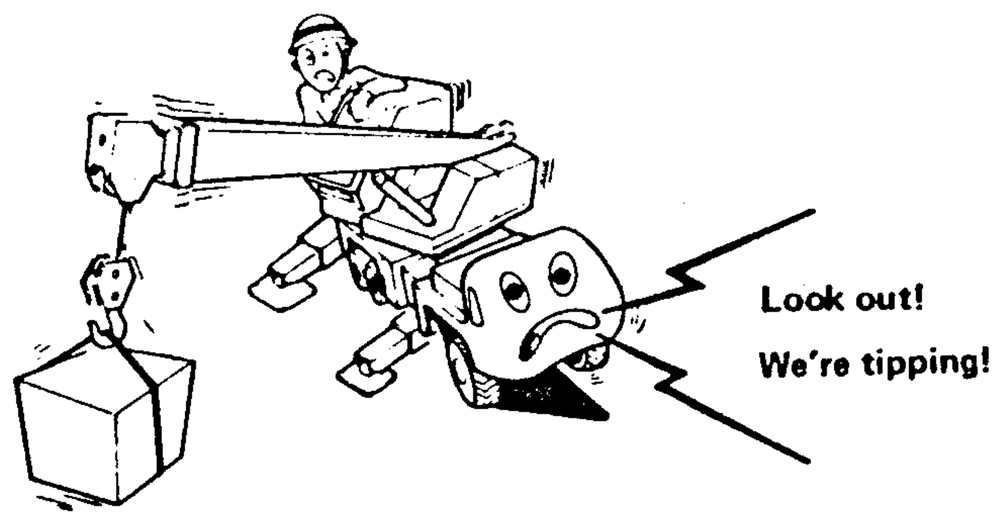


I 4452 -07050

MEMO

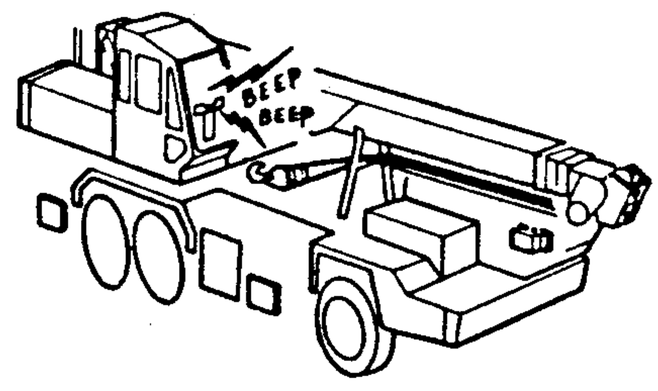
TIPPING WARNING DEVICE

When the crane is unstable and there is danger of tipping. the buzzer sounds to give alarm. The indicator lamps in the carrier cab also light to show which outrigger has lost ground contact.

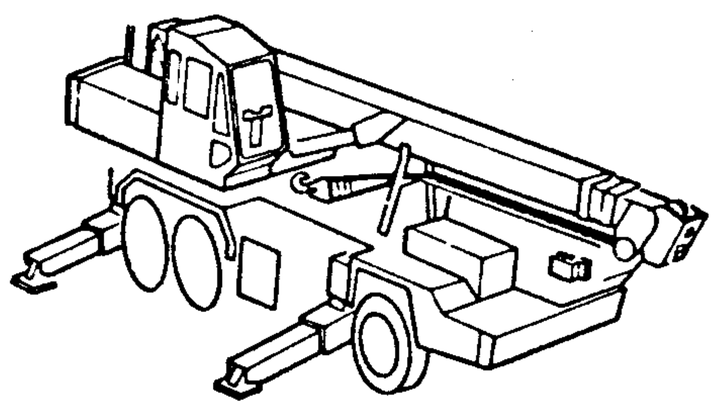


☐ FUNCTION CHECKING

Make sure the lamp is lit and the buzzer sounds when PTO is engaged.

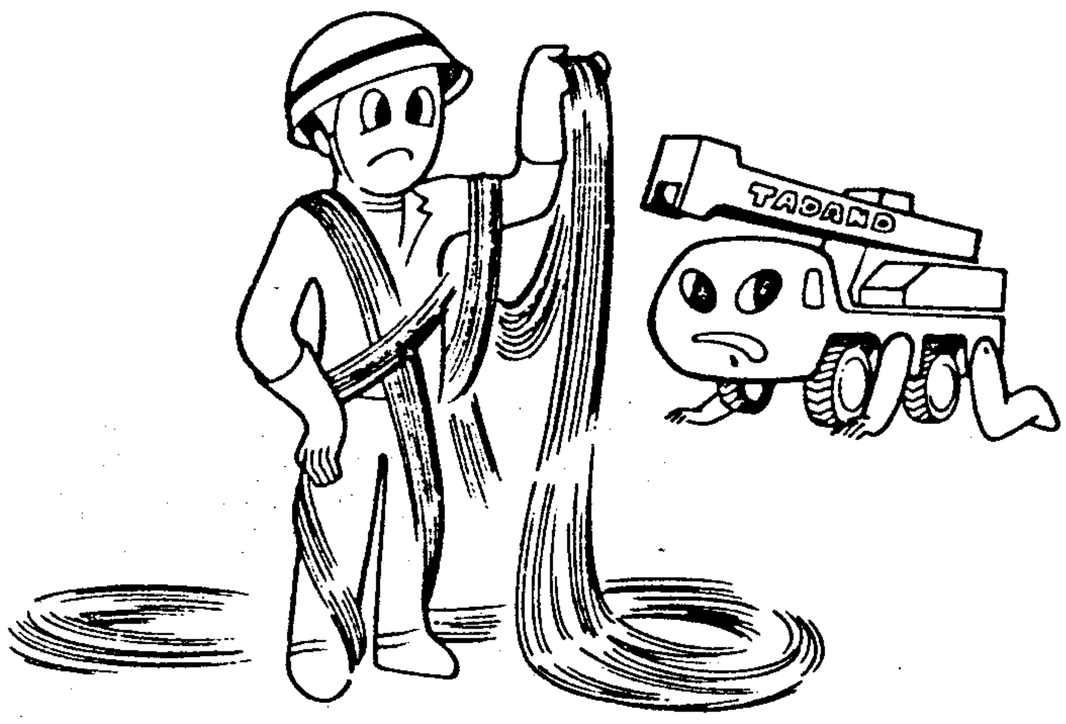


Make sure the lamp goes out and the buzzer stops when the outrigger is fully extended.



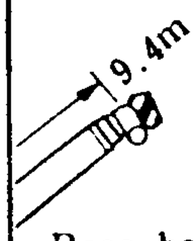
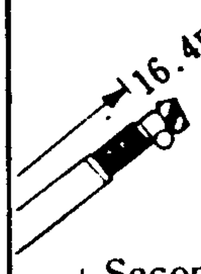
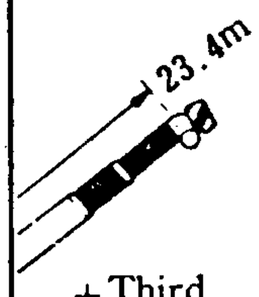
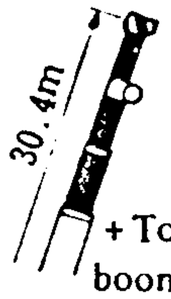
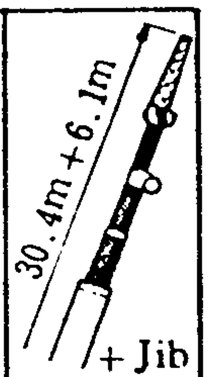
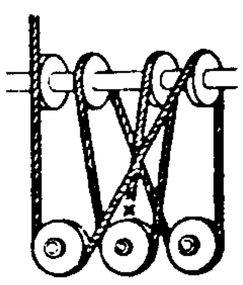
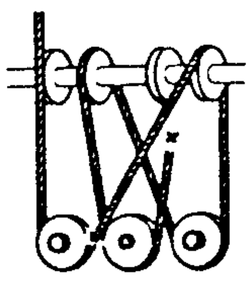
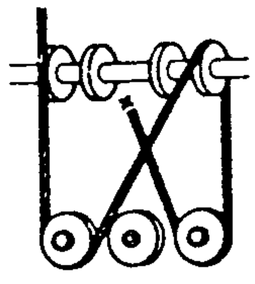
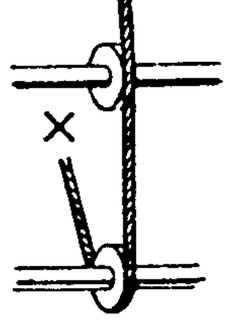
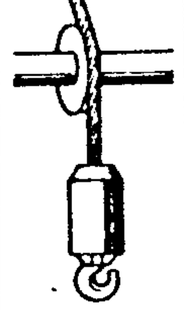
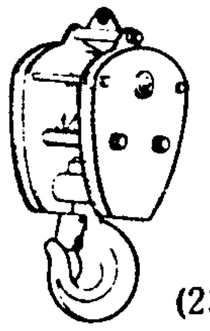
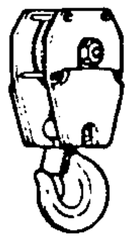
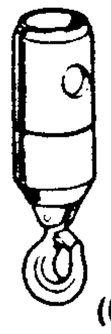
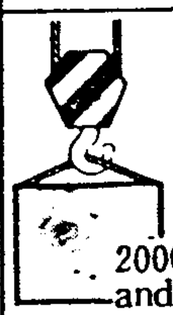
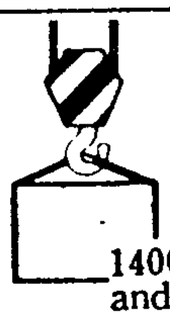
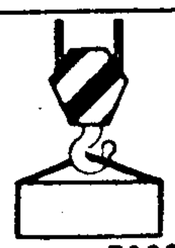
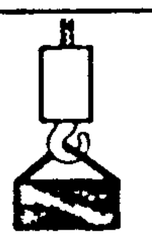
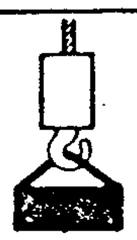
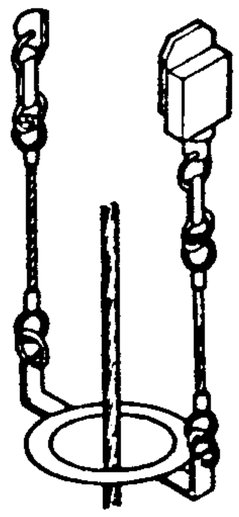
MEMO

RE-REEVING WIRE ROPE



RE-REEVING WIRE ROPE

RELATION BETWEEN BOOM LENGTH AND NUMBER OF PART LINE

Boom length (boom in use)	 9.4m Base boom sec.	 16.4m + Second boom sec.	 23.4m + Third boom sec.	 30.4m + Top boom sec.	 30.4m+6.1m + Jib
Maximum number of part line	 7-part line	 6-part line	 4-part line	 2-part line	 1-part line
Hook in use (hook's weight)	 (230 kg)			 (110 kg)	 (60 kg)
Total rated load	 20000 kg and less	 14000 kg and less	 7000 kg and less	 4000 kg and less	 2500 kg and less	 2000 kg and less
Over-winding alarm device						

CAUTION:
Load per line should not surpass 2900 kg.

MEMO

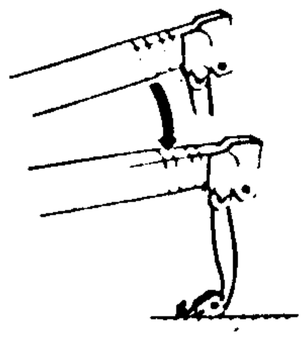
RE-REEVING WIRE ROPE

NOTES ON OPERATION

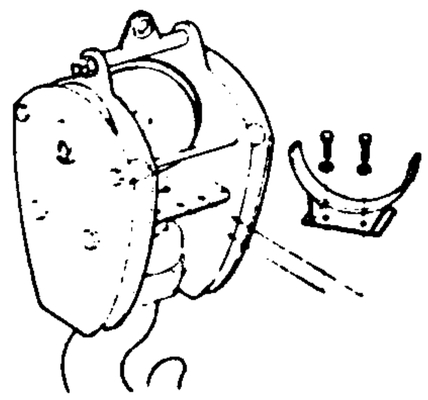
1. Set up the outriggers and fully retract the boom, then swing over side or over rear.
2. Avoid disorderly rope winding on the drum while re-reeving.

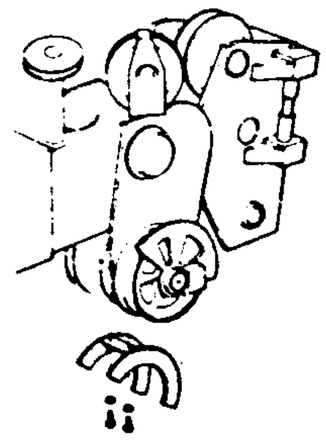
☐ CHANGING REEVING OF MAIN WINCH ROPE

Position the main hook on the ground by lowering the boom.

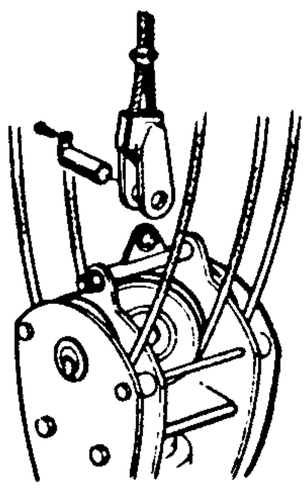


Remove the rope guides.

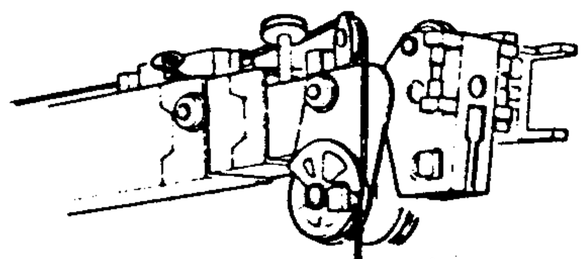




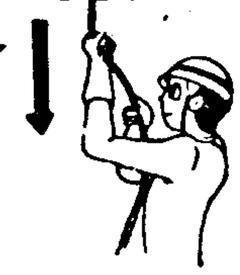
Remove the rope socket.



Re-reeve the rope to the desired number of part line.



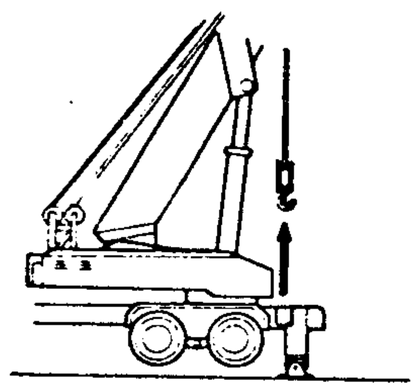
Pull out the rope, if necessary, with the winch as in free-falling.



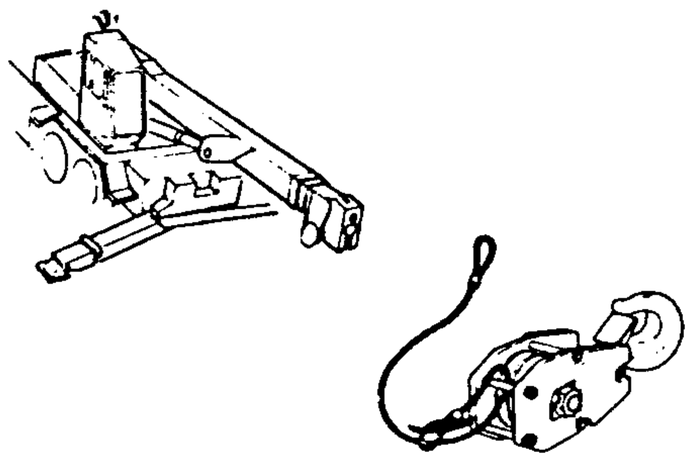
☐ REEVING AUXILIARY WINCH WIRE ROPE ON TOP BOOM SECTION

The auxiliary winch rope, as well as the weight of the over-winding alarm device, is used for both the top boom section and the jib.

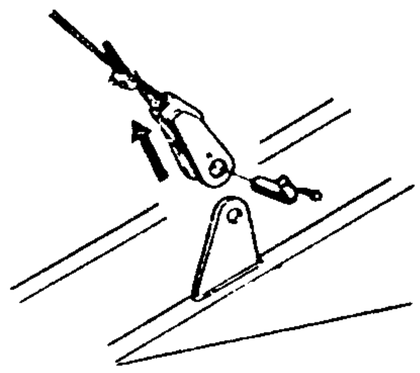
(1) Attach one end of some proper rope to the main winch hook and the other end to the one-sheave hook in its hanger. Then, wind up the main winch wire rope and the one-sheave hook will be lifted off the hanger.



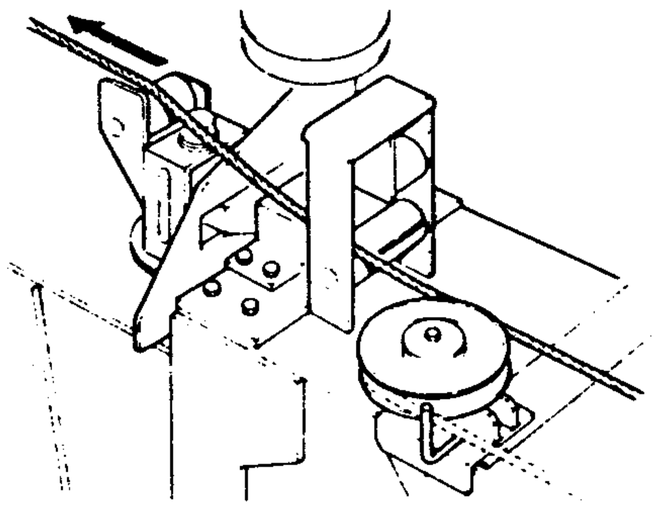
(2) Lower the boom to 0° to place the hook on the ground, and remove the rope from the hooks.



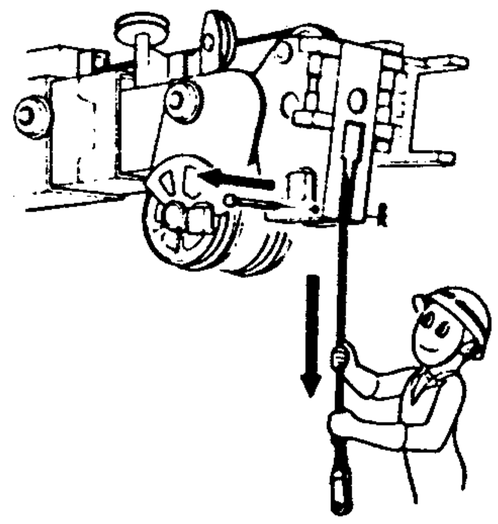
(3) Remove the rope socket from the swing table.



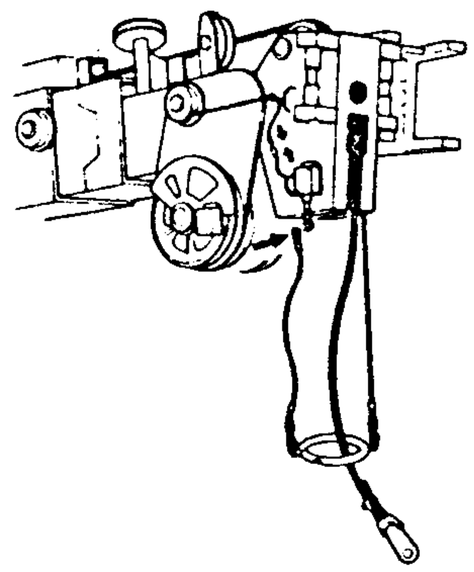
(4) Take the auxiliary rope off the horizontal sheave on the top of the base boom section, and place it on the rollers.



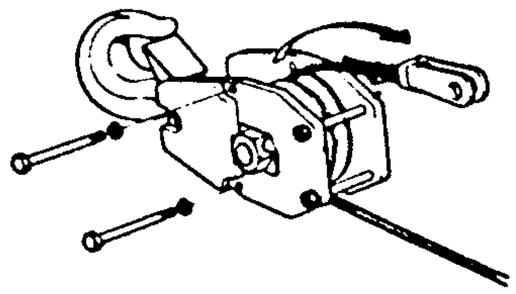
(5) Draw out the pin, and place the rope on the top boom section.



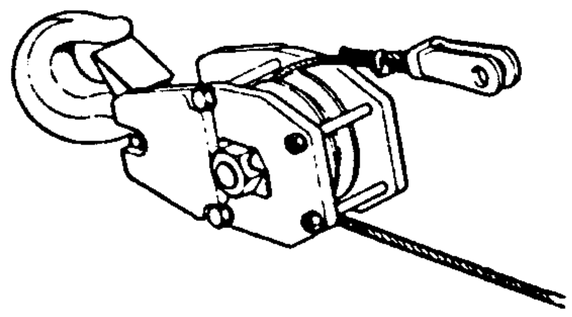
(6) After connecting the over-winding alarm device cord, attach the over-winding alarm device rope and pass the winch rope through the weight of the over-winding alarm device.



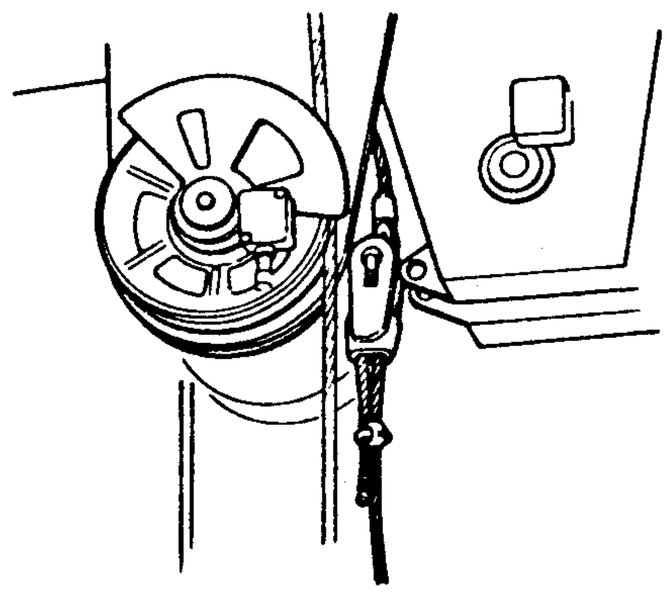
(7) Remove the bolts, and pass the rope on the sheave of the hook.



(8) Re-attach the bolts.

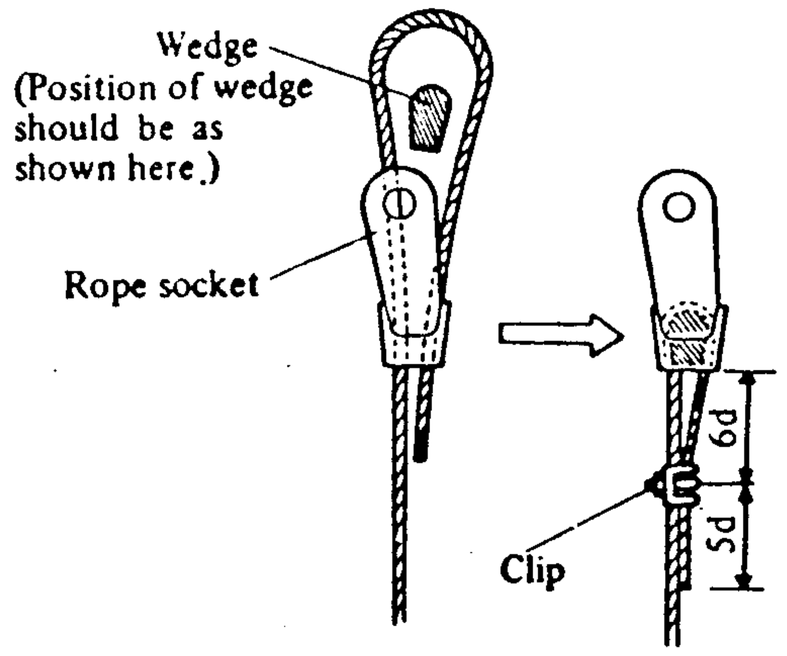


(9) Remove the eye clamp from the top boom section by drawing out the pin, and attach the rope socket to the eye clamp by means of the pin.



NOTES:

1. Rope socket and clip should be assembled as shown below.

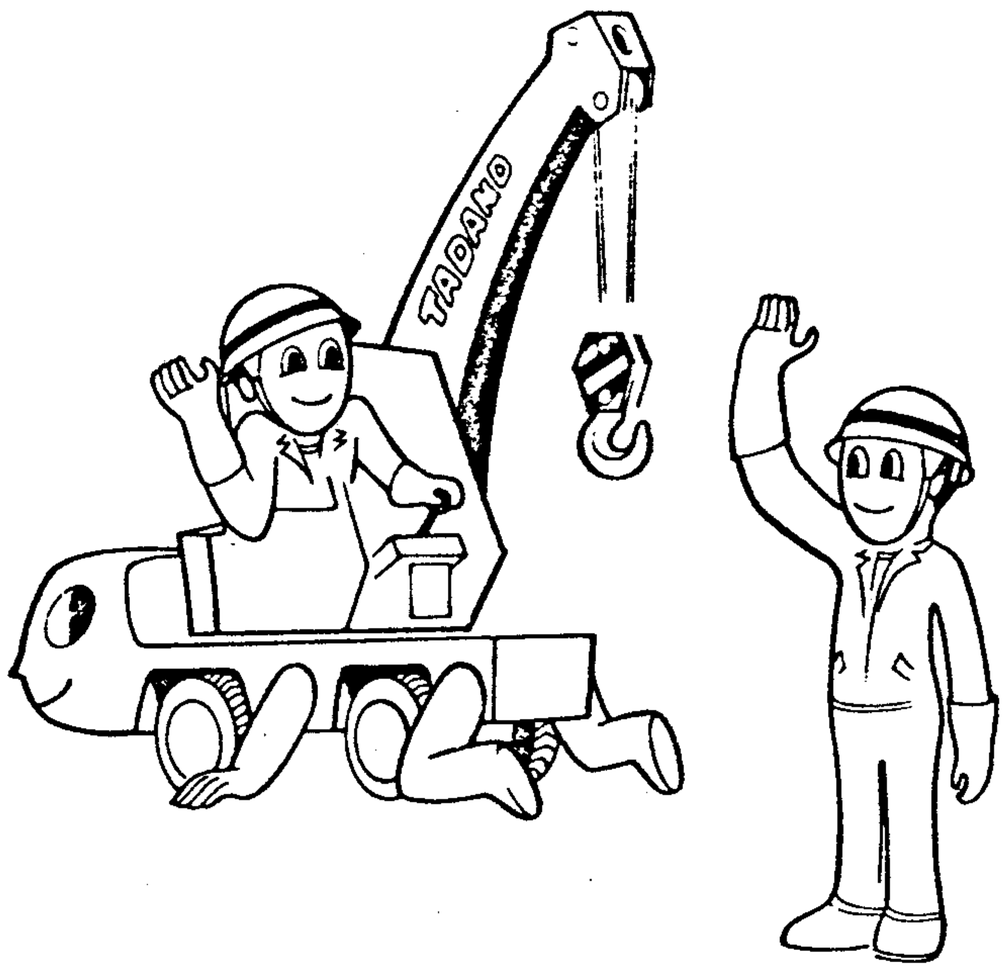


d: wire rope diameter

2. The auxiliary winch hook can be used for the top boom section in place of the one-sheave hook.
When using the auxiliary winch hook on the top section, the total rated load of 2500 kg should not be exceeded.

MEMO

PREPARATIONS FOR TRAVELLING OR CRANE OPERATION

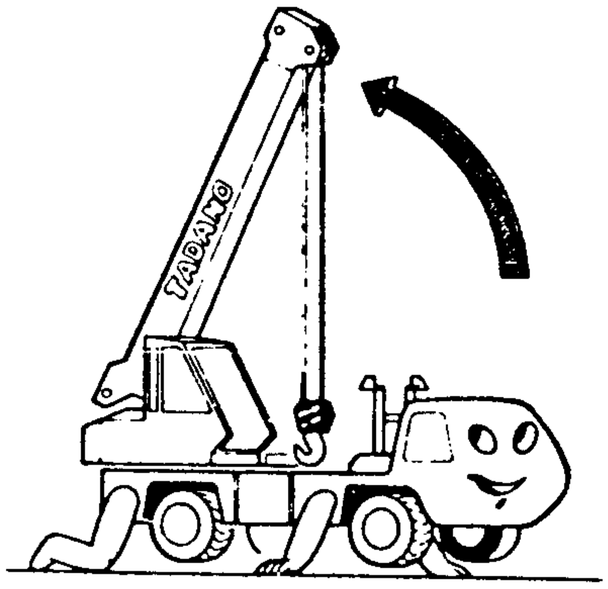


PREPARATIONS FOR TRAVELLING OR CRANE OPERATION

STORING AND TAKING OUT MAIN WINCH HOOK

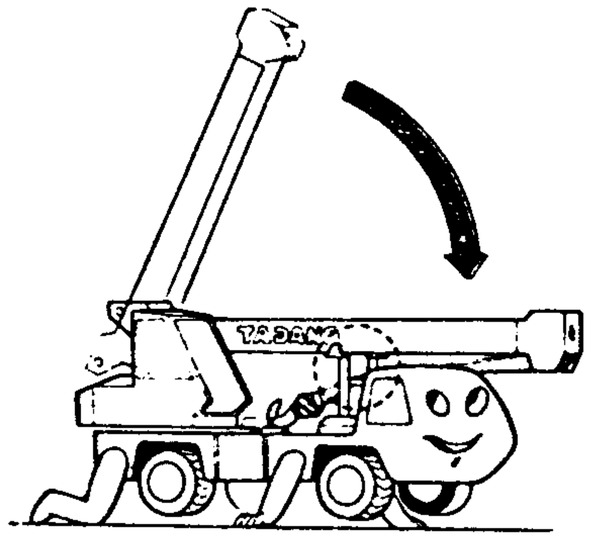
STORING

(1) Set up the crane and elevate the boom as shown in the figure.

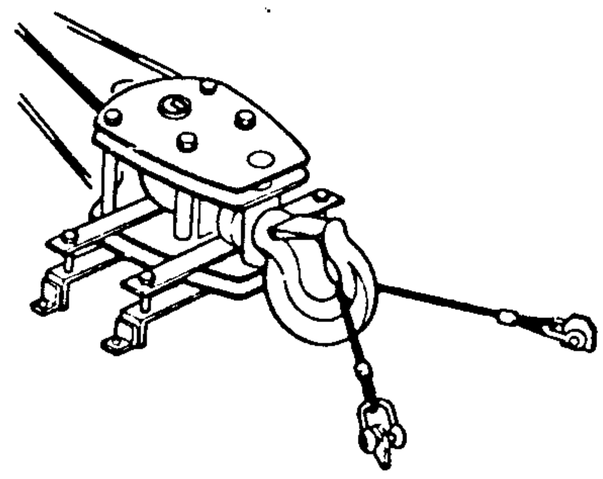


(2) Place a hook rope on the hook.

(3) Lower the boom and store it on the boom rest.

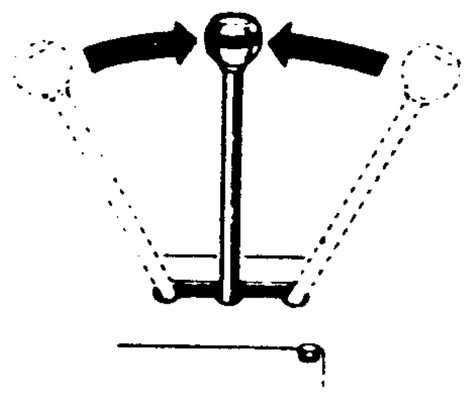


(4) Secure the hook.

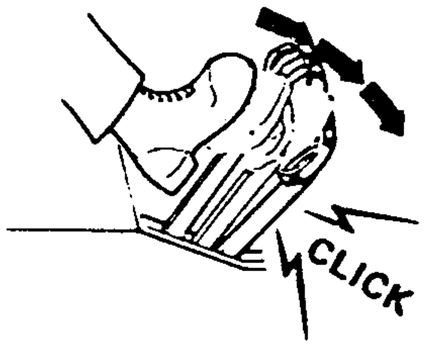


(5) Set the brake lock lever to the neutral.

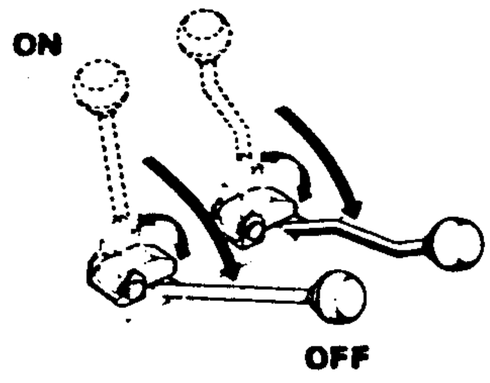
Brake lock lever



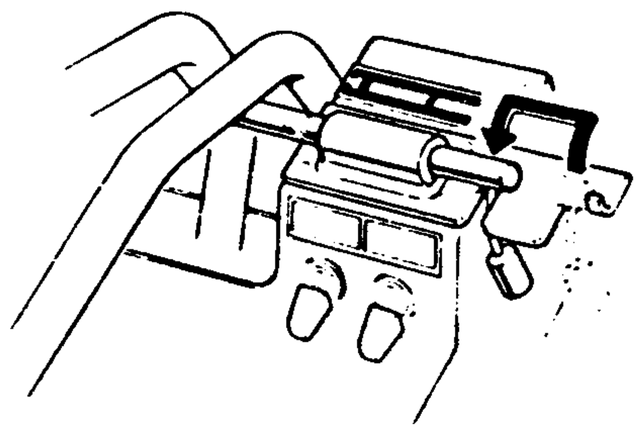
(6) Lock the brake pedals. (Both main and auxiliary winches.)



(7) Disengage the clutches (both main and auxiliary winches).

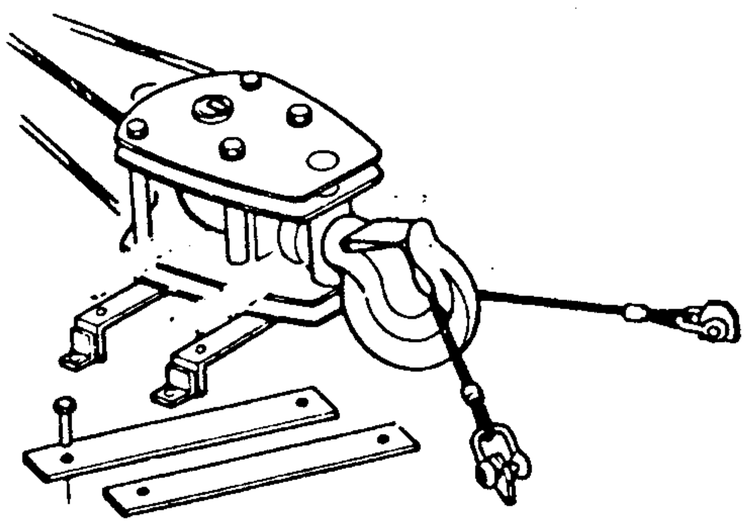


(8) Lock the winch lever.



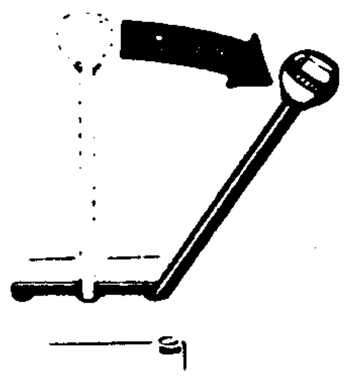
□ TAKING OUT

(1) Unscrew the bolts on the keep plates.

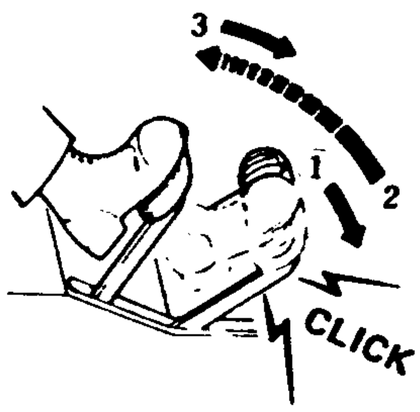


(2) Set the main clutch lever to ON.

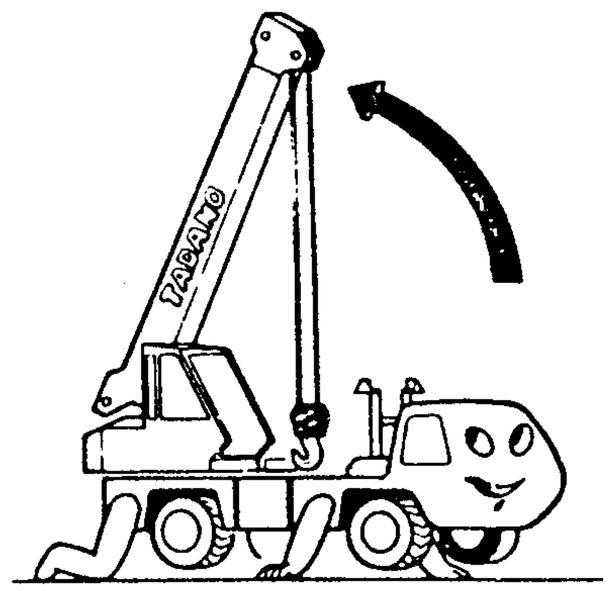
(3) Set the brake lock lever to MAIN FREE.



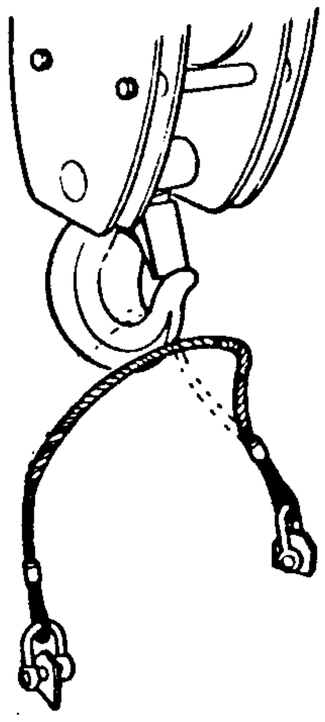
(4) Unlock the main winch brake pedal.



(5) Elevate the boom till the boom nose comes upright over the hook. Operate the winch during elevation to supply enough rope.

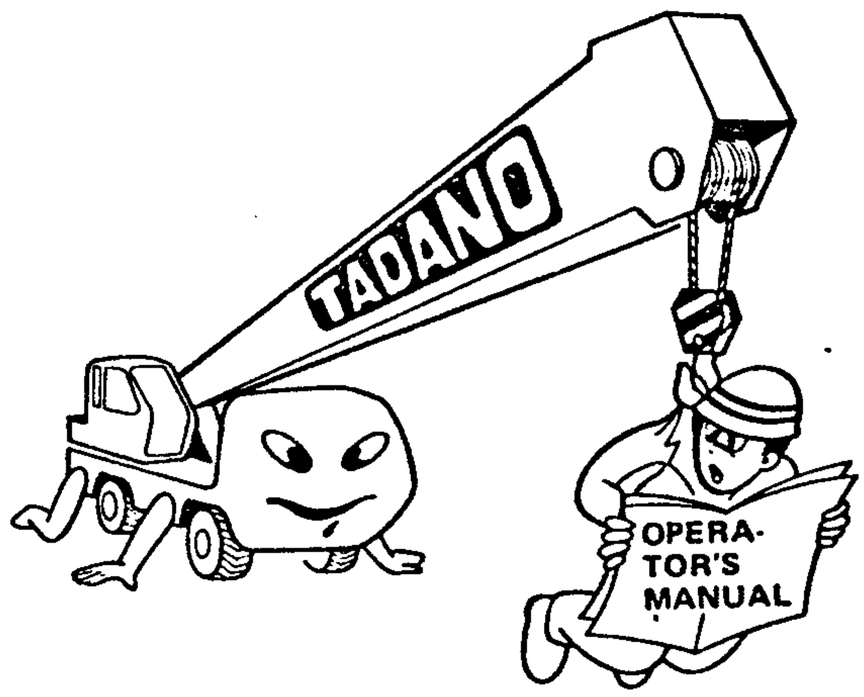


(6) Take the hook off rope.

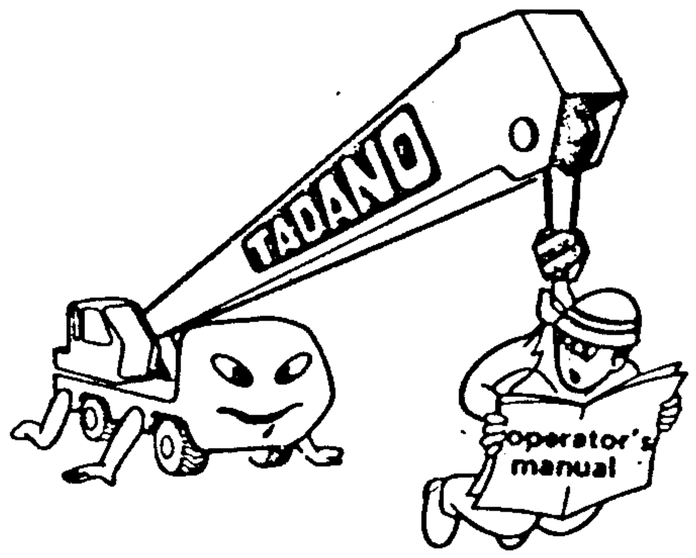


MEMO

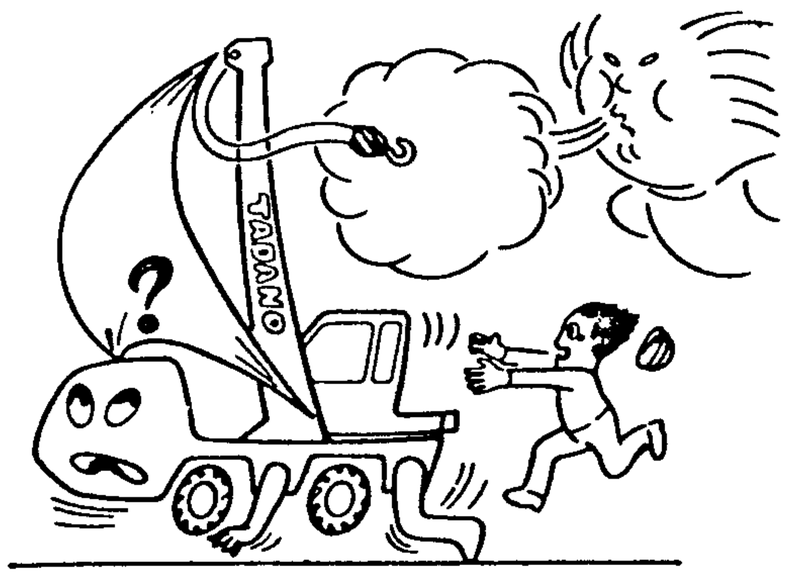
GENERAL OPERATING CAUTION



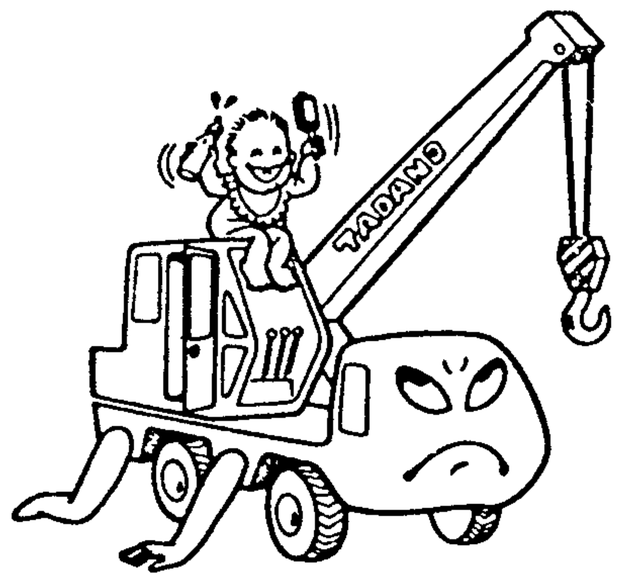
GENERAL OPERATING CAUTION



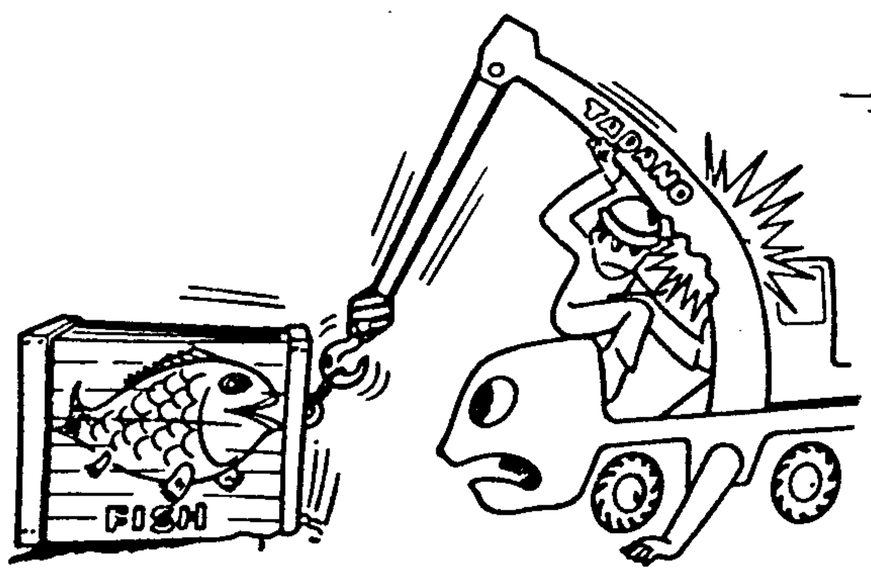
Store the boom when strong wind is blowing.



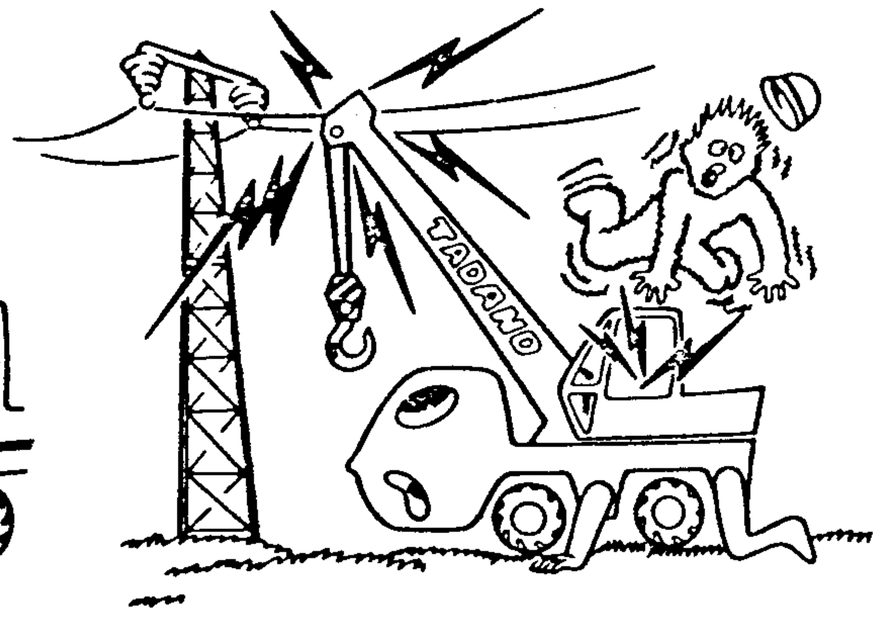
Lock the door of the crane cab when not in use.



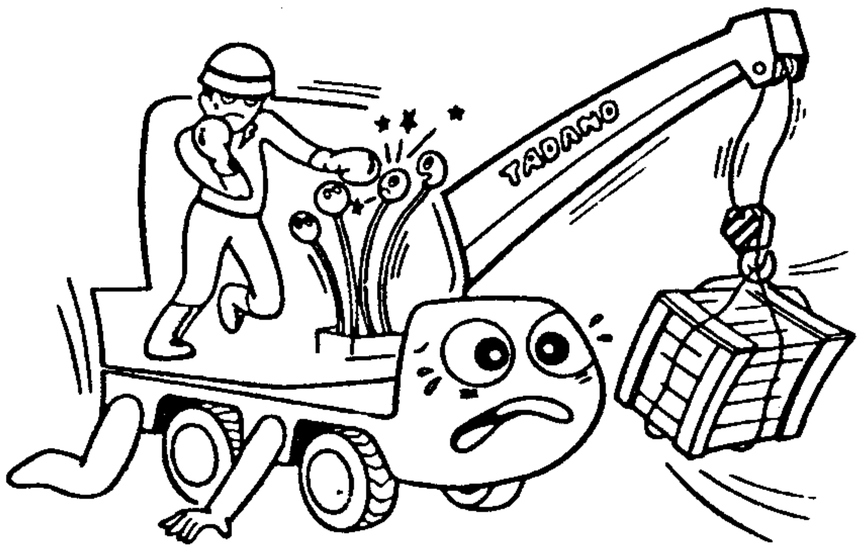
Avoid dragging a load by swinging, elevating, or telescoping.



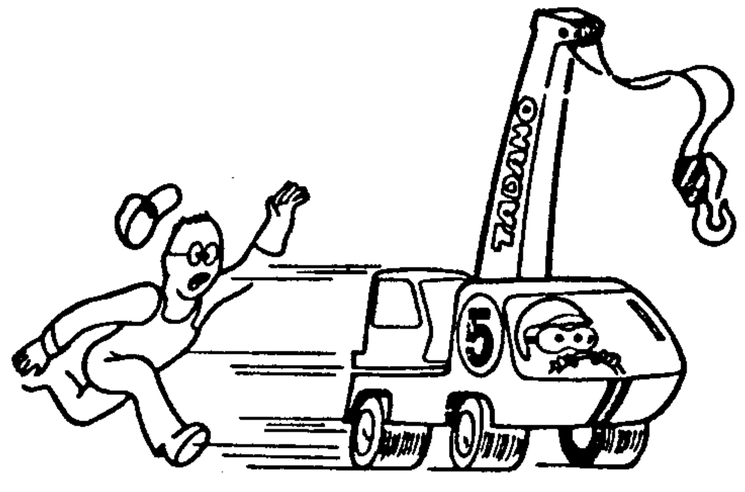
Carefully check the area around the crane.



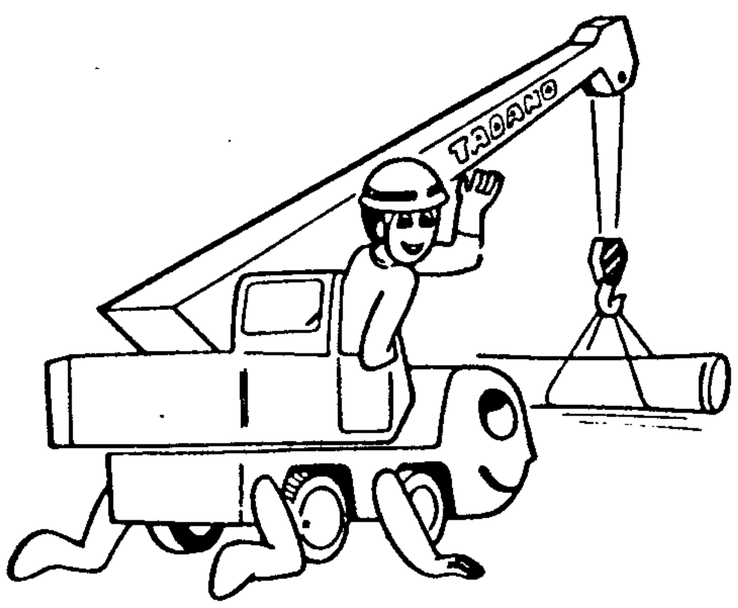
Do not handle levers abruptly.



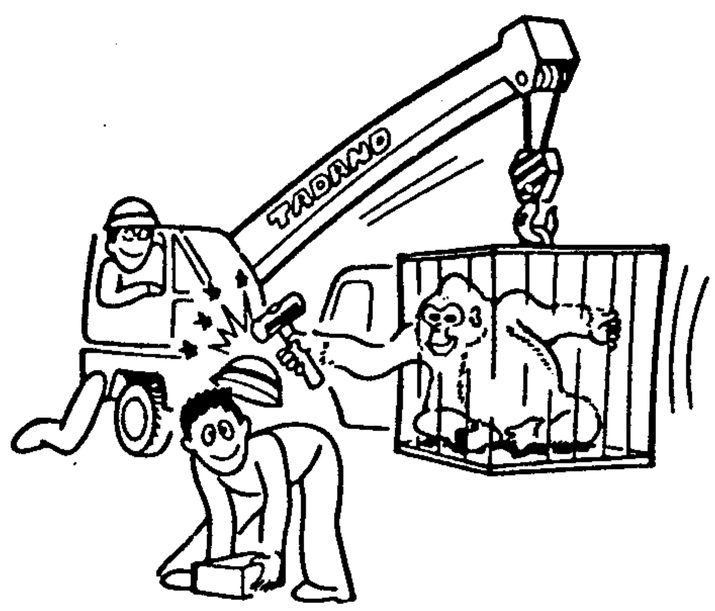
Store the boom and outriggers before travelling.
The hook(s) should be stored in the designated place.



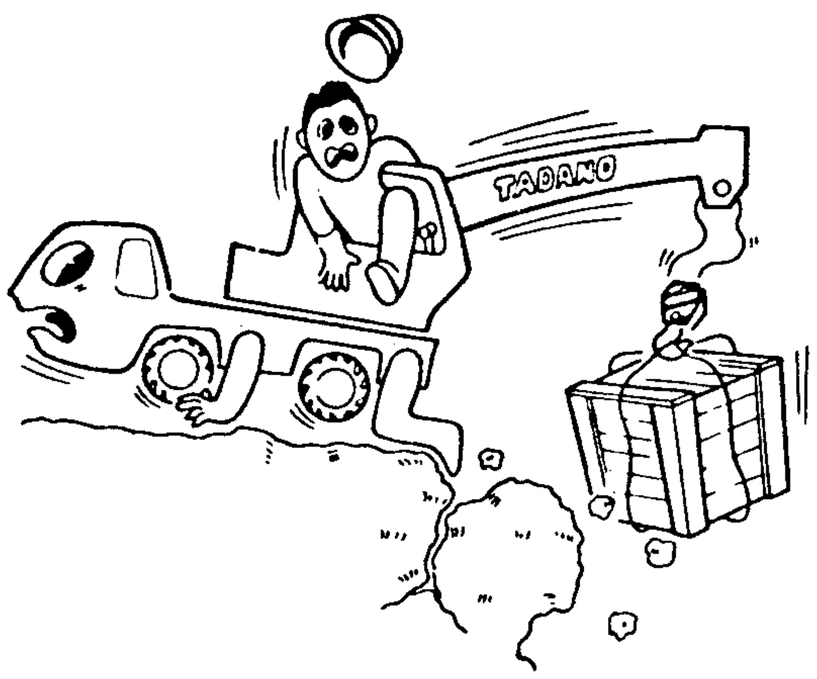
Operate the crane slowly until accustomed to it.



Do not allow anyone to enter the working area.

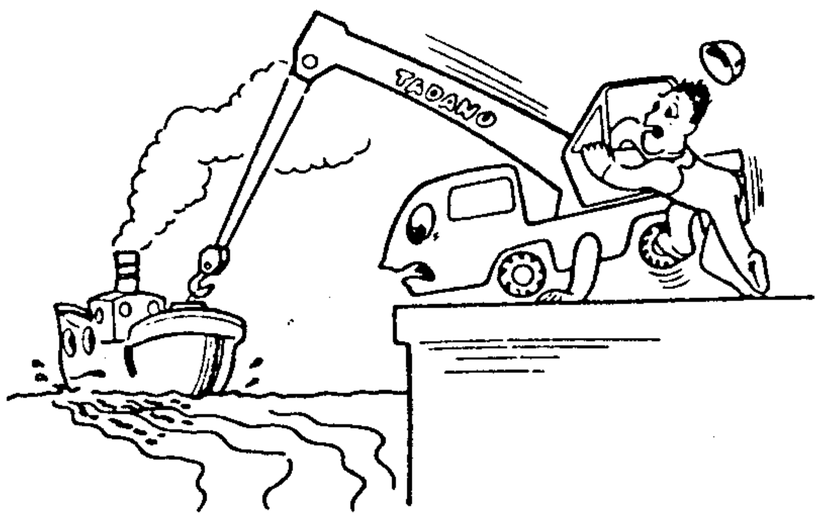


Set up the crane on hard level ground.

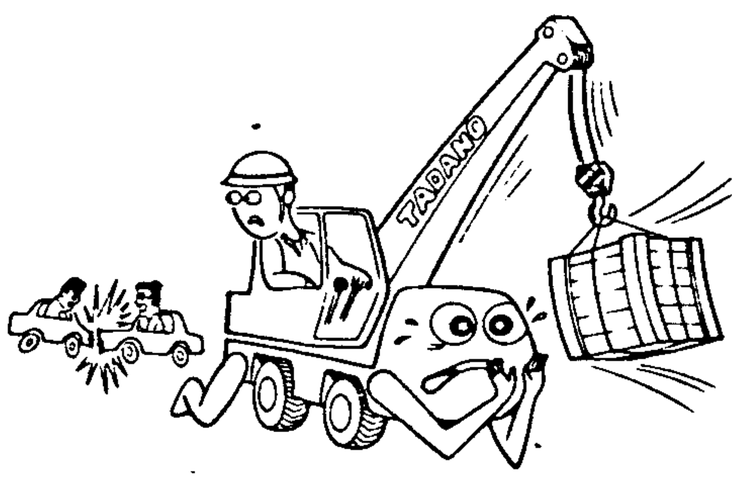


Operate the crane in accordance with the total rated loads table

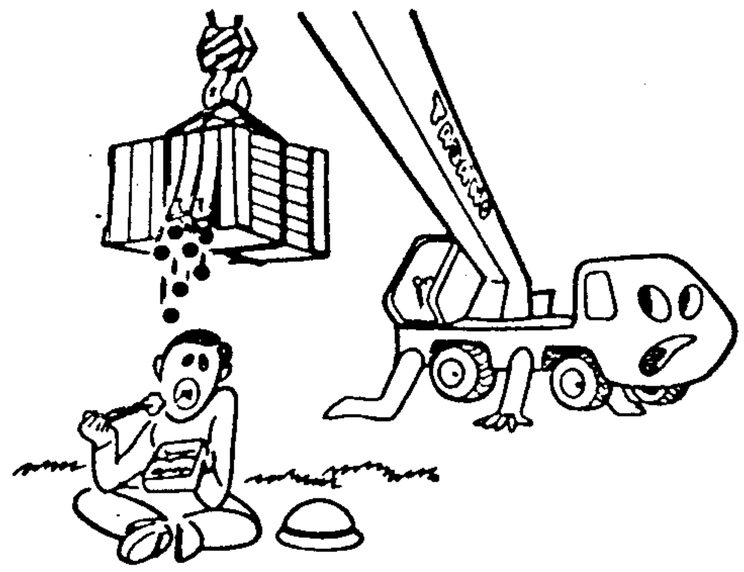
Winch up the hook when not in use.



Do not look away when operating the crane.



Do not leave the operator's cab with a load in the air.



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HAND SIGNALS

HAND SIGNALS
(Prevailing in Japan. For your reference only.)

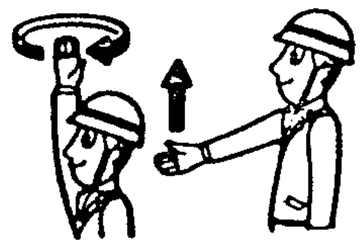
1. Attention!

Raise one arm upright.

2. Indicating position

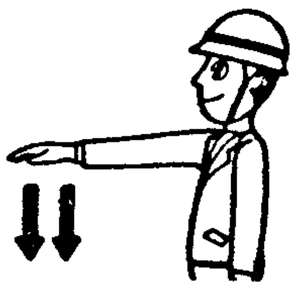
Stand near the position where the load is to be lowered; indicate it.

3. Winch up



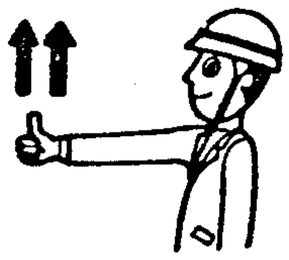
Raise one arm and draw a circle. Or, hold the arm level and moye upward with the palm facing upward.

4. Winch down



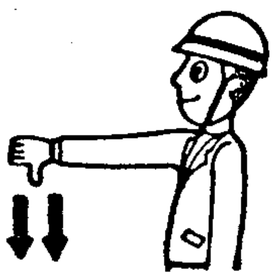
Hold the arm level and move the hand down with the palm facing down.

5. Raising boom



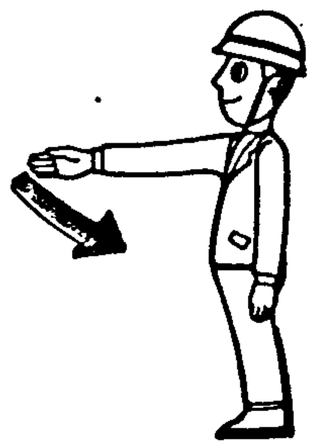
Raise the thumb with the fingers closed, Raise the hand from the level position.

6. Lowering boom



Point the thumb down with the fingers closed. Lower the hand from the level position.

7. Swing

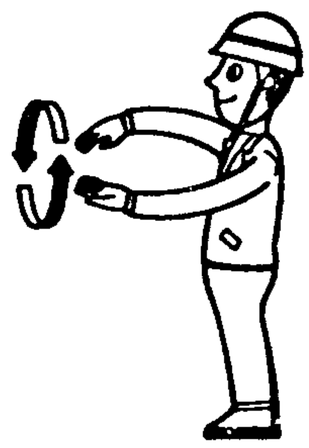


Extend the arm and move it with the palm facing to the moving direction.

8. Slight movement

Raise the index or little finger.

9. Inverting load



Extend both arms parallel and make inverting motion.

10. Telescoping boom

Place the fist on top of the head. Indicate the telescoping direction with the raised thumb, moving the hand in that direction.

11. Stop

Raise one hand open.

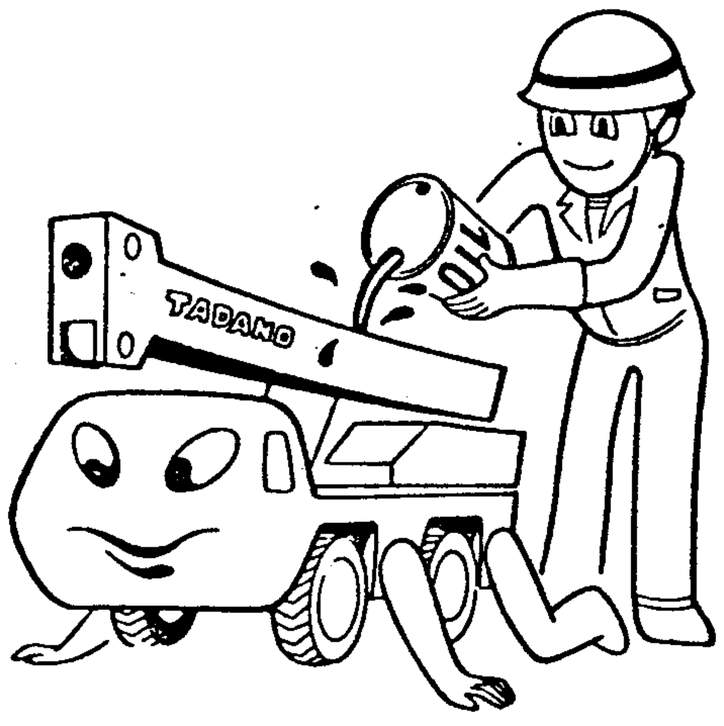
12. Emergency stop

Raise both hands above the head and move rapidly right and left.

13. Work completes.

Cross both hands above the head.

LUBRICATION

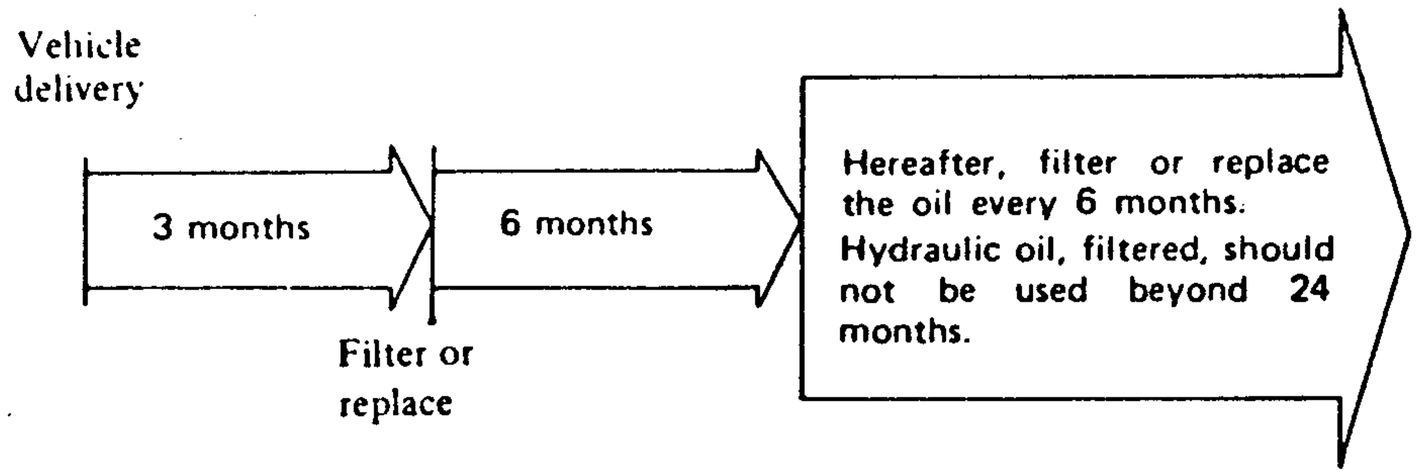


HYDRAULIC OIL

Initially filled oil : Daphne Super Hydraulic Fluid 56 Idemitsu.

TIME TABLE OF FILTRATION OR REPLACEMENT

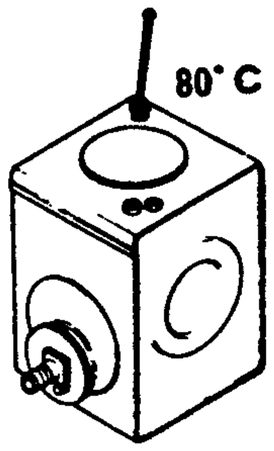
Filter or replace, whichever you choose, the hydraulic oil in accordance with the diagram below.



NOTES:

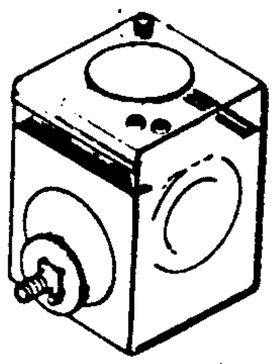
1. Whenever oil has got dirty even before the scheduled dates of filtration or replacement, filter or replace it.
2. Use a suitable oil in accordance with the variation of atmospheric temperature.

☐ OIL TEMPERATURE



The oil temperature should always be below 80°C.

☐ QUANTITY OF OIL



Oil is at proper level when it has reached halfway between marks H and L; the quantity, 380 lit.

Check the oil level without screwing cap in.

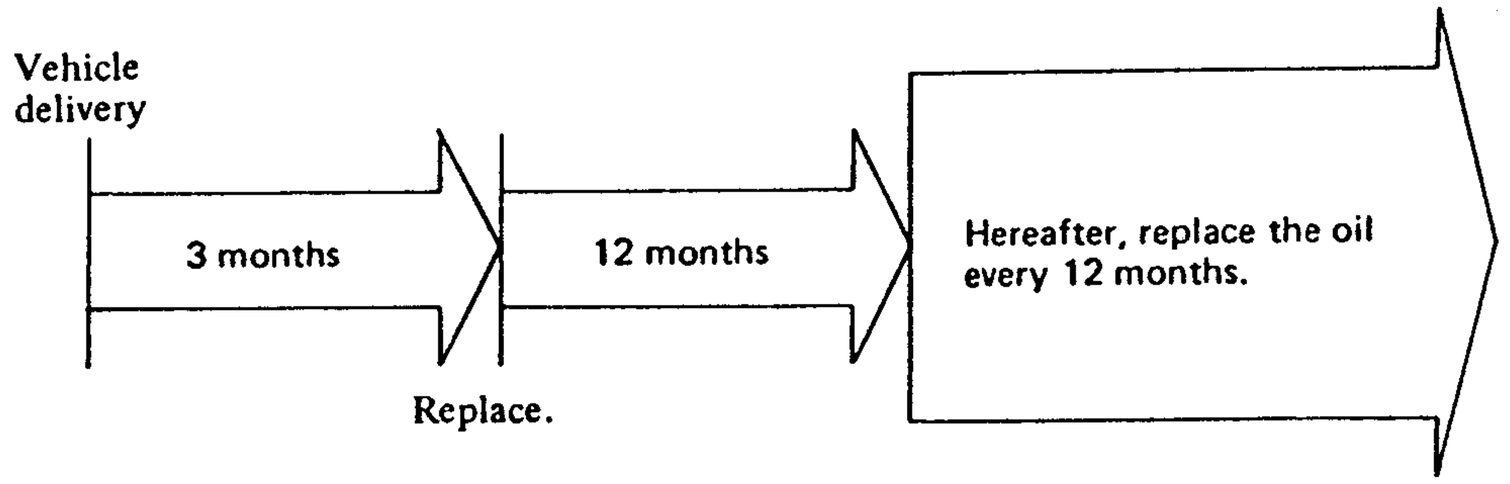
The quantity of hydraulic oil, in the circuits and in the tank, totals to 600 lit.

GEAR OIL

Observe the quantity of gear oils.
Initially filled gear oil: Penta GPL 320 PENTALUBE.

☐TIME TABLE OF REPLACEMENT

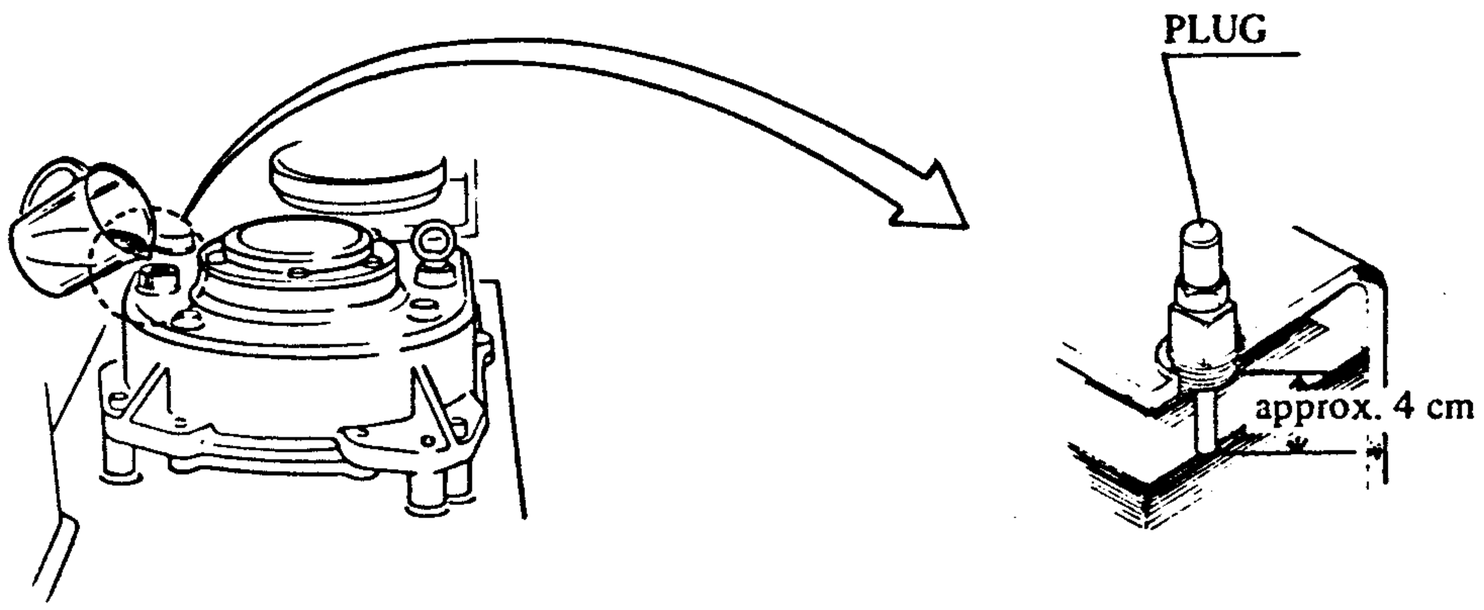
Replace the gear oil used in accordance with the diagram below.



NOTES.

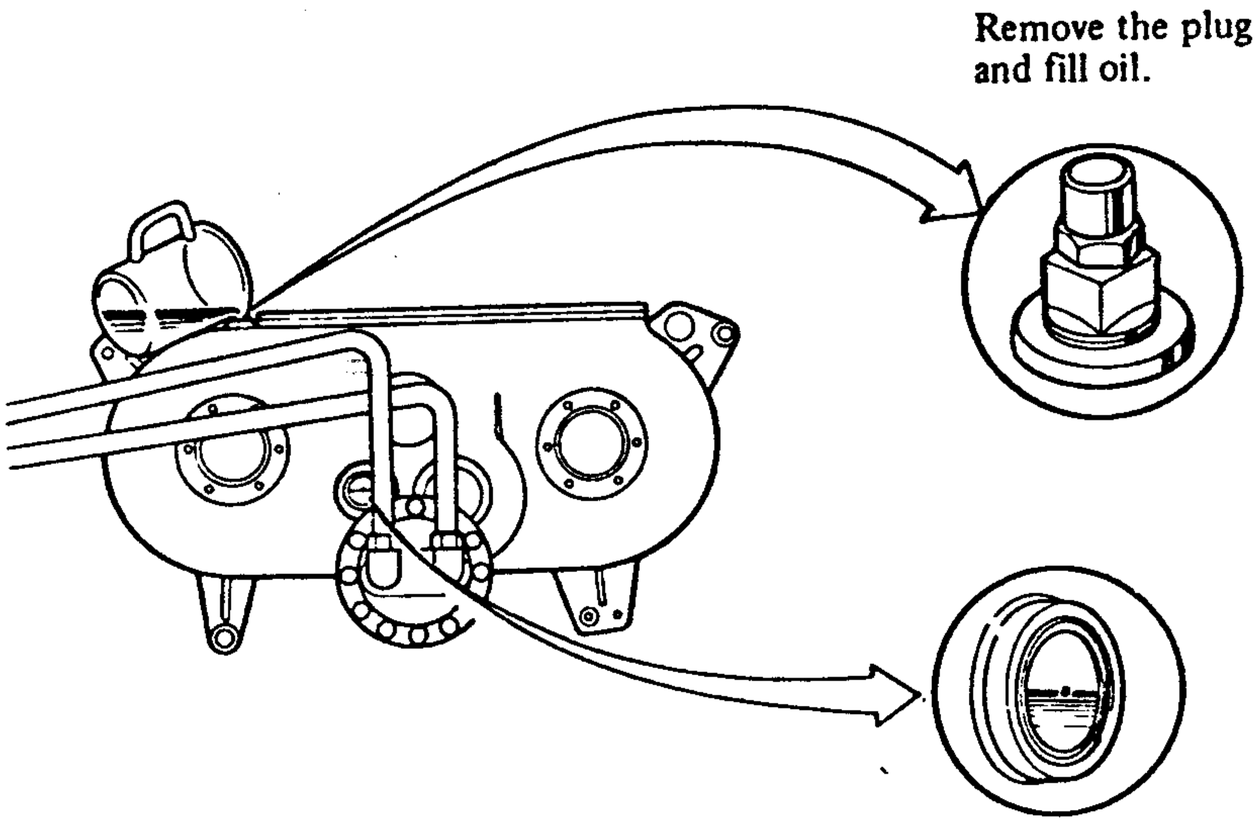
1. Whenever oil has got dirty even before the scheduled dates of replacement, replace it.
2. Use a suitable oil in accordance with the variation of atmospheric temperature.

□SWING SPEED REDUCER



Necessary gear oil quantity: approx. 8 lit.

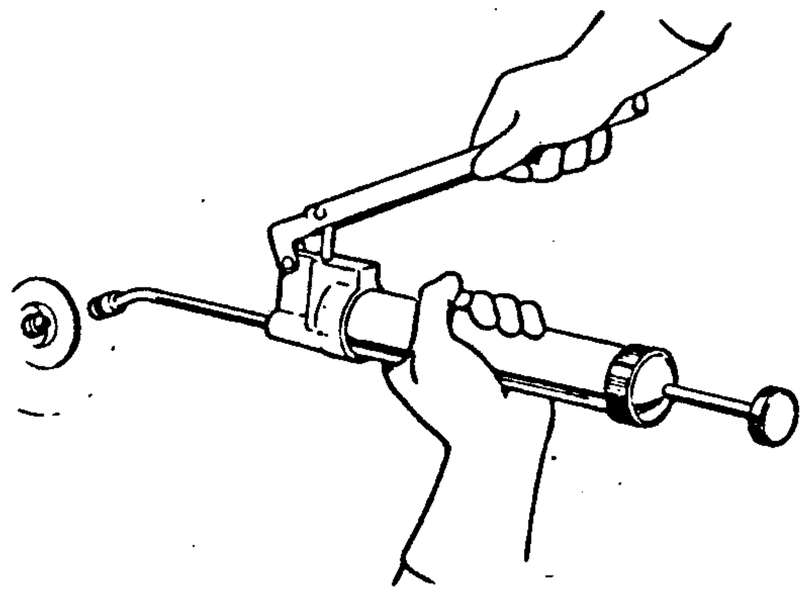
□WINCH SPEED REDUCER



Oil level gauge.
Fill oil till it reaches the red mark.
Necessary gear oil quantity;
approx. 10 lit.

GREASE

Initially filled grease: Daphne Colonex Grease EP No. 2, Idemitsu and TADANO genuine grease (MoS_2 grease).



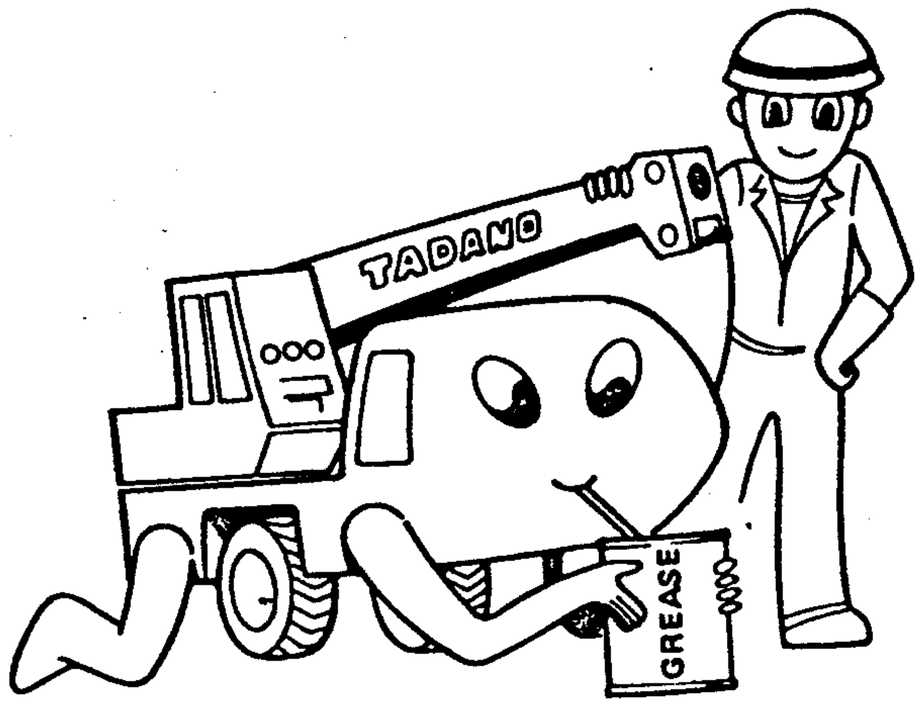
☐ PLACES REQUIRING GREASE

Greasing interval	Marks	Greasing points	Q'ty	Type	Methods
Daily	(D1)	Elevating cylinder upper pivot pin	1	MoS_2 grease	grease pump
	(D2)	Elevating cylinder lower pivot pin	2	MoS_2 grease	grease pump
	(D3)	Boom pivot pin	2	MoS_2 grease	grease pump
	D4	Sheaves and shafts	2	grease	grease pump, coat
	D5	Winch bearing	2	grease	grease pump
	D6	Rotary joint	2	grease	grease pump
	D7	Guide sheave and shaft (Not provided on some cranes)	1	grease	grease pump coat
Weekly	W1	Universal joint	3	grease	grease pump
	W2	Bosses for connecting pins	4	grease	grease pump
	W3	Base boom section, upper part	2	grease	grease pump
	(W4)	Bottom of second boom section	2	grease	coat
	(W5)	Bottom of third boom section	2	grease	coat
	(W6)	Bottom of top boom section	2	grease	coat
Monthly	M1	Jib stowing pin	1	grease	grease pump
	M2	Main winch hook	1	grease	grease pump
	M3	Auxiliary winch hook(1-sheave)	1	grease	grease pump
	M4	Jack float pivot pin	4	grease	grease pump
	M5	Second boom stopper pin section	1	grease	grease pump
	M6	Auxiliary winch hook	1	grease	grease pump
	M7	Wire ropes	2	grease	coat
	M8	Swing bearing	4	grease	grease pump
	M9	Swing gear	—	grease	coat
	M10	Automatic pin stopper	—	grease	grease pump coat

NOTES:

1. For the lubrication of the points encircled in the column "Marks," a relevant crane motion should be given while lubricating so grease is distributed evenly.
2. Every sliding surface should be lubricated appropriately, even if not listed in the above table.

TABLES OF OIL PROPERTIES AND BRANDS
(Reference data)



The tables below show required oil properties and recommended oil brands according to the temperature conditions (climate zone and season). Please use these tables for selecting your oil.

HYDRAULIC OILS

OIL PROPERTIES REQUIRED

Item	Tropical region	Temperate region	Arctic region
Specific gravity at 15/4°C	0.87 to 0.89	0.86 to 0.88	0.86 to 0.88
Flash point (COC) °C	185 and higher	180 and higher	160 and higher
Viscosity at 37.8°C cSt	68 and below	38 and below	30 and below
Viscosity at 98.9°C cSt	7 and higher	5 and higher	4 and higher
Viscosity index	100 and higher	100 and higher	100 and higher
Pour point °C	-15 and below	-25 and below	-30 and below

OIL BRANDS RECOMMENDED

Manufacturers	Tropical region	Temperate region	Arctic region
Idemitsu	Daphne Super Hydraulic Fluid 56	Daphne Hydraulic Fluid 32	Daphne Hydraulic Fluid 18 AV
Esso	Teresso 68	Teresso 32	Nuto H15
Shell	Tellus oil 56	Tellus oil 32	Tellus oil T37
Mobil	D.T.E. Heavy Medium	D.T.E. Light	D.T.E. 13
Pentalube	Penta HR-56	Penta HR-32	Penta HR-22

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GEAR OILS

OIL PROPERTIES REQUIRED

Item			Properties
Specific gravity	at 15/4°C		0.89 to 0.91
Flash point (COC)		°C	240 and higher
Viscosity	at 37.8°C	cSt	290 to 410
Viscosity	at 98.9°C	cSt	20 to 25
Viscosity index			90 and higher
Pour point		°C	-10 and below

OIL BRANDS RECOMMENDED

Manufacturers	Brand name
Pentalube	GPL 320
Idemitsu	Daphne CE Compound 320
Esso	Spartan EP320
Shell	Macoma Oil 320
Mobil	Mobil Gear 633

MEMO

GREASES

OIL PROPERTIES REQUIRED

Item	Properties	Remarks
Penetration mm x 10 @ 25°C	265 to 295	
Soap Type	Lithium + lead = Compounded grease	Must contain lead extreme pressure additive.
Dropping Point °C	180 and higher	
Water Resisting Property	Excellent	
Evaporation Loss 98.9 x 22 hrs (%)	2.0 and below	
Usable Temperature Range °C	–20 to +150	
Copper Strip Corrosion Test	Passed.	

OIL BRANDS RECOMMENDED

Manufacturers	Brand name
Idemitsu	Daphne Colonex EP2
Esso	Beacon 2
Shell	Albania EP2
Mobil	Mobilux 2

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TADANO

PERIODICAL INSPECTIONS

PERIODICAL INSPECTIONS

The crane should be kept in such a condition as will assure the full performance of each crane function. This is essential for both the assurance of safety and the maintenance of high work efficiency.
Inspection items are described below.
Make repairs immediately when something unusual is found during the periodical inspections.
Never fail to perform the pre-operational inspections of:

1. outriggers.
2. crane mechanisms : boom swing, elevation and telescoping, and rope winding.
3. brake system.
4. clutches.
5. electrical system.

	Inspection and adjustment items
Driving system	Control levers and switches 1. Operating condition.
	PTO (power take off) 1. Looseness and leaks. 2. Unusual noise and heat.
	Propeller shaft 1. Looseness of flange and connections. 2. Oscillation, scratches and wear.
Hydraulic system	Hydraulic oil tank 1. Looseness and damage. 2. Cracks and leaks. 3. Oil level, dirtiness and viscosity.
	Hydraulic pump 1. Looseness and leak. 2. Unusual noise, vibration and heat. 3. Leaks. 4. Inlet condition (air entry).

	Inspection and adjustment items
Boom swing system	Swing table 1. Cracks and deformations.
	Speed reducer and swing bearing 1. Oil level and dirtiness. 2. Cracks, deformations of and leaks from gear case. 3. Abnormal noise and vibration. 4. Looseness.
	Hydraulic motor 1. Pressure. 2. Looseness of and leaks from piping and joints. 3. Deformations, cracks and leaks. 4. Leaks from oil seal.
	Brake 1. Braking performance. 2. Deformations and wear of link and cable. 3. Lubrication.

	Inspection and adjustment items
Boom swing system	Rotary joint 1. Leaks. 2. Rotations, noise, vibration and heat.
Boom elevating system	Elevating cylinder 1. Wear and damage of pivot pins and hoses. 2. Looseness of bolts. 3. Leaks. 4. Vibration and noise. 5. Cylinder retracting of itself while lifting a load. 6. Lubrication.
	Counterbalance valve 1. Leaks. 2. Pulsations. 3. Deterioration, twisting and deformation of hoses. 4. Looseness of and leaks from pipings and joints.
Boom telescoping system	Boom 1. Cracks, bend and damage. 2. Looseness of bolts. 3. Scratches on sliding surfaces. 4. Wear and damage of pivot pin bosses. 5. Lubrication of sliding surfaces. 6. Deformations and cracks of boom rest.
	Telescoping cylinders 1. Pulsations, operational sequence and noise. 2. Leaks. 3. Function of valve. 4. Looseness of pipings. 5. Deterioration, twisting and damage of hoses.
	Jib 1. Bend, cracks and deformations. 2. Lubrication of connecting pins and bosses. 3. Lubrication of stowing pin and bosses.
Winches	Hydraulic motor 1. Looseness and cracks. 2. Leaks. 3. Deformation and cracks in main body. 4. Noise and vibration. 5. Looseness of and leaks from pipings and joints.

	Inspection and adjustment items
Winches	Speed reducer 1. Looseness. 2. Noise. 3. Cracks and deformation of gear case. 4. Wear of bearings. 5. Lubrication. 6. Leaks.
	Clutches 1. Slippage. 2. Looseness, leaks, and noise in rotary joint. 3. Looseness of pipings.
	Brakes 1. Braking performance and wear of lining. 2. Correct locking. 3. Wear of links and rod sections. 4. Lubrication.
	Counterbalance valve 1. Leaks. 2. Looseness of and leaks from pipings and joints.
	Drums 1. Cracks. 2. Disorderly rope winding.
	Hooks and sheaves 1. Rotation of hook. 2. Deformation. 3. Movement of trunnion. 4. Connections between trunnion and hook. 5. Bend of rope guides. 6. Rotation of sheave (abnormal noise.) 7. Cracks and wear of sheaves. 8. Bend damage of sheave support and protecting pieces. 9. Lubrication.
	Wire rope 1. Diameter. 2. Wire breakage. 3. Kinks. 4. Deformation. 5. Corrosion. 6. Is the rope socket wedge in place? 7. Connection of wire rope and rope socket. 8. Wear and cracks in rope socket boss and pin. 9. Through correct sheaves?

	Inspection and adjustment items
Winches	Rope guides 1. Distance to hook. 2. Damage and deformation.
Hydraulic system devices	Control valves 1. Operating conditions. 2. Leaks. 3. Looseness of bolts.
	Clutch valve 1. Operating conditions. 2. Leaks.
	Relief valves 1. Set pressure.
	Piping 1. Looseness in connections. 2. Leaks. 3. Looseness and cracks of supports.
Crane operating system	Load meter 1. Looseness and leaks in connection.
	Pressure gauges 1. Smooth movement of needle. 2. Looseness in connection.
	Control levers and pedals 1. Function. 2. Play.
	Work lamps 1. Lightening. 2. Damage. 3. Installation.
	Boom top lamp 1. Lightening. 2. Installation.
	Wipers (front, ceiling) 1. Function. 2. Wear and damage of blade.
	Room lamp 1. Lightening.
	Tipping warning device. 1. Function. 2. Accuracy. 3. Lightening.

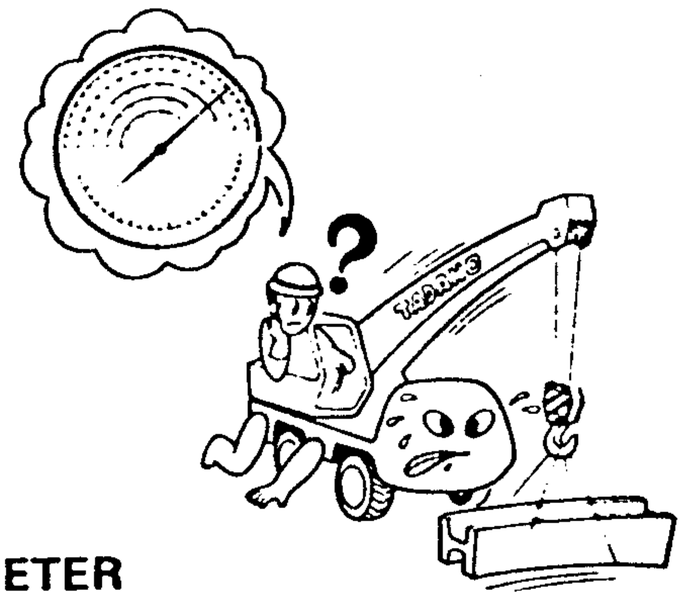
	Inspection and adjustment items
Crane operating system	Over-winding alarm device. 1. Function. 2. Damage of wire for weight. 3. Installation.
	Cab 1. Looseness of nuts and bolts. 2. Function of window and cab door locks.
	Starter switch 1. Function. 2. Installation. 3. Function of pilot lamp.
	Load indicator 1. Function. 2. Accuracy.
Outriggers	Jacks 1. Retract while lifting a load. 2. Lower while traveling. 3. Leaks. 4. Function of pilot check valve. 5. Looseness of piping and joints. 6. Noise and vibration. 7. Deformation and damage of jack floats.
	Sliders 1. Deformation and damage. 2. Damage of pins and bosses for shipment. 3. Deformation and cracks of bracket. 4. Noise and vibration. 5. Looseness and deterioration of piping and hose connections. 6. Leaks.
	Control valve 1. Function. 2. Looseness of piping. 3. Looseness of bolts. 4. Leaks.
	Level gauge 1. Scratches and deformation. 2. Installation. 3. Size of air bubble.

Inspection and adjustment items	
Outriggers	Check valves 1. Function. 2. Leaks. 3. Installation. 4. Looseness of pipe connection and leaks therefrom.
	Jack select valve. 1. Function. 2. Leaks. 3. Installation. 4. Looseness of piping and joints.
Miscellaneous	Frame 1. Twist, bend and cracks.
	Accessories 1. Damage or missing.

ADJUSTMENT

ADJUSTMENT

LOAD METER



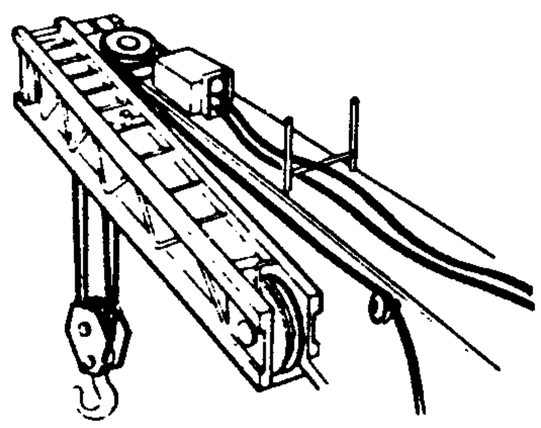
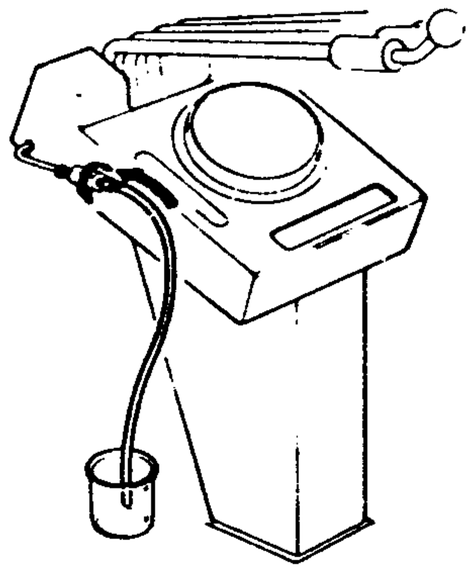
Due to the lack of oil in the circuit or to the entry of air therein, the load meter may not indicate the correct load.

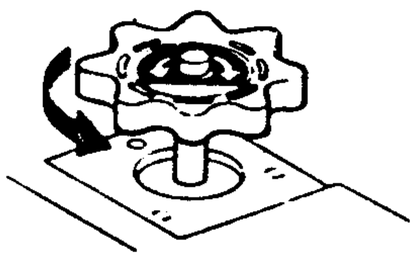
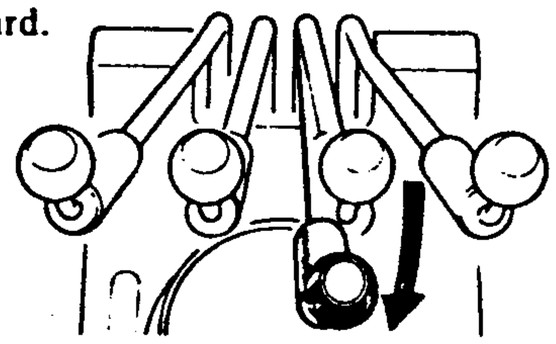
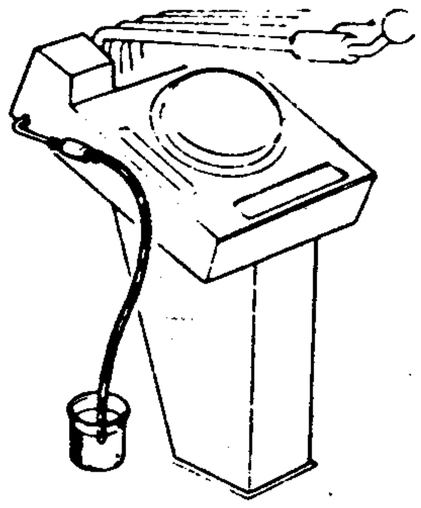
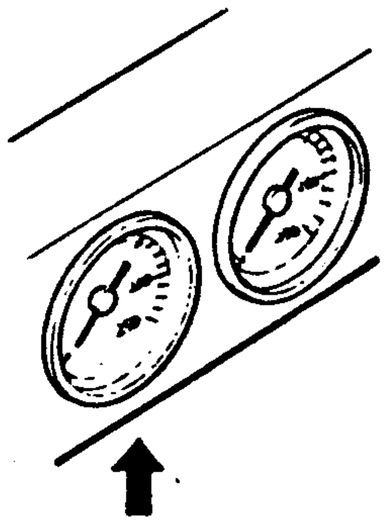
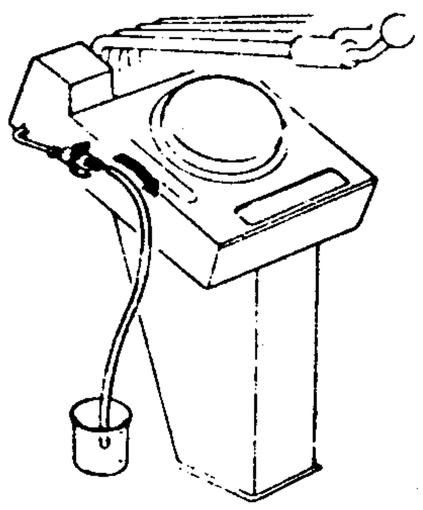
NOTES ON OPERATION

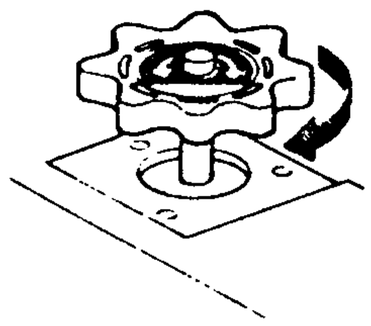
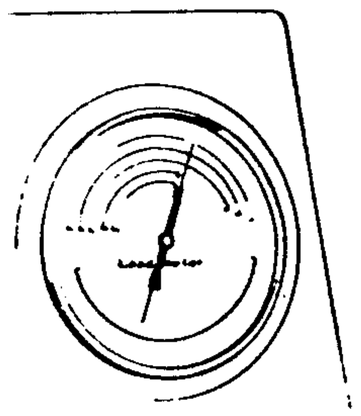
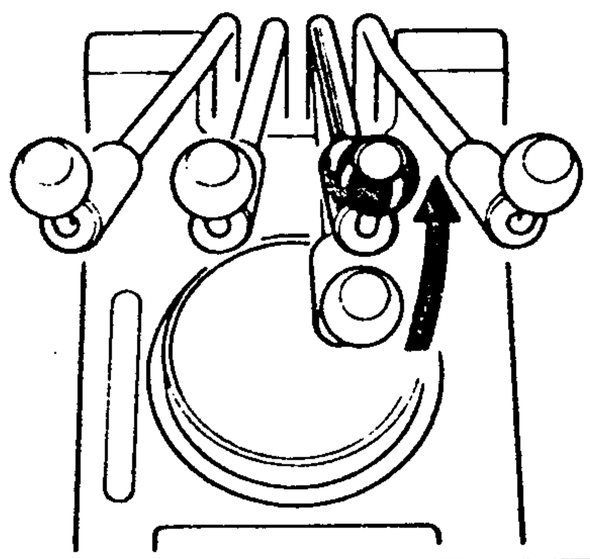
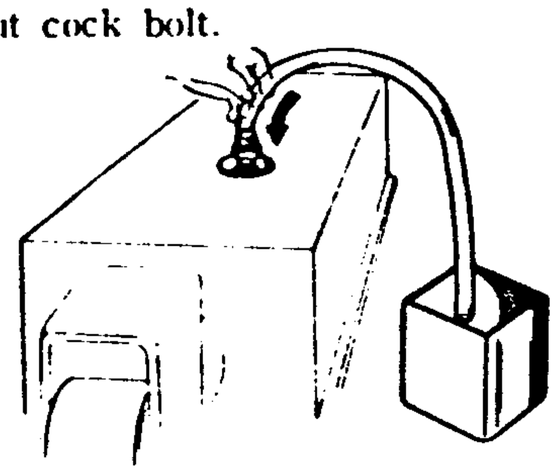
1. Set up the crane on hard level ground.
2. Do not stop the pump during adjustment.
3. Fully retract the boom.

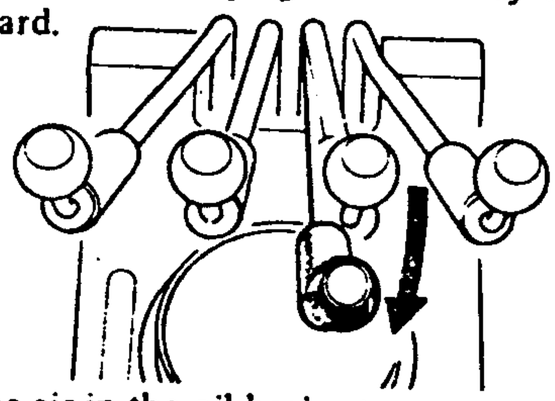
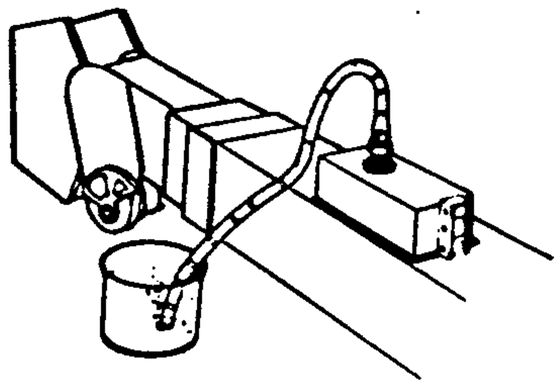
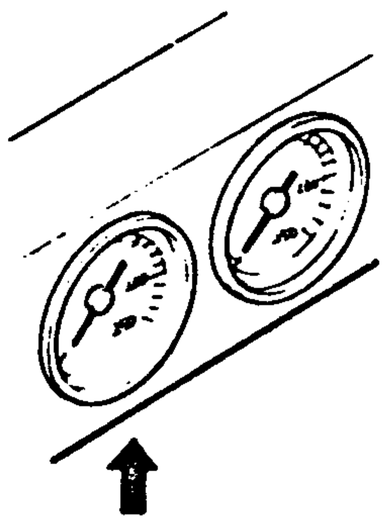
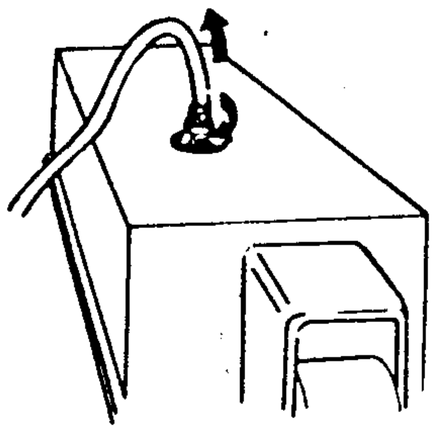
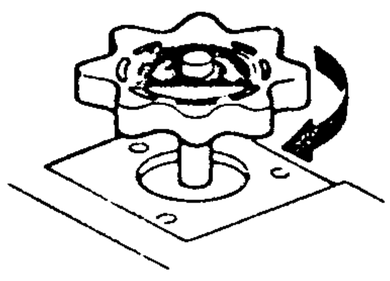
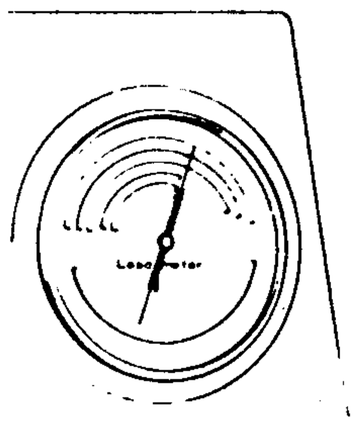
LETTING OUT AIR FROM LOAD METER

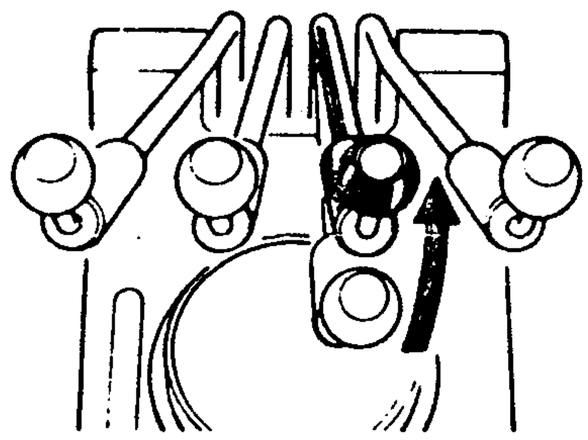
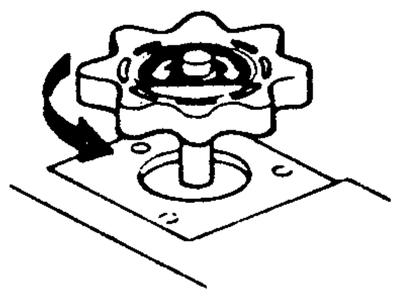
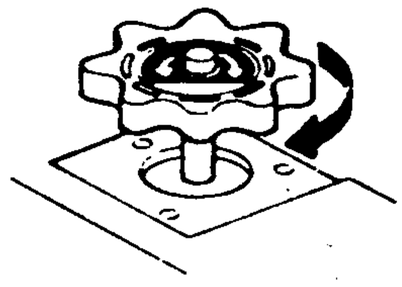
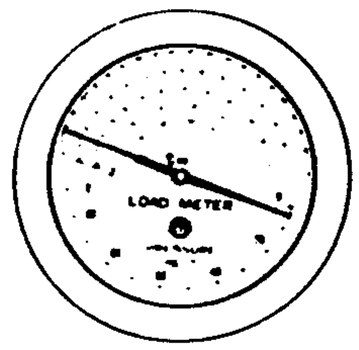
Perform once a month.

No.	Procedure	Note	Maintenance standard and tools
1	Slacken the auxiliary winch rope. 	Avoid disorderly rope winding on the drum.	
2	Put on the vinyl hose and loosen the load meter air letting out cock bolt. 	Put on the vinyl hose firmly so it does not come out.	Vinyl hose, Spanner Ladder Oil container (approx. 20 lit.)

No.	Procedure	Note	Maintenance standard and tools
3	Open the load meter oil supply cock. 	Loosen it by turning fully to the left.	
4	Pull the telescoping lever halfway backward.  The air in the oil begins to go out.  Keep pulling the lever until air bubbles are not seen in the vinyl hose any longer.	Never pull the lever fully back. Observe the pressure gauge.  For elevating, telescoping, swing and outriggers.	Keep the pressure gauge indication below 70kg/cm^2.
5	When air bubbles disappear, close the bolt and remove the vinyle hose. 	Close fully so oil does not leak.	Spanner

No.	Procedure	Note	Maintenance standard and tools
6	Close the oil supply cock. 	Indicator needle stays somewhere on the scale. 	
7	Return the telescoping lever to neutral. 		
8	Put on the vinyl hose provided and loosen the load meter air letting out cock bolt. 	Put on the vinyl hose firmly so it does not come out.	Vinyl hose, Spanner Ladder Oil container (approx. 20 lit.)
9	Open the load meter oil supply cock. 	Loosen it by turning fully to the left.	

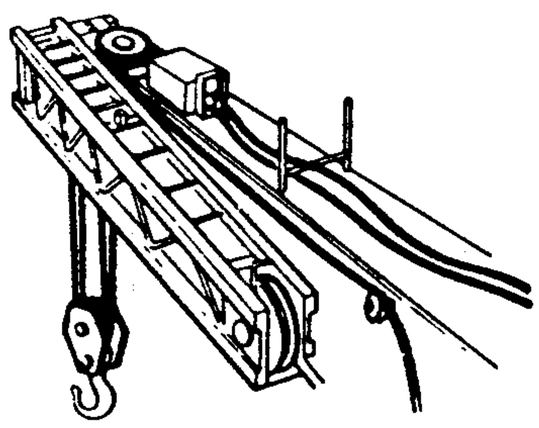
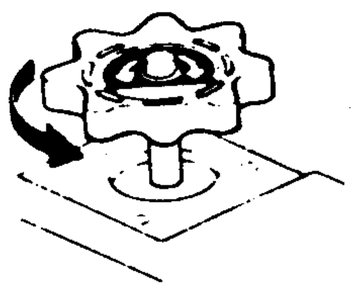
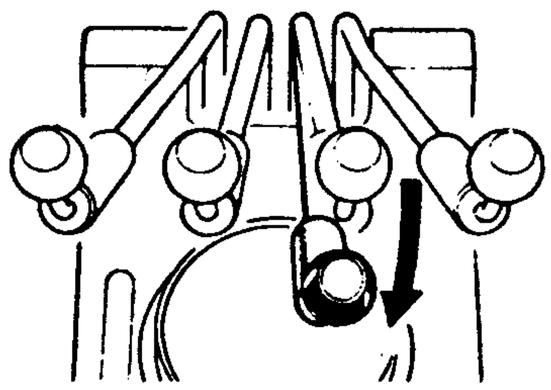
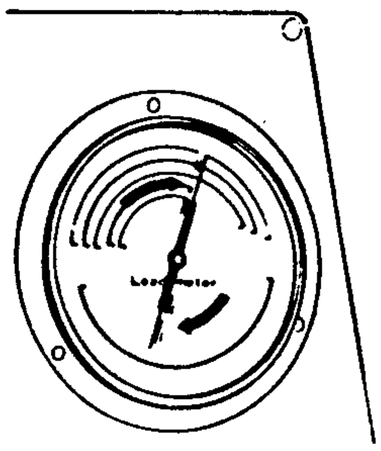
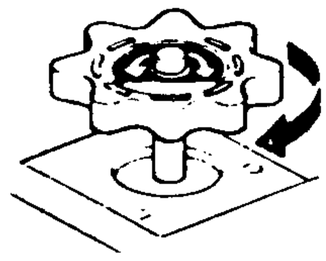
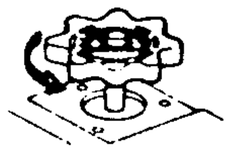
No.	Procedure	Note	Maintenance standard and tools
10	Pull the telescoping lever halfway backward.  The air in the oil begins to go out.  Keep pulling the lever until air bubbles are not seen in the vinyl hose any longer.	Never pull the lever fully back. Observe the pressure gauge.  For elevating, telescoping swing and outriggers.	Keep the pressure gauge indication below 70kg/cm².
11	When air bubbles disappear, close the bolt and remove the vinyle hose. 	Close fully so oil does not leak.	Spanner
12	Close the oil supply cock. 	Indicator needle stays somewhere on the scale. 	

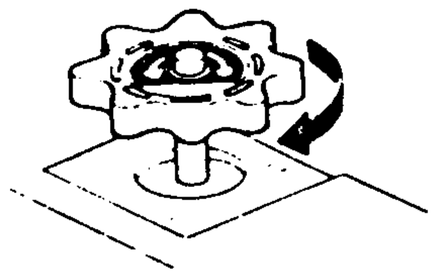
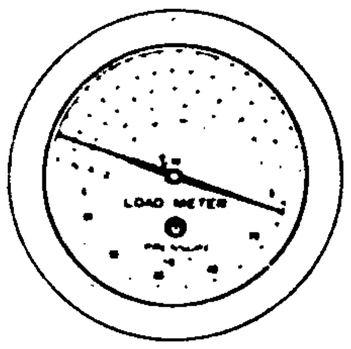
No.	Procedure	Note	Maintenance standard and tools
13	Return the telescoping lever to neutral. 		
14	Open the oil supply cock. 	Indicator needle moves toward 0 ton.	
15	Close the oil supply cock. 	Promptly when the needle comes to the red mark (2.5kg/㎠)on the scale. 	
16	Lift a load below total rated load, and not exceeding 2900kg per part-line. Then detach the load of the hook and raise only the hook.	Hook block weight: 230kg	
17	Make sure that the indicator needle has returned to the red mark on the scale. If not, repeat the procedure No. 14 through 16 till the needle returns to the red mark on the scale.		

After this adjustment is over, take in the rope to eliminate slackness.

☐ SUPPLYING OIL TO LOAD METER

This should be performed weekly and when the meter gets out of order.

No.	Procedure	Note	Maintenance standard and tools
1	Slacken the auxiliary winch wire rope. 	Avoid disorderly rope winding on the drum.	
2	Open the load meter oil supply cock. 	Loosen it by turning fully to the left.	
3	Pull the telescoping lever halfway backward. 	The load meter needle moves upward. 	
4	Close the oil supply cock. 	After closing the oil supply cock, return the telescoping lever to neutral.	Indicator needle stays somewhere on the scale.
5	Open the oil supply cock. 	Indicator needle moves toward 0 ton.	

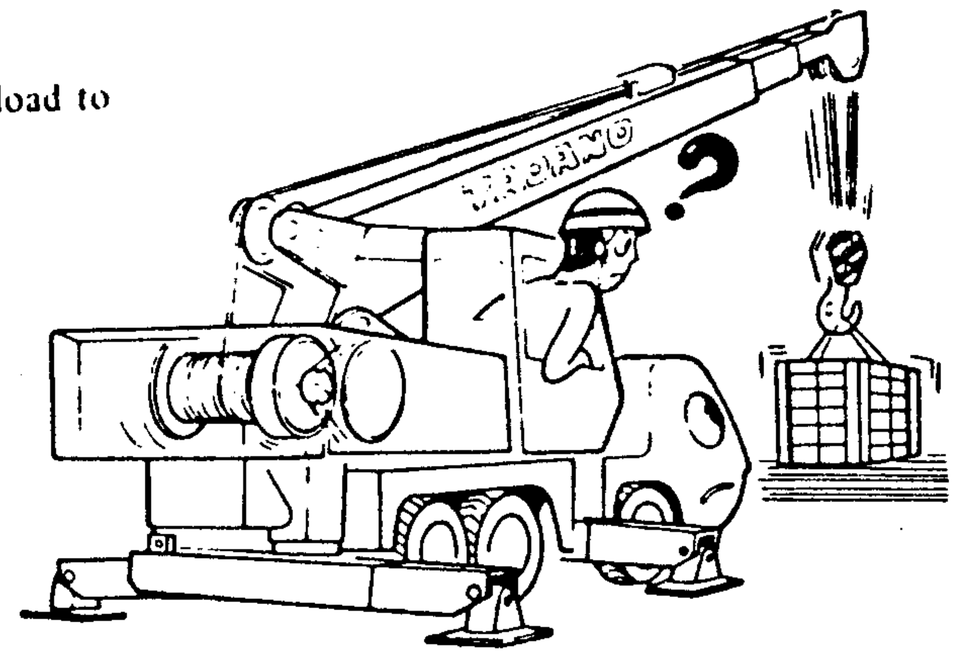
No.	Procedure	Note	Maintenance standard and tools
6	Close the oil supply cock. 	Promptly when the needle comes to the red mark (2.5kg/㎠) on the scale. 	
7	Lift a load below the total rated load, and not exceeding 2900kg per part-lire. Then detach the load of the hook and raise only the hook.	Hook block weight : 230kg	
8	Make sure that the indicator needle has returned to the red mark on the scale. If not, repeat the procedure NO. 5 through 7 till the needle returns to the red mark.		

After this adjustment is over, take in the rope to eliminate slackness.

MEMO

WINCH CLUTCHES

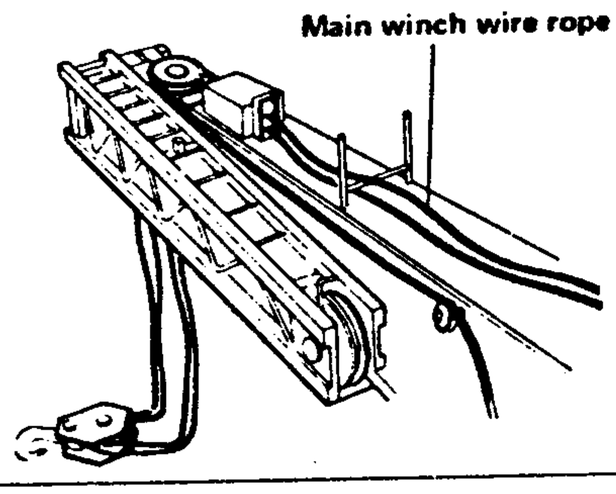
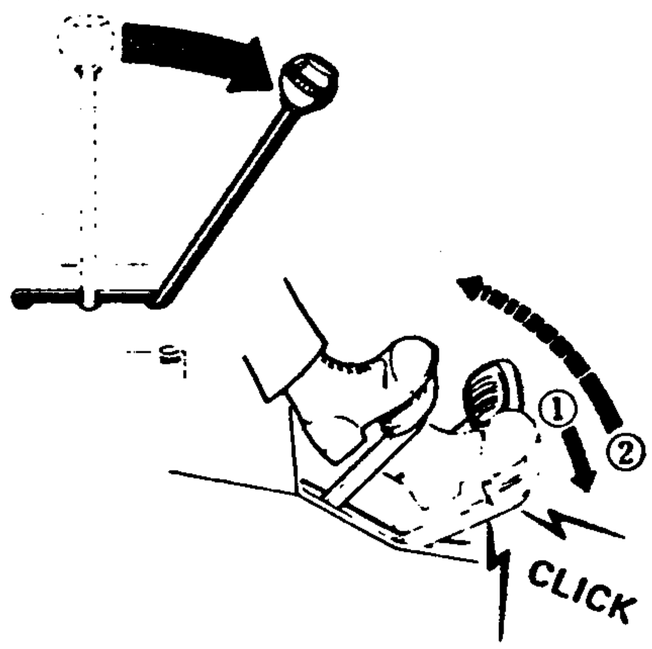
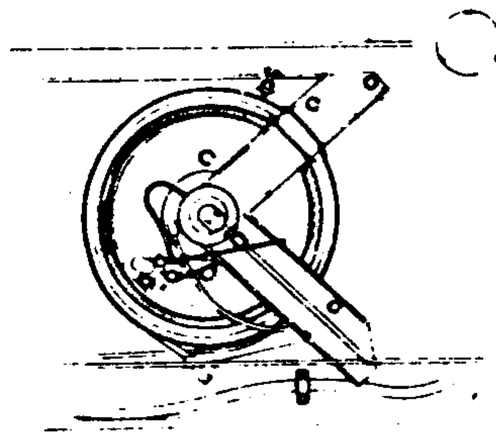
Winch clutch slippage does not allow a load to be lifted. Adjust the clutch as below.

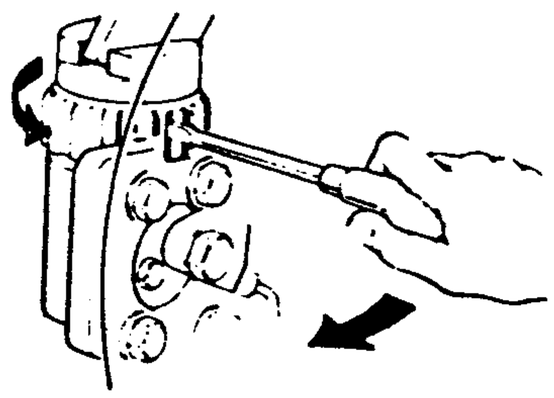
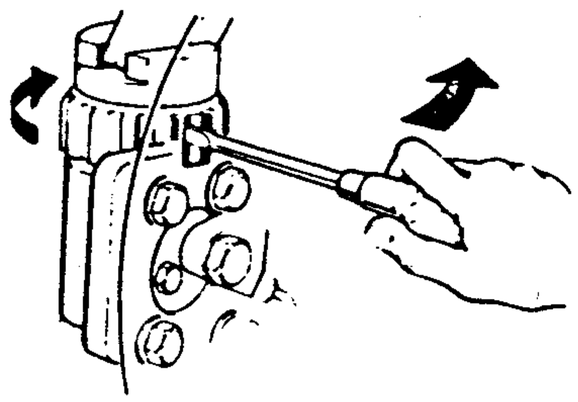
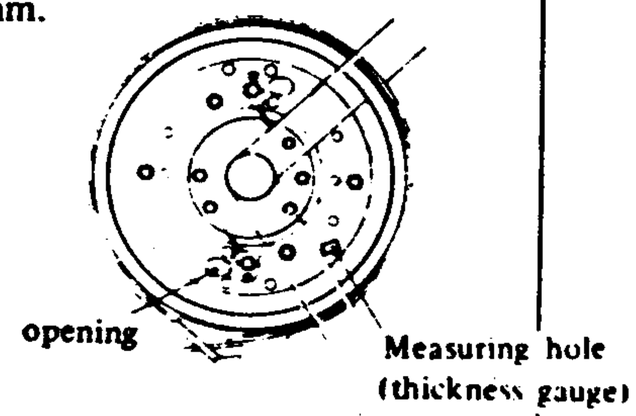
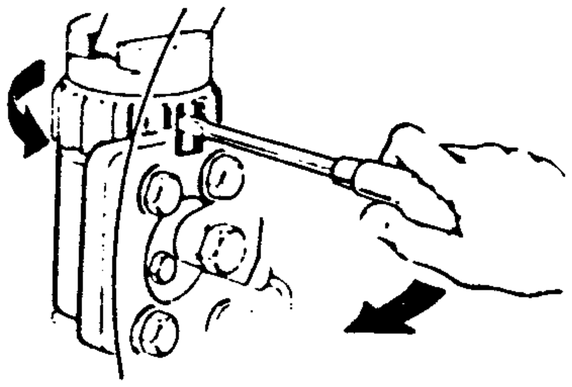
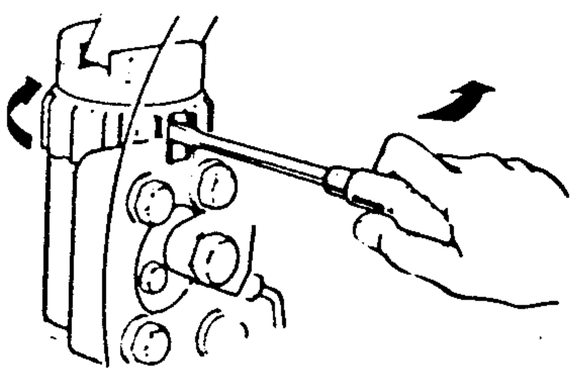


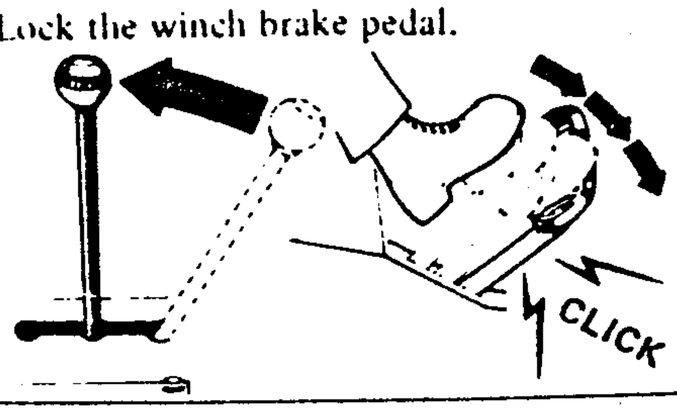
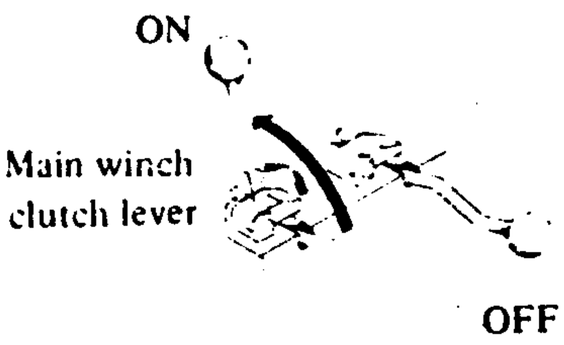
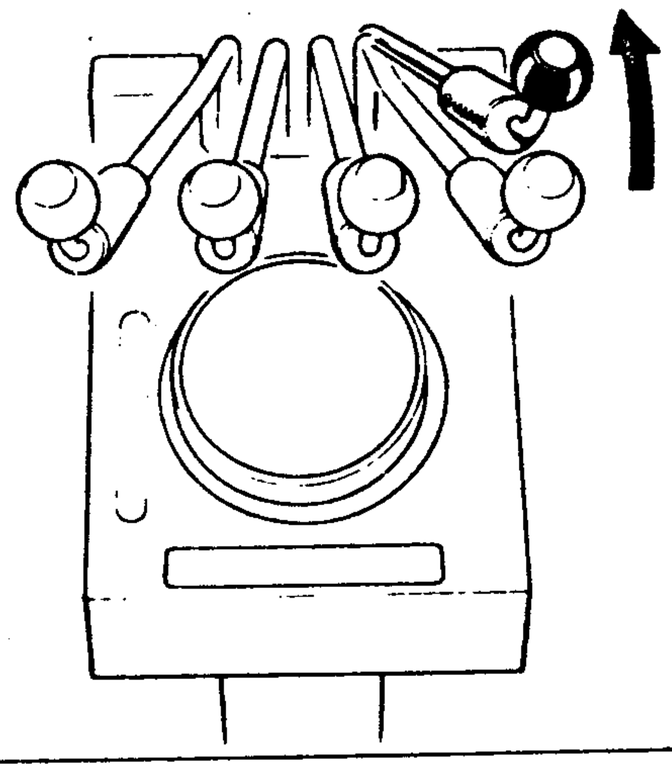
NOTE ON OPERATION

Set up the crane on hard level ground.

ADJUSTING CLEARANCE BETWEEN SHOE AND DRUM OF MAIN WINCH CLUTCH

No.	Procedure	Note	Maintenance standard and tools
1	Slacken the main winch rope. (Place the main winch hook on the ground.) 	Avoid disorderly rope winding on the drum.	
2	Unlock the brake pedal. 	Fasten the drum to the bracket on the swing table with a wire so that the drum does not turn. 	

No.	Procedure	Note	Maintenance standard and tools
3	Turn one of the adjusting nuts fully to the arrow, i.e. "expand", direction. 	Remove the rubber plug from the opening.	Screwdriver
4	Turn the same nut to the arrow, i.e. "contract", direction. 	Turn it until the clutch shoe separates from the drum by 0.4 mm. 	Thickness gauge
5	Turn the other adjusting nut fully to the arrow, i.e. "expand", direction. 	Remove the rubber plug from the opening.	Screwdriver
6	Turn the same nut to the arrow, i.e. "contract", direction. 	Turn it until the clutch shoe separates from the drum by 0.4 mm.	Thickness gauge

No.	Procedure	Note	Maintenance standard and tools
7	Lock the winch brake pedal. 		Third notch
8	Set main winch clutch lever to ON. 		
9	Winch down. 	Depress the accelerator pedal so that the engine will not stall.	No slippage. The winch drive shaft should not rotate.
10.	Place the crane in traveling position.		

ADJUSTING CLEARANCE BETWEEN SHOE AND DRUM OF AUXILIARY WINCH CLUTCH

The adjustment procedures for the auxiliary winch clutch are the same as those for the main winch clutch; only the operational devices different: clutch lever, brake lock lever, and brake pedal.

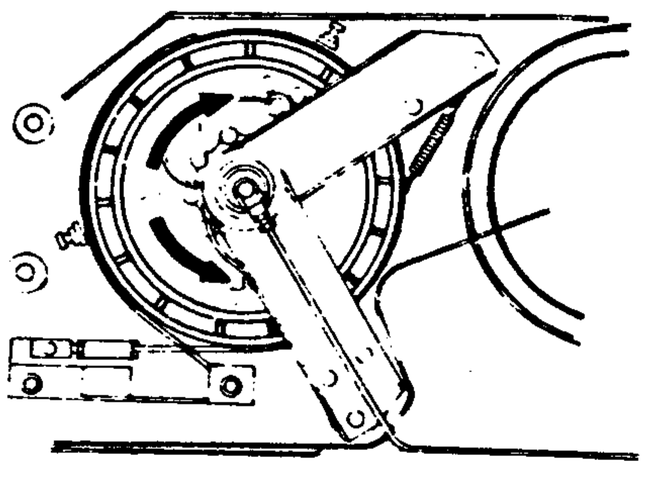
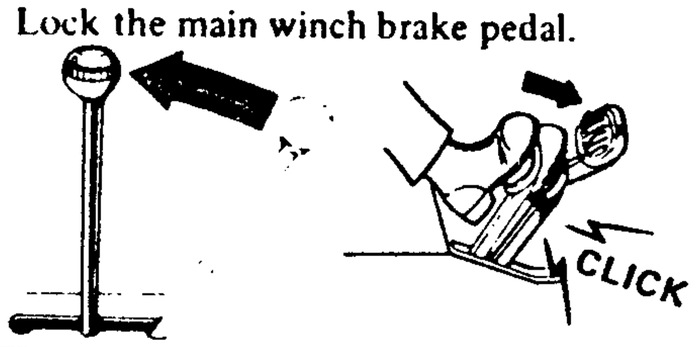
LETTING OUT AIR FROM CLUTCH CYLINDERS

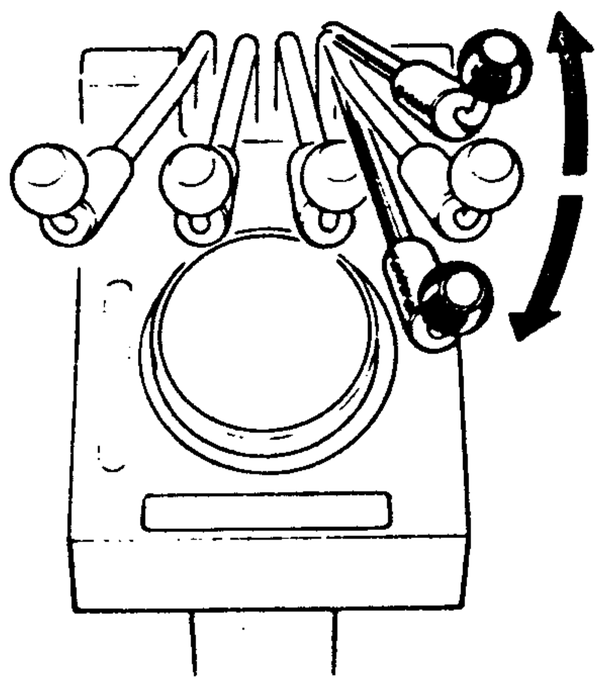
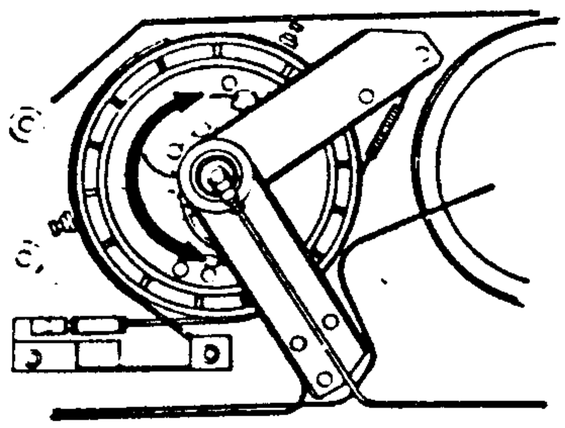
The possible cause of clutch slippage will be the entry of air in the hydraulic oil provided it is proved that there is a proper clearance between the shoe and the drum without any oil or grease adhered thereon.

NOTES ON OPERATION

1. Set up the crane on hard level ground.
2. Fully retract the boom.
3. Idle the pump.

MAIN WINCH

No.	Procedure	Note	Maintenance standard and tools
1	Rotate the clutch plate so that air letting-out cock bolt comes to position where work is easy. 	Two persons are necessary for this work. There should be a close contact between them.	
2	Connect a vinyl hose to the cock bolt and loosen it. 		Spanner Vinyl hose Oil container
3	Lock the main winch brake pedal. 		First notch
4	Engage the main winch clutch.	Disengage the auxiliary winch clutch.	

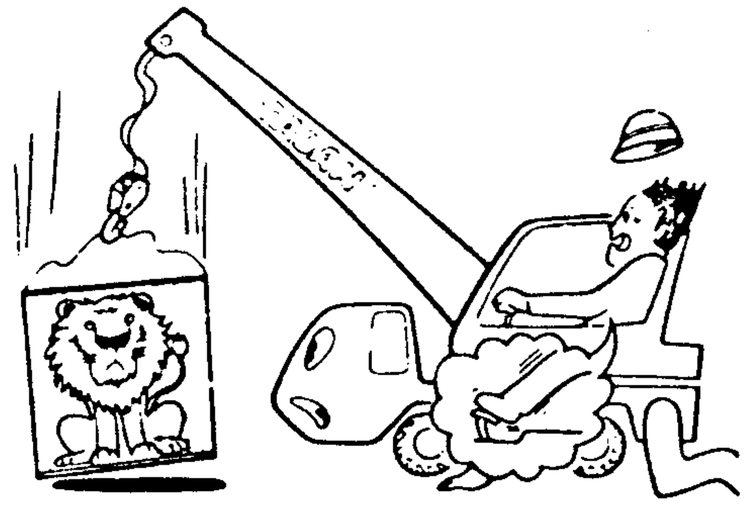
No.	Procedure	Note	Maintenance standard and tools
5	Operate the winch lever back and forth to "Winch up" and "Winch down". 	The clutch plate should be rotated within the arrow range where the cock bolt is situated.  The leaked oil should not adhere to the lining.	Repeat several times till air has been completely expelled.
6	After making sure air has been completely let out, tighten the air letting-out cock bolt.	Simultaneously with No. 5 above.	Spanner
7	Remove the vinyl hose.		
8	Repeat No.1–7 to let out the air from the opposite side cylinder.		
9	Inspect the function of the clutch.		

■ AUXILIARY WINCH

The procedures for letting out air from clutch cylinders for auxiliary winch are the same as those for the main-winch; only the controls different: the brake pedal, brake lock lever, and clutch lever.

MEMO

WINCH BRAKES

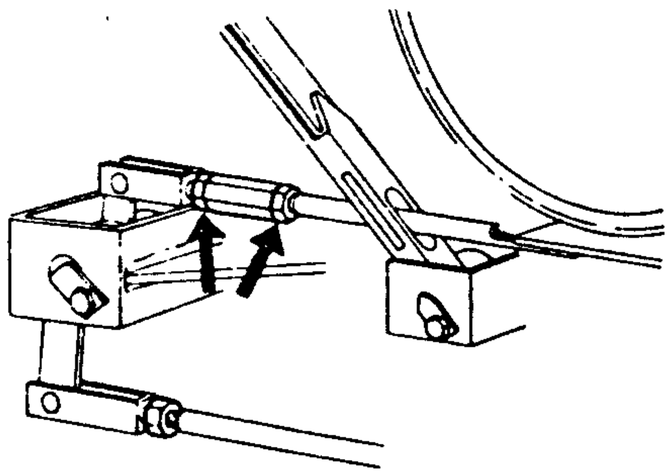
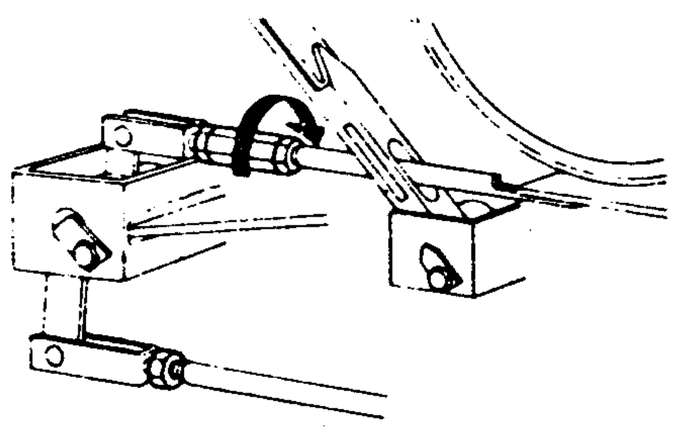


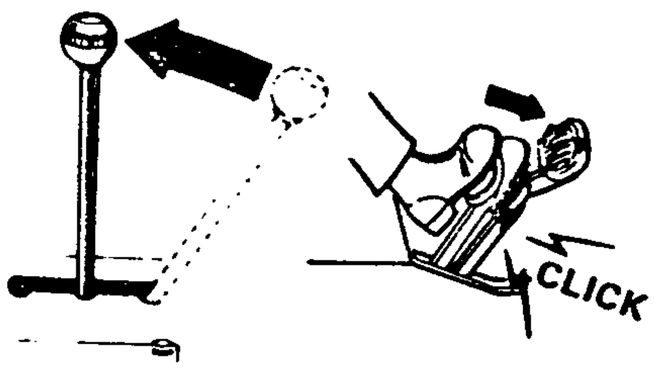
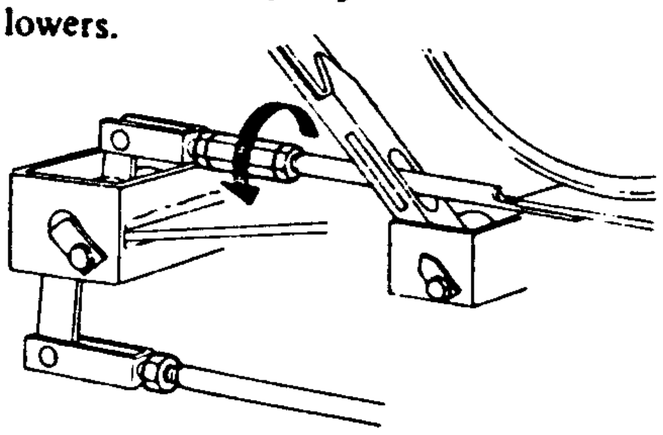
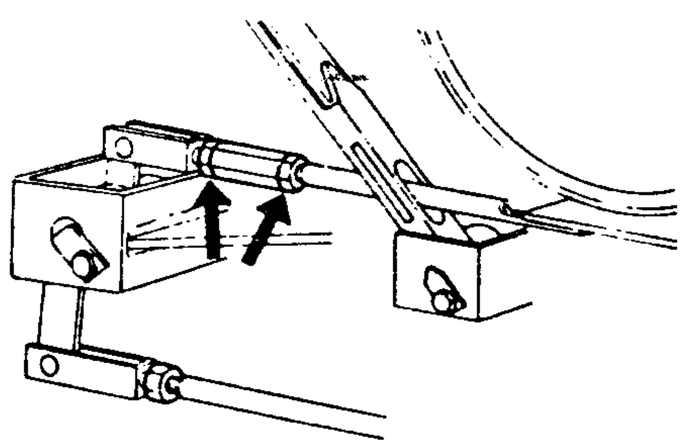
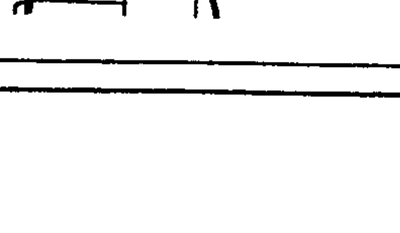
Winch brake slippage causes the lifted load to lower in spite of brake application. Adjust the brake as below.

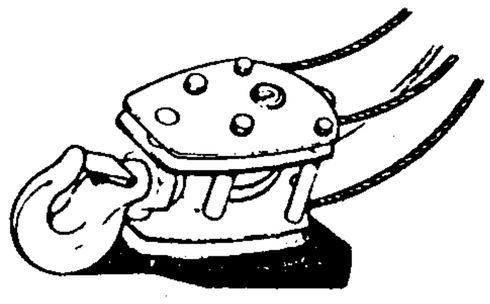
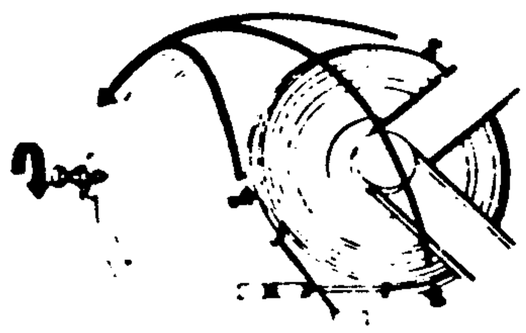
NOTE ON OPERATION

1. Set up the crane on hard level ground.

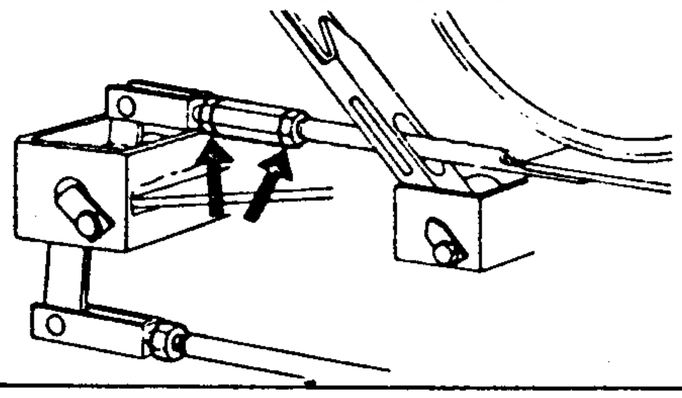
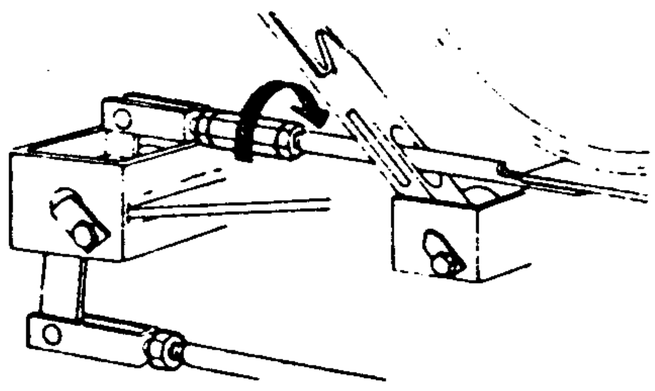
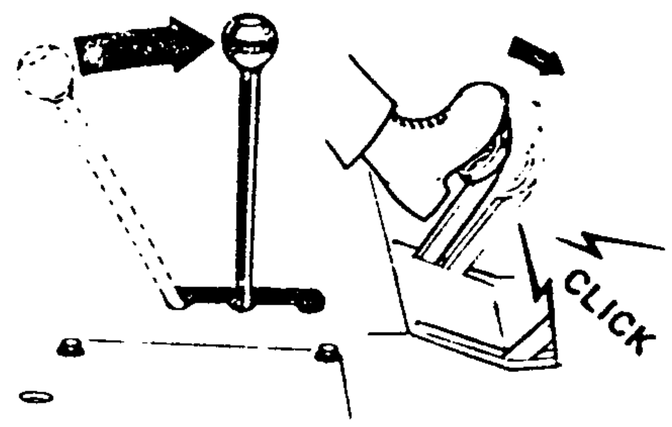
ADJUSTING CLEARANCE BETWEEN SHOE AND DRUM OF MAIN WINCH BRAKE

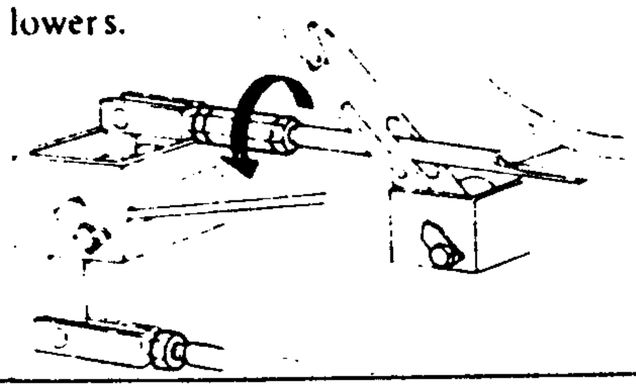
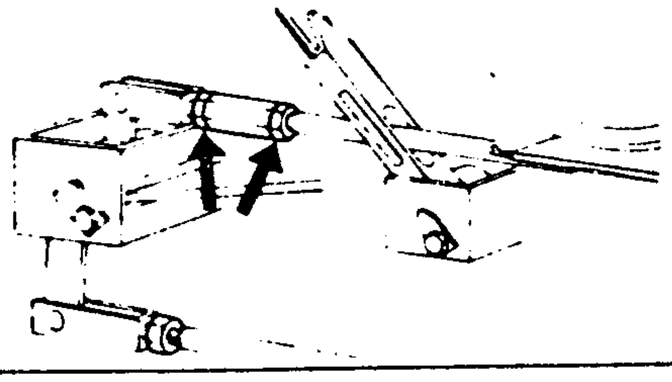
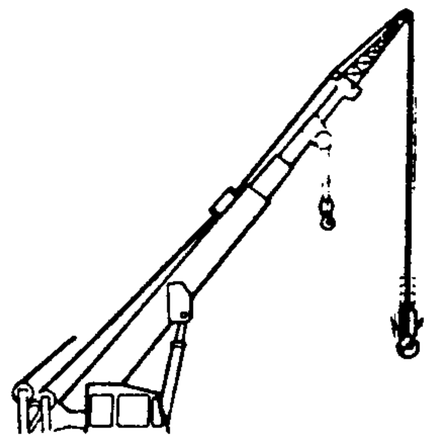
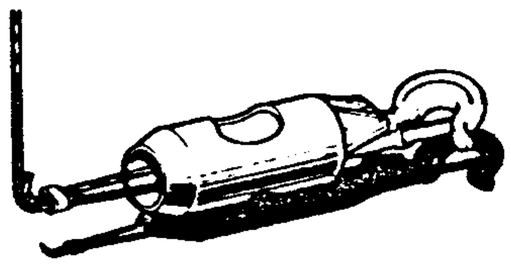
No.	Procedure	Note	Maintenance standard and tools
1	Re-reeve to 4-part line. Lift a load.	Approx. 60 to 70 kg load.	
2	Elevate the boom to 50°.		
3	Depress the main winch brake pedal. Set the main winch clutch lever to OFF.	Do not lock the brake pedal.	
4	Loosen the turnbuckle locknuts. 		Spanner
5	Rotate the turnbuckle in the arrow direction so that there is no clearance between brake shoe and drum. 	Hook must not lower when the brake pedal is released.	Spanner

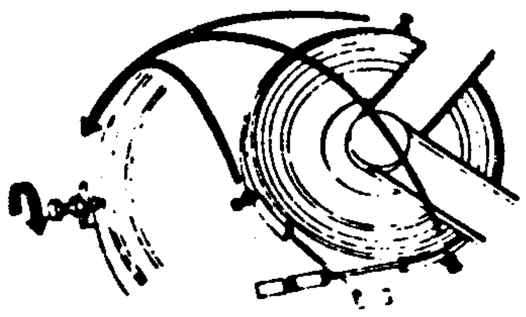
No.	Procedure	Note	Maintenance standard and tools
6	Lock the brake pedal at the first notch. 		
7	Rotate the turnbuckle in the arrow direction; stop it just before the load lowers. 		Spanner
8	Fasten the turnbuckle locknuts. 	Turnbuckle must not rotate then.	Spanner
9	Unload the hook.		
10	Unlock the brake pedal and see if the hook free-falls. 		

No.	Procedure	Note	Maintenance standard and tools
11	Arrange the wire rope in 7-part line.		
12	Release the brake pedal lock and check whether the hook free-falls.		
13	Place the main winch hook on the ground. 	Avoid disorderly rope winding on the drum.	
14	Fasten the drum to the bracket on the swing table with a wire so that the drum does not turn. Release the brake pedal.		
15	Screw in each bolt till its tip end comes to contact with the brake band, and return it half turn. 		Spanner
16	Remove the wire fixing the swing table bracket and the drum. Make sure that the winch drum will not rotate during the winch-down operation, with the brake pedal locked at the third notch. The engine must not stop in this operation. Acceleration will be helpful to avoid engine stop.		Gauge indicates 140 kg/cm^2.

□ADJUSTING CLEARANCE BETWEEN SHOE AND DRUM OF AUXILIARY WINCH BRAKE

No.	Procedure	Note	Maintenance standard and tools
1	Extend the jib.		
2	Attach the auxiliary winch rope to the auxiliary winch hook.		Spanner
3	Lift a load. Elevate the boom to 50°	Approx. 50 to 60 kg load.	
4	Depress the auxiliary winch brake pedal. Set the auxiliary winch clutch lever to OFF.	Do not lock the brake pedal.	
5	Loosen the turnbucke locknuts. 		Spanner
6	Rotate the turnbuckle in the arrow direction so that there is no clearance between brake shoe and drum. 	Hook must not lower when the brake pedal is released.	Spanner
7	Lock the brake pedal at the first notch. 		

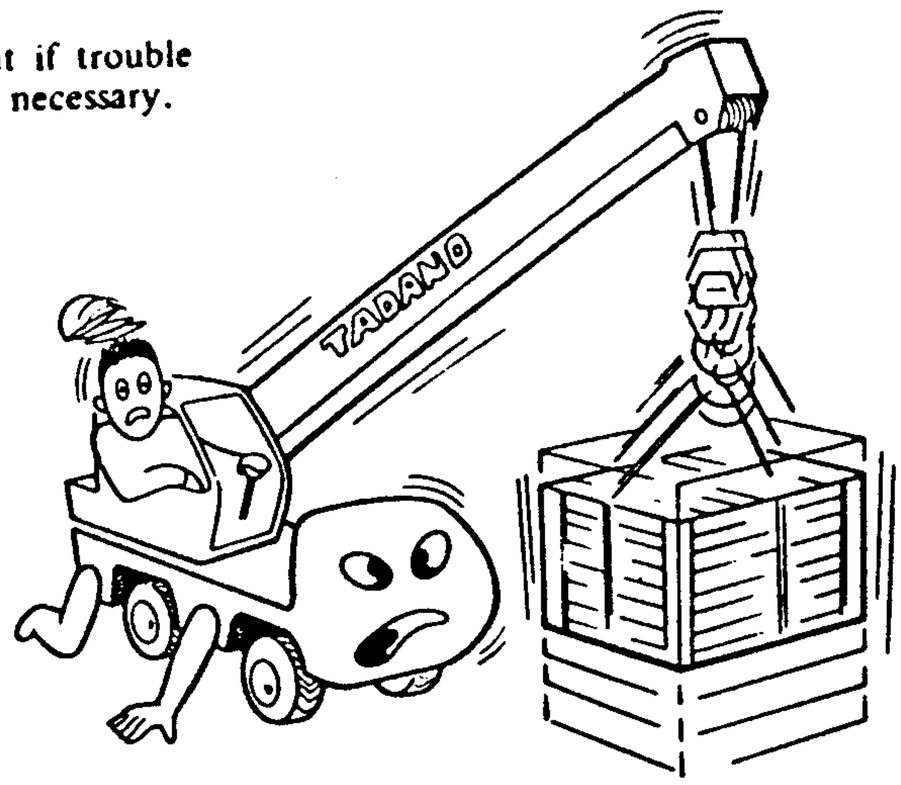
No.	Procedure	Note	Maintenance standard and tools
8	Rotate the turnbuckle in the arrow direction; stop it just before the load lowers. 		Spanner
9	Fasten the turnbuckle locknuts. 	Turnbuckle must not rotate then.	Spanner
10	Unload the hook.		
11	Unlock the brake pedal and see if the hook free-falls. 		
12	Place the auxiliary winch hook on the ground. 	Avoid disorderly rope winding on the drum.	

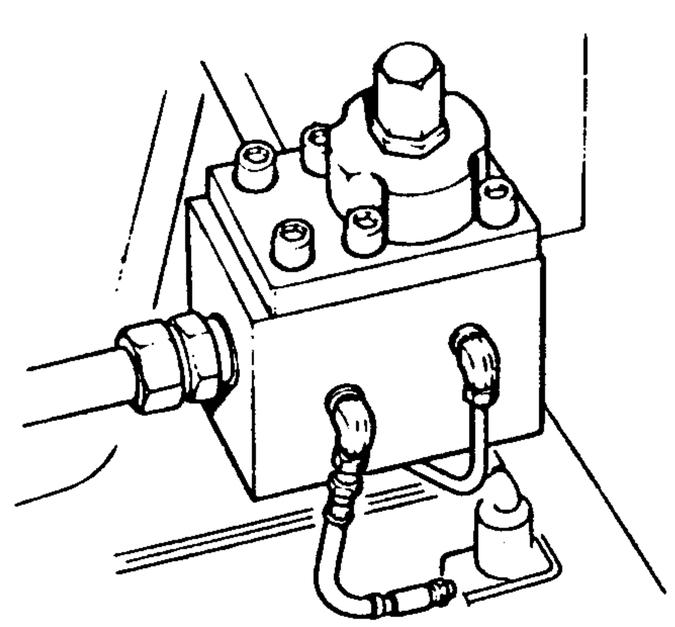
No.	Procedure	Note	Maintenance standard and tools
13	Fasten the drum to the bracket on the swing table with a wire so that the drum does not turn. Release the brake pedal.		
14	Screw in each bolt till its tip end comes to contact with the brake band, and return it half turn. 		Spanner
15	Remove the wire fixing the swing table bracket and the drum. Make sure that the winch drum will not rotate during the winch-down operation, with the brake pedal locked at the third notch. The engine must not stop in this operation. Acceleration will be helpful to avoid engine stop.		Gauge indicates 140 kg/cm^2.
16	Place the crane in traveling position.		

WINCH COUNTERBALANCE VALVE

Mal-function of this valve does not make smooth lowering of load.

Adjustment is not necessary, but if trouble occurs repair or replacement is necessary.





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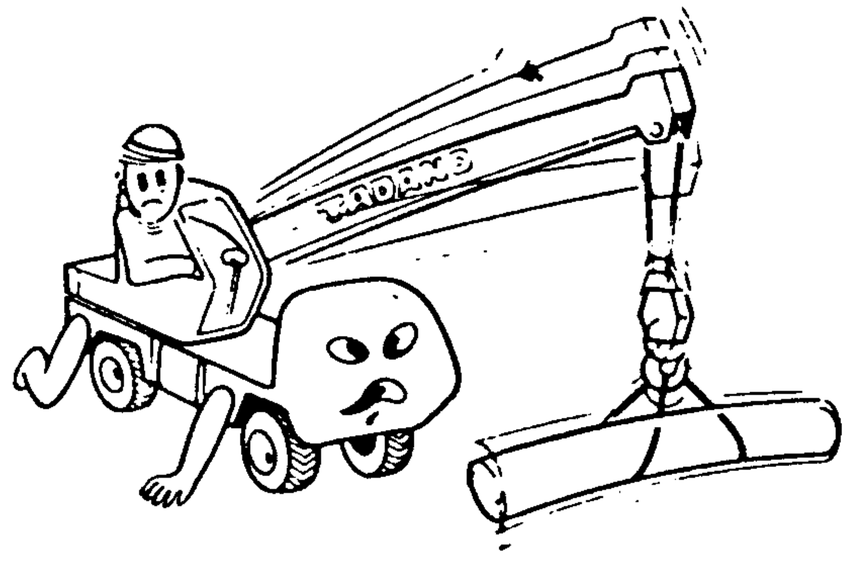
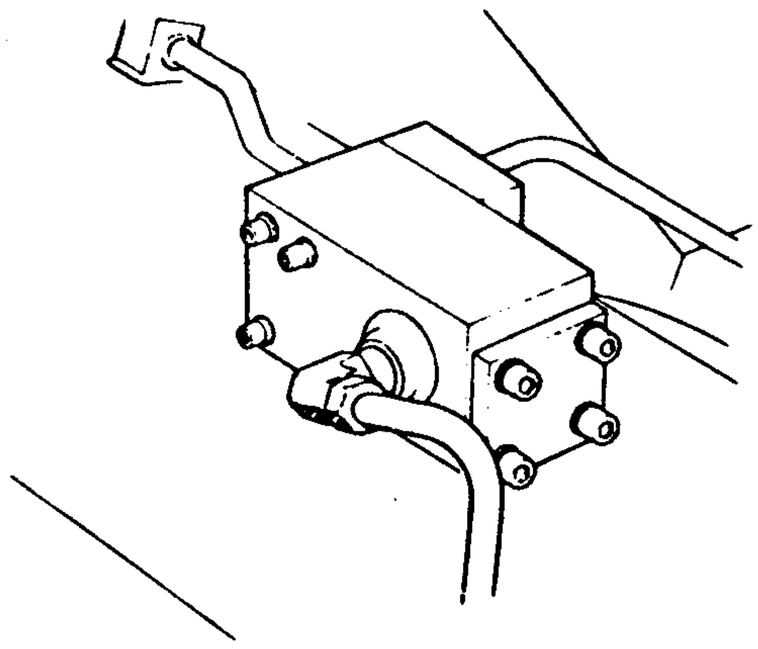
MEMO

ELEVATION COUNTERBALANCE VALVE

Mal-function of this valve does not make smooth lowering of the boom.

Adjustment is not necessary. but if trouble occurs repair or replacement is necessary.





MEMO

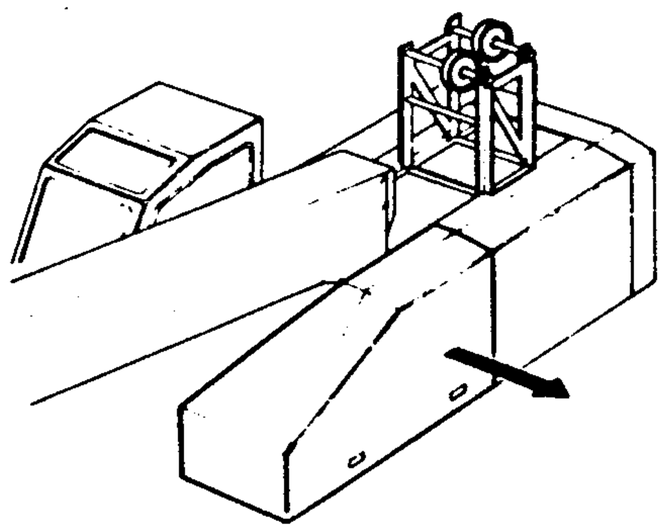
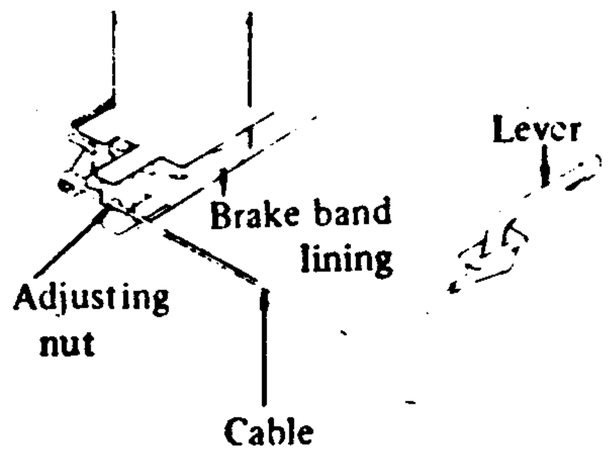
SWING BRAKE

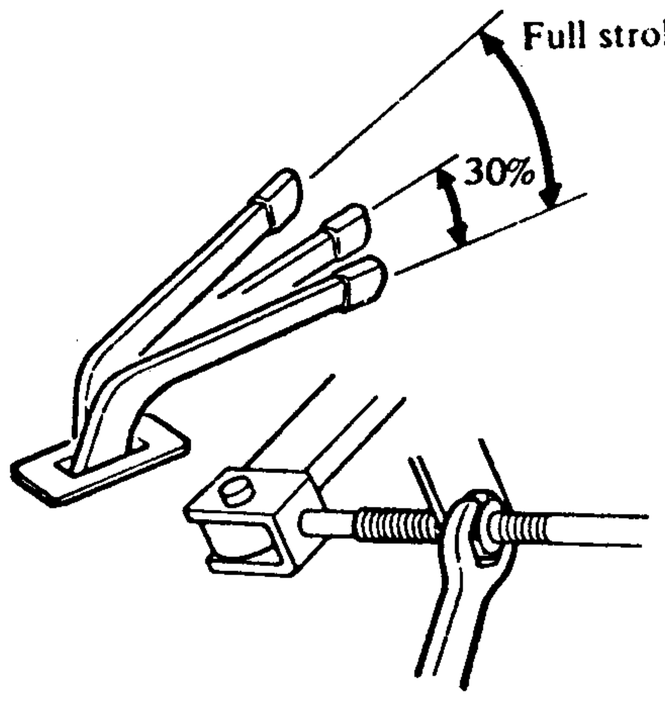
Unless this brake works properly, it is difficult for boom to maintain the same position all through crane operation. Adjust the brake as follows:

NOTE ON OPERATION

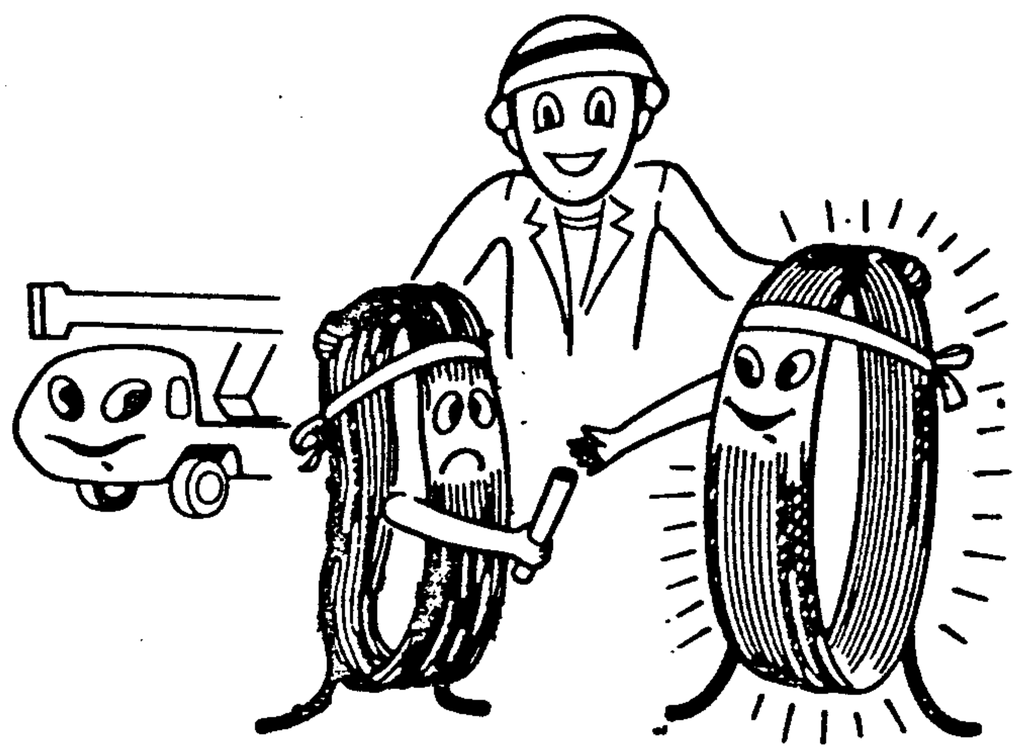
Set up the crane on hard level ground.

☐ ADJUSTMENT

No.	Procedure	Note	Maintenance standard and tools
1	Remove the swing table cover of the reducer side. 		
2	Check the brake lever for smoothness and quantity of its motion. 		

No.	Procedure	Note	Maintenance standard and tools
3	Adjust the adjusting nut so that the brake works completely, when the lever is pulled by 30 percent of its full stroke.  		Spanner
4	Pull the brake lever and check the brake for function in swing.		
5	Place the swing table cover.		

REPLACEMENT OF WIRE ROPES



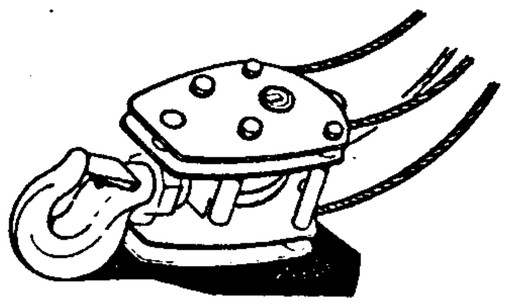
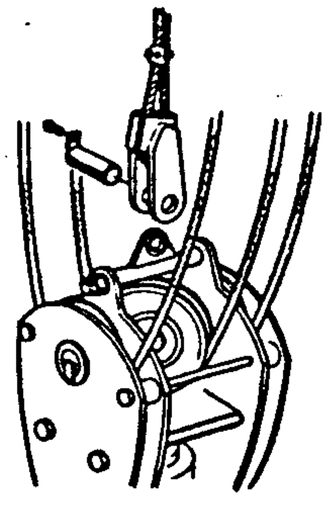
Ropes will deteriorate with the course of time.
It is very dangerous to keep on using faulty rope.
Ropes in one of the following conditions should be replaced with new ones :

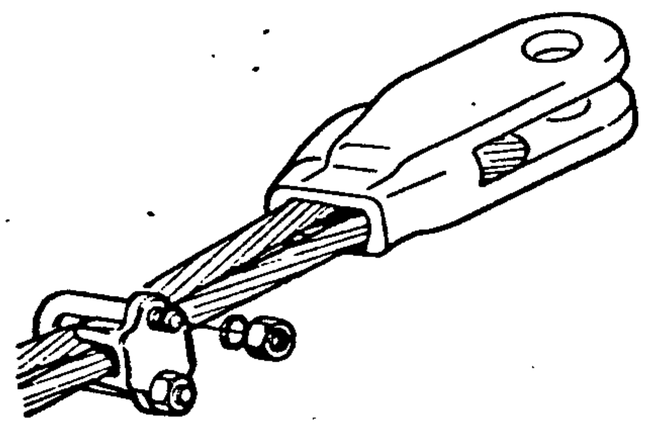
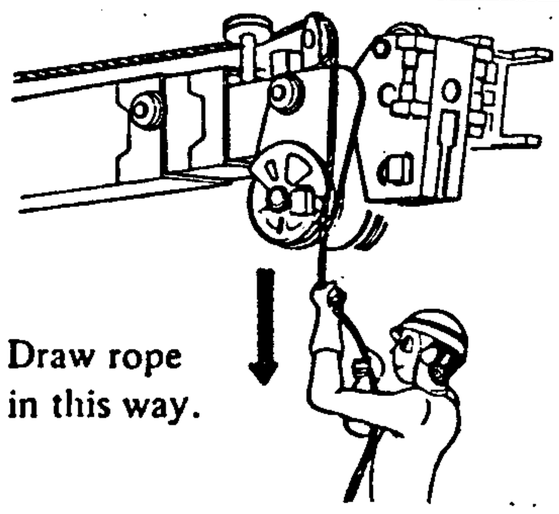
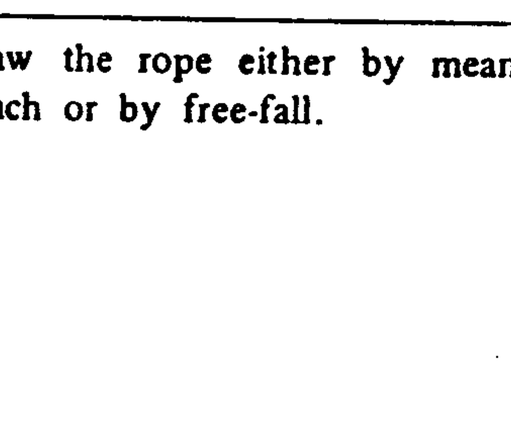
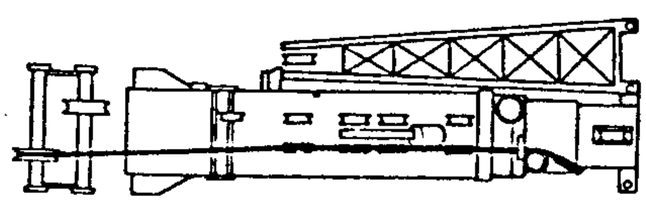
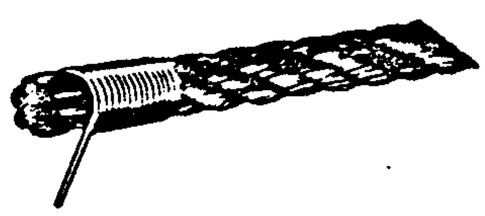
1. Deformed or corroded.
2. Kinked.
3. Having more than 10 percent wires broken in one rope lay.
4. Having a part decreased in diameter by more than 7 percent of the nominal.
5. Deteriorated due to the contact with high-tension wires.
6. Deteriorated by heat.

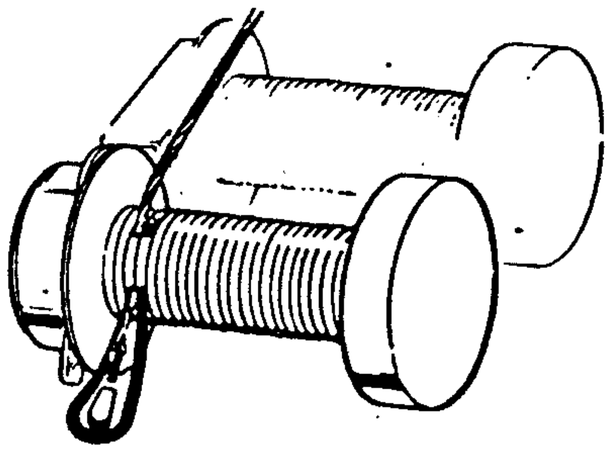
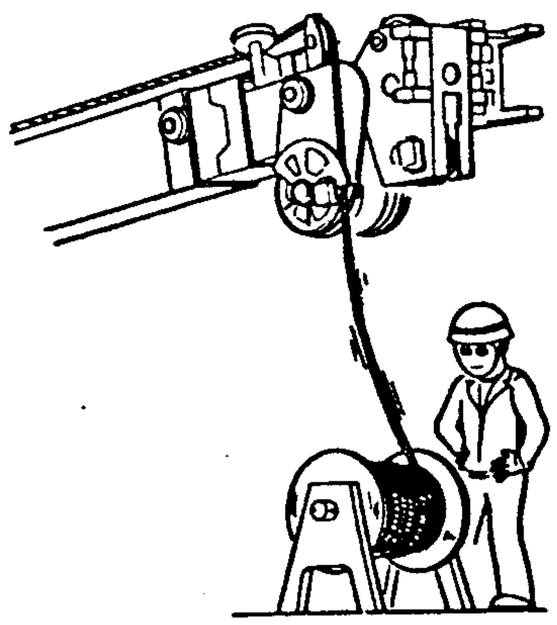
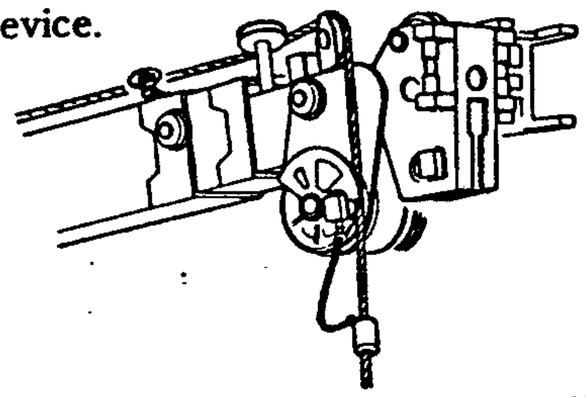
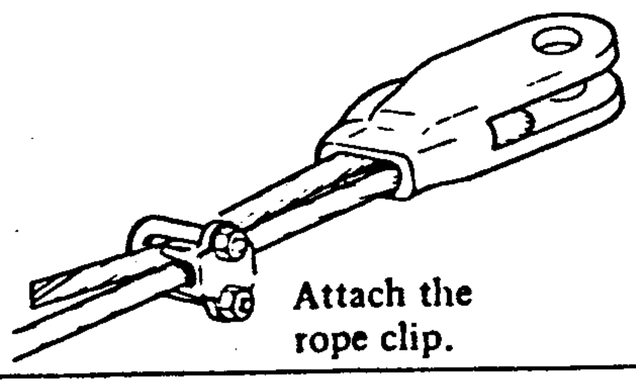
MAIN WINCH

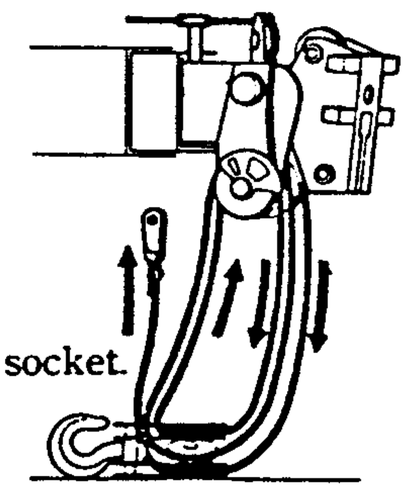
NOTES ON OPERATION

1. Set up the crane on hard level ground.
2. Extend the outriggers fully.
3. Fully retract the boom.

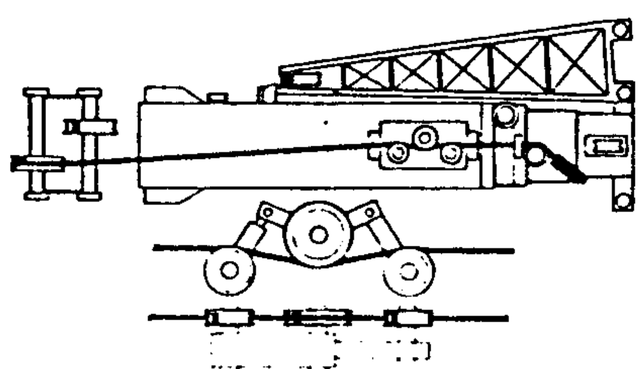
No.	Procedure	Note	Maintenance standard and tools
1	Place the main winch hook on the ground. 	Avoid disorderly rope winding on the drum.	
2	Remove the rope socket from the boom or main winch hook. 	Keep the parts so they are not lost.	Spanner

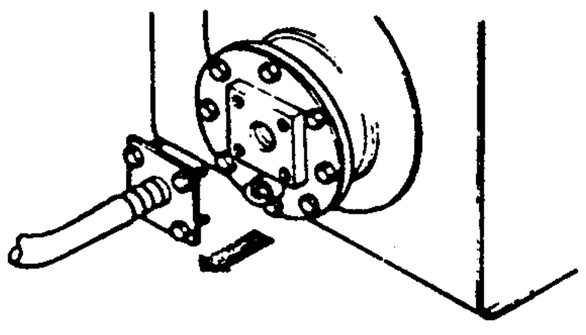
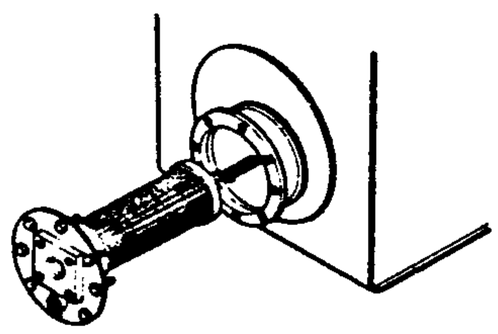
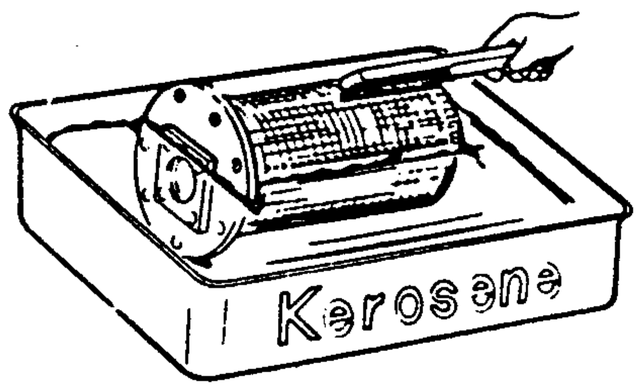
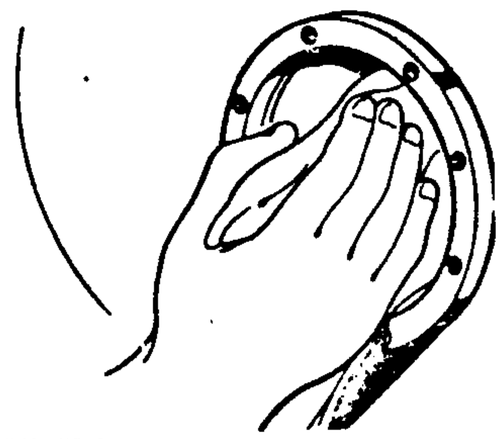
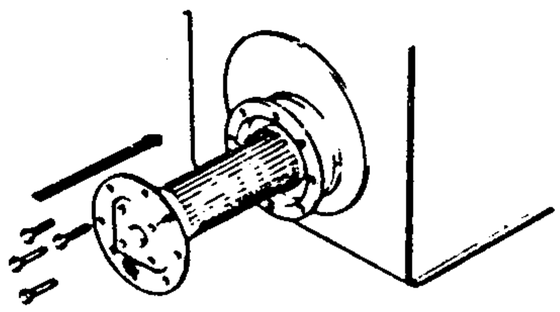
No.	Procedure	Note	Maintenance standard and tools
3	Remove the rope socket from the rope. 	Keep the wedge.	Bar Hammer Spanner
4	Draw the rope either by means of winch or by free-fall.	 Draw rope in this way.	
5	Detach the rope from the main winch drum. 	Keep the wedge.	Bar Hammer
6	Pass the new rope through all the sheaves correctly.  	 Wind up the tip of the rope with wire or vinyl tape.	Wire or vinyl tape

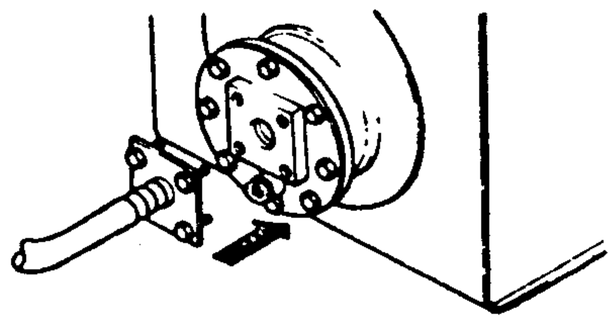
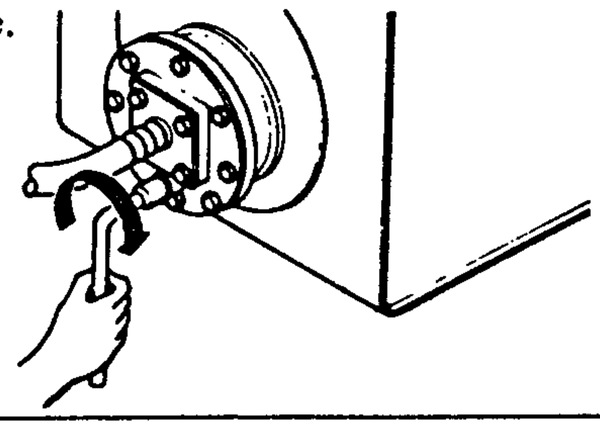
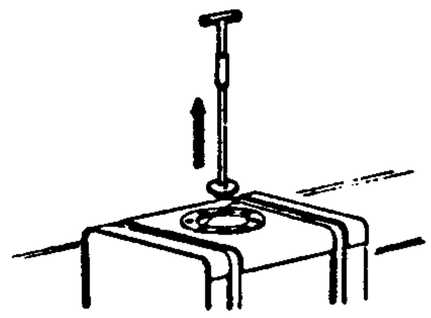
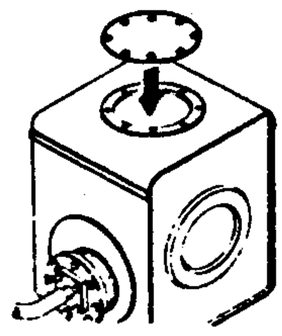
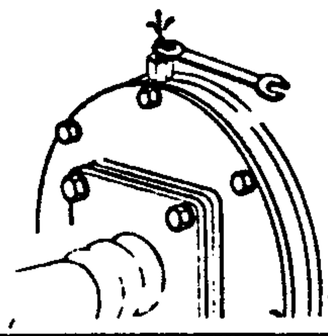
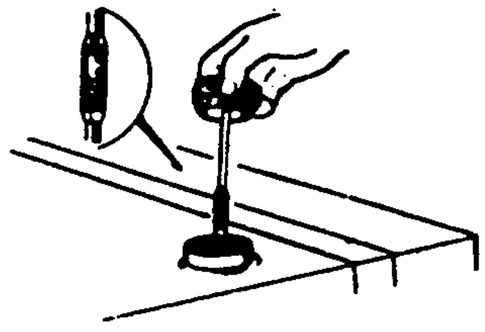
No.	Procedure	Note	Maintenance standard and tools
7	Fasten the tip of the rope to the main winch drum. 	The end of the rope must not protrude above the surface of the drum.	Hammer
8	Wind up the rope. 	Avoid disorderly rope winding on the drum. Cut the rope at the specified length.	
9	Pass the rope through the weight for overwinding alarm device. 		
10	Fasten the rope socket to the rope.  Attach the rope clip.	Wind up the tip of the rope with wire or vinyl tape. 	Spanner Wire or vinyl tape Hammer

No.	Procedure	Note	Maintenance standard and tools
11	Pass the rope through sheaves in accordance with the number of part line.  Attach the rope socket.	Take care with the sequence.	Spanner

NOTE : Some models employ a load detector as shown below. Rope replacement procedure is identical to that described above, except that the rope is to be reeved through the detector as shown. (Remove the detector cover when replacing the rope.)



No.	Procedure	Note	Maintenance standard and tools
4	Remove the suction hose joint. 	Be careful not to damage the O-ring.	Spanner
5	Remove the strainer cover. 	Be careful not to damage the strainer and O-ring.	Spanner
6	Clean the strainer. 	Use air gun or bristle brush. (Use of a wire brush is not allowed.) When using an air gun, blow air from inside of strainer.	Brush Air gun Rags
7	Clean the inside of the strainer case. 		Rags
8	Attach the strainer case cover. 	Coat the O-ring with grease and install.	Grease Spanner

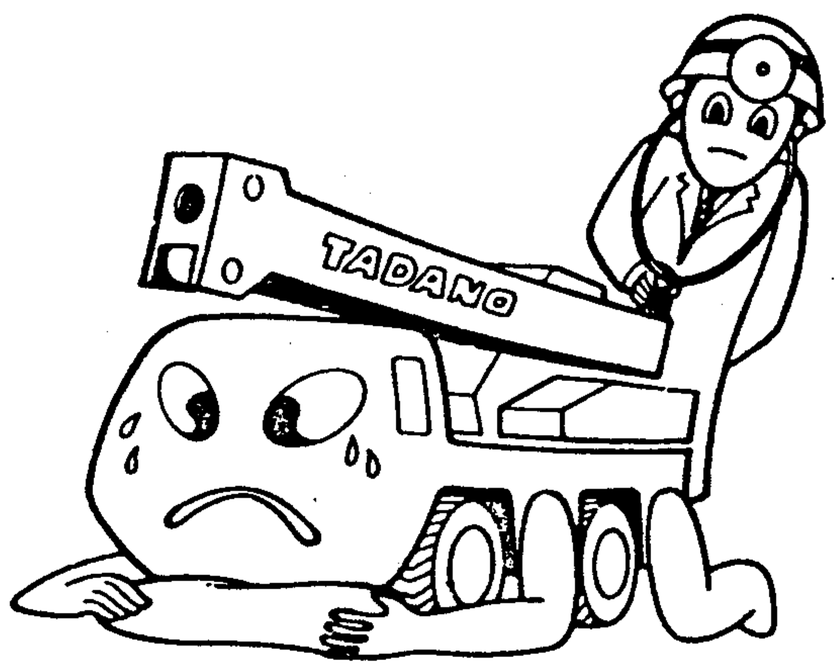
No.	Procedure	Note	Maintenance standard and tools
9	Attach the suction hose joint. 	Coat the O-ring with grease and install.	Spanner
10	Tighten the oil plug to the strainer case. 		Spanner
11	Remove the oil plug. 	Gently	
12	Place the hole cover. 	Bleed the strainer case, if bleeding plug is provided. 	Spanner
13	Check joints for leak. Check oil level with the cap not screwed in. 		

MEMO

TADANO

87'

TROUBLESHOOTING



TROUBLESHOOTING

If a trouble should occur with this machine, carry out inspection, and then repair or replace defective parts as necessary.

Section	Trouble	Causes	Remedies
Electrical	Starter motor will not turn.	1. Battery terminals loose, disconnected or corroded. 2. Main fuse (30A) blown or loose. 3. Cord broken or switch faulty. 4. Poor contact of brush with slipring.	Clean and tighten the terminals. Replace or repair. Repair or replace. Repair or replace.
	Work lamps will not light.	1. Bulb broken. 2. Fuse blown. 3. Earthing incorrect. 4. Cord broken or switch faulty.	Replace. Replace. Repair. Repair or replace.
	Wipers will not operate.	1. Fuse blown. 2. Switch faulty. 3. Motor faulty.	Replace. Replace. Replace.
	Horn will not sound.	1. Fuse blown. 2. Switch faulty. 3. Relay faulty. 4. Cord broken. 5. Horn faulty.	Replace. Replace. Replace. Repair. Repair or replace.
	Over-winding alarm device will not work.	1. Fuse blown. 2. Cord reel faulty. 3. Cord disconnected. 4. Limit switch faulty. 5. Weight wire broken. 6. Buzzer faulty.	Replace. Repair or replace. Repair. Replace. Replace. Repair or replace.
	Boom top lamp will not light.	1. Bulb broken. 2. Switch faulty 3. Cord broken.	Replace. Repair or replace. Repair.
	Room lamp will not light.	1. Bulb broken 2. Switch faulty. 3. Cord broken.	Replace. Replace. Repair.

Section	Trouble	Causes	Remedies
Electrical	Tipping warning device will not work.	1. Bulb broken. 2. Limit switch faulty. 3. Cord broken. 4. Buzzer faulty.	Replace. Replace. Repair. Repair or replace.
Pump	Generates noise.	1. Insufficient oil. 2. Air entering through inlet side pipe joint. 3. Bolts loose. 4. Oil dirty. 5. Strainer clogged. 6. Propeller shaft vibration. 7. Universal joint worn. 8. Pump condition bad.	Supply oil. Repair. Tighten. Replace or clean. Repair or replace. Repair or replace. Replace. Replace.
Outriggers	Will not move.	1. Insufficient oil. 2. Relief valve pressure improperly set. 3. Control valve faulty. 4. Jack adjusting valve faulty.	Supply oil. Adjust. Repair. Repair.
	Movement is sluggish.	1. Internal leakage in control valve. 2. Relief valve pressure too low.	Repair. Adjust.
	Jacks retract spontaneously while lifting a load.	1. Pilot check valve faulty. 2. Internal leakage in cylinder.	Repair. Repair.
	Jacks lower spontaneously while traveling.	1. Pilot check valve faulty. 2. Internal leakage in cylinder. 3. External leakage in cylinder.	Repair. Repair. Repair.
Swing	Brake will not work.	1. Brake lining worn. 2. Oil adhered to brake lining.	Adjust or repair. Replace.
	Unable to swing.	1. Relief valve pressure too low. 2. Control valve faulty. 3. Motor faulty. 4. Speed reducer faulty.	Adjust. Repair. Replace. Repair.
	Swing sluggish.	1. Relief valve pressure too low. 2. Motor condition bad.	Adjust. Replace.

Section	Trouble	Causes	Remedies
Elevation	Cylinder will not extend.	1. Insufficient oil. 2. Relief valve pressure too low. 3. Internal leakage in control valve. 4. Internal leakage in cylinder.	Supply oil Adjust. Repair. Repair.
	Cylinder will not retract.	1. Counterbalance valve faulty.	Repair or replace.
	Cylinder retracts spontaneously.	1. Internal leakage in cylinder. 2. Counterbalance valve faulty.	Repair. Repair.
Telescoping	Boom will not extend.	1. Relief valve pressure too low. 2. Electrical system faulty. 3. Internal leakage in cylinder. 4. Shut-off solenoid valve stuck open. 5. Control valve faulty.	Adjust. Repair. Repair. Repair. Repair.
	Boom will not retract.	1. Holding valve faulty. 2. Control valve faulty.	Repair. Repair.
	Boom retracts spontaneously.	1. Internal leakage in cylinder. 2. Holding valve faulty. 3. External leakage from cylinder, valve and piping joints.	Repair. Repair. Repair.
Winch-up	Can not lift a load.	1. Relief valve pressure too low. 2. Motor faulty. 3. Clutch slipping. 4. Clutch valve faulty. 5. Oil adhered to clutch shoe. 6. Internal leakage in control valve.	Adjust. Replace. Adjust. Repair. Replace. Repair.
Winch-down	Can not lower a load.	1. Clutch slipping. 2. Motor faulty. 3. Counterbalance valve faulty.	Adjust. Replace. Repair or replace.
	Brake will not work.	1. Oil adhered to brake lining. 2. Lining worn.	Replace. Adjust or replace.
	Brake pedal lock will not work.	1. Brake pedal lock mechanism worn. 2. Tip of brake lock notch worn.	Replace. Replace.