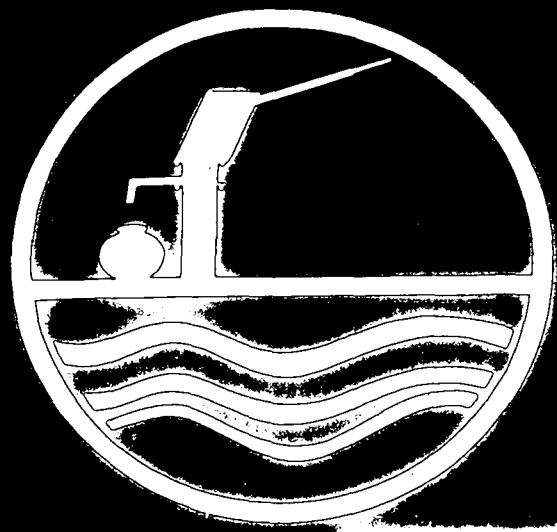


232.2

85 IN

MARK-II WELL PUMP INSTALLATION AND MAINTENANCE MANUAL



ESTD. 1858

232.2-85JN-1408



An Ideal Installation near Vellore in Tamil Nadu

INDIA MARK-II DEEPWELL HAND PUMP INSTALLATION AND MAINTENANCE MANUAL

LIBRARY, INTERNATIONAL REFERENCE
CENTRE FOR COMMUNITY WATER SUPPLY
AND SANITATION (IRC)

P.O. Box 93190, 2509 AD The Hague
Tel. (070) 814911 ext. 141/142

SN: ~~1408~~ 1408
LO: 232.285 JN.

RICHARDSON & CRUDDAS (1972) LTD.


(A Government of India Undertaking)

23, Rajaji Salai, Madras-600 001.





CONTENTS

	Page
About us	4
About this Manual	5
About you, villagers and Hand Pumps	6
Platform for India Mark-II Hand Pump	8
Soakage Pit for Hand Pump	10
Sectional details of Pump Head Assembly	12
Sectional details of Cylinder Assembly	13
How to install the India Mark - II Hand Pump in 34 steps	15
Final check list	50
Chlorination	51
Step by step procedure for pump overhaul	52
Tool requirement for district mobile installation and maintenance team	55
Special tools	56
Recommended spares for each India Mark - II Hand Pump	61
General Maintenance Schedule	62
Trouble Shooting - Cause - Remedies	64
News about new development in Rural Water	
Supply field by 	66

about us

Richardson & Cruddas (1972) Ltd. established in 1858 is a well known Govt. of India Undertaking. We, in our four well equipped factories, at Byculla, Mulund, Nagpur and Madras manufacture Steel Structures, Transmission Towers, Rubber and Sugar Machinery, Graded castings, Railway points & Crossings, Refrigeration Compressors & application products, Package Water Treatment Units, India Mark II Deep Well Hand Pump, India Mark II Shallow Well Hand Pump, Pressure Vessels, Heat Exchangers, Technological Structures, Equipment for Chemical industries and many other items.

WE HAVE DEVELOPED INDIA MARK-II DEEP WELL HAND PUMP IN CLOSE CO-OPERATION WITH AN INTERNATIONAL ORGANISATION AND CENTRAL SCIENTIFIC & INDUSTRIAL RESEARCH ORGANISATION OF GOVERNMENT OF INDIA.

We are the pioneers and now a major manufacturer of India Mark-II Deep Well Hand Pumps in India.

We are equipped with well qualified staff for design, development and manufacture of various products.

Our products are manufactured under strict quality control and checks starting right from raw material stage. The quality control team ensures that the customer whether big or small is assured of a product of good quality.

Our research and development wing has now developed India Mark-II Shallow Well Pump, Extra Deep Well Hand Pump, Force lift Hand Pump, Package Water Treatment Unit & Special Tools for erection and maintenance of India Mark-II Deep Well Hand Pump.



about this manual

To whom this manual is useful ?

This manual is useful to all Engineers and Mobile Maintenance Team members who work in rural water supply programmes.

What is in this manual ?

This manual tells you how to install the India Mark-II Handpump. The India Mark-II Handpump is different from other handpumps. So you have to install it in a slightly different way. Keep the manual with you when you install or repair a handpump. Then only you can refer to it often. This will make your work easier.

Follow all the instructions. Follow them exactly.

Remember to use the checklists at the end of the manual.



about you, villagers and hand-pumps

Why is your job so important ?

The Handpump will always bring good, potable water. If you install the handpump correctly, then only it will work properly, and will need very little maintenance. So if your workmanship is good, then you are helping the villagers to stay healthy.

What should you tell the villagers when you install or repair a hand-pump ?

Here are four important points.

- (1) Deepwell hand pump water is better than water from other sources. Water from ponds, rivers and tanks can contain disease germs. If we drink this water, we can get ill. But the water from a deep well hand pump is protected from diseases. So if we drink water from a deepwell hand pump, we will stay healthy.
- (2) You should show the users how to use the hand pump.
- (3) Villagers must maintain handpumps properly.
- (4) The villagers must contact the appropriate officials if the handpump breaks down. You should tell them exactly, whom to contact and how to contact.



Here are some "do's" and "don'ts" for using hand-pumps:

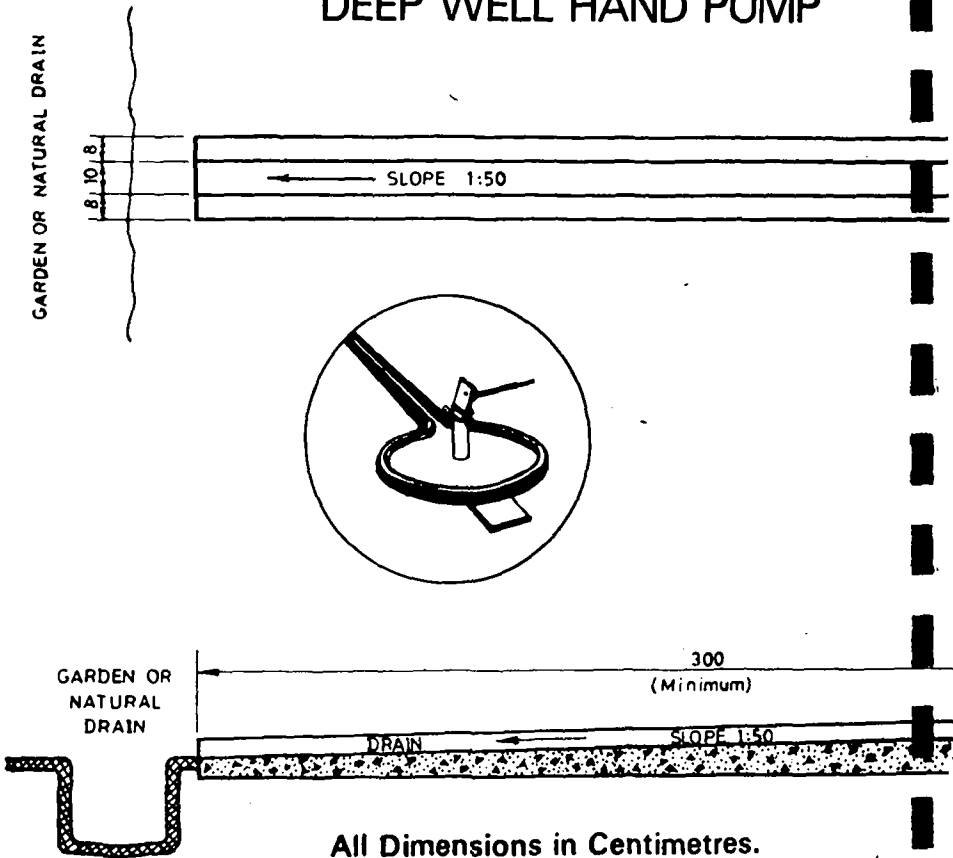
Do	Don't
<i>Do use the pump gently.</i>	<i>Don't use the hand-pump roughly</i>
<i>Do pump the handle with long, slow strokes.</i>	<i>Don't pump the handle with short, quick strokes.</i>

Here are some "do's" and "don'ts" for maintaining hand-pumps:

Do	Don't
<i>Do sweep the platform regularly.</i>	<i>Don't let the platform get dirty.</i>
<i>Do keep the area around the platform dry.</i>	<i>Don't let water collect around the platform.</i>
<i>Do make sure that no one throws rubbish near the pump.</i>	<i>Don't let rubbish collect near the pump.</i>
<i>Do clean the ground near the pump and keep the drain clean</i>	<i>Don't let animals near the pump.</i>
<i>Do make compost far from the pump.</i>	<i>Don't defecate near the pump.</i>
	<i>Don't let animals defecate near the pump.</i>



PLATFORM FOR INDIA MARK-II DEEP WELL HAND PUMP



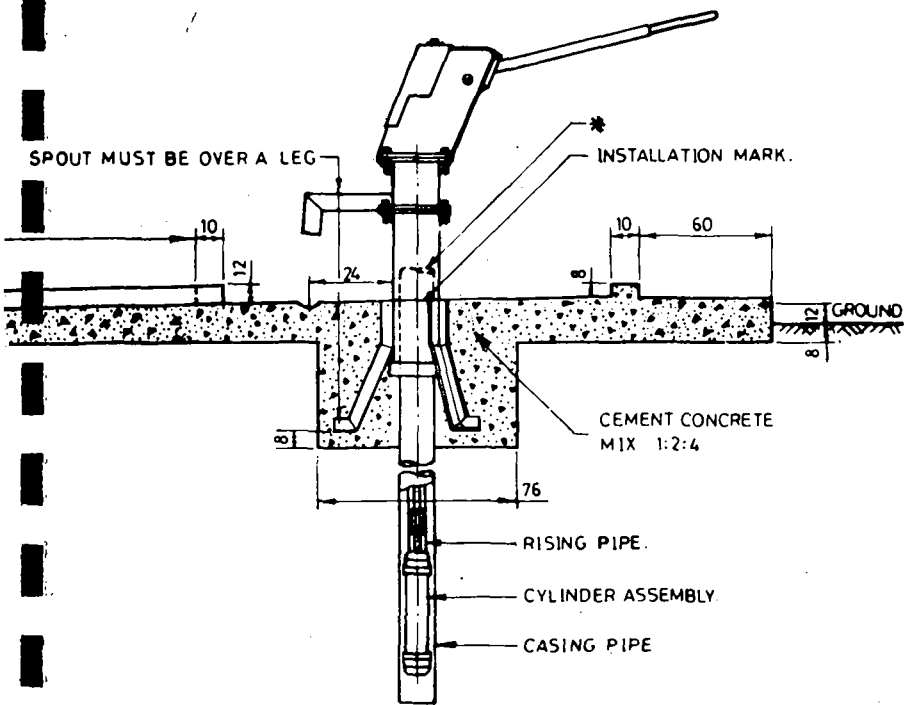
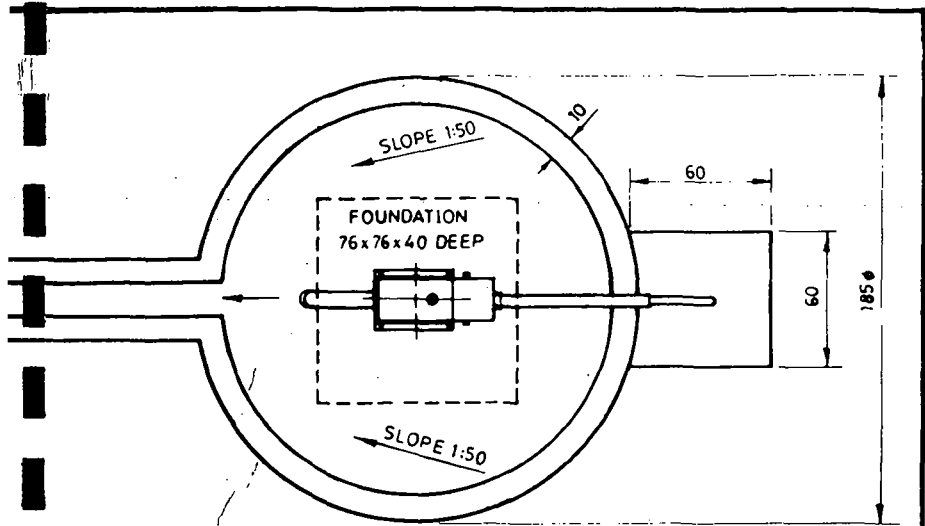
All Dimensions in Centimetres.

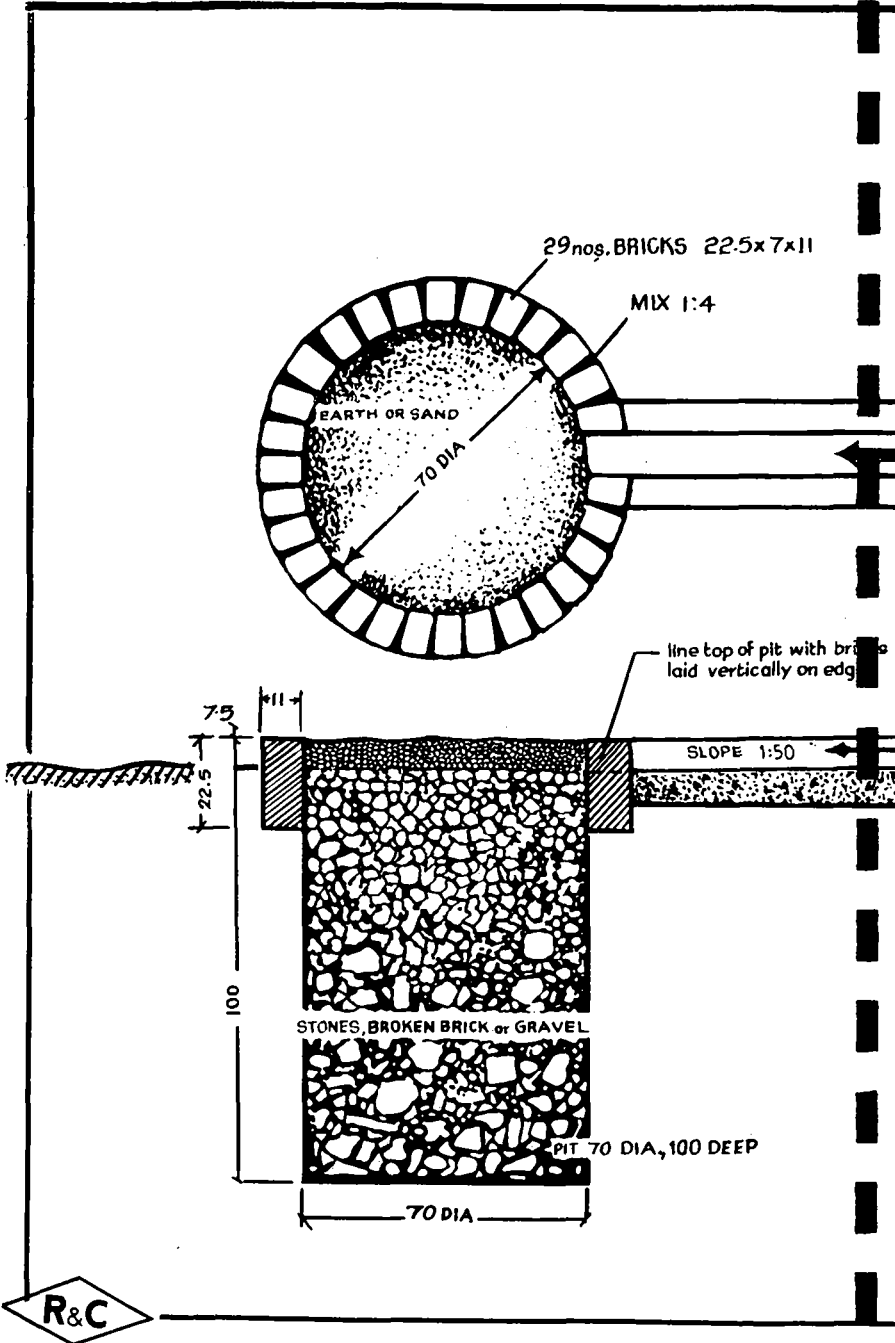
*This Pump Stand assembly is recommended for bore wells with Casing Pipe upto 5" (125 m.m.) N.B.

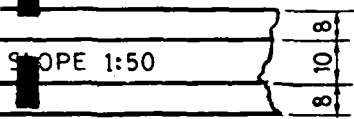
For Casing Pipe of 6" (150 m.m.) N.B. use of Telescopic Stand Assembly as shown on page 65 is recommended.

The free end of the Casing Pipe should be above the installation mark.

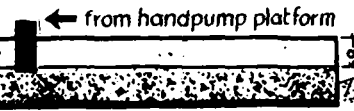








← from handpump platform

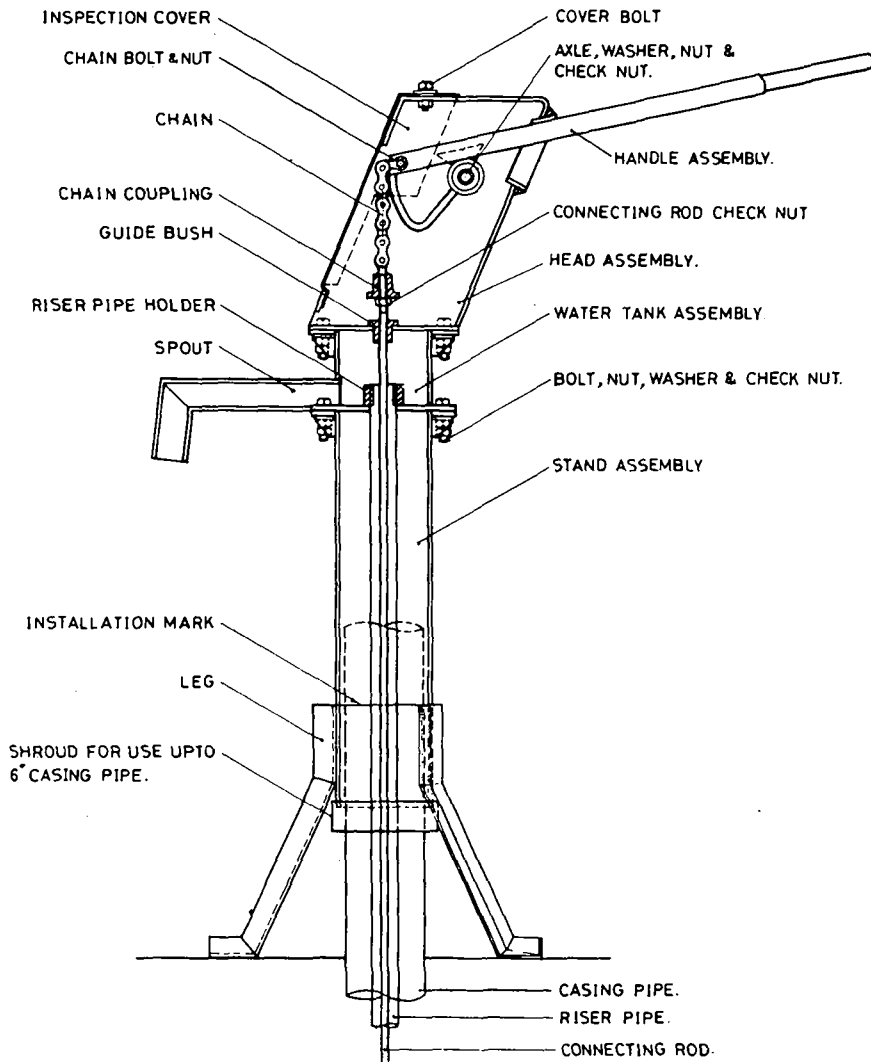


GROUND LEVEL

SOAKAGE PIT for HANDPUMP

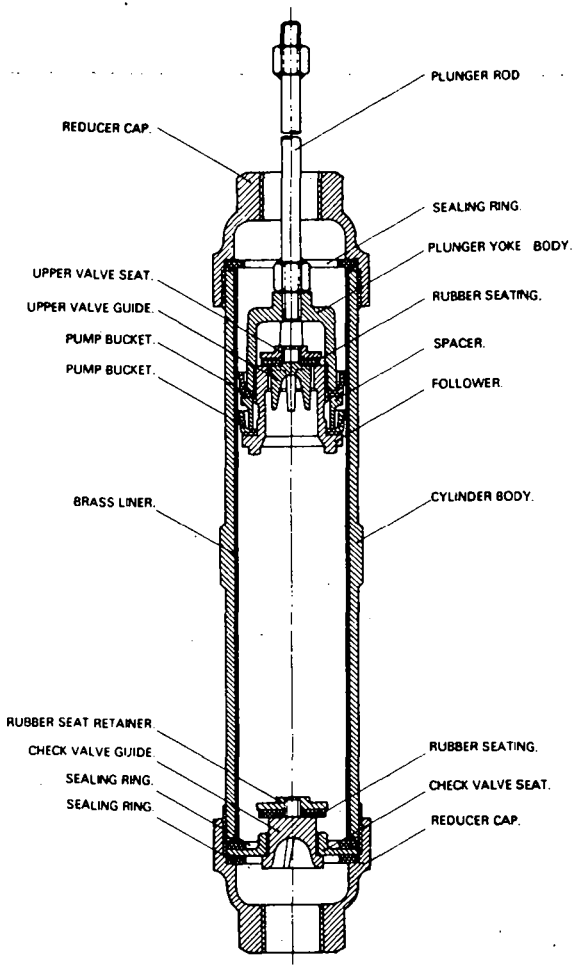
ALL UNITS IN CENTIMETRES





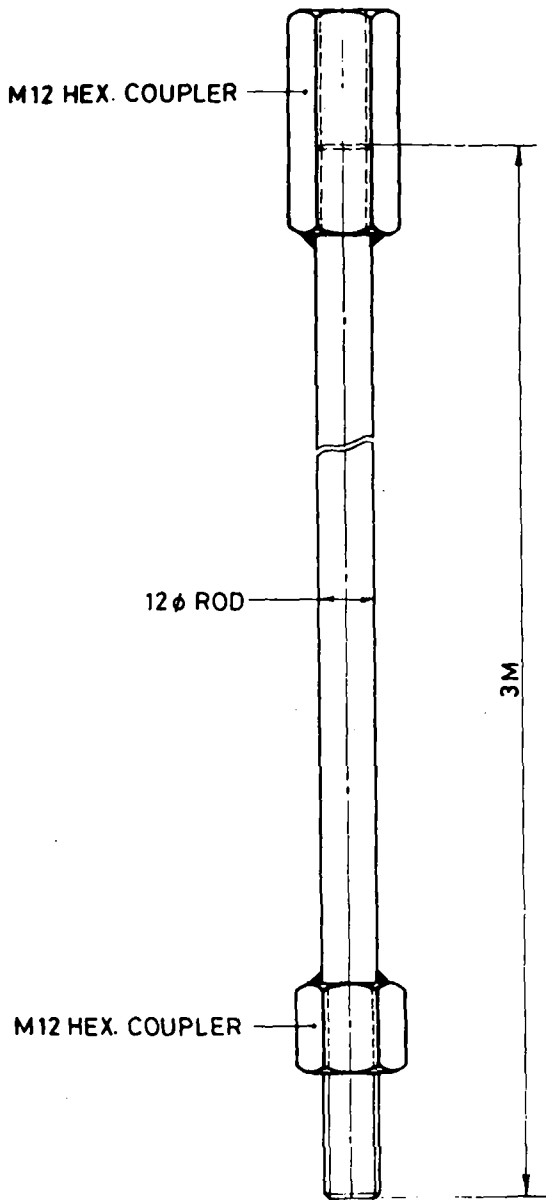
SECTIONAL DETAILS
OF PUMPHEAD ASSEMBLY





SECTIONAL DETAILS
 OF
 CYLINDER ASSEMBLY





DETAILS OF
CONNECTING ROD



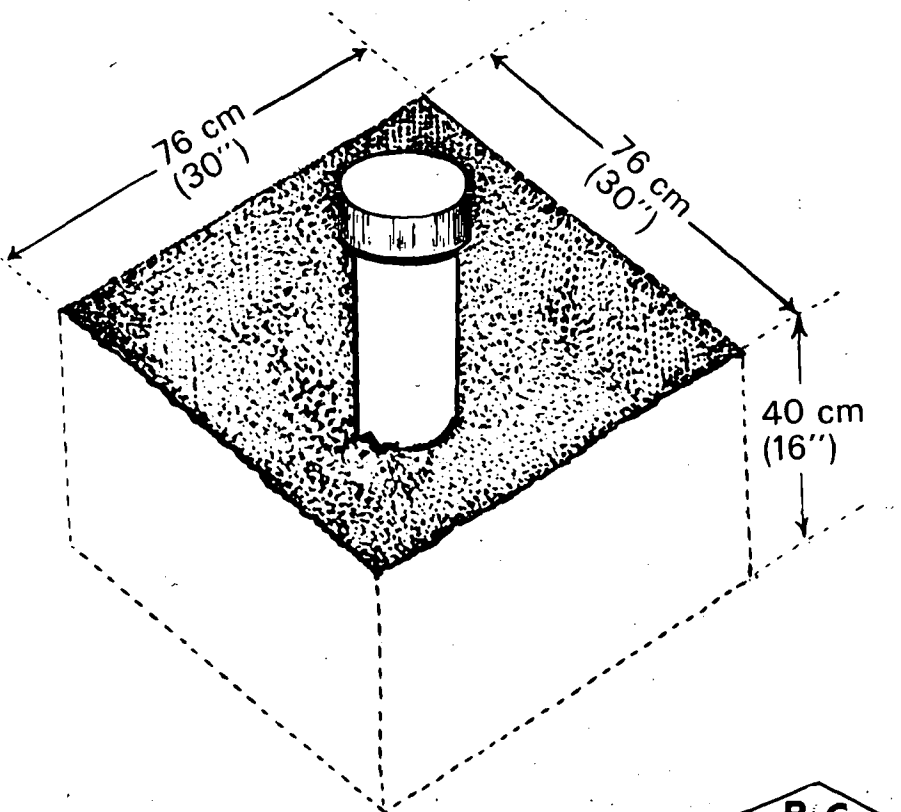
Step

1

Measure depth of tube well and static water level.

Mix 300 gms of Bleaching Powder in a bucket of water and pour into the tube well for chlorination.
Cover casing pipe

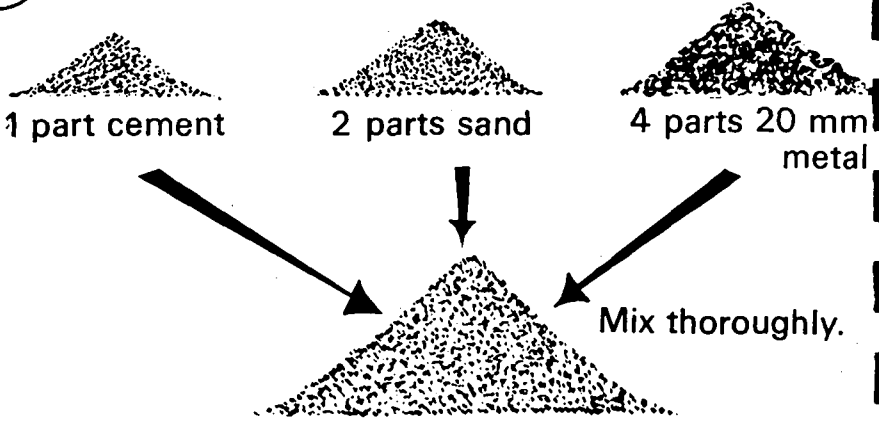
Dig a square pit around casing pipe
40 cm (16") deep



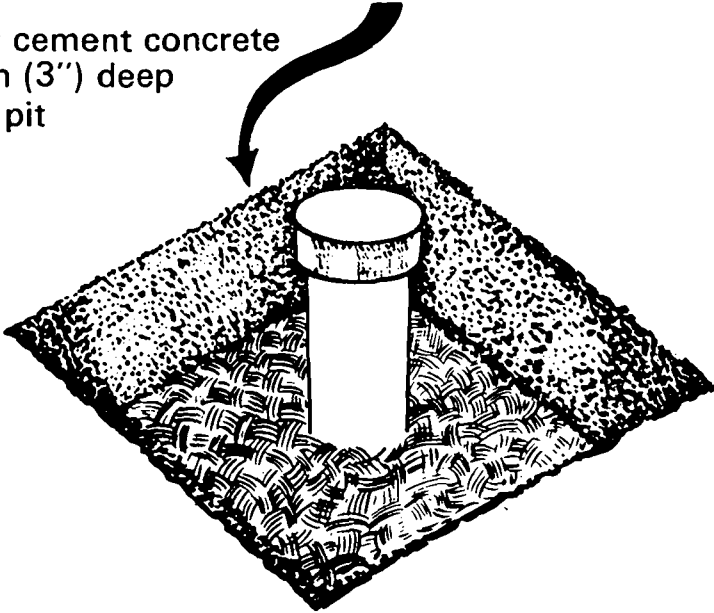
Step

2

Prepare cement concrete mix



Pour cement concrete
8 cm (3") deep
into pit



Step

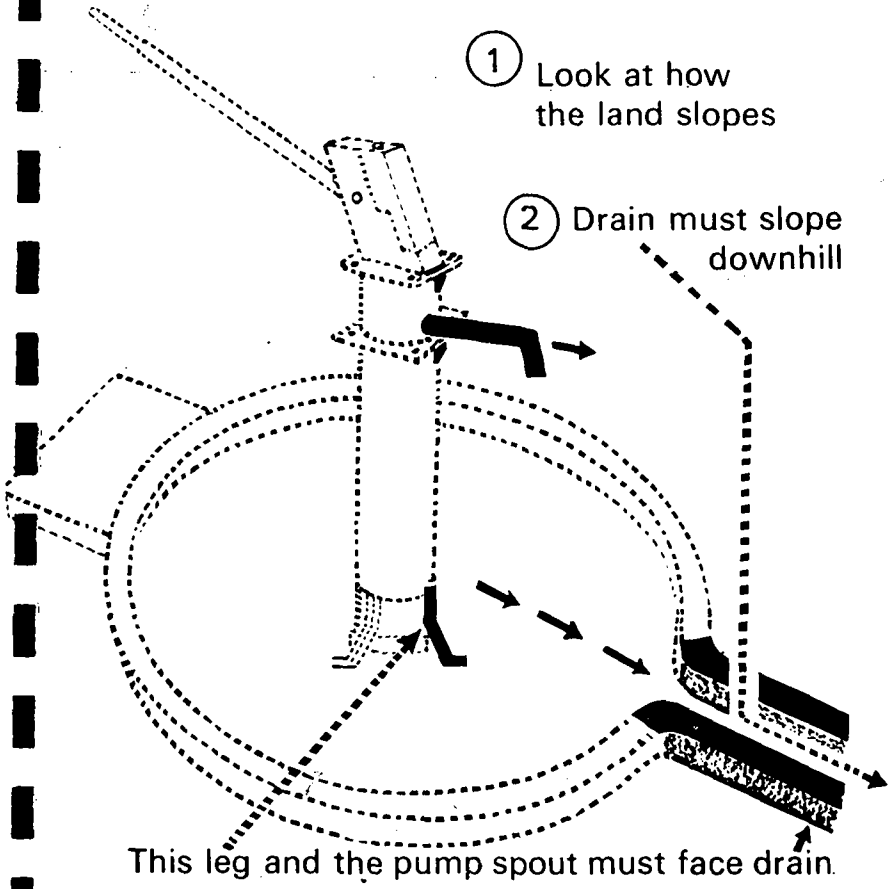
Decide now where you will make the drain

3

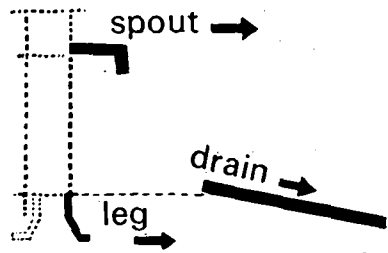
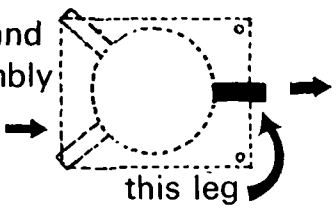
1 Look at how the land slopes

2 Drain must slope downhill

This leg and the pump spout must face drain.



Stand Assembly



Step

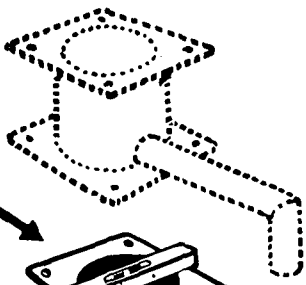
④

Remove cover of casing pipe

①

②

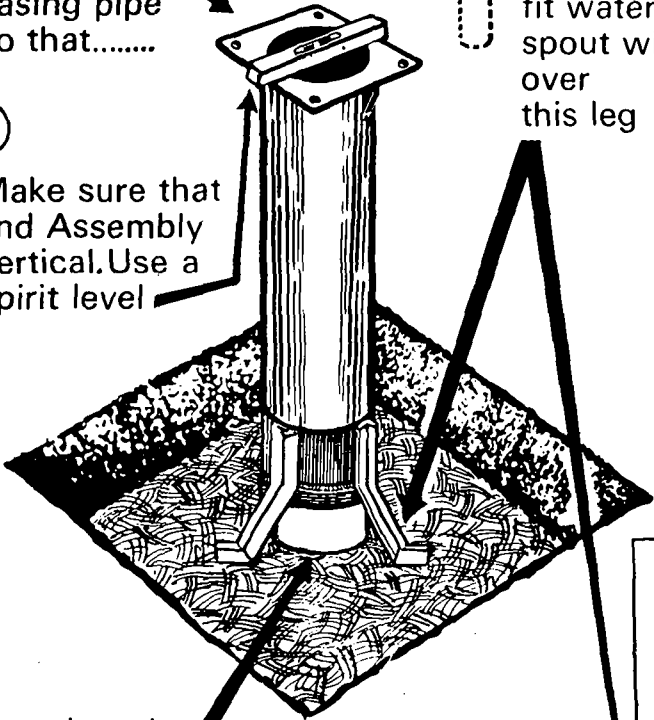
Place Stand Assembly over casing pipe so that.....



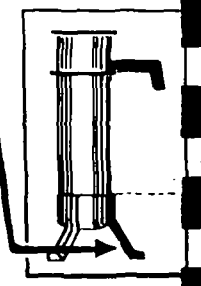
.....when you fit water tank spout will be over this leg

③

Make sure that Stand Assembly is vertical. Use a spirit level



casing pipe



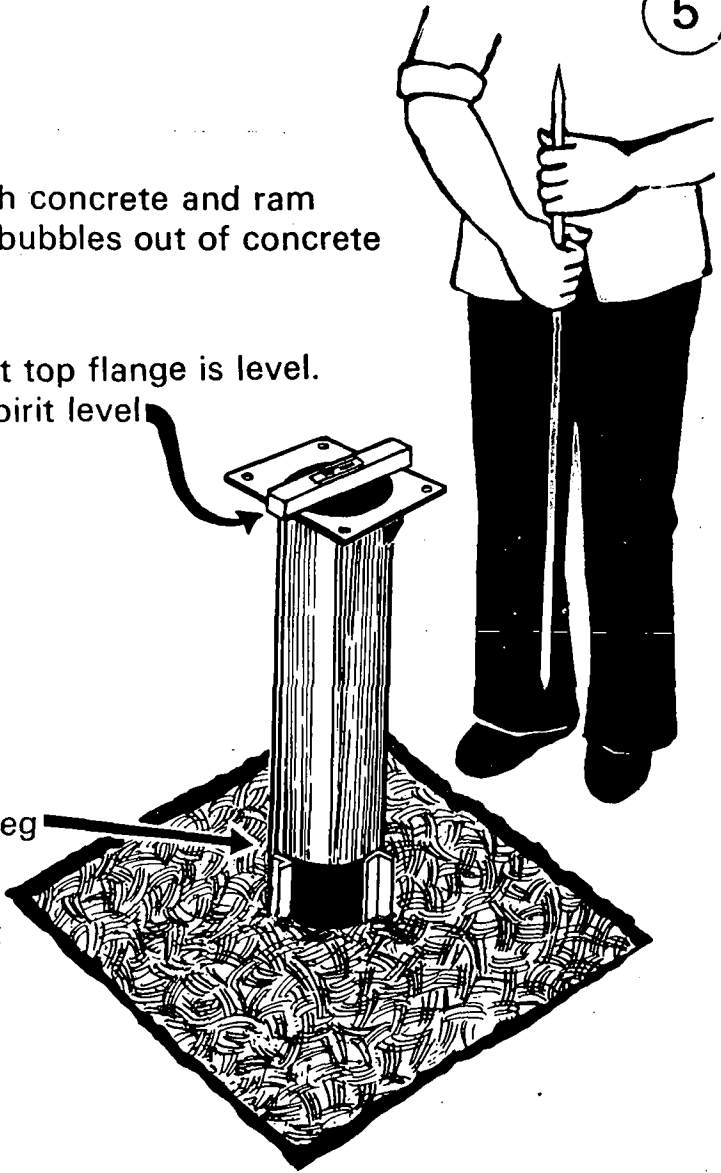
Step

5

Fill pit with concrete and ram to get air bubbles out of concrete

Check that top flange is level. Use the spirit level

Construct platform to top of leg while concrete is still wet

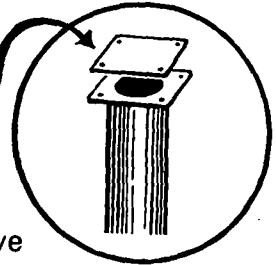


Step

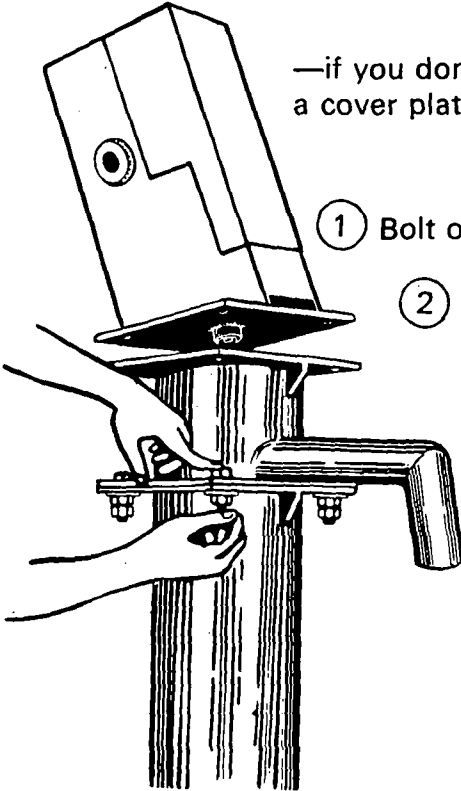
6

Cover
Stand Assembly so that children
can't put stones in the well

—if you have a cover plate
use it



—if you don't have
a cover plate.....

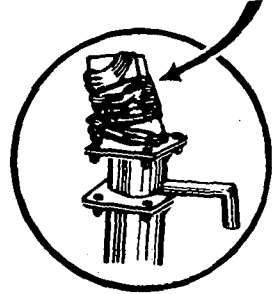


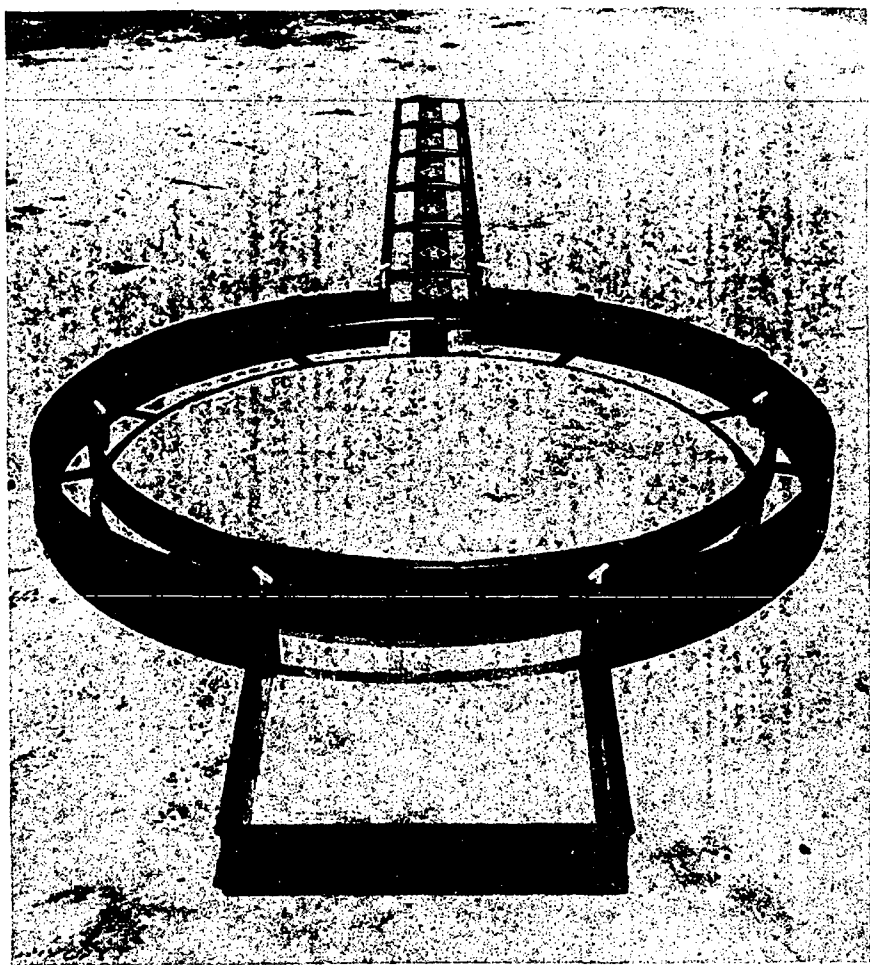
① Bolt on water tank

② Remove handle assembly
from head assembly

③ Bolt on head assembly

④ Wrap cloth
around head





R & C PLATFORM SHUTTERING UNIT
FOR INDIA MARK -II DEEP WELL HAND PUMP.





Construct platform and drain
Use plan on pages 8 and 9

Approximate Material Requirement
for construction of one Platform

- (a) CEMENT — 6 Bags
- (b) SAND — 0.40m^3
- (c) Metal (20mm Size) 0.80m^3

Step

7

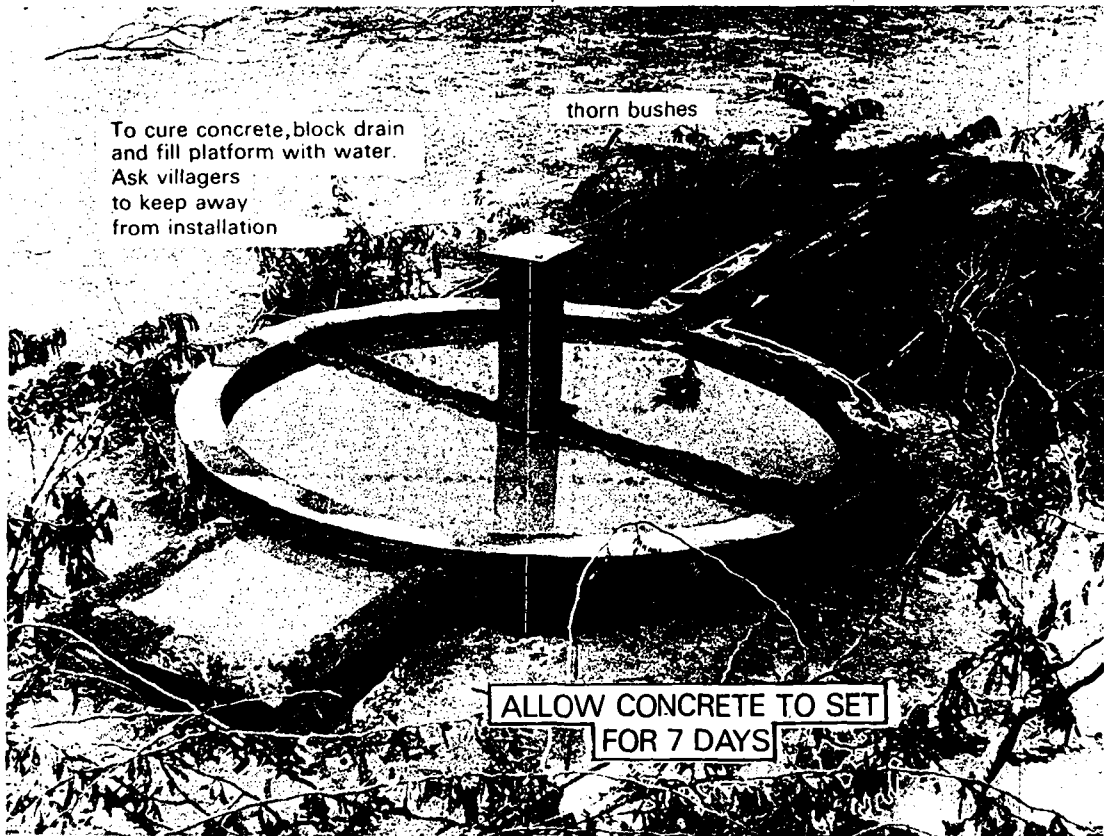
Step

8

To cure concrete, block drain
and fill platform with water.
Ask villagers
to keep away
from installation

thorn bushes

ALLOW CONCRETE TO SET
FOR 7 DAYS

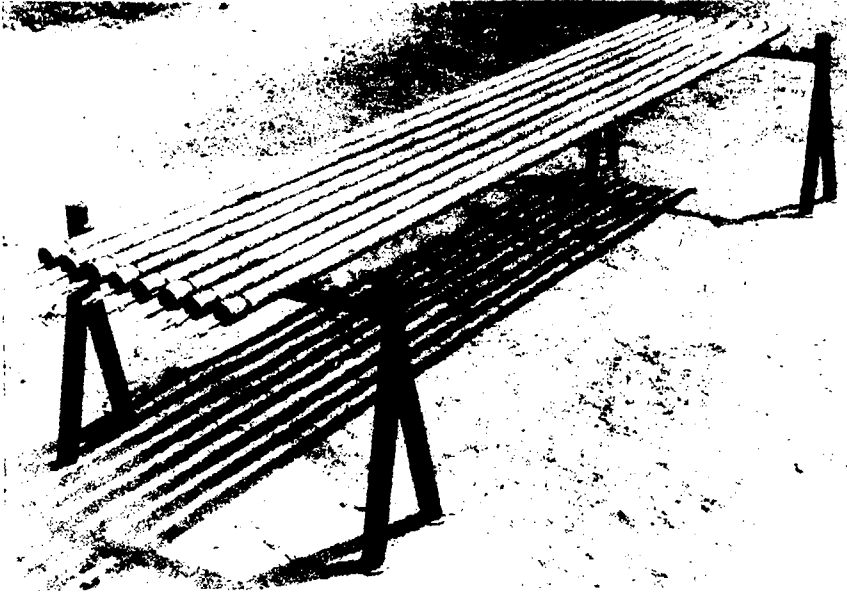


Step

9

SEVEN DAYS LATER

Lay out pipes and connecting rods.
Check that pipes and rods are threaded
Check that all threads are good and clean



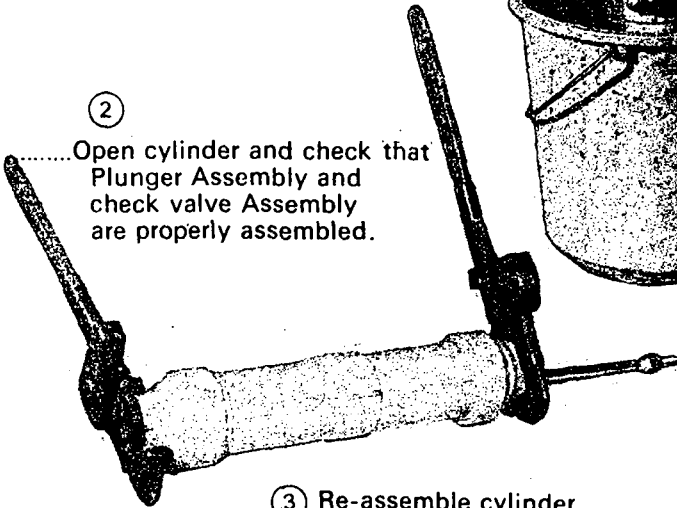
①

Test cylinder in a bucket of water.
If Check valve Assembly leaks.....



②

Open cylinder and check that
Plunger Assembly and
check valve Assembly
are properly assembled.



③

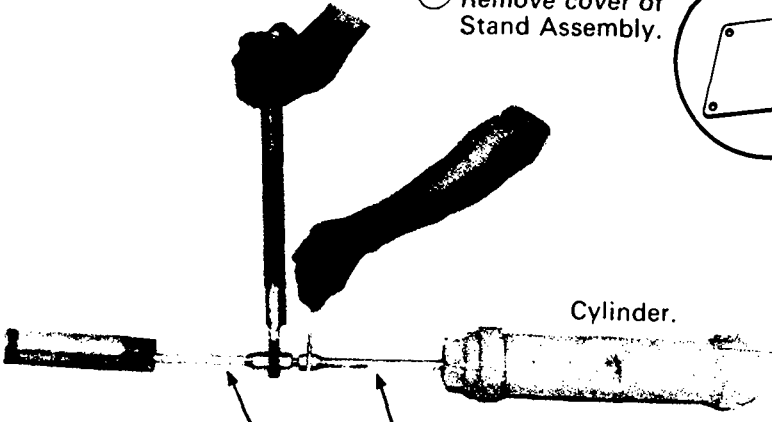
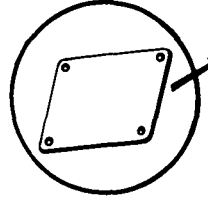
Re-assemble cylinder.



Step

11

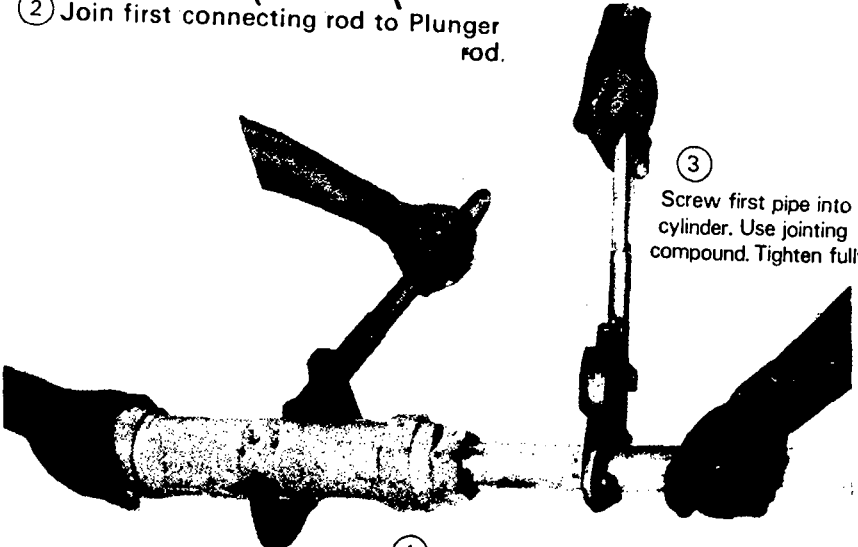
① Remove cover of Stand Assembly.



Cylinder.

② Join first connecting rod to Plunger rod.

③ Screw first pipe into cylinder. Use jointing compound. Tighten fully.



④ Wipe off excess jointing compound.



Step

12



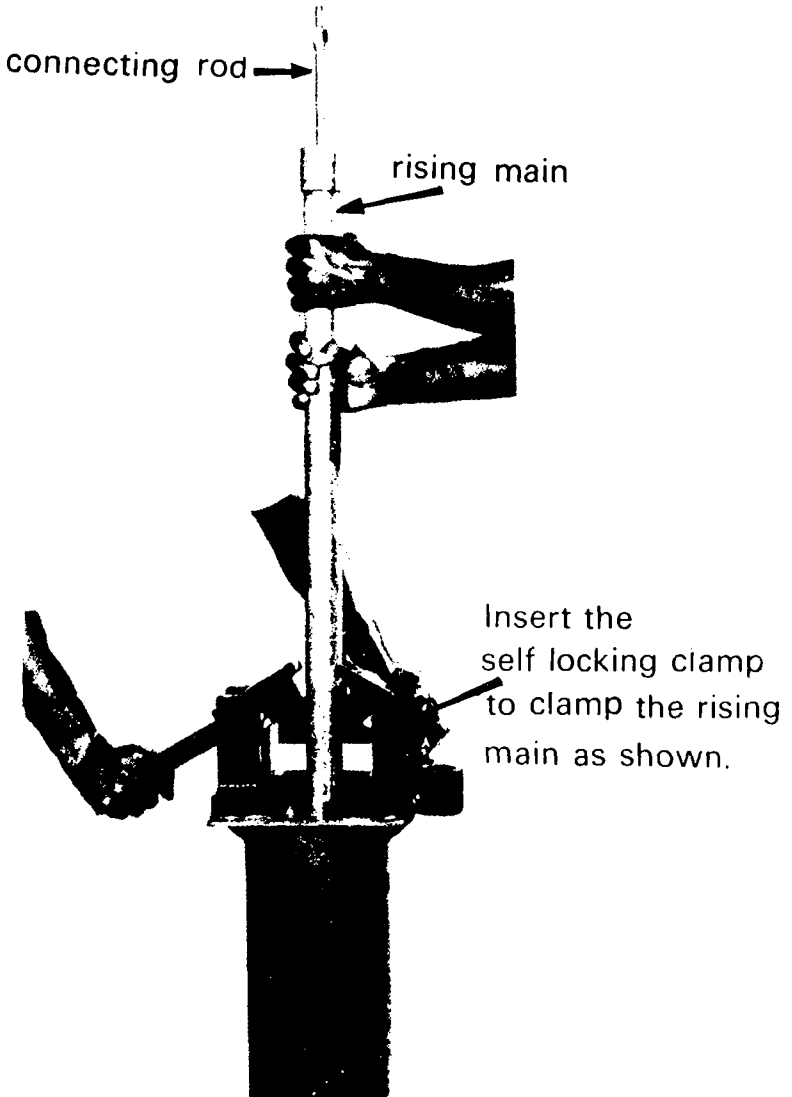
Lower cylinder,
first pipe and
connecting rod
into tube well.

Never install a cylinder
less than 6 Metres (20')
from the bottom of
the tube well.

R&C

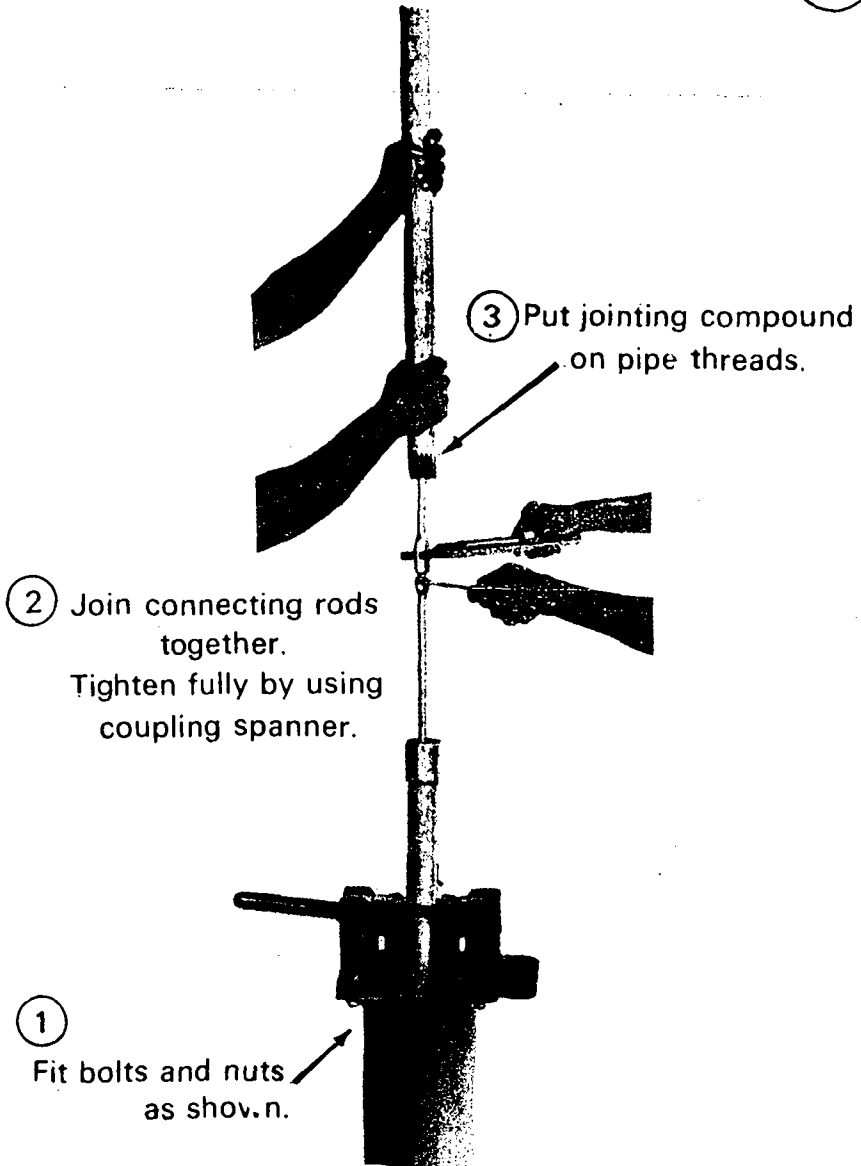
Step

13



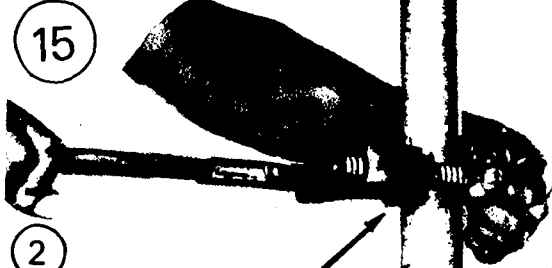
Step

14



Step

15



2

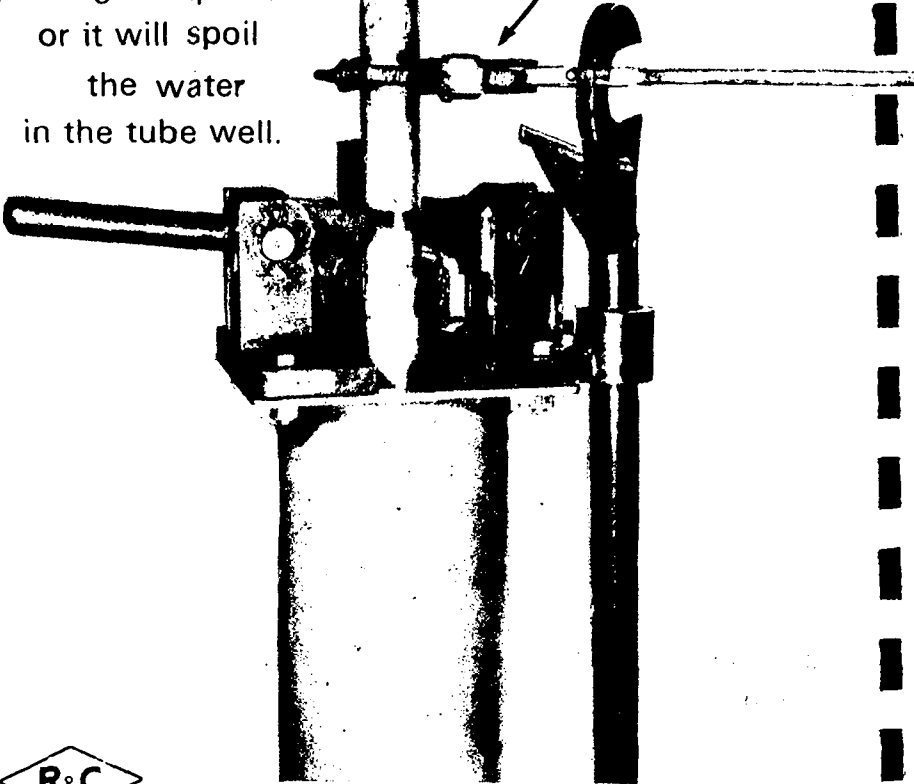
Tighten pipes as shown

1

Lock the bottom pipe with help of self locking clamp lifting spanner and a pipe wrench as shown.

3

Wipe off excess jointing compound or it will spoil the water in the tube well.



Step

16

1

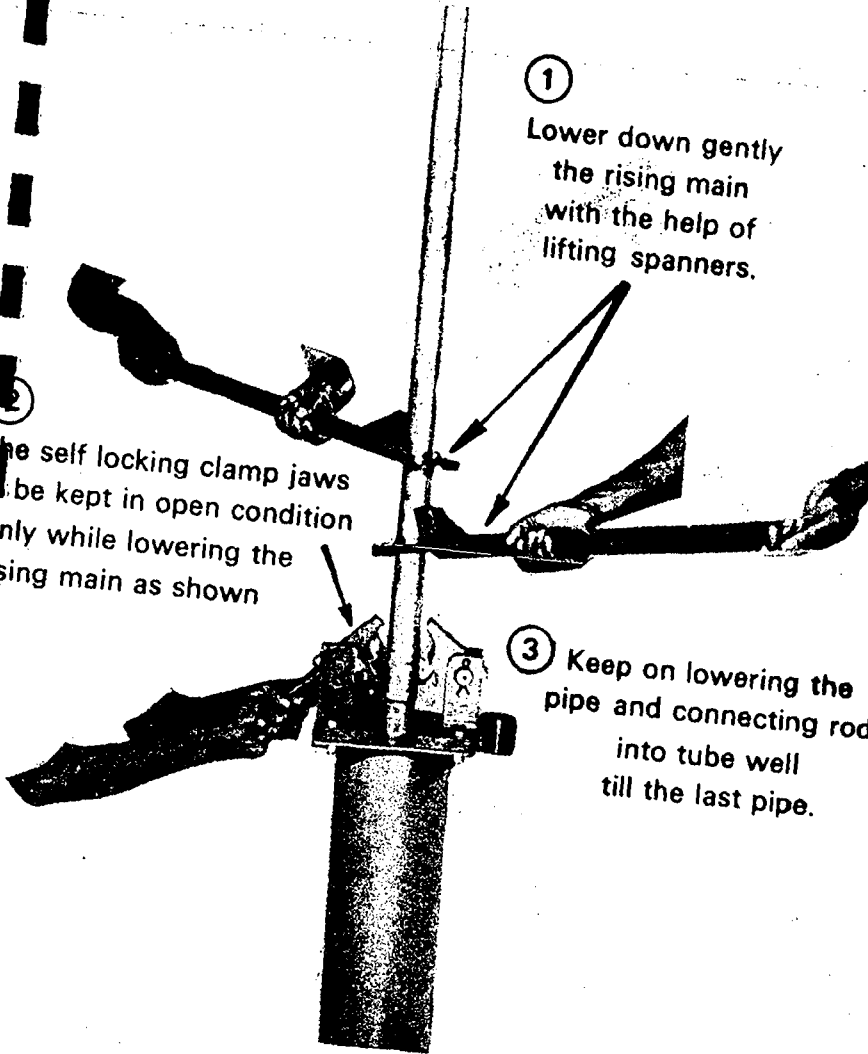
Lower down gently
the rising main
with the help of
lifting spanners.

2

The self locking clamp jaws
be kept in open condition
Only while lowering the
rising main as shown

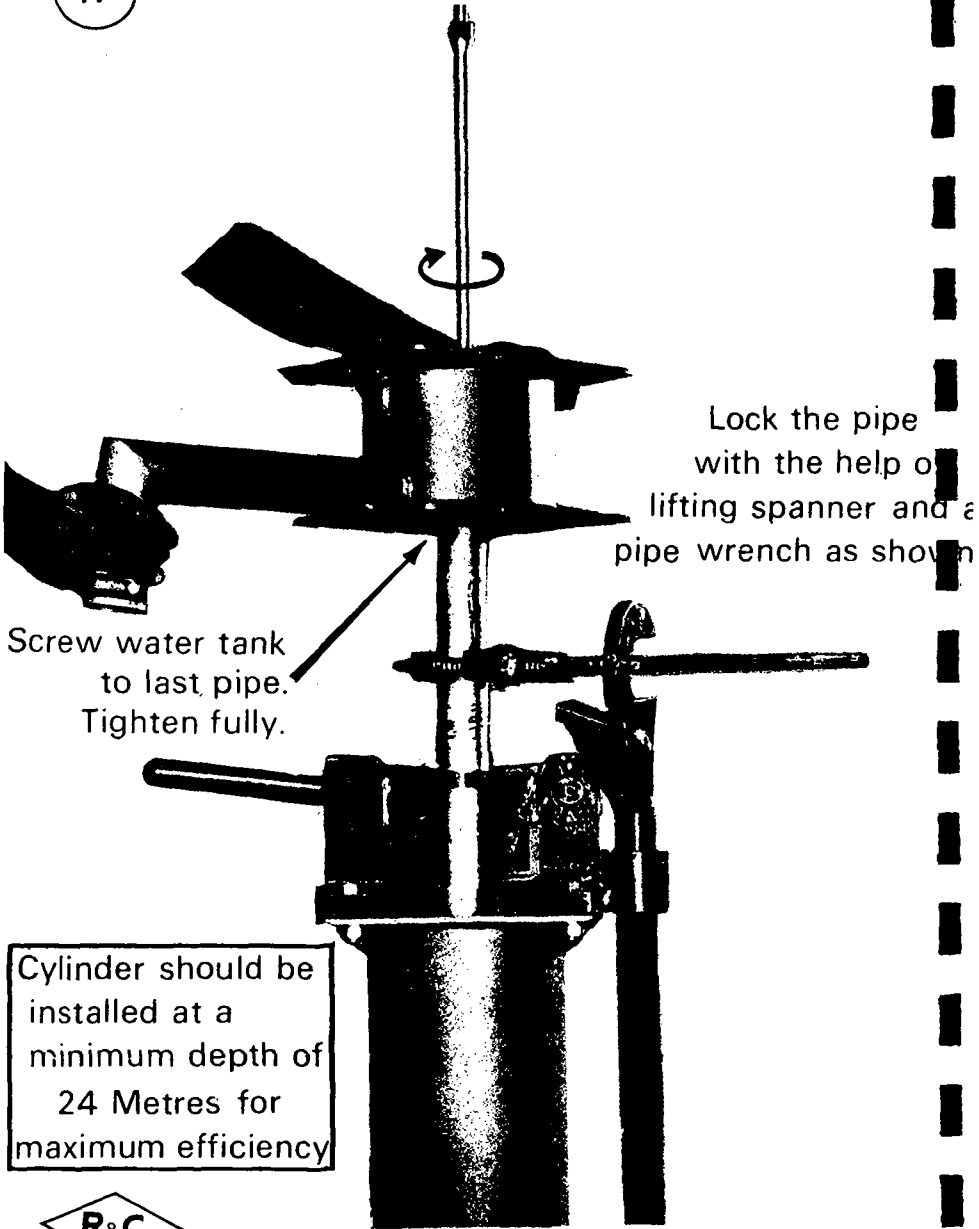
3

Keep on lowering the
pipe and connecting rod
into tube well
till the last pipe.



Step

17



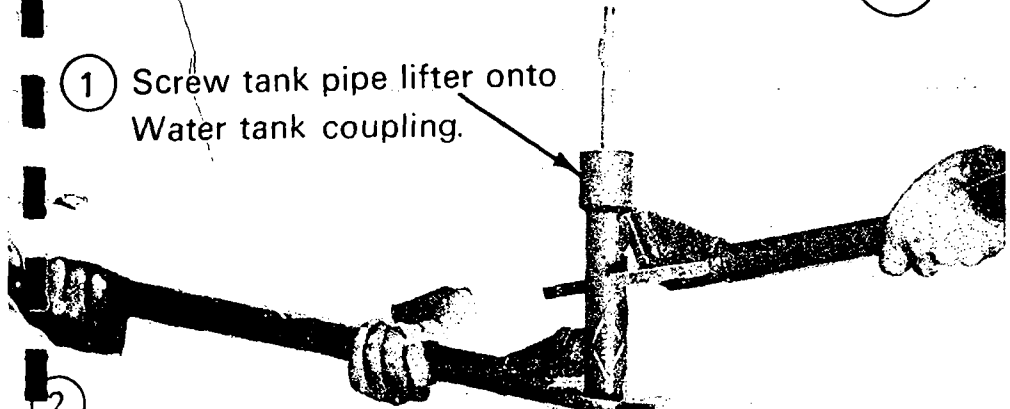
Screw water tank to last pipe. Tighten fully.

Lock the pipe with the help of lifting spanner and a pipe wrench as shown

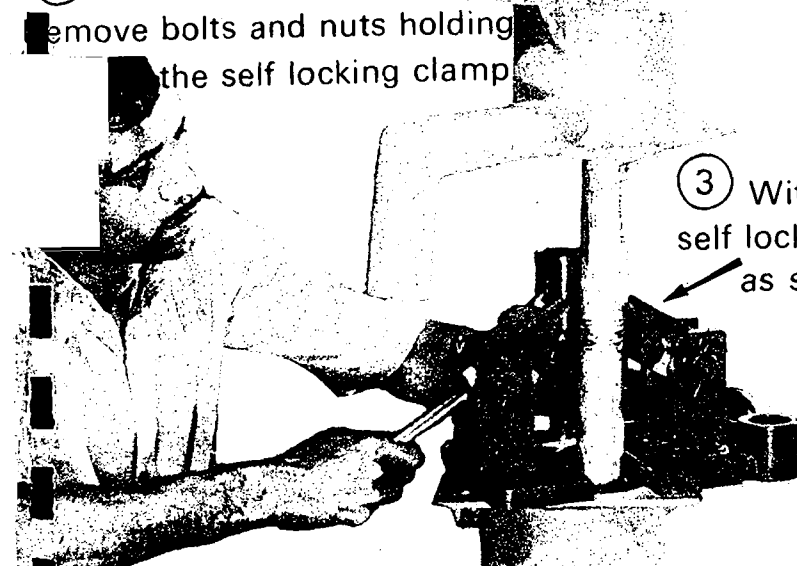
Cylinder should be installed at a minimum depth of 24 Metres for maximum efficiency



- ① Screw tank pipe lifter onto Water tank coupling.

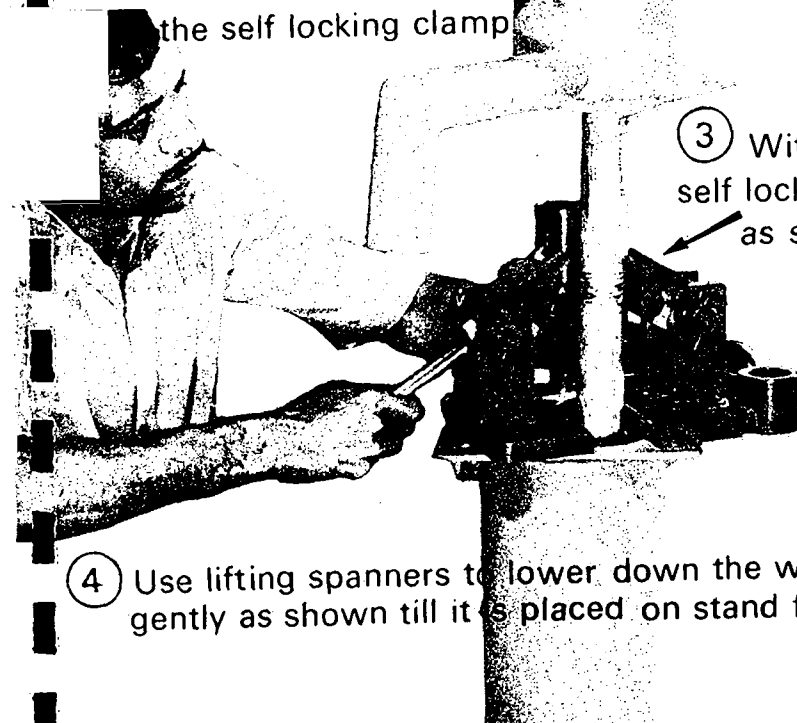


- ② Remove bolts and nuts holding the self locking clamp



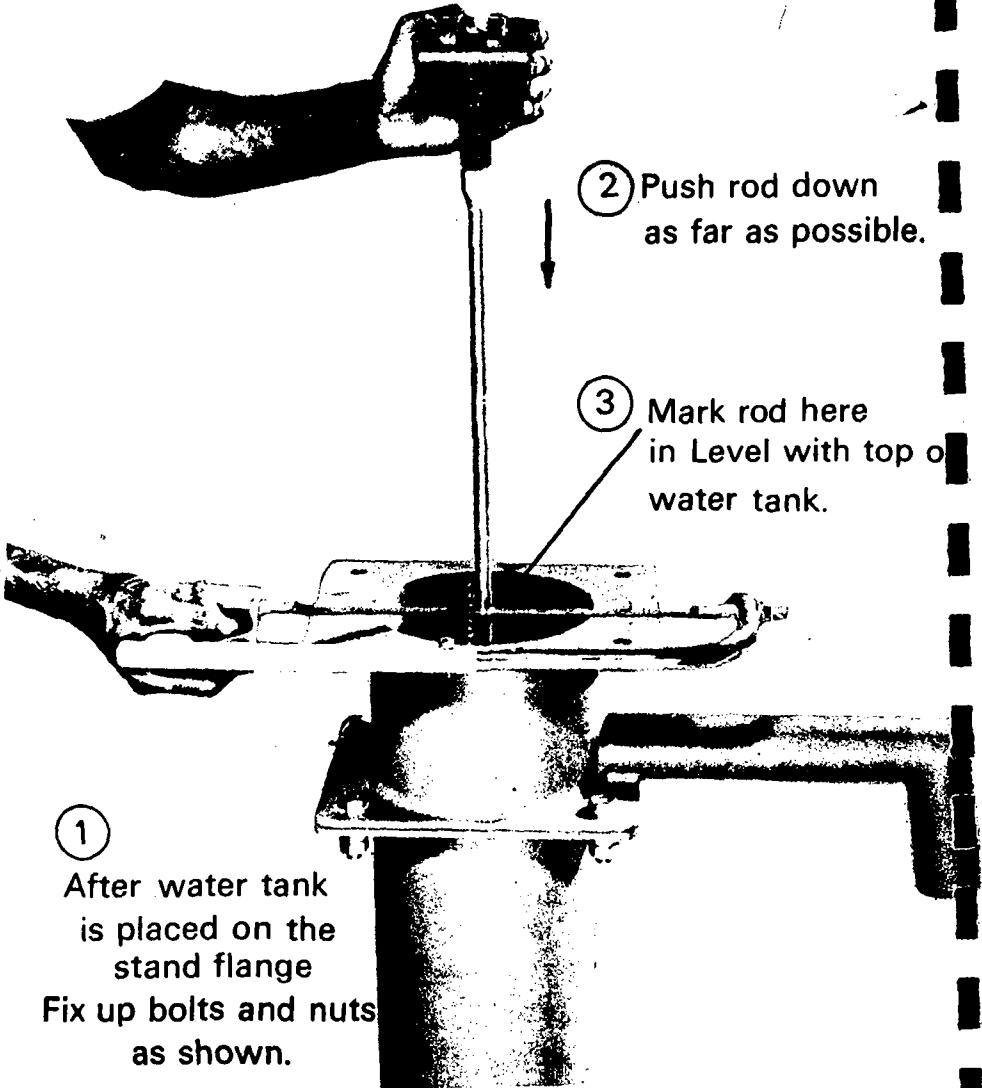
- ③ Withdraw self locking clamp as shown.

- ④ Use lifting spanners to lower down the water tank gently as shown till it is placed on stand flange



Step

19



1

After water tank
is placed on the
stand flange
Fix up bolts and nuts
as shown.

2 Push rod down
as far as possible.

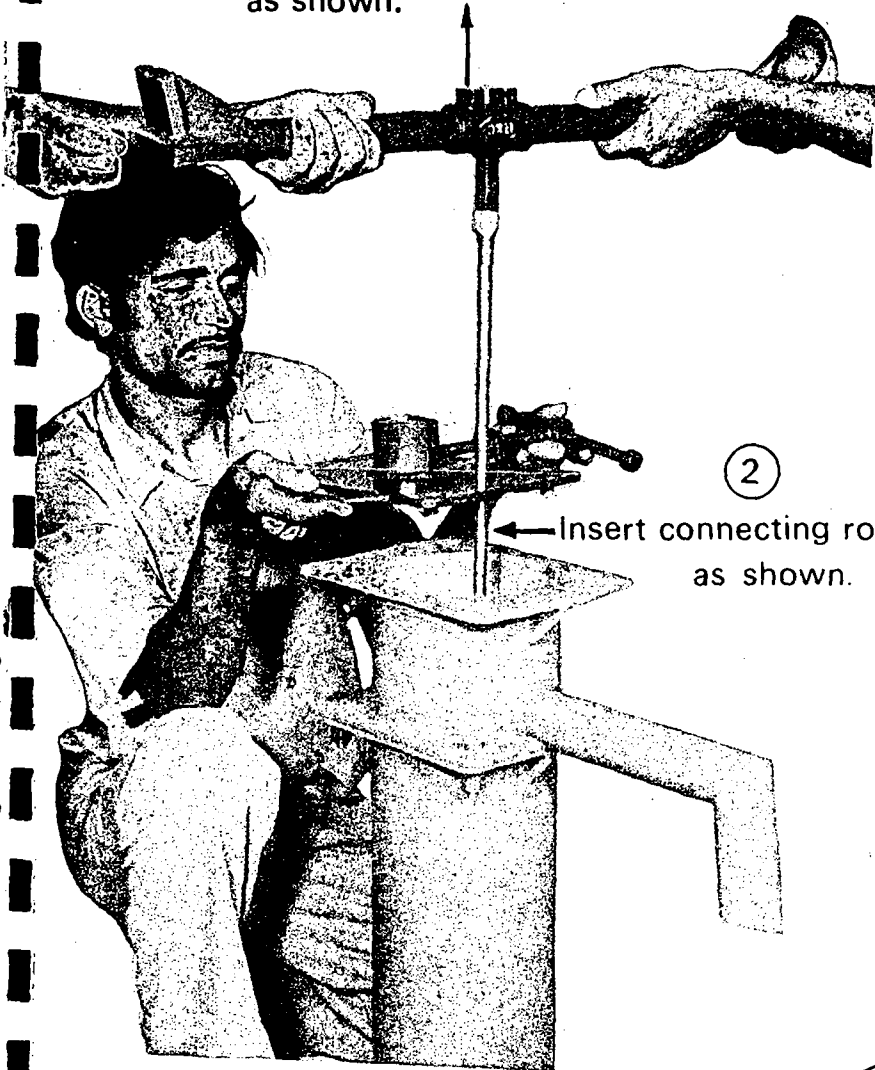
3 Mark rod here
in Level with top o
water tank.

R&C

Step

20

- ① Lift rod as far as possible with help of connecting rod lifter as shown.



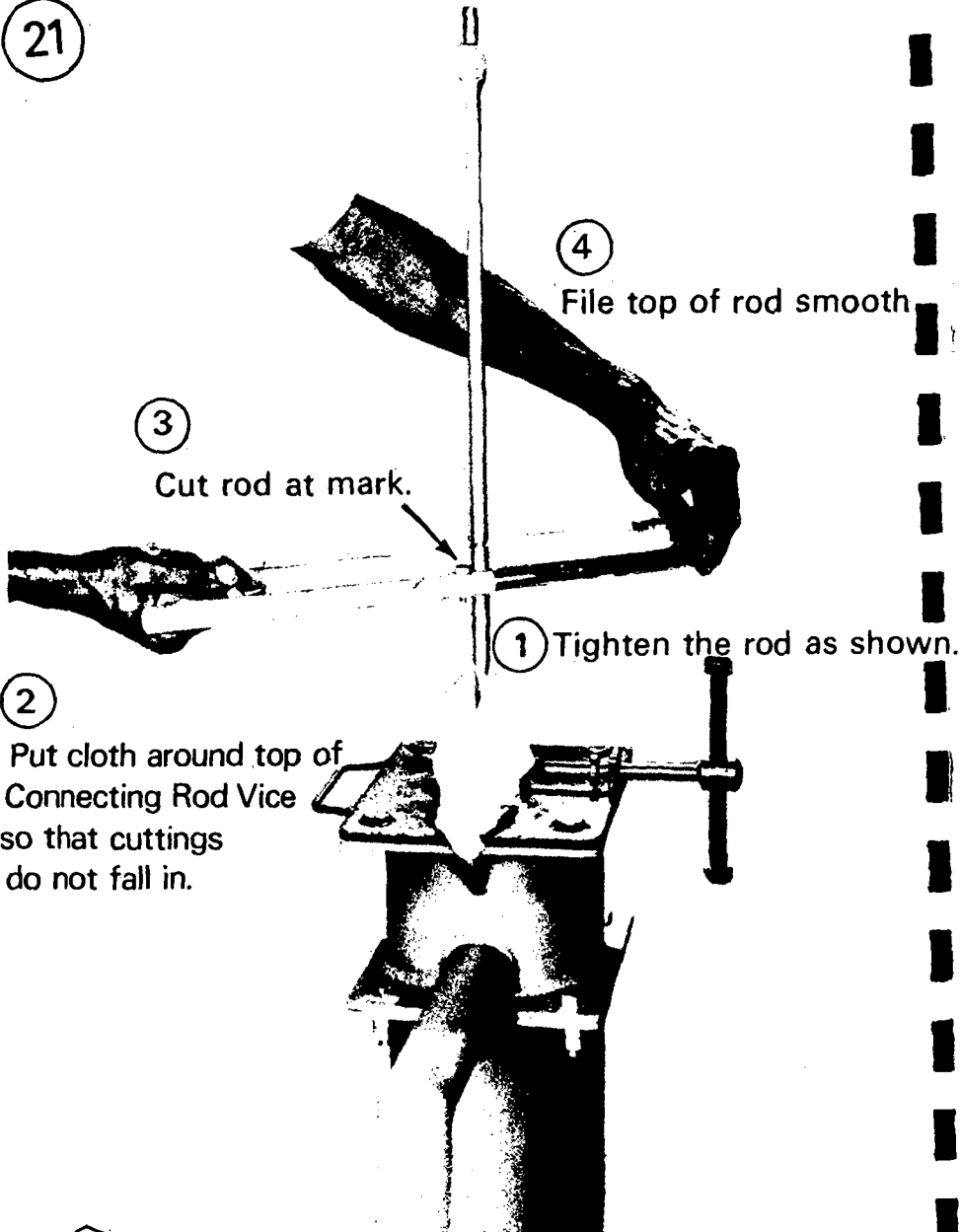
②

← Insert connecting rod vice as shown.



Step

21



4

File top of rod smooth

3

Cut rod at mark.

1

Tighten the rod as shown.

2

Put cloth around top of Connecting Rod Vice so that cuttings do not fall in.



①

Cut thread on the rod for 45 mm length. Make sure the threads are clean and true.

②

Lubricate thread while cutting.

Check thread with check nut. You must be able to screw the nut all the way down by hand.



Step

23

1

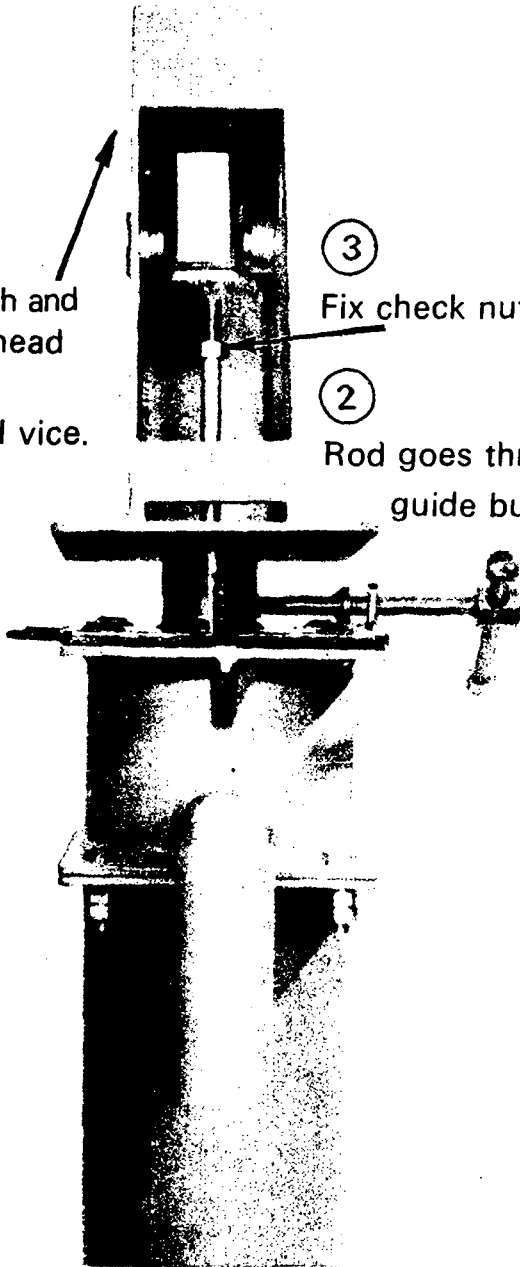
Remove the cloth and
Lower pump head
on to the
connecting rod vice.

3

Fix check nut as shown

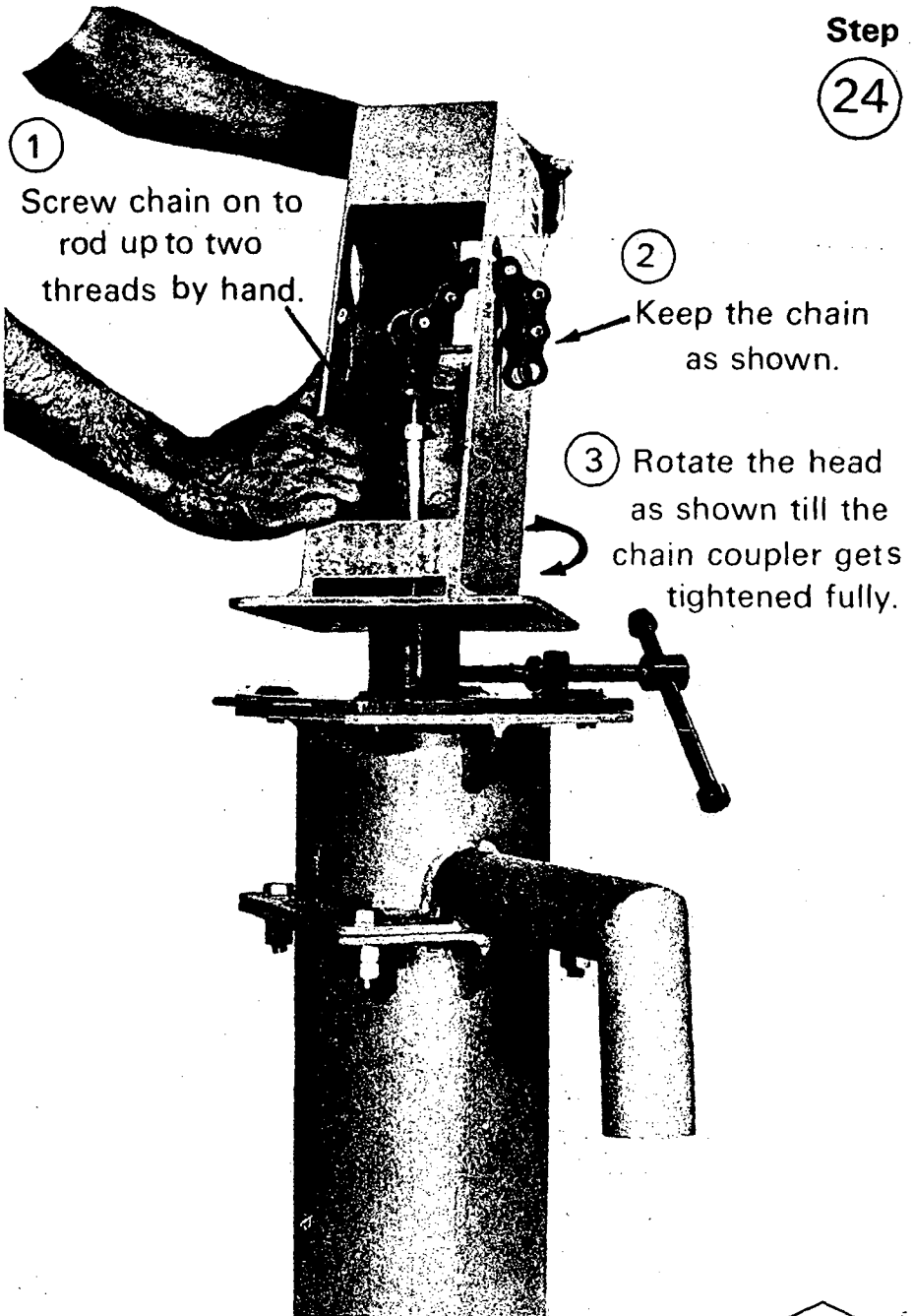
2

Rod goes through
guide bush.



Step

24

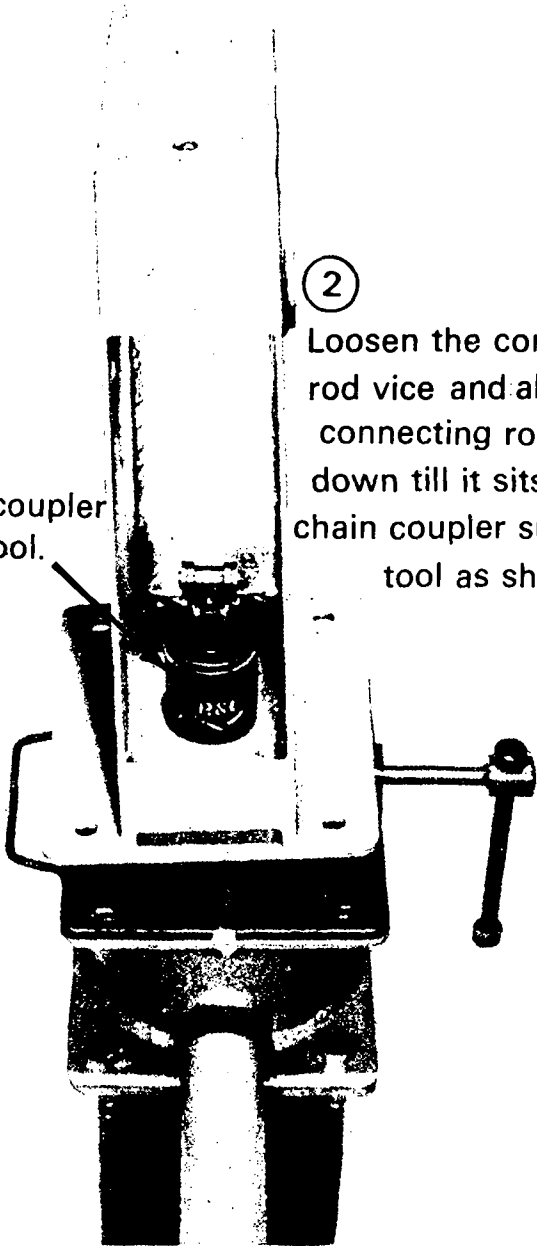


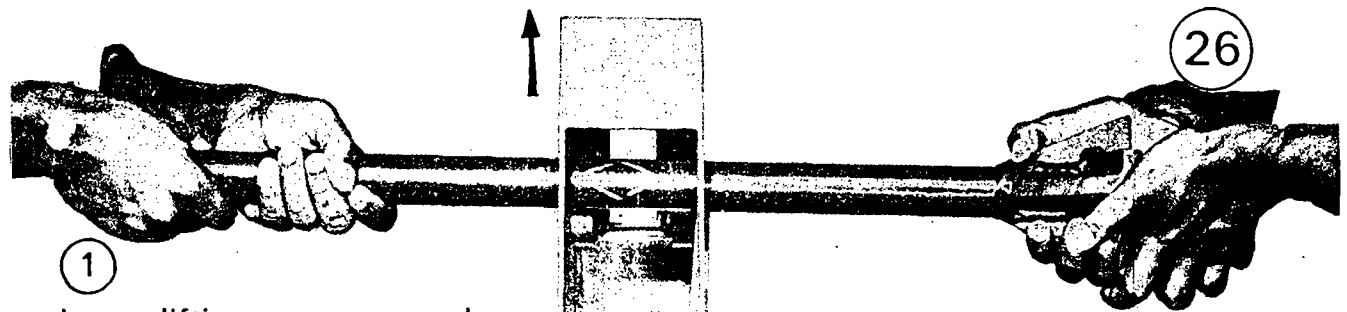
Step

25

①
Insert the chain coupler supporting tool.

②
Loosen the connecting rod vice and allow the connecting rod to go down till it sits on the chain coupler supporting tool as shown.





1

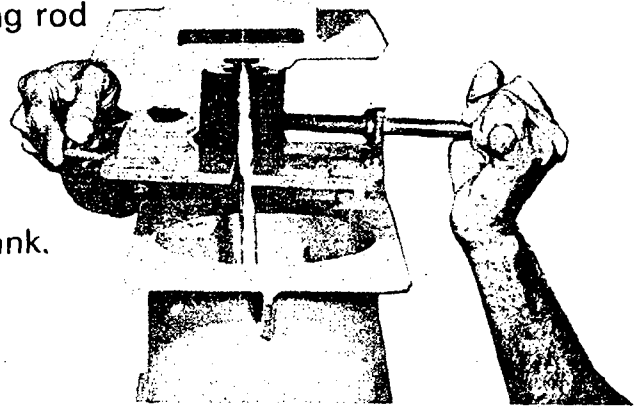
Insert lifting spanner as shown and lift the pump head gently.

2

Withdraw connecting rod vice as shown.

3

Lower the head till it sits on water tank.



Step

27

3

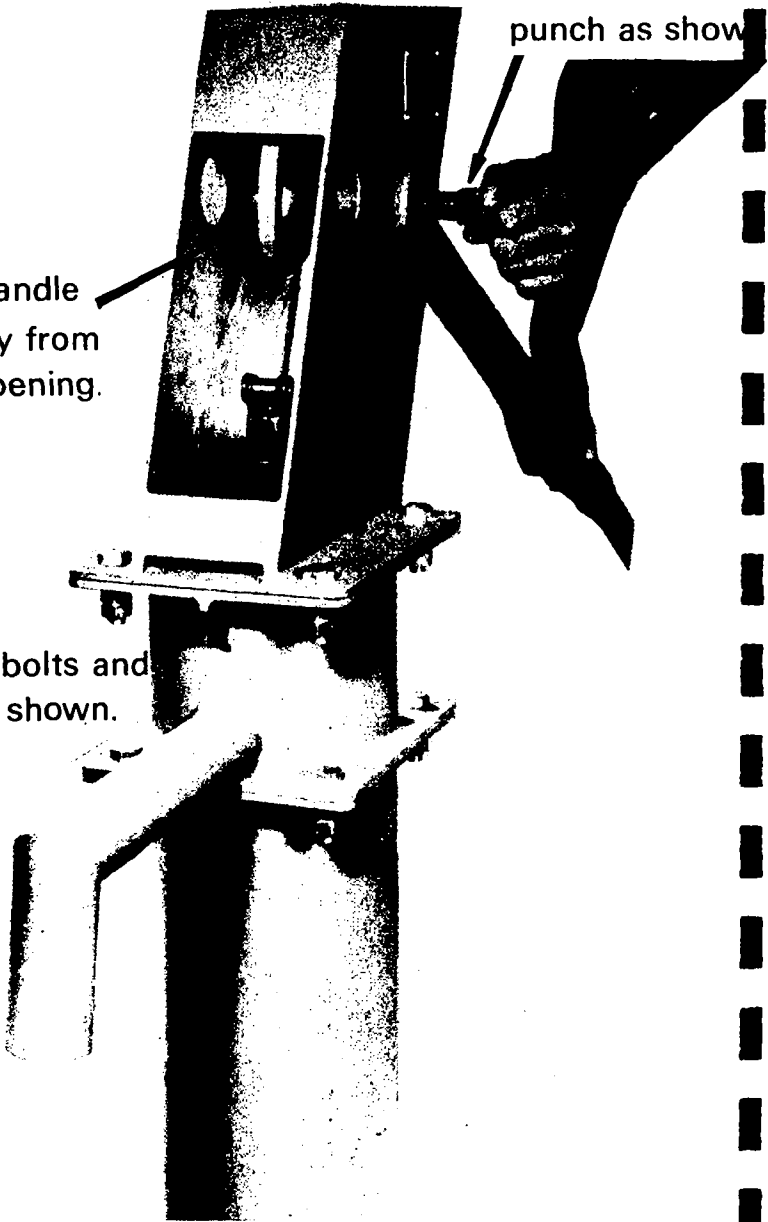
Insert handle axle punch as shown.

2

Insert handle assembly from front opening.

1

Tighten all bolts and nuts as shown.



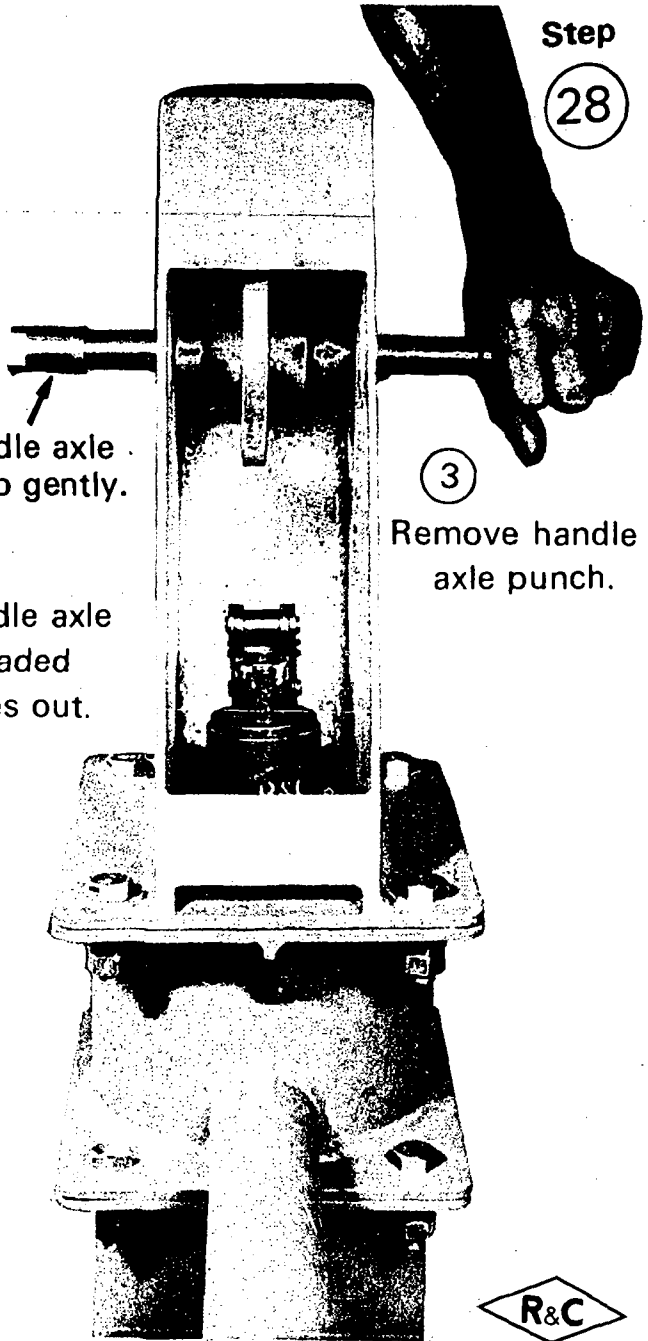
Step

28



① Insert the handle axle as shown. Tap gently.

② Drive the handle axle till the threaded portion comes out.



③ Remove handle axle punch.



Step

29

1

Hold the handle axle
with the help of
Coupling Spanner
as shown.

3

Tighten nuts by
using crank spanner
as shown.

Insert 4 mm washer.



Step

30

3
Tighten the nyloc nut with the help of crank spanners.

1
Lift the handle for fixing chain.

2
Lift the chain and insert high tensile bolt and washer



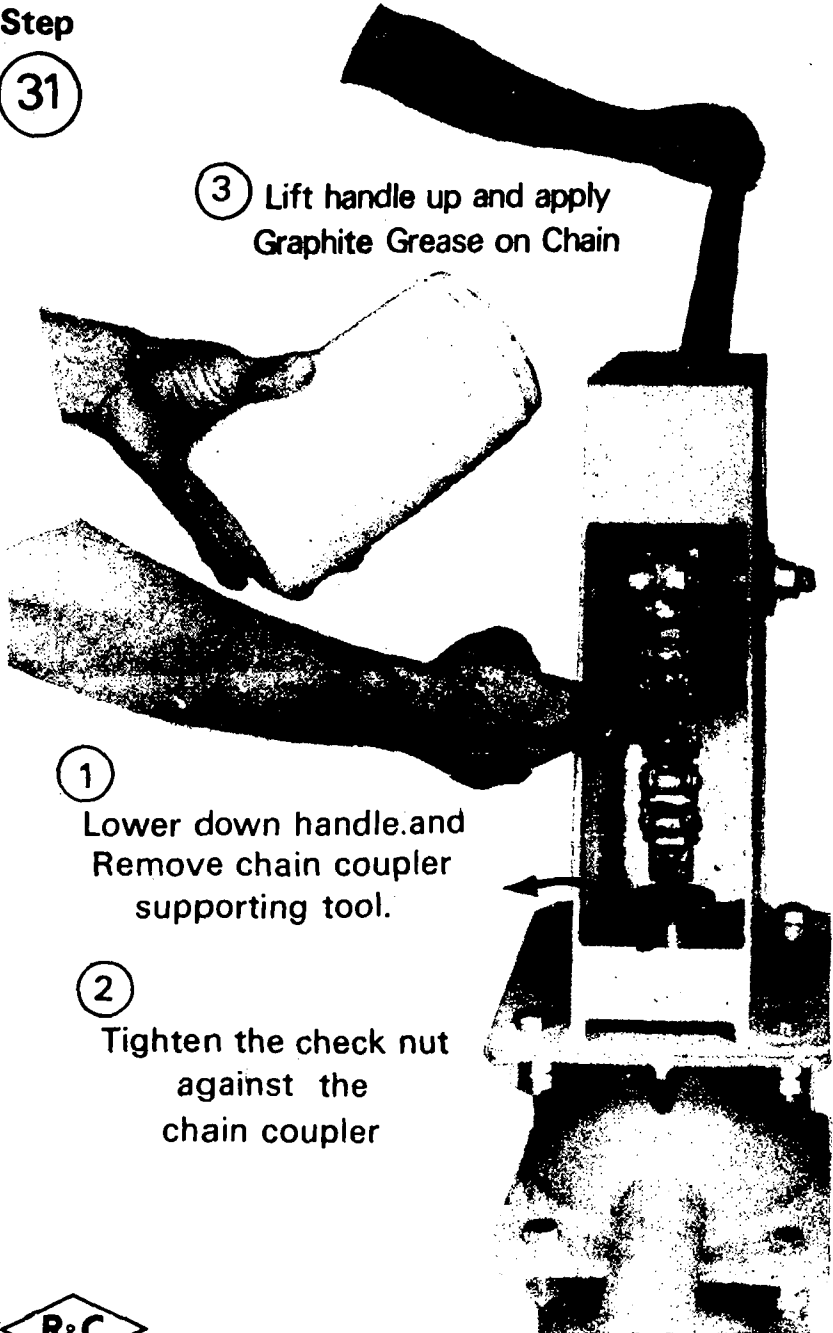
Step

31

③ Lift handle up and apply
Graphite Grease on Chain

① Lower down handle and
Remove chain coupler
supporting tool.

② Tighten the check nut
against the
chain coupler



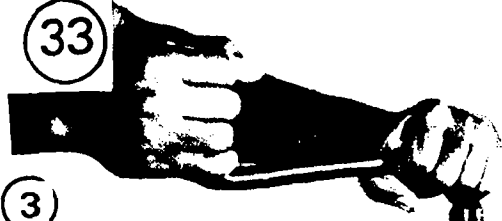
Now make Sure that...

- When you pump, the handle touches the top stop and bottom stop of Bracket. If it does not, then remove head and check the setting of the top connecting rod. Refer to Step (19).
- Connecting rod moves up and down freely in guide bush. If it does not, then the rod must have got bent while threading.
- You have threaded chain coupling fully on to connecting rod, and you have tightened the lock nut fully.
- You have tightened handle axle nut and lock nut fully and the handle axle is firmly retained.
- You have tightened chain anchor bolt and nyloc nut fully.
- All the 8 flange bolts & nuts are tight, and you have also tightened the lock nuts fully.
- You have left nothing inside the head.



Step

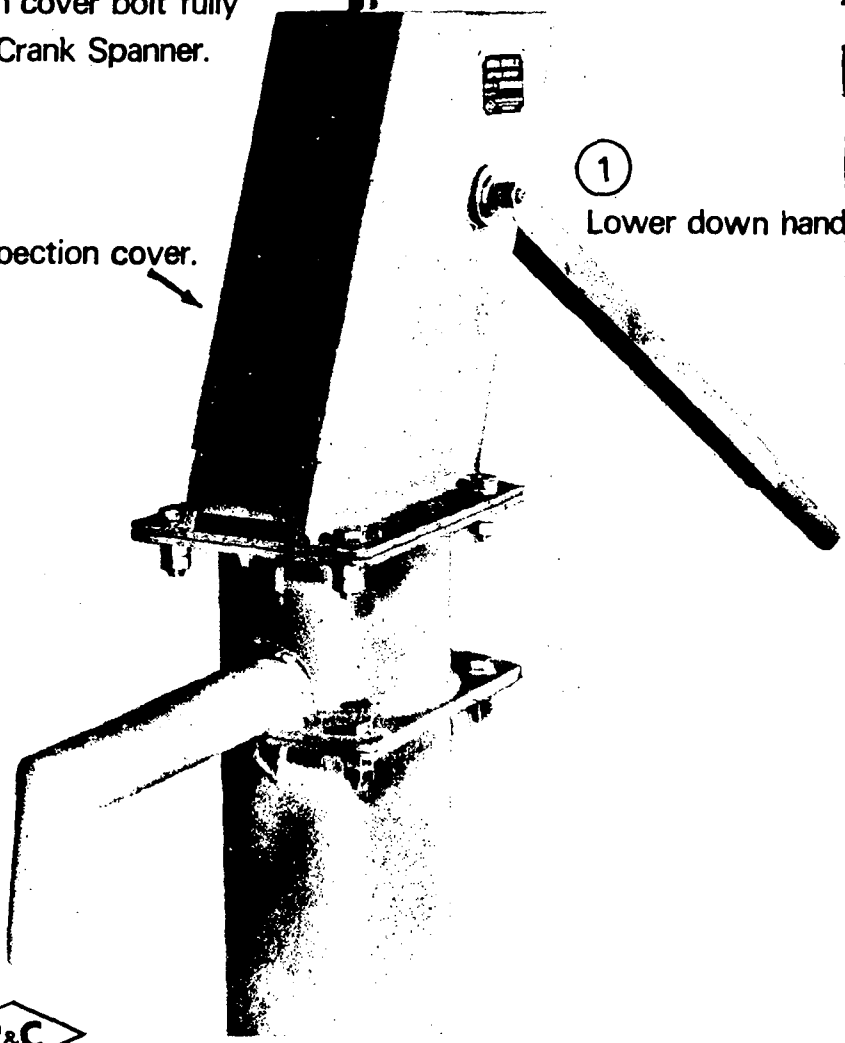
33



3 Tighten cover bolt fully by Crank Spanner.

2 Fix inspection cover.

1 Lower down handle.





Operate the pump handle one hundred times to get clean water.

Check the water. Is it clear of oil, jointing compound, dirt?

If water is not clean, pump another 100 times.

The water may taste strange to the villagers.

Explain to them that it is good, safe water.

They will soon get used to it.

FINAL CHECK LIST

Before you leave, have you . . .

- talked to the villagers about the importance of the hand-pump for their health?
- purged the tubewell?
- checked the quality and taste of the water?
- explained to the villagers that the water from the hand-pump may taste different, or strange? You must explain that they should still drink it, because this water is safe. They will get accustomed to the new taste soon.
- given the villagers the address of your office, so that they can inform you if the pump breaks down?
- made a note of any problems with the tubewell or the hand-pump, so that you can report them to the District/Executive Engineer?



chlorination

Occasionally tubewells get polluted. This may happen if there are natural calamities such as floods, or if the hand-pump platform gets damaged or destroyed. You will then need to disinfect the tubewells.

How to chlorinate a tubewell :

- Put 300 grms of Bleaching Powder in a Bucket of water.
- Mix it thoroughly.
- Remove the four bolts from the lower part of the hand pump's water tank. Lift water tank and clamp riser pipe in the raised position.
- Pour chlorine solution into open end of pedestal.
- Lower water tank and bolt it back to pedestal. Tighten fully.
- Pump. Stop pumping when the water smells strongly of chlorine.
- The handpump must not be used for *at least one hour*. But it is better if the handpump is not used for 6 hours or more. So, ask the villagers not to use it until the next day.
- The next day, pump until the taste of chlorine is just noticeable in the water.
- Collect a sample of the water. Use a sterile bottle. Seal the bottle and label it.
- Send the sample for bacteriological examination.

step-by-step procedure for pump overhaul

Before you move out to any hand-pump site, consult the India Mark-II Hand Pump installation and Maintenance Manual for the checklist of tools and materials and ensure that you have all the tools and materials with you on the vehicle. Before starting work, ensure that all the tools you will require are within reach. You can spread out a gunny bag or a plastic sheet to place tools and components so as to protect them from dirt.

DISMANTLING THE PUMP

1. Remove inspection cover from head assembly.
2. Insert chain coupling supporting tool.
3. Lift the handle to the top position and then disconnect chain from handle by removing the nyloc nut and bolt.
4. Take out handle-axle. While removing, use handle axle punch to protect axle thread and remove handle from head assembly.
5. Remove flange bolts from head assembly.
6. Insert one lifting spanner into the holes provided in the head assembly and lift up.
7. Fit the connecting rod vice on to the water chamber top flange and tighten vice against connecting rod and allow the head assembly to sit on the connecting rod vice.
8. Rotate the head assembly to disconnect the chain and then remove lock nut and conversion head.
9. Support connecting rod with connecting rod lifter, loosen connecting rod vice and remove. Gently lower connecting rod. Remove connecting rod lifter.
10. Remove water tank bottom flange bolts.
11. Lift water tank by using tank pipe lifter and lifting spanners.
12. Fit self locking clamp and remove water tank.
13. Disassemble rising main and connecting rods. Remove connecting rod lengths, one at a time.
14. When you reach the last length of pipe remove self locking clamp and pull out the last pipe & cylinder by hand.
15. Disconnect cylinder from the last pipe.
16. Check all the pipe threads ; clean out the threads by using wire brush. Remove any dirt and rust from the pipes by using wire brush or sandpaper. If any pipe is damaged, replace. Ensure that all the pipe couplings are intact and fit properly



CONNECTING RODS

Check all the connecting rod threads and couplings. Clean out threads with wire brush. Remove any dirt and rust from the rods by using wire brush or sandpaper. Re-thread connecting rods if required. Check each rod for straightness. If rods are bent, try to straighten them. If not possible, replace.

CYLINDER OVERHAUL

Unscrew top and bottom reducer caps using pipe wrenches. Remove piston assembly and check-valve. Inspect piston and check-valve assembly and replace any wornout components. If necessary, replace leather cup-washers, leather sealing ring, rubber seating, etc. Check for cracks which may have developed in the cylinder components. Replace parts if necessary. Re-assemble complete cylinder.

Cylinder Inspection

Check cylinder assembly for any leakage. Place cylinder in a bucket of water and move piston up and down. When cylinder is full of water hold up and check whether any water is seeping through the check-valve. If so, re-open cylinder. Check piston assembly and check-valve assembly again for correct assembly and proper tightening. If necessary, replace check-valve. Lock the upper valve seat and rubber seat retainer by lock punching suitably.

PUMP BODY OVERHAUL (Non-galvanized pumps)

Clean inside of water tank and head assembly. Remove all dirt and rust inside and outside the hand-pump body. Use wire brush and/or sandpaper to remove rust patches. Apply anti-rust paint. Assemble the hand-pump following the hand-pump installation procedures shown in this manual.



PLATFORM CHECKING

As you know, the India mark-II hand-pump must be installed with a proper concrete platform. A Hand-pump platform is essential since it (1) Provides the foundation for the pump pedestal; (2) provides a sanitary seal; and (3) helps prevent any surface water percolating into the tubewell which may contaminate the water. Therefore, special attention must be paid to the platform condition. You should check for cracks which may have developed in the platform and check whether the pump pedestal is tightly secured to its foundation.

If the platform has any cracks, or if the pedestal is loose, do the following :

- i) Fill up cracks in the platform with cement, Make sure that exposed platform is again cement plastered.
- ii) To reinforce the hand-pump pedestal base, dig out a circular space around the pedestal and fill this up with a 1:2:4 concrete mixture. Whenever cement plaster for concrete mixture is reapplied to an existing platform, seven days curing time should be allowed. Disconnect the handle from the chain so that nobody can operate the pump and ask the villagers not to use the hand-pump for the duration of the prescribed time. The required setting time can be reduced to 24 hours if a quick setting cement compound is used.

CHLORINATION OF THE TUBE-WELL

22. Upon completion of the overhaul job, the tubewell should be chlorinated.

Remember

- No dirt should enter the tube-well while lowering pipes and rods since this may seriously contaminate the tube-well water.
- To clean all the hand-pump components thoroughly before assembly.
- To tighten all nuts and lock nuts as well as connecting rod couplings and riser pipe couplings.

tool requirement for district mobile installation and maintenance team

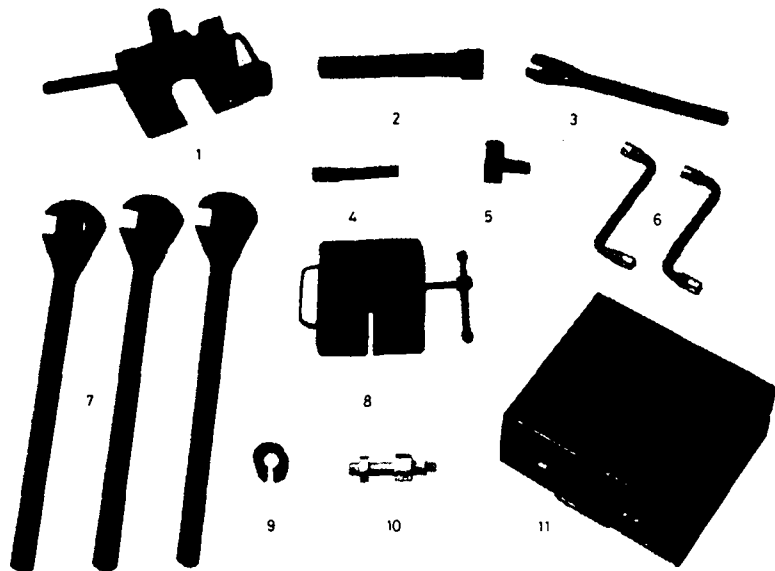
Standard Tools

1.	Button Die to suit M 12 x 1.75 threads	1 No.
2.	Die set for 32/40 mm N.B. pipe	1 set
3.	600 mm pipe wrench (stilson type)	2 Nos.
4.	450 mm pipe wrench (stilson type)	1 No.
5.	M 17 x M 19 double ended spanners (10 mm x 12 mm)	2 Nos.
6.	Screw driver 300 mm long	1 No.
7.	1 Kg. (Approx) ball pein hammer with handle	1 No.
8.	Hacksaw frame with spare blade 300 mm	1 No.
9.	Pressure type oil can (1/2 pint with oil)	1 No.
10.	Wire brush	1 No.
11.	250 mm half round file with handle	1 No.
12.	250 mm flat file with handle	1 No.
13.	Graphite grease & Lithon-3 grease	1 Kg. each
14.	0-9 number punch (6 mm)	1 set
15.	Nylon rope (3 mm thick)	75 metre
16.	Adjustable spanner	1 No.

Masonry Tools

1.	Scoop	3 Nos.
2.	Pan	4 Nos.
3.	Spade	3 Nos.
4.	Crow bar	2 Nos.
5.	Spirit level 250 mm	1 No.
6.	Levelling plank wooden (small & large)	2 Nos.
7.	20 litre Bucket	1 No.
8.	2 litre mug	1 No.
9.	Measuring tape	3 metres
10.	Quick - setting compound	250 gms.
11.	Tube - well cover	1 No.
12.	Pedestal cover plate	1 No.
13.	India Mark-II platform shuttering unit	1 No.





SPECIAL TOOLS

- | | |
|-----------------------------------|---------|
| (1) SELF LOCKING CLAMP | — 1 No. |
| (2) TANK PIPE LIFTER | — 1 No. |
| (3) COUPLING SPANNER | — 1 No. |
| (4) HANDLE AXLE PUNCH | — 1 No. |
| (5) CONNECTING ROD LIFTER | — 1 No. |
| (6) CRANK SPANNER | — 2 No. |
| (7) LIFTING SPANNER | — 3 No. |
| (8) CONNECTING ROD VICE | — 1 No. |
| (9) CHAIN COUPLER SUPPORTING TOOL | — 1 No. |
| (10) BEARING PRESSING TOOL | — 1 No. |
| (11) TOOL BOX | — 1 No. |

The special tools for India Mark II Deep Well Hand Pumps should be used by Mobile installation and maintenance team while installing or repairing India Mark-II Deep Well Hand Pumps.

I. TOOL No. 1—SELF LOCKING CLAMP :

Use this tool for holding the rising main while lifting or lowering.

While raising the pipe, you need not operate the handle to open out the jaws, as the tool has been devised to facilitate pulling out the rising main couplers without opening of the jaws by hand. (See Page 59 for details).

While lowering the pipes, the jaws should be opened slowly and pipes should be lowered with the help of lifting spanners. Never try to open the jaws unless the lifting spanners are on the pipe and load is being taken by them. Insert the lifting spanner handle in the socket and lock one pipe wrench as shown in Step (15). This will reduce one person who is otherwise required.

II. TOOL No. 2—TANK PIPE LIFTER :

Use this tool to lower or lift the water tank with the rising main. (Refer Step 18).

(i) Screw it on to water tank coupling.

(ii) Use 2 or 3 Lifting spanners equally spaced on the tank pipe lifter to raise or lower water tank assembly.

III. TOOL No. 3—COUPLING SPANNER :

Use this tool for tightening the connecting rod coupler faster and with ease (Refer Step 14).

IV. TOOL No. 4—HANDLE AXLE PUNCH :

This tool is used for driving out the handle axle without damage to axle threads (Refer Step 27 & 28).

(A) For driving out the handle axle the sequence shall be :

(i) Remove axle nuts and washers.

(ii) Put handle axle punch on taper portion of axle.

(iii) Hammer gently handle axle punch until you are able to pull out axle by hand.

(B) While driving in the handle axle, the sequence shall be as under :

(i) Insert the handle axle punch through left bush and bearings.

(ii) Insert the handle axle through right bush, so that threaded portion goes in to the handle axle punch.

- (iii) Hold the handle axle punch by one hand and hammer gently the handle axle.
- (iv) Hammer the handle axle till the handle axle threaded portion comes out through left bush. The handle axle punch would have come out by then.

V. TOOL No. 5 - CONNECTING ROD LIFTER :

Use this tool for raising or lowering the connecting rod (Refer Step 20).

- (i) Thread on the tool to connecting rod
- (ii) Insert lifting spanner
- (iii) Lift or lower as required

VI. TOOL No. 6—CRANK SPANNER :

Use crank spanners for tightening or loosening flange bolts, check nuts, nyloc nuts and anchor bolt. (Refer Step 29 and 30).

VII. TOOL No. 7—LIFTING SPANNER :

Use this tool to raise or lower the rising main. These lifting spanners are suitable for 32 MM (1¼") N.B. pipes (Refer Step 16 & 18).

- (i) lifting spanners should be spaced equally around the rising main.
- (ii) Use 2 lifting spanners to lower or lift upto 30 Mtrs. of rising main.
- (iii) Use 3 lifting spanners if the rising main is longer than 30 Mtrs. DO NOT use pipe wrenches for lifting or lowering the rising main.

VIII. TOOL No. 8—CONNECTING ROD VICE :

Use this tool for holding the connecting rod while connecting rod is cut and threaded (Refer Step 20 to 26).

IX. TOOL No. 9—CHAIN COUPLER SUPPORTING TOOL :

Place this tool between the chain coupler and the flange of the conversion head assembly. This facilitates easy fixing of chain on to the handle assembly as the entire rod weight is supported by this tool (Refer Step 25 to 31)

X. TOOL No. 10—BEARING PRESSING TOOL :

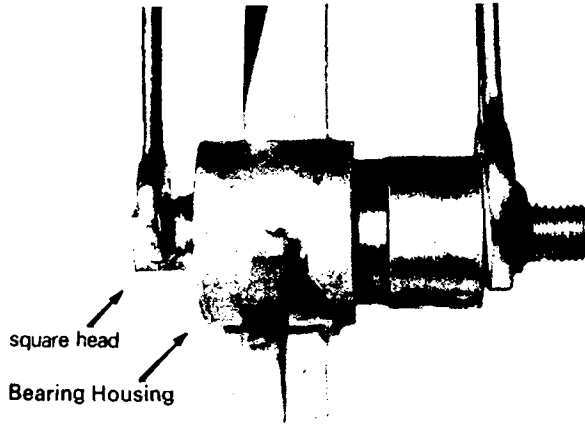
With the help of this tool bearings can be fitted very easily in the Bearing Housing of Handle Assembly. (See page 60 for details).

Lift the rising main
as shown

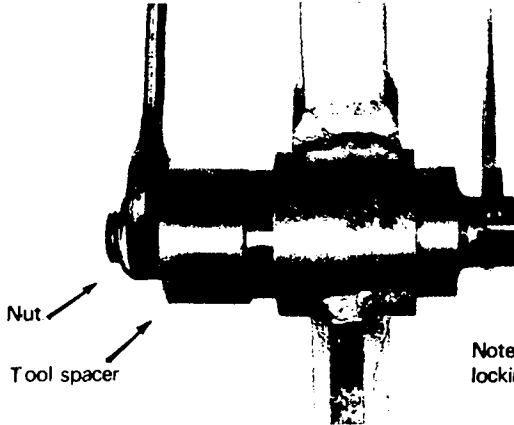
You don't have to operate
handle to clear the pipe
coupling

↑
self locking clamp



**Step 1**

1. Insert the tool till the boss sits in the bearing housing.
2. Insert bearing from threaded end side.
3. Insert tool spacer to be followed by nut.
4. Hold the square head with spanner.
5. Tighten the nut till bearing is flush with the bearing housing face.

**Step 2**

1. Insert the tool through bearing already in position
2. Insert one pump spacer, bearing, followed by the tool spacer and nut.
3. Hold the square head with a spanner.
4. Tighten nut till bearings and pump spacer are locked.

Note: Use of this tool ensures proper fixing and locking of bearings and pump spacer.

recommended spares for each india mark II deep-well hand-pump

**for
two year normal operation**

Quantity

Spares for Pump-Head

1. Hexagonal bolts M12 x 1.75 x 40 mm long	8 Nos.
2. Hexagonal nuts M 12 x 1.75 mm	18 Nos.
3. Washers M 12	10 Nos.
4. High Tensile bolt M 10 x 1.5 x 40 mm long	1 No.
5. Nyloc nut M 10 x 1.5 mm	2 Nos.
6. Handle axle (Stainless Steel)	1 No.
7. Washer (4 mm thick) for handle axle	1 No.
8. Bearing (No.6204 ZZ - Prepacked with Lithiumbase grease and sealed on both sides)	2 Nos.
9. Spacer	1 No.
10. Chain with coupling	1 No.
11. Bolt for front cover M 12 x 1.75 x 20 mm long	2 Nos.

Spares for Cylinder :

1. Leather cup washers	4 Nos.
2. Leather sealing rings	6 Nos.
3. Rubber seating (big)	2 Nos.
4. Rubber seating (small)	2 Nos.

Spares for connecting Rods and G.I. Riser pipe :

1. Hexagonal coupling M 12 x 1.75 x 50	2 Nos.
2. Pipe sockets (32 mm NB medium grade hot dip galvanised)	4 Nos.

Note : Complete pumps to be kept in stock to take care of sub-assembly replacement—3% of the total number of pumps installed in the Block.



general maintenance schedule

The India Mark-II Deep Well Handpumps are to be properly maintained to ensure safe potable drinking water to the rural public without break. Proper and regular maintenance will prevent breakdowns and ensure continuous working of the hand-pumps. The moving parts in the India Mark-II handpump above and below the ground level are few and therefore maintenance is very simple.

India Mark-II handpump is like any other mechanical machine. Any machine is to be kept clean, if for no other reason than that in cleaning all parts are inspected for formation of rust, insufficient lubrication, loose bolts, nuts, etc., and also for missing parts in time to prevent major failures.

The following schedule of maintenance has been drawn at fixed intervals.

(1) ONCE IN 30 DAYS :

- (a) Tighten the handle axle nut and lock nut.
- (b) Look for loose or missing flange bolts and nuts.
- (c) Open the front cover, clean inside the pump.
- (d) Check the chain anchor bolt for proper fitment. Tighten, if necessary.
- (e) Clean the chain assembly. Apply graphite grease.
- (f) Look for rusty patches. If seen, the same may be cleaned with the help of wire brush/sand paper and apply anti-corrosive paint.
- (g) Find out whether the handpump base is loose in the base. If it is loose, arrange for fresh foundation



(2) ONCE IN 365 DAYS :

- (a) Examine the pump carefully and check whether :--
- i) Discharge is satisfactory.
 - ii) Handle has shake.
 - iii) Guide bush has excessively worn out.
 - iv) All bolts, nuts and washers are in position.
 - v) Chain has worn out.
 - vi) Roller chain guide is excessively worn out.
- (b) Pull out the pump and follow the instructions given below :—
- i) If chain, bearings and spacer are damaged, replace them.
 - ii) If roller chain guide is badly worn out replace handle assembly.
 - iii) If any pipes are damaged replace them.
 - iv) Open out cylinder assembly and replace cup washers, sealing rings and also any other part found defective.
 - v) Check the condition of water tank riser pipe holder. If threads are worn out replace water chamber.
 - vi) Check all sub assemblies for crack in weld and other visual defects. If defects are serious replace sub-assemblies.
 - vii) Reinstall the pump as per instructions given in this manual.

Paint the pump head inside/outside with the recommended colour after cleaning/sanding the surfaces.

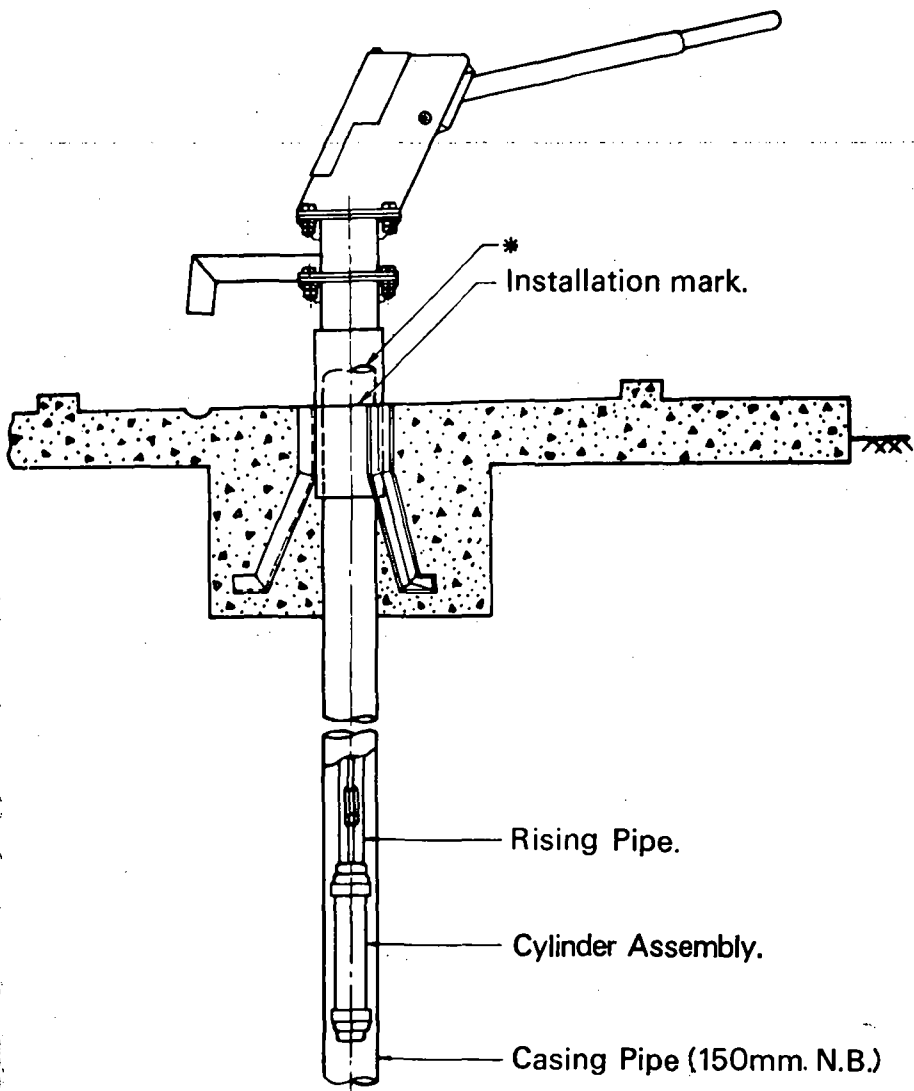
If the pump is fully galvanised, wash the surface. Never apply emery paper to clean galvanized surfaces.



TROUBLE SHOOTING * CAUSES * REMEDIES

TROUBLE	CAUSE	REMEDY
1) Pump handle works easily but no flow of water :	(a) Damaged rising main 	(a) Replace the damaged pipe or connect the affected rising main.
	(b) Water level gone down much below the cylinder assembly.	(b) Add more pipes and rods.
	(c) Worn out cylinder leather bucket.	(c) Overhaul the cylinder and replace the leather bucket.
	(d) Connecting rod joint disconnected.	(d) Pull out the pump and join the connecting rod wherever necessary.
	(e) Valve seats worn out.	(e) Replace valve seats.
	(f) Pump cylinder cracked.	(f) Replace cylinder assembly.
2) Delayed flow or small flow :	(a) Leakage in cylinder bottom check valve or upper valve.	(a) Overhaul cylinder. Replace rubber seats.
	(b) Leakage in Pipe assembly.	(b) Replace rising main.
3) Folding of Chain during return stroke :	(a) Improper erection.	(a) Adjust the length of last connecting rod suitably.
	(b) Leather cup washers getting jammed inside the cylinder.	(b) Overhaul the cylinder and replace leather buckets.
4) Noise during operation :	(a) Stand assembly flange not levelled properly.	(a) Level the flange.
	(b) Bent connecting rod.	(b) Change the defective rod.
	(c) Hexagonal coupler welded off-set.	(c) Change the defective rod.
5) Shaky Handle :	(a) Loose handle axle nut.	(a) Tighten handle axle nut.
	(b) Worn out ball bearings.	(b) Replace ball bearings.
	(c) Spacer damaged.	(c) Replace spacer.





For Casing Pipe of 6" (150 m.m.) N.B. use of Telescopic Stand Assembly as shown above is recommended.



New developments

Keeping in with our tradition to use **TECHNOLOGY FOR BENEFIT OF RURAL MASSES** our Research and Development Wing has developed many new items for rural water supply.

- (1) We have Jumbo India Mark II Hand Pump Fitted with 3" dia Cylinder which gives 18 litres of water/40 strokes as against 12 litres from Standard India Mark II Pump. You can have this benefit with very small extra investment. Many pumps are already in the field.
- (2) We have India Mark II Force lift pump for you. Connect this to windmill and fill overhead tank. Windmill can also be offered by us.



- (3) For shallow well application, we have brought out India Mark II Shallow Well Hand Pump. Already many pumps are working in field with high rate of success.
- (4) We have developed India Mark II Extra Deep well Hand Pump for use in well having static Water Level ranging from 45 Mtrs. to 90 Mtrs. Several pumps are already in use.
- (5) Does your tube well water have high turbidity and iron content ? We can supply **PACKGAE TREATMENT UNIT** to enable you to get water free from iron and turbidity.

For further details on these products,
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Richardson & Cruddas (1972) Ltd.,

(A GOVERNMENT OF INDIA UNDERTAKING)

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notes



A NAME YOU CAN DEPEND ON
A PRODUCT YOU CAN RELY ON



Extra Heavy Duty India Mark II Hand Pump designed to draw water from 85 metres, in operation in Sokoto, Nigeria



(Estd. 1858)

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