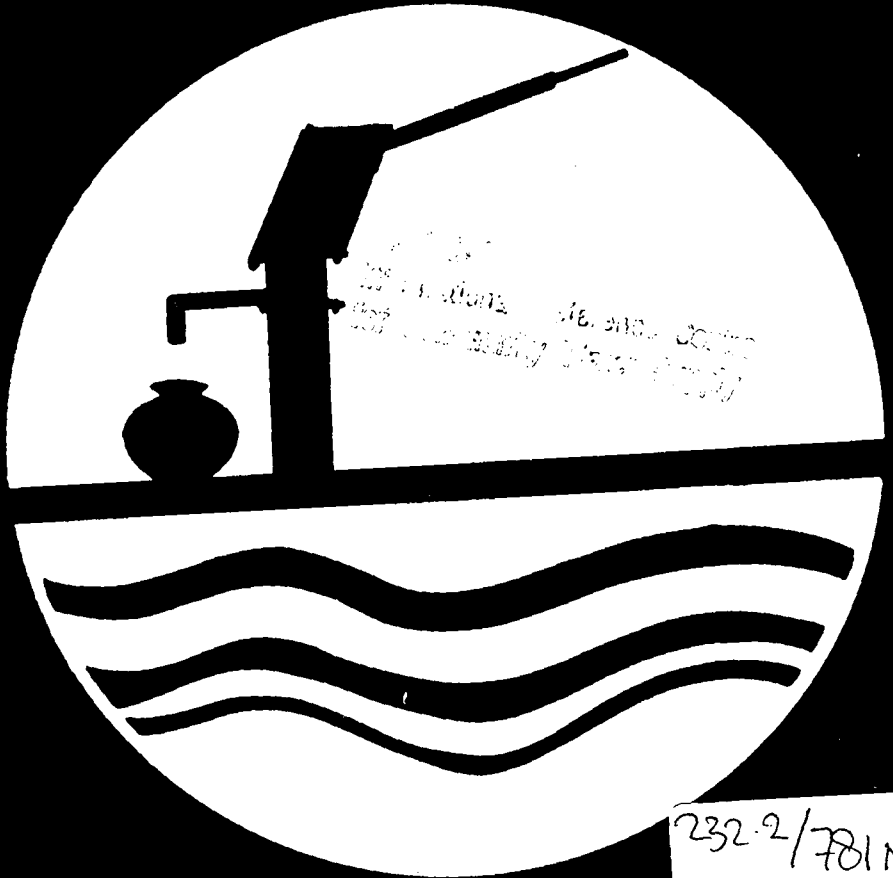


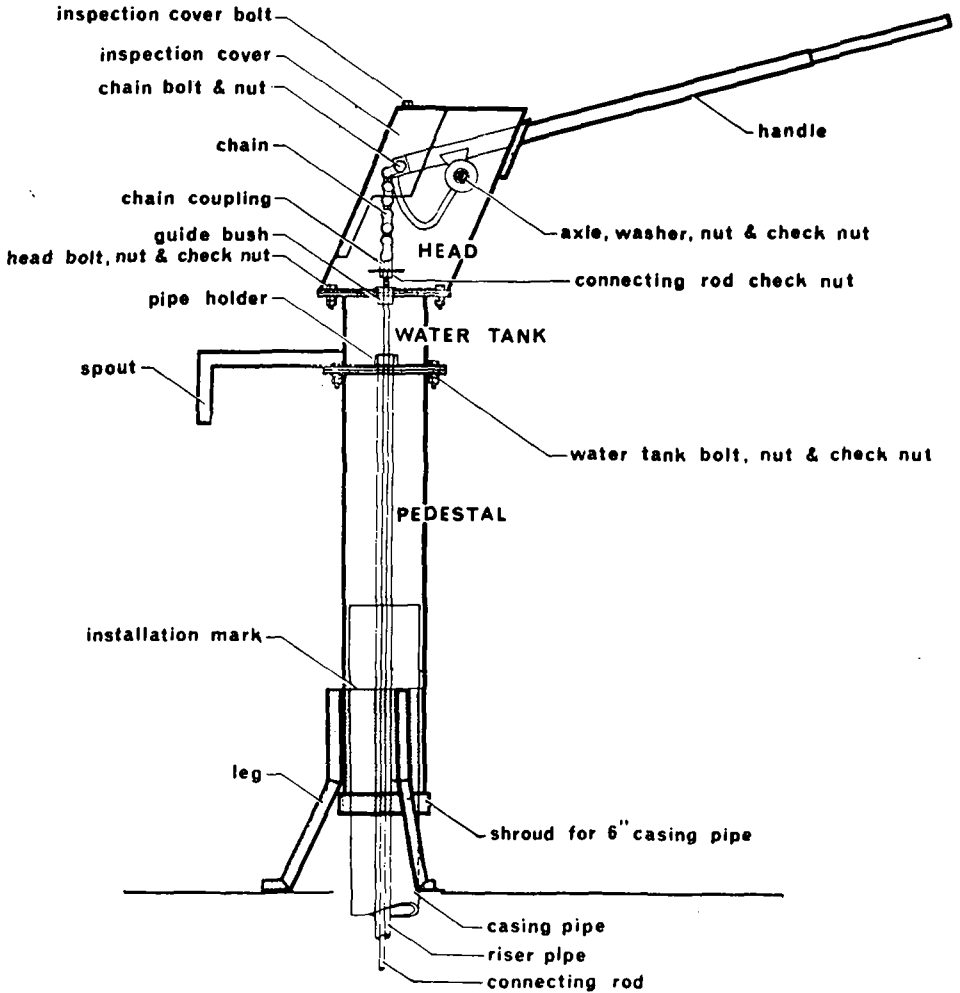
232.2  
78IN

# INDIA MARK-II HANDPUMP INSTALLATION INSTRUCTIONS



232.2/78IN

# INDIA MARK-II HANDPUMP



232.2  
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# INDIA MARK-II HANDPUMP INSTALLATION INSTRUCTIONS

356

UNICEF  
National Printing Works  
10 Daryaganj, New Delhi

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Second edition. May 1978.  
Published by UNICEF, New Delhi and printed at  
National Printing Works  
10 Daryaganj, New Delhi

**This manual belongs to you.  
Put your name on this page.**

# **ABOUT THIS MANUAL**

## **Who is this manual for ?**

This manual is for 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 you can refer to it often. It 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 AND HANDPUMPS

## **Why was the India Mark-II handpump developed ?**

Handpumps in villages are used by many people. Sometimes they are used for 18 hours a day, or even more. Because of this, many handpumps break down quickly.

The India Mark-II handpump is made of very strong materials. It is the best handpump made so far. It seldom breaks down. All the parts are checked and tested, so that they fit together perfectly. This means that you do not have to force the parts together.

## **Why is water from a handpump better than water from other sources ?**

The deepwell handpump is one of the safest sources of clean, potable water. Water from streams, open wells and tanks usually carries disease. But the tubewell is sealed so that harmful germs cannot enter it: it is a *protected* source of water.

If people want to stay healthy, they must have clean drinking water always. If they drink even a sip of water which is not clean, they can get ill. The handpump brings clean drinking water to the villagers. So it is important that the handpump does not fail. The handpump must work well, and work for a long time.

### **Why is your job so important ?**

The handpump should always bring good, potable water to the villagers. If you install the handpump correctly, then 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

### **Do you drink only clean water ? Do you set an example to the villagers ?**

For your own benefit, you should drink water only from the India Mark-II handpump, or water which you *know* is safe. When you work, the villagers will offer you water. Ask them where it comes from. If it is from an open well, or a tank, or from a stream, don't drink it. Tell the villagers that you drink only tubewell water, because it is safer. Advise them to do the same. In this way, you will set an example to the villagers.

The villagers can see that you are healthy. They can see that you only drink protected water. *You do what you say*. Your example will show the villagers that clean water is connected with good health.

In this way you can teach the villagers some very important things.

You can teach them to value their handpumps more, and to look after their handpumps better.

Then the handpumps which you install will work better and last longer, so your work will be easier, and the villagers will be more healthy.

Many children will grow up stronger and healthier because you provide them with good drinking water. You can be proud of your work.

# ABOUT THE VILLAGERS AND HANDPUMPS

**What should you tell the villagers when you install or repair a handpump ?**

Here are four important things about handpumps. You should help the villagers to understand these things:

- *Deepwell handpump 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 handpump is protected from disease. So if we drink water from a handpump, we will stay healthy.*
- *People must use handpumps properly. You should show the villagers how to use the handpump correctly.*
- *People must maintain handpumps properly.*
- *The villagers must contact the appropriate officials if the handpump breaks down. You should tell the villagers exactly whom to contact: and how to contact that person.*

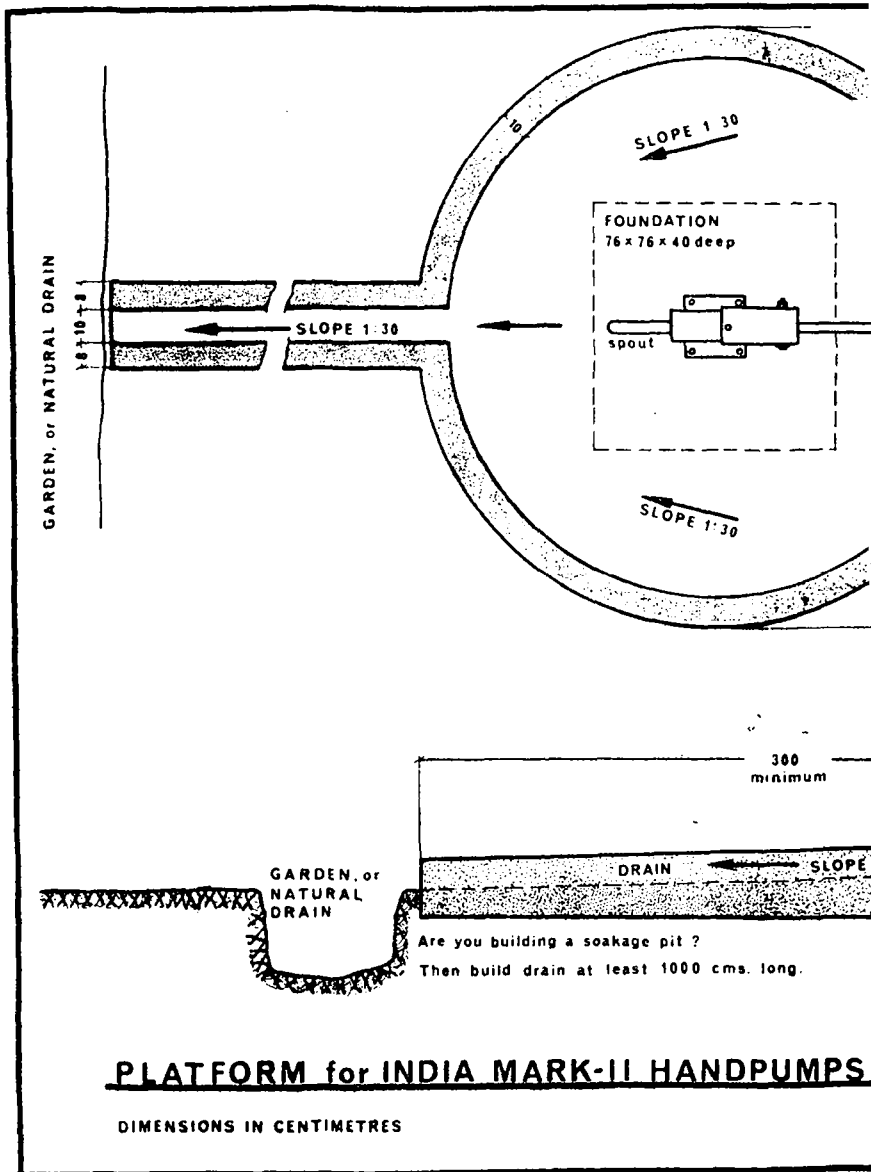


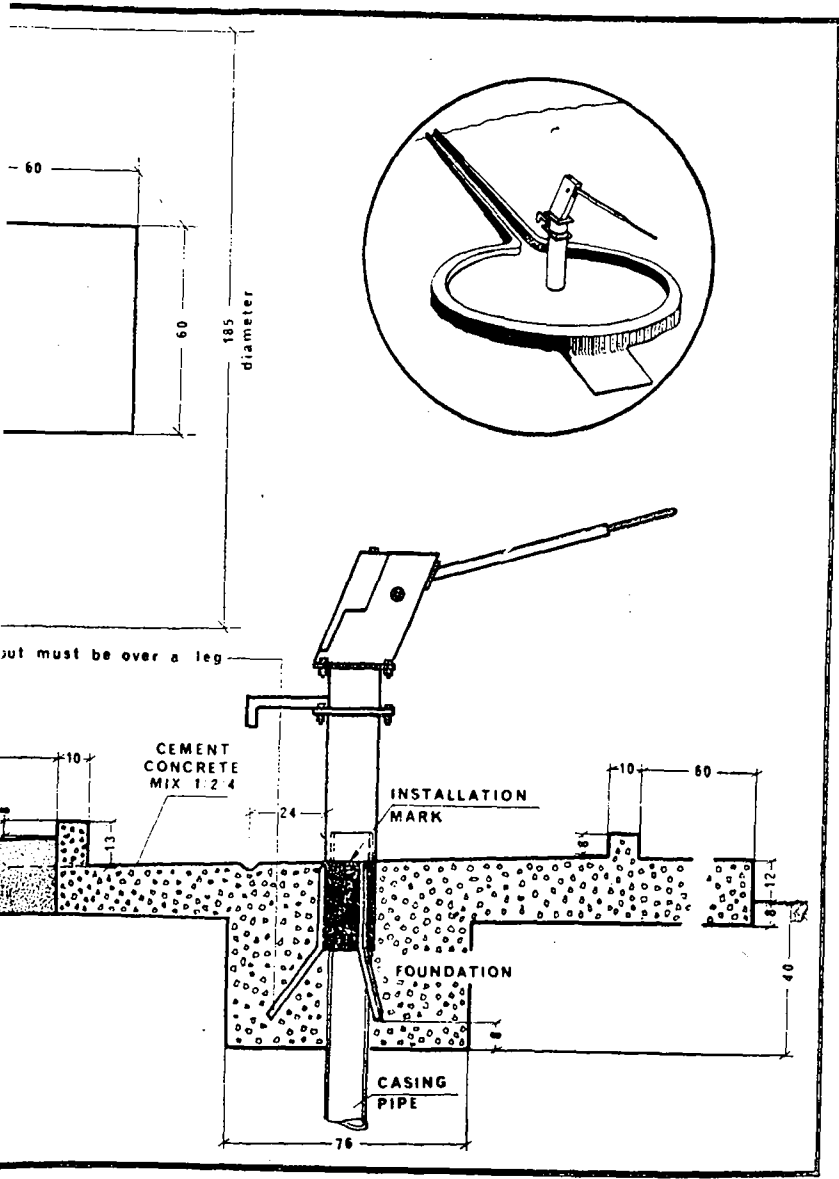
**Here are some “dos” and “don’ts” for using handpumps:**

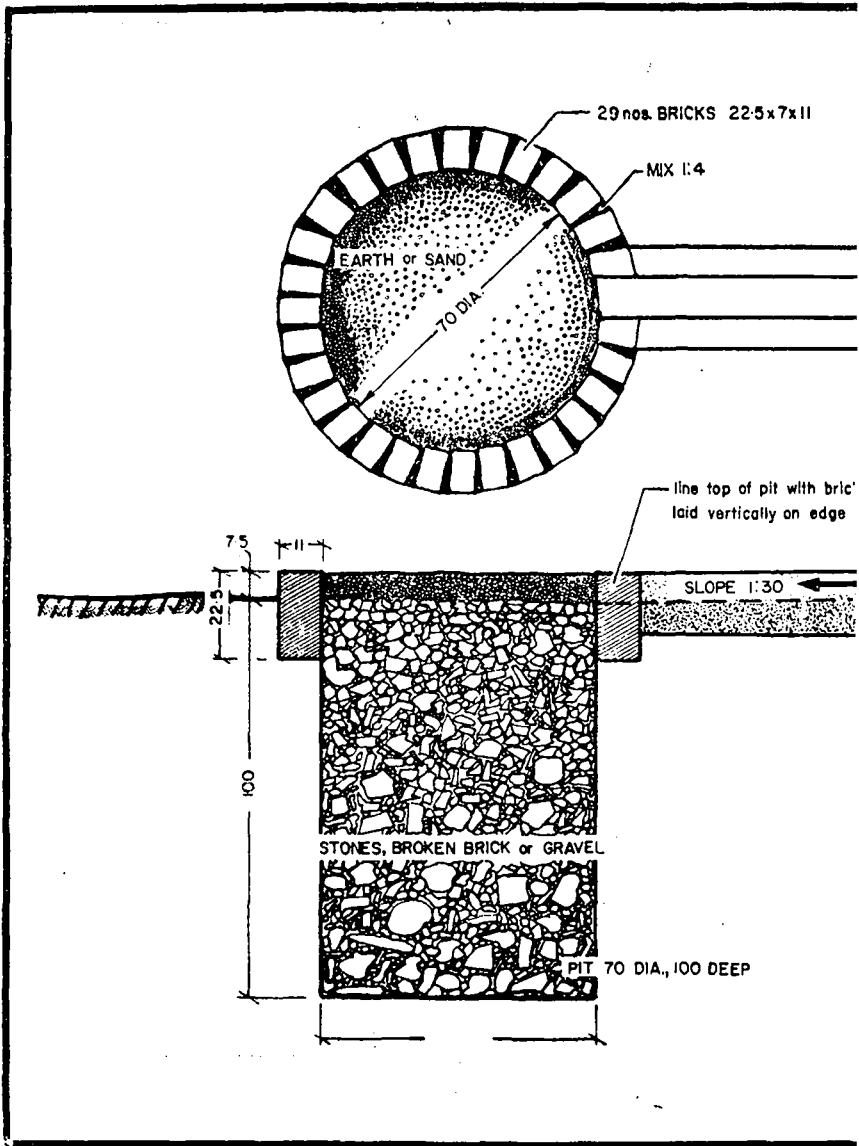
<b>Do</b>	<b>Don’t</b>
<p><i>Do</i> use the pump gently.</p> <p><i>Do</i> pump the handle with long, slow strokes,</p>	<p><i>Don’t</i> use the handpump roughly.</p> <p><i>Don’t</i> pump the handle with short, quick strokes.</p>

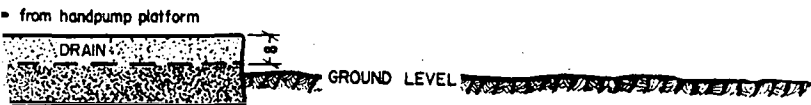
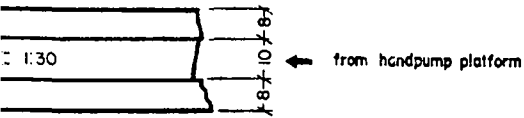
**Here are some “dos” and “don’ts” for maintaining handpumps:**

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









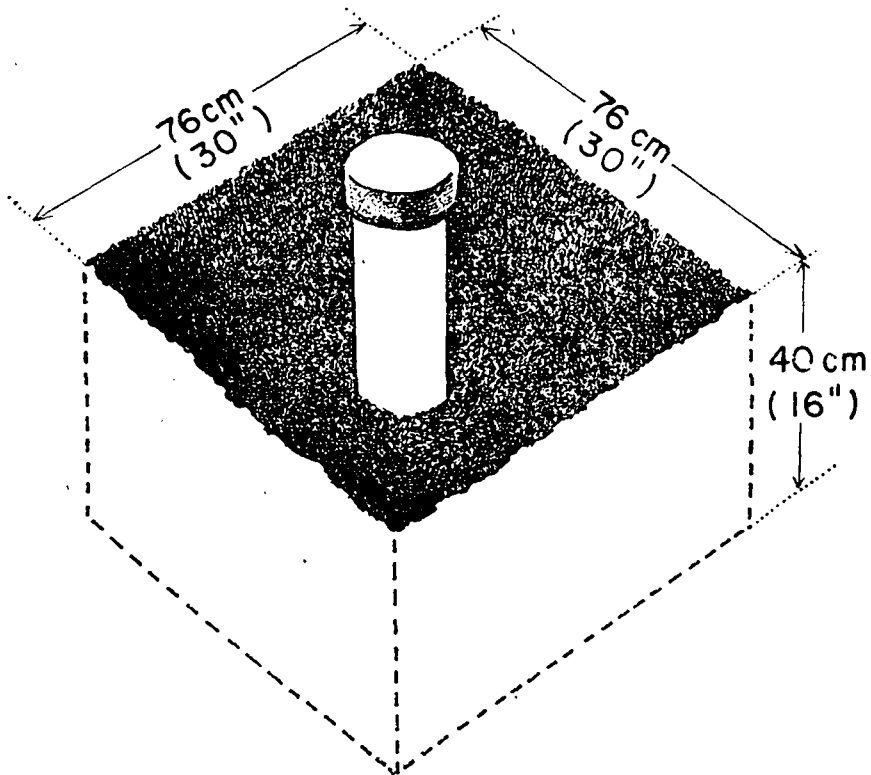
## SOAKAGE PIT for HANDPUMPS

ALL UNITS IN CENTIMETRES

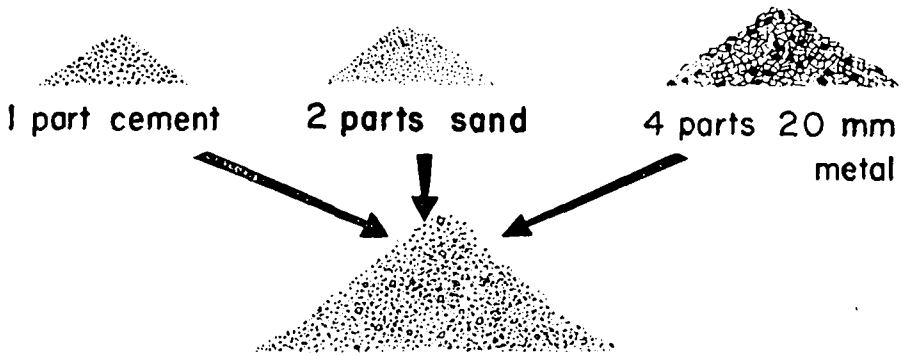
1

① Cover casing pipe

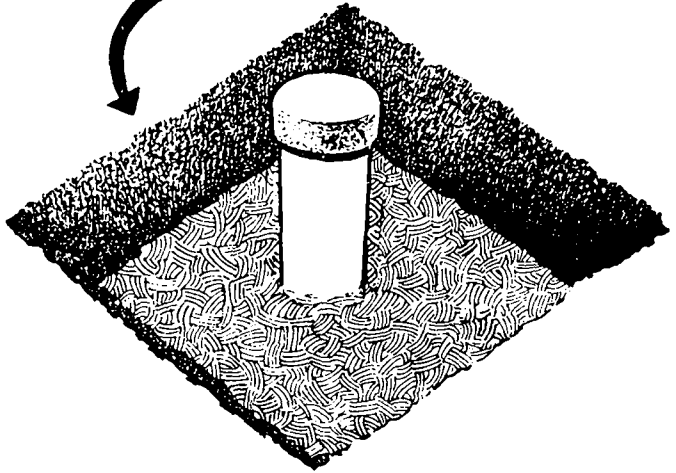
② Dig a square pit around casing pipe  
40cm (16") deep



## Prepare cement concrete mix



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



3

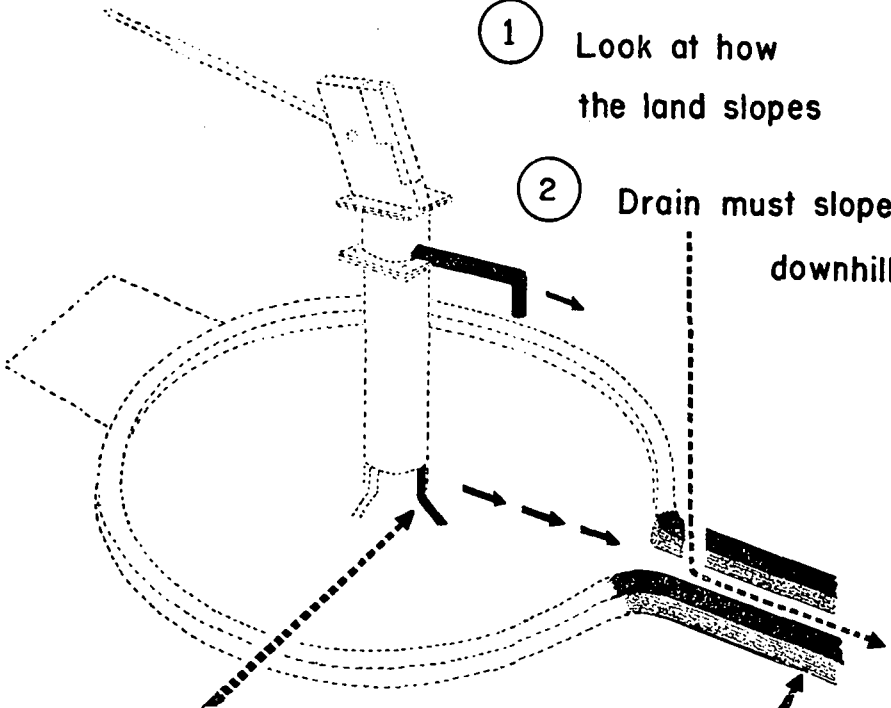
Decide now where you will make the drain

1

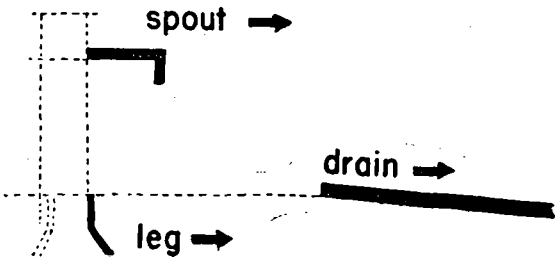
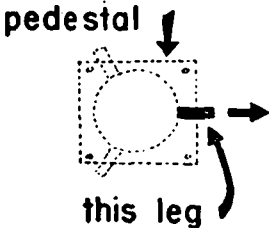
Look at how the land slopes

2

Drain must slope downhill



This leg and the pump spout must face drain





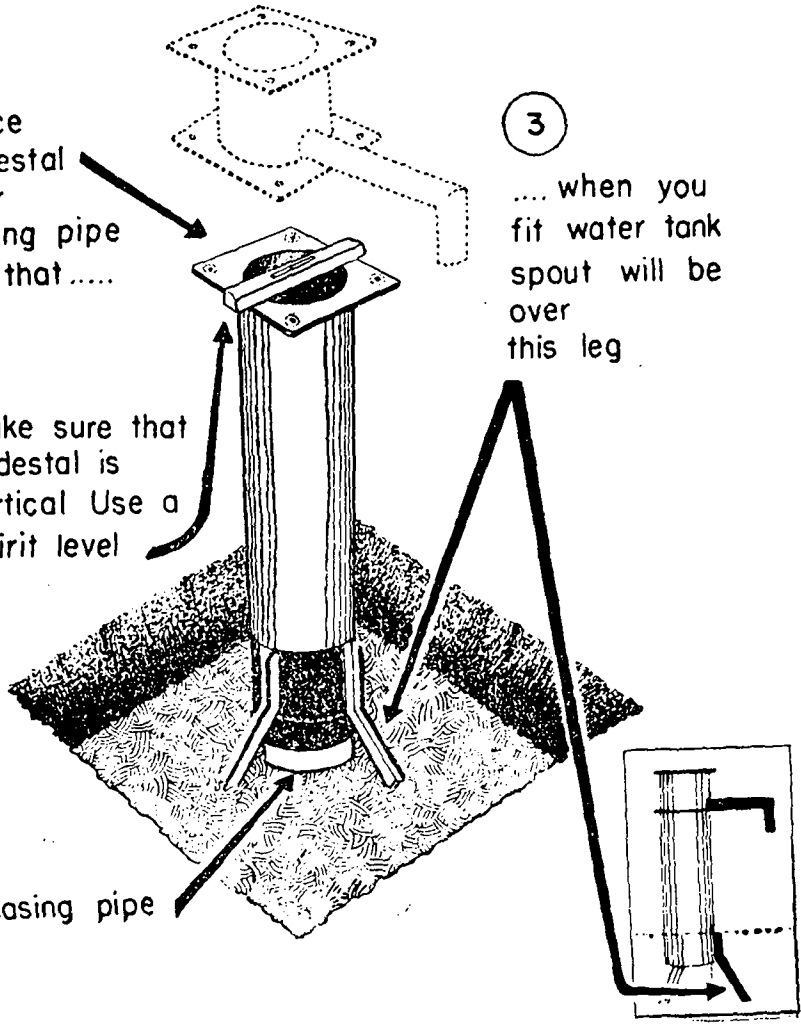
1 Remove cover of casing pipe

2 Place pedestal over casing pipe so that.....

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

4 Make sure that pedestal is vertical Use a spirit level

casing pipe



5

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

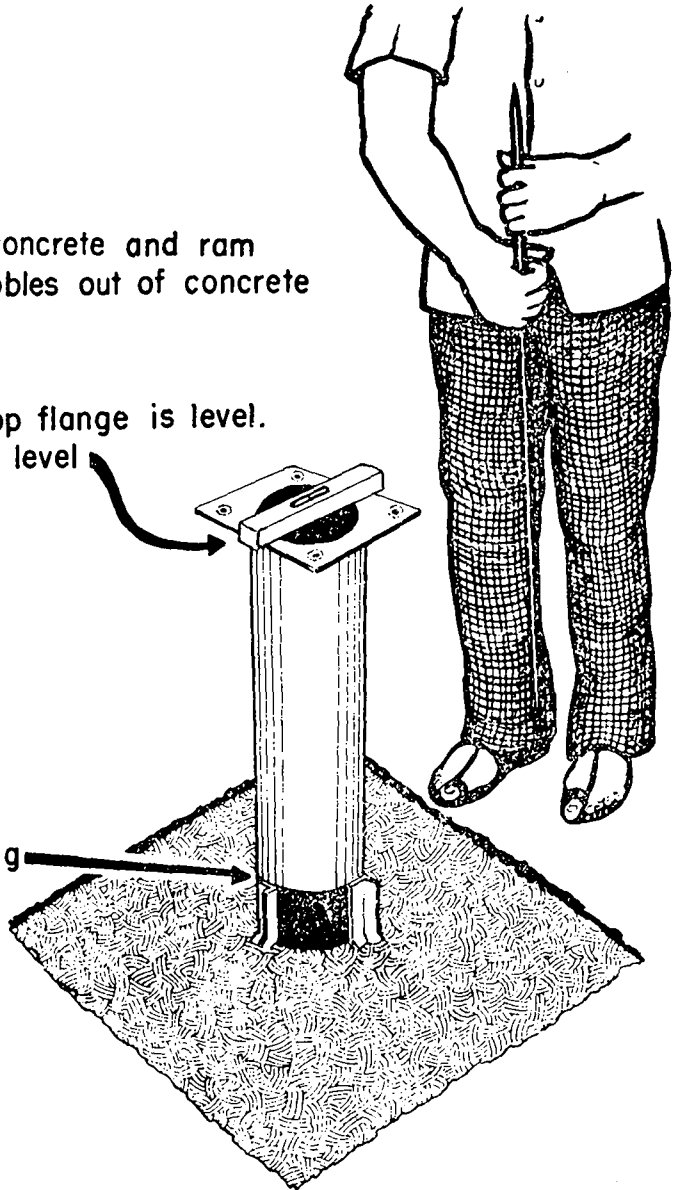
1

Check that top flange is level.  
Use the spirit level

2

3

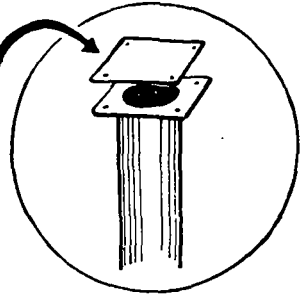
Construct platform to top of leg while concrete is still wet



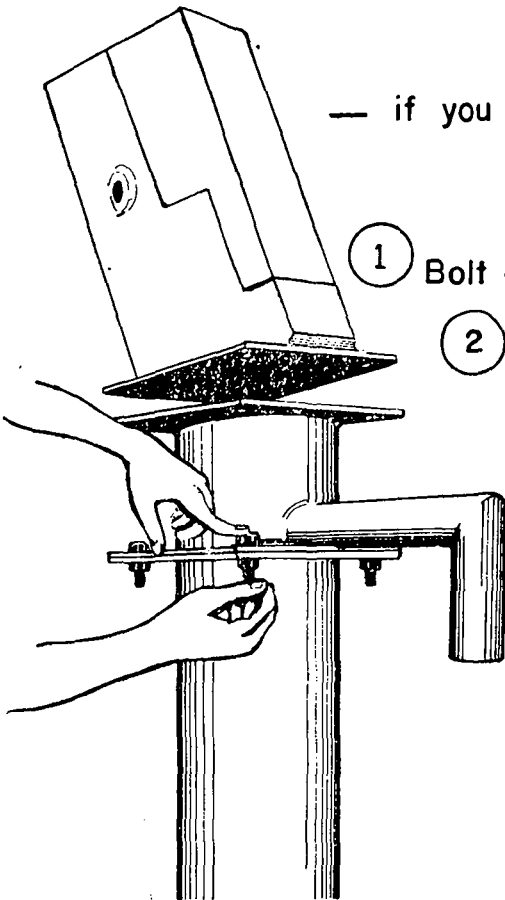
6

Cover pedestal 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 .....

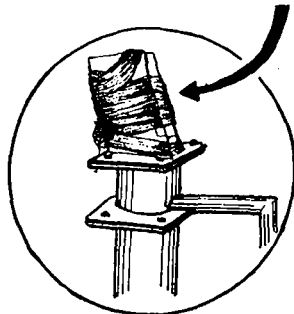


1 Bolt on water tank

2 Remove handle  
from head

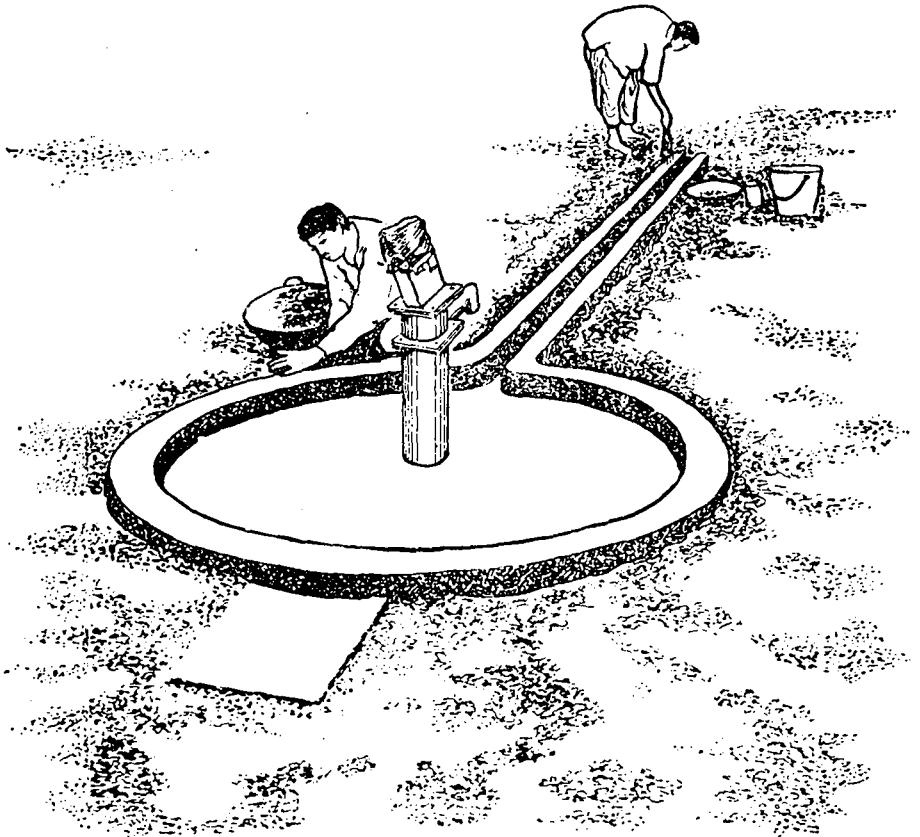
3 Bolt on head

4 Wrap cloth  
around head

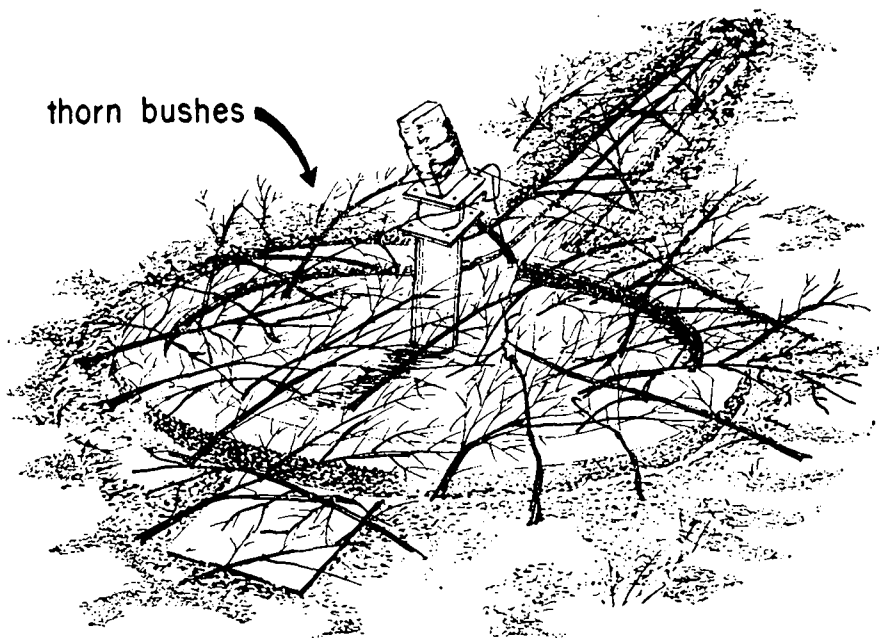


7

Construct platform and drain.  
Use plan on pages 8 and 9



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



ALLOW CONCRETE TO SET FOR 7 DAYS

9

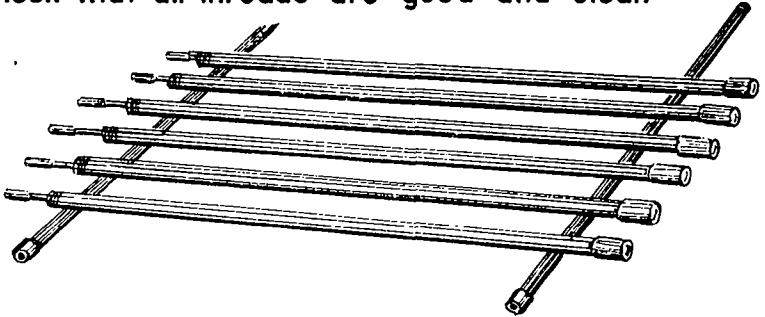
SEVEN DAYS LATER

Lay out pipes and connecting rods.

1

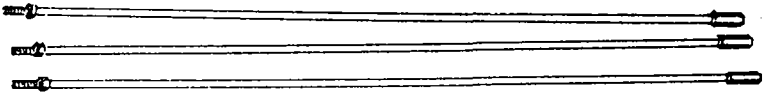
Check that pipes and rods are threaded 40 mm

Check that all threads are good and clean



2

Check rods are fitted with check nuts  
and couplings



3

If rods have couplings welded at one end,  
fit check nuts at the other end

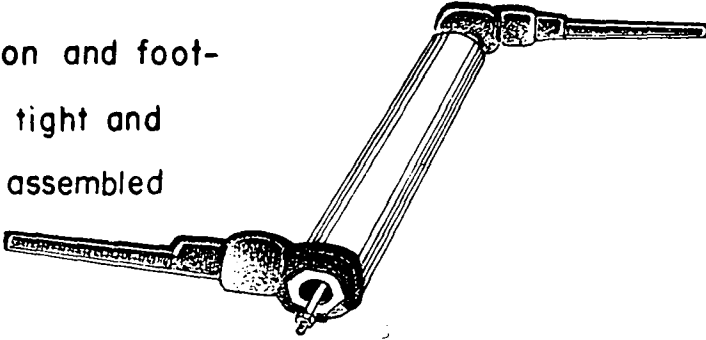
4

Make sure you have spare check nuts



1

Open cylinder and check that piston and foot-valve are tight and properly assembled



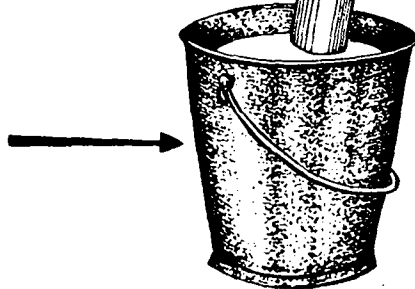
2

Re-assemble cylinder



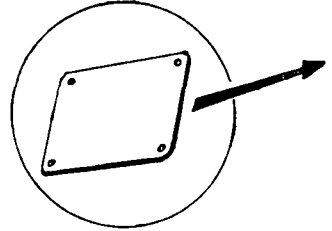
3

Test cylinder in a bucket of water.  
If foot-valve leaks  
replace it

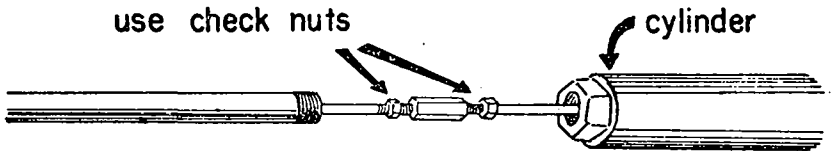


II

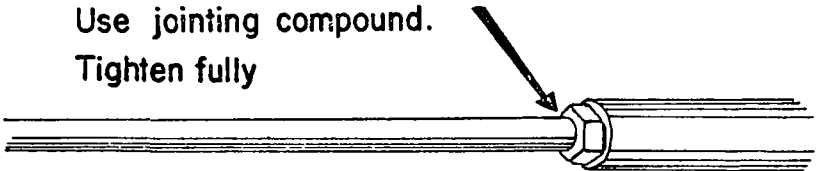
- 1 Remove cover of pedestal



- 2 Join first connecting rod to cylinder rod



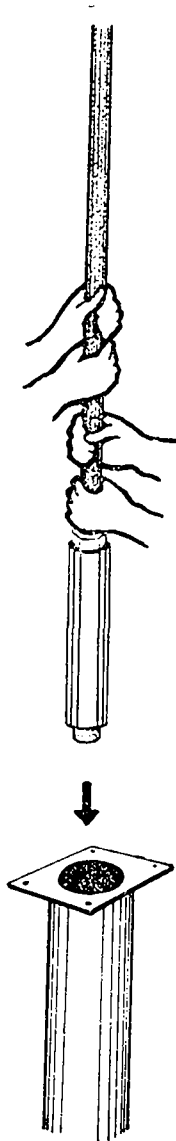
- 3 Screw first pipe into cylinder.  
Use jointing compound.  
Tighten fully



- 4 Wipe off excess jointing compound



Lower  
cylinder,  
first pipe  
and  
connecting rod  
into  
tubewell  
and  
clamp  
the pipe



13

1

Join connecting rods together.

Use check nut at every joint.

Tighten fully against couplings

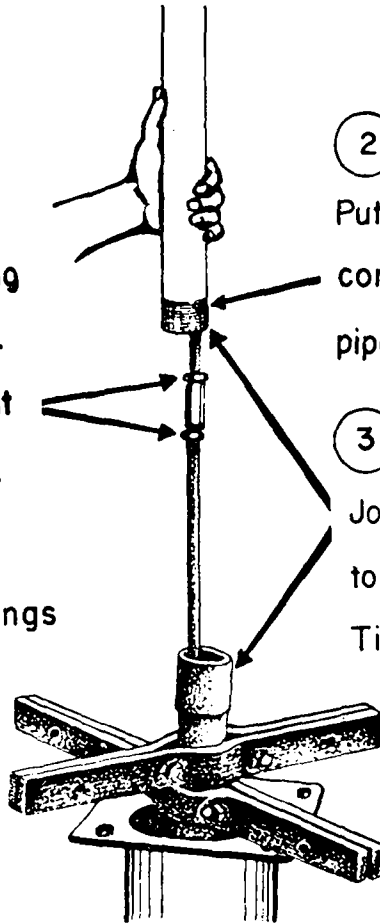
2

Put jointing compound on pipe threads

3

Join pipes together.

Tighten fully



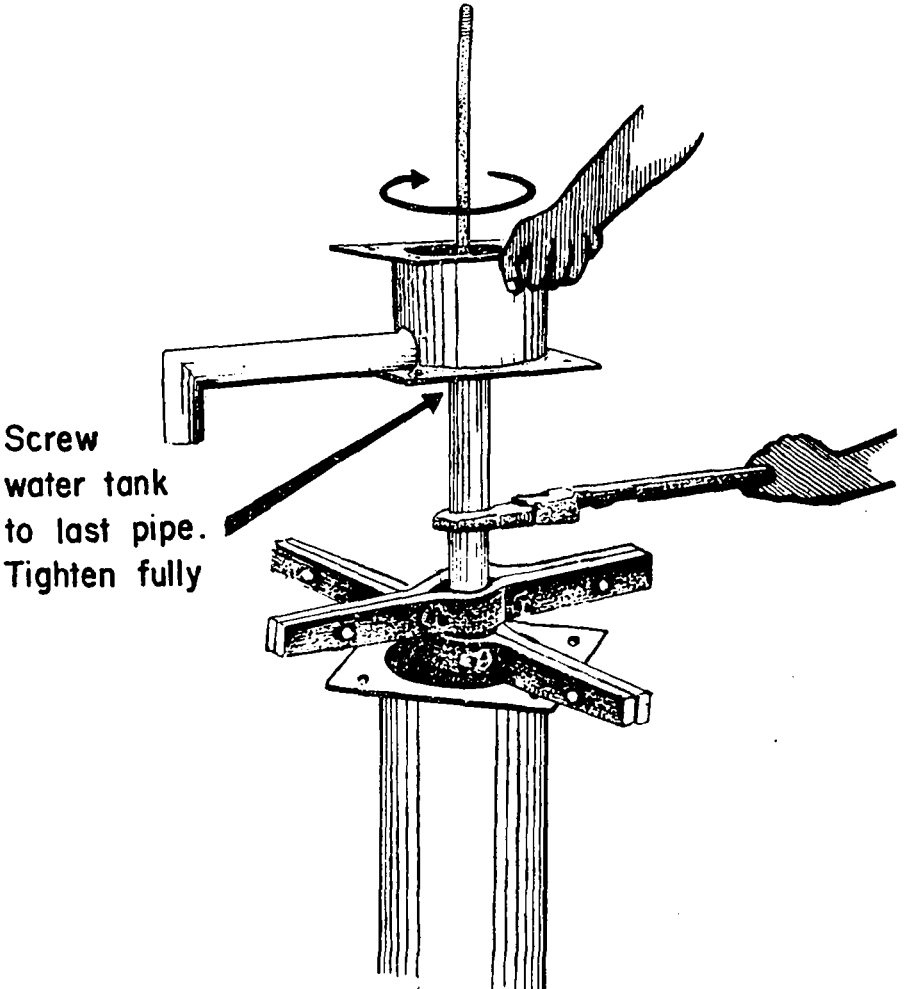
4

Wipe off excess jointing compound or it will spoil the water in the tubewell

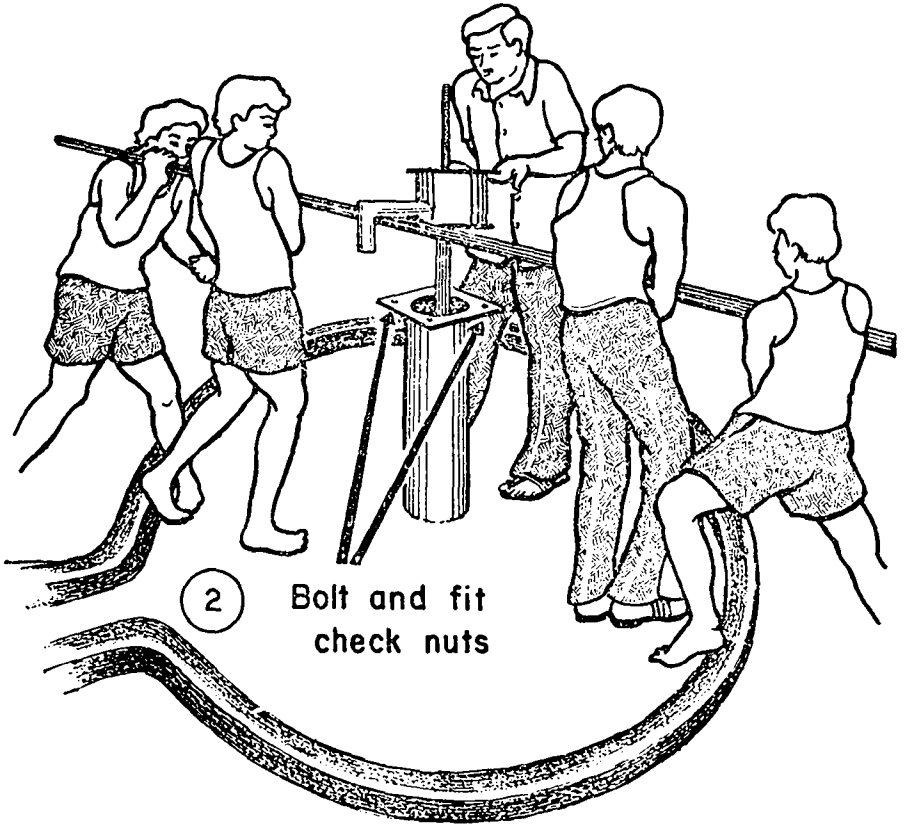
5

Lower cylinder, pipe and connecting rod into tubewell and clamp. Continue to last pipe

Cylinder should be installed at a  
minimum depth of 24 metres (80')  
for maximum efficiency



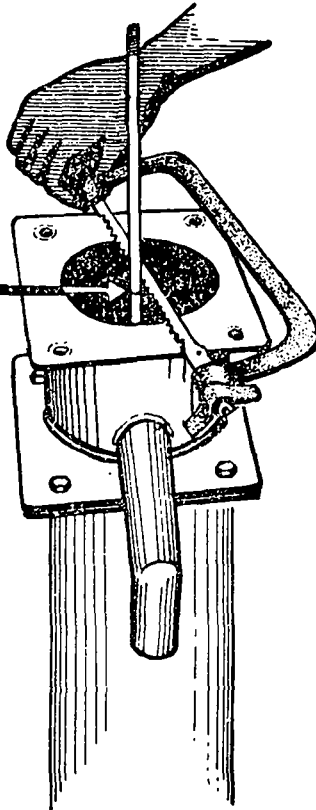
- 1 Carefully lower water tank onto pedestal.  
Spout must face drain



1

Push rod down  
as far as  
possible

16



2

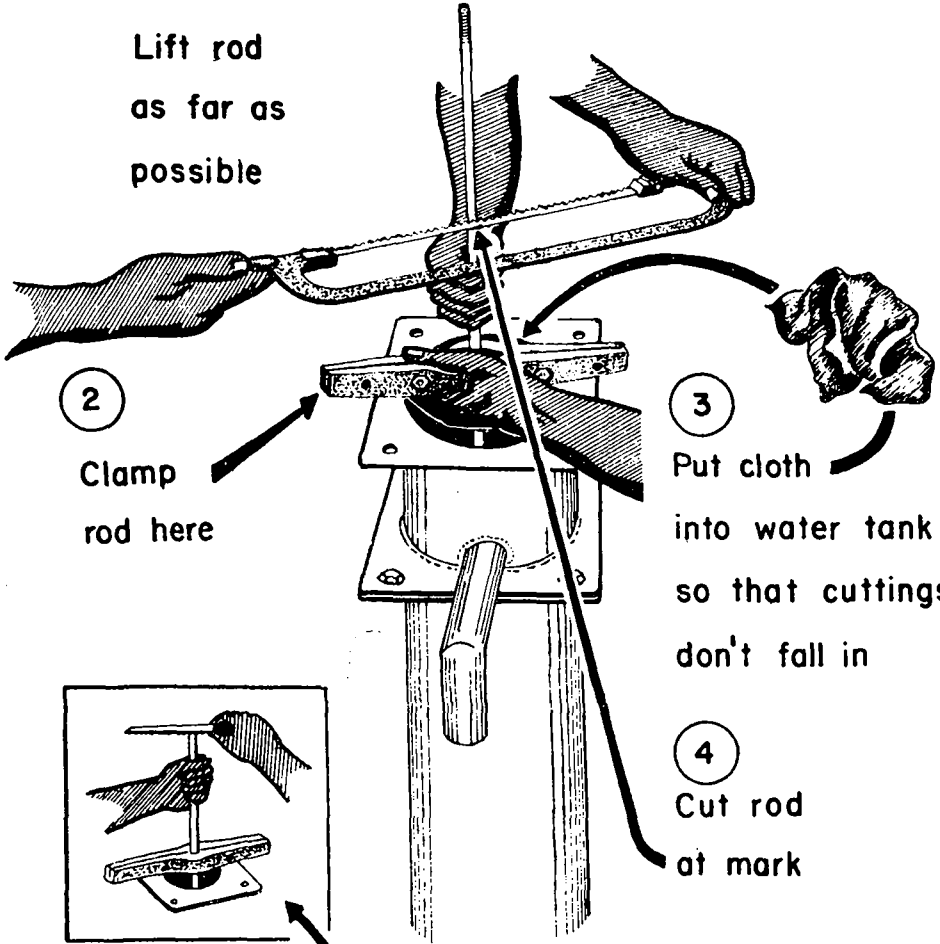
Mark rod here  
- level with top  
of water tank



17

1

Lift rod  
as far as  
possible



2

Clamp  
rod here

3

Put cloth  
into water tank  
so that cuttings  
don't fall in

4

Cut rod  
at mark

5

File top of rod smooth

Leave cloth in water tank

18

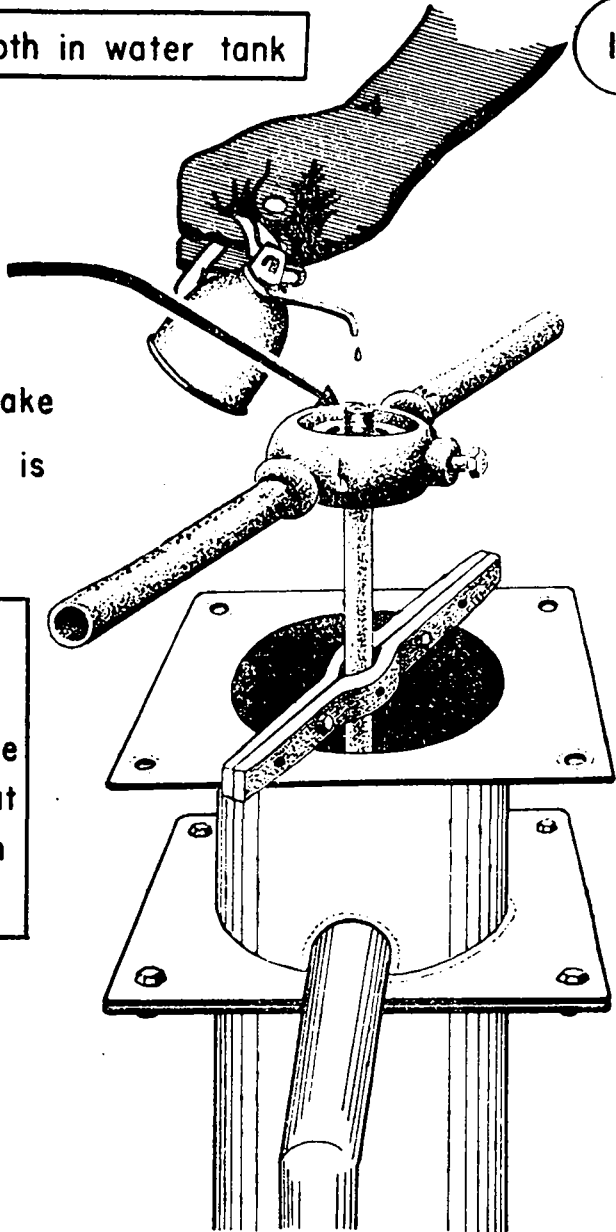
1

Thread  
connecting rod  
for at least  
50 mm (2"). Make  
sure the thread is  
clean and true

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

2

Now  
remove cloth



19

1

Remove inspection cover of head

2

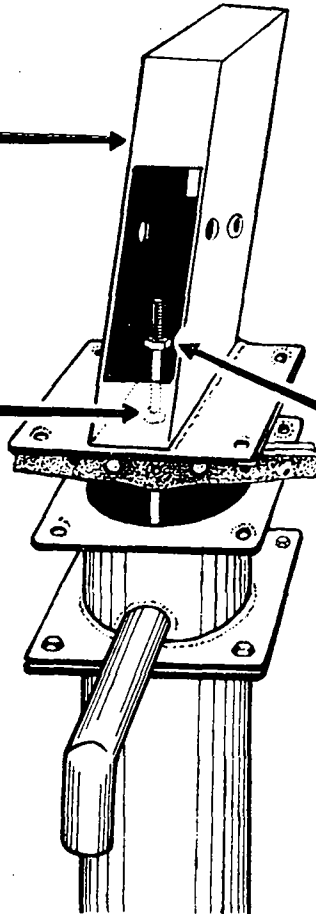
Lower head  
onto water tank

3

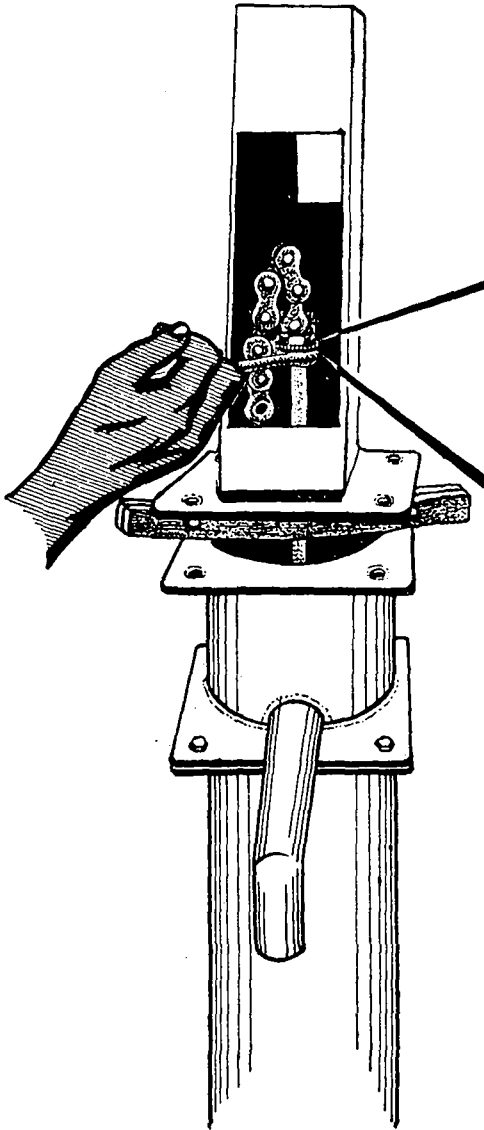
Rod goes through  
guide bush

4

Fit  
check nut  
here







①

Screw chain onto rod.  
Tighten rod fully into  
chain coupling

②

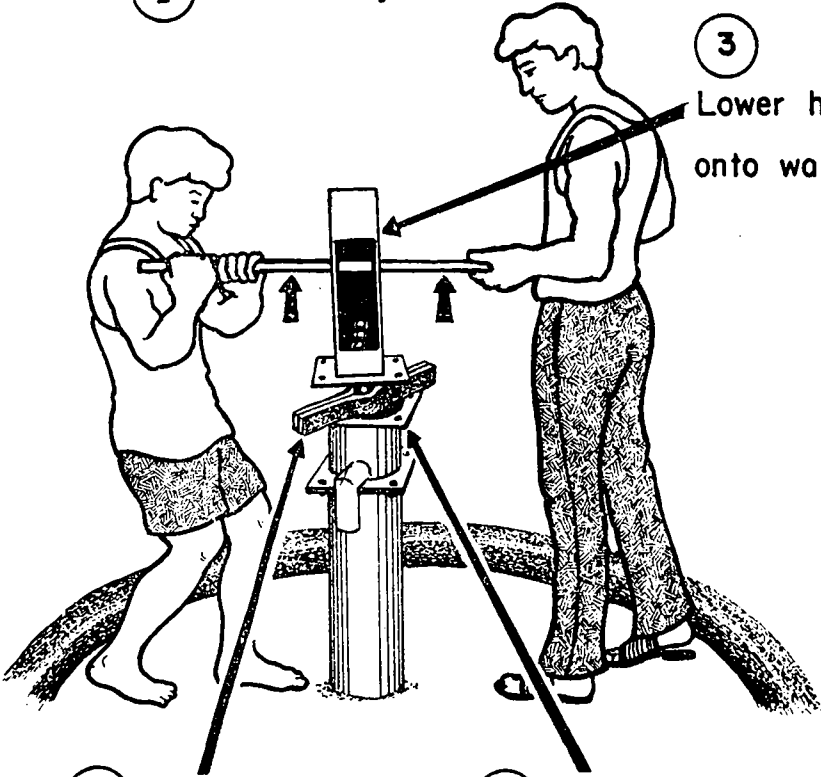
Use two spanners –  
tighten check nut  
fully against chain  
coupling

21

1 Lift evenly

3

Lower head  
onto water tank

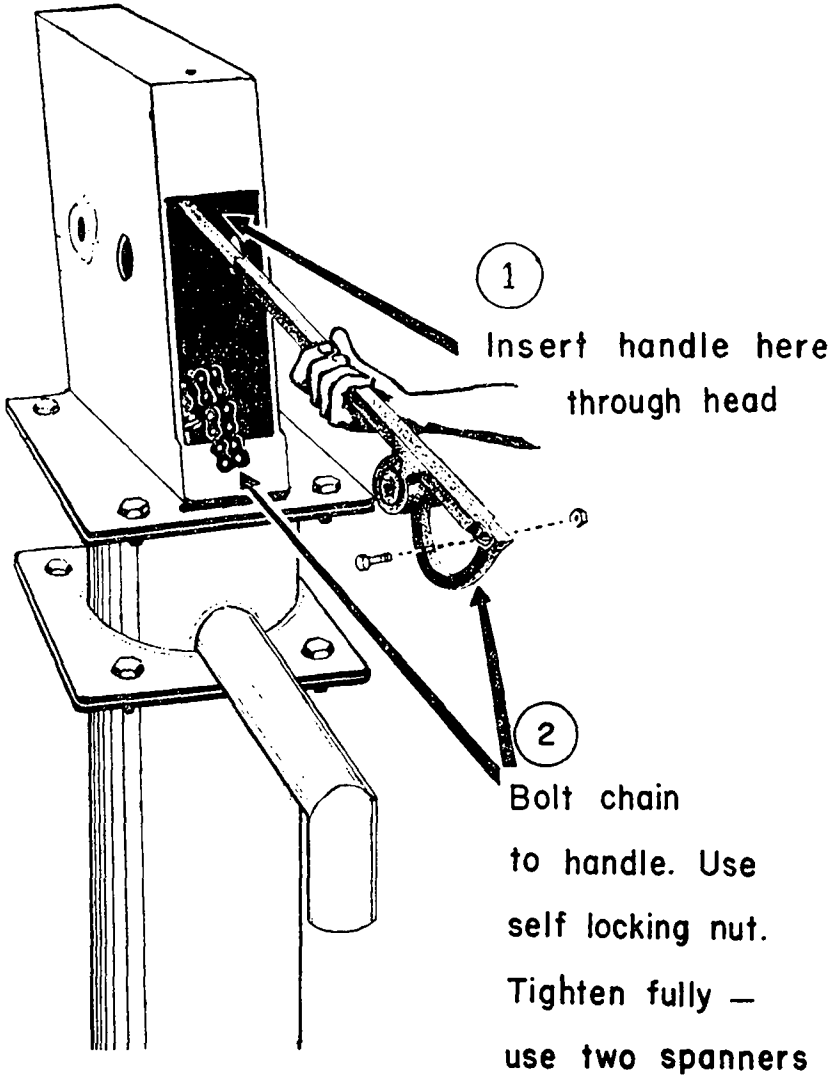


2

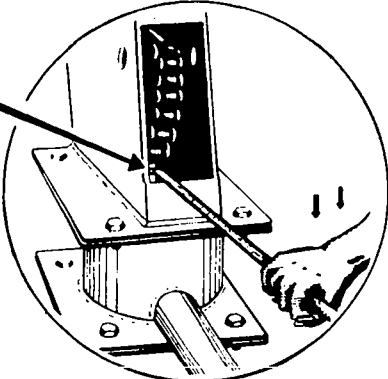
Remove  
rod clamp

4

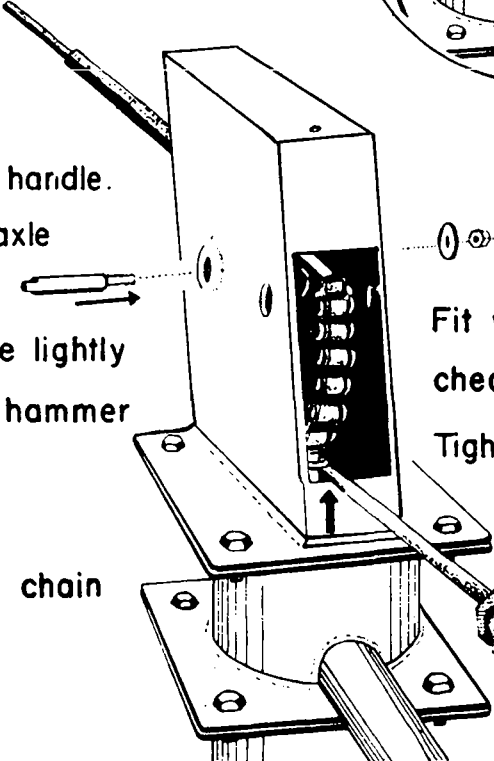
Bolt here.  
Fit check nuts.  
Tighten fully



1 Lift chain coupling  
with a crowbar so  
that you can move  
the handle easily



2 Adjust handle.  
Insert axle  
Tap axle lightly  
do not hammer



3 Fit washer, nut and  
check nut to axle.  
Tighten fully

4 Grease chain



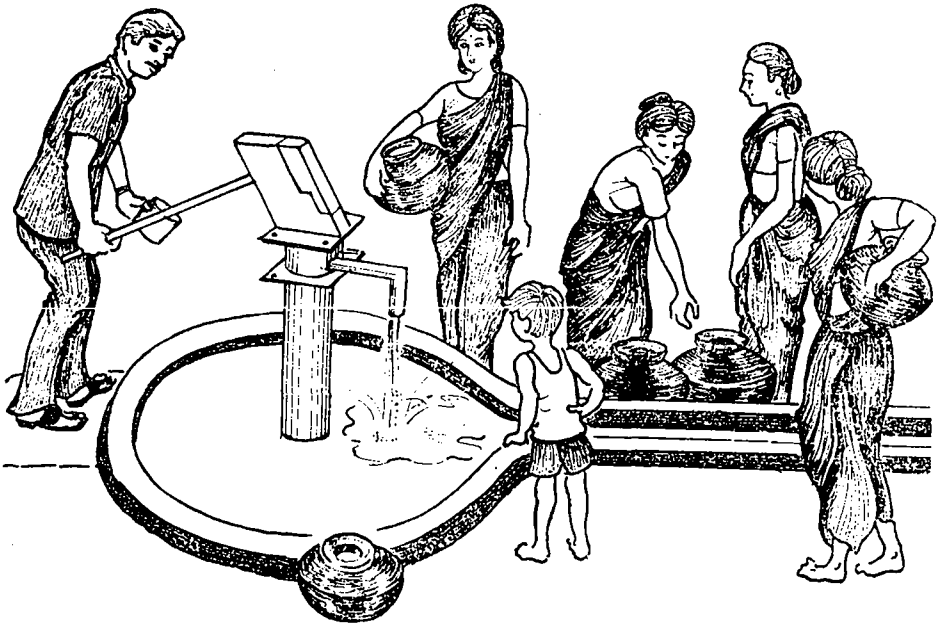
**Now make sure that . . . .**

- When you pump, the handle touches the top and bottom stops. *If it does not*, then remove head and check the setting of the top connecting rod. Refer to Step 16.
- Connecting rod moves up and down freely in guide bush. *If it does not*, then the rod has been bent while threading.
- You have threaded chain coupling fully on to connecting rod, and you have tightened the lock nut fully.
- You have tightened axle nut and lock nut fully and the axle is firmly retained.
- You have tightened chain anchor bolt and nut fully.
- You have greased the chain.
- All 8 flange bolts are tight, and you have tightened the lock nuts fully.
- You have left nothing inside the head.

**Now fit inspection cover.  
Tighten cover bolt fully:**

- Make sure that all tools and unused parts are clean and loaded on the vehicle.

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 handpump for their health?
- purged the tubewell?
- checked the quality and taste of the water?
- explained to the villagers that the water from the handpump 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 handpump, 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 handpump platform gets damaged or destroyed. You will then need to disinfect the tubewells by chlorination.

## **How to chlorinate a tubewell:**

- Remove the four bolts from the lower part of the handpump's water tank. Lift water tank and clamp in the raised position.
- Pour chlorine solution into open end of pedestal. Local health authorities can tell you how much chlorine to use.
- 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.



# LIST OF TOOLS AND MATERIALS.

## Standard Tools

- 2 nos. Pipe Wrench (Stillson) 24", for fitting pipes and cylinder end caps
- 2 nos. Open end Spanner  $\frac{1}{2}$ " BSW, for connecting rod couplings, flange bolts, axle nuts and inspection cover bolt
- 2 nos. Open end Spanner 7/16" BSW. for chain anchor bolt
- 2 nos. Ring Spanner  $\frac{1}{2}$ " BSW, for flange bolts only
- 1 no. Adjustable Spanner 12", for axle
- 1 no. Hack Saw with spare blades 10"—12"
- 1 no. File 10"—12"
- 1 no. Stock and Die, to cut 1 $\frac{1}{4}$ " BSP or 1 $\frac{1}{2}$ " BSP threads
- 1 no. Stock and Die, to cut  $\frac{1}{2}$ " BSW threads. Keep a spare Die at hand
- 1 no. Small Screw Driver, for adjusting die sets
- 1 no. Large Screw Driver
- 1 no. Engineers Hammer  $\frac{1}{2}$  kg.
- 1 no. Tommy Bar 16"—20"
- 1 no. Spirit Level, to set pedestal in vertical position
- 1 no. Wire Brush, for cleaning threads on pipes and rods
- 1 no. Pipe Vice to suit 1 $\frac{1}{4}$ " BSP—1 $\frac{1}{2}$ " BSP pipe
- 1 no. Chisel (high carbon steel)
- 1 no. Tape Measure 6 ft. or 2 meters

### **Special Tools**

- 3 nos. Lifting Spanners to suit  $1\frac{1}{4}$ " BSP or  $1\frac{1}{2}$ " BSP, as required
- 1 no. Rod Clamp, for  $\frac{1}{2}$ " connecting rod
- 2 nos. Pipe Clamp, for  $1\frac{1}{4}$ " BSP or  $1\frac{1}{2}$ " BSP
- 1 no. Special Automatic Pipe Clamp, if available.  
Use instead of  $1\frac{1}{4}$ "— $1\frac{1}{2}$ " BSP pipe clamps

### **Materials**

- 1 tin Jointing compound, for pipe joints
- 1 tin Chassis grease, to lubricate chain
- 1 tin Oil or cutting fluid, for cutting threads
- Cotton waste or cleaning rag

### **Remember to arrange for:**

Cement, metal and sand for the platforms. Tools for the mason: shovel, trowel, bucket, etc.