

Republic of Zimbabwe  
Ministry of Health.

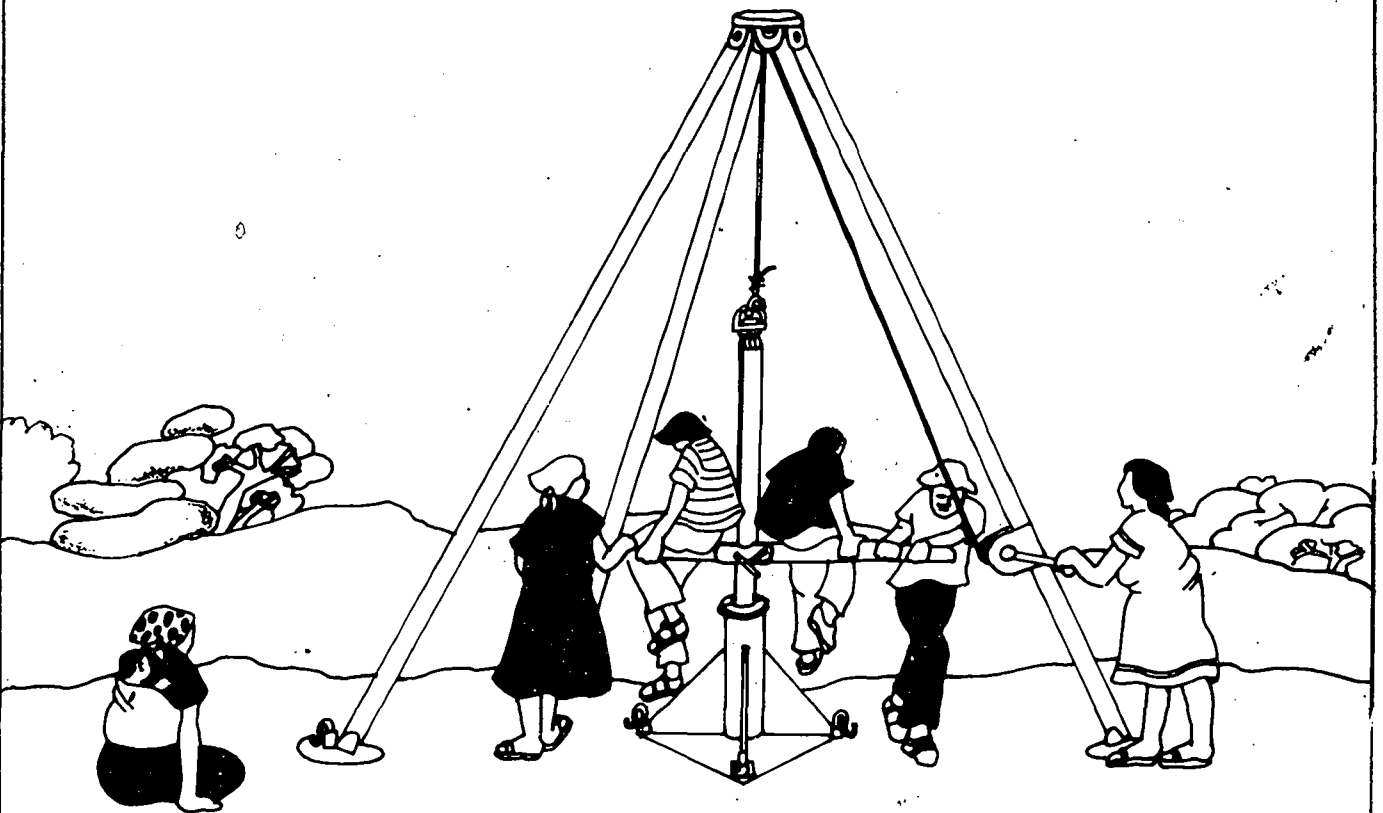
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# Water For All

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

## Step by Step Instructions for using a Hand Operated Drilling Rig

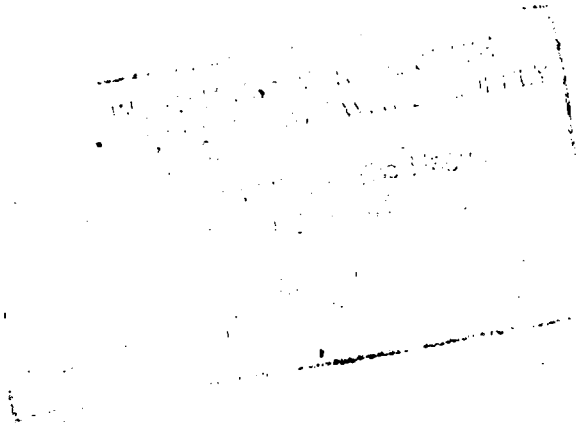
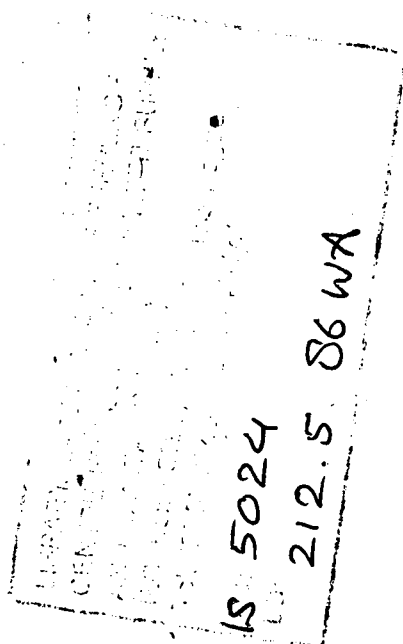


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# The Hand-Operated Drilling Rig

The Vonder Rig is a hand-operated drilling rig. It is made in Zimbabwe. In many communities throughout the country, groups are using this machine to drill for water.



The Vonder Rig is easy to operate and if it is maintained carefully it can be used again and again. It is used to drill a narrow (170mm) hole which is called a TUBEWELL. Providing there is no hard rock, the Rig can drill through layers of soil until underground water and soil rock is reached. The Vonder Rig is then moved to another site and with the assistance of health workers, the tubewell is lined with class 6 PVC casing (which is hardened plastic piping of a certain thickness and size). Depending on depth and quantity of water a simple handpump is fitted and a drainage area built. In a short time the people have clean water!



In the next few pages, we describe how to position and use a Hand-Operated Drilling Rig. Follow the steps carefully and this will be an easy task. If possible, watch to see how others in the community operate the Vonder Rig!

# Advantages of a hand-operated drilling rig

It can be operated by groups in the community with the assistance of a trained operator.

It can easily be moved from place to place in the community

It can be used to drill for water at all times of the year.

It can be assembled quickly.

It requires less effort than digging a well.

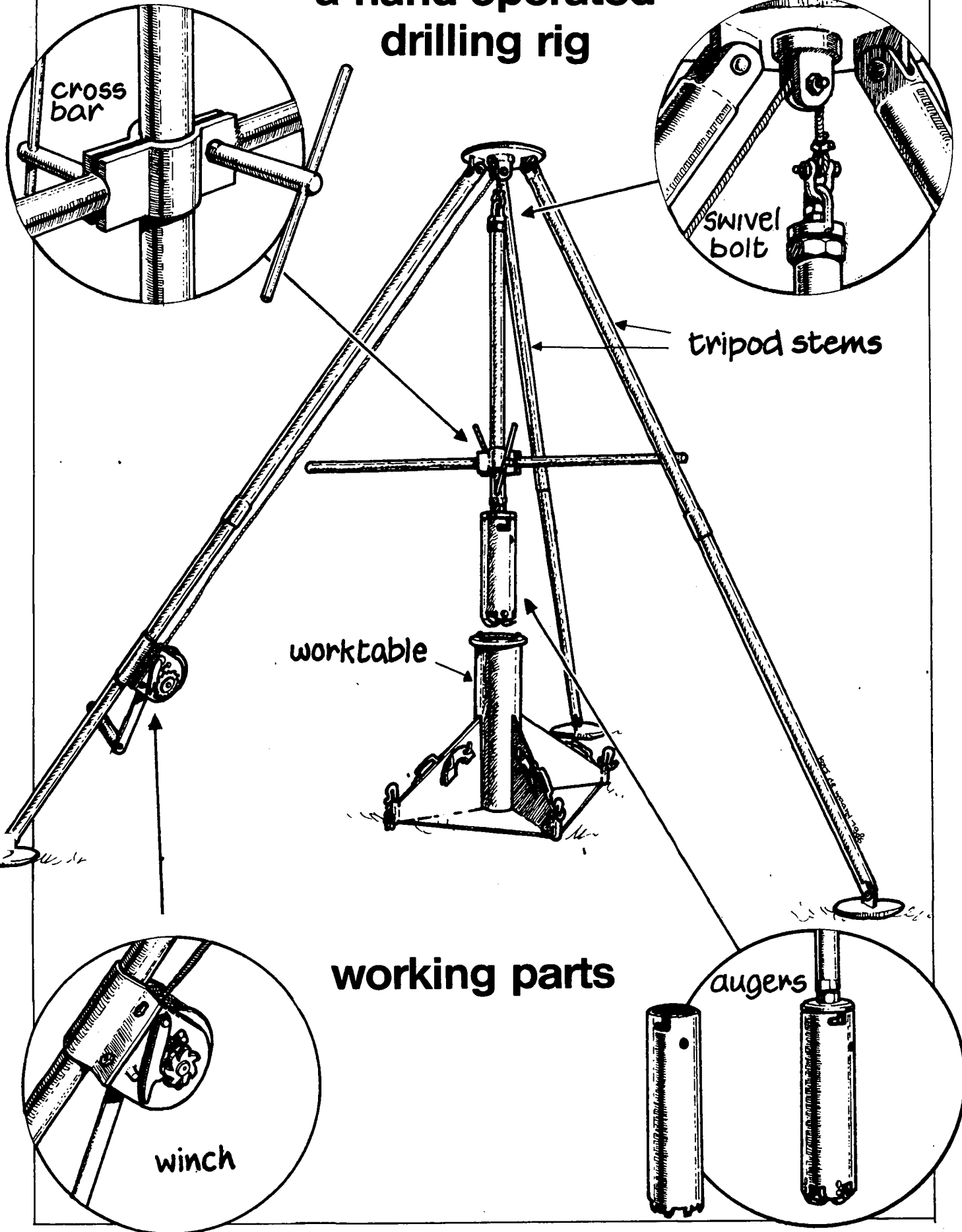
If water is not reached the first time, the drilling rig can be moved to another site which has been chosen by groups who will use the water supply.

There are disadvantages too!

The Hand-Operated Drilling Rig cannot be used to drill through hard rock! In places where there is deep underground rock, other methods are being used to reach water. For example, well diggers with blasting licences can be employed by the community to deepen existing wells or blast new wells. Borehole machines are also used for drilling through hard rock to underground water.

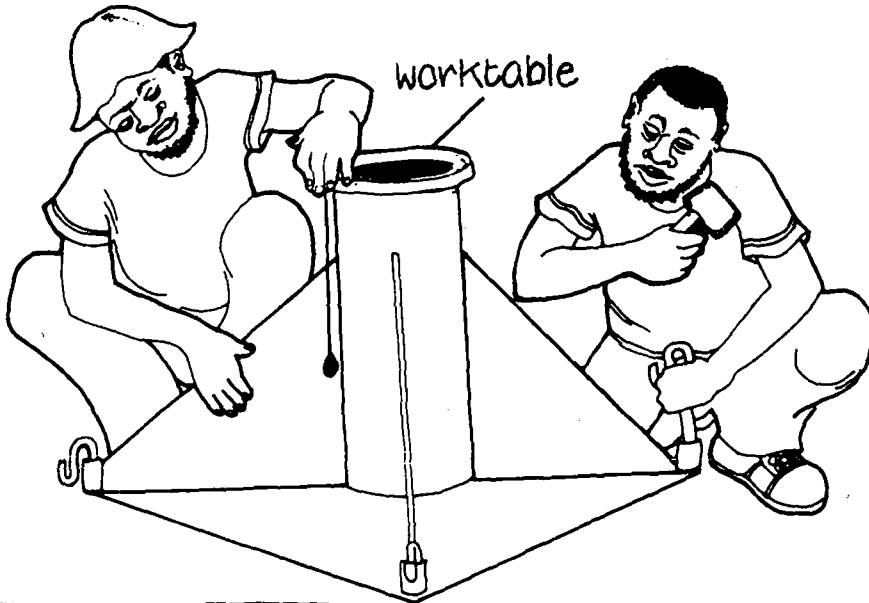
In places where the soils are sandy or wet, difficulty may be experienced with using the Hand-Operated Drilling Rig. The tubewell is also difficult to line under these conditions because the soil collapses easily.

# a hand-operated drilling rig



① The Hand-Operated Drilling Rig is set up at a site chosen by the community.

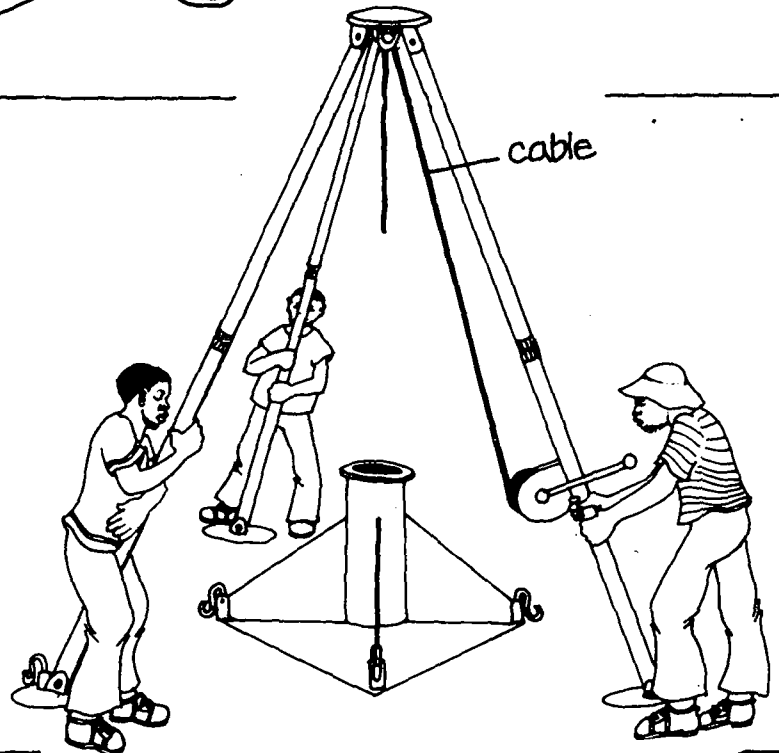
To do this



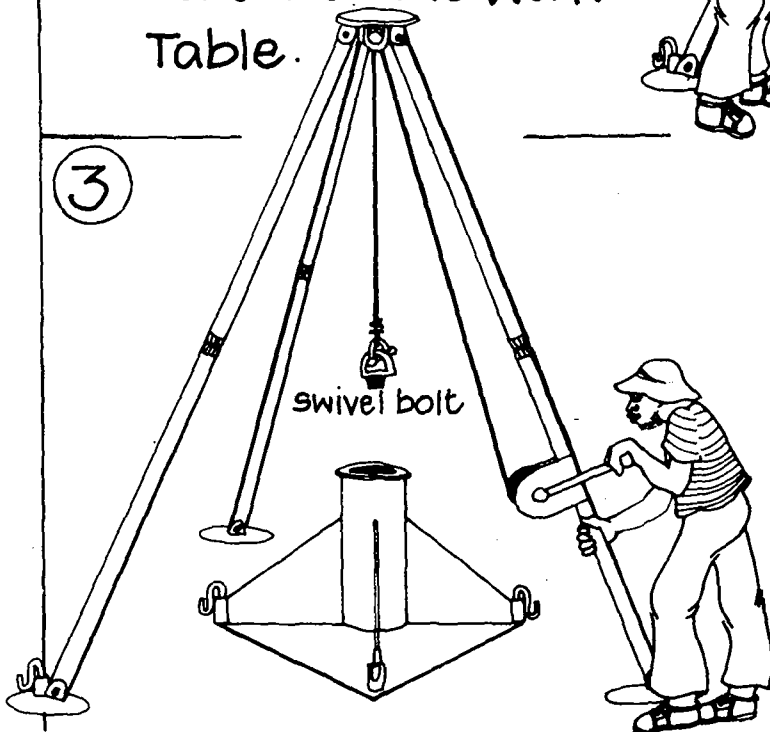
- Position the Work Table.
- Level the Work Table on the ground.
- Use the Plumb line to do this.

② Thread the cable through the cable pulley.

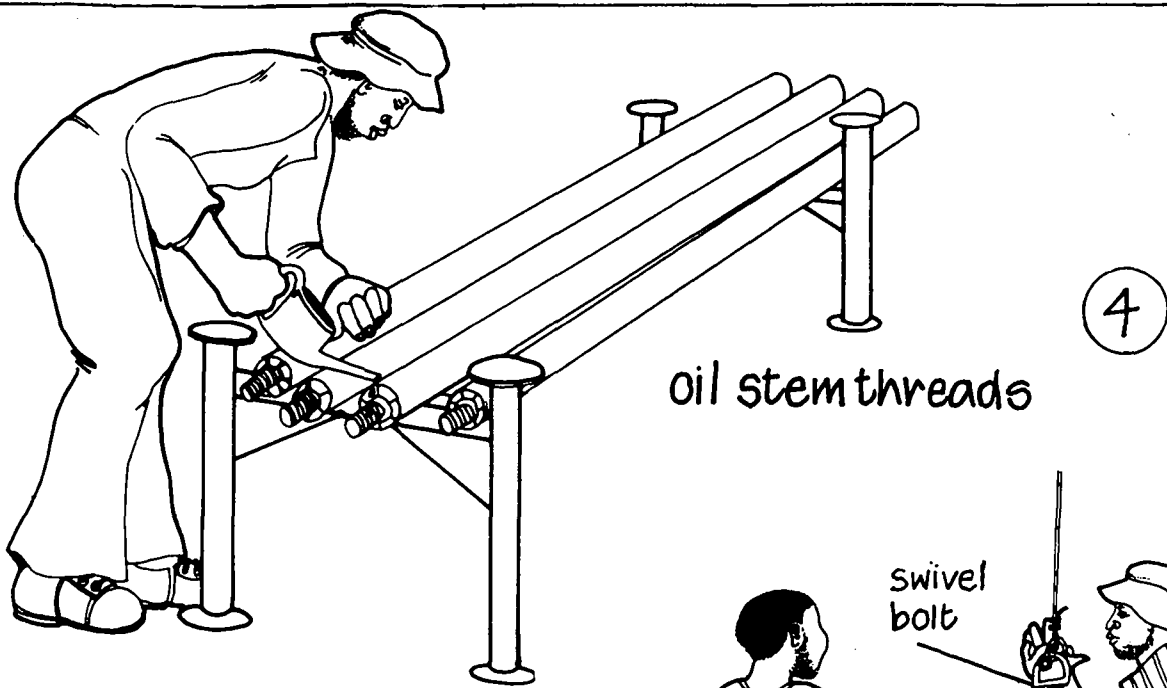
- screw the tripod legs together
- Position the tripod accurately over the centre of the Work Table.



③



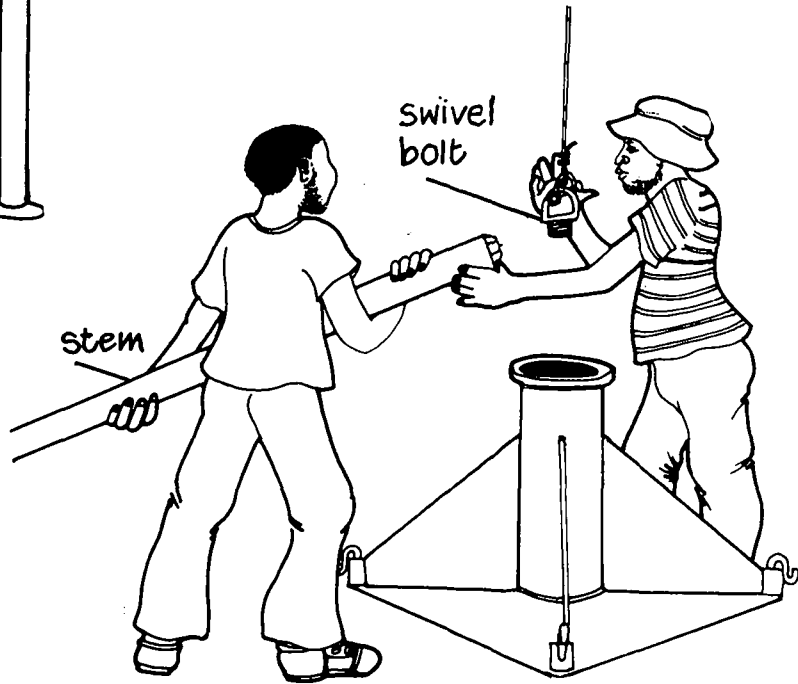
- Lower the cable with the winch.
- Attach swivel bolt to cable.
- Lower swivel bolt into worktable to test position.



oil stem threads

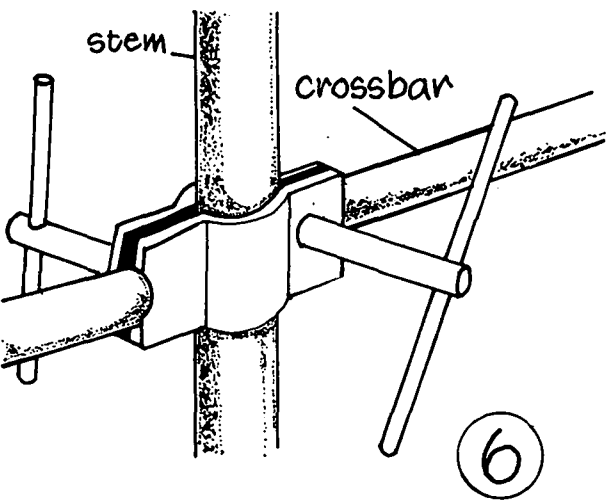
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Screw first stem to swivel bolt. Winch up.



swivel bolt

stem

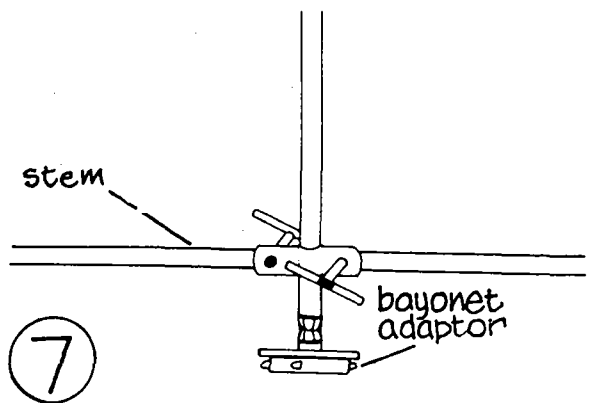


stem

crossbar

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Slide first stem through cross bar. Tighten crossbar bolt.

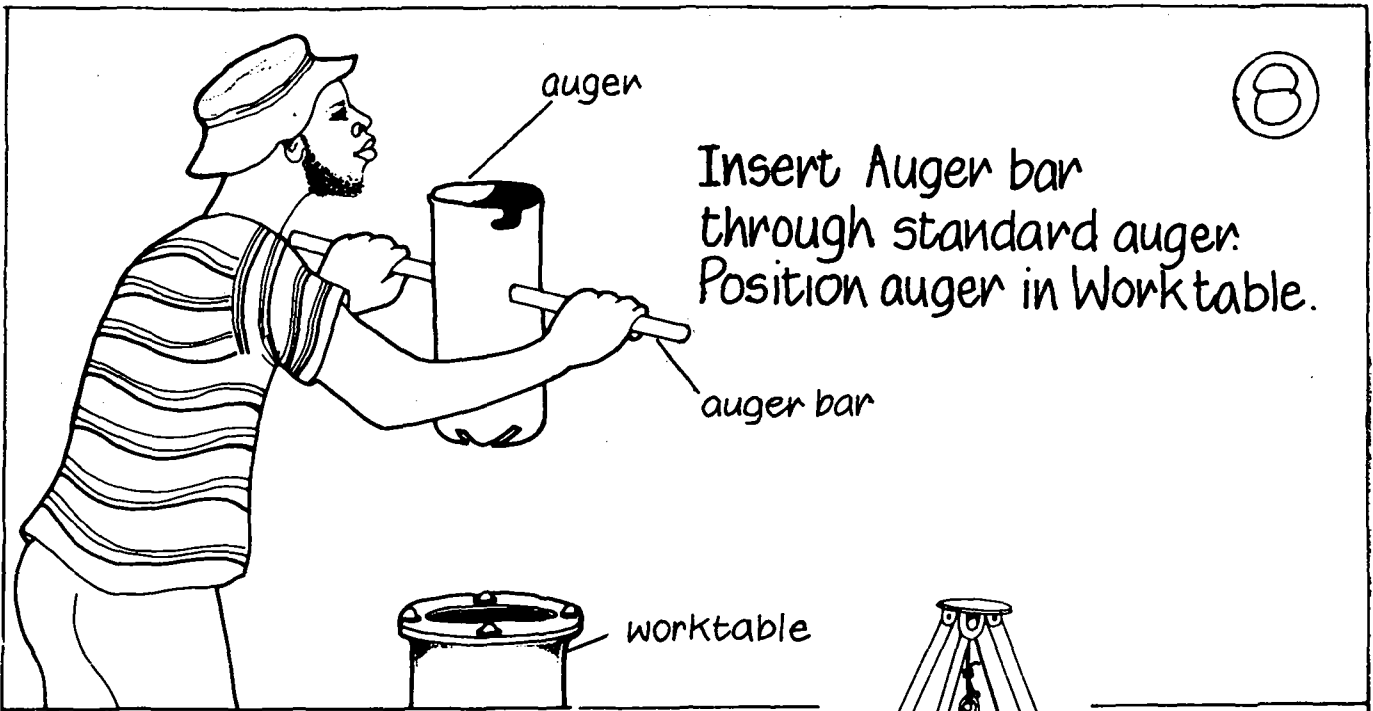


stem

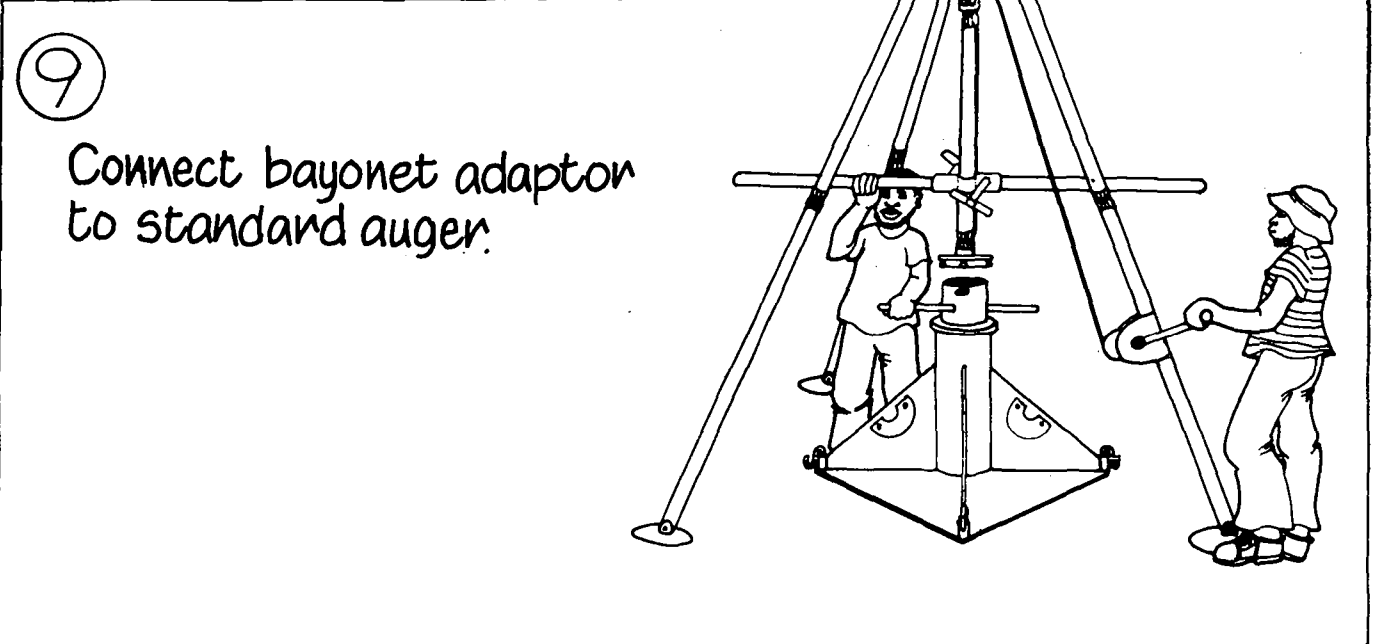
bayonet adaptor

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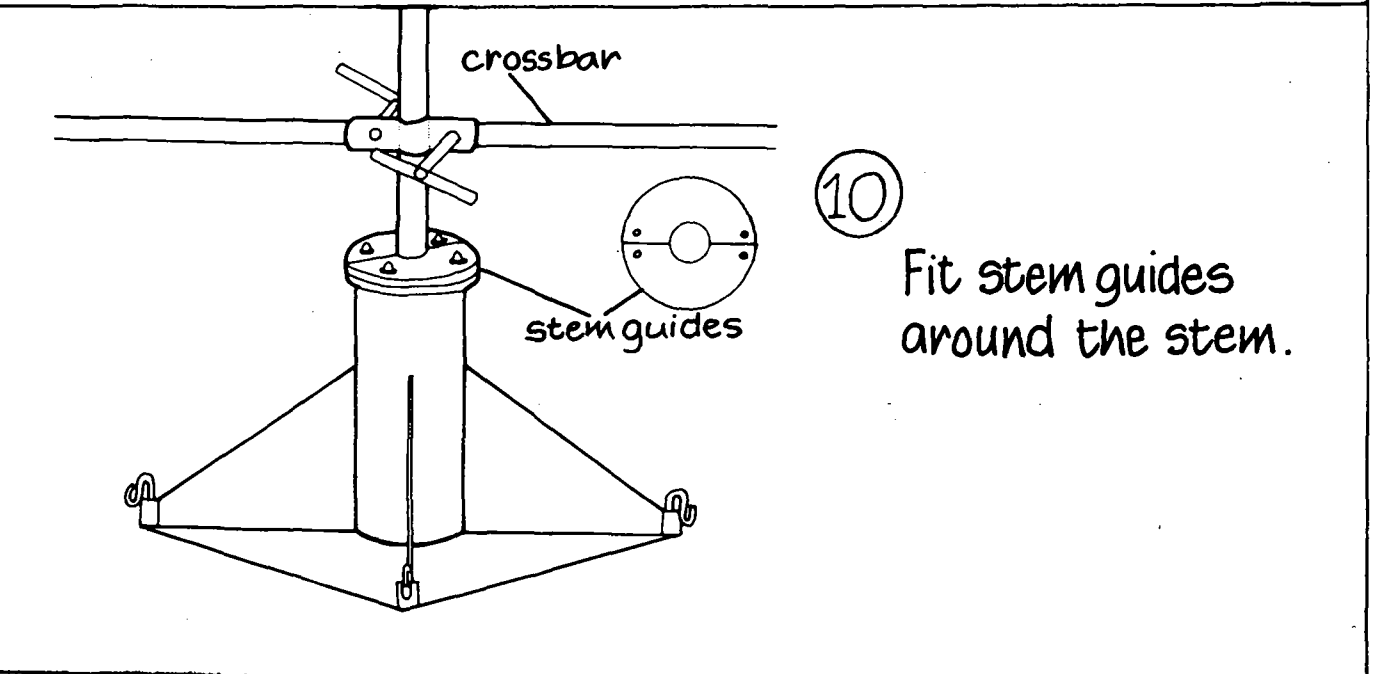
Fit bayonet adaptor to first stem.



Insert Auger bar through standard auger. Position auger in Work table.



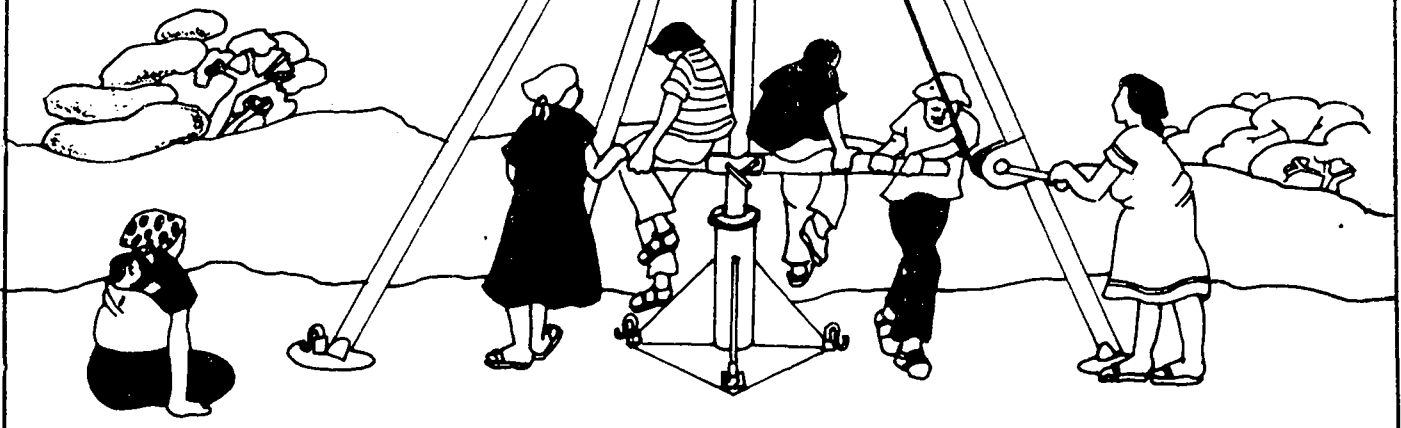
Connect bayonet adaptor to standard auger.



Fit stem guides around the stem.



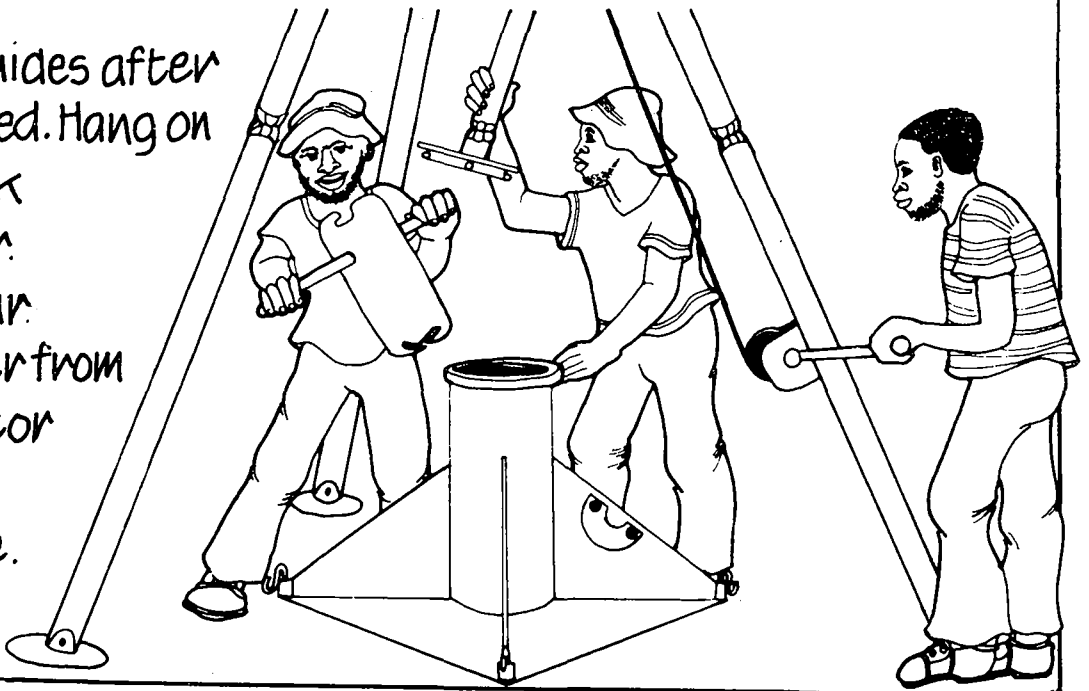
Lower crossbar to convenient position. Tighten crossbar bolts. Push crossbar in clockwise direction. Commence drilling operation



Seat helps on crossbar to add extra weight if necessary.

When auger stops going down, it is probably full. To remove auger:

Remove stem guides after last stem is raised. Hang on worktable hook. Winch up auger. Insert auger bar. Disconnect auger from bayonet adaptor. Remove auger from worktable.



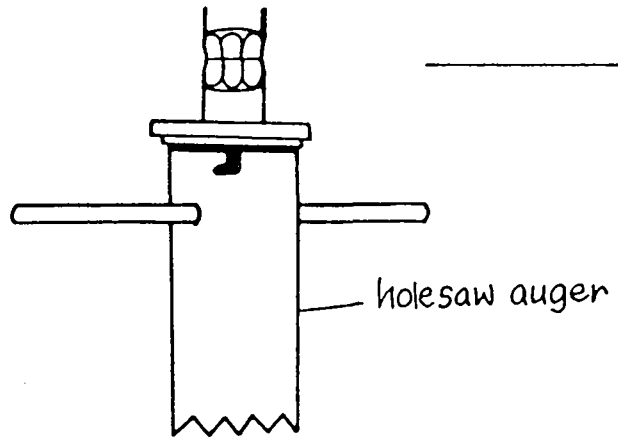


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Remove soil from auger

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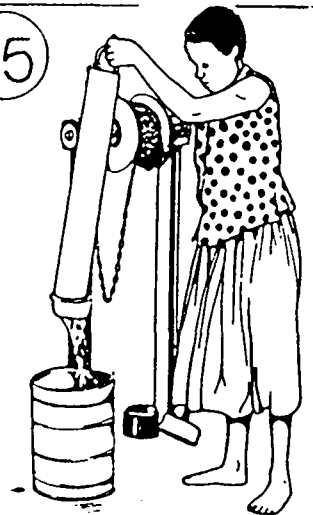
As hole deepens connect extra stems to first stem. Proceed with drilling as from step 7 until hard rock is reached.



Use Holesaw Auger for drilling in decomposed rock! Attach as for standard Auger. See step 7.

When hard rock and at least 3 m of water is reached in the tubewell, the rig can be removed to another drilling site. Then a decision is made about the kind of pump to be fitted. This depends on the depth of the Tubewell the quantity of water available how many people will use the supply.

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For up to 10 families, (50-100 people), use a LIGHT DUTY PUMP. i.e., a Blair Pump or a Bucket Pump for shallow wells.

For over 100 people, use a Bush Pump for all depths.

Then build a drainage area, and the people have clean water!