

ajay

AN ISO 9001 COMPANY

# TARA DIRECT ACTION HANDPUMP

**AJAY INDUSTRIAL CORPORATION**

4561, DEPUTY GANJ, SADAR BAZAR,  
DELHI-110006 (INDIA)

PH. : 0120-4770679, 011-3545291

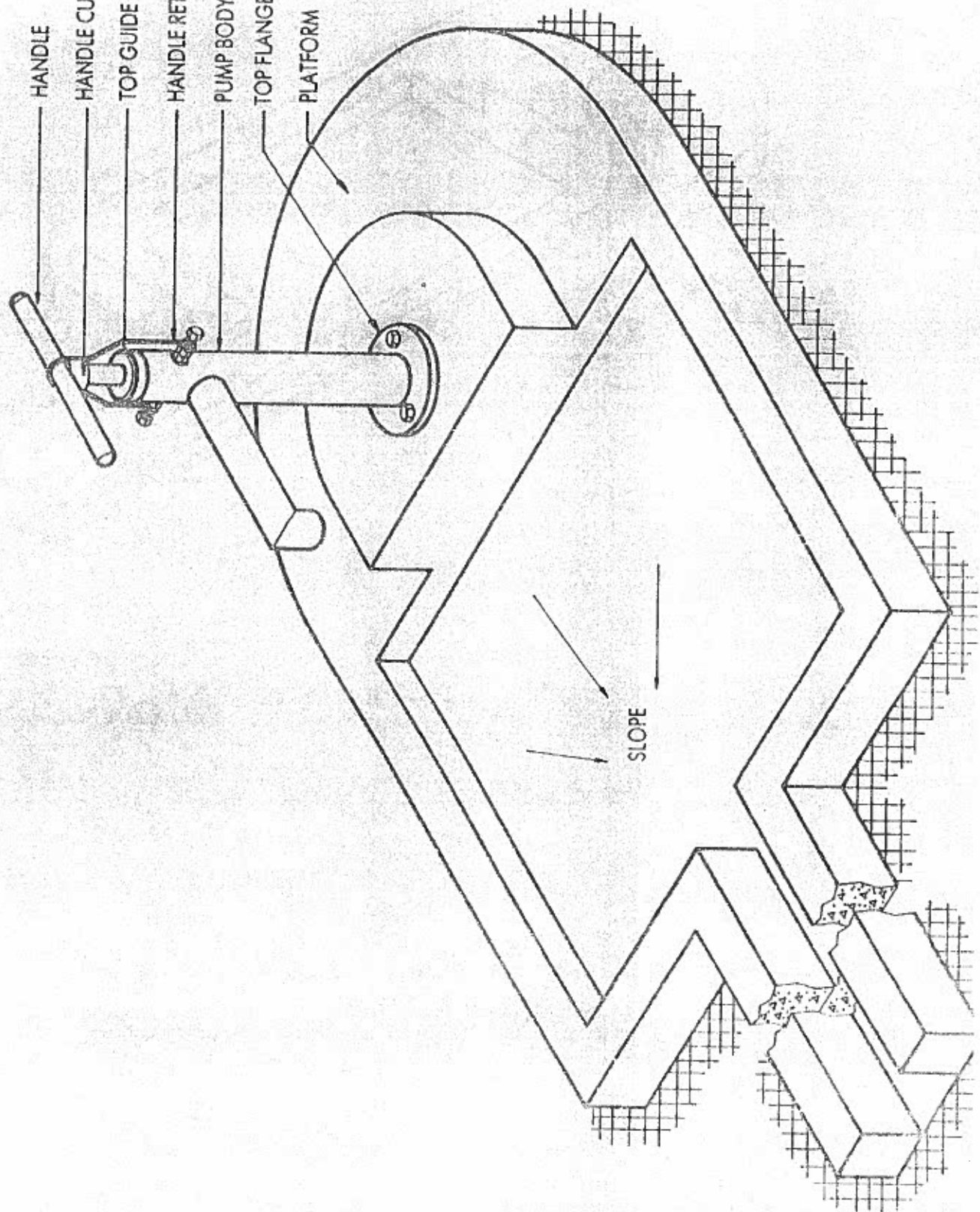
FAX : 0120-4770629, 011-3536205

e-mail : [ajaypump@mantraonline.com](mailto:ajaypump@mantraonline.com)

web site : [www.deepwellhandpump.com](http://www.deepwellhandpump.com)

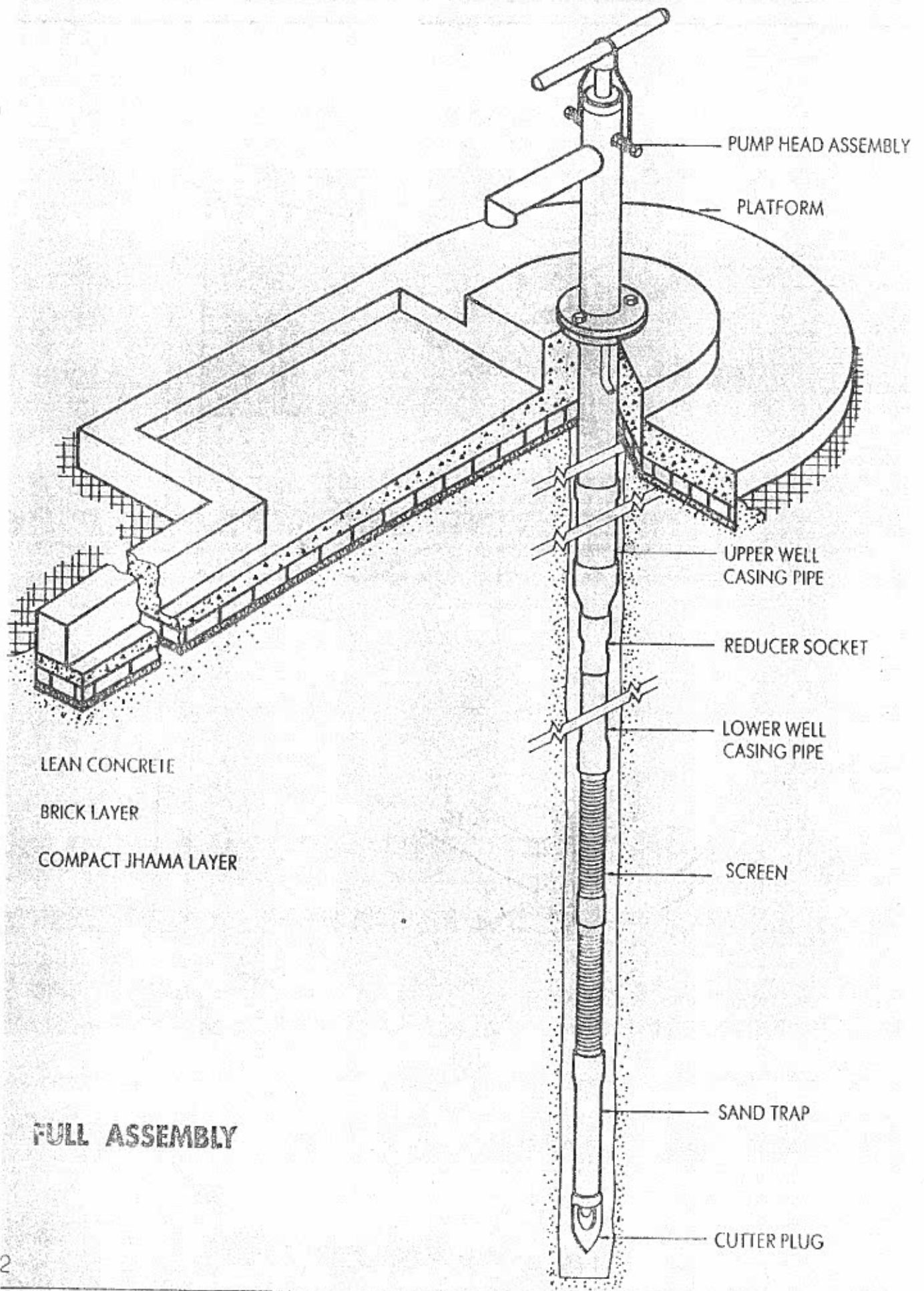


- HANDLE
- HANDLE CUSHION
- TOP GUIDE BUSH
- HANDLE RETAINER
- PUMP BODY
- TOP FLANGE
- PLATFORM



SLOPE





PUMP HEAD ASSEMBLY

PLATFORM

UPPER WELL CASING PIPE

REDUCER SOCKET

LOWER WELL CASING PIPE

SCREEN

SAND TRAP

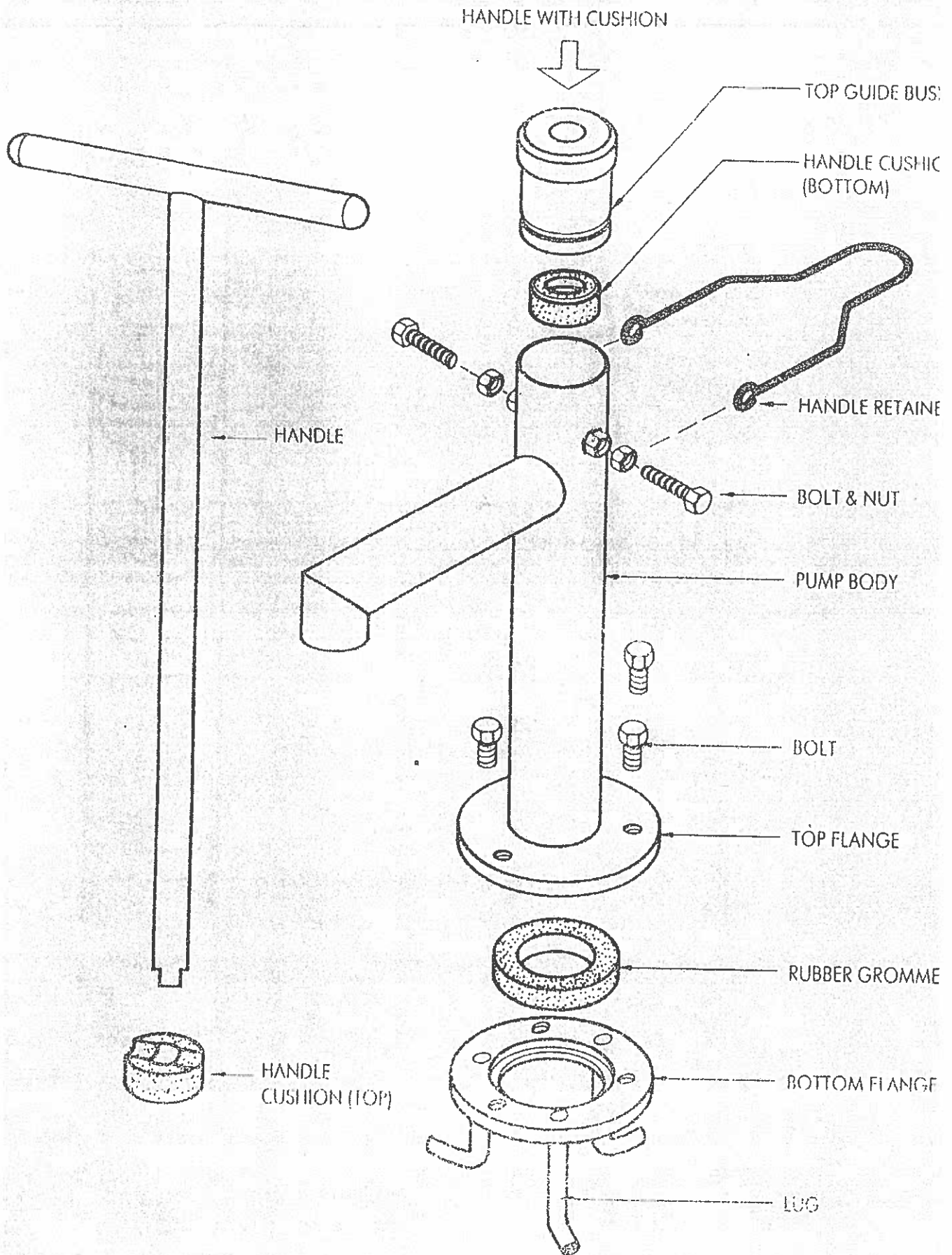
CUTTER PLUG

LEAN CONCRETE

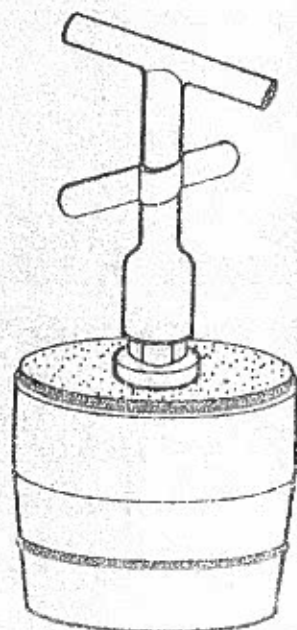
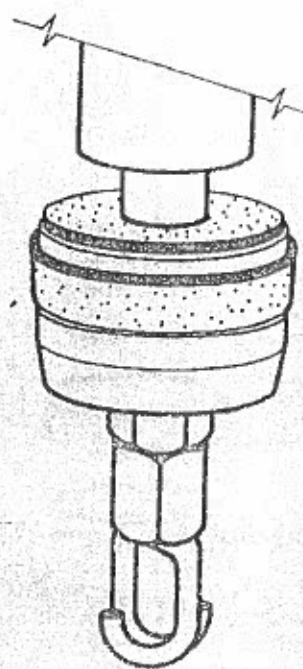
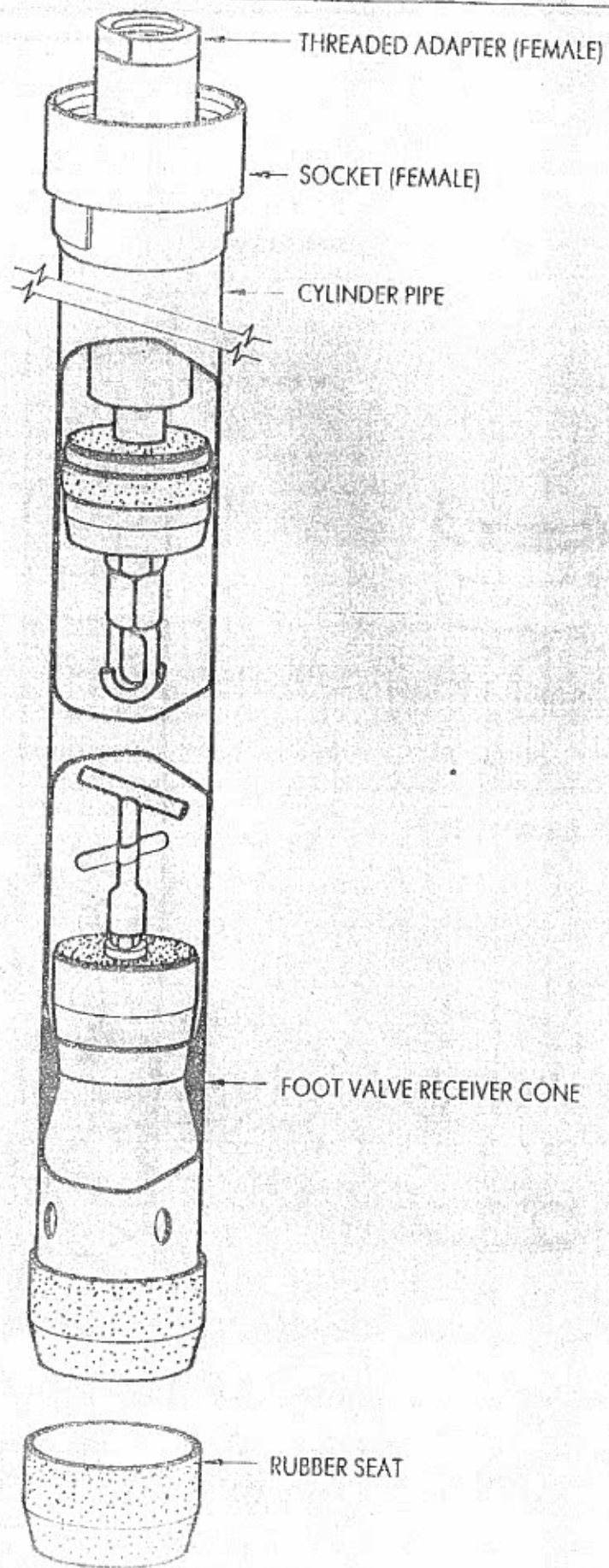
BRICK LAYER

COMPACT JHAMA LAYER

**FULL ASSEMBLY**

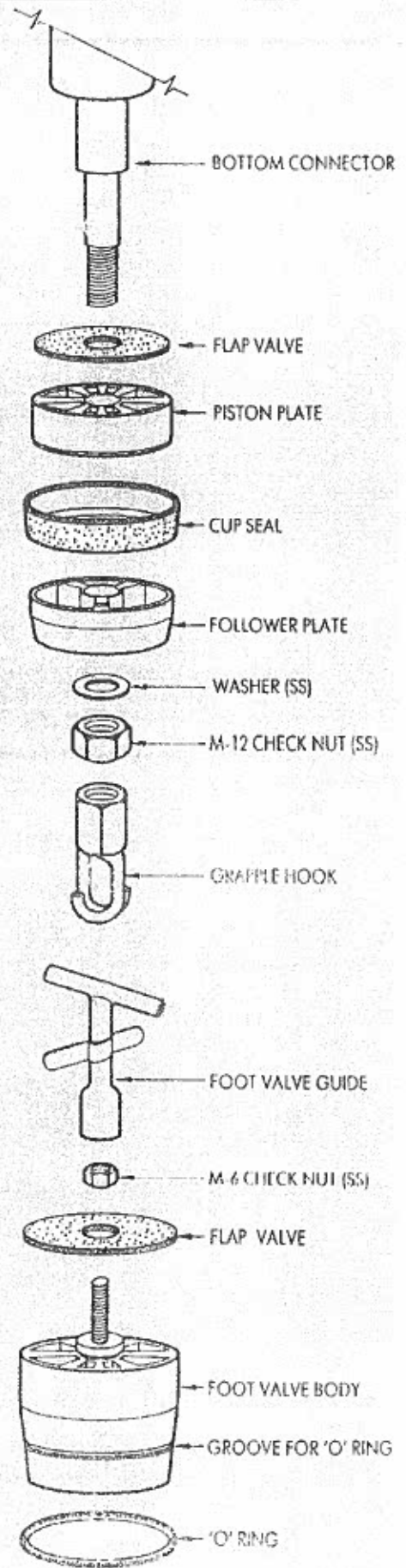
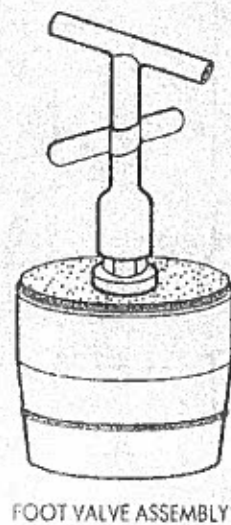
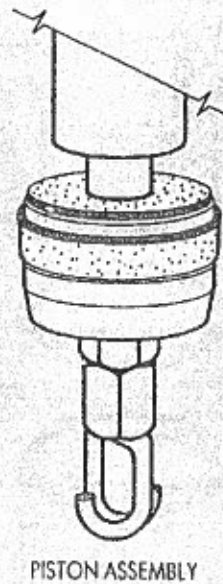
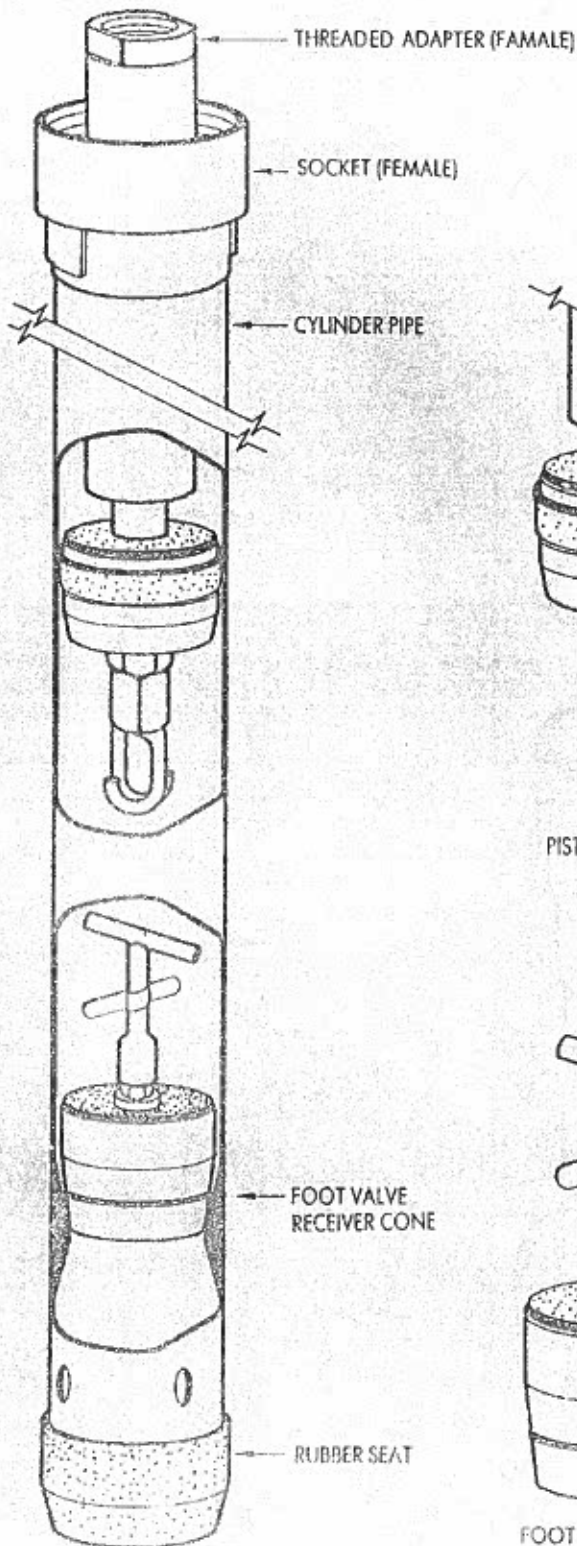


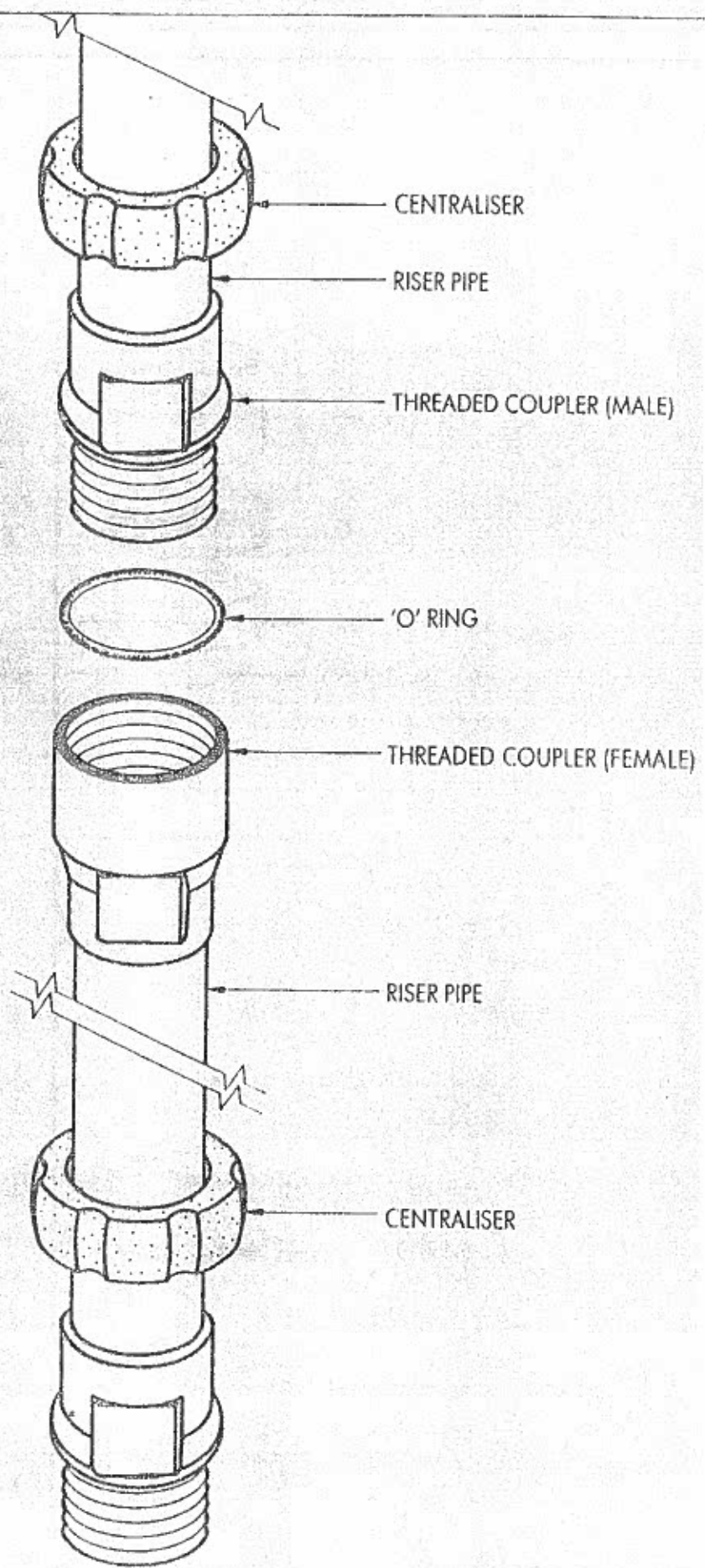
3 ABOVE GROUND PUMP COMPONENTS



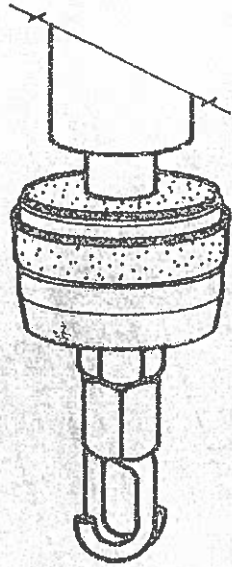
COMPONENTS OF CYLINDER PIPE, PISTON AND FOOT VALVE



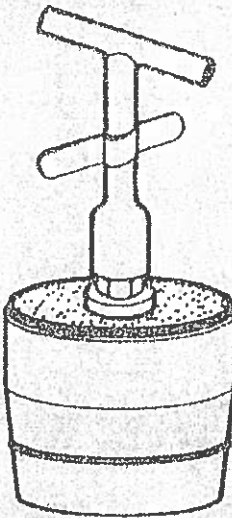




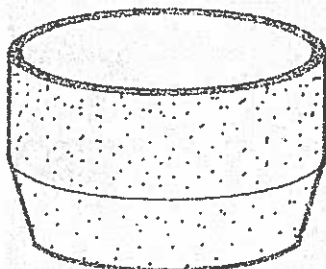
DESCRIPTION OF RISER PIPE JOINTS



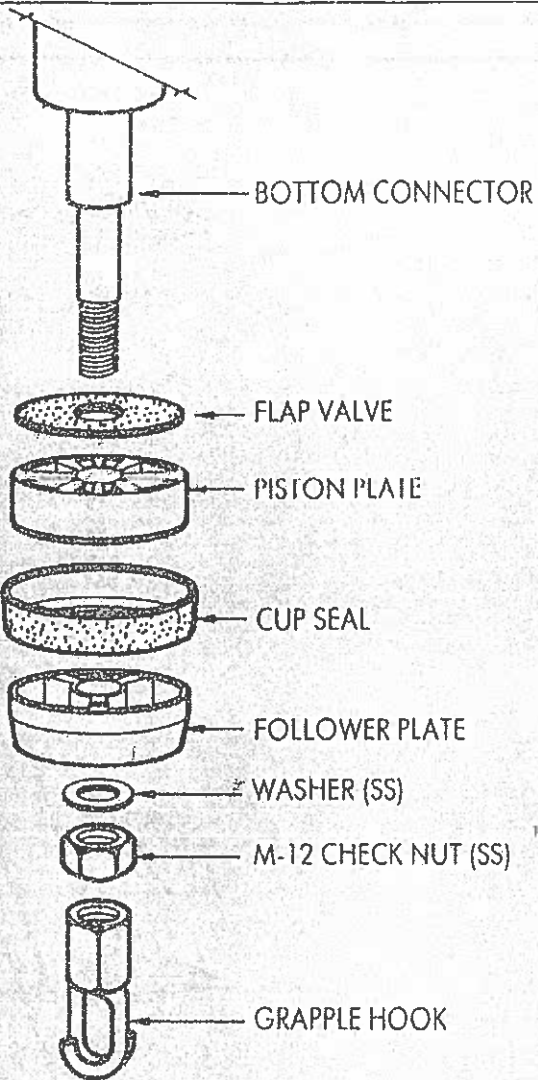
PISTON ASSEMBLY



FOOT VALVE ASSEMBLY



RUBBER SEAT



BOTTOM CONNECTOR

FLAP VALVE

PISTON PLATE

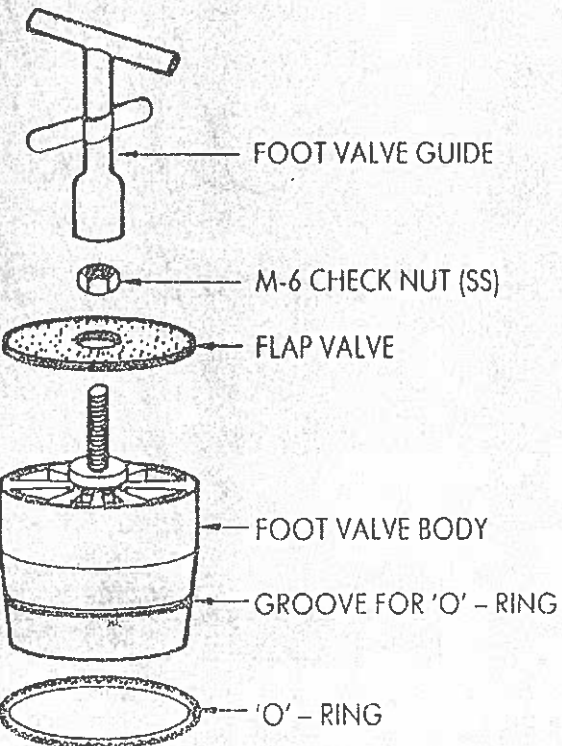
CUP SEAL

FOLLOWER PLATE

WASHER (SS)

M-12 CHECK NUT (SS)

GRAPPLE HOOK



FOOT VALVE GUIDE

M-6 CHECK NUT (SS)

FLAP VALVE

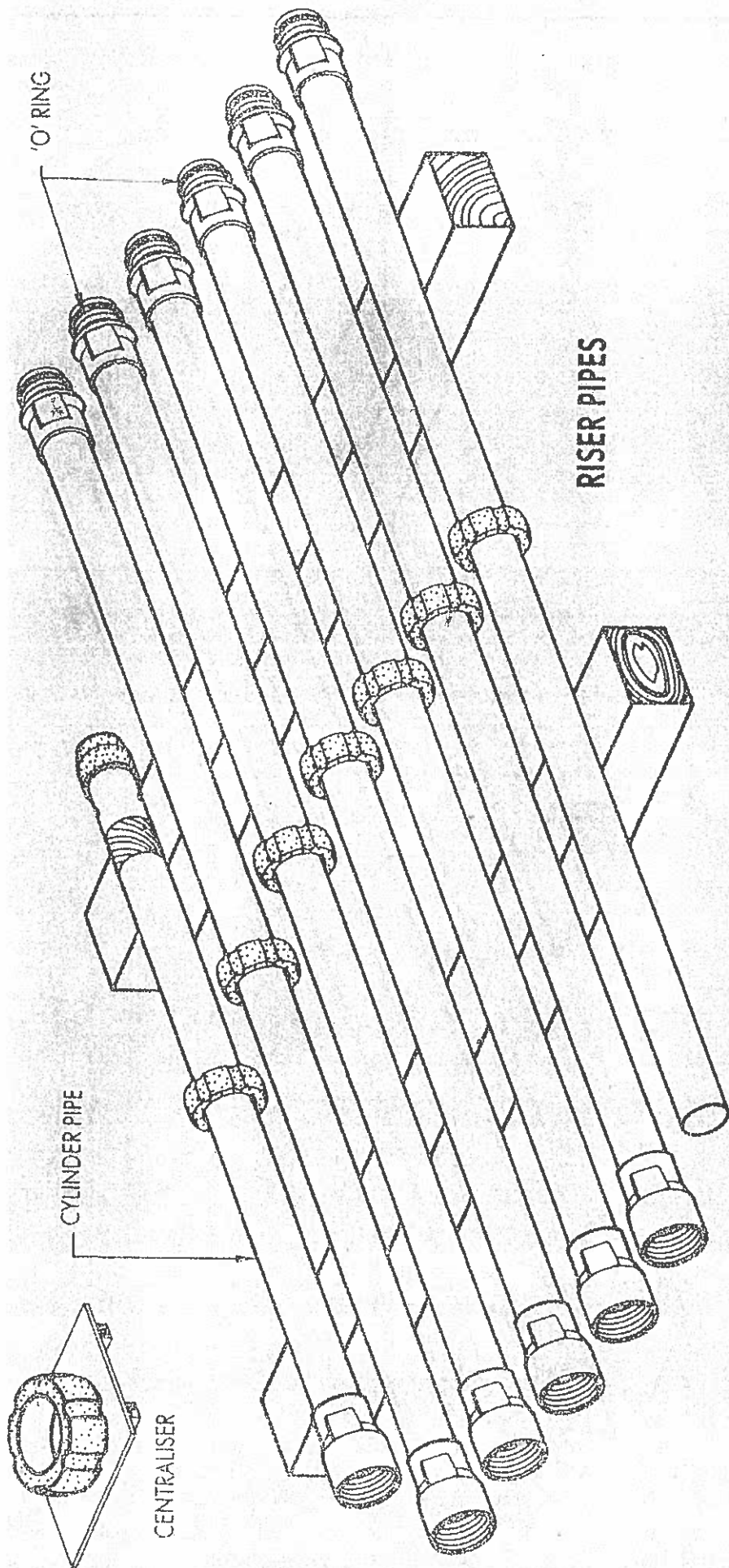
FOOT VALVE BODY

GROOVE FOR 'O' - RING

'O' - RING

7  
**COMPONENTS OF PISTON & FOOT VALVE**





**DESCRIPTION OF RISER PIPES**

4 nos. 50 mm ND u PVC PIPE, EACH 3 m LONG, WITH SOLVENT CEMENTED KNUCLE THREADED MALE/FEMALE COUPLERS.

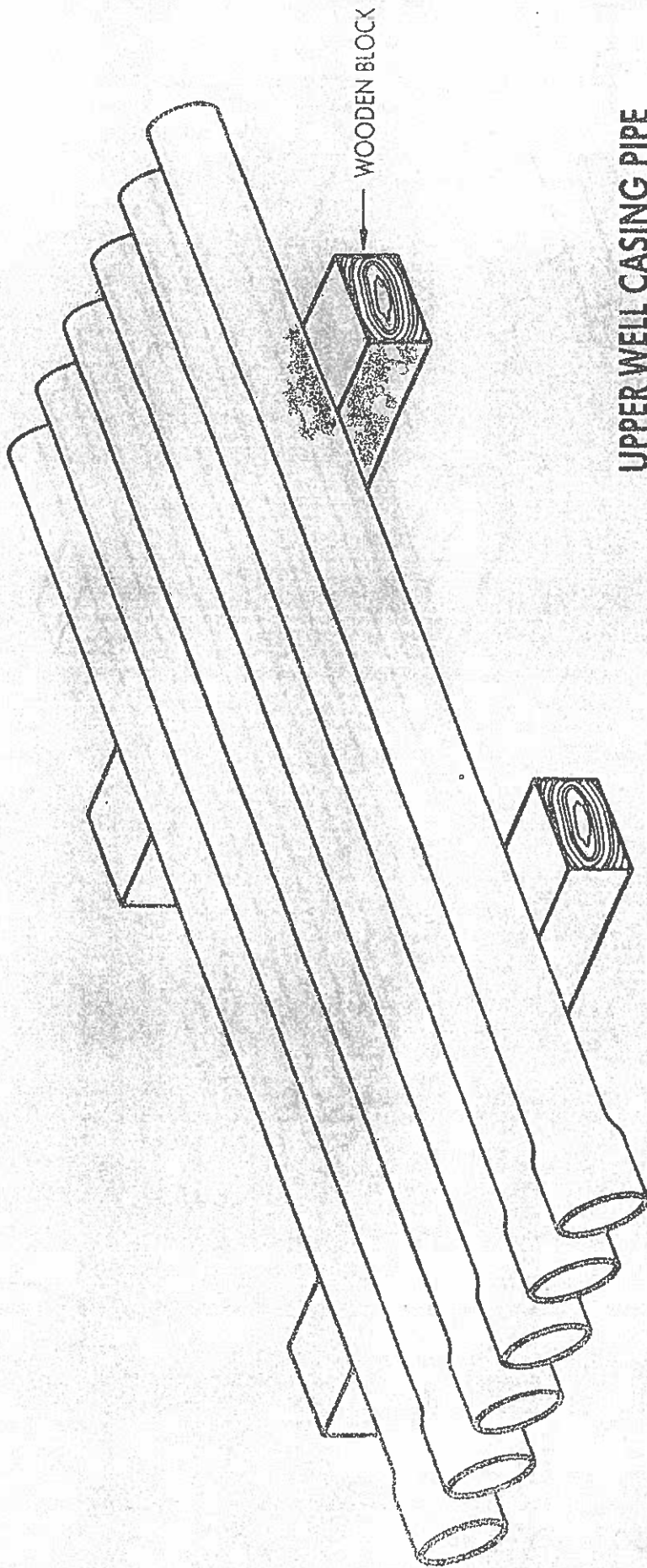
1 no. 50 mm ND u PVC TOP RISER PIPE, 3 m LONG, WITH SOLVENT CEMENTED KNUCLE THREADED MALE COUPLER ONLY AT THE BOTTOM END

**DESCRIPTION OF CYLINDER PIPE**

1 no. 50 mm ND u PVC CYLINDER PIPE, 3 m LONG, WITH uPVC RETAINER AT THE BOTTOM END AND KNUCLE THREADED FEMALE COUPLER AT THE TOP END

**CENTRALISER**

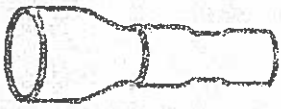
6 nos. NITRILE RUBBER CENTRALISER



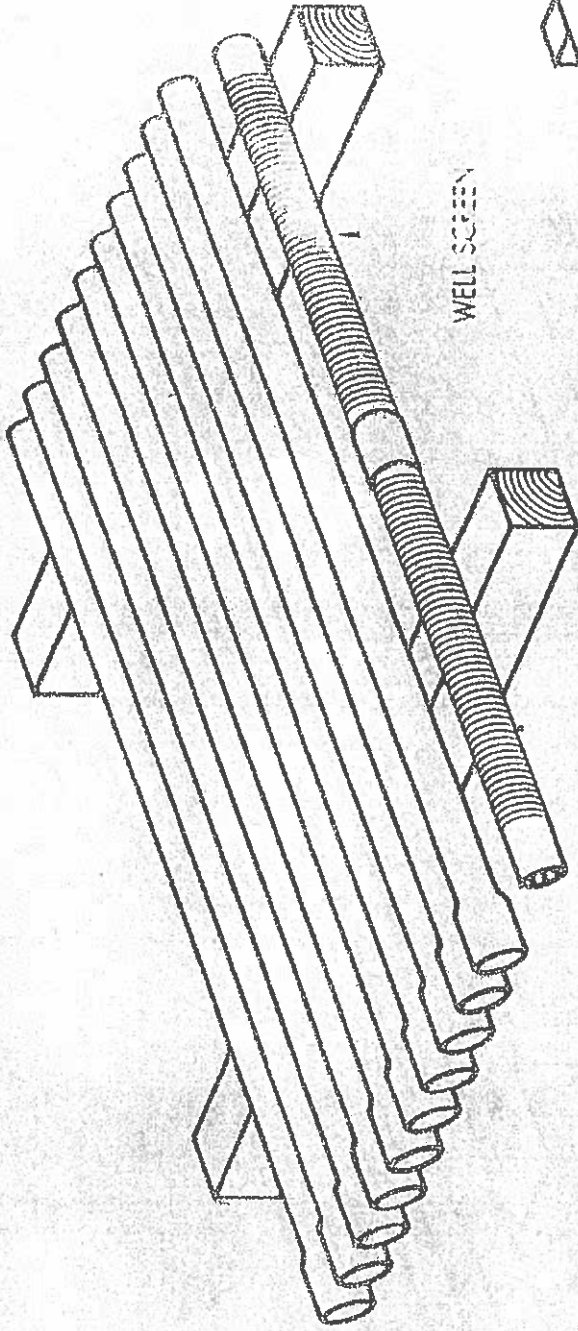
**UPPER WELL CASING PIPE**

**DESCRIPTION OF UPPER WELL CASING PIPE**

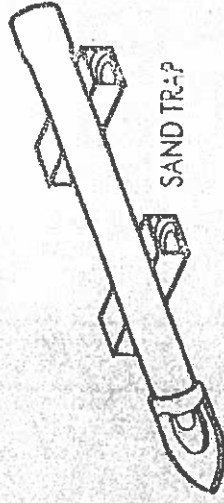
6 nos. 80 mm ND u PVC PIPE, EACH 3 m LONG, WITH BELL AND SPIGOT END.  
SUITABLE FOR SOLVENT CEMENTING.



REDUCER SOCKET



WELL SCREEN



SAND TRAP

### LOWER WELL CASING PIPE

#### DESCRIPTION OF REDUCER SOCKET

1 no. 90 mm ND u PVC PIPE (WHICH BECOMES 50 mm ND WHEN REDUCED) 315 mm LONG

#### DESCRIPTION OF LOWER WELL CASING PIPE

40 mm ND u PVC PIPE, EACH 3 m LONG, WITH BELL AND SPIGOT END, SUITABLE FOR SOLVENT CEMENTING. NO. OF PIPES WILL DEPEND ON THE DEPTH TO WHICH DRILLING IS DONE.

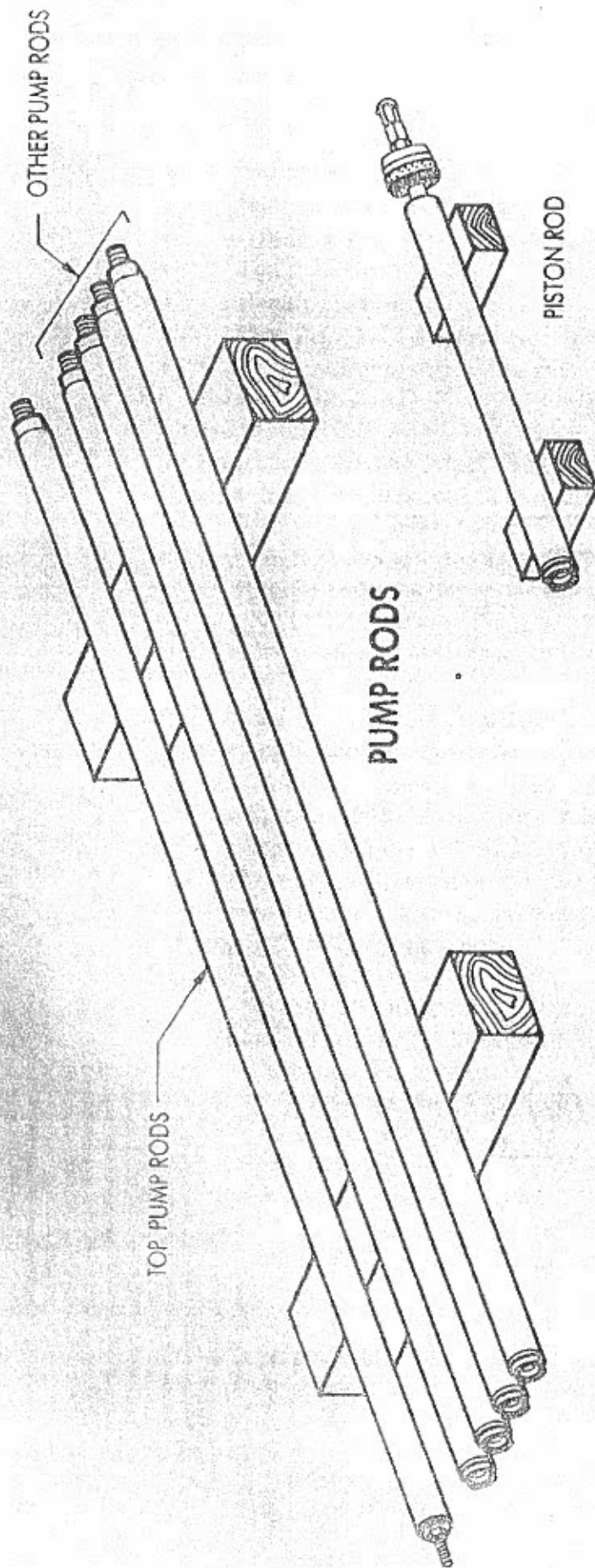
#### DESCRIPTION OF WELL SCREEN

2 nos. 40 mm ND u PVC PIPE (WIDTH OF SLOT 0.2 mm, PITCH 1.5 mm WITH 6 INTERNAL RIBS) EACH 1 m LONG.

#### SAND TRAP

40 mm ND SAND TRAP, 1 m LONG





**DESCRIPTION OF OTHER RODS**

4 nos. 42 mm OUTER DIAMETER u PVC PIPE, EACH 3 m LONG WITH SOLVENT CEMENTED KNUCKLE THREADED MALE/FEMALE ADAPTERS.

**DESCRIPTION OF TOP PUMP ROD**

1 no. 42 mm OUTER DIAMETER u PVC PIPE, 1 m LONG, WITH SOLVENT CEMENTED KNUCKLE THREADED MALE ADAPTER AT ONE END AND NUT CHECK AT THE OTHER.

**DESCRIPTION OF PISTON ROD**

1 no. 42 mm OUTER DIAMETER u PVC PIPE, 1 m LONG WITH SOLVENT CEMENTED KNUCKLE THREADED FEMALE ADAPTER AT ONE END AND PISTON ASSEMBLY AT THE OTHER.

## ANATOMY OF THE DIRECT ACTION HANDPUMP

THE ABOVE GROUND COMPONENTS OF THE TARA DIRECT ACTION HANDPUMP ARE :

- Pump head with 2 Nos. Hex nut M12 welded.
- Rubber grommet.
- Bottom flange assembly.
- Intermediate conical flange.
- Handle assembly with top & bottom cushion.
- Top guide bush
- Handle retainer.
- Hex. Bolt M12 x 40mm with M12 nuts.
- Upper casing rubber centralizer.

THE BELOW GROUND PUMP COMPONENTS OF THE TARA DIRECT ACTION HANDPUMP ARE :

(a) Riser pipe including cylinder pipe :-

- 4 Nos. O.D 60mm x 3 m long uPVC riser main pipe with knuckle threaded male and female coupler.
- 1 No. O.D 60mm x 3 m long uPVC riser main top with knuckle threaded male coupler at one end only.
- 1 No. O.D 60mm x 3 m long uPVC cylinder assembly with uPVC foot valve retainer at the bottom end and knuckle threaded female coupler at top end.
- 5 nos. nitrile rubber centraliser.

(b) Pump rods including piston :-

- 5 Nos. O.D 42mm x 3m long uPVC pump rod with Knuckle threaded adapter (male & female) solvent cemented on both the ends.
- 1 No. O.D 42mm x 1 m long uPVC top rod with Knuckle threaded adapter (female connector) solvent cemented on one end and top connector with check nut on the other end .

(c) Piston and foot valve assembly :-

- 1 No. foot valve assembly.
- 1 No. O.D 42mm x 1m long Piston rod sub assembly with knuckle threaded adapter (male) solvent cemented on one end and piston assembly on the other end.

(d) 6 Nos. O.D 88mm x 3m uPVC upper well casing pipe with bell & spigot ends for solvent cementing.

(e) Lower well assembly.

- 1 No. Reducing socket
- uPVC lower well casing 48mm x 3m long with bell & spigot ends for solvent cementing (No. of pipes will be as per required drilling depth)
- 2 Nos. Well screen pipes each 1m long (coupled) together .
- 1 No. Sand trap 48mm x 1m long with bell & spigot ends and CI Cutter and plug at other end.

Contd.....2

## PLATFORM CONSTRUCTION FOR TARA DIRECT ACTION HANDPUMP

It is essential to have a good and strong platform around the TARA direct action handpump because :-

- It provides a firm rigid base for the top casing pipes of the TARA handpump which is made of plastic (uPVC).
- It ensures proper drainage and prevents water logging around the handpump.
- It maintains the horizontal level of the bottom flange, thus ensuring the vertical position of the pump head. If the pump head is not vertical, the operation of the handpump will be difficult and undue wear and tear of the handpump components will take place.

The platform should be designed in such away that rain water does not wash away the earth below the concrete platform creating voids which may result in cracks in the platform. Where such possibilities exist, a low wall should be constructed around the platform and the drain for their protection.

### STEP - 1 LEVELLING AND FIXING THE BOTTOM FLANGE AND PUMP HEAD OVER THE CASING PIPE

After the completion of bore well casing follow following steps --

- Remove the covering on the casing pipe
- Place the bottom flange with the legs facing downwards and level it with the help of spirit level.
- File and smoothen any unevenness on the top edges of the casing pipe for accurate leveling of the bottom flange.
- Place the bottom flange centrally over the upper casing pipe centraliser.. Fix the rubber grommet in its seat in the intermediate flange.
- Fix the pump body over it and tighten the flange bolts.
- Cover the top opening of the pump body with a polythene sheet to prevent contamination. Check the level by placing the spirit level on top of the pump head.

### STEP - 2 ALIGNMENT OF THE PUMP SPOUT

- Rotate and adjust the pump body so that the pump spout, the center of drain and foot stand are in one line.
- In this position the two legs of the bottom flange will be in the front and the third behind the pump body.
- Check whether the pump body is vertical with the help of a spirit level and plumb line.



STEP – 3 INSTALLATION OF TARA DIRECT ACTION HANDPUMP  
INSTALLATION TOOLS & EQUIPMENTS :

The following tools are required for installation .

- Hacksaw with blade
- Half round file
- Emery paper
- Double ended spanner (17x19)mm
- Special spanners
- Spirit level
- Retrieving rod
- Solvent cement

ACCESSORIES

The following items are required for disinfection of the tubewell before installation of the TARA handpump.

500 grams of fresh bleaching powder.

The other items needed for installation are :

- A plumb line comprising of 6mm dia nylon rope, about 100m long (longer length may be necessary if depth of tubewell is more) bound on a wooden stick or reel with a G.I pipe socket tied as a weight at the free end.
- A 15 m long measuring tape.
- A Small tarpaulin or PVC sheet on which to lay out the pump tools and small items, during installation Spare parts
- The following above ground and below ground handpump components should be carried as spares These may be needed if some of the components are found defective during installation.
- Foot valve O ring
- Foot valve flap valve
- M-12 check nut (S.S) for top end connector and piston grapple
- M-12x40 handle retainer bolt with nut
- Piston flap valve
- Piston cup seal
- Top guide bush
- Handle cushion (top)
- Handle cushion (bottom)
- Bolts for lower flange
- Handle retainer
- Top pump rod
- Rubber seat for cylinder
- Rubber grommet
- Foot valve assembly
- Centraliser
- Piston rod with piston assembly

Contd...4

### INSTALLATION PROCEDURE

- The first step in the installation of Tara handpump is the calculation of the length of riser pipes and consequently the number of pump rods required. For this calculation it is essential to measure the depth of the reducer socket.
- The depths of the static water level and of the tubewell also need to be measured before installation of the handpump.

### INSTALLATION OF THE RISER PIPE

- Take the cylinder pipe which is the first riser pipe to go into the tubewell.
- Check that the rubber seat at the bottom of the cylinder pipe is fixed well. (The rubber seat is fixed to the cylinder pipe with the help of a suitable adhesive.)
- For checking leakage within the cylinder pipe and the foot valve, hold the cylinder pipe vertically and drop the foot valve inside the cylinder pipe from the female coupler end.
- Pour water inside the cylinder pipe till it reaches the level of the top of the female coupler.
- Check whether there is a drop in the water level. If there is a drop, check the foot valve and the cylinder pipe. Replace both, if necessary.
- Lower the cylinder pipe into the tubewell. The rubber seat should go in first and the female coupler end should remain on the top.
- Hold the cylinder pipe on the top of the bottom flange and add another riser pipe with its male coupler facing downwards and female coupler upwards.
- Make sure that the top riser pipe which has only a male coupler at one end is kept ready. It will be the last riser pipe to be lowered.
- Lower the riser pipes one after another in the manner explained earlier till the rubber seat of the cylinder pipe reaches the reducer socket.
- Each coupler should be threaded to its full depth.
- Lubricate the threads with soap water for easy tightening of the threaded couplers.
- Tighten each joint with the special spanners.
- Keep a count of the number of riser pipes being lowered into the tubewell it should be the same as that calculated earlier.
- File and clean the cut end of the pipe. Push the rubber grommet over the riser pipe down to the intermediate flange.

### EXAMINE THE FOOT VALVE ASSEMBLY

The following steps should be carried out

- The O ring is seated properly in its groove.
- The inner hole of the flap valve is fitted properly in its groove. The flap Valve then sits flat on the surface of the valve openings.
- The foot valve guide is tightly screwed the lock nut.

Contd.....5

Drop the foot valve into the riser pipe. It will sink and rest about 75mm above the lowest end of the cylinder pipe. This is the foot valve seat.

#### FITTING THE PUMP BODY

- Place the pump body over the riser pipe. Orient its spout properly; align the holes of the pump body, inter mediate flange and the bottom flange.
- Fit the bolts and tighten them with a 17mm x 19mm spanner.
- After tightening the flange bolts, check whether there is any gap between the flange and the and the platform pedestal.

#### INSTALLATION OF THE PISTON ASSEMBLY AND PUMP RODS

- Check the piston rod to ensure that the flap valve of the piston assembly lies flat on the surface of the piston plate and is free to rotate on the spindle of the bottom connector.
- The stainless steel lock nut and its washer are tight on the collar of the spindle of the bottom connector.
- After the lock nut is tightened with the washer, the piston assembly is free to rotate on the spindle.
- The grapple hook is tight against the lock nut.
- Lower the first pump rod with the piston assembly and hold it on top of the pump body.
- It is essential that all the pump rods are kept above ground level, preferably on top of the PVC sheet to keep them away from dust and dirt.
- Add a connecting pump rod to the piston rod and tighten the pump rod joint.
- Soap water can be used for lubrication of the knuckle threads at the joints of the pump rods.
- If necessary special spanners can be used for tightening the pump rod joints.
- Fit the top pump rod and fix the handle loosely at first. Check position of the piston vis-à-vis foot valve by pressing the handle down to ensure correct stroke length..
- When the handle is pressed down fully the piston assembly grapple hook should not touch the foot valve guide if the handle cannot be pressed down fully, or the grapple touches the foot valve guide, remove one pump rod and fix the top pump rod once again.
- Completing the above ground installation

Contd...6



SPECIAL NOTE

From the installation tools, the two double end spanner (19x17)mm, the special spanners, the retrieving rod and all the fast-moving spares are to be left in the custody of the handpump caretaker.

- The above ground installation can be completed once the top rod has been installed.
- The lock nut should be fitted to the top connector bolt of the top pump rod.
- Hold the guide bush above the top pump rod and pass the handle along with the bottom cushion through the guide bush.
- Thread the top connector bolt well into the handle.
- Tighten the lock nut with the handle using (17x19)mm spanners.
- Push the handle down and push the guide bush into the pump body.
- Put a bolt through each ring of the handle retainer and fit a nut to each bolt. Thread the bolts into the welded retainer nuts of the pump body.
- Tighten the retainer bolts by hand to the extent that they will go into the slots in the guide bush.
- Now tighten the lock nuts against the welded nuts of the pump body.
- Check the handle top cushion for any loose fitting
- Operate the handle to ensure that a smooth flow of water comes out. Sufficient water should be pumped out to ensure that there is no chlorine smell in the water being discharged from the handpump.
- Maintenance records of the installation of the TARA handpump in the installation work card.

THE TARA HANDPUMP INSTALLATION IS NOW COMPLETE

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## New Zealand

**Description:** This is a direct action pump which is identified by a wide pump body. What makes this pump unique is that no piston seals are needed! Below ground, this pump consists of two pipes, one slightly larger than the other. At the bottom of each pipe is a simple, non-return valve. An up and down movement of the handle raises and lowers the inner pipe or plunger while the outer pipe remains still. Water is delivered on both the up and down stroke. As the plunger is raised, it lifts a column of water within it and more enters the outer pipe through its non-return valve. Each time the plunger is pushed down, more water is forced into it from below. Continued movement of the plunger drives water to the top of the inner pipe where it runs out through the pump spout. The pump is self-priming and easy to maintain. The valve seals are flat rubber discs which may be cut from old tyre inner tubes. As long as these discs are in good condition, the pump holds its prime and yields water immediately.

**Overview:** This is a new pump and it has not yet seen widespread use. Its design is still being modified to make it more robust. However, it has excellent potential for selected applications such as for shallower wells and/or for use by family clusters. The current design is too delicate to be suitable for large-scale village use.

**Maximum Pumping Depth (meters):** Theoretically, this pump can be used to any depth. However, it is practically limited by the weight of the water column in the plunger pipe that is lifted each time the user pulls on the handle. It is commercially available for depths up to 30 meters, but we currently recommend that this pump not be used for applications deeper than 15 meters.

**Pumping Rate:** Higher sustainable pumping rate than other handpumps - 5-8 gallons/minute.

**Cost:** Prices range from \$175 US for a 6 meter pump to \$400 US for the 30 meter model. The ultimate goal is to purchase of manufacture this handpump for \$200 US.

**Suppliers:** This handpump is currently commercially manufactured by two suppliers:

- 1) Mr. Richard Cansdale  
SWS Filtration Limited  
Hartburn, Morpeth, Northumberland  
NE61 4JB  
ENGLAND  
Telephone: 011-670-772214; Fax: 011-670-772363  
E-Mail: [swsfilt@dial.pipex.com](mailto:swsfilt@dial.pipex.com)  
Web: <http://ds.dial.pipex.com/sysfilt/nzp/index.htm>

2) NZ Pump Company  
P.O. Box 821  
Hamilton  
NEW ZEALAND  
**Phone:** 011-64-7-839-3838 **Fax:** 011-64-7-839-1193  
**E-Mail:** [info@nzpump.co.nz](mailto:info@nzpump.co.nz)  
**Web:** <http://www.nzpump.co.nz/index.html>

USA Distributor:

Kiwi Enterprises inc  
1065 E. Shadow Cove  
Salt Lake City  
Utah 84121  
ph: +1 801 942 8280  
Fax: +1 801 942 8295  
E-Mail: [colinmc@uswest.net](mailto:colinmc@uswest.net)

For a current list of suppliers, visit: <http://www.nzpump.co.nz/distributors.html>  
1-800-331-3193

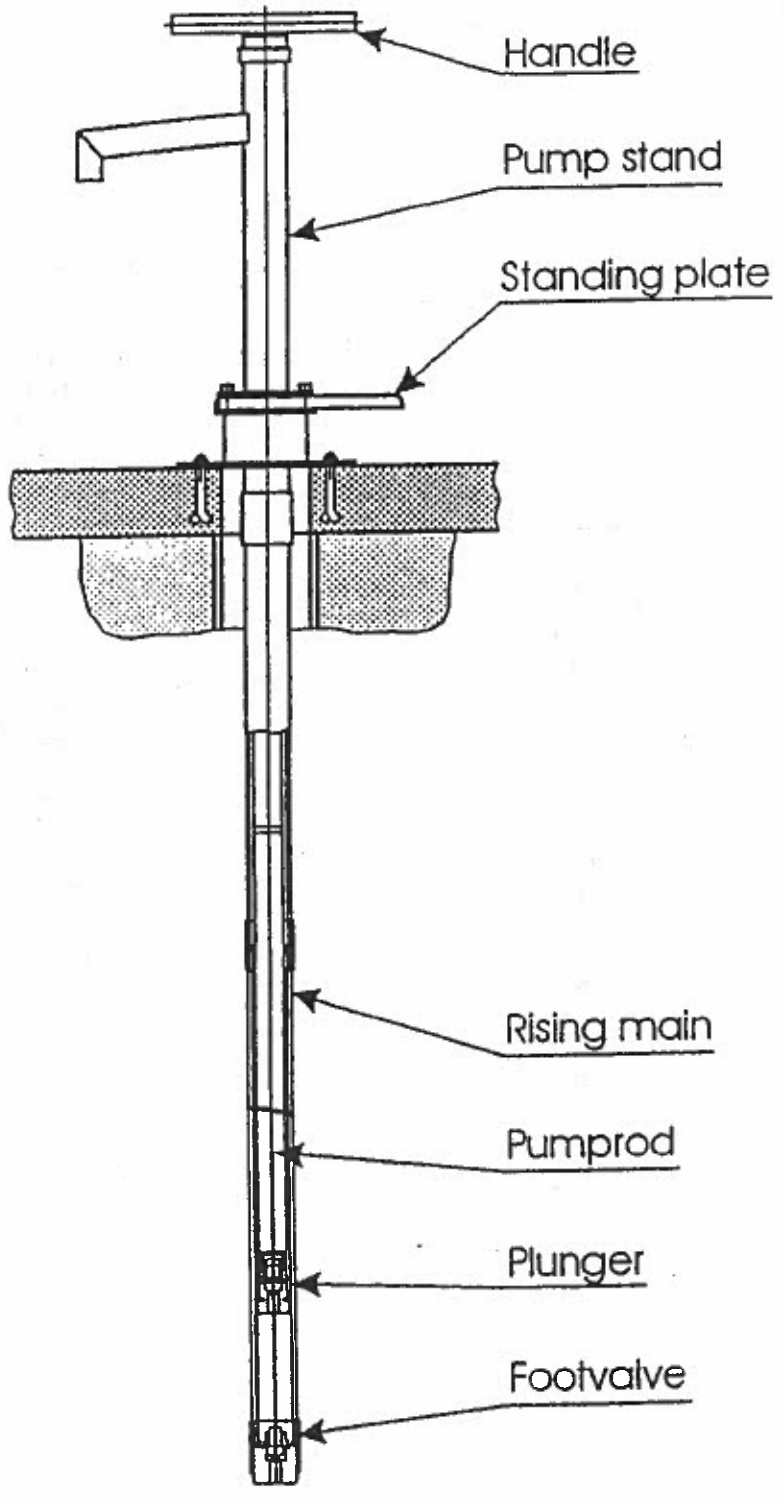
Countries Used: Limited use to-date including New Zealand, Ghana and Burkina Faso.

Special Tools: None required.

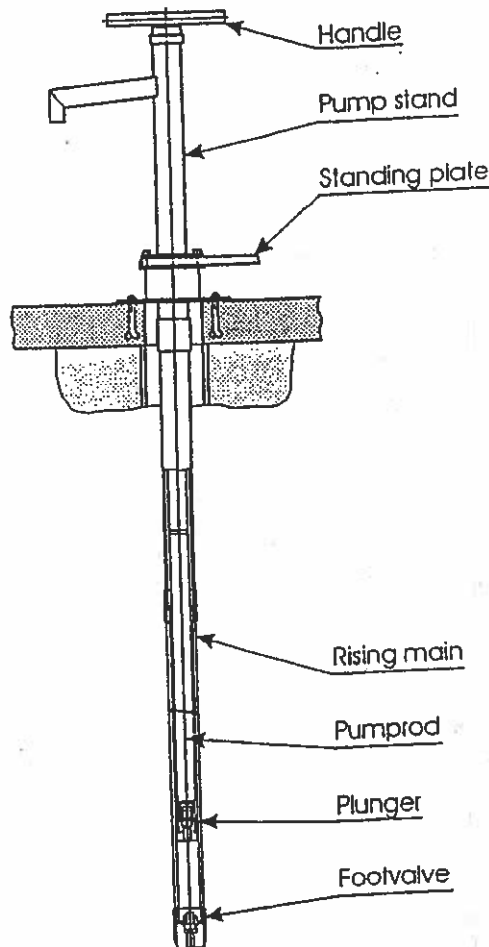
Maintenance Issues (Interval, ease of maintenance, common problems):

Problem with the plastic plunger pipe, immediately below the Tee handle, becoming rapidly and unacceptable worn. It is also vulnerable to being broken if sideways pressure is put on the handle while it is being pulled up and down.





Description: The NIRA AF85 Direct Action Handpump is based on a buoyant pump rod that is directly articulated by the user, discharging water at the up- and down stroke. The pump head and the standing plate are made of galvanised steel and the handle of stainless steel. Pumprod and rising main are of HDPE pipes and the rest of the down hole components are made of plastics. This makes this pump completely corrosion resistant.



### Technical data:

Cylinder diameter (mm):	53.4
Maximum Stroke (mm):	400
*) Approx. discharge m <sup>3</sup> / h:	at 5 m head 3.5
(depending on installation and well)	at 10m head 1.8
	at 15 m head 1.2

Pumping lift (m):	2-15
Population served (nos.):	300
Households (nos.):	30
Water consumption (lpcd):	15-20
Type of well:	borehole or dugwell
*) at about 75 watt input.	

### Material:

• Pump head	galvanised steel
• Handle	stainless steel
• Pump rods	HDPE pipe
• Rising main	HDPE pipe
• Plunger/footvalve	HDPE

### Local manufacturing:

The NIRA AF85 Pump is a protected product and is not intended for local production. Although besides the main company in Finland, there is one branch in Ghana (Ghanira) and one in Tanzania (Tanira) producing this pump.

### Installation:

The installation of the NIRA AF 85 Pump is easy and does not need any lifting equipment or special tools.

### Maintenance:

This pump has an excellent "Community Management Potential". Only simple tools are needed to pull out the entire pumping element as well as the footvalve and rising main. This pump is reliable and popular with the communities.

### Remarks:

This pump is like most of the "Direct Action Pumps" (DAP) limited to pumping lifts of a maximum of 15 m. It is recommended not to go deeper than 12 m.

### Suppliers:

Technical information on the NIRA AF85 is available from Vammalan Konepaya Inc. P.O.Box 54, SF-38201, Vammala, Finland. Tel: +358 351126 67 / Fax: +358 351 431 34.