

Instruction Manual on Installation and Maintenance of UNIMADE 30M Handpump

This report is presented as received by IDRC from project recipient(s). It has not been subjected to peer review or other review processes.

This work is used with the permission of Goh Sing Yau.

© 1987, Goh Sing Yau.

ARCHIV
621.65(595)
G 53



IDRC - Lib.

100301

UNIMADE 30M HANDPUMP



UNIMADE 30M HANDPUMP

A Guide For Installation, Repair And Maintenance

Copyright © 1987 by Goh Sing Yau

This book may not be reproduced in whole or in part, by mimeograph or other means, without permission. Request for permission or further information should be addressed to Professor Goh Sing Yau, Department of Mechanical Engineering, University of Malaya, Lembah Pantai, 59100 Kuala Lumpur, Malaysia.

Perpustakaan Negara Malaysia

Cataloguing-Publication-Data

UNIMADE 30M HANDPUMP

A guide for installation, repair and maintenance.

Also published in Bahasa Malaysia

1. Pumping machinery, 2. Hydraulic Engineering

I. Universiti Malaya.

621.64

PREFACE

This manual describes an improved version of the UNIMADE MARK III Lift handpump. It follows closely the format of the IDRC—UM handpump (1985) and the UNIMADE MARK III Suction handpump (1986) manuals. Several pages of the earlier manuals are retained because they still apply to the present design.

Although the Malaysian project has been field-testing Lift handpumps since 1980, this is the first time we are printing an installation and maintenance manual of them. This has become necessary because we are now installing more of them in Malaysia. Many of these handpumps are also being field-tested in West Africa.

The present design is the result of several years of hard work by a team of researchers and field workers from the Ministry of Health, the Federal Land Development Authority and the University of Malaya. The village users were also involved and often had the final say in various aspects of the design. The present design is by no means a perfect one. Research and development work is still going on to improve it and I welcome comments and suggestions from readers.

All the above activities would not have been possible without the generous support of International Development Research Centre (IDRC) who sponsored Phase I (1979 — 1981) and Phase II (1983 — 1988) of the "Water Pumping Technology (Malaysia)" project.

Goh Sing Yau
University of Malaya

December 1987

CONTENTS

| | Page |
|--|-------------|
| Preface | (iv) |
| Main features of UNIMADE 30M Handpump | (vi) |
| Tools | 1 |
| Pump parts | 2 |
| Part 1 : Installation | 5 |
| Part 2 : Maintenance | 30 |
| Part 3 : Repairs | 33 |

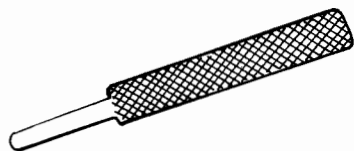
MAIN FEATURES

- PVC and other plastics materials are used for handpump cylinder, piston and footvalve.
- Plastic bearings are used in all pin joints.
- Handpump stand is constructed from standard mild steel piping.

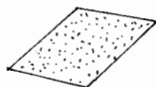
MAIN ADVANTAGES

- The use of plastic parts ensures a light handpump assembly. Installation and removal of handpump from the well can be carried out by 2 or 3 persons without requiring the use of any mechanical lifting equipment.
- Plastic pipes and parts may be joined by solvent welding. This facilitates servicing and repairs at the handpump site.
- The footvalve may be extracted for inspection without having to remove the handpump cylinder.
- The 65 mm diameter cylinder version is recommended for use to a maximum water depth of 30 metres. For greater water depths, a smaller diameter version should be used.

TOOLS



File



Sand paper



Spirit



PVC cement



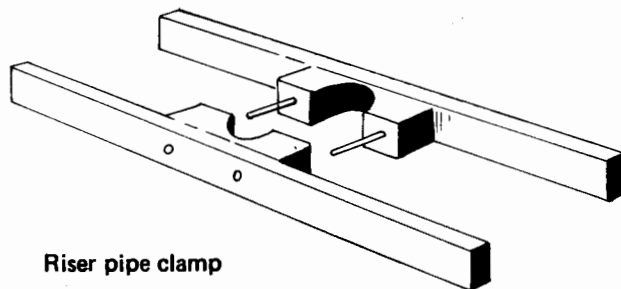
Pencil



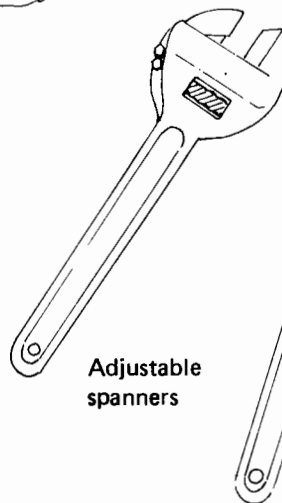
Grease



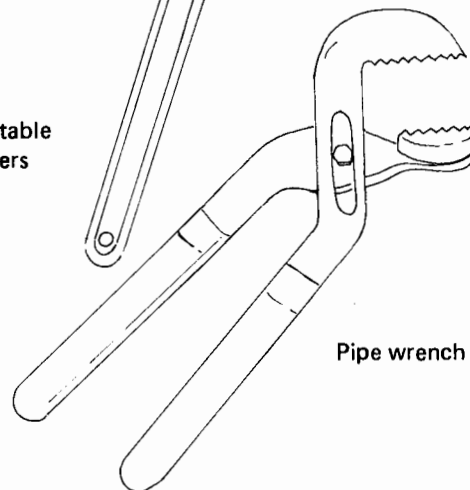
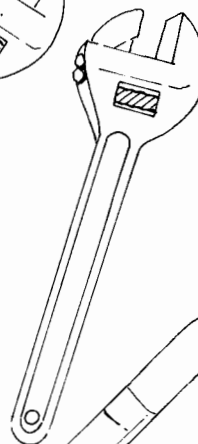
Hack saw



Riser pipe clamp

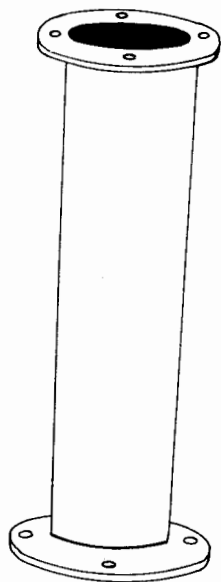


Adjustable
spanners

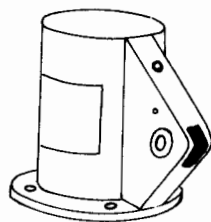


Pipe wrench

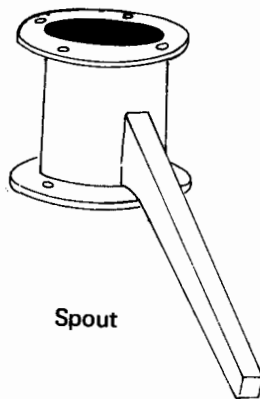
PUMP PARTS



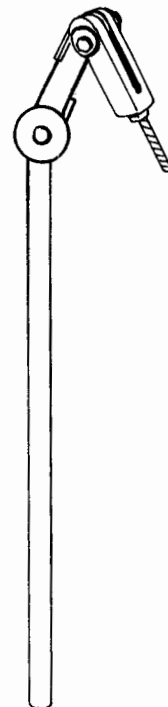
Pump stand



Cover



Spout

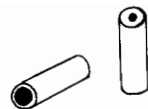


Handle

PUMP PARTS



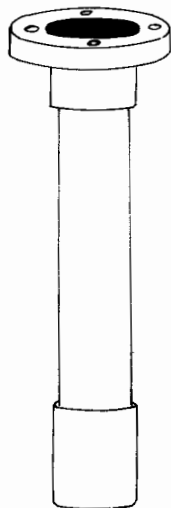
Rubber gasket



Nut sockets



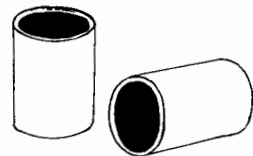
Piston



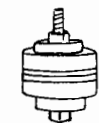
Upper cylinder



Lower cylinder



Riser pipe sockets

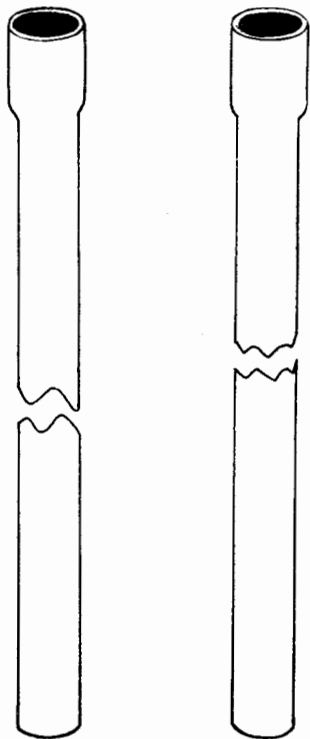


Footvalve

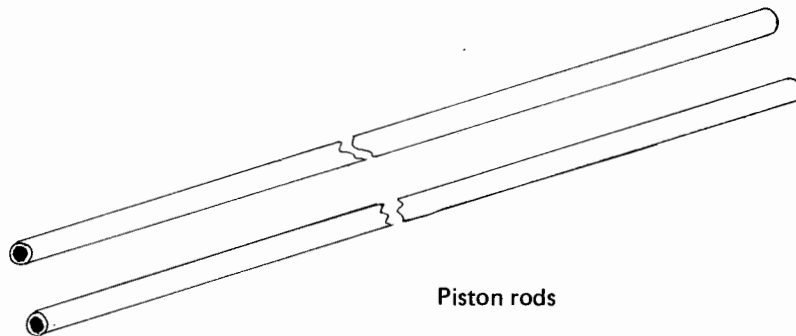


Piston rod sockets

OTHER NECESSARY PIPES NOT SUPPLIED WITH HANDPUMP

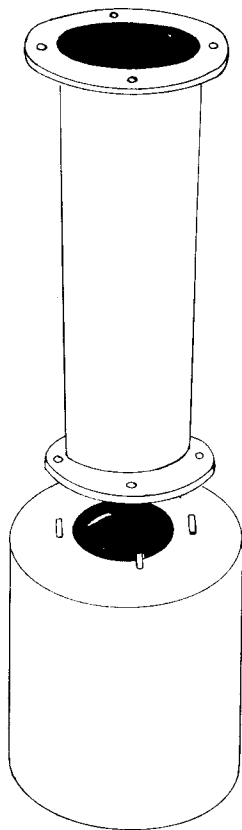


Riser pipes

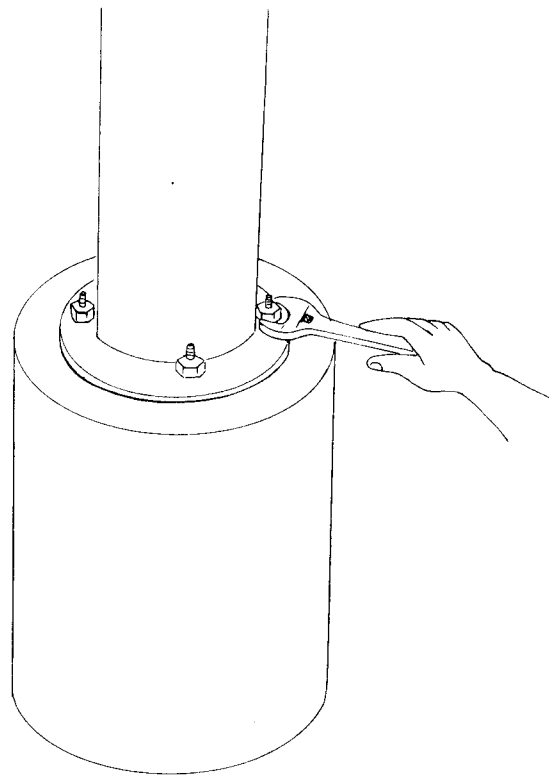


Piston rods

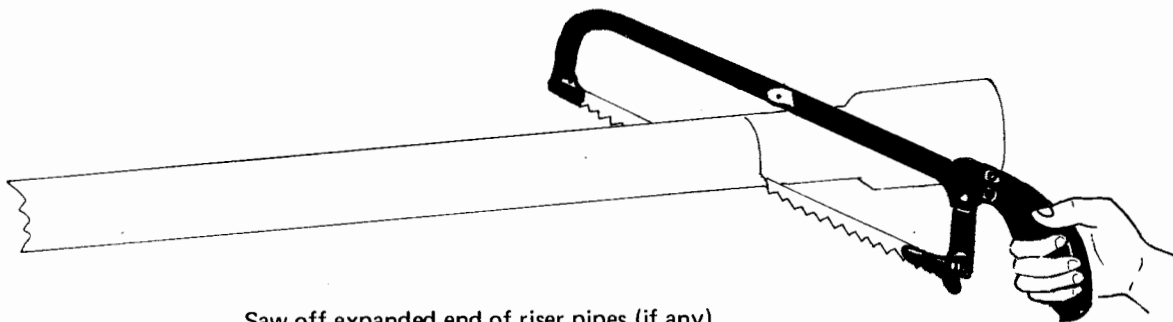
PART 1: INSTALLATION



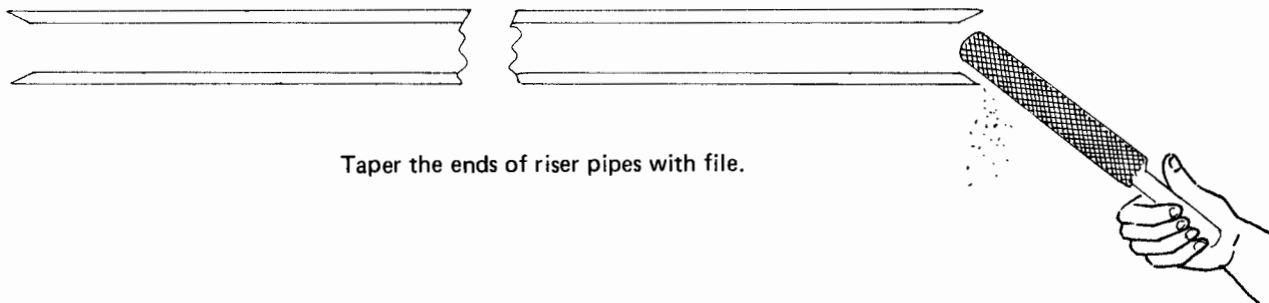
Place pump stand on
concrete pedestal



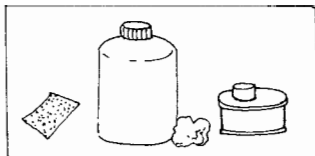
Tighten nuts



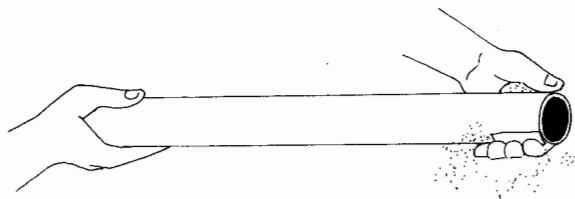
Saw off expanded end of riser pipes (if any).



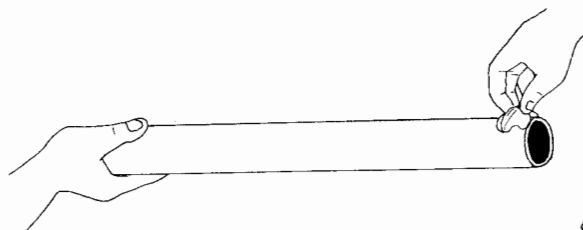
Taper the ends of riser pipes with file.



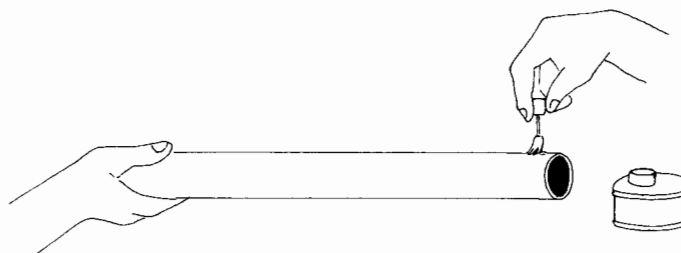
Prepare surfaces for joining
with PVC cement



1. Clean surface with
sand paper



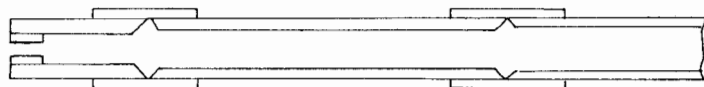
2. Clean surface with rag
soaked with spirit.



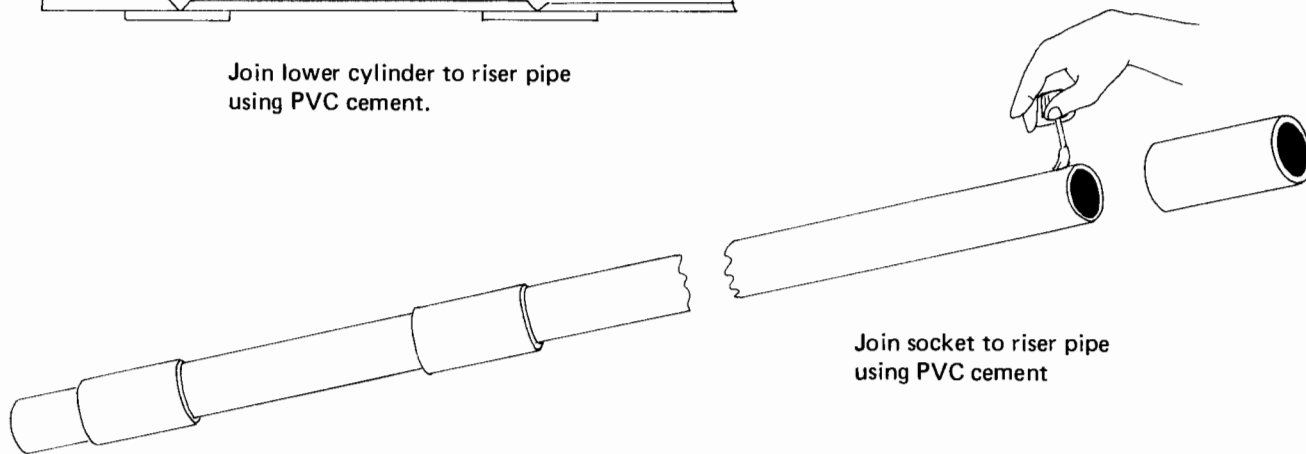
3. Apply PVC cement



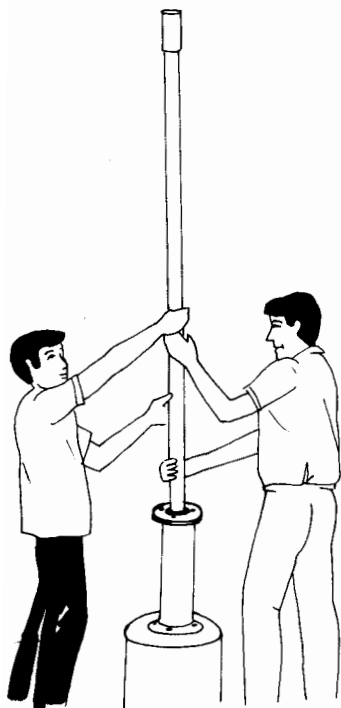
Prepare surfaces for joining
with PVC cement



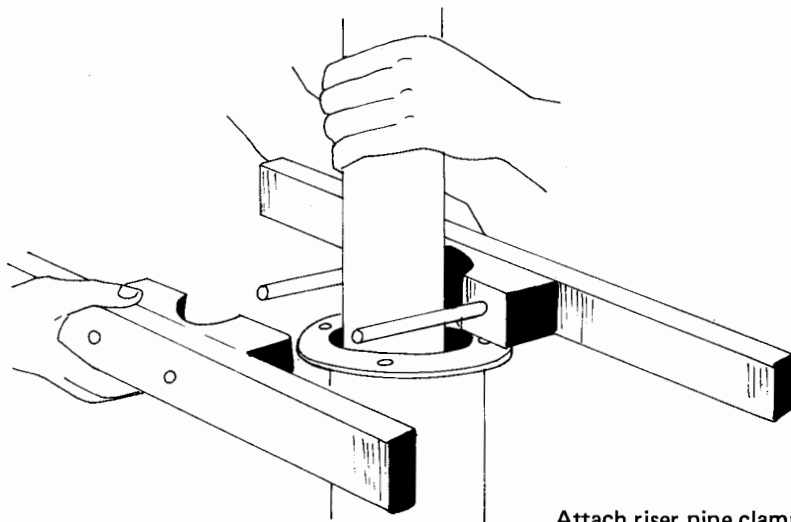
Join lower cylinder to riser pipe
using PVC cement.



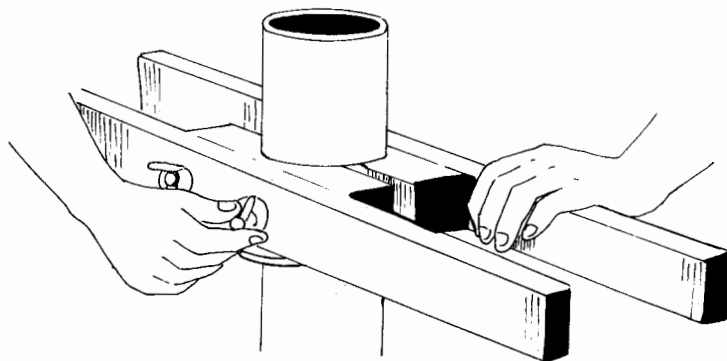
Join socket to riser pipe
using PVC cement

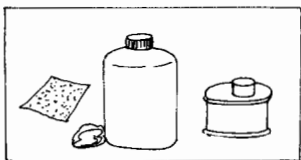


Lower cylinder and riser pipe into well.

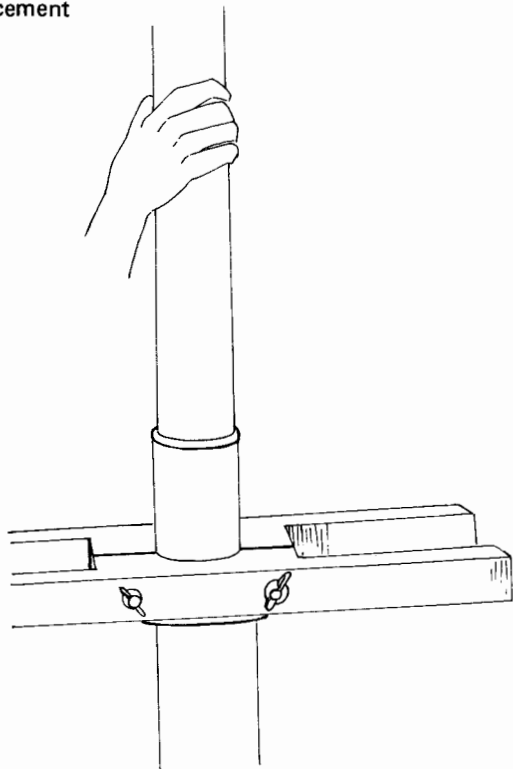
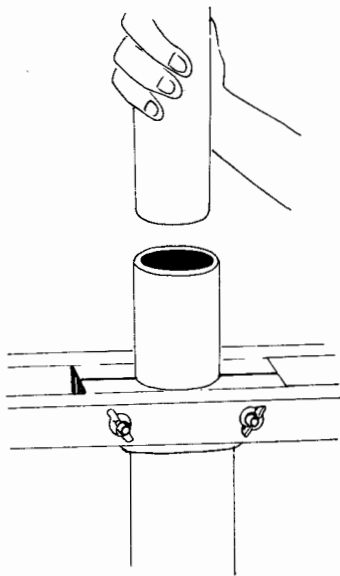


Attach riser pipe clamp to keep it in position.

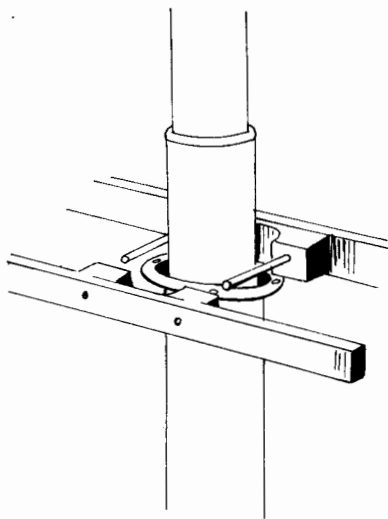




Prepare surfaces for joining
with PVC cement

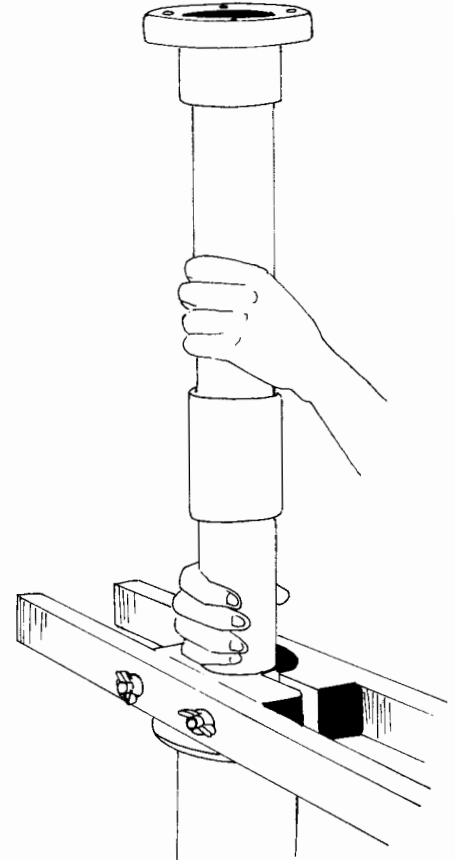
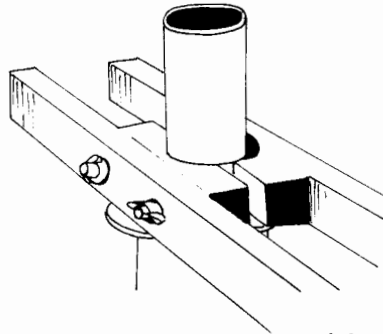


Join more riser pipes if necessary
using PVC cement

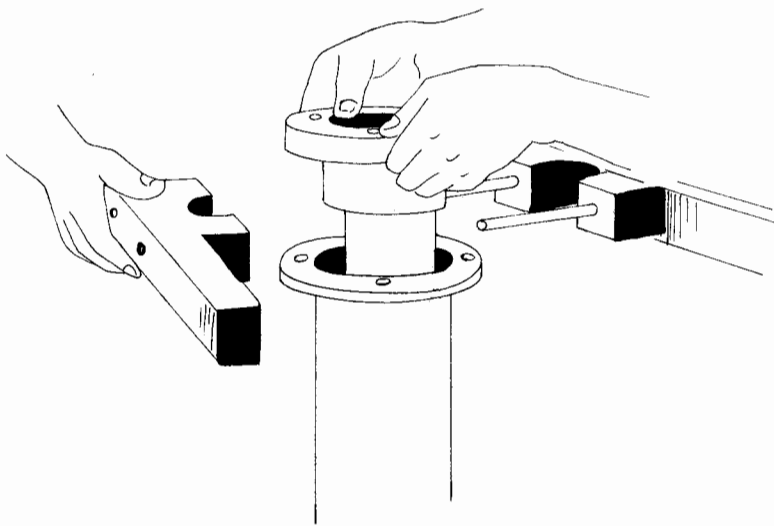




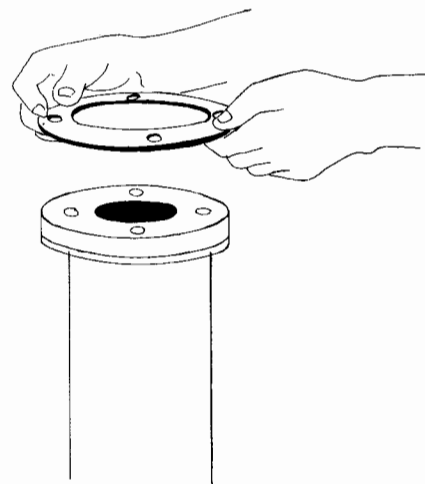
Prepare surface for joining
with PVC cement



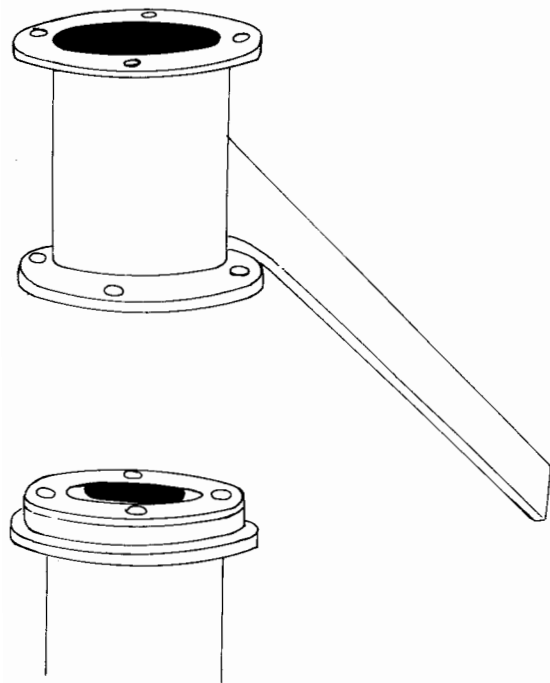
Join upper cylinder to riser pipe
using PVC cement



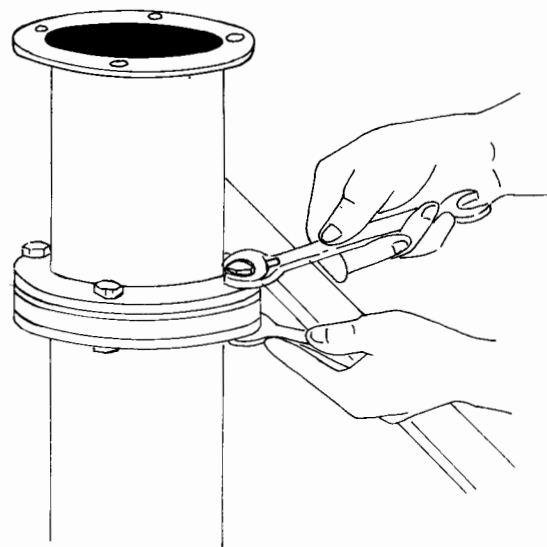
**Remove clamp and lower
flange onto stand.**



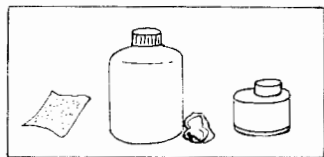
Place gasket on flange



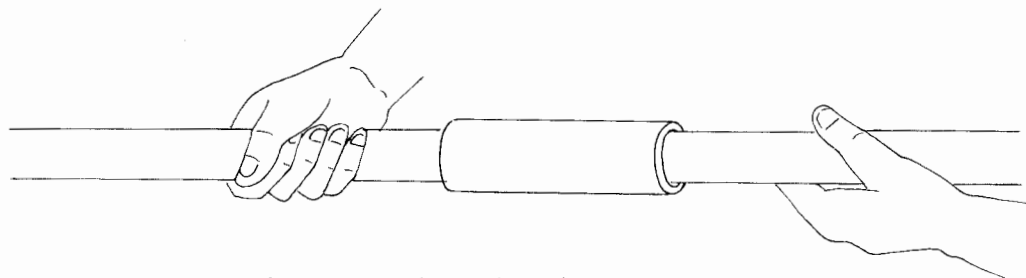
**Place spout in desired
direction of water outflow**



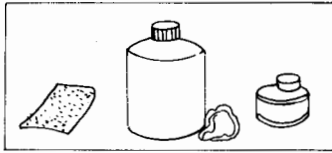
Tighten nuts.



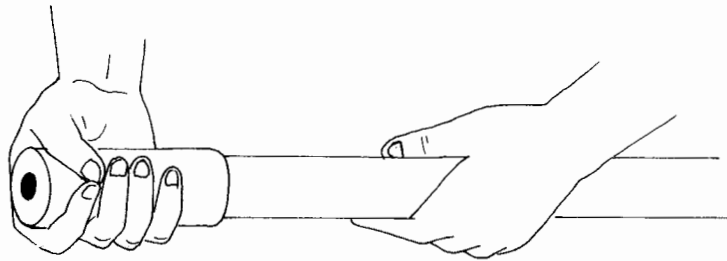
**Prepare surfaces for joining
with PVC cement**



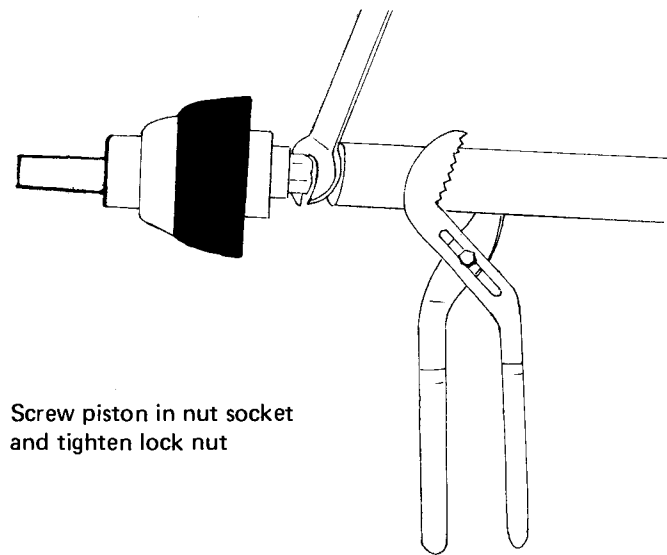
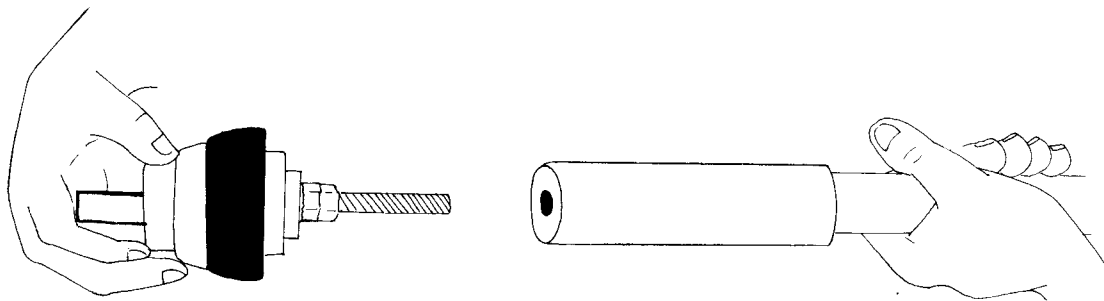
**Join piston rods together using
sockets and PVC cement.**



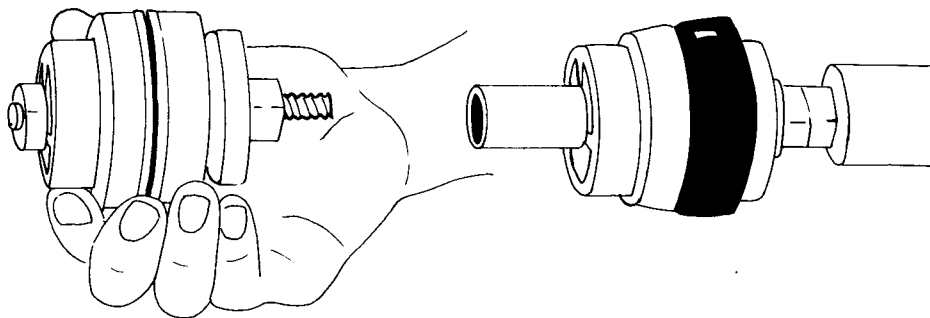
**Prepare surfaces for joining
with PVC cement**



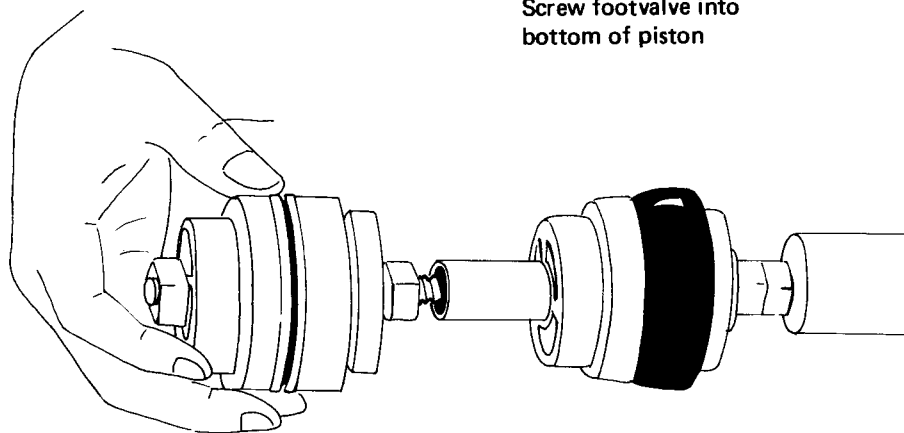
Join nut socket to one end of piston rod.



**Screw piston in nut socket
and tighten lock nut**

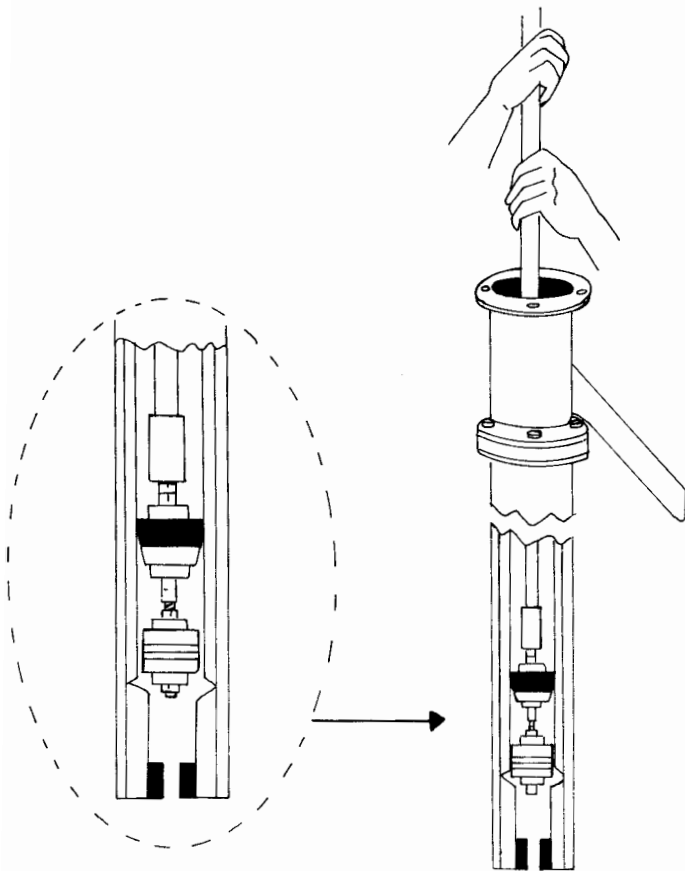


**Screw footvalve into
bottom of piston**

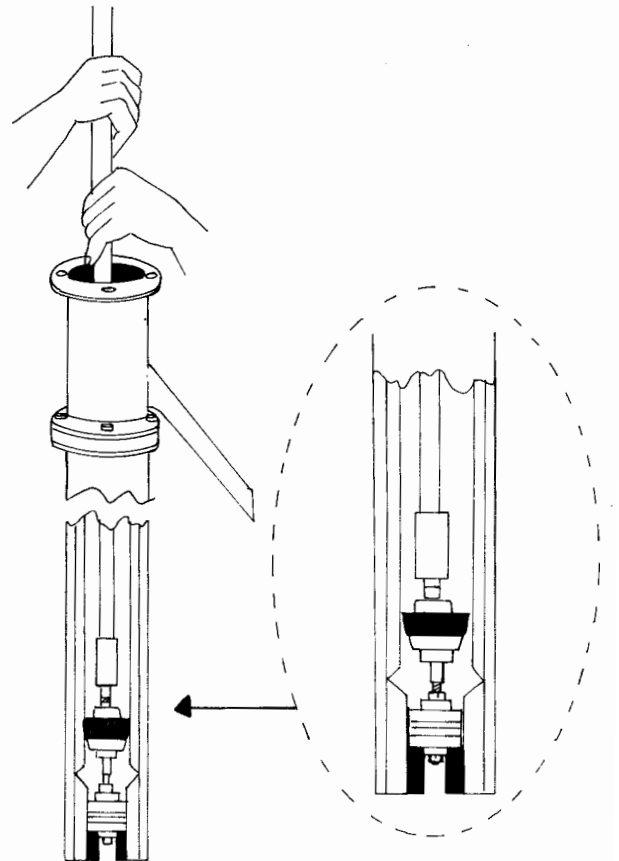




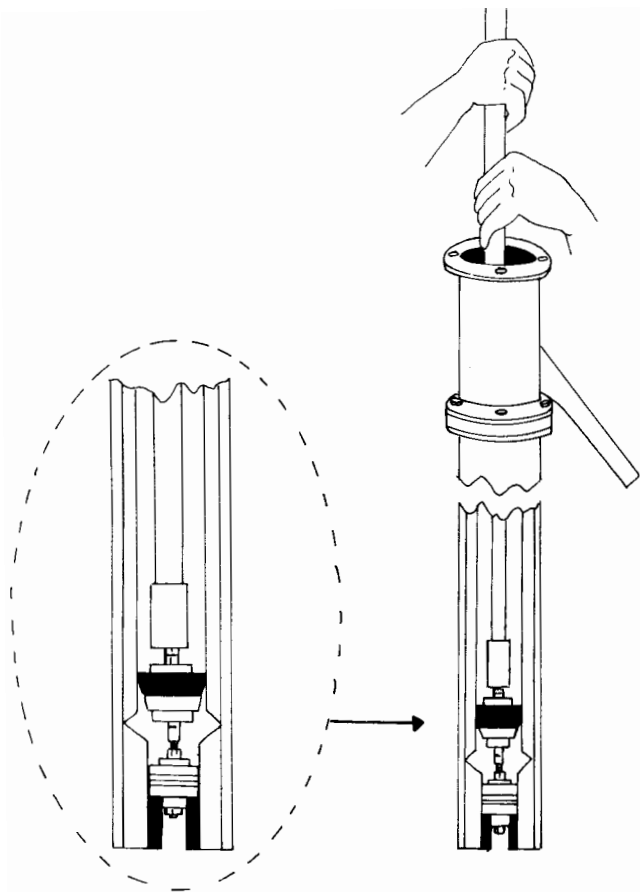
Lower footvalve and piston into cylinder



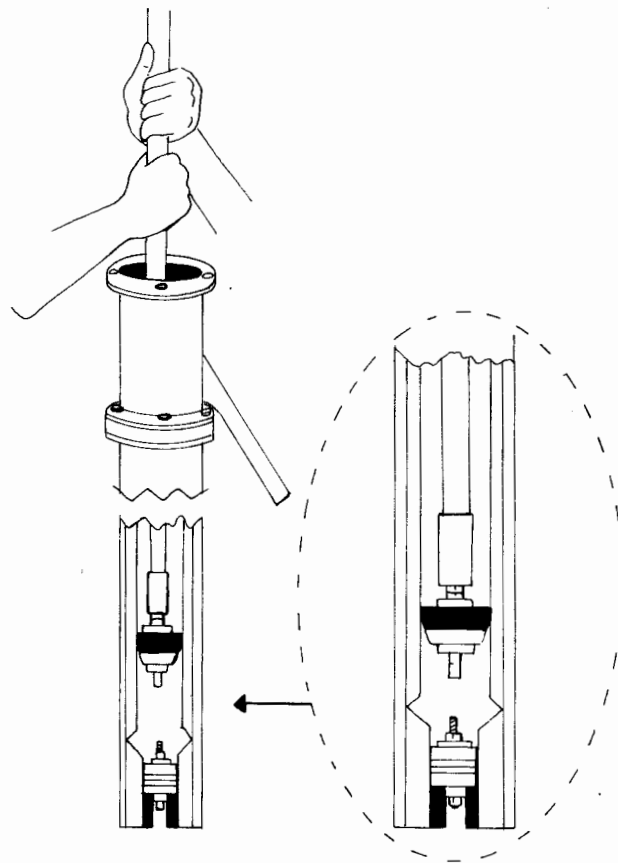
Lower footvalve until it stops at the top of valve seat.



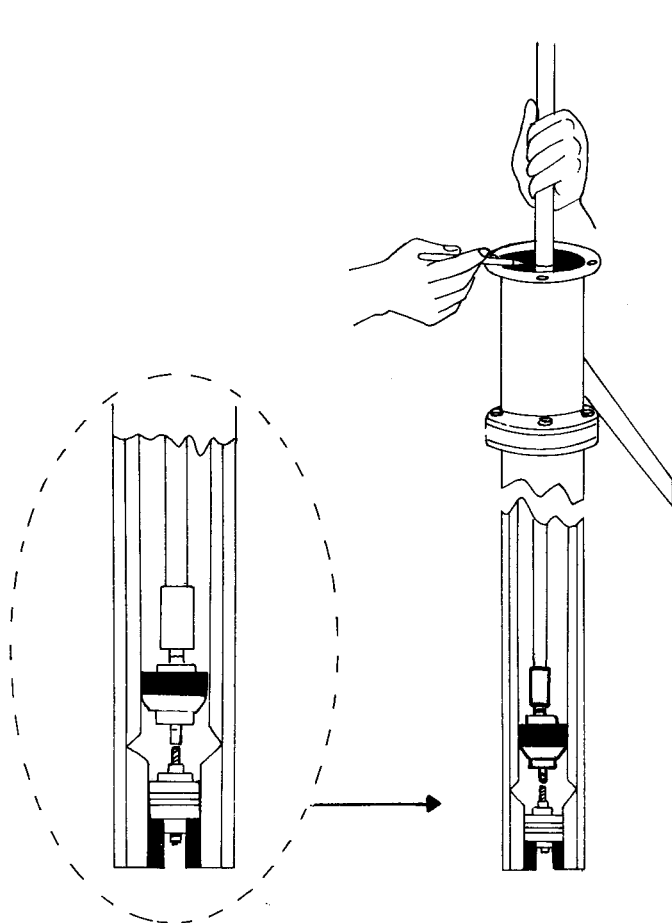
Push footvalve into valve seat.



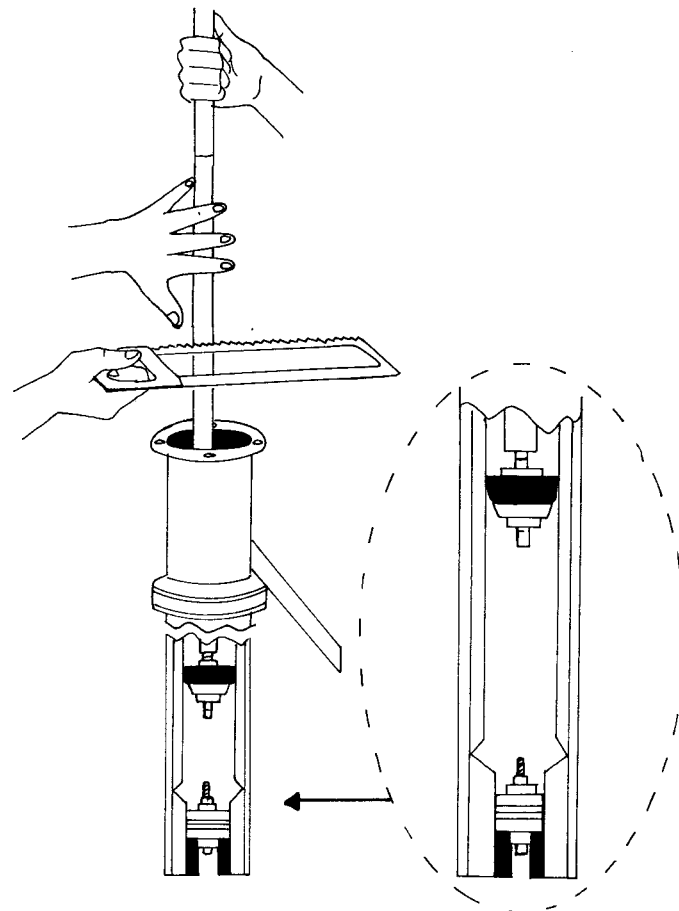
Turn piston rod anticlockwise



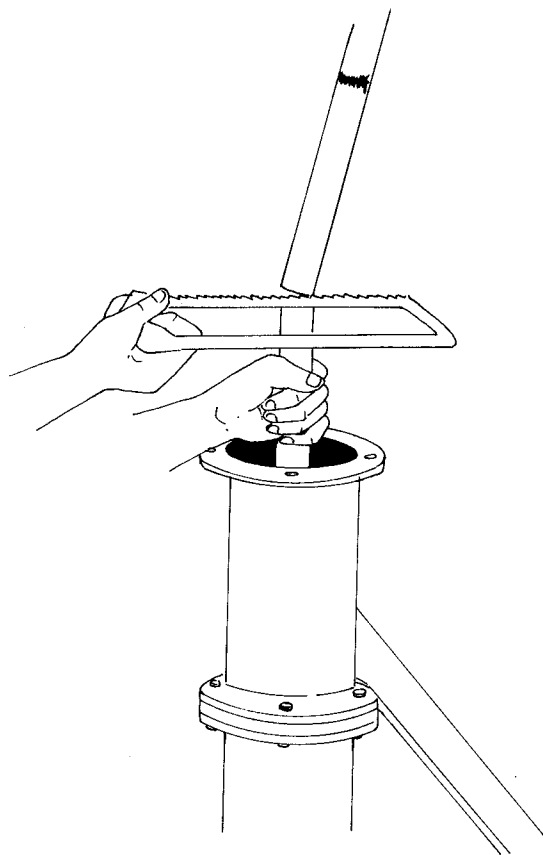
to detach piston from footvalve.



With piston touching footvalve
make mark on piston rod.

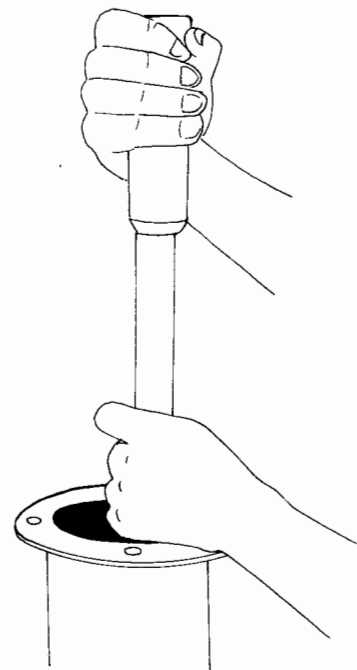
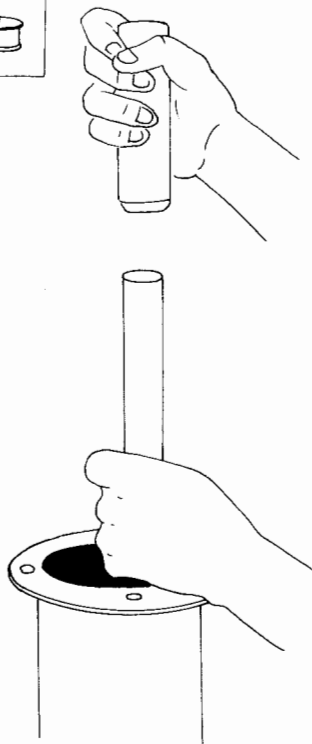


Raise piston rod and cut it at
one hand span below mark.

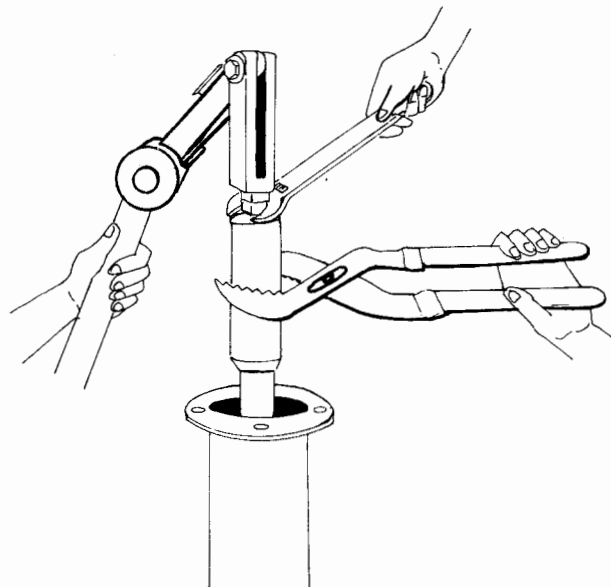
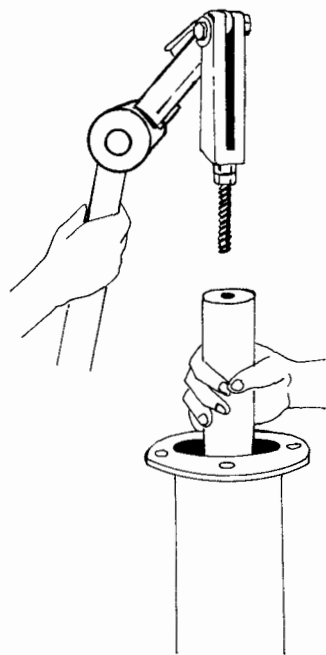




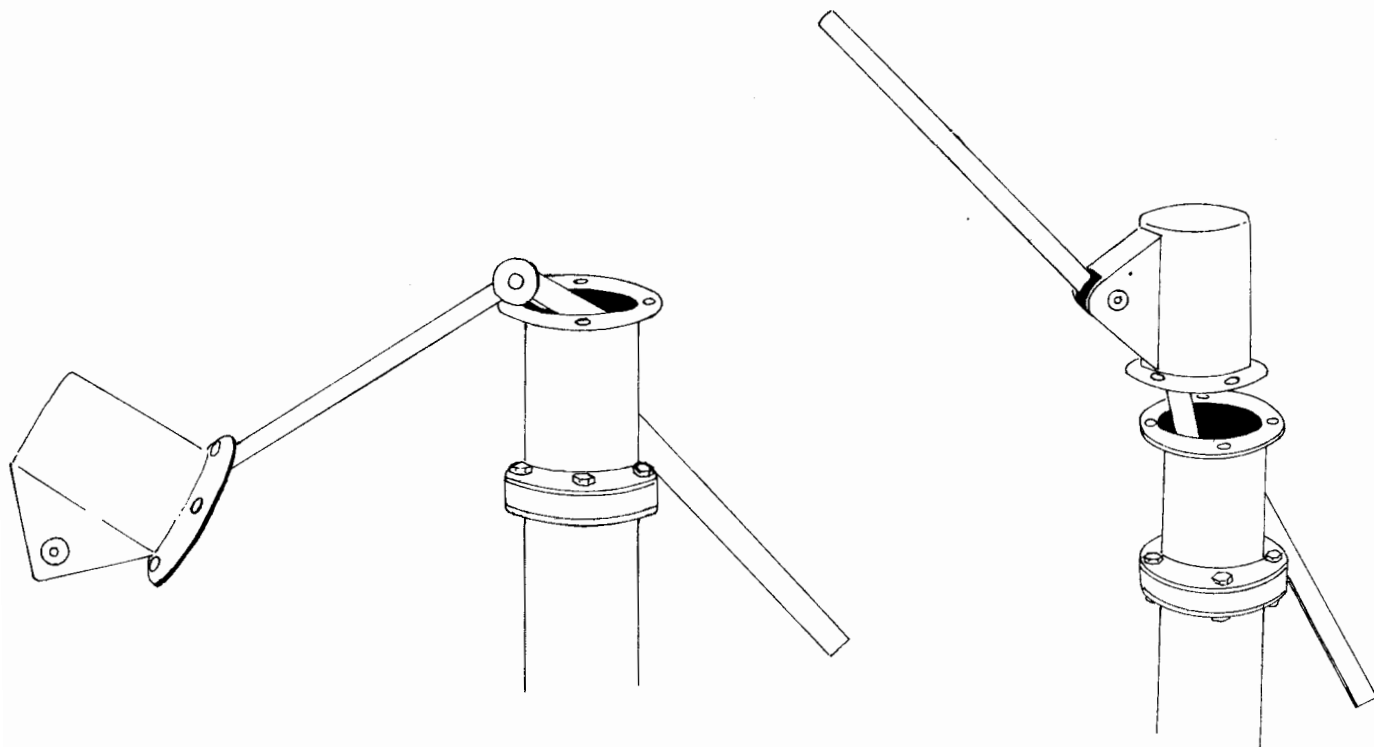
Prepare surfaces for joining
with PVC cement.



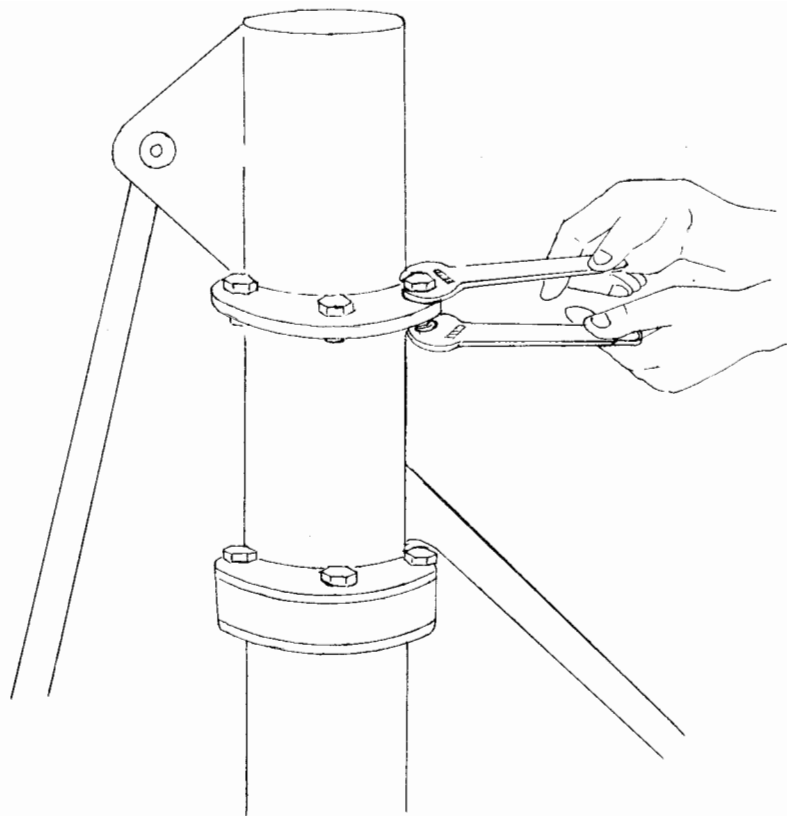
Join socket nut to piston rod using PVC cement



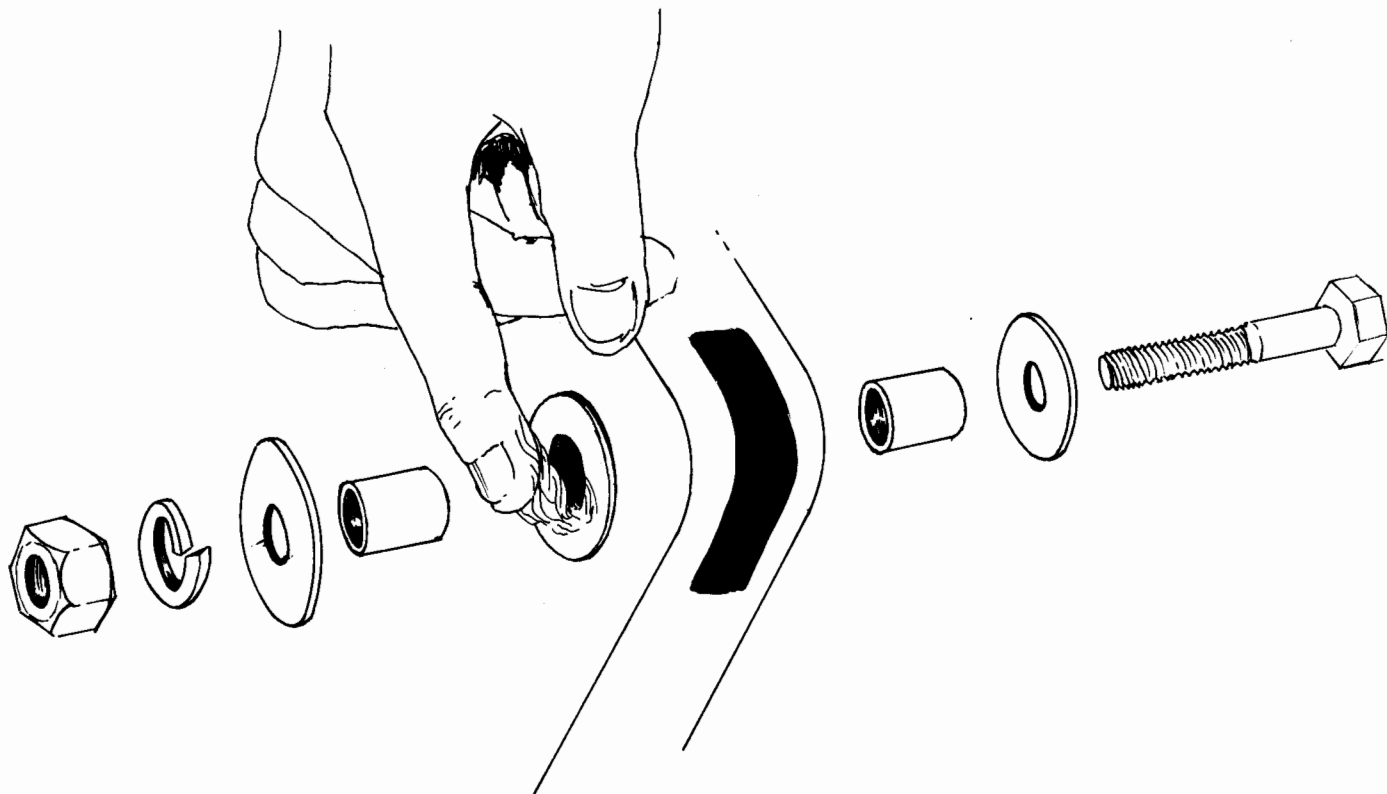
Attach handle to piston rod and tighten lock nut



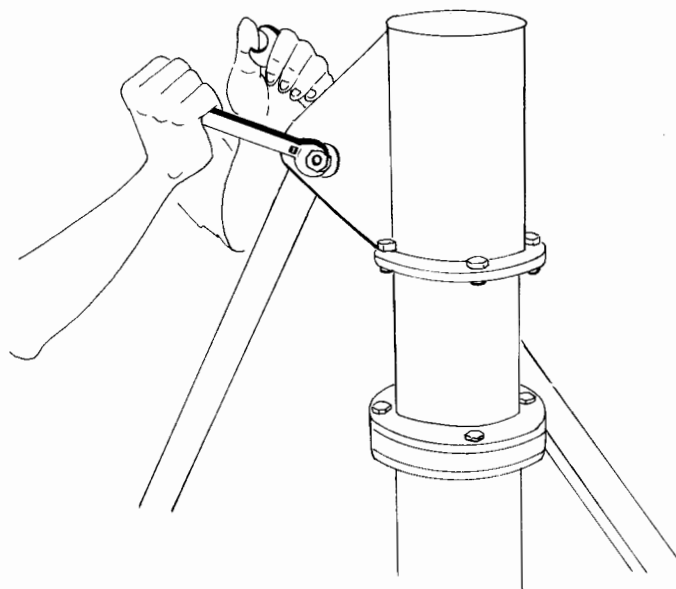
Place cover through handle



Tighten nuts



Apply grease into plastic bushes in cover

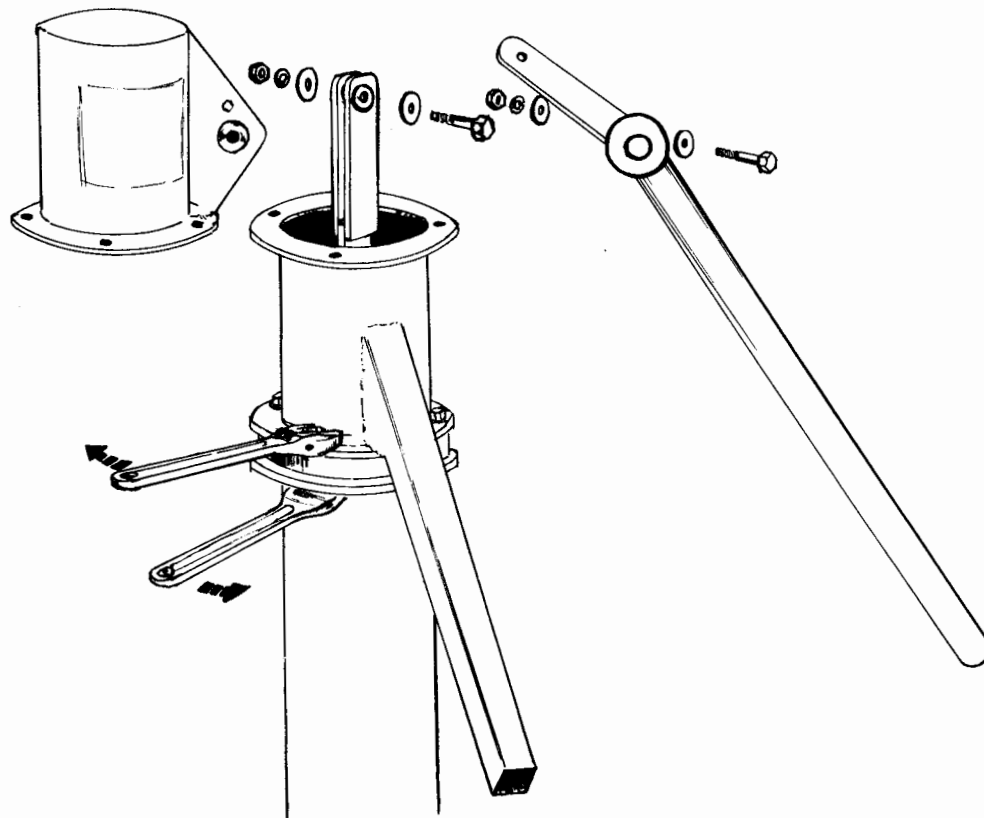


Insert pivot bolt and tighten

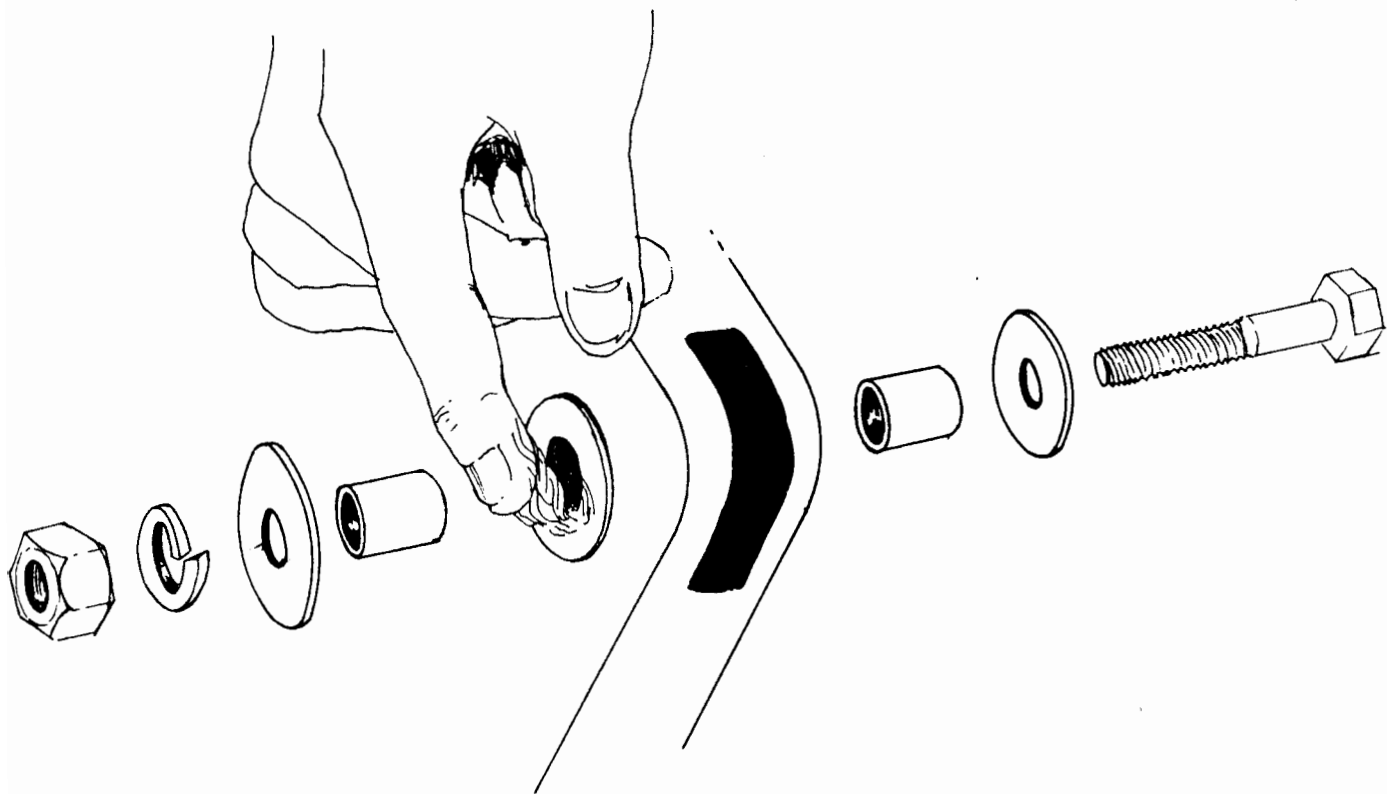


Pump until water is delivered.

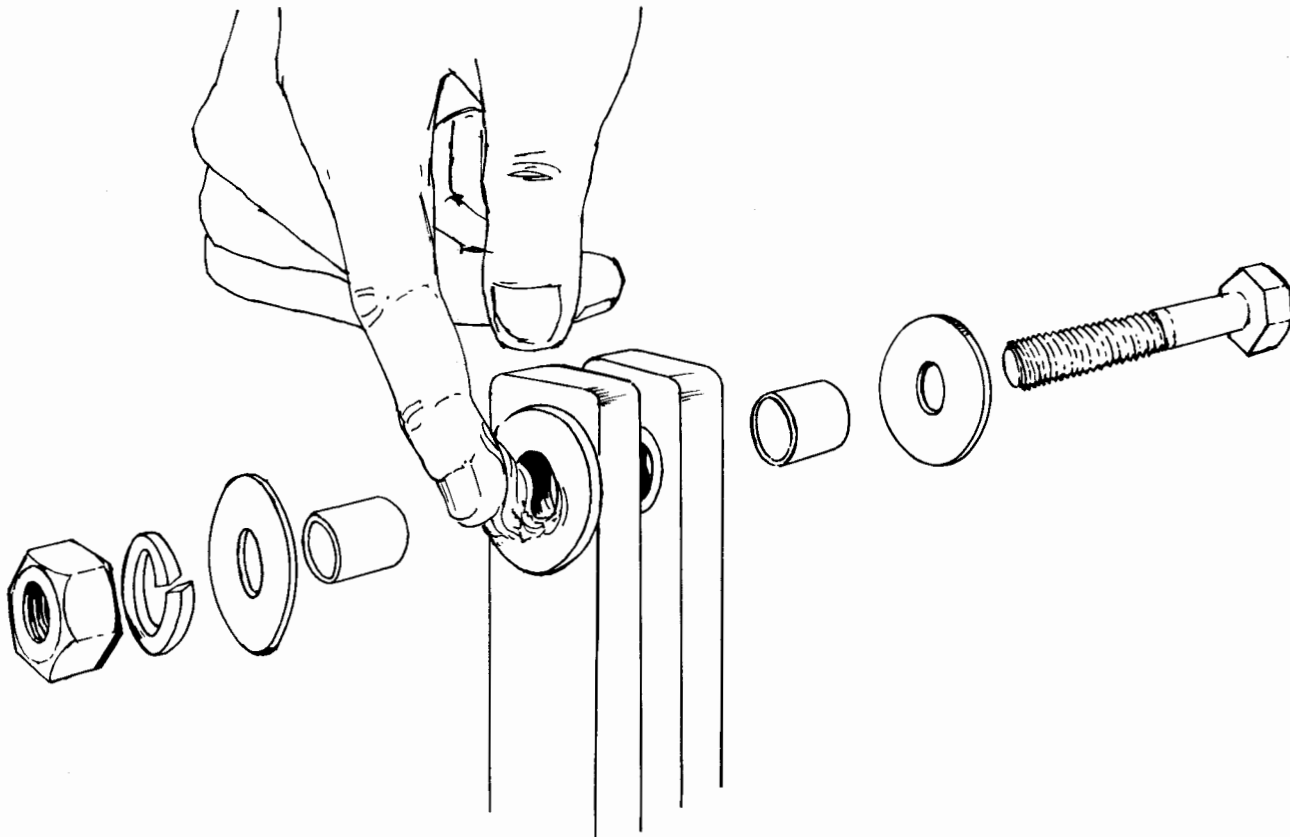
PART 2: MAINTENANCE



Tighten all nuts and bolts, apply grease to plastic bush in piston rod and cover every 6 months.



Apply grease into plastic bushes in cover



Apply grease into plastic bushes

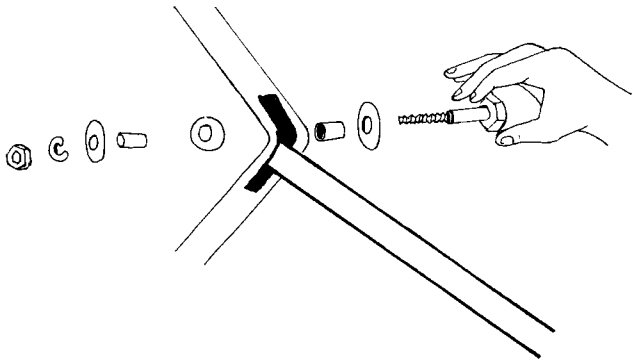
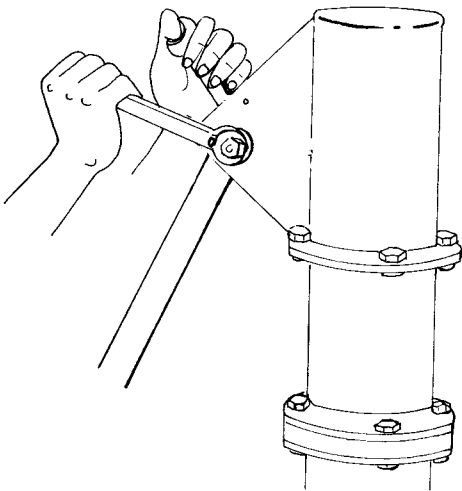
PART 3: REPAIR

Problem 1

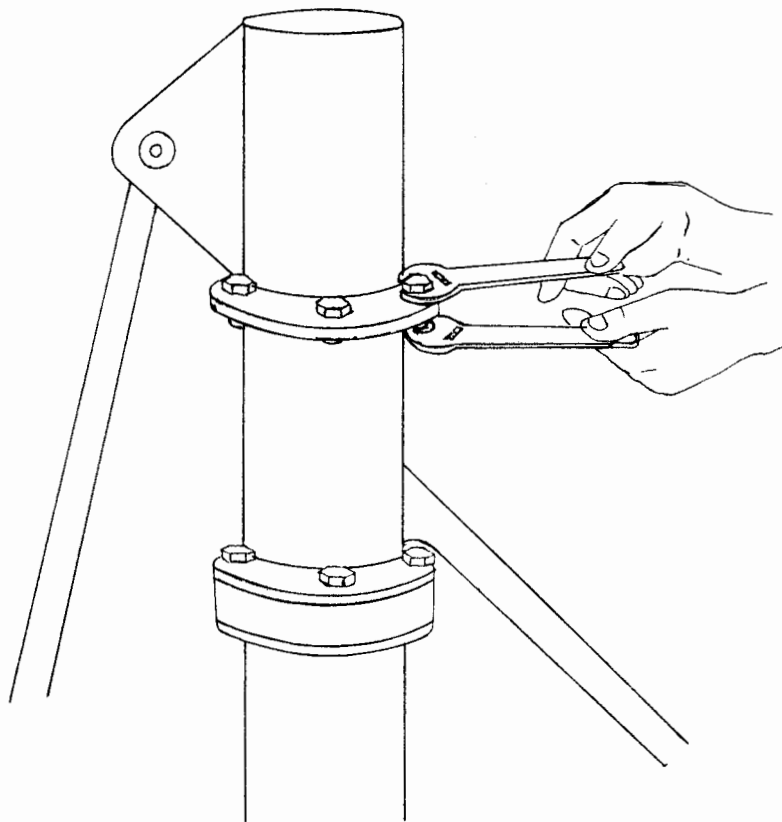


No water!

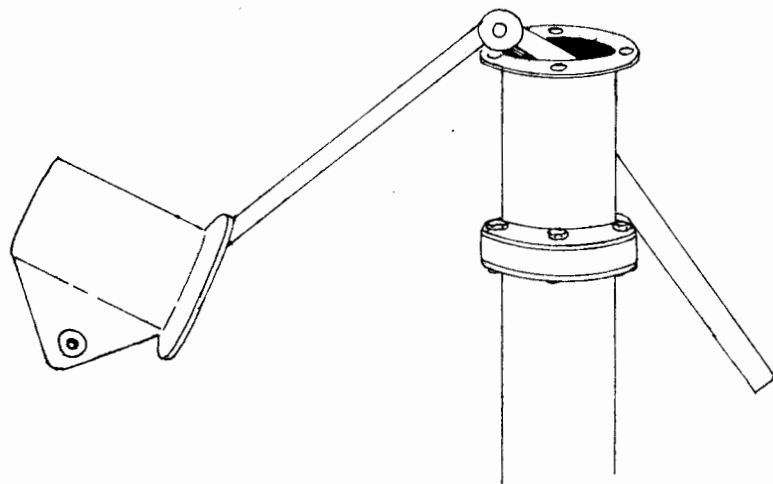
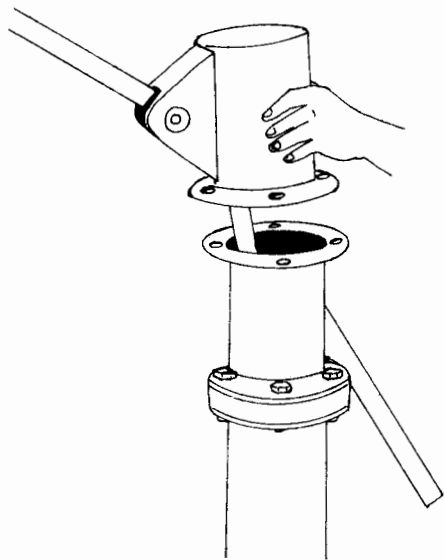
Solution 1



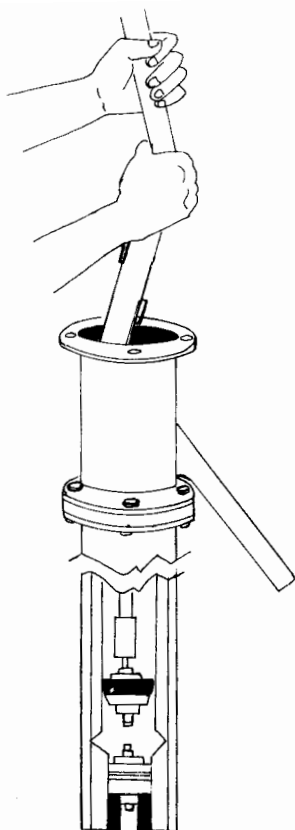
Remove pivot bolt



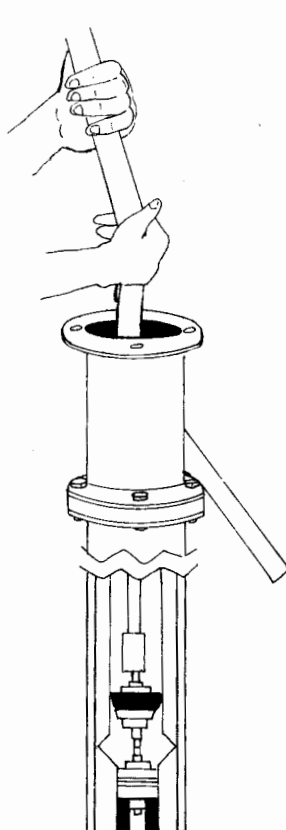
Remove nuts



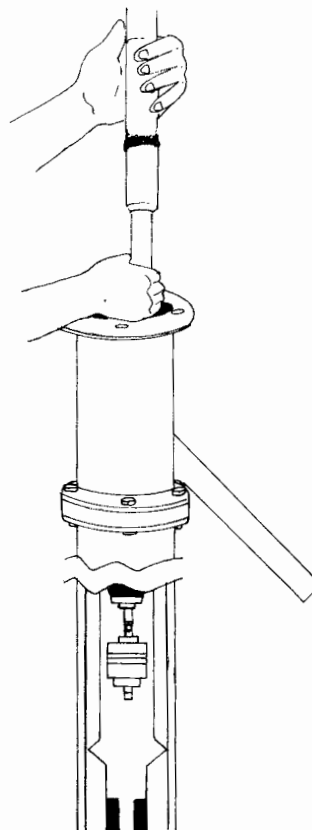
Remove cover through handle



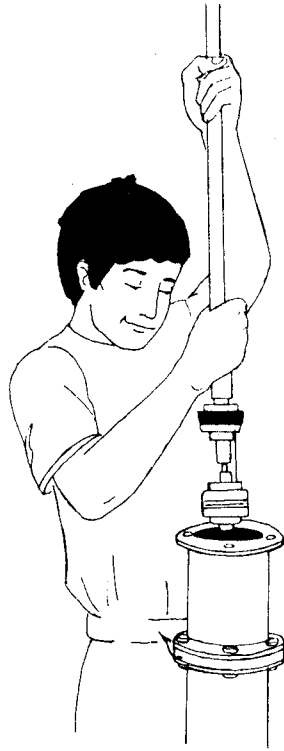
Lower piston rod.



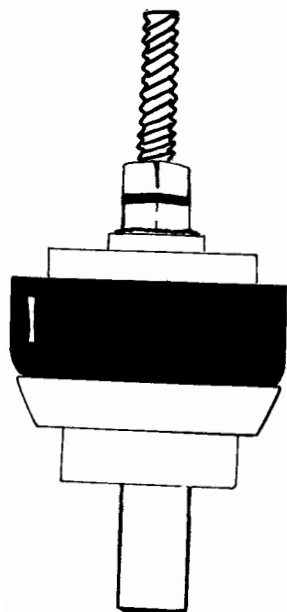
**Screw piston onto
footvalve**



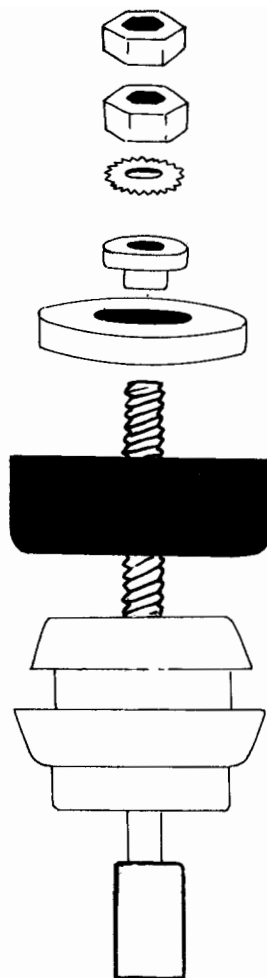
**Pull to extract footvalve
from valve seat.**

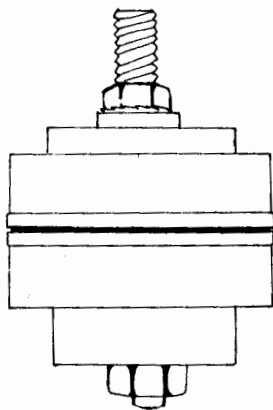


Pull out piston and footvalve

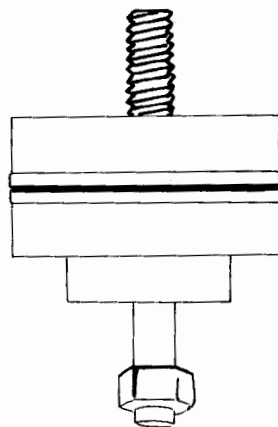
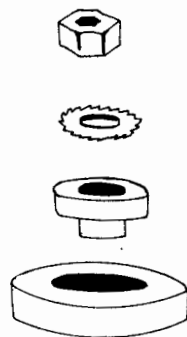


Inspect piston
Replace worn parts.

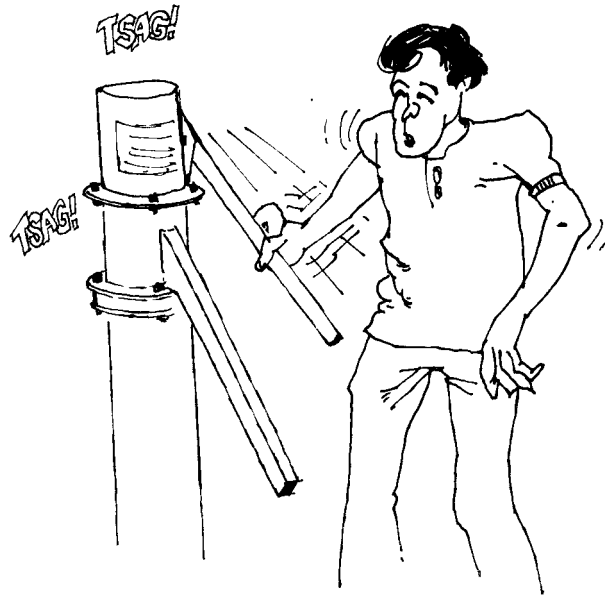




**Inspect footvalve.
Replace worn parts**



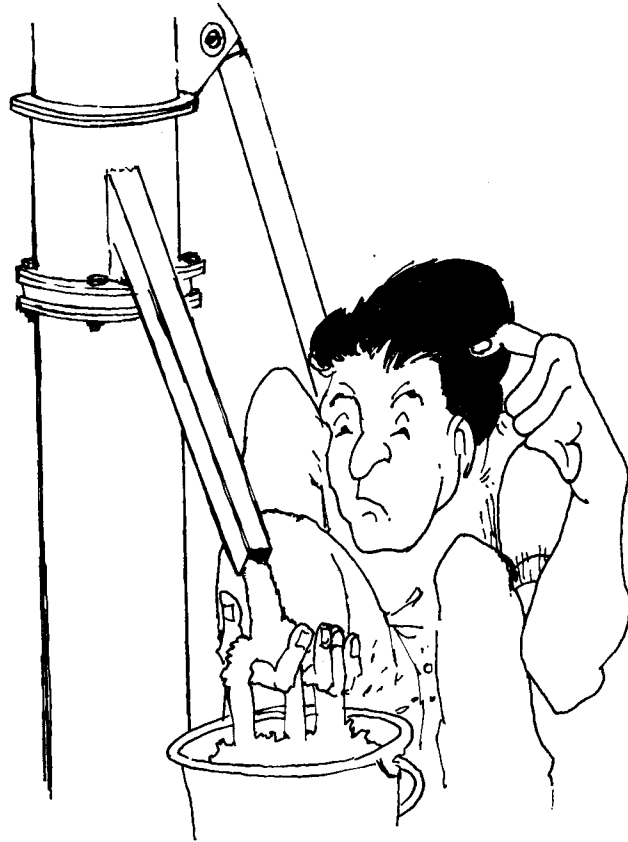
Problem 2



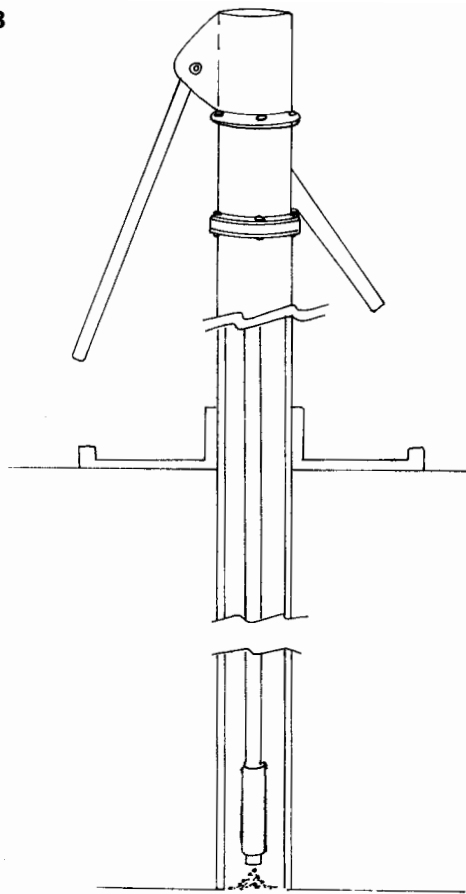
Still no water



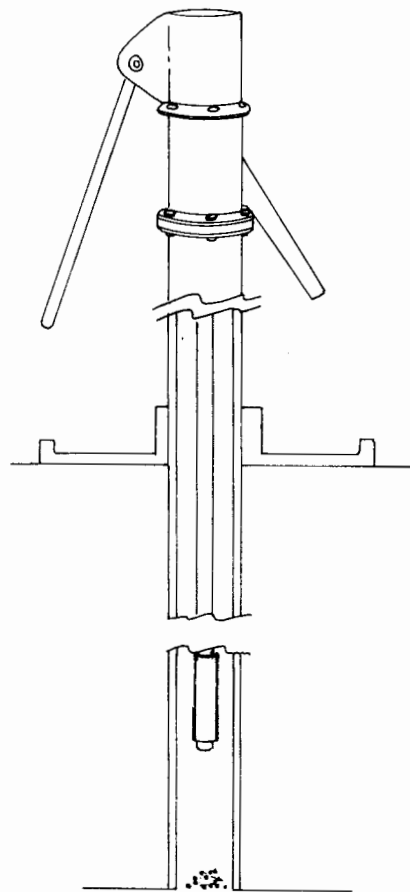
Problem 3



Solution 3



Cylinder too near bottom



Shorten riser pipe until cylinder is about 3 metres from bottom of well

