

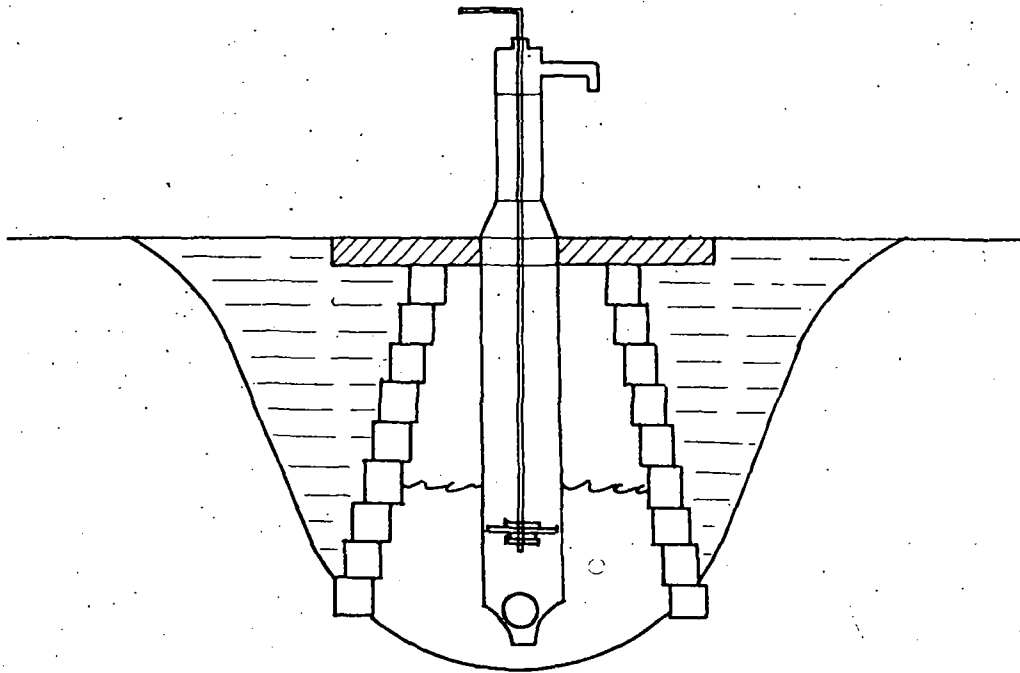
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The Salawepump

construction manual



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General

The Salawe pump is a simple pump with you can build yourself. Originally the pump was designed by Rev. G. Cotter M.M. for the inhabitants of Salawe Village in Tanzania.

Where/when to use? With this pump water can be pumped from a maximum depth of 6 meter (about 20 feet) for example in an existing pit or pool.

Essentials: You build two parts:

1. Pit of self-made bricks (maybe you got one already)
2. Pump, made from a steel pipe to be fastened in a cover plate.

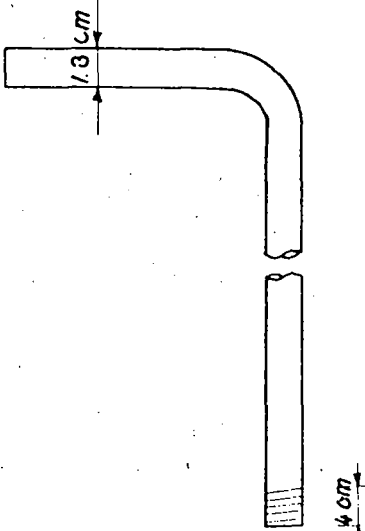
Advantages:

1. Clear water; There is protection against debris from leaves, children, animals etc.
2. Cheap; cost of materials: steel pipe plus two bags of cement, about US \$ 40,-
3. Construction time two days: one day you make the bricks, the next day you build the pit and mount the pump.

Parts

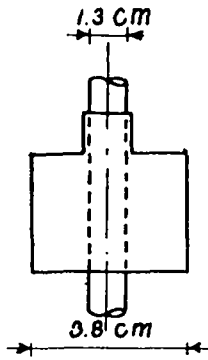
If the material is not available in the proper sizes, other sizes can be used; however, make sure that all parts fit together.

1. Pump handle



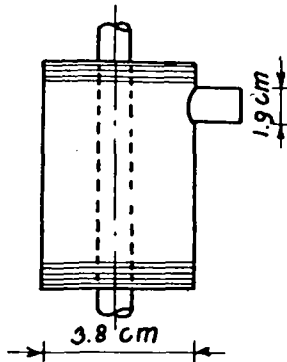
Made from a steel rod (as used in reinforced concrete), $\frac{1}{2}$ " or 1.3 cm in diameter. The bottom portion of the rod should be threaded over a length of $1\frac{1}{2}$ " (4 cm), so that parts nr. 12 through 16 which form the plunger and pressure valve can be screwed into the rod. The length of the rod is dependent on the depth of the pit and can easily be calculated. Remember that the rod better be too long than too short!

2. Stopping plug



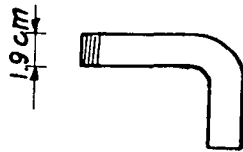
Diameter $1\frac{1}{2}$ " (3.8 cm). The pump handle fits through a $\frac{1}{2}$ " (1.3 cm) hole in the top. The stopping plug is screwed onto the:

3. T-piece



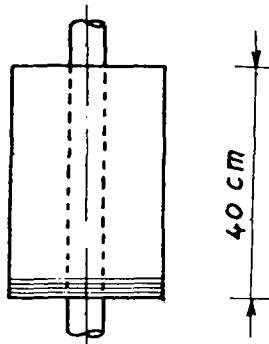
Dimensions $1\frac{1}{2}$ x $\frac{3}{4}$ " (3.8 cm x 1.9 cm). Attached to the side of the T-piece is the:

4. Tap



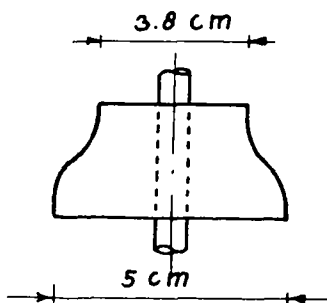
Size: $\frac{3}{4}$ " (1.9 cm). Prevents the wasting of water.

5. Extension pipe



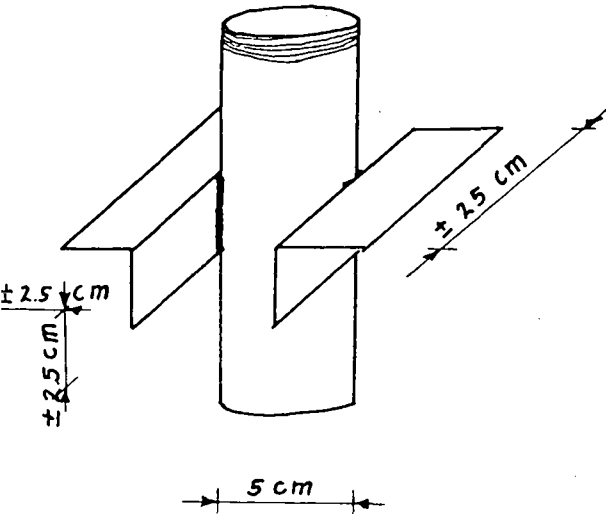
Diameter: $1\frac{1}{2}$ " (3.8 cm); length 15" (40 cm). Both ends of the pipe need to be treaded.

6. Tapering piece



Tapers from 2" (5 cm) to $1\frac{1}{2}$ " (3.8 cm)

7. Coupling piece

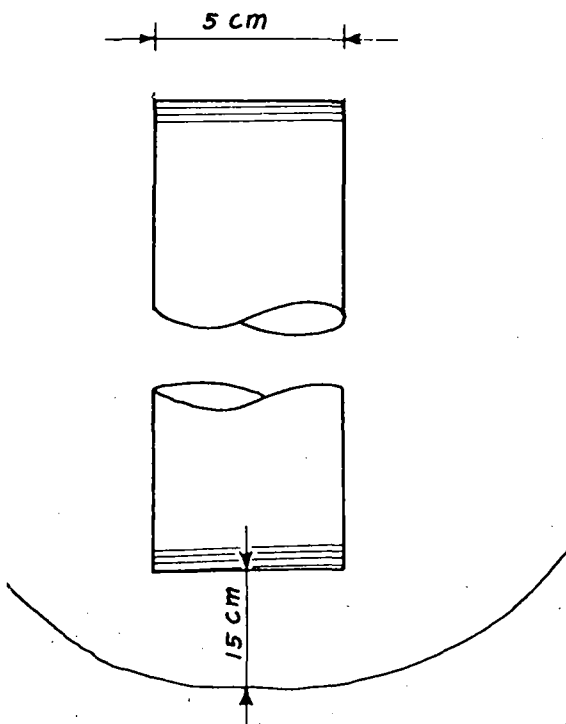


Diameter 2" (5 cm). This coupling piece is to be welded onto two strips of angled steel, each 1" wide and about 10" long (2.5 x 25 cm). Instead of angled steel, sturdy wire netting can be used. Welding is necessary because these parts will be cast in the cover plate and without welding the coupling piece would become detached too easily. During the welding operation care should be taken not to damage the internal thread; for example, put cotton waste inside.

8. Cover plate

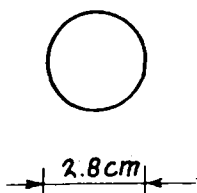
To cover the pit in order to keep out dirt. Made of concrete. For construction, see instructions under Pit Construction

9. Pump tube



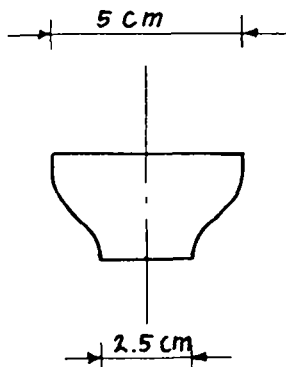
Consists of 2" (5 cm) diameter pipe. Again, the length of the tube is dependent on the depth of the pit, but should be shorter than the depth of the pit by 6" (15 cm). Once more, better too long than too short! The top of the tube has to be threaded and will be attached to the coupling piece. At the bottom will be the bottom valve (see also 11).

10. Steel ball



Part of the bottom valve. Diameter 1 1/8" (about 2.8 cm). Made from stainless steel, if possible. You can try several balls of different diameter to determine which one gives the best results.

11. Tapering piece



Tapers from 2" (5 cm) to 1" 2.5 cm).

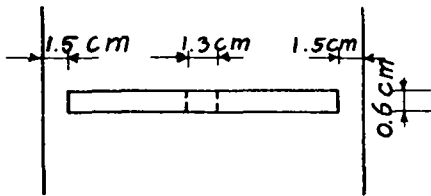
Note: Parts nr. 10 and 11 constitute the bottom valve. Construction is as follows: After the pit has been built, cover plate nr. 8 with pump tube nr. 9 attached, will be placed on top of the pit. Pump tube nr. 9 will then be cut to the proper length such that the distance between the bottom of the tube and the bottom of the pit is 6" (15 cm). The bottom end of the tube must be threaded and the tapering piece screwed onto it. If threading is difficult, an alternative construction is possible (see under Bottom Valve).

12. Bolt



Attach and move to the end of the thread of the pump handle.

13. Steel ring



Inner diameter: $\frac{1}{2}$ " (1.3 cm). Attach to bottom of pump handle nr. 1. The outer diameter of the ring should be such that the clearance between the ring and the pump tube is about $\frac{1}{16}$ " (0.2 cm). Thickness of ring: about $\frac{1}{4}$ " (0.6 cm).

14. Bolt



Attach to pump handle nr. 1 such that the ring is almost tight, but not quite.

15. Springtype ring



Supporting bolt nr. 14.

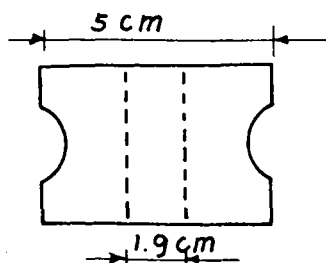
16. Bolt



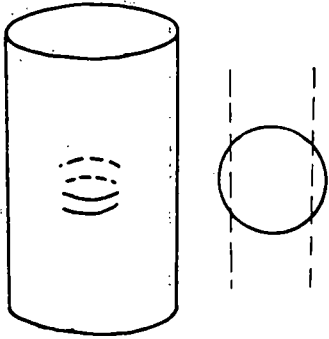
Tighten against ring nr. 15 and bolt nr. 14. Make sure that ring nr. 13 is not entirely tight.

These are the parts of the pump. Now some remarks about the construction of the bottom valve.

Bottom Valve

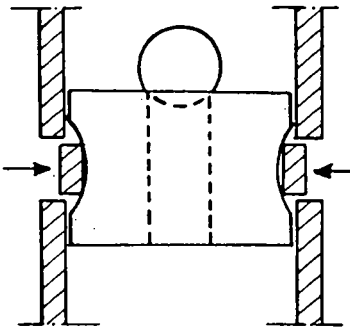


1. It is possible that no thread can be made to attach tapering piece nr. 11 to the pump tube. A similar construction can then be made using a plastic ring with outer diameter of 2" (5 cm), and inner diameter of $\frac{3}{4}$ " (1.9 cm) The ring



should be such that it can be fitted tightly into the pump tube, otherwise the bottom valve will leak.

2. After pump tube nr. 9 has been cut to the proper length, four cuts are made in the tube in a direction perpendicular to the length of the tube and at a distance of about $\frac{1}{2}$ to 1" (1.3 to 2.5 cm) from the bottom of the tube.



3. The plastic ring, which should have a groove around the outside, is pushed inside the tube from the bottom side up. Then the tube is indented at the cuts and the ring should be tight.

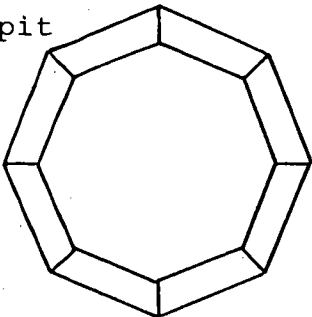
Construction of the pit

Before you install the pump, the pit should be built. This is to be done with trapezium-shaped bricks, made with concrete. There are two kinds of bricks: large ones and small ones. They are to be cast in wooden moulds (see figure 2).

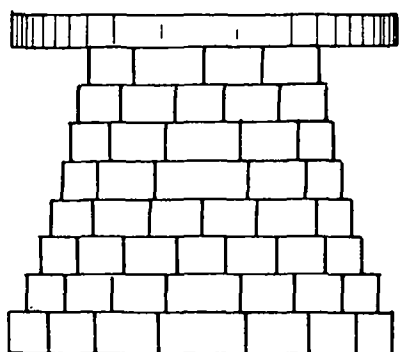
The shaping of the bricks

1. With the largest opening down, put the moulds on a smooth surface (like plywood).
2. Mix cement with sand (ratio 1 : 10)
3. Cast the mixture into the two moulds.
4. Press with a stick or something similar.
5. The moulds can be lifted immediately.

Construction of the pit

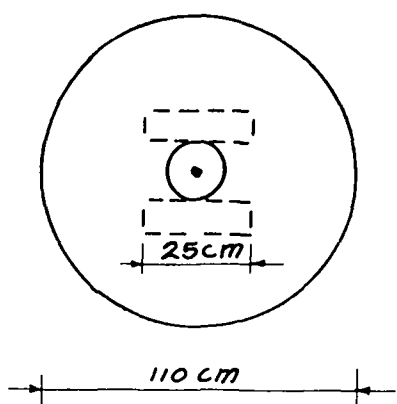


1. Remove the water from the pit (save two buckets full).
2. At the bottom of the pit, make a circle from 9 large bricks. Make sure the bricks are level, otherwise the construction will be tilted. No mortar is needed.



3. On top, make a circle of 8 large bricks and 1 small one, etc.
4. End up with a ring of 9 small bricks. If the top of the construction is not yet level with the ground, then continue with circles of 9 small bricks.
5. Fill up the exterior with sand or soil.

Cover plate 8



1. Make a circular mould from carton or tin with a diameter of 42" (110 cm) so that the plate will cover the pit. Height of the mould: about 2½" (6.3 cm).
2. Put the mould on a smooth surface.
3. Put coupling piece nr. 7 with welded strips in the center of the mould.
4. Fill with mixture of cement, gravel and sand (ratio 1:2:4). Keep the coupling piece straight and keep the cement out of it (cover with paper).

You can reinforce the cover plate by incorporating a piece of sturdy wire netting.

Place the wire just off the bottom, on some gravel.

Mounting the pump

1. Mount pump tube nr. 9 into cover plate nr. 8.
2. Mount the bottom valve according to one of two methods.
3. Deposit cover plate with pump tube and bottom valve on the pit.
4. Attach parts nr. 2 through 6 to each other, pull the pump handle through and attach parts nr. 12 through 16.
5. Sink the pump handle with all parts attached into the pump tube nr. 9 until it rests on the bottom valve.
6. Mount tapering piece nr. 6 on the cover plate and tighten.
7. Lift pump handle nr. 1 about 2 to 3" (5 to 8 cm) and bend the top part. This way one prevents damaging the bottom valve when the pump is in use.

Now the pump is ready for operation.

Pour two buckets of water in the pump tube (this can be done by turning the tap nr. 4 upwards or by loosening the stopping plug nr. 2).

If the handle is moved up and down rapidly, the water will pour out of the tap. The water will be dirty at first, but this will get better in several days.

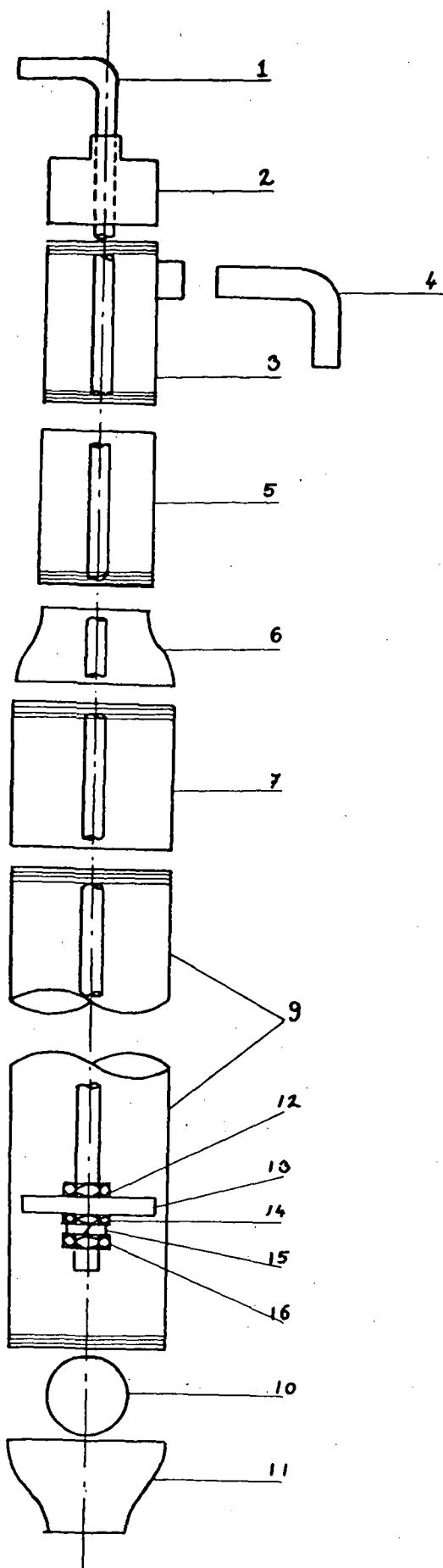
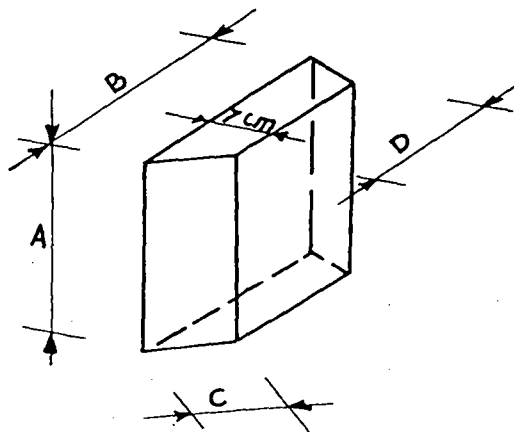
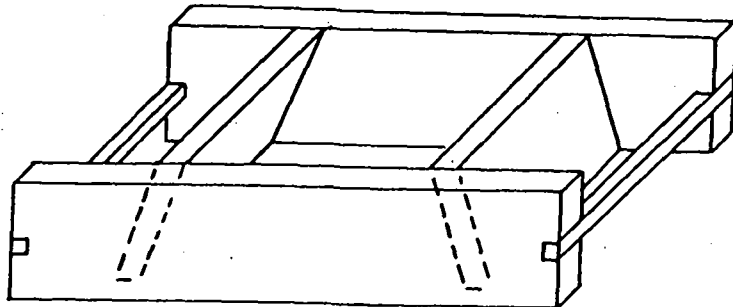


FIGURE 1



Dimensions for:

	Large bricks	Small bricks
A	6" (15 cm)	6" (15 cm)
B	15½" (38 cm)	11½" (28.8 cm)
C	3" (7.5 cm)	3" (7.5 cm)
D	13" (32.5 cm)	9¼" (23.1 cm)

FIGURE 2

YOUR OPINION

Very often, your own experiences from the field provide data not normally available in Holland. Therefore, it will be very important for TOOL and for the authors of this booklet to learn from your experiences. TOOL then can pass them on to other fieldworkers. We thus ask you to fill out this questionnaire and to send it to TOOL.

Please try to find some time to do this, it is most important.

PRESENTATION

Could you understand the text readily?

If not, which parts, and why?

Were the drawings easily understandable?

If not, which ones and why?

Do you have any suggestions yourself for a different presentation?

TECHNICAL DATA

Did the construction give you any serious problems?

If so, with which parts?

Could you explain why?

Other suggestions:

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It does this by making available knowledge and technology adapted to the local situation and social situations of these groups.

Such information is designed to be put into practice as far as possible by the people's own activities.