

rate of about 80 strokes per minute. There is a definite speed at which the pump works best and the operators will soon get the "feel" of their own pumps.

In building the two larger size pumps it is sometimes necessary to strengthen the

pipe to keep it from collapsing if it hits the side of the well. It can be strengthened

by forming "ribs" about every 30cm (12") below the valve or banding with bands made from barrel metal and attached with 6mm (1/4") bolts.

The handle is attached to the pump and post with a bolt 10mm (3/8") in diameter, or a large nail or rod of similar size.

Source:

Dale Fritz, VITA Volunteer, Schenectady, New York.

Handle Mechanism for Hand Pumps

The wearing parts of this durable handpump handle mechanism are wooden (see Figure 1).

fig1x105.gif (600x600)

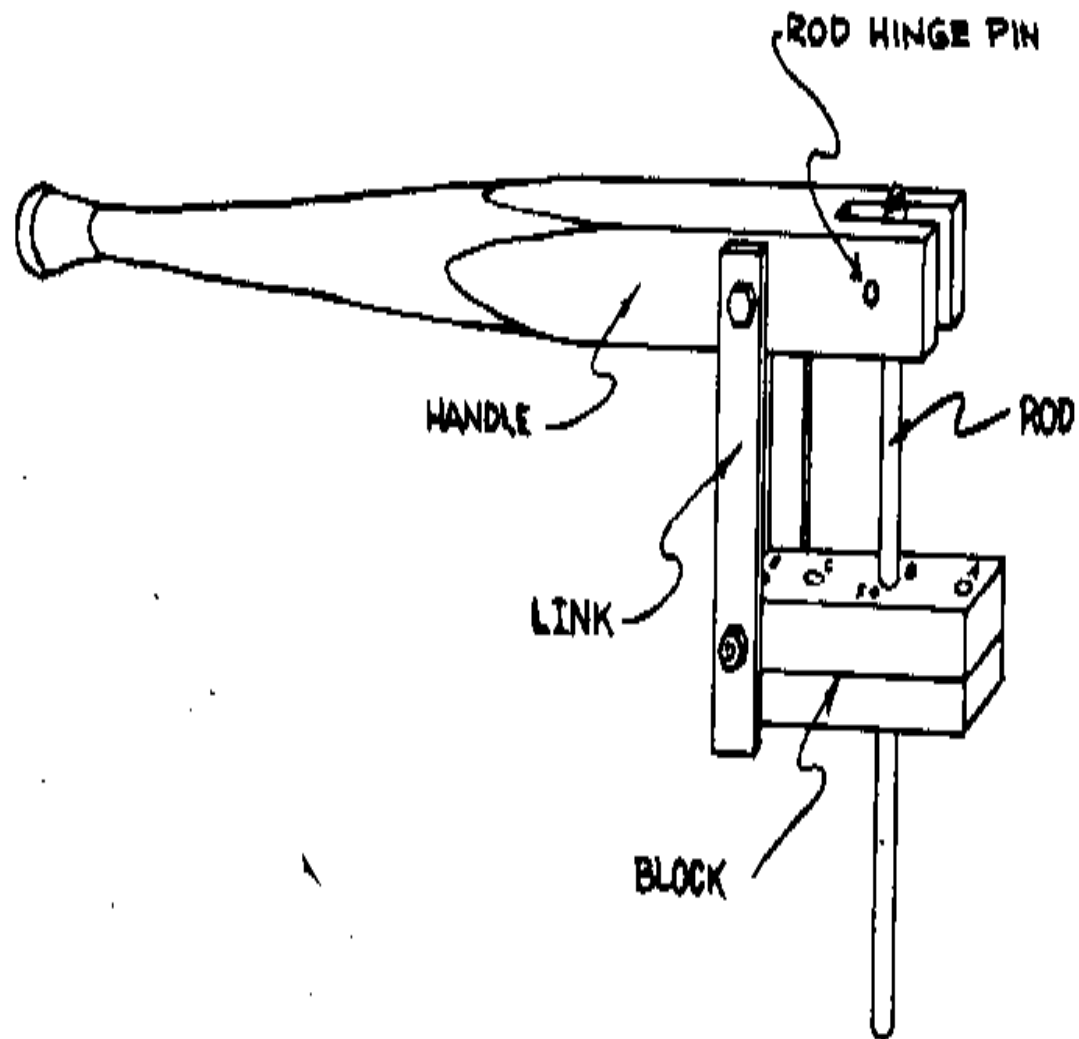


FIG 1

They can be easily replaced by a village carpenter. This handle has been designed to replace pump handle mechanisms which are difficult to maintain. Some have been in use for several years in India with only simple, infrequent

repairs.

The mechanism shown in Figure 1 is bolted to the top flange of your pump. The mounting holes A and C in the block should be spaced to fit your pump (see Figure 6).

fig6x107.gif (600x600)

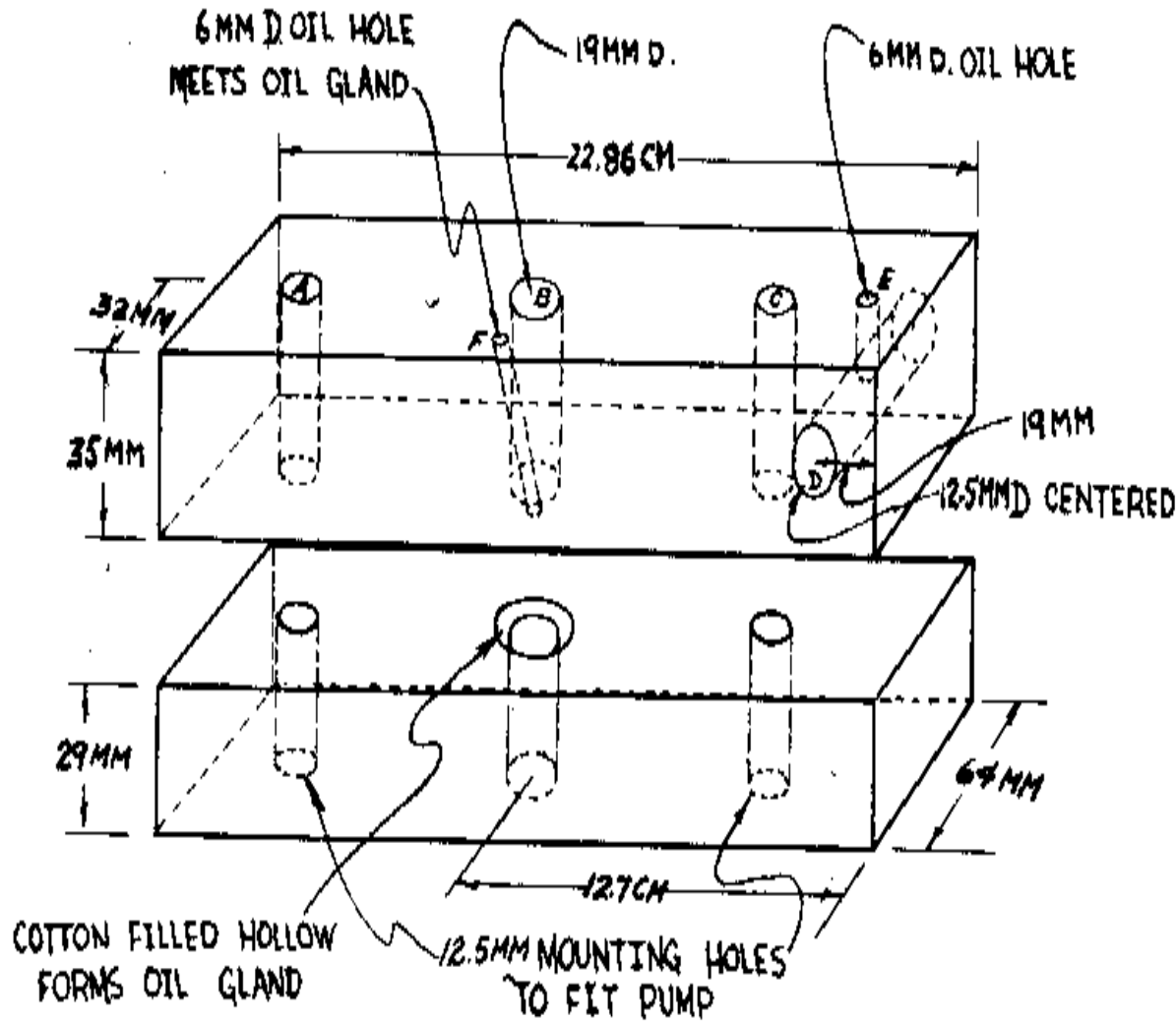


FIG 6
BLOCK

Figure 2 shows a pump with this handle mechanism that is manufactured

fig2x106.gif (486x486)

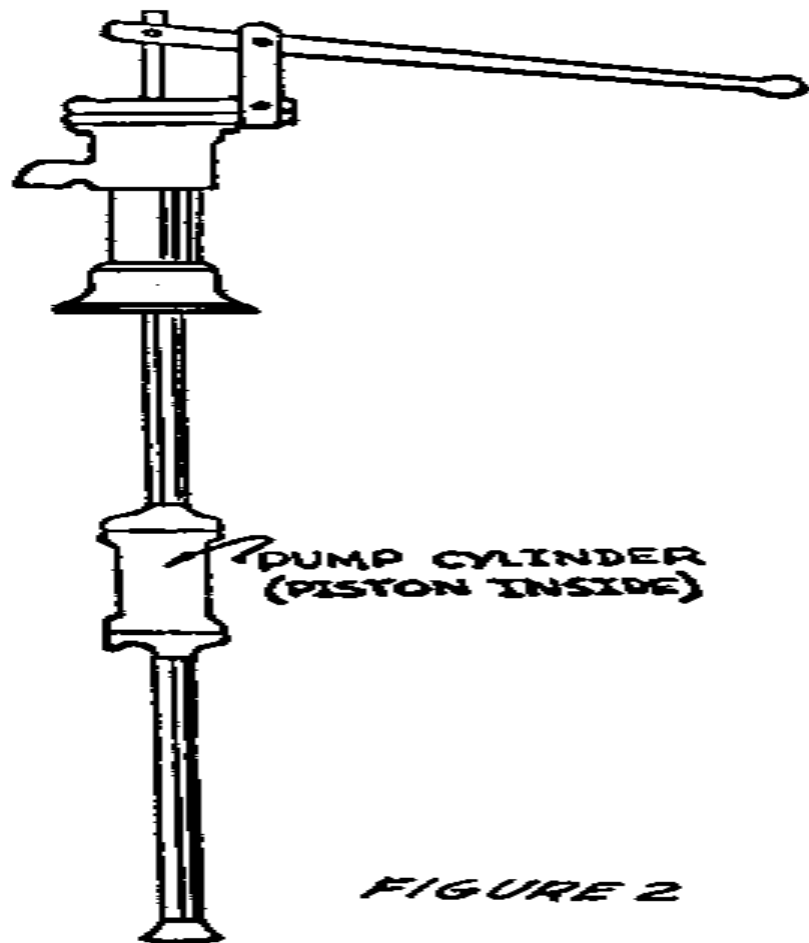


FIGURE 2

by F. Humane and Bros., 28 Strand Road, Calcutta, India.

Tools and Materials

- Saw
- Drill
- Bits

Tap: 12.5mm (1/2")

Tap: 10mm (3/8")

Chisel

Drawknife, spokeshave or lathe

Hardwoods 86.4cm x 6.4cm x 6.4cm

(34" x 2 1/2" x 2 1/2")

Mild steel rod: 10mm (3/4") in diameter
and 46.5cm (16") long

Strap iron, 2 pieces: 26.7cm x 38mm x 6mm
(10 1/2" x 1 1/2" x 1/4")

BOLT HARDWARE

Number of bolts needed	Number Dia. mm	Number Length mm	Number of nuts needed	Number of lock- washers	Number of plain washers	Purpose- fastens:
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1	10	38	0	0	0	76mm bolt to rod
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1	10	76	0	0	2	Rod to handle
---	----	----	---	---	---	---------------

2	12.5	89	2	4	4	Link to handle
---	------	----	---	---	---	----------------

						Link to block
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2	12.5	?	2	2	2	Block to pump
---	------	---	---	---	---	---------------

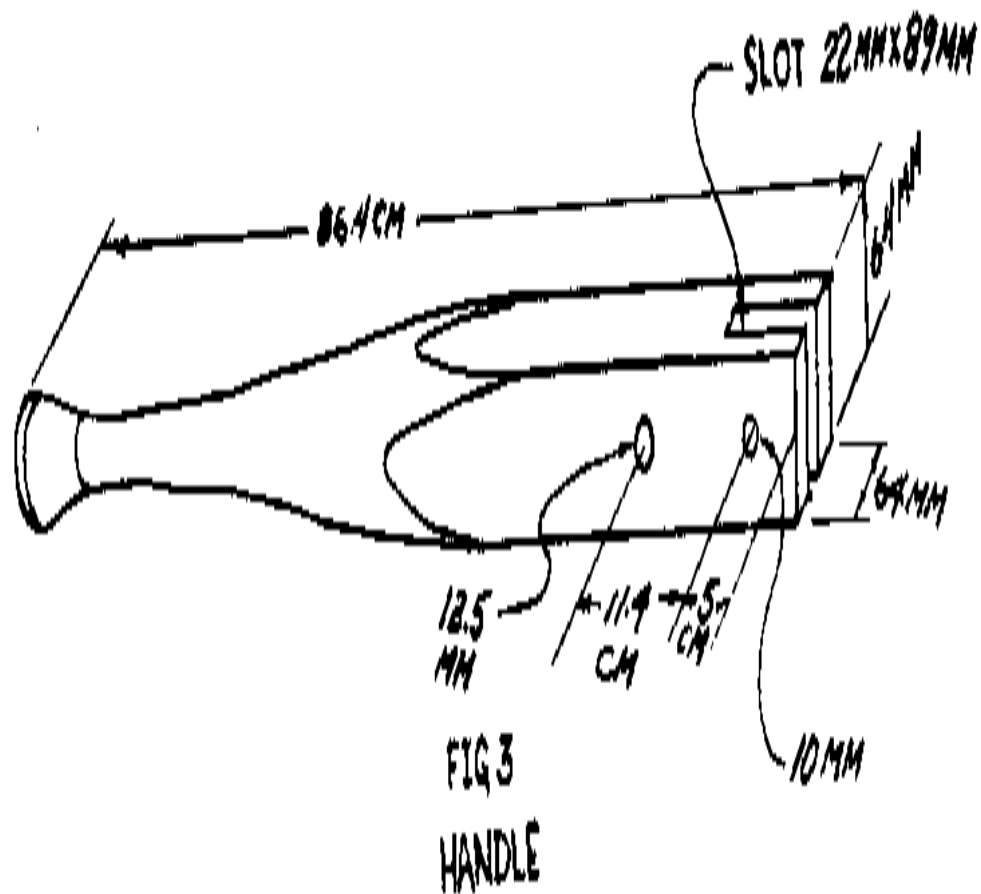
1	12.5	?	1	1	0	Rod to piston
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Handle

Make the handle of tough hardwood,
shaped on a lathe or by hand
shaving. The slot should be cut

wide enough to accommodate the rod with two plain washers on either side. See Figure 3.

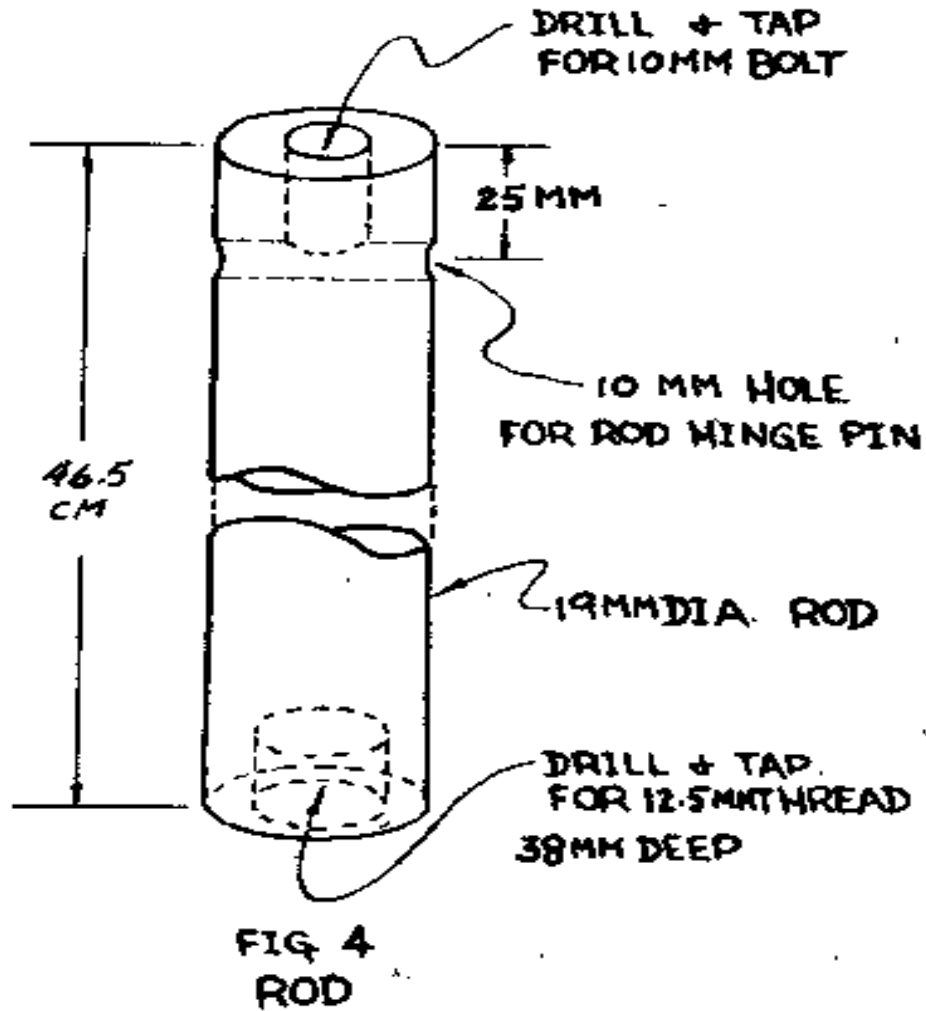
fig3x106.gif (486x486)



Rod

The rod is made of mild steel as shown in Figure 4. A 10mm (3/8")

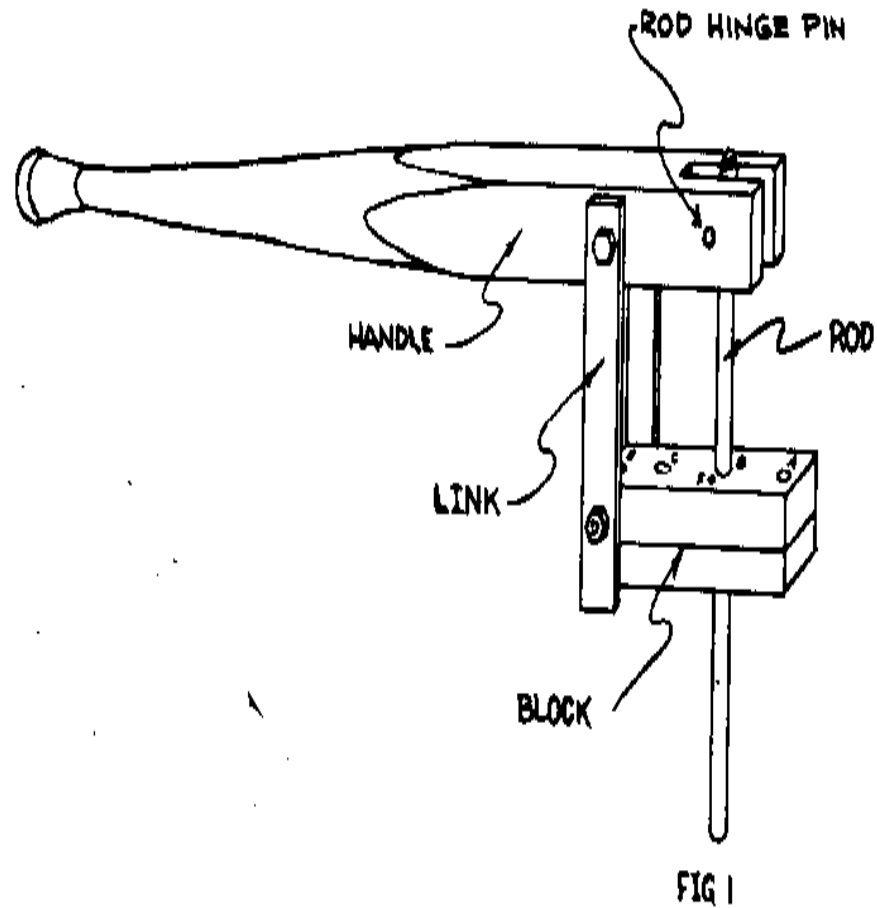
fig4x107.gif (486x486)



diameter machine bolt 38mm (1 1/2") long screws into the end of

the rod to lock the rod hinge pin in place. The rod hinge pin is a 10mm (3/8") diameter machine bolt that connects the rod to the handle (see Figure 1). The end of the rod

fig1x105.gif (486x486)

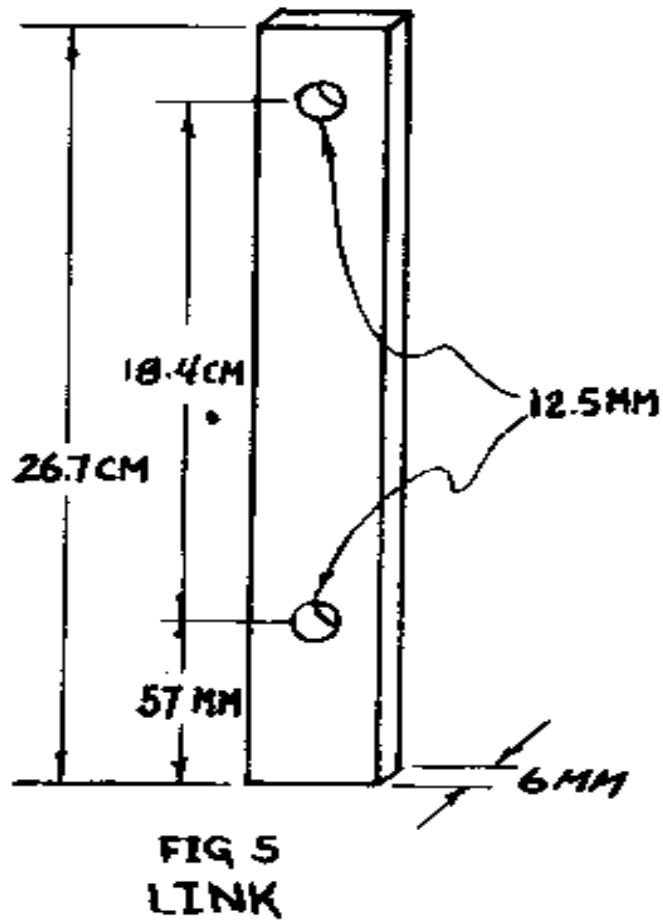


can be bolted directly to the pump piston with a 12.5mm bolt. If the pump cylinder is too far down for this, a threaded 12.5mm (1/2") rod should be used instead.

Links

The links are two pieces of flat steel strap iron. Clamp them together for drilling to make the hole spacing equal. See Figure 5.

fig5x107.gif (486x486)



Block

The block forms the base of the lever mechanism, serves as a lubricated guide hole for the rod, and provides a means for fastening the mechanism to the pump barrel. If the block is accurately made of seasoned tough hardwood without knots,

the mechanism will function well for many years. Carefully square the block to 22.9cm x 6.4cm x 6.4cm (9" x 1 1/2" x 1 1/2"). Next holes, A, B, C, and D are drilled perpendicular to the block as shown in Figure 6. The spacing of the

fig6x107.gif (540x540)

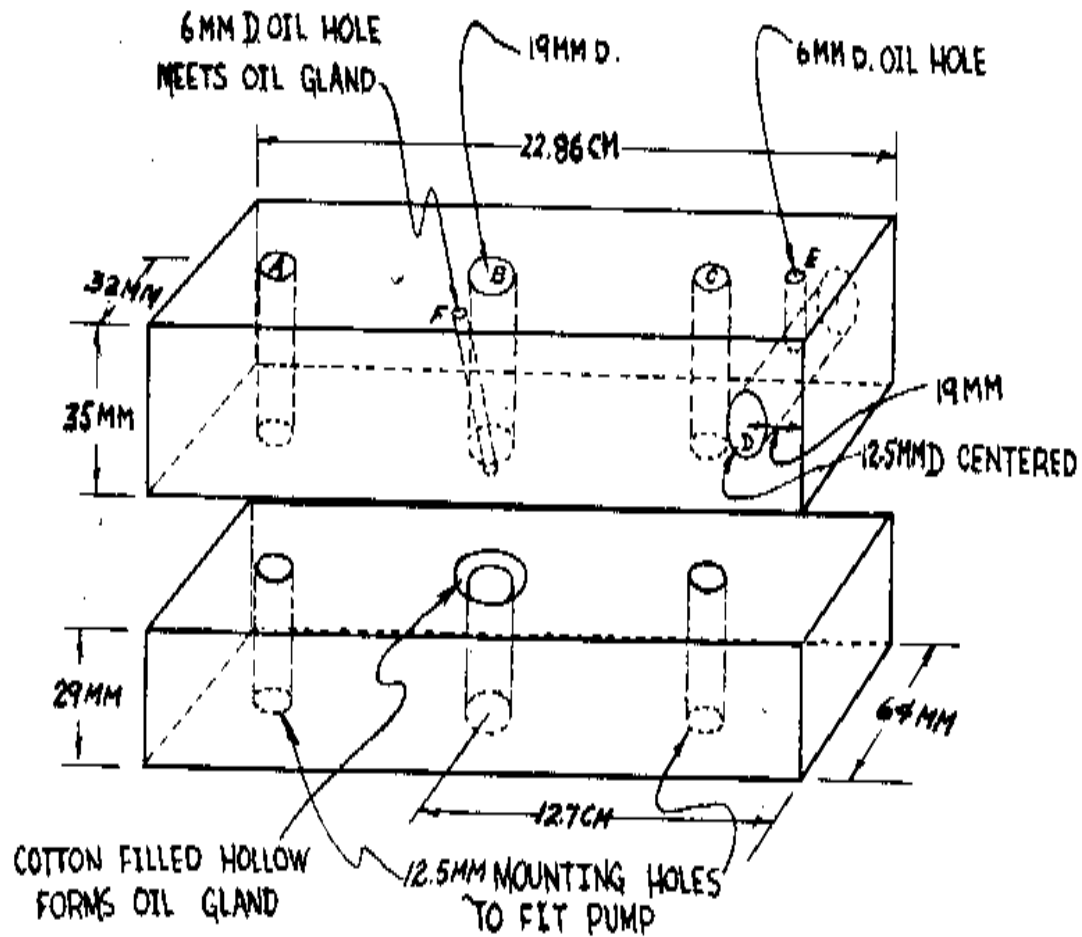


FIG 6
BLOCK

mounting holes A and C from hole B is determined by the spacing of the bolt holes in the barrel flange of your pump. Next saw the block in half in a plane 3.5cm (13/8") down from the top side. Enlarge hole B at the top of the lower section with a chisel to form an oil well around the rod. This well is filled with

cotton. A 6mm (1/4") hole, F, is drilled at an angle from the oil well to the surface of the block. A second oil duct hole E is drilled in the upper section of the block to meet hole D. Use lockwashers under the head and nut of the link bolts to lock the bolts and links together. Use plain washers between the links and the wooden parts.

Source:

Abbott, Dr. Edwin. A Pump Designed for Village Use. Philadelphia: American Friends Service Committee, 1955.

Hydraulic Ram

A hydraulic ram is a self-powered pump that uses the energy of falling water to lift some of the water to a level above the original source. This entry explains the use of commercial hydraulic rams, which are available in some countries.

Plans

for building your own hydraulic ram are also available from VITA and elsewhere.

Use of the Hydraulic Ram

A hydraulic ram can be used wherever a spring or stream of water flows with at least a 91.5cm (3') fall in altitude. The source must be a flow of at least 11.4 liters (3 gallons) a minute. Water can be lifted about 7.6 meters (25') for each 30.5cm (12") of fall in altitude. It can be lifted as high as 152 meters (500'), but a more common lift is 45 meters (150').