

## RECIPROCATING WIRE POWER TRANSMISSION FOR SMALL WATER WHEELS

A reciprocating wire can transmit power from a water wheel to a point up to 0.8km (1/2 mile) away where it is usually used to pump well water. These devices have been used for many years by the Amish people of Pennsylvania. If they are properly installed, they give long, trouble-free service.

The Amish people use this method to transmit mechanical power from small water wheels to the barnyard, where the reciprocating motion is used to pump well water for home and farm use. The water wheel is typically a small undershot wheel (with the water flowing under the wheel) one or two feet in diameter. The wheel shaft is fitted with a crank, which is attached to a triangular frame which pivots on a pole (see Figure 2). A wire is used to connect this frame to another identical unit located over the well. Counterweights keep the wire tight.

### Tools and Materials

Wire - galvanized smooth fence wire

Water wheel with eccentric crank to give a motion slightly less than largest stroke of farmyard pump

Galvanized pipe for triangle frames:  
2cm (3/4") by 10 meters long (32.8')

Welding or brazing equipment to make frames

Concrete for counterweight

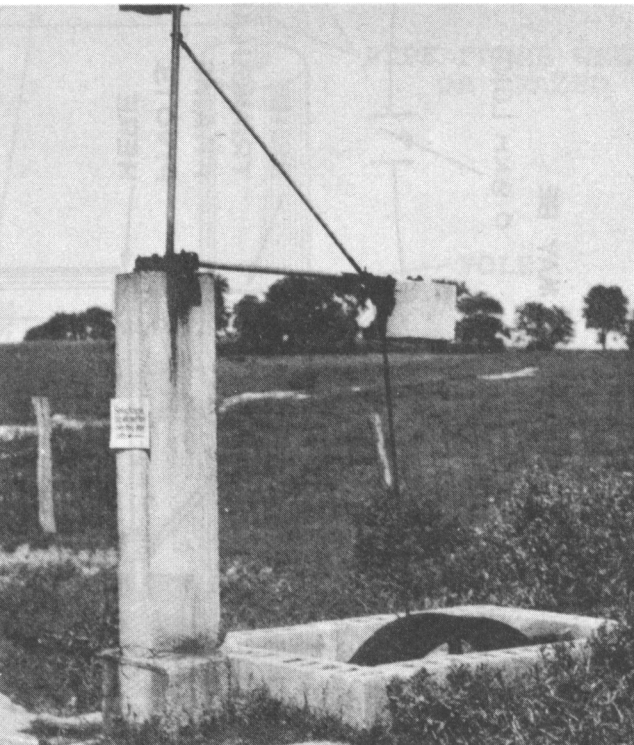
2 Poles: 12 to 25cm (6" to 10") in diameter

As the water wheel turns, the crank tips the triangular frame back and forth. This action pulls the wire back and forth. One typical complete back and forth cycle, takes 3 to 5 seconds. Sometimes power for several transmission wires comes from one larger water wheel.

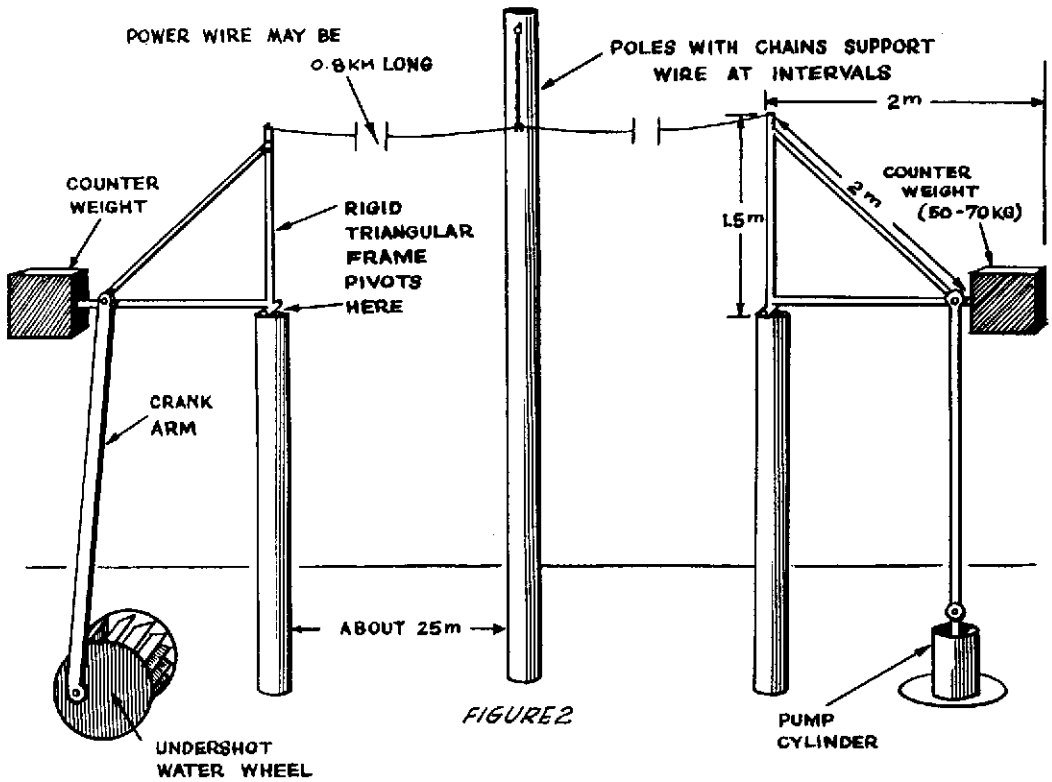


NEW ARROWS  
→

Dairy Barn  
Dairy Barn



Vertical  
to 40 ft  
to 100 ft  
to 150 ft



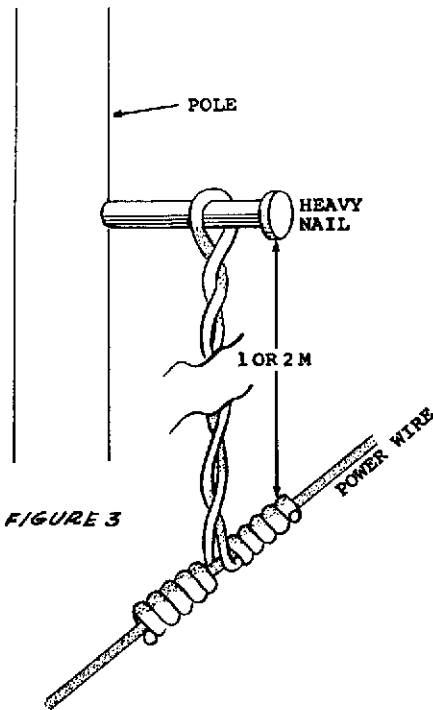
Turns can be made in order to follow hedgerows by mounting a small triangular frame horizontally at the top of a pole as shown in Figure 4.

#### Water Wheel

Figures 5, 6 and 7 show how to build and install a small water wheel made from wood and bamboo.

#### Source:

New Holland, Pennsylvania VITA Chapter.



The wire is mounted up on poles to keep it overhead and out of the way. If the distance from stream to courtyard is far, extra poles will be needed to help support the wire. Amish folks use a loop of wire covered with a small piece of garden hose attached to the top of the pole. The reciprocating wire slides back and forth through this loop. If this is not possible, try making the pole 1-2 meters higher than the power wire. Drive a heavy nail near the pole top and attach a chain or wire from it to the power wire as shown in Figure 3.

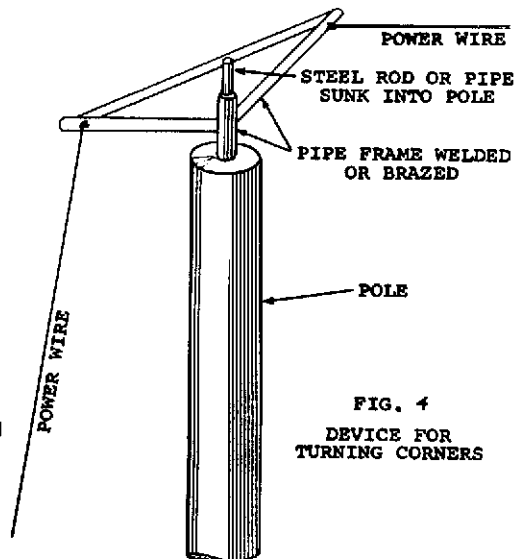
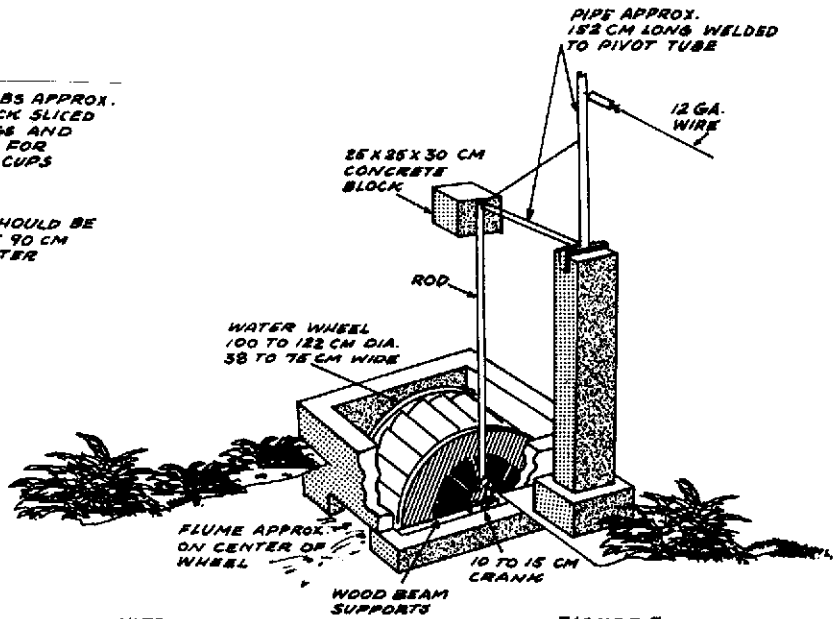
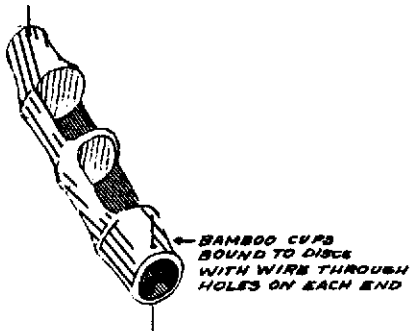
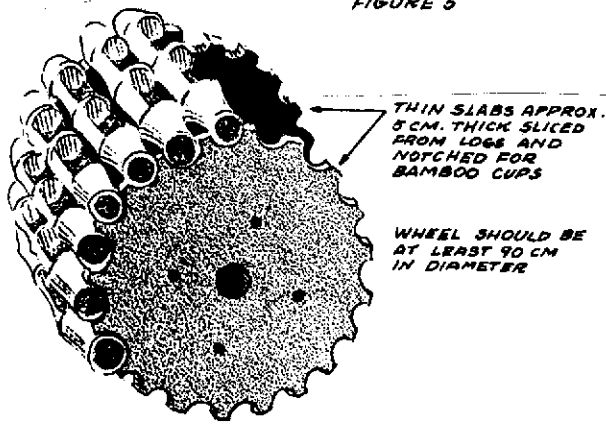


FIGURE 5



NOTE: CRANK CAN BE ADDED TO OTHER END OF SHAFT AT 90° ANGLE TO FIRST CRANK TO ATTACH MORE POWER TRANSMITTING WIRES

FIGURE 7

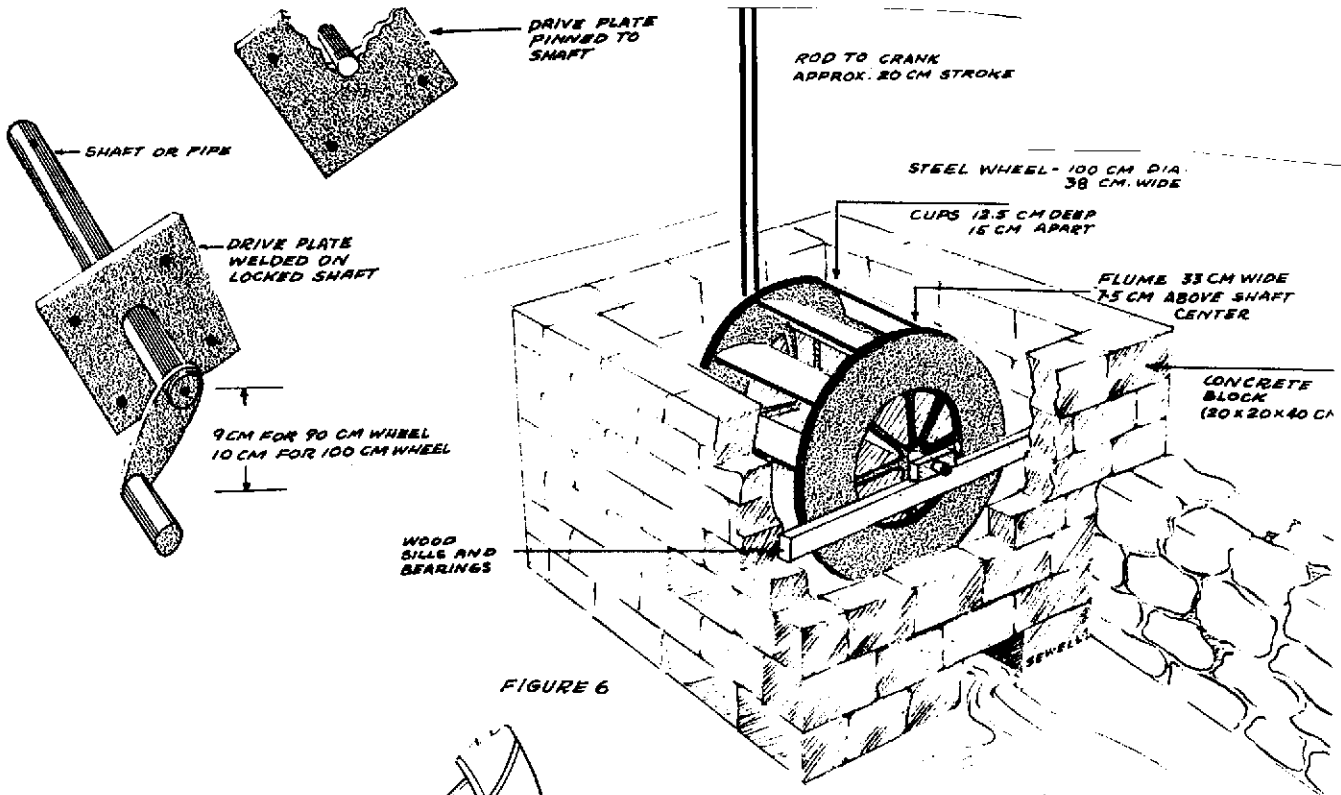


FIGURE 6

