

Wooden bearing-blocks

Wooden bearing-blocks for use as shaft bearings for Crete-type sail windmill - by John Furze and friends.

- 1: Suitable blocks or “chunks” of a hard-type wood were obtained - and in this case blocks from an old apple tree from Southern Finland were used.
- 2: The rough blocks are cut into thick oblong right-angled shapes [the actual size depends on the measurements across the frame-support and the diameter of the actual shaft] and planed smooth and square on all 4 sides and both ends.
- 3: Carefully draw a pencil-line around the block - around and through the exact middle of both sides and ends, then do the same down and along the top and bottom. Two vertical holes are drilled on this upper pencil line from the top down right through to the bottom at a suitable distance from each end so that the finished bearing can be bolted to the frame assembly when required.
- 4: The block is then sawn apart by cutting lengthwise and following the pencil line drawn around the block and through the middle. The two different halves are then clearly marked as “top” and “bottom” [f.ex. - I , II - marked with an old screwdriver].
- 5: Along the upper middle pencil “center-line” of the “top” section - find and mark the exact center. Drill a small hole right-through the section - of a size sufficient to be able to tightly screw-in a large-size grease-nipple - when required.
- 6: The two halves are re-assembled with six or seven strips of newspaper folded in half and then placed as a “packing-washer” or gasket in-between these two block-halves. The assembly is then tightly bolted together using long bolts fitted with large broad washers at both nut and bolt-head end.
- 7: The assembled units are now heated to a high temperature in old and dirty used crankcase-oil, - the thicker and “dirtier” the better. Old and dirty used crankcase-oil contains many trace elements of metal etc. and during the heating process these trace elements will enter the wood and act as bearing-surfaces as well as lubrication for the shaft.
The blocks are completely submerged in a suitable container of such oil - heated to about 100° C. and carefully heated at this temperature for about 20 minutes - until the surface bubbles become smaller in size. They are then left in the hot oil on top of a warm stove overnight [we did this for about 20 hours]. Following this process the blocks are carefully taken out with tongs - and placed lying on their sides on old newspaper for a day or so to enable the excess oil to drain off and dry.
VERY GREAT CARE AND EVERY PRECAUTION - must be taken during this heating process - **DUE TO THE GREAT DANGER OF FIRE OR ACCIDENT** - due to splashing from the 100° C. high temperature oil.

8: A central axle-shaft hole is now drilled through the side of the tightly bolted assembled sections [with the drill-center right in the middle of the newspaper gasket]. A drill corresponding to the diameter of the shaft can be “home-made” by carefully lengthwise cutting [app.10-15 mm] the ends of a suitable size short length of metal tube or pipe. These ends are carefully hammered or bent alternately slightly inwards and outwards corresponding to the outside diameter of the shaft. These bent-ends are then carefully sharpened with a file into “saw-teeth”. The pipe section is welded onto a short rod section complete with a “tube-rod fixing-bracket” - suitable for mounting into a drill-chuck. [Center the rod carefully during welding to prevent “wobble”].

9: The block is carefully positioned in a tower-drill and the “drill-assembly” is carefully lowered onto the block at a very slow speed of rotation. Gentle pressure is needed until one is completely sure that everything is satisfactory. Liberal quantities of oil must be applied to the drill-teeth - to prevent overheating of the hardwood block. The drill-bit must be frequently raised to clean-out the accumulated oil and wood-dust and to cool and possibly re-sharpen the “teeth”- if this is required. Time, great care and slow and steady progress, must be taken on this job - and in our case our first drilling took us over an hour of hard concentrated work and a second drilling 35 minutes.

10: After drilling, the block is then dis-assembled and the newspaper packing-gasket is removed. A large-size grease-nipple for regular additional lubrication is screwed into the wood of the upper small center-hole - after first cleaning-out the pre-drilled hole for possible dust or debris etc. The block is then re-assembled and is thereafter ready to be mounted on the frame or base-plate ready to receive the axle-shaft.

11: It should be noticed that the bearing - does not have to completely encircle the shaft - and in fact one of the main purposes for the insertion of the above-mentioned newspaper washer during the boiling and drilling process is to provide a margin to allow the possibility of tightening or loosening the bearing etc following “settling-in”, wear or use etc.

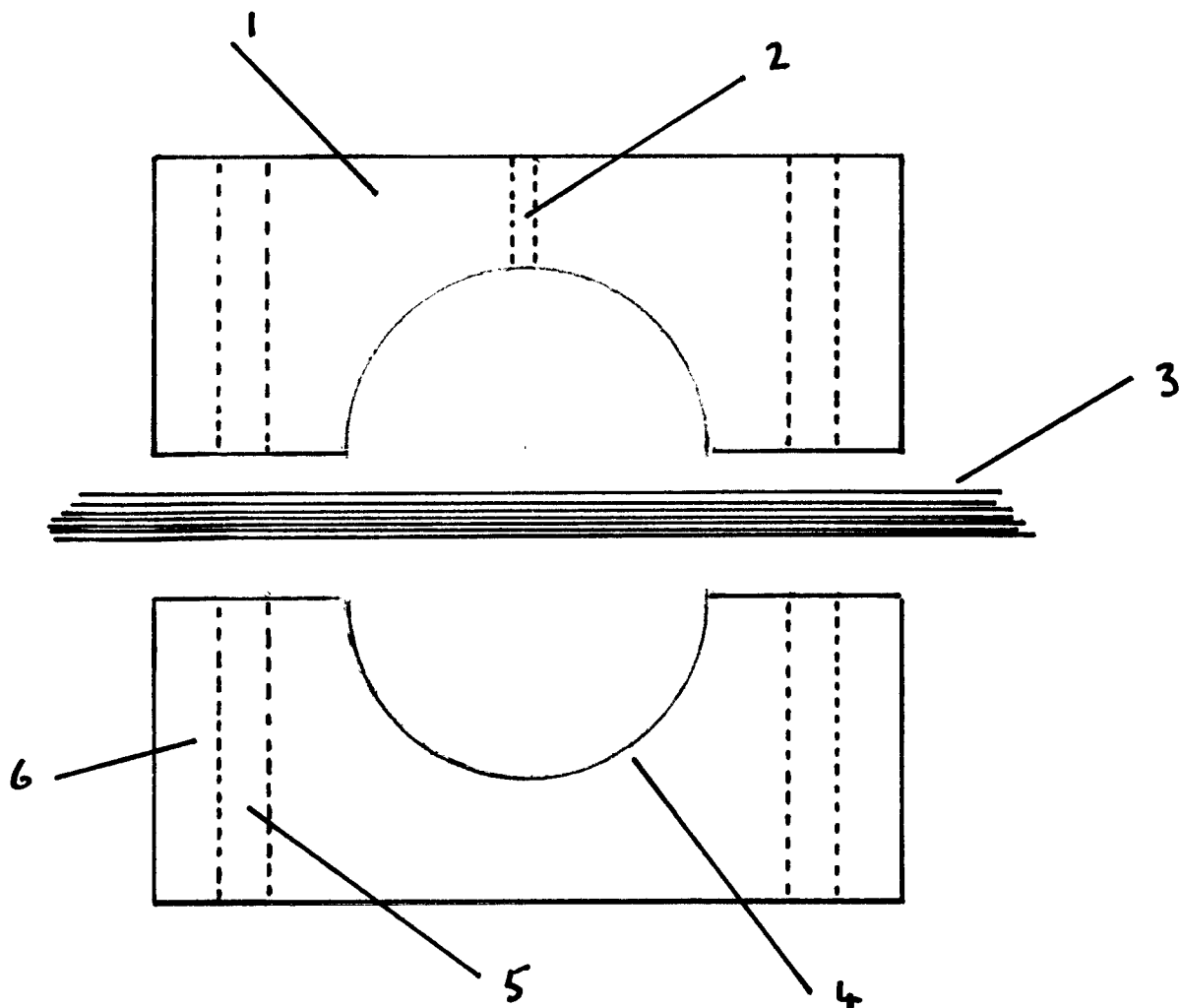
NB: This report is based on joint work done by my friends and I - during a sail windmill technology concept investigation workshop arranged and sponsored by the Finnish NGO-development organization - TEP/TFL - Technology for Life - during 10 days in the early winter of 2001 in a community in Central Finland.

Great interest was shown in the “approach” and the work-results from this course - from local farmers [and even with joint visits from farmers at a considerable distance], the press and other media as well as from the local community and also with the good and loyal support from the official national Ministerial administrative side.

With many thanks to friends and all others helpers and assistants:

Hannu Virtanen, Timo Jodat, Arjo Heinsola, Lars Campradt, Arvi Karhumaki, Olavi Nykanen, Ville Vernamo and all others.

Greetings and best wishes to all - John Furze - furze@post.tele.dk - February 2003



1: Upper hardwood-block section

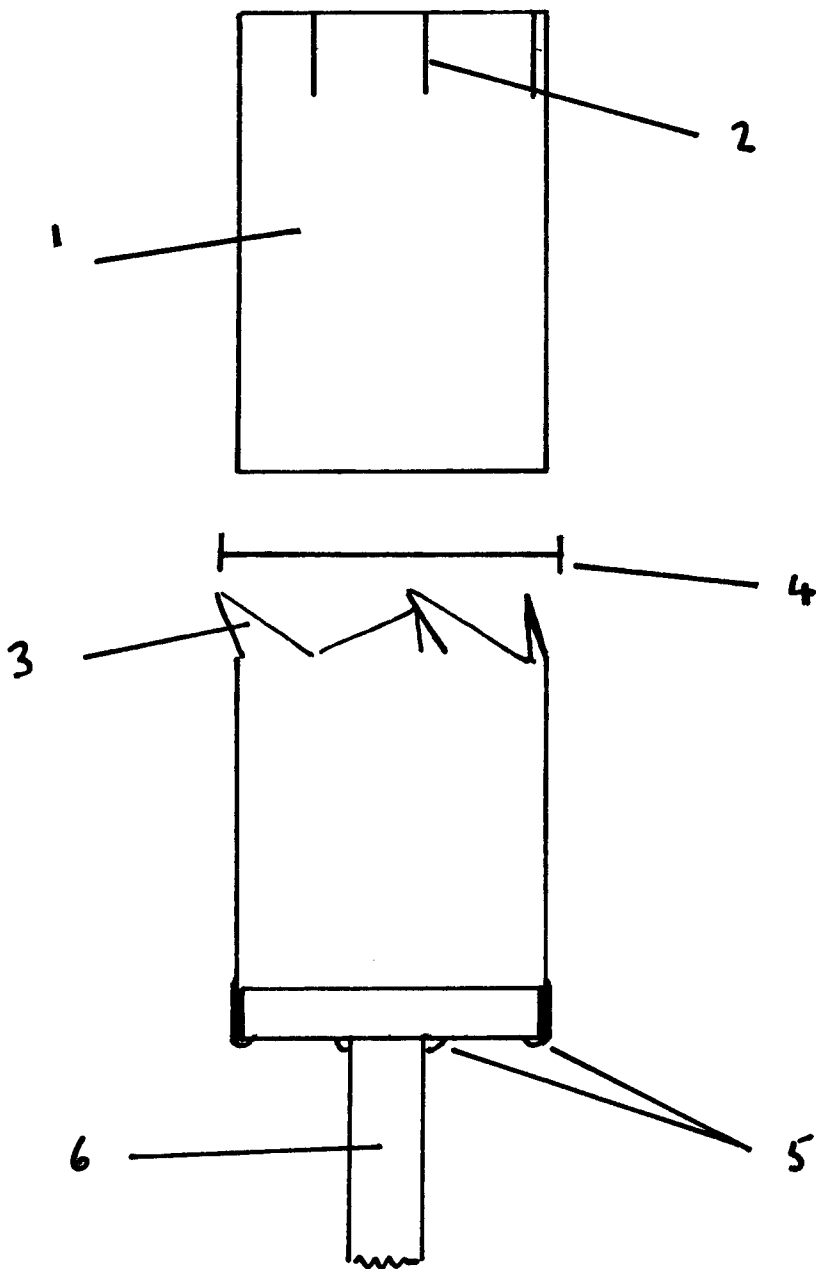
2: Drilled hole for grease-nipple

3: Packing-gasket made from folded newspaper strips

4: Drilled hole for axle-shaft

5: Drilled hole for fastening bolts to the bed-frame or base-plate

6: Lower hardwood-block section



- 1: Section of iron or steel pipe or tube**
- 2: Short vertical cuts made with hack-saw**
- 3: Cutting-teeth - hammered or bent and then filed sharp and pointed**
- 4: Required shaft diameter**
- 5: Welds**
- 6: Rod welded onto a “support-bracket” for fastening into drill-chuck**