

The Vertical Shaft Type Wind-power Chinese Square-pallet Chain-pump

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ABSTRACT

Vertical shaft type wind-power Chinese square-pallet chain-pumps are Chinese square-pallet chain-pumps that are powered by vertical-sail-type Chinese windmills (Chinese great windmills). These apparatuses had been widely-used for raising water in agricultural fields and salt fields along the coast of China since the 12th century until the 1980s, when they went completely extinct. While there is a lack of detailed records of the techniques and craftsmanship used in building these chain-pumps, there still survive some master craftsmen who are skilled in designing and building them, though most of them are quite old. Following a plan¹ for their revival, we have successfully preserved the dying technique and craftsmanship. And as the full meaning behind the old folk song that

“The Big General stands imposingly against winds from all sides
Each of its eight masts turns with the wind
With a hat on top and a needle underneath

It spins freely on both land and water, bringing water to everywhere.”

(大將軍八面威風，小桅子隨風轉動，上戴帽子下立針，水旱兩頭任意動。)

¹The preliminary research for the “Reconstruction Research and Manufacturing of the Vertical Shaft Type Wind-Power Chinese Square-Pallet Chain-Pump” project was initiated in late 2002. The field surveys went under way in April of 2004, and the actual building and field-testing were done between April and December of 2006. The research was completed with funding from the Southern Taiwan University and the National Science Council (Taiwan). It reconstructed the windmill in collaboration with CAS Institute for the History of Natural Science, whose help opens a door to future cooperative efforts between the two sides of the Strait in rescuing important cultural heritage.

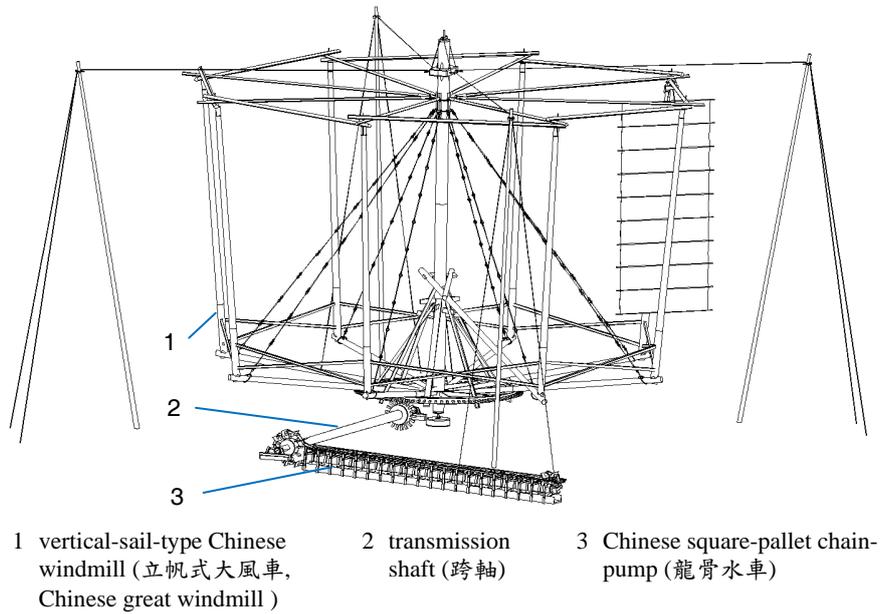


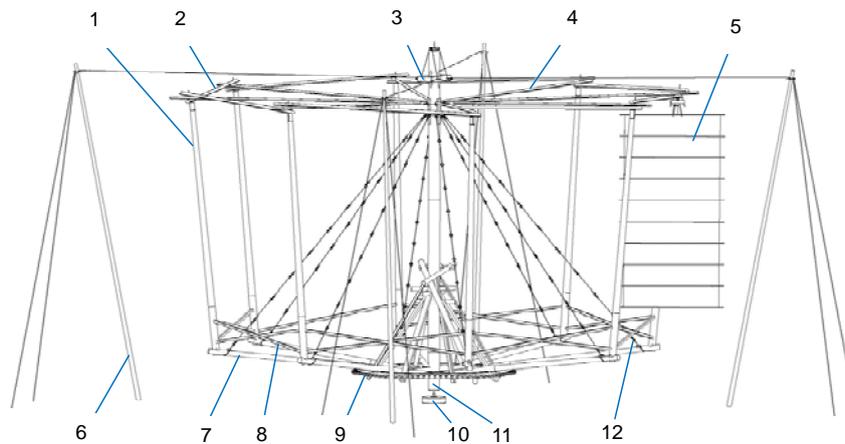
Fig. 1. The vertical shaft type wind-power Chinese square-pallet chain-pump



Fig. 2. The field-test of the vertical shaft type wind-power Chinese square-pallet chain-pump in Haihe in the northern Jiangsu province



Fig. 3. The vertical shaft type wind-power Chinese square-pallet chain-pump stands on the campus of the Southern Taiwan University



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| 1 mast
(桅子) | 5 sail
(帆篷) | 9 level gear wheel
(平齒輪) |
| 2 head hoop
(箍頭) | 6 frame
(幢子木, 大柱) | 10 stone pedestal
(車心石) |
| 3 bearing sleeve
(將軍帽, “general’s hat”) | 7 base rod
(椽擔) | 11 spindle (車心, 大將軍,
“Big General”) |
| 4 top spoke
(撐心, “heart-supporter”) | 8 crossing rod
(剪) | 12 steel wire (軟吊)
or iron chain (鐵鏈) |