

# **The Flying Lizard Windmill**

**By John Franks**

**Silver Springs, NV**

The Flying Lizard is a downwind style windmill especially suited to areas where gusty and turbulent wind conditions are prevalent . The Flying Lizard is designed to be self feathering and self furling, eliminating the need for resetting any protective mechanisms after a high wind event.

The Flying Lizard differs from conventional wind generators in that the captured wind power is transferred down a drive shaft to whatever application is needed, a generator, pump or compressor. To achieve this, a right angle drill attachment from Milecraft, called a *Drill90* is used to transfer mechanical motion.

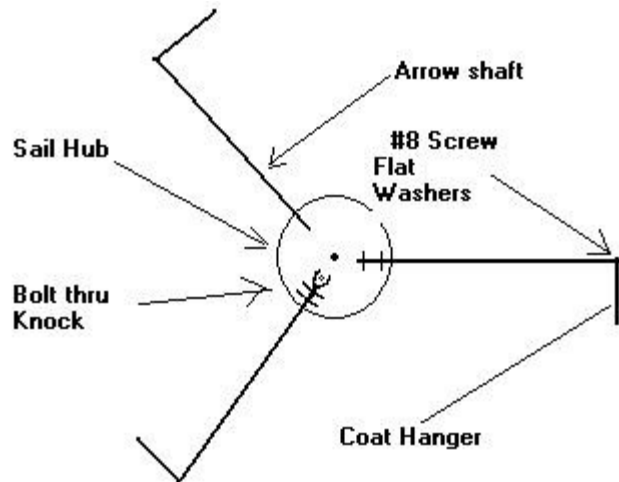
## **Major parts list:**

- 1 Milecraft Drill90 right angle drilling attachment**
- 2 2x4x8ft wood studs for tower**
- 1 2x4x8" center drilled with 1 ¼ " hole for tower top**
- 1 2x4x5" center drilled with 1 ¼ " hole for drive shaft pass through**
- 4 4"x12" ½ " plywood pieces for the support housing**
- 1 treated 6"lodgepole pine post, buried 2 feet into the ground and cemented**
- 1 1"x4' black iron water pipe, threaded on both ends**
- 1 1" black iron close nipple**
- 1 1" Black iron coupling**
- 1 1" fixed caster**
- 1 6' round ½ " plywood disk for the sail hub, center drilled for 3/8<sup>th</sup>**
- 1 1" iron pipe floor flange**
- 3 to 5 aluminum hunting arrows, depending on the number of sails**
- 3 to 5 pieces of sunscreen fabric, cut into 4 X28X 6 trapezoids, for sails.**
- 3 to 5 #8x32 screws to fit into ends of arrows used to secure masts**
- 3 to 5 pieces of wire coat hangers(or substitute) used as masts**
- 6 to 10 # 8 flat washers used to secure sail masts**
- 1 ½ " x 56 " plastic water pipe, 300 psi rated or above for drive shaft**
- 1 3/8<sup>th</sup> x 12" carriage bolt with the head cut off**
- super strong expanding foam glue**
- U nails for barb wire fencing**

## **Step One: Making the sail hub**

- 1. Cut the fins off of the hunting arrows**
- 2. Mark even angular divisions on the 6" plywood hub depending on the number of sails**
- 3. Position and affix the hunting arrows on the angular divisions of the hub. Place the knock points inwards. Secure the arrows by screws through the knock holes. U nail each arrow in two places to the hub. Use glue to further secure the arrows.**
- 4. Make the outer spars for the sails from curved pieces of coat hangers. Bend over one end of the mast so as to fit around the #8 screws you will drive into the arrow nuts.**
- 5. Use to # 8 washers to grip the end masts and screw into the open end of the arrows. Position the spars so that looking into the wind they all point to the right. This is important for the self feathering of the sails. There must be a washer on both sides of the wire spar in order for it to stay tight.**

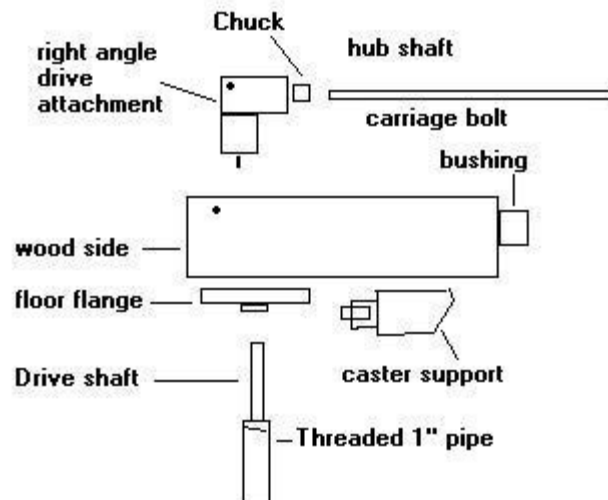
6. Sew the fabric trapezoids onto the mast using sunlight resistant garden twine.



**Step Two: Making the housing for the *Drill 90***

The housing has two functions, holding the right angle drive in place, allowing it to caster in the wind, and to support the hub shaft. The housing is made from 4-4"x12" plywood pieces that are joined to make a rectangular box and a 1" black iron floor flange that allows the driveshaft from the right angle drive to pass through.

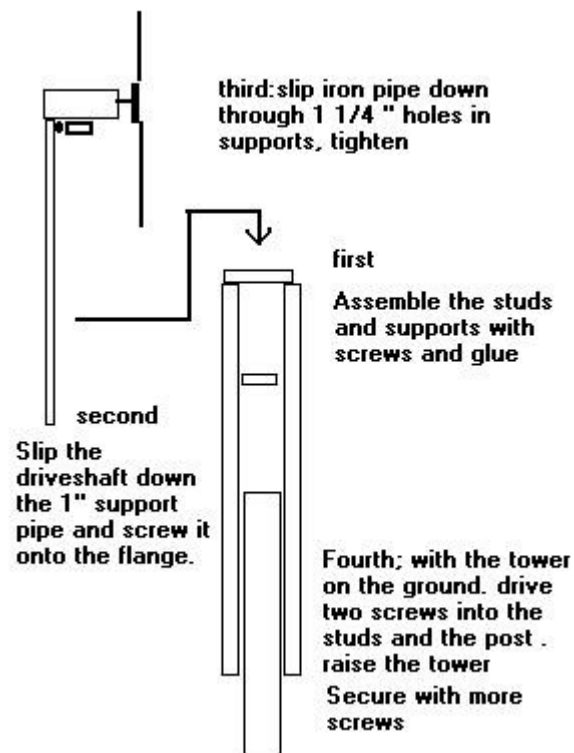
Assemble the housing using screws and glue, drill a hole for the driveshaft through the floor flange opening . Make a hole through both upright sides of the housing for a 5/16<sup>th</sup> bolt to replace the bolt that holds the handle on. This bolt must be aligned correctly for the shaft to run straight .



For added strength the top the threaded pipe with a coupling and a close nipple for the caster to move on. This also gives the assembly more thread slack while turning.

Find your own method for attaching the driveshaft to the output of the right angle attachment. I used flattened pieces of horse wire and glue them to the flat areas of the output shaft. Then they were wrapped with steel wire to secure them.

## Final assembly:



This is where the builder may need assistance and a hard hat. Try to position the windmill so as to take advantage of the prevailing wind in your area. If possible get a *windrose* from the NOAA.

So far this windmill has resisted wind gusts up to 50 mph without failing. Loading on the output shaft causes the housing to furl and the flexible spars on the ends of the mast actually feather themselves in high winds and the windmill slows down.

good luck!