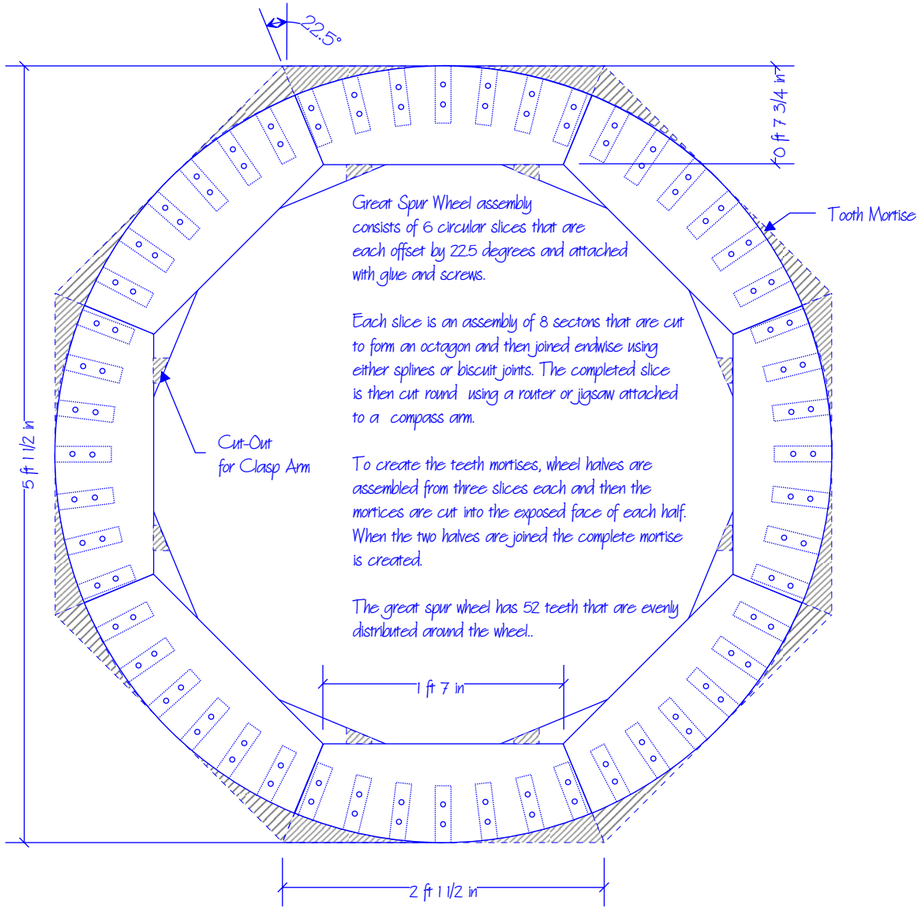
The Great Spur Wheel of the Yorktown Windmill



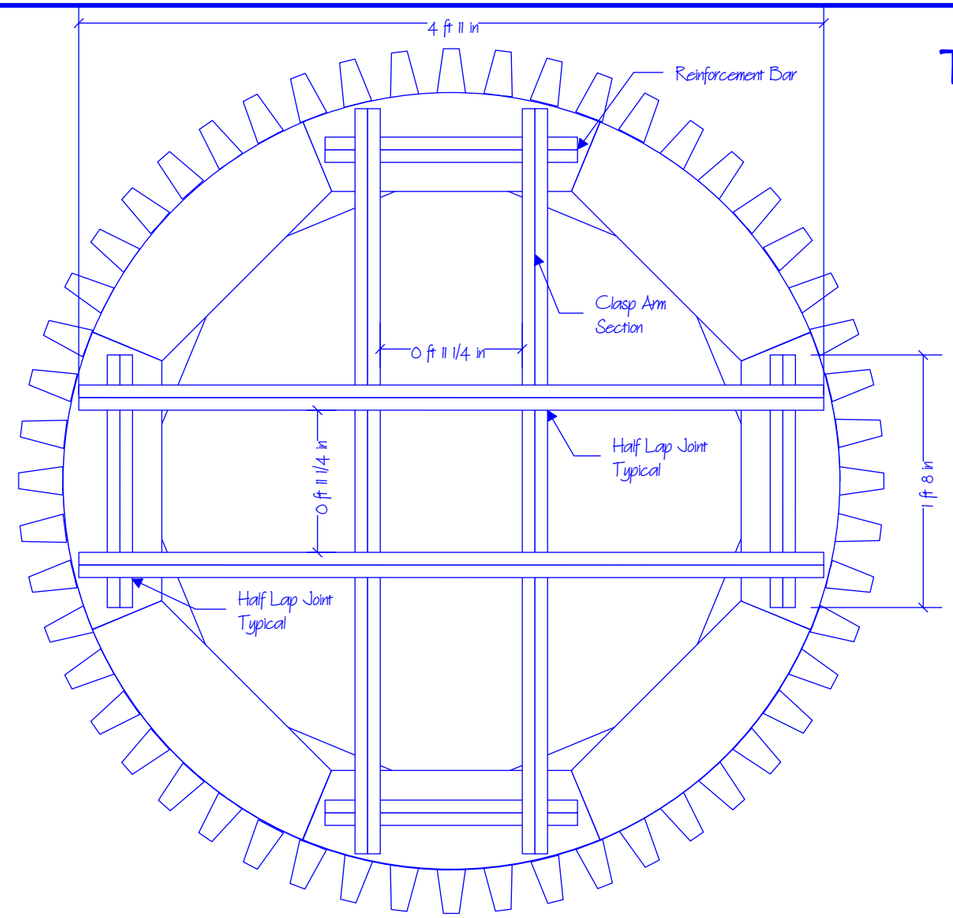
Laminated Spur Wheel Carcasse

Great Spur Wheel assembly consists of 6 circular slices that are each offset by 22.5 degrees and attached with glue and screws.

Each slice is an assembly of 8 sectors that are cut to form an octagon and then joined endwise using either splines or biscuit joints. The completed slice is then cut round using a router or jigsaw attached to a compass arm.

To create the teeth mortises, wheel halves are assembled from three slices each and then the mortices are cut into the exposed face of each half. When the two halves are joined the complete mortise is created.

The great spur wheel has 52 teeth that are evenly distributed around the wheel..

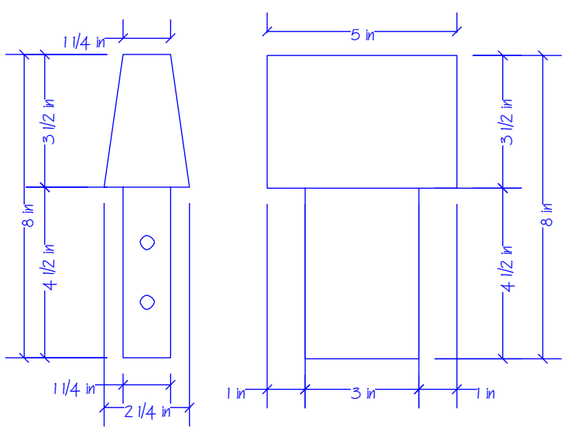


Spur Wheel with Clasp Arm Assembly and Teeth Installed

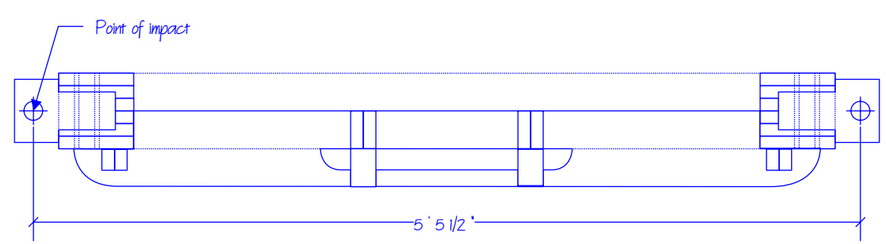
The Clasp Arm Construction is designed to accomodate an 11 inch square main shaft that links the Great Spur Wheel with the Wallower. The connection of the clasp arm to the main wheel is strengthened by the addition of a reinforcing bar that helps distribute torque evenly from the main shaft to the wheel.

Half lap joints are typical at each intersection within the clasp arm assembly. The clasp arms and the reinforcement bars are attached to the main wheel using screws, glue and pegs.

The actual dimensions of the clasp arms are 2" x 6" x 59" and the are 'let-in' to the interior of the wheel by 3" and extend outward 3". The reinforcement bars are 1-1/2" and are surface mounted to the wheel.



Detail of Tooth (Alt Scale: 1:4)



Operational Diameter of Great Spur Wheel

The point-of-impact on the tooth (the point where the alternate gear is expected to make contact) is 1-1/2" from the tip. This makes the effective diameter of the Great Spur Wheel 65-1/2", resulting in an operational circumference of 205.76825".

Because the gear has 52 teeth, the TPI ratio is 52/205.76825 or 0.2527 TPI. Any gear that is designed to mate with this one must have a similar ratio.

SCALE 1" = 1 - 0" (1 : 12)

0 1 5

TWISTED OAKS FOUNDATION	YORKTOWN WINDMILL PROJECT - YORKTOWN - VIRGINIA	Del. Walt Akers April 30, 2008	Sheet 1 of 1