Tktbrainpower engineering awards 2012

PROJECT EXAMPLE – Mechanics

Drilling a Square Hole

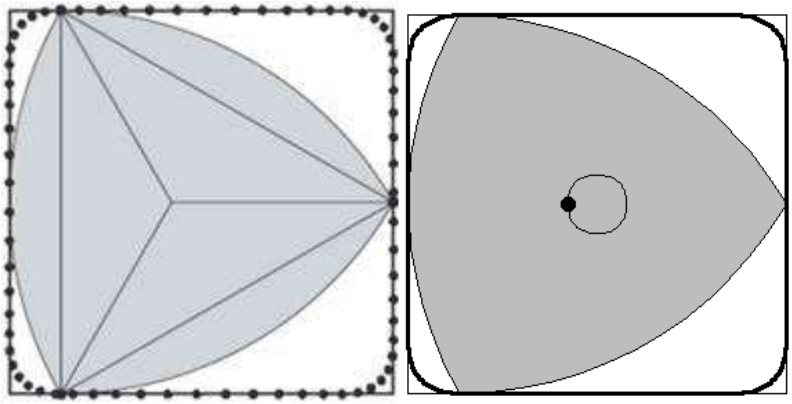
Author: Watts Brothers Tool Works

Abstract:
A mechanism for drilling square holes has to turn circular motion into square motion.

In one early attempt to create such a device, James Watts had the idea of rotating a Reuleaux triangle within a square. A Reuleaux triangle, named after mechanical engineer Franz Reuleaux (1829–1905), has the same width all the way around. Its shape is made from arcs of circles centered at the vertices of an equilateral triangle.

Like a circle, this rounded triangle fits snugly inside a square having sides equal to the curve's width no matter which way the triangle is turned. As it rotates, the curved figure traces a path that eventually covers nearly every part of the square. Watts started a company, Watts Brothers Tool Works in Wilmerding, Pa., to make square-hole drills based on this idea. The company is still in operation today.

Sketch:



More information:
To see the complete information visit the MAA:
http://www.maa.org/mathtourist/mathtourist_08_31_09.html
Example video:
http://www.youtube.com/watch?v=L5AzbDJ7KYI&feature=player_embedded