RESEARCH ARTICLE OPEN ACCESS

Design and Fabrication of Square Hole Drilling Machine

John Thomas*,Ronald Pauly*,Sachin Peter*,Vasyan K S*,Bezaleel Sebastian*, Anto Zacharias**
**(UG Scholar, Department of Mechanical Engineering, Jyothi Engineering College, Thrissur, India*
Email:johnthomasvj@gmail.com,bezaleelsebastian@gmail.com)
*** (Assistant Professor, Department of Mechanical Engineering, Jyothi Engineering College, Thrissur, India*

ABSTRACT
The mechanical design and of a square hole producing tool based on Reuleaux Triangle. The main aim of our papaer is to investigate how the circular motion can be converted into a square motion by purely a mechanical linkages; an application of which is to construct a special tool that drills exact square holes. The geometrical construction that fulfils the laid objective is Reuleaux Triangle . Additionally, for this geometry to work like a rotating drive (such as a drill press) must force the Reuleaux triangle to rotate inside a square, and that requires a square guide to constrain the Reuleaux triangle as well as a special coupling to describe the fact that the center of rotation also in moves within in the constrain. The practical importance of this enhancement is that the driving end can be placed in a standard drill press; the other end is restricted to stay inside the fixed square, will yield a perfectly square locus and this can be turned into a working square-to drill hole.
Keywords – Reuleaux , Eccentricity ,Drilling ,EDM, Geometry

I. INTRODUCTION

Hole serves various purposes in all machine elements. These holes may be round, square, rectangular or any other shape depending on the requirement or design. For circular holes, the machines are available in the market. But for square or any other type of holes, the Methods currently used are broaching, electrode-discharge machine (E.D.M.), and electro-chemical machine. These are very much expensive and require special tools or machines. The reuleaux triangle is one example of a wide class of geometrical discovery by germam mechanical engineer Franz Reuleaux , discussed the famous curvy triangle that is started being used in numerous mechanisms Watts Brother Tool Works[1]. Although Franz Reuleaux was not the first to draw and to consider the shape formed from the intersection of three circles at the corners of an equilateral triangle .But the use of this curve and its special properties for producing polygonal holes was given by Sir James Watts in 1914 and the geometry has been constantly evolving from day to day exactly reproduce the square in which it revolves.

The Reuleaux Triangle is example of a wide classes of geometrical discoveries like Mobius strip that did not find many practical applications until relatively late in humankind's intellective development. Not until around 1875, when the distinguished German mechanical engineer Franz Reuleaux discussed the famous curvy Reuleaux triangle, that it started being used in numerous mechanisms by Watts Brothers Tool Works[1].

I.I Problem statement

Material removal in electrical discharge machining which involves the generation of debris in the working gap that comprises eroded with electrode particles and by-products of dielectric decomposition. Uniformly distributed gap contamination of a certain thresholds is desirable in the interest of discharge .However excessive debris concentration confined to isolated domains in the gap because of insufficient flushing leads to repeated localization of the discharge in a particular location. This will have unfavourable ramifications on process strength, stability, geometry and integrity of the machined surface. Adequate gap flushing is therefore significant in terms of both machining productivity and the quality of the machining surface. Flushing could be accomplished by forced flow of the dielectric fluids through holes in the tool, but flushing holes leaves their footprints on the machined surface, as the work shape produced in EDM is complementary to that of the tool. Flushing could alternatively be through micro holes,which is specially fabricated in the tool . In the instance that it is infeasible to provide flushing holes in either of the electrodes, the dielectric could be directed and controlled at the gap in the form of a jet from outside the machining area. This technique is not effective when the machined depth or the frontal machining area is large.