

Milling By Using Single Cutter As Cutting Tool

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Abstract: This Kinematic linkage of internal cylindrical surface is need for cutting the elliptical as well as cylindrical surface .The cost required for these type of machines is less as compared the conventional milling machine. Kinematic linkage mechanism is based on four bar linkage mechanism is converted into internal cylindrical boring & shape. Double worm drive is used to drive the worktable in circular manner as well as elliptical manner. Worm gear pair ensure that is zero backlash. Adjustable crank mechanism is used for increase the range or the radius of circle traced by the worktable .speed required for machine can easily vary by using speed regulator for large plant but small plant we can easily change the motor.

Keywords: Small milling machine special purpose machine (SPM), elliptical milling.

1. INTRODUCTION

This paper describes that kinematic linkage for internal cylindrical Industrial products like wooden blocks, Plummet blocks etc. are machined from materials like castings, wood or nylon , often special fixtures need to be developed to carry out the internal surface operations like milling , boring and grinding when these parts are to be processed on conventional machines like lathe, milling or grinding machine. which proves costly, and time consuming, Linkage design of mechanism to give desired machining action , adjustable crank design to give variety of sizes ,pair of worm and worm wheel to ensure robust and vibration free drive , spiral bevel gear box to ensure high torque and variable speed to spindle, table linkage design for workpiece holding and movement.

Mechanical design of components under given system of forces to determine functional dimensions of the components to be used using various formulae and empirical relations,

Manufacturing assembly of the device and testing on various job materials for various operations.

2. CONVENTIONAL MACHINE AND SPM

2.1 Conventional Machines:

Now a days conventional machine are used to machine the work piece or job like lathe machine, milling machine, boring machine, drilling machine etc. milling operation done on the milling machine .milling machine is heavy and need more space for installation. It is not easy to transport the whole assembly on the site need to shift with dissembled position.it require the more time to assemble the machine. Required power to run the machine is very high as compare to the other machines.

2.2 Special purpose machines:

This machine are developed for the single operation or for sequenced operation . they produced in limited quantity with high quality and high accuracy .they have specific specification to do work. Work by the spm it will be automatic, semiautomatic and manual.

2.3 Comparison of conventional and SPM:

By considering all the parameter like speed ,accuracy,cost,time production rate etc.

2.4 Gashof's law:

The length of the shortest link plus the longest link of a planar four-bar kinematic-chains cannot be greater than the lengths of the other two Parts.

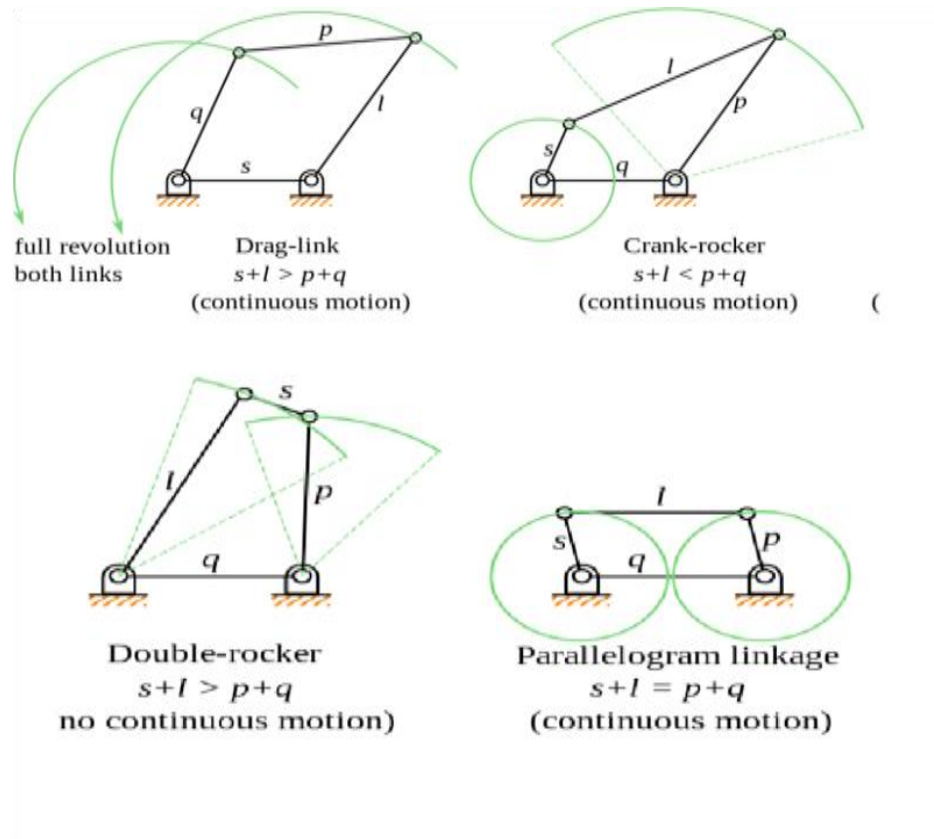


Figure 1:- Fig. For Gashofs Law

3. OPERATION ANALYSIS OF MACHINE

- The job to be machined is held onto the table by clamping bolts.
- Cutter motor is started to drive cutter gear box which in turn drives the cutter.
- Depth of cut is given by moving the cutter down using screw mechanism.
- Handle is rotated to drive the worm wheels which will turn the crank mechanism that moves the job in circular path thus the internal diameter is cut.
- Next cut is taken by rotating screw and thus job is finished.

4. BALL BEARING

1. Inner/Outer Ring Manufacturing Process

- The bearing steel is machined (turned) or forged into rough cut, basic ring configurations;
- Rings are machined to within rough tolerance specifications;
- Rings are heat treated to increase the steel's strength;
- Ring faces receive the final grinding, removing any rough spots;
- The ring O.D. and I.D. are finish ground to a smooth surface;
- Raceways are also finish ground to an even surface;
- The raceways are honed to a polished finish; and,
- The rings are then cleaned and readied for assembly.

2. Ball Manufacturing Process

- The bearing steel wire is cold stamped (headed) into roughly shaped balls;
- Balls are rough ground to remove the flashing (orbit) created during heading;
- The balls are heat treated for strength;
- Balls are rough ground again to remove coarser imperfections;
- The balls are next finish ground;
- The balls are lapped (a fine-polishing process); and,
- Finally, the balls are cleaned and readied for assembly.

3. The Stamped Steel Cage Manufacturing Process

- Blanks, or donut shaped discs, are stamped out of strip steel;
- The retainers are partially (rough) formed;
- The retainers are next finish formed;
- Retainers are then punched (if rivets are to be used);
- Retainers go through a deburring process; and,
- The finished retainers are cleaned and readied for assembly.

Part Table

SR NO.	PART CODE	DESCRIPTION	QTY	MATERIAL
1.	ICM –1	MAIN SPINDLE	01	EN24
2.	ICM –2	GEAR BOX	01	STD
3.	ICM –3	WORM	02	EN9
4.	ICM –4	WORM GEAR	02	CI
5.	ICM –5	SPINDLE HOUSING-2	01	EN9
6.	ICM –6	CRANK	02	EN9
7.	ICM –7	BEARING HOUSING-1	02	EN9
8.	ICM –8	BEARING HOUSING-2	01	EN9
9.	ICM –9	DRIVE MECHANISM	01	EN9
10.	ICM –10	HANDLE	01	EN9
11.	ICM –11	CUTTER	01	STD
12.	ICM –12	WORK TABLE GUIDE	01	MS
13.	ICM –13	WORK TABLE	01	MS
14.	ICM –14	HANDLE CLAMP	01	EN9
15.	ICM –15	GUIDE BAR	01	EN9
16.	ICM –16	GUIDE BUSH	01	GM
17.	ICM –17	MOTOR	01	STD

Table 1: Components of Project

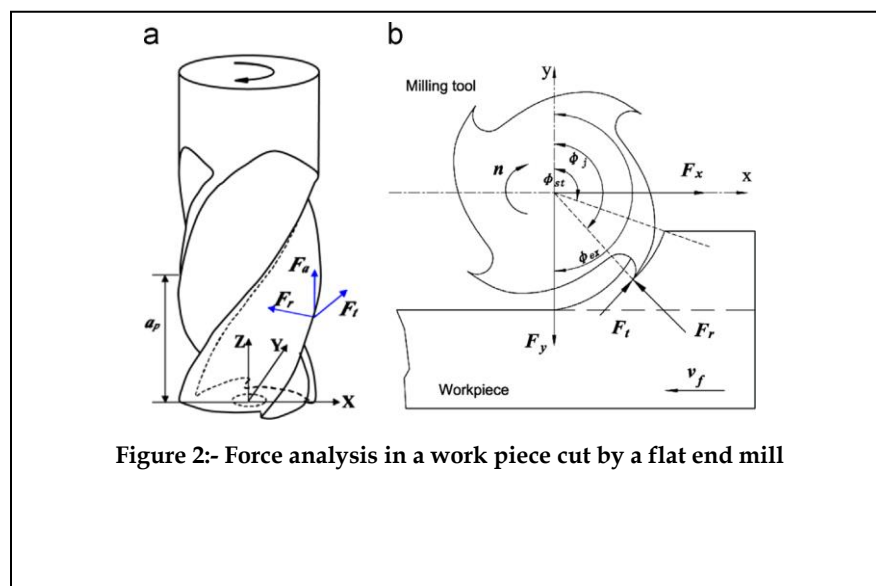


Figure 2:- Force analysis in a work piece cut by a flat end mill

5. CONCLUSION

We successfully designed the mechanism to run the single tool as cutter and to fix the job we designed magnetic table which help to hold the cast material jobs.

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