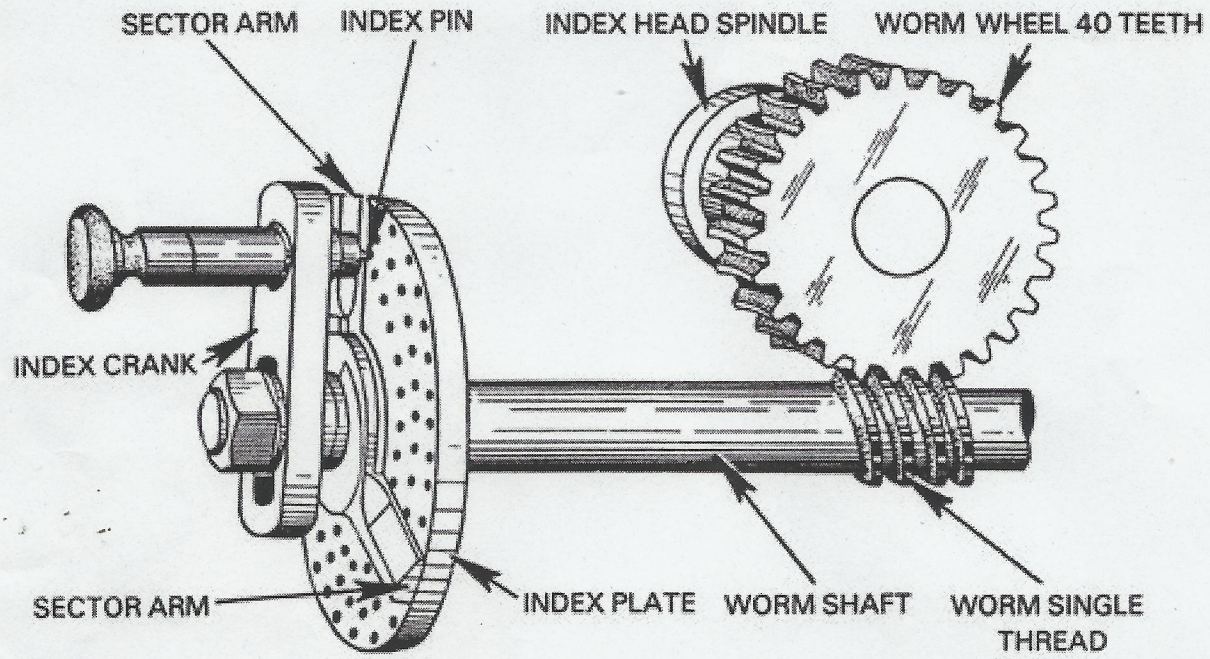

Fig 1: Construction of Dividing head attachment

An **indexing head**, also known as a **dividing head** is a specialized tool that allows a workpiece to be circularly indexed; that is, easily and precisely rotated to preset angles or circular divisions. Indexing heads are usually used on the tables of milling machines. They are commonly used to machine the flutes of a milling cutter or reamer or the teeth of a gear.

The workpiece can be held with a collet in the indexing head, or between centers with the help of an accompanying tailstock.

Simple Indexing

- Work positioned by means of crank, index plate, and sector arms
- Worm attached to crank must be engaged with worm wheel on dividing head spindle
  - 40 teeth on worm wheel
  - One complete turn on index crank cause spindle and work to rotate one-fortieth of a turn (ratio of 40:1)
  - Calculating the indexing or number of turns of crank for most divisions, simply divide 40 by number of divisions to be cut or,

$$\text{Indexing} = \frac{40}{N}$$

The indexing required to cut seven flutes: The five-sevenths turn involves use of an index plate and sector arms.

$$\frac{40}{7} = 5\frac{5}{7} \text{ turns of index crank}$$

MILLING SECTION:

INTRODUCTION:

A milling machine is a machine tool that removes metal as the work is fed against a rotating multipoint cutter. The cutter rotates at a high speed & because of multipoint cutting edges it removes metal at a very fast rate. The machine can also hold one or more numbers of cutters at a time. That is why, this machine finds widely application in workshop.

TYPES OF MILLING MACHINES:→

According to the general design, the milling machines are classified as:→

i) Column & Knee type:→

(a) Hand milling machine.
(b) Plain milling machine.
(c) Universal milling machine.
(d) Omniversal milling machine.
(e) Vertical milling machine.

ii) Manufacturing & fixed bed type :→

a) Simplex milling machine.

b) Duplex milling machine.

c) Triplex milling machine.

iii) Planer Type.

iv) Special Type :→

a) Rotary table milling machine.

b) Drum milling machine.

c) Planetary milling machine.

d) Tracer controller milling machine.

UNIVERSAL MILLING MACHINE :→

A universal milling machine is so named because it may be adapted to very wide range of milling operations. A universal milling machine can be distinguished from a plane milling machine is mounted on a circular swivelling base which has degree graduations & the table can be swivelled to any angle upto 45° on either side of the normal positions. This additional feature enables it to perform helical milling operation which can't be done on a plain milling machine

unless a spiral milling attachment is used. The machine can produce spures, spiral, bavel gears etc, besides doing all conventional milling operations.

SIZE OF MILLING MACHINES :→

The size of the column & knee type milling machine is designated by the dimensional of the working surface of the table & its maximum length of longitudinal cross & vertical travel of the table.

Table length x width = 1100 x 310 mm².

Power traverse = longitudinal x Cross x Vertical.

= 650 x 235 x 420 mm³.

Indexing & dividing heads :→

The indexing is the operation of dividing the periphery of a piece of work into any number of equal parts.

In cutting gear, spur equal spacing of teeth on the gear blank is performed,

by indexing. Indexing operations can be producing ~~can be~~ hexagonal & sq. headed bolts, cutting splines on shafts.

The dividing heads are :→

i) Plain dividing head. (Ratio between indexing crank and spindle is 1:1)

ii) Universal dividing head. (40:1)

iii) Optical dividing head.

INDEXING METHODS :→

The different types of indexing methods :→

i) Direct Indexing or rapid Indexing.

ii) Plain Indexing or Simple Indexing.

iii) compound Indexing.

iv) Differential Indexing.

v) Angular Indexing.

PLAIN INDEXING :→

The plain indexing, sometimes called simple indexing is more accurate & suitable for number beyond the range of rapid indexing. Here the dividing head spindle is moved by turning the index crank. As the shaft carrying the crank has a single threaded worm which meshes with the worm gear having 40 teeths. 40 turns of the crank are necessary to rotate the index head spindle through revolutions. In other words, one complete turn of the index crank will cause the worm wheel to make $\frac{1}{40}$ of one revolution. To find the index crank movement divide 40 by the number of division required on the work. The formulae of index crank is given by index crank movement = 40/N.

(N = Number of division required).

KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY

BHUBANESWAR

DEPARTMENT OF : _____

NAME : _____ ROLL NO. : _____

SUBJECT : _____

YEAR : _____ EXPT. NO. : _____ DATE : _____ PAGE : 10

AIM :→ To prepare a spur gear on a Milling machine by the help of Indexing head or dividing head.

RAW MATERIALS REQUIRED :→

A gear blank.

TOOLS REQUIRED :→

1> Milling machine handle.

2> Spanner (22 x 24)

3> Brush.

PROCEDURE :

1> The work-piece was clamped on the between spindle and tailstock of dividing head or Indexing head.

2> The depth of cut & index crank movement was calculated.

3> The vertical height of the table was so adjusted as to give the required depth of cut.

4> The machine was switched off and the indexing was done through the sector arm and index crank of the universal dividing head.

5> The machine tool was switched off & the indexing was done through the sector arm and index crank of the universal dividing head.

6) The table was moved horizontally & the second groove on the gear blank was created.

7) This process was continued untill the grooves were created on the gear blank.

8) The machine was switched off and the finished product was taken out of the machine.

CALCULATIONS:→

D = 60 mm

module = (m) = 2.

z = no. of teeth.

$D = m(z+2)$.

$60 = (z+2)2$

or $z = 28$.

Index crank = 40/N.

N = Number of division = 28.

Index crank = $\frac{40}{28} = 1\frac{12}{28}$.

CONCLUSION:→

The required Spur gear was prepared by milling operation.