

Shaper, Milling & Gear Cutting M/c

SHAPER

Mr. K. Gobivel

Assistant Professor / Mechanical

KCG College of Technology

Types of Shaper

Types of shaper:

Shapers can be classified into many types based on several criteria:

Based on the type of driving mechanism used

- – Crank and slotted lever driving mechanism type
- – Whitworth quick return driving mechanism type
- – Hydraulic driving mechanism type

Based on the table design

- – Plain Shaper
- – Universal Shaper

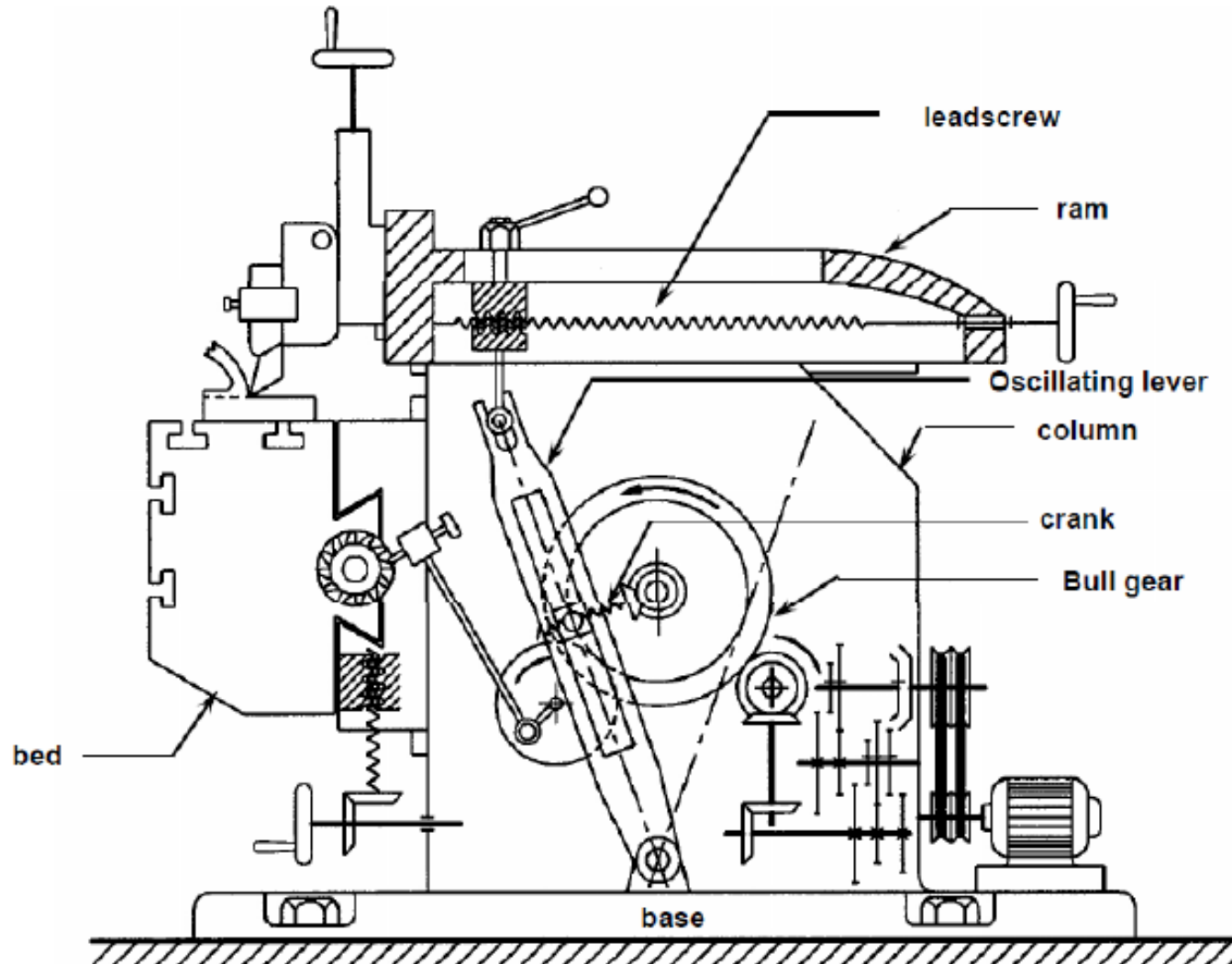
Based on the position of the reciprocating ram used

- – Horizontal shaping machine (Most common type of shaper used)
- – Vertical shaping machine
- – Travelling head shaping machine

Based on the type of cutting stroke of the tool

- – Push out type
- – Draw cut type

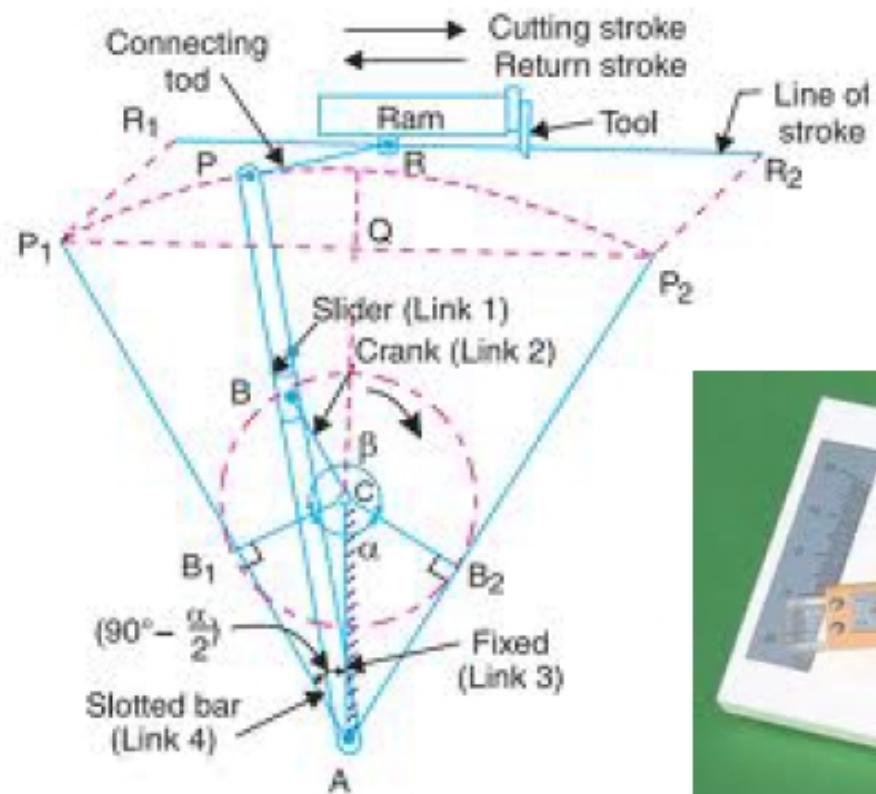
Shaper



Mechanism

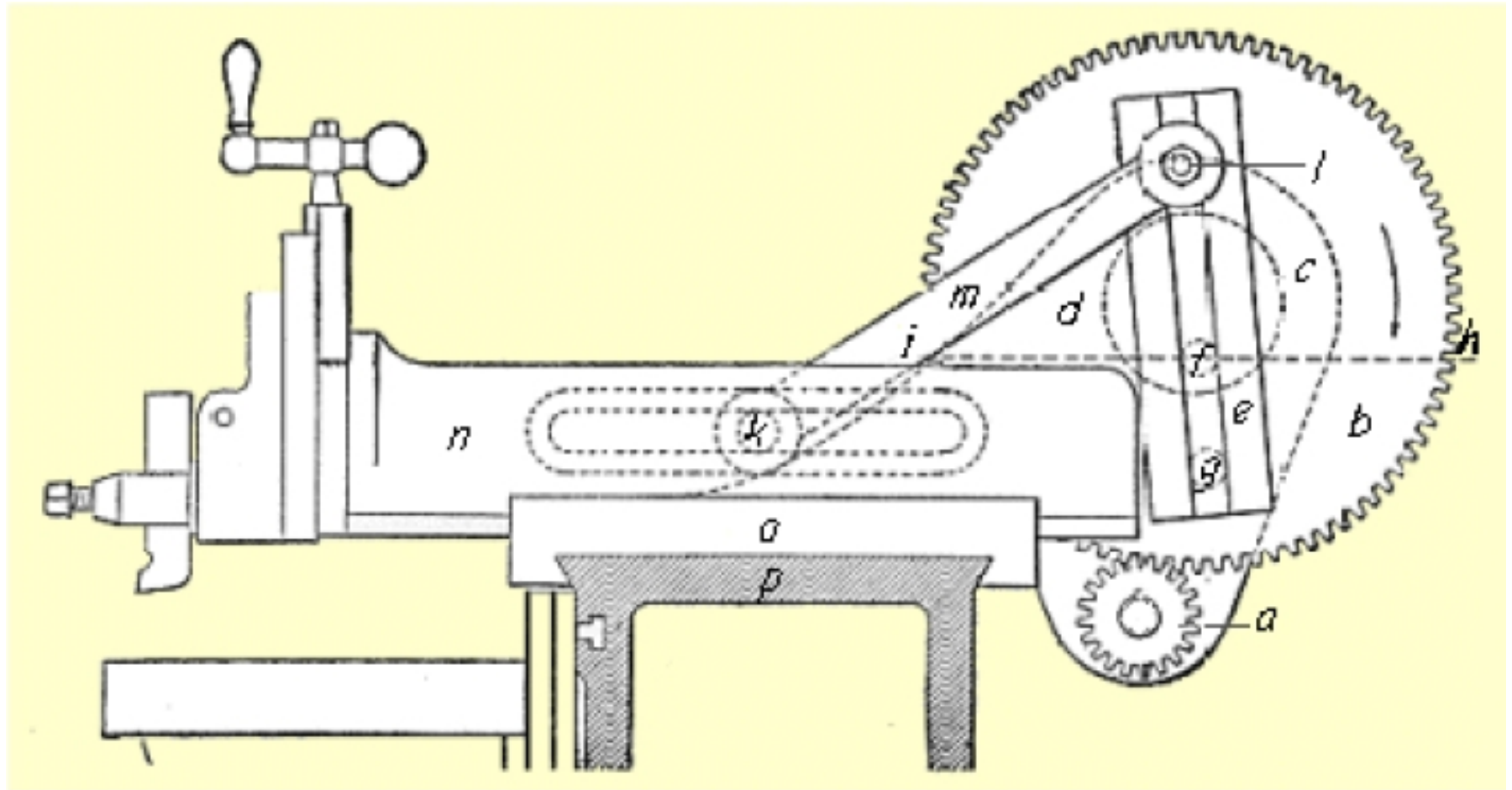
In shaper, rotary movement of the drive is converted into reciprocating movement by the mechanism contained within the column of the machine. The reciprocating movement of the ram and the quick return mechanism of the machine are usually obtained by any one of the following methods

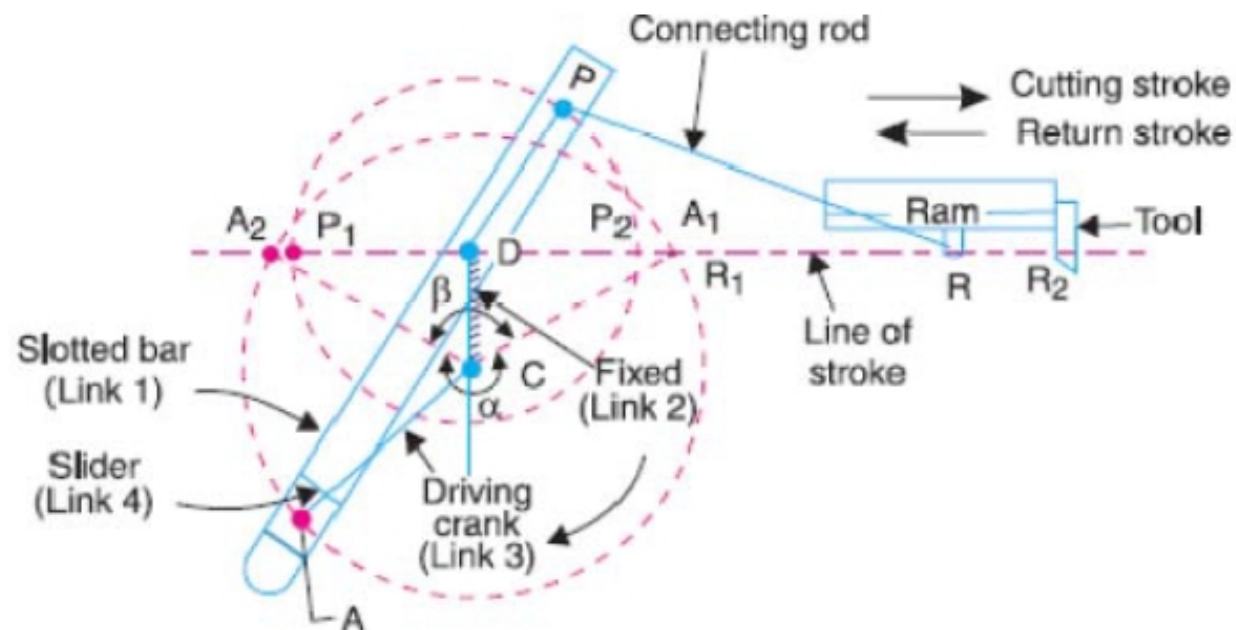
1. Crank and slotted link mechanism
2. Whitworth quick return mechanism
3. Hydraulic shaper mechanism



Crank and slotted mechanism

Whitworth quick return mechanism





$$\frac{\text{Time of cutting stroke}}{\text{Time of return stroke}} = \frac{\alpha}{\beta} = \frac{\alpha}{360^\circ - \alpha} \quad \text{or} \quad \frac{360^\circ - \beta}{\beta}$$

Hydraulic shaper mechanism

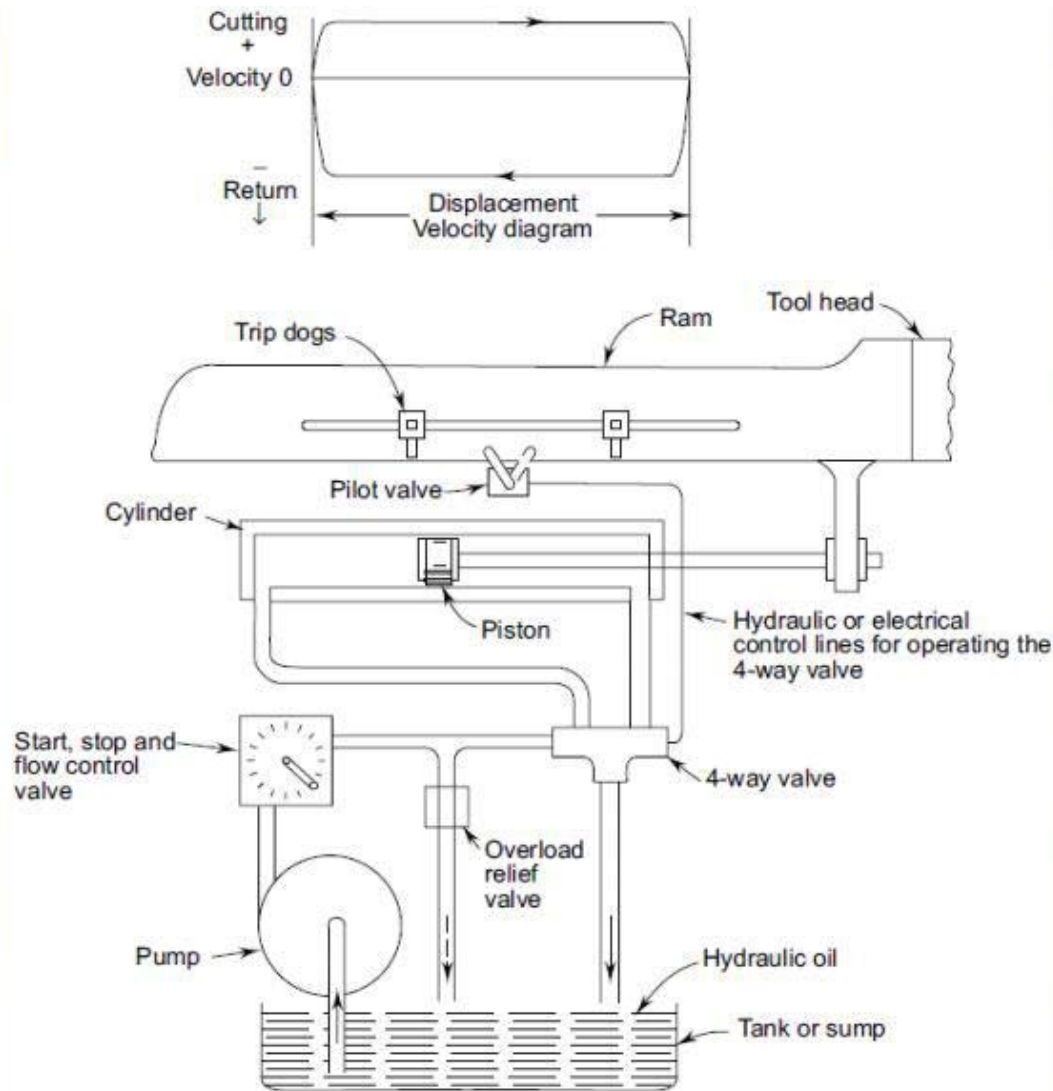
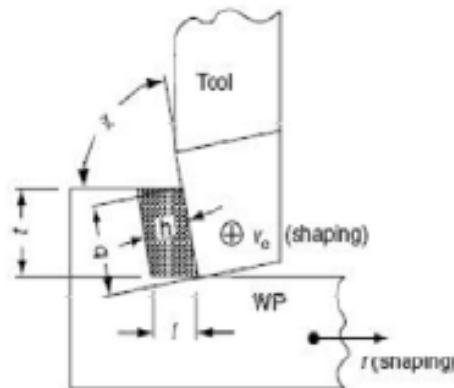
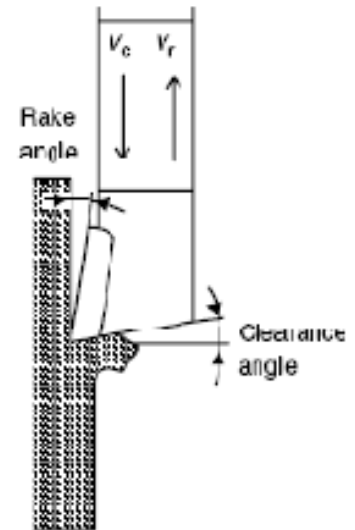
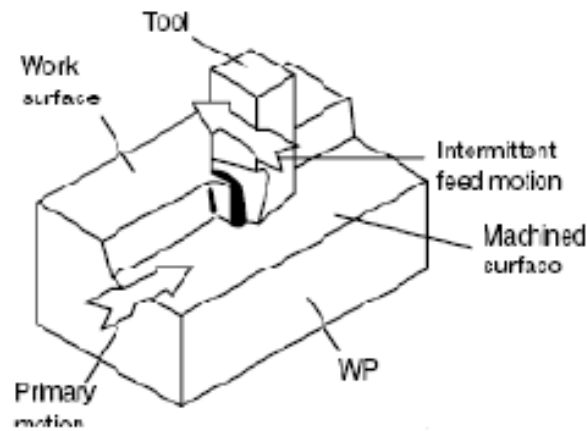
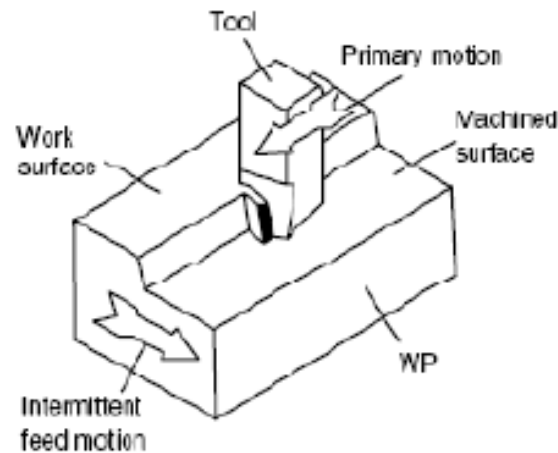
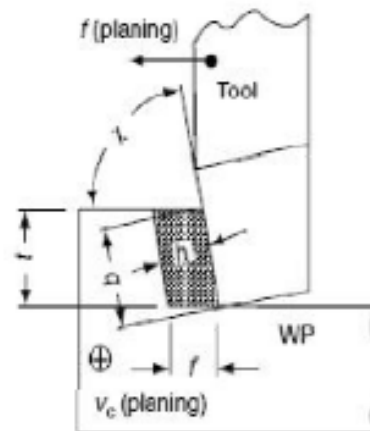


Fig. 6.5 Schematic representation of the functioning of a hydraulic shaper.

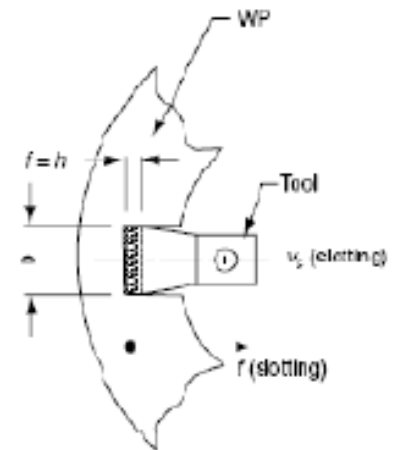
Shaper, Planer and Slotter M/c



a) Shaping



b) Planing

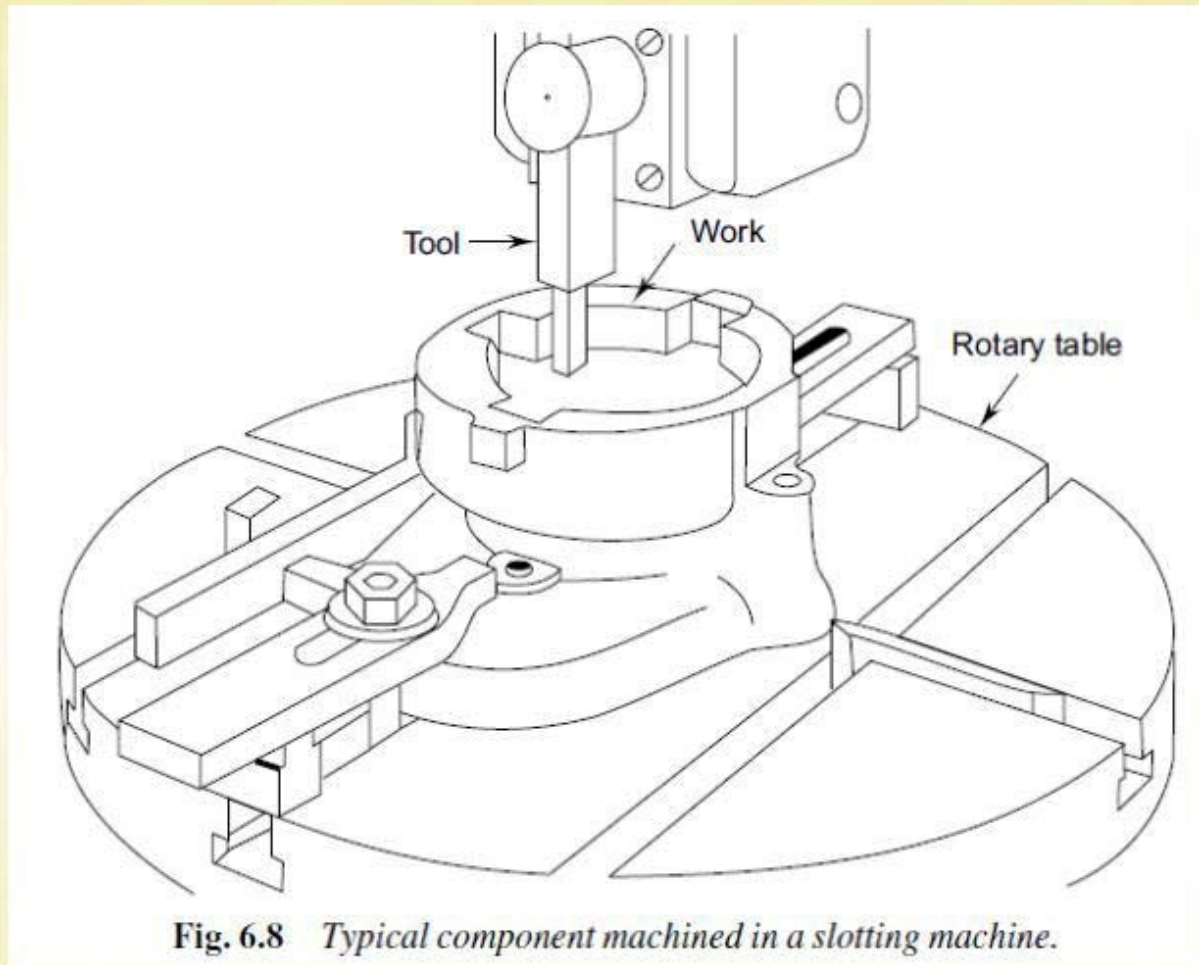


c) Slotting

Planer



Slotter



Difference b/w three types

Difference between the three types

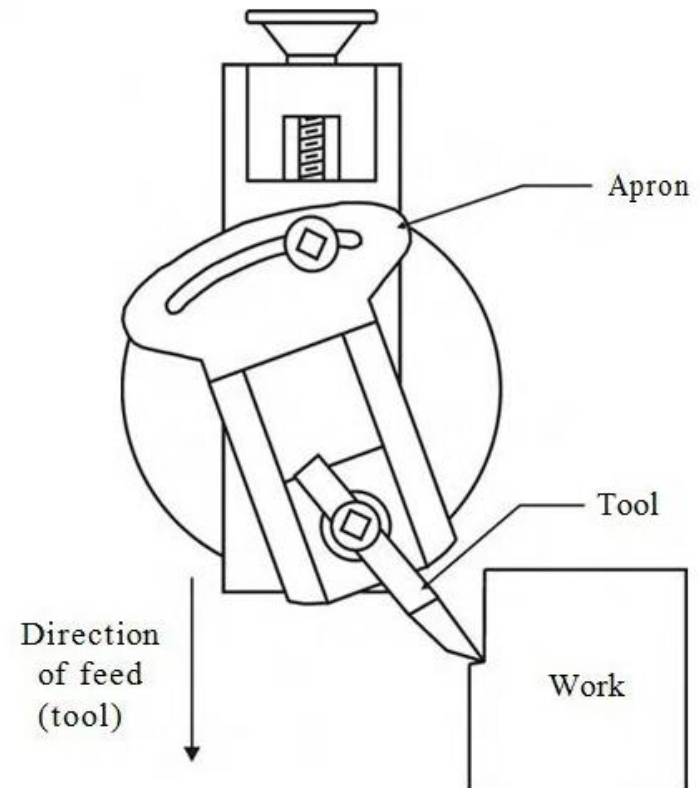
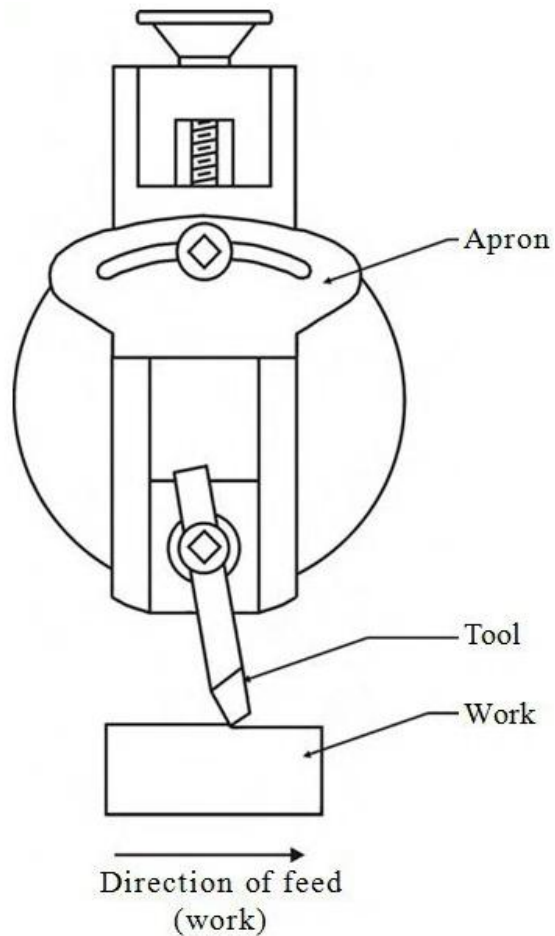
	Shaper	Planer	Slotter
1	The work is held stationary and the tool on the ram is moved back and forth across the work.	The tool is stationary and the workpiece on the table travels back and forth under the tool	The work is held stationary and the tool on the ram is moved up and down across the work.
2	Used for shaping much smaller jobs	Meant for much larger jobs. Jobs as large as 6 metre wide and twice as long can be machined.	It is used for making slots in smaller jobs.
3	Is a light machine	It is a heavy duty machine.	Slotting is light machine
4	Can employ light cuts and finer feed.	Can employ heavier cuts and coarse feed.	Can employ light cuts and finer feed.
5	Uses one cutting tool at a time	Several tools can cut simultaneously.	Shaper uses one cutting tool at a time
6	Driven using quick- return link mechanism	The drive on the planer table is either by gears or by hydraulic means	The rams are either crank-driven or hydraulically driven.
7	It is less rigid and less robust	Better rigidity that give more accuracy on machined surfaces	It is less rigid and less robust

Shaper: Operations

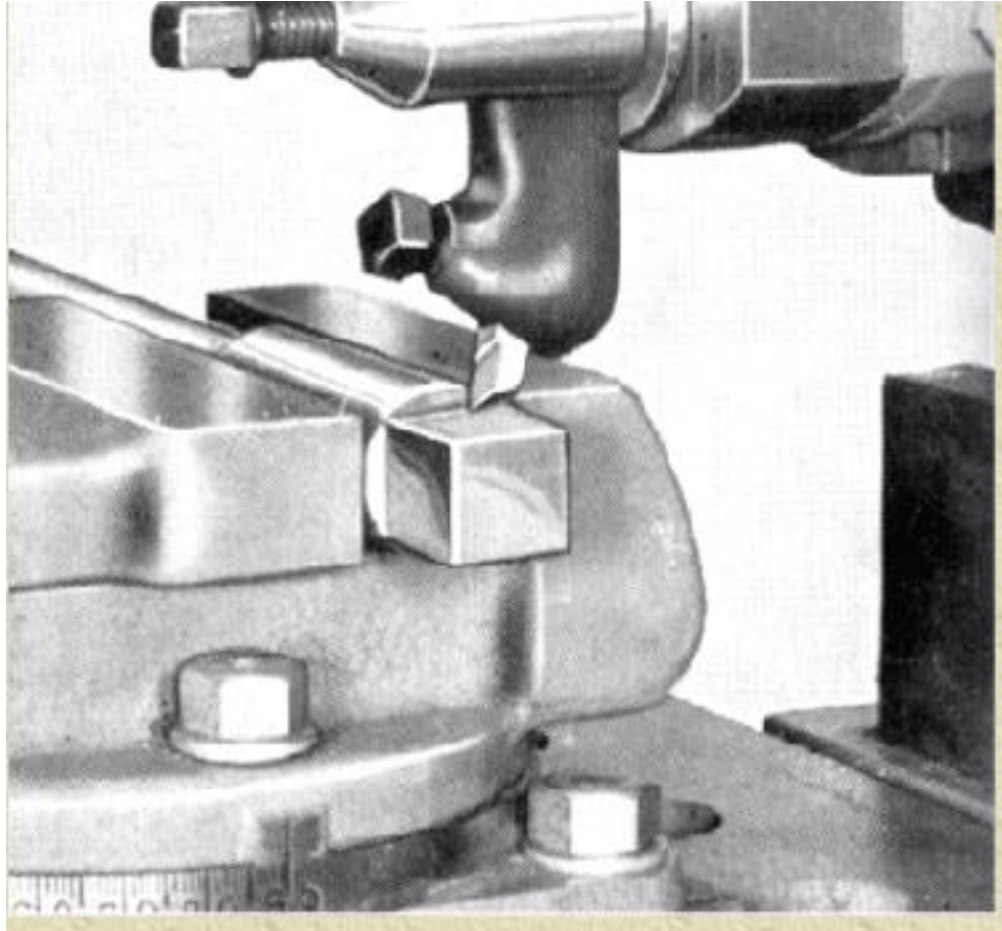
Types of operations

- Machining horizontal surface
- Machining vertical surface
- Machining angular surface
- Cutting slots, grooves and keyways
- Machining irregular surface
- Machining splines or cutting gears

Horizontal & Vertical Surface

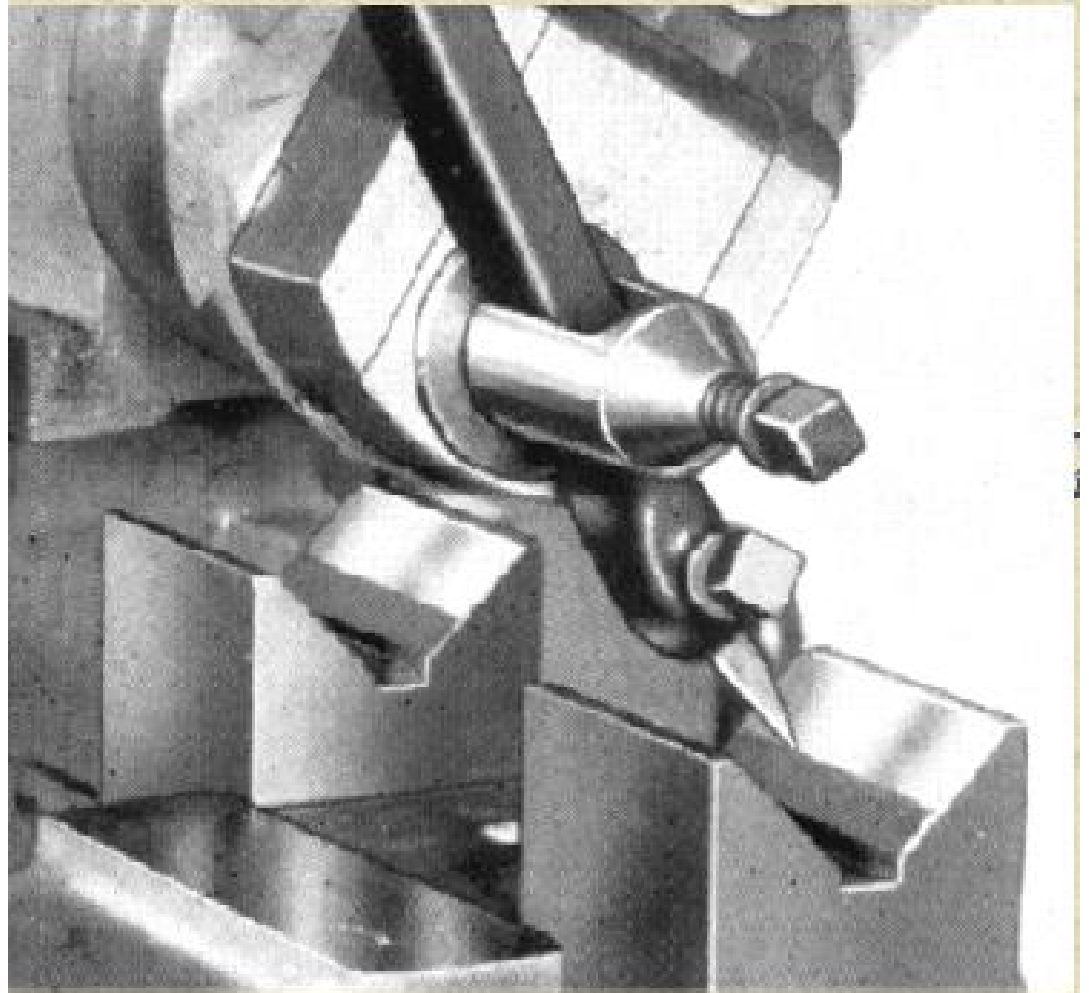


Making Chuck key

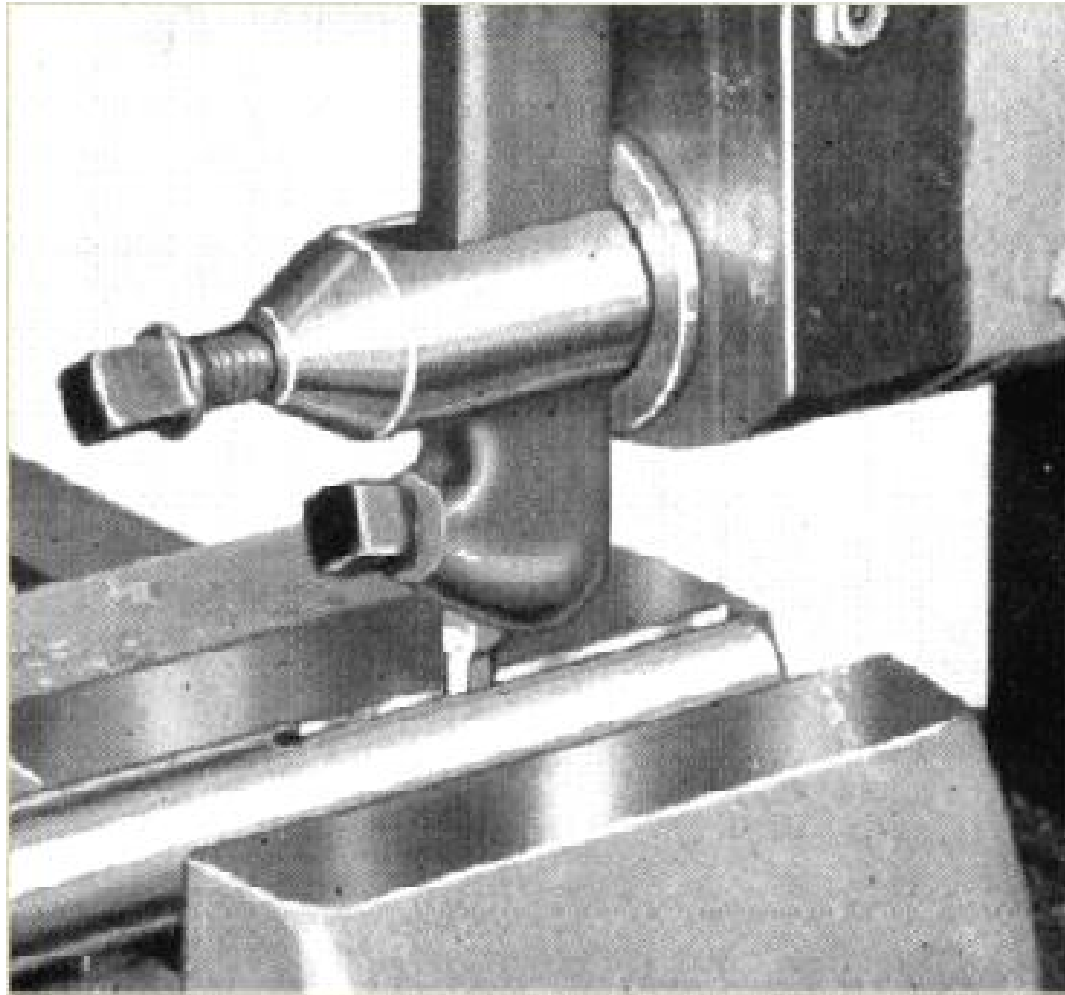


Making V Block

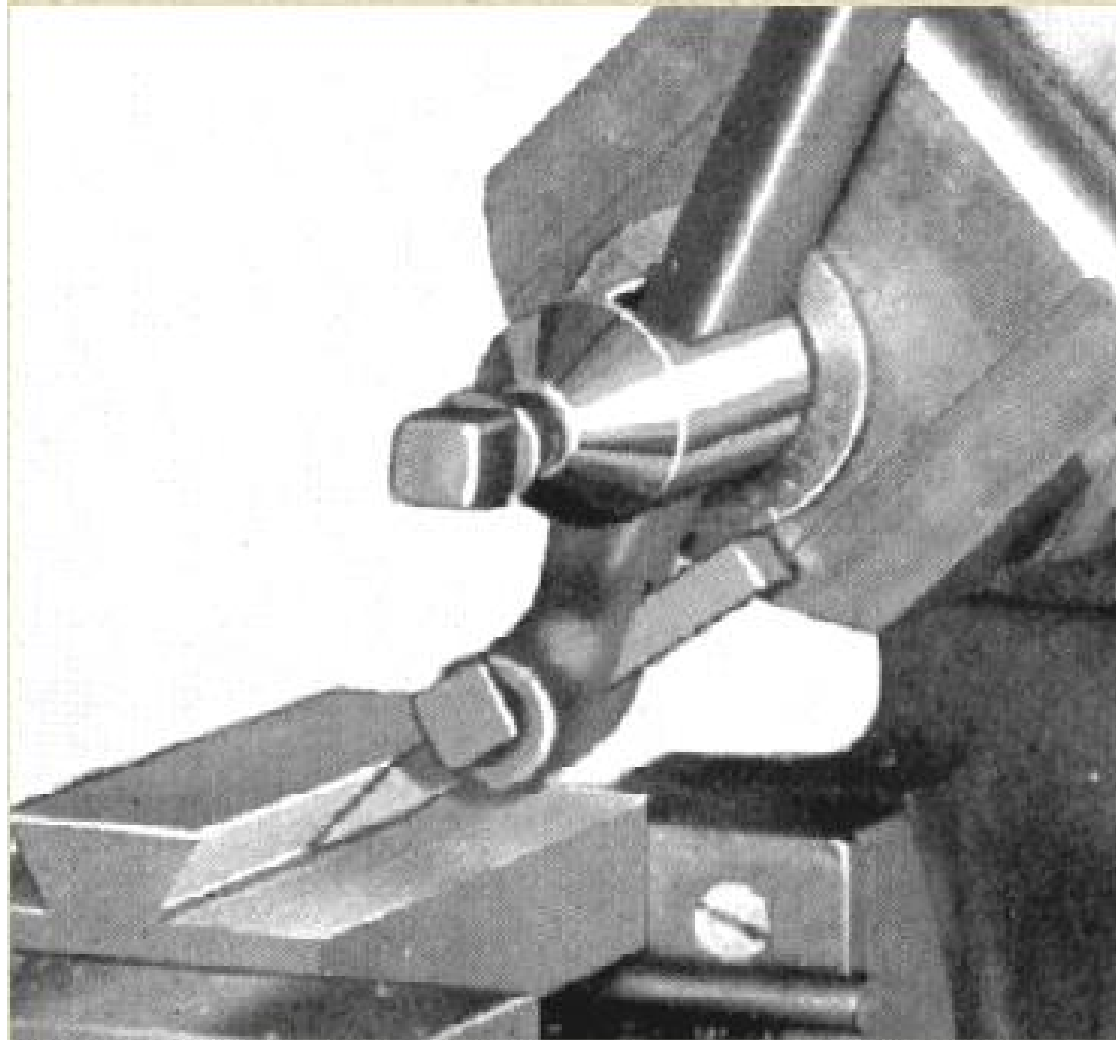
Tool slide is tilted for V block angle



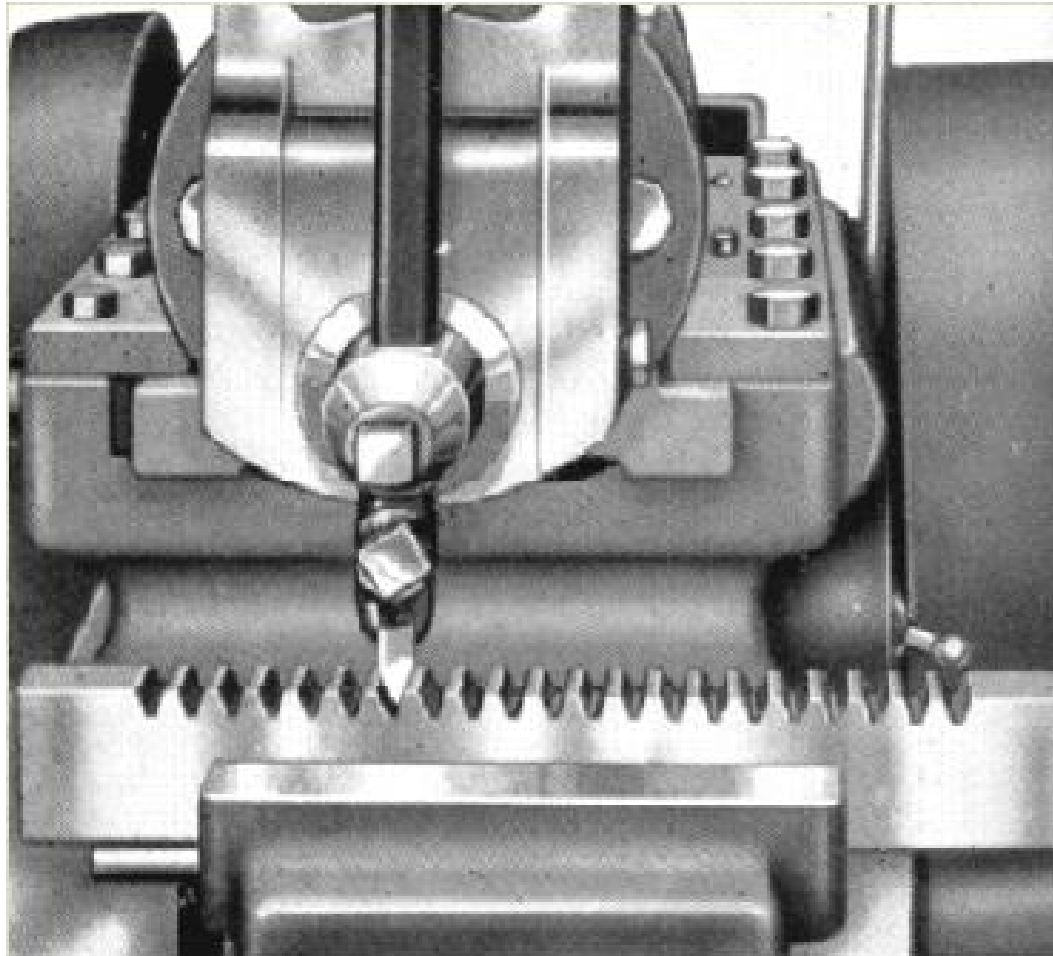
Making an external key way



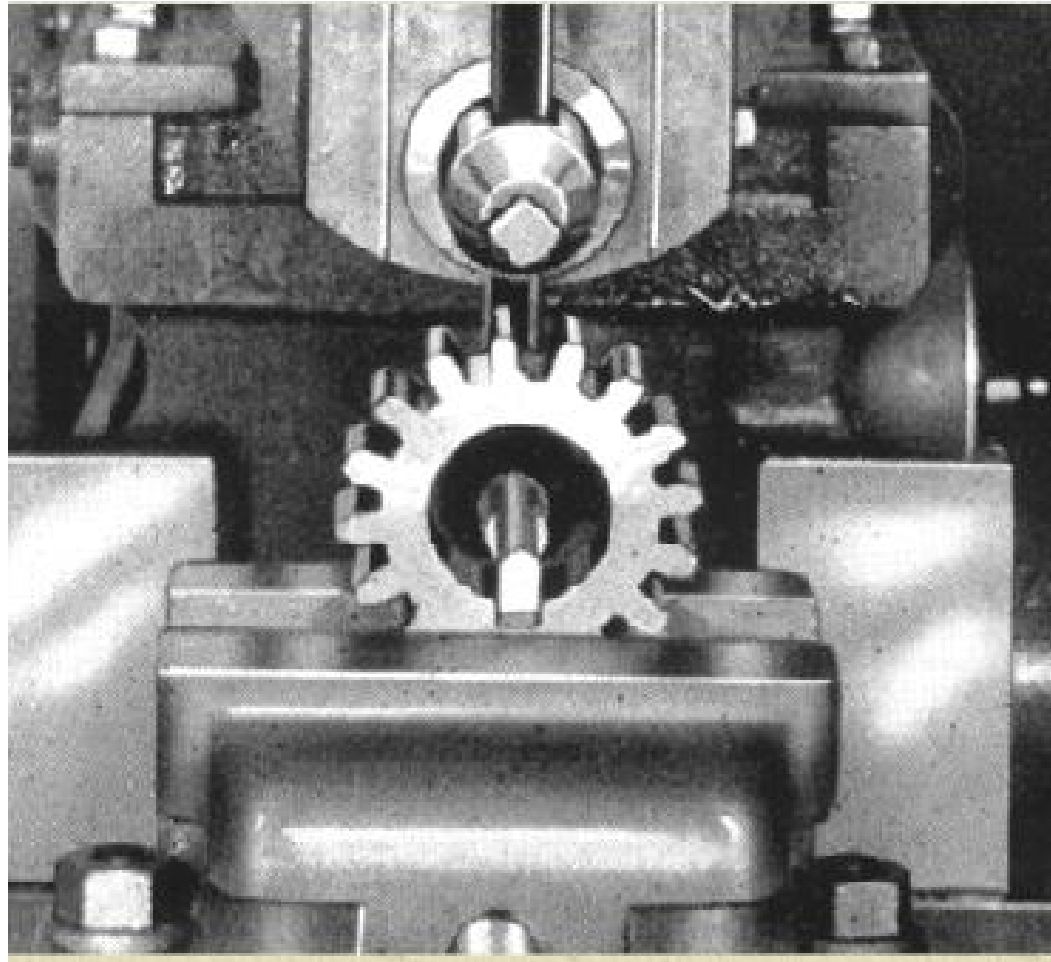
Making of Dovetail



Making of rack



Making of an internal keyway



Machining a contour surface

