

Shaper Machine

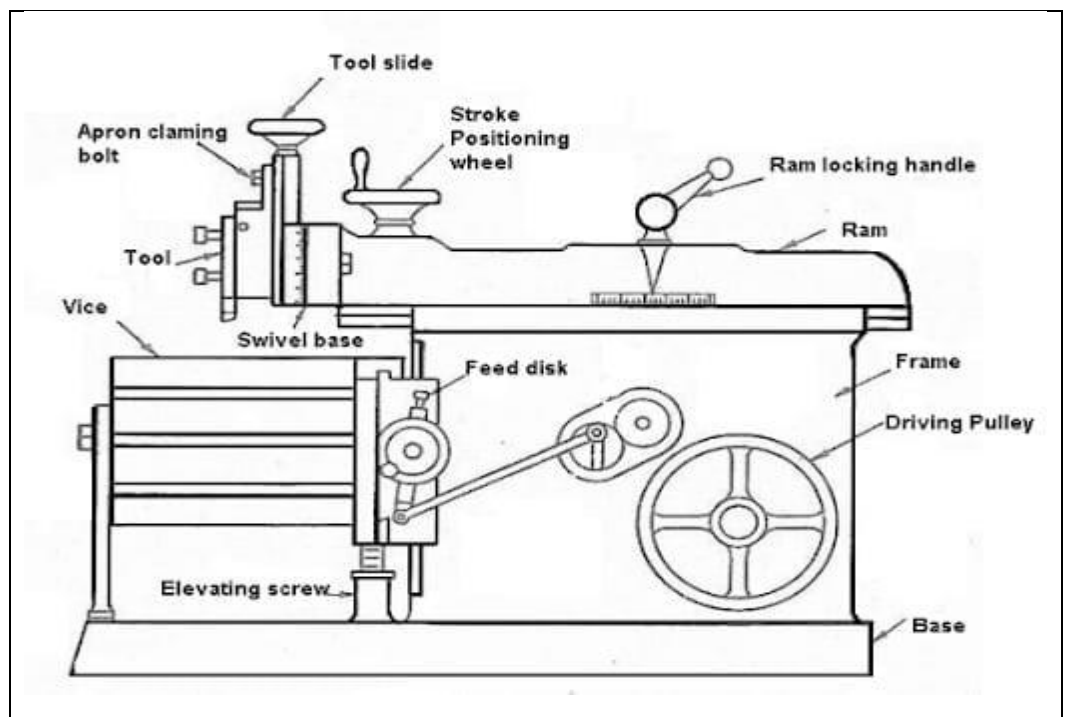
A shaper Machine is a reciprocating type of machine that is used for producing horizontal, vertical flat surfaces. The workpiece is fixed on the table and the Ram holds the single point cutting tool. During forwarding stroke, (the single point tools attached to the ram and workpiece is fixed on a table).

Shaper Machine Definition:

Shaper Machine is a production machine in which the single point cutting tools are attached and the workpiece is fixed and while moving forward the tool cuts the workpiece and in return, there is no cut on the workpiece and used for producing flat and angular surfaces.

Shaper Machine Parts:

- Base
- Column
- Table
- Cross rail
- Ram
- Clapper Box
- Elevating Screw



Base:

The base is the most important part of the shaper because it holds all the loads of the machine. It is made up of cast iron. It absorbs vibration and other forces that occur while performing shaping operations.

Column:

The column is mounted on the base. It is also made up of cast iron. Column supports the ram that is moving forward and backward for operation. It also acts for covering the drive mechanism.

Table:

It is mounted on the saddle. It is also one of the important parts of the machine. The table can be moved crosswise by rotating the crossfeed rod and also for vertical by rotating the elevating screw. It is a box-like casting with an accurately machined side and top

surfaces. These surfaces having T-Slots for clamping the work. In heavier type shaper machines, the table clamped with table support to make it more rigid.

Cross rail:

It is also mounted on the column on which the saddle is mounted. The vertical movement and Horizontal movement is given to the table by raising or lowering the cross rail using the elevating screw and by moving the saddle using the cross feed screw.

Ram:

The Ram reciprocates and it carries the tool head in which single point cutting tool is attached. The tool head is in the clapper box, which causes cutting action only in a forward stroke of the ram. The feed or depth of cut of the tool is given by down feed screw.

Shaper Machine Operation:

Generally, There are Four types of Operation performed on Shaper that are:

- Vertical Cutting Operation
- Horizontal Cutting Operation
- Inclined Cutting and
- Angular or Irregular Cutting Operation

Quick Return Mechanism:

An accelerated return mechanism is a mechanism that produces a reciprocal effect so that the system has less time to return stroke when compared with the forwarding stroke.

In the quick-return mechanism, a circular movement like the crank & lever mechanism converts to reciprocating movement, but the returns time is different from the forward moments.

In many applications, this process is used. Some of them are shaper, slotter, screw-press, mechanical drive, etc. The time required for cuttings is reduced with the help of a quick accelerating mechanism.

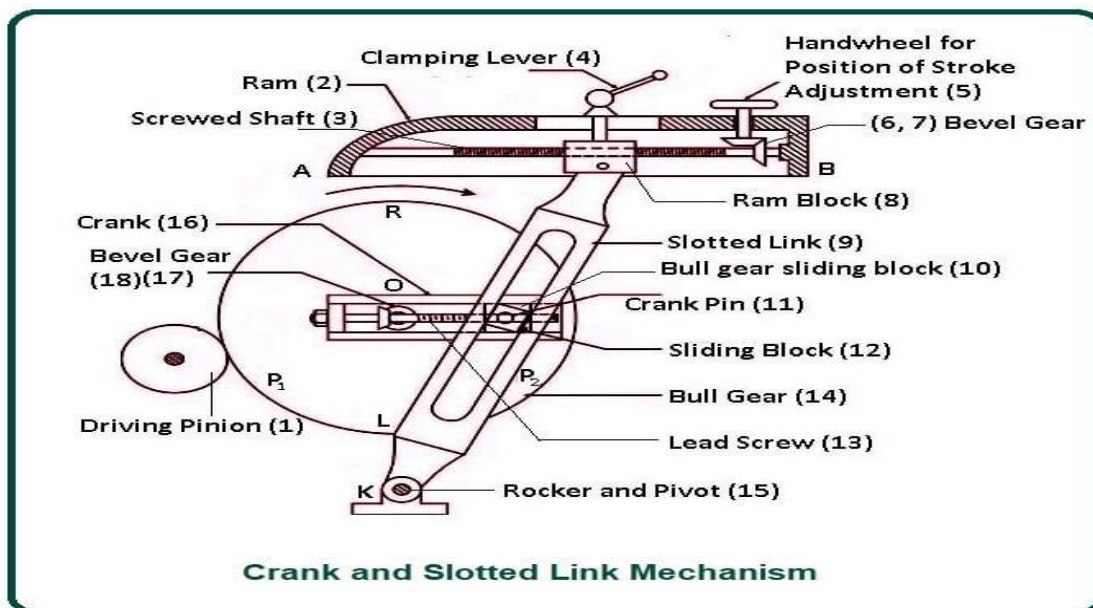
- **Hydraulic Drive.**
- **Crank and Slotted Link Mechanism.**
- **Whitworth Mechanism.**

Crank and Slotted Link Mechanism.

- In crank & slotted link mechanism. Power is transmitted from the bull gear by a pinion that receives its power from an individual motor.
- In a two-year system, smaller gears are called pinions, and larger gears are called bull gears.

Working of Crank & Slotted Link Mechanism:-

- The radial slide is moved to the center of the bull gear. This radial slide consists of a sliding block that fits the crank pin.
- The crank will rotate at the same speed as the bull gear rotates.
- The sliding block mounted on the crank pin is fitted to the crankpin, which is fitted within the slanted link. This slanted link is attached to the column frame, with its lower end pivoted.
- The upper end of the sliding link is bisected and connected to the ram block by a pin.
- When the bull rotates the gear, the crankpin rotates at a uniform speed. the sliding block fastening the crankpin will rotate on the crank pin circle, and at the same time, this slider will slide up & down in the sliding link.
- As the slider moves inside the sliding link, it will provide a rocking movement to the sliding link, and this movement will provide motion by being transferred to the ram.



These quick withdrawal mechanisms have advantages:-

- The process is automated.
- The construction of the system is not so complicated.
- It can perform operations such as cutting, leveling and slotting the workpiece.
- Idle time is reduced due to rapid return stroke.