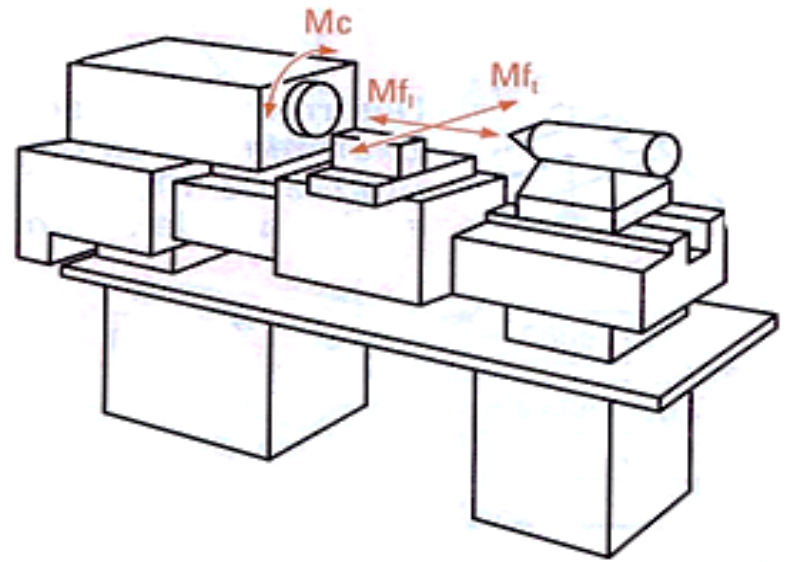
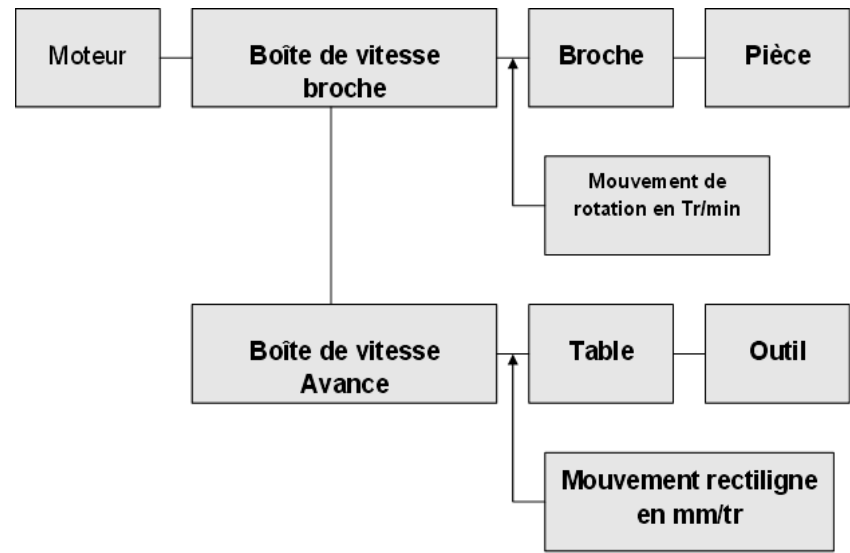


Module: Machine-tools

Speciality: M1 Manufacturing and Production

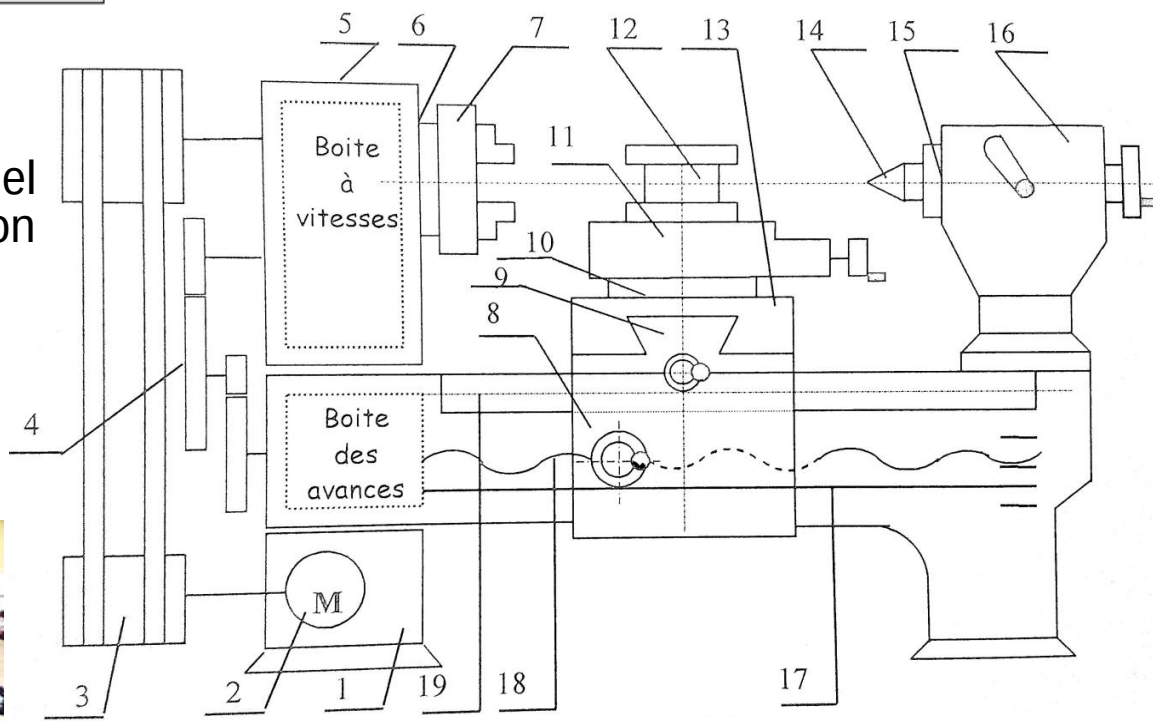
Chapter 2: Different types of Machine Tools

1-LATHES



different types of Lathes

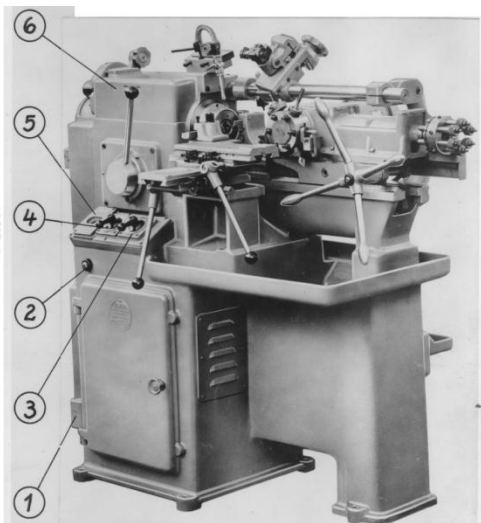
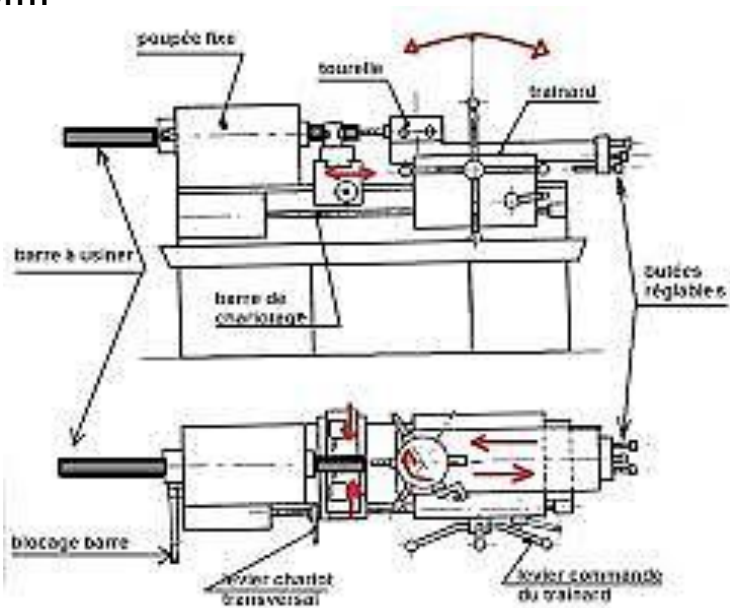
The Parallel Lathe:
Bench Lathe : it is a small span parallel lathe for small parts of good precision

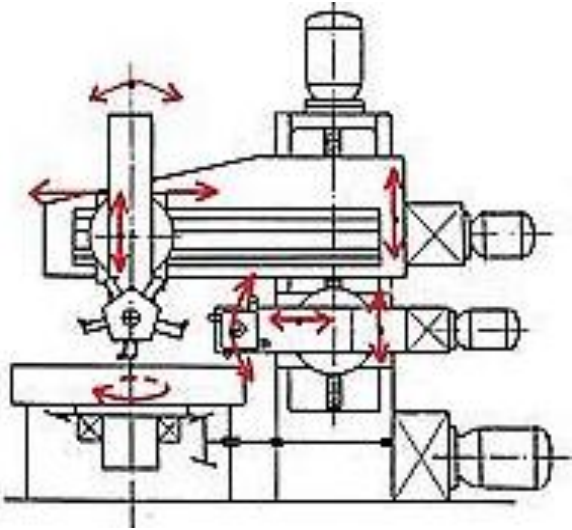


Broken bench Lathe: parallel lathe of very large scope, The bench consisting of two blocks connected slides, intended for large heavy parts with a fairly good accuracy.



Turret lathe revolver: have neither counter doll nor mother screw, are equipped with a rotating turret with vertical axis with 6 to 8 tools, (positioning and quick and accurate tool change), to produce a multitude of similar parts, repeatedly. Existence of a transverse trolley equipped with a 4-position tool holder moving longitudinal and transverse for chariotage, cutting, straightening, etc....



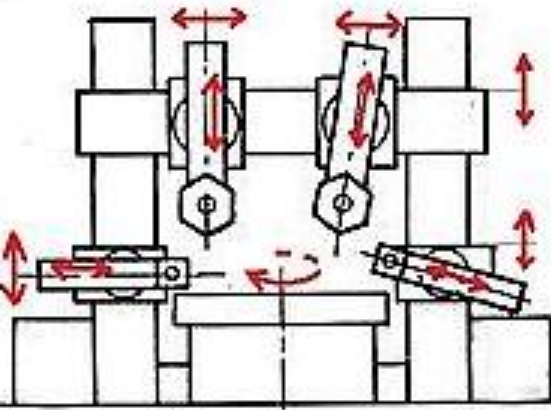


Vertical lathe: in one or two vertical posts (columns),

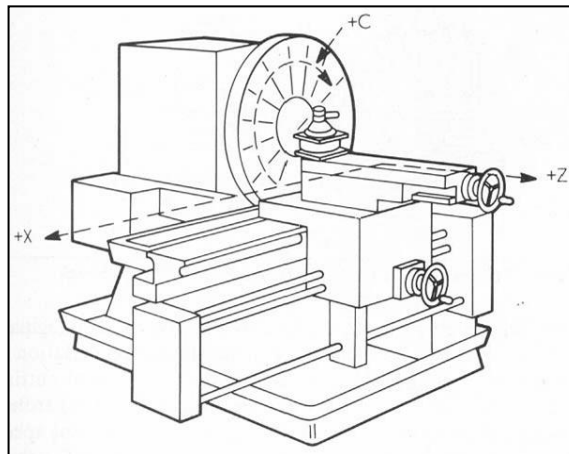
- Vertical axis bit plate
- a crossbar on which the vertical trolleys are located
- Side trolleys on the uprights.

- machining of large diameter parts (more than 5m), heavy and voluminous,

- used in the manufacture of heavy equipment (turbines, rolling mills, crushers, mills, etc.).

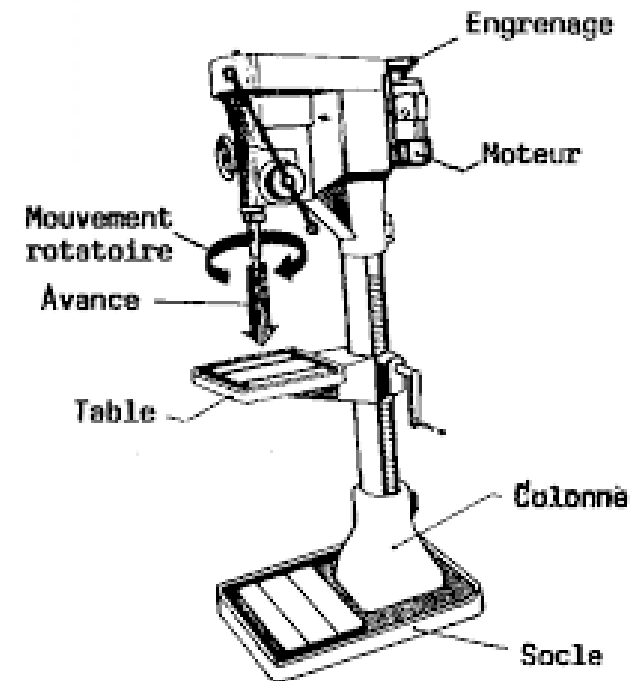
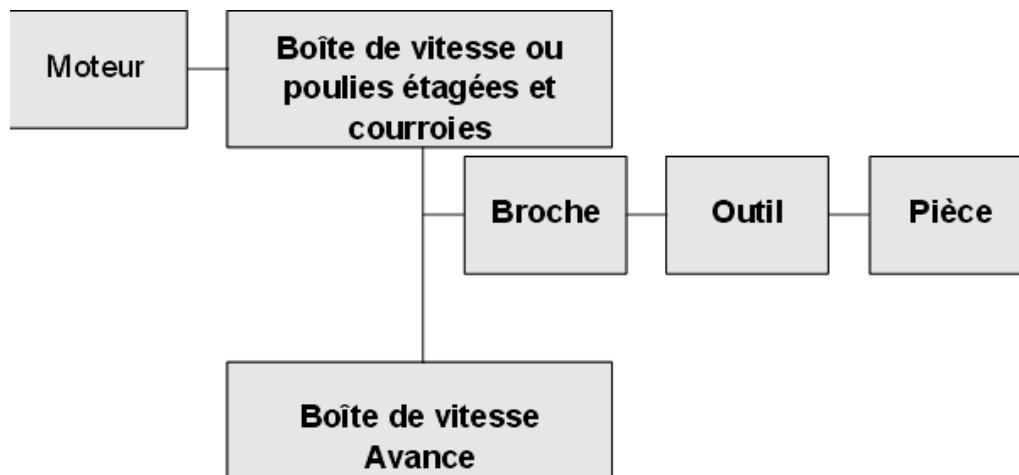


Lathe in the air (frontal lathe): have jaw plates (chucks) of large diameter (up to 5m). - machining of parts with large short diameters (rings, flywheels, toothed wheels, bushings,...).



Multi-spindle automatic lathe: used in medium and large series production of parts requiring maximum precision.

- 2- Drills: fixed part, tool (drill) animated by two simultaneous continuous movements;
- MC (rotation) and Ma (translation) along the tool axis.
 - execution of cylindrical or conical holes opening or blind
 - boring and tapping with a mandrel-mounted tap.



Different types of drilling machines :

Portable drills:-hand tools, hole execution (up to 12mm).

- power is low, limited use
- sometimes mounted on support and guide gauge (with flexible cables)

Sensory drills:- machining of small diameter holes (up to 15 mm).

- are controlled manually,
- column of short height, mounted on tables or pedestals.

Column drills: larger and heavier than sensitives

- vertical diameter drilling (up to 50mm)
- drilling small and medium height parts
- poor structural rigidity, but widely used in industry.

Upright drills: drill with rigid castings for medium-sized workpieces up to 50 mm in diameter



Radial drills: for bulky workpieces, the radial arm can be rotated around the fixed vertical column, and the trolley can slide along the arm, so the drill can be oriented and made a hole according to any desired angle.

Multi-spindle drills: several holes to be made on the same plane of a part (industrial machine and serial work only), up to 24 tools working at the same time driven by a single motor that drives all spindles. the distances between the drill shafts can be changed depending on where the holes need to be drilled. drilling jigs are used to guide the forests.

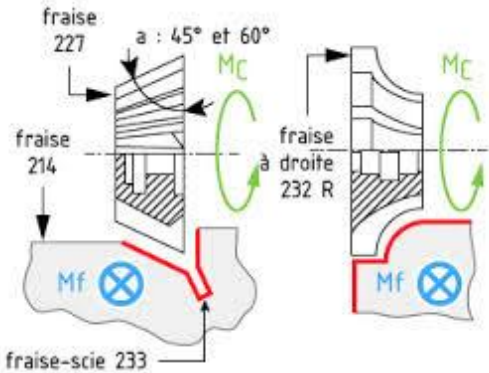
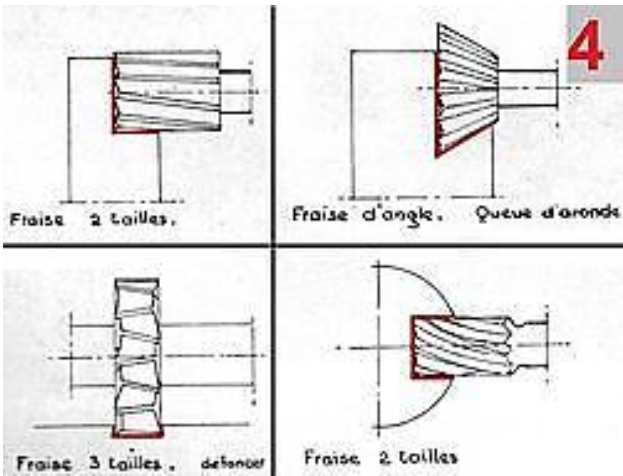
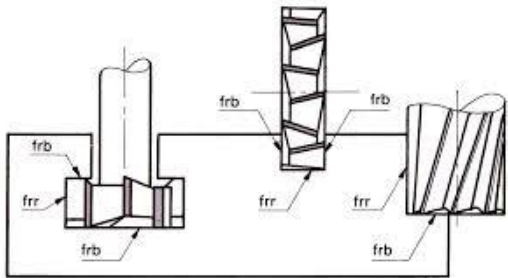
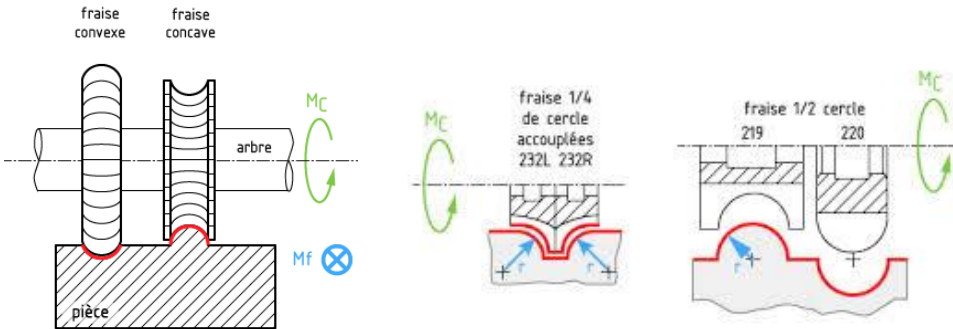
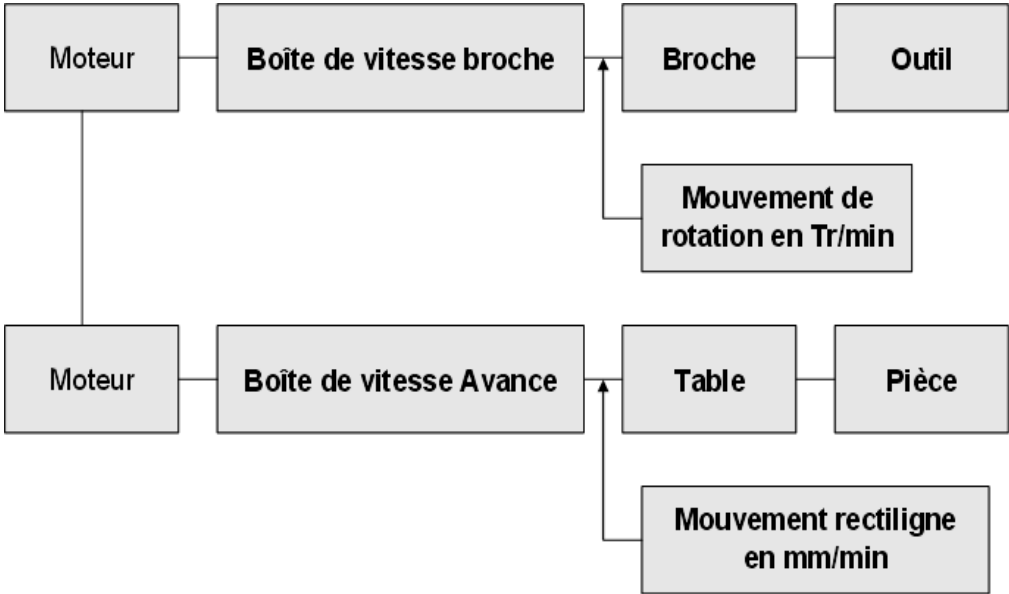


Multi spindle drills: has a long common base 4 to 6 drilling heads side by side driven by independent motors, each spindle is set with different tools for different operations
- used for production work (series of operations such as drilling, boring, grinding and tapping can be carried out in series by simply moving the workpiece from one position to another on the table).



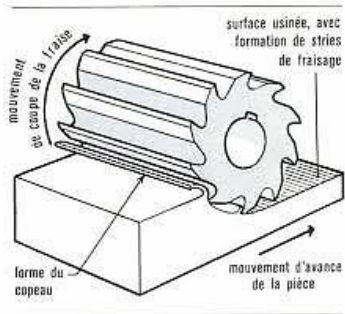
Horizontal drills: horizontal layout of the spindle, used for special operations such as boring for example.

Milling machines: dedicated to simple geometric surfaces (planes) or associated (groove, shoulder, etc.), uses a multi cutting tool (cutter). The cut made by association of 2 movements: Mc rotation of milling cutter (rp/min) and Mf rectilinear displacement in (mm/ min).

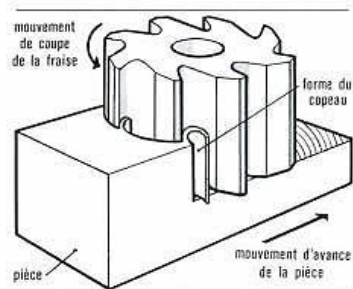


The different types of milling machines:

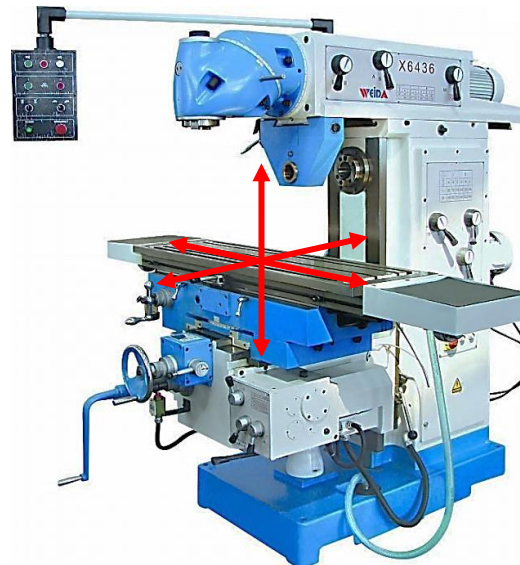
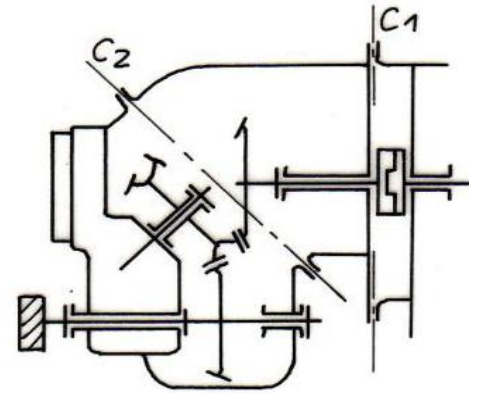
- **Horizontal milling machine FH:** horizontal spindle- rigid and robust structure it is intended for heavy workpieces
- **Vertical milling machine FV:** similar to fh in construction - but the spindle is vertical.
- **Universal milling machine FU:** suitable for a very wide range of milling operations. used in the works of the tool shop. has a universal head designed knee can be tilted to a required angle. it can receive drills, reamers, cutters with a very high degree of precision.



Fraisage cylindrique.



Fraisage frontal.



- bench milling machine
- double height milling machine
- duplex milling machine
- multi-spindle milling machine
- cnc milling machine



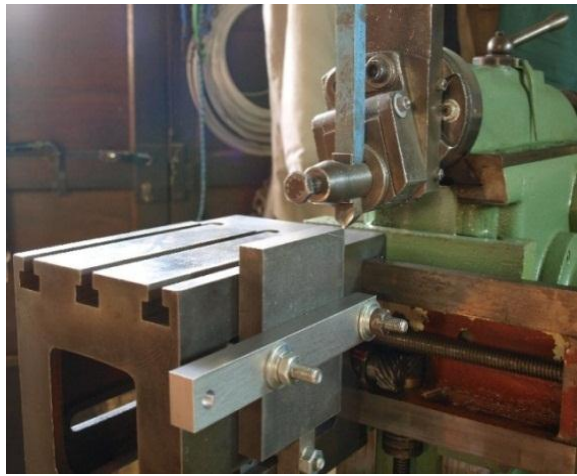
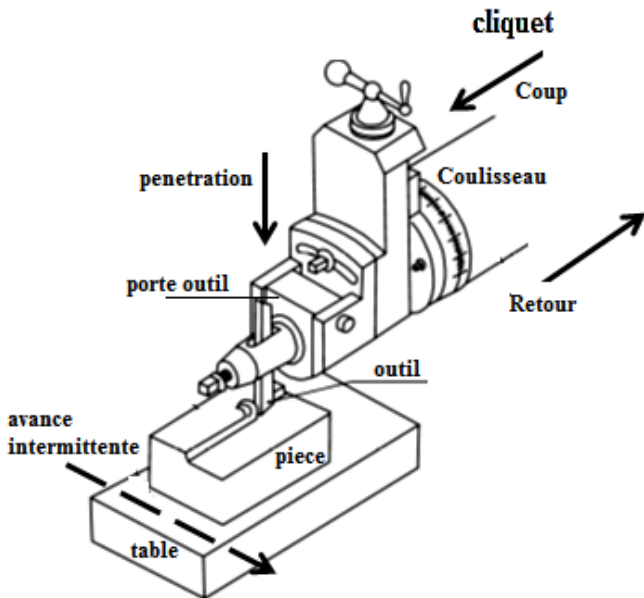
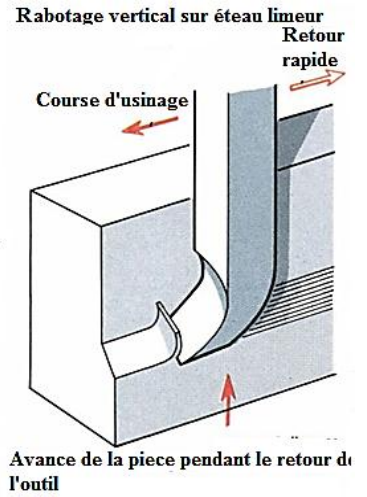
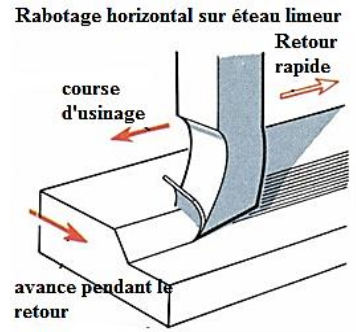
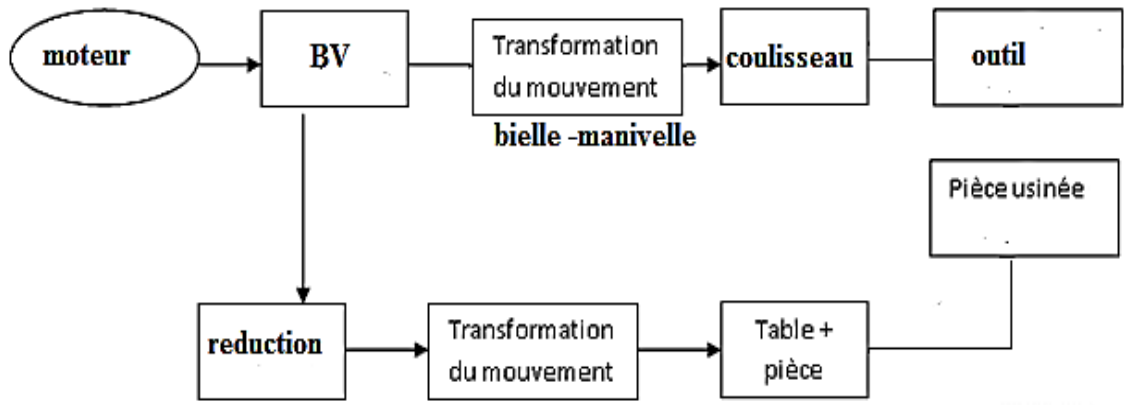
planers: machining horizontal, vertical, inclined, concave, convex and even conjugated surfaces-
use single-edged tools with alternating motion.

straight mc machines include; planers, shapers, mortiser and broaching machines,

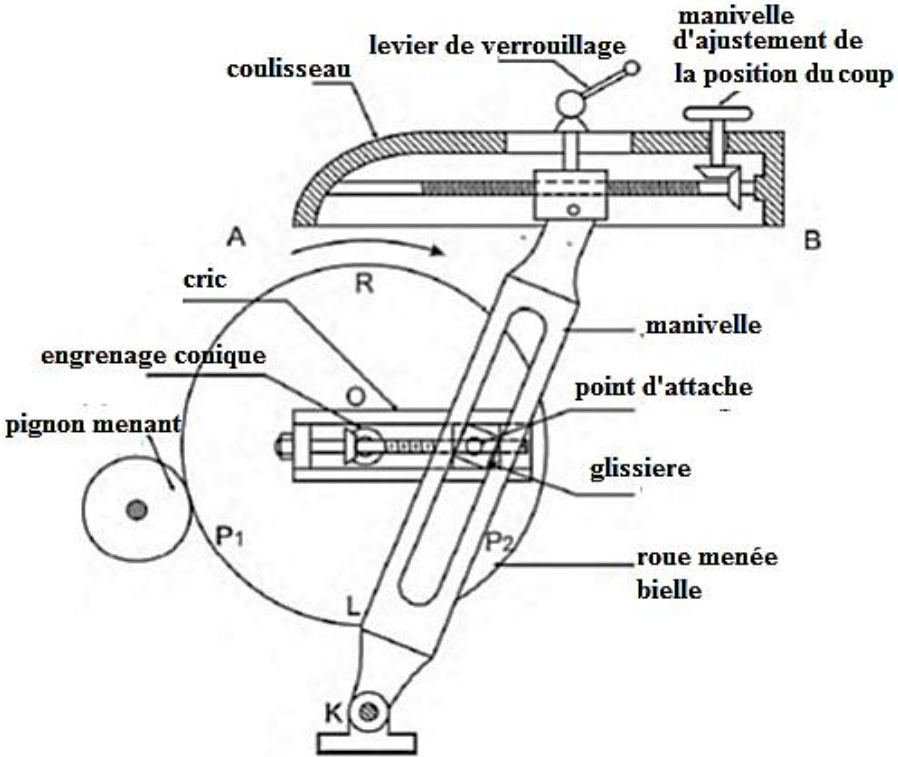
- Shaper:

Cutting movement Mc: fast engagement (stroke) attributed to the tool + faster return (empty and tool clear)

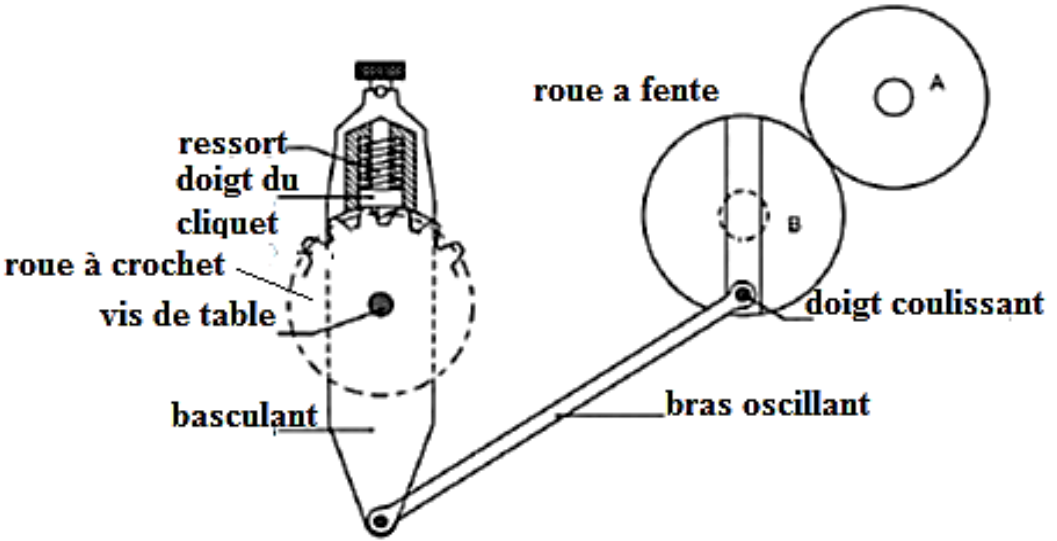
Advance motion Ma: intermittent table movement



Production of Mc:



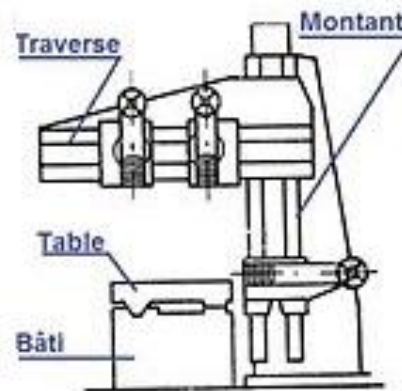
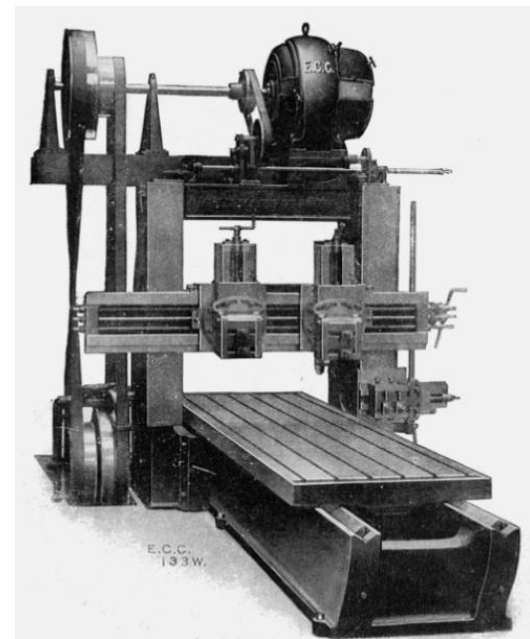
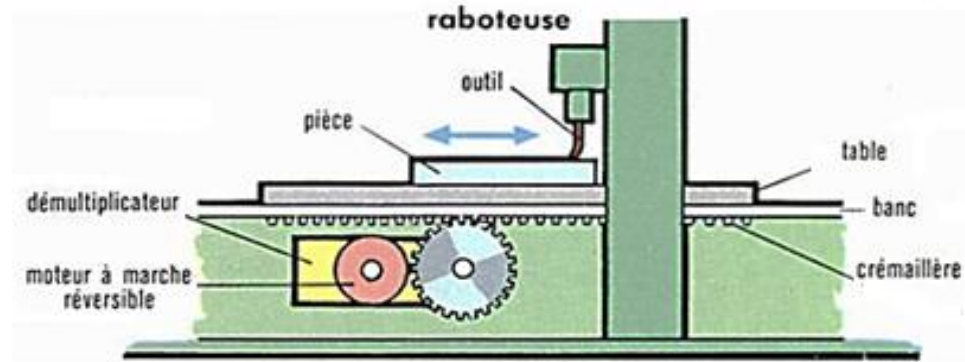
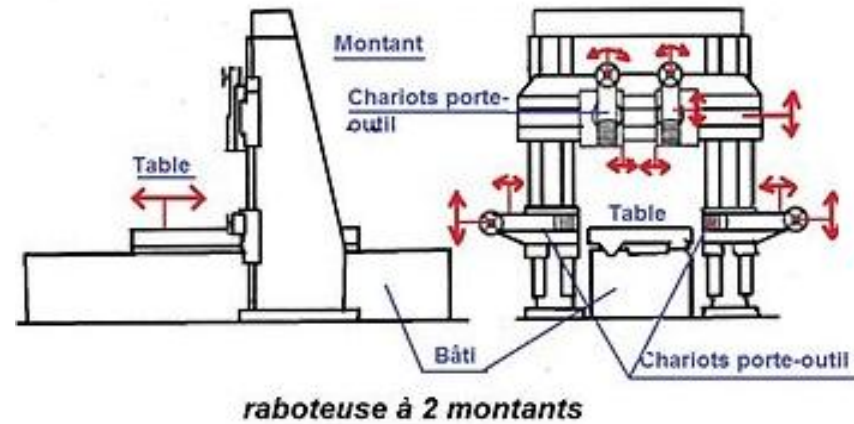
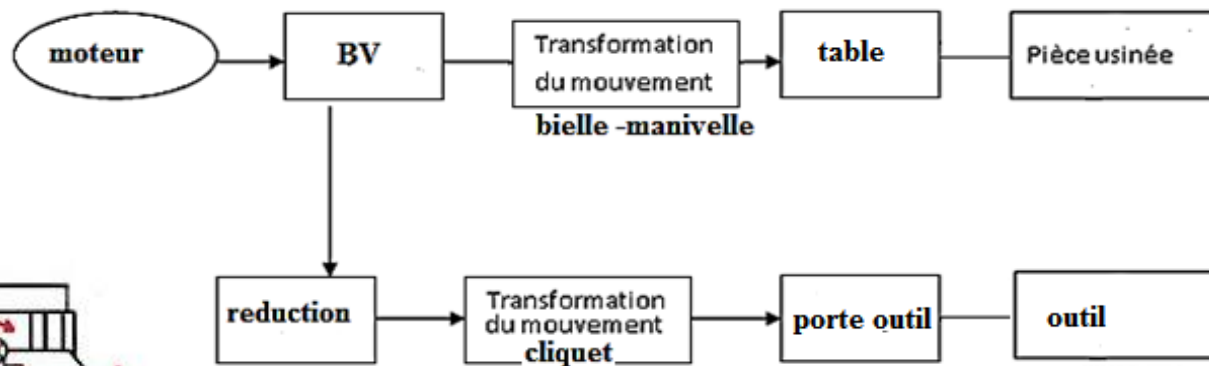
Production of Ma:



Planer:

Production of Mc:

Different types of planers



Raboteuse 1 montant

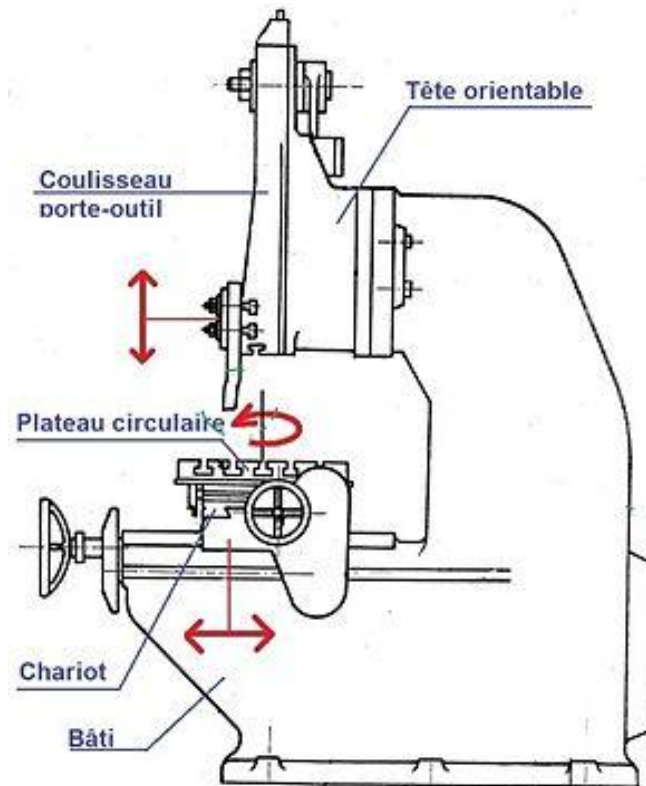
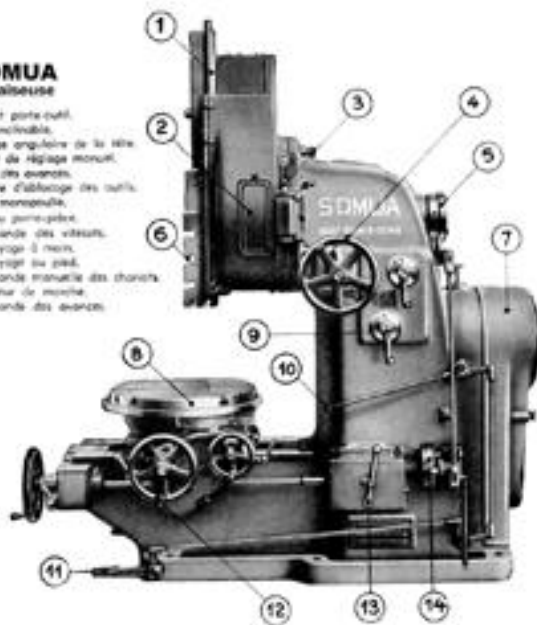


Slotters



SOMUA Mortaiseuse

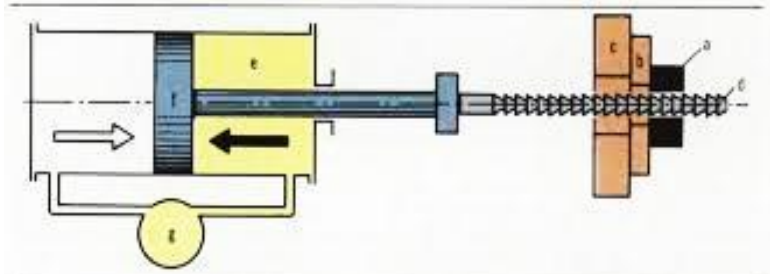
1. Chariot porte-outil.
2. Tête inclinable.
3. Régulateur angulaire de la tête.
4. Visser de réglage manuel.
5. Cône des avances.
6. Roue d'entraînement des outils.
7. Boîte manivelle.
8. Plateau porte-outil.
9. Commande des vitesses.
10. Embrochage à main.
11. Embrochage au pied.
12. Commande manuelle des chariots.
13. Sélecteur de marche.
14. Commande des avances.



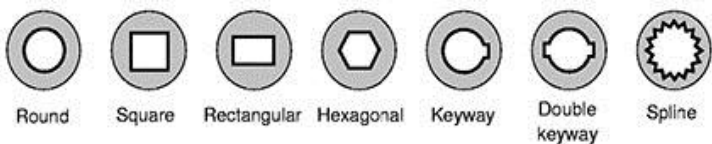
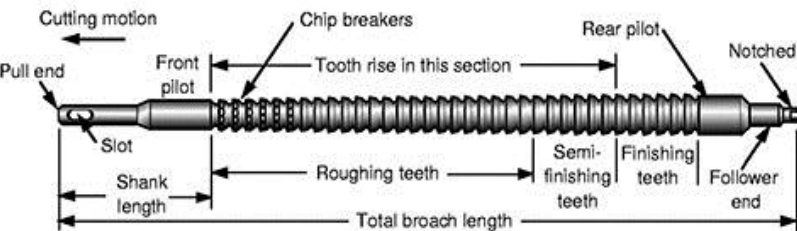
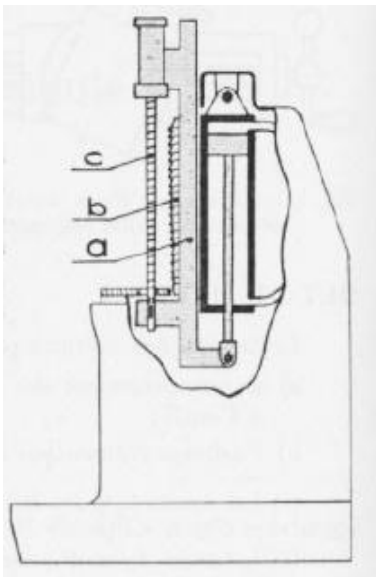
© Marcell Maschinen AG



broaching machines



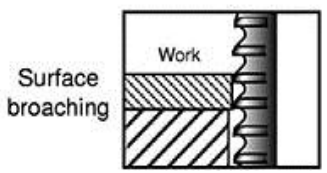
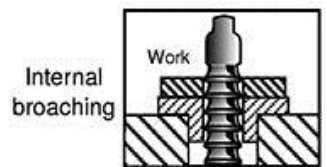
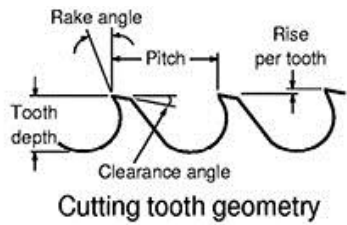
Machine à brocher horizontale avec entraînement hydraulique : a, pièce; b, appui; c, plaque de fixation; d, broche; e, cylindre; f, piston; g, pompe à huile.



Some typical examples of internal broaching profiles



Some typical examples of surface broaching profiles

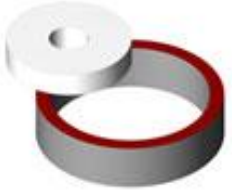


Grinding machines:

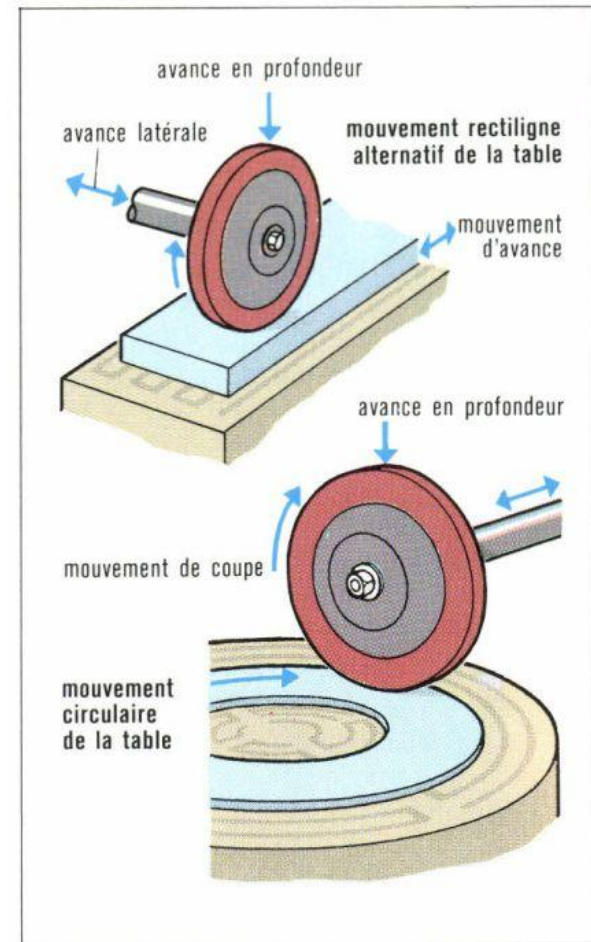
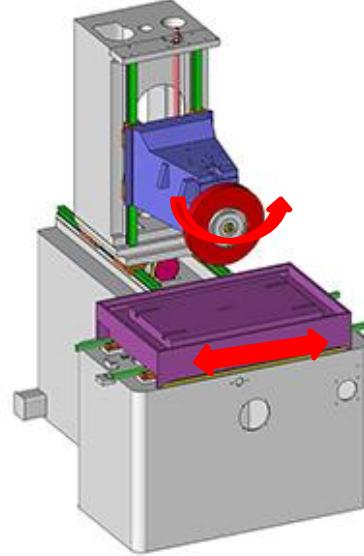
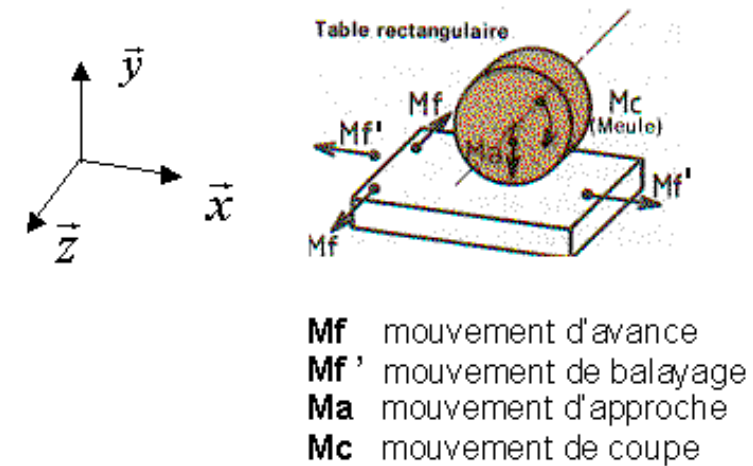
the grinding is a process of machining by abrasion with the grinding tool, the M_c is the rotation of the grinding wheel

the M_a is the intermittent translation of the table.

we distinguish : External and Internal rectification

	External cylindrical	Internal cylindrical	Plan	Rotation
Peripheral plunge grinding				
Peripheral longitudinal loops				
Side plunge grinding				

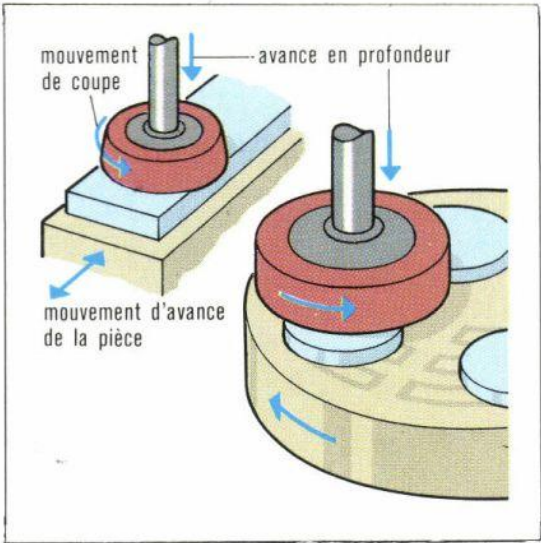
Flat grinding machine: according to the position of the axis of the horizontal or vertical grinding wheel:
 Tangential flat grinding: (the grinding wheel axis is horizontal)



Rectification plane tangentielle.



Frontal flat grinding: (the axis of the grinding wheel is vertical)



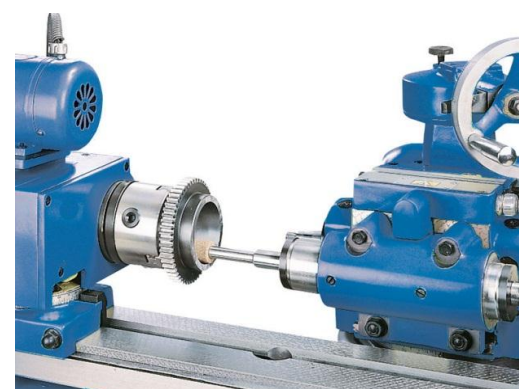
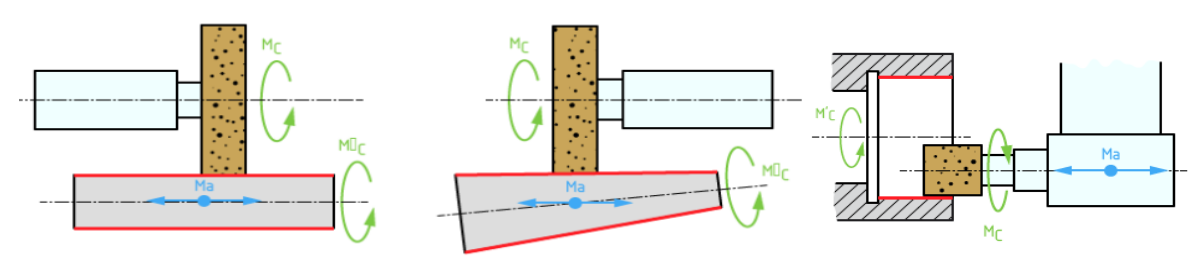
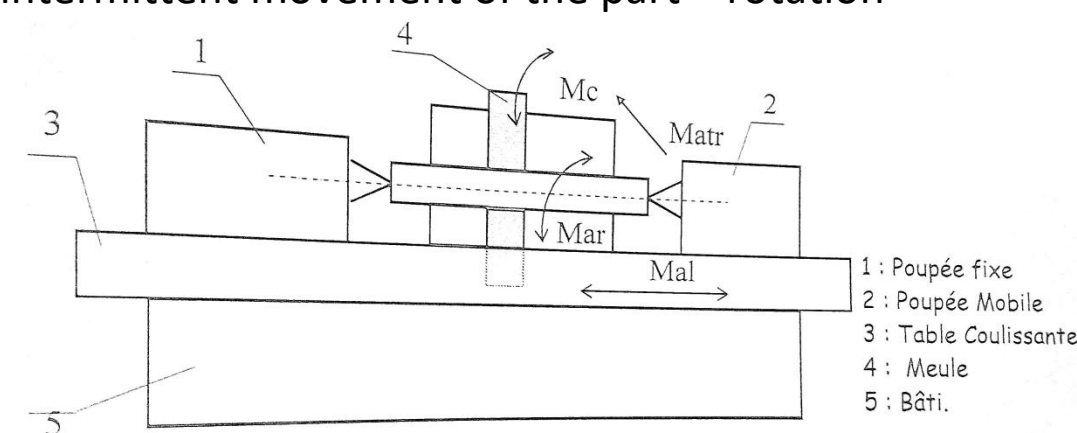
Rectification plane frontale.



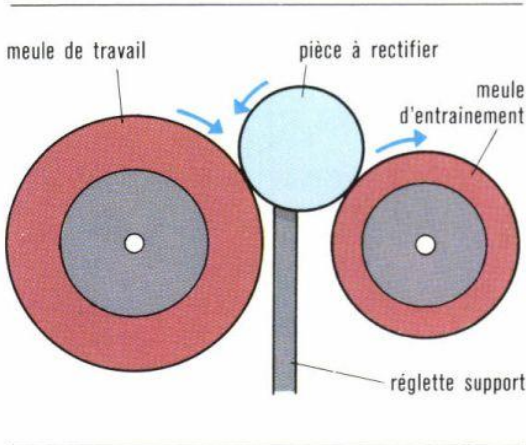
Cylindrical grinding: Two types; External and Internal

The M_c : wheel rotation

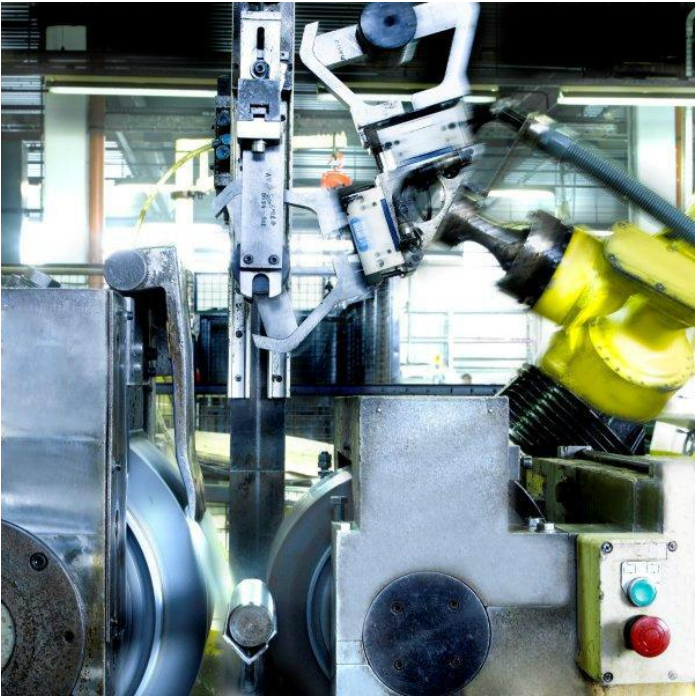
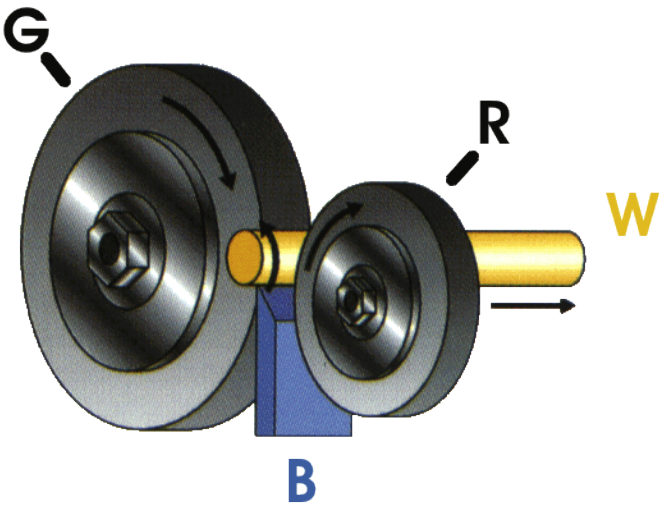
The M_a : intermittent movement of the part + rotation



Centreless Rectification: rectification without centres



Rectification extérieure sans pointe (procédé « centerless »).



Saws:

- Blade saw
- Band saw
- Disc saw

Formes de dent normale – abréviations

