



THE MAIN TYPES OF MODERN LATHES

Lathe

Modern lathes are highly efficient, accurate and complex devices, capable of doing a great quantity and variety of work. Lathes are made in a wide variety of types and sizes, from the small precision lathe found in watch repair shops to the immense machine. The lathe consists essentially of a bed (1), headstock,(2) tailstock(4) and saddle(3).



2. headstock

3. saddle

4. tailstock



1. bed

The bed – The main casting of the lathe is called the bed, and usually consists of a good quality grey iron casting of rigid design. It is provided with accurately machined ways, on which slides the saddle and the tailstock, and on which the headstock is located and bolted.



The headstock is located true with the the gearing and controls for traversing the saddle towards and away from the headstock ways and bolted rigidly to the bed at the left-hand end. It carries the lathe spindle and back gear-box if the lathe is of the all-gearred head type. The spindle is mounted in two large plain bearings capable of adjustment and provided with thrust washers to prevent end play. The nose of the spindle is provided with an external thread and register for attaching a face plate or a chuck back plate and a taper bore for the insertion of a centre.



The saddle consists of a casting designed to carry the tool post slide or slides, and is fitted to the ways of the bed so that it may slide along it without lateral movement. The front of this casting called the apron, carries. The cross slide is mounted on the top of the saddle and must be at right angles to the bed.



The tailstock consists of a casting fitted to the bed and capable of being firmly clamped to it at any position along its length. The casting is bored for a sliding sleeve which is moved axially by a handwheel at the right-hand end.



Turret lathe

Turret Lathe – The characteristic feature of a turret lathe is the turret which is mounted upon a carriage and contains the tools which are successively brought into the working position by indexing or rotating the turret. Many turret lathes also have systems of stops or gauges for controlling the travel of the turret carriage and cross-slide, in order to regulate the depth of a bored hole, the length of a cylindrical part or its diameter.



Drilling machines

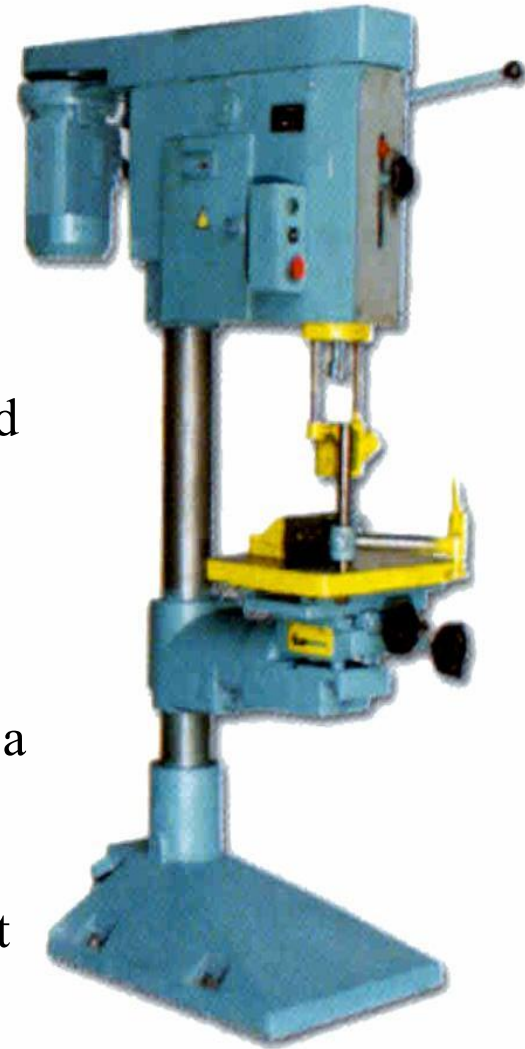
Drilling machines which are used mainly for drilling holes in machine parts, are made in many different types designed for handling the various classes of work.

The upright drilling machine is the type most commonly used, and the name applied to this class indicates that the general design of the machine is vertical and also that the drill spindle is in a vertical position.

The multiple-spindle type is built in both vertical and horizontal design.

It can perform a number of operations on a component without the necessity of changing tools.

Gang Drills - When a number of single-spindle drilling machine columns are placed side by side on a common base and have a common work table, the machine is known as a gang drill. Each spindle is independently controlled as to speed and feed so that a number of operations may be performed in succession and simultaneously upon the machine. In this machine work is moved progressively from one spindle to the next.



Radial drilling machine

The radial drilling machine – The main advantage of a radial machine is that the drill can be moved over the work to any desired position, so that a large number of holes can be drilled in the work without moving it.

The sensitive drill is a small machine of light construction, which possesses sensitive qualities which are of value in drilling holes in delicate work.



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Shaper



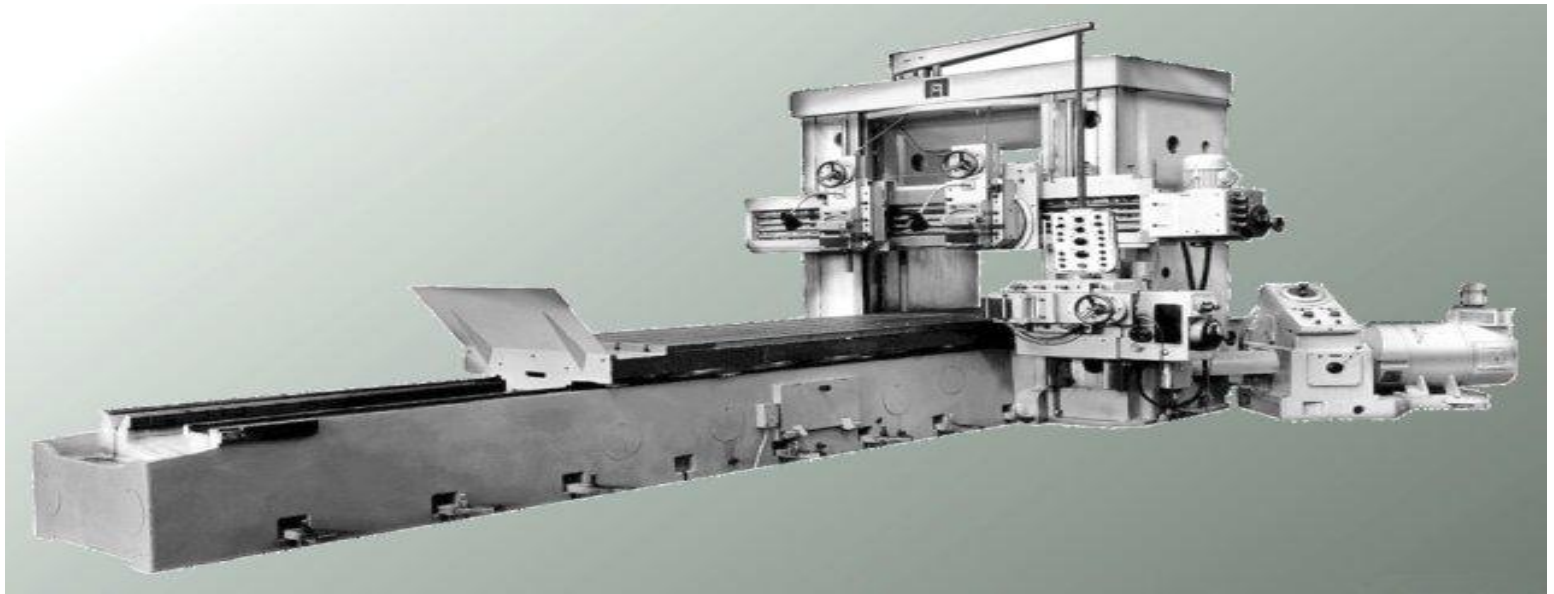
A shaper is a machine that forms surfaces by successive reciprocating cuts of a tool over the work. The work is stationary with reference to the tool but moves laterally in small steps so that the successive cuts can be made. Although most of the work performed on shapers consists of plane horizontal surfaces, it is also possible to finish vertical and angular surfaces, and, with the proper tools and accessories, even curved surfaces may be machined.

The size of a shaper is determined by the longest stroke of the ram. Shapers are driven by belt from a countershaft, by direct connected motor, or by hydraulic power.

Planers

Planers are essentially for machining plane surfaces which are larger than can be cut or reached on the shaper. The modern planer with modern electric controls has a high output.

The planer has a reciprocating table which travels beneath a cross bar on which the tool heads are mounted. Normally one or two tool heads are mounted on the cross bar, but additional tools, generally for cutting vertical faces, may be mounted on the columns supporting the cross bar. The usual design comprises two vertical columns between which the table reciprocates. The cross bar is so mounted that it can slide vertically on these columns. All motions for feed or cut take place either by dropping the cross bar, moving the tool head across the cross bar, or lowering the tool holder mounted on the tool head. The table is normally operated by some form of rack-and-pinion or spiral drive. Modern high-speed planers are now fully electrified.



Slotter

Slotters are usually provided with three or four speeds, obtained either by cone pulley or gear-box. The work table is usually circular and provided with T-slots for clamping the work. The slotting machine may be looked upon as a vertical shaping machine. It machines the internal surfaces of a casting or forging and can do circular work by virtue of its pivoted table. Originally slotters were used for cutting keyways, machining the square holes in such parts as dog clutches and they are still used for this work in small shops.

