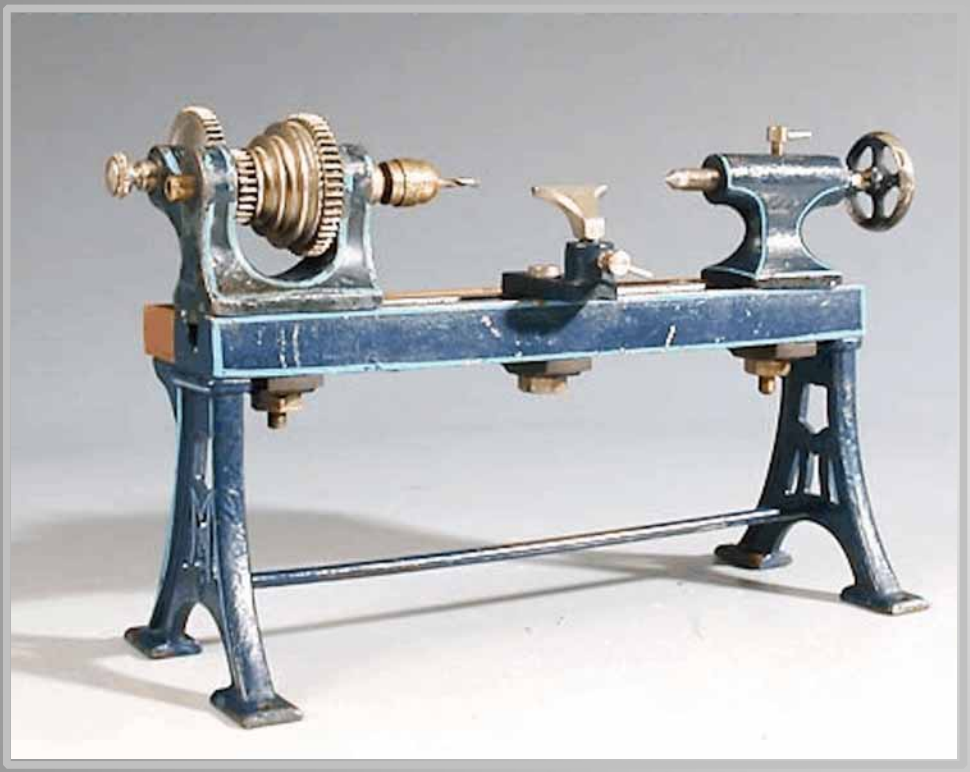


The Development of the Lathe

200 - 1850

Ca. 300 before Christ: Egyptian Lathe

Relief of the Grave of Petosiris, Egypt

In this Figure the earliest representation we have of a lathe is shown. It was carved in low relief on one of the walls of an Egyptian grave of the third century B.C., the grave of Petosiris.

The frame of the lathe appears to have consisted of two longitudinal bars, of which one is probably hidden behind the assistant. At right angles to this primitive lathe bed are two other bars which act as head and tail stocks. One or both of these must have been movable along the lathe bed, to permit the turner to do work on pieces of different lengths, for both stocks seem to have been secured to collars which could slide along the front bed bar.

Robert S. Woodbury, History of the Lathe

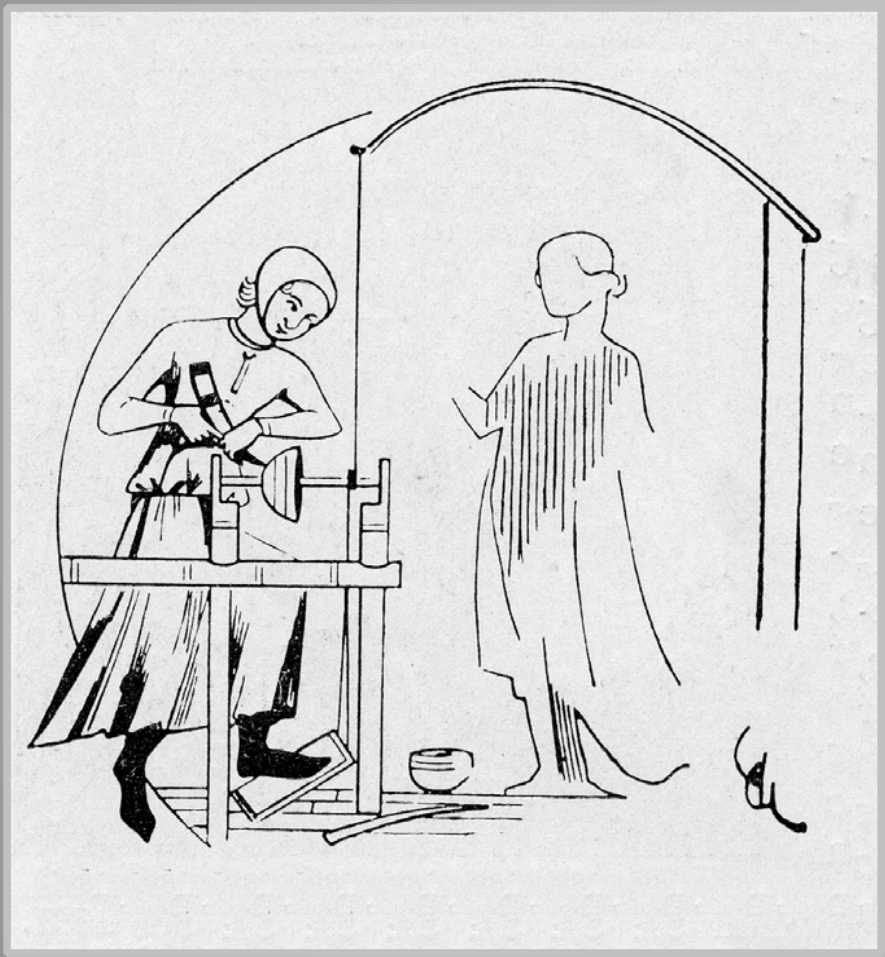
Ca. 1250: The Pole Lathe

Manuscript miniature of the 13th. Century

Here the turner is seated at his work to prevent the motion of his left leg on the treadle from interfering with his control of the tool. The cutting tool already has a long handle held in the position. There is no evidence of a tool rest, although in turning the bottom of a bowl it would be more convenient to rest the tool on the tail stock, as he appears to be doing. The head and tail stocks, the treadle, the spring pole, and the drive cord wrapped around the workpiece, are all clearly shown.

Robert S. Woodbury, History of the Lathe

Ca. 1350: Rocker Lathe



French Moral Bible, ca. 1400

The rocker on the top acts as a spring and pulls the rope, which is wound around the lathe spindle, and the pull down pedal upwards. The result is a couple of revolutions of the lathe spindle in one direction. By pushing down the pedal a rotation is obtained in the other direction.

The turner has either to turn his turning tool around or get the machining done in only one direction of rotation.

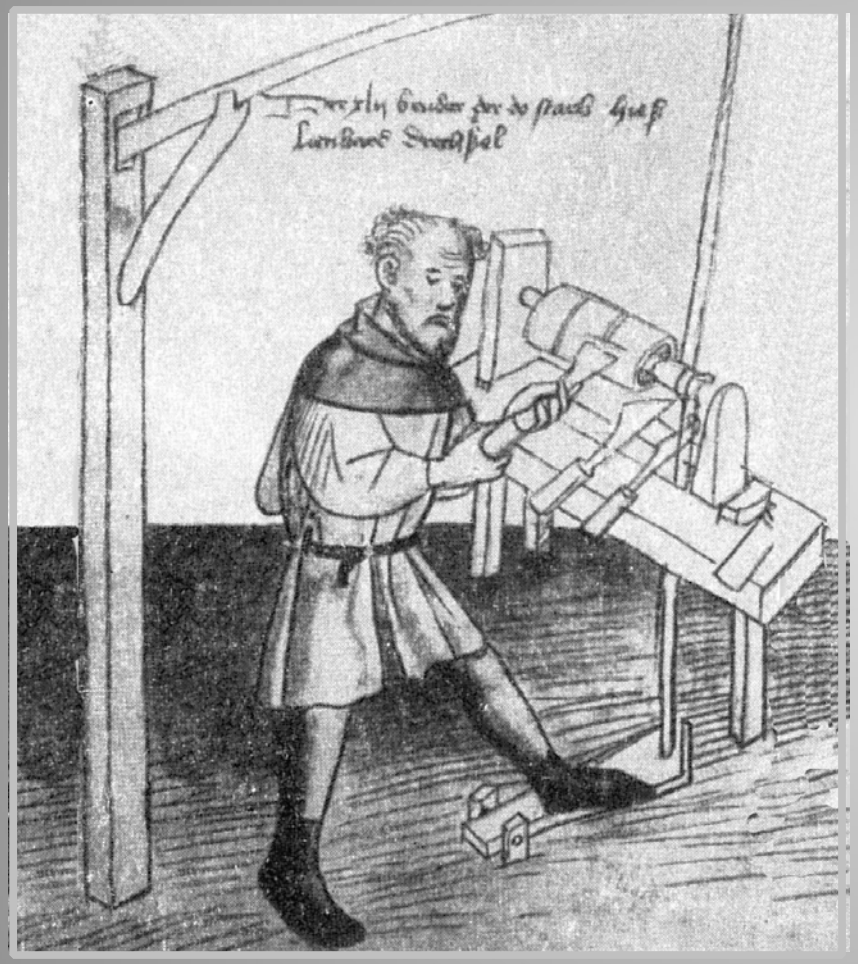
Ca. 1390: Fiddle Lathe

Mendelsches Hausbuch der 12-Brüder-Stiftung, 1397

With his right hand a monk moves his fiddle bow back and forth to apply a rotation to th lathe spindle

In his left hand he pushes a turning tool against the turned part.

Ca. 1395: Pole Lathe

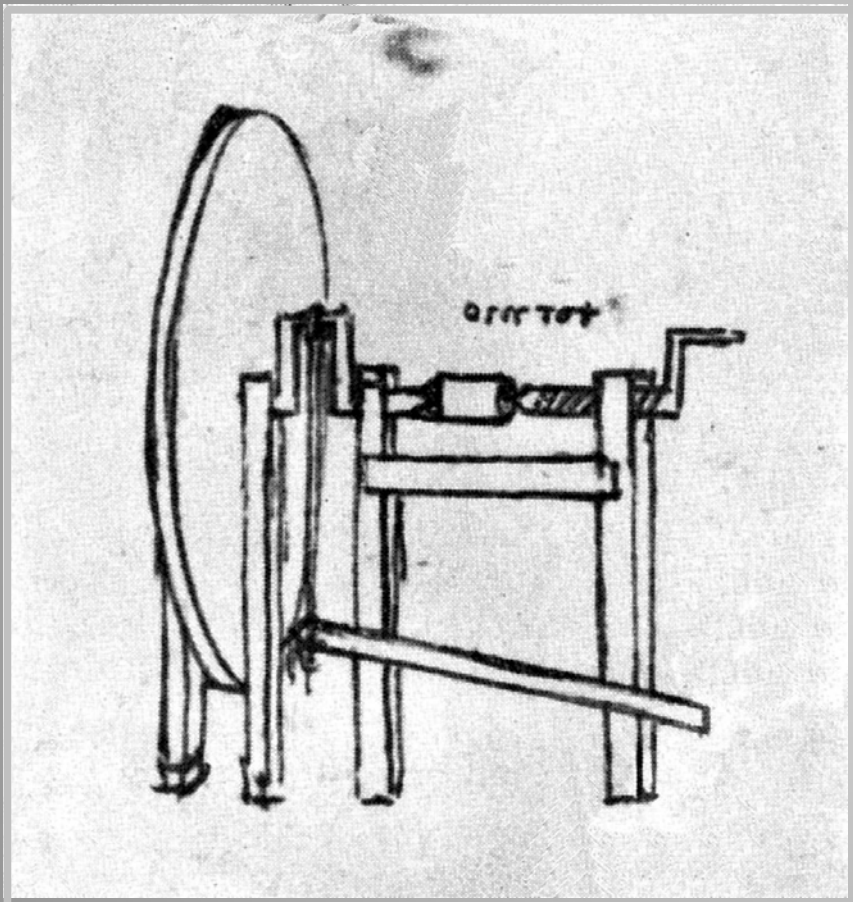


Mendelsches Hausbuch der 12-Brüder-Stiftung, 1397

The turner is shown Standing at his work, but in a position such that coordination between the pole drive and the operation of the tool would not be obtained by rocking his weight from one foot to the other. The cutting tools have short handles and are merely held in the hands, without any tool rest.

Robert S. Woodbury, History of the Lathe

Ca. 1490: Lathe with Spindle Drive, Leonardo da Vinci



Leonardo da Vinci, Il Codice atlantico, um 1490

We find in the Codice Atlantico the first sketch of another important drive of the lathe - a treadle acting on a crankshaft, with a flywheel.

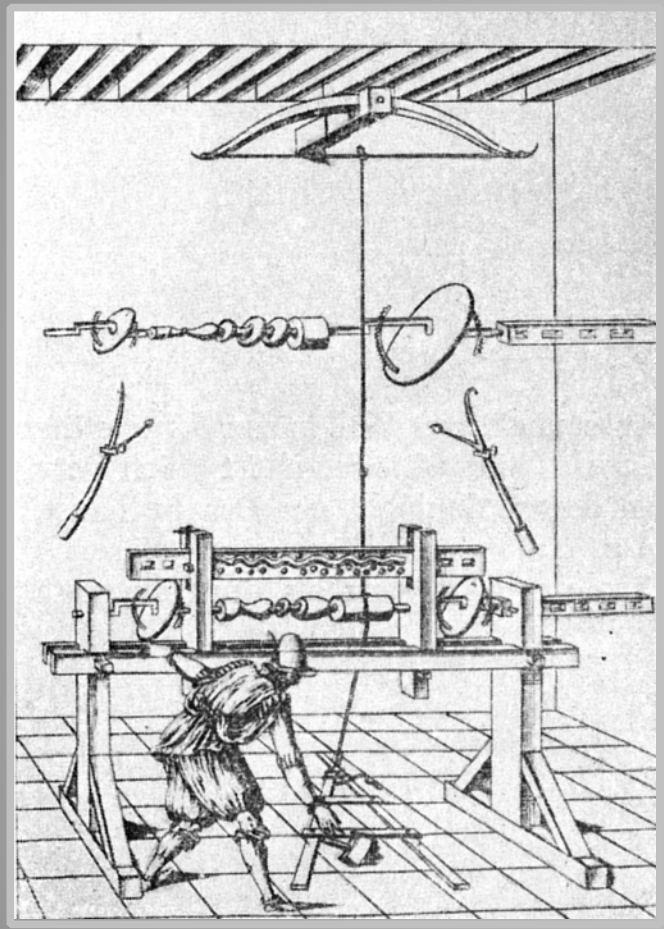
The lathe itself is shown only schematically.

Although the tail stock is fixed, a tail-stock spindle adjustable by a hand crank is clearly shown.

This is the first evidence we have for the use of this method of adjustment in holding work pieces of different lengths between centers.

Robert S. Woodbury, History of the Lathe

Ca. 1578: Ornamental Turning Lathe, Besson



J. Besson, Theatrum Instrumentarium et Machinarum, Lugduni, 1578

In this figure we see the use of both cams and templets to get intricate forms. Here an elliptical cross section of the work is obtained by circular cams mounted on an extension of the lathe spindle so as to permit being set at any desired angle and to bear on a tool guide bar to give the tool the necessary oscillation. Non-circular cams could be used to produce more intricate cross sections. The tool guide bar had cut in it a templet slot to give the desired profile to the workpiece, and could slide up and down between guides. The forked hand tools used for this work are shown on the wall.

Robert S. Woodbury, History of the Lathe

Ca. 1570: Lathe Driven by Wheel and Cord

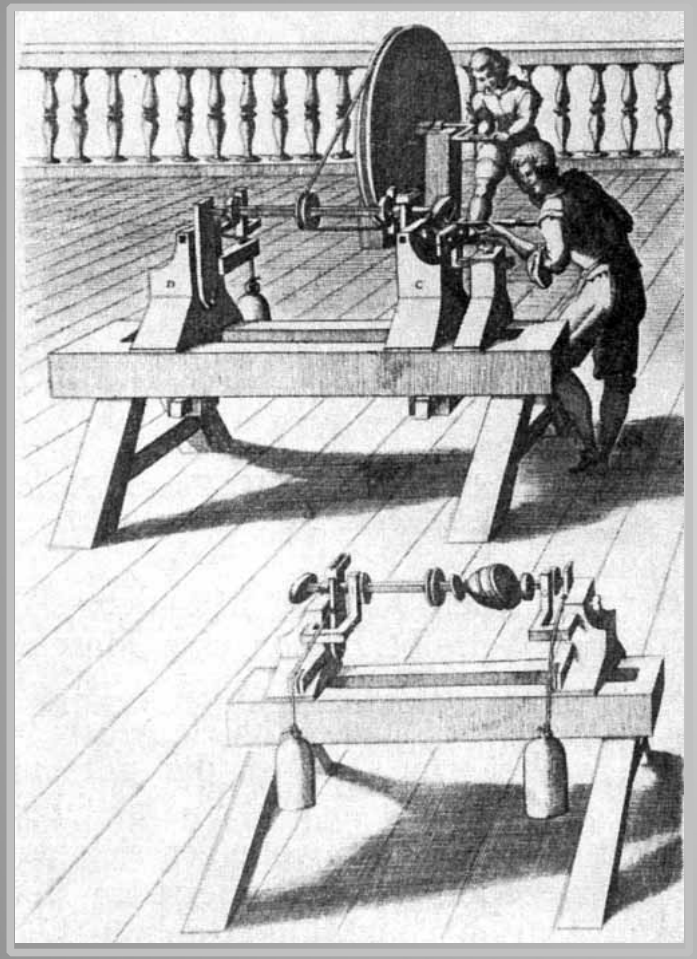
Jost Amman, Stände und Handwerker, Frankfurt, 1568

Although the lathe itself is also shown here as largely schematic, we do see the long handled tool braced under the armpit and surely with a tool rest hidden behind the work.

There can be no doubt of the method of driving the workpiece.

Robert S. Woodbury, History of the Lathe

Ca. 1615: Eccentric Lathe of De Claus



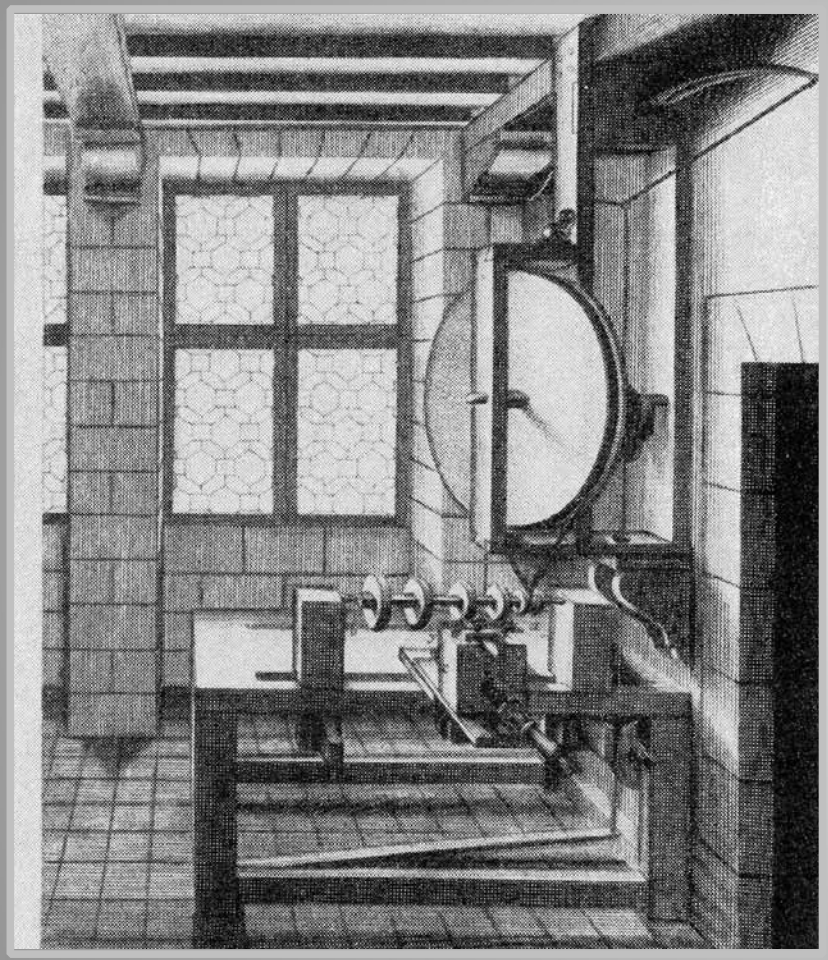
S. De Caus, Maschinenbuch, Frankfurt am Main, 1615

In 1615 the court engineer Salomon de Caus depicted an eccentric turning lathe very similar to Besson's third lathe, in which for the first time the workpiece and the spindle are pushed against a guide by weighted cords. De Caus preferred the weights to springs and noted the advantages of continuous drive for this work.

The construction of this lathe is especially heavy for the work to be performed on it, but was probably required because he used very heavy weights. Although we see an adjustable tool rest, the tool is otherwise controlled by band.

Robert S. Woodbury, History of the Lathe

Ca. 1670: Lathe with Crank



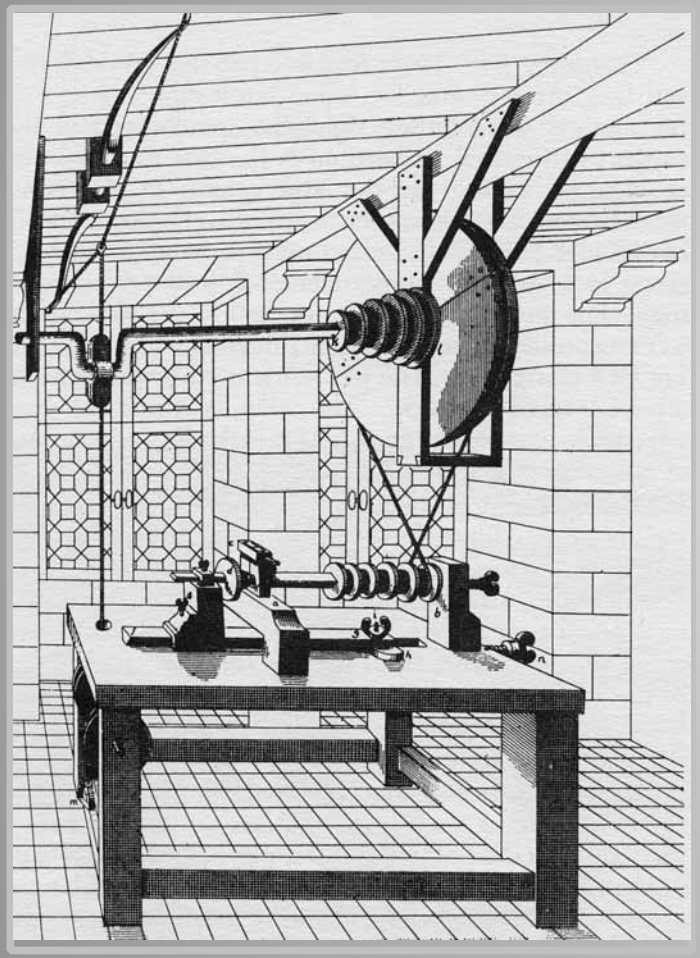
P. Cherubin, La Dioptrique oculaire, Paris, 1671

The powering of this lathe is done by pushing down the foot pedal.

By a crank behind the flywheel the up-and-down movement is being transformed into a more or less constant rotation.

The small driving wheel on the lathe gives a large increase of the rotational speed of the lathe spindle.

Ca. 1675: Lathe with Variable Speed Drive and Gibbed Slide



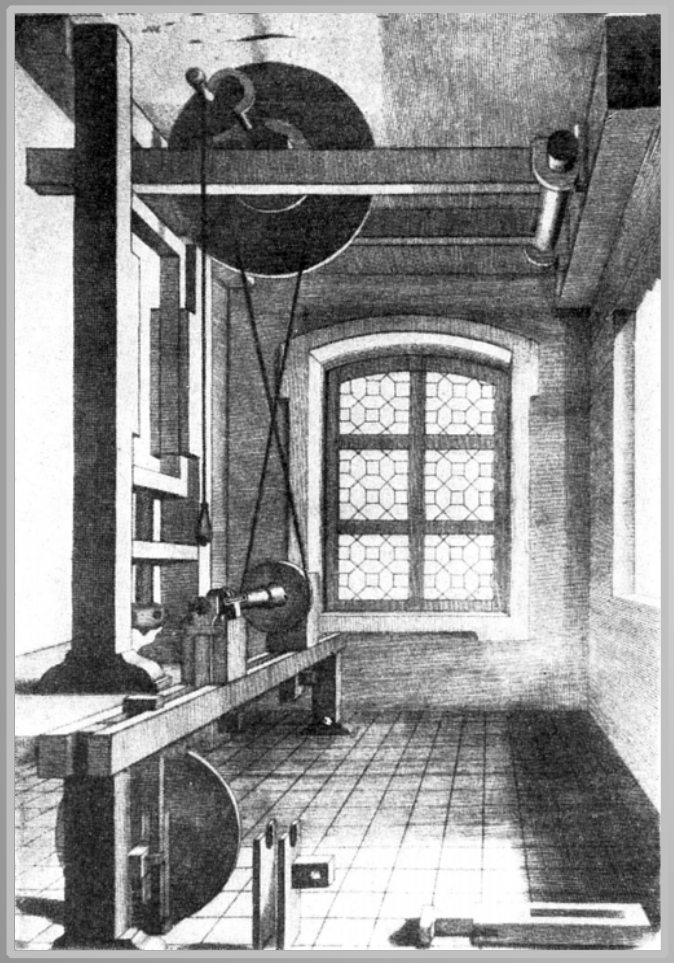
P. Cherubin, La Dioptrique oculaire, Paris, 1671

Cherubin d'Orleans, writing in 1671 describes in some detail an interesting combination of the bow drive and the crank flywheel.

But the most important feature of this drive is the use of several pulleys of different sizes mounted on the overhead shaft so that different speeds of revolution can be obtained, a great advance in flexibility and convenience, even though there is no corresponding step pulley on the lathe spindle and different cords would therefore be required for each speed.

Robert S. Woodbury, History of the Lathe

Ca. 1700: Lathe with Hand Operated Crank



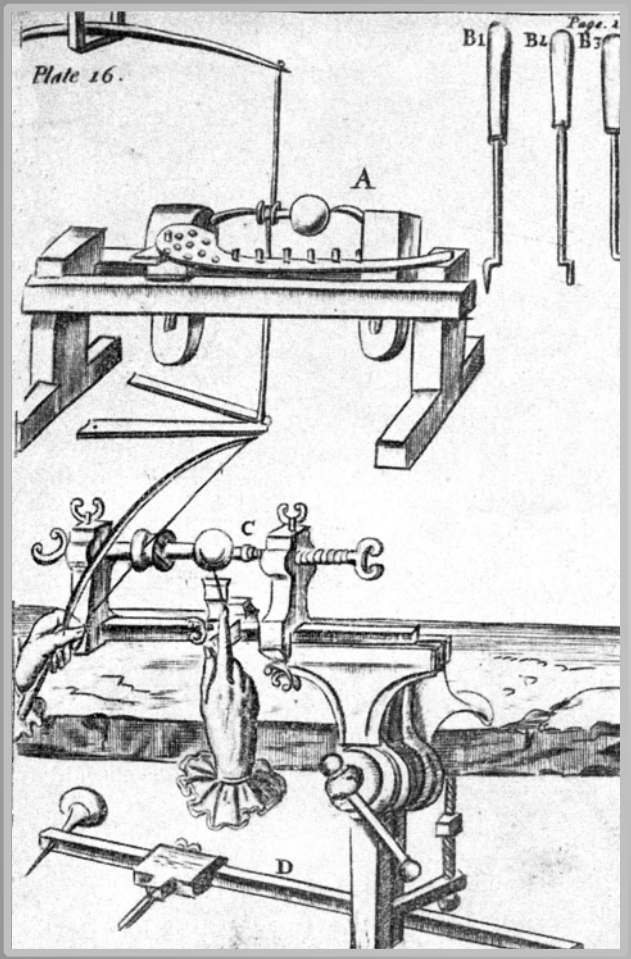
J. M. Plumier, L'Art de tourneur en perfection, Alyon, 1701

A rope with a handle is attached to the crank on the flywheel above the lathe.

The flywheel could be brought to rotation by pulling down the rope.

With several pulley the speed of rotation could be changed.

Ca 1705: Small Lathe with Fiddle Bow Drive



J. Moxon, Mechnick Exercises, London, 1703

The lathe in the background has a pedal-fiddle drive.

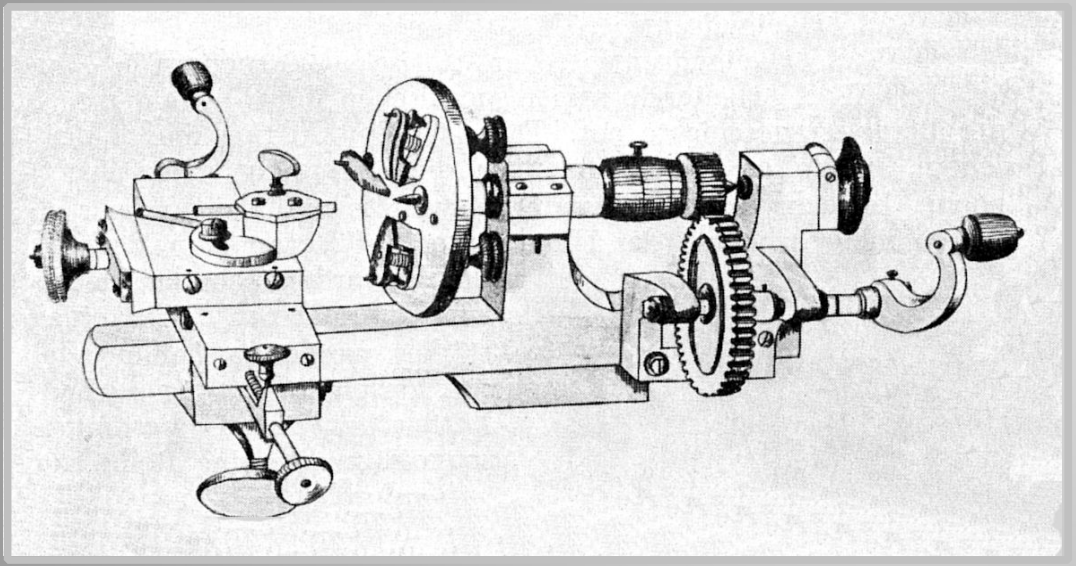
The support for the turning tool is of a special design for the turning of balls.

A number of different turning tools are hanging on the wall.

The lathe in the foreground is being held in a vice.

The support for the turning tool can be seen underneath the ball.

Ca. 1740: Small Lathe with Gear Wheel Transmission

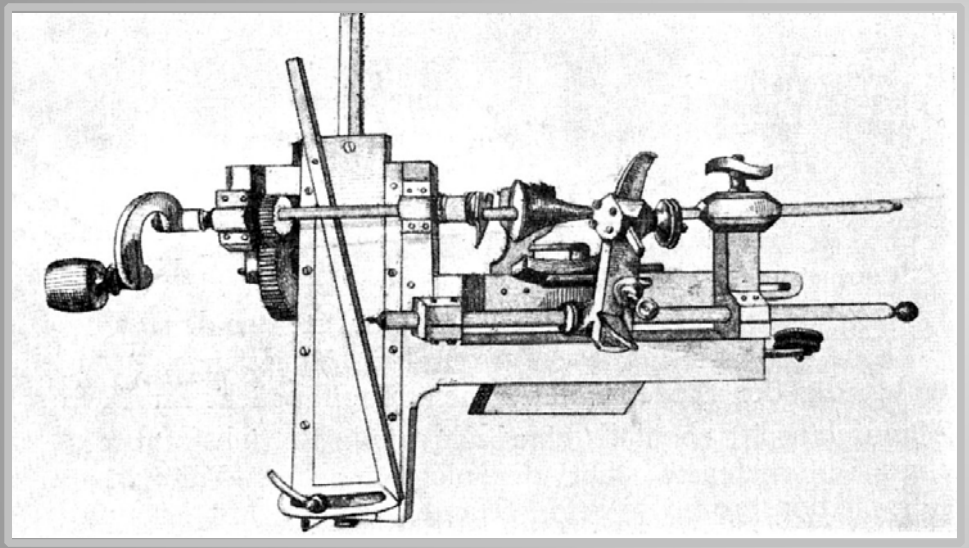


Thiouts, Traité d'Horlogerie Mechanisme et Pratique, Paris, 1741

This lathe represents a very advance design with a gear transmission and a slide rest adjustable in two directions.

The steal arbor and also the face plane are of an advanced design.

Ca. 1740: Contouring Lathe

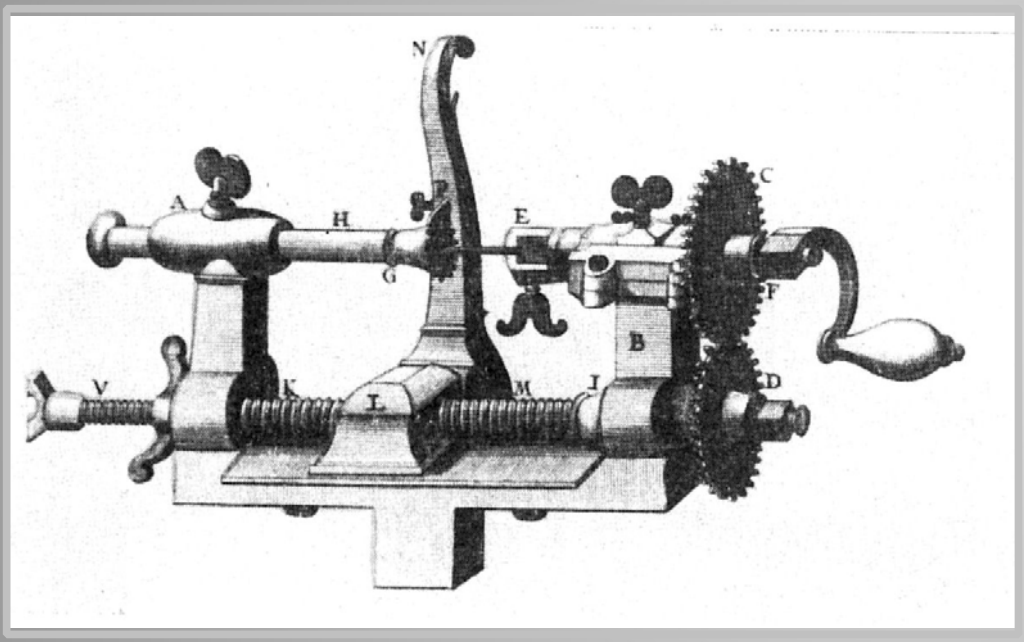


Thiouts, Traité d'Horlogerie Mechanisme et Pratique, Paris, 1741

The feed of the turning tool is controlled by a template behind the spindle.

This represents an interesting machine for mass production.

Ca. 1745: Watch Maker's Lathe

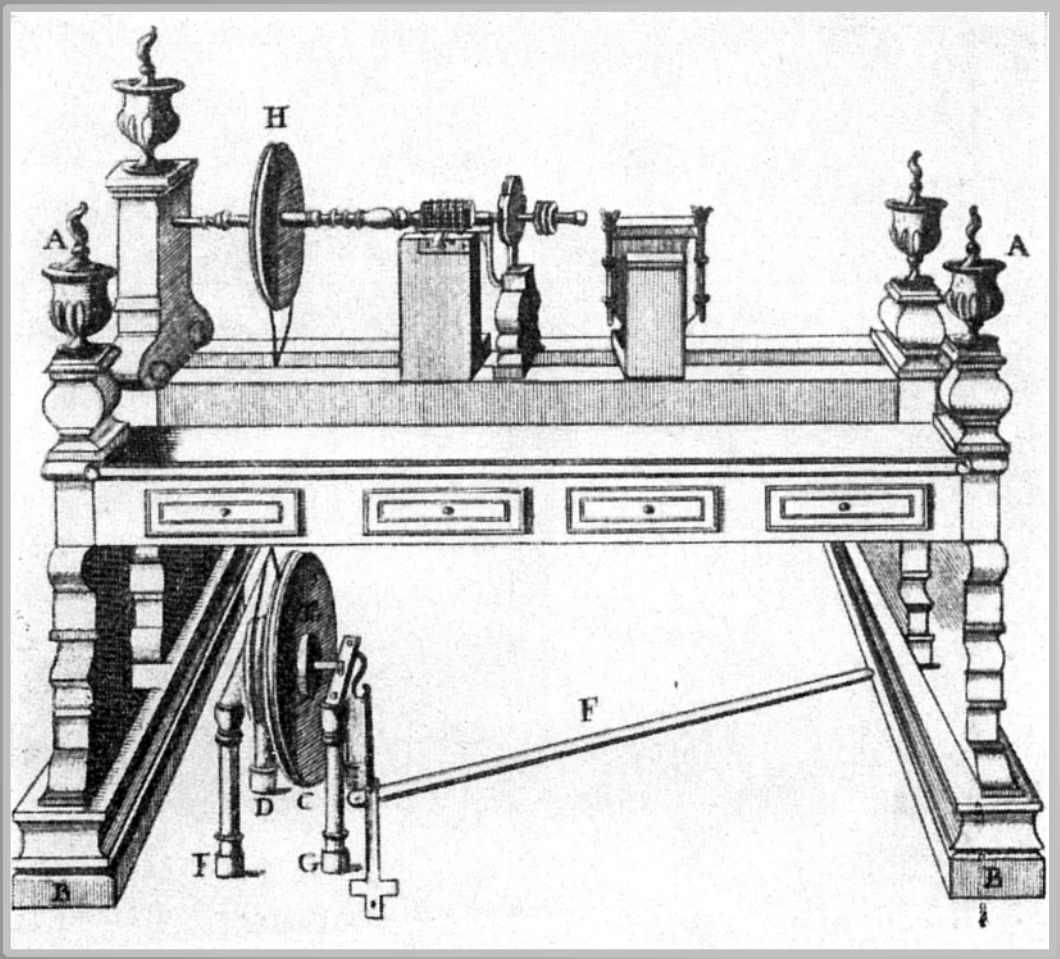


Thiouts, Traité d'Horlogerie Mechanisme et Pratique, Paris, 1741

This very small lathe can be attached to a vice.

The lengthwise feed of the turning tool is obtained by a threaded spindle driven by tooth wheels.

Ca. 1750: Universal Lathe

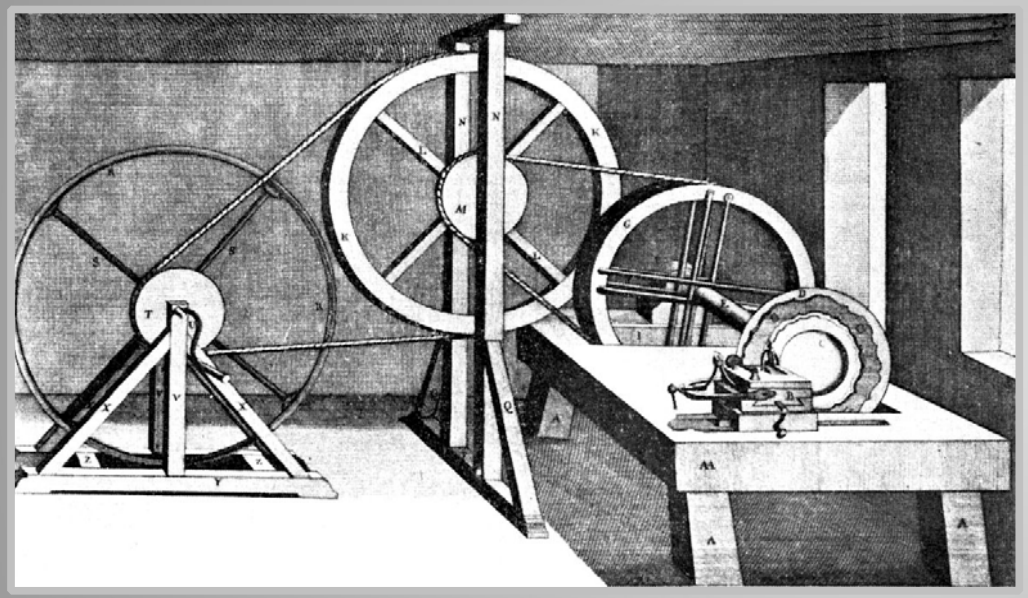


The twisted drive rope gives an increased friction on the pulleys resulting in more powerful use.

The foot pedal serves the powering of the lathe.

J. M. Teuber, Vollständiger Unterricht von der gemeinen und höheren Drehkunst, Wien, 1756

Um 1750: Lathe for “Quillochier Work”



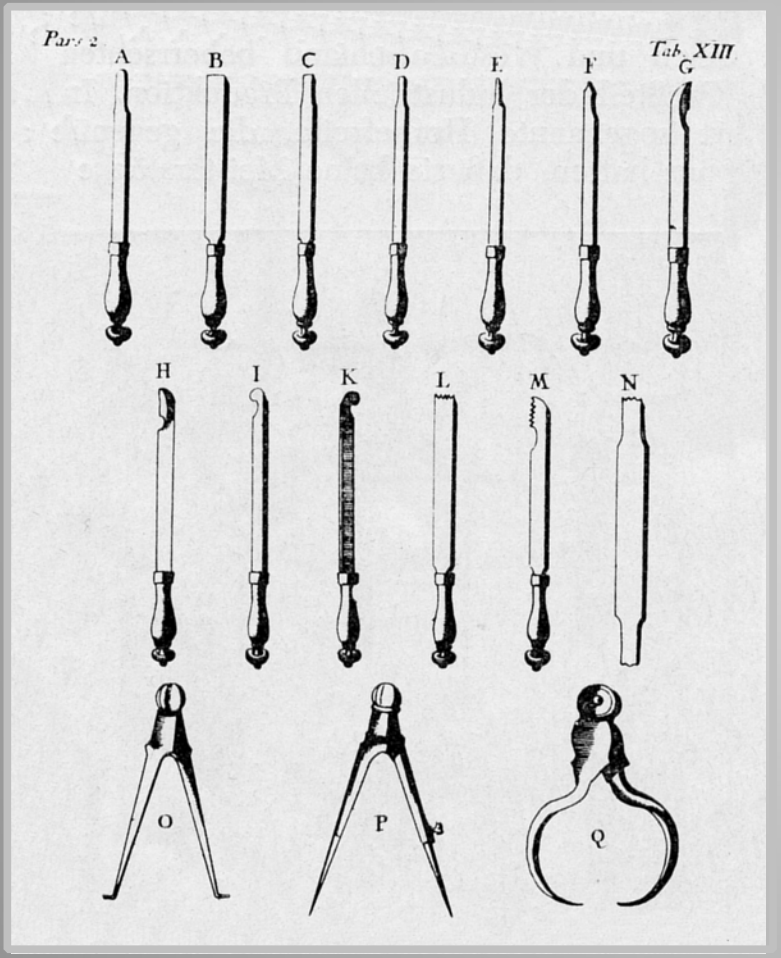
D. Diderot & J. L. D’Alembert, Encyclopédie ou Dictionaire, Paris, 1751

By “Quillochieren” we understand the cutting of a decoration consisting of several overlapping lines forming a ornament.

These lines are engraved in a rotating templet plate.

A tracer transmits this ornament to a cutter. The cutter engraves the decoration to the work piece.

Ca. 1755: Turning Tools



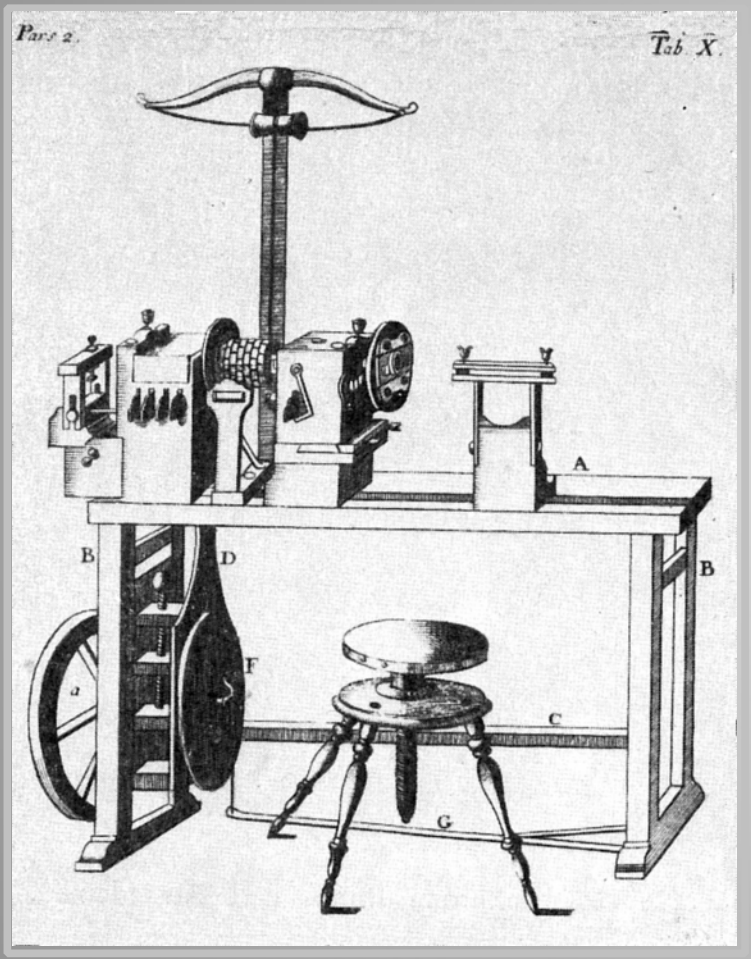
J. M. Teuber, Vollständiger Unterricht..., Wien, 1756

Depending on the shape of the part to be turned a variety of turning tools with differently shaped cutting edges where in use.

All these tools with the wooden handle where held by the turner in his hand.

On the bottom three different gages are shown.

Ca. 1760: Small Universal Lathe

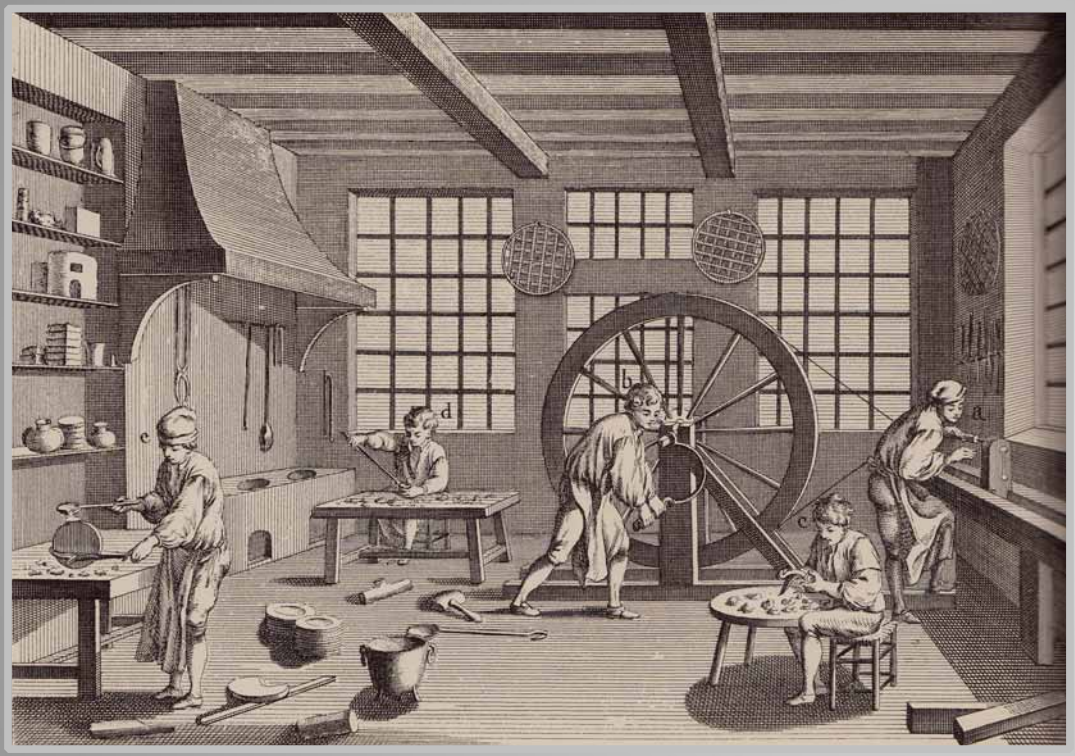


This small lathe is being operated by a pedal combined with a rope and a spring bow.

Different revs of the main spindle can be obtained with the gear box on the left side.

J. M. Teuber, Vollständiger Unterricht von der gemeinen und höheren Drehkunst, Wien, 1756

Ca. 1770: Turner's Work Shop



D. Diderot & J. L. D'Alembert, Encyclopédie ou Dictionaire, Paris, 1751

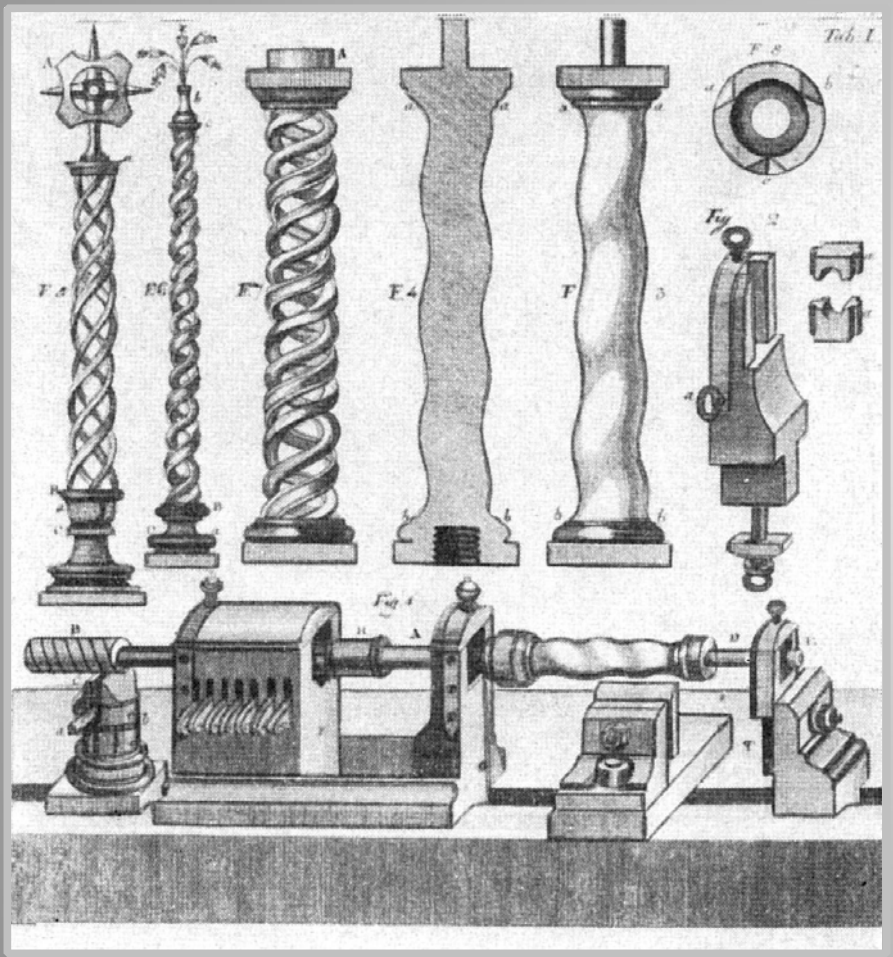
In the pewter-maker's workshop, two of his men turn a vessel on the lathe.

An other shapes a handle.

The furnace is near the window, where a hot soldering iron is being withdrawn from the fire.

In the foreground the molder pours a ladle full of molten pewter.

Ca. 1790: Lathe for the Machining of Winding Pillars



J. G. Geissler, Der Drechsler, Leipzig 1792

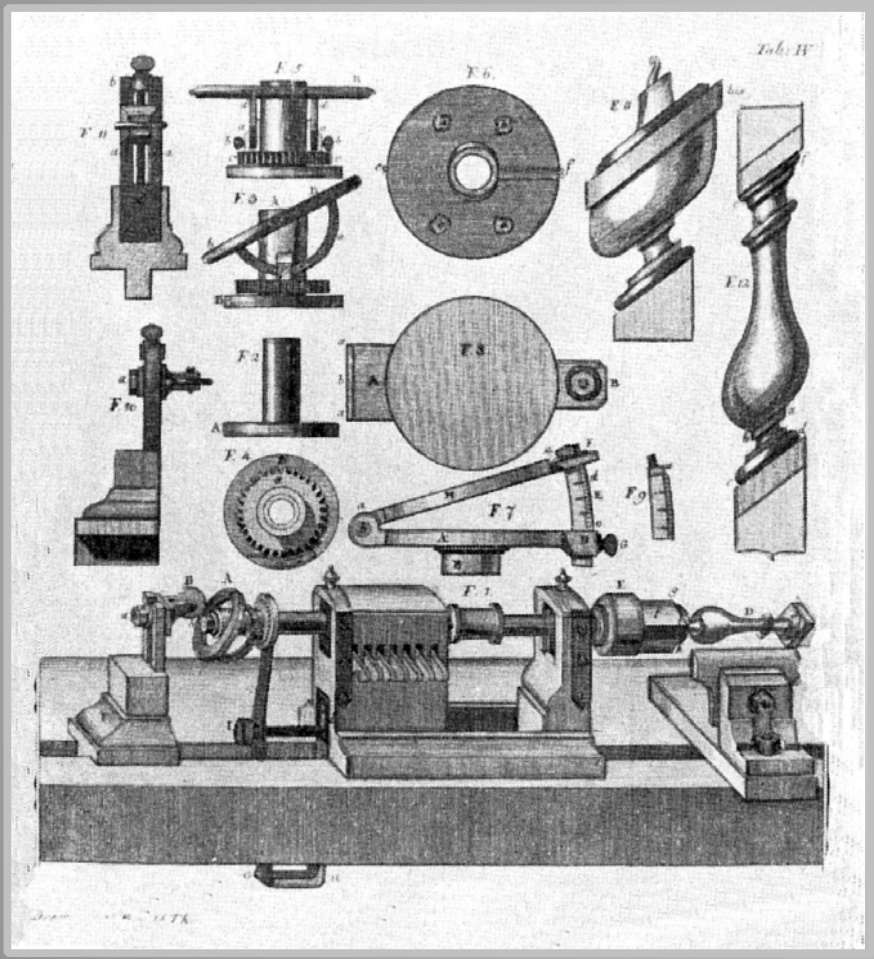
Winding pillars on cabinets have been machined on slowly rotating lathes using a cylindrical templet.

The cylindrical templet is shown on the left side of the lathe.

A spiraled groove in this cylinder gave the feet to the work piece.

The turning tool was held by a fixed support.

Ca. 1790: Oval Lathe



J. G. Geissler, Der Drechsler, Leipzig 1792

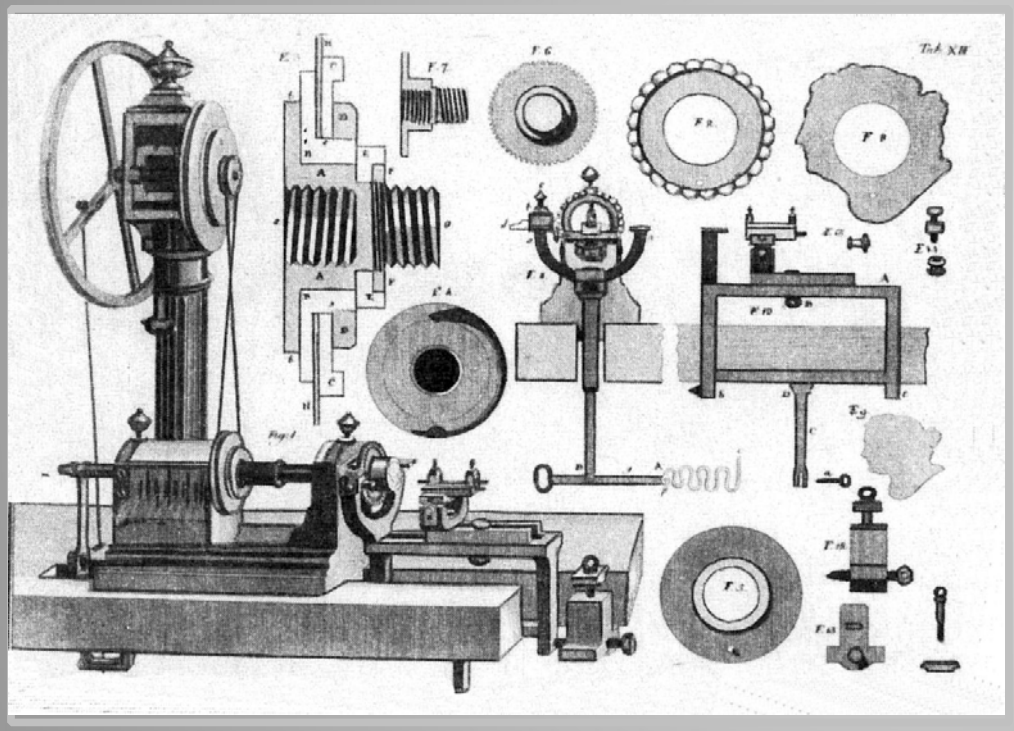
On the top left side two oval shaped templets are shown.

On the right side two pillars machined on this equipment can be seen.

On the oval-lathe shown on the bottom the oval templet can be seen on the left end of the spindle.

The feed of the part to be turned is generated in the housing with a number of levers.

Ca. 1790: Profile Lathe



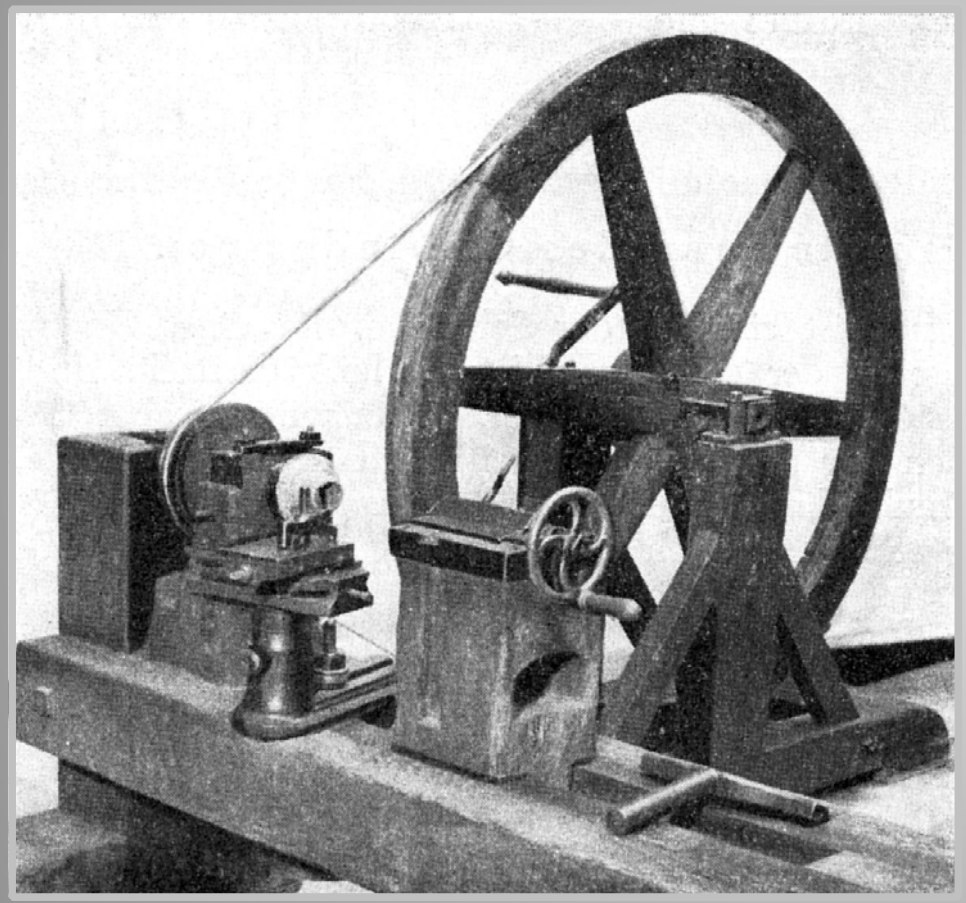
J. G. Geissler, Der Drechsler, Leipzig 1792

The profile lathe has been used to machine Parts with a not circular cross section.

These contours have ben sweeped off a template with the same cross section.

On the top right three typical templets are shown.

Ca. 1800: Wooden Lathe

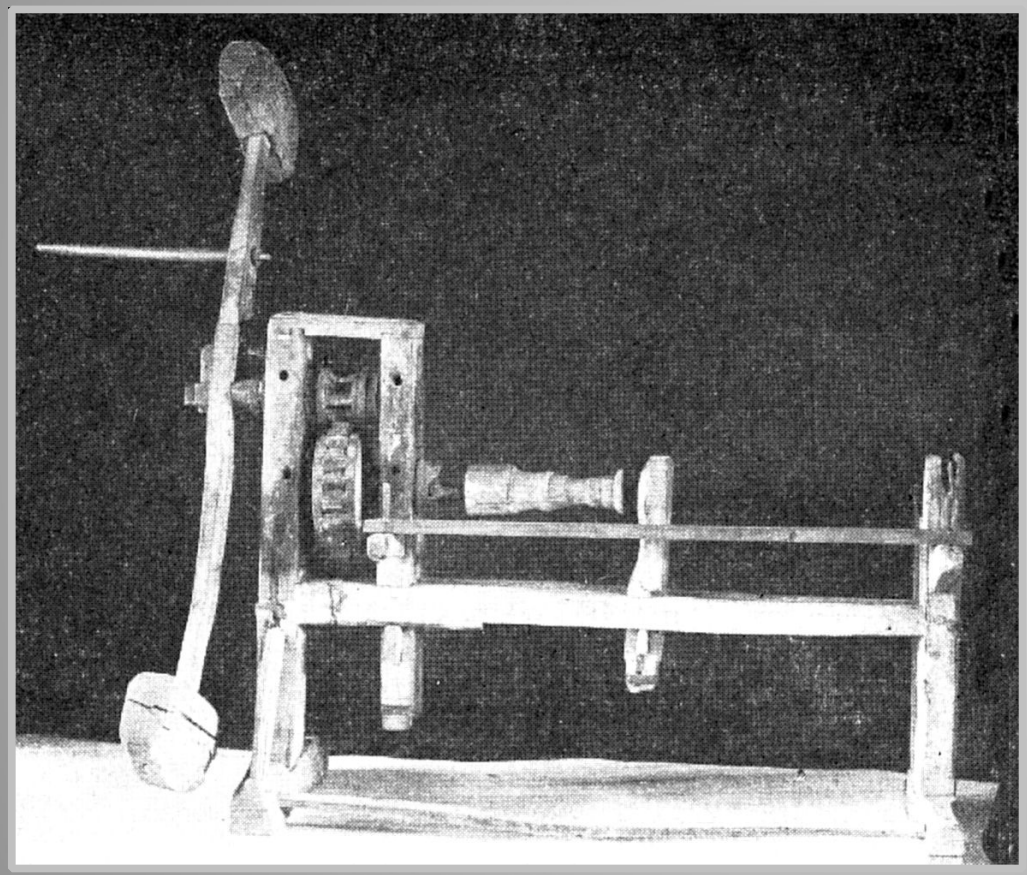


Technical Museum, Wien

This log-built lathe was used by a lock smith.

It was hand driven by an assistent using the crank on the large flywheel.

Ca. 1800: Simple Wainwright Lathe



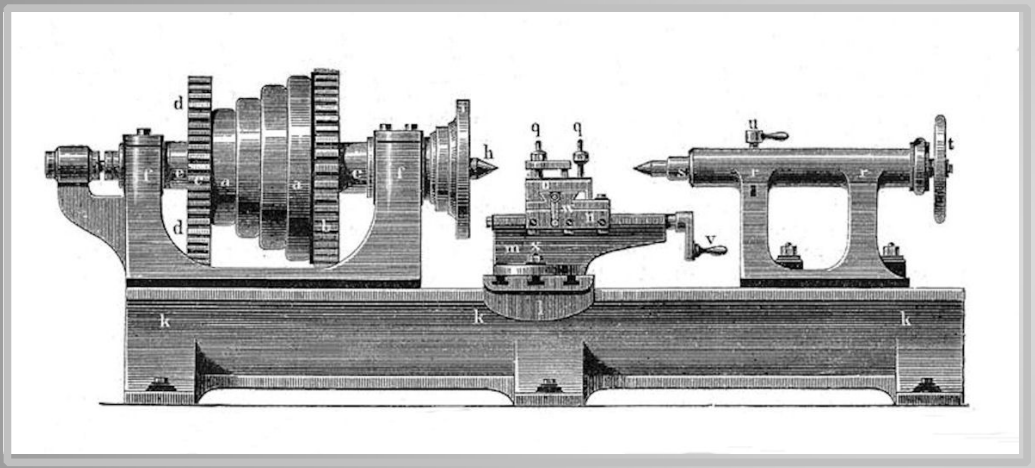
German National Museum, Munich

Still to 1900 simple and clumsy turning lathes were often used by wainwrights and black smiths.

On the outside of the crank two heavy counterweights serve as flywheel.

Gear and frame are made in wood.

Ca. 1850: Professional Lathe



Unknown Artist, um 1850

Already in 1850 most of the lathes had a gearbox.

The lathe guide ways consisted of two iron bars.

The heavy carriage itself is of brass and carries a cross slide on which the tool holder is mounted.

The cross slide has a screw to permit accurate feed of the tool into the work.

There are no divisions to make possible accurate readings of the actual amount of cross feed.

End