



## SOUTHERN TURNERS BEGINNERS GUIDE TO LATHES

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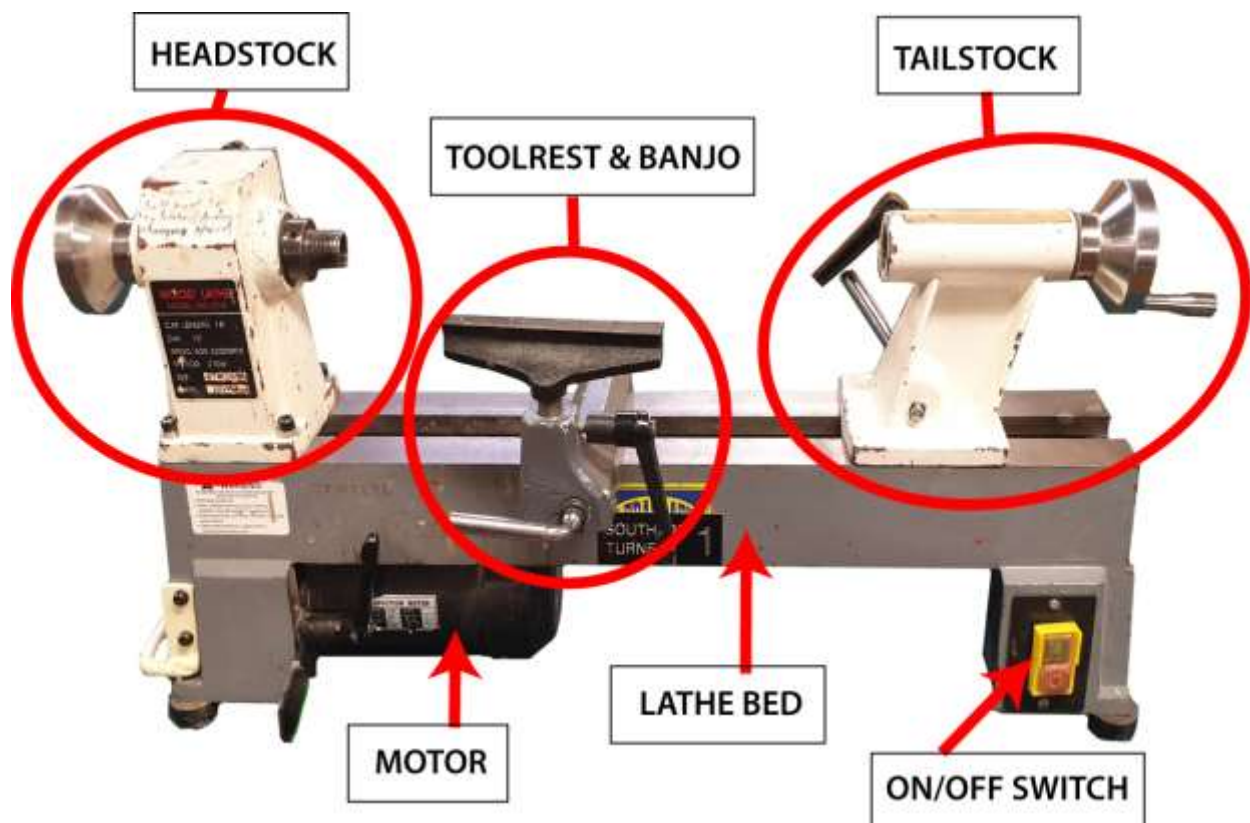
This document is a basic overview of wood lathes, their component parts, terminology and basic safe use. For information on lathe maintenance, please visit the resources page on the Southern Turners website.

Firstly, there are 3 basic sizes of lathes:

- Mini lathes are generally portable, or at least fairly easily moved, sit on a table or bench, and are designed for making pens, small bowls, pots and similar. They have lengths about 600 mm, and weights about 35 kg.
- Midi lathes: larger and heavier (around 50 kg) than the mini lathes, but still bench-mounted. They can be used for projects involving larger and perhaps heavier pieces of wood than mini lathes.
- “Regular” lathes are typically free standing on their own base, have a heavy construction, larger size (so large weight, from 100 kg upwards), and more powerful motor to accommodate heavier and continuous work.

The different sized lathes usually come with different features, but the major parts and terminology remain essentially the same. The Southern Turners own a number of mini lathes, so we will use them as our example.

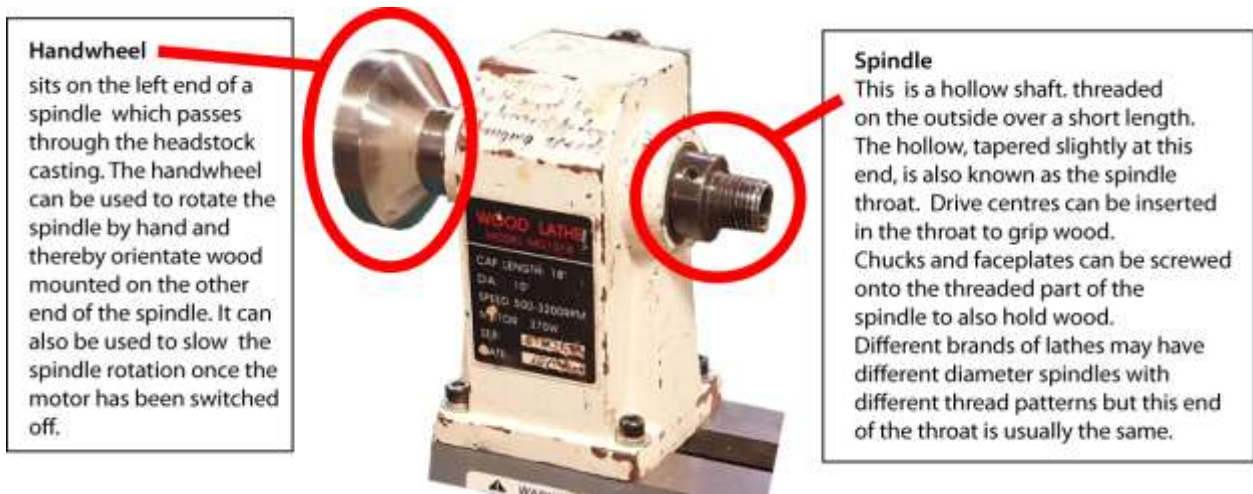
The main parts are indicated below when facing a lathe from the side you would work from:



# Headstock

The head or headstock casting ("headstock" for short) contains the components which rotate wood to shape it. It is mounted on the left hand end of the lathe bed. It contains a spindle, usually hollow along its length, mounted in bearings. On the spindle are pulleys, hidden inside the casting image below. The spindle is rotated via the pulleys linked to a motor. On some larger lathes the headstock can be turned sideways so the spindle faces you, allowing larger diameter projects to be turned.

Within the headstock are the following components:

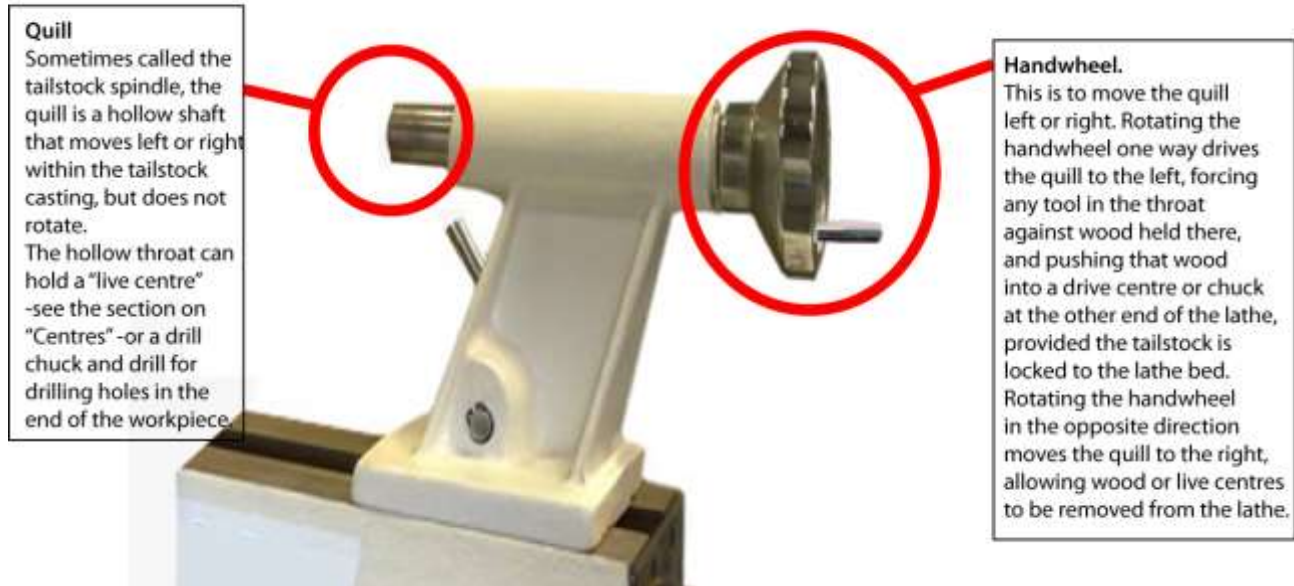


# Tailstock

The tailstock is a component which primarily supports the right hand end of a work piece. It can be slid along the lathe bed and locked into place to accommodate different lengths of timber that are held between head and tailstocks. It can be removed entirely if required.

Within the tailstock are the following components:

## FRONT VIEW



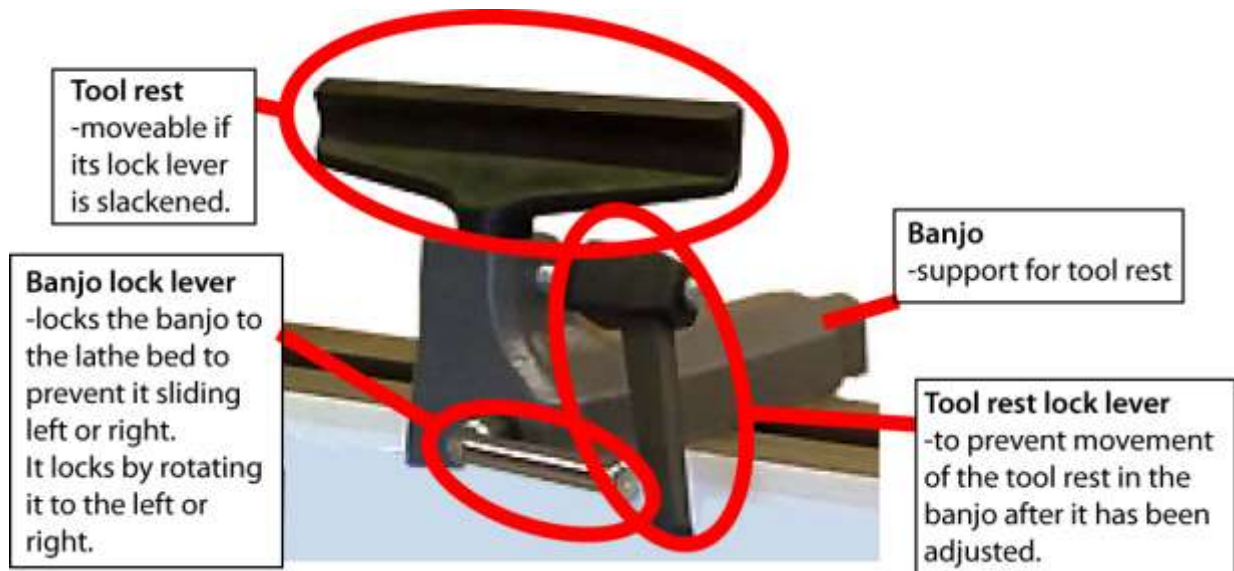
## VIEW from BACK of LATHE BED



Winding the quill all of the way towards the rear ("retracting the quill") generally ejects anything inserted into the spindle. But if a live centre or drill chuck becomes jammed in the quill, a "knock-out bar" can be used to remove it.

## Banjo and tool rest

The banjo is the component that holds the tool rest. It can be slid along the lathe bed and locked in place to position the toolrest where needed. The toolrest is exactly as the name says, a component that supports your chisel or gouge as you make cuts in wood that is held in the lathe. Most commonly straight, curved tool rests are also available that follow more nearly the contours of bowls or similar objects. The tool rest can be raised or lowered, and rotated about its stem to closely follow the shape being turned, then locked into the banjo so it does not move while you slice wood.



## Centres

Centres are used to both drive and support work that is held between headstock and tailstock (i.e. for “between centres work”. Drive centres fit into the end of the headstock spindle over the lathe bed. They are one way that the work is driven around. Support centres fit into the tailstock quill. Both have shafts that are tapered to match the hollows in spindle and quill. Once inserted (into clean holes), they will not slip.

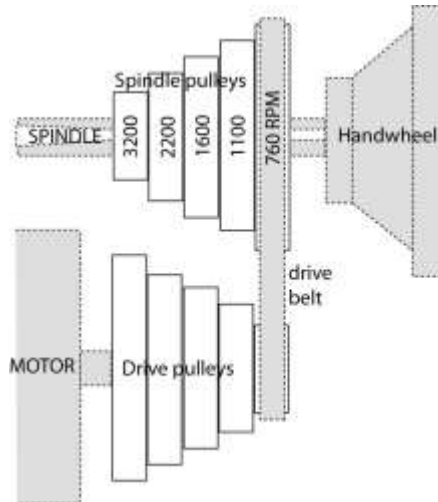
Although centres come in different sizes and shapes, each category has special characteristics:

- Drive centre –this has spurs which bite into the workpiece to grip it. They are sometimes called spur drives. Some have two, four or many spurs. Examples are the three leftmost ones below.
- Most support centres are known as tail centres or “live” centres. They are responsible for both supporting the workpiece and pushing the timber into the drive centre. They are called “live” because the end in contact with the wood rotates freely about its shaft: there is no resistance against rotation, so no friction and burning of wood held there. Common shapes of the live part are cones and cups. The last three below are examples:



# Changing the Lathe Speed

It is often essential to change the rotation speed of the spindle to safely and efficiently turn different sized and shaped pieces of wood. Different brands of lathe have similar but not identical ways in which the speeds can be changed, unless the lathe has electronic speed adjustment. The lathes which the club has, apart from 2 electronic variable speed types, provide 5 different speeds. You should familiarise yourself with the following details to change the speed of these:



In this cutaway view through the headstock (seen from the back) are shown the available spindle rotation speeds in revolutions per minute (RPM) on club lathes, and the corresponding pulleys used to achieve the different rates.

To change the speed, the position of the drive belt on both sets of pulleys is moved left or right, after the belt is slackened as described below.



1. Locate this locking clamp below the headstock and loosen it by rotating the handle downwards from the position shown.

2. Lift the lever here to raise the motor and release the tension on the drive belt so it can be moved from one pair of pulleys to the next.



Back view of headstock with safety cover removed showing the spindle pulleys and drive belt position giving the slowest spindle speed.



End view of lathe bed below the headstock, with its safety cover removed, showing the motor drive belt on the smallest pulley giving the slowest speed.

3. Once the desired pair of pulleys have been selected and the drive belt put on to them in the correct position (belt vertical in back view), push the motor plate lever downwards (reverse step 2 above) to re-tension the belt, and tighten the locking clamp (reverse of step 1).

4. Replace the cover plates on headstock and base.