

Focus on

Robert Sorby

Eccentric Chuck Projects



**A step by step guide book on making four exciting projects using the
Robert Sorby Eccentric Chuck.**

Eccentric Chuck Projects

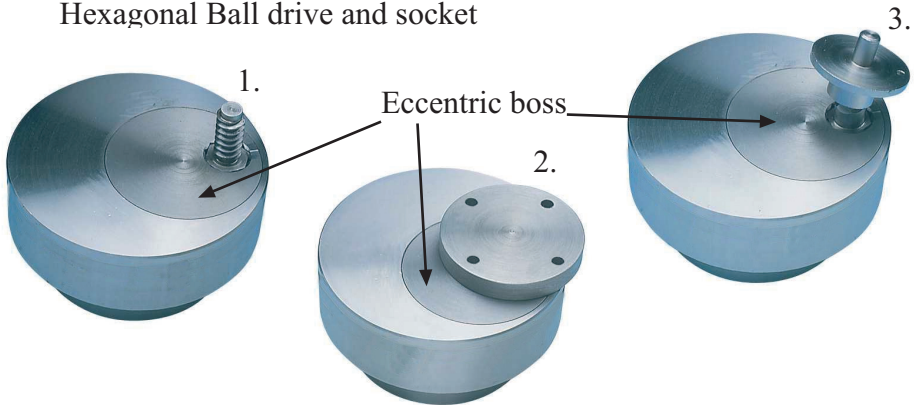
In this booklet we will take an in-depth look at the Robert Sorby Eccentric Chuck with all its component parts and make 4 different projects.

The four projects are of varying complexity and use all of the Eccentric Chuck's various holding methods.

The first project will be an Off-set Stem Goblet. The second will be a 3-sided bowl with a cloverleaf centre detail. The next will be a Cabriole Candlestick and we will finish this presentation with a scallop lidded box.

The Robert Sorby Eccentric Chuck uses three methods for holding the wood. These are:

1. Screw chuck
2. Faceplate
3. Hexagonal Ball drive and socket



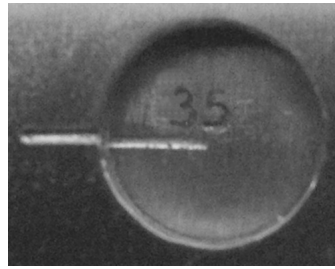
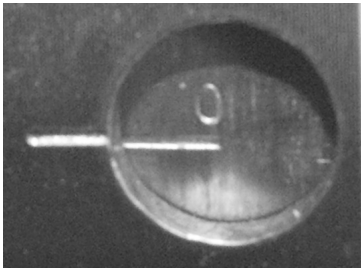
The Robert Sorby Eccentric Chuck is the most comprehensive multi-centre chuck available.

The unique eccentric boss provides easy and accurate adjustment with its bi-hexagonal locating socket for each of the holding components. This allows for each component to be located at any of the 12 positions.

The eccentric boss is marked 0-35 on its outside diameter, which can be seen through the viewing window in the main body.

These markings are the amount the holding component held in the eccentric boss can be offset from centre.

Zero being on the centre axis of the lathe. At this position the work-piece will run concentrically to the rotation of the lathe.



Any number other than zero will then offset the work-piece by the amount shown in the viewing window.

The combination of the amount of offset of the eccentric boss & the position in the bi-hexagonal socket means this is the most versatile Eccentric Chuck available.

The Robert Sorby Eccentric Chuck weighs around 51/2 lbs (2.5kgs). It is designed this way to counterbalance the weight of the work piece when it is offset. This gives more stability than any other offset system where the main components are offset from the centre as well as the work piece, adding far more weight and creating a greater imbalance. This would substantially reduce its capability increasing the risk of damage or injury.

Using an inserted adaptor system with a large variety of thread sizes the Robert Sorby Eccentric Chuck can be fitted to virtually any lathe in the world.

The insert, screws into the main body of the chuck and is tightened using the large wrench supplied.

The chuck can be easily mounted onto the lathe and is tightened using the wrench supplied.

The Robert Sorby Eccentric Chuck is also supplied with a comprehensive 12 page instructional manual.

It describes the chuck and its component parts as well as instructions how to use each of the holding methods.

A CD video to accompany this booklet is also available. It shows all the procedures described with full step by step commentary.

Use and care of the Eccentric Chuck

Turning eccentrically or off-centre as it is more commonly known is exciting and different but it is this difference to concentric turning that we have to be aware of. Because the wood is turning off-centre the lathe speeds have to be dramatically reduced and a far higher awareness of the rotating wood has to be observed.

At the end of each project section there is a detailed drawing with sizes and descriptions of particular points that are mentioned in the step by step instructions. This is a good reference guide whilst turning each project. All the measurements and conversions are approximate and are intended as a guide to producing each project using the wood detailed in the relevant instructions.

The Robert Sorby Eccentric Chuck is a precisely engineered product and should be well maintained. When not in use keep the chuck and all its components clean and store them in the carry case provided. A thin film of a light oil or silicon spray will keep all parts in top condition.

Health and Safety

The safe toolrest position

In this booklet we will mention the “safe toolrest position” prior to and whenever any turning is going to be done. The following procedure should be made at all times.

Slide the toolrest, as close to the work-piece that is safely possible ensuring there is enough room for full rotation of the wood without any interference. Check this by rotating the wood or work piece by hand before switching the lathe on.

Safety equipment

As with all woodworking, sufficient safety equipment should be worn. A very minimum of a pair of safety glasses and a dust mask is essential but when turning off-centre, a face shield is highly recommended.

Please read the step by step instructions very carefully before attempting any of the projects.

Caution

Robert Sorby have taken great care to explain correct and safe working techniques throughout this booklet. However it must be stressed that eccentric woodturning like all woodworking tools and machinery use can be inherently dangerous and can cause damage and/or serious injury if used incorrectly. Neither Robert Sorby nor any of its dealers can accept any liability for any injury or damage that might be caused as a result of using any of the techniques shown in this presentation.

Anyone using these techniques does so at their own risk.

Off-set Stem Goblet



For this project we are going to use the screw chuck attachment which is fitted into the eccentric boss and held in place by the machine screw and washer.

We are using a piece of close grain hardwood approx $2\frac{1}{2}$ " (63mm) square x 7" (178mm) long, which has a hole drilled in one end $21/64$ " (8mm) diameter and 1" (25mm) deep.

When marking the wood for the final parting off it is advisable to allow for a little clearance of the depth of the screw chuck.

Now screw the main body of the chuck onto the lathe and ensure it is tight by using the wrench.

Place the eccentric boss into the main body and rotate it so that '0' is visible in the sight window. The wood will run concentrically at this position and re-tighten the eccentric boss screws

Carefully screw the wood onto the screw-chuck making sure it is tight against the body of the chuck and inline with the lathe.

Turn the lathe on at a safe speed appropriate to the capabilities of the lathe and using a roughing gouge, turn the outside of the wood down to the round

Switch the lathe off to check that the entire square has been removed and you have a round piece of wood

Now mark 1 1/8" (28mm) from the end for final parting as mentioned earlier to give clearance for the screw chuck

Next put the toolrest in the "safe toolrest position" and hollow out the cup shape of the goblet with a hollowing tool to a depth of approx 1" (25mm).

Switch off lathe, check, switch on lathe, sand and finish.

Return the toolrest to the "safe toolrest position" along the length of the wood and turn the outside of the cup, following the internal profile using a 3/8" (10mm) fingernail spindle gouge.

Switch the lathe off, check for a clean cut, switch lathe back on, sand and finish.

Now using a 3/8" cove cutter or similar tool turn the first cove at the base of the bowl. Mark the cutter/tool to ensure all the coves will be the same depth.

Switch off the lathe, check the cove, then sand and finish by hand.

Now undo the two eccentric boss screws in the side of the main body and rotate the boss so that '10' is visible in the viewing window.

Place the tool rest in the "safe toolrest position"

As the wood is now off centre we will reduce the speed of the lathe for safety. It can be increased with confidence and experience.

Switch the lathe on and watch the wood spin to understand what the wood is doing now it is rotating off centre.

*** Care must be taken when turning off centre work. Approach the wood very carefully and allow for the fact that you will only touch the wood in one place on every rotation ***

Place the cove cutter level with the left hand side of the first cove and create the second cove adjacent to the first to the depth mark on the tool

Switch off the lathe, check the cove, then sand and finish by hand as before.

Now undo the screws and move the eccentric boss to position '20' and re-tighten.

Move the tool rest to a new "safe toolrest position" and slow the lathe down, as the wood is now more off centre.

As with the previous cove, place the tool on the left hand side of cove No.2 and create cove No.3 to the same depth as before.

Switch off the lathe, check the cove, then sand and finish by hand.

Now undo the screws and move the eccentric boss back to position '10' and re-tighten.

Move the tool rest to the "safe toolrest position" and switch on the lathe

As before, place the tool on the left hand side of cove No.3 and create cove No.4 to the same depth as before.

Switch off the lathe, check the cove, then sand and finish by hand.

Now undo the screws and move the boss back to position '0' and re-tighten and move toolrest to "safe toolrest position"

Place the tool on the left hand side of cove No.4 and create cove No.5 to the same depth as before and again switch off the lathe, check the cove, then sand and finish by hand.

Now turn the lathe speed back up as the work piece is now running on centre. Turn the base from the outside diameter to flow into the last cove using the spindle gouge

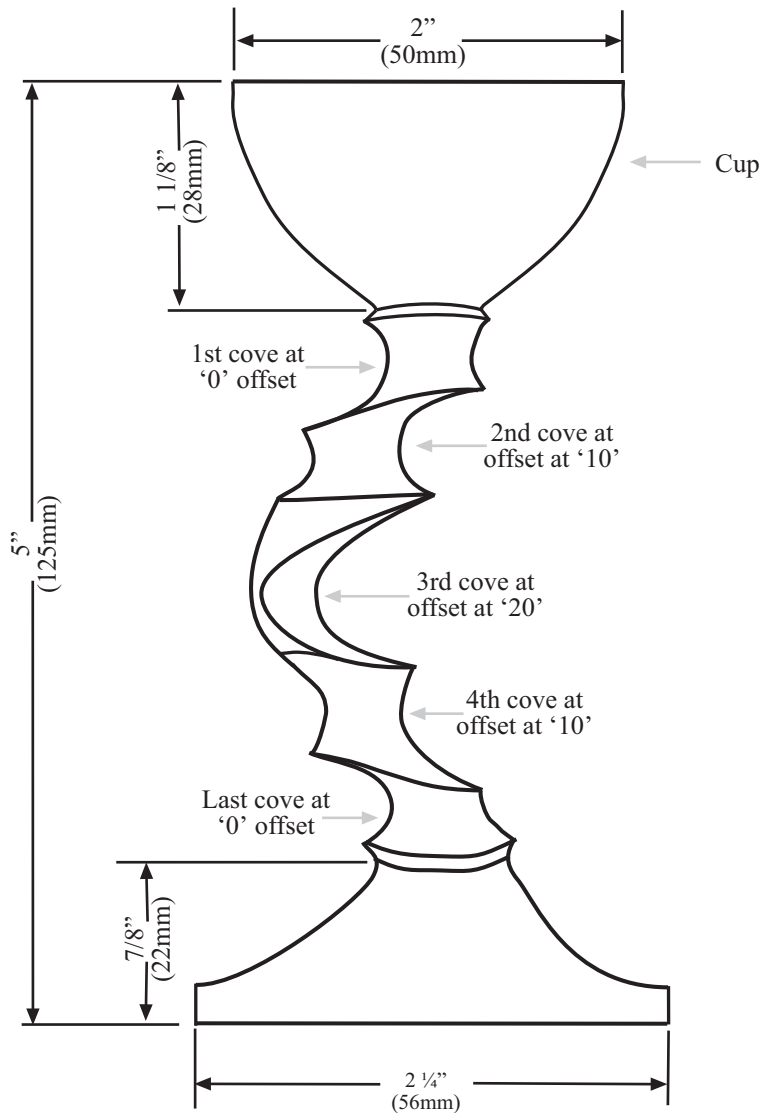
Sand and finish the base with the desired finished.

Now the completed goblet can be removed from the waste wood using the parting tool.

Ensure that when you part off it is to the right hand side of the original safety mark.

*** Be careful when parting off that the goblet does not come loose. Only part all the way through if you have experience and confidence to do so, if not part a small way through and finish with a saw ***

Check and finish the base and proudly display your Off-set Stem Goblet.



Three sided bowl with a Cloverleaf centre detail



The second project we are going to make in the presentation is a 3-sided bowl with a cloverleaf centre.

We will use a bowl blank of approx 5" (125mm) diameter and approx 2 ½" (62.5mm) thick. Using a blank of this diameter your lathe will need to have a swing over the bed bars of more than 5 ½" (140mm)
If it does not, then use a smaller bowl blank.

Mark the centre and screw the faceplate into place using woodscrews.

Place the hexagonal stem of the faceplate into the bi-hexagonal locating socket of the eccentric boss and tighten the machine screw and washer.

Place the eccentric boss into the main body and set to '0' in sight window.

Tighten the boss screws and place the toolrest at the face of the blank in the "safe toolrest position".

Turn the face of the blank flat.

Place the toolrest at the "safe toolrest position" at the outside of the blank

Turn the face with a small bowl shape curve on the blank.

Now loosen the boss screws and remove the eccentric boss.

Undo and remove the machine screw and washer and remove the faceplate from the eccentric boss.

Unscrew the wood screws and remove the blank from the faceplate.

Turn the blank over so that the face that has just been turned is facing up.

Now using an angle protractor mark 3 lines radiating out at 120 degrees apart and number them 1, 2 & 3.

Place the faceplate in the centre of the bowl blank and secure using the woodscrews.

Now fix the faceplate to the eccentric boss using the machine screw and washer.

Place the boss back into the main body

Place the toolrest at the “safe toolrest position”

Turn the outside diameter of the bowl blank so that is it perfectly round.

Now place the toolrest in the “safe toolrest position” at the face of the blank and true up

Mark the centre with a pencil.

Undo the eccentric boss screws and rotate it so that ‘35’ is visible in the sight window.

Retighten the screws and transfer a mark at position “1” onto the main chuck body for a reference point for the rest of the marking out.

Move the toolrest to a new “safe toolrest position” as the wood is now considerably off-centre.

Reduce the lathe speed as slow as possible and switch on. Take a minute to watch the wood spinning to get an idea of how it looks when it is spinning this far off-centre. Increase to a safe speed where the lathe is running without any vibration.

Mark a new centre number ‘1’.

Loosen the screws and remove the eccentric boss.

Undo and remove the machine screw & washer and very carefully remove the faceplate from the bi-hexagonal locating socket and turn it through 120 degrees, which is 4 positions in the socket.

Replace it back into the socket and re-tighten the machine screw and washer

Replace the eccentric boss back into the main body.

Set to position ‘35’ in the sight window and re-tighten the boss screws.

Now the line marked ‘2’ will be in line with the reference mark on the chuck body.

Move the toolrest to the “safe toolrest position” at the face of the blank

Switch on the lathe and mark a new centre No. ‘2’

Switch off the lathe and loosen the boss screws to remove the eccentric boss.

Undo and remove the machine screw & washer and very carefully remove the faceplate from the bi-hexagonal locating socket and turn it through 120 degrees.

Replace it back into the socket and re-tighten the machine screw and washer

Replace the eccentric boss back into the main body, set to position '35' in the sight window and re-tighten the screws.

Now the line marked '3' will be in line with the reference mark on the chuck body.

Move the toolrest to the "safe toolrest position" at the face of the wood

Switch on the lathe and mark a new centre No. '3'

You will now have 4 centres marked on the face, one true centre and three offset centres.

Next mark an arc using compasses from each offset centre to just inside the outer diameter of the bowl blank. These marks will give a guide to the outside shape and size of the finished 3-sided bowl.

Now draw 3 circles from each centre ensuring that there is a $\frac{1}{2}$ " (13mm) gap between the circle and the arc. These circles will indicate the position of the 3 parts of the cloverleaf

Now mark the size and position of the centre circle of the bowl

Loosen the screws and remove the eccentric boss.

Undo and remove the machine screw & washer. Carefully remove the faceplate from the bi-hexagonal locating socket and turn it through 120 degrees again to get it back to the original position.

Replace it back into the socket and re-tighten the machine screw and washer

Replace the eccentric boss back into the main body.

Set to position '35' in the sight window and ensure that line '1' is in-line with the reference mark, then re-tighten the boss screws.

Then move the toolrest to the “safe toolrest position” at the face of the wood.

Turn the first small dish outlined by the circle marked 1.

Do not go too deep as there would be a danger of breaking through to the fixing screws

Switch off the lathe. Check the tool finish, sand and finish the dish by hand.

Move the “safe toolrest position” at the outside of the wood

Ensure the lathe is still set to a very slow speed.

Switch on the lathe and watch the wood for a short while before starting to turn.

*** Once again care must be taken when turning off centre. Approach the wood very carefully and allow for the fact that you will only touch a third of the wood on each rotation***

Take very small cuts with a 3/8” (10mm) bowl gouge to begin with and as experience and confidence are gained the lathe speed and size of cut can be increased.

Regularly switch off the lathe to check for clean cut and how much more needs to be removed until the arc is reached.

Once the outside is turned down to the mark, switch off the lathe and check there is a clean finish from the tool. Then sand and finish this side by hand.

Loosen the boss screws and remove the eccentric boss.

Undo and remove the machine screw & washer and very carefully remove the faceplate from the bi-hexagonal locating socket and turn it through 120 degrees as before.

Replace it back into the socket and re-tighten the machine screw and washer

Replace the eccentric boss back into the main body.

Set to position ‘35’ in the sight window and re-tighten the boss screws.

Now the line marked ‘2’ will be in line with the reference mark on the chuck body.

Now move the toolrest to the “safe toolrest position” at the face of the wood.

Turn the second small dish outlined by the small circle with the centre marked ‘2’

Remembering to only go as deep as the previous dish

Switch off the lathe. Check the tool finish, sand and finish the dish by hand.

Move the toolrest back to the “safe toolrest position” at the outside of the blank.

Now turn the second arc. Regularly switch off the lathe and check as before.

Once the outside is turned down to the mark, switch off the lathe and check there is a clean finish from the tool. Then sand and finish this side by hand.

Loosen the boss screws and remove the eccentric boss.

Undo and remove the machine screw & washer and carefully remove the faceplate from the bi-hexagonal locating socket and turn it through 120 degrees.

Replace it back into the socket and re-tighten the machine screw and washer

Replace the eccentric boss back into the main body and set to position ‘35’ in the sight window and re-tighten the boss screws.

Now the line marked ‘3’ will be in line with the reference mark on the chuck body.

Next move the toolrest to the “safe toolrest position” at the face of the wood.

Turn the third small dish outlined by the small circle with the centre marked ‘3’

*** Remembering to only go as deep as the previous 2 dishes***

Switch off the lathe. Check, sand and finish as before.

Move the toolrest back to the “safe toolrest position” at the outside of the blank.

Now turn the third arc. Regularly switch off the lathe and check as before.

Once the outside is turned down to the mark, switch off the lathe. Check, sand and finish as with the previous sides.

Loosen the boss screws and turn the boss so that '0' is visible in the sight window and re-tighten the screws

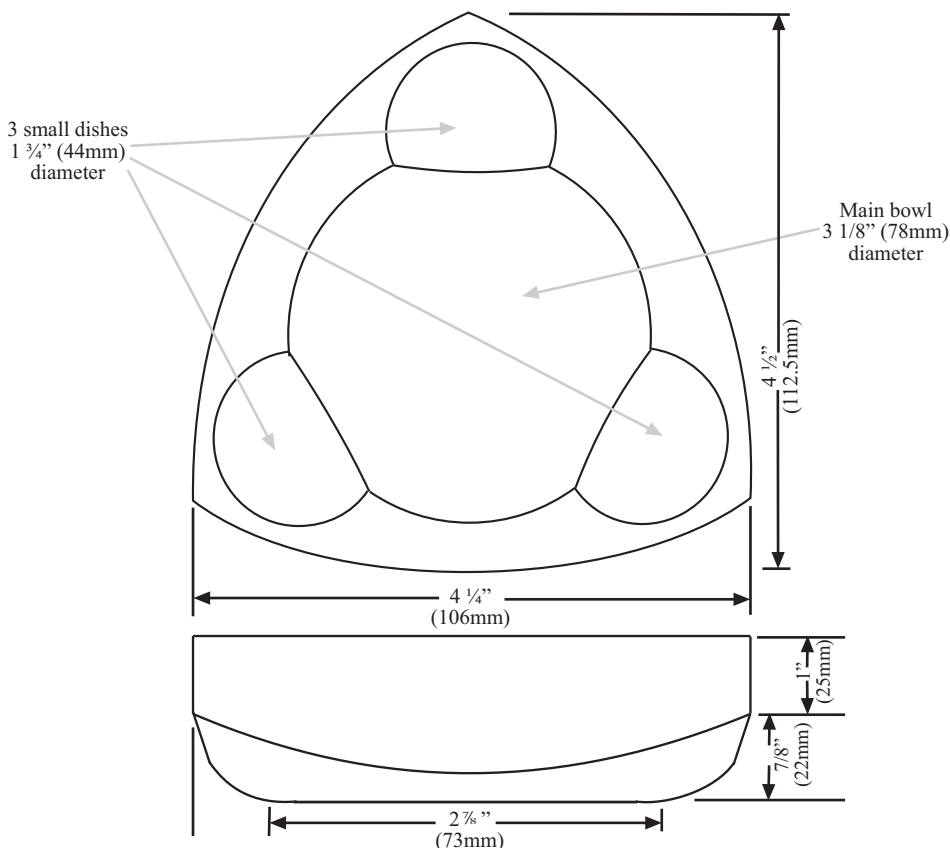
Switch the lathe back on and turn the centre dish. Then sand and finish as required.

Loosen the boss screws and remove the eccentric boss.

Undo the machine screw and washer and remove the faceplate from the eccentric boss.

Undo the woodscrews from the faceplate, remove the bowl, sand and finish the base.

We now have a 3-sided bowl with a cloverleaf design in the centre.



Cabriole Candlestick



The next project we are going to make is a Cabriole Candlestick.

We will use a piece of hardwood approx 9.5" (240mm) long and approx 3" (75mm) square.

We will use the hexagonal Ball & Socket for this project.

Mark the centre of each end of the wood.

Drill a 1" (25mm) diameter by 1" (25mm) deep hole in one end. This will take the candle in the finished piece.

Now drill a 21/64" (8.5mm) diameter by 1/2" (13mm) deep hole in the other end to take the pin of the ball and socket.

Push the pin into the hole and screw 2 small woodscrews into the holes to hold in place.

Place the hexagonal stem in to bi-hexagonal locating socket of the eccentric boss and tighten with the machine screw and washer.

Place the boss into the main body and set to '0' in the sight window and tighten the boss screws

Now locate the hexagonal socket onto the ball joint.

Pull up the tailstock and using a standard 60-degree revolving live centre wind in the tailstock and lock, to hold the wood in place .

Place the tool rest in the "safe toolrest position"

Set the speed of the lathe appropriate for the size of wood and the capabilities of the lathe

Switch the lathe on and turn the wood down to the round, ensuring that only the minimum is removed.

Now place the tool rest to the "safe tool rest position" at the face of the wood.

Switch the lathe on and trim the face flat using the 3/8" (10mm) fingernail spindle gouge

Now turn a small cove approximately 1/8" (3mm) from the outside diameter and the inner lip of the drilled hole.

Switch off the lathe and check for a clean finish.

Once this is done, return the tool rest to the “safe tool rest position” along the length of the wood

Now mark the wood at 1½” (38mm), 5½” (140mm) and 6¾” (172mm).

Switch on the lathe and complete the marks round the diameter

Using a fine parting tool part down at the first mark leaving approximately ½” (13mm) stem for the neck of the cup

The cup of the candlestick can be turned approx 1½” (38mm) long to the first mark

Increase the lathe speed as appropriate

Ensure that the waste material is removed to allow for the spindle gouge to get down to the neck without any interference.

Move the tool rest away and sand the cup

Undo the eccentric boss screws and offset to ‘25’ in the sight window

Re-tighten the boss screws

Place the toolrest in the “safe tool rest position”

Extra care should be taken as the wood is now off-centre. Slow the lathe speed down to very slow before switching the lathe on, then increase to a safe and comfortable speed if desired

Using the spindle gouge, turn an elongated egg shape from the second mark to the neck of the cup.

Switch off lathe and check for a clean cut

Now switch lathe back on and move along to the third mark and turn a large V-shape

Switch off the lathe and sand by hand to finish

Holding the wood with one hand, push back the tailstock so that it is clear.

Now very carefully remove the hexagonal stem from the socket and turn through 180 degrees. Replace back into the socket at that position.

Pull the tailstock back up and gently apply tension and lock the tailstock into place.

Place the toolrest in the “safe tool rest position”

Now turn the fine cove following the outside shape of the initial egg shape.

Sweep from the outer edge of the large section of the egg shape to the neck of the cup.

Switch off the lathe, check and sand as required

Switch the lathe back on and move along to turn the second V-shape at the third mark.

Switch off the lathe, sand and apply the desired finish

Move the tool rest away and undo the eccentric boss screws.

Turn the boss so that ‘0’ is visible in the sight window and retighten the boss screws

Place the tool rest back into the “safe tool rest position”

The lathe speed can now be increased as the wood is turning concentrically. But remember that the main parts of the candlestick are turning off centre so keep fingers well clear.

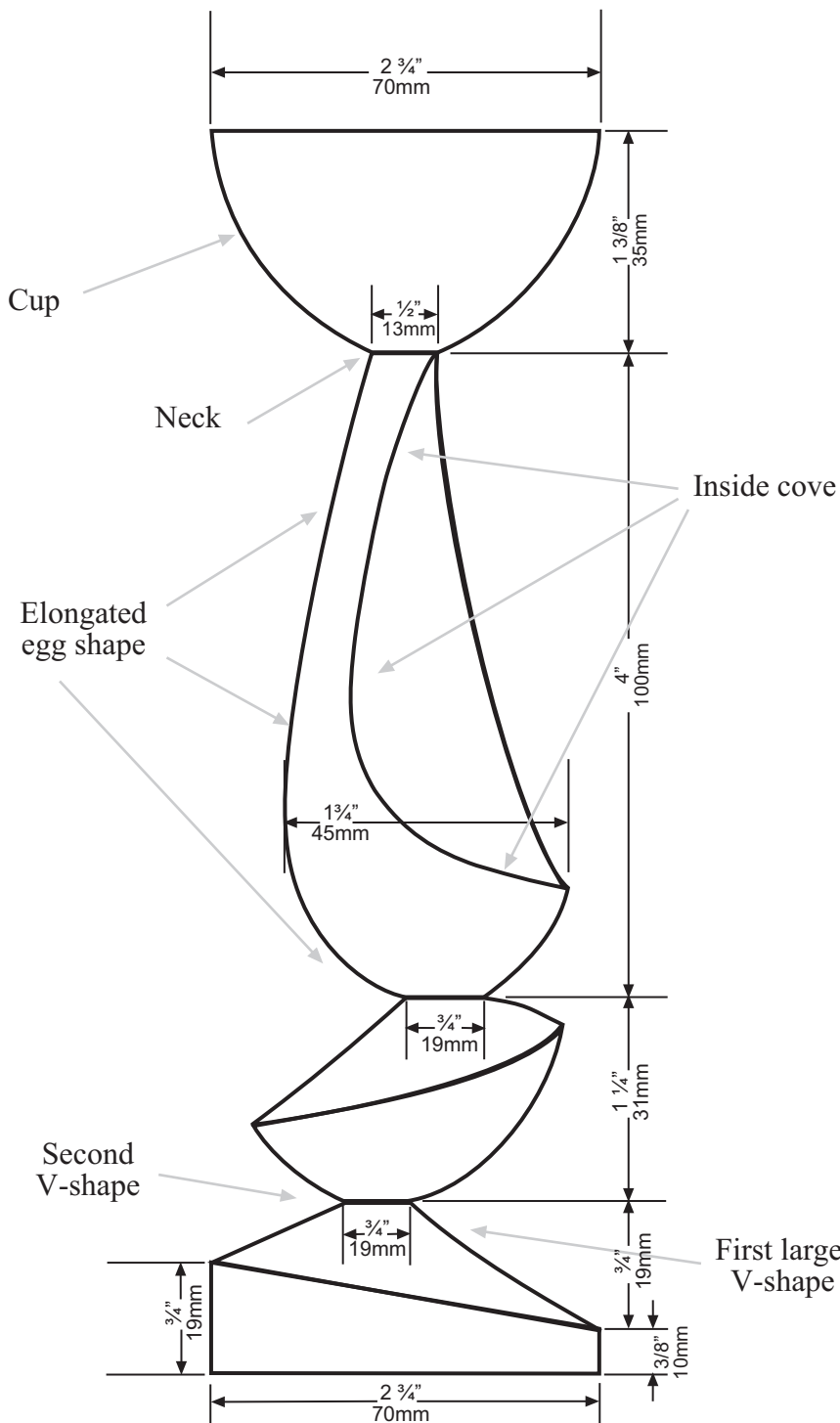
Switch the lathe on

Take a clearance cut as well as a parting cut and allow for the holding screws when parting the candlestick from the waste wood

Do not part all the way through, allow a small nib in the middle that can be removed with a fine saw.

Switch off the lathe and remove the candlestick from the waste, then sand and finish as required.

Finish the piece with a suitable finish and proudly display your Cabriole Candlestick.



Scallop lid box



The last project we will make a box with a scallop detailed lid

For this project we will use the faceplate

We are going to use a bowl blank of hardwood approx 4 ½” (152mm) diameter and approx 3 ½” (89mm) thick.

Place the faceplate over the centre of the bowl blank and secure with woodscrews.

Note the mark on the edge

Line up this mark with the dot on the face of the boss

Locate the hexagonal stem of the faceplate into the socket of the Eccentric boss.

And secure with the machine screw and washer.

Place the eccentric boss into the main body so that ‘0’ is visible in the sight window.

Now tighten the boss screws and put tool rest in “safe tool rest position”

Adjust the lathe speed as appropriate and switch the lathe on.

Using the 3/8" bowl gouge turn the bowl blank down to the round.

Switch off the lathe and check for smooth finish.

Sand and finish

Now place tool rest in "safe tool rest position" at face of blank

Switch the lathe on and turn the face to a slight dome shape

Switch off the lathe, sand and finish as required

Slacken the eccentric boss screws and rotate the boss so that "35" is now visible in the sight window.

Re-tighten the boss screws.

Return the tool rest to the "safe tool rest position".

Slow the lathe to its slowest speed

The wood is now at full off centre so extra care has to be taken while turning as before

Now turn a small button shape, some of which will overlap the edge of the lid.

Switch off the lathe

Check the surface finish and sand as required

Loosen the eccentric boss screws and remove the boss from the main body

Undo the machine screw and washer. Now very carefully index the hexagonal stem 1 position clockwise and replace into the socket

Re-tighten the machine screw and washer

Replace the boss back into the main body with "35" visible in the sight window and re-tighten the screws

Place the tool rest in the "safe tool rest position"

Switch the lathe on and look for the outer edge of the initially turned button.

Turn the first groove starting from the outer edge of the button.

A fine parting tool or a pencil can be used to mark the position of the groove. It can then be turned using the 3/8" fingernail gouge

Switch off the lathe, sand and finish

Loosen the eccentric boss screws and remove the boss from the main body

Undo the machine screw and washer and once again very carefully index the hexagonal stem 1 position and replace into the hexagonal socket

Re-tighten the machine screw and washer and replace the boss back into the main body with "35" visible in the sight window

Place the tool rest in the "safe tool rest position"

Switch the lathe on and look for the outer edge of the first groove

Mark the edge of the first groove with the parting tool or pencil and turn the second groove

Switch off the lathe and sand as before

Again loosen the eccentric boss screws and remove the boss from the main body

Undo the machine screw and washer and very carefully index the hexagonal stem another 1 position and replace into the hexagonal socket

Re-tighten the machine screw and washer

Replace the boss back into the main body with "35" visible in the sight window and re-tighten the screws

Place the tool rest in the "safe tool rest position"

Switch the lathe on and look for the outer edge of the second groove

Mark and turn the third groove starting at the edge of the second groove as before

Switch lathe off

Check the surface finish and sand as before

We now have a finished Scallop detail lid.

Now make the inner lip for the lid to locate into the box body.

Using the fine parting tool make several cuts. One as the parting cut, one to allow for clearance and one as the guide for the hollowing of the main box at the same point as the inner lid lip

Part down, leaving a small nib in the centre

Switch off the lathe and remove the lid

Check and sand

Place the tool rest at the “safe tool rest position”

Switch on the lathe and hollow out the inside of the box allowing room at the bottom for the holding screws and parting off

The outer limit of the hollow will be the guide left from the inner lip when parted off

Switch off lathe and offer the lid up to check for a good fit.

When the box has been hollowed, sand and apply a finish as required

Now move the tool rest to the “safe tool rest position” at the side of the box

Using the fine parting tool part off the box in the same way that the lid was removed

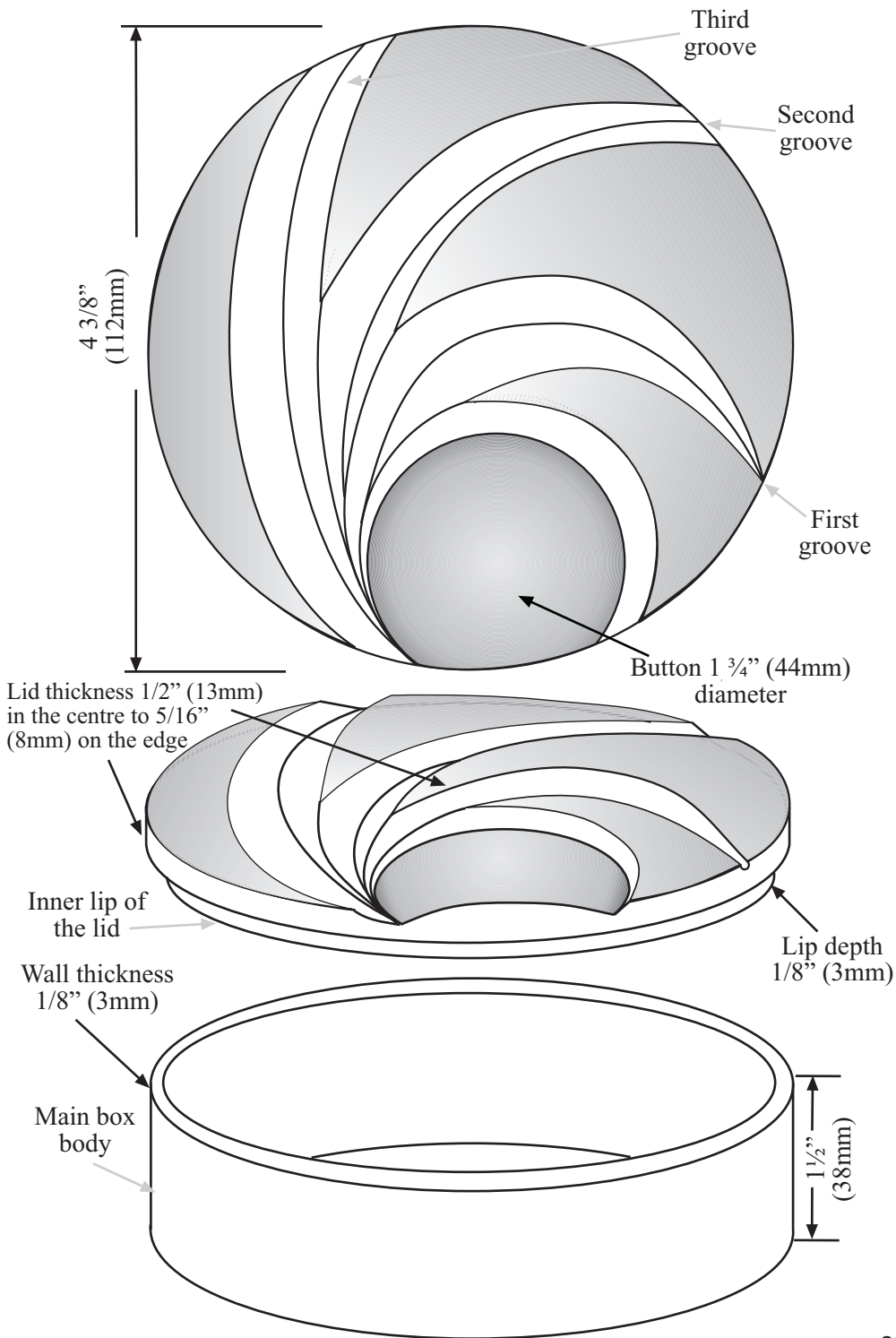
Ensure that enough clearance is left for the fixing screws

We have our complete box with Scallop detail lid

Note.

The drawing on the next page has been shaded to give an impression of the 3 dimensional look of the finished Scallop detail.

Copyright © 2005 Robert Sorby



Notes

The Robert Sorby Eccentric Chuck is just one of many unique and innovative products that we manufacture in our factory in Sheffield, England. Listed below are just a few of the more specialised tools and products that are available. Please read on the back page for further information on our renown catalogue and website

The Texturing tool is used to produce beautiful textures and patterns such as the very popular orange peel effect on most turned work. It can change the look of an ordinary piece to an eye catching piece of art.



The Spiralling and Texturing system can enhance any turned piece with a variety of spirals from the 3 different sized spiral cutters included. These can be used on the outside of bowls and to apply spirals on candlesticks and goblet stems. It also contains the texture cutter as described



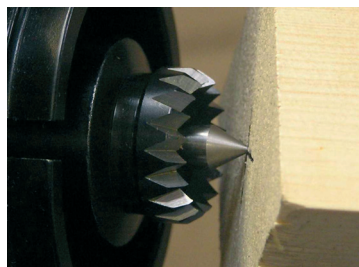
One of the most versatile tools available. The Multi-Tip Hollowing Tool is fitted with a ¾" (19mm) wide half-round shank which makes it the most user friendly hollowing tool on the market. It is supplied with three cutters. One for under shoulder hollowing and one for straight box cutting. The other cutter is tear-drop shaped and is used for shear scraping.



The Robert Sorby Thread Cutting tools are available in three thread sizes. These are 10, 16 and 20 threads per inch (TPI). The thread sizing gauge is a must have for anybody wanting to make accurate threaded boxes. There is also available a Tool Rest and a relief tool to assist in the internal thread cutting.



The range of Stebcentres includes the original version available in 1MT & 2MT with ½", 7/8" and 1 ¼" heads sizes. There is also a revolving, live version that fits into the tailstock for simple eccentric work. The Steb Drive has all the same benefits as the original version but with advantage that it will fit directly into a four jaw scroll chuck



Useful information



All of our products can be found in the acclaimed Robert Sorby catalogue. It contains full descriptions on every product with colour images and sizes with editorial on the use of them. It also has useful advice on tool care and sharpening with recommended angles and guides how to get the best from each product.



The Robert Sorby website www.robert-sorby.co.uk is a fantastic source of information. It has full descriptions of all the tools and products as well as instructions for tool use. A comprehensive list of names and addresses of our worldwide network of dealers as well as a list of all the shows and demonstrations that Robert Sorby staff will be attending is continually updated.



For more information please contact

Robert Sorby

Athol Road
Sheffield
England S8 0PA

Tel: +44 (0) 114 225 0700
www.robert-sorby.co.uk

Fax: +44 (0) 114 2250710
sales@robert-sorby.co.uk