



SIMPLE GUIDE TO MAKING MILLS – THEY ARE NOT DIFFICULT!

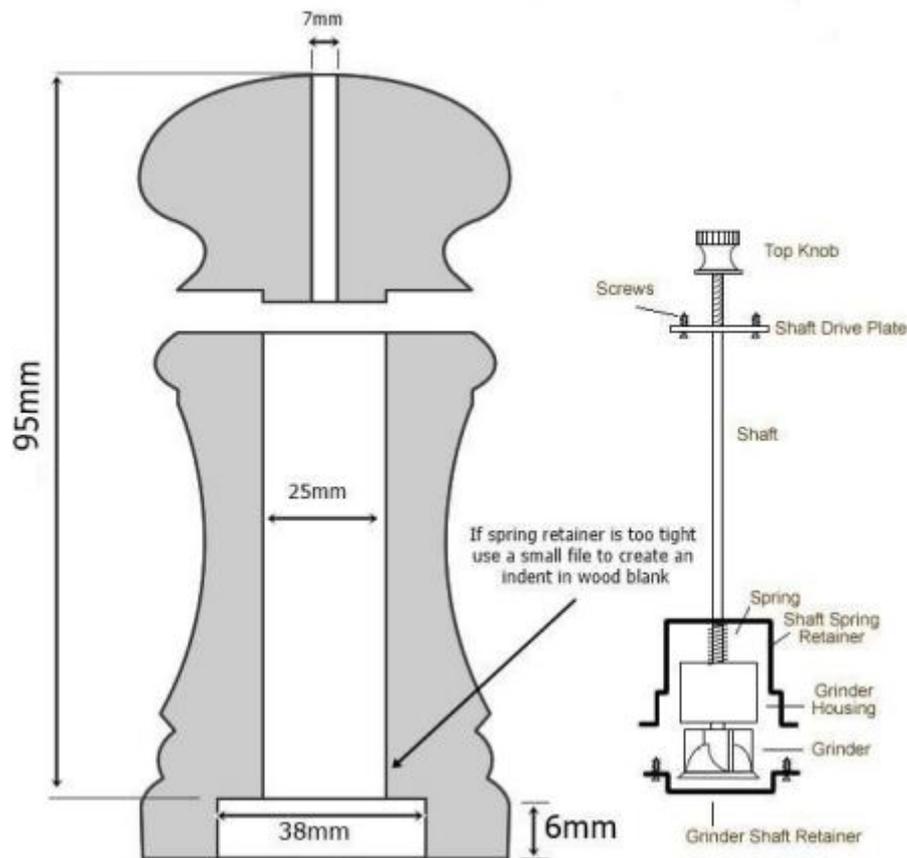
The purpose of this guide is to try to remove the fear some people have when considering making mills. There are a lot of components and you will need to measure things but they are really quite straightforward. We hope this guide will give more people the confidence to try them as they are great fun to make and you can really make some beautiful designs.

The kit we have featured here is a small 4” kit and we have done everything except drill the screw pilot holes on the lathe. You will need several types of jaws and a 4 jaw chuck but this guide only shows one way of doing a kit – there is always more than 1 way depending on your equipment.

WHAT ARE ALL THOSE BITS?

A salt or pepper mill kit has quite a few components, if you have not seen one before it may not be obvious what all the bits are, after all they are normally hidden inside a block of wood. The diagram below shows the component parts and how they go together in a block of wood.

Hopefully when you can see how they fit the steps that follow will make some sense.



WHAT TOOLS AM I GOING TO NEED?

We are going to assume you already have a lathe some tools and a chuck with some jaws. We will be using a Jacobs chuck fitted to the tailstock to drill the parts – these are not essential you can make these cuts with turning tools but drills are much easier and more accurate.

We use: Jacobs chuck, 38mm Forstner drill, 25mm drill and a 1.5mm drill for the pilot holes. We then use all the usual finishing and sanding products

A quick word about drills: When using forstner type drills it is important you drill the biggest hole first and gradually get smaller, otherwise centering the drills becomes difficult. For drilling the central hole we used a twist drill but you can use a forstner drill bit or an auger drill. Beware of auger drills they have a thread start and will pull the drill into the wood, their advantage is you can get very long ones if you decide to make a very tall mill.

WHAT SIZE WOOD DO I NEED?

The industry standard size for the bottom of a mill is 38mm so anything larger should be fine. We would usually start with 60mm square stock – so you have a bit to play with to create your design.

The length of stock we usually add 30-40mm onto the size of the kit this is to allow for holding it in the chuck and also making the tenon that sits inside the main hole.

Remember if you have a bit extra you can cut it off – you can't stick it back on if it's too short! For this project we used a blank 130mm long and 60mm square

WHERE DO I START?

The first job is to mark the centres at each end, turn the stock round and create a dovetail tenon so you can hold the piece in the chuck.



Once you have done this you can turn the blank around and mount it in dovetail jaws on your chuck.

DRILLING

When mounted securely we can start the drilling process.

First of all we will drill the 38mm rebate in the bottom, for this kit it needs to be 6mm deep (other kits may have different requirements)



Once the 38mm hole is drilled we will start to drill the 25mm central hole, not all the way through just about halfway into the body – in this case about 45mm.



We have now finished drilling the bottom and are about to turn the project around – if you want to do some finishing now you can do to tidy things up a little.

Next we need to turn the blank around and mount it on expanding jaws (possibly different ones to your dovetail jaws) on the 38mm hole you just made.



Once we have turned it round we can start to lay out and mark up the top and bottom parts, make sure you leave some extra for the tenon that will fit inside the main hole. This tenon is what stops the cap wobbling all over the place and keeps it turning centrally.

HOW BIG SHOULD EACH BIT BE?

The simple answer is whatever size you like as long as the overall length is correct. For our mill we are going to have quite a shallow cap and tapered body. Mark out where each bit will be and where the tenon part will be.



CAN I MATCH THE GRAIN?

Not quite, because you have to have that little tenon so there will always be a slight break in the grain pattern, it is unlikely anyone will notice but with some designs it is more obvious than others.

MAKING THE CAP

Once marked out you can cut the tenon part to roughly 24mmØ (to fit inside the 25mm centre hole) it must be an easy fit but don't worry we can adjust this bit later on. The next step is to drill a 7mm hole through the cap, tenon and just into what will be the top of the body – this is to take the drive shaft. Once this is drilled you have a choice of either removing the cap to finish later or turning and finishing while it is still connected to the main piece. We removed ours to finish later on. Our head piece was 25mm tall plus tenon which was 15mm.



FINISHING THE BODY

Once the cap is finished or removed we can finish the body and the next step is to finish drilling the 25mm hole. We already have a central point where we drilled the 7mm drill slightly into the body so we can re-mount the jacobs chuck and drill to meet up with the hole we started at the other end.



WHAT IF THE DRILLED HOLES DON'T MEET UP EXACTLY?

This really does not matter because the only thing that will touch this part is your salt or peppercorns, the drive shaft runs through the big hole in the middle.

Some makers enlarge the central hole so the mill will hold more peppercorns, the middle section of the hole can be as big as your blank will allow. You only need the 25mmØ hole to keep the spring retainer in the correct place right at the bottom of the main body.

MAKE SURE THE CAP FITS

Now take your top cap and make sure it fits well in the 25mm hole, if it is tight it will make the mill difficult to use - you can adjust the central hole if you need to and enlarge it slightly with a small skew chisel or other tool if you prefer.

TURN THE BODY

You can now turn and finish the body as you wish



TURN AND FINISH THE CAP

If you didn't finish the cap when it was on the main body you can do that now



ALL YOU NEED TO DO NOW IS PUT IT TOGETHER.....

DRILLING & SCREWING: drilling the pilot holes is one of the most important parts of assembly it is also important you understand about fitting small screws: Most mill kits come with screws that are 2mmØ that measurement is to the outside of the threads, the inner shaft therefore is approximately 1mmØ. Any metal that is 1mmØ will have very limited strength – it is not a fault, it is physics!

It is therefore very important that pilot holes are drilled at 1.5mm, to the depth of the screw shaft and straight. We usually use a pillar drill but done carefully they can be done by hand.

We recommend once you have drilled pilot holes you blind fit the bottom plate to make assembly easier. It is also essential that you use the correct size screwdriver – for our kits and most others this is a PH1 (Philips x-head size 1) do NOT use a bigger size or pozi drive screwdrivers or you will strip the heads!

That ends the lecture on screws!



Now all you need to do is screw the parts together following where they go on the diagram on page 1. Make sure the cutouts on the spring retainer and burr housing are located correctly to allow the screws access to your neatly drilled pilot holes.

OH NO – I HAVE MADE AN ERROR AND IT DOES NOT WORK PROPERLY!
This is quite common when you first start – don't panic we can probably fix it quite easily... Unlike things like pens, all the bits of a mill can be unscrewed and re-used in another blank – but you probably don't need to do that.

You are most likely to encounter one of 2 problems:

1] The thread at the top of the cap does not stick out far enough – I can't screw the knob on.

This is when a pillar drill comes in handy because you can remove the fittings and using your 38mm forstner drill bit drill in a bit further which will have the effect of moving the whole mechanism upwards. Don't forget to re-drill your pilot holes before re-assembly.

2] The thread sticks out too far at the top and I can't adjust the grind.

This fix sounds drastic but it really isn't – you need to remove the drive shaft and make it shorter. Mill drive shafts are made of aluminium which is nice and soft, trim off the amount needed (probably only a tiny bit) with a hacksaw put the shaft in a vice with just a small amount sticking out and using a steel headed hammer tap the edge of each side until it splays out – just enough so the grinder burr won't fall off the end.

This is also a great tip if you want to make a specific sized kit and can't find the exact size required – buy a 10" kit, trim off 1" and there you have your 9" kit – because you probably can't buy a 9" kit off the shelf.

And finally.... What kit should you buy? There are stainless steel burrs, plastic burrs and ceramic burrs – which is best? Undoubtedly alumina ceramic grinding burrs offer the best grind and will last longer than any other burr when cared for.

Stainless steel are more expensive and offer no advantage at all over ceramic – salt will eat any metal even stainless steel. Plastic burrs have the advantage of being cheap and that is all – they aren't very good and they won't last very long – even on salt.

We hope this guide has been useful and also of course that you visit the website and buy a kit – they are one of the most rewarding projects to complete and you will probably use them every day.



SJ4 Salt & pepper mill set finished in olivewood with optional copper adjuster knobs