

Southern Turners Project Sheet

Big Spinning Tops



This project sheet indicates one way of making larger spinning tops in two parts, along with handles for spinning a top up to a high speed.

Requirements:

Follow all safety and equipment guidelines in making the three components of this project.

Wood for a disc, 120 mm or so square, about 12-20 mm thick, uniform grain, higher density hardwood is better.

Wood for stem or spindle of top: A hard hardwood so it doesn't wear quickly, about 120 x 15 x 15 mm.

Wood for a handle –about (130-150) long x19x30.

Small faceplate & live centre on lathe.

Pin or small nail for bottom end of spindle.

Wood glue.

Drill bit to suit diameter of spindle –6-10 mm.

2-2.5 mm drill bit for a cross-wise hole in the shaft of the top to accommodate a thin cord.

Perhaps a 20 mm Forstner bit for boring a handle hole.

Thin cord (say 1 mm diameter like builder's line -to spin up the top –about 100 cm say, less for younger users. Seal the ends of the cord in a flame.

Usual finishing stuff.

Preliminaries:

Big tops are taken here to mean those that are not easy to spin fast in fingers alone –they have a large diameter, are heavy, and/or have a small diameter spindle. They have intrinsic value over small one in spinning for longer times and having greater stability.

In order to spin a larger top, some additional means is needed. The one described here is a string pull and handle.

Allow time to make both a top and its driver in the session.

Making a larger top:

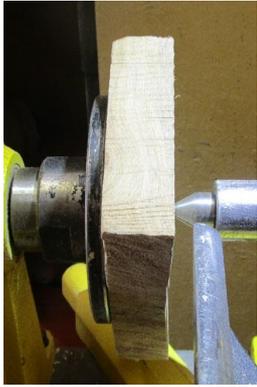
Tops with large diameter discs are most economically turned in two parts, a base and a cylindrical stem, subsequently glued together in good alignment. They give practice at both faceplate and spindle turning, along with careful drilling.

THE BASE



Select timber for the base that has a pretty uniform density across the plank, otherwise the non-uniformity may well induce out-of-balance forces when the base is spun –that is if you are after a wobble-free version, and want to avoid re-turning it or adding little weights to the rim to rebalance it.

The piece of plank should be of sufficient thickness, say 12–20 mm, to firmly embed the spindle in the centre and perpendicular to the plane of the finished base. One face of the plank should be flat to start with –plane it if necessary. Cut a piece roughly square or round with a bandsaw. Mark a centre on the face opposite the flat one.



With a small faceplate on the lathe spindle, place the flat side of the piece of wood against that, and hold it there with pressure from a live centre in the tailstock, centred on the marked centre. Make sure the tailstock is locked up tight, and the live centre is firmly embedded into the wood.



With the lathe on a lowish speed to start with, turn the base circular with a sharp gouge, parting tool, skew -whatever you are comfortable with. Face the disc if it doesn't run true with the faceplate. Flatten off any remaining wood at the centre with abrasives or a chisel.

Place the disc on a pedestal drill table, centred side up, and drill a hole right through and square to the face to take the spindle, say 6-8 mm or so in diameter for a 10 mm base diameter.

If necessary, put the wood back on the faceplate and face the other side of the disc, again supported by the live centre, now in the drilled hole.



You can leave the edges of your disc square to the face, or shape them however you like –making the edge very thin may be unwise, because the spinning edge may then bruise anything it hits, or even break off. Keeping the edge broad increases the mass of the base out towards the edge, and the moment of inertia, which aids the duration of spin considerably. Shape a cross-section for the base however you like, also keeping it thick enough at the centre to support the stem well.

THE STEM

Using a piece of hardwood about $\frac{3}{4}$ x disc diameter long –longer if the disc is thicker, and about 15 mm square, turn the piece into a cylinder, either between centres, or by holding one end in small chuck jaws and supporting the other end in a live centre. Part or all of the stem should be thinned to about 6-8 mm (thicker for larger bases), the size of a drill bit. It should be thin enough to spin the top to a high speed,



but strong enough to withstand a bit of rough treatment, perhaps with a small cross-wise hole drilled in it. Taper the end near the tailstock to a blunt point, to take a small nail or pin in the centre point to reduce wear –the greater mass of a larger top creates more wear on the point, so some

protection is recommended.



Look ahead at the examples of handles used to hold the tops as they are being spun up, for aspects of the stem shape close to the top of the base – a neck/spacer/boss there may be useful for the

horizontal type of handle. Also appreciate that a very long stem may make it tricky to remove the handle from the stem once a top is up to speed, so trim the length after making the handle, if required.



The stem can be made a greater diameter where it passes through the base – enlarge the hole in the base to accommodate it if needed. Allow enough length below any boss to accommodate the base and to allow the top to tilt by perhaps

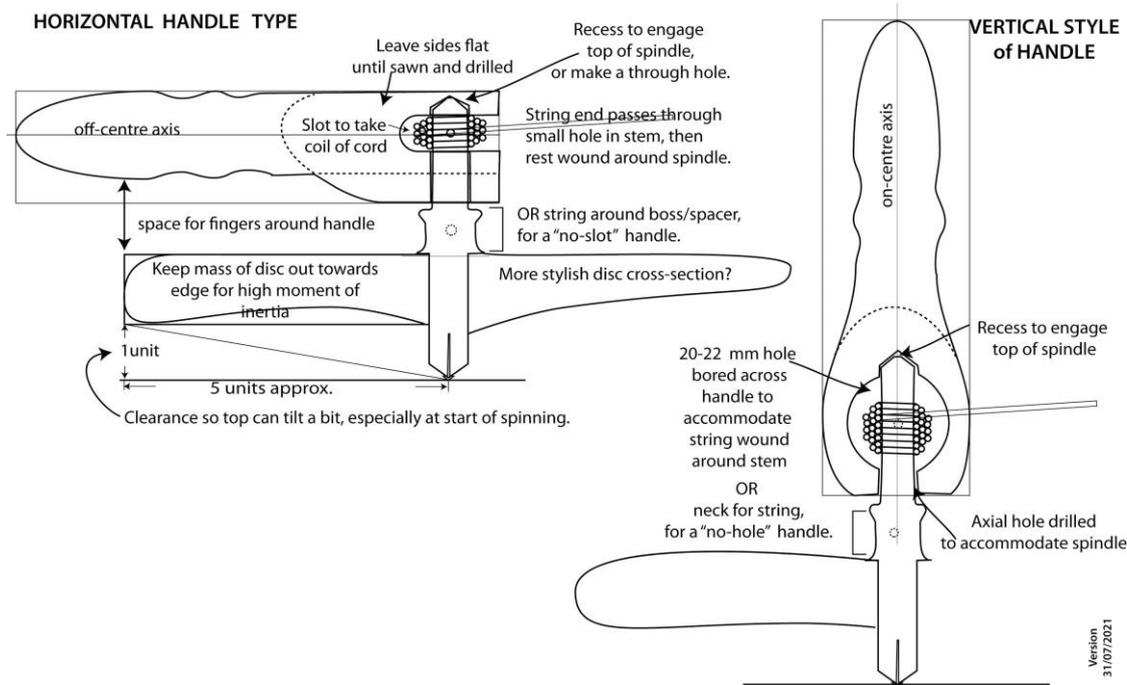
10° without the base touching the surface. (10° corresponds to a stem length below the base of 1 unit and about 5 units of disc radius.)

SPINNING THE TOP

There are several ways to spin a top to a high speed. The method given here holds the top in a handle, and a thin cord is wound around the spindle of the top to start it spinning. By pulling on the cord, a torque is applied to the shaft which accelerates the top to a high rate. When the cord comes free, the handle can be lifted off.

HANDLES

Two common forms of handle are shown below, along with sections of tops. Decide if you are going to hold the top in a horizontal or vertical handle.

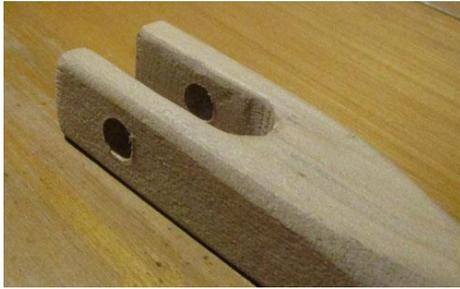


Turn a handle from, say, pine board or something fancier, 130-150 mm or so long x about 30 mm wide x 19 mm thick (i.e. with a rectangular cross-section), held between centres. If you are to make a horizontal handle, set the turning axis a few mm off the centre line of the piece to give more

clearance for fingers around the handle.

Whichever shape you have decided on, turn the wood down, for about 2/3 of its length, to a size and shape comfortable to hold in the hand. The other end can remain square to assist in the next steps after finishing all edges smoothly.

For a horizontal handle:



Near the broader and flatter end of the piece, but into the marrow side, drill a hole with a diameter slightly larger than that of the spindle of the top, so the latter would be a loose but not too sloppy fit. To make room for the cord to spin the top, cut a slot in the end of the handle and deep enough to go past the hole drilled already. A bandsaw or hand saw and rasp & drill can be used for the task. Smooth the edges of the slot to minimise wear on the cord, and finish all surfaces.

If you are going to wind the cord around a stem spacer or boss close to the base rather than the stem, skip the slot cutting guide.

For a vertical handle



Bore a hole, say 20 mm in diameter, across the handle near its mostly unshaped end, to accommodate the cord around the stem.

Then drill a hole parallel to the length of the handle, in the end, to accommodate the spindle to a loose fit. Make this hole deep enough to go all the way through the larger hole and further into the handle.

Smooth the edges of the hole so the cord used to spin the top suffers little wear in use -and finish all surfaces.

Back to the stem of the top,



Now the handle is finished: put the stem of the top into the handle and mark the stem in the middle of the gap where the cord goes. At this mark, drill a small diameter cross-wise hole (say 2-3 mm), just large enough to initially retain the end of the pull cord. Recognise that a larger hole will weaken the stem and may result in an early breakage there. If you are going to wind the cord around a spacer or boss adjacent to the base of the top, drill a hole through that for the same purpose, rather than through the stem.

Now glue the stem to the base! Once the glue has set, wind on some cord and time how long your top can spin - on something other than the surface of your prize table!



Here are some examples of tops ranging from 150 mm in diameter down to about 75 mm, with various handles.