Sally Ault…..Making a Sea Urchin Box. www.sallyault.com

You first need to obtain a nice sea urchin. The Sputnik versions are sold by Craft Supply and others. The Alfonso, Purple, Green and White Mexican Urchins are a bit harder to find but Etsy and EBay are good sources. You might even have a local source…or a beach to find them on.

To make the sea Urchin strong you fill it with insulating foam. I use a brand from Home Depot called Great Stuff. There are 2 types…I use the one for windows…it doesn't expand quite as much.
First completely cover the sea urchin with plastic wrap or foil and masking tape to prevent any of the foam from getting on the shell.
Cut a large hole in the tape and plastic covering the hole at the top. Squirt in the foam…get it into all the areas. It will continue to "grow" until it gets firm so don't overfill…it goes everywhere and you will soon see why it is important to cover the shell completely with plastic wrap. If you overfill with too small a hole it can break the shell. If you get foam on the shell it will discolor in time even if you think you got it cleaned off.
Once the foam is cured remove the tape and plastic wrap.
You won't use the whole can of foam unless you are doing a large number of urchins but if you don't clean the tube with acetone immediately you won't be able to use it again.

To determine the size of wood blank required you need to decide what the diameter of the rim of the box insert will be and add a bit for rounding to a cylinder.
Measure the height of the urchin to determine the length of wood needed for the insert, add the desired height of the lid and the foot (including a longer than usual tenon) plus the amount of wood needed for 2 tenons and 2 parting cuts and that is the length of blank you will need for the box. If you want a finial from the same wood add that length to the blank or find a pen blank that is the same wood to use for the finial. A contrasting finial or one made from a different material can be effective too.

Round the blank to a cylinder, make a tenon on both ends and part between the base and the lid. Put the base into the chuck and form the lip that will overlap the hole in the shell. Shape the outside of the box (this part won't be seen) to the desired depth. Create a small tenon on the bottom for insurance.
Cut in a step for the lid to rest on making sure it being cut into solid wood. If you make the interior too wide you may cut off the rim of the box.
Make sure the sides of the recess for the lid are perfectly straight and deep enough to provide a stable spot for the lid.
Hollow the inside remembering that it shouldn't be too deep since it is a small box. I generally make the depth about the same dimension as the width of the interior. I gently round the bottom rather than making straight sides.
Sand and finish the rim and inside. No need to finish the outside since it will be hidden inside the shell.

Put the lid blank into the chuck. Determine the width of the lid and the width of the tenon which will fit into the recess in the base of the box. Give some thought to how the rim of the base and lid shapes work together. The lid can be wider than the rim of the base, the same diameter or narrower. It is a design choice.
Make sure the tenon on the lid is perfectly straight. The fit should not be tight…this is a one handed opening box and you don't need a tight fit to work on the lid.
Once the tenon is the right size, create a slight dovetail inside the tenon going deep enough to get into solid wood and then create a curved recess in the lid. Sand and Finish the tenon, rim and inside the lid.
Rough out the shape of the top of the lid as far as possible while it is still in the chuck. You can support the lid using the tailstock with a non-marring insert while you are shaping.
Once you are close to the desired shape part it off (the wood remaining in the chuck is for the foot) and turn it around in a chuck with the jaws expanding into the lids dovetail recess. I use a piece of paper towel to help avoid any marks from the chuck jaws.
Support the lid with the tailstock. (I use the Drozda point with the smallest pin) and finish turning the top of the lid. Take very light cuts.
If you are making a tall finial you can make the finial separately from the lid with a 1/8" or ¼" tenon on the end…make the corresponding recess in the lid and connect them after both the lid and finial are completed.

For the foot, measure the area to be covered by the shell side of the foot. Round to a cylinder and cut a tenon that will be inserted into the shell. Cut a small tenon on the end of that tenon to use when finishing the bottom of the foot.
Shape the part of the foot that will touch the shell with an undercut so the shell will fit up into it if needed.

Shape the outside of the foot making sure the base is wide enough to give support to the shell. Part off with as much of an undercut as possible so there isn't as much turning to do when it is turned around in the chuck. Sand and finish all the accessible areas.

Secure the small tenon into the chuck and support the foot area with the tailstock for as long as possible. I use the Drozda point with the smallest pin for this. Shape the underside of the foot as far as possible then remove the tailstock and complete the cutting. Sand and finish the underside.
If you make a foot with a pedestal it can be made in one piece or in two pieces similar to adding a finial.

Using a rotary tool with a small cylindrical sander or abrasive bit, start cutting out the shell to the diameter of the insert. Measure carefully and draw a line at the proper diameter. Shape the hole slowly so you don't crack off any shell. Keep trying the insert. Only take as much foam out as needed. Don't make the shell too tight against the wood in case of movement of the wood. Glue insert into the shell with 5 minute epoxy.

Using a smaller abrasive bit make the hole for the foot tenon in the bottom. Keep trying for size…again don't make the fit too tight.

If you have a tall finial and/or a pedestal foot you will need to take extra care to line them up since shells are not symmetrical. Glue in the foot with 5 minute epoxy.

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