Cryptex:
The first step in making a cyptex is to pick the code for the box and write it down. Trust me, you don't want to forget your code half way through the project. The number of characters in your code determines the number of dials you need to make. For this example we will use MAWT (Milwaukee Area Wood Turners).

The Dials:
Mount your blank in the chuck and clean up the end grain. Make sure to leave a dimple in the center whenever we clean up the end grain to help start your drill bits. With a 1 ½" forstner bit bore out a hole deep enough for all of your dials. I usually go ½" per dial plus an extra ½" to make sure everything clears. True up the inside with a box scraper being carful to keep the walls parallel. If you have a cone shaped live center now would be a good time to bring it up to help stabilize the piece while you turn the outside of blank down to 2" diameter. Sand to desired finish with a flat block to ensure outside is really flat.

Using the index wheel in your headstock divide the cylinder into the number of letters, numbers or symbols you want on each dial. Draw a line for each indexing with a soft pencil along the outside using your tool rest for support. Now when we part off the dials each will be divided the same.

With a spindle gouge clean up the end of the opening giving it a slight back angle. Using a 1 ¾" forstner bit you will bore a 1/8" recess into the end of the cylinder. Sand and clean the inside. Measure 3/8" from the end and make a line around the cylinder. Part the piece off at this line while giving the part a slight forward angle. Use a rasp or sandpaper around a dowel to clean any frayed or torn fibers. You have just turned your first dial. Now repeat these steps until you have enough dials to make your code starting with cleaning up the end of opening and giving it a slight back angle. Number the inside of each dial with a pencil, as you part them off. This is important.

You will need to burn or mark you dials with the letters, numbers or symbols that you want to use. I prefer to burn the letters because it is more durable and it will be handled a lot. After burning I lightly sand the dial to remove the pencil lines and this cleans up some of the scorching that can come from burning. Then I apply finish inside and out.

The Back Bone:
Put your blank in the chuck and clean up the face. Using a 1 1/8" forstner bit bore a hole as deep as the code rings are tall when stacked then add another ½". True up the inside with a box scraper and sand. Using the cone center again turn down the outside until it is the same diameter as the inside of the dials you made. Make the outside of the cylinder as long as you bored out the inside plus another ½". Sand the cylinder with a wood block to ensure its flat, stopping when the dials slide on smoothly over the tube. Apply finish and using your indexer draw a single line down the center the full length of the cylinder using your soft pencil. If you have

more than one chuck leave the blank there and set aside. If not remove from chuck and prepare for the next step.

The Box:
Put a blank in the chuck and clean up face. Using a 7/8" forstner bit bore a hole the same depth as the code rings are tall plus another ¼". Sand and finish the inside. Using the cone center again turn down the outside to same diameter as the inside of the Back Bone and as long as the dials are tall plus 1/8". Sand until it smoothly slides into the Back Bone and then apply finish. Note: The shoulder of the blank should be back beveled a hint and finished at this time. To make things easier we will refer to this as the base of the box because it will eventually be turned into the base or one end of the actual box. Thus we will name the opposite side of the box as the "top", which is the side the Back Bone is on.

Pin Holes:
Now you will take the dials and slip them over the Back Bone making sure the number 1 dial goes on first with the recess facing the chuck. Then slide the Box into the Back Bone and press them together. I use a clamp to make sure the two pieces don't move apart. Press your last dial up against the shoulder of the Box/ base and make a gap between the last dial and the second to last. You will mark the Back Bone at the inside edge of the recess with your soft pencil across the pencil line running the length that you drew earlier. Repeat for each dial then remove the dials.

Slide the Box back into the Back Bone and re-clamp them to keep them from moving apart. Using a 1/8" brad point drill bit you will drill down through side of both the Back Bone and Box pieces. You can measure the distance and remark the cross marks on the Back Bone 1/16" toward the Back Bone shoulder. I prefer to just put the outer wing of the brad point on the existing lines and rock the point into the wood. The point is that you are making the holes for your pins, these pins ride in the recess of the dials until the combo is achieved, therefore the holes have to be entirely to side of the pencil cross points. The "top" side. Drill your holes as vertical as possible. Remove the Box from the Back Bone and clean up any splintering that may have occurred.

Mounting the Back Bone in a vise and use a dovetail saw to cut a slot from the open end of the cylinder to the last pin hole and no further. This slot allows the pins that will be mounted in the Box to slide through the Back Bone and dials therefore the slot has to be at least as wide as the pin holes you just drilled. So use the pin holes as a guide for your saw kerfs. If anything a little too big is better, just in case the pins are not perfectly perpendicular to the box. Clean up with a rasp and sandpaper for a smooth finish.

Re-mount the Back Bone on the lathe. Measure from the opening the depth as the code rings are tall plus another ¼" and draw a line around the cylinder. Part the Back Bone off to the left of the line as cleanly as possible. Clean up any fibers with sandpaper and set aside.

Top and Base:
Mount a blank of the same wood as the base/ Box and true the face, sand and finish. Make a recess a gnats ass deeper than ¼" and the same diameter as the Back Bone. Specifically the side that does not have the slot. This is the side that will be glued into the recess, but not now. Reverse the blank and jam chuck it to the lathe and bring your tail stock up to support the chucking. Now turn the top to the design of your choice making sure the shoulder needs to be bigger around than the dials. Sand and finish the top and remove from lathe. Glue the Back Bone into the recess and set aside.

Reverse the Box/ base and jam chuck it onto the lathe. Turn the base of the box to the design of your choice making sure the shoulder is larger than the dials. Either a mirror image of the top or an actual base so the entire box will stand vertical when it is done. Sand and finish. Set aside.

Pins:
Pins are nothing more than 1/8" brass rod that you can get at the box store for a couple of bucks. You can hack saw them to size and smooth with a file or sander. I prefer to cut them to two inch lengths and put one in a Jacobs chuck on the lathe. With the lathe on I use a file to round over the lead edge until its bullet shaped. Then using a dial caliper I measure how tall I need the pins and then transfer that mark to the brass with the sharp tips of the calipers. Then I just use a skew to part it off. Repeat until I have a few more than I need. I line them up and see if I need to adjust any with a file before I super glue them into the holes we drilled in the Box making sure they are all the same height. Always dry fit them before adding the glue as more often than not you will need to file them to slide into the holes.

Combo:
Remember that piece of paper you wrote your combo on? Dig it out. You will need to make a notch into each dial that corresponds to the combo you chose. If you numbered your dials as they were parted off then your 1st dial is your first letter. In our case dial 1 is M, dial 2 is A, dial 3 is W, and dial 4 is T. The notch has to let the pin through so it has to be at least 1/8" wide and as deep as the pins stand above the Back Bone when slid together. I use a rat tail rasp and cut out a groove as deep as the recess inside, making sure I am doing this right behind the letter representing that dials combo.

Assemble:
It is very important to dry fit all the parts before final gluing to make sure everything moves freely and smoothly. Slide the dials onto the Back Bone/ top with the recess side facing the shoulder. Slide the Box/ base inside the Back Bone turning the dials to allow the pins to slide home. This should make the dials spell your combo. This is a good time to mark the top and/ or bottom where the code lines up on the pins so that when you dial the combo later you know where it should line up to work. Spin the dials and make sure they move smoothly. Dial your combo and make sure you can extract the box without pulling the dials off. If you have a problem with any of these you will need to find where things are binding and finesse

them with a rasp or sandpaper. Only when it passes these tests should you assemble the dials on the Back Bone and glue the last dial to the Back Bone itself. These will permanently hold the dials on the Back Bone and up against the shoulder of the top. Since you cant move the last dial you must glue it so the slot of the Back Bone and the notch of the dial line up allowing the pins to pass. Note: I like to use the Beall buffing system and buff all the pieces before final gluing. It gives everything a smooth polished feeling and nice sheen.

Congratulations, despite everything I told you might actually have a working Cryptex. If not, blame the demonstrator and start over.