



Off Center Turning Set. All of the items which are included

Equipment Review, Andrew Kuby

#CSC600 Off-Center Chucking System, Penn State Industries \$140.00 plus shipping. Includes video disc.

This is a unique piece of equipment which facilitates a number of operations which are much more difficult with shop built jigs and much more expensive with other systems. There is a bit of a trade off in versatility and accuracy for the price.

**The Chuck Body:** This is a five and three quarter pound, chrome plated steel chuck with a 1X8 thread (perfect for the little OneWay or Jet lathes). The front of the chuck has a black steel movable spindle with a 1X8 threaded external thread and 1/2 inch internal thread. The spindle can be offset as much as 7/8 inch parallel to the axis of rotation by means of an internal cross screw. A 1X8 thread black steel lock nut is provided to secure the spindle in position. The front of the chuck case is marked with 0, 60, 90, 120, 180, 240, 270 and 300 degrees. The markings are stamped into the steel. There is a hole for a 5/16 inch tommy bar in the base of the chuck and a set screw to lock it on the headstock.

The chuck body is screwed directly onto the headstock and a second chuck (not provided) is mounted to the front spindle. The offset is adjusted using an Allen wrench to turn the cross screw inside the body of the chuck. Snugging the second chuck up against the offset chuck body will lock in the offset. There is also a 1X8 lock nut to lock the spindle in place if a second chuck or face plate is not used. The spindle must be locked down or the vibration will change the offset and ruin your piece. Obviously a large, heavy, scroll chuck will create significant vibration all by itself and with a work-piece mounted, the effect is multiplied. Wood or metal faceplates could also be used but they do not allow for rotating the work to create a number of different sides. In use, the scroll chuck is solidly mounted to the offset chuck and the work is turned within the chuck using the degree marks on the face of the chuck (which should have been filled with black paint for better visibility) or other index marks on the scroll chuck. This type of system is obviously only as accurate as the marks and how well they can be seen. The offset chuck can be lined up to turn on center but there are no presets for this. Repeating an offset involves

remembering the number of rotations of the Allen wrench used to move spindle; once again accuracy is limited. All of the movement of the offset chuck is perpendicular to the lathe axis.

**The Multi-Port Holder:** This is a one pound, two ounce piece of machined aluminum, threaded 1X8 to fit directly on the headstock. On the front of the Multi-Port Holder there are five M12-1.75 threaded holes, one at the center and four additional holes around the outside, 9/16, 11/16, 13/16 and 15/16 from the center. There is also a hole for a 5/16 inch tommy bar on the side of the piece (same size as Jet Mini knockout bar). The Multi-Port Holder is used with the Pen and Bottle Stopper Mandrels for repeatable offsets.

**The Pen and Bottle Stopper Mandrels:** The Pen Mandrel holds a single pen blank on a 7mm by four inch rod. The rod has a lock nut on one end and a spring loaded head with nine detents. The detents allow for the mandrel to be rotated and locked into position for three, four or six sided turning of the blank. The Bottle Stopper Mandrel is similar to the Pen Mandrel except the end is threaded 3/8 inch X 16 tpi to mount a stopper blank. The spring-loaded head and the detents are similar. The Pen Mandrel and the Bottle Stopper Mandrel can be used in the Off Center Chuck by threading them into the internal thread on the spindle. This allows for a variable offset. The mandrels will also fit into the Multi-Port Holder which allows for repeatable offsets and a bit of counterweight (using a M12-1.75 by 30mm bolt, provided, in the opposite threaded hole). Obviously a pen blank does not have much material to shape, so light cuts, or shaping by sanding on the lathe, is necessary. Because of the vibration inherent in the system, the intersections between the sides are not as crisp as might be expected. With the bottle stopper mandrel the results are better. The spring loaded heads cannot be locked down at any of the detents and there is some movement. Perhaps a stronger spring or a lock nut could have been provided. The mandrels are also limited to offset in parallel with the lathe axis.

Also included are three Allen wrenches, the 1X8 lock nut for the spindle, three 7mm spacer bushings and a M12-1.75 by 30mm bolt and nut to use a counterweight on the Multi-Port Holder.

## Conclusions

I have turned three sided bottle stoppers and a three sided smart phone stylus using the Pen and Bottle Stopper Mandrels on the Multi-Port Holder. The stoppers turned out crisp and sharp although the threads holding the blank could be self tapping. The pen mandrel has a bit of vibration at the unsupported end. Light cuts are necessary. The video instructions suggest shaping by power sanding which results in a slightly softer look.

To turn an offset candle stick I used the Penn States #CSC500K Micro Chuck (one pound) to reduce the vibration caused by the offset scroll chuck weight. This works fine but all of the offsets were obviously parallel to the lathe axis. To create pieces where the work axis is at an angle to the lathe axis, I fitted the movable spindle with a pointed steb type center made from a M12-1.75 bolt and threaded into the spindle (Penn States has a drive center set with multiple heads which threads onto the 1 X 8 spindle which would work as well). The workpiece was then turned off-axis between the spindle and a live-center in the tail-stock. The headstock center was marked with a groove cut into the bolt head so I could align marks on the base of the workpiece as I adjusted it. This allowed me to make a three sided cup without changing centers. I also tried turning the tenon on the work piece as a small sphere. Then the angle of the work-piece could be adjusted in the scroll chuck. This scenario worked better than I expected (I only had the workpiece jump out of the chuck once) but the turning is non-repeatable and you can't go back and touch up any face. I think the same effect could be obtained with larger ends on

the spindle to allow for the live and drive centers to be offset from the axis of the workpiece (as in turning a spiral).

Overall, I am satisfied with the chuck system, realizing the limitations. With small modifications this system should surpass what I would have been able to do with completely shop built jigs, at a considerable savings in time and treasure.



Off Center Faceplate Turning.



Off-Set Turning



Offset, variable angle at chuck



Off-Set Turning, On-Axis



Off-Set Turning, Off-Axis



Three Sided Stopper, turned on the stopper mandrel with the Multi-port Holder