Build an Overhead Drive

By Jon Magill

Welcome to the first installment of a new department dedicated to ornamental turning (OT).

Like everything else in OT, and turning for that matter, there are at least a hundred ways to accomplish the same thing. That's true with this project, too, so read the following as general direction and approach it with your own ingenuity and available materials.

As those of you new to OT become more experienced, you will inevitably expand your arsenal of cutting frames and drilling spindles. See related article on *page 32*.

As a beginner (especially if you started with a rose engine), it is often sufficient to have a single motorized cutting frame. Over time, though, as you acquire more cutting frames to do more specialized tasks, you will want to easily switch between them. When you reach this point, you may want to build an overhead drive, as shown *above*.

The primary advantage of an overhead drive is one of economy. One motor drives all of your cutting frames and drilling spindles. I also appreciate that the motor is positioned farther from my face and ears while I'm turning.

This basic overhead is derived from an original design by English ornamental turner Paul Fletcher. Typically with a motor on the far end of the crane arm, that weight translates into belt tension, which supplies the traction necessary to spin the cutter on the cutting frame. Notches on the underside of the arm support the arm on top of a wedge-shaped pivot, the fulcrum for the whole arm.

These notches allow moving the arm forward or backward, which increases or decreases the belt tension. The upright support is a solid piece of ¾"-diameter steel rod. You could use galvanized pipe just as successfully. A number of holes drilled along the rod or pipe allows for adjusting the height. A simple clevis pin and a washer provide the support for the pivot to sit atop. Keeping the arrangement level isn't critical, but for the pivot and notches to work as intended, the closer to level it is the better (**Photo 1**).

A safety cord prevents the arm from toppling over if the belt breaks or comes off while you are turning. Using another clevis pin and cleating off the cord around it makes for a simple way to adjust it anytime you adjust the height of the arm.

If you use a single-speed motor, a step pulley will allow simple speed adjustments. A variable-speed motor is a luxury. If you use a variable-speed motor, I find it is helpful to still have at least two steps to keep the motor spinning within its optimal range (**Photo 2**).

The motor can mount with either a flat or L-bracket to the back of the arm. The length of the arm should be sized to fit your lathe and layout. The two bars that make up the arm spaced apart by the diameter of your upright, allow the upright to pass between them. This also makes for a simple mounting option for the pulleys at the end of the arms. A bolt passing through the two parts of the arm (with washers outside each pulley and one between them acting as spacers) will keep everything running smoothly. Sliding-glass-door wheels from the hardware store provide a readily available and economical pulley source, seemingly custom made for the round belting (**Photo 3**).

Belting for most applications is ⅛"-round urethane belting. This is bought in lengths cut to fit, with the ends melted together to form a continuous belt of the appropriate length. As shown in **Photo 3**, crossing the belt allows quick and easy reversal of the rotation. Depending on your arrangement, the belt can be crossed on top of the arm as shown, or between the arm and cutting frame. Install additional pulleys on the top of the arm to reduce any belt-slap common with longer belts.

The notches on the underside of the arm allow adjustment on top of the pivot block, which is supported by a clevis pin. The washer between the two allows the arrangement to rotate freely.

Even with a variable-speed motor, at least two steps in the pulley allow fine-tuning speeds. More steps would easily allow the use of a less expensive single-speed motor.

Two inexpensive sliding-glass-door wheels make perfect pulleys for the ⅛"-round belting. Crossing the belting provides a simple way to reverse the cutter direction.

HINTS, TIPS, AND Q&A

- Just like regular turning, cutting with the grain, or "downhill," will reduce fuzz. Many cuts overlap, so plan the sequence of cuts to eliminate tear-out and fuzz.
- Cutters must be sharp! You will never achieve a reflective cut off the tool, which is always the goal in OT, if your cutter isn't sharp. I once read that you can never get a better finish off of your tool than the finish on the tool itself. In other words, unless your cutter has a mirror finish, you cannot expect to produce a mirror finish on your work.
- Avoid using burrs designed for rotary carving. They rarely if ever leave a pleasing cut or finish. They also usually fall short of producing attractive OT patterns.
- Adjust the speed of your cutter to match your wood and the diameter at which you are cutting. A fast cutter will burn as it gets nearer the center (where the rotation of the workpiece is slower). Some woods are more prone to burning, and the cutter needs to be slowed for them. Maple is an example of a wood that requires a slower speed.
- The diameter of your cutter will determine the scale and detail of your decorations. Generally, smaller-diameter cutters allow decorations to be closer together with more details.

Send feedback, questions, and topic suggestions to jon@magill.com.