

Drill Frame Construction



This article describes the construction of a drill frame (which can be used for an eccentric cutter) made from a Freedom hand-piece.

For many years, I've used a Freedom rotary tool. After looking at the options for building a drill frame, it occurred to me that much of what I needed was already included in the Freedom hand-piece. There are a number of different hand-pieces made by Freedom. I used a model 44T (street price about \$50) because it included collets for 3 different

sizes: 1/4", 1/8", 3/32" (other collet sizes are available). It has the bearings already installed and pre-loaded and it's good for 18K rpm.

The construction involves adapting the hand-piece to an overhead drive, and attaching it to a quick release tool holder. I don't want to use the Freedom motor and flexible shaft to drive the piece, because it seems to couple too much vibration into the work. I used a mini metal lathe and a mini milling machine for this project, but creative people may come up with other alternatives for construction.

To cut down the hand-piece and expose the back of the shaft, I mounted the hand-piece in my mini metal lathe. I carefully turned off most of the back end of the hand-piece exposing the back of the shaft. Be careful to leave enough material to hold the bearings in place.



The exposed shaft is 1/4" diameter and hollow with a slot to fit the end of the Foredom flexible shaft. I made a 1" diameter pulley to press fit onto the end of the shaft. The hole in the pulley is slightly smaller than the shaft to allow for a tight press fit. (I used a "D" drill, 0.0246").

To mount the modified hand-piece to my tool holder, I used a 5/8" square piece of aluminum and milled one side to fit the tool holder (1/2" wide). Then I milled a slight groove in the side facing the hand-piece so that it would make contact at 2 points the length of the hand-piece for stability.

To mount the machined aluminum bar to the hand-piece, I carefully marked the position for 2 screws and drilled/tapped 2 holes in the hand-piece. Be careful to position the location of the screws so that the drill and the tap don't mess up anything inside (like bearings). Then drill and countersink 2 holes in the aluminum bar to match.

