Dog-Hole Clamp

The first two photos show the assembled clamp in operation. The fences and jaws of this version are made from 11/2" square stock, and are therefore too high for the at-hand carved work-in-progress saw handle I used for the illustration. This is not a serious issue, since everything is made from scrap and simple, cheap hardware, whose dimensions can be modified at will. The modularity of the system allows the stationary and movable appurtenances: fences, 3/4" dowel dogs and clamp jaws, etc., to be adapted to the needs of any particular carving project.

There are three assemblies. First is the monolithic, replaceable jaw. The face can be cut, sawn or carved to any shape needed to hold the work. The two screws are identical. The threaded rod is glued securely into the handles. The center block is a threaded nut attached to a dowel that drops into the table. The threaded rod rotates freely in the knuckle joint, and the knuckle joint rotates freely in the jaw.

The following photos show materials and construction details.

I used a 1-1/2" Forstner bit to drill the sockets in the jaw for the knuckle joints. This poplar jaw may well prove to not be strong enough, since the knuckle walls are only 1/4" thick, and I may have to build a sturdier one. The holes are on 4-1/2" centers.

The screws are built from four subassemblies, the rod, handle, nut and knuckle.

The handle is turned hardwood, with a brass ferrule, and a deep hole the same diameter as the threaded rod. I have described my methods for making handles elsewhere.

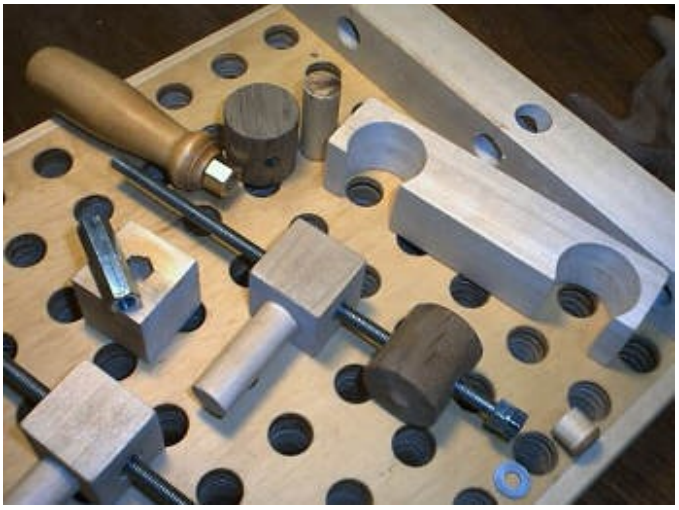
The rod is a length of all-thread with two nuts jammed onto one end. With a hacksaw, cut the threaded rod to length. Smooth the ends of the threads with a triangular or cantsaw file. I also run a die all the way down the rod, to make sure it operates freely on the nut. Thread two nuts on one end, and with a pair of wrenches, tighten them against each other. You don't want them to ever work loose.

The knuckle is turned from a length of hard wood. It must turn freely in the holes drilled in the jaw. Make the jaw first, and use it as a gauge when turning the knuckles. Cut the knuckles to length. You'll need a V-block for your drill press to get accurately centered holes. Drill a pilot hole all the way through, centered on the length. From one side, drill a hole the nominal diameter of the threaded rod (5/16" diameter). From the other side, drill another hole, about 3/4" of the way through the knuckle, that allows the jammed nuts to turn freely (use a 5/8" bit for 1/2" nuts). Insert the rod, drop in a washer that will act as a bearing against the end of the nuts, and glue in a wooden (5/8" diameter) plug. allowing enough room inside the joint for the rod and nuts to move freely. After the sparingly applied glue has dried, trim the end of the plug flush with the outside diameter of the knuckle. I use a block plane and sand paper.

The nut is assembled from a length of dowel, a square block of hardwood and a piece of threaded rod connector. For 5/16" all-thread, these are about 1-7/8" long. I made two nuts from one connector, by cutting it in two with a hacksaw. Alternately, you can use T-nuts. Drill a 3/4" diameter hole in the end of the block, most of the way through, and glue in the 3/4" diameter dowel for the dog. After the glue has dried, drill another 5/16" hole through the side to fit the all-thread. Centered on this hole, drill a 1/2" diameter to the depth of the half of the connector you made. To fit the connector into this hole without splitting the block, you will need to do a little carving with a veiner (V-groove tool). Center the end of the connector on the hole, and tap it with a mallet to indicate where the corners need to be carved. After cutting shallow slots all the way to the bottom of the hole, use the mallet to drive the connector into the hole.

Thread the rod and knuckle into the nut. The connector should face the knuckle, not the handle.

Finally, glue the rod into the handle. Epoxy, polyurethane, or PVA works. Alternately, Jorgensen uses a rivet in a hole drilled through the wooden handle and through the steel threaded rod.



Sometimes, it is more convenient to clamp the work down onto the table, instead of sideways between jaws. My original plan was to embed a matrix of threaded inserts into the top of the table so I could use my holddowns. Then I had an inspiration. One threaded insert could be embedded in the end of a dowel and the dowel inserted from the bottom of the table, if it had a head so it wouldn't pull through. I already had one that I could adapt.

Some dimensions of the one I built, provided as a benchmark for adaptation to your needs:

The table is 2" thick, glued up from three sheets of plywood, and framed in hardwood scraps. The

bottom fence is screwed and glued to the bottom. A single piece of wood would have worked for the front face and fence, but that would have made it a bit more difficult to drill the dog holes. The 8 x 9 matrix of dog holes are 3/4" in diameter, on 1-1/2" centers. The round dogs are cut from 3/4" diameter dowel, 31/2" long. The fences are 1-1/2" square. The threaded rod, nuts, threaded rod connectors and threaded inserts are 5/16"-18 NC. The threaded rods are 9" long. The holes in the handles are 3" deep x 5/16" diameter. The knuckle joints are 1-1/2" in diameter. The clamp jaw is 1-1/2" x 1-1/2" x 6-1/2” long.