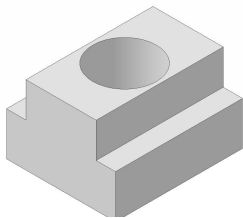


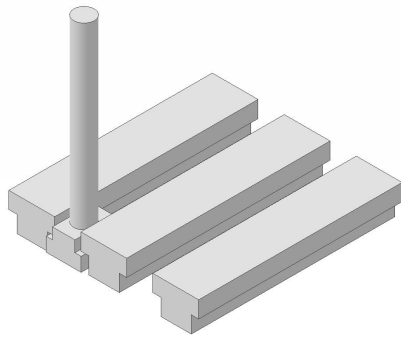
A "C-nut" for Clamping on a Mill/drill, version 3

By R. G. Sparber

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Let's start with what should be familiar. This is a T-nut. The hole is threaded to accept a stud. The T-nut slides into a T-slot cut into the table of a mill.



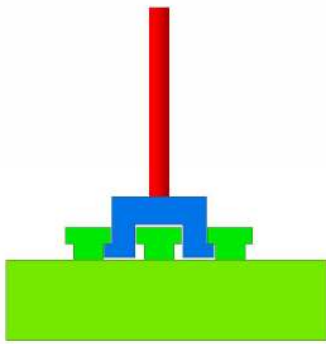
When used for clamping, there is an upward force that lifts the T-nut until it makes contact with the underside of the lips.



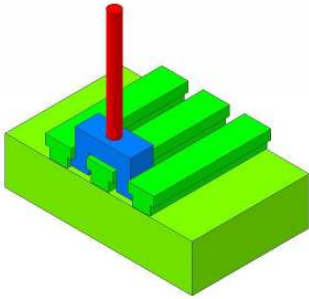
Here is a typical application of a T-nut, threaded stud, support block, clamping bar, and hex nut. The closer the stud is to the part being clamped, the larger percentage of the force is applied to it.

This arrangement permits the user to position the stud anywhere along the T-slot. *The problem I run into is when I need the stud to be located between T slots. That is where the "C-nut" comes in.*

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Here is an end view of a C-nut engaged into a pair of T-slots. The C-nut is blue, the stud is red, and T-slots are green. The C-nut straddles what I call an island formed by two T-slots.



The upward force passing through the stud lifts the ears of the C-nut and applies pressure to the lips of the T-slot. Ideally, the forces are identical to a T-nut. In practice there will be some bending of the C-nut so the ears are expected to bend slightly. This will put more force on the ends of the lips. I plan to run a test to see if this is a problem.

Just as the T-nut simply slides into the T-slot to provide an anchor point for the stud, so does the C-nut except that it slides into two T-slots.

A few variations to this design have already been proposed. John at the valley metal yahoo group suggested having 3 tapped holes to provide more choices for stud location. As John and I kicked around this idea, we realized that the part of the C-nut above the surface of the table could be taller to give more strength. The holes could be straight across or staggered. This depends on how wide the island is on a given mill. The Bridgeport I saw had rather wide islands. My RF30 mill/drill has narrow islands.

There are many ways to make the C-nut. The first is to mill it out of a block of metal. T-nuts are often cut from 1018 steel but if we used 6061 aluminum, it is possible that the C-nut would fail before it could damage the T-slot. This assumes that the user is severely over tightening the nut that pulls up on the stud.

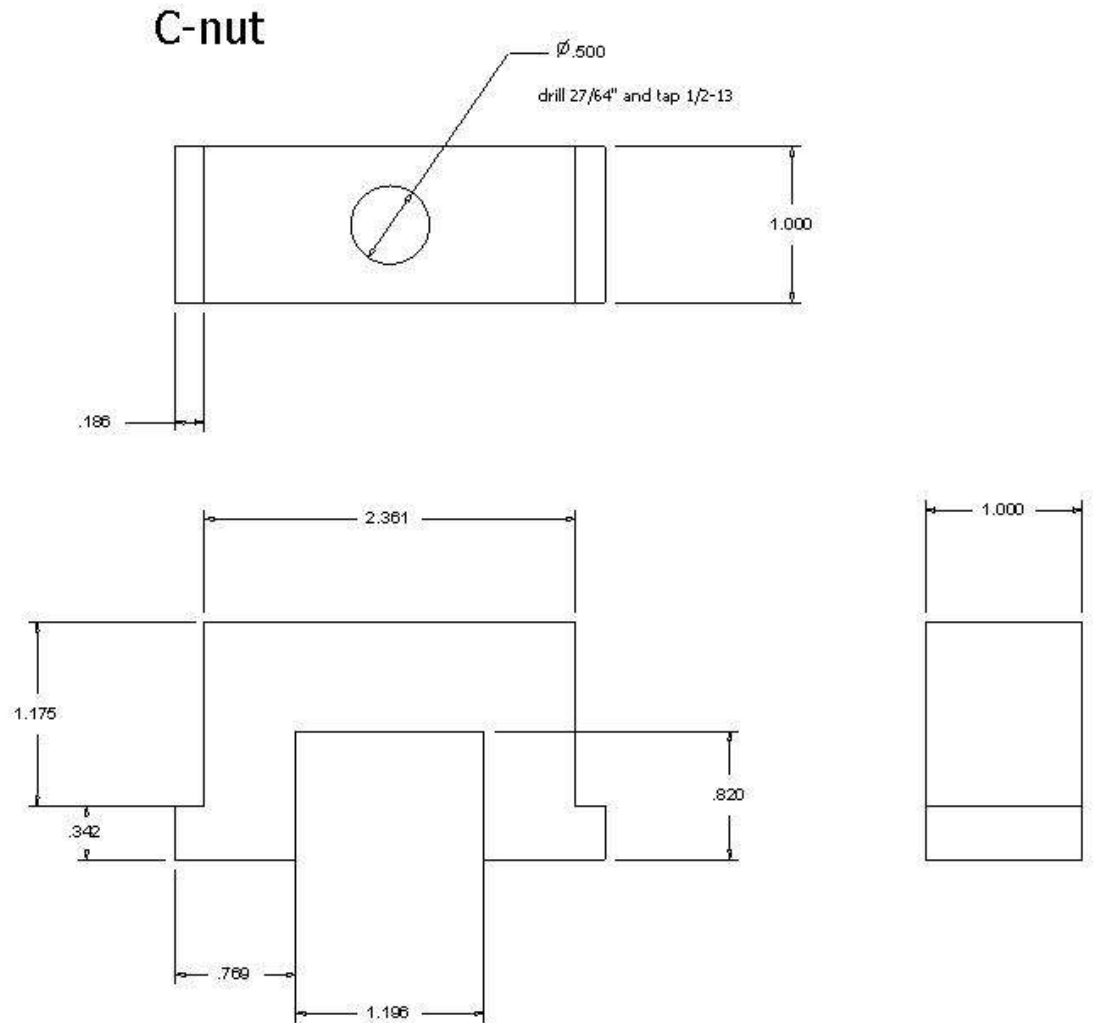
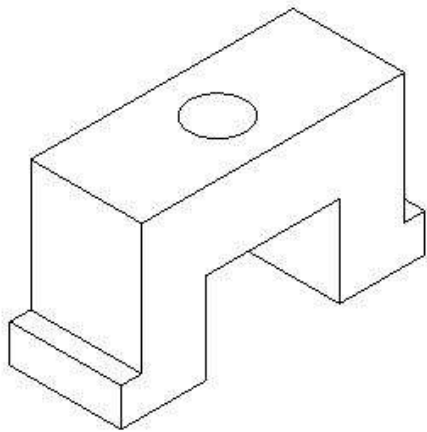
Originally, the ears pointed inward making this a difficult machining task. But William from the mill_drill yahoo group made the brilliant observation that pointing the ears as shown above simplifies the milling task.

Another means of making the C-nut would be to use steel and weld three parts together. The parts sitting in the T-slots would still need to be machined but there would be far less waste.

A variation on welding is to bolt the parts that fit into the T-slot to the horizontal part. If one bolt was used on each side, it would be possible to let the parts that contact the T-slot lips to pivot slightly. This would eliminate any problem with poor contact between ears on the C-nut and lips on the T-slot.

And finally we could cast it out of aluminum. It should be possible to even cast in the threaded hole. Then a clean-up cut on the ears and maybe a quick run through with a tap would complete the job. There would be no waste with this approach and it would be easy to make a number of them at once. Cast aluminum is weaker than rolled aluminum which might be an advantage if the user is concerned about breaking out a T-slot.

The next step is for me to make a C-nut that fits my mill/drill.



I will adjust the 1.175" dimension to fit the stock I have on hand.

I welcome your comments and questions. All of us are smarter than any one of us.

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