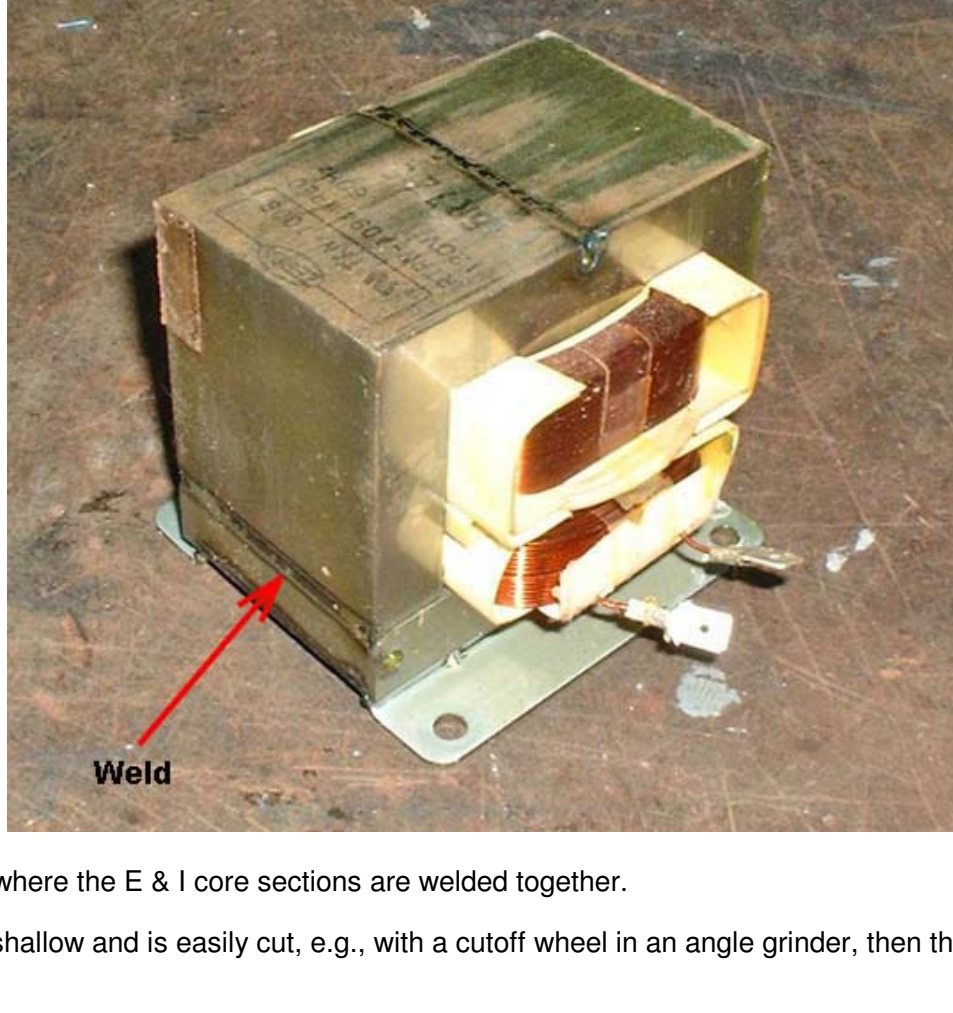


Fun with MOTs  
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6/22/08

For the HSM'er, microwave oven transformers (MOTs) have a number of very desirable attributes:

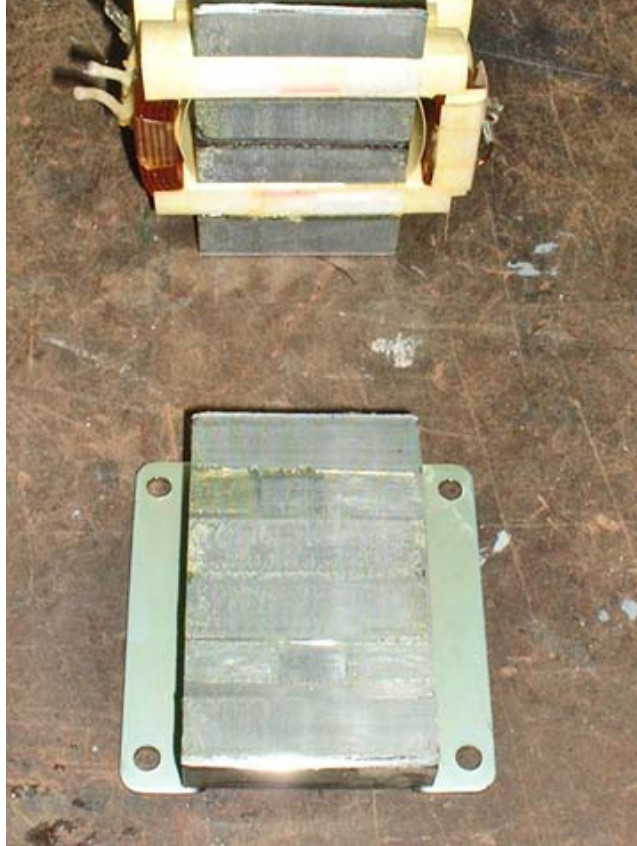
- they are readily available, free, from discarded microwave ovens
- they have decent power (around 1.5kva)
- the coils are wound adjacent to each other, not concentric
- they have non-interleaved E-I cores

A typical MOT:



"Weld" indicates where the E & I core sections are welded together.

The weld is very shallow and is easily cut, e.g., with a cutoff wheel in an angle grinder, then the E and I sections separate:



this is only possible because the sections are not interleaved.

Then the coils can be "slid" off the core, although they tend to be quite tight. I used an old woodworking chisel to pry this primary coil off and just managed to not damage it:



This secondary was more troublesome:



The stripped core:



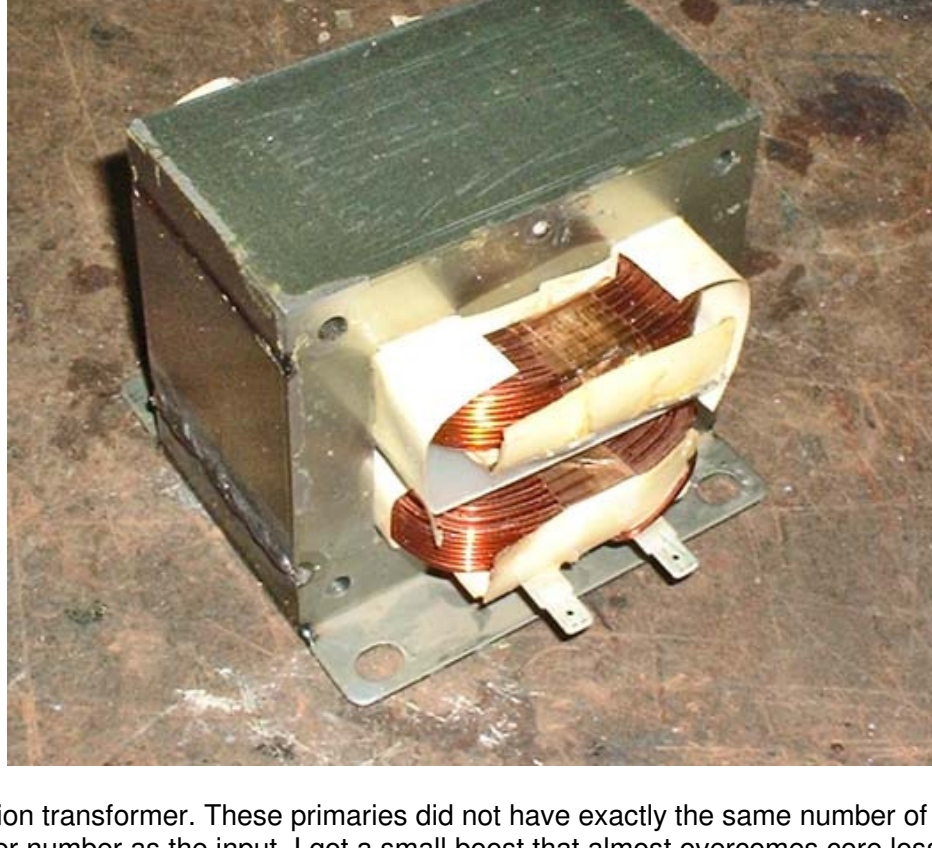
Having the core split makes it very easy to wind a new secondary. It can just be wound around the core, or wound on a mandrel and slipped onto the core. A very professional looking coil can be wound using a lathe or drill press. If the core isn't opened, winding a new secondary means passing the wire back & forth through the core openings, an exceedingly tedious task for secondaries with significant turns.

Here I've wound an 18v secondary to drive a 18v cordless drill motor:



I've also rewound a MOT with 2 new secondaries: a 15v & a 65v. This was for an EDM machine that is YAUP (Yet Another Unfinished Project). The new secondaries took about 1 turn per volt, trial & error being used to zero in. When the cores were re-welded I clamped them very tightly to minimize any air gap between the E and I sections.

If you can find 2 MOTS with cores that have the same size center section, you can put both primaries on one core:



and have an isolation transformer. These primaries did not have exactly the same number of turns, so using the one with the smaller number as the input, I got a small boost that almost overcomes core loss (120v in gives 116v out).

This seemed like a Great Idea and it works fine, except that the core gets very hot! Too hot to touch. The temperature stabilizes and it doesn't smoke, so I live with it and am careful about not touching it. I don't understand why this would be, unless in the microwave it gets just as hot, but we don't know it.

I don't always mangle the secondary in getting it off. Here's one that came off whole and to which I added a cord, making a demagnetizing coil:



With 120v on the coil that produces 2000v as a secondary, the current is an amp or so. You cannot use a primary coil this way - the current is very high. IIRC, a voltage of about 12v is the most that I could use on an exposed primary.

Before I figured out that the core sections were non-interleaved and could be separated, I sawed a MOT in half to make an electromagnet for use as a magnetic vise (using the secondary winding):



The box has an autotransformer and a bridge, and there's a piece of angle welded to the bottom of the core, for holding in the vise.

This was not as useful as I hoped it would be, but still gets used to hold odd-shaped stuff for layout and tack welding. The main problem is that the magnetic field grabs the tools and wreaks havoc with the MIG arc. And it is not strong enough for work holding. E.g., sawing or filing. The work is held down, but twists pretty easily. I've thought about putting 2 secondaries on a core, but haven't got around to it.

A couple of other MOTs that I sawed in half were used as magnetic vises for welding and plasma cutting:



These are more useful and their use often eliminates clamps entirely. Especially when plasma cutting largish pieces of sheet. Having 2 of them keeps the work from twisting as it does with one.