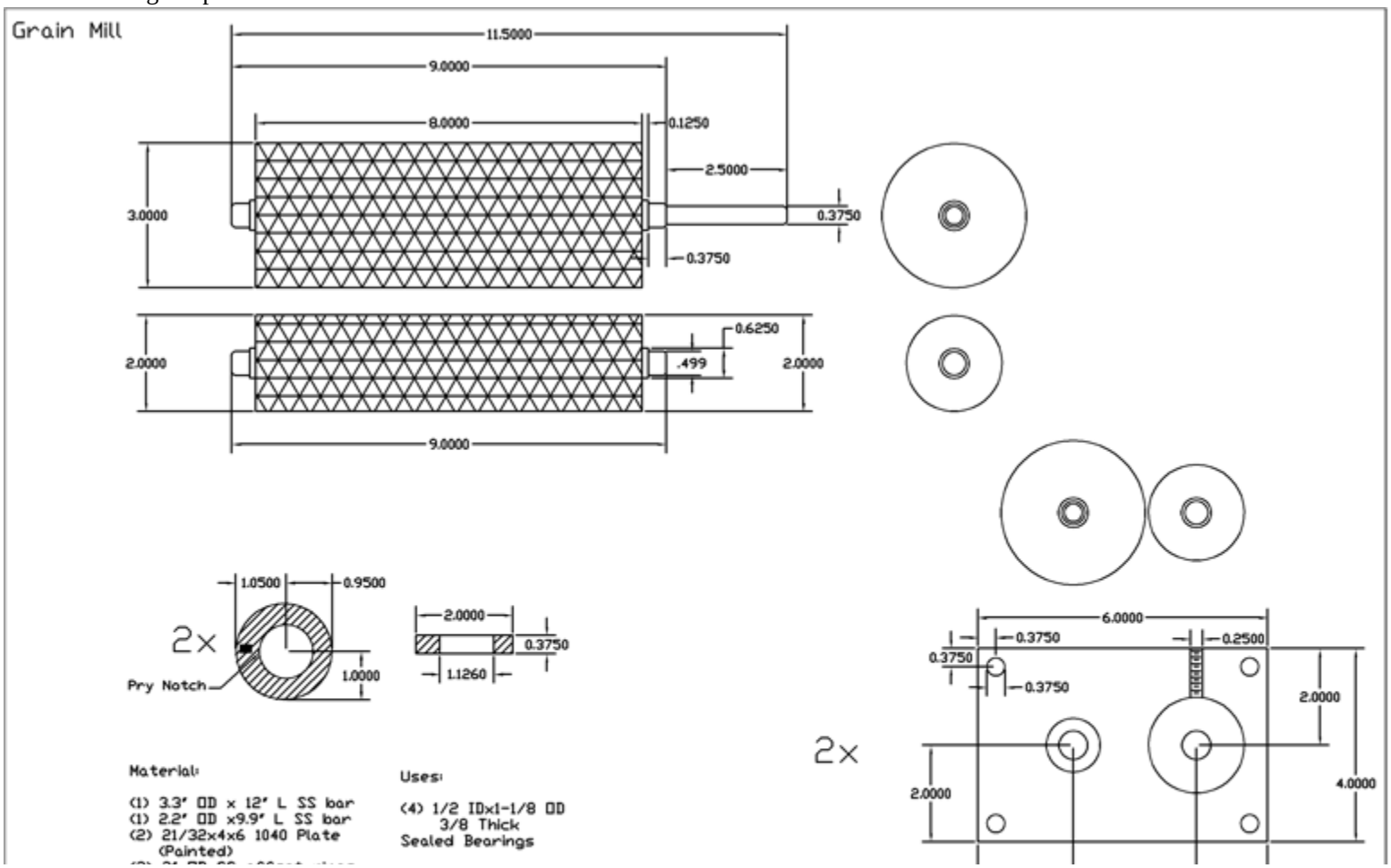
My Grain Mill

Okay, so argue all you want about all grain beer being better flavored than extract beer. That was not my goal behind going minimash/all grain. My hopes are to reduce the cost of making my beer. Buying grain alone can save you a significant expense. This grain can be premilled and you can use it the next time you brew. However, once you start buying in bulk (55lb sacks) your savings are significantly reduced from grain by the lb or extract purchases. However, some suppliers will not mill your grain for you in these quanities (although many will). The significant problem if you're only brewing 5 gallon batches is grain freshness. After the grain is cracked the exposed starches absorb moisture from the air much easier than uncracked grain. So to save money, it's best to mill your own grain.

Grain mills are terribly expensive. For a mill like mine you could expect to pay $100-150. That's a large expense for a beginning brewer. I do have metal scrap available at work at a convient price. However the steel we work with is carbon steel and would not work for the rollers. So after about 2-3 weeks of searching we were able to find some stainless bars left in our scrap dumpsters by other branches. I was asked why I have one bar larger than the other. I have seen many designs that work this way, but the major reason is turning the bar down is a lot of work. I wanted to minimize the time it took to build the mill to minutes rather than hours. It's lucky I did as the mill took about two months from starting the project since only spare off the clock time could be used.

Here is the original print I drew:



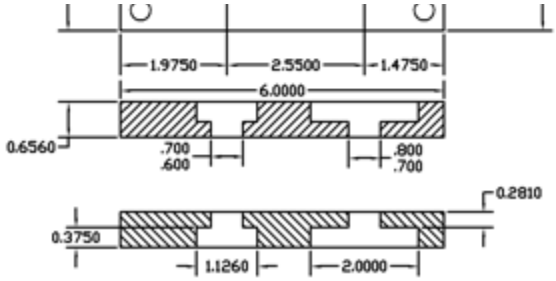
(2) 21/32x4x6 1040 Plate (Painted)
(2) 2" OD SS offset rings

3/8 Thick Sealed Bearings

(4) 3/8x10"+ Allthread

(16) 3/8 Nuts One on inside and outside?

(2) 1/4-28 Setscrews



I believe the only major design change from the print was the bars that hold the side plates together. They ended up being made out of bar which is MUCH easier to deal with than the allthread would have been. You'll see I used some inserts that have offset bearing holes so when spun they adjust the roller spacing. I wish I would have done it inverted to make adjustments easier, but once again I wanted the construction to be fairly simple. The light knurling should be just enough to pull in the grain without shreding it.

Here is all the pieces taken apart:

The mill easily goes together in a matter of seconds. I ended up priming the carbon steel and washing the rollers after my first experiment. I'll probably use it a few times before I actually paint it. I'm thinking a nice chrome would look nice with a clear finish over it. I'll probably wait and get the cheapest paint I can find, once again reducing cost. The stainless rollers will never rust, but the rest of the body might not like moisture.

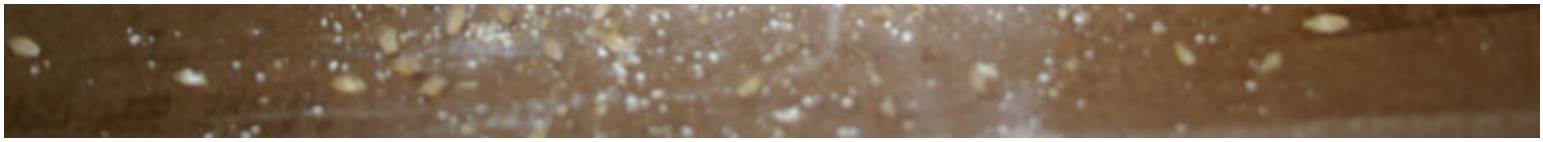
The grainmill put together:

This puppy weighs in at 35 lbs. It's pretty heavy and I haven't built a hopper or collection bin yet. I think I'm going to use a large aluminum pot I have for the bin and mount this directly to the lid. The hopper I plan to make out of a thin wood.

Here's a video of me using it (from daughter's TOY camcorder):
Grain Mill Movie

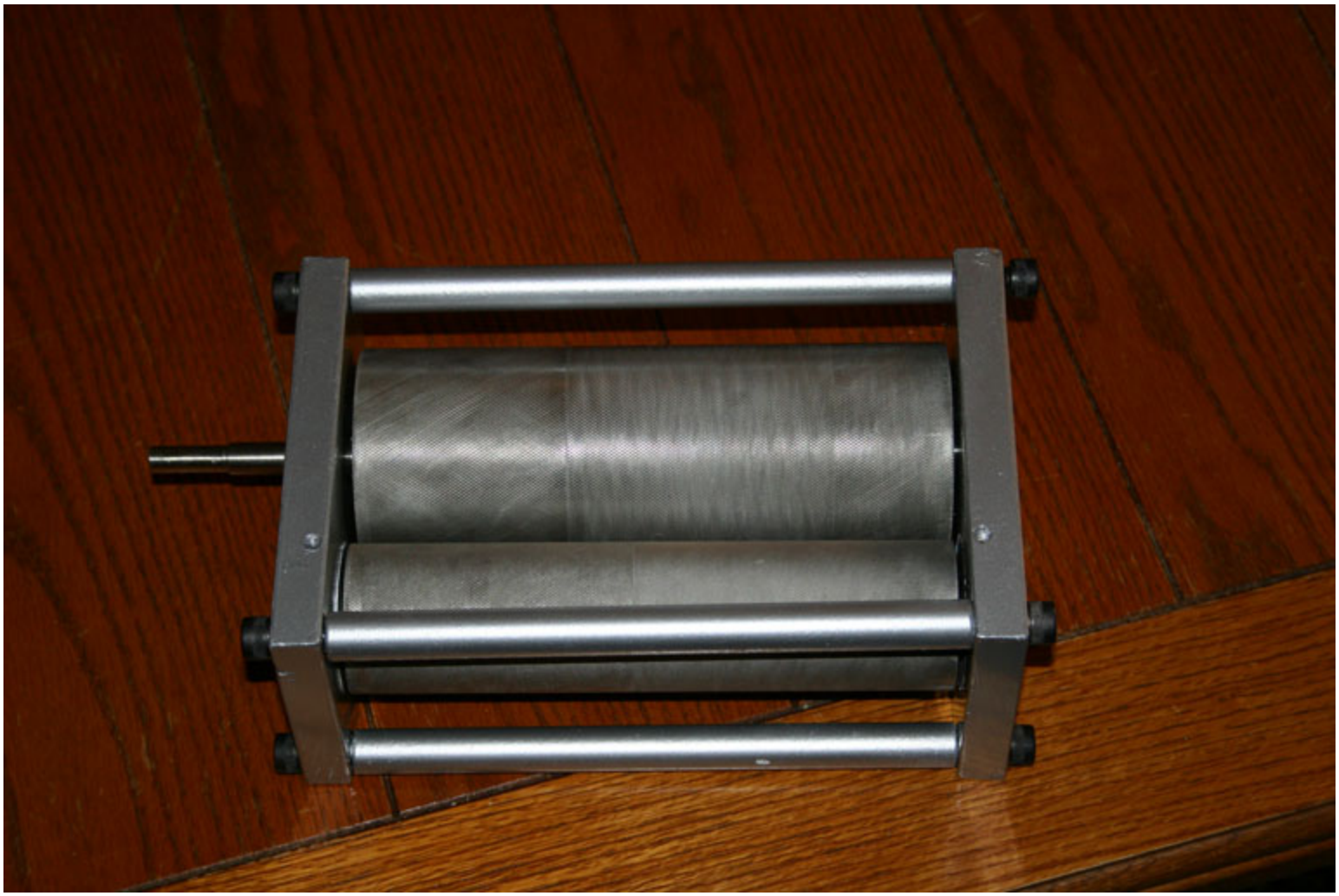
The mill is adjustable, but might need to be able to adjust it more.
It's hard to imagine how well it keeps the hulls together. If you try to crush the grain with plyers or your fingers, you can't help but distroy the hulls.
I might need to make a more extreme offset so I can make larger spacing later, but we might have to wait till after the first mash to see how well the current setting works.

Here is the grain at the first setting I was happy with:



I'm excited it's finished. I haven't brewed a batch in over a month hoping this would be completed sooner. The current setting mills the grain pretty fine. Hopefully my process won't end in a stuck mash/sparge.

My first batch went great! PERFECT, actually.
I painted the mill after the first batch too (while I was doing my mash).
I went with a chrome + clearcoat color so it wouldn't be too bright from the rollers.
Obviously chrome spraypaint ALWAYS turns out just silver, but that's what I was going for.



I still need to make a better hopper. The first one from cardboard was too high away from the rollers. The second one out of wood was too tall. I have more cardboard now (lighter) so I'll hopefully give it another try this coming brew weekend.

2/25/05
Well I used my mill for the second time. I liked the design I played with cardboard this I think this will be the same shap when I make it out of wood or metal. Hell I might just stick with this, it worked so damn good. Well you're going to want pictures:

These pics were taken with batch 15 for my oatmeal stout.

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