The Tools
Recipe Generator
Recipe Calculator
Final Beer Analysis
Your Account
Register
Modify Account
Delete Account
Upgrade to GOLD!
Features
Brewing Tutorial
Recipe Library
Home Brewing Books

Homemade Grain Mill

by J. Fowler

One of the more costly pieces of equipment for the home brewer is the grain mill. If you have more time than money, perhaps you might consider making one yourself!

As is the case with most home brewers, I like to make stuff. After all, it takes more to be a home brewer than a simple love for beer. Unless, of course, you do it to save the money; but this article is aimed toward those who pride themselves in the fruits of their labor.

There are a few grain mills available on the market for home brewing use that range in price from about $80 to over $150. The Corona style mill which can usually be obtained for about $30, tends to be inferior to the roller type mills. Roller type mills crush the grain between two rollers or between one roller and a steel plate as in the Phil Mill. These mills are adjustable allowing fine tuning of the grind.

I didn't want to settle for a cheap mill, but I didn't want to pay $150 for a good one either. So I decided to design and build my own.

Finding the Parts

Rollers and bearings are the central parts of the mill and were the ones that I looked for first. The rest of the mill chassis is designed around these parts. Since having a machine shop create the rollers defeated the cost effectiveness of building the mill myself, I looked for another option.

What's New?
Try our 30 second survey!
Your input will make BeerTools.com a better site!
Recent Recipes
American Beauty VI
BARTS BEARD
Helles '06
oat cream ale
BROWNING
NIGHT OUT
Toasty Ale '05
Two Handed Ale
Helles Bock 115-05
Combo Ale No.114 '05
Last Forum Post
Determining Vessel Heat Capacity
(0 replies)
Tip
If you do this ... you will almost definitely contaminate your beer!

Commercially made roller type mills use stainless steal knurled rollers. Since these rollers have a knurled surface, they can use a smaller diameter roller while pulling grain through the mill with the rough roller surface. Since I would have to depend on a machine shop for knurling, I wanted to avoid knurling if possible. Smooth rollers needed to be larger in diameter. Larger rollers can pull grain between them without the use of a knurled surface. Using this method required that the rollers be at least 4 inches in diameter which made the use of stainless steal or any other metal impractical. I chose to use wood instead.

The wood could not be a soft wood such as pine or fir because such woods could not hold up to the stresses involved in crushing grains. I chose to use hard maple for my rollers. In order to get the 4 inch thickness I needed, I glued and clamped maple boards together. Then I cut the assembly to size on the table saw and cut the corners lengthwise at a 45° angle so I had less material to remove when rounding the rollers.

I got away with using wood to create the rollers, but the same could not be achieved with the bearings. The bearings were purchased from an industrial supply distributor for about $5 a piece. Four bearings were used in the assembly.

Wood could not be used for the axles either. 1/2 inch steal rod served this purpose, which was the inside diameter of the bearings, thus no additional machining was necessary for the axles besides drilling the hole to insert the key. Since the mill is driven by a crank, a key was used to prevent the roller or the crank from spinning around the axle. A hole was drilled perpendicular through the axle with a 1/4 inch rod inserted in it. One key locked the roller, another locked the crank. Only one roller is driven and the other spins freely.

The crank was made from maple, and fitted with a round knob found at Home Depot. A 1/2 inch hole was drilled so the crank could be mounted and clamped to the axle.

Designing the Chassis

The chassis was built out of maple as well. Essentially, the chassis is a wooden box that holds the bearings in place, within which the axles turn. I wanted to be able to adjust the distance between the rollers in order to fine tune the degree of crushing. This required that one roller be movable, and the logical one to choose was the roller that spun freely.

The chassis was designed with a slider which has grooves that lock into the main frame. The slider holds one set of bearings, and the main frame contains the other set. The slider is adjusted using two bolts which are tightened to draw the slider assembly further into the main frame. This results in a smaller gap between the rollers.

To help keep the movable roller in position, springs were inserted between the slider and the mainframe to keep the slider under constant tension. Four bolts through the ends of the box hold the main frame together. Two bolts hold the three pieces of the slider together.

Shaping the Parts

The rollers require an accurate and perfectly round surface that is centered on the axle. In order to achieve such precision, I drilled the 1/2 inch hole for the axle before rounding the rollers. This allowed me to insert the axle and place the roller in the bearing assembly. I took this assembly and placed it on the router table with the fence set so that the router bit was centered on the roller. I clamped everything in place. The bit height was set to the final diameter of the roller, and I manually turned the roller over the bit to remove the material. I used a 1/4 inch straight bit, so each time I turned the roller a full turn I then moved the roller over 1/4 inch. I repeated the process until the roller was completely resurfaced. Doing it this way, I have completely wobble free rollers!

The bearings had to be fixed to the walls of the chassis somehow. I decided to rout holes in the main frame and the slider. I made an adjustable circle cutting router base for this purpose since these holes would have to hold the bearings snug. I did some tests in scrap to find the correct diameter and then proceeded to cut the holes in the frame. The holes go only as deep as necessary, and not all the way through so the bearings are hidden.

The rest of the parts were cut on the table saw and drilled with the drill press. The sides with the bearings are built from three pieces each. Two pieces feature the track that the grooves of the slider slide on, and the other piece contains the bearing to which the track pieces are glued.

Testing the Mill

To my delight, the mill worked! It achieved a grind just as good as the quality achieved by commercially available grain mills. There were two things I noticed were lacking though; a mounting surface and a hopper. The mill requires quite a bit of leverage, and mounting it to a fixed surface would make grinding much easier. Also, without a hopper it is necessary to have a friend available to pour the grain as you grind.

While it is not a project for the faint of heart, building your own grain mill is certainly a rewarding way to add to your collection of “brew ware,” and a way of bringing you one step closer to brewing beer that is truly your own.

Site design by