

My grinder is designed straight from The \$50 Knife Shop by my mentor Wayne Goddard (with a few modifications).



Wayne told me that a two wheel grinder has the most torque. Each additional wheel added to the system reduces the grinder's efficiency. By bolting the frame together rather than welding (not one of my specialties at that time), the frame can be adjusted when it's not aligned.

I found a 220V, fully enclosed fan cooled 3450 RPM motor at a farm sale and bolted it to a large box tube.

I could not get any cart wheels or hand truck wheels to run true, so I turned a 7" wheel out of two pieces of 1" oak laminated to 2". There is no crown on this wheel.



I bored a hole with a Forstner bit in the center of the wheel where the wood lathe left the index points. The motor shaft had a keyway, so I cut a slot in the wood, starting with my sawzall and finishing with a narrow chisel. The wood drive wheel wanted to wander on the shaft and I did not want it to fly off the end. I drilled and tapped the motor shaft, and bolted a large washer on the end of the shaft. This kept the wheel from flying off, but not wandering. I drilled and tapped the wheel opposite the keyway. Inserting a long alan set screw into the hole and tightening it down helped, but still didn't stop the wandering until I drilled a recess into the motor shaft for the set screw to tighten into.



freezer to get it through the bearings.

The idler/tracking wheel is a different story. 2" thick oak, turned to 4" diameter was a good start. For the 2"X72" grinding belt to track straight and adjust from side to side, the idler/tracking wheel has to be slightly crowned. Since it was still on the wood lathe, working a slight crown with a file was easy.

This wheel has to turn freely, so high quality bearings are in order. I selected two bearings with an inside bore of 5/8" because my "shaft" is a 5/8" diameter bolt. I recessed both sides of the idler/tracking wheel using a Forstner bit so that the bearings were a tight press fit and still slightly above the sides of the wheel. Oops! The standard grade and grade 8 bolts were slightly too small. They rattled slightly in the bearings. Success! Galvanized bolts were JUST enough larger that I had to LIGHTLY sand it and throw it in the



I tried a couple different tracking adjustments that worked (poorly). This system works well.

I ran a nut down on the 5/8" bolt until the large body washer was snug on the inside bearing. Add some washers to the bolt to place the idler/tracker wheel over the drive wheel. I drilled the aluminum block (it's what I had about the right size) for the 5/8" bolt near the top and front to back for a 1/4" bolt for a pivot. This allows the Idler/tracker wheel to move.



Double nut the end of the 5/8" bolt on the back side of the aluminum block.

I attached an "L" bracket to the back side of the aluminum block and drilled a hole through the bottom of the "L". The tracking screw is double nutted above the "L", a spring is placed below the "L" to keep upward tension on the "L". The "L" bracket below the spring is drilled and tapped so when the tracking screw is turned, the whole aluminum block with the idler/tracking wheel pivots up and down. When the belt is running, this pivoting of the idler/tracking wheel makes the belt move side to side over the platen and drive wheel.

You may notice extra holes in the top pivot arm. Failed attempts!



This whole idler/tracking mess is mounted on top of the top pivot arm that is attached to the mast. A strong spring on the end of the top pivot arm gives the tension needed to make the belt keep traction on the drive wheel.

I was having problems breaking belts, which Wayne diagnosed right away. "The belts too tight. The tension is right when you hold the drive wheel stationary you should be able to slide the belt with some resistance." A chain and a hook for adjustment of the tension solved the problem.



A “U bolt” attached the receiver for the platen. I found that I needed to adjust the receiver tube to align the platen. A thin wedge of wood on the back side of the mast took care of the problem. The receiver type set up makes adjusting the platen against the back of the belt very easy. Loosen two bolts and push and pull the platen against the inside of the belt. The platen is not ideal, but it works. It should be made of heavier material so it won't heat up as fast. The 12” platen gives me lots of working surface while still allowing for a long slack belt area above and short slack belt area below the platen.

One of the things that Wayne talked about was not having straight lines in a knife blade.



Curves, however slight are more pleasing to the eye. Straight lines tend to create a stopping point when looking at the knife rather than allowing a continuous flow.

Taking this to heart, how is the easiest way to create a consistent curve in the clip and spine of a Bowie in particular?

My answer, curved platen adapters.

I started out with a 2X4 on my band saw to rough out the shape. I used an adjustable auto body filing tool as a template to set the curve. This is a tool with handles and a plate that has a turn buckle on the back to create a wide variety of curves in auto body repair.

With this tool I am able to create numerous different radius for different platens. It is very easy to build the wooden platen, so making a new one with a different radius for a new knife is not hard. I typically use two different wooden platens on a knife blade. One large radius platen for the spine and a smaller/tighter radius platen for the clip. I currently have made 4 different wooden platens that serve for most larger knives.

In this photo I used two sheet rock screws at the top of the wooden platen to hook over the top of the metal platen. The belt tension holds the wooden platen in place without further clamps.

I was not sure how long a wooden platen would last, but they have held up well over several years.



Another different platen attachment is a felt platen. Wayne used a harder felt than I had, but mine seems to work.

Make sure to use wool felt because the friction of the belt running over the felt would make synthetic felt melt.

I used contact cement to glue one 1/2" layer of soft wool felt to a piece of thin stainless steel. I formed a lip at the top to slip over the top of the platen and two tabs on the sides near the bottom to keep the felt platen in place.

I use this platen for a couple different applications.

First, the felt gives a firmer surface than a true slack belt, but enough give in the surface to allow a very controlled convex grind to a blade.

The felt platen behind an A30 Trizac Gator (600 grit) with a light touch and slow side to side motion leaves the blade with a nice satin finish.

Advantages to this belt grinder.

It's simple! If you have ANY scrounging abilities, you can build this grinder for very little.

It can be changed or rebuilt or parts replaced with ease since you made most of the parts yourself.

It's got power! A 3 HP motor MAY be a little overkill, but its what I found cheap. I have tried to stop a 36 grit belt by pushing a piece of truck leaf spring into the belt with all my weight. All that happened was the spring got shorter FAST.

It's got speed, between 5000 and 6000 belt feet per minute.

Disadvantages to this belt grinder.

It's got speed! You will learn to use a light touch when grinding. At this speed it seems to glaze the belts quick.

It's got ONE speed. I have worked on a couple variable speed belt grinders and they are easier to control and more versatile. However if you are daring and get used to this type belt grinder, you can use any type grinder.

it's harder to adapt this grinder to some of the common accessories used on some commercially made belt grinders.

There may be things I could do easier with a commercially built grinder with all the attachments. Since I am ignorant for these advantages, I do what I can with what I have. I grind "freehand", without a guide or rest. It's just the way I learned to grind blades. There are even some silly people that think some of my knives are almost acceptable.

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