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Project: Wooden Jack

Overview: This wooden example of a jack is used to demonstrate how the rotating of a crank can rotate gears and in turn move a rack up and down; raising and lowering the toothed rack. A beginner project to help understand gears to move into larger and more complicated gearing projects.

Materials: 3/4" plywood, 6" of 5/8" dowel

Minimum Cutting Area: 39" x 48"

Bit Size: 1/4"

Finishing: Using a spray polyurethane works best for getting inside the gears. This can also be sprayed over all of the other parts before assembly has taken place. Also consider painting parts different colors



Always read the entire project details before starting to cut the file yourself

Account for the thickness of the physical material on hand and the material thickness in the file

This file is zeroed to the tables surface, Zero your bit to the tables surface



Included with the cut file is a hold down tool path that shows where it is safe to put screws. Run this file separately from the cut file so you can screw down the work piece, or if you have a different size board or different type of hold down disregard the file.



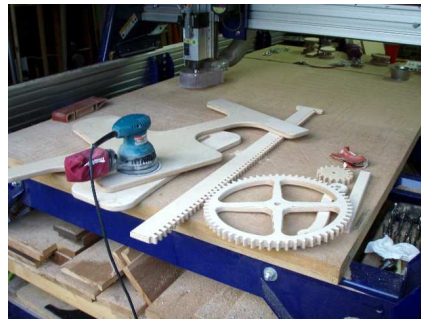
As the file starts cutting the profile of the parts make sure the cut is going all the way through the work piece and into the table surface. If you need to adjust any part of the file make sure you do not remove the hold down or you will lose position.



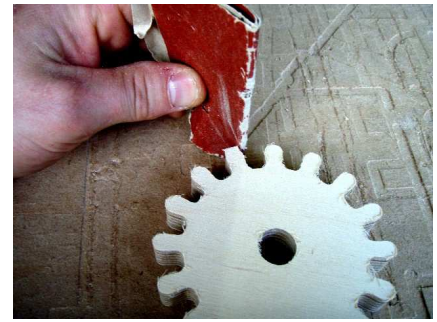
Tabs are used to hold all the pieces to the scrap wood attached to them. Use a utility knife to score these edges. Never try to push a piece out without cutting the tab, it will tear the grain on your project. Sand remaining tab flat.



Not all of the pieces need to be routed. However the base, handle and main vertical piece will look great with a round over edge.



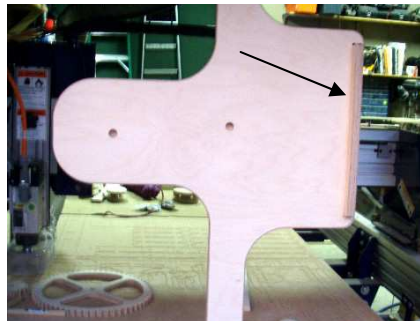
All flat surfaces should be sanded on both the face and the edges.



To help the gears flow smooth with one another a piece of hand sandpaper is all that is needed to touch up the edges.



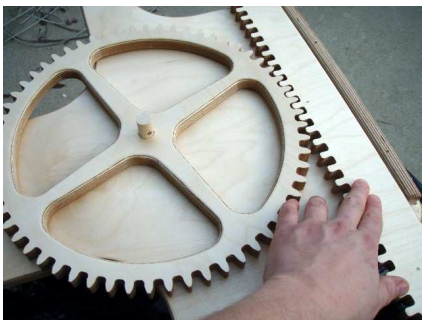
Spraying all of the parts before assembly eases the finishing process. A clear coat of any polyurethane will work great for a finish.



First glue the rack support into its pocketed slot.



Depending on the thickness of your plywood is how long one will cut the dowels needed for this project. This does not need to be exact, just what works for your project. Note to leave the one longer for the handle that goes on the small gear.



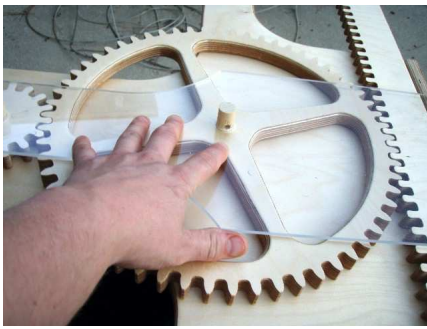
Place the two gears and rack into position. Double check they spin with each other, the next step will be fastening them into place.



Note the lengths of the dowels in this picture. The left one is needed to be left longer so a handle can be fit over it. It is always a good idea to dry fit parts before gluing.



Cut the Plexiglas with the included file. Hanging on to scrap pieces or drops really benefit for projects like this.



Push the Plexiglas into place.



Measure, drill and insert some smaller dowels to help keep the plexi in place over the gears.



Pilot hole two holes into the Plexiglas over the rack support.



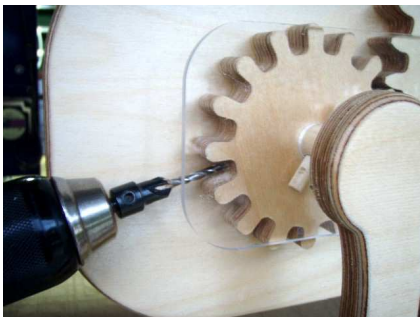
No more than a 1/2" in length screw is needed for these two holes.



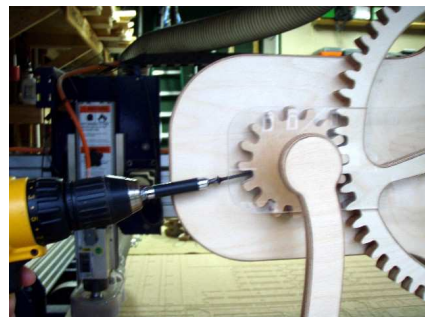
Apply some glue and insert the handle. Use glue on the end of the handle that is not a through hole. The through hole will be used as the physical handle that turns the gears.



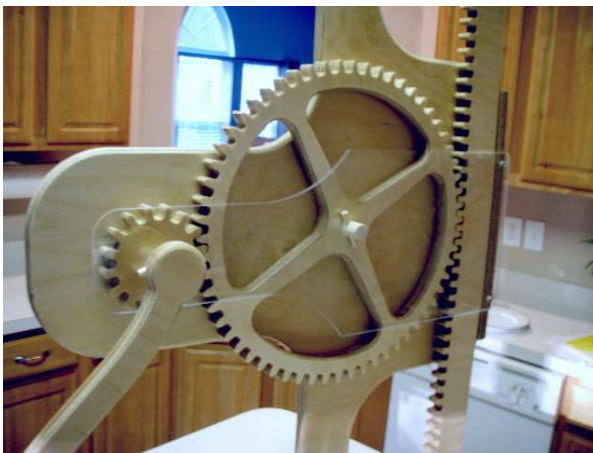
Glue in the dowel handle. Add a brad nail for extra strength.



To ensure these gears turn correctly, add a countersink into the smaller gear.



Run a screw all the way in so that the head does not interfere with the gears.



Use this project as an introductory project to the world of gearing. There are many different type of gear teeth and different gear ratios product different results. There are several gear calculators available online where CAD type gears will be generated and can simply be brought into the software.