

AROUND THE MAKER WORKSHOP, BROUGHT TO YOU BY DREMEL

By John Edgar Park

» Lay siege to your coworkers (or the house pets) with this desktop catapult.

Let's face it, nobody needs a medieval siege weapon on their desk. Or do they? I recently decided that the lack of catapults in our brainstorming sessions at work was negatively impacting our ability to be creative. So I decided to remedy this. My friend Bill Gurstelle is the dean of siege weapons, so I chose to build a modified version of the Roman onager-style catapult from his book *The Art of the Catapult*. Using only pine, twine, pegs, glue, and a re-purposed night-stand drawer pull, I was able to build a great looking, fun, and functional desktop catapult.

Directions

Step 1: Cut the 1"x1" pieces to length, using the wood blade on your oscillating tool (Figure A). You'll need two 10" lengths for the frame sides, two 4" lengths for the frame cross members, and three 4" lengths for the uprights.

! WARNING: It's always important to use safety goggles or safety glasses when operating any power tools. Work in a well ventilated place and wear a dust filter to avoid breathing in particles.

Step 2: Cut the 3/4"x3/4" upright supports to length; two 4" lengths. Then, measure and mark each end for a 45-degree angle cut. Clamp each piece in a bench vise and make the cut (Figure B).

Step 3: Next, switch to the sander attachment on the Multi-Max and sand down all of the pieces until they're smooth (Figure C). I also beveled the edges slightly.

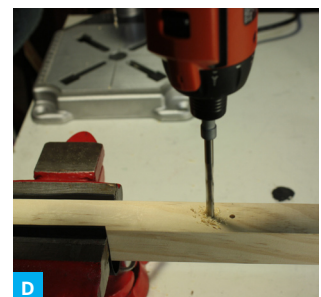
Step 4: Before you construct the frame, you'll want to drill two holes in each 10" frame sidepiece. These will be for the twine torsion spring and stop pegs to hold the turning pegs in place.

Mark a centered point 5" from the left end (what will be the front of the catapult), and another at 5 1/2" from that same end. Drill the 5" mark with a 3/16" bit, then drill the 5 1/2" mark with a 1/2" bit (Figure D). Repeat for the other 10" frame side.



MATERIALS AND TOOLS

- » **Dremel Multi-Max oscillating tool** with wood blade, sander attachment, and sanding pads.
- » **Drill or drill press** with 1/8", 3/16", and 1/4" bits
- » **1"x1"x48" length of pine.** You'll use 40", but it's good to have extra for error and kerf.
- » **3/4"x3/4"x10" length of pine.** You'll use 8".
- » **3/4"-diameter x 8 1/2"-long wooden dowel.** Sold in various lengths, you'll cut to size.
- » **3/16"-diameter wooden dowel.** You'll need to cut four 1 1/2" lengths.
- » **1/4"x1 1/4" hardwood fluted dowel pegs (20)**
- » **Small bowl, tablespoon, or other suitable projectile cup** 1 1/2" diameter, with screw for mounting
- » **Wood glue**
- » **Clamps**
- » **Twine**
- » **Wood stain and foam brush (optional)**
- » **Carpenter's square with 45-degree angle gauge**
- » **Dust mask**
- » **Safety goggles**



Step 5: Glue and clamp the 1"x1"x4" cross members in place (Figure E). These should be 1½" from the front end (nearest the smaller ⅜" peg hole), and ¼" from the back end (nearest the larger ½" hole).

Step 6: After the glue has dried, you'll drill holes for the fluted pegs. Measure and mark a point centered on the end of each cross member (four in total). Drill these with the ¼" bit to a depth of 1½" (Figure F).

Step 7: Since my pegs were tapered, and I wanted a clean, flush-cut finish, I inserted two pegs into each of the four holes. Place one peg in each hole, then follow it with a second peg to about half its length (Figure G).

Use the wood blade on the Multi-Max to flush-cut the four exposed pegs (Figure H). Be careful not to cut into the frame.

Step 8: Using the same methods in Steps 5–7 (glue, clamp, drill, peg, and flush) assemble and attach the uprights and upright supports as pictured in Figure I. The center of the upright will be 4½" from the front of the catapult.

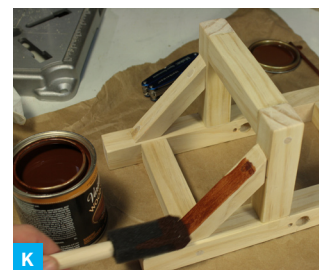
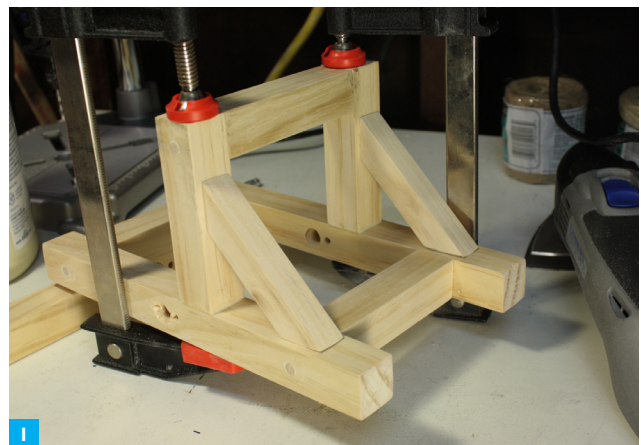
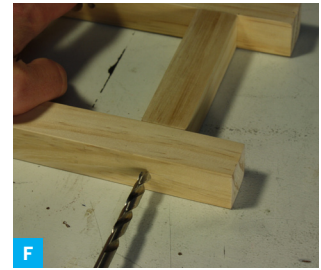
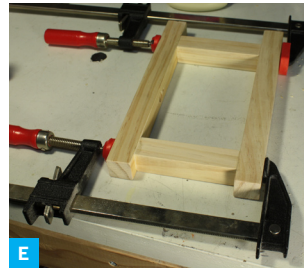
Note: the upright supports will not need to be double-pegged, only drill to a depth of 1" from the upright support into the upright and frame. The Multi-Max really shines when flush-cutting those pegs at a 45-degree angle in such tight quarters.

Step 9: Sand all surfaces of the frame, uprights, upright supports, and pegs until smooth and well integrated (Figure J).

Step 10: Wipe the wood clean with a damp cloth, and then stain it so it looks all awesome and medieval (Figure K).

Step 11: Cut the ¾" dowel to an 8½" length, sand the ends, and stain it. This will be the throwing arm.

Step 12: Attach your projectile bowl to one end of the dowel (Figure L). You don't have to have a pull ring like I do; that was just a lucky find in my junk hardware collection.



Step 13: Cut the $\frac{3}{16}$ " dowel into four $1\frac{1}{2}$ " lengths. Sand and stain them. These will be the turning and stop pegs for the torsion spring.

Step 14: To assemble the torsion spring, cut a 16" length of twine and tie it into a loop. Double the loop over, then feed it through the two $\frac{1}{2}$ " holes in the catapult frame.

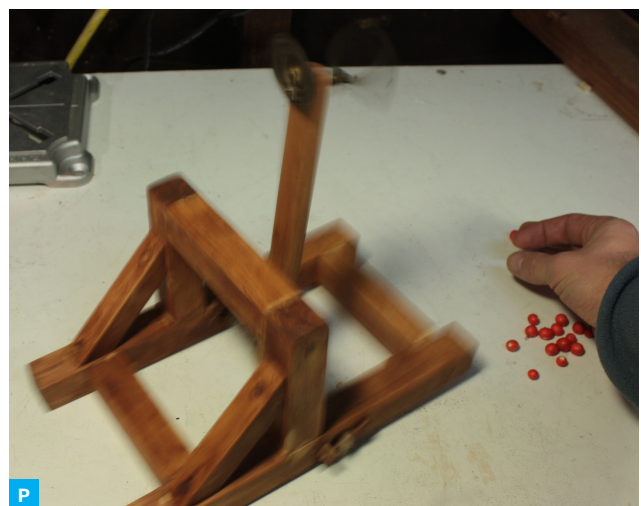
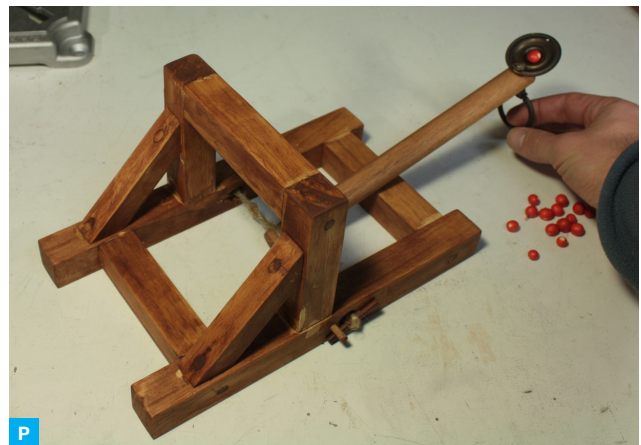
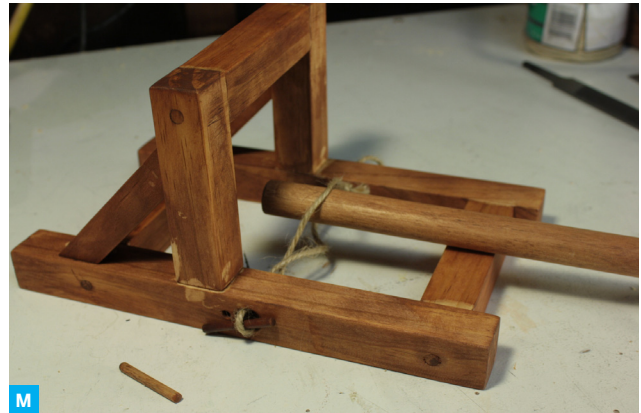
Place a turning peg through each loop. Insert the throwing arm in the middle of the twine (Figure M). Twist both pegs toward the uprights until the tension pulls the throwing arm up to meet the uprights (Figure N).

Give each turning peg a couple of more turns until it is good and tight, then insert the stop pegs into their holes to prevent unwinding.

Step 15: You can fine-tune the angle of throw by wrapping twine around the upright crossbeam where the catapult's arm will strike it (Figure O). The farther the padding protrudes, the higher the trajectory.

Step 16: Now it's time to hurl stuff! Pull back the arm, load it up with berries, marshmallows, paper wads, whatever you like (just keep it soft), and then let go to watch the projectiles fly (Figure P). Attack!

Your brainstorming meetings will never be boring again!



About the Author

John Edgar Park is the host of *Make:* television and a CG Supervisor at DisneyToon Studios. Find him online at jpixl.net.