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Spinning Wheel Assembly Instructions (Irish Tension Castle Wheel)

3D-Printed Parts Included in Kit

(1) L Post Bracket	(6) Pegs
(1) Main Post Bracket	(1) Hub
(2) Pedals	(2) Tie Rod Ends
(1) Rocker Assembly Top Piece	(1) Flyer Assembly Stand
(1) Spacer	(1) Flyer Orifice
(5) Wheel Spokes	(1) Flyer Arms
(1) Pivot Spoke	(3) Bobbin Caps
	(3) Bobbin Pulleys

Misc Parts in Complete Kit

(3) 3/8 in, 4 3/4 in - Aluminum Bobbin Tubes
(1) 1/4 in, 6 1/2 in - Steel Rod
(6) Bearings
(1) Cord for Drive Band, paracord or thick yarn
(1) 1/4 in by 4 inch Leather Strap

Wood Cuts

(1) 2x2, 10 in - Frame Arm
(1) 2x2, 24 in - Frame Post
(2) 2x2, 12 in - Frame Feet
(1) 2x4, 12 in - Frame Connector
(1) 1x2, 11.5 in - Pedal (Rocker) Arm
(1) 3/8 in dowel, 12 in - Tie Rod

Total Wood Pieces: 7

Bolts & Bits

(1) 2 inch, 5/16 lag bolt
(1) 1 1/2 inch, 5/16 lag bolt
(1) 3 inch, 5/16 hex bolt
(1) 1 1/2 inch, 5/16 hex bolt
(2) 5/16 lock nuts
(1) 2 inch, 1/4 inch Carriage Bolt
(1) 1/4 in wingnut
(1) 1/8 in eye screw
(12) 1/2 in Screw Hooks

Screws

(6) 2 in deck screws - For Frame
(40) 1 in deck screws - For Frame Brackets, Pedals, and Flyer Assembly
(2) 1/2 in screw (optional) - Tie Rod End (can also use strong glue)

Total Screws: 48

Instructions

1. Cut the 1x2, 2x4, and 2x2 pieces according to the list. Also cut the length of dowel for the tie rod. You should have 7 wood pieces total, including the tie rod.
 2. Predrilling:
 - a. Predrill a 3/16 in hole in the 2x2 Frame Post 14 in from the bottom. Make sure the hole is centered in the post. If the hole isn't drilled perfectly perpendicular to the face of the board, the wheel won't spin evenly.
 - b. Predrill a 3/16 hole in the 1x2 Pedal (Rocker) Arm on the end of the board facing the Square Post Bracket. (Again, see the Tie Rod Reference Photos.)
 3. (Optional) Painting or Staining: It is much easier to paint or stain the wood parts of the kit to your color preference before the kit is assembled. Have fun with this part!
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FRAME ASSEMBLY

4. Screw the middle of each 12-inch section of 2x2 (2x) onto either end of the 12-inch section of 2x4 with 2-inch screws to make an "I" shape.
 5. Screw the 10-inch section of 2x2 (Frame Arm) to the end of the 24-inch section of 2x2 (Main Post) with 2-inch screws to make an "L" shape.
 6. Place the Main Post Bracket on the 12 inch section of 2x4 (Frame Connector) so the back of the bracket is flush with one edge of the 2x4 and screw in place with the 1 inch screws. The back of the Main Post bracket should be flush with the end of the 2x4, and the portion of the bracket with the two rocker assembly holders should be centered on the 2x4 and pointing in the opposite direction.
 7. Set the Rocker Assembly Top Piece on a flat surface with one of the two bearing holes facing up. Insert bearings. It's a tight fit. You'll need a piece of scrap wood and a hammer. Set the bearing over the hole. Place the piece of scrap wood on top of the bearing. Tap the piece of wood with a hammer until the bearing seats properly. (I use this technique to seat all of my bearings.)
 8. Screw the Rocker Assembly Top Piece to the bottom of the 1x2 Pedal (Rocker) Arm. It should be centered and perpendicular to the pedal. Flip the wood piece over and screw the pedals to it on either end. There is a groove in the bottom of the pedals which rests on the edge of the board. The spacing of the pedals is not critical and can be set to preference.
 9. Attach the 1x2 Pedal (Rocker) Arm, which should have both pedals and the Rocker Assembly Top Piece secured, to the 2x4 Frame Connector by placing the Rocker Assembly Top Piece on the Main Post Bracket in the space that seems to fit it. Align the holes and press the 3 inch long 5/16 hex bolt through the aligned holes. Then secure the bolt in place with one of the 5/16 lock nuts. The pedals should now rock back and forth when you push on them.
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MAIN WHEEL

10. Gather the pieces for the Main Wheel. You'll need 1 Spacer, 5 Wheel Spokes, 1 Pivot Spoke, 1 Hub, and 6 pegs. (See the Main Wheel reference photo.)
11. Tap in one bearing on each side of the Hub's center hole. It's a tight friction fit, and you'll need a hammer or a mallet. (See the technique in Step 7.)
12. The marked side of the hub faces up. Slide a spoke into place on every other divot, making sure that the wider face of the spoke faces down. Use 3 of the regular spokes for this step, we will use the pivot spoke in the next step.
13. Then, slide spokes into the remaining gaps, making sure that the wider face of the spoke faces up. The edges of the first three spokes and the edges of the second three spokes should align like a puzzle, creating the spinning wheel.

14. Pound the Pegs into the overlapping holes with a hammer or mallet. Take your time on this step to make sure everything is aligned. The fit is tight, but be careful not to pound the pegs in at an angle. If you do pound them at an angle, you might break them or the spokes.
 15. Find the Pivot Spoke. One side of the Pivot Spoke has a hexagon-shaped hole. Insert the 1 and 1/2 inch 5/16 bolt so that the bolt extends from the wheel with the bolt head fitting into the hexagon-shaped hole on the backside.
 16. Insert a 2 inch 5/16 lag bolt through the bearings in the center of the Assembled Wheel from the marked front side of the hub.
 17. Slide the Spacer onto the lag bolt. It should go between the Assembled Wheel and the Frame Post.
 18. Attach the 2 inch 5/16 lag bolt to the Frame Post by turning the 2 inch 5/16 lag bolt into the predrilled hole.
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TIE RODS

19. Tap a bearing into one of the Tie Rod Ends. Do the same for the other Tie Rod End. (See the technique in Step 7.)
 20. Slide both Tie Rod Ends onto the $\frac{3}{8}$ in dowel Tie Rod. Make sure the Tie Rod Ends are facing opposite directions. One end of the rod will attach to the Pivot Spoke on the wheel. The other end will attach to the 1x2 Pedal (Rocker) Arm. On my models, I make sure the back of the Tie Rod End (the blank side without the bearing insert) sits against the Pivot Spoke. The blank side of the opposite Tie Rod End then sits against the 1x2 Pedal (Rocker) Arm. (See the Tie Rod Reference Photos.) Once the Tie Rod Ends are facing the appropriate directions, secure them to the dowel using either the $\frac{1}{2}$ in screws or a strong glue.
 21. Attach the 1.5 inch 5/16 lag bolt by sliding the bolt through the bearing in one of the Tie Rod Ends and then securing it to the hole in the rocker arm.
 22. Slide the other end of the Tie Rod over the bolt sticking out of the Pivot Spoke on the Main Wheel and secure using a 5/16 inch lock nut. Now, when you push the pedals, the Tie Rod should push and spin the Assembled Wheel. It might take some practice on the pedals to get the wheel running smoothly.
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FLYER ASSEMBLY

23. Screw the Flyer Assembly Stand to the 1x2 Frame Arm. The edge of the Flyer Assembly Stand should be flush with the edge of the board furthest away from the Frame Post. Make sure the U-shaped part of the stand is furthest away from the Assembled Wheel and flush with the end of the board.
 24. Align the pegs in the Flyer Orifice with the holes in the Flyer Arms and apply pressure to click them into place. Be sure not to press them at an angle. (See the Bobbin & Flyer Reference Photos.) Once the fit is relatively tight, add superglue to the seam to secure the connection permanently.
 25. Twist the $\frac{1}{2}$ in hook screws into the available holes.
 26. Insert the $\frac{1}{4}$ in Steel Rod into the hole in the middle of the Flyer Arms. Tap gently with a hammer until it seats firmly.
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BOBBINS

27. Use a hammer to tap one end of one of the $\frac{1}{4}$ inch Aluminum Rods into one of the Bobbin Pulleys. Then set a Bobbin Cap onto the opposite end and tap it into place to form a completed bobbin. (See the Bobbin & Flyer Reference Photos.) You should have enough pieces to make 3 completed bobbins. Secure using superglue or other strong adhesive.
 28. Slide the completed bobbin onto the Flyer Assembly. The steel rod goes through the aluminum tube, and the Bobbin Pulley should face the side closest to the wheel.
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FINAL STEPS

29. Place the completed Bobbin & Flyer Assembly onto the Flyer Assembly Stand. The Flyer Orifice sits in the fork of the Flyer Assembly Stand, and the protruding bit of steel rod goes through the hole on the other end of the stand.
 30. Wrap a cord around the Main Wheel and the Large Bobbin Pulley. The cord should be taut and should run smoothly when you push the pedals.
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TENSIONER

31. Look at the Flyer Assembly Stand, at the part with the fork in it. One side of the fork has a single hole. The other side has two holes.
32. Screw the eye screw into the single hole.
33. Find the leather strap. On one end, punch a ¼ in hole or slit for the carriage bolt. Insert the bolt.
34. On the other end of the strap, tap a screw with a hammer to get it started working through the leather. Then, drive the screw (with the leather still attached) into one of the two holes on the other side from the eye screw.
35. The leather strap should be able to fold over the orifice while it is resting in the fork of the stand to help control tension in the take-up of the wheel.
36. Put the carriage bolt through the eye of the eye bolt and attach the wing nut.

Well done! You made it!

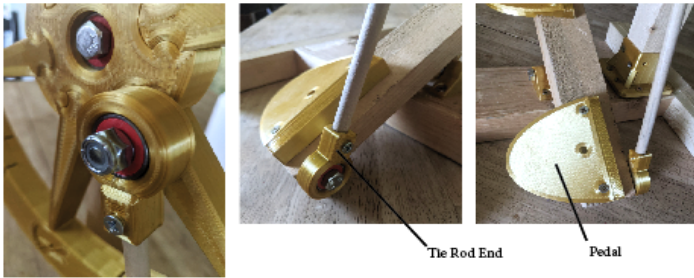
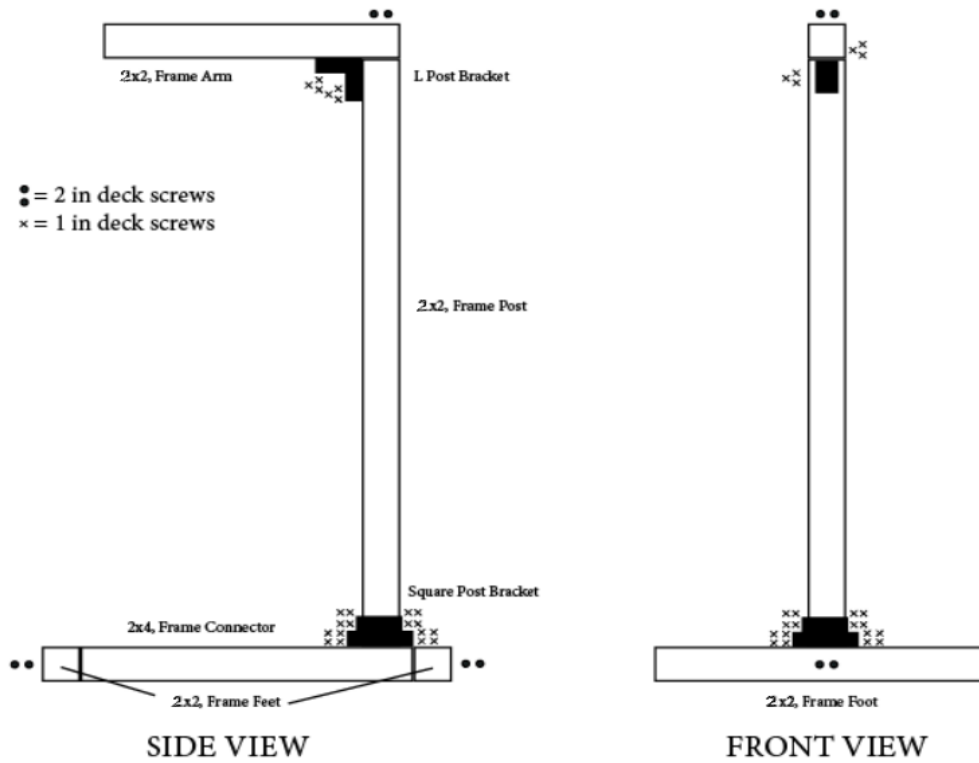
If you have any questions or concerns, contact me via the Etsy shop (link below) or via goodandbasic@gmail.com.

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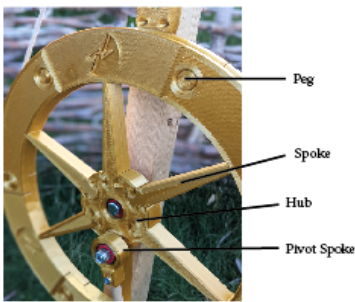
FRAME ASSEMBLY (1)



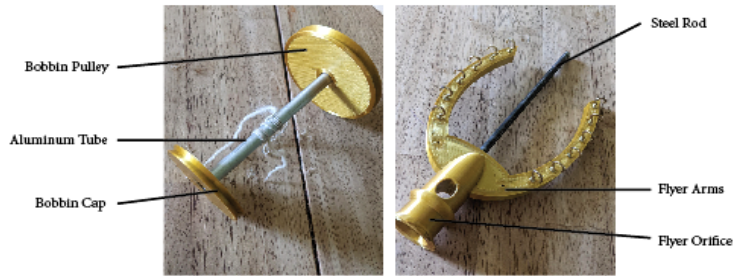
TIE ROD REFERENCE PHOTOS



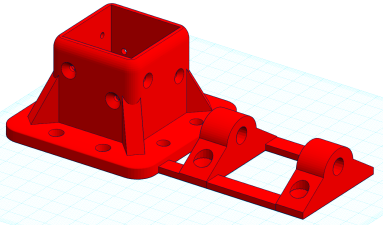
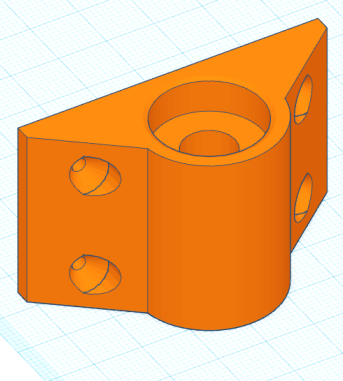
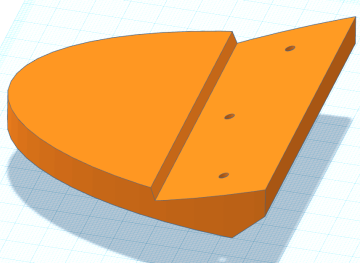
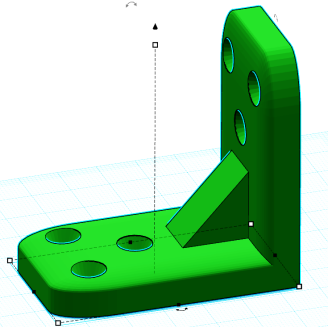
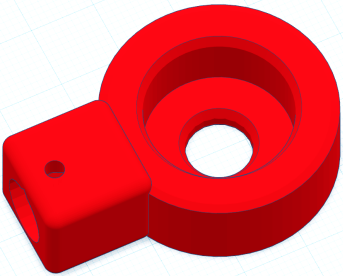
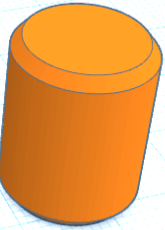
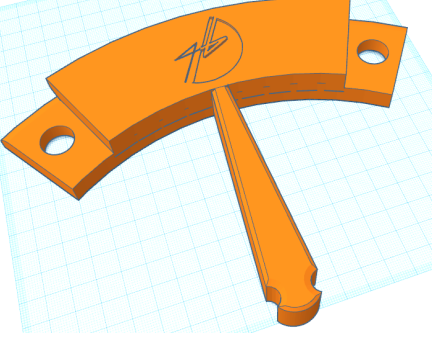
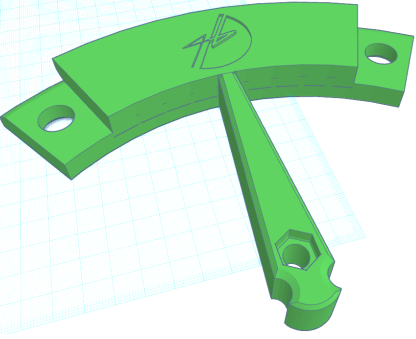
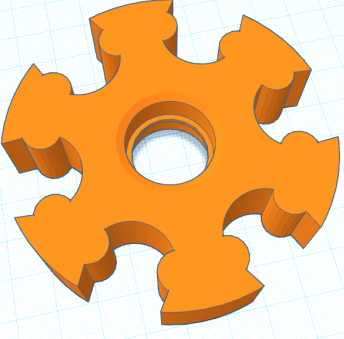
ROCKER ARM REFERENCE PHOTO

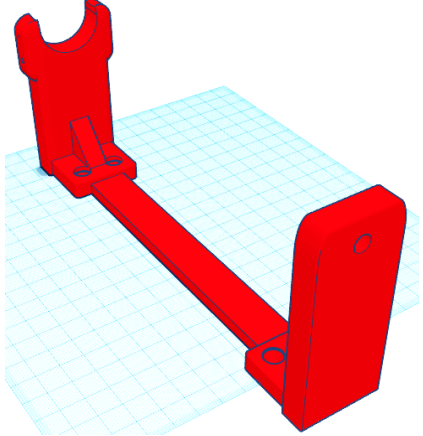
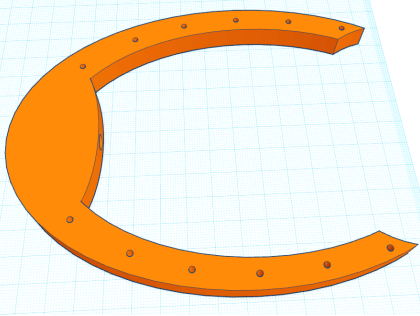
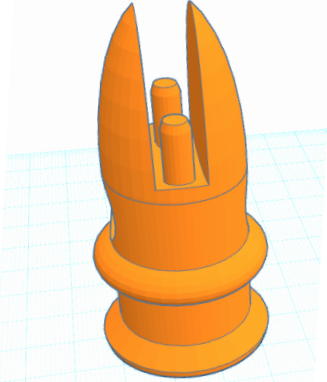
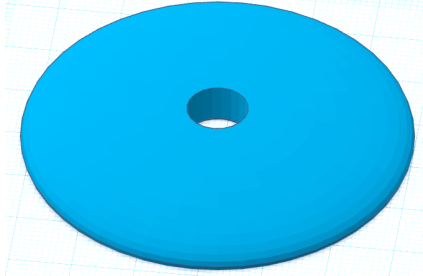
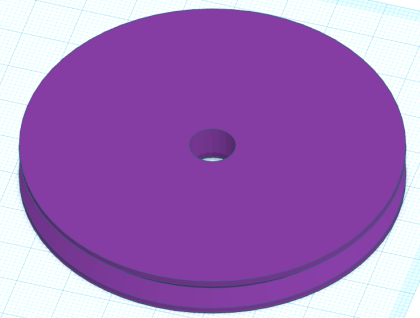
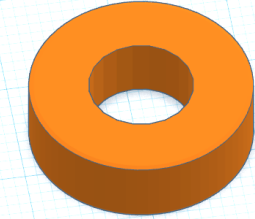


MAIN WHEEL REFERENCE PHOTOS



BOBBIN & FLYER REFERENCE PHOTOS

		
<p>Main Post Bracket (1x)</p>	<p>Rocker Assembly Top Piece (1x)</p>	<p>Pedal (2x)</p>
		
<p>L Post Bracket (1x)</p>	<p>Tie Rod End (2x)</p>	<p>Peg (6x)</p>
		
<p>Spoke (5x)</p>	<p>Pivot Spoke (1x)</p>	<p>Hub (1x)</p>

		
<p>Flyer Assembly Stand (1x)</p>	<p>Flyer Arms (1x)</p>	<p>Flyer Orifice (1x)</p>
		
<p>Bobbin Cap (3x)</p>	<p>Bobbin Pulley (3x)</p>	<p>Wheel Spacer (1x)</p>