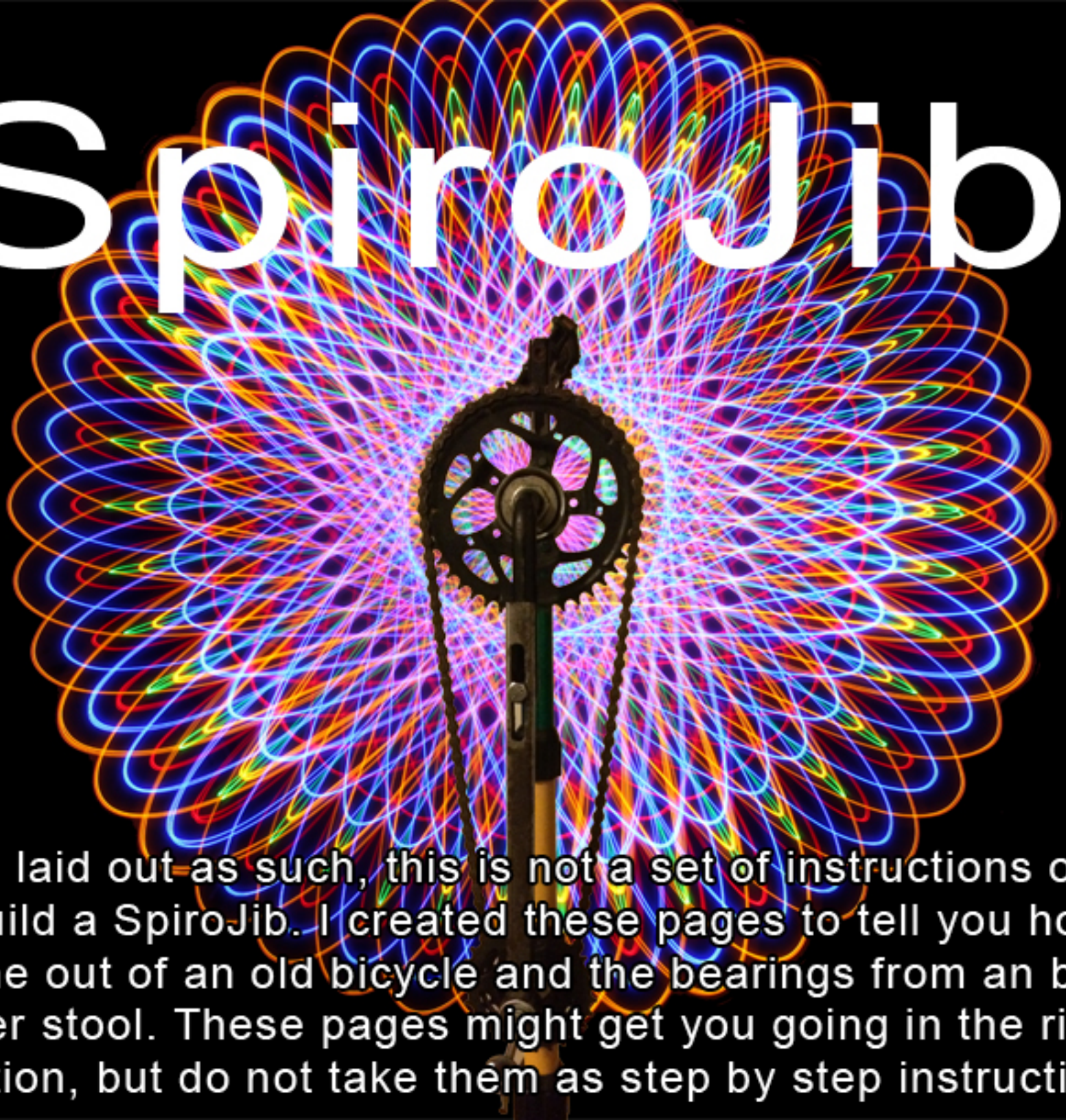
SpiroJib

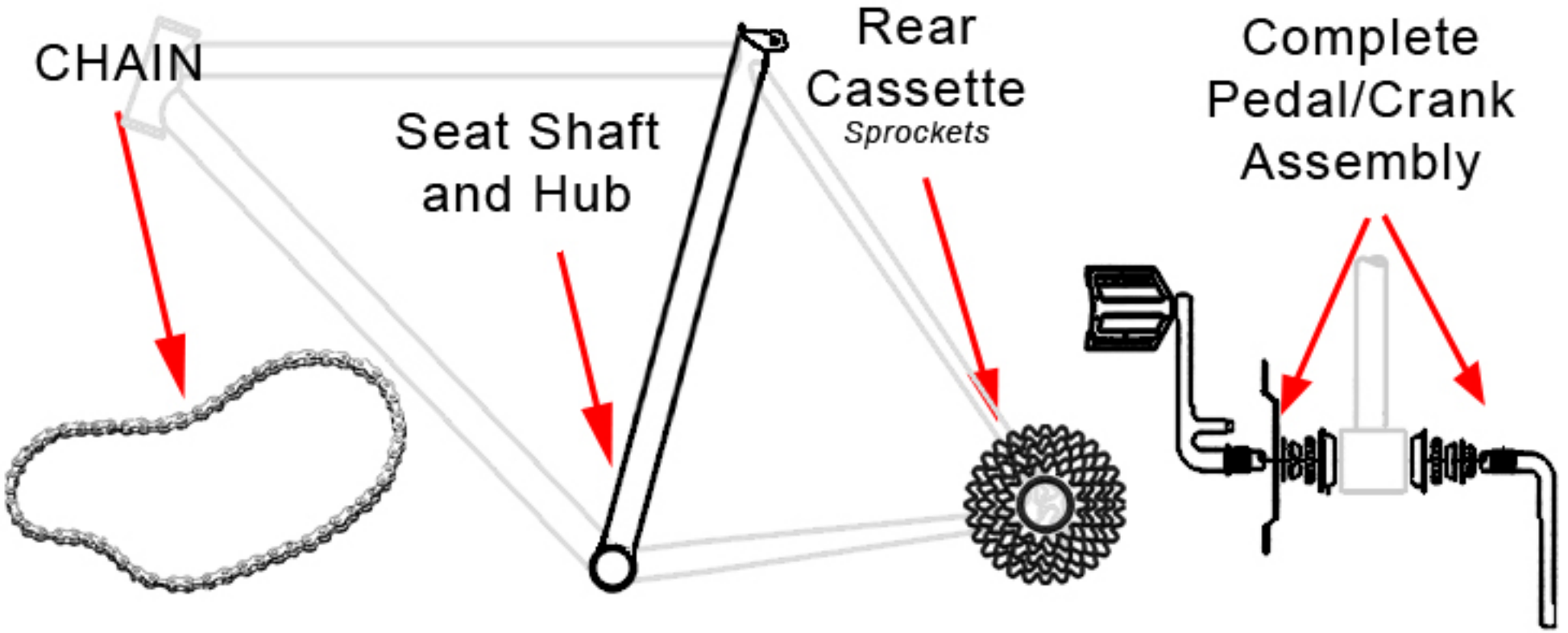


Though laid out as such, this is not a set of instructions on how to build a SpiroJib. I created these pages to tell you how I built one out of an old bicycle and the bearings from an broken glider stool. These pages might get you going in the right direction, but do not take them as step by step instructions.

Bicycle Parts Needed

If you have never dismantled a bicycle before, there are some special tools required.

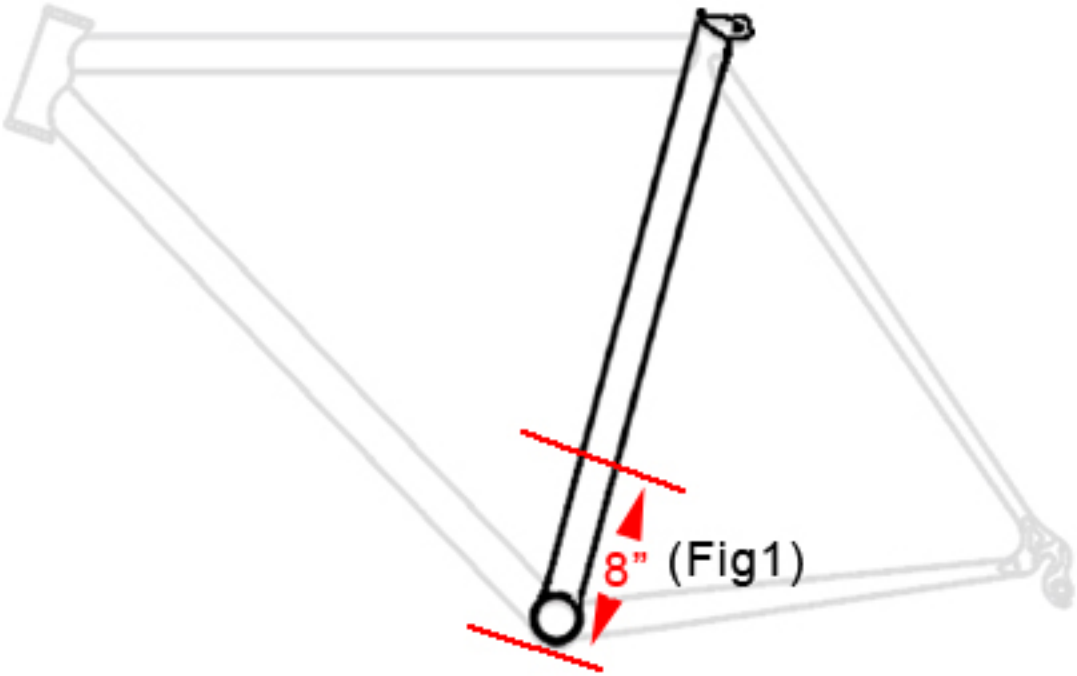
Helpful tip: For less than $100 you can buy a 10 speed bicycle from a store and have brand new dust, dirt and rust free parts to work with. As a bonus, you'll also come out with two new wheels to make light spinners from.



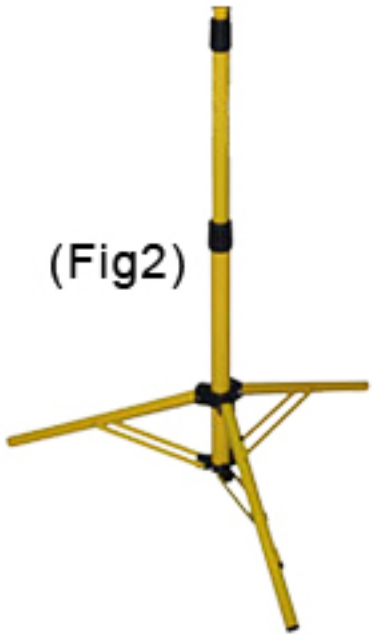
The Frame

This step requires working with saws and grinders. PLEASE be careful with these tools. They can cause serious injury to you and your property if not handled properly.

The only parts of the frame you will need are the drive hub and seat tube. How far up to cut the seat tube is a matter of choice in how you are going to mount the SpiroJib head once it's built. I cut it off at about 8" (Fig1) because I used an old work light tripod (Fig2) as a mount. You could however use the entire tube and buy a piece of pipe the diameter of the seat post and make your own stand. You can always shorten the tube later, so I suggest keeping the tube at lenth to begin with.



(Fig1)


(Fig2)

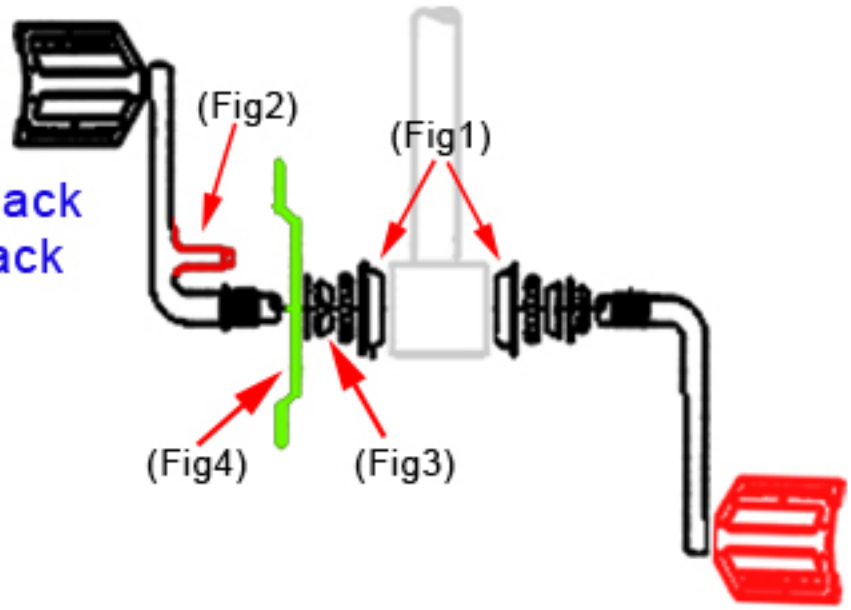
Main Crank

This step requires working with saws and grinders. PLEASE be careful with these tools. They can cause serious injury to you and your property if not handled properly.

The crank needs to be disassembled, including the bearing races (Fig1) on either side of the hub. *(You do not have to remove the pedal on the side of the crank that had the sprocket on it and you'll also want to remember the order the parts come out in as well as the direction they are facing)* The bearing races are pressed in, but can be removed using a wooden dowel rod and hammer by tapping around the race edges from the inside of the hub. Once disassembly is complete, take a hacksaw and cut the sprocket stablizer tab (Fig2) off the crank arm. You want to be sure to grind any sharp edges from this cut because your hand may be holding close to there when working the jib. Now replace and tighten the sprocket nut (Fig3). You will NOT put the sprocket (Fig4) back on.

Leaving the crank off the hub, I suggest putting all crank parts back on the crank in the order you removed them. it might be awhile before you get back to them and this way you will know how they go back together later on.

(actual image)

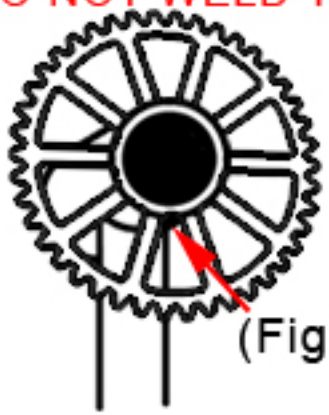


The Hub and Stationary Gear

This step requires working with saws, grinders and a welder. PLEASE be careful with these tools. They can cause serious injury to you and your property if not handled properly.

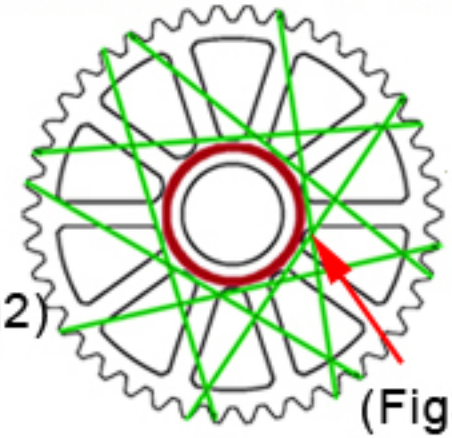
The front sprocket of the bicycle is what we will use as our stationary gear (Fig1). You will have to cut the center out of the sprocket so it will fit tightly over the outside edge of the hub. The seat tubes I've seen are centered on the hub, but if yours is offset, you will want to mount the sprocket on the longest side. It is very important that the sprocket be centered, squared and at an almost perfect 90º angle off the crank. Here is how I achieved it. 1st grind the paint off the hub about 1/2" back on the side you will mount the sprocket on to give you a clean welding surface (Fig2). To find center on the gear, I laid the hub on it as close to center as I could eyeballing it then drew a line with a straight edge from one tooth to another along a straight as close to the hub as I could (Fig3). I then counted the teeth between the two ends of the line, rotated over several teeth and made a simular line with the same number of teeth between the ends. Continued around the gear in this manner until I had a good pattern to get the sprocket as close to center as I could. I then marked a tight scribe circle around the hub to use as a cut line.Then with a metal saw and rotatary tool with grinder head I cut out the center of the sprocket so it would just fit over the hub. To square the gear. I slid it back over the hub and used one of the factory bearing races to true it. I pressed the race back in the hub and pulled the gear out to touch it evenly all around. Then took a wire feed welder and spot welded the back of the gear in place on the hub(Fig4).

DO NOT WELD TO RACE OR RACE SIDE OF THE HUB!

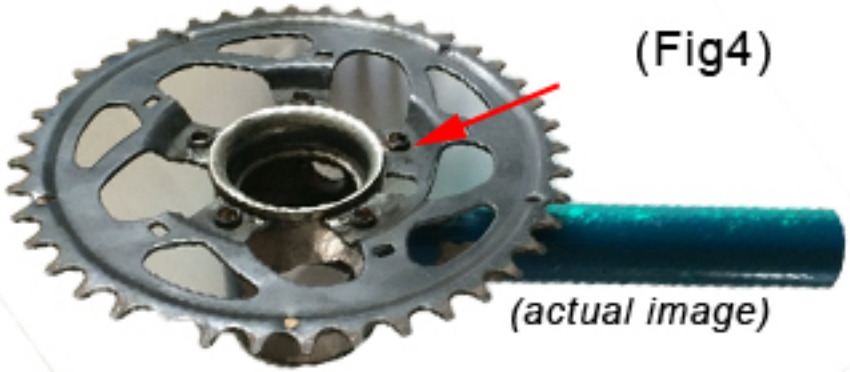


(Fig1)

(Fig2)



(Fig3)



(Fig4)

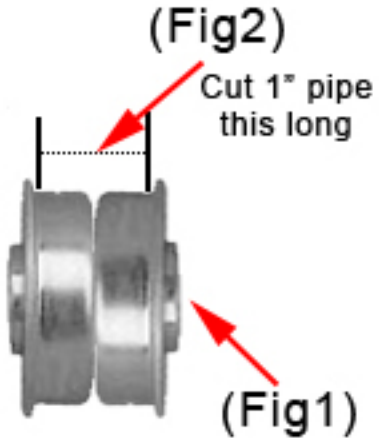
(actual image)

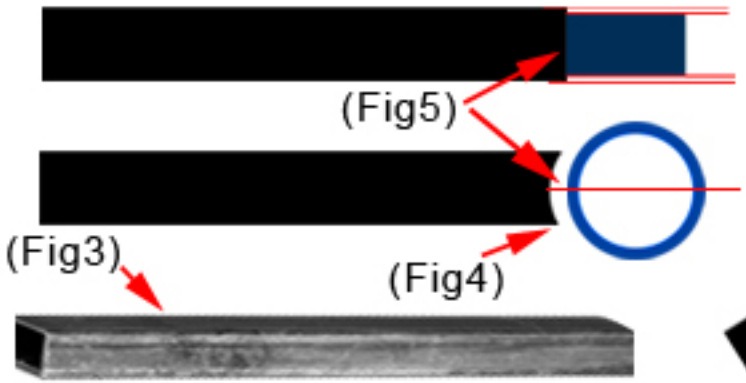
Drive Arm Part-1

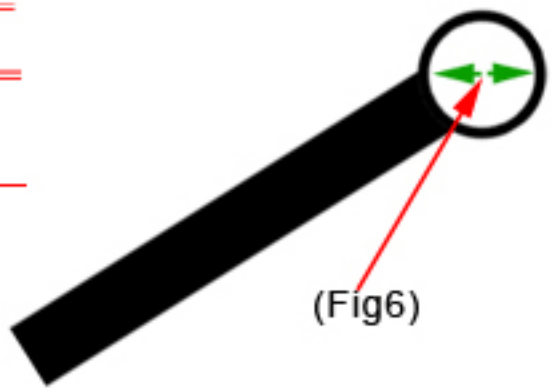
This step requires working with drills, saws and grinders. PLEASE be careful with these tools. They can cause serious injury to you and your property if not handled properly.

The drive arm controls how the lights move and can be the most challenging piece to manufacture. The parts, as I built it, consist of a pair of glider stool bearings (Fig1), a 12" piece of 1/2" square tubing, 1ea 6" 3/8ths" bolt, 1ea 3" 3/8ths bolt, 2ea heavy 3/8" fender washers, 5ea 3/8ths" nuts, 1ea 3/8ths" wingnut, a 5 sprocket cassette and a piece of 1" black pipe. (NOTE: Make sure the bearings you have almost but not quite fit into the end of the pipe. We want to hone the pipe out later to press fit the bearings.)

1st cut a piece of 1" pipe just long enough that when the two bearings are squeezed together it will bearly fit between their flanges(Fig2). Next take your 12"X1/2" square tube (Fig3) and grind a contour in the end to match the curve of the 1" pipe (Fig4). Now weld the pipe piece to the tube, making sure the pipe is squared and centered on the tube (Fig5). Next hone the inside of the pipe (Fig6) enough that you can press in the bearings Not too tightly because you may wear them out and have to change them, but not so loose that they slip around. I did this using a rotary tool with a grinder head.







Drive Arm Part-2

(Fig1) shows about how far down you should be able to hand press the bearing in when you have the honning correct and should be the same on both sides. Making sure you only have one bearing in, now use a socket that fits on the flange (Fig2) and tap (NOT POUND) the bearing down until it seats (Fig3). Once you have the first side seated, run the 6" bolt through that bearing (Fig4) and run the other bearing down the opposity side. By putting the bolt in place before seating the 2nd bearing you will insure their alignment. (Note: Though generally all the same size, there are several types of these bearings. The ones I used are threaded 3/8ths" on the inside in which case you thread the bearing down the bolt to seat it. Others I've seen are smooth sleeve in which case you will have to run a nut down the bolt to seat the bearing. Either type should work fine, but variations in some of the parts used to build this jib is something you should be aware of and once you understand its construction, you might want to collect all the componients before you start the build.)

(Fig2)
(actual image)

(Fig1)

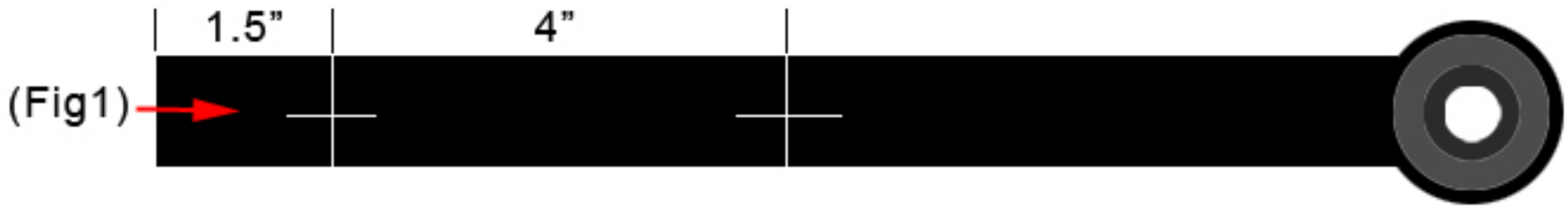
(Fig3)

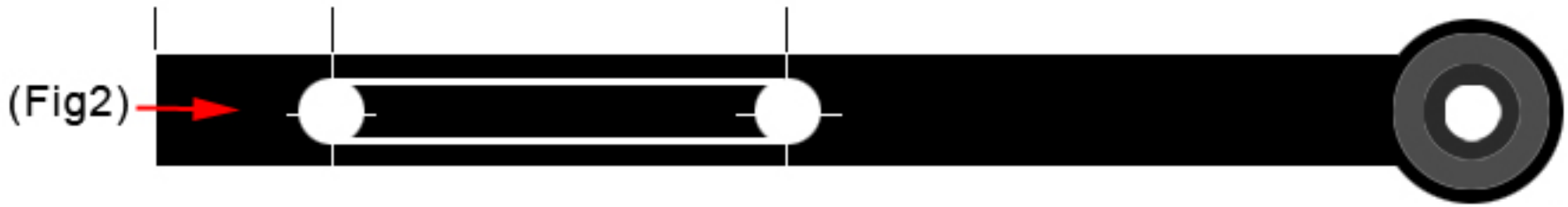
(Fig4)

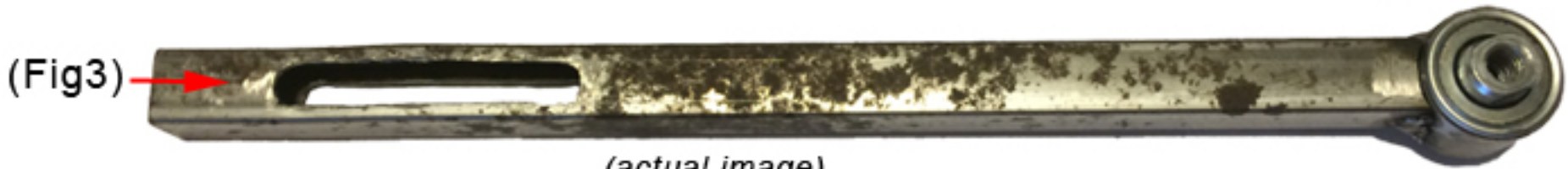
(actual image)

Drive Arm Part-3

To be able to adjust the chain tension, you need to place a slot through the drive arm. The slot will need to be 3/8ths of an inch wide, 4” long and be aligned with the hole in the bearings. Measure down 1 1/2“ inches from the opposite end of the tube from the bearings and make a mark. Drop down 4” from that mark, make another cross mark and then a center mark on each (Fig1). Using a 3/8ths” drill bit, drill all the way through the tube at each mark then scribe a line connecting the outter edge of the holes on each side (Fig2). Now cut down the inside of each line to make a slot. I used a rotary tool with a metal cutter to make the cuts. Finished arm (Fig3).







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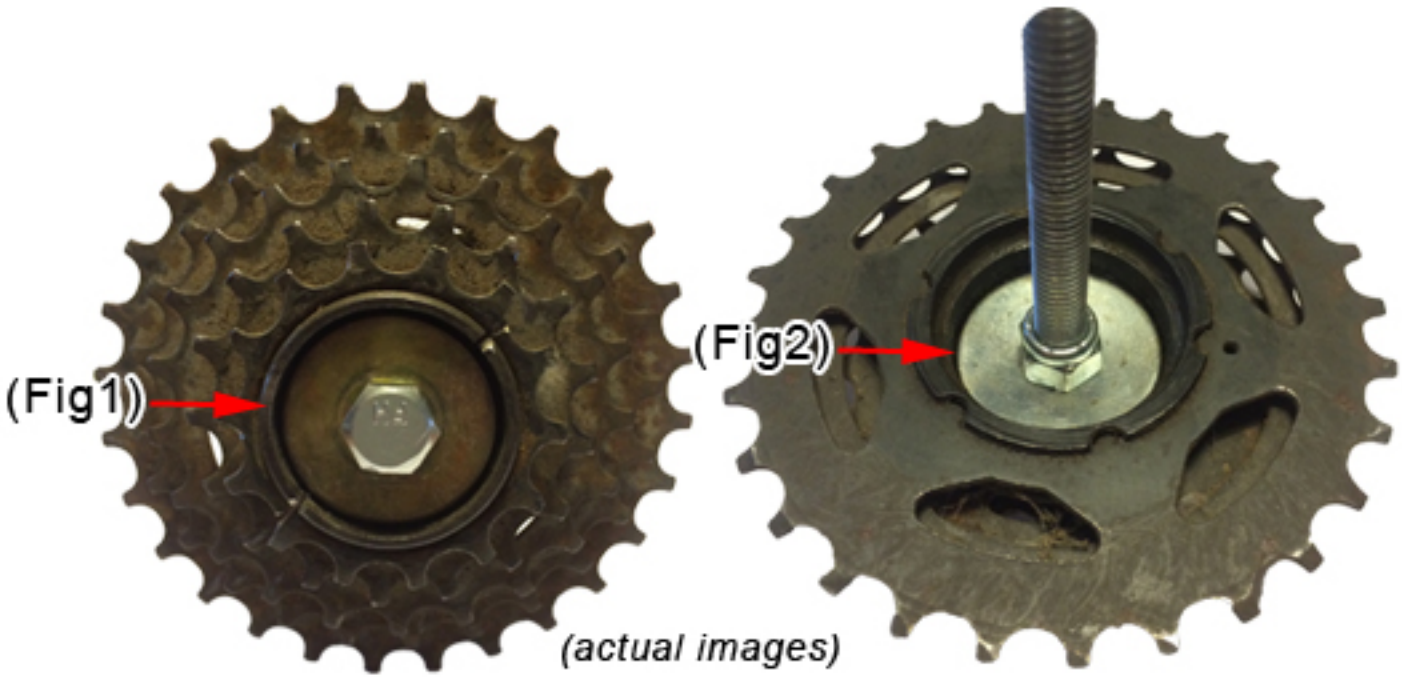
Cassette Mounting

To drive the lights, the cassette has to be mounted solid on a bar running through the bearings in the drive arm and out the other side to mount the lights on. This is the reason for having such a long 6”X 3/8ths” bolt. First we have to mount the cassette though and to do so, we need two large washers called “Fender Washers”. They need to have a 3/8ths” hole in their center and should barely fit inside the cassette housing to make sure it centers. Much like the stationary gear earlier, it’s important the shaft is on center and 90º off the sprockets. This means the outside fit of the washers is vital. You can drill the centers out to 3/8ths” if need be, but outside must be dead on and an even circle. Assembly is simple. Place the outside washer on the bolt, run the bolt from outside in on the cassette, slide the inside washer on and then secure everything with a 3/8ths” lock nut. End assembly should look like figures 1 & 2



(actual images)

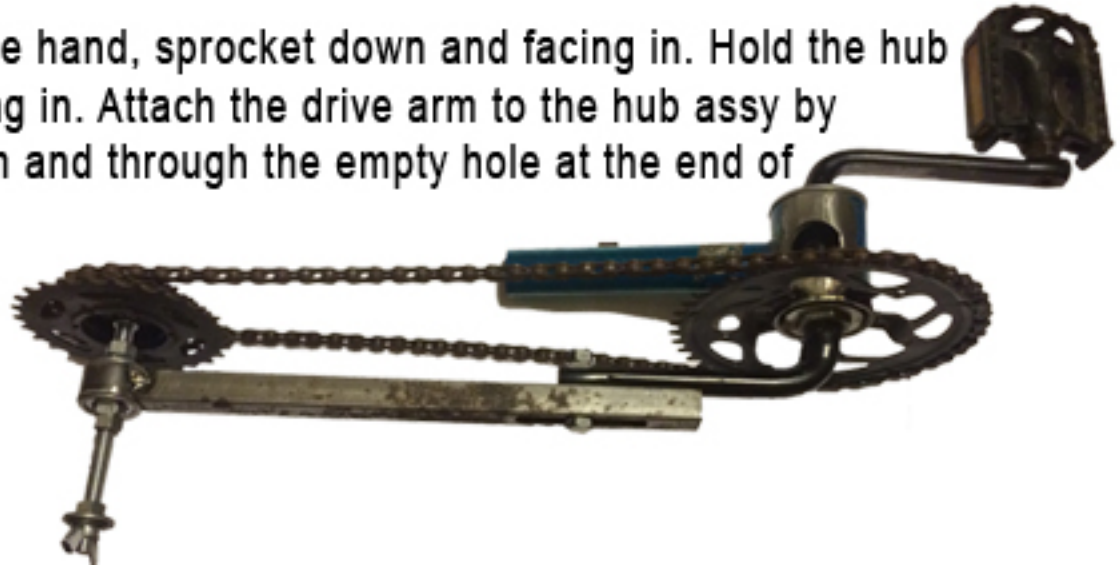
SpiroJib Assembly

1) Mount the Cassette Assembly to the Drive Bar. First put a nut on the cassette bolt to use as a lock down for the bearings, then thread the bolt through the bearings. Add another nut to the outside as another bearing lock. Put on an additional nut, two regular 3/8ths" washers and a wing nut on the end of the bolt shaft. These will be your light mounts when assembly's completed. (Fig1).

(Fig1)
(actual image)

2) Reassemble the hub. There should already be a race on the sprocket side of the hub that we used to align the sprocket, so now we need to tap in the other race.
There should already be a tappered nut on the crank where the sprocket was originally, so next slide on one of the ball bearing sets, flat side toward the tapper nut, balls facing in. Then slide the crank into the hub from the opposite side of the sprocket. Now the other ball bearing set, ball bearings in, flat side out and the tappered nut (tapper in). The tapper nut just goes in hand tight plus a 1/4 turn. The slot washer next and finally the outter lock nut. The lock nut is wrench tightened
(Refer to Main Crank Page for a crack parts diagram if needed)

3) For the final assembly, hold the drive arm in one hand, sprocket down and facing in. Hold the hub assembly in the other hand, sprocket up and facing in. Attach the drive arm to the hub assy by putting the 3" bolt through the slot in the drive arm and through the empty hole at the end of the crank where the pedal used to be.

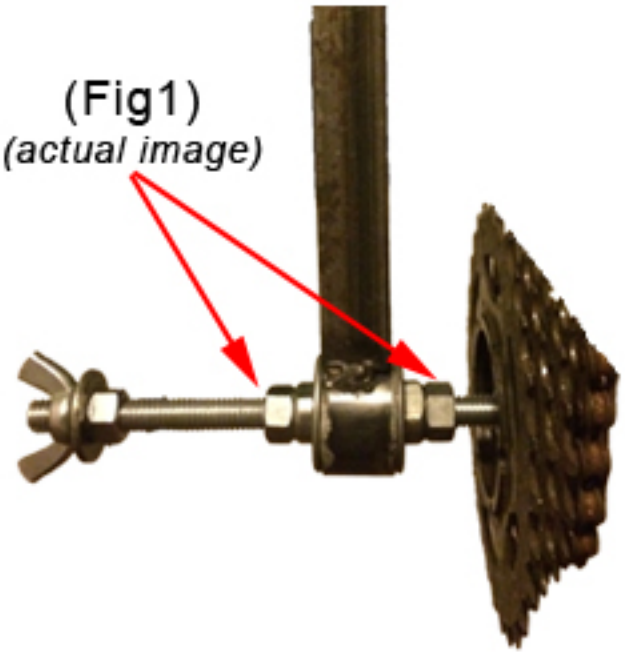


Final Tuning

1)The SpiroJib needs to be mounted for final tuning. Loosen the nuts on each side of the drive arm bearings (Fig1) and lay the chain over the stationary sprocket drapped down next to the drive arm cassette. Adjust the cassette in or out until the drapped chain is aligned with the largest sprocket in the cassette. Loosen the nut that connects the drive arm to the crank and lift the drive arm until the bolt is about a 1/2" from the bottom of the slot and retighten the bolt (Fig2). Now size and mount the chain to go around the stationary sprocket and the large sprocket on the cassette. Tighten the bearing nuts in (Fig1) to lock the bearings in place and give the jib a spin. If the SpiroJib spins smoothly, then you're all set. If it feels like it's dragging, the chain may be too tight or the cassette bearings may be out of adjustment binding the shaft. Once you've used it a few times, tuning will become easier.

To change gears, loosen the drive arm and adjust the cassette until the gear you want is aligned. I usually set the chain on the gear I want and then adjust the cassette. Retighten the chain and it's ready.

(Fig1)
(actual image)



(Fig2)
(actual image)