

Adding A Third Wheel to a Lectric XP eBike, Version 1.0

By R. G. Sparber

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After over 3,000 miles of riding around Phoenix plus along the South Rim of the Grand Canyon, I can tell you the Lectric XP eBike is a joy and a life changer.

It flattens previously insurmountable hills and makes a 15-mile ride only as strenuous as I choose.



For transport, I can fold the 62-pound bike into a smaller package. However, it is designed to be deadlifted, which is beyond what my 71-year-old body can handle. Not to worry, I built [a ramp](#) into my little Honda Fit.

If I'm transporting just my bike, I first slide the passenger seat all the way forward. Then I roll the unfolded bike into the car. With care, I can place a second eBike next to it. There is room for one person in the back. Not ideal, but for short trips, it works.

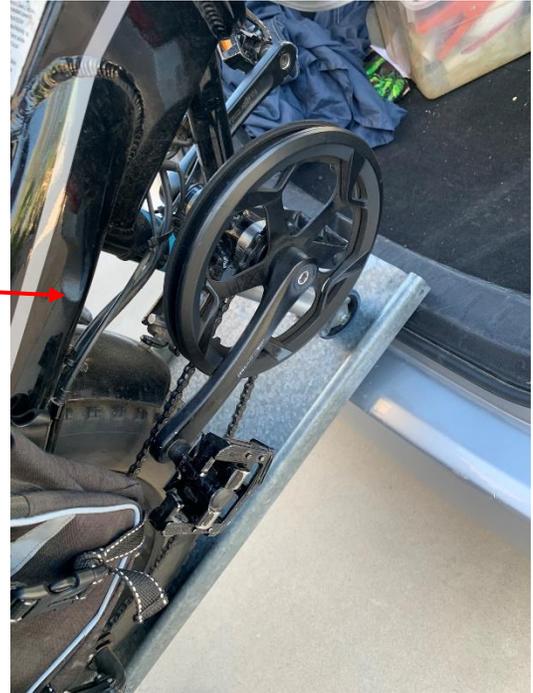
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For longer trips, I fold each bike up. Then there is room for luggage, and my passenger can sit in the front seat.



When folded, the bike rests on the wheels and a short bail² welded to the bottom of the crank box. This arrangement works if the plan is to deadlift. It is unworkable if you are trying to roll the folded bike, particularly inside my little Honda.

My solution is to add a removable third wheel. Along with two other tricks, I can easily roll my bike up the ramp and through my car.



This arrangement works for my Lectric XP 1.0 but not my wife's step-through.

² I bought my XP directly from Lectric in an As-Is state. The bail had been broken off during shipping.



The removable third wheel consists of a fixed wheel secured to the bottom of a thick aluminum rod. An arm extends out the back, which engages with a hole in the bike's frame to prevent the assembly from pivoting.

I used a caster in a previous design. The caster had a mind of its own, and the bike never went straight.

I turned the top 3 inches of the rod down to be a close sliding fit in the bike's down tube.

The shoulder below this section supports the weight of the bike.



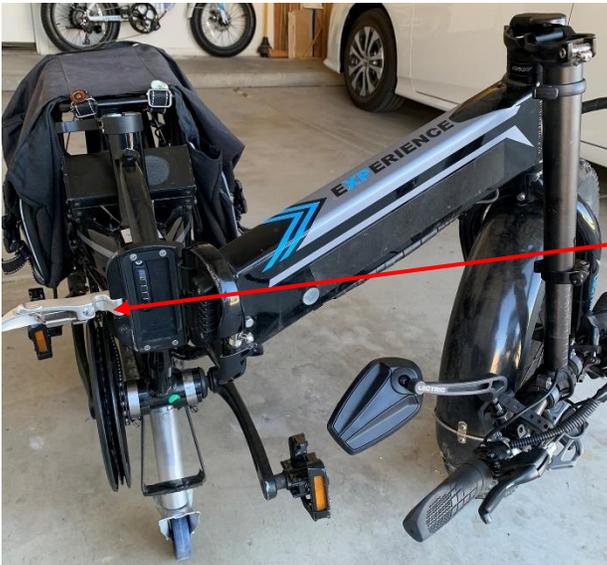
With the bike on its kickstand, I position the third wheel under my bike.



There is enough room to slide the bar up into the downtube without raising the bike off the ground.



The rod has just enough spring to slide through the existing hole in the rear fender support and lock into place.



I can then unlatch the bike's center, and it easily swings to the side. This movement lowers the rear part of the bike onto my third wheel.

I employ a tool and an attachment along with the removable third wheel.

This trick is unnecessary if you only need to move the bike forward. But if you ever move the bike backward, the pedals will rotate and jam against the frame. Then the back wheel stop turning – an unpleasant predicament within the cramped confines of my little car.



The tool consists of a pair of washers with a spacer between them. A small bolt with a nut secures them. The bolt screws into a threaded cylinder I found in my junk drawer. The spacer is slightly wider than the bike's chain.

I use this tool to slip the chain off of the front sprocket. By holding onto the cylinder, I avoid the grease. The tool stays in a small plastic medicine bottle when not in use.



Before folding the bike, I place the tool on the chain just before it enters the front sprocket. As I turn the crank, I push. This guides the chain off of the gear.



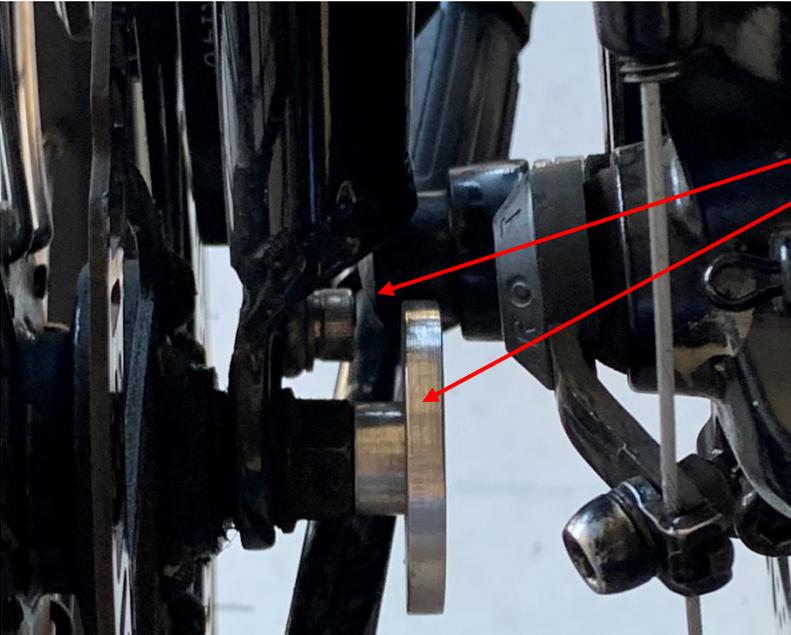


The chain comes to rest on the crank box. Yes, that area does get a little greasy, but it won't get on you. At this point, the cranks freely turn, so it can't jam into the frame and lock up the rear wheel.



The attachment secures the front wheel to the back wheel while permitting both wheels to turn. I don't need much strength here, just enough to prevent the front wheel from going out on its own.

I use the kickstand to capture the front wheel's axle fitted with a disk.



Looking down between the wheels with the bike folded, you can see the kickstand engages [the disk](#) from below, holding the wheels together.

When not in use, the disk remains on the axle.

OK, so how does this all go together?

First, I removed the key because the cranks can shear it off. Then the seat comes off because it is too tall for my car's ceiling. Next, I slip off the chain from the front sprocket. I install the third wheel and unlatch the frame.



I swing the front wheel until the axle disk contacts the kickstand. Momentarily pushing down on the kickstand, it catches the disk.



Since the crank is not connected to the chain, I can now smoothly roll the folded bike forward and backward.



I roll it up my narrow ramp on the rear wheel and my third wheel. By slightly tilting the bike, the front wheel clears the lip of the ramp.



I push the folded bike up the ramp to the lip of the hatch.



After lowering the third wheel down to the deck, I can roll the bike forward by pushing from the rear. The front and rear wheels easily handle the lip.

I secure the bike with a ratchet strap that pushes mostly on the front and rear wheels.



To unload the bike, I roll the back wheel over the lip of the hatch and onto the ramp. Then I pivot the bike, so the third wheel clears the lip and then rolls down the ramp.

When back on the ground, I unlock the kickstand from the disk and swing the front of the bike around until I can latch the frame. Then I pull the third wheel assembly out of the down tube. After installing the seat, I guide the chain back onto the front sprocket using the tool. Put in the key and I'm ready to ride!

Construction Hints



I used a length of DOM³ 6061-T6 from my scrap bin for the leg. It is lighter than a solid bar stock, plus the hole lets me easily secure the wheel.



I turned down the top 3 inches of the leg for a smooth sliding fit in the bike's down tube.



Then I cross-drilled a 3/8 inch hole just below the transition to full diameter.

I then drilled and tapped a 10-24 hole at a slight angle⁴ to the 3/8 inch hole so a setscrew would enter the 3/8 inch hole.

The rod is 3/8 inch diameter 6061-T6. I slid it through the cross-drilled hole for a rough size test and locked it in place with the setscrew. Then I sawed off the excess.

³ DOM – Drawn Over Mandrel. During the forming of the stock, the soft aluminum is pierced by a long rod to form the internal hole while a die forms the outside diameter.

⁴ Normally, I would put my setscrew perpendicular to the cross drilled hole but since the bar is hollow, this would bend the 3/8 inch rod and not lock it.



I loosened the setscrew. With the cylinder in the down tube, I adjusted the bent rod so it would enter the fender support plate with a slight flexure. This force was enough to retain the assembly until I lowered the bike onto the wheel.



After tightening the setscrew again, I trimmed off the excess rod, so it was flush with the cylinder.



I started with a standard 2-inch diameter lightweight wheel.

After removing the wheel, I drilled a 3/8 inch hole in the center of the frame.



I found a bit of scrap steel that was a close fit to the axial hole in the leg. On the end of the scrap was a 3/8 inch spigot, 1/4 inch tall which became my mounting post. With the wheel frame upright and supported on a firebrick, I fluxed the mating surfaces and then pushed the pieces together. Using a MAPP torch and some silver braze, I formed the joint. The

great thing about brazing is you get a large surface area for the joint. If welded, it would only be on the perimeter of the steel rod, and I would likely burn through the sheet metal frame.

After the assembly cooled, I sawed off the mounting ears on the wheel frame and deburred. Then I re-installed the wheel.



Next, I drilled and tapped a 1/4-20 hole near the bottom of the leg. The installed setscrew locked the mounting post after I had roughly aligned the wheel to the major axis of the bike.

I believe wood could be used for the removable wheel support.

If you decide to build one, please send me a picture of your masterpiece, and I will include it in this article along with proper credit.

I welcome your comments and questions.

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