

Build Instructions for the Re-circulating Tesla CD Turbine Power-Boost Blender

Thinking Outside the Cakebox...

Nikola Tesla invented the first disc turbine over 100 years ago, and claimed in his autobiography that his turbine was the greatest of his inventions.

A Tesla turbine relies on a different principle than other turbines, using rotating discs, instead of blades or cups, to extract power from the fluid. The way it works is that the pressurized fluid is accelerated through the turbine inlet nozzle, then flows at high velocity into the narrow gap between the discs. The fluid imparts its energy to the discs, making use of the properties of adhesion of a fluid to a smooth surface and the boundary layer effect, as it spirals through the discs and into the center exhaust hole of the turbine.

The end result of this project is to supply a Tesla CD Turbine blender with a "Power Boost" by using combined hydraulic and pneumatic pressures generated by solar power. There are various ways and means to achieve this, and it is an open-ended project in that one can make use of whatever parts are most readily available, on hand, or cheapest.



This Tesla CD Turbine is fabricated from a CD cakebox, recycled CD's, neodymium supermagnets, a nozzle and glue. There is no shaft, shaft seals or bearings, using a magnetic coupling instead. The discs ride on the centre post of the CD cakebox. The hollow centre post of the CD spindle is drilled with 1/8 inch holes, to allow the egress of fluids through the post, out the bottom of the turbine, and as directly as possible into the recovery bucket.



The turbine inlet nozzle is made by hot-gluing on a garden hose power nozzle to the side of the CD cakebox cover . . . Make a hole in the cakebox cover about halfway up the side, and start applying hot-glue to secure the nozzle. The nozzle should point towards the outer edge of the discs as much as possible, not towards the centre. The nozzle must not protrude inside the cover very much; excess will need to be removed to allow disc rotation. Build up glue all around the nozzle to secure it to the cakebox cover. The CD cover gets hot-glued to the CD spindle bottom tray after the disc pack is made and installed.



The discs in a Tesla Turbine need to be separated by a gap of about .030 inch, to effectively make use of the boundary layer of fluid adhering to the discs. In this case, the 23 CD disc layers are separated, at the outer edges, by 6 evenly-spaced 1/32 inch x 3/16 inch neodymium magnets which are glued on with super-glue, between each layer. Make one layer first, and then the next layer will be easy because the magnets will "snap" into place where they need to be glued, 6 per layer.



There are also 6 of 1/2x1/2 inch neodymium magnets super-glued to the top CD disc of the disc pack. They engage magnetically outside the cakebox to turn the corresponding magnets in the blender coupling. The 6 magnets at the top of the turbine will be all North-up. The corresponding 6 magnets in the blender magnetic coupler will be all North-down, to couple in repel (NOT attract) mode to the turbine. That is a total of 12 of the 1/2 inch neodymium magnets; N42 strength magnets will work, but N52 magnets work better for heavy-duty use. Use marine Goop around the magnets to reinforce to the disc after super-gluing.

For more step-by-step instructions on building the basic Tesla CD Turbine, visit http://www.instructables.com/id/Eco_friendly_Tesla_CD_Turbine_Turbo_Boost_Blender/

Also check out the Tesla CD Turbine website at <http://www.cdturbine.com> and CD turbine movies at <http://youtube.com/MrfixitRick>

The hydraulic and pneumatic pressures to run the turbine can come from various sources. I used a simple 12 volt bilge pump in a bucket re-circulating system, to deliver a minimum 15 psi water pressure that will run the turbine at a slower speed. Other pumps could be substituted. An automotive electric fuel pump or RV water pump could work. An in-line pump similar to Allied Stock # 547-1009 could be substituted outside of the bucket. The CD turbine can also run on any available faucet water pressure, or from a 40 foot head minimum water supply such as from a 4-story minimum building, or a mountain creek.



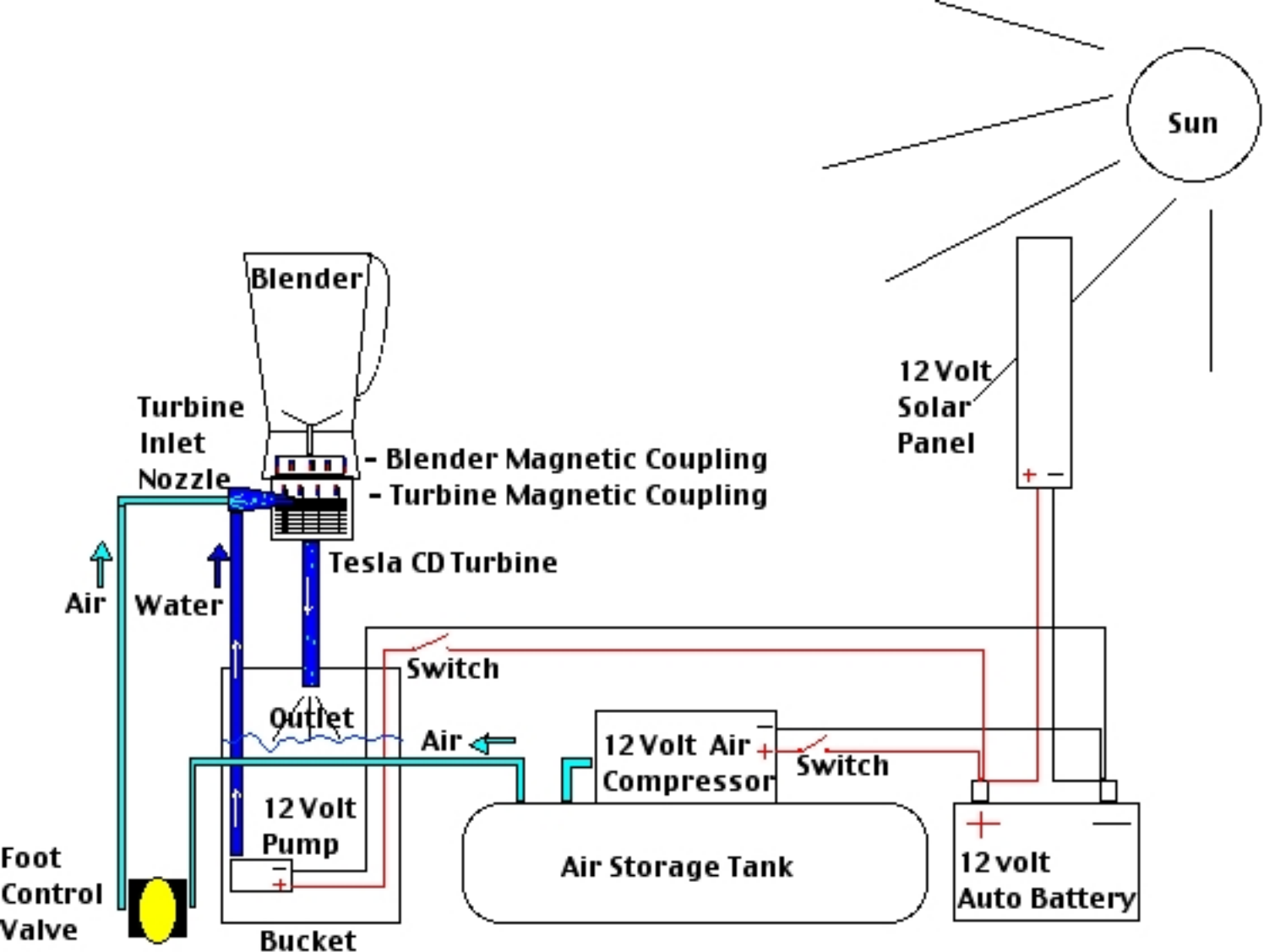
For a compressed air source, I used a 5-gallon air storage tank, with a 12 volt compressor. The 12 volt systems are connected to an automotive 12 volt battery, which in turn is charged with a 12 volt solar battery charger. The idea is to run the compressor long enough to build up to about 80-100 psi in the tank, which is good for a few minutes use of the turbine blender in "boost" function.

The turbine "Power Boost" function works by combining compressed air (or other gasses) to the water flow entering the turbine. It increases torque and power at lower rpms. The air boost pressure is controlled with an adapted foot-controlled garden hose valve. It could also be controlled by a 12 volt electrical solenoid with an optional pressure regulator.

A word about safety. This machine may not be safe. It can and will explode at any time. If this turbine is run at high speed on plain compressed air, it may explode and send sharp CD shards and broken magnets in all directions. You can run the turbine on just water pressure for better safety...I had mine running in the kitchen sink for a year with no problems! However, with the recent addition of a little too much air pressure, the top blew off the CD case

Please use a substantial protective cover for all use of this turbine. It is important to have a shield around the turbine discs in case of rupture. I used a piece of 6 inch diameter clear polycarbonate tubing with a 1/8 inch wall thickness. That way when (not if) the turbine comes apart, the parts are fully contained, preventing personal injury.

This CD turbine is basically an sci-art project gone wild. It definitely works...but the design limits have not been fully investigated. Have fun with it...but use caution!



**Schematic:
 Recirculating Off-Grid Tesla CD Turbine
 Power-Boost Blender**