

Make:
technology on your time

Weekend
Projects



Weekend Project: T-Shirt Cannon



Sometimes it can be so frustrating to have people you want to give a t-shirt to who are far away and inaccessible on the upper decks of stadiums. They wave their hands in desperation with such hope and joy at the possibility of receiving a t-shirt from you, but you know in your heart that they will won't find satisfaction because your throwing arm just isn't capable of hurling a t-shirt into the upper decks...

Fear not, your problem may be solved this weekend if you attempt to build this awesome air-powered, solenoid control valved, tough-looking t-shirt cannon! I collaborated with William Gurstelle, author of [Whoosh, Boom, Splat](#). It's always fun and exciting to work with Bill!



PVC is meant for plumbing. You do this project at your own risk.

Here's the official warning:

Technology, the laws, and limitations imposed by manufacturers and content owners are constantly changing. Thus, some of the projects described may not work, may be inconsistent with current laws or user agreements, or may damage or adversely affect some equipment.

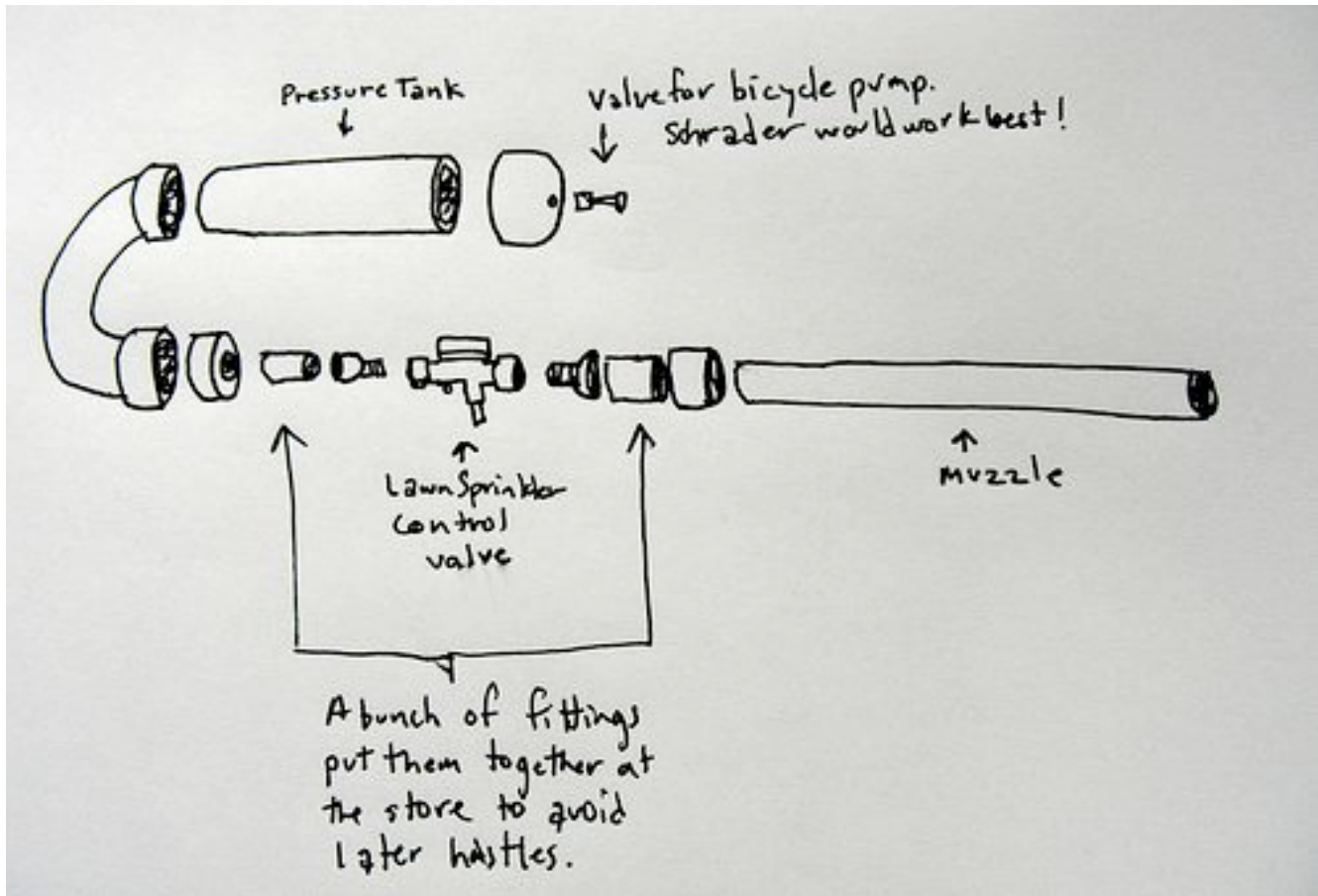
Your safety is your own responsibility, including proper use of equipment and safety gear, and determining whether you have adequate skill and experience. Power tools, electricity, and other resources used for these projects are dangerous, unless used properly and with adequate precautions, including safety gear. Some illustrative photos do not depict safety precautions or equipment, in order to show the project steps more clearly. These projects are not intended for use by children.

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Always check the page associated with each project before you get started. There may be important updates or corrections.

Acquiring Parts

I went to a big box hardware store to pick up the parts for this. If I remember right it came out to be about \$75 with lots of PVC left over for other projects. It took at least an hour to find all the parts in the store. Seriously, they don't organize the section with plumbing stuff very well. I recommend that you fit everything together at the store before leaving so you can make sure that it will all work out.



Materials

Here's a rough estimate of what you might need. This will change due to availability.

- An air chamber. We used 3" PVC. About 2-3 feet of it.
- An end cap.
- A U shaped piece to go from the air chamber to the muzzle

- A bunch of little fittings to go from the air chamber to a set of threads that will fit into the sprinkler control valve.
- A sprinkler control valve. You may be able to put this in place of the u shaped PVC if you can find one shaped like a U.
- A muzzle. We used about 2-3 feet of 2" PVC.
- All bunch of fittings to go from the sprinkler control valve threads to the muzzle.
- Plumbers tape for sealing the threads.
- A bike pump with a pressure gauge.
- A Schrader valve. (We actually used fittings that were made for an air compressor, but they leaked a little. You might be able to just take a valve off a bicycle tire and epoxy it in somehow.
- Two switches. One switch for the safety and one for the launch button.
- A 9 volt battery and a 9 volt battery connector.
- Some wire to connect it all together
- Zip ties for holding the button assembly to the body of the cannon.
- PVC Primer and Cement for holding it all together.
- T-shirts!

Tools

- Drill for drilling the holes for the end-cap valve.
- Saw for cutting up PVC. We used a wood saw. A hack saw would work too.
- Soldering iron and solder for the wires.

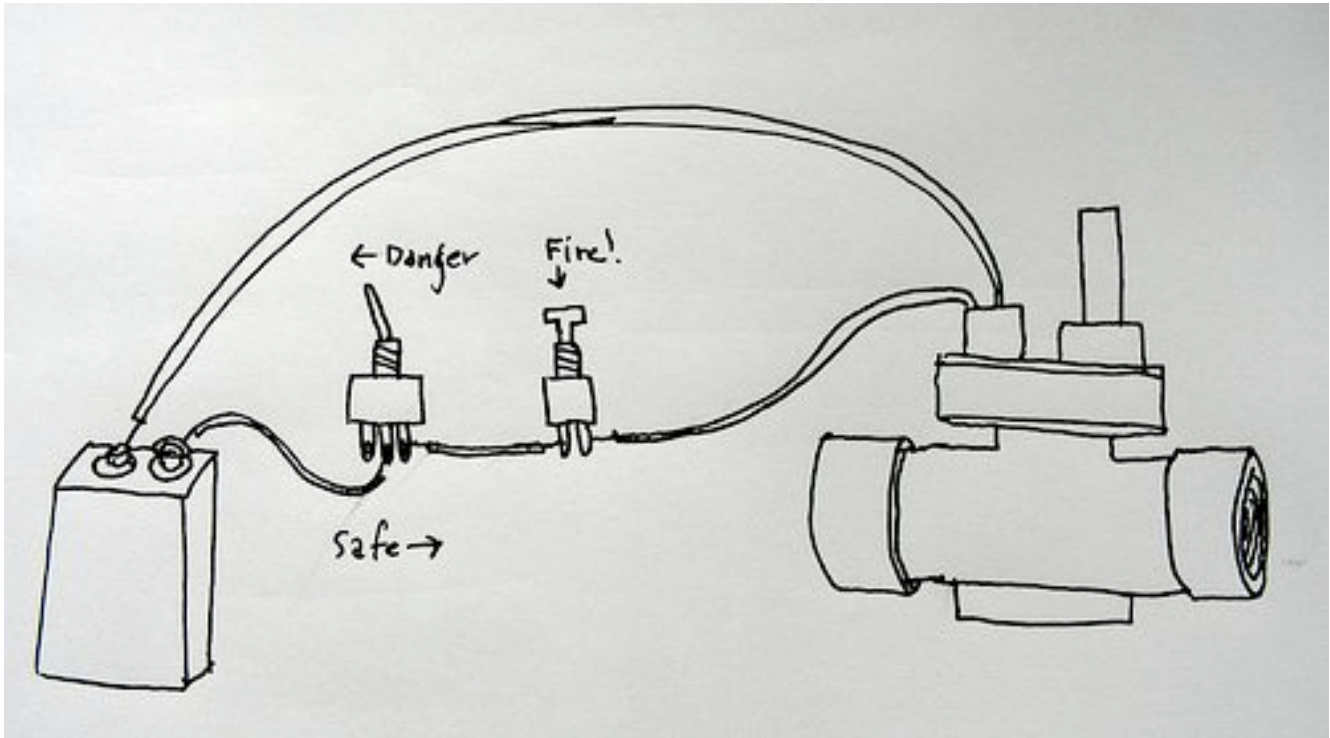
Once you've got everything, it's time to put it together! Follow the instructions on the package for using the primer and cement to put all the pieces together. I've heard horror stories of people who forgot to cement everything and then under pressure, a piece flies off. Make sure to get them all!

Then use plumber's tape to seal the threads and screw in the valve. You don't need to use cement on this, since the plumber's tape will seal it.

Let it dry overnight to ensure a good bond.

The Electronics.

This is a super simple electronics build. You hook up a 9 volt with a battery harness and set it up so that when the safety switch is set and the button is pushed, the sprinkler control valve gets the juice.



Firing it!

In theory, I've heard of people putting a lot of pressure in these things, but we didn't have a pressure gauge, so we conservatively only put about 60 pumps of the bicycle pump into the canon. We pumped until it started to get a bit harder to put air in it. People who have done this report on the internet talk about filling it to 80 and 120 psi, but I think they may be exaggerating. Start off with a few pumps and work up from there. I've been around tires when they've blown at 30 PSI and that was enough excitement for me. Be safe!

Roll your t-shirts tightly and make them fit nice and cozy into the muzzle. A tight fit will let the pressure from canon go towards firing the t-shirt instead of letting the air pass by.



Be careful where you point this thing and treat it with respect. Obviously, don't point it at anyone directly and always lob t-shirts into crowds! You are responsible for the T-shirts you lob!

If you make this project, be sure to take pictures and upload them to the Make: flickr pool at <http://flickr.com/groups/make/pool>. Be safe and have fun!



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