

Hose Connect Launcher

This launcher is very popular in Japan, probably partly because it is very easy to use, and works very well. The main disadvantage of this launcher is that you can only launch rockets that have smaller nozzles. I do not use this launcher anymore, mainly due to the very large and heavy base that I had to transport.

Materials:

- • 1 tubeless tire valve
- • 2 clamps (metal; look at second pictures below)
- • 2 feet of hose, although the length is optional, but 1-2 feet is a good length
- • 1 garden hose fitting (male and female parts)
- • 2 screw eyes
- • 1 plank of wood

Instructions:

The first step is to insert the tubeless tire valve into the garden hose. Put the two clamps around the hose, and tighten them so that they make an air tight seal. Make sure that you leave a short part of the valve sticking out to attach the pump to. Next drill three small holes in the garden hose fitting (the part which you pull down to release it; picture below). Put some strong string through these three holes, and tie the string together. Then take a long piece of string and tie it onto the end of the three pieces. This is the release string. Put the garden hose fitting, which you just attached the string to, onto the garden hose (not the end with the tubeless tire valve), and make sure that it is very tight. The launcher is finished, you just need to make a base for it. Cut the plank into 3 pieces; one long piece about 1.5 meters long, and two other pieces just over half a meter long. Make a 'T' shape with the long piece and one of the smaller pieces, with the longest piece as the top of the T. Drill some small holes into the wood close to the joint, and attach the pieces of wood together. At the top of the T, attach the third piece of wood vertically. If you use screws, then you can unscrew the launcher to transport it later. Finally, attach the launcher to the base using string, cable-ties, or some other sort of clamp. Drill two small holes in the wood just below the launcher to run the string through.





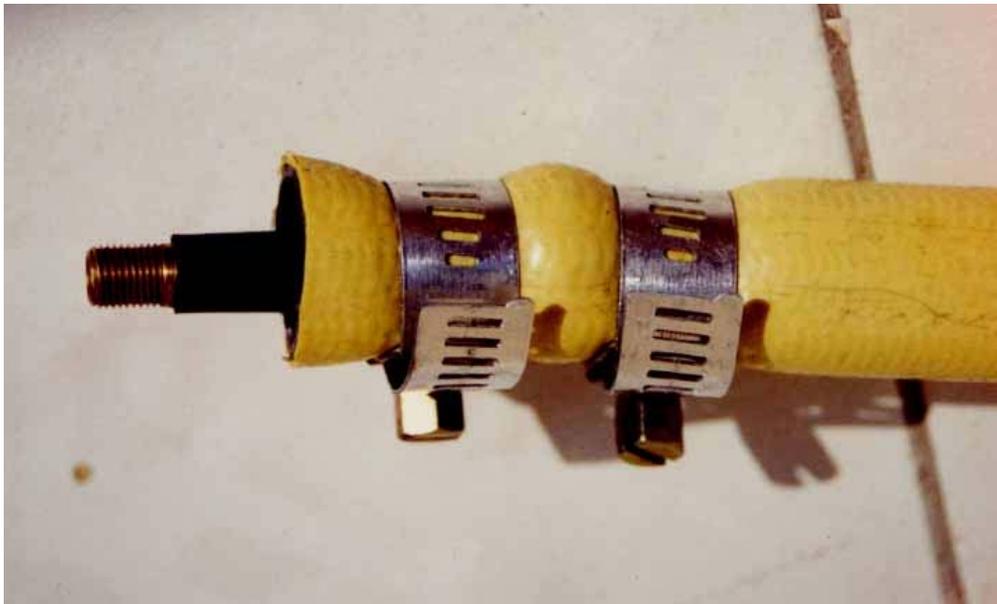
This is the garden hose fitting with the string attached to it. It is in the release position (the orange plastic piece is being pulled down).



This is one end of the garden hose fitting, with a bottle cap glued in to make the nozzle.



The same as above, but from a different angle.



This is the garden hose with the two clamps holding the tubeless tire valve in place.

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How to Build the Launcher

What You Will Need

For a hand held launcher you will need

- 75 mm of garden hose
- 600 mm of 15 mm diameter copper pipe (a plumber gave me this for free). The outside diameter of the pipe should be slightly larger than the inside diameter of the garden hose. Do not use a pipe with a smaller diameter, it will not make an airtight seal when it is assembled.
- An automotive hose clamp of the right size for the garden hose.
- a 15 mm end cap (for the pipe)
- a car tyre valve (I got mine from a car tyre seller and the guy gave it to me for free)
- a garden hose coupling, the female part that fits on the hose

The hand held launcher is probably not so good as one that you can operate remotely for safety reasons and because you get a bit wet every time you use the hand-held launcher. You also have to close your eyes as you launch to avoid the initial jet of water from the rocket and so you miss the best part of the flight which is where the rocket accelerates to full speed. If you want to convert the launcher into one that sits on the ground then you will also need the following.

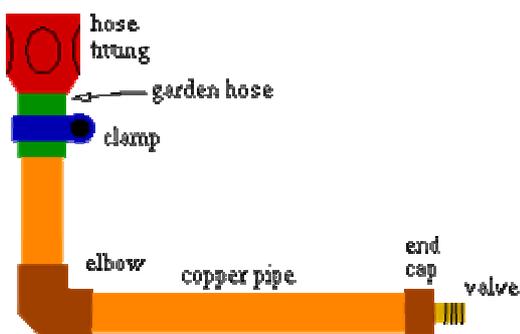
- elbow fitting for the pipe
- three saddle brackets for holding the pipe
- some string
- a plank of wood
- some nails to knock the wood together
- five 120 mm nails

You will need these tools

- plumbers solder and flux
- a propane gas torch
- a wire brush
- a hack saw
- a sharp knife to cut the rubber off the tyre valve
- a hammer
- an electric drill and drill bits
- some vaseline
- a screwdriver
- a tool to remove the inside of the tyre valve

How To Build It

Start with the launcher. The figure below shows how it should look when it is finished. The instructions below describe how to build the hand held launcher shown in the photo with Rick. The list of instructions that follow it describe how to build a wooden support so that you can launch it remotely with a string.



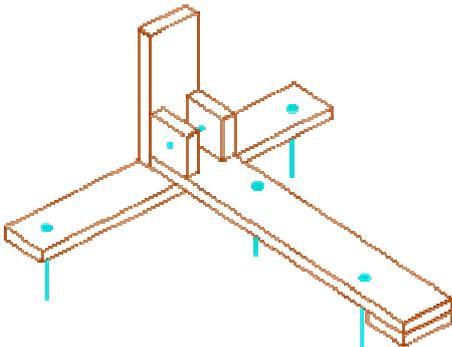
1. Remove the inside of the tyre valve with the tyre-valve-inside-remover tool.

- Cut all of the rubber off the car tyre valve. Make sure every bit of rubber is removed or you will not be able to solder it to the end cap (which is what you are going to do soon). Use a sharp knife and wire brush to clean the rubber off. You may be able to burn small, hard-to-remove pieces of rubber away with a propane gas torch and the wire brush.
- Drill a hole through the centre of the end cap the same diameter as the tyre valve. The valve must be a close fit in the hole so that you can solder it.
- With a wire brush clean one end of the copper pipe till it is bright with the colour of fresh metal.
- Smear some plumbers flux on the cleaned metal and on the end cap and valve. Put the end cap over the pipe and insert the valve into the hole that you drilled. Solder the pieces together with a propane gas torch and plumbers solder as shown in the photo. Try not to get solder on the threads of the valve. Make sure the solder fills all of the gaps.



- File all burrs off the copper pipe at the other end to the valve. Smear some vaseline onto the pipe. Warm up the piece of garden hose with hot water so that it is soft and slip about 25 mm of it over the end of the pipe. Using the screwdriver, clamp the hose firmly in place with the hose clamp.
- Fix the female garden connector to the free end of the garden hose. Cut the hose short with the knife, if you need to, so that the hose connector sits close to where the end of the copper pipe is.

The launcher is essentially complete. You can operate it by hand but I recommend that you follow the next set of instructions and make it so that you can launch it remotely. A diagram of the wooden support is shown in the figure below. The cyan parts are the 120 mm nails.



- Remove the core of the tyre valve and the hose so that they don't melt when you solder the pipes in the next step.
- Cut the copper pipe in the middle. Clean the pipe ends with the wire brush. With the flux and propane gas torch solder the two pieces of pipe into the elbow fitting.
- Put the tyre-valve core and the hose back on the copper pipes.
- Wrap the string around the hose connector so that the ends come out on either side. The string has to be fixed tightly enough that you can use it to pull back the hose connector without it slipping off.
- You need to build a wooden support for the launcher. With whatever pieces of wood you have handy, build the support with nails and butt joints as shown in the figure.
- Use the three clamps to fix the copper pipe to the wooden support: two at the bottom and one on the vertical part. Put a long nail through the side pieces, in front of the pipe. The string on the garden hose will pass behind the nail so that it may be pulled to launch the rocket. The 120 mm nails will probably split the wood when you hammer them in so drill holes for them first. The holes should be about 0.5 mm diameter less than the nails.
- Put the four remaining nails through the wooden support so that they point downwards. They make an easy way of staking the launcher to the ground so that it will not topple over when you pull the launch string.

The launcher is complete! A 6mm rod may optionally be placed inside the copper pipe so that it extends 200 mm or so into the rocket when the rocket is attached to the launcher. This *launch tube* helps guide the rocket as it takes off although, so far, I haven't really needed one.