PVC -- It's Great for Inventions

by **Thinkenstein** on July 15, 2009

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intro: PVC -- It's Great for Inventions

PVC, polyvinyl chloride, is a thermoplastic. It softens with heat and rigidifies when it cools again. While soft, it can be bent and even stretched into molds. Cold, it can be sawed, filed, drilled, scraped, or whittled with a knife.

PVC material can be found at most hardware stores in the form of plumbing pipe. I find it to be inexpensive, especially when I consider all the things that can be done with it -- musical instruments, repairs, tools and toys to name a few.

It is resistant to sunlight damage, has a degree of flexibility, is fairly strong, and is electrically non-conductive.

This is a very valuable material for use in inventions; one that very few people seem to be have experience with.

The picture below shows some of the shapes it is possible to make with PVC.

step 1: Safety while heating PVC

Plastics manufacture and decay tend to pollute the environment and negatively affect our health. That is not why we love plastics.

Vinyl Chloride, one of the components of PVC, is carcinogenic. When it is locked up in the polymer, however, it is much safer to be around. In my years of experience working with PVC, I have not noticed any adverse effects on my health.

Always work in areas with good ventilation. If you do get caught in a cloud of smoke, hold your breath and move to clean air.

When heating PVC with a gas stove or propane torch, try not to let it burn. Smoke from burning PVC is bad. With experience one burns it less and less. Don't panic the first time you do burn some. It scorches, but doesn't burst into flame. Move the material away from the flame and try again. Don't breathe the smoke. Smoke avoidance comes naturally for most people.

While heating PVC over a gas flame, keep the plastic an appropriate distance from the flame to avoid scorching the surface before the inside can warm up. It takes time for heat to travel to the center of the material being heated.

Keep the plastic moving, and keep an eye on the state of the plastic. When heated, the PVC material is flexible, like leather.

step 2: Using Lacquer Thinner to remove lettering

Inventions look nicer without stray lettering on them.

When pipe leaves the factory, it is printed with information about the pipe. Fortunately, a little lacquer thinner and a piece of toilet paper will usually remove the lettering, or most of it.

Lacquer thinner vapors are not good to breathe. Make sure you have good ventilation. Only a small amount of thinner is needed to wet the wad of toilet paper. I poked a small hole in the plug under the cap when I bought the new can, instead of removing the whole plug. That way, I only get the thinner I need, and release the minimum amount of vapors into the air.

Image Notes
1. The green lettering has been removed.

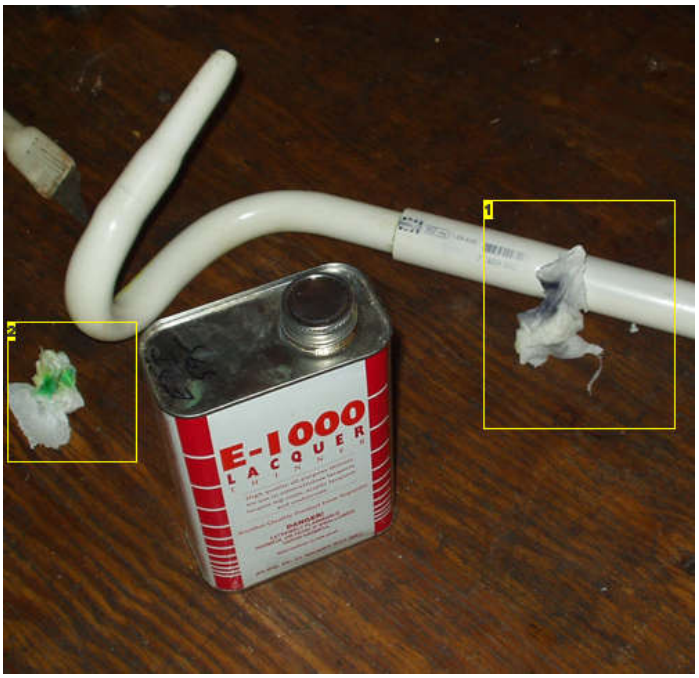


Image Notes
1. Black ink being removed.
2. Green ink removed.

Image Notes
1. Small hole poked in the plug.

step 3: Flattening PVC

To make a flat sheet of PVC to work with, cut a section of pipe and cut the pipe section down one side. Hold it with pliers and heat it over a gas stove.

When the plastic heats up, it will unroll itself and feel like a piece of leather. Place it on the floor and put a piece of plywood, or some other flat object on top of it until it cools. When it cools, it rigidifies again, and you have a flat sheet to work with.

Use a gas stove to heat large areas. Use a propane torch to heat small areas.

The photo below shows a narrow strip of pipe being flattened.

step 4: Bending PVC

In the dust pan shown below, the square body was folded from a flat pattern.

The handle was formed by hand, pressing the heated plastic around a piece of pipe. Protect your hands from hot plastic by using rags.

To speed the hardening of hot plastic, you can cool it quickly with water. I sometimes hold projects under a faucet, use a spray bottle, or sponge them with a wet sponge.

Image Notes
1. Folded corners

Image Notes
1. The handle was formed by hand over a piece of pipe. Protect your hands from the heat using rags, etc.

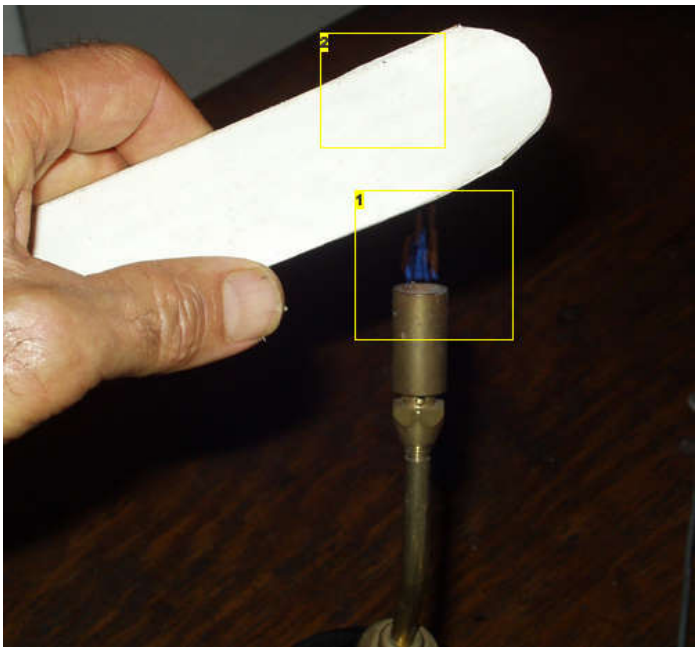


Image Notes
1. Use a propane torch for heating lines, or small areas.
2. This photo is not part of the dustpan project. It just demonstrates use of the torch.

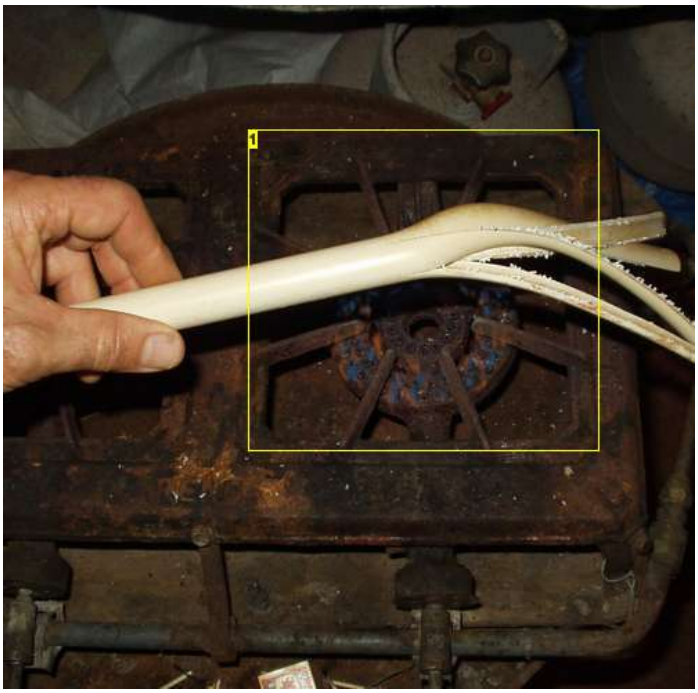
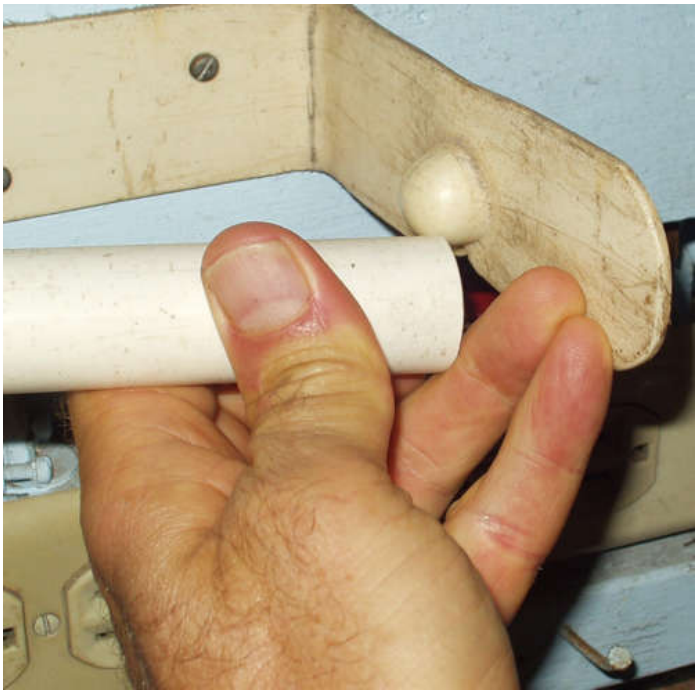


Image Notes
1. Use a gas stove burner to heat larger areas than the propane torch can handle easily. This photo is not from the dust pan project.

step 5: Using molds

A mold is a shape that is used to create another shape. In the case of the toilet paper roll holder shown below, the hole at the end of the central pipe served as the "female" part of the mold. The ball of a ball peen hammer served as the "male" part of the mold. Between the two of them, they forced the flat plastic into a domed shape. When the PVC cooled, it hardened again.

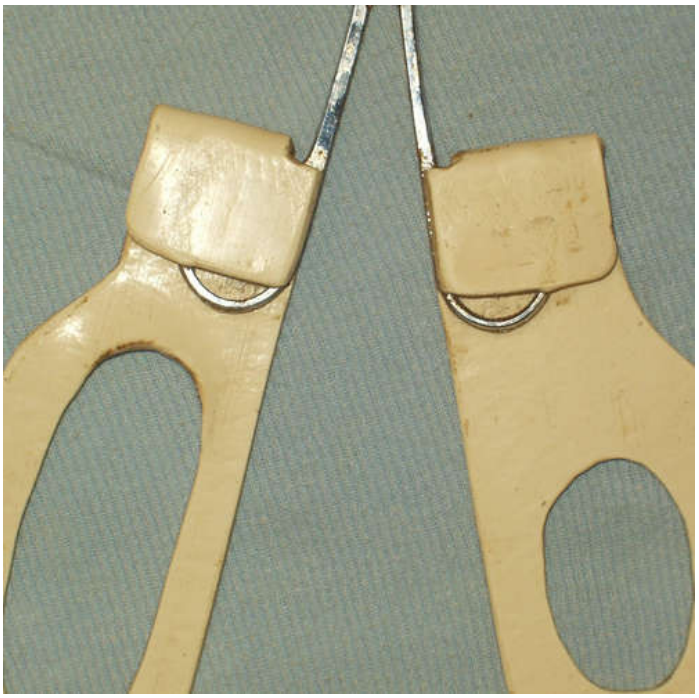
The dome locks into the end of the pipe section upon which the roll of toilet paper spins.



step 6: Example: Scissors Handles

Separate instructables could be done for each of the objects shown here. My goal here is to give you a broad overview of what you can do and to inspire you to invent whatever it is you need.

My fingers didn't fit in the handles of these tiny sewing scissors. I solved the problem by making larger handles and attaching them to the smaller handles. Just fold over the plastic and press hard until it cools.



step 7: Example: Cup Holder

These are two cup holders mounted near my computer desk. It is nice to avoid spilling liquids onto the computer keyboard.

Image Notes
1. The glass rests on a tab bent in from the bottom edge.

Image Notes
1. The cap is formed in a plywood mold (round hole). I used a piece of PVC pipe as the male half of the mold. I filled the end of the pipe with cement to keep it from reducing in diameter as it absorbed heat from the plastic being formed. I used the mold to make lots of caps.

step 8: Examples: In the Kitchen

PVC has solved a lot of problems for me in the kitchen. Move your cursor around the picture to get the details.

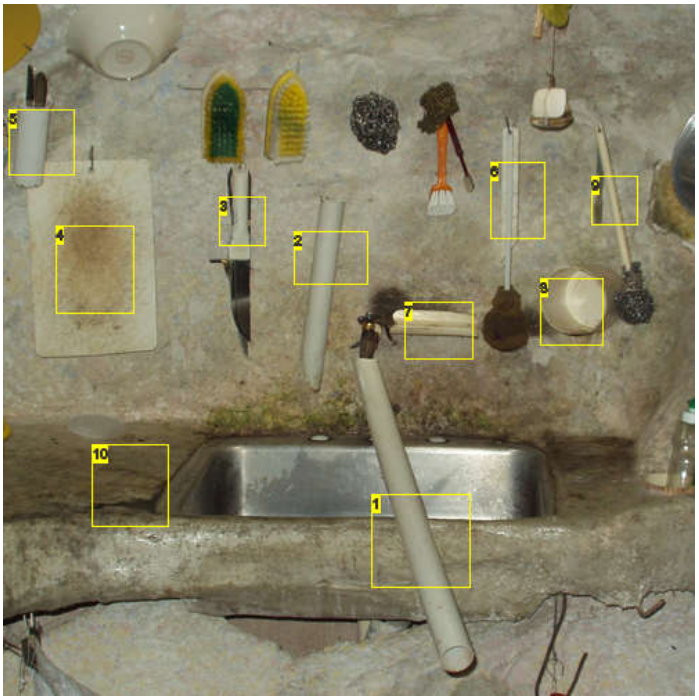


Image Notes
1. A pipe clips onto the faucet for filling 5 gallon buckets on the floor.
2. This pipe takes the place of a hose and pistol for rinsing out the sink. It conducts water from the faucet to any part of the sink.
3. PVC is an easy way to replace a broken knife handle. Just heat it up and jam it over the metal stub that was inside the old handle. Any irregularities in the metal will hold the new handle in place. Make irregularities if there are none.
4. This cutting board is a piece of flattened large-diameter pipe.
5. This section of pipe holds table knives.
6. This sponge ball glass washing tool has a PVC handle.
7. A PVC holder for the dish sponge.

Image Notes
1. Kitchen knife handle.

8. A PVC soap holder.
9. PVC handle for a scrubbing pad.
10. OK, so I'm not a great housekeeper.

Image Notes
1. Holder for table knives.

Image Notes
1. Another table knife holder.

Image Notes
1. Counter top well for holding the detergent.

step 9: Examples: Handles

PVC is smooth, and fits comfortably in the hand. It is great for making handles for things. Just heat the end of the pipe, jam it over what is left of the old handle and squeeze tightly until the plastic cools.

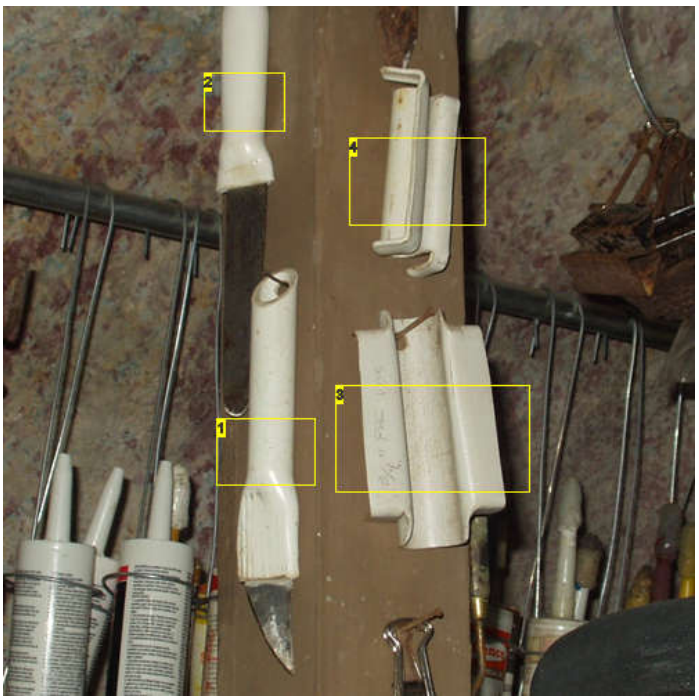


Image Notes
1. A scraping tool using a broken knife blade.
2. New handle for an old knife blade.
3. Vise adaptor for holding 3/4" diameter PVC pipe.
4. Vise adapter for holding 1/2" PVC pipe.

Image Notes
1. Handles for razor blades. Very good for sharpening wooden pencils, among other things.

Image Notes
1. Handles for files. Just heat and squeeze the PVC around the file tang.

Image Notes
1. Kitchen knife handle.

step 10: Example: Fruit Pickers

A friend gave me a light weight fiberglass sailboat mast, which makes a great picking pole. I made an adapter for the end so I could use it with different fruit picker heads.

One has gardening shears mounted on the end. Pulling strings open and closes the jaws. I can cut small branches with it.

The other pole uses a two pole system to open and close a pair of scissors. I use it to snip the stems of fruit.

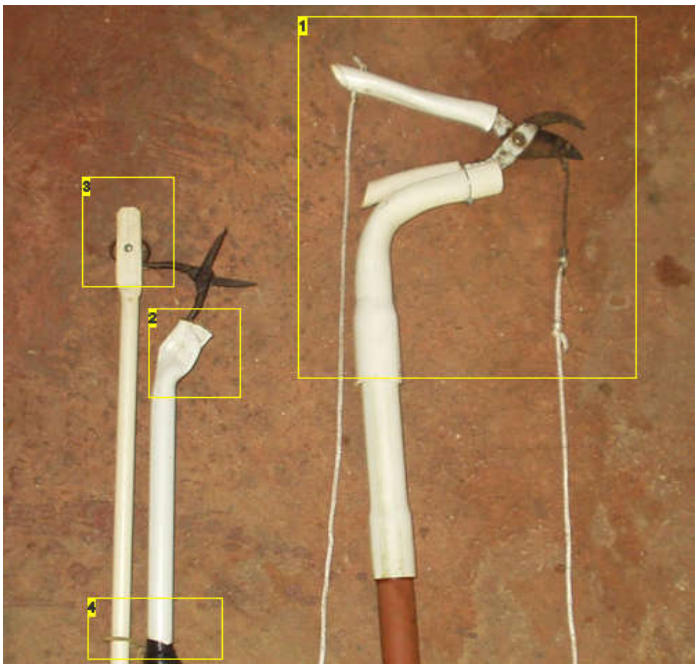


Image Notes
1. Gardening shears are mounted to a pole. The string to the handle closes the jaws and cuts the branch. The string to the jaw opens the jaws of the shears, and helps free the jaws if they get stuck in the branch.
2. One handle is firmly mounted to the base pole.
3. This handle is loosely jointed. Push the pole to the left up and the scissors open. Pull down and the cissors close to cut the stems of fruit.
4. A ring of string attached to the base pole on the right helps control the movement of the free moving pole to the left.

Image Notes
1. This unit converts the tip of the fiberglass pole into a standard pipe size upon which different picking heads can be mounted.

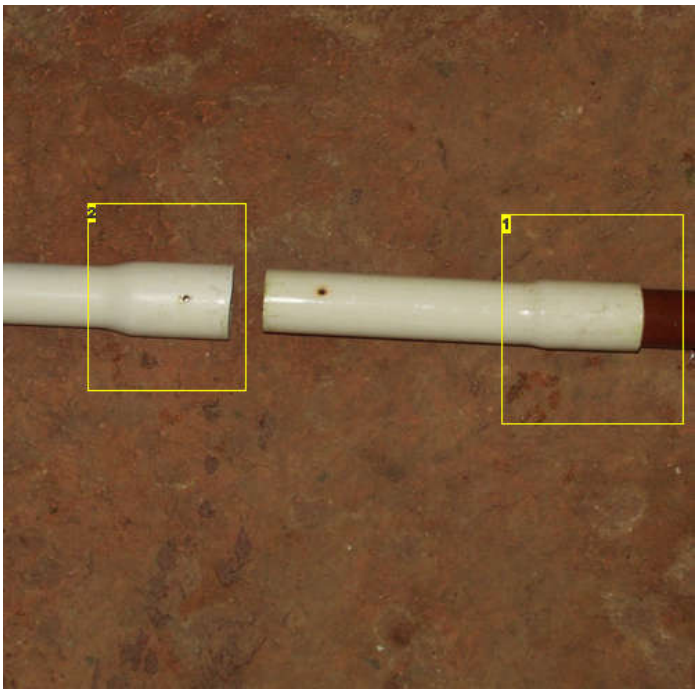


Image Notes
1. Heat-formed to fit the end of the fiberglass pole.
2. If your pipe doesn't already have a usable socket at one end, you can heat form your own socket over another piece of pipe. Round the edges for easier

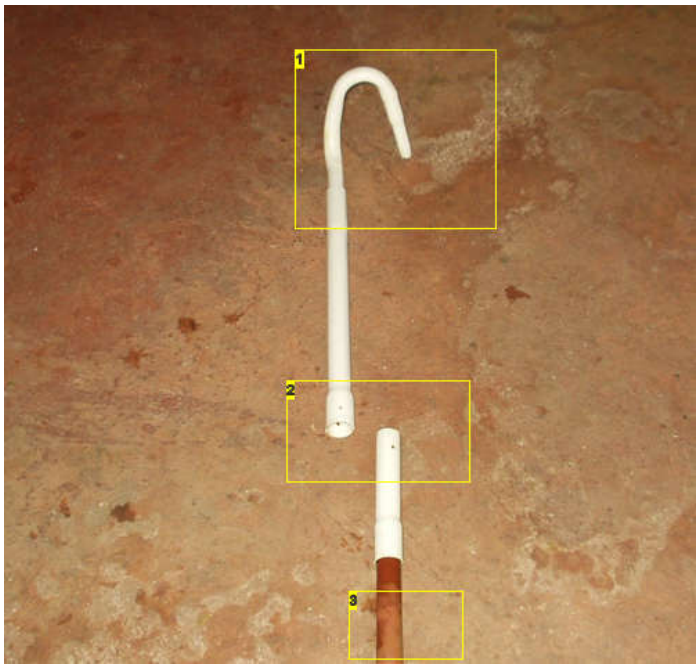


Image Notes
1. This is a big hook for pulling down breadfruit.
2. A hole for a locking pin (nail) keeps the socket joint from pulling apart. It also allows replacement with other picker heads.
3. A friend gave me a fiberglass sailboat mast, which works great as a pole

entry. Lubricate the mold pipe with dish detergent, if necessary. When cool, the formed socket taps off of the pipe with a block of wood and a hammer.

base to mount various picker heads on.

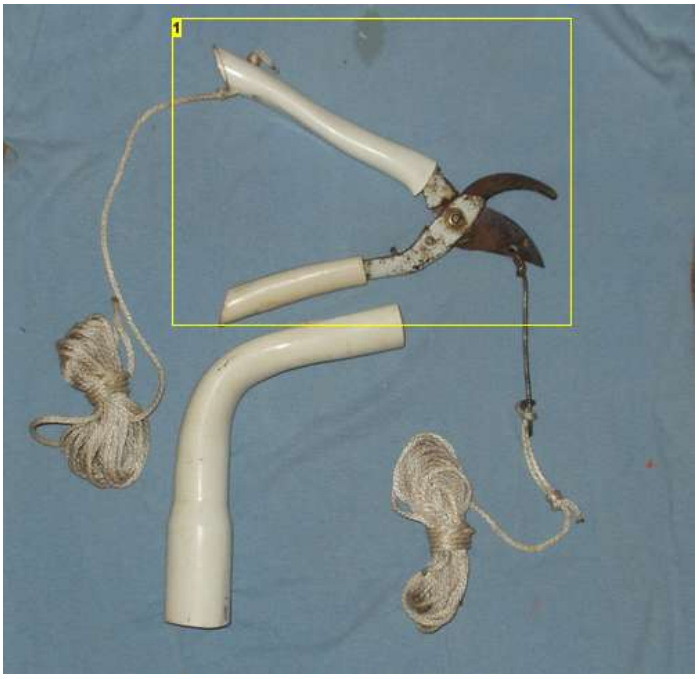


Image Notes
1. The shears can be removed from the handle and used independently.

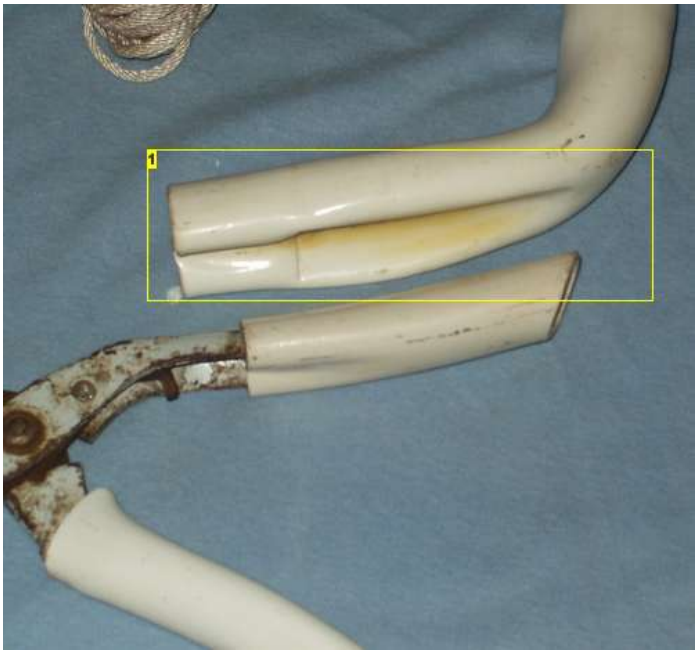


Image Notes
1. The heat formed end of the pole conforms to the shape of the pruning shear handle. The handle is held firmly in this cradle by a piece of wire which wraps around them.

step 11: Examples: Mixed

This is a collection of left over odds and ends.

I think that when the inventors in the Instructables community start playing with this material more there will be an explosion of new ideas.

"Necessity is the mother of invention." See what you need and try to make it.

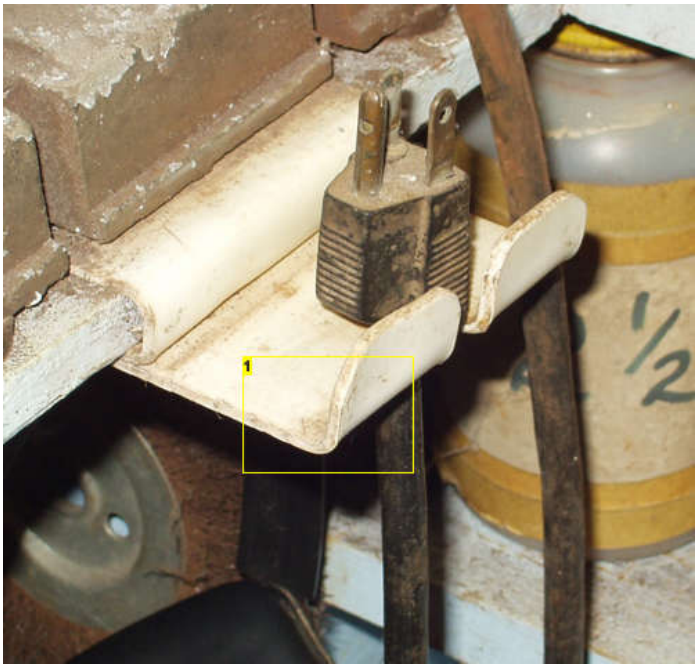


Image Notes
1. This holds the plug end of the cord for my bench grinder.

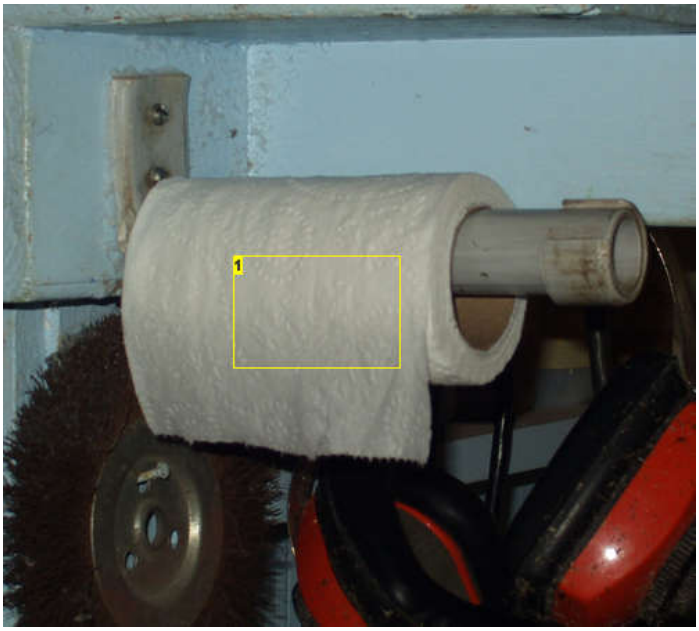


Image Notes
1. Another toilet paper role holder in the workshop. Toilet paper is cheaper than paper towels for small jobs.

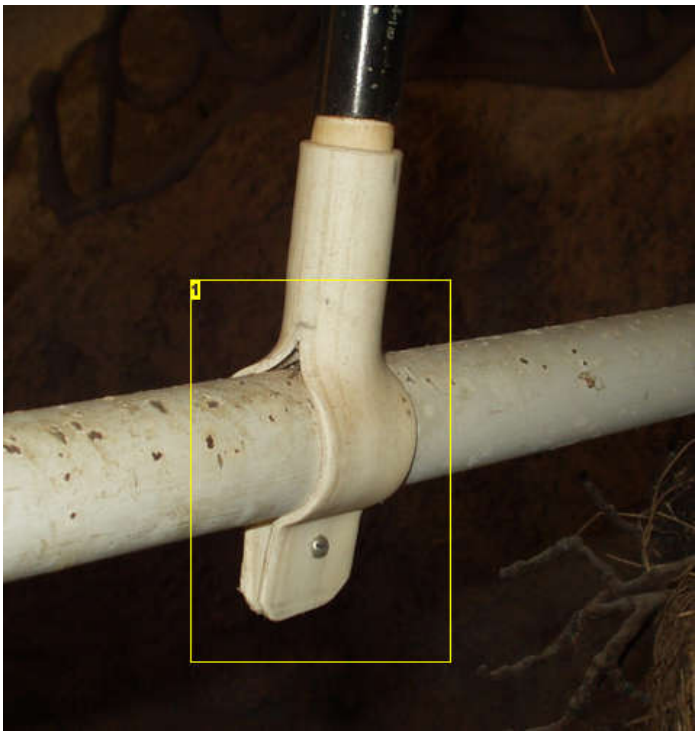


Image Notes
1. This is a clamp for mounting a musical instrument to this pipe.

Image Notes
1. This ball joint allows the lamp to swivel in all directions.

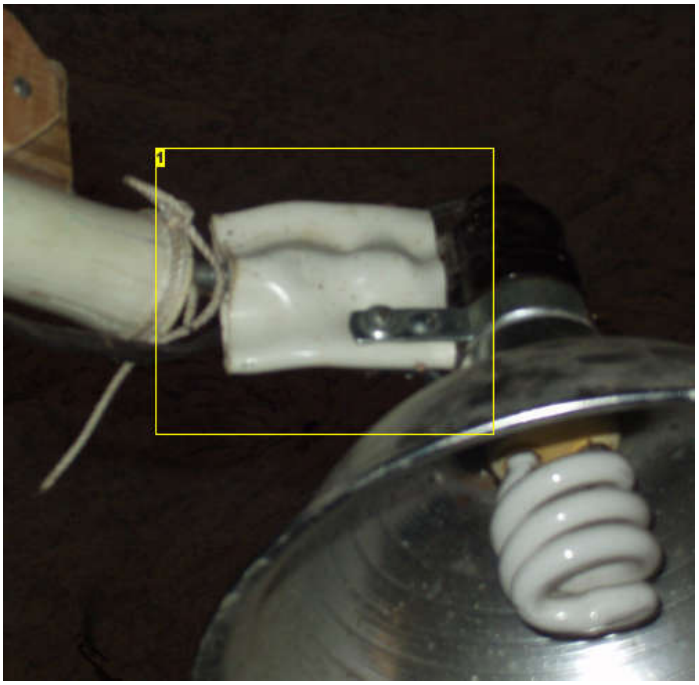


Image Notes
1. The other side of the ball joint adapter. Whatever metal shape that is inside is pinched firmly and held solidly.

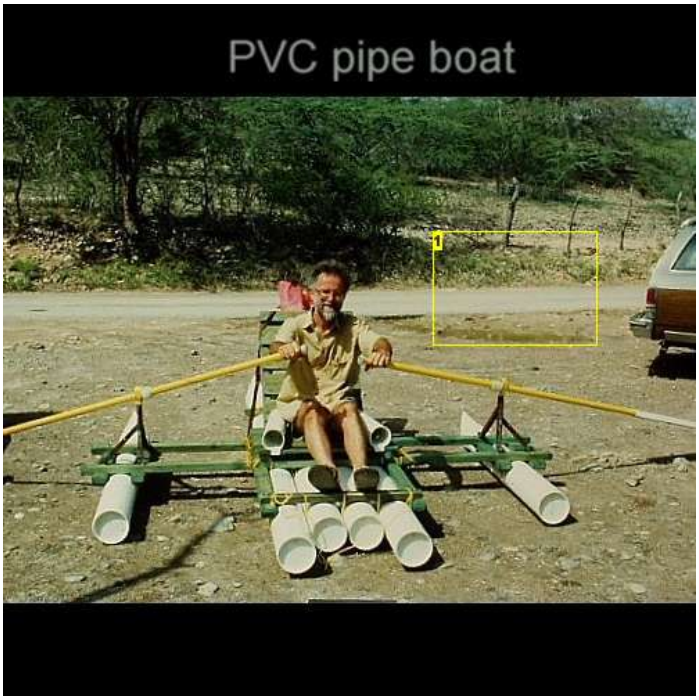


Image Notes
1. This "boat" floated in about 3 inches of water. It was not very good in choppy water, though.

Related Instructables

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variation on the marshmallow gun by Xander da gr8

PVC Bo (Fighting Stafff) by Izanagi Telos

How to make a spanner(wrench) out of pvc. by Oorspronklikheid