The Firepiston – Ancient Fire Making Machine

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What sounds amazing - a tube of wood that could instantly create a hot coal with just a quick push of a piston or plunger-and it had been used for ages.

How does it work?

Air gets very hot when it is compressed under high pressure.

A classic example; would be the heat that is created when one uses a bicycle pump.

But when the air is compressed in a firepiston it is done so quickly and efficiently that it can reach a temperature in excess of 800^{o} degrees Fahrenheit.

This is hot enough to ignite the tinder that is placed in the end of the piston which has been hollowed out to accept it.

Ancient examples of the tube itself are of hardwood, bamboo, or even horn.

It is closed on one end, very smooth inside and accurately bored.

Equal care is taken in the creation of the associated piston.

A "gasket" of wound thread, fiber, or sometimes leather insures a proper seal for successfully creating the compression.

This gasket is "greased" to help with the seal and to allow free travel of the piston.

Natives believed that the firepiston wouldn't work unless it was greased with fat.

The natives of the Philippines say to use the grease of a wild pig from the jungle.

Shortening has been shown to work, just fine.

You might also want to try a combination of bacon fat mixed with a little candle wax, which is what outdoorsman John Rowlands used on his firepiston.

An article by Richard Jamison in a 1994 issue of Woodsmoke contains a nice description of how to operate a firepiston:

"...the cylinder is held firmly in the fist of the left hand: a small piece of tinder...is placed in a cavity on the point of the piston, which is just entered into the mouth of the bore; with a sudden stroke of the right hand the piston is forced down the bore, from which it rebounds slightly back with the elasticity of the compressed air, and on being plucked out, which it must be instantly, the tinder is found to be lighted."

As you can probably see, this ancient firemaking machine is utilizing the Diesel principle.

Making the Firepiston:

Great care is necessary in making a working firepiston.

Also, it is said that there's some technique to working it.

Many, warns that "it takes patience and practice and not to be disappointed if your first firepiston doesn't work."

Other sources also speak of the need for practice.

On the other hand there are those who say that if care is taken in the manufacture, and easily ignited tinder is used, it shouldn't be a problem.

Make the tube for the firepiston out of a short piece of quarter-inch brass pipe or 3/4” to 1” wooden cylinder.

The secret of making it was to have a small, smooth bore with one end closed.

Then there must be what is called "packing" on one end of the piston.

This means what has been referred to as the "gasket."

Then hollow out the end of the plunger to a depth of no more than one-eighth of an inch and that's where the tinder is inserted.

The plunger is made out of a large nail with the end cut off square.

Then put a groove around the circumference of the nail or wooden shaft as close to the end as possible which will serve as a place for winding on the thread for the gasket.

Make sure the body of the nail or wooden shaft is very smooth and then grease the gasket with the bacon fat and candle wax mixture.

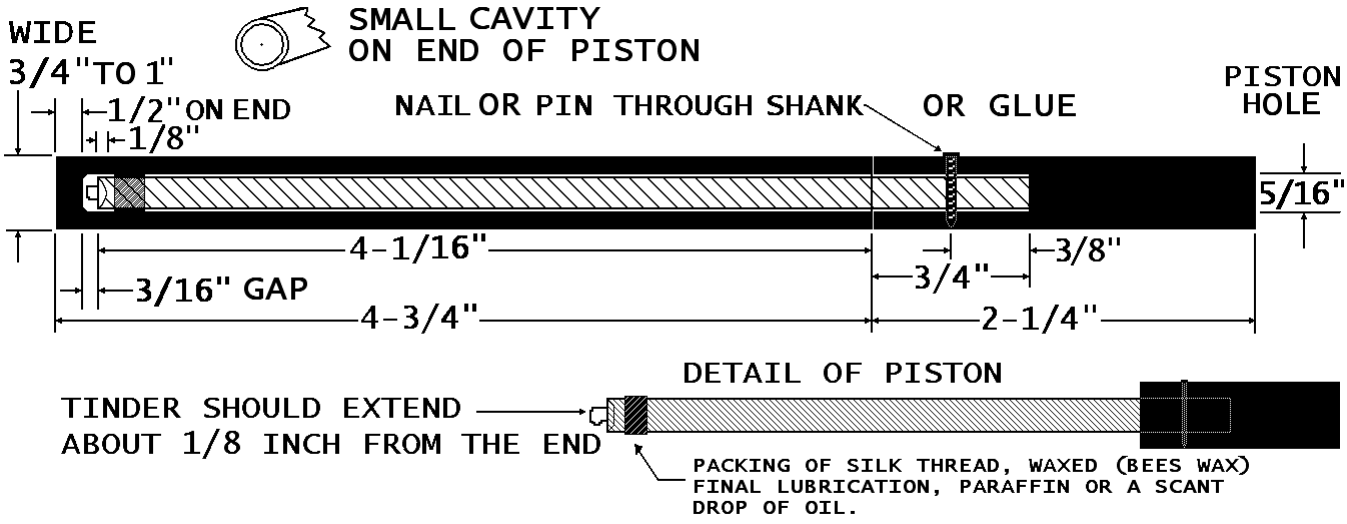
A wooden handle is fastened to the other end of the piston for a grip.

One could either solder the end in the tube or make a threaded plug for it or make the wooden shaft longer, taking care to adhere to the dimensions specified in the drawing.

It is indicated that the speed and force of the thrust had a lot to do with making it work right.

It is suggested putting the end against a tree or wall and then giving the handle a quick shove.

Best used is a charred cotton rag or finely shredded bark and it must be absolutely dry.



WIRE PICK FOR GETTING
THE GLOWING TINDER
OUT OF THE PISTON

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A Traditional Firepiston:

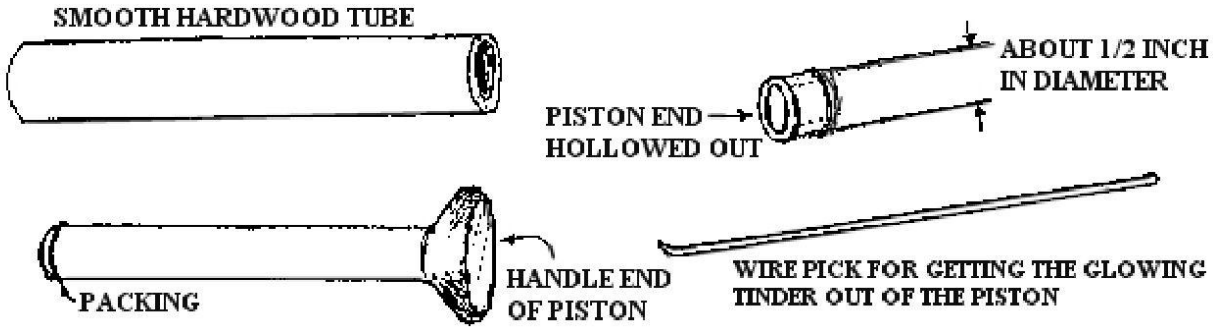
Here's a drawing for a traditional wooden firepiston.

The cylinder is 4" to 7" long and 3/4" to 1" in diameter.

Make the inside diameter around 1/4" to 1/2".

Follow the drawing for making the piston.

The walls of the bore must be perfectly straight and polished smooth.



http://www.onagocag.com/piston.html

Wrapping a Fire Piston Gasket – Troubleshooting

Wrapping a Fire Piston cotton string gasket can be a tricky process until you get the feel of how tight (or loose) you need to make it. Typically it takes several attempts until you get it so that it still fits into the piston bore but still is holds the compression when the piston is pushed down so that the pistons "rebounds" a little at the bottom of the stroke (indicating that there was a lot of pressure in the cylinder.) The more pressure inside the cylinder, the easier the tinder will ignite... and to get more pressure you need a gasket that will hold in as much of the air as possible in the cylinder as you hit the piston down into the cylinder.

Here are a few tips that might solve you gasket wrapping problems...

First let's go over compressing the gasket once you wrapped it according to the instructions for the Fire Piston:

Grasp the piston plunger by the handle in your left hand and place the plunger on a kitchen counter or table top such that the handle over hangs the edge and the shaft lays flat on the surface. Lay a metal ruler, narrow wooden board, flat side of a wide knife blade, (anything wider than the gasket, rigid and flat will do) on top of the gasket, press down and roll the shaft between the two flat surfaces. The harder you press down, the smaller the gasket diameter becomes.

If it squeaks as you insert the piston into the cylinder, it's a little too tight in the bore and the string gasket needs just a bit more rolling to compress the diameter. You can use any smooth, hard item as a "roller" to push down on the wraps to compress them further. Use increasing amounts of pressure on the roller until the piston travels smoothly yet still has full contact with the cylinder walls.

Don't over-do the amount of rolling force as this can result in a gasket diameter that is too small and wont seal. Go slow - roll, fit and feel + repeat as necessary.

Initially, the string needs to be really "gobbed up" with Vaseline and worked up and several times to force the grease into the fibers. You can actually dip the shaft into the jar of grease. As compression increases the air will find escape pathways and the grease will be forced into these areas. This is important and probably the number one reason for difficulty with Fire Piston kits.

The most significant tips are as follows:

- Maintain tension on the string while wrapping. You usually need to pull the string tight every couple of wraps. This helps in keeping the fibers close together and compressed against each other.

- Roll the completed gasket to eliminate lumps and bumps

- Grease it excessively at first to seal the fibers, and then wipe off the excess. Make sure there is no grease left at the bottom of the bore as this will inhibit ignition. Charcloth left at the bottom will also prevent ignition.

You may have to try wrapping the gasket several times until you get it right but in the end it will be well worth it as you amaze your friends with this amazing fire making device.

http://www.survivalschool.com/articles/Fire_Making/Fire_Piston_Gasket_Wrapping.htm

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