Root Simple

WEDNESDAY, MARCH 28, 2012

A Rocket Stove Made From a Five Gallon Metal Bucket

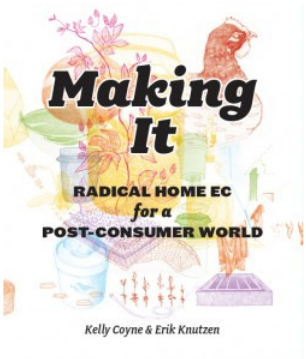
The principle behind a rocket stove is simple--rather than cooking on an open fire, you burn wood in an insulated chimney. Rocket stoves are highly efficient and easy to make. They run on twigs, so you can avoid cutting down a whole tree just to cook dinner.

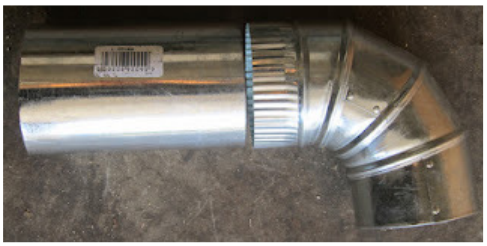
We've had a rocket stove made out of brick in our backyard for several years. The post we wrote on it in 2007 is--oddly--the most frequently searched post on this site. I figured that since there was so much interest in the topic it would be good to offer one that didn't require masonry work. Better yet, I figured that it should be portable, so I made it out of a five gallon steel paint bucket. (*eta: for your googling pleasure, it seems retailers call these cans "steel pails" rather than buckets*). The project took less than an hour to complete and I'm very pleased with the final result. We created a pdf with full instructions that you can download at the Internet Archive. What follows are some photos showing the building process:

ALL CHANGE BEGINS AT HOME

Root Simple is about back to basics, DIY living, encompassing homegrown vegetables, chickens, herbs, hooch, bicycles, cultural alchemy, and common sense. We're always learning, figuring stuff out, taking advantage of the enormous smarts of our friends and our on-line community, and trying to give some of that back in turn. Root Simple is a gathering place for everyone. Welcome.

OUR BOOKS





Using a piece of 4" vent pipe and a 90° elbow, I made the chimney. See the pdf for the exact dimensions.

I traced the outline of the vent pipe on to the lid of the bucket and cut this hole out with a jig saw. Tin snips would also have worked.

Using the vent pipe as a guide again, I cut out a 4" hole near the bottom of the bucket.

THE ROOT SIMPLE BLOG TEAM

Kelly Coyne
Erik Knutzen
Eric Thomason
Julia Posey
Lora Hall

I used one part clay (harvested from the yard) to six parts vermiculite as my insulation material. Mixed with water, the clay holds the vermiculite together. I could also have used dry wood ash, but I had the vermiculite and clay on hand so that's what I went with.

With the vent pipe in place, I packed the insulation into the bucket and let it dry for a few days before putting the lid on.

I found a barbecue grill at Home Depot that rests on the top of the bucket to support a pot.

Next you want to get yourself a tin can, take off both ends and open it up with tin snips. Cut a piece to serve as a shelf in the mouth of the pipe. It should be about 4" long--so it sits forward in the mouth of the vent. The rear part of the vent, where the fire burns, is open. The twigs rest on top of the shelf, the lower half is for drawing air.

The last step was to add the new Root Simple stencil to the back.

Some fire tips from the little lady, our resident pyro:

A rocket stove isn't like a campfire--you don't throw on a big log and kick back. Cooking on it is intense and concentrated, best suited for boiling or frying. The best fuel source is twigs, small ones--I prefer pencil-sized twigs, and I never try to burn anything thicker than a finger.

To start a fire just shove some paper or other tinder under the shelf toward the back of vent. Lay some very thin twigs, pine needles or other combustibles on the shelf. Light the paper and watch it go. Start adding larger twigs to establish the fire. Of course, twigs burn fast and hot, so you have to keep adding more fuel. Also, the twig are burning from the back (the fire is concentrated in the bend) so as the fire consumes the sticks, you just keep shoving the unburned parts to the rear.

There's a balance between choking the vent with too much wood and having too sparse a fire. After a few minutes of playing with it you'll get the hang of things. If

you're doing it right, there should be no smoke, or almost none. These things burn clean.

Let us know if you like the pdf and if you would like to see more similar instruction sheets (maybe in an ebook format) of these types of projects. There's also a good book on using rocket stoves as heaters: Rocket Mass Heaters: Superefficient Woodstoves YOU Can Build by Ianto Evans and Leslie Jackson.

Posted by Mr. Homegrown at 3:00 AM

+8 Recommend this on Google

Labels: appropriate technology, rocket stove

26 comments:

Sara A. 3/28/12 4:49 AM

This is awesome. Do you use yours at all or is it just for fun? If you do cook with it, I would be interested in seeing some action shots. Or recipes.

Reply

Replies

Mrs. Homegrown 3/28/12 7:40 AM

It's mostly for fun, demo, and emergencies. When we were redoing our kitchen years ago we cooked off our brick one extensively.

We should do a video. We have an overall plan to do lots of how-to videos and that would be one. But in the meanwhile we can try to get some pics of the thing in action and add them to the post.

In terms of recipes, there really are none that we've developed. It's good for fast cooking, boiling things up, scrambled eggs, a quick stir fry. It could be used in conjunction with a hay box to do slow cooking. Also, some people have modified this technology to make ovens, which is really interesting.

Reply

Anonymous 3/28/12 6:22 AM

Cool - but where does one find a metal five-gallon can? All the 5-gal containers I come across while scavenging are plastic. Are there certain commercial paints/etc. that still come in metal cans?

Reply

Replies

Mrs. Homegrown 3/28/12 7:46 AM

Here in LA we're lucky enough to have a place called Apex Drum which is an old company which sells new and used barrels, drums and buckets of all sorts. We got

ours used there. So, that kind of joint. There should be that sort of place in most major cities. Or painter's supply stores, perhaps?

You could also order one online--search "5-gallon steel pail" and you'll see lots. Don't know where you'd scavenge one, since they're not much used on building sites. Classy housepainters? The problem is that these things are tough, and more expensive than plastic, so people are less likely to abandon them in good shape.

Mark McDermott 5/15/12 9:55 PM

I was just checking at Home Depot: some roofing tar still comes in steel 5 gallon pails, I'm guessing the stuff is too heavy for a plastic pail to support it.

I'll be asking around for anyone who can save me a pail, maybe freecycle and such, but otherwise, you can get new ones from www.grainger.com. They have stovepipe, too, but vermiculite only in insulated gloves.

Unknown 6/26/12 11:57 AM

I work at a cabinet shop. Many finishes come in the pails you are looking for. 5 gallon kerosene and lacquer thinner cans could also be used.

Anonymous 7/2/12 8:15 PM

Lowes has a 5 gallon metal garbage can that might work.

Reply

Alison 3/28/12 9:19 AM

query about the vermiculite... would using coarse or fine vermiculite work better, if I needed to purchase it, since it comes in various sizes of granules. Also, do you think that 1/8" pumice granules would work instead, as those are also available to purchase and are a lot less expensive.

Reply

Replies

Mr. Homegrown 3/28/12 2:21 PM

The course would probably be better. We think the pumice would work, too. Worth a try. If you do it, tell us how it goes.

Remember you can always use plain ash for the most cost savings. Our first stove was stuffed with ash that I gathered from the bbq grills in the public park. (If you do, remember that ash doesn't need clay added, and you don't wet it. Just pack it in.)

Reply

Megan 3/28/12 11:04 AM

Another super helpful post. I love Root Simple.

Zach and I were thinking about a rocket stove. (Well, I was telling him we should make one while he nodded silently). :D

Reply

Sam Smith 3/28/12 11:12 AM

Perlite will work just as well for a cooking fire, running it to metal melting temps will melt the perlite, but you wont get there with twigs :)
Pottery supply stores sell all kinds of powdered clay, fire-clay can be used instead of yard clay, if you don't have any yard clay or don't want to dig up your yard to get some :)
If your creative with rivets you can make a cylinder or box to house the clay/vermiculite from galvanized 36ga roof flashing metal (home reno store). Old washing machine / stoves have a lot of metal on them, would need a saw and a lot of elbow grease, local dumps (scrap yards) often have all kinds of metal cans.

Reply

Anonymous 3/28/12 12:59 PM

I use a "T" rather than an elbow in mine. Allows space for coals to build up. You empty it less and get a hotter fire.

Reply

Replies

Mr. Homegrown 3/28/12 2:22 PM

Nice idea! I can see how that would work well.

Anonymous 3/29/12 2:37 PM

Also, I've found a 4" horizontal piece feeding a 6" vertical riser is a good combination. I've used big tomato sauce cans connected together. The metal will eventually burn out, so better to insulate with a combination clay/ash or clay/perlite otherwise the loose perlite will flood into the burn zone.

Reply

Anonymous 3/28/12 1:32 PM

Thanks Mr. and Mrs. Homegrown. I have been thinking awhile of trying my hand at it here in Phoenix, AZ. Love your site.

Reply

sara 3/28/12 1:44 PM

I worked at a recycling yard for over seven years and never did trip over anything suitable for stove construction. This past Christmas, like on the

Eve, we wound up at the Home Despot, shopping for venting material and some heavy-gauge wire to support the vent in the stove proper. This was all in a quest to steam our holiday tamales faster and more efficiently than in the huge pot on the stove indoors. We converted an aluminum food dehydrator, of all things. Removing shelves and wiring, and then inserting the vent and the rack to balance the tamale pot. Worked like a charm!

Reply

Replies

Mrs. Homegrown 3/29/12 7:46 AM

Very cool!

Reply

Eric 3/28/12 4:28 PM

That looks great! I don't think you need to mix clay with the vermiculite though- it won't burn, and you have the lid to hold everything down. Just top it off in a few months as it settles slightly.

Reply

Practical Parsimony 3/28/12 11:38 PM

As luck would have it, I just acquired a metal five-gallon bucket)along with a topless garbage can that I have a lost lid to fit). I see more metal lids than metal buckets.

I have three massive oaks and a hickory tree that continually drop twigs, so this would make use of what falls and gets hauled to the dump. Now, I just need to visit the parks and get ash.

Even though I have a propane grill, the rocket stove sounds like a cheaper way in an emergency. I saw your brick stove and it looks so quaint.

To say it rains lots here is an understatement. Building this where a metal garbage can could be placed over the grill for protection seems like a way to keep it dry. Or, would just a piece of metal over the top be sufficient.

Since bending/stooping/squatting is a problem for me right now, can this be made taller or higher?

Reply

Replies

Mrs. Homegrown 3/29/12 7:53 AM

This steel bucket model is truly portable, so you could move it in and out of shelter when you're not using it, or yes, you could cover it with whatever is handy.

And if it's properly insulated, the bottom doesn't get hot (as far as we've seen--proceed with caution!), so you can put it up on a table or anything you like to get it to a good height.

Reply

Practical Parsimony 3/29/12 11:57 AM

Thanks. I thought the base provided insulation or heat retention. I also have tables.

Reply

Marty 3/31/12 9:03 AM

This looks neat but people should be aware that at high temperatures, zinc burns out of galvanized steel, creating zinc oxide vapor which can induce "metal fume fever," a poisonous, but temporary, condition.

http://www.osha.gov/doc/outreachtraining/htmlfiles/weldhlth.html

Don't know if this stove gets hot enough to be a problem or if there's a good alternative, but zinc oxide poisoning has come up in other DIY stove discussions.

Reply

fixer 4/1/12 3:32 PM

I'm working on an emergency hot water system, designed around a passive solar build, but am now thinking using a steel 55 gallon drum with a rocket stove underneath might be a great assist. Make the stove movable so it's under a grate with a cast iron griddle on top, or slide it over a couple feet and it's under the water barrel

Reply

Troy Young 4/6/12 5:28 AM

That's awesome! I can't wait to give this a try. Thanks for the great tutorial and pics.

Reply

Anonymous 5/26/12 8:40 AM

I have some old cast iron (black) drain pipe with a 90deg angle in it could I cut it down and use it? it might retain heat as well as last longer then the vent pipe. I would blow torch it a bit to burn off any left over "stuff" in it. Just thinking since I see this type of pipe around remodels, as they take it out and put in PVC like they did mine.

Reply

Best Built Construction, LLC 5/27/12 6:39 AM

Just a thought about galvanized pipe...
Welding galvanized pipe can kill you or at the least make you very ill. I would suggest using black chimney pipe that doesn't have a zinc coating.

Reply

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