Transcript: How to build a Rocket Stove Water Heater!!

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**[00:00:00]** welcome back to the channel in this

**[00:00:01]** video we are building this rocket stove

**[00:00:03]** that can heat up water is this not the

**[00:00:05]** prettiest rocket stove that you've ever

**[00:00:08]** [Music]

**[00:00:23]** seen I think this looks awesome in the

**[00:00:27]** last couple videos if you're new here we

**[00:00:29]** built this rocket stove I think this

**[00:00:31]** one's a lot cooler because it has a

**[00:00:33]** detachable built-in heat

**[00:00:35]** exchanger can't see the Copper from here

**[00:00:37]** but we have 10 ft of copper coil built

**[00:00:39]** inside of this thing and it heats up

**[00:00:42]** water really fast I'll have a link to

**[00:00:43]** the build video and the test video in

**[00:00:45]** the description if you're interested in

**[00:00:47]** that um but yeah it's got 10 ft of

**[00:00:48]** copper coil inside the the tube so it's

**[00:00:51]** exposed to direct flame and the copper

**[00:00:53]** seems to be holding up just fine I've

**[00:00:54]** used it a bunch of times so far but to

**[00:00:57]** continue this project The Next Step was

**[00:01:00]** to build one out of round tubing and to

**[00:01:03]** put the copper on the outside and I just

**[00:01:05]** want to see how well they compare so

**[00:01:07]** that's what we're going to do in this

**[00:01:08]** video we're going to test this thing out

**[00:01:09]** but before I can test it let me show you

**[00:01:11]** how to build it so let's get to it I

**[00:01:14]** want to quickly thank everybody that has

**[00:01:15]** commented in the last couple videos if

**[00:01:17]** you didn't know commenting really helps

**[00:01:18]** out a video you know we're in a constant

**[00:01:20]** battle against the YouTube algorithm

**[00:01:22]** that's why we ask you guys to like And

**[00:01:23]** subscribe comment all that kind of stuff

**[00:01:26]** um so yeah really helps us out and I

**[00:01:28]** really appreciate it all right here's

**[00:01:29]** our material to get started on this

**[00:01:31]** project we're using 4 in steel pipe it's

**[00:01:34]** about 8 in thick and we're going to cut

**[00:01:36]** this in a few pieces I'm not exactly

**[00:01:38]** sure what the dimensions are at at the

**[00:01:39]** moment let's get this cut up we'll start

**[00:01:41]** getting it shaped once I do that I'll

**[00:01:43]** clean the metal up get all the rust

**[00:01:44]** removed and make it look

**[00:01:57]** nice all right we got our three pie is

**[00:02:00]** cut this will go

**[00:02:03]** there this guy will go right about there

**[00:02:06]** they that looks pretty good somebody in

**[00:02:09]** the last video asked why why do people

**[00:02:11]** make rocket stoves out of square instead

**[00:02:13]** of round tubing I'll show you exactly

**[00:02:17]** why nothing stays nothing stays in place

**[00:02:21]** it's much more difficult to work

**[00:02:24]** [Music]

**[00:02:27]** with I think that's going to look good

**[00:02:29]** I'm going to get the met cleaned up

**[00:02:30]** really good get it nice fresh looking

**[00:02:33]** and then we'll we'll weld

**[00:02:53]** up all right this is what we got this is

**[00:02:56]** still the same rusty metal uh just went

**[00:03:00]** a little overboard on the sanding just

**[00:03:03]** got in the

**[00:03:05]** zone wanted to see this stuff shine

**[00:03:08]** again I know if I look at it wrong it's

**[00:03:10]** going to flash rust but how cool would

**[00:03:12]** it be if we put a mirror finish on this

**[00:03:14]** thing it would look

**[00:03:17]** awesome mirror finish with the copper

**[00:03:19]** going up that would look really cool I

**[00:03:22]** might have to go a little further with

**[00:03:23]** with my

**[00:03:25]** sanding all right I think that's what

**[00:03:27]** we're going to do right there

**[00:03:30]** going to weld that baby up grind it back

**[00:03:33]** down and might keep polishing I'll have

**[00:03:35]** to oil it up after I weld to keep it

**[00:03:37]** from

**[00:03:38]** rusting before I weld anything up I

**[00:03:40]** think I want to add some type of like

**[00:03:42]** sliding door here to control my

**[00:03:45]** airflow um be able to dump any ashes out

**[00:03:49]** so I think that'll be easier to do U

**[00:03:51]** before I weld things up probably also

**[00:03:54]** going to add the expanded metal like

**[00:03:56]** down in here to hold the fuel off the

**[00:03:59]** bottom a little bit so it'll be a little

**[00:04:02]** bit of space between the bottom and our

**[00:04:04]** little airflow

**[00:04:05]** vent so I got to figure out how I'm

**[00:04:07]** going to do

**[00:04:09]** that I grabbed one of the cut off pieces

**[00:04:11]** from our 45 I think I'm going to open it

**[00:04:13]** up a little bit and then it'll be my

**[00:04:16]** slider and I'll attach it somehow

**[00:04:33]** all right this is what I came up with I

**[00:04:34]** think I'm going to cut out this this

**[00:04:36]** will be my my vent here and then I'll

**[00:04:38]** cut a slot here for this to slide on and

**[00:04:42]** it'll just open and close like this this

**[00:04:44]** won't be super tight but we'll be able

**[00:04:46]** to slide that open and close empty out

**[00:04:48]** the ashes get airf

**[00:04:52]** flow so I think that's going to I think

**[00:04:54]** that'll look good so I'm going to cut

**[00:04:55]** that out start getting that put together

**[00:04:58]** I'll probably end up trimming this down

**[00:04:59]** quite a bit we don't need it to be quite

**[00:05:01]** this

**[00:05:15]** [Music]

**[00:05:22]** big all right got our sliding piece all

**[00:05:25]** polished up I'm using a carriage bolt to

**[00:05:28]** go through the back

**[00:05:34]** I'll put a handle on this at some point

**[00:05:35]** but just slides

**[00:05:45]** open all right now that we have

**[00:05:48]** that we can get this welded on

**[00:05:59]** my other glove oh here it is

**[00:06:05]** [Music]

**[00:06:32]** all right I'm in the process of trying

**[00:06:33]** to figure out how I want to do the legs

**[00:06:36]** and this is what I've come up with so

**[00:06:37]** far it's pretty simple but I also wanted

**[00:06:39]** the legs to be

**[00:06:41]** detachable so I made these and we'll

**[00:06:43]** weld on this piece just like that and

**[00:06:45]** then we can just screw on the legs

**[00:06:47]** whenever we want to use it essentially

**[00:06:49]** just welded a bolt to a washer and then

**[00:06:52]** a nut to a washer just like that this is

**[00:06:55]** what that looks like once it's all

**[00:06:56]** welded up so on the short side we'll

**[00:07:01]** weld this together just like that and

**[00:07:02]** then grind those welds down and on the

**[00:07:05]** tube side we'll we'll weld that in just

**[00:07:07]** like that so yeah pretty

**[00:07:10]** simple uh so I got a couple more of

**[00:07:12]** these to make and then uh we'll get them

**[00:07:14]** we'll get them welded

**[00:07:17]** up all right we got two legs built got

**[00:07:20]** the whole stove just propped up in place

**[00:07:22]** while I mock this up I'm going to get

**[00:07:25]** these tacked in place I'm not sure if I

**[00:07:27]** want to do a tripod just one out the

**[00:07:29]** front or do four

**[00:07:31]** legs um but we'll figure that out after

**[00:07:34]** I get this welded up

**[00:08:03]** all right got those welded on thought

**[00:08:05]** it'd be a good time to practice my TIG

**[00:08:06]** welding but as you can see I need a

**[00:08:08]** whole lot more practice that's not

**[00:08:10]** pretty at all TIG welding is freaking

**[00:08:12]** hard but I would like to get better at

**[00:08:14]** it um at some point I just got to put in

**[00:08:16]** the time but we got those on I'm going

**[00:08:18]** to do two more up front I think and then

**[00:08:20]** we can start working on our copper

**[00:08:41]** all right done with the

**[00:08:44]** legs I was going to do two legs up front

**[00:08:47]** uh but I broke one of them during the

**[00:08:49]** fabrication process and these legs were

**[00:08:51]** taking forever to build so tripod it

**[00:08:54]** is next thing to do is to coil up our

**[00:08:57]** copper around our tube up here and then

**[00:09:00]** test it out all right here is our Copper

**[00:09:03]** got a lot more than last time this is 20

**[00:09:05]** feet of/ in inside diameter copper the

**[00:09:10]** last stove I used 10 ft of 38 inside

**[00:09:12]** diameter copper this is Type L um and I

**[00:09:16]** think I'm going to do exactly what I did

**[00:09:18]** last time I'm just going to fill it with

**[00:09:19]** sand and wrap it around the chimney

**[00:09:20]** portion a lot of people mentioned

**[00:09:22]** freezing it uh filling it with water

**[00:09:24]** freezing it to bend it um but I I don't

**[00:09:27]** I don't have the patience for that um

**[00:09:29]** mentioned filling it with salt or sugar

**[00:09:31]** something like that that dissolves in

**[00:09:32]** water to be able to remove it easily uh

**[00:09:35]** but man the sand thing works so well and

**[00:09:37]** uh it really wasn't that much trouble to

**[00:09:38]** get out or anything so I think that's

**[00:09:40]** what I'm going to go with I'm going to

**[00:09:42]** uncoil this fill it with sand and we'll

**[00:09:44]** start wrapping it around the

**[00:09:53]** chimney first thing we need to do is we

**[00:09:55]** need to crimp off uh this end right here

**[00:09:57]** so we can fill it with sand

**[00:10:27]** who's to really say which method is

**[00:10:29]** really better for bending copper seems

**[00:10:31]** to work just

**[00:10:37]** fine all right now we got the copper

**[00:10:39]** filled to the brim with sand I mean who

**[00:10:41]** in their right mind would wait for this

**[00:10:43]** to freeze when you could just do what I

**[00:10:44]** just did in 5 minutes I mean come on but

**[00:10:47]** now that we have this thing filled with

**[00:10:48]** sand we're just going to wrap it around

**[00:10:50]** our tube our 3in tube and we'll just see

**[00:10:52]** how much we use up in you know covering

**[00:10:55]** this chimney section so let's get to it

**[00:11:13]** all right it's coming along nicely we

**[00:11:14]** got about six ft left it was way out

**[00:11:16]** there in the yard um but I'm basically

**[00:11:18]** just having to muscle it around this

**[00:11:20]** 3-in pipe I am very strong so not sure

**[00:11:23]** if you guys will be able to do this um

**[00:11:26]** but yeah I'm going to keep wrapping this

**[00:11:27]** thing up this will easily fit on this

**[00:11:30]** section of

**[00:11:42]** pipe all right guys we got it done this

**[00:11:44]** thing looks

**[00:11:46]** awesome definitely want to make sure you

**[00:11:49]** uh get this as tight as possible around

**[00:11:50]** the pipe the first time because there's

**[00:11:52]** really no going back especially with

**[00:11:53]** this half inch thick stuff I wish I

**[00:11:56]** could get cinch this a little bit

**[00:11:57]** tighter but I think this is I think this

**[00:11:59]** is really good it's really nice and

**[00:12:01]** tight on the pipe good Lord That's Heavy

**[00:12:05]** all that sand in it got it as tight as I

**[00:12:08]** could so now for the fun part we'll cut

**[00:12:11]** the ends we'll remove the

**[00:12:13]** sand get our fittings put

**[00:12:26]** on it's about all of it

**[00:12:30]** really doesn't take that long to empty

**[00:12:31]** this thing out the spin method works the

**[00:12:33]** best and then eventually you can just

**[00:12:34]** blow it

**[00:12:36]** out that's all of

**[00:12:41]** it now that the sand is out of our

**[00:12:43]** copper we're ready to add our fitting

**[00:12:45]** and I decided to listen to a subscriber

**[00:12:48]** and use a compression fitting instead of

**[00:12:51]** dealing with all soldering on a copper

**[00:12:53]** fitting so the way this works it has a

**[00:12:56]** little collar in here and it just

**[00:12:58]** squeezes onto the copper instead of

**[00:13:00]** using solder fun fact we call these

**[00:13:02]** ferals here in the us and our friends

**[00:13:05]** across the pond call these olives so

**[00:13:07]** we'll slip this

**[00:13:11]** over and we'll slip our Olive over the

**[00:13:22]** top now we just have to thread these

**[00:13:24]** together the tighter we thread the

**[00:13:26]** tighter will squeeze onto the copper but

**[00:13:28]** you don't want want to overtighten this

**[00:13:30]** now to test it for

**[00:13:35]** leaks perfect I bet that's how the

**[00:13:37]** plumbers do

**[00:13:39]** it I would like to mention that this is

**[00:13:42]** $125 of copper and brass fitting so uh

**[00:13:45]** if you could just do me a solid and hit

**[00:13:47]** that like button and subscribe I'd

**[00:13:49]** really appreciate

**[00:13:50]** it man it looks so good it's time to

**[00:13:53]** test this thing out I did a couple

**[00:13:55]** things off camera add a little Oak

**[00:13:57]** handle for our slider here I can tighten

**[00:14:00]** that up if I need to finished up the

**[00:14:03]** legs the legs honestly took longer to

**[00:14:04]** build than the entire rocket stove so

**[00:14:06]** you might want to go a different route

**[00:14:08]** here but I think it still looks good so

**[00:14:10]** yeah let's get our test set up and see

**[00:14:11]** how she

**[00:14:21]** does all right just getting set up

**[00:14:24]** couple things um I was going to do a an

**[00:14:27]** uninsulated copper versus ins ated just

**[00:14:29]** to see the difference um but I thought

**[00:14:31]** it'd be more fun if we brought out our

**[00:14:33]** first rocket stove that has the

**[00:14:34]** detachable heat exchanger with the

**[00:14:37]** copper on the inside so yeah it's going

**[00:14:39]** to be fun to see the difference between

**[00:14:40]** the two one thing I'm going to do it's

**[00:14:42]** already 83 de so our water is going to

**[00:14:44]** be probably around 75 degrees or so um

**[00:14:47]** and getting from 75 to 100 really

**[00:14:49]** wouldn't be that much of a test so I'm

**[00:14:51]** going to put a bag of ice in each bucket

**[00:14:53]** we're going to bring that temperature

**[00:14:54]** down to hopefully about 40° and that'll

**[00:14:57]** just be a much more thorough test it's

**[00:14:59]** going to be a lot harder on the on both

**[00:15:01]** stoves the other thing I'm doing I have

**[00:15:03]** the wood bundled in one PB batches uh so

**[00:15:07]** we got 8 PBS of wood right here and just

**[00:15:08]** for a visual reference that piece right

**[00:15:10]** there is 6 lb 5 oz so this way we can

**[00:15:14]** keep track of how much fuel we're using

**[00:15:16]** throughout this test so yeah let's get

**[00:15:17]** the copper insulated get our buckets

**[00:15:19]** filled and we'll get this test going

**[00:15:27]** [Applause]

**[00:15:44]** all right first

**[00:15:46]** pound of

**[00:15:52]** [Music]

**[00:15:55]** Oak all right we just got our timer

**[00:15:57]** going

**[00:15:59]** still nice and cool down

**[00:16:02]** here so I'll give that one a little bit

**[00:16:04]** of a head start as we start this

**[00:16:11]** one we still got ice up

**[00:16:14]** here so we're at 33 Dees this is

**[00:16:17]** probably going to take a

**[00:16:22]** while you see the difference you got

**[00:16:24]** condensation this one's nice and cold

**[00:16:27]** here versus this one it's much

**[00:16:30]** warmer and then our water we've lost

**[00:16:32]** almost all of our ice we're only 10

**[00:16:35]** minutes

**[00:16:38]** in so on this side we have a

**[00:16:41]** thermosyphon set up where as the cold

**[00:16:43]** water falls to the bottom it of course

**[00:16:46]** heats up inside the coil and then makes

**[00:16:48]** its way to the top so that top layer is

**[00:16:50]** going to start warming up a lot faster

**[00:16:52]** than down here it's going to stay really

**[00:16:53]** cold and that's just how the cycle works

**[00:16:56]** all the cold water drops to the bottom

**[00:16:58]** all the way to the bottom of the coil

**[00:16:59]** and then heats up makes its way to the

**[00:17:01]** top over here we're borrowing the 12volt

**[00:17:04]** pump from my portable shower to cycle

**[00:17:06]** the water through have it running from

**[00:17:08]** the top down to the bottom and then back

**[00:17:11]** into the

**[00:17:12]** bucket everybody gets so mad that I run

**[00:17:14]** this to the top and not to the bottom

**[00:17:16]** because of the thermos cypon effect but

**[00:17:17]** it really doesn't matter when you're

**[00:17:19]** pumping at 2.5 gallons a

**[00:17:27]** minute all right we're almost 15 minutes

**[00:17:30]** in temp down here is 530 up here drops

**[00:17:35]** down to 180 or

**[00:17:38]** so down here we're getting 700° at the

**[00:17:44]** chamber

**[00:17:46]** 266 let's check our

**[00:17:48]** water up to 72° down

**[00:17:53]** here and here we are up to 74

**[00:17:59]** but that changes quite a bit when you

**[00:18:01]** drop down here it's still going to be in

**[00:18:02]** the 50s down here at the bottom all

**[00:18:05]** right 41 minutes in this is the end of

**[00:18:08]** the third bundle for this stove this

**[00:18:10]** thing is going strong this stove seems

**[00:18:11]** to be burning a lot slower this is the

**[00:18:13]** end of the second bundle for this stove

**[00:18:16]** so let's check our

**[00:18:18]** temps this side we have 96 almost to 100

**[00:18:23]** degre that's awesome and then over

**[00:18:27]** here we are at

**[00:18:31]** 85° if we drop down here we're still

**[00:18:35]** down into the 50s so it's just going to

**[00:18:37]** take a while to get that that bottom

**[00:18:39]** water heated

**[00:18:40]** up this side is going very

**[00:18:50]** well all right we're an hour in this

**[00:18:53]** guy's kicking over here both are doing

**[00:18:55]** really well let's do a quick temp check

**[00:18:59]** this one is at

**[00:19:02]** 114° that's crazy this one was at 100°

**[00:19:05]** and like 45 46 minutes and with this

**[00:19:08]** side I didn't even have a lid to keep

**[00:19:10]** the water covered over here I've been

**[00:19:12]** trying to keep it covered got a little

**[00:19:14]** bit of steam

**[00:19:16]** going right now we're at 117 degrees at

**[00:19:20]** the top it'll drop down pretty quick as

**[00:19:23]** we go towards the

**[00:19:24]** bottom so yeah still got a little bit

**[00:19:26]** more time before we can get that Tire

**[00:19:28]** jug to

**[00:19:30]** 100° this stove is awesome it runs so

**[00:19:33]** efficiently really love the the first

**[00:19:36]** stove the two the difference in the two

**[00:19:38]** stoves has been this one runs so much

**[00:19:40]** better runs faster um in terms of

**[00:19:44]** efficiency it's burning the wood faster

**[00:19:47]** um but it takes more to keep lit I was

**[00:19:50]** really have to tend to this one a lot

**[00:19:51]** more this one over here I haven't had a

**[00:19:54]** trouble out of it at all it's just been

**[00:19:56]** burning no trouble with it trying to go

**[00:19:58]** out this one

**[00:19:59]** wants to go out on me sometimes so

**[00:20:01]** that's been the difference between the

**[00:20:02]** two stoves but yeah just having the coil

**[00:20:05]** on the inside and using that pump to

**[00:20:07]** cycle it it just heats up so much faster

**[00:20:09]** I'm going to stop the test on this guy

**[00:20:10]** we're well over

**[00:20:12]** 100° and we end up using four bundles of

**[00:20:16]** wood so under 4 lb this is the end of

**[00:20:19]** the fourth bundle so I got four bundles

**[00:20:22]** left over here so that that is awesome

**[00:20:26]** four lbs of wood four 45 minutes or so

**[00:20:29]** we got this thing well over 100° just to

**[00:20:32]** give you an idea of what the

**[00:20:33]** temperatures are doing down here at the

**[00:20:35]** bottom we're at

**[00:20:38]** 700° the bottom of the wrap it drops

**[00:20:41]** down

**[00:20:44]** 170 yeah

**[00:20:45]** 170 here at the

**[00:20:48]** top just jumping all

**[00:20:52]** around 160s the top of the

**[00:20:55]** chimney back up to 450s

**[00:21:00]** so

**[00:21:03]** yeah all right at an hour and 16 minutes

**[00:21:06]** we are

**[00:21:07]** at

**[00:21:10]** 120° down here at the bottom we're at

**[00:21:15]** 100 if we measure this this line temp is

**[00:21:19]** at 100°

**[00:21:21]** too the bottom Line's at 100 this Top

**[00:21:24]** Line is at

**[00:21:26]** 134 so yeah

**[00:21:29]** so there you go hour and 15 minutes we

**[00:21:31]** got it done all right so that wraps up

**[00:21:34]** the testing on these two stoves this one

**[00:21:36]** got it to over 100 degrees in 45 minutes

**[00:21:38]** no surprise there that stove works

**[00:21:40]** awesome if you had seen the video on

**[00:21:41]** that one definitely go check it out this

**[00:21:43]** one didn't do a bad job it got it to

**[00:21:45]** 100° in about an hour and 15 minutes I

**[00:21:48]** am kind of annoyed though because about

**[00:21:49]** Midway through I made a change with the

**[00:21:51]** venting and it got so much hotter I had

**[00:21:54]** Flames coming out the top so I think if

**[00:21:56]** I did it again I could get it to over

**[00:21:58]** 100 in less than an hour for sure um but

**[00:22:01]** yeah I hope yall have enjoyed these two

**[00:22:03]** build videos I've learned so much by

**[00:22:05]** doing them so be sure to like this video

**[00:22:07]** subscribe if you haven't we'll see you

**[00:22:09]** guys in the next videos

# Full Text (without timestamps)

welcome back to the channel in this video we are building this rocket stove that can heat up water is this not the prettiest rocket stove that you've ever [Music] seen I think this looks awesome in the last couple videos if you're new here we built this rocket stove I think this one's a lot cooler because it has a detachable built-in heat exchanger can't see the Copper from here but we have 10 ft of copper coil built inside of this thing and it heats up water really fast I'll have a link to the build video and the test video in the description if you're interested in that um but yeah it's got 10 ft of copper coil inside the the tube so it's exposed to direct flame and the copper seems to be holding up just fine I've used it a bunch of times so far but to continue this project The Next Step was to build one out of round tubing and to put the copper on the outside and I just want to see how well they compare so that's what we're going to do in this video we're going to test this thing out but before I can test it let me show you how to build it so let's get to it I want to quickly thank everybody that has commented in the last couple videos if you didn't know commenting really helps out a video you know we're in a constant battle against the YouTube algorithm that's why we ask you guys to like And subscribe comment all that kind of stuff um so yeah really helps us out and I really appreciate it all right here's our material to get started on this project we're using 4 in steel pipe it's about 8 in thick and we're going to cut this in a few pieces I'm not exactly sure what the dimensions are at at the moment let's get this cut up we'll start getting it shaped once I do that I'll clean the metal up get all the rust removed and make it look nice all right we got our three pie is cut this will go there this guy will go right about there they that looks pretty good somebody in the last video asked why why do people make rocket stoves out of square instead of round tubing I'll show you exactly why nothing stays nothing stays in place it's much more difficult to work [Music] with I think that's going to look good I'm going to get the met cleaned up really good get it nice fresh looking and then we'll we'll weld up all right this is what we got this is still the same rusty metal uh just went a little overboard on the sanding just got in the zone wanted to see this stuff shine again I know if I look at it wrong it's going to flash rust but how cool would it be if we put a mirror finish on this thing it would look awesome mirror finish with the copper going up that would look really cool I might have to go a little further with with my sanding all right I think that's what we're going to do right there going to weld that baby up grind it back down and might keep polishing I'll have to oil it up after I weld to keep it from rusting before I weld anything up I think I want to add some type of like sliding door here to control my airflow um be able to dump any ashes out so I think that'll be easier to do U before I weld things up probably also going to add the expanded metal like down in here to hold the fuel off the bottom a little bit so it'll be a little bit of space between the bottom and our little airflow vent so I got to figure out how I'm going to do that I grabbed one of the cut off pieces from our 45 I think I'm going to open it up a little bit and then it'll be my slider and I'll attach it somehow all right this is what I came up with I think I'm going to cut out this this will be my my vent here and then I'll cut a slot here for this to slide on and it'll just open and close like this this won't be super tight but we'll be able to slide that open and close empty out the ashes get airf flow so I think that's going to I think that'll look good so I'm going to cut that out start getting that put together I'll probably end up trimming this down quite a bit we don't need it to be quite this [Music] big all right got our sliding piece all polished up I'm using a carriage bolt to go through the back I'll put a handle on this at some point but just slides open all right now that we have that we can get this welded on my other glove oh here it is [Music] all right I'm in the process of trying to figure out how I want to do the legs and this is what I've come up with so far it's pretty simple but I also wanted the legs to be detachable so I made these and we'll weld on this piece just like that and then we can just screw on the legs whenever we want to use it essentially just welded a bolt to a washer and then a nut to a washer just like that this is what that looks like once it's all welded up so on the short side we'll weld this together just like that and then grind those welds down and on the tube side we'll we'll weld that in just like that so yeah pretty simple uh so I got a couple more of these to make and then uh we'll get them we'll get them welded up all right we got two legs built got the whole stove just propped up in place while I mock this up I'm going to get these tacked in place I'm not sure if I want to do a tripod just one out the front or do four legs um but we'll figure that out after I get this welded up all right got those welded on thought it'd be a good time to practice my TIG welding but as you can see I need a whole lot more practice that's not pretty at all TIG welding is freaking hard but I would like to get better at it um at some point I just got to put in the time but we got those on I'm going to do two more up front I think and then we can start working on our copper all right done with the legs I was going to do two legs up front uh but I broke one of them during the fabrication process and these legs were taking forever to build so tripod it is next thing to do is to coil up our copper around our tube up here and then test it out all right here is our Copper got a lot more than last time this is 20 feet of/ in inside diameter copper the last stove I used 10 ft of 38 inside diameter copper this is Type L um and I think I'm going to do exactly what I did last time I'm just going to fill it with sand and wrap it around the chimney portion a lot of people mentioned freezing it uh filling it with water freezing it to bend it um but I I don't I don't have the patience for that um mentioned filling it with salt or sugar something like that that dissolves in water to be able to remove it easily uh but man the sand thing works so well and uh it really wasn't that much trouble to get out or anything so I think that's what I'm going to go with I'm going to uncoil this fill it with sand and we'll start wrapping it around the chimney first thing we need to do is we need to crimp off uh this end right here so we can fill it with sand who's to really say which method is really better for bending copper seems to work just fine all right now we got the copper filled to the brim with sand I mean who in their right mind would wait for this to freeze when you could just do what I just did in 5 minutes I mean come on but now that we have this thing filled with sand we're just going to wrap it around our tube our 3in tube and we'll just see how much we use up in you know covering this chimney section so let's get to it all right it's coming along nicely we got about six ft left it was way out there in the yard um but I'm basically just having to muscle it around this 3-in pipe I am very strong so not sure if you guys will be able to do this um but yeah I'm going to keep wrapping this thing up this will easily fit on this section of pipe all right guys we got it done this thing looks awesome definitely want to make sure you uh get this as tight as possible around the pipe the first time because there's really no going back especially with this half inch thick stuff I wish I could get cinch this a little bit tighter but I think this is I think this is really good it's really nice and tight on the pipe good Lord That's Heavy all that sand in it got it as tight as I could so now for the fun part we'll cut the ends we'll remove the sand get our fittings put on it's about all of it really doesn't take that long to empty this thing out the spin method works the best and then eventually you can just blow it out that's all of it now that the sand is out of our copper we're ready to add our fitting and I decided to listen to a subscriber and use a compression fitting instead of dealing with all soldering on a copper fitting so the way this works it has a little collar in here and it just squeezes onto the copper instead of using solder fun fact we call these ferals here in the us and our friends across the pond call these olives so we'll slip this over and we'll slip our Olive over the top now we just have to thread these together the tighter we thread the tighter will squeeze onto the copper but you don't want want to overtighten this now to test it for leaks perfect I bet that's how the plumbers do it I would like to mention that this is $125 of copper and brass fitting so uh if you could just do me a solid and hit that like button and subscribe I'd really appreciate it man it looks so good it's time to test this thing out I did a couple things off camera add a little Oak handle for our slider here I can tighten that up if I need to finished up the legs the legs honestly took longer to build than the entire rocket stove so you might want to go a different route here but I think it still looks good so yeah let's get our test set up and see how she does all right just getting set up couple things um I was going to do a an uninsulated copper versus ins ated just to see the difference um but I thought it'd be more fun if we brought out our first rocket stove that has the detachable heat exchanger with the copper on the inside so yeah it's going to be fun to see the difference between the two one thing I'm going to do it's already 83 de so our water is going to be probably around 75 degrees or so um and getting from 75 to 100 really wouldn't be that much of a test so I'm going to put a bag of ice in each bucket we're going to bring that temperature down to hopefully about 40° and that'll just be a much more thorough test it's going to be a lot harder on the on both stoves the other thing I'm doing I have the wood bundled in one PB batches uh so we got 8 PBS of wood right here and just for a visual reference that piece right there is 6 lb 5 oz so this way we can keep track of how much fuel we're using throughout this test so yeah let's get the copper insulated get our buckets filled and we'll get this test going [Applause] all right first pound of [Music] Oak all right we just got our timer going still nice and cool down here so I'll give that one a little bit of a head start as we start this one we still got ice up here so we're at 33 Dees this is probably going to take a while you see the difference you got condensation this one's nice and cold here versus this one it's much warmer and then our water we've lost almost all of our ice we're only 10 minutes in so on this side we have a thermosyphon set up where as the cold water falls to the bottom it of course heats up inside the coil and then makes its way to the top so that top layer is going to start warming up a lot faster than down here it's going to stay really cold and that's just how the cycle works all the cold water drops to the bottom all the way to the bottom of the coil and then heats up makes its way to the top over here we're borrowing the 12volt pump from my portable shower to cycle the water through have it running from the top down to the bottom and then back into the bucket everybody gets so mad that I run this to the top and not to the bottom because of the thermos cypon effect but it really doesn't matter when you're pumping at 2.5 gallons a minute all right we're almost 15 minutes in temp down here is 530 up here drops down to 180 or so down here we're getting 700° at the chamber 266 let's check our water up to 72° down here and here we are up to 74 but that changes quite a bit when you drop down here it's still going to be in the 50s down here at the bottom all right 41 minutes in this is the end of the third bundle for this stove this thing is going strong this stove seems to be burning a lot slower this is the end of the second bundle for this stove so let's check our temps this side we have 96 almost to 100 degre that's awesome and then over here we are at 85° if we drop down here we're still down into the 50s so it's just going to take a while to get that that bottom water heated up this side is going very well all right we're an hour in this guy's kicking over here both are doing really well let's do a quick temp check this one is at 114° that's crazy this one was at 100° and like 45 46 minutes and with this side I didn't even have a lid to keep the water covered over here I've been trying to keep it covered got a little bit of steam going right now we're at 117 degrees at the top it'll drop down pretty quick as we go towards the bottom so yeah still got a little bit more time before we can get that Tire jug to 100° this stove is awesome it runs so efficiently really love the the first stove the two the difference in the two stoves has been this one runs so much better runs faster um in terms of efficiency it's burning the wood faster um but it takes more to keep lit I was really have to tend to this one a lot more this one over here I haven't had a trouble out of it at all it's just been burning no trouble with it trying to go out this one wants to go out on me sometimes so that's been the difference between the two stoves but yeah just having the coil on the inside and using that pump to cycle it it just heats up so much faster I'm going to stop the test on this guy we're well over 100° and we end up using four bundles of wood so under 4 lb this is the end of the fourth bundle so I got four bundles left over here so that that is awesome four lbs of wood four 45 minutes or so we got this thing well over 100° just to give you an idea of what the temperatures are doing down here at the bottom we're at 700° the bottom of the wrap it drops down 170 yeah 170 here at the top just jumping all around 160s the top of the chimney back up to 450s so yeah all right at an hour and 16 minutes we are at 120° down here at the bottom we're at 100 if we measure this this line temp is at 100° too the bottom Line's at 100 this Top Line is at 134 so yeah so there you go hour and 15 minutes we got it done all right so that wraps up the testing on these two stoves this one got it to over 100 degrees in 45 minutes no surprise there that stove works awesome if you had seen the video on that one definitely go check it out this one didn't do a bad job it got it to 100° in about an hour and 15 minutes I am kind of annoyed though because about Midway through I made a change with the venting and it got so much hotter I had Flames coming out the top so I think if I did it again I could get it to over 100 in less than an hour for sure um but yeah I hope yall have enjoyed these two build videos I've learned so much by doing them so be sure to like this video subscribe if you haven't we'll see you guys in the next videos