

3D Plans Pebble Style Rocket Mass Heater

By Paul Wheaton &
Bernal Bros. Studios



This is one 3D plan of a six set, to see more please visit permies.com/fh-plans

For more information visit permies.com/fh

Rocket Mass Heaters are possibly the most powerful solution to many of the problems confronting individuals and the global population today. For individuals, Rocket Mass Heaters can save thousands of dollars and bring greater comfort. Around our world, if a billion people used Rocket Mass Heaters as their primary source of heat, it would solve a list of global issues. The only barrier to this solution is knowledge.

During the Fall of 2021 Wheaton Labs hosted the Rocket Mass Heater Jamboree, intended to offer this revolutionary and accessible home heating technology to the the world and cause massive positive global change. The event was a smashing success. The cameras were rolling. We collected gobs of high-quality video of many different kinds of Rocket Mass Heaters and other Rockety contraptions so we made a movie and six 3d plans. In this booklet you'll find the step by step plans for a standard, 8 inch, pebble style j-tube rocket mass heater. This is a basic, yet incredibly high performing system.



Pebble Style Rocket Mass Heater





We have a new space we are building at Wheaton Labs. An uninsulated garage where we replace the garage door with a bump out that has lots of glass. We are calling it the solarium. During the rocket mass heater jamboree, we had just finished getting the insulation in and the bump-out is under construction.



When the space is done, it will need heat. We decided to build a pebble style 8 inch j-tube.

The primary insulator around the core is loose sand. The riser is a five minute riser using "super wool".

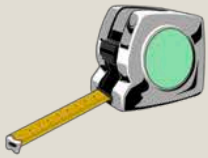


To find more about the solarium and the bootcamp team who built it, visit permies.com



Tools

Measuring tape



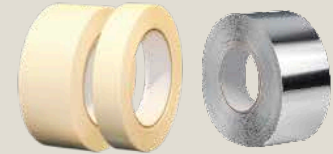
Marker/pencil



Level



Masking & high temp. tape



Hacksaw



Crimpers or pliers



Wood saw



Drill



Angle Grinder



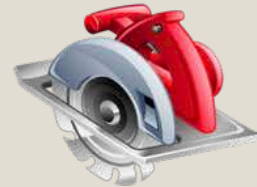
Shovel



Gloves and safety gear



Circular Saw (optional)



Tamper



Wheelbarrow



Fan



Gravel Screen



Cutters and tin snips (various sizes)



For more information on tools for rocket mass heater installations see [Movie 4: Hot Rocket from the Better Wood Heat Movies Set](#)

Materials

Barrel: 55-gallon steel drum,
with paint removed



Nails and Screws



Metal Sheet Screws



Beveled
Head Screw



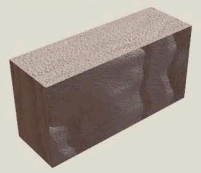
Full thread
metal bolts



Orange Fire Brick 9 x 4 1/2 x 2 1/2 inches



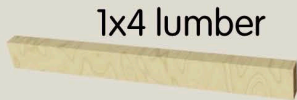
White Fire Brick 9 x 4 1/2 x 2 1/2 inches



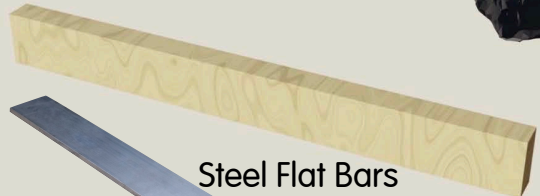
1x6 lumber



1x4 lumber



2x4 lumber



Steel Flat Bars
1 x 38 inches



High temp wool (super wool)



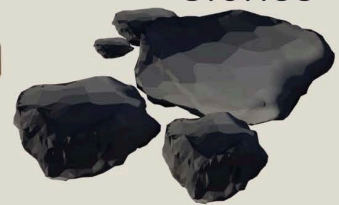
Cob (the natural
builder duct tape)



Sand



Stones



8 inch cap



Thin Steel
Plate

8 and 6 inch elbows



8 inch Tee



10 inch black or
stainless steel
stove pipe or steel
remesh for 5
minute riser
exoskeleton



6 inch vertical
exhaust



Pebbles



(Big enough to
allow air flow
aka pea gravel size)

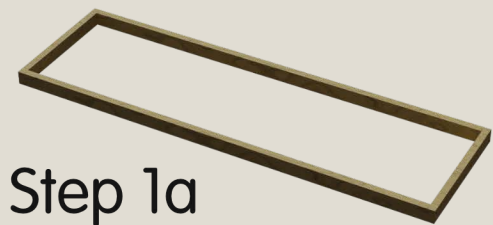
6 inch stove pipe



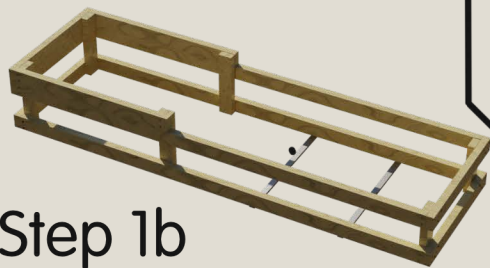
8 inch duct



1/4 of an inch
metal mesh



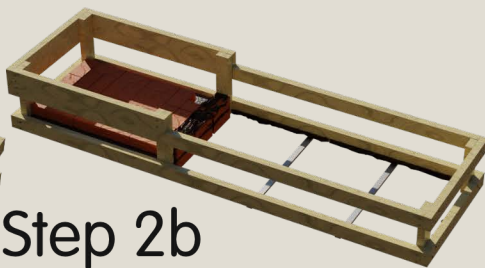
Step 1a



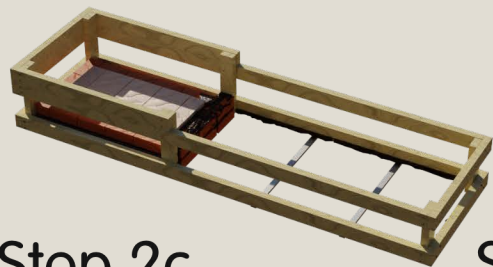
Step 1b



Step 2a



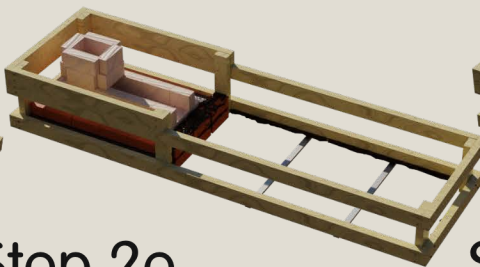
Step 2b



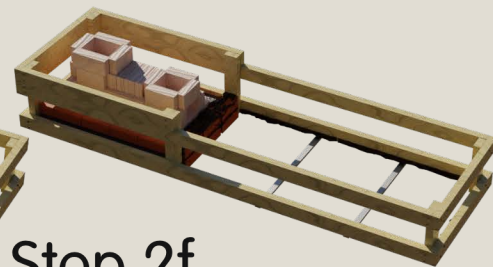
Step 2c



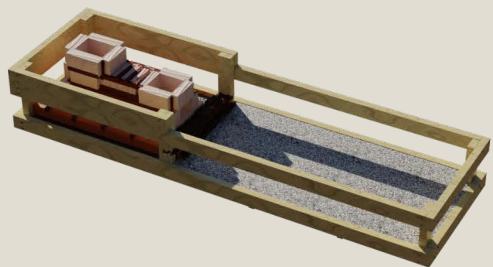
Step 2d



Step 2e



Step 2f



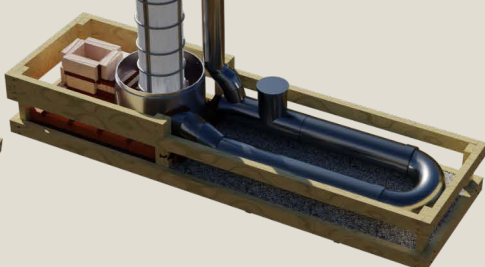
Step 3a



Step 3b



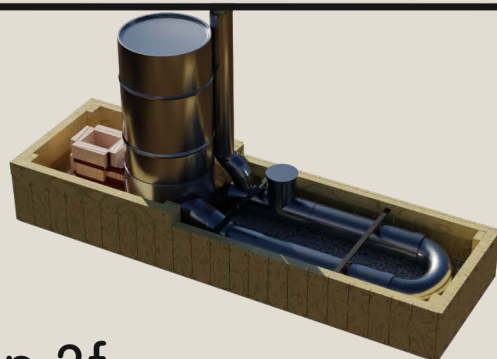
Step 3c



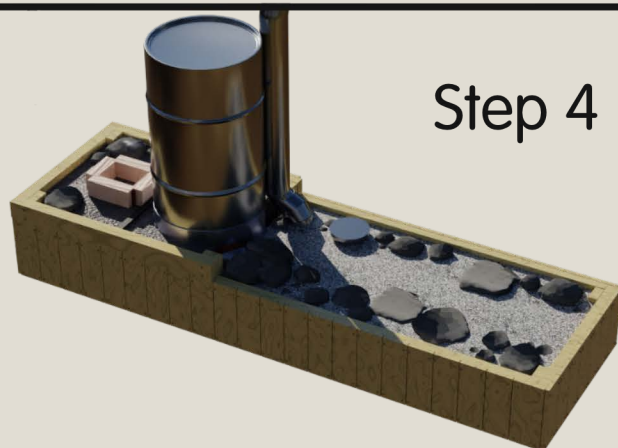
Step 3d



Step 3e

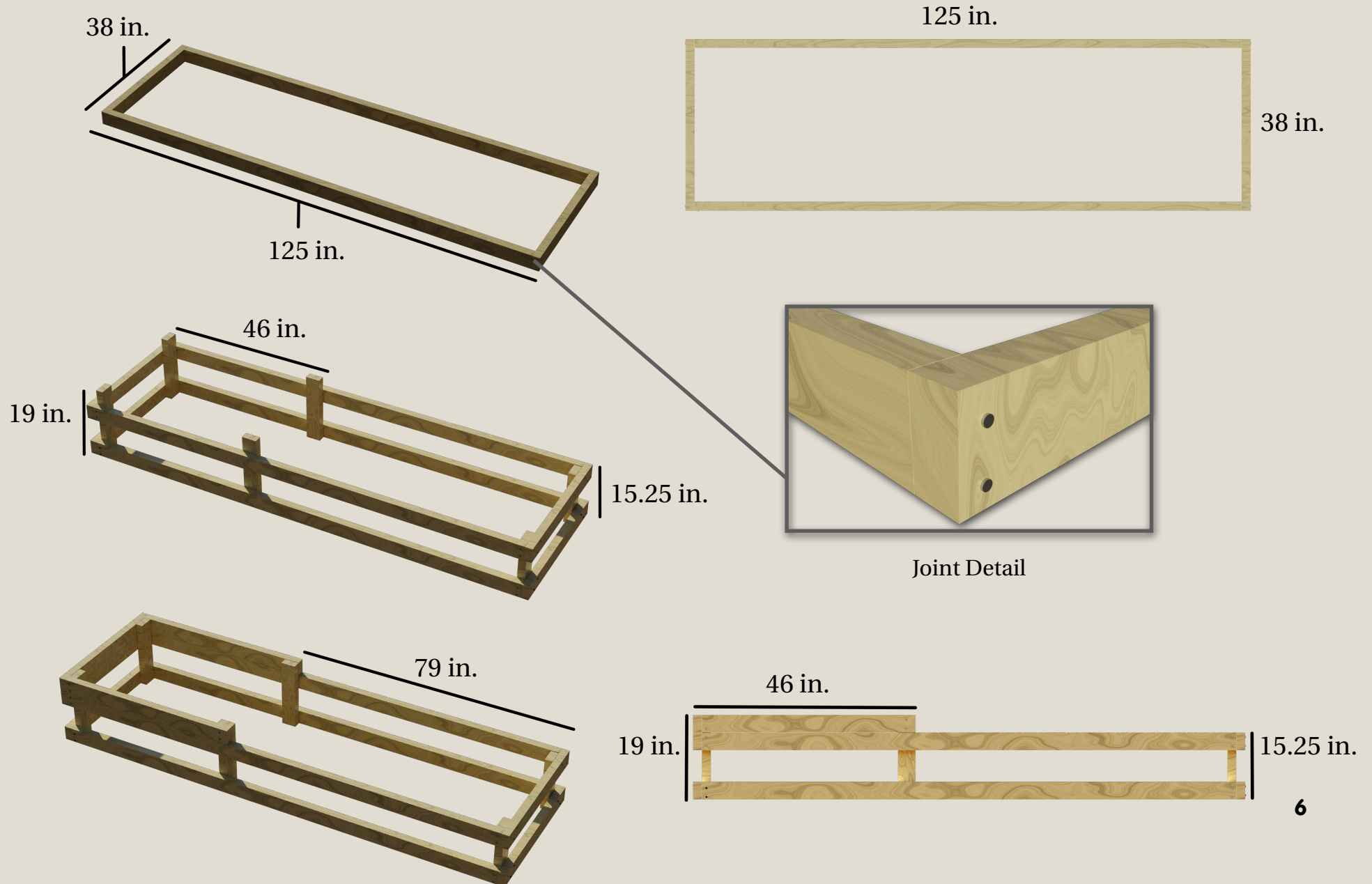


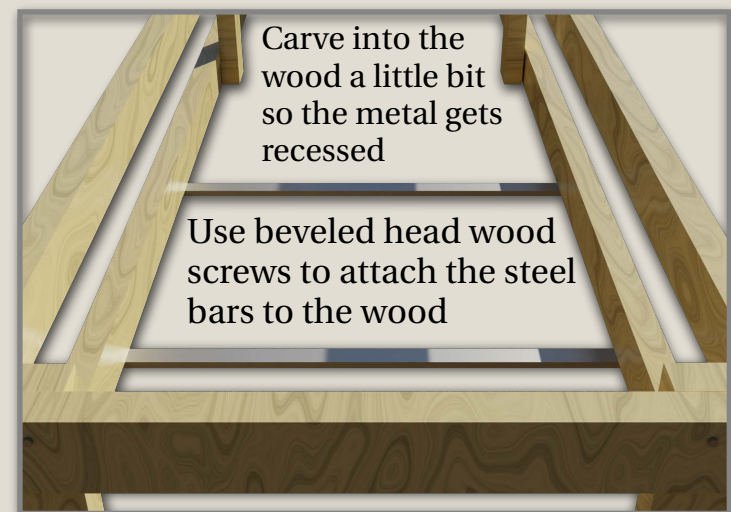
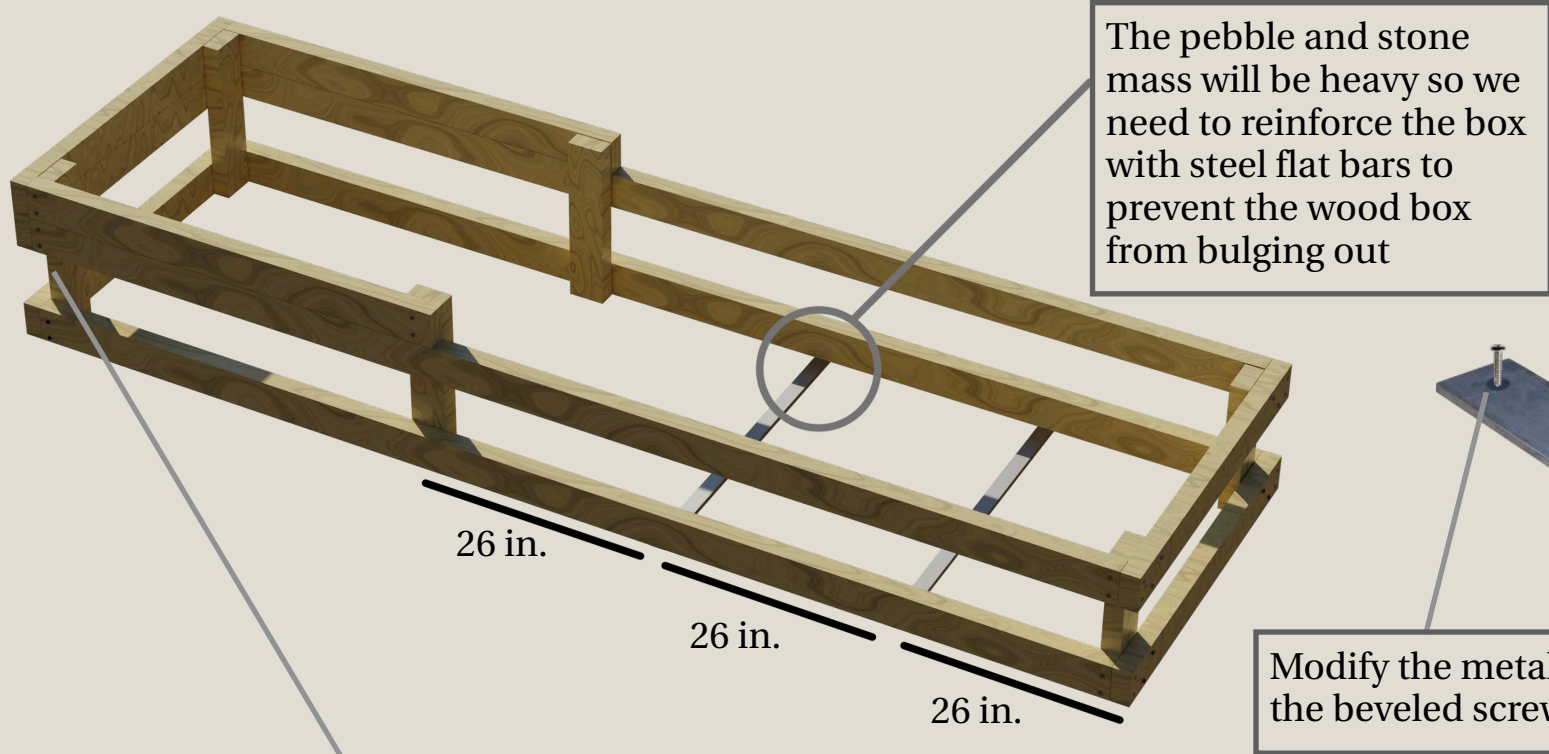
Step 3f



Step 4

Step One: Create a box to contain the rocket mass heater

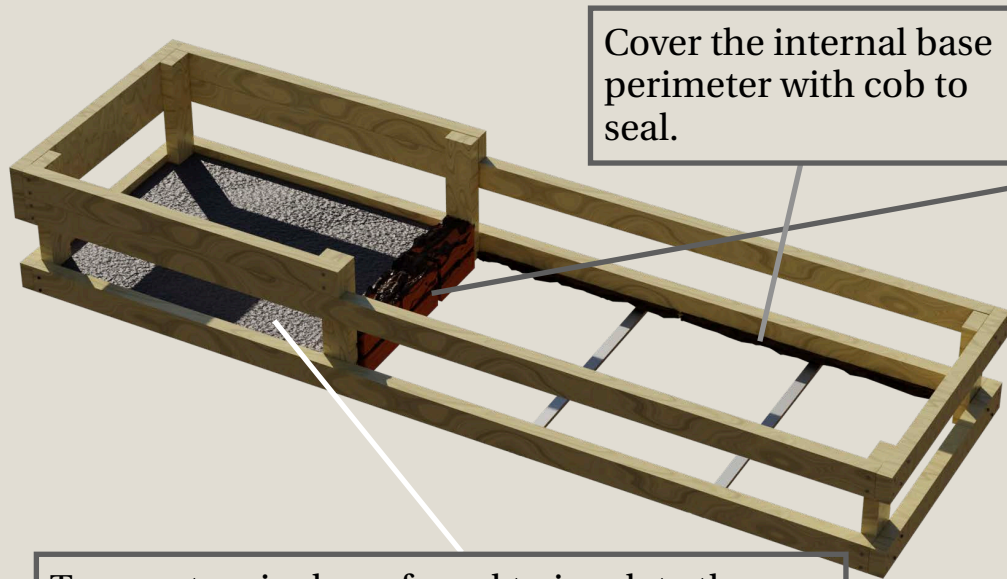




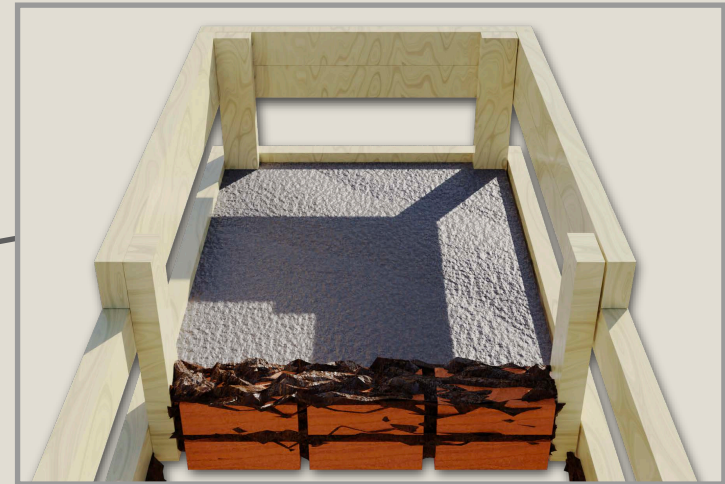
Photographic reference from the movie Free Heat



Step Two - A: Bottom insulation



Tamper two inches of sand to insulate the rocket mass heater from the concrete floor and prevent spalling. Pack to create stability for the next layer.

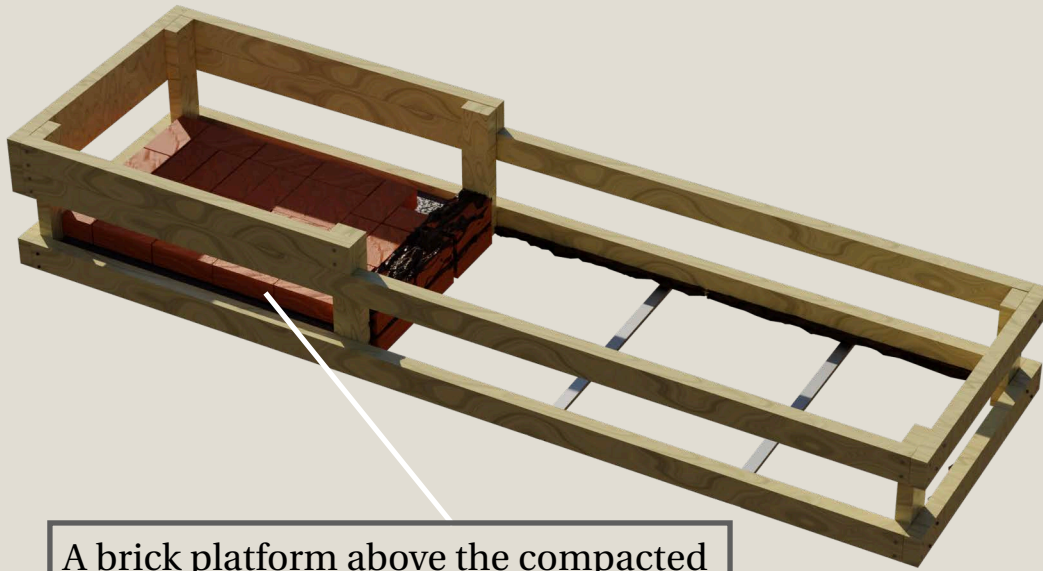


A two step brick layer to separate the subdivision

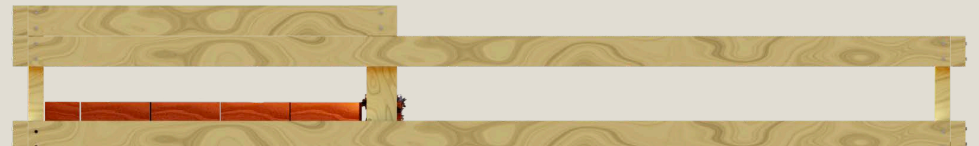


Photographic reference from the movie [Free Heat](#)

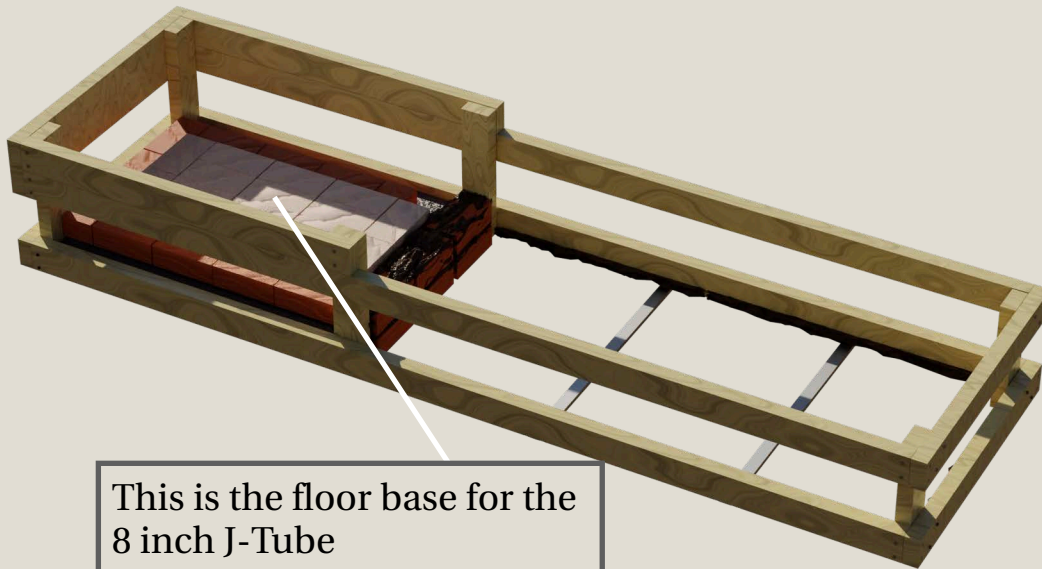
Step Two - B: Brick platform



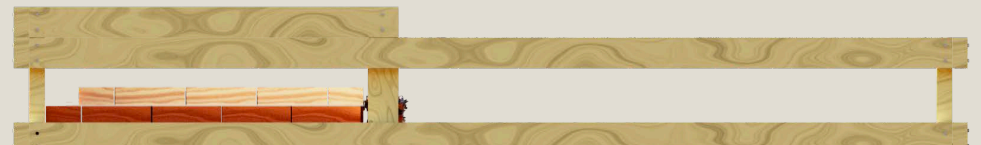
A brick platform above the compacted sand to build the J-Tube on top



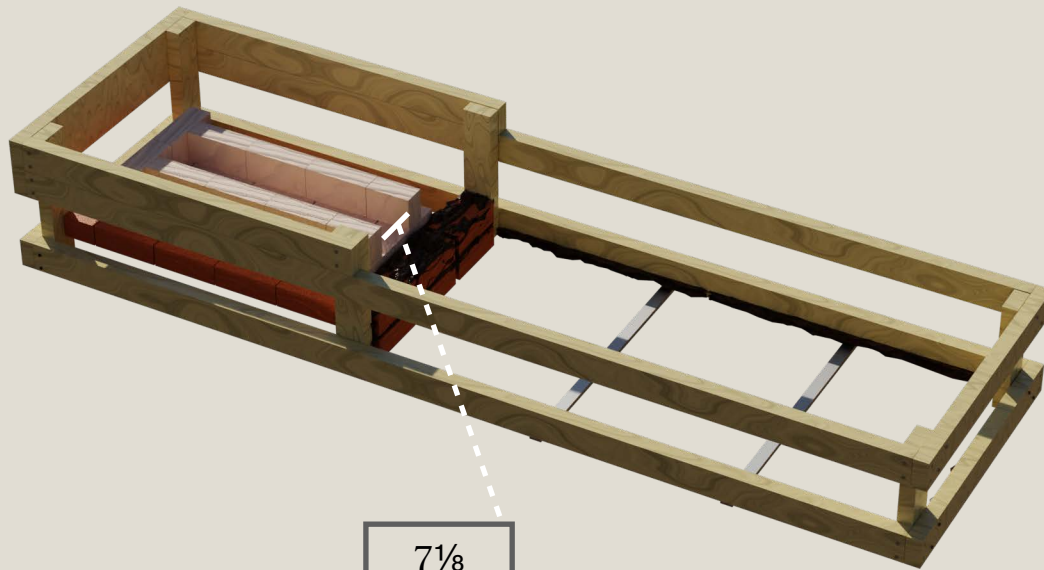
Step Two - C: 8 inch J-tube - fire brick base layer 1



This is the floor base for the
8 inch J-Tube



Step Two - D: 8 inch J-tube - wood feed, tunnel, and riser layer 2



7 $\frac{1}{8}$
inches



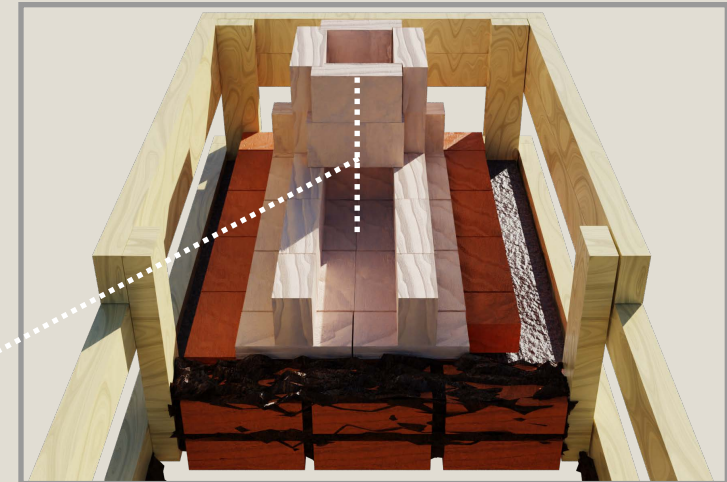
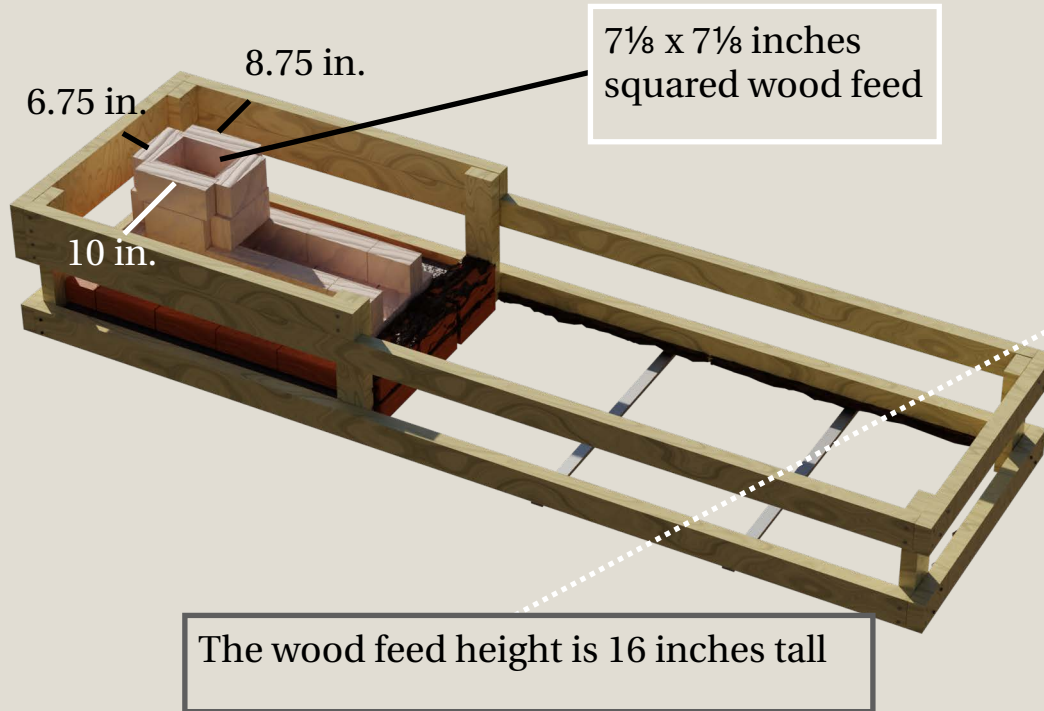
An 8 inch system has a cross sectional area (CSA) of $\pi * r^2 \rightarrow \pi * 4^2 \rightarrow 50.25$. A square wood feed would be $\sqrt{50.25} \rightarrow \text{aprox. } 7\frac{1}{8} \times 7\frac{1}{8}$ "



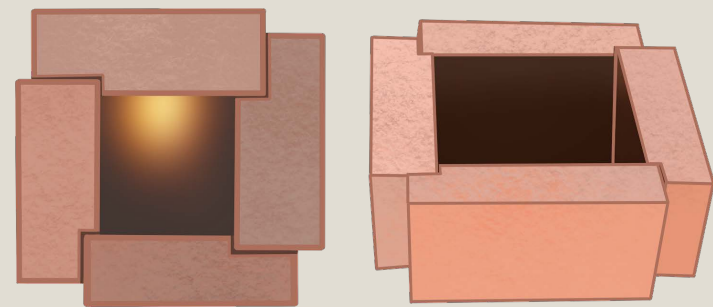
Photographic reference from the movie Free Heat



Step Two - E: 8 inch J-tube - wood feed



Cuts on the brick edges allow a better fit and easier construction

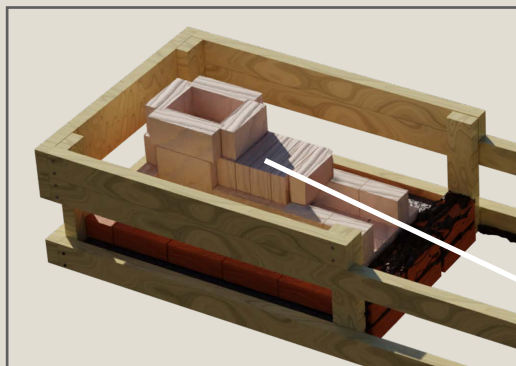


To learn more about RMH see the [RMH Risers Ebook](#)

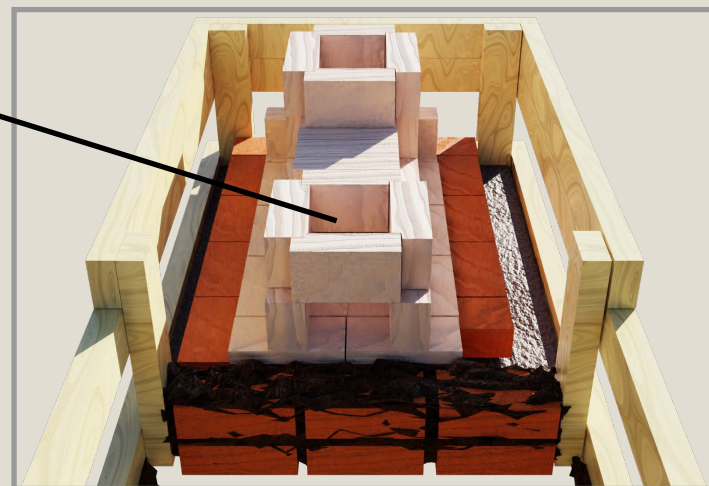
Photographic reference from the movie Free Heat



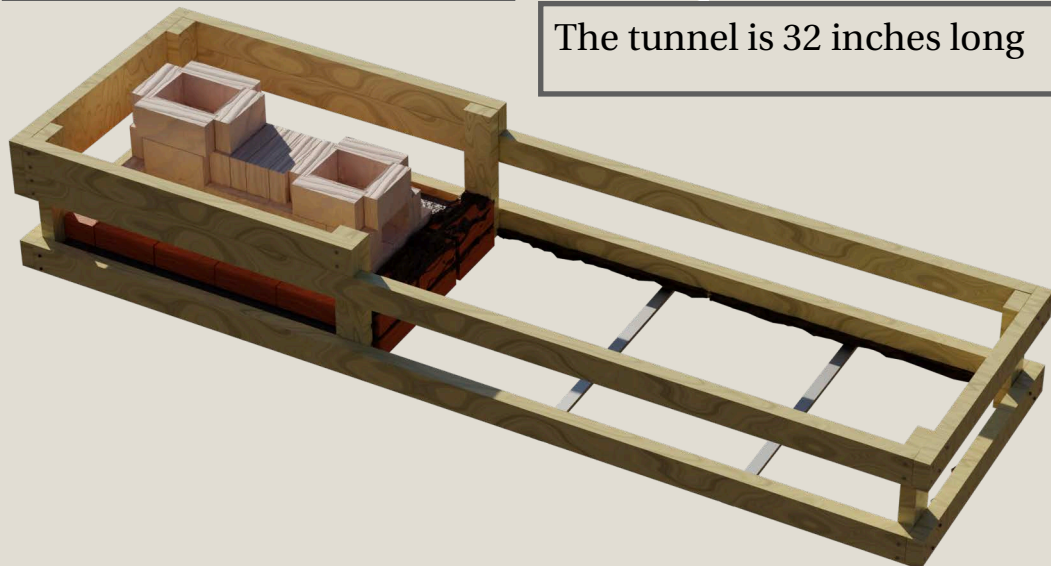
Step Two - F: 8 inch J-Tube - Complete tunnel and brick riser base



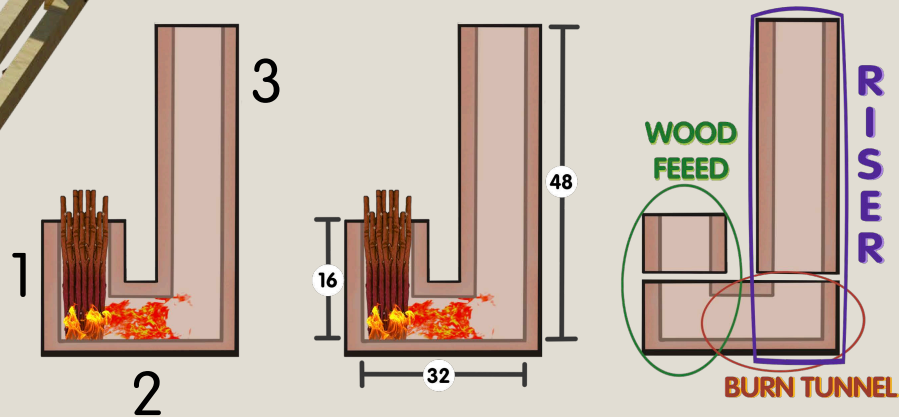
7 1/8 x 7 1/8 inches
squared brick base
for 5 minute riser



The tunnel is 32 inches long



The burn tunnel should be
double the wood feed height,
and the riser, triple.

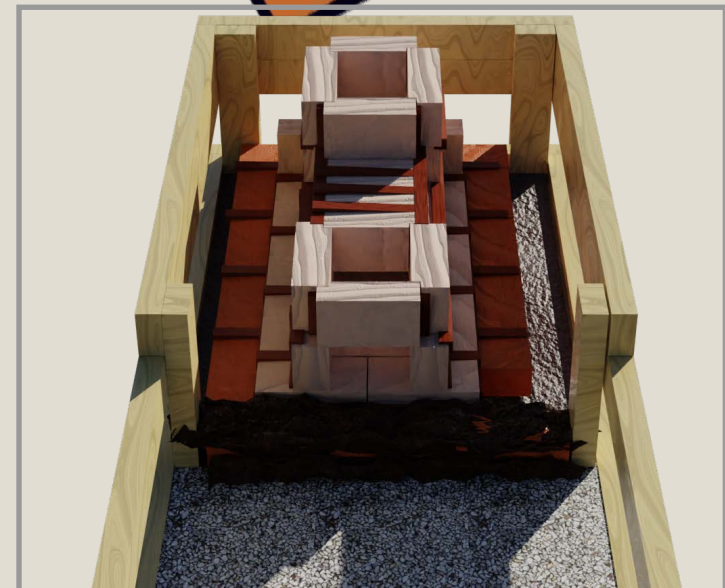
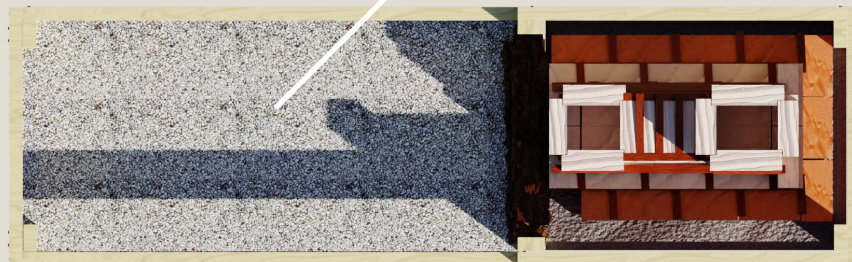
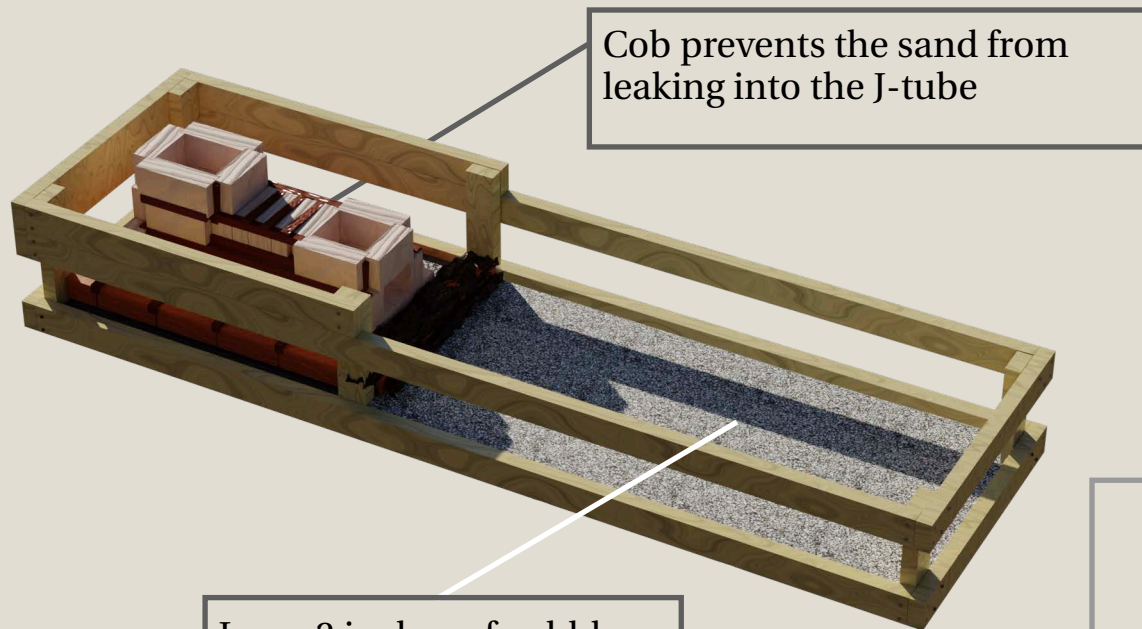


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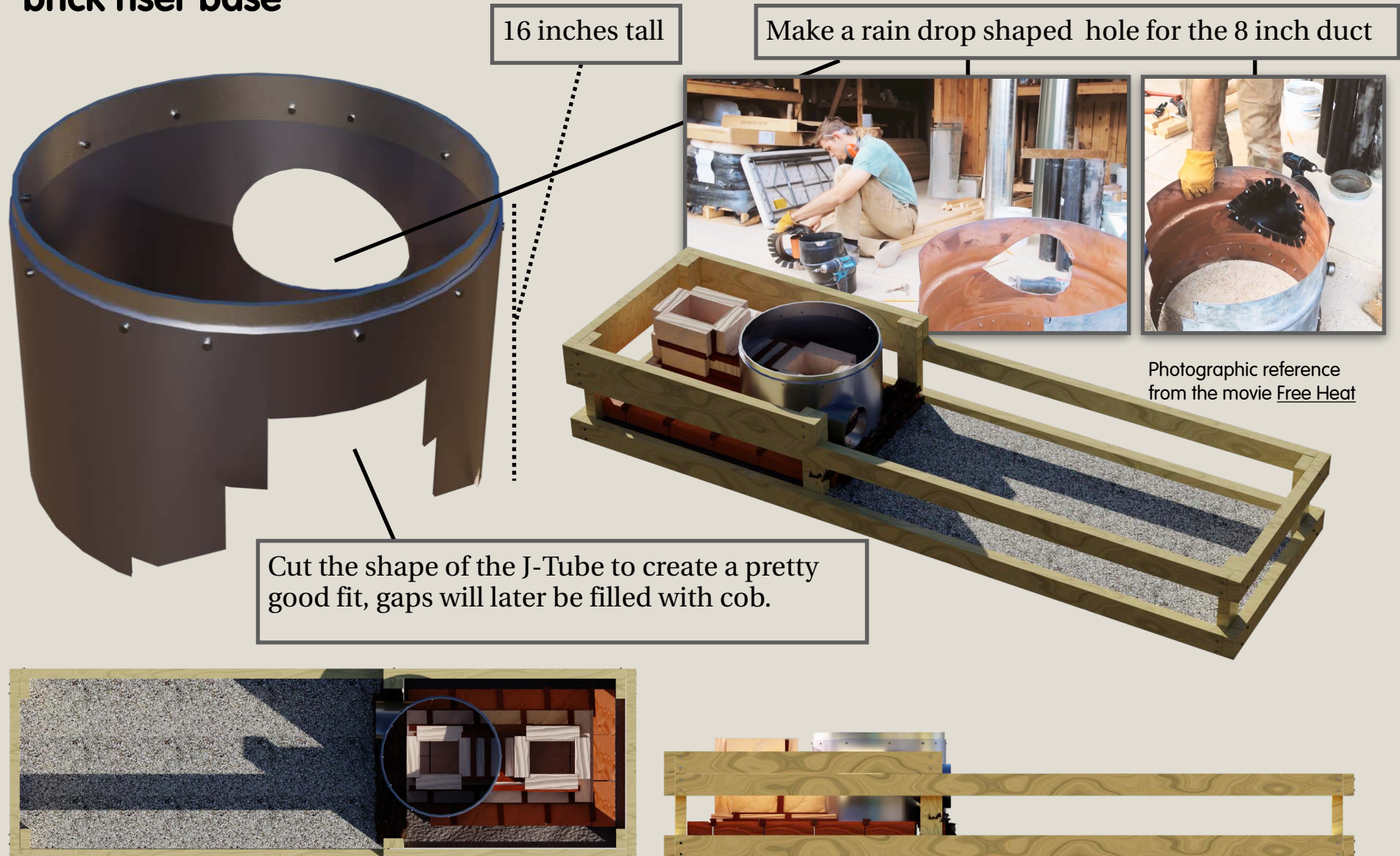
Photographic reference from the movie Free Heat



Step Three A: Add cob to the bricks and the first layer of pebbles to the mass

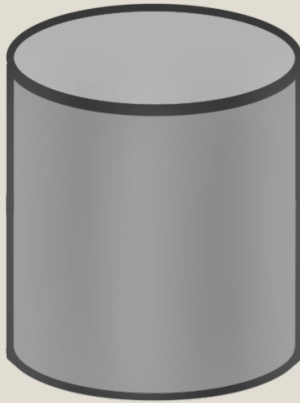


Step Three B: Cut the barrel, cut the J-tube shape and put on top of the brick riser base



Manifold with flange

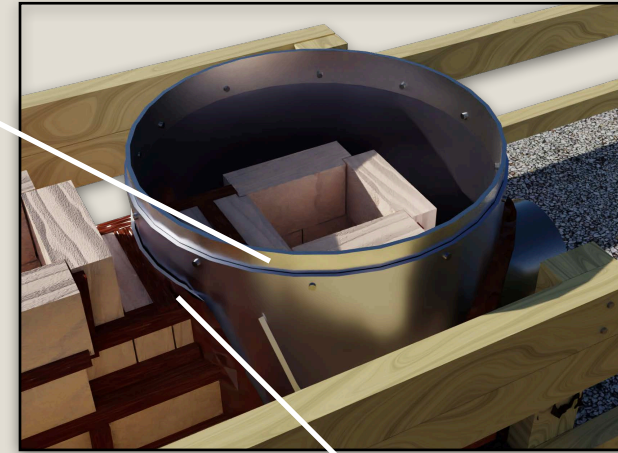
Cut the steel plate to create a cylinder/flange and use bolts to secure the flange to the bottom barrel



A flange attached with bolts to the bottom barrel with at least one inch extending above the barrel



You can then remove the top barrel and clean out the ash

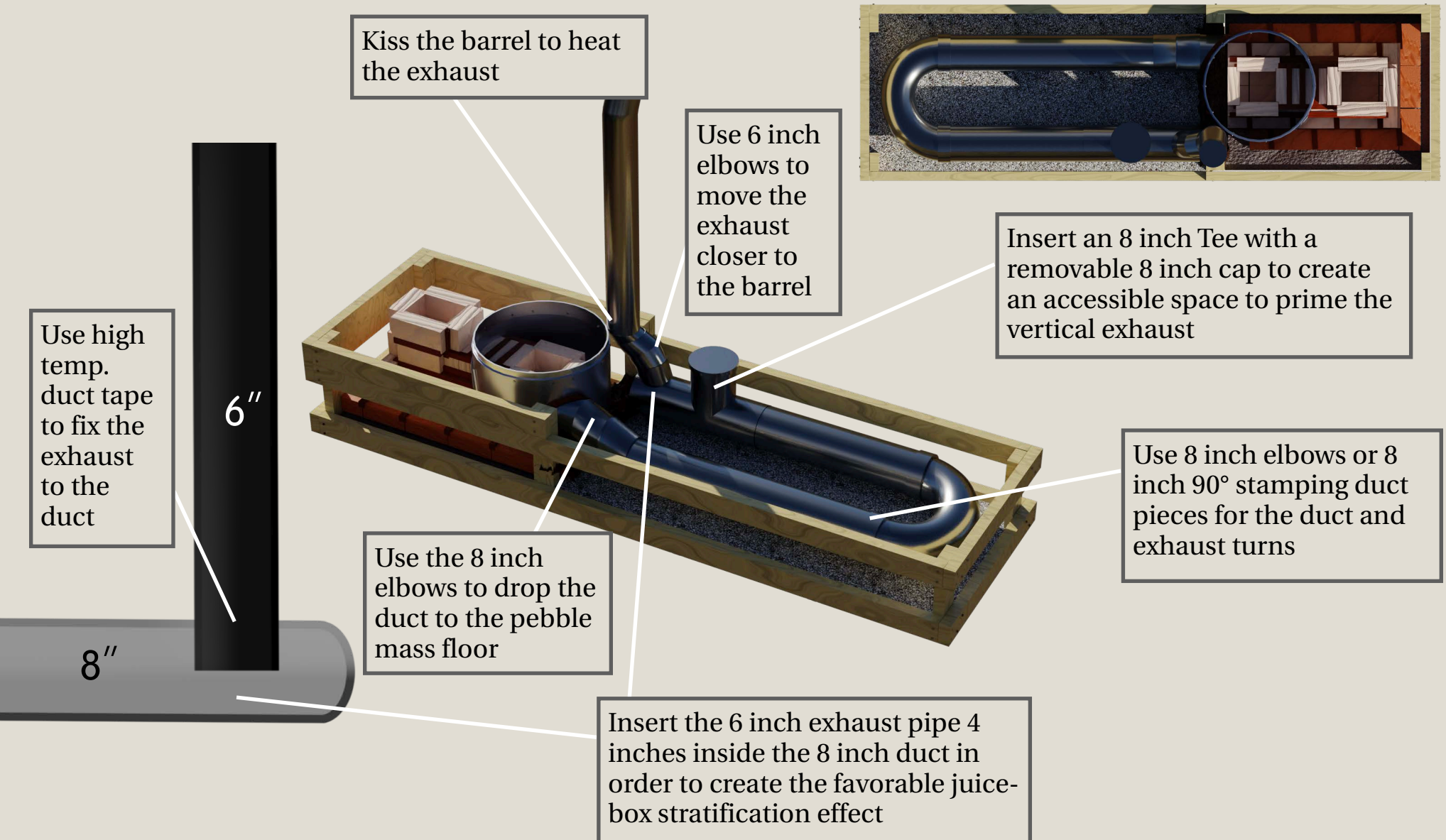


Add cob to seal the space between the barrel and the bricks

Photographic reference from the movie Free Heat



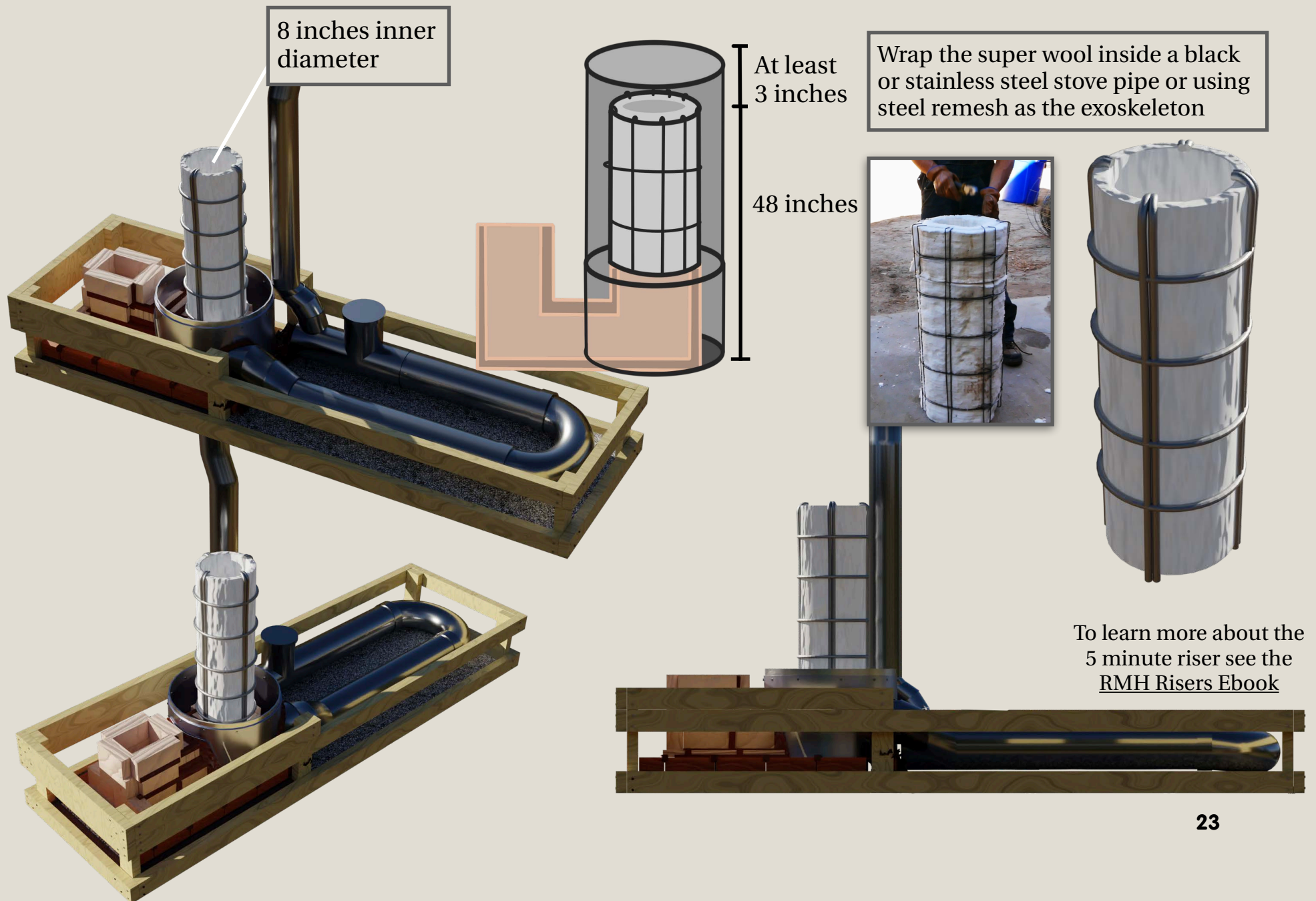
Step Three C: Add 8 inch ducting and 6 inch Juice-box exhaust



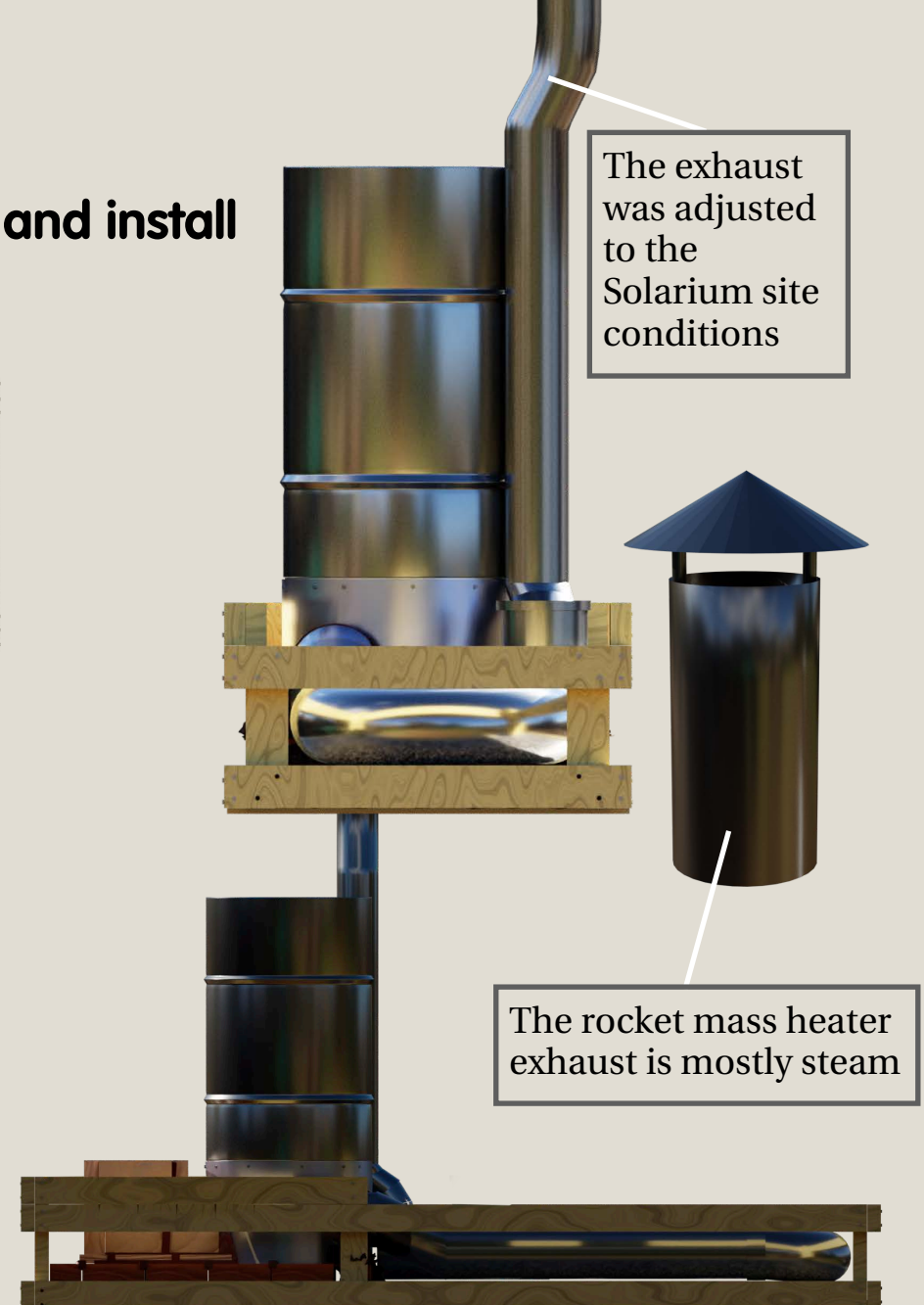
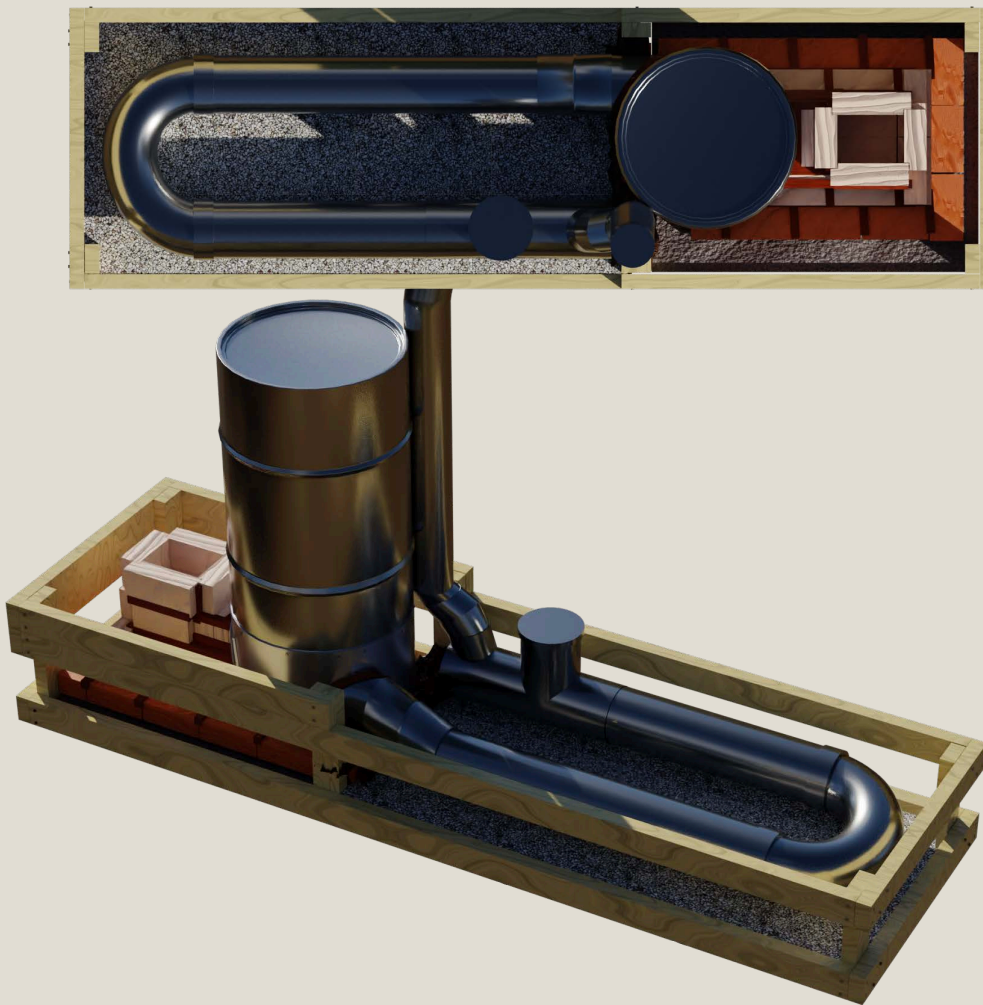
Photographic reference from the movie Free Heat



Step Three D: Insert the 5-minute riser (To learn more about risers see the [RMH Risers Ebook](#))

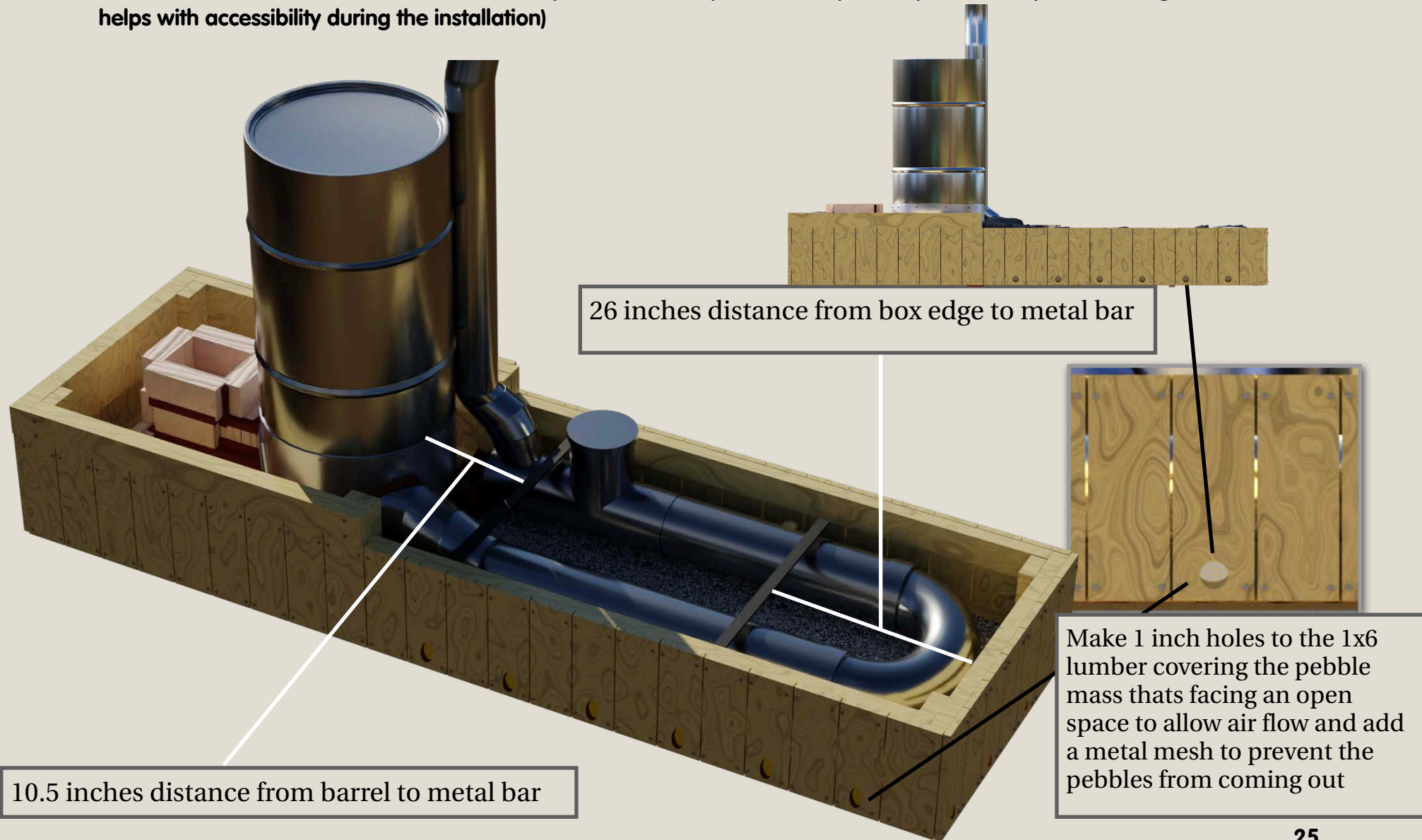


Step Three E: Put the top barrel in place and install the 6 inch vertical exhaust

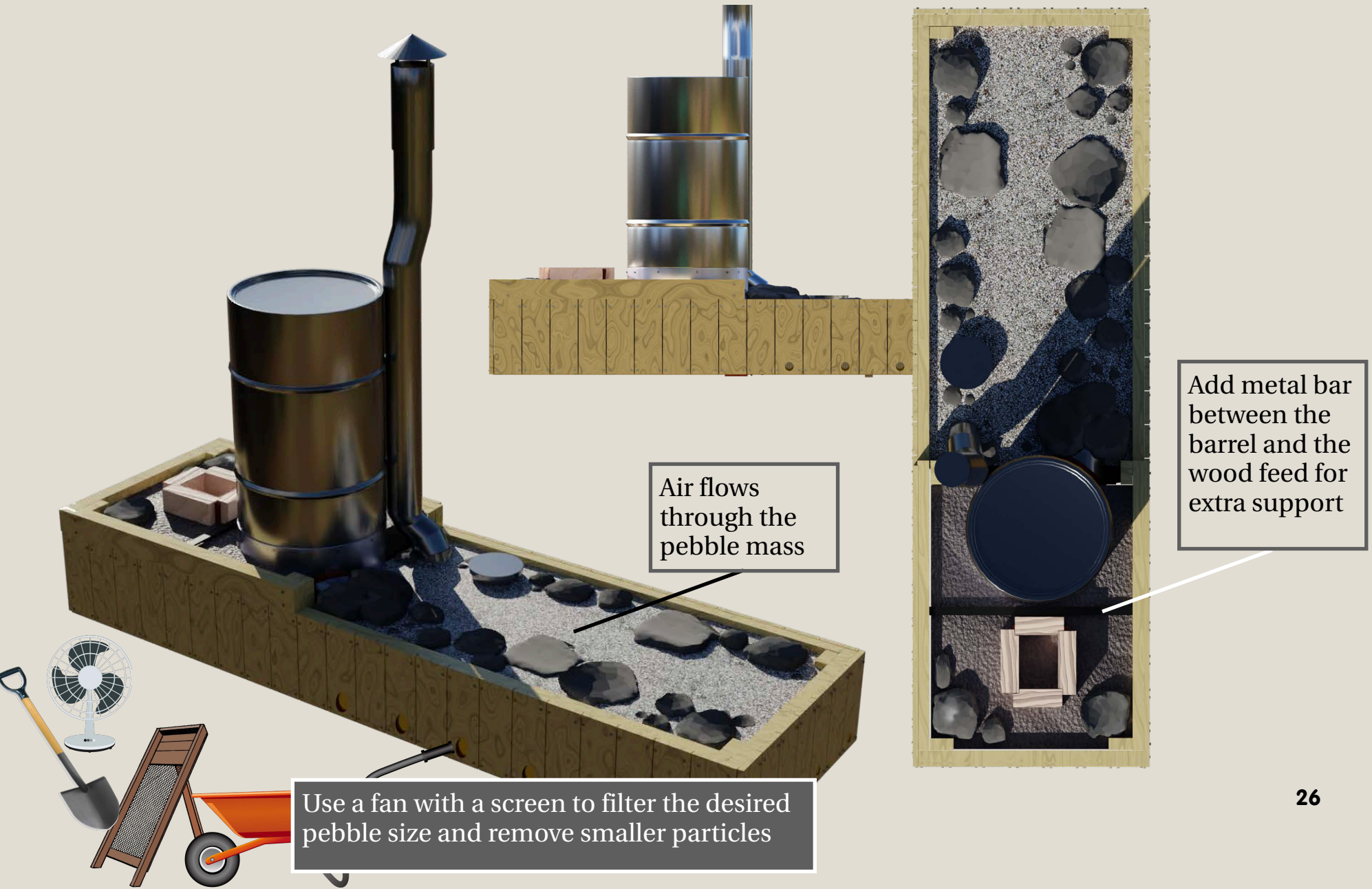


Step Three F: Attach the 1x6 lumber all around the box and add flat steel bars for reinforcement

(This step can be accomplished in any of the previous steps but leaving it for last helps with accessibility during the installation)



Step Four: Fill the J-tube subdivision with sand and the bench with pebbles and rocks at the top, then enjoy a cozy warm space!



Photographic reference from the movie Free Heat



Other Resources

- A. [Free Heat Movie](#)
- B. [Free Heat Full Event](#)
- C. [Rocket Mass Heaters Risers: Materials and Designs eBook](#)
- D. [Better Wood Heat Better Wood Heat: DIY Rocket Mass Heaters 8-movie Set](#)
- E. [Rocket Ovens Movie](#)
- F. Join the Bootcamp team at [Wheaton Labs](#)
- G. For future events visit [wheaton-labs.com](#)
- H. To find more about the authors please visit [permies.com/Bernal](#)

[permies.com](#)

Acknowledgments

Big thanks to the permies.com community for making this artifact possible by supporting the KickStarter for the Free Heat movie, the bootcamp team at Wheaton Labs for providing aid in measurements and general help, specially Mr. Jeff Bosch, and the instructors Issac Workman and J.R. Megee with all the attendees at the Rocket Mass Heater Jamboree 2021 event who helped create this wonderful build!

