

# Building the Thermal Battery

## Materials for Building a Bench, Couch or Bed

You will use rocks or urbanite (old concrete), filling the gaps with cob. Cob is a mineral-fiber composite made by mixing together damp clay soil, sand and usually straw. The easiest way to make small quantities of it is to lay a tarp on the ground, dump the ingredients on it then roll and tread it together with your bare feet. The final consistency for heat storage should be very sandy and homogeneous, sticky and damp enough to hold together for hand sculpting. For a thorough explanation of cob see *The Cobber's Companion* or *The Hand-Sculpted House* (in Recommended Books).

## Lay Out Exhaust

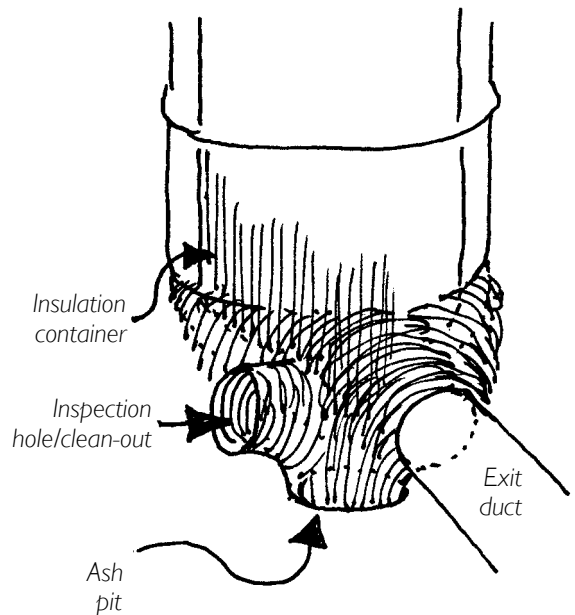
Draw out on your floor the shape of the heat storage you want to build. Set a layer of rocks in damp cob to begin with, and then place your exhaust pipe on top of the rocks.

The exhaust pipe may be made of metal duct or stove pipe, aluminum or steel. Lay out the pipes beginning at the stove end, facing the male ends of the connectors upstream, that is, towards the fire. This way, if there's a condensation drip in the outdoor part of the pipe, it can't run out at the joints, but can be caught in a creosote trap at the bottom of the vertical stack, where there should be a clean-out. If the flue passes outside through a wall, build it to drain outwards as protection against condensation running in from the outdoor stack. If you are simultaneously building a thermal battery and a cob wall, build in a pipe of equal or greater diameter than your system. You may need to reinforce a thin metal pipe to protect it from distortion caused by differential settlement in the wet cob. Make all pipe connections airtight to avoid carbon monoxide leaks.

## CONNECTING STOVE TO BENCH

The three-dimensional shape of the transition from stove to bench is hard to describe, yet fairly easy to sculpt. Effectively, you're connecting a thin, curved, partial cylinder to a fat cylindrical tube at right angles. English has no word for this geometry. The ideal material for the connection is a sand-clay mixture fairly rich in sand and stiff enough that it can't fall into the hole.

To simplify construction, use scraps of 1/4" or 1/8" hardware cloth or expanded metal lath or scrap sheet metal. Curve the lath into place to fit the shape using several small pieces, and then plaster your sand-clay very carefully over its surface. Add extra volume of space at this location, as it is a prime candidate for



*This shows the shape of the chamber. A bit like Scientific American cutaways of heart surgery.*

ash build-up and blockage. If possible leave an ash pit here up to one-gallon capacity.

An alternative if less aerodynamic approach is to rough out the box in brick, then plaster it inside and out with cob, really smooth. We have also used slate roofing tiles and random flattish rocks. The result may look funky but will work fine if you emphasize **leaving plenty of space inside.**

### ***Locate Clean-Outs***

You will need to put an inspection hole close to where the pipe exits from the barrel and another one at the bottom of the vertical exhaust pipe. You may need others if your pipe has many bends and turns. The hole at the base of the vertical pipe doubles as a primer into which you may need to put burning newspaper to get the stove started in unusual weather conditions (see *Light My Fire*). Each inspection hole may also be used to clean out the flues. The simplest way to build them is to use a T-junction in standard duct work or stovepipe. Metal caps are made commercially to fit these pipes, or you could make a plug of your own design. Make this plug airtight to prevent carbon monoxide leaks into the room.

### ***Sculpt the Thermal Battery***

The cob immediately surrounding the pipe should be packed in really tight for good thermal contact and should contain no straw within six inches of the pipe. Pack cob very thoroughly between the rocks and tight against the stovepipe, working up the sides of the stovepipe evenly and carefully, adding rocks as you build. If the work is done with love and the bench is protected until it's dry, there's no danger of the pipes collapsing. Straw is only necessary in the cob that is close to the surface of the bench. Without the straw the cob may crack or be subject to shattering if it's hit with a heavy object, so put in a good amount for the surface layer, chopped to two inches in length. Protect the bench with a half-inch or so of a hard earthen plaster. Reinforce the corners of the bench,

as they will get dinged and bashed with use. You may want to try a gypsum based plaster nearest the barrel as the metal will shrink and swell with the rise and fall of temperature, as will the clay. For more information on plasters and amendments, see *The Hand-Sculpted House* and *The Natural Plaster Book*, both in Recommended Books.