

"In the Beekeeper's Work Shop"
Building a Honey Bucket Heater
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A Honey Bucket Heater

A fact of life that all beginning beekeepers learn is that honey will sooner or later crystallize. Because honey is a supersaturated sugar solution, crystallization is, after all, a natural process. Some honeys will crystallize a lot faster than others. We find, for example, that our fall honey crystallizes much faster than our summer honeys; sometimes within a few weeks after extraction.

Whether you store honey in buckets, jars or squeeze bears, you will need some means to reliquify your honey. The heater presented in these plans may be just what you need.

The Heat Source

The heat source is provided by a 100 watt light bulb in a ceramic fixture on the bottom. You control the temperature by wiring the fixture into a standard dimmer switch. By increasing the brightness of the light bulb, you also increase its heat output. You will find that you can control the temperature of the bucket heater very accurately and within a degree or two.

An advantage of using a light bulb is that it provides a constant, steady heat source. There are no temperature swings like you would have with a thermostatically controlled resistance heater. Also, using a light bulb for heat is very safe. The price is right when using a light bulb heat source. You will only have a few dollars tied up in the heating device and the operating cost is very low.

About the only disadvantage with the light bulb that we can see is that eventually incandescent light bulbs are being phased out in favor of the more energy efficient compact fluorescent bulbs which produce very little heat. To solve this



problem, we plan on stocking up with a lifetime supply of the old fashion light bulbs before they are no longer available.

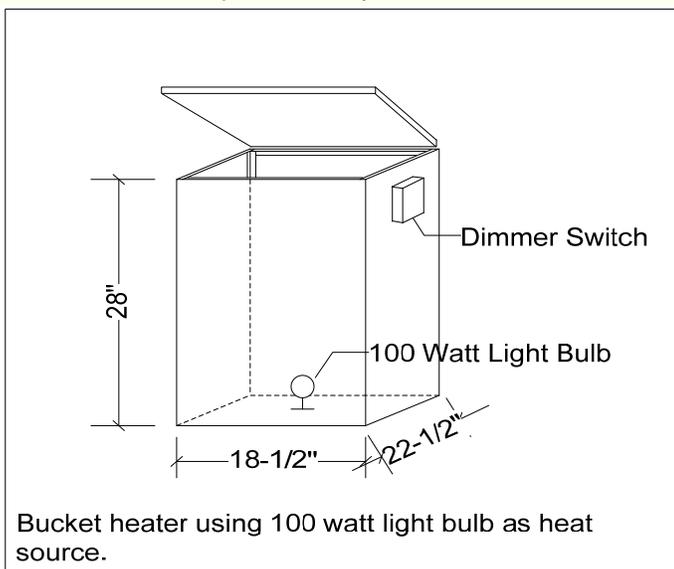
Using the Bucket Heater

The target temperature for the heater is around 105 to 110 degrees (F). At this temperature, it will take about 48 hours to liquify a 5 gallon bucket of honey. Higher temperatures are not necessary and may affect the flavor and color of the honey.

You can easily monitor the temperature by putting a wall thermometer in the heater and keeping a close eye on it. With a little practice, you will be able to keep the heater temperature within a degree or two by using the dimmer switch.

If you keep honey in jars or squeeze bears, then you will eventually have to reliquify these too. The heater in these plans can accommodate two queen excluders (wire bound recommended) for shelves. Pop in a queen excluder or two, load up the heater with jars and bears and you are ready to go. As with a honey bucket, try not to exceed 110 degrees (F) when liquifying honey in jars and squeeze bears.

Warm honey spins out easier than cold honey. So you



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can use this heater to slightly warm up to 20 medium depth frames (10 full size frames) of honey. Operating temperature should be lower - around 80 degrees (F) or so - to prevent wax melting.

Got burr comb on queen excluders you want to remove? Try putting them in this heater and running it at a little higher temperature. Be sure to put something under the excluders to catch the melting wax. You can also put cleaned cappings in the heater for melting. Just keep in mind that melted wax is extremely flammable; so be careful when melting wax in this or any other heater.

Basic Construction

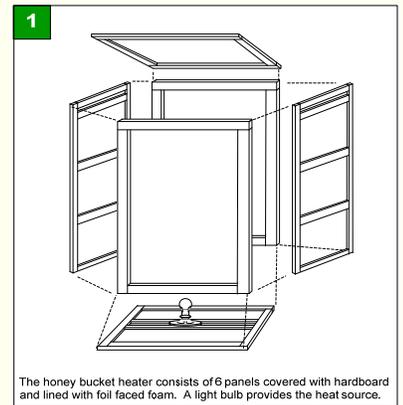
The honey bucket heater consists of a simple, insulated box (Figure 1) large enough to hold a standard 5-gallon honey bucket. The size is such that two standard queen excluders can be placed inside to serve as shelving. With the shelves in place, you reliquify honey stored in jars and squeeze bears as the need will surely arise. The shelf supports brackets are spaced so that you can hang harvested frames in order to

warm them up prior to extracting honey.

The six sides of this heater are first constructed as individual panels. A panel is constructed with a simple wood frame faced with 1/4-inch hardboard (eg. tempered Masonite®). Each panel is insulated with 3/4-inch foiled faced foam.

The front and back panels have three wooden shelf support brackets spaced to accommodate up to 20 medium depth frames or 10 full size frames. The panels are then screwed together to form the sides, bottom and hinged top cover.

Finally, an aluminum heat shield is installed directly above the light bulb on the bottom of the lowest shelf bracket. This heat shield prevents drips from falling on the light bulb (which will shatter the bulb) and to prevent a "hot spot" from developing directly above the bulb.



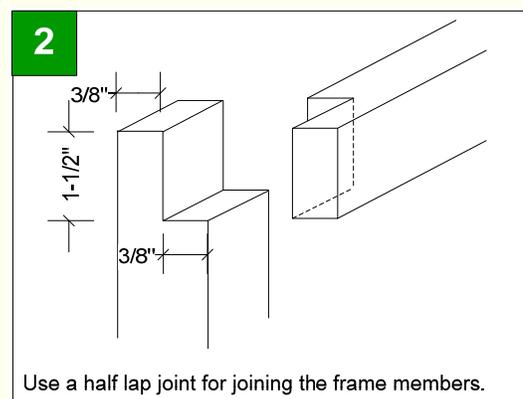
The honey bucket heater consists of 6 panels covered with hardboard and lined with foil faced foam. A light bulb provides the heat source.

Operating Hints

1. You can use a queen excluder (wire bound) as a shelf inside the heater. Shelves are needed when heating jars and squeeze bears.
2. When heating a full 5 gallon honey bucket, place the bucket on three wood slats 1/2" thick cut from scrap 2x4s. Set the slats on the bottom shelf bracket to support the bucket.
3. Place a wall thermometer inside the heater when in use. That way, you can monitor the temperature.
4. You can hang honey frames inside the heater if you need to warm them up prior to extraction. However, keep the temperature on the low side (around 80 degrees F) and monitor frequently as the wax will melt at higher temperatures. If the wax melts, you will have a royal mess. This is a mistake that you will only make once!
5. You can melt wax built up on queen excluders in this heater. Be sure to place something under the excluders to

Before You Begin...

All of the panel frames are made from 1-1/2" by 3/4" pine. You can make these boards by ripping a 1x4 down the middle. We suggest using half-lap joints for the corners of the frames (Figure 2). This joint is easy to make and sufficiently strong since each panel will be faced with a piece of 1/4" hardboard (eg. tempered Masonite®). Simply glue and clamp each joint and check for square. Using nails or brads in the joint is optional and not really necessary.



Use a half lap joint for joining the frame members.

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Construction Details

Step 1. Construct and Assemble the Panel Frames

Construct all six frames as shown in Figure 3,5 and 6. Before gluing up, cut three 1-1/2" wide by 3/8" deep notches (dadoes) in the front and back panels (Figure 4) which will be used for the shelf brackets. Assemble the frames by gluing and clamping each corner.

Step 2. Install the Shelf Brackets

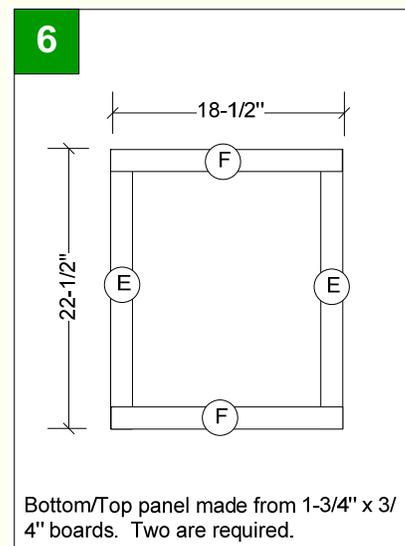
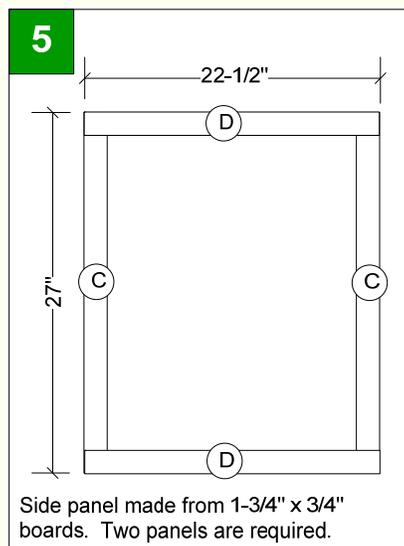
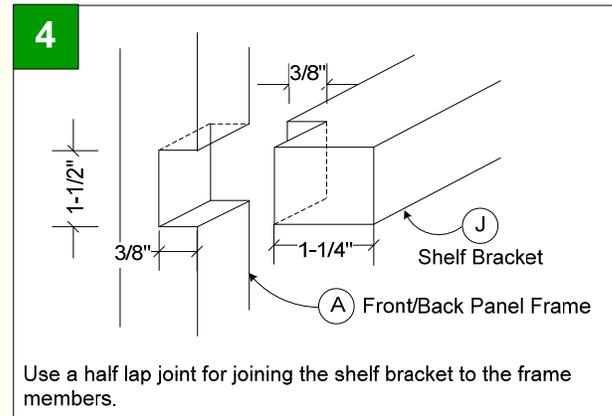
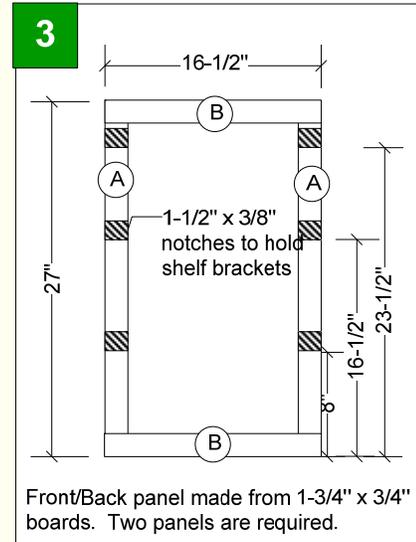
The shelf brackets are made from 1-3/8" x 1-1/2" stock cut to 16-1/2" long (made from 2x4s). Glue and clamp each bracket to the front and back frames using a half lap joint (Figure 4).

Step 3. Install the Hardboard Facing

For the panel face, cut from a sheet of tempered 1/4-inch hardboard (eg. tempered Masonite®) a piece the size of the assembled frame. Glue the facing to the outside of the frame. Nail or screw the facing to the frame for added strength (eg. use 3/4-inch drywall screws).

Step 4. Install the Foil Faced Foam Insulation

Finally for the insulation, cut from a 3/4-inch sheet of foil faced foam board a piece to fit inside the assembled frame. A snug fit is preferred. Install foil side toward the interior of the box. You can glue the foam panel in place but be sure to use a glue rated for foam. Because of the shelf brackets, the front and back panels will require three separate pieces of foam.



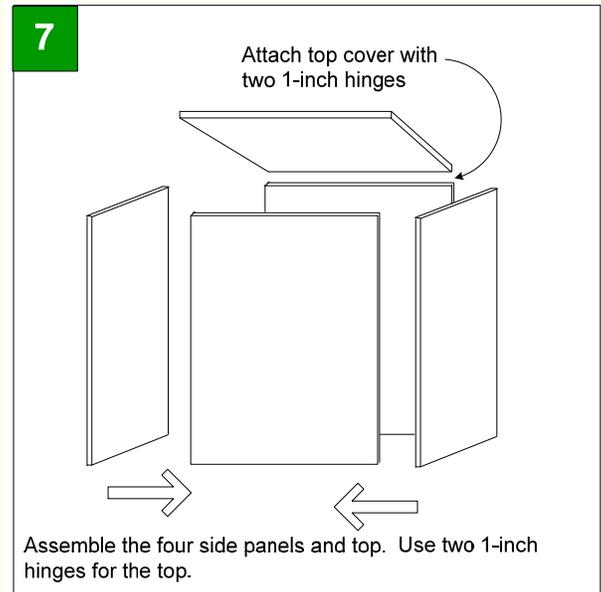
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Step 5. Assemble the Side and Top Panels

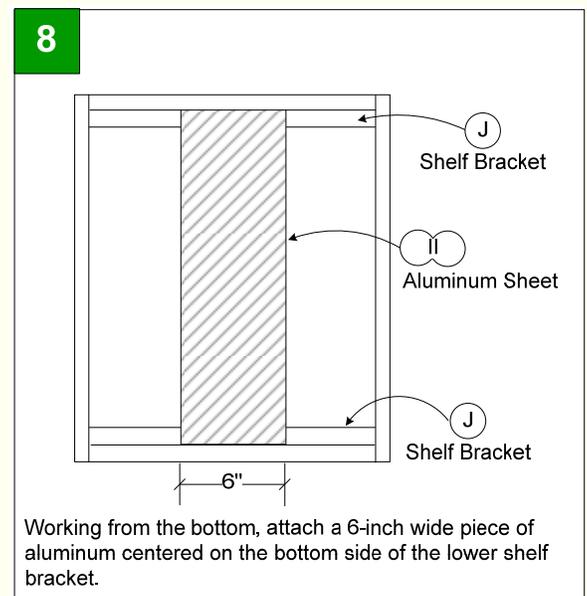
Assemble the four side panels by gluing and screwing them together using 2" drywall screws (Figure 7). The front and back panels go between the side panels so that the assembled size of the box is 18-1/2" wide. Make sure the panels are square to each other. Attach the top panel to the back panel using two 1-inch hinges. The bottom will be attached in a subsequent step.



Step 6. Install the Heat Shield (Do Not Skip This Step!)

Turn the partially assembled heater upside down to install the aluminum heat shield. On the bottom side of the lower shelf brackets, screw a 6-inch wide piece of aluminum (such as a scrap piece of aluminum siding) centered between the side panels (Figure 8).

The heat shield should be directly above where the light bulb will be. The heat shield also acts to catch any drippings for contacting the light bulb (and there will be some).

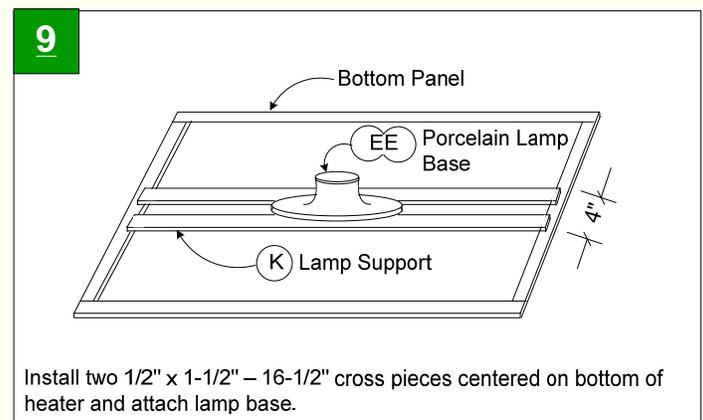


Step 7. Install the Light Bulb Fixture

On the bottom panel, install two 16-1/2" x 1/2" x 1-1/2" cross pieces (cut from scrap 2x4s). The outside edges of the two cross pieces should be 4" apart and centered on the bottom. The ends of these cross pieces should be 1" in from the edge of the bottom panel to allow for the box sides.

Attach a 4' piece of two conductor wire to the porcelain lamp base and screw the base to the cross pieces. Center the lamp base.

Finally, glue and screw the bottom panel to the bottom of the heater box. Route the wire through a small hole drilled in the bottom of one of the side panels. This wire will be connected to the dimmer switch in the next step.



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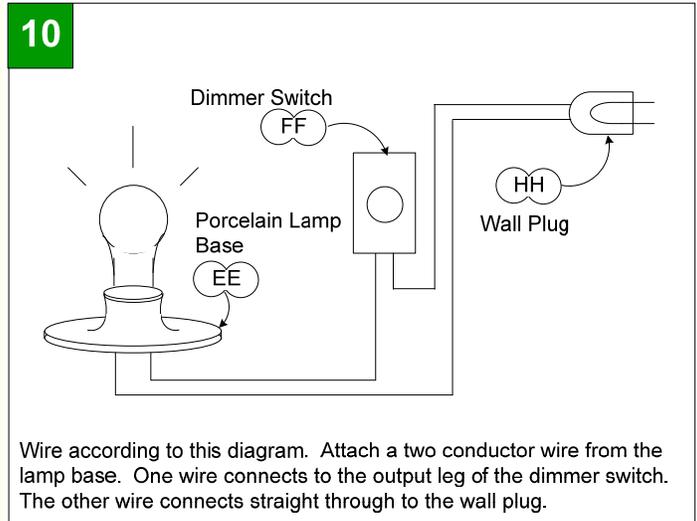
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Step 8. Complete Wiring to Dimmer Switch and Plug

Hook up the two wires from the lamp base to the dimmer switch according to the switch’s instructions. This is a good place to use those electrical wires you have saved from old appliances! Typically, one wire from the lamp base will be wired into the dimmer switch. The other wire will go directly from the wall plug to the other connection on the lamp base (Figure 10).

Install the dimmer switch in a standard electrical junction box with appropriate cover. Screw the junction box to a convenient location on the outside heater box.

A 100 watt light bulb is all that is required for the heat source. With a little practice, you will soon figure out how bright the bulb should be to achieve the desired temperature inside the heater box. Your target should be around 110 degrees (F). At this temperature, a 5 gallon bucket of complete crystallized honey should liquify in about 48 hours or less.



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List of Materials: Honey Bucket Heater

WOOD

		Reference Figure
A	Front/Back Panel Frame, Sides (4)	4
B	Front/Back Panel Frame, Top/Bottom (4)	4
C	Side Panel Frame, Sides (4)	5
D	Side Panel Frame, Top/Bottom (4)	5
E	Top/Bottom Panel Frame, Sides (4)	6
F	Top/Bottom Panel Frame, Front/Back (4)	6
G	Front/Back Panel Sheathing, 1/4" Hardboard (2)	4
H	Side Panel Sheathing, 1/4" Hardboard (2)	5
I	Top/Bottom Panel Sheathing, 1/4" Hardboard (2)	6
J	Shelf Brackets (6)	3
K	Lamp Supports (2)	9

3/4" FOIL FACED FOAM

AA	Front/Back Panel Insulation, cut to fit (2)	4
BB	Side Panel Insulation, cut to fit (2)	5
CC	Top/Bottom Panel Insulation, cut to fit (2)	6

HARDWARE

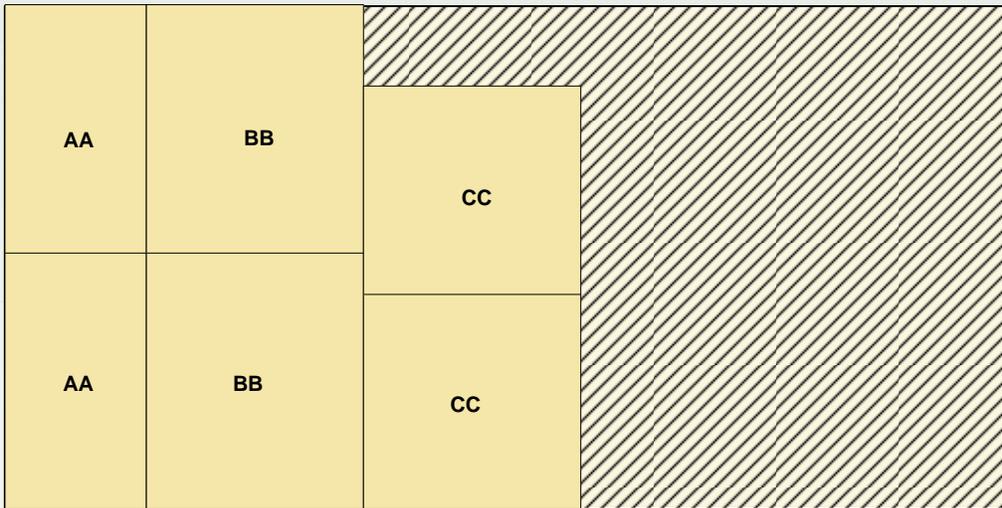
DD	1-inch Hinge (for top lid)	7
EE	Porcelain lamp base (1)	9
FF	Light dimmer switch (1)	10
GG	Electrical junction box and cover for dimmer switch (1)	10
HH	4' (approx) two conductor wire (such as from an old lamp)	11
II	Aluminum Heat Shield	8

2" and 3/4" drywall screws (for assembly panels and facing)
 Franklin's Titebond® Glue
 Misc wood screws (for attaching support brackets and lamp base)
 Wall Thermostat (for monitoring operating temperature)

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Cutting Diagram: Honey Bucket Heater

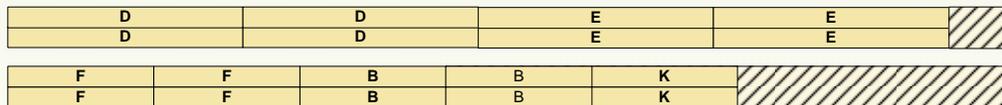
1 Sheet (48" x 96" of 1/4" - Hardboard eg. Tempered Masonite®)



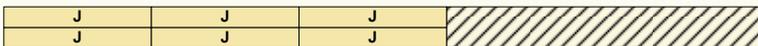
3/4" x 3-1/2" - 120" (1X4 Pine)



3/4" x 3-1/2" - 96" (1X4 Pine)



1-3/4" x 1-1/4" - 72" (Cut from 2X4 Pine)



CUT BUCKET SUPPORTS (3) FROM
 1X4 WASTE.

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Photo Gallery...

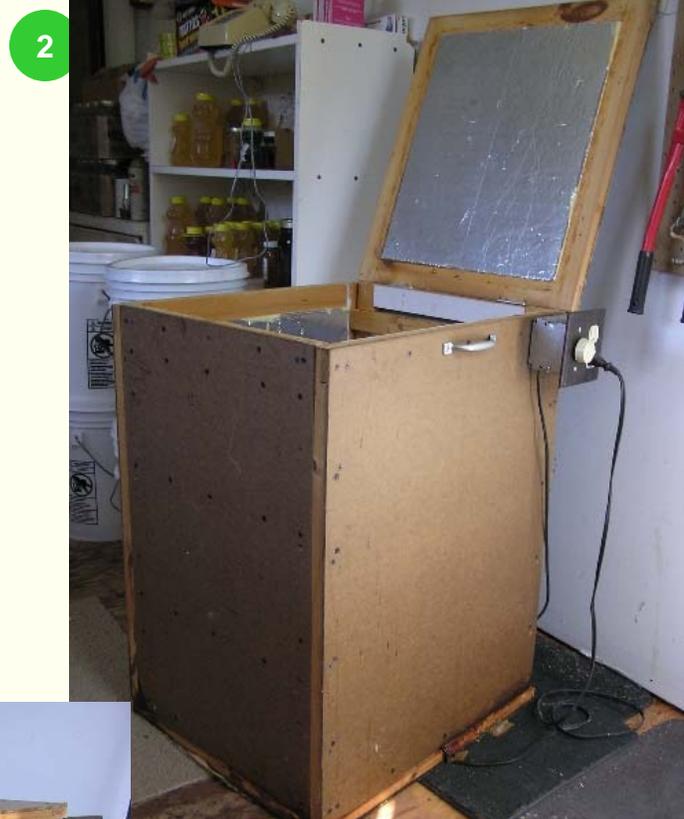


Photo Captions:

1. Honey bucket heater with lid open.
2. Honey bucket heater showing dimmer switch
3. Honey bucket heater with lid closed.