

# HOME ECONOMICS GUIDE



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## How To Build a Portable Electric Food Dehydrator

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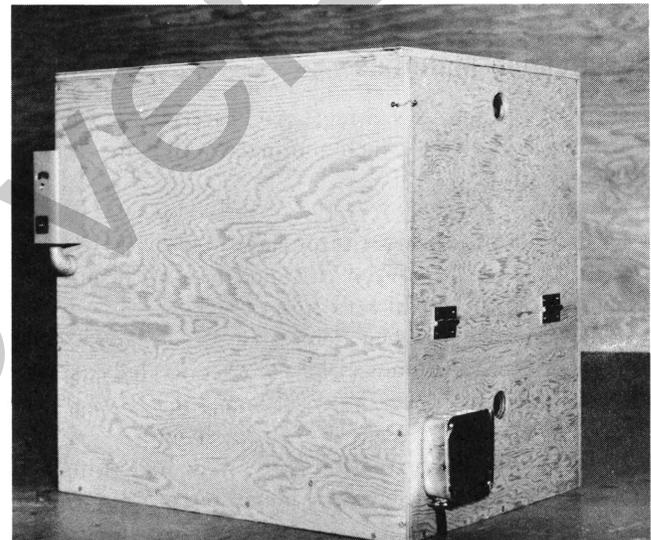
A small dehydrator can be used in the home to preserve many types of fruits, blanched vegetables, meats, and nuts and to make specialty confections from fresh, natural products.

The dehydrator shown in Figure 1 and described in the drawings in Figure 2 provides 8½ square feet of tray surface, which can accommodate approximately 18 pounds of fresh, moist product. The necessary heat for evaporating the moisture is supplied by standard household light bulbs, which are efficient and relatively safe heating elements. An 8-inch household type electric fan can be used for air circulation, or a 6-inch or 8-inch diameter air-duct circulating fan may be purchased from an electrical supply house.

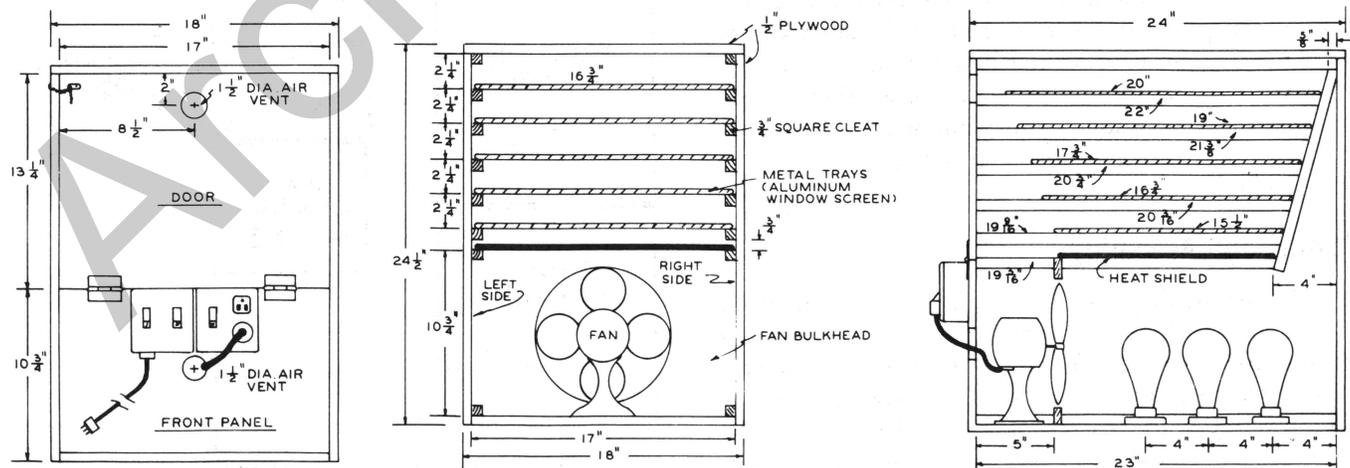
The dehydrator box described here is easy to build. It requires only two forms of wood building materials: ½-inch plywood and ¾-inch square wood strips. The necessary lumber and electrical supplies are shown in Figure 3. Construction can be done with a hand saw, a coping saw or compass saw, drill, countersink, screwdriver, and knife. A square or tape is needed for measurements.

The drying trays may be built of wooden slats or metal mesh. It is recommended, however, that you purchase

prefabricated aluminum window screens for use as trays. They are light weight, sturdy, easily cleaned, and relieve the builder of much of the more difficult construction.

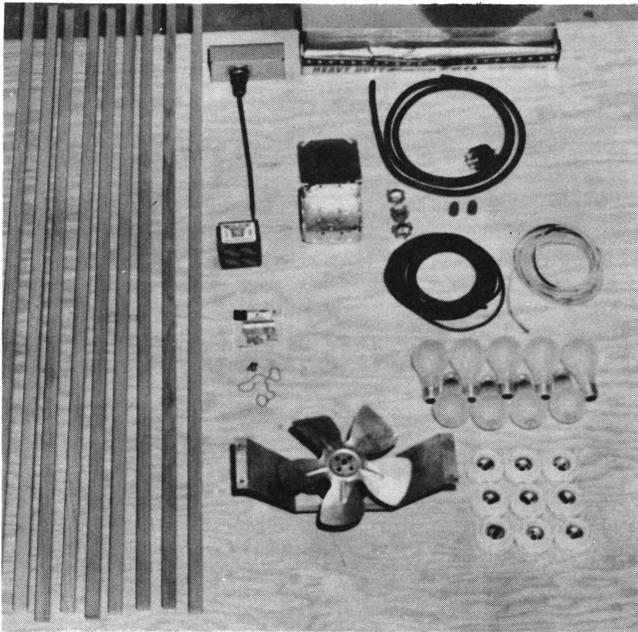


1-Table top size food dehydrator for home use.



2-Front and two section views of dehydrator construction.

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3-Materials needed for construction.

### Construction Materials

- 1 sheet of 1/2-inch, 4 x 8 foot, A-C exterior plywood
- 9 4-foot pieces of 1 x 1-inch nominal (3/4 x 3/4-inch actual) wood strips
- 1 8-inch fan
- 1 set of 5 aluminum screens for trays. 16 3/4 x 20, 16 3/4 x 19, 16 3/4 x 17 3/4, 16 3/4 x 16 3/4, and 16 3/4 x 15 1/2 inches
- 1 pair of 2-inch, metal butt hinges
- 1 ball chain or equivalent door latch
- 9 porcelain surface-mount sockets with concealed contacts
- 9 75-watt light bulbs
- 15 feet of asbestos-covered # 14 copper wire
- 6 feet of # 14 wire extension cord, with male plug
- 1 36-inch length of heavy-duty household aluminum foil wrap
- 116 1-inch No. 8 flathead wood screws (nails and glue may be used instead)
- 18 5/8-inch x No. 7 roundhead wood or sheet-metal screws
- 1 10-amp-capacity thermostat, 100-160° F approximate range, either air-type or hot-water-tank immersion type available through appliance repair shops
- 1 4-inch electrical surface utility box with blank cover
- 2 1/2-inch utility box compression fittings
- 2 wire nuts

### Cutting and Assembly

The cutting diagram in Figure 4 shows how all of the 1/2-inch plywood pieces can be cut from the single 4 x 8-foot sheet. It is usually most satisfactory to measure from the factory-cut edges as shown. Allowances for saw kerfs must be made between adjacent pieces.

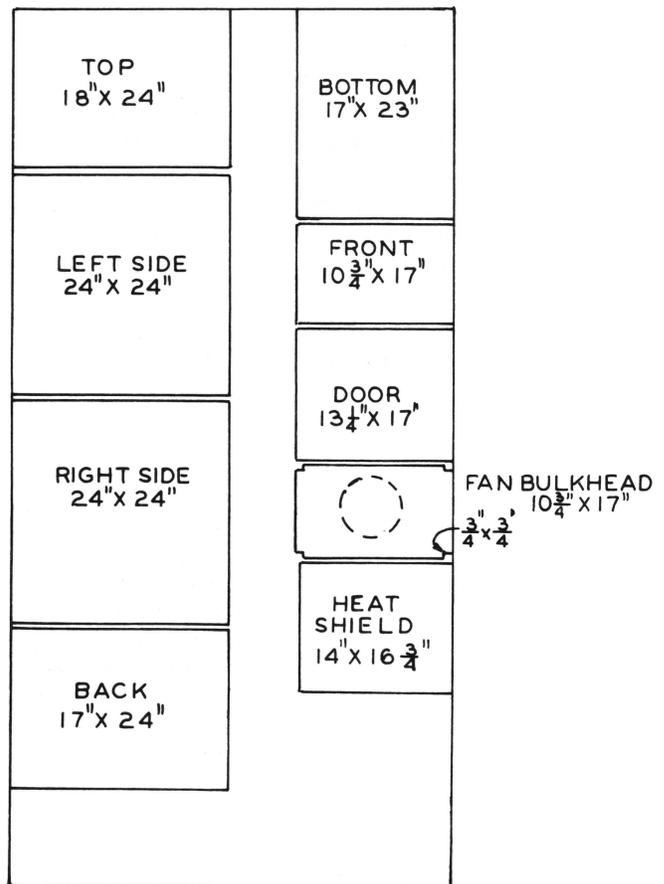
Cut the plywood sections to size and the 1 x 1 strips to the lengths shown. Then assemble the side panels as shown in Figure 5.

Next, lay out the porcelain sockets and fasten to the base, as shown in Figure 6. Fasten the asbestos covered wire to the porcelain sockets. Connect the wire that goes to the yellow screws on the sockets to the thermostat, mounted near the rear on the left side panel. (The yellow screws on the sockets connect to the center pole, rather than the threaded wall of the socket.) Connect the wire that goes to the white screws to the white wire in the extension cord. The third wire (green) in the extension cord should be connected directly to the junction box, mounted on the front panel.

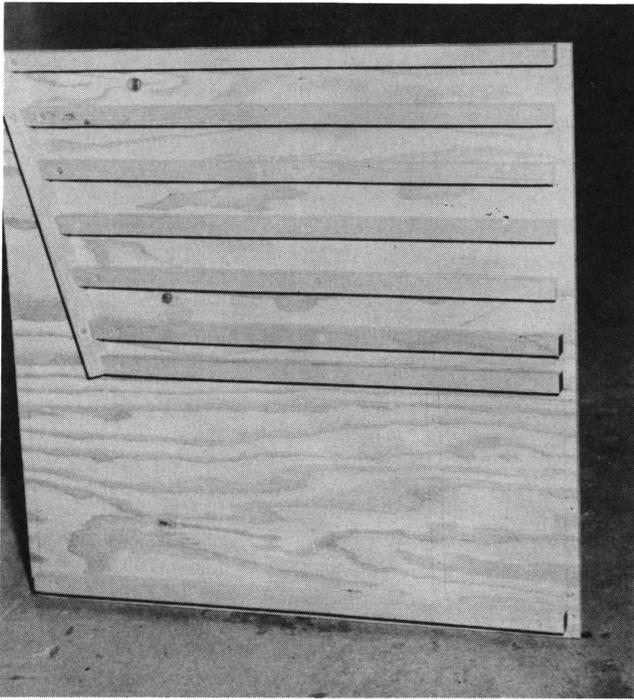
If you use a household-type fan with the base left attached, fasten it in place on the dehydrator base and cut the hole in the fan bulkhead to fit. If you use a duct-type fan, cut the necessary size hole (approximately 8 1/2 inches in diameter for an 8-inch fan or approximately 6 1/2 inches in diameter for a 6-inch fan) in the bulkhead and fasten the fan-mounting frame directly to the bulkhead. Now set the bulkhead in place (approximately 5 to 5 1/2 inches from the front panel) and fasten it temporarily in position by two screws through the left side panel as shown in Figure 7. Center the 1 1/2-inch-diameter air vent hole in the front panel directly in front of the fan motor, approximately one inch away from the motor. This will allow the cold air to enter and pass over the motor to cool it.

Next, fasten the right side, back, and top in place.

Cover the heat shield with a heavy-duty household aluminum foil wrap. This provides a reflective surface to



4-Cutting plan to obtain the necessary plywood parts with a minimum of saw cuts.



5-Right side panel showing cleats assembled to the inside surface.

protect the plywood heat shield, and also provides a smooth surface on the top of the shield for easier removal of juices that may drip from the drying trays.

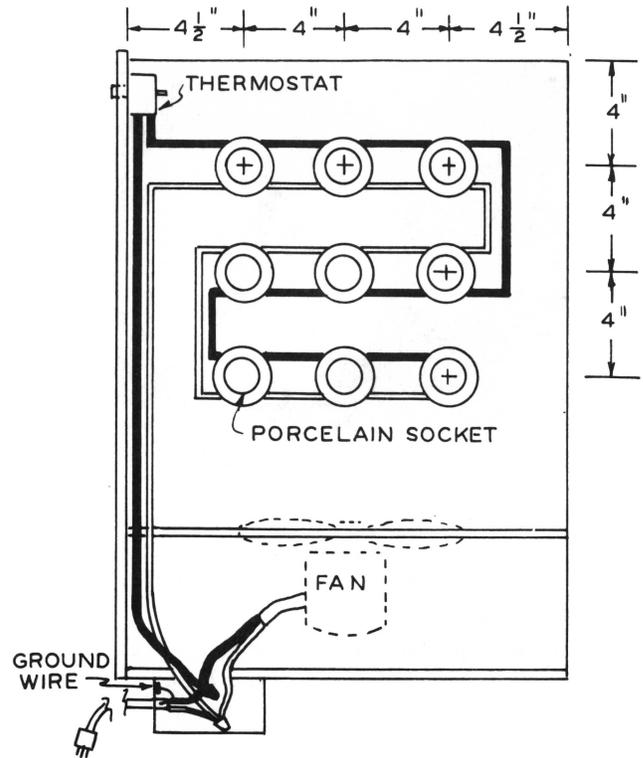
You could build the drying trays, but we suggest you purchase aluminum window screens made to the sizes listed. You can order these through your local lumber or building supply dealer. If they do not have a ready source of supply, further information about suppliers may be obtained through your local county Extension office. If you prefer to build the trays, we suggest you make a light, wooden frame and use either aluminum screen or smooth wood strips. Most plastic screens will sag badly under load and heat. Black-metal screens will rust and leave stains on the food product.

You'll need some type of adjustable latch to hold the door in a partially opened position during the early stages of drying, when the moisture is being removed rapidly. The ball-link chain with a catch as shown provides a ready adjustment for the amount of door opening.

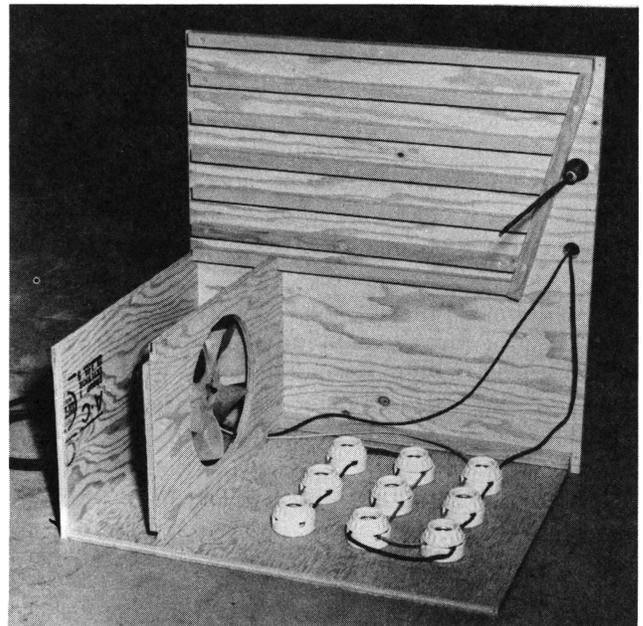
As a check on the thermostat setting, some type of thermometer capable of service in the 100 to 160° F temperature range should be available. The dial type, as shown in Figure 8, is rugged and easily read. A kitchen-type meat thermometer also will serve. The sensing part of the thermometer should project through the box into the space above the trays for accurate indication of the drying temperature. Placing the sensing element in the heating chamber with the light bulbs will give a misleading, high reading.

## Operation

For most moist fruits and blanched vegetables the trays may be loaded at the rate of one to two pounds of



6-Layout of socket locations and wiring plan.

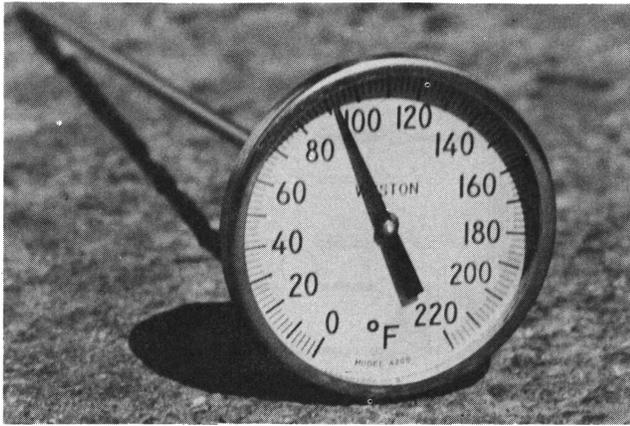


7-Bottom, front, left side, and bulkhead assembled with sockets, fan, wiring, and thermostat in place.

fresh product per square foot of tray surface. Nuts and meats should be placed only one layer deep on the trays. The following thermostat settings are suggested:

Nuts	100-105° F
Meat (Jerky)	start at 100°, program to 165° (internal temp. 155°)
Fruits	135-145°
Vegetables	140-150° (max. 165°)

During the early stages of drying, the door should be



8-Dial type thermometer useful in monitoring dehydrator temperature.

opened about 1/2 to 3/4 inch at the top to allow easy escape of moisture-laden air. As moist air exhausts at the top, fresh air will be taken in along the sides of the partially opened door.

Test to determine when the first, high-moisture drying stage is completed. Hold your hand or a mirror at the opening at the top of the door. When moisture no longer tends to condense, close the door. The air exchange provided by the two 1-1/2-inch-diameter vents should be enough to complete the drying process.

### Maintenance

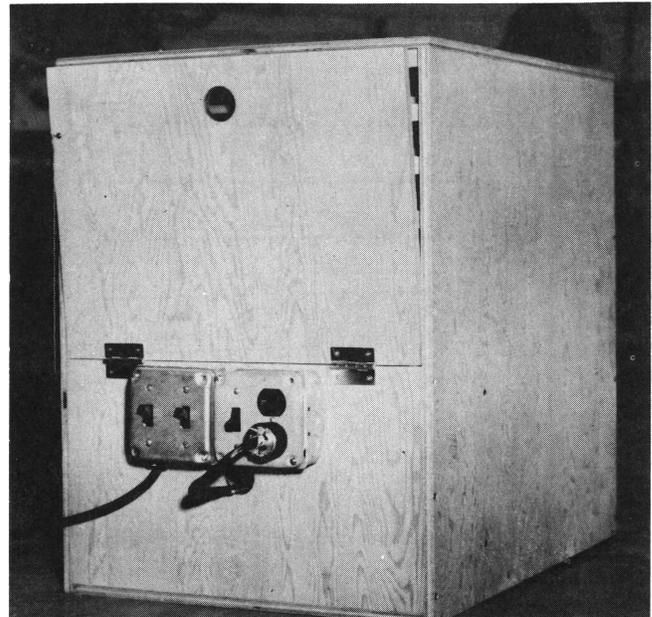
The electric fan motor is supplied by a stream of fresh air from the lower vent, positioned in front of the motor, but it will still operate at a higher temperature than in normal, open-room service. Lubricate the motor bearings with 30-weight engine oil. Lighter grade household or sewing machine oil may tend to gum and stall the fan motor after extended service.

Wash trays with hot water and a detergent when they become soiled with dried-on juices. If you purchased the recommended aluminum window screens with an aluminum wedge strip to hold the screen in place, you can put them in an electric dishwasher without damage.

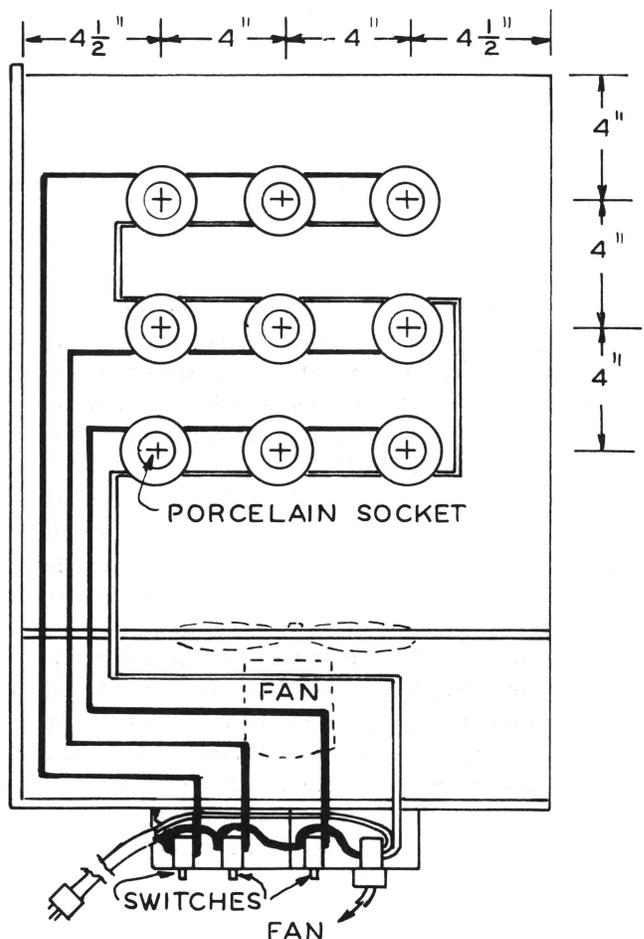
### Alternate Construction and Operation

The dehydrator can be built without a thermostat. Temperature can be controlled by the use of switches to operate various numbers of light bulbs. Figure 9 shows such a unit, with three separate switches, each controlling three bulbs in the heating chamber. The wiring diagram is shown in Figure 10.

All three switches should be turned on for at least the first hour or two when the dehydrator is loaded with moist product. As soon as the temperature comes up to the desired level and the extra heat is not needed to warm large amounts of incoming fresh air, one or two switches may be turned off and the drying completed at the reduced heating rate.



9-Dehydrator cabinet showing three switches used to control heat input. Note the use of a duplex outlet which may be used for plugging in the fan instead of wiring in permanently.



10-Socket location and wiring plan for use with three-switch control.