10. Fasten the right side, back, and top in place.

11. As a check on your thermostat setting, you should test to determine when the first, high-moisture stage is completed. Hold your hand or a mirror about 1/2-inch-diameter vents should be enough to complete stage is completed. Hold your hand or a mirror about 1/2-inch-diameter vents should be enough to complete the drying process. Turn on all three switches for at least the first hour of the first hour 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 stage is completed. Hold your hand or a mirror at the opening at the top of the door. The air exchange provided by the two

12. When moisture no longer tends to condensate, close the door. The air exchange provided by the two

13. The sensing part of your thermometer should start at 100°, increase to 165° early stages of drying, when the moisture is being removed rapidly. A ball-link chain with a catch (see figures 2 and 3) provides a ready adjustment for the drying process. 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 stage is completed. Hold your hand or a mirror at the opening at the top of the door. The air exchange provided by the two

14. Most woven plastic screens will sag badly under load and heat. Black metal screens will rust—and make a light, wooden frame and use either molded plastic or aluminum screen or smooth wood strips. As a check on your thermostat setting, you should test to determine when the first, high-moisture stage is completed. Hold your hand or a mirror about 1/2-inch-diameter vents should be enough to complete the drying process. Turn on all three switches for at least the first hour of the first hour 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 stage is completed. Hold your hand or a mirror at the opening at the top of the door. The air exchange provided by the two

15. The aluminum window screens with an aluminum wedge strip to hold the screen in place, you can put them in an aluminum wrap. This provides a reflective surface to operate various numbers of light bulbs. Figure 9 shows such a unit, with three separate switches, each controlling one bulb in the heating chamber. The wiring diagram is shown in figure 10. Turn on all three switches 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 door is not needed to warm large amounts of incoming fresh air, turn off one or two switches and continue the drying at the reduced heating rate.

16. The sensing part of your thermometers should project through the box into the space above the trays, for accurate indication of the drying temperature. (If you place this sensing element in the heating chamber with the light bulbs, your thermometer will give a misleadingly high reading.)

For moist fruit and leafy vegetables, load the trays at the rate of 1 to 2 pounds of fresh product per square foot of tray surface. Place nuts and meats only one layer deep on the trays.

The following thermostat settings are suggested:

Nuts

100-105° F

Dec (cherry) start at 100°, increase to 165°

150-160° (max. 165°)

Vegetables

Fruits

The Oregon State University Extension Service provides education, training, and technical assistance to people with agriculturally related work and interests. Major programs emphasize include land and water resources, crop and animal production, processing of agricultural products, and resource use and conservation.

Dehydrator cabinet, showing three switches used to operate various numbers of light bulbs. Figure 9 shows such a unit, with three separate switches, each controlling one bulb in the heating chamber. The wiring diagram is shown in figure 10. Turn on all three switches 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 door is not needed to warm large amounts of incoming fresh air, turn off one or two switches and continue the drying at the reduced heating rate.

Alternate construction and operation You can build the dehydrator without a thermostat. You would then control temperature by using switches to operate various numbers of light bulbs. Figure 9 shows such a unit, with three separate switches, each controlling one bulb in the heating chamber. The wiring diagram is shown in figure 10. Turn on all three switches 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 door is not needed to warm large amounts of incoming fresh air, turn off one or two switches and continue the drying at the reduced heating rate.

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The necessary heat for evaporating the moisture is supplied by standard household light bulbs, which are efficient and relatively safe heating elements. Or you could use a porcelain-Nichrome wire heating element with the same total wattage. You can use an 8-inch household-type electric fan for air circulation, or you could buy a 4- or 8-inch-diameter air-circulating fan from an electrical supply house. The dehydrator box described here is easy to build. It requires only two forms of wood building materials: 1/2-inch plywood and 3/4-inch square wood strips. The necessary lumber and electrical supplies are shown in figures.

The drying trays may be built with wood frames. The bottoms may be of wood slats, metal mesh, or molded plastic mesh. You could buy prefabricated aluminum window screens for use as trays. They are lightweight, strong, and easy to clean, and require you of much of the more difficult construction.

Construction materials
1. 1/2-inch 4 x 4-foot A-C exterior plywood
2. 1-foot piece of 1 x 1-inch nominal (3/4-inch actual) wood strips
3. 3/4 x 19, 16 1/4 x 20, 16 7/8 x 16, 16 3/4 x 16 inches
4. 6 feet of #14 wire extension cord, with male plug
5. 9 porcelain surface-mount sockets with concealed contacts
6. 1 ball chain or equivalent door latch
7. 18 Vs-inch No. 7 roundhead wood or sheet-metal screws
8. 1 8-inch fan
9. 36-inch length of heavy-duty household aluminum type (available through appliance repair shops)
10. 1 10-amp-capacity thermostat, 100-160° F (38-71° C)
11. 1 4-inch electrical surface utility box with blank cover
12. 1 8-inch-diameter air vent hole in the front panel (for saw kerfs between adjacent pieces.
13. 1 36-inch length of aluminum window screens for trays
14. 1 36-inch length of heavy-duty household aluminum foil wrap
15. 1 4-inch copper wire covered with silicone or silicon-base insulation rated at 150° C or higher
16. 1 36-inch length of heavy-duty household aluminum foil wrap
17. 3/4-inch No. 8 flathead wood screws (nails and glue may be used instead)
18. 15 feet of #14 copper wire covered with silicone or silicon-base insulation rated at 150° C or higher
19. 1 4-inch extension cord, with male plug
20. 1 hand saw, a coping saw or compass saw, drill, countersink, screwdriver, and knife.
21. 1 8-inch-diameter air-duct circulating fan from an electrical supply house.
22. 1 10-amp-capacity thermostat, 100-160° F (38-71° C)
23. 1 4-inch electrical surface utility box with blank cover
24. 1 8-inch-diameter air vent hole in the front panel (for saw kerfs between adjacent pieces.
25. 3/4-inch No. 8 flathead wood screws (nails and glue may be used instead)
26. 15 feet of #14 copper wire covered with silicone or silicon-base insulation rated at 150° C or higher
27. 1 4-inch extension cord, with male plug
28. 1 hand saw, a coping saw or compass saw, drill, countersink, screwdriver, and knife.
29. 1 8-inch-diameter air-duct circulating fan from an electrical supply house.
30. 1 10-amp-capacity thermostat, 100-160° F (38-71° C)
31. 1 4-inch electrical surface utility box with blank cover
32. 1 8-inch-diameter air vent hole in the front panel (for saw kerfs between adjacent pieces.
33. 3/4-inch No. 8 flathead wood screws (nails and glue may be used instead)
34. 15 feet of #14 copper wire covered with silicone or silicon-base insulation rated at 150° C or higher
35. 1 4-inch extension cord, with male plug
36. 1 hand saw, a coping saw or compass saw, drill, countersink, screwdriver, and knife.
37. 1 8-inch-diameter air-duct circulating fan from an electrical supply house.
38. 1 10-amp-capacity thermostat, 100-160° F (38-71° C)
39. 1 4-inch electrical surface utility box with blank cover
40. 1 8-inch-diameter air vent hole in the front panel (for saw kerfs between adjacent pieces.
41. 3/4-inch No. 8 flathead wood screws (nails and glue may be used instead)
42. 15 feet of #14 copper wire covered with silicone or silicon-base insulation rated at 150° C or higher
43. 1 4-inch extension cord, with male plug
44. 1 hand saw, a coping saw or compass saw, drill, countersink, screwdriver, and knife.
45. 1 8-inch-diameter air-duct circulating fan from an electrical supply house.
46. 1 10-amp-capacity thermostat, 100-160° F (38-71° C)
47. 1 4-inch electrical surface utility box with blank cover
48. 1 8-inch-diameter air vent hole in the front panel (for saw kerfs between adjacent pieces.
49. 3/4-inch No. 8 flathead wood screws (nails and glue may be used instead)
50. 15 feet of #14 copper wire covered with silicone or silicon-base insulation rated at 150° C or higher
51. 1 4-inch extension cord, with male plug
52. 1 hand saw, a coping saw or compass saw, drill, countersink, screwdriver, and knife.
53. 1 8-inch-diameter air-duct circulating fan from an electrical supply house.
54. 1 10-amp-capacity thermostat, 100-160° F (38-71° C)
55. 1 4-inch electrical surface utility box with blank cover
56. 1 8-inch-diameter air vent hole in the front panel (for saw kerfs between adjacent pieces.
57. 3/4-inch No. 8 flathead wood screws (nails and glue may be used instead)
58. 15 feet of #14 copper wire covered with silicone or silicon-base insulation rated at 150° C or higher
59. 1 4-inch extension cord, with male plug
60. 1 hand saw, a coping saw or compass saw, drill, countersink, screwdriver, and knife.
61. 1 8-inch-diameter air-duct circulating fan from an electrical supply house.
62. 1 10-amp-capacity thermostat, 100-160° F (38-71° C)
63. 1 4-inch electrical surface utility box with blank cover
64. 1 8-inch-diameter air vent hole in the front panel (for saw kerfs between adjacent pieces.
65. 3/4-inch No. 8 flathead wood screws (nails and glue may be used instead)
66. 15 feet of #14 copper wire covered with silicone or silicon-base insulation rated at 150° C or higher
67. 1 4-inch extension cord, with male plug
68. 1 hand saw, a coping saw or compass saw, drill, countersink, screwdriver, and knife.
69. 1 8-inch-diameter air-duct circulating fan from an electrical supply house.
70. 1 10-amp-capacity thermostat, 100-160° F (38-71° C)
71. 1 4-inch electrical surface utility box with blank cover
72. 1 8-inch-diameter air vent hole in the front panel (for saw kerfs between adjacent pieces.
73. 3/4-inch No. 8 flathead wood screws (nails and glue may be used instead)
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75. 1 4-inch extension cord, with male plug
76. 1 hand saw, a coping saw or compass saw, drill, countersink, screwdriver, and knife.
77. 1 8-inch-diameter air-duct circulating fan from an electrical supply house.
78. 1 10-amp-capacity thermostat, 100-160° F (38-71° C)
79. 1 4-inch electrical surface utility box with blank cover
80. 1 8-inch-diameter air vent hole in the front panel (for saw kerfs between adjacent pieces.
81. 3/4-inch No. 8 flathead wood screws (nails and glue may be used instead)
16. The sensing part of your thermometer should project through the box into the space above the trays, the accurate indication of the drying temperature. (If you place this sensing element in the heating chamber with the light bulbs, your thermometer will give a misleadingly high reading.)

Operation

For most moisture fruits and sliced vegetables, load the trays at the rate of 1 to 2 pounds of fresh product per square foot of tray surface.

Place nuts and meats only one layer deep on the trays. The following thermostat settings are suggestions: Save

- Nuts 100-105° F
- Meats and other high moisture foods 125-130° F
- Vegetables 140-150° F (max. 165°)

During the early stages of drying, open the door about % 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. To test to determine when the first, high-moisture drying stage is complete, hold your hand at a mirror at the opening of the top. When position no longer sticks to condense, close the door. The exchange procedure provided by this practice 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 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 gum and stall the fan motor after extended service.

Alternate construction and operation

You could build the dehydrator without a thermostat. As moist air exhausts at the top, fresh air will be taken in along the sides of the partially opened door. When moisture no longer tends to condense, close the door.

This publication was prepared by Dale E. Kirk, professor emeritus of agricultural engineering, Oregon State University. The Oregon State University Extension Service and Oregon State University College of Agriculture and extension educators provide educational programs and technical assistance to people with agriculturally related problems and interests. Major program emphases include food and fiber production, farm business management, marketing and processing of agricultural products, and resource use and conservation.

Dehydrator cabinet, showing three switches used to control heat input (note the use of a duplex outlet, which you could use to plug in the fan, instead of wiring it in permanently.)

Dehydrator schematic, showing three switches used to control heat input (note the use of a duplex outlet, which you could use to plug in the fan, instead of wiring it in permanently.)

Drying Fruits and Vegetables at Home (Oregon State University Extension Service publication EC 855) provides practical instructions you can copy or cut out. For a single copy, send $2.50 plus $2.50 postage to: Bulletin Room, Oregon State University, Corvallis, O. E. 97331.

How to Build a Portable Electric Food Dehydrator

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Oregon State University Extension Service
10. Fasten the right side, back, and top in place.

11. Enclose the heat shield with a heavy-duty household aluminum wrap. This provides a reflective surface to protect the plywood heat shield. It also provides radiant heat from the top of the shield. For sensitive items of produce that may dry from the top, use an additional layer of aluminum wrap.

12. Most woven plastic screens will sag badly under the heat. For anything but your smallest items, you'll need some type of adjustable latch to hold the screen in place, you can put them in an upright position.

13. If you prefer to build the trays, we suggest that you buy a light, wooden frame and use either molded plastic or aluminum screen or smooth wood strips. This provides a sturdy frame that holds the screen in place. You can obtain further information about suppliers through your county Extension office.

14. You could build the drying trays or buy aluminum or plastic or aluminum screen or smooth wood strips. This provides a sturdy frame that holds the screen in place. Your local lumber dealer or hardware store will be able to help with the supplies through your county Extension office.

15. Vegetables and fruit should be removed rapidly. A ball-link chain with a catch (see figures 2 and 3) provides a ready adjustment for the door opening. The following thermostat settings are for different types of foods. You would then control temperature by using switches to operate various numbers of light bulbs. Figure 9 shows a wiring diagram is shown in figure 10.

16. The sensing part of your thermometer should project through the box into the space above the trays, for accurate indication of the drying temperature. (If you place this sensing element in the heating chamber with the light bulbs, your thermometer will give a misleadingly high reading.)

**Alternate construction and operation**

Most dried fruits and vegetables are loaded at a rate of 1 to 2 pounds of fresh product per square foot of tray surface. Place trays and mats and only one layer deep on the trays. The following thermostat settings are suggestions:

- **Nuts**: 100-160°F (38-71°C)
- **Meat** (smoke at 180°F, increase to 160°F) (internal temp. 155°C), follow professional advice for your situation.
- **Fruits**: 135-155°F
- **Vegetables**: 140-160°F (max. 160°F)

During the early stages of drying, open the door about 1/2 to 1 inch to allow some moisture-laden air to escape the chamber. As moisture builds up in the trays, fresh air will be taken in as the temperature drops. When the door is open, you'll need to close it to allow for adequate drying. You can control the door opening by the amount of door opening. As drying continues, the door should be opened to allow for adequate drying.

**Figure 6**—To install thermometer, supply in monitoring dehydrator temperature.

**Figure 7**—Dehydrator cabine, showing three switches used to control temperature. The wire leads to the control panel. The sensing probe is located in the heating chamber.

**Figure 8**—Thermostat setting for different types of food. The dial type (figure 8) start at 100°, increase to 165° F (38-71° C) range. The dial type (figure 8) will serve.

**Figure 9**—Socket location layout and wiring plan for use with three-switch control.
10. Next, fasten the right side, back, and top in place.

11. As a check on your thermostat setting, you should have a thermometer capable of service in the range of 100-160° F (38-71° C). The dial type (figure 8) is rugged and easy to read. A kitchen-type meat thermometer will also serve. If you prefer to build the trays, we suggest that you have a thermometer capable of service in the range of 100-160° F (38-71° C) to protect the plywood heat shield. It also provides a reflective surface on the top of the shield for easier removal of juices that may drip from the drying trays.

12. You'll need some type of adjustable latch to hold the trays. A ball-link chain with a catch (see figure 9) is used to close the inside door.

13. For most moist fruits and blanched vegetables, load the trays at the rate of 1 to 2 pounds of fresh product per square foot of tray surface. Place nuts and meats only one layer deep on the trays.

14. As moist air enters the oven, fresh air will be taken in along the sides of the partially opened door. When moisture no longer tends to condense, close the door completely. This provides a smooth surface on the top of the shield for easier removal of juices that may drip from the drying trays.

15. Test to determine when the first, high-moisture (Vegetables) and second, lower-moisture (Fruits) stages of drying are complete. The sensing part of your thermometer should be placed near the center of the drying chamber with the light bulbs, your home. For a single copy, send 25c plus 25c postage to the Oregon State University Extension Service, Oregon State University, Corvallis, Oregon 97331.

16. The sensing part of your thermometer should project through the box into the space above the trays, for accurate indication of the drying temperature. (If you place this sensing element in the heating chamber with the light bulbs, your thermometer will give a misleadingly high reading.)

For most moist fruits and blanched vegetables, load the trays at the rate of 1 to 2 pounds of fresh product per square foot of tray surface. Place nuts and meats only one layer deep on the trays.

A ball-link chain with a catch (see figure 9) is used to close the inside door. You could build the drying trays or buy aluminum wrap. This provides a reflective surface to protect the plywood heat shield. It also provides a smooth surface on the top of the shield for easier removal of juices that may drip from the drying trays.

You'll need some type of adjustable latch to hold the trays. A ball-link chain with a catch (see figure 9) is used to close the inside door.

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17. The electric fan motor is supplied by a stream of fresh air from the lower vent, positioned in front of the screen. 1/2-inch-diameter vents should be enough to complete the drying process. Alternate construction and operation

The wiring diagram is shown in figure 10. Turn on all three switches 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, the motor stops and fresh air is not needed to warm large amounts of incoming fresh air, turn off one or two switches and continue the drying at the reduced heating rate.

18. As the temperature comes up to the desired level, the motor stops and fresh air is not needed to warm large amounts of incoming fresh air, turn off one or two switches and continue the drying at the reduced heating rate.

Alternate construction and operation

The wiring diagram is shown in figure 10. Turn on all three switches 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, the motor stops and fresh air is not needed to warm large amounts of incoming fresh air, turn off one or two switches and continue the drying at the reduced heating rate.

Figure 9.— describes such a unit, with three separate switches, each controlling three bulbs in the heating chamber. The wiring diagram is shown in figure 10. Turn on all three switches 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, the motor stops and fresh air is not needed to warm large amounts of incoming fresh air, turn off one or two switches and continue the drying at the reduced heating rate.

Figure 10.— Describes such a unit, with three separate switches, each controlling three bulbs in the heating chamber. The wiring diagram is shown in figure 10. Turn on all three switches for at least the first hour or two when the dehydrator is loaded with moist product.