Making Wooden Light Fixtures

With nice ones so hard to find, creating your own makes sense

by John Birchard

Trying to find the right manufactured light fixture can be a discouraging experience. They soon begin to look all the same, and the prices can be astounding. When my wife and I were building our own home, we installed several reasonably priced cylindrical fixtures only to discover later that they were so poorly made that we couldn't remove spent bulbs without twisting the wires inside the fixture—a ridiculously dangerous situation. Because we could find nothing else that fit our decor, I eventually replaced them with fixtures I made myself. The techniques involved in building fixtures are fairly basic, and the latitude for creativity is great.

Safety—The first consideration in constructing a light fixture should be safety. You may want to consult with your local building inspector to clarify any particular questions you have, but the following guidelines taken from the Uniform Building Code are a good place to start.

1. Combustible materials should never be exposed to heat in excess of 90°C (194°F). Incandescent light bulbs produce lots of waste heat. In wall-mounted fixtures this heat can usually be dissipated by leaving most or all of the top of the fixture open. Ceiling fixtures can be suspended or spaced down an inch or so from the ceiling. Where this approach isn't practical, recessed fixtures can be ventilated into the attic. Never insulate within 6 in. of such fixtures, or over their tops. Since fluorescent tubes produce very little waste heat compared to incandescent bulbs, consider them for large fixtures where ventilation is a problem.

2. Wiring should never be exposed to heat in excess of its rated capacity. If the first rule is followed carefully, this won't be a problem, but in ceiling boxes where the wiring runs through the box, check the insulation rating on the wire you use, and make sure it's adequate.

3. There should be no exposed wires or connections. I generally design my fixtures so that wiring is concealed within their structural parts, but there are exceptions to the rule. Exposed connections are acceptable more than 8 ft. above the floor, and exposed wiring may be necessary for hanging fixtures. Pulley cord, vacuum-cleaner cord, and some lamp cords are rated for this kind of use. Wiring that supports a fixture must be firmly clamped to prevent tension on the connections. Use stranded conductors (wires made up of many small strands twisted together) for movable or flexible fixtures. Romex is too stiff and brittle for these applications. You should also be careful not to run wires across sharp edges or areas where they can be abraded by movement or vibration.

4. Fixtures should be firmly attached to fram-

Birchard started making his own light fixtures (right) when he found commercial ones expensive and flimsy. Now he makes them professionally for clients who like the effects of custom wood fixtures. The valance (top), built by Robert Lasso, has translucent panels, though it could have a solid wooden bracket instead. This kind of fixture works just as well along a blank wall as over a window. The drawing at top left on p. 62 shows how such a wall bracket can be built.

ing members (usually joists or studs). Fixtures up to 50 lb. can be supported by outlet boxes as long as the boxes are firmly attached to framing members. This is especially important if the switch is located on the fixture, which means that people will be coming into contact with it.

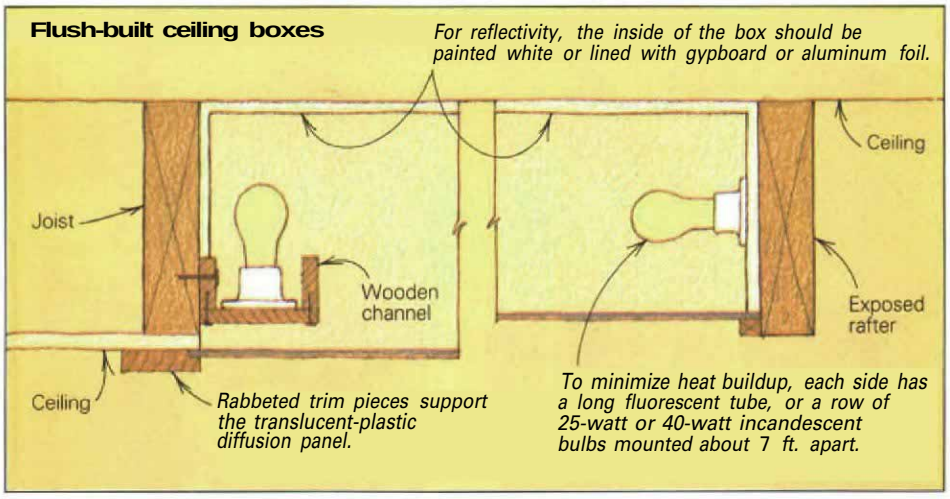
Design considerations—Besides safety, fixtures have to look good and provide the right kind of light for their location and function. The design possibilities are endless, but they break down into two basic categories. I think of *built-ins* as including ceiling-mounted, wall-mounted and most suspended lamps. *Portables* are plug-ins—usually table or floor lamps. Both types can be designed to provide different qualities of light. Sometimes a bright beam is needed in a fairly confined area (direct lighting). In another situation a softer, more general source of light is called for (indirect lighting). I'll be talking mostly about built-ins in this article.

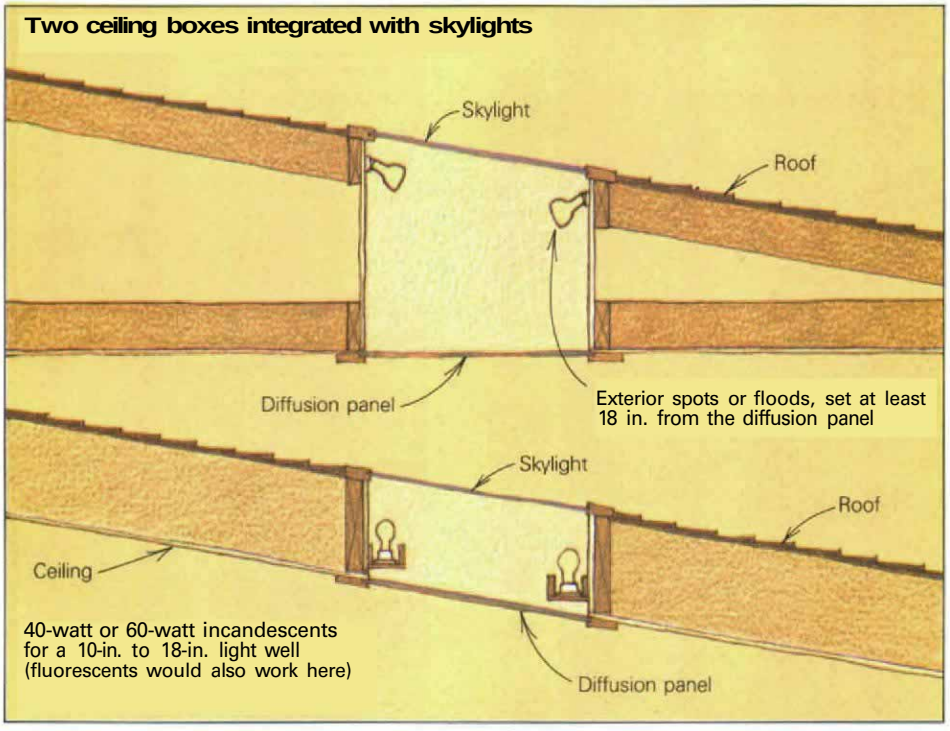
Ceiling boxes—Perhaps the simplest approach to room-lighting is to create ceiling boxes by nailing wooden channels or troughs along the bottom of ceiling joists and blocking, as shown in the drawing, top right. You can use one or more low-wattage sockets in these boxes, and cut rigid translucent plastic that will fit into rabbeted trim pieces tacked to the undersides of the joists. The inside of the box, top and sides, should be painted white or lined with gypboard or aluminum foil for reflectivity.

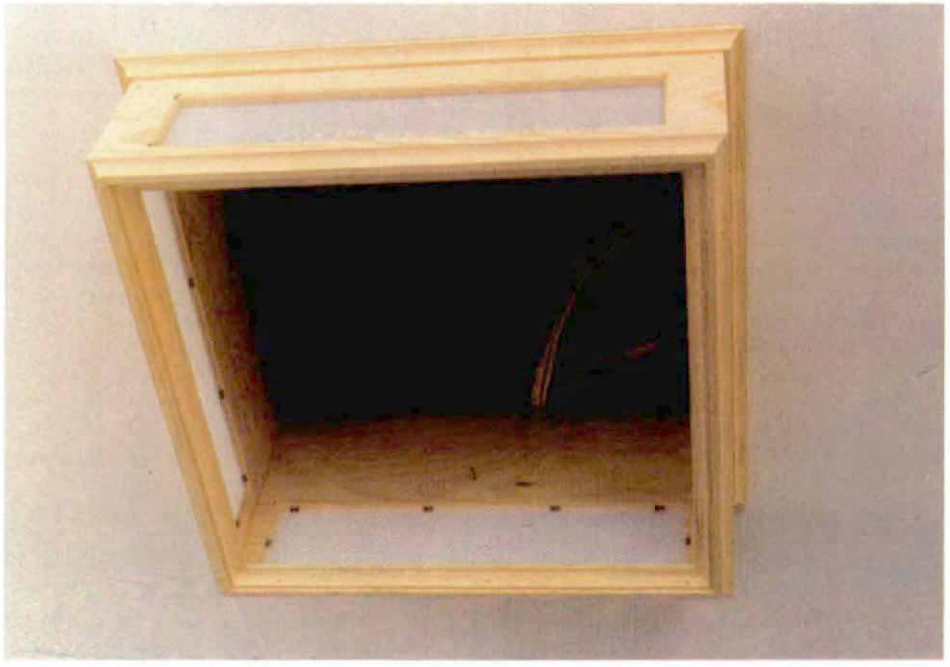
Depending on its size, a ceiling box could require a number of 25-watt or 40-watt bulbs spaced a foot apart. Using more bulbs in one box means that each bulb should be of lower wattage. This will prevent heat build-up problems. In long narrow boxes, consider using the cooler fluorescent tubes.

A simple ceiling box can be set flush with the ceiling or suspended in a carefully crafted wooden frame for a look that is reminiscent of Greene and Greene, as shown in the photo at right. This same type of light box can also be built in conjunction with a skylight (drawing, middle right). The skylight cuts down on your use of electricity during the day, and also allows for better dissipation of waste heat from the bulbs at night. Because of the tendency of moisture to condense on skylights in cold weather, use exterior spots or floods in a skylight light box because of their weather resistance. They also allow you to direct the light downward. Bulbs this powerful should be at least 18 in. from the diffusion panel. The farther away you can put them, the more even their light will be.

Wall brackets and valances—Another approach to indirect lighting is to reflect light off the ceiling from a wall bracket or valance strip (photo facing page, top). The term valance once

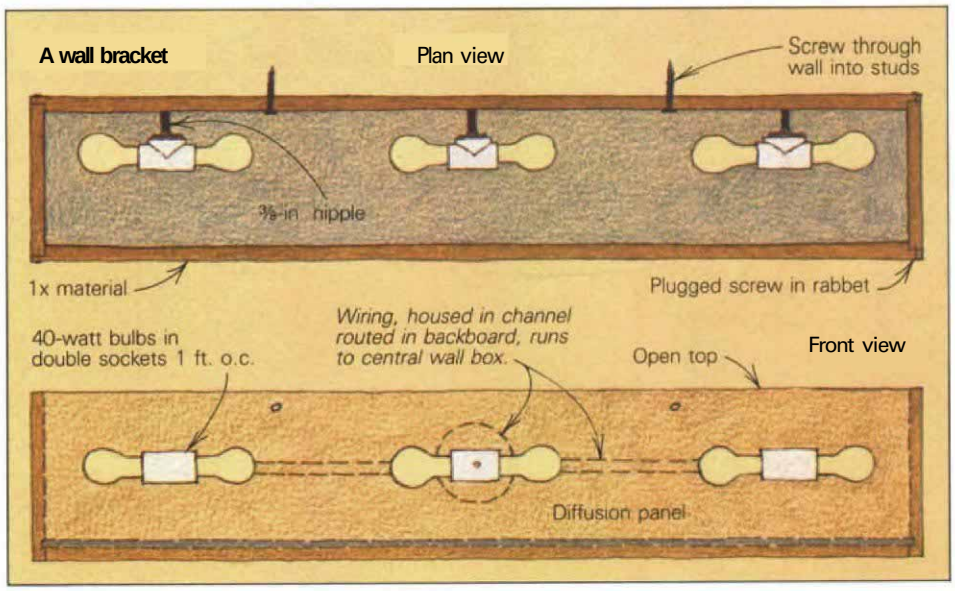




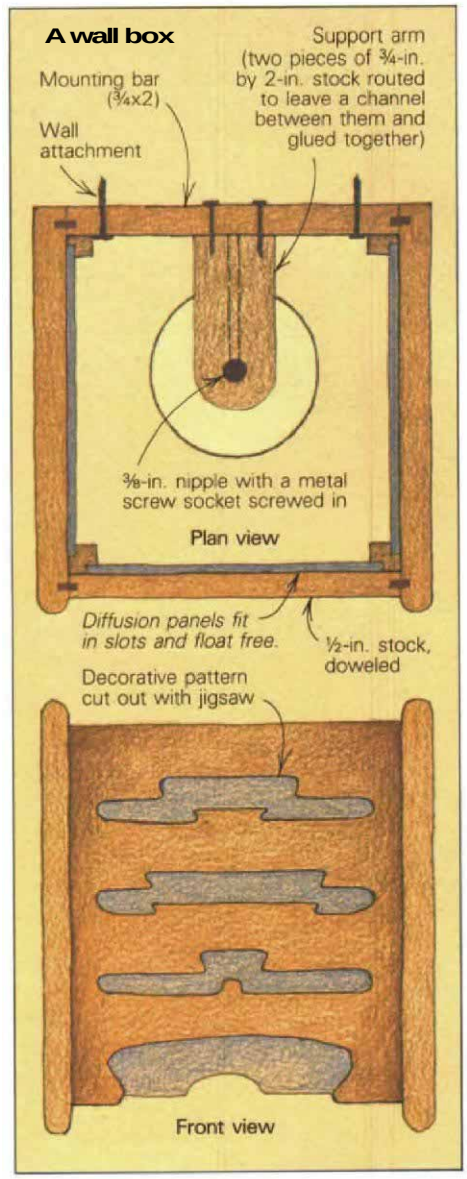


Celling boxes can be built flush by setting them between the joists (drawing, top right). They can also be suspended from the ceiling in a frame (photo right). A suspended box can carry out the design scheme of the rest of the room, and it can be built with translucent panels in its sides as well as its bottom surface.

Photo this page and facing page, bottom: John Birchard



Lasso built the wall bracket above using the techniques detailed in the drawing at top. Housing the plastic panels in slots solves potential shrinkage problems.



referred to a decorative strip along the top of a window to hide drapery tracks, but it is now also used to refer to a wide strip of wood or other material used to hide lighting along the top of a window. A wall bracket is simply a valance without a window below it. Wall brackets can be especially useful in large, open rooms where conventional ceiling lighting may fail to illuminate areas close to the walls.

You can build a valance or wall bracket that's closed on the bottom to direct light to reflect off the ceiling, or you can leave the bottom open and let the light shine down as well. Install this type of lighting at least 2 ft. from the ceiling or you may get a lot of glare.

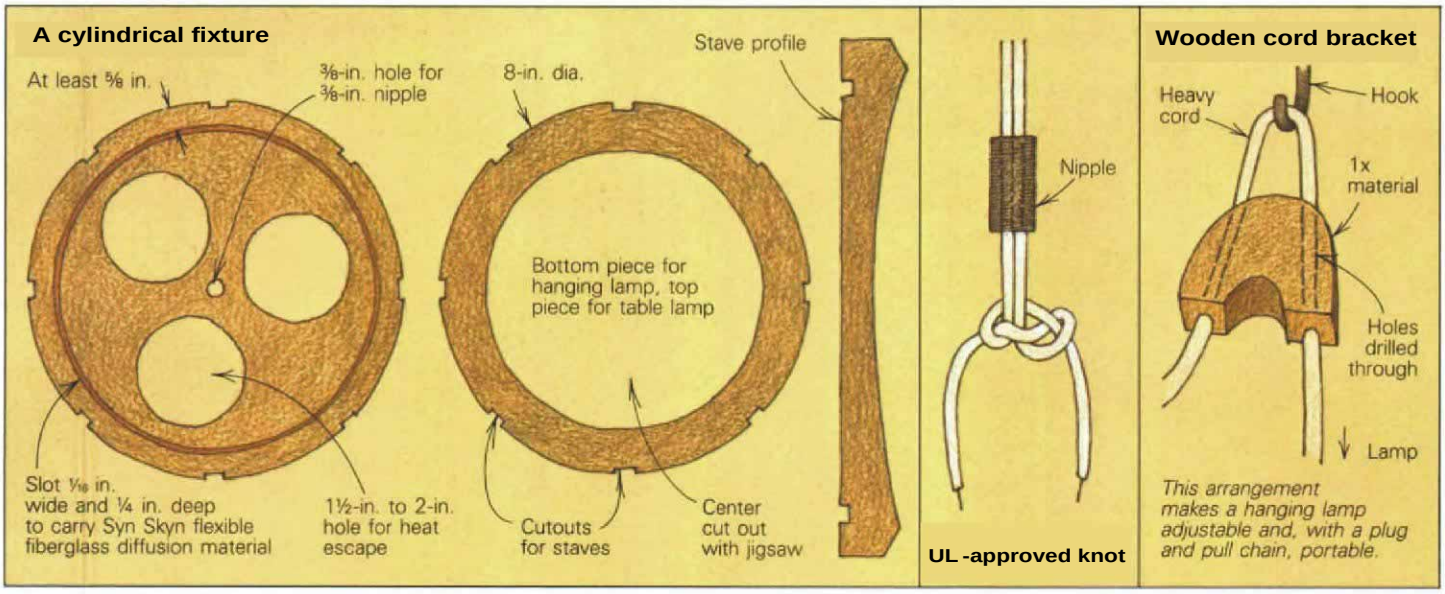
The backboard, an inner strip of wood screwed to the studs, holds the bracket to the wall and also supports the light sockets. In the drawing, top left, a series of double cluster sockets are anchored to the inner strip by ⅜-in. nipples (small threaded pipe nipples, through which wiring can be run, and which can hold a socket in place), and the wiring is run in a channel on the wall side of the backboard. Leave at least 1 in. of clearance between the bulbs and the front strip, and leave the top of the bracket open for ventilation. The front strip of a wall bracket should generally be at least 6 in. wide to hide the bulbs, and the ends should be capped. If you want light to shine out the bottom, consider a diffusion panel to help prevent glare.

Wall-mounted boxes—These squarish spotlights can produce either direct or indirect light, depending on your design and the materials you use. In some areas you may want your boxes to transmit light from all sides, and in others you may want a box that is opaque on the sides and open only on the top and bottom.

Wall-mounted boxes, like the one in the photo at left, provide a chance for real creativity. The Greene brothers designed some exquisite light boxes employing both leaded glass and intricate wood joinery. This style is still a source of inspiration for many home builders today, and is well documented in books like Randell L. Makinson's *Greene and Greene* (Peregrine Smith, Inc., Salt Lake City). Vol. II has many fine photographs of light fixtures and other details from Greene and Greene homes.

One of my favorite approaches to making wall boxes is to cut designs out of flat pieces of ½-in. thick wood with a scrollsaw. I glue these pieces of wood together to form a three-sided box, and then attach translucent plastic to the inside with stops. I tried gluing the plastic in, but it came loose because of wood shrinkage caused by the heat from the bulbs. For incandescent fixtures, it's important to construct them so that they won't pull themselves apart when the wood shrinks. For this reason, I try to attach the shade to the support arm at only one place. Leave

Photos, except where noted: Robert Lasso



space for the plastic to move around, too, so the wood can move without stressing the joint.

My friend, Robert Lasso, who has built many wall boxes over the years, has had few shrinkage problems. He dowels or laps all joints (drawing, facing page, right), and cuts thin slots in his frames with a fine-toothed table-saw blade or a slotting cutter on a router table to hold the plastic diffusion panels. With the plastic floating free in the slot, a little shrinkage is no problem.

Hanging lamps—Lasso also makes cylindrical hanging lamps (photo right). He begins by cutting out two discs of wood about 8 in. in diameter. Then he drills a ¼-in. hole through the center of the discs so he can bolt them to an adjustable jig that holds a small router at the desired distance from the center. He uses a 1/16-in. straight bit to rout ¼-in. deep slots around the circumference of both discs, at least ⅝ in. from their outside edges.

Lasso usually cuts most of the center out of the disc that won't hold the socket, leaving a ring through which light can shine (drawing, above). He drills a ⅜-in. hole in the center of the other disc, through which he passes a ⅜-in. nipple to run the wire through. He also drills three 1½-in. to 2-in. holes in this disc, to let heat out. There are a number of ways to connect the top and bottom discs. The drawing shows staves, but you could just as easily use dowels.

A metal shell socket is screwed to the inside of the nipple, and the wire is then passed through the nipple and into the socket. Two-strand lamp wire can be tied in the UL-approved knot (drawing, top center) inside the socket to relieve the strain on the connections. Crimp-on strain relievers can also be used for heavier wire like vacuum-cleaner cord. If the fixture is to be hung on the wall, the socket is at the top. For a table-top cylindrical lamp, it is on the bottom.

For his cylinders and other curved shapes, Lasso uses as a diffusion panel a flexible material called Syn Skyn, made by Tap Plastics (3011 Alvarado, San Leandro, Calif. 94577). This flame-resistant fiberglass comes in three grades of coarseness. The finest grade looks almost like

For diffusion panels on cylindrical fixtures like the one above, Lasso uses a thin fiberglass material called Syn Skin. The cylinders work as table lamps or, with a simple cord bracket (drawing top right), as hanging lamps.

Japanese rice paper, and bends easily to a radius of 6 in. or less. The lamp-parts supply companies mentioned in the sidebar at right also sell preformed plastic cylinders in various sizes.

A nice trick Lasso showed me is the small wooden cord bracket shown in the drawing, top right. Lasso uses a heavily insulated vacuum-cleaner or pulley cord, which, when swagged through the bracket, will form an adjustable loop by which the fixture may be suspended. This type of fixture, when outfitted with a plug and pull chain switch, becomes fully portable. □

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Sources of supply

A couple of sources for lamp parts and lighting-fixture supplies are American Lamp Parts, Inc. (930 Belt Line Rd. #122, Irving, Tex. 75061) and Crystal Lamp Parts (Box 21814, 2050 E. 15th St., Los Angeles, Calif. 90021). If you plan to do a lot of fixtures, it will be worthwhile to send for their catalogs and check out the wide variety of supplies they sell. These are wholesale outlets, but if you don't have your own resale number, you can probably get your electrician or local building-supply store to order for you.

Building-supply stores usually stock a line of lighting supplies, but many of the specialty items needed for making your own fixtures are hard to find. The following examples of the kind of hardware you'll need are available through the two outlets mentioned above: steel and brass ⅜-in. nipples and locknuts; swivels for movable lamp fixtures; lamp sockets with various switches and dimmers; cluster sockets, fluorescent sockets, decorative sockets; wiring cords in bulk; ornamental stampings, castings, bases and shades; exterior lamp bases, globes, and bulbs; specialty tools, chain.

Building-supply stores usually stock a couple of different types of plastic diffusion panels. These are usually made of polypropylene, which works fine indoors if it isn't exposed to high temperatures. Acrylics and fiberglass, like the Syn Skyn mentioned in the article, are more durable and resist heat and sunlight better, but cost more. All the diffusion materials are somewhat flexible, and can be cut with a matte knife or a sawblade.

Stained-glass suppliers carry a wide variety of tinted and obscured glasses as well as crystals, bevels, and the like.

Two sources for Japanese rice paper are Soko Hardware (1698 Post, San Francisco, Calif. 94115) and J.C. Trading Co. (Mikado, Japanese Cultural Trade Center, 1737 Post St., San Francisco, Calif. 94115). Prices range from $1 to $10 a sq. ft., and it comes in 2-ft. by 3-ft. sheets. —*J. B.*

Drawings: Frances Ashforth