



## HOW-TO BOOKLET #3131

# EXTENDING EXISTING WIRING



### TOOL & MATERIAL CHECKLIST

- Screwdriver
- Utility Knife
- Electric Drill
- Fish Tape
- Keyhole or Saber Saw
- Wire Strippers
- Electrician's Tape
- Measuring Tape
- Wood Chisel
- Needlenose Pliers
- Stud Locator
- Cold Chisel
- Wire Stapler

*Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in the Basics Listed Above.*

The easiest place to tap power is in the basement or attic, immediately below or above the new outlet. You can also bring power from a wall receptacle or from a light circuit. While running cable through walls and ceilings appears to be a formidable job, the proper use of fish tapes makes things much easier and will help cut down on plaster and carpentry repair after you complete the installation.

### OPENING WALLS AND CEILINGS

The first step is to locate the new outlets (receptacles) and cut openings for the boxes. Always locate a new outlet between framing members. Find studs or joists by tapping or with a stud locator. The best box location is a spot 4" to 5" from a joist or a stud. Put switches 48" above the floor, and receptacles 12". Wall light fixtures should be 66" to 70" above the floor. If you can, use large 2"x3" boxes that are 2-1/2" deep.

The method of opening the wall depends on the material it is made of.

**Drywall.** Openings in gypsum wallboard and drywall are cut with a keyhole saw or portable electric saber saw with a wallboard blade. Outline the opening on the wall and mask the outline with tape. Then drill holes in the material so you can insert the saw (**Fig. 1**). Make the cut on all four sides and either remove the scrap or knock it back between the framing members.

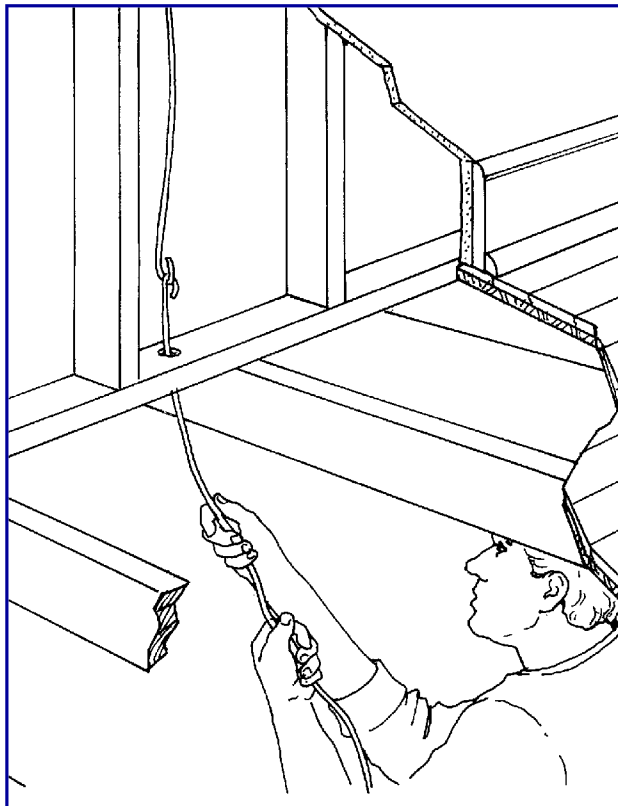
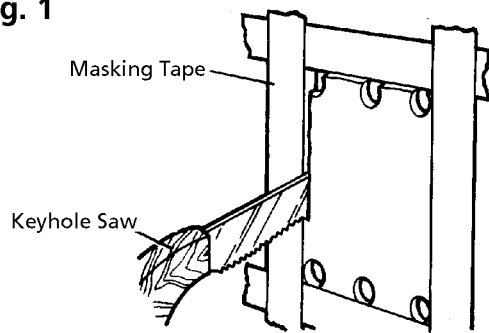


Fig. 1



In gypsum wallboard, outline the opening, using the box as a template. Mask these lines. Drill holes to start the saw, and connect the holes.

**Plastered Wood Lath.** Make the outline drawing and remove the plaster within the outline with a cold chisel. Then cut the lath with a keyhole or saber saw after drilling a hole to start the blade.

**Plastered Metal Lath.** Outline the opening and chisel out the plaster. Use a keyhole hacksaw or a hacksaw blade in a saber saw.

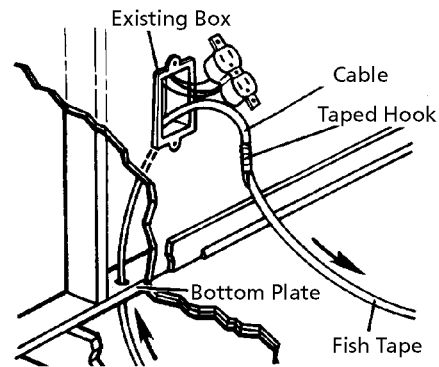
**Wood Paneling.** Outline the opening, drill a series of holes along the outline, and then connect the holes with a keyhole saw or saber saw.

## CABLE FISHING

Before you start fishing cable, determine if you need a permit. Be sure any box from which you will draw power is of a sufficient volume and can, by code, handle another cable. Be absolutely sure to kill power to the box before working on it.

Fish tapes are long flexible metal strips available in various lengths. A hook at the end of the tape is used to secure the ends of the wire you're pulling or to catch one tape with another. Two tapes may be required when you need to make a severe bend or pull a cable through two small holes or openings. The fish tapes are maneuvered to hook together, then one is pulled through both

Fig. 2



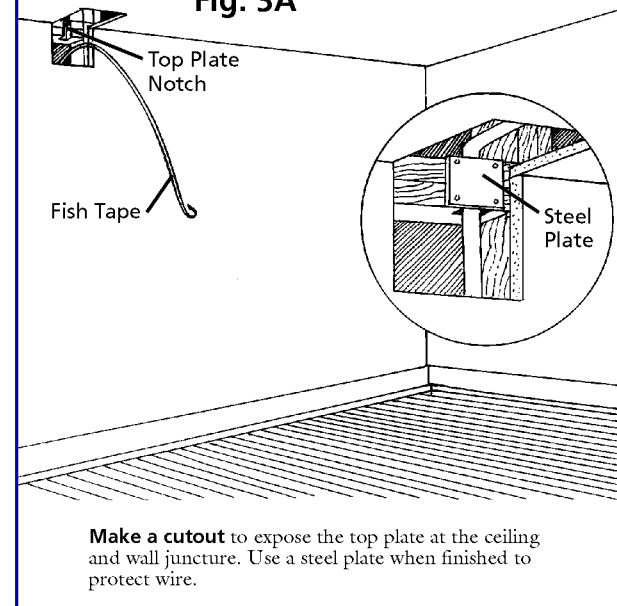
When fishing, pull tape and cable up into room. Remove tape. Strip 8" of outer insulation from cable for hookup.

openings by pulling on the other. Next the new cable is attached to the hook end of one and pulled back through both openings (Fig. 2). Here are the basic methods of fishing cable.

## Fishing From Basement Electrical Panel to Floors Above.

- 1 From the basement, locate the underside of the wall through which you will run wires. Wiring or plumbing that disappears up from the subfloor is a good clue as to the wall cavity location.
- 2 Drill a 5/8-inch hole up through the bottom plate into the first floor wall cavity.
- 3 To reach the second floor you will pull wire in stages. Start by making a small cutout from the ceiling and wall juncture to expose the top plate (Fig. 3 A). Notch the top plate and bottom plate of second floor for access to the second-story wall cavity. When finished, you must cover this notch with a steel plate to protect the cable.
- 4 Fish a tape down through the top plate notch and connect to one coming up from the basement. Pull the upper tape down and then connect a cable to the other end to pull it

Fig. 3A



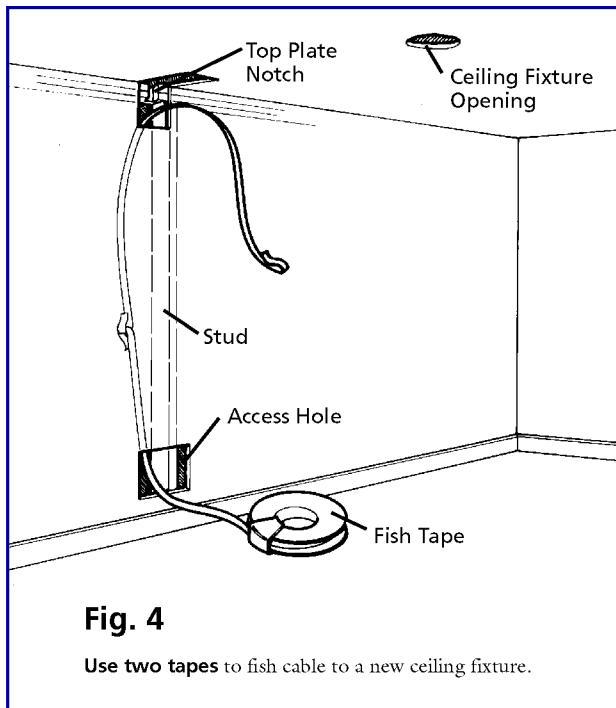
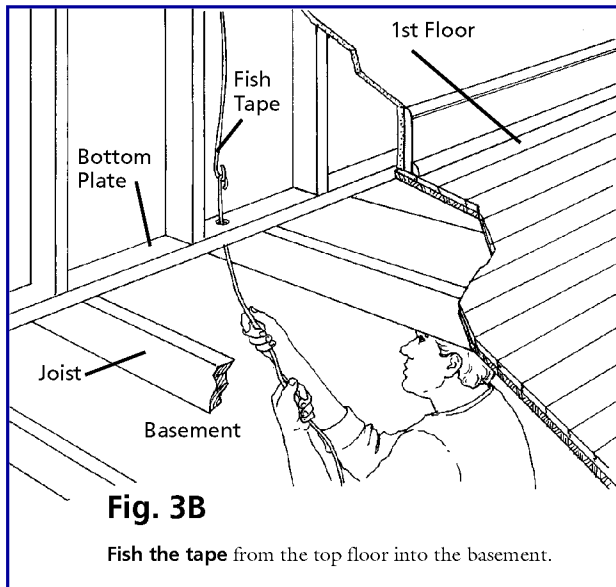
Make a cutout to expose the top plate at the ceiling and wall juncture. Use a steel plate when finished to protect wire.

down to the basement service panel (Fig. 3 B).

- 5 If you will be running up to another floor, simply remove the second floor baseboard and cut an access hole through the wall covering to reveal the notched plates. Run tape and connect cable as in Step 4.

## Fishing Through the Ceiling.

- 1 Cut a hole in the wall large enough to notch into the double top plates into the ceiling cavity as in Step 3 above.
- 2 Insert a short tape into this cavity down to the bottom of the wall. Find the end of the tape at the hole on the floor plate (the cable from lower floors will be fished up from here). Then, insert a second tape through a ceiling hole where the new fixture will be located. Fish until the tapes from the wall and ceiling interlock.
- 3 Withdraw the tapes through the lower wall



hole until the hook of the ceiling tape can be grasped.

- 4 Attach the cable to the ceiling hook, then pull the tape and the cable through the wall and ceiling cavity and out the ceiling hole. As you do, pull the cable up from the floors below (Fig. 4). You now have cable for a new ceiling fixture.

### ADDING AN OUTLET

- 1 Make a hole for a cut-in box at the desired location.
- 2 With a stiff wire feel back behind the wall for the first stud. Mark that distance on the wall to guide you in making a neat rectangular hole about 4" wide and about 3" high exposing the stud. At intervals of 16" on centers there should be studs all the way back to the existing box.
- 3 Make a neat rectangular hole to expose each of them. Cut a notch in or drill a hole through each stud to provide an open path for wiring from the existing box to the new one. Before inserting and securing the new box in its mounting hole, box connectors and cable must be attached to it. Once it is in place only its interior is accessible.
- 4 With the new wiring in place, patch the holes over the studs and repaint the wall.

Another method of running the cable from an

existing outlet to a new one, requires the removal of the baseboard.

- 1 Thin-chisel a groove 1" high and 1/2" or 3/4" deep in the plaster or cut out a section of drywall (Fig. 5).
- 2 Drop one fish tape into the wall through the knockout hole in the box and push another fish tape up into the wall through the channel opening just below it. Hook the two together.
- 3 Fish the cable down through the knockout hole to the channel. Run the cable along the channel to the area of the new box(es); push the cable into the wall. At the opening for the new box(es), use fish tape to pull the cable up the wall into the opening.
- 4 When the new box(es) have been installed and the wiring completed, cover the channel with a 1/16"-thick metal plate fastened in place with small screws. Attach the baseboard with subfloor adhesive, or nail into studs well above the cable notches.

When the new box location is across the room from the existing one, wiring under the floor may be a simpler way of running wires to the new one (Fig. 6). This will require holes through the sole plates at the bottoms of the walls on both sides. These should be made from below. If the floor joists run in the same direction as the wire run, then the wiring can

**Fig. 5**

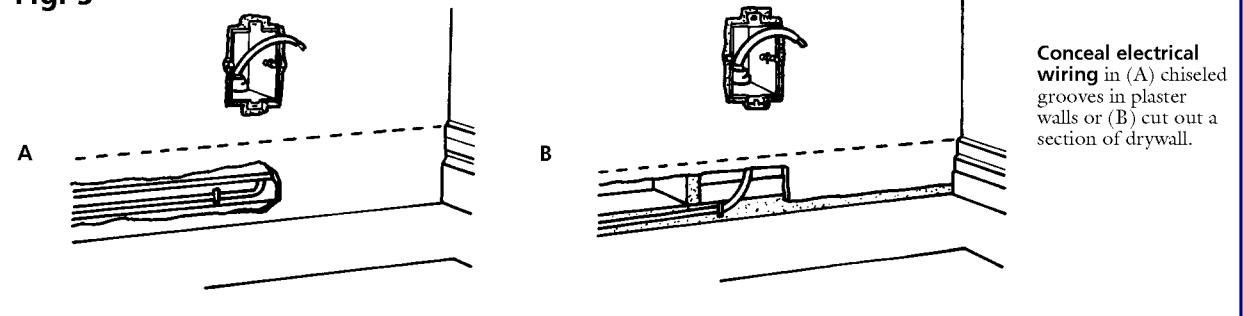
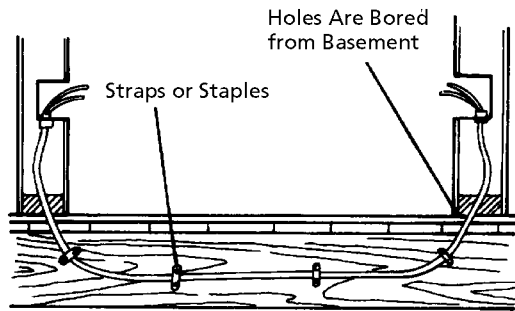
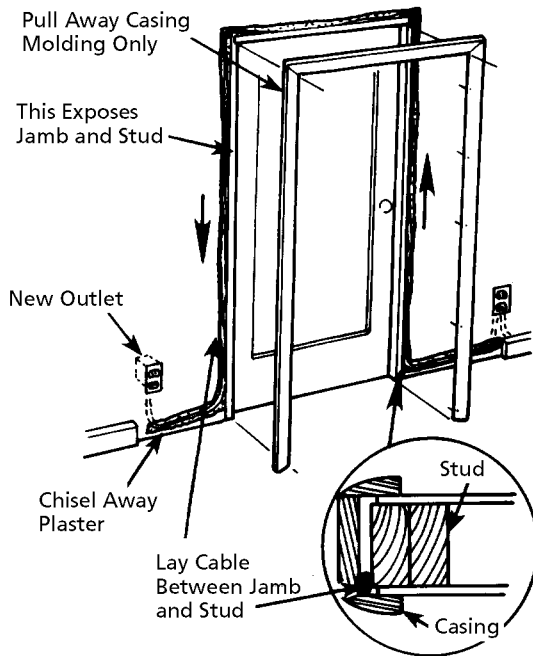


Fig. 6



Going under the floor joists to another wall outlet

Fig. 7



Running a cable around a door frame

be secured to the side of a joist. Otherwise it will have to be attached underneath the joists, or passed through a series of holes drilled through the joists. Where the wiring is passing over a usable basement area, taking the time to drill holes in the joists is probably worthwhile. If it is only a crawl space, certainly not.

If there is a doorway between the existing box location and the new, it will be necessary to go over or under it (Fig. 7).

### INSTALLING SURFACE WIRING

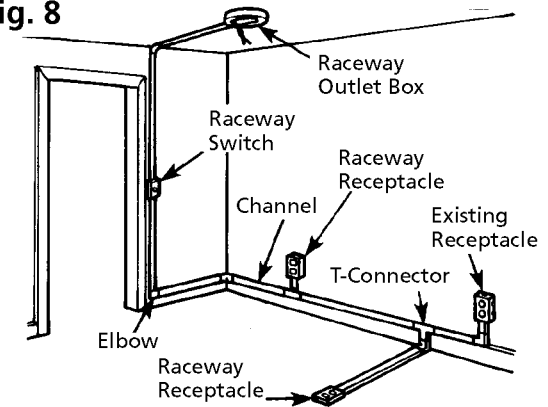
If you are unable to run cable through the walls (with an exposed wood and beam ceiling, for instance), another option is to run it along the surface through a plastic or metal raceway (Fig. 8).

The National Electrical Code limits raceway use to dry locations not subject to physical damage. The sections must form a secure mechanical and electrical coupling to protect wires inside the raceway. Screws that hold the raceways against surfaces must be flush with the channel surface to avoid cable abrasion. Plastic raceway must be flame-retardant; resistant to moisture, impact, and crushing; and be installed in a dry location. Before you purchase any materials, be sure to check local codes for special restrictions concerning their use.

It's a good idea to first take a look at a raceway system in a store paying attention to all available parts. Then at home, sketch out on graph paper a plan of the route that the raceway will take, carefully measuring and marking distances, box locations, junctions, and so on. Then go back to the store and purchase the materials needed (Fig. 9).

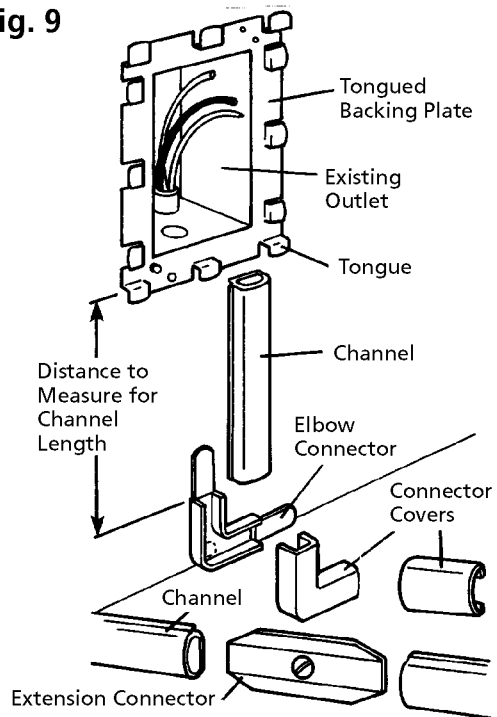
To connect a raceway to an existing receptacle, disconnect the receptacle and attach a notched raceway plate. Bring all the house wires from the receptacle and the raceway wires through a raceway extension plate, then attach the extension plate. Attach both the house and the raceway wires to the house convenience outlet receptacle.

Fig. 8



Surface wiring must be enclosed in a protective raceway.

Fig. 9



Various fittings join channel sections. Wires are fished through before connector covers are added.