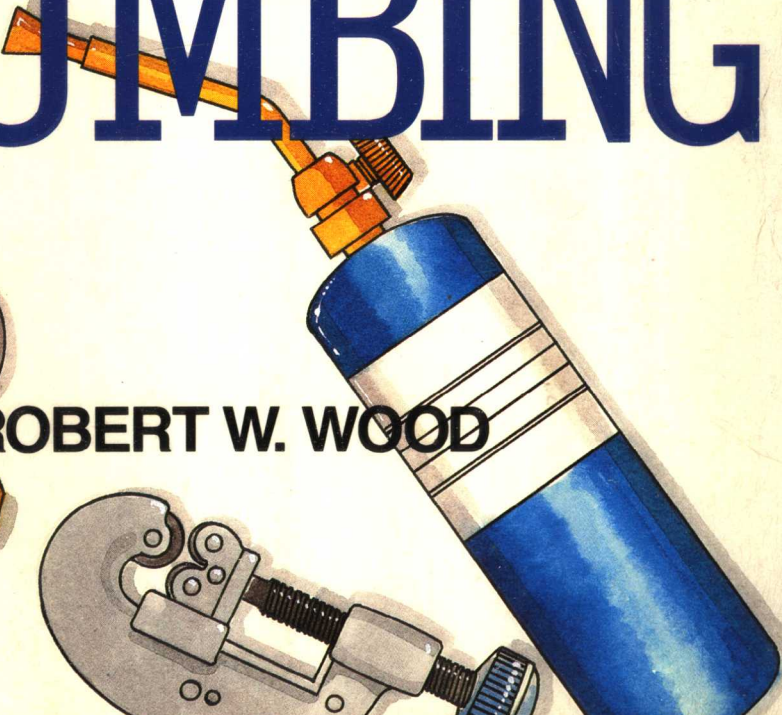




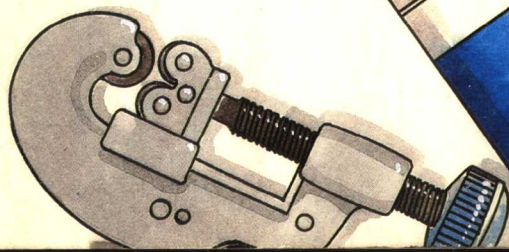
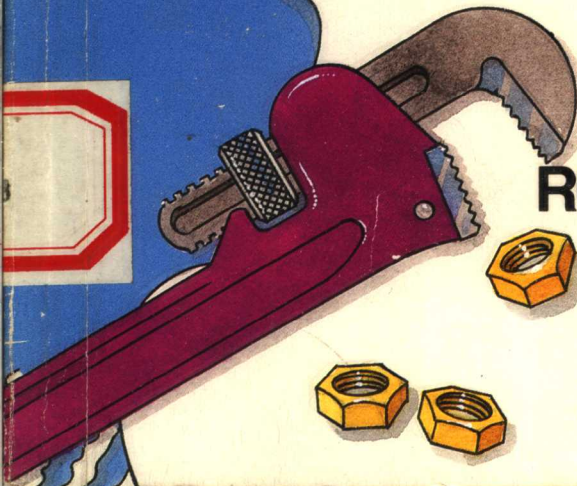
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# ALL THUMBS

## GUIDE TO HOME PLUMBING



ROBERT W. WOOD



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# **ALL THUMBS**

## **Guide to Home Plumbing**

Robert W. Wood  
Illustrations by Steve Hoeft

**TAB** **TAB BOOKS**  
Blue Ridge Summit, PA

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# Preface

A collection of books about do-it-yourself home repair and improvement, the All Thumbs series was created not for the skilled jack-of-all-trades, but for the average homeowner. If your familiarity with the various systems in the home is minimal, or your budget doesn't keep pace with today's climbing costs, this series is tailor-made for you.

Several different types of professional contractors are required to construct even the smallest home. Carpenters build the framework, plumbers install the pipes, and electricians complete the wiring. Few people can do it all. The necessary skills often require years to master. The professional works quickly and efficiently and depends on a large volume of work to survive. Because service calls are time-consuming, often requiring more travel time than actual labor, they can be expensive. The All Thumbs series saves you time and money by showing you how to make most common repairs yourself.

The guides cover topics such as home wiring; plumbing; painting, stenciling, and wallpapering; and repairing major appliances, to name a few. Copiously illustrated, each book details the procedures in an easy-to-follow, step-by-step format, making many repairs and home improvements well within the ability of nearly any homeowner.

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# Introduction

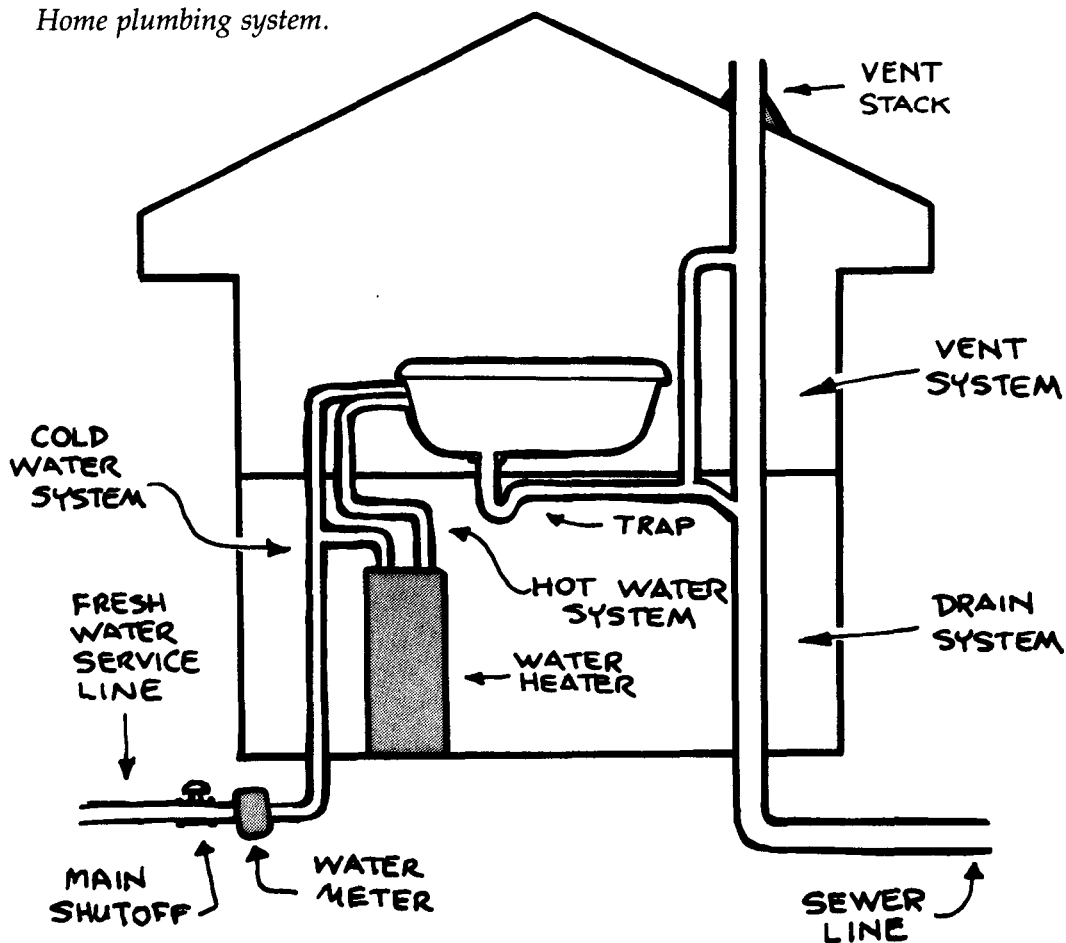
**D**esigned for the novice do-it-yourselfer, this book will provide relief from the frustrating problems that crop up in the home plumbing system. It was written because of the mind-jarring drip of a faucet that keeps you awake at night, because of the annoying sound of a toilet that's still running as you settle back in front of the TV, and for the garbage disposal that only hums when you flip the switch.

Starting with the basics here in the Introduction, this book shows the skeletal framework of a typical home and exposes the internal plumbing system. Chapter 1 presents a systematic approach to troubleshooting plumbing problems and a list of basic tools needed for making repairs. The following chapters show the inner parts of faucets and drains, along with illustrated step-by-step instructions that will help you make repairs easily. The book includes information on toilets, garbage disposals, and tub and shower plumbing. It also shows you how to work with pipe.

Most of the repairs in the book can be accomplished quickly and inexpensively. Making your own repairs can be personally satisfying and can save you a service call from a plumber, who might be too busy to get to your home for several days.

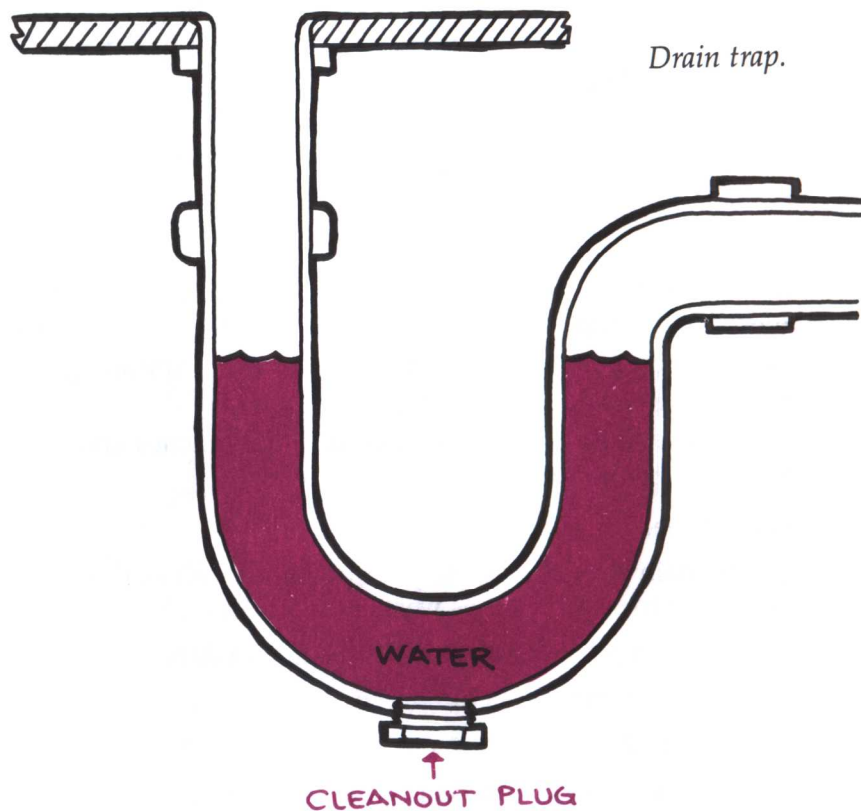
Today's plumbing materials and equipment are designed to make repairs or replacements easier for the homeowner as well as the professional. These advances have greatly reduced the amount of physical effort required for plumbing work and have made the repair techniques easy to master. In the past, plumbing materials were made of lead, iron, galvanized steel, and brass. Today they are mostly copper and plastic.

*Home plumbing system.*

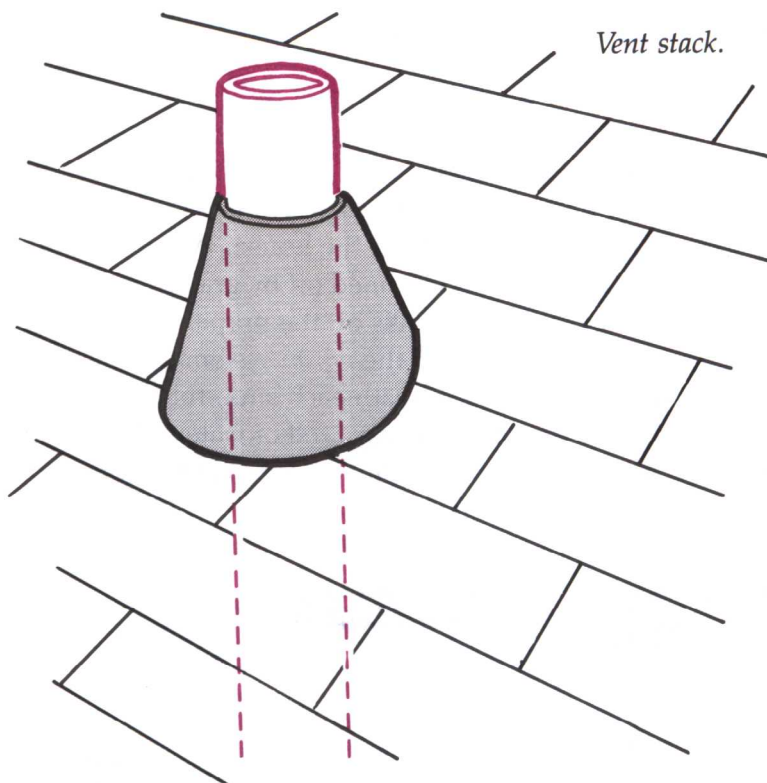


The major part of the plumbing system is hidden within the walls and under the floors. Normally we only see the chrome faucets, porcelain fixtures, and stainless steel sinks. Although these come in a variety of shapes and designs, the inner workings of plumbing systems are pretty much the same in all homes. Supply lines, under as much as 40 pounds of pressure per square inch, deliver fresh water to various locations throughout the house. Waste water, under normal atmospheric pressure, is drained off by gravity to main sewer lines or, in rural areas, to septic tanks on the property.

Two important components in the waste system are traps and vent stacks. The *trap*, which is beneath each sink, tub, or shower in the house, is a U-shaped pipe that stays full of water all the time. The water forms a seal in the waste line and prevents odors and combustible gases from entering the home.







*Vent stacks* are pipes that protrude through the roof from the waste lines. They equalize the air pressure in the drain system and prevent the suction generated by flowing water from siphoning the water out of the traps and commodes.

You can make most repairs with a couple of wrenches and a screwdriver, but before you start remember to:

1. Take your time.
2. Locate the main shutoff valve to your home, as well as the shutoff valves to sinks, clothes washer, and dishwasher.
3. Do not use power tools or electric drop lights in damp areas.
4. Shut off the water supply before taking faucets apart.
5. Have a few rags and a bucket handy to catch any spilled water.
6. Cover the drain to keep small parts from being lost.



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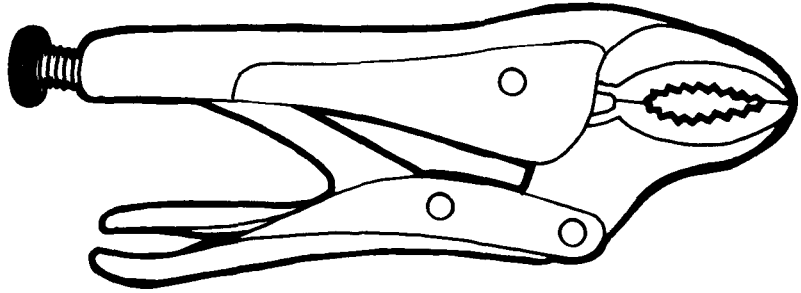
# Basic Troubleshooting & Tools

**P**lumbing systems have just two basic areas: the high-pressure side that delivers fresh water throughout the home, and the low-pressure side that uses gravity to carry wastewater away. Typically, fresh water enters the house from a meter on the street side of the house. The supply pipe is usually  $\frac{3}{4}$  inch or larger and has a *shutoff valve* near the meter or just inside the wall where the pipe enters the house. The supply pipe then feeds branch runs of smaller pipes, usually  $\frac{1}{2}$  inch in diameter, that deliver water to the water heater and other sections of the system. Except for the shutoff valves, these pipes are buried in the ground or hidden in the walls until they arrive at the various fixtures. There, a shutoff valve is normally installed and the pipe diameter is reduced again. The pipe then supplies water to the fixture. Waste water goes down a drain, then travels through a trap and into the main sewer line leading from the house.

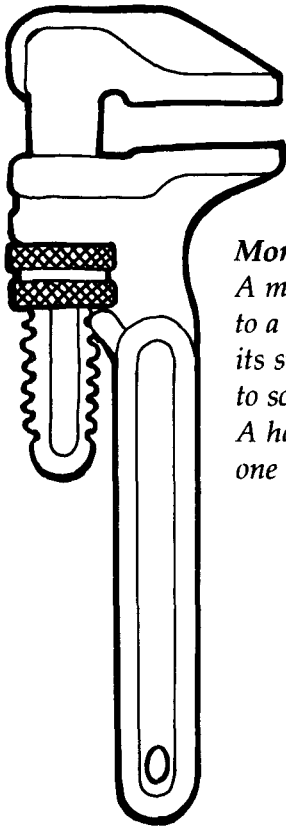
If you know where the shutoff valves are, you can quickly handle emergencies such as a burst pipe or washer hose. Here are a few pointers for handling other basic plumbing problems:

- When small objects such as rings disappear down the drain, don't run water in the sink. Get a bucket, place it under the trap beneath the sink, and check the trap.
- If a sink won't drain or a toilet becomes blocked, don't run more water in the sink or flush the toilet. Use a plunger to remove the blockage, then run fresh water.
- If an electrical appliance such as a clothes washer, dishwasher, or garbage disposal is leaking, turn off the power before touching the appliance or attempting any repairs. Unplug the appliance if you can stay out of the water, or turn off the power at the *electrical panel*.
- If a basement becomes flooded or an electrical outlet is under water, don't enter the room. The first thing to do is turn off the power at the electrical panel. Then, shut off the water at the *main valve*.
- If sewage odors occur, run water in the sinks to make sure the traps are full of water.

While today's materials make plumbing easier to do, you do need to work carefully and have the proper tools. If you have a job that requires an expensive tool—one you probably won't need often—you can usually rent it at a tool-rental store or from your plumbing supply dealer where you buy parts. Most plumbing repairs can be handled with basic tools along with the following plumbing tools shown on the next few pages.

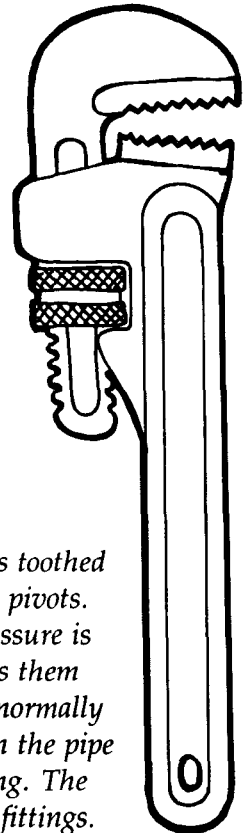


**Locking pliers** Locking pliers provide an adjustable, viselike grip that, once in place, holds a fitting by itself.

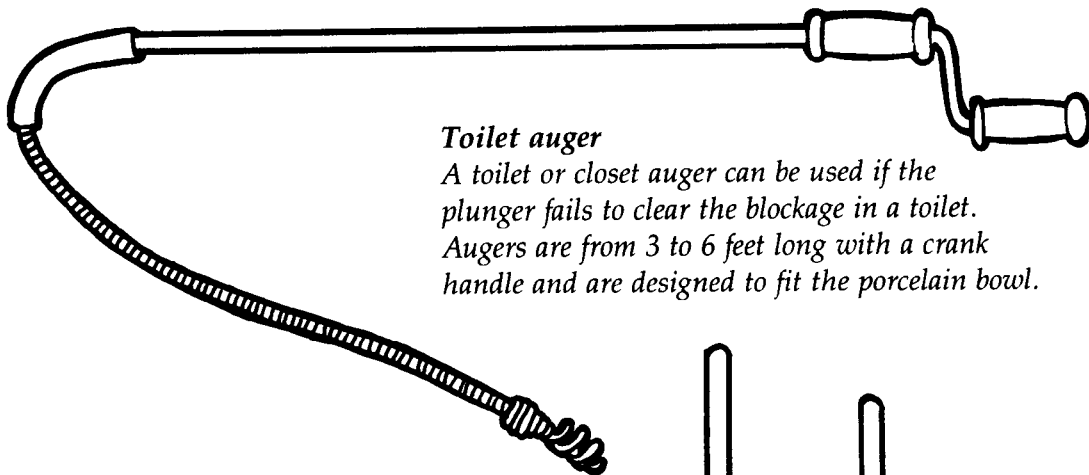


**Monkey wrench**

A monkey wrench is similar to a pipe wrench except that its smooth jaws are less likely to scratch chrome fittings. A handy size for home use is one with a 10- or 12-inch handle.



**Pipe wrench** A pipe wrench has toothed jaws where the top adjustable jaw pivots. The jaws tighten their grip as pressure is applied to the handle, which keeps them from slipping on pipes. They are normally used in pairs, with one wrench on the pipe and the other wrench on the fitting. The toothed jaws will damage chrome fittings.

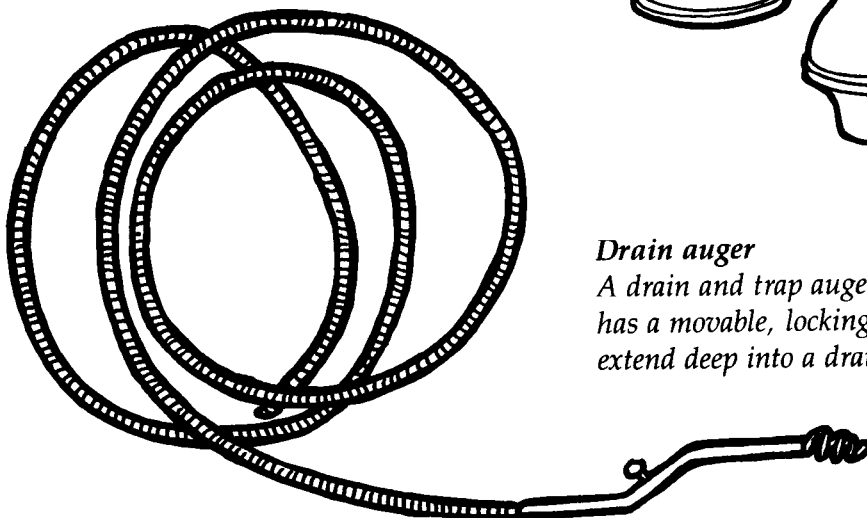
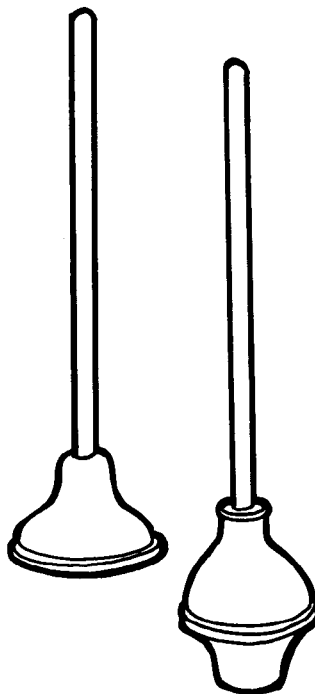


**Toilet auger**

*A toilet or closet auger can be used if the plunger fails to clear the blockage in a toilet. Augers are from 3 to 6 feet long with a crank handle and are designed to fit the porcelain bowl.*

**Plungers**

*Rubber plungers use alternating pressure and suction to unclog drains in sinks, tubs, and toilets.*

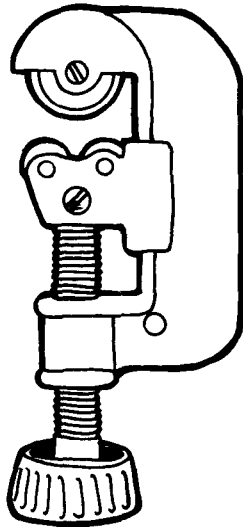
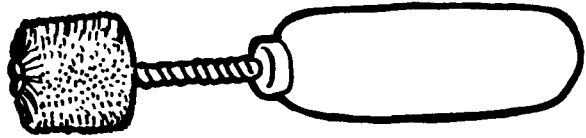


**Drain auger**

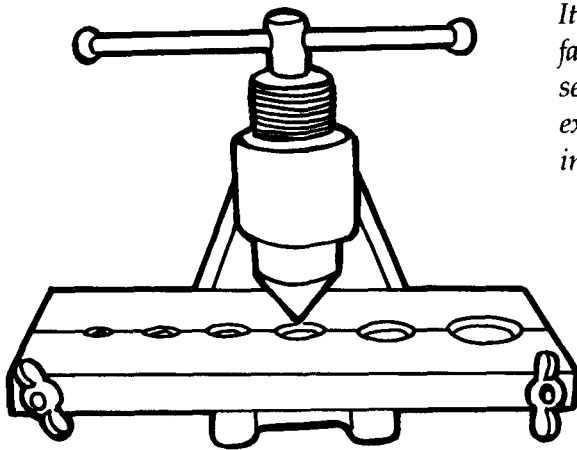
*A drain and trap auger (plumber's snake) has a movable, locking handle and can extend deep into a drain to remove a clog.*

**Wire brush**

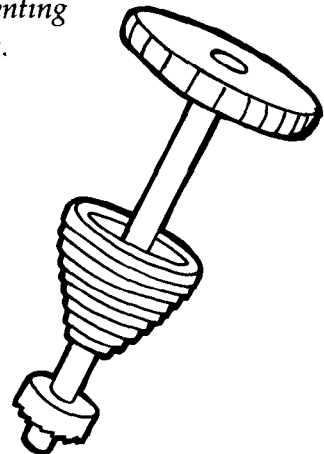
A wire-cleaning brush is used to scour the inside of copper fittings to prepare them for soldering.

**Tube cutter**

A tube cutter cuts copper and plastic tubing and has a reamer that swings out to deburr the cut end.

**Faucet-seat dresser**

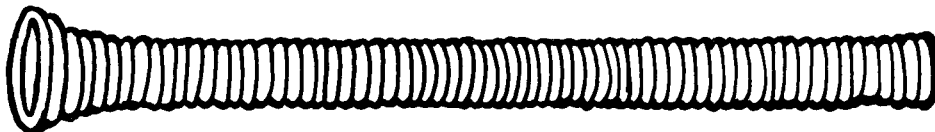
A faucet-seat dresser comes with different-sized guides and cutting tips. It is designed to smooth worn or damaged faucets that can't be removed with a seat wrench. These tools can be expensive—try renting instead of buying.

**Flaring tool**

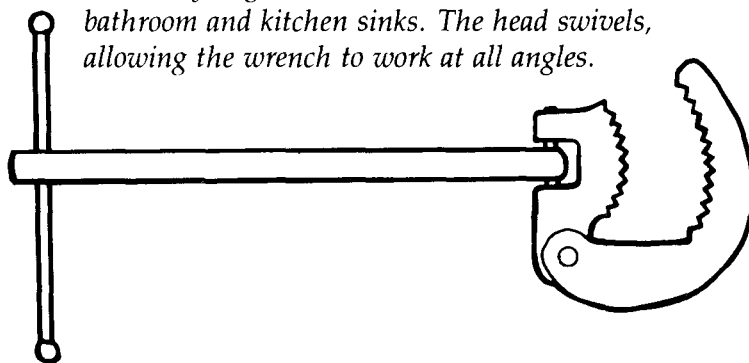
A flaring tool is used to flare the end of a tube so that it can be attached to flared fittings.



**Tube bender** A tube bender is a coiled, springlike tool that allows you to bend tubing without kinking it.

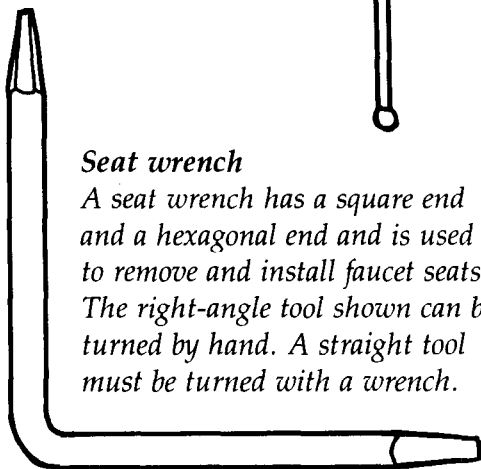


**Basin wrench** A basin wrench is a valuable tool that lets you get to hard-to-reach nuts hidden under bathroom and kitchen sinks. The head swivels, allowing the wrench to work at all angles.



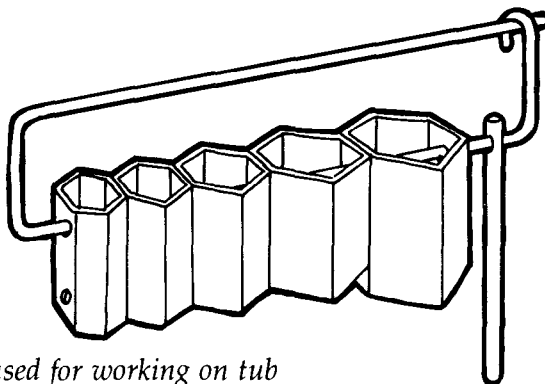
**Seat wrench**

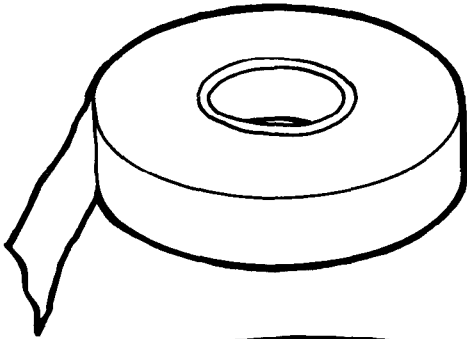
A seat wrench has a square end and a hexagonal end and is used to remove and install faucet seats. The right-angle tool shown can be turned by hand. A straight tool must be turned with a wrench.



**Plumber's sockets**

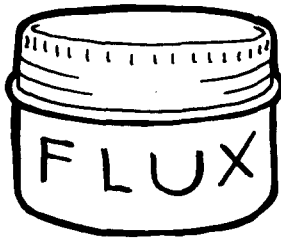
Socket wrenches are used for working on tub and shower faucets that are recessed in the walls. They are normally sold in sets of five sockets and a bar handle.





**Pipe tape**

Teflon pipe tape can be wrapped around male threads to provide watertight seals where threaded pipe enters fittings.



**Flux**

Flux (noncorrosive) is available in paste and liquid form. It is used to clean copper and help the solder flow.

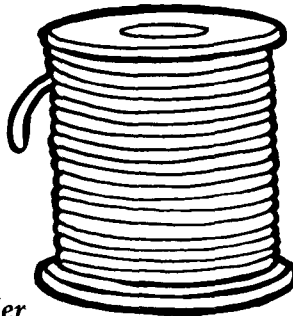
**Penetrating oil**

Penetrating oil will help loosen corroded fittings.



**Propane torch**

A propane torch is used to heat copper tubing for soldering.



**Plumbing solder**

Plumbing solder (not electrical) is used to join fittings to copper pipe. Some plumbing codes require a low-lead (90/10 percent tin/lead) solder.

# Repairing Faucets

**D**espite the fact that faucets come in many different sizes and shapes, they can be divided into two basic types: stem faucets and single-lever faucets. *Stem faucets* are made up of these internal parts: a threaded shaft (the *stem*), a packing washer or O-ring near the top of the stem, and a washer at the bottom of the stem. When the handle is turned on, the stem rotates. The threads cause the stem to rise, moving the washer away from the *faucet seat* and allowing water to flow. When the handle is turned off, the stem rotates downward, pressing the washer against the faucet seat and stopping the flow of water. The *packing washer* or the O-ring prevents water from leaking around the handle when the water is on.