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ing fireplaces, you may be able to
outside air by opening the ash dump door

Glass or Metal Doors. Another way to improve the
ency of your fireplace is to limit the available
gen or control the oxygen flow by the use of glass
metal doors (Figure 2). Using such doors will
control the intensity of the fire and slow the rush of
eated air up the chimney. When you leave the fire to
urn down and cannot as yet close the damper, as at

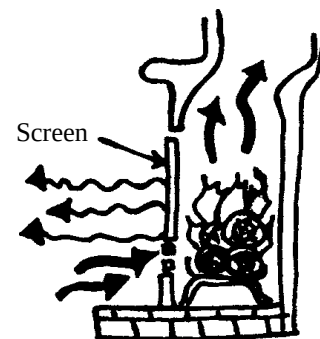


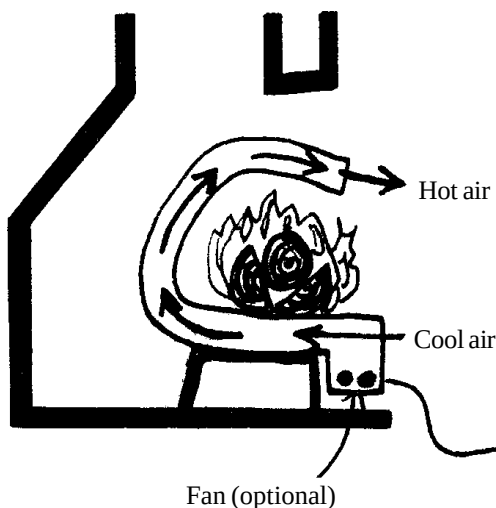
Figure 3. Heat radiant grate.



Heat Exchangers. A third way to improve fireplace efficiency is to install a heat exchanger. These are available in many forms. Some are simple structures, called radiant grates (Figure 3), designed to hold the burning logs in a way to increase the radiant exposure. Heat circulation units are another classification of exchangers. Most of these are on the fireplace floor below the firegrate and the burning logs. In some units, the fire is built directly on ducts which take the place of the grate. Air moves from the room under the fire and back into the room by convection or by fans. The ducts can be simple hollow C-shaped tubes or elaborate systems with blowers or even steam heating systems (Figure 4).

Some units extract the heat from the top of the fire or above it. Hot gases flow around and over them. Proponents of these systems claim they are better because they do not take the heat from the fire's core and thus do not reduce burning efficiency. They take many forms – C-shaped tubes, grid patterns, pipes

Figure 4. Convection heat exchanger.



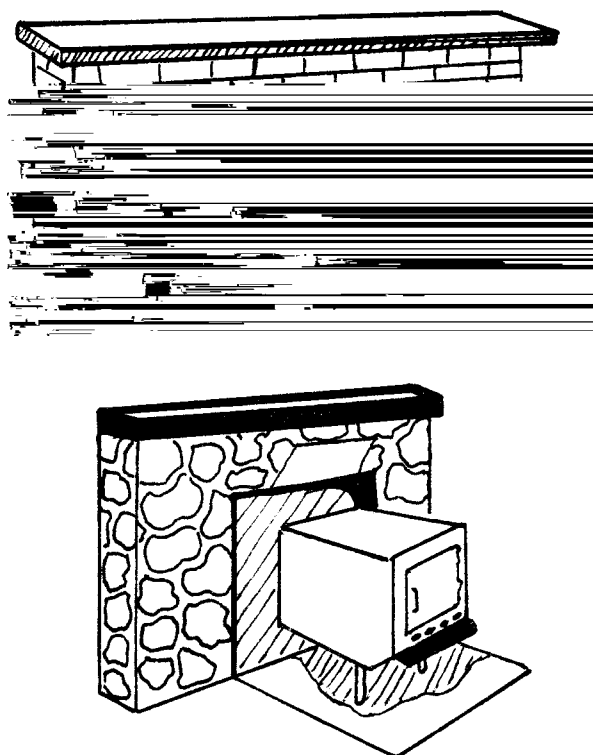
and units that heat water for supplementing other water heating or for radiator heating.

When selecting and using heat exchangers, take heed of these precautions:

- Heat exchangers should be sized to fit the fireplace. Be sure they do not interfere with the damper control arm.
- Never install a blower exchanger with glass doors unless the doors are designed as part of the unit. The superheated air blowing on the glass can cause warping and even glass breakage.
- Any unit that supports the fire can burn out, some faster than others. When small holes occur, the hot embers can drop into the air channel and be blown into the room causing a fire hazard. Be sure you purchase a unit that is well enough constructed to last. Inspect it often.

Fireplace Insert Units. If these methods do not gain the heat that you require, you might consider replacing the fireplace with a stove unit (Figure 5). Some units are designed to fit directly into the fireplace opening,

Figure 5. Fireplace insert unit (top) and fireplace stove.



giving you draft control and glass or metal doors. Some have heat exchange blowers incorporated into the design. Some stoves are designed to stand in front of the opening or partially in, partially out.

You can also purchase an airtight stove, seal off the fireplace opening and use the chimney. You can evaluate these free-standing units on the same basis as stoves and heaters. The diagrams in Figure 6 show possible methods of installation.

Summary. A conventional fireplace handles heat transfer three ways: by radiation, convection, and conduction. To improve the efficiency we need to maintain or increase the radiant heat, use the conducted heat fully and trap or return the convected heat to the room. Radiant heat is determined by the design of the fire box and opening and can be increased by

use of special grates. Secondary radiant heat produced by convection through the fireplace walls is used better if all surfaces are within the house and not on an outside wall. Convection heat can be manipulated and controlled in various ways, including heat exchangers and glass enclosures.

When adding a fireplace efficiency improver, the energy and money saved should be carefully weighed against the cost of the installed unit and the convenience change it might involve.

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Figure 6. Three methods of installing free-standing stoves.

