HOME MAINTENANCE

GAS FURNACE TUNEUP

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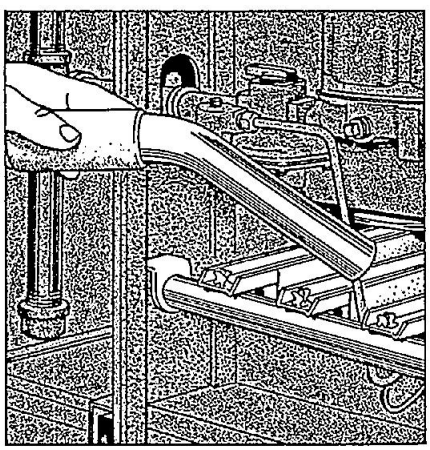
● You've probably seen the yearly ads offering a routine tuneup for your gas furnace. And if you're like most homeowners, you'd like to know first, whether the work is really necessary, and second, exactly what you'll get for your money. In most cases, the entire job consists of cleaning and lubricating the blower unit, and cleaning and adjusting the burner assembly.

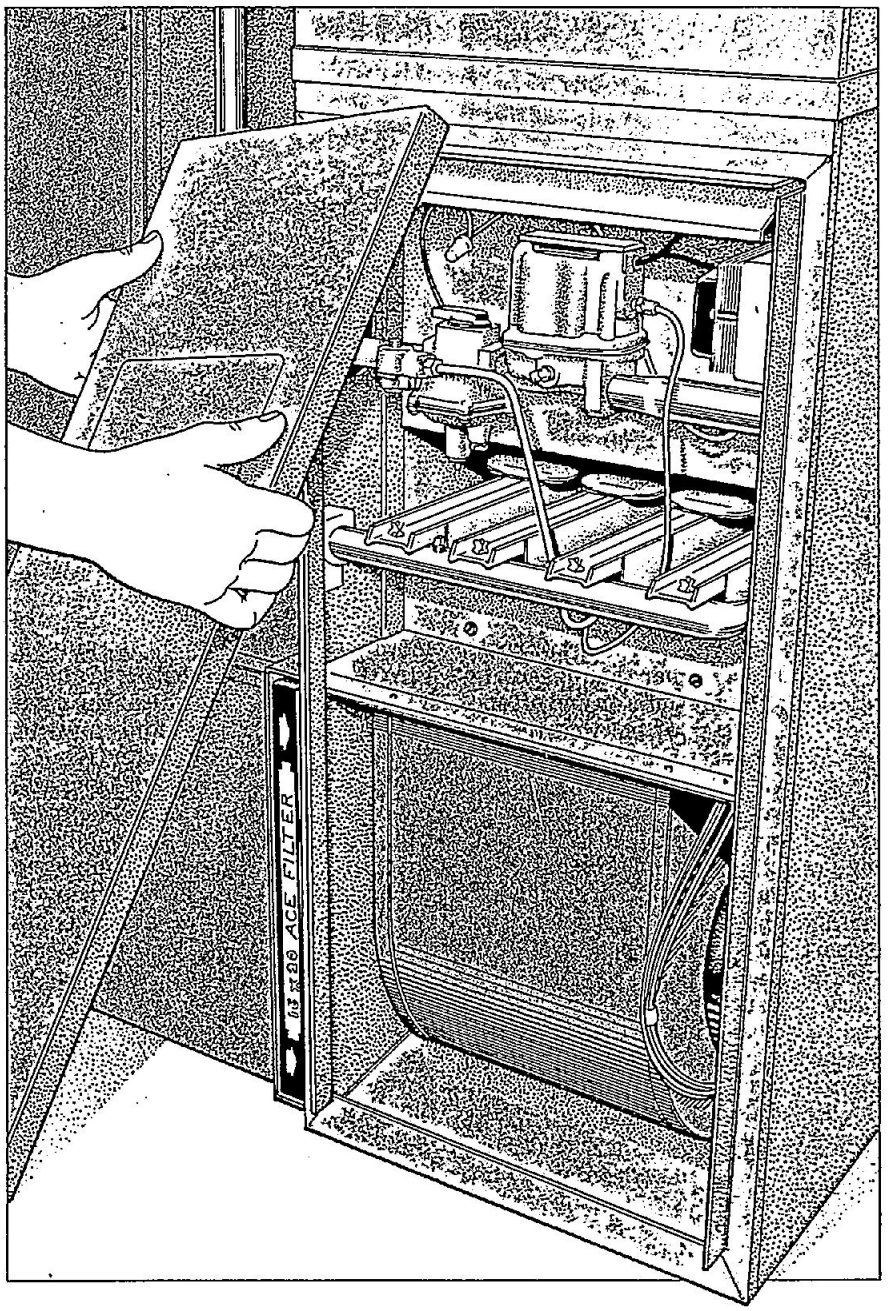
Such simple maintenance is, however, well worth the typical $40 to $80 price tag. It's the best frontline defense in the battle against the twin threats to furnace life and efficiency —dust and rust. Simply put, a well-maintained furnace will operate more efficiently and last longer.

The value will be even greater if you handle the job yourself. The complete project takes less than an hour, and you'll save yourself the service charge, as well as scheduling hassles. As long as you stay clear of the control valve and limit switches, and put back everything as you found it, there's little chance for error.



1 Begin by vacuuming the cabinet to remove dust and cobwebs that would soon foul a newly cleaned burner assembly.

The procedures that we're outlining are suitable for a typical older furnace that operates safely and predictably. We'll limit the discussion to the simplest components within the furnace cabinet and leave the control valves, relays, thermostats and heat exchangers in the hands of the professionals. We'll also assume that you change furnace filters regularly.



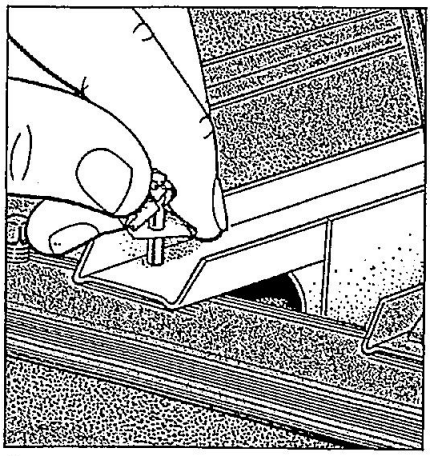
What to look for

A dirty, improperly adjusted burner will display a variety of symptoms, all of which are visible during the heating cycle. To check out the system, all you'll need to do is pull up a chair, remove the furnace cabinet door to gain access to the burner assembly and watch the burners in operation.

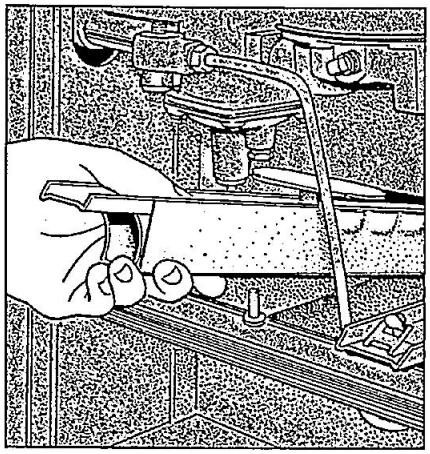
A standard gas furnace will have two, three or four burners, each with some sort of ignition crossover device. In order to troubleshoot the condition of the burner assembly, you'll need to study these components in both their startup and continuous-run stages.

Start the furnace by having someone turn up the thermostat while you observe the ignition. When the furnace starts, ignition should progress evenly from one burner to the next and without hesitation or a late flash. Then, observe the nature of the flames during normal operation. When working properly, each burner yields a continuous, steady blue flame.

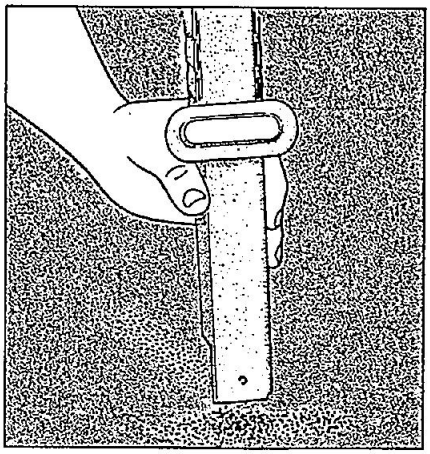
If you see a burner-to-burner ignition that displays a noticeable puff and small flash, then gas is not moving



2 To remove one of the burners for cleaning, slip off the small fastening clip that secures the burner to the gas feed piping.



3 Tip the burner up and slide it out where it can be worked on. Burners are often clogged on the inside with rust.



4 After the burner has been removed, tap the open end of the burner on the floor to clear the inside of loose rust.

through the crossover pieces that ignite each burner in sequence. In all likelihood, one of these crossover members is clogged with dirt or rust.

If you see a burner that doesn't ignite at all, or only puffs on and off sporadically, it's a good bet that the gas jet that feeds the burner is partially clogged with dirt or rust.

On the other hand, a burner that shows flame gaps along its length during normal operation suggests that some of the gas ports are clogged. If you see a burner whose flame lifts off its ports, you can bet that the air mixture on that burner is too rich. Conversely, a flame that burns orange and lazy (wavering from side to side) means that there's too little air in the mix. Before attempting to regulate the air intake, the burner assembly should be cleaned.

Cleaning the burner assembly

To begin, shut off the electrical disconnect switch so that the furnace can't come on while you're working on it. If your furnace doesn't have a dedicated disconnect switch, usually mounted on the side of the cabinet, turn the gas control from ON to PILOT. Then, vacuum the inside of the cabinet to remove all dust and cobwebs that could cause trouble later (Fig. 1).

Next, check the burner type and mounting mechanism. Most conventional burners fall into two general categories. One is the ribbon-type burner trough that we're showing in the illustrations. The other burner assembly is made of cast iron and has two rows of round ports at the top of each burner.

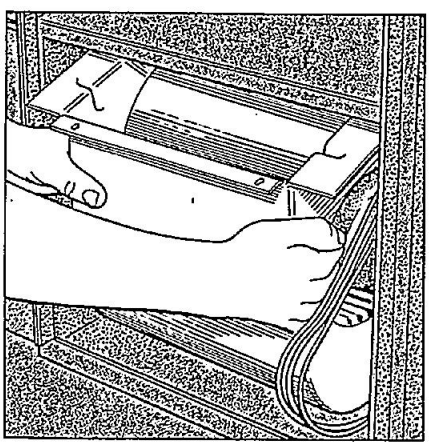
For the maintenance procedures that we're describing, the difference between these two designs is negligible. (If you find a third type consisting of several steel burner tubes welded together, you'll have to call a service technician. This type must be disconnected from the control valve and pulled out in one piece.)

In most cases, each burner is attached to a gas feed pipe and is served by a removable jet that delivers the right amount of gas to the burner. Each burner also has a provision for air-intake adjustment at its outer end. This allows you to adjust the air/gas mixture for most efficient burning.

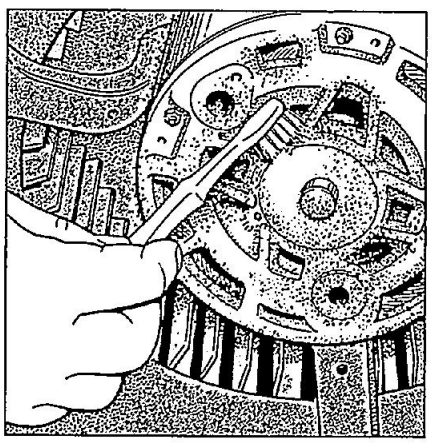
To take a burner out for cleaning, first remove the securing clip that holds the burner to the feed pipe (Fig. 2). Then, carefully lift up the burner and slide it out of its seat below the heat exchanger cell (Fig. 3). Once it's removed, turn it so that the open end faces down, and tap the burner repeatedly on the floor or some other hard surface to dislodge rust particles inside (Fig. 4).

If you've noticed gaps in the flames on that burner, poke a thin wire or small Allen wrench into each of the burner openings. Then, tap the burner on the floor again. Finally, clean the openings in the crossover member with a thin-bladed knife (Fig. 5), and vacuum the entire burner.

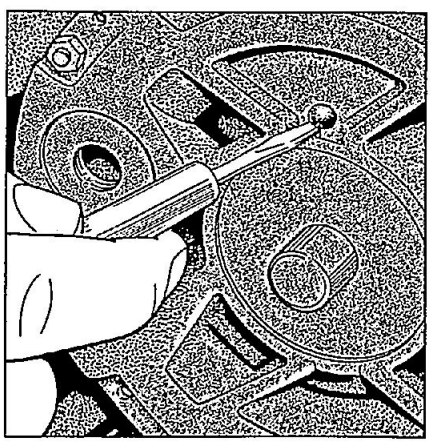
If one of the burners was not work-



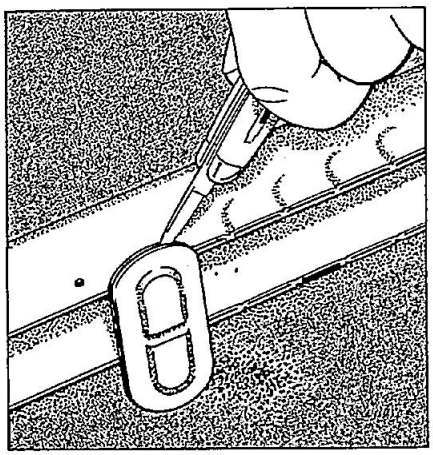
8 Most blower units are designed for easy service. To remove the unit, loosen the retaining screws and slide it out.



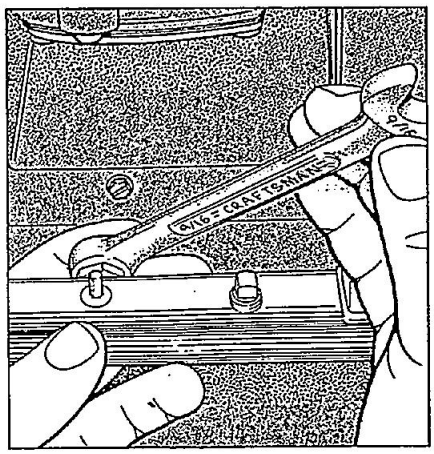
9 Use an old toothbrush to remove greasy dust accumulations from the motor housing and blower fan louvers.



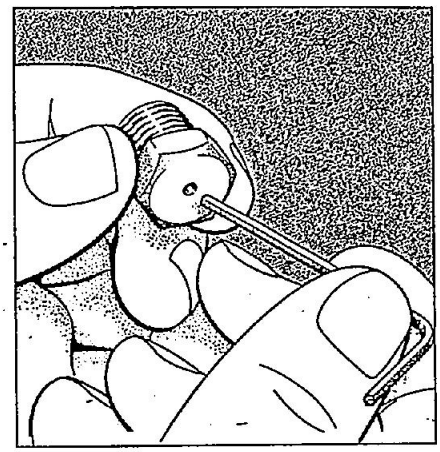
10 If the motor bearing oil ports are covered with rubber plugs, pry off the plugs with a small screwdriver or knife.



5 Slide a small knife or stiff wire through the crossover member to clear away rust particles and dirt that affect ignition.



6 Use a box-end wrench to remove a gas jet. Because the jet is brass, it loosens easily. Don't overtighten when reinstalling.



7 After removing a gas jet from the feed pipe, use a piece of wire or small Allen wrench to unclog the jet orifice.

ing, or flashed on only occasionally, you'll have to clean the gas jet serving that burner. It's usually best to back the entire jet from its threads in the feed pipe and clean it where you can see what you're doing (Fig. 6). Again, a thin wire or small Allen wrench works well in poking dirt or rust accumulation from the orifice (Fig. 7). When the jet is cleared, thread it back into its opening and tighten with a wrench until it feels snug. No joint compound is needed.

To replace the burner, simply slide it back in position and replace the clip that holds it to the feed pipe. Then, remove each subsequent burner, and repeat the process.

Servicing the blower

The blower assembly is comprised of a motor and a squirrel-cage-type fan that circulates air through the ductwork of the home heating system. Servicing a furnace blower is easier than you might think, partly because manufacturers have designed them for easy access. Some blower housings are mounted on sliding tracks, while others tip down and out. At most, you'll need to undo a couple of hexhead screws and an electrical connection.

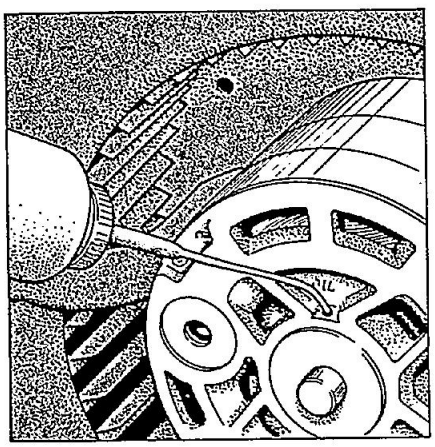
Begin by removing the blower compartment access panel. Remove the retaining screws, and pull the fan housing out into your workspace (Fig. 8). The unit's electrical connection will likely be in the form of a simple 2-prong plug. Unplug it to give yourself some room to maneuver.

Pulling the blower unit will reveal a good deal of greasy dust on the motor's bell housing and on the louvers of the fan. Both accumulations are potentially troublesome because they cause the motor to run hot and the fan to move less air. Brush the dust loose with an old toothbrush (Fig. 9), and then vacuum the entire assembly with a bristle attachment. It's also possible to remove the squirrel cage and hose it down with water, but this is seldom necessary.

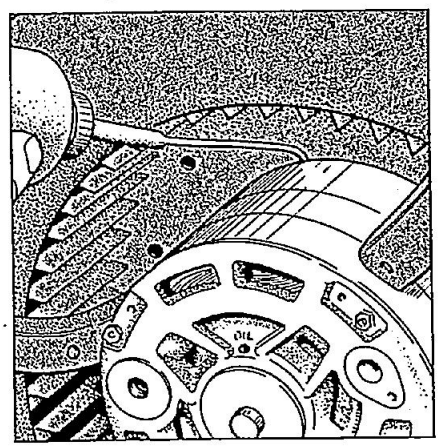
With the blower unit clean, check for oil ports on the motor housing that facilitate lubrication of the motor bearings. These are found at each end of the shaft, and are either flip-cap ports or holes covered with small rubber plugs. A third possibility is sealed bearings that are lubricated for life and require no maintenance. Check carefully to make sure that your motor has no provisions for lubrication before dismissing it as a sealed-bearing type.

If you find a rubber plug at each end, pry them out with a screwdriver (Fig. 10), and give each opening a squirt of turbine oil (Fig. 11). Turbine oil is more heat resistant than other light lubricants, and can be found at most appliance outlets. The turbine oil bottle has a long stem that allows you to reach the rear bearing without removing the motor (Fig. 12).

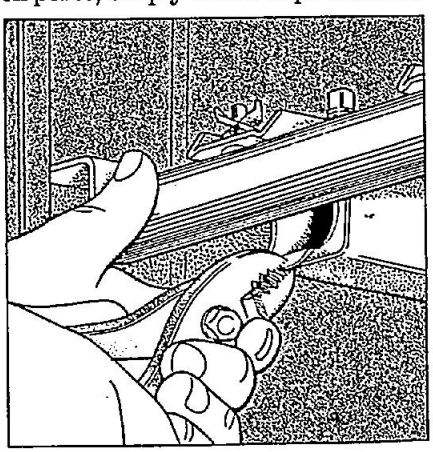
After lubricating, replace the rubber plugs and slide the blower unit back in place. If your unit has flip-cap oil ports, simply lift the caps to oil the



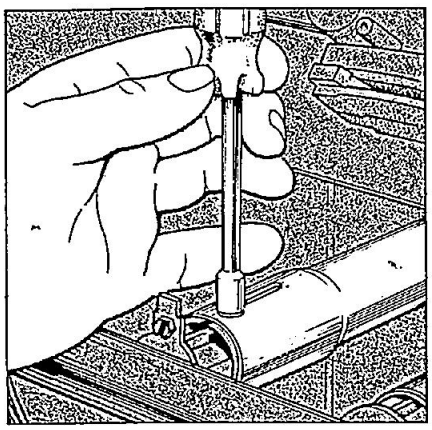
11 Use turbine oil to lubricate the motor bearings. Permanently lubricated motors have sealed bearings and no oil ports.



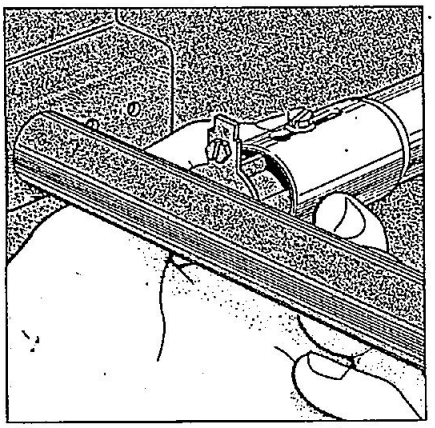
12 The long stem of the turbine oil bottle will allow you to reach rear shaft bearings without removing the motor.



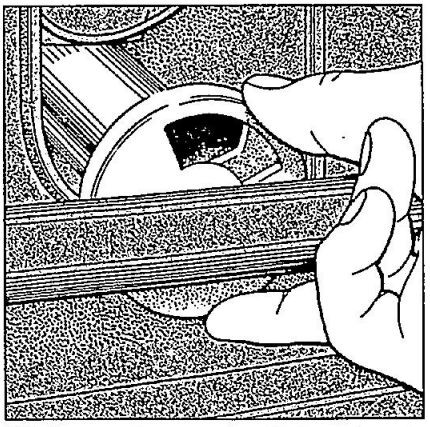
13 To alter air/gas mix on burner with internal slide adjuster, pull or push the slide to increase or decrease opening.



14 Adjust air/gas mixture on exterior-sleeve-type burner by first loosening setscrew that locks adjustment in place.



15 With screw loosened, slide sleeve toward feed pipe to decrease air, or away to increase air. Then, tighten screw.



16 Set rotating-cap air-adjustment mechanism by turning cap to increase or decrease size of air-intake opening.

bearings. When you're done, plug in the electrical connection, slide the assembly back in place and reinstall the hexhead screws. Finally, replace the lower access panel and restore power to the furnace by turning on the electrical disconnect switch.

Adjusting the burners

Air adjustments for gas burners come in several designs, most of which are based on either sliding sleeves or rotating end caps. By sliding the sleeves in and out, or rotating the caps, you'll align their openings—to a greater or lesser degree—with openings on the burner (Figs. 13, 14, 15 and 16). In this way, the amount of air available to the burner is regulated.

To adjust the air/gas mixture, first turn up the thermostat so that the furnace starts. With the burners in operation, check for abnormal flames. If the flames burn blue but lift off the burner, reduce the amount of air intake until the flames settle down. If you see an orange, lazy flame, increase the amount of air intake. Continue to adjust each burner until you see a steady blue ribbon of flame above each. Then, replace the access panel, and settle down for a warm and comfortable winter. PM