

ENGINEERING

Cut Heat Loss to Save Fuel

Full heat value from fuels requires stopping up all avenues through which heat can escape and proper firing of stoves for full combustion of coal.

By A. C. MONAHAN

► THE careful home-owner already has his heating furnace in shape for its winter job, but now is the time to examine the house itself and to put it into condition for heating economically and efficiently. Lost heat means fuel wastage.

Preparation for economical heating means closing cracks and crevices through which heat may escape, the installation of window and door stripping, re-puttying and painting storm windows, and perhaps the installation of wall and roof insulation if past experience shows that it is needed.

The furnace itself is the number one factor in satisfactory heating, but a good furnace is of slight economical value if the building itself will not hold heat. Every furnace needs careful preparation before the winter fire is ignited. The coal-burner particularly needs attention. Usually it is a job for the home-owner, unless new parts must be installed. For the oil or gas furnace, an expert is desirable. The cost is usually far off-set by fuel saving.

Removing Soot

The principal job with the coal burner is proper cleaning. All soot must be removed from the flues. Carbon deposits are excellent insulators, and soot layers on the flues prevent the passage of the heat from the fire to the air or water which carries the heat to the rooms. A heavy soot deposit can cut heating efficiency by one-half.

Ordinarily the soot is removed with a wire brush with flexible handle which is standard equipment with most coal furnaces. Muscle and persistence are the principal requirements. Summer cleaning is not enough; flues of a furnace in use should be cleaned perhaps once a month, the frequency depending upon the type of coal used and the skill of the fireman as an operator.

Beside cleaning, there are other factors in furnace preparation that are important. Warped grates are nuisances, and they are also coal-wasters. They should be replaced. All dampers and checks, and safety valves, should be checked and replaced if necessary. Stovepipe from furnace to chimney should be renewed if it shows signs of leakage. This is essential to eliminate fire hazard and to prevent the escape of carbon monoxide and other gases into the house, and also of smoke which soon settles as soot on the walls.

For fuel saving, proper furnace firing is all-important. Most home-owners are not experts. What they have learned is by trial and error. No matter how efficient they may think they are, they should study with care available publications on furnace firing that have been prepared by professionals.

Such publications are available without cost from the U. S. Department of the Interior and the Department of Agriculture. They also can be obtained from many state universities which have given special study to home heating problems. The University of Illinois, at Urbana, might be mentioned as one.

Again, excellent firing directions are available from Anthracite Institute, Wilkes-Barre, Pa., and Bituminous Coal Institute, Washington, D. C. These are national organizations maintained by the anthracite and bituminous industries respectively, and both are interested in the wider use of coal through better coal usage.

A belching chimney is always a sign of waste. Smoke is soot, and soot is made up of fine carbon particles which escape combustion in the furnace. Smoke from a chimney means that complete combustion is not taking place. It is undesirable from another standpoint: that of health. The soot in the atmosphere, together with gases, also partly the results of incomplete combustion, add pollution to the air. It should not be assumed that the furnace is the only air-polluter. Much pollution comes from other sources.

Improper Firing

A belching chimney is also a sign of improper firing. Because of its nature, bituminous coal creates more smoke than anthracite. Spreading the fresh coal over the entire burning coal bed results in much smoke. Better firemen heap the bituminous coal in the ordinary furnace either on one side or in a cone in the center so that combustion takes place at the foot of the slope.

There is an air-jet system of eliminating smoke in a commercial coal furnace but it has not yet been adapted for use in the household. The principle involves a stream of air driven into the combustion chamber over the coal. There the air mixes with the gases and vapors formed by the heat of the burning coal, and causes complete combustion.

Some of the stove and furnace patents on file in the U. S. Patent Office indicate that inventors have been trying for nearly 100

years to develop practicable smokeless coal heaters, it was recently stated by Prof. J. R. Fellows of the University of Illinois. Success was limited. But the university engineering experiment station seems now to have the problem well solved.

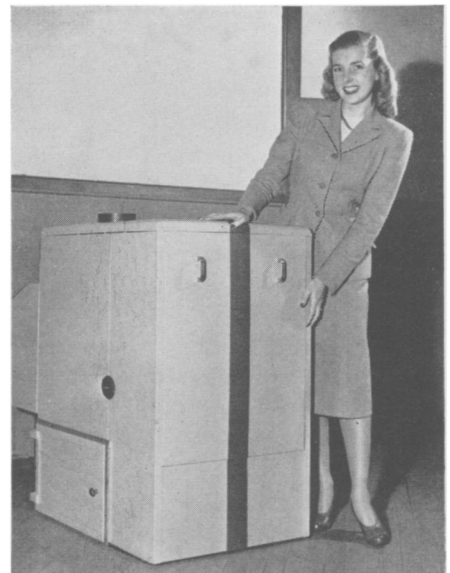
A smokeless stove, already on sale, has been developed by Battelle Memorial Institute of Columbus, Ohio. The development project, which had the same objective as that of the University of Illinois, is under the sponsorship of Bituminous Coal Research, Inc., and a group of stove manufacturers.

Smokeless Heater

In the Illinois furnace, fresh coal is converted to coke in a coking chamber at the front of the furnace, then is fed into a coke-burning combustion chamber at the rear. The volatile matter released as a gas in the coking process mixes with secondary air introduced through vertical air passages adjacent to the combustion flue, where the mixture becomes ignited.

The rate of release of gases from the fresh coal is governed by the amount of air admitted to the coking chamber, and the rate at which the coke is burned is determined by the amount of air passing in the ashpit door and through the grates.

Not all effort to develop better coal burning furnaces is confined to bituminous burners. A new anthracite furnace, now on the market, is claimed to be efficient, soot-



ANTHRACITE ANTHRATUBE—
Bearing little resemblance to ordinary furnaces, the Anthratube is claimed to be efficient, sootless and smokeless,



SMOKELESS HEATER—One of the recent developments in home-heating is this smokeless heater under test in the Champion Coal Company's laboratory at Pittsburgh.

less and smokeless.

In basic principle, it was developed by the Anthracite Institute, Wilkes-Barre, Pa., but the creation of practical household units was carried out by commercial furnace manufacturers. It is known as the Anthratube. One claim is that it saves from 15% to 38% of the fuel bill. Anthra-Flo is the newest development in equipment, and utilizes the general principles behind the Anthratube.

The Anthratube bears little resemblance to ordinary furnaces, being relatively small in size, and having a horizontal tubular combustion chamber from six to eight inches in diameter. Coal, from a chute, is forced in one end in a continual stream by a screw propeller, similar to that in the familiar household meat grinder. The same pressure forces the ashes out the other end.

Combustion takes place in the half of the tube nearest the ash end. The coal is preheated in the approaching stretch. Air for combustion is drawn through the tube in the opposite direction to the movement of the coal. The same suction draws the gases of combustion through the unignited fuel in the tube and out into the chimney. The heat from the combustion is picked up by air or water in a chamber surrounding the combustion tube.

Coal is still by far the most important fuel used in America in spite of greatly increased installation of oil and gas furnaces. It will probably always remain the most widely used home fuel because there is enough unmined coal in the country to last for many centuries, while known deposits of natural petroleum and gas are approaching exhaustion.

But wood promises to become more important. Much wood now wasted in logging operations may find its way into the fuel market in the present campaign to save wood wastage.

Foreseeing wide use of wood as fuel, the Northeastern Wood Utilization Council, New Haven, Conn., has had a furnace developed to deliver more useful heat from the wood. The new furnace is called the Woodomat, and it is now in commercial production. In it the wood is first heated enough to break it down into charcoal and gases. These products are then mixed with additional air and burned. Complete combustion is the result, and there are no deposits of creosote and soot.

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PSYCHIAIKY

Alcohol Addiction Comes From Five Sources

► FIVE things combine to make an alcohol addict, Dr. Robert V. Seliger, Baltimore, Md., psychiatrist, told the American Prison Association's Congress of Correction in Milwaukee, Wis.

The five are: 1. Ancestry. 2. Early and later emotional hurts, likes and experiences, both conscious and unconscious. 3. A physical ingredient including the alcoholic's neurological system and the reactions associated with his glandular make-up, blood chemistry content, biological rhythm and metabolism. 4. Emotional and personality difficulties with other people and in coping with situations. 5. A lack of or inadequate basic philosophy, faith and conviction in the essential and profound worthwhileness of life.

Science News Letter, October 8, 1949

MATHEMATICS-AGRICULTURE

Slippery Statistics Studied in Paris


► IN an attempt to remove some of the slipperiness from the elusive science of statistics, European governmental experts are going to a three-month "school" in Paris sponsored by the Food and Agriculture Organization.

The "students" are government statisticians. The objective is to bring all agriculture and population statistics into uniformity, so that the figures from one government may be readily compared to those of all others.

This venture, which will run until Dec. 22, is called the European Center of Applied Agricultural and Demographic Statistics. A successor to previous statistics seminars held by FAO in Baghdad and Mexico, the Paris center was organized with the help of the United Nations Statistical Office and the French Government, and with the cooperation of UNESCO.

Science News Letter, October 8, 1949

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