For Better Homes

Federal Government Gives Pointers On Oil Burners for House Heating

Editor's Note—This is the first of a series of two articles dealing with oil burners. The second will appear next week in The Observer's building and improvement columns.

In response to a general demand for information on oil burners for house heating the United States department of agriculture has tested a number of oil burners of different design and prepared the following information to assist the home owner in deciding if it is advisable to install such a burner and the type to install. Heating with such burners appeals to many home owners because of the relief from furnace attendance, dirt, the uncertainties of coal supply and the ease of heat regulation. Different types of burners have been placed on the market and the tests conducted by the department and a study of many installations indicate the character of performance that my be expected of the different types of burners, the adaptability of existing heating plants and facts concerning oil fuel supplies and operation costs.

Oil Fuels

Different grades of oil fuels are on the market and the particular grade required by a burner is an important consideration. For the laymen the gravity of the oil in degrees of the A. P. I. (Baume's sometimes used) scale is the best guide. The gravity is determined with a hydrometer graduated in what is called the A. P. I. scale. A high gravity indicates a light thin oil while a low one indicates a heavier more viscous oil.

Oil fuels are commercially known in most sections as furnace oil, distillate fuel oil, gas oil and fuel oil. The common range in gravity is for furnace oil 38 to 40 degrees, distillate fuel oil 38 to 40 degrees in some sections, and 33 to 36 degrees and 27 to 35 degrees in others, gas oils 28 to 39 degrees, and fuel oil 24 to 28 degrees all on the A. P. I. scale. The name of the oil does not always indicate its gravity. One should know the range in gravity of oil that a burner will use satisfactorily and use this information rather than trade names in purchasing oils. More heat units per dollar of cost can be secured from the low gravity, heavier oils but they can be used only with burners adapted for them.

Types of Burners

There are on the market a number of burners for use in house heaters, varying in the method employed to prepare the fuel for combustion. They may be divided into two general classes—the vaporizing which includes the gravity-feed type, and the atomizing, which includes those in which the oil is broken up by mechanical or spray devices.

Gravity-Feed Vaporizing Type

This is the simplest type of burner, very often consisting merely of one or two rough castings which are set inside the furnace and its initial cost is low. Some device such as a "hot plate" is essential for volatilizing the oil so that a vapor will be produced. The air to support combustion is generally brought into the furnace by the natural draft produced by the chimney. Some rather ingenius means are used to induce an intimate mingling of this air with vaporized fuel but in general good combustion is not secured by this method unless a highly volatile (high gravity) fuel is used. While the principle seems simple enough, the fuel and the air are not mixed with sufficient thoroughness to give a good, clean flame. In the cheapest burners of this class the control is entirely manual; the burner is started by hand and the control of temperature is effected in like manner. In some cases automatic control has been applied with apparent success. The gravity-feed vaporizing burner is limited to the use of the relatively high priced fuels.

Atomizing Type

The atomizing type of oil burners may be subdivided into those which break up the oil by purely mechanical means, and those which atomize the oil by spray devices.

In one mechanical type atomizing burner the oil is put under pressure and forced through a small opening to break it up into minute particles and it enters the furnace as a vapor spray. Air is supplied by a blower or pump and so regulated as to bring about the proper combustion of the fuel.

In another type of mechanical atomizing burner the oil is broken up by being thrown from the periphery of a revolving disc or cup driven by an electric motor.

The spray type of atomizing burner consists of air and oil nozzles, so arranged that air supplied by a motor-driven compressor blows directly over the oil nozzle and creates a partial vacuum. The oil is drawn up from the supply reservoir by the vacuum thus formed and is atomized or broken into minute particles by the air pressure, in preparation for ignition. The rate of feed is governed by the air pressure and the size of the nozzle openings. This principle is not unlike that of the ordinary carburetor employed in the gasoline engine.

Combustion

The oil fuels that are now employed for domestic heating are quite uniform in composition and contain roughly 84 per cent carbon and 13 per cent hydrogen; and oxygen, nitrogen and sulphur taken together compose the other 3 per cent. A pound of fuel of this composition requires about 14¼ pounds of air for complete combustion.

Insufficient air supply is one cause of clouds of dense smoke and soot. Sometimes the draft prevailing under this condition is not sufficient to carry off the sooty smoky products of combustion and they permeate the entire house with damage to draperies, hangings, and household goods. This form of combustion is inefficient in that the fuel is not entirely consumed. An excess of air is essential to insure satisfactory combustion. In practice, possibly 25 to 30 per cent more air is supplied than that which is theoretically required. An excess of air is also advantageous with automatic operation, where the burner is started and stopped frequently, in that it lessens the smoky condition which almost invariably occurs when the burner "comes on".

With the manually-controlled gravity burner, the hot plate is preheated by a wick which is saturated with oil and ignited by a torch. The heat of combustion after operation has begun is supposed to vaporize the oil falling on the hot plate. When the burner is off for a few minutes the plate must be again heated before the oil can be vaporized and ignited.

In some automatically-controlled vaporizing burners a gas flame is used for heating the plate and acts as a pilot light for ignition of the vaporized oil. The automatic device in this case merely shuts off or opens a valve in the oil line to the burner.

With the atomizing type of burner a flame or electric are ignites the mixture of oil and air. With a gas pilot the heat of the flame is so placed as to most effectively bring the mixture of oil and air to a temperature which will cause combustion.

Electric spark machines are either continuous or intermittent and the spark is introduced into the region of the charge. In the intermittent type the spark is active only when necessary to ignite the charge. In the electric-gas type a gas pilot is automatically turned on, the gas being ignited by a spark while in the case of the electric-oil type an independent mixture of atomized oil is ignited by an electric arc.

An oil flame heats rapidly and if not controlled in some manner will build up dangerous temperatures and pressures since the overheating continues as long as the oil supply lasts.

The simple gravity-feed, vaporizing type is generally controlled by hand. When the house is deserted the fire is either extinguished or cut down so as to maintain a temperature sufficient to prevent freeze-ups. Some burners of this type do not operate satisfactorily if throttled and it is safer to cut off the flame entirely and use other means to prevent freezing. The power atomizing type of burner is better adapted to automatic control than the gravity type and it is on this type that such controls have been most successfully utilized.

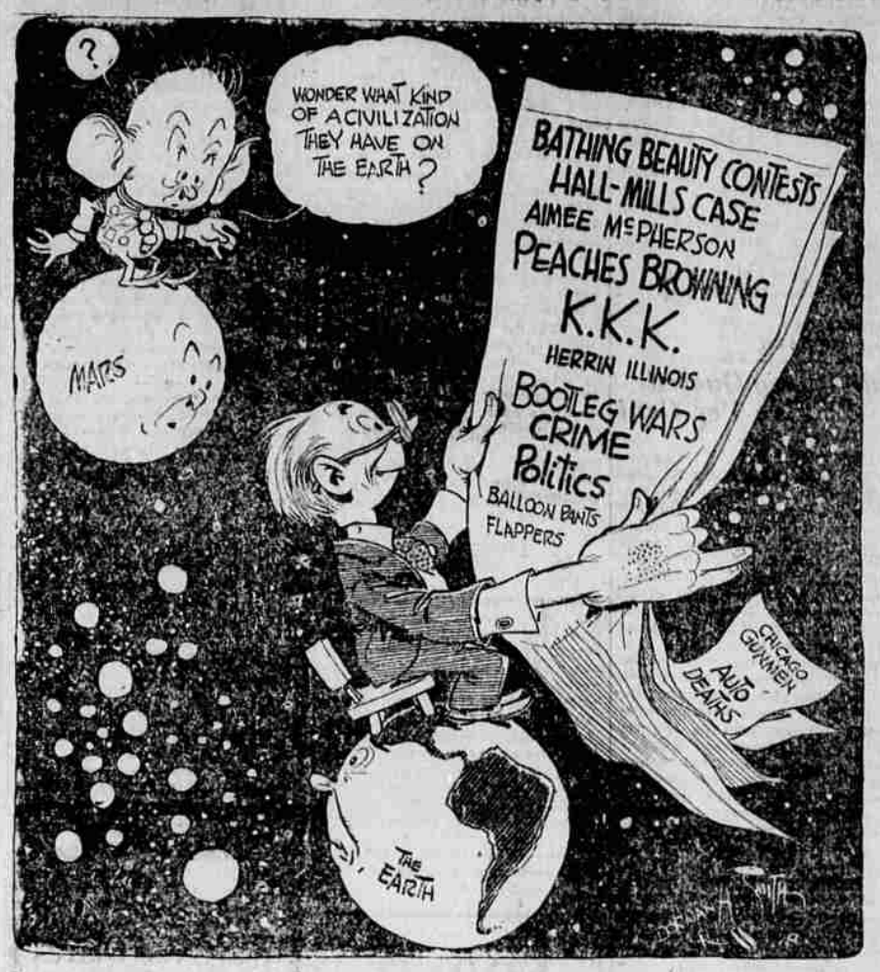
The thermostat is the device on automatic burners which renders the burners active or inactive in the process of maintaining desired room temperatures. It contains a member, actuated by temperature changes, which operates to maintain a constant temperature by shutting off or starting the burner. It is placed in a room in which it is desired to maintain a constant temperature and is adjusted to the desired temperature by moving a pointer which passes along a scale graduated in degrees Fahrenheit.

Automatic oil burners are provided with boiler controls in addition to the the room thermostat. These are termed hydrostats if it is a hot water system and pressurestats if a steam system. These devices keep the steam or water temperature at the boiler within safe limits regardless of the room temperature.

In addition to the controls mentioned it is necessary that provision be made for cutting off the burner in the event that ignition fails to take place. This is accomplished in some burners by a drip bucket or sump float which trips when a certain amount of oil reaches it and either stops the flow of oil or breaks the power circuit. The machine must then be set by hand before operation can be resumed. Another device is designed on the assumption that as long as the pilot light burns the charge will be ignited and a thermostatic member is accordingly exposed to the heat of the pilot light which breaks the power circuit should the pilot light be accidentally extinguished. In other types a thermostatic member is placed in the stack which, after a predetermined period breaks the power circuit and stops the motor and the supply of oil provided the stack does not become heated within that time.

(To Be Concluded)

MEBBE IT'S A GOOD THING HE DOESN'T COME ANY CLOSER



10 PERMITS TO BUILD GRANTED

Construction Work Started Last Week Valued at $12,375.

Building permits for two new homes were applied for last week, one to be built on Adams and one on Ash and Y.

A total of 10 permits, calling for construction worth $12,375 were issued.

The permits follow:

Nov. 8—John Stewart, to alter and repair a home on Spruce between R and S, work to cost $75.

Nov. 8—Toy Young, to erect a residence on Adams between Box Elder and Willow to cost $8,700.

Nov. 8—Barbara Hug, to build a garage on Z between Spruce and the city limits, to cost $50.

Nov. 8—W. H. Hohnenkamp company, to alter and repair a business building on Fifth between Spruce and Washington, work to cost $1,800.

Nov. 9—A. F. McMillan, to alter and repair a dwelling on Y between Birch and Depot, to cost $75.

Nov. 10—Hunting Tractor company, to alter and repair a business building on Jefferson between Fir and Greenwood, work to cost $75.

Nov. 12—Frank Loveless, to erect a woodshed on Third between Z and Crook, to cost $50.

Nov. 12 — C. H. Batrick, to build a garage on J between Fir and Greenwood, to cost $50.

Nov. 12 — K. H. Perry, to erect a dwelling place on Ash and Y to cost $2,500.

Nov. 13 — Dr. R. P. Landis to alter and repair a three - story apartment house on Second between Spring and Main, work to cost $5,000.

EDITOR DIES

DES MOINES, Iowa, Nov. 15 (AP)—Lafayette Young, editor of the Des Moines Daily Capitol, and a former U. S. senator from Iowa, died here today from heart disease.

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