



DON'T BE LIKE Alice in Wonderland

Where are you headed in your search for the Ideal in Heating Equipment? Will you be like Alice, and wander through a Wonderland of doubts and confusion? Or, would you rather approach your all-important decision down a well-marked road that leads to a sensible . . . satisfying . . . economical choice?



this book leads straight to FACTLAND

If you aren't happy with your selection of a car, you may trade it in. If a "small purchase" proves disappointing, you can toss it away. When you select heating equipment, it may well be the "choice of a lifetime." You will not be confused, or misguided, in your selection of the right heating unit if you know the facts beforehand!

This book is presented to give you all the facts that you need-and should have-to make a permanently satisfying selection. Read this Fact-book thoroughly. It will take you straight to a land of constant, winter-time comfort; where heat comes to you automatically, and much more economically than you ever dreamed.

you are looking for

A HEATING UNIT



THAT

GIVES A LOT OF HEAT

TAKES BUT LITTLE OIL



GENERAL 🛞 ELECTRIC

GO THROUGH
THE PAGES OF THIS BOOK
TAKE YOUR WIFE WITH YOU



Where have you ever seen a heating unit that looked just like the General Electric Oil-fired Boiler pictured on the opposite page?

The answer is-"Nowhere!"

And, where have you ever met the really outstanding kind of heating service the G-E Boiler is capable of delivering at such extremely low oil rates?

Again, the answer is-"Nowhere!"

The General Electric Boiler is designed different—that is why it is different. There is a definite economy-reason for the design of every part, piece, and

burner shape that you see in this "cut open" view of the G-E Unit.

General Electric engineers, world-famous for producing the "impossibles" for home and industry decided (way back in the early days of oil-hurners) that an entirely new principle of burning fuel was needed to make home oil-furnaces truly efficient—truly economical. They developed the now-famous "turn back flame" which, utilized in a unit designed for the single purpose of burning oil; puts the most amount of heat into the radiators for every drop of oil used.

That principle has been refined, but never changed—because a more economical way of utilizing fuel oil to its fullest capacity for heating has never

been found.

G-E Boilers have been saving both oil and money for G-E owners for many years! If you have not made a study of the G-E Boiler, you have lost many dollars and much comfort—all of which can now be yours, if you make the right decision.

G-E DESIGN SAVES YOU FUEL. The first automobile was a "carriage with a gasoline engine." The first electric refrigerator was an "ice box with a freezing unit." And, the first oil-burner was (by modern standards) a hig, old-fashioned boiler with a conversion burner unit poked into the ash-pit.

Cars and refrigerators have been redesigned and refined to be functional."

Result!—they work better. They are cheaper to own because they are cheaper

to operate.

But—today—you still find oil burners designed along "horse and buggy" principles—still consuming gallons and gallons of fuel oil that might be conserved—still burning up dollars that might be saved.

It was this needless waste that G-E Engineers eliminated when they designed

the General Electric Oil-fired Boiler.

Just listen to some of the results: The down-burning flame turns back upon itself—you get longest flame-travel in the shortest space, greatest amount of heat.

Domestic hot water coil built into the unit-you get year 'round hot water

from the same equipment—no "extras" to buy or operate.

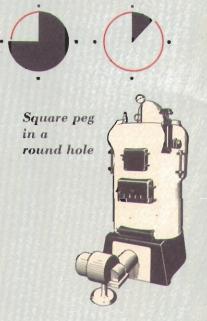
Tough, long-life steel combustion walls—designed to permit rapid transfer of heat from flame to water.

Low water content—water heats quicker; heat comes sooner.

The unit is designed to hold in heat after the flame shuts off—natural chimney draft cannot rapidly pull heat out of the unit during idle periods. Remember this: over the period of a year, your boiler will normally be idle 80% of the time, and thus the "heat-holding" ability of the unit becomes important. The G-E flue outlet is on the bottom—heat stays in at the top of the unit!

These high-spot but a few of the engineered features that add up to fuel savings which (many G-E users have reported to us) are as high as 50%.

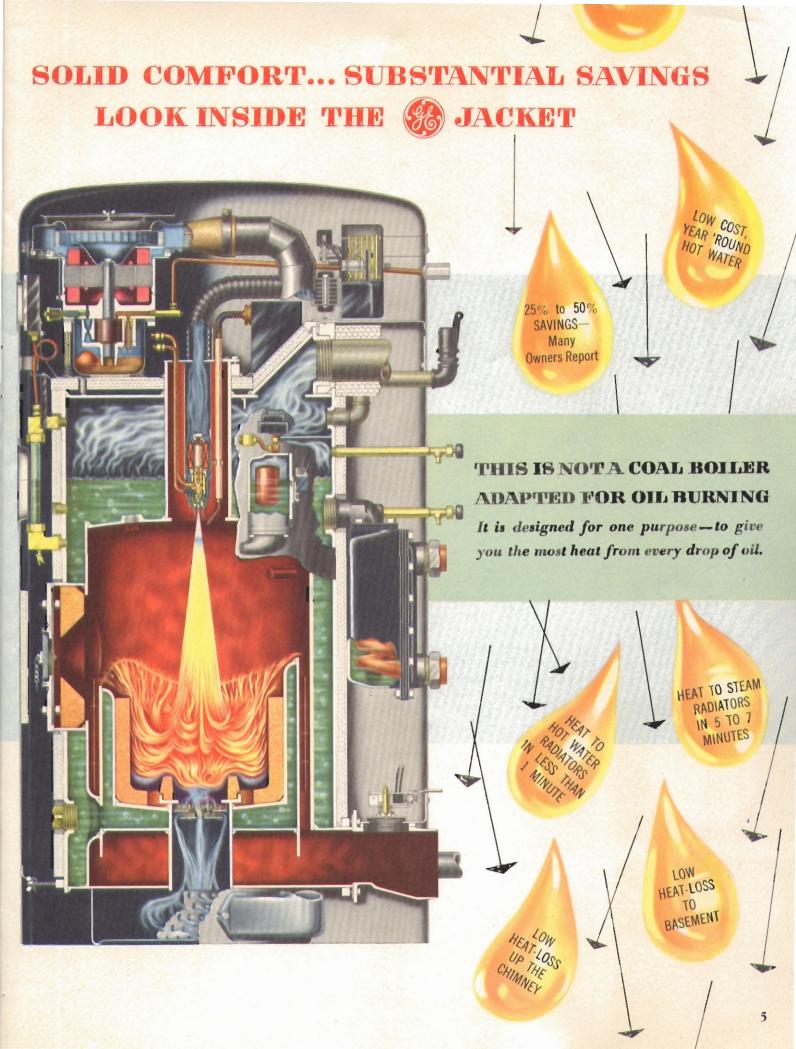
"MISFITS" CAN TAKE 30 TO 45 MINUTES TO PUT HEAT IN RADIATORS, GE DOES IT IN 5 TO 7 MINUTES



If you are looking for heating economy, and heating comfort, the type of combination unit shown above cannot give you satisfaction. The boiler part was designed to burn fuel other than oil. It has heavy, castiron sections. It has a large water content. The burner part may be good. It may be new. It may even be reasonably efficient. But it still has to first heat up all that metalall that water—before you get heat in radiators!

Your own wrist watch will prove the economy of a G-E coordinated unit over a combination unit. "Mishi" heating plants can take 30 to 45 minutes of running (and oil-burning) before heat reaches radiators.

Time a General Electric. You get heat in radiators in 5 to 7 minutes. And think of your comfort. With G.E., you don't wait (and shiver) for heat to come up. You are warm—consistently.



SEE THE SECRET OF G-E's COMPLETE

ATOMIZATION

every drop of oil is broken into more than 100 million particles

Remember when you blew soap bubbles? Remember—when they burst—how they seemed to disappear into absolute nothingness? You didn't know it then, but when a bubble burst, the gossamer walls shattered into millions of infinitesimal particles.

This childhood observation will help you to understand why a General Electric heating unit burns all the oil that passes through its burner nozzle—why it gives you that much sought-for feature of "complete combustion."

The G-E unit mixes air and oil in a special mixing chamber—and forms oil bubbles. The instant these oil bubbles pass into the combustion chamber, they burst into invisible particles. By this method, G-E shatters each single drop of oil into millions of quick-flaring particles!

The perfection of the G-E method wins your admiration, and makes you understand G-E economy when you compare G-E atomization with the ordinary way oil is atomized.

In ordinary methods, oil is pumped at high pressure against a tiny "pin point" hole, where it is broken into droplets. The outside of each droplet will burn, but too much of the inside core never burns*—and you can find it (and all its fellows) on the inside walls of your burner, where you see a thickening wall of black carbon. All of it is unburned fuel!

The G-E "core" is a bubble of air—which does its part to supply oxygen to burn the millions of particles which burn right down to nothing.

When you look inside a properly adjusted G-E unit you never see carbon. You can say to yourself— "Here's real efficiency in an oil burner . . . this owner is getting all the heat he has paid for!"



The ordinary droplet of oil burns from the outside in-with too much of the unburned "core" forming black carbon on combustion walls. Black carbon is unburned oil!*



BUBBLE

The G-E "oil bubble" bursts-shatters each drop of oil into millions of particles—each particle burns completely!

*Of course, you can make the oil droplet burn completely if you adjust the burner to take in a large quantity of air. But this is a costly way to achieve complete combustion. This extra air carries useful heat up the chimney.



From General Electric's vast research facilities came G-E's better method of burning fuel oil. The hooded figures shown here are G-E scientists, experimenting with fuel atomization equipment, long before the first G-E oil-fired unit was ever built. G-E findings resulted in the development of an entirely different method of preparing oil for combustion-a development which is saving fuel for many G-E users-some as high as 50%.



MANY A OWNER REPORTS

Full Savings 25% to 50%

"We are now getting perfect service in both heating and hot water with our General Electric, at 50% of our former operating cost with the other make of oil burner. I would highly recommend a General Electric to any homeowner."

"From the date of installation (of a General Electric) a careful check of my oil bills indicates a saving of 30%...

It is an investment that no homeowner can afford to miss."

Statement from owner who saved 33%—"If, at any time, I can be of service in convincing anyone of (G-E's) potentialities, you may call on me. As a satisfied customer, I thank you."

"About a year ago you installed a General Electric unit— I have checked oil consumption and find I am saving better than 40% . . . I am satisfied."

We have told you why you get fuel savings with the G-E unit . . . now, let some of the owners tell you how much!

Many report savings (compared to old equipment they replaced) as high as a full 50%. Savings like that make you independent of "conditions." If fuel is scarce because of temporary shortages, a big saving means that you get ample heat on far less oil. And, if fuel is plentiful, the savings still go on—in cash!



looking for user satisfaction



The mechanical excellence of the G-E unit makes it sensible for you to pay strict attention to its engineered features.

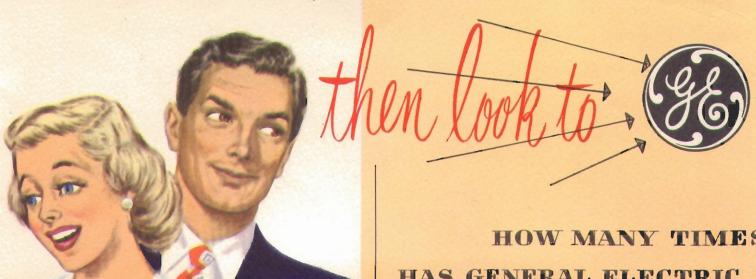
But—in your search for heating satisfaction, take time out and look at the beauty of the General Electric Oil-fired Boiler.

Here, you see a unit that owners proudly display to guests—with good reason. The smoothly finished, blue-grey jacket is handsome, and polishes as readily as a plate-glass surface.

The unit is completely enclosed—small (for such big heating capacities)—compact, and makes no apologies when installed in spaces conspicuous to living quarters.

The G-E heating unit is every inch a General Electric product. It acts it! It looks it!





If you know the owner of a G-E heating unit—talk to him! Get—at first hand—an inkling of the downright satisfaction that a G-E user has for the kind of heating service he experiences, winter after winter.

As the owner of a heating plant, you are entitled to a deep-down contentment with the equipment of your choice. G-E owners are contented because General Electric delivers the goods—in bigger packages than was ever expected at the outset.

When you talk to a G-E user, just consider what is behind his contentment. It's top-notch heating service—and nothing else—the kind of service that means day-after-day heating satisfaction, with year-after-year savings. And that is everything you want!



HOW MANY TIMES HAS GENERAL ELECTRIC SERVED YOU TOWN ?

Perhaps you were awakened this morning by a G-E Clock—ate breakfast food preserved in a G-E Refrigerator, and cooked to a "T" on a G-E Range—listened to news on a G-E Radio, brought to you with the help of G-E Broadcasting Equipment.

Perhaps you left the house to the merry murmur of a G-E Cleaner—swung aboard a bus, train, or trolley that was G-E driven—swiftly swept to your office floor in a G-E powered elevator—read your mail in the light of G-E Bulbs, made brilliant from afar by enormous G-E Turbines.

There is hardly a person in the U. S. A. who, at one time or another, or most of the time, is not served by a General Electric product—seen, or unseen. Thousands of G-E products serve the home, industry, the sciences, and professions. Each one of these products does important work.

To you—there is nothing more important to the well-being of your family than a heating unit in winter—there is nothing that calls for greater reliability of product.

Make your heating unit-General Electric.

YOU CAN PUT YOUR CONFIDENCE IN GENERAL ELECTRIC

SUPER-SENSITIVE CONTROLS AND SAFETY FEATURES BELONG IN YOUR SEARCH FOR



right down to the tips of your fingers. You select General Electric gives you superior heating service the temperature you want with the Room Thermostat. Automatically, you are kept within the "comfort zone." No "chilly periods," no "overheating"—you get steady, even, fuel-saving heat. As

saving feature, there is available, as optional equipment, the Day-Night Time Switch.

an additional fuel-It is powered by a

dependable Telechron control. It automatically sets back temperature at night when you are in bed; turns remperature up before you awaken in the morning.

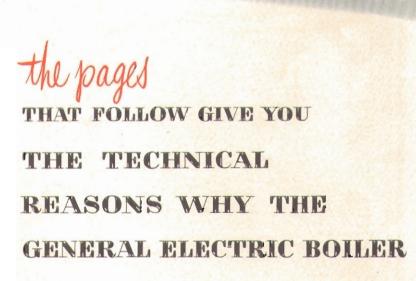
There is comfort to be found in the safety features of G.E., too. The General Electric Oil-fired Boiler has these three big safety features—among many others: There's the Flame Detector that acts to shut down the five seconds in case of flame nnit within failure. The Limit Switch shuts down the unit should temperature become too high. The Master Control coordinates, electrically, all of the pressure or

starting and running operations of the complete unit. There is nothing to think about. Just enjoy your G-E Heat.



HERE'S A SPECIAL SECTION FOR

Ah-Hah...Sounds like the real dope





A STUDY SECTION FOR PEOPLE WHO WANT

LOSS—OR SAVINGS—IN BOILER RATINGS

There are two essentially different types of heating units in which you may hurn oil. You may hurn it in a "conversion-type" unit, which is installed to produce flame in the ash-pit of a cast iron boiler originally designed to burn coal. Or—you may burn it in a completely coordinated unit, like the G-E Oil-fired Boiler, designed to burn oil.

Compare the two heating units . . . first, the converted coal burner. When you look at the boiler part of the heating plant, you find that it is sensibly designed for the purpose of burning coal. It has a heavy mass of metal (iron or steel) to absorb the slow, steady, output of constantly burning solid fuel. It has large flue passages to permit a quick pickup of heat when you "throw open the drafts."

Now—the installers of coal hurners logically put in a boiler large enough to give all the heat you need during severe weather. They know that you will adjust the drafts to "slow it down" on milder days. But—what happens when a conversion oil burner is put into that coal boiler? The burner installer is just as sensible as the coal-boiler installer. He, too, puts in a unit large enough to take care of you on the coldest days. But note this difference to you. Now that your boiler hurns oil—

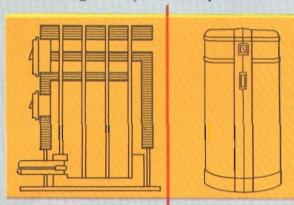


Fig. 1—Boiler designed for coal, equipped with high pressure conversion oil burner.

Fig. 2—G-E Oil-fired Bailer designed for the single purpose of burning oil most economically.

you cannot adjust drafts—you cannot change the rate at which the oil burns. It is just as though your automobile engine were "fixed" to always climb the steepest hill. On level stretches, and in traffic, you would "ride the clutch" with the engine racing—using more gasoline than you really needed. When your car—or your converted coal boiler—is operating at peak output (in a hoiler it is called Total Rated Output) efficiency drops. The average coal boiler gives maximum efficiency (about 70%) at 40% of the Total Rated Output. When operating at 100% of its rating (on a cold day) the efficiency may drop to around 55%. Because the oil-rate of your conversion unit is "fixed" to fire at maximum demand on the boiler—efficiency suffers.

The General Electric Oil-fired Boiler bears no relationship or resemblance to a conversion-equipped coal-fired boiler. It is designed for the specific burning characteristics of OIL; hence it achieves maximum efficiency at full output, not only in moderate weather, but at all times. Its design accounts, in part, for the reason many conversion-burner owners report savings in fuel, 25% or more, some as high as 50%, after switching to a General Electric Boiler.

If you have a coal-boiler, it is designed to do an excellent job of burning coal. But, if you want all of the benefits of burning oil—use the boiler designed for oil—the G-E Oil-fired Boiler.

COMBUSTION CHAMBERS—AND WHY SOME CAN COST 50% MORE FUEL

A coal-fired boiler is somewhat like a "contented cow"—contented, if burning the fuel for which it was originally designed. The solid fuel burns steadily on. The boiler soaks up the heat—constantly "passes it along" to the water in the water jacket. The inside surfaces (Heat Transfer Surfaces) of the coal boiler are adequately sized for slow-action heat. But, oil sfast-action fuel; intensely hot, loaded with heat units. The short, and wide-open flues of the coal boiler provide an almost "straight through" passage of hot, oil-fired gases; permit rapid escape of heat from the boiler.

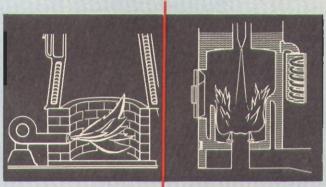


Fig. 3—Combustion chamber of a cool burning boiler converted to oil burning—water-backed surface above flame.

Fig. 4—Combustion chamber of G-E Oil-fired Boiler which is 96% water-backed.

There is the important matter of water-backed surfaces. The ash-pit is a convenient place to install a conversion burner—but also an inefficient place. This area generally is not water-backed—much heat is lost to the basement. Water-backed surfaces begin above the grate line. Heat absorption to water is minimized.

The G-E Boiler is designed to extract all possible heat from fast burning oil. Gases rise to the boiler's top, where travel is reversed downward through the secondary passages... while the combustion area is 96% water-backed. Such details of design and construction are important to you—they contribute to the 25% to 50% fuel oil savings which characterize General Electric installations.

AIR LEAKS CAN SWEEP FUEL DOLLARS UP THE CHIMNEY

Any homeowner knows that air leaks around windows and doors waste heat. He may not know that "air leaks" in a boiler waste fuel.

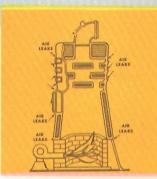


Fig. 5—Sources of air leaks in a coal bailer converted to ail-burning.

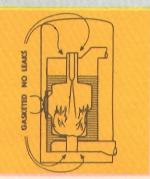


Fig. 6—G-E Oil-fired Boiler, effectively sealed against air leaks.

OF HEATING EQUIPMENT

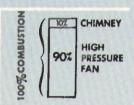
Firing and cleanout doors have a definite use when a coalburning boiler burns coal. But, those doors can be fuel wasters if the boiler burns oil. Just as leaking doors and windows rob the house of heat, leaking boiler doors, or leaking joints between boiler sections (vertical, or horizontal) rob the boiler of heat. Excess air, beyond that required for proper combustion, carries heat up the chimney.

These coal-hurner joints and doors may be cemented-a temporary measure, because the cement dries out, falls away, and the leaks return. Air leaks effect combustion when the burner runs-cause rapid standby loss when the boiler is off. And-unfortunately-in many cases, these sources of air leaks may be hidden behind the bright, shiny jacket which only serves to make an "old-style" burner look modern.

The combustion chamber of the G-E Oil-fired Boiler is tightly sealed and gasketed. No air leaks in. No oil odors leak out. No oil-film gathers on windows and furniture. No excess heat wastes up the chimney.

HAPPENS TO COMBUSTION EFFICIENCY IN A HEATING UNIT SUBJECT TO THE WHIMS OF THE WEATHER

A coal burner depends upon the chimney for 100% of its draft. If a high wind causes too strong a draft, you "damper it down." If you need more draft, you "open it up." When a conversion burner is installed, 50% of the draft may be supplied by the chimney, the other 50% by a motor fan in the burner. Just because you can no longer hand-adjust chimney draft, control (and fuel Fig. 7- Minor effect of natural costs) are subject to the whims of draft in G-E Boilers. the weather. In warm weather, the



chimney draft is low. In cold weather, it is high—maybe 100% higher. When chimney draft is uncontrollable, fuel costs are uncontrollable. Here is why:

Assume that the conversion burner was installed, and adjusted, in warm weather. Cold weather comes. Assume that the chimney draft doubles, and combustion air increases. This excess air simply carries heat up the chimney, and contributes nothing to efficient oil burning.

The G-E Boiler controls fuel oil costs, for it controls both the air and oil rates. Over 90% of draft is supplied by the G-E fan; less than 10% by the chimney—an amount so low that changes in chimney draft have a negligible effect upon the rate of combustion air flow. Even if the chimney pull is doubled there is less than 5% increase in volume of air used. The result? . . . constant fuel savings. The G-E unit maintains correct ratio of air to oil, month after month, throughout the year, operating with the same high level of economy, regardless of weather conditions.

CO, READINGS AND STACK TEMPERATURES DETERMINE THE "HEALTH" OF A BOILER-

IT'S GOOD, OR BAD

Whether an oil-burning boiler is "efficient" or "inefficient" need not be left to guesswork. A combustion expert, using special instruments, can analyze flue gases and measure stack temperatures (see chart) to de-termine if a burner is 70%, 60%, or 50% efficient.

Typical converted-to-oil burner; efficiency of only 67.5%.

GOOD-

CO2 reading of G-E Oil-fired Boiler shows efficiency of 83.2%.

| PER CENT CO. | | | | | | | | | | |
|--------------|------|------|------|------|------|------|------|------|------|---|
| | 6 | J | 8 | 9 | 10 | п | 12 | 13 | 14 | Γ |
| 400 | 79 | 81 | 82 | 83 | 84 | 84.8 | 85.3 | 86 | 86.5 | 1 |
| 450 | 76.5 | 78.5 | 80.5 | 81.5 | 82.5 | 83.5 | 84.2 | 84.8 | 85.2 | 8 |
| 500 | 74 | 22 | 79 | 80.5 | 81.5 | 82.5 | | 83.7 | 84.2 | 8 |
| 550 | 72 | 75 | 77 | 78.7 | 80 | 8 | oc | P | 83 | Æ |
| 690 | 70 | FS. | 75 | 77 | 78.5 | 79.5 | 80.5 | 81.5 | 82.5 | 1 |
| 650 | 87.5 | 71 | 73.5 | 75.5 | 77.2 | 78.5 | 79.5 | 80.5 | 81.5 | 7 |
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| 750 | 63 | tist | 70 | 12.5 | 74.5 | 76 | N.B. | 78 | 12 | ı |
| 800 | 61 | 65 | 68 | . 23 | 73 | 74.8 | 76 | 77 | 78 | 7 |
| 850 | 58 | 63 | 66.5 | 69.5 | 71.5 | 78.2 | 74.8 | 76 | NF. | 7 |
| 900 | 56 | 61 | 65 | 68 | 70 | 72 | 73.5 | 74.8 | 76 | 7 |

Fig. 8-CO2 and stock temperature chart.

His readings are significant, for, during the combustion process, oxygen in the air unites with carbon in the oil, producing carbon dioxide (CO₂). Under perfect combustion conditions (found only in laboratories) approximately 15% of combustion gases would be carbon dioxide, and 85% would be other gases not considered in combustion tests. This "perfect" 15% figure is used as a standard of comparison for CO₂ readings in actual installations. A "good reading" is around 11 or 12 percent. A "bad reading" is under 8 percent.

Stack temperatures must be just right. A high stack temperature means that useful heat is being swept up the chimney. wasting fuel. Too low a stack temperature can cause harmful moisture to condense in the chimney, resulting in corrosion and damage to the chimney walls. Ideal stack temperature should be about 550 to 650 degrees, Fahrenheit.

What causes "bad readings?" A number of faults—excess air leaks . . . incorrect air-oil ratio . . . an undersized boiler; these are many of the faults found in converted boilers burning

General Electric Boilers are installed with CO, readings from 11 to 12 percent, and with stack temperatures of from 550 to 650 degrees. A glance at the chart shows that G-E operating efficiencies are from 75.5 percent to 83.2 percent—bigh efficiencies which are maintained constantly. Compare that efficiency with the typical conversion burner operating at only 67.5 percent. THERE is one big place where you save money with General Electric.

A GLANCE AT YOUR WRIST WATCH MAY SHOW HOW MUCH OIL IS WASTED

For economy's sake, a unit should waste as little heat as For economy's sake, a unit should waste as little heat as possible. As much as possible should go to your rooms. A boiler with a heavy mass of metal, and a large content of water "hogs" heat. Such a unit, operating on a domestic hot water switch, may run 5, 10, and even 15 minutes before heat begins to flow to radiators. A simple time-test with a watch, or clock, can help to determine just how much oil is wasted by a heavy boiler, fired by a conversion burner. You can count the money lost. If the burner is set for 3 gallons per hour, it uses one-quarter gallon through even a 5 minute run before heat is quarter gallon through even a 5 minute run before heat is delivered to the house. In 2,000 such starts a year, 500 gallons of oil would be used just to heat the mass of boiler water, cast iron, or steel.

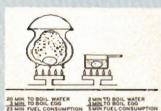


Fig. 9—Illustrating heat storage, and law standby losses.

A G-E Oil-fired Boiler works fast because of the efficient absorption of heat released from the flame. Skillful engineering reduced water content to about half of that ordinarily used. There are no long waits for heat. There is no mass of metal, or extra gallons of water to "soak up" heat—before heat starts for radiators. The entire heating surface transfers heat at a rate twice as fast as most boilers. Low heat storage, plus low jacket loss, enable the G-E

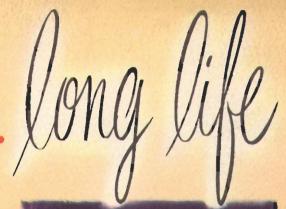
Boiler to deliver steam to radiators in approximately 3 minutes from the time it starts (heat to hot water radiators in less than I minute). To give you an idea of the unnecessary fuel that can be used to heat masses of water and metal-to illustrate bow much fuel can be saved when metal and water are greatly reduced—study the "egg boiling test" pictured above.

HEAT UNITS SAVED ARE DOLLARS SAVED

An oil-fired boiler should be so adequate and so efficient that it is in operation only about 1200 hours of the 8760 hours per year. During non-operating hours (7560) high standby losses result in high heat losses . . . and a converted boiler that bas a high standby loss is a fuel waster.

The G-E Boiler is designed for low standby loss. Very little air flows through the unit when it is not operating. For youlow standby loss means lower fuel costs.

HERE'S AN

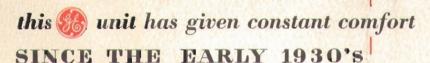




the House where the Boiler was installed

on the standard of service win you talned through all these years. This expression of the efficiency of operation of the No. 1 General is presented in appreciation at installed by you, is presented in these many years its excellent performance during I am completely I might sum it all up by etating I am completely satisfied.

part of the owner's statement on satisfaction



How long will a G-E Heating Unit last? Frankly, General Electric doesn't know! Here is pictured the very first G-E Oil-fired Boiler ever built for sale. It was installed way back in the early 1930's—and it is still going strong—still giving the owner (to quote him) "complete comfort . . . excellent performance . . . economy of operation."

Long life is a feature of any General Electric product. You can expect long life in a General Electric Oil-fired Boiler. General Electric Company, Air Conditioning Department, Bloomfield, New Jersey.



completed your trip through Factland, here is the last, and most important, look of all-



LOOK TO YOUR GENERAL & ELECTRIC



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