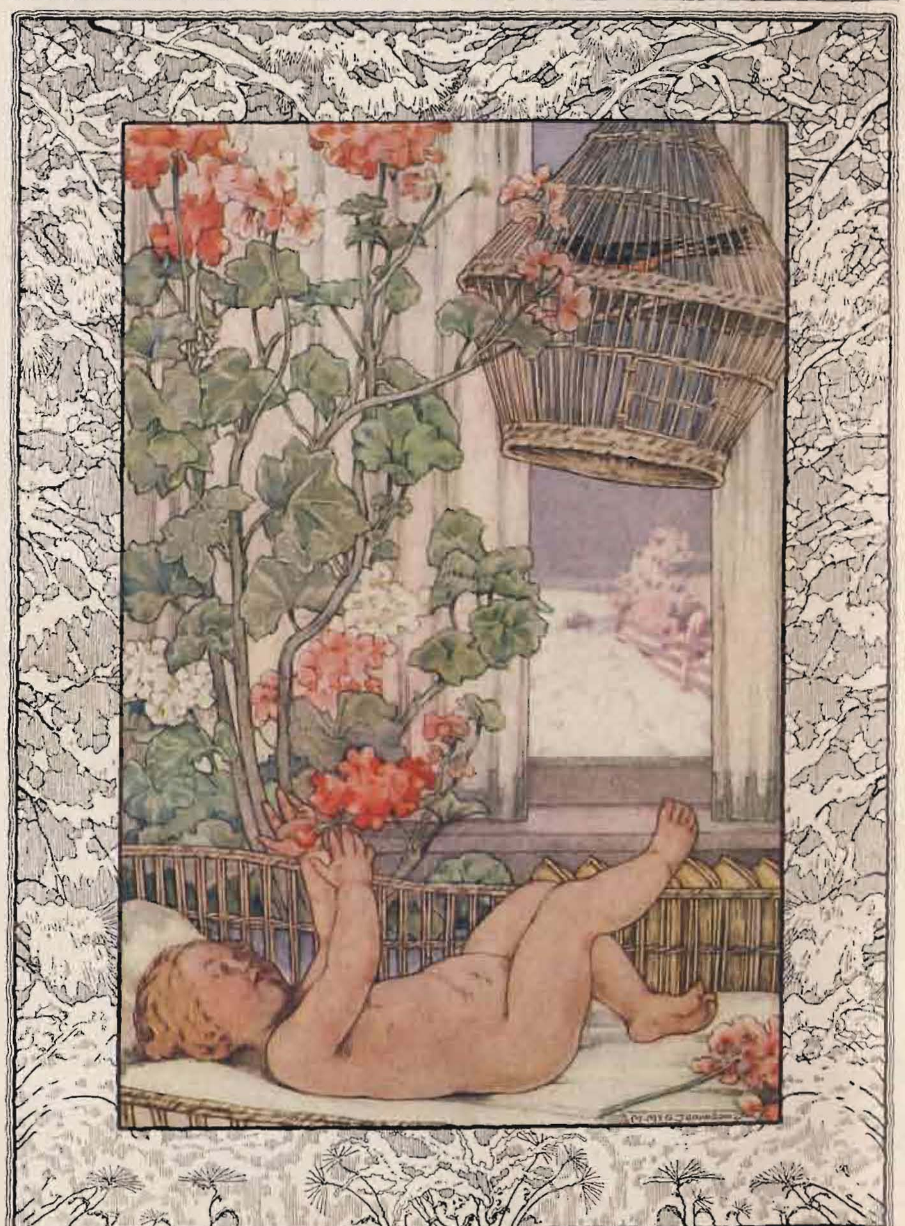
Ideal Heating



Ideal Heating

IDEAL HEATING

AMERICAN RADIATOR COMPANY

General Offices: 816-822 South Michigan Avenue, Chicago

Salesrooms and Warehouses in all Large Cities. See List of Offices on Page 48

Institute of Thermal Research, Buffalo

Where Ideal Boilers are scientifically tested and their working capacity carefully rated. **See page 22**

THE NINTH EDITION OF IDEAL HEATING, APRIL, 1912

Ideal: A standard of perfection; a model of excellence.—Webster.

Our Main Ideals

In the Manufacture of IDEAL Boilers and Heaters

In making these well-known heaters we aim to give the comfort-seeker the fullest sense of comfort with the least sense of apparatus, the most satisfying results at the least expense of fuel and of labor, with freedom from repairs, and a durability not even limited by the life of the buildings in which the heating outfits are erected. IDEAL Steam and Water Boilers fill those requirements exactly—and more.

They are strong factors in thousands of ideal homes. It is the efficient, silent, reliable servant of the house-owner—an adjunct which does more for the cheer and healthfulness of home-life than any other material feature.

True Boiler Economy

Correct circulation; right proportions; unique ideas

IDEAL Boilers are made to warm the building well and economically—not to decorate the cellar. Wherever used our Boiler becomes the strong, steady, silent, unbreakable heart of the heating outfit.

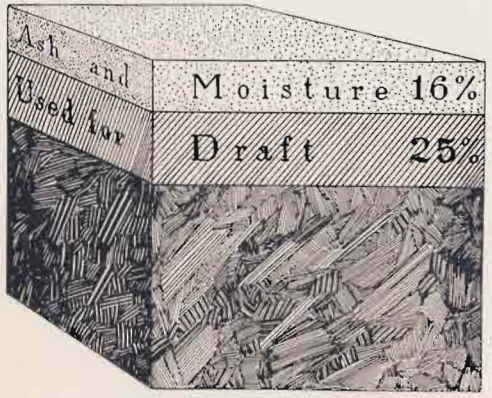
In each of the various types of IDEAL Boilers every line has been laid and stands for one purpose—thorough heating results with least expense for fuel. Every conceivable feature has been carefully and exhaustively analyzed in our testing laboratories by a corps of inventors, designers, mechanical and heating experts, whose experience and ripest ideas are solely devoted to the advancement of our product. The results are expressed in Boiler constructions having correct proportions between areas of grates, draft openings, heating surface, gas-burning chamber, flues, water-ways, fuel and water capacity.

Every type is built to keep hot water a-plenty moving rapidly through the piping and radiators above, or, in changed construction, to gently, surely, evenly vaporize water into steam, which steadily presses forward throughout the piping to the radiators in the rooms. The main idea is to insure a rapid circulation of heat and without waste of fuel.

No Waste of Fuel

Standard of heating values; how to get largest results

Everyone knows that we have standards of measure, weight, capacity, etc., like the yard-stick, the pound, the gallon, bushel, ton, etc. But few people know that there is a standard of heat, called "a thermal unit." It is the general custom to buy coal by the ton weight, not by its heating value. If the coal does not seem to give out as much heat as did a previous lot, then the householder knows from experience that it is full of slate, ash, and moisture—which, of course, do not burn. Clinkers are the common sign of a poor quality of coal. It is only within a short time that the Governments of the United States, Canada, France, Germany and England began to buy coal on the basis of its thermal-unit value, or heating power—that is, a certain



Coal Values

The above chart shows net available heat (dark portion) from 1 pound of average commercial hard coal—about 8,500 to 9,000 B. t. u's.

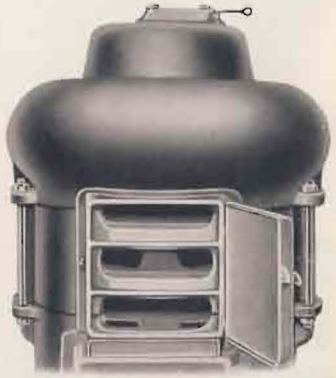
percentage is taken off the agreed price in proportion as the coal delivered is found to contain incombustible matter. Perhaps, some day, the United States Government will protect the public by insisting on coal-dealers stating the thermal-unit value per pound of the coal they offer for sale—just as the Pure Food Law now insists that bottlers and canners shall print on the label the standard of purity of the goods, or else mention the harmful ingredients contained therein.

No Waste of Fuel

Standard of heating values; how to get largest results

Meanwhile, let us learn these facts: A thermal unit (known among scientific men as a "British thermal unit") is the quantity of heat necessary to raise 1 pound of water 1 degree Fahrenheit. In other words, to raise 100 pounds of water 1 degree Fahrenheit requires 100 B. t. u's. of heat. If it is desired to raise 100 pounds of water 12 degrees Fahrenheit, then 1,200 B. t. u's. would be expended. One pound of coal, if it contained no incombustible matter, is the equivalent of 14,500 B. t. u's. The average of all well-known veins of coal in the United States is shown by government test to run near to 12,000 B. t. u's. per pound. All authorities agree that to induce best draft in the chimney (to supply air for the proper combustion of the fuel) requires 25 per cent of the fuel or about 3,000 B. t. u's. per pound of coal. Hence, in the average quality of coal there is available for heat distribution to the rooms to be warmed (in the form of steam or hot water which emits its heat through the piping and radiators) the net amount of 9,000 B. t. u's. per pound of coal.

Over three thousand tests thus far conducted at our Laboratories—not only on all sizes and types of IDEAL Boilers, but in comparison with all other kinds and makes of steam and water-heating apparatus in the market—show that IDEAL Boilers will absorb this available 8,500 to 9,000 B. t. u's. from every pound of this average coal and distribute the resultant heat through the radiators in the rooms. These exhaustive tests and the several hundred thousand IDEAL Boilers in actual use in every civilized country where heating is needed furnish the genuine basis for our broad claim that IDEAL Boilers are unequaled in the world because they *shut off all fuel waste.*



IDEAL Boilers are made with easy clean-out doors to insure economical burning of even the lowest grade fuels

The Unit Idea

Interchangeable parts; easily increased investment

All types of IDEAL Steam and Water Boilers are made upon the unit or sectional plan. If, therefore, the structure in which they are placed should be rebuilt (65 per cent of all buildings are remodeled), a few sections may be added to exactly meet the new heating requirements. Unlike stoves and hot-air furnaces, any IDEAL Boiler may at any time be easily and quickly changed in size. The same can be said of all AMERICAN Radiators. This feature, together with the fact that they do not rust, corrode, or wear out, makes our heating outfits strong factors in the way of building investments which insure the best property values—whether to occupy, rent, or sell.

Our Boilers are made in many patterns precisely suitable to the best heating of cottages, residences, churches, schools, stores, banks, hotels, stables—all kinds of occupied buildings.

For Mild Climates

Controllable for mild climates; no fuel waste

These Boilers can be set up by modern fitters so that they may be perfectly controlled. Overheating or waste of fuel need never occur in maintaining a low fire for the chilly days of fall and spring.

Because of these special provisions IDEAL Boilers are well adapted to southern climates. With our modern controlling devices they can be used to furnish heat for either steam or hot-water outfits with very economical fuel burning and a surprisingly small amount of care-taking.

While these Boilers are specially made to bring out the most reliable heating results in zero weather, the simple requirements of mild climates have not been overlooked. No more fuel need be consumed in IDEAL Boilers than is required to produce the degree of warmth necessary to warm the rooms. They can be self-regulated to produce low, medium or high temperatures as the climate may require, and with a corresponding demand on the coal-bin.

Steam Circulation Principle

Dry circulation; simple example; noiseless operation

In order to get effective, noiseless results in a Steam Boiler, the steam should be sent through the radiators quite dry—that is, not much water in the vapor. We invite particular attention to the care taken in making all types of IDEAL Steam Boilers to establish the correct means for circulation of water within the Boiler itself.

When water is boiling in a single test tube (see Fig. A) over a lamp, with no chance for circulation, a convulsive or fountain-like action is produced—the rising steam lifts so much water in the form of foam that the vessel boils over. But when heat is applied to one leg of a "U" shaped tube (as shown by Fig. B), a circuit is brought about—up one side and down the other—thus violent action at the surface of the water ceases, resulting in a much larger supply of steam delivered to the space above in quite a dry state.

Fig. A

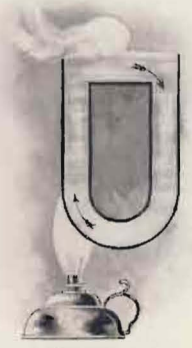


Fig. B

This idea of smooth-working inner circulation has been applied to IDEAL Boiler construction. The foaming and lifting of water into mains, piping, and radiators, which has been a source of trouble in earlier and competitive Boilers, is thus overcome. Erected with ordinary care, there can be no uncouth noises of "gurgling" or "hammering" in a heating outfit supplied by IDEAL Boilers.

Causes of Circulation

General principle; difference in weight; boiler efficiency

As water is heated it rises to the highest point—to its level. Any one who has watched the boiling of water in an open kettle has noted the little globules or "bubbles" of heat rising straight up to the top level of the water. Bulk for bulk, water when heated is lighter in weight than when cold. Thus a cubic foot of water at 39 degrees weighs about 62½ pounds, while a cubic foot of water at 212 degrees (the boiling point) weighs about 59½ pounds. This difference of about 3 pounds per cubic foot in weight causes the heated or lighter weight water to go up, while the colder or heavier weight water falls—like a grocer's scale.

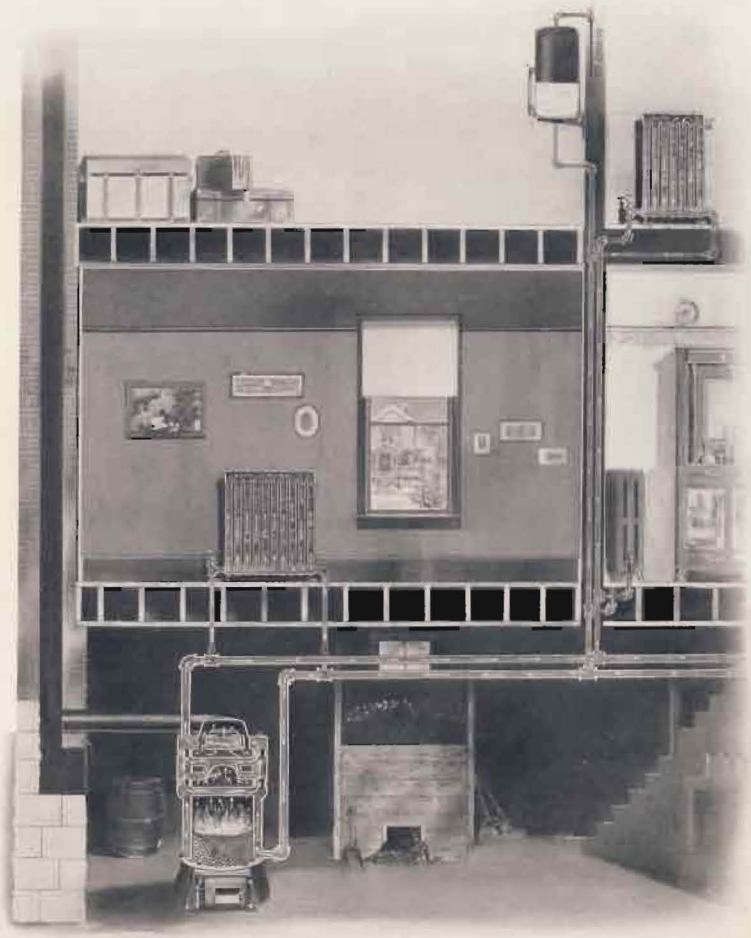
As will be seen in the outline illustration herewith, the walls of the fire chamber of the Boiler are hollow—double walls. The space between is filled with water. The moment heat is applied the iron transmits it to the water. Water is the greatest medium known for absorbing and conveying heat, and the heat globules, answering natural law, rise instantly through the other hollow sections of the Boiler, thence into the piping and through the hollow radiators beyond. The colder, heavier water falls to the bottom of the fire chamber to be heated. As the heat globules rise to the top of the heating plant they come in contact with the colder surfaces of the radiators, which absorb the heat from the water or steam and impart it to the atmosphere of the rooms. This cooled water, on account of its greater density and greater weight, then drops to the lowest point in the system to be reheated.

The heated water, or the steam in the steam apparatus, does not, as is sometimes supposed, come in contact with the atmosphere of the rooms. The atmosphere of the rooms simply comes in contact with the liberal surfaces of the radiators heated at a low temperature—much lower than the warming surfaces of stoves and hot-air furnaces; hence the milder, more healthful quality of atmosphere brought about.

As was pointed out above, the natural tendency of the heat globules is to shoot straight up. There is so little difference between the weights of the cold and heated water that all the water-ways should be so arranged that they will not interfere with the velocity of the heating medium throughout the heating plant. This means high efficiency in IDEAL Water Boilers.

Causes of Circulation

Illustration of the principle of water-heating circulation



NOTE—This view shows an average outfit opened up to illustrate circulation. It merely shows the idea, by Boiler, piping, three radiators, and the expansion tank, which is the relief-valve of the job—always open to the air. The overflow pipe from the expansion tank usually runs to a drain or to some storage tank. The arrows show the flow or circulation.

The Central Feature

Large direct heating surface; little flue travel

The best possible Boiler for the house-owner is one that has a large proportion of direct heating surface and a comparatively small amount of flue travel for the smoke and gases.

IDEAL Premier Boiler with casing removed. Note the large, broad, deep main section, combining large fuel storage and fire chamber

To obtain best heating results from average drafts (especially in low chimneys of one-and-a-half or two-story residences) the heating surface must be massed around and over a large body of coal. In IDEAL Boilers an average of about 65 per cent of all the heating surface which passes the heat from fire, flames, and gases to the water, is direct surface. Each square foot of direct surface is worth four to twenty times more than a square foot of indirect flue surface, depending upon how remote the indirect surface is from the fire. This feature is well illustrated by the view of one of our IDEAL Round Boilers here shown.

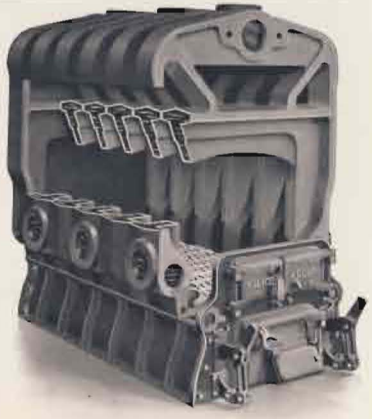
The large hollow-wall pot and fire-chamber section (with feed and slice doors open) affords a large capacity for fuel. Between the fuel line and crown of the chamber there is ample space for an intense, rapid, and complete burning of the gases. Thus a short but well-staggered draft-pull between the sections above maintains a sharp fire in the pot and chamber below, with quick contact of the heat rays upon the prime surface. The largest measure of heating value of the coal is thus taken up in circulating the water, or making steam.

These features are prominent in all IDEAL Boilers and stand for high heating results, with lowest fuel expenses and without requiring extraordinary chimney flues. Boilers with limited fire-pots and long flue travel must have large chimney flues (not always found in small houses), and even then are often extravagant in fuel.

Efficient Boiler Surfaces

Equal circulation around and over fire; surface posing

Just note the clean-cut, strong lines of the sections of the Boiler here shown. There is "bridge-like" strength, arching equilibrium, the most careful calculation of water-ways and flues, concentration of radiant heating surface, perfect machining—all are exhibited in the proportions, areas, curves, and angles commonly termed "the lines" of the Boiler. In each size of IDEAL Sectional Boilers there is equal water circulation coming in at the foot of both legs of the section, pressing upwards at the side of and over the hottest fire. The largest amount of heating surface takes the direct action of the fire. Boiler success does not depend on the *amount* of surface in both the fire chamber and the flues, but on the area of correctly posed *direct* fire-to-water heating surface against which the fuel lies, or the fire shines. In IDEAL Boilers every ounce of fuel is made to yield its full value of heat to the water.



Open Sectional Boiler
Notice section over fire with its thin water-ways for quick heating (See Page 13)

Steam Boiler Economy

Built for high ratio of results in severe or mild weather

The basis of Steam Boiler economy is the quantity of water which it will turn into steam per pound of coal burned. We have proven by tests repeated year after year, that an active combustion will evaporate more water per pound of fuel than will a sluggish fire. All IDEAL Steam Boilers are made to promote active combustion. While they make more steam per pound of fuel at a high rate of combustion than at a low rate, they will also get the best results from a low fire, because by average, 65 per cent of the heating surface is direct and exposed to the first heat of the fire.

Value of Prime Fire Surface

The live coals and heat rays do most of the work

Fuel is saved in a Boiler which has its prime fire surface so presented as to be freely exposed to the heat rays from the live coals, and to the licking flames of the burning gases. The idea is to have this surface take up directly, quickly, and extensively all the heat generated from the fire. IDEAL Boilers are so constructed, and thus insure full heating results for either *low* or *heavy* firing. (See view on page Thirteen.) Many Boilers do very well in severe weather—at least the householder at such times is willing to overlook fuel cost if the Boiler can be *forced* to keep the premises warm. Such Boilers, however, noticeably require over-firing in moderate or ordinary winter weather—it is then that the fuel is doubly wasted. This is because the surfaces are not correctly placed or ample enough to obtain *best results from a low fire.*

As most of the weather of the heating season is mild, this fuel-saving feature of IDEAL Boilers will be fully appreciated, for it insures freedom from an overheated house during the many mild days of spring and fall when "just a little heat" is needed. Our Boilers are made to produce satisfaction with economy—in either mild or severe weather.

For Low Cellars

Pits not necessary; masonry expense is avoided

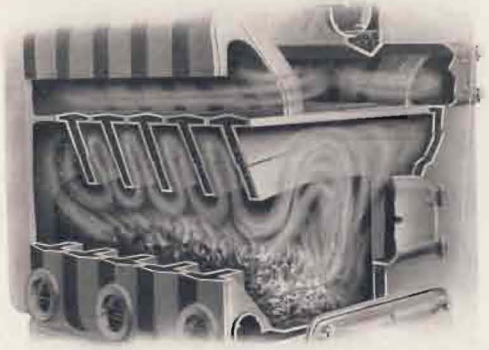
The old-style, so-called "header" Boilers, with their multitude of drums, nipples, etc., necessitated a deep cellar or digging a special pit into which to set the Boiler. Pits add considerably to the expense of an outfit, and are a nuisance.

As IDEAL Boilers have no "headers" they easily go into shallow cellars, saving the bother and expense of preparing a pit. This low construction gives ample opportunity to run the mains (or large supply pipes) at such decided pitch in the cellar as to thoroughly drain the steam system of the water of condensation, or to insure rapid circulation in the hot-water system. This prevents any liability of "trapping" with its uncouth, gurgling noises, commonly termed "pounding in the pipes."

Sensitive Water-Ways

Thin water-ways make for quickest heating results

The proper quantity of water per square foot of Boiler heating surface presented to the fire and gases of combustion is another important feature. IDEAL Boilers for Steam and Water heating are carefully designed so as to hold, or circulate sufficient water to produce the best heating results for the amount of radiation each Boiler is rated to carry. If the water-ways of a Boiler are large the water will move slowly—at a rate largely influenced by the size of the inlets and outlets—and the film of water next to the walls of the fire-pot will rise to a high temperature while the balance will take up but little heat, causing a low average for the entire volume. On the other hand, small water-ways give a high velocity to the water across the heating surface, with quick and effective heating. A Boiler having long and tortuous water-ways is not economical because the water moves too slowly, and the heat is not rapidly passed from the fire to the water.



Water-ways of Sectional pattern showing thin sheet circulation

This factor of proper size water-ways which insure quick and continuous circulation of a volume of water correctly proportioned to the needs of the radiators above, is a strong point in the construction of all IDEAL Boilers. Particular pains are taken to avoid the distribution of thick volumes of water or sluggish pockets which are not effective in taking up the heat. All these precautions stand for rapid and liberal heating results, with good economy of fuel.

No "Undigested" Coal

Gases burn quickly and fully; flues do not impede draft

Burning coal liberates certain gases which burn readily and make intense heat—if they are permitted to "take fire." The chambers (and the flues opening out of these spaces) are so arranged in IDEAL Boilers that the gases are burned as fast as they are freed from the coal. Often spaces are made between the sections so that these flaming gases very much assist the combustion throughout the flues—making the flue surfaces also rapid or quick conductors of heat to the water.

These flue surfaces are rightly proportioned to the grate surfaces and other features of the Boiler which they influence. They are proportioned so as to promote *good draft* to the fire below, rather than to clog its action, as in the case of some Boilers on the market in which excessive flue travel calls for extraordinary chimney draft. Thus in IDEAL Boilers a sharp fire is maintained and the coal is fully digested, thus fully supplying the radiators connected to the outfit with an ample volume of warmth.

Tight Nipple Connections

Absolutely tight joints; no packing or gaskets to leak

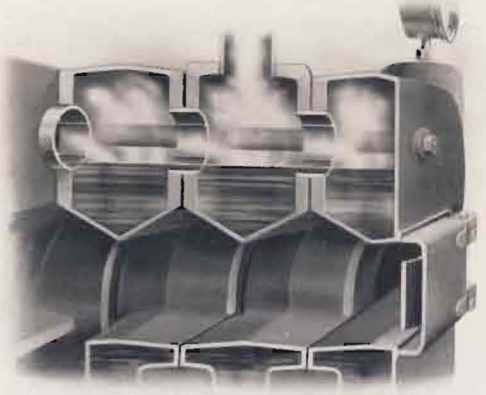
Here is a vital point. Next to heating efficiency and fuel economy, a Boiler must be tightly put together—permanently water-tight. One of the most successful features of IDEAL Boilers is the method of push-nipple connection for joining the sections, or water-ways. Made of the same cast iron as the Boiler, the nipple is not affected by expansion or contraction. It is lathe-turned to the thousandth of an inch and insures a joint "as tight as a drum-head," *and keeps* it so. Packed or gasket joints made up with rubber, asbestos, paper, or composition washers are not used in any IDEAL Boiler. Such joints often leak and have to be repacked—an expensive process. Our Boiler nipples insure quick erection and tight joints.

Self-Cleaning Surfaces

Little labor to keep clean; full heating value of coal burned

Most of the fire surfaces of IDEAL Sectional Boilers are at such pitch or angle that they are practically self-cleaning.

Further, as will be observed by reference to the illustrations, these heating surfaces are so arranged and inclined that the heat rays are brought directly in contact with a large proportion of the heating area. Hence the heat rays or flames quickly burn off any incrustations which may accumulate during periods of low firing. Thus the heating efficiency of these surfaces is always maintained at a high degree and the full value of coal burned is passed to the radiators above. One-fourth inch of soot (non-conductor of heat) requires 50 per cent more fuel than is necessary for clean surfaces.



Connections of hollow castings in IDEAL Sectional Boilers by machine-turned Push Nipples; also clean-out door and showing case of access to flues

IDEAL Boilers are all equipped with clean-out doors at points which permit easy access for thorough cleaning of all fire and flue surfaces when soft or low-grade fuels are used. As stated in a previous paragraph, however, the fire surfaces of our Boilers are so inclined as to be practically self-cleaning. When poor quality of soft coal is used, these surfaces should be kept thoroughly clean to obtain the best results.

Deep Fire-Pots

Less care-taking and more efficient results without forcing

IDEAL Premier Water Heater

Showing the deep fire-pot, fire surfaces, and water circulation; a type for hot faucet supply (See pages 40-43)

The magazine-feed type of Boilers has well-nigh passed out of use. The fault was that the magazine usually occupied a space which otherwise would provide the most effective fire chamber and water-heating surface. The extra heavy weight of the fuel also crushed down the center of the fire—producing poor combustion and clinkers.

In the IDEAL Boilers we have the far better plan of a deep fire-pot which will hold a liberal amount of fuel without displacing this vital Boiler surface, but rather increasing its area. Attention to the fire is not required oftener than twice a day in ordinary weather. The large, deep fire-pot holding a big supply of fuel is far more economical and makes the Boiler simpler to manage.

Air Burning

Insures complete burning of the coal; means less coal

Air has as much to do with economical results as has any other feature. A certain part of air, the "oxygen," must be supplied, or no fire. To "smother" a fire is to cut off its supply of oxygen; that kills the flame. Too much air makes too great a draft; that chills the flame.

Air must be supplied under the grate to the fuel in the fire-pot, in addition to a proper amount through the fire-door slide over the top or face of the fire to mix with the flame and free gases, and thus to cause good, sharp, complete combustion. In proportion as the right amount of air is supplied, at right points, the right economy in fuel is secured. The air-burning features of IDEAL Boilers are fully developed, and thus the gases do not escape and waste the fuel values.

IDEAL Arco Steam Boiler

No. 2-19-S

View of a representative size cut away to show the deep fire-pot, circulation and vaporizing surface

Working Capacity

Steady warmth in cold nights and early in the morning

The running of the house-heating Boiler is the work of the man of the house or some member of the family. It is seldom the work of a janitor or special fireman. The heating outfit is not successful if during zero days or in high windy weather the members of the household are obliged to frequently run up and down the cellar steps to look after the firing and regulation of the Boiler. If this happens during the cold winter nights, the outfit is a source of dissatisfaction instead of joy. As eight hours is the ordinary sleeping period, as well as being the usual period for work and recreation, all IDEAL Boilers are so built as to provide ample heat for the radiation without attention for not less than eight hours in bitter, wintery weather—and, of course, for proportionately longer periods in less severe to mild weather.

Some manufacturers calculate their Boilers shall be charged with fuel every five hours; others establish six hours as the average period for taking care of the Boilers, others fix upon seven hours as the proper period. There are a few old types of Boilers in the market that will not run over four hours without recoaling; but these and the five-hour Boilers are fast declining in sales as the public becomes educated to the comfort and convenience of the eight-hour IDEAL Boiler.

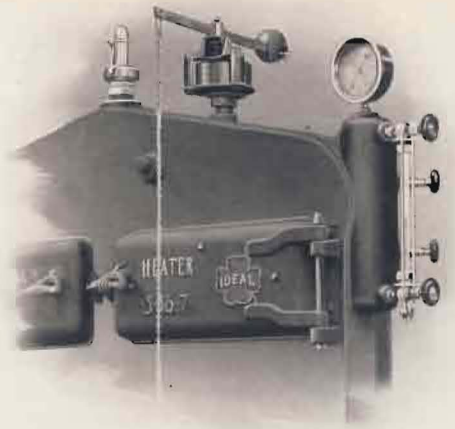
The Boilers of less than eight-hour capacity have, however, a deceptive sales-price advantage. It is the same as say a 10-, 12-, or 14-ounce loaf of bread can be sold at less than the price asked for a full 16-ounce or pound loaf. For instance, let us suppose that to properly warm your building to 70 degrees there are required 750 square feet of radiation and 250 square feet of radiating surface in the form of mains and risers (piping), or a total of 1,000 square feet of surface for distributing the heat generated by the Boiler. This 1,000 square feet of radiating surface will require, under ordinary conditions, 250 pounds of steam per hour to be supplied by the Boiler. By multiplying the number of pounds of steam required per hour (250 pounds) by 4, 5, 6, 7, or 8 hours (making respectively 1,000, 1,250, 1,500, 1,750, or 2,000 pounds of steam) you will see how important a matter it is for the buyer or user to know the hourly-basis or time factor established by the manufacturer in rating his Boiler.

Working Capacity

Steady warmth in cold nights and early in the morning

To be sure of getting full value in the Boiler purchased, it behooves the purchaser, therefore, to insist on knowing the hourly basis on which the Boiler is guaranteed, or the measure of work it will perform. If a Boiler has to be recoaled every five hours to produce 250 pounds of steam per hour, it will do only five-eighths of the work done by an eight-hour IDEAL Boiler, and should be valued accordingly.

IDEAL Boilers are not alone built to run eight hours in zero weather on one firing, but will at the end of that time leave 20 per cent of the fuel unconsumed, so that by adding fresh coal the fire is, without rekindling, carried forward for another eight-hour period and so on through the season. Under specially good draft or chimney-flue conditions, IDEAL Boilers will of course do proportionately better. In every instance the IDEAL Boilers will do the highest amount of heating work possible to be performed under the conditions in which they are used.



IDEAL Sylphon Regulator on a Sectional Steam Boiler. Also showing water column cast to the first section

Eight-Hour Ratings

Full capacity for eight hours from one fuel charge

The average house-heating Boiler should run *in zero weather* for not less than eight hours on one charge of coal, so as to maintain heat through the night and still have an ample reserve of live coal in the Boiler pot to ignite a fresh body of coal in the morning. IDEAL Boilers are all carefully accredited with

"Early morning comfort" at breakfast time starts the day aright

heating capacities with this requirement in mind. Their ratings for supplying heat to the amount of radiator surface (stated in square feet of area for each size and pattern), are based on their fuel-holding capacity to accomplish the results stated—a full supply of heat to all the radiators in the building in zero weather for eight hours, for *one* charging of fuel. This insures heating economy because *all* the radiators are not often turned on at the same time.

Many other Boilers can only prove their stated capacities for supplying heat to radiators for five, six, or seven hours in zero weather, from one charge of fuel—according to the size of their fire-pots. In IDEAL Boilers this important factor of time-firing has been determined by scientific tests that lift their capacities from any "hit-or-miss" standard to a basis which insures reliable heating results. This assurance is of great value to the house-owner in zero weather, when a warm house at night and early morning comfort are of much impor tance to the well-being of the domestic circle.

Check- and Cross-Dampers

Complete draft control insures comfort and economy

A Boiler under a well-arranged test may show a high efficiency and a large capacity to circulate water or evaporate it with steam, but it may be difficult to operate, or control. In the manufacture of IDEAL Boilers particular attention is given to the draft and damper features, so that the Boiler can be well controlled and not throw gas into the cellar when the feed-door is open. Easily operated draft and check dampers are valuable adjuncts.

Smoke-hood for IDEAL Sectional Boilers

Showing balanced check-damper — Showing cross-damper and handle

IDEAL Boilers are always provided with smoke-hoods (to which smoke-pipes connect), and are fitted with check-draft dampers. The check-draft lids are as sensitively balanced as a pair of scales, and when connected by chain to the regulator rod they do much to control the fire automatically and establish best fuel economy.

Most of the patterns are fitted with the cross-damper in smoke-hood. It is regulated by a handle and ratchet which can be set rigidly in any angle. By setting this damper in right position the rate of combustion is controlled, loss of heat is avoided up the chimney, and the fire regulated correctly for either mild or severe weather.

IDEAL Premier Boiler smoke-hood. Bottom view showing cross-damper

How Our "Ratings" are Made

Showing how the heat-making power of boilers is proven

The house-owner who buys a Boiler to warm his home or other building, should know just what is the basis and methods of determining the working capacity (called the "rating") of the heat-maker which he is to rely on for comfort. The stated ability of each size of IDEAL Boilers to furnish heat to a fixed number of square feet of surface on the room-warming radiators is worked out from actual tests and from scientific standards. No general theory or guess-work accounts for the stated amount of radiating surface affixed to each IDEAL Boiler.

One of the factors that affects the heating results of a steam Boiler in operation is the rapidity with which the heat is thrown off by the radiators in the rooms. As the heat of the steam is thrown off, the steam is said to condense—that is, it yields its warmth to each room through the walls of the radiator and turns back into water which goes to the Boiler to again be vaporized into steam. The rate of condensation ordinarily may vary from one-fifth (.20) to about three-tenths (.30) of a pound of steam per square foot of radiator surface per hour. But, for all practical purposes, the average rate of one-quarter of a pound of steam (.25) condensed by each square foot of condensing surface on the radiators and the piping, is sufficiently accurate to determine the total demand on the steam-making Boiler.

Each steam Boiler is thoroughly tested and the total quantity of steam which it will make (measured in pounds) from one full charge of fuel every eight hours is ascertained and recorded. That total amount of steam has just so much heating capacity per hour at the radiators, as may be illustrated by a given steam Boiler, which, from one charging of hard coal will make 1,000 pounds of steam in eight hours. That would mean an average hourly capacity of 125 pounds. For instance, let the total steam produced and hourly quota be represented by the following sub-divided chart:

1	2	3	4	5	6	7	8	Hours.
	1,000	Pounds		of	Steam			Total.
125	125	125	125	125	125	125	125	Pounds

How Our "Ratings" are Made

Showing how the heat-making power of boilers is proven

On the basis that each pound of steam will supply heat for one hour to four square feet of radiator surface in the rooms, it is seen that this given Boiler has an hourly capacity of supplying heat to (4 x 125) 500 square feet of radiating surface, placed in various rooms of the house. This Boiler, however, on our conservative method, would be rated only to supply heat to 400 square feet for eight hours, because in computation at least 20 per cent of the fuel charge is reserved to ignite the next charging of coal.

To show how much the results of a Steam Boiler depend on the time factor of fuel-burning, we would say that the given Boiler above shown to produce steam for 500 square feet of radiation on an eight hour fuel charge, would only produce steam for about 350 square feet on one charge of fuel in *ten* hours (at same rate of condensation at the radiators). But, on a full fuel charge every *six hours* on the same rate of condensation (¼ of a pound of steam per square foot of surface per hour), the capacity of the same Boiler would be increased to about 650 square feet.

The ratings of IDEAL Steam Boilers are computed on the basis of 2 pounds gauge pressure, steam at 219 degrees Fahrenheit at Boiler, radiators standing in air at 70 degrees Fahrenheit, and steam condensing at the rate of ¼ pound per square foot of surface per hour. The ratings are then computed for the amount of surface which the Boiler will supply with steam for eight hours from one charge of fuel, reserving 20 per cent for the recoaling demands.

Having seen how much the heating results from the radiators in the rooms depend on the number of hours which the Boiler will easily supply all the radiator surface at which it is rated, it is important in comparing Boilers of different makes to know *how long* the stated capacity of any given Boiler may be depended on to produce heat from one full charge of coal. A Boiler cannot be compared fairly with the IDEAL unless it will furnish the full amount of heat declared by its rating for eight hours from one charge of fuel, and have 20 per cent fuel reserve to continue combustion for the next charge.

Sylphon Damper Regulation

Automatic boiler control; prevents overheating; saves coal

The Ideal Sylphon Regulator supplied with all IDEAL Steam Boilers is the greatest improvement in damper control made in a century. While this device adds to the cost of making, it adds so much to IDEAL Boiler value that the improvement was immediately added when offered to our Company.

This Regulator is so sensitive that the slightest change in pressure will affect the draft and check dampers, automatically keeping the pressure at the right point for economical heating, and prevents the waste of fuel, or fluctuations in the temperature of the rooms above.

This improved method of automatic control of a Steam Boiler enables the owner to get the best results from reasonable coal consumption in severe weather, and to keep the fire at a moderate pitch in mild weather.

The Regulator is made entirely of metal, works without friction, and will not wear out—it has no rubber diaphragms, packing, or piston joints to get out of order, or call for renewing. The Sylphon Regulator is made on the plan of a bellows with two brass disks and accordion sides of best flexible steam brass. It works at just about atmospheric pressure, closing the dampers, if desired, before one ounce of steam pressure is generated. Moreover, it remains always sensitive and reliable. Actual tests have shown that 150,000 movements will not affect this bellows in any way. By shifting a weight on the bar (not shown in cut) its application can be changed to any pressure desired for good draft control.

It is only necessary to supply the coal, take out the ashes, set the Regulator, and then the Boiler does the rest. Even pressure is insured and coal saved.

Sylphon Damper Regulation

Automatic boiler control; prevents overheating; saves coal

We also supply the Ideal Sylphon Water Regulator for the automatic control of the dampers of Water-Heating Boilers and Tank Water Heaters. It can be set to maintain a stated temperature in the water and it thus insures even heating of the rooms, or in the water supply, with best fuel economy. This Regulator is not included with our Boilers or Heaters. Prices quoted by heating contractors, fitters, dealers, etc.

Large Ash-Pits for Ashes

Ample ash storage; permits easy dumping if necessary

It will be noted that the ash-pits of IDEAL Boilers are all of extra large capacity. They will hold several days' ash deposit.

Ash-Pit for a round Boiler

It is best, however, to remove the ashes from the pit once per day. If permitted to accumulate the deposit will fill up under the grates, cut off the air supply, and thus cause the grate bars to warp or melt down. If the ashes are regularly removed, the grates should last as long as the Boiler.

Liberal Steam Domes

No foaming of water; no water gathering in radiators

To get rapid, noiseless results, the steam should be sent through the radiators quite dry. The liberal steam space provided in IDEAL Steam Boilers entirely overcomes the trouble found in the use of many old-style Boilers, through

the foaming and lifting of water into mains, pipes, and radiators. The view above shows that the two hollow arms (which bring the heated water to the dome from the lower part of the section) point *away* from the main outlet. Thus even if heavy firing should agitate the water line no spray is sent into the mains. Where the piping is erected with ordinary care, there is no uncouth noise of "gurgling" or "hammering."

No Choking of Heat Currents

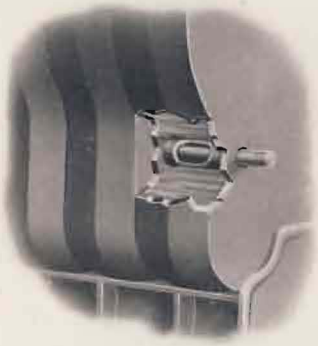
No loss by useless burning of coal caused by friction

In the IDEAL Boilers designed for hot-water heating, a perfectly free, continuous upward movement of water is maintained. This idea of rapid, free circulation is applied by spreading the water into separate columns, distributed over large areas of heating surface.

Friction means choking of heat currents, which in turn means inefficiency and waste of fuel. IDEAL Water Boilers are so made that every particle of water, from the moment it commences to take up heat, moves freely and rapidly *straight up* through the Boiler and piping to the radiators beyond. This in part accounts for the good results and marked fuel economy secured in the use of these Boilers.

Reliable Binding Rods

Do not touch the water; no rusting out; last a century



The sections are held fast together by heavy binding-rods which run through independent cored holes. The rods at no place come in contact with the water or the fire in the Boiler. The "rust of a century" would not weaken the holding power of these rods; nor does expansion and contraction of the sections affect their stability.

Ample Fire-Doors

Easy to feed and spread fuel; special doors for wood

Experience proves that no feature of Boiler Construction is so annoying to the householder as a narrow fuel-door.

The extra large fire-doors in all IDEAL Boilers freely admit throwing in fuel in quantities, and of easily distributing the fuel to all parts of the grate.

IDEAL 22- and 28-inch Sectional Boilers are equipped with special fire-doors and grates for wood-burning. Door sizes:—22-inch, 11⅛ x 18 inches; 28-inch, 12⅞ x 20 inches.

Handy Slice-Door

Permits burning ordinary coals; handy for mild weather

Where a poor quality of hard coal is employed, and particularly where soft coal or coke is used, the slicing-door of IDEAL Boilers will be found most useful. It is placed on a level with grate, and through the door a poker or slicing-bar may be run and the ashes or clinkers may be cleaned away from or dropped through the grates without too greatly agitating the hot coals above. This is a particularly economical feature in the moderate winter weather when the fire needs just a little agitation to keep the ashes from accumulating too thickly, so that a very little fire in the early morning or at night will take the chill off the rooms.

Sensitive Butterfly Damper

Inlet air draft easily regulated for any condition of weather

In all IDEAL Boilers the ash-pit door is fitted with a secondary door, strongly but lightly balanced or hinged in the middle to make its operation most sensitive. The chain connecting to the damper regulator is attached to this door. Through this butterfly damper opening a greater or less supply of air needed in the process of combustion is admitted as may be required.

A chain can be run to a sleeping-room of servant, or elsewhere, and the operation of the Boiler controlled without going down to the basement.

Easy-Shaking, Heavy Grates

Construction; correct air inlets; no accidental dumping

In IDEAL Boiler construction the purpose of the grates is not merely to support the fuel and permit a supply of air to pass up between and through the bars upon a basis of guesswork as to volume and velocity. The amount of grate surface for each Boiler and its free area of air passage is determined by scientific tests which take into consideration the fuel charge, the heating surface, flue travel, and the time factor in Boiler operation. In each type the fingers of the bar come close together, permitting use of small sizes of coal.

Heavy trussed grate-bar (Sectional Boiler) for hard usage

The strength and weight of the bars do not interfere with their simple, easy shaking, as they are well pivoted or balanced. In all except Boilers of the smallest size we provide two shaking levers—one at the right, the other at the left of the ash-pit door. With the right-hand lever the rear grate-bars are rocked or dumped, the left-hand lever rocks or dumps the front grate-bars. In this way the fire can be agitated to a greater or less degree to suit any condition. With ordinary care the grates will last as long as the building itself.

A ratchet or lug is placed on the front of the ash-pit of all IDEAL Boilers above the grate connecting-bar which passes through the front. This device permits of rocking the grate-bars sufficiently for all ordinary care. When it is desired to dump the fire or ashes quickly and completely, the releasing of this ratchet permits a freer action of the bar, turning the grate surfaces up sidewise. This device prevents the possi bility of accidental dumping of fire.

Easy Erection in Old Houses

Quickly installed; no disturbance to occupants; no damage

The phenomenal success of IDEAL Boilers is also largely due to the fact that they are made in sections so that even their largest parts can be carried through an ordinary size doorway. For this reason they can be quickly installed in old houses without disturbing the occupants. In fact, in unmodernized or old types of houses they can be erected, including the necessary piping and radiators, without the necessity of removing the stoves or hot-air furnace until the new heating apparatus is ready to fire up. For this reason they can be quickly installed in winter weather when the old, crude heaters get badly worn or collapse.

Often pipes can be run through partitions without any cutting of plaster or woodwork. And where pipes cannot be so arranged they can often be run up in a corner or through halls and closets, or behind a door, and not appear conspicuous when neatly bronzed.

Modern steamfitters can put in a heating outfit with neatness, quietness, and dispatch, leaving the floors and partitions undisturbed. Not one-tenth the muss and fuss of painting, papering or carpeting.

An IDEAL Steam or Water Boiler naturally becomes an object of pride to the owner

IDEAL Arco Water Boiler

No. 2-22-W

A compact, plain Boiler, low in stature and few parts, easy to erect, and simple to run

Cast Iron vs. Wrought Metal

Cast iron is long-lasting; wrought metal is short-lived

The forms in which wrought iron or steel can be made are greatly limited. On the contrary, cast iron admits of being molded into almost any shape, and all riveted joints and expanded connections (which may easily leak) are avoided.

Curiously, water and fuel gases have no appreciable effect on cast iron, while they are highly destructive to sheet iron or steel. The average life of a steel or wrought-iron Boiler is twelve years, while a cast-iron Boiler is practically indestructible.

Where the water is impregnated with lime, wrought iron or steel rapidly corrodes and the Boiler is destroyed in a few years, while in the case of cast iron there can be no corrosion. In IDEAL Boilers there are no tubes or sheets which can rust out and strip off through summer dampness, and thus expensive repair bills are not incurred in their use.

That cast iron is considered superior to steel or wrought iron is well evidenced by the fact that at the present time at least 95 per cent of the house-heating Boilers and radiators used are constructed of cast iron, while only a few years ago practically all such Boilers and radiators were of wrought iron or steel.

Therefore, cast-iron construction is the lasting investment.

An Assured Relief-Valve

A safe monitor; rarely needed, but there if required

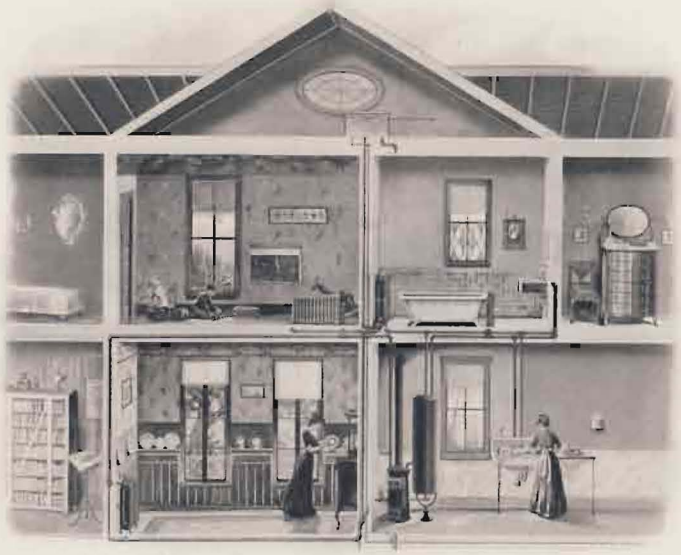
The non-corroding relief-valve, which is a part of the equipment of each Steam Boiler, plays the part of monitor over the action of the Boiler. This valve insures the absolute safety of the Boiler by releasing any extra pressure—which is rarely ever produced. With the automatic damper regulator, there is a double insurance against the Boiler carrying more steam than is required by the radiators to balance the outside weather conditions—otherwise fuel is needlessly burned.

For Buildings Without Cellars

How to get good heating with boiler on first floor

Where no cellar is available, an IDEAL Water Boiler can be located in a back or unused room and the circulating main-feed pipe carried up to the attic, from which place down-feed supply pipes are carried, having branch connections to the radiators as they pass down to the return main. IDEAL Boilers and AMERICAN Radiators are used in heating thousands of cellarless buildings in sections of the country where the seepage of the soil is so great as to make the cost of a cellar prohibitive.

The radiators and Boiler to a Steam-Heating outfit can be set in the same story, if the radiators are placed on shelves or brackets on the side wall above the water line in the Boiler. Our Rococo side-wall radiator is well adapted for this method. It, is however, more desirable to arrange for a small cellar where Steam apparatus is used.



Partial heating of a Southern home

IDEAL Water Heater, radiators and piping, with valves so located that by closing them the radiation may be shut off, and the remainder of the outfit used for supplying hot water to bath and kitchen sink in summer weather

Easily Operated Boilers

Simple as a heating stove; our correct instruction book

Any person, no matter how inexperienced, may easily operate the average IDEAL Boiler. It requires no more care than a parlor stove. The dampers and draft-doors are few and simple, and give absolute control of the fire.

A booklet entitled "BEST WAYS TO RUN THE BOILER" is furnished with each shipment. This book tells just how to get the best results in mild or severe weather, from hard, soft coal, or coke. It presents a few simple rules, readily understood, and if followed with ordinary care the Boiler will yield the best possible results.

Our interest in the Boilers does not cease with their sale, and should any feature in the care or operation of the Boiler not be understood, we most cordially invite correspondence.

Boilers Which Last

Severely tested; outlast most any building

IDEAL Boilers are made by the best workmanship and of the finest grade of new cast iron. All parts are accurately finished—each is machined and fitted to an exact standard of size. Practically every inch of surface is "backed" by water, and the Boilers are about indestructible. They are tested at 80 pounds hydrostatic pressure before they leave the works.

No part of an IDEAL Boiler is too small to receive the most careful attention. The grate connections and pins, hinge-pins, door-handles, screws, rivets, bolts, etc., are very carefully made and fitted. The feed-doors and other doors fit tight. The latch so closely fits the catch-nose that the doors are drawn up flush and tight to the frame without cracks, and do not warp and spring open, allowing gas and dust to escape.

In our larger Boilers, the catch-noses and the stationary half-hinges are on separate, countersunk castings, so that if they are broken, new countersunk castings can be supplied at trifling expense; a marked advantage over the old way, wherein such breakages (while rare) necessitate the purchase of a new entire section.

For Different Fuels

Boilers made to fit any demand precisely; no "straddles"

We make Boilers on the exact—the specific—plan. IDEAL Boilers are made specially for water and for steam. They are made in patterns specially for hard coal, for soft coal, for coke, and for wood. Some patterns of IDEAL Boilers are specially made for large buildings, some for medium buildings, for cottages, for water-heating, for greenhouse heating, etc.

It was the practice of Boiler manufacturers, and is still followed to a large extent, of offering one or two types of Boilers to cover any and all purposes, to burn any and all kinds and grades of fuel, to heat any and all classes of buildings. Naturally, such Boilers are rightly considered as "straddles." This Company was the first to develop lines of special Boilers, each designed with particular reference to its intended use, as well as its use with a certain kind or grade of fuel. Hence the satisfactory results our IDEAL Boilers invariably give to the householder, because it is not to our interest to urge the sale of an "all-around" Boiler which may or may not do the work, but rather to assist him to select the particular type and size of Boiler which will give him the very best satisfaction for his own precise needs and fuel available.

IDEAL-AMERICAN heating popular with ladies

Coal Consumption

Depends on conditions; our boilers meet them all economically

Almost any make of steam or hot-water warming apparatus is satisfactory in some measure to the owner who has previously been experiencing the discomforts of crude methods. His new experience is so pleasurable that he does not dream of the height of satisfaction which comes from possessing an ideal apparatus—operating with the least attention and with highest economy in fuel.

We are often asked as to the exact amount of fuel our Boilers will burn in warming say an eight-room or say an eleven-room house.

If all eight-room or eleven-room houses (or houses with more or less rooms) were built exactly alike, if they were occupied by people who could all agree as to the exact temperature desired in the rooms during waking and sleeping hours, if they all used the same quality of fuel (coal varies from 14,000 down to 6,300 heat units per pound in quality), if the weather remained practically stationary, if the fire were always attended to with regular care, etc., etc., we might then make a statement or a guarantee as to the total annual consumption of coal in any given size building equipped with a given size of heating apparatus. Conditions vary so widely that no uniform statement of fuel demands can be made.

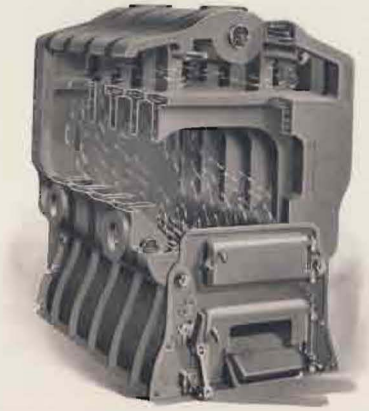
Much depends on the construction of the building. It is not altogether infrequent that many buildings require the services of the mason and of the carpenter as much as the services of the heating contractor, to tighten up window joints, doors, cellar-ways, etc., etc., to make them comfortably snug.

We would say, however, that the most exhaustive tests in our Department of Research, regularly conducted at our factories, show that each Boiler we make transmits per pound of fuel per hour the highest possible number of heat units. We take pardonable pride in saying, further, that in the many thousands of instances in which IDEAL Boilers have been installed in place of other heating apparatus, they have proved far more economical in fuel than the heaters which they replaced—sometimes reducing fuel bills one-half.

Coal Consumption

Depends on conditions; our boilers meet them all economically

IDEAL Boilers are the best construction that experience and capital can produce, and when given proper fuel, proper draft, and proper management, only the most eminent satisfaction will result.



Inside of an IDEAL Sectional Water Boiler. 65% direct heating surface makes best fuel economy

Refilling the Boilers

No street main required; very little water needed

In IDEAL Boilers the same water is used over and over and over again. It is not necessary that a Water or Steam plant should be supplied direct from the street water-main, as the system when once filled requires but a small amount of water to replace the loss due to evaporation; hence Boilers, either Steam or Water, are installed in farmhouses and other buildings remote from waterworks supply. A few gallons only of water need be added once or twice during the season.

In Water-Heating outfits the water can remain in the system during the summer months. No bad results will follow if the system is not refilled more often than once in two or three years. But, generally, it is thought that best results are secured by emptying the system once a year (after fire is out) and immediately refilling with fresh water.

Large Boilers for Soft Coal

Reasons for larger capacity; best soft coal to use

For burning soft coal it is wise to select a Boiler one size larger than would be selected for hard coal. Sometimes two sizes larger grate will be required if a steady steam pressure is desired for six or eight hours. A cubic foot of hard coal weighs approximately 50 pounds, whereas a cubic foot of soft coal weighs approximately 40 pounds. Therefore, if soft coal is to be burned it will require a fire-pot large enough to hold at least 20 to 25 per cent more coal than if hard coal were to be used.

More heat can be produced with a given bulk of hard coal than with the same bulk of soft coal, therefore a greater coal-carrying capacity is needed for soft coal than for hard coal. It is also true that in many parts of the country the soft coals are of such inferior qualities that they vary in heating value per pound from 20 to 50 per cent less than is contained in a pound of Pennsylvania anthracite of good quality. A soft-coal Boiler requires a large fire-box, large combustion space, and self-cleaning surfaces. Our IDEAL Sectional Boilers have these features and are made in a wide range of sizes.

There are so many varieties of soft coal with differing heat-yielding capacities that it is impossible to make any general statement of its value for house-heating Boilers that will apply in every locality. The caking soft coals which fuse and stick together when heated are the most valuable for house-heating Boilers, because the fusing process forms a cap or crust over the top of the fuel which prevents the rapid escape of the hydrocarbons from the coal. These carbons form volatile gases which have a high heating value, and when properly burned add a good deal to the heating results of the Boiler. The free-burning soft coals, on the other hand, liberate the volatile gases at a comparatively low temperature, so that they escape without ignition, and much of the heating value of the fuel is wasted. The difference in heating value between a good caking soft coal and a free-burning type in house Boilers is from 40 to 50 per cent in favor of the caking.

Selecting Ample Boiler Capacity

Helpful notes on how to choose the right size of boiler

The capacity of a Heating Boiler should include a reasonable reserve power beyond the actual demands made by the radiation and piping.

The difference in cost between a liberally proportioned heating outfit, as compared with one of limited capacity, is too small to jeopardize the success of the investment. Money saved by buying too small a Boiler usually has to be paid out over and over again in waste of fuel through forcing of the fire, and in extra labor in care-taking, regulating, etc.

Steam and Water-Heating outfits are usually installed on the basis of heating the building to 70 degrees in zero weather. To meet the contingency of *below zero* weather occurring now and then, it is advisable to provide a reserve capacity. By having a Boiler of ample capacity, it is *regulated*, rather than forced, even in the severest weather. This *regulation* of fire is economy, for no more fuel is used than the amount needed to warm the air in the rooms to the temperature desired.

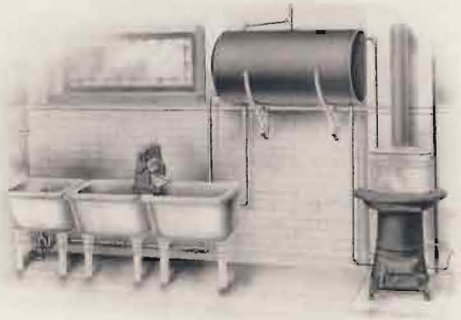
The amount of reserve capacity can only be determined after studying the heating needs of each building, taking into consideration construction, its exposure to the elements, chimney-flue conditions, extreme range of weather, etc. If, however, the following conditions are observed, IDEAL Boilers will supply the radiation stated in their published ratings, without reserve capacity:—That the radiators shall be correctly proportioned and located to produce a stated temperature, with due calculation of the loss of heat through outer walls and glass surfaces; that all piping (mains and risers, flow and return) shall be counted as radiating surface when estimating the heating demand on the Boiler; that the chimney flue, fuel, and attention shall be such that the Boiler is permitted to do its work right.

Reserve capacity is recommended only because the factors which waste the heat (such as outer walls and glass surfaces) are not always carefully regarded and sufficient radiation is not supplied to offset these influences. Hence the Boiler is often called on for extra service.

An Abundance of Hot Water

A daily, hourly necessity for domestic and many other uses

"Washday" has long been regarded as the bugaboo of housekeeping. Old-fashioned ways require the make-shift heating of kettles and boilers of steaming water, spreading dampness and odor through the house. These conditions accompanied with lifting and waiting for the water to heat are hardly conducive to happy housework. Therefore a means for furnishing an abundance of hot water for the washday is one of the greatest blessings of modern home life.



IDEAL Laundry Heater supplies an abundance of hot water for laundry purposes

And in no other branch of housework is an ample supply of hot water so necessary as in that continuous kitchen performance—the washing of pots and pans, cutlery and dishes. Good work in this line cannot be done when the worker is obliged to wait for a meager kettle of water to heat, or is delayed near the finish because there is not enough hot water to "rinse the dishes" thoroughly.

Again, an abundant supply of hot water at the turn of the faucet in the bathroom is another prime necessity. Nothing is more annoying than when ready to take a bath to find the supply of heated water about exhausted, and the bather is then obliged to wait until the kettle, boiler, coil, or kitchen range tank can be reheated.

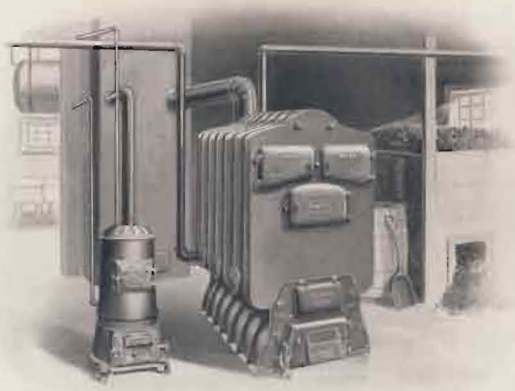
An Abundance of Hot Water

A daily, hourly necessity for domestic and many other uses

There are thousands of homes over-charged with drudgery of cleaning and keeping house caused by lugging water up and down stairs. There is a great difference between turning a stop-cock for hot water in a bathroom, toilet, or bedroom on any floor, and lugging a fifty-pound bucketful up one or more flights of stairs—just the difference between work well in hand and drudgery.

IDEAL Water Heaters shown on following pages meet all these needs and do away with the surplus cleaning work, requiring but a few pennies' worth of coal per day, while the care-taking amounts to almost nothing. With a fairly cheerful disposition the whole housekeeping problem becomes an ideal task compared with old-fashioned methods.

These Heaters are also used in hundreds of other connections requiring hot water for washing, heating, tempering, and anti-freezing purposes. Send for catalogue of "IDEAL WATER HEATERS" with special capacity tables and general information in regard to their various uses.



For domestic water supply an independent water-heater should be provided, and connected to an independent chimney flue, as shown. If a coil is used an abnormal fire is often maintained for a minor service and fuel is wasted. An independent water-heater is also desirable, as it can be used in summer when the heating apparatus is out of use

IDEAL Water Heaters

For laundry work, flat-iron heating, fruit-canning, etc.

No. 1-D Laundry Heater

We make the IDEAL Laundry Heater as a handy and economical means of heating water for laundry and other purposes of the household which require flat-iron heating in the laundry-room; and water hot and plenty in the bathroom, pantry, kitchen, toilet, and other rooms.

This heater has a large, double-griddle top for the specific purpose named, or for heating water in washboilers on washdays, and for heating preserving-kettles in canning time.

Its various features will commend it to house-owners, hotel and restaurant keepers, laundry proprietors, to hospitals and other public and private institutions. The fire-pot is deep and has ample holding capacity for coal—requires little attention. It is hollow, thus forming the water-heating cylinder.

The utmost simpleness is worked into this construction. Only three parts to connect. Very easily set up—requiring but a few minutes' time to put them together and ready for the fire.

They can be cleaned of soot in less than a minute.

IDEAL Arco Water-Heater, also used for laundry and ironing work

The IDEAL Tank-Water Heaters

No. 0 IDEAL Junior

No. 12 IDEAL Junior

Style	No.	Height, Inches	Diameter, Inches	Smoke-Collar, Inches	Cap'ty Gallons
Premier	101	33	18	5	Ask your Dealer to refer to "The Ideal Fitter"
"	121	42	24	6	
"	122	47	24	6	
"	151	48	26	6	
"	152	54	26	7	
"	181	50	27	7	
"	182	57	27	7	
Junior	00	25	15	5	
"	0	35	18	5	
"	10	39	20	6	
Junior	12	43	20	6	Ask your Dealer to refer to "The Ideal Fitter"
"	20	48	23	6	
"	22	52	23	6	
"	30	48	26	7	
"	32	52	26	7	
Arco	10	27	16	5	
"	12	28	20	5	
"	15	30	21	6	
Laundry	1-D	7	27	6	

(See page 16 for picture of Premier; page 42 for Arco and Laundry).

Note—Fuels and Ratings of IDEAL Boilers

The ratings for IDEAL Boilers listed on pages 44 to 46, are based on the use of hard coal, because the anthracite fuels have more uniform heat-making qualities than all other kinds.

No standard ratings can be made based on the soft or lignite fuels, because their heat-making values differ so widely. (See page 38.)

In selecting the size of an IDEAL Boiler for any given job it should be remembered the ratings stated require that all piping (mains and risers, flow and return), in addition to the direct radiation to be used, shall be figured as radiating surface, with due reference to the amount of steam each kind of surface may condense, or to its effect in cooling water.

These ratings are for direct radiation. When any other heating surface than direct radiation is to be supplied, increased Boiler capacity must be figured, according to the demand in each case.

Boilers should be covered by asbestos to prevent heat wastes.

The IDEAL Arco Round Boilers

No. 2-22-S Steam Boiler

No. 2-22-W Water Boiler

Steam Boilers					Water Boilers				
No.	Height (to Top Outlet) Inches†	Diam. at Base Inches	Smoke Pipe, Inches	*Ratings. (Note P. 43)	No.	Height (to Top Outlet) Inches†	Diam. at Base Inches	Smoke Pipe, Inches	*Ratings. (Note P. 43)
1-19-S	53	31	8	275	1-19-W	46	31	8	450
2-19-S	57	31	8	350	2-19-W	50	31	8	575
3-19-S	62	31	8	400	3-19-W	55	31	8	650
1-22-S	55	35	9	400	1-22-W	48	35	9	650
2-22-S	59	35	9	525	2-22-W	52	35	9	875
3-22-S	64	35	9	575	3-22-W	57	35	9	950
1-25-S	57	38	9	500	1-25-W	50	38	9	825
2-25-S	64	38	9	625	2-25-W	55	38	9	1025
3-25-S	67	38	9	700	3-25-W	60	38	9	1150
1-28-S	58	41	10	800	1-28-W	51	41	10	1325
2-28-S	63	41	10	900	2-28-W	56	41	10	1500
3-28-S	68	41	10	1000	3-28-W	61	41	10	1650
1-31-S	61	44	10	1000	1-31-W	54	44	10	1650
2-31-S	66	44	10	1275	2-31-W	59	44	10	2100
3-31-S	72	44	10	1400	3-31-W	65	44	10	2325
1-34-S	64	49	11	1250	1-34-W	56	49	11	2075
2-34-S	69	49	11	1500	2-34-W	62	49	11	2475
3-34-S	75	49	11	1650	3-34-W	67	49	11	2725

*Hard coal ratings. See page 38 for advice on soft coal.
†Add a few inches to height for smoke-hood.

The IDEAL Premier Round Boilers

No. 2024 Steam Boiler

No. 2124 Water Boiler

Steam Boilers					Water Boilers				
No.	Height (to Top Outlet) Inches†	Diameter Inches	Smoke Pipe Inches	*Ratings (Note P. 43)	No.	Height (to Top Outlet) Inches†	Diameter Inches	Smoke Pipe Inches	*Ratings (Note P. 43)
1015	45	24	7	175	1115	40	24	7	300
2015	49	24	7	200	2115	44	24	7	325
3015	53	24	7	225	3115	48	24	7	350
1018	48	27	7	275	1118	43	27	7	450
2018	52	27	7	300	2118	47	27	7	500
3018	57	27	7	325	3118	52	27	7	550
1021	50	30	9	400	1121	44	30	9	600
2021	54	30	9	425	2121	49	30	9	650
3021	58	30	9	450	3121	53	30	9	700
4021	63	30	9	475	4121	58	30	9	750
1024	51	33	9	525	1124	45	33	9	875
2024	56	33	9	575	2124	50	33	9	950
3024	60	33	9	625	3124	55	33	9	1025
4024	65	33	9	650	4124	60	33	9	1075
1027	52	36	10	750	1127	46	36	10	1250
2027	57	36	10	800	2127	51	36	10	1325
3027	62	36	10	850	3127	56	36	10	1400
4027	67	36	10	900	4127	61	36	10	1475

*Hard coal ratings: We do not recommend these Boilers for soft coal.
†Add a few inches to height for smoke-hood.

The IDEAL Sectional Boilers

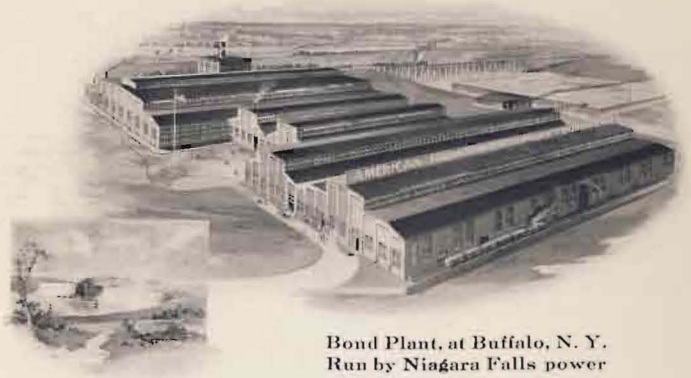
No. S-28-7 Boiler

No. W-22-7 Boiler

Steam Boilers						Water Boilers					
No.	Len'h In.	H'ght In.	Wid. In.	Sm. Pipe In.	*Ratings (Note P. 43)	No.	Len'h In.	H'ght In.	Wid. In.	Sm. Pipe In.	*Ratings (Note P. 43)
S-15- 4	41	54	35	8	300	W-15- 4	41	43	28	8	500
S-15- 5	47	54	35	8	425	W-15- 5	47	43	28	8	700
S-15- 6	54	54	35	8	550	W-15- 6	54	43	28	8	900
S-19- 5	53	56	38	9	600	W-19- 5	53	50	31	9	1000
S-19- 6	54	56	38	9	750	W-19- 6	59	50	31	9	1250
S-19- 7	65	56	38	9	900	W-19- 7	65	50	31	9	1500
S-22- 5	53	60	42	10	800	W-22- 5	53	52	36	10	1300
S-22- 6	60	60	42	10	1000	W-22- 6	60	52	36	10	1650
S-22- 7	67	60	42	10	1200	W-22- 7	67	52	36	10	2000
S-25- 5	59	64	47	11	1100	W-25- 5	59	58	41	11	1825
S-25- 6	67	64	47	11	1350	W-25- 6	67	58	41	11	2225
S-25- 7	75	64	47	11	1600	W-25- 7	75	58	41	11	2650
S-25- 8	82	64	47	11	1850	W-25- 8	82	58	41	11	3050
S-28- 5	60	67	51	12	1300	W-28- 5	60	61	44	12	2150
S-28- 6	68	67	51	12	1625	W-28- 6	68	61	44	12	2675
S-28- 7	76	67	51	12	1950	W-28- 7	76	61	44	12	3200
S-28- 8	84	67	51	12	2275	W-28- 8	84	61	44	12	3725
S-36- 5	70	76	60	15	2100	W-36- 5	70	70	53	15	3450
S-36- 6	79	76	60	15	2625	W-36- 6	79	70	53	15	4325
S-36- 7	88	76	60	15	3150	W-36- 7	88	70	53	15	5200
S-36- 8	97	76	60	15	3675	W-36- 8	97	70	53	15	6050
S-36- 9	106	76	60	15	4200	W-36- 9	106	70	53	15	6925
S-48- 6	92	97	80	21	4750	W-48- 6	92	82	68	21	7825
S-48- 7	103	97	80	21	5700	W-48- 7	103	82	68	21	9400
S-48- 8	114	97	80	21	6650	W-48- 8	114	82	68	21	10975
S-48- 9	124	97	80	21	7600	W-48- 9	124	82	68	21	12550
S-48-10	135	97	80	21	8550	W-48-10	135	82	68	21	14125

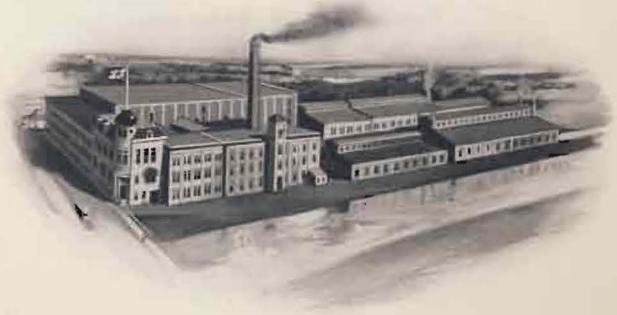
*Hard coal ratings: For soft coal see pages 43 and 38.

Where IDEAL Boilers are Made



Bond Plant, at Buffalo, N. Y.
Run by Niagara Falls power

Michigan Plant, at Detroit, Mich.



Canadian Plant, at Brantford, Ont.

AMERICAN RADIATOR COMPANY

SALES OFFICES

NEW YORK	104-108 West Forty-second Street
BOSTON	129-131 Federal Street
PROVIDENCE	Industrial Trust Building
PHILADELPHIA	115 North Broad Street
BALTIMORE, 1003-4 Munsey Bldg.,	Calvert and Fayette Sts.
WASHINGTON	316-317 Union Trust Building
BUFFALO	693 Main Street
PITTSBURGH	300 Wood Street
CINCINNATI	Fourth and Elm Streets
ATLANTA	508 Candler Building
BIRMINGHAM	406 Chamber of Commerce Building
NEW ORLEANS	328 Hennen Building
CLEVELAND	710 Prospect Avenue
DETROIT	Woodward Cor. Jefferson Avenue
CHICAGO	816-822 South Michigan Avenue
CHICAGO	182 North Dearborn Street
MILWAUKEE	214 Sycamore Street
INDIANAPOLIS	243 N. Pennsylvania Street
ST. LOUIS	Olive and Fifteenth Streets
MINNEAPOLIS	229 Fifth Street, South
ST. PAUL	688 Hampden Avenue
OMAHA	413-417 South Tenth Street
KANSAS CITY	312-314 East Eighth Street
DENVER	1522 Glenarm Street
SAN FRANCISCO	Second and Townsend Streets
SEATTLE	522 Pike Street
PORTLAND	703 Yeon Building
SPOKANE	1019 Paulsen Building
BRANTFORD, ONT.	17 Market Street
LONDON	439-441 Oxford Street
BRUSSELS	75 Boulevard du Nord
PARIS	24 Rue de Mogador
BERLIN	35 Alexandrinen Strasse
DUESSELDORF	68 Koenigs-Allee
MILAN	7 via Tomasso Grossi
VIENNA	4 Paulanergasse