THE STORY OF
FIRE

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 2501 (Sec. 510 P. L. & R.) Cleveland, O.

IRON FIREMAN MANUFACTURING CO.

3170 West 106th Street

Cleveland, Ohio

BACK in the Paleolithic Age, lightning struck a forest and set it afire. Animals fled before the flames. Among them were human beings—weird, shaggy, low-browed Neanderthal men and women. They had been hunting in the edges of the forest. Seldom did these men and women of the Paleolithic or early stone age stray far from their caves along the river banks. There was too much danger from larger, stronger, fiercer animals. So this forest fire didn't

IRON FIREMAN MANUFACTURING CO., Cleveland, Ohio

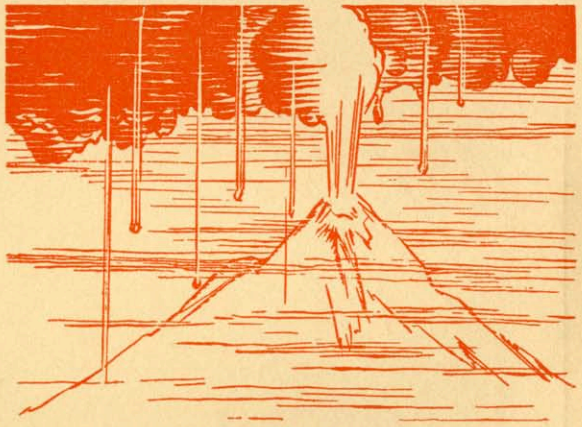
Please send me further information on the Iron Fireman Automatic Coal Burner exhibited at Century of Progress Exposition. I am interested as a possible ☐ Purchaser ☐ Dealer (indicate which by X), but this request does not obligate me in any way.

Name _____

Address _____

_____

THIS CARD IS READY FOR MAILING — IT NEEDS NO STAMP



Volcanoes and lightning probably first introduced fire to mankind.

catch these humans, though it destroyed the other wild life of this forest.

After the fire these Paleolithic people went forth again in search of food. They lived upon fish from the stream at their door, roots, berries, barks of certain trees, and especially meat—the flesh of almost any animal which could be killed by a blow from a stone hatchet. All food was eaten raw. Fire was known only as lightning, a terrifying spectacle from the heavens which set fire to the forests, or as a sign of wrath from the bowels of the earth when volcanoes became active. Storms and cold in winter and forest fires in summer were natural enemies.

After this fire of which we speak now, when these people went forth to find food, the forest was stark and bare. No wild life—no food of any kind remained. Many bodies of dead animals were found, and finally hunger prompted one reckless fellow to pry off a leg from a roasted carcass. It smelled good. It was still warm. It tasted good. The tribe rallied round and primitive man had his first taste of cooked food—and liked it. Another Neanderthal man grew curious and played with smoking embers, fanning them into larger flames and building a bonfire. In the early morning this fire felt mighty good. He discovered that fire was useful, if properly handled. Another bright young man conceived the notion of carrying a burning brand to his cave. We imagine he smoked himself out in a hurry and was laughed at.

Discovery of fire for cooking was doubtless accidental.

The first heating plant.

But the use of fire was discovered. You will notice that we do not refer to the "discovery of fire" but to the "discovery of the *use* of fire."

This happened in the Paleolithic or Rough Stone Age. At once the progress of the human race began at a faster pace. The Paleolithic or Rough Stone Age developed into the Neolithic or Smooth Stone Age, when around the fireside a much wider variety of better finished implements was fashioned from stone. As the art of implement making developed, man learned to smelt metals, and the bronze, or metal age followed. The march of civilization was on its way, served by fire which was at first feared as an arch enemy.

All fires were bonfires. Around the bonfire the family grew. Seasonal migrations were no longer so necessary. Permanent, year round abodes became the fashion for men of standing. Men learned to till the soil and to tame some of the wild animals. Villages and cities grew, all because man

The handle was invented at the primitive fireside.

Around the fireside man fashioned better implements.

had learned to use fire, which kept him warm and comfortable so he could work and think. With fire he cooked his food and became gentler in disposition than he had been when he lived on raw meat. And so civilization went on for thousands of years, using fire and accepting it as one of the forces of nature. It is interesting to know that at the beginning of recorded history, the Greeks classed fire as one of the elements, along with land, air, and water; but, of course, we know now that this classification is not correct.

Use of fire developed the bronze age and metal working.

While there were many different kinds of fireplaces, and ovens and burning pits, the principle of the open bonfire, using only the direct radiant warmth from the fire, remained the method of heating until near the close of the 18th Century, when Benjamin Franklin in-

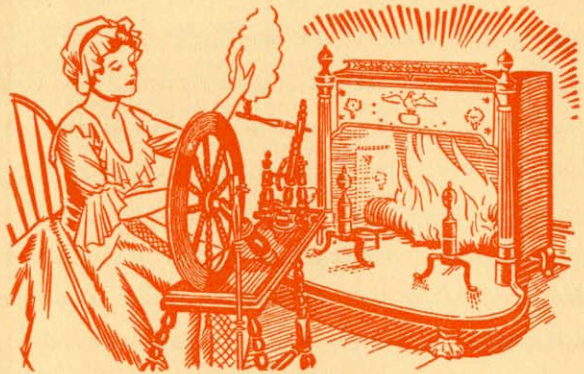
The early Greeks classed fire as one of the elements.

vented the Franklin stove, by which a supply of warmed air was circulated through the room. This Franklin stove is generally accepted as the first use of indirect heating. The circulating room heater sold today is a "Franklin Stove." Installed in the basement, with air ducts leading to various rooms, it is a warm air furnace. Steam heat, hot water, and vapor systems all employ the same principle, except that they use water as the heat distributing element instead of air.

Thus the Franklin stove, the forerunner of indirect heating, marked the second great forward step in the use of fire. In its wake quickly followed many makes of boilers, furnaces, radiators, valves and other devices which aid in extending the indirect heating principle and make possible a far more efficient use of heat than had ever been known before.

But in all this time, the bonfire still remained the method of *creating* this heat. Heat *distribution* made enormous progress. But except in certain large industrial operations, *heat production* stayed on a bonfire basis. "Build a fire, throw on fuel and let 'er burn!" Sometimes a forced draft was used. But always it was the old original bonfire principle, wasting a large part of the combustible elements in the fuel because of the primitive method of firing. Smoke is the visible evidence of such waste, and not only means wasted fuel, but also pollution of the air we breathe.

Then, in very recent years, a new development began—*automatic firing, with automatic temperature control*. Through the development of gas and oil wells, and the desire to find new markets for these fuels, methods were devised for



The Franklin stove marked an epoch because it introduced indirect heating.

burning them. Useful combustion of oil and gas must necessarily be controlled because by their very nature these explosive fuels cannot be thrown on top of a fire in the primitive way that coal has been fired since the beginning. So automatic valves, atomizers, thermostatic instruments and various principles and applications were brought together to make the automatically controlled oil and gas fire, and the era of automatic firing was ushered in. What an improvement over uncontrolled firing! Room temperatures no longer fluctuated, but held steady. It was no longer necessary to give the furnace a thought during the day. Both gas and oil were adopted by thousands who wanted the uniformity and convenience of this new higher standard of firing.

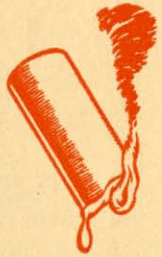
But there were objections and limitations. The cost of automatic heating with gas and oil was in most cases considerably more than the cost of hand firing. There is always a certain amount of risk in handling highly explosive fuels. In warm air furnaces these fuels developed a new problem, peculiarly their own, because of a fundamental characteristic of their type of fire. An automatic oil or gas fire is always either completely on or completely off. There is no graduated degree of heat production. This means that

Automatic Temperature Control makes fire the obedient servant of man.

when going full blast, it soon warms up the room to the point where the thermostat shuts off the fuel and immediately the fire goes out and furnace cools off. Warm air rises and cold air falls. The moment warm air ceases to pour into a room, that moment the air begins to "stratify" —the warm air going to the top and the cold air falling to the floor. Soon one's feet are cold and yet the thermometer says "70 degrees" at eye level. "Stratified heating" or "cold 70" is a natural result of firing any fuel which is hot one moment and completely out the next.

Recognizing the weaknesses of other automatic fuels, and realizing their excessive cost, as well as the fact that coal, after all, is the world's permanent fuel supply—a group of engineers and businessmen in Portland, Oregon, caught the vision of the great opportunity to be of service to mankind through working out the solution of making coal an automatic fuel. Exhaustive engineering analyses of the various methods of conveying fuel to the fire and a scientific study of combustion resulted in the discovery of the principle of "*forced underfiring*." The first experiments

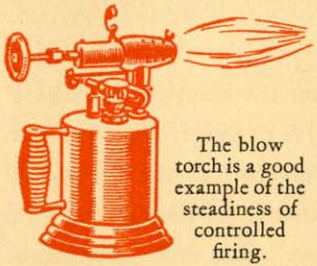
with this method of firing proved so satisfactory that it was soon evident that a superior method of combustion for coal had been devised and it was necessary only to work out the best possible application of it.



Fuel from above causes smoke and waste.

One success led to another, and while unexpected problems arose they have been surmounted. Proved principles were adhered to wherever possible, and so well were the first machines built that today, more than 11 years later, most of them are still in daily use, giving satisfactory service.

It was soon discovered that coal required different types of automatic control instruments than other fuels. A complete line of automatic controls was devised for the exclusive use of this coal burner. These controls operate by time, by steam pressure, room or furnace temperature, water temperature or from vacuum, and enable the coal burner to regulate the amount of heat generated by the boiler or furnace and the amount of heat applied to the rooms. So complete is their functioning that this automatic coal burner is today one of the most completely controlled pieces of automatic mechanism that has ever been developed.

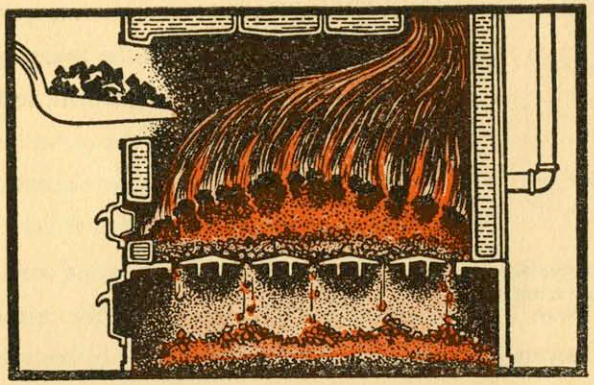


The blow torch is a good example of the steadiness of controlled firing.

Fuel from below is the scientific way.

Just as Elias Howe in inventing the sewing machine discovered that the secret of his success lay in placing the eye in the point of the needle instead of in the head, so in the automatic firing of coal it was discovered that the secret of obtaining ideal combustion was to feed the fuel to the fire from below instead of from above. By this method all the valuable heat producing gases in the fuel are consumed because, approaching the fire from below, the coal is gradually warmed and its most volatile gases when distilled off must pass upward through the bed of live coals. In hand-firing with the fuel thrown on top of the fire, these gases are distilled off above the fire bed and pass out the stack in the form of smoke, thus not only creating a smoke nuisance, but also wasting a substantial part of the valuable heat gases which the fuel contains.

An analysis of results soon showed that this automatic coal

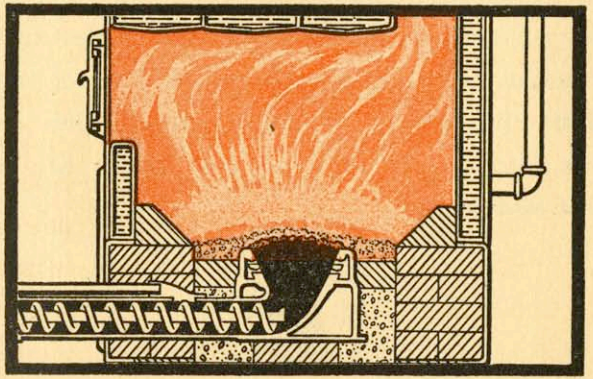


A hand-fed fire in a furnace or boiler may be likened to the bonfire of primitive man.

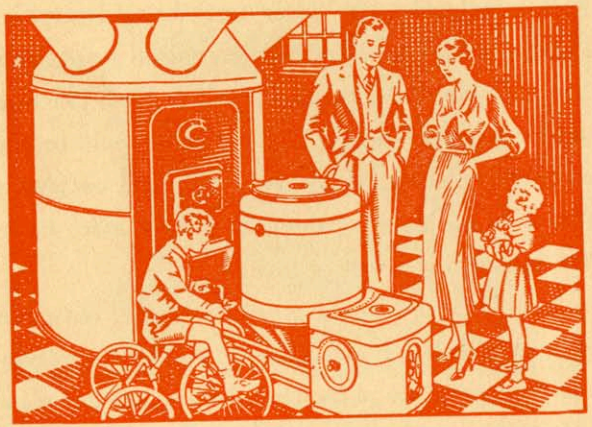
burner reduced fuel bills from 15% to 75%, and in some cases even more. There are cases on record where the fuel cost saving has been in excess of 80% and even 90%.

The result of this development is far-reaching indeed. It means that the vast beds of coal which are the principal source of heat and power for homes, institutions, businesses and industries of all types, and which have been burned in a wasteful manner causing air pollution as well as financial loss, can now be utilized scientifically. Uneven heating is a thing of the past. The bonfire principle can be discarded in favor of this new scientifically controlled firing, automatically regulated with "blow torch" uniformity, with the amount of heat units released determined automatically by the heating or power requirements involved. Efficiencies and uniform temperatures which formerly could be maintained only by electric, gas or oil heating are now obtained from coal—a far more economical and far safer form of fuel for heating and power purposes.

The Iron Fireman Manufacturing Company, with plants in Portland, Cleveland, and Toronto, and with representatives in principal cities of the United States and Canada and many foreign countries, is the out-growth of this develop-



An Iron Fireman controlled coal fire with fuel fed from below.



The Iron Fireman is a faithful and accurate servant.

ment. Its product, the Iron Fireman Automatic Coal Burner, is bringing increased firing efficiency to business enterprises, institutions, buildings and residences, and is saving owners (collectively) millions of dollars yearly in fuel costs.

Iron Fireman, the automatic coal burner, has made coal *an automatic fuel*.

Epochs in the Use of Fire

PALEOLITHIC AGE
Discovery of the Use of Fire
and the Dawn of Civilization

EIGHTEENTH CENTURY
Development of Principle
of Indirect Heating
by Benjamin Franklin

TWENTIETH CENTURY
Development of Automatic Firing
and its Application to Coal,
the World's Permanent Fuel Supply