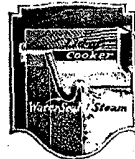


Twenty Minutes' Use of your range will cook this meal



Be sure the fireless cookstove you buy has the triple seal top shown, with the famous Water Seal to lock the heat in.

It takes only twenty minutes to heat the *Toledo Fireless Cookstove* radiators on your kitchen range. Foods are not pre-heated; all the cooking is done by the imprisoned heat of the fireless cookstove.

Meats—even the cheapest cuts—have a new delicacy and richness, because they are cooked without water, in their own juices. Vegetables, cooked with but a few spoonfuls of water, lose none of their fine flavor, are tender and delicious. Breads, biscuits and pies are all evenly and beautifully browned, thoroughly cooked—never over or under-done. Everything has a better flavor, because the goodness is cooked in instead of out.



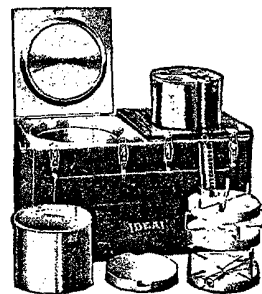
FREE BOOK
"Delicious Fireless Cooked Dishes" is a fireless cooking demonstration with colored photographs and recipes. Write for this book: address Dept. 26

Toledo Fireless Cookstoves retain heat intense enough to do any kind of rapid cooking because of the patented Water Seal, the third and final heat-lock of the triple seal-top. In this Water Seal—a groove in the aluminum compartment lining into which the cover fits—water collects and forms a barrier against escape of heat. The locked-in heat cooks almost as quickly as your range and with infinitely less fuel.

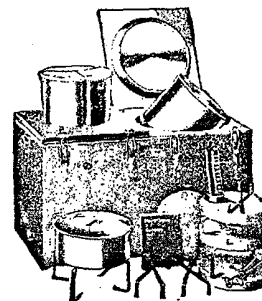
Other features which are found only in these cookstoves are the patented Automatic Pressure Regulator, which releases the surplus steam and permits the wonderful browning for which *Toledo Cookstoves* are noted; the scientifically arranged insulation that prevents heat loss through compartment walls; and the seamless, aluminum compartment lining, five times the usual thickness and durability.



Play more. Get out every afternoon. Your fireless cookstove will cook the evening meal while you are not home.



Ideal Model
Solid oak, cabinet-built case, specially vulcanized



Domestic Science Model
Steel cabinet, with handsome enamel finish

The Toledo Cooker Co.

T O L E D O • O H I O

SCIENCE AND INVENTION

Continued

the factory departments were swept up during working hours the average lost time per operative was five minutes on this. This gave a yearly loss on five hundred female operatives of approximately sixty-six thousand working hours at twenty cents per hour, approximately thirteen thousand dollars, eliminating the usual lost time before quitting, and ignoring the fact that the men in the department quit work at the same time the girls did.

"It was not hard to see that providing a separate exit for the women and separate pay-windows on pay-day supplied the needed segregation at the congested hours. Sweeping at night cut out the disturbing expense incident to doing this in the daytime."

HOW PAINT "DRIES"

WHEN a wet towel "dries" the water with which it is saturated evaporates. There is no water in oil paint, nor any other thing that will evaporate, except occasionally when turpentine is used to thin it. The thing that "dries" is the oil; and this it does, not by leaving the paint but by solidifying by combination with the oxygen of the air. This oxidation may take days if the oil is left alone, but it may be hastened so as to take place in a few hours by using certain metallic salts. We are told by F. P. Ingalls, writing in *Chemical and Metallurgical Engineering* (New York), that these salts act as catalysts, in that they are substances that promote chemical reaction without themselves taking part in it. Liquids capable of oxidation are few and are all oils. Many oils oxidize, but few solidify in so doing. Linseed-oil, exprest from flaxseed, is the most important and is almost universally used with paint. Writes Mr. Ingalls:

"When linseed-oil is exposed to the air it absorbs oxygen, increases in weight and volume, passes through a stage of highly increased viscosity, and finally becomes a solid, tough, rubbery mass. The rapidity of this oxidation, perhaps indeed even its extent, is dependent upon a number of conditions, chief among which are the temperature and extent of surface exposed, especially the latter. Exposed in layers 0.001 to 0.003 inches in thickness, on glass plates, at a uniform temperature of 75° F., it requires from about six to fifteen days (according to thickness of layer, quality, and kind of oil) for the film to become 'dry to touch,' and in ordinary parlance is then said to be 'dry,' altho it is very well and generally known that the film continues to harden progressively for a very long and definite time thereafter. Obviously, this reaction is very slow.

"If various pigment colors be incorporated with the oil by a process of mechanical grinding, and the mixture so obtained be spread out in thin layers as above, we observe some very remarkable differences in the drying time. Some pigments, as, for instance, umber, will shorten it to less than twenty-four hours, while others will lengthen it into weeks, as in the case of carbon blacks; and certain of the anilin-

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SCIENCE AND INVENTION

Continued

color tannate lakes (made from magenta or methyl violet) may inhibit the oxidation of the oil to such an extent that even after months of exposure there remains only a sticky, gummy film in nowise acceptable as a good paint coating.

"This quickening effect of umber has long been known; just how long is a matter of some doubt, but certainly for two or three hundred years. White-lead, one of the most ancient of pigments, has also long been recognized as an accelerator of this drying process; but, without attempting to follow the historical development, we may come down to the early half of the nineteenth century when good 'boiled oil' and 'oil varnishes' which dry in twenty-four hours or less had become commercial commodities. . . .

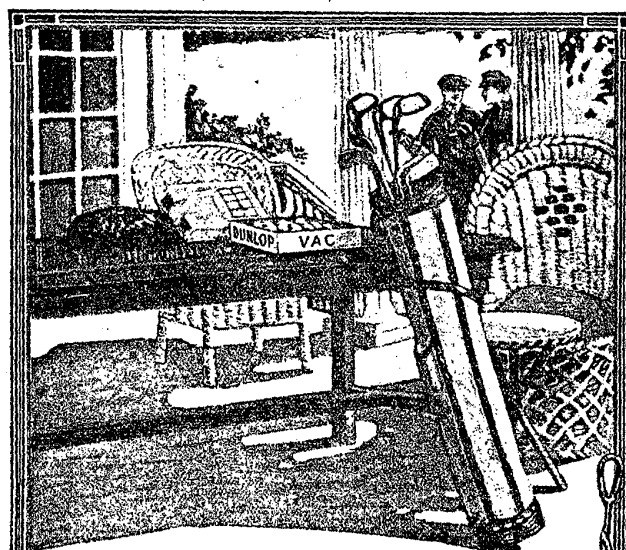
"Because the best of these were prepared by heating the oil with metallic oxids, notably litharge and red-lead, and because the oil was still further oxidized by the air during the heating process, there became prevalent a theory that the normal drying time was shortened by virtue of the fact that the oil so treated was already well oxidized and only a limited exposure was necessary to complete the process. This theory, altho not now tenable, contained an element of truth, in that coatings with such oils gave harder films than most others made at that time, and was further supported by numerous instances where oil which had merely been heated rather strongly in the air showed greatly increased drying power. Without direct knowledge of how this heating was done, nor under what circumstances, we may now assert quite positively that the increased drying power was due to some other circumstance than were heat and the attendant air oxidation."

It is now known, Mr. Ingalls tells us, that the drying process is dependent on the presence in the oil of certain fatty acids, known collectively, in the case of linseed oil as "linoleic acids." It is the salts formed by these acids with certain metals, notably cobalt, manganese, and lead, that are the real "driers," or stimulants of oxidation. He says:

"Concerning the quantity of these driers required to produce the maximum acceleration, much depends on conditions. Unless the metal is in solution or retained in what may be termed the active field, it has little or no power. Whether the solution is crystalloidal, partly colloidal, or wholly colloidal is open to discussion, but when a precipitate forms it is (at least relatively) inactive, even tho it may retain considerable metal.

"Roughly speaking, it is easy to bring the drying time down to seven or eight hours for linseed-oil, but to go below this time requires extraordinary drier. With lead alone it is difficult to reach this speed with any amount within reason. With manganese three to five parts in ten thousand will suffice. Cobalt requires about the same, perhaps slightly less. . . .

"In general practise, therefore, it is customary to use lead for character, and jock it up with manganese or cobalt for speed. A good strong-drying oil will generally show on analysis, in parts per 10,000: lead, 50 to 150, and manganese, 5 to 15."



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