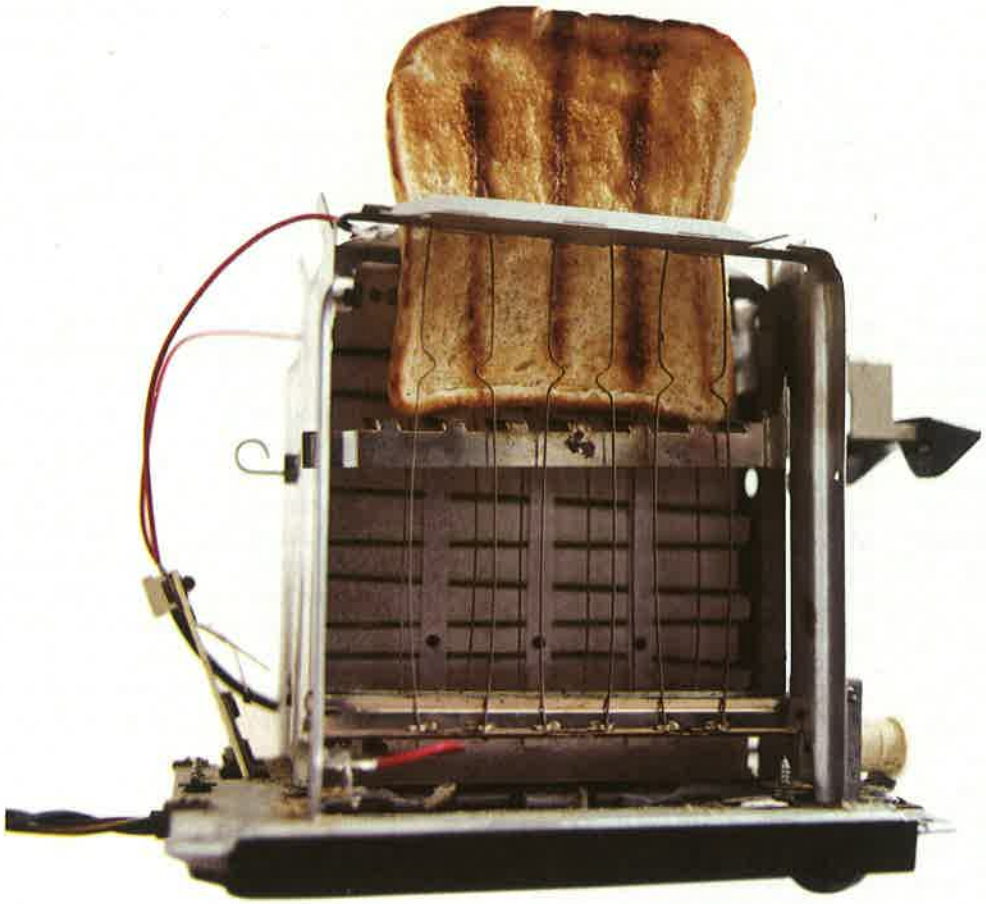


Inside a modern toaster, things look pretty much as they did 50 years ago.

THE TOASTER

Inventors burn the midnight oil so you won't burn your morning bread

BY CURT WOHLEBER

CHARLES STRITE HAD seen enough burnt toast in the company cafeteria at his factory in Stillwater, Minnesota. Rather than complain (though he probably did that as well), Strite, a master mechanic, took things into his own hands.

Electric toasters made during World War I lacked many of the conveniences we take for granted today. They toasted only one side of the bread at a time and did not shut off automatically. In the multitask environment of a busy cafeteria kitchen, toast tended to get overlooked until it was too late.

Strite determined that preventing burnt toast would require a major improvement in toaster technology. In 1919 he applied for a patent on a toaster with a clockwork mechanism that, after a certain adjustable amount of time had elapsed, would turn off the heating elements and trigger the ascension of a spring-loaded basket containing the toasted bread. The pop-up toaster was born.

Specialized utensils for toasting bread over open flames go back at least 200 years. A British firm, Crompton & Company, unveiled an electric toaster as early as 1893. Not much is known about that, but around the same time, Crompton also sold an electric space heater that used iron wires as heating elements. These had an unfortunate tendency to rust, melt, and start fires, and Crompton's electric toaster may have had similar drawbacks. Moreover, electric power was not yet widely available, and then often only at night, as households used electricity almost exclusively for lighting. Whatever its flaws may have been, the Crompton toaster was certainly premature.

For electric companies to generate power during daylight hours, there needed to be a steady demand for it, since early power distribution systems were ill-equipped to deal with widely fluctuating loads. Earl Richardson, a plant superintendent for the local power company in

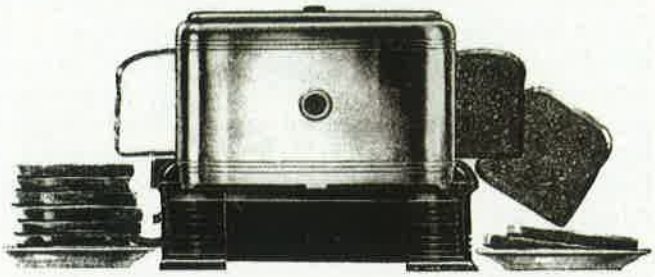
LEFT: TIM FLACH/GETTY IMAGES; RIGHT: COURTESY OF THE TOASTER MUSEUM FOUNDATION, CHARLOTTESVILLE, VA.

Ontario, California, hatched a scheme to increase daytime demand by distributing an electric iron he had developed to local homemakers. At the same time, he persuaded his employer to make daytime power available on Tuesdays.

In 1904 Richardson formed the Pacific Electric Heating Company to market his invention, and the following year he achieved commercial success with his Hotpoint electric iron. That same year, 1905, an engineer named Albert Marsh patented Nichrome, an alloy of nickel and chromium with several properties that made it ideal for use as a heating element. It had a high melting point and did not oxidize (unlike iron or the carbon filament of Thomas Edison's incandescent light, which had to be sealed in a vacuum). And because of its high electrical resistance, it gave off large amounts of heat in the form of infrared radiation and a smaller amount of visible light at the red end of the spectrum.

Infrared radiation is the key to making toast. Direct heating of bread to at least 310 degrees Fahrenheit triggers what food chemists call the Maillard reaction, in which sugars and amino acids in the bread react to form numerous flavorful compounds responsible for the change in the bread's taste, color, and aroma. The Maillard reaction also reduces the bread's water content by about two-thirds, making the toast crunchy.

Nichrome made possible the first commercially successful electric toaster, General Electric's D-12, patented by the company's engineer Frank Shailor in 1909. The D-12 consisted of four vertical heating elements, of Nichrome wire wrapped around a mica core, arranged in a row. Because wall outlets were not yet common, the power cord was designed to be screwed into a light socket. The D-12 retailed for three dollars; another dollar got you a model with decorative floral patterns on the ceramic base.



Toast-o-Lator users could watch bread slide past the heating elements.

Like other early toasters, it could toast bread only one side at a time.

Toasters were a symbol of affluence in the days when most homes didn't even have electricity. A 1910 ad for a Westinghouse toaster trumpeted the notion of "breakfast without going into the kitchen," and some homes had a toaster in every bedroom. *The Labour Saving House*, a 1917 book by Mrs. C. S. Peel of Great Britain, looked to technology as a solution to the disappearing servant class, a problem that was then being exacerbated by World War I. Of toasters, Mrs. Peel remarked that "you do not need to ring for more toast but make it yourself and eat it while it is crisp and hot."

As with many immature but promising technologies, toaster evolution saw a Cambrian explosion of diverse and sometimes bizarre configurations and designs. Many models featured knobs, levers, or buttons to flip the bread halfway through toasting. Aficionados use such terms as *pincher, percher, turner, swinger, tipper, flopper,* and *dropper* to describe the various types of toasters.

Particularly beloved among collectors is the late-1930s Toast-o-Lator, one of the few "slide-through" toasters made for the consumer market. In this arrangement, bread was placed on a conveyor belt and moved slowly from left to right between the heating elements. A small round window allowed you to watch the Maillard reaction taking place; one rare version had fully transparent sides. A well-preserved example of this type recently sold for $5,100.

Toaster evolution saw a Cambrian explosion of diverse and sometimes bizarre configurations and designs.

But the pop-up toaster was destined to predominate. Charles Strite sold his first ones to restaurants. In 1926 a consumer version called the Toastmaster hit the shelves. Compared with some of its Rube Goldberg–esque competitors, the single-slice Toastmaster, with its streamlined nickel-plated chassis, looked like an artifact teleported from the future. A 1927 magazine ad touted its ability to "make perfect toast every time! Without turning! Without burning!" The Toastmaster solved the turning problem through the simple expedient of putting heating elements on both sides of the basket. Darkness could be adjusted by moving a lever on the side of the toaster that controlled the timing mechanism.

Toaster sales grew from 400,000 units in 1922 to 1.2 million in 1930. In the late 1920s many bakeries began selling loaves of pre-sliced bread, marketed by one company as Wonder-Cut Bread, which was later changed to Wonder Bread.

By the 1940s, clockwork timers had mostly given way to simpler bimetallic strips. During heating, two metals—typically brass and steel—expand at different rates, making the strip bend until it closes a switch that turns off the heating elements. By basing the length of exposure on temperature rather than time, this allowed users to put bread in a still-warm toaster without lowering the darkness setting. On the other hand, toasters of this type were prone to premature ejection if the bread was inserted before the bimetallic strip had time to uncoil. This is still a problem with inexpensive toasters, which repeatedly pop up the toast after a few seconds if it is inserted too soon after the last batch.

"Fully automatic" toasters appeared in the 1940s. One of the first was the Sunbeam T-20, which freed

consumers from the exertion of pulling a lever. The bread's own weight closed an electrical contact (or so one hoped; the technology is still not foolproof today), activating machinery that lowered the bread into the toaster and delivered current to the heating elements. A bimetal thermostat supposedly measured the temperature of the bread itself rather than of the toaster, lessening the chance of burning the toast.

A 1950s toaster tester seeks the golden mean.

According to E. Townsend Artman's 1996 book *Toasters 1909–1960: A Look at the Ingenuity and Design of Toaster Makers*, the "Grand Age of the Toaster" was over by 1960. The next decades saw a lot of cheaply made models designed to last a few years at best. This period also saw the rise of the toaster oven, though connoisseurs believe these admittedly versatile appliances produce substandard toast. And the toaster wasn't just for toast anymore, with the appearance of such products as frozen waffles and toastable pastries, including the wildly popular Pop-Tart (see "Postfix" in this issue).

The years have seen some practical but unexciting improvements, including electronic timers (generally a capacitor charged through a variable resistor) and wider slots to accommodate bagels. Typical of the high-tech toasters of today, the $70 Avant Elite two-slice model offers such features as an LCD countdown showing exactly when your toast will pop and a choice of several different modes, including Bagel (which toasts only one side), Reheat, Defrost, and Waffle. High-end toasters, such as a Williams-Sonoma stainless-steel four-slice one retailing for $320 (ostensibly designed for commercial use), don't sport fancy electronics but do appear sturdy enough to protect your toast from a nuclear blast.

Paying more won't necessarily get you better toast. On the inside, modern toasters aren't dramatically different from their forebears of half a century ago: Most still employ Nichrome heating elements, spring-loaded baskets held in place by electromagnets, a timing mechanism, and perhaps a heat sensor. A 2004 study by *Consumer Reports* found that a $15 Proctor-Silex toaster outperformed a number of high-priced models. The toaster's place in the American kitchen appears to be secure forever—or at least until someone invents microwavable toast. ★

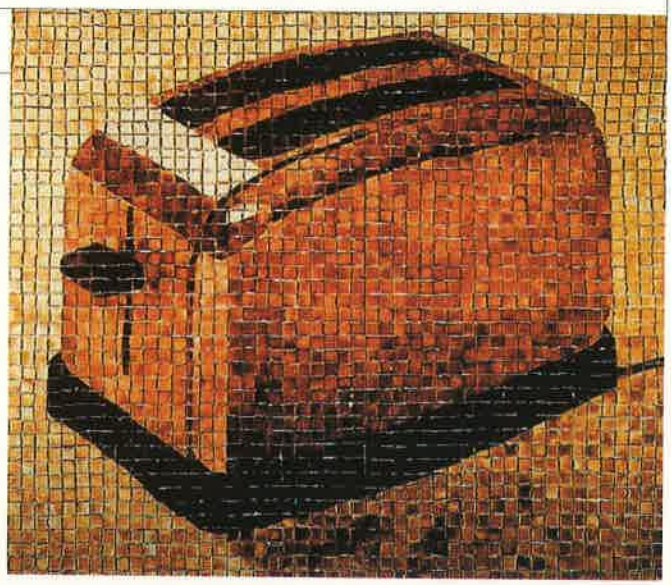
TOASTER TOPICS

The subject keeps popping up on the Internet

SOME ORGANIZATIONS, MOST NOTABLY NASA DURING ITS APOLLO PROGRAM, have always favored stand-up meetings, in which the lack of seats encourages brief, to-the-point exchanges of important information, after which everyone can get back to work. Publishing tends to attract less driven types, with most sit-down meetings divided equally between yarn-spinning and desultory discussion of work. A former editor in chief of this magazine was more businesslike than most, but even he had a weakness. The slightest mention of toasters would infallibly launch him into a 10-minute rant: "Why does my toast always come out with stripes? Why does it always pop up either too soon or too late?"

Many Americans share this obsession, as can be seen by the prices recently paid for pieces of toast with images of the Virgin Mary or the Runaway Bride of Georgia. In this issue's "Object Lessons" and "Postfix" columns, we address the history of the toaster and of one of its tastiest outputs, the toaster pastry. While researching these stories, we were struck by the wealth of information about toaster-related topics to be found on the Internet.

Toaster.org, run by a foundation that hopes someday to open a bricks-and-mortar museum, offers photos of antique and modern toasters, electronic greeting cards and games with toaster images, art (including a quite astonishing mosaic image of a toaster made from more than 3,000 slices of toast), vintage advertisements, and a discussion board with its dedicated coterie of toaster posters. Toastermuseum.com, a German-based English-language site with scores of beautiful photographs, lives up to its Teutonic origins by being more serious, more exhaustive, and more international than toaster.org. Drtoast.com covers the general subject of toast rather than toasters per se; its sections range from recipes ("Place 1 slice bread in toaster. Push lever down") to toast haiku to "Ask Dr. Toast." All of the preceding have numerous links to other toaster sites, which vary widely in whimsicality and relevance—including dozens that document attempts, mostly successful, to set Pop-Tarts on fire by leaving them in a toaster too long.—*Frederic D. Schwarz*



The toast mosaic, created by the artists Ingrid Falk and Gustavo Aguerre.

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