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Shopping by Design

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In the early fall of 1999, four Seattle inventors were awarded a U.S. patent (No. 5,960,411) for a “Method and System for Placing a Purchase Order via a Communications Network,” better known as Amazon.com’s trademarked “1-Click” shopping. By this scheme, a customer previously registered can order a book or anything else offered on Amazon’s Web site by a single mouse click. Amazon.com’s arch World Wide Web rival, Barnesandnoble.com, had a similar feature, designated Express Lane, and within weeks of the patent’s issuance, Amazon sued Barnes & Noble for infringement. An injunction was granted by a Seattle court in early December, and Barnes & Noble immediately appealed. Within a week, the Court of Appeals upheld the judgment in favor of Amazon, and Express Lane had to be closed. Just before Christmas, Barnesandnoble.com customers had no choice but to use the Web merchant’s metaphorical shopping cart and input credit card and shipping data as if they were at the checkout counter of a conventional store.

The Amazon.com patent and its consequences are quite controversial, and they prompted considerable discussion on the Web and elsewhere about software patenting generally. One side of the argument holds that Amazon benefited greatly from the open and free circulation of software and programming ideas and practices that prevailed in the 1990s, and could not have prospered had other Internet companies secured protective patents the way Amazon had. The other side, represented by Jeff Bezos, Amazon’s founder and one of the inventors of 1-click shopping, contends that without patent protection competitors can just copy Amazon’s innovations with-

Supermarkets, like other inventions, didn’t just happen; they were designed, developed—and patented

out having to invest in costly development of their own. Barnesandnoble.com eventually got around Amazon’s 1-click patent by requiring customers to add a second, confirmational click, but the general debate over the matter of software patents has continued and can be expected to do so for some time.

No-Click Shopping

Debates about patents are nothing new. Just as the shopping cart icon on Internet retail sites connects them metaphorically to the bricks-and-mortar stores after which they are ultimately modeled, so does the use of patents to gain business advantage continue a long tradition of battles over intellectual property. A century or so ago, long before there were computers, shopping was done quite differently than it is today. Even a half-century ago, when I was growing up in Brooklyn, I recall it being a different experience. My family lived on a block occupied by a mix of houses, duplexes and rows of attached three-story apartment buildings, from the top floors of which an old woman might stick her head out the window, call down to a passing boy and ask him to go to the corner grocery store for her. On those occasions when I was that boy, the woman would throw down to me

on the sidewalk a knotted handkerchief containing a note and money. Thus I became a surrogate shopper and customer at a store in which a clerk provided the interface with the merchandise.

Entering such a store, the customer would approach the counter (or wait for a clerk to become available) and place an order, either verbally or, as was often the case for boys running errands, in the form of a note or list. While the customer waited, the clerk would move behind the counter and throughout the store, select the items on the list—some from shelves so high that long-handled grasping devices had to be used—and bring them back to the counter to be tallied and bagged or boxed. The process might be expedited by the customer calling or sending in the order beforehand, or by the order being handled by a delivery boy on a bike, but otherwise it did not vary greatly. The alternative to the clerk-tended grocery was, of course, the self-service supermarket, but young errand boys were not always trusted to make important selections among A&P’s grades of coffee and degrees of grinding. Besides, the supermarket was blocks away.

Inventing Self-Service

The self-service supermarket may have provided an alternative shopping experience at mid-century, but that was not the case just decades earlier. Like all things and systems that do not exist in nature, it had first to be invented and designed, then developed, and finally promoted. Inventions that progress through successful adoption earn the name innovations. What inspired and drove the innovation of the self-service store were the limitations and frustrations of shopping the old way. Just about everyone could articulate the shortcomings, or at least instantly recognize them as soon as they were pointed out, but it took an inventor to do something about them.

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Clarence Saunders patented the concept of the supermarket in 1917. The first actual store, shown here, was built in 1916 in Memphis. Saunders eventually named this and his other chain stores Piggly Wiggly. (Photograph from the Library of Congress.)

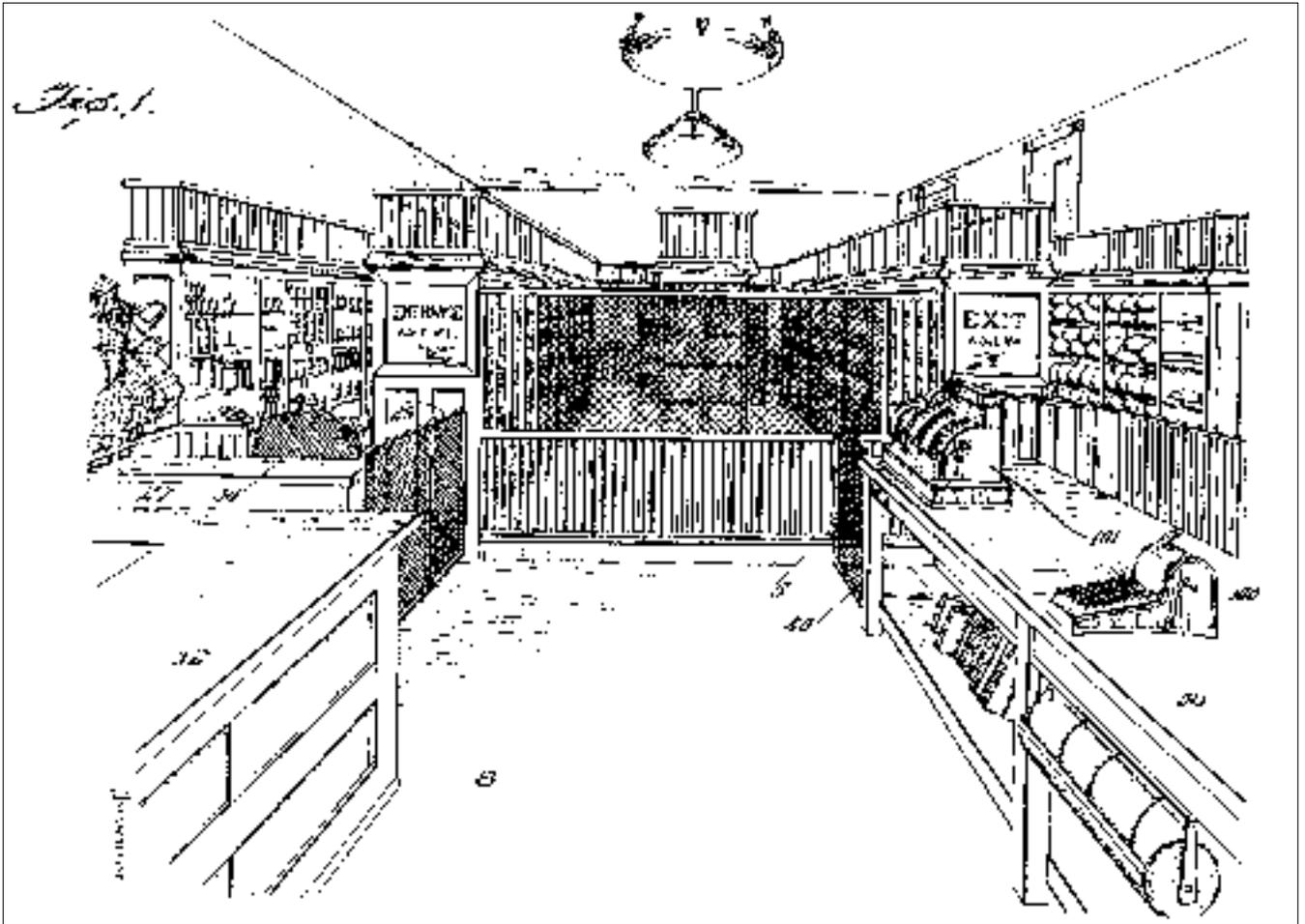
Clarence Saunders, who left school at age 14 to work as a clerk in a general store, was to be such an inventor. He eventually became a wholesale grocery salesman in Memphis, Tennessee, and he decried the lack of efficiency and economy that he had observed in retail grocery stores, much of it having to do with high overhead and large credit losses. Among the principal inefficiencies was the employment of clerks to retrieve items, and Saunders devised a system in which the customer would do that directly. Saunders's concept was to divide a store's floor plan into three distinct areas: (1) a front "lobby (forming an entrance and exit room)," what today we might call the checkout area, where only relatively few clerks were needed to operate the cash register and pack orders; (2) a "sales department," which was entered through one gate (later, a turnstile) and exited through another, and about which cus-

tomers were constrained to move on a prescribed path and were thus "required to review the entire assortment of goods carried in stock," which were displayed on shelves and in appropriate cabinets, including a glass-doored refrigerator for perishables; and (3) a rear "storage or stock room." Above the shelving and cabinet units of the sales department were galleries, from which a "floor-walker" or other employee could direct and instruct customers in the new method of shopping, monitor the shelves and cabinets for need of replenishment, and generally supervise the activity below—all without getting in the way of those negotiating the maze and selecting and purchasing goods.

In 1916, Saunders opened his first store operating under the new principle at 79 Jefferson Street in Memphis. He filed a patent application shortly thereafter. With the experience gained

in just a short time of operation of his store, he could state in his patent (No. 1,242,872), issued in 1917 for a "self-serving store," that:

In actual operation it has been found that the usual margin of profit on the sale of goods allowed for the successful operation of what are known as "cash groceries" may be reduced by more than half without reducing the measure of profits. It has also been demonstrated that the sales capacity of a store, equipped in accordance with my invention and operating in accordance with my system, is increased several times, *i.e.*, the sales of a store thus equipped have exceeded, by three or four times, the amount of sales that it would be possible to handle in the same store waited upon by clerks in the usual way.



Patent 1,242,872 described a “self-serving store” that could operate successfully at half the profit margin when compared to the conventional clerk-service store of the time.

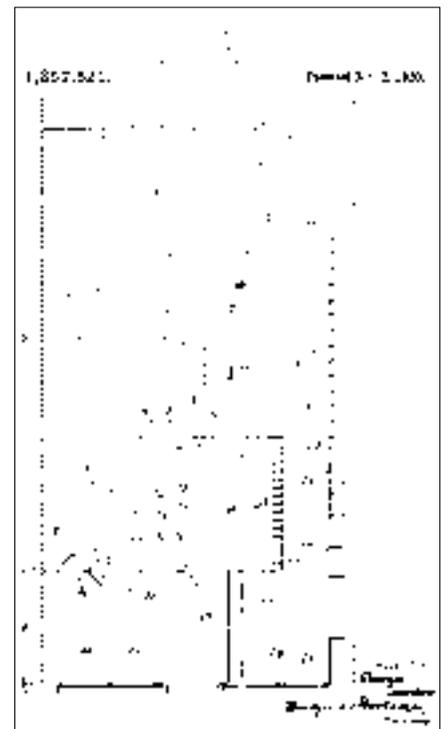
In other words, the self-service store system could operate with lower prices, which would attract more customers, which in turn would provide a higher overall profit. Although Saunders’s justification for his invention was largely its economic advantage to the store owner, the self-service concept also offered advantages to the customer, even though she or he was constrained to traverse the “sales department” in a highly orchestrated way. Nevertheless, by being exposed to all the store’s offerings, the customer might be reminded of an item inadvertently left off the shopping list for the evening’s dinner, thus saving a return trip.

Whence Piggly Wiggly?

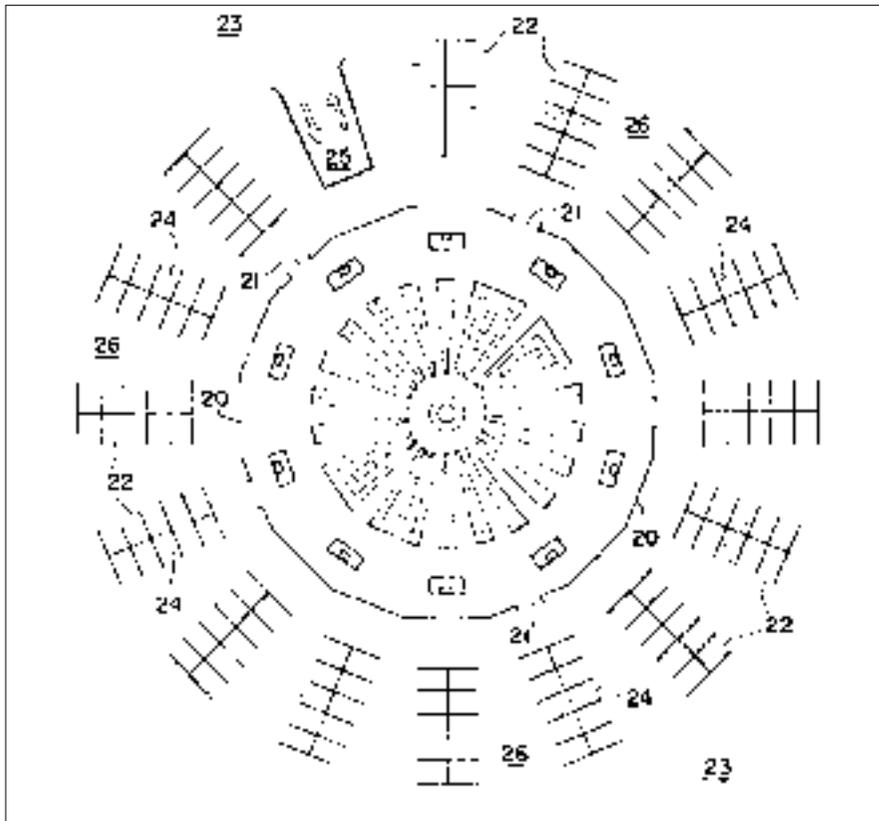
Saunders expanded his concept into a chain of stores, which he called Piggly Wiggly, a name he copyrighted and trademarked. Today, the chain’s Web site (<http://www.pigglywiggly.com>) states that he “wanted and found a name that would be talked about and remembered,” though it admits that the inventor/founder was “curiously

reluctant to explain” his choice’s origin. According to one story about it, Saunders “once saw from a train several piglets trying to get under a fence.” Since a contemporary dictionary defined “piggy-wiggly” as a “child’s riming extension of *piggy*, used playfully in speaking of or to a child,” the constrained movement through the sales department may have evoked the recollection and hence the name. Another explanation may be Saunders’s own reply to the question of why he named his chain what he had: “So people will ask that very question.” Or perhaps Saunders was simply more cynical than playful, and named the stores after the way the hungry shoppers had to wiggle their way through the labyrinth of crowded aisles.

In any case, Saunders made franchises available, and the Piggly Wiggly chain grew to 1,200 stores by 1922. Many of them no doubt included features described in another patent (No. 1,357,521), issued in 1920 to Sanders but assigned to the Piggly Wiggly Corporation. In this patent, which was ap-



Saunders refined his supermarket concept in this 1920 patent, which separated checkout from the lobby and entrance to the store.



One concept of the supermarket of the future employs a circular structure (20) with the aisles arranged radially. Checkout counters are distributed around the entire perimeter, and the store has multiple entrances (21), allowing patrons easy access to parking (22).

plied for after a year's operation of his first store, Saunders incorporated improvements that addressed problems that must have been encountered in operating the earliest self-service stores. Among these problems was the confusion in the lobby area, where incoming shoppers had to fight through the "congestion of customers at the checking and settlement counter," which he obviated by designing a dedicated "checking and paying station," with a second aisle and cash register that could be opened up when customers backed up at the first one. He also demonstrated his sense of sales and marketing by proposing "to provide means for more effectively displaying certain kinds of goods, and to display goods of any character whatsoever and however perishable, to the end of adopting a system of selling to meet the demands of an intelligent and critical public." To this end, he introduced such practices as price tagging items on shelves, stocking staples in convenient prepackaged quantities and featuring a "bargain rack" for damaged items.

Early on, Saunders had incorporated Piggly Wiggly, transferring to the corporation all rights to the name and pat-

ents (including foreign patents) relating to the self-service store for the sum of about \$750,000 and 50,000 shares of common stock in the Piggly Wiggly Corporation, of which he became president. Soon afterwards, Saunders established a new entity, Piggly Wiggly Stores, Inc., for which he also served as president, which ran stores licensed by the original corporation, whose stock was traded on the New York Stock Exchange. However, after a while there developed a falling out between the Piggly Wiggly Corporation and Saunders, who tried unsuccessfully to corner the market on the stock. Saunders resigned his presidencies in 1923 and claimed that he had gone into considerable debt for the corporation that owned the business and patents covering the merchandising system designated as the "Clarence Saunders Self-Serving Stores."

Later that year, a Tennessee District Court prohibited Saunders from using the system embodied in his patents, but it did not forbid him from using his own name in connection with operating a self-service store system whose features were in use before the time that he signed over rights to the Piggly Wiggly

Corporation. Before his legal troubles, the rapid success of the initial venture had enabled him to begin building a 36,500-square-foot mansion in Memphis. Then, the future looked bright, but his patent disputes and stock losses forced him to declare bankruptcy. His unfinished mansion was given to the city, which after completing it made it into the Memphis Museum of Natural History and Industrial Arts. But Memphians continued to call the building the Pink Palace, after the color of the Georgia marble with which Saunders had had it faced. The name was used so persistently that in 1960 the official name of the museum was changed to Memphis Pink Palace Museum. Among its notable exhibits are replicas of a turn-of-the-century general store and the first Piggly Wiggly.

Sole Owner, Keedoozle, Foodelectric

Not one to be defeated by bankruptcy, but embittered by the loss of control of his brainchild and namesake, Saunders next set out to destroy the Piggly Wiggly empire that he had established. He opened a new chain of stores, which he called "Clarence Saunders, Sole Owner of My Name" stores, or Sole Owner stores for short. These failed in the Depression, however, and he eventually began to look for other means to improve retail shopping. (Piggly Wiggly survived, but compared to the more than 1,300 stores in 42 states that existed in the mid-1920s, today there are about half that number in only 16 states, located principally in the Southeast and in Wisconsin.)

In 1937, Saunders produced a prototype for a "store for automatic dispensing of articles and registering the total cost of the articles." The principal component of the vending-machine-like system was a "key" that at the same time provided a means for activating a mechanism to dispense an article and for adding its price to the running total cost of purchases displayed on the key. He called his automated store "Keedoozle," which was a master marketer and advertiser's rendering of "key does all." His system held promise, but Keedoozle was plagued by mechanical failures, which forced it to close. A patent application was submitted posthumously by his wife and the patent (No. 2,820,591) issued in 1958.

Saunders's final effort was an automatic store that he christened "Foodelectric." He filed a patent for a system

that included a device that would print the name and price of an item and at the same time punch holes or print dots on a strip of paper that could be fed into dispensing machines, thereby assembling the order automatically. The 40-page patent (No. 2,661,682), which includes 24 sheets of drawings, was applied for in 1945 but not issued until 1953, just months after Saunders died. His legacy, in addition to Piggly Wiggly stores, included the concept of franchised grocers, the use of refrigerated cases for produce, individual item price tagging, printed receipt tapes and checkout lanes.

The Future of Super Marketing

Today, the corner grocery store has been all but totally eclipsed in heavily populated areas by the supermarket, which is a direct descendant of Clarence Saunders's original concept, especially as expressed in his 1920 improvement patent. However, the feature of forcing every shopper to walk down what amounts to a single long, if sinuous, aisle before reaching the checkout has become impractical, as the number of grocery items available has multiplied to the point where such a trek might amount to a distance of a mile or so. In my book *Small Things Considered: Why There Is No Perfect Design*, I consider such a store in the hyperbolic form of a single long aisle contained in a single long building. Though it might be a seller's ideal, it can be a shopper's nightmare.

The only time most shoppers seem willing to walk past every item on display in a supermarket is when they are getting the "big order," that once-a-week or once-a-month marathon to stock the pantry and refrigerator. On in-between visits, shoppers want to flit from milk to bread to cat food without having to pass by everything else. (Shoppers at the IKEA furniture superstores, who like those in Saunders's early Piggly Wiggly are directed along a sinuous path through the entire store before reaching the checkouts and exit, understandably complain about the experience. But in Connecticut, the single winding aisle in a Stew Leonard's, which bills itself at the "world's largest dairy store," seems to have proved to be an attraction.)

The now-standard layout of supermarkets with parallel aisles open at both ends allows shoppers to move freely from one aisle to any other aisle,

albeit by what might be a long walk perpendicular to the aisles. The necessary trek to the far corner of the store for milk is not a mere accident of the layout, for by placing the dairy case as far from the entrance as possible, the store exposes even the single-item shopper to as much temptation to buy other things as possible.

Another way in which today's supermarkets differ in a big way from the first Piggly Wiggly is in their need to provide lots of parking for automobiles. The familiar store layout has a single entrance, which typically opens into the produce department, thus welcoming the shopper with the subliminal message that the store is full of things that are as fresh and abundant as the lettuce that glistens from frequent mistings under the complimentary lighting. The checkout counters and the exit from the store can be a distance away from the entrance. Thus, when driving up to some supermarkets, especially in inclement or uncomfortable weather, the shopper may have to choose between parking close to the entrance or close to the exit. Most choose to compromise by parking midway between them, as is usually evident by the crowd of cars at that location. Naturally, during busy times even the less-than-choice parking spaces are frequently taken, forcing shoppers to park quite a distance from both entrance and exit, rain or shine. (Some shoppers prefer to park in the farthest corners of the lot anyway, but they do so for an ulterior motive: They wish to keep their new car from being banged and scratched, or they want to maximize the exercise opportunity that a visit to the store gives them.)

If Saunders's single-aisle store is the ideal from the merchant's point of view, then what might be the customer's ideal? From the foregoing observations of the disappointments and frustrations of shoppers with regard to the accessibility of aisles and parking spaces, it would appear that patrons should appreciate a store in which all aisles are adjacent to each other and all parking spaces are right beside both entrance and exit. Such a layout would seem to be a geometrical impossibility in the conventional rectangular architecture of modern big-box stores. However, by employing a circular geometry the ideal can be approached. By arranging all aisles in a radial, spoke-like fashion, any one can be reached from any other

one by a short walk across the store's central hub area. Checkout counters can be located all around the periphery of the store, so that no matter where the shopper ended up, there would be a checkout counter nearby. And the store can have multiple entrances and exits located, say, between every two peripheral checkout counters. By placing the entire store structure on a turntable, in a manner not unlike that of a rotating restaurant, shoppers can wait at a convenient exit until their car comes into view, a great feature when it is pouring rain outside. (The store would rotate slowly enough that entering or exiting would be no more difficult than getting on or off a moving walkway at an airport or the Millennium wheel in London.) A patent for such a radial store system, which is described in more detail in *Small Things Considered*, has recently been issued.

Supermarkets and other systems for selling everything from beans to books will continue to evolve, and patents are likely to play a continuing role. Though there has been an ongoing debate about the advantages and disadvantages of the patent system, it too is evolving, not just in the area of software design but also now in that of genetic engineering. But patent debates have long been conducted, and they doubtless long will be. In the meantime, inventions of all kinds will continue to be patented, litigation over rights and infringement will continue to be carried out, and clever innovators will figure out ways to get around one protected innovation with another, often superior one. Such is the nature of invention and technology in its many forms and manifestations.

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