

The Origins of Telephone Switching *or...* Truth Is Stranger than Fiction

Prelude to a Famous Film Moment

'Twas cold outside, so mankind invented fire. Next came the many millennia of geometric discovery. The perfection of the circle—the wheel. Then the square—a wheel that wouldn't roll away. The pyramids, built to last an eternity. The beautiful golden rectangle of the Parthenon. Then the 5-sided Pentagon. Yet before men could build the Pentagon, they needed a way to phone defense subcontractors, and in the 19th century no one had ever even heard a dial tone.

It's summer in 1874 and a young Scotsman, Alexander Graham Bell (1847–1922) is doing experiments to invent a multiplexing telegraph. He's built a phonoautograph, a Frankenstein-like device consisting of a human ear with an attached reed to write wave patterns of speech onto smoked glass. It's still 57 years too soon for Colin Clive to shout "It's alive!" but in another year and a half *the moment* arrives.

It's the 10th of March in the great centennial year of the United States. At one end of a phone line in a separate room Thomas Watson is working. ~~Don Ameche speaks the words, "You can save money with a different long distance carrier!"~~ Bell speaks the words into the first telephone, "Mr. Watson – Come here – I want to see you."
The telephone is born.

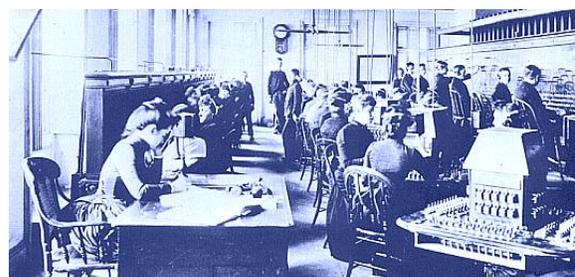
Business Plan

The telegraphy giant Western Union, in hindsight suffering from a serious bout of colossal stupidity, refuses the \$100,000 offer to buy the telephone patent rights. So in July of 1877, the *Bell Telephone Company* is formed. By year's end there are 3,000 phones in service, and soon the *Bell* name is connected with both the persistent ringing in our ears (courtesy of Watson's 1878 ringer patent) and infamously troublesome telephone service.



Making a Connection

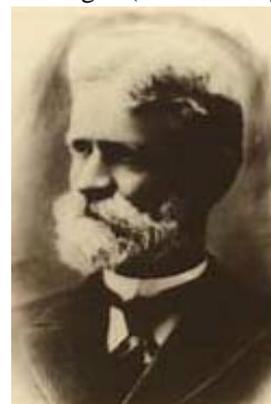
It's January 28, 1878 and the residents of New Haven, Connecticut have something to talk about. Their city's place in history—site of the first manual switchboard that allows many phones to be connected through a single central exchange. Previously, your phone had to have a direct wire connection to every other phone you'd want to reach. And jumper cables to complete the connections. Now you just crank the lever to alert one of the teenage boys who are the telephone operators, and tell him to whom you wish to speak. He grabs a cord and puts its plug into the jack. You're ready to talk.



Yes, the boys *are* rude and impatient, but within a few years they'll all be replaced with females who are "calm and gracious." If you're willing to wait another 80 years, you'll find some well-behaved males back as operators.

Almon Brown Strowger

Necessity may often be the mother of invention, but sometimes eccentricity is the father. The unusual patriarch of automated telephone switching was Almon B. Strowger (1839–1902) pronounced *STRO-ger*. Born in Penfield near Rochester, New York, this wandering Civil War veteran headed west, completed his study of embalming, and settled in Topeka, Kansas where he bought a funeral parlor in 1882. He had already suffered through some

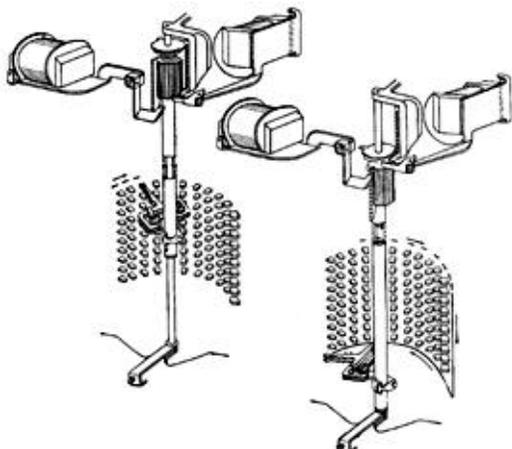


dreadful war casualties at the Second Battle of Bull Run, followed by the early death of his young wife, so his sometimes rather surly temperament could be expected. But nowhere were hostilities as pronounced as his constant feuds with telephone exchanges. He complained that operators took too long to make connections and routed calls to other undertakers. When a close friend died and the body was delivered to a rival, he became convinced that a telephone operator was the wife or daughter of a competing mortician. He sold off his business in Topeka and in 1886 moved to booming Kansas City where he purchased an even larger funeral parlor in hopes of more business through better telephony. But of course it couldn't be that simple when Strowger and phones got together.

“A girl-less, cuss-less switching device”

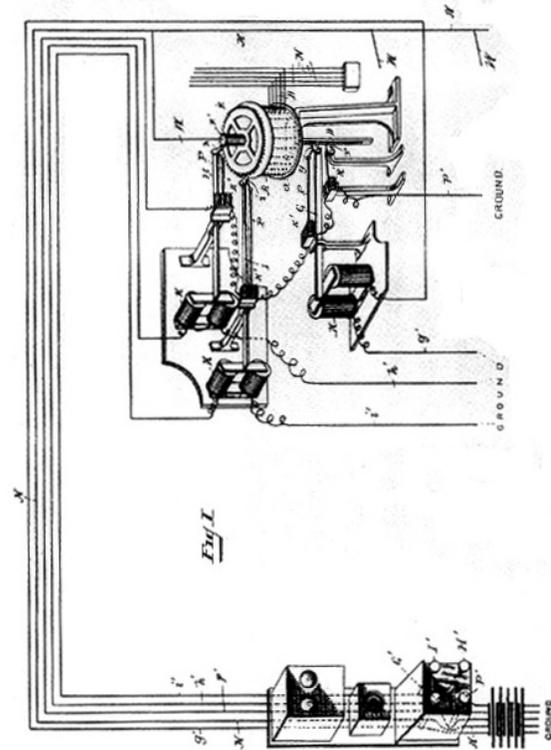
Strowger often called upon the phone exchange office to complain that his phone wasn't working and that switchboard operators were giving false busy signals to his potential customers. They in turn called him “irascible” and “mad.” So he hired some technicians in 1887 to help him find a way to make and receive phone calls without involving any operators. Though he promised his helpers a part of the new business, he never gave it to them.

By 1888 he and his brother, Walter S. Strowger, had assembled a working model switch from a pencil in a round cardboard shirt-collar box, with patterns of straight pins as the contacts. There were developments and improvements including electromagnets to control how the central axis raised and rotated.



In 1891 Strowger received Patent No. 447918.

(No Model.) 3 Sheets—Sheet 1.
A. B. STROWGER.
AUTOMATIC TELEPHONE EXCHANGE.
 No. 447,918. Patented Mar. 10, 1891.



Witnesses: *R. H. Anderson*
W. S. Strowger
 Inventor: *Amos B. Strowger*

With Joseph Harris and Moses Meyer, he founded the *Strowger Automatic Telephone Exchange* company, later to become the *Automatic Electric Company*, and finally *GTE*.



Pushbutton and Dial Telephones

The first Strowger exchange was installed in La Porte, Indiana in 1892 to mixed reviews but eventual success, with similar hardware in use for a century. Strowger's first design for indicating the number to call was a pad of three pushbuttons, one each for hundreds, tens, and ones. Users would push each button multiple times as necessary; *e.g.*, for #235 one would press the hundreds button twice, the tens button thrice, and the units button five times. At least that's how the first ones worked. Country folk wouldn't embrace a pushbutton approach till about 70 years later. By 1896 Strowger replaced the pushbuttons with his lastingly popular innovation, the rotary phone dial. Today when we call the record shop, which has CD's but no records, we still say that we *dial* our phones, though we have no dial, and we're back to pushbuttons again.



Bell Leave It Or Not

In 1896 Strowger sold his patents to his associates for \$1,800 and in 1898 his share in the company for \$10,000. He moved to St. Petersburg, Florida where he bought a small hotel and died there at age 63 in 1902. In 1916 the Bell System bought the patents for \$2.5 million. Bell (the company) had rejected the phone dial idea earlier, but in 1919 introduced phones with dials in Norfolk, Virginia after a strike by telephone operators rekindled an interest in the do-it-yourself dial concept.



Modern Times

There have been numerous improvements in switching hardware over the years, such as the introduction of crossbar in 1938. Fully electronic switching became prominent in the 1970's. However, lingering (or malingering) Strowger designs have remained in service, even in technologically sophisticated countries up to very recent times. Located in Catford, England, the roomful of equipment below was decommissioned in July, 1995—replaced with a telephone exchange the size of a filing cabinet.

