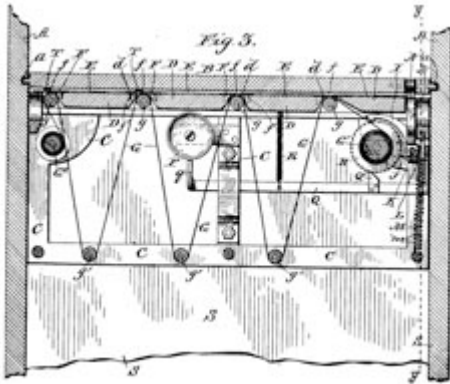


Voting Machines and the Voters They Represent



Technology and democratic intent

While the contested presidential election of 2000 famously offered Americans a five-week lesson in civics, it also provided a crash course in the metaphysics of representation. Political representation was at issue—one “man,” one vote—but a second form of representation proved at least as vexing: How do the television networks represent outcomes on election night? How did Palm Beach County’s “butterfly” ballot represent electoral choices to voters? And exactly what sort of punch mark or dimple in a ballot should represent a voter’s intent? The political importance (in a pretty narrow, partisan sense) of questions like these was obvious throughout the Bush/Gore controversy; however, such questions address representation not as a function of politics but as a function of media. American voters count on media (conventionally “the Media”) to represent the outcome of elections accurately and quickly. They similarly count on the media of voting—the materials of ballots and voting machines—to aid them in representing their individual electoral choices to the public at large. Though ballots and voting machines are less familiarly “media” than televisions, newspapers, or the Internet, their mediating role is at least as important to the democratic process.

As it turned out, the electoral controversy of November and December 2000 revealed a central tension that forever attends this second form of representation: Whether it means switching on the TV or stepping into a voting booth, media are deployed precisely because they are expected to efface themselves. The television and the punch-card ballot are supposed to answer questions about election returns, not to stir up thornier questions about televisions and ballots. Put another way, audiences expect to look *through* media, not *at* them. Yet in 2000 the American public was forced to reckon with the question of how the material properties of punch-card ballots and voting machines, far from effacing themselves, had helped to determine the outcome of the election.

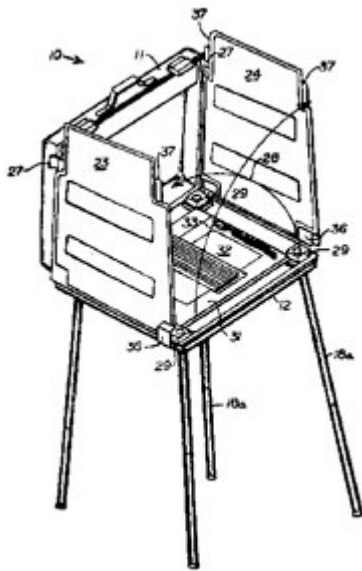


Fig. 1. U.S. Patent 4,258,249. Courtesy of the U.S. Patent and Trademark Office.

The eight U.S. patents granted to John E. Ahmann in the 1980s together describe the kind of voting machine that greeted so many Floridians on Election Day 2000 (fig. 1). Voters using the VotoMatic type of punch-card machine step up to a voting booth, insert their ballot card into a frame, and then use a stylus to punch selections into the card. My Aunt Irene, who used to winter in Palm Beach County but who votes in Pennsylvania, jokingly disparaged her Florida neighbors for not voting “like normal people,” standing inside old lever-type voting machines as Pennsylvanians do. Unlike the lever machines with their Wizard of Oz-like curtains and internal tallying devices, the punch-card machines rely upon 1960s-era data processing technology to tally votes. Fully one in three Americans who voted in the 2000 election used punch-card machines, of which VotoMatic is the major brand. VotoMatic inventor John Ahmann is a former IBM engineer, who appeared after the 2000 election as a witness for the Bush campaign in Florida’s Leon County Circuit Court. Two of Ahmann’s voting-related patents are particularly noteworthy.

Ahmann’s 1981 patent on the “Punch Frame” for holding ballot cards is noteworthy in hindsight, given the closeness of the Florida election and the ensuing disputes over undercounts and recounts. Ahmann’s patent specifies that, “Precautions must be taken to insure that all of the chips punched from the card are expelled [from the device]...If chips are permitted to accumulate...this can interfere with the punching...Incompletely punched cards can cause serious errors to occur in data processing operations utilizing the cards.” This kind of precautionary statement is extremely rare in the text of any patent document, since patents are legal instruments that must claim novelty and usefulness, and thus must rhetorically vaunt the excellence of the specified invention over its predecessors. Ahmann and his patent lawyers were unusually cognizant of potential errors.

Ahmann's patent on the "stylus" for punching ballot cards more typically presents his invention as a decisive improvement over existing technology (fig. 2). In earlier stylus devices there had been a tendency for the point to break off, Ahmann notes, "when improperly bent to one side with the tip portion" inserted into "a marking hole of the voting device." Such mishandling of the stylus is cleverly made irrelevant by his new invention, because,

Embedded within the tapered portion 30 is an elongated tip member 32, which is adapted to be inserted...in order to perform the normal punch-out function...This tip member is made from a hard, durable material...An outer exposed portion of the tip member...has a smooth cylindrical portion 38 adjacent a short ribbed...section 40, and this outer end portion is preferably heat treated to increase hardness...Thus, in use, the ribbed end of the tip member will readily punch-out the precut area of a tabulating card and assure the removal of this punched out portion (or "chad").

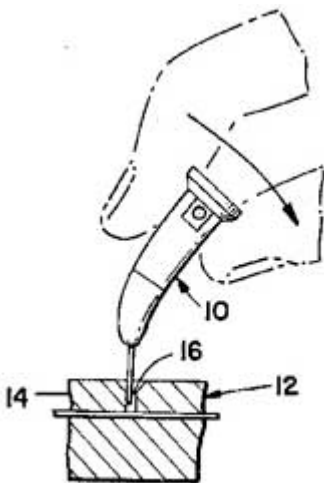


Fig. 2. U.S. Patent 4,445,731. Courtesy of the U.S. Patent and Trademark Office.

Presented in the notoriously dry and legalistic language of patenting, Ahmann's stylus nonetheless accrues a certain salacious charge when described as a heat-hardened member with ribbed tip for insertion.

Though Ahmann's stylus patent only cites four recent patents that his invention improved upon, the broadest features of his voting machine have a very long history. The first patented voting machine in America, a device its inventor Robert Monaghan dubbed "the vox populi" in 1848, worked through the action of tiny knives or "lancets" that perforated paper (fig. 3). This mechanized voice of the people relied upon perforated ballot sheets, its inventor claimed, because such perforations were "in the present connection a simple and at the same time indelible mode of recording the vote." Ahmann's stylus refigured Monaghan's "lancets" as well as innumerable other means of perforating or punching paper. The varied terms by which such means were described hint at how

many different ways Ahmann could have described his stylus. For instance, John McTammany, an especially prolific inventor of voting machines, in 1895 used what he termed a "hand punch," which, like Ahmann's stylus, came tethered to his voting machine (fig. 4). In 1897 the Supreme Court of Rhode Island decided in the context of McTammany's machines that a puncture in a piece of paper is as much a record of voter intent as "a pencil mark thereon." So performed absence got legally constructed as semiotic presence: ever since then, a *hole* is a readable *mark*, because both are intentional and both are lasting.

Even apart from the peculiarly (that is, the unnecessarily) gendered character of the ghostly, phallic voter whose fingers appear in the drawing of Ahmann's stylus, what Ahmann's patents help to suggest is that voting machines themselves represent a voter prone to error (or to scandalous bending of his inserted tip member) who can be redeemed by the right machine. Built into the machinery, in other words, are at least 1) an imperfect and abstract voter of dubious intent and 2) a dispersed and bureaucratized system prone to inefficiencies. By extension and precisely in proportion to these features are built in 3) an ideological commitment to the technological fix and 4) not a little anxiety that "normal" voting—the diction is Ahmann's as well as my Aunt Irene's—may be an elusive goal. Machines, by this light, are representations. They are not *only* representations, of course, but they are meaningful in part according to the order of things they represent.

I am making a strong claim. As critic Langdon Winner puts it, "There is no idea more provocative than the notion that technical things have political qualities." And yet to identify voting machines as themselves representations, in addition to conduits *for* representation, is to suggest that they can possess an inherent politics, that "they can embody specific forms of power and authority." During the Florida controversy, James Baker III flatly denied such a possibility when he remarked regarding machine recounts, "Machines are neither Republicans nor Democrats, and therefore can be neither consciously nor unconsciously biased." To be sure, machines are neither registered Republicans nor registered Democrats, but by representing abstract voters, voting media are biased toward their inventors' and adopters' socially derived sense of what normal voting is. And normality in voting, like normality in so much else, is culturally and historically contingent: remember all of the years when it would not have seemed normal for Aunt Irene (or me) to vote at all. Put another way, like the layout of a newspaper and the layout of a ballot, the layout of a voting machine harbors implications about meaning, about what *is* and what is important, and therefore harbors politics in its broadest sense. The changing design of voting machines (where "design" means a literal organization of parts as well as a desire) offers one index of varying relationships between the American public and its constitutive private voting subjects.

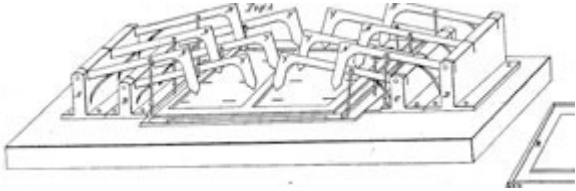


Fig. 3. U.S. Patent 5,469. Courtesy of the U.S. Patent and Trademark Office.

Americans like Ahmann have dedicated themselves with amazing ingenuity to the invention of various voting machines. I made a cursory search and found more than four hundred U.S. patents that have been granted on the subject. Each of these inventions in effect expresses a theory of democracy, of what a voter is, and each theory is framed by the assumption that technology is appropriate to voting. Such a framing assumption forms the lifeblood of today's technocratic society (where technology is appropriate to everything) but seems only to have emerged around the middle of the nineteenth century, when inventors like Monaghan made the first scattered efforts to connect voting to machines. Before and even while these men invented, the phrase "voting machine" was an oxymoron. Men voted, not machines. "It has been asserted," the German-American statesman Carl Schurz wrote in his report on conditions in the South immediately after the Civil War, "that the Negro would be but a voting machine in the hand of his employer." Likewise, a few years after the contested Hayes/Tilden election of 1876, *The Atlantic Monthly* looked ahead to reform, calling the electoral college system "out of gear" with contemporary politics and noting with contempt that "the electors are mere voting machines." Comments like these suggest at once how paradoxical the addition of machinery to voting once seemed and just how deeply the pejorative semantics of "machine politics" run. Machinery was the categorical opposite of democracy, at least until Monaghan, McTammany, and the others got busy in their attempts to derail political machinery in its control of voters by providing those voters with literal machines.

Almost all of the earliest voting machines had to do, like Monaghan's lancet device, with "taking the yeas and nays" or "ayes and noes" in legislative assemblies. Patents on these devices often picture an empty legislative chamber of some kind, making legislative space an arena of moving parts in which members of the legislature gather to serve as operators internal to the system. These inventions were less absolute theories of democracy than theories of legislative process. Particularly after the Civil War, when the government grew much more complicated in scope, members of Congress increasingly voted according to cue (by watching how others voted), were tutored by partisan social relations amid increasing party discipline, or were instructed by lobbyists. In their patents, inventors thus billed their devices as a way to bring honesty into politics.

Among the most innovative legislative machines were gravity-activated devices, relying upon balls as ballots (thus acting on the derivation of the word *ballot*), which were dropped into pipes that went under the floorboards or dropped into automatic sorting and counting boxes. Some were mechanical

devices, using what one inventor classed vaguely as “cords, wires, levers, pulleys, etc.,” to cast and display votes. Many more were electrical, designed as legislative telegraphs, one inventor explained, so that members could send in their votes from around the chamber. In their most ideal form, seldom realized, these voting machines did four things: they “took” votes, displayed them, counted them, and produced a lasting, tangible record of some sort. This quartet of functions possessed many different associations for the authors of patents. Different devices had parts that worked “like the keys of a piano,” like “bells [for service that] are hung in private houses or hotels,” like “hotel registers,” as well as like telegraphs, adding machines, and electrotype or other printing technology. The legislative chamber was like a fancy hotel, perhaps, at which visiting members conducted the business of state, or it was a nexus of communications, where far-flung members transmitted the will of their further-flung constituents. Thomas A. Edison’s first patent was for an electrographic vote-recorder of this sort. Invented in 1869, his device counted the number of votes “yea” and “nay” and then printed the names of voting members for and against in two different columns (fig. 5). The legislators themselves applied the current, which printed their names by ionizing chemically treated paper.

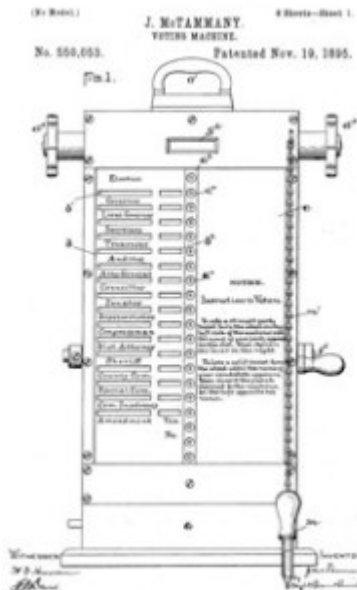


Fig. 4. U.S. Patent 550,053. Courtesy of the U.S. Patent and Trademark Office.

Few if any of these nineteenth-century voting machines, including Edison’s, appear to have been successfully used. But debate over the use of voting machines in Congress continued for decades. In 1914 members of the House minority observed a damning contradiction between voting and machinery: “Congress is and should be a deliberative body,” one Representative explained, “and electricity and mechanism are no more essential in grinding out legislation than a slot machine would be useful in dispensing justice.” Proponents for the devices meanwhile noted that machine voting was quick and (by that odd and yet widely accepted calculus) would therefore save money.

Elements of the proposed system would be accurate, like adding machines, and unobtrusive, like drop-head sewing machines, which disappeared into the tables when not in use.

Nineteenth-century American inventors proposed only a handful of voting machines for balloting in general elections. But by the end of the century a new generation of voting machines was beginning to appear. These machines were aligned with broader reforms in the same period, which directly addressed what had been the great weakness of prior voting systems. In place of easily identified color-coded party tickets, voting reforms and the machines that followed them introduced ballots prepared by municipalities rather than parties (fig. 6). Every voter got a copy of the same printed ballot and could exercise his franchise without the intrusion or surveillance of party agents. Massachusetts adopted these new ballots in 1889, and the other states followed suit over the next two decades. It was a justly celebrated reform, though results were uneven. Voting methods continued to vary from state to state and even from county to county (as they still do). Voters in California and Louisiana marked their ballots with a rubber stamp, in West Virginia voters used ink, and in New York it had to be a black lead pencil. In many states voters made a mark to the right of the name of the candidate they wished to vote for, but in other states voters made a mark to the left. In Wisconsin marks had to be under the middle of the names. Other much more important variations remained in provisions for illiterate voters (e.g., different party symbols or various color coding methods), the layout of rows and columns (e.g., whether by party or office), and the ease or difficulty with which voters were permitted to vote a "straight" ticket or to "scratch" candidates and "split" tickets.

The most singular advantage of the new generation of voting machines was their ability "to guard against the failure of 'the human element,'" particularly against the "enormous loss of votes resulting from defective, spoiled, and doubtful ballots" that were improperly marked by voters. One study had found, for example, that "more than 3000 persons in Maryland who qualify as voters regularly disenfranchise themselves in every election by incorrect markings," most of them presumably accidental, but also "including drawings and comments on the city government." Inventors and other reform-minded citizens agreed with politicians who amended the applicable voting laws: "The voting machine must prevent the voter from doing what he ought not to do." Gone and forgotten was any sense that voters had to be protected from corrupt party hacks. Voters in the new century would need to be protected from themselves.

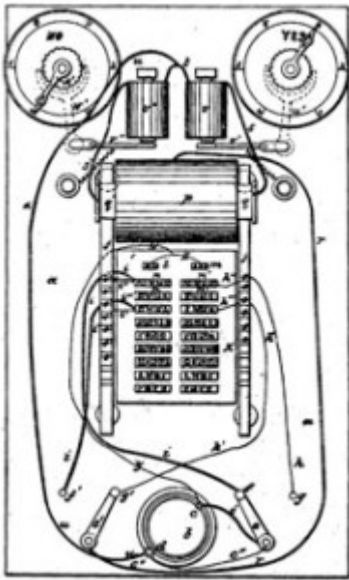


Fig. 5. U.S. Patent 90,646. Courtesy of the U.S. Patent and Trademark Office.

Voting machines and the patents that describe them render the voter an abstract, impersonal, or hypothetical citizen, available to drop, pull, press, stamp, puncture, or insert as directed. And the more complicated the gizmo, the more it risks derailing the process. A related worry about complicated ballots was evident in the last minute instructions that one election supervisor tried to relay to the polls in Palm Beach County in November 2000: "Please remind all voters," Theresa LePore wrote, "that they are to vote for one (1) presidential candidate and that they are to punch the hole next to the arrow next to the number next to the candidate they wish to vote for." The varied media of voting conspire to separate voters from candidates along a chain of signifiers—a name, a number, an arrow, a hole—that can be extended to include all manner of machinery—a pencil, a stylus, a lever, a knob, gear work, housing, wiring, hardware, software, and so on. The chain that separates voters and candidates—and that mediates between voters and the collective will or the vox populi—is an ongoing construction of law, since judicial decrees and state statutes, for instance, make a hole into a mark. But it is also an ad hoc construction, cobbled in part from the practices of local voting commissions, who decide when a dimple is like a hole that is a mark. And it is cobbled as well from the material conditions of voting, from the stuff that voters experience as part of their signifying acts.

If voting machines have rendered voters into an abstraction by generalizing the functions and—particularly—the pitfalls inherent in casting, collecting, and counting votes, they have also variously mystified the experience of voting, complicating it with machinery that few voters understand but all must operate. Running parallel to increasing technological complexity has been an attendant mystification of differently dematerialized ballots. Gone is the certainty of one "man," one ballot, if in so many cases voters use machines that produce only a mechanical or an electrical tally, not a material record of individual voting acts. Confronted by more and more complicated *things* at the polling

place, in other words, the voter loses any clear perspective on *votes* as things. Though punch-card voting and optical-scan or “bubble” ballots still offer an individual piece of paper to every voter, the old lever machines and the new direct recording electronic devices (DREs) do not. In one sense, these devices make literal the analogies to adding machines and cash registers that recur so often in the history of voting machines and that are notably reiterated in frequent identifications of DREs as versions of automatic teller machines (ATMs). The speculative equation of votes and money works, at least insofar as money has proved to be one thing (unlike population, for instance) that can be counted exactly, no matter how many millions are at stake. Nor is the equation of paper ballots and paper bills without weight, since both are particularly sacrosanct instances of representation, the individuated paper manifestations of voter choice and consumer confidence, those two sustaining abstractions of today’s liberal nation state.

Very few patented voting machines were ever built or used. Their inventors were truly theorists, theorizing in metal and other materials as they proposed and patented what they thought was a better democratic future, a better version of voting. Successive voting machines for the most part have harbored a reform, Mugwump, or Progressive ideology, with its generous helping of what might be termed *technoblesse oblige*: The right machine saves the voter from error and the state from confusion. In this sense, the built-in bias of voting machines is less politically partisan than it is culturally political, adapted to the contexts of “normal” voting in any historical moment. Machines represent the normal voter, and, if implemented, help that voter to represent her or his will.

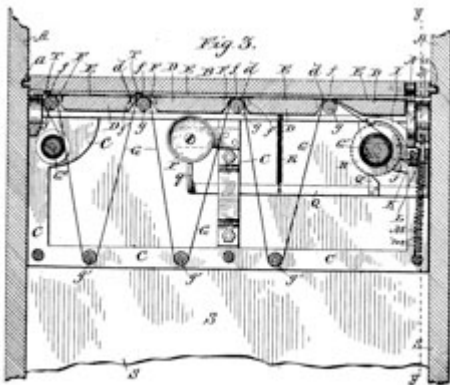


Fig. 6. U.S. Patent 502,743. Courtesy of the U.S. Patent and Trademark Office.

It remains to note in conclusion that no theory remains unmoved by practice. Like all representations, voting machines are non-static; their meanings arise in part from their reception and use, not just from the authorial intentions of their patent-holding inventors and manufacturers. Thomas Edison may have meant one thing by his voting machine in 1869, for example, but today that same machine means something else. Likewise, John Ahmann’s invention represents a stylus-wielding, chad-punching voter. In retrospect, it also represents a voter

who is a bit more likely to be African American than not, since those were the hands that held the stylus, according to a *New York Times* survey of Florida precincts and their equipment. James Baker III was correct; machines are neither Republicans nor Democrats, when they are invented by people like Ahmann or adopted by states like Florida. Only in use was the VotoMatic so emphatically a Republican machine, when its inventor testified for the Republicans in court and when its relatively high rate of residual votes or undercounts (combined with confusing ballot design in several counties) helped George W. Bush to win the 2000 election.

Further Reading:

Details of the Bush/Gore recount controversy, including comments by James Baker III and Theresa LePore may be found in *36 Days: The Complete Chronicle of the 2000 Presidential Election Crisis*, by correspondents of the *New York Times* (New York, 2001). Langdon Winner asks, "Do Artifacts Have Politics?" in *Daedalus* 109 (Winter 1980): 121-136. Material on present-day voting machines is drawn from the Caltech/MIT Voting Technology Project's report, "[Residual Votes Attributable to Technology: An Assessment of the Reliability of Existing Voting Equipment](#)," by Stephen Ansolabehere, et al., Version 2 (March 30, 2001). Material on voting machines of the past may be found in T. David Zukerman, *The Voting Machine: Report on the History, Use and Advantages of Mechanical Means for Casting and Counting Ballots* (New York, 1925) as well as the [government's database of patents](#). (For a full list of patents referred to in this essay, please contact the author.) Material on the history of ballots in the United States comes from Spencer D. Albright, *The American Ballot* (Washington, 1942); in *American Ballot Laws, 1888-1910*, prepared by Arthur C. Ludington, *University of the State of New York Education Department Bulletin* 488 (February 1, 1911); Philip Loring Allen, "The Multifarious Australian Ballot" *North American Review* 191 (1910): 602-611; and particularly Philip Loring Allen, "Ballot Laws and Their Workings," *Political Science Quarterly* 21 (1906): 38-58. Carl Schurz's comment on voting machines may be found in *Message of the President of the United States...Accompanied by a Report of Carl Schurz on the States of South Carolina, Georgia, Alabama, Mississippi, and Louisiana* (Washington, D.C., 1865). Helpful works on political process include Margaret Susan Thompson, *The "Spider Web": Congress and Lobbying in the Age of Grant* (Ithaca, N.Y., 1985) and David J. Rothman, *Politics and Power: The United States Senate, 1869-1901* (Cambridge, Mass., 1966). See also Michael Schudson, *The Good Citizen: A History of American Civic Life* (New York, 1998).

This article originally appeared in issue 9.1 (October, 2008).

Lisa Gitelman is the author most recently of *Always Already New: Media,*

History, and the Data of Culture (2006). During 2008-9 she is teaching history of technology at Harvard University.