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ANNALS OF INVENTION

THE FLASH OF GENIUS

Bob Kearns and his patented windshield wiper have been winning millions of dollars in settlements from the auto industry, and forcing the issue of who owns an idea.

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In November, 1962, Bob Kearns was driving his Ford Galaxie through the streets of Detroit when it started to rain lightly. Kearns turned the wipers on low. In those days, even the most advanced wipers had just two settings, one for steady rain and one for heavy rain; in a mizzling rain, they screeched back and forth across the glass, mesmerizing the driver, and occasionally causing accidents. Kearns' vision was already impaired as a result of an accident nine years earlier, when, on his wedding night, he was hit in the left eye by a flying champagne cork. Now, straining to see through the windshield, half thinking about his lousy wipers and half thinking about his bad eye, Kearns had what the *Wall Street Journal* later called "the kind of inspiration that separates inventors from ordinary people." He thought, "Why can't a wiper work more like an eyelid? Why can't it blink? The idea for the intermittent windshield wiper entered his mind.

Sometime this year, a little more than three decades after his good idea came to him, Kearns will go to trial in a suit he has brought against General Motors. Kearns, who is sixty-five years old, has already defeated Ford and Chrysler in court, and he stands to collect more than twenty million dollars from them for infringing his patents on the intermittent windshield wiper. After the G.M. trial, Kearns will start on foreign automakers, beginning with Ferrari, and working his way through virtually the entire automobile industry worldwide. His remarkable success has made him one of the most famous inventors in the country, a hero to thousands of inventors with their own patent-infringement horror stories to tell. To others, he is a barnacle that has fastened itself to the underside of our patent system so tenaciously that the most powerful corporations in the world cannot pry it off.

Kearns is a small man, a few inches taller than elfin. His voice is high, nasal, and toneless, and his shoulders are stooped, perhaps from years of peering down at patent texts. His skin is pinkish, and his hair is startlingly white. According to Dennis, his oldest son, it turned white all at once, in 1976, when Kearns took apart an intermittent-

windshield-wiper apparatus made by Mercedes and discovered that the great German carmaker had apparently

infringed his wiper patents, too.

Kearns represented himself against Chrysler, and will do so again against G.M. His offices, Kearns Associates, are directly across the street from the Detroit federal courthouse, where his cases are tried. He can usually be found at his

desk, half hidden behind heaps of motions and counter motions and books on trial procedure. The Associates are mainly Kearns' family. He has six children, and the lawsuit has become the dominant event in their lives—and now *their*

children are growing up with the case. The family is close, and the lawsuit has brought them closer. Four of his children have worked or are working full time for their father. The case is what they do. None of them have any legal training.

They have learned on the job to write briefs, service documents, and deal with maneuvers pulled on them by the hundreds of lawyers working for the Big Three. "For the kids, the lawsuit is all we've ever known," says Kearns'

daughter Kathy, who is thirty-one. "I mean, for us this is normal."

There is widespread feeling in patent departments of corporations around the country that Kearns' case represents a

rightening precedent. A California inventor named Gilbert Hyatt, who was recently granted a basic patent on the microprocessor, is the latest example of the trend. In theory, Hyatt has billions coming to him from the dozens of

corporations that use microprocessors. "This kind of stuff makes people who work for corporations very nervous,"

Marty Adelman, a law professor and patent expert at Wayne State University, says. "The story today is not the big

company screwing the little guy but the little guy screwing the big company. It's getting easier and easier for the little

guy to do it."

The United States patent system is designed for the independent inventor—for the person whom Nikola Tesla

described as "the lone worker who follows the fleeting inspiration of a moment and finally does something that has not

been done before." Two hundred years ago, when Thomas Jefferson created our patent system, all inventors were

independent. Now most inventors work in huge corporate research centers. Individuals surrender their ideas to the

corporation, and for doing so they receive regular salaries. But the patent system, together with the law that has accrued

around it, still rests on the eighteenth-century idea of the inventor, and in court a lone inventor with a patent is a

formidable opponent for any corporation to face. "I read all the patent cases, and rarely has there been a case in the last

five years where the corporation has beaten an independent inventor," Adelman says. "I tell all the corporate people

who call me to testify against individuals, 'Jesus, guys, you're up against it.'"

The most frightening thing about Kearns, from the automobile companies' point of view, is that he is not

particularly interested in money. He wants justice. "They think they can pay me thirty million dollars and put me on a

park bench," he says. "Well, Bob Kearns is not somebody's lackey." When I first met him, a few months after he

received ten million dollars from Ford, he was living by himself in a small, dark unfurnished apartment in Houston. A

sleeping bag was on the floor, and boxes of legal documents were everywhere—on the floor, on the kitchen counters,

stacked on the toilet. He has since bought a Colonial house and some property on the eastern shore of Maryland (it's

right next to a house owned by Mario Boyardee, the canned-spaghetti heir), but he hardly ever goes there. He sleeps on

friends' couches around Detroit, or on the floor of his office. He says he simply wants to make windshield wipers. That

is all he has ever wanted. He will go on suing until automobile companies around the world are stopped from

manufacturing his wiper, and he can make it himself.

The United States Patent and Trademark Office is in Crystal City, a government development in Arlington,

Virginia. The buildings are glass and steel, and sleek, in the modern federal style, and the place has a sort of

splendid isolation about it which goes nicely with being the city of invention. On the ground floor of the Patent Office

is the Search Room, a vast space filled with patents. The Patent Office has the largest collection of patents in the world.

Here or upstairs, in the library, are Balinese patents and Manchuian patents, and English patents dating back to 1623.

There are German dyestuff patents that were confiscated by the United States during the First World War and became

part of the foundation of the American chemical industry. More than five million United States patents have been

issued since 1790, when the first one went to Samuel Hopkins, of Pittsford, Vermont, for a new way of making potash,

and they are all stored here, in paper form, stacked face up in an immense lattice of metal cubbyholes—about a hundred

bright ideas to each cubby, and thousands of inspirations to each long, dark row. Feathery dust lies on some of the older

patents. Patent searchers can be found in the aisles, scouring their fingertips lightly together to remove the dust, and

plucking flakes of rotting patents from their jackets and sweaters.

A graph of the fall and rise in the popularity of patents over the last hundred years would look like this: U. Having

weathered a long siege of anti-monopoly sentiment in the middle of this century, patents are now almost as popular as they were in the eighteen-nineties. Last year, the Patent Office received 185,446 patent applications, more than in any previous year, and 109,728 patents were granted, almost twice as many as a decade ago. The Patent Office cites these numbers as evidence that the spirit of Edison and Bell is alive, that America is as innovative as ever. This may be true. It is certainly true that patents are more valuable than they used to be.

One reason is the influence of a new patent court, the United States Court of Appeals for the Federal Circuit, which was created in 1982 in part to hear all patent appeals. Before that, patent appeals went to circuit courts of appeal. Most judges despise patent cases. A patent case can tie up a judge's calendar for months, sometimes for years, and often involves technical issues that the judge doesn't understand. Also, patent law is maddeningly subjective and imprecise, and apt to plunge all but the stoutest minds into dizzying swirls of logic. In a patent case a judge is asked to dissect the indivisible stream that is technical progress, to say where one man's inspiration ends and another's begins. For these reasons, circuit judges tended to dismiss patents as invalid simply to get rid of the cases. Between 1950 and 1975, three out of every four patents in the circuit courts were ruled invalid or not infringed. Certain circuits were notorious for their hostility toward patents: in the Eighth Circuit, almost no patents were held valid. The federal circuit court was created to bring fairness and logic to the system, and most people agree that it has. It has also dramatically increased the value of patents. The court has found three out of every four patents valid or infringed. Of eleven judges who sit on the court, five are former patent attorneys, so they are inclined to be more sympathetic to patents than most people are. In the federal circuit, patents are held to be valid until proved otherwise, and not the other way around.

In the last decade or so, the boundaries of what is patentable have expanded. In 1972, a molecular engineer named Ananda Chakrabarty applied for a patent on a microbe he had engineered that would help break down crude oil. The Patent Office rejected his application, citing a clause in the patent code which says that life forms are not patentable. Chakrabarty appealed, and in 1980 the Supreme Court ruled in his favor, 5-4, creating a brand-new sector of intellectual property: life. Last February, the National Institutes of Health applied for thousands of patents on human genes. The prospect that the United States government may soon own the gene that causes, say, green eyes has naturally created a certain amount of controversy, with some people predicting a kind of land grab at the cellular level—the Japanese patenting brown eyes, Swedes patenting blond hair, Italians patenting Roman noses. Independent inventors are pleased by the renewed popularity of patents, because stronger patents give them greater leverage with the manufacturers and licensing companies they sell their inventions to. Patents granted to independent inventors rose thirty-seven per cent in the last half of the eighties. Automobile and computer manufacturers—businesses that assemble many pieces of technology into a product, as opposed to businesses whose product is a single technology—are not so pleased. They now have to pay royalties for parts that used to be free: or, if they decide to infringe a patent, they can no longer be reasonably confident of getting away with it. The number of patent-infringement cases in litigation in 1990 was fifty per cent greater than the number in 1980, and the average damage award has tripled.

The boom in intellectual property has been good for the Patent Office; patents are its principal source of income. Last year, the Patent Office took in two hundred and forty-five million dollars from patent and trademark fees, its best year ever. It has raised the number of its patent examiners to fourteen hundred and forty-six. (In 1980, there were nine hundred and forty-nine.) They work on six floors above the Search Room, their desks and floors awash in patent applications. The Commissioner of Patents has a spacious office on the top floor of the building. Harry F. Manbeck, a trim, forceful, no-nonsense sort of fellow, who was until recently the commissioner, is naturally pleased with the robust good health that the patent system currently enjoys. "I think there is an increasing awareness of the importance of technology in America, and of the need to protect our technology from incursions by others," he said not long ago. "Having said that, I think it is remarkable, isn't it, that the system that was used for granting the first patent"—he waved toward a framed copy of that document, hanging on a wall behind a secretary—"is essentially the same as the system used in granting Patent No. 5,000,000, for . . ." He shot a glance, over his spectacles, toward an aide.

"Ethanol Production by *Escherichia Coli* Strains Co-Expressing Zymomonas PDC and ADH Genes," said the aide, reading from a clipboard. "Right," Manbeck said. He leaned back, laced his hands behind his head, and directed his gaze out the window. Across an expanse of the Potomac floodplain, airplanes were landing at National Airport.

ob Kearns grew up in River Rouge, a working-class neighborhood on the west side of Detroit. Two things about the place captured Kearns' imagination. One was Our Lady of Lourdes Cathedral, a big red brick Catholic church, which, he remembers, imported water from the real Lourdes. The other thing was the Ford Motor Company's Rouge plant, the largest industrial complex in the world. Kearns' father, who was a roll turner for the Great Lakes Steel Corporation, had once taken his son to visit the Rouge, and Kearns recalls that he had been "just so impressed by the magnitude of what Ford's was doing." Lumber from Ford forests; ore and coal and coke from Ford mines; silica sand from Ford quarries, for making windshields; rubber from Ford plantations in Fordlandia, in Brazil, for making tires—all flowed into the Rouge aboard Ford trains and Ford ships, to be refined and machined and assembled into Fords. At the Rouge, a car could be made from raw materials in four days.

As a teen-ager, Kearns worked in some of the job shops that used to fill the streets and alleys of Detroit. One place made the molding around the opera windows on Cadillacs. That was its entire business. Another place made the dies for the tools that were used to install one part of the landing gear of C-5 transport planes. The father of one of Kearns' friends had designed a better car-door handle—the familiar bar of curved steel with the push button under it—which helped prevent the door from opening if the car rolled. The man made a fortune supplying G.M. "The automotives, the automotives," Kearns once said to me. "That's all there was. If you were an inventor, and you really wanted to reach people, you invented for the automotives. I remember when Charley Wilson"—the president of G.M. in the forties and fifties—"said, 'What's good for G.M. is good for America. I really believed that was true.'"

Kearns' first invention was a comb that dispensed its own hair tonic. It did not get beyond the model stage. He experimented with an amplifier for people who had undergone laryngectomies and with a new kind of weather balloon. In 1957, he invented a navigational system that he hoped the military would use in its Sidewinder missiles. His ex-wife, Phyllis, remembers him dancing her around the kitchen and saying he was going to buy her two Cadillacs, one for each foot. "It was so exciting," Phyllis recalls. "It was always so exciting, living with Robert—such an adrenaline high." The navigational system didn't pan out, either. Kearns tried again.

When the idea for the intermittent wiper came to him, Kearns and his wife and their four young children were living in a brick house on Rutherford Street, on the north side of Detroit. Kearns, who had a master's in mechanical engineering from Wayne State University, was commuting to Case Western Reserve, in Cleveland, where he was working toward his Ph.D. He believes that his great idea grew in some mysterious way out of the eye injury he had received on his wedding night, in a country inn in Ontario. "Phyllis was in the bathroom, you know, changing, and I was sitting on the bed opening the champagne. And I'd never opened champagne before. And—pow! The cork goes off, hits me directly in the left eye, I fall back on the bed bleeding all over the sheets, Phyllis comes out of the bathroom screaming. I mean, it was a mess."

Kearns worked on the wiper on weekends during the first half of 1963. He constructed a glassed-in office for himself on one side of the basement, where he could work without interference from the kids. The other half was Phyllis's laundry room. "I'd be over here, doing laundry, up to my ears in kids, and he'd be over there behind the glass with his feet up," Phyllis recalls. "Well, he said he did his best work with his feet up."

By the summer, Kearns had built a working model of his invention. He could vary the time the wipers dwelled at the base of the windshield; he could vary the speed with which they swept it; he had even figured out a way of making the wipers automatically adjust their interval to the amount of water on the glass. He put his wiper control in a red metal box that on the outside had the words "For Engineering Tests Only. Do Not Open. Proprietary Design Property of Kearns Engineers," and two friends installed the box in the Galaxie.

Phyllis: "If it rained, we would stop whatever we were doing, run out to the car, turn the wipers on, and drive around. Doing life tests, Robert called it."

Bob: "I had figured out that the elasticity of rainwater was different from the elasticity of hose water, and I wanted to set the thing just right."

Phyllis: "Oh, I felt so proud, driving that car in the rain. I'd get both my hands right up at the top of the steering wheel, where people passing could see them, so they knew I wasn't just switching the wipers on and off."

In October, Kearns decided that the time had come to demonstrate his invention to a car manufacturer. He chose Ford, because it had supplied him with some wiper motors to experiment on and because "to me Ford was always the greatest." Through his brother Marty, who worked in body engineering at Ford, he made contact with a man named

John Cjupak, who he believed "had a substantial position in windshield wipers," and Cjupak said he should come over to the engineering complex in Dearborn, Ford's headquarters. Kearns drove the Galaxie over. He met Cjupak inside, and brought him out to the parking lot. He demonstrated variable speed, variable dwell, and moisture

responsiveness. He let Cjupak try. They spent about forty-five minutes at it altogether, and Cjupak seemed impressed. However, he explained to Kearns that his field was wiper linkages and blades—that Joe Neill, the executive engineer, was the man Kearns needed to speak to.

Three days later, Kearns, once again driving the Galaxie, reappeared for his appointment with Neill. He was surprised to find about ten Ford engineers waiting for him in the parking lot. They took turns running the wipers; they poked around under the hood; they crawled under the dash. One at a time, several engineers took Kearns aside and asked him how his wiper worked. "I didn't want to tell them how I'd done it, but I didn't want to be impolite, either," Kearns recalls. Eventually, Neill appeared. He had a Mercury brought out of the lab, and, keeping Kearns at a distance, demonstrated to him that, as chance would have it, Ford was working on an intermittent wiper, too. Nonetheless, Neill said, Ford would like to look at Kearns' invention, if Kearns would like to show it to Ford.

Neill then said he would like to know how much Kearns' wipers cost to build. He also arranged for Kearns to get instructions on Ford's specification tests: the wipers had to run three million cycles, and they had to be able to operate at two hundred and seventy degrees, the maximum temperature under the hood. Kearns left in a state of euphoria. Many years later, recalling that day in a court document, he wrote, "I was in heaven!"

Ted Daykin was one of the Ford engineers who came out into the parking lot to inspect Kearns' Galaxie in 1963. Daykin spent thirty-eight years, his entire career, working as an engineer at Ford, and took early retirement two years ago. He is almost exactly the same age as Kearns, received a similar education, and also devoted many years to windshield-wiper experiments, but the two men are nothing alike. Daykin looks about ten years younger than Kearns, and he appears to be one of the steadiest of men. He and his wife, Prill, live in a spacious ranch-style house in Dearborn, within a mile of the Ford engineering laboratories where Ted did his life's work. Around the living room are framed photographs of the Daykin family: their daughter, Elizabeth, who is also an engineer at Ford; Elizabeth's husband, Gregory, who works in product planning for General Motors; and the Daykins' son, Robert, who works on the Pontiac account for a local advertising agency.

Daykin began experimenting with windshield wipers in 1957, when his supervisor asked him to design an electric wiper motor. Electricity was the new auto technology then. Electric windows, electric locks, electric trunk catches were the latest gadgets. But wipers were one of the quiet backwaters of automotive technology. The standard wiper was driven by intake from the engine manifold, which was connected by a series of hoses to the wiper motor. The wipers wiped from the center of the windshield out, leaving a big unwiped V in the middle.

Ford had asked Daykin and his colleagues to invent a wiper system in which the blades moved parallel to each other. "See, Chrysler had come out with parallel blades in 1955, and people liked them," Daykin says. "So Ford wanted parallel blades. But the problem with parallel blades is that your surface area is too large for the mechanism to drive the wipers effectively." Daykin's electric motor, linked to parallel blades, appeared as a standard feature on 1959 Mercury and as an option on 1959 Lincoln, and it was immediately popular. At that time, the beauty of the option business was just beginning to dawn on the auto industry. By keeping the base price of the car low—even selling the car at a loss—Ford could bring customers into the dealerships, then sell them a bunch of options that were extremely profitable for Ford.

Windshield wipers were a potentially rich source of options. "The success of those parallel blades got management thinking, Well, what other wiper options can we come up with?" Daykin says. "So I was told to organize a windshield-wiper group, and to play around and see what else we could invent. You know, a lot of people don't really spend a lot of time thinking about their wipers. They turn them on, they turn them off, and that's about it. But the fact is that there are dozens of inventions that go into the way your wipers work. What causes wipers to complete their wipe cycle when they're turned off mid-wipe? How, when they have returned to the base of the windshield, do they park themselves out of the driver's sight? In the industry, we call that feature 'depressed park.' How are wipers synchronized with the wash mechanism—what makes the wiper go on automatically when you push the washer, and give you two or three wipes? How about the rear-window wiper? Well, when you talk about that stuff you're talking about the inventions of windshield-wiper engineers." In the early sixties, Daykin and his colleagues busted themselves with inventing features like those. "Of course, one of the things we worked on was the intermittent wiper. How do you design a circuit where

the wiper comes to a stop at the base of the windshield and then goes into its cycle again? The intermittent wiper was—Well, I won't say it was the Holy Grail for wiper engineers. But it was the obvious next step for wipers to take." The basic problem to solve in inventing an intermittent windshield wiper was the timing device—the thing that sends current to the wiper motor at regular intervals. What should the timing device be? One of the engineers working with Daykin had designed a circuit that relied on a bimetallic timer. The timer worked like a thermostat, on the principle that two different kinds of metal will expand and contract at different rates when their temperature changes. The problem with this invention was that it took some time to heat up. On very cold days, it might not work at all. Also, getting the wiper to dwell for short periods was difficult, because of the time it took for the switch to heat and cool. In late 1961, Ford's principal supplier of windshield-wiper components, a Buffalo-based company called Trico Products, brought a new intermittent device to Ford. It was a small vacuum chamber, about the size and shape of a bathtub stopper, that contained a plunger and spring, and had two small air hoses attached to it. The outlet hose ran to the engine manifold, and the inlet hose ran to the dashboard, where it was attached to a small dial. The engine, as it cooled itself, sucked in air through the outlet hose, producing suction in the vacuum chamber, and so drawing the plunger down and compressing the spring. The driver used the dial mounted on the dash to control the flow of air into the vacuum chamber. The spring moved a switch in the wiper circuit to the "off" position, and the wipers dwelled. The spring eventually caused the plunger to rise, and moved the switch to the "on" position. The wipers wiped. As a piece of engineering, the Trico system was not especially distinguished. It was something of a Rube Goldberg contraption. It had twenty-nine moving parts, which meant a lot of potential for breaking down. When the driver accelerated, the vacuum was insufficient to run the intermittent mode, and the wipers would default to high speed. Trico, in trying to sell the wiper to Ford, advertised this as a specially designed passing feature—useful, say, in overtaking a truck on a rainy day. "The engineers saw it for what it was, which was a design flaw," Daykin says. "But the planners thought that the passing feature was really neat." Management decided to offer Trico's intermittent wiper as an option on 1965 Mercurys, and the wiper division went to work developing it. This was the intermittent wiper that Kearns saw when he paid his first visit to the engineering building.

Kearns' intermittent wiper was an elegant piece of engineering. It had four parts, and only one of them moved. It was a leap forward, beyond electricity and into electronics. Though Kearns did not realize it, he was on the threshold of the next revolution in automotive technology. He had worked for the Bendix Corporation in the mid-fifties, and had some experience with electronic control systems, which were then used only in high technology, like computers. A transistor, a capacitor, and a variable resistor were the three basic components of Kearns' circuit. The resistor and the capacitor together were the timer, and the transistor worked as the switch. The resistor, which the driver could adjust with a knob, controlled the rate of current flowing into the capacitor. When the voltage in the capacitor reached a certain level, it triggered the transistor; the transistor turned on, and the wipers wiped once. The running of the wiper motor drained voltage out of the capacitor; it sank below the threshold level of the transistor, and the transistor turned off. The wipers dwelled until the capacitor recharged.

"There's no question that Dr. Kearns' wiper circuit was interesting," Daykin says. "He had a three-brush motor, with dynamic brake and intermittent on one speed only—his system was a concatenation of a lot of different ideas. But we figured there was just no way in the world it was patentable. An electronic timing device was an obvious thing to try next. How can you patent something that is in the natural evolution of technology?" Daykin shook his head. He said he had spent much of his last year at Ford helping to prepare for the Kearns case, and the experience had caused him to think a lot about the patent system. "I think about all those Ford engineers I worked with developing wiper systems. Dozens of inventors—maybe a hundred—contributed to your intermittent windshield wiper. There were men from Trico, Magnetti Marelli, Rover, Prestolite, Delco, General Motors, Chrysler, and Ford. I don't know who some of them were—nobody does. They were the real inventors of the intermittent windshield wiper, not Kearns."

Prill could be heard in the dining room, setting the table for a family lunch. "Patents were meant to encourage innovation, after all, not static ownership," Daykin says. "Can you imagine where we would be if each one of those engineers had gone after a patent? We'd all still be driving around with two-speed wipers."

Having received the go-ahead from Ford, Kearns began testing his intermittent wiper. He figured that putting it through three million cycles would take six months. He bought an aquarium, installed the wipers in it, filled the tank with a mixture of oil and sawdust to simulate a load on the wiper, and set it over on Phyllis's side of the basement. It was Phyllis's job, when her husband was away, to keep an eye on the tank; occasionally, she would stir its contents

with a cooking spoon. When Kearns came home from Case Western Reserve on weekends, he devoted himself to wiper experiments. On Friday night, sometimes all night, Phyllis would watch the oscilloscope, an EKG-like monitor for measuring electrical impulses, while Bob tried components in different configurations. On Saturday, he would be out in the driveway all day, bent over the Galaxie, making adjustments. He would fill the neighbors in on his progress. A salesman from Motorola or Delco might stop by, with a quote on resistors. On Saturday evening, the whole family gathered in the living room and inked in circuit diagrams, for making printed circuit boards. On Sunday, after church, Bob drove Phyllis and the kids around Detroit, scouting out sites for the Kearns wiper factory. "Dad had picked out jobs for each of us," his son Tim recalls. "My brother Dennis was going to be the company lawyer, I was going to be the chief engineer, and my brother Robert would be the head mechanic." By the late fall of 1963, Phyllis was pregnant again. "How about a girl?" she remembers Bob saying. "We need a computer programmer."

The wipers completed their three-million-four-hundred-thousandth wipe on November 16, 1964. (Kearns had let the wipers run another four hundred thousand cycles for good measure.) He called Ford with the good news, but Ford didn't seem overexcited. His financial situation was becoming dire. His family was large; his income as a doctoral fellow was not, and he was spending a considerable portion of it on wiper components. Also, he needed money to get his patents. Phyllis was supportive—"I thought the sun was never going to set on Robert," she says—but Phyllis's mother had begun to wonder why her son-in-law didn't get a regular job in the auto industry, like so many of his classmates. "Oh, but giving up the rights to his patents would have killed Robert," Phyllis says. "He would have died." Kearns finally took action: "I waited for a rainy day, then I drove over to see Dave Tamm." Tamm was one of six brothers who had expanded the business started by their father, a small tool-and-die shop, into the Tamm Corporation, a midsize manufacturing company that supplied carmakers with various parts and tools—fenders, dashboards, hood ornaments, dies for stamping out hoods. He was the sort of man Kearns imagined himself becoming. Kearns brought Tamm out to the car and showed him the intermittent wiper. "Dave got in the car, drove around awhile, and came back all excited," Kearns recalls. "'This is great! This is great!' he kept saying. He wouldn't give me my car back. He said, 'Here, we'll swap. Take my Cadillac.' So I drove that home, and he took mine." They agreed that Kearns would assign his rights to the intermittent wiper to Tamm, and Tamm would take over the cost of getting the patents. In addition, Tamm would pay Kearns a thousand dollars a month to continue his wiper R. & D., plus royalties when the wiper went into production. Kearns went home that afternoon with his first year's payment, twelve thousand dollars in cash. "Robert came home, got me and the kids into the kitchen, and covered the whole kitchen counter with money," Phyllis says. "That was a great day."

Dick Aitken, Tamm's patent attorney, filed the first patent application for Kearns' intermittent wiper in December of 1964. When it comes to writing patent applications, patent attorneys talk about "staking out the four corners of the invention," and Aitken did an excellent job of staking them as far apart as he could. The first patent was granted in November, 1967. Meanwhile, Tamm had made contact with Ford, and he and Kearns had given a formal presentation to a group of Ford engineers and executives. "Dave bought a new car to make the demonstration with," Kearns says. "And that car was Henry Ford's favorite color—black. It had black everything. Black tires, black wheels, and black leather seats. Dave said, 'Black is what Ford likes? Well, we'll give 'em what they like.' That was how Dave Tamm did things." The demonstration was a hit, and it led to a series of demonstrations to other parts of the Ford organization.

Finally, Roger Shipman, a Ford supervisor, announced to Kearns that he had "won the wiper competition." He told Kearns that his wiper would be used on the 1969 Mercury line. Kearns was given the prototype of a windshield-wiper motor to commemorate the occasion. The other engineers welcomed him aboard Ford's wiper team. Then, according to Kearns, Shipman asked him to show his wiper control to the rest of the team. Wipers were a safety item, Shipman explained, and the law required disclosure of all the engineering before Ford could give Kearns a contract. This sounded reasonable to Kearns, so he explained to the Ford engineers exactly how his intermittent wiper worked. About five months later, Kearns was dismissed. He was told that Ford did not want his wiper system after all—that the other engineers had designed their own. Kearns remembers that one of the engineers taunted him as he was leaving. Then, about six months after the dismissal, Shipman called Kearns, told him his wiper still had a chance for the 1969 model year, and asked him to come in again. "And, just like a lover, I went back again," Kearns says. "Because what else could I do? Ford was my market. Plus I did not really believe at that time that Ford would infringe my patent. I mean, I believed in Ford. I'm a believer."

Thomas Jefferson was the first superintendent of our patent system, and our first patent examiner. Among the

public men of the late eighteenth century, he was by far the best qualified for the job. He was an inventor himself: he invented a moldboard for plows, a swivel chair, a pedometer, a camp stool, and a copying device, among other things. He was interested in inventors, and seems to have understood them.

Another quality that made Jefferson the right person to run the patent system was that he distrusted patents. Patents, being monopolies, were dangerous in a republic conceived in part as an anti-monopoly haven. Starting a patent system was like providing the young economy with enough rope to hang itself. Jefferson was familiar with the havoc that patents had caused in the British economy. In England, in the late sixteenth century, Elizabeth I had discovered that when Parliament refused to give her money she could raise it herself by selling monopoly rights to noblemen. In 1623, to put a stop to that practice, Parliament passed the Statute of Monopolies, which declared monopolies illegal. However, the statute contained an exception for patents: to encourage innovation, Parliament allowed genuine inventors the right to hold limited monopolies on their inventions.

The trouble was that Parliament did not figure out how to determine who was a genuine inventor and what a genuine invention was. It was easy for Elizabeth's successor, James I, and for his son, Charles I, to go on selling monopolies to bogus inventors who could afford to buy them. This was one reason that, in 1649, Parliament chopped off Charles's head.

Jefferson thought he could fix the basic flaw in the British system. His solution was the principle of examination. The principle is that certain innovations have a quality that elevates them to the status of inventions, and thus makes them eligible to be held as private property, while innovations that lack this quality are the common property of humanity. Learned people can, by study and power of reason, determine which inventions deserve a patent and which do not. Examination is the greatest American contribution to the institution of patents, and it has been copied by virtually every industrial nation in the world. Like a lot of ideas associated with the Enlightenment, it sounds a lot better than it works.

Jefferson and his fellow-examiners struggled to come up with a definition for "invention." Jefferson declared that in order to be patentable an invention had to be new and useful, but he found that some new and useful inventions were too frivolous to be worth "the embarrassment of an exclusive patent," as he put it. He did make sure the law stated that a patent could go only to "the true and sole inventor." Of course, when Jefferson used the word "inventor" he had in mind a farmer or a small manufacturer who in the course of harvesting a crop or making a doorknob would discover a shortcut or devise a new tool that would make the job easier or the product better. The idea of an industrial-research laboratory, a place staffed by thousands of inventors working for a single organization, could hardly have occurred to Jefferson.

In 1906, a patent lawyer named Edwin Prindle published a series of articles in the magazine *Engineering* in which he explained to businessmen how they could use patents to restrain trade. "Patents are the best and most effective means of controlling competition," he wrote. "They occasionally give absolute command of the market, enabling their owner to name the price without regard to cost of production. . . . Patents are the only legal form of absolute monopoly." Patent lawyers recommended the use of what are called improvement patents, by which the life of a patent—in the United States, its life is seventeen years—could be extended almost indefinitely. First, one had to get control of a basic patent on a new technology, and the best way of doing that was to organize a trust and buy the patent from the inventor. If no basic patent existed, the trust could simply buy up all the minor patents in the field. Then, every year or two, inventors working for the company could come up with a slightly improved version of the technology and patent it, and the seventeen-year clock would start over. The lawyers suggested hiring large numbers of inventors, to build a fortress of improvement patents around the basic patent and keep competitors far from the company's technology. These inventors would, of course, have to sign contracts surrendering the right to their ideas. While this was not in the spirit of the patent system designed by Jefferson, it was technically legal: the law could not prevent the inventor from assigning his idea, once it had become his private property, to someone else.

The first corporations were essentially large blocks of patents. Western Union grew from Samuel Morse's patents on the telegraph, International Harvester from Cyrus McCormick's patents on the reaper, General Electric from Edison's patents on the light bulb, and A. T. & T. from Bell's patents on the telephone. Independent inventors began to find it difficult to compete with inventors hired by the corporations. A lot of them took jobs in corporate research laboratories—they were willing to exchange the chance of getting rich for the certainty of a regular salary. The ones that remained independent turned to inventing gadgets and toys to survive. Opining on whether or not this is a good

thing is one of the set pieces of technology histories. Some people see the rise of hired inventors as a natural part of the evolution of technology; others see it as a wrong turn.

James B. Conant: "As theory developed in physics and chemistry and penetrated into practice, as the degree of empiricism was reduced in one area after another, the inventor was bound to disappear."

John Kenneth Galbraith: "Technical development has long since become the preserve of the scientist and the engineer. Most of the cheap and simple inventions have, to put it bluntly, been made."

Philo Farnsworth: "We must not lose track of the fact that inventions as such, important inventions, are made by individuals and almost invariably by individuals with very limited means."

Nikola Tesla: "Invention is predominantly individualistic. Everything of prime moment comes from some individual unconnected with any commercial organization."

In 1969, Ford came out with a new, electronic intermittent windshield wiper, the first in the industry. It used a transistor, a resistor, and a capacitor in the same configuration that Kearns had designed. It cost Ford about ten dollars to make, and it sold for thirty-seven dollars. At first, Ford offered the intermittent wiper as a stand-alone option, and it sold slowly. Then Ford packaged it with another gadget—the remote-control side mirror, which was one of Ford's most popular options—and wiper sales took off. In 1974, General Motors began putting the intermittent wiper on its cars, and in 1977 it appeared on Chryslers. Saab, Volvo, Honda, and Mercedes, among others, soon followed. By 1989, Ford alone had sold 20.6 million cars with the intermittent wiper, and made a profit that has been calculated at five hundred and fifty-seven million dollars. Altogether, about thirty million intermittent wipers are sold around the world each year.

Kearns tried to get an explanation from Ford, but he soon discovered that "there's a diode in the line when you talk to Ford—the information only goes one way." His lawyers wrote letters to Ford's legal department, informing it that Ford was infringing Kearns' patents. Eventually, they received a letter back saying that Ford was not infringing Kearns' patents and that, in any case, Kearns' patents were invalid. "I just felt very diminished," Kearns says. "It's like you're a nothing, you're a nut. You don't count. You just don't count."

Kearns wanted Tamm to sue Ford. "As a practical matter, we couldn't sue Ford for patent infringement, because they were one of the family's main sources of business," Tamm said later, of his company. "We needed Ford's good will to keep our business alive."

Several years passed. Kearns got his patent rights back from Tamm. He moved his family to Gaithersburg, Maryland, to take a job with the Bureau of Standards, testing the skid resistance of various kinds of road surfaces. Kearns was in his mid-forties now. On July 8, 1976, Dennis Kearns stopped in at a Mercedes service center, bought a wiper control, and brought it home to his father. Kearns went down to the basement and took it apart. "And I saw capacitor, resistor, transistor—it was all there," he recalls. "Even the great Mercedes had infringed my patents." He wandered distractedly out of his home, hitchhiked to Washington, and got on a Greyhound headed South. Somehow, he had become convinced that Richard Nixon wanted him to go to Australia, to build an electric car. "Then I realized I'd never spent any time with my kids. I'd been so consumed with my work on the wiper that I'd never even shown them how to fly a kite. So I went and bought these two kites. When the police picked me up a few days later, I was in Tennessee, in a park, holding these two kites."

In 1978, Kearns filed suit against Ford for patent infringement. Eventually, he added other car companies to the suit, but Ford was the principal focus of his hatred. "I just had an overwhelming feeling that what Ford had done was wrong," Kearns says. "It was unjust, and it was illegal." In his suit he asked for three hundred and fifty million dollars in lost profits, multiplied by three—the maximum penalty for willful infringement—plus interest and costs, for a total of \$1.6 billion.

Henry Ford loathed patents. One of Ford's lawyers once boasted, "There is no power on earth, outside of the Supreme Court, which can make Henry Ford sign a license agreement or pay a royalty." Ford thought that the cars and do nothing," and because patents afford "opportunities for little minds, directed by others more cunning, to usurp the gains of genuine inventors—for pettifoggers to gain a strategic advantage over honest men, and, under a smug protest of righteousness, work up a hold-up game in the most approved fashion."

Ford's opinion of the patent system was galvanized by the Selden Patent. In 1879, George B. Selden, a resident of

Rochester, had filed a patent application in which he claimed to have invented the automobile. In his application Selden described a machine with a gasoline-driven, combustion-type engine that sat in front of the driver, a clutch, a foot brake, a drive shaft, and front-wheel drive. Selden had never built such an automobile. He wasn't an especially skilled mechanic. He was a patent lawyer, in fact. Selden believed that in the not too distant future people were going to be riding around in motorized cars of the type he envisioned, and he wanted to have a monopoly on them.

For the next sixteen years, Selden kept his application pending in the Patent Office, using his professional skills to draw the process out, amending the application now and then, waiting for the men who were actually building automobiles to produce one that was marketable. In 1895, he decided that the moment had come, and he caused himself to receive Patent No. 549,160. An East Coast auto manufacturer named Albert Pope, who was backed by a syndicate of investors, made a royalty agreement with Selden and acquired the rights to his patent. In keeping with business practices of the day, Pope and his backers formed a trust, and called it the Association of Licensed Automobile Manufacturers. The A.L.A.M. declared that any car manufacturer that did not get a license from the trust and pay a royalty of one and a quarter per cent of the sales price of each car it sold would be infringing the Selden Patent and would be sued. By 1905, eighty-five per cent of the auto industry was under license to the A.L.A.M. Selden was promoted as the inventor of the automobile.

In 1903, Henry Ford, then an unknown engineer from Detroit, had formed the Ford Motor Company. He applied for a license from the A.L.A.M. but was judged to be merely a fly-by-night assembler of parts, not a bona-fide automobile manufacturer, and was turned down. Ford decided to make and sell his cars anyway. He announced that he had no intention of paying his tithes to the Selden Patent, that the patent was unjust, and that the machine Selden described could never have worked in the first place. The A.L.A.M. wasted no time in suing Ford for patent infringement. The drama of Ford, a barely educated, plainspoken Midwesterner, defying the entire automobile industry, as well as some of the most powerful interests on Wall Street, was irresistible to the public, and it made Ford famous.

Ford did not shrink from the attention. He expanded his position into a general attack on the patent system. "I believe absolutely in free competition, and in abolishing patents, which kill competition," he said. In "Monopoly on Wheels," a 1961 book about the Selden case, William Greenleaf writes, "By endowing his own struggle for a place in the sun with a luminous appeal to fundamental principles, [Ford] translated a wearisome patent suit into one man's struggle for the right to enjoy unhampered opportunity. This was a potent theme in a day when the politics of

Progressivism was sweeping the land and the movement for social democracy was still nourished by the hopes and ambitions of the small businessman." In 1911, Ford won the Selden case on appeal, breaking the patent, destroying the A.L.A.M., propelling himself into the dominant position in the auto industry, and insuring that future generations of Americans would regard Henry Ford, not George Selden, as the inventor of the automobile.

For the rest of his life, Ford virtually ignored the patent system. "As a rule Ford adamantly refused to adopt parts and components patented by others," Greenleaf writes. "Instead, he ordered his engineers to evolve their own designs." Other carmakers designed their own parts, too. This gave the young automobile industry the unique advantage of having free access to technology as soon as it was invented. Ford was a kind of Promethean figure, taking a revolutionary new technology out of the hands of the elite and giving it directly to the people. This was not necessarily the best thing for those who invented the technology—the designers of carburetors, sparkplugs, radiators, rubber tires, power steering, overdrive, the convertible top, rack-and-pinion steering, the rear-window defroster, cruise control, air bags, and intermittent windshield wipers. However, Ford, in defense of his position on patents, often pointed out that his own invention—a light, cheap, durable car that could be mass-produced, like matches or pins, at a time when the industry was committed to the automobile as a luxury product—would have been impossible if he had been forced to pay for the inventions of other men. "I invented nothing new," he once declared. "I simply assembled into a car the discoveries of other men behind whom were centuries of work, and the discoveries of still other men who preceded them. Had I worked fifty or even ten or even five years before I would have failed. So it is with every new thing. Progress happens when all the factors that make for it are ready, and then it is inevitable. To teach that a comparatively few men are responsible for the great forward steps of mankind is the worst sort of nonsense."

When Kearns filed suit against the Ford Motor Company, in 1978, Ford did what corporations usually do in patent cases: it began stalling, in the hope that Kearns would lose heart or run out of money. Patent cases are richly endowed with opportunities for stalling. The heart of Ford's defense was that Kearns' patents were invalid, because according to the Doctrine of Nonobviousness his intermittent wiper was not an invention at all.

The Doctrine of Nonobviousness is the current solution to the problem that confounded Jefferson: how to define invention. Over the last two centuries, many people have tried to define it. Learned Hand, whom patent lawyers revere as one of the great patent judges of all time, wrote that the definition of invention was "as fugitive, impalpable, wayward, and vague a phantom as exists in the whole paraphernalia of legal concepts." The 1929 edition of "Walker on Patents," the standard patent textbook, stated, "What constitutes invention is a very perplexing question." In 1937, this was revised to read "An invention is the result of an inventive act." An inventive act was generally considered to be a flash of insight that comes when the inventor is not striving for it, as in the case of Nikola Tesla, who was strolling through a park in Budapest and reciting some lines from Goethe when the concept of alternating current suddenly came into his mind and he diagrammed it in the dust with a stick; or of Edwin Land, who was taking photographs of his three-year-old daughter one morning in Sante Fe and, when she asked him why the pictures couldn't be seen immediately, conceived the Polaroid process. The invention story was an important part of the invention itself. Most judges are not scientists. The average judge's view of invention tends to have more to do with Coleridge's theories about the imagination than with the judge's experience inside an engineering lab. As the twentieth century got older, and the gap between the liberal arts and the applied sciences got larger, the problem got worse. The last straw came in 1941, when the Supreme Court issued its "flash of creative genius" decision, in *Cuno Engineering Corporation v. Automatic Devices Corporation*. The invention in question was the first cordless automobile cigarette lighter. The Court decided that it was not patentable, because it lacked the characteristics of an invention. Justice William O. Douglas, writing for the majority, stated that "the new device, however useful it may be, must reveal the flash of creative genius, not merely the skill of the calling."

Patent professionals began to feel that the legal view of invention was inconsistent with the way things actually got made, and that a more scientific, less romantic definition of invention was needed. A panel of patent experts produced the Doctrine of Nonobviousness, which became law in the Patent Act of 1952. The doctrine states that a patentable invention must be nonobvious to a person of ordinary skill in the art at the time the invention is made. While this definition is generally believed to be an improvement over the flash of genius, it isn't perfect: there is a how-many-angels-can-dance-on-the-head-of-a-pin aspect to nonobviousness which makes it possible to argue cases almost indefinitely, and often the side with more legal resources wins.

The lawsuit against Ford became Kearns' life. He put every penny he had into it. He was driven by an uncynical, almost spiritual belief in justice and an equally pure hatred of the automobile industry. At a hearing in 1980, Kearns said, "I want you to understand that I am wearing a little badge here, and that badge says that I am an inventor, and it says I am a net contributor to society. And it is like maybe you can't see the badge, and these other gentlemen can't see the badge, and I don't think anybody is going to be able to see the badge until my trial is finished in this courtroom and I will find out whether I am wearing the badge or not." After his breakdown over the Mercedes wiper, he was unable to work. He collected disability from his employer, the Bureau of Standards, and he and his son Tim assembled and sold digital-difference-to-analog converters out of the basement of their home in Catheersburg. Tim says, "I guess you could say the lawsuit has ruined my father's life, but I don't choose to look at it that way. It is his life. If there's a tragic aspect to it, it is that my father has never invented anything else. It would be interesting to know how many people's lives have been saved by the intermittent wiper, and how many more lives could have been saved by his next invention. We'll never know, because he couldn't let this one thing go. But he just couldn't."

Phyllis Kearns stuck it out as long as she could. "We'd gear ourselves up for a hearing in ninety days," she says. "And then, on the eighty-ninth day, the phone would ring, and I would hear Bob screaming and yelling, and it would turn out that Ford had dumped a bunch of new documents on us, and the hearing would be postponed. Now, I had never heard shouting in the house before. My parents had never shouted. It got to the point where I just couldn't take it." Phyllis left her husband in 1980. "Robert expected me to have the same focus he did, and I just didn't have it."

From time to time, when I felt the concept of what a patent was slipping away, I would get in touch with Jerry Lemelson. Lemelson has received over five hundred patents—more than any other independent inventor alive. He inherited the title two years ago, upon the death of Edwin Land, who had five hundred and thirty-three. If Lemelson continues to average twenty patents a year—a pace he has sustained for three decades—he will catch Edison, who is the Hank Aaron of patents, with a thousand and ninety-three, by the time he is ninety-seven. Lemelson is sixty-nine now. He is a compact fellow, with a bald head and a comical New York squawk. He talks quickly. Behind each of his inventions is a story about how it came to him, and Lemelson tells it in the manner of a standup comedian, except that

Some people see life in terms of a photograph or a song or a short story; Lemelson sees it in terms of a patent. He thinks in patents, and sometimes he dreams in patents. Lemelson holds patents on machine-vision systems, an industrial robot, a fax machine, a copy machine, a tape-recorder drive, and a camcorder. It's hard to think of a technology he has not patented. Once, when I was talking to him on a cordless telephone, we had one of those electronic drifts which such phones are subject to. "Damn," Lemelson said. "I invented this thing, too."

When Lemelson invents, he first selects a particular field—say, microsurgery, which he is currently looking into. (He has a patent on an electronically controlled tourniquet.) He may hire a patent searcher to obtain copies of all the patents in that art or he may go down to the Patent Office and read the patents himself. He tries to imagine the path along which the art will develop, and to construct a patent application that sits squarely in the middle of it, so that even if the invention is never manufactured—and only one in every seven of Lemelson's inventions is actually made—his patent will be like a tollgate on a highway, at which all travellers must stop. Lemelson's great advantage over other inventors is that he writes all his patent applications himself. Though in theory a patent application is merely a rendering of the invention in language, in reality it is a kind of invention itself. "It takes great skill to craft a patent application," he says. "You have to stake the four corners of your invention broadly enough so that they give you maximum protection. You tend to avoid adjectives. You don't say 'transistor' when you can use 'controllable electronic valve'—that sort of thing. Of course, if you write too broadly you may invalidate your claim, because it will read on the prior art. But if you write too narrowly you may miss the thing about the technology that turns out to be truly valuable."

Last year, thanks to deals with Sony, Sanyo, Siemens, and others, Lemelson reportedly earned two hundred million dollars. He has filed suit against Motorola, Kodak, and Apple. Several years ago, he moved his residence from New Jersey to Nevada. "I don't mind saying that the reason for it is that it's a lot easier to litigate from out there," he says. "When I litigate in New Jersey or New York, it takes five to ten years to get to trial. Out in Nevada, it only takes a year."

Lemelson is a corporation's worst nightmare. To his critics he is merely an inventor of paper patents, who is exploiting the power that the patent system gives the independent inventor. As Lemelson sees it, though, litigation is the only way an independent inventor can protect his rights. "Occasionally, it is possible to earn money selling licenses—it's a lot easier these days than it used to be," he says. "But the simple fact is that most manufacturers would rather infringe a patent than pay a license. Have you heard of N.I.H.—the Not Invented Here syndrome? Well, it's a disease that American industry in general suffers from. The attitude is 'If we didn't invent it, we're not interested.' Or 'If it's such a good invention, how come we didn't think of it?' Or 'Hey, we have all these thousands of engineers on our payroll—why should we have to pay someone else for an idea? It is virtually impossible for an independent inventor to invent for an American U.S. corporation. They're just not interested in inventions that they don't make."

Lifford Sadler is an executive in the patent department of Ford. Sadler, known to his colleagues as Kip, is a lean, likable fellow with silver hair and a droll sense of humor. He listens to questions with his head to one side, his fingers making a lawyerly tent in his lap. "Electronics was simply the way the world was going," he told me recently. "I would say it's to Dr. Kearns' credit that he perceived this. But for Dr. Kearns to say he invented the electronic intermittent windshield wiper is, we feel, sadly unrealistic. Even in 1963, the resistor-capacitor timing device was a standard piece of engineering—it was sophomore-in-college stuff."

Sadler stretched his long legs out in front of him, rocked back in his chair, and sighed. "I think Dr. Kearns honestly believed he was part of the Ford design team," he said. "But Ford never saw it that way. As far as the engineers were concerned, Kearns was a sort of pest. He was always stopping by the lab and saying, 'Hey, what's going on? Need any help?'—that sort of thing." Sadler said that under no circumstances had Ford copied Kearns' design. "As for infringement, we had our lawyers examine Kearns' patents, and in their view the patents were invalid." He added that Kearns' great ambition—to be a supplier of windshield wipers to Ford—was misguided. "Ford has more than two thousand suppliers," he said. "In no case that I can think of has an independent inventor who has no manufacturing track record ever become a supplier to the auto industry. It just doesn't happen."

The Ford case came to trial in January, 1990—twelve years after it was filed. Most of Kearns' patents had expired by then. The waters of progress had closed over his head. Judge Avern Cohn divided the trial into two parts: one to determine whether Kearns' patents were valid and infringed, and, if they were, one to determine how much Ford should

pay for infringing them.

Marty Adelman, the Wayne State law professor, was an expert witness in the Ford case. He told me that once Kearns got into the courtroom the odds of his winning shifted dramatically in his favor. "The inventor has a piece of paper with a big blue ribbon on it that issues from the Patent Office, and that he can wave around in front of the jury, and the jury tends to say, 'Oh, he has a patent, he must be right,'" Adelman said. "The corporation is placed in the very formidable position of trying to convince the jury that the Patent Office is wrong.

"The inventor has a story to tell. The cardinal rule for any patent attorney representing an independent inventor is to tell the invention story. You know—how he got the idea. It comes to him in a dream, or when he's in the shower or mowing the lawn. In Kearns' case, the guy gets hit in the eye with a champagne cork on his wedding night, he starts thinking about how the eye works, and ends up inventing a wiper that works like an eyelid. A classic invention story. That's not how things get invented in the lab. It's the heroic theory of invention versus the social theory of invention, and in front of a jury the former is going to win every time. The judge can lecture the jury till he's blue in the face about the Doctrine of Nonobviousness, but the flash of genius is what people want to hear."

Adelman thought for a moment and added, "Of course, in the Kearns case the really scary thing is that Kearns is probably crazy. I mean, any rational holdup artist would have taken the money."

The first trial lasted three weeks, and the jury deliberated for another week. It found that Kearns' patents were valid and that Ford had infringed them. Ford, concerned about the size of the award that a jury in Wayne County might give Kearns, offered to settle the case for thirty million dollars. Kearns, against everyone's advice, turned the money down. "To accept money from Ford would have been like admitting it was O.K. for them to do what they did," he said.

So there was a second trial, and the second trial awarded Kearns \$5.2 million, or about thirty cents a wiper plus interest. Kearns wasn't there for the verdict, having left the proceedings in protest two weeks earlier. Without even telling his family, Kearns had returned to GaitHERSBURG ("inventor in wiper lawsuit disappears" was the headline in the *Detroit Free Press*) got his camping equipment, pitched a tent in Little Bennett Regional Park, in West Virginia, and was living off pork and beans. Meanwhile, Judge Cohn, his patience wearing thin, suggested that if Kearns did not reappear and accept the money he might begin proceedings to determine whether or not Kearns was mentally competent. Finally, Kearns and Ford settled for \$10.2 million.

On June 10, 1992, the night before the Chrysler verdict was announced, Kearns went out on the town with his family: Dennis; Tim; Tim's girlfriend, Francine; Maureen; Maureen's fiancé, Paul; and Kathy. Wherever they went in downtown Detroit, bartenders and waiters came up and wished them good luck. Kearns' spirits were high. He was confident that he had persuaded the jury to award him a sum of money large enough to hurt Chrysler seriously—he believed that the sum would be around forty million—and to send a message to corporations everywhere that patent infringement does not pay. "I believe I laid it on 'em pretty straight," he said.

The Kearnses ate dinner at the Pontchartrain Hotel. The possibility that the family might become extraordinarily wealthy the following morning wasn't discussed. The money was like a guest at the table to whom no one had been introduced. People talked about it obliquely. Everyone chose a number and put twenty dollars in a pool. After dinner was over and Kearns had left, Kathy said, "The main thing is that Dad seems happy." She said no one was under the illusion that the next day would be the end of anything. "I remember during the Ford case my father's girlfriend Jean used to say, 'Well, soon it will all be over, and he'll be mine.' Finally, I had to say, 'Jean, are you crazy? Don't you get it? This is never going to end.'"

The next morning, the courtroom began filling up at eight-thirty. Lou Mihaly, Kearns' college roommate, came, with his wife, Pinkie. The attendant from the Fort Washington Garage, where Kearns parked his car, came. Phyllis was there. She had driven up from Maryland the night before, with her son Robert. That night, Kathy had said to me, "It's obvious that Mom still cares for Dad. I mean, you can see it in the way she is just thrilled when he comes up behind her and puts his hands on her shoulders. But she just can't live with the lawsuit. It's too crazy." Now Phyllis said she was trying not to be nervous, by focussing on the fact that the jury had already made its decision, and nothing she felt or did could change it. She clenched her hands into fists and said, "Oh, I want willful infringement so badly."

Shortly after nine, the jury came in. Judge Cohn asked his clerk, Judy Cassady, if she would read the verdict. Ms. Cassady read, "Did you find that Dr. Kearns proved by clear and convincing evidence that Chrysler acted willfully when it infringed any of Dr. Kearns' patents? Answer: no." Phyllis gasped softly. Ms. Cassady went on, "What amount do you find is a reasonable royalty on a per-unit basis for the total of twelve million five hundred and sixty-four

thousand and one hundred and seven units? Answer: ninety cents per unit."

In the silence that followed, one could almost hear people multiplying 12.5 million by .9. It comes to about eleven and a half million dollars. With the years of interest, the total will probably be around twenty million.

Judge Cohn thanked the jurors for their efforts and dismissed them. Then he said goodbye to the lawyers. "I'm sure I will see you here again," he said in the direction of Kearns.

The Kearns family moved out into the corridor. The garage attendant reached for Kearns' hand, and Kearns

accepted his congratulations somewhat awkwardly. Reporters encircled him. Kearns looked grim. "I would have to say I'm disappointed," he said. The family, standing around, seemed unsure of what to do. It wasn't clear whether anyone felt like whooping it up over eleven and a half million dollars; it was perfectly clear that it would be considered bad form if anyone did. They talked about who had won the pool. Eventually, Kearns said he had to get over to the office, and he moved toward the elevators, with a crowd of family and reporters trailing him. Down in the lobby, a woman

pointed at the entourage and said, "Who's that?"

One of the guards said, "That's the man who invented the intermittent windshield wiper."

The family walked down West Lafayette Street. In the elevator, on the way up to Kearns' office, on the fourteenth floor, no one spoke. Kearns stared at the ceiling. "I just don't understand it," he said finally, to no one in particular. "I just don't understand why they didn't hold for willfulness."

The family spilled out onto the fourteenth floor. The former tenants had recently left, taking even the wall-to-wall carpeting with them, so we walked over slabs of epoxy-encrusted concrete. The view from the windows was of

downtown Detroit—empty hotels and department stores, abandoned machine shops. In an unused room sat a disembodied windshield-and-dashboard assembly from a 1965 Dodge Dart, with a windshield-wiper system rigged up to it, which Kearns had used in the trial.

The family went into the Kearns offices. It was only ten-thirty—too early to go out to lunch. Phyllis suggested that she make some coffee. Her ex-husband seemed to be slipping away into one of his hopeless moods. "The moral is that unlawful conduct does pay," he said. "I don't see how any of us could go home to our children and say it does not." He sat at his desk. He looked like a man outdoors in very cold weather who was concentrating hard on staying warm. ?

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