

TIME

THE INVENTION ISSUE

The Edible Campfire
 Mind-Reading Computers
 The Invisibility Cloak
 The Hummingbird Drone
 A Twitter-Based Hedge Fund
 The Artificial Leaf
 The 10,000-Year Clock
 ... and 43 more of the
 year's best innovations

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 What Steve Jobs
 couldn't teach us
 about inventing
 By Lev Grossman



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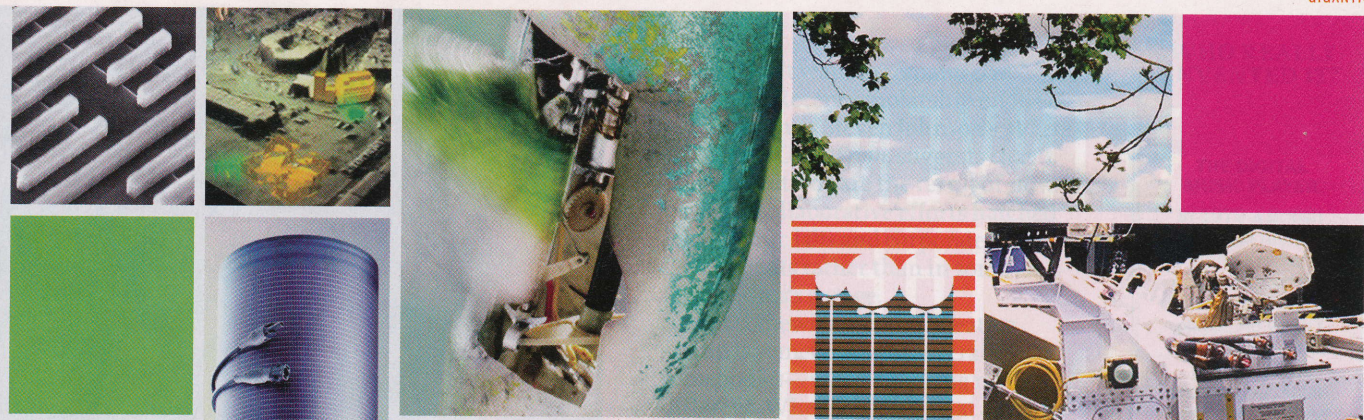
HOW
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 OSCARS
 By Joel Stein

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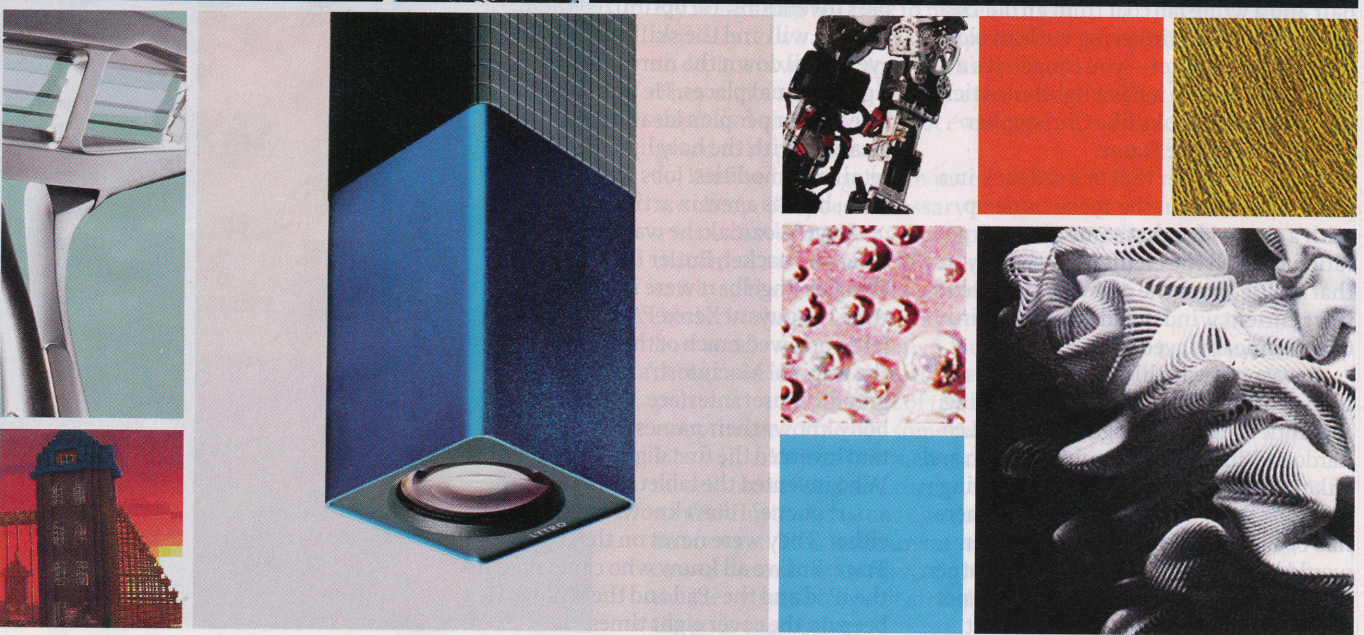
TINY

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THE 50 BEST INVENTIONS

The year's most inspired ideas, innovations and revolutions, from the microscopic to the stratospheric



REINVENTING THE INVENTOR

In the age of Steve Jobs, it's all about perfecting the final product. Nobody remembers the guy who had the idea in the first place

BY LEV GROSSMAN

TELL ME WHAT YOU THINK OF when you read the word *inventor*. (If Professor Jack Gallant of Berkeley, Calif., were here and you were in his fMRI machine, he could read your mind and tell you himself. But more of him anon.) I'll tell you what I think of: a little guy with white hair and a white lab coat from an old Disney cartoon. He's tinkering with an old-fashioned computer—you can tell it's a computer because it has a lightbulb sticking out of it. He looks like Christopher Lloyd in *Back to the Future*.

I think of either that or a sad sack in a plaid blazer who in the 1960s came up with a clever idea that some giant corporation took all the credit for—the guy in that movie about the guy who invented intermittent windshield wipers. I think Greg Kinnear played him.

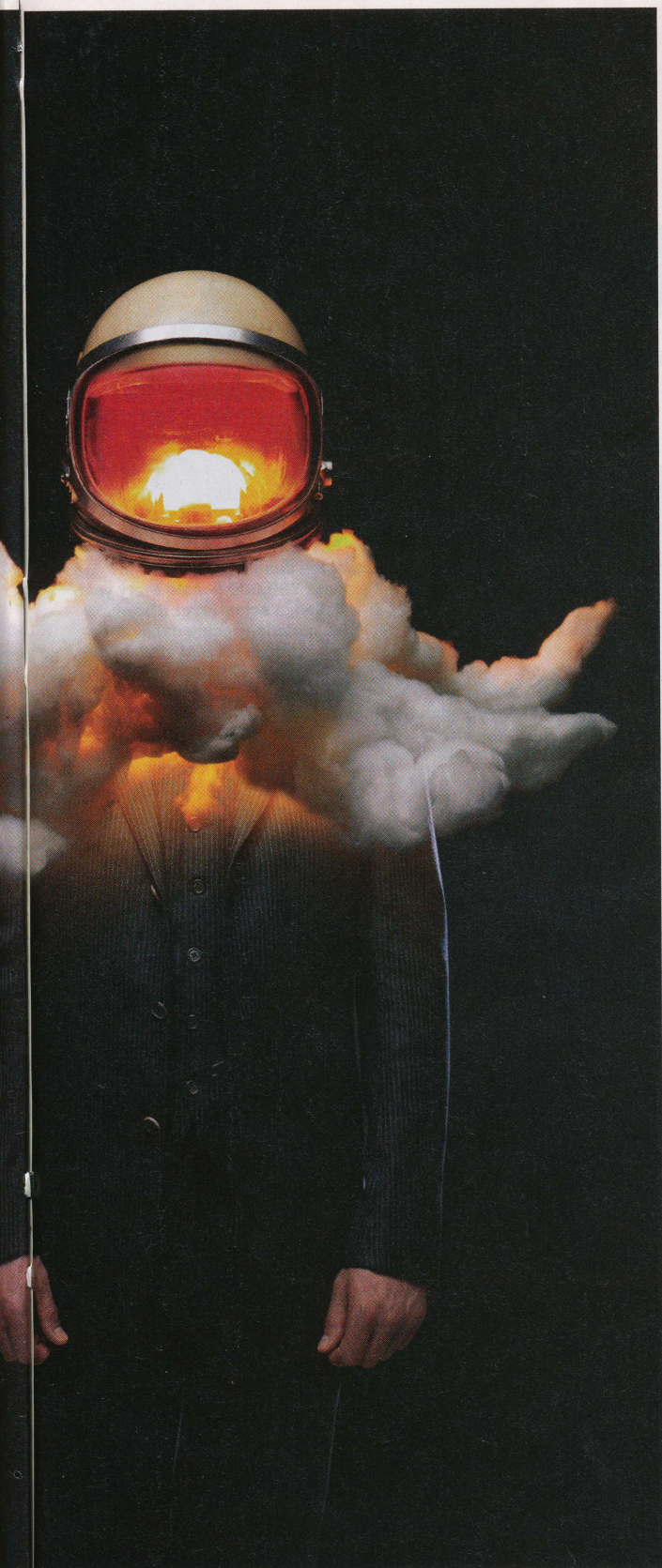
It wasn't always like this. Inventors used to be cool. They used to be towering, romantic figures, rogue geniuses like Leonardo da Vinci and Benjamin Franklin and Nikola Tesla, who called down lightning and stole the holy fire of the gods. If there had been movies back then, these men would have been played by Taylor Lautner. But all that has changed. Now they're not even played by George Clooney. What

happened? How did inventors lose their divine aura? When did scientific innovation stop being sexy? I place the blame, reluctantly, on the late, great Steve Jobs.

That's to take nothing away from Jobs, a true genius who revolutionized at least four industries. But an inventor he was not. What Jobs did was perfect other people's inventions. He optimized them. He had the will and the skill and the caliper eye to nail down the numbers to the far-right decimal places. He buffed and polished other people's ideas until they gleamed with the holy light of irresistible retail commodities. Jobs wasn't an idea man; he was a remix artist.

Steve Wozniak: he was an inventor. Charles Thacker, Butler Lampson and Douglas Engelbart were inventors—they were the guys at Xerox PARC from whom Jobs borrowed much of the look and feel of the original Macintosh's revolutionary graphical user interface. But hardly anybody knows their names. What poor bastard invented the first digital music player? Who invented the tablet computer? The smart phone? I don't know. You don't know either. They were never on the cover of *TIME*. But we all know who came up with the iPod and the iPad and the iPhone. He's been on the cover eight times.





You don't want to romanticize inventors. Recent scholarship on innovation, such as Steven Johnson's *Where Good Ideas Come From*, suggests that most inventions are the result of slow-burning collaborative efforts hatched in academic labs and corporate R&D departments rather than in some isolated genius's garage.

But somewhere in that creative scrum is somebody—or several somebodies—who's thinking really different. When Jobs looked at a smart phone, what he saw was a better smart phone, and that's all well and good. But you have to think truly different(ly) to look at sour milk and see a new textile, which is what the German biologist and fashion designer Anke Domaske did. Or to use electricity to put out fires rather than start them, as Harvard researcher Ludovico Cademartiri does. What if you could refocus a picture after you took it? Lytro's Light Field camera can. What if you could use an fMRI machine to capture a picture straight from someone's imagination? It's been done. Gallant did it.

Who looks at an ordinary lightbulb and sees a wireless data transmitter that could replace wi-fi? Who looks at a giant incinerator and sees an even more giant ski slope? Those aren't ordinary thoughts. They're not even different—they're downright weird. Jobs' genius lay in figuring out how to make things actually do what they were supposed to do, but inventors do something else. They make things do what they're not supposed to do—what's not even supposed to be possible.

We live in an age when inventors are cheap. They're a necessary evil, a manufacturing by-product to be discarded as soon as their patents are safely in the hands of the optimizers. But let's take a second to remember how much we need them. A lot of the things you'll see in this feature aren't pretty; it's a rough draft of the future, unoptimized. One day someone like Jobs will take it as raw material to be tamed and refined and turned into something that will change the world. But not yet. This is the uncut, unprocessed ore of invention, straight from the idea guys, who got it straight from the gods themselves.

WHO REALLY INVENTED IT?

THE DIGITAL MUSIC PLAYER

In 1979 a British engineer named Kane Kramer demonstrated the IXI, a digital audio player. He wasn't able to turn it into a commercial product, but Apple has acknowledged the importance of Kramer's work.

THE SMART PHONE

Engineers at IBM developed the first smart phone, called Simon, which was demonstrated in 1992. Weighing in at 680 g, it had a touchscreen and could send e-mails and even faxes (!). Those were the days.

THE TABLET COMPUTER

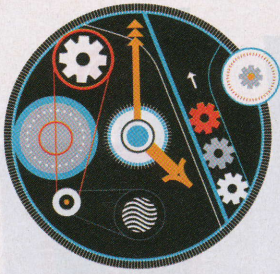
In 1968 computing pioneer Alan Kay imagined the Dynabook, a remarkably iPad-like tablet-style PC designed for children. (You can spot a similar device in Stanley Kubrick's 1968 film *2001*.)

DIGITAL ANIMATION

In 1965 Charles Csuri, a painter and member of the art faculty at Ohio State, began using an IBM mainframe to morph and animate his drawings, including a widely exhibited film of a hummingbird.

PHOTOGRAPH BY PHILLIP TOLEDANO FOR TIME

Photograph by Jamie Chung for TIME Photograph by Phillip Toledano

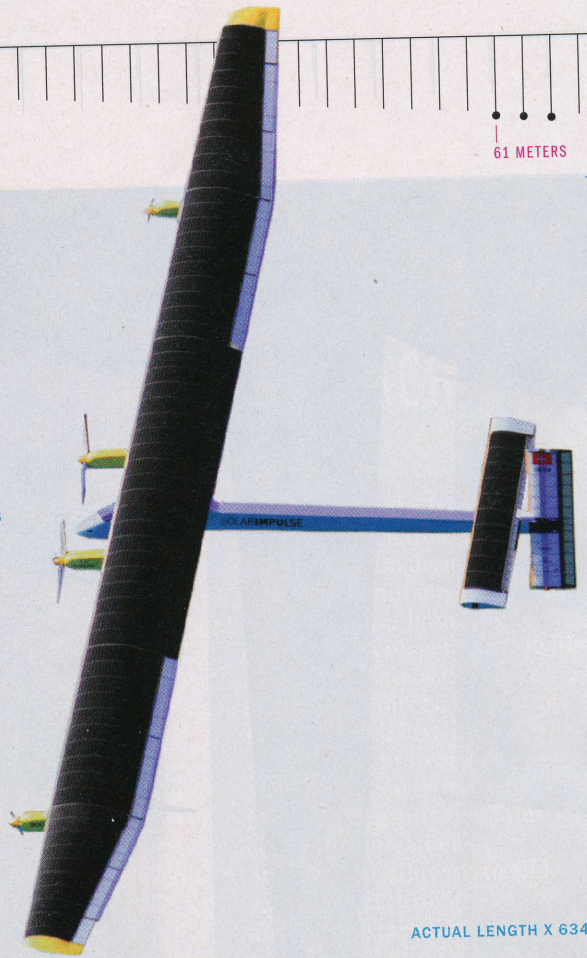


THE 10,000-YEAR CLOCK

61 METERS | Conceived as a monument to long-term thinking, this enormous timepiece—brainchild of inventor Danny Hillis and funded by Amazon CEO Jeff Bezos—will be 61 m tall and housed in a remote West Texas cave. Built primarily out of steel, titanium and ceramic ball bearings, the clock will play a unique melody once each day and when prompted by visitors to the site. Yet the inevitable question on everyone's mind is, can a clock—especially one so complex—endure for 10,000 years? Only time will tell.

THE SOLAR AIRPLANE

63.4 METERS (WINGSPAN) | The Solar Impulse airplane has a wingspan only a meter shorter than that of a Boeing 747, but it weighs as little as a family car. Designed by a team of engineers led by André Borschberg and Bertrand Piccard at Switzerland's Ecole Polytechnique Fédérale de Lausanne, the single-seat airplane has four electric motors powered by 11,600 solar cells, which can store energy for later use. The Solar Impulse has flown continuously for more than 24 hours; a second model that will be able to fly around the world is in the works.



THE BAGUETTE VENDING MACHINE

73.2 METERS (120 BAGUETTES LAID END TO END) | Americans have their late-night slices of pizza, and now, thanks to an entrepreneurial French baker, Parisians will have their late-night baguettes. For 1 euro, or about \$1.35, hungry night owls in Paris and the town of Hombourg-Haut in northeastern France can get a nice warm baguette well after the country's roughly 33,000 bakeries have closed for the night. Jean-Louis Hecht told the Associated Press he got the idea from living above the bakery he owns and having customers knocking on his door at all hours, seeking a carb fix to tide them over until the morning. His machines can hold up to 120 precooked baguettes at a time. In his first month he sold 1,600, and in July, his machines moved 4,500.



Photograph by Jamie Chung for TIME